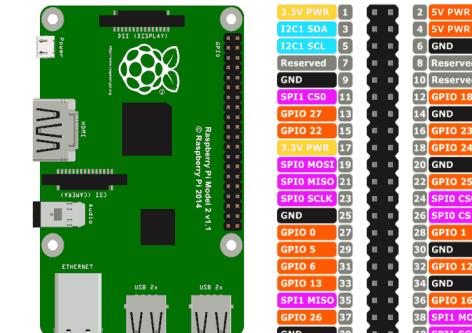
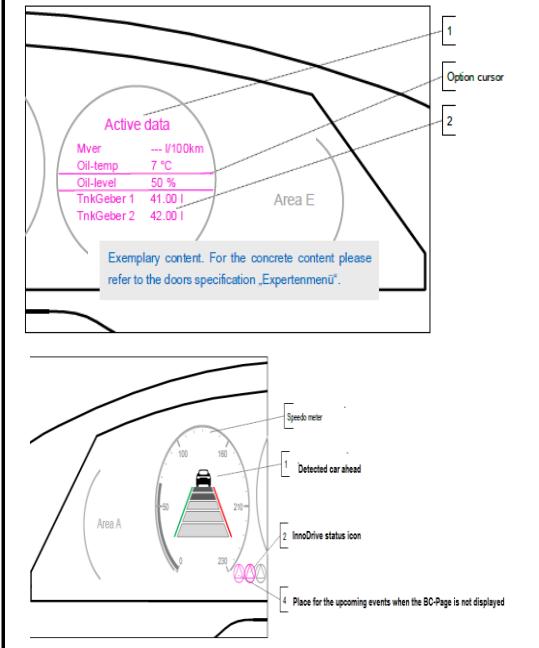


Domain	Module	Keywords	P	Stand for	Definition	How it work (English)	How it work (Vietnamese)	Image																																																																																
2.AVN	Power Mode	BUB	P1	Backup Battery	Backup Battery	<p>There are two types of BUB:</p> <ul style="list-style-type: none"> - Vehicle BUB: if primary battery is failure, vehicle can switch to BUB for some important and main funtions - Telematics unit BUB: In normal conditions, telematics unit uses vehicle power for its power. But incase of failure and maitaining the collision call, it switch to a build-in BUB. BUB is rechargeable from vehicle power 																																																																																		
4.Telematics	Common	GPIO	P1	General Purpose I/O	<p>A general-purpose input/output (GPIO) is an uncommitted digital signal pin on an integrated circuit or electronic circuit board whose behavior—including whether it acts as input or output—is controllable by the user at run time.</p> <p>GPIOs have no predefined purpose and are unused by default. If used, the purpose and behavior of a GPIO is defined and implemented by the designer of higher assembly-level circuitry: the circuit board designer in the case of integrated circuit GPIOs, or system integrator in the case of board-level GPIOs.</p>	N/A	<p>GPIO là viết tắt General Purpose Input Output (Cổng đầu vào và đầu ra với mục đích cơ bản) thực tế nó là các chân đầu ra, đầu vào đa chức năng. Nhìn vào cấu trúc bất kì của vi điều khiển nào chúng ta dễ dàng nhận thấy các hàng chân của vi điều khiển, chúng có chức năng kiểm soát và giao tiếp với các thiết bị bên ngoài</p>	 <table border="1"> <tr><td>3.3V PWR</td><td>1</td><td>2</td><td>SV PWR</td></tr> <tr><td>I2C1 SDA</td><td>3</td><td>4</td><td>SV PWR</td></tr> <tr><td>I2C1 SCL</td><td>5</td><td>6</td><td>GND</td></tr> <tr><td>Reserved</td><td>7</td><td>8</td><td>Reserved</td></tr> <tr><td>GND</td><td>9</td><td>10</td><td>Reserved</td></tr> <tr><td>SPI1 CS0</td><td>11</td><td>13</td><td>GPIO 18</td></tr> <tr><td>GPIO 27</td><td>13</td><td>14</td><td>GND</td></tr> <tr><td>GPIO 22</td><td>15</td><td>16</td><td>GPIO 23</td></tr> <tr><td>3.3V PWR</td><td>17</td><td>18</td><td>GPIO 24</td></tr> <tr><td>SPI0 MOSI</td><td>19</td><td>20</td><td>GND</td></tr> <tr><td>SPI0 MISO</td><td>21</td><td>22</td><td>GPIO 25</td></tr> <tr><td>SPI0 SCLK</td><td>23</td><td>24</td><td>SPI0 CS0</td></tr> <tr><td>GND</td><td>25</td><td>26</td><td>SPI0 CS1</td></tr> <tr><td>GPIO 0</td><td>27</td><td>28</td><td>GPIO 1</td></tr> <tr><td>GPIO 5</td><td>29</td><td>30</td><td>GND</td></tr> <tr><td>GPIO 6</td><td>31</td><td>32</td><td>GPIO 12</td></tr> <tr><td>GPIO 13</td><td>33</td><td>34</td><td>GND</td></tr> <tr><td>SPI1 MISO</td><td>35</td><td>36</td><td>GPIO 16</td></tr> <tr><td>GPIO 26</td><td>37</td><td>38</td><td>SPI1 MOSI</td></tr> <tr><td>GND</td><td>39</td><td>40</td><td>SPI1 SCLK</td></tr> </table>	3.3V PWR	1	2	SV PWR	I2C1 SDA	3	4	SV PWR	I2C1 SCL	5	6	GND	Reserved	7	8	Reserved	GND	9	10	Reserved	SPI1 CS0	11	13	GPIO 18	GPIO 27	13	14	GND	GPIO 22	15	16	GPIO 23	3.3V PWR	17	18	GPIO 24	SPI0 MOSI	19	20	GND	SPI0 MISO	21	22	GPIO 25	SPI0 SCLK	23	24	SPI0 CS0	GND	25	26	SPI0 CS1	GPIO 0	27	28	GPIO 1	GPIO 5	29	30	GND	GPIO 6	31	32	GPIO 12	GPIO 13	33	34	GND	SPI1 MISO	35	36	GPIO 16	GPIO 26	37	38	SPI1 MOSI	GND	39	40	SPI1 SCLK
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2.AVN	Power Mode	GPIO	P2		<p>General-purpose input/output (GPIO) is a generic pin on an integrated circuit or computer board whose behavior—including whether it is an input or output pin—is controllable by the user at run time.</p> <p>GPIO pins have no predefined purpose, and go unused by default.^{[1][2]} The idea is that sometimes a system integrator who is building a full system might need a handful of additional digital control lines—and having these available from a chip avoids having to arrange additional circuitry to provide them. For example, the Realtek ALC260 chips (audio codec) have 8 GPIO pins, which go unused by default. Some system integrators (Acer Inc. laptops) use the first GPIO (GPIO_0) on the ALC260 to turn on the amplifier for the laptop's internal speakers and external headphone jack.</p>	<p>Manufacturers use GPIOs in:</p> <ul style="list-style-type: none"> Devices with pin scarcity: integrated circuits such as system-on-a-chip, embedded and custom hardware, and programmable logic devices (for example, FPGAs) Multiplication chips: power managers, audio codecs, and video cards Embedded applications (Arduino, BeagleBone, PSoC kits, Raspberry Pi,^[3] etc.) use GPIO for reading from various environmental sensors (IR, video, temperature, 3-axis orientation, and acceleration), and for writing output to DC motors (via PWM), audio, LC displays, or LEDs for status. 		
2.AVN	Phone call	(Phone) Active Call	P0	N/A	<p>When you answer an incoming call or interact with a hold call, it's Active Call</p>	<p>Have incoming call to HU or make outgoing call from HU to another phone, keep the call on HU.</p> <p>For example, In case that device 1 is connected to Head Unit via Bluetooth or Phone projection (CarPlay, Android Auto). There are 2 ways to make an active call:</p> <ul style="list-style-type: none"> - Device 1 receive incoming call from device 2 => device 1 accept call in Head Unit screen, after that, active call occurs. - Make outgoing from device 1 to device 2 => device 2 accept call in device side => Active call 		

4.Telematics	Common	.INF files	P2	Setup Information files	Driver setup Information files	While USB devices plugging, rowse to "driver install" popup, locate to .inf file	File install driver phô biến, ngoài ra còn có file .sys	
4.Telematics	Other	_L	P2		'_L' stands for 'Long Press'. For example, 'Next SK_L' means 'Next SK with Long Press'.	When user press a button in a few seconds (~more than 2 seconds)		
4.Telematics	Telematics	+B power supply	P2	N/A	12V faction power supply supplied to DCM by vehicle battery.	[TBD]		
2.AVN	Navigation	1 foot	P2		1 foot = 12 inches The foot is a unit of length in the imperial and US customary systems of measurement. Since 1959, both units have been defined by international agreement as equivalent to 0.3048 meters exactly. In both systems, the foot comprises 12 inches and three feet compose a yard.			
2.AVN	Navigation	1mi	P2		1 mile = 1760 yd The mile is an English unit of length of linear measure equal to 5,280 feet, or 1,760 yards, and standardised as exactly 1,609.344 metres by international agreement			
2.AVN	Phone	2nd Call	P2		The 2nd Incoming Call when you already had an active call	Make 1st incoming call from device 2 to device 1 => Accept Call Make 2nd incoming call from device 3 to device 1 (This is 2nd call)		
2.AVN	Vehicle	2WD	P2		2-Wheel Drive	Two-wheel drive (2WD) describes vehicles with a drivetrain that allows two wheels to receive power from the engine simultaneously.		

2.AVN	Phone call	3 way call	P0	N/A	<p>A type of phone call that helps 3 users can speak together.</p> <p>One of ways to make 3-way call is below:</p> <ul style="list-style-type: none"> - Step 1. Make 1st incoming call from device 2 to device 1 - Step 2. On device 1, accept the 1st incoming call (1st call) - Step 3. Make 2nd incoming call from device 3 to device 1 - Step 4. On device 1, accept the 2nd incoming call, after that, the 1st call will be in-hold call automatically. (2nd Call) - Step 5. In device 1, merge 1st Call and 2nd Call by press "3 way call" button. - After that, the 3-way call is established. <p>Note: In some projects (MIB3), "3 way call" is a configuration option that you shall set up for AVN by using tool (ODIS). When "3 way call" is enable, user can make a conference call (more than or equal 3 users can speak together)</p>			
4.Telematics	Vehicle	3-button assembly	P1		<p>Include: Phone button, Onstar button, Emergency button.</p> <ul style="list-style-type: none"> * Phone Button (White button/DOT button) - Answer an incoming personal/OnStar Advisor non-emergency call - End an incoming Emergency Call once it gets to the "Connected" state. - End an outgoing personal/OnStar Advisor/Emergency call during an active call session (not idle). - Launch OnStar Wrapper Application when no active call or incoming notification present - The White button will end an active speech recognition session and launch the OnStar Wrapper Application. * Onstar button (Blue button) : Make Advisor Calls ton OnStar Call center * Emergency button (Red button) : Make Emergency Call 			

4.Telematics	Telematics	3PP	P2		3rd Party Provider/Partner	3rd Party Provider/Partner		
4.Telematics	Telematics	3PSP	P2		3rd Party Service Provider	3rd Party Service Provider		
2.AVN	Vehicle	4WD	P2		4 Wheel Drive	Four-wheel drive, also called 4×4 ("four by four") or 4WD, refers to a two-axled vehicle drivetrain capable of providing torque to all its wheels simultaneously. It may be full-time or on-demand, and is typically linked via a transfer case providing an additional output drive-shaft and, in many instances, additional gear ranges.		
2.AVN	Vehicle	4x4i	P2		Four-by-four Information	Four-by-four (4×4) refers to the general class of vehicles. The first figure represents the total wheels (more precisely, axle ends), and the second, the number that are powered "Four-wheel drive" typically refers to a set of specific components and functions, and/or intended offroad application, which generally complies with modern use of the terminology. These systems are meant only for use in low-traction conditions, such as off-road or on snow or ice.		

2.AVN	Bluetooth/Phone	A2DP	P1	<u>Advanced Audio Distribution Profile</u>	<ul style="list-style-type: none"> - A2DP defines protocol and procedures for audio streaming from one device to another over a Bluetooth connection 	<ul style="list-style-type: none"> - It is dependent upon the GAP (Generic Access Profile) and Generic Audio/Video Distribution Profile (GAVDP) - It supports high quality audio data streaming in only one direction from Source (SRC) to Sink (SNK). 	

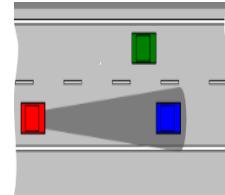
2.AVN	Phone Projection	AA / AAP	P0	<u>Android Auto/Android Auto Projection</u>	<p>- Android Auto is a mobile app developed by Google to mirror features from an Android device to a car's compatible head unit (AVN). - Android Auto is a simpler way to use your phone in the car so you can stay focused on the road. This app supports Google maps/navigation, music/media player, phone call, SMS, google assistant (by voice).</p>	<p>Because in Vietnam is not supported Android Auto, so you can not download Android Auto directly from Google App store.</p> <p>If you want to install Android auto, you should install from external files to your Android phone:</p> <ul style="list-style-type: none"> - Step1: Go to Settings > Lock screen and security > Enable Unknown Sources > OK (do this step to allow your device to install a program not from Google Store) - Step2: Download Android Auto APK and copy it to the Device Storage - Step3: Go to File Manager on Phone > Browse the APK file > Open and Install <p>[Using]</p> <ul style="list-style-type: none"> - Connection: connect Android device to vehicle via USB cable and Bluetooth - Vehicle time date and Phone have to matching - Android auto is connected, BT is auto connected to Android auto device, user can use phone functions on vehicle like: music, phone, map, ... 	
2.AVN	Projection	AA TBT	P2		Android Auto Turn-by-Turn: It's a feature of Google Maps support user to navigate turn by turn while driving	You can use Android Auto to get voice-guided navigation, estimated arrival times, live traffic information, lane guidance, and more with Google Maps.	
2.AVN	Media	AAC	P0	Advanced Audio Coding	<p>AAC is an audio coding standard for lossy digital audio compression. Designed to be the successor of the MP3 format, AAC generally achieves better sound quality than MP3 at the same bit rate</p>	<p>AAC is the default or standard audio format for YouTube, iPhone, iPod, iPad, Nintendo DSi, Nintendo 3DS, iTunes, DivX Plus Web Player, PlayStation 3 and various Nokia Series 40 phones.</p> <p>AAC is also supported by manufacturers of in-dash car audio systems.</p>	

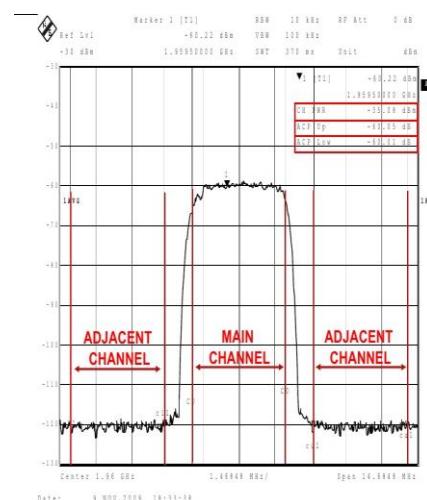


2.AVN	Projection	AAC-LC decoder	P2		Advanced Audio Coding: Advanced Audio Coding (AAC) is a proprietary audio coding standard for lossy digital audio compression. Designed to be the successor of the MP3 format, AAC generally achieves better sound quality than MP3 at the same bit rate																					
4.Telematics	Application	AACN / ACN	P0	<u>Advanced Automatic Collision Notification / Automatic Collision Notification</u>	An automatic crash notification system is an emerging safety technology designed to notify emergency responders that a crash has occurred and provide crash data.	When vehicle has collision, the sensors in vehicle will send crash/collision signal to ACN system. This system will send signal to vehicle network. When telematics receives this signal, it will make an emergency call to call center.	ACN/AACN là hệ thống cảnh báo va chạm/ đụng độ. Khi xe bị va chạm, các sensor lắp trên xe sẽ gửi tín hiệu va chạm đến hệ thống ACN/AACN. Hệ thống cảnh báo va chạm sẽ phân tích tín hiệu va chạm và quyết định có cảnh báo không. Khi xác định là tín hiệu va chạm cần cảnh báo, hệ thống sẽ gửi tín hiệu cảnh báo va chạm vào mạng lưới xe để các ECU khác có thể nhận được tín hiệu này. Ví dụ 1: Đối với thiết bị telematics, khi nhận được tín hiệu cảnh báo này sẽ thực hiện cuộc gọi khẩn cấp lên tổng đài để thông báo về việc xe bị va chạm. Ví dụ 2: Đối với thiết bị AVN, khi nhận được tín hiệu cảnh báo, sẽ hiển thị màn hình cảnh báo khẩn cấp.																			
2.AVN	Phone Projection	AAVR	P0	<u>Android Auto Voice Recognition</u>	- AAVR or voice commands supported by Android Auto. - It helps drivers can fully control their car's infotainment system with their voice.	Talk to Google To control Android Auto, you can talk to Google. Simply follow these steps: Use Android Auto on your phone screen 1. Say "OK Google" or select the microphone. ↗ 2. Wait until you hear the beep. 3. Say what you'd like to do. Use Android Auto on your car display 1. Say "OK Google", press and hold the voice command button on your steering wheel, or select the microphone. 2. Wait until you hear the beep. 3. Say what you'd like to do.																				
2.AVN	Vehicle	ABL	P2		Automotive Boot Loader	Automotive Boot Loader is a piece of code that runs before any operating system is running		<table border="1"> <thead> <tr> <th>Driving Mode</th> <th>Environmental Factors</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Unrestricted mode, vehicle is "Parked"</td> </tr> <tr> <td>1</td> <td>Vehicle stopped (e.g., vehicle speed = 0 mph/kph) or PCMM Moving at Low Speed (e.g., vehicle speed < 5 mph / 8 kph)</td> </tr> <tr> <td>2</td> <td>Not in Neutral or High Speed (e.g., vehicle speed > 5mph / 8 kph)</td> </tr> <tr> <td>3</td> <td>vehicle is NOT "Parked" and the driver is a Team</td> </tr> <tr> <td>4</td> <td>Reserved</td> </tr> <tr> <td>5</td> <td>Reserved</td> </tr> <tr> <td>6</td> <td>Restrictions NOT applicable mode</td> </tr> <tr> <td>7</td> <td></td> </tr> </tbody> </table>	Driving Mode	Environmental Factors	0	Unrestricted mode, vehicle is "Parked"	1	Vehicle stopped (e.g., vehicle speed = 0 mph/kph) or PCMM Moving at Low Speed (e.g., vehicle speed < 5 mph / 8 kph)	2	Not in Neutral or High Speed (e.g., vehicle speed > 5mph / 8 kph)	3	vehicle is NOT "Parked" and the driver is a Team	4	Reserved	5	Reserved	6	Restrictions NOT applicable mode	7	
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1.Common	ECU	ABS	P0	<u>Anti-Lock Braking System</u>	<p>Anti-Lock Braking System is:</p> <ul style="list-style-type: none"> - A safety system in cars and other automobiles that keeps their wheels from locking up and helps their drivers to maintain steering control. - It enables the wheels of a vehicle to maintain tractive contact with the ground so that they don't go into an uncontrolled skid. 	<p>ABS uses wheel speed sensors to determine if one or more wheels are trying to lock up during braking. If a wheel tries to lock up, a series of hydraulic valves limit or reduce the braking on that wheel. This prevents skidding and allows you to maintain steering control.</p> <p>The system has four main components that all work in unison to keep your car's wheels from skidding while you slow down.</p> <ul style="list-style-type: none"> -Speed Sensors. Each of your car's wheels have a speed sensor that relays information back to the ABS. -Valves. The ABS controls a small valve located within the brake line. This valve works to open, block, and release pressure on the brake line. -Pump. The pump works alongside the valve. If the valve releases pressure on the brakes, then the pump serves to re-apply pressure to the brake line. -Controller. This is the computer that monitors the rest of the components and ensures that each system fires at the precise moment it is needed in order to stop the vehicle. It also works to control the valves and speed sensors. 	<p>ABS là hệ thống chống bó cứng phanh.</p> <p>Khi thực hiện phanh lúc xe đang di chuyển, hệ thống phanh bó chặt vào bánh xe dẫn đến hiện tượng xe không thể đánh lái hay còn gọi là bó cứng và gấp tình trạng bánh xe bị trượt (skid) dài trên mặt đường. Điều này sẽ rất nguy hiểm khi phía trước của xe đang có vật cản. ABS là hệ thống được sinh ra để tránh việc bó cứng bánh xe trong lúc phanh, giúp xe vẫn có thể điều hướng được.</p> <p>Các thiết bị chống bó cứng phanh ABS hiện đại gồm một controller, 4 cảm biến tốc độ (speed sensor) trên từng bánh và các van thủy lực (hydraulic valves). Khi controller nhận thấy một hay nhiều bánh có tốc độ quay chậm hơn mức quy định nào đó so với các bánh còn lại, nó sẽ tự động giảm áp suất tác động lên phanh. Tương tự, nếu một trong các bánh quay quá nhanh, Chip điện tử cũng tự động tác động lực trở lại, đồng thời tạo độ rung ở bàn đạp phanh để báo cho người lái biết ABS đang hoạt động. Khi hoạt động, ABS nhả - nhấn piston khoảng 15 lần mỗi giây. Nhờ đó</p> <p>lái xe sẽ nhận ra các tình huống khẩn</p>	
2.AVN	Projection	ABT	P2		ABT is the German acronym of "main screen display"			

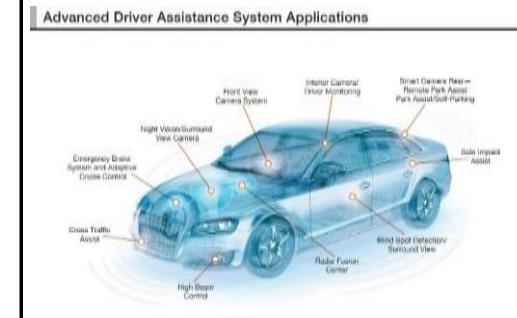
2.AVN	Radio	AC	P2		<p>Auto Compare (AC) is based on automatic comparison of tuned station to stations in memory locations. The intention is to signalize the availability of the station on a preset or storage position. Besides it's the guarantee, that the recalled station is the formerly stored one - and if not, the mechanism of break up of AC is also of importance.</p>		
2.AVN	Climate	AC system	P2	AC system	<p>The A/C is a closed system, which comprising a low and a high pressure side.</p> <p>At the high-pressure side the coolant (which is now gaseous) is operated by an engine compressor. The noise that you hear under the hood when you turn on the A/C system, indicates that the compressor is starting. The compressor forces the gas into the condenser, which is basically a radiator, as it cools the hot fluid and change liquidized at high temperatures.</p> <p>At the low-pressure side, the high pressure cooling liquid passes through an expansion valve and comes to the evaporator. Here in the low-pressure refrigerant the boiling point is very low, which, if reach, the evaporator make into gas immediately. This is an endothermic process, which means that heat absorption occurs, thereby the environment cools down.</p>	<p>The diagram illustrates the refrigeration cycle of an air conditioning system. It shows the flow of refrigerant through various components: Compressor, Condenser and fan, Expansion valve, Drier, and Evaporator and blower. The refrigerant starts as high-pressure hot gas in the compressor, moves through the condenser where it becomes high-pressure cold liquid, then passes through the expansion valve where it becomes low-pressure liquid, and finally enters the evaporator where it becomes low-pressure gas. The cycle is completed with the return of the gas to the compressor.</p>	
2.AVN	Media	AC-3	P2		<p>Audio Codec 3, Dolby Digital</p> <p>Dolby Digital is the name for audio compression technologies developed by Dolby Laboratories.</p>		

3.Cluster	Common	ACC	P0	<u>Adaptive Cruise Control</u>	<p>ACC is an available cruise control system for road vehicles that automatically adjusts the vehicle speed to maintain a safe distance from vehicles ahead.</p> <p>This is also known as Dynamic cruise control.</p>	<p>Using the signals from the radar sensor, the control unit computes the distance to the vehicle ahead and your car's speed relative to it. It also works out its lateral position on multi-lane roads. If there are several vehicles within the sensor's field of coverage at the same time, this information is used to select which of the vehicles the system should track. The radar sensor is not capable of detecting stationary obstructions, such as the end of a tailback or crash barriers, however.</p> <p>If approaching a slower vehicle ahead or if another vehicle cuts in front of you, the adaptive cruise control slows down the car by initiating corrective controls in the engine management and, if necessary, in the braking system too. If the required rate of deceleration exceeds 30% of the vehicle's maximum stopping power, visual and audible warning signals will prompt the driver to apply the brakes manually.</p>	<p>Hệ thống điều khiển hành trình chủ động ACC – Adaptive Cruise Control có khả năng duy trì tốc độ theo ý muốn của tài xế, nó còn cảnh báo va chạm và hỗ trợ giảm tốc trong trường hợp cần thiết.</p> <p>Công nghệ ACC – Adaptive Cruise Control là sự nâng cấp từ tính năng ga tự động Cruise Control, nhằm tăng sự an toàn và tính tiện dụng cho người lái xe.</p> <p>Ưu điểm:</p> <ul style="list-style-type: none"> + Giúp người lái thư giãn hơn khi vận hành phương tiện + Giúp tiết kiệm nhiên liệu hơn (Khoảng 30%) + Giúp kiểm soát được tốc độ cho phép <p>Nhược điểm:</p> <ul style="list-style-type: none"> + Chỉ thích hợp khi sử dụng trên đường cao tốc, đường phẳng ít chướng ngại vật + Dẫn đến tâm lý chủ quan khi vận hành 	 
3.Cluster	Cluster	ACCM	P2		Air Condition compressor: Máy nén khí			

2.AVN	System	ACD	P2	Adjacent channel distortion: (means 'nhiều kênh lân cận' in Vietnamese). Excessive distortion creates Spectral Leakage into adjacent channel. Distortion can caused by any component in the signal chain, not just the modulator.	Measuring adjacent channel distortion is an important parameter when characterizing wireless transmission systems. Radio system interference of adjacent channels can be measured with two modulation methods: intermodulation distortion (IMD) and adjacent channel power ratio (ACPR). With either method (ACPR or IMD) the measurement is often performed on the most nonlinear components in a transmission chain such as the power amplifier. Both methods are similar in that the main channel contains a larger signal than the adjacent channel. Making this measurement accurately can be a challenge, requiring a high-dynamic range receiver, filtering, and noise correction.																					
4.Telematics	Common	ACI	P2	Audio Control Interface	a class data																					
2.AVN	Bluetooth/Phone	ACL	P1	<u>Asynchronous Connection-Less</u>	- ACL is a data communication protocol in Bluetooth - It is used when data integrity is more important than avoiding latency - ACL has two frame types, DM (which provides Forward Error Correction:FEC) and DH (which doesn't provide FEC)	<p style="text-align: right;">Table 1: ACL frame type and data length</p> <table border="1"> <thead> <tr> <th>Number of Slot</th> <th>1</th> <th>3</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>BDR w/ FEC</td> <td>DM1 1-18 byte</td> <td>DM3 2-123 byte</td> <td>DM5 2-226 byte</td> </tr> <tr> <td>BDR w/o FEC</td> <td>DH1 1-28 byte</td> <td>DH3 2-185 byte</td> <td>DH5 2-341 byte</td> </tr> <tr> <td>EDR 2Mbps</td> <td>2-DH1 2-56 byte</td> <td>2-DH3 2-369 byte</td> <td>2-DH5 2-681 byte</td> </tr> <tr> <td>EDR 3Mbps</td> <td>3-DH1 2-85 byte</td> <td>3-DH3 2-554 byte</td> <td>3-DH5 2-1023 byte</td> </tr> </tbody> </table>	Number of Slot	1	3	5	BDR w/ FEC	DM1 1-18 byte	DM3 2-123 byte	DM5 2-226 byte	BDR w/o FEC	DH1 1-28 byte	DH3 2-185 byte	DH5 2-341 byte	EDR 2Mbps	2-DH1 2-56 byte	2-DH3 2-369 byte	2-DH5 2-681 byte	EDR 3Mbps	3-DH1 2-85 byte	3-DH3 2-554 byte	3-DH5 2-1023 byte
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4.Telematics	Common	ACM	P1	Abstract Control Model	<p>There are two versions of the Abstract Control Model (ACM). The original version is defined in the USB Communication Device Class (CDC) specification. The USB Wireless Mobile Communication Device Class (WMCDC) specification contains an extended definition of the ACM.</p> <p>The MCCL® USB Modem Integration Package (an implementation of CDC WMC ACM) allows OEMs to create a USB modem (or other product that uses Dial-Up Networking) quickly and cost-effectively.</p>	Một driver /class khi test USB	
2.AVN	Phone	ACN event	P2	<u>Automatic Collision Notification Event</u>	Automatic collision notification	<p>- ATT run -> View -> VIF select and click Initiate Collision button (refer to image)</p>	
4.Telematics	Telematics	ADA	P2	Abstract Diagnostic Access	<p>Provides vehicle information to other systems and features through the use of diagnostic service. ADA also enables over the air troubleshooting of vehicle electronic issues by providing remote access to the vehicle diagnostic services</p> <p>ADA request/respond diagnostic request via to/from VTM/Vehicle/Back Office</p> <p><i>The VCP uses the Diagnostic function to check the status of the devices in the vehicle and the status of the VCP itself and store information about them. If there is a request to the OCC, it transfers the stored information to the OCC. In addition, the OCC can issue diagnostic requests to various ECUs in the vehicle through the VCP to request specific information and read or change data values in the ECU's memory (GM Telematics)</i></p>		

1.Common	Utility	ADAS	P0	Advanced Driver Assistance Systems	<ul style="list-style-type: none"> - ADAS are systems to help the driver in the driving process. - ADAS aims to automate/adapt/enhance vehicle systems for safety and better driving. 	<p>Adaptive features may automate lighting, provide adaptive cruise control, automate braking, incorporate GPS/ traffic warnings, connect to smartphones, alert driver to other cars or dangers, lane departure warning system, automatic lane centering, or show what is in blind spots. Safety features are designed to avoid collisions and accidents by offering technologies that alert the driver to potential problems, or to avoid collisions by implementing safeguards and taking over control of the vehicle.</p>

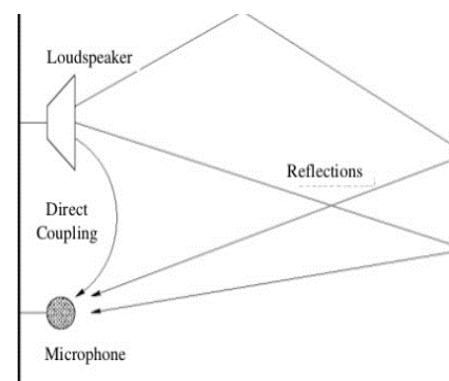


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2.AVN	System Base	ADB	P2	<p>Android Debug Bridge (ADB) is a versatile command-line tool that lets you communicate with a device. The adb command facilitates a variety of device actions, such as installing and debugging apps, and it provides access to a Unix shell that you can use to run a variety of commands on a device. It is a client-server program that includes three components:</p> <ul style="list-style-type: none"> •A client, which sends commands. The client runs on your development machine. You can invoke a client from a command-line terminal by issuing an adb command. •A daemon (adbd), which runs commands on a device. The daemon runs as a background process on each device. •A server, which manages communication between the client and the daemon. The server runs as a background process on your development machine. 	<p>When you start an adb client, the client first checks whether there is an adb server process already running. If there isn't, it starts the server process. When the server starts, it binds to local TCP port 5037 and listens for commands sent from adb clients—all adb clients use port 5037 to communicate with the adb server.</p> <p>The server then sets up connections to all running devices. It locates emulators by scanning odd-numbered ports in the range 5555 to 5585, the range used by the first 16 emulators. Where the server finds an adb daemon (adbd), it sets up a connection to that port. Note that each emulator uses a pair of sequential ports — an even-numbered port for console connections and an odd-numbered port for adb connections. For example:</p> <p>Emulator 1, console: 5554 Emulator 1, adb: 5555 Emulator 2, console: 5556 Emulator 2, adb: 5557 and so on...</p> <p>As shown, the emulator connected to adb on port 5555 is the same as the emulator whose console listens on port 5554.</p> <p>Once the server has set up connections to all devices, you can use adb commands to access those devices. Because the server</p>		
2.AVN	Radio	ADC	P1	<u>Analog-to-Digital Converte</u> r	ADC is a system that converts an analog signal, such as a sound picked up by a microphone or light entering a digital camera, into a digital signal.	N/A	
2.AVN	Connection	Add New	P2		Status is ready to pairing which new device which is never connect with AVN before	When user select Add New from HU, name of HU will display in Bluetooth list of phone. So the phone can connect to HU via Bluetooth.	
4.Telematics	Network	ADI	P2	Aged Data Indicator	Aged Data Indicator	N/A	

2.AVN	Radio	Adjacent Channel	P0	N/A	<ul style="list-style-type: none"> - Adjacent Channels are AM, FM, or TV channels that are next to another channel. - Their information is used to minimize their interference 			
2.AVN	Power Mode	ADM	P2		Accessory Delay Mode (Power mode cho thị trường Bắc Mỹ)			
		ADP						
2.AVN	Vehicle	AdSR	P2		Adaptive Surface Response (Jaguar version of Auto-TR)	a new approximation-based optimization method for computation-intensive design problems. The ARSM creates quadratic approximation models for the computation-intensive design objective function in a gradually reduced design space. The ARSM was designed to avoid being trapped by local optimum and to identify the global design optimum with a modest number of objective function evaluations.		
2.AVN	System	ADT	P2		Application Development Toolkit or A software development kit (SDK or devkit) is typically a set of software development tools that allows the creation of applications for a certain software package, software framework, hardware platform, computer system, video game console, operating system, or similar development platform.	Some SDKs are critical for developing a platform-specific app. For example, the development of an Android app on Java platform requires a Java Development Kit, for iOS apps the iOS SDK, and for Universal Windows Platform the .NET Framework SDK. There are also SDKs that are installed in apps to provide analytics and data about activity. Prominent examples include Google, InMobi and Facebook.		
4.Telematics	Telematics	Advisor call	P1		Advisor call	The user can initiate/end an Advisor Call using the dedicated OnStar buttons or through the HMI interface. The function of Advisor Call allows user to inform vehicle breakdowns, order movie/football ticket..Example If you get locked out, just make a quick call to OnStar. After verifying your account, an OnStar Advisor can send a remote signal that unlocks your doors within minutes.		

4.Telematics	Telematic Call	Advisor Data Call	P2	N/A	Make an advisor call	- Set FID2= Data call, Press and release Onstar button		
4.Telematics	Telematics	Advisor Demo Call	P2	N/A	This state indicates that the Onstar account is inactive	Press and release Onstar button. If press Onstar button again, Advisor Enrollment call is initiated		
4.Telematics	Telematics	Advisor Enrollment call	P2	N/A	Advisor call to register Onstar services	Press and release Onstar button twice times		
4.Telematics	Telematics	Advisor No Call	P2	N/A	This state indicates that the Onstar system is not active	Press and release Onstar button		
4.Telematics	Telematic Call	Advisor playback	P2	N/A	User can record the Advisor call and play	- While Advisor call, Press Onstar button to start recording, Press the second time to stop recording		
3.Cluster	Cluster	AEB	P1	Autonomous Emergency Braking / Automatic Emergency Brake	<p>AEB: Autonomous Emergency Braking / Automatic Emergency Brake</p> <p>AEB is a feature that alerts a driver to an imminent crash and helps them use the maximum braking capacity of the car.</p> <p>Each car manufacturer has its own automatic braking system technology, but they all rely on some type of sensor input. Some of these systems use lasers, others use radar, and some even use video data. This sensor input is then used to determine if there are any objects present in the path of the vehicle. If an object is detected, the system can then determine if the speed of the vehicle is greater than the speed of the object in front of it. A significant speed differential may indicate that a collision is likely to occur, in which case the system is capable of automatically activating the brakes.</p> <p>In addition to the direct measurement of sensor data, some automatic braking systems can also make use of GPS data. If a vehicle has an accurate GPS system and access to a database of stop signs and other information, it can activate its auto brakes if the driver accidentally fails to stop in time.</p>			

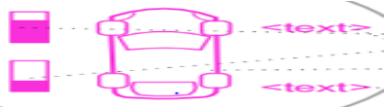
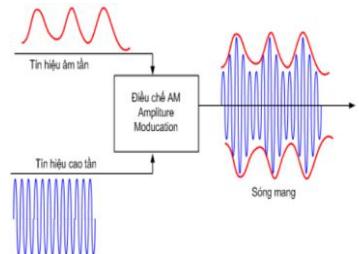
2.AVN	System	AEC	P2	Acoustic Echo Cancellation (means 'Loại bỏ âm vọng') Acoustic echo cancellation is important for audio teleconferencing when simultaneous communication of speech is necessary.	In recent years, speakerphones and hands-free cellular phones have been used widely around the world for audio-conferencing and video teleconferencing applications. A speaker phone or a hands-free cellular phone allows full-duplex communication without having to hold the phone. Full-duplex means voices on both ends of the line are transmitted continuously, as with a normal telephone. The speech from the far-end caller is broadcast by the speakerphone or the hands-free cellular phone and then repeats itself by bouncing off the inside surfaces of the room. This repetition of sound is called an echo. Echoes are picked up by the near-end microphone, creating a feedback loop where the far-end caller hears an echo of his or her own voice. To solve this problem, developers are using the digital signal processing technique of acoustic echo cancellation (AEC) to stop the feedback and allow full-duplex communication.		
2.AVN	Connection	AES-CCMP	P2	Advanced Encryption Standard - Counter Mode CBC-MAC Protocol	The encryption algorithm used in the 802.11i security protocol.	It uses the AES block cipher, but restricts the key length to 128 bits. AES-CCMP incorporates two sophisticated cryptographic techniques (counter mode and CBC-MAC) and adapts them to Ethernet frames to provide a robust security protocol between the mobile client and the access point.	
2.AVN	Radio	AF	P0	Alternative Frequency	- AF is a field contained in FM-RDS (Radio Data System) data - It allows a receiver to re-tune to a different frequency providing the same station when the first signal becomes too weak.	- Enable AF feature for radio receiver of the moving vehicle. - Tune to the station that broadcasts FM-RDS with AF. - When signal of the main station gets too weak, radio receiver automatically switches to alternative frequency of the same station continuously	

4.Telematics	Telematics	AFS	P2	Adaptive Front-lighting System	<p>One of the most important factors in mitigating driver fatigue and increasing safety during night driving is providing a well-illuminated field of view. The Adaptive Front-lighting System (AFS) optimizes distribution of light from the headlights according to driving circumstances. Depending on vehicle speed and steering input, the system points the low-beams headlights in the direction the driver intends to travel</p>		 Without AFS With AFS
2.AVN	Radio	AGC	P2	Automatic Gain Control Automatic gain control (AGC), also called automatic volume control (AVC), is a closed-loop feedback regulating circuit, the purpose of which is to provide a controlled signal amplitude at its output, despite variation of the amplitude in the input signal.	<p>All fm radio aid systems have Automatic Gain Control or AGC. This is required by all national radio regulatory authorities in order to control the use of valuable radio spectrum.</p> <p>There are many forms of AGC. Basic hearing aids use 'peak clipping' (also known as hard limiting) and more advanced hearing aids use 'compression'. fm radio aid systems use 'soft limiting' in which changes of sound level at the input are directly reflected at the output up to a certain value known as the 'knee point'. For example, at an input sound level of 60dB SPL, a 5dB increase of sound at the input results in a 5dB increase of output. Above the 'knee point' the AGC circuit controls the gain so that the output remains virtually constant.</p>		
2.AVN	Connection	Aggregate MAC Protocol Data Unit (A-MPDU)	P2	Frame aggregation is a feature of the IEEE 802.11e, 802.11n and 802.11ac wireless LAN standards that increases throughput by sending two or more data frames in a single transmission.			
2.AVN	Navigation	AGV	P2	Automated guided vehicle is a portable robot that follows markers or wires in the floor, or uses vision, magnets, or lasers for navigation			

2.AVN	Radio	AGW	P2		Graphic Weather Map Show the weather in the graphical map (Look like when you're watching weather forecast on VTV1)			
4.Telematics	Telematics	Aiec	P2	Automatically Initiated eCall	Automatically Initiated eCall + (eCall) services in order to transfer an emergency message from a vehicle to a Public Safety Answering Point (PSAP) in the event of a crash or emergency, via an eCall communication session and to establish a voice channel between the in-vehicle equipment and the PSAP. + Automatic triggering shall be generated by a signal emanating from one or more sensors or processors within the vehicle to the eCall in-vehicle equipment (example : A signal generated by the airbag control module and/or a combination of sensor data)			
4.Telematics	Telecommunication	AIF	P0	Air Interface	AIF is the Wireless Communications Protocol between the the telematics Center system and the telematic In-the Vehicle system, defines the messages that are sent across the Air Interface Protocol that is being used in concordance with transmitting messages across digital or analog channels inside telematics hardware			
1.Common	Safety	Air bag	P0	N/A	- Airbag is a safety device. - It cushions the impact of collisions, reducing the risk of injury.	- Once, collision happens, crash sensor determines whether there is an accident. - Control unit sends a signal to the inflator system. - The inflator sets off a chemical charge, producing an explosion of nitrogen gas, filling up the airbag *This all happens usually within 25~50ms	 	

1.Common	Utility	Air distribution	P0	N/A	Air distribution(or Air Delivery Mode, Blower Mode): change the direction of the airflow.	<ul style="list-style-type: none"> - 1. Panel (AC) button: Air is directed to the instrument panel outlets. - 2. Floor-Windshield (Heater - Defrost) button: Indicate which vents air is flowing from inside the vehicle, air directed to the windshield & floor outlets. - 3. Floor (Heater) button: Air is directed to the floor - 4. Bi level button: Air is directed to the instrument panel & floor outlets. 		
1.Common	Utility	Air recirculation (or Recirculate Air)	P0	N/A	It switches between drawing air in from outside and recirculating the air in the car. The default position is usually for outside air.	<ul style="list-style-type: none"> - Tap the Recirculate Air button on the Front Climate Screen toggles between air being recirculated inside the vehicle (Recirculate Air button is ACTIVE) and allowing outside air to flow into the vehicle (Recirculate Air button is INACTIVE). - Recirculating air inside the vehicle to limit the amount of pollution that may enter the car in situations like stop and go traffic conditions - Pausing air recirculation to prevent window fogging. 		
2.AVN	Media	Album Art	P0	N/A	<ul style="list-style-type: none"> - It's also album cover art - It is artwork created for a music album 			
2.AVN	Media	Album Browser	P1	N/A	Album browser is a list of albums of audio tracks.	The user may browse media specifically by album by selecting the album list item in the browse list. This will display the main list view for album based browsing. Users can then select an album by pressing its associated button which will bring up the song list in album order for that specific album. At this point the user can select any song to begin playback of that album.		

4.Telematics	Telematics	ALDL	P2	Assembly Line Diagnostic Link	Assembly Line Diagnostic Link	ALDL is a port to connect Test Bench with NeoVI for CAN communication. In a real vehicle, it also contains ALDL port for Diagnostic Service but it's known as "OBD" name ALDL is named by GM for CAN hardware port for communication.		
2.AVN	System	Alert	P1	N/A	The Alerts Popup is used by any applicaton in the cluster/AVN to present critcal information to the user that requires attention or input from the user.	Alerts are triggered from a system event or outside stimulus (e.g. Incoming Phone Call, Appointment Reminder, Low Fuel, etc.). The Alert View replaces the current view in the Alert display zone. Alerts may contain two or three actions the user must choose between to dismiss the alert while present (e.g. Dismiss an Appointment or Snooze, etc.) In certain cases, Alerts may auto dismiss or may also immediately be removed if the alert stimulus no longer exists (e.g. Incoming Call transfers to voice mail).		
2.AVN	Framework	Alert Screen	P2		The Alert Screen: displays an alert box with a specified message and The alert screen takes the focus away from the current window, and forces the browser to read the message			
4.Telematics	Other	Algorithm	P2		Algorithm is a step-by step procedure for solving problem. It mainly used in computer science and means the procedure for computer to do a certain work.			

3.Cluster	Cluster	Allrad	P1	(German language) Four-wheel drive	Allrad(German language): Four-wheel drive Allrad is a type of drive of vehicles , in which the driving force - in contrast to the front or rear-wheel drive - is passed to all ground-contacting wheels.	The power (or urge) disposition on the front and rear axis with a barograph diagram are displayed beside the car graphic	The power (or urge) disposition on the front and rear axis with a barograph diagram are displayed beside the car graphic	
2.AVN	Connection	Alsa	P2		Advanced Linux Sound Architecture (ALSA) is a software framework and part of the Linux kernel that provides an application programming interface (API) for sound card device drivers.	The Advanced Linux Sound Architecture (ALSA) provides audio and MIDI functionality to the Linux operating system. ALSA has the following significant features: <ul style="list-style-type: none">•Efficient support for all types of audio interfaces, from consumer sound cards to professional multi channel audio interfaces.•Fully modularized sound drivers.•SMP and thread-safe design.•User space library (alsa-lib) to simplify application programming and provide higher level functionality.•Support for the older Open Sound System (OSS) API, providing binary compatibility for most OSS programs. ☺		
2.AVN	Radio	AM	P0	<u>Amplitude Modulation</u>	- AM is a modulation technique used for transmitting information via radio carrier wave. In amplitude modulation, the amplitude (signal strength) of the carrier wave is varied in proportion to that of the message signal being transmitted. The message signal is, for example, a function of the sound to be reproduced by a loudspeaker, or the light intensity of pixels of a television screen - AM carrier frequencies are in the frequency range 535-1605 kHz.			

2.AVN	Radio	AMBE	P2		Advanced Multi Band Excitation AMBE is a codebook-based vocoder that operates at bitrates of between 2 and 9.6 kbit/s, and at a sampling rate of 8 kHz in 20-ms frames	The audio data is usually combined with up to 7 bits/s of forward error correction data, reducing a total RF bandwidth of approximately 2,250 Hz (compared to 2,700–3,000 Hz for an analogue single sideband transmission). Lost frames can be masked by using the parameters of the previous frame to fill in the gap.		
2.AVN	System	AMOS	P2		Analysis of a Moment Structures AMOS is specially used for Structural Equation Modeling (SEM), path analysis, and confirmatory factor analysis. It is also known as analysis of covariance or causal modeling software. AMOS is a visual program for SEM. In AMOS, we can draw models graphically using simple drawing tools. AMOS quickly performs the computations for SEM and displays the results.	The AMOS was developed and operated within the Microsoft Windows interface.		
1.Common	Audio	AMP	P0	<u>AMPLifier</u>	An amplifier, electronic amplifier or (informally) amp is an electronic device that can increase the power of a signal (a time-varying voltage or current).	Bộ âm li (bộ khuếch đại) là một thiết bị điện tử nhằm khuếch đại năng lượng của sóng		
2.AVN	System	Amplitude	P2		Amplitude is the vertical distance from a peak to the equilibrium position or from the equilibrium position to a valley. The amplitude of a periodic variable is a measure of its change over a single period (such as time or spatial period). There are various definitions of amplitude: - Peak-to-peak amplitude - Peak amplitude - Semi-amplitude - Root mean square amplitude - Ambiguity - Pulse amplitude	1. Peak amplitude 2. Peak-to-peak amplitude 3. Root mean square amplitude 4. Wave period (not an amplitude)		

2.AVN	Connection	AMPS	P2		Advanced Mobile Phone System (AMPS) is an analog mobile phone system standard developed by Bell Labs	AMPS is a first-generation cellular technology that uses separate frequencies, or "channels", for each conversation . It therefore required considerable bandwidth for a large number of users.		
4.Telematics	Application	AN / TN	P0	<u>Anti-theft Notification/</u> <u>Theft Notification</u>	An anti-theft system is any device or method used to prevent or detect the unauthorized appropriation of items considered valuable.	A group of many vehicle sensors detect unauthorization attemp then send signal for further processing. For example: a sensor on door can detect the window is broken and send signal to indicated ECU such as telematics, then it will send notification to user mobiphone to warning.		
2.AVN	HMI	Analog Clock	P2		Set to display analalog clock when Power off.	In this case, the clock type set is not equally applicable in the home screen clock widget and display digital clock by default.		
2.AVN	HMI	animation	P2		Animation is a dynamic medium in which images or objects are manipulated to appear as moving images	HU has Startup Animation and Shutdown Animation: - The welcome animation is initiated when the user closes the driver door after entering the vehicle. It is played on the center stack and cluster, if available. - The shutdown animation: When the system transitions into sleep from any mode where the displays are enabled, the system plays the shutdown animation, a 2 sec. fade to black, on the center stack, cluster, and RSE screens if available		
2.AVN	Power Mode	Animation Init	P1	N/A	- Animation Init is the visual animation displayed in the AVN screen when the engine is started up. - It's often the logo animation.	N/A		

2.AVN	Navigation	Announcement	P1	The system shall provide an announcement for the next maneuver on manual user request during active and inactive route guidance.	<p>The announcements shall support additional street additions:</p> <ul style="list-style-type: none"> - Distance to the next maneuver - The name of the road type, for instance "European route", "Bundesstraße", ... - Cardinal direction, e.g. northbound - Road attributes, e.g. exit, ramp, tunnel, toll gate, HOV, turnpike, destination street, ... - Signposts, directions and street names - Destination/Stopover + side - Maneuver type 			
2.AVN	Projection	AOA AOAP	P2	Android Open Accesory Android Open Accesory Protocol	<p>Android Open Accessory (AOA) support allows external USB hardware (Android USB accessories) to interact with Android-powered devices in accessory mode. When an Android-powered powered device is in accessory mode, the connected accessory acts as the USB host (powers the bus and enumerates devices) and the Android-powered device acts as the USB accessory</p>			
2.AVN	Media	AP	P2	Automatic Play	<p>It depends on your Requirement. Refer ULC4.0: + USB/iPod: Will automatically play music + AUX/BT: Audio device is playing music, after connected it still play. If not, it is not played automatically. + Carplay, Android Auto: will not auto play music</p>			
2.AVN	Connectivity	AP/WAP	P0	<u>Access Point/</u> <u>Wireless Access Point</u>	- WAP or AP is a networking hardware device that allows a Wi-Fi device to connect to a wired network	An AP connects directly to a wired local area network, typically Ethernet, and the AP then provides wireless connections using wireless LAN technology, typically Wi-Fi, for other devices to utilize that wired connection.		

1.Common	Utility	APA	P0	<u>Advanced Park Assist</u>	<ul style="list-style-type: none"> - The technology assists drivers in parking their vehicle or automatic parking. - The car can steer itself into a parking space with little input from the user 	<ul style="list-style-type: none"> - APA is available when vehicle speed is low and gear position is Reverse. - APA uses sensors/camera to detect objects/obstacles/parking lots and to estimate the size of parking space then manoeuvre the vehicle after driver determines the parking lot. 	<p>Tính năng hỗ trợ đỗ xe: dựa vào tín hiệu từ các sensor và phân tích hình ảnh từ camera để nhận diện các đối tượng xung quanh xe. Khi được kích hoạt, hệ thống sẽ tự động tìm kiếm trong bán kính nào đó với tốc độ di chuyển cho phép để tìm ra khoảng trống đủ rộng hai bên đường để đỗ xe. Khi tìm được vị trí phù hợp, hệ thống sẽ báo hiệu tiếng kêu và hiển thị trên màn hình chỉ dẫn vị trí mà xe có thể đỗ vào. Lúc này người lái có thể rời tay khỏi vô lăng, chỉ cần thao tác cần số và chân phanh.</p>	
2.AVN	HMI	API	P2		Application Programming Interface: In computer programming, an application programming interface (API) is a set of subroutine definitions, protocols, and tools for building application software. In general terms, it is a set of clearly defined methods of communication between various software components			
2.AVN	System Base	APIX	P2		Automotive Pixel Link (APIX) is a serial high speed Gigabit Multichannel link to interconnect displays, cameras and control units over one single cable targeting automotive applications. APIX2 transmits up to two independent HR real time video channels plus bidirectional protected data communication like Ethernet, SPI, I2C including 8 channels for audio.			

2.AVN	Connectivity	APN	P0	<u>Access Point Name</u>	<p>APN is the name of a gateway between a GSM, GPRS, 3G or 4G mobile network and another computer network, frequently the public Internet. Example: APN of Viettel Operator:</p> <ul style="list-style-type: none"> + 3G: APN: v-internet (Mobiphone: m-wap) Username: [Blank] (Mobiphone:mms) Password: =[Blank] (Mobiphone:mms) +LTE: APN: [Blank] Username: [Blank] Password: =[Blank] 	<p>Tên điểm truy cập (Access Point Name - APN) là tên của các cài đặt mà điện thoại của bạn đọc để thiết lập kết nối tới cổng giữa mạng di động của nhà cung cấp và Internet công cộng.</p> <p>Nhà cung cấp đọc các cài đặt này, sau đó đảm bảo xác nhận đúng địa chỉ IP, kết nối tới đúng cổng an toàn và xem ban có cần kết nối tới mạng riêng tư như VPN không. Tất cả các thao tác được thực hiện ở phía nhà cung cấp dịch vụ, nhưng bạn cũng cần đảm bảo các cài đặt được thiết lập đúng để có được mạng bạn cần.</p>	
2.AVN	Connection	APP	P2		Absolute Packet Point		
2.AVN	Vehicle	AQS	P2		<p>Air pollution sensors are devices that detect and monitor the presence of air pollution in the surrounding area. They can be used for both indoor and outdoor environments. These sensors can be built at home, or bought from certain manufactures. Although there are various types of air pollution sensors, and some are specialized in certain aspects, the majority focuses on five components: ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrous oxide. The sensors were very expensive in the past, but with technological advancements these sensors are becoming more affordable and more widespread throughout the population. These sensors can help serve many purposes and help bring attention to environmental issues beyond the scope of the human eye.</p>		

2.AVN	Vehicle	ARC	P2		Active Roll Control (a kind of air suspension)	reduce body roll and increase stability		
2.AVN	Vehicle	Ari	P2		All Road information	All traffic information This feature is similar as 4x4i, allows jaguar vehicles to travel on many terrains: riding on snow, wading, climbing ...		
2.AVN	Vehicle	ARPC	P2		All Road Progress Control This is feature name in Jaguar. It will show state of ATPC	driving technology helps you take everything in your stride, inclue AWD + AdSR + ASPC		
2.AVN	Radio	ARQ	P2		Automatic Repeat Request Automatic repeat request (ARQ) is a protocol for error control in data transmission ARQ is sometimes used with Global System for Mobile (GSM) communication to guarantee data integrity	When the receiver detects an error in a packet, it automatically requests the transmitter to resend the packet. This process is repeated until the packet is error free or the error continues beyond a predetermined number of transmissions.		
4.Telematics	Telematics	AS	P2		Access Stratum	The access stratum (AS) is a functional layer in the UMTS and LTE wireless telecom protocol stacks between radio network and user equipment.[1] While the definition of the access stratum is very different between UMTS and LTE, in both cases the access stratum is responsible for transporting data over the wireless connection and managing radio resources. The radio network is also called access network.		
2.AVN	Phone	ASCII	P2		Stands for: American Standard Code for Information Interchange It's a type of character encoding standard	In some features about input character or display character like Phone Contact, SRS request system need to support ASCII and other character encoding standard like UTF-8		

2.AVN	Radio	ASD	P2		<p>Active Sound Design</p> <p>Active sound design (ASD) is an automotive audio application in which the car engine's sound is generated based on various engine parameters like speed and throttle input.</p>	<p>The Active Sound Design technology specially developed for the new BMW M5 takes its cues from the driving situation at any one time to deliver an accurate reproduction of the engine's sound through the car's audio system. The system's digital signal processing exchanges data directly with the engine management, allowing it to reflect the engine's revs and torque, and the car's speed over the road. The result over a smoothly driven journey is a discreet soundtrack in keeping with the harmonious</p>		
4.Telematics	Common	ASI	P2	Audio Streaming Interface	a class data			
3.Cluster	Common	ASIL	P0	Automotive Safety Integrity Level	<p>ASIL is a risk classification scheme defined by the ISO 26262 - Functional Safety for Road Vehicles standard. There are four ASILs identified by the standard:</p> <ol style="list-style-type: none"> 1. ASIL A 2. ASIL B 3. ASIL C 4. ASIL D <p>ASIL D dictates the highest integrity requirements on the product and ASIL A the lowest.</p>	<p>The determination of ASIL is the result of hazard analysis and risk assessment. In the context of ISO 26262, a hazard is assessed based on the relative impact of hazardous effects related to a system, as adjusted for relative likelihoods of the hazard manifesting those effects. That is, each hazard is assessed in terms of severity of possible injuries within the context how much of the time a vehicle is exposed to the possibility of the hazard happening as well as the relative likelihood that a typical driver can act to prevent the injury</p>		<p>Typical Automotive Classifications</p> <ul style="list-style-type: none"> ASIL-A: Rear lights, Both side failure, ASIL-A; Rear view camera, No valid sensor data, ASIL-B ASIL-B: Instrument cluster, loss of critical data, ASIL-B; Airbag, Inadvertent deploy, ASIL-D; Engine management, Unwanted acceleration, ASIL-C to D; Headlights, Both side failure, ASIL-B; Radar cruise control, inadvertent braking, ASIL-C; Electric power steering, Self-steering, ASIL-D; Vision ADAS, Incorrect sensor feedback, ASIL-B ASIL-C: Active suspension, Suspension oscillates, ASIL-B to C ASIL-D: Brake lights, Both side failure, ASIL-B; Antilock braking, Unintended full power braking, ASIL-D
2.AVN	Connection	ASL	P2		Adaptation Service Layer			
2.AVN	Connection	ASLSS	P2		Available System List System Selection			

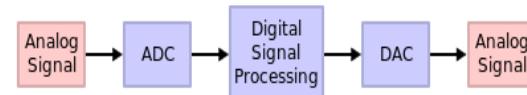
2.AVN	Vehicle	ASPC	P2	All Surface Progress Control (Jaguar version of ASPC)	<p>Driving technology helps you take everything in your stride.</p> <p>All Surface Progress Control (ASPC) acts as a low speed cruise control.</p> <p>ASPC automatically controls the throttle and the brakes, giving you added confidence on slippery, loose, or icy surfaces, as well as on undulating terrain.</p> <p>On low-grip surfaces, it can help you pull away first time, and its hill descent function controls your vehicle speed when heading downhill. All you have to do is steer. ASPC is available on vehicles fitted with automatic transmission.</p>		
2.AVN	Voice Recognition	ASR	P0	<u>Automated Speech Recognition</u>	<ul style="list-style-type: none"> - Automatic speech recognition (ASR) is the use of computer hardware and software-based techniques to identify and process human voice: + Convert spoken words into computer text + Authenticate users via their voice + Perform actions based on the instructions defined by the human 	User input audio signal, ASR will identify and process this signal then output text into the system	
2.AVN	Connection	AST	P2		Auto Store The process to store recent connected network in the top of WiFi's list.		
4.Telematics	Telecommunication	AT&T	P2	N/A	AT&T Inc. is an American multinational conglomerate holding company. It is the world's largest telecommunications company, the second largest provider of mobile telephone services, and the largest provider of fixed telephone services in the United States through AT&T Communications.		

2.AVN	Vehicle	ATCM	P2	All Terrain Control Module	<p>ATCM allows user to preselect a manual terrain response program (Grass Gravel Snow, Mud Ruts, Sand, Rock Crawl, Dynamic Lite, Eco, Comfort ...)</p> <p>The most common failure is loss of power or ground to the ATCM module. Check all fuses that power up the ATCM module on this vehicle. Check all grounds for the ATCM. Locate where the ground attaching points are on the vehicle and make sure that these connections are clean and tight. If you have to, take them off, get a small wire bristle brush and baking soda/water solution and clean each one, both the connector and where it connects.</p> <p>Read more at: https://www.obd-codes.com/u0138 Copyright OBD-Codes.com</p>		
2.AVN	[TBD]	ATN	P2	<u>Aktiver Teilnehmer</u>	Aktiver Teilnehmer (participant of personalization) - Người dùng được active (người tham gia cá nhân hóa)	A system will authorize many types of users to use the car system (each type of user can customize and save to its profile in the system)	[TBD]
2.AVN	Vehicle	ATPC	P2	All Terrain Progress Control (Land Rovers)	<p>aimed at reducing driver workload in off-road conditions.</p> <p>The ATPC system can be thought of as cruise control for off-road use.</p>		

2.AVN	Radio	ATSC	P2		Advanced Television Systems Committee (ATSC) standards are a set of standards for digital television transmission over terrestrial, cable, and satellite networks. It is largely a replacement for the analog NTSC standard, and like that standard, used mostly in the United States, Mexico and Canada. Other former users of NTSC, like Japan, have not used ATSC during their digital television transition.			
2.AVN	Connection	ATT	P2		Attribute Profile The ATT is a wire application protocol for the Bluetooth Low Energy specification. It is closely related to Generic Attribute Profile (GATT).			
4.Telematics	Telematics	ATT	P2	Automation Test Tool	Automation Test Tool PC tool to monitor and get logs of GM Telematics Control Unit			
2.AVN	Radio	Attack Time	P2		This determines how quickly the AGC (Automatic Gain control) circuitry decreases the PGA (Programmable gain Amplifier) gain when the input signal exceeds the target level. It is expressed in fractions of ADC sampling rates.			
2.AVN	System	AUD	P1	Audio Module (automotive) syno: Car Audio System	Car audio system is equipment installed in a car to provide in-car infotainment for the vehicle occupants.	The subject of car audio can seem pretty complicated at first, but there are just three basic components that every system has to include. The head unit provides an audio signal, the amplifier boosts it, and the speakers actually produce the sound. These components are highly dependent on one another, and the overall quality of a car audio system is determined by how they interact.	https://www.lifewire.com/thmb/Tli_1YWirnb07IGmETMHvNWzis=/768x0/filters:no_upscale():max_bytes(150000):strip_icc():format(webp)/10908170_64e0062ec6_b--Matteo-Martinello-56a103ea5f9b58eba4b69df0.jpg	

2.AVN	Navigation	Audible Guidance	P2		The guidance which play the pre-recorded wave or the wave generated by TTS (text-to-speech) synthesis to provide the information of bifurcation, destination and etc.		
2.AVN	System Base	Audio Analyzer	P1	N/A	An Audio Analyzer is a test and measurement instrument used to objectively quantify the audio performance of analog, digital or combined signal It can measure: <ul style="list-style-type: none"> - Level and gain - Frequency response - Total Harmonic Distortion plus Noise (THD+N) - Signal-to-Noise Ratio (SNR) - Crosstalk - Phase - Intermodulation Distortion (IMD) - Time domain display 		 A photograph of a Rohde & Schwarz RZO-A audio analyzer. It is a benchtop unit with a blue and white front panel. On the left, there are two BNC connectors labeled 'AUDIO IN' and 'AUDIO OUT'. In the center, there is a large digital display showing a waveform. To the right of the display are several buttons and a small screen. On the far right, there are more connectors and a power switch.
2.AVN	Media	Audio codec	P2		An audio codec is a computer program implementing an algorithm that compresses and decompresses digital audio data according to a given audio file or streaming media audio coding format. The objective of the algorithm is to represent the high-fidelity audio signal with minimum number of bits while retaining quality.	An audio codec is a codec (a device or computer program capable of encoding or decoding a digital data stream) that encodes or decodes audio	

2.AVN	Media	Audio codec formats	P2	<p>Audio codec formats</p> <ul style="list-style-type: none"> - FLAC: Free Lossless Audio Codec, delivers CD-quality audio in a file size smaller than an actual CD - WAV: Waveform Audio Format, is an uncompressed audio format that's great to use if you want to get the original recorded material without losing sound quality. This is especially true in cases with limited bandwidth. The audio in these files is crisp, and the sound is good over Bluetooth. - MP3: Moving Picture Experts Group Layer-3 Audio, is one of the most popular audio codecs. MP3 files use lossy compression, which compacts audio drastically. - WMA: Windows Media Audio, WMA files are smaller than their uncompressed counterparts, and similar in functionality to MP3s and FLAC files. this format sounds good over Bluetooth. Though WMA offers versatility, it's not compatible with all devices, especially Apple devices. - AAC: Advanced Audio Coding, is another lossy codec that provides small audio files and works great for online streaming. The compressed 		

2.AVN	Media	Audio Cue	P2	To cue audio is to determine the desired initial playback point in a piece of recorded music.	The run audio cue is played when the vehicle transitions from crank back to run, if applicable to the vehicle model. This is to provide indication that the vehicle is ready to go and is only used for electric powertrain vehicles. The run audio cue will only be played if audio cues are turned on in the user's settings. The run audio cue will be accompanied by the startup animation when the user immediately starts the vehicle from a key off state. In the case where the user first puts the vehicle in Accessory or Local Infotainment, only the startup animation will initially be played, and not until/if the user then starts the vehicle will the run audio cue be played.		
2.AVN	System	Audio DSP	P2	Audio Digital Signal Processors DSP is a specialized microprocessor, with its architecture optimized for the operational needs of digital signal processing. The goal of DSPs is usually to measure, filter or compress continuous real-world analog signals. Most general-purpose microprocessors can also execute digital signal processing algorithms successfully, but dedicated DSPs usually have better power efficiency thus they are more suitable in portable devices such as mobile phones because of power consumption constraints. DSPs often use special memory architectures that are able to fetch multiple data or instructions at the same time.	Digital signal processing algorithms typically require a large number of mathematical operations to be performed quickly and repeatedly on a series of data samples. Signals (perhaps from audio or video sensors) are constantly converted from analog to digital, manipulated digitally, and then converted back to analog form. Many DSP applications have constraints on latency; that is, for the system to work, the DSP operation must be completed within some fixed time, and deferred (or batch) processing is not viable. A typical digital processing system	 	
2.AVN	System	Audio priority	P2	Audio priority	Most of audio has their own priority. When sounds over two audio, higher priority audio sounds.		

2.AVN	Media	Audio Source	P0	N/A	"Audio source" is a term to indicate the input channel which contains audio files then media/audio player will use this channel to get audio data. For example: - USB - Bluetooth - CD/DVD - Radio - AUX			
2.AVN	Media	Audiobooks	P2		Audiobooks are voice recordings of the text of books that you can listen to in the car, on a computer or on a mobile phone or tablet			
3.Cluster	Cluster	AudioOutput	P1	N/A	- The function test with many type of AUDIO source that can be output from the vehicle (FM / AM, USB, BT, etc.).			
4.Telematics	Application	Auth Code	P0	Authentication Code	In telematics, some application required authentication process between telematics device with other component to ensure the certification connection. Authentication code is stored in both telematics unit and the other for ensure security of communication.	For example: + Authentication code between telematics unit with the call center server. + Authentication code between 2 ECUs inside vehicle		
2.AVN	Connection	Auth Code	P2		Authentication Code	Stored in both telematics unit and OCC. When making connection between telematics and OCC, authentication process need to perform to ensure Certificate connection		
2.AVN	Connection	Authentication process	P2		Process occur before connection	If you select a secured WiFi network, you need input password of this network.		
2.AVN	Navigation	Auto Re-Planning	P2		If it is Off-Route which is judged by the criteria of route guidance, it automatically re-search the route from the current position to the destination.			
2.AVN	Radio	Auto Store	P2		- Auto Store : The stations that are valid for the reception band are stored in the preset according to the reception quality.			

4.Telematics	Telematics	Automatic Emergency Call	P1		Automatic Emergency Call is an emergency Call which is triggered by automatically such as crash signal or airbag signal.	When telematic box receives crash or airbag signal, it will trigger an emergency call to emergency center. It is different type with manual emergency call, when driver presses the emergency button to trigger a call to emergency center.		
1.Common	Common	AUTOSAR	P0	<u>Automotive Open System Architecture</u>	The AUTOSAR development partnership was formed in July 2003 by BMW, Bosch, Continental, Daimler, Chrysler, Siemens VDO and Volkswagen to develop and establish an open industry standard for automotive E/E architecture.	It pursues the objective of creating and establishing an open and standardized software architecture for automotive electronic control units (ECUs). Goals include the scalability to different vehicle and platform variants, transferability of software, the consideration of availability and safety requirements, a collaboration between various partners, sustainable utilization of natural resources, and maintainability throughout the whole "Product Life Cycle"		
1.Common	Audio	AUX	P0	<u>AUXiliary</u>	- It's also known as auxiliary jack/port/input or phone connector (audio), is a family of electrical connectors typically used for analog audio signals. - In your car, it is usually a 3.5mm jack - AUX sends sound to the multimedia system, enabling you to 'stream' music from a device through the car's speakers	The most common arrangement remains to have the male plug on the cable and the female socket mounted in a piece of equipment: the original intention of the design. Common case: vehicle has AUX female socket (AUX-IN), driver uses jack connector plug to connect music player to vehicle to use vehicle's speaker to play music.		
2.AVN	Projection	Auxiliary Rotary Encoder	P2		Auxiliary Rotary Encoder is a MFC (Multi-Function Controller) contribute to communicate with CSM (Center Stack Module)	A secondary encoder placed directly on the load for dual loop control to eliminate position errors caused by backlash and machine flexure. The primary encoder would typically be placed on the motor and be used for velocity feedback and commutation.		

1.Common	Audio	AUX-IN	P2	<u>Auxiliary Input</u>	<p>An aux-in (or auxiliary-in) socket in your car is a 3.5mm jack which allow you to transmit media data from the handset devices to car's audio system</p> <p>Any device that features the correct 3.5mm socket can be connected to a car. You simply need an auxiliary cable with the same 'headphone' plug in each end to marry the two.</p> <p>It's the simplest type of media connection, so can't send commands along with the music. This means if you want to change track you'll have to do that on the device itself, rather than being able to do this using the car's controls like most other connections, including Bluetooth and USB.</p>	<p>AUX-IN là một cổng giao tiếp cho phép thực hiện phát nhạc từ thiết bị phát nhạc cầm tay (như điện thoại, ipod) ra hệ thống phát nhạc của xe. Cổng này thường sử dụng loại có kích thước 3.5mm.</p>	
2.AVN	Media	AV socket	P0	<u>Audio Video socket</u>	<p>Audio connectors and video connectors are electrical connectors (or optical connectors) - plugs and sockets - for carrying audio signal and video signal.</p> <p>There are 2 types of AV sockets: AV-IN and AV-out.</p> <p>AV-IN socket: use device contains AV-IN socket as output.</p> <p>AV-OUT socket: use device contains AV-OUT socket as input</p>		
2.AVN	Connection	Available AP	P2		<p>Available Access Point</p> <p>The access points is displayed in WiFi's list .</p>		
2.AVN	Media	AVB	P2		<p>Audio Video Bridge, AVB, is a method for transport of audio and video streams over Ethernet-based networks. It is based on ratified IEEE standards for Ethernet networks that define signaling, transport and synchronization of the audio and video streams.</p>		
2.AVN	Media	AVC	P0	<u>Audio Video Codec</u>	<p>In software, Audio Video Codec is program/libraries that compresses/decompresses digital audio/video according to the given format like MPEG4, FLAC ...</p>		

2.AVN	Connection	AVCTP	P2		Audio/Video Control Transport Protocol Defines the transport mechanisms used to exchange messages for controlling Audio or Video devices. Two roles are defined: 1. Controller (CT): The device initiating an AVCTP transaction by sending a command message 2. Target (TG): Remote device receiving the command message and returning responses to the controller		
2.AVN	Connection	AVDTP	P2		Audio Video Distribution Transport Protocol The AVDTP is used by the advanced audio distribution profile to stream music to stereo headsets over an L2CAP channel intended for video distribution profile in the bluetooth transmission.		
1.Common	Common	Average fuel consumption	P0	N/A	Indicates the average fuel consumption since the function was last reset. It relates distance traveled by a vehicle and the amount of fuel consumed. Consumption can be expressed in terms of volume of fuel to travel a distance (L/km or L/100km), or the distance travelled per unit volume of fuel consumed (km/L). Miles per gallon (mpg) is commonly used in the United States, the United Kingdom, and Canada (alongside L/100 km). Kilometers per liter (km/L) is more commonly used elsewhere in the Americas, Asia, parts of Africa and Oceania.	Lượng tiêu thụ nhiên liệu trung bình	
1.Common	Common	Average speed	P0	N/A	Indicates the average speed since the function was last reset. Press reset button to set to zero Speed is expressed by the traveled distance in a unit of time as number of kilometers per hour (km/h) or number of miles per hour (mph)		
2.AVN	Media	AVI	P2		Audio Video Interleave (also Audio Video Interleaved), known by its initials AVI, is a multimedia container format introduced by Microsoft in November 1992 as part of its Video for Windows software AVI files can contain both audio and video data in a file container that allows synchronous audio-with-video playback		

2.AVN	Camera	AVM	P0	<u>Arround View Monitor/ Monitoring</u>	<p>Arround view monitor/ monitoring is a support technology that assists drivers to park more easily by better understanding the vehicle's surroundings through a virtual bird's-eye view from above the vehicle. The Arround View Monitor helps the driver visually confirm the vehicle's position relative to the lines around parking spaces and adjacent objects, allowing the driver to maneuver into parking spots with more ease.</p>	<p>The Arround View Monitor processes video from four cameras, displaying the composite footage on the screen as if there is a single birds-eye view camera right above the vehicle. This makes parking much easier.</p> <p>Through the bird's-eye view, a driver can check for obstructions around the vehicle. The system can display the bird's-eye, front and rear views, making it possible to check the vehicle's 360-degree surroundings simultaneously with either the fore and back.</p>		 
1.Common	ECU	AVN	P0	<u>Audio Video Navigation</u>	<p>AVN is a device which is installed inside vehicle to mainly support entertainment applications such as media, radio, connectivity (bluetooth, usb, aux..), navigation, news... Some types of AVN also provide vehicle's status or vehicle information and allow driver to perform some remote functions inside vehicle like climate or heating.</p> <p>Same functions as head unit</p>	<p>AVN includes both hardware and software. Driver or passenger can interact with AVN via buttons or touch screen.</p>		

2.AVN	Bluetooth/Phone	AVRCP	P1	<u>Audio/Video Remote Control Profile</u>	<ul style="list-style-type: none"> - AVRCP is a Bluetooth profile that allows remote control of media playback on other devices. Supported functions are play, pause, stop, next, and previous. - It defines the features and procedures to ensure interoperability between BT devices with audio/video control functions. - This profile does not handle audio/video streaming 	<ul style="list-style-type: none"> - In this profile, the controller translates the detected user action to the A/V control signal and then transmits it into a remote BT device. - It is dependent into GAP (Generic Access Profile) 		
2.AVN	Vehicle	AW	P2		Assistant Windows	a help feature of a software package that automates complex tasks by asking the user a series of easy-to-answer questions.		
2.AVN	Vehicle	AWD	P2		All Wheel Drive	All wheel drive (AWD) historically was synonymous with "four-wheel drive" on four-wheeled vehicles, and six-wheel drive on 6x6s, and so on, being used in that fashion at least as early as the 1920s		
4.Telematics	Telematics	AYS	P2	At Your Service	At Your Service	AtYourService, a multichannel platform providing Chevrolet, Buick, GMC and Cadillac owners who subscribe to OnStar with money-saving offers on products and services is adding Groupon and ExxonMobil as partners		
2.AVN	Bench	B+ button on Bench	P2		Battery	AVN system have to get energy from Battery (12+ Voltage) to Turn ON. (Battery button is operated like as clamp 30)		

2.AVN	Connection	B2Bi	P2		Business to Business Integration B2B Integration means the integration, automation and optimisation of key business processes that extend outside the four walls of a companies organisation.			
2.AVN	System	Back switch	P2		Back switch is one switch in Cadillac Infotainment Controller (6)	Pressing the Back switch performs the same system function as when a Back button is displayed on the touchscreen (e.g., when in an application sub-view).		
2.AVN	Radio	Background SCAN (BST - Background scanning tuner)	P2		<ul style="list-style-type: none"> - It consists of Dual Tuner (Main Tuner and Sub Tuner). - The main tuner operates the sound output of the reception broadcasting the sub tuner operates the AF update, the regional change, the EON TA and the background SCAN. - The Background operation detects broadcasts that can be received in the current area and updates the FM / AM list 			
1.Common	Power Mode	BUB	P0	Backup Battery	Backup Battery is used if primary battery has issue to ensure important functions can not be interrupted.	<p>There are two types of BUB:</p> <ul style="list-style-type: none"> - Vehicle BUB: if primary battery is failure, vehicle can switch to BUB for some important and main funtions - ECU BUB: In normal conditions, ECU uses vehicle battery for its power. But incase of failure and maitaining the collision call, it switch to a built-in BUB. BUB is rechargeable from vehicle power 		
2.AVN	Navigation	Backward Search	P2		The search method which finds route from destination to departure point.			
2.AVN	Phone Projection	Baidu CarLife	P0	N/A	Baidu CarLife is an app that can run on Android or iOS devices. It uses Baidu's own voice control engine, similar to Siri or Google Voice.	Operating system required in mobiphone: Android 4.1 / IOS 7 and above. Users can connect their cars and smartphones via Wifi or USB cable. CarLife supports navigation, hands-free calling and music steaming.		

2.AVN	Projection	Baidu CarLife QR Code	P2		The Baidu CarLife QR Code pop-up is shown when the Baidu CarLife icon is selected and the connected device does not have CarLife installed	Scan code with your device to download CarLife		
2.AVN	Radio/Media	Balance/Fader	P2		These two controls adjust the strength of the sound coming from each speaker. The Balance control adjusts the side-to-side strength The Fader control adjusts the front-to-back strength.	Enter Audio application of Head unit, enter sound to adjust Balance/Fader		
2.AVN	Radio	Ballgame mode	P2		Ballgame mode It is a mode of HD station for sport channel	This feature means that a main FM station will broadcast live events, where the content of the programming is more important than sound quality, in analog mode only to help prevent the delay between analog and digital broadcasting		
1.Common	Network/Protocol	BAP	P2	<u>Bedien und Anzeigeprotokoll</u> (Operating and Display Protocol)	BAP is a control and display protocol which designed to exchange control and display information between control units. In the automotive technology, there are driver assistance systems which support the driver by visual, tactile and auditory information while driving his motor vehicle. These systems also take different view for the comfort and infotainment. Due to the many features of these systems it is required to standardize the interfaces, operation and display. To meet these requirements, the Hersteller Initiative Software (HIS) has developed a transfer protocol for the operation and display: The Bedien und Anzeigeprotokoll (BAP). ☺	Within the OSI model, the BAP uses layer 2-7, layer 1 (sometimes also layer 2) adopt common protocols such as LIN, CAN or Flexray. An example of interaction between function and display control units is the activation of a climate function via operating menus in the vehicle.		

2.AVN	System	BAT	P2		Build Acceptance Test, otherwise known as smoke testing, is a small, quick check against the software to prove that it is acceptable to continue testing further. This can be performed either manually or automated. Build Acceptance Testing is Sanity testing where the build is accepted for Testing															
1.Common	Power Mode	BATT / B+	P0	<u>BATT</u> ery	Battery or an automotive battery is a rechargeable battery that supplies electrical current to a motor vehicle.	- Main purpose of battery: feed the starter, which starts the engine. Once the engine is running, power for the car's electrical systems is supplied by the alternator. - Every Bench will have battery to supply electric for some function when Power Off														
3.Cluster	Cluster	BatteryControl	P1	N/A	This function handle and display bellow information: - Battery Charge - E-Power - Charging Socket - Charging Connection state	Battery level indication The barograph indicates the current battery level on the scale. The reserve area is visually separated. Reserve area: The reserve is reached at 20% SOC Color definition of the barograph filling: <input type="checkbox"/> White <input type="checkbox"/> yellow <input type="checkbox"/> red		<table border="1"> <tr><td>Rest range indication - SOC > 21 %</td><td></td></tr> <tr><td>Rest range indication - SOC < X %</td><td></td></tr> <tr><td>Rest range indication - SOC < Y %</td><td></td></tr> <tr><td>Rest range based on navigation - SOC > 21 %</td><td></td></tr> <tr><td>Rest range based on navigation - SOC xxxxx</td><td></td></tr> <tr><td>Rest range based on navigation - SOC xxxxx</td><td></td></tr> </table>	Rest range indication - SOC > 21 %		Rest range indication - SOC < X %		Rest range indication - SOC < Y %		Rest range based on navigation - SOC > 21 %		Rest range based on navigation - SOC xxxxx		Rest range based on navigation - SOC xxxxx	
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Rest range based on navigation - SOC > 21 %																				
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Rest range based on navigation - SOC xxxxx																				
2.AVN	Power Mode	Battery voltage	P2		Battery voltage Điện áp ác quy															
4.Telematics	Phone	B-Call or bCall	P1		Breakdown Call Transmit your location and all relevant vehicle information to Assistance at the touch of a button	<ul style="list-style-type: none"> • Can be activated quickly and easily at the press of a button • Communicates exact location and vehicle data to the Roadside Assistance service • Connects you straight to the Roadside Assistance service and ensures help is quickly on the way to you 														

1.Common	ECU	BCM	P0	<u>Body Control Module</u>	<p>Body Control Module: In automotive electronics, body control module or 'body computer' is a generic term for an electronic control unit responsible for monitoring and controlling various electronic accessories in a vehicle's body. Typically in a car the BCM controls the power windows, power mirrors, air conditioning, immobilizer system, central locking, etc.</p> <p>The BCM communicates with other on-board computers (like ECU) via the car's vehicle bus, and its main application is controlling load drivers – actuating relays that in turn perform actions in the vehicle (actuators) such as locking the doors or dimming the salon overhead lamp.</p>	
2.AVN	Connection	BD_ADDR	P2		<p>Bluetooth Device Address</p> <p>The Bluetooth device address stores the network address of a Bluetooth-enabled device. It is used to identify a particular device during operations such as connecting to, pairing with, or activating the device.</p> <p>A Bluetooth-enabled device address is a unique, 48-bit address containing the following three fields:</p> <ul style="list-style-type: none"> - LAP field: lower part of the address containing 24 bits. - UAP field: upper part of the address containing 8 bits. - NAP field: non-significant part of the address containing 16 bits. <p>The LAP and the UAP represent the significant address part (SAP) of the Bluetooth device address.</p>	
4.Telematics	Common	BDC	P2	Body Domain Controller	<p>The body domain controller (BDC) is the central control unit in the body electronics</p> <p>The Body Domain Controller (BDC) is a newly developed control unit with many integrated functions. The aim is to reduce the number of control units and improve component networking. At the same time, the optimisation of the wiring harness reduces the physical bus capacity.</p>	

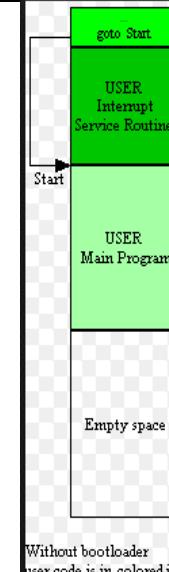
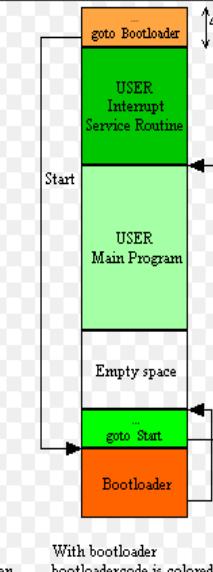
2.AVN	System	BE	P2	Backend System In software engineering, the terms front end and back end refer to the separation of concerns between the presentation layer (front end), and the data access layer (back end) of a piece of software, or the physical infrastructure or hardware. In the client-server model, the client is usually considered the front end and the server is usually considered the back end.	Back-end systems deal with databases and data processing components, so the purpose of the back-end system is to launch the operating system's programs in response to front-end system requests and operations. In other words, the back-end system implements responses to what the front end has initiated.		<pre> graph LR subgraph Front_end [Front-end] Website[Website] PG[Payment Gateway] 3PS[3rd Party Services] end subgraph Back_end [Back-end] FCI[Full-Cycle Insurance] QE[Quote Engine] DM[Documents Management] DM[Diary Management] DB[Database] AC[Accounting] end Website --> WS[Web Service] PG --> WS 3PS --> WS WS <--> FCI WS <--> QE WS <--> DM WS <--> DM WS <--> DB WS <--> AC </pre>
2.AVN	Vehicle	BEM	P2	Battery Electric Module/ Battery Energy Management	Battery Electric Module	An electric-vehicle battery (EVB) or traction battery is a battery used to power the propulsion of battery electric vehicles (BEVs). Vehicle batteries are usually a secondary (rechargeable) battery. Traction batteries are used in forklifts, electric golf carts, riding floor scrubbers, electric motorcycles, electric cars, trucks, vans, and other electric vehicles.	
2.AVN	System	BER	P2	Bit Error Rate: in digital transmission, is the number of received bits of a data stream over a communication channel that have been altered due to noise, interference, distortion or bit synchronization errors.	The bit error rate (BER) is the number of bit errors per unit time. The bit error ratio (also BER) is the number of bit errors divided by the total number of transferred bits during a studied time interval. Bit error ratio is a unitless performance measure, often expressed as a percentage.		<p>Pattern Generator transmitted data</p> <p>BER Tester Received data</p> <p>error</p> <p>Bit Error Rate, BER</p> $= \frac{\text{Number of errors}}{\text{Total number of bits sent}}$

1.Common	Vehicle Type	BEV	P0	<u>Battery Electric Vehicle</u>	<p>Battery Electric Vehicle: A battery electric vehicle (BEV), battery-only electric vehicle (BOEV), full electric vehicle (FEV) or all-electric vehicle is a type of electric vehicle (EV) that uses chemical energy stored in rechargeable battery packs. BEVs use electric motors and motor controllers instead of internal combustion engines (ICEs) for propulsion. They derive all power from battery packs and thus have no internal combustion engine, fuel cell, or fuel tank. BEVs include - but are not limited to - motorcycles, bicycles, scooters, skateboards, rail cars, watercraft, forklifts, buses, trucks, and cars.</p>	<p>BEV is a electric vehicle</p> <ul style="list-style-type: none"> - Use electric motors and motor controllers - Power is derived from battery packs - No internal combustion engines (ICEs) for propulsion. - No fuel cell/tank 	<p>BEV là xe sử dụng hoàn toàn năng lượng điện để chuyển hóa thành năng lượng cơ học. Trên xe BEV chỉ sử dụng động cơ điện (electric motor) để tạo ra chuyển động cho xe thay vì sử dụng động cơ đốt trong (ICE) thông thường.</p>	
2.AVN	Radio	BFO	P2		<p>Beat Frequency Oscillator A beat frequency oscillator or BFO is a dedicated oscillator used to create an audio frequency signal from Morse code radiotelegraphy (CW) transmissions to make them audible</p>			
2.AVN	Radio/Media	BG	P2		<p>Background</p>	<p>An application is in background mean that this function is not using and displayed in screen</p>		
2.AVN	System	BIOS	P2		<p>Basic Input Output System: is non-volatile firmware used to perform hardware initialization during the booting process (power-on startup), and to provide runtime services for operating systems and programs.</p>	<p>BIOS is software stored on a small memory chip on the motherboard. You might need to access BIOS to change how the device works or to assist in troubleshooting a problem</p>		
2.AVN	Connection	BIP	P2		<p>Basic Imaging Profile</p>	<p>This profile is designed for sending images between devices and includes the ability to resize, and convert images to make them suitable for the receiving device</p>		

2.AVN	System	Bit Position	P2		Lay out position in the message; Byte order adopt Motorola data type			
2.AVN	System	BitBake	P2		BitBake: A tool that reads metadata and runs tasks			 BitBake → Metadata → Tasks
2.AVN	Connection	BLE	P2		Bluetooth Low Energy The lastest enhancements to the BT technology that was added as a part of BT 4.0 specification	Data transfer rate < 100 kbps, working in sleep mode Object exchange (OBEX) & audio/video distribution (A2DP) are not offered in BLE		
2.AVN	Radio	Block Explicit	P0	N/A	It is a setting s to block/allow explicit content to display or play. The explicit content is applied when the lyrics or content of a song or a music video, streaming contain one or more of the following criteria which could be considered offensive or unsuitable for children: strong language, violence, mental abuse, sexualised behavior, racist, homophobic, misogynistic or other language that could be considered discriminatory; dangerous or criminal behaviour.	Example: On Radio, set in Audio Setting of SXM source. Set ON means the explicit content will be blocked. Set OFF means allow explicit content.	Chế độ chặn thông tin nhạy cảm, bao lực (thường dùng khi gia đình có trẻ em)	
		Block Explicit On						

4.Telematics	Telematics	BlueLink	P2	N/A	<p>A connected vehicle system using an embedded telematics to gather vehicle Car Care information such as Monthly Vehicle Health Report and Automatic Crash Notifications.</p>	<p>The system utilizes mobile apps to allow the customer to Remote Start, Stop, Lock or Unlock their Hyundai.</p> <p>Blue Link functionality varies based on the type of vehicle, as well as the type of radio the vehicle is equipped with. For example, the basic, non touch-screen radios will not offer services such as send-to-car for destination assist, which requires that the vehicle be equipped with the GPS navigation system.</p> <p>Smartphones can connect to Hyundai Blue Link using bluetooth technology or a USB cable and an installed Hyundai Blue Link mobile application</p>		
2.AVN	Connectivity	Bluetooth / BT	P0	Bluetooth	Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices, and building personal area networks			
2.AVN	Connection	Bluetooth SIG	P2		Bluetooth Special Interest Group Bluetooth SIG is the standards organisation that oversees the development of Bluetooth standards and the licensing of the Bluetooth technologies and trademarks to manufacturers.			
2.AVN	Media	BMP	P2		Bitmap Image	BMP file format, also known as bitmap image file or device independent bitmap (DIB) file format or simply a bitmap, is a raster graphics image file format used to store bitmap digital images, independently of the display device (such as a graphics adapter), especially on Microsoft Windows[1] and OS/2[2] operating systems.		

2.AVN	System	BMS	P2	<p>Battery Management System: (BMS) is any electronic system that manages a rechargeable battery (cell or battery pack), such as by protecting the battery from operating outside its Safe Operating Area, monitoring its state, calculating secondary data, reporting that data, controlling its environment, authenticating it and / or balancing it</p>			<pre> graph TD Measurement((Measurement)) --> Control((Control)) Control --> Diagnosis((Diagnosis)) Diagnosis --> Communication((Communication)) Communication --> Measurement subgraph BMS [BMS KEY FUNCTIONS] Measurement Control Diagnosis Communication end Measurement --- "Measures general information of battery such as voltage, current, and temperature, etc." Control --- "Controls the battery temperatures and cell balancing." Diagnosis --- "Diagnoses the safety of battery and detects errors." Communication --- "Provides battery data by communicating with PCBs and operating system." </pre>
3.Cluster	Cluster	BMSH	P2	<p>Battery Management System HighVoltage: Hệ thống quản lý pin Điện áp cao</p>	<p>There are vehicles that divide the charger's power supply case to high and low. When plugging the BMSH into the car to charge directly to the battery. The system will show the charging current is HighVoltage.</p>		
3.Cluster	Cluster	BMSL	P2	<p>Battery Management System Low Voltage: Hệ thống quản lý pin Điện áp thấp</p>	<p>There are vehicles that divide the charger's power supply case to high and low. When plugging the BMSL into the car to charge directly to the battery. The system will show the charging current is LowVoltage.</p>		
2.AVN	Connection	BNEP	P2	<p>Bluetooth Network Encapsulation Protocol BNEP is used for delivering network packets on top of L2CAP.</p>	<p>This protocol is used by the personal area networking (PAN) profile. BNEP performs a similar function to Subnetwork Access Protocol (SNAP) in Wireless LAN.</p>		
2.AVN	System	BOI	P2	<p>Business Operation Integrator (backend)</p>	<p>This is related to telematics function</p>		
2.AVN	System	Bootblock	P2	<p>Independent Software which is permanently present in the ECU containing startup and SW-download functionality. A dedicated block usually at the beginning (first block on first track) of a storage medium that holds special data used to start a system. Some systems use a boot block of several physical sectors, while some use only one boot sector.</p>	<p>Independent Software which is permanently present in the ECU containing startup and SW-download functionality.</p>		<pre> boot block super block inode list data blocks File System Layout </pre>

2.AVN	System	BootLoader	P2	Part of the Bootblock, which holds all functionality to erase, download and check application SW.	Part of the Bootblock, which holds all functionality to erase, download and check application SW.			<p>Without bootloader user code is in colored in green</p>
2.AVN	System	BootManager	P2	Part of Bootblock, which performs SW-validity checks during start-up and starts either BootLoader or application SW.	Part of Bootblock, which performs SW-validity checks during start-up and starts either BootLoader or application SW.			<p>With bootloader bootloader code is colored in red</p>
2.AVN	Projection	BP	P2	Baseline Profile	low level profile for mobile equipment(ex.. 2G Phone)and released at 2003 it is old profile so low compression late comparing new profile such as High profile, High 10 profile.			
2.AVN	Connection	BR	P2	Basic Rate Maximum Physical Layer data rate of 1 megabit per second (Mbps).				
4.Telematics	Telematics	BS	P2	Block Size	The maximum number of N_PDU's the receiver allows the sender to send, before waiting for an authorization to continue transmission of the following N_PDU's.			

3.Cluster	Cluster	BSG	P2	BSG: Belt Driven Starter Generator	The Belt Driven Starter Generator (BSG) system uses a bellow method to start the engine: a reversible alternator which also acts as an electric motor, in this case mimicking a starter motor. The BSG is integrated into the belt drive system of a conventional combustion engine in the same way a normal alternator is, as it has the same fixing points. The main difference with a standard belt drive system is the reinforcement of the belt tensioning, the BSG acts bidirectional on the belt to speed up the combustion engine during start-up.		
2.AVN	System	BSM	P1	Bus Sleep Mode	Bus-sleep mode: A mode of CAN bus. Head unit will go to bus sleep mode in pre-condition of Klamp signal S = OFF , Klamp signal 15 = OFF. After specific time (e.g. 70 seconds), Head unit goes to OFF mode from bus sleep mode. The communication controller is switched into the sleep mode, respective wakeup mechanisms are activated and finally power consumption is reduced to the adequate level in the Bus-Sleep Mode.		
2.AVN	Radio	BSM	P2	Best Station Memory	When you are scanning for radio channel, press the button BSM will activate BSM ON The stations with the strongest signals will be stored in order of their signal strength		
4.Telematics	Telematics	BSP	P2	Board Support Package	A board support package (BSP) is essential code for a given computer hardware device that will make that device work with the computer's OS (operating system). The BSP contains a small program called a boot loader or boot manager that places the OS and device drivers into memory.		

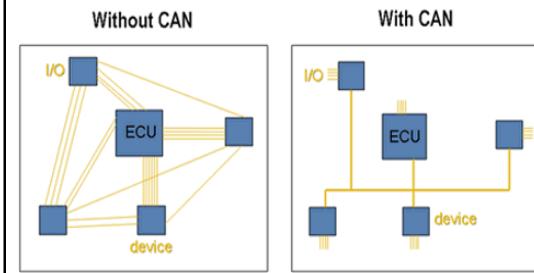
2.AVN	Connection	BT 2.0+EDR BT 2.0+HS	P2	Bluetooth 2.0 + Enhanced Data Rate / Bluetooth 2.0 + High Speed	BT BR (Basic rate) support a max. data rate of 721 kbps BT 2.0+EDR: Max. 2.1 Mbps BT3.0+HS: Max. 24 Mbps		
2.AVN	Phone	BT phone	P2		Bluetooth phone - Phone that support Bluetooth functions	When BT supported phone connect to AVN via BT, it's able to stream BT music, make phone call and other BT functions	
2.AVN	Voice Recognition	BT SR	P1	<u>Blue</u> <u>T</u> <u>ooth</u> <u>S</u> peech <u>R</u> ecognition	Bluetooth speech recognition: transform voice to text by computers via BT connection to execute command Another SPEECH RECOGNITION: Google Assist, Apple Siri	Example from project MIB3: - Pair phone with HU via BT with Internet available, Press PTT button. Then use voice to request command - User just order the features of the phone (Ex: Play music on Phone, Call, Send message), can not order to play AM or FM - When there are 2 or more phones connected with HU, the connected phone VR session to be triggered should be based on the following priority order: Projection Device, Outgoing BT source	
2.AVN	Connectivity	BTA	P0	<u>Blue</u> <u>T</u> <u>ooth</u> <u>A</u> udio	Bluetooth audio is a short-range radio technology that was developed to provide wireless audio and data transmission. Two Bluetooth-enabled devices (like a mobile phone and a car) can be paired so that they establish a communication link when they come within range of each other.	After Phone and Car are paired via Bluetooth, open the Bluetooth Audio App or Bluetooth Source on HU to choose your audiobook and start listening.	Chức năng Bluetooth audio cho phép người dùng có thể nghe nhạc từ nguồn nhạc trên điện thoại mà đã được kết nối BT với H/U của người dùng. 
2.AVN	Connection	BTAS	P2		Bluetooth Audio Sound It is the sound output when playing audio via Bluetooth		
2.AVN	Connection	BTHS	P2		Bluetooth Handset Some hand devices (for ex Phone) use Bluetooth		

2.AVN	System	Bus-off	P2	<p>Bus-Off state</p> <p>A “bus off state” refers to a CAN controller state that ceases message transmission when the error counter exceeds 255 and is controlled by the CAN controller hardware.</p>	In testing: to make bus-off, we need to use a pincer to attach CAN HIGH with CAN LOW		<p>Error Confinement and Error states:</p> <pre> graph TD Active((Active)) --> ErrorActive((Error Active)) Passive((Passive)) --> ErrorActive BusOFF((Bus OFF)) --> ErrorActive ErrorActive --> REC127[REC/TEC > 127] REC127 --> TEC255[TEC > 255] TEC255 --> BusOff((Bus Off)) REC127 --> REC128[REC/TEC < 128] REC128 --> Reset[Reset or Configuration of 128x11 recessive bits] Reset --> ErrorPassive((Error Passive)) ErrorPassive --> ErrorActive </pre> <p>REC: Receiver Error Counter TEC: Transmit Error Counter</p>
2.AVN	Vehicle	Buttons on Bench	P2	<p>(1) (2) : FAV +/- scroll up and down (7): Press the scroll to choose (5): BT-SR (Bluetooth Speech Recognition) and Answer call (6) End call or Audio volume muted (3) Increase volume of Audio (4) Decrease volume of Audio</p>	<p>(1) (2) : FAV +/- scroll up and down (7): Press the scroll to choose (5): BT-SR (Bluetooth Speech Recognition) and Answer call (6) End call or Audio volume muted</p>		
2.AVN	Connection	BW	P2	Bandwidth is the bit-rate of available or consumed information capacity expressed typically in metric multiples of bits per second	Can test by wifi tool: iperf, wireshark, wifi analyzer ..		
4.Telematics		BWS	P2	This is one kind of data service for Radio			
2.AVN	System	C	P2	Conditional is the probability of an event A given that another event B has occurred			
2.AVN	Radio	C/N	P2	<p>Carrier-to-noise</p> <p>The carrier-to-noise ratio, often written CNR or C/N, is the signal-to-noise ratio (SNR) of a modulated signal. The term is used to distinguish the CNR of the radio frequency passband signal from the SNR of an analog base band message signal after demodulation, for example an audio frequency analog message signal. If this distinction is not necessary, the term SNR is often used instead of CNR, with the same definition.</p>			
2.AVN	Projection	CAB	P2	Contextual action bar: A contextual action bar (CAB) is a temporary action bar that overlays the Navigation/Status bar for the duration of a particular sub-task	CABs are most typically used for tasks that involve acting on selected data or text.		

2.AVN	Navigation	Cache Database	P2		That is an NDS database which is stored onboard. The cache database contains always the freshest data supporting all onboard functions for a certain subarea. Roughly speaking, this area contains the current car position and some vicinity to ensure that the onboard application always works with fresh cache data. In particular, this means that this area is not statically defined but dynamically moves around, e.g., with the current car position. The area of the cache depends not only on the current car position but also on other parameters like the currently active route or the currently shown map.		
4.Telematics	Telematics	C-ACK	P2	<u>Communication Acknowledge</u>	Is the acknowledge supported in the VDS protocol	which is used mainly as the purpose for the message sender to know when the message is got by the receiver in the asynchronous communication	
2.AVN	Vehicle	CAI	P2		Cabin Air Ionisation	An air ioniser (or negative ion generator or Chizhevsky's chandelier) is a device that uses high voltage to ionise (electrically charge) air molecules	
2.AVN	System	Calibration	P2		Calibration is the process of configuring an instrument to provide a result for a sample within an acceptable range. With GM project, ATT is a tool for calibration.		
2.AVN	System	Call connection Strategy	P2		The strategy to setup the data call from telematics unit to OCC This applied for some type of call as: Collision Detection call, Theft Notification, Onstar advisor, Emergency call, Enrollment call...		

2.AVN	Phone call	Call State	P0	N/A	<p>There are some Call State with from start a call to hang up call:</p> <ul style="list-style-type: none"> 0 - Call Start 1 - Incoming Call 2 - Call Failed - reconnection 3 - Call Failed 4 - Call Connecting 5 - Call Connected 6 - Call data sending 7 - Call ended 		
4.Telematics	Telematics	Caller/Me on OnStar Personal call	P2	N/A	<p>When vehicle not moving, can use TTY mode for Active Call By using IPC tool to display send/receive text of "Caller" and "Me"</p> <p>I. How to open IPC tool</p> <ol style="list-style-type: none"> 1. Copy "\IPC-Simulator-2\IPC_Sim\IPCSim" into App on QNX (each time update MW) 2. Open putty.exe, Host name: 10.10.10.2, Connection type: Telnet -> Open 3. Login user: root, pass: root 4. Copy and paste this on putty sync cd App SOCK=/alt ./IPCSim 9999 & 5. Enter 6. Double click on \IPC-Simulator\IPC_Sender\sender.html "Connected to: 10.10.10.2:9999" Choose module: OnStarphone Check text for "Me": Choose IDM_MONSTAR_AMAIN_ONSTARPHONE_RES_TTYRECEIVETEXT Check text for Sender: Choose IDM_MONSTAR_AMAIN_ONSTARPHONE_RES_SENDDTYTEXTRESPONSE 		

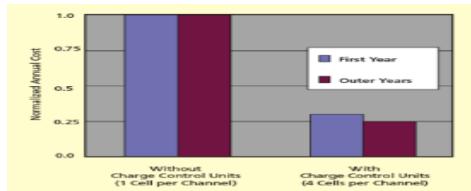
1.Common	Network/Protocol	CAN	P0	<u>Controller Area Network</u>	<p>Controller Area Network: Internal network protocol in car to communicate between ECUs. It is a message-based protocol, designed originally for multiplex electrical wiring within automobiles to save on copper. CAN speed can reach to 1 Mbps CAN is most spread network in the car.</p>	<p>CAN is a multi-master serial bus standard for connecting Electronic Control Units (ECUs) also known as nodes. Two or more nodes are required on the CAN network to communicate. All nodes are connected to each other through a two wire bus. The wires are a twisted pair with a $120\ \Omega$ (nominal) characteristic impedance</p>	<p>Ô tô hiện đại có thể chứa đến hơn 70 đơn vị điều khiển điện tử. Từ đơn vị quan trọng nhất là điều khiển động cơ cho đến các đơn vị điều khiển truyền động, túi khí, chống bó cứng phanh, điều khiển hành trình, hệ thống âm thanh, cửa, cửa sổ, gương, nguồn điện, hay hệ thống thống sạc cho các xe điện... Một số hệ thống này có thể hoạt động độc lập, tuy nhiên về cơ bản tất cả các đơn vị này cần được kết nối với nhau. Bên trong mỗi một hệ thống nhỏ cũng cần có kết nối đến các bộ phận chấp hành (actuator) và nhận dữ liệu từ các cảm biến. Chuẩn CAN được sinh ra để phục vụ cho các kết nối đó.</p>																																							
1.Common	Network/Protocol	CAN message	P2	<u>Controller Area Network Message</u>	<p>It's the message/frame transmitted on a CAN bus.</p> <ul style="list-style-type: none"> - There are 2 different frame formats: + Standard contains 11-bit identifier + Extended contains 29-bit identifier. <p>Both support up to 8 bytes data.</p>		<table border="1"> <thead> <tr> <th>Field name</th> <th>Length (bits)</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>Start-of-frame</td> <td>1</td> <td>Denotes the start of frame transmission</td> </tr> <tr> <td>Identifier (green)</td> <td>1</td> <td>A (unique) identifier which also represents the message priority</td> </tr> <tr> <td>Remote transmission request (RTR) (blue)</td> <td>1</td> <td>Must be dominant (0) for data frames and recessive (1) for remote request frames (see Remote Frame, below)</td> </tr> <tr> <td>Identifier extension bit (IDE)</td> <td>1</td> <td>Must be dominant (0) for base frame format with 11-bit identifiers</td> </tr> <tr> <td>Reserved bit (r0)</td> <td>1</td> <td>Reserved bit. Must be dominant (0), but accepted as either dominant or recessive</td> </tr> <tr> <td>Data length code (DLC) (yellow)</td> <td>4</td> <td>Number of bytes of data (0-8 bytes)^a</td> </tr> <tr> <td>Data (red)</td> <td>0-64 (0-8 bytes)^b</td> <td>Data to be transmitted (length in bytes dictated by DLC field)</td> </tr> <tr> <td>CRC</td> <td>15</td> <td>Cyclic redundancy check</td> </tr> <tr> <td>CRC delimiter</td> <td>1</td> <td>Must be recessive (1)</td> </tr> <tr> <td>ACK slot</td> <td>1</td> <td>Transmitter sends recessive (1) and any receiver can assert a dominant (0)</td> </tr> <tr> <td>ACK delimiter</td> <td>1</td> <td>Must be recessive (1)</td> </tr> <tr> <td>End-of-frame (EOF)</td> <td>7</td> <td>Must be recessive (1)</td> </tr> </tbody> </table>	Field name	Length (bits)	Purpose	Start-of-frame	1	Denotes the start of frame transmission	Identifier (green)	1	A (unique) identifier which also represents the message priority	Remote transmission request (RTR) (blue)	1	Must be dominant (0) for data frames and recessive (1) for remote request frames (see Remote Frame, below)	Identifier extension bit (IDE)	1	Must be dominant (0) for base frame format with 11-bit identifiers	Reserved bit (r0)	1	Reserved bit. Must be dominant (0), but accepted as either dominant or recessive	Data length code (DLC) (yellow)	4	Number of bytes of data (0-8 bytes) ^a	Data (red)	0-64 (0-8 bytes) ^b	Data to be transmitted (length in bytes dictated by DLC field)	CRC	15	Cyclic redundancy check	CRC delimiter	1	Must be recessive (1)	ACK slot	1	Transmitter sends recessive (1) and any receiver can assert a dominant (0)	ACK delimiter	1	Must be recessive (1)	End-of-frame (EOF)	7	Must be recessive (1)
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4.Telematics	Vehicle	CANNM	P2	CAN Network Management	<ul style="list-style-type: none"> - CANNM is a hardware independent protocol that can only be used on CAN - To coordinate the transition between normal operation and bus-sleep mode of the network 	[REF: https://www.autosar.org/fileadmin/user_upload/standards/classic/3-0/AUTOSAR_SWS_CAN_NM.pdf]																																								



1.Common	Tools/Simulators	CANoe	P0	N/A	CANoe is a development and testing software tool from Vector Informatik GmbH. The software is primarily used by automotive manufacturers and electronic control unit (ECU) suppliers for development, analysis, simulation, testing, diagnostics and start-up of ECU networks and individual ECUs	CANoe supports CAN, LIN, FlexRay, Ethernet and MOST bus systems. The hardware models of CANoe are using in DCV are VN1630, VN1640, VN5610		Hardware: Example: VN1640A model
								Software: Example: Canoe v10.0
2.AVN	System	CANSIM	P2		CAN Simulator Device	Simulator to be used to send the CAN message. It could be used to replace some ECUs. For example, CANSIM can send the message regarding speed, instead of gateway.		
2.AVN	System	CAN-TAP	P2		Cf. CAN and TAP. A protocol that supports communication of information to be displayed on a vehicle cluster over a CAN bus.			
4.Telematics	Network	CANTP	P2	CAN Transport Layer	CAN Transport Layer covers CAN transport protocol specifics	- CAN Transport Layer runs only in an event triggered mode [REF: https://www.autosar.org/fileadmin/user_upload/standards/classic/4-3/AUTOSAR_SWS_CANTransportLayer.pdf]		
2.AVN	Vehicle	Car structure	P2			A vehicle frame is the main supporting structure of a motor vehicle to which all other components are attached, comparable to the skeleton of an organism.		
2.AVN	Navigation	Car Symbol	P2		Car Symbol is a symbol of car on the navigation map.			
2.AVN	CarSSW	CarSSW	P2	<u>Car Standard Software</u>	CarSSW to indicate the standard softwares are implemented in AVN to communicate between HMI with the layer services, and exchange data from AVN with other ECUs inside vehicle.	We test CarStandard Software by CAN Interface Test tool, control ECU enable/disable 1) Allinone simulation 2) BAP viewer 3) BAPSWconfig 4) xmb 5) BAP dll ...		

2.AVN	Radio/Media	Categories	P2		Allow users to find similar programming/content by category (Ex: music, sports, news,)	When the user selects AM(HD)/FM Categories they will be taken to the categories list for AM(HD)/FM. The list contains category names associated with AM(HD)/FM stations. Selecting a given category name displays a list of stations for that category. Categories will not be shown for AM when HD is unavailable or turned off.		
2.AVN	System	CBC	P2		Carrier Board Communication	It indicates communication between AVN system and Cluster.		
2.AVN	Media	CBR	P2		Constant Bit Rate a term used in telecommunications, relating to the quality of service. Compare with variable bitrate			
2.AVN	Connection	CC	P2	Connectivity Controller	It can be fully customized to meet OEM requirements, establishes a connection between the vehicle's control units and a data center. Certain configurations of the connectivity control unit (CCU) also allow vehicles to communicate with one another as well as with the roadway infrastructure (V2X).			
2.AVN	Radio	CC	P2	Country code	Country codes are short alphabetic or numeric geographical codes (geocodes) developed to represent countries and dependent areas, for use in data processing and communications.			

2.AVN	Projection	CCC	P2	Car Connectivity Consortium	<p>Car Connectivity Consortium: is an organization driving global technologies for smartphone-centric car connectivity solutions. The organization has developed MirrorLink®, an open standard for car-smartphone connectivity, in collaboration with cross-industry stakeholders including Car OEM, Tier-I suppliers, Phone Manufacturers, and App Developers, etc. CCC has also expanded its portfolio of technologies to include two very exciting projects: "Digital Key," where smartphones are used to gain access to the car, and "Car Data," which builds ecosystems for services such as usage-based insurance, diagnostic, driver health/behavior monitoring, ride hailing and sharing etc.</p>																																															
1.Common	Common	CCF	P0	Car Configuration File	<p>The CCF on the vehicle uses to store the configuration parameters. Examples of data held in the vehicle parameters section are:</p> <ul style="list-style-type: none"> • Vehicle Type • Brand • Model Year • VIN • Tyre Dynamic Rolling Radius • Brake System Type • Brake Disc size • Final Drive Ratio • Transmission Type • Hand of Drive • MOST configurations <p>Some of the CCF vehicle parameters can be altered by the customer as part of the personalization mode. Some of these parameters may be able to be changed by the driver.</p> <p>The CCF files are stored in several modules, one of which will be the master module. The other modules stores copies of CCF data which may be used when programming new modules.</p> <p>The car configuration file (CCF) may be thought of as the electrical make up (or electrical DNA) of the vehicle.</p> <p>Example: within the CCF will be codes relating to all aspects of the vehicles: the vehicle model, whether the vehicle is left or right hand, the wheel size, engine size and type of transmission and which electrical modules and features are installed to name but a few.</p>		<table border="1"> <thead> <tr> <th>Group title</th> <th>Description</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Brand</td> <td>Brand</td> <td>Land Rover</td> </tr> <tr> <td>Model year</td> <td>Model year</td> <td>2006 model year</td> </tr> <tr> <td>Vehicle identification number</td> <td>Vehicle identification number</td> <td>SALLSA0A8A91894</td> </tr> <tr> <td>Transmission type</td> <td>Transmission type</td> <td>Automatic transmission is fitted</td> </tr> <tr> <td>Fuel type</td> <td>Fuel type</td> <td>Petrol engine</td> </tr> <tr> <td>Engine type</td> <td>Engine type</td> <td>Petrol V6</td> </tr> <tr> <td>Vehicle status</td> <td>Battery delivery mode</td> <td>Inactive</td> </tr> <tr> <td>Vehicle status</td> <td>Suspension delivery mode</td> <td>Inactive</td> </tr> <tr> <td>Vehicle status</td> <td>Locking delivery mode</td> <td>Inactive</td> </tr> <tr> <td>Trailertowing</td> <td>Trailer towing ball</td> <td>Not fitted</td> </tr> <tr> <td>Trailertowing</td> <td>North America trailer lighting function</td> <td>Disabled</td> </tr> <tr> <td>Powershift</td> <td>Drive</td> <td>4 wheel drive vehicle</td> </tr> <tr> <td>All terrain control module</td> <td>Grass/gravel/snow mode results after time</td> <td>No</td> </tr> <tr> <td>Passenger airbag</td> <td>Passenger airbag</td> <td>Enable front airbag</td> </tr> </tbody> </table>	Group title	Description	Value	Brand	Brand	Land Rover	Model year	Model year	2006 model year	Vehicle identification number	Vehicle identification number	SALLSA0A8A91894	Transmission type	Transmission type	Automatic transmission is fitted	Fuel type	Fuel type	Petrol engine	Engine type	Engine type	Petrol V6	Vehicle status	Battery delivery mode	Inactive	Vehicle status	Suspension delivery mode	Inactive	Vehicle status	Locking delivery mode	Inactive	Trailertowing	Trailer towing ball	Not fitted	Trailertowing	North America trailer lighting function	Disabled	Powershift	Drive	4 wheel drive vehicle	All terrain control module	Grass/gravel/snow mode results after time	No	Passenger airbag	Passenger airbag	Enable front airbag
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2.AVN	Projection	CCF	P2	Common Cause Failure	A common cause failure (CCF) is a failure where: - Two or more items fail within a specified time such that the success of the system mission would be uncertain. - Item failures result from a single shared cause and coupling factor (or mechanism)			
2.AVN	System	CCFA	P2	Cluster Control Feature Application	As application protocol, "Bedien- und Anzeigeprotokoll" (BAP) shall be used in Cluster.			
4.Telematics	Phone	CCFT	P2		Call Clear-down Fallback Timer			
2.AVN	System	CCP	P2	Center Control Panel	The center console (British English: centre console) in an automobile refers to the control-bearing surfaces in the center of the front of the vehicle interior.	In Bench, it's the central button for user to control H/U that may include: Back button, Volume Up/Down button, Seek Up/Down button, Menu button, Home button, etc.		
2.AVN	Vehicle	CCP	P2	Current Car Position	The positioning interfaces include GNSSService (for satellite sensors like GPS), SensorsService (for vehicle sensors that are used by the geolocation software) and EnhancedPositionService (better localization based on dead reckoning).			
2.AVN	Climate	CCSM (ECC & MCC)	P2	Climate console select module	Climate console select module: For GEELY CMA	ECC : Electronic Climate Control.(display electric) MCC: Manual Climate control (analog rotary button) it is selected depends on the car variant.		
2.AVN	System	CCU	P2	Charge Control Unit	Charge Control Unit A charge-control unit was developed as part of a program to validate Li-ion cells packaged together in batteries. The lithium-ion cell charge- control unit will be useful to anyone who performs testing of battery cells and to anyone who manufacturers battery test equipment.			

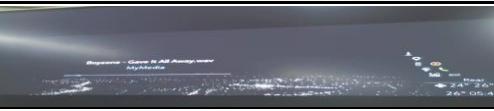
2.AVN	System	CD	P2	Compact Disc a digital optical disc data storage format that was co-developed by Philips and Sony and released in 1982. The format was originally developed to store and play only sound recordings but was later adapted for storage of data (CD-ROM)			
4.Telematics	Common	CDC	P1	Communication Device Class USB communications device class (or USB CDC class) is a composite Universal Serial Bus device class. The class may include more than one interface, such as a custom control interface, data interface, audio, or mass storage related interfaces	Install driver provided from HQ or specific devices	Lớp thiết bị truyền thông	This is a driver /class So image just an example https://i.stack.imgur.com/3xXBp.png http://www.usblyzer.com/img/screenshots/usb-properties-panel-cdc-interface-descriptor-bg.png
4.Telematics	Common	CDC ECM	P1	CDC Ethernet Control Model This embedded USB Communications Device Class – Ethernet Control Module subclass (CDC-ECM) class driver is used to send and receive Ethernet frames over USB.	USB to Ethernet cable	Tương tự Ethernet over USB. Đây là driver giúp gửi nhận tín hiệu Ethernet qua giao tiếp USB	https://www.hcc-embedded.com/uploads/media-upload/2019-05/System%20Overview%20-%20USB%20Device%20Class%20Driver%20CDC-ECM.jpg

4.Telematics	Common	CDC EEM	P1	CDC Ethernet Emulation Model	<p>CDC Ethernet Emulation Model.</p> <p>Revision 1.0. 2 Management Overview.</p> <p>Ethernet Emulation Model (EEM) is a specification for inexpensive and efficient transport of Ethernet frame across the USB bus</p>	<p>Không giống như CDC ECM, EEM không mở rộng giao tiếp bus USB mà thay vào đó xem bus USB là phương tiện để di chuyển các gói tin Ethernet. EEM cho phép tận dụng ngăn xếp mạng qua giao tiếp USB và Ethernet.</p> <p>Trước EEM, các dịch vụ chuyên dụng cần thiết để tạo một lớp thiết bị trong USB DWG hoặc một Nhà cung cấp thiết bị cụ thể. Việc sử dụng EEM cho phép khám phá các lớp trên giao thức mạng hiện có và sử dụng dịch vụ mới</p>	<pre> graph LR subgraph HOST [HOST] MACT([MACT]) NICDriver[NIC Driver] MACT --- NICDriver end USB[USB] --- SEB[Simulated Ethernet Bus] Device[Device NIC Driver WMC] --- SEB </pre>
4.Telematics	Common	CDC WMC	P1	CDC Wireless Mobile Communication	The CDC Wireless Mobile Communication (WMC) 1.1 specification, maintained by USB-IF, allows cell phones to use USB to bring communication functions and multi-media capabilities to PCs and PDAs.	Trình điều khiển WMC cho phép GPRS, EDGE, DECT, CDMA-2000, UMTS, WCDMA và các thiết bị đầu cuối 2.5G và 3G khác tận dụng tối đa các khả năng giao tiếp và đa phương tiện	

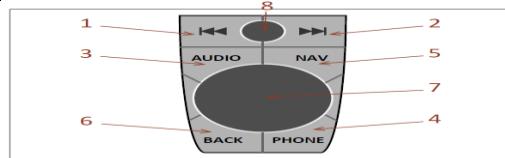
3.Cluster	Cluster	CDD	P1	Complex Device Driver	Complex Device Driver: Device drivers are programs which allow software or higher-level computer programs to interact with a hardware device	A driver communicates with the device through the computer bus or communications subsystem to which the hardware connects. When a calling program invokes a routine in the driver, the driver issues commands to the device. Once the device sends data back to the driver, the driver may invoke routines in the original calling program. Drivers are hardware dependent and operating-system-specific. They usually provide the interrupt handling required for any necessary asynchronous time-dependent hardware interface		
4.Telematics	Telematics	CDMA	P1		Code Division Multi Access	One of telecommunication network access technology		
2.AVN	Phone	CDMA phone	P2		CDMA: stands for Code-division multiple access	CDMA supported phone does not need SIM like GSM phone. Nowadays, almost carriers like Mobiphone, Viettel, Vinaphone just support GSM and doesn't support CDMA and it's difficult to find phone that support CDMA in Vietnam		

2.AVN	Others	CDN	P2	<u>Content Delivery Network</u>	<p>A content delivery network or content distribution network (CDN) is a geographically distributed network of proxy servers and their data centers.</p> <p>The goal is to distribute service spatially relative to end-users to provide high availability and high performance.</p> <p>CDNs serve a large portion of the Internet content today, including web objects (text, graphics and scripts), downloadable objects (media files, software, documents), applications (e-commerce, portals), live streaming media, on-demand streaming media, and social media sites.</p>		
4.Telematics	Telematics	CDR	P2	Charging Data Record	<p>A charging data record (CDR) is, in 3GPP parlance, a formatted collection of information about a chargeable telecommunication event (making a phone call, using the Internet from your mobile device).</p> <p>CDRs are used for user billing: a telecom provider transfers them from time to time in order to send bills to their users. CDRs are sent using the GTP' or FTP protocol.</p>		
2.AVN	Radio	CEI	P2	Change Event Indicator			
2.AVN	Vehicle	CEM	P2	Central Electronics Module	Central and main parts (e.g. headlight, direction indicators, etc.)		
2.AVN	Radio/Media	Centerstack Now Playing View	P1	N/A	Same as Now Playing View		

4.Telematics		CF	P2		Consecutive Frame	Consecutive Frame: The frame/s that indicates remaining bytes while transmitting/receiving the message that contains more than 8 bytes of information.		
4.Telematics		CFI	P2		Canonical Format Indicator	The Canonical Format Indicator (CFI) bit indicates whether the following 12 bits of VLAN identifier conform to Ethernet or not. For Ethernet frames, this bit is always set to 0. (The other possible value, CFI=1, is used for Token Ring LANs, and tagged frames should never be bridged between an Ethernet and Token Ring LAN regardless of the VLAN tag or MAC address.)		
4.Telematics	Telematics	CGM	P2	Central Gateway Module	Central Gateway Module	CGM is the central communication node, acts as a router (for in-vehicle communication and through the CCU to the outside) and is the gate for all data coming into the vehicle. It supports various bus systems (Ethernet, CAN, LIN)		
2.AVN	[TBD]	cGW	P2	connected <u>GateWay</u>	connected Gateway	A gateway is a piece of networking hardware used in telecommunications for telecommunications networks that allows data to flow from one discrete network to another.		https://en.wikipedia.org/wiki/Gateway_(telecommunications)
2.AVN	Navigation	Change Lane	P2		The driver will change the lane if the vehicle is on a road with multiple lanes, the position shall always be matched to the correct road and the position remains on road	When the vehicle is on a road with multiple lanes for the current direction, the system detects the lane on which the vehicle is. When driver changes the lane, the lane position is updated. The position shall always be matched to the correct road and the position remains on road		

2.AVN	Connection	Channel	P2		A channel refers either to a physical transmission medium such as a wire over a multiplexed medium such as a radio channel in telecommunications and computer networking	A channel is used to convey an information signal, for example a digital bit stream, from one or several senders (or transmitters) to one or several receivers		
2.AVN	Broadcast	Channel Logo	P2	N/A	Logo of channel	It displays on Cover Flow of Now Playing screen and Direct Tuner screen, Favorite Tile, ...		
2.AVN	System	Chime volume	P2		Sound play when open door			
2.AVN	Projection	CHP	P2		Customisable Home page	it is related to Android auto and main screen when connecting the andrio auto using phone.		
1.Common	ECU	CID	P0	<u>Central Info Display</u>	Central Info Display: is the graphic display unit for the user interface of all convenience functions and some vehicle functions	CID is the LCD usually located in the upper middle of the dashboard of the car CID can display informations such as navigation, audio/video, climate control and communications systems		
2.AVN	Vehicle	CID/Caller ID	P2		Caller Information Display	Caller ID (caller identification, CID), also called calling line identification (CLID), Calling Line Identification (CLI), calling number delivery (CND), calling number identification (CNID), calling line identification presentation (CLIP), or call display, is a telephone service, available in analog and digital telephone systems, including VoIP, that transmits a caller's telephone number to the called party's telephone equipment when the call is being set up. The caller ID service may include the transmission of a name associated with the calling telephone number, in a service called CNAM.		
2.AVN	Vehicle	CIMG	P2		Crank Integrated Motor Generator	CiMG is using an electric machine fitted on the crankshaft, between the engine and transmission.		

2.AVN	Projection	CL (BCL)	P2		Baidu CarLife: CarLife is a mobile app developed by Baidu that help car driver to connect between mobile and automotive head unit. CarLife is developed for Chinese market, it can run on iOS and Android OS. It provides features that include GPS map matching/ navigation, SMS, telephony, music and so on.	Can download from App Store for iOS and Google Play for Android devices		
1.Common	Power Mode	Clamp 15 (KL15)	P0	Clamp 15	Terminal 15 ignition(SW-CL.15) state KL is the abbreviation for 'klemme' which is the German term for connector / connection. KL15 is ignition switch position #2 (on) KL30 is battery positive, hot at all times KL31 is battery negative, connected all the time KL50 is ignition position #3 (start) KLS is terminal S contact(Key Inserted/Ejected) state KLR means ignition switch position #1 (accessory)			
1.Common	Power Mode	Clamp 30 (KL30)	P0	Clamp 30	A permanent power supply KL is the abbreviation for 'klemme' which is the German term for connector / connection. KL30 is battery positive, hot at all times KL31 is battery negative, connected all the time KL50 is ignition position #3 (start) KLR means ignition switch position #1 (accessory)	A permanent power supply	<p>Main states and transitions</p> <pre> graph TD MMI_OFF((MMI_OFF or MMI_IOC)) -- 1 --> MMI_IOC((MMI_IOC)) MMI_IOC -- 2 --> MMI_STDBY((MMI_STDBY)) MMI_STDBY -- 3 --> MMI_STDBY MMI_STDBY -- 4 --> PWR_SAVE((PWR_SAVE)) PWR_SAVE -- 5 --> MMI_ON((MMI_ON)) PWR_SAVE -- 6 --> MMI_STDBY MMI_ON -- 7 --> MMI_STDBY MMI_ON -- 8 --> PWR_SAVE MMI_STDBY -- 9 --> MMI_IOC </pre> <p>1: (Clamp S Off -> On) AND ([LastOn == True] OR On-button pressed) 2: (Clamp S Off -> On) AND (LastOn == False) 3: Wakeup-relevant event on Infotainment CAN bus (explain in next slide) 4: (Clamp S Off -> On) AND (LastOn == True) OR On-button pressed 5: (Clamp S Off -> On) AND (LastOn == True) OR On-button pressed 6: (Clamp S Off -> On) AND (LastOn == True) OR On-button pressed 7: (t_standby expired) OR (Clamp S On -> Off) OR On-button pressed 8: t_mmloff1 expired 9: (t_mmloff2 expired) OR (t_mmistandby_powersave_expired)</p> <p>Note: Timer (ex: t_standby, t_mmloff1...) above is default value. It can changes (Engineer Testing Mode)</p>	
1.Common	Power Mode	Clamp S (KL S)	P0	Clamp S	Clamp S (KL S) KL is the abbreviation for 'klemme' which is the German term for connector / connection. (VW MIB3) Terminal S contact(Key Inserted/Ejected) state			

3.Cluster	Cluster	Classic Control	P2	N/A	<ul style="list-style-type: none"> - PSM off - Chassis (toggle) (FW) - Level Function (NF) - Reserve <p>Chassis : allow show mode of drivemode 1. Normal 2. Range 3. Sport 4. Sport Plus 5. Individual State of PSM, Chassis, Lift... button will change when the VP receive signal of chassiscontrol</p>	<p>How it work: State of PSM, Chassis, Lift... button will change when the VP receive signal of chassiscontrol</p>	
2.AVN	System	Client	P2		External Diagnostic Tool	External Diagnostic Tool is VAS. And VAS's OS(operating system) is ODIS. Usually, Head unit is called as HOST. And connected other devices are called as Client.	 <p>Figure 3.2.6.1 Cadillac Infotainment Multifunction Controller</p>
1.Common	Utility	Climate	P0	N/A	<ul style="list-style-type: none"> - Climate control is a system for controlling the temperature inside a vehicle. 	<ul style="list-style-type: none"> - The car's climate control system controls the heating and air-conditioning systems. - The climate control unit adjusts the temperature and air flow inside the car. - The climate control module can select hot/cold, defrost/vent, or fresh air/recirculated air. 	
3.Cluster	Cluster	Clock	P1	N/A	Provides real-time clock and functionality for switch to summer/winter time as well as to other time zones		
2.AVN	Navigation	Cloud	P2		That describes every device or cluster of devices which can be used as data source for retrieving map updates. A cloud does not necessarily have to be accessed via an online connection. We can distinguish between the following types of clouds:		

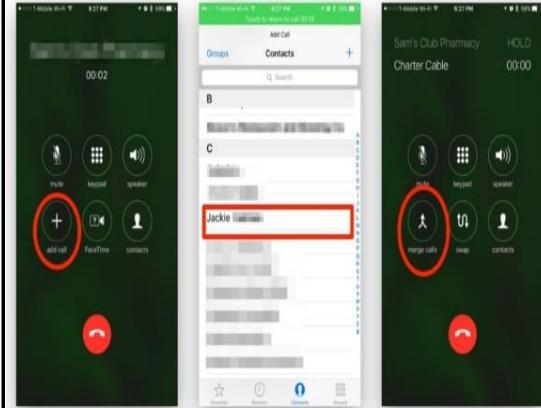
1.Common	ECU	Cluster	P0	N/A	<p>Cluster (Instrument Clusters) is a control panel located directly ahead of a vehicle's driver, displaying instrumentation and controls for the vehicle's operation.</p> <p>In an automobile, an electronic instrument cluster, digital instrument panel or digital dash for short, is a set of instrumentation, including the speedometer, that is displayed with a digital readout rather than with the traditional analog gauges. Many refer to it simply as a digital speedometer.</p>	<p>Instrument Clusters ensure that the driver is comprehensively and reliably informed at all times. They provide basic driving information like speedometer, tachometer, temperature, fuel, telltales, and warnings. Additional information is presented via display, e.g. radio, on-board computer, internet, navigation, telephone, rear/front view camera and driver assistance systems information</p>		
3.Cluster	Cluster	Cluster Menu List	P1	N/A	Cluster Menu List	<p>Cluster Menu is displayed when user select Cluster Menu button. There are some display modes can be selected: Display Gauge, Map, Night Vision. After ignition, it will show the last selected cluster type. If no type had been selected, Gauge Analog Cluster is default.</p>		
2.AVN	System	CM	P2		<p>Compute Module</p> <p>The compute module contains the guts of a Raspberry Pi (the BCM2835 processor and 512Mbyte of RAM) as well as a 4Gbyte eMMC Flash device (which is the equivalent of the SD card in the Pi). This is all integrated on to a small 67.6x30mm board which fits into a standard DDR2 SODIMM connector (the same type of connector as used for laptop memory*)</p>			

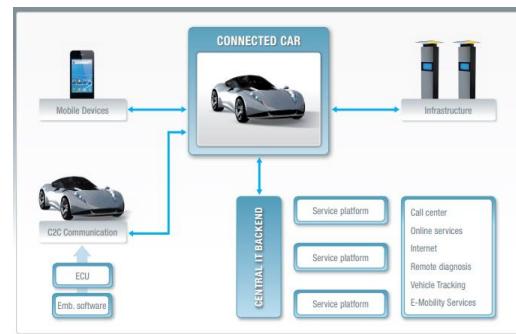
4.Telematics	CMA	P2	Compact Module Architecture	Compact Module Architecture	<p>The Compact Modular Architecture (CMA) is a global mid-size unibody automobile platform, jointly developed by Volvo and Geely under their China Euro Vehicle Technology AB (CEVT) R&D banner.</p> <p>Development began in 2013 with the goal of producing a highly flexible vehicle platform. Only the distance between the centre of the front wheels and the pedal box is fixed, everything else can be configured to suit the intended vehicle design.</p> <p>The platform debuted in September 2017 with the release of the Volvo XC40. The CMA platform configuration in the XC40 will feature new 1.5-litre, three-cylinder engines with turbocharged and naturally aspirated variations. The platform will also accommodate a plug-in hybrid configuration capable of 180 bhp, supplemented by a 74 bhp electric motor.</p> <p>The Compact Modular Architecture platform will also be shared with Chinese startup company, Lynk & Co. The upcoming Lynk & Co 01 SUV will be the first of several Lynk & Co models to be underpinned by the CMA platform.</p>	

4.Telematics		CMC	P2	Common Mode Choke	<p>Common-mode chokes are frequently used in automotive CAN networks to increase system reliability with respect to electromagnetic compatibility (EMC). Electromagnetic interference emitted from an Electronic Control Module (ECU) through the CAN transceiver can be filtered, thus limiting unwanted high-frequency noise on the communication bus. Another reason for using a common-mode choke is attempting to improve the susceptibility (immunity) of the transceiver to electromagnetic disturbances on the bus.</p> <p>A common mode choke is where both line and neutral windings are wound on a single core. When using a current compensated choke to decrease common mode noise, (the interference pattern or the unwanted noise) you want to have a high impedance at the unwanted frequencies to knock down that unwanted noise.</p>		
2.AVN	System	CMMB	P2	China Mobile Multimedia Broadcasting (Mobile TV) is a mobile television and multimedia standard developed and specified in China by the State Administration of Radio, Film, and Television (SARFT)	It specifies usage of the S-band/U-band and occupies 25 MHz bandwidth within which it provides 25 video and 30 radio channels with some additional data channels.		

2.AVN	System	CMX	P2		<p>CAN Matrix</p> <p>The communication matrix (or CAN matrix) is a table structure, essentially defining the following:</p> <ul style="list-style-type: none"> • Which ECU sends which message under which conditions and with which cycle time. • Which ECU receives a certain message/signal. • Which signals are included in a message as well as their interpretation, i.e. how hexadecimal sizes are converted into physical or logical sizes. • Which identifier and thus priorities messages have. 		
2.AVN	Voice Recognition	CNR	P2		<p>Command Not Recognize-The case where a discrete or continuous command is correctly spoken and the Speech Recognition application detects the speech, but it is unable to understand the command and returns "Command Not Recognized" prompt asking the user to speak the command again.</p>	<p>Connect BT/or USB port device, press PTT and command " Open A A" (with A A is not saved on HU) => "Command Not Recognized" is displayed</p>	
2.AVN	Radio	Co-channel	P2		Two broadcasts exist on the same frequency.		
2.AVN	System	Coding	P2	N/A	This is a function in ODIS tool. This function is for allowing turn on or turn off features in car	Activity to chage the coded value in the system. Many parameters could be changed by coding.	

2.AVN	System	Coding	P2	N/A	<p>There are two kinds of coding method:</p> <ol style="list-style-type: none"> 1) Analogue Signal <p>The signal is coded, the scaling factor and the offset. This is the formula used to convert between computer value to engineering value. The general formula is $E = N \cdot x + C$, where E = engineering value, N = computer value, x = scaling factor and C = offset.</p> <ol style="list-style-type: none"> 2) Enumerable Signal <p>List the signal value table.</p>		
2.AVN	Radio	COFDM	P2		<p>Coded Orthogonal Frequency Division Multiplex</p> <p>Coded Orthogonal Frequency Division Multiplexing (COFDM) is a modulation form that is ideal for the requirements of terrestrial broadcasting channels. COFDM has the ability to deal with high levels of multi-path propagation. It uses a wide spread of delays between the received signals.</p>		
2.AVN	System	ComfortCAN	P2		<p>Comfort CAN Bus</p> <p>CAN-BUS solutions for Comfort has 3 types:</p> <ol style="list-style-type: none"> 1. ComfortControl - units providing windows and sunroof automatic closing. 2. FanControl - units for original and optional heating equipment control. 3. SeatsControl - units ensuring MB & BMW seats proper functioning when they are installed in cars of other brands. 	<p>Comfort CAN(low speed CAN)</p> <p>- transmit information with speed of up to 100 Kbit/s. It serves as a connection between control units included into "Comfort" system and others. It may be in a dominant mode when the ignition is off</p>	
2.AVN	System	Communication zone	P2		<p>The communication zone is a simplified version of the full phone and text applications showing missed events that have occurred while in the vehicle</p>		

3.Cluster	Cluster	Component protection (KS)	P1	N/A	<p>Component protection is way of eliminating vehicle or component theft by keeping track of each individual component and which vehicle it's assigned too from the assembly line. Component protection is a system state during the construction phase of the instrument cluster. For this mode / state a certain content should be displayed on the instrument cluster:</p> <ul style="list-style-type: none"> 1 Outside temperature 2 Total mileage 3 Rest range indication 4 Battery level indication 5 Drive mode 6 Gear shift indication 7.Time 8. My Info screen 9. Digital speed indication 10 Powermeter 11 Tire pressure screen: Current pressure 	<p>When a component protected module is fitted to its non-original vehicle, its functions will be limited. This way is to prevent the use of stolen parts in the second-hand market. If a vehicle is reported stolen, a flag will be raised with their database for the vehicle's VIN and the internal serial number/coding of each module fitted to said vehicle making it impossible for these parts to be used on another vehicle.</p>		
2.AVN	Phone call	Conference call	P0	N/A	<p>A type of phone call that helps 3 or more users can speak together.</p>	<p>One of ways to make conference call is below:</p> <ul style="list-style-type: none"> - Step 1. Make 1st incoming call from device 2 to device 1 => Accept Call (1st Call) - Step 2. In device 1, push on "Add" (phone) button then choose contact you want to call. - Step 3. On other phones, accept the call from device 1. - After that, the conference call is established. 		
2.AVN	Connection	Connect	P2		<p>It is an operation so that the HU and the Phone device can substantially transmit and receive information.</p>	<p>Turn on Bluetooth on Headunit and Phone. Select one phone from list in Headunit and versa.</p>		

1.Common	Vehicle Type	Connected Car	P0	N/A	<p>A connected car is one that has its own connection to the Internet, usually via a wireless local area network (WLAN) that allows the car to share internet access and data with other devices inside and outside the car</p>	<p>Connected car features fall into several categories: safety, navigation, infotainment, diagnostics/efficiency and payments. A connected car can assist with a wide range of potentially useful functions such as monitor traffic information, remotely start car's engine, lock the car, make it flash its headlights or honk its horn, parking the car automatically, book car n for a service, connectivity to help motorists in emergency situation.</p>		
4.Telematics	Telematics	Connected Service	P2		This is Telematic Service which use by Genesis Motors	Require account and not support in Vietnam		
2.AVN	Navigation	Connection Road (JC)	P2		The location that the same class of two highways is connected.			
2.AVN	Broadcast	Contextual Banner	P2	N/A	Status label displays on Now Playing screen of channel	It indicator different state of content		[TBD]
2.AVN	Climate	coolant	P2		<p>A coolant is a substance, typically liquid or gas, that is used to reduce or regulate the temperature of a system. An ideal coolant has high thermal capacity, low viscosity, is low-cost, non-toxic, chemically inert, and neither causes nor promotes corrosion of the cooling system. Some applications also require the coolant to be an electrical insulator.</p>	<p>What is coolant used for? Another of its less well-known purposes is to keep your vehicle's passenger compartment warm</p>		
2.AVN	Media	Corrupted	P2		<p>Data corruption refers to errors in computer data that occur during writing, reading, storage, transmission, or processing, which introduce unintended changes to the original data.</p> <p>Corrupt audio file: Any information inside the audio file is modified or is missing, it becomes unplayable</p>			

2.AVN	Navigation	Cost	P2		The cost is a factor included when route calculation. According to the route calculation option, the cost would be distance, travel time, the time when driving. For example, if the route calculation option is Short, the cost would be distance, and If the option is Fast, the cost would be time.			
2.AVN	Media	Cover Flow	P0	N/A	The panel which displays albums art			
2.AVN	Phone Projection	CP	P0	Apple <u>CarPlay</u>	<p>Apple CarPlay is a mobile app developed by Apple to mirror features from an iOS device to a car's compatible head unit.</p> <p>Apple CarPlay available on iOS phone and supports maps/navigation, media player, phone call, SMS, voice and apps from iOS device...</p>	<p>Device must have carplay application with at least IOS 7.1</p> <p>HU must enable Carplay at setup device connection, time set is realtime and the same time on device.</p> <p>when complete device and HU, icon CP on HU is appear, tap icon to display CP screen then you can use on HU with funtions: music, phone, map,...</p> <ul style="list-style-type: none"> - CarPlay function and Siri on the phone must be turned on before connecting - To connect device with HU, using cable : plug one into your mobile device and the USB port on HU. - CarPlay is connected, BT is disabled for CarPlay device, user can use phone functions on vehicle like: music, phone, map, ... 		
2.AVN	System	CP	P2		Cluster Proxy	<p>make it easier to administer multiple proxy servers.</p> <p>For example, if your proxy servers are members of a proxy server cluster, you can specify configuration settings for that proxy server cluster, and the settings are automatically applied to all of the proxy servers in that cluster. Creating a proxy server cluster also enables you to simultaneously start and stop all of the proxy servers in that cluster.</p>		

4.Telematics	Telematics	CPID	P1	Control Parameter Identifier	Memory for Device control	PID [REF: https://www.autosar.org/fileadmin/user_upload/standards/classic/4-3/AUTOSAR_RS_DiagnosticExtractTemplate.pdf]		
2.AVN	Vehicle	CPM	P2		The panel which is for input ports	Control Port Manager network device connector.		
1.Common	Common	CPU	P0	<u>Central Processing Unit</u>	CPU is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions			
2.AVN	Power Mode	Critical_under_voltage	P2		(VW MIB3) voltage <6V			
4.Telematics		CRM	P2		Customer Relationship Management	Customer relationship management (CRM) is an approach to manage a company's interaction with current and potential customers. It uses data analysis about customers' history with a company to improve business relationships with customers, specifically focusing on customer retention and ultimately driving sales growth		
4.Telematics	Telematics	CRS	P1	Connection Retry Strategy	Connection Retry Strategy	N/A		
2.AVN	Voice Recognition	CS	P2		Confidence Score	Confidence scoring shall be used to determine the degree of certainty in the raw recognition results/or the semantic results		
2.AVN	Vehicle	CSD	P2		Central stack display:	Another name of HU's screen		
2.AVN	Vehicle	CSF	P2		Convenience Seat Folding	Include: Seat Folding, Headrest Floding...		
4.Telematics	Others	CSFB	P2	<u>Circuit Switched Fallback</u>	Circuit Switched Fallback The downgrade of voice call from LTE to lower network is CSFB	The LTE network and lower network need internetworking to do this procedure		
2.AVN	Vehicle	CSM	P2		Center Stack Module			

4.Telematics	Connection	CSP	P2		Connectivity Service Platform or Provider	This is related to telematics function		
2.AVN	Radio	CT	P2		Clock Time and date Time and date codes use Coordinated Universal Time (UTC) and Modified Julian Day (MJD). If MJD = 0, the receiver shall not be updated. The listener, however, will not use this information directly and the conversion to local time and date will be made in the receiver's circuitry. CT is also used as time stamp by various RDS applications and thus it shall be accurate			
2.AVN	Vehicle	CTA	P2		Cross Traffic Alert (CTA) is a driver aid intended to warn about crossing traffic when the car is reversing.			
2.AVN	Radio	CTDB	P2		Common Tuner-Database This is the source for Radio include Station list, radio main screen, presets,All radio operations (i.e. Tune, Seek, Scan, and Service-Following, AF-Switching, station list operations, Preset recall and store) shall be performed based on the CTDB. The CTDB shall contain a list of all received services in DAB and stations in FM, which identify the broadcasted networks. The supplier shall define a proper CTDB update algorithm, to add, to purge and to maintain the content in the background.			
2.AVN	Connection	CTN	P2		Calendar, Tasks, Notes Profile	This protocol support download and upload calendar, task, note between Head unit and phone via Bluetooth.		

2.AVN	System	CTS	P2		Content Theft Status	Attempts to make a call when a push-away element is found in the vehicle. -> It is similar Component Protection in VW. When AVN detect some condition for theft, display Component protection popup and disable functions.		
2.AVN	Navigation	CTT	P2		Congestion And Travel Time Information	The information regarding the status of traffic and estimated time to arrival.		
2.AVN	Navigation	CTT Sum	P2		Congestion And Travel Time Information Sum	Sum of the information regarding the status of traffic and estimated time to arrival.		
2.AVN	Navigation	Current Car Position (CCP)	P2		The Current Car Position (CCP) provides information where the vehicle is located. It uses the available naming information of the matched road segment	The application provides an update as soon as the value has been changed, regardless whether the guidance is active or not.		
4.Telematics	Service	CUST	P2	CUST omer Account Management	The purpose of CUST is register information of customer to cloud server and CUST is Telematic Box-initiated CUST occurs when the Telematic Box receives Telematics Flag = ON from TSC (Toyota Smart Center). Communication with the center is done via packet data.	The purpose of CUST is for the Telematic Box to: A- Confirm TSP (Telematic Service Provider) communication. B- Enable service enrollment (ghi danh) for vehicle. C- Set/Update default service flags in Telematic Box (optional). ■		
2.AVN	System	Custom key	P2		Supports setting of operation specification when Custom hard key is input.	EX: Tap Setup on home screen --> Advantage --> Custom button --> choose Phone ==> press custom harkey ==> phone screen is active . The other buttons on Custom button list are similar.		
2.AVN	Connection	CVC	P2		Connected Vehicle Cloud Connected Vehicle cloud is a flexible solution to connect driver and vehicle and collect vehicle data to innovate and deploy new services on and creating a marketplace to share and collaborate on.			

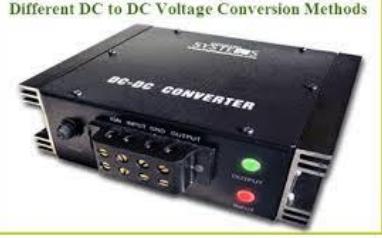
2.AVN	System	CVE	P2	<p>Common Vulnerabilities and Exposures</p> <p>CVE is a catalog of known security threats. The catalog is sponsored by the United States Department of Homeland Security (DHS), and threats are divided into two categories: vulnerabilities and exposures.</p>	<p>A vulnerability is a mistake in software code that provides an attacker with direct access to a system or network. For example, the vulnerability may allow an attacker to pose as a superuser or system administrator who has full access privileges. An exposure, on the other hand, is defined as a mistake in software code or configuration that provides an attacker with indirect access to a system or network. For example, an exposure may allow an attacker to secretly gather customer information that could be sold.</p>		
2.AVN	Radio	CW	P2	<p>Continuous Wave</p> <p>A continuous wave or continuous waveform (CW) is an electromagnetic wave of constant amplitude and frequency, almost always a sine wave, that for mathematical analysis is considered to be of infinite duration. Continuous wave is also the name given to an early method of radio transmission, in which a sinusoidal carrier wave is switched on and off.</p>			
2.AVN	System	D	P2	<p>Driving is the controlled operation and movement of a motorized vehicle with wheels, such as a car, motorcycle, truck, or bus by either a human or computer controller.</p>			
2.AVN	Navigation	D.M.S	P2	<p>Degrees,minutes,seconds</p>	<p>Degrees,minutes,seconds</p>		

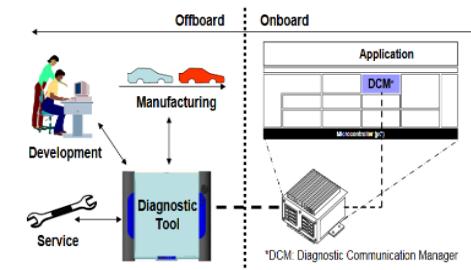
2.AVN	Radio	DAB	P0	<u>Digital Audio Broadcasting</u>	<p>Digital audio broadcasting (DAB) is a digital radio standard for broadcasting digital audio radio services, used in countries across Europe, the Middle East and Asia Pacific.</p> <p>DAB uses a wide-bandwidth broadcast technology and typically spectra have been allocated for it in Band III (174–240 MHz) and L band (1.452–1.492 GHz), although the scheme allows for operation between 30 and 300 MHz.</p> <p>The DAB system hardware and software shall be compliant with the DAB, DAB+ and DMB-A standards</p>		
2.AVN	Radio	DAB Anouncement	P0	N/A	<ul style="list-style-type: none"> - DAB Announcement is a short audio message that interrupts the current DAB radio mode. - There are about 11 announcement types: <ul style="list-style-type: none"> + Alarm + Road Trafic flash + Transport flash + Warning/Service + News flash + Area weather flash + Event announcement + Special event + Programme Information + Sport report + Financial report 	<p>In vehicle, to receive DAB announcement, driver shall enable the settings for Announcement.</p>	
2.AVN	Radio	Service Following	P1		<p>Service following is the term applied to maintaining the same audio or data content that the user has selected in spite of the varying reception conditions that occur, for example, when travelling by car or train. There are 3 transmission models: DAB/DAB, DAB/DRM & DAB/FM-RDS service following</p>		

2.AVN	Radio	DAB Slideshow	P1	Slideshow adds synchronised visual content (slides) to radio broadcasts on DAB or DAB+.	Slideshow is transmitted in either X-PAD (where data capacity is allocated within your existing audio stream) or MSC (where data capacity is allocated in a separate channel on the multiplex), and can be effective at data rates from 8kbit/s upwards. Slides can be shown at any frame rate, from 1 frame per second upwards; faster frame rates (up to 10fps) are supported through use of APNG (Animated PNG) files.		
2.AVN	Radio	DAB Station Label	P2	DAB Station Label is shown in the Line 1 of DAB now playing view. It can set by DAB signal generator.	The following information is shown on the DAB now playing view: Line 1: DAB Station Label (16 characters) Line 2: Ensemble Label Line 3: Artist Info Line 4: Song Info DAB Album Art or DAB icon		
2.AVN	Radio	DAB+	P1	Digital audio broadcasting plus	DAB+ is a more efficient method of broadcasting music and is based on the AAC codec popularised by Apple's iPod. It's more efficient than the old standard that uses MP2 and means a higher quality signal is possible than before.		
2.AVN	Radio	DAB-DAB linking	P1	DAB to DAB service following	DAB to DAB linking means that the DAB radio can go from one channel with poor or no reception to the same channel in another channel group with better reception.		
2.AVN	Radio	DAB-FM Linking	P1	DAB to FM-RDS service following	It allows receivers to continue to provide a service carried on DAB when moving beyond the digital coverage area with the same content available from FM-RDS		

2.AVN	System	Daemon	P2	Daemon is a process that runs in the background and performs a specified operation at predefined times or in response to certain events.	The term daemon is a UNIX term, though many other operating systems provide support for daemons, though they're sometimes called other names. Windows, for example, refers to daemons as System Agents and services.		
2.AVN	Connection	Data rate	P2	Data rate is the speed at which data is transferred between two devices.	Can test by wifi tool: iperf, wireshark, wifi analyzer ..		
2.AVN	System	Data size	P2	The number of bits that the computer value is used.	Names for different sizes of data: Bit, Byte, KB, MB, GB, TB, PB		

2.AVN	Climate	DATC	P1	Dual Automatic Temperature Control	<p>If your car is equipped with dual automatic climate control technology, you have an advanced system capable of maintaining not only a different temperature for the driver and front passenger, but of doing so automatically. Here's what you need to know about the controls:</p> <p>Auto/Driver Temp: This dial adjusts the temperature on the driver side. Push the center to set automatic functionality. Turn the dial to manually change the temperature. The system will automatically adjust air conditioning, heat, and fan speed to maintain the set temperature.</p> <p>Rear Defroster: Push this button to activate the rear window defroster (not automatically controlled).</p> <p>Defrost: Use this to defrost/defog the windshield (not automatically controlled). Push the button twice to cancel defrost and return to automatic climate control.</p> <p>Defrost and Lower Vents: This turns on the front defroster and the lower vents in the front (not automatically controlled). Press the button a second time to return to auto.</p> <p>Power: The Power button turns the Climate Control system on and off. It also allows you to control the fan manually (not auto). Press the Auto button to turn on automatic climate control.</p>	

2.AVN	Vehicle	Day/Night Mode	P2	Support the day/night mode for LCD Brightness and color of navigation.	<p>1) Automatic dimming (ON / OFF) - Automatic ON : Adjusts the brightness and navigation color automatically according to Auto-Light Sensor : Auto-Light sensor interface</p> <p>2) Day mode - Activated automatically when the Automatic dimming is OFF. - Set the LCD and navigation color brightly. - Auto-Light sensor interface</p> <p>3) Night Mode - Activated automatically when the Automatic dimming is OFF. - Set the LCD and navigation color darkly. - Auto-Light sensor interface</p>		
2.AVN	Radio	DC	P2	Direct Current Direct current (DC) is the unidirectional flow of electric charge. A battery is a good example of a DC power supply. Direct current may flow in a conductor such as a wire, but can also flow through semiconductors, insulators, or even through a vacuum as in electron or ion beams.			
2.AVN	System	DCDC	P2	DC-DC Converter DCDC is an electronic circuit or electromechanical device that converts a source of direct current (DC) from one voltage level to another. It is a type of electric power converter. Power levels range from very low (small batteries) to very high (high-voltage power transmission).			<p>Different DC to DC Voltage Conversion Methods</p> 

4.Telematics	Telematics	DCM	P1	Data Communication Module	<p>Abbreviation of Data Communication Module.</p> <p>DCM indicates global 16CY DCM and Japanese DCM 16CY in this specifications.</p> <p>16CY, global 16CY, and global indicate 16CY global DCM, and 16CY Japan and Japan indicate Japanese DCM 16CY.</p> <p>Abbreviation of Data Communication Module</p> <p>In this specification, DCM means "16CY Global DCM" and "16CY Japan DCM."</p> <p>"16CY", "16CY Global" and "Global" mean "16CY Global DCM," and "16CY Japan". "Japan" means "16CY Japan DCM."</p>	N/A		
2.AVN	System	DCM	P2		<p>Diagnostic Communication Manager</p> <p>DCM is a Basic Software Module of the Communication Services.</p> <p>It is in charge of the communication path and execution of diagnostic service resulting in the processing of diagnostic requests from an external tester or onboard test system</p>		 <p>*DCM: Diagnostic Communication Manager</p>	
2.AVN	System	DCU	P2		Display Control Unit			
2.AVN	Radio	DDB	P2	Drop Down Box	<p>A drop-down box or a drop-down list (abbreviated drop-down; also known as a drop-down menu, drop menu, pull-down list, picklist) is a graphical control element, similar to a list box, that allows the user to choose one value from a list.</p>	<p>When a drop-down list is inactive, it displays a single value. When activated, it displays (drops down) a list of values, from which the user may select one. When the user selects a new value, the control reverts to its inactive state, displaying the selected value</p>		
2.AVN	System	DDB	P2	Dealer Database	Dealer Database			

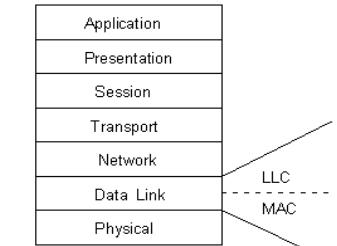
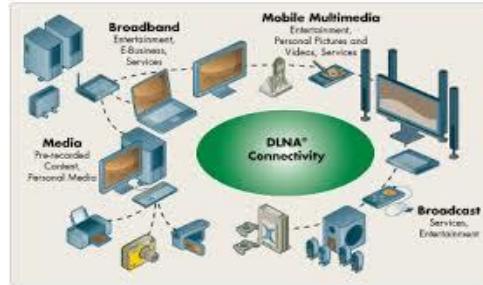
2.AVN	Voice Recognition	DDS	P2		Dreh Drück Steller (Rotary-Press-Controller)	Possible interactions include turning, pressing and rocking in 4 directions: 7. Primary Rotary Knob with Menu>Select Push Switch 8. Volume Rotary Knob with Mute/Power Push Switch		
2.AVN	Radio	Decay time	P2		This determines how quickly the AGC circuitry increases the PGA gain when the input signal falls below the target level. It is expressed in fractions of ADC sampling rates.			
2.AVN	System	Default scope set	P2		"Default scope set" aims that the majority of errors (> 90%) can be analyzed successfully from the log messages with this scope set			
2.AVN	System	Default value(Physical)	P2		What is the default engineering value at start-up. Serve as default value for receiving ECU's application when no signal is available from bus. Or Serve as intial value which will be sent out to bus when no sampling/calcuation result is available from sending ECU's application.			
2.AVN	Climate	Defroster	P2		Defroster - Hệ thống làm tan băng	There are two different types of window defrosters: front windshield defrosters and rear window defrosters. The front windshield defroster is designed to blow large volume of air on the windshield with the goal of dissipating condensation that has built up on the inside of a windshield. When the weather is cool, droplets of water can form on a vehicle's windows. Condensation on the inside of the windshield occurs because the air outside is colder than the temperature inside the car. When the temperatures become even colder, the condensation turns to frost or ice, which must be scraped away by hand or thawed by the defroster.		

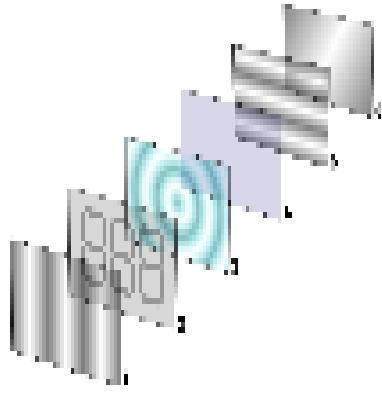
2.AVN	Navigation	DEM	P2	Digital elevation model	Digital elevation model A digital elevation model (DEM) is a 3D CG representation of a terrain's surface – commonly of a planet (e.g. Earth), moon, or asteroid – created from a terrain's elevation data.		
4.Telematics	Telematics	DEM	P2	Diagnostic Event Manager	- The Diagnostic Event Manager is a standard AUTOSAR module. - It is responsible for processing and storing diagnostic events (errors) and associated data.	[REF: https://www.autosar.org/fileadmin/user_upload/standards/classic/4-3/AUTOSAR_SWS_DiagnosticEventManager.pdf]	
2.AVN	Navigation	Destination	P2		Destination is a position that we want to go to. It may be a POI (Points Of Interest), or an address, ...		
2.AVN	System	Device Indexing	P2		Index of items in devices When a new device (i.e., no device ID previously defined) is first plugged in, the system should begin playback of the first available file from the device as indexing is started	If the user is browsing a filter and a device is currently indexing or is added to the system, the indexed files of the new device will be updated in the filtered lists as they become available. The progress bar is shown in the first line item in these scenarios. The time remaining until indexing complete shall also be shown on the now playing view while indexing is in progress.	
2.AVN	Connection	DFS	P2		Dynamic Frequency Selection DFS is the process of detecting radar signals that must be protected against interference from 5GHz (802.11a/n/ac/h) radios, by dynamically switching the operating frequency of the 5GHz radio to one that does not interfere with radar		
2.AVN	System	Diag	P2		Help driver to get a quick and reliable diagnosis of your car problems		

1.Common	Common	Diag / Diagnostics	P0	Diagnostics	<ul style="list-style-type: none"> - It helps user to get a quick and reliable diagnosis of your car problems - Diagnostic tests can discover problems within a car's engine, transmission, exhaust system, brakes, ECU... 	Using specialized software and hardware, car diagnostic tools quickly and accurately point to problem areas in a car's engine or elsewhere, thanks to built-in processors, microchips and sensors.		
4.Telematics	Diagnostics	DID	P0	Data IDentifier	<p>DID is represented for data. It is used for locating a memory block. Each ECU can store many DIDs. DID is a term which is usually found in diagnostics domain. In service layer, these DIDs have same meaning as configuration parameters.</p> <p>For example, vehicle identifier number (VIN) is represented by DID 0xF190 in a project, this DID is matching with a data block of 17 bytes which are the value of VIN</p>	<p>Use DID to get the value of data. The DIDs are mainly defined by OEM, you should get the list of DID for testing.</p> <p>For example: To get the VIN value is stored in an ECU, we use DID 0xF190 in a project.</p> <p>If the ECU returns output like: 39 38 37 36 35 34 33 32 31 30 41 42 43 44 45 46 47 in hex value (17 bytes), that means the ECU stores VIN number as 9876543210ABCDEFG in ASCII value.</p>		
2.AVN	Connection	DID	P2	Device ID Profile	This profile allows a device to be identified above and beyond the limitations of the Device Class already available in Bluetooth. It enables identification of the manufacturer, product id, product version, and the version of the Device ID specification being met.			
2.AVN	Vehicle	Differential lock	P2	N/A	<ul style="list-style-type: none"> - It's also locking differential - Be used to make the left/right or front/rear tires spin in a given direction while not in sync - Prevent tire spin at different speeds, allowing for tight turns with little resistance 	<ul style="list-style-type: none"> - Be used for off-road driving on difficult terrain, such as dirt, gravel, mud or snow when you need extra traction <p>[REF: https://www.4site4x4tyres.co.uk/4x4-advice/blog/july-2016/how-to-use-diff-lock-the-right-way]</p>		
2.AVN	System	Digital Clock	P2		Set to display digital clock when Power off or Display Off.	In this case, the clock type set is not equally applicable in the home screen clock widget and display digital clock by default.		

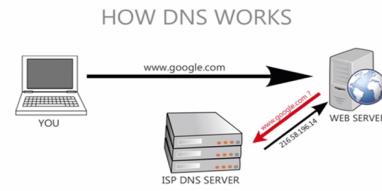
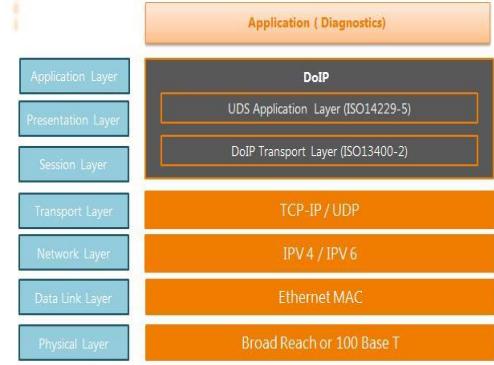
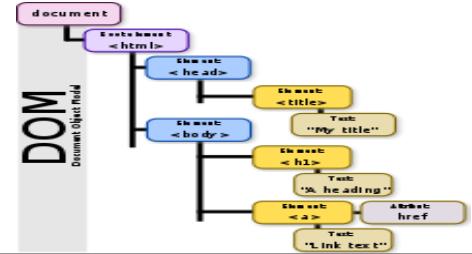
2.AVN	Navigation	Dijkstra Algorithm	P2		Dijkstra's algorithm is an algorithm for finding the shortest paths between nodes in a graph, which may represent, for example, road networks.	It is a typical Tree Building Algorithm which uses node label technique. Firstly, it extends the route from the initial node to the neighbor of the initial node and the route is fixed, then do the procedure repeatedly to find the effective route.		
2.AVN	System	DIM	P2	Driver Information Module	Driver Information Module: Cluster DIM is used to inform the driver of impending service requirements, of the currently selected gear (automatic transmission only), and the CommandShift mode status (if selected).			
2.AVN	Vehicle	DIM	P2	Dimmer Control	Dimmer Control for Dash/Component Lights			
2.AVN	Vehicle	Dimming Control	P2		Dimmed depending on the ambient brightness and manual dimming setting			
2.AVN	Media	DiPO	P2		Digital iPod Out	It can play iPod music through the car		
2.AVN	Radio	Direct Tune	P0	N/A	Direct Tune is to tune a radio station by inputting/selecting its specific frequency.	In Manual Tune mode, rotate the dial or touch the screen frequency. You can change the frequency by dragging while touching.		
2.AVN	Connection	DIS	P2		Device Information Service exposes manufacturer and/or vendor information about a device.	This service support information from a remote device		
2.AVN	System	DISP	P2		Display Not meaning, need to removed			
3.Cluster	Cluster	DisplayConfiguration	P1	N/A	Displays the individual configuration	Via the function display configuration, the BC-pages to be displayed and their contents are configured.		

2.AVN	Navigation	Distance	P2		Distance is a numerical measurement of how far apart objects are. Or the amount of space between two places or things			
2.AVN	Navigation	Distance To Empty	P2		Distance to empty calculates the approximate distance you can drive with the amount of fuel remaining in the tank	The calculation is based off of the average fuel consumption over the past 20 miles of driving along with the amount of fuel left in the tank		
2.AVN	Radio	DIV	P2		Diversity Diversity is mainly used in radio communication and is a common technique for combatting fading and co-channel interference and avoiding error bursts			
2.AVN	Media	DivX	P2		DIVX (Digital Video Express) was a rental format variation on the DVD player in which a customer would buy a DIVX disc (similar to a DVD)	DivX is a brand of video codec products developed by DivX, LLC.		
2.AVN	Radio	DL	P2		Dynamic Label Text messages that are associated with a programme service and are transmitted in the PAD part of that programme.			
2.AVN	Radio	DL+ or DL Plus	P2		Extension of the Dynamic label feature; it allows storing and filtering parts of the text (sent as DL messages) in the receiver terminal as DL Plus objects, which then can be selected and accessed by the listener independently from the currently transmitted DL messages			
2.AVN	System	DLC	P2		Date Length Code	DLC values ranging from 1001 to 1111 are used to specify the data lengths of 12, 16, 20, 24, 32, 48, and 64 bytes.		

							OSI Model
2.AVN	System	DLL	P2		Data Link Layer The data link layer or layer 2 is the second layer of the seven-layer OSI model of computer networking. This layer is the protocol layer that transfers data between adjacent network nodes in a wide area network (WAN) or between nodes on the same local area network (LAN) segment	A Layer in OSI system	
2.AVN	System	DLNA	P2		Digital Living Network Alliance was founded by a group of consumer electronics companies in June 2003 (with Sony in the lead role) to develop and promote a set of interoperability guidelines for sharing digital media among multimedia devices under the auspice of a certification standard.	DLNA certified devices include smartphones, tablets, PCs, TV sets and storage servers; in a typical use case, a user sends videos, pictures or music from their smartphone or storage server through their home WLAN to a TV set or tablet for display.	
2.AVN	Radio	DLS	P2		Dynamic Label Segment. Scrolling text on DAB radio stations.		
2.AVN	System	DLT	P2		Diagnostic Log and Trace The Diagnostic Log and Trace (DLT) is a Basic Software Module of the Diagnostic Services. It provides a generic Logging and Tracing functionality.		
2.AVN	System Base	DLT	P1	Diagnostic Log and Trace	The Diagnostic Log and Trace (DLT) is a Basic Software Module of the Diagnostic Services. It provides a generic Logging and Tracing functionality It is assumed to use an external logging- and tracing tool to store the debug information generated by the ECU (Refer AUTOSAR Diagnostic Log and Trace Protocol Specification document)	It is a protocol support to show, store and check how system work via diagnostic DLT message. We can check DLT message via DLT viewer, Putty, Terminal tool..	N/A

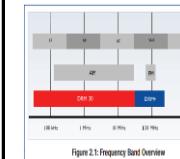
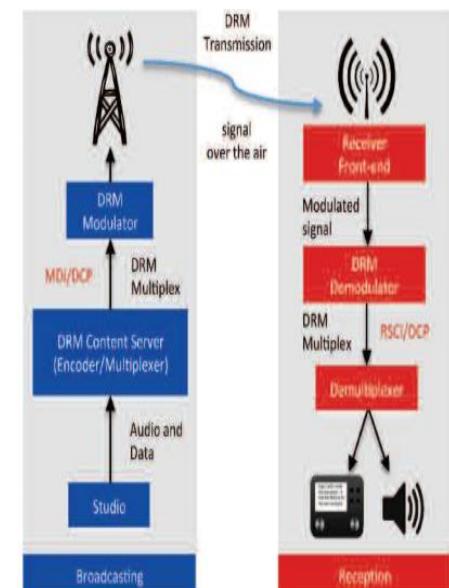
1.Common	Driving Mode	DM	P0	Driving Mode	<p>Driving modes or drive modes allow a vehicle to have multiple personalities or characteristics in the way that it drives, rides and handles as opposed to a single set of characteristics</p> <p>Due to each kind of car, will have different type of driving mode clasification such as :</p> <ol style="list-style-type: none"> 1. Based on type of driving: Normal, Comfort, Economy (Eco), Sport , Race, Off-road/Winter mode, Custom ... 2. Based on operator : Teen Driver, Valet Mode... <p>Depend on each kind of car, user can select mode by hard key near by driver area or select option for setting Driving mode on Head Unit</p>	Chế độ lái	
2.AVN	Voice Recognition	DM	P2		Dialogue Manager/Dialog manager is a component of a dialog system (DS), responsible for the state and flow of the conversation		
2.AVN	Radio	DMB	P2	Digital multimedia broadcasting Digital multimedia broadcasting (DMB) is a digital radio transmission technology developed in South Korea, as part of the national IT project for sending multimedia such as TV, radio and datacasting to mobile devices such as mobile phones, laptops and GPS navigation systems.	The source of revenue for DMB is advertising, though some of DMB services operate on a fee-based subscription basis charged by the service provider to the subscriber. Southkorea provides a free DMB service.DMB technology is based on the established Eureka 147 Digital Audio Broadcast (DAB) radio standard with additional error connection for television, satellite radio or cell phone transmissions. Not only the video and voice but also data files and applications are also delivered through digital broadcasters.		
2.AVN	Media	DMC	P2	A DMC (Digital Media Controller) is a DLNA (Digital Living Network Alliance) device, which is able to request a DMS (Digital Media Server) to send a media stream to a DMR (Digital Media Renderer) and to control it. A DMC may also manipulate the content enabling it to achieve the best output for the device.	Digital Media Controller		

2.AVN	Media	DMP	P2		Digital media player is a home entertainment consumer electronics device that can connect to a home network to stream digital media such as music, photos or digital video	Digital Media Player		
2.AVN	Media	DMR	P2		Digital Media Renderer A DMR is a function that allows content to be streamed to a DLNA-compliant product from a Digital Media Server (DMS), such as a mobile device or a computer.	The content can also be controlled using Digital Media Controller (DMC) products that are connected through a network. Some TVs, Audio/Video receivers, Blu-ray Disc players, Blu-ray Disc home theater systems, and remote speakers serve as DMRs. They can be used on a home network system.		
2.AVN	Media	DMS	P2	Digital Media Service	A DMS (Digital Media Service) is an online service provider that sells access to digital library of content such as films, software, games, images, literature, etc			
2.AVN	System	DMS	P2	Dealer Management System	Dealer Management System traditionally known as a software platform dealers use for managing their vehicle inventory, deals (cash, finance, wholesale, buy here pay here (BHPH), etc.), customer information, credit reports and printing paperwork.		 	
2.AVN	System	DMSM	P2		Drive Mode Switch Module	User can select drive mode(ECO/Sports/Hybrid/Dynamic/Comfort/Pure/XC) through DMSM dial.		
2.AVN	System	DMTS	P2		Driving Mode Transition Service Driving Mode Levels are determined and signaled by a dedicated system component, described in SFS-3 and called Driving Mode Transition Service (DMTS).	Several DMTS variants can be deployed in the system, and the currently active one is either the default one or the region-specific one, should the latter exist in the system.		
4.Telematics	Telematic Call	DNA	P2	Dynamic Number Advisor	Dynamic Number Advisor	Phone number of Onstar Advisor information included in AIF message. So driver can talk with real advisor		

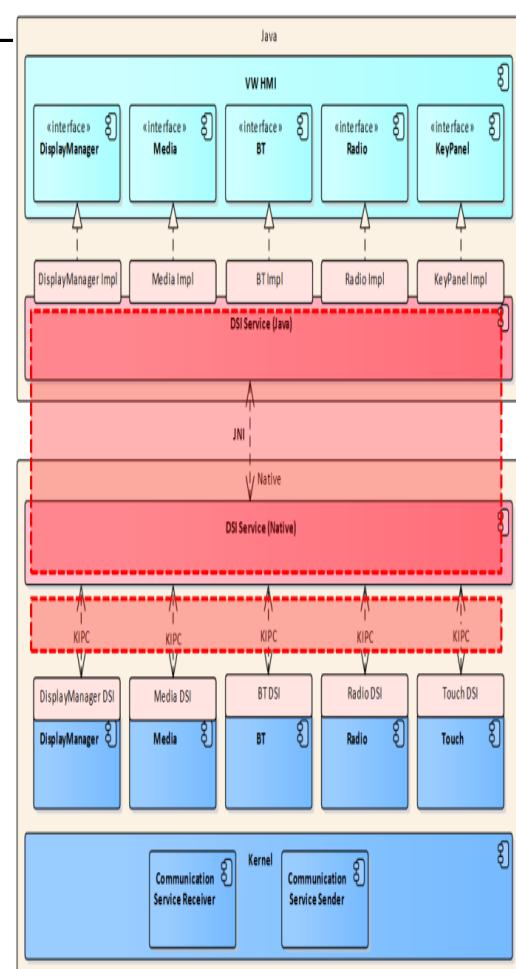
2.AVN	System	DNS	P2	<p>Domain Name Server DNS is a host name to IP address translation service. DNS is a distributed database implemented in a hierarchy of name servers. It is an application layer protocol for message exchange between clients and servers.</p> <p>DNS are the Internet's equivalent of a phone book. They maintain a directory of domain names and translate them to Internet Protocol (IP) addresses.</p>		
2.AVN	System	DoIP	P2	<p>Diagnostics over Internet Protocol The DoIP is used to develop a prototype for vehicle diagnostics. The main aim of using IP into the family of automotive diagnostic protocol is that the development of new in-vehicle network has led to the need for communication between external test equipment and onboard ECUs using many data link layer technologies. DoIP is a protocol mainly used for communication between off-board and on-board diagnostic system.</p>		
2.AVN	System	DOM	P2	<p>Document Object Model a cross-platform and language-independent application programming interface that treats an HTML, XHTML, or XML document as a tree structure wherein each node is an object representing a part of the document.</p>		
2.AVN	Others	DOORS	P2	<p>Dynamic Object Oriented Requirements (DOORS) is a software tool for managing complex projects. It is used to store multiple Documents and Tables containing project requirements and other information.</p>		

2.AVN	System	Double touch	P2		A Double Touch gesture consists two Touches in quick succession	Details of the action to be performed when a Double Touch is detected are described in the application Form and Behavior specifications where it is used. (This is applicable to Mid/High systems only.)		
4.Telematics	Telematics	Downlink	P2	N/A	Service provider sends the message to telematics box. (example: CSP -> T-BOX)			
2.AVN	System	DPAD	P2		A D-pad (short for directional pad or digital pad also known as a control pad)	A D-pad (short for directional pad or digital pad also known as a control pad) is a flat, usually thumb-operated four-way directional control with one button on each point, found on nearly all modern video game console gamepads, game controllers, on the remote control units of some television and DVD players, and smart phones		
2.AVN	Projection	dpi	P2		Dots per inch: is a measure of spatial printing or video or image scanner dot density, in particular the number of individual dots that can be placed in a line within the span of 1 inch (2.54 cm). Monitors do not have dots, but do have pixels; the closely related concept for monitors and images is pixels per inch or PPI. Many resources, including the Android developer guide, use the terms DPI and PPI interchangeably.			
2.AVN	Projection	DPR	P2		Design Pre-Requisite			

2.AVN	Navigation	DR	P1	Dead Reckoning	<p>Dead reckoning is the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time and course.</p>	<p>The system detects loss of GPS signal (for example, when the car enters a tunnel). In this case, the system activates the software dead reckoning mode. Dead reckoning mode activated only if there is a planned route.</p> <p>If the GPS offline status takes more than 5 seconds (configurable), and if it is enabled (also configurable), the signal loss event is announced to the user as a vocal warning ("GPS signal lost").</p>		
2.AVN	System	Dr_Door	P2		Driver Door	Open/Close the door by switching the button		
2.AVN	System	Drag	P2		Drag gesture may be used to move items on the screen, scroll a list, or change pages / views of content.	To Drag, users press, move and lift.		
2.AVN	Radio	DRC	P2		Dynamic range compression Dynamic range compression (DRC) or simply compression is an audio signal processing operation that reduces the volume of loud sounds or amplifies quiet sounds thus reducing or compressing an audio signal's dynamic range			
2.AVN	System	Driver Workload Conditions	P2		Duplicated, need to removed			

2.AVN	System	Driver workload/Driver Workload Conditions	P2	The Infotainment 3.0 HMI will be evaluated by GM for effect on driver behavior and performance when performing system-related tasks. Based on the results of this evaluation, certain features and functions may need to be modified and/or rendered unavailable while the vehicle is in motion, the vehicle is stationary but not parked, or the driver is identified as a Teen.	The system shall be capable of making specific manual controls (i.e., touch screen, faceplate, and/or steering wheel controls) inoperable within the user interface by graying out/making invisible the option and/or ignoring the touchscreen / faceplate / SWC switch input. Such lockouts are determined by the current Driving Mode state defined in GM Info 3.0 SFS-3 Driving Modes Support and the lockout behavior details specified in Section 5.5 Driver Workload Restrictions for the corresponding GIS-5xx HMI domains.		
3.Cluster	Cluster	Driving Condition Info	P1	Driving Condition Info	Displays driving condition information such as: road condition, brake temperature		
3.Cluster	Cluster	Driving Mode	P1	Display Drive mode	Display drive mode(RANGE / NORMAL / SPORT / SPORT PLUS) in tube D in cluster screen.		
2.AVN	Radio	DRM	P0	Digital Radio Mondiale	DRM system is specifically designed to allow the new digital transmissions to co-exist with the current analogue broadcasts, and a significant amount of work has been undertaken to quantify the operating parameters that assure mutual analogue and digital compatibility. Hence the changeover from analogue to digital broadcasting can be phased over a period of time, which in turn allows existing broadcasters to spread the required investment to meet any budgetary constraints. Furthermore, unlike some other digital systems, the DRM system has been designed to allow suitable analogue transmitters to be modified to switch easily between digital and analogue broadcasts. This can significantly reduce the initial investment cost for a broadcaster. An additional budgetary benefit is the reduction of transmission energy costs.	 Figure 2.1: Frequency Band Overview	 Figure 5.2: Simple DRM Broadcast chain

2.AVN	Radio	DRM	P2	Direct Rendering Manager	The Direct Rendering Manager (DRM), a subsystem of the Linux kernel, interfaces with the GPUs of modern video cards. DRM exposes an API that user-space programs can use to send commands and data to the GPU, and to perform operations such as configuring the mode setting of the display.			
4.Telematics	Telematics	DRx	P2	Discontinuous Receive	Discontinuous Receive	Mode that allows the VCP (Vehicle Connectivity Platform) to receive OCC-requested calls while conserving battery power during the time Vehicle power OFF. When vehicle is turned off and certain VCP functions have concluded, the VCP will enter DRx mode.		
4.Telematics	Telematics	DRx cycle	P2	Discontinuous Receive cycle	Period of time beginning when DRx Mode is initiated due to a Vehicle Power transition to OFF or a Theft Event and continuing through the entering of the OFF mode or until Sys/backup power mode state transition to Run			
2.AVN	Radio	DSBRC	P2		Double-Sideband Reduced Carrier Double-sideband reduced carrier is transmission in which (a) the frequencies produced by amplitude modulation are symmetrically spaced above and below the carrier and (b) the carrier level is reduced for transmission at a fixed level below that which is provided to the modulator.			

2.AVN	Radio	DSBSC	P2		Double-Sideband Suppressed Carrier Double-sideband suppressed-carrier transmission (DSB-SC) is transmission in which frequencies produced by amplitude modulation (AM) are symmetrically spaced above and below the carrier frequency and the carrier level is reduced to the lowest practical level, ideally being completely suppressed.		
2.AVN	Vehicle	DSCU	P2		Driver Seat Control Unit		
2.AVN	CarSSW	DSI	P0	<u>Device_Service_Interface</u>	<p>DSI is an interface to communicate between HMI and core services.</p> <p>Let take an example to describe how DSI work: HMI provides Display, Media, Bluetooth, Radio, and Touch features. Anyway, HMI is not developed by LGE (provided by 3rd-party company) and the interface of this HMI is written by Java. Moreover, the core services of AVN are developed by LGE need to be written by Native (C++) language for ensuring the performance of AVN.</p> <p>With this reason, LGE need to build an interface to communicate between HMI and core services. It is the DSI. When user interact on HMI through Touch, DSI will get this touch information and send to Touch service to further process. Touch service can send response information to HMI through DSI.</p>	<p>Ví dụ để mô tả DSI:</p> <p>Một AVN dạng tách rời gồm một màn hình cảm ứng và một mạch xử lý. Màn hình cảm ứng (HMI) được phát triển bởi một hãng thứ ba, trong khi đó mạch xử lý được phát triển bởi LGE. HMI cung cấp giao diện để tương tác với mạch xử lý chính sử dụng ngôn ngữ Java, trong khi đó, đội ngũ LGE muốn sử dụng Native (C++) để phát triển core services cho mạch xử lý (vì lý do đảm bảo hiệu năng xử lý). Do đó để tương tác được giữa HMI và Core services, LGE phát triển thêm giao diện DSI để giúp hai thành phần giao tiếp được với nhau. Ví dụ khi người dùng chạm vào màn hình cảm ứng, DSI sẽ giúp chuyển thông tin này đến Touch service của mạch xử lý, service này sử dụng thông tin và đưa ra phương án xử lý (có thể sẽ phản hồi lại và gửi thông tin phản hồi về HMI thông qua DSI).</p>  <pre> graph TD subgraph Java_HMI [Java] direction LR subgraph DSI_Service_Java [DSI Service (Java)] direction TB subgraph JNI [JNI] direction TB subgraph Native [Native] direction TB subgraph DSI_Service_Native [DSI Service (Native)] direction TB subgraph KIPC [KIPC] direction TB subgraph DSI_Services [DSI Services] direction LR subgraph DisplayManager_DSI [DisplayManager DSI] direction TB subgraph Media_DSI [Media DSI] direction TB subgraph BT_DSI [BT DSI] direction TB subgraph Radio_DSI [Radio DSI] direction TB subgraph Touch_DSI [Touch DSI] direction TB end end end end end end end end subgraph Native [Native] direction TB subgraph DSI_Services [DSI Services] direction LR subgraph DisplayManager_DSI [DisplayManager DSI] direction TB subgraph Media_DSI [Media DSI] direction TB subgraph BT_DSI [BT DSI] direction TB subgraph Radio_DSI [Radio DSI] direction TB subgraph Touch_DSI [Touch DSI] direction TB end end end subgraph Kernel [Kernel] direction TB subgraph Communication_Service_Receiver [Communication Service Receiver] direction TB subgraph Kernel [Kernel] direction TB subgraph Communication_Service_Sender [Communication Service Sender] direction TB end end end </pre>	

3.Cluster	Cluster	DSI	P1	Digital Cluster Instrument	Digital Cluster Instrument	Digital Cluster Instrument with LCD screen, it provides a variety of options which show car's different parameters such as vehicle speed, Engine temperature, Engine Oil Pressure		
2.AVN	Voice Recognition	DSLAP	P2		Digital Signal Level Adjustment Performance			
2.AVN	System	DSM	P2	Data Storage Manager	Data Storage Manager			
2.AVN	Vehicle	DSM	P2	Driver's Seat Module	User can shift driver's seat position and change temp.			
2.AVN	System	DSP chipset	P2		Digital signal processor (DSP) is a specialized microprocessor (or a SIP block), with its architecture optimized for the operational needs of digital signal processing	The goal of DSPs is usually to measure, filter or compress continuous real-world analog signals. Most general-purpose microprocessors can also execute digital signal processing algorithms successfully, but dedicated DSPs usually have better power efficiency thus they are more suitable in portable devices such as mobile phones		
4.Telematics	Common	DSRC	P2	Dedicated Short Range Communication	Dedicated short-range communications are one-way or two-way short-range to medium-range wireless communication channels specifically designed for automotive use[1] and a corresponding set of protocols and standards.	Link	NA	

4.Telematics	Diagnostics	DTC	P0	<u>Diagnostic Trouble Code</u>	<p>Diagnostic Trouble Codes is 3-byte hexadecimal number (in UDS). DTC is used to uniquely identify the fault of an ECU in memory. If ISO 15031-6 is supported, a unique 5-character-string plus an additional Failure Type Byte (when using UDS) is used to describe the fault on the external test tool (e.g. "B162C" or "B162A 12").</p> <p>Each DTC is dedicated for one fault which ECU can detect. Each ECU can detect many different DTCs if it supported diagnostic service.</p> <p>Based on the DTC, people can match with the corresponding fault to check the ECU's issues.</p>	<p>For example: DTC B12400 means "E-call button stuck" has value in hexa is 923400. In diagnostics, if ECU detects DTC B12400, that means this ECU has trouble with E-call button (this button has stuck).</p>		
2.AVN	Navigation	DTD	P2		Distance and time to destination/stopover			
2.AVN	Connection	DTIM	P2		Delivery Traffic Indication Map	The DTIM is how the AP (wireless router) warns its clients that it is about to transmit the multicast (and broadcast) frames it queued up since the previous DTIM.		
2.AVN	Navigation	DTM	P2		Digital terrain model DTMs are typically created through stereo photogrammetry. The DTM points are regularly-spaced and characterize the shape of the bare-earth terrain.			
2.AVN	Phone call	DTMF	P0	<u>Dual Tone Multiple Frequencies</u>	Dual Tone Multiple Frequencies : is the signal to the phone company that you generate when you press an ordinary telephone's touch keys	With DTMF, each key you press on your phone generates two tones of specific frequencies. So that a voice can't imitate the tones, one tone is generated from a high-frequency group of tones and the other from a low frequency group		

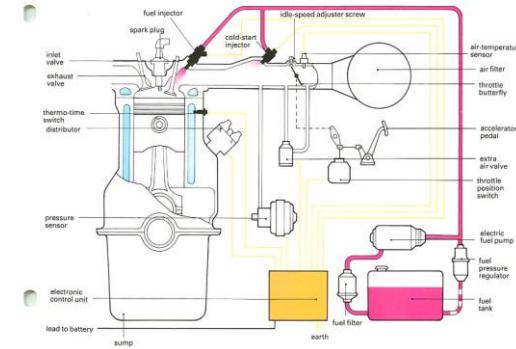
2.AVN	Connection	DTMF sound	P1	Dual-Tone Multi-Frequency Sound	<p>Dual Tone Multiple Frequencies. The sounds used for touch tone dialing.</p> <p>It appear when you Input number for calling. DTMF, better known as touch-tone, is a system of signal tones used in telecommunications. Applications include voice mail, help desks, telephone banking, etc.</p> <p>There are twelve DTMF signals, each of which is made up of two tones from the following selection: 697 Hz, 770 Hz, 852 Hz, 941 Hz, 1209 Hz, 1336 Hz, 1477Hz.</p> <p>The tones are divided into two groups (low and high), and each DTMF signal uses one from each group. This prevents any harmonics from being misinterpreted as part of the signal.</p> <p>The following table shows the frequencies used for each signal:</p>	<p>DTMF là chuẩn đa âm tần kép sử dụng trong viễn thông.</p> <p>Nó là hệ thống dùng nhiều tần số khác nhau để biết nút nào được bấm. Một nút bấm sẽ phát ra 2 tần số riêng biệt (cao và thấp) vì vậy nó có tên là dual tone. Có tất cả 8 tần số khác nhau (multi frequency) dùng cho 16 nút bấm, nhưng đa số điện thoại chỉ dùng 12 nút thôi.</p> <p>Khi bạn nhấn số ở điện thoại, nó sẽ tạo ra tiếng kêu đặc biệt và máy nhận ở tổng đài sẽ biết là bạn đang cần gọi cho số nào.</p>	
2.AVN	Media	DTS	P2		Digital Theater System is a series of multichannel audio technologies owned by Xperi Corporation (formerly known as Digital Theater Systems, Inc.), an American company specializing in digital surround sound formats used for both commercial/theatrical and consumer grade applications		
2.AVN	System	DTU	P2		Diagnostic Triggered Update		
2.AVN	Hardware	Dual Wi-Fi Antenna	P2	N/A	A dual Wi-Fi antenna is a pair of identical antennas on a wireless router or Wi-Fi-equipped device, intended to eliminate signal fading and dead spots.	Dual Wi-Fi antennas operate on a principle known as antenna diversity, which offers two different reference points for signal reception or transmission (or both) and uses the better one.	

2.AVN	Climate	Dual zone Climate system	P2		<p>Passengers can tailor the interior temperature to their individual preferences for greater comfort.</p> <p>This system offers independent left and right temperature controls.</p> <p>A single temperature can be selected for the entire cabin, or the driver and front passenger can individually set the temperature they prefer.</p> <p>On navigation-equipped models, the system uses global positioning system (GPS) technology to monitor the sun's position, and adjusts accordingly.</p>		
2.AVN	Connection	DUN	P2		<p>Dial-up Networking Profile</p> <p>The Dial-up Networking profile defines the requirements for Bluetooth devices necessary to support the Dial-up networking use case</p>		
2.AVN	System	DUT	P2		<p>Device under test also known as equipment under test (EUT) and unit under test (UUT), is a manufactured product undergoing testing, either at first manufacture or later during its life cycle as part of ongoing functional testing and calibration checks.</p>		
2.AVN	Media	DVD	P2		<p>Digital Video Disc</p> <p>DVD (an abbreviation of "digital video disc"[5] or "digital versatile disc"[6][7]) is a digital optical disc storage format invented and developed by Philips and Sony in 1995. The medium can store any kind of digital data and is widely used for software and other computer files as well as video programs watched using DVD players. DVDs offer higher storage capacity than compact discs while having the same dimensions.</p>		

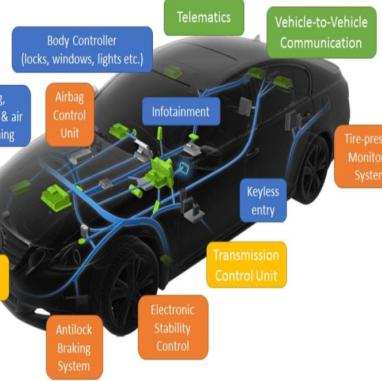
2.AVN	Radio	DWR	P2	Doppler Weather Radar Doppler Weather Radar is a type of radar used to locate precipitation, calculate its motion, and estimate its type (rain, snow, hail etc.). Modern weather radars are mostly pulse-Doppler radars, capable of detecting the motion of rain droplets in addition to the intensity of the precipitation	A radar unit consists of a transmitter and a receiver. The transmitter emits pulses of microwaves, a type of radio waves, outward in a circular pattern. Precipitation scatters these microwaves, sending some energy back to the transmitter, where it is detected by the radar's receiver. The intensity of this received signal, called the radar echo, indicates the intensity of the precipitation. Measuring the time it takes for the radio wave to leave the radar and return tells us how distant the storm is. The direction the radar is pointing locates the storm.		
4.Telematics		E/E/PE	P2	Electrical, Electronics, and Programmable Electronic is a part in IEC61508 Standard, about Functional Safety			
4.Telematics	Telematic Call	EA	P2	Emergency Assist	Emergency Assist (= Ecall)	E-Call(Emergency Call) system enables the quick handling of emergency. As soon as in-vehicle sensors detects a car accident, E-Call automatically or manually by a button sends details including the exact position of the vehicle to the emergency center and makes a telephone link for the operator to judge the situation. E-Call is mandatory in Europe and is proceeding in many other countries.	
2.AVN	Vehicle	EAC	P2	External Angle Control	Uses in Tow Assist feature		
2.AVN	Connection	EAI	P2	Enterprise Application Integration	Enterprise application integration (EAI) is the use of software and computer systems' architectural principles to integrate a set of enterprise computer applications.		

4.Telematics	Telematics	EAIF	P2	Embedded Air Interface	Embedded Air Interface	EAIF is message standard developped by GM to communicate between in car telematics controll unit and Onstar call center using Air Interface as transportation		
2.AVN	Connection	EAVB	P2		Ethernet Audio/Video Bridging Audio Video Bridging over Ethernet (AVB) is a set of IEEE standards for transporting audio and other real-time content over Ethernet.	The Ethernet Audio/Video Bridging standard adds QoS (Quality of Service) features like time-synchronized low latency streaming services and bandwidth reservation to make it possible to carry audio and video signals on a standard Ethernet line.		
3.Cluster	Cluster	E-AVB	P2		E-AVB: Ethernet Audio Video Bridge. It is an emerging standard that extends Ethernet to support multimedia streaming	The Ethernet Audio/Video Bridging standard adds QoS (Quality of Service) features like time-synchronized low latency streaming services and bandwidth reservation to make it possible to carry audio and video signals on a standard Ethernet line. Development of the Ethernet Audio/Video Bridging standard is being conducted by the IEEE under a number of working specifications, including 802.1AVB, 802.1AS, 802.1Q, 802.1Qat and 1722. Once deployed, audio and video hardware components will be capable of being linked via Ethernet Audio/Video Bridging connections, enabling the concurrent transmission of network, audio and video signals		

3.Cluster	Cluster	EBA	P2	EBA: Emergency Braking Assist EBA is a generic term for an automobile braking technology that increases braking pressure in an emergency	By interpreting the speed and force with which the brake pedal is pushed, the system detects if the driver is trying to execute an emergency stop, and if the brake pedal is not fully applied, the system overrides and fully applies the brakes until the anti-lock braking system (ABS) takes over to stop the wheels locking up. If the system identifies an emergency, it automatically initiates full braking more quickly than any driver can move his or her foot. Emergency stopping distances can be shortened, reducing the likelihood of accidents – especially the common "nose-to-tail" incident.			
2.AVN	Vehicle	EBCM	P2	Electric Brake Control Module	The EBCM is typically installed in the engine compartment on most vehicles made after 1995. It's attached to a series of electrical harnesses that are attached to sensors that send data to the EBCM.			
2.AVN	Connection	EC/NR	P2	Echo Cancellation/ Noise Reduction	Noise and echo can have a big influence over the performance of communication systems. To make hands-free systems viable, developers use a combination of a noise reduction algorithm along with an echo cancellation algorithm running on the DSP device. Often, this is also bundled with some speech enhancing software that provides the services of some acoustic filters and gain control to boost the clarity of the voice.			
4.Telematics	Application	Ecall	P0	<u>Emergency Call</u>	Emergency Call is a call which is made by telematics device to emergency call center. In GM telematics, ecall is the name for emergency call in EU market only.	The emergency call can be made automatically upon collision detection or via driver request by pressing HMI button		

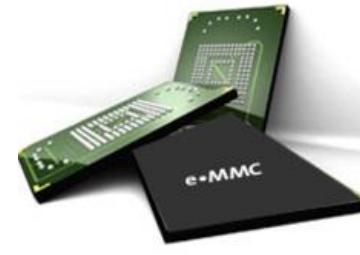
2.AVN	Climate	ECC	P2	Electronic Climate Control	ECC maintains the temperature selected in the passenger compartment and can be set separately for the driver's side and passenger side.	The auto function is used to automatically control temperature, air conditioning, fan speed, recirculation and air distribution.		
2.AVN	Radio	ECC	P2	Extended Country Code	This code is only used when the EPP(Enhanced Paging Protocol) is used, it defined the selected country.	RDS uses its own country codes, composed of a combination of a Country Identifier CI and an Extended Country Code ECC. The first most significant bits of the PI code carry the RDS Country Identifier.		
1.Common	ECU	ECM	P0	<u>Engine Control Module</u>	Engine Control Module An engine control unit (ECU), also commonly called as an engine control module (ECM), is a type of electronic control unit that controls a series of actuators on an internal combustion engine to ensure optimal engine performance. It does this by reading values from a multitude of sensors within the engine bay, interpreting the data using multidimensional performance maps (called lookup tables), and adjusting the engine actuators accordingly. Before ECUs, air-fuel mixture, ignition timing, and idle speed were mechanically set and dynamically controlled by mechanical and pneumatic means.	It's basically an on-board computer in a car with sensors and actuators to control operation of engine to produce demanded power as rotary force. In case of combustion engine, sensors read environment parameters like air pressure, density of oxygen, temperature and internal parameters like fuel level, position of piston, combustion chamber... Actuators such as fuel injector, spark plug, valves and pumps. Sensors provide data input to ECM and actuator receive command from ECM to control the fuel firing. ECM is a special kind of ECU (Electronic Control Unit)	Electronic injection systems 	
4.Telematics	Other	ECN	P2	Economy Compact Navigation	Economy Compact Navigation	This is Economy & Compact Navigation type of HKMC Models		
2.AVN	System	ECO	P2		Ecology or Eco mode in car suggests an improvement in fuel economy Eco-friendly vehicle is a road motor vehicle that produces less harmful impacts to the environment than comparable conventional internal combustion engine vehicles running on gasoline or diesel, or one that uses certain alternative fuels			

2.AVN	Climate	ECO A/C	P2	Eco A/C or Eco Air Conditioning: An attempt to protect the environment, the European Union adopted the directive 2009/125/EC concerning all energy consuming products. The aim of the European Union is to reduce greenhouse gas emissions, reduce the usage of primary energy and increase the usage of renewable energy sources. Eco Design devices are designed, manufactured, operated and recycled, based on the environmental protection	Touching the A/C button on the Front Climate Screen turns Air Conditioning ON or OFF or toggles through OFF > ECO > ON / MAX AC > OFF		 Figure 3.2.1.9 Front Climate Screen with Air Conditioning Display and Adjustment Element Highlighted
2.AVN	Power mode	Eco Mode	P1	<u>Economical Mode</u> It is button on car. Eco Mode in your vehicle helps you reduce fuel consumption	The working of Eco mode in a car is mainly associated with the engine. It automatically turns off the engine. For instance, the engine stops working on a pause at the traffic lights for any length of duration. And, as soon the clutch pedal is pressed along with the accelerator, it again starts the engine. When you depress the throttle pedal, the car accelerates slower than usual -> It takes longer for the engine speed (the revs) to rise. You use less fuel this way. https://carfromjapan.com/article/car-maintenance/how-eco-mode-work/		
4.Telematics		ECP	P2	Engineering Change Proposal	Engineering Change Proposal Spec changes or create new feature from OEM		
4.Telematics	Application	ECSL	P0	<u>Emergency Call Sequence Logging</u>	Fuction to store a number of latest emergency call log in internal memory of telematic device. These data can be get by server to analysis purpose.	For example: telematics box will store two latest emergency call log and then call center can request to get this information for more analysis.	

							
1.Common	ECU	ECU	P0	Electronic Control Unit	<ul style="list-style-type: none"> - ECU is an embedded electronic device that controls one or more electrical systems in a vehicle. - The term ECU, however, is commonly used when referring to engine management systems - which are often called <u>Engine Control Units</u>. These are responsible for controlling the injection and ignition system of an engine. Please consider two meanings of this word in your documents. - In How it work, we just mentioned detail about Electronic Control Unit. 	<p>- ECU reads signals coming from sensors placed at various parts and in different components of the car. The data from these inputs is assessed by the ECU and compared against stored on-board data. The ECU then decides what needs to happen to ensure the system in question functions properly and issues new commands to suit, like remote actuators or logging. These outputs then alter the operation of the system, delivering the desired effect.</p> <p>- Common ECUs:</p> <ul style="list-style-type: none"> ECM (Engine Control Module), PCM (Powertrain Control Module), BCM (Body Control Module), GEM (General Electric Module), Telematics Control Module (TCU)... 	
2.AVN	Navigation	ECU Error	P2		Electronic Control Unit Error is any error embedded system that controls one or more of the electrical system or subsystems in a transport vehicle	ETC ECU error shall be processed by the system.	
3.Cluster	Cluster	ECUC Config	P2		Electronic control Unit configuration	This function will management vehicle power status and vehicle wakeup/shut down process	
2.AVN	Connection	EDI	P2		Electronic Data Interchange	EDI can be formally defined as the transfer of structured data, by agreed message standards, from one computer system to another without human intervention.	
2.AVN	Connection	EDR	P2	Enhanced Data Rate	The bit rate of EDR is 3 Mbit/s for faster data transfer. EDR can provide a lower power consumption through a reduced duty cycle. - EDR is one of the signalling modes of the Bluetooth protocol version 2.0 which provides: + A faster data rate (speed) ~ 3 Mbit/s + Possibly improved battery life	[REF: https://www.gsmarena.com/glossary.php?term=edr]	
2.AVN	System	EDT	P2		External Diagnostics Tester		

2.AVN	System	EEPROM	P2		Electrically Erasable Programmable is a type of non-volatile memory used in computers, integrated in microcontrollers for smart cards and remote keyless system, and other electronic devices to store relatively small amounts of data but allowing individual bytes to be erased and reprogrammed.			
4.Telematics	Network	EGNOS	P2	European Geostationary Navigation Overlay Service	European Geostationary Navigation Overlay Service (EGNOS) is a satellite based augmentation system (SBAS) developed by the European Space Agency and EUROCONTROL on behalf of the European Commission. It supplements the GPS, GLONASS and Galileo by reporting on the reliability and accuracy of their positioning data and sending out corrections.	N/A		
3.Cluster	Cluster	EGSM	P2	EGSM: Electronic Gear Selector Module	EGSM: Electronic Gear Selector Module		Need more details	
2.AVN	Vehicle	E-GSM	P2		Electronic Gear Select Module(The shift selector module is an electronic shift)			
2.AVN	Connection	EIR	P2		Extended Inquiry Response was added in BT 2.1+EDR	If a device supports EIR, it can provide some additional data (name, supported services, Received Signal Strength Indicator - RSSI, etc) while responding to the inquiry		

2.AVN	Navigation	Electronic Toll Collect (ETC)	P2		<p>Electronic Toll Collection System (ETC) aims to eliminate the delay on toll roads, HOV lanes, toll bridges, and toll tunnels by collecting tolls without cash and without requiring cars to stop.</p>	<p>ETC information shall be displayed:</p> <ul style="list-style-type: none"> - ETC card status (at least card type, insert state, authorisation state, read/write/error state) - ETC/DSRC antenna status - ETC gate communication/DSRC communication status - Last 5 failed gate communications (no access to pass) with timestamp - Error code with time stamp for last 5 occurred errors. 		
4.Telematics		EMC	P2		<p>Electro Magnetic Compatibility</p>	<p>Electromagnetic compatibility (EMC) is the branch of electrical engineering concerned with the unintentional generation, propagation and reception of electromagnetic energy which may cause unwanted effects such as electromagnetic interference (EMI) or even physical damage in operational equipment. The goal of EMC is the correct operation of different equipment in a common electromagnetic environment.</p> <p>Electromagnetic compatibility (EMC) is the branch of electrical engineering concerned with the unintentional generation, propagation and reception of electromagnetic energy which may cause unwanted effects such as electromagnetic interference (EMI) or even physical damage in operational equipment. The goal of EMC is the correct operation of different equipment in a common electromagnetic environment</p>		
4.Telematics	Application	Emergency Button	P0	N/A	<p>Emergency Button is deployed on vehicle to help user trigger an emergency call to connect to Emergency Call Center. Common names of emergency button: SOS button, Ecall button.</p>	<p>The common case is to press and release the button in a time (depend on the requirement) to trigger a call.</p>		

4.Telematics	Telematic Call	Emergency Data Call	P2	N/A	<p>Emergency function is serviced. The state indicates Emergency function is serviced and VCP (telematic device) makes call immediately after Emergency button pressed</p>	<ul style="list-style-type: none"> - Set FID1= Data Call, this setting allows Ecall Enable -> Press and release Emergency button 		
4.Telematics	Telematic Call	Emergency No Call	P2	N/A	Emergency No Call	<p>The state indicates Emergency function is not serviced in VCP (telematic device) when press Emergency button</p> <ul style="list-style-type: none"> '- Set FID1= No Call, this setting doesn't Ecall -> Press and release Emergency button 		
2.AVN	System	eMMC	P2		<p>Embedded MultiMediaCard (eMMC) is a small storage device made up of NAND flash memory and a simple storage controller. The eMMC standard for embedded flash memory applications was developed in 2006 by JEDEC and the MultiMediaCard Association.</p>			

3.Cluster	Cluster	EMS	P1	EMS: Engine Management System	EMS: Engine Management System EMS stands for Engine Management System which consists of a wide range of electronic and electrical components such as sensors, relays, actuators and an Engine Control Unit.	Engine controls were originally implemented using mechanical devices such as the carburetor, mechanical diesel fuel injector, distributor with centrifugal or vacuum advance, and thermal bimetal actuators. Although these devices provided acceptable performance in many applications and were relatively inexpensive, they could not provide the level of control needed to meet the emission regulations of today. Many of the control functions performed by these devices are now done electronically using sensors and actuators. The sensors provide information about the operating condition of the engine while the actuators are used to regulate its operation. The ECU processes information from the sensors and determines the desired position for each actuator.	
2.AVN	Radio	Ensemble	P1	Ensemble	DAB ensembles are groups of Digital audio broadcasting (DAB) broadcasters transmitting multiple digital radio channels on a single radio transmission.	Entity of programme and data services (usually about 9 to 12 DAB programmes or about 18 to 32 DAB+ programmes) with a fixed total capacity which is processed and transmitted. The DAB multiplex data stream has a maximum capacity of 2.25 Mbit/s, normally shared by a number of services (radio / data). The name multiplex relates to the fact that the individual data streams are multiplexed (that is, they are transmitted alternately in chunks). A multiplex needs a bandwidth of about 1.5 MHz on the frequency band.	
2.AVN	Radio	Ensemble lable	P2				

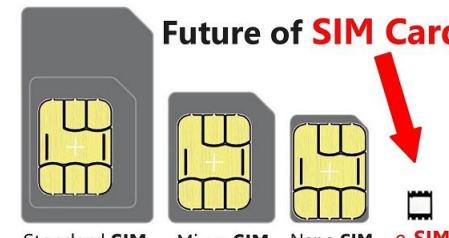
4.Telematics		EOL	P2	End of Line	<p>End-of-line (EoL) testers are responsible for testing the overall functionality of the product during the manufacturing process. Under the harsh conditions of the manufacturing environment, test systems must simulate all the relevant conditions, whilst at the same measuring the responses of the equipment being tested.</p>		
2.AVN	System	EOLP	P2	End of Line Programming	<p>End-Of-Line is a software development framework and maintenance system for ECU.</p> <p>The system includes:</p> <ul style="list-style-type: none"> - ECU programming control modules - ECU programming stations for engine assembling - ECU programming stations for automotive production sites - ECU diagnostics and programming stations for authorized companies - ECU backup and diagnostics modules for presales, warranty and post-warranty repair of engines and vehicles 		
2.AVN	Radio	EON	P1	Enhanced Other Networks	<p>EON is a radio system used to deliver traffic information to enabled devices. It is a component of the European Radio Data System (RDS). It allows the receiver to monitor other networks or stations for traffic programmes, and automatically temporarily tune into that station.</p>	<p>EON offers the ability for local stations to "break into" a national station's broadcast for the duration of a Traffic Announcement. When TP=0 and TA=1, This program carries EON information about another program which gives traffic information</p>	

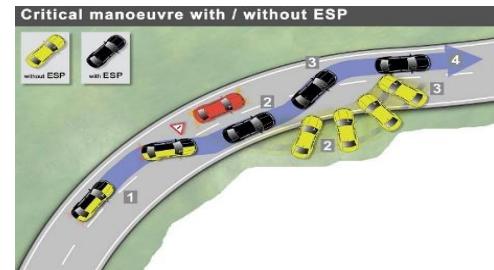
2.AVN	Radio	EON (enhanced other networks information)	P1	<p>Enhanced other networks information</p> <p>Enhanced other networks (EON) is a radio system used to deliver traffic information to enabled devices. It is a component of the European Radio Data System (RDS).</p> <p>The system delivers traffic information (TP and TA) to enabled devices, by interrupting the current stream of media (radio, cd, etc.) and sends the traffic message.</p>			
2.AVN	Audio	EON-TA	P1	<p>Enhanced Other Networks Information - Traffic Announcement:</p> <p>The TA Flag of the other program can be transmitted via EON. This makes it possible to detect an ongoing traffic announcement on the other program. The flag can be used to automatically switch to the other program during the traffic announcement.</p>	<p>If the user has set Traffic Programming to the ON state in the menu, the user will receive Traffic Alerts during audio listening in any mode.</p> <p>If the user is currently tuned to a TP station, all traffic alerts will be initiated from the current station and not from other TP supported stations.</p> <p>Users must be tuned to a TP station or a non-TP station that supports EON-TA's to receive traffic alerts. This applies to both single and dual tuner radios.</p>		
2.AVN	Vehicle	EPAS	P2	<p>Electric Power Assisted Steering:</p> <p>The main purpose of any type of power steering system is to attenuate the driver effort required to steer the vehicle.</p>	<p>The EPAS system is capable of receiving a detected value of steering wheel torque and the EPAS system is operable to improve the accuracy of the detected value of steering wheel torque by compensating for a weight imbalance present in the steering wheel.</p> <p>Advantages of EPAS:</p> <ol style="list-style-type: none"> 1. It is highly accurate system and thus gives a better control over vehicle. 2. Helps to improve the fuel economy of vehicle as no fuel is required to run the steering pump. 		

1.Common	ECU	EPB	P0	Electronic Parking Brake	<p>In road vehicles, the parking brake, also called hand brake, emergency brake, or e-brake, is used to keep the vehicle stationary on grades and flat roads and, in many cases also perform an emergency stop.</p> <p>This was accomplished traditionally using a manual parking brake. With electric park brakes, the driver activates the holding mechanism with a button and the brake pads are then electrically applied onto the rear brakes.</p> <p>The implementation of the control logic for the actuators is carried out by either using a stand alone ECU or by integrating it in the ECU for electronic stability control</p>	<p>First installed in the 2001 BMW 7 Series (E65), electric park brakes have since appeared in a number of vehicles. Two variations are available: In the more-traditional "cable-pulling" type, an electric motor simply pulls the emergency brake cable on the push or pull of a button rather than a mechanical pedal or handle in the cabin. A more complex unit [3] (first seen on the 2003 Audi A8) uses a computer-controlled motor attached to each of the two rear brake calipers referred to as the Motor on Caliper(MoC) system.</p> <p>It is expected that these systems will incorporate other features in the future. Jaguar, Landrover, BMW, Renault, Subaru and VW already have a system where the park brake engages when the engine is stopped and is released when the gas pedal is pressed. An extension of this system, called the hill-hold function, prevents roll-back when stopping and starting on a hill. The OEM can easily turn off the system. Some electric park brakes function similar to "park" on an automatic transmission and will not engage when the vehicle is in motion, there is no emergency brake in this case.</p>	<p>Phanh tay điện, khác với phanh tay thường, sử dụng nút bấm, lái xe không cần phải giữ phanh tay khi cần dùng.</p>	 <p>Electric park brake in the center console in a Volkswagen Touran</p>
4.Telematics	Telematic Call	EPG	P1		<p>Extended Phone Grammar. EPG (Extended Phone Grammar) Mode (also known as VAK): this allows the driver to input voice commands to VCP while VCP is on outgoing/incoming call.</p>	<p>While on call, driver can use SWC1 (button on the steering wheel) and input the voice command (Mute, Call nametag ...)</p> <p>To exit EPG, driver just push SWC1 again or SWC2 button.</p>		

3.Cluster	Cluster	EPS	P2	<p>EPS: Electronic Power Steering Power steering systems supplement the torque that the driver applies to the steering wheel. Traditional power steering systems are hydraulic systems, but electric power steering (EPS) is becoming much more common. EPS eliminates many HPS components such as the pump, hoses, fluid, drive belt, and pulley....</p>	<p>An electric motor that is mounted on either the steering column or steering gear (usually a rack-and-pinion setup these days) applies torque to the steering column, assisting the driver to turn the steering wheel. Sensors detect the position of the steering wheel and any input from the driver – hauling on the wheel to change the vehicle's direction. A control module applies assistive torque via the electric motor. If the driver is just holding the wheel steady, at the straight-ahead position, the system doesn't provide any assistance.</p>		<pre> graph LR SW((Steering Wheel)) --> SAS[Steering Angle Sensor] SAS --> TS[Torque Sensor] TS --> MG[Motor Assembly] MG --> R[Reduction Gear] MG --> M[Motor] VSS[Vehicle Speed Sensor] --> ECU[ECU] SAS --> ECU TS --> ECU ECU --> MG </pre>
3.Cluster	Cluster	EPT	P2	EPT: Electric Power Train			
2.AVN	Radio	EQ	P2	<p>Equalization (audio) Equalization or equalisation is the process of adjusting the balance between frequency components within an electronic signal. The most well known use of equalization is in sound recording and reproduction but there are many other applications in electronics and telecommunications. The circuit or equipment used to achieve equalization is called an equalizer.</p>			
2.AVN	Radio	ERP	P2	<p>Effective radiated power Effective radiated power is an IEEE standardized definition of directional radio frequency (RF) power, such as that emitted by a radio transmitter. It is the total power in watts that would have to be radiated by a half-wave dipole antenna to give the same radiation intensity (signal strength in watts per square meter) as the actual source at a distant receiver located in the direction of the antenna's strongest beam (main lobe)</p>	<p>ERP measures the combination of the power emitted by the transmitter and the ability of the antenna to direct that power in a given direction. It is equal to the input power to the antenna multiplied by the gain of the antenna</p>		

2.AVN	Radio	eRT	P2	<p>Enhanced RadioText This is an ODA and an alternative to RadioText to enable text transmissions with 128 bytes at maximum, coded in UTF-8 and addressed to receivers, which would be equipped with suitable display facilities. As eRT is an ODA, it is thus compatible with receivers not using this feature. This feature supports a wider range of languages than RT.</p>			
3.Cluster	Cluster	ESC/ESP	P1	<p>ESC/ESP: Electronic stabilization control/Electronic Stability Program ESC: is a computerized technology that improves a vehicle's stability by detecting and reducing loss of traction (skidding)</p> <p>ESC/ESP: Electronic stabilization control/Electronic Stability Program ESC: is a computerized technology that improves a vehicle's stability by detecting and reducing loss of traction (skidding)</p>	<p>When ESC detects loss of steering control, it automatically applies the brakes to help "steer" the vehicle where the driver intends to go. Braking is automatically applied to wheels individually, such as the outer front wheel to counter oversteer or the inner rear wheel to counter understeer. Some ESC systems also reduce engine power until control is regained. ESC does not improve a vehicle's cornering performance; instead, it helps to minimize the loss of control.</p>		

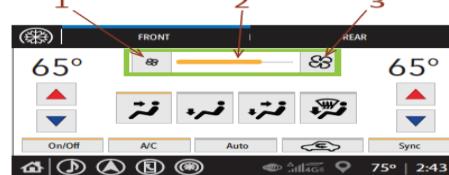
4.Telematics	ESCL	P2		Electronic Steering Column Lock	<p>Most national legislations demand that cars have to be protected against unwanted use by two independent systems. Over decades cars used to have (1) mechanical door locks and (2) a mechanical steering column lock. This steering column lock blocks the steering in a position slightly off the straight position, so that the car cannot roll off a hill. It is forced into a curve and probably will hit the pavement soon.</p> <p>With the introduction of keyless go systems the mechanical part of the car key became more or less useless. The car is opened by a remote control, and the engine is started with a button, while the car detects the appearance of the car key via a wireless transmitter. Today the car key either is plugged into a socket somewhere on the dashboard or it can stay in your pocket.</p> <p>In order to prevent the car from unwanted rolling, the steering column still is blocked when the car is not in use. As there is no mechanical key to start the engine anymore, the column is blocked by an electric/electronic mechanism, which unlocks the column as soon as you start the ignition.</p>		
4.Telematics	Telecommunication	eSIM	P0	embedded Subscriber Identity Module	<ul style="list-style-type: none"> - eSIM is a small chip(SIM card - hardware) embedded in device and cannot be removed. 	<p>- The SIM stores all information that is necessary to identify and authenticate the mobile subscriber.</p> <p>- Allows the download and activation of eSIM profiles over the air in a seamless, secure, and convenient way</p> <p>- eSIM needs to be supported by the network or carrier and enabled by them and not all networks support eSIM as yet</p>	<p>SIM (Subscriber Identity Module) là con chip nhỏ có để lưu trữ chi tiết tài khoản cá nhân của bạn trên đó. Còn eSIM giống như một SIM điện tử được gắn trực tiếp lên bo mạch và có kích thước vô cùng bé so với SIM truyền thống hiện tại.</p>  <p>Future of SIM Cards</p> <p>Standard SIM Micro SIM Nano SIM e-SIM</p> <p>eSIM nhỏ hơn rất nhiều các chuẩn SIM hiện nay</p>
2.AVN	Vehicle	ESIS	P2		ECU Signal Interface Specification		

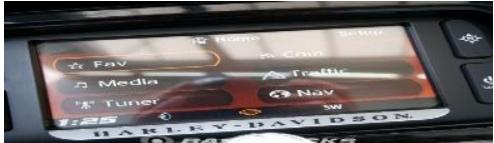
1.Common	ECU	ESP / ESC / DSC / VSC	P0	<u>Electronic Stability Control / Electronic Stability Program / Dynamic Stability Control / Vehicle Stability Control</u>	<p>ESC, also referred to as ESP or DSC or VSC, is a computerized technology that improves a vehicle's stability by detecting and reducing loss of traction (skidding).</p> <p>When ESC detects loss of steering control, it automatically applies the brakes to help "steer" the vehicle where the driver intends to go. Braking is automatically applied to wheels individually, such as the outer front wheel to counter oversteer or the inner rear wheel to counter understeer. Some ESC systems also reduce engine power until control is regained. ESC does not improve a vehicle's cornering performance; instead, it helps to minimize the loss of control.</p>	<p>Trong quá trình chuyển động, nếu hệ thống cân bằng điện tử (ESC) phát hiện tình trạng xe bắt đầu mất lái (rõ rệt nhất vào lúc cua) thì ESC sẽ làm việc bằng cách can thiệp vào hệ thống phanh để giảm ngay vận tốc xe. ESC có thể ra lệnh cho hệ thống phanh hoạt động riêng rẽ cho một hoặc nhiều bánh xe, trên cầu trước hoặc cầu sau. Nhiệm vụ chính của hệ thống ESC chính là giúp ổn định xe khi phanh, khi xe vào cua và ngay cả lúc xe mới khởi hành, tăng tốc.</p> 

2.AVN	Navigation	ETA	P0	Estimated Time of Arrival	<p>The ETA option is the time when a ship, vehicle, aircraft, cargo, emergency service or person is expected to arrive at a certain place.</p> <p>Route calculation a ETA (Estimate Time of Arrival) has to calculate by the system with following parameter:</p> <ul style="list-style-type: none"> - Average speed (Database attribute of related street segment) - Time dependent average speed (traffic pattern) is available - Manoeuvre Penalties - Road Furniture Penalties <p>During operation, the device recalls the average driving velocity for the inputted driver over each different type of thoroughfare traversed. Using prestored average velocity data, the device calculates an initial estimated time en route and an estimated time of arrival for a desired route. The device continues to receive GPS data as to the driver's position and velocity and updates the average velocity record for that driver on the specific type of thoroughfare. As the average velocity fluctuates, the device adjusts the estimated time en route and the estimated time of arrival. The device further has control processes for potentially erroneous sampling. The device has a predetermined threshold in which data inputs below that threshold will not be averaged into the memory.</p>			
2.AVN	Navigation	ETC Card Info	P2		<p>ETC card which is linked to a credit card (only certain Japanese credit card issuers provide ETC cards; foreign-issued cards cannot be used with ETC)</p> <p>"The ETC card (for "Electronic Toll Collection") is a toll card inserted in an electronic transceiver integrated into the rental car. It then wirelessly connects with Japanese highway toll gates as you pass through them and records all the data related to your trip in a system accessible to Nissan Rent a Car."</p>			

2.AVN	Navigation	ETC Card Reminder	P2		Electronic Toll Collection Card Reminder	ETC Card not inserted warning system.		
2.AVN	Navigation	ETD	P2		Estimated Travel Distance	If user set to the destination in navigation system, navigation system will calculate the distance how far does it remain to get to the destination.		
2.AVN	Navigation	ETE	P2		Estimated Time of Enroute	If user set to the destination in navigation system, navigation system will calculate the time how long does it take to get to the destination.		
1.Common	Network/Protocol	Ethernet	P0	N/A	Ethernet is a family of computer networking technologies commonly used in local area networks (LAN), metropolitan area networks (MAN) and wide area networks (WAN). Ethernet is widely used in home and industry. The Internet Protocol is commonly carried over Ethernet. Ethernet is mainly used for diagnostics, high potential for more.	Systems communicating over Ethernet divide a stream of data into shorter pieces called frames. Each frame contains source and destination addresses, and error-checking data so that damaged frames can be detected and discarded; most often, higher-layer protocols trigger retransmission of lost frames		
2.AVN	Navigation	ETT	P2		Estimated Travel Time	ETT is similar to ETE.		
4.Telematics	Telecommunication	eUICC	P0	<u>Embedded Universal Integrated Circuit Card</u>	- eUICC is the software component (differentiate with UICC, eSIM - hardware component) that allows the remote SIM provisioning of multiple network profiles	- This allows the user to select which network profile to download and connect to without the need to physically obtain or swap out SIMs, making it well-suited for devices with embedded SIMs		

1.Common	Vehicle Type	EV	P0	Electric Vehicle	<p>An electric vehicle, also called an electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels or an electric generator to convert fuel to electricity. EVs include road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.</p> <p>EV includes BEV and HEV/PHEV.</p>	<p>Example on HU: Tap icon EV on HU to display EV screen, however other HU models will show different</p> <p>Using canlink for control EV, connect canlink with HU and computer, computer must be have CANlink app and hard driver.</p> <p>Turn on canlink on computer, when sent message on computer through canlink to HU, HU receives message and runs EV follow message</p> <p>EV screen will be changed to show any available value of signal, and we will not change EV if no can.</p> <p>Have many messages: HU_EV_PE_00 0x1AA, HU_GW_E_00 0xE8, GWCLU_P 0x56E,.....</p>		<pre> graph TD EV[Electric Vehicles] --> HEV[HEV] EV --> PHEV[PHEV] EV --> BEV[BEV] HEV --> MicroHybrid[Micro Hybrid] HEV --> MildHybrid[Mild Hybrid] HEV --> FullHybrid[Full Hybrid] PHEV --> SeriesPHEV[Series PHEV] PHEV --> ParallelPHEV[Parallel PHEV] BEV --> NEV[NEV] BEV --> CEV[CEV] BEV --> HPEV[HPEV] </pre>
2.AVN	Radio	EWS	P1	Emergency Warning System	The EWS feature is intended to provide for the coding of warning messages. These messages will be broadcast only in cases of emergency and will only be evaluated by special receivers			
3.Cluster	Cluster	ExpertMenus	P1	Expert menus	Expert menus	Provides a developer/expert menu in cluster screen: current configuration, software information, monitoring internal data and encoding from defined EEPROM areas.		
2.AVN	Hardware	External Antenna Jack	P2	N/A	<ul style="list-style-type: none"> - External Antenna Jack - a connector that allows an external antenna to be connected to the phone/vehicle. - It helps to improve reception indoors or in a car. 	<ul style="list-style-type: none"> - Need to connect the compatibility type of external antenna to the external Antenna Jack. 		

4.Telematics	Application	External MIC	P0	External Microphone	External microphone is another microphone is installed in car which supports only for telematics call (main microphone is typically in head unit)	In common, when a telematic call (Example: emergency call), the driver will automatically use the external microphone and external speaker (the main ones is mute).		
2.AVN	Vehicle	External MIC	P2	External Microphone	An AUX cable connect computer and Bench. Voice will be supply from PC	Switch MIC-Control on Bench to EXT-MIC, Connect to an AUX cable		
2.AVN	Vehicle	FA	P2		Feature Application	Feature Application		
2.AVN	Projection	Faceplate Home button	P2		The Home button on the faceplate of Head unit			
4.Telematics		Factor	P2		This is the resolution of the signal after signal conditioning (Linearization, filtering...). For the transmitting ECU this is the resolution that can be obtained. For the receiving ECU this is the resolution that is required.	Value = value*factor + offset EMS_EngineCoolantTemp erature $100*0.75-37= 38$		
4.Telematics	Telematics	Factor/Offset	P2		Value = value*factor + offset	EMS_EngineCoolantTemp erature: $100*0.75-37= 38$		
2.AVN	Projection	FAD	P2		Function Area Definition			
2.AVN	Vehicle	FAD	P2		Functional Area Description:			
2.AVN	Media	FAD	P2		Function Area Description			
2.AVN	Climate	Fanspeed	P2		The Front Climate Screen shows the current Fan Speed seting (i.e., the speed at which air is flowing out of the vents) through the Fan Speed display element.	Fan Speed settings range between zero (0) up to twelve (12) as determined by the ECC module. a dynamic data parameter specifies the maximum number of user selectable fan speed settings. The Fan Speed HMI should normalize the manual fan speed seting enumeraton to the max fan speed data parameter value and show that as a fill percentage of the Fan Speed display element.	 <p>Figure 3.2.1.3 Front Climate Screen with Fan Speed Display and Adjustment Elements Highlighted</p>	

3.Cluster	Cluster	FAS Interface	P1	Driver assistant system	Driver assistant system	Analysis the steering behavior characteristic of the driver and evaluation of the information such as steering angle, pedal use and the lateral acceleration to determine whether the drive is tired		
2.AVN	Media	FAV	P0	Favorite	FAV is an option for personalization purpose. FAV is typically representative by a star icon.	In AVN, it is commonly used for favorite songs/video to help driver quickly choose the list of audio/video. For example: favorite media list (media), favorite contact list (phone)		
2.AVN	Media	Favorite contact	P2		The contacts list store contacts which user usually/frequently use	Example: Favorite_Add: - Phonebook registered Favorite: show ★ - Phonebook with more than 2 phone numbers: display phone contacts by popup +Register the entire phonebook: show ★ +Register a part of the phonebook: show ☆ +Not register the number: NOT show ★ / ☆		
2.AVN	Broadcast	Favorite indicator	P2	N/A	Star symbol of channel	Add channel to Audio Favorite => It displays favorite indicator on channel		[TBD]
4.Telematics		FC	P2		Flow Control: In data communications, flow control is the process of managing the rate of data transmission between two nodes to prevent a fast sender from overwhelming a slow receiver.			
		FCAL						
2.AVN	Vehicle	FCDIM	P2	Front Control Display Interface Module	Acts as a customer interface with the audio system, the climate control system ...			

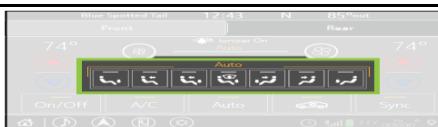
2.AVN	System Base	FCEV	P2		Fuel Cell Electric Vehicle. A fuel cell vehicle (FCV) or fuel cell electric vehicle (FCEV) is a type of electric vehicle which uses a fuel cell, instead of a battery, or in combination with a battery or supercapacitor, to power its on-board electric motor.	Fuel cells in vehicles generate electricity to power the motor, generally using oxygen from the air and compressed hydrogen. Most fuel cell vehicles are classified as zero-emissions vehicles that emit only water and heat. As compared with internal combustion vehicles, hydrogen vehicles centralize pollutants at the site of the hydrogen production, where hydrogen is typically derived from reformed natural gas.		
2.AVN	Vehicle	FCIM	P1		Front Climate Interface Module			
2.AVN	Vehicle	FCS	P1		Front Camera System are cameras that are designed to placed in the front of the vehicle facing forward.	A single camera takes on multiple roles in order to help avoid various risks which could occur ahead of and to the sides of the vehicle. For example, "Forward Collision Warning" helps alert the driver when his vehicle is getting close to a vehicle ahead. "Pedestrian Detection" helps alert the driver if a pedestrian is in the path of the vehicle. Additionally, "Lane Departure Warning" helps alert the driver when the vehicle starts to drift out of the lane.		
3.Cluster	Cluster	FCS	P2		Front Camera Setting	Front Camera Setting in vehicle		
2.AVN	Others	FDMA	P2	Frequency Division Multiple Access	Frequency Division Multiple Access	[TBD]		[TBD]
4.Telematics	Vehicle interface	FF	P2	First Frame	First Frame: The frame that indicates first message while transmitting/receiving the message that contains more than 8 bytes of information.			

2.AVN	Media	FF/REW	P0	<u>Fast Forward/Rewind</u>	<p>Fast-forward is to move forward through a recording at a speed faster than that at which it would usually be played.</p> <p>Rewind or Fast Backwards, in other hand, is to help to move backward</p>	<p>To active fast forward: press button FFW or long touch Next button;</p> <p>To active REW: press button REW or long touch Previous button.</p> <p>When the SEEK UP key is RELEASE during FF operation, it start playing from the current play position at normal speed.</p> <p>In some product, If file is last in folder, play next folder ; If file is last in category, play first file in current category</p>	Tua dì/ Tua lại	  Rewind (Fast Backwards)   Fast forward
2.AVN	Vehicle	FFH	P2		<p>Fuel Fired Heater</p> <p>This system is to increase the coolant temperature quickly by firing diesel fuel in the burner</p>	FFH is operated by the coolant temperature and ambient temperature		
2.AVN	Media	FFT	P2		<p>Fast Fourier Transform (FFT) performs a one-dimensional forward transform of 4K complex numbers.</p> <p>This kernel exercises complex arithmetic, shuffling, non-constant memory references and trigonometric functions. The first section performs the bit-reversal portion (no flops) and the second performs the actual Nlog(N) computational steps.</p>			
2.AVN	Radio	FG	P1		<p>Foreground (Audio sink connected to cabin speak)</p> <p>Foreground tuner: tuner radio signal by manual</p>			
2.AVN	Media	FHSP	P2		Frequency Hopping Spread Spectrum	<p>A mechanism used to combat interference from wireless devices</p> <p>Instead of using a constant frequency to send and receive data, the communicating devices use a set of frequencies and hop rapidly from one frequency to another using a pseudo random pattern.</p>		

2.AVN	Connection	FIC PCBER	P2		Fast Information Channel Pseudo Channel Bit Error Rate This is channel support fast information base on pcBER = No. of bit errors per audio frame / No. of corresponding net bits Channel Pseudo Channel Bit Error Rate: an objective quantity for assessing DAB coverage		
2.AVN	System	FICM	P2		Front Infotainment Control Module		
2.AVN	Projection	FID	P2				
2.AVN	Radio	Field Strength	P2		Strength of radio waves		
2.AVN	Media	FIFO	P2		First-in First-out		
2.AVN	Connection	FILE SEARCH	P2		Search for files according to search and play order.	User can use TUNE KNOB UP and DOWN to search music file then ENTER to play this.	
2.AVN	Media	Files or folders starting with a "." (dot) in the name	P2		Files/folder	Go to folder which want to create .file/.folder -> cmd -> mkdir .filename	
2.AVN	Media	FIT	P2		Failure In Time	FIT reports the number of expected failures per one billion hours of operation for a device. This term is used particularly by the semiconductor industry but is also used by component manufacturers.	
3.Cluster		FlashUpdated	P2	Ability of flashing blocks with an ODX file which includes lzss compressed bins.	Ability of flashing blocks with an ODX file which includes lzss compressed bins.	Ability of flashing blocks with an ODX file which includes lzss compressed bins.	

1.Common	Network/Protocol	FLEXRAY	P2	N/A	<p>FlexRay is an automotive network communications protocol developed by the FlexRay Consortium to govern on-board automotive computing. It is designed to be faster and more reliable than CAN, but it is also more expensive.</p> <p>Flexray is high performance (10 Mbps), deterministic, and secure network (mainly used in X-by-wire, ADAS, and high performance applications)</p>	<p>FlexRay supports high data rates, up to 10 Mbit/s. Flexray mainly used in ADAS and high performance applications.</p>		
2.AVN	Media	FLV	P2		Flash Video	Flash Video is a container file format used to deliver digital video content (e.g., TV shows, movies, etc.) over the Internet using Adobe Flash Player version 6 and newer.		
2.AVN	Radio	FM	P0	Frequency Modulation	<p>Frequency modulation (FM) is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave.</p> <p>This contrasts with amplitude modulation, in which the amplitude of the carrier wave varies, while the frequency remains constant.</p> <ul style="list-style-type: none"> - FM transmission have a broadcast wave 87.5–108 MHz 	The most obvious method of applying modulation to a signal is to superimpose the audio signal onto the amplitude of the carrier. However this is by no means the only method which can be employed. It is also possible to vary the frequency of the signal to give frequency modulation or FM		
2.AVN	Navigation	Footwell	P2		The space for the feet in front of a seat in a vehicle	All the air flows to the front and rear footwell area. Any combination of setting for air flow can be selected simultaneously		
2.AVN	Climate	foreground	P2		execute an action, however not display on screen	<ul style="list-style-type: none"> - This definition use on phone, when an application is running, currently display for user. It is called foreground - application is running the internal on the system, user can not see it: background <p>Ex: On Iphone when use open app music to play a song then user back to home & open other app (Facebook) then Facebook is foreground, App music is background</p>		

2.AVN	Navigation	Forward Search	P2		The search method which finds route from departure point to destination.			
4.Telematics	Application	FOTA	P0	<u>Firmware Over The Air</u>	Method to distribute updated firmware by wireless telecommunications.	New firmware is transferred to the ECU via wireless channel (wifi or telecommunication network), then installed, and put into use. It is often necessary to reset the ECU for the new programming to take effect.		
3.Cluster	Cluster	FOV	P2		FOV: Field of View	Field of View determines how wide your view into the virtual world is represented.		
		FP						
4.Telematics	Common	FPCB	P0	<u>Flexible Printed Circuit Boards</u>	FPCB or Flexible electronics, also known as flex circuits, is a technology for assembling electronic circuits by mounting electronic devices on flexible plastic substrates, such as polyimide, PEEK or transparent conductive polyester film	In telematic projects, the hardware of telematics unit is a PCB. We also use the FPCB to attach external SIM card instead of using built-in SIM inside main PCB for testing purpose.	Bảng mạch in linh hoạt là công nghệ lắp ráp các mạch điện tử bằng cách gắn các thiết bị điện tử trên các chất dẻo dẻo như polyimide , PEEK hoặc màng polyester dẫn điện trong suốt.	
2.AVN	Vehicle	FPGA	P2		Field Programmable Gate Array is an electronic component used to build reconfigurable digital circuits.			
2.AVN	Radio	FPS	P2		Frames Per Second: Frames per second (Frame rate) is the frequency (rate) at which consecutive images called frames appear on a display. Frame rate may also be called the frame frequency, and be expressed in hertz.			
2.AVN	System	FR	P2		Functional Realization			

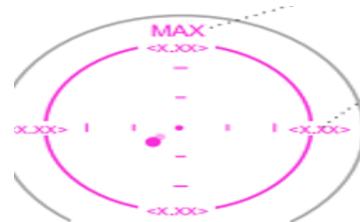
4.Telematics	Vehicle interface	Frame	P2	N/A	A frame is a digital data transmission unit in computer networking and telecommunication. In the OSI model of computer networking, a frame is the protocol data unit at the data link layer.	A frame works to help identify data packets used in networking and telecommunications structures. Frames also help to determine how data receivers interpret a stream of data from a source. Transport: A complete multiplex "message" consists of one or more frames. Each "frame" contains 8 data bytes, including the Protocol Control Information (PCI). A "message" may contain up to 4095 bytes.		
2.AVN	Connection	Front Dual Zone Discrete Air Distribution	P2		Dual Zone Discrete Air Distribution (7-mode air distribution)	Change the direction of the airflow of driver and front passenger		
2.AVN	Climate	Front screen	P2		All the air flows to the front screen and the side windows defrosting/demisting vents			
2.AVN	Vehicle	FRS	P2		Front Radar System Radar is an object-detection system that uses radio waves to determine the range, angle, or velocity of objects.			
2.AVN	Media	FS	P2		Fast scrolling	Fast Scrolling at the middle of screen		
2.AVN	System	FS ID	P2		Function Identify	It include 8 binary number to generate the FEC for active a selected function by Software as Product		
2.AVN	System	FSG	P2		Functional Control Unit			
2.AVN	Vehicle	F-SOI	P2		Feature Statement of Intent			
2.AVN	Broadcast	FTA Channel	P2	<u>Free To Air Channel</u>	it is TV/Radio services broadcast in clear (unencrypted) form, allowing any person with the appropriate receiving equipment to receive the signal and view or listen to the content without requiring a subscription	N/A		[TBD]
2.AVN	Vehicle	FTP	P2		File Transfer Protocol	The File Transfer Protocol (FTP) is a standard network protocol used for the transfer of computer files between a client and server on a computer network.		

4.Telematics		FU class	P2		Functional Unit Class	Each FUClass represents an abstract messaging interface between the display and functional unit		
2.AVN	Vehicle	FUEL	P2		A fuel is any material that can be made to react with other substances so that it releases chemical or nuclear energy as heat or to be used for work. The concept was originally applied solely to those materials capable of releasing chemical energy but has since also been applied to other sources of heat energy such as nuclear energy (via nuclear fission and nuclear fusion).	A fuel is any material that can be made to react with other substances so that it releases chemical or nuclear energy as heat or to be used for work. The concept was originally applied solely to those materials capable of releasing chemical energy but has since also been applied to other sources of heat energy such as nuclear energy (via nuclear fission and nuclear fusion).		
3.Cluster	Common	Fuel Gauge	P0	N/A	The fuel gauge shows approximately how much fuel is remaining in the tank	When the ignition is switched ON, the fuel gauge shows approximately how much fuel is remaining in the tank.		
3.Cluster	Cluster	G2 Hybrid Dunctions	P2		G2 Hybrid Dunctions	Hybrid informations are exchanged between Head Unit and instrument cluster by BAP protocol		
2.AVN	Voice Recognition	G2P	P2		grapheme-to-phoneme converter			
2.AVN	Projection	GAL	P2		Google Auto Link: A protocol to help Mobile device connecting to HU			
2.AVN	Audio	GALA	P2	Geschwindigkeits abhängige lautstärkeanhebung (German) => It means Speed-dependent Volume Control in English	GALA (Speed-Dependent Volume Control) automatically adjusts the volume whether you are listening to the radio, a cassette or a CD in line with the speed of the car.			[TBD]

4.Telematics	Network	GALILEO	P2	N/A	<p>Is the global navigation satellite system (GNSS) that is being created by the European Union (EU) through the European GNSS Agency (GSA). Galileo is intended to provide horizontal and vertical position measurements within 1-metre precision, and better positioning services at higher latitudes than other positioning systems</p>	N/A		
2.AVN	Connection	GAP	P2		<p>Generic Access Profile GAP defines how Bluetooth Low Energy-enabled devices can make themselves available and how two devices can communicate directly with each other.</p>			
2.AVN	Connection	GATT	P2		<p>Generic Attribute Profile GATT describes in detail how attributes (data) are transferred once devices have a dedicated connection</p>			

2.AVN	Connection	GAVDP	P2	<p>General Audio Video Distribution Profile</p> <p>This profile provides the basis for the A2DP and VDP Bluetooth profiles.</p> <p>These are used for systems designed for distributing video and audio streams using Bluetooth technology.</p> <ul style="list-style-type: none"> - A2DP (Advanced Audio Distribution Profile): This profile defines how multimedia audio can be streamed from one device to another over a Bluetooth connection (it is also called Bluetooth Audio Streaming). - VDP (Video Distribution Profile): This profile allows the transport of a video stream. It could be used for streaming a recorded video from a PC media center to a portable player, or a live video from a digital video camera to a TV. Support for the H.263 baseline is mandatory 	<p>This may be used in a variety of scenarios, e.g. with a set of wireless stereo headphones and a music player - the music player sends messages to the headphones to establish a connection or adjust the stream of music, or vice versa.</p>		
2.AVN	Media	GB	P2	Giga Byte	<p>The gigabyte (/'gigəbāt/[1] or /dʒigəbāt/[1]) is a multiple of the unit byte for digital information. The prefix giga means 109 in the International System of Units (SI). Therefore, one gigabyte is 1000000000bytes. The unit symbol for the gigabyte is GB.</p>		

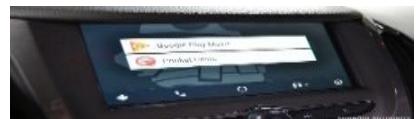
1.Common	Driving Mode	Gear	P1	N/A	<p>- A gear is a rotating machine part having cut teeth, or cogs, which mesh with another toothed part in order to transmit torque</p> <p>- Gears change the</p> <ul style="list-style-type: none"> • speed • torque (rotational force) • direction of rotating axles <p>The driver selects gears in a manual transmission by moving a shift lever, which engages a linkage that controls the movement of the gears along the input shaft. Moving the lever forward or rearward chooses between the two gears available on a given linkage; cars with four gears, or speeds, use two linkages; cars with five or six speeds use three linkages. The driver changes between linkages by moving the shift lever left and right.</p> <p>+ To engage a gear in a manual transmission, The driver pushes in the clutch pedal, disconnecting the engine from the input shaft of the transmission. This frees the gears on the input shaft to move, as when the engine is sending torque through the input shaft, the gears on it are engaged. Once the clutch has disconnected the power from the engine to the transmission, the user selects the appropriate gear (i.e. first, third, reverse) and releases the clutch, re-engaging engine power to the input shaft and propelling the car with the selected gear ratio.</p> <p>+ In an automatic transmission, the same essential process is going on within the transmission itself, but it's all done behind the scenes. Automatics don't use clutches (typically, anyway). Instead, the automatic transmission relies on a torque converter to de-couple the engine and the gear set</p>	

1.Common	Driving Mode	Gear Position	P0	N/A	<p>Change position of gear box.</p> <p>Here are the list of common gear position:</p> <ul style="list-style-type: none"> - P: Park - N: Neutral - R: Reverse - D: Driver <p>Some cars support S (Sport) and L (Low) gears also.</p> <p>In manual transmission vehicle, the gear position is represented by number from 1 to 6 and Reverse position.</p>	<p>- Park: In an automatic transmission there is a ring with teeth on the output shaft of the transmission. When the transmission is shifted into park, a lever called the parking pawl is lowered against the ring. If the parking pawl did not land squarely into an opening in the ring the car will roll slightly and there will be a usually an audible click. The parking pawl now holds the output shaft from turning.</p> <p>- Neutral: Shifting to the neutral gear in an automatic transmission will cut off the connection between the engine and the wheels. So, no power will be transmitted to the wheels when you press the pedal. This allows the wheels to rotate freely without drawing much action from the engine, but you will still have some control over the car.</p>		
2.AVN	Media	GEM	P2		Green Engineering Mode: GEM is engineering application used for development purpose to read/write the system properties of various applications	Press and Hold Home/Menu button		
2.AVN	Connection	GEN	P2		Generator Control Unit: This generator control unit is a multi-processor digital controller. The main function is the control and protection of power generators for industrial or special applications			
2.AVN	Vehicle	G-Force	P2		<ul style="list-style-type: none"> - Display a graphical representation of the lateral and longitudinal acceleration of the car 	<p>The system receive values of the current lateral and longitudinal acceleration by CAN signal</p> <p>After receive values of acceleration, system evaluated values and representation in graphical at G-force mode</p>		

2.AVN	Projection	GGA	P2	GPS Fixed Data: The GGA record contains time, position and fix related data for a GNSS receiver (a global navigation satellite system)	The Global Positioning System (GPS), originally Navstar GPS, is a space-based radionavigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.		
2.AVN	Connection	GI	P2	Guard Interval. A GI is a period of time between symbol transmission that allows reflections (from multipath) from the previous data transmission to settle before transmitting a new symbol.	The 802.11n draft specifies two guard intervals: 400ns (short) and 800ns (long). Support of the 400ns GI is optional for transmit and receive. The purpose of a guard interval is to introduce immunity to propagation delays, echoes, and reflections to which digital data is normally very sensitive. The support S-GI provides an 11% increase in data rate. Guard Interval (GI) = 800ns Short Guard Interval (S-GI) = 400ns		
2.AVN	Media	GIFF	P2	Graphics Image Format	The Graphics Interchange Format (better known by its acronym GIF (/gɪf/ GHIF or /dʒɪf/ JIF)) is a bitmap image format that was developed by a team at the bulletin board service (BBS) provider CompuServe led by American computer scientist Steve Wilhite on June 15, 1987.[1] It has since come into widespread usage on the World Wide Web due to its wide support and portability.		
2.AVN	System	GIMP	P2	GNU Image Manipulation Program a free and open-source raster graphics editor used for image retouching and editing, free-form drawing, converting between different image formats, and more specialized tasks.			 The logo for GIMP (GNU Image Manipulation Program) features a stylized, cartoonish eye with a thick, dark, curved line above it, resembling a brow or a smile. Below the eye, the word "GIMP" is written in a bold, sans-serif font. Underneath "GIMP", the full name "GNU Image Manipulation Program" is written in a smaller, all-caps, sans-serif font.

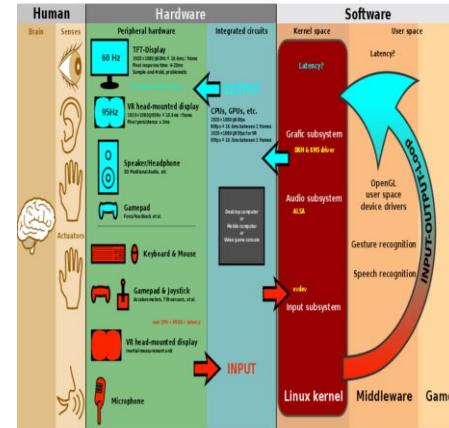
2.AVN	Projection	GLL	P2	Geographic Position - Latitude/Longitude	A geographic coordinate system is a coordinate system used in geography that enables every location on Earth to be specified by a set of numbers, letters or symbols. The coordinates are often chosen such that one of the numbers represents a vertical position, and two or three of the numbers represent a horizontal position. A common choice of coordinates is latitude, longitude and elevation		
2.AVN	System	Global A	P2	- A platform architecture of GM. - Global A is a superset architecture, i.e. defines the maximum possible set of features that can be deployed on any vehicle program.	<!> The vehicle electrical architecture level should be selected based on the requested vehicle content, in particular the requested E/E features – New features can be introduced with any major Global A release – All subsystems must be compatible with the respective architecture release <!> In 2012 around 70% of all GM vehicles will be based on the same global E/E architecture (Global A) • Global A has been designed to reduce development time leveraging the global company footprint		
2.AVN	System	Global B	P2	A new electrical architecture for GM's vehicles, which he called "Global B," that will move much of a vehicle's computer power to the mobile internet, or cloud. This technology will enable cloud computing and over-the-air updates.			
		Global pop up					
4.Telematics	Telematics	Global sim	P2	N/A	Global sim	Definition: Global Simulators	

2.AVN	System	GM	P2		General Motor is an American multinational corporation headquartered in Detroit that designs, manufactures, markets, and distributes vehicles and vehicle parts, and sells financial services. With global headquarters in Detroit's Renaissance Center, GM manufactures cars and trucks in 35 countries			
2.AVN	Connection	GMLAN	P2		General Motor Local Area Network.GM Local area network that is protocol use in GM car.	It's use to exchange information between ECUs.GMLAN based on CAN protocol		
1.Common	Navigation	GNSS	P0	<u>Global Navigation Satellite System</u>	Global Navigation Satellite System (GNSS) refers to a constellation of satellites providing signals from space that transmit positioning and timing data to GNSS receivers. The receivers then use this data to determine location.	Common GNSS Systems are GPS, GLONASS, Galileo, Beidou and other regional systems. The advantage to having access to multiple satellites is accuracy, redundancy and availability at all times. Though satellite systems don't often fail, if one fails GNSS receivers can pick up signals from other systems.	GNSS là hệ thống định vị toàn cầu sử dụng vệ tinh. Hệ thống GNSS hiện nay bao gồm GPS (sử dụng vệ tinh của Mỹ), GLONASS (Nga), Beidou (Trung Quốc) và các hệ thống vệ tinh khác (Nhật, Canada).	
2.AVN	Connection	GOEP	P2		Generic Object Exchange Profile GOEP is used to transfer an object from one device to another. The object may be any object such as a picture, document, business card, etc.	The profile defines two roles, a server that provides the location form which an object is pulled or pushed, as well as a client that initiates the action. GOEP provides a generic blueprint for other profiles using the OBEX protocol.		
2.AVN	Phone Projection	Google VR	P0	<u>Google Voice Recognition</u>	Google Voice recognition: Google Voice is a telephony service that provides call forwarding and voicemail services, voice and text messaging, as well as U.S. and international call termination for Google Account customers			
2.AVN	System	GPL	P2		General Public License a widely used free software license, which guarantees end users the freedom to run, study, share and modify the software			

2.AVN	Phone Projection	GPM	P0	<u>Google Play Music</u>	Google Play Music is a music and podcast streaming application and online music locker operated by Google.	In common, Android Auto uses GPM to play music, user need to install GPM in Mobile device to run on AA.		
2.AVN	Connection	GPP	P2		Generic PIM Profile The GPP specifies the generic requirements for protocols and profiles that shall be used by devices for exchange of PIM data objects. It is based on a Client-Server interaction model where the Client initiates the transactions. This profile defines no specific application objects or data access functions but will be used as a generic framework for PIM profiles (e.g., for access to contact/phonebook data, message objects, social media data or calendar, tasks and notes objects). Therefore, GPP can be considered an abstract profile. PIM: Product information management			
1.Common	Navigation	GPS	P0	<u>Global Positioning System</u>	The Global Positioning System (GPS), originally Navstar GPS, is a satellite-based radionavigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth . - Can be set to GPS time synchronization status. (On / Off) 			
2.AVN	Navigation	GPS Coordinates	P2		GPS coordinates are a unique identifier of a precise geographic location on the earth, usually expressed in alphanumeric characters.			

2.AVN	Navigation	GPS Device	P0	<u>Global Positioning System Device</u>	A GPS device, GPS receiver, or simply GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position	Just connect GPS cable to the port on HU correctly and wait for some time (about 1 minute). After that, check the Map screen, it will display your current location base on GPS data, and local time should be changed too.		
2.AVN	Navigation	GPS Log	P2		GPS Log is a feature that allows location and speed information to be recorded when shooting using the GPS feature of the camera.	When the Navi/Map function occurs an issue, you need to get Navi/Map log to attach to your bug. It will be useful for developer to analyze and find problem. You can follow the step to prepare data and do to get these log files of Navi/Map in this document on Collab system:		
2.AVN	System	GPS/DR	P2		Global Position system/Dead Reckoning Dead reckoning is the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time and course	Advances in navigational aids that give accurate information on position, in particular satellite navigation using the Global Positioning System, have made simple dead reckoning by humans obsolete for most purposes.		
3.Cluster	Cluster	GPU	P1	<u>Graphic Processing Unit</u>	Graphic Processing Unit	A graphics processing unit (GPU) is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device.		
2.AVN	System	GRUB	P2		Grand Unified Bootloader is a boot loader package developed to support multiple operating systems and allow the user to select among them during boot-up	Briefly, a boot loader is the first software program that runs when a computer starts. It is responsible for loading and transferring control to the operating system kernel software (such as the Hurd or Linux). The kernel, in turn, initializes the rest of the operating system (e.g. GNU).		

2.AVN	Projection	GSA	P2	Google Search Appliance	(Using for VR in AA) The Google Search Appliance enables you to provide universal search to your users. You can get the most from your Google Search Appliance by using some or all of its many features to fine-tune and enhance universal search. Become familiar with the Google Search Appliance's features by reading this document and apply those features that best suit your search solution		
2.AVN	Connection	GSM	P2	Global System for Mobile Communications. GSM is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation digital cellular networks used by mobile devices such as tablets, first deployed in Finland in December 1991.[2] As of 2014, it has become the global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories	GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network—macro, micro, pico, femto, and umbrella cells. The coverage area of each cell varies according to the implementation environment		
2.AVN	Vehicle	GSMC	P2	Graphic seat multifunction controller			
2.AVN	Media	Gstreamer	P2	GStreamer is a pipeline-based multimedia framework that links together a wide variety of media processing systems to complete complex workflows. For instance, GStreamer can be used to build a system that reads files in one format, processes them, and exports them in another. The formats and processes can be changed in a plug and play fashion.	GStreamer processes media by connecting a number of processing elements into a pipeline. Each element is provided by a plug-in. Elements can be grouped into bins, which can be further aggregated, thus forming a hierarchical graph: ex. The file source reads an MP3 file from a computer's hard-drive and sends it to the MP3 decoder. The decoder decodes the file data and converts it into PCM samples which then pass to the ALSA sound-driver. The ALSA sound-driver sends the PCM sound samples to the computer's speakers.		

1.Common	Common	GUI	P0	<u>Graphical User Interface</u>	<p>Graphical User Interface is a form of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, instead of text-based user interfaces, typed command labels or text navigation.</p> <p>A series of elements conforming a visual language have evolved to represent information stored in computers. This makes it easier for people with few computer skills to work with and use computer software. The most common combination of such elements in GUIs is the windows, icons, menus, pointer (WIMP) paradigm, especially in personal computers. [1]</p>	
2.AVN	Media	GUID	P2		Globally Unique Identifiers: one of the partition type GUID Partition Table (GPT) is a standard for the layout of the partition table on a physical hard disk, using globally unique identifiers (GUID).	
2.AVN	Navigation	Guidance	P2		Guidance is the guideline user to go through a routing. There are text guidance, voice guidance ...	
2.AVN	Projection	GVLS	P2		Google Voice Local Service	Google Voice is a telephony service that provides call forwarding and voicemail services, voice and text messaging, as well as U.S. and international call termination for Google Account customers.
2.AVN	Connection	GW	P2		Gate Way A wireless gateway routes packets from a wireless LAN to another network, wired or wireless WAN	
2.AVN	Vehicle	GWM	P2		Gateway Module	

2.AVN	Projection	Gyroscope	P2		A gyroscope is a device used for measuring or maintaining orientation and angular velocity. It is a spinning wheel or disc in which the axis of rotation is free to assume any orientation by itself. When rotating, the orientation of this axis is unaffected by tilting or rotation of the mounting, according to the conservation of angular momentum.			
2.AVN	Media	H.264	P2		a type of video codec			
2.AVN	Phone	H/P	P2		Hands-Free Phone Hands-free is an adjective describing equipment that can be used without the use of hands (for example via voice commands) or, in a wider sense, equipment which needs only limited use of hands, or for which the controls are positioned so that the hands are able to occupy themselves with another task (such as driving) without needing to hunt far afield for the controls.	That can be used without the use of hands (for example via voice commands) or, in a wider sense, equipment which needs only limited use of hands while driving		
2.AVN	Other	H/U	P2		Head Unit, sometimes referred to as a deck, is a component of a stereo system either in an automobile or a home which provides a unified hardware interface for the entire system. An antiquated name for a head unit is a receiver	Head units give the user control over the vehicle's information and entertainment media: AM/FM radio, satellite radio, CDs, cassette tapes (although these are now uncommon), MP3, GPS navigation, Bluetooth, etc. Many audio-only head units afford the user precise control over detailed audio functions such as volume, band, frequency, speaker balance, speaker fade, bass, treble, EQ and so on.		
2.AVN	Phone	Handfree	P2		Is an equipment that support connected to phone via BT and help user can accept call and speak/listen without using phone in hand	Connect Handfree equipment to Phone via Bluetooth. Phone receive incoming call -> accept call by using Handfree equipment.		

2.AVN	Phone call	Hands-free calling	P0	N/A	Hands-free (or Hands-free) calling is a call mode. User listens via speaker of HU/AVN/Bench and speaks via mic of HU/AVN/Bench without using phone in hand.	<ul style="list-style-type: none"> - Step 1. Connect Phone to AVN via Bluetooth or phone projection, setting for sound output via AVN. - Step 2. Phone receive incoming call - Step 3. Accept call by press "accept" button on AVN screen <p>=> After that, you can speak/listen to Caller by using AVN</p>		
2.AVN	Phone	Handset	P2		is a component of a telephone that contain speaker and microphone.	When receiving incoming phone, accept the call. Listen to caller by using speaker and talk to him/her via microphone		
2.AVN	Connection	Handsets mode	P2		It is the mode when 2 devices connected via Bluetooth Handset.	When connect Phone & AVN via BT. User make an call & accept it. User choose handset mode means, user heard through the phone's earpiece or speaker, and using the phone's microphone		
2.AVN	Phone	Hang On	P2		is a type of call state when user accept an incoming call Hang on also means that you don't end call. For example when you call to your friend but another one take the call, and he/she will say "Hang on, I will call his/her"	Connect Phone to AVN via Bluetooth Phone receive incoming call => Accept call by press "accept" button on AVN screen => Call state is Hang On		
2.AVN	Phone	Hang Up= Hang out	P2		is a type of call state when user end call	Connect Phone to AVN via Bluetooth Call state is Active => press "End Call" button => Hang Up		

3.Cluster	Common	Hazard	P0	N/A	<p>An warning light and button use to trigger others in case your car in emergency.</p> <p>Hazard warning lights are a pair of intermittent flashing indicator lights that flash in unison to warn other drivers that the vehicle is a temporary obstruction. They are also called hazard flashers and hazard lights. Different countries use hazard warning lights in different ways. In New Zealand we wouldn't use them on a motorway to warn other drivers that we're slowing down, but in the UK this is recommended.</p>	<p>Press this button to make the front and rear turn signal lamps flash on and off. Press again to turn the flashers off. When the hazard warning flashers are on, the vehicle's turn signals will not work.</p>		
2.AVN	Bench	hazardous	P2		<ul style="list-style-type: none"> - This category is for dangerous motor vehicle activities, which may also be explicitly illegal to perform on public roads in many jurisdictions, or which police officers would give a citation for in many jurisdictions. - Hazard warning lights are a pair of intermittent flashing indicator lights that flash in unison to warn other drivers that the vehicle is a temporary obstruction. They are also called hazard flashers and hazard lights - They are usually activated by pressing a button on the dashboard that looks like a red triangle, as shown 			
2.AVN	Connection	HCI	P2		<p>Host Controller Interface</p> <p>The pseudo-protocol referring to any standardized communication between the host stack (e.g., a PC or mobile phone OS) and the controller</p>	<p>An HCI decouples the host from the controller, allowing either to be swapped without affecting the other. Bluetooth defines several HCI standards, each for a different hardware interface to transfer the same commands, events, and data packets. The most commonly used are USB (in PCs) and UART (in mobile phones and PDAs).</p>		

4.Telematics	Other	HCT	P2	High Confidence Threshold	High Confidence Threshold	If CS is higher than HCT, VCP recognize user's voice with confidence else, VCP need to confirm the user command input		
2.AVN	Media	HD	P2		High definition video	High-definition video is video of higher resolution and quality than standard-definition.		
2.AVN	Radio	HD DMB	P2		High Definition Digital multimedia broadcasting DMB (a digital radio transmission technology developed in South Korea for sending multimedia such as TV, radio and datacasting to mobile devices such as mobile phones, laptops and GPS navigation systems) with HD: HD DMB started in August 2016 in South Korea. HD DMB has been improved from 240p to 720p. It uses HEVC.5 codec. There are currently 6 HD DMB stations in Seoul. Smartphones integrated Qualcomm Snapdragon 801 or higher received firmware upgrade to support HD DMB.			
2.AVN	Radio	HD Radio	P0	Hybrid Digital Radio	- HD Radio is a trademarked term for iBiquity's in-band on-channel (IBOC) digital radio technology. - Used by AM/FM with embedded digital signal	Note: IBOC is a hybrid method of transmitting digital radio and analog radio broadcast signals simultaneously on the same frequency		
2.AVN	Vehicle	HDC	P2		Hill Descent Control Hill Descent Control (HDC) is a driver-assistance system. It allows a controlled hill descent in rough terrain without any brake input from the driver.			
2.AVN	Media	HDD	P2		Hard Disk Drive	Portable or Internal		

2.AVN	Media	HDMI	P2	High-Definition Multimedia Interface	HDMI (High-Definition Multimedia Interface) is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio device.[4] HDMI is a digital replacement for analog video standards.		
2.AVN	Media	HE-AAC	P2	High-Efficiency Advanced Audio Coding	High-Efficiency Advanced Audio Coding (HE-AAC) is an audio coding format for lossy data compression of digital audio defined as an MPEG-4 Audio profile in ISO/IEC 14496-3. It is an extension of Low Complexity AAC (AAC LC) optimized for low-bitrate applications such as streaming audio.		
2.AVN	Vehicle	HEV	P2	Hybrid Electric Vehicle	A hybrid electric vehicle (HEV) is a type of hybrid vehicle that combines a conventional internal combustion engine (ICE) system with an electric propulsion system (hybrid vehicle drivetrain).		
1.Common	Vehicle Type	HEV or (Hybrid)	P0	<u>Hybrid Electric Vehicle</u>	A hybrid electric vehicle (HEV) is a type of hybrid vehicle that combines a conventional internal combustion engine (ICE) system with an electric propulsion system (hybrid vehicle drivetrain).	Xe lai là xe có một động cơ điện và một động cơ đốt trong và một thùng dự trữ nhiên liệu cùng với một thiết bị dự trữ điện (pin sạc)	<p style="text-align: center;">THE ELECTRIC POWERTRAIN</p>
2.AVN	Connection	HFP	P0	Hands-Free Profile	HFP is the profile most commonly used to allow mobile phones to communicate with Bluetooth headsets and car kits. A Bluetooth car kit will use HFP to connect to a Bluetooth phone, allowing phone calls to take place via the car's audio system (or an installed speaker) while the phone stays safely in a pocket or purse.	HFP provides the ability to carry out basic functions such as answering, rejecting and ending calls, and adjusting the call audio volume, as well as more advanced features like using the phone's voice dial functionality	
2.AVN	Vehicle	HFS	P2	Heated Front Screen			

2.AVN	Voice Recognition	High Confidence Threshold	P2		If CS is higher than HCT, VCP recognize user's voice with confidence else, VCP need to confirm the user command input			
2.AVN	Navigation	High Vigilance Areas	P2		High Vigilance Areas contains: Dangerous zone , Risky zone			
2.AVN	Navigation	Hippo	P2		Trimble Data Format The HIPPO protocol interface is implemented. HIPPO Protocol for supported messages			
2.AVN	Media	Hitlist	P2		Search history	Most recent search history		
2.AVN	Other	HK	P1	Hard key	Hard keys (also called Hard button) are buttons around the head unit, which are used to perform certain AVN functions. For example: Track up, track down, Menu, Audio,...			
2.AVN	System	HLC	P2		High Line Cluster. A cluster that is controlled using the SOME/IP protocol over Ethernet.	High line cluster is the expert level. It will show an image of your car: which doors are open, setup menu, Audio, navigation, phone		
2.AVN	Vehicle	HLDF	P2		High Level Display Front			
1.Common	Common	HMI / MMI	P0	Human - Machine Interface / Man - Machine Interface	The user interface is the space where interactions between humans and machines occur. (HMI) interfaces machines with physical input hardware such as keyboards, mice, game pads and output hardware such as computer monitors, speakers, and printers. A device that implements a HMI is called a human interface device (HID). Additional user interface layers may interact with one or more human sense, including: tactile UI (touch), visual UI (sight), auditory UI (sound), olfactory UI (smell), equilibrial UI (balance), and gustatory UI (taste).	Example: The driver can touch on the AVN's screen and listen music via AVN, AVN is a HMI of vehicle with the driver. The driver can turn on air conditioner by pressing AC button. That means AC button is HMI between the driver with air conditioner system inside vehicle.		

2.AVN	Power Mode	HMIinactive	P2		Main state during Off vehicle power mode when system is fully initialized.	<p>the vehicle power mode remains OFF, but the engine is running.</p> <p>The HMIinactive state is exited when:</p> <ol style="list-style-type: none"> 1. The vehicle power mode changes to Run, Accessory, Propulsion, or 2. The Power button on the center stack faceplate is pressed as shown in the diagram below. This transition allows the user to go into LocalInfotainment 		
2.AVN	Power Mode	HMIinit	P2		Second-stage initialization stage entered after tAnimationReady and held until both CSM/Low Radio and IPC certify that they are ready to produce a customer usable HMI on the center and cluster/HUD displays respectively. Exited at tHMIReady when such certification is received or a failsoft timer expires.	<p>the user has started the vehicle or attempted to enter a local mode, a startup animation is played on the center stack and cluster HMI displays while the system is still initializing in order to hide initialization artifacts from the user</p>		
		HNP						
2.AVN	Phone call	Hold Call	P0	N/A	<p>In telephony, a call may be placed on hold, in which case the connection is not terminated but no verbal communication is possible until the call is removed from hold by the same or another extension on the key telephone system. Music on hold or on hold messaging may be played for the caller while the call is on hold, especially if the call has been placed to a customer service center.</p> <p>For example: when a call (1st call) is active and user receive 2nd incoming call, he/she hold the 1st call and activate the 2nd incoming call.</p>	<ul style="list-style-type: none"> - Step 1. Make 1st incoming call from device 2 to device 1 - Step 2. Accept the call - Step 3. Make 2nd incoming call from device 3 to device 1 - Step 4. Accept 2nd Call and Hold 1st Call => The 1st Call will be on Hold 		
2.AVN	Vehicle	HRW	P2		Heated Rear Screen			
1.Common	Common	HS	P2	<u>High Speed</u>	High Speed			

2.AVN	Connection	HSGMLAN	P2		<p>High Speed GMLAN Bus is used where data needs to be exchanged at a high enough rate to minimise the delay between the occurrence of a change in sensor value and the reception of this information by a control device using the information to adjust vehicle system performance</p>	<p>The High Speed GMLAN serial data network consists of two twisted wires. One signal circuit is identified as GMLAN-High and the other signal circuit is identified as GMLAN-Low. At each end of the data bus there is a $120\ \Omega$ termination resistor between the GMLAN-High and GMLAN-Low circuits.</p>		
2.AVN	Connection	HSP	P1	Headset Profile	<p>The Headset Profile defines a simple audio connection between a Bluetooth audio gateway, like a cell phone, and a headset.</p>	<p>It defines how the two devices can transmit monophonic audio between each other, one channel at a time. The profile also supports a single button to start or end a call, and the use of a volume control.</p>		

4.Telematics	Telecommunication	HTTP	P0	<u>Hypertext Transfer Protocol</u>	<p>Protocol used to send and receive data of HTML document etc. between Web server and client.</p> <p>Communication protocol used to exchange data like HTML documents between web server and client.</p> <p>The HTTP request methods: GET, HEAD, POST, PUT, DELETE, TRACE, OPTIONS, CONNECT, PATCH</p>	<p>HTTP functions as a request-response protocol in the client-server computing model.</p> <p>A web browser, for example, may be the client and an application running on a computer hosting a website may be the server. The client submits an HTTP request message to the server.</p> <p>The server, which provides resources such as HTML files and other content, or performs other functions on behalf of the client, returns a response message to the client. The response contains completion status information about the request and may also contain requested content in its message body.</p> <p>Common tool to test HTTP: Postman</p> <p>Example:</p> <p>Client request: GET /index.html HTTP/1.1 Host: www.example.com</p>	<p>Ví dụ: (server trả về mã http code = 200)</p> <p>Client request: GET /index.html HTTP/1.1 Host: www.example.com</p> <p>Server response: HTTP/1.1 200 OK Date: Mon, 23 May 2005 22:38:34 GMT Content-Type: text/html; charset=UTF-8 Content-Length: 138 Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT Server: Apache/1.3.3.7 (Unix) (Red-Hat/Linux) ETag: "3f80f-1b6-3e1cb03b" Accept-Ranges: bytes Connection: close</p> <pre><html> <head> <title>An Example Page</title> </head> <body> Hello World, this is a very simple HTML document. </body> </html></pre>	

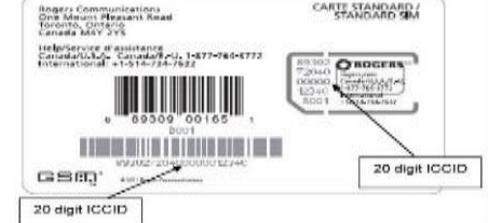
1.Common	ECU	HU or IHU	P0	Head Unit / Infortainment Head Unit	<p>The head unit is the centerpiece of the car's sound and information system. Typically located in the center of the dashboard, modern head units are densely integrated electronic packages housed in detachable face plates. As high-end head units are common targets for theft, many head units are typically integrated into the vehicle's alarm system.</p> <p>An automotive head unit, sometimes referred to as a deck, is a component of an automotive infotainment, which provides a unified hardware interface (mainly, the screen and buttons) for the entire system. [1]</p>	<p>Head units give the user control over the vehicle's information and entertainment media: AM/FM radio, satellite radio, DVDs/CDs, cassette tapes (although these are now uncommon), USB MP3, Dashcams, GPS navi, Bluetooth, WiFi etc. Many audio-only head units afford the user precise control over detailed audio functions such as volume, band, frequency, speaker balance, speaker fade, bass, treble, EQ and so on.</p> <p>Several OEMs such as General Motors are integrating more advanced systems into vehicle's head units such that they can offer vehicle data such as trouble warnings; such a head unit thus serves as a secondary instrument panel. [2]</p>		
1.Common	ECU	HUD	P0	<u>Head-up Display</u>	<p>A head-up display or heads-up display, also known as a HUD, is any transparent display that presents data without requiring users to look away from their usual viewpoints</p>	<p>Displays the data on a transparent windscreen, enhancing the drivers' driving capability by fulfilling the requirements for safety, comfort, and information, without requiring users to look away from their usual viewpoints</p> <p>A typical HUD contains three primary components: a projector unit, a combiner, and a video generation computer.</p>		

2.AVN	Vehicle	HUD_Vehicle Message	P2		<p>HUD_Vehicle Message is the warning image display on HUD in case vehicle is crashed</p> <p>Some alerts are displayed in HUD.</p> <ul style="list-style-type: none"> • When there is vehicle message from the vehicle, only display an icon on the HUD. • Show vehicle message based on following cases: <ul style="list-style-type: none"> - Intersection Stop Alert - Intersection Collision Warning (Left) - Intersection Collision Warning (Right) - Collision Imminent Alert - V2V Hard Braking - Pedestrian Alert - Animal Alert • If both animal and pedestrian been detected at the same time, pedestrian has higher priority. Only Pedestrian Alert is displayed. 		
1.Common	ECU	HVAC	P0	<u>Heating, Ventilation, and Air Conditioning</u>	<p>HVAC is heating, ventilation, and air conditioning system.</p> <p>HVAC is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality</p>	<p>When your air conditioning is not functioning properly, driving can be miserable and, in some cases, even dangerous. All modern cars have a heater, and most have an air conditioner. These components help maintain safe and comfortable driving conditions, including visibility.</p>	<p>HVAC là một hệ thống tỏa nhiệt hoàn chỉnh, thông hơi và điều hòa không khí</p>
2.AVN	Vehicle	Hybrid	P2		<p>A hybrid vehicle uses two or more distinct types of power, such as internal combustion engine to drive an electric generator that powers an electric motor,[1] e.g. in diesel-electric trains using diesel engines to drive an electric generator that powers an electric motor, and submarines that use diesels when surfaced and batteries when submerged</p>	<p>A hybrid vehicle uses two or more distinct types of power, such as internal combustion engine to drive an electric generator that powers an electric motor,[1] e.g. in diesel-electric trains using diesel engines to drive an electric generator that powers an electric motor, and submarines that use diesels when surfaced and batteries when submerged</p>	

2.AVN	System Base	IAM	P1	Integrated Audio Module	Integrated Audio Module	<p>The integrated audio module (IAM) handles functions for:</p> <ul style="list-style-type: none"> - Radio reception (AM and FM) - CD playback - AUX playback - RDS reception - USB/iPod playback <p>The integrated audio module (IAM) communicates with directly connected components as well as with other control modules and components via the MOST network, which is a fiber-optic communication network.</p> <p>The integrated audio module (IAM) is a slave module on the MOST network. The infotainment control module (ICM) is the master module.</p> <p>The integrated audio module (IAM) is mounted in the center console. It is integrated with the audio unit and they are replaced together.</p> <p>In order to function in the MOST network, the infotainment control module (ICM) checks that the integrated audio module (IAM) has a correct serial number. If the number is incorrect, the integrated audio module (IAM) does not work.</p>



2.AVN	Connection	iAP	P1	iPod Accessory Protocol/ Interface Accessory Protocol	<p>The Apple iAP2 protocol (iPod Accessory Protocol) is used in Bluetooth® communications between iOS devices and wireless accessories such as dock stations or car adapters. This profile enables to exploit Apple specific features.</p>	<p>The use of the Apple iAP2 Profile allows your Bluetooth® accessory to wirelessly interact with any iOS devices to (partial list) :</p> <ul style="list-style-type: none"> • Play control of iOS devices • Transferring metadata information • Transferring contacts information • Add communication between the accessory and applications running on the iOS • Act on iOS device settings • Send HID report • Receiving media information • Receiving call information • Send RAW data 		
2.AVN	Audio	iAP1 iAP2	P2		<p>iAP1 and iAP2 are the two communication systems used by accessories today to communicate with Apple devices.</p> <p>iAP1 is a legacy or an older communication system, while iAP2 is the latest and greatest.</p>			
2.AVN	Projection	iAP2 protocol	P2		iPod Accessory Protocol	<p>The Apple iAP2 protocol (iPod Accessory Protocol) is used in Bluetooth® communications between iOS devices and wireless accessories such as dock stations or car adapters. This profile enables to exploit Apple specific features.</p>		
2.AVN	Vehicle	IB	P2		Icon Badges	<p>Also known as 'Dots', these allow us to display a Badge (or Dot) on our applications launcher icon to notify our users that there is a pending notification that they have not yet acted upon</p>		

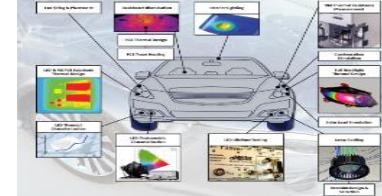
2.AVN	Audio	IBOC	P1	In-band on-channel	In-band on-channel (IBOC) is a hybrid method of transmitting digital radio and analog radio broadcast signals simultaneously on the same frequency. By utilizing additional digital subcarriers or sidebands, digital information is "multiplexed" on an AM or FM analog signal, thus avoiding re-allocation of the broadcast bands.	By utilizing additional digital subcarriers or sidebands, digital information is "multiplexed" on an AM or FM analog signal, thus avoiding re-allocation of the broadcast bands.		
2.AVN	Navigation	IC – Interchange	P2		Interchange is a place where several different roads joins joins a major road such as a motorway or interstate, designed so that vehicles leaving or joining the road do not have to cross other lines of traffic.	Interchanges are almost always used when at least one of the roads is a controlled-access highway (freeway or motorway) or a limited-access divided highway (expressway), though they may occasionally be used at junctions between two surface streets		
2.AVN	Projection	ICA	P2		In Control Apps: presents an interactive set of apps that enable media streaming, cloud and location-based services and more - via a USB port.			
4.Telematics	Phone	iCall or i-Call	P2		Information Call: Simply press the information button on the headliner: A voice connection is immediately established with the local customer service for up-to-date information on products or support	Press i-call button to trigger i-Call. The vehicle will connect to i-Call Center to help driver contacts with call agent to request support		
2.AVN	System	I-CAN	P2		CAN interface with Infotainment Unit			
2.AVN	Vehicle	ICC	P2	In car communication	ICC is a feature supporting enhance voice inside the car. The voice from driver or passenger in the front seats will be recorded and send out to speakers in the rear seats.	ICC) system from paragon significantly improves the understanding of communication between the occupants of a vehicle.		
4.Telematics	Telecommunication	ICCID	P0	Integrated Circuit Card Identifier	Each SIM is internationally identified by its integrated circuit card identifier (ICCID). ICCIDs are stored in the SIM cards and are also engraved or printed on the SIM card body during a process called personalisation.	A full ICCID is 19 or 20 characters. Sometimes it happens that on the SIM card is printed only the last 13 digits of ICCID number.		

2.AVN	Projection	ICD	P2		Interface Component Design					
2.AVN	Vehicle	ICE	P2		Internal Combustion Engine:	An internal combustion engine (ICE) is a heat engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit.				
1.Common	Vehicle Type	ICE or CE	P0	Internal combustion engine	An internal combustion engine (ICE) is a heat engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit.	Typically an ICE is fed with fossil fuels like natural gas or petroleum products such as gasoline, diesel fuel or fuel oil.	Động cơ đốt trong là một loại động cơ nhiệt tạo ra công cơ học dưới dạng moment quay (hay còn gọi là moment xoắn) bằng cách đốt nhiên liệu bên trong động cơ. Các loại động cơ sử dụng dòng chảy (tiếng Anh: fluid flow engine) để tạo công thông qua việc đốt cháy nhiên liệu	<p style="text-align: center;">INTERNAL COMBUSTION ENGINES (ICE) VS ELECTRIC MOTORS (EM)</p> <table border="0"> <tr> <td style="vertical-align: top;"> ICe <ul style="list-style-type: none"> ➢ Requires more maintenance ➢ Produces noise ➢ Fast refueling ➢ The range of conventional gasoline vehicles today is around 400 miles. ➢ Causes pollution in large scale. ➢ The supply of petrol is decreasing and we will one day run out of it. ➢ Because of high demand and decreasing supply, the price of petrol is increasing </td> <td style="vertical-align: top;"> EM <ul style="list-style-type: none"> ➢ Requires less maintenance ➢ Doesn't produce noise. ➢ Slow refueling ➢ The range, the distance an electric car can travel on a single charge or fill up—varies from about 60 to more than 200 miles. ➢ Causes less pollution. ➢ Electricity is a renewable resource. ➢ These are cheaper to fill up once again </td> </tr> </table>	ICe <ul style="list-style-type: none"> ➢ Requires more maintenance ➢ Produces noise ➢ Fast refueling ➢ The range of conventional gasoline vehicles today is around 400 miles. ➢ Causes pollution in large scale. ➢ The supply of petrol is decreasing and we will one day run out of it. ➢ Because of high demand and decreasing supply, the price of petrol is increasing 	EM <ul style="list-style-type: none"> ➢ Requires less maintenance ➢ Doesn't produce noise. ➢ Slow refueling ➢ The range, the distance an electric car can travel on a single charge or fill up—varies from about 60 to more than 200 miles. ➢ Causes less pollution. ➢ Electricity is a renewable resource. ➢ These are cheaper to fill up once again
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1.Common	ECU	ICE/IVI	P0	In-Car Entertainment/ In-Vehicle Infotainment	In-car entertainment (ICE), or in-vehicle infotainment (IVI), is a collection of hardware and software in automobiles that provides audio or video entertainment.	In car entertainment originated with car audio systems that consisted of radios and cassette or CD players, and now includes automotive navigation systems, video players, USB and Bluetooth connectivity, Computers, in-car internet, and WiFi. Once controlled by simple dashboards knobs and dials, ICE systems can include steering wheel audio controls and handsfree voice control.				
2.AVN	Vehicle	ICM	P2	Intel Compute Module	Intel Compute Module					
2.AVN	Vehicle	ICM	P2	Integrated Control Module	Integrated Control Module					
2.AVN	Vehicle	ICP	P2		Instrument Control Panel					
2.AVN	Vehicle	ICS	P2		Integrated Center Stack					
2.AVN	Vehicle	ICU	P2		Integrated Control Unit	ICU means "integrated control unit" that receives requests from other controllers through Logic signal or CAN signal and supplies the output to operate necessary functions through control logic of ICU. In SecurityAccess, if you can unlock security of one ECU, that means you have already enable ICU of this ECU.				

2.AVN	Media	ID3Tag	P0	N/A	<p>ID3 is a metadata container most often used in conjunction with the MP3 audio file format. It allows information such as the title, artist, album, track number, and other information about the file to be stored in the file itself.</p>	<p>ID3 tags may be edited in a variety of ways. On some platforms the file's properties may be edited by viewing extended information in the file manager. Additionally most audio players allow editing single or groups of files. Editing groups of files is often referred to as "batch tagging". There are also specialized applications, called taggers, which concentrate specifically on editing the tags and related tasks</p>		
4.Telematics	Connectivity	IDC	P2		<p>Internet Data Center</p>	<p>iDC is a place established by a service provider or iDC company to provide stable and wide-band networks with high performance computers as a service to their customers</p>		
2.AVN	System	Identification	P2		<p>The self-diagnosis function Identification is for reading various permanent values out of the control unit, such as part number, software version etc. These values can only be displayed, they cannot be modified. For testing, ensure that the values that appear in the Identification screen matching with the values returned from Hex services and also matching with SRS</p> <p>Ví dụ: Software version, serial number, diagnostic mode, Manufacturer's test stand number.</p>			

2.AVN	System Base	IDL	P2	<p>Interface Description Language:</p> <p>An interface description language or interface definition language (IDL), is a specification language used to describe a software component's application programming interface (API). IDLs describe an interface in a language-independent way, enabling communication between software components that do not share one language. For example, between those written in C++ and those written in Java.</p>	<p>IDLs are commonly used in remote procedure call software. In these cases the machines at either end of the link may be using different operating systems and computer languages. IDLs offer a bridge between the two different systems.</p>		
2.AVN	System	IEC61508	P2	<p>It's an international standard published by the International Electrotechnical Commission of rules applied in industry. It is titled Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems (E/E/PE, or E/E/PES).</p>	<p>IEC 61508 is intended to be a basic functional safety standard applicable to all kinds of industry.</p> <p>Part of the overall safety relating to the EUC and the EUC control system</p>		
2.AVN	Connection	IEEE	P2	<p>Institute of Electrical and Electronic Engineers</p> <p>The Institute of Electrical and Electronics Engineers (IEEE) is a professional association with its corporate office in New York City and its operations center in Piscataway, New Jersey. Its objectives are the educational and technical advancement of electrical and electronic engineering, telecommunications, computer engineering and allied disciplines.</p>			

2.AVN	Connection	IEEE 802.11 standards	P2	<p>IEEE 802.11 is a set of media access control (MAC) and physical layer (PHY) specifications for implementing wireless local area network (WLAN) computer communication in the 900 MHz and 2.4, 3.6, 5, and 60 GHz frequency bands. They are the world's most widely used wireless computer networking standards, used in most home and office networks to allow laptops, printers, and smartphones to talk to each other and access the Internet without connecting wires</p>	<p>In May 2007, task group TGmb was authorized to "roll up" many of the amendments to the 2007 version of the 802.11 standard.REVmb or 802.11mb, as it was called, created a single document that merged ten amendments (802.11k, r, y, n, w, p, z, v, u, s) with the 2007 base standard. In addition much cleanup was done, including a reordering of many of the clauses.Upon publication on March 29, 2012, the new standard was referred to as IEEE 802.11-2012.</p>		
2.AVN	Radio	IF	P2	<p>Intermediate frequency An intermediate frequency (IF) is a frequency to which a carrier wave is shifted as an intermediate step in transmission or reception.The intermediate frequency is created by mixing the carrier signal with a local oscillator signal in a process called heterodyning, resulting in a signal at the difference or beat frequency.</p>			
1.Common	Power Mode	Ignition / IGN / IG	P0	Ignition	<p>Ignition is a system in vehicle to generate a very high voltage from the car's 12 volt battery, and to send this to each sparkplug in turn, igniting the fuel-air mixture in the engine's combustion chambers.</p>	<p>Hệ thống đánh lửa để khởi động động cơ xe: Trong hệ thống đánh lửa, tia lửa được phát ra giữa các điện cực của các bugi để đốt cháy hỗn hợp hòa khí. Hòa khí bị nén có điện trở lớn, nên cần phải tạo ra điện thế hàng chục ngàn volt để đảm bảo phát ra tia lửa mạnh, có thể đốt cháy hỗn hợp hòa khí.</p>	<pre> graph LR B[BATTERY] -- "-" --> T[TRIGGER & MODULE] T -- "-" --> C[COIL] C -- "-" --> D[CAP & ROTOR] D -- "-" --> SP[SPARK PLUG WIRES] SP -- "-" --> SP_Plugs[SPARK PLUGS] C -- "+" --> S[PRIMARY - BOLD SECONDARY - LIGHT] S -- "+" --> SP_Plugs </pre>

2.AVN	Bench	Ignition cycle	P2		<ul style="list-style-type: none"> - Ignition OFF, ACC, ON, CRUNK - Dr_Door Open (1) - Dr_Door Close (2) - HS Enable ON (1) (HS: high speed) - HS Enable OFF (2) - Ampere (A) - AMP INT: Loa AMP INT (1): ON AMP INT (2): OFF 	<ol style="list-style-type: none"> 1. Key off (Ignition off) 2. HS Enable Off (2) 2. Open door (1) 3. Close door (2) 4. Check Ampere returns to 0 5. Ignition ON (wake up) 		
1.Common	Power Mode	Ignition key (OFF/ACC/ON/START/RUN)	P0	N/A	<p>The key used in a motor vehicle to turn the switch that connects the battery to the ignition system and other electrical devices</p> <p>Mode</p> <p>IGN KEY OFF : Vehicle turn OFF, Steering wheel lock, Head Unit OFF, Cluster OFF</p> <p>IGN KEY ACC (Accessory) : Vehicle ON (but not run), steering wheel unlocked, Head Unit On, Cluster OFF</p> <p>IGN KEY ON : Vehicle ON (not run until release brake), Head Unit On, Cluster ON. This is the key positio when driving</p> <p>IGN KEY RUN : Vehicle is moving, Head Unit On, Cluster ON , some functions on Head Unit/Cluster are blocked to use while driving (depend on specification of OEM)</p>			
2.AVN	Power Mode	Ignition key cycle	P1		This describes State when you off vehicle and Start it	Move key to OFF position, wait vehicle OFF, after that wake up vehicle by move key to ON.		
2.AVN	Navigation	IGV	P2		Inactive Guidance View			
2.AVN	System	ILL	P2		Illumination: The lighting system of a motor vehicle consists of lighting and signalling devices mounted or integrated to the front, rear, sides, and in some cases the top of a motor vehicle.			
2.AVN	Bench	III button on Bench	P2		Illumination	To "ON/OFF" the light of faceplate button		

2.AVN	Radio	IM	P2	Intermodulation is the amplitude modulation of signals containing two or more different frequencies, caused by nonlinearities in a system.	The intermodulation between each frequency component will form additional signals at frequencies that are not just at harmonic frequencies (integer multiples) of either, like harmonic distortion, but also at the sum and difference frequencies of the original frequencies and at multiples of those sum and difference frequencies. Intermodulation is caused by non-linear behaviour of the signal processing (physical equipment or even algorithms) being used. The theoretical outcome of these nonlinearities can be calculated by generating a Volterra series of the characteristic, while the usual approximation of those nonlinearities is obtained by generating a Taylor series		
2.AVN	Projection	IMC	P2	Infotainment Master Controller			
2.AVN	Vehicle	Imperial Units	P2	VD: yard(yd), mile(m)	The system of imperial units or the imperial system (also known as British Imperial[1] or Exchequer Standards of 1825) is the system of units first defined in the British Weights and Measures Act of 1824, which was later refined and reduced		
4.Telematics	Network	IMS	P2	IP Multimedia Subsystem	- It's an architectural framework - IMS is based on SIP (Session Initiation Protocol) - IMS allows voice, text and multimedia services to traverse all connected networks	While IMS configuration disable, Voice call making in LTE network will be fallback to lower network as 3G, 2G If IMS configuration is enable, Voice call making in LTE network is VoLTE	

							<ul style="list-style-type: none"> • IMSI Format <p>The diagram illustrates the structure of an IMSI number. It is divided into three main parts: MCC (Mobile Country Code), MNC (Mobile Network Code), and MSIN (Mobile Subscription Identification Number). The MCC is 3 digits, the MNC is 2 or 3 digits, and the MSIN is up to 10 digits, totaling up to 15 digits. An example is provided for Korea SK Telecom, where the MCC is 450, the MNC is 05, and the MSIN is 0123456789.</p>	
4.Telematics	Telecommunication	IMSI	P0	International Mobile Subscriber Identity	<p>IMSI is used to identify the user of a cellular network and is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network.</p> <p>The IMSI is used in any mobile network that interconnects with other networks. For GSM, UMTS and LTE network, this number is provisioned in the SIM card and for CDMA2000 in the phone directly or in the R-UIM card</p>	<p>An IMSI is usually presented as a 15 digit number, but can be shorter (not longer). The first 3 digits are the mobile country code (MCC), which are followed by the mobile network code (MNC), either 2 digits (European standard) or 3 digits (North American standard). The length of the MNC depends on the value of the MCC, and it is recommended that the length is uniform within a MCC area. The remaining digits are the mobile subscription identification number (MSIN) within the network's customer base (mostly 10 or 9 digits depending on the MNC length).</p>	<p>IMSI (số nhận dạng thuê bao di động quốc tế) được chứa trong thẻ SIM. Số IMSI thường là một chuỗi 15 chữ số, bao gồm một MCC (mobile country code), một MNC (mobile network code) và một MSIN (mobile subscription identification number). Nhằm đảm bảo số IMSI không bị đánh cắp dễ dàng, số IMSI chỉ được gửi đến mạng di động lần đầu khi thiết bị di động được bật lên gia nhập mạng. Số IMSI dùng để nhận dạng 1 thuê bao ở mức độ quốc tế (thuộc quốc gia nào, nhà mạng nào).</p>	
2.AVN	Phone call	Incoming call	P0	N/A	Is a call from other phone to your phone	<p>When device 1 makes a call to Device 2, we can say that:</p> <p>=> Device 1 makes an outgoing call to Device 2</p> <p>=> Device 2 receives an incoming call from Device 1</p>		
2.AVN	User Interaction	Infortainment Head Unit - AVN	P2					

3.Cluster	Cluster	InnoDrive	P1	<p>Assistance driving with information</p> <ul style="list-style-type: none"> - Display warning message - Display upcomming events 	<p>Receive signal of warning message and event from ECU</p> <ul style="list-style-type: none"> - Show warning message and event <p>The display / function in the Assistance screen for ACC also applies for InnoDrive (PID). In addition to the display of the car ahead, in futher events like upcomming speed limit, curve etc. are displayed.</p> <p>InnoDrive has two mode: Manual and Auto</p> <ul style="list-style-type: none"> - <i>In the auto mode InnoDrive regulates on all upcoming events.</i> - <i>In the manual mode InnoDrive regulates on all upcoming events except the speed limit signs.</i> <p><i>Note: The mode can be set in the Head unit.</i></p> <ul style="list-style-type: none"> - <i>InnoDrive icon has active or passive status. InnoDrive icon has active status that displayed in green color. InnoDrive icon has passive status that displayed in gray color.</i> - <i>Place for the upcoming events when the BC-Page is not displayed (position point 4 on Innodrive image)</i> <p><i>When the BC-Page „Assistance“ is not displayed and InnoDrive is set (active or passive) then the upcoming events (curves and roundabout) are displayed here. Speed limit signs are not displayed here because the information is already included in the status icon</i></p>	<p>The display / function in the Assistance screen for ACC also applies for InnoDrive (PID). In addition to the display of the car ahead, in futher events like upcomming speed limit, curve etc. are displayed. InnoDrive has two mode: Manual and Auto</p>		
2.AVN	Connection	Inquiry	P2		If two Bluetooth devices know absolutely nothing about each other, one must run an inquiry to try to discover the other.	One device sends out the inquiry request, and any device listening for such a request will respond with its address, and possibly its name and other information.		
2.AVN	System Base	Interlocutor	P2		The remote party in a phone call, without reference to whether they are the caller or the recipient (q.v.).			
2.AVN	Vehicle	Internal MIC	P2		Voice will be transfer via MIC integrated in Bench directory.	Switch MIC-Control on Bench to INT-MIC		
2.AVN	Navigation	Intersection	P2		An Intersection is where two or more roads meet or cross each other.			

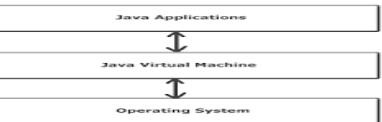
2.AVN	Climate	ionizer	P2		<p>It is An air ioniser, Air ionisers have been used to eliminate the occurrence of air-borne bacterial infections and to reduce static electricity buildup in electronics.</p> <ul style="list-style-type: none"> - User can modify ionizer in Air Quality app. 		
2.AVN	Radio	I-OUT and Q-OUT	P2		In-phase Out Quadrature Out		
2.AVN	System Base	IP	P2		<p>Internet Protocol The Internet Protocol (IP) is the principal communications protocol in the Internet protocol suite for relaying packets across network boundaries. Its routing function enables internetworking, and essentially establishes the Internet.</p>	<p>IP has the task of delivering packets from the source host to the destination host solely based on the IP addresses in the packet headers. For this purpose, IP defines packet structures that encapsulate the data to be delivered. It also defines addressing methods that are used to label the datagram with source and destination information.</p>	

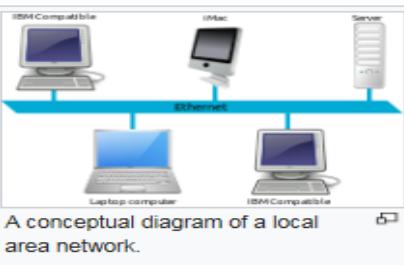
2.AVN	Audio	IPC	P2	Inter Process Communication	<p>Inter Process Communication: In computer science, inter-process communication or interprocess communication (IPC) refers specifically to the mechanisms an operating system provides to allow the processes to manage shared data. Typically, applications can use IPC, categorized as clients and servers, where the client requests data and the server responds to client requests.[1] Many applications are both clients and servers, as commonly seen in distributed computing. Methods for doing IPC are divided into categories which vary based on software requirements, such as performance and modularity requirements, and system circumstances, such as network bandwidth and latency.[1]</p> <p>IPC is very important to the design process for microkernels and nanokernels. Microkernels reduce the number of functionalities provided by the kernel. Those functionalities are then obtained by communicating with servers via IPC, increasing drastically the number of IPC compared to a regular monolithic kernel</p>		
4.Telematics	Telematic Call	IPC	P2	Incoming personal call	<p>Receiving a call</p> <p>When someone calls you in your vehicle, you will hear a ring and see the Green System Status light flashing. Simply press the phone button or phone icon button (for FMV owners) to answer. Press it again to end the call.</p> <p>Unwanted calls</p> <p>If you're getting unwanted calls, you can ask an Advisor for a different Hands-Free Calling number. Please have your account number or Vehicle Identification Number (VIN) ready.</p>		

1.Common	ECU	IPC / IPK	P0	<u>Instrument Panel Cluster</u> <u>/Instrument Pack</u>	Same as Cluster IPC / IPK is an ECU name of a Cluster.			
2.AVN	Vehicle	IPK	P2		Instrument Pack	An ECU		
2.AVN	Audio	iPod Nano and Ipod touch	P2		- Difference about standard protocol (Nano = iPA1; Touch = iAP2) - Difference about function: + Nano: Cannot control from iPod + Touch: CAN control from iPod	How to import data on Ipod? To import data to iPod, iPhone devives you need to support from IT guys who uses Itunes and computers server to import.		
2.AVN	Vehicle	IPU	P2		Integration Power Unit:			
2.AVN	Connection	IPv6	P2		Internet Protocol, version 6 IPv6 is the most recent version of the Internet Protocol (IP), the communications protocol that provides an identification and location system for computers on networks and routes traffic across the Internet	IPv6 uses a special feature called autoconfiguration to find and assign IP address configuration to hosts on the network. IPv6 autoconfiguration can be Stateful (DHCPv6) or stateless.		
2.AVN	Vehicle	IRMCU	P2		Inner Rear Mirror Control Unit			
2.AVN	Software Management	IRR	P2		Internal Remote Re-flash	Upgrade telematic control unit software at local center		
2.AVN	Navigation	IS	P2		Information Search			
2.AVN	Connectivity	ISC	P2		Infotainment Slave Controller Infotainment Master Controller (IMC) and Infotainment Slave Controller (ISC), are the Infotainment main Embedded systems for infotainment control. The format and content of inventory information is to be decided and depends on the IMC/ISC or system node chosen."			
2.AVN	Vehicle	ISCM	P2		Intelligent Seat Control Module			

2.AVN	Connection	ISM	P2	Industrial, Scientific and Medical	<p>Industrial, Scientific and Medical radio band</p> <p>The industrial, scientific and medical (ISM) radio bands are radio bands (portions of the radio spectrum) reserved internationally for the use of radio frequency (RF) energy for industrial, scientific and medical purposes other than telecommunications. Examples of applications in these bands include radio-frequency process heating, microwave ovens, and medical diathermy machines</p>	<p>The powerful emissions of these devices can create electromagnetic interference and disrupt radio communication using the same frequency, so these devices were limited to certain bands of frequencies</p>		
2.AVN	Vehicle	ISM	P2	Intelligent Seat Module	Intelligent Seat Module			
4.Telematics	Common	ISO	P2	International Standard Organization	<p>ISO is an independent, non-governmental international organization with a membership of 161 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges.</p>			
2.AVN	Vehicle	ISO 639-1 codes	P2		<p>ISO 639-1:2002, Codes for the representation of names of languages</p>	<p>Turkish is represented by tr</p> <p>Urdu is represented by ur</p>		
2.AVN	System	ISO26262	P2		<p>An international standard for functional safety of electrical and/or electronic systems in production automobiles</p>	<p>The standard consists of 9 normative parts and a guideline for the ISO 26262 as the 10th part.</p> <p>2.1 Part 1: Vocabulary</p> <p>2.2 Part 2: Management of functional safety</p> <p>2.3 Part 3-7: Safety Life Cycle</p> <p>2.4 Part 8: Supporting Processes</p> <p>2.5 Part 9: Automotive Safety Integrity Level (ASIL)-oriented and safety-oriented analysis</p>		
4.Telematics	Vehicle	ISRVM	P2	Inside Rear View Mirrors	Inside Rear View Mirrors	N/A		

2.AVN	Radio	ITM	P2		Integrated Tuner Mode ID3 ITM is merging DAB and FM into one common radio function.			
2.AVN	Radio	iTunes radio	P0	N/A	iTunes radio is an Internet radio service by Apple Inc. that let users listen to automatically generated playlists based on direct input as well as collected data on music preferences.	iTunes Radio was a free, ad-supported service available to all iTunes users, featuring Siri integration on iOS. Users were able to skip tracks, customize stations, and purchase the station's songs from the iTunes Store. Users could also search through their history of previous songs.		
2.AVN	Media	iTunes tag	P2		Metadata with iTunes tool			
2.AVN	Vehicle	IVER	P2		Integration Vehicle Engineering Release			
2.AVN	Vehicle	JDC	P2		Jaguar Drive Control	JaguarDrive Control™ (JDC) system offers drivers choice of four standard driving modes: Normal, Winter, ECO and Dynamic2		
2.AVN	Vehicle	JIG	P2		The state of key	- Key off: JIG OFF - Key on: JIG ON		
2.AVN	Vehicle	JLR	P2		Jaguar Land Rover	The brand's name		
2.AVN	CarSSW	JNI	P2	<u>Java Native Interface</u>	JNI is used for communication HMI and DSI Service, which is LGE's common service for handling DSI mechanism			
2.AVN	Navigation	Journal Log or Journey Log	P2		The Journal Log is to store the vehicle trip information in the CSP and available to end user to keep all the trips.			
2.AVN	Navigation	Junction view	P1		Junction view: is a navigational aid that displays the appropriate lane you should be driving in while in an active route. In Freeway drive, the system renders the image, arrow and direction information (sign board) of the front junction or exit.			

2.AVN	System	JVM	P2		Java Virtual Machine: an abstract computing machine that enables a computer to run a Java program.			
2.AVN	Projection	KC	P2		Kendrick Canyon: Intel In-Vehicle Solutions Software Foundation			
2.AVN	Connection	Key features	P2		<p>Spectrum: 2.4 GHz ISM Band. Regulatory range: 2400–2483.5 MHz.</p> <p>Frequency Hopping: 1600 hops per second across 79 RF channels. The channels are separated by 1 MHz. $f(k) = 2402 + k$ MHz, $k = 0 \rightarrow 78$</p> <p>Modulation: Gaussian Frequency Shift Keying (GFSK).</p> <p>Maximum Output Power: 1 mW to 100 mW.</p> <p>Transmit Power: Nominal = 0dBm. Goes up to 20 dBm with power control.</p> <p>Receiver Sensitivity: -70 dBm at 0.1% Bit Error Rate</p> <p>Maximum Data Rate: 721.2 kbps for Basic Rate./2.1 Mbps with Enhanced Data Rate (BT Spec 2.0+EDR)./24 Mbps with High Speed (BT Spec 3.0+HS).</p> <p>Typical Range: 10 m to 100 m.</p> <p>Topology: Up to 8 devices in a piconet including 1 Master and up to 7 Slaves.</p> <p>Voice Channels: 3</p> <p>Data Security: Authentication Key (128 bit).</p> <p>Data Security: Encryption Key 8-128 bits (configurable).</p> <p>Applicability: Does not require line of sight./Intended to work anywhere in the world since it uses unlicensed band.</p>			
2.AVN	Vehicle	KFC	P2		Key Feature Concept	Key Feature Concept		
2.AVN	CarSSW	KIPC	P2		KIPC is used between DSI Service and each native module. LGE developed KIPC for efficient communication among native modules			

4.Telematics	Theft Notification	KL	P2	Key Learning	Key Learning	A kind of CTS (Content Theft Status) is triggered when key operation by master key is detected by VCP		
2.AVN	System	KVM	P2		Kernel-based Virtual Machine KVM is a virtualization infrastructure for the Linux kernel that turns it into a hypervisor. It was merged into the Linux kernel mainline in kernel version 2.6.20, which was released on February 5, 2007. KVM requires a processor with hardware virtualization extensions.			
2.AVN	Connection	L2CAP	P2		Logical Link Control and Adaptation Protocol The Logical Link Control and Adaptation Layer Protocol (L2CAP) is layered over the Baseband Protocol and resides in the data link layer.	L2CAP provides connection-oriented and connectionless data services to upper layer protocols with protocol multiplexing capability, segmentation and reassembly operation, and group abstractions. L2CAP permits higher level protocols and applications to transmit and receive L2CAP data packets up to 64 kilobytes in length.		
2.AVN	Media	Label text	P2			A label (as distinct from signage) is a piece of paper, plastic film, cloth, metal, or other material affixed to a container or product, on which is written or printed information or symbols about the product or item. Information printed directly on a container or article can also be considered labeling.		
1.Common	Common	LAN	P0	Local Area Network	A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building. Ethernet and Wi-Fi are the two most common technologies in use for local area networks			 <p>A conceptual diagram of a local area network.</p>

2.AVN	Navigation	Lane Information	P2		<p>The lane detection method shall use the following information from the digital map:</p> <ul style="list-style-type: none"> • Number of lanes • Lane number • Type of lanes (normal, exit, entry, shoulder lane) • Center line • Link of center line • Width of lane • Divider of lanes (dotted line, slashed line ...) • Divider color (for NAR) • Direction of lanes • Curvature • Heading • Precise geometry • Gradient and slope data for ramp detection 			
2.AVN	Power Mode	Last_ON	P2		<p>(VW MIB3) This flag is a virtual on/off button for the user. In case the driver wants no infotainment, a long-press (Audi) or short-press (VW/SK/SE) on the On/Off button turns off all visible and audible entertainment sources. The system looks as if it was switched off. Under the assumption that the driver wants to have no infotainment system until the system is switched on again via short-press on the On/Off button, the drivers selection "infotainment off" has to be stored persistently in a flag.</p>	<ul style="list-style-type: none"> - LastON = 1, if short press on/off key is detected in MMI_OFF, MMI_IOC, MMI_STANDBY_PWR_SAVE or MMI_STANDBY - LastON = 0, when a short-press on/off key is detected in MMI_ON. 		

2.AVN	Media	LC	P2	Low-Complexity	In computational complexity theory, a language B (or a complexity class B) is said to be low for a complexity class A (with some reasonable relativized version of A) if $AB = A$; that is, A with an oracle for B is equal to A.[1] Such a statement implies that an abstract machine which solves problems in A achieves no additional power if it is given the ability to solve problems in B at unit cost. In particular, this means that if B is low for A then B is contained in A.		
2.AVN	Connection	LCF	P1	Local Configuration File	This file contains configuration within a limited area		
4.Telematics	Other	LCT	P2	Low Confidence Threshold	Low Confidence Threshold	Minimum datum point, CS must be at least above LCT to be recognized by the VCP.	
2.AVN	Connection	LDAP	P2	Lightweight Directory Access Protocol The Lightweight Directory Access Protocol is an open, vendor-neutral, industry standard application protocol for accessing and maintaining distributed directory information services over an Internet Protocol (IP) network	A client starts an LDAP session by connecting to an LDAP server, called a Directory System Agent (DSA), by default on TCP and UDP port 389, or on port 636 for LDAPS (LDAP over SSL, see below). The client then sends an operation request to the server, and the server sends responses in return. With some exceptions, the client does not need to wait for a response before sending the next request, and the server may send the responses in any order. All information is transmitted using Basic Encoding Rules (BER).		
2.AVN	Vehicle Update	LDW	P2	Lane Detection Warning:			

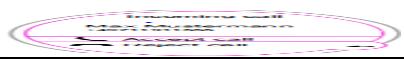
2.AVN	Connection	LE	P2	<p>Low Energy</p> <p>Bluetooth Low Energy (Bluetooth LE, BLE, formerly marketed as Bluetooth Smart) is a wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group (Bluetooth SIG) aimed at novel applications in the healthcare, fitness, beacons, security, and home entertainment industries. Compared to Classic Bluetooth, Bluetooth Low Energy is intended to provide considerably reduced power consumption and cost while maintaining a similar communication range.</p>		
2.AVN	Vehicle	Left-hand site	P2	<p>The terms right-hand traffic (RHT) and left-hand traffic (LHT) refer to the practice, in bidirectional traffic situations, to keep to the right side or to the left side of the road, respectively</p>	<p>Many of the countries with LHT were formerly part of the British Empire. In addition, Japan, Indonesia and other countries have retained the LHT tradition.</p>	
4.Telematics	Other	Legacy Display Interface	P2	<p>Used to provide simple, non-interactive text display show on a display device within the vehicle (vehicle radio or Driver Information Center)</p>	<p>Legacy displays portray basic information to the user, including the type and progress of a call, the phone number dialed, caller ID information, number of minutes remaining, ect.</p> <p>Note that the number of text characters available on the display vary between different devices</p>	
2.AVN	Connection	Legacy pairing	P1	<p>Legacy Pairing is method available in Bluetooth v2.0 and before. Each device must enter a PIN code; pairing is only successful if both devices enter the same PIN code</p>	<p>In legacy pairing, the key is derived from a shared PIN code, and a random number that is passed between the two devices. If the sniffer has all of this same data, it can create the link key in the same way that the devices do.</p>	
2.AVN	Vehicle	LFL	P2	<p>Low Friction Launch (Jaguar version of LTL)</p> <p>Low friction launch helps to further enhance low speed maneuvering and pulling away from a standstill, in adverse conditions.</p>	<p>The operation of low friction launch is further enhanced if the rain/ice/snow driving mode</p>	

2.AVN	Vehicle	LightingControl	P1		<ul style="list-style-type: none"> - The lighting system consists of lighting and signalling devices mounted or integrated to the front, rear, sides, and in some cases the top of a motor vehicle. - Car lights include: Headlights, Tail lights, Daytime running lights, Daytime running lights, Signal lights, Brake lights, Hazard lights, Hazard lights 		
2.AVN	Navigation	LIMF	P2		LG International Map Format		
1.Common	Network/Protocol	LIN	P0	<u>Local Interconnect Network</u>	<p>The LIN bus is an inexpensive communications protocol used for communication between components in vehicles. In recent years, the LIN bus standard has been introduced to complement CAN for non-critical subsystems such as air-conditioning and infotainment, where data transmission speed and reliability are less critical.</p> <p>LIN is low cost bus for body applications (speed is 19.2 kbit/s).</p>	<p>LIN is a broadcast serial network comprising 16 nodes (one master and typically up to 15 slaves). Current uses combine the low-cost efficiency of LIN and simple sensors to create small networks. These sub-systems can be connected by back-bone-network (i.e. CAN in cars)</p>	
2.AVN	Media	Lingo	P2		The command category used by an accessory. There is a General lingo that must be supported by all accessories. Other lingoes are designed for use by specific accessories, such as simple remote controls and microphones.		
2.AVN	Navigation	Link	P2		A road connected to node		
2.AVN	Audio	Link Loss	P1		Cancel connection due to wireless status is unstable	Occur when Bluetooth at out of range which the device can connect, occur strong collision	

2.AVN	Vehicle	LKS	P1	<p>Lane keeping assist is a mechanism designed to warn the driver when the vehicle begins to move out of its lane (unless a turn signal is on in that direction) on freeways and arterial roads. These systems are designed to minimize accidents by addressing the main causes of collisions: driver error, distractions and drowsiness</p>	<p>. Systems vary. Some use infrared sensors but cars are increasingly using video cameras mounted at the top of the windscreen in the rear-view mirror unit. Both read the road markings and when the car drifts towards and moves beyond the white lines, the driver is alerted. Some give an audible warning. Others vibrate the driver's seat and yet more will give a gentle tug on the steering wheel and move the car back to the centre of the lane without the driver doing anything.</p>		
2.AVN	Connection	LMP	P2	<p>Link Manager Protocol</p> <p>The Link Manager carries out link setup, authentication, link configuration and other protocols. It discovers other remote LM's and communicates with them via the Link Manager Protocol (LMP). To perform its service provider role, the LM uses the services of the underlying Link Controller (LC).</p>	<p>The Link Manager Protocol essentially consists of a number of PDU (protocol Data Units), which are sent from one device to another, determined by the AM_ADDR in the packet header. LM PDUs are always sent as single-slot packets and the payload header is therefore one byte.</p>		
2.AVN	Connection	LNP	P1	<p>Location and Navigation Profile</p> <p>The Location and Navigation Profile is used to enable a Collector to interact with a Location and Navigation Sensor (LN Sensor) that exposes the Location and Navigation Service for use in outdoor activity applications</p>	<p>The profile defines two roles: LN Sensor and Collector. The LN Sensor is the device that reports speed, distance, location, elevation, and/or navigation data to a Collector.</p> <p>The Collector is the device that receives the data from a LN Sensor while connected to a LN Sensor.</p> <ul style="list-style-type: none"> -The LN Sensor shall be a GATT Server. - The Collector shall be a GATT Client. 		
2.AVN	Connection	LNS	P2	<p>Location and Navigation Service</p>	<p>The Location and Navigation Service (LN Service) exposes location and navigation-related data from a Location and Navigation sensor (Server) intended for outdoor activity applications.</p>		

2.AVN	Phone	Local Infotainment State	P2		<ul style="list-style-type: none"> - UserInitiatedLocalInfotainment: sleep mode (Off key -> Open door -> close door, HS Enable button is off, Headlight is off) -> wake up (key run) - VehicleInitiatedLocalInfotainment: Run => Off key 		
2.AVN	Power Mode	LocalEject	P2		<p>State to allow eject of optical discs for vehicles where the Eject button is not wired directly to the remote optical disc player.</p>	<p>In order to send the Eject button press to the player, the system must wake up on the Eject press, initialized, eject the disc, and go back to Sleep. This state implements this behavior.</p>	
2.AVN	Power Moding	Locallnfoainment	P2		<p>The Locallnfoainment state allows the user to operate most of the functions within the Infotainment subsystem when the rest of the vehicle is deactivated either because the vehicle power mode is Off or the LSGMLAN network is asleep</p>	<p>This state is HU will working when Ignition key = OFF and it used power of Retained Accessory Power</p>	
2.AVN	Power Mode	LocalPhone	P2		<p>State to allow continuation of a phone call in progress or allow answering an incoming call upon exit from Locallnfoainment.</p>	<p>The LocalPhone state is defined separately from the Locallnfoainment state in order to either:</p> <ol style="list-style-type: none"> 1. Continue a customer hands-free phone call which may have been placed from either a Bluetooth portable phone or an embedded cell phone within the Telematics module after the Locallnfoainment state has terminated, or 2. Continue an incoming Onstar advisor call. 	
2.AVN	System	Log level: ALL	P2		<p>Logging of all available information. May lead to message loss and very high system load situations</p>		
2.AVN	System	Log level: DEBUG	P2		<p>Essential information needed to debug the software. This should not lead to a noticeable increase of the system load.</p>		
2.AVN	System	Log level: ERROR	P2		<p>Errors and exceptions that can't be handled and which may lead to undefined system behavior</p>		
2.AVN	System	Log level: FATAL	P2		<p>Critical failures that lead to a system crash or reset.</p>		

2.AVN	System	Log level: INFO	P2		Important events and work steps of the system. This level should not be used for events that occur frequently, but which give an indication of the general state of the system			
2.AVN	System	Log level: NORMAL	P2		Events and work steps that occur frequently and describe the state of the system in detail			
2.AVN	System	Log level: TRACE	P2		Additional (verbose) debug information for detail analysis such as function call tracing. This can cause a high message load and an increased system load.			
2.AVN	System	Log level: WARN	P2		Unexpected but recoverable behavior.			
2.AVN	System	Log levels	P2		Log messages can be logged with different levels of severity	Log levels includes: ALL DEBUG ERROR FATAL INFO NORMAL TRACE WARN		
2.AVN	System	Logging&Debugging	P2		Saves critical log message and supports debugging mode	Save important message log and support debugging mode		
2.AVN	Vehicle	LongitudinalAssistance	P2		- Support ACC Adaptive Cruise Control - Detected vehicle display image for 7 positions - Display warning	Use CAN signal of RBS tool to check: - ACC/ LIM/ GRA menu - Vehicle image with 5 levels - Vehicle image with 7 positions - Turn on warning message		

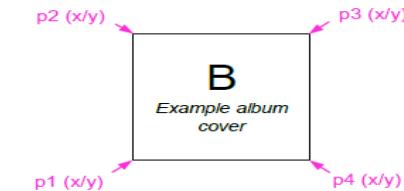
2.AVN	Media	Lossless	P2	FLAC, APE, ALAC	Lossless compression is a class of data compression algorithms that allows the original data to be perfectly reconstructed from the compressed data. By contrast, lossy compression permits reconstruction only of an approximation of the original data, though this usually improves compression rates (and therefore reduces file sizes).		
2.AVN	Media	Lossy	P2	MP3, aac, wma, ogg	In information technology, lossy compression or irreversible compression is the class of data encoding methods that uses inexact approximations and partial data discarding to represent the content		
2.AVN	Media	Low Confidence Threshold	P2		Minimum datum point, CS must be at least above LCT to be recognized by the VCP.		
2.AVN	System	LP	P2		Long Press (Button): First, Tab and hold then release		
2.AVN	Voice Recognition	LP	P2		Language Pack: Google now recognizes 119 languages for voice		
2.AVN	Projection	LPCM	P2	Linear Pulse-Code Modulation	Linear Pulse-Code Modulation (used for audio streams)		
2.AVN	Media	LRE	P2	power off / on (standby). Volume control	LRE When MMI_ON, touch LRE --> change to Standby When HU is standby, touch LRE --> MMI_ON		
1.Common	Common	LS	P2	<u>Low Speed</u>	Low Speed		

4.Telematics	Other	LSB	P2	Least significant byte: The byte of a multibyte number with the least importance: that is, the byte stored last on a big-endian system or first on a little-endian system.	The least significant byte, also abbreviated LSB, is the byte in a multiple-byte word with the smallest value. As with bits, the LSB (byte) is normally the byte farthest to the right in natural writing style. In little-endian format, a multi-byte value is stored in memory from the lowest byte (the "little end") to the highest byte. Example: the value 0x12345678 is stored as (0x78 0x56 0x34 0x12) in little-endian format, i.e. LSB (Least Significant Byte) is first.		
2.AVN	Connection	LSGMLAN	P2	Low speed GMLAN (single wire) GMLAN stands for General Motor Local Area Network	GMLAN is an application- and transport-layer protocol using CAN for lower layer services. GMLAN also have Low Speed GMLAN and High Speed GMLAN that send CAN signal between ECUs in vehicle.		
2.AVN	Radio	LSM	P2	Last situation memory Last situation memory is the last status that is stored in the machine memory			
2.AVN	Vehicle	LSMG	P2	Low Speed Manoeuvring Guidance - LSMG provides a combination of visual guidance and obstacle detection information to assist the driver in making low-speed manoeuvres. - It's used in Parking Assist system	* Only apply for vehicles supporting Parking Assist - Just select the appropriate gear - Control the vehicle's speed. Park Assist will also steer you out of a space. Graphics and notifications guide you through the manoeuvres. [REF: https://www.landrover.gr/system/car_models/brochures/000/000/010/original/Range-Rover-Sport-Brochure-1L4941710C0SBXCEN02P_tcm281-360305.pdf?1496150072]		

4.Telematics	Telecommunication	LTE	P0	<u>Long Term Evolution</u>	Telecommunication technology to reach 4G standard.	A standard for high-speed wireless communication for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies. It increases the capacity and speed using a different radio interface together with core network improvements.		
2.AVN	Vehicle	LTL	P2		Low Traction Launch (Land Rovers)	<p>Low traction launch helps to further enhance low speed manoeuvring and pulling away from a standstill in adverse conditions.</p> <p>Select Low Traction Launch from the 4x4i extra feature on the touch screen. Follow the on-screen instructions. See EXTRA FEATURES.</p> <p>The operation of low traction launch is further enhanced if the grass/gravel/snow driving program is enabled. See GRASS/GRAVEL/SNOW.</p> <p>Low traction launch also operates if either the automatic (AUTO) driving program or the general driving program is selected. See GENERAL PROGRAM (SPECIAL PROGRAMS OFF) and TERRAIN RESPONSE OPERATION.</p> <p>To allow the low traction launch feature to be enabled, make sure that:</p> <ul style="list-style-type: none"> The vehicle is stationary. The accelerator pedal is not pressed. Either the grass/gravel/snow or the general driving program is enabled. All Terrain Progress Control (ATPC) has not entered in to full function mode, if <u>ATPC is currently enabled</u>. See LICING. 		

2.AVN	Radio	LTN	P2		<p>Location Table Number: In RDS: When the variant code is zero, the remaining bits are defined as a location table number (LTN, 6-bits). Whether or not the TMC information is encrypted is determined by the LTN bits. If LTN is zero, then the data is encrypted. Otherwise, LTN in combination with the country code, extended country code, and location code indicates which location table to use. The LTN values for each country are described in ISO 14819-3.</p>			
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2.AVN	System	LTS	P2	<p>Transport Layer Security (TLS) – and its predecessor, Secure Sockets Layer (SSL), which is now prohibited from use by the Internet Engineering Task Force (IETF) – are cryptographic protocols that provide communications security over a computer network.^[1] Several versions of the protocols find widespread use in applications such as web browsing, email, Internet faxing, instant messaging, and voice over IP (VoIP). Websites are able to use TLS to secure all communications between their servers and web browsers.</p>	<p>The TLS protocol aims primarily to provide privacy and data integrity between two communicating computer applications.^{[1]:3} When secured by TLS, connections between a client (e.g., a web browser) and a server (e.g., wikipedia.org) have one or more of the following properties:</p> <ul style="list-style-type: none"> - The connection is private (or secure) because symmetric cryptography is used to encrypt the data transmitted. The keys for this symmetric encryption are generated uniquely for each connection and are based on a shared secret negotiated at the start of the session (see § TLS handshake). The server and client negotiate the details of which encryption algorithm and cryptographic keys to use before the first byte of data is transmitted (see § Algorithm below). The negotiation of a shared secret is both secure (the negotiated secret is unavailable to eavesdroppers and cannot be obtained, even by an attacker who places themselves in the middle of the connection) and reliable (no attacker can modify the communications during the negotiation without being detected). - The identity of the communicating parties can be authenticated using public-key cryptography. This authentication can be made optional, but is generally required for at least one of the parties (typically the server). - The connection ensures integrity because each message transmitted includes a 		
2.AVN	System	LUM	P2	Last user mode: The mode which user set or in use before Power OFF or unpreventable factor			

3.Cluster	Cluster	LVDS	P1	<p>LVDS: Low Voltage Differential Signal</p> <p>LVDS: is a technical standard that specifies electrical characteristics of a differential, serial communications protocol.</p>	<p>LVDS: Low Voltage Differential Signal</p> <p>LVDS: is a technical standard that specifies electrical characteristics of a differential, serial communications protocol.</p>	<p>LVDS operates at low power and can run at very high speeds using inexpensive twisted-pair copper cables. Since LVDS is a physical layer specification only, many data communication standards and applications use it but then add a data link layer as defined in the OSI model on top of it</p>	<p>Description of the position / coordinates in the LVDS stream:</p> <p>The correct position of a content in the stream is described with four parameters (p1 - p4) which contain the x and y coordinates of the position in the stream</p> 
2.AVN	Media	LVM	P2	Logical Volume Management	In computer storage, logical volume management or LVM provides a method of allocating space on mass-storage devices that is more flexible than conventional partitioning schemes to store volumes. In particular, a volume manager can concatenate, stripe together or otherwise combine partitions (or block devices in general) into larger virtual partitions that administrators can re-size or move, potentially without interrupting system use		
2.AVN	Radio	LW	P2	In radio, longwave, long wave or long-wave, and commonly abbreviated LW, refers to parts of the radio spectrum with wavelengths longer than what was originally called the medium-wave broadcasting band.			

2.AVN	Camera	LWC	P0	Lane Watch camera	<p>LaneWatch is a camera system that supplements side mirrors. A camera is installed in the right mirror and pointed toward the vehicle's blind spot. When activated, it displays an image of that area on a 7-inch screen inside the vehicle.</p>	<p>When the right turn signal is activated, an image of the area to the right rear of the vehicle is shown on the display.</p>	<p>Camera quan sát làn đường, được gắn trên gương phải của xe. Hỗ trợ người lái có thể quan sát được các điểm mù trên làn đường. LWC sẽ hiển thị trên HU khi xi-nhan rẽ phải được bật hoặc cũng có thể hiển thị màn hình LWC trên HU bởi thao tác "press button LWC" của người dùng</p>	
2.AVN	Projection	m/s	P2		Metres per second			
4.Telematics	Telematics	M2M	P2		<p>Machine to machine (M2M) is a broad label that can be used to describe any technology that enables networked devices to exchange information and perform actions without the manual assistance of humans.</p>	<p>M2M refers to direct communication between devices using any communications channel, including wired and wireless.[</p> <p>M2M communication is often used for remote monitoring. In product restocking, for example, a vending machine can message the distributor when a particular item is running low.</p>		
2.AVN	Media	MAC	P2	Medium Access Control	<p>In IEEE 802 LAN/MAN standards, the medium access control (MAC) sublayer (also known as the media access control sublayer) and the logical link control (LLC) sublayer together make up the data link layer. Within that data link layer, the LLC provides flow control and multiplexing for the logical link (i.e. EtherType, 802.1Q VLAN tag etc), while the MAC provides flow control and multiplexing for the transmission medium.</p>			

2.AVN	System	MAC	P2	Mandatory Access Control	In computer security, mandatory access control (MAC) refers to a type of access control by which the operating system constrains the ability of a subject or initiator to access or generally perform some sort of operation on an object or target	Base on system-wide policies that cannot be changed by individual users - Each database object is assigned a security class - Each subject (user or user program) is assigned a clearance for a security class - Rules base on security classes and clearance govern who can read/write which subject		
4.Telematics	Telematics	Main network	P1		A network for, among other things, software downloads that is connected to the diagnostic connector.	A network for, among other things, software downloads that is connected to the diagnostic connector.		
4.Telematics	Vehicle interface	Main Node	P1	N/A	An ECU that is connected to a main network. The ECU is or is not a gateway.			
4.Telematics	Telematics	Make an advisor call	P2	N/A	- Set FID2= Data call, Press and release Onstar button	Press and release Onstar button		
4.Telematics	[TBD]	MAN	P2	MANual Emergency Notification	Abbreviation of MANual Emergency Notification	[TBD]		
2.AVN	Navigation	Maneuver	P2		Maneuver is to position that vehicle has to change speed. At that position, you can see the traffic signs to guide how to continue running.			
2.AVN	Navigation	Maneuver area	P2		Part of the route which is relevant for the maneuver generation. The maneuver point is located at the first intersection.			
2.AVN	Navigation	Maneuver point	P2		The point within the maneuver area where the turn has to be executed. The execute guidance point reference on this.			
4.Telematics	Telematic Call	Manual emergency call	P1	N/A	Manual Emergency Call is an emergency call which is triggered by pressing button or HMI interation.	Driver presses the emergency button or interact with AVN screen at emergency HMI to trigger a call to emergency center.		

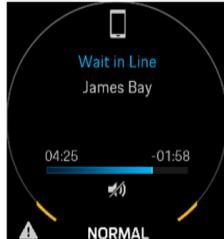
3.Cluster	Cluster	MAP	P1	Graphical presentation of navigation map, animated.	Graphical presentation of navigation map, animated.	<p>MAP includes some options:</p> <ol style="list-style-type: none"> 1. Manual Zoom: Gives the driver the option to zoom in and out of the map manually 2. Autozoom: Zooms in and out automatically depending on the situation 3. 3D MAP: Displays the MAP graphic in 3D (three dimensional) format. 4. Northward: The MAP is normally displayed in driving direction. If the driver activates the option „Northwards“ the MAP graphic is displayed in north direction. <p><i>Note: 3D Map and Northwards can be activated ONLY separately. It means the activation of 3D Map deactivates Northwards and the activation of northwards deactivates 3D Map .</i></p>	
2.AVN	Connection	MAP	P2	Mobile Access Point Mode	This mode is when you set your phone or Head Unit as a Mobile Hotspot. Your phone or Head Unit can broadcast wifi and other devices can connect to.	<p>A Wifi router broadcast Wifi as an Access Point Head Unit connect to Wifi as a Station Head Unit activate Mobile Hotspot Mobile Phone connect to HU as a Station Mobile Phone can access to Internet successfully</p>	
2.AVN	Phone	MAP	P2	Message Access Profile	<p>AVN support MAP Connect mobile device to AVN AVN ask permission to access to device message => Allow AVN will download all the message from device Check AVN Message => message from device has been downloaded to AVN</p>		

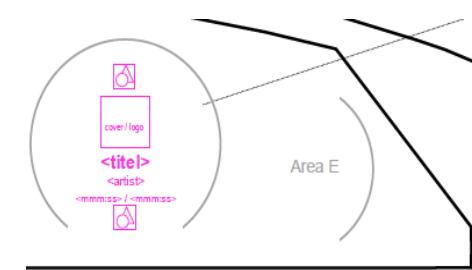
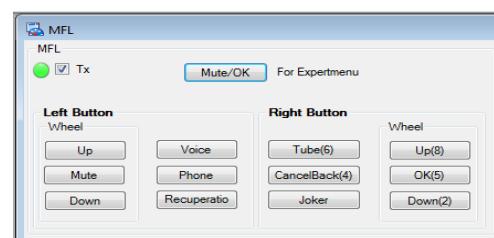
2.AVN	Navigation	Map data	P2		Map data have long been used as a navigation guide for travelers and explorers	Some special case, with normal data in HU you can not test them clearly, so you must fake Map data to test. To fake Map data you can follow these step on the guideline: http://collab.lge.com/main/pages/viewpage.action?spaceKey=IVIDCV&title=6.2.1.11+How+to		
4.Telematics	Common	MBN	P1	Mobile Broadband Networking	Same definition with Mobile Broadband, it's the marketing term for wireless Internet access delivered through cellular towers to computers and other digital devices using portable modems. Although broadband has a technical meaning, wireless-carrier marketing uses the phrase "mobile broadband" as a synonym for mobile Internet access. Some mobile services allow more than one device to be connected to the Internet using a single cellular connection using a process called tethering	We need an SIM, an Internet devices like smartphone/laptop, Internet access subscriptions. Maybe need an connect cards as mobile broadband modems and debug board for testing	Cách gọi khác của mobile data hoặc data cellular Bao gồm các kết nối Internet dựa vào sim trên di động như 3G, 4G LTE...	NA
2.AVN	Connection	Mbps	P2		Mega bits per second	One megabit is equal to one million bits or 1,000 kilobits. While "megabit" sounds similar to "megabyte," a megabit is roughly one eighth the size of a megabyte (since there are eight bits in a byte). Mbps is used to measure data transfer speeds of high bandwidth connections, such as Ethernet and cable modems.		

2.AVN	Audio	MBR	P2		Master Boot Record: A master boot record (MBR) is a special type of boot sector at the very beginning of partitioned computer mass storage devices like fixed disks or removable drives intended for use with IBM PC-compatible systems and beyond. The MBR holds the information on how the logical partitions, containing file systems, are organized on that medium. The MBR also contains executable code to function as a loader for the installed operating system—usually by passing control over to the loader's second stage, or in conjunction with each partition's volume boot record (VBR). This MBR code is usually referred to as a boot loader.																										
4.Telematics	Telecommunication	MCC	P0	<u>Mobile Country Code</u>	IMSI = MCC + MNC + MSIN (Mobile Subscriber Identification Number). Mobile Country Code indicates the country of a subscriber in the telecommunication network. The mobile country code consists of three decimal digits and the mobile network code consists of two or three decimal digits. Link to search MCC and MNC: http://vuthanhvan.vansu.vn/cell/MNC.htm	- Mã định danh quốc gia. Ví dụ: số IMSI là 452040123456789 => Mã quốc gia là 452: số IMSI thuộc Việt Nam; Mã nhà mạng là 04: thuê bao thuộc nhà mạng Viettel. - Mã này khác với mã vùng trong số điện thoại. Ví dụ: MCC của Việt Nam là 452, trong khi mã vùng điện thoại là +84.	<p>Vietnam</p> <table> <thead> <tr> <th>MCC</th> <th>MNC</th> <th>Brand</th> </tr> </thead> <tbody> <tr> <td>452</td> <td>01</td> <td>MobiFone</td> </tr> <tr> <td>452</td> <td>02</td> <td>Vinaphone</td> </tr> <tr> <td>452</td> <td>03</td> <td>S-Fone</td> </tr> <tr> <td>452</td> <td>04</td> <td>Viettel Mobile</td> </tr> <tr> <td>452</td> <td>05</td> <td>Vietnamobile</td> </tr> <tr> <td>452</td> <td>06</td> <td>E-Mobile</td> </tr> <tr> <td>452</td> <td>07</td> <td>Beeline VN</td> </tr> </tbody> </table>	MCC	MNC	Brand	452	01	MobiFone	452	02	Vinaphone	452	03	S-Fone	452	04	Viettel Mobile	452	05	Vietnamobile	452	06	E-Mobile	452	07	Beeline VN
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4.Telematics	Common	MCCI	P1	Communication Class Interface	The Communication Class interface is described by a USB interface descriptor, three class-specific descriptors, and an endpoint descriptor for the notification endpoint	https://docs.microsoft.com/en-us/windows-hardware/drivers/network/interface-descriptor-for-communication-class-interface																									

4.Telematics	Common	MCCI	P1	Communication Class Interface	The Communication Class interface is described by a USB interface descriptor, three class-specific descriptors, and an endpoint descriptor for the notification endpoint	https://docs.microsoft.com/en-us/windows-hardware/drivers/network/interface_DESCRIPTOR-for-communication-class-interface	
4.Telematics	Common	MCCI ADB	P1	MCCI Android Debug Bridge	The MCCI ADB Driver makes the connection between an Android-powered device and a computer. ADB lets developers interface with and control an Android-powered device from a Windows PC via the command line. Not only are its debug and diagnostic capabilities useful for product developers, but its ability to support the installation of applications is a plus for end-users.	Phân biệt ADB driver của Android http://adbdriver.com Universal ADB driver của CWM https://adb.clockworkmod.com Còn MCCI ADB driver https://mcci.com/usb/software-stacks/usb-class-drivers/ Tùy thiết bị dc cung cấp và cài đặt cho phù hợp để chạy các câu lệnh trong ADB	

2.AVN	Connection	MCE	P2		<p>Message Client Equipment: This is the device that uses the message repository engine of the MSE for browsing and displaying existing messages and to upload messages created on the MCE to the MSE.</p> <p>MSE: Message Server Equipment . This is the device that provides the message repository engine i.e. has the ability to provide a client unit with messages that are stored in this device and notifications of changes in its message repository.</p>		
4.Telematics	Common	MCPC	P2	Mobile Computing Promotion Consortium	<p>It is urgent that the leading corporations in these four industries promote the establishment of a mobile computing environment. The Mobile Computing Promotion Consortium (MCPC) was instituted to meet this societal need.</p>		<p>Hiệp hội quảng bá điện toán di động</p>
2.AVN	Connection	MCS	P2		<p>Modulation & Coding Scheme. The MCS index value list gives every combination of "number of spatial streams + modulation type + coding rate" that is possible.</p>	<p>We can measure data rate is corresponding to MCS and Channel bandwidth and Guard Interval</p>	
1.Common	Common	MCU	P0	<u>Micro Controller Unit</u>	<p>Micro Controller Unit (MCU) is a small chip used as an embedded system. In automotive projects, MCU is a common name for a chip which is responsible for processing vehicle signals</p>	<p>It's controlling the hardware that implements the device's operation. The MCU receives inputs from buttons, switches, sensors, and similar components; and controls the peripheral circuitry—such as motors and displays—in accordance with a preset program that tells it what to do and how to respond.</p>	<p>Figure 1: MCU Structure</p>
2.AVN	Navigation	MD	P2		Map Display		
2.AVN	Vehicle	MDF	P2		Multiplexed Data Field	<p>It's related car configuration For example: MDF ID 0x4925 is 0x02 (Deployable Sidesteps is fitted), MDF ID 0x4925 is NOT 0x02 (Deployable Sidesteps is NOT fitted)</p>	

4.Telematics	Telecommunication	MDN or MSISDN	P0	<u>Mobile Directly Number / Mobile Subsciber Integrated Service Digital Network Number</u>	<p>MSISDN is a number uniquely identifying a subscription in a GSM or a UMTS mobile network.</p> <p>The MSISDN together with IMSI are two important numbers used for identifying a mobile subscriber. IMSI is stored in the SIM while MSISDN is the number used for routing calls to the subscriber.</p> <p>A SIM has a unique IMSI that does not change, while the MSISDN can change in time</p>	<p>Maximum length of an MSISDN to 15 digits. 1-3 digits are reserved for country code</p>	<p>MSISDN là số điện thoại người dùng sử dụng để kết nối đến người dùng khác.</p>	
2.AVN	Connection	ME	P2		<p>Mobile Equipment is the equipment for mobile phone like Headphones, headsets, handsfree set.</p>	<p>Mobile Equipment connect to Mobile Phone via Bluetooth connection or via Cable with main purpose is listening to music or handsfree calling.</p>		
2.AVN	[TBD]	MEB	P2	<u>Modularer Elektrobaukasten</u>	<p>- English: Modular Electric Drive Kit - A modular car platform for electric cars of Volkswagen Group, regardless of vehicle size and performance parameters.</p>	<p>[EN] https://www.vwpress.co.uk/technology/technology-the-modular-electric-drive-kit-meb [VN] http://www.hanoimoi.com.vn/Tin-tuc/Oto-xemay/913664/nen-tang-moi-cua-volkswagen-se-mo-man-cuoc-cach-mang-dien-hoa-o-to-tren-dien-rong</p>		[TBD]
2.AVN	Media	Media	P0	N/A	<p>Media is a general term for feature playing multimedia file in AVN like audios, videos, movies and music. Media is related to media sources (USB, BT, Ipod,...) which is included in Audio. Audio includes another source: radio sources (FM, AM, DAB, SXM). There are some possible screens: Playscreen and Playlist</p>	<p>- In some project, we use CAN and BAP signal to send media file information. In other projects, we can select media sources from source page</p>	 Playscreen	 Playlist screen
2.AVN	Media	Media art / artwork	P1		<p>picture for a song when media is playing</p>	<p>Album art/ album cover</p>		

3.Cluster	Cluster	Media Info	P1	<p>Display media content in cluster</p> <ul style="list-style-type: none"> - Display content of media file : source -type; TotalPlayTime, titel - artist, cover/ logo ... 	<p>Display media content in cluster</p> <ul style="list-style-type: none"> - Check display content of media file : source -type; TotalPlayTime ... 	<p>Connect with media device (like Audio)</p> <ul style="list-style-type: none"> - Play media file - Display media information <p>Display content of media of source -type.</p> <p>- Playscreen: The playscreen contains all information about the selected media source or content. There are two types of the playscreen with different content: radio and media.</p> <p>- Playlist: The playlist shows / contains all available items of the selected media source.</p> <p>There are two types of the playlist with different content: radio and media. Codable option „list length“: Limitation of the available items in the list (e.g. show only 40 list entries). The limitation is config on DIAG</p> <ul style="list-style-type: none"> - Loading screen: This screen is displayed while the data is loading. - Loading error screen: This screen is displayed when data could not be loaded. 	<p>Display content of media of source -type</p> <p>Playscreen: The playscreen contains all information about the selected media source or content. There are two types of the playscreen with different content: radio and media.</p> <p>Playlist: The playlist shows / contains all available items of the selected media source.</p> <p>There are two types of the playlist with different content: radio and media.</p> <p>Codable option „list length“: Limitation of the available items in the list (e.g. show only 40 list entries).</p> <p>Loading screen: This screen is displayed while the data is loading.</p> <p>Loading error screen: This screen is displayed when data could not be loaded.</p>	
2.AVN	Voice Recognition	Memory footprint	P2		Memory footprint refers to the amount of main memory that a program uses or references while running			
3.Cluster	Cluster	Menu Control	P1	<p>Control via MFL (multi functional steering wheel)</p>	<p>Control via MFL (multi functional steering wheel)</p>	<p>In menu view, signal of MFL function can provide:</p> <ul style="list-style-type: none"> - Move up - Move down - Move tube - Select item in menu - Back - Cancel 		

2.AVN	Phone call	Merge Call	P0	N/A	<p>Is a phone feature to combine 2 incoming phone calls into a 3-way call</p> <ul style="list-style-type: none"> - Step 1. Make 1st incoming call from device 2 to device 1 - Step 2. On device 1, accept the 1st incoming call (1st call) - Step 3. Make 2nd incoming call from device 3 to device 1 - Step 4. On device 1, accept the 2nd incoming call, after that, the 1st call will be in-hold call automatically. (2nd Call) - Step 5. On device 1, merge 1st Call and 2nd Call. - After that, the 3-way call is established 		
2.AVN	Connection	MES	P2		Manufacturing Execution Systems	Manufacturing Execution Systems [help] create flawless manufacturing processes and provide real-time feedback of requirement changes, and provide information at a single source	

4.Telematics	Telematics	Message Event	P2	N/A	<p>Message events are events which reference a named message. A message has a name and a payload. Unlike a signal, a message event is always directed at a single recipient.</p> <p>All the messages in one service execution is an Event in the system, the messages in one Event will be linked together with the same EventId (specified in the VDS Core schema). The EventId is generated by the event initiator, either CSP or TEM. Both CSP and TEM should keep the service session for the ongoing Event. It's the responsibility for CSP and TEM to link the message and maintain the context for all the messages in one Event.</p> <p>The Event can be terminated with 2 conditions:</p> <ul style="list-style-type: none"> ■ The service is successfully finished. For example, the call center agent terminates the ECall case by sending a command, or telematics application receives the operation result for remote control use cases, or all the needed interactions are finished. ■ The service reaches the predefined time to wait the service to be finished. CSP and TEM can decide to terminate the service event if not receiving the expected message within the maximum service waiting time. CSP need to wait for SERVICE_TIMEOUT_CSP minutes before it terminates the service session, since TEM may stay in the sleep_poll mode when CSP initiates the service, so the SERVICE_TIMEOUT_CSP should be 		

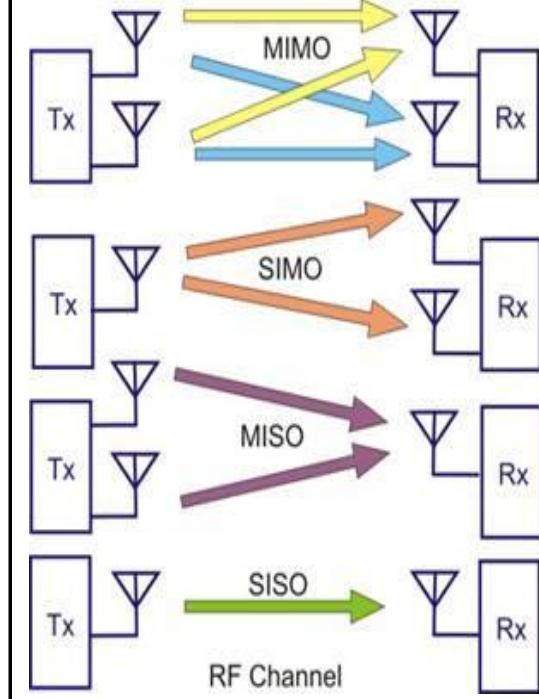
4.Telematics	Telematics	Message TTL	P2	Message Time To Live	<p>Message TTL can be set in each VDS message, which is important information to avoid the message receiver proceeding the old message which is not valid any more for the current service.</p> <p>Time to Live (TTL) is a mechanism that limits the lifespan or lifetime of data in a computer or network. In relation to SMS, this is what you set to limit the active lifetime of a pending message. So if a message has not been delivered to its intended recipient before the expiry of its TTL, it will fail.</p> <p>The time-to-live (TTL) for messages means that messages persist in the partitions of a stream topic for a specific time period. During that time, messages can be read or re-read by consumers. Once the TTL for a message runs out, the message is marked for deletion.</p>																		
2.AVN	Media	Metadata	P0	N/A	<ul style="list-style-type: none"> - Metadata means data (information) about data. It describes one or more aspects of the data. - Many distinct types of metadata exist, among these: <ul style="list-style-type: none"> + Descriptive metadata + Structural metadata + Administrative metadata + Reference metadata + Statistical metadata <p>Example: The metadata of a music file includes title, artist, album, year, track, genre... The metadata can be loaded on now playing or some other screens of AVN.</p>		<thead> <tr> <th>Tag</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Artist Name</td> <td>Zbigniew Somogyi</td> </tr> <tr> <td>Track Title</td> <td>Matra MS10 at Goodwood Festival of Speed 2009</td> </tr> <tr> <td>Album Title</td> <td>Goodwood Festival of Speed 2009</td> </tr> <tr> <td>Track Number</td> <td>1</td> </tr> <tr> <td>Year</td> <td>2009</td> </tr> <tr> <td>Genre</td> <td>Field Recording</td> </tr> <tr> <td>Comments</td> <td>Creative Commons Attribution-Noncommercial-Sha</td> </tr> </tbody>	Tag	Value	Artist Name	Zbigniew Somogyi	Track Title	Matra MS10 at Goodwood Festival of Speed 2009	Album Title	Goodwood Festival of Speed 2009	Track Number	1	Year	2009	Genre	Field Recording	Comments	Creative Commons Attribution-Noncommercial-Sha
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Below the table are buttons for 'Add', 'Remove', 'Clear', 'Genres', 'Template', 'Edit...', 'Reset...', 'Load...', 'Save...', 'Set Default', 'Cancel', and 'OK'.

2.AVN	Audio	Metadata Corrector	P2		When on, the Metadata Corrector will add and correct information associated with your media files on connected devices.		
2.AVN	Radio	MF	P2		Mapped Frequency Radio Frequency (RF) mapping is generally performed in wireless site surveys in order to monitor the coverage of a wireless network. Systems and methods for surveying a wireless network site are presented in		
2.AVN	Vehicle	MFC	P2		MultiFunction Controller - Press - Long Press - Rotate clock/Rotate counter clock - Tilt right/left - Tilt up/down		

2.AVN	Vehicle	MFC Switch Bank	P2					
2.AVN	Connection	Mfi	P2	Made for iOS Devices: iPod / iPhone / iPad Apple program for making "accessories" which can communicate with iOS devices	Apple Inc.'s MFi Program ("Made for iPhone/iPod/iPad") is a licensing program for developers of hardware and software peripherals that work with Apple's iPod, iPad and iPhone. The name is a shortened version of the original long-form Made for iPod. The program covers various device connectors including the headphone jack, original dock connector and the newer Lightning connector, as well as AirPlay support.			
2.AVN	Voice Recognition	MFL	P2	Hardkey at the steering wheel Multi Funktions Lenkrad (Mulit Functional Steering Wheel)				
2.AVN	Vehicle	MH	P2	Micro Hybrid	Vehicles that have idle stop/start and energy management functions are called Micro Hybrids.			
2.AVN	Vehicle	MHEV	P2	Mild Hybrid Electric Vehicle	Vehicles that have idle stop/start and energy management functions are called Micro Hybrids.			
2.AVN	System	MHL	P2	Mobile High-Definition Link Mobile High-Definition Link (MHL) is an industry standard for a mobile audio/video interface that allows the connection of smartphones, tablets, and other portable consumer electronics devices to high-definition televisions (HDTVs), audio receivers, and projectors. The standard was designed to share existing mobile device connectors, such as Micro-USB, and avoid the need to add additional video connectors on devices with limited space for them				

2.AVN	[TBD]	MIB	P2	<u>Modularer Infotainment Baukasten</u>	- English: Modular Infotainment Matrix. - An in-car infotainment system, MMI generation of Volkswagen	[EN] https://en.wikipedia.org/wiki/Multi_Media_Interface		
2.AVN	System	MIB-CAN	P2		CAN Interface with Human Interface Unit			
2.AVN	Media	MIC	P2		Micro	- Switch left (TCP MIC) - Switch right (EXT_MIC) - Use to speak during a Bluetooth Speech Recognition - Speak during Bluetooth Phone call		
1.Common	ECU	MICOM	P1	<u>Microcomputer</u>	Microcomputer, A microcomputer is a small, relatively inexpensive computer with a microprocessor as its central processing unit (CPU). It includes a microprocessor, memory, and minimal input/output (I/O) circuitry mounted on a single printed circuit board			
4.Telematics	Phone	Miec	P2	Manually Initiated eCall	Manually Initiated eCall			
2.AVN	Radio	MIF	P2		Maximum Interval Frames			
2.AVN	Media	MII	P2		Media Independent Interface			

2.AVN	Connectivity	MIMO	P0	<u>Multiple-Input Multiple-Output</u>	<p>MIMO is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time. All wireless products with 802.11n standard support MIMO.</p> <p>At one time, in wireless the term "MIMO" referred to the use of multiple antennas at the transmitter and the receiver. In modern usage, "MIMO" specifically refers to a practical technique for sending and receiving more than one data signal simultaneously over the same radio channel by exploiting multipath propagation. MIMO is fundamentally different from smart antenna techniques developed to enhance the performance of a single data signal, such as beamforming and diversity.</p> <p>SISO/SIMO/MISO are special cases of MIMO</p> <p>Multiple-input and single-output (MISO) is a special case when the receiver has a single antenna.</p> <p>Single-input and multiple-output (SIMO) is a special case when the transmitter has a single antenna.</p> <p>Single-input single-output (SISO) is a conventional radio system where neither transmitter nor receiver has multiple antennas.</p>	

2.AVN	Phone Projection	MirrorLink	P0	N/A	<p>MirrorLink is a device interoperability standard that offers integration between a smartphone and a car's infotainment system. MirrorLink transforms smartphones into automotive application platforms where apps are hosted and run on the smartphone while drivers and passengers interact with them through the steering wheel controls, dashboard buttons and touch screens of their car's In-Vehicle Infotainment (IVI) system.</p>	<p>MirrorLink currently works with Symbian phones (only Nokia Belle phones), Samsung Galaxy series (on Android Lollipop (5.0)), and Sony Xperia Z series Android phones. Sony audio has launched two audio head units in 2012 Q2, which are MirrorLink compliant. Phone maker Motorola and audio head unit maker Alpine are also members of the group supporting MirrorLink. Alpine will offer MirrorLink based aftermarket systems in the US in 2013.</p> <p>VW will offer MirrorLink based infotainment systems starting with its 2nd generation MIB infotainment hardware starting in 2014 with the new Polo</p>	
2.AVN	System	MLC	P2		<p>Mid Line Cluster, A cluster that is controlled using CAN-TAP over a CAN bus.</p>		
2.AVN	Navigation	MM	P2		<p>Map Matching Map matching is the problem of how to match recorded geographic coordinates to a logical model of the real world, typically using some form of Geographic Information System</p>		
2.AVN	Navigation	MM_SYST	P2		<p>Vehicle Multimedia System (or "navigation" system), i.e. "head-unit" – corresponds to "Accessory" in Apple specifications – refer to architecture scheme for details</p>		
3.Cluster	Cluster	MMI	P2		<p>MMI: Multi Media Interface</p>		
2.AVN	Vehicle	MMI	P2		<p>Main machine interface A MMI is a software application that present information to an operator or user about the state of a process, and to accept and implement the operators control instructions. Typically information is displayed in a graphic format (Graphical User Interface or GUI).</p>		

2.AVN	System	MMI OFF	P2		VW Power State, deep sleep of Infotainment system	MMI OFF: when ACC and ING are off state if MMI OFF: User can not control and use function of Infotainment system		
2.AVN	Power Mode	MMI STANDBY RESTRICTED	P2		(VW MIB3)1. As exception power state, It is activated when abnormal event such as critical High or Low Battery voltage, Critical Thermal(Over-temperature...) and so on. 2. It prepare the shutdown process(goes to hibernation mode) for arrangement.			
2.AVN	Power Mode	MMI state	P2		(VW MIB3) MMI states are power state of Vehicle Infotainment			
2.AVN	Power Mode	MMI_IOC	P2		(VW MIB3) Network and Infotainment system basis function is only activated.			
2.AVN	Power Mode	MMI_OFF	P2		(VW MIB3) Main Unit keep hibernation mode until wakeup event is activated.			
2.AVN	Power Mode	MMI_ON	P2		(VW MIB3) All Infotainment system components are fully working	Vehicle turn ON, Head unit ON Press ON button on Head unit		
2.AVN	Power Mode	MMI_Standby	P2		(VW MIB3) As One of Power Saving mode, Its power consumption is higher than MMI STANDBY PWR SAVE and less than MMI ON.	MMI_Standby: from State MMI_ON, touch Power on ABT or KL S		
2.AVN	Power Mode	MMI_Standby_Power save	P2		(VW MIB3) 1.As one of power saving mode, Its power consumption is higher than MMI IOC and less than MMI STANDBY. 2. It is composed of MMI STANDBY PWR SAVE1 and MMI STANDBY PWR SAVE2	MMI_Standby_Powersave: from State MMI_Standby, wait t_mmi_off1 expired		
2.AVN	Media	MML	P2		Master Media List			

2.AVN	Phone	MMS	P2		Multimedia Message Service	is a standard way to send message that include multimedia content to and from another mobile phone over a cellular network. Users and providers may refer to such a message as a PXT, a picture message or a multimedia message																							
4.Telematics	Telecommunication	MNC	P0	<u>Mobile Network Code</u>	IMSI = MCC + MNC + MSIN (Mobile Subscriber Identification Number). In order to uniquely identify a mobile subscribers network the MCC is combined with a Mobile Network Code (MNC). Each network provider in same country has different MNC.	The mobile network code consists of two or three decimal digits	<p>Mã nhà mạng dùng để định danh thuê bao thuộc nhà mạng nào trên đường truyền. Ví dụ: số IMSI là 450050123456789 => Mã quốc gia là 450: số IMSI thuộc Hàn Quốc; Mã nhà mạng là 05: thuê bao thuộc nhà mạng SKT (SK telecom)</p>	<p>South Korea</p> <table> <thead> <tr> <th>MCC</th> <th>MNC</th> <th>Brand</th> </tr> </thead> <tbody> <tr> <td>450</td> <td>02</td> <td>KTF</td> </tr> <tr> <td>450</td> <td>03</td> <td>Digital 017</td> </tr> <tr> <td>450</td> <td>04</td> <td>KTF</td> </tr> <tr> <td>450</td> <td>05</td> <td>SKT</td> </tr> <tr> <td>450</td> <td>06</td> <td>LGT</td> </tr> <tr> <td>450</td> <td>08</td> <td>KTF SHOW</td> </tr> </tbody> </table>	MCC	MNC	Brand	450	02	KTF	450	03	Digital 017	450	04	KTF	450	05	SKT	450	06	LGT	450	08	KTF SHOW
MCC	MNC	Brand																											
450	02	KTF																											
450	03	Digital 017																											
450	04	KTF																											
450	05	SKT																											
450	06	LGT																											
450	08	KTF SHOW																											
4.Telematics	Telecommunication	MNO	P0	<u>Mobile Network Operator</u>	A mobile network operator (MNO) is a telecommunications service provider organization that provides wireless voice and data communication for its subscribed mobile users. ... Mobile network operators are also known as carrier service providers, mobile phone operator and mobile network carriers.	Examples of MNO: + In Vietnam: Viettel, MobiPhone, Vinaphone, Vietnammobile, Gmobile, S-Fone + In Korea: SK Telecom, KT, LG U+ + In Japan: KDDI, NTT, SoftBank + In China: China Mobile, China Unicom, China Telecom + In Russia: MTS, MegaFon, Beeline, Tele2... + In UK: EE, O2, Vodafone, Three + In US: Verizon Wireless, AT&T Mobility, T-Mobile US, Sprint Corporation, U.S. Cellular	Danh sách các nhà cung cấp dịch vụ viễn thông: https://en.wikipedia.org/wiki/List_of_mobile_network_operators																						
3.Cluster	Cluster	Mobile Online Service	P2		Mobile Online Service	Receive and Provide configured for Mobile App settings																							
2.AVN	[TBD]	MOD	P2	Mobile Online Dienste	- English: Mobile Online Services - Services help user to connect their car with their smartphone and the internet Eg: charging car, remote door ...	[TBD]		[TBD]																					
2.AVN	Vehicle	Moderate	P2		Air quality is moderated	Air pollution occurs when harmful or excessive quantities of substances including gases, particulates, and biological molecules are introduced into Earth's atmosphere.																							

2.AVN	Radio	Modulation	P2		Modulation is the process of varying one or more properties of a carrier signal (Amplitude, frequency, phase) accordance with baseband signal.			
2.AVN	Vehicle	Momentary toggle switch	P2					
2.AVN	Audio	MonD	P2		Media on Demand/ Online service: is a new generation of Video on demand(VOD), which not only allows users to watch/listen video and audio content like movies and TV shows, but also provides functions including real-time information,interactive games, attractions guidance, route information, advertising system, shopping & ordering service etc.Users can select content whenever they want, rather than having to watch it at a specific broadcast time.			
4.Telematics	Telematics	MOST	P1		Media Oriented System Transport	One method of communication in vehicle network MOST is a high-speed multimedia network technology optimized by the automotive industry. It can be used for applications inside or outside the car.		

2.AVN	Audio	MOT	P2		Multimedia Object Transfer Protocol : As the capabilities of receiver are different it should be possible for all types of receivers to at least recognize the program associated and program independent data and process some of the data. To overcome this problem, DAB defines a special protocol called the MOT protocol. The primary goal of MOT is to support different data formats such as MIHEG (Multimedia and Hypermedia Information coding Experts Group), HTML, HTTP, BMP (Bitmap), GIF (Graphic Interchange format).			
2.AVN	Radio	MP/Multipath	P2		The radio waves emitted from the transmitting antenna affect the receiving side due to the influence of obstacles.			
2.AVN	Media	MP3/WMA/AAC	P0	MPEG Audio Layer III	MP3 is an audio format. - MP3: MPEG Audio Layer III including MPEG-1, MPEG-2, MPEG-2.5 Audio Layer III			
2.AVN	Media	MP3? WMA? AAC?	P2		It's an audio format. - MP3: MPEG Audio Layer III including MPEG-1, MPEG-2, MPEG-2.5 Audio Layer III - WMA: Windows Media Audio, developed by Microsoft - AAC: Advanced Audio Coding, developed by Apple			
2.AVN	Media	MP4	P0	MPEG4	MPEG-4 Part 14 or MP4 is a digital multimedia container format most commonly used to store video and audio, but it can also be used to store other data such as subtitles and still images.			
2.AVN	Media	MP4	P2		MPEG4			

2.AVN	Radio	MPEG	P2		The Moving Picture Experts Group (MPEG) is a working group of authorities that was formed by ISO and IEC to set standards for audio and video compression and transmission			
2.AVN	Radio	MPS & SPS	P2		<p>Now, MPS PAD becoming MPSPD for "Main Program Service Data";</p> <p>Now, SPS PAD becoming SPSPD for "Supplemental (multicast) Program Service Data".</p> <p>To ease broadcaster PSD implementation to SPSPD, iBiquity has established a common PSD interface to the Importer, called HDP, where PSD implementation is unified ...</p>	<p>In hybrid modes of the HD Radio system, it preserves the existing analog radio programming formats in both the analog and digital transmissions. In addition to the audio, the MPS also includes PSD (i.e. MPSPD)</p>		
2.AVN	[TBD]	MQB	P2	<u>Modularer Querbaukasten</u>	<ul style="list-style-type: none"> - English: Modular Transversal - A modular platform of Volkswagen Group platforms 	[TBD]		[TBD]
2.AVN	System	MQTT	P2		<p>Message Queuing Telemetry Transport: is an ISO standard (ISO/IEC PRF 20922)[2] publish-subscribe-based messaging protocol. It works on top of the TCP/IP protocol. It is designed for connections with remote locations where a "small code footprint" is required or the network bandwidth is limited. The publish-subscribe messaging pattern requires a message broker.</p>	<p>Providing a lightweight publish/subscribe reliable messaging transport protocol suitable for communication in M2M/IoT contexts where a small code footprint is required and/or network bandwidth is at a premium</p>		

2.AVN	Projection	MRL/ ML	P0	MirrorLink	<p>MirrorLink is a device interoperability standard that offers integration between a smartphone and a car's infotainment system. MirrorLink transforms smartphones into automotive application platforms where apps are hosted and run on the smartphone while drivers and passengers interact with them through the steering wheel controls, dashboard buttons and touch screens of their car's In-Vehicle Infotainment (IVI) system.[1]</p> <p>MirrorLink utilizes a set of well-established, non-proprietary technologies such as IP, USB, Wi-Fi, Bluetooth, Real-Time Protocol (RTP, for audio) and Universal Plug and Play (UPnP).[2] In addition, MirrorLink uses Virtual Network Computing (VNC) as the baseline protocol to display the user interface of the smartphone applications on the infotainment system screens and to communicate user input back to the mobile device.</p>	<p>To connect device AA with HU, using cable : plug one into your mobile device and the USB port on HU.</p> <p>Device AA must have Mirrolink app</p> <p>Setup time set is realtime and the same time on device or setup the year is 2015 up to.</p> <p>when complete device and HU, icon ML on HU is appear, tap icon to display ML screen.</p> <p>so you can use MLink HU the same MLink on device with any funtion: music, radio...</p> <p>when connect device with HU, BT of device connect with BT HU too.if have any BT othter device connect with HU before connect ML, when connect ML complete, BT of device auto connect with HU and auto disconnect other BT</p>		
2.AVN	Vehicle	ms	P2		milli seconds	1 ms = 0.001s		
2.AVN	Radio	MS (Music/Speech switch)	P2		A two-state signal to provide information on whether music or speech is being broadcasted			
2.AVN	System	MS0	P2		Music flag processing			
2.AVN	System	MS1	P2		Speech flag processing			

4.Telematics	Telematic call	MSB	P2		<p>Most Significant Byte: The byte of a multibyte number with the greatest importance: that is, the byte stored first on a big-endian system or last on a little-endian system.</p>	<p>The most significant byte, also abbreviated MSB, is the byte in a multiple-byte word with the largest value. As with bits, the MSB (byte) is normally the byte farthest to the left, or the byte transmitted first in a sequence. In big-endian format, a multi-byte value is stored in memory from the highest byte (the "big end") to the lowest byte. Example: the value 0x12345678 is stored as (0x12 0x34 0x56 0x78) in big-endian format, i.e. MSB (Most Significant Byte) is first.</p>		
2.AVN	Media	MSC	P0	Mass Storage Class	MSC is mainly used for devices that allow access to their internal data storage. Typical examples for MSC class devices are: External hard drives (HDD); External optical drives (such as CD or DVD drives); Portable Flash memory devices; Solid-state drives (SSD); Digital cameras; Card readers ...			
2.AVN	System	MSC PCBER	P2		Main Service Channel Pseudo Channel Bit Error Rate			
2.AVN	Media	MSCD (inlcude SD card, USB)	P2		<p>MSCD is a set of computing communications protocols defined by the USB Implementers Forum that makes a USB device accessible to a host computing device and enables file transfers between the host and the USB device.</p> <p>To a host, the USB device acts as an external hard drive; the protocol set interfaces with a number of storage devices.</p>	<p>The USB mass storage device class (also known as USB MSC or UMS) is a set of computing communications protocols defined by the USB Implementers Forum that makes a USB device accessible to a host computing device and enables file transfers between the host and the USB device. To a host, the USB device acts as an external hard drive; the protocol set interfaces with a number of storage devices.</p>		

4.Telematics	Application	MSD	P0	<u>Minimum Set of Data</u>	<p>MSD is required for Emergency call. Typically, MSD includes following information (which depends on the legal requirements in different region):</p> <ul style="list-style-type: none"> + Position + Time of the accident + Direction of the travel + Vehicle Identification number + ... <p>MSD provides information of vehicle at the time of the emergency.</p>	<p>When emergency call is triggered, Telematics box will send MSD to server via telecommunication channel</p>		
4.Telematics	Telematics	MSDP	P2		Media Service Delivery Platform			
2.AVN	Phone	MSG	P2		Short term of message			
4.Telematics	Telematics	Msg ID(Hex)	P2		<p>Message-ID is a unique identifier for a digital message, most commonly a globally unique identifier used in email and Usenet newsgroups.</p>	<p>Message-IDs are required to have a specific format which is a subset of an email address and to be globally unique. That is, no two different messages must ever have the same Message-ID.</p>		
2.AVN	Connection	MSRP	P2		Multiple Stream Reservation Protocol			
2.AVN	[TBD]	MSS	P2	Modular Sports-Car System	A modular platform of Volkswagen Group platforms	[TBD]		[TBD]
2.AVN	Climate	MTC	P2		Manual Temperature Control	<p>When content for Single-zone manual Temperature Control and Display is required, the HVaC controller shall set the following signals. Note: for Single-zone Manual systems, the set temperature is not displayed in the HMI (i.e., Quick Status Pane or Front Climate Screen, if applicable).</p>		
2.AVN	Media	MTP	P0	<u>Media Transfer Protocol</u>	<ul style="list-style-type: none"> - MTP is communications protocol that allows media files to be transferred automatically to and from portable devices - MTP is introduced by Microsoft - MTP is extention of PTP (Picture Transfer Protocol) 	<p>Connect your MTP to your car via usb port cable. Plug one end of the cable on your MTP Media and the opposite end to the your car via Usb Hub. Your MTP will be displayed on your car with interface the same on your MTP device so that you can easy to use.</p>		

2.AVN	Connection	MTPZ	P2		<p>Media Transfer Protocol for Zune Zune is a discontinued brand of digital media products and services marketed by Microsoft. MTPZ is protocol that use MTP but customize for Zune product like Windows Phone, Xbox 360. About MTP , please refer to keyword "MTP"</p>		
2.AVN	Navigation	Multi Level Search	P2		If the distance from departure point to destination exceeds a certain length, it excludes low-level road from the search in order to optimize the search performance.		
2.AVN	Navigation	Multi-Digitized(Multi-Dig)	P2		Multipled digitization of roads and intersections, for instance in case of a physical divider. The segments are always oneways.		
2.AVN	Connection	Multimedia Connector Hub	P2		<p>Multimedia is content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content. For Multimedia in AVN, we often use USB card that contains audio file, or video file to play on AVN Multimedia connector hub is a hub that help people connect more than 1 USB to AVN</p>	<p>Connect Hub to AVN Connect 1st USB that contains audio file, video file to Hub On AVN, go to Media function, select to play music or video Connect 2nd USB to Hub On AVN, select audio on 2nd USB to play music.</p>	
3.Cluster	Cluster	Multi-zone Clusters	P2				
2.AVN	Vehicle	Mute/Power switch	P2		Mute/Power switch	Mute/Power switch	

					MVC: Multi View Camera. MVC is a survey system that uses 4 vehicle-mounted cameras in order to give end user more informations about the close environment of the vehicle. MVC allow the end user to select and view an external camera view among front/rear/left/right views of the vehicle surroundings.	Connect camera to HU via CAN		
2.AVN	Vehicle	MVC	P1					
2.AVN	Navigation	MVR	P2		Motor Vehicle Report A Motor Vehicle Record (MVR) is a report of your driving history, as reported from your state Department of Motor Vehicles. Information on this report may include Drivers License information, point history, violations, convictions, and license status on your driving record			
2.AVN	Connection	MVRP	P2		Multiple VLAN Registration Protocol Multiple VLAN Registration Protocol (MVRP) is a Layer 2 messaging protocol that manages the addition, deletion, and renaming of active virtual LANs			
2.AVN	Media	MyMedia	P2		Current portable media device	Current portable media device, like "My Document", "My Computer"		
4.Telematics	Diagnostics	N_Ar	P2	Network Layer Timing Parameter Ar	Network Layer Timing Parameter Ar	Time for the transmission of any N_PDU on the receiver side.		
4.Telematics	Diagnostics	N_As	P2	Network Layer Timing Parameter As	Network Layer Timing Parameter As	Time for the transmission of any N_PDU on the sender side.		

4.Telematics	Diagnostics	N_Br	P2	Network Layer Timing Parameter Br	Network Layer Timing Parameter Br	Time until the transmission of the next FC N_PDU.		
4.Telematics	Diagnostics	N Bs	P2	Network Layer Timing Parameter Bs	Network Layer Timing Parameter Bs	Time until the reception of the next FC N_PDU.		
4.Telematics	Diagnostics	N_Cr	P2	Network Layer Timing Parameter Cr	Network Layer Timing Parameter Cr	Time until reception of the next CF N_PDU.		
4.Telematics	Diagnostics	N Cs	P2	Network Layer Timing Parameter Cs	Network Layer Timing Parameter Cs	Time until transmission of the next CF N_PDU		
4.Telematics	Telematics	N_WFTmax	P2		Maximum Number of Flow Control's Wait Frame Transmissions			
4.Telematics	Common	NAD	P0	<u>Network Access Device</u>	Network Access Device: a component in telematic device to connect to cellular network			
4.Telematics	Telematics	NAS	P2		Non-access stratum (NAS) is a functional layer in the UMTS and LTE wireless telecom protocol stacks between the core network and user equipment. This layer is used to manage the establishment of communication sessions and for maintaining continuous communications with the user equipment as it moves.	Examples of NAS messages include Update or Attach messages, Authentication Messages, Service Requests and so forth. Once the User Equipment (UE) establishes a radio connection, the UE uses the radio connection to communicate with the core nodes to coordinate service.		

2.AVN	Phone Projection	Native Navi	P0	N/A	Embedded Navigation (OEM Navigation): Navigation is a field of study that focuses on the process of monitoring and controlling the movement of vehicle from one place to another, Native Navigation is used to indicate the navigation application of Head Unit, not navigation application of android auto or carplay.	Native Navi is the navigation application of head Unit. This word to distinguish with navigation application of the projection .		
2.AVN	Projection	Native screen	P2		Or native UI			
2.AVN	Projection	Native Speech Recognition	P1		OEM speech recognition	When projection application is not activated, user presses Push to talk button will open Native speech recognition		
1.Common	Navigation	Navigation	P0	N/A	Navigation is used to find direction in an automobile. It typically uses a satellite navigation device to get its position data which is then correlated to a position on a road. When directions are needed routing can be calculated. On the fly traffic information can be used to adjust the route.	Mathematically, automotive navigation is based on the shortest path problem, within graph theory, which examines how to identify the path that best meets some criteria (shortest, cheapest, fastest, etc.) between two points in a large network.		
		Navigation system						

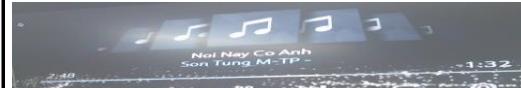
4.Telematics	Common	NCM	P1	Network Control Model	<p>There are numerous protocols for Ethernet-style networking over USB. The main motivation for these protocols is to allow application-independent exchange of data with USB devices, instead of specialized protocols such as video or MTP. Even though USB is not a physical Ethernet, the networking stacks of all major operating systems are set up to transport IEEE 802.3 frames, without caring much what the underlying transport really is.</p> <p>The main industry protocols are (in chronological order): Remote NDIS (RNDIS, a Microsoft vendor protocol), Ethernet Control Model (ECM), Ethernet Emulation Model (EEM), and Network Control Model (NCM)</p>	<p>Có nhiều giao thức cho Ethernet-style Networking over USB. Người dùng chính cho các giao dịch này để cho phép ứng dụng, Independent Exchange của dữ liệu với các thiết bị USB, thay thay cho các giao dịch như như video hay MTP. Không có tùy chọn USB không phải là một cơ sở dữ liệu, các tập tin máy phục vụ nào của tất cả các hệ thống tập tin được cài đặt để truyền tải IEEE 802.3 frames, không biết gì</p> <p>The main industry protocols are (in chronological order): Remote NDIS (RNDIS, a Microsoft vendor protocol), Ethernet Control Model (ECM), Ethernet Emulation Model (EEM), and Network Control Model (NCM)</p>	
2.AVN	Connectivity	NDEF	P1	<u>NFC Data Exchange Format</u>	<p>NDEF is a standardized data format specification by the NFC Forum which is used to describe how a set of actions are to be encoded onto a NFC tag or to be exchanged between two active NFC devices</p>	<p>The data format consists of NDEF Messages and NDEF Records. The standard is maintained by the NFC Forum and is freely available for consultation but requires accepting a license agreement to download.</p>	<p>NDEF message là 1 định dạng nhị phân được sử dụng để đóng gói các dữ liệu được định kiểu. Nó được quy định bởi NFC Forum cho việc truyền tải và lưu trữ với NFC.</p> <p>NDEF định nghĩa các Messages và các Records. Đối tượng NDEF Record chứa đựng dữ liệu được định kiểu như MIME-type media, URI, hoặc một nội dung (payload) được tuỳ chỉnh.</p>

2.AVN	Navigation	Nearby Cloud	P2		This type of cloud is usually located on a smartphone or another vehicle. It is reached by low distance connectivity technologies, e.g. Bluetooth or WLAN. Onboard data (onboard fallback and cache database) can be used as a Nearby Cloud by other vehicles. Thus, every map database together with an update manager is a type of cloud		
2.AVN	Hardware	Network adaptor	P2	N/A	A network adapter is the component of a computer's internal hardware that is used for communicating over a network with another computer. It enable a computer to connect with another computer, server or any networking device over an LAN connection.	A network adapter can be used over a wired or wireless network. E.g: Connect to computer via USB port or ethernet port	
2.AVN	Connectivity	NFC	P0	<u>Near Field Communication</u>	NFC is a set of communication protocols that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication by bringing them within 4 cm (1.6 in) of each other	2 devices that support NFC Device 1 want to send contacts file to device 2 via NFC Turn ON NFC, move 2 devices near each other (~1cm) Select file on device 1 then send to device 2	

2.AVN	Connection	NFS	P2		<p>Network File System</p> <p>Network File System (NFS) is a distributed file system protocol originally developed by Sun Microsystems in 1984, allowing a user on a client computer to access files over a computer network much like local storage is accessed.</p>	<p>NFS begins with two computers which can speak TCP/IP to each other, most commonly over a Local Area Network, e.g. Ethernet.</p> <p>One computer will be the NFS server: it offers up various chunks of disk storage (which is usually directly attached to the server system) to NFS clients that it can exchange TCP/IP packets with.</p> <p>The other computer will be the NFS client: it will make a "mount" request of the NFS server, and subsequently make open/read/write/lseek/close requests of the NFS server on a per-file basis.</p>		
2.AVN	Vehicle	NGI	P2		Next Generation Infotainment			
4.Telematics	Telematics	NGTP	P2		Next Generation Telematics Pattern			
3.Cluster	Common	Night Vision	P0	N/A	<p>An automotive night vision system uses a thermographic camera to increase a driver's perception and seeing distance in darkness or poor weather beyond the reach of the vehicle's headlights</p>	<p>Displays and scales the height and width of the the NightVision picture</p> <p>The street ahead of the car is filmed with a night vision camera and the corresponding picture is displayed on the instrument cluster.</p> <p>The feature night vision has a detection system for pedestrians and animals. If a pedestrian or an animal is detected on the street then the driver gets a warning signal (collision warning). This detection system only works when it's dark enough. During bright daylight, the detection system do not work but the screen is still available.</p>		

3.Cluster	Vehicle	Night Vision Controls	P1	Night Vision Controls is used to control the vehicle's night vision mode	Night Vision Controls is used to control the vehicle's night vision mode	<ul style="list-style-type: none"> Display Night Vision controls when user select Night Vision Controls button. Pressing Night Vision Controls button again should remove the HUD menu and display the current Trip Page. Pressing Night Vision controls button again should remove the Night Vision menu and display the current Trip Page. 																							
2.AVN	Voice Recognition	NLU	P2		Natural Language Understanding																								
2.AVN	Connection	NM	P2		Network Management Network management is the process of administering and managing computer networks. Various services provided by this discipline include fault analysis, performance management, provisioning of networks, maintaining the quality of service, and so on	The Geely NM is based on decentralized direct network management strategy, which means that every network node performs activities self-sufficient depending on the NM PDUs only that are received or transmitted within the communication system																							
4.Telematics	Telecommunication	NMC	P1	<u>Network Mobile Code</u>	Same as MNC (Mobile Network Code) IMSI = MCC + MNC + MSIN (Mobile Subscriber Identification Number). In order to uniquely identify a mobile subscribers network the MCC is combined with a Mobile Network Code (MNC). Each network provider in same country has different MNC.	The mobile network code consists of two or three decimal digits	Mã nhà mạng dùng để định danh thuê bao thuộc nhà mạng nào trên đường truyền. Ví dụ: số IMSI là 450050123456789 => Mã quốc gia là 450: số IMSI thuộc Hàn Quốc; Mã nhà mạng là 05: thuê bao thuộc nhà mạng SKT (SK telecom)	<p style="text-align: center;">South Korea</p> <table> <thead> <tr> <th>MCC</th> <th>MNC</th> <th>Brand</th> </tr> </thead> <tbody> <tr> <td>450</td> <td>02</td> <td>KTF</td> </tr> <tr> <td>450</td> <td>03</td> <td>Digital 017</td> </tr> <tr> <td>450</td> <td>04</td> <td>KTF</td> </tr> <tr> <td>450</td> <td>05</td> <td>SKT</td> </tr> <tr> <td>450</td> <td>06</td> <td>LGT</td> </tr> <tr> <td>450</td> <td>08</td> <td>KTF SHOW</td> </tr> </tbody> </table>	MCC	MNC	Brand	450	02	KTF	450	03	Digital 017	450	04	KTF	450	05	SKT	450	06	LGT	450	08	KTF SHOW
MCC	MNC	Brand																											
450	02	KTF																											
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450	04	KTF																											
450	05	SKT																											
450	06	LGT																											
450	08	KTF SHOW																											
2.AVN	Connection	NMF	P2		Network Management Frame																								
2.AVN	System	NMH	P2	Network Management Header																									
2.AVN	System	NMH	P2	New Message Handling System	Message Handling System (MHS) is an important early email protocol developed by Action Technologies, Inc. (ATI) in 1986. Novell licensed it in 1988 then later bought it.																								

2.AVN	Radio	No	P2		Noise Power Spectral Density is the power spectral density of noise or the noise power per unit of bandwidth. It has dimension of power over frequency, whose SI unit is watts per hertz (equivalent to watt-seconds)			
2.AVN	Phone	No call state	P2		No active Request or Call is in progress, Speech Recognition can be active (by pressing Dot button).			
2.AVN	Power Mode	NoCalibration	P2		State when the CSM/Low Radio detects that it has not been properly calibrated either initially in the plant or after a software upgrade. Note that this state only indicates that the CSM/Low Radio component is in the NoCalibration state.	The CSM has detected invalid or missing calibrations (NoCalibration).		
2.AVN	Radio	SNR	P1	Signal-to-noise ratio	Signal-to-noise ratio is defined as the ratio of the power of a signal (meaningful information) to the power of background noise (unwanted signal). A ratio higher than 1:1 (greater than 0 dB) indicates more signal than noise.			
2.AVN	Navigation	Non-Navigation Porch layout	P2		The porch view contains simplified views of multiple applications to give an overview of their current functionality			
4.Telematics	Network	Non-SVD	P2	Non-Simultaneous Voice & Data	Non Simultaneous Voice & Data	The networks only support voice or data connection (LTE/4G data, 2G/GSM)		
2.AVN	System	NOS	P2		Normal Operation State	A mode of CAN bus		

2.AVN	System	Notes while upgrading.	P2		<p>There are some tips when you upgrade SW version</p> <p>1. When upgrade by using USB: - To check using correct build version for USB - Check the build file on USB - to make sure does not problem while copying. - New build version must higher than current software version, if they are the same, you must downgrade SW version and then upgrade.</p> <p>2. When upgrade by using Mfg: - Turn off HU and change the key on HU board (left -> right), then connect Mfg cable and turn on HU. - You must check using the correct build version too.</p> <p>3. Others, check deeply if it is a upgrade bug.</p>		
2.AVN	Power Mode	NoVIN	P2		<p>State when the CSM/Low Radio has not yet learned a VIN. This state is also used to allow a minimal "bench mode" when the CSM/Low Radio is powered without a connected BCM (that provides the VIN).</p> <p>The CSM/Low radio has not yet learned a valid VIN from the CAN network (NoVIN).</p>		
2.AVN	Media	Now Playing View	P0	N/A	<p>All audio sources play using a main Now Playing screen with similar format and layout</p> <p>Specific details for each source will be given in their own section. Ex, The following information is shown on the AM now playing view:</p> <p>Line 1: Frequency, HD Logo, Call Letters</p> <p>Line 2: Artist Name (HD Only)</p> <p>Line 3: Song Title (HD Only)</p> <p>Browse</p> <p>Sound</p>		 <p>Figure 4.1.3.1 ICS FM Audio Now Playing View (ICS_FM_AUDIO_MAIN_NOW_PLAYING)</p>
2.AVN	Projection	NR	P2		<p>Noise Reduction: Noise reduction is the process of removing noise from a signal</p>		

4.Telematics	Diagnostics	NRC	P0	<u>Negative Response Code</u>	In diagnostics message, we use client-server model. When a client sends a request to server, server may respond to client. If a service cannot be executed, the ECU responds with a negative response. And negative response includes NRC, NRC is used to indicate the cause of the error.	Each NRC is represented for an error. Example: + NRC 0x11 means the diagnostic function in request is not supported + NRC 0x13 means the request message has incorrect length		
2.AVN	Radio	NTSC	P2		National Television System Committee is the analog television system that is used in North America, and until digital conversion was used in most of the Americas (except Brazil, Argentina, Paraguay, Uruguay, and French Guiana); Myanmar; South Korea; Taiwan; Philippines, Japan; and some Pacific island nations and territories (see map)	NTSC was the first widely adopted broadcast color system and remained dominant until the 2000s, when it started to be replaced with different digital standards such as ATSC and others.		
2.AVN	Vehicle	OBC	P2		On Board Charger:	On Board Charger		
2.AVN	Vehicle	OBD	P2		On-Board Diagnostics:	is an automotive term referring to a vehicle's self-diagnostic and reporting capability. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle subsystems		
2.AVN	Connection	OBEX	P2		Object Exchange OBEX (abbreviation of OBject EXchange, also termed IrOBEX) is a communications protocol that facilitates the exchange of binary objects between devices.			
2.AVN	Navigation	OBN	P2		The off-board navigation service is turn by turn application executed by VCP that guides the user to a destination using route guidance and maneuver datasets transmitted to the vehicle from the TBT server	User make a call to OCC center to ask guidance to the target distance. OCC setup the data so VCP will make a call to Turn-by-turn server, then route is downloaded to VCP and display information in AVN.		

4.Telematics	Telematics	OCC	P1	OnStar Call Center	<p>The OnStar service allows users to contact OnStar call centers during an emergency. In the event of a collision, detected by airbag deployment or other sensors, Advanced Automatic Collision Notification features can automatically send information about the vehicle's condition and GPS location to OnStar call centers. OnStar has 24-hour emergency call centers in Warren, Michigan; Charlotte, North Carolina; and Ontario, Canada, and other call centers in Makati, Philippines; and Oshawa, Ontario.[citation needed] This Advanced Automatic Collision Notification service is designed to assist emergency response efforts.</p> <p>The Call Center Operated by GM, support services:</p> <ul style="list-style-type: none"> - Navigation service - Vehicle Diagnostic - Control Vehicle (Engine, Door) - Emergency/Collision Service 		
2.AVN	Connection	OCSP	P2	Online Certificate Status Protocol			
2.AVN	Vehicle	Octet	P2	Eight bits of data	Eight bits of data		
2.AVN	[TBD]	OCU	P2	Online Connectivity Unit	<ul style="list-style-type: none"> - A term coined by Volkswagen - A component ensures a secure and stable connection between vehicle and backend 	<p>OCU acts as a communication gateway between the car and telematics service provider(s)</p> <p>[REF]</p> <p>http://www.viavision.org.uk/ftp/1920.pdf</p> <p>https://fccid.io/ANATEL/00192-14-05452/Manual-HT-6g/4761767F-D08B-4A59-9825-67BF0AC1E4C1/PDF</p>	[TBD]

2.AVN	Radio	ODA	P2		<p>Open Data Application RDS tagging makes use of an RDS feature called "Open Data Application" (ODA). These RDS tagging receivers also make use of a new RDS feature called "RadioText Plus" which is an enhancement to the RadioText feature that is often used by broadcasters for sending song title and artist information over an RDS subcarrier</p>		
2.AVN	System	ODI	P2		<p>Open Display Interface: provides a set of serial data message and defines a functional interface between the telematic device (Ex: VCP) and display devices</p>	<p>Message interface(one type of CAN) to communicate between VCP and AVN/Radio Display Module. It process the User press button on radio/User touch AVN screen and display Onstar menus The ODI provides a set of serial data message and defines a functional interface between VCP and display device via LSGMLAN</p>	
3.Cluster	Common	Odometer	P0	N/A	<p>Odometer is an Instrument for measuring the distance traveled (as by a vehicle). In countries using Imperial units or US customary units it is sometimes called a mileometer or milometer (unit: miles), others use the kilometer (unit: km).</p>	<p>Display the tol</p>	
1.Common	Common	OEM	P0	<u>Original Equipment Manufacturer</u>	<p>The OEM is the original producer of a vehicle's components, and so OEM car parts are identical to the parts used in producing a vehicle. Aftermarket parts are produced by other vendors and do not necessarily have a consistent level of quality or compatibility with the vehicle.</p>		
2.AVN	Projection	OEM Launcher SK	P2		Original Equipment Manufacturer Launcher Soft Key		

2.AVN	SW	OFDM	P2	Orthogonal Frequency Division Multiplexing: In telecommunications, Orthogonal frequency-division multiplexing (OFDM) is a method of encoding digital data on multiple carrier frequencies. OFDM has developed into a popular scheme for wideband digital communication	used in applications such as digital television and audio broadcasting, DSL internet access, wireless networks, power line networks, and 4G mobile communications.		
2.AVN	Power Mode	Off	P2	No functionality and no polling, minimal power consumption.			
2.AVN	Navigation	Offline Cloud	P2	This type of cloud is reached via an USB or SD slot by a local device. With an offline cloud, the system can still provide full functionality in areas where no connectivity is available because the database on the local device can be manually updated. It also ensures full functionality after SOP in case the online cloud is shut off.			
2.AVN	Power Mode	OffMode	P2	State defined for vehicle power off mode features that require the CSM/Low Radio active, but not the entire Infotainment System. (Global B Only)			
2.AVN	Navigation	Offroad	P2	Off-road is the activity of driving or riding a vehicle on unsurfaced roads or tracks, made of materials such as sand, gravel, riverbeds, mud, snow, rocks, and other natural terrain			
2.AVN	Navigation	Off-Route	P2	The condition that car isn't on the planned route.			
2.AVN	Vehicle	Offset	P2	The offset of this value			
4.Telematics	Vehicle	OHC	P2	Over Head Console	If your car is equipped with an overhead console or storage compartment, you'll find that it offers you the ability to store away small items out of sight for easy access. It's designed to hold things about the size of a pair of sunglasses, though, so don't overload it.		

2.AVN	Vehicle	OMA	P2		Open Mobile Alliance	The Open Mobile Alliance (OMA) is a standards body which develops open standards for the mobile phone industry. It is not a formal government-sponsored standards organization like the ITU, but a forum for industry stakeholders to agree on common specifications for products and services.		
2.AVN	Connection	On/Off User state	P2		On/Off HU			
2.AVN	Vehicle	On-board Diagnostics	P1		On-board diagnostics (OBD) is an automotive term referring to a vehicle's self-diagnostic and reporting capability. It is a computer-based system originally designed to reduce emissions by monitoring the performance of major engine components. OBD systems give the vehicle owner or repair technician access to the status of the various vehicle subsystems.	A basic OBD system consists of an ECU (Electronic Control Unit), which uses input from various sensors (e.g., oxygen sensors) to control the actuators (e.g., fuel injectors) to get the desired performance. The "Check Engine" light, also known as the MIL (Malfunction Indicator Light), provides an early warning of malfunctions to the vehicle owner. A modern vehicle can support hundreds of parameters, which can be accessed via the DLC (Diagnostic Link Connector) using a device called a scan tool.		
2.AVN	Navigation	Online Cloud	P2		This type of cloud is reached via an online connection. It is not located in a car, but on a server or cluster.			
2.AVN	Navigation	On-Route	P2		The condition that car is on the planned route.			
2.AVN	Projection	OnStar	P2		OnStar Corporation is a subsidiary of General Motors that provides subscription-based communications, in-vehicle security, emergency services, hands-free calling, turn-by-turn navigation, and remote diagnostics systems throughout the United States, Canada, China, Mexico, Europe, Brazil, and Argentina			

4.Telematics	Telematics	Onstar button	P1		Onstar button/Blue button	- Press and release Onstar button: Connect to OCC - Press Onstar button to start/stop Advisor convesation recording with agent after OCC connection		
4.Telematics	Connectivity	OnStar Prepay and Postpay mode	P2	N/A	OnStar Prepay mode OnStar Postpay mode	OnStar Prepay mode meaning: The TCP decrements the user pre-paid minutes until they have to buy more OnStar Postpay mode meaning: There is no limit for minutes remaining and this value is not be shown		
4.Telematics	Connectivity	OnStar Recents list empty	P2	N/A	Recents list is empty	The recent call history list is empty		
4.Telematics	OnStar	OnStar TBT	P2	Onstar Turn By Turn	Onstar Turn By Turn Navigation	OnStar Turn-by-Turn Navigation provides voice-guided driving directions to you in your vehicle over your speakers and uses Global Positioning System (GPS) technology to route you to your destination. To get directions, simply push the blue OnStar button and tell the Advisor where you want to go. Your Advisor will send detailed directions to the vehicle.		
2.AVN	Connection	OOB	P1	Out of band	Out of Band authentication is performed using a non-Bluetooth communication channel. The data required to open an MITM protected Bluetooth connection with a remote device is transmitted by other means.	Out-of-Band" means "not in the main communication channel" - so, in the case of Bluetooth, that means "not using Bluetooth"		
4.Telematics	Phone	OPC	P2	Outgoing Personal Call	Outgoing Personal Call	Call from VCP to cellular phone: Telematics unit allows in car SIM card call to User equipments		

2.AVN	Vehicle	Open Display Interface	P2		<p>Open Display Interface: provides a set of serial data message and defines a functional interface between the telematic device (Ex: VCP) and display devices</p>	<p>Message interface(one type of CAN) to communicate between VCP and AVN/Radio Display Module. It process the User press button on radio/User touch AVN screen and display Onstar menus The ODI provides a set of serial data message and defines a functional interface between VCP and display device via LSGMLAN</p>		
2.AVN	Vehicle	OpenGL ES	P2		<p>OpenGL for Embedded Systems</p>	<p>OpenGL for Embedded Systems (OpenGL ES or GLES) is a subset[2] of the OpenGL computer graphics rendering application programming interface (API) for rendering 2D and 3D computer graphics such as those used by video games, typically hardware-accelerated using a graphics processing unit (GPU). It is designed for embedded systems like smartphones, tablet computers, video game consoles and PDAs</p>		
2.AVN	Navigation	OPI	P2		<p>Oil Price Information Oil Price Information Service (OPIS) is a company providing pricing and news information for petroleum pricing, news and analysis for gasoline, diesel, ethanol, biodiesel, LP-gas, jet fuel, crude, natural gas, refinery feedstocks, residual fuel, and kerosene</p>			
2.AVN	Connection	OPP	P2		<p>Object Push Profile This profile allows you to transfer files to and from other devices wirelessly. The device you wish to exchange information with must also support the object push profile</p>			
2.AVN	Navigation	Origin	P2		<p>The origin of the maneuver area or origin of a specific intersection point.</p>			

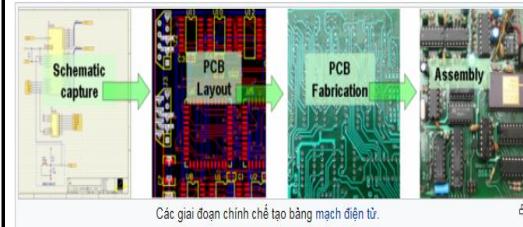
2.AVN	Vehicle	OS	P2		Operating System	An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.		
2.AVN	Vehicle	OSD	P2		On screen display	<p>OSD is partial and temporal pop-up.</p> <p>OSD can be displayed in the bottom of screen or the top of screen</p> <p>OSD doesn't affect to current operating function.</p> <p>OSD only contains the information which is not displayed in main screen to avoid the information duplications.</p> <p>OSD has time out.</p> <p>After passing defined time out value, OSD should disappeared automatically.</p> <p>Default OSD time out value is 5sec, however time out value definition in UX specification has higher priority than this specifications.</p>		
2.AVN	Vehicle	OSEK	P2		Offene Systeme und deren Schnittstellen für die Elektronik in Kraftfahrzeugen	English: "Open Systems and their Interfaces for the Electronics in Motor Vehicles") is a standards body that has produced specifications for an embedded operating system		
2.AVN	Vehicle	OSEK/VDX	P2		Open Systems and their Interfaces for the Electronics in Motor Vehicles / Vehicle Distributed Executive			
4.Telematics	Common	OSFG	P2	<u>Obere Startfähigkeitsgrenze</u> (upper limit of starting capability)	upper critical battery level threshold that allows to start engine. All services terminated except of eCall and except of Car Sharing			
2.AVN	Vehicle	OSS	P2		Open Source Software	Open-source software (OSS) is computer software with its source code made available with a license in which the copyright holder provides the rights to study, change, and distribute the software to anyone and for any purpose		
2.AVN	Vehicle	OSW	P2		On-Steering Wheel (buttons on the steering wheel)	Same as SWRC		

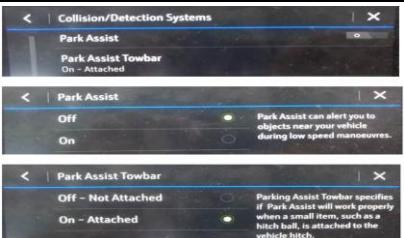
1.Common	Software update	OTA	P0	Over The Air	<p>OTA refers to message is transferred through wireless.</p> <p>OTA update is one common usage of OTA which is a method of distributing new software, configuration settings, and even updating encryption keys to devices like cellphones, set-top boxes or secure voice communication equipment. One important feature of OTA is that one central location can send an update to all the users, who are unable to refuse, defeat, or alter that update, and that the update applies immediately to everyone on the channel</p>			<p>The diagram illustrates two methods for updating vehicle software:</p> <ul style="list-style-type: none"> Conventional method: Shows a manufacturer sending software via media to a dealer, who then brings it to a vehicle mechanic for manual update using dedicated tools. OTA-based method: Shows the manufacturer uploading software to an OTA center, which then delivers it wirelessly to the vehicle's ECU, allowing for automatic updates.
2.AVN	Software Management	OTA / OTA upgrade	P2		<p>Over the air as in OTA update. OTA upgrade is for the procedure that CSP remotely upgrade the firmware or software in TEM over the air.</p>	<p>the developer release new software version and push it to the update server. Server send broadcast message to ask update software to end equipment. If user want to update, software is download from server via wireless and automatically update</p>		
2.AVN	Software Management	OTA Upgrade	P2		<p>OTA upgrade is for the procedure that CSP remotely upgrade the firmware or software in TEM over the air.</p>			
2.AVN	Media	OTG	P2	On The Go	<p>USB On-The-Go, often abbreviated to USB OTG or just OTG, is a specification first used in late 2001 that allows USB devices, such as tablets or smartphones, to act as a host, allowing other USB devices, such as USB flash drives, digital cameras, mice or keyboards, to be attached to them.</p>	<p>USB On The Go: Just plug and play to transfer data or using mouse/keyboard. Use of USB OTG allows those devices to switch back and forth between the roles of host and device.</p> <ul style="list-style-type: none"> - A mobile phone may read from removable media as the host device - A mobile phone is a USB Mass Storage Device when connected to a host computer. 		

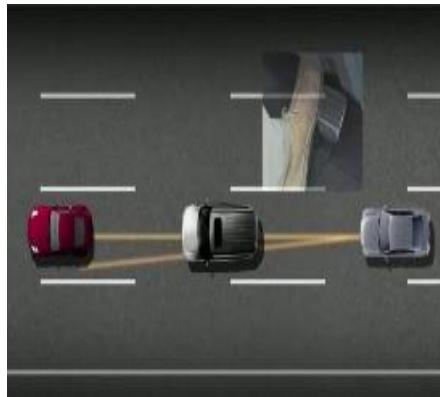
4.Telematics	Billing control	OTUB	P2	One-time Units Bin	<p>One-time Units Bin It's like the money we charge for pre-paid SIM card. Some services of GM telematics are not free as Personal call, Virtual Advisor, Traffic report...</p>	<p>1. For Incoming personal call, each minute communicating costs 1 OTUB unit 2. For Outgoing personal call, first 35 seconds communicating costs 1 OTUB unit, next 25s costs 1 unit and then each minute next costs 1 3. For Virtual Advisor, Traffic report, Weather Forecast, each minutes cost 1 OTUB unit</p>		
4.Telematics		OTUB unit	P2		<p>One-time Units Bin It's like the money we charge for pre-paid SIM card. Some services of GM telematics are not free as Personal call, Virtual Advisor, Traffic report...</p>	<p>1. For Incoming personal call, each minute communicating costs 1 OTUB unit 2. For Outgoing personal call, first 35 seconds communicating costs 1 OTUB unit, next 25s costs 1 unit and then each minute next costs 1 3. For Virtual Advisor, Traffic report, Weather Forecast, each minutes cost 1 OTUB unit</p>		
3.Cluster	Cluster	Outdoor temperature	P1	display current outside temperature	<p>Display the current outside temperature on tube A Negative temperatures are displayed with a leading minus „-“ Units: °C and °F Format °C: XX.X (e.g. 14.0, -1.0, 0.0, 4.5) Format °F: XXX (e.g. 123, 23, 3, -10) Data not avail.: „--- <unit>“ (e.g. --- °C)</p>			
2.AVN	Vehicle	OutdoorTemperature	P2		Displays the outdoor temperature	Displays the outdoor temperature		
2.AVN	Phone call	Outgoing call	P0	N/A	Is a call from our phone to other phone	<p>When device 1 makes a call to Device 2, we can say that: => Device 1 makes an outgoing call to Device 2 => Device 2 receives an incoming call from Device 1</p>		

2.AVN	Phone	Outgoing Personal Call	P2		Make call from HU to cellular network	- On keypad screen, enter phone number and tap on Phone button - On recents tab, tap on one phone number on recent call lis (if have) - On Contacts tab, tap on saved contacts> tap on Phone number (if have)		
2.AVN	Phone	Outgoing source	P2		is a keyword for GM project, with the BT connected device which can make outgoing call and receive incoming call on AVN	Device mobile connected to AVN via Bluetooth Device mobile is able to make outgoing call and receive incoming call		
2.AVN	Vehicle	OV	P2		Over_voltage	(VW MIB3) if the voltage is higher than 18,5V		
2.AVN	Vehicle	OVO	P2		for Kia	N/A		
2.AVN	Vehicle	P	P2		Park	Parking is the act of stopping and disengaging a vehicle and leaving it unoccupied. Parking on one or both sides of a road is often permitted, though sometimes with restrictions. Some buildings have parking facilities for use of the buildings' users. Countries and local governments have rules for design and use of parking spaces.		
2.AVN	Audio	P2 system	P2		Multimedia data set of P2 Company			
2.AVN	Vehicle	PAC	P1		The Park Assist Camera provides assistance when backing up using guide lines and field of vision to help provide driver with a better sense of the vehicle's position in relation to its surroundings	Using the camera located in the tailgate, If there is something behind the car within the view of the camera, driver will see images on the Sensus screen. The Park Assist Camera is activated automatically when the vehicle is started		
2.AVN	System	PAD	P2		Program Associated Data is the data displayed on many HD Radio and satellite radio receivers. It can describe the program being transmitted and other information such as the name of the song, the artist and the genre of music.	The HD radio and satellite systems provides a data path for this programming data to be delivered and read by the listener in near real time. HD radio and satellite radio receivers provide PAD decoders and visual screens for displaying the information.		

2.AVN	Media	Paging scan	P2		Paging Scan: The state waiting for device connect Paging Scan Time: Timeout due to connectable status at H / Unit to be able to connect to H / unit from Bluetooth			
2.AVN	Media	Paging Time	P2		The search time for Bluetooth devices is selected in H / Unit			
2.AVN	Connectivity	Pairing	P0	N/A	The process of associating each other between two devices through Bluetooth communication.	Pairing occurs when two Bluetooth devices communicate with each other and establish a connection. A record of information about this connection is then stored in the memory of each device. There are 2 ways: 1. Security Simple Pairing (SSP) 2. Legacy Pairing (Bluetooth 2.0 and earlier)		
2.AVN	Vehicle	PAM	P2	Parking Assistance /Aid Module	Park Assist is a system designed to make urban parking easier by automating some of the manoeuvres you need to get safely into and out of parking spaces.	Parking aids are advanced driver assistance systems designed to make parking easier. Such systems monitor an area of between example 20 and 250 cm (depend on specific vehicle) in front of and behind the vehicle and warn the driver about any obstacles.		
2.AVN	Navigation	Parcel	P2		Parcel is the unit for map divided by using level, based on longitude and latitude.			
2.AVN	Vehicle	PAS	P1		PAS stand for Park Assist System. Active parking systems are also known as parking assist systems. They represent a more sophisticated form of parking aid system and perform the necessary parking manoeuvres either autonomously or semi-autonomously. The Park Assist system includes the standard Park Assist Camera			
2.AVN	Media	PAUSE status	P2		The stop status at present position of Media file	Pausing		

2.AVN	Navigation	Payment History	P2		The payment history includes your on-time, late payment and missed or non-payment information, includes payment information for credit cards, mortgages, loans, retail accounts and lines of credit	The payment history shall be loaded from ETC card on user request. If no card is inserted, no history shall be shown.		
2.AVN	Connection	PBAP, PBA	P1	Phone Book Access Profile/ Phone Book Access	Phone Book Access Profile enables devices to exchange phone-book objects after a Bluetooth connection is established. Phone-book objects each represent information about a contact stored on a mobile phone.	You can enable users to download phone books from their mobile phones, which makes it possible to make hands-free phone calls to their contacts through the user interface		
2.AVN	Audio	PBC	P2		PlayBack Control: give you a console for controlling the playback of your score			
4.Telematics	Other	PBSM	P2	Prepare Bus Sleep Mode	Prepare Bus Sleep Mode A mode of CAN bus that CAN activity calmed down and finally there is no activity			
1.Common	Common	PCB	P0	Printed Circuit Boards	A printed circuit board (PCB) mechanically supports and electrically connects electronic components or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate.	Bảng mạch in hay bo mạch in, đôi khi gọi tắt là mạch in, là bảng mạch điện dùng phương pháp in để tạo hình các đường mạch dẫn điện và điểm nối linh kiện trên tấm nền cách điện. Chế tạo bảng mạch in là công đoạn quan trọng trong quá trình chế tạo bảng mạch điện tử. Trước đây việc làm bảng mạch in tách rời với công đoạn lập sơ đồ mạch điện. Ngày nay hệ thống thiết kế và sản xuất hỗ trợ bằng máy tính (CAD-CAM) đảm bảo tự động liên hoàn từ thiết kế sơ đồ mạch điện đến lắp ráp, giảm nhẹ sự can thiệp của con người và cho ra sản phẩm giá thành hạ.	 <p>Các giai đoạn chính chế tạo bảng mạch điện tử.</p>	

3.Cluster	Cluster	PCC	P1	Parking Assistant	Parking Assistant	<ul style="list-style-type: none"> - Displays residual range - Outputs mileage of vehicle as well as units, tank level (and warning), long range trip data 1 and 2, short range trip data 1 and 2, current date, date. Current time, remaining time and distance, oil change information, etc. 		
4.Telematics	Other	PCEP	P2	Passenger compartment entry point	Passenger compartment entry point alarm	there are 4 sensors at 4 door to know door is closed completely/Open/Closed. When there is a stolen, base on information from sensor, it will be pushed to OCC as it said that there are 4 sensor at 4 doors. So The PCEP message could be changed depending on the door happened accident.		
2.AVN	Media	PCM	P2	Pulse-code modulation	PCM is a method used to digitally represent sampled analog signals. It is the standard form of digital audio in computers, compact discs, digital telephony and other digital audio applications.			
2.AVN	Vehicle	PCM	P2	Powertrain Control Module	PCM is an automotive component, a control unit, used on motor vehicles. It is generally a combined control unit, consisting of the engine control unit (ECU) and the transmission control unit (TCU).			

2.AVN	System	PCM	P2	Passenger Control Mode	<p>The PCM is a special mode under which all actions normally blocked under DM policies should be allowed, but that depend on how the action/function is calibrated.</p> <p>1. The preconditions of entering into PCM are as follows:</p> <ul style="list-style-type: none"> - Driver must be buckled as determined by the seatbelt buckle sensor; - Front seat passenger must be present as determined by the AOS sensor; - Front seat passenger must be buckled as determined by the seatbelt buckle sensor; - Teen Driver Mode is not Active, as indicated by the corresponding CAN signal. <p>2. PCM is discontinued automatically once one of the following happens:</p> <ul style="list-style-type: none"> - The current ignition cycle has ended (i.e., the vehicle is powered OFF); - One of the seat belt buckles described above is no longer buckled; - The front seat passenger is no longer detected; - The currently active User Profile is switched; 		
3.Cluster	Cluster	PCS	P2	<p>PCS: Predictive Collision System</p> <p>PCS is an automobile safety system designed to prevent or reduce the severity of a collision</p>	<p>It uses radar (all-weather) and sometimes laser (LIDAR) and camera (employing image recognition) to detect an imminent crash. GPS sensors can detect fixed dangers such as approaching stop signs through a location database.</p> <p>Once an impending collision is detected, these systems provide a warning to the driver. When the collision becomes imminent they take action autonomously without any driver input (by braking or steering or both). Collision avoidance by braking is appropriate at low vehicle speeds (e.g. below 50 km/h), while collision avoidance by steering may be more appropriate at higher vehicle speeds if lanes are clear.[4] Cars with collision avoidance may also be equipped with adaptive cruise control, using the same forward-looking sensors.</p>		

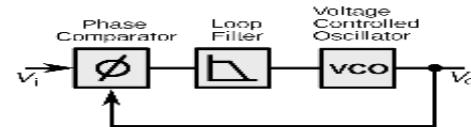
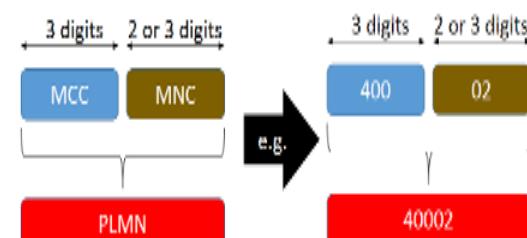
2.AVN	Projection	PCTS	P2		projection compatibility test suite	Starting with the B-Sample delivery, the supplier shall provide the results of a full PCTS test once a month, these results shall be delivered with the Software.		
3.Cluster	Cluster	PCU	P1	Path Control Unit: Bộ điều khiển đường dẫn tự động	Path Control Unit: Bộ điều khiển đường dẫn tự động			
3.Cluster	Cluster	PCV	P1	Phone Connect and View	Phone Connect and View			
2.AVN	Radio	PD / PDIV	P2		phase diversity			
2.AVN	Vehicle	PDAs	P2		Personal Digital Assistants	A personal digital assistant (PDA), also known as a handheld PC,[1][2] is a variety mobile device which functions as a personal information manager. PDAs were largely discontinued in the early 2010s after the widespread adoption of highly capable smartphones, in particular those based on iOS and Android.[3]		
3.Cluster	Cluster	PDC	P1	Plays an appropriate sound	Plays an appropriate sound		Phát một âm thanh một cách thích hợp	
2.AVN	Projection	PDC	P2	Park Distance Control	Park Distance Control: is a system that warns drivers of nearby objects when parking.			
4.Telemati cs	Diagnostics	PDU	P0	Protocol Data Unit	PDU is a single unit of information transmitted among peer entities of a computer network. A PDU is composed of protocol specific control information and user data.	Examples: PDU of the OSI model are: + Layer 4 (Transport layer) PDU is the segment or the datagram + Layer 3 (Network layer) PDU is the packet + Layer 2 (Data Link Layer) PDU is the frame + Layer 1 (Physical layer) PDU is the bit or symbol		

4.Telematics	Common	Pearl Chain	P2		<p>list of localization points which is generated continuously in the ECU and the results of which are made available to relevant applications as a list of "waypoints" - describes the data which is made available to the back-end systems</p>	<ul style="list-style-type: none"> - ECU shall store a continuous "Pearl chain" of localization points based on angle, distance, and speed changes, and telematic service triggers, - Pearl chain algorithm shall process incoming positioning and dead reckoning data in a clocked manner. 	<p>Thuật ngữ "Chuỗi ngọc trai" được sử dụng để mô tả một chuỗi (hoặc danh sách) ngọc trai (hoặc các điểm định vị bản địa hóa) được tạo liên tục trong ECU và kết quả được cung cấp cho các ứng dụng liên quan dưới dạng danh sách "điểm tham chiếu".</p>	
3.Cluster	Cluster	PEBS	P2		<p>PEBS: Predictive Emergency Braking System</p>	<p>Predictive emergency braking systems can prevent three out of four rear-end collisions involving personal injury. In critical situations, the system warns and supports the driver. If an accident is inevitable, the system reduces the impact by automatically braking with maximum deceleration.</p>		
4.Telematics	Other	PEPS	P2	Passive Entry Passive Start	<p>Passive Entry Passive Start</p> <p>The Passive Entry Passive Start system offers greater ease of use for car drivers and passengers. Valeo's hands-free access and start system allows the user to automatically lock and unlock the car doors without taking the key out of a bag or pocket. The engine is started simply by pushing the ignition button.</p>			
4.Telematics	[TBD]	Personal call	P2	N/A	<p>Call service that can send to arbitrary general house and cellular phone, and arrive. It doesn't contain the voice call at the emergency call. An optional contract is necessary by one of the G-BOOK services.</p>	[TBD]		

3.Cluster	Common	Personalization	P0	N/A	<p>Personalization configuration for user accounts</p> <p>- Loads and executes the parameter data set of detected user accounts.</p> <p>- Displays the account information</p> <p>- This function possible to save or saves automatically all car specific settings of vehicle(e.g. seat setting, assistance system..). The user is recognized through the entry key and the setting are adapted according to the specific user account.</p> <p>The PopUp „Personalization“ Welcomes the driver with his name.</p> <p>The control panel and settings of personalization are located in the MIB. The PopUp is used for welcoming the user.</p> <p>1 Welcome message</p> <p>Here the welcome message is displayed with the name of the current driver profile (e.g. Mr. Müller).</p> <p>Note: The welcome message PopUp should have a timeout of 4000 ms (codable).</p>		
2.AVN	System	PFD	P2		Probability of Failure on Demand		
2.AVN	System	PFH	P2		"Probability of Failure per Hour" (average frequency of dangerous failure of the safety function) this is calculation index of safety systems		
2.AVN	System	PGS	P2		<p>Parking Guide System present drivers with dynamic information on parking within controlled areas. The systems combine traffic monitoring, communication, processing and variable message sign technologies to provide the service.</p>	<p>Uses data from a car's sensors and cameras. The video feed is streamed directly to the driver so they can make a better judgment of the space they want to park in. There are usually markings over the video to assist steering into a parking spot.</p>	

1.Common	Vehicle Type	PHEV	P0	<u>Plug-In Hybrid Electric Vehicle</u>	A plug-in hybrid electric vehicle (PHEV) is a hybrid electric vehicle whose battery can be recharged by plugging it in to an external source of electric power as well by its on-board engine and generator.	PHEV là xe lai sạc điện có đặc điểm của một chiếc lai thông thường, có một động cơ điện và một động cơ đốt trong và một thùng dự trữ nhiên liệu cùng với một thiết bị dự trữ điện (pin sạc). Ngoài ra, nó có thêm phích cắm để kết nối với điện lưới.	
2.AVN	System	Phone	P2		Phone (mobile phone) is a kind of device connect with Car infotainment system	User can control phone function via phone device instead of via Head unit - Make an outgoing call - Accept/ reject an incoming call - Control bluetooth audio - Connect Android Auto, CarPlay, MirrorLink...	
4.Telematics	Telematics	Phone Button	P1		Start and end an action. Answer the call & hang up	"- Press to answer incoming call - Press to hang up call while a call is activate	
2.AVN	Phone	Phone Number type	P1		is a type of phone contact such as: Mobile, Home, Work, Fax, ...	Add new contact on mobile phone Input phone number Add phone number as Mobile (or Home, Work, Fax,)	
2.AVN	Phone call	Phonebook	P0	N/A	It is the contacts list that contains an alphabetical list of the names, images, addresses, and telephone numbers, of the contacts which stored on device.	- Phonebook will download on to the system (HU) base on permission + First pairing: user have to set permission on popup (access phonebook data, message... or not) + Paired: user can change permission on BT setting (device or HU) - Phonebook will be updated when reconnecting or has changed or countimer expired,... (base on project) - Downloading completed, Phonebook will show on the system	Danh bạ điện thoại

2.AVN	Radio	PI	P0	<u>Programme Identification</u>	<ul style="list-style-type: none"> - PI in FM-RDS is the unique 4 character hexadecimal code that identifies the station. - Every station receives a specific code with a country prefix. <p>This allows for quick identification of radio program type, based on country, coverage area, and program reference number. While the country code is specified by the standard, bit 11 to bit 0 is specified by each country local authorities.</p>	<p>PI is provided by radio stations transmitting Radio Data System (RDS) data as part of the FM radio broadcast. The PI code allows the radio to display the name of the radio station.</p>		<table border="1"> <tr> <td>PI Code</td><td>Nibble 0</td><td>Nibble 1</td><td>Nibble 2</td><td>Nibble 3</td></tr> <tr> <td>Meaning</td><td>Country Code</td><td>Program Area Coverage</td><td>Program Reference Number</td><td></td></tr> <tr> <td>Bit Position</td><td>b15</td><td>b12</td><td>b11</td><td>b8</td><td>b7</td><td>b4</td><td>b3</td><td>b0</td></tr> </table>	PI Code	Nibble 0	Nibble 1	Nibble 2	Nibble 3	Meaning	Country Code	Program Area Coverage	Program Reference Number		Bit Position	b15	b12	b11	b8	b7	b4	b3	b0
PI Code	Nibble 0	Nibble 1	Nibble 2	Nibble 3																							
Meaning	Country Code	Program Area Coverage	Program Reference Number																								
Bit Position	b15	b12	b11	b8	b7	b4	b3	b0																			
2.AVN	Connection	Pick up	P2		Receive a call																						
2.AVN	Framework	pinch close	P2		A Pinch Close gesture may be used to zoom out on a map, image or web page, close a page/view or application, or perform an action specific to an application.																						
2.AVN	Framework	pinch open	P2		A Pinch Open gesture may be used to zoom in on a portion of the map, image or web page, or perform an action specific to an application																						
4.Telematics	Other	PKI	P2		Public Key infrastructure is a system for the creation, storage, and distribution of digital certificates which are used to verify that a particular public key belongs to a certain entity. The PKI creates digital certificates which map public keys to entities, securely stores these certificates in a central repository and revokes them if needed.																						
2.AVN	Media	PLAY status	P2		The running status of Media file	Playing media sources or radio sources																					

3.Cluster	Cluster	PLIM_PGRA	P2	PLIM:Predictive Speed limiter PGRA: Predictive speed control system These features will handling the vehicle speed	PLIM:Predictive Speed limiter PGRA: Predictive speed control system These features will handling the vehicle speed	Objective of both systems is to have adjusted a lower proactively taken desired- or maximum speed until the reaching of the new permissible maximum speed. A higher taken desired- or maximum speed should be released from the moment of cancellation of the last valid permissible maximum speed. If a new permissible maximum speed is detected only when passing the appropriate sign, it is adjusted as quickly as possible, but comfortably.		
4.Telematics	Other	PLL	P2	Phase Locked Loop is a control system that generates an output signal whose phase is related to the phase of an input signal.				
4.Telematics	Telecommunication	PLMN	P0	<u>Public Land Mobile Network</u>	PLMN defined in telecommunications regulation, is a network that is established and operated by an administration or by a recognized operating agency (ROA) for the specific purpose of providing land mobile telecommunications services to the public. It is a five- to six-digit number identifying a country, and a mobile network operator in that country, usually represented in the form 001-01 or 001-001. PLMN = MCC + MNC	A PLMN is identified by the Mobile Country Code (MCC) and the Mobile Network Code (MNC). Each operator providing mobile services has its own PLMN. PLMNs interconnect with other PLMNs and Public switched telephone networks (PSTN) for telephone communications or with internet service providers for data and internet access of which links are defined as interconnect links between providers. These links mostly incorporate SDH digital transmission networks via fiber optic on land and digital microwave links.		
2.AVN	Navigation	Plural Junction (PJ)	P2		Plural junction is used to indicate whether a driver will perceive a junction as one or as multiple intersections. The special type "maneuver" is used if only a maneuver at the entrance should be generated.			

2.AVN	Connection	PMF	P2	Wi-Fi Protected Management Frames. Wi-Fi CERTIFIED WPA2 with Protected Management Frames provides WPA2 protection for unicast and multicast management action frames. Unicast management action frames are protected from both eavesdropping and forging, and multicast management action frames are protected from forging. WPA2 with Protected Management Frames augments WPA2 privacy protections already in place for data frames with mechanisms to improve the resiliency of mission-critical networks			
2.AVN	System	PMHF	P2	Probabilistic Metric for (Random) Hardware Failures: The PMHF is calculated as the maximum probability of violation of each safety goal due to random hardware failures			
2.AVN	[TBD]	PNAV	P2	<u>Predictive NAVigation</u>	Predictive navigation	Navigate based on user's completed trip data and habits	[TBD]

2.AVN	Media	PNG	P2		Portable Network Graphic	Portable Network Graphics (PNG, pronounced /'pi:en'dʒi:/[2] PEE-en-JEE or /'pɪŋ/[3][4] PING) is a raster graphics file format that supports lossless data compression. PNG was created as an improved, non-patented replacement for Graphics Interchange Format (GIF), and is the most widely used lossless image compression format on the Internet		
2.AVN	Audio	Podcast	P2		A podcast is an episodic series of digital audio or video files which a user can download and listen to. It is often available for subscription, so that new episodes are automatically downloaded via web syndication to the user's own local computer, mobile application, or portable media player.	Podcast is installed on Apple devices		
2.AVN	Navigation	POI	P0	<u>Point Of Interest</u>	<p>POI is a specific point location that someone may find useful or interesting.</p> <p>Most consumers use the term when referring to hotels, campsites, fuel stations or any other categories used in modern (automotive) navigation systems</p>	<p>Example:</p> <p>Press Navigation SK on HU, display Navigation screen. Press POI SK then display POI category (hospital, medical services, pharmacies, police station,.....) or POI name. Chose anything so display POI allow category or name.</p> <p>AVN displays all place of POI around your destinaton</p>		

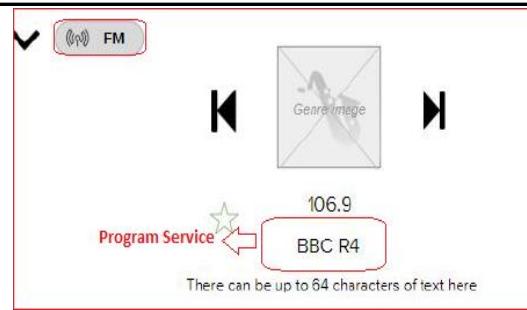
2.AVN	System	Poky	P2	A reference distribution used for test and release purposes by the Yocto Project: Poky is the reference distribution of the Yocto Project, used as something which can be tested and put through QA and that has a regular well established six month release cycle. One of the cornerstones of the Yocto Project is that there should be something tangible which people can look at that has a known quality and start from. Poky provides this.	At the technical level it is a combined repository of the components BitBake, OpenEmbedded-Core, meta-yocto and documentation all together in one place provided, known to work well together. Meta-yocto is intentionally small having some hardware reference BSPs (so tests can be made on real hardware) and a small amount of "distribution policy".		
2.AVN	Frameworks and Widget	Pop-up	P2	The Pop-ups Widget is used by any application in the system to present important information to the user in response to some interaction that the user has just performed. This information could be error, or confirmation related.	The Pop-ups Widget is used by any application in the system to present important information to the user in response to some interaction that the user has just performed. This information could be error, or confirmation related.		
2.AVN	Frameworks and Widget	Porch View	P2	The home screen has two main modes of operation. The first is the standard home page view which has all of the user's applications for them to launch an application. The second is the Porch View, which gives an overview of the most important areas of the system.	The home screen has two main modes of operation. The first is the standard home page view which has all of the user's applications for them to launch an application. The second is the Porch View, which gives an overview of the most important areas of the system.		
3.Cluster	Cluster	Portable Audio Device	P1	A USB drive with audio files, USB media player or an Apple device.	User can store audio, image, video files in USB stick or SD card then connect to Car for entertainment Or they can use USB / SD card to store update file (Some update version in Car can be update using USB /SD card)		

2.AVN	System	POSIX	P2	<p>Portable Operating System Interface for Unix</p> <p>POSIX (Portable Operating System Interface) is a set of standard operating system interfaces based on the Unix operating system. The need for standardization arose because enterprises using computers wanted to be able to develop programs that could be moved among different manufacturer's computer systems without having to be recoded. Unix was selected as the basis for a standard system interface partly because it was "manufacturer-neutral." However, several major versions of Unix existed so there was a need to develop a common denominator system.</p>	<p>Informally, each standard in the POSIX set is defined by a decimal following the POSIX. Thus, POSIX.1 is the standard for an application program interface in the C language. POSIX.2 is the standard shell and utility interface (that is to say, the user's command interface with the operating system). These are the main two interfaces, but additional interfaces, such as POSIX.4 for thread management, have been developed or are being developed. The POSIX interfaces were developed under the auspices of the Institute of Electrical and Electronics Engineers (IEEE).</p>		
4.Telematics	Other	POST	P2	<p>Power On Self Test</p> <p>is a process performed by firmware or software routines immediately after a computer or other digital electronic device is powered on.</p> <p>In the case of a computer, the POST routines are part of a device's pre-boot sequence; if they complete successfully, the bootstrap loader code is invoked to load an operating system.</p>			
4.Telematics	Other	POU	P2	Portable OnStar Unit	<p>Smaller unit than bench, most ECU not attached.</p> <p>Korean DQA sometimes use only just for network test.</p>		
4.Telematics	Other	Power On	P2	Action when the KL 30 is re-connected. KL 30 = ignition position 3 (where the ignition defaults after starting the engine - running).			

3.Cluster	Cluster	Powermeter	P1	Displays the powermeter according to driving condition	Displays the powermeter according to driving condition	The powermeter indicates the electrical power and the recuperation	The powermeter indicates the electrical power and the recuperation	
4.Telematics	Common	PPP LAN driver	P2	Point to Point LAN driver	<p>As cellular network operators begin to tell handset makers to design an Ethernet-style interface into their products, OEMs are forced to choose between taking the expensive route of redesigning their handset hardware or trying to find a reliable and transferable off-the-shelf software driver to satisfy operator requirements.</p> <p>The MCCl® PPP LAN (Point-to-Point LAN) driver solves this problem by supporting connections to fast, contemporary cellular networks while leveraging the existing modem connection. It presents a familiar user interface to the end user.</p>	Install driver		http://www.mcci.co.in/images/hostside/PPP-LAN.png
4.Telematics	Telematics	PRC (Positive Response Code)	P1		Diagnostics: indicate the successful respond			
2.AVN	Navigation	Predecessor	P2		All previous segments which are connected to the target segment. In contrast to the successors, any route segments turn restrictions and oneways are not included.			
2.AVN	Audio	Preset	P1		<p>Preset . Preset Memory : Store the received broadcast in the desired preset number.</p> <p>. Recall Preset : If the Preset No is selected, the memorized broadcast is tune.</p>			
2.AVN	Audio	PRG_TYPE	P2		PRG_TYPE is on field on REDWOOD signal generator, includes categories of FM station (News, Sports, Travel ...)	Open FM mode of REDWOOD signal generator, tune to PRG_TYPE to set category for FM station		

4.Telematics	Other	PRI	P2		A Priority indication of a PRL record			
2.AVN	System	Primary Rotary Encoder	P2		<p>A rotary encoder is a type of position sensor which is used for determining the angular position of a rotating shaft. It generates an electrical signal, either analog or digital, according to the rotational movement.</p> <p>https://howtomechatronics.com/tutorials/arduino/rotary-encoder-works-use-arduino/</p> <p>The encoder has a disk with evenly spaced contact zones that are connected to the common pin C and two other separate contact pins A and B, as illustrated below. When the disk will start rotating step by step, the pins A and B will start making contact with the common pin and the two square wave output signals will be generated accordingly.</p> <p>Any of the two outputs can be used for determining the rotated position if we just count the pulses of the signal. However, if we want to determine the rotation direction as well, we need to consider both signals at the same time.</p> <p>We can notice that the two output signals are displaced at 90 degrees out of phase from each other. If the encoder is rotating clockwise the output A will be ahead of output B.</p> <p>So if we count the steps each time the signal changes, from High to Low or from Low to High, we can notice at that time the two output signals have opposite values. Vice versa, if the encoder is rotating counter clockwise, the output signals have equal values. So considering this, we can easily program our controller to read the encoder position and the rotation direction</p>			
2.AVN	System	Primary Rotary Knob	P2		<p>Rotary Knob is a rotary control used to provide input to a device when grasped by an operator and turned, so that the degree of rotation corresponds to the desired input. Such knobs are one of the most common components in control systems and are found on all sorts of devices.</p>	<p>These rotary encoders rotate all the way around continuously, and are divided up into many 'segments'. Each segment has a click-y feeling to it, and each movement clockwise or counter-clockwise causes the two switches to open and close.</p>		

2.AVN	Projection	Privacy Consent	P2		Privacy Consent informs the user that vehicle location and data information may be shared with the device from which the projection feature is about begin. □	There are privacy consent pop-ups unique to Android Auto) and AppleCarPlay and Baidu Carlife. Privacy consent would still be required before the device can launch a projection session.		
4.Telematics	Other	PRL	P2		The Preferred Roaming List (PRL) is a database residing in a wireless (primarily CDMA) device, such as a cellphone, that contains information used during the system selection and acquisition process			
2.AVN	Radio	Programme Type	P1		- Up to 31 pre-defined programme types - Allow users to find similar programming by genre.			
2.AVN	Phone Projection	Projection	P0	N/A	Certain devices that support broadcasting their screen or app functionality onto the vehicle interface. This shall be launched from the Home screen Projection icon. Ex: Apple CarPlay, Android Auto, Baidu Carlife			
2.AVN	Projection	Projection device	P2		The devices connect to head unit to share vehicle location and data information.			
2.AVN	Power Mode	Propulsion	P2		Full Infotainment operation state when vehicle power mode = Propulsion (Global B only)	Move key to Crank (start) position		

4.Telematics	Application	Provision / Provisioning / Subscriber (GM)	P0	N/A	<p>The term Provisioning (JLR, BMW, Toyota, Geely) or Account/Subscriber (GM), which originated in telecommunications, is the act of acquiring a service.</p> <p>Example: Vehicle manufacturer provides a list of telematics services/application for driver to choose (emergency call, remote control, broken car support...).</p> <p>The services selected by driver (he/she may need to pay for them) are provisioning with him/her (he can use these services).</p> <p>Otherwise, the services which he didn't pay or not included in the telematic product are unprovisioning.</p>	<p>Provisioning or Subscriber is represented through configuration parameter in telematics unit, commonly, through XML file. When perform provisioning action, there is a request which is sent from (dealer) server to telematics unit installed inside vehicle to change the configuration parameter.</p>		
2.AVN	System	Proximity Gestures	P2					
2.AVN	Connection	PS	P2		<p>Power Save Power Saving mode minimizes battery usage to extend battery life</p>	<p>Provides a method by which the STA can sleep when information is not being transferred</p>		
2.AVN	Radio	PS / PSN	P0	<u>Program Service / Program Service Name</u>	<p>PS is simply an eight-character static display that represents station identity name</p>	<p>- It's FM-RDS (Radio Data System) content. Example: ON AVN: Turn on menu: RDS mode ON Signal generator: Set RDS mode is ON => ON Now playing of FM source of Audio: PSN is displayed with 8 character</p>	 <p>There can be up to 64 characters of text here</p>	
4.Telematics	Application	PSAP	P0	Public-Safety Answering Point	<p>A public-safety answering point, sometimes called "public-safety access point", is a call center responsible for answering calls to an emergency telephone number for police, firefighting, and ambulance services. It is commonly used in Canada, United States.</p>	<p>The call center to help people to solve problem related to public-safety like 113-114-115 in Vietnam.</p>		

3.Cluster	Cluster	PSC	P2		Parking Steering Control	PAS helps make parking easier by providing automatic steering assistance along a preset path to guide a driver to the optimal position from which to start backing into a parking space.		
2.AVN	[TBD]	PSO	P2	[TBD]	Personalization	Personalization, broadly known as customization, consists of tailoring a service or a product to accommodate specific individuals, sometimes tied to groups or segments of individuals		[TBD]
2.AVN	Connection	PS-Poll	P2		Power Save Poll There are three building blocks of power save polling: - Wakeup Procedure - Sleep Procedure - PS-Poll Procedure			
3.Cluster	Cluster	PSS	P2		PSS: Power System Stabilizer	Power system stabilizer (PSS) control provides a positive contribution by damping generator rotor angle swings, which are in a broad range of frequencies in the power system. These range from low frequency intertie modes (typically 0.1 - 1.0 Hz), to local modes (typically 1 - 2Hz), to intra-plant modes (about 2 -3 Hz). The low frequency modes, commonly called intertie or interarea modes, are caused by coherent groups of generators swinging against other groups in the interconnected system. These modes are present in all interconnected systems and the damping is a function of tie line strength and unit loading factors. Weak ties due to line outages and heavy system loads can lead to poorly damped intertie modes. PSS control can generally provide significant improvements in intertie mode damping, by applying stabilizers to most units that participate in power swing modes		

4.Telematics	Other	PSTN	P2	<p>Public Switched Telephone Network is the aggregate of the world's circuit-switched telephone networks that are operated by national, regional, or local telephony operators, providing infrastructure and services for public telecommunication. The PSTN consists of telephone lines, fiber optic cables, microwave transmission links, cellular networks, communications satellites, and undersea telephone cables, all interconnected by switching centers, thus allowing most telephones to communicate with each other. Originally a network of fixed-line analog telephone systems, the PSTN is now almost entirely digital in its core network and includes mobile and other networks, as well as fixed telephones</p>			
3.Cluster	Cluster	PTC	P2	<p>PTC: Positive Temperature Coefficient</p>	<p>PTC thermistors are resistors with a positive temperature coefficient, which means that the resistance increases with increasing temperature</p>		
4.Telematics	Other	PTCAN	P2	<p>PowerTrain CAN Bus</p>			
4.Telematics	Common	PWF State	P1	<p>German: parken, wohnen, fahren In English: parking, living, driving</p>	<p>These are the main states of the vehicle's state model. parken: Ignition is off, most of the ECUs are shut down, no communication on the vehicle bus. wohnen: Ignition is on, most of the ECUs are running, engine off fahren: Ignition is on, most of the ECUs are running, engine on</p>		

2.AVN	System	PWM	P2	<p>Pulse-width modulation: Pulse-width modulation (PWM), or pulse-duration modulation (PDM), is a modulation technique used to encode a message into a pulsing signal. Although this modulation technique can be used to encode information for transmission, its main use is to allow the control of the power supplied to electrical devices, especially to inertial loads such as motors. In addition, PWM is one of the two principal algorithms used in photovoltaic solar battery chargers, the other being maximum power point tracking.</p>	<p>Pulse Width Modulation (PWM) uses digital signals to control power applications, as well as being fairly easy to convert back to analog with a minimum of hardware.</p> <p>Analog systems, such as linear power supplies, tend to generate a lot of heat since they are basically variable resistors carrying a lot of current. Digital systems don't generally generate as much heat. Almost all the heat generated by a switching device is during the transition (which is done quickly), while the device is neither on nor off, but in between. This is because power follows the following formula:</p> $P = E I, \text{ or } \text{Watts} = \text{Voltage} \times \text{Current}$		
2.AVN	Power Mode	PWR	P2	Power			
2.AVN	Power Mode	Q_critical	P2	<p>Vehicle battery level information (VW MIB3) If Battery Level is lower than Critical threshold, Q-Critical event will be activated</p> <p>Vehicle battery level information. Q2, Q3 (Low battery)</p>			
2.AVN	System	Q-critical	P2	Vehicle battery level information. Q2, Q3 (Low battery)			
4.Telematics	Telematics	QMI	P2	Qualcom Message Interface	<p>Qualcom Message Interface: interface to communicate between NAD and TCU of Gen10 VCP</p>	Qualcomm MSM Interface(QMI) is a messaging format used to communicate between software components in the modem and other peripheral subsystems.	
4.Telematics	Telematics	QoS	P2	Quality of service	<p>The MQTT protocol allows different levels of Quality-of-Service (QoS) to be specified on a protocol level to enable different levels of message delivery assurance.</p> <p>The proper QoS should be decided for different type of services.</p>		

2.AVN	HMI	QSP	P2	Quick status pane	The Quick Status Pane Widget is used by the system to present certain status information based on user interaction with other controls in the vehicle, separate from the touchscreen (e.g. centerstack volume and HVAC controls).		
2.AVN	System Base	Quad Zone Climate control	P2		There are separate controls for the driver, front passenger, and the rear seat is divided in two with separate controls for each half allowing four passengers to enjoy their own climate control settings. If there are five passengers in the vehicle the person sitting in the middle of the rear seat will enjoy a mixture of the left and right rear settings		
2.AVN	Vehicle	Quadlet	P2	Four octets	Four octets		
2.AVN	HMI	Quick notice	P2	Quick notice	Used to provide simple feedback about an operation in a non-invasive way. For example: A Quick Notice shall be shown when a favorite is added		
2.AVN	System	Q-uncritical	P2	Vehicle battery level information Q0, Q1(Normal battery)			
2.AVN	Radio	QVGA	P2	QVGA (Quarter Video Graphics Array) is a small-screen display mode in which the resolution is 320 pixels horizontally by 240 pixels vertically (320 x 240). This is 25 percent of the total number of pixels afforded by the VGA (Video Graphics Array) display mode originally introduced by IBM in 1987. Because the display on small-screen devices is frequently greater in height than width, QVGA resolution is sometimes expressed as 240 x 320.			

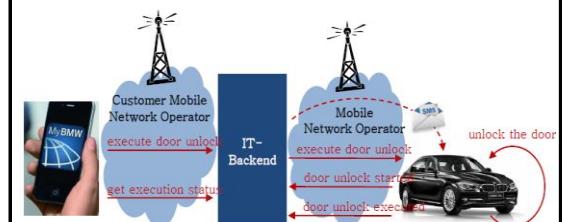
2.AVN	Vehicle	R	P2	Rear Camera	A backup camera (also called reversing camera) is a special type of video camera that is produced specifically for the purpose of being attached to the rear of a vehicle to aid in backing up, and to alleviate the rear blind spot. Backup cameras are alternatively known as 'reversing cameras' or 'rear-view cameras'. It is specifically designed to avoid a backup collision.		
4.Telematics	Telematic Call	RA	P2	Roadside Assist	<p>Roadside Assist (= B-Call)</p> <p>Breakdown cover may include jump-starting an automobile, diagnosing and repairing the problem that caused the breakdown, towing a vehicle, helping to change a flat tire, providing a small amount of fuel when a vehicle runs out of it, pulling out a vehicle that is stuck in snow or helping people who are locked out of their cars.</p> <p>In case of technical incident of the vehicle, the driver can make a breakdown call (B-Call) to report it to a service center or fleet manager. Thanks to the integrated GPS and GSM modules, this service provides initial information about the position of the vehicle, the type of problem, the technical situation and the data shown in the error memory of the vehicle.</p> <p>A voice connection with the driver is established, so that the technical service can advise and help to make the remote diagnosis of the incidence, and thus it can be solved more nimbly.</p>		
2.AVN	Radio	Radio Long Wave, Medium Wave and Short Wave	P2	<p>1. LW: longwave, 3-30 kHz 2. MW: medium wave, 500 - 1606.5 kHz 3. SW: short wave, 1.6-30MHz</p> <p>(You can see it while searching for the next channel)</p>			

2.AVN	Radio	Radio tuner	P0	N/A	A tuner is a subsystem that receives radio frequency (RF) transmissions like radio broadcasts and converts the selected carrier frequency and its associated bandwidth into a fixed frequency that is suitable for further processing, usually because a lower frequency is used on the output.	Broadcast FM/AM transmissions usually feed this intermediate frequency (IF) directly into a demodulator that convert the radio signal into audio-frequency signals that can be fed into an amplifier to drive a loudspeaker.			
2.AVN	Media	RANDOM	P2		RANDOM ALL : Play randomly the files in all the stored files RANDOM FOLDER : Play randomly the files in the current folder ↴	There are two states ON / OFF of RANDOM.			
3.Cluster	Cluster	RangeData	P2	Displays electrical range	Displays electrical range	Calculate of distance with battery			
2.AVN	Projection	RAP	P2	Retained accessory power	The retained accessory power module takes control of any accessory driven by its relay. When the key is turned on, the relay is closed providing power to the accessories. This is no different than stock "key on" operation. It is when the key is turned off that the operation differs from stock. The relay remains on for up to 20 minutes after the key is off, allowing the radio to keep playing or the power windows to be rolled up. The accessories can be shut off before the 20 minutes is up by simply opening any door (or just the driver's door). See below to set option). If, during the 20 minutes, the battery voltage drops too low, the accessories are shut off to help prevent the battery from going dead.				

4.Telematics	Telematics	RAT	P1	Radio Access Technology	A Radio Access Technology or (RAT) is the underlying physical connection method for a radio based communication network. Many modern mobile phones support several RATs in one device such as Bluetooth, Wi-Fi, and GSM, UMTS, LTE or 5G	N/A		
2.AVN	System	RC	P2		Regular Change after updating software			
2.AVN	Climate	RCC	P2	Remote Climate Control	Remote Climate Control			
2.AVN	Vehicle	RCM	P1	Rear Camera Module	A backup camera (also called reversing camera) is a special type of video camera that is produced specifically for the purpose of being attached to the rear of a vehicle to aid in backing up, and to alleviate the rear blind spot. Backup cameras are alternatively known as 'reversing cameras' or 'rear-view cameras'. It is specifically designed to avoid a backup collision.			
2.AVN	Vehicle	Rcows	P2	Remote close/open windows/sunroof	The remote close/open window sunroof is used by the user to send command in application via the CSP to the vehicle to close/open the window and sunroof remotely			
2.AVN	System	RCS	P2	Rear Camera Setting: Setting for Rear Camera (Back-up camera) that help you see objects directly behind you while backing				
4.Telematics	Safety	RCTA	P2	<u>Rear Cross Traffic Alert</u>	RCTA warns you if one or more vehicles are about to enter your backing path.	Rear cross traffic alert is designed to warn you of cars that are entering your backing path. You may not be able to see these cars as quickly as your rear cross traffic alert system can on a road or in a parking lot.	Cảnh báo va chạm	
2.AVN	Vehicle	RDCM	P2		Rear Differential Control Module			

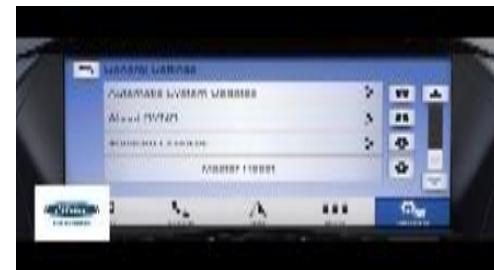
3.Cluster	Cluster	RDK	P1	Reifen Druck Kontrolle (means Tire Pressure Control)	<p>Tire Pressure Control or Tire Pressure Management System</p> <p>The BC-Site tire information has three possible screens: „current pressure“, „pressure deviation“ and „Tire temperature“. The cluster shall display every single tire pressure or temperature value immediately as soon as the information is received (irrespective if the speed is below 25 km/h or the measurement is ongoing). Menu „current pressure“: In this screen the current pressure of each tire is displayed.</p> <p>Menu „pressure deviation“: In this screen the difference between the current pressure and the pressure which is set as a limit is displayed. Here is also a tire pressure warning displayed by coloring the tires. If the pressure falls under a critical level, the color of the corresponding tire is red or yellow (see example on the next pages).</p> <p>Note „Availability of this Menu“: The pressure deviation menu can only be entered when the car stands still. During driving the submenu entry should be grayed out and by the try to enter this menu the driver will only get a white info message with the text: „Menu is only available when the car stands“ If the user is already in</p>	<p>- Display pressure for 4 wheels</p> <p>- Display warning message for 4 wheels with 2 levels (show red warning and yellow warning)</p>	<p>Definition(Update) The BC-Site tire information has three possible screens: „current pressure“, „pressure deviation“ and „Tire temperature“. The cluster shall display every single tire pressure or temperature value immediately as soon as the information is received (irrespective if the speed is below 25 km/h or the measurement is ongoing).</p> <p>Menu „current pressure“: In this screen the current pressure of each tire is displayed.</p> <p>Menu „pressure deviation“: In this screen the difference between the current pressure and the pressure which is set as a limit is displayed. Here is also a tire pressure warning displayed by coloring the tires. If the pressure falls under a critical level, the color of the corresponding tire is red or yellow (see example on the next pages).</p> <p>Note „Availability of this Menu“: The pressure deviation menu can only</p>	
3.Cluster	Common	RDK / TPMS	P0	Reifen Druck Kontrolle (means Tire Pressure Control) / Tire Pressure Monitoring System	<p>Displays tire Temperature and its pressure.</p> <p>RDK was jointly developed by Bosch GmbH and Porsche AG.</p>	<p>Display temperature for 4 wheels</p> <p>The temperature have one of the following state:</p> <ol style="list-style-type: none"> 1. Hot = red color highlight 2. Warm = no color highlight 3. Cold = blue color highlight 		
2.AVN	Radio	TMC	P1	Trafic Message Channel	is a technology for delivering traffic and travel information to motor vehicle drivers			

2.AVN	Radio	Digital Radio Tester/ Radio Signal Generator	P0	N/A	<ul style="list-style-type: none"> - It is a device that supports digital audio like DAB, DAB+, DMB, DRM30, DRM+; analog radio AM, FM and embedded-digital-signal radio as FM-RDS - It supports radio frequency output from 10dBm ~120 dBm <p>http://collab.lge.com/main/x/2t1qLg</p>		
2.AVN	Radio	RDS/RBDS	P0	<u>Radio Data System</u> / <u>Radio Broadcast Data System</u>	<ul style="list-style-type: none"> - RDS/RBDS is a communications protocol standard for embedding small amounts of digital information in conventional FM radio broadcasts, for example: PSN, PI... - RDS is official name used by European Broadcasting Union - RBDS is official name used for US 		
4.Telematics	Telematics	RDU	P2	Remote Door Unlock	Remote Door Unlock/Lock	The remote Door lock/unlock door trunk is used by the user to send the command in the mobile application via the CSP to the vehicle, so that the vehicle can try to lock/unlock the car doors or trunk	
2.AVN	Navigation	Real time	P2		The real-time time-dependent vehicle routing problem	<p>Way 1. Connect GPS signal with HU and set any position</p> <p>Way 2. Connect GPS Signal with HU, fake map and create 1 route from 1 position to a another place where has different time zone</p>	
2.AVN	Media	REPEAT operation	P2		Repeat a Media file, all Media file, folder, artist	<ol style="list-style-type: none"> 1. Type: Repeat 1, repeat all, repeat folder(repeat all file in a folder), repeat artist(repeat all file the same artist = artist category) 2 Repeat1 and seek down <3s → play previous song 3. Repeat1 and seek down >3s → goto start of current song 4. Default = repeat all 5. When Selecting random, if select repeat1 then cancel random 	
2.AVN	Power Mode	Rear/Gear	P2		Rear View Camera		

2.AVN	System	Recipient	P2		The party that receives a phone call. Cf. caller and interlocutor.		
2.AVN	Climate	Recirculation Button	P2		It switches between drawing air in from outside and recirculating the air in the car. The default position is usually for outside air	Touching the Recirculate Air button on the Front Climate Screen toggles between air being recirculated inside the vehicle (i.e., when Recirculate Air button is ACTIVE) and allowing outside air to flow into the vehicle (i.e., when Recirculate Air button is INACTIVE).	 Figure 3.2.1.12 Front Climate Screen with Recirculate Air Display and Adjustment Element Highlighted
2.AVN	Radio	REG	P2		Region In Radio, there are some channel blocked by region. PI Code will be use to check the region		
4.Telematics	Application	Remote Control / Remote service	P0	N/A	The remote control or remote service is for the scenario that user sends the request in the remote control client (such as application on mobile phone, call center website) to vehicle, so that the vehicle can perform the operation required	User performs remote (Ex: remote engine start) on mobile device which has Internet access (or on control website). The request will be sent to telematics unit then it will send request to vehicle to start the engine. When telematics unit received response from vehicle, it will send response to user.	
4.Telematics	Remote Control	Remote Control inhibition	P2	N/A	It shall be to disable all remote control operation (e.g. heater start or engine start) via diagnostics request in workshop. Any attempt to start a remote control operation during this state shall result in a negative acknowledgement sent to CSP. The inhibition start shall be deactivated when the vehicle achieves a speed off 30km/h or when being deactivated by diagnostics request		
4.Telematics	Remote Control	Remote diagnostics	P2	N/A	Remote Diagnostics provides the functions to support either end user or dealer to get the information for the car with the purpose of checking if anything goes wrong.		

4.Telematics	Application	Remote engine start/stop	P0	N/A	Remote engine start supports the end users to send the request via mobile phone application or call center to vehicle with the purpose of starting/stopping the car engine		Ứng dụng điện thoại giúp người dùng khởi động/tắt động cơ mà không cần ngồi trên xe.	
4.Telematics	Application	Remote honk/flash or remote car seeking	P0	N/A	The remote honk/flash is used by the user to send the request in the mobile application or call center to the vehicle, so that the vehicle can be easily located		Ứng dụng điện thoại giúp người dùng tìm xe bằng cách yêu cầu xe nháy đèn trước hoặc/và tự động còi báo.	
4.Telematics	Remote Control	Remote PM2.5 clean	P2	N/A	The remote PM2.5 clean enables the possibility in the user clients, typically in the mobile phone application, to remotely trigger the command to TEM to clean the PM2.5 pollution inside the vehicle			
4.Telematics	Remote Control	Remote pull PM2.5	P2	N/A	The remote pull pm2.5 allows the user to remotely wakeup the vehicle to get the fresh PM2.5 values from the sensors.			
4.Telematics	Telematics	Remote seat heat	P2	N/A	The remote seat heat is used by the end user to send the command via clients from CSP to vehicle. So that the user can heat the seats in the vehicle	When the service is requested from CSP, TEM needs to check whether the engine is running or not, if not running the TEM should have the responsibility to send the signal to CAN to turn on the engine first and then send seat heating signal .If the engine is already running by a previous remote engine start, TEM only needs to send the remote seat heat signal with the parameter needed for the service.		
2.AVN	Power Mode	RemoteReflash Programming	P2		State defined in order report programming progress on the center stack display during a remote reflash event.	The RemoteReflashProgramming state is defined in order to allow the presentation of a simple HMI to the user through the center stack display when either the Telematics or CSM/Low Radio module is reprogramming one or more vehicle modules.		

2.AVN	Media	ReplayGain	P2	<p>It allows media players to normalize loudness for individual tracks or albums.</p> <p>ReplayGain analysis can be performed on individual tracks, so that all tracks will be of equal volume on playback. Analysis can also be performed on a per-album basis. In album-gain analysis an additional peak-value and gain-value, which will be shared by the whole album, is calculated. Using the album-gain values during playback will preserve the volume differences among tracks on an album.</p>	<p>ReplayGain is a proposed standard published by David Robinson in 2001 to measure the perceived loudness of audio in computer audio formats such as MP3 and Ogg Vorbis. It allows media players to normalize loudness for individual tracks or albums. This avoids the common problem of having to manually adjust volume levels between tracks when playing audio files from albums that have been mastered at different loudness levels.</p>		
2.AVN	Phone	Resync Contacts	P2	<p>is a keyword when user update contact on an application and sync to phone again</p>	<p>Add google account on Android Phone Using google account to sync contact with your phone Change information from your phone and sync contact with google account</p>		
2.AVN	Media	REW operation	P2	<p>Rewrite Operation Moves the playing file backward at 4x or 20x speed.</p>	<p>1) When operating SEEK DOWN long key, it plays backward at 4x speed in the first 5 seconds. 2) When operating SEEK DOWN long key, it plays backward at 20x speed after the first 5 seconds. 3) When the SEEK DOWN key is RELEASE during REW operation, it start playing from the current play position at normal speed. ☺</p>		
2.AVN	Media	REWIND/FBW/REW	P2	<p>to make a recording go back towards the beginning (Fast backward)</p>	<p>Press and Hold Previous button</p>		
2.AVN	Radio	RF	P0	<p><u>Radio Frequency</u></p> <ul style="list-style-type: none"> - Radio frequency (RF) refers to the oscillation rate of electromagnetic radio waves. - Its range: 3 kHz to 300 GHz 			

2.AVN	System	RF Gain	P2		<p>Radio frequency gain: The RF (Radio Frequency) Gain is a facility to increase or decrease the sensitivity of the receiving signal, acts as a sensitivity filter. It reduces noise in the receiver without reducing reception power</p>	<p>Radio frequency (RF) is any of the electromagnetic wave frequencies that lie in the range extending from around 20 kHz to 300 GHz, roughly the frequencies used in radio communication. Gain is a measure of the ability of a two-port circuit (often an amplifier) to increase the power or amplitude of a signal from the input to the output port by adding energy converted from some power supply to the signal.</p>	
2.AVN	Connection	RFCOMM	P2		<p>The RFCOMM protocol based on the ETSI (European Telecommunications Standards Institute) standard TS 07.10. It is a simple set of transport protocols, made on top of the L2CAP protocol, providing emulated RS-232 serial ports (up to sixty simultaneous connections to a Bluetooth device at a time).</p>	<p>RFCOMM provides a simple reliable data stream to the user, similar to TCP. It is used directly by many telephony related profiles as a carrier for AT commands, as well as being a transport layer for OBEX over Bluetooth.</p>	
2.AVN	Radio	RFI	P2		<p>Radio Frequency Interference Radio frequency interference is the conduction or radiation of radio frequency energy that causes an electronic or electrical device to produce noise that typically interferes with the function of an adjacent device.</p>	<p>Radio frequency interference is emitted by most electronic and electrical devices like switching power relays, industrial controls, medical instrumentation, electronic printers, personal computers, laptops, game consoles, computing devices, etc. There are two ways by which an electronic or electrical device emits radio frequency interference: radiated radio frequency interference and conducted radio frequency interference.</p>	
2.AVN	Common	RFS	P0	Reset Factory Setting	<p>A factory reset, also known as master reset, is a software restore of an electronic device to its original system state by erasing all of the information stored on the device in an attempt to restore the device's software to its original manufacturer settings.</p>	<p>Khôi phục lại software trên thiết bị về trạng thái mặc định (xóa hết các thông tin được tạo ra bởi người dùng)</p>	

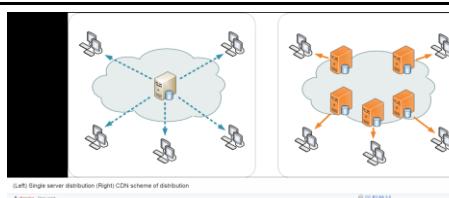
2.AVN	Vehicle	RFS	P2	Root File System	The root filesystem is the filesystem that is contained on the same partition on which the root directory is located, and it is the filesystem on which all the other filesystems are mounted (i.e., logically attached to the system) as the system is booted up (i.e., started up).			
2.AVN	Navigation	RG	P2	Route Guidance				
2.AVN	System	RGB	P2	<p>Red Green Blue</p> <p>The RGB color model is an additive color model in which red, green and blue light are added together in various ways to reproduce a broad array of colors. The name of the model comes from the initials of the three additive primary colors, red, green, and blue.</p> <p>The main purpose of the RGB color model is for the sensing, representation and display of images in electronic systems, such as televisions and computers, though it has also been used in conventional photography. Before the electronic age, the RGB color model already had a solid theory behind it, based in human perception of colors.</p>	<p>RGB is a device-dependent color model: different devices detect or reproduce a given RGB value differently, since the color elements (such as phosphors or dyes) and their response to the individual R, G, and B levels vary from manufacturer to manufacturer, or even in the same device over time. Thus a RGB value does not define the same color across devices without some kind of color management.</p> <p>Typical RGB input devices are color TV and video cameras, image scanners, and digital cameras. Typical RGB output devices are TV sets of various technologies (CRT, LCD, plasma, OLED, quantum dots, etc.), computer and mobile phone displays, video projectors, multicolor LED displays and large screens such as JumboTron. Color printers, on the other hand are not RGB devices, but subtractive color devices (typically CMYK color model).</p>			
2.AVN	HW	RHD	P2	Right screen display	It's Right rear seat monitor			

2.AVN	System	RHD	P2	Right Hand Driver	A right-hand drive vehicle has its steering wheel on the right side. It is designed to be driven in countries such as Britain, Japan, and Australia where people drive on the left side of the road.		Vô lăng lái xe để bên phải, dùng cho các quốc gia đi xe đúng luật ở bên trái	
4.Telematics		RIL	P2		Radio Interface Layer	A Radio Interface Layer (RIL) is a layer in an operating system which provides an interface to the hardware's radio and modem on e.g. a mobile phone.		
2.AVN	Vehicle	RLSM	P2		Rear Left Seat Movement (RLSM)	Refer to RRSM / RLSTM		
2.AVN	Radio	RMS	P2	Root Mean Squared	Root Mean Squared is defined as the square root of mean square (the arithmetic mean of the squares of a set of numbers)			
4.Telematics	Remote Control	RMS	P2	<u>Remote Monitoring System</u>	Remote Monitoring System (RMS) is for the scenarios that new energy vehicle uploads real-time vehicle data (include speed & position, electric drive data, battery data, and error alarm data) to CSP.	Vehicle should upload RMS data at defined frequency or event trigger, after CSP receive RMS data, CSP will transfer to Authority as well		
4.Telematics	Remote Control	RMS	P2	<u>Repeat Message State</u>	Repeat Message State	A mode of CAN bus		

2.AVN	Phone	Roles of Phones	P2	Roles of Phones when connect HU via each type of connection (Bluetooth, Projection)	<p>Example : GM AVN Products</p> <ul style="list-style-type: none"> - How to check this role: Setting -> Phone - Role: Outgoing and Incoming Calls (outgoing source): when connect Phone with HU via BT. This phone can make outgoing & receive incoming call. Only 1 outgoing source. The first phone connect HU always take role outgoing source - Role: Incoming calls: When connect Phone with HU via BT. This phone only receive incoming call. - Role: Media-Bluetooth: When connect IPod/Ipad via BT, only play music. If Ipod connect via USB port, Iphone & Android Phone connect via USB (but Apple Carplay & Android Auto item in Setting is off). The device screen does not display any roles, even if in Audio app, these sources are displayed - Role: Apple Carplay: When connect Iphone with HU via USB port - Role: Media-Baidu Carlife: When device has Baidu Carlife app connect with HU via USB port, but Baidu Carlife item in Setting is off <p>Note: Outgoing source & incoming calls are called telephony role. Android Auto device, Baidu CarLife devices show their telephony role as if they were only connected via Bluetooth</p>		<p>Outgoing</p> <p>%DeviceNameA% Outgoing and Incoming Calls</p> <p>Figure 3.2.2.3 Outgoing Phone Connection View (ICS_DEVICES_OUTGOING_PHONE)</p> <hr/> <p>%VehiclePhoneName% Incoming Calls</p> <p>Connected</p> <p>%DeviceNameE% Media - Bluetooth</p> <p>Figure 3.2.2.5 Media Connection View (ICS_DEVICES_MEDIA_DEVICE)</p> <hr/> <p>%DeviceNameB% Apple CarPlay</p> <p>Connected</p> <p>%DeviceNameA% Media - Baidu CarLife</p> <p>Figure 3.2.2.6 CarPlay Connection View (ICS_DEVICES_PROJECTION_DEVICE)</p>
2.AVN	Navigation	Roundabout	P2	That is called a traffic circle, road circle, rotary, rotunda or island, is a type of circular intersection or junction in which road traffic flows almost continuously in one direction around a central island.	The driver is about to perform one of the following maneuvers and then performs the maneuver: <ul style="list-style-type: none"> • Enter the roundabout • Drive within the roundabout • Drive within the roundabout and change the lane • Leave the roundabout 		
2.AVN	Navigation	Route segment	P2	Describes the segment(s) along the route. In case of a stopover/destination only the part to the destination point is referenced.			

2.AVN	Navigation	Routing	P0	N/A	Routing is the process of selecting a path for traffic in a network, or between or across multiple networks. In navigation, routing is a process to suggest a route from a start position to a destination.			
2.AVN	Navigation	Routing Approach Correct Side	P2		Calculate the route to a street address with house number, a POI or any other point location by avoiding crossing of opposing traffic by user after guidance has reached the destination.			
2.AVN	Navigation	Routing Best in Class	P2		Best in class is defined as the meaning of user selected parameters has to be taken in account as much as possible.	User select parameters such as: - A short route must be the shortest related to all defined parameters - Calculate a route on the digitized road network / digital map between any locations, i.e. a start point and one or more destinations (e.g. destination, stop over, off road location, etc.), in accordance with selected route		
2.AVN	Navigation	Routing Cost Model	P2		Find the minimal "cost" path within the road network according to the selected route criterion and defined general routing rules	For the cost model at least segment length, average speed (inclusive time related traffic pattern) and maneuver penalties shall be taken into account		
2.AVN	Navigation	Routing DTD Calculation	P2		Routing Real road distance(DDT) Route System shall provide a distance for all available routes			
2.AVN	Navigation	Routing Dynamic Route Calculation	P2		The dynamic route option shall incorporate traffic information for route calculation.	The navigation application shall offer an option to use or exclude dynamic information for route calculation. Traffic information shall be continuously monitored and utilized for recalculation. The influence of a traffic penalty shall decrease with the distance		
2.AVN	Navigation	Routing Ecological	P2		This route shall be optimized for fuel consumption	The navigation application shall calculate an ecological route when the ecological route criterion has been selected The route calculation shall take in account several database information and vehicle and driver relevant data		

2.AVN	Navigation	Routing Economical	P2		<p>Routing with minimum money from start position to destination.</p> <p>The navigation system with this feature attempts to use the resources of time and route economically by minimising both distance and driving time, saving fuel as a result.</p>	<p>Calculate an economic route when the economic route criterion has been selected. An economic route is based on a cost mix for time and distance</p>		
2.AVN	Navigation	Routing ETA (Estimate Time of Arrival) Calculation	P2		<p>The ETA (Estimate Time of Arrival) option shall incorporate traffic information for route calculation.</p>	<p>Route calculation a ETA (Estimate Time of Arival) has to calculate by the system with following parameter:</p> <ul style="list-style-type: none"> - Average speed (Database attribute of related street segment) - Time dependent average speed (traffic pattern) is available - Manoeuvre Penalties - Road Furniture Penalties <p>During operation, the device recalls the average driving velocity for the inputted driver over each different type of thoroughfare traversed. Using prestored average velocity data, the device calculates an initial estimated time en route and an estimated time of arrival for a desired route. The device continues to receive GPS data as to the driver's position and velocity and updates the average velocity record for that driver on the specific type of thoroughfare. As the average velocity fluctuates, the device adjusts the estimated time en route and the estimated time of arrival. The device further has control processes for potentially erroneous sampling. The device has a predetermined threshold in which data inputs below that threshold will not be averaged into the memory.</p>		
2.AVN	Navigation	Routing ETC Lane	P2					

2.AVN	Navigation	Routing Exclude U-Turn in forbidden Direction	P2		In one way situation or on controlled access roads, a generation of U-turns in forbidden direction has to be excluded			
2.AVN	Navigation	Routing Fast	P2		Routing with minimum time to go from start position to destination.	Calculate the "fastest" route, when the fast route criterion has been selected The fast route shall be calculated based on database attributes: - Segment length - Average speed - Traffic pattern - Maneuver penalties		
2.AVN	Navigation	Routing HOV	P2		Routing High Occupancy Vehicle (HOV) lane A high-occupancy vehicle lane is a restricted traffic lane reserved at peak travel times with a driver and one or more passengers System shall take HOV marked lanes to find a user optimized route.	For HOV routing several parameters are: - Use HOV only if the lane has to be used more than x miles - Leave the HOV lane on controlled access roads x miles in front of the exit		
2.AVN	Navigation	Routing Hybrid Routing	P2		If a route guidance / calculation is initialized by user the navigation application shall be able to provide the first guidance instruction. Then it calculates a route onboard and online in parallel			
2.AVN	Navigation	Routing Maneuver Penalties	P2		For all route option (FAST, ECONOMIC, ECOLOGICAL ...) for every single maneuver a penalty factor has to be increase the estimated time of arrival			
2.AVN	Navigation	Routing Minimize U-Turn	P2		Depend on market, it needs to minimize the generation of U-Turns. If this function is selected an additional penalty must be added for ETA (Estimated arrival time) calculation			 <p>Left: Single server distribution (Right: CDN scheme of distribution)</p> <p>© IEC 61131-3 IEC 61131-3 IEC 61131-3 IEC 61131-3</p>

2.AVN	Navigation	Routing Multiple Route	P2		When navigating to a location, offer three or four choices, perhaps as fastest, shortest, cheapest (i.e. no toll roads). Each route would show the number of miles, estimated time, and the actual route on the map with different colors to identify each route. If no selection is made within say 10 seconds, default to the fastest choice.				
2.AVN	Navigation	Routing Offroad	P2		Routing Offroad is routing which contain road not defined on map.				
2.AVN	Navigation	Routing Offroad Access Point	P2		As limitation for Offroad route calculation navigation application shall never use controlled access roads, ramps or car transportation segments as entry or exit point from digitized map If a current car position is detected as offroad, controlled access roads shall not be crossed to reach a entry point in the street network				
2.AVN	Navigation	Routing Offroad Exit Point	P2		It is used when the user defined a offroad position as destination.	System shall avoid route which include path CANNOT drive and segments to define the exit point from digitized street network. The using / crossing of <ul style="list-style-type: none">- rivers,- lakes,- railway crossings- national borders- motorways- ferry and car transportation segments has to be minimized to find a optimal exit point. ☐			
2.AVN	Navigation	Routing on CA Roads	P2		A specially on roads with controlled access a routing via shortcut / ramps, parking area ... back to the same highway based on avarage speed and segment length has to be avoided. For such situation a maneuvre penalty to leave or enter the highway has to be implemented				

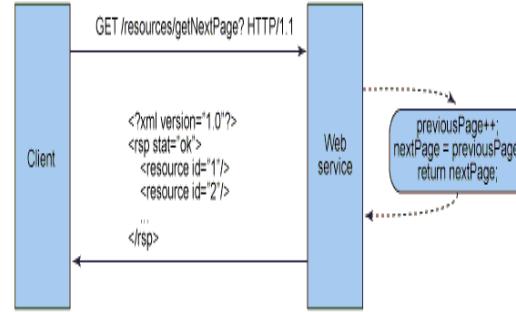
2.AVN	Navigation	Routing Pedestrian Area Not Accessible	P2		Navigation application shall be able to calculate a route inside pedestrian areas inclusive maneuver generation and guidance			
2.AVN	Navigation	Routing POI Access Point	P2		Routing POI Access Point	For route calculation the navigation application shall use as destination database coded access point of a POI instead of coded geographical coordinate		
2.AVN	Navigation	Routing Probable Destination Overview	P2		Routing Probable Destination Overview	It shall be presented and updated as soon the navigation application is available and during the complete system run time		
2.AVN	Navigation	Routing Real Road Distance	P2		For any kind of destinations (destination memory, POI etc.) which are presented to the user, the system shall provide a estimated travel time and a real road distance.			
2.AVN	Navigation	Routing Rerouting Request	P2		The generated route has to be monitored at the cloud and in the head unit in parallel			
2.AVN	Navigation	Routing Resume Guidance	P2		Routing Resume Guidance	Navigation application was shutdown guidance shall be resumed		
2.AVN	Navigation	Routing Route Criteria Change	P2		The navigation application shall be able to provide routes based on several route criteria. Depends on market and navigation application up to 5 routes with up to 20 stopovers and 1 final destination shall be supported			
2.AVN	Navigation	Routing Route Option Avoid	P2		Avoid Highways, Tunnel, Vignette, City Maut, HOV, Time / Seasonal restricted Roads, Unpaved Roads, Trailer, Border, Transportation, avoid option with additional Cost, Ferry, Toll, Exclude, User Defined Avoid Areas	If a avoid option is selected by user this option has to be avoided as much as possible. Therefor the complete database has to be analyze to find a path related to user settings		

2.AVN	Navigation	Routing Route Selection	P2	Routing when multiple route calculation	In any cases of multiple route calculation (incl. alternative routes), as soon as all calculated routes are visible on the map, the navigation application shall inform user acoustically to select a route. If the user does not make a selection within time, and the car is moving, the navigation application shall take over the first calculated route for guidance automatically.		
2.AVN	Navigation	Routing Seamless	P2	The system shall realize a seamless routing between databases located in each an in main memory	A routing shall be realized even the data for the estimated route is not complete available - Route guidance will be started without online connection - Current Home region is Germany - Destination is defined in Spain - only Basic Map Data are available The system shall be able to calculate a "estimated" route based on available data and to optimized the route even the online connection is available and the data for the current route are refreshed		
2.AVN	Navigation	Routing Seasonal Time restricted	P2	Seasonal and time restricted roads shall be used for route calculation if the restriction is valid or NOT in related time frame	An acoustical hint has to be provided once after route calculation of if such segment is detected on current route.		
2.AVN	Navigation	Routing Short	P2	Routing with minimum distance from start position to destination.			
2.AVN	Navigation	Routing Signpost Relation	P2	In situations where several possibilities are available to enter a upcomming street, the system shall calculate the route in relation to available signpost also if a core efficient route in relation to distance and time can be calculated. E.g. 1Germany B188 /			
2.AVN	Navigation	Routing Specific Regulations	P2	It is routing algorithm base on Specific Regulations. Country specific regulations are applied for routing and guidance E.g. - It's not allowed to use a u-turn maneuver in Argentina			

2.AVN	Navigation	Routing Start	P2		Start point of routing	Function to start a route after user select start point and end point		
2.AVN	Navigation	Routing Traffic Pattern	P2		<p>The navigation application shall use statistical time based traffic information called Traffic Pattern to find an optimal route in relation to travel time.</p> <p>Traffic mode can be separated as follows: up-peak traffic pattern; down-peak traffic pattern; two-route traffic pattern; four-route traffic pattern; balance-floor traffic pattern; and leisure traffic pattern</p>			
2.AVN	Navigation	Routing Turn Restrictions	P2		<p>To find a optimal path any database given turn restriction has to be taken into account.</p>	<p>A turn restriction routing can be obtained by prohibiting at least one of the four possible clockwise turns and at least one of the four possible anti-clockwise turns in the routing algorithm</p>		
2.AVN	Navigation	Routing Vehicle based Restrictions	P2		<p>The navigation application shall consider vehicle based restrictions for route calculation, to avoid any violation of a given restriction. E.g. E-vehicle only, Eco-Zone, Truck, Coach ...)</p>	<p>A system according to yet another embodiment of the invention is configured to receive from a user:</p> <ol style="list-style-type: none"> (1) a time window (2) "road segment" information that defines a road segment (3) a vehicle based restriction that is to apply to the road segment during the time window. <p>After receiving the "road segment" information and the vehicle based restriction, the system applies the vehicle based restriction to schedule one or more routes so that substantially no route includes travel on the road segment during the time window by one or more vehicles that satisfy the criteria for the vehicle based restrictions.</p>		

							
2.AVN	Navigation	RP	P2	Route Planner It is a specialised search engine used to find an optimal means of travelling between two or more given locations	Searches may be optimised on different criteria, for example fastest, shortest, least changes, cheapest.[3] They may be constrained for example to leave or arrive at a certain time, to avoid certain waypoints. Trip planners depend on a number of different types of data and the quality and extent of this data limits their capability: - Contextual data (Point of interest data, Gazetteer data) - Road data (Road network data, Real-time data for roads) - Public Transport data		
2.AVN	Media	RPT	P2	Repeat	Repeat Mode		
1.Common	Software update	RR / RSU	P0	Remote Reflash / <u>Remote Software Update</u> RR or RSU describes the update software in vehicle ECUs without physically connected to the vehicle. This word is same meaning with OTA Update.	Remote reflash will utilize a long range connection from the telematic box to a Remote IT system. Remote reflash feature will need to operate while the engine is not running.		
4.Telematics	Network	RRAT	P2	Registered Radio Access Telecommunication	The Primary Connection Method over the currently registered radio access technology and network. Depending on RAT (Radio Access Telecommunication) and PDN (Public data network) Context the VCP/TCP attempts to make connection of MOCCP (Mobile Originated Call Connect Process) that is supported on the RAT/Network		
2.AVN	HW	RRC	P2	Rear Control	In luxury car, there will be 2 rear monitors for user, RRC include buttons in Rear seat for user to control 2 rear monitors: Power-L (Turn On/Off Left monitor) Power-R (Turn On/Off Right monitor) Volume Up/Down Back button Home button Menu button etc.		

2.AVN	Media	RRE	P2		Right Rotate Encode Browser list entry, cursor movement and selection in browser, and scrolling list	Using to change list of entry		
2.AVN	Vehicle	RRS	P2		Rear Radar System	BLIND SPOT DETECTION RADAR SENSOR TECHNOLOGY MAKES BLIND SPOTS TRANSPARENT		
2.AVN	Vehicle	RRSM / RLSM	P2		Rear Right/Left Seat Movement Seat movement include: folding/unfolding seats, armrest stowed/deployed ...	when User selects folding/unfolding seats, armrest stowed/deployed ... NGI will send signal to RRSM / RLSM to request seat movement.		
2.AVN	System	RSA	P2		Rivest–Shamir–Adleman: RSA (Rivest–Shamir–Adleman) is one of the first public-key cryptosystems and is widely used for secure data transmission. In such a cryptosystem, the encryption key is public and it is different from the decryption key which is kept secret (private).			
2.AVN	Bluetooth	rSap/ SIM	P1	remote SIM access profile	The remote SIM access profile (rSAP) is one of two Bluetooth profiles made for handsfree phone operation in cars. The advantage over the "Handsfree" profile is that the car has a built-in mobile phone device which connects to the external antenna. This improves reception quality. Instead of using a separate SIM card the car borrows the mobile's card over a Bluetooth connection.			

1.Common	Utility	RSE / RSI	P0	<u>Rear Seat Entertainment /Rear Seat Infotainment</u>	<p>Rear Seat Entertainment (RSE)/Rear Seat Infotainment (RSI): A system is designed for the rear passengers to enjoin audio, media, navigaton...It's an entertainment solution for the rear seat in cars</p> <p>The Rear Seat Infotainment System features two high-resolution monitors (measured diagonally, corner to corner) in the back of the front-seat headrests. These monitors work much like a smart TV. They give your vehicle's passengers flexibility to play media from smartphones, tablets, SD cards, USB drives, devices connected via HDMI (such as gaming systems or a smart TV stick), and DVDs (if equipped). Wireless connectivity (via Wi-Fi, if equipped and active) lets them seamlessly share video content between mobile devices, tablets and/or Rear Seat Infotainment monitors</p>		
2.AVN	CarSSW	RSI	P0	RESTful Service Interface	<ul style="list-style-type: none"> - RESTful service is WEB service based on REST. - RSI defines structure of each service as JSON file. - RSI defines HTTP request/response payload structure (element property) - RSI defines allowed HTTP operation (GET, POST, UPDATE, DELETE) <ul style="list-style-type: none"> + (<i>REST stands for Representational State Transfer, which is an architectural style for networked hypermedia applications</i>) - Almost every RESTful service uses HTTP as its underlying protocol) <p>- The client and service talk to each other via messages. Clients send a request to the server, and the server replies with a response</p> <p>For example, a RESTful URL: GET /v1/path/to/resource HTTP/1.1 <i>Host: www.example.gov.au</i> <i>Accept: application/json, text/javascript</i></p> <p>- Resource is any information. For example, in Media service: albums, artists, genres ... are resources.</p> <p>- Resource method (HTTP method) is GET, PUT, POST and DELETE</p>		 <pre> sequenceDiagram participant Client participant WebService Client->>WebService: GET /resources/getNextPage? HTTP/1.1 WebService->>Client: <?xml version="1.0"?> WebService->>Client: <rsp stat="ok"> WebService->>Client: <resource id="1"/> WebService->>Client: <resource id="2"/> WebService-->>Client: ... WebService-->>Client: </rsp> Note over WebService: previousPage++; nextPage = previousPage; return nextPage; </pre>
2.AVN	Safety	RSPA	P2		<p>Rear System Parking Assistance:The rear and front park assist system provides audible feedback, allowing drivers to identify any obstacles behind the vehicle.</p>	<p>https://www.youtube.com/watch?v=a9bolfzN1is</p>	

2.AVN	System	RSS	P2		Ready Sleep State When system going to Ready Sleep State , all last used information of the system will be stored permanent	send relevant CAN signal or press Turn off button and check log		
2.AVN	Radio	RSSI	P2		Received Signal Strength Indicator in Radio signal processing It is a measure of power level that a RF client device is receiving from an access point or router. At larger distances, the signal gets weaker and the wireless data rates get slower, leading to a lower overall data throughput. Signal is measured by the receive signal strength indicator (RSSI), which indicates how well a particular radio can hear the remote connected client radios. For point-to-(multi)point applications, the optimal RSSI on each end of the wireless link is between -40 dBm and -50 dBm to achieve the highest possible data rates.			
2.AVN	Radio	RT	P0	<u>Radio Text</u>	- RT is a 64-character field in the RDS/RBDS standards. - It's used as either a static (such as station slogans) or dynamic display (such as the title and artist)	- For radio receiver, setting For FM-RDS must be ENABLED.		
2.AVN	Radio	RT+ eRT+	P1		RadioText Plus This feature allows tagging specific elements of RadioText (RT and eRT) and permits, among many other possibilities, to improve the presentation on a display for both. The tagged RadioText elements can also be stored as a list that could be searched by the end user.			

2.AVN	Navigation	RTM	P2	Road Traffic Message It is a technology for delivering traffic and travel information to motor vehicle drivers	<p>It is digitally coded using the ALERT C protocol into RDS Type 8A groups[1] carried via conventional FM radio broadcasts. It can also be transmitted on Digital Audio Broadcasting or satellite radio. TMC allows silent delivery of dynamic information suitable for reproduction or display in the user's language without interrupting audio broadcast services</p> <p>Each message consists of an event code, location code, expected incident duration, affected extent and other details.</p>		
2.AVN	System	RTOS	P2	Real Time Operating System: A real-time operating system (RTOS) is an operating system (OS) intended to serve real-time applications that process data as it comes in, typically without buffer delays. Processing time requirements (including any OS delay) are measured in tenths of seconds or shorter increments of time. A real time system is a time bound system which has well defined fixed time constraints. Processing must be done within the defined constraints or the system will fail. They either are event driven or time sharing. Event driven systems switch between tasks based on their priorities while time sharing systems switch the task based on clock interrupts.	Using command line \$date		

2.AVN	Projection	RTP	P2		Real-time Transport Protocol: The Real-time Transport Protocol (RTP) is a network protocol for delivering audio and video over IP networks. RTP is used extensively in communication and entertainment systems that involve streaming media, such as telephony, video teleconference applications including WebRTC, television services and web-based push-to-talk features.			
2.AVN	Connection	RTS/CTS mechanisms	P2		RTS/CTS (Request to Send / Clear to Send) is the optional mechanism used by the 802.11 wireless networking protocol to reduce frame collisions introduced by the hidden node problem.			
2.AVN	Navigation	RTT	P2		Remaining Travel Time			
2.AVN	System	RU	P2		Regular Update: We can supply daily, weekly or monthly updates of tick or regular interval data for SW, App, futures and other instruments (please inquire).			
2.AVN	Power Mode	Run	P2		Full Infotainment operation state when vehicle power mode = Run	This is start when vehicle key in ON (Run) position		
2.AVN	Power Mode	Run,Propulsion , Accessory State	P2		Logical state with key = Run,Propulsion, Accessory	Change Key position to go to this state: - Run: Key in ON position - Propulsion: Key in Crank (Start) position - Accessory: Key in ACC position.		
2.AVN	Camera	RVC	P0	<u>Rear View Camera</u>	Rear View Camera or reverse camera/ rear camera The "Rear view camera" system allows the driver to see behind his vehicle. It helps the driver during maneuvers, giving him an enhanced rear view.	A backup camera (also called reversing camera) is a special type of video camera that is produced specifically for the purpose of being attached to the rear of a vehicle to aid in backing up, and to alleviate the rear blind spot. Backup cameras are alternatively known as 'reversing cameras' or 'rear-view cameras'. It is specifically designed to avoid a backup collision.		

4.Telematics	Remote Control	RVI	P2	Remote Vehicle Immobilization	Remote Vehicle Immobilization	<p>The remote vehicle immobilization is to provide the functionality for call center to send the command to the suspected stolen vehicle so that the vehicle will be blocked and no longer be started.</p> <p>It also supports to mobilize the blocked car. The use case here does not include the process of how vehicle owner reports to police for the suspected stolen vehicle and gets the report number, etc.</p> <p>Remote vehicle immobilization can be operated either when vehicle is running or off.</p>		
2.AVN	Vehicle	RVS	P2	Rear View System		A backup camera (also called reversing camera) is a special type of video camera that is produced specifically for the purpose of being attached to the rear of a vehicle to aid in backing up, and to alleviate the rear blind spot. Backup cameras are alternatively known as 'reversing cameras' or 'rear-view cameras'. It is specifically designed to avoid a backup collision.		
2.AVN	Media	RW	P2	Rewind (Refer Keyword REWIND)	Rewind			
2.AVN	Vehicle	SA	P2	Slope Assist	The infotainment system's graphical representation of the Slope Assist-related information.			

4.Telematics	S-ACK	P2	Service Acknowledgement	is the acknowledge supported in the VDS protocol	<p>message acknowledge is an important mechanism for both message sender and receiver to get the clear understanding whether the message is delivered or not, which can be used either for the message sender to decide whether to resend the message if the ACK is not received in an expected period, or as the message to inform the user when his/her message received by the vehicles in another side.</p> <p>VDS protocol supports 2 different types of ACK to fulfill the requirement as above, they're:</p> <ul style="list-style-type: none"> ■ Service level ACK (S-ACK) <p>Service level ACK is the acknowledge supported in the VDS protocol by specifying RequestHeader.ACKRequired in each VDS message, which is used mainly as the purpose for the message sender to know when the message is got by the receiver in the asynchronous communication.</p> <p>The S-ACK is not used for messages resending.</p> <p>Upon receiving or not receiving the ACK, the action what message sender should take totally depends on the service logic to be realized.</p> <p>All the downlink messages will require acknowledge to be sent by the TEM for both CMC</p>	
2.AVN	Vehicle	SAD	P2	Slope Assist Display.	The infotainment system's graphical representation of the Slope Assist-related information.	

4.Telematics	[TBD]	Safety Connect	P2	N/A	The state of ON/OFF of Safety Connect is judged with the flag of ACN and MAN. It is judged assuming that it becomes independent of Active mode. Details[19] 16CY NA DCM Application SpecificationReference. The ON/OFF state of Safety Connect is judged from ACN/MAN flags. It's different from Active mode. Regarding the details, refer to [19] 16CY NA DCM Application Specification.	[TBD]		
2.AVN	Projection	SAI	P2	<u>Standard App Interface</u>	SAI is a structure of RSI-based microservices that exchange data according to ViWi protocol. The ViWi microservice is a microservice that complies with the ViWi protocol: + Each ViWi microservice has an HTTP-based Restful Service Interface. + Each ViWi microservice includes its own HTTP server (port open, listen, ...). SAI, RSI, ViWi microservice terms are sometimes same meaning.	SAI Concept:		
2.AVN	Connection	SAN	P2		Storage Area Network A storage area network (SAN) is a Computer network which provides access to consolidated, block level data storage.	SANs are primarily used to enhance storage devices, such as disk arrays and tape libraries, accessible to servers so that the devices appear to the operating system as locally attached devices. A SAN typically is its network of storage devices not accessible through the local area network (LAN) by other devices.		
2.AVN	Vehicle	SAP	P2		Semi Automatic Parking	Unlike with fully automatic systems, in a semi-automatic parking system the driver must drive their car onto the parking pallet themselves. The parking and retrieval process for vehicles is then controlled by the operator.		

2.AVN	Phone	SAP, SIM, rSAP	P2		SIM Access Profile SIM Access Profile is a Bluetooth profile allowing a GSM phone to share its SIM card with another device of the same type When connect SAP supported Phone to SAP supported Car, so that Phone will share SIM card with Car.		
4.Telematics	Telematic Call	SAS	P2	Steering Angle Sensor	<p>critical part of the ESC (Electronics Stability Control) system that measures the steering wheel position angle and rate of turn. A scan tool can be used to obtain this data in degrees. The SAS is located in a sensor cluster in the steering column. The cluster always has more than one steering position sensor for redundancy and to confirm data. The ESC module must receive two signals to confirm the steering wheel position. These signals are often out of phase with each other.</p> <p>Why Measure Steering Angle?</p> <p>The angle of the steering on its own can be used to determine where the front wheels are pointed. When combined with other pieces of information from the yaw(nghiêng), accelerometer (gia tốc) and wheel speed sensors, it is possible to measure the dynamics of the vehicle. With the collected information, the stability control system can be used to determine the driver's intentions, how the vehicle is reacting and what corrections can be made with the ABS hydraulic control unit</p> <p>How is the angle measured?</p> <p>The steering angle can be measured with optical sensors, by assessing Hall effect and through other technologies. These sensors measure the movement of the steering wheel in degrees.</p>		

2.AVN	Media	SBC	P2		Sub Band Codec specified by the Bluetooth Special Interest Group (SIG) for the Advanced Audio Distribution Profile (A2DP). SBC is a digital audio encoder and decoder used to transfer data to BT audio output devices like headphones or loudspeakers. I can also be used on Internet.		
2.AVN	Vehicle	SCA	P2		SuperCruise Alerts	true hands-free driving system for the freeway	
2.AVN	Radio	Scan	P1		SCAN : Search for the next station in the current broadcast position, stop for 5 seconds (SCAN PLAY), and search for the next station to perform SCAN PLAY operation. Repeating this operation causes the SCAN operation to be canceled at the first broadcast location.		
2.AVN	Radio	SCIds	P2		Service Component Identifies		
2.AVN	Bluetooth/Phone	SCO	P1	<u>Synchronous Connection Oriented</u>	<ul style="list-style-type: none"> - SOC link is a data communication protocol in Bluetooth - It is a symmetric, point-to-point link between the master device and a specific slave device - It is used to support time critical information, eg: voice data 	<p>[REF: https://en.wikipedia.org/wiki/List_of_Bluetooth_protocols]</p>	<p>SCO (Synchronous Connection-Oriented) Circuit-switched communication</p> <p>Legend:</p> <ul style="list-style-type: none"> L2CAP Layer (Dashed Blue Line) Logical Layer (Dashed Black Line) Physical Layer (Solid Black Line)
2.AVN	Power Mode	Screen Saver	P1		The screen saver is displayed when user didn't interact with HU screen for a few minutes	When you don't do anything with vehicle screen in defined time, this screen auto change to Screen Saver.	
2.AVN	Media	Scrolling in lists	P2			Scrolling at the scroll bar	

2.AVN	System	SCSI	P2	Small Computer Standard Interface	Small Computer System Interface (SCSI) is a set of standards for physically connecting and transferring data between computers and peripheral devices. The SCSI standards define commands, protocols, electrical and optical interfaces. SCSI is most commonly used for hard disk drives and tape drives, but it can connect a wide range of other devices, including scanners and CD drives, although not all controllers can handle all devices.		
2.AVN	Connection	SD	P2	Secure Digital	Secure Digital includes four card families available in three different sizes. The four families are the original Standard-Capacity (SDSC), the High-Capacity (SDHC), the eXtended-Capacity (SDXC), and the SDIO, which combines input/output functions with data storage. The three form factors are the original size, the mini size, and the micro size. Electrically passive adapters allow a smaller card to fit and function in a device built for a larger card. The SD card's small footprint is an ideal storage medium for smaller, thinner and more portable electronic devices.		
2.AVN	Phone	SDAP	P2		Service Discovery Application Profile : defines the features and procedures for an application in a Bluetooth® device to discover services registered in other Bluetooth® devices and retrieve any desired available information pertinent to these services.	Refer Link	

2.AVN	Radio	SDARS	P1	Satellite Digital Audio Radio Service	<p>SDARS is primarily for entertainment broadcasting from orbital satellites and received by modules commonly found on modern automobiles</p> <p>SDARS is mainly two digital broadcast technologies, SIRIUS and XM, which use terrestrial transmitters and satellite carried transmitters. The foundation is the satellite transmitters covering vast areas. The terrestrial transmitters are used to cover areas, which the satellite transmitters don't reach satisfactorily mainly in cities where systems are shadowed by tall buildings. SDARS broadcast uses the frequency range 2332,5 MHz – 2345 MHz. SDARS content is normally broadcast in stereo. If the signal strength to the tuner is not sufficient the audio is not degraded but muted.</p> <p>SDARS is a subscription based system. The customer can enable / disable subscription status and packages via the SXM call centre or website.</p>		
2.AVN	Connection	SDHC	P2		<p>Secure Digital High-Capacity</p> <p>Secure Digital High Capacity (SD High Capacity or SDHC) refers to a type of SD flash memory card known as SD 2.0. It includes higher memory storage capacity, ranging from 4 GB to 32 GB</p>		
2.AVN	Navigation	SDI	P2		<p>Safety Driving Information</p> <p>It is service for Digital Multimedia Broadcasting (DMB)</p> <p>Speed camera position data, accident data, etc., from the TPEG so that the terminal can automatically update safety-related information from time to time.</p>		

2.AVN	Connection	SDP	P2		<p>Service Discovery Protocol</p> <p>A service discovery protocol (SDP) is a network protocol that helps accomplish service discovery. Service discovery aims to reduce the configuration efforts from users.</p>	<p>The service discovery protocol (SDP) provides a means for applications to discover which services are available and to determine the characteristics of those available services.</p>		
2.AVN	Radio	SDR	P2		Software-Defined Radio	<p>Software-Defined Radio</p> <p>Software-defined radio (SDR) is a radio communication system where components that have been traditionally implemented in hardware (e.g. mixers, filters, amplifiers, modulators/demodulators, detectors, etc.) are instead implemented by means of software on a personal computer or embedded system.[1] While the concept of SDR is not new, the rapidly evolving capabilities of digital electronics render practical many processes which used to be only theoretically possible.</p>		
2.AVN	Voice Recognition	SDS	P2		Smart Distributed System			
2.AVN	Navigation	SDS (Speech Dialogue System)	P1	Speech Dialogue System	<p>A speech dialogue system is an interface that allows communication between a human being and a machine. A usual in-car speech dialogue system is a multimodal interface, with two input and two output modalities (at least): manual and speech input and graphical and speech output.</p>			
2.AVN	Media	SDVC	P2		Sound Dependent Volume Control	<ul style="list-style-type: none"> - Supports the setting for the " Sound Dependent Volume Control (SDVC) --> ON : Set the sound volume automatically depending on the speed --> OFF: maintain a sound volume, regardless of the vehicle. 		

2.AVN	Connection	SDXC	P2		Secure Digital eXtended Capacity A Secure Digital Extended Capacity (SDXC) card is a very small flash memory card that resembles a SD (Secure Digital) card, but has far greater storage capacity.			
2.AVN	Media	SE	P2		Search entry : Function allow user to enter keywords for searching			
1.Common	Safety	Seat belt	P0	N/A	A seat belt (also known as a seatbelt or safety belt) is a vehicle safety device designed to secure the occupant of a vehicle against harmful movement that may result during a collision or a sudden stop. A seat belt functions to reduce the likelihood of death or serious injury in a traffic collision	Common types of seat belt: + 2-point: attaches at its two endpoints, and was invented in the early 1900s (belt in airplane) + 3-point: is a Y-shaped arrangement. In a collision, the three-point belt spreads out the energy of the moving body over the chest, pelvis, and shoulders + 4-, 5-, 6-point: are typically found in child safety seats and in racing cars	 <p>Examples of warning lights on a car dashboard.</p> 	
2.AVN	Vehicle	Seat Status pane	P2		Seat Status pane is used by the system to present status information based on user interaction with the Seat multifunction Controller.	The Seat Status pane also provides a structure for the user to illustrate - Features are available for user interaction. - While the user operates within a feature of the seat their primary output is feeling the seat move as they adjust it to their preference.		
2.AVN	Radio	SEEK DOWN operation	P0	N/A	Go to previous radio station			
2.AVN	Radio	SEEK UP operation	P0	N/A	Go to next radio station			
2.AVN	Radio	Seek up/down	P2		The buttons which allow user move to previous/next strong signal station (Radio)			
2.AVN	Navigation	Service Area / SA	P2		A public facility, located next to a large thoroughfare such as a highway, at which drivers and passengers can rest, eat, or refuel			

2.AVN	Radio	Service Linking	P1		- Service Linking : If the reception status of the currently received broadcast is poor, it is switched to the same broadcast in another channel or switched to another related broadcast. (ex.. DAB to DAB linking, DAB to FM linking)			
2.AVN	SAI	Service Registry	P2	N/A	<p>Service Registry is a database of services In which the microservices register their instances and their locations.</p> <ul style="list-style-type: none"> - There are 2 groups of interaction between the registry and microservices: <ul style="list-style-type: none"> + Self-registration + Third-party registration 	<p>The information for registration can be "name", "url", "port", "type" and etc. Here is an example for a service registration:</p> <pre>registry.register({ name: serviceName, url: '/tickets', endpoints: [{ type: 'http', url: 'http://127.0.0.1:' + port + '/tickets' } })</pre> <p>Here is an example to retrieve service instance location (ICAS3)</p> <ul style="list-style-type: none"> - service name: serviceName - Send command: rsi-send -p 80 get /serviceName [This command depends on each project] <p>=> Output: http:[port]/[serviceName]</p> <p>[REF: https://auth0.com/blog/an-introduction-to-microservices-part-3-the-service-registry/]</p>	<p>SELF-REGISTRATION</p> <pre> graph LR subgraph SELF_REGISTRATION [SELF-REGISTRATION] direction TB SR((Service Registry)) M1[Microservice] -- "when going up / down" --> SR M2[Microservice] -- "when going up / down" --> SR M3[Microservice] end </pre>	
2.AVN	Navigation	Service/Side Roads	P2		Service/Side roads parallel to the main road and tied over short connectors shall be considered in the maneuver generation. They must also be handled at start and end point. At least maneuvers to turn and leave must be supported			

2.AVN	Radio	SFN	P2		<p>Single Frequency Network A single-frequency network or SFN is a broadcast network where several transmitters simultaneously send the same signal over the same frequency channel. Single Frequency Network model Top:Multi Frequency Network Bottom:Single Frequency Network Analog AM and FM radio broadcast networks as well as digital broadcast networks can operate in this manner. SFNs are not generally compatible with analog television transmission, since the SFN results in ghosting due to echoes of the same signal.</p>		
2.AVN	Connection	S-GI	P2		<p>Short Guard Interval is intended to avoid signal loss from multipath effect.</p>	<ol style="list-style-type: none"> 1. When intending to improve the throughput, enable short GI can improve the throughput about 10% 2. If the multipath effect is not too serious (not too many metals or other reflecting materials), you can enable short GI. 3. If you are using 802.11n or 802.11ac only, you can enable short GI. In another word, when using mixed mode, please disable the short GI, which may cause issues. 	
4.Telematics	Common	Shark antenna	P0	N/A	<p>Shark antenna or shark fin antenna is a type of antenna with shape like a shark fin which is equipped on vehicle to booster wireless signal for services inside the car.</p>	<p>Most shark fin "antennas" on modern vehicles are actually modules: they contain several antennas inside a single housing. Common features include AM/FM, 4G LTE, GPS navigation, and Satellite Radio elements.</p>	

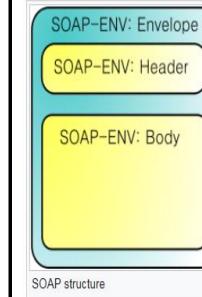
4.Telematics	Theft Notification	SI	P2	Supplemental Theft Information	Supplemental Theft Information	The information of UAV (Unauthorized Access Vehicle) types of CTS (Content Theft Status): - Hood : Bonnet - Trunk/Tonneau - Glass Breakage - Battery Re-connect - Tilt/Inclination - Interior Movement		
4.Telematics	Application	SID	P2	<u>Service Identifier</u>	Service identifier is used to determine the telematics service /application is using. For example: 1) Emergency call has SID = 31, remote control has SID = 51... 2) Diagnostic service: 0x10 (Diagnostics Session), 0x11 (ECU Reset), 0x19 (DTC)...			
2.AVN	Phone	SIM	P2		Subscriber Identify Module	A smart card inside a mobile phone, carrying an identification number unique to the owner, storing personal data, and preventing operation if removed. Currently, we can purchase a SIM card easily on Vietnamese carrier like: Viettel, Mobifone, Vinafone, Vietnamobile,...		
2.AVN	Phone Projection	SIRI	P0	N/A	Apple personal voice assistance, available on iOS devices			
2.AVN	Connection	SISO	P2		Single In Single Out (SISO) (single input, single output) refers to a wireless communications system in which one antenna is used at the source (transmitter) and one antenna is used at the destination (receiver).			
2.AVN	User Interaction	SK	P1	Soft Key	It is soft button on AVN screen.	User press softkey on screen to interact with HU (ex: Press SK Music on screen to play music)		

2.AVN	Media	Skip backward	P0	N/A	Skip backward is one of item in media controls. It means to go to the previous track.	Press "Skip backward" button on the media player screen to go to the previous track		
2.AVN	Media	Skip directory backward	P2		Go to track of previous directory			
2.AVN	Media	Skip directory forward	P2		Go to track of next directory			
2.AVN	Media	Skip forward	P0	N/A	Go to the next track	Go to the next track		
2.AVN	Vehicle	SLA	P2		Service Life time	- Displays maintenance data in an info menu and sends out the data via diagnostic interface again. - Saves at least 150 maintenances		
2.AVN	Connection	SLC	P2		Single Level Cell is a memory element capable of storing only one bit per memory element			
2.AVN	Navigation	SLDE	P2		Single Line Destination Entry The single line destination entry ignores the matching of some navigation location definitions to improve the value of the results. E.g. only POIs shall be found	The user says: "Next fuel station" The token "fuel station" will be requested at the single line destination entry search. --> Then system shall have the possibility to match the entered text of the user against all elements of a navigation location definition to get a set of results.		
2.AVN	Power Mode	Sleep	P2		Background sleep timeout and low-power quiescent state.	This state when you move key to OFF and wait in require time until Screen changes to black OR You move key to OFF and open/close driver door => Vehicle screen change to black		

4.Telematics	Power Mode	Sleep_Poll	P2	In Sleep, no functionality. A polling schedule is defined to wakeup periodically and check for pending service requests from Cloud, meanwhile the TEM will report the information that next wake up time together with some basic vehicle information.that next wake up time together with some basic vehicle information. There're 2 period of Sleep_Poll, period 1 and period 2. The period 1 lasts 5 days and polling frequency is every 2 hours, the period 2 is 10 days, the polling frequency is every 4 hours			
2.AVN	Vehicle	SLIF	P2	Speed Limit Information Function	<p>The system displays the information of speed limit and no passing restriction to the driver in both the instrument cluster and navigation screen. SLIF detects traffic signs with camera system attached behind the top of the windscreen.</p> <p>The SLIF also utilizes the navigation information to display the speed limit information.</p>		
2.AVN	Radio	SLS	P2	Slide show A slide show is a presentation of a series of still images on a projection screen or electronic display device, typically in a prearranged sequence. The changes may be automatic and at regular intervals or they may be manually controlled by a presenter or the viewer. Slide shows originally consisted of a series of individual photographic slides projected onto a screen with a slide projector.			

2.AVN	Connection	SM ME	P2		<p>1. ME means you can search the phone number saved in internal memory of phone.</p> <p>2. SM means you can search the phone number saved in SIM memory of phone.</p>				
2.AVN	System	SMB	P2		Server Message Block	<p>In computer networking, Server Message Block (SMB), one version of which was also known as Common Internet File System (CIFS, /sdfs/),[1][2] operates as an application-layer network protocol[3] mainly used for providing shared access to files, printers, and serial ports and miscellaneous communications between nodes on a network. It also provides an authenticated inter-process communication mechanism.</p>			

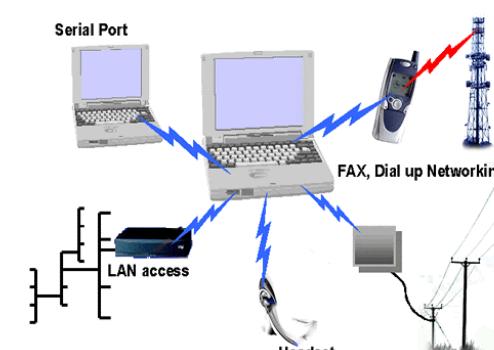
4.Telematics	Telecommunication	SMS	P0	Short Message Service <p>SMS (short message service) is a text messaging service component of most telephone, internet, and mobile-device systems. It uses standardized communication protocols to enable mobile devices to exchange short text messages.</p> <p>The protocols allowed users to send and receive messages of up to 160 alpha-numeric characters to and from GSM mobiles. Although most SMS messages are mobile-to-mobile text messages, support for the service has expanded to include other mobile technologies.</p>	<p>Each message contains up to 160 characters.</p> <p>Once a message is sent, it is received by a Short Message Service Center (SMSC), which must then direct it to the appropriate mobile device. To do this, the SMSC sends a SMS Request to the home location register (HLR) to find the roaming customer. Once the HLR receives the request, it will respond to the SMSC with the subscriber's status: 1) inactive or active 2) where subscriber is roaming. If the response is 'inactive', then the SMSC will hold onto the message for a period of time. When the subscriber accesses his device, the HLR sends a SMS Notification to the SMSC, and the SMSC will attempt delivery.</p> <p>The SMSC transfers the message in a Short Message Delivery Point-to-Point format to the serving system. The system pages the device, and if it responds, the message gets delivered. The SMSC receives verification that the message was received by the end user, then categorizes the message as 'sent' and will not attempt to send again</p>			<pre> graph LR subgraph Originator_MO_SMS [Originator - MO SMS] A((A)) --- BS1[BS] BS1 --- MSC1[MSC] MSC1 --- SMSC1[SMSC] SMSC1 --- HLR[HLR] SMSC1 --- VLR[VLR] end subgraph Destination_MT_SMS [Destination - MT SMS] B((B)) --- BS2[BS] BS2 --- MSC2[MSC] MSC2 --- SMSC2[SMSC] SMSC2 --- HLR SMSC2 --- VLR end HLR <--> VLR SMSC1 <--> SMSC2 </pre>	
2.AVN	Connection	SNEP	P2	<p>SNEP : Simple NDEF Exchange Protocol</p> <p>SNEP is a stateless request/response protocol</p>	<p>The client sends a request to the server, the server processes that request and returns a response. On the protocol level both the request and response have no consequences for further request/response exchanges</p>				

2.AVN	Voice Recognition	SNR	P2	Signal-to-noise ratio -The ratio of the mean speech power to the mean noise power for a given speech utterance	Signal-to-noise ratio (abbreviated SNR or S/N) is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. S/N ratio is defined as the ratio of signal power to the noise power, often expressed in decibels. A ratio higher than 1:1 (greater than 0 dB) indicates more signal than noise		
4.Telematics	User Interaction	SNRS	P2	Signal To Noise Ratio Score	The strength of the speech signal in relation to background noise with each recognition result		
4.Telematics	User Interaction	SNRT	P2	Signal to Noise Ratio Threshold	Telemetric module shall implement a signal to noise threshold that is applicable for all the utterances. VCP send the prompt saying that can't not recognize because of too noise if SNRC (signal to noise score) > SNRT The range: 0-6dB		
4.Telematics	Telecommunication	SOAP	P0	Simple Object Access Protocol	SOAP provides the Messaging Protocol layer of a web services protocol stack for web services. It is an XML-based protocol consisting of three parts: + An envelope, which defines the message structure and how to process it + A set of encoding rules for expressing instances of application-defined datatypes + A convention for representing procedure calls and responses	 <p>SOAP structure</p>	<p>Example message (encapsulated in HTTP) [edit]</p> <pre> POST /InStock HTTP/1.1 Host: www.example.org Content-Type: application/soap+xml; charset=utf-8 Content-Length: 239 SOAPAction: "http://www.w3.org/2003/05/soap-envelope" <?xml version="1.0"?> <soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"> <soap:Header> </soap:Header> <soap:Body> <m:GetStockPrice> <m:StockName>GOOG</m:StockName> </m:GetStockPrice> </soap:Body> </soap:Envelope></pre>

2.AVN	Power Mode	SoC	P2		<p>State of charge (SoC) is the equivalent of a fuel gauge for the battery pack in a battery electric vehicle (BEV), hybrid vehicle (HV), or plug-in hybrid electric vehicle (PHEV). The units of SoC are percentage points (0% = empty; 100% = full). An alternate form of the same measure is the depth of discharge (DoD), the inverse of SoC (100% = empty; 0% = full). SoC is normally used when discussing the current state of a battery in use, while DoD is most often seen when discussing the lifetime of the battery after repeated use.</p>		
2.AVN	Connection	Soft Disconnect	P2		<p>Disconnect in Setting (Not related to physical)</p>		
1.Common	Network/Protocol	SOME/IP	P0	<u>Scalable service-Oriented Middleware over IP</u>	<p>SOME/IP shall be implemented on different operating system (i.e. AUTOSAR, GENIVI, and OSEK) and even embedded devices without operating system SOME/IP supports a wide range of middleware features:</p> <p>1. Serialization – transforming into and from on-wire representation.</p> <p>2. Remote Procedure Call (RPC) – implementing remote invocation of functions.</p> <p>3. Service Discovery (SD) – dynamically finding and functionality and configuring its access.</p> <p>4. Publish/Subscribe (Pub/Sub) – dynamically configuring which data is needed and shall be sent to the client.</p> <p>5. Segmentation of UDP messages – allowing the transport of large SOME/IP messages over UDP without the need of fragmentation.</p>	<pre> struct x1 { uint32 a; float32 b_0; float32 b_1; uint32 d; float32 e_0; float32 e_1; uint8 f; }; struct x2 { uint32 a; float32 b[2]; float32 c; float32 d; float32 e[2]; uint8 f; }; </pre>	
		SOP					

2.AVN	Software Management	SOTA	P2		Software Over the Air	This word to show to process of upgrade software of a device through Internet, not using any cable to connect directly to the hardware device		
2.AVN	Media	SP	P2	Short Press	Short Press (button): First, Tab then release	Short Press (button): First, Tab then release		
4.Telematics	Common	SP	P1	Serial Port	In computing, a serial port is a serial communication interface through which information transfers in or out one bit at a time (in contrast to a parallel port).[1] Throughout most of the history of personal computers, data was transferred through serial ports to devices such as modems, terminals, and various peripherals.		https://vi.wikipedia.org/wiki/Cổng_nối_tiếp	
4.Telematics		SPA	P2		Scalable Product Architecture	The Volvo Scalable Product Architecture (SPA)[4] platform is a global full-size unibody automobile platform developed and manufactured by Volvo Cars.[5] It debuted in 2014 when the second-generation Volvo XC90 was released.[6] With SPA, Volvo claims it "enables significant improvements when it comes to offering protection in worst-case scenarios and when creating innovative features that support the driver in avoiding accidents." [7] Volvo has invested 90 billion SEK in the platform. All SPA based cars will be delivered with 4 cylinder engines. The diesel and petrol engines share the same Volvo Engine Architecture, and Volvo can build 530,000 engines per year.[8]		
2.AVN	Projection	SPCX	P2		SmartPhone Car UX – generic name, corresponding to CarPlay (for iOS device), AndroidAuto (for Android devices)			

2.AVN	Projection	SPDIF	P2		S/PDIF (Sony/Philips Digital Interface Format)	S/PDIF (Sony/Philips Digital Interface Format)[citation needed] is a type of digital audio interconnect used in consumer audio equipment to output audio over reasonably short distances		
2.AVN	System	Special scope set	P2		"Special scope set" facilitates the analysis of errors that can not be fully analyzed with default scope set. It's to set logging level for a particular application/service. It can be done via command line or Engineering Screen plugging with OEM diagnostic device			
2.AVN	Phone call	Speed dial	P0	N/A	Is a quickly way to make phone call to a frequent calling number without typing all input number	- On Phone Setting, choose Speed Dial, input the phone number and select the number you want to store. - For example: You often call to number 091234567, input that number with number "1" to store. Then when you want to call the phone number, just long press number 1, Phone will automatically make outgoing call to that number.		
3.Cluster	Cluster	Speed Limitter	P1	Speed Limitter	Speed Limitter	Helps manage the speed limit for vehicles Help to warn drivers when the car is running at a speed limit Improve driving safety		
3.Cluster	Common	Speedometer	P0	N/A	A speedometer or a speed meter is a gauge that measures and displays the instantaneous speed of a vehicle	https://www.explainthatstuff.com/how-speedometer-works.html		
2.AVN	Connection	SPI	P2		Serial Peripheral Interface The Serial Peripheral Interface bus (SPI) is a synchronous serial communication interface specification used for short distance communication, primarily in embedded systems.	SPI devices communicate in full duplex mode using a master-slave architecture with a single master. The master device originates the frame for reading and writing. Multiple slave devices are supported through selection with individual slave select (SS) lines.		

2.AVN	Vehicle	Spoiler	P2		<p>Switches on or off spoiler LED and warning messages and saves error memory entry</p> <p>A spoiler is an automotive aerodynamic device whose intended design function is to 'spoil' unfavorable air movement across a body of a vehicle in motion, usually described as turbulence or drag</p>		
2.AVN	Connection	SPP	P2		<p>Serial Port Profile SPP is great for sending bursts of data between two devices. Using SPP, each connected device can send and receive data just as if there were RX and TX lines connected between them</p> <p>This profile allows applications to treat Bluetooth links as virtual COM ports The Serial Port Profile group defines two roles : a gateway that provides access to a service, and a terminal that uses that service.</p> <p>In the headset profile, the terminal is the headset itself; the gateway is a device, such as a phone, supplying an audio call to the headset. The signaling for the audio call uses AT commands (the format used by modems); this is the part that relies on the Serial Port Profile—the audio call simply uses an SCO (audio) link.</p> <p>The LAN Access Profile has a gateway providing a link to a local area network (LAN). The terminal is anything that you might connect to a LAN—this typically is a laptop PC, but a PDA or even a smartphone might be terminals.</p> <p>The Dialup Networking Profile (DUN) provides modem services. The gateway gives a link to a telephone network via a cellular or Landline connection. The FAX profile similarly provides a link to a telephone network, but this time specifically for faxes rather than for general data transfer</p>		
2.AVN	Radio	SPS	P2		Supplement Program Service: Frequency sub-digital broadcasting		
2.AVN	Projection	SPVR	P2		SmartPhone Voice Recognition (SIRI eyes-free, GoogleNow, etc.)		

4.Telematics	User Interaction	SRFR	P2	Speech Recognition Flexible Recognition	SRFR is a feature mode allows driver to say a full sentence.	Example, normally when driver want to call a number or nametag (directory number), he will need to say: "Call" or "Dial" but with this feature, driver can input a voice command: "I would like to call a number" --> SR will recognize and tell the driver to input the number to call.		
2.AVN	[TBD]	SRP	P2	<u>Session Request Protocol</u>	SRP allows a B-Device to request an A-Device to turn on VBUS power and start a session.	Allows both communicating devices to control when the link's power session is active; in standard USB, only the host is capable of doing so. That allows fine control over the power consumption, which is very important for battery-operated devices such as cameras and mobile phones. The OTG or embedded host can leave the USB link unpowered until the peripheral (which can be an OTG or standard USB device) requires power. OTG and embedded hosts typically have little battery power to spare, so leaving the USB link unpowered helps in extending the battery runtime.		[TBD]
2.AVN	Connection	SRP	P2	Stream Reservation Protocol	Stream Reservation Protocol is an enhancement to Ethernet that implements admission control. The dynamic control protocol used to create a path through a network for rank-based, latency guaranteed bandwidth reservations within a heterogeneous AVB Cloud	Reservation Process : 1. Establish a Domain 2. Talker Advertises a stream 3. Listener(s) Attach to the stream		

4.Telematics	Vehicle interface	SRS	P0	<u>Supplemental Restraint System</u>	The Supplemental Restraint System (SRS) is basically an air-bag system	The Supplemental Restraint System (SRS) is basically an air-bag system. This works together with conventional 3-point seat belts and prevents impact of the driver's chest and face with the steering wheel in the event of a collision. SRS may sometimes be installed to the passenger's side to prevent impact with the dashboard. Side-impact air-bags are also fitted to protect the upper body and head during a sideways impact.		
2.AVN	Connectivity	SSID	P0	<u>Service Set Identifier</u>	An SSID is the Name of a Wifi Network. For example: uLGE is a SSID that we use to connect to wifi of DCV.	This name allows stations to connect to the desired network when multiple independent networks operate in the same physical area. There are two types of SSID: (1) The Basic Service Set Identification (BSSID) (2) The Extended Service Set Identification (ESSID) In an ad hoc wireless network with no access points, the Basic Service Set Identification (BSSID) is used. In an infrastructure wireless network that includes an access point, the ESSID is used, but may still be referred to as SSID.		
2.AVN	Voice Recognition	SSLM	P2		Speech Synthesis Markup Language			

2.AVN	Connection	SSP	P1	Secure Simple Pairing	Secure Simple Pairing was introduced in BT 2.1+EDR to simplify pairing procedure and improve level of security	4 association models: 1. Numeric Comparison: Both devices are capable of displaying a 6-digit number and having user enter a binary "yes" or "no" response. (HU - Phone) 2. Just Works: The device does not have capability to enter or display 6 decimal digits. It works without user intervention (HU - Headset or Phone - Headphone) 3. Out of band (OOB): BT Pairing method is not used. Typically, this could be NFC where the user may touch 2 devices. But when 2 devices are connected 4. Passkey Entry: When one device has input capability but does not have display capabilities and the second device has display capabilities (PC - Keyboard)	
2.AVN	Voice Recognition	SSP	P2	Speech Signal Preprocessing	A processing of the speech spectrum ensuring stability of recognition in the presence of frequency distortions and additive noise was proposed. Digital Audio => ASR => SLM => Raw text result => Action Classifier => Action Action Classifier		
2.AVN	Media	SSR	P2		Scalable Sampling Rate		
2.AVN	Power Mode	SSTL	P2		System State Logic	This is logic of system in order to coordinate the behavior of all components.	
2.AVN	Connection	STA	P1	(Wifi) Station	(STATION) A client device in an 802.11 (Wi-Fi) wireless network such as a computer, laptop or smartphone. The term STA is sometimes used for the access point (AP) as well, in which case a STA is any device communicating via the 802.11 protocol.	Thiết bị kết nối vào mạng WIFI được gọi là station (trạm). Việc kết nối vào mạng Wifi được hỗ trợ bởi một access point (AP)	

2.AVN	System	Standard Home Screen view	P2		Default View mode in Home screen in Head Unit			
2.AVN	Power Mode	Start	P2		Holding state during CrankRequest (Global A) or Start (Global B) power mode.	Move key from ON to Crank(Start) position		
4.Telematics	Connectivity	Stationary/Non-Stationary	P2	N/A	When vehicle power transition to ON or while vehicle power is ON, VCP will determine the vehicle state as stationary or non-stationary	Upon vehicle power transition to ON or while vehicle power is ON, VCP will check: + If vehicle speed is not available or vehicle speed <=5km/h, vehicle is Stationary else vehicle is non-stationary + Vehicle is also change state form non-stationary to stationary when vehicle power is ON		
4.Telematics	Telematic Call	Stealth call state	P1		Active Request and/or Call is in progress which is not indicated to the User. It means that the user does not know Active Request and/or Call in Theft Call For example: VTM call, theft call, GPKT.	this is a incomming call (Ex: Theft Call) to OCC (Onstar call Center) from vehicle or the call from advisor to vehicle		
4.Telematics	Connectivity	STID	P2		Station Identity (VCP Identifier)	To identity telematics unit provides by GM. Each VCP/TCP have unique identity number. It must be registered to OCC so OCC and making connection between OCC and VCP can pass the authentication process		
4.Telematics	System	STmin	P2	Separation Time Minimum	Separation Time Min. STmin is defined as the timing parameter sent by sender via the Flow Control Frame to regulate the transmission rate of Consecutive Frames sent by receiver			
2.AVN	Navigation	Stopover	P2		Stopover is a transit station in a routing.			

2.AVN	Connection	Streaming start	P2		Start streaming: in case pair device (ex: usb) to HU and music is played automatically. Or incase pair device (phone) with Android auto/Car play, music can be played automatically or need to push in "Play icon" to play music.			
2.AVN	Connection	Streaming stop	P2		Stop streaming: in case pair device (ex: usb) to HU and music is playing, stop playing by pushing button			
2.AVN	Voice Recognition	STT	P0	<u>Speech To Text</u>	- Speech to Text: is a software/function/characteristic of electronic system that transforms spoken voice into text - It is also known as automatic speech recognition (ASR), computer speech recognition or Speech recognition.	- "speech to text" (STT) is used some methodologies and technologies that enables the recognition and translation of spoken language into text by computers. - After that, display the text on the destination screen or send it to the other functions.		
4.Telematics	Diagnostics	Stuck Button	P0	N/A	Stuck button is an issue of button when it is pressed for a duration of time more than a threshold time. The threshold time will be defined in the requirement.	Stuck button can be detected by ECU through diagnostic service, when it happened, the DTC is occurred. For example: If we press SOS button during between 2~8seconds, a call is triggered to call center, but if the button is pressed for more than 15 seconds, it means the button is stuck and an issue is occurred.		
4.Telematics	Vehicle interface	Sub Network	P1	N/A	A network is connected to a main network via a gateway.			
2.AVN	Navigation	Successor	P2		Denote all segments which are connected to an intersection point, excluding the origin segment. Segments with turn restrictions, oneway, the target are included.			
2.AVN	Radio	SVC	P2		Speed-sensitive volume control SSVC is preventing the constant need to manually change your volume and preventing situations in which your music is either inaudible or far too loud.			

4.Telematics	Network	SVD	P1		Simultaneous Voice Data: The network support both Voice and Data connection at the same time (VoLTE, WCDMA/UMTS/3G)	When Ecall occurred, VCP (Vehicle Connectivity Platform) call to OCC (Onstar Call Center), both of Voice call and data package are established at the same time that it called SVD		
4.Telematics	[TBD]	SVL	P2	Stolen Vehicle Locator	Stolen car pursuit service.	[TBD]		
4.Telematics	Application	SVT	P0	Stolen Vehicle Tracking	Vehicle tracking systems use the GPS/GNSS and telecommunication technology, providing vehicle location accuracy. This feature to support driver to find the vehicle when it was stolen.	The vehicle location data will be sent to server frequently. There is a server which collect these data to help driver to track the vehicle location. For example: when user detected the car was stolen, he can call directly to call center, call center then use SVT to tracking vehicle position and contact with police to find the car. In some projects, SVT and theft notification are related. When vehicle detects theft through sensors, it sends the alarm the user, and then when user confirm the car is actually stolen, vehicle will send position data to help tracking location.		
2.AVN	System	SW	P2	Software	Computer software, or simply software, is a part of a computer system that consists of data or computer instructions, in contrast to the physical hardware from which the system is built. Embedded software is computer software, written to control machines or devices that are not typically thought of as computers.			
4.Telematics	Network	SW	P2	Single Wire	Single Wire	N/A		

2.AVN	System	SWAP	P1	Software as a Product	Function to be able activated by FEC. Normally some function is blocked for end user and need to be activated by SWAP function	Ví dụ Swap là Microsoft office (bỏ tiền mua 1 lần), SaaS là Google Docs (thuê bao)	
1.Common	Utility	SWC/SWRC	P0	<u>Steering Wheel Control</u> (<u>Steering Switch Controls</u>)/ <u>Steering Wheel Remote Control</u>	SWC/SWRC: Steering Wheel Control/ Steering Wheel Remote Control: are designed to make it less dangerous to interact with your car when driving. The basic idea is that you can use these controls without taking your hands off the steering wheel or taking your eyes off the road	Buttons might be appeared on the steering wheel: - Active call - End call - Volume up/ down - Next/ previous - Mute ...	
2.AVN	System	SWDL	P2	Software Download			
2.AVN	Phone call	Switching calls	P0	N/A	Change connection between 2 parallel phone calls by user	- Step 1. Phone 1 is connected to HU via BT. - Step 2. Make an incoming call (Call1) to Phone 1. - Step 3. Accept call on HU. - Step 4. Make another incoming call (Call2) to Phone 1. - Step 5. User can accept the Call2 on HU --> it means that user switch call from call 1 to call 2. *Note: To do this feature on HU, user needs to setup depend on requirement of each OEM.	
4.Telematics	Other	SWRS	P2	Software Requirement Specification	A software requirements specification (SRS) is a description of a software system to be developed. It includes functional and non-functional requirements, and it may include a set of use cases that describe user interactions that the software must provide.		

2.AVN	Vehicle	SWRT	P2		Software Requirement Traceability	Requirements traceability is a sub-discipline of requirements management within software development and systems engineering		
2.AVN	Radio	SXM Filtering Explicit Content	P2		SXM Filtering Explicit Content is used to filter channels that have 18+ content			
2.AVN	Radio	SXM Subscription expired	P2		SXM Subscription expired is used to notify when subscription expired			
2.AVN	Radio	SXM/XM/Sirius	P0	Sirius Stream X-Machine	SXM/XM/ Sirius: is satellite radio (SDARS) and online radio services in the United States and Canada, operated by Sirius XM Holdings.	It provided pay-for-service radio, analogous to cable television. Its service included 73 different music channels, 39 news, sports, talk and entertainment channels, 21 regional traffic and weather channels and 23 play-by-play sports channels. XM channels were identified by Arbitron with the label "XM"		
2.AVN	Climate	SYNC	P2		Synchronization: The temperature in the different climate zones of the vehicle can be synchronized with the temperature set for the driver's side.	The temperature for all of the vehicle's climate zones will be synchronized with the one set for the driver's side. Synchronization is stopped with another press on Synchronize temperature or by changing the temperature setting for a climate zone other than the driver's		
2.AVN	Projection	SYST	P2		System	Vehicle Multimedia System (or "navigation" system), i.e. "head-unit" – corresponds to "Accessory" in Apple specifications – refer to architecture scheme for details		
2.AVN	Radio	TA	P0	Traffic Announcement	- The Traffic Announcement Identification flag (TA) is used to indicate an ongoing traffic announcement - The tuner can use TA to auto-switch to FM tuner if another audio source is selected	1. TP = 1, TA = 1: Ongoing traffic announcement on present program 2. TP = 1, TA = 0: Traffic program itself offers traffic program 3. TP = 0, TA = 0: Program offers no traffic program 4. TP = 0, TA = 1: Traffic program is offered via an EON (Enhanced Other Networks) referenced program		

2.AVN	Vehicle	TA	P2		Tow Assist: Use this feature when reversing the vehicle while towing a trailer			
3.Cluster	Common	Tachometer	P0	N/A	Tachometer is an instrument for measuring the speed of an engines rotation	A tachometer is a sensor device used to measure the rotation speed of an object such as the engine shaft in a car, and is usually restricted to mechanical or electrical instruments. This device indicates the revolutions per minute (RPM) performed by the object.		
2.AVN	System	TAP	P2		Template Access Protocol	The Template Access Protocol is based upon fixed templates stored in the cluster. There is a fixed template for every display to be shown on the cluster. Each one is divided into several fields with unique Field IDs. Each template is a member of a group that determines its display priority level relative to other templates. The IMC (Infotainment Master Controller) requests that the cluster load a template along with the data for each field in that template. Upon receiving it, the Cluster will load that template with fields populated with the received data and display it on the message centre.		
2.AVN	Navigation	Target	P2		The outgoing route segment of a specific intersection point.			
2.AVN	System	Target Level	P2		This represents the nominal output level that the AGC (Automatic Gain control) attempts to hold the ADC (analog-to-digital converter) output signal.			
2.AVN	System	TB	P2		Tera Byte: The terabyte is a multiple of the unit byte for digital information. The prefix tera represents the fourth power of 1000, and means 1012 in the International System of Units (SI), and therefore one terabyte is one trillion (short scale) bytes. The unit symbol for the terabyte is TB.	1 TB = 1000000000000bytes = 1012bytes = 1000gigabytes.		

4.Telematics	Vehicle interface	T-Box	P0	<u>Telematics Box</u>	<p>T-box is common name of the telematics device which is installed inside a vehicle to support telematics services/application on that vehicle.</p> <p>Development product name:</p> <ul style="list-style-type: none"> GM: VCP, TCP Geely: NGT, TEM, TEM2 JLR: TCU3, TCU4, VDC Toyota: DCM BMW: Wave 	<p>The “telematics box” is an electronic control unit that incorporates a phone module for the connection to communication networks, a module for vehicle “multi-constellation” satellite localisation (GPS, Galileo, Glonass systems) and a 3-axes accelerometer to detect acceleration and braking parameters.</p>		
2.AVN	Navigation	TBT	P0	<u>Turn-By-Turn</u>	<p>Turn-by-turn systems typically is feature of some GPS navigation devices. It uses an electronic voice to inform the user whether to turn left or right, the street name, and how much distance to the turn</p>	<p>For example:</p> <p>'Enter Navigation feature (Tap Navigation icon on screen) -> Then select location -> vehicle is run by simulator -> Turn by Turn is executed.</p>		 <p>CLICK ON IMAGE TO ENLARGE</p>
2.AVN	Vehicle	TCM	P2		Transmission Control Module	A transmission control unit or TCU is a device that controls modern electronic automatic transmissions.		

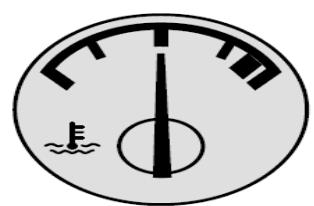
4.Telematics	Vehicle interface	TCU	P0	<u>Telematic Control Unit</u>	<p>A telematic control unit (TCU) in the automobile industry refers to the embedded system on board a vehicle that controls tracking of the vehicle. TCU is to indicate telematic box in the view of vehicle network (ECU).</p> <p>A TCU consists of:</p> <ul style="list-style-type: none"> - A global positioning system (GPS) unit, which keeps track of the latitude and longitude values of the vehicle; - An external interface for mobile communication (GSM, GPRS, Wi-Fi, WiMax, or LTE), which provides the tracked values to a centralized geographical information system (GIS) database server; - An electronic processing unit; - a microcontroller, in some versions; a microprocessor or field programmable gate array (FPGA), which processes the information and acts on the interface between the GPS; - A mobile communication unit; And some amount of memory for saving GPS values in case of mobile-free zones or to intelligently store information about the vehicle's sensor data 		
2.AVN	Radio	TDM	P2		<p>Time Division Multiplex</p> <p>Time-division multiplexing (TDM) is a method of transmitting and receiving independent signals over a common signal path by means of synchronized switches at each end of the transmission line so that each signal appears on the line only a fraction of time in an alternating pattern. It is used when the bit rate of the transmission medium exceeds that of the signal to be transmitted.</p>		

2.AVN	Radio	TDMA	P2		Time Division Multiple Access Time-division multiple access (TDMA) is a channel access method for shared-medium networks. It allows several users to share the same frequency channel by dividing the signal into different time slots. The users transmit in rapid succession, one after the other, each using its own time slot. This allows multiple stations to share the same transmission medium (e.g. radio frequency channel) while using only a part of its channel capacity. TDMA is used in the digital 2G cellular systems such as Global System for Mobile Communications (GSM), IS-136, Personal Digital Cellular (PDC) and iDEN, and in the Digital Enhanced Cordless Telecommunications (DECT) standard for portable phones. It is also used extensively in satellite systems, combat-net radio systems, and PON networks for upstream traffic from premises to the operator			
2.AVN	Media	Technical info	P2		Example: size, duration, bitrate, type....	It's physical value of an MP3 files, not metadata		

2.AVN	System	Teen driver	P2		<p>Teen Driver is a feature that helps guide teens to develop safe driving habits like seat belt use and watching your speed</p> <p>Once activated, a vehicle operated with a Teen Driver key fob can limit certain vehicle features and prevent certain safety systems from being switched off. Additionally, an in-vehicle report card can provide details into distance driven, maximum speed, number of over speed warnings, and other driving events, providing parents with useful information for coaching their new driver.</p>	<p>It lets you set speed alerts, a volume limit and more; and with the industry's first and only in-vehicle report card, it's easy to track your teen's driving performance</p> <p>A PIN is required to register keys or key fobs, change Teen Driver Settings, or access/ delete Report Card data.</p> <p>When the vehicle is in park, select "Teen Driver" from the vehicle settings menu in the infotainment screen</p> <p>Create a four-digit PIN code, or enter the PIN if you've already set one</p> <p>Select "Key Registration" and follow on-screen prompts. If your vehicle is equipped with passive entry, place your key fob in the transmitter pocket</p> <p>Once a Teen Driver key or fob has been registered, you can configure settings and view an on-screen report card. Some settings are non-configurable, meaning that if Teen Driver is enabled, these settings will always be active while others can be customized or turned ON/OFF.</p>		
2.AVN	Connection	TEL	P2		Tata Elxsi Limited			
4.Telematics	Telematic Power Mode	Telematic Normal mode	P0	N/A	Action when the KL 30 is re-connected. KL 30 = ignition position 3 (where the ignition defaults after starting the engine - running).			
4.Telematics	Telematic Power Mode	Telematic OFF/ Shut down Mode	P0	N/A	In OFF mode, telematic board may not support any function, minimal power consumption.			

4.Telematics	Telematic Power Mode	Telematic Standby / Sleep Mode	P0	N/A	<ul style="list-style-type: none"> - During these modes, the control unit shall consume as little power as possible. All components shall be powered down, except the ones(ex, RTC, Ethernet, Airbag Interface,...) - When vehicle stopped, telematic board may change to low power state with limited functionality. This state supports wake up to Normal (working) state when meet specific condition. 			
1.Common	ECU	Telematics	P0	N/A	<p>Telematics was a merging of the telecommunications and informatics (computing science). It referred to the transfer of information over telecommunications.</p> <p>Telematics is a general term, can involve any of the following:</p> <ul style="list-style-type: none"> - The technology of sending, receiving and storing information using telecommunication devices to control remote objects - The integrated use of telecommunications and informatics for application in vehicles and to control vehicles on the move -Global navigation satellite system technology integrated with computers and mobile communications technology in automotive navigation systems <p>Some commercial vehicle telematics services: GM Onstar, BMW Assist, Lexus Link, Toyota G-Book, Hyundai Blue Link, Nissan CarWings</p>	<p>To provide a vehicle telematics service, the manufacturer needs to establish a center server system to manage all telematics activities of all vehicles.</p> <p>Regarding vehicle side, we need a device which is installed inside the vehicle, it is usually called as telematics box or tbox. This tbox can get the vehicle's status and send information to the center server via telecommunication like SMS or data service (3G, LTE) or voice call. In another hand, tbox can receive request from center and decide what need to happen.</p> <p>Để cung cấp dịch vụ telematics cho người mua xe, các nhà sản xuất xe nhất thiết phải xây dựng một hệ thống máy chủ trung tâm để quản lý tất cả các hoạt động liên quan đến telematics.</p> <p>Bên cạnh đó, bên trên mỗi chiếc xe cũng phải cài đặt một thiết bị để thực hiện các công việc phục vụ cho telematics và thường được gọi là telematics box (hay tbox). Thiết bị này do cài đặt trên xe nên có thể lấy được các thông tin trên xe và gửi về hệ thống máy chủ trung tâm thông qua kết nối viễn thông (Có thể xem thiết bị này có vai trò tương đương như một chiếc điện thoại di động, có thể kết nối Internet thông qua mạng viễn thông 3G, LTE đến hệ thống máy chủ của hãng xe). Một khía cạnh thiết bị cũng có thể nhận được các yêu cầu từ máy chủ và xử lý.</p>	<p>Telematics là kết hợp của từ "telecommunication" (viễn thông) và "informatics" (khoa học máy tính) dùng để mô tả việc trao đổi thông tin thông qua mạng viễn thông.</p> <p>Telematics là một khái niệm chung, nó có thể là các khái niệm sau:</p> <ul style="list-style-type: none"> - là công nghệ truyền - nhận thông tin thông qua các thiết bị truyền thông với mục đích điều khiển từ xa (giống với IoT) - là việc ứng dụng viễn thông với khoa học máy tính trên xe cộ để điều khiển các phương tiện này. - là việc tích hợp công nghệ định vị toàn cầu với viễn thông để ứng dụng vào hệ thống định vị trên các phương tiện giao thông. <p>Trong ứng dụng telematics trên các phương tiện giao thông, các dịch vụ telematics đã được thương mại hóa như: GM Onstar, BMW Assist, Lexus Link, Toyota G-Book, Hyundai Blue Link, Nissan CarWings</p>	<pre> graph LR GPS[GPS] --> PV[Passenger Vehicle] GPS --> CV[Commercial Vehicle] PV --> CS[Center Server] CV --> CS CS --> MA[Maps Application] CS --> A[Analytics] MA --> MA_S[Mobile Applications] A --> MA_S MA_S --> MA_C[SMS & Email] </pre>

4.Telematics	Application	Telematics Navigation	P2	N/A	<p>Telematics navigation is an application through telematics service to help driver monitoring and controlling the movement from one place to another play.</p> <p>It is different application with the navigation application on head unit.</p>		
2.AVN	Phone	Telephony role	P2		<p>Roles of Phones when connect HU</p> <ul style="list-style-type: none"> - How to check this role: Setting -> Phone - Role: Outgoing and Incoming Calls (outgoing source): when connect Phone with HU via BT. This phone can make outgoing & receive incoming call. Only 1 outgoing source. The first phone connect HU always take role outgoing source - Role: Incoming calls: When connect Phone with HU via BT. This phone only receive incoming call. - Role: Media-Bluetooth: When connect IPod/Ipad via BT, only play music. If Ipod connect via USB port, Iphone & Android Phone connect via USB (but Apple Carplay & Android Auto item in Setting is off). The device screen does not display any roles, even if in Audio app, these sources are displayed - Role: Apple Carplay: When connect Iphone with HU via USB port - Role: Media-Baidu Carlife: When device has Baidu Carlife app connect with HU via USB port, but Baidu Carlife item in Setting is off <p>Note: Outgoing source & incoming calls are called telephony role. Android Auto device, Baidu CarLife devices show their telephony role as if they were only connected via Bluetooth</p>		

3.Cluster	Common	Telltale	P0	N/A	<p>Telltale Indicators are Graphical Icons and/or Text displayed in the Cluster that indicate the state of a vehicle system or subsystem to the user. Such states include ON/OFF, ENAbLED/DISAbLED, WARNING, etc.</p> <p><i>Telltale is an indicator of malfunction of a system within a motor vehicle by an illuminated symbol or text legend</i></p>	<p>When active, they must always be shown and must not be obscured by any other graphics.</p>		
4.Telematics	Telematics	TEM	P2		Telematics Electronic Module	<p>It works same as T-box</p> <p>It's a device which merges telecommunications and infomatics in car</p>		
2.AVN	Climate	Temperature	P2			<p>The climate system Set Temperature(s) is displayed on the Climate Screen. This includes both dual zone and single zone climate systems. Configuration Signals, also referred to as Indicators, determine which Set Temperature display and adjustment elements are shown on the screen.</p>		
3.Cluster	Common	Temperature gauge	P0	N/A	<p>A temperature gauge is used to indicate the temperature of an item being monitored.</p> <p>The temperature gauge in your vehicle is designed to indicate the temperature of your engine's coolant. This gauge will tell you if your engine's coolant is cold, normal, or overheating. It is an important dial that is located on the dashboard of your vehicle.</p>		 	
2.AVN	System	Terminaliranica	P2		A software to get log			
2.AVN	Navigation	Terminating	P2		The first segment behind the maneuver area along the route.			
2.AVN	System	Terra Term	P2		Tera Term (rarely TeraTerm) is an open-source, free, software implemented, terminal emulator (communications) program, a software to get log			

4.Telematics	Telematics	Tester (external tester)	P2		External tool, which requests service execution on the ECU. Tester -ECU communication is a Client - Server relation.	External tool, which requests service execution on the ECU. Tester -ECU communication is a Client - Server relation.		
4.Telematics	Common	TFTP	P2	Trivial File Transfer Protocol	a simple File Transfer Protocol which allows a client to get a file from or put a file onto a remote host	- It is used where user authentication and directory visibility are not required. TFTP uses the User Datagram Protocol (UDP) rather than the Transmission Control Protocol (TCP)		
2.AVN	Radio	THD	P2		Total Harmonic Distortion The total harmonic distortion (THD) is a measurement of the harmonic distortion present in a Signal and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency			
2.AVN	Navigation	The direction of Car	P2		The direction of car is based on x-coordinate, counterclockwise. The unit for direction is deg (degree)			
2.AVN	System	The Notification Drawer	P2		The notification drawer is a screen on Head Unit to display notifications	The Notification Drawer is accessed by touching the Notification Icon on Head Unit screen		
2.AVN	Navigation	The Probability of Matching	P2		The absolute matching probability which takes into account of the heading/distance deviation.			

2.AVN	Power Mode	Theft lock	P2		<p>State when the CSM/Low Radio is theftlocked due to a received VIN that does not match the stored VIN. Note that this state only indicates that the CSM/Low Radio component is in the theftlock state. The Theftlock state of all other modules is not included in order to reduce overall system complexity.</p>	<p>The CSM/Low radio has detected a VIN mismatch from a previously learned VIN (Theftlocked).</p>		
4.Telematics	[TBD]	Theft pursuit	P2	N/A	<p>Abbreviation of Stolen Vehicle Locator.</p>	[TBD]		
2.AVN	Connection	Throughput	P2		<p>Throughput is the actual capacity in bits transmitted per an unit time. Normal Throughput High Throughput (HT) Very High Throughput (VHT)</p>	<p>Can test by wifi tool: iperf, wireshark, wifi analyzer ..</p>		
2.AVN	Media	TIFF	P2		<p>Tagged Image File Format</p>	<p>Tagged Image File Format, abbreviated TIFF or TIF, is a computer file format for storing raster graphics images, popular among graphic artists, the publishing industry,[1] and photographers.</p>		
2.AVN	Vehicle	Timed Charging	P2	N/A	<p>- It's also Scheduled Charging - This function is to set time to recharge the battery for battery/plug-in electric vehicle</p>	<ul style="list-style-type: none"> - Connect the vehicle's Charging cable to domestic sockets. - Access [Settings] screen to set time to charge <p>[REF: https://www.landrover.co.uk/vehicles/phev/charging.html]</p>		

4.Telematics	Telecommunication	TLS	P0	<u>Transport Layer Security</u>	<p>Transport Layer Security (TLS) is a protocol that provides privacy and data integrity between two communicating applications.</p> <p>Transport Layer Security (TLS), and its now-deprecated predecessor, Secure Sockets Layer (SSL), are cryptographic protocols designed to provide communications security over a computer network.</p> <p>TLS is using to prevent the attack in the data transfer channel. If a hacker can read the data between client and server, he/she can read all the data.</p>	<p>To establish TLS connection between 2 components, they should share the keys for encryption first.</p> <p>The connection is private (or secure) because symmetric cryptography is used to encrypt the data transmitted.</p> <p>TLS (SSL) là giao thức mã hóa an toàn, nhằm nâng cao tính bảo mật và toàn vẹn của dữ liệu được trao đổi trên mạng máy tính.</p> <p>Thông thường, khi hai đối tượng truyền dữ liệu với nhau, nếu dữ liệu không được mã hóa, kẻ tấn công ở giữa đường truyền có thể đọc được toàn bộ dữ liệu. Tuy nhiên, nếu dữ liệu truyền đi đã được mã hóa, kẻ tấn công chỉ có thể lấy được các dữ liệu đã mã hóa và không nắm được nội dung chính.</p> <p>Để mã hóa dữ liệu cần dùng khóa (key) để mã hóa. Nếu hai đối tượng sử dụng cùng một khóa (shared key) để mã hóa và giải mã, thì gọi là khóa đối xứng.</p> <p>TLS sử dụng công nghệ khóa đối xứng để mã hóa dữ liệu truyền đi. Tuy nhiên, trước khi muốn truyền được dữ liệu, hai đối tượng phải cùng lưu lại giá trị khóa để mã hóa và giải mã. Do đó để cài đặt TLS cần phải thực hiện bước thiết lập khóa và lưu khóa trên hai đối tượng muốn trao đổi dữ liệu với nhau.</p>

2.AVN	Radio	TMC	P2	Traffic Message Channel Traffic Message Channel (TMC) is a technology for delivering traffic and travel information to motor vehicle drivers. It is digitally coded using the ALERT C protocol into RDS Type 8A groups[1] carried via conventional FM radio broadcasts. It can also be transmitted on Digital Audio Broadcasting or satellite radio. TMC allows silent delivery of dynamic information suitable for reproduction or display in the user's language without interrupting audio broadcast services				
4.Telematics	Telematics	TMP	P2	Telematics Management Portal	TMF, TSC, TSG, TSS, TC that belong to solution overview of Geely Project - file: Integration Solution - Geely CSP- IHU and CSP Integration - Application Interface. The implementation of CSP is based on an IT architecture, which implements automotive industry specific requirements and functions. Note: Connectivity Service Platform (CSP) – provide telematics service and infotainment service to end users and responsible for telematics service management during the whole user and vehicle lifecycle by integrated with external system.			
4.Telematics	Telematics	TMU	P2	Telematics Unit TMU (Telematics Unit). TMU is a module for telematics service which provides vehicles, drivers and passengers with diverse information and service.				
2.AVN	General	Toll	P2	Money that you pay to use a particular road or bridge				

2.AVN	Navigation	Toll Announcement s	P2		The announcements shall support additional street additions such as: Road attributes (tunnel, toll gate, etc...)			
2.AVN	Navigation	Toll Gate Approach	P2		It is approach of toll gate. It will be detected by the system base on the navigation map.	Toll Gate is a gate where a toll is collected. Wireless communication between the in-vehicle device and the toll gate antenna, cars are able to drive through toll gates without stopping		
2.AVN	Media	Tone	P2		Tone of sound	Tone definition, any sound considered with reference to its quality, pitch, strength, source - Sound Tone Setting : Support the bass / mid / treble adjustment.		
2.AVN	System	Tone button	P2		The Tone button causes the Tone Settings view to directly be accessed	Tap softkey "Tone" on Head Unit screen		
2.AVN	System	Tone setting	P2		An screen on HU screen that allows you to make changes to the Treble, Middle and Bass settings.	1. Press the Tone settings button. 2. Use the \blacktriangleleft , \triangleright buttons to make adjustments to the Treble, Middle and Bass. Press the button to return to Sound Setup.		
4.Telematics	Telematics	TOT	P2	Technology Order Table	Technology Order Table	N/A		
2.AVN	System	Touch	P2		The Touch gesture is used frequently throughout the system interface to trigger the default functionality associated with a given item.	The action for Touch is performed when the finger is lifted from the screen		

2.AVN	Vehicle	Tow Assist	P1	N/A	<ul style="list-style-type: none"> - It's also Trailer Assist (Volkswagen, Range Rover, Ford) - Tow Assist aims to make reversing a trailer easier 	<ul style="list-style-type: none"> - Reverse gear - Activate parking aid - Use the mirror adjustment switch to set the direction in which the trailer should be steered. <p>-----</p> <ul style="list-style-type: none"> - Vehicle automatically changes steering wheel - User manually changes gear, accelerating and braking <p>[REF: https://www.volkswagen.co.uk/technology/parking-and-maneuvring/trailer-assist]</p>		
2.AVN	Vehicle	Tow Bar	P2	N/A	<ul style="list-style-type: none"> - A bar attached to the back of A car that is used for pulling A caravan or trailer 	N/A		
2.AVN	Navigation	Townblock	P2		<p>Townblock is the part of the displayed map, which doesn't include road. (A city block is the smallest area that is surrounded by streets. City blocks are the space for buildings within the street pattern of a city, and form the basic unit of a city's urban fabric.)</p>			
2.AVN	Radio	TP	P0	Traffic Programme	<ul style="list-style-type: none"> - The Traffic Program Identification flag (TP) is used to identify stations that offer traffic program - The signal shall be taken into account during automatic search tuning. 	<ul style="list-style-type: none"> - TP = 0: Program offers no traffic program - TP = 1: Traffic program itself offers traffic program 		

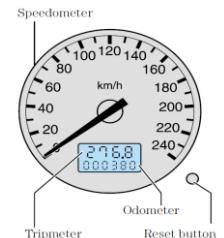
2.AVN	Radio	TP – TA Feature	P2	<p>The broadcast of Traffic Programme signal inside the RDS signal means that the radio station makes Traffic Announcements.</p> <p>If TA signal is broadcasted before TP signal this means that another radio station broadcasts TA signal over EON.</p> <p>If the transmitter enables TA signal and the radio receiver has TA support and driver listening to that station tape or CD player is going to stop playing radio receiver's volume automatically increases.</p> <p>So radio listener never misses the Traffic Announcement of the radio station</p>			
2.AVN	Connection	TPC	P2	<p>Transmit Power Control</p> <p>TPC, Transmit Power Control, is a feature of 802.11h along with DFS by which the access point can define local rules for maximum transmit power.</p>			
2.AVN	Navigation	TPEG	P2	<ul style="list-style-type: none"> - The Transport Protocol Experts Group (TPEG) is a data protocol suite for traffic and travel related information. - Transport Protocol Experts Group TPEG is used to inform travellers on roads, in public transport or even pedestrians about road conditions, weather, fuel prices, parking or transport delays. (NAVI + Europe Only) 	<p>Signaling TPEG by signal tool redwood .</p> <p>Setup HU time is 15/08/2013, 3h PM, radio receive YOU FM signal. On radio screen, press Menu button, if icon prgarm type is enable that means TPEG was active.</p>		

2.AVN	Vehicle	TPMS	P2	Tire Pressure Monitoring System (타이어공기압관리시스템):	A tire-pressure monitoring system (TPMS) is an electronic system designed to monitor the air pressure inside the pneumatic tires on various types of vehicles. TPMS report real-time tire-pressure information to the driver of the vehicle, either via a gauge, a pictogram display, or a simple low-pressure warning light. TPMS can be divided into two different types – direct (dTPMS) and indirect (iTTPMS).		
2.AVN	Vehicle	TR	P2	Terrain Response: System allows drivers to select one of several modes that optimize performance on a variety of different surfaces (example: Mud Ruts, Sand, Grass Gravel Snow, Eco ...)			
2.AVN	System	Trace scope set	P2	<ul style="list-style-type: none"> - "Trace scope set" means the bundle of log levels configured per each function, that specifies log level of Domain ID and Channel ID described in MLP specification. - Two types of scope sets should be defined, i.e. "Default scope set" and "Special scope set" - All the function owners should define these two scope sets in order to properly secure log messages for issue analysis 			
2.AVN	Media	Track session postview	P2				
2.AVN	Media	Track session preview	P2				
2.AVN	Navigation	Traffic Horizon	P2	The space that the traffic information is applied based on the current car position			

2.AVN	Vehicle	TrafficLightOnline	P2	A application which connects the car with the central traffic control computer, which controls all the traffic lights in the city.	Based on information of traffic lights in the city which store in the control computer , it shows the driver what speed needs to be selected to pass through the next traffic light through a green phase		
2.AVN	Power Mode	Transmission	P2	<ul style="list-style-type: none"> -a mechanism for transmitting power from a vehicle's engine (or motor) to its wheels - Is the system of gears and shafts by which the power from the engine reaches and turns the wheels <p>There are two mode : Manual Transmission and Auto Manual Transmission</p>	<p>4-speed transmission selector lever positions</p> <p>P: Park : transmission is locked, if P not selected, if driver's door opened, IGN OFF, audible alarm will sound. This mode locks the movement of the vehicle in any direction. P is the only mode in which cars can be started, other than N (Neutral). The P mode is used when you have to stop and park the car for long time. i.e at your house, office, shopping center parking, etc</p> <p>R: Reverse : This mode allows the vehicle to be driven backwards. To select reverse, the driver must depress the gear level, press the foot brake or the shift lock button (varies n different vehicles).</p> <p>N : Neutral : It is same as P (Park) mode, except that the movement of the vehicle is not restricted. You should use this mode if you are driving in a stop-and-go situation when you do not want to take the extra effort of continuously applying foot brakes when the car should not be moving. This mode can also be used if the car has to be towed. In N mode you can switch the car engine on and off</p> <p>D: Drive</p> <p>In the D mode, you engage the gear, allowing the vehicle to move forward through its range of available gears. How many gear ratios are in the gearbox i.e 4, 5 or 6 or more, vary in different car models.</p>		

2.AVN	Connection	Transceiver Module	P2	A transceiver is a device comprising both a transmitter and a receiver that are combined and share common circuitry or a single housing.	Transceivers module can handle analog or digital signals, and in some cases, both. In regions where digital coverage is spotty, a transceiver may be equipped for analog to ensure that there will be no loss of signal. The ability to receive both can drive up the cost of the transceiver, due to the need to bundle in additional circuitry. Used in Very low power UHF wireless data transmitters and receivers , 315 / 433 / 868 and 915 MHz ISM/SDR band systems and RKE – Two-way Remote Keyless Entry		
2.AVN	Media	Transport Control	P2	Buttons are using control the track is playing	Play/Pause , Next, Previous, Shuffle...		
2.AVN	Radio	Transport Controls	P2	Transport control contain button : next/previous/ play/pause..... to control and playback music,sound.....	Press or Tap on these button		
2.AVN	Navigation	Travel Time	P2	Time travel is the concept of movement between certain points in time, analogous to movement between different points in space by an object or a person			

2.AVN	Media	Treble/Bass	P1	<ul style="list-style-type: none"> - Bass adjusts the lower frequency sounds, such as bass guitar, or drum kick. Frequencies from ~20Hz - 500Hz. - Treble adjusts the higher frequency sounds, such as an electric guitar or violin notes. Frequencies from ~ 6kHz - 20kHz. 	<ul style="list-style-type: none"> - Bass describes tones of low (also called "deep") frequency, pitch and range from 16-256 Hz - Treble refers to tones whose frequency or range is at the higher end of human hearing. It is characterized by a very high pitched sound or tone and is the higher part in a recording. They have frequencies from 2.048 kHz-16.384 kHz 	<p>-Treble: Có dải tần số âm thanh trải dài từ khoảng 6kHz đến 20kHz, âm Treble góp phần làm tăng độ chi tiết, tươi sáng, sắc bén của mọi âm thanh ta nghe thấy trong cuộc sống. Tiếng Treble “hay” sẽ không bị quá “bén” hoặc chói gắt, mà sẽ “thanh thoát và trong vắt như pha lê”.</p> <p>- Bass:</p> <p>Là những âm thanh trầm, nằm trong khoảng tần số 20Hz – 500Hz. Chúng là những nốt âm rất nhỏ và được xem là nhỏ nhất. Vậy nên những chiếc loa tạo âm bass được gọi là loa trầm hay siêu trầm. Và ngay trong âm Bass, người ta cũng chia ra làm 3 mức khác nhau:</p> <ul style="list-style-type: none"> – Bass sâu (20Hz – 80Hz) – Bass trung (80Hz – 300Hz) – Bass cao (320Hz – 500Hz) 	
3.Cluster	Common	Trip computer	P0	N/A	<p>A trip computer is a computer fitted to some cars; most modern trip computers record, calculate, and display the distance travelled, the average speed, the average fuel consumption, and real-time fuel consumption.</p>	<p>Example: A trip is available when IGN ON</p> <p>Includes below information:</p> <ul style="list-style-type: none"> + Outside temperature + Traveled distance + Average Fuel consumption + Average speed + Time 	
3.Cluster	Vehicle	Trip Information	P1	<p>Displays the time, distance, cons, speed according to display option ('since', 'continuous', 'til destination', 'e-trip since')</p>	<p>Displays the time, distance, cons, speed according to display option ('since', 'continuous', 'til destination', 'e-trip since')</p>	<p>Show this view as a default or when user select Trip Computer</p>	

2.AVN	Vehicle	Trip meter	P2	The tripmeter records the mileage of individual journey	<p>The trip meter records the total distance the vehicle is driven until the meter is again reset.</p> <p>Return it to "0.0" by depressing and holding the selector for one second or more. Use this meter to measure trip distances and to compute fuel consumption.</p>		
2.AVN	Climate	Tri-zone Climate control	P2	This climate-control system helps maintain a comfortable environment for passengers while helping to filter out allergens for sensitive occupants.	<p>The advantages of selecting individual temperature levels for three areas of the cabin are further enhanced by the filtering and conditioning functions.</p> <p>It's capable of filtering nearly 100 percent of particulates over 8 microns in size (the size of most pollen), as well as about 40 percent of particulates down to 0.3 microns (about the size of diesel emissions).</p> <p>The tri-zone automatic climate-control system lets the driver, front passenger and rear passengers adjust temperature and air distribution to automatically meet their needs.</p> <p>Both front and rear systems are controllable by the driver.</p> <p>With the press of a button, the rear system can be independently adjusted using the control panel in the second row.</p> <p>On models equipped with navigation, the system uses data from the onboard global positioning system receiver to automatically adjust fan speed to compensate for heating from direct sunlight.</p> <p>Tri-zone automatic climate control also features humidity control designed to automatically prevent the windows from fogging.</p>		

4.Telematics	Telematics	TSC	P2	Telematics Service Controller	<p>TMP , TSC, TSG, TSS, TC that belong to solution overview of Geely Project - file: Integration Solution - Geely CSP- IHU and CSP Integration - Application Interface. The implementation of CSP is based on an IT architecture, which implements automotive industry specific requirements and functions.</p> <p>Note: Connectivity Service Platform (CSP) – provide telematics service and infotainment service to end users and responsible for telematics service management during the whole user and vehicle lifecycle by integrated with external system.</p>		
4.Telematics	Telematics	TSG	P2	Telematics Service Gateway	<p>TMP, TSC, TSG, TSS, TC that belong to solution overview of Geely Project - file: Integration Solution - Geely CSP- IHU and CSP Integration - Application Interface.</p> <p>The implementation of CSP is based on an IT architecture, which implements automotive industry specific requirements and functions.</p> <p>Note: Connectivity Service Platform (CSP) – provide telematics service and infotainment service to end users and responsible for telematics service management during the whole user and vehicle lifecycle by integrated with external system.</p>		
2.AVN	Radio	TSPER	P2		<p>Transport Stream Packet Error</p> <p>The transport stream packet error rate (TS-PER) as a paper. basic is employed to measure the performance of the physical layer of digital video broadcasting for handheld terminals</p>		

4.Telematics	Telematics	TSS	P2	Telematics Support System	Telematics Support System	<p>TMP, TSC, TSG, TSS, TC that belong to solution overview of Geely Project - file: Integration Solution - Geely CSP- IHU and CSP Integration - Application Interface.</p> <p>The implementation of CSP is based on an IT architecture, which implements automotive industry specific requirements and functions.</p> <p>Note: Connectivity Service Platform (CSP) – provide telematics service and infotainment service to end users and responsible for telematics service management during the whole user and vehicle lifecycle by integrated with external system.</p>		
2.AVN	Navigation	TTD	P2		Time to destination			
2.AVN	System	TTL	P2		Time to Live: Time-to-live (TTL) is a value in an Internet Protocol (IP) packet that limits the lifespan of a packet of data in a computer or network	TTL may be implemented as a counter or timestamp attached to or embedded in the data. Once the prescribed event count or timespan has elapsed, data is discarded. In computer networking, TTL prevents a data packet from circulating indefinitely. In computing applications, TTL is used to improve performance of caching.		
2.AVN	Voice Recognition	TTS	P0	<u>Text To Speech</u>	Text To Speech: is a software/function/characteristic of electronic system that converts text into spoken voice output.	<ul style="list-style-type: none"> - User input text with the supported format into the text box in some functions like Email, Messaging, Multimedia Message Service. - System will translate text to voice data and readout those text following speed rate value : Slow, Medium, and Fast 		

4.Telematics	Telematics	TTY	P2	<p>Tele-Type is designed to allow hard of hearing Onstar subscribers to effectively communicate over wireless to any other teletype user or teletype equipped Advisor at the Onstar Call Center.</p>	<p>Onstar support an device caller TTY to help deaf people can use Onstar Service TTY connect with VCP via Bluetooth connection</p> <p>Upon power transition from to ON, VCP will check if TTY funtion enable or not, if yes then it will check if have any TTY device paired then decide if needed pair or re-connect TTY device</p> <p>While in TTY mode, VCP shall disable SR function</p> <p>TTY only required for NA(North America) market</p>		
2.AVN	Phone	TTY mode	P2	<p>TeleTypeWriter is a telecommunications device that allows people who are deaf, hard of hearing, or who have speech or language disabilities, to communicate by telephone</p>	<ul style="list-style-type: none"> - Just only for Onstar & while vehicle is stopped - How to enable TTY Mode: Setting -> Apps > Phone > Enable Onstar Phone TTY Mode <p>To use a TTY, you set a telephone handset onto special acoustic cups built into the TTY. (some TTY models can be plugged directly into a telephone line). Then, type the message you want to send on the TTY's keyboard. As you type, the message is sent over the phone line, just like your voice would be sent over the phone line if you talked. You can read the other person's response on the TTY's text display.</p>		
2.AVN	Radio	Tune Up/ Tune Down	P1	<p>- Tune Up/Down : 1-Step Up, Down An adjustment of Tune</p>	<p>Adjust the tune decrease by using the knob</p>		
2.AVN	Media	TUNE KNOB	P1	<p>Button help choose item</p>	<ul style="list-style-type: none"> - Turn the tune knob follow clockwise to go to next item - Turn the tune knob follow counter-clockwise to back to previous item - Enter the tune knob to choose present item 		
2.AVN	Radio	Tune Up	P1	<p>- Tune Up/Down : 1-Step Up, Down An adjustment of Tune</p>	<p>Adjust the tune increase by using the knob</p>		

2.AVN	Radio	TuneMix	P2		Tune Mix plays songs in a shuffle format from the favorite music channels which are currently displayed on the Satellite Radio Now Playing screen	Use Tune Mix to create your own unique listening experience by grouping your favorite channels together The user may use as few as two stations and as many as 6 stations to create this unique station.		
2.AVN	Radio	Tuner	P2		A tuner is a subsystem that receives radio frequency (RF) transmissions like radio broadcasts and converts the selected carrier frequency and its associated bandwidth into a fixed frequency that is suitable for further processing, usually because a lower frequency is used on the output.			
2.AVN	Radio	TuneStart	P2		TuneStart is a feature that allows you to tune to a channel with a song playing from the beginning, instead of playing the live broadcast. This can help you catch the song listed as playing on the channel in its entirety. It's only support XM radio	On AVN set support XM, Toggle to turn on TuneStart Feature		
2.AVN	Connection	U-APSD	P2		Unscheduled Automatic Power Save Delivery U-APSD is a part of 802.11e and helps considerably in increasing the battery life of VoWLAN terminals. U-APSD must be supported both by the VoWLAN terminal and by the WLAN access point. U-APSD always only works for the WMM access category concerned	The basic procedure works as follows: 1. The VoWLAN terminal logs in with Class of Service Expedited Forwarding (EF) and U-APSD at the WLAN access point. 2.The VoWLAN terminal then switches to power-save mode. 3.If the WLAN access point is sent data packets for the VoWLAN terminal concerned with the Class of Service Expedited Forwarding (EF), the access point temporarily stores this data for a short time and waits until the VoWLAN terminal is woken up again. Only then is the data sent. 4.The procedure works so rapidly that, even in the call status, the terminal still has enough time for the power-save mode.		

2.AVN	System	UART/ SPI	P2	<u>Universal Asynchronous Receiver Transmitter / Serial Peripheral Interface</u>	<p>A universal asynchronous receiver-transmitter (UART) is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable.</p> <p>The Serial Peripheral Interface bus (SPI) is a synchronous serial communication interface specification used for short distance communication, primarily in embedded systems.</p>	<p>Use for taking Bug Log in some project.</p> <p>SPI: SPI devices communicate in full duplex mode using a master-slave architecture with a single master. The master device originates the frame for reading and writing. Multiple slave devices are supported through selection with individual slave select (SS) lines.</p> <p>UART: A UART is usually an individual (or part of an) integrated circuit (IC) used for serial communications over a computer or peripheral device serial port. UARTs are now commonly included in microcontrollers. A related device, the universal synchronous and asynchronous receiver-transmitter (USART) also supports synchronous operation.</p>	<pre> graph TD subgraph SPI_Master [SPI Master] SCLK[SPI SCLK] MISO[SPI MISO] MOSI[SPI MOSI] SS1[SS1] SS2[SS2] SS3[SS3] end subgraph SPI_Slave1 [SPI Slave 1] SCLK1[SPI SCLK] MISO1[SPI MISO] MOSI1[SPI MOSI] SS1 end subgraph SPI_Slave2 [SPI Slave 2] SCLK2[SPI SCLK] MISO2[SPI MISO] MOSI2[SPI MOSI] SS2 end subgraph SPI_Slave3 [SPI Slave 3] SCLK3[SPI SCLK] MISO3[SPI MISO] MOSI3[SPI MOSI] SS3 end SCLK --> SCLK1 SCLK --> SCLK2 SCLK --> SCLK3 MISO1 --> MOSI MISO2 --> MOSI MISO3 --> MOSI MOSI1 --> MISO MOSI2 --> MISO MOSI3 --> MISO SS1 --> SS1 SS2 --> SS2 SS3 --> SS3 subgraph MCU1 [MCU1] UART_RX[UART RX] UART_TX[UART TX] GND1[GND] end subgraph MCU2 [MCU2] UART_RX[UART RX] UART_TX[UART TX] GND2[GND] end UART_RX --> UART_RX UART_RX --> UART_TX UART_TX --> UART_RX UART_TX --> UART_TX GND1 --- GND2 </pre>
4.Telematics	Telematics	UAV	P2	Unauthorized Access Vehicle	Unauthorized Access Vehicle	Content theft call function uploaded to OCC when unauthorized access in the vehicle is detected by VCP	

4.Telematics	Diagnostics	UDS	P0	<u>Unified Diagnostic Services</u>	<p>Unified Diagnostic Services is a diagnostic communication protocol in the electronic control unit (ECU) environment within the automotive electronics, which is specified in the ISO 14229-1.</p> <p>It is derived from ISO 14230-3 (KWP2000) and ISO 15765-3 (Diagnostic Communication over Controller Area Network (DoCAN)[2]). Unified in this context means that it is an international and not a company-specific standard. By now this communication protocol is used in almost all new ECUs made by Tier 1 suppliers of Original Equipment Manufacturer (OEM). These ECUs control a wide range of functions in vehicles including electronic fuel injection (EFI), Engine control unit (ECU), the transmission, anti-lock braking system, door locks, braking, and more. This protocol allows to do following function groups:</p> <ul style="list-style-type: none"> - Diagnostic and Communications Management - Data Transmission - Stored Data Transmission - Input / Output Control - Remote Activation of Routine - Upload / Download 		
2.AVN	Radio	UHF	P1	Ultra high frequency	Range of electromagnetic waves whose frequency is between 300 MHz and 3 GHz (3,000 MHz). Also known as the decimeter band or decimeter wave as the wavelengths range from ten to one decimeters		
4.Telematics	Telecommunication	UICC	P0	<u>Universal Integrated Circuit Card</u>	<p>The universal integrated circuit card (UICC) is the smart card used in mobile terminals in GSM and UMTS networks</p> <p>UICC (Universal Integrated Circuit Card) is the hardware used in mobile devices that contains SIM and/or USIM applications enabling access to GSM, UMTS/3G and LTE networks.</p>		
2.AVN	Vehicle	UIP	P2		User Interface Panel		

4.Telematics	Telematics	UKAI	P2	Unauthorized Key Attempting Ignition	Unauthorized Key Attempting Ignition	One type of VTS (Vehicle Theft Status), Triggered when the vehicle is started with an unacceptable key		
2.AVN	Common	UMS	P2	<u>USB mass Storage Device Class</u>	UMS = USB MSC = USB mass storage device class - is a set of computing communications protocols defined by the USB Implementers Forum that makes a USB device accessible to a host computing device and enables file transfers between the host and the USB device. To a host, the USB device acts as an external hard drive; the protocol set interfaces with a number of storage devices.	N/A		
2.AVN	Media	Uncompress	P2		Example:WAV, AIFF	The uncompress utility will restore files to their original state after they have been compressed using the compress utility. If no files are specified, the standard input will be uncompressed to the standard output		
2.AVN	Power Mode	Under_voltage	P2		(VW MIB3) the voltage <9V	Use CANOE to set status		
3.Cluster	Cluster	UnitMater	P1	- Converts temperature and velocity - Sets the units of volume/ liquid consumption/ gas consumption/ electricity consumption/ weight and the formats of date/ time	- Converts temperature and velocity - Sets the units of volume/ liquid consumption/ gas consumption/ electricity consumption/ weight and the formats of date/ time	Receive and provide calculated unit converted value in vehicle		

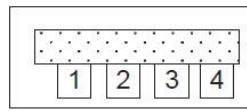
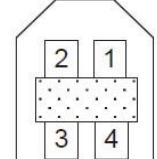
2.AVN	System	UPA - Ultrasonic park assist	P2		<p>An ultrasonic park assist (UPA) system consists of an UPA ECU (electronic control unit), and multiple smart ultrasonic transducers.</p> <p>Ultrasonic transducers typically are installed in front and rear bumpers, and wing mirrors of an automobile.</p>	<p>The system uses ultrasonic sensors (and the backup camera on some models) to locate park spots and detect obstacles. Once a spot is found the system can determine the proper steering-wheel inputs necessary to get into the space. The car will steer itself, with the driver only having to control the brake and throttle. The system works both when parallel parking on the street and when parking transversely in a parking lot. Even when not automatically parking the vehicle the system can warn of objects around the car and alert the driver. When it comes time to leave the Park Assist system can also provide the ideal path to follow to get out of the parking spot.</p>	
4.Telematics	Telematics	Uplink	P2	N/A	<p>Uplink communication refers to communication from the ECU to CVC. It is used for all messages being sent from the ECU to CVC</p>	<p>During uplink communication the ECU sends a message payload, formatted according to the Service Layer protocol message format. The ECU should attempt to send the message using MQTT, the Primary Communication Layer Protocol. If there is no existing data connection between ECU and CVC the ECU should attempt to establish a connection. If the connection cannot be established the ECU may try to deliver the message using SMS, the Secondary Communication Layer Protocol. The ECU may only use the Secondary Communication Layer Protocol to deliver some type of messages. The messages that should be delivered using the Secondary Communication Protocol are designated High-Priority Messages.</p>	

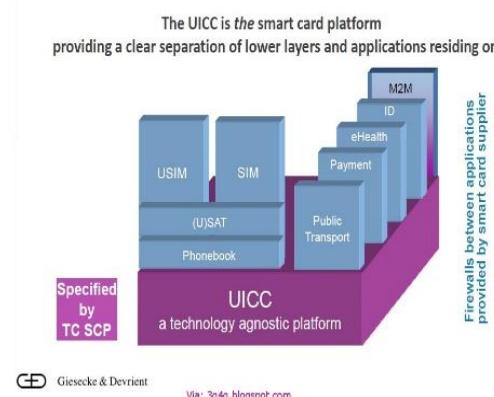
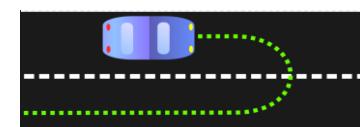
4.Telematics	Other	URI	P1	Uniform Resource Identifier	<p>URIs (Uniform Resource Identifier) are a standard for identifying documents using a short string of numbers, letters, and symbols. It is simple that is a text which is used to identify any resource or name on Internet.</p> <p>For testing, Tester need write the correct URI, the data shall be send to OCC to establish the call successfully.</p>	<p>The syntax of generic URIs and absolute URI references was first defined in Request for Comments (RFC) 2396, published in August 1998.^[3] and finalized in RFC 3986, published in January 2005.^[4]</p> <p>A generic URI is of the form:</p> <p><code>scheme://[user[:password]@]host[:port]][/path][?query][#fragment]</code></p>																																
2.AVN	Audio	URT™	P2		Universal Receiver Tester: The URT-Series offers several tools to capture, generate and playback real-world RF signals, with all its impairments. It offers products for Navigation as well as Broadcast Radio & Video and can be used for receiver validation, testing and support.																																	
2.AVN	Media	USB	P0	<u>Universal Serial Bus</u>	USB is an industry standard that was developed to define cables, connectors and protocols for connection, communication, and power supply between personal computers and their peripheral devices.	In Media, USB to indicate the source of media files, which means media player will get files through USB connection.																																
4.Telematics	Vehicle interface	USB	P2	<u>Universal Serial Bus</u>	USB (abbreviation of Universal Serial Bus) is an industry standard that establishes specifications for cables, connectors and protocols for connection, communication and power supply between personal computers and their peripheral devices.	There are many types of USB connector. You should remember to distinguish: + Standard: Type A, Type B, Type C + Mini connector + Micro connector. USB is commonly the communication between telematic unit and AVN.		<table border="1"> <thead> <tr> <th>Connectors</th> <th>USB 1.0 1996 1.5 Mbit/s (Low Speed)</th> <th>USB 2.0 2001 480 Mbit/s (High Speed)</th> <th>USB 2.0 Revised 2011 5 Gbit/s (Super-Speed)</th> <th>USB 3.0 2011 10 Gbit/s (SuperSpeed+)</th> <th>USB 3.1 2014 20 Gbit/s (SuperSpeed+)</th> <th>USB 3.2 2017 40 Gbit/s (SuperSpeed+ and Thunderbolt 3)</th> <th>USB4 2019</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Standard</td> <td>Type A </td> <td>Type A </td> <td>Type A </td> <td>Type A </td> <td>Type A </td> <td>Type A </td> <td></td> </tr> <tr> <td>Type B </td> <td>Type B </td> <td>Type B </td> <td>Type B </td> <td>Type B </td> <td>Type B </td> <td>Deprecated</td> </tr> <tr> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>Type-C </td> <td></td> </tr> </tbody> </table>	Connectors	USB 1.0 1996 1.5 Mbit/s (Low Speed)	USB 2.0 2001 480 Mbit/s (High Speed)	USB 2.0 Revised 2011 5 Gbit/s (Super-Speed)	USB 3.0 2011 10 Gbit/s (SuperSpeed+)	USB 3.1 2014 20 Gbit/s (SuperSpeed+)	USB 3.2 2017 40 Gbit/s (SuperSpeed+ and Thunderbolt 3)	USB4 2019	Standard	Type A 		Type B 	Deprecated	N/A	N/A	N/A	N/A	N/A	Type-C 											
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	N/A	N/A	N/A	N/A	N/A	Type-C 																																

4.Telematics	Common	USB FS	P1	USB Full Speed /USB1.1	USB 1.1, Speed 12 Mbps	USB 1.0 specification, which was introduced in January 1996, defined data transfer rates of 1.5 Mbit/s Low Speed and 12 Mbit/s Full Speed			
4.Telematics	Common	USB HID class	P1	USB Human Interface Devices class	In computing, the USB human interface device class (USB HID class) is a part of the USB specification for computer peripherals: it specifies a device class (a type of computer hardware) for human interface devices such as keyboards, mice, game controllers and alphanumeric display devices. The USB HID class is defined in a number of documents provided by the USB Implementers Forum's Device Working Group. The primary document used to describe the USB HID class is the Device Class Definition for HID 1.11				
4.Telematics	Common	USB HS	P1	USB High Speed /USB2.0	USB 2.0, Speed 480 Mbps	USB 2.0 was released in April 2000, adding a higher maximum signaling rate of 480 Mbit/s (60 MB/s) named High Speed or High Bandwidth			
2.AVN	System	USB Mass Storage	P2		USB Mass Storage Device	USB Mass Storage Device là driver (còn gọi là trình điều khiển) hỗ trợ kết nối máy tính với thiết bị USB, giúp cho hệ điều hành và thiết bị USB làm việc với nhau một cách hiệu quả. Các thiết bị USB có thể là thiết bị lưu trữ, máy in USB, thiết bị âm thanh USB, máy quét USB			
2.AVN	Media	USB OTG cable	P2	N/A	USB On The Go cable	USB On-The-Go, often abbreviated to USB OTG or just OTG, is a specification first used in late 2001 that allows USB devices, such as tablets or smartphones, to act as a host, allowing other USB devices, such as USB flash drives, digital cameras, mice or keyboards, to be attached to them.			

4.Telematics	Common	USB SS	P1	USB Super Speed /USB 3.x	USB 3.x, Speed > 5 Gbps	The USB 3.0 specification was published on 12 November 2008. Its main goals were to increase the data transfer rate (up to 5 Gbit/s), decrease power consumption, increase power output, and be backward compatible with USB 2.0. USB 3.0 includes a new, higher speed bus called SuperSpeed in parallel with the USB 2.0 bus. For this reason, the new version is also called SuperSpeed		
4.Telematics	Common	USB to SD	P1	USB to Serial Driver	A software and hardware that convert USB signal to Serial	Cổng chuyển và driver giúp chuyển đổi tín hiệu từ USB sang COM và ngược lại		
4.Telematics	Common	USB-C	P1	USB Type C	USB-C, formally known as USB Type-C, is a 24-pin USB connector system, which is distinguished by its two-fold rotationally-symmetrical connector	Link	Chuẩn giao tiếp USB mới nhất hiện nay (2019), có thể truyền dẫn dữ liệu/audio/video/power tốc độ cao và cắm được 2 chiều	

4.Telematics	Common	USB-IF	P1	Universal Serial Bus Interface	<p>The term "interface" can refer to either a hardware connection or a user interface. It can also be used as a verb, describing how two devices connect to each other.</p> <p>A hardware interface is used to connect two or more electronic devices together. For example, a printer typically connects to a computer via a USB interface. Therefore, the USB port on the computer is considered the hardware interface. The printer itself also has a USB interface, which is where the other end of the USB cable connects.</p>	<p>Link</p>	<p>USB interfaces đích là giao tiếp USB Wiki và Handbook 2018 đã có mô tả gần đầy đủ về chuẩn kết nối USB. https://vi.wikipedia.org/wiki/USB Một đặc điểm nói chung của giao tiếp usb là hotpluggable (cắm rút nóng) mà ko cần restart máy tính hay thiết bị ngoại vi Tuy nhiên keyword này tập trung hơn vào phần giao tiếp (Interface). Vậy Interface là gì? Định nghĩa (Computing) Hardware Interface: "Một kiến trúc được sử dụng để kết nối hai thiết bị với nhau. Nó bao gồm thiết kế của phích cắm và ổ cắm, loại, số lượng và mục đích của dây và tín hiệu điện, dữ liệu được truyền qua chúng" Có thể xem cổng USB trên máy tính là một USB interface</p>	<p>Link</p>
4.Telematics	Common	USBS	P1	USB Shield	The shield of USB	<p>The expensive high-end USB 2.0 high speed cables are typically shielded, sometimes including a ferrite bead at each cable end. Cheaper cables may not have a black wire, instead using the shield as the power supply ground. The cheapest USB 2.0 low/full speed cables aren't shielded, and may only consist of three wires, combining the data return line and power supply ground</p>	<p>Lớp vỏ của dây/cổng usb Dây USB xịn thường kèm theo lõi ferrit chống nhiễu Có 1 từ gần giống là USB host shield tuy nhiên khác xa nghĩa và tạm klq dự án</p>	

4.Telematics	Common	USBV	P1	USB-Vbus	<p>A standard classic USB host must always provide VBUS (+5V +- 10%) to a downstream port, so a device can initiate the connect sequence (pull D+ or D- high). The port must provide at least 500 mA (2.0 version) or 900 mA (3.0 version)</p>	<p>USB requires a shielded cable containing 4 wires.</p> <p>Two of these, D+ and D-, form a twisted pair responsible for carrying a differential data signal, as well as some single-ended signal states. (For low speed the data lines may not be twisted.)</p> <p>The signals on these two wires are referenced to the (third) GND wire.</p> <p>The fourth wire is called VBUS, and carries a nominal 5V supply, which may be used by a device for power.</p>	<p>Truyền cấp cho usb (5V).</p> <p>Cổng USB classic sẽ có 4 chân, chân Vbus màu đỏ cấp nguồn 5V cho thiết bị</p> <p>Ba chân khác: USB D+, USB D- và GND (Ground)</p>	  <table border="1"> <tr> <td>1</td><td>VCC (+5V)</td> </tr> <tr> <td>2</td><td>D- (Data -)</td> </tr> <tr> <td>3</td><td>D+ (Data+)</td> </tr> <tr> <td>4</td><td>Ground</td> </tr> </table>	1	VCC (+5V)	2	D- (Data -)	3	D+ (Data+)	4	Ground
1	VCC (+5V)															
2	D- (Data -)															
3	D+ (Data+)															
4	Ground															
4.Telematics	Other	User call state	P2	N/A	<p>active Request and/or Call is in progress with specified Status Display and audio indication to the User. It means that the user can know Active Request and / or Call with Display and Audio</p> <p>For example: IPC/OPC, Onstar call.</p>	<p>For example, if you trigger OPC, you can see the Calling message on the radio display in Ring mode and the Call end message when the call is terminated.</p> <p>The second example is Onstar call and Emergency Call. When connecting, you can see "Connecting" message, and after connection, you can see "Connected" message.</p> <p>For more information on the radio display according to the user call state, please check the Spec GIS-505 OnStar UI.</p>										
4.Telematics	Common	USFG	P2	<u>Untere Startfähigkeitsgrenze</u> (lower starting capability limit)	<p>lower critical battery level threshold.</p> <p>The battery level is lower than OSFG. KL30F OFF</p>											
2.AVN	Air quality	USG	P2		<p>Unhealthy for Sensitive Groups</p> <p>It is one level of health concern of AQI (Air Quality Index). AQI values are between 101 and 150, air quality conditions are unhealthy</p>											

4.Telematics	Telecommunication	USIM	P0	<u>Universal Subscriber Identity Module</u>	In 2G times, the SIM consisted of the hardware and the software. USIM refers to Universal Subscriber Identity Module and works on UMTS Universal Mobile Telecommunications System, which is a 3G(third generation) networking standard. It was launched in 2001. The physical card is known as UICC(Universal Integrated Circuit Card) and USIM is an application running on top of UICC.	USIM vs SIM	 <p>The UICC is the smart card platform providing a clear separation of lower layers and applications residing on it</p> <p>Specified by TC SCP</p> <p>Giesecke & Devrient</p> <p>Via: 3g4g.blogspot.com</p>
2.AVN	Navigation	UTC	P2		Universal Time Coordinated UTC is the standard time common to every place in the world		
2.AVN	Phone	UTF8	P2		Universal Transformation Format – 8-bit Is a type of character format. Vietnamese characters are also using UTF8.		
2.AVN	Navigation	U-turn	P2		A U-turn in driving refers to performing a 180° rotation to reverse the direction of travel. It is called a "U-turn" because the maneuver looks like the letter U		
4.Telematics	Telematics	UUDT	P2	Unacknowledged Unsegmented Data Transfer	For more information on the radio display according to the user call state, please check the Spec GIS-505 OnStar UI and GMW3110 For GM telematics, Diagnostic service \$A9 and \$AA is UUDT service.		
4.Telematics	Theft Notification	UVM	P2	Unauthorized Vehicle Motion	One type of VTS (Vehicle Theft Status), The function that Triggered Vehicle Theft call to OCC when motion of unauthorized vehicle is detected by VCP.		
2.AVN	Projection	UX	P2	User Experience			

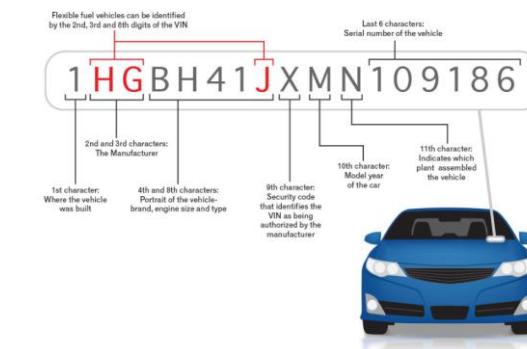
1.Common	Driving Mode	Valet Mode	P0	N/A	Valet Mode is a function in vehicles that allows you to effectively "turn off" the ability to use some of the technologies until the mode is deactivated. With this mode, you can prevent others, such as your valet driver, from using your phone, navigation system, or other system. There are many ways you can customize your settings and ensure your safety.			
4.Telematics	Telematics	VAS	P2	Vehicle Audio System	Vehicle Audio System shall accept and play all VCP audio outputs in their entirety	When the VAS is off and the VCP requires audio, the VAS shall be powered up When VCP has control of the VAS, the audio shall be unaffected by Vehicle Power Transition		
2.AVN	Voice Recognition	VBI	P2		Voice Barge In- Barge-in is generally turned on for interactive voice response so the user can interrupt the system at any time	When the system detects speech of any kind, it immediately stops playing the current prompt and begins listening		
2.AVN	Media	VBR	P2		Variable Bit Rate	Variable bitrate (VBR) is a term used in telecommunications and computing that relates to the bitrate used in sound or video encoding. As opposed to constant bitrate (CBR),		
2.AVN	Vehicle	VBSH	P2		Vehicle Bus Signal Handler A vehicle bus is a specialized internal communications network that interconnects components inside a vehicle. Special requirements for vehicle control such as assurance of message delivery, of non-conflicting messages, of minimum time of delivery... Protocols include Controller Area Network (CAN), Local Interconnect Network (LIN) and others			
2.AVN	Vehicle	VC	P2		Vehicle Component	list of automotive parts		

2.AVN	Vehicle	VCM	P2	Vehicle Connectivity Module	Vehicle Connectivity Module: Module kiểm soát xe		Module kiểm soát xe	
4.Telematics	Telematics	VCP	P2	Vehicle communications platform	VCP - Vehicle communications platform is a telematics device that locate in car. VCP can communicate to other ECUs via GMLAN	a telematics device that can connect and get data from other ECUs inside the car, then it will combine GPS data and communicate with Call Center via cellular network. Interact with ECUs in car via vehicle bus Interact with outside network via telecommunication interface		
2.AVN	Power Mode	VCP DRx mode	P2		Discontinuous Receive: To save power, one type of state is DRx, in this mode telematics can receive and transmit SMS message (OCC-requested call)	When the vehicle power is turned off and certain VCP functions have concluded, the VCP will enter DRx mode. The VCP will then remain in DRx Cycle until either the System/Backup power state transition to Run or DRx cycle times out. For Collision and Theft call, one Can message will be sent to wake up the telematics unit		
4.Telematics	Telematic Call	VCP Off mode	P2	N/A	VCP Off mode	While in the Off Mode, when the Vehicle Power transitions to ON, the VCP shall enter the No Call State of the On Mode		
4.Telematics	Telematic Call	VCP on mode	P2	N/A	The VCP On Mode shall consist of three Call States: a) No Call State - no active Request or Call is in progress, Speech Recognition can be active; b) User Call State - active Request and/or Call is in progress with specified Status Display and audio indication to the User; and c) Stealth Call State - active Request and/or Call is in progress which is not indicated to the User	1. From DRx mode/OFF mode: VCP will transition to ON mode No call state if Vehicle power is ON 2. From DRx or OFF mode if Theft call trigger, VCP will transition to On mode-stealth call state 3. From DRx mode, if send or receive SMS, the VCP will transition to On mode-stealth call state 4. During on mode, if vehicle power = OFF and DRx enable, VCP will transition to DRx mode and then DRx timer expired, transition to OFF mode 5. VCP on mode, make any call that notify user, VCP will transition to On mode-user call state		

4.Telematics	Telematic Call	VCP unpower mode	P2		VCP unpower mode	When no power to VCP, it will transition to unpower mode And when power to VCP it will transition to OFF mode The state where no BUB power or primary power is available to the VCP . It is different from VCP OFF mode		
4.Telematics	User Interaction	VCP User Interface Feature	P2	N/A	Several interface which user can interact with the system processing by VCP	1. An audio Interface for playing audio prompt to the user 2. A button assembly interface (3 onstar buttons: Dot button/Phone button, Onstar button/Blue button, Emergency button/Cross button; SWC1 and SWC2) 3. Vehicle display interfaces (VDI) by which a user can view text displays and interact with visual menus (AVN or intrusment cluster) and 4. A speech recognition interface by which a user can speak verbal commands o the system		
2.AVN	Radio	VCRM	P2		The HP Version Control Repository Manager (VCRM) enables management of HP Service Pack for ProLiant, HP ProLiant and HP Integrity Support Packs and components in a repository.			
2.AVN	Vehicle	VCU	P2		The Vehicle Control Unit, or VCU, is the supervisory controller for electric or hybrid vehicles. The VCU reads the driver input signals, and is responsible to manage the system energy, command the torque, and coordinate the motor, battery pack and the on-board charging system			

2.AVN	Connection	VDA	P2		Verband der Automobilindustrie: German interest group of the German automobile industry, both automobile manufactures and automobile component suppliers. The VDA represents carmakers including BMW, Volkswagen, and Mercedes-Benz parent Daimler but also counts foreign suppliers and foreign-owned carmakers like Opel among its members			
2.AVN	Voice Recognition	VDE	P2		Voice Destination Entry- When making a destination entry by voice (Voice commands), system will send request then perform command	press PTT on the steering wheel => Enter address by speaker command (as town/city, street, and house number) then system will send request then perform command		
2.AVN	System	VDI	P2		Vehicle Display Interface: to help user can view text displays and interact with virtual menus			
2.AVN	Media	VDP	P2		Video Distribution Profile			
2.AVN	Vehicle	VDS	P2		Vehicle Data Service			
2.AVN	Vehicle	Vehicle spy	P2		Vehicle Spy is a single tool for diagnostics, node/ECU simulation, data acquisition, automated testing, and in-vehicle communication networks bus monitoring			
2.AVN	Vehicle	Vehicle Type	P2		Vehicle Type is not a signal. To define a Vehicle Type, we use Car Configuration File			
4.Telematics	Service	Vehicle Update Packet	P2		refers to metadata collection of a manifest file, programming files, user interface resource and related metadata required for either an External ECU or an Internal VCP update	Package can download as HTTP server, it saved at inside VCP. If change the file setup inside the package, the update is change. When update is complete, package is deleted		

4.Telematics	Telematic Call	VFB	P2	Voice Fallback	Voice Fallback	Onstar setup the number of OCC advisor as voice fallback number. When making connection between telematics unit and OCC, if packet connection failed, telematics unit will call directly to Onstar Advisor so driver can talk to Advisor		
2.AVN	Radio	VHF	P1	Very High Frequency	Radio frequency range from 30 MHz to 300 MHz, also known as the meter band or meter wave as the wavelengths range from ten to one meters.			
2.AVN	Vehicle	VICS	P1	VICS (Vehicle Information and Communication System) is a technology used in Japan for providing real-time road and traffic information to individual vehicles	VICS use three types of media (radio wave beacons, infrared beacons, and FM multiplex broadcasts). Information is provided as map display, simple graphic display and text. FM Radio Multiplex Broadcasting uses DARC (Data Radio Channel) with a transmission capacity of 8 k bit/s, of which VICS uses 4 k bit/s. The information transmission cycle is five minutes in which the same data is sent two times for error correction. Information is provided on traffic congestion, journey time, accidents, construction work, traffic restriction and vacancies in parking lots. The In-vehicle units display this information in three modes. Level 1 is for text information only with about 30 Japanese characters. Level 2 is for graphic information with simple road maps and traffic congestion data, and the information can be output on a display. Level 3 is for traffic data navigation equipment that has a detailed road map using a CD-ROM and a GPS receiver. ■			

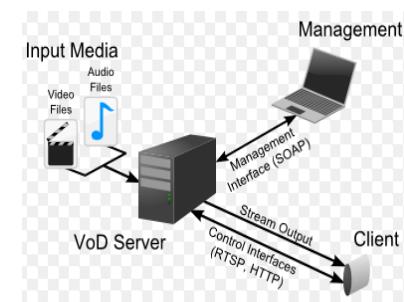
2.AVN	Connection	VID	P2	VLAN Identification: To keep track of frames traversing a switch fabric, VLAN identification is used to identify which frames belong to which VLANs "Enter frame tagging. Frame tagging is a technique where additional VLAN identification information is added to a frame. Two main protocols exists for the purpose of Ethernet frame tagging – Inter Switch Linking (ISL) and IEEE 802.1q. Both modify a frame in different ways to add VLAN identifiers. Once implemented, VLAN tagging allows ports on the same VLAN (but on different switches) to communicate as though they were part of a single physical switch."		
		VID				
4.Telematics	Vehicle interface	VIF	P0	<u>Vehicle Interface</u> VIF is the component to connect the ECU to vehicle's bus like CAN or ethernet which supports to translates proprietary network messages to the standard message format which can use by ECU.		
1.Common	Common	VIN	P0	<u>Vehicle Identification Number</u> The car's vehicle identification number (VIN) is the identifying code for a SPECIFIC automobile. The VIN serves as the car's fingerprint, as no two vehicles in operation have the same VIN. A VIN is composed of 17 characters (digits and capital letters) that act as a unique identifier for the vehicle. A VIN displays the car's unique features, specifications and manufacturer.	A number to identify one vehicle	 <p>The diagram illustrates a VIN plate with 17 characters, each serving a specific purpose:</p> <ul style="list-style-type: none"> 1st character: Where the vehicle was built 2nd and 3rd characters: The Manufacturer 4th and 8th characters: Portrait of the vehicle, brand, engine size and type 8th character: Security code that identifies the vehicle being authorized by the manufacturer 10th character: Model year 11th character: Indication which plant assembled the vehicle Last 6 characters: Serial number of the vehicle
2.AVN	Vehicle	VIP	P2	Vehicle Interface Processor		
2.AVN	System	Virtual advisor call	P2			

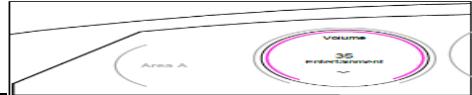
2.AVN	Connection	Virtual keyboard	P2	A PC with A touchscreen also has A touch keyboard. When you're using A PC with A touchscreen, tap in A text field or other area where you can type and the touch keyboard appears. To open the OSK from the sign-in screen, select the Ease of Access button in the lower-right corner of the sign-in screen, and then select On-screen keyboard			
2.AVN	System	Visual focus (Video focus)	P2	An application in visual focus mean that this application is being used and display in the screen	Visual focus is all about navigation. Users who rely heavily, or even solely, on a keyboard need clear on-screen indications of what objects or links are selected so that they can properly navigate your site and access what they need. To ensure this accessibility, you need to make sure that ALL navigational elements on a page are compatible with the visual focus indicator. Any option that requires a mouse is essentially blocked off to users who rely on keyboards — so, as a developer and designer, you need to take care to make sure this never happens.		

2.AVN	SAI	ViWi	P2	Volkswagen Infotainment Web Interface	<p>ViWi is an interface that provides vehicle and infotainment data for external (mobile) devices and applications.</p> <p>With the ViWi, applications running on an in-vehicle infotainment (IVI) system (or any device connected via TCP/IP) get access to the systems resources and functionality.</p>	<p>The interface is based on web technologies. The goal using web technologies (HTTP, WebSockets) is to create a convenient API for developers on both ends, the system and the application(s). Viwi is a restful service interface, which promotes (micro) service system design patterns. At the same time, viwi utilizes standardized web security mechanisms like TLS encryption, OAuth or JWT tokens. The API is designed in a graph-like fashion to allow interconnection between services. Viwi is treating the car like a web service from an API perspective - REST extended by publish/subscribe for high frequency changes.</p> <p>ViWi is an interface specification using HTTP / REST and WebSocket.</p> <p>ViWi = RSI + encryption.</p> <p>ViWi Protocol</p> <p>Define a URI (/ <service> / <resource> / <element>) and an HTTP Payload structure.</p>	<pre> graph TD Client1[Client UI] -- "http(s)://" --> WebServer[WebServer] Client1[Client UI] -- "ws(s)://" --> WebServer[WebServer] Client2[Client UI] -- "http(s)://" --> WebServer[WebServer] Client2[Client UI] -- "ws(s)://" --> WebServer[WebServer] WebServer[WebServer] --- S1[Service #1] WebServer[WebServer] --- S2[Service #2] WebServer[WebServer] --- Sn[Service #n] </pre>
4.Telematics	Network	VJC	P2	Van Jacobson Compression	<p>Is a data compression protocol, specifically designed by Van Jacobson to improve TCP/IP performance over slow serial links. Van Jacobson compression reduces the normal 40 byte TCP/IP packet headers down to 3-4 bytes for the average case. It does this by saving the state of TCP connections at both ends of a link, and only sending the differences in the header fields that change.</p>	N/A	

2.AVN	System	VLAN	P1	Virtual Local Area Network	<p>Virtual local area network: A virtual LAN (VLAN) is any broadcast domain that is partitioned and isolated in a computer network at the data link layer (OSI layer 2). [1][2] LAN is the abbreviation for local area network and in this context virtual refers to a physical object recreated and altered by additional logic.</p>	<p>VLANs work by applying tags to network packets and handling these tags in networking systems – creating the appearance and functionality of network traffic that is physically on a single network but acts as if it is split between separate networks. In this way, VLANs can keep network applications separate despite being connected to the same physical network, and without requiring multiple sets of cabling and networking devices to be deployed.</p>		
4.Telematics	Telematics	VNMF	P2	Virtual Network Management Frame	<ul style="list-style-type: none"> - A VNMF, message is sent by an ECU only to initialize or continue VNs (Virtual Networks) - ALL VNMFs have a range of 11 bit IDs - ALL VNMFs have 8 bytes in length 	<p>- Here is the VNMF format: <i>Format: ArbID, B1, B2, B3, B4, B5, B6, B7, B8</i> As Seen: \$620-\$63F, 01 or 00, XX, XX, XX, XX, 00, 00, 00 (Where XX = Some bit-encoded value where each bit represents a single VN).</p> <p>[REF: http://canbushack.com/network-management-part-1-gmlan/]</p>		
2.AVN	Media	VOB	P2		<p>Video Object</p> <p>is the container format in DVD-Video media. VOB can contain digital video, digital audio, subtitles, DVD menus and navigation contents multiplexed together into a stream form</p>	<p>Files in VOB format have a .vob filename extension and are typically stored in the VIDEO_TS directory at the root of a DVD.[5] The VOB format is based on the MPEG program stream format, but with additional limitations and specifications in the private streams.[6][7][8] The MPEG program stream has provisions for non-standard data (as used in VOB files) in the form of so-called private streams. VOB files are a very strict subset of the MPEG program stream standard</p> <p>Files in VOB format may be encrypted.</p>		

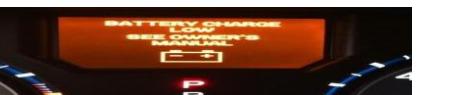
2.AVN	Radio	VOD	P2		<p>Video on Demand: is a programming system which allows users to select and watch/listen to video or audio content such as movies and TV shows whenever they choose, rather than at a scheduled broadcast time</p>	<p>Television VOD systems can stream content through either a set-top box, a computer or other device, allowing viewing in real time, or download it to a device such as a computer, digital video recorder (also called a personal video recorder) or portable media player for viewing at any time. The majority of cable- and telephone company-based television providers offer:</p> <ul style="list-style-type: none"> - VOD streaming, whereby a user selects a video program and it begins to play immediately on the television set, or - downloading to a digital video recorder (DVR) rented or purchased from the provider, or downloading onto a PC or to a portable device, for viewing in the future. 	
2.AVN	Voice Recognition	VOE	P2		<p>Voice Output Embedded - Perform command and control application with VR software</p>	<p>Raw data is collected from an input source, such as a microphone, and sent to audio processing. Voice recognition is the result.</p>	
2.AVN	Phone call	Voicemail	P0	N/A	<p>Any system of conveying a stored telecommunications voice messages, including using an answering machine</p>	<p>Voicemail systems are designed to convey a caller's recorded audio message to a recipient. To do so they contain a user interface to select, play, and manage messages; a delivery method to either play or otherwise deliver the message; and a notification ability to inform the user of a waiting message. Most systems use phone networks, either cellular- or landline-based, as the conduit for all of these functions. Some systems may use multiple telecommunications methods, permitting recipients and callers to retrieve or leave messages through multiple methods such as PCs, PDA, Cellphones or Smartphones.</p>	



2.AVN	Voice Recognition	VoIP	P2	Voice over Internet Protocol- Allows you to make voice calls using a broadband Internet connection instead of a traditional phone line	<p>- Analog voice calls are converted into packets of data. The packets travel like any other type of data, such as e-mail, over the public Internet and/or any private Internet Protocol (IP) network. Using a VoIP service, you can call other cell phones by speaking and listening via speakers or handset</p> <p>Ex: Connect device (2G, 3G, LTE) via BT/or USB port then making incoming/receive call and perform conversation. Speaking and listening the voice by speakers or headsets</p>		
2.AVN	Media	VOL	P1	Volume The degree of loudness or the intensity of a sound			
4.Telematics	Telematics	VoLTE	P2	Voice over LTE	Voice call is process via LTE network		
3.Cluster	Cluster	Volume	P1	Display Volumn popup.	- When the driver adjusts the volume of the audio, the information is output to the cluster.		
2.AVN	Vehicle	VP	P2	Vehicle Processing:			
2.AVN	Voice Recognition	VR / SR	P0	<u>Voice Recognition / Speech Recognition</u>	<p>Voice or speech recognition is the ability of a machine or program to receive and interpret dictation, or to understand and carry out spoken commands.</p> <p>- With IOS device: Press Home button to open voice recognition - With Android device: Choose icon google voice</p> <p>When user don't connect any device and selecting language support VR , press and hold PTT to display VR then the speech recognizer "hearing" what you said and perform commands of speaker</p>		
2.AVN	Radio	Vrms	P2	Root-mean-square voltage The root-mean-square (rms) voltage of a sinusoidal source of electromotive force (Vrms) is used to characterize the source. It is the square root of the time average of the voltage squared. The value of Vrms is $V_0/\sqrt{2}$, or, equivalently, 0.707V0.			

2.AVN	Vehicle	VSC	P2		Vehicle system control	The Computer-controlled Vehicle System, almost universally referred to as CVS, was a personal rapid transit (PRT) system developed by a Japanese industrial consortium during the 1970s		
2.AVN	System	VTM	P2		Vehicle Task Management: is a configurable monitor that initiates data storage and various other actions based on conditions being met Monitoring is initiated by activation of a configured VTM task. This task defines relationships between actions to be taken and the conditions that must be met in order to take them. Ex: a VTM Task could be configured to request and storage diagnostic info baseed on receiving a serial data message of a certain format, and initiate a data upload when the data storage buffer is 75%			
4.Telematics	Theft Notification	VTS	P1		Vehicle Theft Status Status when the intention of the vehicle is stolen	Try to call if the intention of the vehicle is stolen. A flag that, when true, indicates that one or more Vehicle Theft Triggers have occured and have not yet been reset.		
2.AVN	Voice Recognition	VUI	P2		Voice User Interfaces	Allow the user to interact with a system through voice or speech commands such as Siri, Google Assistant. User long press hard key as PTT then observe by eyes / or input text then use TTS module to readout input text		
2.AVN	Vehicle	VZA	P2		Verkehrszeiche nerkennung Verkehrszeiche nerkennung (VZA) = Traffic Sign Detection	Displays road sign indication warnings		

2.AVN	System	VZE	P2	Verkehrszeiche nerkennung (VZE)= Traffic Sign Recognition Method for assisting driver of vehicle, involves receiving sensor signals over interface, where sensor signals are used for detecting object in surrounding area of vehicle - Traffic signal for area zone: EU, EU(UK), NAR(USA), NAR(Canada), China, HongKong - Traffic signal by group: speed limit,no passing all motor vehicles, danger, additional signal (weather, school, etc)	- Use CAN signal to setup area zone and type of traffic sign - The method involves receiving the sensor signals (101) over an interface. The sensor signals are used for detecting an object in a surrounding area of a vehicle. The data signals are received (102) over the interface, and are used for determining a driving situation of the vehicle. The evaluation signals are supplied (103), and are based on the sensor signals and the data signals. Independent claims are included for the following: (1) a control unit for assisting a driver of a vehicle; and (2) a computer program product with the program code stored on a machine readable medium for the execution of the method. - Three main components in work on traffic sign recognition: detection, classification and temporal integration.		
2.AVN	Radio	WAAS	P2	Wide Area Augmentation System: is an air navigation aid developed by the Federal Aviation Administration to augment the Global Positioning System (GPS), with the goal of improving its accuracy, integrity, and availability			

2.AVN	Vehicle	Wade Aid	P2	N/A	<ul style="list-style-type: none"> - Wade aid provides a real-time display of the water level around the vehicle by using WADE SENSORS - It gives warning if the water is nearing the vehicle's maximum wading depth. 	<p>Preconditions:</p> <ul style="list-style-type: none"> - Ultrasonic sensors are fitted in the exterior mirrors, facing downwards - Mirrors are in the normal position and free of water/ice/mud - Vehicle speed <= 6mph <p>Step:</p> <p>[Range Rover] Access 4x4i screen or Extra Feature -> Tap the Wade Sensing icon</p> <p>[REF: https://www.landrover.co.uk/explore-land-rover/one-life/technology/technology-guide-wade-sensing.html]</p>		
2.AVN	Vehicle	WAM	P2		Wide Angle vision Module:			
2.AVN	Connection	WAN	P2		Wide Area Network: is a telecommunications network or computer network that extends over a large geographical distance			
3.Cluster	Common	Warning light	P0	N/A	<p>Array of dashboard warning lights to let driver know an issue with the car.</p>	<p>Displays warning lights as LCD icon and LED (Refer Cluster warning indicator for details).</p> <p>Example:</p> <ul style="list-style-type: none"> + Seatbelt indicator: You're not wearing your seatbelt + Airbag indicator: there's something faulty with the airbags + Brake warning light: it's likely that you left your handbrake on, or your car is low on brake fluid 		
3.Cluster	Common	Warning Messages	P0	N/A	Message inform to drivers about possible issue if the car have something wrong	Displays warning messages as popup in consideration of priority		

2.AVN	System	Watchdog	P2	A watchdog is a device used to protect a system from specific software or hardware failures that may cause the system to stop responding.	The application is first registered with the watchdog device. Once the watchdog is running on your system the application must periodically send information to the watchdog device. If the device doesn't receive this signal within the set period of time it would execute the proper keystrokes to reboot the machine or restart the application.		
2.AVN	Media	WAV	P2	Waveform Audio File Format Is a Microsoft and IBM audio file format standard for storing an audio bitstream on PCs . It is the main format used on Windows systems for raw and typically uncompressed audio. The usual bitstream encoding is the linear pulse-code modulation (LPCM) format	a WAV file can contain compressed audio, the most common WAV audio format is uncompressed audio in the linear pulse code modulation (LPCM) format. LPCM is also the standard audio coding format for audio CDs, which store two-channel LPCM audio sampled at 44,100 Hz with 16 bits per sample. Since LPCM is uncompressed and retains all of the samples of an audio track, professional users or audio experts may use the WAV format with LPCM audio for maximum audio quality.[11] WAV files can also be edited and manipulated with relative ease using software.		
2.AVN	Navigation	Waypoint	P2	These waypoints are used to help define invisible routing paths for navigation.	GPS systems are increasingly used to create and use waypoints in navigation of all kinds. GPS receiver can locate a waypoint with an accuracy of three meters		
2.AVN	System	Ways to upgrade the software version	P2	There are two ways you can do to upgrade software version for ULC4.0: 1. Using USB - with specific build version for USB 2. Using Mfg cable - with Mfg build version. 3. Update by OTA			
2.AVN	Radio	WB	P2	Weather band : It's North American Weather service has 11 band from WX1 to WX10, frequency from : 162.550MHz to 163.275MHZ			

2.AVN	Connection	WBMP	P2		Wireless Application Protocol Bitmap Format: is a monochrome graphics file format optimized for mobile computing devices.			
2.AVN	Connection	WCDMA	P2		Wideband Code Division Multi Access: Third Generation of Telecommunication network technology, is an air interface standard found in 3G mobile telecommunications networks. It supports conventional cellular voice, text and MMS services, but can also carry data at high speeds, allowing mobile operators to deliver higher bandwidth applications including streaming and broadband Internet access			
2.AVN	Connection	WCH	P1	Wireless charging	Wireless charging is use an electromagnetic to tranfer energy between 2 objects: smartphone that supports wireless charging & wireless charger	Wireless charging works by transferring energy from the charger to a receiver in the back of the phone via electromagnetic induction. The charger uses an induction coil to create an alternating electromagnetic field, which the receiver coil in the phone converts back into electricity to be fed into the battery	Sạc pin không dây (wireless charging) là khái niệm dùng để chỉ loại sạc cảm ứng, không cần đến dây cáp nối thiết bị với nguồn điện. Bạn chỉ cần đặt thiết bị lên một tấm sạc cảm ứng và thiết bị của bạn sẽ được sạc nhờ dòng điện tạo ra bởi từ trường biến đổi.	

2.AVN	Connection	WEP	P2	<p>Wired Equivalent Privacy: Wired Equivalent Privacy (WEP) is a security protocol, specified in the IEEE Wireless Fidelity (Wi-Fi) standard, 802.11b, that is designed to provide a wireless local area network (WLAN) with a level of security and privacy comparable to what is usually expected of a wired LAN</p>	<p>"Two methods of authentication can be used with WEP: Open System authentication and Shared Key authentication":</p> <ul style="list-style-type: none"> - Open System authentication: the WLAN client need not provide its credentials to the Access Point during authentication. Any client can authenticate with the Access Point and then attempt to associate. In effect, no authentication occurs. <p>Subsequently, WEP keys can be used for encrypting data frames. At this point, the client must have the correct keys</p> <p>Shared Key authentication: the WEP key is used for authentication in a four-step challenge-response handshake:</p> <ol style="list-style-type: none"> 1.The client sends an authentication request to the Access Point. 2.The Access Point replies with a clear-text challenge. 3.The client encrypts the challenge-text using the configured WEP key and sends it back in another authentication request. 4.The Access Point decrypts the response. If this matches the challenge text, the Access Point sends back a positive reply. <p>After the authentication and association, the pre-shared WEP key is also used for encrypting the data frames using RC4.</p>	

2.AVN	System	Weston	P2	This is an implementation of Wayland compositor for embedded device	<p>Weston is the reference implementation of a Wayland compositor also developed by the Wayland project. It is written in C and published under the MIT License. Weston only has official support for the Linux operating system due to its dependence on certain features of the Linux kernel, such as kernel mode-setting, Graphics Execution Manager (GEM), and udev, which have not been implemented in other Unix-like operating systems.[52] When running on Linux, handling of the input hardware relies on evdev, while the handling of buffers relies on Generic Buffer Management (GBM). However, in 2013 a prototype port of Weston to FreeBSD was announced.[53]</p> <p>Weston relies on GEM to share application buffers between the compositor and applications. It contains a plugin system of "shells" for common desktop features like docks and panels.[15] Clients are responsible for the drawing of their window borders and their decorations. For rendering, Weston can use OpenGL ES[54] or the pixman library to do software rendering.[55] The full OpenGL implementation is not used, because on most current systems, installing the full OpenGL libraries would also install GLX and other X Window System support libraries as dependencies.[56]</p>		

2.AVN	Android Auto	WGS84	P2		<p>world geodetic system 1984: The World Geodetic System (WGS) is a standard for use in cartography, geodesy, and navigation including GPS. It comprises a standard coordinate system for the Earth, a standard spheroidal reference surface (the datum or reference ellipsoid) for raw altitude data, and a gravitational equipotential surface (the geoid) that defines the nominal sea level.</p> <p>The latest revision is WGS 84 (also known as WGS 1984, EPSG:4326), established in 1984 and last revised in 2004</p>	<p>It is the reference system used by the Global Positioning System</p>		
2.AVN	Vehicle	Wheel slip	P2	N/A	<p>-Wheel Slip means the tire is slipping relative to the road.</p>	<p>- Occur with Four-Wheel Drive Vehicle</p>		
2.AVN	Vehicle	WI	P2		Wheel Information	See SWRC		
2.AVN	Vehicle	WID	P2		Wheel Information Display	See SWRC		
2.AVN	Connection	Wi-Fi Alliance	P2		Wi-Fi Alliance is a non-profit organization that promotes Wi-Fi technology and certifies Wi-Fi products if they conform to certain standards of interoperability			

2.AVN	Connection	Wi-Fi CERTIFIED	P2		Wi-Fi CERTIFIED™ is an internationally-recognized seal of approval for products indicating that they have met industry-agreed standards for interoperability, security, and a range of application specific protocols. Wi-Fi CERTIFIED products have undergone rigorous testing by one of our independent Authorized Test Laboratories. When a product successfully passes testing, the manufacturer or vendor is granted the right to use the Wi-Fi CERTIFIED logo.		
2.AVN	[TBD]	Wi-Fi Hotspot	P2	N/A	<p>A hotspot is a physical location where people may obtain Internet access, typically using Wi-Fi technology, via a wireless local area network (WLAN) using a router connected to an internet service provider.</p>	<p>There are three options that you can choose from which are using a MiFi wireless router, built in telematics or via a 4G LTE connection.</p> <p>The newest option which was introduced around 2 years ago, is the MiFi option. You need to contact your mobiles network and purchase a MiFi router, then you will get a monthly fee or contract with it. Then you are good to go with instant internet access, it really is that simple.</p> <p>The second option is from cars with built in Wi-Fi, as modern vehicles often have it already built in. The built in-schematics allow you to completely make calls hands free and adjust your music.</p> <p>The 4GE LTE option is similar to other mobile hot spots but it provides 4G speeds, however vehicle manufacturers are only just starting to tap into it.</p>	[TBD]
2.AVN	System	Wifi RX	P2		Receive		

2.AVN	Connection	Wi-Fi security protocol	P2		Protocol help to security Wifi	The first connection between the device and the WiFi network is successful. The connection is made with the WiFi security protocol and authentication. Given) During the connection process When) When WEP, WPA, WPA2 Network is selected Then it should be connected after authentication.		
2.AVN	System	Wifi TX	P2		transmit			
2.AVN	Audio	Windows tag	P2					
2.AVN	Phone Projection	Wireless Carplay	P0	N/A	Since iOS 9, Apple has supported wireless CarPlay implementations. Wireless CarPlay alleviates the need for a Lightning cable, allowing an iPhone to connect to an in-car system wirelessly.	Wireless carplay can connect via bluetooth and Wifi connection with in-car system		
2.AVN	Media	WMA	P0	Windows Media Audio	WMA is a series of audio codecs and their corresponding audio coding formats developed by Microsoft			

2.AVN	Connection	WMM	P2	<p>Wi-Fi Multimedia (WMM), previously known as Wireless Multimedia Extensions (WME), is a subset of the 802.11e wireless LAN (WLAN) specification that enhances quality of service (QoS) on a network by prioritizing data packets according to four categories. Network administrators can change priority levels as they see fit.</p> <p>Ranging from highest priority to lowest, these categories are:</p> <ul style="list-style-type: none"> •Voice: Giving voice packets the highest priority enables concurrent Voice over IP (VoIP) calls with minimal latency and the highest quality possible. •Video: By placing video packets in the second tier, WMM prioritizes it over all other data traffic and enables support for three to four standard definition TV (SDTV) streams or one high definition TV (HDTV) stream on a WLAN. •Best effort: Best effort data packets consist of those originating from legacy devices or from applications or devices that lack QoS standards. •Background: Background priority encompasses file downloads, print jobs and other traffic that does not suffer from increased latency. 	Can test by tool: Lanforge			
2.AVN	Connection	WMM-PS	P2	<p>Wireless Multimedia Power Save (WMM-Power Save) increases the efficiency and flexibility of data transmission. Specifically, the client device can doze between packets to save power, while the access point buffers downlink frames. The application chooses the time to wake up and receive data packets to maximize power conservation without sacrificing Quality of Service.</p>				

2.AVN	Media	WMV	P2		Windows Media Video	Windows Media Video (WMV) is a series of video codecs and their corresponding video coding formats developed by Microsoft. It is part of the Windows Media framework		
2.AVN	Connection	WPA/WPA2	P1	Wi-Fi Protected Access	<ul style="list-style-type: none"> - Wi-Fi Protected Access (WPA) and Wi-Fi Protected Access II (WPA2) are two security protocols and security certification programs developed by the Wi-Fi Alliance to secure wireless computer networks. - WiFi Protected Access II . WPA2 (Wi-Fi Protected Access 2) is a network security technology commonly used on Wi-Fi wireless networks. It's an upgrade from the original WPA technology, which was designed as a replacement for the older and much less secure WEP. The major difference between WPA2 and WPA is that WPA2 further improves the security of a network because it requires using a stronger encryption method called AES 			
2.AVN	Connection	WPA2	P1	WiFi Protected Access II	<p>WiFi Protected Access II . WPA2 (Wi-Fi Protected Access 2) is a network security technology commonly used on Wi-Fi wireless networks. It's an upgrade from the original WPA technology, which was designed as a replacement for the older and much less secure WEP. The major difference between WPA2 and WPA is that WPA2 further improves the security of a network because it requires using a stronger encryption method called AES</p>			
2.AVN	Connection	WPC	P2		Wireless Phone Charger			

2.AVN	Connection	WPS	P2		Wireless Protected Setup. Wi-Fi Protected Setup (WPS; originally, Wi-Fi Simple Config) is a network security standard to create a secure wireless home network	There are three primary approaches to network setup within Wi-Fi Protected Setup: push-button, PIN entry, and Near Field Communication (NFC). PIN entry is mandatory in all Wi-Fi Protected Setup devices, while push-button and NFC are optional and may also be found in some devices		
2.AVN	Radio	WSA	P2		Weather and Security Alerts It informs the user of weather alert, abduction alerts and other alerts (national disasters, etc.) around the current location (car location).			
		WSDL						
2.AVN	Voice Recognition	WUP	P1	Wake Up Phrase	Wake Up Phrase- wake-up phrase to start Voice Control It can works in native OEM space or Projection space (Android Auto, Apple CarPlay)	Example: Press and hold PTT => Say any phrase (Ex: Hello, Ana) and listening Example2: Connect AA: Say "OK Google" and listening Example3: Connect CP Say "Hi Siri" and listening		
2.AVN	Connection	WUSB	P2		Wireless Universal Serial Bus. Technology that uses radio-frequency (RF) links rather than cables to provide the interfaces between a computer and peripherals, such as monitors, printers, external drives, head sets, MP3 players and digital cameras. The WUSB technology is based on the WiMedia ultra wideband common radio platform.			

2.AVN	Radio	WX	P2		Radio US weather band : It's North American Weather service has 11 band from WX1 to WX10, frequency from : 162.550MHz to 163.275MHZ			
4.Telematics	Common	xHCI	P1	Extensible Host Controller Interface	Extensible Host Controller Interface. eXtensible Host Controller Interface (xHCI) is a computer interface specification that defines a register-level description of a host controller for Universal Serial Bus (USB), which is capable of interfacing with USB 1.x, 2.0, and 3.x compatible devices.		Được dịch từ tiếng Anh-Giao diện bộ điều khiển máy chủ eXtensible là một đặc tả giao diện máy tính xác định mô tả cấp độ đăng ký của bộ điều khiển máy chủ cho Universal serial Bus, có khả năng giao tiếp với các thiết bị tương thích USB 1.x, 2.0 và 3.x. Thông số kỹ thuật cũng được gọi là thông số kỹ thuật của bộ điều khiển máy chủ USB 3.0.	
2.AVN	System	XMP	P2		Extensible Metadata Platform: The Extensible Metadata Platform (XMP) is an ISO standard, originally created by Adobe Systems Inc., for the creation, processing and interchange of standardized and custom metadata for digital documents and data sets.			
2.AVN	Navigation	ZIP code	P2		Zone Improvement Plan code ZIP Codes are a system of postal codes used by the United States Postal Service (USPS), Canada. The basic format consists of five digits			
2.AVN	Media	Zoom bubble	P2		Zoom Bubble displays the first letter or the frequency/channel number(s) corresponding to the first viewable List Item while indexed lists are scrolled	Tool tips display when moving between funtions in GM V2 CSM by rotating knob on MFC		
2.AVN	Navigation	Zoom scale	P2		The system shall be able to present the map in different zoom scales. These scales have to be consistent for every position of the map			