



Feature Implementation Specification (FIS)

Power Open/Close Liftgate

(F000162)

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Feature Implementation Specification (FIS) Power Open/Close Liftgate

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1 INTRODUCTION

1.1 Document Purpose

The Feature Implementation Specification (FIS) specifies the deployment of the logical functions of a feature to an electrical architecture. The FIS specifies all interactions between the ECUs of the electrical architecture required for the feature including the technical signals and the interfaces. It also gives interface and integration requirements, which are specific to the feature for the electrical architecture.

To get more information about the concept of feature, function and component level abstraction refer to the [Ford RE Wiki](#).

1.2 Document Scope

This FIS describes the deployment of the feature [Feature](#) to the following electrical architecture(s):

Electrical Architecture Name	Owner	Reference
e.g. CGEA1.3		<Add VSEM Link>

Table 1: Electrical Architecture(s) referenced in this document

The following functions from the [Global Feature & Function List](#) are referenced in this Feature Implementation Specification:

Function ID	Function (Group) Name	Owner	Reference
<Add VSEM ID>	Locking	n/a	<Add VSEM Link>

Table 2: Functions referenced in this document

1.3 Document Audience

The FIS is authored by [Daniel King](#), [Feature Owner](#). All Stakeholders, i.e., all people who have a valid interest in the feature implementation should read and, if possible, review the FIS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FIS.

1.3.1 Stakeholder List

For the latest list of the function stakeholders and their roles & responsibilities refer to [Put VSEM Link here](#).

#Hint: Refer to [Ford RE Wiki – Stakeholder List](#) on how to create a stakeholder list. The stakeholder list should be stored in VSEM in the pseudo folder “General Data Artifacts” of the corresponding feature / function / component.

1.4 Document Organization

1.4.1 Document Context

Refer to the [Specification Structure page](#) in the [Ford RE Wiki](#) to understand how the FIS relates to other Ford Requirements Documents and Specifications.

1.4.2 Document Structure

The structure of this document is explained below:

Section 1 – Introduction – Giving an explanation how to use this document including responsibilities and the scope of the document. Additionally it contains the revision history and a list of unsettled but known



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issues that have to be consolidated in future versions. It explains the terminology and gives a clarification of the definitions, concepts and abbreviations used in the document.

- Section 2** – Feature Implementation Description – Giving an overview of the platform and listing assumptions, constraints or dependencies
- Section 3** – Feature Implementation Architecture – Describing 3 Architecture Views:
- Functional Architecture – Showing the logical architecture of functions
 - Physical Architecture – Showing the physical architecture (first of all the E/E Architecture), which the Logical Functions get allocated to.
 - Function Deployment – Presenting the allocation of logical functions and signals to the electrical and other components
- Section 4** – Deployment Specific Modeling – Modeling techniques providing additional detail on e.g. interface behavior
- Section 5** – Deployment Specific Requirements – Deployment specific requirements for ECUs, Network Communication, and Process
- Section 6** – List of Open Concerns
- Section 7** – Revision History
- Section 8** – Appendix - Presenting additional data mainly in a tabular form, e.g., a data dictionary

1.5 Document Conventions

1.5.1 Requirements Templates

Each requirement in this specification shall follow the corresponding template given in the document template *Specification_Macros.dotm* on Wiki page [“Specification Templates”](#). This document template also provides macros to insert the requirement templates. Refer to [“How to use the Specification Templates”](#) on how to enable the macros and the requirements templates in this specification.

The requirements macro and requirements templates also enable the import of the specification to VSEM (refer to [“How to import specifications into VSEM as separate requirements”](#)).

1.5.1.1 Identification of requirements

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

All identifiers in an FIS shall be composed of 4 parts:

- A leading prefix, which indicates the type of requirement (R=Requirement, UC=Use Case, SC=Scenario, ...)
- A prefix, which indicates the abstraction level (F=Feature, FNC=Function, CMP = component).
- Followed by a name, indicating the scope, which the requirement belongs to (e.g. feature or function name)
- Ending with the actual requirement number

Example:

R_CMP_LockArbitrator_00004

This is the fourth requirement on component level for the function Lock Arbitrator.

1.5.1.2 Requirements Attributes

Additionally attributes can be added to each requirement. This helps to classify requirements. A [list of available attributes](#) is given in the RE Wiki.



2 FEATURE IMPLEMENTATION OVERVIEW

2.1 Description

#Hint: Give a short overview on what E/E systems / platforms the feature is implemented and what special considerations have to be taken into account for E/E systems / platforms.

2.2 Input Requirements

#Hint: In this section all input requirements affecting the system development phase are collected, which have an effect on system development in addition to the function requirements. Typically, ARL and SDS requirements are listed here. The goal is to get a complete view of all requirements affecting all aspects of the system under development. Not all these requirements are further developed in the Platform Spec. As some requirements only affect the electrical components and are common to all similar components in the complete system of the vehicle they are left to be further investigated in the electrical component development phase. This means that the Platform Spec serves as the input document for the electrical component development phase rather than a lot of high level documents describing the product and properties of the complete project. The list below gives an idea of requirements, which should be listed here.

- Cost requirements
- Legal requirements
- Ergonomic requirements
- Electrical requirements
- EMC requirements
- Crashworthiness requirements
- Reliability requirements
- Weight requirements
- Styling requirements
- Security requirements
- Service requirements
- Accessories requirements
- Environmental care requirements
- Performance, fuel economy requirements
- Ride comfort requirements
- Noise, vibrations requirements
- Handling requirements
- Climate comfort requirements
- Fire prevention requirements
- Aerodynamic requirements
- Corrosion and surface treatment requirements
- Durability requirements
- Theft protection requirements
- Polymer material requirements
- Audio and communication requirements
- Inner dirt contamination requirements
- Ground clearance requirements
- Waterproof requirements
- Thermic requirements
- Production requirements
- Complete Electrical System requirements
- Communication requirements
- Diagnostic requirements

2.3 Assumptions

2.4 References



Feature Implementation Specification (FIS) Power Open/Close Liftgate

2.4.1 Ford Documents

The list of all Ford internal documents, which are directly related.

Reference	Title	Doc. ID	Revision	Document Location

Table 3: Ford internal Documents

2.4.2 External Documents and Publications

The list of external documents could include books, reports and online sources.

Reference	Document / Publication
[bbb]	

Table 4: External documents and publications

2.5 Glossary

2.5.1 Definitions

Definition	Description

Table 5: Definitions used in this document

2.5.2 Abbreviations

Abbr.	Stands for	Description
FS		
E/E	Electrical and Electronics	

Table 6: Abbreviations used in this document.



3 FEATURE IMPLEMENTATION ARCHITECTURE

3.1 Functional Architecture

3.1.1 Description

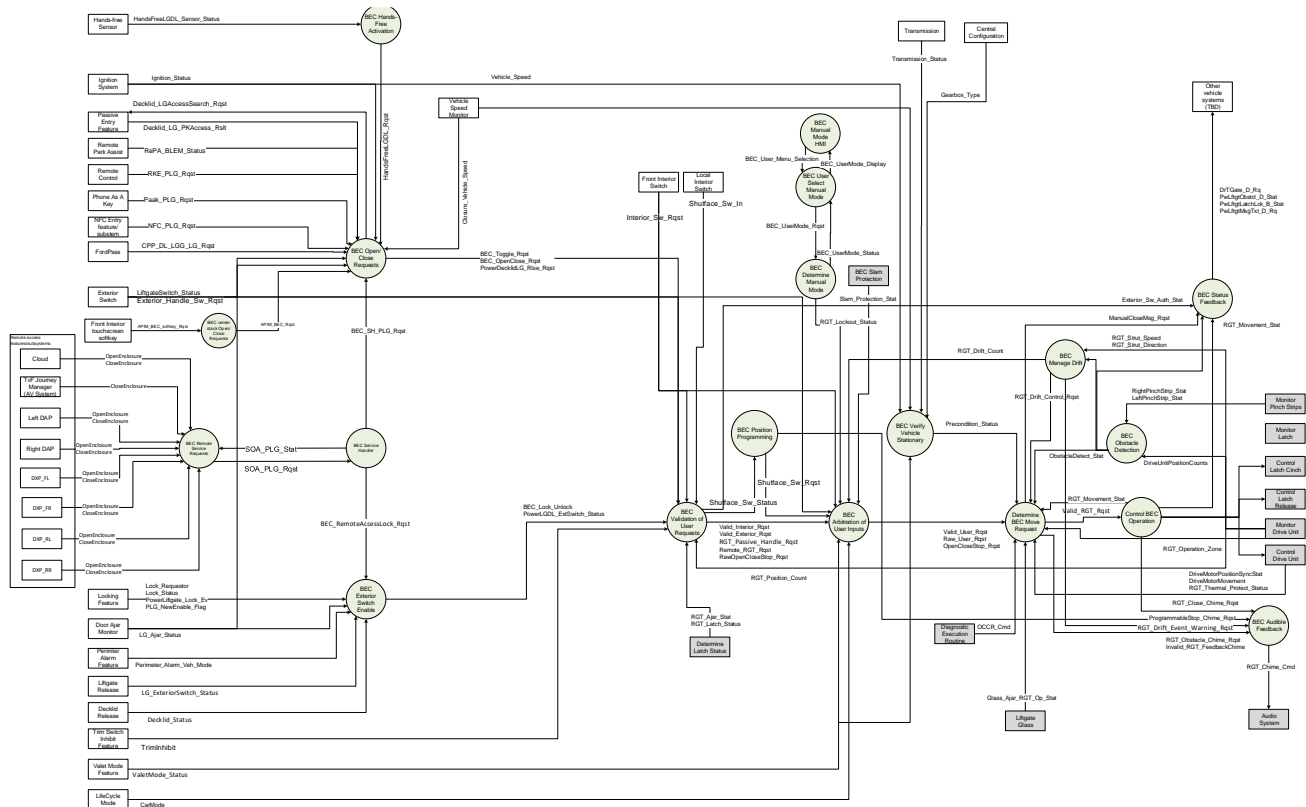


Figure 1: Functional Architecture

3.1.2 Function List



Feature Implementation Specification (FIS) Power Open/Close Liftgate

Function ID	Function Name	Function Description
	BEC Open/Close Requests	
	BEC center stack Open/Close Requests	
	BEC Service Handler	
	BEC Remote Service Requests	
	BEC Exterior Switch Enable	
	BEC Hands-Free Activation	
	BEC Validation of User Requests	
	Arbitration of User Inputs	
	BEC Position Programming	
	Verify BEC Operation Preconditions	
	Determine BEC Move Request	
	BEC Audible Feedback	
	Control BEC Operation	
	BEC Manual Mode HMI	
	BEC Status Feedback	

Table 7: List of Functions

3.1.3 Signal List

#Hint: Refer to the [Data Dictionary - Logical Signals](#).

3.2 Physical Architecture

3.2.1 E/E Architecture

3.2.1.1 E/E Architecture Variants

E/E Architecture Variant Name	Variant Description	Variant Condition (optional)
FNV2.5	Similar to FNV2, except using a GEN 3 BCM on CAN FD1 which supports Message Authentication. FNV2.5 also introduces the Interior PDB on CAN FD1.	
FNV3	Similar to FNV2.5, except using an ECG Service Oriented architecture which supports API based enclosure requests from ECG to BCM	

[illegible]

Figure 2:E/E Architecture (Network Topology Style)



Feature Implementation Specification (FIS) Power Open/Close Liftgate

3.2.1.2 E/E Components

Component Name	Description
RGTM	Rear Gate Trunk Module
BCM	Body Control Module
ECG	Enhanced Central Gateway
PCM	Powertrain Control Module
IPC	Instrument Panel Cluster
APIM / APIM_CDC	APIM(Sync Module) / APIM_CDC(Phoenix Domain controller)

Table 8: Electrical Components

3.2.1.3 E/E Connections

Connection Name	Type	Description	Allocated Messages	Connected Nodes
CANFD1	CAN FD	CAN FD 1 Network		BCM, AVPIM, DAPL, DAPR, PCM
MSCAN1	MSCAN	Medium Speed CAN		RGTM
HS3CAN	HSCAN	High Speed CAN Network 3		IPC, APIM/APIM_CDC
Ethernet	SOA	Service Oriented Architecture		ECG, AVPIM, DAPL, DAPR, BCM, DXP_FL, DXP_FR, DXP_RL, DXP_RR

Table 9: E/E Connections

3.2.1.4 Signal List

#Hint: Refer to the [Data Dictionary - Technical Signals](#).



Feature Implementation Specification (FIS) Power Open/Close Liftgate

3.3 Function Deployment

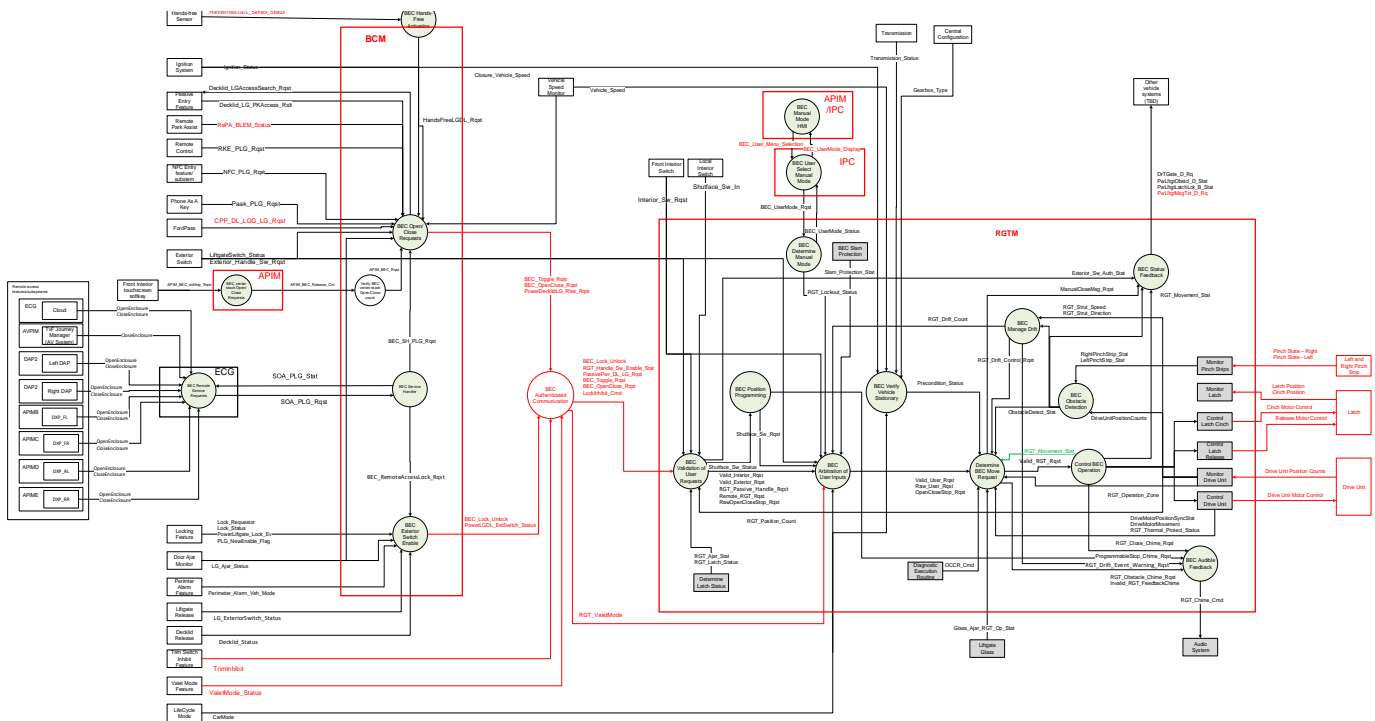


Figure 7: Deployment Diagram

3.3.1 Function Allocation

Function ID	Logical Function Name	Component Name
	BEC Open/Close Requests	BCM
	BEC center stack open/Close Requests	APIM/ APIM_CDC
	Verify BEC center stack open/Close count	BCM
	BEC Service Handler	BCM
	BEC Remote Service request	ECG
	BEC Exterior Switch Enable	BCM
	BEC Validation of User Requests	RGTM
	BEC Arbitration of User Inputs	RGTM
	BEC BEC Position Programming	RGTM
	BEC Hands free activation	BCM
	Determine BEC Move Request	RGTM
	BEC verify vehicle stationary	RGTM
	BEC Audible Feedback	RGTM
	BEC Status Feedback	RGTM
	BEC Authenticated Communication	BCM, RGTM
	BEC User Select Manual Mode	IPC
	BEC Manual Mode HMI	APIM / APIM_CDC, IPC
	BEC Determine manual mode	RGTM
	BEC Obstacle Detection	RGTM
	Control BEC Operation	RGTM



Feature Implementation Specification (FIS) Power Open/Close Liftgate

Table 10: Function Allocation Table

3.3.1.1 Functional Safety

#Classification: Functional Safety Only

#Hint: For each architectural component implementing the safety goal fill out the following 2 tables.

The table below provides the ability to allocate requirements directly to components. This is necessary for requirements such as ASIL hardware metric values and safety measures that don't relate to E/E functions (ex. thermal shielding or something like a fan cover to prevent access to moving parts)

#Link: [Functional Safety Sharepoint](#)

Component / Interface	Overall Component ASIL	Req IDs	Req ASIL	Function	Req IDs	Req ASIL
Component 1	C(D)	Req a	B	Function 1	Req d	
		Req b	QM		Req e	B(C)
		Req c	C(C)	Function 3	Req f	C(D)
				Function 4	Req g	B(D)
Component 2	B(C)	Req b	QM	Function 1	Req d	
		Req h	B(C)			

Table 11: Function Allocation Table

#Hint: Most of the analysis and classification for Architectural Redundancy should be accomplished via a safety analysis and implemented via requirements. Those should be referenced in the table below. The rationale section is used to provide a quick summary of the need for the redundancy. If an element does not facilitate any redundant functions or purpose enter 'n/a' in all the remaining columns starting with the 2nd (Redundant Component/Subsystem).

Affected Components/ Subsystems/ Data	Redundant Component/ Subsystem/ Data	If redundancy is used:		Requirements Calling for redundancy (Reference to Req IDs)
		Rational for why the redundant component is needed/suitable	Reference to Safety Analysis	

Table 12: Architectural Redundancy Summary



4 FEATURE IMPLEMENTATION MODELING

4.1 Component Interaction Diagrams

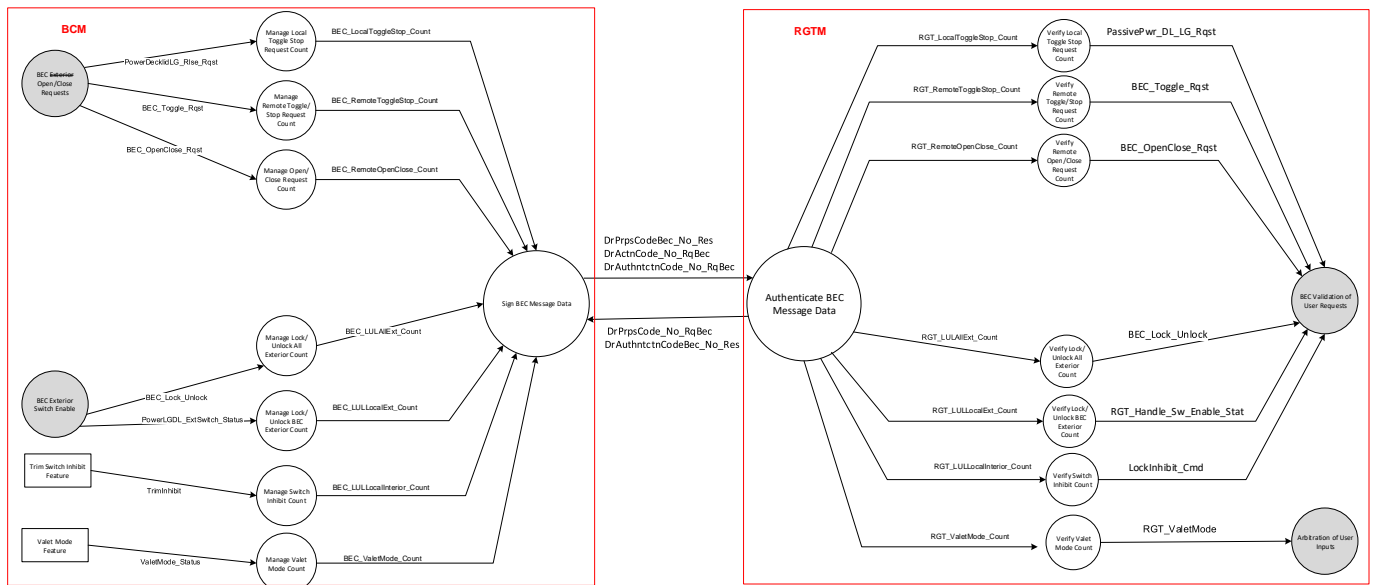


Figure 3: Back End Closure Authenticated Communication DataFlow Diagram

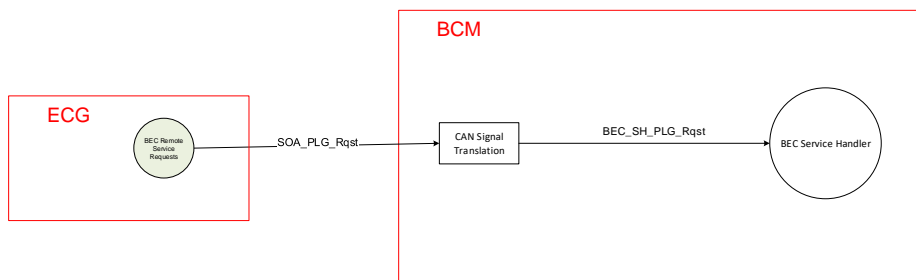


Figure 4: BEC Service Handler

4.1.1 Functional Safety

4.1.1.1 Fault Handling Time Analysis

#Classification: Functional Safety Only - Optional

#Hint: The purpose of this table is to check the individual component Fault Handling Time (FHT) contributions of the TSRs against the stated FHT of the (refined) FSRs (as derived from the Functional Safety Concept) from which the TSRs were derived (checking for consistency or violations). The table serves as a quick summary of the key information. For help in determining the FHT values of the TSRs please use the expanded version of the table in the [Functional Safety Sharepoint](#) along with its accompanying instructions.

#Link: [Functional Safety Sharepoint](#)



Feature Implementation Specification (FIS) Power Open/Close Liftgate

Component/ Subsystem [or Communication Channel]	F-S-Req-ID	Fault Handling Time (FHT)	T-S-Req-ID	Portion of the FHT [or Time Delay of Communication Channel]
Component A	Functional Safety Requirement X			
Component B	Functional Safety Requirement Y			

Table 13: Fault Handling Time Table

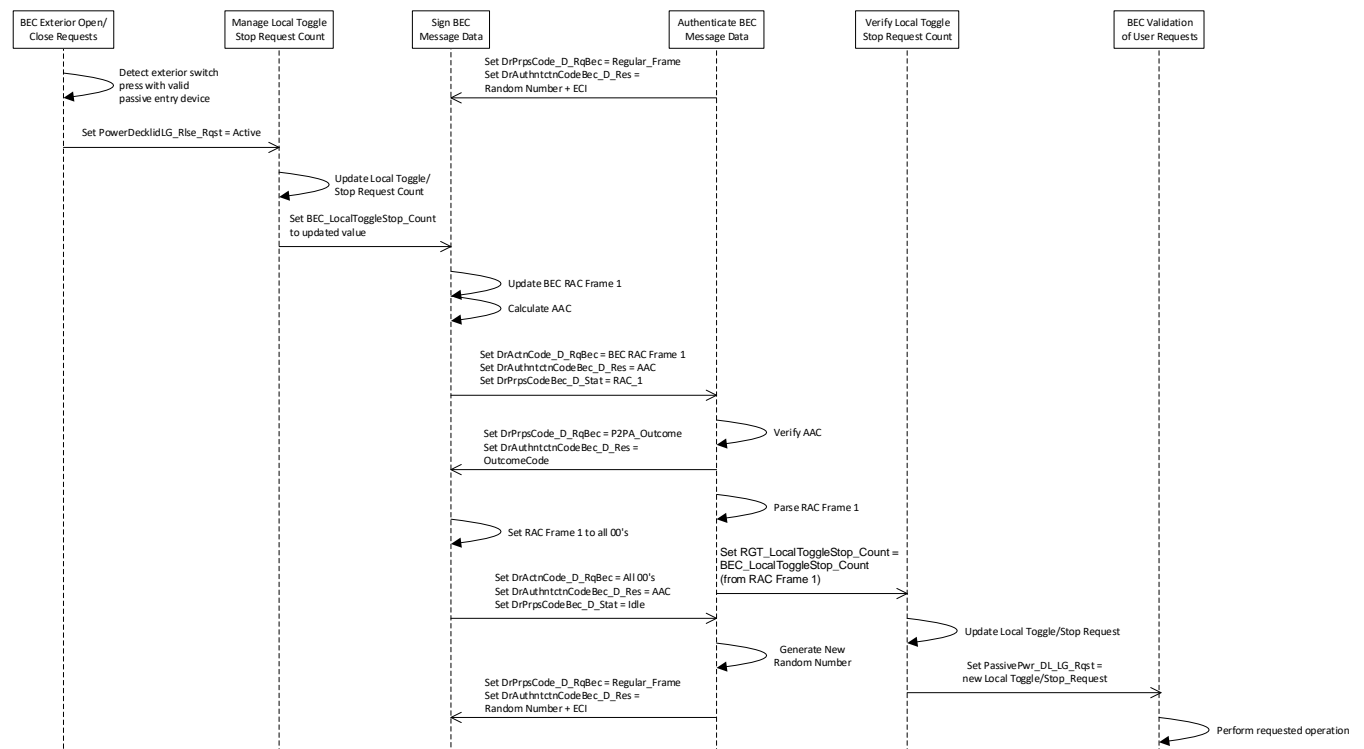
4.1.1.2 Requirements Derivation Diagram

#Classification: Functional Safety Only - Optional

#Hint: Optionally include a Requirements Derivations Diagram (SysML Requirements Diagram) or a Goal Structuring Notation (GSN) Diagram to illustrate the relationship between requirements.

4.2 Component Interface Behavior Diagrams

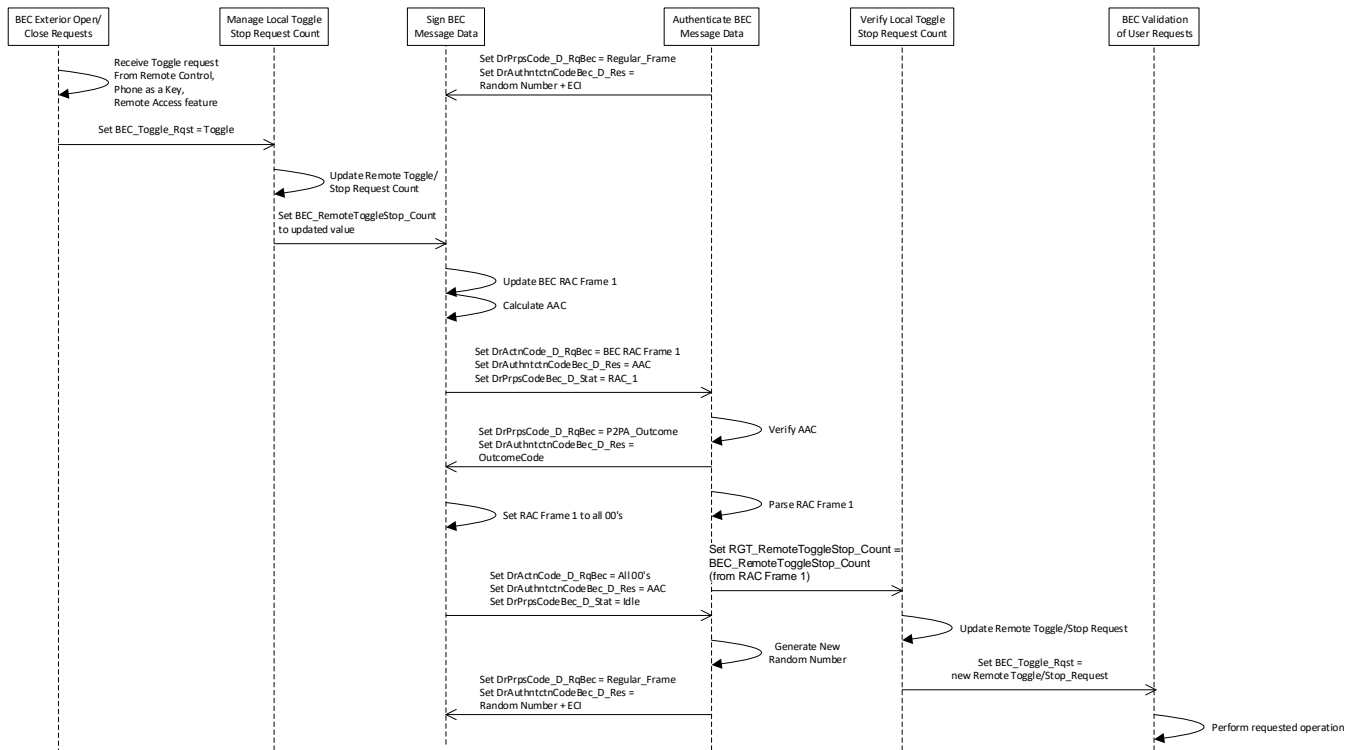
4.2.1 Scenario: Request power operation from exterior switch with valid passive entry device



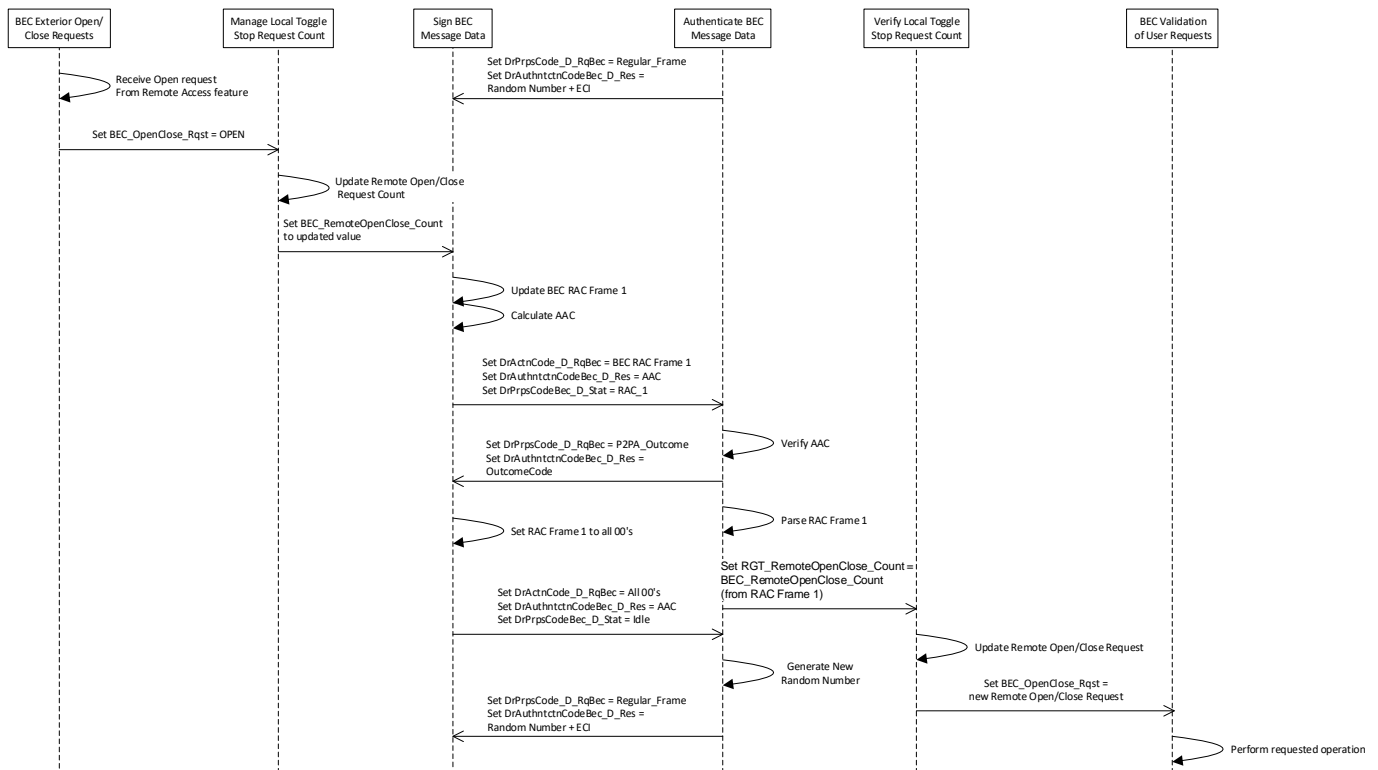


Feature Implementation Specification (FIS) Power Open/Close Liftgate

4.2.2 Scenario: Remote Toggle/Stop Request



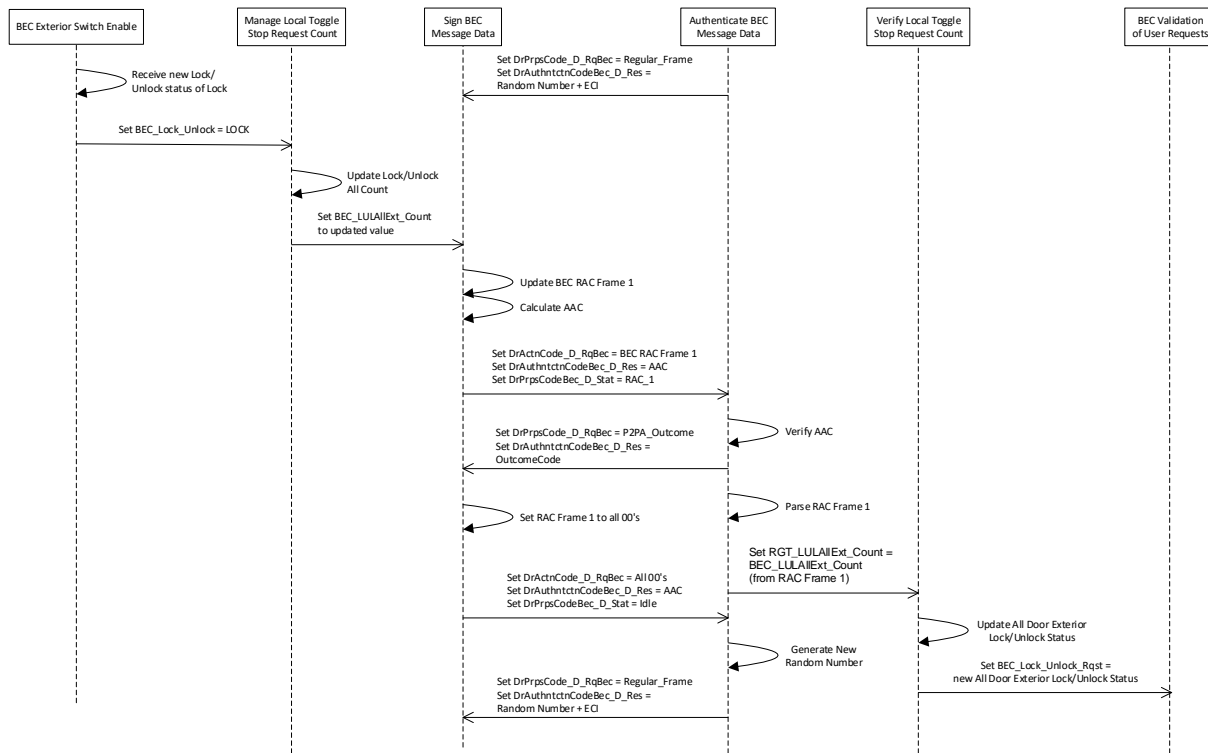
4.2.3 Scenario: Remote Open/Close Request



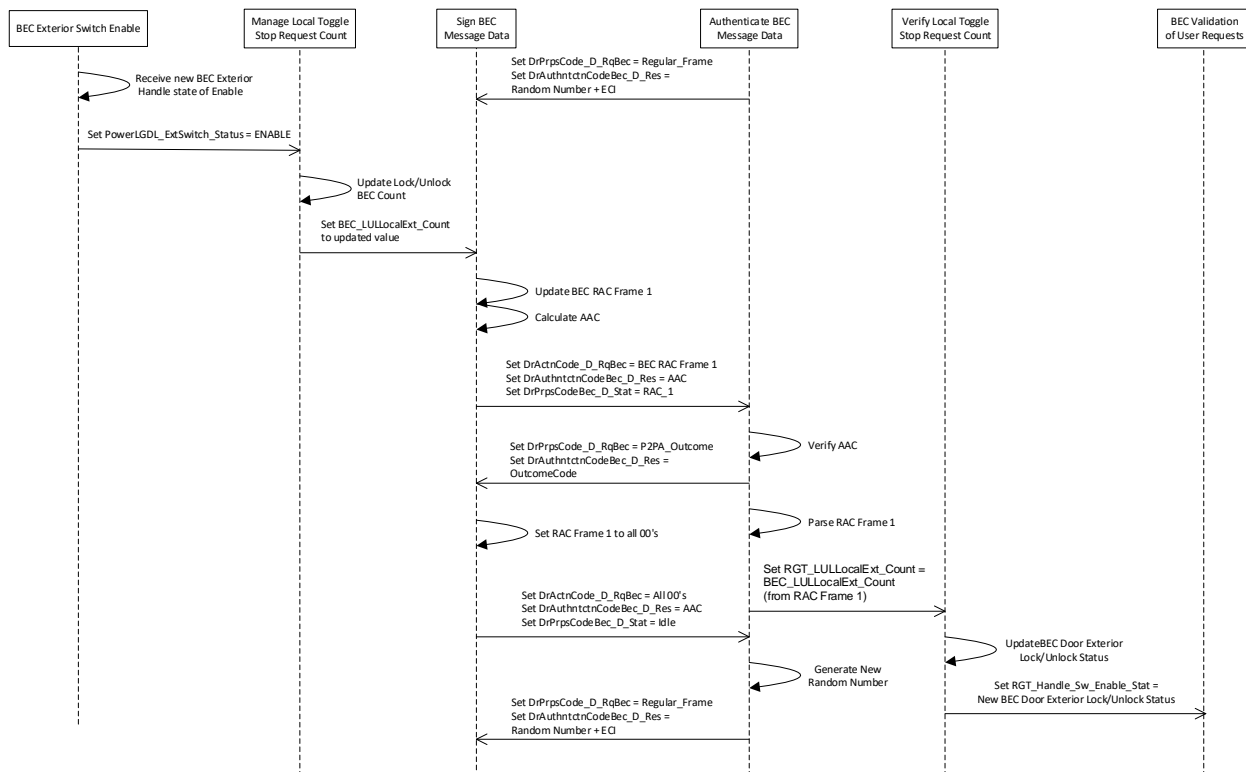


Feature Implementation Specification (FIS) Power Open/Close Liftgate

4.2.4 Scenario: Lock/Unlock All Doors Exterior Handle



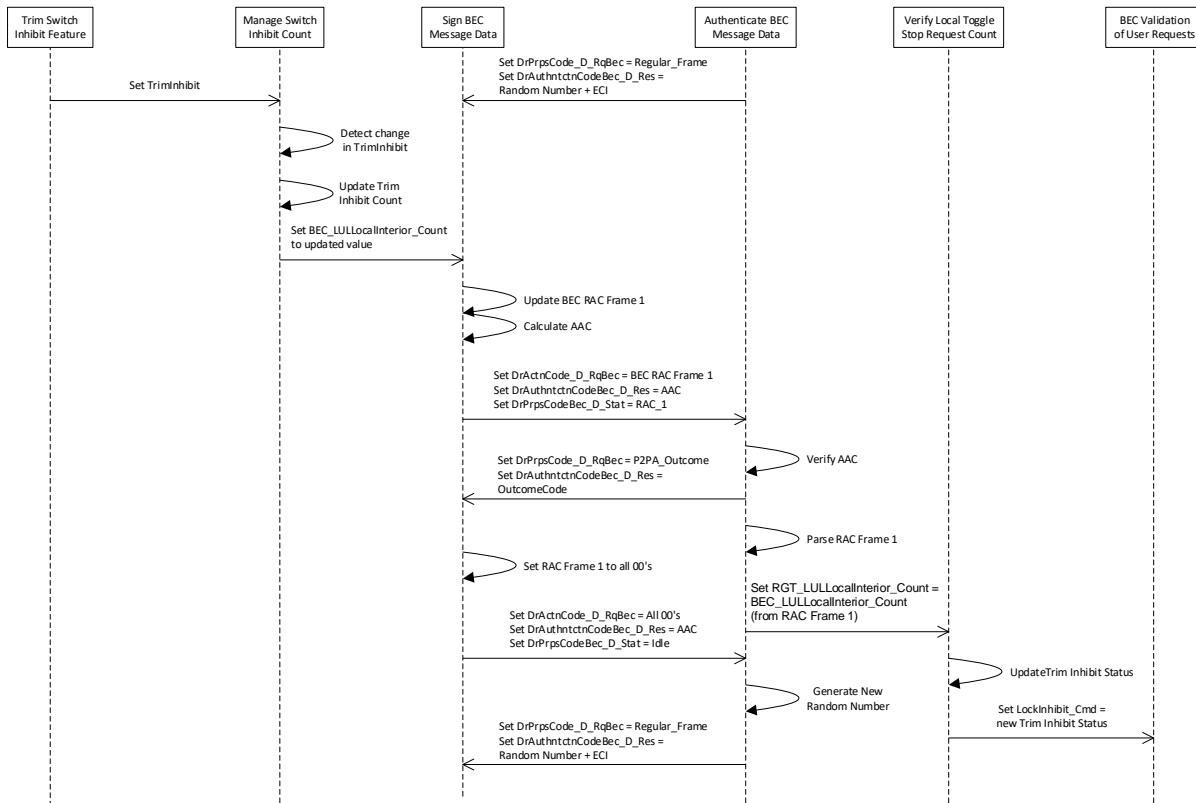
4.2.5 Scenario: Enable BEC Exterior Handle





Feature Implementation Specification (FIS) Power Open/Close Liftgate

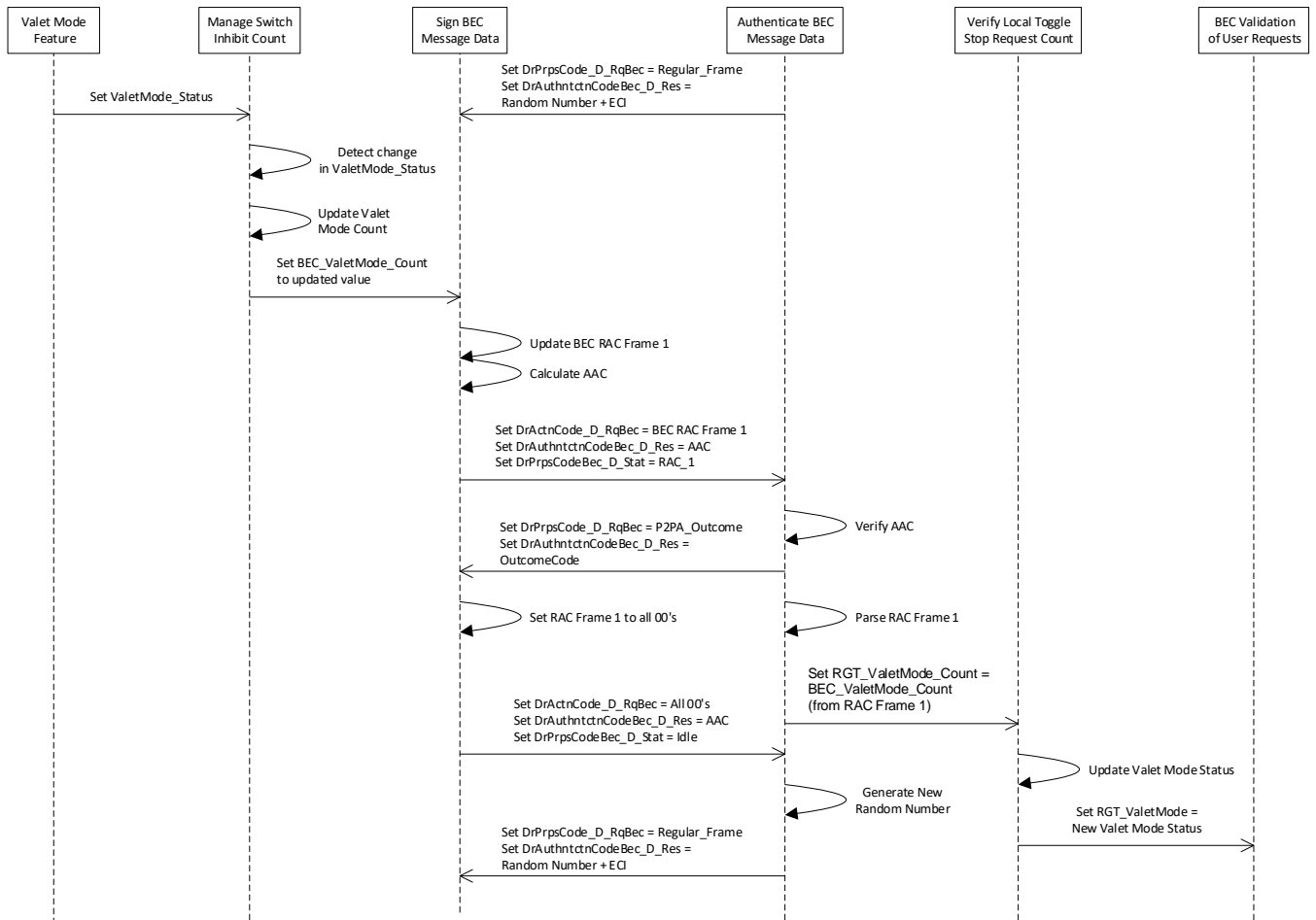
4.2.6 Scenario: Trim Switch Inhibit





Feature Implementation Specification (FIS) Power Open/Close Liftgate

4.2.7 Scenario: Valet Mode





5 FEATURE IMPLEMENTATION REQUIREMENTS

#Hint: The Feature Implementation Specification is first of all an architecture document. It shows the Functional and the E/E architecture as well as the deployment of the Functional one to the E/E one.

5.1 Requirements on Components

5.1.1 BCM

5.1.1.1 Implemented Function BEC Open/Close Requests

5.1.1.1.1 Function Interfaces

5.1.1.1.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details	Subscriber Interface	Connection (Optional)
RKE_PLG_Rqst	Same			Internal to BCM
Paak_PLG_Rqst	Same			Internal to BCM
NFC_PLG_Rqst	Same			Internal to BCM
CPP_DL_LGG_LG_Rqst	Same			Internal to BCM
SmartUnlockPLG_Rqst	Same			Internal to BCM
BEC_SH_PLG_Rqst	Same			Internal to BCM
Remote_PDL_Rqst	Same			Internal to BCM
HandsFree_DL_Rlse_Rqst	Same			Internal to BCM
Closure_Vehicle_Speed	Same			Internal to BCM
LiftgateSwitch_Status	Same			Internal to BCM
LG_Ajar_Status	Same			Internal to BCM
RePA_BLEM_Status	Same			Internal to BCM
Ignition_Status	Same			Internal to BCM
Decklid_LG_PKAccess_Rslt	Same			Internal to BCM
Decklid_LGAccessSearch_Rqst	Same			Internal to BCM
HandsFreeLGDL_Rqst	Same			Internal to BCM
PassivePwrDecklidRlse_Rqst	Same			Internal to BCM
APIM_BEC_Rqst	Same			Internal to BCM

Table 14: Input Signal mappings of Function BEC Open/Close Requests



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.1.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_Toggle_Rqst	Same			Internal to BCM
BEC_OpenClose_Rqst	Same			Internal to BCM
PowerDecklidLG_Rlse_Rqst	Same			Internal to BCM
PLG_Flash_Rqst	Same			Internal to BCM
PLG_Illum_Entry_Rqst	Same			Internal to BCM
PLG_Switch_Remote	Same			Internal to BCM

Table 15: Output Signal mappings of Function BEC Open/Close Requests

5.1.1.1.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 16: Parameter mappings of Function BEC Open/Close Requests

5.1.1.1.1.4 Interface Requirements

N/A

5.1.1.1.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_OCR_00001	Accept Remote BEC Toggle Requests	
R_FNC_BEC_OCR_00002	Verify Passive Entry on Exterior Request	
R_FNC_BEC_OCR_00003	Accept Exterior BEC Toggle Request	
R_FNC_BEC_OCR_00004	User Feedback for accepted Toggle request	
R_FNC_BEC_OCR_00005	Inhibit Perimeter Alarm	
R_FNC_BEC_OCR_00006	Toggle Request due to Smart Unlock	
R_FNC_BEC_OCR_00007	Enable Exterior Switch on Toggle Request	
R_FNC_BEC_OCR_00008	Accept Interior BEC Toggle Request	
R_FNC_BEC_COC_00002	Disable front interior touchscreen softkey	

Table 17: Inherited Requirements - BEC Open/Close Requests

5.1.1.1.2.1.1 Component Specific Requirements

N/A



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.2 Implemented Function Verify BEC Center Stack open/close count

5.1.1.2.1 Function Interfaces

5.1.1.2.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
APIM_BEC_Release_Cnt	BecRleas_No_RqMnu			HS3CAN to CANFD1

Table 18: Input Signal mappings of Function

5.1.1.2.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
APIM_BEC_Rqst	Same			Internal to BCM

Table 19: Output Signal mappings of Function

5.1.1.2.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 20: Parameter mappings of Function

5.1.1.2.1.4 Interface Requirements

N/A

5.1.1.2.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment

Table 21: Inherited Requirements - BEC Exterior Switch Enable

5.1.1.2.2.1.1 Component Specific Requirements

R_CMP_PLG_FIS_00040### Verify APIM Toggle Stop Request Count

The BCM shall maintain an event counter (APIM_BECLRelease_Cnt) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the subscriber
- The event counter is classified as single feature event counter
- When the counter is incremented to next value, the APIM_BEC_Rqst is set to BEC_REL

End of Requirement



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.3 Implemented Function BEC Exterior Switch Enable

5.1.1.3.1 Function Interfaces

5.1.1.3.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Lock_Requestor	Same			Internal to BCM
Lock_Status	Same			Internal to BCM
PowerLiftgate_Lock_Ev	Same			Internal to BCM
PLG_NewEnable_Flag	Same			Internal to BCM
Perimeter_Alarm_Veh_Mode	Same			Internal to BCM
LG_Ajar_Status	Same			Internal to BCM
TrimInhibit	Same			Internal to BCM
PLG_Switch_Remote	Same			Internal to BCM
BEC_RemoteAccessLock_Rqst	Same			Internal to BCM
LG_ExteriorSwitch_Status	Same			Internal to BCM
Decklid_Status	Same			Internal to BCM

Table 22: Input Signal mappings of Function

5.1.1.3.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_Lock_Unlock	Same			Internal to BCM
PowerLGDL_ExtSwitch_Status	Same			Internal to BCM

Table 23: Output Signal mappings of Function

5.1.1.3.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 24: Parameter mappings of Function

5.1.1.3.1.4 Interface Requirements

N/A



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.3.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_ESE_00001	Enable Back End Closure Exterior Switch – Power Liftgate	
R_FNC_BEC_ESE_00002	Disable Back End Closure Exterior Switch – Power Liftgate	

Table 25: Inherited Requirements - BEC Exterior Switch Enable

5.1.1.3.2.1.1 Component Specific Requirements

N/A

5.1.1.4 Implemented Function BEC Service Handler

5.1.1.4.1 Function Interfaces

5.1.1.4.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
SOA_PLG_Rqst	ClsrOprtPrxmChk_D_Stat ClsrOprtSrvclد_No_Rq ClsrOprtSrvclد_B_Rq ClsrOprtSrvclد_Rq ClsrOprtSrvclد_Type_B_Rq LckUnlckSrvclد_No_Rq LckUnlckSrvclد_B_Rq LckUnlckSrvclد_Rq LckUnlckSrvclد_Type_B_Rq			FD1 CAN

Table 26: Input Signal mappings of Function

5.1.1.4.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_RemoteAccessLock_Rqst	Same			Internal to BCM
BEC_RemoteAccessOpenClose_Rqst	Same			Internal to BCM
BEC_RemoteAccessStopToggle_Rqst	Same			Internal to BCM
SOA_PLG_Stat	ClsrOprtSrvclد_Arb ClsrOprtSrvclد_No_Actl ClsrOprtSrvclد_Res LckUnlckSrvclد_Arb LckUnlckSrvclد_No_Actl LckUnlckSrvclد_Res			FD1 CAN

Table 27: Output Signal mappings of Function



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.4.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 28: Parameter mappings of Function

5.1.1.4.1.4 Interface Requirements

N/A

5.1.1.4.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_RA_00001	Enable Exterior Handle when Unlock is requested	
R_FNC_BEC_RA_00002	Disable Exterior Handle when Lock is requested	
R_FNC_BEC_RA_00003	Request Open Operation	
R_FNC_BEC_RA_00004	Request Close Operation	

Table 29: Inherited Requirements - BEC Service Handler

5.1.1.4.2.1.1 Component Specific Requirements

N/A

5.1.1.5 Implemented Function BEC Hands-Free Activation

Refer to BCM Functional Spec FS-NU5T-14B476-AGx, Section 2.4.56.

5.1.1.6 Implemented Function Back End Closure Authenticated Communication

5.1.1.6.1 Function Interfaces

5.1.1.6.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
PowerDeckIdLG_Rlse_Rqst	Same			Internal to BCM
BEC_Toggle_Rqst	Same			Internal to BCM
BEC_OpenClose_Rqst	Same			Internal to BCM
BEC_Lock_Unlock	Same			Internal to BCM
PowerLGDLExtSwitch_Status	Same			Internal to BCM
TrimInhibit	Same			Internal to BCM
ValetMode_Status	Same			Internal to BCM
BEC_PurposeCode_Exec	DrPrpsCode_D_RqBec			MS1CAN to CANFD1
BEC_AAC_Key_Exec	DrAuthntctnCodeBec_D_Res			MS1CAN to CANFD1

Table 30: Input Signal mappings of Function



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.1.6.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_PurposeCode_Rqstr	DrPrpsCodeBec_D_Res			CANFD1 to MS1CAN
BEC_RAC_ECI_Rqstr	DrActnCode_D_RqBec			CANFD1 to MS1CAN
BEC_AAC_Key_Rqstr	DrAuthntctnCode_D_RqBec			CANFD1 to MS1CAN

Table 31: Output Signal mappings of Function

5.1.1.6.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 32: Parameter mappings of Function

5.1.1.6.1.4 Interface Requirements

N/A

5.1.1.6.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment

Table 33: Inherited Requirements

5.1.1.6.2.1.1 Component Specific Requirements

###R_CMP_PLG_FIS_00001### Manage Local Toggle Stop Request Count

The BCM shall maintain an event counter (BEC_ToggleStop_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the Publisher.
- A change to the value of logical signal PowerDecklidLG_Rlse_Rqst to TRUE is considered an event that causes an increment of the counter to MutExB (next even value).
- MutEx A is not used (reserved).

End of Requirement

###R_CMP_PLG_FIS_00002### Manage Requester type Count

The BCM shall maintain a state encoded signal (BEC_OprtSrc_D_Stat) per the below mentioned table where:

- The BCM is the Publisher.

4	3	2	1	0
---	---	---	---	---



Feature Implementation Specification (FIS) Power Open/Close Liftgate

Null	0	0	0	0	0
Remote_Key	0	0	0	0	1
Remote_Phone	0	0	0	1	0
Ford_Pass_Modem	0	0	0	1	1
SOA_Offboard	0	0	1	0	0
SOA_Onboard	0	0	1	0	1
Handsfree	0	0	1	1	0
Passive_Back_End_Enclosure	0	0	1	1	1
Passive_Smart_Release	0	1	0	0	0
Interior_Softkey_HMI	0	1	0	0	1
Passive_Back_End_Enclosure_PK	0	1	0	1	0
Passive_Back_End_Enclosure_Phone	0	1	0	1	1
Keypad	0	1	1	0	0
NFC_Back_End_Enclosure	0	1	1	0	1
Open_On_Approach	0	1	1	1	0

Note: BEC_OprtSrc_D_Stat reflects the origin/source of the liftgate operation request

BEC_OprtSrc_D_Stat has to be updated when BCM receives a BEC_OpenClose_Count or BEC_ToggleStop_Count request

End of Requirement

###R_CMP_PLG_FIS_00003### Manage Open/Close Request Count

The BCM shall maintain an event counter (BEC_OpenClose_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the Publisher.
- A change to the value of logical signal BEC_OpenClose_Rqst to CLOSE is considered an event that causes an increment of the counter to MutExA (next odd value).
- A change to the value of logical signal BEC_OpenClose_Rqst to OPEN is considered an event that causes an increment of the counter to MutExB (next even value).

End of Requirement

###R_CMP_PLG_FIS_00005### Manage Lock/Unlock BEC Exterior Count

The BCM shall maintain an event counter (BEC_LULExt_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the Publisher.
- A change to the value of logical signal PowerLGDL_ExtSwitch_Status to DISABLE is considered an event that causes an increment of the counter to MutExA (next odd value).
- A change to the value of logical signal PowerLGDL_ExtSwitch_Status to ENABLE is considered an event that causes an increment of the counter to MutExB (next even value).

End of Requirement



Feature Implementation Specification (FIS) Power Open/Close Liftgate

###R_CMP_PLG_FIS_00006### Manage Switch Inhibit Count

The BCM shall maintain an event counter (BEC_LULLocalInterior_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the Publisher.
- A change to the value of logical signal TrimInhibit to INHIBIT is considered an event that causes an increment of the counter to MutExA (next odd value).
- A change to the value of logical signal TrimInhibit to NO_INHIBIT is considered an event that causes an increment of the counter to MutExB (next even value).

End of Requirement

###R_CMP_PLG_FIS_00007### Manage Valet Mode Count

The BCM shall maintain an event counter (BEC_ValetMode_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The BCM is the Publisher.
- A change to the value of logical signal ValetMode_Status to ACTIVE is considered an event that causes an increment of the counter to MutExA (next odd value).
- A change to the value of logical signal ValetMode_Status to INACTIVE is considered an event that causes an increment of the counter to MutExB (next even value).

End of Requirement

###R_CMP_PLG_FIS_00008### Sign BEC Message Data

The BCM shall secure the following signals using the protocol specified in “Point-to-Point Authentication Protocol Specification Version 0.1” (Reference VSEM item VDOC077948):

- BEC_ToggleStop_Count
- BEC_OpenClose_Count
- BEC_LULExt_Count
- BEC_LULLocalInterior_Count
- BEC_ValetMode_Count

Where

- The BCM is the Requestor.
- DrPrpsCodeBec_D_Res is used for the P2PA_PurposeCode of the Requestor.
- DrActnCode_D_RqBec is used for the P2PA_RAC_ECI of the Requestor.
- DrAuthntctnCode_D_RqBec is used for the P2PA_AAC_Key for the Requestor.
- DrPrpsCode_D_RqBec is used for the P2PA_PurposeCode of the Executor.
- DrAuthntctnCodeBec_D_Res is used for the P2PA_AAC_Key of the Executor.
- There is no CAN signal defined for the P2PA_RAC_ECI of the Executor.

End of Requirement

###R_CMP_PLG_FIS_00009### Calculate Requested Action Code for Back End Closure

The BCM shall calculate the Requested Action Code (RAC) Frame 1 for the Back End Closure Authenticated Communication function when any of the Event Counters changes value to other than zero according to the following table:

msb		Bits for Requested Action Code Frame 1																						lsb			
27	26	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	9	8	7	6	5	4	3	2	1	0
		5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0										



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BEC_LULExt_Count	BEC_LULocalInterior_Count	BEC_LULAllExt_Count	BEC_ToggleStop_Count	BEC_RemoteToggleStop_Count	BEC_OpenClose_Count	BEC_ValetMode_Count	BEC_OprtSrc_D_Stat	Executor Challenge Index (ECI)
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End of Requirement

###R_CMP_PLG_FIS_00010### Calculate Authenticated Data

The BCM shall calculate the Action Authentication Code (AAC) for the Back End Closure Authenticated Communication function when any of the Event Counters changes value and the corresponding RAC Frame has been calculated.

End of Requirement

###R_CMP_PLG_FIS_00011### Send Authenticated Data

The BCM shall send the authenticated data once the AAC is calculated and until a P2PA Outcome Code is received.

Once the P2PA Outcome Code is received, the BCM shall send an Idle Purpose Code and clear the RAC Frame 1.

End of Requirement



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5.1.2 RGTM

5.1.2.1 Implemented Function BEC Validation of User Requests

5.1.2.1.1 Function Interfaces

5.1.2.1.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
LockInhibit_Cmd	Same			Internal to RGTM
Interior_Sw_Rqst	Same			Internal to RGTM
BEC_Lock_Unlock	Same			Internal to RGTM
RGT_Handle_Sw_Enable_Stat	Same			Internal to RGTM
Exterior_Handle_Sw_Rqst	Same			Internal to RGTM
RGT_Ajar_Stat	Same			Internal to RGTM
PassivePwr_DL_LG_Rqst	Same			Internal to RGTM
BEC_Toggle_Rqst	Same			Internal to RGTM
BEC_OpenClose_Rqst	Same			Internal to RGTM
Shutface_Sw_In	Same			Internal to RGTM
RGT_Position_Count	Same			Internal to RGTM
RGT_Latch_Status	Same			Internal to RGTM

Table 34: Input Signal mappings of Function

5.1.2.1.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
Valid_Interior_Rqst	Same			Internal to RGTM
Valid_Exterior_Rqst	Same			Internal to RGTM
RGT_Passive_Handle_Rqst	Same			Internal to RGTM
Remote_RGT_Rqst	Same			Internal to RGTM
RawOpenCloseStop_Rqst	Same			Internal to RGTM
Shutface_Sw_Rqst	Same			Internal to RGTM

Table 35: Output Signal mappings of Function

5.1.2.1.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 36: Parameter mappings of Function

5.1.2.1.1.4 Interface Requirements

N/A



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5.1.2.1.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_VUR_00001	Validate Front Interior Switch	
R_FNC_BEC_VUR_00002	Validate Local Exterior User Requests	
R_FNC_BEC_VUR_00004	Validate Remote User Stop Requests	
R_FNC_BEC_VUR_00005	Validate Remote User Open Requests	
R_FNC_BEC_VUR_00006	Validate Remote User Close Requests	
R_FNC_BEC_VUR_00007	Validate Remote User Toggle Request	
R_FNC_BEC_VUR_00008	Validate Local Interior Requests	

Table 37: Inherited Requirements

5.1.2.1.2.1.1 Component Specific Requirements

N/A

5.1.2.2 Implemented Function Liftgate / Decklid Position Programming

5.1.2.2.1 Function Interfaces

5.1.2.2.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Shutface_Sw_Status	Same			Internal to RGTM
RGT_Movement_Stat	Same			Internal to RGTM

Table 38: Input Signal mappings of Function

5.1.2.2.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
Shutface_Sw_Rqst	Same			Internal to RGTM
RGT_Programmed_Open_Position	Same			Internal to RGTM
ProgrammableStop_Chime_Rqst	Same			Internal to RGTM

Table 39: Output Signal mappings of Function

5.1.2.2.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 40: Parameter mappings of Function

5.1.2.2.1.4 Interface Requirements

N/A



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5.1.2.2.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC-PROG_00001	Program User Selected Open Position	
R_FNC_BEC-PROG_00002	User Feedback for Programming Open Position	
R_FNC_BEC-PROG_00003	Toggle Request on Short Activation of Shutface Switch	

Table 41: Inherited Requirements

5.1.2.2.2.1.1 Component Specific Requirements

N/A

5.1.2.3 Implemented Function Arbitration of User Inputs

5.1.2.3.1 Function Interfaces

5.1.2.3.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Valid_Interior_Rqst	Same			Internal to RGTM
Valid_Exterior_Rqst	Same			Internal to RGTM
RGT_Passive_Handle_Rqst	Same			Internal to RGTM
Remote_RGT_Rqst	Same			Internal to RGTM
RawOpenCloseStop_Rqst	Same			Internal to RGTM
RGT_ValetMode	Same			Internal to RGTM
CarMode	Same			Internal to RGTM
RGT_Lockout_Status	Same			Internal to RGTM
Interior_Sw_Rqst	Same			Internal to RGTM
Exterior_Handle_Sw_Rqst	Same			Internal to RGTM
Shutface_Sw_Rqst	Same			Internal to RGTM
Slam_Protection_Stat	Same			Internal to RGTM
RGT_Drift_Count	Same			Internal to RGTM

Table 42: Input Signal mappings of Function

5.1.2.3.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
Valid_User_Rqst	Same			Internal to RGTM
Raw_User_Rqst	Same			Internal to RGTM
OpenCloseStop_Rqst	Same			Internal to RGTM

Table 43: Output Signal mappings of Function



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.2.3.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 44: Parameter mappings of Function

5.1.2.3.1.4 Interface Requirements

N/A

5.1.2.3.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_ARB_00001	Accept Toggle Requests from User Input	
R_FNC_BEC_ARB_00002	Toggle Requests become Unlatch requests	
R_FNC_BEC_ARB_00003	Requests while Factory Mode	
R_FNC_BEC_ARB_00004	Toggle Requests become Unlatch Rquests - Factory Mode	
R_FNC_BEC_ARB_00005	Accept Stop Requests	
R_FNC_BEC_ARB_00006	Accept Open requests	
R_FNC_BEC_ARB_00007	Accept Close Requests	

Table 45: Inherited Requirements

5.1.2.3.2.1.1 Component Specific Requirements

N/A

5.1.2.4 Implemented Function BEC Verify Vehicle Stationary

5.1.2.4.1 Function Interfaces

5.1.2.4.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Ignition_Status	Ignition_Status			MS1CAN
Vehicle_Speed	Veh_V_ActlEng			MS1CAN
Gearbox_Type	Gearbox_Type			GGCC CDID 110
Transmission_Status	GearLvrPos_D_Actl			MS1CAN
CarMode	LifeCycMde_D_Actl			MS1CAN

Table 46: Input Signal mappings of Function

5.1.2.4.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
Precondition_Status	Same			Internal to RGTM

Table 47: Output Signal mappings of Function



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5.1.2.4.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 48: Parameter mappings of Function

5.1.2.4.1.4 Interface Requirements

N/A

5.1.2.4.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_STAT_00001	Vehicle Speed Status	
R_FNC_BEC_STAT_00002	Vehicle Stationary Determination	
R_FNC_BEC_STAT_00003	Allow Power Operation	

Table 49: Inherited Requirements

5.1.2.4.2.1.1 Component Specific Requirements

###R_CMP_PLG_FIS_00037### Use Gearbox Type from ECVC

The RGTM shall determine the Gearbox_Type using data from the requirements found in version 002, dated October 6, 2015, of the Economized Central Vehicle Configuration Specification published by the Ford NetComm group and currently maintained at <https://www.vsemweb.ford.com/tc/webclient?argument=zhSNtS9Ex3NrTD>

End of Requirement

###R_CMP_PLG_FIS_00038### Use ECVC Database to Decode CDIDs

The RTM shall decode the ECVC CDIDs to determine Gearbox_Type using the requirements found in the VSEM version dated January 7, 2015 of the EconomizedCentralVehicleConfigurationDatabase(ECVC_DB) published by the Ford NetComm group and currently maintained at <https://www.vsemweb.ford.com/tc/webclient?argument=UIZRdT9dx3NrTD>

End of Requirement



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5.1.2.5 Implemented Function Determine BEC Move Request

5.1.2.5.1 Function Interfaces

5.1.2.5.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Precondition_Status	Same			Internal to RGTM
Valid_User_Rqst	Same			Internal to RGTM
Raw_User_Rqst	Same			Internal to RGTM
OpenCloseStop_Rqst	Same			Internal to RGTM
Glass_Ajar_RGT_Op_Stat	Same			Internal to RGTM
ObstacleDetect_Stat	Same			Internal to RGTM
RGT_Movement_Stat	Same			Internal to RGTM
RGT_Operation_Zone	Same			Internal to RGTM
RGT_Drift_Control_Rqst	Same			Internal to RGTM
OCCR_Cmd	Same			Internal to RGTM

Table 50: Input Signal mappings of Function

5.1.2.5.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
Valid_RGT_Rqst	Same			Internal to RGTM
RGT_Obstacle_Chime_Rqst	Same			Internal to RGTM
Invalid_RGT_FeedbackChime	Same			Internal to RGTM

Table 51: Output Signal mappings of Function

5.1.2.5.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 52: Parameter mappings of Function

5.1.2.5.1.4 Interface Requirements

N/A



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5.1.2.5.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_MOVE_00001	User request for Unlatch Operation	
R_FNC_BEC_MOVE_00002	User Request for Open Operation	
R_FNC_BEC_MOVE_00003	User Request for Close Operation	
R_FNC_BEC_MOVE_00004	User Request for Stop Operation	
R_FNC_BEC_MOVE_00005	Inhibit User Requested Operation	
R_FNC_BEC_MOVE_00006	Move Request due to BEC Manage Drift	
R_FNC_BEC_MOVE_00007	Move Request Due to Diagnostics	
R_FNC_BEC_MOVE_00008	Move Request Due to User Request	
R_FNC_BEC_MOVE_00009	Request Manual Close Message	
R_FNC_BEC_MOVE_00010	Warning on Rejected User Request	
R_FNC_BEC_MOVE_00011	Warning Due to Obstacle Detection	

Table 53: Inherited Requirements

5.1.2.5.2.1.1 Component Specific Requirements

N/A

5.1.2.6 Implemented Function Control BEC Operation

5.1.2.6.1 Function Interfaces

5.1.2.6.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Valid_RGT_Rqst	Same			Internal to RGTM
RGT_Programmed_Open_Position	Same			Internal to RGTM
RGT_Latch_Status	Same			Internal to RGTM
RGT_Latch_Cinch_Position_Status	Same			Internal to RGTM
RGT_Position_Count	Same			Internal to RGTM

Table 54: Input Signal mappings of Function

5.1.2.6.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
RGT_DriveControl_Rqst	Same			Internal to RGTM
Latch_CinchControl_Rqst	Same			Internal to RGTM
Latch_ReleaseControl_Rqst	Same			Internal to RGTM
RGT_Close_Chime_Rqst	Same			Internal to RGTM
RGT_Movement_Stat	Same			Internal to RGTM

Table 55: Output Signal mappings of Function



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5.1.2.6.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 56: Parameter mappings of Function

5.1.2.6.1.4 Interface Requirements

N/A

5.1.2.6.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_CTRL_00001	Request to Power Unlatch	
R_FNC_BEC_CTRL_00002	Request to Power Open	
R_FNC_BEC_CTRL_00003	Completion of Power Open	
R_FNC_BEC_CTRL_00004	Request to Power Close	
R_FNC_BEC_CTRL_00005	Power Cinch from Manual Close	
R_FNC_BEC_CTRL_00006	Completion of Power Cinch	
R_FNC_BEC_CTRL_00007	Request to Stop Power Open or Close	
R_FNC_BEC_CTRL_00008	Request to Power Hold	

Table 57: Inherited Requirements

5.1.2.6.2.1.1 Component Specific Requirements

N/A

5.1.2.7 Implemented Function Manage Drift

5.1.2.7.1 Function Interfaces

5.1.2.7.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
RGT_Strut_Speed	Same			Internal to RGTM
RGT_Strut_Direction	Same			Internal to RGTM
Diag_ClearDriftCount_Rqst	Same			Internal to RGTM
RGT_Movement_Stat	Same			Internal to RGTM
ObstacleDetect_Stat	Same			Internal to RGTM

Table 58: Input Signal mappings of Function

5.1.2.7.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
RGT_Drift_Count	Same			Internal to RGTM
RGT_Conrol_Drift_Rqst	Same			Internal to RGTM
RGT_Drift_Event_Warning_Rqst	Same			Internal to RGTM



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Table 59: Output Signal mappings of Function

5.1.2.7.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details
Drift_Speed_High_Cfg	Same		Method 3	
Detect_Drift_Time_Cfg	Same		Method 3	
Drift_Time_at_Speed_Cfg	Same		Method 3	

Table 60: Parameter mappings of Function

5.1.2.7.1.4 Interface Requirements

N/A

5.1.2.7.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_DRIFT_00001	Falling Gate Determination After Each Power Operation	
R_FNC_BEC_DRIFT_00002	Hold Liftgate When Falling Gate Detected	
R_FNC_BEC_DRIFT_00005	Power Close After Hold Due to Falling Gate	
R_FNC_BEC_DRIFT_00007	Warning Chime for Falling Gate	
R_FNC_BEC_DRIFT_00006	Obstacle During Power Close Due to Falling Gate	
R_FNC_BEC_DRIFT_00004	Falling Gate Determination Calibration	

Table 61: Inherited Requirements

5.1.2.7.2.1.1 Component Specific Requirements

N/A

5.1.2.8 Implemented Function BEC Slam Protection

TBD

5.1.2.9 Implemented Function BEC Obstacle Detection

5.1.2.9.1 Function Interfaces

5.1.2.9.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
DriveUnitPositionCounts	Same			Internal to RGTM
RightPinchStrip_Stat	Same			Internal to RGTM
LeftPinchStrip_Stat	Same			Internal to RGTM

Table 62: Input Signal mappings of Function

5.1.2.9.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
ObstacleDetect_Stat	Same			Internal to RGTM



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Table 63: Output Signal mappings of Function

5.1.2.9.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 64: Parameter mappings of Function

5.1.2.9.1.4 Interface Requirements

N/A

5.1.2.9.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_OD_00001	Primary Obstacle Detection	
R_FNC_BEC_OD_00002	Secondary Obstacle Detection	
R_FNC_BEC_OD_00003	Obstacle Detection Status	
R_FNC_BEC_OD_00004	Faulted Pinch Strip	
R_FNC_BEC_OD_00005	Primary Obstacle Detection Performance	

Table 65: Inherited Requirements

5.1.2.9.2.1.1 Component Specific Requirements

N/A

5.1.2.10 Implemented Function BEC Audible Feedback

5.1.2.10.1 Function Interfaces

5.1.2.10.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
RGT_Close_Chime_Rqst	Same			Internal to RGTM
RGT_Obstacle_Chime_Rqst	Same			Internal to RGTM
Invalid_RGT_FeedbackChime	Same			Internal to RGTM
RGT_Drift_Event_Warning_Rqst	Same			Internal to RGTM
ProgrammableStop_Chime_Rqst	Same			Internal to RGTM

Table 66: Input Signal mappings of Function

5.1.2.10.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
RGT_Chime_Cmd	DrTgateChime2_D_Rq			MS1CAN



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Table 67: Output Signal mappings of Function

5.1.2.10.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 68: Parameter mappings of Function

5.1.2.10.1.4 Interface Requirements

N/A

5.1.2.10.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_CHIME_00001	Sound Warning Chime for Closing	
R_FNC_BEC_CHIME_00002	Sound Urgent Warning Due to Falling Gate	
R_FNC_BEC_CHIME_00003	Sound Warning Chime due to Rejected User Request	
R_FNC_BEC_CHIME_00004	Sound Short Chime to Indicate Successful Opening Position Programming	
R_FNC_BEC_CHIME_00009	Sound Warning Chime for Opening	

Table 69: Inherited Requirements

5.1.2.10.2.1.1 Component Specific Requirements

N/A

5.1.2.11 BEC Determine Manual Mode

5.1.2.11.1 Function Interfaces

5.1.2.11.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_UserMode_Rqst	Power_Liftgate_Mode_Cmd			

Table 70: Input Signal mappings of Function

5.1.2.11.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
RGT_Lockout_Status	Same			Internal to RGTM
BEC_UserMode_Status	Power_Liftgate_Mode_Stt			MS1CAN

Table 71: Output Signal mappings of Function



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5.1.2.11.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 72: Parameter mappings of Function

5.1.2.11.1.4 Interface Requirements

N/A

5.1.2.11.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_MAN_00001	User Requests BEC to be in Manual Mode	
R_FNC_BEC_MAN_00002	User Requests BEC to be in Power Mode	
R_FNC_BEC_MAN_00003	Store User Selected Mode in NVM	
R_FNC_BEC_MAN_00004	User Selected Mode on System Initialization	

Table 73: Inherited Requirements

5.1.2.11.2.1.1 Component Specific Requirements

N/A

5.1.2.12 Implemented Function Back End Closure Status Feedback

5.1.2.12.1 Function Interfaces

5.1.2.12.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
Exterior_Sw_Auth_Stat	Same			Internal to RGTM
ManualCloseMsg_Rqst	Same			Internal to RGTM
ObstacleDetect_Stat	Same			Internal to RGTM
RGTM_Movement_Stat	Same			Internal to RGTM

Table 74: Input Signal mappings of Function

5.1.2.12.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
DrTGate_D_Rq	Same			MS1CAN
PwLftgtObstcl_D_Stat	Same			MS1CAN
PwLftgtLatchLck_B_Stat	Same			MS1CAN
PwLftgtMsgTxt_D_Rq	Same			MS1CAN

Table 75: Output Signal mappings of Function



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5.1.2.12.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 76: Parameter mappings of Function

5.1.2.12.1.4 Interface Requirements

N/A

5.1.2.12.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_Stat_00001	Report BEC Movement	
R_FNC_BEC_Stat_00002	Report Obstacle Detection	
R_FNC_BEC_Stat_00003	Report Exterior Switch Lock Status	
R_FNC_BEC_Stat_00004	Request Manual Close Message	

Table 77: Inherited Requirements

5.1.2.13 Implemented Function Back End Closure Authenticated Communication

5.1.2.13.1 Function Interfaces

5.1.2.13.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_PurposeCode_Rqstr	DrPrpsCodeBec_D_Res			CANFD1 to MS1CAN
BEC_RAC_ECI_Rqstr	DrActnCode_D_RqBec			CANFD1 to MS1CAN
BEC_AAC_Key_Rqstr	DrAuthntctnCode_D_RqBec			CANFD1 to MS1CAN

Table 78: Input Signal mappings of Function

5.1.2.13.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_PurposeCode_Exec	DrPrpsCode_D_RqBec			MS1CAN to CANFD1
BEC_AAC_Key_Exec	DrAuthntctnCodeBec_D_Res			MS1CAN to CANFD1
PassivePwr_DL_LG_Rqst				Internal to RGT M
BEC_Toggle_Rqst				Internal to RGT M
BEC_OpenClose_Rqst				Internal to RGT M
BEC_Lock_Unlock				Internal to RGT M
RGT_Handle_Sw_Enable_Stat				Internal to RGT M
LockInhibit_Cmd				Internal to RGT M
RGT_ValetMode				Internal to RGT M

Table 79: Output Signal mappings of Function



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5.1.2.13.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 80: Parameter mappings of Function

5.1.2.13.1.4 Interface Requirements

N/A

5.1.2.13.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment

Table 81: Inherited Requirements

5.1.2.13.2.1.1 Component Specific Requirements

###R_CMP_PLG_FIS_00012### Authenticate BEC Message Data

The RGTM shall verify the authenticity of the following signals using the protocol specified in "Point-to-Point Authentication Protocol Specification Version 0.1" (Reference VSEM item VDOC077948):

- RGT_ToggleStop_Count
- RGT_OpenClose_Count
- RGT_LULExt_Count
- RGT_LULLocalInterior_Count
- RGT_ValetMode_Count

Where:

- The RGTM is considered the Executor.
- DrPrpsCodeBec_D_Res is used for the P2PA_PurposeCode of the Requestor.
- DrActnCode_D_RqBec is used for the P2PA_RAC_ECI of the Requestor.
- DrAuthntctnCode_D_RqBec is used for the P2PA_AAC_Key for the Requestor.
- DrPrpsCode_D_RqBec is used for the P2PA_PurposeCode of the Executor.
- DrAuthntctnCodeBec_D_Res is used for the P2PA_AAC_Key of the Executor.
- There is no CAN signal defined for the P2PA_RAC_ECI of the Executor.

End of Requirement

###R_CMP_PLG_FIS_00013### Verify BEC Action Authentication Code

The RGTM shall verify the Action Authentication Code received from the BCM in DrAuthntctnCodeBec_D_Res when a Purpose Code of RAC_Frame_1 is received in DrPrpsCodeBec_D_Stat per the "Point-to-Point Authentication Protocol Specification Version 0.1" (Reference VSEM item VDOC077948).

End of Requirement

###R_CMP_PLG_FIS_00014### Report BEC Authentication Outcome Code

Once the Action Authentication Code has been verified, the RGTM shall send a P2PA Outcome Code by setting signal DrPrpsCode_D_RqBec to P2PA_Outcome (0xE) and setting signal DrAuthntctnCodeBec_D_Res as follows:



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- Outcome Code of 0x01 when a received Action Authentication Code has been verified as correct (success).
- Outcome Code of 0x02 when a received Action Authentication Code has been verified as not correct (failure).

End of Requirement

###R_CMP_PLG_FIS_00015### Parse BEC Requested Action Code Frame 1

Once the Action Authentication Code has been verified as correct, the RGTM shall decode the Requested Action Code Frame 1 per the following Table:

msb		Requested Action Code Frame 1 bits																				lsb					
27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RGT_LULExt_Count		RGT_LULLocalInterior_Count				RGT_LULAllExt_Count			RGT_ToggleStop_Count			RGT_RemoteToggleStop_Count			BEC_OpenClose_Count		RGT_ValetMode_Count		BEC_OprtSrc_D_Stat						ExecutorChallenge Index (ECI)		

If the Action Authentication Code is verified as not correct, then no change occurs to any of the Event Counters.

End of Requirement

###R_CMP_PLG_FIS_00023### Generate New Executor Challenge

Once a P2PA Outcome Code is provided, the RGTM shall continue to send the P2PA Outcome Code until the Requestor (BCM) sends a Purpose Code of Idle (0x0).

Once the Purpose Code of Idle is received by the RGTM, the RGTM shall generate a new random number to use as the Executor challenge and then set DrPrpsCode_D_RqBec = Regular_Frame and DrAuthntctnCodeBec_D_Res = Random Number + Executor Challenge Index.

End of Requirement

###R_CMP_PLG_FIS_00016### Verify Local Toggle Stop Request Count

The RGTM shall maintain an event counter (RGT_ToggleStop_Count) per the "Feature Specification – Event Counter: DRAFT 10sept2018" where:

- The RGTM is the Subscriber.
- When the counter is incremented to MutExB (next even value), the PassivePwr_DL_LG_Rqst is set to ACTIVE.
- MutEx A is not used (reserved).

End of Requirement

###R_CMP_PLG_FIS_00017### Verify Requester type Count



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The RGTM shall verify the state encoded signal (BEC_OprtSrc_D_Stat) per the below mentioned table where:

- The RGTM is the Subscriber.

	4	3	2	1	0
Null	0	0	0	0	0
Remote_Key	0	0	0	0	1
Remote_Phone	0	0	0	1	0
Ford_Pass_Modem	0	0	0	1	1
SOA_Offboard	0	0	1	0	0
SOA_Onboard	0	0	1	0	1
Handsfree	0	0	1	1	0
Passive_Back_End_Enclosure	0	0	1	1	1
Passive_Smart_Release	0	1	0	0	0
Interior_Softkey_HMI	0	1	0	0	1
Passive_Back_End_Enclosure_PK	0	1	0	1	0
Passive_Back_End_Enclosure_Phone	0	1	0	1	1
Keypad	0	1	1	0	0
NFC_Back_End_Enclosure	0	1	1	0	1
Open_On_Approach	0	1	1	1	0

Note: BEC_OprtSrc_D_Stat reflects the origin/source of the liftgate operation request

BEC_OprtSrc_D_Stat has to be verified when RGTM receives a BEC_OpenClose_Count or BEC_ToggleStop_Count request

End of Requirement

###R_CMP_PLG_FIS_00018### Verify Open/Close Request Count

The RGTM shall maintain an event counter (RGT_OpenClose_Count) per the "Feature Specification – Event Counter: DRAFT 10sept2018" where:

- The RGTM is the Subscriber.
- When the counter is incremented to MutExA (next odd value), the BEC_OpenClose_Rqst is set to CLOSE.
- When the counter is incremented to MutExB (next odd value), the BEC_OpenClose_Rqst is set to OPEN.

End of Requirement

###R_CMP_PLG_FIS_00020### Verify Lock/Unlock BEC Exterior Count

The RGTM shall maintain an event counter (RGT_LULExt_Count) per the "Feature Specification – Event Counter: DRAFT 10sept2018" where:

- The RGTM is the Subscriber.
- When the counter is incremented to MutExA (next odd value), the RGT_Handle_Sw_Enable_Stat is set to DISABLE.
- When the counter is incremented to MutExB (next odd value), the RGT_Handle_Sw_Enable_Stat is set to ENABLE.

End of Requirement



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###R_CMP_PLG_FIS_00021### Verify Switch Inhibit Count

The RGTM shall maintain an event counter (RGT_LULocalInterior_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The RGTM is the Subscriber.
- When the counter is incremented to MutexA (next odd value), the LockInhibit_Cmd is set to INHIBIT.
- When the counter is incremented to MutexB (next odd value), the LockInhibit_Cmd is set to NO_INHIBIT.

End of Requirement

###R_CMP_PLG_FIS_00022### Verify Valet Mode Count

The RGTM shall maintain an event counter (RGT_ValetMode_Count) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The RGTM is the Subscriber.
- When the counter is incremented to MutexA (next odd value), the RGT_ValetMode is set to ON.
- When the counter is incremented to MutexB (next odd value), the RGT_ValetMode is set to OFF.

End of Requirement

5.1.3 IPC

5.1.3.1 Implemented Function BEC User Select Manual Mode

5.1.3.1.1 Function Interfaces

5.1.3.1.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_User_Menu_Selection	CtrStkFeatConfigActl CtrStkFeatNoActl CtrStkPersIndex_D_Actl CtrStkDsplyOp_D_Rq			HS3CAN
BEC_UserMode_Status	Power_Liftgate_Mode_Stt			HS3CAN

Table 82: Input Signal mappings of Function

5.1.3.1.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_UserMode_Rqst	Power_Liftgate_Mode_Cmd			HS3CAN
BEC_UserMode_Display	FeatConfiglpcActl FeatNoIpcActl PersIndexlpc_D_Actl MsgCntrDsplyOp_D_Rq MsgCntrFeatConfigRq MsgCntrFeatNoRq MsgCntrPersIndex_D_Rq			HS3CAN



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Table 83: Output Signal mappings of Function

5.1.3.1.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 84: Parameter mappings of Function

5.1.3.1.1.4 Interface Requirements

N/A

5.1.3.1.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_USER_00001	User Selects Manual Mode	
R_FNC_BEC_USER_00002	User Selects Power Mode	
R_FNC_BEC_USER_00003	Update Menu Display of User Selected Mode	
R_FNC_BEC_USER_00004	User Selected Mode on System Initialization	

Table 85: Inherited Requirements

5.1.3.1.2.1.1 Component Specific Requirements

5.1.3.2 Implemented Function BEC Manual Mode HMI

5.1.3.2.1 Function Interfaces

5.1.3.2.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_mode_selection	Same			Internal to IPC
BEC_UserMode_Display	FeatConfigIpcActl FeatNoIpcActl PersIndexIpc_D_Actl			Internal to IPC

Table 866: Input Signal mappings of Function



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.3.2.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC User Menu Selection	Same			Internal to IPC

Table 877: Output Signal mappings of Function

5.1.3.2.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 888: Parameter mappings of Function

5.1.3.2.1.4 Interface Requirements

N/A

5.1.3.2.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_MODE_HMI_00001	User Selects Manual Mode	
R_FNC_BEC_MODE_HMI_00002	User Selects Power Mode	
R_FNC_BEC_MODE_HMI_00003	Update Menu Display of User Selected Mode	

Table 899: Inherited Requirements

5.1.3.2.2.1.1 Component Specific Requirements

5.1.4 APIM / APIM_CDC

5.1.4.1 Implemented Function BEC Manual Mode HMI

5.1.4.1.1 Function Interfaces

5.1.4.1.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_mode_selection	Same			Internal to APIM / APIM_CDC
BEC_UserMode_Display	FeatConfigIpcActl FeatNoIpcActl PersIndexIpc_D_Actl			HS3CAN

Table 90: Input Signal mappings of Function



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.4.1.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
BEC_User_Menu_Selection	CtrStkFeatConfigActl CtrStkFeatNoActl CtrStkPersIndex_D_Actl CtrStkDsplyOp_D_Rq			HS3CAN

Table 9190: Output Signal mappings of Function

5.1.4.1.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 92: Parameter mappings of Function

5.1.4.1.1.4 Interface Requirements

N/A

5.1.4.1.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_MODE_HMI_00001	User Selects Manual Mode	
R_FNC_BEC_MODE_HMI_00002	User Selects Power Mode	
R_FNC_BEC_MODE_HMI_00003	Update Menu Display of User Selected Mode	

Table93: Inherited Requirements

5.1.4.1.2.1.1 Component Specific Requirements

N/A

5.1.4.2 Implemented Function BEC center stack Open Close Request

5.1.4.2.1 Function Interfaces

5.1.4.2.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
APIM_BEC_softkey_Rqst				Internal to APIM / APIM_CDC

Table 9491: Input Signal mappings of Function



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5.1.4.2.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
APIM_BECDRelease_Cnt	BecRleas_No_RqMnu			HS3CAN to CANFD1

Table95: Output Signal mappings of Function

5.1.4.2.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 9692: Parameter mappings of Function

5.1.4.2.1.4 Interface Requirements

N/A

5.1.4.2.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_COC_00001	Request liftgate operation from front interior touchscreen	
R_FNC_BEC_COC_00002	Disable front interior touchscreen softkey	

Table97: Inherited Requirements

5.1.4.2.2.1.1 Component Specific Requirements

R_CMP_PLG_FIS_00039### Manage APIM Toggle Stop Request Count

The APIM / APIM_CDC shall maintain an event counter (APIM_BECDRelease_Cnt) per the “Feature Specification – Event Counter: DRAFT 10sept2018” where:

- The APIM is the publisher
- The event counter is classified as single feature event counter
- The event counter shall be incremented when APIM_BECD_softkey_Rqst becomes ACTIVE

End of Requirement

5.1.5 ECG

5.1.5.1 Implemented Function BEC Remote Service Requests



Feature Implementation Specification (FIS) Power Open/Close Liftgate

5.1.5.1.1 Function Interfaces

5.1.5.1.1.1 Inputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Subscriber Interface	Connection (Optional)
BEC_OpenClose_Rqst_Cloud	Same			Ethernet
BEC_StopToggle_Rqst_Cloud	Same			Ethernet
BEC_OpenClose_Rqst_AV	Same			Ethernet
BEC_StopToggle_Rqst_AV	Same			Ethernet
BEC_OpenClose_Rqst_LeftDAP	Same			Ethernet
BEC_StopToggle_Rqst_LeftDAP	Same			Ethernet
BEC_OpenClose_Rqst_RightDAP	Same			Ethernet
BEC_StopToggle_Rqst_RightDAP	Same			Ethernet
BEC_OpenClose_Rqst_FrontLeftDXP	Same			Ethernet
BEC_StopToggle_Rqst_FrontLeftDXP	Same			Ethernet
BEC_OpenClose_Rqst_FrontRightDXP	Same			Ethernet
BEC_StopToggle_Rqst_FrontRightDXP	Same			Ethernet
BEC_OpenClose_Rqst_RearLeftDXP	Same			Ethernet
BEC_StopToggle_Rqst_RearLeftDXP	Same			Ethernet
BEC_OpenClose_Rqst_RearRightDXP	Same			Ethernet
BEC_StopToggle_Rqst_RearRightDXP	Same			Ethernet
SOA_PLG_Stat	ClrOprtSrvc_D_Arb ClrOprtSrvclD_No_Actl ClrOprtSrvc_D_Res LckUnlckSrvc_D_Arb LckUnlckSrvclD_No_Actl LckUnlckSrvc_D_Res			FD1 CAN

Table 93: Input Signal mappings of Function

5.1.5.1.1.2 Outputs

Logical Signal Name	Technical Signal Name	Mapping Details (Conditional)	Publisher Interface	Connection (Optional)
SOA_PLG_Rqst	ClrOprtPrxmChk_D_Stat ClrOprtSrvclD_No_Rq ClrOprtSrvcSrc_B_Rq ClrOprtSrvc_D_Rq ClrOprtSrvcType_B_Rq LckUnlckSrvclD_No_Rq LckUnlckSrvcSrc_B_Rq LckUnlckSrvc_D_Rq LckUnlckSrvcType_B_Rq			FD1 CAN

Table 94: Output Signal mappings of Function

5.1.5.1.1.3 Parameters

Logical Parameter Name	Technical Parameter Name	Mapping Details (Conditional)	Method	Method Details

Table 95: Parameter mappings of Function

5.1.5.1.1.4 Interface Requirements

Refer to Enclosure_Service_Specification_RevH



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5.1.5.1.2 Function Requirements

Requirement ID (of Logical Function)	Requirement Title	Comment
R_FNC_BEC_RS_00001	Enable Exterior Handle when Unlock is requested	
R_FNC_BEC_RS_00002	Disable Exterior Handle when Lock is requested	
R_FNC_BEC_RS_00003	Request Open Operation	
R_FNC_BEC_RS_00004	Request Close Operation	

Table 96: Inherited Requirements - BEC Remote Service Request

5.1.5.1.2.1.1 Component Specific Requirements

###R_CMP_PLG_FIS_00041### Accept BEC Open/Close Requests from Remote access features/subsystems

Refer to Enclosure_Service_Specification_RevH, Requirement FUR-REQ-391111

End of Requirement

###R_CMP_PLG_FIS_00042### Accept BEC Unlock Requests from Remote access features/subsystems

Refer to Enclosure_Service_Specification_RevH, Requirement FUR-REQ-391104

End of Requirement

###R_CMP_PLG_FIS_00043### Report BEC status to Remote access features/subsystems

Refer to Enclosure_Service_Specification_RevH, Requirement FUR-REQ-391117

End of Requirement

5.2 Requirements on Connections

5.2.1 CAN Bus x

#Hint: For CAN most requirements are defined by Netcom and listed in the SDS CAN. Put in this section only those requirements, which deviate from that standard specification.

5.2.1.1 Protocol Requirements

#Hint: For CAN Ford currently mandates FNOS as SW implementation for the CAN protocol stack. This includes the CAN Network Management and Transport Protocol. If you deviate from this assumption or if you have specific requirements on FNOS, which are not contained in the standard package, put requirements in this section. For details the FNOS user guide and application notes could be referenced.

5.2.1.1.1 Message List

Refer to chapter “[Messages](#)” in the “[Data Dictionary](#)”.



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5.2.1.2 Electrical Requirements

#Hint: List requirements here, only if they deviate from the SDS CAN.

5.2.2 LIN x

#Hint: Place requirements here, which are common to all LIN nodes, but not covered by some SDS LIN.

5.2.2.1 Protocol Requirements

5.2.2.1.1 Message List

#Hint: The message list is typically documented in the LDF file.

Refer to chapter “[Messages](#)” in the “[Data Dictionary](#)”

5.2.2.1.2 Schedule Table

#Hint: The LIN Schedule Table should be documented in the LDF file. The LDF file could be referenced here

5.2.2.2 Electrical Requirements

#Hint: The LIN Schedule Table should be documented in the LDF file. The LDF file could be referenced here

5.2.3 Ethernet x

#Hint: On Ethernet we will see most likely the DoIP and MQTT protocol. Both protocols are described in separate specifications and are implemented in the Ford AUTOSAR stack. While DoIP might be not that relevant in this scope, MQTT (together with the Google Protocol Buffer (GPB) serialization of the payload) will become important for all features, which are mapped to a Service Oriented Architecture/Communication (SoC). All application data, which is transmitted via MQTT (so called MQTT Topics) is managed in the IDB by Netcom.

#Link: <http://www.mqtt.org>, <https://developers.google.com/protocol-buffers/docs/proto>

5.2.4 WLAN (IEEE 802.11.x)

5.2.5 RF

5.2.6 Hardwired I/Os

#Hint: This section lists all hardwired signals relevant for the feature deployment. Those get typically mapped to EDAS signals (“connections”) – refer to list of connections in corresponding table in chapter “[Hardwired Signals](#)”

5.3 Requirements on Development Process



6 OPEN CONCERNS

ID	Concern Description	e-Tracker Reference	Status	Solution
1	Need to define criteria for Slam Protection. This is currently defined by the supplier.			
2				
3				
4				

Table 97: Open Concerns



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7 REVISION HISTORY

#Hint: A new version number is assigned to a document with a given revision each time it is checked in to Team Center (TCSE). After release of a revision, the document cannot be edited and no new versions can be created on that revision. When updating the document after that, a new revision has to be created and new versions on that revision will be created upon checking in.

Rev. (revision)	Vers.	Date	Description	Approved by	Responsible
001	A	1/31/20	Initial version		DKING13
002	A	2/11/20	Revised R_CMP_PLG_FIS_00017-21 to define Mutex B properly.		DKING13
003	A	10/12/20	Added APIM and IPC functions		KPURI
004	A	4/23/21	Added ECG Remote service Request function		KPURI



8 APPENDIX

8.1 Data Dictionary

8.1.1 Logical Signals

#Hint: Logical Signals are managed in VSEM in the [RE Data Dictionary](#).

#Link: [RE Wiki – Adding a Logical Signal or Parameter](#)

#Macro: Add Ins -> Add Requirement macro (select “Logical Signal” as type)

8.1.2 Logical Parameters

#Hint: Logical Parameters are managed in VSEM in the [RE Data Dictionary](#).

#Link: [RE Wiki – Adding a Logical Signal or Parameter](#)

#Macro: Add Ins -> Add Requirement macro (select “Logical Parameter” as type)

8.1.3 Technical Signals

#Hint: This section lists all GSDB + GDT + SW signals relevant for the feature deployment.

#Link:

[Technical Signal or Parameter](#)

#Macro: Add Ins -> Add Requirement macro (select “Technical Signal” as type)

8.1.3.1 GSDB Signals

#Hint: This part of the Data Dictionary lists signals, which should go to the GSDB in VSEM, but do not exist in the GSDB in VSEM yet, but are or will be requested for the GSDB. Those would go temporarily to this section in the [RE Data Dictionary](#) in VSEM.

8.1.3.2 Service Oriented Communication

#Hint: This part of the Data Dictionary lists signals, which are used for the Service Oriented Architecture (SoA), but do not exist in the IDB in VSEM yet, but are or will be requested for the IDB. Those would go temporarily to this section in the [RE Data Dictionary](#) in VSEM.

8.1.3.3 Hardwired Signals

#Hint: This chapter lists signals, which will be mapped to hard-wired connections. Those get typically mapped to the signals (“connections”) in the logical schematics – refer to list of connections in corresponding table in chapter “[Hardwired I/Os](#)” in section “

#ToDo: Where do we manage hardwired signals / connections. While we do not have such a central repository in VSEM those signals will be managed as a work around in the [RE Data Dictionary](#).

8.1.3.4 Diagnostic Interfaces

#Hint: This chapter lists Diagnostic Interfaces (DTCs and DIDs), which get mapped to Logical Parameters in context of the Implemented Functions in chapter “[Parameters](#)” of the [Function Interfaces](#). Those DTC/DID names should match the names in the diagnostics specification (Part 2).

#ToDo: Currently the template below is just a proposal. A macro still needs to be created

8.1.3.4.1 DTCs



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###<DTC_<ID>>### <DTC Name>

<Some Description of the DTC.

Refer to VSEM document "[Diagnostic Fault Coverage and DTC Numbers Design Consideration](#)", what to fill into the attributes below>

Test Period Time	
Test Run Criteria,	
Enable Criteria (EC)	
Applicable	
FailureTypeBytes	
Test Period Time	
Test Run Criteria,	

8.1.3.4.2 DIDs

#Hint: This section lists diagnostic DID which Technical Parameters get mapped to.

#Todo: A proper template derived from the Part 2 spec still needs to be created.

8.1.4 Technical Parameters

#Hint: This section lists all Method 2, Method 3 and calibration parameters relevant for the feature deployment.

#Link: [RE Wiki – Adding a Technical Signal or Parameter](#)

#Macro: Add Ins -> Add Requirement macro (select "Technical Parameter" as type)

8.1.5 Mappings

#Hint: This section lists mapping objects for Logical Signals / Parameters to their GSDB + GDT + SW counterparts (1:N mapping is supported). Mapping objects are managed in VSEM in the [RE Data Dictionary](#).

#Link: [RE Wiki – Adding a Signal or Parameter Mapping](#)

#Macro: A macro still needs to be created. For the time being use a copy&paste approach.

Please follow the naming convention "MAP_LogicalSignalName_TechnicalSignalName".

Optionally, create a Word bookmark for the Mapping Name of each Mapping object. This allows referencing the Mapping object in the rest of the document.

###<MAP_MappingID>### <MAP_LogicalSignalName_TechnicalSignalName>

<Some Description of the Mapping>

Logical Signal/Parameter			Technical Signal(s)/Parameter(s)	
Name		<Logical Signal Name>	Name(s)	<Technical Signal / Parameter Names>
Encoding Type		<Name of Encoding Type>	Mapping Details	<Description how encoding of logical signal maps to the the one of the technical signal(s)/parameter(s)>
Note: An encoding is either discrete or continuous. Delete fields below which are not needed				
Value (continuous encoding)	Min Value			
	Max Value			
	Resolution			
	Offset			
Value (discrete encoding)	Value 1	<Interpretation of value 1>		
	Value 2	...		
		
Unit				



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8.1.6 Technical Interfaces

#Hint: This section lists port/interface details, which define how network/SW/HW signals are published / subscribed.

#Link: [RE Wiki – Adding a Technical Interface](#)

8.1.6.1 AIS Interfaces

#Hint: This chapter lists the AIS interface objects (managed in VSEM), which are needed to deploy the feature / service to the E/E architecture. If required AIS interfaces do not yet exist in VSEM, those may temporarily be managed as a workaround in the [RE Data Dictionary](#).

#Link: [RE Wiki - AIS Interfaces](#)

[Publisher Interface AIS in VSEM](#)

[Subscriber Interface AIS in VSEM](#)

#Macro: A macro still needs to be created. For the time being use a copy&paste approach.

8.1.6.1.1 Publisher Interfaces

Requirement ID: ###PUBIF_AIS_InterfaceID###	
Interface Name	PubIf_TechnicalSignalName (Please follow the naming convention "PubIf_TechnicalSignalName". Optionally you may create a Word bookmark for the Interface Name. This allows referencing the Mapping object in the rest of the document)
Interface Description	Some Description of the Publisher Interface of the Technical Signal
Signal Robustness/Integrity	
Functional Safety Relevant	Choose an item.
Checksum	Choose an item.
Counter	Choose an item.
Network Timing	
Publishing Interval (ms)	
Publisher Latency (ms)	
Signal Transmit Strategy	Choose an item.
Signal Send Type	Choose an item.
Signal Refresh Rate (ms)	
Network Management	
Publishing Network Sleep Inhibitor	
Network Wake Up	Choose an item.
Signal Update While Network Asleep	Choose an item.
Fresh data on Network wakeup	Choose an item.
Max latency before signal is valid on Network wakeup(ms)	
Reset Behavior	
Fresh data on ECU Reset	Choose an item.
Max latency before signal is valid on reset (ms)	
Functional Characteristics	
ECU Power Mode	Choose an item.
CAN Node Type	Choose an item.

End of Requirement

8.1.6.1.2 Subscriber Interfaces



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Requirement ID: ###SUBIF_AIS_InterfaceID###	
Interface Name	SubIf_TechnicalSignalName (Please follow the naming convention "SubIf_TechnicalSignalName". Optionally you may create a Word bookmark for the Interface Name. This allows referencing the Interface object in the rest of the document)
Interface Description	Some Description of the Subscriber Interface of the Technical Signal
Signal Robustness/Integrity	
Functional Safety Relevant	Choose an item.
Checksum	Choose an item.
Counter	Choose an item.
Network Timing	
Subscribing Interval (ms)	
Subscriber Latency (ms)	
Network Management	
Subscribing Network Sleep Inhibitor	
Network Wake Up	Choose an item.
Network Routing	
Gateway Required	Choose an item.
Max Gateway Latency (ms)	
Gateway Message Type	Choose an item.
Missing Message Strategy	
Missing Message Strategy	Choose an item.
Time Period for Last Signal Value to be used	
Missing Message Default Value	
Missing Message DTC	
Missing Message Strategy Details	
Functional Characteristics	
ECU Power Mode	Choose an item.
End of Requirement	

8.1.6.2 Service Oriented Communication (SoC) Interfaces

8.1.6.3 AUTOSAR Ports (SW Interfaces)

8.1.7 Messages

8.1.7.1 CAN Bus "<Bus Name>"

#Hint: This section gives the relevant extract from the [Central Message Database \(CMDB\) in VSEM](#).

###<MSG_MessageID### MessageName

Message Name	ID	Transmission Mode	Period	Signal Names	Transmitters	Receivers
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8.1.7.2 LIN Bus "<Bus Name>"

8.1.8 Encoding Types

#Link: [RE Wiki – Adding Encoding Types](#)

#Macro: Add Ins -> Add Requirement macro (select "Encoding Type" as type)



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Document ends here.