**Pre-Collision Assist**

**Instrument Cluster Interface Specification**

**CGEA 1.3 / FNV2**

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| Approved by (dept, name, phone) | Issued by (dept, name, phone) |
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# INTRODUCTION

## Revision history

| Version | Date | Description | Responsible | Approved by |
| --- | --- | --- | --- | --- |
| 001 | 2010-08-18 | Initial release – Based on 2013MY D-car CGEA1.2 CADS Cluster Interface Spec v004.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req1v1:  - Deleted AccMntr\_B\_Err since does not exist for CGEA1.3 programs.  - Added display conditions for "Standby\_Denied" state while Normal Cruise Control is selected. - Added Stop&Go ACC display state definitions.  - To simplify tables, separated Set Speed Display table from other display graphics. - Added Table to define ACC Message Overlay for clusters which support. - Added states to enable display of lead vehicle in standby  CGEA13\_CS\_CADS\_IPCDisplay-001:Req2v1:  - Added new warning messages for Applying Park Brake, Down-Shift, Cancelled, and S&G ACC Following Only.  - Revised Priorities to support added warning states - Added new warnings for missing message conditions to support S&G ACC. - Deleted AccSrvcRqd\_B\_Rq. - Added CadsCamraBlck\_B\_Actl and warning state, ACC\_CAM\_BLOCK to communicate reduced function when Camera Blocked.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req3v1: Added S&G ACC state condition. Deleted AccMntr\_B\_Err. Deleted AccSrvcRqd\_B\_Rq.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req4v1: Added new S&G ACC Brake Release Warning. Added chime conditions for lost communications while S&G ACC active.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req26v1: Genericized SC display during ACC Radar Not Aligned warning condition, since some clusters may be able to display system check with non-resettable warning message. Deleted AccSrvcRqd\_B\_Rq  CGEA13\_CS\_CADS\_IPCDisplay-001:Req5v1: Deleted CadsAudioMute\_D\_Rq . Added S&G States to CC\_Function\_Display. Added warning states to ACC\_Display\_Warn\_Req. Added new S&G ACC Chime. Added 5th Time Gap setting. Added new signals, AccStopMde\_B\_Dsply and AccStopRes\_B\_Dsply. Deleted AccSrvcRqd\_B\_Rq.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req29v1: Updated CAN Message name and Missing Message Timer flag to be consistent with CGEA1.3 message list. Added check of CcStat\_D\_Actl\_UB due to gatewayed signal. Added check of GWM Lost Comm.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req9v1: Replaced Ignition\_Switch\_Stable with 1 second timer. Added PwPckTq\_D\_Stat check to disable ACC display during engine crank event. Deleted reference to Adaptive\_Cruise\_Cfg = 'Enabled' since this check is covered in req29.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req13v1: Updated to correct Missing Message Timer Flag. Added support for S&G ACC state. Revised timer duration to be consistent across ACC-supported modules. To support Engine Stop-Start, added ElPw\_D\_Stat as conditions to inhibit missing message DTCs during potential low voltage conditions. To support gateway added PCM missing message check. Added 5sec timer for configuration fault.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req24v1: Added new chime type.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req14v1: Deleted reference to CmbbMntr\_B\_Err. Added CadsCamraBlck\_B\_Actl. Deleted FcwCmbbSrvcRqd\_B\_Rq. Added logic for FCW Warning.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req27v1 : Added CadsCamraBlck\_B\_Actl signal. Deleted FcwCmbbSrvcRqd\_B\_Rq and CmbbMntr\_B\_Err, and replaced with FcwDeny\_B\_Dsply.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req30v1: Revised FCW Setting strategy to provide start-up warning for FCW ON/OFF setting, instead of FCW Audio On/Off.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req18v1:  - Deleted Ignition\_Switch\_Stable, FcwCmbbSrvcRqd\_B\_Rq and CmbbMntr\_B\_Err.  - Added Low Visibility warning and SC value.  - Added FCW\_Locked menu setting option.  - Deleted FcwAudioOn\_MC, since Audio On/Off is not adjustable.  - Added FdaStat\_MC to support Forward Distance Alert On/Off adjustment. - Replaced Fcw\_Chime\_Warn\_Flg and FCWChimeOffTimer with FcwOff\_Warn\_Flg and FCWOffTimer. Change needed since audio On/Off deleted and FCW On/Off can be remembered between keycycles. - Added FDA\_Cfg Method 2 configuration signal. Added states to FCW\_Menu\_Setting to support FDA menu setting displays  CGEA13\_CS\_CADS\_IPCDisplay-001:Req15v1: Added FCW Locked Menu condition to prevent feature adjustment when feature is not available due to blockage or fault. Added FDA\_Cfg configuration signal. Added states to FCW\_Menu\_Setting to support FDA menu setting displays.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req21v1: Deleted Ignition\_Switch\_Stable and replaced with 1sec timer. Deleted Fcw\_Cfg condition since redundant with state charts.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req22v1: Updated to support engine stop-start. Added configuration fault check and 5sec timer.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req25v1: Updated to define ACC\_Brake\_Release Chime within sequence. Added reference to audio system generated chime.  U38x\_CS\_CADS\_IPCDisplay-009:Req10v5: Updated to reference lost comm. with GWM and Invalid Data from PCM due to CGEA1.3 communications architecture.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req13v1: Requirement deleted. Detailed logic and DTC definitions are defined in req29.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req28v1: Added requirement to enable back-up cluster chime if the audio system is unable to perform chime function.  CGEA13\_CS\_CADS\_IPCDisplay-001:Req20v1: Defined settings for Forward Distance Alert On/Off | Aaron Mills |  |
| 002 |  | CGEA13\_CS\_CADS\_IPCDisplay-002:Req1v2: Modified to clarify that the embedded faults for the signal, Veh\_V\_DsplyCcSet, should be mapped to 'Inactive' (i.e. set speed value not displayed).  CGEA13\_CS\_CADS\_IPCDisplay-002:Req2v2: Updated duration of ACC Not Available Warnings to be consistent  CGEA13\_CS\_CADS\_IPCDisplay-002:Req5v2: Corrected Time Gap definitions, since graphics only support 4 possible gap display values. Mapped Gap5 to same setting as Time\_Gap\_4. Clarified that the displayed set speed value shall be equivalent to Veh\_V\_DsplyCcSet when CC\_Display\_Speed = ACT. Assigned Warning ID to Brake Capacity Warning.  CGEA13\_CS\_CADS\_IPCDisplay-002:Req30v2: Requirement deleted.  CGEA13\_CS\_CADS\_IPCDisplay-002:Req18v2 : Assigned Warning ID to FCW Warning. |  |  |
| 003 |  | CGEA13\_CS\_CADS\_IPCDisplay-003:Req13v2: Corrected error in PCM Comm flowchart. Incorrectly referred to MMT\_C146\_42E instead of MMT\_C100\_42E.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req14v2: Updated FCW\_Cfg value to include both FCW and DA option. This aligned spec with the Forward Collision Warning Control Function – CGEA 1.3 spec. Updated to delete conditions associated with CmbbPostEvnt\_B\_Dsply.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req15v2 : Updated FCW\_Cfg value to include both FCW and DA option.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req16v1: Updated FCW\_Cfg value to include both FCW and DA option.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req27v2: Updated FCW\_Cfg value to include both FCW and DA option.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req18v3: Deleted FDA\_Cfg. Modified FCW\_Cfg to be consistent with Forward Collision Warning Control Function – CGEA 1.3 spec.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req2v3 : Corrected typo. State ACC\_NA\_SC was changed to ACC\_NA  CGEA13\_CS\_CADS\_IPCDisplay-003:Req1v3 : Modified state chart to define "ALL OTHER CASES" only when ACC is enabled. This is to allow for a compatible state chart in the Speed Control STSS.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req5v3: Updated ACC\_Display\_Warn\_Req to replace TBDs with warnings W1430, W1431, and W1432. To clarify intent for FCW\_Menu\_Setting, replaced 'de-emphasized' verbage with 'restricted' (i.e. no change in function). Mapped ACC\_Brake\_Release to Soft warning chime.  CGEA13\_CS\_CADS\_IPCDisplay-003:Req4v2: Updated ACC\_Brake\_Release chime state to have consistent attenuation level with other Soft Warning chimes. |  |  |
| 004 |  | CGEA13\_CS\_CADS\_IPCDisplay-004:Req1v4: New table and flowchart to support Analog and redundant digital set speed display on M3 cluster  CGEA13\_CS\_CADS\_IPCDisplay-004:Req5v4: New parameters to support Analog and redundant digital set speed display  CGEA13\_CS\_CADS\_IPCDisplay-004:Req14v3: FCW\_CAM\_LOW\_VIS state not used. Trigger condition for this state deleted.  CGEA13\_CS\_CADS\_IPCDisplay-004:Req18v4: Defined FCW\_CAM\_LOW\_VIS state as not used. |  |  |
| 005 |  | CGEA13\_CS\_CADS\_IPCDisplay-005:Req22v2: MMT\_C146\_42E renamed to MMT\_C146\_42C due to change in message ID of CcStat\_D\_Actl.  CGEA13\_CS\_CADS\_IPCDisplay-005:Req13v3 : MMT\_C146\_42E renamed to MMT\_C146\_42C due to change in message ID of CcStat\_D\_Actl. |  |  |
| 006 |  | CGEA13\_CS\_CADS\_IPCDisplay-006:Req18v5: Corrected setting definition for FCW\_Sensitivity\_1 and FCW\_Sensitivity\_3. Clarified state FCW\_CAM\_LOW\_VIS\_SC as not used.  CGEA13\_CS\_CADS\_IPCDisplay-006:Req22v3: Corrected state chart to support new FCW+DA state, FCW\_Cfg = 0x2  CGEA13\_CS\_CADS\_IPCDisplay-006:Req10v1 : Corrected typo. Referenced wrong requirement.  CGEA13\_CS\_CADS\_IPCDisplay-006:Req27v3 : Deleted reference to FCW\_CAM\_LOW\_VIS\_SC, since not supported.  CGEA13\_CS\_CADS\_IPCDisplay-006:Req1v5 : Revised flow chart to prevent display of 0 set speed when Veh\_V\_DsplyCcSet = 0 and CcStat\_D\_Actl = Active. |  |  |
| 007 |  | CGEA13\_CS\_CADS\_IPCDisplay-007:Req18v6: Deleted reference to unused signals, Attn\_Info\_Audio and Chime\_Req\_Audio. No impact on function. Deleted unused menu settings, due to simplication of FCW settings strategy.  CGEA13\_CS\_CADS\_IPCDisplay-007:Req5v5: Deleted reference to unused signal, Attn\_Info\_Audio. No impact on function.  CGEA13\_CS\_CADS\_IPCDisplay-007:Req1v6: Added ACC Cancelled display state to Table 1 and Table 4. Replaced strikethrough state with standby state in Table 2.  CGEA13\_CS\_CADS\_IPCDisplay-007:Req2v4: Deleted ACC Cancelled Warning. Moved to display state.  CGEA13\_CS\_CADS\_IPCDisplay-007:Req5v5 : Added CC\_Display\_Speed = STANDBY, CC\_Function\_Display = ACC\_CANCEL\_NLV, CC\_Function\_Overlay = ACC\_CANCEL\_NLV. Deleted ACC\_Display\_Warn\_Req = ACC\_CANCELLED  CGEA13\_CS\_CADS\_IPCDisplay-007:Req15v3 : Deleted unused menu settings, due to simplication of FCW settings strategy. |  |  |
| 008 |  | CGEA13\_CS\_CADS\_IPCDisplay-008:Req15v4: Deleted FCWStat\_MC  CGEA13\_CS\_CADS\_IPCDisplay-008:Req18v7: Deleted FCWStat\_MC |  |  |
| 009 |  | CGEA13\_CS\_CADS\_IPCDisplay-009:Req2v5: Modified ACC warning strategy to provide 2-stage warning when NCC is activated at the beginning of a drive cycle. Modified ‘ACC\_BLOCK’ warning defintion to be a 2-stage warning to enable Cruise Control shortcut menu.  CGEA13\_CS\_CADS\_IPCDisplay-009:Req5v6: Added warning state definition “NCC\_ENABLE\_AND\_SHORTCUT”. Revised blockage warning to a 2-stage message.  CGEA13\_CS\_CADS\_IPCDisplay-009:Req15v5: Added TRUCK\_FCW Menu setting to enable last-remembered FCW ON/OFF strategy for pickup truck applications.  CGEA13\_CS\_CADS\_IPCDisplay-009:Req18v8: Added TRUCK\_FCW Menu setting and FCW\_Cfg definitions.  CGEA13\_CS\_CADS\_IPCDisplay-009:Req30v3: Added strategy to activate the FCW ON/OFF Shortcut message at startup if FCW is set to OFF. |  |  |
| 010 |  | CGEA13\_CS\_CADS\_IPCDisplay-010:Req18v9: Defined FCW OFF Setting Warning as W911. Deleted FCW\_CAM\_LOW\_VIS states.  CGEA13\_CS\_CADS\_IPCDisplay-010:Req14v4: Revised to trigger Collision Warning NA when FCW is misconfigured in the cluster. Added Fcw\_Cfg = TRUCK\_FCW as added condition to enable warning strategy.  CGEA13\_CS\_CADS\_IPCDisplay-010:Req5v7 Deleted 2-stage warning strategy. Reverted ACC\_BLOCK message to existing W818 warning code. Deleted proposed new 2-stage warning NCC\_ENABLE\_AND\_MENU\_SHORTCUT. Revised wording of W1000 message.  CGEA13\_CS\_CADS\_IPCDisplay-010:Req2v6: Deleted 2-stage warning strategy. Replaced NCC\_ENABLE\_AND\_MENU\_SHORTCUT with existing NCC\_ENABLE state.  CGEA13\_CS\_CADS\_IPCDisplay-010:Req16v2: Added Fcw\_Cfg = TRUCK\_FCW as added condition to enable warning strategy.  CGEA13\_CS\_CADS\_IPCDisplay-010:Req27v4: Added Fcw\_Cfg = TRUCK\_FCW as added condition to enable diagnostic strategy. |  |  |
| 011 |  | CGEA13\_CS\_CADS\_IPCDisplay-010:Req1v7: Modified ACC Function display to support the distance indication function.  CGEA13\_CS\_CADS\_IPCDisplay-011:Req5v8: Added Distance Indication state definitions to CC\_Function\_Display. Added state table for AccTrgDist2\_D\_Dsply. Deleted CadsCamraBlck\_B\_Actl.  CGEA13\_CS\_CADS\_IPCDisplay-011:Req2v7: Corrected W1000 Warning Type as Temporary Alert. Deleted CadsCamraBlck\_B\_Actl.  CGEA13\_CS\_CADS\_IPCDisplay-011:Req15v6: Clarified menu strategy to show FCW Not Available (Greyed-out) graphics when there is an FCW Missing Message C ondition. |  |  |
| 012 |  | CGEA13\_CS\_CADS\_IPCDisplay-012:Req2v8: revised ACC\_BRAKE\_CAPACITY to be a resettable warning.  CGEA13\_CS\_CADS\_IPCDisplay-012:Req14v5: revised FCW\_WARN to be a resettable warning.  CGEA13\_CS\_CADS\_IPCDisplay-012:Req18v10: Updated to add FCW\_OnOff\_Setting, FCW\_Sensitivity\_Setting, Distance\_Alert\_OnOff\_Setting and FCW\_ON\_MENU\_Cfg. Delete FCW\_Menu\_Setting.  CGEA13\_CS\_CADS\_IPCDisplay-012:Req15v7: Modified FCW Menu strategy to be consistent with FCW STSS for Truck applications. Specifically, defined separate FCW On/Off Menu Setting Configuration, instead of adding to the existing FCW\_Cfg configuration. Simplified table to define whether individual menu parameters are Enabled, Disabled, or Restricted. |  |  |
| 013 |  | CGEA13\_CS\_CADS\_IPCDisplay-013:Req5v9: Deleted CC\_Display\_RedundantSpeed, since not used.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req16v3: Deleted reference to TRUCK\_FCW.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req27v5: Deleted reference to TRUCK\_FCW.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req30v4: Replaced reference to TRUCK\_FCW configuration with FCW\_ON\_MENU\_Cfg.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req1v8: Clarified that Tables 3, 4 and Figure 1 are not supported on current implementations.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req14v6: Deleted reference to TRUCK\_FCW |  |  |
| 014 |  | CGEA13\_CS\_CADS\_IPCDisplay-014:Req3v2: Corrected ACC Menu state table to avoid inconsistency associated with menu output when AccDeny\_B\_RqIpc = TRUE  CGEA13\_CS\_CADS\_IPCDisplay-014:Req18v11: W910 is deleted from FCW\_Display\_Warn\_Req since not supported.  CGEA13\_CS\_CADS\_IPCDisplay-014:Req15v8: Corrected strategy to disable DA On/Off when MyKey is enabled.  CGEA13\_CS\_CADS\_IPCDisplay-014:Req2v9: Modified to allow ACC\_Display\_Warn\_Req = ACC\_RADAR\_NOT\_ALIGN when ACC is not configured. This is to support this warning message on programs that have FCW functionality with conventional cruise control.  CGEA13\_CS\_CADS\_IPCDisplay-014:Req29v2: Updated to only detect misconfiguration when message is received AND CAN signal, AccMemEnbl\_B\_RqDrv = Yes |  |  |
| 015 |  | CGEA13\_CS\_CADS\_IPCDisplay-015:Req14v7: Undeleted CMbB\_Post\_Evnt\_Warn from warning strategy.  CGEA13\_CS\_CADS\_IPCDisplay-015:Req18v12: Revised CMbB\_Post\_Evnt\_Warn state as Warning ID TBD, instead of NOT\_USED. |  |  |
| 016 |  | CGEA13\_CS\_CADS\_IPCDisplay-016:Req15v9: Updated to support the Active\_Braking\_OnOff\_Setting strategy for the Active Emergency Braking function.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req20v2: Updated to add in the Active Emergency Braking (AEB) On/Off setting.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req18v13: Updated to define AebStat\_MC and FCW\_BrakingOnOff\_Cfg. Deleted reference to W820 since not used. Clarified that CMbB\_Post\_Evnt\_Warn is not used. Replaced W823, W821, W1082 , and W911 with new message IDs, W3298, W3297, W3296, and W3295.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req5v10: Minor clarification. W816 is removed since not used in strategy. Updated Distance Indication sample graphics based on latest graphics.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req14v8: Removed reference to CMbB\_Post\_Evnt\_Warn , since not supported.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req13v4: Changed DTC ID to be set under lost comm condition. |  |  |
| 017 |  | CGEA13\_CS\_CADS\_IPCDisplay-017:Req1v9: Defined new table to separate Distance Indication graphics state definition from CC state definition. New requirements needed to support Distance Indication feature on applications that do not have ACC functionality.  CGEA13\_CS\_CADS\_IPCDisplay-017:Req5v11: Defined new dedicated Function Display state for Distance Indication. Moved states from existing CC\_Function\_Display to new Distance\_Function\_Display.  CGEA13\_CS\_CADS\_IPCDisplay-016:Req15v9: Replaced FCW\_MenuOnOff\_Cfg with FCW\_ON\_MENU\_Cfg to be consistent with ‘Forward Collision Warning Control Function - CGEA1.3\_v2.0’ |  |  |
| 018 |  | **Modified the ‘Purpose’ associated with each requirement to define each requirement as relevent for [IPC] and/or [HUD]**  CGEA13\_CS\_CADS\_IPCDisplay-018:Req1v10: Heavily revised to support HUD graphics, analog set speed display, temporary gap and set speed displays.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req2v10: Added strategy to inhibit cluster warning messages when the HUD is active.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req4v3: Deleted chime from W1000 warning condition to be consistent across all trigger conditions.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req7v1: Updated latency performance to include HUD and ACC Warnings  CGEA13\_CS\_CADS\_IPCDisplay-018:Req31v1: New requirement to specify ACC HUD Warning display.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req5v12: Added CC\_Display\_RedundantSpeed, ACC\_Display\_Gap, ACC\_HUD\_Warn\_Req, SetSpeedError, CC\_TempSetSpeed\_Timer, Veh\_V\_DsplyCcSet\_n\_1, and ACC\_HUD\_Display to support new HUD and HMI strategy. Deleted CC\_Function\_Overlay.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req12v1: Updated to require that HUD speed strategy and calibrations are common with cluster.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req9v2: Updated to clarify that HUDs should implement common strategy.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req31v1: New requirement to define ACC warnings that are to be displayed in HUD.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req32v1: New requirement to specify the HUD FCW Warning.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req18v14: Added FCW\_HUD\_Warn\_Req to define HUD warning |  |  |
| 019 |  | CGEA13\_CS\_CADS\_IPCDisplay-019:Req1v11: Seperated Clustet display requirements from HUD display requirements, due to differences in how the temporary set speed strategy would be implemented and to clarify that strategy is dependent on existence of HUD.  CGEA13\_CS\_CADS\_IPCDisplay-019:Req33v1: Revised Table 9 to hide the set speed display in the SGACC\_STOP states. New requirement to separate the HUD Display graphics from the Cluster display graphics.  CGEA13\_CS\_CADS\_IPCDisplay-019:Req10v2: Deleted reference to Invalid Data from PCM  CGEA13\_CS\_CADS\_IPCDisplay-019:Req14v9: Added unique warning message for flashing FCW Warning.  CGEA13\_CS\_CADS\_IPCDisplay-018:Req18v15: Added Flashing FCW Warning message.  CGEA13\_CS\_CADS\_IPCDisplay-019:Req21v2: Added HUD criteria for startup enabling. |  |  |
| 020 |  | CGEA13\_CS\_CADS\_IPCDisplay-20:Req34v3: New requirement to define an FCW RTT needed to meet UN-ECE 131 Regulations (e.g. V36x). Updated to include configuration capability for RTT.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req32v2: Updated HUD flash rate to allow up to 5Hz rate. Referenced HUD Brightness Spec.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req1v12: Updated Table 1 to correct the logic condition that should set the RES diplay. Updated Figure 2 to clarify that the temporary digital setspeed is only showed in the cluster when the HUD is inactive and to clarify that Units are not displayed when SET is displayed.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req31v2: Deleted warning duration criteria from HUD Warning table. ACC Warning durations are controlled by the ACC controller.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req33v2: Updated Table 7 to correct the logic condition that should set the RES diplay. Clarified mapping of Veh\_V\_DsplyCcSet = Unknown/Fault to a value of 0 for Figure 3.  CGEA13\_CS\_CADS\_IPCDisplay-019:Req18v16: Updated to support FCW RTT needed to meet UN-ECE 131 Regulations for V36x MCA (new RTT control and configuration parameters)  CGEA13\_CS\_CADS\_IPCDisplay-017p3:Req35v2: New requirement to define RTT for Distance Alert conditions on applications that do not have an Advanced HUD or FCW LED Light Bar HUD (based on spec v17.3 for V36x). Updated strategy to consider the value of HUD\_Cfg.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req5v13: Updated to define Distance\_Alert\_Telltale display parameter. Revised definition of ACC\_HUD\_Display to reference the HUD\_ADAS\_ON/OFF Memory setting, and referenced both Cruise/LKS\_ON and CruiseOn as valid HUD Active States.. Modified Adaptive\_Cruise\_Cfg default value to Enabled to ensure that initial ACC settings don’t change during the assy process.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req14v10: Removed FcwDeny\_B\_Dsply signal as condition to trgger FCW\_NA warning message. This is to allow this signal to independently control the amber FCW RTT for applications/markets that require this. Modified HUD\_Cfg to define Flashing FCW warning only required for non-HUD implementations.  CGEA13\_CS\_CADS\_IPCDisplay-020:Req2v11: Flashing ACC Brake Capacity warning only required for non-HUD implementations. |  |  |
| 021 |  | CGEA13\_CS\_CADS\_IPCDisplay-021:Req1v13: Generated 3 new tables to support B479 display concept. Added example mapping between Tables/Figures and example clusters/programs  CGEA13\_CS\_CADS\_IPCDisplay-021:Req10v3: Updated to clarify that Lost Comm DTCs should be applied to IPMA instead of CCM on new applications.  CGEA13\_CS\_CADS\_IPCDisplay-021:Req5v14: Updated to define display signals to support B479 display concept.  CEA13\_CS\_CADS\_IPCDisplay-021:Req13v5: Updated Lost Comm diagnostics to refer to Lost Comm with IPMA (C23A) instead of Lost Comm with CCM (C104), since IPMA will replace the CCM as the feature controller for B479 and later applications.  CGEA13\_CS\_CADS\_IPCDisplay-021:Req22v4: Updated Lost Comm diagnostics to refer to Lost Comm with IPMA (C23A) instead of Lost Comm with CCM (C104), since IPMA will replace the CCM as the feature controller for B479 and later applications.  CGEA13\_CS\_CADS\_IPCDisplay-021:Req14v11: To support HUD and non-HUD applications (i.e. FCW Warning in cluster), the FCW warnings are triggered differently. Specifically, non-HUD will have flashing warning followed by non-flashing warning (when active braking has been applied), while HUD applications will have constant non-flashing warning. |  |  |
| 022 |  | CGEA13\_CS\_CADS\_IPCDisplay-022:Req14v12:  - Updated to clarify the flash rate associated with the cluster flashing FCW warning.  - Added strategy to support unique combiner HUD requirements for FCW warning. Specifically, the Combiner HUD can only issue a warning when the combiner is deployed and is active.  - Removed FCW\_NA message when not configured for FCW (see req22 for more details on updated missing message strategy)  CGEA13\_CS\_CADS\_IPCDisplay-022:Req32v3: Clarified that HUD warning strategy common with Combiner and Windshield HUDs.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req18v17:  - Replaced TBD Warning ID with W3556 for flashing PCA warning.  -Deleted FCW\_BrakingOnOff\_Cfg, since new applications have active braking.  -Updated FCW\_Chime\_Req to Active\_Chime\_Status\_Flag and deleted FCW\_Mute\_Req to reconcile with Chime STSS.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req5v15:  -Replaced TBD warning ID with W3555 for flashing ACC warning.  -Added Combiner HUD as possible HUD\_Cfg.  -Defined new state to define activation status of Combiner HUD.  -Added new configuration setting, IACC\_Cfg.  -Added new settings to ACC\_Menu\_Setting to support IACC settings.  -Added states to ACC\_Display\_Warn\_Req to support IACC\_NA and TJA\_NA trigger condition.  -Added new display states for HUD and cluster to support IACC Display strategy.  -Updated signal from AccMsgTxt\_D\_Rq to AccMsgTxt\_D2\_Rq to support new states -Deleted ACC\_Mute\_Req and replaced ACC\_Chime\_Req with Active\_Chime\_Status\_Flag to be consistent with Audio Generated DNA Chimes- Cluster Chime Arbitrator STSS  CGEA13\_CS\_CADS\_IPCDisplay-022:Req2v12:  -Added Brake Capacity warning strategy for Combiner HUD implementations.  -Deleted ACC SHIFT DOWN Warning, since the shift down warning has been integrated into the standard (non-ACC) shift down warning.  -Modified conditions for ACC Not Available and ACC Blockage warnings to occur independent of HUD state.  -Added IACC Not Available and TJA Not Available warning conditions. -Clarified that ACC\_BRAKE\_CAP\_FLASH is to cycle at 4-5Hz.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req31v3: Deleted HUD warning for ACC Shift Down Warning, since commonized with non-ACC shift-down warning. Deleted ACC Not Available and Blockage warnings, to align with Combiner HUD space constraints, and since information would fit better within common cluster warning strategy.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req1Av14:  -Seperated requirement for M/L Family Clusters (req1A) from S Family Clusters (req1B).  -Updated Table 4 to be consistent with implementation. Specifically, in GAP is displayed continuously in Follow Mode (independent of AccTgap\_B\_Dsply)  -Renamed AccMsgTxt\_D2\_Rq to be consistent with latest message list (no strategy change)  CGEA13\_CS\_CADS\_IPCDisplay-022:Req1Bv14:  - Added new Table to define Set Speed display strategy for ‘thin’ clusters.  - Revised Thin cluster tables to be independent of the HUD state (specifically, clusters with on-demand ADAS screens have a mirroring strategy in the HUD).  - Added new table for DA RTT control  CGEA13\_CS\_CADS\_IPCDisplay-022:Req29v3: Clarified that requirement is to be met by HUD  CGEA13\_CS\_CADS\_IPCDisplay-022:Req13v6: Clarified that requirement is to be met by HUD  CGEA13\_CS\_CADS\_IPCDisplay-022:Req22v5: Clarified that requirement is to be met by HUD. Modified missing message strategy to delete DTC test condition where ACCDATA\_3 message is received but FCW\_Cfg = 0 (Not Configured). Specifically, for IPMA-based implementations, this message will be transmitted independent of whether the vehicle offers FCW, hence this check must be deleted.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req3v3: Updated to define IACC configuration options  CGEA13\_CS\_CADS\_IPCDisplay-022:Req33v3: Added sample graphics for combiner HUD. Added new table to support IACC. Updated temporary GAP display to always show the GAP when in Follow Mode. Updated Set Speed state chart to show Set Speed when in Stopped Mode and to clarify that OVERRIDE is a unique graphical state compared to ACTIVE (Grey instead of white)  CGEA13\_CS\_CADS\_IPCDisplay-022:Req15v10: Removed strategy for FCW\_BrakingOnOff\_Cfg since Active Braking is bundled with AEB on all upcoming applications.  CGEA13\_CS\_CADS\_IPCDisplay-0022:Req8v3: Clarified that IACC is mapped to AccEnbl\_B\_RqDrv = ‘Adaptive\_Cruise’  CGEA13\_CS\_CADS\_IPCDisplay-022:Req4v4: Replaced chime table with new table that is compatible with Audio Generated DNA Chimes- Cluster Chime Arbitrator - CGEA v6.6 STSS and later. Specifically, all warning requests need to be linked to a chime request. Attenuation strategy is deleted and is part of chime spec.  CGEA13\_CS\_CADS\_IPCDisplay-022:Req16v4: Replaced chime table with new table that is compatible with Audio Generated DNA Chimes- Cluster Chime Arbitrator - CGEA v6.6 STSS and later. Specifically, all warning requests need to be linked to a chime request. Attenuation strategy is deleted and is part of chime spec. Deleted FCW\_Confirmation chime, since obsolete. |  |  |
| 023 |  | CGEA13\_CS\_CADS\_IPCDisplay-023:Req33v4: HUD incorrectly referenced the Cluster internal parameter, CC\_Function\_Display, instead of the HUD-internal parameter CC\_Function\_HUD. Updated tables to support base Cruise Control strategy (replaces ‘Speed Control Dedicated RTT w ACC CGEA1.3 STSS) Updated State Chart for CC\_Display\_Speed to allow common strategy to be enabled for Cruise control.  CGEA13\_CS\_CADS\_IPCDisplay-023:Req1Av15: Updated tables to support base Cruise Control strategy (replaces ‘Speed Control Dedicated RTT w ACC CGEA1.3 STSS)  CGEA13\_CS\_CADS\_IPCDisplay-023:Req1Bv15: Updated tables to support base Cruise Control strategy (replaces ‘Speed Control Dedicated RTT w ACC CGEA1.3 STSS)  CGEA13\_CS\_CADS\_IPCDisplay-23:Req36v1: New requirement to clarify that the Downshift RTT strategy shall be applied to all applications with ACC and Manual Transmission. This is needed since the ACC-specific Downshift warning has been deleted to allow for a common indication strategy.  CGEA13\_CS\_CADS\_IPCDisplay-023:Req5v16: Updated definition of CC\_Dissplay\_RedundantSpeed to include STANDBY state since the new Set Speed display stragy for unscaled speedometer rings requires a digital standby set speed display. |  |  |
| 24 |  | CGEA13\_CS\_CADS\_IPCDisplay-024:Req33v5: Updated ACC\_Gap\_HUD logic to display gap lines in Cancel, STOP\_LV, STANDBY\_LV and RESUME states, independent of AccTgap\_B\_Dsply (since GAP should be shown continuosuly when there is a Lead Vehicle). Updated DI table to use a DI-specific HUD display setting, DI\_HUD\_Display, since some HUDs have a separate On/Off for DI.  CGEA13\_CS\_CADS\_IPCDisplay-024:Req1Av16: Updated ACC\_Display\_Gap logic to display gap lines in Cancel state independent of AccTgap\_B\_Dsply. Updated Digital Set Speed table and temporary digital display state chart and flow chart to include an Override state, to clarify different graphics associated with Override (Grey) vs. Active (White)  CGEA13\_CS\_CADS\_IPCDisplay-024:Req1Bv16: Updated Digital Set Speed table to include an Override state, to clarify different graphics associated with Override (Grey) vs. Active (White)  CGEA13\_CS\_CADS\_IPCDisplay-024:Req5v17: Added Override state to set speed parameters, to clarify that there is a graphical difference compared to SET (non-functional change). Updated ACC\_HUD\_Display based on C-HUD strategy. Added DI\_HUD\_Display parameter, to control the DI HUD display seperately for HUD applications that allow separate setting controls for DI and ACC. Clarified HUD\_Mode and how it is mapped to the HudActv\_D\_Stat signal. |  |  |
| 25 |  | Clarified generally in the spec that all HUD definitions refer to both Advanced (Projection) and Combiner HUDs.  CGEA13\_CS\_CADS\_IPCDisplay-025:Req22v6: Clarified that DTC C23A00 should be set under FCW\_Missing\_Msg conditions.  CGEA13\_CS\_CADS\_IPCDisplay-25:Req34v4: Clarified that a standard Telltale may also be used.  CGEA13\_CS\_CADS\_IPCDisplay-025:Req13v7: Non-functional impact. Defined signal name instead of message name for missing message strategy.  CGEA13\_CS\_CADS\_IPCDisplay-025:Req5v18: Clarified that Combiner and Windshield HUDs are both treated as ‘Advanced’ HUDs for purposes of this specification. Referenced Warning ID for TJA Not Available.  CGEA13\_CS\_CADS\_IPCDisplay-025:Req33v6:  - Revised conditions for triggering SGACC\_RES\_READY in the Main ACC Chart to also consider CcStat\_D\_Actl == Active  - Minor correction with no functional impact. AccDeny\_B\_RqIpc is an IPC signal that is not received by the HUD. As such, revised the table to consider lost comm condition (ACC\_Missing\_Msg).  - Update to Digital Set Speed State Chart to Add check of Veh\_V\_DsplyCcSet > 0 for transition from Set\_Speed\_Inhibit to Temp\_SetSpeed\_Display to prevent single cycle display of Set Speed - Modified Figure 3 to remove the word ‘Analog’. Specifically, the ACC HUD Set Speed display strategy is relevent whenever there is a redundant cluster set speed (whether analong or digital)  CGEA13\_CS\_CADS\_IPCDisplay-025:Req15v11:  - For truck with Snow-plow applications, it is possible to have FCW set to OFF with a MyKey. As such, in this case, if FCW is OFF, then the Sensitivity setting should be restricted.  - When MyKey is enabled, the DI menu should be hidden. This is to align this spec with the Forward Collision Warning Control Function STSS.  CGEA13\_CS\_CADS\_IPCDisplay-25:Req35v4: Clarified that a DA RTT is only required when there is not a continuous DI display (i.e. with Driver Assist ODI implementations)  CGEA13\_CS\_CADS\_IPCDisplay-025:Req1Av17:  - Revised conditions for triggering SGACC\_RES\_READY in the Main ACC Chart to also consider CcStat\_D\_Actl == Active - Update to Digital Set Speed State Chart (Unscaled Speedometer Ring) to Add check of Veh\_V\_DsplyCcSet > 0 for transition from Set\_Speed\_Inhibit to Temp\_SetSpeed\_Display to prevent single cycle display of Set Speed  CGEA13\_CS\_CADS\_IPCDisplay-025:Req31v4: To support C-HUD failure mode (loss of RED LEDs, added a comment that there shall be a backup warning to replace the Red flashing ACC\_BRAKE\_CAPACITY warning.  CGEA13\_CS\_CADS\_IPCDisplay-025:Req32v4: To support C-HUD failure mode (loss of RED LEDs, added a comment that there shall be a backup warning to replace the Red flashing FCW\_WARN warning. |  |  |
| 25.1 |  | CGEA13\_CS\_CADS\_IPCDisplay-026:Req31v5: Updated to define duration for HUD warnings. Limited duration of ACC\_BRAKE\_CAPACITY warning to 1.5 sec to maintain consistency with the chime duration (D544 AIMS #3594085)  CGEA13\_CS\_CADS\_IPCDisplay-025p1:Req32v5: Limited duration of FCW\_WARN warning to 1.5 sec to maintain consistency with the chime duration (D544 AIMS #3594085) |  |  |
| 26 | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Impact Matrix** | | | | | | |  | ACC | S&G ACC | FCW | IACC | TJA | | C-HUD Functional Impact | Minor |  |  |  | Minor | | C-HUD Diagnostic Impact |  |  |  |  |  | | A-HUD Functional Impact | Minor |  |  |  | Y | | A-HUD Diagnostic Impact |  |  |  |  |  | | Low Cost Cluster Functional Impact |  |  |  |  |  | | S1-S2 Cluster Functional Impact | Minor | Y |  |  | Y | | M/L/SX-Family Cluster Functional Impact | Minor |  |  | Y | Y | | Reconfigurable Cluster Functional Impact | Minor |  |  | Y | Y | | Cluster Diagnostics Impact |  |  |  |  |  | | Menu In Center Stack | Y | Y | Y | Y |  |   CGEA13\_CS\_CADS\_IPCDisplay-026:Req1Av18:  - Added a new table to support IACC-unique display.  - Revised Table 1 to remove conflict between ACC\_CRUISE/ACC\_FOLLOW and SGACC\_RES\_READY states. Also, needed to create a new state, SGACC\_RES\_READY\_NLV to support applications where no lead vehicle is shown.  - Deleted Table 4, since HMI direction is to always show gap in cluster display. - Deleted Figures 1 and 2 since HMI direction is to follow standard digital set speed display strategy in table 3. - Modified strategy such that Table 3 (digital set speed) is relevent for all clusters - Updated Distance Indication Function display to display content in Normal or Crank. This is to resolve display flicker that can occur during crank.  CGEA13\_CS\_CADS\_IPCDisplay-026:Req1Bv17:  - Revised Table 10 to remove conflict between ACC\_CRUISE/ACC\_FOLLOW and SGACC\_RES\_READY/ SGACC\_RES\_READY\_GAP states. Also, needed to create a new state, SGACC\_RES\_READY\_NLV to support applications where no lead vehicle is shown.  - Updated Table 8 to define CC\_Display\_Speed to show standby graphic (i.e. strikethrough) when AccStopMde\_B\_Dsply or AccStopRes\_B\_Dsply are TRUE. - Updated Distance Indication Function display to display content in Normal or Crank. This is to resolve display flicker that can occur during crank.  CGEA13\_CS\_CADS\_IPCDisplay-026:Req33v7:  - Revised Table 14 to remove conflict between ACC\_CRUISE/ACC\_FOLLOW and SGACC\_RES\_READY states.  - Revised Table 14 to create a new state, SGACC\_RES\_READY\_NLV to support applications where no lead vehicle is shown.  - Revised Table 14 to correct logic for displaying NCC\_OVERRIDE state when HUD is configured for Cruise. - Updated Table 17 to include new SGACC\_RES\_READY\_NLV state - Revised Table 18 to replace AccDeny\_B\_RqIpc with ACC\_Missing\_Msg, since HUD doesn’t receive AccDeny\_B\_Rq\_Ipc. - Updated Distance Indication Function display to display content in Normal or Crank. This is to resolve display flicker that can occur during crank.  CGEA13\_CS\_CADS\_IPCDisplay-026:Req5v19: Added IACC\_Func\_Disp for non-S2 clusters. Clarified definition of SGACC\_RES\_READY, since this is also to be used to support the TJA Take-over strategy (i.e. ACC is inhibited from accelerating to set speed until the driver presses the RESUME button. Added SGACC\_RES\_READY\_NLV to clarify that the lead vehicle may not be displayed. Added Settings\_Menu\_Cfg  CGEA13\_CS\_CADS\_IPCDisplay-026:Req3v4: To support migration of menu settings to the Center Stack, modified the menu logic to be enabled only when Settings\_menu\_cfg == Enabled  CGEA13\_CS\_CADS\_IPCDisplay-026:Req15v12: To support migration of menu settings to the Center Stack, modified the menu logic to be enabled only when Settings\_menu\_cfg == Enabled  CGEA13\_CS\_CADS\_IPCDisplay-026:Req18v18: To support migration of menu settings to center stack, clarified that the settings signals (i.e. FcwStat\_MC, FcwSens\_MC, etc.) are to be defined by the IPC based on the Personalization interface even when the menus are disabled.  CGEA13\_CS\_CADS\_IPCDisplay-026:Req9v3: Removed display requirement from requirement, as display requirements are specified in individual display tables based on Operational Mode. | | | |
| 26.1 | CGEA13\_CS\_CADS\_IPCDisplay-026p1:Req2v13: Added a new warning state, ACC\_BRAKE\_WARM  CGEA13\_CS\_CADS\_IPCDisplay-026p1:Req5v20: Added new warning message W999, tied to ACC\_Display\_Warn\_Req. | | | |
| 27 | |  |  |  | | --- | --- | --- | | **Impact Matrix** |  | | |  | | FCW | | C-HUD Functional Impact | |  | | C-HUD Diagnostic Impact | |  | | A-HUD Functional Impact | |  | | A-HUD Diagnostic Impact | |  | | Low Cost Cluster Functional Impact | | Y | | S1-S2 Cluster Functional Impact | | Y | | M/L/SX-Family Cluster Functional Impact | | Y | | Reconfigurable Cluster Functional Impact | | Y | | Cluster Diagnostics Impact | |  | | Menu In Center Stack | |  |   Separated the CADS Cluster Interface Spec into 2 versions: PCA and ACC+DI  CGEA13\_CS\_CADS\_IPCDisplay-27:Req34v5: Modified FCW telltale strategy to support expected UNECE regulations.  CGEA13\_CS\_CADS\_IPCDisplay-027:Req14v13: Clarified that FCW\_WARN\_FLASH should start with the red graphic.  CGEA13\_CS\_CADS\_IPCDisplay-027:Req15v13: Clarified encoding for Settings\_Menu\_Cfg to refer to ‘Cluster’  CGEA13\_CS\_PCA\_IPCDisplay-27:Req37v1: New requirement to specify the continuous display strategy for PCA.  CGEA13\_CS\_CADS\_IPCDisplay-013:Req27v5: Deleted since obsolete. | | | |

# Terminology

## Definitions

| Definition | Description |
| --- | --- |
| CADS | Collision Avoidance & Driver Support |
| CC | Cruise Control (Superset of NCC and ACC) |
| ACC | Adaptive Cruise Control |
| NCC | Normal Cruise Control |
| CMbB | Collision Mitigation by Braking |
| FCW | Forward Collision Warning |

## Identification of requirements

**Ex. DocID-IssueIndex** : **ReqNrVersNr**

When a requirement is introduced it is given a tag including a requirement number. This tag follows the requirement throughout the development process. In this document requirements are identified using a tag consisting of two parts. The first part consists of the document ID and the document issue in which the requirement was introduced *or* updated. The second part consists of the requirement number and the requirement version. A colon separates each part. A requirement tag shall be unique, i.e. there must not exist two different requirements with the same requirement tag. The same requirement may however be used more than once (i.e. the same requirement may exist several times, even within the same document).

*<The document owner is responsible for defining a suitable document ID. Since a requirement may be used in other documents (i.e. not only in its source document) it is very important that this ID is unique and not used to identify any other document. Otherwise there is a risk that two or more different requirements will have exactly the same requirement tag. Try to define an ID that is as descriptive as possible.>*

*Example:*

*SRD-5A-001:Req4v1 This requirement was introduced in the first issue of the document with ID SRD-5A. The requirement number is 4 and it is the first version.*

*CS-FA7A-3-003:Req1v2 This requirement was updated in the third issue of the document with ID CS-FA7A-3. The requirement number is 1 and it has been updated to a second version (CS could e.g. be an abbreviation for Class Specification, FA7A could be an ID for the function area and 3 could be an ID for a class within this function area).*

*SWRS-PJB-003:Req9v1 This requirement was introduced in the third issue of document with ID SWRS-PJB. The requirement number is 9 and it is introduced for the first time in document issue 003 (PJB could e.g. be an abbreviation for an ECU).*

*<Two predefined macros are available in the SRD template to help in tagging the requirements. Insert a new requirement with the "InsertNewReq" macro and update an existing requirement with the macro "UpdateExistingReq". When running these macros a dialog box appears where the following information is to be inserted:*

*DocumentID: This field should be set to the ID you select for your document (e.g. SRD-5A, where 5A a number identifying the system). The document owner are free to choose any ID, but it is important to select one that is unique (i.e. not used by any other document) since it is this part that will make the requirement tag unique. The ID is changed from the Properties Dialogue (File -> Properties and the tab “Custom”)*

*Doc Issue: This field is set to the issue index of the document. The issue index is changed from the Properties Dialogue (File->Properties and the tab Custom).*

*ReqNr: The number of the requirement. If a new requirement is to be inserted, the macro proposes the next number according to the "HighestReqNr" property (File -> Properties and the tab “Custom”-> HighestReqNr). Otherwise this field is by default empty.*

*VersionNr: The version number of the requirement. If a new requirement is to be inserted, the version number is automatically set to 1. Otherwise this field is by default empty.*

*ContextID: This field should be set to the identifier of the domain in which you are working in (e.g. the system area for SRD or class specification, or the component for SWRS). The information is used to name the requirement styles in this document. This makes it possible for SWRS writers to automatically create lists showing changes in a new SRD releases from the previous ones.*

*When pressing OK in the dialog box the macro will automatically select or create the right styles for the requirement, create a requirement tag and create the sub sections of the requirement according to the information in the dialog box. Please note that it is important that the styles for the requirements are not changed. Doing so may make the requirement technique and macros to malfunction.*

*The macros described are generic and used in a number of different specifications within the electrical development process. In order to get the macros to work correctly the type of specification must be specified in the property dialog box for this document (Properties Dialogue (File -> Properties and the tab “Custom”->SpecType). The coding of the field is as follows:*

*0: Specification type not defined.*

*1: FAD (Function Area Description)*

*2: SRD (System Requirement and Description)*

*3: SWRS (Software Requirement Specification*

*4: CS (Class specification)*

*5: SWDC.*

*6. Specification type not defined. >*

# FCW requirements

## FCW Interfaces

**CGEA13\_CS\_PCA\_IPCDisplay-27:Req37v1 Continuous FCW State Display**

Req ID:

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The following state chart defines the continuous FCW display graphic for the IPC (where supported by HMI). For Definitions of the Input and Output parameters in the state chart, see req18.

An example of a continuous FCW display graphic is shown below.

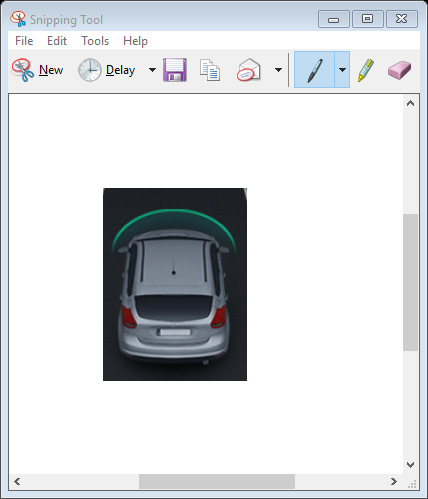


Table 1: State Chart for FCW Warning Display

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Operational\_ Mode** | **FCW\_Cfg** | **FCW\_Missing\_Msg** | **FCWStat\_MC** | **FcwDeny\_B\_Dsply** | **CadsRadrBlck\_B\_Actl** | **CamraStats\_D\_Dsply** | | | **CcStat\_D\_Actl** | **CcOvrrdActv\_B\_Actl** | **AccEnbl\_B\_RqDrv** | **FCW\_Function\_Display** |
| <> (Normal or Crank) | X | X | X | X | X | X | | | X | X | X | OFF |
| X | <> (FCW or FCW+DA) | X | X | X | X | X | | | X | X | X | OFF |
|  | FCW or FCW+DA | TRUE | X | X | X | X | | | X | X | X | OFF |
|  | X | OFF | X | X | X | | | X | X | X | OFF |
| Normal or Crank | X | X | TRUE | X | X | | | X | X | X | OFF |
| X | X | X | TRUE | X | | | X | X | X | OFF |
| X | X | X | X | Front\_Camera\_Service\_Reqd | | | X | X | X | OFF |
| X | X | X | X | FrtCam\_TempUnavailVisibile | | | X | X | X | OFF |
| X | X | X | X | FrtCam\_TempUnavailOther | | | X | X | X | OFF |
|  | X | X | X | X | Missing as per Lane Assist Warning STSS | | | X | X | X | OFF |
|  | X | X | X | X | X | | | Active or Active\_Que\_Assist | FALSE | ACC | OFF |
| ALL OTHER CASES | | | |  | | |  |  |  |  |  | ON |

CGEA13\_CS\_CADS\_IPCDisplay-027:Req14v13 FCW Warning Message Displays

Req ID:

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The following state chart defines the FCW-relevant graphic and textual displays for the warning message display area of the IPC. For Definitions of the Input and Output parameters in the state chart, see req18.

Table 2: State Chart for FCW Warning Display

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Inputs** | |  |  |  |  | | |  | |  | | **Warning Parameters** | **Warning Duration** |
| **Operational\_ Mode** | **FCW\_Cfg** | **HUD\_Cfg** | **HUD\_Mode** | **FCW\_Missing\_Msg** | **FcwVisblWarn\_B\_Rq** | **CmbbPostEvnt\_B\_Dsply** | **~~FcwDeny\_B\_Dsply~~** | | **FcwMsgTxt\_D\_Rq** | | **CadsRadrBlck\_B\_Actl** | **FCW\_Display\_Warn\_Req** | **Duration** |
|  | ~~None~~ | ~~X~~ | ~~X~~ | ~~TRUE~~ | ~~X~~ | ~~X~~ | ~~X~~ | | ~~X~~ | | ~~X~~ | ~~FCW\_NA~~ | ~~While Condition is TRUE (Resettable)~~ |
|  |  | X | X | TRUE | X | X | ~~X~~ | | X | | X | FCW\_NA | While Condition is TRUE (Resettable) |
|  |  | FCW\_HUD | X | FALSE | TRUE | X | ~~X~~ | | X | | X | FCW\_WARN | While Condition is TRUE (Resettable) |
| Normal | FCW or FCW+DA | Adv\_Comb\_ HUD | Active | FALSE | TRUE | X | ~~X~~ | | X | | X | FCW\_WARN | While Condition is TRUE (Resettable) |
| X | X | FALSE | FALSE | TRUE | ~~X~~ | | X | | X | FCW\_WARN | While Condition is TRUE (Resettable) |
| No\_HUD | X | FALSE | TRUE | X | ~~X~~ | | X | | X | FCW\_WARN\_FLASH | While Condition is TRUE (Resettable) |
|  |  | Adv\_Comb\_ HUD | OFF or Pending | FALSE | TRUE | X | X | | X | | X | FCW\_WARN\_FLASH | While Condition is TRUE (Resettable) |
|  |  | ~~X~~ | ~~X~~ | ~~FALSE~~ | ~~FALSE~~ | ~~FALSE~~ | ~~YES~~ | | ~~X~~ | | ~~X~~ | ~~FCW\_NA~~ | ~~While Condition is TRUE (Resettable)~~ |
|  |  | X | X | FALSE | FALSE | FALSE | ~~NO~~ | | Unavailable | | FALSE | FCW\_NA | While Condition is TRUE (Resettable) |
|  |  | X | X | FALSE | FALSE | FALSE | ~~NO~~ | | Unavailable | | TRUE | FCW\_BLOCK | While Condition is TRUE (Resettable) |
| ALL OTHER CASES | | |  |  |  | | | | | | | Ina | N/A |

The Cluster flashing FCW Warning, FCW\_WARN\_FLASH, shall cycle between 2 color-inverted images at frequency of 4Hz-5Hz with a 50% Duty Cycle. It shall cycle from Red -> Grey/Black -> Red -> Grey/Black…

CGEA13\_CS\_CADS\_IPCDisplay-025p1:Req32v5 FCW HUD Warning Message Displays

Req ID:

Purpose: [FCW] [HUD]

Verification Method:

**Req:**

For programs with a graphical HUD, the following state chart defines the FCW-relevant display for the warning message display area of the IPC. For Definitions of the Input and Output parameters in the state chart, see req18.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inputs** | | | | **Warning Parameters** | **Warning Duration** |
| **Operational\_ Mode** | **FCW\_Cfg** | **FcwVisblWarn\_B\_Rq** | **HUD\_Mode** | **FCW\_HUD\_Warn\_Req** | **Duration** |
| Normal | FCW or FCW+DA | TRUE | Active | FCW\_WARN | 1.5sec  ~~While Condition is TRUE~~ |
| ALL OTHER CASES | | | | Ina | N/A |

The HUD FCW Warning, FCW\_WARN, shall cycle On/Off at frequency of 4Hz-5Hz with a 50% Duty Cycle.

When FCW\_WARN is activated, the first displayed graphic shall be RED (i.e. It shall cycle from Red -> Grey/Black -> Red -> Grey/Black…)

The HUD FCW Warning brightness shall be compensated based on measured ambient light levels, with strategy as defined in the HUD Image Brightness Function – CGEA1.3 STSS.

Brightness calibrations shall be reviewed and consensed with Ford.

If a HUD failure state exists, which only impacts the Red color of the the display, a non-Red warning shall be displayed for the FCW\_WARN warning graphic.

CGEA13\_CS\_CADS\_IPCDisplay-027:Req15v13 FCW Menu Setting Displays

Req ID: Previously U38x\_CS\_CADS\_IPCDisplay-007:Req15v5

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The following state chart defines the FCW-relevant menu display of the IPC. For Definitions of the Input and Output parameters in the state chart, see req18

Table 3: State Chart for FCW Menu Display

| **Inputs** | | |  |  | | |  | | **Display Parameters\*\*** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Operational\_ Mode** | **Settings\_Menu\_cfg** | **FCW\_Cfg** | **FCW\_ON\_MENU\_Cfg\*** | **FCW\_Missing\_Msg** | **FcwMsgTxt\_D\_Rq** | **IgnKeyType\_D\_Actl** | | **FCWStat\_MC** | **FCW\_OnOff\_Setting** | **FCW\_Sensitivity\_Setting** | **Distance\_Alert\_OnOff\_Setting** | **FCW\_Braking\_OnOff\_Setting** |
| Normal | Cluster | FCW | OFF | TRUE | X | X | | X | Disabled | Restricted | Disabled | Restricted |
| FALSE | Unavailable | X | | X | Disabled | Restricted | Disabled | Restricted |
|  | FALSE | NOT Unavailable | X | | X | Disabled | Enabled | Disabled | Enabled |
|  |  | ON | TRUE | X | X | | X | Restricted | Restricted | Disabled | Restricted |
|  |  |  |  | FALSE | Unavailable | X | | X | Restricted | Restricted | Disabled | Restricted |
|  |  |  |  | FALSE | NOT Unavailable | NOT Key\_In\_Ignition\_My\_Key | | ON | Enabled | Enabled | Disabled | Enabled |
|  |  |  |  | FALSE | NOT Unavailable | NOT Key\_In\_Ignition\_My\_Key | | OFF | Enabled | Restricted | Disabled | Restricted |
|  |  |  |  | FALSE | NOT Unavailable | Key\_In\_Ignition\_My\_Key | | ON ~~X~~ | Disabled | Enabled | Disabled | Enabled |
|  |  |  |  | FALSE | NOT Unavailable | Key\_In\_Ignition\_My\_Key | | OFF | Disabled | Restricted | Disabled | Restricted |
|  |  | FCW+DA |  | TRUE | X | X | | X | Disabled | Restricted | Restricted | Restricted |
|  |  | OFF | FALSE | Unavailable | X | | X | Disabled | Restricted | Restricted | Restricted |
|  |  |  |  | FALSE | NOT Unavailable | NOT Key\_In\_Ignition\_My\_Key ~~X~~ | | X | Disabled | Enabled | Enabled | Enabled |
|  |  |  |  | FALSE | NOT Unavailable | Key\_In\_Ignition\_My\_Key | | X | Disabled | Enabled | Disabled | Enabled |
|  |  |  |  | TRUE | X | X | | X | Restricted | Restricted | Restricted | Restricted |
|  |  |  | ON | FALSE | Unavailable | X | | X | Restricted | Restricted | Restricted | Restricted |
|  |  |  |  | FALSE | NOT Unavailable | NOT Key\_In\_Ignition\_My\_Key | | ON | Enabled | Enabled | Enabled | Enabled |
|  |  |  |  | FALSE | NOT Unavailable | NOT Key\_In\_Ignition\_My\_Key | | OFF | Enabled | Restricted | Enabled | Restricted |
|  |  |  |  | FALSE | NOT Unavailable | Key\_In\_Ignition\_My\_Key | | ON ~~X~~ | Disabled | Enabled | Disabled | Enabled |
|  |  |  |  | FALSE | NOT Unavailable | Key\_In\_Ignition\_My\_Key | | OFF | Disabled | Restricted | Disabled | Restricted |
| ALL OTHER CASES | | | | | | |  | | Disabled | Disabled | Disabled | Disabled |

**\* Menu Configuration Restrictions:**

FCW\_ON\_MENU\_Cfg is to be configured to ON for truck applications (vehicles that can support snow plows), such as P552 and U/P375, INCLUDING APPLICATIONS WITH MENU SETTINGS IN CENTER STACK.  
FCW\_ON\_MENU\_Cfg is to be configured to OFF for non-truck applications.

Note: FCW\_BrakingOnOff\_Cfg is not required for new applications, since Active Braking is bundled with all new PCA applications.

**\*\*Terms:**

**Restricted** – menu item is displayed but the menu items will be grayed out and the customer will not be able to change the selection.

**Enabled** – menu item is displayed and the customer can change the selection on the menu.

**Disabled** – menu item is not displayed

CGEA13\_CS\_CADS\_IPCDisplay-022:Req16v4 FCW Audible Warning Settings

Req ID: Previously CGEA12\_D-car\_CS\_CADS\_IPCDisplay-002:Req16v1

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The following state chart defines the FCW-relevant chime requests of the IPC. For Definitions of the Input and Output parameters in the state chart, see req18

Table 4: State Chart for FCW Chime Request

| **Inputs** | | |  | **Warning Parameters** |
| --- | --- | --- | --- | --- |
| **Operational\_ Mode** | **Fcw\_Cfg** | **FcwAudioWarn\_B\_Rq** | **FCW\_Display\_Warn\_Req** | **Active\_Chime\_Status\_Flag** |
| Normal | FCW or FCW+DA | Yes | X | FCW\_Chime\_Status\_Flag |
| No | FCW\_NA | Message\_Center\_Soft\_Warning\_Chime\_Status\_Flag |
| No | FCW\_BLOCK | Message\_Center\_Soft\_Warning\_Chime\_Status\_Flag |
| All Other Cases | | | | Ina |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **~~Inputs~~** | | | | **~~Warning Parameters~~** | **~~Mute Parameter~~** | **~~Warning/ Mute Duration~~** |
| **~~Operational\_ Mode~~** | **~~Fcw\_Cfg~~** | **~~FcwAudioWarn\_B\_Rq~~** | **~~CadsChime\_B\_Rq~~** | **~~FCW\_Chime\_Req~~** | **~~FCW\_Mute\_Req~~** | **~~Chime/Mute Duration~~** |
| ~~Normal~~ | ~~FCW or FCW+DA~~ | ~~Yes~~ | ~~X~~ | ~~FCW~~ | ~~Attenuation\_6~~ | ~~See Chime Spec~~ |
| ~~No~~ | ~~Yes~~ | ~~FCW\_Confirmation~~ | ~~No\_Attenuation~~ | ~~See Chime Spec~~ |
| ~~ALL OTHER CASES~~ | | | | ~~Ina~~ | ~~No\_Attenuation~~ | ~~See Chime Spec~~ |

CGEA13\_CS\_CADS\_IPCDisplay-013:Req27v5 FCW Diagnostics Settings

Req ID: Previously CGEA12\_D-car\_CS\_CADS\_IPCDisplay-004:Req27v2

Purpose: [FCW] [IPC]

Verification Method:

**Req:Deleted**

~~The Message Center System Check Display Strategy for Collision Warning related signals are as follows:~~

~~Table 5: Table defining warnings to be displayed in System Check~~

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **~~Inputs~~** | | | | | | | **~~Display Parameter~~** |
| **~~Operational\_ Mode~~** | **~~FCW\_Cfg~~** | **~~FCW\_Missing\_Msg~~** | **~~FcwDeny\_B\_Dsply~~** | **~~FcwMsgTxt\_D\_Rq~~** | **~~CadsRadrBlck\_B\_Actl~~** | **~~CadsCamraBlck\_B\_Actl~~** | **~~FCW\_SC\_Req~~** |
| ~~Normal~~ | ~~FCW or FCW+DA~~ | ~~TRUE~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~FCW\_NA\_SC~~ |
| ~~FALSE~~ | ~~TRUE~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~FCW\_NA\_SC~~ |
| ~~FALSE~~ | ~~FALSE~~ | ~~Unavailable~~ | ~~FALSE~~ | ~~X~~ | ~~FCW\_NA\_SC~~ |
| ~~FALSE~~ | ~~FALSE~~ | ~~Unavailable~~ | ~~TRUE~~ | ~~X~~ | ~~FCW\_BLOCK\_SC~~ |
| ~~FALSE~~ | ~~FALSE~~ | ~~Low Visibility~~ | ~~FALSE~~ | ~~TRUE~~ | ~~FCW\_CAM\_LOW\_VIS\_SC~~ |
| ~~ALL OTHER CASES~~ | | | | | | | ~~Ina~~ |

CGEA13\_CS\_CADS\_IPCDisplay-013:Req30v4 FCW Post-Startup Warning Strategy

Req ID: Previously U38x\_CS\_CADS\_IPCDisplay-008:Req30v1

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

If FCW Menu On Off Configuration setting is configured to ON (i.e. FCW\_ON\_MENU\_Cfg = ON) and the FCW Setting is set to 'OFF' when entering Normal Operation, the FCW setting warning shall be displayed to the customer for 8 seconds or until the customer sets the FCW Setting to 'ON'. The strategy to support this function is defined in Figure 1.



Figure 1: State diagram of FCW Post Startup Function

**CGEA13\_CS\_CADS\_IPCDisplay-27:Req34v5 FCW Fault RTT Display**

Req ID: Previously CGEA13\_CS\_CADS\_IPCDisplay-017p2:Req34v2

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

Either of the below graphics shall be implemented as a telltale or RTT. For UN-ECE markets, the telltale/RTT must be continuously visible. If package space allows, the ‘OFF’ graphic is preferred; however, both meet requirements. For non-UNECE markets, an RTT in a toggle position may be used.

**Indicator Graphics / Display Format**

OR  OR 

For actual symbol definition refer to database # K.15 of the 03-0685 ARL requirement

**Indicator Color Coordinates:**

Amber - Reference SDS IL-0017/IS-0379

The following state chart defines the FCW RTT or Telltale graphic for the IPC. For Definitions of the Input and Output parameters in the state chart, see req18.

Table 6: State Chart for FCW Warning Display

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Operational\_ Mode** | **FCW\_Cfg** | **FCW\_AmberRTT\_Cfg** | **FCW\_Missing\_Msg** | **FCWStat\_MC** | **FcwBrakingStat\_MC** | **FcwDeny\_B\_Dsply** | **CadsRadrBlck\_B\_Actl** | **CamraStats\_D\_Dsply** | **FCW\_Telltale** |
|  | FCW or FCW+DA | ON | TRUE | X | X | X | X | X | ON |
|  | X | OFF | X | X | X | X | ON |
|  | X | X | OFF | X | X | X | ON |
|  | X | X | X | TRUE | X | X | ON |
| Normal | X | X | X | X | TRUE | X | ON |
| X | X | X | X | X | Front\_Camera\_Service\_Reqd | ON |
| X | X | X | X | X | FrtCam\_TempUnavailVisibile | ON |
|  | X | X | X | X | X | FrtCam\_TempUnavailOther | ON |
|  | X | X | X | X | X | Missing as per Lane Assist Warning STSS | ON |
| ALL OTHER CASES | | | | | | | | | OFF |

CGEA13\_CS\_CADS\_IPCDisplay-026:Req18v18 FCW Parameter Definitions

Req ID: Previously CGEA12\_D-car\_CS\_CADS\_IPCDisplay-004:Req18v2

Purpose: [FCW] [IPC] [HUD]

Verification Method:

**Req:**

The CAN Inputs which are relevant to the FCW display strategy are defined below:

Table 7: Parameter definition of CAN signal inputs

|  |  |  |  |
| --- | --- | --- | --- |
| **CAN Inputs** | | | |
| **Signal Name** | **Defalt Value  (Startup or Batt Conn)** | **Required Receiver** | **Requirement Reference** |
| Ignition\_Status | Not Defined Here | IPC | See CAN Spec for Signal Encoding |
| ElPw\_D\_Stat | Not Defined Here | IPC | See CAN Spec for Signal Encoding |
| PwPckTq\_D\_Stat | Not Defined Here | IPC | See CAN Spec for Signal Encoding |
| IgnKeyType\_D\_Actl | Not Defined Here | IPC | See CAN Spec for Signal Encoding |
| FcwAudioWarn\_B\_Rq | No (0x0) | IPC | See CAN Spec for Signal Encoding |
| CadsChime\_B\_Rq | No (0x0) | IPC | See CAN Spec for Signal Encoding |
| CmbbPostEvnt\_B\_Dsply | No (0x0) | IPC | See CAN Spec for Signal Encoding |
| CadsRadrBlck\_B\_Actl | No (0x0) | IPC | See CAN Spec for Signal Encoding |
| FcwDeny\_B\_Dsply | No (0x0) | IPC | See CAN Spec for Signal Encoding |
| FcwMsgTxt\_D\_Rq | No\_Text (0x0) | IPC | See CAN Spec for Signal Encoding |
| FcwVisblWarn\_B\_Rq | Off (0x0) | IPC, HUD | See CAN Spec for Signal Encoding |

The display parameters which are relevant to the FCW display strategy are defined below:

Table 8: Parameter definition of IPC Display Parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Display Parameters** | | | | |
| **Parameter Name** | **Definition** | **Detail Meaning** | **Default Value  (Startup or Batt Conn)** | **Req Ref** |
| FCW\_Display\_Warn\_Req | Defines FCW Warning messages (Text and/or Graphics) to be displayed as follows | o Ina (0x0): No FCW-specific Message o W3298 ~~W823~~ - FCW\_BLOCK (0x3): "PRE-COLLISION ASSIST UNAVAILABLE – FRONT SENSOR BLOCKED" Warning Text and Amber Front Sensor Graphic o W3297 ~~W821~~ - FCW\_NA (0x4): "PRE-COLLISION ASSIST NOT AVAILABLE" Warning Text o W3296 ~~W1082~~ - FCW\_WARN (0x7): “PRE-COLLISION ASSIST” and Collision Warning Graphic o W3556 - FCW\_WARN\_FLASH (0x8): Flashing Red “PRE-COLLISION ASSIST” and Collision Warning Graphic | Ina (0x0) | Req14 |
| FCW\_HUD\_Warn\_Req | Defines FCW Warnings to be displayed in Advanced/Combiner HUD | Ina (0x0): No FCW-specific Message  FCW\_WARN: Red Flashing Collision Warning Graphic | Ina (0x0) | Req32 |
| ~~FCW\_SC\_Req~~ | ~~Defines the FCW-specific messages to display in the System Check sequence~~ | ~~o Ina (0x0): No FCW message in System Check sequence o FCW\_MALF\_SC (0x1): 'COLLISION WARNING MALFUNCTION' in System Check sequence o FCW\_BLOCK\_SC (0x2): COLLISION WARNING UNAVAILABLE – FRONT SENSOR BLOCKED" Warning Text and Amber Front Sensor Graphic o FCW\_NA\_SC (0x3): "COLLISION WARNING NOT AVAILABLE" Warning Text~~ | ~~Ina (0x0)~~ | ~~Req27~~ |
| FCW\_OnOff\_Setting | Defines the display value of the FCW On/Off menu selection | Restricted – menu item is displayed but the menu items will be grayed out and the customer will not be able to change the selection.  Enabled – menu item is displayed and the customer can change the selection on the menu.  Disabled – menu item is not displayed | Disabled | Req15 |
| FCW\_Sensitivity\_Setting | Defines the display value of the FCW Sensitivity menu selection | Restricted – menu item is displayed but the menu items will be grayed out and the customer will not be able to change the selection.  Enabled – menu item is displayed and the customer can change the selection on the menu.  Disabled – menu item is not displayed | Disabled | Req15 |
| Distance\_Alert\_OnOff\_Setting | Defines the display value of the Distance Alert On/Off menu selection | Restricted – menu item is displayed but the menu items will be grayed out and the customer will not be able to change the selection.  Enabled – menu item is displayed and the customer can change the selection on the menu.  Disabled – menu item is not displayed | Disabled | Req15 |
| FCW\_Braking\_OnOff\_Setting | Defines the display vale of the Active Braking On/Off menu selection | Restricted – menu item is displayed but the menu items will be grayed out and the customer will not be able to change the selection.  Enabled – menu item is displayed and the customer can change the selection on the menu.  Disabled – menu item is not displayed | Disabled | Req15 |
| FCW\_Telltale | Defines the FCW RTT control | OFF – FCW RTT is not displayed  ON - FCW RTT is displayed | OFF | Req34 |
| FCW\_Function\_Display | Defines the continuous FCW Display state | OFF – FCW Graphic (e.g. front shield) is not displayed  ON - FCW Graphic (e.g. front shield) is displayed | OFF | Req37 |

The ACC display internal parameters which are relevant to the FCW display strategy are defined below:

Table 9: Parameter definition of IPC Internal Parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Internal Parameters** | | | | |
| **Parameter Name** | **Definition** | **Detail Meaning** | **Default Value  (Startup or Batt Conn)** | **Requirement Reference** |
| FCW\_Missing\_Msg | Defines when the FCW-relevent CAN messages are missing | FALSE (0x0): FCW-relevent CAN messages are not missing TRUE (0x1): FCW-relevent CAN messages are missing | FALSE (0x0) | Req24, Req14 |
| FcwStat\_MC | FCW Status (On/Off) to be displayed in Message Center OR defined by Personalization (Menu in Center Stack implementations) | OFF (0x0): FCW is set to OFF  ON (0x1): FCW is set to ON | Yes (0x1) | Req20 |
| FcwSens\_MC | FCW Sensitivity value to be displayed in Message Center OR defined by Personalization (Menu in Center Stack implementations) | FCW\_Sensitivity\_1 (0x1): Short Setting (Low Sens)  FCW\_Sensitivity\_2 (0x2): Normal Setting(Normal Sens)  FCW\_Sensitivity\_3 (0x3): Long Setting (High Sensitivity) | FCW\_Sensitivity\_2 (0x2) | Req20 |
| FdaStat\_MC | Forward Distance Alert Status (On/Off) to be displayed in Message Center OR defined by Personalization (Menu in Center Stack implementations) | OFF (0x0): FDA is set to OFF  ON (0x1): FDA is set to ON | Yes (0x1) | Req20, Req1 |
| FcwBrakingStat\_MC | Active Emergency Braking Status (On/Off) to be displayed in Message Center OR defined by Personalization (Menu in Center Stack implementations) | OFF (0x0): Active Braking is set to OFF  ON (0x1): Active Braking is set to ON | Yes (0x1) | Req20 |
| Active\_Chime\_Status\_Flag ~~FCW\_Chime\_Req~~ | Defines the FCW feature chime request. To be used by the master chime arbiter to define the Audio Chime request and/or cluster chime driver | See Audio Generated DNA Chimes- Cluster Chime Arbitrator for detailed definitions.  ~~o Ina (0x0): No FCW Chime is requested o FCW (0x1): Requests the FCW Warning chime to be activated. o FCW\_Confirmation (0x2): Requests the FCW Setting Confirmation chime to be activated~~ | Ina (0x0) | Req16 |
| ~~FCW\_Mute\_Req~~ | ~~Defines the FCW feature mute request. To be used by the master mute arbiter to define the Audio Mute request~~ | ~~No\_FCW\_Attenuation (0x0) Attenuation\_1 (0x1) Attenuation\_2 (0x2) Attenuation\_3 (0x3) Attenuation\_4 (0x4) Attenuation\_5 (0x5) Attenuation\_6 (0x6)~~ | ~~No\_FCW\_Attenuation (0x0)~~ | ~~Req16~~ |
| Operational\_Mode | 4 state indicator for cluster operational mode | Sleep Limited Normal Crank | Limited | Req1, Req2, Req3, Req4 |
| FCW\_Cfg | State Indicator for feature presence controlled via CAN at EOL at VO plant. Defaulted to Disabled at supplier manufacturing. | 0x00 = None  0x01 = FCW  0x02 = FCW+FDA | Stored Value | Req15 |
| FCW\_ON\_MENU\_Cfg | State Indicator for FCW On/Off Menu Setting feature presence controlled via CAN at EOL at VO plant. Defaulted to Disabled at supplier manufacturing. | 0x0 = OFF  0x1 = ON | OFF | Req15 |
| ~~FCW\_BrakingOnOff\_Cfg~~ | ~~State Indicator for CADS3 Active Emergency Braking On/Off Menu Setting feature presence controlled via CAN at EOL at VO plant. Defaulted to Disabled at supplier manufacturing.~~ | ~~0x0 = OFF~~  ~~0x1 = ON~~ | ~~OFF~~ | ~~Req15~~ |
| FcwOff\_Warn\_Flg | State variable used by M/C Warning Arbitrator. | INACTIVE: FCW OFF Setting Warning (W3295 ~~W911~~) should not be displayed  ACTIVE: FCW OFF Setting Warning (W3295 ~~W911~~) should be sequenced by M/C Warning Arbitrator | INACTIVE | Req30 |
| FCWOffTimer | Timer used to establish when to display FCW Setting Warning (W911) | OFF  RUNNING:  EXPIRED: Set after 8 seconds of RUNNING or when set to EXPIRED | OFF | Req30 |
| FCW\_AmberRTT\_Cfg | State Indicator for enabling FCW Amber RTT to support relevent regulatory requirements | 0x0 = OFF  0x1 = ON | OFF | Req34 |

Table 10: Parameter definition of FCW Sensitivity Parameters

|  |  |
| --- | --- |
| **FcwSens\_D\_Actl State** | **Display Representation** |
| FCW\_Sensitivity\_1 | FCW Short Setting (Low Sensitivity) |
| FCW\_Sensitivity\_2 | FCW Normal Setting (Normal Sensitivity) |
| FCW\_Sensitivity\_3 | FCW Long Setting (High Sensitivity) |

## FCW Performance and Reliability

U38x\_CS\_CADS\_IPCDisplay-001:Req19v1 FCW Response Time

Req ID:

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The IPC shall respond to the FCW Audible Warnings and Mute requests, within 20 milliseconds from when the CAN-signal is received.

The IPC shall display FCW Warning information within 100 milliseconds from the signal is received.

CGEA13\_CS\_CADS\_IPCDisplay-016:Req20v2 FCW Setting Synchronization

Req ID: Previously U38x\_CS\_CADS\_IPCDisplay-006:Req20v3

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

The requirements for the internal parameters, FcwStat\_MC, FcwSens\_MC, FdaStat\_MC, and FcwBrakingStat\_MC are defined in the FCW Control Function SPSS and the Personalization Display Setup Overview SPSS.

CGEA13\_CS\_CADS\_IPCDisplay-019:Req21v2 Enabling criteria for displaying FCW-related information and for detection of FCW-related errors

Req ID: Based on U38x\_CS\_CADS\_IPCDisplay-002:Req21v2

Purpose: To ensure that the displaying of FCW-related information and the error detection related to signals from other nodes can not be made before these nodes are expected to transmit meaningful FCW-related signals.   
[FCW] [IPC] [HUD]

Verification Method: Review and test

**Req:**

(a) The display of FCW-related information shall be possible if, and only if, the IPC is in state C (as described below).

(b) For any FCW-related error detection mechanism that is based on CAN signals received from other nodes, error detection and resulting entry into the denied mode shall be possible if, and only if, the IPC is in state C (as described below). This requirement overrules any other requirement that describes when FCW shall be denied by the IPC.



State Transition Conditions, X and Y, are defined as follows:

X = (IPC has completed its initialization) AND

(CAN signal Ignition\_Status = 'Run' ) AND

PwPckTq\_D\_Stat <> 'StartInPrgrss\_TqNotAvail' )

Y = 1 second timer

The Advanced/Combiner HUD (if equipped) shall follow the same enabling criteria as defined above for the IPC.

CGEA13\_CS\_CADS\_IPCDisplay-025:Req22v6 FCW Missing Message

Req ID: Based on U38x\_CS\_CADS\_IPCDisplay-007:Req22v2

Purpose: [FCW] [IPC] [HUD]

Verification Method:

**Req:**

As defined in the flowchart in Figure 2, the IPC and advanced/Combiner HUD (if equipped) shall monitor the ~~CCM~~ IPMA and GWM CAN messages and check for consistency with the IPC configuration settings. This monitoring shall only be performed under the following conditions:

* The IPC/HUD is in state C (as defined in Req21)

Note: MMT\_C23A\_18A and MMT\_C146\_42C values are defined based on the ACC missing message logic defined in req13



Figure 2: FCW Configuration validity check flowchart

U38x\_CS\_CADS\_IPCDisplay-001:Req23v1 FCW Audible Warning, sound type

Req ID: Based on CS\_CADS\_CADSDriverInfoIF-007:Req10v4

Purpose: [FCW] [IPC]

Verification Method:

**Req:**

For detailed definitions of the FCW and FCW\_CONFIRMATION chimes, see the Warning Chime Specification

# CADS requirements

## CADS Interfaces

CGEA13\_CS\_CADS\_IPCDisplay-001:Req25v1 CADS Audible Warnings

Req ID: Based on U38x\_CS\_CADS\_IPCDisplay-009:Req25v2

Purpose: [ACC] [FCW] [IPC]

Verification Method:

**Req:**

The IPC shall arbitrate and generate different sound warnings to alert the driver and send the chime request to the audio system. The sequencing of ACC and FCW chime requests relative to other vehicle warnings shall be defined by the DI with consensus from the CADS team.

The warnings shall be short sounds, which are played when the FCW\_Chime\_Req and ACC\_Chime\_Req requestchange from OFF to ON (flank triggered). A sound that has been started shall be played in its full

length, unless a higher priority sound is initiated.

The sequencing of simultaneous ACC/FCW chime requests shall be defined as follows:

1. FCW\_Warn
2. ACC\_More\_Urgent
3. ACC\_Brake\_Release
4. ACC\_Less\_Urgent
5. FCW\_Confirm

CGEA13\_CS\_CADS\_IPCDisplay-001:Req28v1 CADS Audible Warnings Backup Strategy

Req ID: Based on U38x\_CS\_CADS\_IPCDisplay-001:Req28v1

Purpose: [ACC] [FCW] [IPC]

Verification Method:

**Req:**

Under normal non-fault conditions, the Audio Control Module shall actuate CADS chimes based on the arbitrated IPC request. If the IPC loses communication with the ACM or the ACM detects a fault which prevents normal chime function, the IPC shall actuate audible chimes for the following ACC/FCW chimes:

1. FCW\_Warn
2. ACC\_More\_Urgent
3. ACC\_Less\_Urgent
4. ACC\_Brake\_Release

Note: The ACC/FCW chime performance associated with the above IPC backup chime is not required to meet the performance requirements defined for the ACM-based chimes.