# 1 HUD_ADA (Highway_Assist_AND_LCA)_ALC_ FNV2+

## 1.1 Functional Description

Highway Assist is a SAE Level 2 Automated Driving System built upon Adaptive Cruise Control with Stop & Go (ACC S&G) with Lane Centering Assist (LCA). It offers longitudinal support with continuous steering support in highway-like environments.

This feature allows the driver to select two modes within the cruise control feature:
With Lane Centering
With Smart Offerings

ADA (Active Drive Assist) =Highway Assist offers 2 modes:

- **Limited Support**: If the necessary criteria for lane quality is met, but the criteria for Extended Support is not met, the system will operate in Limited mode where the driver needs to have his hands on the steering wheel and cannot take their hands off the wheel beyond a certain time duration (similar to LCA/TJA)
- **Extended Support**: The system will not issue hands-off warnings and hence allows the driver to take his hands off the steering wheel for an extended period of time, provided the driver is paying attention to the road (as determined by the driver monitor camera). This will be only allowed on limited access roadways, which are deemed acceptable for hands-off driving (per sensors, actuators, etc.)

The cluster and HUD display information pertinent to the two modes mentioned above in addition to the warnings to ensure driver awareness.
Highway Assist Limited Mode-LCA (also known as Traffic Jam Assist (TJA)) requires the driver's hands to be on the steering wheel; if not, it will alert the driver to re-engage in the driving task by placing their hands on the wheel. In the absence of either the driver's hands on the steering wheel or inattentiveness (eyes not on the road), the system will provide a two-step warning (hands-off or eyes-off).

The Highway Assist with Lane Centering Control Function correlates the Personalization signals from the IPMA, several signals from the ADAS module and the Operational_Mode to determine when to activate the appropriate displays.

There is another feature added along with ADA (Highway Assist Limited and Extended Mode) which works independently with these features and called ALC (Assisted Lane Change).

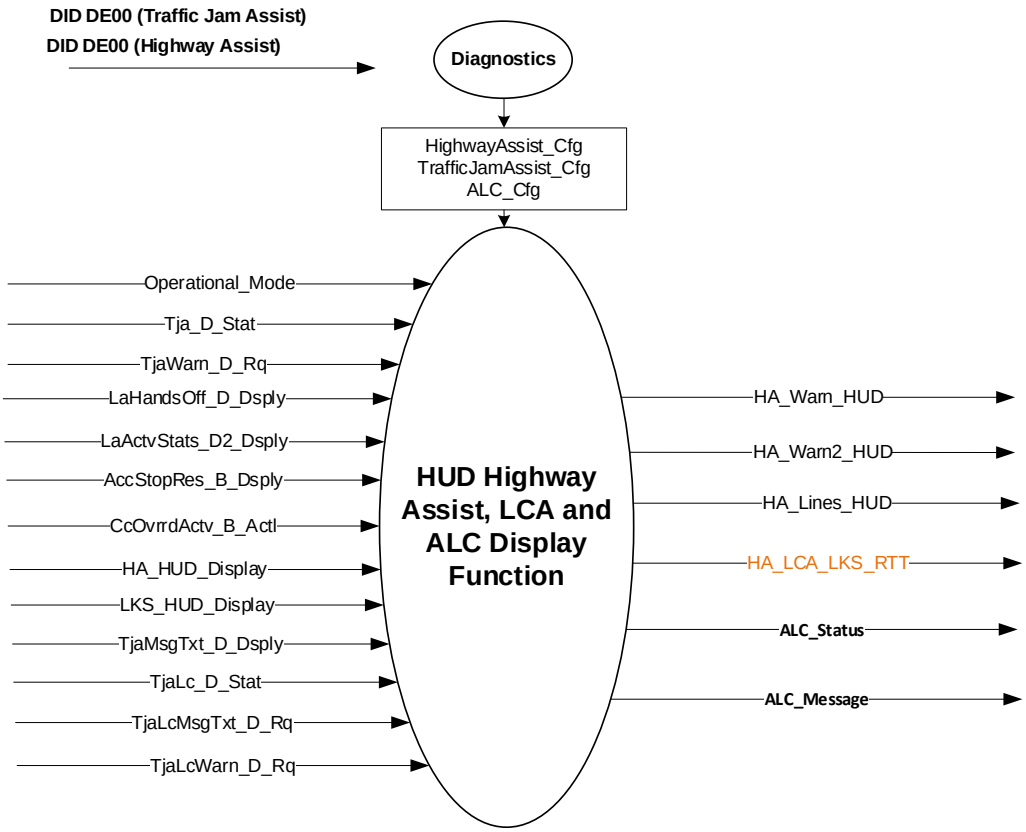
**ALC (Assisted Lane Change) Display:**

Provide information to the driver about Assisted Lane Change (Lane Change conducted by vehicle on request of driver).
Note: Assisted Lane change is regulated (incl. some HMI aspects by ECE079 for ECE-markets).

## 1.2 Interfaces

### 1.2.1 Interface Context Diagram (I/O Block Diagram)

HUD Highway Assist, LCA and ALC Function Context Diagram




### 1.2.2 Inputs

*1.2.2.1 IR-REQ-342687/C-INTERNAL:*

- Operational_Mode
- HighwayAssist_Cfg; based on “Highway Assist” of DID DE01 indicating if the Highway Assist feature is Enabled (0x1) or Disabled (0x0).
- TrafficJamAssist_Cfg; based on “Traffic Jam Assist” of DID DE01 indicating if the LCA feature is Enabled (0x1) or Disabled (0x0).
- ALC_Cfg; based on “Assisted Lane Change” of DID DE01 indicating if the ALC feature is Enabled (0x1) or Disabled (0x0).
- HA_HUD_Display
- LKS_HUD_Display

#### *1.2.2.2 MUX signals on the CAN Bus*

##### 1.2.2.2.1 SIG-REQ-342688/A-Tja_D_Stat Signal

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| Tja_D_Stat | 3 | | SED | 1 | 0 | | 0 (0x0) | 7 (0x7) |
| | | Off | | | | 0 (0x0) | | |
| | | Standby | | | | 1 (0x1) | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Active | | | | 2 (0x2) | | |
| | | ActiveIntervention Left | | | | 3 (0x3) | | |
| | | ActiveIntervention Right | | | | 4 (0x4) | | |
| | | ActiveWarningLeft | | | | 5 (0x5) | | |
| | | ActiveWarningRight | | | | 6 (0x6) | | |
| | | ExtendedActive | | | | 7 (0x7) | | |

#### 1.2.2.2.2 SIG-REQ-342689/C-TjaWarn_D_Rq

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| TjaWarn_D_Rq | 3 | | SED | 1 | 0 | | 0 (0x0) | 7 (0x7) |
| | | NoWarning | | | | 0 (0x0) | | |
| | | TrafficJamAssistCancel | | | | 1 (0x1) | | |
| | | HardTakeOverLevel1 | | | | 2 (0x2) | | |
| | | HardTakeOverLevel2 | | | | 3 (0x3) | | |
| | | HaLaneDeptWarningRight | | | | 4 (0x4) | | |
| | | HaLaneDeptWarningLeft | | | | 5 (0x5) | | |
| | | SoftTakeOverEyesOff | | | | 6 (0x6) | | |
| | | HardTakeOverEyesOff | | | | 7 (0x7) | | |

#### 1.2.2.2.3 SIG-REQ-342690/A-LaHandsOff_D_Dsply

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| LaHandsOff_D_Dsply | 2 | | SED | 1 | 0 | | 0 | 3 (0x3) |
| | | HandsOn | | | | 0 (0x0) | | |
| | | Level1 | | | | 1 (0x1) | | |
| | | Level2 | | | | 2 (0x2) | | |
| | | Suppressed | | | | 3 (0x3) | | |

#### 1.2.2.2.4 SIG-REQ-342691/B-LaActvStats_D2_Dsply

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| LaActvStats_D2_Dsply | 5 | | SED | 1 | 0 | | 0 (0x0) | 31 (0x1F) |
| | | No Left No Right | | | | 0 (0x0) | | |
| | | Available Left No Right | | | | 1 (0x1) | | |
| | | Suppress Left No Right | | | | 2 (0x2) | | |
| | | Warn Left No Right | | | | 3 (0x3) | | |
| | | Intervene Left No Right | | | | 4 (0x4) | | |
| | | No Left Available Right | | | | 5 (0x5) | | |
| | | Available Left Available Right | | | | 6 (0x6) | | |
| | | Suppress Left Available Right | | | | 7 (0x7) | | |
| | | Warn Left Available Right | | | | 8 (0x8) | | |
| | | Intervene Left Available Right | | | | 9 (0x9) | | |
| | | No Left Suppress Right | | | | 10 (0xA) | | |
| | | Available Left Suppress Right | | | | 11 (0xB) | | |
| | | Suppress Left Suppress Right | | | | 12 (0xC) | | |
| | | Warn Left Suppress Right | | | | 13 (0xD) | | |
| | | Intervene Left Suppress Right | | | | 14 (0xE) | | |
| | | No Left Warn Right | | | | 15 (0xF) | | |
| | | Available Left Warn Right | | | | 16 (0x10) | | |
| | | Suppress Left Warn Right | | | | 17 (0x11) | | |
| | | Warn Left Warn Right | | | | 18 (0x12) | | |
| | | Intervene Left Warn Right | | | | 19 (0x13) | | |
| | | No Left Intervene Right | | | | 20 (0x14) | | |
| | | Available Left Intervene Right | | | | 21 (0x15) | | |
| | | Suppress Left Intervene Right | | | | 22 (0x16) | | |
| | | Warn Left Intervene Right | | | | 23 (0x17) | | |
| | | Intervene Left Intervene Right | | | | 24 (0x18) | | |
| | | Not Used | | | | 25 (0x19) | | |
| | | Not Used | | | | 26 (0x1A) | | |
| | | Not Used | | | | 27 (0x1B) | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Not Used | | | | 28 (0x1C) | | |
| | | ECE OFF RTT | | | | 29 (0x1D) | | |
| | | LA OFF | | | | 30 (0x1E) | | |
| | | Not Used | | | | 31 (0x1F) | | |

#### 1.2.2.2.5 SIG-REQ-342692/A-CcOvrrdActv_B_Actl

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| CcOvrrdActv_B_Actl | 1 | | SED | 2 | 0 | | 0 | 1 |
| | | Cruise_Req_Not_Overridden | | | | 0 (0x0) | | |
| | | Cruise_Overridden | | | | 1 (0x1) | | |

#### 1.2.2.2.6 SIG-REQ-342693/A-AccStopRes_B_Dsply

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| AccStopRes_B_Dsply | 1 | | SED | 1 | 0 | | 0 | 1 |
| | | No | | | | 0 (0x0) | | |
| | | Yes | | | | 1 (0x1) | | |

#### 1.2.2.2.7 SIG-REQ-353957/A-TjaMsgTxt_D_Dsply

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| TjaMsgTxt_D_Dsply | 3 | | SED | 1 | 0 | | 0 (0x0) | 7 (0x7) |
| | | NoMessage | | | | | 0 (0x0) | |
| | | TrafficJamAssistUnavailabl | | | | | 1 (0x1) | |
| | | TrafficJamAssistSelected | | | | | 2 (0x2) | |
| | | TurnOnAdaptCruiseControl | | | | | 3 (0x3) | |
| | | HaUnavailable | | | | | 4 (0x4) | |
| | | HaSelected | | | | | 5 (0x5) | |
| | | SmartOffering | | | | | 6 (0x6) | |
| | | Disclaimer | | | | | 7 (0x7) | |

#### 1.2.2.2.8 SIG-REQ-407830/A-TjaLc_D_Stat Signal

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| TjaLc_D_Stat | 4 | | SED | 1 | 0 | | 0 (0x0) | 15 (0xF) |
| | | Off | | | | 0 (0x0) | | |
| | | Standby | | | | 1 (0x1) | | |
| | | AvailableLeft | | | | 2 (0x2) | | |
| | | AvailableRight | | | | 3 (0x3) | | |
| | | AvailableLeftRight | | | | 4 (0x4) | | |
| | | PreparingLeft | | | | 5 (0x5) | | |
| | | PreparingRight | | | | 6 (0x6) | | |
| | | LcActiveLeft | | | | 7 (0x7) | | |
| | | LcActiveRight | | | | 8 (0x8) | | |
| | | NotUsed_1 | | | | 9 (0x9) | | |
| | | NotUsed_2 | | | | 10 (0xA) | | |
| | | NotUsed_3 | | | | 11 (0xB) | | |
| | | NotUsed_4 | | | | 12 (0xC) | | |
| | | NotUsed_5 | | | | 13 (0xD) | | |
| | | NotUsed_6 | | | | 14 (0xE) | | |
| | | NotUsed_7 | | | | 15 (0xF) | | |

#### 1.2.2.2.9 SIG-REQ-407831/A-TjaLcMsgTxt_D_Rq Signal

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| TjaLcMsgTxt_D_Rq | 3 | | SED | 1 | 0 | | 0 (0x0) | 7 (0x7) |
| | | NoMessage | | | | 0 (0x0) | | |
| | | LcSuggestionLeft | | | | 1 (0x1) | | |
| | | LcSuggestionRight | | | | 2 (0x2) | | |
| | | AlcOn | | | | 3 (0x3) | | |
| | | AlcOff | | | | 4 (0x4) | | |
| | | TurnOffIndicator | | | | 5 (0x5) | | |
| | | NotUsed_1 | | | | 6 (0x6) | | |
| | | NotUsed_2 | | | | 7 (0x7) | | |

#### 1.2.2.2.10 SIG-REQ-407832/A-TjaLcWarn_D_Rq Signal

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| TjaLcWarn_D_Rq | 3 | | SED | 1 | 0 | | 0 (0x0) | 7 (0x7) |
| | | NoWarrning | | | | 0 (0x0) | | |
| | | DriverCancel | | | | 1 (0x1) | | |
| | | SystemCancel | | | | 2 (0x2) | | |
| | | CancelNoLane | | | | 3 (0x3) | | |
| | | CancelLaneBusy | | | | 4 (0x4) | | |
| | | CancelSpeedTooLow | | | | 5 (0x5) | | |
| | | NotUsed_1 | | | | 6 (0x6) | | |
| | | NotUsed_2 | | | | 7 (0x7) | | |

### 1.2.3 Outputs

#### *1.2.3.1 INTERNAL*

- HA_Warn_HUD
- HA_Warn2_HUD
- HA_Lines_AHUD
- ALC_Status
- ALC_Message
- HA_LCA_LKS_RTT

## 1.3 Function/Performance

### 1.3.1 F-REQ-342694/B-Operational Modes

| Mode | Differentiating Vehicle Conditions |
|---|---|
| Sleep Mode | Highway Assist/LCA and ALC Disable |
| Limited Mode | Highway Assist/LCA and ALC Disable |
| Normal Mode | Highway Assist/LCA and ALC Disable/Enable |
| Crank Mode | Highway Assist/LCA and ALC Disable/Enable |

### 1.3.2 Voltage Levels

Refer to the HUD Features table located in the Operational Modes and Voltage Range Strategies Section in this SPSS.

### 1.3.3 Human-Machine Interface

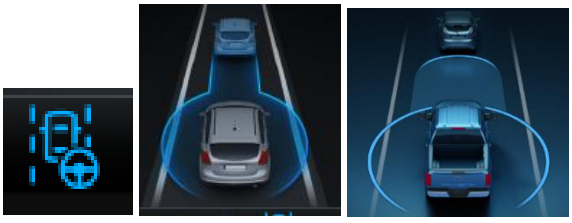
#### *1.3.3.1 Visual*

1.3.3.1.1 HMI-REQ-342695/C-Indicator Graphics / Display Format

Sample graphics provided below for HUD Display. Please refer to the specific program for exact graphics.
HMI examples:

Standby:

Active (Limited):



Active (Extended):


Note1: Active (Limited Mode) is also known as TJA/LCA or Highway Assist Limited Mode and Active (Extended Mode) as Highway Assist Extended Mode.

Displaying the above graphics is possible only if Highway Assist in HUD is enabled and On.
Refer “AHUD Basic Settings Control Function - CGEA1.3_xxx.doc” for AHUD, “CHUD Basic Settings Control Function - CGEA1.3_xxx.doc” for CHUD, and HUD – Memory Save and Recall STSS CGEA 1.3_xxx.doc to enable/disable or turn on/off the feature.

#### 1.3.3.1.2 Indicator Color Coordinates

Reference section COLOR & ILLUMINATION REQUIREMENTS (GRAPHICS)

### *1.3.3.2 Audio*

None

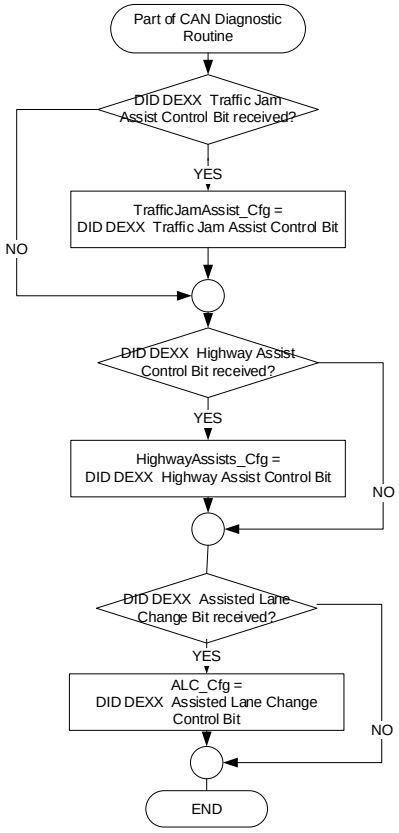
1.3.4 PFM-REQ-342697/A-System Accuracy

Within a 100msec of receiving a message that results in a change of state the HUD will update the display to the proper status.

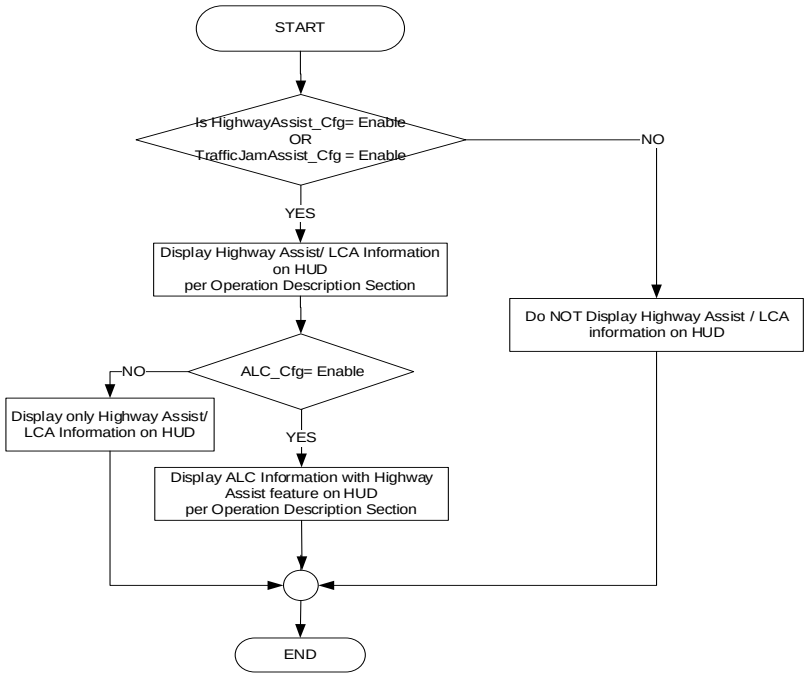
## 1.3.5 Operation: Performance and Functional

### *1.3.5.1 Subsystem Algorithm Flowchart / State Diagram*

#### 1.3.5.1.1 F-REQ-342698/C-Highway Assist and ALC Diagnostic Configuration Flowchart



#### 1.3.5.1.2 F-REQ-342699/C-Highway Assist and ALC Display Flowchart




### *1.3.5.2 Operation Description (supports algorithm flowchart /state diagram)*

#### 1.3.5.2.1 F-REQ-342700/B-Highway Assist and Lane Keep System HUD Display

| Parameter Name | Logic | State |
|---|---|---|
| HA_HUD_Display | For AHUD:<br>Not Equipped OR<br>(HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== ADAS VIEW OFF)* | Ina |
| | For CHUD<br>Not Equipped OR<br>(CHUD_State== Off) * OR<br>(HUD_Cruise_Control==Off)*<br>OR<br>(HudAct_D_Stat == NOT Active)** | |
| | For AHUD:<br>(HUD_Image_OnOff == On)* AND<br>((HUD_ADAS_OnOff == (ADAS VIEW ON))* | ACT |
| | For CHUD<br>(CHUD_State == On)* AND<br>(HUD_Cruise_Control == On)* AND<br>(HudActv_D_Stat == Active)** | |
| LKS_HUD_Display | For AHUD:<br>Not Equipped OR | Ina |

| | | |
|---|---|---|
| | (HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== ADAS VIEW OFF)* | |
| | For CHUD<br>Not Equipped OR<br>(CHUD_State== Off) * OR<br>(HUD_LaneKeeping== Off)*<br>OR<br>(HudAct_D_Stat == NOT Active)* | |
| | For AHUD:<br>(HUD_Image_OnOff == On)* AND<br>(HUD_ADAS_OnOff == (ADAS VIEW ON)* | ACT |
| | For CHUD<br>(CHUD_State == On)* AND<br>(HUD_Lane_Keeping == On)* AND<br>(HudActv_D_Stat == Active)** | |

*see HUD_Memory_Save_and_Recall STSS
**see CHUD_Welcome_Farewell_Strategy STS

#### 1.3.5.2.2 F-REQ-342701/E-HUD Highway Assist Warning Indication

| Operational_Mode | HA_HUD_Display | LaHandsOff_D_Dsply | TjaWarn_D_Rq | Tja_D_Stat | TjaMsgTxt_D_Dsply | HA_Warn_HUD |
|---|---|---|---|---|---|---|
| NORMAL or CRANK | ACT | Ina (0x0) | NoWarning (0x0) | X | NoMessage (0x0) | Ina |
| | | Ina (0x0) | NoWarning (0x0) | X | Disclaimer(0x7) | HA_RESUME |
| | | Level1 (0x1) | NoWarning(0x0) | Off (x0) OR Standby (0x1) | X | LKS_STSS |
| | | Level1 (0x1) | NoWarning (0x0) | Active (0x2) OR ActiveInterventionLeft (0x3) OR ActiveInterventionRight (0x4) | X | HA_HO_HUD |
| | | Level1 (0x1) | NoWarning (0x0) | Extended (0x7) | X | HA_HO_HUD_Ext |
| | | Level2 (0x2) | NoWarning (0x0) | Off (x0) OR Standby (0x1) | X | LKS_STSS |
| | | Level2 (0x2) | NoWarning (0x0) | Active (0x2) OR ActiveInterventionLeft (0x3) OR ActiveInterventionRight (0x4) | X | HA_HO_HUD_L2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Level2 (0x2) | NoWarning (0x0) | Extended (0x7) | X | HA_HO_HUD_Ext_L2 |
| | | X | HardTakeOverLevel2 (0x3) | X | X | HA_HTO_HUD |
| | | ~~X~~ | ~~HAWarningRight (0x4)~~ | ~~X~~ | ~~X~~ | ~~HA_WARNING_RHT~~ |
| | | ~~X~~ | ~~HAWarningLeft (0x5)~~ | ~~X~~ | ~~X~~ | ~~HA_WARNING_LFT~~ |
| | | X | SoftTakeOverEyesOff (0x6) | X | X | HA_SOFT_WARNING_L1 |
| | | X | HardTakeOverEyesOff (0x7) | X | X | HA_HARD_WARNING_L2 |
| ALL OTHER CASES | | | | | | Ina |

***Note:** All Green highlighted rows in above table represent Highway Assist Extended Mode only.

### 1.3.5.2.3 F-REQ-342703/G-Highway Assist HUD status indication and warnings (line & steering wheel)

| Operational_Mode | HA_HUD_Display | LKS_HUD_Display | LaActvStats_D2_Dspl y | TjaWarn_D_Rq | Tja_D_Stat | TjaLc_D_Stat | HA_Lines_HUD | HA_Warn2_HUD |
|---|---|---|---|---|---|---|---|---|
| NORMAL or CRANK | ACT | X | X | Ina (0x0) | Off (0x0) | Off (0x0) | Ina | Ina |
| | | Ina | X | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | Not (0x5 or 0x6 or 0x7 or 0x8) | TJA_STANDBY | Ina |
| | | ACT | 0xC or 0x0 or 1D or 1E | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | Not (0x5 or 0x6 or 0x7 or 0x8) | TJA_STANDBY | Ina |
| | | ACT | 0x1, 0x5, 0x6, 0x7 0xB | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | Not (0x5 or 0x6 or 0x7 or 0x8) | TJA_STANDBY_LKS | Ina |
| | | ACT | 0x8 or 0xD | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | X (Don't Care) | TJA_STBY_WARN_LEFT | Ina |
| | | ACT | 0x10 or 0x11 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | X (Don't Care) | TJA_STBY_WARN_RIGHT | Ina |
| | | ACT | 0x9 or 0xE | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | X (Don't Care) | TJA_STBY_INTERVENE_LEFT | Ina |
| | | ACT | 0x15, 0x16 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Standby (0x1) | X (Don't Care) | TJA_STBY_INTERVENE_RIGHT | Ina |
| | | X | Not 0x8, 0x9, 0xD, 0xE, 0x10,0x11, 0x15, 0x16 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Active (0x2) or ActiveInterventionLeft (0x3) or ActiveInterventionRight (0x4) | Not (0x5 or 0x6 or 0x7 or 0x8) | TJA_ACTIVE | Ina |
| | | X | 0x8 or 0xD | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Active (0x2) or | X (Don't Care) | TJA_ACT_WARN_LEFT | Ina |

| Operational_Mode | HA_HUD_Display | LKS_HUD_Display | LaActvStats_D2_Dsply | TjaWarn_D_Rq | Tja_D_Stat | TjaLc_D_Stat | HA_Lines_HUD | HA_Warn2_HUD |
|---|---|---|---|---|---|---|---|---|
| | | | | | ActiveInterventionLeft (0x3) or ActiveInterventionRight (0x4) | | | |
| | | X | 0x10 or 0x11 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Active (0x2) or ActiveInterventionLeft (0x3) or ActiveInterventionRight (0x4) | X (Don't Care) | TJA_ACT_WARN_RIGHT | Ina |
| | | X | 0x9 or 0xE | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Active (0x2) or ActiveInterventionLeft (0x3) or ActiveInterventionRight (0x4) | X (Don't Care) | TJA_ACT_INTERVENE_LEFT | Ina |
| | | X | 0x15, 0x16 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Active (0x2) or ActiveInterventionLeft (0x3) or ActiveInterventionRight (0x4) | X (Don't Care) | TJA_ACT_ INTERVENE _RIGHT | Ina |
| | | X | Not 0x8, 0x9, 0xD, 0xE, 0x10,0x11, 0x15, 0x16 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Extended (0x7) | Not (0x5 or 0x6 or 0x7 or 0x8) | HA_ACTIVE_Extended | Ina |
| | | X | 0x8 or 0xD | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Extended (0x7) | X (Don't Care) | HA_ACT_WARN_LEFT_Extended | Ina |
| | | X | 0x10 or 0x11 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Extended (0x7) | X (Don't Care) | HA_ACT_WARN_RIGHT_Extended | Ina |
| | | X | 0x9 or 0xE | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Extended (0x7) | X (Don't Care) | HA_ACT_INTERVENE_LEFT_Extended | Ina |
| | | X | 0x15, 0x16 | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | Extended (0x7) | X (Don't Care) | HA_ACT_ INTERVENE _RIGHT_Extended | Ina |
| | | X | X | HAWarningRight (0x4) | NOT "Extended (0x7)" | X (Don't Care) | HA_HO_LDW_RIGHT | Ina |

| Operational_Mode | HA_HUD_Display | LKS_HUD_Display | LaActvStats_D2_Dsply | TjaWarn_D_Rq | Tja_D_Stat | TjaLc_D_Stat | HA_Lines_HUD | HA_Warn2_HUD |
|---|---|---|---|---|---|---|---|---|
| | | X | X | HAWarningRight (0x4) | Extended (0x7) | X (Don't Care) | HA_HO_LDW_RIGHT_Ext | Ina |
| | | X | X | HAWarningLeft (0x5) | NOT "Extended (0x7)" | X (Don't Care) | HA_HO_LDW_LEFT | Ina |
| | | X | X | HAWarningLeft (0x5) | Extended (0x7) | X (Don't Care) | HA_HO_LDW_LEFT_Ext | Ina |
| | | Ina | X | TrafficJamAssistCancel (0x1) | X | X (Don't Care) | HA_CANC | HA_Cancel_Txt |
| | | ACT | 0xC or 0x0 or 1D OR 1E | TrafficJamAssistCancel (0x1) | X | X (Don't Care) | HA_CANC | HA_Cancel_Txt |
| | | ACT | NOT 0xC or 0x0 OR 1D or 1E | TrafficJamAssistCancel (0x1) | X | X (Don't Care) | HA_CANC_LKS | HA_Cancel_Txt |
| | | X | Not 0x8 or 0x9 or 0x10 or 0x11 or 0x15 or 0x16 or 0xD or 0xE | 0x0 or 0x2 or 0x3 or 0x6 or 0x7 | X | 0x5 or 0x6 or 0x7 or 0x8 | ALC_ACTIVE | Ina |
| ALL OTHER CASES | | | | | | | Ina | Ina |

***Note:** All Green highlighted rows in above table represent Highway Assist Extended Mode only.
**HA and LKS -**In all states (Off, Standby, Active (Limited Mode), Active (Extended Mode) LKS Warnings or Interventions shall be shown as per LKS STSS.

### 1.3.5.2.4 F-REQ-342704/F-HUD Highway Assist Display Elements

| HA_Lines_HUD | Left Line/Bubble | Right Line/Bubble | Steering wheel | HA_LCA_LKS_RTT | Text |
|---|---|---|---|---|---|
| Ina | No TJA information Displayed *Follow STSS "Lane Keeping Systems Control Function"* | | | | |
| TJA_STANDBY | Grey Solid or None*** | Grey Solid or None*** | Grey or None*** |  (LCA) | None |

| HA_Lines_HUD | Left Line/Bubble | Right Line/Bubble | Steering wheel | HA_LCA_LKS_RTT | Text |
|---|---|---|---|---|---|
| TJA_STANDBY_LKS | LKS STSS | LKS STSS | Grey or None*** |  (LCA) | LKS STSS |
| TJA_STBY_WARN_LEFT | Red Solid | LKS STSS | None*** |  (LKS) | None |
| TJA_STBY_WARN_RIGHT | LKS STSS | Red Solid | None*** |  (LKS) | None |
| TJA_STBY_INTERVENE_LEFT | Amber Solid | LKS STSS | None*** |  (LKS) | None |
| TJA_STBY_ INTERVENE _RIGHT | LKS STSS | Amber Solid | None*** |  (LKS) | None |
| TJA_ACTIVE | Green Solid or Blue Solid** or None*** | Green Solid or Blue Solid** or None*** | Green or Blue** |  (LCA) | None |
| TJA_ACT_WARN_LEFT | Red Solid | Green Solid or Blue Solid** or None*** | Green or Blue** |  (LKS) | None |
| TJA_ACT_WARN_RIGHT | Green Solid or Blue Solid** or None*** | Red Solid | Green or Blue** |  (LKS) | No Text |
| TJA_ACT_INTERVENE_LEFT | Amber Solid | Green Solid or Blue Solid** or None*** | Green or Blue** |  (LKS) | No Text |
| TJA_ACT_ INTERVENE _RIGHT | Green Solid or Blue Solid** or None*** | Amber Solid | Green Or Blue** |  (LKS) | No Text |
| HA_ACTIVE_Extended | Blue Solid or None*** | Blue Solid or None*** | Blue** |  (LCA) | None |
| HA_ACT_WARN_LEFT_Extended | Red Solid | Blue Solid or None*** | Blue** |  (LKS) | None |

| HA_Lines_HUD | Left Line/Bubble | Right Line/Bubble | Steering wheel | HA_LCA_LKS_RTT | Text |
|---|---|---|---|---|---|
| HA_ACT_WARN_RIGHT_Extended | Blue Solid or None*** | Red Solid | Blue** |  (LKS) | None |
| HA_ACT_INTERVENE_LEFT_Extended | Amber Solid | Blue Solid or None*** | Blue** |  (LKS) | None |
| HA_ACT_ INTERVENE _RIGHT_Extended | Blue Solid or None*** | Amber Solid | Blue** |  (LKS) | None |
| HA_HO_LDW_RIGHT | Blue or None*** | Red | Red or Blue** | Red LCA RTT with steering wheel (LCA) | None |
| HA_HO_LDW_RIGHT_Ext | Blue or None*** | Red | Red or Blue** | Red LCA RTT with steering wheel (LCA) | None |
| HA_HO_LDW_LEFT | Red | Blue or None*** | Red or Blue** | Red LCA RTT with steering wheel (LCA) | None |
| HA_HO_LDW_LEFT_Ext | Red | Blue or None*** | Red or Blue** | Red LCA RTT with steering wheel (LCA) | None |
| HA_CANC | Amber Solid or None*** | Amber Solid or None*** | Amber** |  (LCA) | "Cancelled" |
| HA_CANC_LKS | Amber Solid or LKS STSS | Amber Solid or LKS STSS | Amber** |  (LCA) | "Cancelled" |
| ALC_ACTIVE | Blue or None*** | Blue or None*** | Blue** |  (LCA) | None |

***Note:** All Green highlighted rows in above table represent Highway Assist Extended Mode only.
Program metaphor decides to show or not to show lines or bubbles for Highway Assist/LCA feature.
If program doesn't display LCA RTT then ignore the "HA_LCA_LKS_RTT" column.
**HMI to decide color
***HMI will decide to display solid line or no line or no steering wheel.

HMI examples:

LCA RTT

| State Name | Example RTT color | Example RTT Graphic |
|---|---|---|
| Standby (LKS Not Available) | (Grey)* |  ** |
| Standby (LKS Available) | (White)* |  ** |
| Active | (Blue)* |  ** |
| Warning | (Red)* |  ** |

LKS RTT

| State Name | Example RTT Color | Example RTT Graphic |
|---|---|---|
| Not Available | (Grey)* |  ** |
| Available | (White)* |  ** |
| Intervention | (Amber)* |  ** |
| Warning | (Red)* |  ** |
| Inactive | None | None |

*For all the RTT Color follow the program specific HMI
**For all the RTT Graphics follow the program specific HMI

### 1.3.5.2.5 F-REQ-342705/H-HUD Highway Assist Warnings

| Parameter | Warning Name | Description |
|---|---|---|
| | LKS_STSS | Display Warnings Per LKS STSS (no text from LCA) |

| | | |
|---|---|---|
| HA_Warn_HUD | HA_HO_HUD | Highway Assist/LCA Text "Keep Hands On Steering Wheel"<br>**Note**: This warning is independent of any LKS color lines but can trigger with blue/amber/red lines/bubbles according to program metaphor. |
| | HA_HO_HUD_Ext | No warning will display. HUD will show extended mode only.<br>**Note:** HUD can't have Hands On state when HA is extended mode. |
| | HA_HO_HUD_L2 | Highway Assist/LCA Text "Keep Hands On Steering Wheel"<br>**Note**:<br>This warning is independent of any LKS color lines but can trigger with any blue/amber/red lines/bubbles according to program metaphor.<br>When this warning display on HUD then HUD will display amber triangle warning sign instead of lead vehicle. (*Note: Follow this according to program wallpapers and HMI Handling spec). |
| | HA_HO_HUD_Ext_L2 | No warning will display. HUD will show extended mode only.<br>**Note:** HUD can't have Hands On state when HA is extended mode. |
| | HA_HTO_HUD | "Resume Control"<br><br>**Note:** This warning will appear for both limited and extended mode. |
| | ~~HA_WARNING_RHT~~ | ~~Highway Assist/LCA Text "Keep Hands On Steering Wheel" with Red Right line/bubble as per (HA_HO_LDW_RIGHT).~~<br><br>**Note:** There is no HA_WARNING_RHT state in system and no relevant text warning. Only display elements apply which already cover in HA_HO_LDW_RIGHT and HA_HO_LDW_RIGHT_Ext. |
| | ~~HA_WARNING_LFT~~ | ~~Highway Assist/LCA Text "Keep Hands On Steering Wheel" with Red Left~~ |

| | | |
|---|---|---|
| | | ~~line/bubble as per (HA_HO_LDW_LEFT).~~<br><br>**Note:** There is no HA_WARNING_LFT state in system and no relevant text warning. Only display elements apply which already cover in HA_HO_LDW_LEFT and HA_HO_LDW_LEFT_Ext. |
| | HA_SOFT_WARNING_L1 | Soft Warning (Level1) Visual "Watch the Road"<br><br>Note: This warning will appear for both HA limited or extended mode. |
| | HA_HARD_WARNING_L2 | Hard Warning (Level2): Visual "Watch the Road"<br><br>Note:<br>This warning will appear for both HA limited or extended mode.<br>For level 2 warning, HMI will display amber triangle as warning instead of lead vehicle for both HA limited and extended mode. (*Note: Follow this according to program wallpapers and HMI Handling spec). |
| | HA_RESUME | Display Text "Press Accelerator Pedal To Resume" |
| HA_Warn2_HUD | HA_Cancel_Txt | Display Text "Canceled" |

***Note:** All Green highlighted rows in above table represent Highway Assist Extended Mode only.

### 1.3.5.2.6 F-REQ-342706/E-Priority between ACC S&G messages and TJA messages displayed in the text area

| HA_HUD_Display | Highway_Assist_Cfg Or TrafficJamAssist_Cfg | TjaWarn_D_Rq | CcOvrrdActv_B_Actl | AccStopRes_B_Dsplyt | HA_Lines_HUD |
|---|---|---|---|---|---|
| ACT | Enabled | Ina (0x0) | FALSE | FALSE | See CADS spec |
| | | Ina (0x0) | FALSE | TRUE | See CADS spec |
| | | Ina (0x0) | TRUE | FLASE | See CADS spec |
| | | Ina (0x0) | TRUE | TRUE | See CADS spec |
| | | 0x1 or 0x6 or 0x7 | X | X | Display per REQ - 342703 |
| ALL OTHER CASES | | | | | See REQ -342703 |

The priority between display of the LCA “Canceled” and ACC prompt/warning, is defined in HMI Handling Spec under this requirement “HMI-REQ-343157”.

#### 1.3.5.2.7 F-REQ-342773/A-HUD Highway Assist Personalization

Highway Assist shall be part of the ADAS personalization feature (0xC02) for AHUD and (0xC13) for CHUD as specified in Memory_Save_and_Recall_CGEA1.3_Vxx STSS

#### 1.3.5.2.8 Highway Assist Personalization Reference

Please refer to the HUD Memory_Save_and_Recall_CGEA1.3Vxx for details

### *1.3.5.3 ALC (Assisted Lane Change)*

1.3.5.3.1 REQ-407836/A-ALC (Assisted Lane Change) Display

Provide information to the driver about Assisted Lane Change (Lane Change conducted by vehicle on request of driver) with Highway Assist feature only.
**Note:** Assisted Lane change is regulated (incl. some HMI aspects by ECE079 for ECE-markets).

1.3.5.3.1.1 REQ-407837/A-ALC (Assisted Lane Change) Status Display

1.3.5.3.1.1.1 REQ-407838/A-Generic status display

The primary (IPC) and secondary (HUD) displays shall at all times provide visual information of the actual status of Assisted Lane Change to the driver, based on the CAN signal TjaLc_D_Stat (ECE79 5.6.4.5.1: The optical signals identified in paragraph 5.6.4.5. (Available, Preparation & Lane Change Active) shall be easily distinguishable from each other).

1.3.5.3.1.1.2 REQ-407839/A-Display of Availability

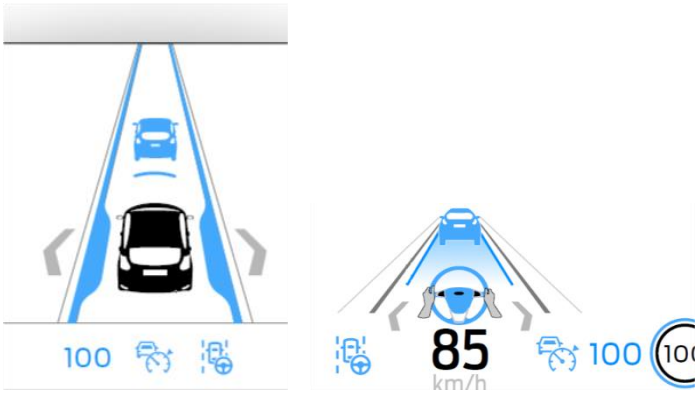
The primary (IPC) and secondary (HUD) displays shall at all times (in limited and in extended mode) provide visual information about the availability of Assisted Lane Change to the driver, based on the CAN signal TjaLc_D_Stat. For the primary display this is for ECE markets a legal requirement:

| Operational_Mode | Configurations | TjaLc_D_Stat | ALC_Status:Display | ADAS screen |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled<br>&<br>ALC_Cfg = Enabled | Off (0x0) | OFF | no indication |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled<br>&<br>ALC_Cfg = Enabled | AvailableLeftRight (0x4) | AVAILABLE BOTH SIDES | Grey chevron on the left and on the right side |
| ALL Other Cases | | Off (0x0) or AvailableLeftRight (0x4) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for message(If Any) color and graphic representation.

HMI examples:

Available Left and Right:



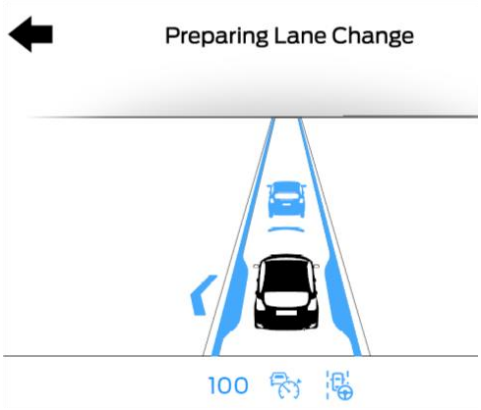

1.3.5.3.1.1.3 REQ-407840/A-Preparation Display

The primary (IPC) and secondary (HUD) displays shall at all times provide visual information about the availability of Assisted Lane Change to the driver (in limited and extended mode), based on the CAN signal TjaLc_D_Stat. For the primary display this is for ECE markets a legal requirement. The text shall only be shown in the ADAS metaphor (ADA IOD when feasible. As long as the state can be discriminated from the other states it is deemed sufficient to meet the ECE requirements.

| Operational_Mode | Configurations | TjaLc_D_Stat | ALC_Status:Display | ADAS screen |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | Off (0x0) | OFF | no indication |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | PreparingLeft (0x5) | PREPARATION LEFT | Blue chevron on the left side, none right |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | PreparingRight (0x6) | PREPARATION RIGHT | Blue chevron on the right side, none left |
| ALL Other Cases | | Off (0x0) or PreparingLeft (0x5) or PreparingRight (0x6) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for message(If Any) color and graphic representation.

HMI examples:
Preparation Left:





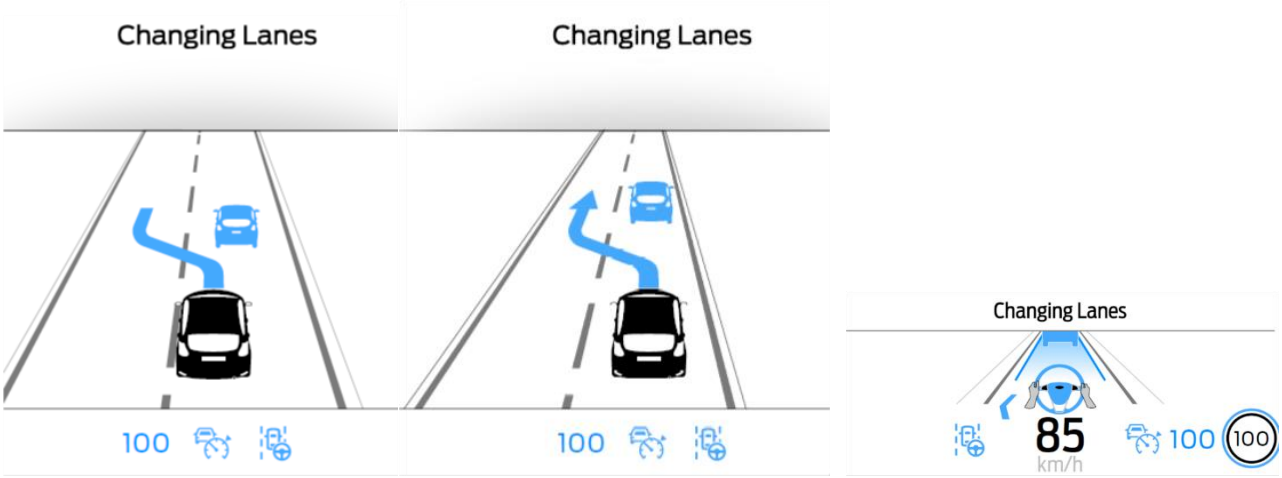
1.3.5.3.1.1.4 REQ-407841/A-ALC (Assisted Lane Change) Active Status

The primary (IPC) and secondary (HUD) displays shall at all times provide visual information that an Assisted Lane Change is conducted to the driver (in limited and extended mode), based on the CAN signal TjaLc_D_Stat, throughout the entire duration of the lane change:

| Operational_Mode | Configurations | TjaLc_D_Stat | ALC_Status:Display | ADAS screen |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | Off (0x0) | OFF | no indication |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | LcActiveLeft (0x7) | LANECHANGE LEFT | Indication of a lane change to the left as long as signal is active & Text Changing Lanes& blue chevron left* |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | LcActiveRight (0x8) | LANECHANGE RIGHT | Indication of a lane change to the left as long as signal is active & Text Changing Lanes & blue chevron right* |
| ALL Other Cases | | Off (0x0) or LcActiveLeft (0x7) or LcActiveRight (0x8) | Inactive | |

*If an animation is used to display the lane change, it shall be 'played' in a fixed time (e.g. max 5-6s) but the final state shall remain showing that the Lane Change is ongoing until signal is reset
***Note**: Follow the program wallpaper and HMI handling spec for message(If Any) color and graphic representation.

HMI examples:
Changin Lane Left:




1.3.5.3.2 REQ-407842/A-ALC (Assisted Lane Change) Warning Messages

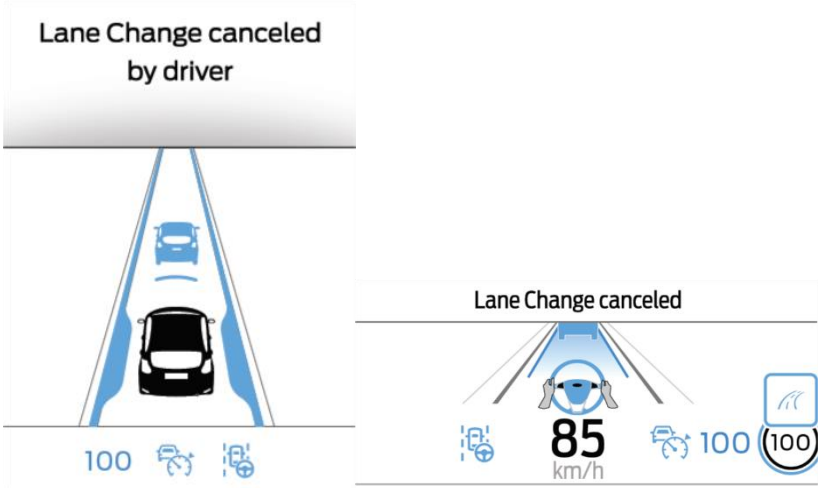
1.3.5.3.2.1 REQ-407843/A-ALC Drive Cancellation Information

The primary display (IPC) and secondary display (HUD) shall provide visual only information that Assisted Lane Change is cancelling/has been cancelled by a driver action at all times.
On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as Global Alert pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).
(ECE79r4e 5.6.4.5.4.: When the lane change procedure is suppressed … the system shall clearly inform the driver about this system status by an optical warning signal and additionally by an acoustic or haptic warning signal. In case the suppression is initiated by the driver, an optical warning is sufficient)

| Operational_Mode | Configurations | TjaLcWarn_D_Rq | ALC Message | Graphic |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | DriverCancel (0x1) | CANCELED | Amber Chevrons in ADAS Metaphor/IOD |
| ALL Other Cases | | DriverCancel (0x1) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for warning color and graphic representation.

HMI Example:




1.3.5.3.2.2 REQ-407844/A-ALC Generic System Cancellation Information

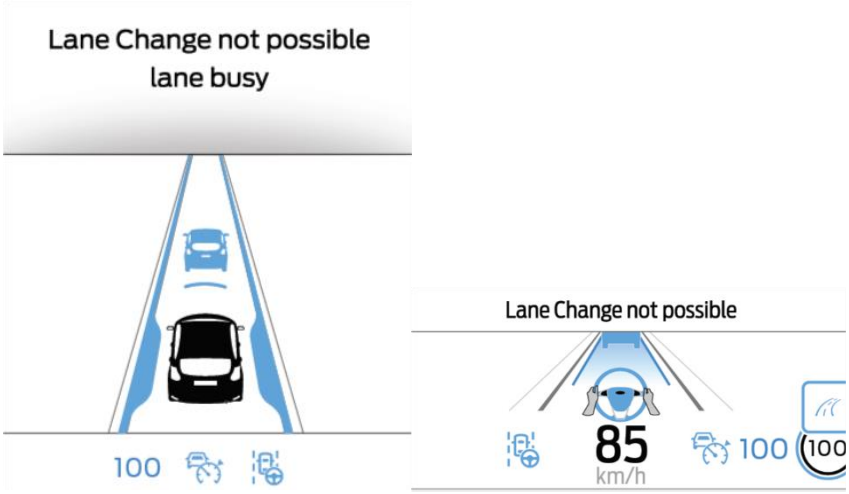
The primary display (IPC) shall always provide visual and audible information that Assisted Lane Change is cancelling/has been cancelled by means of the system. On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as Global Alert pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

The secondary display (HUD) shall only display the visual information.
(ECE79r4e 5.6.4.5.4.: When the lane change procedure is suppressed… the system shall clearly inform the driver about this system status by an optical warning signal and additionally by an acoustic or haptic warning signal. In case the suppression is initiated by the driver, an optical warning is sufficient)

| Operational_Mode | Configurations | TjaLcWarn_D_Rq | ALC Message | Graphic |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | SystemCancel (0x2) | CANCELED | Amber Chevrons in ADAS Metaphor/IOD |
| ALL Other Cases | | SystemCancel (0x2) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for warning color and graphic representation.

HMI Example:




1.3.5.3.2.3 REQ-407845/A-ALC System Cancel-Lane not free

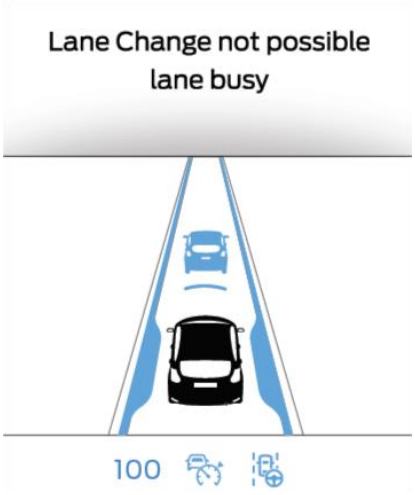
The primary display (IPC) shall always provide visual and audible information that Assisted Lane Change is cancelling/has been cancelled by means of the system due to the fact that the neighboring lane is occupied and hence prevent a lane change to be conducted/finished. On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as Global Alert pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

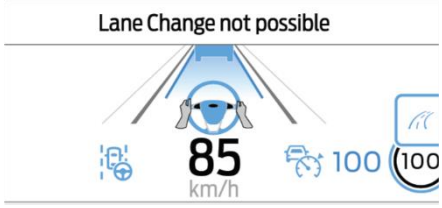
The secondary display (HUD) shall only display the visual information.
(ECE79r4e 5.6.4.5.4.: When the lane change procedure is suppressed… the system shall clearly inform the driver about this system status by an optical warning signal and additionally by an acoustic or haptic warning signal. In case the suppression is initiated by the driver, an optical warning is sufficient)

| Operational_Mode | Configurations | TjaLcWarn_D_Rq | ALC Message | Graphic |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | CancelLaneBusy (0x4) | CANCELED | Amber Chevrons in ADAS Metaphor/IOD |
| ALL Other Cases | | CancelLaneBusy (0x4) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for warning color and graphic representation.

HMI Example:




1.3.5.3.2.4 REQ-407846/A-ALC System Cancel Information - No Lane

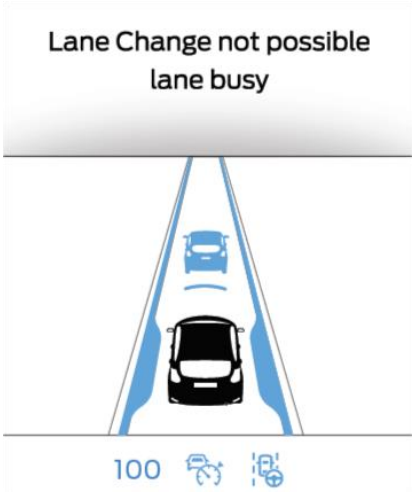
The primary display (IPC) shall always provide visual and audible information that Assisted Lane Change is cancelling/has been cancelled by means of the system due to the fact that the neighboring lane is not valid anymore and hence prevent a lane change to be conducted/finished. On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as Global Alert pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

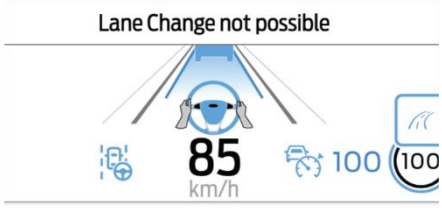
The secondary display (HUD) shall only display the visual information.
(ECE79r4e 5.6.4.5.4.: When the lane change procedure is suppressed… the system shall clearly inform the driver about this system status by an optical warning signal and additionally by an acoustic or haptic warning signal. In case the suppression is initiated by the driver, an optical warning is sufficient)

| Operational_Mode | Configurations | TjaLcWarn_D_Rq | ALC Message | Graphic |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | CancelNoLane (0x3) | CANCELED | Amber Chevrons in ADAS Metaphor/IOD |
| ALL Other Cases | | CancelNoLane (0x3) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for warning color and graphic representation.

HMI Example:




1.3.5.3.2.5 REQ-407847/A-ALC System Cancel Information - speed too low

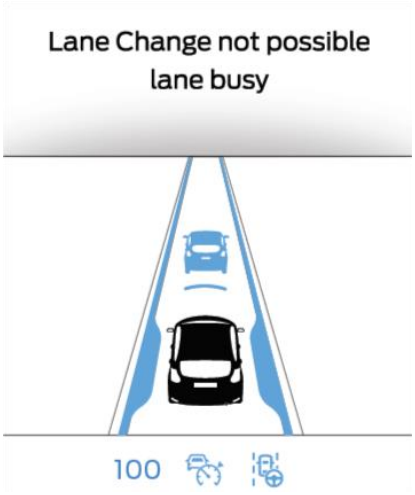
The primary display (IPC) shall always provide visual and audible information that Assisted Lane Change is cancelling/has been cancelled by means of the system due to the fact that the vehicle speed dropped below the operational threshold and hence prevent a lane change to be conducted. On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as Global Alert pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

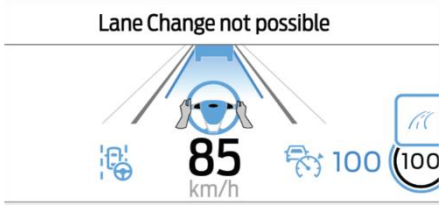
The secondary display (HUD) shall only display the visual information.
(ECE79r4e 5.6.4.5.4.: When the lane change procedure is suppressed… the system shall clearly inform the driver about this system status by an optical warning signal and additionally by an acoustic or haptic warning signal. In case the suppression is initiated by the driver, an optical warning is sufficient)

| Operational_Mode | Configurations | TjaLcWarn_D_Rq | ALC Message | Graphic |
|---|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled<br>&<br>ALC_Cfg = Enabled | CancelSpeedTooLow (0x5) | CANCELED | Amber Chevrons in ADAS Metaphor/IOD |
| ALL Other Cases | | CancelSpeedTooLow (0x5) | Inactive | |

***Note**: Follow the program wallpaper and HMI handling spec for warning color and graphic representation.

HMI Example:




1.3.5.3.3 REQ-407848/A-ALC (Assisted Lane Change) Information Messages

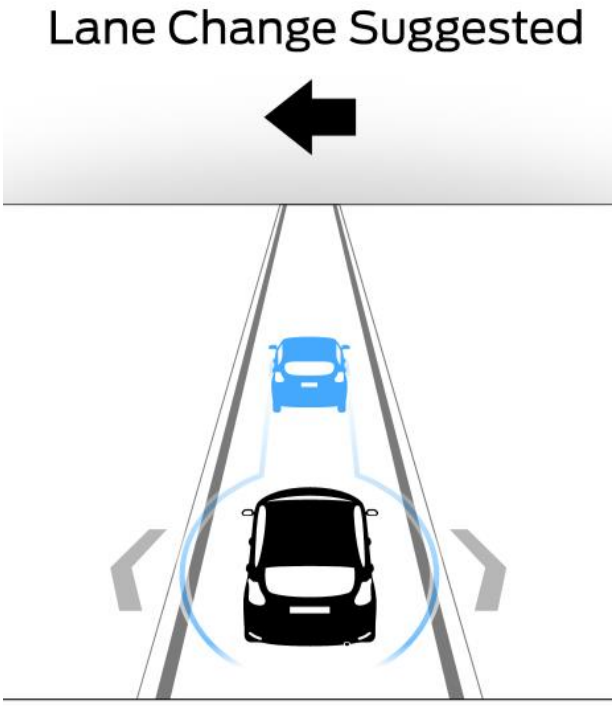
1.3.5.3.3.1 REQ-407849/B-Lane Change Suggestion

The primary (IPC) and secondary (HUD) HMI shall visually inform the driver that Assisted Lane Change is suggested by the System. On the primary display the information shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as HMI Message pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

| Operational_Mode | Configurations | TjaLcMsgTxt_D_Rq | ALC Message |
|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | LcSuggestionLeft (0x1) | Message “Lane Change Suggested" with “arrow left” |
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cfg = Enabled | LcSuggestionRight (0x2) | Message “Lane Change Suggested” with “arrow right” |
| ALL Other Cases | | LcSuggestionLeft (0x1) Or LcSuggestionRight (0x2) | Inactive |

***Note**: Follow the program wallpaper and HMI handling spec for message color.

HMI Example:
Lane Change Suggestion left




1.3.5.3.3.2 REQ-407851/A-ALC On Message

The primary display (IPC) shall visually prompt the driver to activate Assisted Lane Change via a selection menu and provide the driver input to the ADS ECU.
On the primary display the selection shall be shown in the ADAS Metaphor/ ADAS IOD where technical feasible. If it is not feasible or ADAS metaphor/IOD are not visible the information shall be shown as HMI Message pop-up (e.g. whenever the IOD is not shown or when metaphor is not shown as overlaid by other information).

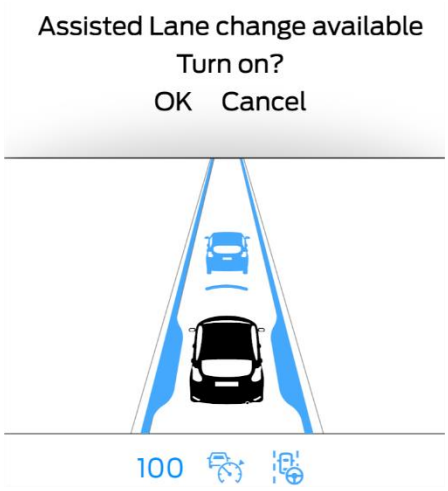
The secondary display (HUD) shall inform the driver that Assisted Lane Change Feature is available and can be activated

| Operational_Mode | Configurations | TjaLcMsgTxt_D_Rq | ALC Message |
|---|---|---|---|
| NORMAL or CRANK | HighwayAssist_Cfg = Enabled & ALC_Cg = Enabled | AlcOn (0x3) | Assisted Lane Change available |
| ALL Other Cases | | AlcOn (0x3) | Inactive |

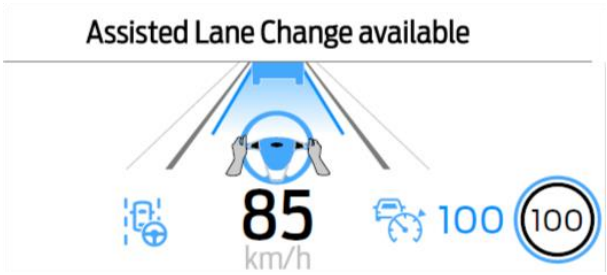
***Note**: Follow the program wallpaper and HMI handling spec for message color.

HMI Example:

**Primary Display (Cluster):**




**Secondary Display (HUD):**




### *1.3.5.4 FS-REQ-342709/A-Function Safety Classification (EMC)*

Class B

### *1.3.5.5 NVM-REQ-342710/F-Memory Storage*

| Parameter Name | Description | Value at Battery Connect | Value at Wake-up |
|---|---|---|---|
| Operational_Mode | 4 State indicator for HUD operational mode | Limited | Limited, Normal, or Crank |
| Tja_D_Stat | CAN signal from IPMA | 0x0 | 0x0 |
| TjaWarn_D_Rq | CAN signal from IPMA | 0x0 | 0x0 |
| LaHandsOff_D_Dsply | CAN signal from IPMA | 0x0 | 0x0 |
| HighwayAssist_Cfg | State indicator for feature presence controlled via CAN at EOL at VO plant. | Use Stored Value | Use Stored Value |
| TrafficJamAssist_Cfg | State indicator for feature presence controlled via CAN at EOL at VO plant. | Use Stored Value | Use Stored Value |
| LaActvStats_D2_Dsply | Input signal sent from IPMA to indicate the Lane Keeping System status for MY23 CX483, MY23 P708 and onwards HUD programs, which has DAT 204, DAT 221/222 or latest DAT SW. | 0x0 | 0x0 |
| HA_HUD_Display | State indication of whether (Advanced/Combiner) HUD is active and capable of displaying TJA information | Inactive | Inactive |

| Parameter Name | Description | Value at Battery Connect | Value at Wake-up |
|---|---|---|---|
| LKS_HUD_Display | State indication of whether HUD is active and capable of displaying LKS information | Inactive | Inactive |
| CcOvrrdActv_B_Actl | CAN signal from PCM | 0x0 | 0x0 |
| AccStopRes_B_Dsply | CAN signal from IPMA | 0x0 | 0x0 |
| TjaMsgTxt_D_Dsply | CAN signal from IPMA | 0x0 | 0x0 |
| TjaLc_D_Stat | CAN signal from IPMA | 0x0 | 0x0 |
| TjaLcMsgTxt_D_Rq | CAN signal from IPMA | 0x0 | 0x0 |
| TjaLcWarn_D_Rq | CAN signal from IPMA | 0x0 | 0x0 |
| ALC_Cfg | State indicator for feature presence controlled via CAN at EOL at VO plant. | Use Stored Value | Use Stored Value |

#### *1.3.5.6 Reconfigurable Telltale*

No

#### *1.3.5.7 Prove Out*

Not applicable

#### *1.3.5.8 Message Center Msg*

None

## 1.4 Error Handling

1.4.1 SR-REQ-342711/B-Missing Message Strategy

The signals will be declared missing as per the Diagnostics section of this SPSS.

DTCs states and history will be determined as per the Diagnostics section of this SPSS.

In case of missing message being detected according CADS Interface spec for ACC no TJA relevant information shall be displayed (off state) till messages are received again within one Ignition cycle. In the transition time between not receiving messages and detecting lost communication the HMI shall show the last known state.

### 1.4.2 Invalid Message Strategy

None.

## 1.5 Diagnostics

### 1.5.1 Self Test

None

### 1.5.2 Engineering Test Mode

Reference section “Dealer / Engineering Test Mode (ETM)”

### 1.5.3 Part II Performance

#### *1.5.3.1 DTC-REQ-342713/A-Supported Diagnostic Trouble Codes (DTCs)*

| DTC | Description |
|---|---|
| 0xC23A00 | Lost Communication With Image Processing Module A No Sub Type Information |

#### *1.5.3.2 DCR-REQ-342714/C-Supported DID DExx*

| Block Num | Block Description | Byte(s) | Bits(s) | State: Description | "0" | "1" | Default | Comments/ Information |
|---|---|---|---|---|---|---|---|---|
| PACKETED BLOCKS | | | | | | | | |
| | | | | | | | | |
| $01 | Option Content (B&A) | 1 | 6 | Highway Assist | Disabled | Enabled | 0x0 | Enable when Highway Assist feature is present |
| $01 | Option Content (B&A) | 1 | 7 | Traffic Jam Assist | Disabled | Enabled | 0x0 | Enable when Traffic Jam Assist feature is present |
| $01 | Option Content (B&A) | 8 | 2 | Assisted Lane Change | Disabled | Enabled | 0x1 | Enabled means the ALC feature including messages and ADAS metaphor/IOD is present in the HUD. Disabled means the ALC feature including messages and ADAS metaphor/IOD is not present in the HUD. |
| | | | | | | | | |

## 1.6 Reference Specification

Lane Keeping System –CGEA1.3_xxx.doc

HUD_Memory_Save_and_Recall –CGE1.3_xxx_doc
AHUD Basic Settings Control Function - CGEA1.3_xxx.doc
CHUD Basic Settings Control Function - CGEA1.3_xxx.doc
ACC Cluster Interface Specification – verXX
CGEA13 PCA Cluster Interface Specification - ver XX

## 1.7 Revision History

SPSS Module Revision History

| Revision Level | Name | Change Description | Date |
|---|---|---|---|
| V1.0 | Itza Lopez (ilopezla) | Initial VSEM release | 1/30/2019 |
| V1.1 | Itza Lopez (ilopezla) | *Updated Functional Description section to match “IPC Highway Assist with Lane Centering Control Function –FNV2” specification.<br>*Updated HA_WARNING_LHT name to HA_WARNING_LFT.<br>*Replaced reference to Table 1.9 with sections “1.3.5.2.4” and “1.3.5.2.5” in section “1.3.5.2.6”.<br>Added Traffic Jam Assist Cfg to:<br>*1.2.1 Highway Assist Function Context Diagram<br>*1.2.2.1 Internal inputs<br>*1.3.5.1.1 Highway Assist Diagnostic Configuration Flowchart<br>*1.3.5.1.2 Highway Assist Display Flowchart<br>*1.3.5.2.6 Priority Between ACC S&G messages and TJA messages displayed in the text area<br>*1.3.5.4 Memory Storage section<br>*1.5.3.2 Supported DID DExx section<br><br>Removed HighwayAssist_Cfg from:<br>*Table in section 1.3.5.2.2 since configuration is already been checked in section 1.3.5.1<br>*Table in section 1.3.5.2.3 since configuration is already been checked in section 1.3.5.1 | 2/1/2019 |
| V1.2 | Itza Lopez (ilopezla) | **All changes in blue text.**<br><br>The following changes are a result of the following DI change control request (item number 360 in 5/19 agenda):<br><br>• In LCA’s current implementation, if Takeover is triggered, the vehicle will drive at the current speed when the driver puts his hands back on the wheel<br>  • For the driver to resume ACC/LCA, the ACC message ‘Press RES to Resume’ is shown<br>  • Due to changes in the switch pack, if this message is shown, pressing ‘RES/CAN’ would cancel the feature<br>• In ADA, when Takeover is triggered and the driver’s hands are on the wheel and eyes on road are detected, a new message will be shown: ‘Press Accelerator Pedal to Resume’<br>  • Message is issued to show driver action is needed to regain full system performance<br><br>1. Section 1.2.1- TjaMsgTxt_D_Dsply signal added (change approved in DI change control, item number 360 in 5/9/19 agenda)<br>2. Added SIG-REQ 353957-TjaMsgTxt_D_Dsply | 6/10/2019 |

| | | | |
|---|---|---|---|
| | | 3. REQ-342701 – TjaMsgTxt_D_Dsply and HA_RESUME<br>4. REQ-342705-Added HA_RESUME<br>5. REQ-342710- Added TjaMsgTxt_D_Dsply signal<br><br>Other Changes:<br>• SIG-REQ-342689-Updated Detail description for TjaWarn_D_Rq state 0x4 and 0x5 to match global message database.<br>• Updated REQ-342703 so that all TjaWarn_D_Rq states are considered.<br>• Updated REQ-342703 so that Tja_D_Stat state 0x3 and 0x4 are considered.<br>• REQ-342703-Added HA_HO_LDW_RIGHT and HA_HO_LDW_LEFT in HA_Lines_HUD<br>• REQ-342704-Updated name in blue text for more clarity<br>• REQ-342704- Added the option to display Blue or GREEN for TJA Active State Steering Wheel.<br>• REQ-342704-Added HA_HO_LDW_RIGHT and HA_HO_LDW_LEFT<br>• Replaced reference to “CGEA13 CADS Cluster Interface Specification” with “ACC Cluster Interface Specification” and “CGEA13 PCA Cluster Interface Specification”. The CADs specification was split into these two documents. | |
| V1.3 | F. Sethi | Updated “F-REQ-342705/C-HUD Highway Assist Warnings”, while removing flashing for HA_HARD_WARNING_L2. Flashing is not applicable for HUD.<br>Updated “F-REQ-342705/C-HUD Highway Assist Warnings”, while removing Red Steering Wheel for warning HA_HO_HUD_L2, HA_HO_HUD_Ext_L2, HA_WARNING_RHT and HA_WARNING_LFT.<br>Updated “F-REQ-342705/C-HUD Highway Assist Warnings”, while updating warning HA_SOFT_WARNING_L1 and HA_HARD_WARNING_L2 with new warning description “Watch the road”.<br>Updated “F-REQ-342705/C-HUD Highway Assist Warnings”, while updating warning HA_RESUME with new warning description “Press Accelerator Pedal To Resume”.<br>Updated “F-REQ-342705/C-HUD Highway Assist Warnings”, while updating warning HA_Cancel_Txt with new warning description “Canceled”. | 7/14/2020 |
| V1.3 | F. Sethi | Updated “**F-REQ-342705/C-HUD Highway Assist Warnings**”, while adding few notes for warnings:<br>Added note for warning HA_HO_HUD; “**Note**: This warning is independent of any LKS color lines but can trigger with blue/yellow/red LKS lines.”<br>Removed warning text from description for warning HA_HO_HUD_Ext And HA_HO_HUD_Ext_L2 and added note; “N/A **Note:** HUD can’t have Hands On state when HA is extended mode.”<br>Added note for warning HA_HO_HUD_L2; “This warning is independent of any LKS color lines but can trigger with any blue/yellow/red LKS lines. When this warning display on HUD then HUD will display red triangle warning sign instead of lead vehicle.”<br>Updated Description for warning HA_HTO_HUD from “Driver Resume Control” to “Resume Control”<br>Added note for warning HA_HTO_HUD; “**Note:** This warning will appear for both limited and extended mode.”<br>Added note for warning HA_WARNING_RHT & HA_WARNING_LFT; “Note: This warning is both for limited and extended mode”.<br>Added note for warning HA_SOFT_WARNING_L1; “Note: This warning will appear for both HA limited or extended mode.”<br>Added note for warning HA_HARD_WARNING_L2; “Note: This warning will appear for both HA limited or extended mode. | 8/18/2020 |

| | | | |
|---|---|---|---|
| | | For level 2 warning, HMI will display yellow triangle as warning instead of lead vehicle for both HA limited and extended mode."<br><br>Updated table **"F-REQ-342703/C-Highway Assist HUD status indication and warnings (line & steering wheel)"**, while removing states (0x06) and (0x07) from TjaWarn_D_Rq column for whole table, as these states are not needed in this table. IPC STSS also doesn't have these states for this particular requirement. | |
| V1.4 | F. Sethi | Updated " F-REQ-342700"condition from<br><br>"For AHUD:<br>Not Equipped OR<br>(HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== CruiseControl&LaneKeepOFF)*"<br><br>To<br><br>"For AHUD:<br>Not Equipped OR<br>(HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== ADAS VIEW OFF)*"<br><br>Updated condition from<br>"((HUD_ADAS_OnOff == (CruiseControl&LaneKeepON OR<br>(CruiseControlOnly))"<br><br>To<br><br>"((HUD_ADAS_OnOff == (ADAS VIEW ON))"<br><br>Updated condition from<br>"For AHUD:<br>Not Equipped OR<br>(HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== CruiseControl&LaneKeepOFF)* OR<br>(HUD_ADAS_OnOff == CruiseControlONLY)*"<br><br>To<br><br>"For AHUD:<br>Not Equipped OR<br>(HUD_Image_OnOff == Off)* OR<br>(HUD_ADAS_OnOff== ADAS VIEW OFF)*"<br><br>Updated condition from<br>"For AHUD:<br>(HUD_Image_OnOff == On)* AND<br>(HUD_ADAS_OnOff == (CruiseControl&LaneKeepON)*"<br><br>To<br><br>"For AHUD:<br>(HUD_Image_OnOff == On)* AND<br>(HUD_ADAS_OnOff == (ADAS VIEW ON)*"<br><br>Corrected typo mistake for "NVM-REQ-342710/C-Memory Storage", where change "cluster" to "HUD" for "Operational_Mode" | 12/07/2020 |

| | | | |
|---|---|---|---|
| | | Corrected typo mistake for “Voltage Levels” where change “cluster” to “HUD” | |
| V1.4 | F. Sethi | Updated STSS while highlighting the specs with GREEN color where it specific to Highway Assist Extended Mode only.<br><br>Added note “***Note:** All Green highlighted rows in above table represent Highway Assist Extended Mode only” with following tables:<br>➢ F-REQ_342701/D-HUD Highway Assist Warning Indication<br>➢ F-REQ_342703/E-Highway Assist HUD status indication and warnings (line & steering wheel)<br>➢ F-REQ-342704/C-HUD Highway Assist Display Elements<br>➢ F-REQ-342705/E-HUD Highway Assist Warnings<br><br>Updated “ F-REQ-342705/E-HUD Highway Assist Warnings“ while modifying color red to amber for state HA HA_HO_HUD_L2 and added note “(*Note: Follow this according to program wallpapers and HMI Handling spec).”<br>Also modify color yellow to amber for state HA_HARD_WARNING_L2 and added note “(*Note: Follow this according to program wallpapers and HMI Handling spec).” | 2/4/2021 |
| V1.4 | F. Sethi | Updated requirement “F-REQ-342703/E-Highway Assist HUD status indication and warnings (line & steering wheel)” while adding TjaWarn_D_Rq states “0x6” and “0x7” for following “HA_Lines_HUD” as YELLOW highlighted:<br>TJA_ACTIVE<br>TJA_ACT_WARN_LEFT<br>TJA_ACT_WARN_RIGHT<br>TJA_ACT_INTERVENE_LEFT<br>TJA_ACT_ INTERVENE _RIGHT<br>HA_ACTIVE_Extended<br>HA_ACT_WARN_LEFT_Extended<br>HA_ACT_WARN_RIGHT_Extended<br>HA_ACT_INTERVENE_LEFT_Extended<br>HA_ACT_ INTERVENE _RIGHT_Extended<br><br>Updated requirement “F-REQ-342706/C-Priority Between ACC S&G messages and TJA messages displayed in the text area” while modifying TjaWarn_D_Rq state “TrafficJamAssistCancel (0x1)” to “0x1 or 0x6 or 0x7” and updating “HA_Lines_HUD” output from “Display HA Cancel per REQ-342703” to “Display per REQ-342703” as shown in YELLOW highlighted.<br><br>Updated requirement “F-REQ-342705/E-HUD Highway Assist Warnings” while updating “HA_HO_HUD_Ext” description from “NA” to “No warning will display. HUD will show extended mode only” and updating “HA_HO_HUD_Ext_L2” description from “NA” to “No warning will display. HUD will show extended mode only”. | 2/8/2021 |
| V1.5 | F. Sethi | Updated requirement “IR-REQ-342687/C-INTERNAL:“ while updating „Highway_Assist_Cfg” with “Highway_Assist_Cfg; based on “Highway Assist” of DID DE01 indicating if the Highway Assist feature is Enabled (0x1) or Disabled (0x0).” And updating “TrafficJamAssist_Cfg” with “TrafficJamAssist_Cfg; based on “Traffic Jam Assist” of DID DE01 indicating if the LCA feature is Enabled (0x1) or Disabled (0x0).”<br><br>Updated Config “HighwayAssist_cfg” and Highway_Assist_Cfg” in whole STSS to “HighwayAssist_Cfg” for consistency.<br><br>Added new requirement “ 857598/A-ALC (Assisted Lane Change)“, while adding new ALC (Assisted Lane Change) feature. | 2/8/2021 |

| | | | |
|---|---|---|---|
| | | Updated requirement " 617221/C-Functional Description", while adding description for ALC (Assisted Lane Change)<br><br>Updated requirement " 617223-Interface Context Diagram (I/O Block Diagram)" while adding 3 new input signals:<br>• TjaLc_D_Stat<br>• TjaLcMsgTxt_D_Rq<br>• TjaLcWarn_D_Rq<br>And 2 new output states:<br>• ALC_Status<br>• ALC_Message<br><br>Updated requirement " 617226/C-MUX signals on the CAN Bus" while adding 3 new signals:<br>SIG-REQ-407830/A- TjaLc_D_Stat Signal<br>SIG-REQ-407831/A- TjaLcMsgTxt_D_Rq Signal<br>SIG-REQ-407832/A- TjaLcWarn_D_Rq Signal<br><br>Updated requirement "617234/C-INTERNAL" while adding 2 output states:<br>• ALC_Status<br>• ALC_Message<br><br>Updated requirement "F-REQ-342694/B-Operational Modes; while updating "Highway Assist" with "Highway Assist/LCA and ALC"<br><br>Updated requirement "NVM-REQ-342710/E-Memory Storage" while adding below parameters:<br>TjaLc_D_Stat<br>TjaLcMsgTxt_D_Rq<br>TjaLcWarn_D_Rq<br>ALC_Cfg<br><br>Updated requirement "617223/D-Interface Context Diagram (I/O Block Diagram)" while adding new config "ALC_Cfg" for Assisted Lane Change feature.<br><br>Updated requirement "IR-REQ-342687/C-INTERNAL:", while adding "ALC_Cfg; based on "Assisted Lane Change" of DID DE01 indicating if the ALC feature is Enabled (0x1) or Disabled (0x0)."<br><br>Updated requirement "F-REQ-342698/C-Highway Assist Diagnostic Configuration Flowchart" while adding Assisted Lane change in flowchart and rename the requirement to "Highway Assist and ALC Diagnostic Configuration Flowchart"<br><br>Updated requirement "F-REQ-342699/C-Highway Assist Display Flowchart" while rename the requirement to "F-REQ-342699/C-Highway Assist and ALC Display Flowchart" and adding Assisted Lane Change in flowchart.<br><br>Updated requirement "DCR-REQ-342714/C-Supported DID DExx" while adding new "Assisted Lane Change" config. | |
| V1.6 | F. Sethi | Modified "F-REQ-342704/D-HUD Highway Assist Display Elements" while modifying column name " Left Line" to "Left Line/Bubble" and "Right Line" to "Right Line/Bubble". Modified "HA_CANC" and "HA_CANC_LKS" Left line | 2/262021 |

| | | | |
|---|---|---|---|
| | | and Right Line from “Grey Solid” to “Amber Solid”. Also modified “HA_CANC_LKS” Text from ““Cancelled”, if not LKS Hands-off acc. LKS STSS” to “Cancelled”. Modified “Yellow” with “Amber” in whole table.<br><br>Modified requirement “F-REQ-342704/D-HUD Highway Assist Display Elements“ and added note “Program metaphor decides to show lines or bubbles for Highway Assist/LCA feature.”<br><br>Modified “F-REQ-342705/F-HUD Highway Assist Warnings” while modifying “HA_HO_HUD” description from “Highway Assist Text “Keep Hands On Steering Wheel”<br>**Note**: This warning is independent of any LKS color lines but can trigger with blue/yellow/red LKS lines.” To<br>“Highway Assist/LCA Text “Keep Hands On Steering Wheel”<br>**Note**: This warning is independent of any LKS color lines but can trigger with blue/amber/red lines/bubbles according to program metaphor.”<br><br>Modified “F-REQ-342705/F-HUD Highway Assist Warnings” while modifying “HA_HO_HUD_L2” description from “Highway Assist Text “Keep Hands On Steering Wheel”. **Note**: This warning is independent of any LKS color lines but can trigger with any blue/yellow/red LKS lines. When this warning display on HUD then HUD will display amber triangle warning sign instead of lead vehicle. (*Note: Follow this according to program wallpapers and HMI Handling spec).”<br>To<br>“Highway Assist/LCA Text “Keep Hands On Steering Wheel”<br>**Note**: This warning is independent of any LKS color lines but can trigger with any blue/amber/red lines/bubbles according to program metaphor. When this warning display on HUD then HUD will display amber triangle warning sign instead of lead vehicle. (*Note: Follow this according to program wallpapers and HMI Handling spec).”<br><br>Modified “F-REQ-342705/F-HUD Highway Assist Warnings” while modifying “HA_WARNING_RHT” description from “HA Hands- Off LDW/LKA Right TJA Right Red Line. Note: This warning is both for limited and extended mode”<br>To<br>“Highway Assist/LCA Text “Keep Hands On Steering Wheel” with Red Right line/bubble as per (HA_HO_LDW_RIGHT).<br><br>**Note:** This warning is only for limited mode. This will not be triggered in extended mode by ADAS ECU.”<br><br>Modified “F-REQ-342705/F-HUD Highway Assist Warnings” while modifying “HA_WARNING_LFT” description from “HA Hands-Off LDW/LKA left TJA Left Red line Note: This warning is both for limited and extended mode”<br>To<br>“Highway Assist/LCA Text “Keep Hands On Steering Wheel” with Red Left line/bubble as per (HA_HO_LDW_LEFT).<br><br>**Note:** This warning is only for limited mode. This will not be triggered in extended mode by ADAS ECU.” | |
| V1.7 | F. Sethi | Modified requirement “ F-REQ-342706“ while updatng “The display of the TJA cancel shall have higher priority than ACC S&G override or Resume ready representation.“ with “ The priority between display of the LCA “Canceled” and ACC prompt/warning, is defined in HMI Handling Spec under this requirement “HMI-REQ-343157”. “. | 3/12/2021 |

| | | | |
|---|---|---|---|
| | | As per Highway Assist feature owner we need to remove “Keep Hands On Steering Wheel“ text for HA_WARNING_RHT and HA_WARNING_LFT. These states only show the Red Right/Left line/bubble without showing any text. So i reverted it back while updating requirement “F-REQ-342705/G-HUD Highway Assist Warnings“ while strike through this “~~Text~~ “~~Keep Hands On Steering Wheel~~””. | |
| V1.8 | F. Sethi | As part of new UN-ECE requirements, the HUD is to display LKS Off visual notification to the user in case of a fault or if the system is turned off. Hence, a new LKS Off RTT is introduced in this version. A new CAN signal has also been introduced, which going forward replaces the old signal. This update needs to be coordinated with IPMA to ensure both modules support the new CAN signal.<br><br>LaActvStats_D2_Dsply signal replaces LaActvStats_D_Dsply signal on all new programs starting from MY23 CX483, MY23 P708 and onward programs, which has DAT 204, DAT 221/222 or latest DAT SW. Backward compatibility is not maintained since IPMA will stop supporting the old signal as well.<br><br>All below updated are highlighted in YELLOW:<br><br>617223/E-Interface Context Diagram (I/O Block Diagram)<br>SIG-REQ-342691/B-LaActvStats_D2_Dsply<br>F-REQ-342703/F-Highway Assist HUD status indication and warnings (line & steering wheel)<br>NVM-REQ-342710/F-Memory Storage<br>617273/J-Revision History | 4/9/2021 |
| V1.9 | F. Sethi | Updated requirement “F-REQ-342701/E-HUD Highway Assist Warning Indication” while deleting (strikethrough) below 2 states. As there is no Text Warning defined for these 2 states so there is no point of having these states:<br>• HA_WARNING_RHT<br>• HA_WARNING_LFT<br><br>Updated requirement “F-REQ-342703/F-Highway Assist HUD status indication and warnings (line & steering wheel)”, while adding 2 new states for Extended Mode (i.e. Extended (0x7)):<br><br>• HA_HO_LDW_RIGHT_Ext<br>• HA_HO_LDW_LEFT_Ext<br><br>Updated requirement “F-REQ-342703/F-Highway Assist HUD status indication and warnings (line & steering wheel)”, while modifying state “HA_HO_LDW_RIGHT” & “HA_HO_LDW_LEFT” and replace “X” with “NOT Extended (0x7)” for Tja_D_Stat signal.<br><br>Updated requirement “F-REQ-342704/E-HUD Highway Assist Display Elements”, while adding below 2 states to display elements for extended mode:<br>• HA_HO_LDW_RIGHT_Ext<br>• HA_HO_LDW_LEFT_Ext<br><br>Updated requirement “F-REQ-342705/H-HUD Highway Assist Warnings”, while deleting “**Note:** This warning is only for limited mode. This will not be triggered in extended mode by ADAS ECU.” for state “HA_WARNING_RHT” and “HA_WARNING_LFT”. | 4/12/2021 |

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| | | Updated requirement “F-REQ-342705/H-HUD Highway Assist Warnings”, while deleting the below 2 states, as there is no text warning for these 2 states:<br>• HA_WARNING_RHT<br>• HA_WARNING_LFT<br><br>Updated requirement this while adding below new note for “~~HA_WARNING_RHT~~” :<br>**Note:** There is no HA_WARNING_RHT state in system and no relevant text warning. Only display elements apply which already cover in HA_HO_LDW_RIGHT and HA_HO_LDW_RIGHT_Ext.<br><br>Updated requirement this while adding below new note for “~~HA_WARNING_LFT~~” :<br>**Note:** There is no HA_WARNING_LFT state in system and no relevant text warning. Only display elements apply which already cover in HA_HO_LDW_LEFT and HA_HO_LDW_LEFT_Ext. | |
| V2.0 | F. Sethi | HUD will also start displaying LCA and LKS RTT on MY24 and onwards vehicle programs as per HMI direction. New output state “HA_LCA_LKS_RTT” is added in STSS and following requirements are updated in Orange:<br><br>Updated requirement “617223/F-Interface Context Diagram (I/O Block Diagram)”, while adding new output state “HA_LCA_LKS_RTT”.<br>Updated requirement “617234/D-INTERNAL”, while adding new output state “HA_LCA_LKS_RTT”.<br>Updated requirement “F-REQ-342703/G-Highway Assist HUD status indication and warnings (line & steering wheel)”.<br>• While adding below new “HA_Lines_HUD” states:<br>TJA_STBY_WARN_LEFT<br>TJA_STBY_WARN_RIGHT<br>TJA_STBY_INTERVENE_LEFT<br>TJA_STBY_ INTERVENE _RIGHT<br>ALC_ACTIVE<br>• Added new input signal “TjaLc_D_Stat” in state matrix table.<br>• Modified following states while adding “0x6 or 0x7” signal states for “TjaWarn_D_Rq” signal:<br>TJA_STANDBY<br>TJA_STANDBY_LKS<br>• Modified “TJA_STANDBY_LKS” states while adding “0x1, 0x5, 0x6, 0x7 0xB” states for “LaActvStats_D2_Dsply” signal.<br><br>Updated requirement “F-REQ-342704/F-HUD Highway Assist Display Elements”, while added new column “HA_LCA_LKS_RTT” and added below states:<br>TJA_STBY_WARN_LEFT<br>TJA_STBY_WARN_RIGHT<br>TJA_STBY_INTERVENE_LEFT<br>TJA_STBY_ INTERVENE _RIGHT<br>ALC_ACTIVE<br>Added None*** for those states where HMI doesn’t display Line or bubble or steering wheel and added note “If program doesn’t display LCA RTT then ignore the “HA_LCA_LKS_RTT” column.” And “***HMI will decide to display solid line or no line or no steering wheel.”<br>Added HMI examples for “LCA RTT” and “LKS RTT”. | 10/01/2021 |

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| | | Updated requirement “HMI-REQ-342695/C-Indicator Graphics / Display Format” while adding White LCA RTT for Standby HMI examples. Removed Green LCA RTT from Active (Limited) HMI examples. | |
| V2.1 | F. Sethi | Corrected Typo mistake by updating requirement “REQ-407849/B-Lane Change Suggestion”, while updating “TjaLcMsgTxt_D_Rqy” signal name to “TjaLcMsgTxt_D_Rq”. | 03/07/2022 |