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|  | Vehicle status and health alert | | |  |
|  | (VSHA) | | |  |
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|  |  | | |  |
| Document Type | Feature Document (FD) | | |  |
| Document ID | 879440 | | |  |
| Document Location | VSEM Rich Client, VSEM Active Workspace | | | i1hBF9xtx3NrTD |
| Document Owner | Lu, Chao (clu42) | | |  |
| Document Version | A | | |  |
| Document Status |  | | |  |
| Date Issued | 22-Mar-2021 01:34 | | |  |
| Date Revised |  | | |  |
| Document Classification | GIS1 Item Number: |  | |  |
| GIS2 Classification: | Confidential & Proprietary | |
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# Introduction

**What is vehicle status and health alert?**

Vehicle status and health alert feature, hereafter abbreviated as VSHA throughout this document, is designed to add value to the customer as well as Ford Motor Company by addressing the following concerns:

Customer’s Concerns

* Lack of understanding of vehicle’s state of health and how best to react to a warning light on the cluster.
* Mistrust of service stations to act in customer’s best interest.

Ford Motor Company’s Concerns

* Customer service loyalty is approximately 33%, with the rest of owners taking their service needs to competitors in the marketplace.
* Lack of visibility in the operation and condition of vehicles in operation can lead to increased warranty claims and potentially costly recalls.

**How does vehicle status and health alert add value?**

Vehicle status and health alert (VSHA) is designed to be a feature within both mobile app (e.g. FordPass, LincolnWay) and IVI. The main components of the VSHA feature are the abilities for the customer to

* View vehicle status information based on up-to-date vehicle diagnostic data - (Vehicle Status)
* Receive contextual notifications based on events triggered from the vehicle diagnostic data - (Vehicle Health Alert)
* Perform appropriate actions, such as tap/touch to call dealer, in response to notifications and in-app content

Solving Customer’s Concerns

*Lack of understanding of vehicle’s state of health and how best to react to a warning light on the cluster*

VH provides contextual information based on the vehicle’s current condition so the customer is informed of what a warning light means, what could be causing the problem, and what potential solutions are.

*Mistrust of service stations to act in customer’s best interest*

VH provides transparency to the customer by unveiling the diagnostic data directly from the vehicle, allowing him/her to make informed service decisions based on trusted information.

Solving Ford Motor Company’s Concerns

*Customer service loyalty is approximately 33% with the rest of owners taking their service needs to competitors in the marketplace*

Providing vehicle health information directly to the customer creates trust and having the ability to send notifications creates opportunities to engage with customers and direct them to service at Ford dealers.

*Lack of visibility in the operation and condition of vehicles in operation can lead to increased warranty claims and potentially costly recalls*

The ability to collect a regular stream of data from vehicles in operation gives Ford the opportunity to perform analytics to validate warranty claims, detect early signs of potential recalls, and improve overall quality.

[RE\_Marker\_RemoveLines]

# High-level Requirements - VSHA Content

[RE\_Marker\_RemoveLines]

## FRD-REQ-411989/A-Fuel and DTE (Distance to empty)

For vehicles that support fuel level, fuel level shall be a fuel percentage ranging from 0 to 100, with a resolution of 1.

For vehicles that support DTE, DTE shall be decimal with a resolution of 0.1 km.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416973/A-DTE default unit

DTE default unit is km in China.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416974/A-DTE unit conversion

DTE unit conversion is the same as odometer, please refer to FRD-REQ-411987.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416977/A-Fuel and DTE warning

If fuel level < 10% and DTE <= 80km (using unit conversion if unit is mile), IVI should trigger low DTE alert.

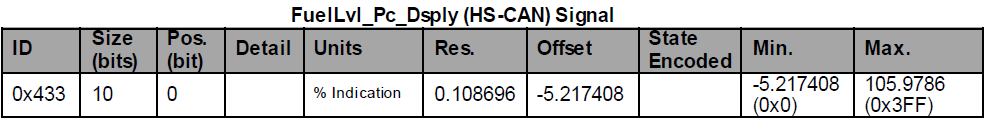
If 80km < DTE <= 300km and DTE < Navigation distance \* 105% (only available when user starts navigation), IVI should trigger DTE not enough alert.

[RE\_Marker\_RemoveLines]

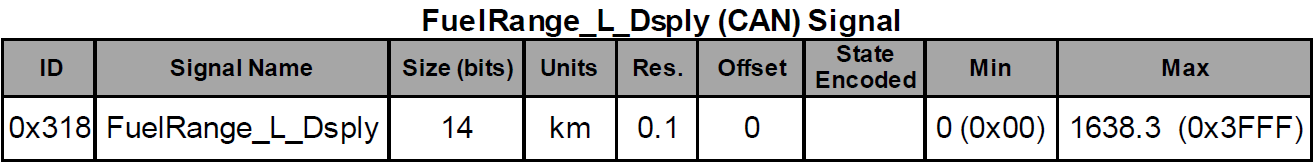
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416975/A-Fuel and DTE data collection

Fuel level value is contained in the signal FuelLvl\_Pc\_Dsply.



The DTE value is contained in the signal FuelRange\_L\_Dsply. The default value of the signal FuelRange\_L\_Dsply is in the units of km.



IVI should only collect signal when ignition is ON. Because fuel level and DTE value may not be correct when ignition is OFF.

IVI should show following message similar text when ignition is OFF: Fuel level or DTE will be available after start vehicle engine. (depends on HMI spec)

If fuel level is not 0% and DTE is 0km, IVI should consider DTE as invalid value, and not use DTE.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416976/A-Fuel and DTE eligible

In China, if vehicle fuel type is not gas/PHEV/HEV/diesel, vehicle does not support fuel level and DTE.

IVI should not show fuel level and DTE if fuel and DTE eligible is false.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## FRD-REQ-411985/A-Odometer

Odometer shall be displayed in whole units, rounded to the nearest integer, in either miles or kilometers, depending on the vehicle region and user preferences.

IVI should show both odometer value and unit.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-411986/A-Odometer default unit

Odometer default unit is km in China.

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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-411987/A-Odometer Unit Conversion

Odometer value from kilometers to miles and vise-versa shall use the conversion of 1.60934 km = 1 mile.

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| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-411988/A-Odometer data collection

OdometerMasterValue (HS-CAN) Signal:

图片包含 屏幕截图

描述已自动生成

The default value of the signal OdometerMasterValue is in the units of km.

[Note] OdometerMasterValue is different from cluster, it is design intent, not issue. For example, OdometerMasterValue is 300 and odometer on cluster is 300.3, IVI shown odometer as 300, which is different from cluster.

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| **Type** | |  | | **Priority** |  | **Status** |  | |
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### FRD-REQ-416972/A-Oodmeter eligible

Currently, all Ford and Lincoln vehicles (including Mustang) support odometer.

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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## FRD-REQ-416882/A-Oil life

Oil life should be percentage from 0 to 100 with resolution of 1.

IVI should show oil life (please refer to HMI spec):

1. Using oil life value
2. Using progress bar
3. Using both oil life value and progress bar

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| **Rationale** | |  | | | | | | |
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| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
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### FRD-REQ-416884/A-Oil warning

If 0% < oil life <= 5%, IVI should trigger oil warning: change oil soon.

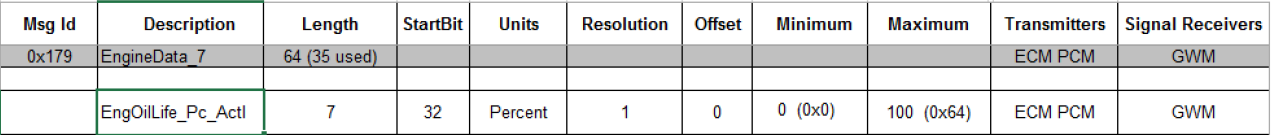
If oil life = 0%, IVI should trigger oil warning: oil change required.

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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
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### FRD-REQ-416883/A-Oil data collection

IVI should collect oil life via signal EngOilLife\_Pc\_Actl



[RE\_Marker\_RemoveLines]

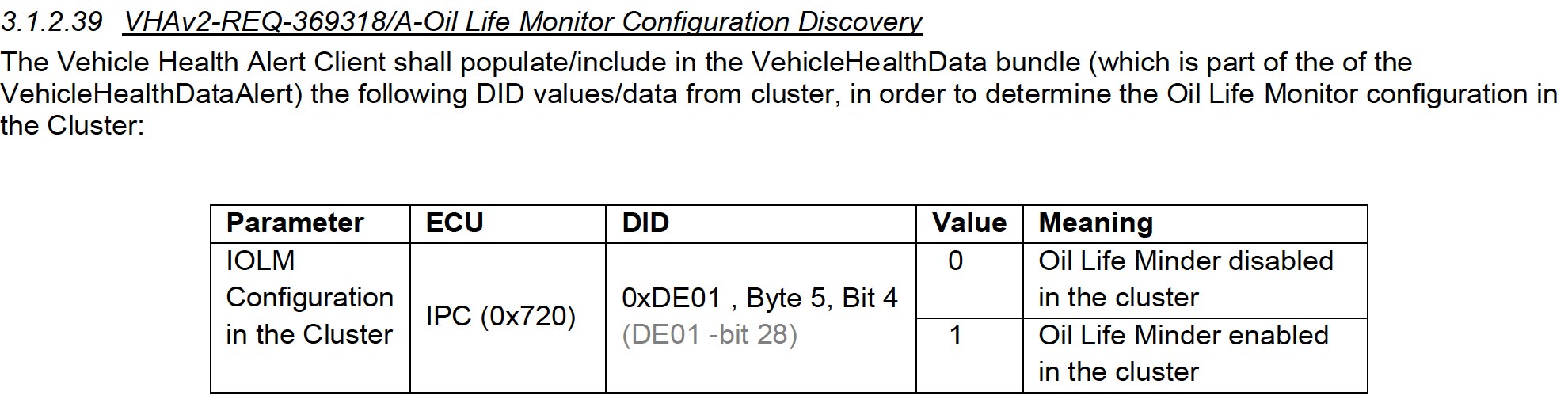
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416885/A-Oil eligible

If OILM is configured as enabled, oil life eligible is true; if OILM is configured as disabled, oil life eligible is false.

If oil life eligible is false, IVI should not collect oil data and show oil life.

OILM configuration on IPC as below



IVI should create a new configuration, use the same configuration and value as IPC, and IVI oil life feature should follow IVI its own configuration.

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
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| **Notes** | |  | | | | | | |
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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
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## FRD-REQ-416978/A-Tire pressure

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| **Rationale** | |  | | | | | | |
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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
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### FRD-REQ-416981/A-TPMS default unit

TPMS default unit is synchronized with IOD.

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| **Legacy Requirement** | |  | | | | | | |
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| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416982/A-TPMS unit conversion

* kpa -> bar

bar = kpaValue \* 0.01, then 保留一位小数4舍5入

for example, 34.14 -> 34.1, 34.15 -> 34.2

* kpa -> kpa

舍弃小数部分, 个位数做 2舍8入, 3-7取5

For example, 8 to12 -> 10, 13 to 17 -> 15, 18 to 22 -> 20

* kpa->psi

pis = kpaValue \* 0.14504, 取整4舍5入

[RE\_Marker\_RemoveLines]

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| **Legacy Requirement** | |  | | | | | | |
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| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416983/A-TPMS warning

If TPMS by location is disabled, IVI should trigger TPMS low tire alert when Tire\_Press\_System\_Stat is Low\_Composite\_Stat.

If TPMS by location is enabled, IVI should

* trigger left front tire pressure low alert when Tire\_Press\_LF\_Stat is Low
* trigger left front tire status not valid alert when Tire\_Press\_LF\_Stat is not Normal or Low, or Tire\_Press\_LF\_Data is not valid value
* trigger right front tire pressure low alert when Tire\_Press\_RF\_Stat is Low
* trigger right front tire status not valid alert when Tire\_Press\_RF\_Stat is not Normal or Low, or Tire\_Press\_RF\_Data is not valid value
* trigger left rear tire pressure low alert when Tire\_Press\_LR\_OLR\_Stat is Low
* trigger left rear tire status not valid alert when Tire\_Press\_LR\_OLR\_Stat is not Normal or Low, or Tire\_Press\_LR\_OLR\_Data is not valid value
* trigger right rear tire pressure low alert when Tire\_Press\_RR\_ORR\_Stat is Low
* trigger left rear tire status not valid alert when Tire\_Press\_RR\_ORR\_Stat is not Normal or Low, or Tire\_Press\_RR\_ORR\_Data is not valid value

IVI can trigger all alerts at the same time.

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| **Legacy Requirement** | |  | | | | | | |
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| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416980/A-TPMS data collection

TPMS by location configuration on IPC as below

图片包含 屏幕截图

描述已自动生成

If TPMS support is “TPMS Enabled” and TPMS by location is Enabled, vehicle should support individual tire pressure.

If TPMS support is “TPMS Enabled” and TPMS by location is Disabled, vehicle should support overall tire pressure.

IVI should create a new configuration “TPMS by location”, use the same configuration and value as IPC.

If vehicle supports overall TPMS, IVI should collect following CAN signals:

* Tire\_Press\_System\_Stat

|  |  |  |
| --- | --- | --- |
| Tire\_Press\_System\_Stat | Value | Meaning |
| Unknown\_Composite\_Stat | 0x0 | TPMS status unknown |
| Systm\_Fault\_Composite\_Stat | 0x1 | TPMS fault |
| Sensr\_Fault\_Composite\_Stat | 0x2 | TPMS sensor fault |
| Low\_Composite\_Stat | 0x3 | Low tire pressure detected |
| Systm\_Activ\_Composite\_Stat | 0x4 | TPMS monitoring |
| Train\_LeftFront\_tire | 0x5 | TPMS is training |
| Train\_RightFront\_tire | 0x6 | TPMS is training |
| Train\_RightRear\_tire | 0x7 | TPMS is training |
| Train\_OutsideRtRear\_tire | 0x8 | TPMS is training |
| Train\_InsideRtRear\_\_tire | 0x9 | TPMS is training |
| Train\_LeftRear\_tire | 0xA | TPMS is training |
| Train\_OutsideLeftRear\_tire | 0xB | TPMS is training |
| Train\_InsideLeftRear\_tire | 0xC | TPMS is training |
| Training\_Complete | 0xD | TPMS training complete |
| Tires\_not\_trained | 0xE | TPMS is not training |

If vehicle supports individual tire pressure, IVI should collect following CAN signals:

* Tire\_Press\_System\_Stat (Same as Overall TPMS)
* Tire\_Press\_System\_Stat

|  |  |  |
| --- | --- | --- |
| Tire\_Press\_LF\_Stat | Value | Meaning |
| Unknown | 0x0 | Status unknown |
| Normal | 0x1 | Normal |
| Low | 0x2 | Low tire pressure |
| Fault | 0x3 | Status unknown |
| Alert | 0x4 | Ignore if TPMS configuration “Federal Regulation” is not EU |
| Not\_Supported | 0xF | Status does not support |

* Tire\_Press\_RF\_Stat
* Tire\_Press\_RR\_ORR\_Stat
* Tire\_Press\_LR\_OLR\_Stat
* Tire\_Press\_IRR\_Stat (not used)
* Tire\_Press\_ILR\_Stat (not used)
* Tire\_Press\_LF\_Data

|  |  |  |
| --- | --- | --- |
| Tire\_Press\_LF\_Data | Value | Meaning |
| Unknown | 0xFFFD | Status unknown |
| Invalid | 0xFFFE | Invalid value |
| Not\_Supported | 0xFFFF | Not support |
| Other | 0 – 0xFFFE | Valid value |

* Tire\_Press\_RF\_Data
* Tire\_Press\_RR\_ORR\_Data
* Tire\_Press\_LR\_OLR\_Data
* Tire\_Press\_IRR\_Data (not used)
* Tire\_Press\_ILR\_Data (not used)

IVI should not use Tire\_Press\_IRR\_Stat and Tire\_Press\_ILR\_Stat because Dual Rear Wheel is disabled.

IVI should not use Tire\_Press\_IRR\_Data and Tire\_Press\_ILR\_Data because Dual Rear Wheel is disabled.

IVI should show tire pressure value and status for individual tire.

If tire pressure status is not Normal/Low, IVI should show tire pressure value as “--”.

If tire pressure status is Normal/Low, tire pressure value is not valid, IVI should show tire pressure value as “--”.

Tire temperature is not in feature scope.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

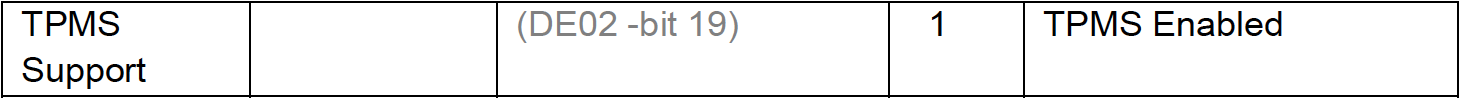
### FRD-REQ-416979/A-TPMS eligible

If TPMS support is configured as enabled, TPMS eligible is true; if TPMS support is configured as disabled, TPMS eligible is false.

If TPMS eligible is false, IVI should not collect TPMS data and show TPMS.

TPMS configuration on IPC as below

图片包含 屏幕截图

描述已自动生成

IVI should create a new configuration, use the same configuration and value as IPC, and IVI TPMS feature should follow IVI its own configuration.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## FRD-REQ-416997/A-Health alert

Vehicle health alert:

* Antilock Brake Fault
* Tire Pressure Monitor System (TPMS) Warning
* Malfunction Indicator Lamp (MIL) - Regulatory
* Low Washer Fluid
* Low Engine Oil Pressure
* Charge System Fault
* Engine Coolant Overtemperature
* Powertrain Malfunction/Reduced Power
* All Wheel Drive OFF or 4X4 OFF
* Air Filter Minder
* Service Steering
* Hill Descent Control Fault Warning
* Hill Start Assist Warning
* Bulb Failure

Note: some alerts may not support on certain vehicle model, please refer to HMI specification to check which alerts are contained.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416998/A-Health alert data collection

**Driver Warning Monitoring Cycle Configuration on ECG**

The Driver Warning Monitoring Cycle timing shall be configurable. The range shall be 0 to 1800 seconds where 0 seconds disables the Driver Warning Monitoring cycle. The default shall be 60.

Because monitoring is executed by ECG, IVI takes no action on this configuration. Validation and test team may use this in test cases.

ECG DID 0xA017, Start byte = 1, Start Bit = 7

图片包含 屏幕截图

描述已自动生成

**Driver Warning Collection Type Configuration**

The Driver Warning Collection Type Configuration shall be configurable. The range shall be 0 to 1, default is 1.

|  |  |  |
| --- | --- | --- |
| **Value** | **Action** | **Default** |
| 0 | CAN Signal TeltalWarnData\_No\_Actl | - - |
| 1 | DIDs 600E&F | Yes |

If ECG reads CAN signal TeltalWarnData\_No\_Actl, IVI should also read the same CAN signal. If ECG read IPC DID 600E & 600F, IVI should read diagnostic data on CAN.

|  |  |
| --- | --- |
| Warning | DID |
| Antilock Brake Fault | Bit 29 of $600E |
| Tire Pressure Monitor System (TPMS) Warning | Bit 27 of $600E |
| Malfunction Indicator Lamp (MIL) - Regulatory | Bit 26 of $600E |
| Charge System Fault | Bit 25 of $600E |
| Low Washer Fluid | Bit 19 of $600E |
| Low Engine Oil Pressure | Bit 17 of $600E |
| Engine Coolant Overtemperature | Bit 16 of $600E |
| Powertrain Malfunction/Reduced Power | Bit 15 of $600E |
| All Wheel Drive OFF or 4X4 OFF | Bit 03 of $600E |
| Air Filter Minder | Bit 02 of $600E |
| Service Steering | Bit 29 of $600F |
| Hill Descent Control Fault Warning | Bit 25 of $600F |
| Hill Start Assist Warning | Bit 22 of $600F |

Mapping of TeltalWarnData\_No\_Actl with DID $600E, DID $600F

|  |  |
| --- | --- |
| TeltalWarnData\_No\_Actl | DID $600E/$600F |
| Bit 63 | Bit 31 of $600E |
| Bit 62 | Bit 30 of $600E |
| …. | …. |
| Bit 33 | Bit 1 of $600E |
| Bit 32 | Bit 0 of $600E |
| Bit 31 | Bit 31 of $600F |
| Bit 30 | Bit 30 of $600F |
| …. | …. |

For FNV2, Message sent by IPC to report DIDs 600E and 600F for Driver Warning notifications.

If vehicle health monitoring data collect type is CAN signal, IVI should show vehicle alert monitoring status:

|  |  |
| --- | --- |
| **Condition** | **Vehicle alert monitoring status** |
| Ignition OFF | Vehicle alert monitoring not started, will start monitoring 60s after start vehicle |
| Ignition ON less than 60s | Vehicle alert monitoring not started, will start monitoring 60s after start vehicle |
| Ignition ON more than 60s | Vehicle alert monitoring in started |

If vehicle health monitoring data collect type is IPC DID 600E & 600F, IVI should show vehicle alert monitoring status:

|  |  |
| --- | --- |
| **Condition** | **Vehicle alert monitoring status** |
| Ignition OFF | Vehicle alert monitoring not started, will start monitoring 60s after start vehicle |
| Ignition ON less than 60s | Vehicle alert monitoring not started, will start monitoring 60s after start vehicle |
| Ignition ON more than 60s, no response received | Vehicle alert monitoring not started, please check if vehicle is authorized |
| Ignition ON more than 60s, response is received | Vehicle alert monitoring in started |

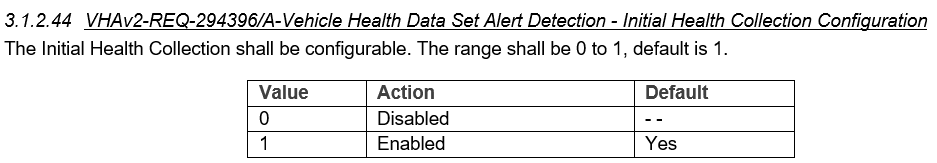
For FNV3, Message sent by APIM to report DIDs 600E and 600F for Driver Warning notifications. So APIM does not need to collect Driver Warning data from other ECUs since FNV. APIM does not has any condition check as FNV2.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416999/A-Health alert eligible

IVI should follow the same vehicle health monitoring cycle timing as ECG. If Vehicle Health Monitor is configured as Disabled, the vehicle should not support vehicle health alert.



[RE\_Marker\_RemoveLines]

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

## FRD-REQ-416984/A-Trip

Trip contains:

1. Start date and time
2. End date and time
3. Trip distance
4. Trip used time
5. Trip average speed
6. Trip event

Note: Some trip elements may not show on HMI, please refer to HMI specification.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416985/A-Trip start and end

Trip starts when vehicle ignition is ON, trip ends when vehicle ignition is OFF.

When vehicle ignition is ON, if IGN\_ON\_TIME - LAST\_IGN\_OFF\_TIME <= 30 min, this is not new trip.

Let IDLE\_TIME += IGN\_ON\_TIME - LAST\_IGN\_OFF\_TIME.

If LAST\_IGN\_OFF\_TIME – IGN\_ON\_TIME > 30 min, this is new trip.

For last trip, TRIP\_START\_TIME = IGN\_ON\_TIME, TRIP\_END\_TIME = IGN\_OFF\_TIME, TRIP\_TIME = TRIP\_END\_TIME - TRIP\_START\_TIME - IDLE\_TIME.



[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416986/A-Trip distance

Trip distance = trip end odometer – trip start odometer.

Trip distance unit is the same as odometer.

[RE\_Marker\_RemoveLines]

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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416987/A-Trip used time

Trip used time = Trip end time – trip start time – idle time.

If trip used time < 1 hour, IVI should show trip used time as MM min, ignore seconds.

If trip used time >= 1 hour, IVI should show trip used time as HH hour MM min, ignore seconds.

If trip used time >= 24 hour, IVI should show trip used time as DD day HH hour, ignore minutes.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
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| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-416988/A-Trip average speed

Trip average speed = trip distance / trip used time.

Trip average speed unit is the same as trip distance and used time, should be km/h or mile/h.

When IVI calculate trip average speed, IVI should not ignore trip used time minutes and seconds.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### FRD-REQ-417084/A-Trip event

If vehicle triggers health alert, IVI should mark it as one trip event.

Trip event includes health alert title and timestamp.

If alert occurs more than once during trip, IVI should mark it as different trip event, because timestamp is different.

If vehicle fuel level increase more than 1% after engine start, IVI should mark it as trip event. This trip event does not have timestamp.

[RE\_Marker\_RemoveLines]

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

# Sequence

[RE\_Marker\_RemoveLines]

Step1: VHA app checks if vehicle supports TPMS by reading TPMS configuration on IVI

Step2: VHA app gets tire pressure unit setting and tire temperature unit setting by reading TPMS configuration on IVI

Step3: VHA app gets tire pressure value and status, get tire temperature from CAN signals

Step4: VHA app shows TPMS on HMI

手机截图图社交软件的信息

描述已自动生成

Following diagram is Vehicle Health Monitor via ECG flowchart



Vehicle health monitoring data collect type is IPC DID 600E & 600F

Step1: VHA app checks VHA configurations on IVI

Step2: if data collection configuration is Read IPC DID 600E&600F, VHA app reads 600E&600F value on CAN

Step3: VHA app uses DID value to check if there’s active alert

Step4: VHA app shows warning on HMI

手机截图图社交软件的信息

描述已自动生成

Vehicle health monitoring data collect type is CAN signal

Step1: VHA app checks VHA configurations on IVI

Step2: if data collection configuration is Read CAN signal, VHA app reads CAN signal TeltalWarnData\_No\_Actl

Step3: VHA app uses CAN signal value to check if there’s active alert

Step4: VHA app shows warning on HMI

手机屏幕截图

描述已自动生成

Step1: VHA app checks if vehicle supports oil life by reading OIL Minder 10K configuration on IVI

Step2: VHA app gets odometer CAN signal

Step3: VHA app gets OIL LIFE CAN signal

Step4: VHA app show odometer and oil life on HMI; VHA app checks oil life, if oil life = 5% or 0%, trigger oil change reminder message on IVI

手机屏幕截图

描述已自动生成