|  |  |
| --- | --- |
| **ID** | **EXL FD for Base and MId BCM** |
| 21 | **1 Front Matter** |
| 22 | **PROJECT: Body Control Module** |
| 23 | (For Passenger Car ) |
| 24 | Functional Description: Exterior Light**s** |
| 25 | **Variants: Base, Mid, & Mid With Gateway BCMs** |
| 26 | DOCUMENT VERSION: 13.3 |
| 27 | RELEASE DATE: 26-May-2022 |
| 30 | |  |  | | --- | --- | | **Author list** |  | | ***Ver*** | ***DateCompany*** ***Author*** ***Contact*** ***Telephone*** | | 13.3 | 26-May-2022Tata Motors Limited Pranjali/ Prashanth Mettu pranjali.t@tatamotors.com 8879620092 | |
| 50 | ... |
| 8746 | |  |  | | --- | --- | | TML Reviewer | Himanshu Saxena | | TML Approver | Himanshu Saxena | |
| 58 | **Document History** |
| 61 | |  |  | | --- | --- | | **Ver** | **DateAuthor** **Details** | | 1.0 | 10/04/2012Rakesh Nikhade Initial Release | | 1.1 | 19/06/2012Rakesh Nikhade Updated one. | | 2.0 | 23/07/2012Rakesh Nikhade Updated after Supplier's comment | | 2.1 | 02/11/2012Rakesh Nikhade  DRL added | | 2.2 | 06/11/2012Rakesh Nikhade  cornering lamp section updated | | 3.0 | 08/11/2012Rakesh Nikhade  DRL updated | | 3.1 | 08/11/2012Rakesh Nikhade  Low beam section updated | | 3.2 | 08/11/2012Rakesh Nikhade Updated after internal Discussion | | 3.3 | 04/12/2012Rakesh Nikhade  Updated DRL | | 3.4 | 14/12/2012Rakesh Nikhade updated for FMH | | 3.5 | 27/12/2012Rakesh Nikhade FMH req updated | | 3.6 | 28/12/2012Rakesh Nikhade Updated change history. | | 3.7 | 31/01/2013Rakesh Nikhade Brake lamp and Position Lamp Req updated. | | 3.8 | 25/03/2013Rakesh Nikhade Updated Position and reverse lamps functions. Added crash detection requirement | | 3.9 | 23/07/2013Rakesh Nikhade Updated as per Annexture 1.16 | | 4.0 | 25/09/2013Sandip Patil Updated after internal and supplier discussion | | 4.1 | 15/10/2013Sandip Patil Updated after internal and supplier discussion | | 4.2 | 21/10/2013Sandip Patil Updated after supplier discussion | | 4.3 | 02/12/2013Sandip Patil Updated after supplier discussion (Updated for descripancies between DID list V4.20 and FD) | | 4.4 | 10/03/2014Sandip Patil Updated after internal discussion | | 4.5 | 07/08/2014Sandip Patil Updated for automatic DRL activation/de-activation requirements | | 4.6 | 22/11/2014Sandip Patil Functional safety requirements implemented in R6.0 SW release added | | 4.7 | 11/12/2014Saichaitanya Requirements for Turn Indicator added. | | 4.8 | 12/12/2014Sandip Patil Updated for new CAN signals and configuration parameter added in list | | 4.9 | 16/12/2014Sandip Patil Updated after internal discussion | | 5.0 | 22/12/2014Sandip Patil Updated after internal discussion | | 5.1 | 01/01/2015Sandip Patil Updated after discussion with supplier and for Kite reverse gear CAN signal for other ECUs in case of Base BCM | | 5.2 | 10/01/2015Sandip Patil Updated after supplier discussion | | 5.3 | 22/01/2015Sandip Patil Updated after supplier discussion | | 5.4 | 11/08/2015Sandip Patil Crash active / inactive defintion updated | | 5.5 | 09/09/2016Rakesh Nikhade Turn indicator STB, STG , open ckt detection requirements added. | | 5.6 | 21/09/2016Rakesh Nikhade DRL requirements updated. | | 5.7 | 24/11/2016Sandip Patil Updated to add the turn indicator partial bulb out fault threshold and other requirements | | 5.8 | 07/12/2016Rakesh Nikhade New requirement added to calculate turn Indicator threshold. | | 5.9 | 21/12/2016Rakesh Nikhade steering based Cornering lamps req added. | | 6.0 | 16/01/2017Rakesh Nikhade Requirements for various exterior lights loads depending on platform are added. | | 6.1 | 30/03/2017Nitin Nalinde Updated Turn Indicator wattage value for Nexon and In Mid BCM, FrFogLmpRelay will be used as separate output for driving Tell-tale indicator on fascia switch for Front Fog Lamp. | | 6.2 | 01/06/2017Nitin Nalinde Added requirement for turn inidcator voltage compensation control.  Par\_TurnWattageType added and other threshold parameter related requirement removed. | | 6.3 | 04/07/2017Nitin Nalinde Modified requirement for DRL: Off-state diagnostic to be removed. | | 6.4 | 08/07/2017Nitin Nalinde Added requirement for Partial Bulb Double Flicker for Turn Indicator Lamp control | | 6.5 | 12/10/2017Thanmaya Ramesh Added requirements for voltage compensation control for following lamps: Position Lamp,DRL Lamp,Reverse Lamp,Brake Lamp,Front Fog Lamp ,Rear Fog lamp   Added requirement for BCM to select loads as per the vehicle configuration | | 6.6 | 15/11/2017Thanmaya Ramesh Updated requirement for BCM to select loads as per the vehicle configuration. Updated the Lamp load wattages for X451-low,Q501-High,Q501-Low platforms wherein Lamp loads will be selected as per Par\_LmpWattageVehicleTypeSel.  Updated requirement for DRL/Position lamp activation/deactivation based on turn indicator lamp/Hazard lamp. | | 6.7 | 15/12/2017Thanmaya Ramesh Added new requirements as per the pin reassignment. | | 6.8 | 01/01/2018Thanmaya Ramesh Added requirement-Telltale shall be OFF when BCM User customization setting for DRL is disabled. | | 7.0 | 02/01/2018Thanmaya Ramesh Added voltage compensation parameter for turn indicator lamps | | 7.1 | 01/02/2018Thanmaya Ramesh Added requirement for DRL/position lamps -diagnostics | | 7.2 | 15/02/2018Thanmaya Ramesh **FD\_EL\_NM\_TS:Req19V2:**Updated the requirement | | 7.3 | 26/03/2018Suresh kumar S Updated Lamp wattages for X451 | | 7.4 | 05/04/2018Thanmaya Ramesh Updated requirements for pin reassignment w.r.t to BCM variant | | 7.5 | 31/05/2018Thanmaya Ramesh Updated steering wheel angle input CAN signals as per Q5 | | 7.6 | 14/06/2018Thanmaya Ramesh Updated Load wattages for Q501 and X451 | | 7.7 | 21/06/2018Thanmaya Ramesh Updated load wattages of position lamps for Q501 | | 7.8 | 31/07/2018Thanmaya Ramesh Updated Brake lamp and CHMSL wattages | | 7.9 | 31/08/2018Thanmaya Ramesh Update Position Lamp Load wattages for X451 | | 8.0 | 03/10/2018Thanmaya Ramesh Updated Load wattages for Headlamps,reverse lamps | | 8.1 | 11/10/2018Thanmaya Ramesh Updated Load wattages for X445 | | 8.2 | 23/01/2019Utkarsh Shukla  Nilesh Shirbhate  Thanmaya Ramesh Updated Operating power modes for all lamps as per Nexon EV strategy. Updated Reverse gear functionalities for DCT/TCU (Transmission Control Unit) as per Nexon EV strategy.  Added Requirements for Remote Light Access as per Nexon EV strategy | | 8.3 | 29/01/2019Nilesh Shirbhate Thanmaya Ramesh  Updated the lamp load wattages for Q502-High and Q502-Low | | 8.4 | 01/02/2019Thanmaya Ramesh Updated the Below requirement:**FD\_EL\_NM\_FFAC:Req16V1** | | 8.5 | 07/02/2019        Nilesh Shirbhate Updated the rear turn indicator lamp load wattages for X445-High and X445-Low | | 8.6 | 15/02/2019Thanmaya Ramesh Updated the NEXON ,NEXON MCE loads for all lamps. Updated Reverse lamp,Brake Lamp section for NEXON EV | | 8.7 | 21/02/2019Nilesh Shirbhate  Thanmaya Ramesh  Updated Reverse gear functionalities for AT as per Q5 ATstrategy. Updated Reverse gear functionalities,Brake Lamps,Reverse lamps as per Nexon EV strategy.  Updated the NEXON ,NEXON MCE loads for Brake,DRL,Reverse,turn,position lamps after discussion | | 8.8 | 07/03/2019Thanmaya Ramesh Added note for Crank & RUN power mode published by VCU for Nexon EV | | 8.9 | 09/03/2019Utkarsh Shukla  Thanmaya Ramesh Added Note for EV strategy while vehicle speed signal taken from IPC 3 message frame.  Updated signal list,Block diagrams for the same | | 9.0 | 11/03/2019Thanmaya Ramesh Updated X445 loads as per latest details | | 9.1 | 13/03/2019Thanmaya Ramesh Updated Q502-High and Nexon MCE Lamp loads as per latest details | | 9.2 | 19/03/2019Thanmaya Ramesh Updated X445 loads for Brake,reverse,Turn Indicator Lamps | | 9.3 | 02/04/2019Thanmaya Ramesh Updated CHMSL loads for Tiago,Tigor | | 9.4 | 12/04/2019Thanmaya Ramesh Updated Nexon EV loads as per inputs from Architecture Team | | 9.5 | 22/04/2019Utkarsh Shukla Vehicle type selection for Q502 high/low. | | 9.6 | 29/06/2019Thanmaya Ramesh Updated and added new requirements for Nexon EV | | 9.7 | 01/07/2019Thanmaya Ramesh Updated Approach Lamp Signals as per TCU function net | | 9.8 | 01/08/2019Thanmaya Ramesh Updated all load wattages of Nexon MCE,EV Req updated for Side turn indicator wattages for X451,X445,Q501 | | 9.9 | 10/08/2019Thanmaya Ramesh Updated all Exterior Lamp Loads for Tiago/Tigor MCE | | 10.0 | 21/08/2019Thanmaya Ramesh Updated Par\_LmpWattageVehicleTypeSel for X445 -low and high for Cornerning lamp requirements | | 10.1 | 26/08/2019Saichaitanya Voice command requirements for Hazard lamp, Turn indicators and Position lamp. | | 10.2 | 28/08/2019Thanmaya Ramesh For Nexon MCE-Updated Interior illuminattion loads driven by Position lamp pins | | 10.3 | 17/09/2019Thanmaya Ramesh Updated Rear Fog lamps wattage as 21 W for all variants | | 10.4 | 03/10/2019Thanmaya Ramesh Updated req for Reverse lamp driving rear turn indicators for Nexon MCE Added note for Nexon MCE under turn indicator wattages | | 10.5 | 10/10/2019Thanmaya Ramesh Updated req for Reverse lamp driving rear turn indicators for Nexon MCE Added note for Nexon EV under turn indicator wattages | | 10.6 | 14/10/2019Thanmaya Ramesh Updated Front Fog Lamp requirements for Immo related requirements | | 10.7 | 21/11/2019Utkarsh Shukla Updated side reapeter lamp wattage for Osprey (Nexon), Osprey (Nexon) MCE, Osprey (Nexon) EV, Tiago/Tigor Low/High, Tiago/Tigor MCE Low/High. | | 10.8 | 30/12/2019Saichaitanya Updated the Flickering condition for Highbeam and debounce time. | | 10.9 | 13/06/2020Utkarsh Shukla Updated Fog Lamps telltale driving Pins Details. | | 11.0 | 17/06/2020Utkarsh Shukla Updated Requirement reference in **FD\_EL\_NM\_FFL:Req15V1** and **FD\_EL\_NM\_RFL:Req15V1** | | 11.1 | 20/08/2020Utkarsh Shukla Updated Requirement for **Par\_LmpWattageVehicleTypeSel** for X445 platform for CHMSL. | | 11.2 | 21/08/2020Utkarsh Shukla Updated new requirements for Kenger 2.0. | | 11.3 | 07/10/2020Saichaitanya Added details for AC operation flashing requirement | | 11.4 | 27/10/2020Saichaitanya Modified AC operation flashing requirement | | 11.5 | 15/12/2020Utkarsh Shukla Updated requirement for side repeater. | | 11.6 | 23/12/2020Utkarsh Shukla Updated requirement "**FD\_EL\_NM\_FFL:Req15V2**" for Fog Lamp. | | 11.7 | 29/12/2020Utkarsh Shukla Updated requirement "**FD\_EL\_NM\_FFL:Req15V2**" for Fog Lamp. | | 11.8 | 17/03/2021Utkarsh Shukla Added requirements for RESS. | | 11.9 | 29/04/2021Utkarsh Shukla Updated requirements for Hazard lamps related to Emergency braking in **FD\_EL\_NM\_HzEBL:Req1V1, FD\_EL\_NM\_HzEBL:Req2V1**. Removed requirement related to emergency braking from Brake lights in requirement **FD\_EL\_NM\_BL:Req10V1**. | | 12.0 | 12/05/2021Saichaitanya Updated Turn indicators requirements during Emergency Braking as per OPL sheet sent to Hella on 11/05/2021 | | 12.1 | 17/05/2021Saichaitanya Clarifications updated as per OPL sheet Dt. 14-May-2021 | | 12.2 | 21/07/2021Saichaitanya Remote Engine Start Stop (RESS) related open point updated. | | 12.3 | 05/08/2021Saichaitanya Requirements related to Remote Engine Start function, please refer the RESS FD. | | 12.4 | 13/08/2021Saichaitanya Requirements related to Hazard Lamp operation (CAN based) has been added. | | 12.5 | 03/09/2021Saichaitanya Limber platform updates | | 12.6 | 04/10/2021Saichaitanya Change in Signal name: Hazard\_Lamp\_Vcu\_Req to VcuHazardLampReq | | 12.7 | 22/10/2021Saichaitanya Harrier / Safari MCE2 Power wattage requirement. | | 12.8 | 15/12/2021Saichaitanya Lamp feature Priority modification for Kenger 2.0 and above | | 12.9 | 17/12/2021Saichaitanya Emergency braking activation requirement strike out on the basis of lamp features priority updates. | | 13.0 | 24/12/2021Saichaitanya Emergency braking activation requirement reverted (same was striked out in V12.9) on the basis of lamp features priority updates. | | 13.1 | 24/01/2022Pranjali/ Ravindra CabinCooling requirement striked out & RESS relevant requirement added | | 13.2 | 17/03/2022Pranjali/ Prashanth New ADAS features, AEB & HBA added in section 19 & 20(Entire New Section Added) Requirements updated for BrkLightSig2 signal input | | 13.3 | 26/05/2022Pranjali / prashanth Mettu Req. added for new parameters "Par\_LEDHeadLampFunction" and "Par\_MFRHeadLampFunction" Lamp Load added for Nexon MCE2 and Q5 MCE  Requirements added for Rear ADAS features- Door Open Alert and Rear Collision Warning | |
| 80 | **Change History** |
| 83 | |  |  | | --- | --- | | **Issue** | **PageSection** **Change details** | | 1.0 | AllAll First release | | 1.1 | All 1.    Config. Parameters name changed. 2.    Signal (ignition related) added in block diagram and in input-output tables. 3.    Requirements where detection of failure on input signals is not possible are removed. 4.    Requirements on Ignition / switch Failures are removed 5.    Brake lamp, Rear fog, Reverse lamp and Position Lamp will be control by two pins instead of one. 6.    Detected Failures section removed. | |  | 3.9.2 Requirements for failure mode updated. -    Par\_HazardSwStuckTime added for switch stuck detection. -    Parameter TturnIndicatorOnBulbFailure removed. -    Failure requirement added. | |  | 4.9.2 - Requirements on position sw failure removed. - failsafe req added | |  | 6.9.1 - Normal mode req. added. | |  | 7.9.2 Switch failure req. removed. | |  | 8.9.1 - Two config. Parameters added and Req. added based on this config parameter. - front fog activation and deactivation req changed.(one o/p pin is used in base BCM and two o/p pins are used for Mid BCM) - Requirements on switch failures is removed. | |  | 9.9.1 - Req. added based on config parameter - Rear fog activation and deactivation requirement changed based on config parameters. | |  | 10.3.1 - operating powermode changed. | |  | 10.9.2 - Requirements on switch failures is removed | |  | 10.9.2 - failsafe req added. | |  | 11.9.1 Req. added based on single and dual chamber. | |  | 12.9.1 - Req1 changed. - Requirements on switch failures is removed | |  | 13.9.1 - Req added based on parameter “Par\_UCSEnable”. - Manual and Auto timer replaced by Single timer. - Automatic activation and deactivation changed. - Req for lamps use in FMH added. - Req for FMH activation using remote changed. | |  | 14.9.1 Activation & deactivation req changed. | |  | 14.9.2 - FM Req added based on unavailability of vehicle speed signal. - Requirements on switch failures is removed | |  | 15.9.1 - Req added based on parameter “Par\_UCSEnable”. | |  | 16 Signals added in block diagram, input- output table. | | 2.0 | All Engine RUN mode added in all Powermode table. | |  | 3.3.3  Threshold voltage for Hazard changed. | |  | 3.9.2 Failure mode req. updated. | |  | 4.9.1 Req updated based on Par\_PositionContactAtHeadlampON | |  | 4.9.2 Failure mode req. updated. | |  | 4.11 , 4.12 HeadlampON signal added | |  | 4.14 Configuration parameter Par\_PositionContactAtHeadlampON added. | |  | 7.13 RevLampStatus is replaced by RevGearStatus | |  | 8.9.1 -Front fog lamp behaviour in auto mode added. -Config parameter added for fog lamp telltale . | |  | 8.9.2 Failure mode updated. | |  | 9.9.1 -Rear fog lamp behaviour in auto mode added. - Config parameter added for fog lamp telltale. | |  | 9.9.2 Failure mode req. updated. | |  | 12.3.1 Turn Tip activation enabled on start mode. | |  | 12.9.1 Turn Tip detection requirement added. | |  | 12.14 TurnTip min – max range changed. | |  | 15.3.1 Approach light function disabled in battery saver mode. | |  | 16.9.2 Switch failure req removed | |  | 8.12, 9.12, 16.12 LowBeamSwitchSig applicability removed from base BCM. | |  | All Requirement ID added for operating power mode and configuration parameters. | | 2.1 | NOTE : Since baseline 1.0 in DOORS is same as v2.0 in word, all changes done thereafter are mentioned in 2.1  Power mode updated for Hazard, position lamps, brake lamps and CHMSL, High beam, FMH and Approach lamps. (Features Non-functional in Standby mode) FMH : Auto with & without RLS req combined to form one requirement. | | 2.1 | Updated as per Annexture\_1.3 | | 2.1 | 1) DRL features added 2) CAN Status signals and requirement for status signal added. 3) CAN signal list updated. | | 2.2 | 1) status signal requirement added for cornering lamp feature. 2) Par\_CrashSel values updated. | | 3.0 | 1) DRL updated. 2) CAN Status signals added in Input Output list. | | 3.1 | Low beam malfunction status signal added. | | 3.2 | Operating Powermodes modified: Hazard & Position Lamp Full function on Transport Park. | | 3.3 | Note added in Position Lamp Req when combined with DRL | | 3.3 | FMH Auto mode req updated: Headlamp ON dependency removed from Engine turning OFF. | | 3.3 | DRL: Failure mode added | | 3.4 | FMH: Added FMH on remote activation for Mid BCM | | 3.5 | FMH: FMH activation with 2 button RKE onle | | 3.5 | FMH: Par\_TwoButtonRKE added. | | 3.6 | Change history updated | | 3.7 | 7877 Par\_MLsAutoOffTransitionDelay range and default value changed. | | 3.7 | 1772 Position Lamps: Failure mode req for postion lamps failure changed . (Req 1) | | 3.7 | 9347, 9358 Brake lamp & CHMSL: Req added for signal from ESP/ABS. | | 3.7 | 2132, 2154, 2456, 2478 Brake lamp & CHMSL : Normal mode Req modified considering CAN signal from ESP. | | 3.7 | 9228, 9331 Brake lamp & CHMSL: failure mode req for implausible CAN signal added | | 3.7 | 2326 Par\_ABsESpAvailable added | | 3.8 | 9390 Position Lamps: Requirement added to avoid unneccessary battery drain. | | 3.8 | 2783, 2794, 9420 Reverse lamp:Normal req. modified and failure req added | | 3.8 | Below feature parameters added Par\_PositionLmpSel Par\_LowBeamSel Par\_HighBeamSel Par\_AutoHeadlmpSel Par\_TurnTipSel Par\_RevLmp Par\_BrkLmp Par\_RearFogFitted | | 3.8 | 9619 Crash detection requirement added. | | 3.8 | 9390, 1987 Position Lamp: Requirement modified based on Par\_MinBatteryDrain. | | 3.8 | 1215 CrashSignal renamed as CrashoutputSignal | | 3.8 | 9725, 3675,4257 Rear Fog and Low beam: Req added/modified to deactivete rear fog and low beam during crank as per PAT Recommendation. | | 3.8 | 5618 Par\_TurnTripTimeMinThd – parameter minimum duration changed from 10 ms to 20  ms | | 3.9 | 9746 General Req 3 added for parameter if KeyIN input is not available in vehicle | | 3.9 | 3033 Par\_TCuAvailable parameter added in Reverse lights | | 3.9 | 9797, 3033, 2783 Reverse lamp : Req and Parameter added for single bulb reverse lamp. RevLightSig is replaced with CurGearTcu | | 3.9 | 949,1073 Requirement updation for crash and flasher priority | | 3.9 | 9838 General requirement for crash | | 3.9 | 5844, 5855, 5866, 5888, 5910, 5921, 5932, 5899, 10192 FMH: Requirement update to consider tailgate, bonnet and headlamp, position lamp input. FMH with RKE deactivation requirement added. | | 3.9 | 9805, 4162 Rear Fog: Req and Parameter added for single bulb Rear fog lamp. | | 3.9 | 4797 Requirement reworded for FTP | | 3.9 | 9933 Requirement added based on par\_ CombiSwitchType | | 3.9 | 4797 Requirement reworded for FTP | | 3.9 | 9933, 9945 Requirement Added based on Combiswitch type | | 3.9 | 10066, 5073 Parameter and Requirement added for FTP in case of single chamber | | 3.9 | 3580, 4162, 8429, 1987, 6272, 7291 Default value for parameter changed for Par\_FrontFogSwitchSel, Par\_MastLightSwitchSel,Par\_FrontFogFitted, Par\_FogTelltaleOnIC, Par\_RearFogFitted, Par\_DRlEnable, Par\_PositionContactAtHeadlampON, Par\_UCSEnable, Par\_TwoButtonRKE, Par\_AppLightONTime | | 3.9 | All Operating Powermode Section Added Powermode Transport Drive Crank and Transport Drive Run for all features | | 4.0 | ID - 1534 **FD\_EL\_CP\_TS:Req1V1:** Default value of configuration parameter 'Par\_HazardONTime' and 'Par\_HazardOFFTime' is changed to 320 mSec (as recommended by PAT team) | |  | ID - 1772 **FD\_EL\_FM\_PL:Req1V1:** Requirement modified for better understanding.  If at least one of the position lamp output fails BCM shall publish malfunction indication CAN message (PositionLmpMalFn) as error indication to other ECU added. | |  | ID - 2170 **FD\_EL\_FM\_BL:Req1V1:** Requirement modified for better understanding.  If at least one of the brake lamp output fails BCM shall publish malfunction indication CAN message (BrakeLmpMalFn) as an error indication to other ECU added. | |  | ID - 9419 **FD\_EL\_FM\_RL:Req1V1:** Requirement modified for better understanding. Malfunction indication condition in case signle output selection as well as in case of both output selection added. | |  | ID - 3273 **FD\_EL\_FM\_FFL:Req1V1:** Requirement modified for better understanding. Telltale deactivation condition in case of Mid BCM (two outputs) and in case of Base BCM (single output) added. | |  | ID - 3855 **FD\_EL\_FM\_RFL:Req1V1:** Requirement modified for better understanding.  Telltale deactivation condition in case of two outputs and in case of single output added. | |  | ID - 4661 **FD\_EL\_OPM\_HLHB:Req1V1:** Power mode table modfied. "Transport Park", and "Battery Save" as full function added. | |  | ID - 4742 **FD\_EL\_NM\_HLHB:Req1V1:** Requirement modified to consider the accessory input (IgnKeyStateACC) to activate the high beam output. | |  | ID - 4753 **FD\_EL\_NM\_HLHB:Req2V1:** Requirement modified to consider the accessory input (IgnKeyStateACC) to deactivate the high beam output. | |  | ID - 4257 **FD\_EL\_OPM\_HLLB:Req1V1:** Power mode table modfied. "Transport Park (IgnKeyStateACC == Active)", "Accessory", Accessory Delay (IgnKeyStateACC == Active), and "Battery Save" as full function added. | |  | ID - 4338 **FD\_EL\_NM\_HLB:Req1V1:** Requirement modified to consider the accessory input (IgnKeyStateACC) to activate the high low output. | |  | ID - 4349 **FD\_EL\_NM\_HLB:Req2V1:** Requirement modified to consider the accessory input (IgnKeyStateACC) to deactivate the low beam output. | |  | ID - 9420 **FD\_EL\_FM\_RL:Req2V1:** System requirement ID corrected (Previous ID FD\_EL\_FM\_RL:Req1V1 new ID FD\_EL\_FM\_RL:Req2V1) | |  | ID - 5073 **FD\_EL\_CP\_HLHB:Req1V1:** Description of configuration parameter "Par\_FTpOnIgnOff" modified for better understanding. | |  | ID - 10383 **FD\_EL\_NM\_HLHB:Req13V1:** New requirement added for better understanding of flash to pass functionality.  Flash to pass behavior during FTP Function with IgnOn only. | |  | ID - 10394 **FD\_EL\_NM\_HLHB:Req14V1:** New requirement added for better understanding of flash to pass functionality. FTP Function with IgnOn and IgnOff also | |  | ID - 3033 Description of configuration parameter "Par\_ReverseLampSingleBulb" modified for better understanding. | |  | ID - 4162 **FD\_EL\_CP\_RFL:Req1V1:** Description of configuration parameter "Par\_RearFogLampSingleBulb" modified for better understanding. | | 4.1 | ID - 5618 **FD\_EL\_CP\_LC:Req1V1 :** Default and Max Value of 'Par\_TurnTripTimeMaxThd' configuration parameter changed Max. - 1000 Default - 600 | |  | ID - 10066 **FD\_EL\_NM\_HLHB:Req12V1:** Requirement modified, "DTC shall be logged" removed. | |  | ID - 7291 Configuration parameter - "Par\_UCSEnable" default value changed to 0 (Disable) | |  | ID - 4257 Power mode table modified - Battery save - No Function, Battery save (IgnKeyStateACC == Active) - Full function added | |  | ID - 4661 Power mode table modified - Battery save - No Function, Battery save (IgnKeyStateACC == Active) - Full function added | |  | ID - 7041 Requirement modified for better understanding, IgnKeyStateIGN = Active added. | |  | ID - 1734 Requirement modified for better understanding, Position light activation behaviour in case of Base BCM added. | |  | ID - 1745 Requirement modified for better understanding, Position light deactivation behaviour in case of Base BCM added. | |  | ID - 3196 Requirement modified for better understanding, Front fog light activation behaviour in case of Base BCM added. | |  | ID - 3207 Requirement modified for better understanding, Front fog light deactivation behaviour in case of Base BCM added. | |  | ID - 3767, ID - 3778 Requirement modified for better understanding, Rear fog light activation behaviour in case of Base BCM added. | |  | ID - 3789, ID - 3800 Requirement modified for better understanding, Rear fog light deactivation behaviour in case of Base BCM added. | |  | ID - 10469 General requirement added, **FD\_EL\_NM\_GR\_Req7v1:** Reverse gear activation or deactivation if TCU present added. | |  | ID - 10480 General requirement added, **FD\_EL\_NM\_GR\_Req8v1:** Reverse gear activation or deactivation if TCU not present added. | |  | ID - 6489, ID - 6511 Requirement modified for better understanding, reference for reverse gear activation or deactivation added. | | 4.2 | ID - 9945, ID - 9948 Normal and failure Operation Strategy, Table modified, Row No. 8 & 9 - PL ON added. | |  | ID - 9933 Requirement modified for better understanding. **FD\_EL\_NM\_HLHB:Req11V1** - note added. | |  | ID - 6901 Requirement modified for better understanding. **FD\_EL\_OPM\_APL:Req1V1** - Power mode table modified, Accessory mode full function added. | | 4.3 | ID - 1140 Parameter "Par\_HazardSwStuckTime" replaced with "Par\_SwitchStuckTim". | |  | ID - 1534 Parameter "Par\_HazardSwStuckTime" replaced with "Par\_SwitchStuckTim". Description of "Par\_SwitchStuckTim" description updated. | |  | ID - 1987 Parameter "Par\_MinBatteryDrain" description updated as per DID list V4.20. | |  | ID - 2326 Parameter "Par\_ABsESpAvailable" description updated as per DID list V4.20. | |  | ID - 2650 Parameter "Par\_CHMSlHwInterface" removed from FD. | |  | ID - 2445 Requirement modified as "Par\_CHMSlHwInterface" removed from FD. | |  | ID - 3033 Parameter "Par\_RevLmp" description updated as per DID list V4.20. | |  | ID - 6816 Parameter "Par\_CornerlampConfig" default value modified with 0 as per DID list V4.20. | |  | ID - 6272 Parameter "Par\_FMHDeactDelayTime" Min. Value = 0, Max. Value = 240, Resolution = 10 modified as per DID list V4.20. | |  | ID - 7291 Parameter "Par\_AppLightONTime" resolution modified with 10 as per DID list V4.20. | |  | ID - 7877 Parameter "Par\_MLsAutoOffTransitionDelay" resolution modified with 10 as per DID list V4.20. | |  | ID - 8429 Parameter "Par\_DRlDropOutReg" description updated as per DID list V4.20. | | 4.4 | ID - 1534 Configurable parameters Par\_HazardONTime, Par\_HazardOFFTime, Par\_TurnIndicatorOffTime, Par\_TurnIndicatorOnTime default values changed to 300 mSec | |  | ID - 7877 Configurable parameters, "Par\_AutoHeadlmpSel" added in the list as it was present in DID list but not in FD |  |  |  | | --- | --- | |  | ID-8123Automating switching ON of DRL is not de-activated condition added |  |  |  | | --- | --- | |  | ID-10670 Automatic switching ON of DRL de-activation requirement added | |  | ID-10681 Automatic switching ON of DRL activation requirement added | |  | ID-10692 Automatic switching ON activation/de-activation state shall be memorised requirement added | | 4.6 | ID-10735 ID-10746 ID-10758 ID-10770 ID-10782 Functional safety requirements added (Implemented in R6.0 SW release) | | 4.7 | ID-1196  ID-10828 Requirements for Turn Indicator added. Instead of Digital, the turn indicator output shall be controlled through PWM. | |  | ID - 10840 ID - 10862 ID - 10873 ID - 10851 ID - 10884 Requirements to publish the crash output state over CAN for other ECUs added | |  | ID - 10895 Requirement to configure the CAN message IDs as per configuration parameter added | |  | ID - 11022 Note added | | 4.8 | ID - 1427 Output Signal Table - "BCMCrashOutputState" & "BCMCrashOutputStateStatus" CAN signal added | |  | ID - 1534 Configuration Parameter Table - "Par\_ChangeMsgID" added | | 4.9 | ID - 10895 ID - 1534 Par\_ChangeMsgID updated for 2 bits instead of 1 bit | | 5.0 | ID-11117 ID-11128 ID-11139 New requirement to use the reverse lamp outputs to drive the rear turn indicator LED lamps added | |  | ID-1534 Configurable parameter table - "Par\_LEDBasedRearTurnIndLamps" added in list | |  | ID-1427 Outputs list - RevLampSigLH & RevLampSigRH output added | |  | ID-11150 ID-11161 ID-11172 New requirements to publish the brake lamp status over CAN for other ECUs added (independent of trailer ECU) | |  | ID-2249 Outputs list - BrkLmpON & BrkLmpONStatus signals added | |  | ID-2200 Block Diagram - BrkLmpON & BrkLmpONStatus signals added | | 5.1 | ID-1427  ID-5526 Outputs - "TurnLHInd" & "TurnRHInd" output marked as PWM instead of digital | |  | ID-2805 Applicable Variants - Base BCM added | |  | ID-10469  ID-10480 Requriements modified to publish the reverse gear status over CAN for Base BCM | |  | ID-2834 Inputs - CAN signals 'CurGearTcu' & 'CurGearTcuStatus' applicability marked to Base BCM. | |  | ID-2941 Outputs - CAN signals 'RevGear' & 'RevGearStatus' applicability marked to Base BCM. | | 5.2 | ID-1196 ID-10828  ID-10782 ID-10840 ID-10862 ID-10873 ID-10851 ID-10884 Requirement number (text IDs) corrected | | 5.3 | ID-11128 Requirement modified to log the new DTCs as per new set threshold | | 5.4 | ID-9632 ID-9633 Crash (ON) & No Crash (OFF) definition updated by capturing all available CAN signal values | | 5.5 | ID- 11429 ID- 11437 ID- 11445 1)Turn indicator STG & STB and Open ckt. wattage calculation req. added. FD\_EL\_NM\_TS:Req21V1 FD\_EL\_NM\_TS:Req22V1 FD\_EL\_NM\_TS:Req23V1 2) Below Parameter added. Par\_ThresholdPercSTG Par\_ThresholdPercSTB Par\_TurnWattageOpenCkt Par\_TurnWattage | | 5.6 | ID- 10670 ID- 10681 ID- 11550  FD\_EL\_NM\_DRL:Req10 and FD\_EL\_NM\_DRL:Req11 modified (DRL activation and deactivatiion logic is now based on OFF -> Position ON input / Headlamp ON input -> OFF transitiion.) | | 5.7 | ID-11584 "FD\_EL\_NM\_TS:Req24V1" new requirement added | |  | ID-1534 Configurable parameters - 1. Par\_ThresholdPercSTB & Par\_ThresholdPercOpen Removed 2. Par\_ThresholdPercSTbOpen added 3. Par\_MultFactorPartial added | |  | ID-11437 "FD\_EL\_NM\_TS:Req22V2" Modified to consider the open fault as well. | |  | ID-11445 "FD\_EL\_NM\_TS:Req23V1" Removed as no more applicable. | |  | ID-11633 "FD\_EL\_NM\_GR\_Req15v1" new general requirement added | | 5.8 | ID-11429 ID-11437 ID-11584 ID-11633 Below Requirement removed. FD\_EL\_NM\_TS:Req21 FD\_EL\_NM\_TS:Req22 FD\_EL\_NM\_TS:Req24 FD\_EL\_NM\_GR\_Req15 | |  | ID-11649 New req. FD\_EL\_NM\_TS:Req25 added to calculate threshold for STG, STB or Open. | |  | ID-1534 Par\_TurnWattageType added and other threshold parameter for turn indicator removed. | | 5.9 | \* ID-6489 :  ID-6500 ID-6511  ID-6533 :  ID-6533 :  ID-6544 :  ID-8635 :  ID-9591 :  ID-6555 :       ID-11723  ID-11787 ID-11809 ID-11820 ID-11831  ID-11842 ID-11864  ID-11875   ID-6816 \* ID-6489 : FD\_EL\_NM\_FFAC:Req1 ID-6500:FD\_EL\_NM\_FFAC:Req2 ID-6511 : FD\_EL\_NM\_FFAC:Req3 ID-6533 : FD\_EL\_NM\_FFAC:Req4 ID-6533 : FD\_EL\_NM\_FFAC:Req5 ID-6544 : FD\_EL\_NM\_FFAC:Req6 ID-8635 : FD\_EL\_NM\_FFAC:Req7 ID-9591 : FD\_EL\_NM\_FFAC:Req8 ID-6555 : D\_EL\_FM\_FFAC:Req1 Above requirements updated  \* New req. based on steering input added. ID-11723 : FD\_EL\_NM\_FFAC:Req9 ID-11787 : FD\_EL\_NM\_FFAC:Req10 ID-11809 : FD\_EL\_NM\_FFAC:Req11 ID-11820 : FD\_EL\_NM\_FFAC:Req12 ID-11831 : FD\_EL\_NM\_FFAC:Req13 ID-11842 : FD\_EL\_NM\_FFAC:Req14 ID-11864 : FD\_EL\_NM\_FFAC:Req15 ID-11875 : FD\_EL\_FM\_FFAC:Req2  \* ID-6816 : FD\_EL\_CP\_FFAC:Req1 Par\_FrntCornLightOnSpdThd range changed and below parameters added: Par\_CorneringLampActInput, Par\_CorneringLampActAngle and Par\_CorneringLampDeActAngle | | 6.0 | ID-6555 and ID-11875 FD\_EL\_FM\_FFAC:Req1 and FD\_EL\_FM\_FFAC:Req2 are updated to consider implausible signal. | | 6.0 | ID-11649 and ID-11671 ID-11886 and ID-11897 ID-11945 and ID-11956  ID-12020 and ID-12031 ID-12074 and ID-12085  ID-12117 and ID-12128 ID-12220 and ID-12182  Various loads based requirement added based on various platform.   FD\_EL\_NM\_TS:Req25 updated   FD\_EL\_NM\_PL:Req5 added  FD\_EL\_NM\_BL:Req8 added  FD\_EL\_NM\_RL:Req7 added  FD\_EL\_NM\_FFL:Req13V added  FD\_EL\_NM\_RFL:Req13V added  FD\_EL\_NM\_DRL:Req13 added | | 6.1 | ID-11674 For Nexon, 1. Front turn indicator wattage changed from 21w to 24w 2. Rear turn indicator wattage changed from 10w to 21w | |  | ID-3188 ID-3199 ID-3210 ID-3254 ID-3265 ID-3276 ID-7985 ID-6409 FD\_EL\_NM\_FFL:Req4, FD\_EL\_NM\_FFL:Req5, FD\_EL\_NM\_FFL:Req6, FD\_EL\_NM\_FFL:Req10, FD\_EL\_NM\_FFL:Req11, FD\_EL\_NM\_FFL:Req1, FD\_EL\_NM\_FFL:Req2, 13.1, 4.3.5.25 :- In Mid BCM, FrFogLmpRelay will be used as separate output for driving Tell-tale indicator on fascia switch for Front Fog Lamp. | | 6.2 | FD\_EL\_NM\_GR\_Req16 FD\_EL\_CP\_GR:Req1 Added requirement for turn inidcator voltage compensation control | |  | Par\_TurnWattageType added and other threshold parameter for turn indicator removed. | | 6.3 | FD\_EL\_NM\_DRL:Req13 Modified requirement for DRL(Day time running light) | | 6.4 | FD\_EL\_FM\_TS:Req2 FD\_EL\_FM\_TS:Req3 FD\_EL\_FM\_TS:Req4 FD\_EL\_FM\_TS:Req11 FD\_EL\_CP\_TS:Req1 Q5 Vehicle Program - Added requirement for Partial Bulb Double Flicker for Turn Indicator Lamp control | | 6.5 | ID:12359 ID:12538  ID:12687  ID:12591 ID:12622 ID:12665 ID:12564         Added requirements for voltage compensation control for following lamps: Position Lamp,DRL Lamp,Reverse Lamp,Brake Lamp,Front Fog Lamp ,Rear Fog lamp:  FD\_EL\_NM\_GR\_Req16v1  FD\_EL\_FM\_PL:Req4V1  FD\_EL\_NM\_BL:Req9V1  FD\_EL\_NM\_RL:Req8V1  FD\_EL\_NM\_FFL:Req14V1  FD\_EL\_NM\_RFL:Req14V1  FD\_EL\_NM\_DRL:Req14V1 | |  | ID:1987,ID:2326, ID:3033,ID:3580 ID:4162,ID:8429 Configurable parameters-Par\_PosLampVoltCompensation,Par\_BrakeLampVoltCompensation,Par\_ReverseLampVoltCompensation,Par\_FrontfogLampVoltCompensation,Par\_RearfogVoltCompensation,Par\_DRLVoltCompensation have been added. | |  | ID:12514  ID:12370  FD\_EL\_NM\_GR\_Req17v1 New requirement added where the BCM shall select lamp loads as per different vehicles   Configurable parameter Par\_LmpWattageVehicleTypeSel has been added. | | 6.6 | 15/11/2017ID:12517  FD\_EL\_NM\_GR\_Req17v1 Updated the requirement where the BCM shall select lamp loads as per different vehicles(Added for Q501-High,Q501-Low,X451-High,X451-Low) | |  | ID:11671 ID:11897 ID:11959 ID:12085 ID:12128 ID:12031 ID:12182  Updated the lamp load wattages for Q501-High,Q501-Low and X51 based on Par\_LmpWattageVehicleTypeSel. | |  | ID:12746 FD\_EL\_NM\_DRL:Req6V2 Added requirement for activation/deactivation of DRL or position lamps based on Par\_DedicatedDrLConfig when turn indicator/hazard switch is active. | | 6.7 | 15/12/2017ID:11117 FD\_EL\_NM\_TS:Req19V1 Modified Requirement for driving rear turn indicators via the reverse lamp outputs based on Par\_LmpWattageVehicleTypeSel. | |  | ID:12799  FD\_EL\_NM\_TS:Req26V1: Added Requirement for driving Rear turn indicators via the brake lamp outputs for BCM variant-Base and vehicle type-X451. | |  | ID:12813   FD\_EL\_NM\_FFL:Req15V1: Added Requirement wherein when **Par\_LINbasedIMMOfunction is enabled**,BCM shall drive IMMO telltale via pin 44- frfogrelay/front fog facsia switch telltale and  RrFogLmpCntrlLH(Pin 2) shall be driving the Rear fog lamp control LH Relay -Double Config (driving Rear Fog LH & RH Bulb ) Single Config (driving Rear Fog Lamp LH) .  and the RrFogLmpCntrlRH(Pin 5) shall be driving the Rear Right Fog lamp / Rear Fog Lamp Relay / Front Fog tell tale  Table added. | |  | ID:12836  FD\_EL\_NM\_RFL:Req15V1:Added Requirement where Diagnostics of only the Relay driving Rear Fog lamp shall be calculated only when **Par\_LINbasedIMMOfunction is enabled** . | | 6.8 | 01/01/2018ID:12877 FD\_EL\_NM\_DRL:Req15V1:Added Requirement where Telltale shall be OFF if BCM User customization setting for DRL is disabled(HuDRLActiveSignalVal=0). | | 7.0 | 02/01/2018ID:12370 FD\_EL\_CP\_GR:Req1V1**:**Configurable parameter Par\_TurnLampVolt Compensation added. | | 7.1 | 01/02/2018ID:12946   ID:12925 **FD\_EL\_FM\_PL:Req5V1,FD\_EL\_NM\_DRL:Req16V1**:Added requirement where Diagnostics of DRL/Position lamps shall not be monitored when turn indicator/Hazard function is active. | | 7.2 | 15/02/2018ID:1117  **FD\_EL\_NM\_TS:Req19V2:**Updated the requirement | | 7.3 | 26/03/2018ID: 11897 Updated Rear Position lamp & Licence plate lamp wattages for X451 low & High | | 7.4 | 05/04/2018 11117   11128 12799 13209 **FD\_EL\_NM\_TS:Req19V3,FD\_EL\_NM\_TS:Req20V1**:Requirement updated where only Base BCM variant is considered and not the vehicle type,as per discussion with supplier **FD\_EL\_NM\_TS:Req26V1**:Requirement updated where only MGW BCM variant is considered and not the vehicle type,as per discussion with supplier **FD\_EL\_NM\_TS:Req27V1**:Requrement added for diagnostics | | 7.5 | 31/05/2018  **FD\_EL\_NM\_FFAC:Req10V1,FD\_EL\_NM\_FFAC:Req15V1**:Requirement updated for steering wheel angle as per Q5 aspect **FD\_EL\_FM\_FFAC:Req2V2**: Striked out since it is a duplicate of 15v1 | | 7.6 | 14/06/201811671 11897 12182 11956 **FD\_EL\_NM\_FFAC:Req16V1:**New req added for steering wheel angle   **Updated load wattages of**  **turn,position,DRL lamps for Q501 and Brake lamps for X451** | | 7.7 | 21/06/20189007 Updated Load wattages of Positon lamps and added a note | | 7.8 | 31/07/201811956 Updated Brake lamp and CHMSL wattages for Low and Q501-High | | 7.9 | 31/08/20189007 Updated Load wattages of Positon lamp for X451 | | 8.0 | 03/10/201813321,13267,12034 Updated Load wattages for Headlamps,Reverse Lamps | | 8.1 | 11/10/2018  Updated Exterior Lamp Loads for X445 | | 8.2 | 23/01/2019735, 772, 773, 13659, 1652, 13672, 2050, 13679, 2364, 13686, 2698, 13693, 3071, 13697, 3675, 13704, 4257, 13711, 4661, 13718, 5160, 13725, 5707, 13732, 6413, 13739, 6901, 13746, 7378, 13753, 8013, 13760  2783,2794,9608,9420,9418,2834,3033, 10469,10480  13798,13809,14024, 14036,14047,14058 Updated Operating power modes for all lamps as per Nexon EV strategy.           Updated Reverse gear for DCT/TCU(Transmission Control Unit) functionality as per Nexon EV strategy.    Added following requirements,Updated Block Diagrams,Input output Signal List under Hazard,Position,Low beam lamps section for remote light access w.r.t to NEXON EV strategy: **FD\_EL\_NM\_TS:Req28V1,FD\_EL\_NM\_TS:Req29V1**,**FD\_EL\_NM\_PL:Req6V1**,**FD\_EL\_PL\_TS:Req7V1**,**FD\_EL\_NM\_HLB:5V1**,**FD\_EL\_NM\_HLB:Req6V1** | | 8.3 | 29/01/2019    11897,14191     Updated the lamp load wattages for Q502-High and Q502-Low | | 8.4 | 01/02/201913354 Updated below req**:FD\_EL\_NM\_FFAC:Req16V1** | | 8.5 | 07/02/2019        11671     Updated the rear turn indicator lamp load wattages for X445-High and X445-Low | | 8.6 | 15/02/20199347 2157  2786 2797 9611 9423 Updated all Lamp Loads for Nexon and Nexon MCE platform.  Updated following requirements,Block diagrams,Input-Output Signal List,Configurable parameters under following sections for Nexon EV respectively: Brake Lamps-**FD\_EL\_NM\_BL:Req1V1,**  **FD\_EL\_NM\_BL:Req3V1**  **FD\_EL\_NM\_BL:Req5V1** Reverse Lamps-**FD\_EL\_NM\_RL:Req1V2, FD\_EL\_NM\_RL:Req2V2** **FD\_EL\_NM\_RL:Req3V2** **FD\_EL\_FM\_RL:Req2V2**  Updated requirements: **FD\_EL\_NM\_GR\_Req7v2** **FD\_EL\_NM\_GR\_Req8v2** Updated Signal description of CurGearDct,CurGearTCu | | 8.7 | 21/02/20192783,2794,9608,9420,9418,2834,3033, 10469,  11897,11671,12182,11956,12031    10480,10469,2132,9347,2154,2783,2794,9608,9420   Updated requirements for reverse gear for Q5 AT functionality   Updated Position,Turn Indicator,DRL,Brake,Reverse Lamp loads for Nexon and Nexon MCE.  Updated following for Nexon EV- **FD\_EL\_NM\_GR\_Req8v3** **FD\_EL\_NM\_GR\_Req7v3**  Brake Lamps-**FD\_EL\_NM\_BL:Req1V1,**  **FD\_EL\_NM\_BL:Req3V1**  **FD\_EL\_NM\_BL:Req5V1** Reverse Lamps-**FD\_EL\_NM\_RL:Req1V2, FD\_EL\_NM\_RL:Req2V2** **FD\_EL\_NM\_RL:Req3V2** **FD\_EL\_FM\_RL:Req2V2** | | 8.8 | 07/03/20199850,886,897,9393,3232,9728,4833,5858,5891,10195,7472,8147  Updated requirements for Nexon EV strategy for Run & crank Power modes-      FD\_EL\_NM\_GR\_Req6v1,      FD\_EL\_NM\_TS:Req1V1,FD\_EL\_NM\_TS:Req2V1, FD\_EL\_NM\_PL:Req4V1,FD\_EL\_NM\_FFL:Req8V1,FD\_EL\_NM\_RFL:Req11V1,FD\_EL\_NM\_HLHB:Req9V1,FD\_EL\_NM\_FM:Req7V1,      FD\_EL\_NM\_FM:Req10V1,FD\_EL\_NM\_FM:Req17V1,FD\_EL\_NM\_AHL:Req2V1,FD\_EL\_NM\_DRL:Req3V1 | | 8.9 | 09/03/20196489, 6511, 8635, 11787, 11820, 11864, 6555 Added Note for EV strategy while vehicle speed signal taken from IPC 3 message frame. Updated signal list,Block diagrams for the same | | 9.0 | 11/03/201911671,11897,11956, 12031 14366 12799,13209,11117 11128 Updated following loads for X445- Rear and front Turn indicators,Position lamps,Brake,Reverse Note updated for reverse lamps Requirements updated for Reverse and brake lamps for X445-HIGH||LOW | | 9.1 | 13/03/201911897 11671  Updated Position Lamp loads(tail) of Q502 -HIGH and Position,front turn lamps of Nexon MCE High | | 9.2 | 19/03/201911671,11956,12031,11897 Updated Rear Turn Indicator,Brake,Reverse lamp loads Added note for cockpit wattages driven by position lamps | | 9.3 | 02/04/201911956 Updated CHMSL loads for Tiago,Tigor | | 9.4 | 12/04/201911671,11897,11956,12182. 14757 14758 Updated Lamp loads for Turn Indicator,Position Lamps,Brake,DRL for Nexon EV. Note added for Nexon EV | | 9.5 | 22/04/201913354, 11864 Updated Vehicle type selection for Q502 high and low variant. | | 9.6 | 29/06/201914875,14864,14940,14838,7092,7199   14047,14058, 14953,4410 For Nexon EV- Added following requirements for Approach lamp on remote access -**FD\_EL\_NM\_APL:Req9V1**  **FD\_EL\_NM\_APL:Req10V1**  **FD\_EL\_NM\_APL:Req11V1** Updated Block Diagram,Input signals Output signals  Removed following requirements for Low Beam lights**-**  **FD\_EL\_NM\_HLB:Req5V1** **FD\_EL\_NM\_HLB:Re6V1** Block Diagram | | 9.7 | 01/07/201914875,14864,7090 7092,7199 Updated Approach Lamp Signals as per TCU function net **FD\_EL\_NM\_APL:Req9V1** **FD\_EL\_NM\_APL:Req10V1** Block Diagram Input signals Output signals | | 9.8 | 01/08/201911671,12182 11897 11956 12031 12085  12128 12182   11117                 UPdated load wattages for Nexon EV and MCE(Front Turn and DRL from 18W to 10W)     **FD\_EL\_NM\_TS:Req19V3**- Req Updated where- Front and side indicator lamps clubbed for X445,X451 Rear and side indicator lamps clubbed for Q501 | | 9.9 | 10/08/201911671,11897,11956, 12031,12128,13318,13264,12182 Updated Exterior Lamp Load-Turn,Position,Brake,Reverse,Front Fog,Rear Fog,Headlamp low and high beam,DRL | | 10.0 | 21/08/201913354,11864,12514 Updated value of Par\_LmpWattageVehicleTypeSel in below req for X445: **FD\_EL\_NM\_FFAC:Req16V1** **FD\_EL\_NM\_FFAC:Req15V1** **FD\_EL\_NM\_GR\_Req17v1** | | 10.1 | 26/08/2019Refer entire sections 4.3.7 and 5.9.1.15 Refer section 4.3.7 for Voice command Requirements (Turn Indicators and Hazard indicator)  Refer section 5.9.1.15 for Voice command Requirements (Position lamp)  Refer Sections 4.6 and 5.12 for newly added input signals to BCM. | | 10.2 | 28/08/201911897 For Nexon MCE-Updated Interior illuminattion loads driven by Position lamp pins | | 10.3 | 17/09/201912128 Updated Rear Fog lamps wattage as 21 W for all variants | | 10.4 | 03/10/201911117 11128  14758 11671  12031 14366  Updated Req for Rev lamp pin drivng rear turn indicators- **FD\_EL\_NM\_TS:Req19V3** **FD\_EL\_NM\_TS:Req20V1** Added a note for Nexon MCE under turn indicator wattage section.  Updated remarks section for Nexon MCE under turn indicator and Reverse lamp wattages section. | | 10.5 | 10/10/201911117 11128  14758 11671  12031 14366 Updated Req for Rev lamp pin drivng rear turn indicators- **FD\_EL\_NM\_TS:Req19V3** **FD\_EL\_NM\_TS:Req20V1** Added a note for Nexon EV under turn indicator wattage section.  Updated remarks section for Nexon MCE under turn indicator and Reverse lamp wattages section. | | 10.6 | 14/10/201912813 **FD\_EL\_NM\_FFL:Req15V1:** Updated Requirement as follows- Irrespective of Par\_LINbasedIMMOfunction is enabled,BCM shall drive **IMMO telltale** via pin (C1:Pin 44)- frfogrelay/front fog facsia switch telltale, (C2:Pin 2) shall be driving the **Rear fog lamp control LH** Relay -Double Config (driving Rear Fog LH & RH Bulb ) OR Single Config(driving Rear Fog Lamp LH) and (C2:Pin 5) shall be driving the **Front Fog tell tale**. Table updated inline to this. | | 10.7 | 21/11/201911671 Updated side reapeter lamp wattage for Osprey (Nexon), Osprey (Nexon) MCE, Osprey (Nexon) EV, Tiago/Tigor Low/High, Tiago/Tigor MCE Low/High. | | 10.8 | 30/12/201915599 Added new Requirement: FD\_EL\_NM\_HLHB:Req16V1 | | 10.9 | 13/06/202012813 Updated Fog Lamps telltale driving Pins Details. Updated Requirement :  **FD\_EL\_NM\_FFL:Req15V1** | | 11.0 | 17/06/202012813, 12836 Updated Requirement reference in **FD\_EL\_NM\_FFL:Req15V1** and **FD\_EL\_NM\_RFL:Req15V1** | | 11.1 | 20/08/202011956 Updated Requirement for **Par\_LmpWattageVehicleTypeSel** for X445 platform for CHMSL. | | 11.2 | 21/08/202015705, 15720 Updated following new requirements for Kenger 2.0 : -  **FD\_EL\_NM\_BL:Req10V1** **FD\_EL\_NM\_TS:Req37V1** | | 11.3 | 07-10-202015720 Added further details for AC operation flashing requirement: FD\_EL\_NM\_TS:Req37V2 | | 11.4 | 27-10-202015720 Eliminated the dependency of ComfortState CAN input signal for AC operation ON request through remote in IGN OFF state. FD\_EL\_NM\_TS:Req37V3 | | 11.5 | 15-12-202011671, 11139, 11117 Updated requirement for side repeater. 4.3.5.25 table updated for X445 side repeater wattage updated. **FD\_EL\_FM\_TS:Req11V2** requirement updated for side repeater turn indicator while both front and rear turn indicator bulb out detected. **FD\_EL\_NM\_TS:Req19V3** removed contradicting statement. | | 11.6 | 23/12/202015839 Updated requirement "**FD\_EL\_NM\_FFL:Req15V2**" for Fog Lamp. | | 11.7 | 29/12/202015839 Updated requirement "**FD\_EL\_NM\_FFL:Req15V2**" for Fog Lamp. | | 11.8 | 17/03/202115857 Updated requirements for RESS: -  **FD\_EL\_NM\_TS:Req38V1** | | 11.9 | 29/04/202115929, 15940, 15750 Updated requirements for Hazard lamps related to Emergency braking in **FD\_EL\_NM\_HzEBL:Req1V1, FD\_EL\_NM\_HzEBL:Req2V1**. Removed requirement related to emergency braking from Brake lights in requirement **FD\_EL\_NM\_BL:Req10V1**. | | 12.0 | 12/05/202115963 2132, 9347, 2154 9328, 2202 Added DOORS Requirement ID: 15963 Modified DOORS Requirement ID: 2132, 9347, 2154 Updated Input table & Block Diagram: 9328, 2202 | | 12.1 | 17/05/202115984 16006  2132 9347 2154 15929 15984, 16006: Added new requirement  Below requirements DOORS ID updated: 2132, 9347, 2154, 15929 | | 12.2 | 21/07/202115900 Below requirement has been modified: 15900: FD\_EL\_NM\_TS:Req38V2 | | 12.3 | 05/08/202115900   16027 Below requirement has been modified: 15900: FD\_EL\_NM\_TS:Req38V3  RESS general requirement added: 16027: FD\_EL\_NM\_TS:Req39V1 | | 12.4 | 13/08/202116049 16049  New Section added (Refer Section 5) Hazard Light (CAN input based) | | 12.5 | 17/09/202115929 15940 15984 16645 FD\_EL\_NM\_HzEBL:Req1V3 Updated the NOTE 2.  FD\_EL\_NM\_HzEBL:Req3V2 Updated the NOTE.  FD\_EL\_NM\_HzEBL:Req5V2 Updated the NOTE  FD\_EL\_NM\_HL:Req1V2 Added the NOTE | | 12.6 | 04/10/202116645 18872 19099 **FD\_EL\_NM\_HL:Req1V3** **Signal name has been changed:** Hazard\_Lamp\_Vcu\_Req to VcuHazardLampReq  **New Failure requirement added** FD\_EL\_FM\_TS:Req12V1 | | 12.7 | 22/10/202119110 19125 19112 **Harrier / Safari MCE2 Power wattage requirement.** FD\_EL\_NM\_GR\_Req18v1 (19112) Also refer section with Title "Harrier / Safari MCE2 (Power Wattage)" | | 12.8 | 15/12/20211073 **As per PAT feedback, below Requirement updated:** FD\_EL\_NM\_TS:Req18V2 | | 12.9 | 17/12/202115940 **Below Requirement Strike out:** FD\_EL\_NM\_HzEBL:Req3V2 | | 13.0 | 24/12/202115940 1073 **Below Requirement has been reverted (it was striked out in V12.9):** FD\_EL\_NM\_HzEBL:Req3V3  **Below Requirement updated:** FD\_EL\_NM\_TS:Req18V3 | | 13.1 | 24/01/202215723 19166 **Below Requirement is Striked Out:** FD\_EL\_NM\_TS:Req37V3 **Below Requirement relevent to RESS is added:** FD\_EL\_NM\_TS:Req40V1 | | 13.2 | 17/03/20222132 9347 2154 9228 2456 9358 2478 9331 2526 9329 15929 15940 15984  New ADAS features, AEB & HBA added in section 19 & 20(Entire New Section Added) New Requirement Added FD\_EL\_NM\_HBA:Req1V1    to FD\_EL\_NM\_HBA:Req8V1and FD\_EL\_FM\_HBA:Req1V1 to FD\_EL\_FM\_HBA:Req3V1  FD\_EL\_NM\_AEB:Req1V1    to FD\_EL\_NM\_AEB:Req7V1 and FD\_EL\_FM\_AEB:Req1V1  Following Requirements updated for BrkLightSig2 signal input  FD\_EL\_NM\_BL:Req1V4 FD\_EL\_NM\_BL:Req5V4 FD\_EL\_NM\_BL:Req3V4 FD\_EL\_FM\_BL:Req3V2 FD\_EL\_NM\_CHMSL:Req2V2 FD\_EL\_NM\_CHMSL:Req6V2 FD\_EL\_NM\_CHMSL:Req4V2 FD\_EL\_FM\_CHMSL:Req3V2 FD\_EL\_NM\_HzEBL:Req1V4 FD\_EL\_NM\_HzEBL:Req3V4 FD\_EL\_NM\_HzEBL:Req5V3 2526  9329 | | 13.3 | 26/05/2022 21622 21633 5073 4797  9556 21659  21659  21661  20561 20613  21398  21409  21036  20970  20981  20902  21003  21070  21081    Following Req. added for new parameters "Par\_LEDHeadLampFunction" and "Par\_MFRHeadLampFunction" FD\_EL\_NM\_HLHB:Req17V1 FD\_EL\_NM\_HLHB:Req18V1  Following Requirement updated FD\_EL\_CP\_HLHB:Req1V1 FD\_EL\_NM\_HLHB:Req6V1 FD\_EL\_NM\_HLHB:Req10V1  Nexon MCE2 Lamp Load added Q5 MCE Lamp Load added  Following Requirement added for Door Open Alert feature FD\_EL\_NM\_DOA:Req1V1 FD\_EL\_NM\_DOA:Req2V1 FD\_EL\_NM\_DOA:Req3V1 FD\_EL\_NM\_DOA:Req4V1  Following Requirement added for Rear Collision Warning Feature FD\_EL\_NM\_RCW:Req1V1 FD\_EL\_NM\_RCW:Req2V1 FD\_EL\_NM\_RCW:Req3V1 FD\_EL\_NM\_RCW:Req4V1 FD\_EL\_FM\_RCW:Req1V1 FD\_EL\_NM\_RCW:Req2V1 | |
| 272 | **TABLE OF CONTENTS** |
| 273 | FDocument History    F2 |
| 274 | FChange History    F3 |
| 275 | F1    Introduction    F14 |
| 276 | F1.1    General    F14 |
| 277 | F1.2    Document Scope    F15 |
| 278 | F1.3    Terminologies    F15 |
| 279 | F1.4    Reference documents    F16 |
| 280 | **F2**    **General    F16** |
| 281 | F2.1    Operating Conditions    F16 |
| 282 | F2.1.1    Operating Voltage Range    F16 |
| 283 | F2.1.2    Temperature dependency    F16 |
| 284 | F2.1.3    Operating power modes    F16 |
| 285 | F2.1.4    Maximum Power Consumption    F16 |
| 286 | F2.2    Response Time    F17 |
| 287 | F2.3    Legend    F17 |
| 288 | F2.4    Normal Mode    F17 |
| 289 | F2.5    Failure Mode    F17 |
| 290 | **F3**    **Turn Signals and Hazard Lights    F17** |
| 291 | F3.1    Description    F17 |
| 292 | F3.2    Applicable BCM Variants    F17 |
| 293 | F3.3    Operating Conditions    F17 |
| 294 | F3.3.1    Operating Power Modes for Turn Indicators    F17 |
| 295 | F3.3.2    Operating Power Modes for Hazards    F19 |
| 296 | F3.3.3    Operating Voltage Range    F19 |
| 297 | F3.3.4    Nominal Power consumption    F20 |
| 298 | F3.3.5    Temperature dependency    F20 |
| 299 | F3.4    Vehicle Example diagram    F20 |
| 300 | F3.5    Response Time    F20 |
| 301 | F3.6    Assumptions    F21 |
| 302 | F3.7    Hardware/Software    F21 |
| 303 | F3.8    HMI commodities    F21 |
| 304 | F3.9    Behavior Modes    F21 |
| 305 | F3.9.1    Normal Mode    F21 |
| 306 | F3.9.2    Failure Mode    F24 |
| 307 | F3.10    Safety Level    F26 |
| 308 | F3.11    Block Diagram    F27 |
| 309 | F3.12    Inputs    F27 |
| 310 | F3.13    Outputs    F28 |
| 311 | F3.14    Configurable Parameters    F28 |
| 312 | **F4**    **Position Lights    F29** |
| 313 | F4.1    Description    F29 |
| 314 | F4.2    Applicable BCM Variants    F29 |
| 315 | F4.3    Operating Conditions    F29 |
| 316 | F4.3.1    Operating Power Modes    F29 |
| 317 | F4.3.2    Operating Voltage Range    F30 |
| 318 | F4.3.3    Nominal Power consumption    F30 |
| 319 | F4.3.4    Temperature dependency    F30 |
| 320 | F4.4    Vehicle Example diagram    F30 |
| 321 | F4.5    Response Time    F31 |
| 322 | F4.6    Assumptions    F31 |
| 323 | F4.7    Hardware/Software    F31 |
| 324 | F4.8    HMI commodities    F31 |
| 325 | F4.9    Behavior Modes    F31 |
| 326 | F4.9.1    Normal Mode    F31 |
| 327 | F4.9.2    Failure Mode    F32 |
| 328 | F4.10    Safety Level    F33 |
| 329 | F4.11    Block Diagram    F33 |
| 330 | F4.12    Inputs    F33 |
| 331 | F4.13    Outputs    F34 |
| 332 | F4.14    Configurable Parameters    F34 |
| 333 | **F5**    **Brake lamps    F36** |
| 334 | F5.1    Description    F36 |
| 335 | F5.2    Applicable BCM Variants    F36 |
| 336 | F5.3    Operating Conditions    F36 |
| 337 | F5.3.1    Operating Power Modes    F36 |
| 338 | F5.3.2    Operating Voltage Range    F37 |
| 339 | F5.3.3    Nominal Power consumption    F37 |
| 340 | F5.3.4    Temperature dependency    F37 |
| 341 | F5.4    Vehicle Example diagram    F37 |
| 342 | F5.5    Response Time    F37 |
| 343 | F5.6    Assumptions    F38 |
| 344 | F5.7    Hardware/Software    F38 |
| 345 | F5.8    HMI commodities    F38 |
| 346 | F5.9    Behavior Modes    F38 |
| 347 | F5.9.1    Normal Mode    F38 |
| 348 | F5.9.2    Failure Mode    F39 |
| 349 | F5.10    Safety Level    F39 |
| 350 | F5.11    Block Diagram    F39 |
| 351 | F5.12    Inputs    F40 |
| 352 | F5.13    Outputs    F40 |
| 353 | F5.14    Configurable Parameters    F40 |
| 354 | **F6**    **Centre High Mounted Stop LEDs    F41** |
| 355 | F6.1    Description    F41 |
| 356 | F6.2    Applicable BCM Variants    F41 |
| 357 | F6.3    Operating Conditions    F41 |
| 358 | F6.3.1    Operating Power Modes    F41 |
| 359 | F6.3.2    Operating Voltage Range    F41 |
| 360 | F6.3.3    Nominal Power consumption    F42 |
| 361 | F6.3.4    Temperature dependency    F42 |
| 362 | F6.4    Vehicle Example diagram    F42 |
| 363 | F6.5    Response Time    F42 |
| 364 | F6.6    Assumptions    F43 |
| 365 | F6.7    Hardware/Software    F43 |
| 366 | F6.8    HMI commodities    F43 |
| 367 | F6.9    Behavior Modes    F43 |
| 368 | F6.9.1    Normal Mode    F43 |
| 369 | F6.9.2    Failure Mode    F44 |
| 370 | F6.10    Safety Level    F44 |
| 371 | F6.11    Block Diagram    F44 |
| 372 | F6.12    Inputs    F45 |
| 373 | F6.13    Outputs    F45 |
| 374 | F6.14    Configurable Parameters    F45 |
| 375 | **F7**    **Reverse light    F46** |
| 376 | F7.1    Description    F46 |
| 377 | F7.2    Applicable BCM Variants    F46 |
| 378 | F7.3    Operating Conditions    F46 |
| 379 | F7.3.1    Operating Power Modes    F46 |
| 380 | F7.3.2    Operating Voltage Range    F46 |
| 381 | F7.3.3    Nominal Power consumption    F46 |
| 382 | F7.3.4    Temperature dependency    F47 |
| 383 | F7.4    Vehicle Example diagram    F47 |
| 384 | F7.5    Response Time    F47 |
| 385 | F7.6    Assumptions    F47 |
| 386 | F7.7    Hardware/Software    F48 |
| 387 | F7.8    HMI commodities    F48 |
| 388 | F7.9    Behavior Modes    F48 |
| 389 | F7.9.1    Normal Mode    F48 |
| 390 | F7.9.2    Failure Mode    F49 |
| 391 | F7.10    Safety Level    F49 |
| 392 | F7.11    Block Diagram    F49 |
| 393 | F7.12    Inputs    F49 |
| 394 | F7.13    Outputs    F50 |
| 395 | F7.14    Configurable Parameters    F50 |
| 396 | **F8**    **Front fog lamps    F51** |
| 397 | F8.1    Description    F51 |
| 398 | F8.2    Applicable BCM Variants    F51 |
| 399 | F8.3    Operating Conditions    F51 |
| 400 | F8.3.1    Operating Power Modes    F51 |
| 401 | F8.3.2    Operating Voltage Range    F51 |
| 402 | F8.3.3    Nominal Power consumption    F52 |
| 403 | F8.3.4    Temperature dependency    F52 |
| 404 | F8.4    Vehicle example diagram    F52 |
| 405 | F8.5    Response Time    F52 |
| 406 | F8.6    Assumptions    F53 |
| 407 | F8.7    Hardware/Software    F53 |
| 408 | F8.8    HMI commodities    F53 |
| 409 | F8.9    Behavior Modes    F53 |
| 410 | F8.9.1    Normal Mode    F53 |
| 411 | F8.9.2    Failure Mode    F55 |
| 412 | F8.10    Safety Level    F55 |
| 413 | F8.11    Block Diagram    F56 |
| 414 | F8.12    Inputs    F56 |
| 415 | F8.13    Outputs    F57 |
| 416 | F8.14    Configurable Parameters    F57 |
| 417 | **F9**    **Rear fog lamps    F59** |
| 418 | F9.1    Description    F59 |
| 419 | F9.2    Applicable BCM Variants    F59 |
| 420 | F9.3    Operating Conditions    F59 |
| 421 | F9.3.1    Operating Power Modes    F59 |
| 422 | F9.3.2    Operating Voltage Range    F59 |
| 423 | F9.3.3    Nominal Power consumption    F60 |
| 424 | F9.3.4    Temperature dependency    F60 |
| 425 | F9.4    Vehicle example diagram    F60 |
| 426 | F9.5    Response Time    F60 |
| 427 | F9.6    Assumptions    F61 |
| 428 | F9.7    Hardware/Software    F61 |
| 429 | F9.8    HMI commodities    F61 |
| 430 | F9.9    Behavior Modes    F61 |
| 431 | F9.9.1    Normal Mode    F61 |
| 432 | F9.9.2    Failure Mode    F63 |
| 433 | F9.10    Safety Level    F63 |
| 434 | F9.11    Block Diagram    F64 |
| 435 | F9.12    Inputs    F64 |
| 436 | F9.13    Outputs    F65 |
| 437 | F9.14    Configurable Parameters    F65 |
| 438 | **F10**    **Headlamp Low Beam    F67** |
| 439 | F10.1    Description    F67 |
| 440 | F10.2    Applicable BCM Variants    F67 |
| 441 | F10.3    Operating Conditions    F67 |
| 442 | F10.3.1    Operating Power Modes    F67 |
| 443 | F10.3.2    Operating Voltage Range    F67 |
| 444 | F10.3.3    Nominal Power consumption    F68 |
| 445 | F10.3.4    Temperature dependency    F68 |
| 446 | F10.4    Vehicle Example diagram    F68 |
| 447 | F10.5    Response Time    F68 |
| 448 | F10.6    Assumptions    F69 |
| 449 | F10.7    Hardware/Software    F69 |
| 450 | F10.8    HMI commodities    F69 |
| 451 | F10.9    Behavior Modes    F69 |
| 452 | F10.9.1    Normal Mode    F69 |
| 453 | F10.9.2    Failure Mode    F70 |
| 454 | F10.10    Safety Level    F70 |
| 455 | F10.11    Inputs    F71 |
| 456 | F10.12    Outputs    F71 |
| 457 | F10.13    Configurable Parameters    F71 |
| 458 | **F11**    **Headlamp High Beam    F72** |
| 459 | F11.1    Description    F72 |
| 460 | F11.2    Applicable BCM Variants    F72 |
| 461 | F11.3    Operating Conditions    F72 |
| 462 | F11.3.1    Operating Power Modes    F72 |
| 463 | F11.3.2    Operating Voltage Range    F73 |
| 464 | F11.3.3    Temperature dependency    F73 |
| 465 | F11.4    Vehicle Example diagram    F73 |
| 466 | F11.5    Response Time    F74 |
| 467 | F11.6    Assumptions    F74 |
| 468 | F11.7    Hardware/Software    F74 |
| 469 | F11.8    HMI commodities    F74 |
| 470 | F11.9    Behavior Modes    F74 |
| 471 | F11.9.1    Normal Mode    F74 |
| 472 | F11.9.2    Failure Mode    F76 |
| 473 | F11.10    Safety Level    F76 |
| 474 | F11.11    Block Diagram    F77 |
| 475 | F11.12    Inputs    F77 |
| 476 | F11.13    Outputs    F78 |
| 477 | F11.14    Configurable Parameters    F78 |
| 478 | **F12**    **Lane Changer - 3 Flash Mode    F79** |
| 479 | F12.1    Description    F79 |
| 480 | F12.2    Applicable BCM Variants    F79 |
| 481 | F12.3    Operating Conditions    F79 |
| 482 | F12.3.1    Operating Power Modes    F79 |
| 483 | F12.3.2    Operating Voltage Range    F80 |
| 484 | F12.3.3    Nominal Power consumption    F80 |
| 485 | F12.3.4    Temperature dependency    F80 |
| 486 | F12.4    Vehicle Example diagram    F80 |
| 487 | F12.5    Response Time    F81 |
| 488 | F12.6    Assumptions    F81 |
| 489 | F12.7    Hardware/Software    F81 |
| 490 | F12.8    HMI commodities    F81 |
| 491 | F12.9    Behavior Modes    F81 |
| 492 | F12.9.1    Normal Mode    F81 |
| 493 | F12.9.2    Failure Mode    F83 |
| 494 | F12.10    Safety Level    F84 |
| 495 | F12.11    Block Diagram    F84 |
| 496 | F12.12    Inputs    F84 |
| 497 | F12.13    Outputs    F85 |
| 498 | F12.14    Configurable Parameters    F85 |
| 499 | **F13**    **Follow Me    F87** |
| 500 | F13.1    Description    F87 |
| 501 | F13.2    Applicable BCM Variants    F87 |
| 502 | F13.3    Operating Conditions    F87 |
| 503 | F13.3.1    Operating Power Modes    F87 |
| 504 | F13.3.2    Operating Voltage Range    F88 |
| 505 | F13.3.3    Nominal Power consumption    F88 |
| 506 | F13.3.4    Temperature dependency    F88 |
| 507 | F13.4    Vehicle Example diagram    F88 |
| 508 | F13.5    Response Time    F89 |
| 509 | F13.6    Assumptions    F89 |
| 510 | F13.7    Hardware/Software    F89 |
| 511 | F13.8    HMI commodities    F89 |
| 512 | F13.9    Behavior Modes    F89 |
| 513 | F13.9.1    Normal Mode    F89 |
| 514 | F13.9.2    Failure Mode    F93 |
| 515 | F13.10    Safety Level    F93 |
| 516 | F13.11    Block Diagram    F94 |
| 517 | F13.12    Inputs    F94 |
| 518 | F13.13    Outputs    F95 |
| 519 | F13.14    Configurable Parameters    F96 |
| 520 | **F14**    **Front fog lamp as cornering lamp    F97** |
| 521 | F14.1    Description    F97 |
| 522 | F14.2    Applicable BCM Variants    F97 |
| 523 | FMid BCM    F97 |
| 524 | F14.3    Operating Conditions    F97 |
| 525 | F14.3.1    Operating Power Modes    F97 |
| 526 | F14.3.2    Operating Voltage Range    F97 |
| 527 | F14.3.3    Nominal Power consumption    F98 |
| 528 | F14.3.4    Temperature dependency    F98 |
| 529 | F14.4    Vehicle Example diagram    F98 |
| 530 | F14.5    Response Time    F99 |
| 531 | F14.6    Assumptions    F99 |
| 532 | F14.7    Hardware/Software    F99 |
| 533 | F14.8    HMI commodities    F99 |
| 534 | F14.9    Behavior Modes    F99 |
| 535 | F14.9.1    Normal Mode    F99 |
| 536 | F14.9.2    Failure Mode    F101 |
| 537 | F14.10    Safety Level    F101 |
| 538 | F14.11    Block Diagram    F101 |
| 539 | F14.12    Inputs    F102 |
| 540 | F14.13    Outputs    F102 |
| 541 | F14.14    Configurable Parameters    F103 |
| 542 | **F15**    **Approach light    F104** |
| 543 | F15.1    Description    F104 |
| 544 | F15.2    Applicable BCM Variants    F104 |
| 545 | F15.3    Operating Conditions    F104 |
| 546 | F15.3.1    Operating Power Modes    F104 |
| 547 | F15.3.2    Operating Voltage Range    F104 |
| 548 | F15.3.3    Nominal Power consumption    F105 |
| 549 | F15.3.4    Temperature dependency    F105 |
| 550 | F15.4    Vehicle Example diagram    F105 |
| 551 | F15.5    Response Time    F105 |
| 552 | F15.6    Assumptions    F106 |
| 553 | F15.7    Hardware/Software    F106 |
| 554 | F15.8    HMI commodities    F106 |
| 555 | F15.9    Behavior Modes    F106 |
| 556 | F15.9.1    Normal Mode    F106 |
| 557 | F15.9.2    Failure Mode    F108 |
| 558 | F15.10    Safety Level    F108 |
| 559 | F15.11    Block Diagram    F108 |
| 560 | F15.12    Inputs    F109 |
| 561 | F15.13    Outputs    F109 |
| 562 | F15.14    Configurable Parameters    F110 |
| 563 | **F16**    **Automatic Headlamp Control Using Light Sensor    F111** |
| 564 | F16.1    Description    F111 |
| 565 | F16.2    Applicable BCM Variants    F111 |
| 566 | F16.3    Operating Conditions    F111 |
| 567 | F16.3.1    Operating Power Modes for Low beam    F111 |
| 568 | F16.3.2    Operating Voltage Range    F111 |
| 569 | F16.3.3    Nominal Power consumption    F112 |
| 570 | F16.3.4    Temperature dependency    F112 |
| 571 | F16.4    Vehicle Example diagram    F112 |
| 572 | F16.5    Response Time    F113 |
| 573 | F16.6    Assumptions    F113 |
| 574 | F16.7    Hardware/Software    F113 |
| 575 | F16.8    HMI commodities    F113 |
| 576 | F16.9    Behavior Modes    F113 |
| 577 | F16.9.1    Normal Mode    F113 |
| 578 | F16.9.2    Failure Mode    F115 |
| 579 | F16.10    Safety Level    F115 |
| 580 | F16.11    Block Diagram    F116 |
| 581 | F16.12    Inputs    F116 |
| 582 | F16.13    Outputs    F117 |
| 583 | F16.14    Configurable Parameters    F117 |
| 584 | **2 Introduction** |
| 585 | **2.1 General** |
| 586 | Light sources have always played an important role in automobiles especially in the region of safety along with styling. The headlamps along with other light sources like taillights and indicators are added for safety and better organization in growing traffic. |
| 587 | The exterior lighting such as tail lights, indicators, headlamps or emergency warning lights (and fog lights to a lesser extent) must always be available to avoid serious safety problems. |
| 588 | Some exterior lighting like headlamps provide high power illumination where as lights such as tail lights need to be visible over long distances but must not illuminate a wide area. |
| 589 | The exterior lamps are attached over different positions of the vehicle to inform other road users by means of their signals. |
| 590 | The exterior lighting provides indication for various purposes such as: |
| 591 |     Forward illumination for the vehicles are provided by the headlamps where as vehicle presence shall be indicated with the help of the position light, taillight, rear fog light. |
| 592 |     Vehicle braking shall be indicated through rear left and rear right brake light and centre high mounted stoplight. |
| 593 |     When the vehicle is changing direction, the front, side, rear direction indicator lights shall be used. |
| 594 |     Vehicle reversing is indicated with reversing lights. |
| 595 | This document describes the following exterior lamps features: |
| 596 |     Headlamps |
| 597 |     Follow Me Home |
| 598 |     Approach |
| 599 |     Position lights |
| 600 |     Fog Lamps |
| 601 |     Turn signal |
| 602 |     Cornering lamp |
| 603 |     Brake lamps |
| 604 |     CHMSL- centre high mounted stop lamp in bulb / LED |
| 605 |     Reverse light |
| 606 |     License plate lamps |
| 607 | **2.2 Document Scope** |
| 608 | This document contains a detailed specification of the requirements and functionality of the Exterior Lighting for the TATA Small Passenger Car Project. These requirements are inputs to the E & E architecture definition process. The architecture designer, function owner and ECU owner are the intended audience. |
| 609 | **2.3 Terminologies** |
| 612 | |  |  | | --- | --- | | **Term / Abbreviation** | **Description** | | ASIL | Automotive Safety Integrity Level | | BCM | Body Control Module | | CAN | Control Area Network | | COC | Center of Competence | | E&E | Electrical and electronics | | ECU | Electronic Control Unit | | IC | Instrument Cluster | | IGN | Ignition | | IP | International Protection | | LF | Low Frequency | | LIN | Local Interconnect Network | | MiL | Model in Loop | | RF | Radio Frequency | | RFQ | Request For Quotation | | SiL | Software in Loop | | TBD | To Be Decided | | TML | TATA Motors Limited | | TS | TATA Motors Standard | |
| 668 | **2.4 Reference documents** |
| 669 | The intended audience is requested to refer to the latest versions of the following documents. Agreement on these versions can be achieved by referencing in the following table a document listing all documents, which are relevant for the project (“List of Documents”). |
| 672 | |  |  | | --- | --- | | **SR.** | **DOCUMENTDESCRIPTION** | | 1 | RFQ\_Family of Body Control Modules\_v1.3RFQ | |
| 679 | **Table** F1**: Reference Documents** |
| 680 | **3 General** |
| 681 | This section covers some of the general requirements that are applicable for Exterior Lighting feature. |
| 682 | **3.1 Operating Conditions** |
| 683 | **3.1.1 Operating Voltage Range** |
| 686 | |  |  | | --- | --- | | **FD\_EL\_OC\_GEN:Req1V1** | Normal operating voltage: 12V Min & Max operating voltage range: 9V-16V | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 694 | **3.1.2 Temperature dependency** |
| 697 | |  |  | | --- | --- | | **FD\_EL\_TD\_GEN:Req1V1** | Operating temperature range: -30° C to +85° C  Storage temperature range: -40° C to +105° C | | **Validation Method** | Component Level Testing. | | **Applicable variants** | Base and Mid BCMs | |
| 705 | **3.1.3 Operating power modes** |
| 706 | Functional requirements mentioned in this document take precedence in case of any clashes w.r.t. the operating power modes strategy defined in the corresponding section |
| 707 | **3.1.4 Maximum Power Consumption** |
| 708 | Maximum power consumption depends on the vehicle loads. The detailed workout to be done during detailed design for a given vehicle. The values mentioned in this document for Nominal Power Consumption are indicative only. |
| 709 | **3.2 Response Time** |
| 712 | |  |  | | --- | --- | | **FD\_EL\_RT\_GEN:Req1V1** | Response time shall be 60ms. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 720 | **3.3 Legend** |
| 721 | Hardwired Signal |
| 722 | CAN Message |
| 723 | LIN Message |
| 724 | RF Signals |
| 725 | **3.4 Normal Mode** |
| 8556 | ... |
| 8559 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req1v1** | BCM shall send CAN signals status as plausible whenever it has correct state of signal. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 8568 | ... |
| 8571 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req2v1** | BCM shall send CAN signals status as implausible whenever it has not derived actual state of signal. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 8579 | ... |
| 8582 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req3v1** | BCM shall send CAN signals status as SNA if particular feature is not present. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9619 | ... |
| 9622 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req4v1** | BCM shall identify Crash signals for different inputs as given in tables below. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9631 | **3.4.4.1 Case 1 : Crash input is PWM only** |
| 9636 | |  |  | | --- | --- | | **Crash PWM (input to BCM)** | **Crash ON/OFF** | | Crash | Crash (ON) | | No Crash | No Crash (OFF) | | Error | No Crash (OFF) | |
| 9632 | **3.4.4.2 Case 2 : Crash input is CAN only** |
| 9652 | |  |  | | --- | --- | | **Crash CAN (input to BCM)** | **Crash ON/OFF** | | 0x00 - No Crash | No Crash (OFF) | | 0x01 - No Fire Crash | No Crash (OFF) | | 0x02 - Front Deploy Crash | Crash (ON) | | 0x04 - Rear Crash | Crash (ON) | | 0x08 - Right Hand Side Deploy Crash | Crash (ON) | | 0x10 - Left Hand Side Deploy Crash | Crash (ON) | | 0x20 - Not Used | No Crash (OFF) | | 0x40 - Not Used | No Crash (OFF) | | 0x80 - Not Used | No Crash (OFF) | |
| 9633 | **3.4.4.3 Case 3 : Crash input is PWM+CAN only** |
| 9662 | |  |  | | --- | --- | | **Crash PWM (input to BCM)** | **Crash CAN (input to BCM)Crash ON/OFF** | | Crash | X (don't care)Crash (ON) | | No Crash | X (don't care)No Crash (OFF) | | Error | 0x00 - No CrashNo Crash (OFF) | | Error | 0x01 - No Fire CrashNo Crash (OFF) | | Error | 0x02 - Front Deploy CrashCrash (ON) | | Error | 0x04 - Rear CrashCrash (ON) | | Error | 0x08 - Right Hand Side Deploy CrashCrash (ON) | | Error | 0x10 - Left Hand Side Deploy CrashCrash (ON) | | Error | 0x20 - Not UsedNo Crash (OFF) | | Error | 0x40 - Not UsedNo Crash (OFF) | | Error | 0x80 - Not UsedNo Crash (OFF) | |
| 9746 | ... |
| 9759 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req5v1** | If Par\_IgnSwKeyInPresent is configured as “Not Present”, consider IgnKeyStateACC input as KeyIn signal and absence of IgnKeyStateACC input as KeyOut. Refer Lock control FD for Par\_IgnSwKeyInPresent parameter details. | | **Validation Method** | None | | **Applicable variants** | Base and Mid BCMs | |
| 9838 | ... |
| 9850 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req6v1** | Crash behaviour shall be applicable only when ignition switch is at "IGN ON" position or "CRANK" position or "Engine is Running" in both Normal Mode and Transport Mode.   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode. BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | None | | **Applicable variants** | Base and Mid BCMs | |
| 10469 | ... |
| 10472 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req7v3** | ( Par\_TCuAvailable is "Present", Reverse gear is Engaged If, value of CAN signal "CurGearTcu" is 'Reverse Gear(8)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  Reverse gear is Disengaged If, value of CAN signal "CurGearTcu" is other than 'Reverse Gear' with plausible status OR Reverse gear switch input (RevGearSwSig) is in-active.  For 'CurGearTcu' and 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.  OR  Par\_TCuAvailable is "AT Present", Reverse gear is Engaged If, value of CAN signal "CurGearTcuAT" is 'Reverse Gear(14)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  Reverse gear is Disengaged If, value of CAN signal "CurGearTcuAT" is other than 'Reverse Gear' with plausible status OR Reverse gear switch input (RevGearSwSig) is in-active.  For 'CurGearTcuAT' and 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.  OR  Par\_TCuAvailable is " DCT Present", Reverse gear is Engaged If, value of CAN signal "CurGearDct" is 'Reverse Gear(14)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  Reverse gear is Disengaged If, value of CAN signal "CurGearDct" is other than 'Reverse Gear' with plausible status OR Reverse gear switch input (RevGearSwSig) is in-active.  For 'CurGearDct' and 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.  )   **For Nexon EV strategy-**  Reverse gear is Engaged If, value of CAN signal "GearForDisplayVcu" is 'Reverse Gear(2)' with plausible status  Reverse gear is Disengaged If, value of CAN signal "GearForDisplayVcu" is other than 'Reverse Gear' with plausible status  For 'GearForDisplayVcu' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality.    ( Par\_TCuAvailable is "Present", Reverse gear is Engaged If, value of CAN signal "CurGearTcu" is 'Reverse Gear(8)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  Reverse gear is Disengaged If, value of CAN signal "CurGearTcu" is other than 'Reverse Gear' with plausible status OR Reverse gear switch input (RevGearSwSig) is in-active.  For 'CurGearTcu' and 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.  OR Par\_TCuAvailable is "AT Present", Reverse gear is Engaged If, value of CAN signal "CurGearTcuAT" is 'Reverse Gear(14)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  Reverse gear is Disengaged If, value of CAN signal "CurGearTcuAT" is other than 'Reverse Gear' with plausible status OR Reverse gear switch input (RevGearSwSig) is in-active.  For 'CurGearTcuAT' and 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.  OR  Par\_TCuAvailable is "DCT Present", BCM shall publish 'RevGear' CAN signal as 'Reverse Gear Engaged(1)' if, value of CAN signal "CurGearDct" is 'Reverse Gear(14)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  BCM shall publish 'RevGear' CAN sinal as 'Reverse Gear Disengaged(0)' if, value of CAN signal "CurGearDct" is other than 'Reverse Gear' with plausible status AND Reverse gear switch input (RevGearSwSig) is in-active.  As 'RevGear' CAN signal is applicable for Base & Mid BCMs, so BCM shall not publish 'RevGearStatus' CAN signal as SNA for other ECUs.  }    For Nexon EV strategy- BCM shall publish 'RevGear' CAN sinal as 'Reverse Gear Engaged(1)' if, value of CAN signal "GearForDisplayVcu" is 'Reverse Gear(0x2)' with plausible status OR Reverse gear switch input (RevGearSwSig) is active.  BCM shall publish 'RevGear' CAN sinal as 'Reverse Gear Disengaged(0)' if, value of CAN signal "GearForDisplayVcu" is other than 'Reverse Gear' with plausible status AND Reverse gear switch input (RevGearSwSig) is in-active.  As 'RevGear' CAN signal is applicable for Base & Mid BCMs, so BCM shall not publish 'RevGearStatus' CAN signal as SNA for other ECUs. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 10480 | ... |
| 10483 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req8v3** | ( Par\_TCuAvailable is "Not Present", Reverse gear is Engaged If, Reverse gear switch input (RevGearSwSig) is active  Reverse gear is Disengaged If, Reverse gear switch input (RevGearSwSig) is in-active    For 'Par\_TCuAvailable' details please refer 'Reverse Lamp' functionality section.  BCM shall publish the reverse gear status ('RevGear' & 'RevGearStatus' signals) over CAN and it shall be independent of the reverse lamp functionality and shall be applicable for both Base & Mid BCMs variants.    ( Par\_TCuAvailable is "Not Present", BCM shall publish 'RevGear' CAN signal as 'Reverse Gear Engaged(1)' if, Reverse gear switch input (RevGearSwSig) is active.  )  BCM shall publish 'RevGear' CAN signal as 'Reverse Gear Disengaged(0)' if, Reverse gear switch input (RevGearSwSig) is in-active.  As 'RevGear' CAN signal is applicable for Base & Mid BCMs, so BCM shall not publish 'RevGearStatus' CAN signal as SNA for other ECUs. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 10782 | ... |
| 10785 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req9v1** | For Position Lamps, Low Beam and Brake Lamps: BCM shall diagnose the emergency HW path periodically in field. If a failure is detected in the emergency HW path then send malfunction CAN message to instrument cluster. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 10840 | ... |
| 10843 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req10v1** | BCM shall publish the crash input state (Inactive/Active) over CAN "BCMCrashOutputState" for other ECUs along with it's status signal "BCMCrashOutputStateStatus". | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 10862 | ... |
| 10865 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req11v1** | When the input crash state is active (crash) then the value of CAN signal "BCMCrashOutputState" shall be active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 10873 | ... |
| 10876 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req12v1** | When the input crash state is inactive(no crash) then the value of CAN signal "BCMCrashOutputState" shall be inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 10851 | ... |
| 10854 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req13v1** | When the correct status of the input is available with BCM then it shall send the status of the CAN signal “BCMCrashOutputStateStatus” as Plausible. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 10884 | ... |
| 10887 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req14v1** | When the correct status of the input is not available with BCM then it shall send the status of the CAN signal “BCMCrashOutputStateStatus” as Implausible. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 10895 | **3.4.15 Change Msg IDs Configuration** |
| 11011 |  |
| 11633 | ... |
| 11636 | |  |  | | --- | --- | | **~~FD\_EL\_NM\_GR\_Req15v1~~** | ~~Below configuration shall be applicable to all exterior or interior lamps loads via DTC masking DID i.e. 722D,~~  ~~1. Apply voltage compensation i.e. PWM or Digital output type configuration~~ ~~2. Apply parmeter based lamps wattage logic (Yes or No)~~ | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 12359 | ... |
| 12362 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req16v1** | Voltage compensation Configuration shall be applicable based on the “Par\_TurnLampVoltCompensation” configuration as follows.  1.    If “Par\_TurnLampVoltCompensation = Enable” then, BCM shall apply the voltage configuration to drive the turn indicator lamp load. 2.    If “Par\_TurnLampVoltCompensation = Disable” then, BCM shall not apply the voltage configuration to drive the turn indicator lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 12514 | ... |
| 12517 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req17v1** | BCM shall consider Lamp Load wattages as per parameter "Par\_LmpWattageVehicleTypeSel" configuration as follows,   1. If “Par\_LmpWattageVehicleTypeSel= 00” then, BCM shall consider lamp load wattage as per Zest, Bolt, TIAGO, & TIGOR lamp loads. 2. If “Par\_LmpWattageVehicleTypeSel= 01” then, BCM shall consider lamp load wattage as per HEXA lamp loads. 3. If “Par\_LmpWattageVehicleTypeSel= 02” then, BCM shall consider lamp load wattage as per Nexon high/low lamp loads. 4. If “Par\_LmpWattageVehicleTypeSel= 03” then, BCM shall consider lamp load wattage as per Q501 High end lamp loads 5. If “Par\_LmpWattageVehicleTypeSel= 04” then, BCM shall consider lamp load wattage as per Q501 Low end lamp loads.  6. If “Par\_LmpWattageVehicleTypeSel= 05” then, BCM shall consider lamp load wattage as per X451 High end lamp loads. 7. If “Par\_LmpWattageVehicleTypeSel= 06” then, BCM shall consider lamp load wattage as per X451 Low end lamp loads.  8.If “Par\_LmpWattageVehicleTypeSel= 07” then, BCM shall consider lamp load wattage as per X445 High end lamp loads  9.If “Par\_LmpWattageVehicleTypeSel= 08” then, BCM shall consider lamp load wattage as per X445 Low end lamp loads  10.If “Par\_LmpWattageVehicleTypeSel= 09” then, BCM shall consider lamp load wattage as per Q502 High end lamp loads  11.If “Par\_LmpWattageVehicleTypeSel= 10” then, BCM shall consider lamp load wattage as per Q502 Low end lamp loads 12.If “Par\_LmpWattageVehicleTypeSel= 11” then, BCM shall consider lamp load wattage as per Nexon MCE-High/Low end lamp loads 13.If “Par\_LmpWattageVehicleTypeSel= 12” then, BCM shall consider lamp load wattage as per Nexon EV lamp loads. 14.If “Par\_LmpWattageVehicleTypeSel= 13” then, BCM shall consider lamp load wattage as per Tiago/Tigor MCE lamp loads. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 19112 | ... |
| 19115 | |  |  | | --- | --- | | **FD\_EL\_NM\_GR\_Req18v1** | The Power Wattage requirement captured for Harrier / Safari MCE2, refer section with Title "**Harrier / Safari MCE2 (Power Wattage)**" | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, & Mid with Gateway | |
| 727 | **3.5 Failure Mode** |
| 728 | None |
| 11022 | NOTE: The variants applicability are exclusively updated only for newly added requirements. As per the assumption the common software will be applicable for all variants, the existing requirements applicability shall  be considered |
| 12370 | **3.6 Configurable Parameters** |
| 12404 | |  |  | | --- | --- | | **FD\_EL\_CP\_GR:Req1V1** |  | |  | **Change By** | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Service** **EOL** **Access Conditions** | | Par\_TurnLampVolt Compensation | Turn Indicator Lamp Voltage Compensation 0 - Disable 1 - Enable- 0 1 1 - - X Yes | | Par\_LmpWattageVehicleTypeSel | Vehicle type for lamp load wattage configuration- 0 15 0 1 X X Yes | |
| 729 | **4 Turn Signals and Hazard Lights** |
| 730 | **4.1 Description** |
| 731 | Turn signals — formally called "directional indicators" or "directional signals", and informally known as "directional's", "blinkers", "indicators" or "flashers" — are signal lights mounted near the left and right front and rear corners of a vehicle, and sometimes on the sides, used to indicate to other drivers that the operator intends a lateral change of position (turn or lane change). |
| 732 | **4.2 Applicable BCM Variants** |
| 733 | Base and Mid BCMs |
| 734 | **4.3 Operating Conditions** |
| 735 | **4.3.1 Operating Power Modes for Turn Indicators** |
| 738 | |  | | --- | | **FD\_EL\_OPM\_TS:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive* Run | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 772 | **NOTE:**      The above power modes are applicable for turn indicator function only. In case of turn indicators to be switched ON by any other function, the corresponding functional requirements have to be followed.  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU. \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 773 | **4.3.2 Operating Power Modes for Hazards** |
| 776 | |  | | --- | | **FD\_EL\_OPM\_TS:Req2V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *Full Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive* Run | *Full Function* | | *Battery save* | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13659 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 810 | **4.3.3 Operating Voltage Range** |
| 815 | ... |
| 818 | |  |  | | --- | --- | | **FD\_EL\_OC\_TS:Req1V1** | Normal voltage range 9V-16V(Turn Signals) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 826 | ... |
| 829 | |  |  | | --- | --- | | **FD\_EL\_OC\_TS:Req2V1** | Normal voltage range 7V-16V(Hazard Lights) Threshold: If voltage drops below 6V, then it should stop working AND when voltage rises to/above 7V, then it should start working. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 837 | ... |
| 840 | |  |  | | --- | --- | | **FD\_EL\_NPC\_TS:Req1V1** | Nominal power consumption is 122.496 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 848 | **4.3.4 Temperature dependency** |
| 849 | Refer Section 2.1.2 |
| 850 | **3.4    Vehicle Example diagram** |
| 851 |  |
| 854 | |  |  | | --- | --- | | C: Controller IGN: IgnKeyState LTL: TurnLmpCtrlLH RTL: TurnLmpCtrlRH LTR: TurnSideLmpCtrlLH RTR: TurnSideLmpCtrlRH | DIRA: DirIndReqAlarm DIRCL – DirIndReqCentLock TSW: TurnSwitchSig TSWS: TurnSwitchState IC: Instrument Cluster (Turn signal tell tale) HZSW: HazardSwitch / CrashSig | |
| 856 | **3.5    Response Time** |
| 857 | Refer Section 2.2 |
| 858 | **3.6    Assumptions** |
| 859 | None |
| 860 | **3.7    Hardware/Software** |
| 861 | Hardware: Light, Stalk Switch/Hazard Switch and BCM |
| 862 | Software: ECU software (BCM and IC) |
| 863 | **3.8    HMI commodities** |
| 866 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Turn Lights | | Switches | Stalk Switch/Hazard Switch | | IC | Turn Indicator Telltales | |
| 877 | **3.9    Behavior Modes** |
| 878 | **4.3.5 Normal Mode** |
| 881 | |  |  | | --- | --- | |  |  | |
| 883 | ... |
| 886 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req1V1** | BCM shall start flashing front left, rear left and left side repeater when all of the following conditions are met: 1.    Ignition switch is ON/Crank 2.    When left turn switch is activated.   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode. BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 894 | ... |
| 897 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req2V1** | BCM shall start flashing front right, rear right and right side repeater when all of the following conditions are met: 1.    Ignition switch is ON/Crank 2.    When right turn switch is activated.    **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode. BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 905 | ... |
| 908 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req3V1** | BCM shall send CAN message to operate telltale to Instrument cluster as long as the turn indicators are activated. CAN message corresponding to the turn indicator that's ON to be sent instead of following the turn indicator switch input. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 916 | ... |
| 919 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req4V1** | Turn Indicator flash signal times shall be according to Local configuration parameters “Par\_TurnIndicatorOnTime” and “Par\_TurnIndicatorOffTime”.. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 927 | ... |
| 930 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req5V1** | BCM shall deactivate the left/right turn signal output if the left/right turn switch is deactivated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 938 | ... |
| 941 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req6V1** | The hazard switch input shall be made configurable for sensing both latchable and non-latchable switch inputs. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 949 | ... |
| 952 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req7V1** | BCM shall activate hazard signal when any of the following conditions is met: 1. Hazard switch is activated. 2. Crash is detected in IGN ON. 3. At force panic mode (refer lock control FD for more details) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 960 | ... |
| 963 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req8V1** | Hazard flash signal times shall be according to Local configuration parameters “Par\_HazardONTime” and “Par\_HazardOFFTime”. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 971 | ... |
| 974 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req9V1** | BCM shall send both TurnLHTelltale and TurnRHTelltale on CAN to Instrument cluster as long as the hazard condition is active. TellTale & HW Output shall be in sync with each other. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 982 | ... |
| 985 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req10V1** | When hazard switch is deactivated, BCM shall deactivate hazard lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 993 | ... |
| 996 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req11V1** | If the turn indicator and hazard are activated simultaneously, Hazard signal shall have highest priority regardless of the ignition switch position. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1004 | ... |
| 1007 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req12V1** | When Hazard is ON, if any of the turn indicators are made active, then the corresponding functionality shall be inhibited. If turn indicator switch signal is still present when the hazard is made OFF, turn indicators shall be activated in line with the switch input. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1018 | ... |
| 1021 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req13V1** | When the hazard is active, BCM shall illuminate the LED of the hazard switch. The LED inside the hazard switch shall not get dimmed when the cockpit illumination adjustment dial is selected. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1029 | ... |
| 1032 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req14V1** | When the position lights are made ON, BCM shall illuminate the LED of the hazard switch. The LED inside the hazard switch shall not get dimmed when the cockpit illumination adjustment dial is selected. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1040 | ... |
| 1043 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req15V1** | When changing directly from left turn to Hazard, left turn indicator shall flash continuously and BCM shall flash right turn indicator in phase with left turn indicator such that both the indicators flash in synchronization. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1051 | ... |
| 1054 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req16V1** | When changing directly from right turn to Hazard, right turn indicator shall flash continuously and BCM shall flash left turn indicator in phase with right turn indicator such that both the indicators flash in synchronization. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1062 | ... |
| 1065 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req17V1** | When Hazard is active then BCM shall not indicate the condition of turn bulb in car is failed. i.e. there will be no doubled frequency. The flashing rate shall not change due to failures when Hazard is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1073 | ... |
| 1076 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req18V3** | Function prioritization of Hazard Lights / Direction Indicators shall be as follow: 1. Alarm Indication 2. Locking Indication 3. Unlocking Indication 4. Hazard Warning 5. Turn Indication ~~6. Emergency Braking (when flashing with turn indicators)~~   **~~NOTE: Below priority is applicable for Kenger 2.0 and above~~** ~~Function prioritization of Hazard Lights / Direction Indicators shall be as follow:~~ ~~1. Alarm Indication~~ ~~2. Locking Indication~~ ~~3. Unlocking Indication~~ ~~4. Emergency Braking (when flashing with turn indicators)~~ ~~5. Hazard Warning~~ ~~6. Turn Indication~~  **NOTE: Below priority is applicable for Kenger 2.0 and onwards** Function prioritization of Hazard Lights / Direction Indicators shall be as follow: 1. Alarm Indication 2. Locking Indication 3. Unlocking Indication 4. Hazard Warning 5. Emergency Braking (when flashing with turn indicators) 6. Turn Indication  (i.e. Hazard > Panic Braking > Turn Indicator)  **NOTE:** 1.) In case of Hazard indication ON and Panic braking activation input request received, then priority to be given to Hazard ON.  2.) In case of Turn indicator ON and Panic braking activation input request received, then priority to be given to Panic braking indication over Turn indicators. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11117 | ... |
| 11120 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req19V3** | If Par\_RevLmp == Disable(0)  && [Par\_LEDBasedRearTurnIndLamps == Enable(1)  ||{ (Q5=High||Low) || (X451=High||Low)} ||(X445=High||Low)||(Nexon MCE=High||Low) ||(Nexon EV=High||Low]  && BCM variant == MWG||MID  then, BCM 'RevLampSigLH' and 'RevLampSigRH' output shall be used to drive the rear turn indicator outputs.   There shall be total 4 outputs to drive the loads as per the turn indicator and Hazard functional requirements -  a) **Two for Front** - 'TurnLHInd' output to drive the front LH turn indicator lamp and 'TurnRHInd' output to drive the front RH turn indicator lamp. b) **Two for Rear** - 'RevLampSigLH' output to drive rear LH turn indicator LEDs and 'RevLampSigRH' output to drive the rear RH turn indicator LEDs.  The turn indicator and hazard outputs shall be activated or deactivated as per the requirements.  **Note:** 1)In Q501 & Nexon MCE, side repeater lamps are clubbed with rear turn indicators.  2)In X451 and X445, side repeater lamps are clubbed with front turn indicators.  3)BCM shall log only respective function DTCs.  ~~BCM software should have the thresholds setting to cater side repeater connection to either connected Front TI or Rear TI , in X451, x445 vehicle platform.~~ | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & Mid With Gateway BCMs | |
| 11128 | ... |
| 11131 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req20V1** | If Par\_RevLmp == Disable(0)  && [Par\_LEDBasedRearTurnIndLamps == Enable(1)|| {(Q5=High||Low) || (X451=High||Low) ||( X445=High||Low) || (Nexon MCE=High||Low) || Nexon EV=High||Low ]  && BCM variant == MWG||MID  then,  BCM shall log the respective DTCs as mentioned in DTC list as per the new threshold set for turn indicator LED lamps. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & Mid With Gateway BCMs | |
| 11429 | ... |
| 11432 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req21V1** | ~~BCM shall calculate threshold wattage for STG based on wattage of turn indicator loads (Par\_TurnWattage) and threshold percentage for STG (Par\_ThresholdPercSTG).~~  ~~(Note that STG Threshold wattage will be more than Par\_TurnWattage. )~~ | | **Validation Method** | NA | | **Applicable variants** | Base , Mid & Mid With Gateway BCMs | |
| 11437 | ... |
| 11440 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req22V2** | ~~BCM shall calculate threshold wattage for STB or Open based on wattage of turn indicator loads (Par\_TurnWattage) and threshold percentage for STB or Open (Par\_ThresholdPercSTbOpen).~~  ~~(Note that STB or Open Threshold wattage will be less than Par\_TurnWattage. )~~ | | **Validation Method** | NA | | **Applicable variants** | Base , Mid & Mid With Gateway BCMs | |
| 11584 | ... |
| 11587 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req24V1** | ~~BCM shall calculate threshold wattage for partial bulb based on below formula,~~  ~~Wattage for partial bulb out = Par\_TurnWattage \* Par\_MultFactorPartial~~ | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base , Mid & Mid With Gateway BCMs | |
| 11649 | ... |
| 11652 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req25V2** | BCM shall calculate turn indicator threshold for STG, STB or Open based on ~~Par\_TurnWattageType and~~ loads associated with the parameter value. ( Refer below table). | | **Validation Method** | Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base , Mid & Mid With Gateway BCMs | |
| 11671 | **4.3.5.25 Loads based on Par\_LmpWattageVehicleTypeSel are as below** |
| 11674 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Front turn indicatorRear turn indicator** **Side turn indicator** **Platform / Remarks** | | 0 | 21w21w 5w Bolt / Zest | | 0 | 21w21w 5w (Bulb) / 1w (LED) Tiago / Tigor  (Low / High) | | 2 | 24w21w 1w (LED) Nexon Low/High | | 3 | 11w21w 6w Q501-high | | ~~4~~ | 21w21w 6w  Q501-low | | 5 | 21w16w 5w X451-high | | 6 | 21w16w  5w  X451-low | | 7 | 21w(Bulb)16w(Bulb) ~~5w~~ **< 1W ( 0.6 W)** **LED** X445-High(MGW BCM-Reverse Lamp pins are driving Rear Turn indicators) | |  | 21w(Bulb)16w(Bulb) ~~5w~~ **< 1W ( 0.6 W)** **LED** X445-High(Base BCM-Brake lamp pins are driving Rear Turn Indicators) | | 8 | 21w(Bulb)16W(Bulb) ~~5w~~ **< 1W ( 0.6 W)** **LED** X445-low(MGW BCM-Reverse Lamp pins are driving Rear Turn indicators) | |  | 21w(Bulb)16W(Bulb) ~~5w~~ **< 1W ( 0.6 W)** **LED** X445-low(Base BCM-Brake lamp pins are driving Rear Turn Indicators) | | 9 | 21w21w 6w Q502-High | | 10 | 21w21w 6w Q502-Low | | 11 | 21w21 w 1w (LED) Nexon MCE Low (MGW BCM-  Reverse Lamp pins are driving Rear turn indicator+Side repeater Lamps) | |  | 10w(LED)\* (Note written below)21W Bulb 1w (LED) Nexon MCE High (MGW BCM- Reverse Lamp pins are driving Rear turn indicator+Side repeater Lamps) | | 12 | 21w21 w 1w (LED) Nexon EV Low (MGW BCM- Reverse Lamp pins are driving Rear turn indicator+Side repeater Lamps) | |  | 10w(LED)\* (Note written below) 21W Bulb  1w (LED)  Nexon EV High (MGW BCM- Reverse Lamp pins are driving Rear turn indicator+Side repeater Lamps) | | 13 | 21w 21w 5w (Bulb) Tiago/Tigor MCE Low | | 13 | 21w21w 1w (LED) Tiago/Tigor MCE High | |
| 14758 | **Note for Nexon EV**-Turn Lamp strategy for Nexon EV shall be same as that of Nexon MCE. Turn indicator lamps wattage shall be carry over from Nexon MCE and shall be exactly same.  \***Note for Nexon MCE**- 10W is the constant wattage and current shall vary based on voltage. Please refer below table |
| 12799 | ... |
| 12802 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req26V2** | If Par\_BrkLmp=Disable (0)  && {(Q5=High||Low) || (X451=High||Low) || (X445=High||Low)} && BCM variant == BASE  then, Brake lamp outputs( BrakeLmpSigLH and BrakeLmpSigRH) shall be used to drive the Rear turn Indicators. | | **Validation Method** | Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base | |
| 13209 | ... |
| 13212 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req27V1** | If Par\_BrkLmp=Disable (0)  && {(Q5=High||Low) || (X451=High||Low) || (X445=High||Low) }  && BCM variant == BASE  then,  BCM shall log the respective DTCs as mentioned in DTC list as per the new threshold set for turn indicator LED lamps. | | **Validation Method** | Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base | |
| 13797 | **4.3.6 Normal Modes-Remote Light Access for Connected Car(Hazard function)** |
| 13798 | ... |
| 13801 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req28V1** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  -Read Remote hazard On request(RemoteHazardCmd)over CAN from TCU (Telematics Control Unit) If Remote hazard in request is set(if RemoteHazardCmd="1") then, BCM shall turn ON the hazard lamp if is OFF.  -Publish updated hazard lamp state (HazardLampState=’1’) after RemoteHazardCmd execution on CAN to TCU (Telematics Control Unit)    If hazard lamp is in On state, discard the Command from TCU (Telematics Control Unit) and publish the hazard lamp state.  - Publish status signal for HazardLampState.    **If Ignition is ON,BCM shall-** - Ignore hazard lamp on request (RemoteHazardCmd) from TCU (Telematics Control Unit). | | **Validation Method** | Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 13809 | ... |
| 13812 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req29V1** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  -Read Remote hazard OFF request(RemoteHazardCmd)over CAN from TCU (Telematics Control Unit) If Remote hazard in request is set(if RemoteHazardCmd="0") then, BCM shall turn OFF the hazard lamp if is ON.  -Publish updated hazard lamp state (HazardLampState=’0’) after RemoteHazardCmd execution on CAN to TCU (Telematics Control Unit)    If hazard lamp is in OFF state, discard the Command from TCU(Telematics Control Unit) and publish the hazard lamp state.  - Publish status signal for HazardLampState.    **If Ignition is ON,BCM shall-** - Ignore hazard lamp OFF request (RemoteHazardCmd) from TCU(Telematics Control Unit). | | **Validation Method** | Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 15918 | **4.3.7 Normal Modes - Emergency Braking Hazard function** |
| 15929 | ... |
| 15932 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req1V4** | On receiving the Emergency Brake input i.e. **BrkLightSig2** == 2 (Panic Brake detect), then BCM shall activate the turn indicators with flashes for **4.0 +/- 1.0 Hz** until emergency brake input is received to BCM. **Note 1** : The BCM shall receive the Emergency Brake input from ABS/ ESP on CAN via BrkLightSig2. **Note 2** :- This requirement is only applicable for Kenger 2.0 & Limber and onwards where ABS / ESP plus iVBAC is present. **Note 3**:-This requirement is also applicable for Non-EV Q501/Q502 onward where ABS/ESP is present | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15963 | ... |
| 15966 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req2V1** | **Please refer the below timing diagram for Hazard flashes during Emergency braking:** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15940 | ... |
| 15943 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req3V4** | Emergency braking for hazard shall not be provided, while Hazard warning signal already is activated. Hazard has highest priority. **Note**:- This requirement is only applicable forKenger 2.0 & Limber and onwards **Note 2**:-This requirement is also applicable for Non-EV Q501/Q502 onward where ABS/ESP is present | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15951 | ... |
| 15954 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req4V1** | Emergency braking for hazard shall be applicable only in RUN power mode. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15984 | ... |
| 16009 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req5V3** | On receiving the BrkLightSig2 signal with "Panic Brake Detect" state by BCM, the Hazard lamp and Brake lamp shall get activated.  NOTE: BrkLightSig2 signal shall be applicable for Kenger 2.0 & Limber and onwards.  NOTE: This requirement is also applicable for Non-EV Q501/Q502 onward where ABS/ESP is present | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 16006 | ... |
| 15987 | |  |  | | --- | --- | | **FD\_EL\_NM\_HzEBL:Req6V1** | Normal operating voltage: 12V Min & Max operating voltage range: 9V-16V | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15132 | **4.3.8 Voice command Requirements** |
| 15274 | ... |
| 15277 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req30V1** | The voice command feature for Turn Left & Turn Right, Hazard indicator shall work during IGN ON / RUN mode. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15307 | ... |
| 15310 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req31V1** | The behavior for Turn Left & Turn Right, Hazard indicator (like ON / OFF flash time, flashing frequency) shall be as per existing implementation. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15318 | ... |
| 15321 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req32V1** | The Turn Left indicator shall get deactivated on receiving “Turn OFF Left indicator” request from HU on CAN (TurnLeftThroughVC: 0x0 value). The Turn Left indicator shall get activated on receiving “Turn ON Left indicator” request from HU on CAN (TurnLeftThroughVC: 0x1 value). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15329 | ... |
| 15332 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req33V1** | The Turn Right indicator shall get deactivated on receiving “Turn OFF Right indicator” request from HU on CAN (TurnRightThroughVC: 0x0 value). The Turn Right indicator shall get activated on receiving “Turn ON Right indicator” request from HU on CAN (TurnRightThroughVC: 0x1 value). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15350 | ... |
| 15353 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req34V1** | The Hazard indicator shall get deactivated on receiving “Turn OFF Hazard indicator” request from HU on CAN (HazardThroughVC: 0x0 value). The Turn Left indicator shall get activated on receiving “Turn ON Hazard indicator” request from HU on CAN (HazardThroughVC: 0x1 value). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15361 | ... |
| 15364 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req35V1** | On receiving any request to BCM on CAN and if lamp DTC is present, the lamp shall remain in OFF state. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15372 | ... |
| 15399 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req36V1** | The below table shall be implemented in BCM for Turn Left & Turn Right, Hazard indicator functionality through Voice command request. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15387 | **4.3.8.7.1 Voice Command cases for Turn Indicators and Hazard indicator** |
| 15388 | **4.3.8.7.1.1 Turn Left indicator: Voice command cases** |
| 15389 | <**Turn Left indicator: Cases**> |
| 15390 | **4.3.8.7.1.2 Turn Right indicator: Voice command cases** |
| 15391 | **<Turn Right indicator: Cases>** |
| 15392 | **4.3.8.7.1.3 Hazard indicator: Voice command cases** |
| 15393 | **<Hazard indicator: Cases>** |
| 15720 | **4.3.8.8 Both Turn Indicator flashes after Remote Engine Start with AC operation request** |
| 15723 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req37V3** | ~~During IGN OFF, the BCM shall activate the turn indicators flashes for 3 times to indicate AC ON operation after receiving below state of the signal:~~ ~~CabinCoolingSolValveState with value "Cabin Cooling SV is ON" from VCU.~~  ~~NOTE: The BCM shall operate the turn indicators only for first time throughout the IGN OFF state.~~ | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway BCM | |
| 15897 | **4.3.8.9 Both Turn Indicator flashes after RESS operation request from TCU.** |
| 15900 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req38V3** | **~~RESS Function is Enabled : -~~**  ~~While~~ **~~Par\_RemoteEngStartFunction~~** ~~is enabled AND~~ ***~~RemoteUsecaseState == 3~~*** ~~[ON] with~~ ***~~RemoteUsecaseStateStatus~~*** ~~==~~ **~~0~~** ~~(Pausible),~~ ~~After Remote Engine and AC start operation is successful, then Hazard lights or turn indicator lights should flashed for 3 times.~~  ~~Hazard lights should flashed for 3 times and horn gets on for 3 time after the successful Remote Engine or AC start operation, while~~ **~~BCMRemotePrecheck = 1 (Passed)~~**  Hazard lights shall flashed for 3 times and horn gets on for 3 time while **BCMRemotePrecheck = 1(Passed)** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 19166 | **4.3.8.10 RESS enable** |
| 19169 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req40V1** | After awaking, BCM shall monitor signal *RemoteUseCaseState == 3* On receiving *RemoteUseCaseState == 3* command, BCM shall turn off below loads: • Front Wiper (Low / High / Intermittent / Auto) • Rear Wiper (Normal wipe and Fixed Intermittent wipe) • Low Beam Headlamp • High Beam Headlamp  Note: The only function based on the hardwired switch input shall be disabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 16027 | ... |
| 16030 | |  |  | | --- | --- | | **FD\_EL\_NM\_TS:Req39V1** | Requirements related to Remote Engine Start function, please refer the RESS FD. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 1084 | **4.3.9 Failure Mode** |
| 1087 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req1V1** | If both turn signals are active at the same time, BCM shall activate turn signals as per latest input. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1098 | ... |
| 1101 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req2V2** | If Par\_PartialBulbDblFlickerTurnIndLamps == Enable(1) and the bulb failure is detected (front or rear) the remaining bulb shall flash with double the normal frequency (“Par\_TurnIndicatorOnTime/2” and “Par\_TurnIndicatorOffTime/2”.) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | TBD | | **Applicable variants** | Base and Mid BCMs | |
| 1112 | ... |
| 1115 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req3V2** | If Par\_PartialBulbDblFlickerTurnIndLamps == Enable(1) and the LED failure is detected (front or rear) the remaining LED shall flash with the double the normal frequency according to frequency. (“Par\_TurnIndicatorOnTime/2” and “Par\_TurnIndicatorOffTime/2”.) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 1126 | ... |
| 1129 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req4V2** | In case of bulb or LED failure, if Par\_PartialBulbDblFlickerTurnIndLamps == Enable(1) then BCM shall activate the lamps with failure frequency. Also the telltale shall be send at the double freq in sync with HW signals. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1140 | ... |
| 1143 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req5V1** | In case of non-latchable hazard switch, if it is continuously pushed for more than ”Par\_SwitchStuckTime”, Hazard function shall not work. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1154 | ... |
| 1157 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req6V1** | When turn indicators are ON and if output driver fails, BCM shall send respective CAN message to deactivate the corresponding telltale. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1168 | ... |
| 1171 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req7V1** | If CAN communication fails and BCM cannot send the tell tale messages to IC, turn indicator function shall work as per normal mode behaviour. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1182 | ... |
| 10832 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req9V1** | If right turn indicator switch is active and BCM observes that the left turn indicators are coming ON then the left turn indicators shall be switch OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 10829 | ... |
| 1185 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req8V1** | If left turn indicator switch is active and BCM observes that the right turn indicators are coming ON then the right turn indicators shall be switch OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1196 | ... |
| 10820 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req12V1** | The turn indicator output shall be controlled through PWM with a frequency of 125±3 Hz and a duty cycle of 50% during the ON time of turn indicators. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway | |
| 10828 | ... |
| 10809 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req13V1** | Turn indicator shall not flicker due to Battery fluctuation, such that the output of turn indicator shall remains stable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid with Gateway | |
| 10770 | ... |
| 10773 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req10V1** | In case of over voltage condition (Battery voltage >16), the turn signal or hazard output shall not be switched OFF | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11139 | ... |
| 11142 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req11V2** | If "Par\_LEDBasedRearTurnIndLamps == Enalbe(1)" && "Par\_RevLmp == Disable(0)"&& "Par\_PartialBulbDblFlickerTurnIndLamps == Enable(1)" then, **a)** If 'RevLampSigLH' or 'TurnLHInd' output fails then BCM shall log the partial bulb out DTC and activate the remaining healthy turn indicator output with double frequency.  **b)** If 'RevLampSigRH' or 'TurnRHInd' output fails then BCM shall log the partial bulb out DTC and activate the remaining healthy turn indicator output with double frequency.  **c) If both front and rear bulbs are removed and side repeater are still connected, then BCM shall detect overall open Load (partial bulbout for Front/Rear\* and Open load for Front/Rear\*) and continue giving double frequency for side repeater lamp (~~Bulb~~/LED). But since there is Open load DTC present, then turn off the Telltale at cluster.**   **d) If both front and rear bulbs are removed and side repeater are still connected, then BCM shall detect overall partial bulbout for Front/Rear\* and continue giving double frequency for side repeater lamp (Bulb/~~LED~~). Open load DTC for Front/Rear\* will get set, when side repeater lamp is also removed. While open load DTC for Front/Rear\* is present, then turn off the Telltale at cluster.**  **\*Note : - Side repeater lamps are connected to Front or Rear Turn Indicator lamp outputs line as per project wise. TML will provide the connection details with respect to projects.** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & Mid With Gateway BCMs | |
| 19099 | ... |
| 19102 | |  |  | | --- | --- | | **FD\_EL\_FM\_TS:Req12V1** | The BCM shall not activate the Emergency Brake function (Hazard lamp), if BrkLightSig2Status == 2 (i.e. implausible) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & Mid With Gateway BCMs | |
| 1210 | **4.4 Safety Level** |
| 1211 | Automotive Safety Integrity Level (ASIL) for Turn Signals: Not applicable for Base and Mid Segments |
| 1212 | Automotive Safety Integrity Level (ASIL) for Hazard Lights: Not applicable for Base and Mid Segments |
| 1213 | **4.5 Block Diagram** |
| 9724 |  |
| 1215 | **4.6 Inputs** |
| 1218 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition keyX X - 0 1 1 - X - - - - | | TurnLHSWSig | Turn switch signal LHX X - 0 1 1 - X - - - - | | TurnRHSWSig | Turn switch signal RHX X - 0 1 1 - X - - - - | | HazardSWSig | Hazard SignalX X - 0 1 1 - X - - - - | | PostionLampSwSig | Postion Lamp Switch SignalX X - 0 1 1 - X - - - - | | KeyRfSig | Lock unlock signalX X - - - - - - - - - X | | CrashHwDig | Crash signalX X - 0 1 1 - X - - - - | | CrashHwPwm | Crash signal- X - - - - - - X - - - | | CrashoutputSignal | Crash signalX X - 0 (0x00) 128 (0x80) - - - - X - - | | RemoteHazardCmd | Hazard lamp ON/OFF request from TCU(Telematics Control Unit)x x - 0 1 1   - - x - | | RemoteHazardCmdStatus | Status of RemoteHazardCmd published by TCU (Telematics Control Unit)- x - 0 3 1   - - x - | | TurnLeftThroughVC | Turn Left indicator request though Voice command (i.e. on CAN)X X - 0 1 - - - - X - - | | TurnRightThroughVC | Turn Right indicator request though Voice command (i.e. on CAN)X X - 0 1 - - - - X - - | | HazardThroughVC | Hazard indicator request though Voice command (i.e. on CAN)X X - 0 1 - - - - X - - | | CabinCoolingSolValveState | Cabin Cooling Solenoid Valve signal for Turn indicators activation during AC ON operation.- X - 0 3 1 - - - X - - | | CabinCoolingSolValveStateStatus | Cabin Cooling Solenoid Valve signal Status- X - 0 3 1 - - - X - - | |
| 1427 | **4.7 Outputs** |
| 1430 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | TurnLHInd | Left Turn SignalX X - - - - - - X - - - | | TurnRHInd | Right Turn SignalX X - - - - - - X - - - | | HazardSWLEDSig | Hazard SignalX X - - - - - - X - - - | | TurnLHTelltale | Telltale for Left Turn Side X X - - - - - - - X - - | | TurnLHTelltaleStatus | Status for Left Turn SidetelltaleX X \_ \_ \_ \_ \_ \_ \_ X \_ \_ | | TurnRHTelltale | Telltale for right turn SideX X - - - - - - - X - - | | TurnRHTelltaleStatus | Status for Right Turn SidetelltaleX X \_ \_ \_ \_ \_ \_ \_ X \_ \_ | | BCMCrashOutputState | BCM Crash Output State Signalx x - 0 1 1 - - - x - - | | BCMCrashOutputStateStatus | BCM Crash Output State Status Signalx x - 0 3 1 - - - x - - | | RevLampSigLH | Reverse lamp output LH- x - - - - - - x - - - | | RevLampSigRH | Reverse lamp output RH- x - - - - - - x - - - | | HazardLampState | Hazard Lamp State as published by BCM- X - 0 1 1 - - - X | | HazardLampStateStatus | Status of HazardLampState as published by BCM- X - 0 3 1 - - - X | |
| 1534 | **4.8 Configurable Parameters** |
| 1537 | |  |  | | --- | --- | | **FD\_EL\_CP\_TS:Req1V2** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_HazardSwitchSel | Hazard Switch Latchable/Non-Lachable input  0 – Latchable 1 – Non-Latchable- 0 1 1 1 X - Yes | | Par\_HazardONTime | Hazard ON timems 100 600 300 10 X - Yes | | Par\_HazardOFFTime | Hazard OFF timems 100 600 300 10 X - Yes | | Par\_SwitchStuckTime | Momentary Switch stuck time detectionsec 10 100 60 10 X - Yes | | Par\_TurnIndicatorOffTime | OFF time for turn indicator flashingms 100 500 300 10 X - Yes | | Par\_TurnIndicatorOnTime | ON time for turn indicator flashingms 100 500 300 10 X - Yes | | Par\_CrashSel | Crash signal 0 – Digital 1 – PWM 2 – CAN 3 – PWM + CAN 4 - Digital + CAN- 0 4 0 1 X - Yes | | Par\_ChangeMsgID | Change in Msg ID configuration 0 - Falcon 1 - Eagle 2 - Reserved 3 - Reserved- 0 3 0 1 x x Yes | | Par\_LEDBasedRearTurnIndLamps | LED Based Rear Turn Indicator Lamp 0 - Disable 1 - Enable - 0 1 0 1 x x Yes | | Par\_TurnWattage | Turn indicator wattage - ~~1~~ ~~255~~ ~~40~~ 1 x - Yes | | ~~Par\_ThresholdPercSTG~~ | ~~Threshold Percentage to find wattage for STG.~~- ~~10~~ ~~1000~~ ~~200~~ 10 x - Yes | | ~~Par\_ThresholdPercSTbOpen~~ | T~~hreshold Percentage to find wattage for STB or Open circuit.~~- ~~10~~ ~~1000~~ ~~40~~ 10 X - Yes | | ~~Par\_MultFactorPartial~~ | ~~Multiplication factor to find the wattage of individual turn lamp~~- ~~0~~ ~~1~~ ~~0.500~~ 0.0625 x - Yes | | ~~Par\_TurnWattageType~~ | ~~Turn Indicator Wattage Type~~- ~~0~~ ~~255~~ ~~0~~ ~~1~~ ~~x~~ - Yes | | Par\_PartialBulb DblFlickerTurnIndLamps | Partial Bulb Double Flicker for Turn Indicator Lamp 0 - Disable 1 - Enable- 0 1 1 - - X Yes | | Par\_TurnLampVoltCompensation |  | |
| 16049 | **5 Hazard Light (CAN input based)** |
| 16646 | **5.1 Description** |
| 16650 | Hazard Lamp is **pair of intermittent flashing indicator lights that flash in unison to warn other drivers that the vehicle** is a temporary obstruction. So indication should be given when user presses the hazard lamp switch or vehicle detects some Hazard situation where it can become obstruction to others. Vehicle Crash is one of example where such obstruction detection and automation of hazard lamp is done. Similarly, Hazard Lamp can be automated with panic braking detection simply to warn drivers behind that something is happening ahead of them and they should use caution (and slow down). In case of Nexon EV, there are chances of vehicle turning Neutral from Drive because some use-cases (Ex: Low SoC, Battery Fault). Immediate transition of Drive to Neutral will withdraw traction efforts from vehicle and vehicle will start coasting and cannot be accelerated even if user wants to. This can cause obstruction to surrounding vehicles and should be informed in terms of Hazard lamp Indication. This document defines requirements for the same.   Hazard Lamp is connected to BCM module. VCU and BCM are connected on Vehicle CAN. BCM shall glow Hazard Lamp when it detects Hazard Switch Press from user or when VCU sends signal over CAN because of detection Drive to Neutral transition. VCU shall detect Drive to Neutral transition from any scenario and inform the same to BCM over CAN. Flow Chart of signals and actions is as follows. |
| 16652 | <Picture> |
| 16647 | **5.2 Operating Power Modes** |
| 16052 | |  | | --- | | **FD\_EL\_OPM\_TS:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive* Run | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 16098 | **NOTE:**      The above power modes are applicable for turn indicator function only. In case of turn indicators to be switched ON by any other function, the corresponding functional requirements have to be followed.  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU. \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 16631 | **5.3 Behaviour Modes** |
| 16644 | **5.3.1 Normal Modes** |
| 16645 | ... |
| 16635 | |  |  | | --- | --- | | **FD\_EL\_NM\_HL:Req1V3** | BCM shall operate the Hazard Lamp as Active till the VCU request is present (Hazard\_Lamp\_Vcu\_Req == 1)  NOTE: Applicable for Kenger 2.0 & Limber | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 18872 | **5.4 Inputs** |
| 18875 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | VcuHazardLampReq | Hazard lamp operation request from VCU to BCM  0 - No Request for Hazard Lamp 1 - Request to activate Hazard LampX X - 0 1 1 - - - X - - | |
| 1646 | **6 Position Lights** |
| 1647 | **6.1 Description** |
| 1648 | The Position Lights are used to indicate the vehicle presence during driving. These lamps are on the corner of the car (front/rear and left/right). |
| 1649 | **6.2 Applicable BCM Variants** |
| 1650 | Base and Mid BCMs |
| 1651 | **6.3 Operating Conditions** |
| 1652 | **6.3.1 Operating Power Modes** |
| 1655 | |  | | --- | | **FD\_EL\_OPM\_PL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *Full Function* | | *Transport Drive* | *Full function* | | *Transport Drive Crank* | *Full function* | | *Transport Drive Run* | *Full function* | | *Battery save* | *Full function* | | *Stand-By* | *No function* | | *Awake* | *Full function* | | *Accessory Delay* | *Full function* | | *Accessory* | *Full function* | | *Active* | *Full function* | | *Run/Normal Run \** | *Full function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load \*\** | *Full Function* | | *Start/Crank* | *Full function* | |
| 13672 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 1689 | **6.3.2 Operating Voltage Range** |
| 1690 | Refer Section 2.1.1 |
| 1691 | **6.3.3 Nominal Power consumption** |
| 1694 | |  |  | | --- | --- | | **FD\_EL\_NPC\_PL:Req1V1** | Nominal power consumption is 60.048 watts | | **Validation Method** | Component Level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 1702 | **6.3.4 Temperature dependency** |
| 1703 | Refer Section 2.1.2 |
| 1704 | **6.4 Vehicle Example diagram** |
| 1705 |  |
| 1708 | |  |  | | --- | --- | | HSW: HeadLmpSelectSwitch RRPL: PsnLightCtrlRearRHC: Controller | FLPL: PsnLightCtrlFrntLH FRPL: PsnLightCtrlFrntRH RLPL: PsnLightCtrlRearLH | |
| 1710 | **6.5 Response Time** |
| 1711 | Refer Section 2.2 |
| 1712 | **6.6 Assumptions** |
| 1713 | None |
| 1714 | **6.7 Hardware/Software** |
| 1715 | Hardware: Light, Master Light Switch/Combination Switch, BCM |
| 1716 | Software: BCM software. |
| 1717 | **6.8 HMI commodities** |
| 1720 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Position Lights | | Switches | Master Light Switch/Combination Switch | |
| 1728 | **6.9 Behavior Modes** |
| 1729 | **6.9.1 Normal Mode** |
| 1732 | |  |  | | --- | --- | |  |  | |
| 1734 | ... |
| 1737 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req1V1*** | BCM shall activate Position lights when any of the following condition satisfies: 1. Position lamp switch signal is active  2. Main beam / Dipped beam is ON (in case of the switches usage in vehicle where position lamp switch contact is not made when dip beam or main beam is ON) i.e, Par\_PositionContactAtHeadlampON is disabled (contact not available).  In case if "Base BCM" where 'main beam' / 'dipped beam' outputs are not available, the input conditions of "Mid BCM" for making these outputs ON shall be considered to activate the position lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1745 | ... |
| 1748 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req2V1*** | BCM shall deactivate Position lights when 1. Position lamp switch signal is inactive. 2. Main Beam & Dipped beam Operations are inactive (in case of the switches usage in vehicle where position lamp switch contact is not made when dip beam or main beam is ON). i.e, Par\_PositionContactAtHeadlampON is disabled (contact not available).  In case if "Base BCM" where 'main beam' / 'dipped beam' outputs are not available, the input conditions of "Mid BCM" for making these outputs OFF shall be considered to deactivate the position lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 1756 | ... |
| 1759 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req3V1*** | BCM shall publish position lamp output status on CAN so that the other ECUs can take the same and illuminate their back lighting. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9390 | ... |
| 9393 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req4V1*** | BCM shall not activate Position lights when  Headlamp ON signal is active and Position lamp signal is Inactive and Ignition is other than ON/RUN/CRANK position.This is applicable when Par\_MinBatteryDrain is enabled.   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode. BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9443 | ... |
| 9446 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req4V1*** | Position Light function shall be Active/Inactive based on Par\_PositionLmpSel | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11886 | ... |
| 11889 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req5V1*** | BCM shall calculate Position lamp threshold for STG, STB or Open based on ~~Par\_PositionWattageType and~~ loads associated with the parameter value. ( Refer below table). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11897 | **6.9.1.7 Loads based on Par\_LmpWattageVehicleTypeSel are as below** |
| 11900 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Position Lamp LHPosition Lamp RH** **License Plate Lamps** **Platform / Remarks** | | 0 | 15 W15 W 2W Bolt / Zest / Tiago | | 2 | 2.9 W2.9 W - Nexon High end | |  | 6.1 W6.1W - Nexon Low end | | 3 | 9.9W+[3.42W to 6.73W(cockpit wattage)]9.9W +[2.7W to 4.8W cockpit wattage)]+ 0.68W(License plate) - Q501- High | | 4 | 21.9W+[1.58W to 6.1W(cockpit wattage)]21.9W+ [2.7W to 4.8W(cockpit wattage)]+ 0.68W(License plate)  - Q501-Low | | 5 | 20W+[0.7272W to 4.0464W(cockpit wattage)+0.7W(License plate)20W+[2.7W to 4.8W(cockpit wattage)+0.7W(License plate) - X451-High | | 6 | 20W+[0.7272W to 4.0464W(cockpit wattage)+0.7W(License plate)20W+[2.7W to 4.8W(cockpit wattage)+0.7W(License plate) - X451-Low | | 7 | 7.7w+[0.7272W to 4.0464W(cockpit wattage)+5w(License plate) Refer below **Table 5.1** for cockpit wattages.  Range defined as per features applicability for various trims7.7w+[2.7W to 4.8W(cockpit wattage)+5W(License plate)  Refer below **Table 5.2** for cockpit wattages.  Range defined as per features applicability for various trims    X445 High | | 8 | 10w+\*[0.7272W to 4.0464W(cockpit wattage)+5w(License plate)  Refer below **Table 5.1** for cockpit wattages. Range defined as per features applicability for various trims10w+\*\*[2.7W to 4.8W(cockpit wattage)+5W(License plate) Refer below **Table 5.2** for cockpit wattages.  Range defined as per features applicability for various trims    X445 Low | | 9 | 9.9W+[3.42W to 6.73W(cockpit wattage)]9.9W +[2.7W to 4.8W cockpit wattage)]+ 0.68W(License plate)  - Q502- High | | 10 | 22.4W+[1.58W to 6.1W(cockpit wattage)]22.4+ [2.7W to 4.8W(cockpit wattage)]+ 0.68W(License plate)   - Q502- Low | | 11 | 1.8W(Front)+2.1W(Rear)+[2.196W to 3.904W(cockpit wattage)]1.8W(Front)+2.1W(Rear)+[2.7W to 4.8W cockpit wattage)]+ 0.68W(License plate)    - Nexon MCE High | |  | 1.8W(Front)+2.1W(Rear)+[2.196W to 3.904W(cockpit wattage)]1.8W+2.1W(Rear)+[2.7W to 4.8W cockpit wattage)]+ 0.68W(License plate)   Nexon MCE Low | | 12 | 3.9W+10W(License plate LH+RH)6.72+[1.062W to 1.888 W(cockpit wattage)]   Nexon EV | | 13 | 15w15w 2w Tiago/Tigor MCE | |
| 9007 | **6.9.1.8 Note: 1) When front position lamps are combined with DRL, then BCM shall drive front positon lamps with two PWM o/p and rear position lamps with two digital o/p.** |
| 14679 | **6.9.1.9 2)For Q501-High, 9.9W is addition of Front lamps(3W)+Rear Lamps[4.5W(Tail BSO)+2.4W(Trunk Lamp) 3)For Q501-low 21.9W is addition of Front lamps(15W)+Rear Lamps[4.5W(Tail BSO)+2.4W(Trunk Lamp)** |
| 14191 | **6.9.1.10 Note : 1)For Q502-High, 9.9W is addition of Front lamps(3W)+Rear Lamps[4.5W(Tail Lamp)+2.4W(Trunk Lamp) 2)For Q502-low,22.4W is addition of Front lamps(15W)+Rear Lamps[5W(Tail Lamp)+2.4W(Trunk Lamp)** |
| 14680 | **6.9.1.11 3)For X445-High, 7.7W is addition of Front lamps(1.2W)+Rear Lamps(6.5W) 4)For X445-High, 10W is addition of Front lamps(5W)+Rear Lamps(5W)** |
| 14757 | **6.9.1.12 4)For Nexon EV and Nexon MCE, a)Cockpit illumination is fixed and in line with Q5/ X451 b)3.9W is addition of HeadLampLHPESType(1.8W)+TailLampLED\_BSO\_LH(2.1) c)6.72 is addition of TailLampLH\_TailgateSide(1.41W)+TailLampRH\_TailgateSide(1.41W)+TailLampLED\_BSO\_RH(2.1W)+HeadLampRHPESType (DRL+TI+Pos)(1.8W)** |
| 14691 | **Table 5.1**  **For X445** Cockpit Wattage loads driven by **PositionLmpCntrlLH**(Connecter 2-pin 6): |
| 14697 | |  |  | | --- | --- | | Window Winding Switch  For 4 window switch (10.8\*4) | 0.518W | | Steering wheel switch | 1.32W | | Drive Mode Switch | 0.24W | | Start Stop switch | 0.24W | | Hazard switch | 0.24W | |
| 14723 | **Table 5.2** Cockpit Wattage loads driven by **PositionLmpCntrlRH**(Connecter 2-pin 17): |
| 14726 | |  |  | | --- | --- | | HVAC | 3.6W | | Outboard fascia switch | 0.1452W | |
| 14022 | **Normal Modes-Remote Light Access for Connected Car(Position Light function)** |
| 14024 | ... |
| 14027 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req6V1*** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  - Read Remote Position ON request (RemotePositionCmd) over CAN from TCU(Telematics Control Unit) If Remote Position in request is Set (If RemotePositionCmd = “1”),BCM shall turn ON the position Lamp if is OFF.  -Publish updated Position lamp state (PositionLmpTelltale=’1’) after RemotePositionCmd execution on CAN to TCU(Telematics Control Unit)    If Position lamp is in On state, discard the Command from TCU (Telematics Control Unit) and publish the Position lamp state.  Publish status signal for PositionLmpTelltale     **If Ignition is ON BCM shall**, - Ignore Position lamp on request (RemotePositionCmd) from TCU(Telematics Control Unit) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 14036 | ... |
| 14039 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req7V1*** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  - Read Remote Position OFF request (RemotePositionCmd) over CAN from TCU (Telematics Control Unit) If Remote Position in request is Set (If RemotePositionCmd = “0”),BCM shall turn OFF the position Lamp if is ON.  -Publish updated Position lamp state (PositionLmpTelltale=’0’) after RemotePositionCmd execution on CAN to TCU (Telematics Control Unit)    If Position lamp is in OFF state, discard the Command from TCU (Telematics Control Unit) and publish the Position lamp state.  Publish status signal for PositionLmpTelltale     **If Ignition is ON BCM shall**, - Ignore Position lamp OFF request (RemotePositionCmd) from TCU (Telematics Control Unit) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid with Gateway BCM | |
| 15407 | **6.9.1.15 Voice Command Requirements for Position lamp** |
| 15420 | ... |
| 15423 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req8V1*** | The voice command feature for Position lamp (i.e. BCM receives request on CAN) shall work during IGN ON / RUN mode. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid With Gateway BCMs | |
| 15453 | ... |
| 15456 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req9V1*** | The behavior for Position lamp (like Debounce time, lamp configuration) shall be as per existing implementation. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid With Gateway BCMs | |
| 15442 | ... |
| 15445 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req10V1*** | The Position lamp shall get deactivated on receiving “Turn OFF Position lamp” request from HU on CAN (PositionLampThroughVC: 0x0 value). The Position lamp shall get activated on receiving “Turn ON Position lamp” request from HU on CAN (PositionLampThroughVC: 0x1 value). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid With Gateway BCMs | |
| 15431 | ... |
| 15434 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req11V1*** | On receiving Position lamp ON / OFF request to BCM on CAN and if DTC is present, the Position lamp shall remain in OFF state. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid With Gateway BCMs | |
| 15465 | ... |
| 15468 | |  |  | | --- | --- | | ***FD\_EL\_NM\_PL:Req12V1*** | The below table shall be implemented in BCM for Position lamp functionality through Voice command request. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid, Mid With Gateway BCMs | |
| 15478 | **<Position lamp: Voice command cases>** |
| 1767 | **6.9.2 Failure Mode** |
| 1772 | ... |
| 1775 | |  |  | | --- | --- | | **FD\_EL\_FM\_PL:Req1V1** | If both of position lamp output fail or lamps fail and Position lamp switch signal is active, BCM shall publish a CAN signal "PositionLmpTelltale" as ON so that the other ECUs can take the same and illuminate their back lighting.  If atleast one of the postion lamp output (PositionLmpCntrlLH/ PositionLmpCntrlRH) fails or lamp fails, BCM shall publish a CAN signal "PositionLmpMalFn" as ON to IC (other ECU) to display failure message. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1786 | ... |
| 1789 | |  |  | | --- | --- | | **FD\_EL\_FM\_PL:Req2V1** | If failsafe condition is detected, BCM shall activate position lights.  For the details on failsafe condition, switch normal and failure behaviour tables shall be referred. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 1800 | ... |
| 1803 | |  |  | | --- | --- | | **FD\_EL\_FM\_PL:Req3V1** | In case of the BCM hardware failure or microcontroller failure, Position lights shall be activated if Position lamp switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 12538 | ... |
| 12541 | |  |  | | --- | --- | | **FD\_EL\_FM\_PL:Req4V1** | Position lamp load compensation shall be applicable based on parameter“Par\_PosLampVoltCompensation” configuration as below,  1.If “Par\_PosLampVoltCompensation = Enable” then, BCM shall apply the voltage Compensation to drive the position lamp load.  2.If “Par\_PosLampVoltCompensation = Disable” then, BCM shall not apply the voltage Compensation to drive the position lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12946 | ... |
| 12949 | |  |  | | --- | --- | | **FD\_EL\_FM\_PL:Req5V1** | If the Par\_LmpWattageVehicleTypeSel= 03(Q501 High end), 1)Diagnostics(STB only) of left side Position lamps need not be monitored/logged when left side turn indicator/Hazard lamp is ON.  2)Diagnostics(STB only) of right side Position lamps need not be monitored/logged when right side turn indicator/Hazard lamp is ON.  This condition will be applicable if position lamps were ON before turning ON the turn indicator lamp. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 1814 | **6.10 Safety Level** |
| 1815 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs |
| 1816 | **6.11 Block Diagram** |
| 14159 |  |
| 1818 | **6.12 Inputs** |
| 1821 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | PositionLmpSwSig | Position Lamp Switch SignalX X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Failsafe Switch SignalX X - 0 1 1 - X - - - - | | HeadLampONSig | Head Lamp ON SignalX X - 0 1 1 - X - - - - | | RemotePositionCmd | Position Lamp ON/OFF request from TCU (Telematics Control Unit)  X - 0 1 1 - - - x - - | | RemotePositionCmdStatus | Status of RemotePositionCmd signal published by BCM  X - 0 3   - - - x - - | | PositionLampThroughVC | Position lamp request though Voice command (i.e. on CAN)X X - 0 1   - - - X - | |
| 1895 | **6.13 Outputs** |
| 1898 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | PositionLmpCntrlLH | Position Lamp control LeftX X - 0 1 1 - X - - - - | | PositionLmpCntrlRH | Position Lamp control RightX X - 0 1 1 - X - - - - | | PositionLmpTelltale | Position lamp statusX X - 0 1 - - - - X - - | | PositionLmpTelltaleStatus | PositionLmp Telltale statusX X \_ 0 3 \_ \_ \_ \_ X \_ \_ | | PositionLmpMalFn | Output Failure TelltaleX X - - - - - - - X - - | | PositionLmpMalFnStatus | position lamp malfunction statusX X \_ \_ \_ \_ \_ \_ \_ X \_ \_ | |
| 1987 | **6.14 Configurable Parameters** |
| 1990 | |  |  | | --- | --- | | **FD\_EL\_CP\_PL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_PositionContactAtHeadlampON | Whether position contact is available or not when ML switch is in Headlamp position. 0 – not available 1 - Available- 0 1 1  1 X - Yes | | Par\_PositionLmpSel | Position Light Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1 1 1 X - Yes | | Par\_MinBatteryDrain | PositionLamp operation when IgnOff & Headlamp switch ON (Minimize battery drain due to parking lamp Enable Disable parameter) 0 – Disable 1 – Enable- 0 1 0 1 X - Yes | | ~~Par\_PositionWattageType~~ | ~~Position Lamp Wattage type~~- ~~0~~ ~~255~~ ~~0~~ 1 X - Yes | | Par\_PosLampVoltCompensation | Position Lamp Voltage Compensation control parameter 0-Disable 1-Enable- 0 1 0 1 X X Yes | |
| 2044 | **7 Brake lamps** |
| 2045 | **7.1 Description** |
| 2046 | Brake lamps are also called stop lamps. These are mandatory for all vehicles. The stop lamps on vehicle are placed in the same housing as the rear lights and turn signals. Stop lamps are used to give warning to the following drivers that the vehicle speed is reducing or the vehicle is stopped. |
| 2047 | **7.2 Applicable BCM Variants** |
| 2048 | Base and Mid BCMs |
| 2049 | **7.3 Operating Conditions** |
| 2050 | **7.3.1 Operating Power Modes** |
| 2053 | |  | | --- | | **FD\_EL\_OPM\_BL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13679 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 2087 | **7.3.2 Operating Voltage Range** |
| 2088 | Refer Section 2.1.1 |
| 2089 | **7.3.3 Nominal Power consumption** |
| 2092 | |  |  | | --- | --- | | **FD\_EL\_NPC\_BL:Req1V1** | Nominal power consumption is 60.072 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 2100 | **7.3.4 Temperature dependency** |
| 2101 | Refer Section 2.1.2 |
| 2102 | **7.4 Vehicle Example diagram** |
| 2103 |  |
| 2106 | |  |  | | --- | --- | | BLS: Brake lamp switch C: Controller | BLL: Brk lamp left BLR: BrkLmpright | |
| 2108 | **7.5 Response Time** |
| 2109 | Refer Section 2.2 |
| 2110 | **7.6 Assumptions** |
| 2111 | None |
| 2112 | **7.7 Hardware/Software** |
| 2113 | Hardware: Light, Brake pedal, BCM. |
| 2114 | Software: BCM software. |
| 2115 | **7.8 HMI commodities** |
| 2118 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Brake Lights | | Switches | Brake pedal | |
| 2126 | **7.9 Behavior Modes** |
| 2127 | **7.9.1 Normal Mode** |
| 2130 | |  |  | | --- | --- | |  |  | |
| 2132 | ... |
| 2135 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req1V4** | BCM shall activate brake lamps when any of the following condition satisfies: 1) when the brake switch signal is active.  2) When CAN signal "BrkLightSig" is active with plausible status if ESP/ABS ECU is present (Par\_ABsESpAvailable).  3) When CAN signal "**BrkLightSig2"**is active with plausible status if ESP/ABS ECU is present (Par\_ABsESpAvailable).  **For Nexon EV strategy**- BCM shall activate brake lamps when any of the following condition satisfies: 1) when the brake switch signal is active. 2) When CAN signal "BrkPressStateVcu" is 0(Brake is pressed) with plausible status. **For Kanger EV 2.0 strategy**- BCM shall activate brake lamps when any of the following condition satisfies: 1) when the brake switch signal is active. 2) When CAN signal "BrkPressStateVcu" is 0(Brake is pressed) with plausible status. 3) When CAN signal "**BrkLightSig2"**is active with plausible status if ESP/ABS ECU is present (Par\_ABsESpAvailable). **If there are different values received during failure condition, then brake lamp ON request is the highest priority.** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9347 | ... |
| 9350 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req5V4** | BCM shall consider CAN signal "**BrkLightSig**" only if ESP/ABS ECU is present .(Par\_ABsESpAvailable)  Also BCM shall consider CAN signal "**BrkLightSig2"**only if ESP/ABS ECU is present .(Par\_ABsESpAvailable)  **For Nexon EV strategy**- BCM shall consider CAN signal "BrkPressStateVcu" only **For Kanger EV 2.0 strategy**- 1. BCM shall consider CAN signal "BrkPressStateVcu"  2. BCM shall consider CAN signal "**BrkLightSig2"**only if ESP/ABS ECU is present .(Par\_ABsESpAvailable) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2143 | ... |
| 2146 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req2V1** | Brake lamps feature shall be available even if the vehicle is in OFF condition (IGN OFF, key is out of the ignition barrel) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2154 | ... |
| 2157 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req3V4** | BCM shall deactivate brake lamps when all of the following condition satisfies: 1) The brake switch signal is inactive. 2) When CAN signal "BrkLightSig" is inactive. (Par\_ABsESpAvailable) 3) When CAN signal "**BrkLightSig2"**is inactive (i.e. NO request of Brake lamp)  **For Nexon EV strategy**- BCM shall deactivate brake lamps when all of the following condition satisfies: 1) The brake switch signal is inactive. 2) When CAN signal "BrkPressStateVcu" is 1(Brake is not pressed)  **For Kanger 2.0 strategy**- BCM shall deactivate brake lamps when all of the following condition satisfies: 1) The brake switch signal is inactive. 2) When CAN signal "BrkPressStateVcu" is 1(Brake is not pressed) 3) When CAN signal "**BrkLightSig2"**is inactive (i.e. NO request of Brake lamp) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9466 | ... |
| 9469 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req4V1** | Brake Light function shall be Active/Inactive based on Par\_BrkLmp | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11150 | ... |
| 11153 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req5V1** | BCM shall publish the "BrkLmpON" CAN signal as 'ON' for other ECUs if below condition is satisfied, a) Brake lamps are ON  BCM shall publish this signal even if trailer ECU is not present. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11161 | ... |
| 11164 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req6V1** | BCM shall publish the "BrkLmpON" CAN signal as 'OFF' for other ECUs if below condition is satisfied, a) Brake lamps are OFF  BCM shall publish this signal even if trailer ECU is not present. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11172 | ... |
| 11175 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req7V1** | If "Par\_BrkLmp == Disable" then BCM shall publish the "BrkLmpONStatus" CAN signal as 'Signal Not Available' for other ECUs | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11945 | ... |
| 11948 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req8V1** | BCM shall calculate brake lamp threshold for STG, STB or Open based on ~~Par\_BrakeWattageType and~~ loads associated with the parameter value. ( Refer below table). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 11956 | **7.9.1.10 Loads based on Par\_LmpWattageVehicleTypeSel are as below:** |
| 11959 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Brake LampRight Brake Lamp** **CHMSL** **Platform / Remarks** | | 0 | 21W21W 1W Bolt / Zest / | |  | 21W21W 25W Tiago/Tigor | | 2 | 16W 16 W - Nexon High/Low | | 3 | 4.2W4.2W 6W(LED) Q501-High | | 4 | 4.2W4.2W 25W(Bulb) Q501-Low | | 5 | 21W+2W(CHMSL wattage)21W - X451-High | | 6 | 21W+2W(CHMSL wattage)21W - X451-Low | | 7 | 5.76W(LED)5.76W(LED)+25W CHMSL(BULB) - X445-High(MGW BCM-Brake lamps used as it is) | |  | 21W21W   X445-High(Base BCM-Brake Lamps used for Rear turn indicator lamps) | | 8 | 21W21W~~+25WCHMSL(BULB)~~ Note : - BCM is not driving CHMSL. - X445-Low((MGW BCM-Brake lamps used as it is) | |  | 21W21W   X445-Low(Base BCM-Brake Lamps used for Rear turn indicator lamps) | | 9 | 3.8W3.8W 6W(LED) Q502-High | | 10 | 21W21W     25W(Bulb) Q502-Low | | 11 | 2 W2 W 2W Nexon MCE High/Low | | 12 | 21W21W 2W Nexon EV | | 13 | 21W21W 25W Tiago/Tigor MCE | |
| 14778 | For Nexon EV-Brake Lamp strategy shall be same as that of exisiting Nexon.Brake lamp pins shall be used only for driving the brake lamps. |
| 15690 | ... |
| 12690 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req9V1** | Brake lamp load compensation shall be applicable based on the parameter “Par\_BrakeLampVoltCompensation” configuration as follows,  1.If “Par\_BrakeLampVoltCompensation= Enable” then, BCM shall apply the voltage compensation to drive the Brake lamp load. 2.If “Par\_BrakeLampVoltCompensation = Disable” then, BCM shall not apply the voltage compensation to drive the Brake lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15705 | ... |
| 15708 | |  |  | | --- | --- | | **FD\_EL\_NM\_BL:Req10V1** | ~~On receiving the Emergency Brake input i.e.~~ **~~BrkLightSig~~** ~~== 2 (Panic Brake detect), then BCM shall activate the turn indicators with flashes (TBD : untill emergency brake input is recieved to BCM).~~ **~~Note 1~~** ~~: The BCM shall receive the Emergency Brake input from ABS/ ESP on CAN via BrkLightSig.~~ **~~Note 2~~** ~~:- This requirement is only applicable for~~ **~~Kenger EV 2.0~~**~~.~~ | | **FD\_EL\_NM\_BL:Req9V1** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2165 | **7.9.2 Failure Mode** |
| 2168 | |  |  | | --- | --- | |  |  | |
| 2170 | ... |
| 2173 | |  |  | | --- | --- | | **FD\_EL\_FM\_BL:Req1V1** | If at least one of the brake lamp output fails (BrakeLmpSigLH / BrakeLmpSigRH) or lamp fails, BCM shall publish a malfunction indication CAN message (BrakeLmpMalFn) as ON to display failure indication to the Instrument Cluster (other ECU). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 2184 | ... |
| 2187 | |  |  | | --- | --- | | **FD\_EL\_FM\_BL:Req2V1** | In case of the BCM hardware failure or microcontroller failure, Brake lights shall be activated if brake lamp switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 9228 | ... |
| 9232 | |  |  | | --- | --- | | **FD\_EL\_FM\_BL:Req3V2** | In case of BrkLightSig or **BrkLightSig2** CAN signal status is implausible, BCM shall operate the brake lamp as per brake switch HW input (BrakeLightSwSig). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2198 | **7.10 Safety Level** |
| 2199 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs |
| 2200 | **7.11 Block Diagram** |
| 9327 | **7.11.1** |
| 9328 |  |
| 2202 | **7.12 Inputs** |
| 2205 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | BrakeLightSwSig | Brake lamp switch signalX X - 0 1 1 - X - - - - | | BrkLightSig / BrkLightSig2 | Brake light signal from ABS / ESPX X - - - - - - - X - - | | BrkLightSigStatus | Status of Brake light signal from ESP.X X - - - - - - - X - - | | BrkPressStateVcu | This information tells whether brake is pressed or not x x  -  0  1  -  -  -  - X  -  - | | BrkPressStatusVcu | This information is used to determine the Brake press statussignal statusx x - 0 3 - -  -  - X  -  - | |
| 2249 | **7.13 Outputs** |
| 2252 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | BrakeLmpSigLH | Brake lamp Control LeftX X - 0 1 1 - X - - - - | | BrakeLmpSigRH | Brake lamp Control RightX X - 0 1 1 - X - - - - | | BrakeLmpMalFn | Brake lamp Mal functionX X - - - - - - - X - - | | BrakeLmpMalFnStatus | Brake lamp malfunction status signalX X \_ \_ \_ 1 \_ \_ \_ X \_ \_ | | BrkLmpON | Brake Lamp signalx x - 0 1 1 - - - x - - | | BrkLmpONStatus | Status of the Brake Lamp signalx x - 0 3 1 -             - - x - - | |
| 2326 | **7.14 Configurable Parameters** |
| 2329 | |  |  | | --- | --- | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_ABsESpAvailable | Brake Signal from ABS/ESP 0 - Not Available (Not Present) 1 - Available (Present)- 0 1 1 -   - | | Par\_BrkLmp | Brake Light Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1 1 X - Yes | | ~~Par\_BrakeWattageType~~ | ~~Brake Lamp wattage type~~- 0 ~~255~~ 0 X - Yes | | Par\_BrakeLampVoltCompensation | Brake Lamp Voltage Compensation control parameter 0 - Disable 1 - Enable- 0 1 0 X X Yes | |
| 2358 | **8 Centre High Mounted Stop LEDs** |
| 2359 | **8.1 Description** |
| 2360 | The CHMSL LED signal lamps provide value in safety features with shorter reaction times when used with LED. The CHMSL provides a warning to following drivers, whose view of the other stop lamps (of braking vehicle) is blocked by other vehicles. |
| 2361 | **8.2 Applicable BCM Variants** |
| 2362 | Base and Mid BCMs. |
| 2363 | **8.3 Operating Conditions** |
| 2364 | **8.3.1 Operating Power Modes** |
| 2367 | |  | | --- | | **FD\_EL\_OPM\_CHMSL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13686 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 2401 | **8.3.2 Operating Voltage Range** |
| 2402 | Refer Section 2.1.1 |
| 2405 | |  |  | | --- | --- | | **FD\_EL\_NPC\_CHMSL:Req1V1** | Nominal power consumption is 60.072 watts | | **Validation Method** | Component level Testing. | | **Applicable variants** | Base and Mid BCMs | |
| 2413 | **8.3.3 Temperature dependency** |
| 2414 | Refer Section 2.1.2 |
| 2415 | **8.4 Vehicle Example diagram** |
| 2416 |  |
| 2419 | |  |  | | --- | --- | | BLSS: BrkLightSwitchSensSig C: Controller | CHMSLC: CHMSlCtrl | |
| 2421 | **8.5 Response Time** |
| 2422 | Refer Section 2.2 |
| 15554 | ... |
| 2423 | **8.7 Assumptions** |
| 2424 | None |
| 2425 | **8.8 Hardware/Software** |
| 2426 | Hardware: Light, Brake pedal, BCM |
| 2427 | Software: BCM software |
| 2428 | **8.9 HMI commodities** |
| 2431 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Brake Lights | | Switches | Brake pedal | |
| 2439 | **8.10 Behavior Modes** |
| 2440 | **8.10.1 Normal Mode** |
| 2443 | |  |  | | --- | --- | |  |  | |
| 2445 | ... |
| 2448 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req1V1** | ~~CHMSL shall follow brake lamp output BrakeLmpSigLH or BrakeLmpSigRH based on Par\_CHMSLHwInterface.~~  CHMSL will be always connected to BCM Left Brake lamp output (BrakeLmpSigLH). So the (fault monitoring)threshold for Left Brake lamp output (BrakeLmpSigLH) shall be adjusted accordingly. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2456 | ... |
| 2459 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req2V2** | BCM shall activate CHMSL (with LEDs) when any of the following condition satisfies: 1) when the brake switch signal is active.  2) When CAN signal "BrkLightSig" is active with plausible status if ESP/ABS ECU is present (Par\_ABsESpAvailable).  3) When CAN signal "**BrkLightSig2**" is active with plausible status if ESP/ABS ECU is present (Par\_ABsESpAvailable). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9358 | ... |
| 9361 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req6V2** | BCM shall consider CAN signal "BrkLightSig" only if ESP/ABS ECU is present .(Par\_ABsESpAvailable) Also, BCM shall consider CAN signal "**BrkLightSig2**" only if ESP/ABS ECU is present .(Par\_ABsESpAvailable) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2467 | ... |
| 2470 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req3V1** | CHMSL (with LEDs) lamps feature shall be available even if the vehicle is in off condition (IGN off, key is out of the ignition barrel) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2478 | ... |
| 2481 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req4V2** | BCM shall deactivate CHMSL (with LEDs) when all of the following condition satisfies: 1) The brake switch signal is inactive. 2) When CAN signal "BrkLightSig" is inactive. 3) When CAN signal "**BrkLightSig2**" is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9488 | ... |
| 9491 | |  |  | | --- | --- | | **FD\_EL\_NM\_CHMSL:Req5V1** | CHMSL function shall be Active/Inactive based on Par\_BrkLmp | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2489 | **8.10.2 Failure Mode** |
| 2492 | |  |  | | --- | --- | |  |  | |
| 2508 | ... |
| 2511 | |  |  | | --- | --- | | **FD\_EL\_FM\_CHMSL:Req2V1** | In case of the BCM hardware failure, CHMSL shall be activated if brake lamp switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 9331 | ... |
| 9334 | |  |  | | --- | --- | | **FD\_EL\_FM\_CHMSL:Req3V2** | When BCM subscribes CAN signal "BrkLightSig" OR "**BrkLightSig2**" with implausible status OR BCM takes default state of this message, BCM shall activate CHMSL when brake switch signal is active and deactivate when brake switch signal is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 2522 | **8.11 Safety Level** |
| 2523 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs. |
| 2524 | **8.12 Block Diagram** |
| 9329 |  |
| 2526 | **8.13 Inputs** |
| 2529 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | BrakeLightSwSig | Brake light switch SignalX X - 0 1 1 - X - - - - | | BrkLightSig | Brake light Signal from ESPX X - - - - - - - X - - | | BrkLightSigStatus | Status of Brake light Signal from ESX X - - - - - - - X - - | | BrkLightSig2 | Brake light Signal from ESPX X - - - - - - - X - - | | BrkLightSigStatus2 | Status of Brake light Signal from ESX X - - - - - - - X - - | |
| 2573 | **8.14 Outputs** |
| 2576 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | BrakeLmpSigRH | Brake light signalX X - 0 1 1 - X - - - - | | BrakeLmpSigRH | Brake light signalX X - 0 1 1 - X - - - - | | BrakeLmpMalFn | Brake light Malfunction SignalX X - - - - - - - X - - | | BrakeLmpMalFn Status | Brake lamp malfunction signalX X - - - - - - - X \_ \_ | |
| 2650 | **8.15 Configurable Parameters** |
| 2653 | |  |  | | --- | --- | | **FD\_EL\_CP\_CHMSL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | ~~Par\_CHMSlHwInterface~~ | ~~CHMSL Interface~~ ~~0 – driven by BrakeLmpSigLH~~ ~~1 – driven by BrakeLmpSigRH~~- ~~0~~ ~~1~~ ~~1~~ ~~X~~ ~~-~~ ~~Yes~~ | |
| 2692 | **9 Reverse light** |
| 2693 | **9.1 Description** |
| 2694 | The reversing lights are used to illuminate the rear end of the vehicle when in reverse gear. |
| 2695 | **9.2 Applicable BCM Variants** |
| 2696 | Mid BCM |
| 2697 | **9.3 Operating Conditions** |
| 2698 | **9.3.1 Operating Power Modes** |
| 2701 | |  | | --- | | **FD\_EL\_OPM\_RL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13693 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 2735 | **9.3.2 Operating Voltage Range** |
| 2736 | Refer Section 2.1.1 |
| 2737 | **9.3.3 Nominal Power consumption** |
| 2740 | |  |  | | --- | --- | | **FD\_EL\_NPC\_RL:Req1V1** | Nominal power consumption is 60.048 watts. | | **Validation Method** | Component level Testing. | | **Applicable variants** | Mid BCM | |
| 2748 | **9.3.4 Temperature dependency** |
| 2749 | Refer Section 2.1.2 |
| 2750 | **9.4 Vehicle Example diagram** |
| 2751 |  |
| 2754 | |  |  | | --- | --- | | RLL: RevLmpLH RLR: RevLmplRH C: Controller | RGS: GearRevSig IGN: IgnKeyState | |
| 2756 | **9.5 Response Time** |
| 2757 | Refer Section 2.2 |
| 2758 | **9.6 Assumptions** |
| 2759 | None |
| 2760 | **9.7 Hardware/Software** |
| 2761 | Hardware: Light, Reverse Gear switch, Ignition, BCM |
| 2762 | Software: ECU software (BCM and IPC) |
| 2763 | **9.8 HMI commodities** |
| 2766 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Reverse Lights | | Switches | Reverse Gear Switch | | Key | Ignition key | |
| 2777 | **9.9 Behavior Modes** |
| 2778 | **9.9.1 Normal Mode** |
| 2781 | |  |  | | --- | --- | |  |  | |
| 2783 | ... |
| 2786 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req1V3** | BCM shall activate Reverse lights when any one of the following conditions are met: 1. CAN signal "CurGearTcu" is active with plausible status if TCU (Transmission Control Unit) is present (Par\_TCuAvailable = Present) OR CAN signal "CurGearTcuAT" is active with plausible status if TCU (Transmission Control Unit) is present (Par\_TCuAvailable = AT Present) OR CAN signal "CurGearDct" is active with plausible status if DCT is present (Par\_TCuAvailable = DCT Present) OR Reverse gear switch input (RevGearSwSig) is active.   2. Ignition is in ON/START position  **For Nexon EV strategy,** BCM shall activate Reverse Lights when- CAN Signal "GearForDisplayVcu" is active with plausible status.  2. Ignition is in ON/START position | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & MGW BCM | |
| 2794 | ... |
| 2797 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req2V3** | BCM shall deactivate Reverse lights when any of the following condition satisfies: 1.Reverse gear switch input (RevGearSwSig) is not active  OR ( CAN signal "CurGearTcu" is inactive if TCU (Transmission Control Unit) is present (Par\_TCuAvailable = Present) OR CAN signal "CurGearTcuAT" is inactive if TCU(Transmission Control Unit) is present (Par\_TCuAvailable = AT Present) OR CAN signal "CurGearDct" is inactive if DCT is present (Par\_TCuAvailable = DCT Present) )  2. Ignition state is other than ON/START     **For Nexon EV strategy,** BCM shall deactivate Reverse Lights when- 1.CAN Signal "GearForDisplayVcu" is inactive with plausible status. 2. Ignition state is other than ON/START | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & MGW BCM | |
| 9608 | ... |
| 9611 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req3V3** | BCM shall consider CAN signal "CurGearTcu" only if TCU is present (Par\_TCuAvailable = Present) OR BCM shall consider CAN signal "CurGearTcuAT" only if TCU is present (Par\_TCuAvailable = AT Present) OR BCM shall consider CAN signal "CurGearDct" only if DCt is present (Par\_TCuAvailable = DCT Present)    **For Nexon EV strategy-** BCM shall consider CAN signal "GearForDisplayVcu" | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid & MGW BCM | |
| 2805 | ... |
| 2808 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req4V1** | BCM shall publish reverse gear status on CAN. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9499 | ... |
| 9502 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req5V1** | Reverse Light function shall be Active/Inactive based on Par\_RevLmp | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9797 | ... |
| 9800 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req6V1** | BCM shall activate one or two lamp for reverse lamp functionality based on Par\_ReverseLampSingleBulb. | | **Applicable variants** | Mid BCM | |
| 12020 | ... |
| 12023 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req7V1** | BCM shall calculate Reverse lamp threshold for STG, STB or Open based on ~~Par\_ReverseWattageType and~~ loads associated with the parameter value. ( Refer below table) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12031 | **9.9.1.8 Loads based on Par\_LmpWattageVehicleTypeSel are as follows:** |
| 12034 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Reverse LampRight Reverse Lamp** **Platform / Remarks** | | 0 | 12 W12 W Bolt / Zest / Tiago | | 2 | 10 W 10 W Nexon High | |  | 21 W- Nexon low | | 3 | 16 W16 W Q501-High | | ~~4~~ | 16W16W Q501-Low | | 5 | 21W21W X451-High | | 6 | 21W21W   X451-Low | | 7 | -- X445-High(Base BCM) | |  | 21W21W X445-High(MGW BCM-RevLampSigLH and RevLampSigRH pins used as Rear Turn indicators) | | 8 | -- X445-Low(Base BCM) | |  | 21W21W X445-Low(MGW BCM-RevLampSigLH and RevLampSigRH pins used as Rear Turn indicators) | | 9 | 16W16W Q502-High | | 10 | 16W16W Q502-Low | | 11 | 10 W10 W  Nexon MCE-High/Low(MGW BCM-RevLampSigLH and RevLampSigRH pins used for driving Rear Turn indicators+Side repeater lamps) | | 12 | 10W10W Nexon EV (MGW BCM-RevLampSigLH and RevLampSigRH pins used for driving Rear Turn indicators+Side repeater lamps) | | 13 | 12W12W Tiago/Tigor MCE | |
| 14366 | For Nexon High End, both reverse lamps are present(LH and RH) and for Low end only one reverse lamp present. For X445,X451,Q501,Q502,Nexon MCE,Nexon EV- BCM shall not drive reverse lamps. Refer **FD\_EL\_NM\_TS:Req19V3,FD\_EL\_NM\_TS:Req20V1**   **For Nexon EV**-Reverse lamps shall be driven by VCU unit via switch. Existing reverse lamp pins shall be driving the rear indicator lamps+Side repeater lamps. |
| 12591 | ... |
| 12594 | |  |  | | --- | --- | | **FD\_EL\_NM\_RL:Req8V1** | Reverse lamp load compensation shall be applicable based on the parameter “Par\_ReverseLampVoltCompensation” configuration as follows 1.If “Par\_ReverseLampVoltCompensation = Enable” then, BCM shall apply the voltage compensation to drive the Reverse lamp load. 2.If “Par\_ReverseLampVoltCompensation = Disable” then, BCM shall not apply the voltage compensation to drive the Reverse indicator lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 2816 | **9.9.2 Failure Mode** |
| 9419 | ... |
| 2819 | |  |  | | --- | --- | | **FD\_EL\_FM\_RL:Req1V1** | If the value of configuration parameter "Par\_ReverseLampSingleBulb" is set to 'Both Lamps' (Left & Right Reverse lamp present), if atleast one of the reverse lamp output fails (RevLampSigLH / RevLampSigRH) or lapm fails, BCM shall publish a malfunction indication CAN message (RevLampMalFn) as ON to indicate an error message to other ECU.   If the value of configuration parameter "Par\_ReverseLampSingleBulb" is set to 'Single Lamp' (Single Reverse lamp fitted on Left Reverse lamp output), if the left reverse lamp output fails (RevLampSigLH) or lamp fails, BCM shall publish a malfunction indication CAN message (RevLampMalFn) as ON to indicate an error message to other ECU. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9420 | ... |
| 9423 | |  |  | | --- | --- | | **FD\_EL\_FM\_RL:Req2V3** | In case of CurGearTcu CAN signal status is implausible, BCM shall operate the Revere lamp as per Reverse Gear HW input (RevGearSwSig).  OR  In case of CurGearTcuAT CAN signal status is implausible, BCM shall operate the Revere lamp as per Reverse Gear HW input (RevGearSwSig).  OR  In case of CurGearDct CAN signal status is implausible, BCM shall operate the Revere lamp as per Reverse Gear HW input (RevGearSwSig). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 2830 | **9.10 Safety Level** |
| 2831 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs |
| 2832 | **9.11 Block Diagram** |
| 9418 |  |
| 2834 | **9.12 Inputs** |
| 2837 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | KeyINSig | Ignition key- X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition key- X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition key- X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition key- X - 0 1 1 - X - - - - | | RevGearSwSig | Reverse Gear Switch SignalX X - 0 1 1 - X - - - - | | CurGearTcu | indicates the gear engagedX X - 0     15 - - - - X - - | | CurGearTcuStatus | Status of the CurGearTcu signalX X - 0 3 - - - - X - - | | CurGearTcuAT | indicates the gear engagedX X - 0 15 - - - - X | | CurGearTcuATStatus | Status of the CurGearTcuAT signalX     X -     0 3 - - - - X | | CurGearDct | indicates the gear engagedX X - 0 15 - - - - X - - | | CurGearDctStatus | Status of the CurGearDct signalX X - 0 3 - - - - X - - |  |  |  | | --- | --- | | GearForDisplayVcu | Gear For Display - X  -  0 15  - -  X - X |  |  |  | | --- | --- | | GearForDisplayVcuStatus | Gear For Display Status- X - 0 3 - - - - X - - | |
| 2941 | **9.13 Outputs** |
| 2944 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | RevLampSigLH | Reverse lamp signal left- X - 0 1 1 - X - - - - | | RevLampSigLH | Reverse lamp signal right- X - 0 1 1 - X - - - - | | RevGear | Reverse lamp statusX X - - - - - - - X - - | | RevGearStatus | Reverse gear status signalX X - - - - - - - X - - | | RevLampMalFn | Reverse lamp Malfunction- X - - - - - - - X - - | | RevLampMalFnStatus | Reverse lamp malfunction status signal- X - - - - - - - X - - | |
| 3033 | **9.14 Configurable Parameters** |
| 3036 | |  |  | | --- | --- | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_RevLmp | Reverse lamp configuration  0 - Not Fitted (Disable),  1 - Fitted (Enable)- 0 1 1 X - Yes | | Par\_TCuAvailable | Transmission control module 0 – Not Present 1 – Present 2- DCT Present     3- AT Present- 0 3     0 X - Yes | | Par\_ReverseLampSingleBulb | 0- Both Lamps: Left & Right Reverse lamp present  1- Single Lamp: Single Reverse lamp fitted on Left Reverse lamp output of BCM- 0 1 1 X - Yes | | ~~Par\_ReverseWattageType~~ | ~~Reverse Lamp wattage type~~- 0 ~~255~~ 0 X - Yes | | Par\_ReverseLampVoltCompensation | Reverse Lamp Voltage Compensation Control parameter- 0 1 0 X X Yes | |
| 3065 | **10 Front fog lamps** |
| 3066 | **10.1 Description** |
| 3067 | The fog lights are used in low visibility weather conditions such as dense fog, heavy rain, heavy snow, or smoke. Front fog lamps are used to improve the illumination of the road in case of fog, snowfall, rainstorms or dust clouds. |
| 3068 | **10.2 Applicable BCM Variants** |
| 3069 | Base and Mid BCMs |
| 3070 | **10.3 Operating Conditions** |
| 3071 | **10.3.1 Operating Power Modes** |
| 3074 | |  | | --- | | **FD\_EL\_OPM\_FFL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 13697 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 3108 | **10.3.2 Operating Voltage Rangel** |
| 3109 | Refer Section 2.1.1 |
| 3112 | |  |  | | --- | --- | | **FD\_EL\_NPC\_FFL:Req1V1** | Nominal power consumption is 2.544 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 3120 | **10.3.3 Temperature dependency** |
| 3121 | Refer section 2.1.2. |
| 3122 | **10.4 Vehicle example diagram** |
| 3123 |  |
| 3126 | |  |  | | --- | --- | | IGN: IgnKeyState FLRL: FogLmpRearLH  RFS: FogLmpRearSwitchSig C: Controller IC : Instrument Cluster | FFS: FogLmpFrntSwitchSig FLFL: FogLmpFrntLH FLFR: FogLmpFrntRH FLRR: FogLmpRearRH | |
| 3128 | **10.5 Response Time** |
| 3129 | Refer Section 2.2 |
| 3130 | **10.6 Assumptions** |
| 3131 | None |
| 3132 | **10.7 Hardware/Software** |
| 3133 | Hardware: Lamps, Master Light Switch/Combination Switch, IGN Switch, BCM |
| 3134 | Software: ECU software (IC and BCM) |
| 3135 | **10.8 HMI commodities** |
| 3138 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Front Fog Lights | | Switches | Master Light Switch/Combination Switch | |
| 3146 | **10.9 Behavior Modes** |
| 3147 | **10.9.1 Normal Mode** |
| 3150 | |  |  | | --- | --- | |  |  | |
| 3152 | ... |
| 3155 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req1V1** | Front fog lamp functionality shall be available if “Par\_FrontFogFitted” is enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3163 | ... |
| 3166 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req2V1** | Front fog switch input shall be made configurable for sensing both latchable and non-latchable switch inputs. (Par\_FrontFogSwitchSel). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3174 | ... |
| 3177 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req3V1** | In case of Base BCM, front fog shall be activated with one output (FrFogLmpRelay). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base BCM | |
| 3185 | ... |
| 3188 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req4V2** | In case of Mid BCM, front fog shall be activated with three output (FogLmpCtrlFrntLH, FogLmpCtrlFrntRH & FrFogLmpRelay) and FrFogLmpRelay will be used as separate output for driving Tell-tale indicator on fascia switch. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 3196 | ... |
| 3199 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req5V2** | BCM shall activate front fog lights and Tell-tale indicator on fascia switch (in case if “Mid BCM”) when all of the following conditions are met: 1. Ignition (IgnKeyStateIGN) switch is ON. 2. Position Lamp OR Headlamp is ON. 3. Front fog lamp switch signal is active.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs ON shall be considered to activate the front fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3207 | ... |
| 3210 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req6V2** | BCM shall deactivate front fog lights and Tell-tale indicator on fascia switch (in case if “Mid BCM”) when any of the following condition is met: 1. Ignition (IgnKeyStateIGN) switch is OFF 2. Both position Lamp and Headlamps are OFF. 3. Front fog lamp switch signal is inactive.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs OFF shall be considered to deactivate the front fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3218 | ... |
| 3221 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req7V1** | BCM shall send CAN message to Instrument cluster to operate telltale as long as the fog lamps are activated if Par\_FogTelltaleOnIC is enable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3229 | ... |
| 3232 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req8V1** | BCM shall deactivate front fog lights during Ignition Crank but front fog light telltale shall not be deactivated during crank.  **For Nexon EV startegy-**  BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3240 | ... |
| 3243 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req9V1** | **Auto Mode:** Activation and deactivation of fog lamps in auto mode shall be available if Par\_FogLampInAutoMode is enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 3251 | ... |
| 3254 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req10V2** | **Auto Mode:** BCM shall activate front fog lamps and Tell-tale indicator on fascia switch (in case if “Mid BCM”) in auto mode, If Headlamps are activated based on RLS inputs AND front fog lamp switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 3262 | ... |
| 3265 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req11V2** | **Auto Mode**: BCM shall deactivate front fog lamps and Tell-tale indicator on fascia switch (in case if “Mid BCM”) in auto mode, If Headlamps are deactivated based on RLS inputs OR front fog lamp switch signal is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 8591 | ... |
| 8614 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req12V1** | If Fog lamp telltale is not given on IC (Par\_FogTelltaleOnIC) OR Front Fog lamp is not fitted (Par\_FrontFogFitted ), BCM shall send FrontFogTelltaleStatus signal as SNA . | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12074 | ... |
| 12077 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req13V1** | BCM shall calculate front fog lamp threshold for STG, STB or Open based on ~~Par\_FrontFogWattageType and~~ loads associated with the parameter value. ( Refer below table). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12085 | **10.9.1.14 Loads based on Par\_LmpWattageVehicleTypeSel are as follow:** |
| 12088 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Front Fog lampRight Front Fog lamp** **Platform / Remarks** | | 0 | 21 W21 W Bolt / Zest / Tiago | | 2 | 21W21W Nexon High/Low | | 3 | 19 W19 W Q501-High | | 4 | 19 W19 W  Q501-Low | | 5 | 35 W35 W X451-High | | 6 | 35 W35 W  X451-Low | | 7 | 19W19W X445-High | | 8 | 19W19W X445-Low | | 9 | 19 W19 W Q502-High | | 10 | 19 W19 W Q502-Low | | 11 | 21W21W Nexon MCE-High/Low | | 12 | 21W21W Nexon EV | | 13 | 21W21W Tiago/Tigor MCE | |
| 12622 | ... |
| 12635 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req14V1** | Front Fog Lamp load compensation shall be applicable based on the parameter “Par\_FrontfogLampVoltCompensation” configuration as follows  1.If “Par\_FrontfogLampVoltCompensation= Enable” then, BCM shall apply the voltage compensation to drive the Front fog lamp load. 2.If “Par\_FrontfogLampVoltCompensation = Disable” then, BCM shall not apply the voltage compensation to drive theFront fog lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 15839 | ... |
| 12816 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFL:Req15V2** | Default PIN configuration for front lamp telltale based on the function applicability:      1. Connector 1 (Pin 44) shall be driving Front Fog Telltale.          Applicable Projects: Q501, Q502, X445      2. Connector 2 (Pin 5) shall be driving Front Fog Telltale.          Applicable Projects: X451, Tiago Tigor MCE, Nexon MCE, Limber             EV, Kanger 1.0, Kanger 2.0 In above default Vehicle platforms, if LIN based IMMO SW is implemented in BCM && If Par\_LInBasedIMMoFunction=1(Enable), then,      1. Connector 1(Pin 44) shall be driving Immo Telltale.      2. Connector 2(Pin 5) shall be driving Front Fog Telltale.  If Par\_LInBasedIMMoFunction=0(Disable), then,      • Default PIN configuration shall be applicable for given projects. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid and Mid with gateway BCMs | |
| 15842 | |  | | --- | | **Connector 2, PIN 5 (active high) driving Front Fog telltale** | | Nexon MCE | With LIN SW implemented | | Tiago / Tigor MCE | With LIN SW implemented | | X451 | Without LIN SW implemented | | Limber EV | With LIN SW implemented | | Kanger 1.0 | Without LIN SW implemented | | Kanger 2.0 | Without LIN SW implemented | | **Connector 1, PIN 44 (active low) driving Front Fog telltale** |  | | X445 | Without LIN SW implemented | | Q-501 | Without LIN SW implemented | | Q-502 | Without LIN SW implemented | | ~~Nexon EV~~ | ~~Without LIN SW implemented~~ | |
| 15837 | ... |
| 15813 | |  |  | | --- | --- | | **~~FD\_EL\_NM\_FFL:Req15V1~~** | ~~When LIN based IMMO is~~ **~~present~~**~~,~~  ~~Par\_LInBasedIMMoFunction=~~**~~1(Enable)~~**~~, then,~~ ~~Below Pins are dedicated for both PEPS vehicles ( where Immo is controlled by PEPS) and w/o PEPS vehicles ( where Immo is controlled by BCM):~~ ~~1.Connector 1(Pin 44) shall be driving~~ **~~Immo Telltale~~**~~.~~ ~~2.Connector 2(Pin 5) shall be driving Front Fog Telltale.~~ ~~Please refer below Table for details of Front Fog lamp requirements.~~ ~~When LIN based IMMO is~~ **~~not present,~~** ~~Par\_LInBasedIMMoFunction=~~**~~0(Disable)~~**~~, then,~~ ~~1.Connector 1(Pin 44) shall be driving~~ **~~Front Fog Telltale~~**~~.~~ ~~Note:This requirement is same as that of~~ **~~FD\_IF\_NM\_LBIBS: Req25V2~~** ~~from the~~ **~~LIN Based Immobilizer Interface FD~~**  **~~Applicable for Nexon MCE and Tiago/Tigor MCE vehicle onwards wherever LIN based implementation in BCM is present~~**~~.~~ | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base, Mid and Mid with gateway BCMs | |
| 13093 | |  |  | | --- | --- | | ~~Par\_LInBasedIMMoFunction=1(Enable)/0(Disable)~~ | ~~Par\_FrontFogFitted=1(Fitted)/0(Not Fitted)Par\_RearFogFitted=1(Fitted)/0(Not Fitted)~~ ~~Par\_RearFogLampSingleBulb=0(Double lamps)/1(Single Lamp)~~ ~~BCM OUTPUT~~ | | ~~0~~ | ~~00~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~00~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~01~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~01~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~10~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~10~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~11~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~0~~ | ~~11~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~1~~ | ~~00~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~1~~ | ~~00~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~1~~ | ~~01~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale Connector 2(Pin 2) --> Rear fog lamps.~~ ~~3. Connector 2(Pin 10) --> Front Fog Lamp LH and Connector 2(Pin 19) --> Front Fog Lamp LH.~~ | | ~~1~~ | ~~01~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~3.Connector 2(Pin 2)--> for Rear fog function only (as per existing logic)~~ ~~4. Consider rear fog lamp connected on left side (Pin C2:2) only and no diagnostics on rear right pin (as per existing logic)~~ | | ~~1~~ | ~~10~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~3. Consider Rear left fog lamp pin-Connector 2(Pin 2) for rear fog lamp function. However no diagnostics to be monitored on this pin, as rear fog function is disabled~~ | | ~~1~~ | ~~10~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~3. Consider Rear left fog lamp pin-Connector 2(Pin 2) for rear fog lamp function. However no diagnostics to be monitored on this pin, as rear fog function is disabled~~ | | ~~1~~ | ~~11~~ ~~0~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~3. Consider Rear left fog lamp pin-Connector 2(Pin 2) for rear fog lamp function.. Diagnostics to be performed for rear fog relay~~ | | ~~1~~ | ~~11~~ ~~1~~ ~~BCM to consider fog lamp pins as per below implementation i.e.,~~  ~~1.Connector 1(Pin 44) --> Immo Telltale~~ ~~2.Connector 2(Pin 5) --> Front Fog Telltale~~ ~~3. Consider Rear left fog lamp pin-Connector 2(Pin 2) for rear fog lamp . Diagnostics to be performed for bulb/LED type of lamp.~~ | |
| 3273 | **10.9.2 Failure Mode** |
| 3276 | |  |  | | --- | --- | | **FD\_EL\_FM\_FFL:Req1V2** | In case of MID BCM if both of the front fog lamps output (FogLmpCtrlFrntLH, FogLmpCtrlFrntRH) fails (driver fails or lamps fails), BCM shall send a CAN message as OFF to the other ECU (IC) to deactivate the tell-tale and deactivate Tell-tale indicator on fascia switch (in case if “Mid BCM”). BCM shall calculate Tell-tale indicator threshold for STG, STB or Open by considering 20mA max current for FrFogLmpRelay separate output.  In case of BASE BCM if the front fog lamp output (FrFogLmpRelay) fails, BCM shall send a CAN message as OFF to the other ECU (IC) to deactivate the tell-tale. BCM shall calculate Tell-tale indicator threshold for STG, STB or Open by considering 80mA max current for FrFogLmpRelay separate output. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 7982 | ... |
| 7985 | |  |  | | --- | --- | | **FD\_EL\_FM\_FFL:Req2V2** | In case of stuck condition for momentary switch, BCM should switch Off Fog lamps and Tell-tale indicator on fascia switch (in case if “Mid BCM”). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3287 | **10.10 Safety Level** |
| 3288 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs |
| 3289 | **10.11 Block Diagram** |
| 3290 |  |
| 3291 | **10.12 Inputs** |
| 3294 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateCrank | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | FogLmpFrntSwitchSig | Front fog lamp switch signalX X - 0 1 1 - X - - - - | | HeadLampONSig | Head Lamp ON signalX X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Fail safe switch signalX X - 0 1 1 - X - - - - | | PositionLmpSwitchSig | Position lamp switch signalX X - 0 1 1 - X - - - - | | MainBeamSwSig | High Beam Switch Signal- X - 0 1 1 - X - - - - | | LowBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | AutoLightONSig | Auto light ON signalX X - 0 1 1 - X - - - - | |
| 3488 | **10.13 Outputs** |
| 3491 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | FrFogLmpRelay | Front Fog lamp relayX - - 0 1 1 - X - - - - | | FogLmpCtrlFrntLH | Control of Front Left Fog Light- X - 0 1 1 - - X - - - | | FogLmpCtrlFrntRH | Control of Front Right Fog Light- X - 0 1 1 - - X - - - | | FrontFogTelltale | Front Fog lamp telltaleX X - - - - - - - X - - | | FrontFogTelltaleStatus | Front Fog lamp telltale status signalX X - - - - - - - X - - | |
| 3580 | **10.14 Configurable Parameters** |
| 3583 | |  |  | | --- | --- | | **FD\_EL\_CP\_FFL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_FrontFogSwitchSel | Front Fog Latchable/Non-Lachable input  0 – Latchable 1 – Non-Latchable- 0 1 1  1 X - Yes | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0  1 X - Yes | | Par\_FrontFogFitted | 0 – Not Fitted 1 – Fitted- 0 1 0 1 X - Yes | | Par\_FogLampInAutoMode | Fog lamp in auto mode 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_FogTelltaleOnIC | Fog lamp Telltale 0 – Telltale on Fascia switch 1 – Telltale on IC- 0 1 0  1 X - Yes | | ~~Par\_FrontFogWattageType~~ | ~~Front Fog lamp wattage type~~- 0 255 0 1 X - Yes | | Par\_FrontfogLampVoltCompensation | Front Fog Lamp voltage compensation Control parameter- 0 1 0 1 X X Yes | |
| 3670 | **10.15 Description** |
| 3671 | The fog lights are used in low visibility weather conditions such as dense fog, heavy rain, heavy snow, or smoke. The telltale indications for fog lamps are necessary. Rear fog lamps are used to make the vehicle more easily visible from the rear in dense fog. |
| 3672 | **10.16 Applicable BCM Variants** |
| 3673 | Base and Mid BCMs |
| 3674 | **10.17 Operating Conditions** |
| 3675 | **10.17.1 Operating Power Modes** |
| 3678 | |  | | --- | | **FD\_EL\_OPM\_RFL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 13704 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 3712 | **10.17.2 Operating Voltage Range** |
| 3713 | Refer Section 2.1.1 |
| 3716 | |  |  | | --- | --- | | **FD\_EL\_NPC\_RFL:Req1V1** | Nominal power consumption is 60.144 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 3724 | **10.17.3 Temperature dependency** |
| 3725 | Refer Section 2.1.2 |
| 3726 | **10.18 Vehicle example diagram** |
| 3727 |  |
| 3730 | |  |  | | --- | --- | | IGN: IgnKeyState FLRL: FogLmpCtrlRearLH  RFS: FogLmpRearSwitchSig IC: Instrument Cluster C : Controller | FFS: FogLmpFrntSwitchSig FLFL: FogLmpFrntLH FLFR: FogLmpFrntRH FLRR: FogLmpRearRH | |
| 3732 | **10.19 Response Time** |
| 3733 | Refer Section 2.2 |
| 3734 | **10.20 Assumptions** |
| 3735 | None |
| 3736 | **10.21 Hardware/Software** |
| 3737 | Hardware: Light, Master Light Switch/Combination Switch, BCM. |
| 3738 | Software: ECU software (BCM and IC) |
| 3739 | **10.22 HMI commodities** |
| 3742 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Rear Fog Lights | | Switches | Master Light Switch/Combination Switch | |
| 3750 | **10.23 Behavior Modes** |
| 3751 | **10.23.1 Normal Mode** |
| 3754 | |  |  | | --- | --- | |  |  | |
| 3756 | ... |
| 3759 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req1V1** | Rear fog switch input shall be made configurable for sensing both latchable and non-latchable switch inputs. (Par\_RearFogSwitchSel). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3767 | ... |
| 3770 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req2V1** | **If front fog lamp is fitted (Par\_FrontFogFitted)**,  BCM shall activate rear fog lights when all of the following conditions are met: 1. Ignition (IgnKeyStateIGN) switch is ON  2.a) Position lamp and Front fog lamp are ON OR b) Headlamp is ON 3. Rear fog lamp switch signal is active.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs ON shall be considered to activate the rear fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3778 | ... |
| 3781 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req3V1** | **If front fog lamp is not fitted (Par\_FrontFogFitted)**,  BCM shall activate rear fog lights when all of the following conditions are met: 1. Ignition (IgnKeyStateIGN) switch is ON  2. Headlamp is ON 3. Rear fog lamp switch signal is active.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs ON shall be considered to activate the rear fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3789 | ... |
| 3792 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req4V1** | **If front fog lamp is fitted (Par\_FrontFogFitted),**  BCM shall deactivate rear fog lights when any of the following condition is met: 1. Ignition (IgnKeyStateIGN) is OFF. 2. a) Headlamps are OFF AND  b) Front fog lamps OR Position Lamps are OFF. 3. Rear fog lamp switch signal is inactive.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs OFF shall be considered to deactivate the rear fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3800 | ... |
| 3803 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req5V1** | **If front fog lamp is not fitted (Par\_FrontFogFitted),** BCM shall deactivate rear fog lights when any of the following condition is met: 1. Ignition (IgnKeyStateIGN) is OFF. 2. Headlamps are OFF. 3. Rear fog lamp switch signal is inactive.  In case if "Base BCM" where 'main beam' / 'dipped beam' (Head lamps) outputs are not available, the input conditions of "Mid BCM" for making these outputs OFF shall be considered to deactivate the rear fog lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3811 | ... |
| 3814 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req6V1** | BCM shall send CAN message to Instrument cluster to operate telltale as long as the rear fog lamps are activated if Par\_FogTelltaleOnIC is enable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3822 | ... |
| 3825 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req7V1** | **Auto Mode:** Activation and deactivation of fog lamps in auto mode shall be available if Par\_FogLampInAutoMode is enabled | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 3833 | ... |
| 3836 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req8V1** | **Auto Mode:** BCM shall activate rear fog lamps in auto mode, If Headlamps are activated based on RLS inputs AND rear fog lamp switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 3844 | ... |
| 3847 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req9V1** | **Auto Mode**: BCM shall deactivate rear fog lamps in auto mode, If Headlamps are deactivated based on RLS inputs OR rear fog lamp switch signal is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 8623 | ... |
| 8626 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req9V1** | if Fog lamp telltale is not given on IC (Par\_FogTelltaleOnIC), BCM shall send RearFogTelltaleStatus signal as SNA . | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9521 | ... |
| 9524 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req10V1** | Rear fog function shall be Active/Inactive based on Par\_RearFogFitted | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9725 | ... |
| 9728 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req11V1** | BCM shall deactivate rear fog lights during Ignition Crank but rear fog light telltale shall not be deactivated during crank if Fog lamp telltale is given on IC (Par\_FogTelltaleOnIC).   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 9805 | ... |
| 9808 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req12V1** | BCM shall activate one or two lamp for Rear Fog Lamp functionality based on Par\_RearFogLampSingleBulb. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12117 | ... |
| 12120 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req13V1** | BCM shall calculate Rear Fog lamp threshold for STG, STB or Open based on ~~Par\_RearFogWattageType and~~ loads associated with the parameter value. ( Refer below table). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12128 | **10.23.1.15 Loads based on Par\_LmpWattageVehicleTypeSel are as follows:** |
| 12131 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Rear Fog lampRight Rear Fog lamp** **Platform / Remarks** | | 0 | 21W- Bolt / Zest / Tiago | | 2 | 21W21W Nexon High/Low | | 3 | 21 W21 W Q501-High | | 4 | 21 W 21 W Q501-Low | | 5 | 21 W21 W X451-High | | 6 | 21 W21 W  X451-low | | 7 | 21 W- X445-High | | 8 | 21W- X445-Low | | 9 | 21W21W Q502-High | | 10 | -- Q502-Low | | 11 | 21W21W Nexon MCE-High/Low | | 12 | 21W21W Nexon EV | | 13 | 21W- Tiago/Tigor MCE | |
| 12665 | ... |
| 12668 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req14V1** | Rear Fog lamp load compensation shall be applicable based on the parameter “Par\_RearfogVoltCompensation” configuration as follows,  1.If “Par\_RearfogVoltCompensation= Enable” then, BCM shall apply the voltage compensation to drive the Rear Fog lamp load. 2.If “Par\_RearfogVoltCompensation= Disable” then, BCM shall not apply the voltage compensation to drive the Rear Fog lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 12836 | ... |
| 12839 | |  |  | | --- | --- | | **FD\_EL\_NM\_RFL:Req15V1** | Please refer the ~~table~~ requirement mentioned in **FD\_EL\_NM\_FFL:Req15V1,** the same shall be followed for rear fog lamps as well. Note:This requirement is same as that of **FD\_IF\_NM\_LBIBS: Req25V2** from the **LIN Based Immobilizer Interface FD** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3855 | **10.23.2 Failure Mode** |
| 3858 | |  |  | | --- | --- | | **FD\_EL\_FM\_RFL:Req1V1** | If the value of configuration parameter 'Par\_RearFogLampSingleBulb' is set to Both Lamps (Left & Right Rear Fog lamp present), if both the outputs(RrFogLmpCntrlLH & RrFogLmpCntrlRH) fails or lamps fails BCM shall send a CAN message as OFF to other ECU (IC) to deactivate the telltale.  If the value of configuration parameter 'Par\_RearFogLampSingleBulb' is is set to Single Lamp (Single Rear Fog lamp fitted on Left Rear fog lamp output), if the output(RrFogLmpCntrlLH) fails or lamp fails BCM shall send a CAN message as OFF to other ECU (IC) to deactivate the telltale. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 7996 | ... |
| 7999 | |  |  | | --- | --- | | **FD\_EL\_FM\_RFL:Req2V1** | In case of stuck condition for momentary switch, BCM should switch Off Fog lamps | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 3869 | **10.24 Safety Level** |
| 3870 | Automotive Safety Integrity Level (ASIL): Not applicable for Base and Mid BCMs |
| 3871 | **10.25 Block Diagram** |
| 3872 |  |
| 3873 | **9.12    Inputs** |
| 3876 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | IgnKeyStateCrank | Ignition keyX X - 0 1 1 - X - - - - | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | FogLmpRearSwitchSig | Rear fog lamp switch signalX X - 0 1 1 - X - - - - | | HeadLampONSig | Head Lamp ON signalX X - 0 1 1 - X - - - - | | MainBeamSwSig | High Beam Switch Signal- X - 0 1 1 - X - - - - | | LowBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Fail Safe Switch Signal- X - 0 1 1 - X - - - - | | PositionLmpSwitchSig | Position Lamp Switch SignalX X - 0 1 1 - X - - - - | | FogLmpFrntSwitchSig | Front Fog lamp switch signalX X - 0 1 1 - X - - - - | | AutoLightONSig | Auto light ON signalX X - 0 1 1 - X - - - - | |
| 4085 | **10.26 Outputs** |
| 4088 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | RrFogLmpCntrlLH | Control of Rear Left Fog LightX X - 0 1 1 - X - - - - | | RrFogLmpCntrlRH | Control of Rear Right Fog LightX X - 0 1 1 - X - - - - | | RearFogTelltale | Rear fog TelltaleX X - - - - - - - X - - | | RearFogTelltaleStatus | Rear fog Telltale statusX X - - - - - - - X - - | |
| 4162 | **10.27 Configurable Parameters** |
| 4165 | |  |  | | --- | --- | | **FD\_EL\_CP\_RFL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_RearFogSwitchSel | Rear Fog Switch Latchable/Non-Lachable input  0 – Latchable 1 – Non-Latchable- 0 1 1 1 X - Yes | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0  1 X - Yes | | Par\_FrontFogFitted | 0 – Not Fitted 1 – Fitted- 0 1 0 1 X - Yes | | Par\_FogLampInAutoMode | Fog lamp in auto mode 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_FogTelltaleOnIC | Fog lamp Telltale 0 – Telltale on Fascia switch 1 – Telltale on IC- 0 1  0 1 X - Yes | | Par\_RearFogFitted | Rear fog Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1  0 1 X - Yes | | Par\_RearFogLampSingleBulb | 0- Both Lamps: Both Left & Right Rear Fog lamp present  1- Single Lamp: Single Rear Fog lamp fitted on Left Rear Fog lamp output of BCM- 0 1 1 1 X - Yes | | ~~Par\_RearFogWattageType~~ | ~~Rear Fog lamp wattage type~~- 0 255 0 1 X - Yes | | Par\_RearfogVoltCompensation | Rear Fog Lamp Voltage Compensation Control parameter 0 - Disable 1 - Enable- 0 1 0 1 X x Yes | |
| 4252 | **10.28 Description** |
| 4253 | Low beams have stricter control of upward light, and direct most of their light downward, to provide safe forward visibility without excessive glare or back dazzle. The headlamps (low beam) are ON when the headlamp selection is in Low Beam Position. |
| 4254 | **10.29 Applicable BCM Variants** |
| 4255 | Mid BCMs. |
| 4256 | **10.30 Operating Conditions** |
| 4257 | **10.30.1 Operating Power Modes** |
| 4260 | |  | | --- | | **FD\_EL\_OPM\_HLLB:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Park (IgnKeyStateACC == Active)* | *Full Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Battery save* *(IgnKeyStateACC == Active)* | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory Delay* *(IgnKeyStateACC == Active)* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 13711 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 4294 | **10.30.2 Operating Voltage Range** |
| 4295 | Refer Section 2.1.1 |
| 4298 | |  |  | | --- | --- | | **FD\_EL\_NPC\_HLLB:Req1V1** | Nominal power consumption is 62.52 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Mid BCM | |
| 4306 | **10.30.3 Temperature dependency** |
| 4307 | Refer Section 2.1.2 |
| 4308 | **10.31 Vehicle Example diagram** |
| 4309 |  |
| 4312 | |  |  | | --- | --- | | HSW: HeadLmpSelectSwitch MBSW: MainBeamSwitch C: Controller | LHL: HeadLmpLH RHL: HeadLmpRH IC: Instrument cluster IGN: IgnKeyState | |
| 4314 | **10.32 Response Time** |
| 4315 | Refer Section 2.2 |
| 4316 | **10.33 Assumptions** |
| 4317 | None |
| 4318 | **10.34 Hardware/Software** |
| 4319 | Hardware: Light, Master Light Switch/Combination Switch, BCM |
| 4320 | Software: ECU software (BCM and IC) |
| 4321 | **10.35 HMI commodities** |
| 4324 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Head Lights | | Switches | Master Light Switch/Combination Switch | |
| 4332 | **10.36 Behavior Modes** |
| 4333 | **10.36.1 Normal Mode** |
| 4336 | |  |  | | --- | --- | |  |  | |
| 4338 | ... |
| 4341 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLB:Req1V1** | BCM shall activate low beam when all of the following conditions are met:  1. Ignition (IgnKeyStateIGN) is ON **OR** Accessory (IgnKeyStateACC) is ON. 2. Headlamp ON signal is active. 3. Low beam switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4349 | ... |
| 4352 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLB:Req2V1** | BCM shall deactivate low beam when any of the following condition satisfies: 1. Ignition (IgnKeyStateIGN) is OFF **AND** Accessory (IgnKeyStateACC) is OFF. 2. Headlamp ON signal is inactive. 3. Low beam switch signal is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9544 | ... |
| 9547 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLB:Req3V1** | Low beam function shall be Active/Inactive based on Par\_LowBeamSel | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 13298 | ... |
| 13301 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLB:Req4V1** | BCM shall calculate Head lamp-Low Beam threshold for STG, STB or Open based on loads associated with the parameter value.( Refer below table) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 13318 | ... |
| 13321 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Headlamp-Low BeamRight Headlamp-Low beam** **Platform/Remarks** | | 0 | 55w55w Bolt/Zest/Tiago/Tigor | | 2 | 55w55w Nexon High/low | | 3 | 25w25w  Q501- high | | 4 | 55w55w  Q501- low | | 5 | 55w55w X451-high | | 6 | 55w55w X451-low | | 7 | 55w55w X445-high | | 8 | 55w55w X445-low | | 9 | 25w25w Q502-high | | 10 | 55w55w Q502-low | | 11 | 55w55w Nexon MCE-High/Low | | 12 | 55w55w Nexon EV | | 13 | 55w55w Tiago/Tigor MCE | |
| 14047 | ... |
| 14050 | |  |  | | --- | --- | | **~~FD\_EL\_NM\_HLB:Req5V1~~** | **~~If Ignition is OFF BCM shall,~~**  ~~- Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy~~ ~~- Read Remote LowBeam ON request (RemoteLowBeamCmd) over CAN from TCU (Telematics Control Unit)~~ ~~- If Remote LowBeam in request is Set (If RemoteLowBeamCmd = “1”)then,~~ ~~BCM shall turn ON the low beam if it is OFF~~ ~~- Publish updated LowBeam lamp state (LowBeamLmpTelltale=’1’) after RemoteLowBeamCmd execution on CAN to TCU (Telematics Control Unit)~~    ~~If LowBeam lamp is in On state, discard the Command from TCU (Telematics Control Unit) and publish the LowBeam lamp state.~~ ~~- Publish status signal for LowBeamLmpTelltale~~    **~~If Ignition is ON~~****~~BCM shall,~~** ~~- Ignore LowBeam lamp ON request (RemoteLowBeamCmd) from TCU(Telematics Control Unit)~~ | | **~~Validation Method~~** | ~~Model-In-Loop if model available~~  ~~Hardware-in-Loop when implemented in a specific ECU~~ | | **~~Applicable variants~~** | ~~Mid with Gateway BCM~~ | |
| 14058 | ... |
| 14061 | |  |  | | --- | --- | | **~~FD\_EL\_NM\_HLB:Re6V1~~** | **~~If Ignition is OFF BCM shall,~~**  ~~- Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy~~ ~~- Read Remote LowBeam ON request (RemoteLowBeamCmd) over CAN from TCU(Telematics Control Unit)~~ ~~- If Remote LowBeam in request is Set (If RemoteLowBeamCmd = “0”)then,~~ ~~BCM shall turn OFF the low beam if it is ON~~ ~~- Publish updated LowBeam lamp state (LowBeamLmpTelltale=’0’) after RemoteLowBeamCmd execution on CAN to TCU(Telematics Control Unit)~~    ~~If LowBeam lamp is in OFF state, discard the Command from TCU (Telematics Control Unit)~~ ~~and publish the LowBeam lamp state.~~ ~~- Publish status signal for LowBeamLmpTelltale~~    **~~If Ignition is ON~~****~~BCM shall,~~** ~~- Ignore LowBeam lamp OFF request (RemoteLowBeamCmd) from TCU(Telematics Control Unit)~~ | | **~~Validation Method~~** | ~~Model-In-Loop if model available~~  ~~Hardware-in-Loop when implemented in a specific ECU~~ | | **~~Applicable variants~~** | ~~Mid with Gateway BCM~~ | |
| 4360 | **10.36.2 Failure Mode** |
| 4363 | |  |  | | --- | --- | |  |  | |
| 4365 | ... |
| 4368 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLB:Req1V1** | If low beam output fails, BCM shall send a lamp malfunction message to the Instrument Cluster. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 4379 | ... |
| 4382 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLB:Req2V1** | If failsafe condition is detected, BCM shall activate low beam lights. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 4393 | ... |
| 4396 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLB:Req3V1** | In case of the BCM hardware failure or microcontroller failure, low beam shall be activated if HeadLampOn signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 10735 | ... |
| 10738 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLB:Req4V1** | If low beam realy circuit failure is detected then BCM shall switch ON the high beam relay in case of low beam ON request is provided to the BCM | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 10746 | ... |
| 10749 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLB:Req5V1** | In case of over voltage condition (battery voltage >16) low beam output shall not be switched OFF | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4407 | **10.37 Safety Level Automotive Safety Integrity Level (ASIL): Not applicable for Mid BCMBlock Diagram** |
| 14953 |  |
| 4410 | **10.38 Inputs** |
| 4413 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLampONSig | Head Lamp ON SignalX X - 0 1 1 - X - - - - | | LowBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition KeyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition KeyX X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Fail safe Switch Signal- X - 0 1 1 - X - - - - | | KeyIn | Key In signalX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Accessory Input switch signalX X - 0 1 1 - X - - - - | | ~~RemoteLowBeamCmd~~ | ~~Low Beam ON/OFF request from TCU (Telematics Control Unit)~~- ~~X~~ - ~~0~~ ~~1~~ ~~1~~ - - - X - | | ~~RemoteLowBeamCmdStatus~~ | ~~Status of RemoteLowBeamCmd signal published by TCU (Telematics Control Unit)~~- ~~X~~ - ~~0~~ ~~3~~ ~~1~~ - - - X - | |
| 4547 | **10.39 Outputs** |
| 4550 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLmpLowBeamRelay | Headlamp control (low beam)X X - 0 1 1 - X - - - - | | LowBeammalFn | Low Beam malfunction X X - - - - - - - X - - | | LowBeammalFnStatus | Low beam malfunction status signalX X - - - - - - - X - - | | LowBeamLmpTelltale | Low beam state as published by BCM- X - 0 1 1 - - - X - | | LowBeamLmpTelltaleStatus | Status of Low beam state published by BCM- X - 0 3 1 - - - X - | |
| 4609 | **10.40 Configurable Parameters** |
| 4612 | |  |  | | --- | --- | | **FD\_EL\_CP\_HLLB:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_LowBeamSel | Low beam Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1 1 1 X - Yes | |
| 4655 | **11 Headlamp High Beam** |
| 4656 | **11.1 Description** |
| 4657 | High beams cast most of their light straight ahead, maximizing viewing distance, providing safe forward visibility. |
| 4658 | **11.2 Applicable BCM Variants** |
| 4659 | Mid BCM |
| 4660 | **11.3 Operating Conditions** |
| 4661 | **11.3.1 Operating Power Modes** |
| 4664 | |  | | --- | | **FD\_EL\_OPM\_HLHB:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *Full Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Battery save* (*IgnKeyStateACC == Active*) | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 13718 | **NOTE :** \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 4698 | **11.3.2 Operating Voltage Range** |
| 4699 | Refer Section 2.1.1 Nominal Power consumption |
| 4702 | |  |  | | --- | --- | | **FD\_EL\_NPC\_HLHB:Req1V1** | Nominal power consumption is 62.520watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Mid BCM | |
| 4710 | **11.3.3 Temperature dependency** |
| 4711 | Refer Section 2.1.2 |
| 4712 | **11.4 Vehicle Example diagram** |
| 4713 |  |
| 4716 | |  |  | | --- | --- | | HSW: HeadLmpSelectSwitch MBSW: MainBeamSwitch C: Controller | LHL: HeadLmpLH RHL: HeadLmpRH IC: Instrument cluster IGN: IgnKeyState | |
| 4718 | **11.5 Response Time** |
| 4719 | Refer section 2.2 |
| 4720 | **11.6 Assumptions** |
| 4721 | None |
| 4722 | **11.7 Hardware/Software** |
| 4723 | Hardware: Light, Master Light Switch/Combination Switch, BCM |
| 4724 | Software: ECU software (BCM and IC) |
| 4725 | **11.8 HMI commodities** |
| 4728 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Head Lights | | Switches | Master Light Switch/Combination Switch | |
| 4736 | **11.9 Behavior Modes** |
| 4737 | **11.9.1 Normal Mode** |
| 4740 | |  |  | | --- | --- | |  |  | |
| 4742 | ... |
| 4745 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req1V1** | BCM shall activate High beam when all of the following conditions are met: 1. Ignition (IgnKeyStateIGN) is ON **OR** Accessory (IgnKeyStateACC) is ON. 2. Headlamp ON signal is active. 3. High beam switch signal is active. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4753 | ... |
| 4756 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req2V1** | BCM shall deactivate High beam when any of the following condition satisfies:  1. Ignition (IgnKeyStateIGN) is OFF **AND** Accessory (IgnKeyStateACC) is OFF. 2. Headlamp ON signal is inactive. 3. High beam switch signal is inactive. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4764 | ... |
| 4767 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req3V1** | BCM shall send CAN message to Instrument cluster to operate telltale as long as the high beams are activated | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4775 | ... |
| 4778 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req4V1** | **In case of Dual chamber (Par\_ChamberSel)**: When low beam is active, if High beam operation is requested then the low beam shall continue operating and the high beam shall be made on. Once the high beam request is deactivated, low beam shall still continue if the low beam ON conditions still persists and high beam shall go OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4786 | ... |
| 4789 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req5V1** | **In case of Single chamber (Par\_ChamberSel):** When low beam is active, if High beam operation is requested then the high beam shall be made ON and low beam shall go OFF after Par\_LowBeamOffDelayTime Once the High beam request is deactivated, low beam shall still continue if the low beam ON conditions still persists and high beam shall go OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4797 | ... |
| 4800 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req6V1** | **Flash To Pass**: BCM shall activate high beam as long as flash to pass input is active (i.e. flash to pass position). Note:- Refer requirement no FD\_EL\_NM\_HLHB:Req17V1 and FD\_EL\_NM\_HLHB:Req18V1 from Q5 MCE onwards | | **Validation Method** | Model-In-Loop if model available Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4808 | ... |
| 4811 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req7V1** | **Flash To Pass:** Configurable parameter Par\_FTPOnIgnOff shall be implemented for Activation of Flash To Pass operation in IgnOff/ACC condition. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4819 | ... |
| 4822 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req8V1** | **Flash To Pass:** The flash to pass feature shall be available even when the headlamps are OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4830 | ... |
| 4833 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req9V1** | BCM shall deactivate high beam on ignition crank and shall activate once the crank pulse is not sensed but BCM shall not deactivate high beam telltale in the Instrument cluster during crank  **For Nexon EV strategy-**  BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9556 | ... |
| 9559 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req10V1** | High beam function shall be Active/Inactive based on Par\_HighBeamSel  Note:- Refer requirement no FD\_EL\_NM\_HLHB:Req17V1 and FD\_EL\_NM\_HLHB:Req18V1 for higheam activation from Q5 MCE onwards | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9933 | ... |
| 9936 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req11V1** | BCM shall consider par\_ CombiSwitchType and follow below table to Operate Position Lamp, Low Beam, High Beam and FTP outputs. (Refer below table)  **Note:** "Combiswitch Failure DTC", if BCM is not getting "Position Lamp" active input after getting "Head Lamp ON" active input, shall be applicable if value of configuration parameter Par\_PositionContactAtHeadlampON = Available | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9945 | **11.9.1.12 Normal and failure Operation Strategy** |
| 9948 | |  |  | | --- | --- | | **PostionLampSwSig** | **HeadlampON signalLowBeamSwitchSig** **MainBeamSwitchSig** **Action For par\_ CombiSwitchType = 1** **Action For par\_ CombiSwitchType = 0** | | 0 | 00 0 Log Combiswitch Failure DTC. PL, LB, HB are OFF. PL, LB, HB are OFF. | | 0 | 00 1 PL, LB, HB are OFF. PL, LB are OFF & FTP ON | | 0 | 01 0 PL, LB, HB are OFF. PL, LB, HB are OFF. Log Combiswitch Failure DTC. | | 0 | 01 1 FTP ON Log Combiswitch Failure DTC. PL, LB, HB are OFF. FTP ON. | | 0 | 10 0 Log Combiswitch Failure DTC. PL, LB are ON. Log Combiswitch Failure DTC. PL, LB are ON. | | 0 | 10 1 Log Combiswitch Failure DTC. PL+ HB ON Log Combiswitch Failure DTC. PL+ HB ON | | 0 | 11 0 Log Combiswitch Failure DTC.  PL + LB ON. Log Combiswitch Failure DTC.  PL + LB ON | | 0 | 11 1 Log Combiswitch Failure DTC.  PL + FTP ON. Log Combiswitch Failure DTC.  PL + LB + FTP ON. | | 1 | 00 0 PL ON. Log Combiswitch Failure DTC PL ON. | | 1 | 00 1 PL ON. PL + FTP ON | | 1 | 01 0 PL ON. PL ON. Log Combiswitch Failure DTC | | 1 | 01 1 PL+FTP ON Log Combiswitch Failure DTC. PL + FTP ON | | 1 | 10 0 Log Combiswitch Failure DTC. PL ON + Low Beam Log Combiswitch Failure DTC. PL ON + Low Beam | | 1 | 10 1 PL and MB PL and MB ON | | 1 | 11 0 PL and LB PL and LB ON | | 1 | 11 1 PL + LB + FTP PL + LB + FTPON. | |
| 10066 | ... |
| 10069 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req12V1** | when low beam is ON and FTP is requested in case of single chamber,low beam shall remain ON and high beam shall come ON as long as FTP request is active. If FTP request is active for more than Par\_FtpSwStuckTime, high beam shall go OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 10383 | ... |
| 10386 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req13V1** | **Flash To Pass:** If the value of configuration parameter 'Par\_FTPOnIgnOff' is set to **0** (FTP Function with IgnOn only) then flash to pass functionality shall be active during IGN ON (IgnKeyStateIGN Active) only. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 10394 | ... |
| 10397 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req14V1** | **Flash To Pass:** If the value of configuration parameter 'Par\_FTPOnIgnOff' is set to **1** (FTP Function with IgnOn and IgnOff also) then flash to pass functionality shall be active during IGN ON (IgnKeyStateIGN), ACC ON (IgnKeyStateACC), KeyIN ON as well as key is outside ignition barrel. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 13252 | ... |
| 13255 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req15V1** | BCM shall calculate Head lamp -High Beam threshold for STG, STB or Open based on loads associated with the parameter value. ( Refer below table | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 13264 | ... |
| 13267 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left Headlamp-High Beam**     **Right Headlamp-High Beam**  **Platform/Remarks** | | 0 | 60w60w Zest/Bolt/Tiago/Tigor | | 2 | 55w55w Nexon High/Low | | 3 | 55w55w Q501-High end | | 4 | 55w55w Q501-Low end | | 5 | 55w55w X451-High end | | 6 | 55w55w X451-Low end | | 7 | 60w60w X445-High end | | 8 | 60w60w X445-Low end | | 9 | 55w55w Q502-High end | | 10 | 55w55w Q502-High end | | 11 | 55w55w Nexon MCE-High/low | | 12 | 55w55w Nexon EV | | 13 | 60w60w Tiago/Tigor MCE | |
| 15599 | ... |
| 15602 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req16V1** | The Highbeam shall flicker with below conditions: 1.) Ignition is ON or Run state 2.) Combi switch light in OFF state (i.e. Position lamp signal is OFF) 3.) Turn ON & OFF Highbeam Headlamp switch (No Flash-to-Pass switch input, just operate Highbeam Headlamp switch ON & OFF)  NOTE: The debounce time for Main beam switch shall be 40ms. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 21622 | ... |
| 21625 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req17V1** | when Par\_LEDHeadLampFunction is enable(1) then LED Head Lamp type is selected. The High Beam and Low Beam functionality will be as given in below table    To turn ON Low Beam, only Low Beam output shall be turn ON To turn ON High Beam, both HighBeam and LowBeam Output shall Turn ON In Flash to Pass also to turn ON high beam, Both High beam and low beam output shall be turn ON and for turning On Low Beam, only Low beam output will turn ON | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 21633 | ... |
| 21636 | |  |  | | --- | --- | | **FD\_EL\_NM\_HLHB:Req18V1** | when Par\_MFRHeadLampFunction is enable(1) then MFR/MRS Head Lamp type is selected. The High Beam and Low Beam functionality will be as given in below table    To turn ON Low Beam, only Low Beam output will be turn ON To turn ON High Beam, only High Beam output will be turn ON In Flash to Pass also to turn ON HighBeam, only High Beam output shall be turn ON and for turning ON Low Beam, only Low beam output shall turn ON | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 4841 | **11.9.2 Failure Mode** |
| 4844 | |  |  | | --- | --- | | **FD\_EL\_FM\_HLHB:Req1V1** | If high beam output fails, BCM shall send a CAN message to the Instrument Cluster to deactivate telltale. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 4855 | **11.10 Safety Level** |
| 4856 | Automotive Safety Integrity Level (ASIL): Not applicable for Mid BCM |
| 4857 | **11.11 Block Diagram** |
| 4858 |  |
| 4859 | **11.12 Inputs** |
| 4862 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLampONSig | Head Lamp ON Signal- X - 0 1 1 - X - - - - | | MainBeamSwitchSig | Main Beam Switch Signal- X - 0 1 1 - X - - - - | | LowBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | KeyINSig | Ignition KeyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition KeyX X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition KeyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition KeyX X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Fail safe Switch Signal- X - 0 1 1 - X - - - - | |
| 5011 | **11.13 Outputs** |
| 5014 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLmpHighBeamRelay | Highbeam control - X - 0 1 1 - X - - - - | | HighBeamTelltale | High Beam Telltale- X - - - - - - - X - - | | HighBeamTelltaleStatus | High Beam Telltale status signalX X - - - - - - - X - - | |
| 5073 | **11.14 Configurable Parameters** |
| 5076 | |  |  | | --- | --- | | **FD\_EL\_CP\_HLHB:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_ChamberSel | Number of Chamber 0 – Single 1 – Dual- 0 1 1 1 X - Yes | | Par\_FTpOnIgnOff | Flash to pass configuration 0 – (Disabled) FTP Function with IgnOn only 1 – (Enabled) FTP Function with IgnOn and IgnOff also - 0 1 0 1 X - Yes | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_LowBeamOffDelayTime | Time for how long low beam shall be ON after High beam is made ON.ms 100 1000 500 10 X - Yes | | Par\_HighBeamSel | High beam Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1 1 1 X - Yes | | Par\_FtpSwStuckTime | FTP switch stuck time - 10 60 30 10 X - yes | | Par\_ CombiSwitchType | 0 – Low beam input availability only with headlamp ON position.  1 – Low beam input availability independent of headlamp ON position.- 0 1 0 1 X - Yes | | Par\_LEDHeadLampFunction | LED Head Lamp Function Configuration- 0 1 0 1 x - Yes | | Par\_MFRHeadLampFunction | MFR Head Lamp Function Configuration- 0 1 0 1 x - Yes | |
| 5152 | **11.15** |
| 5153 | **12 Lane Changer - 3 Flash Mode** |
| 5154 | **12.1 Description** |
| 5155 | The turn-tip feature allows the driver to activate the turn signal lights by momentarily pressing the turn switch up or down. The turn signal lights flash for a predefined number of times. |
| 5156 | This feature is advantageous in lane change situations when the steering wheel does not travel far enough to cancel a conventional turn signal request. After flashing for a number of times, the turn signal lights stop flashing; the driver does not have to manually cancel the turn signal switch. |
| 5157 | **12.2 Applicable BCM Variants** |
| 5158 | Mid BCM |
| 5159 | **12.3 Operating Conditions** |
| 5160 | **12.3.1 Operating Power Modes** |
| 5163 | |  | | --- | | **FD\_EL\_OPM\_LC:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *Full Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *Run/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13725 | **NOTE :**  \* - BCM should publish same power mode to other ECU’s as received from VCU/EMS ECU. \*\* - BCM should publish same power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 5197 | **12.3.2 Operating Voltage Range** |
| 5198 | Refer Section 2.1.1 |
| 5199 | **12.3.3 Nominal Power consumption** |
| 5202 | |  |  | | --- | --- | | **FD\_EL\_NPC\_LC:Req1V1** | Nominal power consumption is 120.072 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Mid BCM | |
| 5210 | **12.3.4 Temperature dependency** |
| 5211 | Refer Section 2.1.2 |
| 5212 | **12.4 Vehicle Example diagram** |
| 5213 |  |
| 5216 | |  |  | | --- | --- | | C: Controller IGN: IgnKeyState LTL: TurnLmpCtrlLH RTL: TurnLmpCtrlRH LTR: TurnSideLmpCtrlLH RTR: TurnSideLmpCtrlRH | DIRA: DirIndReqAlarm DIRCL – DirIndReqCentLock TSW: TurnSwitchSig TSWS: TurnSwitchState IC: Instrument Cluster (Turn signal tell tale) HZSW: HazardSwitch / CrashSig | |
| 5218 | **12.5 Response Time** |
| 5219 | Refer Section 2.2 |
| 5220 | **12.6 Assumptions** |
| 5221 | None |
| 5222 | **12.7 Hardware/Software** |
| 5223 | Hardware: Light, Master Light Switch/Combination Switch, BCM. |
| 5224 | Software: ECU software (BCM and IC) |
| 5225 | **12.8 HMI commodities** |
| 5228 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Turn Lights | | Switches | Master Light Switch/Combination Switch | |
| 5236 | **12.9 Behavior Modes** |
| 5237 | **12.9.1 Normal Mode** |
| 5240 | |  |  | | --- | --- | |  |  | |
| 5242 | ... |
| 5245 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req1V1** | Turn Tip: BCM shall activate Turn Tip when turn indication stalk switch signal is received for a duration Par\_TurnTripTimeMinThd and Par\_TurnTripTimeMaxThd after switch activation. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5253 | ... |
| 5256 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req2V1** | BCM shall start flashing Turn indicator with normal turn indicator ON/OFF frequency, as soon as the turn indicator stalk switch input is activated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5264 | ... |
| 5267 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req3V1** | The number of flashes shall be according to Local configuration parameters “Par\_TurnTipFlashCount”. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5275 | ... |
| 5278 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req4V1** | The turn tip mode shall be available when Ignition is ON and this feature shall be deactivated when Ignition is OFF | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5286 | ... |
| 5289 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req5V1** | Turn Tip: BCM shall immediately cancel the activation of the turn-tip feature when a request for the turn signal in the opposite direction is made. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5297 | ... |
| 5300 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req6V1** | Turn Tip: When Turn tip is being operated if the turn tip request is received again then the ongoing turn tip flashes shall be stopped and the turn tip functionality shall start again. (i.e. the number of turn tip flashes (Par\_TurnTipFlashCount ) shall get restarted) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5308 | ... |
| 5311 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req7V1** | Turn Tip: During the turn tip operation if the turn indicators are switched ON then the turn tip functionality shall get cancelled and turn indicators shall get started. Always the priority shall be given to turn indicators. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5319 | ... |
| 5322 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req8V1** | Turn Tip: During the turn tip operation if the hazard is switched ON then the turn tip functionality shall get cancelled and hazard shall get started. Always the priority shall be given to hazard. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5330 | ... |
| 5333 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req9V1** | Turn Tip: During the turn tip operation CAN message shall be sent to IC for the tell tale operation as long as the turn indicators are flashing. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5341 | ... |
| 5344 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req10V1** | Turn Tip: BCM shall detect Turn Tip request within one turn indicator cycle time and execute outputs as per above Turn Tip requirement and number of flashes setting. Note: Turn Tip Min Max time shall not be more than a Turn Indicator 1 cycle time. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9579 | ... |
| 9582 | |  |  | | --- | --- | | **FD\_EL\_NM\_LC:Req11V1** | Turn Tip function shall be Active/Inactive based on Par\_TurnTipSel | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5352 | **12.9.2 Failure Mode** |
| 5355 | |  |  | | --- | --- | |  |  | |
| 5357 | ... |
| 5360 | |  |  | | --- | --- | | **FD\_EL\_FM\_LC:Req1V1** | If the bulb failure is detected (front or rear) the remaining bulb shall flash with double the normal frequency (“Par\_TurnIndicatorOnTime/2” and “Par\_TurnIndicatorOffTime/2”.) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | TBD | | **Applicable variants** | Mid BCM | |
| 5371 | ... |
| 5374 | |  |  | | --- | --- | | **FD\_EL\_FM\_LC:Req2V1** | If output fails, BCM shall send CAN message to Instrument Cluster to deactivate telltale. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCM | |
| 5385 | **12.10 Safety Level** |
| 5386 | Automotive Safety Integrity Level (ASIL): Not applicable for Mid BCM |
| 5387 | **12.11 Block Diagram** |
| 5388 |  |
| 5389 | **12.12 Inputs** |
| 5392 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HazardSWSig | Hazard signalX X - 0 1 1 - X - - - - | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition keyX X - 0 1 1 - X - - - - | | TurnLHSwSig | Turn switch signal leftX X - 0 1 1 - X - - - - | | TurnRHSwSig | Turn switch signal rightX X - 0 1 1 - X - - - - | |
| 5526 | **12.13 Outputs** |
| 5529 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | TurnLHInd | Control of Left Turn LampX X - - - - - - X - - - | | TurnRHInd | Control of Right Turn LampX X - - - - - - X - - - | | TurnLHTelltale | Control of Left Turn Side LampX X - - - - - - - X - - | | TurnLHTelltaleStatus | Turn LH Telltale status siganlX X - - - - - - - X - - | | TurnRHTelltale | Control of Right Turn Side LampX X - - - - - - - X - - | | TurnRHTelltaleStatus | Turn RH Telltale status siganlX X - - - - - -   X - - | |
| 5618 | **12.14 Configurable Parameters** |
| 5621 | |  |  | | --- | --- | | **FD\_EL\_CP\_LC:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_TurnTipSel | Enable/Disable of Turn Tip selection 0 - Disable 1 - Enable- 0 1 1 1 X - Yes | | Par\_TurnTipFlashCount | No of flashes for turn tip(left/right)- 1 10 3 1 X X Yes | | Par\_TurnTripTimeMinThd | If the switch is triggered shorter than this time Repeat Flash shall be disabled.ms 20 100 50 10 X - Yes | | Par\_TurnTripTimeMaxThd | If the switch is triggered longer than this time Repeat Flash shall be disabled.ms 100 1000 600 10 X - Yes | |
| 5697 | ***Note: Supplier to confirm the Parameter Min values, whether BCM can detect that much time.*** |
| 5698 | **13 Follow Me** |
| 5699 | **13.1 Description** |
| 5700 | Follow me function assists the user to find the way in dark conditions while dark conditions while the driver goes away from the vehicle. The existing lamps of the vehicle such as low beam of the headlamp and the position lamps are used for follow me home functionality. |
| 5701 | Follow me functional implementation is of two types. |
| 5702 | Manual follow me |
| 5703 | Automatic follow me. |
| 5704 | **13.2 Applicable BCM Variants** |
| 5705 | Base and Mid BCMs |
| 5706 | **13.3 Operating Conditions** |
| 5707 | **13.3.1 Operating Power Modes** |
| 5710 | |  | | --- | | **FD\_EL\_OPM\_FM:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *No Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *No Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *No Function* | | *Active* | *No Function* | | *RunRun/Normal Run \** | *No Function* | | *Energy Recuperation Run \*\** | *No Function* | | *Limited Load Run \*\** | *No Function* | | *Start/Crank* | *No Function* | |
| 13732 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 5744 | **13.3.2 Operating Voltage Range** |
| 5745 | Refer Section 2.1.1 |
| 5746 | **13.3.3 Nominal Power consumption** |
| 5749 | |  |  | | --- | --- | | **FD\_EL\_NPC\_FM:Req1V1** | Nominal power consumption is approximately 62.592 watts | | **Validation Method** | Component level Testing | | **Applicable variants** | Base and Mid BCMs | |
| 5757 | **13.3.4 Temperature dependency** |
| 5758 | Refer Section 2.1.2 |
| 5759 | **13.4 Vehicle Example diagram** |
| 5760 |  |
| 5763 | |  |  | | --- | --- | | C: Controller IGN: IgnKeyState HSW: HeadLmpSelectSwitch RLRF: RevLmpReqFollowMeHome | LS: LightSensSig LBRF: LowBeamReqFollowMeHome DRF: DrlReqFollowMeHome FLFRF: FogLmpFrntReqFollowMeHome | |
| 5765 | **13.5 Response Time** |
| 5766 | Refer Section 2.2 |
| 5767 | **13.6 Assumptions** |
| 5768 | None |
| 5769 | **13.7 Hardware/Software** |
| 5770 | Hardware: Light, Master Light Switch/Combination Switch, BCM. |
| 5771 | Software: ECU software (BCM and IC) |
| 5772 | **13.8 HMI commodities** |
| 5775 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Head Lights | | Switches | Master Light Switch/Combination Switch | |
| 5783 | **13.9 Behavior Modes** |
| 5784 | **13.9.1 Normal Mode** |
| 5787 | |  |  | | --- | --- | |  |  | |
| 5789 | ... |
| 5792 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req1V1** | Follow me home function shall be Active/Inactive based on Par\_FMHEnable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCM | |
| 5800 | ... |
| 5803 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req2V1** | BCM shall use configuration parameter “PAR\_FMHModeSel” for follow me home function. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCM | |
| 5811 | ... |
| 5814 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req3V1** | **UCS Enable:** If UCS is Enabled (Par\_UCSEnable), BCM shall use FMH activation value from User customization settings. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCM | |
| 5822 | ... |
| 5825 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req4V1** | **UCS Disable:** If UCS is Disabled (Par\_UCSEnable), BCM shall use FMH activation value from EOL (Par\_FMHDeactDelayTime). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCM | |
| 5833 | ... |
| 5836 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req5V1** | Follow me function lights i.e both low beam and position lights shall be made ON when this function is requested | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCM | |
| 5844 | ... |
| 5847 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req6V1** | **Manual:** BCM shall activate Follow Me Home lights for FMH Delay time when all of the following conditions are met: 1) Combination switch/master light switch shall be in OFF position (i.e, both headamp and position lamp shall be OFF.)  2) When IGN is OFF and key is taken out . 3) Combination switch is moved to the headlamp flash switch position between Par\_FMHSwitchActMinThd and Par\_FMHSwitchActMaxThd time. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5855 | ... |
| 5858 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req7V1** | **Manual:** BCM shall deactivate Follow Me Home lights when any of the following condition is met: 1. FMH Delay timer is elapsed. 2. Combination switch/master light switch is moved to position lamp / headlamp ON position. 3. Ignition is made ON/CRANK. 4. Combination switch is again moved to the headlamp flash switch position between Par\_FMHSwitchActMinThd and Par\_FMHSwitchActMaxThd time.   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5866 | ... |
| 5869 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req8V1** | **Auto:** In case of automatic follow me, BCM shall activate Follow Me Home lights for FMH Delay when all of the following conditions are met: 1. Headlamp is ON for “Par\_FMHHlOnTime“ time. 2. Combination switch/master light switch shall be in OFF position (i.e, both headamp and position lamp shall be OFF.)  3. Key is taken out within Par\_FMHHlOffDelayTime .   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | |  | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5877 |  |
| 5888 | ... |
| 5891 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req10V1** | **Auto:** Follow Me lights feature shall be deactivated when any of the following condition satisfies: 1. FMH Delay timer is elapsed. 2. Combination switch/master light switch is moved to position lamp / headlamp ON position. 3. Ignition is made ON/CRANK. 4. Combination switch is moved to the headlamp flash switch position   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 5899 | ... |
| 5902 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req11V1** | **With RKE:**  BCM shall activate Follow Me Home lights for FMH Delay when all of the following conditions are met: 1) RF signal is received from the remote to activate the follow me function. (LOCK button is pressed (After Locked) for Par\_LongDurationTime. 2) Combination switch/master light switch shall be in OFF position (i.e, both headamp and position lamp shall be OFF.)  3) Key is taken out 4) Par\_TwoButtonRKE is enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5910 | ... |
| 5913 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req12V1** | If any door / Tailgate/ bonnet changes status from close to Open AND FollowMe Home is active, then BCM shall extend the Follow Me Home operation by Par\_FMHDoorAjarActDelayTime. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5921 | ... |
| 5924 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req13V1** | When one door/ Tailgate / bonnet is open and the timer is reset, during this time if another door is also made open then the timer shall reset again. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5932 | ... |
| 5935 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req14V1** | If all door status including tailgate and bonnet changes to close AND FollowMeHome is active, then BCM shall restart deactivation timer FMH Delay(Par\_FMHDeactDelayTime). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5943 | ... |
| 5946 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req15V1** | BCM shall not send position light telltale when FollowMeHome is activated. If position light is selected, this has higher priority than Follow me home. i.e.; BCM shall send position lights telltale accordingly. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5954 | ... |
| 5957 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req16V1** | FollowMeHome shall have higher priority than Approach Light and shall not be cancelled by any lock or unlock commands. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 10192 | ... |
| 10195 | |  |  | | --- | --- | | **FD\_EL\_NM\_FM:Req17V1** | **With RKE:**  BCM shall deactivate Follow Me Home lights when any of the following conditions is met: 1) FMH Delay timer is elapsed. 2) Combination switch/master light switch is moved to position lamp / headlamp ON position. 3) Ignition is made ON/CRANK 4) RF signal is received from the remote for the follow me function.   **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 5965 | **13.9.2 Failure Mode** |
| 5968 | |  |  | | --- | --- | | **FD\_EL\_FM\_FM:Req1V1** | If the RF signal fails, BCM shall ignore this input. ***(To be confirmed/updated once RF requirements are finalized)*** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base BCM | |
| 5979 | **13.10 Safety Level** |
| 5980 | Automotive Safety Integrity Level (ASIL): Not applicable for Low and Mid BCMs |
| 5981 | **13.11 Block Diagram** |
| 5982 |  |
| 5983 | **13.12 Inputs** |
| 5986 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | PositionLmpSwSig | Position Lamp Switch Signal X X - 0 1 1 - X - - - - | | HeadLampONSig | Head Lamp ON SignalX X - 0 1 1 - X - - - - | | LowBeamSwSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | MainBeamSwSig | High Beam Switch Signal- X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnCrank | Ignition keyX X - 0 1 1 - X - - - - | | DrDoorState | Driver Door StatusX X - 0 1 1 - X - - - - | | Co-DrDoorState | Passenger Door Status- X - 0 1 1 - X - - - - | | RrLHDoorState | Rear Left Door Status- X - 0 1 1 - X - - - - | | RrRHDrDoorState | Rear Right Door Status- X - 0 1 1 - X - - - - | | KeyRFSig | Key RF SignalX X - - - - - - - - - X | | LightSensorSig | Light Sensor Signal- X - - - - - - - - X | | BonnetState | State (close or ajar) of tailgate- X - 0 1 1 - x - - - - | | TailgateState | State (close or ajar) of bonnet- X - 0 1 1 - x - - - - | |
| 6195 | **13.13 Outputs** |
| 6198 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLmpLowBeamRelay | Head Lamp Low Beam RelayX X - 0 1 1 - X - - - - | | PositionLmpCntrlLH | Position Lamp Control leftX X - 0 1 1 - X - - - - | | PositionLmpCntrlRH | Position Lamp Control rightX X - 0 1 1 - X - - - - | |
| 6272 | ... |
| 6275 | |  |  | | --- | --- | | **FD\_EL\_CP\_FM:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | | Par\_FMHModeSel | Follow me home configuration 0: Manual  1: Auto- 0 1 1 1 - - Yes | | Par\_UCSEnable | User customization settings. 0: Disable  1: Enable- 0 1   0 1 X - Yes | | Par\_FMHDeactDelayTime | Follow me Deactivation delay sec 0 240 30 10 - X Yes | | Par\_FMHDoorAjarActDelayTime | Follow me Deactivation delay when any door is opensec 30 300 60 2 - X Yes | | Par\_FMHSwitchActMinThd | Switch min activation time at flash position.ms 100 1000 100 10 - X Yes | | Par\_FMHSwitchActMaxThd | Switch max activation time at flash position.ms 500 2000 500 10 - X Yes | | Par\_FMHHlOnTime | Head Lamp ON Timemin 1 20 5 1 - X Yes | | Par\_FMHHlOffDelayTime | Duration between headlamp switched OFF and Key OUT.min 1 20 5 1 - X Yes | | Par\_FMHEnable | Follow Me Home Enable Disable parameter 0: Disable  1: Enable- 0 1 1 1 X - Yes | | Par\_LongDurationTime | Time for which lock key need to press to activate FHMsec 1 5 2 1 X \_ Yes | | Par\_TwoButtonRKE | RKE with two button or three button. 1 - RKE with two button. 0 - RKE with three button.- 0 1  0  1 - X Yes | |
| 6406 | ***Note: Supplier to confirm the Parameter Min values, whether BCM can detect that much time.*** |
| 6407 | **14 Front fog lamp as cornering lamp** |
| 6408 | **14.1 Description** |
| 6409 | The existing front fog lamps of the vehicle are used as cornering lamps and no separate cornering lights are available. In case of Mid BCM, BCM shall not use the Tell-tale indicator on fascia switch (separate output - FrFogLmpRelay) for Cornering Lamps functionality. It provides additional illumination of the area to the side of the vehicle, making night-time parking and turning safer. |
| 6410 | **14.2 Applicable BCM Variants** |
| 6411 | Mid BCM |
| 6412 | **14.3 Operating Conditions** |
| 6413 | **14.3.1 Operating Power Modes** |
| 6416 | |  | | --- | | **FD\_EL\_OPM\_FFAC:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 13739 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 6450 | **14.3.2 Operating Voltage Range** |
| 6451 | Refer Section 2.1.1 |
| 6454 | |  |  | | --- | --- | | **FD\_EL\_NPC\_FFAC:Req1V1** | Nominal power consumption is 120.144 watts | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6462 | **14.3.3 Temperature dependency** |
| 6463 | Refer Section 2.1.2 |
| 6464 | **14.4 Vehicle Example diagram** |
| 6465 |  |
| 6468 | |  |  | | --- | --- | | IGN: IgnKeyState FLRL: FogLmpCtrlRearLH  RFS: FogLmpRearSwitchSig C: Controller IC: Instrument Cluster | FFS: FogLmpFrntSwitchSig FLFL: FogLmpFrntLH FLFR: FogLmpFrntRH FLRR: FogLmpRearRH TLS:Turn LH switch TRS: Turn RH switch | |
| 6470 | **14.5 Response Time** |
| 6471 | Refer Section 2.2 |
| 6472 | **14.6 Assumptions** |
| 6473 | None |
| 6474 | **14.7 Hardware/Software** |
| 6475 | Hardware: Fog Lights, Master Light Switch/Combination Switch |
| 6476 | Software: ECU software (BCM) |
| 6477 | **14.8 HMI commodities** |
| 6480 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Front Fog Lights (Cornering Light) | | Switches | Master Light Switch/Combination Switch | |
| 6488 | **14.9 Behavior Modes** |
| 6489 | **14.9.1 Normal Mode** |
| 6492 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req1V2** | **(Par\_CorneringLampActInput = 0)** **Activation**: BCM shall activate cornering lamp feature (front fog lamps) when all of the following conditions are met: 1) Left/Right turn switch is active  2) Head lamp is ON. 3) Ignition is in ON. 4) Vehicle speed **(refer note for Nexon EV strategy)** is below pre-configured speed (Par\_FrntCornLightOnSpdThd) 5) Reverse gear is deactivated.  For 'Reverse Gear' activation/deactivation please refer requirement (ID -10469:**FD\_EL\_NM\_GR\_Req7v2** and ID - 10480:**FD\_EL\_NM\_GR\_Req8v2**)mentioned in general section.   **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6500 | ... |
| 6503 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req2V2** | **(Par\_CorneringLampActInput = 0)** BCM shall activate the Fog lamp of the corresponding side of the vehicle when turn signal of the same vehicle side is turned ON with above activation conditions. i.e. If left turn indicator activated, BCM shall activate the left Fog lamp as a cornering lamp. Similarly BCM shall activate right fog lamp when right indicator is activated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6511 | ... |
| 6514 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req3V2** | **(Par\_CorneringLampActInput = 0)** **Deactivation**: BCM shall deactivate cornering lamp feature when any of the following conditions is met: 1) Left and Right turn switch are not active. 2) Head lamp is OFF. 3) Ignition is not in ON position. 4) Vehicle speed **(refer note for Nexon EV strategy)** is equal to or above pre-configured speed (Par\_FrntCornLightOnSpdThd). 5) Reverse gear is activated.  For 'Reverse Gear' activation/deactivation please refer requirement (ID -10469:**FD\_EL\_NM\_GR\_Req7v1** and ID - 10480:**FD\_EL\_NM\_GR\_Req8v1**)mentioned in general section.  **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6522 | ... |
| 6525 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req4V2** | **(Par\_CorneringLampActInput = 0)** BCM shall activate and deactivate front fog lamps with pre-configured ramp up (Par\_FogRampUpTime) and ramp down (Par\_FogRampDownTime) timings for the cornering feature. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6533 | ... |
| 6536 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req5V2** | **(Par\_CorneringLampActInput = 0/1)** If the fog lamps are already active and then request to turn ON cornering lamp is received, BCM shall not activate the cornering lamp function, instead the front fog lamps shall continue to be lightened. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6544 | ... |
| 6547 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req6V1** | **(Par\_CorneringLampActInput = 0/1)** If the cornering lamps function is active, BCM shall not give telltale for fog lamp ON. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8635 | ... |
| 8638 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req7V1** | **(Par\_CorneringLampActInput = 0)** When BCM receives Vehicle speed **(refer note for Nexon EV strategy)** on CAN with implausible status, Cornering lamps shall not come ON.  **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9591 | ... |
| 9594 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req8V1** | **(Par\_CorneringLampActInput = 0/1)** Cornering lamp function shall be Active/Inactive based on Par\_CornerlampConfig | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11723 | ... |
| 11726 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req9V1** | **(Par\_CorneringLampActInput = 0/1)** For activation and deactivation of cornering lamps, BCM shall consider turn switch input OR steering input based on pre-configured parameter "Par\_CorneringLampActInput" . | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11787 | ... |
| 11790 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req10V1** | **(Par\_CorneringLampActInput =1)** **Activation :**  **Precondition**:  1) Ignition is in ON position.  2) Head lamp is ON. 3) Fog lamp is not active. 4) Vehicle speed **(refer note for Nexon EV strategy)** is above 0 km/hr and below pre-configured speed (Par\_FrntCornLightOnSpdThd) 5) Reverse gear is not active.  **Requirement:** BCM shall activate cornering lamp feature (i.e., fog lamp) if steering wheel angle is greater than or equal to "Par\_CorneringLampActAngle" degree.  **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 13354 | ... |
| 13357 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req16V1** | 1)BCM subscribes CAN signal "**SteerAngEPAS**" from frame EPAS2 OR "**SAsAngEPAS**" from frame EPAS3 to detect current steering wheel angle  AND "**SteerAngEPAsDir**" from frame EPAS2 OR "**SAsAngEPAsDir**" from frame EPAS3 to detect Current steering wheel direction for Par\_LmpWattageVehicleTypeSel=02||05 ||06||07||08(Nexon OR X451-High OR X451 Low OR X445-High OR X445-Low) BCM shall not log any DTC's against SAS in this case  2)BCM subscribes CAN signal "**SAsAng**" from SAS to detect both current steering wheel angle and direction for Par\_LmpWattageVehicleTypeSel=03||04(Q501-High or Q501-Low) OR 09||0A(Q502-High or Q502-Low). BCM shall not log any DTC's against EPAS in this case. For interpretation of steering angle values in case of clockwise and anticlockwise,please refer latest CAN DBC v17.1. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11809 | ... |
| 11812 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req11V1** | **(Par\_CorneringLampActInput =1)** When Steering wheel angle direction is received indicating left direction, BCM shall activate the left Fog lamp as a cornering lamp. Similarly BCM shall activate right fog lamp when Steering wheel angle direction is received indicating rigt direction.  NOTE : BCM subscribes CAN signal "SteerAngEPAsDir" to detect current steering wheel direction. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11820 | ... |
| 11823 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req12V1** | **(Par\_CorneringLampActInput =1)** **Deactivation:** BCM shall deactivate cornering lamp feature when any of the following conditions is met: 1) steering wheel angle is less than or equal to "Par\_CorneringLampDeActAngle" degree. 2) Head lamp is OFF. 3) Ignition is not in ON. 4) Vehicle speed **(refer note for Nexon EV strategy)** is above pre-configured speed (Par\_FrntCornLightOnSpdThd). 5) Reverse gear is activated  **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11831 | ... |
| 11834 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req13V1** | **(Par\_CorneringLampActInput =1)** **Activation:** BCM shall activate cornering lamp immediately without ramp up effect. **De-activation:** BCM shall deactivate cornering lamps with pre-configured ramp down (Par\_FogRampDownTime) time. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11842 | ... |
| 11845 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req14V1** | **(Par\_CorneringLampActInput =1)** During ramp down period while deactivating, if cornering lamp activation conditions satisfies, then ramp down shall stop and cornering lamps shall turn ON immediately. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11864 | ... |
| 11867 | |  |  | | --- | --- | | **FD\_EL\_NM\_FFAC:Req15V1** | **(Par\_CorneringLampActInput =1)** In case of Par\_LmpWattageVehicleTypeSel=02||05||06||07||08(Nexon OR X451-High OR X451 Low OR X445 High OR X445 Low), Cornering lamps shall not come ON when Vehicle speed **(refer note for Nexon EV strategy)** or steering wheel angle or steering wheel direction is received with implausible status.(SAsAngEPASStatus =1 i.e implausible steering wheel angle recieved) In case of Par\_LmpWattageVehicleTypeSel=03||04(Q501-High or Q501-Low) OR 09||0A(Q502-High or Q502-Low),Cornering lamps shall not come ON when Vehicle speed **(refer note for Nexon EV strategy)** or steering wheel angle is received with implausible status.(SAsFailureStatus=1 i.e implausible steering wheel angle recieved) **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 6555 | **14.9.2 Failure Mode** |
| 6558 | |  |  | | --- | --- | | **FD\_EL\_FM\_FFAC:Req1V3** | **(Par\_CorneringLampActInput =0)** If vehicle speed **(refer note for Nexon EV strategy)** is not available OR signal is received with implausible status, Cornering lamps shall not come ON.  **Note for Nexon EV strategy:-** BCM shall be subscribing signal ICDispSpeedSig & ICDispSpeedSigStatus from frame IPC3(0x19A) for obtaining vehicle speed information & status. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11875 | ... |
| 11878 | |  |  | | --- | --- | | **~~FD\_EL\_FM\_FFAC:Req2V2~~** | **~~(Par\_CorneringLampActInput =1)~~** ~~If Vehicle speed or steering wheel angle or steering wheel direction is not available on CAN or signal is recieved with implausible status, Cornering lamps shall not come ON.~~ | | **~~Validation Method~~** | ~~Model-In-Loop if model available~~  ~~Hardware-in-Loop when implemented in a specific ECU~~ | | **~~Applicable variants~~** | ~~Mid BCM~~ | |
| 6569 | **14.10 Safety Level** |
| 6570 | Automotive Safety Integrity Level (ASIL): Not applicable for Mid BCM |
| 6571 | **14.11 Block Diagram** |
| 6572 |  |
| 6575 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 - X - - - - | | KeyINSig | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition keyX X - 0 1 1 - X - - - - | | GearRevSig | Reverse Gear SignalX X - 0 1 1 - X - - - - | | TurnSwitchLH | Left Turn Switch SignalX X - 0 1 1 - X - - - - | | TurnSwitchRH | Right Turn Switch SignalX X - 0 1 1 - X - - - - | | FrontFogLampSw Sig | Front Fog Lamp Switch SignalX X - 0 1 1 - X - - - - | | HeadLampONSig | Head Lamp ON SignalX X - 0 1 1 - X - - - - | | VehSpd | Vehicle SpeedX X - - - - - - - X - - | | VehSpdStatus | Vehicle speed status signalX X - - - - - - - X - - | | ICDispSpeedSig | Signal represents Display Vehicle Speed evaluated by Instrument Clusterx x m/s  0 128 1  - -  - x  -  - | | ICDispSpeedSigStatus | Status of ICDispSpeedSigx x - 0 3   - - - x  - - | | MLFailsafeSwitchSig | Master Light Fail safe Switch Signal- X - 0 1 1 - X \_ - \_ \_ | | SteerAngEPAS | Current steering wheel angle calculated by EPAS system- X Degree 0 1433.56  -  - - - X -  - | | SAsAngEPAS | Current steering wheel angle calculated by EPAS system- X Degree 0 1433.56  - - - - X - - | | SteerAngEPAsDir | Steering wheel angle direction- X  - 0  1 1 -  - - X -  - | | SAsAngEPAsDir | Steering wheel angle direction- X - 0 1 1 - - - X - - | |
| 6754 | **14.12 Outputs** |
| 6757 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | FogLmpCtrlFrntLH | Control of Front Left Fog Light- X - 0 1 1 - - X - - - | | FogLmpCtrlFrntRH | Control of Front Right Fog Light- X - 0 1 1 - - X - - - | |
| 6816 | ... |
| 6819 | |  |  | | --- | --- | | **FD\_EL\_CP\_FFAC:Req1V2** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_MastLightSwitchSel | State of Master Light Switch 0 – Disabled 1 – Enabled- 0 1 0 1 X - Yes | | Par\_FrntCornLightOnSpdThd | Speed limit to turn on cornering lampsKmph 10 200 80 5 - X Yes | | Par\_FogRampUpTime | Ramp up Time for front fog as cornering lamp.Sec 1 30 5 1 - X Yes | | Par\_FogRampDownTime | Ramp Down Time for front fog as cornering lamp.Sec 1 30 5 1 - X Yes | | Par\_CornerlampConfig | Cornering lamp Enable/Disable 0 – Disable 1 - Enable- 0 1 0 1 X \_ Yes | | Par\_CorneringLampActInput | Cornering lamp activation input. 0 - Turn switch based cornering lamps . 1 - Steering input based cornering lamp- 0 1 1 1 X \_ Yes | | Par\_CorneringLampActAngle | Steering angle for activation of cornering lamps- 10 60 20 5 X \_ Yes | | Par\_CorneringLampDeActAngle | Steering angle for deactivation of cornering lamps- 0 20 5 1 X \_ Yes | |
| 6895 | **15 Approach light** |
| 6896 | **15.1 Description** |
| 6897 | The approach lights are helpful for the vehicle driver while approaching the vehicle, especially during nighttime. The existing lamps of the vehicle i.e. low beam of the head lamp, position lamps and the roof lamps are used for approach lights function. |
| 6898 | **15.2 Applicable BCM Variants** |
| 6899 | Base and Mid BCMs |
| 6900 | **15.3 Operating Conditions** |
| 6901 | **15.3.1 Operating Power Modes** |
| 6904 | |  | | --- | | **FD\_EL\_OPM\_APL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *No Function* | | *Transport Drive Crank* | *No Function* | | *Transport Drive Run* | *No Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *No Function* | | *RunRun/Normal Run \** | *No Function* | | *Energy Recuperation Run \*\** | *No Function* | | *Limited Load Run \*\** | *No Function* | | *Start/Crank* | *No Function* | |
| 13746 | **NOTE :** \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 6938 | **15.3.2 Operating Voltage Range** |
| 6939 | Refer Section 2.1.1 |
| 6940 | **15.3.3 Nominal Power consumption** |
| 6943 | |  |  | | --- | --- | | **FD\_EL\_NPC\_APL:Req1V1** | Nominal power consumption is 86.424 watts | | **Validation Method** | Component level Testing. | | **Applicable variants** | Base and Mid BCMs | |
| 6951 | **15.3.4 Temperature dependency** |
| 6952 | Refer Section 2.1.2 |
| 6953 | **15.4 Vehicle Example diagram** |
| 6954 |  |
| 6957 | |  |  | | --- | --- | | C: Controller IGN: IgnKeyState RLRAL: RevLmpReqApprLight | ALR: ApprLightReq LPLRAL: LicPltLmpReqApprLight LBRAL: LowBeamReqApprLight ECLRAL: ExtCourtesyLmpReqApprLight | |
| 6959 | **15.5 Response Time** |
| 6960 | Refer Section 2.2 |
| 6961 | **15.6 Assumptions** |
| 6962 | None |
| 6963 | **15.7 Hardware/Software** |
| 6964 | Hardware: Light, Master Light Switch/Combination Switch |
| 6965 | Software: ECU software |
| 6966 | **15.8 HMI commodities** |
| 6969 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Head Lights | | Remote | Remote control | | Switches | Master Light Switch/Combination Switch | |
| 6980 | **15.9 Behavior Modes** |
| 6981 | **15.9.1 Normal Mode** |
| 6984 | |  |  | | --- | --- | |  |  | |
| 6986 | ... |
| 6989 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req1V1** | Approach Light function shall be Active/Inactive based on Par\_ApprLightEnable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 6997 | ... |
| 7000 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req2V1** | **UCS Enable:** If UCS is Enabled (Par\_UCSEnable), BCM shall use Approach lights activation value from User customization settings. Follow me home function shall be Active/Inactive based on Par\_FMHEnable. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7008 | ... |
| 7011 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req3V1** | **UCS Disable:** If UCS is Disabled (Par\_UCSEnable), BCM shall use Approach lights activation value from EOL Par\_AppLightONTime. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7019 | ... |
| 7022 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req4V1** | BCM shall activate Approach lights for predefined time Approach Light ON Time when all of the following conditions are met : 1) Approach light request from remote key is received.  2) Ignition key is not inserted (Ignition key is outside ignition barrel).  Once activated Approach lights shall stay ON (with 'KeyIN (KeyINSignal)', 'ACC (IgnKeyStateACC)' inputs active) till deactivation condition is not satisfied. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7030 | ... |
| 7033 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req5V1** | BCM shall select exterior lights for illumination as per value specified in configuration parameter “Par\_AppLightsModSel”. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7041 | ... |
| 7044 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req6V1** | BCM shall deactivate Approach lights when any of the following conditions is met : 1) Ignition is made ON (IgnKeyStateIGN = Active). 2) Predefined time Approach Light ON Time is elapsed. 3) Approach light request from remote key is received again within predefined Approach Light ON Time. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7052 | ... |
| 7055 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req7V1** | BCM shall not send position light Telltale message to IC when approach light function is activated.  If position light is selected, this has higher priority than approach function. i.e. the position lights telltale shall be activated accordingly. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 7063 | ... |
| 7066 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req8V1** | Follow Me Home light feature shall have higher priority than Approach Light feature. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid BCMs | |
| 14843 | **15.9.2 Remote Access for Connected Car(Approach Lamp):** |
| 14875 | ... |
| 14856 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req9V1** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  -Read Remote Approach ON request(RemoteApprochLmpCmd)over CAN from TCU (Telematics Control Unit) If Remote hazard in request is set(RemoteApprochLmpCmd="1") then, BCM shall turn ON the Approach lamp if it is OFF.  -Publish updated Approach lamp state (ApprochLampState=’1’) after RemoteApprochLmpCmd execution on CAN to TCU (Telematics Control Unit)    If Approach lamp is in On state, discard the Command from TCU (Telematics Control Unit) and publish the Approach lamp state.  - Publish status signal for ApprochLampState   **If Ignition is ON,BCM shall-** - Ignore Approach lamp on request (RemoteApprochLmpCmd) from TCU (Telematics Control Unit). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid with Gateway BCMs | |
| 14864 | ... |
| 14867 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req10V1** | **If Ignition is OFF BCM shall-**  -Wake up as per TML\_NexonEV\_Wake\_Up\_Strategy  -Read Remote Approach OFF request(RemoteApprochLmpCmd)over CAN from TCU (Telematics Control Unit) If Remote hazard in request is not set(RemoteApprochLmpCmd="0") then, BCM shall turn OFF the Approach lamp if is ON.  -Publish updated Approach lamp state (ApprochLampState=’0’) after RemoteApprochLmpCmd execution on CAN to TCU (Telematics Control Unit)    If Approach lamp is in OFF state, discard the Command from TCU (Telematics Control Unit) and publish the Approach lamp state.  - Publish status signal for ApprochLampState    **If Ignition is ON,BCM shall-** - Ignore Approach lamp OFF request (RemoteApprochLmpCmd) from TCU (Telematics Control Unit). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid with gateway BCMs | |
| 14940 | ... |
| 14943 | |  |  | | --- | --- | | **FD\_EL\_NM\_APL:Req11V1** | BCM shall not execute Remote Access-Approach Light command when battery voltage is below 9 volt and when battery voltage is over 16 volt. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Base and Mid with gateway BCMs | |
| 7074 | **15.9.3 Failure Mode** |
| 7077 | |  |  | | --- | --- | | **FD\_EL\_FM\_APL:Req1V1** | If the RF signal fails, BCM shall ignore this input. ***(To be confirmed/updated once RF requirements are finalized)*** | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Base and Mid BCMs | |
| 7088 | **15.10 Safety Level** |
| 7089 | Automotive Safety Integrity Level (ASIL) for Approach Lights: Not applicable for Base and Mid BCMs |
| 7090 | **15.11 Block Diagram** |
| 14965 |  |
| 7092 | **15.12 Inputs** |
| 7095 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | ApprLightReqRF | Request for approach lightX X - - - - - - - - - X | | KeyINSig | Ignition keyX X - 0 1 1 X - - - - - | | IgnKeyStateACC | Ignition keyX X - 0 1 1 X - - - - - | | IgnKeyStateIGN | Ignition keyX X - 0 1 1 X - - - - - | | IgnKeyStateCRANK | Ignition keyX X - 0 1 1 X - - - - - | | RemoteApprochLmpCmd | Approach Lamp ON/OFF request from TCUX X - 0  1 -  -  - -  X - - | | RemoteApprochLmpCmdStatus | Status of RemoteApprochLmpCmdX X - 0 3 -  - - -  X  - - | |
| 7199 | **15.13 Outputs** |
| 7202 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HeadLmpLowBeamRelay | Head Lamp Low Beam RelayX X - 0 1 1 - X - - - - | | PositionLmpCntrlLH | Position Lamp Control leftX X - 0 1 1 - X - - - - | | PositionLmpCntrlRH | Position Lamp Control rightX X - 0 1 1 - X - - - - | | FrRoofLmpCtrl | Front Roof Lamp ControlX X - - - - - - X - - - | | ApprochLampState | Status of Approach lamp as published by BCMX X -  0 1 - - - - X - - | | ApprochLampStateStatus | Status of ApproachLmpTelltaleX X - 0 3 - - - - X - - | |
| 7291 | ... |
| 7294 | |  |  | | --- | --- | | **FD\_EL\_CP\_APL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_AppLightONTime | Predefined ON time for Approach Lightssec 0 240 60 10 - X Yes | | Par\_AppLightsModSel | Lamps used as approach light- 0 - Low beam Light. 1 - Low beam Light & Position Light 2 - Low beam Light, Position Light and Roof Light- 0 2 2 1 X - Yes | | Par\_ApprLightEnable. | Approach Light Function Enable Disable parameter 0 – Disable 1 – Enable- 0 1 1 1 X - Yes | | Par\_UCSEnable | User customization settings. 0: Disable  1: Enable- 0 1 0 1 X - Yes | |
| 7370 | **16 Automatic Headlamp Control Using Light Sensor** |
| 7371 | **16.1 Description** |
| 7372 | The automatic headlamp feature allows activation of headlamps automatically with input from the light sensor based on the ambient light level. |
| 7373 | The light sensors used can be tunnel detection sensors or a rain/light sensor. |
| 7374 | Clear details regarding this function will be provided by BCM during B2 sample software freeze. |
| 7375 | **16.2 Applicable BCM Variants** |
| 7376 | Mid BCM |
| 7377 | **16.3 Operating Conditions** |
| 7378 | **16.3.1 Operating Power Modes for Low beam** |
| 7381 | |  | | --- | | **FD\_EL\_OPM\_AHL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *No Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 13753 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 7415 | **16.3.2 Operating Voltage Range** |
| 7416 | Refer Section 2.1.1 |
| 7417 | **16.3.3 Nominal Power consumption** |
| 7420 | |  |  | | --- | --- | | **FD\_EL\_NPC\_APL:Req2V1** | Nominal power consumption is TBD watts | | **alidation Method** | Component level Testing. | | **Applicable variants** | Mid BCMs | |
| 7428 | **16.3.4 Temperature dependency** |
| 7429 | Refer Section 2.1.2 |
| 7430 | **16.4 Vehicle Example diagram** |
| 7431 |  |
| 7434 | |  |  | | --- | --- | | C: Controller LS: LightSensSig WFM: WprFrntMode IGN: IgnKeyState LD: LightDet | HSW: HeadLmpSelectSwitch LBRAL: LowBeamReqAutoLight PLRAL: PsnLightReqAutoLight | |
| 7436 |  |
| 7437 | **16.5 Response Time** |
| 7438 | Refer Section 2.2 |
| 7439 | **16.6 Assumptions** |
| 7440 | None |
| 7441 | **16.7 Hardware/Software** |
| 7442 | Hardware: Light sensor, lights |
| 7443 | Software: ECU software |
| 7444 | **16.8 HMI commodities** |
| 7447 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | Head Lights | |
| 7452 | **16.9 Behavior Modes** |
| 7453 | **16.9.1 Normal Mode** |
| 7456 | |  |  | | --- | --- | |  |  | |
| 7458 | ... |
| 7461 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req1V1** | BCM shall publish Auto mode selection message on LIN to inform light sensor module when auto mode is selected. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7469 | ... |
| 7472 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req2V1** | BCM shall activate Low beam and position lights when all of the following conditions are met:  1)    Ignition is RUN/CRANK position 2)    Auto Mode is selected. 3)    Light sensor detects dark.  The specific details of the light sensor information/implementation details will be shared in the communication matrix and sensor specifications.    **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode.  BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | | **FD\_EL\_NM\_AHL:Req3V1** | BCM shall deactivate Low beam and position lights when any of the following conditions is met:  1) Ignition is other RUN/CRANK position  2) Auto Mode is not selected. 3) Light sensor detects light.  The specific details of the light sensor information/implementation will be shared in the communication matrix and sensor specifications.  **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode.  BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7489 | ... |
| 7492 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req4V1** | If Low beam and position lights are active in auto mode and ignition is turned to OFF or ACC, then BCM shall deactivate these lights after preconfigured time (Par\_AutoOffDelayTime). | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7500 | ... |
| 7503 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req5V1** | When activation condition (Req2) satisfies, BCM shall always activate Low beam and position lights irrespective of activation of low beam / high beam switch. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7511 | ... |
| 7514 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req6V1** | Manual override: When low beam is made ON based on the information from light sensor, if the high beam switch is made on by the user, then both low beam and main beam shall be made on. During this condition if high beam switch is made OFF, the lighting function shall work based on light sensor input. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7522 | ... |
| 7525 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req7V1** | When low beam and position lights are ON in auto mode when high beam switch signal was already activated, BCM shall not activate High beam. If switch is moved from high beam position to low beam and then again in high beam, then BCM shall activate High beam and Low beam shall not be deactivated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7533 | ... |
| 7536 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req8V1** | When low beam and position lights are ON in auto mode when flash to pass switch signal was already activated, BCM shall not activate High beam. If switch is moved from flash to pass position to low beam and then again in flash to pass, then BCM shall activate High beam and Low beam shall not be deactivated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7544 | ... |
| 7547 | |  |  | | --- | --- | | **FD\_EL\_NM\_AHL:Req9V1** | When ML switch is moved out off Auto position (headlamps on due to Night condition), and Off/position contact is received then BCM shall wait for predefine time "par\_MLsAutoOffTransitionDelay" for confirming the OFF/Position contact and shall keep the lights ON for "par\_MLsAutoOffTransitionDelay" time. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 7555 | **16.9.2 Failure Mode** |
| 7558 | |  |  | | --- | --- | | **FD\_EL\_FM\_AHL:Req1V1** | If light sensor signal fails auto light functionality shall not work. Malfunction message on CAN shall be sent to IC. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Diagnostics requirement** | Shall be filled once design is frozen | | **Applicable variants** | Mid BCMs | |
| 7569 | **16.10 Safety Level** |
| 7570 | Automotive Safety Integrity Level (ASIL) for Approach Lights: Not applicable for Base and Mid BCMs |
| 7571 | **16.11 Block Diagram** |
| 7572 |  |
| 7573 | **16.12 Inputs** |
| 7576 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | LowBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | IgnKeyStateIGN | Ignition KeyX X - 0 1 1 - X - - - - | | IgnKeyStateCRANK | Ignition KeyX X - 0 1 1 - X - - - - | | MLFailsafeSwitchSig | Master Light Fail safe Switch Signal- X - 0 1 1 - X - - - - | | MainBeamSwitchSig | Low Beam Switch Signal- X - 0 1 1 - X - - - - | | LightSensSig | Light Sensor Signal- X - 0 20 1 - - - - X - | | AutoLightONSig | Auto lamp signalX X - - - - - X - - - - | |
| 7710 | **16.13 Outputs** |
| 7713 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | AutoLightONSig | Auto lamp signalX X - - - - - - - - X - | | HeadLmpLowBeamRelay | Head Lamp Low Beam RelayX X - 0 1 1 - X - - - - | | PositionLmpCntrlLH | Position Lamp Control leftX X - 0 1 1 - X - - - - | | PositionLmpCntrlRH | Position Lamp Control rightX X - 0 1 1 - X - - - - | | HeadLmpHighBeamRelay | Front Roof Lamp Control- X - - - - - X - - - - | | LowBeammalFnTelltale | Telltale for low beamX X - - - - - - - X - - | | HighBeamTelltale | Telltale for low beamX X - - - - - - - X - - | | AutoLightONSig | Auto light signalX X - 0 1 1 - X - - - - | | LightSensMalFn | Malfuntional for Light sensor- X - - - - - - - X - - | |
| 7877 | **16.14 Configurable Parameters** |
| 7880 | |  |  | | --- | --- | | **FD\_EL\_CP\_AHL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_AutoOffDelayTime | Light ON time after IGN is made OFFSec 0 3 3 1 x - Yes | | Par\_MLsAutoOffTransitionDelay | Autoheadlamp ON time When ML switch is moved out off Auto positionmsec 0 1000 500 10 X - Yes | | Par\_AutoHeadlmpSel | Auto headlamp configuration, 0 - Disable 1 - Enable- 0 1 0 1 X - Yes | |
| 8007 | **17 Day time running lights** |
| 8008 | **17.1 Description** |
| 8009 | This feature is used to increase the visibility of the vehicle to other drivers during daytime. The daytime running lights are positioned on the front of the vehicle. For safety benefit, daytime running light is compulsory in many countries. |
| 8010 | **17.2 Applicable BCM Variants** |
| 8011 | Mid BCM |
| 8012 | **17.3 Operating Conditions** |
| 8013 | **17.3.1 Operating Power Modes** |
| 8016 | |  |  | | --- | --- | | **FD\_EL\_OPM\_DRL:Req1V1** |  | | **Power mode** | **Functionality** | | Transport Park | No function | | Transport Drive | Full function | | Transport Drive Crank | Full function | | Transport Drive Run | Full function | | Battery save | No function | | Stand-By | No function | | Awake | No function | | Accessory Delay | No function | | Accessory | No function | | Active | Full function | | *Run/Normal Run \** | Full function | | *Energy Recuperation Run \*\** | Full function | | *Limited Load Run \*\** | Full function | | Start/Crank | Full function | |
| 13760 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 8054 | **17.3.2 Operating Voltage Range** |
| 8055 | Refer Section 2.1.1 |
| 8058 | **17.3.3 Nominal Power consumption** |
| 8062 | |  |  | | --- | --- | | **FD\_EL\_NPC\_DRL:Req1V1** | Nominal power consumption is approximately 48.144 watts | | **Validation Method** | Component level Testing. | | **Applicable variants** | Mid BCMs | |
| 8070 | **17.3.4 Temperature dependency** |
| 8071 | Refer Section 2.1.2 |
| 8072 | **17.4 Vehicle example diagram** |
| 8073 |  |
| 8078 | C: Controller (BCM) IGN: IgnKeyState HSWS: HeadLmpSelectSwitchState LS: LightSensSig DLIL: DRlLmpInhibLH    LDRL: DRlLmpCtrlLH RDRL: DRlLmpCtrlRH IC: Instrument Cluster (DRL tell tale) DRF: DrlReqFollowMeHome  DLIR: DRlLmpInhibRH |
| 8079 | **17.5 Response Time** |
| 8080 | Refer Section 2.2 |
| 8081 | **17.6 Assumptions** |
| 8082 | None |
| 8085 | **17.7 Hardware/Software** |
| 8086 | Hardware: Lights, Master Light Switch/Combination Switch Software: ECU software |
| 8087 | **17.8 HMI commodities** |
| 8101 | |  |  | | --- | --- | | **Commodity** | **Remarks** | | Light | DRL | | Switches | Master Light Switch / Combination Switch | |
| 8110 | **17.9 Behaviour Mode** |
| 8111 | **17.9.1 Normal Mode** |
| 8112 | ... |
| 8115 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req1V1** | DRL feature shall be available if Par\_DRlEnable is Enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8123 | ... |
| 8126 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req2V1** | The DRL shall be activated when all of the following conditions are met:  1. Ignition is in ON position (if Par\_DRlOnIGnOn is enable) OR Ignition switch is Run mode (if Par\_DRlOnIGnOn is disable) 2. Headlamps and position lamps are OFF. 3. Automatic switching ON of DRL is not de-activated (Req ID - 10670 & 10681) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8134 | ... |
| 8147 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req3V1** | The DRL shall be deactivated automatically when any of the following condition satisfies: 1. Headlamp is ON. 2. Position lamps are ON. 3. Engine is not running if Par\_DRlOnIGnOn is disable. 4. Ignition is not in ON / Crank position if Par\_DRlOnIGnOn is enable.  **For Nexon EV strategy-** BCM shall identify the vehicle power mode as "Run" when it recieves any of the following VCU power modes-Normal Run,Energy Recuperation,Limited power mode  BCM shall identify the vehicle power mode as "Crank" when it recieves Hardwired Crank signal OR  Crank state published on CAN by VCU(VcuPowerMode=0X02) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8155 | ... |
| 8158 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req4V1** | BCM shall activate and deactivate DRL with preconfigured ramp up and ramp down time (Par\_DRlRampUpTime & Par\_DRlRampDownTime) respectively if Par\_DRlRampEnable is enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8166 | ... |
| 8169 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req5V1** | BCM shall send CAN message to Instrument cluster to operate telltale as long as the DRL is activated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8177 | ... |
| 8180 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req6V1** | If Par\_DRlDropOutReg is enabled, then If the turn indicator of one side is activated then the DRL of the same side shall be switched OFF immediately. The DRL shall come ON again immediately when the turn indicator is made OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12746 | ... |
| 12749 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req6V2** | If Par\_DRlDropOutReg is enabled and Par\_DedicatedDrLConfig=0(combined with position lamp) , then if indicator of one side or Hazard lamp is activated, then either of the two- DRL or position lamp(whichever is ON) of the same side shall be switched OFF immediately. The Lamp which was active before(Position or DRL) shall get activated again immediately when the turn indicator or Hazard Lamp is made OFF. DTC's shall not get logged when DRL or Position lamps are turned OFF. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8188 | ... |
| 8191 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req7V1** | When the headlamp auto mode (using light sensor) is selected and if light sensor detects the day mode, the DRL shall be activated if activation conditions in Req. 2 above satisfies. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8659 | ... |
| 8682 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req8V1** | If Same lamps are used for DRL as well as front position lamps (Par\_DedicatedDrLConfig), then BCM shall activate lamps with more duty cycle (Par\_DRLDutyCycleConfig) for DRL and with less duty cycle (Par\_PLDutyCycleConfig) for position lamps. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8690 | ... |
| 8693 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req9V1** | DRL shall not go off when flash to pass is activated. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 10670 | ... |
| 10673 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req10V2** | **DRL Automatic Switching ON De-activation -** 1. If Par\_DRlOnIGnOn == 1 (DRL comes ON with Ign ON and Engine Run) then, when the power mode state is ACTIVE (IGN ON) or RUN (Engine is running) and the DRL are ON, if any of below transitions is detected two times within three seconds OR both transition are detected once within three seconds, DRL shall be deactivated. A) OFF -> Position ON input -> OFF  B) OFF -> Position ON input -> Headlamp ON input -> Position ON input -> OFF  2. If Par\_DRlOnIGnOn == 0 (DRL comes ON with Engine Run only) then, when the power mode state is RUN (Engine is running) and the DRL are ON, if any of below transitions is detected two times within three seconds OR both transition are detected once within three seconds, DRL shall be deactivated. A) OFF -> Position ON input -> OFF  B) OFF -> Position ON input -> Headlamp ON input -> Position ON input -> OFF  (Please refer below table . ID-11550 for more detail) The position lamps shall be made ON/OFF during above said switch operation. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 10681 | ... |
| 10684 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req11V2** | **DRL Automatic Switching ON Activation -**  1. If Par\_DRIONIGnOn == 1 (DRL comes ON with Ign On and Engine Run), when the power mode state is ACTIVE (IGN ON) or RUN (Engine is running) and the DRL are OFF, if any of below transitions is detected two times within three seconds OR both transition are detected once within three seconds, DRL shall be activated. A) OFF -> Position ON input -> OFF  B) OFF -> Position ON input -> Headlamp ON input -> Position ON input -> OFF   2. If Par\_DRIONIGnOn == 0 (DRL comes ON with Engine Run only), when the power mode state is RUN (Engine is running) and the DRL are OFF,if any of below transitions is detected two times within three seconds OR both transition are detected once within three seconds, DRL shall be activated. A) OFF -> Position ON input -> OFF  B) OFF -> Position ON input -> Headlamp ON input -> Position ON input -> OFF . (Please refer below table . ID-11550 for more detail) The position lamps shall be made ON/OFF during above said switch operation. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 11550 | **17.9.1.13 DRL Activation / Deactivation Logic** |
| 11553 | |  |  | | --- | --- | | First Transition | Second TransitionDRL Activation /De-activation | | A | AEnable | | B | BEnable | | A | BEnable | | B | AEnable | |
| 10692 | ... |
| 10695 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req12V1** | If user de-activated the automatic switching ON activation of DRL then it shall not be activated again until user activates it.  Automatic switching ON activation or deactivation state shall be memorised by BCM and DRL functionality shall work as per the memorised state. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12220 | ... |
| 12223 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req13V2** | BCM shall calculate DRL threshold for STG, STB or Open based on ~~Par\_DRLWattageType and~~ loads associated with the parameter value. ( Refer below table). There shall not be off-state diagnostics on DRL output pins. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12182 | **17.9.1.16 Loads based on Par\_LmpWattageVehicleTypeSel are as follows:** |
| 12185 | |  |  | | --- | --- | | **Par\_LmpWattageVehicleTypeSel** | **Left DRL lampRight DRL lamp** **Platform / Remarks** | | 0 | 12 W 12 W  Bolt / Zest / Tiago | | 2 | 18 W 18 W Nexon | | 3 | 11W11W Q501- high | | 4 | --  Q501 - low | | 5 | 10W10W X451-high | | 6 | 10W10W X451-low | | 7 | 9.5w 9.5w X445-high | | 8 | -- X445-low | | 9 | 11W11W Q502-high | | 10 | 11W11W Q502-low | | 11 | 10W10W Nexon MCE | | 12 | 10W10W  Nexon EV | | 13 | 7.7W7.7W Tiago/Tigor MCE | |
| 14776 | **Note for Nexon EV**-DRL wattage shall be same as that of Nexon MCE. |
| 12564 | ... |
| 12567 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req14V1** | DRL lamp load compensation shall be applicable based on parameter “Par\_DRLVoltCompensation” configuration as follows 1.If “Par\_DRLVoltCompensation= Enable” then, BCM shall apply the voltage compensation to drive the DRL lamp load. 2.If “Par\_DRLVoltCompensation = Disable” then, BCM shall not apply the voltage compensation to drive the DRL lamp load. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12877 | ... |
| 12880 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req15V1** | If BCM User customization setting for DRL is disabled(HuDRLActiveSignalVal=0),then the corresponding telltale shall be OFF(DRLTelltale =0) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 12914 | ... |
| 12917 | |  |  | | --- | --- | | **FD\_EL\_NM\_DRL:Req16V1** | If the Par\_LmpWattageVehicleTypeSel= 03(Q501 High end), 1)Diagnostics(STB only) of left side DRL need not be monitored/logged when left side turn indicator/Hazard lamp is ON.  2)Diagnostics(STB only) of right side DRL need not be monitored/logged when right side turn indicator/Hazard lamp is ON.  This condition will be applicable if DRL were ON before turning ON the turn indicator lamp. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 9024 | **17.9.2 Failure Mode** |
| 9025 | ... |
| 9038 | |  |  | | --- | --- | | **FD\_EL\_FM\_DRL:Req1V1** | If both of DRL output fail or lamps fail, BCM shall send a CAN message to the Instrument Cluster to deactivate telltale. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCM | |
| 8211 | **17.10 Safety Level** |
| 8212 | Automotive Safety Integrity Level (ASIL): Not applicable for Mid BCM |
| 8213 | **17.11 Block Diagram** |
| 8214 |  |
| 8215 | **17.12 Inputs** |
| 8218 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy**  **Types** | |  | **Base**  **Mid**          **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | IgnKeyStateIGN | State of the ignition keyX X \_ 0 1 1 - X \_ \_ \_ \_ | | LowBeamSwSig | Low Beam Switch Signal\_ X \_ 0 1 1 - X \_ \_ \_ \_ | | HeadLampONSig | Head Lamp ON SignalX X \_ 0 1 1 - X \_ \_ \_ \_ | | HighBeamSwSig | High Beam Switch Signal\_ X \_ 0 1 1 - X \_ \_ \_ \_ | | AutoLightONSig | Auto light signal\_ X \_ 0 1 1 - X \_ \_ \_ \_ | | TurnLHSwSig | Turn Left Switch SignalX X \_ 0 1 1 - X \_ \_ \_ \_ | | TurnRHSwSig | Turn Left Switch SignalX X \_ 0 1 1 - X \_ \_ \_ \_ | |
| 8367 | **17.13 Outputs** |
| 8370 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min Value** **Max Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | DRLPositionLmpCtrlLH | Left Daytime Running Light Control\_ X \_ \_ \_ \_ \_ \_ X \_ \_ \_ | | DRLPositionLmpCtrlRH | Right Daytime Running Light Control\_ X \_ \_ \_ \_ \_ \_ X \_ \_ \_ | | DRlTellTale | DRl Telltale\_ X \_ \_ \_ \_ \_ \_ \_ X \_ \_ | | DRlTelltaleStatus | DRl Telltale Status\_ X \_ \_ \_ \_ \_ \_ \_ X \_ \_ | |
| 8429 | **17.14 Configurable Parameters** |
| 8546 | |  |  | | --- | --- | | **FD\_EL\_CP\_DRL\_Req1V1:** |  | | **Name** | **DescriptionUnit**  **Min Value** **Max Value** **Default Value** **Resolution** **Change By**   **Access Condition** | |  | **EOL** **Service** | | Par\_DedicatedDrLConfig | 0: Combined with position Lamp 1: Dedicated DRL\_ 0 1 0 1 X \_ Yes | | Par\_DRLDutyCycleConfig | 0-100 duty cycle% 0 100 50 1 X \_ Yes | | Par\_PLDutyCycleConfig | 0-100 duty cycle% 0 100 10 1 X X X | | Par\_DRlEnable | DRL Enable / Disable 0 – Disable 1 - Enable\_ 0 1 0  1 X \_ Yes | | Par\_DRLVoltCompensation | DRL voltage compensation control Parameter  0 - Disable 1 - Enable- 0 1 0 1 X X Yes | | Par\_DRlRampEnable | DRL with or without ramp up/down 0 – without ramp up/down 1 – with ramp up/down\_ 0 1 0 1 X \_ Yes | | Par\_DRlRampUpTime | Ramp up timeSec 1 60 10 1 X \_ Yes | | Par\_DRlRampDownTime | Ramp down timeSec 1 60 10 1 X \_ Yes | | Par\_DRlOnIGnOn | DRL on Ignition ON. 1 - DRL comes ON with Ign On and Engine Run (Enable) 0 - DRL comes ON with Engine Run only (Disable)- 0 1 1 1 X \_ Yes | | Par\_DRlDropOutReg | Drop Out regulation for DRL 1 - Enable 0 - Disable- 0 1 0 1 X - Yes | | ~~Par\_DRLWattageType~~ | ~~DRL wattage type~~- ~~0~~ ~~255~~ ~~0~~ 1 X - Yes | |
| 19110 | **18 Harrier / Safari MCE2 (Power Wattage)** |
| 19125 |  |
| 19189 | **19 High Beam Assist (HBA) ADAS Function** |
| 19190 | **19.1 Description** |
| 19193 | HBA system automatically switches the headlight settings (High beam ON/OFF) depending on surrounding environment (preceding or approaching vehicle, dark environment) |
| 19191 | **19.2 Applicable BCM Variants** |
| 19192 | Mid BCM |
| 19194 | **19.3 Operating Power Modes** |
| 19197 | |  | | --- | | **FD\_EL\_OPM\_AHL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *No Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 19237 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 19238 | **19.4 Behavior Modes** |
| 19239 | **19.4.1 Normal Mode** |
| 19265 | ... |
| 19257 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req1V1** | BCM shall activate HBA mode when all of the following conditions satisfies:  Vehicle is in Ignition ON / RUN mode Par\_HighBeamAssistFunction is Enable HbaOnOffState signal is ON BcmHbaFaultState signal is at No Fault | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19585 | ... |
| 19610 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req2V1** | BCM shall deactivate HBA mode when any of the following conditions satisfies:  Vehicle is not in Ignition ON / RUN mode  Par\_HighBeamAssistFunction is Disable  HbaOnOffState signal is OFF/ Not Present BcmHbaFaultState signal is at System Fault state | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19597 | ... |
| 19600 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req3V1** | BCM shall transmit following signal to Front Camera Module (FCM) for its internal processing through ESP gateway  LightSensActive LightSensActiveStatus HighBeamTelltale HighBeamTelltaleStatus  NOTE: Refer Requirement from FD\_EL\_NM\_AHL:Req1V1 to FD\_EL\_NM\_AHL:Req9V1 for automatic headlamp control using light sensor | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19586 | ... |
| 19589 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req4V1** | BCM shall publish HighBeamState signal as High Beam Input ON only when User operate Highbeam manually (not highbeam lamp state). BCM shall publish HighBeamState signal as High Beam Input OFF state for any auto highbeam operating conditions like HighBeam ON/OFF due to HBA feature, Light sensor | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19701 | ... |
| 19704 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req5V1** | When HBA mode is ON, BCM shall turn OFF HighBeam if it receives HbaStates signal as “HBA ON & High Beam OFF” and corresponding Highbeam telltale state should get updated on vehicle CAN network for partner ECU | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19712 | ... |
| 19715 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req6V1** | BCM shall turn ON HighBeam when it receives HbaStates signal as “HBA ON & High Beam ON” and corresponding Highbeam telltale state should get updated on vehicle CAN network for partner ECU | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19734 | ... |
| 19737 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req7V1** | In case of user intervention (Flash to pass, park, Low beam ON, Auto OFF), BCM shall override Headlight control request from FCM and control the head lamp as per user input | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19745 | ... |
| 19748 | |  |  | | --- | --- | | **FD\_EL\_NM\_HBA:Req8V1** | BCM shall publish BcmHbaFaultState signal state as “No fault” in normal operating mode when there are no fault conditions | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19856 | **19.4.2 Failure Mode** |
| 19240 | ... |
| 19243 | |  |  | | --- | --- | | **FD\_EL\_FM\_HBA:Req1V1** | BCM shall disable HBA mode in case of Fault/Inhibit condition like BCM unable to control the lamps/ Internal fault with BCM/lamp fault state and update BcmHbaFaultState signal state as System Fault | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19723 | ... |
| 19726 | |  |  | | --- | --- | | **FD\_EL\_FM\_HBA:Req2V1** | BCM will log DTC when HbaStates signal state is “HBA System failure” | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19857 | ... |
| 19860 | |  |  | | --- | --- | | **FD\_EL\_FM\_HBA:Req3V1** | If BCM does not receive signals from FCM via ESP gateway till 500 msec (TBD), then it shall log MTO DTC against FCM. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 19267 | **19.5 Safety Level** |
| 19771 | Automotive Safety Integrity Level (ASIL): BCM shall support QM requirement for the HBA functionality for Mid BCM |
| 19254 | **19.6 Block Diagram** |
| 19787 |  |
| 19268 | **19.7 Inputs** |
| 19271 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HbaOnOffState | HBA enable/disable signal to enter and exit from HBA mode 0 - OFF     1 - ON     2 - Not Present     3 - ReservedX X - 0 3 1 - X - X - - | | HbaStates | This signal indicates the HBA system states 0 - HBA OFF     1 - HBA ON & High Beam OFF     2 - HBA ON & High Beam O     3 - HBA System failure    X X - 0 3 1 - X - X - - | |
| 19405 | **19.8 Outputs** |
| 19408 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HighBeamState | It indicates the status of input of High Beam switch 0 - High Beam Input OFF         1 - High Beam Input ON- X - 0 1 1 - X - X \_ - | | BcmHbaFaultState | It indicates any failure state in BCM for HBA control 0 - No fault     1 - System Fault- X - 0 1 1 - X - X - - | | HighBeamTelltale | the high beam tell-tale when the high beam lamp is active 0 - High Beam OFF 1 - High Beam ON- X - 0 1 1 - X - X - - | | HighBeamTelltaleStatus | Status of the High Beam Telltale 0 - Plausible      1 - Reserved for future use.     2 - Reserved for future use.     3 - signal HighBeamTelltale Not Available- X - 0 3 1 - X - X - - | | LightSensActive | When an auto light switch is on then BCM shall communicate the light sensor ON status signal LightSensorActive over CAN  0 - No activation of light sensor     1 - Light sensor is activated- X - 0 1 1 - X - X - - | | LightSensActiveStatus | Status of the Light sensor active 0 - Plausible      1 - Reserved for future use.     2 - Reserved for future use.     3 - signal LightSensActive Not Available- X - 0 3 1 - X - X - - | | HeadLmpHighBeamRelay | Highbeam control - X - 0 1 1 - X - - - - | |
| 19788 | **19.9 Configurable Parameters** |
| 19791 | |  |  | | --- | --- | | **FD\_EL\_CP\_AHL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_HighBeamAssistFunction | HBA feature enable/disable 0 - Disable 1 - Enable- 0 1 - 1 x - Yes | |
| 19266 | **20 Autonomous Emergency Braking (AEB) ADAS Function** |
| 20040 | **20.1 Description** |
| 20041 | The AEB is a system to prevent collision by performing emergency braking in a collision hazard situation by using the information of the relative distance, relative speed, and position in the lane to the preceding vehicle and the pedestrian received from sensor (Radar, Camera), which helps to prevent accidents. |
| 20042 | **20.2 Applicable BCM Variants** |
| 20043 | Mid BCM |
| 20044 | **20.3 Operating Power Modes** |
| 20047 | |  | | --- | | **FD\_EL\_OPM\_AHL:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *No Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *No Function* | |
| 20087 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 20088 | **20.4 Behavior Modes** |
| 20089 | **20.4.1 Normal Mode** |
| 20090 | ... |
| 20093 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req1V1** | BCM shall activate AEB mode when all of the following conditions satisfies:  Vehicle is in Ignition ON / RUN mode Par\_AutonomousEmergencyBrakingFunction is Enable FcwAebOnOffState signal is 1 - ON (FCW/AEB) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20101 | ... |
| 20104 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req2V1** | BCM shall deactivate AEB mode when any of the following conditions satisfies:  Vehicle is not in Ignition ON / RUN mode  Par\_AutonomousEmergencyBrakingFunction is Disable  FcwAebOnOffState signal is OFF/ Not Present/ON (FCW) | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20112 | ... |
| 20115 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req3V1** | BCM shall monitor following received signal from ESP during Active braking for switching ON/OFF brake lamp (including CHMSL) signals  BrkLightSig2 BrkLightSig2Status  NOTE:Refer Requirementfrom **FD\_EL\_NM\_BL:Req1V4** to **FD\_EL\_NM\_BL:Req9V1** for Brake lamp control and **FD\_EL\_NM\_CHMSL:Req1V1** to **FD\_EL\_NM\_CHMSL:Req6V2** for CHMSL control | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20134 | ... |
| 20137 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req4V1** | BCM shall flash the hazard lights till the time it receives  AebWarnCmdFcm signal state as Full brake Active or Stop Request. Corresponding Left/Right Turn lamp telltale state should get updated on vehicle CAN network for partner ECU  Note: Refer **section 4.3.7 Emergency Braking Hazard function from** **FD\_EL\_NM\_HzEBL:Req1V4 to** **FD\_EL\_NM\_HzEBL:Req6V1** requirement for frequency of hazard light and further details | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20145 | ... |
| 20148 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req5V1** | All brake lamps, including the CHMSL, shall illuminate within 350 ms of input (BrkLightSig2, BrkLightSig2Status) from ESP | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20156 | ... |
| 20159 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req6V1** | Once illuminated, all lamps shall stay ON till the time signal is available for at least 1 second (whichever comes later), to avoid flickering. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20167 | ... |
| 20170 | |  |  | | --- | --- | | **FD\_EL\_NM\_AEB:Req7V1** | Requirements **FD\_EL\_NM\_AEB:Req5V1 & FD\_EL\_NM\_AEB:Req6V1** are applicable only when AebWarnCmdFcm signal state is Partial Brake Active OR Full Brake Active OR Stop Request | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20178 | **20.4.2 Failure Mode** |
| 20179 | ... |
| 20182 | |  |  | | --- | --- | | **FD\_EL\_FM\_AEB:Req1V1** | If BCM does not receive signals from FCM via ESP gateway till 500 msec (TBD), then it shall log MTO DTC against FCM. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20212 | **20.5 Safety Level** |
| 20213 | Automotive Safety Integrity Level (ASIL): BCM shall support QM requirement for the AEB functionality for Mid BCM |
| 20214 | **20.6 Block Diagram** |
| 20215 |  |
| 20216 | **20.7 Inputs** |
| 20219 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | FcwAebOnOffState | It indicates the AEB feature's On/Off State 0 - OFF     1 - ON(FCW/AEB)     2 - Not Present     3 - ON (FCW)- X - 0 3 1 - X - X - - | | AebWarnCmdFcm | AEB warning command (prefill, partial braking, full braking) 0 - Not Active     1 - Prefill Active     2 - Partial Brake Active     3 - Full Brake Active     4 - Stop Request     5-7 - Reserved    - X - 0 7 1 - X - X - - | | BrkLightSig2 | Brake status signal from ABS/ESP 0 - No request of Brake lamp  1 - Brake lamp on request 2 - Panic Brake detect     3 - Reserved for future use- X - 0 3 1 - X - X - - | | BrkLightSig2Status | Status of the Brake Light 0 - Plausible signal     1 - Reserved for future use 2 - Implausible     3 - signal BrkLightSig2 Not Available    - X - 0 3 1 - X - X - - | |
| 20278 | **20.8 Outputs** |
| 20281 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | TurnLHTelltale | the turn left tell-tale when the left side indicator lamp is active 0 - LH Turn Indicator OF     1 - LH Turn Indicator ON- X - 0 1 1 - X - X \_ - | | TurnLHTelltale Status | Status of the TurnLHTelltale signal  0 - Plausible          1 - Reserved for future use 2 - Reserved for future use 3 - signal TurnLHTelltale Not Available- X - 0 3 1 - X - X - - | | TurnRHTelltale | the turn right tell-tale when the right side indicator lamp is active 0 - RH Turn Indicator OF     1 - RH Turn Indicator ON- X - 0 1 1 - X - X - - | | TurnRHTelltale Status | Status of the TurnRHTelltale signal 0 - Plausible          1 - Reserved for future use 2 - Reserved for future use 3 - TurnRHTelltaleStatus signal Not Available    - X - 0 3 1 - X - X - - | | TurnLHInd | Left Turn SignalX X - - - - - - X - - - | | TurnRHInd | Right Turn SignalX X - - - - - - X - - - | | BrakeLmpSigRH | Brake light signalX X - 0 1 1 - X - - - - | | BrakeLmpSigLH | Brake light signalX X - 0 1 1 - X - - - - | |
| 20415 | **20.9 Configurable Parameters** |
| 20418 | |  |  | | --- | --- | | **FD\_EL\_CP\_AHL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_AutonomousEmergencyBrakingFunction | AEB feature enable/disable 0 - Disable 1 - Enable- 0 1 - 1 x - Yes | |
| 20561 | **21 DOOR Open Alert (DOA) Rear ADAS Function** |
| 20562 | **21.1 Description** |
| 20565 | DOA system warns the passengers in the car about the presence of approaching vehicles from behind which may hit the door while opening. DOA shall be operational till 3 minutes after Ignition OFF |
| 20563 | **21.2 Applicable BCM Variants** |
| 20566 | Mid BCM |
| 20567 | **21.3 Operating Power Modes** |
| 20570 | |  | | --- | | **FD\_EL\_OPM\_DOA:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Battery save* | *Full Function* | | *Stand-By* | *No Function* | | *Awake* | *Full Function* | | *Accessory Delay* | *Full Function* | | *Accessory* | *Full Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 20610 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 20564 | **21.4 Behaviour Modes** |
| 20611 | **21.4.1 Normal Mode** |
| 20613 | ... |
| 20616 | |  |  | | --- | --- | | **FD\_EL\_NM\_DOA:Req1V1** | BCM shall activate DOA mode when all of the following conditions satisfies:  Vehicle operating in above mention power modes with full functionality Par\_DoorOpenAlertFunction is Enable DoaOnOffState signal is ON DoaStates signal is System On | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21398 | ... |
| 21401 | |  |  | | --- | --- | | **FD\_EL\_NM\_DOA:Req2V1** | BCM shall deactivate HBA mode when any of the following conditions satisfies:  Vehicle operating in above mention power modes with Nol functionality  Par\_DoorOpenAlertFunction is Disable  DoaOnOffState signal is at System Off or Not Present State DoaStates signal is System OFF or Not Supported | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21409 | ... |
| 21412 | |  |  | | --- | --- | | **FD\_EL\_NM\_DOA:Req3V1** | DOA shall publish wakeup signal to BCM till 3 minutes after Ignition OFF to keep DOA ifunctionality operational  Note:- Form Q5 MCE onwards, two BCM pins shall be added for further functionality of DOA feature | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21036 | ... |
| 21039 | |  |  | | --- | --- | | **FD\_EL\_NM\_DOA:Req4V1** | BCM shall publish following required signals when DOA functionality is operational  DoorStateDrvr\_100ms DoorStateDrvrStatus\_100ms DoorStatePass\_100ms DoorStatePassStatus\_100ms DoorStateRearLH\_100ms DoorStateRearLHStatus\_100ms DoorStateRearRH\_100ms DoorStateRearRHStatus\_100ms VehicleLOckState | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20624 | **21.4.2 Failure Mode** |
| 20612 | **21.4.2.1 None** |
| 20625 | **21.5 Safety Level** |
| 20626 | Automotive Safety Integrity Level (ASIL): BCM shall support QM requirement |
| 20627 | **21.6 Block Diagram** |
| 20628 |  |
| 20629 | **21.7 Inputs** |
| 20632 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | DoaOnOffState | This signal indicates the presence of Rear Radar featureX X - 0 3 1 - X - X - - | | DoaWarnLeft | DOA Left indicator warningX X - 0 3 1 - X - X - - | | DoaWarnRight | DOA Right indicator warningX X - 0 3 1 - X - X - - | | DoaStates | This signal indicates the states of DOAX X - 0 3 1 - X - X - - | |
| 20691 | **21.8 Outputs** |
| 20694 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | DoorStateDrvr\_100ms | Driver door switch state from BCM X X - 0 1 1 - X - X - - | | DoorStateDrvrStatus\_100ms | DoorStateDrvr valid Status    X X - 0 3 1 - X - X - - | | DoorStatePass\_100ms | Co-Driver door switch state from BCM X X - 0 1 1 - X - X - - | | DoorStatePassStatus\_100ms | DoorStatePass valid StatusX X - 0 3 1 - X - X - - | | DoorStateRearLH\_100ms | Rear left side door switch state from BCMX X - 0 1 1 - X - X - - | | DoorStateRearLHStatus\_100ms | DoorStateRearLH valid StatusX X - 0 3 1 - X - X - - | | DoorStateRearRH\_100ms | Rear right side door switch state from BCMX X - 0 1 1 - X - X - - | | DoorStateRearRHStatus\_100ms | DoorStateRearRH valid StatusX X - 0 3 1 - x - X - - | | VehicleLockState | Vehicle central lock state signal from BCM to PEPS ECU 0 - Reserved for future use 1 - Externally Locked 2 - Internally Locked 3 - Unlocked 4 - Crash Unlocked 5 - Reverse Unlock 6 - TCU Locked 7 - TCU Unlockedx x - 0 7 1 - x - x - - | |
| 20873 | **21.9 Configurable Parameters** |
| 20876 | |  |  | | --- | --- | | **FD\_EL\_CP\_AHL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_DoorOpenAlertFunction | Door Open Alert Function 0 - Disable 1 - Enable- 0 1 - 1 x - Yes | |
| 20919 | **22 Rear Collision Warning (RCW) Rear ADAS Function** |
| 20920 | **22.1 Description** |
| 20921 | RCW uses sensors on the rear of the vehicle to identify potential collision risks from back of the vehicle, warn the driver of the target vehicle of identified collision risks by flashing the hazard lights of host vehicle |
| 20922 | **22.2 Applicable BCM Variants** |
| 20923 | Mid BCM |
| 20924 | **22.3 Operating Power Modes** |
| 20927 | |  | | --- | | **FD\_EL\_OPM\_RCW:Req1V1** |  |  |  | | --- | --- | | **Power mode** | **Functionality** | | *Transport Park* | *No Function* | | *Transport Drive* | *Full Function* | | *Battery save* | *No Function* | | *Stand-By* | *No Function* | | *Awake* | *No Function* | | *Accessory Delay* | *No Function* | | *Accessory* | *No Function* | | *Active* | *Full Function* | | *RunRun/Normal Run \** | *Full Function* | | *Energy Recuperation Run \*\** | *Full Function* | | *Limited Load Run \*\** | *Full Function* | | *Start/Crank* | *Full Function* | |
| 20967 | **NOTE :**  \* - BCM should publish Run power mode to other ECU’s as received from VCU/EMS ECU.     \*\* - BCM should publish Run power mode to other ECU’s as received from VCU ECU.     BCM will publish Run power mode, while VCU published Normal Run/ Energy Recuperation Run/Limited Load Run.     Functionality will work as expected in Run mode. If needed will be changed in future with respect to RUN power mode. |
| 20968 | **22.4 Behavior Modes** |
| 20969 | **22.4.1 Normal Mode** |
| 20970 | ... |
| 20973 | |  |  | | --- | --- | | **FD\_EL\_NM\_RCW:Req1V1** | BCM shall activate RCW mode when all of the following conditions satisfies:  Vehicle operating in above mention power modes with full functionality Par\_RearCollisionWarningFunction is Enable RcwOnOffState signal is ON RcwStates signal state is at no failure condition | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20981 | ... |
| 20984 | |  |  | | --- | --- | | **FD\_EL\_NM\_RCW:Req2V1** | BCM shall deactivate RCW mode when any of the following conditions satisfies:  Vehicle operating in above mention power modes with No functionality Par\_RearCollisionWarningFunction is Disable  RcwOnOffState is OFF/ Not Present RcwStates signal is at System Fault state | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 20992 | ... |
| 20995 | |  |  | | --- | --- | | **FD\_EL\_NM\_RCW:Req3V1** | BCM shall publish following signal to Rear Radar Module for its internal processing through ESP gateway  HighBeamTelltale HighBeamTelltaleStatus LowBeamTelltale LowBeamTelltaleStatus RevGear RevGearStatus TurnLHTelltale TurnLHTelltaleStatus TurnRHTelltale TurnRHTelltaleStatus HazardLampState HazardLampStateStatus | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21003 | ... |
| 21006 | |  |  | | --- | --- | | **FD\_EL\_NM\_RCW:Req4V1** | When RCWStates signal is "System Active" and RcwWarning signal is ""RCW warning level1" or "RCW warning level2" then BCM shall blink hazard light with its pre-defined duty cycle  Note: Refer Hazard light section requirement for frequency of hazard light and further details | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21058 | **22.4.2 Failure Mode** |
| 21070 | ... |
| 21073 | |  |  | | --- | --- | | **FD\_EL\_FM\_RCW:Req1V1** | BCM will log DTC when RcwStates signal state is “System failure” | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21081 | ... |
| 21084 | |  |  | | --- | --- | | **FD\_EL\_FM\_RCW:Req2V1** | If BCM does not receive signals from Rear Radar via ESP gateway till 500 msec (TBD), then it shall log MTO DTC against Rear Radar | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21092 | **22.5 Safety Level** |
| 21093 | Automotive Safety Integrity Level (ASIL): BCM shall support QM requirement for the HBA functionality for Mid BCM |
| 21094 | **22.6 Block Diagram** |
| 21095 |  |
| 21096 | **22.7 Inputs** |
| 21099 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | RcwOnOffState | This signal indicates the presence of RCW feature 0 - OFF     1 - ON     2 - Not Present     3 - ReservedX X - 0 3 1 - X - X - - | | RcwStates | RCW system status 0 - System is Off 1 - System Passive 2 - System Active 3 - System Failure 4 - System Blockage 5 - Reserved     6 - Reserved     7 - ReservedX X - 0 3 1 - X - X - - | | RcwWarning | Flag indicating activation of RCW warning (hazard light request) 0 - No RCW Warning 1 - RCW warning level1 2 - RCW warning level2 3 - Reserved | |
| 21158 | **22.8 Outputs** |
| 21161 | |  |  | | --- | --- | | **Signal Name** | **DescriptionApplicability**   **Unit** **Min. Value** **Max. Value** **Accuracy** **Types** | |  | **Base** **Mid**         **Analog** **Digital** **PWM** **CAN** **LIN** **RF** | | HighBeamTelltale | IC to display the high beam tell-tale when the high beam lamp is active 0 - High Beam OFF 1 - High Beam ON- X - 0 1 1 - X - X - - | | HighBeamTelltaleStatus | Status of the High Beam Telltale 0 - Plausible - Information given by HighBeamTelltale is correct and according to specification 1 - Reserved for future use 2 - Reserved for future use 3 - signal HighBeamTelltale Not Available- X - 0 3 1 - X - X - - | | LowBeamTelltale | IC to display the low beam tell-tale when the low beam lamp is active 0 - Low Beam OFF 1 - Low Beam ON- X - 0 1 1 - X - X - - | | LowBeamTelltaleStatus | Status of the Low Beam Telltale 0 - Plausible - Information given by LowBeamTelltale is correct and according to specification 1 - Reserved for future use 2 - Reserved for future use 3 - signal LowBeamTelltale Not Available- X - 0 3 1 - X - X - - | | RevGear | Reverse gear is engaged signal 0 - Reverse gear disengaged 1 - Reverse gear engaged- X - 0 1 1 - X - X - - | | RevGearStatus | Status of the Reverse gear 0 - Plausible - Information given by RevGear is correct and according to specification 1 - Reserved for future use 2 - Reserved for future use 3 - signal RevGear Not Available- X - 0 3 1 - X - X - - | | TurnLHTelltale | IC to display the turn left tell-tale when the left side indicator lamp is active 0 - LH Turn Indicator OFF 1 - LH Turn Indicator ON- X - 0 1 1 - X - X - - | | TurnLHTelltaleStatus | Status of the TurnLHTelltale signal 0 - Plausible - Information given by TurnLHTelltale is correct and according to specification 1 - Reserved for future use 2 - Reserved for future use 3 - signal TurnLHTelltale Not Available- X - 0 3 1 - X - X - - | | TurnRHTelltale | IC to display the turn right tell-tale when the right side indicator lamp is active 0 - RH Turn Indicator OFF 1 - RH Turn Indicator ON- X - 0 1 1 - X - X - - | | TurnRHTelltaleStatus | Status of the TurnRHTelltale signal 0 - Plausible - Information given by TurnRHTelltaleStatus is correct and according to specification 1 - Reserved for future use 2 - Reserved for future use 3 - signal TurnRHTelltaleStatus Not Available- X - 0 3 1 - X - X - - | | HazardLampState | Hazard lamp status from BCM 0 - Hazard lamp OFF 1 - Hazard lamp ON- X - 0 1 1 - X - X - - | | HazardLampStateStatus | Status of signal HazardLampState 0 - Plausible - Information given is correct and according to specification 1 - Reserved for future use 2 - signal is implausible 3 - signal Not Available- X - 0 3 1 - X - X - - | |
| 21295 | **22.9 Configurable Parameters** |
| 21298 | |  |  | | --- | --- | | **FD\_EL\_CP\_AHL:Req1V1** |  | | **Name** | **DescriptionUnit** **Min. Value** **Max. Value** **Default Value** **Resolution** **Change By**   **Access Conditions** | |  | **EOL** **Service** | | Par\_RearCollisionWarningFunction | Configuration of Rear Collision Warning function 0 - Disable 1 - Enable- 0 1 - 1 x - Yes | |
| 21658 | **23 Nexon MCE2 Exterior Lamp Load Details** |
| 21659 |  |
| 21660 | **24 Q5 MCE Exterior Lamp Load Details** |
| 21661 |  |
| 21662 | **25 Welcome GoodBye Feature Details** |
| 21667 | ... |
| 21680 | |  |  | | --- | --- | | **FD\_EL\_NM\_WGF:Req1V1** | Welcome Goodbye feature shall be available if Par\_WelcomeGoodbyeConfig is Enabled. | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21663 | **25.2 Welcome Goodbye Pulse profile** |
| 21664 |  |
| 21665 | <Picture> |
| 21666 | ... |
| 21670 | |  |  | | --- | --- | | **FD\_EL\_NM\_WGF:Req2V1** | BCM will publish Pulse profile given above on Position Pin for Welcome and Goodbye function trigger to Lamps | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |
| 21688 | **25.2.2 Sequential Turn Indicator timing diagram** |
| 21690 | <Picture> |
| 21689 | ... |
| 21693 | |  |  | | --- | --- | | **FD\_EL\_NM\_WGF:Req3V1** | Turn Indicator LED segment shall turn ON sequentially and turn OFF sequentially as represented in above picture. The cycle time shall be 400msec ON time and 400msec OFF time | | **Validation Method** | Model-In-Loop if model available  Hardware-in-Loop when implemented in a specific ECU | | **Applicable variants** | Mid BCMs | |

[Produced by DOORS 9.3.0.5](http://www.ibm.com/software/awdtools/doors/)