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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature Name:**  Considerate Prompts 1.0 | | | | | **Feature ID:**  F001149 | | | | | |
| Date | LET | FR | Revisions | | | | DR | CK | **Reference:**  [**SRD Considerate Prompts**](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=DUZlHoYSx3NrTDAAAAAAAAAAAAA&servername=Production_Server) | |
| 07/14/20 |  | | B- Countries added for Ford Roadside Assistance [UK/France].  Lincoln included as part of the document when mentioned Ford Roadside Asistance.  Charging warning added when “Fuel warnings“ are mentioned as part of electrical vehicles considerate prompts.  Index fixed [tables, figures].  Numeration fixed for requirement/signal numbers. | | | |  |  |
|  |  | |  | | | |  |  | **Prepared/Approved By: Cesar Gonzalez** | |
|  |  | |  | | | |  |  |
|  |  | |  | | | |  |  | **Checked By:** | **Detailed By:** |
|  |  | |  | | | |  |  |
|  |  | |  | | | |  |  | **Concurrence/Approval Signatures:** | |
|  |  | |  | | | |  |  |
|  |  | |  | | | |  |  | **Design Engineering Supervisor**  Skikun Steve | |
|  |  | |  | | | |  |  |
|  |  | |  | | | |  |  | **Design Engineering Manager**  **Dave Kaminski** | |
|  |  | |  | | | |  |  |
|  |  | |  | | | |  |  | **Other Approvals/Concurrences (as required):** | |
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| **STANDARD NOTES:**  **FOR CURRENT RELEASE STATUS, SEE THE WERS ENGINEERING NOTICE.**  **CONTROL ITEM – THE ALSO IDENTIFIES CRITICAL CHARACTERISTICS DESIGNATED BY THE**  **CROSS FUNCTIONAL TEAMS DEVELOPING THE PRODUCT. THESE, AND ADDITIONAL CRITICAL**  **CHARACTERISTICS IDENTIFIED BY PROCESS REVIEWS, MUST APPEAR ON THE CONTROL PLANS**  **ACCORDING TO ISO/TS 16949. THESE CONTROL PLANS REQUIRE PRODUCT ENGINEERING APPROVAL.** | | | | | | | | | | |
| **Frame 1 of 87** | | | | **REV** | |  | | | | |

**Content**

[1 INTRODUCTION 5](#_Toc45710560)

[1.1 Purpose 5](#_Toc45710561)

[1.2 Scope 5](#_Toc45710562)

[1.3 Audience 5](#_Toc45710563)

[1.3.1 Stakeholder List 5](#_Toc45710564)

[1.4 Document Organization 6](#_Toc45710565)

[1.4.1 Document Context 6](#_Toc45710566)

[1.4.2 Document Structure 6](#_Toc45710567)

[1.5 References 6](#_Toc45710568)

[1.5.1 Ford documents 6](#_Toc45710569)

[Message Center – M3 Display with Message Center and Quick Action Menu Button Interface – CGEA 1.3 6](#_Toc45710570)

[1.5.2 External documents and publications 7](#_Toc45710571)

[1.6 Terminology 7](#_Toc45710572)

[1.6.1 Definitions 7](#_Toc45710573)

[1.6.2 Abbreviations 7](#_Toc45710574)

[1.7 Notation 8](#_Toc45710575)

[1.7.1 Requirements Templates 8](#_Toc45710576)

[2 FEATURE DEFINITINON 9](#_Toc45710577)

[2.1 Feature Description 9](#_Toc45710578)

[2.1.1 Purpose and Overview of Feature 9](#_Toc45710579)

[2.1.2 Background 9](#_Toc45710580)

[2.1.3 Feature Context 12](#_Toc45710581)

[2.1.4 Feature Modeling 13](#_Toc45710582)

[2.1.5 Feature Requirements 15](#_Toc45710583)

[3 FEATURE DECOMPOSITION (LOGICAL DESIGN) 20](#_Toc45710584)

[3.1 Overview 20](#_Toc45710585)

[3.2 Input Requirements 20](#_Toc45710586)

[3.3 Assumptions & Constraints 21](#_Toc45710587)

[3.4 Functional Architecture 21](#_Toc45710588)

[3.5 Function List 22](#_Toc45710589)

[3.6 Logical Functions 22](#_Toc45710590)

[3.6.1 Option Display and handle on Categorized Warning 22](#_Toc45710591)

[3.6.2 Request to Display Warning POI & Route 27](#_Toc45710592)

[3.6.3 POI request receive and list send 31](#_Toc45710593)

[3.6.4 POI Route request receive and start route 33](#_Toc45710594)

[3.6.5 Call FRA/LRA Request receive and make call 36](#_Toc45710595)

[3.6.6 Unit Change Warning Display and option handle 40](#_Toc45710596)

[3.6.7 Settings 44](#_Toc45710597)

[3.6.8 Unit Change 47](#_Toc45710598)

[3.6.9 Close Warning Display 50](#_Toc45710599)

[4 FEATURE IMPLEMENTATION (PHYSICAL DESIGN) 54](#_Toc45710600)

[4.1 Feature Implementation Description 54](#_Toc45710601)

[4.1.1 Overview 54](#_Toc45710602)

[4.1.2 Input Requirements 54](#_Toc45710603)

[4.1.3 Assumptions & Constraints 54](#_Toc45710604)

[4.2 Function Deployment 55](#_Toc45710605)

[4.2.1 Feature Implementation Architecture 55](#_Toc45710606)

[4.3 Feature Implementation Modeling 59](#_Toc45710607)

[4.3.1 Component Interaction Diagrams 59](#_Toc45710608)

[4.4 Feature Implementation Requirements 61](#_Toc45710609)

[4.4.1 Requirements on ECUs 61](#_Toc45710610)

[4.4.2 Requirements on Communication Links 74](#_Toc45710611)

[5 OPEN ISSUES 76](#_Toc45710612)

[6 REQUIREMENTS TRACEABILITY 77](#_Toc45710613)

[6.1 Requirements 77](#_Toc45710614)

[7 REVISION HISTORY 78](#_Toc45710615)

[8 APPENDIX 79](#_Toc45710617)

[8.1 Data Dictionary 79](#_Toc45710618)

[8.1.1 Physical Signals 79](#_Toc45710619)

**List of Figures**

[Figure 1: Context Diagram 12](#_Toc45710524)

[Figure 2: Use Case Diagram 13](#_Toc45710525)

[Figure 3: Functional Boundary Diagram 21](#_Toc45710526)

[Figure 4: Option Display and handle on Categorized Warning functional architecture 23](#_Toc45710527)

[Figure 5: Option Display and handle on Categorized Warning functional behavior 24](#_Toc45710528)

[Figure 6: Request to Display Warning POI and Route functional architecture 27](#_Toc45710529)

[Figure 7: Req to Display Warning POI & Route function behavior 28](#_Toc45710530)

[Figure 8: POI request receive and list send fuction architecture 31](#_Toc45710531)

[Figure 9: POI Req receive and List send Function Behavior 32](#_Toc45710532)

[Figure 10: POI Route request receive and start route fuction architecture 34](#_Toc45710533)

[Figure 11: POI Route request receive and display Function Behavior 35](#_Toc45710534)

[Figure 12: Call FRA/LRA request receive and make call function architecture 37](#_Toc45710535)

[Figure 13: Call FRA/LRA request receive and make call function behavior 38](#_Toc45710536)

[Figure 14: Unit Change warning display and option handle functional architecture 40](#_Toc45710537)

[Figure 15: Unit Change warning display and option handler Operation States and Modes 41](#_Toc45710538)

[Figure 16: Settings functional architecture 44](#_Toc45710539)

[Figure 17: Settings function Operation States and modes 45](#_Toc45710540)

[Figure 18: Unit Change functional architecture 48](#_Toc45710541)

[Figure 19: Unit Change Function Operation States and Modes 49](#_Toc45710542)

[Figure 20: Close Warning Display functional architecture 51](#_Toc45710543)

[Figure 21: Close WarningDisplay Function Behavior 52](#_Toc45710544)

[Figure 22: Feature Network Diagram 55](#_Toc45710545)

[Figure 23: Startup sequence Diagram 59](#_Toc45710546)

[Figure 24: Feature Operation Sequence Diagram 60](#_Toc45710547)

[Figure 25: BCM Interface 61](#_Toc45710548)

[Figure 26: SCCM Interface 62](#_Toc45710549)

[Figure 27: ECG Interface 64](#_Toc45710550)

[Figure 28: Option Display and handle on Categorized Warning Functional sequence diagram 66](#_Toc45710551)

[Figure 29: Request to Display Warning POI & Route Functional sequence diagram 67](#_Toc45710552)

[Figure 30: Unit Change warning Display and option handle Functional sequence diagram 68](#_Toc45710553)

[Figure 31: Settings Functional sequence diagram 69](#_Toc45710554)

[Figure 32: Unit Change Functional sequence diagram 69](#_Toc45710555)

[Figure 33: Close Warning Display Functional sequence diagram 70](#_Toc45710556)

[Figure 34: POI Req receive and List send Functional sequence diagram 72](#_Toc45710557)

[Figure 35: POI Route request receive and display Functional sequence diagram 73](#_Toc45710558)

[Figure 36: Call FRA/LRA request receive and make call Functional sequence diagram 74](#_Toc45710559)

**List of Tables**

[Table 1: Feature described in this SRD 5](#_Toc45710235)

[Table 2: List of Stakeholders 6](#_Toc45710236)

[Table 3: List of Ford Internal Documents 7](#_Toc45710237)

[Table 4: Definitions used in this document 7](#_Toc45710238)

[Table 5: Abbreviations used in this document. 8](#_Toc45710239)

[Table 6: List of Legal document reference 10](#_Toc45710240)

[Table 7: List of Influences 13](#_Toc45710241)

[Table 8: List of Actors 14](#_Toc45710242)

[Table 9: List of Functions 22](#_Toc45710243)

[Table 10: Option Display and handle on Categorized Warning functional logical inputs 24](#_Toc45710244)

[Table 11: Option Display and handle on Categorized Warning functional logical outputs 24](#_Toc45710245)

[Table 12: Req to Display Warning POI & Route functional logical Inputs 28](#_Toc45710246)

[Table 13: Req to Display Warning POI & Route functional logical Outputs 28](#_Toc45710247)

[Table 14: POI Req receive and List send Function logical inputs 31](#_Toc45710248)

[Table 15: POI Req receive and List send Function logical output 31](#_Toc45710249)

[Table 16: POI Route request receive and display function logical inputs 34](#_Toc45710250)

[Table 17: POI Route request receive and display function logical outputs 34](#_Toc45710251)

[Table 18: Call FRA/LRA request receive and make call function logical inputs 37](#_Toc45710252)

[Table 19: Call FRA/LRA request receive and make call function logical outputs 37](#_Toc45710253)

[Table 20: Unit Change warning display and option handle functional architecture 41](#_Toc45710254)

[Table 21: Unit Change warning display and option handle functional logical output 41](#_Toc45710255)

[Table 22: Unit Change warning display settings functional logical inputs 44](#_Toc45710256)

[Table 23: Settings functional logical output 45](#_Toc45710257)

[Table 24: Unit Change function logical inputs 49](#_Toc45710258)

[Table 25: Close warning Display functional logical inputs 51](#_Toc45710259)

[Table 26: Electrical Components 55](#_Toc45710260)

[Table 27: Network Connections 56](#_Toc45710261)

[Table 28: HS1 message list 56](#_Toc45710262)

[Table 29: HS2 message list 56](#_Toc45710263)

[Table 30: HS3/INFOCAN message list 56](#_Toc45710264)

[Table 31: Function allocation to ECUs 57](#_Toc45710265)

[Table 32: Logical and Physical Signal Mapping 58](#_Toc45710266)

[Table 33: BCM Publisher Signals 61](#_Toc45710267)

[Table 34: SCCM Publisher Signals 62](#_Toc45710268)

[Table 35: ECG Publisher Signal 63](#_Toc45710269)

[Table 36: ECG Subscribed Signals 63](#_Toc45710270)

[Table 37: IPC Publisher Signals 64](#_Toc45710271)

[Table 38: IPC Subscribed Signals 65](#_Toc45710272)

[Table 39: IPC Inherited Option Display and handle on Categorized Warning Function 66](#_Toc45710273)

[Table 40: IPC Inherited Request to Display Warning POI & Route Function 67](#_Toc45710274)

[Table 41: IPC Inherited Unit Change warning Display and option handle Function 67](#_Toc45710275)

[Table 42: IPC Inherited Unit Change warning Function 68](#_Toc45710276)

[Table 43 IPC Inherited Unit Change Function 69](#_Toc45710277)

[Table 44: IPC Inherited Close Warning Display Function 70](#_Toc45710278)

[Table 45: APIM Publisher Signals 71](#_Toc45710279)

[Table 46: APIM Subscribed Signals 71](#_Toc45710280)

[Table 47: APIM Inherited POI Req receive and List send Function 71](#_Toc45710281)

[Table 48: APIM Inherited POI Route request receive and display Function 72](#_Toc45710282)

[Table 49: APIM Inherited Call FRA/LRA request receive and make call Function 73](#_Toc45710283)

# INTRODUCTION

## Purpose

The System Requirements Document (SRD) specifies the generic electrical/electronic system functional and architectural requirements for the Considerate Prompt.

The 3 chapters

* Feature Definitions
* Feature Decomposition
* Feature Deployment

correspond to the 3 levels of the RE Information Model - Feature Level, Function Level, and Component Level.

## Scope

The following set of features from the [Global Feature & Function List](https://www.vsemweb.ford.com:443/tc/launchapp?-attach=true&-s=226TCSession&-o=ZmZNi0JHx3NrTDAAAAAAAAAAAAA) and the deployment to the

* Considerate Prompt

is described in this Functional Specification.

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature ID** | **Feature Name** | **Owner** | **Reference** |
| F001149 | Considerate Prompts 1.0 | Cesar Gonzalez | https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=zkR58oZMx3NrTDAAAAAAAAAAAAA&servername=Production\_Server |

Table 1: Feature described in this SRD

## Audience

The SRD is authored by Cesar Gonzalez / Feature owner for Considerate Prompt. All Stakeholders, i.e., all people who have a valid interest in the ECU behavior should read and, if possible, review the AFS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the AFS.

The following table lists all stakeholders, who should be involved in the creation and maintenance of this AFS. Refer to the [Roles & Responsibilities page](http://wiki.ford.com/display/RequirementsEngineering/Stakeholder+Role+Dictionary) in the in the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+@+EESE) for a list of common Ford roles and responsibilities.

### Stakeholder List

The latest list of the feature stakeholder and their roles & responsibilities are given below:

|  |  |  |
| --- | --- | --- |
| **Name** | **CDSID** | **Role** |
| Ralf Brosig | RBROSIG | Feature Owner Manager |
| Jean Zheng | JZHENG9 | Feature Owner Technical Specialist |
| Bhru Patel | BPATEL | Feature Owner Supervisor |
| Geoff Turbiak | GTURBIAK | Feature Champion |
| James Blatchford | JBLATCHF | DI Core |
| Sherri Bettendorf | SBETTEND | HMI Supervisor |
| Jim Kaminske | JKAMIN14 | Instrument Cluster D&R |
| Scott Watkins | SWATKINS | DI Technical Expert |
| Jim Gregoire | JGREGOIR | DI Core |
| Vishal Patel | VPATEL7 | DI Core |
| Stavros Dionyssopoulos | SDIONYSS | DI HMI Senior Engineer |
| Alec Struthers | ASTRUTHE | DI HMI Supervisor |
| Jayne Spence | JSPEN126 | HMI Designer |
| Mack Dobbie | MDOBBIE | HMI Designer |
| Gail Chang | GCHENG | Infotainment System Supervisor |
| Jason Myslinski | JMYSLIN2 | Infotainment System Eng |
| Robert Paquette | RPAQUET2 | Infotainment Systems Engineer |
| Bilal Chararah | BCHARARA | Navigation Systems Engineer |
| Casey Feldman | CFELDMA1 | HMI Designer/Engineer |
| Lars Doelling | Ldoellin | Application Engineer |
| Kenneth Williams | KWILL307 | Product Development Supervisor |
| Srikant Hari | SHARI10 | Technical Program Manager |
| Mohammad Kalash | MKALASH | UX HMI Supervisor |
| Grant Gatchel | GGATCHEL | IVI Software Engineer |
| John Rentis | JRENTIS | Product Design Engineer |
| Toby Pulickal | TPULICKA | Feature TDR |
| William Wong | WWONG24 | SW Engineer |
| Pei-Ching Tzeng | PTZENG | EE Software Supervisor |
| Doug Gillespie | DGILLESP | FF QA Engineer |
| Ali Kabalan | AKABALA1 | Feature TDR Engineer |
| Cesar Gonzalez | CGONZ204 | Feature Owner Engineer |

Table 2: List of Stakeholders

## Document Organization

### Document Context

Refer to the [Specification Structure page](http://wiki.ford.com/display/RequirementsEngineering/Structure+of+specification+and+documentation) in the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+@+EESE) to understand how the AFS relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

**Section 1** – Introduction how to use this document including responsibilities and requisite documents. Explains the tterminology. Gives a clarification of the definitions, concepts and abbreviations used in the document.

**Section 2** – Feature Definitions. Defines the feature level requirements of the features realized by the system described in this specification

**Section 3** – Feature Decomposition: Specifies the functions of the functional architecture of the features, which realize the features from section 2.

**Section 4** – Feature Deployment: Specifies details of how the features / functions are deployed to the given electrical platform.

**Section 5** – Open Issues

**Section 6** – Traceability information generated by RM tool

**Section 7** Revision history.

## References

### Ford documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **Doc. ID** | **Title** | **Revision** |
| [1] | [IPC SPSS v3.20](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FIPC%20Package%2FIPC%20SPSS%20Ver%203%2E20) | IPC SPSS | 02/07/2017 |
| [2] | [LIST BROWSER PROTOCOL IPC SPSS v1.6](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FIPC%20Package%2FList%20Browsing%20Protocol%2FLBP%20Ver%201%2E4) | List Browser Protocol IPC SPSS | 02/15/2017 |
| [3] | [Considerate Prompts IPC SPSS v1.0](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/FISI%20Specification%20Package%20Releases/IPC%20Package/Considerate%20Prompts/Ver%201.0) | Considerate Prompt IPC Specification | 02/17/2017 |
| [4] | [Message Center – M3 Display with Message Center and Quick Action Menu Button Interface – CGEA 1.3](https://www.vsemweb.ford.com:443/tc/launchapp?-attach=true&-s=226TCSession&-o=xIeNvHg8x3NrTDAAAAAAAAAAAAA%20%3chttps://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=xIeNvHg8x3NrTDAAAAAAAAAAAAA%3e) | IPC STSS |  |
| [5] | [LIST BROWSER PROTOCOL APIM SPSS v1.6](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2fsites%2fGlobalCockpitSystemsStrategy%2fSPSS%20Drop%20Schedule%2fFISI%20Specification%20Package%20Releases%2fAPIM%20Gen3%20Package%2fList%20Browsing%2fLBP%20Ver%201%2e6&FolderCTID=0x01200033468A5753E57E43B8BAF0D3903D0050) | List Browser Protocol APIM SPSS | 02/17/2016 |
| [6] | [Transport Protocol APIM SPSS v1.12](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FAPIM%20Gen3%20Package%2FTransport%20Protocol%2FVer%201%2E12) | Transport Protocol APIM SPSS | 02/07/2017 |
| [7] | [NAVIGATION APIM SPSS v1.5](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FAPIM%20Gen3%20Package%2FNavigation%2FVer%201%2E5) | Navigation\_APIM\_SPSS | 01/08/2016 |
| [8] | [MAX LEVEL SPSS v1.15](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FMax%20Level%20%28old%20component%20based%29%2FMax%20Level%20SPSS%20Ver%201%2E15) | Max level SPSS part 1 and 2 | 04/15/2016 |
| [9] | [APIM Carplay SPSS v1.7](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FAPIM%20Gen3%20Package%2FCarPlay%2FCarPlay%20Ver%201%2E7) | APIM Infotainment SPSS | 10/03/2016 |
| [10] | [CarPlay IPC SPSS v1.0](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FIPC%20Package%2FCarPlay%2FCPY%20Ver%201%2E0) | CarPlay IPC SPSS | 07/14/2016 |
| [11] | [Considerate Prompt APIM SPSS v1.0](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2fsites%2fGlobalCockpitSystemsStrategy%2fSPSS%20Drop%20Schedule%2fFISI%20Specification%20Package%20Releases%2fIPC%20Package%2fConsiderate%20Prompts%2fVer%201%2e0&FolderCTID=0x01200033468A5753E57E43B8BAF0D3903D0050) | APIM Infotainment Subsystem Part Specific Specification (SPSS) | 02/10/2017 |
| [12] | |  |  | | --- | --- | |  | [BT Connectivity APIM SPSS v2.8](https://team.sp.ford.com/sites/GlobalCockpitSystemsStrategy/SPSS%20Drop%20Schedule/Forms/AllItems.aspx?RootFolder=%2Fsites%2FGlobalCockpitSystemsStrategy%2FSPSS%20Drop%20Schedule%2FFISI%20Specification%20Package%20Releases%2FAPIM%20Gen3%20Package%2FBluetooth%20Connectivity%20%28Phone%29%2FVer%202%2E8) | | APIM Infotainment SPSS | 02/08/2017 |
| [13] | X-Car\_IMSCAN\_R34i\_APIM\_G3\_FixUp.dbc | CAN database | 05/16/2017 |
| [14] | [Released Global Message Lists](https://pd1.extspt.ford.com/sites/DIHMI/Core%20Corps/Forms/AllItems.aspx?RootFolder=%2Fsites%2FDIHMI%2FCore%20Corps%2FMessage%20Lists%2FGlobal%20Message%20Lists%2FReleased&FolderCTID=0x01200039D32B17933AE349AF5788D63B231807&View=%7B1C033B08%2D47ED%2D428F%2D917C%2DE292B6607700%7D#InplviewHash1c033b08-47ed-428f-917c-e292b6607700=FolderCTID%3D0x01200039D32B17933AE349AF5788D63B231807-SortField%3DModified-SortDir%3DDesc-RootFolder%3D%252Fsites%252FDIHMI%252FCore%2520Corps%252FMessage%2520Lists%252FGlobal%2520Message%2520Lists%252FRele) | Global Message list |  |

Table 3: List of Ford Internal Documents

### External documents and publications

None of the external documents and publications is referred in this document

## Terminology

### Definitions

|  |  |
| --- | --- |
| Definition | Description |
| Warning Categorization | Functional algorithm that categorizes received warning request into different types following Global Message List with Category |
| Charging Warning | List of all warnings for indicating low charging and warning related to it |
| Fuel Warning | List of all warnings for indicating low fuel and warning related to it |
| Warning POI List | List of POIs nearby depending on warning type |
| Warning POI Route | Route to warning dependent POI selected from warning POI list |
| Roadside Warning | List of all warnings that require customer attention for immediate roadside assistance |
| Unit Change | Change numeric digital speed units, add secondary numeric speedometer unit (old unit), change indicate min/max to new unit, change set speed to new unit for border crossing from UK to France, USA to Canada/Mexico(and vice versa) |

Table 4: Definitions used in this document

### Abbreviations

|  |  |  |
| --- | --- | --- |
| Abbr. | Stands for | Description |
| SRD | Systems Requirements Document | Type of this document |
| IPC | Instrument Panel Cluster |  |
| SCCM | Steering Column Control Module |  |
| BCM | Body Control Module |  |
| ECG | Enhanced Central Gateway Module |  |
| APIM | Accessory Protocol Interface Module |  |
| ECU | Electronic Control Unit |  |
| POI | Point of Interest |  |
| Spec | Specification |  |
| HMI | Human Machine Interface |  |
| EOL | End Of Line |  |
| CAN | Controller Area Network |  |
| HS1 | High Speed 1 | High Speed CAN network 1 |
| HS2 | High Speed 2 | High Speed CAN network 2 |
| HS3 | High Speed 3 | High Speed CAN network 3 |
| TP | Transport Protocol |  |
| BT | Bluetooth |  |
| FRA | Ford Roadside Assistance |  |
| Req | Request |  |
| LRA | Lincoln Roadside Assistance |  |

Table 5: Abbreviations used in this document.

## Notation

### Requirements Templates

Each requirement, use case or scenario in this specification shall follow the corresponding template given in the document template *Specification\_Macros.dotm* on Wiki page [“Specification Templates”](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates?src=contextnavpagetreemode). This document template also provides macros to insert the requirement templates. Refer to “[How to use the Specification Templates](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates?src=contextnavpagetreemode)” on how to enable the macros and the requirements templates in this specification.

The requirements macro and requirements templates also enable the import of the specification to VSEM (refer to ["How to import specifications into VSEM as separate requirements"](http://wiki.ford.com/pages/viewpage.action?pageId=104991616&src=contextnavpagetreemode)).

#### Identification of requirements

The unique requirement ID given in the headline of any requirement follows the requirement throughout the development process. The requirement ID format follows a well-defined syntax.

All identifiers in a AFS shall be composed of 4 parts:

* A leading letter F / FNC / FI (= Feature/Function/Feature Implementation) according to the abstraction level of the requirement.
* Followed by the feature name (typically an acronym)
* Followed by a letter indicating the category of requirement (whether it is a Scenario (=SC), a Use Case (=UC) or a Requirement (=R))
* Ending with the actual requirement number

*Example:*

*F\_PCL\_R\_00004* This is the fourth requirement on feature level for the feature Power Child Lock.

#### Requirements Attributes

The macros provided by [“Specification Templates”](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates?src=contextnavpagetreemode) add attributes to each requirement. This helps to classify requirements. The [list of available attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes?src=contextnavpagetreemode) is given in the RE Wiki.

# FEATURE DEFINITINON

## Feature Description

### Purpose and Overview of Feature

The purpose of this feature is to assist driver with displaying additional actionable option when any vehicle warning triggered. Feature will categorize the warning in different type and driver will get a list of relevant POIs or call Ford/Lincoln Roadside Assistance depending on warning type. In addition to warning display, new situational prompt will assist driver to change digital speedometer unit when certain conditions meet.

### Background

#### Current State

The feature will add options while displaying any warning for customer to act on it. Feature is expected to improve customer experience by providing assistance in critical situation. Currently, driver can choose any POI’s and can change digital speedometer unit settings manually while driving through menus settings. The implementation of this feature will allow driver to select POI depending on what situation vehicle is in and in which area customer need help on. Ford/Lincoln Roadside Assistance is also becoming more reachable through phone call by pairing cell phone with vehicle. While customer is able to change the digital speedometer unit manually, now this feature will display warning to change digital speedometer unit right at the moment while vehicle changes the US border and unit remains same as vehicle’s previous location. Frequent customers could set the preference for the unit change warning displays well.

#### Feature Opportunity

The feature will provide option for the driver to take depending on warning category. Currently, drivers are only allowed to close all the warnings. The implementation of this feature will update the current situation. The feature will keep the current warning closing option and provide additional option to either go warning POI’s or calling roadside assistance depending on warning types. Feature will also display situational warning based on the condition of change in country.

#### Feature Goals

The goal of this feature is to ease the pain point of customer by assisting with actionable options whenever any vehicle warning displays. Implementation of this feature will improve driver experience with navigating to warning dependent POI bypassing the root POI screens/table of contents menus. The feature will also allow customer to change the digital speedometer unit through warning display whenever condition applies.

#### Feature Objectives

The objectives of this feature are as follows:

* In case of Fuel or Charging Warnings, customer will be able to choose respective POI station to go there
* In case of Roadside Warnings, an option will be available that allows the customer to Call Ford/Lincoln Roadside Assistance
* Depending on vehicle's current location (UK to France and vice versa, USA to Canada/Mexico and viceversa), customer will be able to change digital speedometer unit from English to Metric and vice versa with unit change warning

#### Feature Planning

The feature was introduced in U611 and CX483 in 20MY. Implementation in other Ford/Lincoln vehicle is optional. Feature will be available for SYNC 4.

#### Regions & Markets

Application Engineers must verify local market requirements and advise DI core any changes in regulations in this direction

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Market /**  **Region**  Variant Name | **North America** | **South America** | **Europe** | **MiddleEast/Africa** | **Asia / Pacific** | **China** |
|  | USA “Optional”  Canada “Optional” |  | UK “Optional”  France “Optional” |  |  |  |

#### Input Requirements

##### Legal Requirements

Feature shall abide by the following legal requirements:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RR Country** | **FSMS Requirement ID** | **Title** | **Author** | **Published Date** |
| United States | REG-001300-007864  REG-001300-007866  REG-001300-007884  REG-001300-007885 | USA/CDN DF-T S1 INSTALLATION PRINCIPLES  USA/CDN DF-T S2 INFORMATION PRESENTATION PRINCIPLES  USA/CDN DF-T S3 INTERACTIONS W/ CONTROLS/DISPLAYS PRINCIPLES  USA/CDN DF-T S4 SYSTEM BEHAVIOR PRINCIPLES | Overbeck,Thomas-TOVERBEC (toverbec) | 21-Oct-2016 |
| United States | REG-130101-003390 | USA FMVSS 101 - Controls, Displays and Telltales | Laesch,Renu-RLAESCH1 (rlaesch1) | 05-Oct-2016 |
| Mexico | REG-001401-008288 | Mexico Indicators | Davila,Enrique-EDAVILA9 (edavila9) | 28-Sep-2016 |
| Canada | REG-130100-008051 | CANADA Controls, Displays and Telltales Certification | Laesch,Renu-RLAESCH1 (rlaesch1) | 18-Aug-2016 |
| China [Peoples Republic] | REG-011200-008250 | CHN GB/T 4094.2 EV | Laesch,Renu-RLAESCH1 (rlaesch1 | 03-Jan-2017 |

Table 6: List of Legal document reference

##### Trustmark Requirements

No additional Trustmark requirements for the intended implementation.

##### Corporate Standard Requirements (FSMS & ECE)

No additional Corporate Standards requirements for the intended implementation.

##### Industry Standards

No additional Industry Standards requirements for the intended implementation.

#### Assumptions & Constraints

Assumptions and Constraints listed below are representative of current strategies and may be subject to change. Review documentation of respective features.

1. Contents of this feature Spec assume that configuation is set to ENABLE for all aspects of this feature. In areas or regions where Considerate Prompts is not required, below requirements do not apply.
2. Feature assumes that displaying warning context will maintain the character limit, text, color, arbitration following warning HMI strategy
3. Any new warning needs to be in a category to display with options
4. Embedded navigation is required for the feature
5. Phone call to Ford/Lincoln Roadside Assistance can only be made with pairing cell phone
6. Feature receives Ignition status and warning trigger information as input to start functionality
7. Feature shall be available for any (Park, Reverse, Neutral, Drive, Sports) of the transmission status

### Feature Context

#### Feature Context Diagram



Figure 1: Context Diagram

#### List of Influences

|  |  |  |
| --- | --- | --- |
| **Influence** | **External Entity** | **Influence Description** |
| Host Vehicle | Warning Request | Feature activate when warning triggered |
| Vehicle Location | Displays digital speedometer Unit change prompt based on location change |
| Steering Wheel  Switch Request | Driver is able to take action on displayed warning through set of up, down, ok, menu and back Switches |
| Driver | Warning Category | Feature categorizes warning and provides option |
| Warning Display Feature | Warning Display Close | Feature provides option to close the warning display |
| Navigation Feature | Request POI List | Feature requests and displays warning POI list |
| Request POI Route | Feature requests to display warning POI Route |
| Ford/Lincoln Roadside Assistance Feature | Request to Call FRA / LRA | Feature will provide option to call Ford/Lincoln Roadside Assistance |
| Speedo Unit Conversion Feature | Request to change digital speedometer unit | Feature will provide option to change digital speedometer unit when vehicle unit mismatches with location |

Table 7: List of Influences

### Feature Modeling

#### Operation Modes and States

Feature has no mode dependent behavior.

#### Use Cases

##### Use Case Diagram

**

Figure 2: Use Case Diagram

##### Actors

| Actor | Description |
| --- | --- |
| Driver | User who operates/drives the vehicle |

Table 8: List of Actors

##### Use Case Descriptions

**CSPR-UC-1- Warning Close**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition in Start/RUN, warning active, Display is ON, displayed options with warning are selectable  All warning will appear as per existing warning strategy |
| **Main Flow** | * Warning message displayed related to fuel, charging, roadside and none (see list) * warning displays option to clear the warning display * Customer selects CLOSE option to clear the warning display * Warning will be disappeared from cluster following warning HMI strategy * No further action can be taken once warning display is closed |

**CSPR-UC-2-GO warning dependent POI**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition in Start/RUN, Display is ON, Fuel or Charging warning active, displayed options with warning are selectable, Navigation available and running on SYNC, Navigation is configured ON in Cluster  All warning will appear as per existing warning strategy |
| **Main Flow** | * Warning message displayed in cluster related to Fuel or Charging (see list) * Warning displays with option to go to nearby fuel warning POI * Customer selects GO option to go nearby fuel station * List of POI nearby will be displayed in the cluster * Warning will be disappeared from cluster following warning HMI strategy |

**CSPR-UC-3-Navigate to warning dependent POI**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition in Start/RUN, Display is ON, Fuel or Charging type Warning active, displayed options with warning are selectable, Navigation available and running on SYNC, Navigation is configured ON on Cluster  List of warning dependent POI are displaying followed by selecting “GO POI” |
| **Main Flow** | * Customer selects any item displayed in warning POI station list * Vehicle will be navigated to the newly selected location * Selected POI Route will be displayed * POI list will be disappeared from cluster following HMI strategy * Cluster display will be updated accordingly |

**CSPR-UC-4-Call to Ford/Lincoln Roadside Assistance**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition is Start/ RUN, Display is ON, displayed options with warning are selectable, Roadside Warning active, cell phone is paired with the vehicle, vehicle location in UK/France/Canada/USA, Roadside Assistance number for UK/France/Canada/USA are stored in vehicle, Navigation available  All warning will appear as per existing warning strategy |
| **Main Flow** | * Warning message displayed related to Roadside (see list) * warning displays option to Call Ford/Lincoln Roadside Assistance * Customer selects CALL option to call Ford/Lincoln Roadside Assistance * Call will be placed to Ford/Lincoln Roadside Assistance UK/France/Canada/USA based off of vehicle’s location * Warning will be disappeared from cluster following warning HMI strategy |

**CSPR-UC-5-Convert Digital Speedometer Unit through warning**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition in Start/RUN, Display is ON, displayed options with warning are selectable, vehicle crosses the UK border to/from France and USA border to/from Canada/Mexico and digital speedometer unit does not match with current location, Navigation available and running on SYNC |
| **Main Flow** | * Warning displays related to digital speedometer unit Change * Customer selects “YES” to change unit * Digital speedometer unit will be converted from English to Metric unit (or vice versa) * warning will be disappeared from cluster following HMI strategy |

**CSPR-UC-6-Unit Conversion warning settings**

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | Ignition in Start/RUN, Display is ON, options on settings display are selectable |
| **Main Flow** | * Customer is browsing Menu Settings * Options displayed to turn digital speedometer unit change reminder on and reminder off * Customer makes any selection from:   a. Reminder ON  b. Reminder OFF   * Reminder ON will display unit change warning each time location and unit mismatch found after UK/France/Canada/USA/Mexico border crossing * Reminder OFF will never allow to display unit change warning and will not change the digital speedometer unit |

### Feature Requirements

#### Functional Requirements

* Warning display existing functionality:
  + Detect if any warning is active following Global Warning Strategy
  + Display Warning following Warning HMI Strategy
  + Warning arbitration following Warning HMI Strategy
  + Display option to close the warning
  + Respond to SCCM Switch press request when warning is active in closing the warning display
  + Display POI list and route
* Considerate Prompt functionality:
  + Warning Categorization (Fuel, Charging, Roadside, none)
  + Display warning with options (GO, Call and CLOSE) available per category
  + Display warning based POI List nearby with Close option
  + Display warning based POI route
  + Display option to call to Ford/Lincoln Roadside Assistance UK/France/Canada/USA
  + Display warning for digital speedometer unit change
  + Provide menu settings to turn ON/OFF digital speedometer unit change

###R\_ CSPR \_001 ### Feature Activation with warning trigger

This feature shall activate as soon as any or multiple warning triggered

###R\_ CSPR \_002 ### Feature Activation with Location and Unit Change

Feature shall activate when digital speedometer unit does not match with vehicle location (UK/France/Canada/USA/Mexico) after border crossing

###R\_ CSPR \_003 ### Warning Categorization

When any warning is active, it shall be categorized as “Fuel”, “Charging”, “Roadside” Warning or not being to any category/none following Global Message list with category

###R\_ CSPR \_004 ### Warning Display with Option

Feature shall display Close or (Close and Go) or (Close and Call) options with any active warning depending on warning category

###R\_ CSPR \_005 ### Display Warning POI List and Route

Feature shall be able to display warning dependent POI list and route to that selected POI

###R\_ CSPR \_006 ### Call location based FRA/LRA

Feature shall be able to call Ford/Lincoln Roadside Assistance based on vehicle’s location (UK/France/Canada/USA) in times of severe warning

###R\_ CSPR \_007 ### Location based Digital Speedometer Unit Conversion

Feature shall be able to change digital speedometer unit depending on vehicle’s location (UK/France/Canada/USA/Mexico) upon driver request

###R\_ CSPR \_008 ### Unit Change Warning display preference

Feature shall allow driver to set preference on displaying digital speedometer unit change warning when condition matches

###R\_ CSPR \_009 ### Warning display when warning issue resolved

Resolving the warning issue from active to inactive shall lead to clear the warning display immediately without any driver action on displayed options

###R\_ CSPR \_010 ### Steering Wheel Switch Request

Feature shall allow steering wheel switch request as an input to select options displayed with warning

##### Error Handling

###R\_ CSPR \_011 ### Error in Feature configuration

Warning shall be displayed as a non Considerate Prompt warning if any configuration error occurs

###R\_ CSPR \_012 ### Warning Categorization failure

Warning shall be displayed as non Considerate Prompt warning if algorithm fails to categorize the active warning

#### Nonfunctional Requirements

##### Performance

###R\_ CSPR \_013 ### Warning display timeout

The warnings shall be displayed for the duration the associated issue remains unresolved within the same ignition cycle or until customer takes an action

Warnings with timeout (identified in Global Message List as TA or TA\*) will follow existing timeout strategy

###R\_ CSPR \_014 ### Acceptance in Categorized Warning display latency

No additional latency shall be allowed to categorize the warning than its original display time (display within “X” seconds of triggering) after that warning triggered

###R\_ CSPR \_015 ### Warning display when feature not configured

If feature is not configured in Ford/Lincoln vehicle, then warning shall be displayed as non Considerate Prompts warning

##### Security

No additional security requirements for the intended implementation.

##### Reliability

###R\_ CSPR \_016 ### Consistency in categorizing Warning

Same warning item in Global Message list shall always categorized as same warning type

###R\_ CSPR \_017 ### Categorization effect on Warning Display

Warning Categorization shall have no effect on warning display strategy per IPC STSS

###R\_ CSPR \_018 ### Switch illumination Strategy

SCCM Switch illumination during warning display with options shall follow Steering wheel control logic and strategy per Max Level SPSS 2Safety

#### Safety

###R\_ CSPR \_019 ### Warning display Strategy

All warnings shall be displayed following Cluster warning display strategy per IPC STSS and Global Message list

###R\_ CSPR \_020 ### Consecutive Warning display Strategy

Consecutive warnings shall be displayed following warning and chime arbitration strategy owned by Cluster HMI Global Message List

##### Functional Safety Goals

Feature does not require Hazard Analysis and Risk Assessment (HARA) confirmed by Functional Safety team

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###F\_MyFeature\_SR\_00005###** | | | | | | |
| **Purpose** | | | | | | |
|  | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
|  | | | | | |  |
| **Notes** | | | | | | |
|  | | | | | | |
| **Type** | | Safety Requirement | | **Source** |  | |
|  | |  | | **Owner** |  | |
| **ASIL** | | Choose an item. | | **ASIL Override Rationale** |  | |
| **Operating Modes** | |  | | **Safe State** |  | |
| **Fault Tolerant Time Interval** | |  | | **Reduced Functionality Interval** |  | |
| **Functional Redundancies** | |  | | **Driver Actions or Others** |  | |
|  | |  | | **Action Validation Criteria** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| **1** |  |  | Initial version | | | |

#### HMI Requirements

###R\_ CSPR \_021 ### Warning HMI

Feature shall abide by warning HMI for warning context, color, severity, timeout, frequency of displaying, chime and warning telltale

###R\_ CSPR \_022 ### Unit Change warning preference HMI

Feature shall display digital speedometer unit change warning display settings following cluster HMI for message context, color, timeout, priority and number of characters

#### Other Requirements

##### Manufacturing Requirements

###R\_ CSPR \_023 ### Feature Version

Feature shall have a DID to monitor the latest software version

###R\_ CSPR \_024 ### Feature Configuration

This feature shall have enable and disable configuration at EOL

##### Service Requirements

###R\_ CSPR \_025 ### Feature behavior with software update

Any new warning added in the Global Message list shall be categorized and displayed with option available per category after updating software

###R\_ CSPR \_026 ### Feature behavior with serviced module

Any newly activated warning or digital speedometer unit change warning display shall considered as new warning after Servicing IPC/SYNC/Radio

##### After Sales Requirements

###R\_ CSPR \_027 ### Feature Learning

Learning sections shall available in Owner’s Manual to help customer in understanding the functions of steering wheel switch on displayed warning and explaining the function of displayed options

##### Process requirements

No additional process requirements for the intended implementation.

# FEATURE DECOMPOSITION (LOGICAL DESIGN)

## Overview

The feature consists of nine functions to perform from start to end. Five functions are associated with option display and handle on displayed warning and three functions work to assist driver with digital speedometer Unit Conversion from English to Metric and vice versa depending on vehicles location after UK/France/Canada/USA/Mexico border crossing. One function assists to close both these warning display functions. Among the nine functions, three functions are introduced as new dedicated to this feature only. The new functions are: Option display and handle on displayed warning, settings and Unit Change warning display & option handle. Other functions such as request to display warning POI list and Route, POI request receive and List send, POI Route Request receive & Display will work together to support on demand customer action on Request to Display Warning POI function. Call FRA/LRA request receive & make call function will receive customer request and assist to make call to Ford/Lincoln Roadside Assistance in severe vehicle conditions. Unit change function will receive the request to change digital speedometer unit on the condition of unit mismatch with location after UK/France/Canada/USA/Mexico border crossing and make the change accordingly.

## Input Requirements

###R\_ CSPR \_028 ### Ignition Status

Ignition status (START, RUN, ACCESSORY and OFF) shall be an input to determine when to display the warning with options

###R\_ CSPR \_029 ### Warning Status

Active warnings declared under the Global Message List shall be a valid input for the feature

###R\_ CSPR \_030 ### Warning Category

Active warning’s category mentioned under the Global Message List shall be an input for the feature to tie option based off of warning’s category

###R\_ CSPR \_031 ### Embedded Nav Status

Embedded nav status shall be an input for the feature

###R\_ CSPR \_032 ### Waypoint Status

Waypoint status shall be an input for the feature for adding warning POI as a waypoint

###R\_ CSPR \_033 ### Ford/Lincoln Roadside Available Status

Country based Ford/Lincoln Roadside Assistance status shall be an input for the feature

###R\_ CSPR \_034 ### Vehicle Location

Vehicle’s GPS coordinate shall be an input to request call to FRA/LRA, generate POI list & Route and to request for digital speedometer unit change whenever condition matches

###R\_ CSPR \_035 ### Steering wheel switch Input

Momentary toggle request from Steering wheel switch shall be an input to take any action on the displayed warning message with options

Right side toggle switches (Up, Down, Back and OK) of steering wheel shall only source of input in this feature to select options available with displayed warning

Toggling Left (back) has no function/impact on feature

## Assumptions & Constraints

Assumptions and Constraints are listed below:

1. Feature will be available when Ignition Key status is START/ON
2. Feature will not depend on transmission status
3. Feature shall become active as soon as any or multiple warning triggered
4. Feature shall become active as soon as vehicle crosses the UK border to/from France or USA border to/from Canada/Mexico and digital speedometer unit does not matched with that country
5. Feature requires embedded navigation system
6. Navigation required to configured ON on Cluster
7. Cell phone needs to be paired with vehicle for making call to FRA/LRA

## Functional Architecture



Figure 3: Functional Boundary Diagram

## Function List

| Function Name | Description |
| --- | --- |
| Option Display and handle on Categorized Warning | Receives active warning request as input to display warnings with options available per category and process the request made through option handler |
| Request to Display Warning POI & Route | Receives active warning with category for requesting to display warning based POI nearby if category matches |
| POI request receive and list send | Receive warning based POI request and send the POI list to display |
| POI Route request receive and start route | Receive warning based POI Route request to start that POI Route |
| Call FRA/LRA request receive and make call | Receive the request to call Ford/Lincoln Roadside Assistance to make call FRA/LRA if category matches |
| Unit Change warning Display and Option handler | Accepts change in country code warning while vehicle is moving from UK to France (vice versa) or USA to Canada/Mexico (vice versa) to convert digital speedometer unit through warning display |
| Settings | Make request to enable and disable Unit Change display function partially or completely |
| Unit Change | Receive the request to convert digital speedometer unit from English to Metric and vice versa and execute the request |
| Close Warning Display | Receive the request to clear the warning display and execute the request |

Table 9: List of Functions

## Logical Functions

### Option Display and handle on Categorized Warning

#### Function Description

All the warnings will be displayed with close option regardless of warning category. Fuel and Charging warnings will be displayed with option to go respective POI stations nearby. Roadside type warning will appear with Call option to make call at Ford/Lincoln Roadside Assistance depending on vehicle’s location which is currently available in UK/France/Canada/USA only. Any warning display can be closed upon driver request. For Fuel and Charging warnings driver will be able to select GO option to go POI stations nearby. For roadside type warning, driver can request to call Ford/Lincoln Roadside Assistance selecting call option while cell phone required to be paired with vehicle.

#### Function Scope



Figure 4: Option Display and handle on Categorized Warning functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| Active\_Warning | 0x0 Inactive | Input from warning status |
| 0x1 Active |
| Warning\_Category | 0x0 Not Categorized | Input from Warning Categorization |
| 0x1 Fuel |
| 0x2 Charging |
| 0x3 Roadside |
| 0x4 None |
| [SCCM\_Switch\_Select](#_Signal_/_Parameter) | 0x0 No Action | Input from Steering Wheel Switches |
| 0x1 Back |
| 0x2 Up |
| 0x3 Okay |
| 0x4 Down |
| [Embedded\_Nav\_Active](#_Signal_/_Parameter) | 0x0 Null | Input from Embedded Nav Status |
| 0x1 Inactive |
| 0x2 Active |
| [Waypoints\_Active](#_Signal_/_Parameter) | 0x0 Invalid | Input from route waypoint status |
| 0x1 Inactive |
| 0x2 Active |
| 0x3 Max\_Active |
| [FRA\_Available](#_Signal_/_Parameter) | 0x0 Null | Input from location update |
| 0x1 Available |
| 0x2 Not Available |
| [Phone\_Paired](#_Signal_/_Parameter) | 0x0 Not Paired |  |
| 0x1 Paired |

Table 10: Option Display and handle on Categorized Warning functional logical inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_Call FRA](#_Signal_/_Parameter) | 0x0 No Action | Output to call FRA/LRA |
| 0x1 Select |
| [Select\_Go\_POI](#_Signal_/_Parameter) | 0x0 No Action | Output to request warning POI |
| 0x1 Select |
| [Select\_Close\_Disp](#_Signal_/_Parameter) | 0x0 No Action | Output to request close warning display |
| 0x1 Select |

Table 11: Option Display and handle on Categorized Warning functional logical outputs

#### Function Modeling

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Figure 5: Option Display and handle on Categorized Warning functional behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

|  |  |  |  |
| --- | --- | --- | --- |
| **Options Display**  Warning Type | **CLOSE** | **GO** | **CALL FRA/LRA** |
| Fuel | Yes | Yes | No |
| Charging | Yes | Yes | No |
| Roadside | Yes | No | Yes |
| None | Yes | No | No |

###R\_ CSPR \_036 ### Display Warning Close option

All the warnings shall be displayed with option to clear the warning display regardless of warning category

###R\_ CSPR \_037 ### Fuel Warning Display with GO option

Fuel type warnings shall be displayed with option to go nearby Fuel Station

###R\_ CSPR \_038 ### Charging Warning Display with GO option

Charging type warnings shall be displayed with option to go nearby Charging Station

###R\_ CSPR \_039 ### Roadside Warning display with CALL option

Roadside type warnings shall be displayed with option to call Ford/Lincoln Roadside Assistance

###R\_ CSPR \_040 ### Request to Close warning display

Request to close warning display shall be made through Warning display option handler

###R\_ CSPR \_041 ### Request to Go Fuel Station

Request to go Fuel Station shall be made through Fuel Warning display option handler

###R\_ CSPR \_042 ### Request to Go Charging Station

Request to go Charging Station shall be made through Charging Warning display option handler

###R\_ CSPR \_043 ### Request to CALL FRA/LRA

Request to call Ford/Lincoln Roadside Assistance shall be made through Roadside Warning display option handler

###### Error Handling

###R\_ CSPR \_044 ### Option display when function is in sleep mode with IGN START/RUN

Warnings shall be displayed as non Considerate Prompt warning if function does not wake up when Ignition key status in START/RUN and any warning is active

###R\_ CSPR \_045 ### Warning Category Reception Error

Warnings shall be displayed as a non Considerate Prompt warning if function fails to receive warning category

###R\_ CSPR \_046 ### Incorrect Warning Category Received

Warning shall be displayed with option available on that determined category if incorrect warning category received

###R\_ CSPR \_047 ### Warning and Option Language mismatch

Options display language shall follow cluster strategy if option language does not match with warning context

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_048 ### Display Warning with Embedded navigation unavailable

When apple carplay, android auto or any other 3rd party navigation system is active, Fuel and Charging type warning shall be displayed as non Considerate Prompts warning

Option to Call Ford/Lincoln Roadside Assistance should be available for Roadside type warnings

###R\_ CSPR \_049 ### Display Warning with max waypoints active

Fuel and Charging type warning shall be displayed as non Considerate Prompts warning if vehicle is routing to destination with maximum number of waypoints active

###R\_ CSPR \_050 ### Display Location based Roadside Warning

Roadside warning shall be displayed as non Considerate Prompts warning if vehicle location found anywhere other than UK/France/Canada/USA

###R\_ CSPR \_051 ### Display Warning when cell phone not paired

Roadside warning shall be displayed as non Considerate Prompts warning if cell phone is not paired with the vehicle,

Option to GO POI stations should be available for Fuel and Charging type warnings

###R\_ CSPR \_052 ### Display Warning in Drive Mode

Warning display will be moved to the alternate zone from warning zone and displayed as non Considerate Prompts warning when drive mode pops-up

###R\_ CSPR \_053 ### Display Warning when Drive Mode goes away

Warning display will be moved back to the warning zone from the alternate zone and still displayed as non Considerate Prompts warning when drive mode goes away

###### Safety

###R\_ CSPR \_054 ### Options display text

Font size and color for options display context shall follow Cluster HMI and translation strategy

###R\_ CSPR \_055 ### Warning option highlight

Warning Option highlighting through text box prior to selection shall follow warning display HMI Strategy

###R\_ CSPR \_056 ### Display Clear HMI

Choosing any option on displayed warning shall always clear the warning screen leaving telltale if available following warning HMI

###### Security

No additional security requirements for the intended implementation

###### Reliability

###R\_ CSPR \_057 ### Consistency in displaying Warning option

Warning falls in same category shall be displayed with same options available on that specific category

###R\_ CSPR \_058 ### Warning and options display language

Displayed options available on each warning type shall match with the language of warning context

### Request to Display Warning POI & Route

#### Function Description

Fuel and Charging POI list can be requested through Fuel and Charging type warnings respectively. POI List request will be received and in response to the request, POI list shall be sent if available and list will be displayed following list display HMI. The new edition to list display is an additional Exit option at the Top of the POI list for customer to clear the POI list screen if wish not to select any POI item. Items from POI list can be chosen to navigate there and navigation Route shall be presented following route display HMI.

#### Function Scope



Figure 6: Request to Display Warning POI and Route functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_GO](#_Signal_/_Parameter)\_POI | 0x0 No Action | Input from warning display to select POI option |
| 0x1 Select |
| [Send\_POI\_List](#_Signal_/_Parameter) | 0x0 No Action | Input to display warning POI list |
| 0x1 POI List |
| [Waypoint\_Active](#_Signal_/_Parameter) | 0x0 Invalid | Input from route waypoint status |
| 0x1 Inactive |
| 0x2 Active |
| 0x3 Max\_Active |

Table 12: Req to Display Warning POI & Route functional logical Inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Req\_POI\_List](#_Signal_/_Parameter) | 0x0 No Action | Output to request for warning dependent POI List |
| 0x1 Req POI |
| [Req\_POI\_Route](#_Signal_/_Parameter) | 0x0 No Action | Output to request for warning dependent POI map/Route |
| 0x1 Req route |
| 0x2 Req Close |
| [Select\_Close\_Disp](#_Signal_/_Parameter) | 0x0 No Action | Output to request close POI warning list display |
| 0x1 Select |

Table 13: Req to Display Warning POI & Route functional logical Outputs

#### Function Modeling

**

Figure 7: Req to Display Warning POI & Route function behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_059 ### POI Request

Fuel and Charging POI List request shall be sent through Fuel and Charging Warnings respectively

###R\_ CSPR \_060 ### Receive POI List

Fuel and Charging POI List shall be received to display Fuel and Charging POI nearby when requested through Warning

###R\_ CSPR \_061 ### POI List Display

Fuel and Charging POI List shall be displayed upon reception of POI List sent as a response to list request following Cluster List display HMI

###R\_ CSPR \_062 ### POI List Display with Exit option

Fuel and Charging warnings POI List shall be displayed with exit option to clear the POI list warning screen

###R\_ CSPR \_063 ### POI List Display Close

Warning dependent POI List display shall be cleared upon driver request through Fuel and Charging POI List warning display option handler

###R\_ CSPR \_064 ### POI Route Request

Fuel and Charging POI Route request shall be sent through Fuel and Charging POI list warning display

###R\_ CSPR \_065 ### POI Route Display

Fuel and Charging POI route shall be displayed upon reception of POI route sent as a response to route request following Cluster route display HMI

###### Error Handling

###R\_ CSPR \_066 ### POI List Request Error

Fuel and Charging Warnings shall disappear after making request for warning POI list following cluster strategy if POI request not sent due to CAN signal error

###R\_ CSPR \_067 ### POI List Reception Error

Fuel and Charging Warnings display shall be disappeared after requesting for respective POI List and display shall remain cleared following cluster strategy if POI list not received due to CAN signal error

###R\_ CSPR \_068 ### POI Route Request Error

Fuel and Charging Warnings POI List shall be disappeared after requesting for respective POI route and display shall remain cleared following cluster strategy if POI route request not received due to CAN signal error

###R\_ CSPR \_069 ### POI List and Route Request frequency

If Fuel and Charging POI List/Route shall not receive within 2sec after requesting, POI List/Route request shall sent again automatically

Request will send 3 times with a waiting time of 2 sec after each request has sent if POI List/Route not received by then

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_070 ### Transition from POI List display to Warning display

Transition from warning POI list display to warning display shall not be possible

###R\_ CSPR \_071 ### Display POI List Warning with max waypoints active

If maximum number of waypoints set while/after warning POI list displayed, selecting item from warning POI list shall display a notification message that requested POI item cannot be added as new waypoint

###### Safety

###R\_ CSPR \_072 ### POI item highlight

First POI item in the warning POI list shall be highlighted

###R\_ CSPR \_073 ### Exit POI list Display

Exit the POI list display will follow the Nav Strategy

###R\_ CSPR \_074 ### POI display HMI

Warning POI List display with number of POI items shall abide by HMI strategy for POI list display in Cluster

###R\_ CSPR \_075 ### POI display HMI with multiple active warning

Warning POI List display while any other/multiple warning triggered shall abide by warning display arbitration strategy in Cluster

###R\_ CSPR \_076 ### Follow List Browser Protocol

Choosing item from Warning POI List display shall abide by List browser protocol APIM SPSS and Considerate Prompt\_ APIM SPSS

###R\_ CSPR \_077 ### Follow Transport Protocol

Warning POI List request response shall abide by Transport protocol APIM SPSS

###### Security

No additional security requirements for the intended implementation.

###### Reliability

No additional reliability requirements for the intended implementation.

### POI request receive and list send

#### Function Description

Request to display Fuel and Charging POI list will be received by this function. After receiving the POI list request, response will send back providing the warning POI list. Warning POI list generation, distance and direction calculation, number of items included in the POI list will follow the existing strategy.

#### Function Scope



Figure 8: POI request receive and list send fuction architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Req\_POI\_List](#_Signal_/_Parameter) | 0x0 No Action | Input to request for warning POI list |
| 0x1 Req POI |

Table 14: POI Req receive and List send Function logical inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Send\_POI\_List](#_Signal_/_Parameter) | 0x0 No Action | Output to display warning POI list |
| 0x1 POI List |

Table 15: POI Req receive and List send Function logical output

#### Function Modeling

**

Figure 9: POI Req receive and List send Function Behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_078 ### Receive POI List Request

Fuel and Charging POI List request shall be received when requested through Fuel and Charging warning display

###R\_ CSPR \_079 ### Response to POI List Request

Fuel and Charging POI List shall be sent as response to Fuel and Charging POI List request reception

###### Error Handling

###R\_ CSPR \_080 ### POI List Request Reception Error

Fuel and Charging Warning display shall disappeared after requesting for respective POI List and display shall remain cleared if POI list request not received due to CAN signal error

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_081 ### Latency acceptance on POI List Response

No additional latency is allowed in receiving the POI List request and response back to list display function

###### Safety

###R\_ CSPR \_082 ### POI List generation

POI list generation based off of vehicle’s updated location shall follow existing navigation strategy per Navigation APIM SPSS

###R\_ CSPR \_083 ### Response Strategy for number of POI items

Numbers of items send through POI List response for Fuel and Charging shall follow Transport protocol APIM SPSS

###R\_ CSPR \_084 ### Response POI List Request Strategy

Fuel and Charging POI List request shall be responded following Transport protocol APIM SPSS

###R\_ CSPR \_085 ### No POI found display

If no POI is found nearby while request received for warning POI list, a notification message will be displayed following navigation strategy

###R\_ CSPR \_086 ### POI list loading Error

If POI List cannot be loaded due to network/other failure while requested for warning POI list, a notification message will be displayed following navigation strategy per Navigation SPSS

###### Security

No additional security requirements for the intended implementation.

###### Reliability

No additional reliability requirements for the intended implementation.

### POI Route request receive and start route

#### Function Description

Routing to Fuel and Charging POI Station can be requested through Warning POI List display item selection handler. Once requested, the selected warning POI will be added as a new waypoint and will have higher priority over other waypoints. Route will start to the POI Station first. In case when vehicle is routing with maximum waypoint active, the Warning POI cannot be added as a new waypoint and routing will not be possible.

#### Function Scope



Figure 10: POI Route request receive and start route fuction architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Req\_POI\_Route](#_Signal_/_Parameter) | 0x0 No Action | Input to request for warning POI list |
| 0x1 Req Route |

Table 16: POI Route request receive and display function logical inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| POI\_Route | 0x0 No Action | Route POI as output |
| 0x1 Start Route |

Table 17: POI Route request receive and display function logical outputs

#### Function Modeling



Figure 11: POI Route request receive and display Function Behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_087 ### Receive POI Route Request

Fuel and Charging POI Route request shall be received when requested through Fuel and Charging POI list display

###R\_ CSPR \_088 ### Response to POI Route Request

Fuel and Charging POI Route request shall be received as response to Fuel and Charging POI selection from list

###R\_ CSPR \_089 ### Add POI while navigating to destination

If vehicle is routing to any destination, selected POI shall be added as a new waypoint and will be routed to the warning POI Station first

###R\_ CSPR \_090 ### Add POI while navigating to destination with <max no of waypoint

If vehicle is routing to any destination with less than 5 preselected waypoints, selected warning POI shall be added as a new waypoint and will be routed to the POI Station first

###R\_ CSPR \_091 ### Add POI while navigating with max no of POI

If vehicle is routing to any destination with maximum number of preselected waypoints, selected POI shall not be added as a new waypoint

###### Error Handling

###R\_ CSPR \_092 ### POI Route Request Reception Error

Fuel and Charging POI List display shall disappeared after requesting for respective POI Route and display shall remain cleared if POI Route request not received due to CAN signal error

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_093 ### Latency acceptance on POI Route Response

No additional latency is allowed in receiving the POI Route request and response in displaying Route

###### Safety

###R\_ CSPR \_094 ### POI Route loading error

If POI Route cannot be loaded due to network/other failure while requesting for warning POI list, a notification message will be displayed following navigation strategy

###R\_ CSPR \_095 ### No of Max waypoints

Number of maximum waypoints selectable will follow existing navigation strategy

###R\_ CSPR \_096 ### POI route request with Max waypoints

If warning POI cannot be added as a new point due to maximum waypoint number limit, a notification message will be displayed

###### Security

No additional security requirements for the intended implementation.

###### Reliability

No additional reliability requirements for the intended implementation.

### Call FRA/LRA Request receive and make call

#### Function Description

When any severe warning activates that falls into roadside category, it allows driver to call Ford/Lincoln Roadside Assistance via pairing cell phone with vehicle. Roadside Assistance is available currently in UK/France/Canada/USA and call will be placed depending on where vehicle’s location is detected during that moment for proper assistance. Roadside Assistance number will be prepopulated in the vehicle. If cell phone is paired via Bluetooth, then call will be placed following Bluetooth strategy. If phone is paired via any other way (apple carplay/ android auto and others), call will be placed following respective strategy.

#### Function Scope



Figure 12: Call FRA/LRA request receive and make call function architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_Call](#_Signal_/_Parameter)\_FRA | 0x0 No Action | Input from warning display to select Call option |
| 0x1 Select |
| [Phone\_Paired](#_Signal_/_Parameter) | 0x0 Not Paired | Input from phone pair status |
| 0x1 Paired |

Table 18: Call FRA/LRA request receive and make call function logical inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Req\_Call\_FRA](#_Signal_/_Parameter) | 0x0 No Action | Output to request making call to FRA/LRA |
|  | 0x1 Call FRA |

Table 19: Call FRA/LRA request receive and make call function logical outputs

#### Function Modeling



Figure 13: Call FRA/LRA request receive and make call function behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_097 ### Receive Call FRA/LRA request

Request to Call to Ford/Lincoln Roadside Assistance shall be received to make call through displayed Roadside Warning

###R\_ CSPR \_098 ### Call FRA/LRA UK/France/Canada/USA

Phone call to Ford Roadside Assistance in UK shall be made through displayed Roadside Warning when vehicle is in UK.

Phone call to Ford Roadside Assistance in France shall be made through displayed Roadside Warning when vehicle is in France.

Phone call to Ford/Lincoln Roadside Assistance in Canada shall be made through displayed Roadside Warning when vehicle is in Canada.

Phone call to Ford/Lincoln Roadside Assistance in USA shall be made through displayed Roadside Warning when vehicle is in USA.

###R\_ CSPR \_099 ### Call FRA/LRA pairing phone

Call to Ford/Lincoln Roadside Assistance for roadside warnings shall not be made if cell phone is not paired to the vehicle

###### Error Handling

###R\_ CSPR \_100 ### Call Request Reception Error

Warning Display with Call option shall disappeared after requesting for call to FRA/LRA and display shall remain cleared if Call request not received due to CAN signal error

###R\_ CSPR \_101 ### Call Request frequency

Call to Ford/Lincoln Roadside Assistance request shall not repeat if found no cell phone is paired or call cannot be established due to network error

###R\_ CSPR \_102 ### Call FRA/LRA while Location updated Error

If vehicle’s updated location not found then Call to Ford/Lincoln Roadside Assistance shall be made based off of vehicle’s last updated country info (for UK/France/Canada/USA only)

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_103 ### Call FRA/LRA for North America/Europe

Request to Call Ford/Lincoln Roadside Assistance function is available for UK/France/Canada/USA only

###R\_ CSPR \_104 ### Latency acceptance on Response to Call Request

No additional latency is allowed in receiving the Call FRA/LRA request and make call if phone paired

###### Safety

###R\_ CSPR \_105 ### Make Call Strategy

Call Ford/Lincoln Roadside Assistance shall follow existing call strategy pairing cell phone with vehicle via Bluetooth, apple carplay, android auto and others documented in Carplay and BT Connectivity APIM SPSS

###R\_ CSPR \_106 ### Call FRA/LRA when another call is ongoing

Call Ford/Lincoln Roadside Assistance when another call is continuing shall follow existing call strategy

###R\_ CSPR \_107 ### Call FRA/LRA unavailable notification

If vehicle moves to new country where FRA/LRA is not available right after selecting call to FRA/LRA through Roadside Warning display option handler, a notification message will be displayed that FRA/LRA is not available

###R\_ CSPR \_108 ### Call FRA/LRA unsuccessful notification

If call cannot be established to Ford/Lincoln Roadside Assistance due to network error/phone got unpaired/others, a notification message will be displayed following call strategy

###### Security

No additional security requirements for the intended implementation

###### Reliability

No additional reliability requirements for the intended implementation

### Unit Change Warning Display and option handle

#### Function Description

This function will display a warning requesting to change digital speedometer unit when there is a mismatch in speedometer unit with vehicle’s location after UK/USA border crossing to assist driver with English to Metric (and vice versa) speedometer unit change. As soon as the speedometer unit and location mismatch triggered, there will be a delay of 1 mile to check if condition still valid and then display the speedometer unit change warning. Unit Change warning will allow driver to change the digital Speedometer unit, set speed and Speed indicator to match with Vehicle’s updated location. If driver decide not to align the unit with location or do not take any action through unit change warning display handler, then warning will be displayed again whenever the border crossing and speedometer unit mismatch condition occurs. This Functionality is only available for UK/France/Canada/USA/Mexico.

#### Function Scope



Figure 14: Unit Change warning display and option handle functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [SCCM\_Switch\_Select](#_Signal_/_Parameter) | 0x0 No Action | Input from Steering Wheel Switches |
| 0x1 Back |
| 0x2 Up |
| 0x3 Okay |
| 0x4 Down |
| [Select\_Reminder\_On](#_Signal_/_Parameter) | 0x0 No Action | Input to enable unit change warning |
| 0x1 Enable |
| [Select\_Reminder\_Off](#_Signal_/_Parameter) | 0x0 No Action | Input to disable unit change warning |
| 0x1 Disable |
| [Country\_Unit](#_Signal_/_Parameter) | 0x0 Null | Input from current country’s unit |
| 0x1 Mile/hr |
| 0x2 Km/hr |
| 0x3 Metrickm |

Table 20: Unit Change warning display and option handle functional architecture

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_Close\_Disp](#_Signal_/_Parameter) | 0x0 No Action | Output to request close warning display |
| 0x1 Select |
| [Req\_Unit\_Change](#_Signal_/_Parameter) | 0x0 No Action | Output to request change units |
| 0x1 Req unit change |

Table 21: Unit Change warning display and option handle functional logical output

#### Function Modeling

**

Figure 15: Unit Change warning display and option handler Operation States and Modes

#### Function Requirements

##### Functional Requirements

###### Normal Operation

|  |  |  |  |
| --- | --- | --- | --- |
| **Border Crossing** | **Distance traveled from border to new country** | **Vehicle Speedometer Unit** | **Display Unit Change Warning** |
| UK > France | 1 miles | miles/hr | Yes |
| UK > France | any | km/hr | No |
| France > UK | 1 miles | km/hr | Yes |
| France > UK | any | miles/hr | No |
| USA > Canada | 1 miles | miles/hr | Yes |
| USA > Mexico | 1 miles | miles/hr | Yes |
| USA > Canada | any | km/hr | No |
| USA > Mexico | any | km/hr | No |
| Canada > USA | 1 miles | km/hr | Yes |
| Mexico > USA | 1 miles | km/hr | Yes |
| Canada > USA | any | miles/hr | No |
| Mexico > USA | any | miles/hr | No |

###R\_ CSPR \_109 ### Unit Change Warning Activation

Speedometer Unit Change warning shall be triggered as soon as vehicle has crossed the UK border to/from France or USA border to/from Canada/Mexico and vehicle digital Speedometer unit has a mismatch with current country

###R\_ CSPR \_110 ### Display Unit Change warning

Speedometer Unit Change Warning shall be displayed after driving 1 mile from the border within the new country anytime the unit change warning conditions remain satisfied

###R\_ CSPR \_111 ### Unit Change warning display when condition revert

Revert back to previous location where digital speedometer unit has a match with location shall lead to clear the Unit Change warning display immediately without any driver action on displayed options

###R\_ CSPR \_112 ### Display unit change warning close option

Speedometer Unit change warning shall be displayed with option to clear the warning display

###R\_ CSPR \_113 ### Warning Display with Unit Change option

Unit Change warning message shall be displayed with option to change digital speedometer unit

###R\_ CSPR \_114 ### Request to close Unit Change display

Request to close digital speedometer unit change warning display shall be made through unit change warning display option handler

###R\_ CSPR \_115 ### Request to Change Unit (English to Metric)

Request to change digital speedometer unit from English to Metric when vehicle location found France/Canada/Mexico shall be made through displayed unit change warning option handler

###R\_ CSPR \_116 ### Request to Change Unit (Metric to English)

Request to change speedometer unit from Metric to English when vehicle location found UK/USA shall be made through displayed unit change warning option handler

###R\_ CSPR \_117 ### Unit change warning display clear

After taking any user action through unit change warning option handler, unit change warning display shall be cleared

###### Error Handling

###R\_ CSPR \_118 ### Unit Change display when function is in sleep mode with IGN START/RUN

If function does not wake up when Ignition key status in START/RUN and failed to receive vehicle’s current location info, no Unit Change warning shall display

###R\_ CSPR \_119 ### Location updated Error

If vehicle’s updated location not found after UK/USA border crossing then unit change warning shall not be displayed

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_120 ### Unit Change Warning Display for North America/Europe

Digital Speedometer Unit Change Warning Display function is available for UK/France/Canada/USA/Mexico only

###R\_ CSPR \_121 ### Acceptance in Unit Change warning display latency

No additional latency is allowed to display Unit Change warning

Latency includes updating vehicle location info and generating warning display

###R\_ CSPR \_122 ### Acceptance in action latency through unit change warning option handler

No additional latency is allowed in operation when any option has chosen through unit change warning option handler

###### Safety

###R\_ CSPR \_123 ### Unit Change warning display Strategy

Unit Change warning shall be displayed following Cluster HMI strategy

###### Security

No additional security requirements for the intended implementation

###### Reliability

###R\_ CSPR \_124 ### Consistency in displaying unit change warning

Unit change warning shall not display or flash or appear periodically due to failure/problem in location update

###R\_ CSPR \_125 ### Consistency in clearing unit change warning display

After taking any user action through displayed option handler, unit change warning shall not display or flash or appear periodically

### Settings

#### Function Description

Settings function allows driver to set their preference on displaying digital speedometer unit change warning. Unit change warning display function can be turned on to display each time the digital speedometer unit has a mismatch with country after border crossing event (applicable for UK/France/Canada/USA/Mexico) with option to ignore or change the units. ~~The function will also provide option to auto unit change that results no digital speedometer unit change warning display again but change unit automatically each time a unit mismatch with location found after border crossing.~~ Reminder off option will not display warning again and there will be no unit conversion; units will remain as they were set previously.

#### Function Scope



Figure 16: Settings functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [SCCM\_Switch\_Select](#_Signal_/_Parameter) | 0x0 No Action | Input to select option displayed with Unit Change settings |
| 0x1 Back |
| 0x2 Up |
| 0x3 Okay |
| 0x4 Down |

Table 22: Unit Change warning display settings functional logical inputs

##### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_Reminder](#_Signal_/_Parameter)\_On | 0x0 No Action | Output to enable unit change warning |
| 0x1 Select |
| Select\_Reminder\_Off | 0x0 No Action | Output to disable unit change warning |
| 0x1 Select |
| [Req\_Unit\_Change](#_Signal_/_Parameter) | 0x0 No Action | Output to request for location based unit change |
| 0x1 Req unit change |

Table 23: Settings functional logical output

#### Function Modeling

**

Figure 17: Settings function Operation States and modes

#### Function Requirements

##### Functional Requirements

###### Normal Operation

|  |  |  |
| --- | --- | --- |
| **Displayed Options** | **Unit Change Warning Display when conditions match** | **Unit Change per request** |
| Reminder ON | Yes | Yes |
| Reminder OFF | NO | NO |

###R\_ CSPR \_126 ### Display option to turn Reminder ON

Settings shall display option to turn reminder on to display Unit Change warning each time unit mismatches with vehicle’s location after UK/USA border crossing

~~###R\_ CSPR \_00X ### Display option to automatic unit change~~

~~Settings shall display option to auto unit change to change the digital speedometer unit automatically without displaying the unit change warning each time digital speedometer unit mismatches with vehicle’s location after UK border crossing event~~

###R\_ CSPR \_127 ### Display option to turn Reminder OFF

Settings shall display option to turn reminder off that neither displays Unit Change warning nor makes any change in digital speedometer unit when unit mismatches with vehicle’s location after UK/USA border crossing event occurs

###R\_ CSPR \_128 ### Unit Change warning display Reminder ON

Unit Change warning display reminder shall be turned on through Settings anytime

~~###R\_ CSPR \_00X ### Change Unit Automatically~~

~~Automatic digital speedometer Unit Change with no unit change warning display when unit mismatches with vehicle’s location with border crossing event shall be requested through Settings anytime~~

###R\_ CSPR \_129 ### Unit Change warning display Reminder OFF

Unit Change warning display reminder shall be turned off through Settings anytime

###### Error Handling

###R\_ CSPR \_130 ### Warning display reminder ON request Error

If Unit Change warning reminder cannot be turned ON due to error in algorithm or error in signal transmission after making request choosing remind on option from settings display, then digital speedometer unit change warning shall not be displayed or unit shall not automatically change when condition matches

~~###R\_ CSPR \_00X ### Automatic Change Unit request Error~~

~~If Unit Change warning reminder cannot be turned OFF due to error in algorithm or error in signal transmission after making request choosing auto unit change option from settings display, then speedometer unit shall not automatically change when condition matches~~

###R\_ CSPR \_131 ### Warning Display reminder OFF request Error

If Unit Change warning cannot be disabled due to error in algorithm or error in signal transmission after making request choosing does not remind option from settings display, then digital speedometer unit change warning shall be displayed anytime the condition matches

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_132 ### Acceptance in action latency through unit change settings

No additional latency is allowed in operation when any option has chosen from unit change display settings

###R\_ CSPR \_133 ### Default unit change settings

The default condition for unit change display through settings will be “Reminder ON”

###### Safety

###R\_ CSPR \_134 ### Unit Change display Settings HMI Strategy

Unit Change warning display Settings shall be displayed following Cluster HMI strategy

###### Security

No additional security requirements for the intended implementation

###### Reliability

###R\_ CSPR \_135 ### Consistency in unit change settings display

After taking any user action through displayed unit change settings, settings shall not display or flash or appear periodically

###R\_ CSPR \_136 ### Transition to/from main menu

Transition to/from main menu from/to unit change settings shall be available

### Unit Change

#### Function Description

Speedometer Unit Change function will assist driver to align with digital speedometer and set speed unit after crossing UK/USA border. Whenever the function receives unit change request, it will convert the digital speedometer unit accordingly from English to Metric or Metric to English depending on vehicle’s updated location.

#### Function Scope



Figure 18: Unit Change functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Req\_Unit\_Change](#_Signal_/_Parameter) | 0x0 No Action | Input from unit change warning to update once |
| 0x1 Metric |
| 0x2 Imperial |

Table 24: Unit Change function logical inputs

#### Function Modeling

**

Figure 19: Unit Change Function Operation States and Modes

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_137 ### Receive Unit Change Request

Request to change digital speedometer unit through displayed unit change warning or unit change settings shall be received to match units with vehicle’s location

###R\_ CSPR \_138 ### Change Unit

Digital Speedometer, set speed and speed indicator Unit shall be changed from English to Metric or vice versa depending on vehicle’s location when requested through digital speed unit change warning display handler

###### Error Handling

###R\_ CSPR \_139 ### Unit Change Request Reception Error

Digital Speedometer Unit shall not change and remain in same states after condition changes if unit change request not received due to CAN signal error

###R\_ CSPR \_140 ### Unit Change Request Processing Error

Digital Speedometer Unit shall not change and remain in same states if unit change request not processed due to error in algorithm

###R\_ CSPR \_141 ### Location update Error

Digital Speedometer Unit shall be changed aligning with vehicle location; error in updating location will lead to change units incorrectly

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_142 ### Acceptance in Unit Change latency

No additional latency is allowed to change digital speedometer unit after making request

###### Safety

###R\_ CSPR \_143 ### Unit change Strategy

Unit change request shall proceed with following existing digital speedometer unit change strategy

###### Security

No additional security requirements for the intended implementation

###### Reliability

###R\_ CSPR \_144 ### Consistency in unit change

Digital Speedometer Unit shall always change aligning with vehicle’s current location

### Close Warning Display

#### Function Description

All the Considerate Prompts warnings, POI list warning and digital speedometer unit change warning will display with option to clear the warning display screen. Upon driver request through displayed option handler, the warning display can be closed. Once the warning display is closed no additional option can be taken or customer cannot revert back to previous warning screen.

#### Function Scope



Figure 20: Close Warning Display functional architecture

#### Function Interfaces

##### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Logical Signal Name** | **Signal Value** | **Description** |
| [Select\_Close\_Disp](#_Signal_/_Parameter) | 0x0 No Action | Input to close the warning display |
| 0x1 Close |

Table 25: Close warning Display functional logical inputs

#### Function Modeling

**

Figure 21: Close WarningDisplay Function Behavior

#### Function Requirements

##### Functional Requirements

###### Normal Operation

###R\_ CSPR \_145 ### Warning Display Closed by request

Any active warning display shall be cleared upon driver request through selecting warning close option

###R\_ CSPR \_146 ### Unit Change Warning Closed by request

Unit Change warning shall be cleared upon driver request through selecting warning close option

###R\_ CSPR \_147 ### POI Warning Closed by request

Warning dependent POI List display shall be cleared upon driver request through selecting POI warning close option

###### Error Handling

###R\_ CSPR \_148 ### Warning Display Clear Error

If active warning display does not get cleared due to error in algorithm after making any selection, then warning shall keep displaying following cluster strategy for warning display

###R\_ CSPR \_149 ### Unit Change Display Clear Error

If Unit Change warning display does not get cleared due to error in algorithm or error in signal transmission after making any request choosing option from warning display, then Unit Change warning shall keep displaying following cluster strategy for warning display

###R\_ CSPR \_150 ### POI Warning Close request Error

If POI warning does not get cleared due to error in algorithm after making display clear request, then POI List warning shall keep displaying following cluster strategy for warning display

##### Non-Functional Requirements

###### Performance

###R\_ CSPR \_151 ### Latency acceptance on clearing the warning

No additional latency is allowed to close the warning display when requested from warning display option handler

###### Safety

###R\_ CSPR \_152 ### Display close Strategy

Warning display shall be cleared following existing warning display close strategy

###### Security

No additional security requirements for the intended implementation

###### Reliability

###R\_ CSPR \_153 ### Transition to warning display

Transition to warning display shall not available after closing the warning

# FEATURE IMPLEMENTATION (PHYSICAL DESIGN)

## Feature Implementation Description

### Overview

The following section applies to CGEA 1.3C Gen III and further architecture

### Input Requirements

###R\_ CSPR \_154 ### Ignition Status

Feature shall become active when Ignition\_Status = 0x4 (Run) or Ignition Status = (Start)

When Ignition\_Status = 0x0 (Unknown), 0x1 (Off), 0x2 (Accessory) or 0xF (Invalid), feature will be unavailable

 ###R\_ CSPR \_155 ### Warning Status

Feature shall become active when Warning\_Status = 0x1 (active)

###R\_ CSPR \_156 ### Embedded Nav Status

Feature functionalities shall depend on Embedded\_Nav\_Active = 0x1 (Active)

###R\_ CSPR \_157 ### Waypoint Status

Feature shall receive WaypointsActive\_St = 0x1 (Waypoints\_Inactive), 0x2 (Waypoints\_Active), 0x3 (Max\_Waypoints\_Active) as input to display Fuel and Charging warning and decide adding warning POI as waypoint

###R\_ CSPR \_158 ### Ford/Lincoln Roadside Available Status

Feature shall receive RoadsideAsstAvail\_D\_St = 0x1 (Available) to display Roadside Warning

 ###R\_ CSPR \_159 ### Vehicle Location and unit

Feature shall become active when vehicle’s location and unit are either (Location = UK/USA and Unit =Metric), (Location = France/Canada/Mexico and Unit = English) after UK/USA border crossing

 ###R\_ CSPR \_160 ### Switch toggle

Feature shall respond to SteWhlSwtchOk\_B\_Stat = 0x1, SteWhlSwtchUp\_B\_Stat = 0x1 and SteWhlSwtchDown\_B\_Stat = 0x1 as input when requested to select option displayed with active warning

SteWhlSwtchBack\_B\_Stat = 0x1 has no impact on feature

### Assumptions & Constraints

Assumptions and Constraints are listed below:

1. Feature implementation depends on vehicle network architecture
2. Feature implementation depends on vehicle cluster type and characteristics
3. Feature shall be implemented on SYNC 4 and later versions
4. Feature will be implemented on vision steering wheel and later versions
5. Feature will receive warning category as an input to display it with options
6. Ford/Lincoln Roadside Assistance number will be prepopulated in SYNC
7. Navigation will be configured as ON in Cluster
8. Cluster will check if any 3rd party navigation is active and display Fuel and Charging warnings as non Considerate Prompt Warning
9. Cluster will check if cell phone is paired with vehicle and do not display Call option for Roadside warnings if phone is not paired
10. Cluster will check if unit has a mismatch when receives Unit info after UK/USA border crossing

## Function Deployment

### Feature Implementation Architecture



Figure 22: Feature Network Diagram

#### Electrical Components

|  |  |
| --- | --- |
| **ECU** | **Description** |
| BCM | Implement Publisher requirements |
| SCCM | Implement Publisher requirements |
| ECG | Gateway for Signals to APIM and IPC |
| IPC | Implement Subscriber and Publisher requirements |
| APIM | Implement Subscriber and Publisher requirements |

Table 26: Electrical Components

#### Network Communication

|  |  |  |  |
| --- | --- | --- | --- |
| Name | **Type** | **Description** | **Connected Nodes** |
| [HS1](#_HS1_Message_List) | High Speed | High Speed 1 CAN network | BCM, ECG |
| [HS2](#_HS2_Message_List) | High Speed | High Speed 2 CAN network | SCCM, ECG |
| [HS3](#_HS3/INFOCAN_Message_List) | High Speed | High Speed 3 CAN network | IPC, APIM, ECG |

Table 27: Network Connections

##### HS1 Message List

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Message Name** | **CAN ID** | **Transmission Mode** | **Period** | **Signal Name** | **Transmitters** | **Receiver** |
| BodyInfo\_3 | 0x3B3 | Event Periodic | 500ms | Ignition\_Status | [BCM](#_Publisher_Signals) | [ECG](#_Subscribed_Signals) |

Table 28: HS1 message list

##### HS2 Message List

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Message Name** | **CAN ID** | **Transmission Mode** | **Period** | **Signal Name** | **Transmitters** | **Receiver** |
| Steering\_Wheel\_Data2 | 0x81 | Event Periodic | 1000ms | SteWhlSwtchBack\_B\_Stat | [SCCM](#_Publisher_Signals_1) | [ECG](#_Subscribed_Signals) |
| SteWhlSwtchUp\_B\_Stat |
| SteWhlSwtchOk\_B\_Stat |
| SteWhlSwtchDown\_B\_Stat |

Table 29: HS2 message list

##### HS3/INFOCAN Message List

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Message Name** | **CAN ID** | **Transmission Mode** | **Period** | **Signal Name** | **Transmitters** | **Receiver** |
| BodyInfo\_HS3 | 0x3B2 | Event Periodic | 500ms | Ignition\_Status | [ECG](#_Publisher_Signals_2) | [IPC](#_Subscribed_Signals_1) |
| MC\_Send\_Signals\_1 | 0x2A1 | Event Periodic | 100ms | ICI\_BtnID\_A | [ECG](#_Publisher_Signals_2) | [IPC](#_Subscribed_Signals_1) |
| ICI\_BtnID\_B |
| ICI\_BtnID\_C |
| ICI\_BtnID\_D |
| ICI\_Coding\_BtnID\_A |
| ICI\_Coding\_BtnID\_B |
| ICI\_Coding\_BtnID\_C |
| ICI\_Coding\_BtnID\_D |
| LBClient1\_Request\_Signals | 0x195 | No Send Type |  | LBC1\_ActiveListID | [IPC](#_Publisher_Signals_3) | [APIM](#_Subscribed_Signals_2) |
| LBC1\_ItemIndex |
| LBC1\_Opcode |
| LBC1\_NbrOfItems |
| LBC1\_SetListServ |
| LBC1\_StartItemInd |
| CONMP\_MC\_WORD\_Tx | 0x2B7 | NoMsgSend Type |  | CONMP\_MC\_WORD\_Tx | [APIM](#_Publisher_Signals_4) | [IPC](#_Subscribed_Signals_1) |
| Nav\_Send\_Signals\_2 | 0x2EE | Event Periodic | 1000ms | WaypointsActive\_St | [APIM](#_Publisher_Signals_4) | [IPC](#_Subscribed_Signals_1) |
| EmbedNavActive\_D\_Stat |
| LoclFuelEffUnit\_D\_Stat |
| RoadsideAsstAvail\_D\_St |
| Mc\_Request\_Signals10 | 0x193 |  |  | DealerCall\_B\_Rq | [IPC](#_Subscribed_Signals_1) | [APIM](#_Publisher_Signals_4) |
| Phone\_Paired | 0x2D0 | Event Periodic | 1000ms | VRM\_BTPhoneSts\_St | [APIM](#_Publisher_Signals_[6]) | [IPC](#_Subscribed_Signals_[6]) |

Table 30: HS3/INFOCAN message list

#### Power Supply

 ###R\_ CSPR \_161 ### Power Mode

Feature shall  follow the power mode strategy (Accessory, Delayed Accessory, Under/Over Voltage etc) of the host modules

#### Function Allocation

|  |  |  |  |
| --- | --- | --- | --- |
| **Function ID** | **Function Name** | **Reference** | **Allocated to** |
| 1 | Option display and handle on warning | Functional Boundary Diagram | [IPC](#_Option_Display_and) |
| 2 | Req to Display Warning POI & Route | Functional Boundary Diagram | [IPC](#_Request_to_Display) |
| 3 | POI req receive and Send POI list | Functional Boundary Diagram | [APIM](#_POI_Request_Receive) |
| 4 | POI Route req receive and Start Route | Functional Boundary Diagram | [APIM](#_POI_map_request) |
| 5 | Call FRA/LRA req receive and make call | Functional Boundary Diagram | [APIM](#_Call_LRA_request) |
| 6 | Unit Change Warning Display and option handler | Functional Boundary Diagram | [IPC](#_Unit_Change_pop-up) |
| 7 | Settings | Functional Boundary Diagram | [IPC](#_Unit_Change_pop-up_1) |
| 8 | Unit Change | Functional Boundary Diagram | [IPC](#_Unit_Change) |
| 9 | Close Warning Display | Functional Boundary Diagram | [IPC](#_Close_Warning_Display) |

Table 31: Function allocation to ECUs

#### Signal / Parameter Mapping

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Logical Signal Name | Value | Type | Physical Signal Name | Value |
| Ign\_Status |  | HS1 CAN | Ignition\_Status | 0x0 (Unknown))  0x1 (off)  0x2 (Accessory)  0x4 (Run)  0x8 (Start)  0xF (Invalid) |
| Ignition\_Status |  | INFOCAN | Ignition\_Status | 0x0 (Unknown))  0x1 (off)  0x2 (Accessory)  0x4 (Run)  0x8 (Start)  0xF (Invalid) |
| [SCCM\_Switch\_Select](#_Signal_/_Parameter) | 0x0 No Action | HS2 CAN |  |  |
| 0x1 Select | SteWhlSwtchBack\_B\_Stat | 0x0 (Not\_Pressed) |
| SteWhlSwtchUp\_B\_Stat | 0x0 (Not\_Pressed) |
| SteWhlSwtchOk\_B\_Stat | 0x1 (Pressed) |
| SteWhlSwtchDown\_B\_Stat | 0x0 (Not\_Pressed) |
| [SCCM\_Switch\_Req](#_Signal_/_Parameter)  (Select\_Close\_disp, Select\_GO\_POI, Select\_Call\_ FRA,Selet\_Reminder\_On, Selet\_Reminder\_Off, Req\_Unit\_Change) |  | INFOCAN | ICI\_BtnID\_A |  |
| ICI\_BtnID\_B |
| ICI\_BtnID\_C |
| ICI\_BtnID\_D |
| ICI\_Coding\_BtnID\_A |
| ICI\_Coding\_BtnID\_B |
| ICI\_Coding\_BtnID\_C |
| ICI\_Coding\_BtnID\_D |
| Embedded\_Nav\_Active | 0x0 Null | INFOCAN | EmbedNavActive\_D\_Stat |  |
| 0x1 Inactive |
| 0x2 Active |
| Req\_POI\_List | 0x0 No Action | INFOCAN |  |  |
| 0x1 Req POI | LBC1\_ActiveListID  LBC1\_ItemIndex  LBC1\_Opcode  LBC1\_NbrOfItems  LBC1\_SetListServ  LBC1\_StartItemInd |  |
| Send\_POI\_List | 0x0 No Action | TP Msg |  |  |
| 0x1 POI List | CONMP\_MC\_WORD\_Tx  LBP1\_ItemInfo\_Rsp |
| Req\_POI\_Route | 0x0 No Action | INFOCAN |  |  |
| 0x1 Req Route | LBC1\_ActiveListID  LBC1\_ItemIndex  LBC1\_Opcode  LBC1\_NbrOfItems  LBC1\_SetListServ  LBC1\_StartItemInd |  |
| Waypoints\_Active | 0x0 Invalid | INFOCAN | WaypointsActive\_St |  |
| 0x1 Waypoints\_Inactive |
| 0x2 Waypoints\_Active |
| 0x3 Max\_Waypoints\_Active |
| Phone\_Paired | 0x0 Not Paired | INFOCAN | VRM\_BTPhoneSts\_St |  |
| 0x1 Paired |
| FRA\_Available | 0x0 Null | INFOCAN | RoadsideAsstAvail\_D\_St |  |
| 0x1 Not Available |
| 0x2 Available |
| Req\_Call\_FRA | 0x0 No Action | INFOCAN | DealerCall\_B\_Rq |  |
| 0x1 Call FRA |
| Country\_Unit | 0x0 Null | INFOCAN | LoclFuelEffUnit\_D\_Stat |  |
| 0x1 MilesPerGallon |
| 0x2 LitrePer100Kilometer |
| 0x3 KilometerPerLitre |

Table 32: Logical and Physical Signal Mapping

## Feature Implementation Modeling

### Component Interaction Diagrams

#### Scenario: “System Startup / Shutdown”



Figure 23: Startup sequence Diagram

#### Scenario: “Normal Operation”



Figure 24: Feature Operation Sequence Diagram

## Feature Implementation Requirements

### Requirements on ECUs

#### BCM

##### Interface Requirements

###### Publisher Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x3B3 | Ignition\_Status | Determine the current value of the Ignition state |

Table 33: BCM Publisher Signals

###### Publisher Requirements

###R\_ CSPR \_162 ### BCM HS1-CAN Interface

BCM shall implement an interface via the HS1-CAN bus to be connected to the ECG module. This interface would be used to publish signals to the ECG.



#### Figure 25: BCM Interface

#### SCCM

##### Interface Requirements

###### Publisher Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x81 | SteWhlSwtchBack\_B\_Stat | SCCM Switch requested to scroll back |
| SteWhlSwtchUp\_B\_Stat | SCCM Switch requested to scroll Up |
| SteWhlSwtchOk\_B\_Stat | SCCM Switch requested to scroll OK |
| SteWhlSwtchDown\_B\_Stat | SCCM Switch requested to scroll down |

Table 34: SCCM Publisher Signals

###### Publisher Requirements

###R\_ CSPR \_163 ### SCCM HS2-CAN Interface

SCCM shall implement an interface via the HS2-CAN bus to be connected to the ECG module. This interface would be used to publish signals to the ECG



###### Figure 26: SCCM Interface

#### ECG

##### Interface Requirements

###### Publisher Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x3B2 | Ignition\_Status | Determine Ignition Status |
| 0x2A1 | ICI\_BtnID\_A | SCCM Switch requested to displayed warning |
| ICI\_BtnID\_B |
| ICI\_BtnID\_C |
| ICI\_BtnID\_D |
| ICI\_Coding\_BtnID\_A |
| ICI\_Coding\_BtnID\_B |
| ICI\_Coding\_BtnID\_C |
| ICI\_Coding\_BtnID\_D |

Table 35: ECG Publisher Signal

###### Publisher Requirements

###R\_ CSPR \_164 ### ECG HS3-CAN Interface

ECG shall implement an interface via the HS3-CAN bus to be connected to the IPC module. This interface would be used to publish signals to the IPC

###### Subscribed Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x3B3 | Ignition\_Status | Determine the current value of the Ignition state |
| 0x81 | SteWhlSwtchBack\_B\_Stat | SCCM Switch requested to scroll back |
| SteWhlSwtchUp\_B\_Stat | SCCM Switch requested to scroll up |
| SteWhlSwtchOk\_B\_Stat | SCCM Switch requested to scroll OK |
| SteWhlSwtchDown\_B\_Stat | SCCM Switch requested to scroll down |

Table 36: ECG Subscribed Signals

###### Subscriber Requirements

###R\_ CSPR \_165 ### ECG HS1-CAN Interface

ECG shall implement an interface via the HS1-CAN bus to subscribe signals from the BCM

###R\_ CSPR \_166 ### ECG HS2-CAN Interface

ECG shall implement an interface via the HS2-CAN bus to subscribe signals from the SCCM



Figure 27: ECG Interface

#### IPC

##### Interface Requirements

###### Publisher Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x195 | LBC1\_ActiveListID | Request for warning dependent POI List and Route |
| LBC1\_ItemIndex |
| LBC1\_Opcode |
| LBC1\_NbrOfItems |
| LBC1\_SetListServ |
| LBC1\_StartItemInd |
| 0x193 | DealerCall\_B\_Rq | Request to call FRA/LRA |

Table 37: IPC Publisher Signals

###### Publisher Requirements

###R\_ CSPR \_167 ### IPC HS3-CAN Interface

IPC shall implement an interface via the HS3-CAN/INFOCAN bus to publish signals to the APIM

###### Subscribed Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x3B2 | Ignition\_Status | Determine Ignition Status |
| 0x2A1 | ICI\_BtnID\_A | Receive SCCM Switch requested to warning display |
| ICI\_BtnID\_B |
| ICI\_BtnID\_C |
| ICI\_BtnID\_D |
| ICI\_Coding\_BtnID\_A |
| ICI\_Coding\_BtnID\_B |
| ICI\_Coding\_BtnID\_C |
| ICI\_Coding\_BtnID\_D |
| 0x2EE | EmbedNavActive\_D\_Stat | Receive Embedded nav availability info |
| 0x2B7 | CONMP\_MC\_WORD\_Tx | Receive warning POI List |
| 0x76 | LBP1\_ItemInfo\_Rsp |
| 0x2EE | WaypointsActive\_St | Receive Waypoints active info |
| 0x2EE | RoadsideAsstAvail\_D\_St | Receive Call FRA/LRA availability info |
| 0x2EE | LoclFuelEffUnit\_D\_Stat | Receive unit info for Vehicle’s current location |
| 0x2D0 | VRM\_BTPhoneSts\_St | Receives phone pair info |

Table 38: IPC Subscribed Signals

###### Subscriber Requirements

###R\_ CSPR \_168 ### IPC HS3-CAN Interface

IPC shall implement an interface via the HS3-CAN bus to subscribe signal from the ECG and APIM

##### Functional / Non-Functional Requirements

###### [Option Display and handle on Categorized Warning](#_Function_Requirements_1)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_036 | Display Warning Close option |
| R\_ CSPR \_037 | Fuel Warning Display with GO option |
| R\_ CSPR \_038 | Charging Warning Display with GO option |
| R\_ CSPR \_039 | Roadside Warning display with CALL option |
| R\_ CSPR \_040 | Request to Close warning display |
| R\_ CSPR \_041 | Request to Go Fuel Station |
| R\_ CSPR \_042 | Request to Go Charging Station |
| R\_ CSPR \_043 | Request to CALL FRA/LRA |
| R\_ CSPR \_044 | Option display when function is in sleep mode with IGN START/RUN |
| R\_ CSPR \_045 | Warning Category Reception Error |
| R\_ CSPR \_046 | Incorrect Warning Category Received |
| R\_ CSPR \_047 | Warning and Option Language mismatch |
| R\_ CSPR \_048 | Display Warning with Embedded navigation inactive |
| R\_ CSPR \_049 | Display Warning with max waypoints active |
| R\_ CSPR \_050 | Display Location based Roadside Warning |
| R\_ CSPR \_051 | Display Warning when cell phone not paired |
| R\_ CSPR \_052 | Display Warning in Drive Mode |
| R\_ CSPR \_053 | Display Warning when Drive Mode goes away |
| R\_ CSPR \_054 | Options display text |
| R\_ CSPR \_055 | Warning option highlight |
| R\_ CSPR \_056 | Display Clear HMI |
| R\_ CSPR \_057 | Consistency in displaying Warning option |
| R\_ CSPR \_058 | Warning and options display language |

Table 39: IPC Inherited Option Display and handle on Categorized Warning Function



##### Figure 28: Option Display and handle on Categorized Warning Functional sequence diagram

###### [Request to Display Warning POI & Route](#_Function_Requirements_4)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_059 | POI Request |
| R\_ CSPR \_060 | Receive POI List |
| R\_ CSPR \_061 | POI List Display |
| R\_ CSPR \_062 | POI List Display with Close option |
| R\_ CSPR \_063 | POI List Display Close |
| R\_ CSPR \_064 | POI Route Request |
| R\_ CSPR \_065 | POI Route Display |
| R\_ CSPR \_066 | POI List Request Error |
| R\_ CSPR \_067 | POI List Reception Error |
| R\_ CSPR \_068 | POI Route Request Error |
| R\_ CSPR \_069 | POI List and Route Request frequency |
| R\_ CSPR \_070 | Transition from POI List display to Warning display |
| R\_ CSPR \_071 | Display POI List Warning with max waypoints active |
| R\_ CSPR \_072 | POI item highlight |
| R\_ CSPR \_073 | Exit POI list Display |
| R\_ CSPR \_074 | POI display HMI |
| R\_ CSPR \_075 | POI display HMI with multiple active warning |
| R\_ CSPR \_076 | Follow List Browser Protocol |
| R\_ CSPR \_077 | Follow Transport Protocol |

Table 40: IPC Inherited Request to Display Warning POI & Route Function



Figure 29: Request to Display Warning POI & Route Functional sequence diagram

###### [Unit Change warning Display and option handler](#_Function_Requirements)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_109 | Unit Change Warning Activation |
| R\_ CSPR \_110 | Display Unit Change warning |
| R\_ CSPR \_111 | Unit Change warning display when condition revert |
| R\_ CSPR \_112 | Display unit change warning close option |
| R\_ CSPR \_113 | Warning Display with Unit Change option |
| R\_ CSPR \_114 | Request to close Unit Change display |
| R\_ CSPR \_115 | Request to Change Unit (English to Metric) |
| R\_ CSPR \_116 | Request to Change Unit (Metric to English) |
| R\_ CSPR \_117 | Unit change warning display clear |
| R\_ CSPR \_118 | Unit Change display when function is in sleep mode with IGN START/RUN |
| R\_ CSPR \_119 | Location updated Error |
| R\_ CSPR \_120 | Unit Change Warning Display for Europe |
| R\_ CSPR \_121 | Acceptance in Unit Change warning display latency |
| R\_ CSPR \_122 | Acceptance in action latency through unit change warning option handler |
| R\_ CSPR \_123 | Unit Change warning display Strategy |
| R\_ CSPR \_124 | Consistency in displaying unit change warning |
| R\_ CSPR \_125 | Consistency in clearing unit change warning display |

Table 41: IPC Inherited Unit Change warning Display and option handle Function



##### Figure 30: Unit Change warning Display and option handle Functional sequence diagram

###### [Settings](#_Function_Requirements_2)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_126 | Display option to turn Reminder ON |
| R\_ CSPR \_00X | ~~Display option to automatic unit change~~ |
| R\_ CSPR \_127 | Display option to turn Reminder OFF |
| R\_ CSPR \_128 | Unit Change warning display Reminder ON |
| R\_ CSPR \_00X | ~~Change unit automatically~~ |
| R\_ CSPR \_129 | Unit Change warning display Reminder OFF |
| R\_ CSPR \_130 | Warning display reminder ON request Error |
| R\_ CSPR \_00X | ~~Automatic unit change request Error~~ |
| R\_ CSPR \_131 | Warning Display reminder OFF request Error |
| R\_ CSPR \_132 | Acceptance in action latency through unit change settings |
| R\_ CSPR \_133 | Default unit change settings |
| R\_ CSPR \_134 | Unit Change display Settings HMI Strategy |
| R\_ CSPR \_135 | Consistency in unit change settings display |
| R\_ CSPR \_136 | Transition to/from main menu |

Table 42: IPC Inherited Unit Change warning Function



Figure 31: Settings Functional sequence diagram

###### [Unit Change](#_Function_Requirements_8)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_137 | Receive Unit Change Request |
| R\_ CSPR \_138 | Change Unit |
| R\_ CSPR \_139 | Unit Change Request Reception Error |
| R\_ CSPR \_140 | Unit Change Request Processing Error |
| R\_ CSPR \_141 | Location update Error |
| R\_ CSPR \_142 | Acceptance in Unit Change latency |
| R\_ CSPR \_143 | Unit change Strategy |
| R\_ CSPR \_144 | Consistency in unit change |

Table 43 IPC Inherited Unit Change Function



Figure 32: Unit Change Functional sequence diagram

###### [Close Warning Display](#_Function_Requirements_3)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_145 | Warning Display Closed by request |
| R\_ CSPR \_146 | Unit Change Warning Closed by request |
| R\_ CSPR \_147 | POI Warning Closed by request |
| R\_ CSPR \_148 | Warning Display Clear Error |
| R\_ CSPR \_149 | Unit Change Display Clear Error |
| R\_ CSPR \_150 | POI Warning Close request Error |
| R\_ CSPR \_151 | Latency acceptance on clearing the warning |
| R\_ CSPR \_152 | Display close Strategy |
| R\_ CSPR \_153 | Transition to warning display |

Table 44: IPC Inherited Close Warning Display Function

Inherited Function Level Interface Diagram



Figure 33: Close Warning Display Functional sequence diagram

#### APIM

##### Interface Requirements

###### Publisher Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x2B7 | CONMP\_MC\_Word\_Tx  LBP1\_ItemInfo\_Rsp | Respond to POI list and Route request |
| 0x2EE | EmbedNavActive\_D\_Stat | Transmit Embedded Nav Active info |
| 0x2EE | WaypointsActive\_St | Transmit Waypoint active info |
| 0x2EE | RoadsideAsstAvail\_D\_St | Transmit info of FRA/LRA availability |
| 0x2EE | LoclFuelEffUnit\_D\_Stat | Transmit unit info for Vehicle’s current location |
| 0x2D0 | VRM\_BTPhoneSts\_St | Transmit phone pairing info |

Table 45: APIM Publisher Signals

###### Publisher Requirements

###R\_ CSPR \_169 ### APIM HS3-CAN Interface

APIM shall implement an interface via the HS3-CAN/INFOCAN bus to publish signals to the IPC

###### Subscribed Signals

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
| 0x195 | LBC1\_ActiveListID | Receive request for warning dependent POI List and Route |
| LBC1\_ItemIndex |
| LBC1\_Opcode |
| LBC1\_NbrOfItems |
| LBC1\_SetListServ |
| LBC1\_StartItemInd |
| 0x193 | DealerCall\_B\_Rq | Receive Call FRA/LRA Request |

Table 46: APIM Subscribed Signals

###### Subscriber Requirements

###R\_ CSPR \_170 ### APIM HS3-CAN Interface

APIM shall implement an interface via the HS3-CAN bus to subscribe signals from the ECG and IPC

##### Functional / Non-Functional Requirements

###### [POI Request Receive and List Send](#_Function_Requirements_5)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_078 | Receive POI List Request |
| R\_ CSPR \_079 | Response to POI List Request |
| R\_ CSPR \_080 | POI List Request Reception Error |
| R\_ CSPR \_081 | Latency acceptance on POI List Response |
| R\_ CSPR \_082 | POI List generation |
| R\_ CSPR \_083 | Response Strategy for number of POI items |
| R\_ CSPR \_084 | Response POI List Request Strategy |
| R\_ CSPR \_085 | No POI found display |
| R\_ CSPR \_086 | POI list loading Error |

Table 47: APIM Inherited POI Req receive and List send Function



Figure 34: POI Req receive and List send Functional sequence diagram

###### [POI Route request receive and display](#_Function_Requirements_6)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_087 | Receive POI Route Request |
| R\_ CSPR \_088 | Response to POI Route Request |
| R\_ CSPR \_089 | Add POI while navigating to destination |
| R\_ CSPR \_090 | Add POI while navigating to destination with <max no of waypoints |
| R\_ CSPR \_091 | Add POI while navigating with max no of POI |
| R\_ CSPR \_092 | POI Route Request Reception Error |
| R\_ CSPR \_093 | Latency acceptance on POI Route Response |
| R\_ CSPR \_094 | POI Route loading error |
| R\_ CSPR \_095 | No of Max waypoints |
| R\_ CSPR \_096 | POI route request with Max waypoints |

Table 48: APIM Inherited POI Route request receive and display Function



Figure 35: POI Route request receive and display Functional sequence diagram

###### [Call FRA/LRA request receive and make call](#_Function_Requirements_7)

Inherited Function Level Requirements

|  |  |
| --- | --- |
| **Requirement ID** | **Requirement Title** |
| R\_ CSPR \_097 | Receive Call FRA/LRA request |
| R\_ CSPR \_098 | Call FRA/LRA UK/France/Canada/USA |
| R\_ CSPR \_099 | Call FRA/LRA pairing phone |
| R\_ CSPR \_100 | Call Request Reception Error |
| R\_ CSPR \_101 | Call Request frequency |
| R\_ CSPR \_102 | Call FRA/LRA while Location updated Error |
| R\_ CSPR \_103 | Call FRA/LRA for North America/Europe |
| R\_ CSPR \_104 | Latency acceptance on Response to Call Request |
| R\_ CSPR \_105 | Make Call Strategy |
| R\_ CSPR \_106 | Call FRA/LRA when another call is ongoing |
| R\_ CSPR \_107 | Call FRA/LRA unavailable notification |
| R\_ CSPR \_108 | Call FRA/LRA unsuccessful notification |

Table 49: APIM Inherited Call FRA/LRA request receive and make call Function



Figure 36: Call FRA/LRA request receive and make call Functional sequence diagram

### Requirements on Communication Links

#### HS-CAN

###R\_ CSPR \_171 ### µProcessor Awake

All CAN inputs sampled and processed normally (typically 20 ms FNOS process the message, and 20 ms to process the input)

###R\_ CSPR \_172 ### µProcessor Asleep

All CAN inputs sampled and processed normally (typically 50 ms NM transmit alive message, 50 ms transmit Application message/perform function, and 20 ms to process the input)

###R\_ CSPR \_173 ### Signal not updated for <5sec

If a Signal message containing the transmitted signal has an update bit which shows “not updated” for less than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should continue using last known value of the signal

###R\_ CSPR \_174 ### Signal not updated for >5sec

If a Signal message containing the transmitted signal has an update bit which shows “not updated” for greater than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should use the signal’s default value as listed in the data dictionary

###R\_ CSPR \_175 ### Message not updated for <5sec

If a message goes missing for less than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should continue using last known value of the signal received in the last message

###R\_ CSPR \_176 ### Message not updated for >5sec

If a message goes missing for greater than a period of time as per “Diagnostic Fault Coverage and DTC Numbers Design Consideration” (typically 5 seconds). Then the subscriber should use the signal’s default value as listed in the data dictionary

###R\_ CSPR \_177 ### Error Recovery

If signal massage is received after CAN error is detected as per Diagnostic Fault Coverage and DTC Numbers Design Consideration”, then the subscriber should use most current value of that signal

# OPEN ISSUES

| ID | Issue Description | e-Tracker / Reference | Responsible | Status | Solution |
| --- | --- | --- | --- | --- | --- |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| 6 |  |  |  |  |  |
| 7 |  |  |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |

# REQUIREMENTS TRACEABILITY

## Requirements

**No table of contents entries found.**

# REVISION HISTORY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rev.  (revision) | Vers. | Date | Description | Approved by | Responsible |
| *001* | *1* | *02/06/17* | *Feature Owner peer review* |  |  |
| *002* | *1* | *02/17/17* | *Requirements Engineering review* |  |  |
| *003* | *1* | *02/22/17* | *Requirements Engineering review* |  |  |
| *004* | *1* | *03/07/17* | *Navigation Review* |  |  |
| *005* | *1* | *03/14/17* | *Cluster Review* |  |  |
| *006* | *1* | *04/04/17* | *Cluster Review* |  |  |
| *007* | *1* | *04/24/17* | *Requirements Engineering review* |  |  |
| *008* | *1* | *06/08/17* | *Requirements Engineering review* |  |  |
| *009* | *1* | *06/14/17* | *Cluster Review* |  |  |
| *010* | *1* | *06/23/17* | *Requirements Engineering review* |  |  |
| *A* | *1* | *06/24/20* | *Requirements Engineering review* | *CGONZ204* | *CGONZ204* |
| *B* | *1* | *07/14/20* | *Requirements Engineering review* | *CGONZ204* | *CGONZ204* |
|  |  |  |  |  |  |

## Template Revisions

*<Do not change this section>*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| *1* | *0* | *2016-04-07* | * *Initial version based on FDS v1.2 and Feature Doc 1.5 structure* | *Jbaden1* |
| *1* | *1* | *2016-05-10* | * *Minor rewording in ch. 1.1* * *Cleanup of document properties* | *Jbaden1* |
| *1* | *2* | *2016-06-16* | * *Lessons learned from pilots incorporated into feature and function decomposition part.* | *Jbaden1* |
| *1* | *3* | *2016-07-08* | * *Template version added to footer.* | *Jbaden1* |
| *2* | *0* | *2016-07-15* | * *Template updated according to latest Feature, Function and Platform Specification Templates* * *RE\_SafetyRequirement style added* | *Jbaden1* |
| *3* | *0* | *2016-09-05* | * *Lessons learned from IPRB pilot incorporated* * *Harmonization with CV&S PRD* | *Jbaden1* |

# APPENDIX

## Data Dictionary

### Physical Signals

###SIG\_00001### Ignition\_Status

|  |  |  |
| --- | --- | --- |
| Description | | |
| Ignition Status from BCM to Gateway Module | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS1 CAN | Off (0x1) | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| BCM | Event Periodic | 500ms |

###SIG\_00002### Ignition\_Status

|  |  |  |
| --- | --- | --- |
| Description | | |
| Ignition Status from Gateway Module to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS3 CAN | Off (0x1) | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 500ms |

###SIG\_00003### SteWhlSwtchBack\_B\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Steering wheel switch toggle info from SCCM to ECG | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS2 CAN | Not\_Pressed (0x0) | Not\_Pressed (0x0) |
| Transmit Model | Send Type | E2E Latency |
| SASM SCCM | Event Periodic | 1000ms |

###SIG\_00004### SteWhlSwtchUp\_B\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Steering wheel switch toggle info from SCCM to ECG | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS2 CAN | Not\_Pressed (0x0) | Not\_Pressed (0x0) |
| Transmit Model | Send Type | E2E Latency |
| SASM SCCM | Event Periodic | 1000ms |

###SIG\_00005### SteWhlSwtchOk\_B\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Steering wheel switch toggle info from SCCM to ECG | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS2 CAN | Not\_Pressed (0x0) | Not\_Pressed (0x0) |
| Transmit Model | Send Type | E2E Latency |
| SASM SCCM | Event Periodic | 1000ms |

###SIG\_00006### SteWhlSwtchDown\_B\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Steering wheel switch toggle info from SCCM to ECG | | |
| Data Type | Init Value | Default Value  (missing signal) |
| HS2 CAN | Not\_Pressed (0x0) | Not\_Pressed (0x0) |
| Transmit Model | Send Type | E2E Latency |
| SASM SCCM | Event Periodic | 1000ms |

###SIG\_00007### ICI\_BtnID\_A

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00008### ICI\_BtnID\_B

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00009### ICI\_BtnID\_C

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00010### ICI\_BtnID\_D

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00011### ICI\_Coding\_BtnID\_A

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00012### ICI\_Coding\_BtnID\_B

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00013### ICI\_Coding\_BtnID\_C

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00014### ICI\_Coding\_BtnID\_D

|  |  |  |
| --- | --- | --- |
| Description | | |
| SCCM Switch request from ECG to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| ECG | Event Periodic | 100ms |

###SIG\_00015### LBC1\_ActiveListID

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00016### LBC1\_ItemIndex

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00017### LBC1\_Opcode

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00018### LBC1\_NbrOfItems

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00019### LBC1\_SetListServ

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00020### LBC1\_StartItemInd

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route request from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00021### CONMP\_MC\_WORD\_Tx

|  |  |  |
| --- | --- | --- |
| Description | | |
| POI List and route response from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | No Send Type |  |

###SIG\_00022### WaypointsActive\_St

|  |  |  |
| --- | --- | --- |
| Description | | |
| Waypoint active status from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC | Event Periodic | 1000ms |

###SIG\_00023### EmbedNavActive\_D\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Embedded Nav active status from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| APIM | Event Periodic | 1000ms |

###SIG\_00024### DealerCall\_B\_Rq

|  |  |  |
| --- | --- | --- |
| Description | | |
| Request to call Roadside Assistance from IPC to APIM | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| IPC |  |  |

###SIG\_00025### LoclFuelEffUnit\_D\_Stat

|  |  |  |
| --- | --- | --- |
| Description | | |
| Unit info from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| APIM | Event Periodic | 1000ms |

###SIG\_00026### RoadsideAsstAvail\_D\_St

|  |  |  |
| --- | --- | --- |
| Description | | |
| Roadside Assistance available country info from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| APIM | Event Periodic | 1000ms |

###SIG\_00027### VRM\_BTPhoneSts\_St

|  |  |  |
| --- | --- | --- |
| Description | | |
| Phone pair info from APIM to IPC | | |
| Data Type | Init Value | Default Value  (missing signal) |
| INFOCAN | 0x0 | Follow Initial Value in signal requirements |
| Transmit Model | Send Type | E2E Latency |
| APIM | Event Periodic | 1000ms |