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# Introduction

## Document Purpose

A Feature Document (FD) document specifies **what** the feature shall do and how it shall behave from customer perspective. It should also provide reasoning and background **why** we have the feature in the vehicle.

The FD also serves as an Item Definition as defined by ISO26262 for those features, which follow the Ford Functional Safety process.

To get more information about the concept of feature, function and component level abstraction refer to the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features). For details on the Ford Functional Safety (ISO26262) process refer to the [Ford Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx).

## Document Scope

This Feature Document (FD) specifies the following features:

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature ID** | **Feature Name** | **Owner** | **Reference** |
| <Add VSEM Global Feature Dictionary ID> |  |  | <Add VSEM Link> |
|  |  |  |  |

Table 1: Features described in this FD

## Document Audience

The FD is written by the feature owner of <Feature / Feature Group Name>. All Stakeholders, i.e., all people who have a valid interest in the feature should read and, if possible, review the FD. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FD.

**#Hint:** The FD template has the IP Classification “Proprietary” by default. IP Classification “Confidential” might be required in some cases, e.g. by Ford Functional Safety.

**#Macro:** [Add Ins -> Edit Document Properties macro](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates#HowtousetheSpecificationTemplates-EditDocProperties) (select “Proprietary” for “Document Classification”)

### Stakeholder List

For the latest list of stakeholder of the feature and their influence refer to <Put VSEM Link here>.

**#Hint:** Refer to [Ford RE Wiki – Stakeholder List](http://wiki.ford.com/display/RequirementsEngineering/Stakeholder+Analysis) 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.

## Document Organization

### Document Context

Refer to the [Specification Structure page](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates) in the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features) to understand how the FD relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

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

**Section 2** – Feature Description. States briefly the background and the purpose of the feature, feature variants and corresponding regions and markets. Also includes input requirements, assumptions and constraints.

**Section 3** – Feature Context describes all external entities, which have an influence on the feature.

**Section 4** – Feature Modeling. Contains Use Case, Driving Scenarios, State Charts to describe the functional behavior of the feature.

**Section 5** – Safety. Lists System Behaviors and Safety Goals of the feature.

**Section 6** – Feature Requirements. Lists functional and non-functional requirements of the feature.

**Section 7** – Architecture. Shows the coarse architecture, which the feature requirements are deployed to. Describes the elements and the boundary of the feature as well as the decomposition and distribution of associated functions.

**Section 8** – List of Open Conerns

**Section 9** – Document Change History including a list of new or modified requirements. The requirements in this document are tagged, and this section contains different types of tables listing all, new, or changed requirements by their title and page no.

**Section 10** – Appendix

**#Hint:** All sections are mandatory, unless explicitly marked by the tag “#Classification” as “optional” or as applicable e.g. to certain domains like “Functional Safety”.

## Document Conventions

### Requirements Templates

Each requirement, use case or scenario in this specification shall follow the corresponding template given in the document template *Specification\_Macros.dotm* at [RE Wiki - Specification Templates](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates?src=contextnavpagetreemode).

**#Hint:** The Specification\_Macros.dotm template also provides macros to insert the requirement templates. Refer to “[How to use the Specification Templates](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates?src=contextnavpagetreemode)” on how to enable the macros and the requirements templates in this specification.

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

#### Identification of requirements

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

All identifiers in a FD 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\_F\_AutoLamps\_00004* This is the fourth requirement on feature level for the feature Autolamps.

#### Requirements Attributes

The templates provided by *Specification\_Macros.dotm* define a list of attributes for each requirement. This helps to classify the requirement. The attributes are explained at [RE Wiki - Requirements Attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes?src=contextnavpagetreemode).

# Feature Overview

## Purpose and Description of Feature

The Feature Smart Unlock prevents the user from locking themselves out of the vehicle. Depending on the vehicle configuration and feature variant, appropriate doors will be unlocked when the user locks/reassembles the vehicle doors while a door is open (Smart Unlock Ignition / Door Open) or slam the last open door while a key is inside (Passive Smart Unlock & Release).

## Feature Variants

|  |  |  |
| --- | --- | --- |
| Variant Name | Variant Description | Remarks |
| **Smart Unlock Ignition** | Appropriate doors will be unlocked when the user locks the vehicle while a door is open and ignition is on. |  |
| **Smart Unlock Door Open aka Slam Lock Protect** | Appropriate doors will be unlocked when the user locks the vehicle while a door is open.  [If SUL Door Open is enabled, SUL Ignition is disabled] |  |
| **Smart Unlock Door Off to On upon Close** | This feature-variant unlocks all doors after the user removes a door from the vehicle, reassembles the door and closes the last open door, independent from the current lock status of the vehicle. |  |
| **Passive Smart Unlock & Release** | Appropriate doors will be unlocked when the user locks the vehicle and the last open door will be closed while a passive key / PAAK is inside the vehicle |  |

Table 2: Feature Variants

### Regions & Markets

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Market / Region**  **Feature Variant** | **North America**  **NA** | **Europe**  **EU** | **South America**  **SA** | **Asia Pacific**  **(incl. China)**  **AP** | **Middle East / Africa**  **MEA** |
| **Smart Unlock Ignition** | Mandatory | Not available | Not available | Not available | Not available |
| **Smart Unlock Door Open aka Slam Lock Protect** | Not available | Mandatory | Mandatory | Mandatory | Mandatory |
| **Smart Unlock Door Off to On upon Close** | Mandatory,  if removable doors enabled | Mandatory,  if removable doors enabled | Mandatory,  if removable doors enabled | Mandatory,  if removable doors enabled | Mandatory,  if removable doors enabled |
| **Passive Smart Unlock & Release** | Mandatory,  if Passive Start enabled | Mandatory,  if Passive Start enabled | Mandatory,  if Passive Start enabled | Mandatory,  if Passive Start enabled | Mandatory,  if Passive Start enabled |

Table 3: Regions & Markets

## Input Requirements

**#Hint:** List all input requirements, which are relevant for the feature. Typically, attribute requirements, legal requirements as well as national and international standards have to be considered.

### Legal Requirements

### Trustmark Requirements

### Industry Standards

## Lessons Learned

**#Hint:** Additional information and lessons learned from previous development or related features. A typical source for Lessons Learned is the FMA Quality History.

**#Functional Safety:** In context of Functional Safety Lessons Learned and similar information will be used to check the completeness of the Functional Safety Goals and assumptions in the Hazard Analysis and Risk Assessment (HARA).

**#Link:** [Ford Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx)

## Assumptions

**#Classification**: Optional

**#Hint:** A list of known assumptions concerning the effects of the feature’s behavior on other features or elements (i.e., dependencies) as well as assumptions on the behavior expected by the feature (e.g. known limitations). During the course of the feature development most of those assumptions are typically either converted into actual requirements or discarded at some point – such that this chapter remains mostly empty. For assumptions, which are relevant for the Functional Safety process refer to chapter 6.2 “Safety Assumptions”

## References

### Ford Documents

List here all Ford internal documents, which are directly related to the feature.

| **Reference** | **Title** | **Doc. ID** | **Document Location** | **Revision** |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |

Table 4: Ford internal Documents

### External Documents and Publications

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

**#Hint:** You may refer to [IEEE Citation Reference](http://www.ieee.org/documents/ieeecitationref.pdf) on how to format a reference.

| **Reference** | **Document / Publication** | **Document Location** |
| --- | --- | --- |
|  |  |  |
|  |  |  |

Table 5: External documents and publications

## Glossary

**#Hint**: Terms, concepts and abbreviations used in the document shall be defined and illustrated here. Note that changes to terms and/or concepts described in this section tend to cause major updates to this document.

The tables below have feature specific definitions and abbreviations. For additional, non-feature specific terms please refer to the [RE Glossary](http://wiki.ford.com/display/RequirementsEngineering/Glossary?src=contextnavpagetreemode)

### Definitions

| **Definition** | **Description** |
| --- | --- |
| Vehicle Types | **Passenger Vehicle**  Passenger=Occupant=Cabin- Compartment  Cargo – Compartment  Decklid / Trunk / Boot  Liftgate / Hatchback  Tailgate  **Commercial Vehicle Kombi LG (Double Cab Panel Van)**  Passenger=Occupant=Cabin- Compartment  Cargo – Compartment  Liftgate  Passenger=Occupant=Cabin- Compartment  Cargo – Compartment  Rear Hinged Cargo Door  **Commercial Vehicle Kombi RHCD (Double Cab Panel Van)**  **Commercial Vehicle VAN LG (Single Cab Panel Van)**  Passenger=Occupant=Cabin- Compartment  Cargo – Compartment  Liftgate  **Commercial Vehicle VAN RHCD (Single Cab Panel Van)**  Passenger=Occupant=Cabin- Compartment  Cargo – Compartment  Rear Hinged Cargo Door |
| Basic key cylinder | If the user locks or unlocks the vehicle with a mechanical key in a basic key cylinder, the vehicle will be locked / unlocked **mechanically** only on the driver door. |
| Advanced key cylinder | If the user locks or unlocks the vehicle with a mechanical key in an advanced key cylinder, the vehicle will be locked / unlocked **electrically**. Appropriate doors will be locked / unlocked depending from vehicle type, unlock stage etc. (see decision tables in this document). |
| Legend for Door & Latch States | Liftgate/Hatchback/Trunk/Decklid Released and Outer Release Handle Enabled  Liftgate/Hatchback/Trunk/Decklid Released and Outer Release Handle Disabled  Exterior Central Lock  Double Lock  Unlock (electric)  Liftgate/Hatchback/Tailgate Closed and Outer Release Handle Enabled  Liftgate/Hatchback/Tailgate Closed and Outer Release Handle Disabled  Power/Manual Child Lock Activated & Central Unlock  Power/Manual Child Lock Activated & Central Lock  Rear Hinged Cargo Door  Trunk/Decklid Closed and Outer Release Handle Enabled  Trunk/Decklid Closed and Outer Release Handle Disabled  Swing Gate Closed  Swing Gate Open  Unlock (mechanical)  Interior Central Lock  Local Lock (mechanical) |
| Legend of Visual Feedback | Inside Lock/Unlock Status, Locked  Inside Lock/Unlock Status, Unlocked  Flasher Feedback for Unlock/Enable  Flasher Feedback for Central Lock  Flasher Feedback for Double Lock  Mirror Unfold on Exterior Unlock  Mirror Fold on Exterior Lock |

Table 6: Definitions used in this document

### Abbreviations

Please see the [Glossary for Power Locking Features](https://pd3.spt.ford.com/sites/EESEC3P/Requirements_Engineering/Shared%20Documents/Projects/01_RE_Improvement/04_Documents/06_Pilots/Locking/Old/PowerChildLock/Specs/Feature/Glossary%20for%20Power%20Locking%20Features%20190314.docx).

### Parameters / Values

| **Name** | **Description** | **Range / Resolution** |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

Table 7: Parameters / Values used in this document

# Feature Context

## Feature Context Diagram



## List of Influences

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **External Entity** | | **Influence Description** |
| I1 | User | | A Rear-Seat-Passenger as a user is able to interact with the exterior/interior handle and is informed by current lock/unlock status (Flash-Feedback/Mislock Feedback). |
| I2 | A Front-Seat-Passenger as a user is able to interact with the exterior/interior handle and is informed by current lock/unlock status (Flash-Feedback/Mislock Feedback). |
| I3 | The Driver as a user is able to interact with the exterior/interior handle and is informed by current lock/unlock status (Flash-Feedback/Mislock Feedback). |
| I4 | Service | | Is able to update and configure the feature. |
| I5 | Plant | | Is able to enable or disable the feature |
| I6 | Vehicle Mode Management | | Ignition status of the vehicle is a necessary condition to activate SUL |
| I7 | Feature:  Release Enclosure | | Feature SUL is depended from the open/close status of the doors. |
| I8 | Feature:  Alarm | | Feature Alarm shall be deactivated to trigger the SUL. |
| I9 | Feature:  Customization | | Customization of Smart Unlock is not allowed. |
| I10 | Feature:  Personalization | | Personalization of Smart Unlock is not allowed. |
| I15 | Other Locking Features | Feature:  Electronic Lockable Storage (ELS) | The activation of ELS could trigger the feature SUL |
| I16 | Feature:  Fuel Filler Lock (FFL) & Fuel Filler Unlock (FFUL) | SUL shall activate the feature FFUL. The activation of FFL could trigger the feature SUL |
| I17 | Feature  Power Child Lock (PCL) | SUL shall not enable/unlock interior door handles with PCL active. |
| I18 | Feature:  Central Lock & Unlock (CLUL) | The activation of Exterior Central Lock could trigger the feature SUL. SUL shall generate a mislock feedback after the feature triggers an Unlock. Smart Unlock triggers an Exterior Unlock. |

Table 8: List of Influences

# Feature Modeling

## Operation Modes and States

N/A

## Use Cases

### Use Case Diagram

N/A

### Actors

| Actor | Description |
| --- | --- |
| User | The Driver as a user is able to interact with the interior trim switch, soldier/toggle on the driver door or any exterior trigger (remote key,..).  The user can trigger an interior or exterior Lock via trim switch, soldier on the driver door, remote/passive key, mechanical key in key cylinder, passive lock sensor, passive handles / switches, keypad unlock code, cell phone passport or webpage passport. |
| A Front Passenger as a user is able to interact with the interior trim switch on the passenger door.  The user can trigger an interior or exterior Lock via trim switch, soldier on the passenger door, remote/passive key, passive lock sensor, passive handles / switches, cell phone passport or webpage passport., assuming the user has appropriate trigger device. |
| A Rear Passenger as user is able to interact with the interior and exterior door handle/switch on the rear door.  The user can trigger an interior or exterior Lock via trim switch, soldier on the rear passenger door, remote/passive key, passive lock sensor, passive handles / switches, cell phone passport or webpage passport., assuming the user has appropriate trigger device. |

Table 9: List of Actors

### Use Case Descriptions

#### Passenger Vehicle

##### Smart Unlock Ignition On

###UC\_F\_SUL\_00001### Enable All Exterior Handles on Passenger Vehicle

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | Enable all exterior handles after the user locks the vehicle while a front door or a rear door with trim switch is open, while ignition is on. This feature avoids a locking of the remote key inside the vehicle.  Lock action  Smart Unlock  Liftgate/RHCD open  (If Shutface Lock Switch is fitted)  Lock action  Smart Unlock  Lock action  Smart Unlock  Lock action  Smart Unlock  Lock action  Smart Unlock  Driver Door open  Passenger Door open  Rear Driver Door open  (If Rear Trim switches are fitted)  Rear Passenger Door open  (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Feature “Smart Unlock Door Open” is disabled |
|  |  | Ignition is on |
|  |  | Any front door is open and/or any rear side door with fitted trim switch is open OR  Cargo door with fitted shutface lock switch is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while Ignition is ON (see Central Lock & Unlock Feature Specification) |
|  | M2 | All exterior handles will be locked/disabled -> Exterior Central Lock (ECL) |
|  | M3 | After 1 second all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All doors can be opened from inside and outside |

##### Smart Unlock Door Open

###UC\_F\_SUL\_00002### Enable All Exterior Handles on Passenger Vehicles

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all interior and exterior handles after the user locks the vehicle while a front door or a rear door (only with trim switch) is open. This feature avoids a locking of the remote key inside the vehicle.  Lock action  Smart Unlock Door Open  Liftgate/RHCD open  (If Shutface Lock Switch is fitted)  Lock action  Smart Unlock Door Open  Lock action  Smart Unlock Door Open  Lock action  Smart Unlock Door Open  Lock action  Smart Unlock Door Open  Driver Door open  Passenger Door open  Rear Driver Door open  (If Rear Trim switches are fitted)  Rear Passenger Door open  (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any front door is open and/or any rear side door with fitted trim switch is open OR  Cargo door with fitted shutface lock switch is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while a door fitted with trim switch is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All doors can be opened from inside and outside |

##### Smart Unlock Door Off to On upon Close

###UC\_F\_SUL\_00003### Enable All Exterior Handles on Passenger Vehicles with removable Doors after all Doors reassembled and closed

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all interior and exterior handles after the user removes a door from the vehicle, reassembles the door and closes the last open door.  This feature avoids a locking of the key inside the vehicle after the user removes a door and reassembles it again. |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” with removable doors |
|  |  |  |
| **Main Flow** | M1 | User opens any removable door and removes at least one of the opened doors |
|  | M2 | User reassembles all doors. The vehicle lock status is irrelevant (locked or unlocked) |
|  | M3 | After the user closes the last door, all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All doors can be opened from inside and outside |
|  |  |  |
| **Post-condition** |  | No impact on Alarm features (see Alarm Spec) |

##### Passive Smart Unlock & Release

###UC\_F\_SUL\_00004### Enable All Exterior Handles on Passenger Vehicles after Closing the last open Door

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all interior and exterior handles after the user locks the vehicle electronically while no passive key inside the vehicle and one passive key is found outside and the user closes the last open door. The feature avoids a locking of the passive key inside the vehicle.  Note:  Europe Operation: When “Smart Unlock Door Open” is present and a lock is requested with door ajar it unlocks immediately, hence passive  smart unlock is aborted  Lock action  Passive Smart Unlock & Release”  Close last open door |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” |
|  |  | Feature “Smart Unlock Door Open” is disabled (Europe) |
|  |  | Any Passive Start Method is fitted |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any door or liftgate / decklid / liftgate glass is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while any door or liftgate / deckld / liftgate glass is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | Feature performs an interior search and finds a PK or PaaK |
|  | M4 | Feature performs an exterior search but finds **NO** PK or PaaK |
|  | M5 | After the user closes the last open door, all exterior door handles will be unlocked/enabled -> Central Unlock (CUL) |
|  | M6 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M7 | All doors can be opened from inside and outside |

###UC\_F\_SUL\_00005### Enable and Release Decklid on Passenger Vehicles after Closing the Decklid

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables and releases the decklid after the user locks the vehicle electronically while no passive key is inside the decklid and one passive key is found outside the decklid and the user closes the decklid.  Note:  If a passive key is detected outside after the vehicle is electronically locked (regardless if a passive key was left inside the decklid), when the decklid is closed no Passive Decklid Smart Unlock occurs. |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” |
|  |  | Any Passive Start Method is fitted |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Car mode is not in Factory |
|  |  | Decklid is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while any door or liftgate / deckld / liftgate glass is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | Feature performs an interior search and finds a PK or PaaK |
|  | M4 | Feature performs an exterior search but finds **NO** PK or PaaK (if passive entry is fitted) |
|  | M5 | After the user closes the last open door, all exterior door handles will be unlocked/enabled -> Central Unlock (CUL) |
|  | M6 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M7 | All doors can be opened from inside and outside |

###UC\_F\_SUL\_00006### Stop / Release Power Liftgate / Decklid on Passenger Vehicles after Liftgate / Decklid Closing

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Purpose** |  | The feature stops or enables / releases the liftgate / decklid after the user locks the vehicle electronically while no passive key is inside and one passive key is found outside and the user closes the liftgate / decklid electrically or manually.  The feature Power Liftgate initiates two different key searches after activation:  The **primary key search** is initiated at Power Close requests, which are triggered via shutface operation switch or exterior liftgate / decklid power operation switch while the vehicle is locked.  If one key / phone is found inside (and no key/phone outside ->only if passive entry is fitted) and the vehicle is locked, the feature “Passive Smart Unlock & Release” shall stop the liftgate / decklid.  The **secondary key search** is initiated after any closing of the liftgate / decklid (automatically or manually).  Liftgate: If one key / phone is found inside (and no key/phone outside ->only if passive entry is fitted) and the vehicle is locked, the feature “Passive Smart Unlock & Release”” shall unlock appropriate doors.  Decklid: If the decklid key search find a key and the vehicle is locked, the feature “Passive Smart Unlock” shall release the decklid.   |  |  |  |  | | --- | --- | --- | --- | | Key in interior | Key on exterior | Passive Smart Unlock | | | Passive Start (exterior antennas not fitted) | Passive Entry/Start | | no | no | closes | closes | | no | yes | closes | closes | | yes | no | stops | stops | | yes | yes | stops | closes | |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Passenger Vehicle” |
|  |  | Power liftgate / decklid is open |
|  |  | Vehicle is fitted with passive start / passive entry |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while power liftagte / deckld is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | The user triggers a power liftgate / decklid closing by   1. pressing on the shutface operation switch on the opened liftgate /decklid OR 2. pressing the exterior liftgate / decklid power operation switch (requires “µ-Switch”) |
|  | M3 | Feature performs an interior search and finds a PK or PaaK |
|  | M4 | Feature performs an exterior search but finds **NO** PK or PaaK (if passive entry is fitted) |
|  | M5 | The power liftgate / decklid stops |
|  | M6 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  |  |  |
| **Alternative Flow 1**  [Secondary Key Search] |  | Contintues after M2:   1. The user manually or power closes the liftgate / decklid 2. Feature performs an interior search and finds a PK or PaaK 3. Feature performs an exterior search but finds **NO** PK or PaaK (if passive entry is fitted) 4. Passive Entry Lockout Protection occurs:   Liftgate: All exterior door handles will be unlocked/enabled -> Central Unlock (CUL)  Decklid: Power decklid will be released   1. User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |

#### Commercial Vehicle

##### Smart Unlock Ignition On

###UC\_F\_SUL\_00007### Enable All Side Door Exterior Handles in Double Cab Panel Vans

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | Enable all exterior handles on front and rear doors and all interior handles after the user locks the vehicle while a front door and a rear door with trim switch is open and the ignition is on. This feature avoids a locking of the remote key inside the vehicle.  Lock action  Smart Unlock  Lock action  Smart Unlock  Lock action  Smart Unlock  Lock action  Smart Unlock  Driver Door open  Passenger Door open  Rear Driver Door open  (If Rear Trim switches are fitted)  Rear Passenger Door open  (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Double Cab Panel Van) |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Feature “Smart Unlock Door Open” is disabled |
|  |  | Ignition is on |
|  |  | A front door or rear door is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger while Ignition is ON: |
|  | M2 | All exterior handles will be locked/disabled -> Exterior Central Lock (ECL) |
|  | M3 | After 1 second all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All exterior cabin door handles can be opened from outside and all interior handles can be opened from inside |
|  |  |  |
| **Alternative Flow 1**  [“SUL Door Open” on front doors] |  | If the feature “Smart Unlock Door Open” is enabled for the front doors and a rear door is open:  Lock action  Smart Unlock  Lock action  Smart Unlock   1. User triggers any lock action with the following trigger: 2. Driver presses on lock button of trim switch on the driver door OR 3. Passenger presses on lock button of trim switch on the passenger door OR 4. Rear Passenger presses on lock button of trim switch on the rear passenger door OR 5. Driver pushes the soldier/toggle on the driver door (requires “µ-Switch”) 6. All exterior handles will be locked/disabled -> Exterior Central Lock (ECL) 7. After 1 second all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) 8. User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) 9. All exterior cabin door handles can be opened from outside and all interior handles can be opened from inside |

###UC\_F\_SUL\_00008### Enable All Exterior Front Door Handles in Single Cab Panel Vans

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | Enable all exterior handles on front doors and all interior handles after the user locks the vehicle while a front door with trim switch is open and ignition is on. This feature avoids a locking of the remote key inside the vehicle.  Lock action  Smart Unlock  Lock action  Smart Unlock  Driver Door open  Passenger Door open |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van) |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Feature “Smart Unlock Door Open” is disabled |
|  |  | Ignition is on |
|  |  | A front door is open |
|  |  |  |
| **Main Flow**  [Cabin and cargo door open] | M1 | User triggers Lock All with single lock action with appropriate trigger, while Ignition is ON: |
|  | M2 | All exterior handles will be locked/disabled -> Exterior Central Lock (ECL) |
|  | M3 | After 1 second all exterior handles on front doors will be unlocked/enabled -> Front Door Unlock (FDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All exterior cabin door handles can be opened from outside and all interior handles can be opened from inside |

##### Smart Unlock Door Open

###UC\_F\_SUL\_00009### [Cabin Cargo Unlock] Enable All Exterior Handles on Cabin Doors on Commercial Vehicles with Cabin Door Open

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles on cabin doors after the user locks the vehicle while a front door OR a rear door is open.  This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Double Cab Panel Van  Single Cab Panel Van  Passenger Door open  Driver Door open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Passenger Door open  Driver Door open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Rear Passenger Door open (If Rear Trim switches are fitted)  Rear Driver Door open (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van or Double Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin Cargo” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any Front Door is open or any Rear Side Door is open |
|  |  | * Cargo Door is closed |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while a front or rear door is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles on cabin doors will be unlocked/enabled -> Cabin Door Unlock (CabDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | Cabin doors can be opened from outside and all doors from inside |

###UC\_F\_SUL\_00010### [Cabin Cargo Unlock] Enable All Exterior Handles on Cargo Doors on Commercial Vehicle with RHCD while Any Cargo Door Open

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles on cargo doors after the user locks the vehicle while the rear hinged cargo door (RHCD) is open  This feature avoids a locking of the remote key inside the vehicle.  Double Cab Panel Van  Single Cab Panel Van  RHCD open  Interior or Exterior lock action  Smart Unlock Door Open  RHCD  RHCD open  Interior or Exterior lock action  Smart Unlock Door Open  RHCD  Interior or Exterior lock action  Smart Unlock Door Open  RHCD  Rear Side Door open (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Double or Single Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin Cargo” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Rear hinged cargo door is open |
|  |  | Cabin Doors are closed |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while the RHCD (Double Cab) or a rear side door (Single Cab) is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles on cargo doors will be unlocked/enabled -> Cargo Door Unlock (CarDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | Cargo doors can be opened from outside and all doors from inside |

###UC\_F\_SUL\_00011### [Cabin Cargo Unlock] Enable All Exterior Handles on Cargo Doors on Commercial Vehicle with Liftgate while Cargo Door Open (Single Cab Panel Van)

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles on cargo doors after the user locks the vehicle while the liftgate is open (vehicle is fitted with two side doors).  This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action  Smart Unlock Door Open  Liftgate  Single Cab Panel Van  Liftgate open  Interior or Exterior lock action  Smart Unlock Door Open  Rear Side Door open (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin Cargo” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Liftgate is open |
|  |  | * Cabin Doors are closed |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while the liftgate is open: |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles on cargo doors will be unlocked/enabled -> Cargo Door Unlock (CarDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | Cargo doors can be opened from outside and all doors from inside |

###UC\_F\_SUL\_00012### [Cabin Cargo Unlock] Enable All Exterior Handles on Commercial Vehicles with Liftgate Open (Double Cab Panel Van)

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all interior and exterior handles after the user locks the vehicle while the liftgate is open (vehicle is fitted with four cabin doors -> double cab panel van).  This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action  Smart Unlock Door Open  Liftgate  Double Cab Panel Van  Liftgate open |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Double Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin Cargo” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Liftgate is open |
|  |  | Cabin Doors are closed |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while the liftgate is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles will be unlocked/enabled -> Exterior Central Unlock (ECUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All doors can be opened from inside and outside |

###UC\_F\_SUL\_00013### [Cabin Cargo Unlock] Enable All Exterior Handles on Commercial Vehicles with Front AND Rear Door Open

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles after the user locks the vehicle while a cabin door AND a cargo door are open at the same time.  This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Double Cab Panel Van  Single Cab Panel Van  Any Cabin Door and Cargo Door open  Any Cabin Door and any Cargo Door open (If Rear Trim switches are fitted)  Interior or Exterior lock action    Smart Unlock Door Open |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van or Double Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin Cargo” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any Cabin Door is open and any Cargo Door is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while a cabin AND cargo door is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles on cabin doors will be unlocked/enabled -> Cabin Door Unlock (CabDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All doors can be opened from inside and outside |

###UC\_F\_SUL\_00014### [Cabin All Unlock] Enable All Exterior Handles on Cabin Doors on Commercial Vehicles with Front or Rear Door Open

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles on cabin doors and all interior handles after the user locks the vehicle while a cabin door is open. This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Double Cab Panel Van  Single Cab Panel Van  Passenger Door open  Driver Door open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Passenger Door open  Driver Door open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Rear Passenger Door open (If Rear Trim switches are fitted)  Rear Driver Door open (If Rear Trim switches are fitted) |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van or Double Cab Panel Van) |
|  |  | SLP Transit Configuration “Cabin All” |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any Cabin Door with fitted Trim Switch is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while a cabin door (fittet with a trim switch) is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior cabin door handles will be unlocked/enabled -> Cabin Door Unlock (CabDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | All exterior cabin door handles can be opened from outside and all interior handles can be opened from inside |

###UC\_F\_SUL\_00015### [Cabin Front Unlock] Enable All Exterior Handles on Cabin Doors on Commercial Vehicle

|  |  |  |
| --- | --- | --- |
| **Purpose** |  | The feature enables all exterior handles on cabin doors and all interior handles after the user locks the vehicle while a front door is open. This feature avoids a locking of the remote key inside the vehicle.  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Interior or Exterior lock action    Smart Unlock Door Open  Double Cab Panel Van  Passenger Door open  Single Cab Panel Van  Passenger Door open  Driver Door open  Driver Door open |
| **Actors** |  | User |
| **Precondition** |  | Vehicle Type “Commercial Vehicle” (Single Cab Panel Van or Double Cab Panel Van) |
|  |  | Feature “Smart Unlock Ignition” is disabled |
|  |  | Feature “Enhanced Trim Switch Inhibit” is deactivated |
|  |  | Any Front Door is open |
|  |  |  |
| **Main Flow** | M1 | User triggers Lock All with single lock action with appropriate trigger, while a front door is open |
|  | M2 | All exterior handles will be locked/disabled -> Central Lock (CL) |
|  | M3 | After 1 second all exterior handles on cabin doors will be unlocked/enabled -> Cabin Door Unlock (CabDUL) |
|  | M4 | User receives a mislock feedback (if “Silent Mode” Feature is disabled AND “Audible Mislock Feedback” Feature is enabled) |
|  | M5 | Cabin doors can be opened from outside and all doors from inside |

## Driving and Operation Scenarios

N/A

## Decision Tables

### Smart Unlock

Table 10: Smart Unlock Requests below shows, using which Trigger Devices, executing which Trigger Actions under which Variant Conditions and Preconditions to trigger the following Requests:

* “Unlock All” Request with a Mislock Feedback
* “Unlock Cabin” Request with a Mislock Feedback
* “Unlock Cargo” Request with a Mislock Feedback
* “Unlock & Release Decklid” Request with a Mislock Feedback
* “Stop / Enable & Release PLG/PDL” Request with a Mislock Feedback

Table 10: Smart Unlock Requests

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SubReq ID | **Trigger Device** | | | | | | | | | | | | | **User Action** | **Variant Conditions** | | | | | | | | **Preconditions** | | | Vehicle Response | Mislock Feedback  (See "Central Lock & Unlock" Feature Spec) |
| **Interior Trigger Devices** | | | | | **Exterior Trigger Devices** | | | | | | | | Request Type | Vehicle Type |  |  |  |  | Smart Unlock Ignition | Smart Unlock Door Open | Side Doors fitted with Trim Switches | Enhanced Trim Switch Inhibit Status  (if ETSI is enabled) | Ignition Status | Door Position |
| Driver Door switch pack Lock Button | Trim switch (DD, PD) | Trim switch (RPD, RDD) | Shutface Lock Switch | Advanced Door soldier/toggle on Driver Door | Mechanical key in driver door basic key cylinder | Mechanical key in passenger door basic key cylinder | Remote key unlock button | Mechanical key in advanced key cylinder (DD, PD) | Keyless Entry Keypad | Mobile Phone App | Passive activation switch (DD, PD, RPD, RDD) | Passive entry handle (DD, PD, RPD, RDD) | Commercial Vehicle Variant | SLP Transit Config | SUL Transit Config | Vehicle BEC Type |
| [Lock All /  Lock All + Close last open Door /  Lock All + Press Shutface operation switch] | [Passenger/ Commercial] | [Double Cab Panel Van / Single Cab Panel Van | [Cabin Cargo / Cabin All / Cabin Front | [Cabin All / Cabin Rear] | [RHCD / Liftgate / Decklid / PLG/PDG] |  |  | [Front / Front + Rear] | [active/ inactive] | [Off /  On] | [Any Door open / Front Door open / Cabin Door open / Rear Door open / BEC open ] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R\_F\_SUL\_ 00001-sub1 | X | X | X |  | X |  |  |  |  |  |  |  |  | Lock All | Passenger | N/A | N/A | N/A | Don't Care | X |  | Front + Rear | inactive | On | Cabin Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub2 | X | X |  |  | X |  |  |  |  |  |  |  |  | Lock All | Passenger | N/A | N/A | N/A | Don't Care | X |  | Front | inactive | On | Front Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub3 |  |  |  | X |  |  |  |  |  |  |  |  |  | Lock All | Passenger | N/A | N/A | N/A | Don't Care | X |  | Don't Care | inactive | On | BEC open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub4 | X | X | X |  | X |  |  |  |  |  |  |  |  | Lock All | Commercial | Double Cab Panel Van | Don't Care | Cabin All | Don't Care | X |  | Front + Rear | inactive | On | Cabin Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub5 | X | X |  |  | X |  |  |  |  |  |  |  |  | Lock All | Commercial | Double Cab Panel Van | Don't Care | Cabin All | Don't Care | X |  | Front | inactive | On | Front Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub6 | X | X |  |  | X |  |  |  |  |  |  |  |  | Lock All | Commercial | Single Cab Panel Van | Don't Care | Cabin All | Don't Care | X |  | Front | inactive | On | Cabin Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub7 | X | X | X |  | X |  |  |  |  |  |  |  |  | Lock All | Commercial | Don't Care | Cabin Front | Cabin Rear | Don't Care | X | (X) | Don't Care | inactive | On | Rear Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub8 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Don't Care | Cabin Front | Cabin Rear | Don't Care | (X) | X | Don't Care | inactive | Don't Care | Front Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub9 | X | X | X | X | X | X | X | X | X | X | X | X | X | Lock All | Passenger | N/A | N/A | N/A | Don't Care |  | X | Front + Rear | inactive | Don't Care | Cabin Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub10 | X | X |  | X | X | X | X | X | X | X | X | X | X | Lock All | Passenger | N/A | N/A | N/A | Don't Care |  | X | Front | inactive | Don't Care | Front Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub11 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front + Rear | inactive | Don't Care | Cabin Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub12 | X | X |  |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front | inactive | Don't Care | Front Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub13 | X | X |  |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front | inactive | Don't Care | Front Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub14 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | RHCD |  | X | Don't Care | inactive | Don't Care | Cargo Door open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub15 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | RHCD |  | X | Front + Rear | inactive | Don't Care | Cargo Door open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub16 | X | X |  |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | RHCD |  | X | Front | inactive | Don't Care | BEC open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub17 | X | X | X | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | Liftgate |  | X | Front + Rear | inactive | Don't Care | Cargo Door open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub18 | X | X |  | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | Liftgate |  | X | Front | inactive | Don't Care | BEC open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub19 | X | X | X | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | Liftgate |  | X | Don't Care | inactive | Don't Care | Cargo Door open | Unlock Cargo | True |
| R\_F\_SUL\_ 00001-sub20 | X | X | X | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front + Rear | inactive | Don't Care | Front + Cargo Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub21 | X | X |  | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front | inactive | Don't Care | Front Door + BEC open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub22 | X | X | X | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front + Rear | inactive | Don't Care | Cabin + Cargo Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub23 | X | X |  | X | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin Cargo | Don't Care | Don't Care |  | X | Front | inactive | Don't Care | Front + Cargo Door open | Unlock All | True |
| R\_F\_SUL\_ 00001-sub24 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin All | Don't Care | Don't Care |  | X | Front + Rear | inactive | Don't Care | Cabin Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub25 | X | X |  |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Double Cab Panel Van | Cabin All | Don't Care | Don't Care |  | X | Front | inactive | Don't Care | Cabin Door open | Unlock Cabin | True |
| R\_F\_SUL\_ 00001-sub26 | X | X | X |  | X | X | X | X | X | X | X | X | X | Lock All | Commercial | Single Cab Panel Van | Cabin All | Don't Care | Don't Care |  | X | Don't Care | inactive | Don't Care | Cabin Door open | Unlock Cabin | True |

### Passive Smart Unlock & Release

Table 11: Passive Smart Unlock & Release Requests shows, using which Trigger Devices, executing which Trigger Actions under which Variant Conditions and Preconditions to trigger a unlock requests (refer to column “Vehicle Response”) and initiate a key search (refer to column “Keysearch Area”), using a corresponding “Trigger Device” (refer to columns “Trigger Device”).

**Table 11: Passive Smart Unlock & Release Requests**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SubReq ID | **Trigger Device** | | | | | | | | | | | **User Action** | | **Varant Conditions** | **Preconditions** | | | Keysearch Area | Vehicle Response | Mislock Feedback  (See "Central Lock & Unlock" Feature Spec) |
| **Interior Trigger Devices** | | | | | **Exterior Trigger Devices** | | | | | | Request Type | Last closed door | Vehicle BEC Type | Enhanced Trim Switch Inhibit Status (TBD) (if ETSI is enabled) | Any Door open | Passive Key / PaaK Location |
| Driver Door switch pack Lock Button | Trim switch (DD, PD) | Trim switch (RPD, RDD) | Shutface Lock Switch | Advanced Door soldier/toggle on Driver Door | Remote key unlock button | Mechanical key in advanced key cylinder (DD, PD) | Keyless Entry Keypad | Mobile Phone App | Passive activation switch (DD, PD, RPD, RDD) | Passive entry handle (DD, PD, RPD, RDD) |
| [Lock All /  Lock All + Press Shutface operation switch] | [Any Cabin Door / BEC | [RHCD / Liftgate / Liftgate Glass / Decklid / Tailgate / PLG/PDG] | [active/ inactive] | [None / Decklid / Any Cabin Door] | [Cabin /  Cargo] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R\_F\_SUL\_ 00016-sub1 | X | X | X | X | X | X | X | X | X | X | X | Lock All | Any Cabin Door | RHCD / Liftgate / Liftgate Glass / Tailgate | inactive | None | Cabin | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub2 | X | X | X | X | X | X | X | X | X | X | X | Lock All | Any Cabin Door | Decklid | inactive | Decklid | Cabin | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub3 | X | X | X | X | X | X | X | X | X | X | X | Lock All | Any Cabin Door | Decklid / Liftgate | inactive | None | Cargo | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub4 | X | X | X | X | X | X | X | X | X | X | X | Lock All | Any Cabin Door | Decklid | inactive | Decklid | Cargo | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub5 | X | X | X | X | X | X | X | X | X | X | X | Lock All | BEC | Decklid | inactive | None | Cargo | Cargo | Unlock & Release Decklid | True |
| R\_F\_SUL\_ 00016-sub6 | X | X | X | X | X | X | X | X | X | X | X | Lock All | BEC | Decklid | inactive | Any Cabin Door | Cargo | Cargo | Unlock & Release Decklid | True |
| R\_F\_SUL\_ 00016-sub7 | X | X | X | X | X | X | X | X | X | X | X | Lock All + Press Shutface operation switch | BEC | PDL | inactive | None | Cargo | Cargo | Stop/Enable & Release PLG/PDL | True |
| R\_F\_SUL\_ 00016-sub8 | X | X | X | X | X | X | X | X | X | X | X | Lock All + Press Shutface operation switch | BEC | PDL | inactive | Any Cabin Door | Cargo | Cargo | Stop/Enable & Release PLG/PDL | True |
| R\_F\_SUL\_ 00016-sub9 | X | X | X | X | X | X | X | X | X | X | X | Lock All | BEC | Liftgate | inactive | None | Cabin | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub10 | X | X | X | X | X | X | X | X | X | X | X | Lock All | BEC | Liftgate | inactive | None | Cargo | Whole Vehicle | Unlock All | True |
| R\_F\_SUL\_ 00016-sub11 | X | X | X | X | X | X | X | X | X | X | X | Lock All + Press Shutface operation switch | BEC | PLG | inactive | None | Cabin | Whole Vehicle | Stop/Enable & Release PLG/PDL | True |
| R\_F\_SUL\_ 00016-sub12 | X | X | X | X | X | X | X | X | X | X | X | Lock All + Press Shutface operation switch | BEC | PLG | inactive | None | Cargo | Whole Vehicle | Stop/Enable & Release PLG/PDL | True |

# 

# Feature Requirements

## Functional Requirements

###R\_F\_SUL\_00001### Valid Unlock Requests for Smart Unlock

According to the sub-requirements listed in Table 10: Smart Unlock Requests

If

* The user triggers a Lock Request (refer to column “User Action”) using a corresponding “Trigger Device” (refer to columns “Trigger Device”) AND
* The variant conditions apply to the vehicle (refer to column “Variant Conditions”) AND
* All preconditions are fulfilled (refer to column “Preconditions”)

The feature shall generate a Unlock Requests (refer to column “Vehicle Response”)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00001### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** | Example for how to read each row in Table 10: Smart Unlock Requests  Sub-requirement “**R\_F\_SUL\_00001**-sub1”  If the user executes a Single Trigger Lock Action with any of the following “Lock Trigger Devices”:   * Driver Door switch pack Lock Button * Trim switch (DD, PD) * Trim switch (RDD, RPD) * Advanced Door soldier/toggle on Driver Door   While the following variant condition are given   * Vehicle Type set to “Passenger” and * Smart Unlock Ignition is enabled * Side Doors fitted with Trim Switches on Front + Rear Doors   And the following preconditions are fulfilled:   * Enhanced Trim Switch Inhibit Status is inactive (if ETSI is enabled) * Ignition is on * A cabin door is open   the feature shall trigger a “Central Unlock Request” (Unlock All) with a Mislock Feedback  All Variant Conditions   * Vehicle Type [Passenger/Commercial] * Commercial Vehicle Variant [Double Cab Panel Van / Single Cab Panel Van] * SLP Transit Config [Cabin Cargo / Cabin All / Cabin Front] * SUL Transit Config [Cabin All / Cabin Rear] * Vehicle BEC Type [RHCD / Liftgate / Decklid / PLG/PDG] * Smart Unlock Ignition * Smart Unlock Door Open * Passive Smart Unlock & Release * Side Doors fitted with Trim Switches [Front / Front + Rear]   All Preconditions   * Enhanced Trim Switch Inhibit Status [active / inactive] * Ignition Status [On/Off] * Door Position [Any Door open / Front Door open / Cabin Door open / Rear Door open / BEC open] * Passive Key / PaaK Location [One inside & no outside / One inside Cargo & no outside]   All Unlock Requests:   * Unlock All * Unlock Cabin * Unlock Cargo | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

###R\_F\_SUL\_00016### Valid Unlock Requests for Passive Smart & Release

According to the sub-requirements listed in Table 11: Passive Smart Unlock & Release Requests

If

* The user triggers a Lock Request (refer to column “Request Type”) using a corresponding “Trigger Device” (refer to columns “Trigger Device”) AND
* Closes the last open door (refer to column “Last closed door”) AND
* The variant conditions apply to the vehicle (refer to column “Variant Conditions”) AND
* All preconditions are fulfilled (refer to column “Preconditions”),

The feature shall generate a Unlock Requests (refer to column “Vehicle Response”) AND

Initiate a key search (refer to column “Keysearch Area”).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00016### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** | Example for how to read each row in Table 11: Passive Smart Unlock & Release Requests  Sub-requirement “**R\_F\_SUL\_00016**-sub1”  If the user executes a Single Trigger Lock Action with any of the following “Lock Trigger Devices”:   * Driver Door switch pack Lock Button * Trim switch (DD, PD) * Trim switch (RDD, RPD) * Shutface Lock Switch * Advanced Door soldier/toggle on Driver Door * Remote key unlock button * Mechanical key in advanced key cylinder (DD, PD) * Keyless Entry Keypad * Mobile Phone App * Passive activation switch (DD, PD, RPD, RDD) * Passive entry handle (DD, PD, RPD, RDD)   And closes the last open cabin door,  While the following variant condition is given   * Vehicle BEC Type is RHCD / Liftgate / Liftgate Glass / Tailgate / PLG   And the following preconditions are fulfilled:   * Enhanced Trim Switch Inhibit Status is inactive (if ETSI is enabled) * No other door is open * Passive Key / PaaK is located in cabin area   the feature shall initiate a keysearch in the whole vehicle and trigger a “Central Unlock Request” (Unlock All) with a Mislock Feedback.  User Action:   * Request Type [Lock All / Lock All + Press Shutface operation switch] * Last closed Door [Any Cabin Door / BEC]   Variant Conditions   * Vehicle BEC Type [RHCD / Liftgate / Liftgate Glass / Decklid / Tailgate / PLG / PDG]   Preconditions   * Enhanced Trim Switch Inhibit Status (TBD)   (if ETSI is enabled) [active/inactive]   * Any Door open [None / Decklid / Any Cabin Door] * Passive Key / PaaK Location [Cabin / Cargo]   Keysearch Area:   * Whole Vehicle * Cargo   Unlock Requests:   * Unlock All * Unlock & Release Decklid * Stop/ Enable & Release PLG/ PDL | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

### Interaction with other Features

#### Personalization

###R\_F\_SUL\_00002### Personalization of Smart Unlock Ignition

The Feature Smart Unlock Ignition shall not be personalizable by any user

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00002### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

###R\_F\_SUL\_00003### Personalization of Smart Unlock Door Open

The Feature Smart Unlock Door Open shall not be personalizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00003### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0 | End of Requirement | | | | |

###R\_F\_SUL\_00004### Personalization of Smart Unlock Door Off to On upon Close

The Feature Smart Unlock Door Off to On upon Close shall not be personalizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00004### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00005### Personalization of Passive Smart Unlock & Release

The Feature Passive Smart Unlock & Release shall not be personalizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00005### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

#### Customization

###R\_F\_SUL\_00006### Customization of Smart Unlock Ignition

The Feature Smart Unlock Ignition shall not be customizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00006### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00007### Customization of Smart Unlock Door Open

The Feature Smart Unlock Door Open shall not be customizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00007### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00008### Customization of Smart Unlock Door Off to On upon Close

The Feature Smart Unlock Door Off to On upon Close shall not be customizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00008### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00009### Customization of Passive Smart Unlock & Release

The Feature Passive Smart Unlock & Release shall not be customizable by any user.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00009### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

### Error Handling

## Non-Functional Requirements

***#Hint:*** *Non-functional requirements specify some performance criteria in addition to the functional behavior given defined by the functional requirements. Timing (if not already included in the functional requirements), security details (e.g. how secure does an algorithm have to be) reliability (e.g. mean time between failure) or maintainability could be specified in this section.*

### Safety

**#Hint:** Only those safety requirements, which are not related to Functional Safety (ISO26262) should go here. For Functional Safety refer to chapter 6 “Functional Safety”.

### Security

### Reliability

## HMI Requirements

**#Hint:** Requirements in this section could specify details of e.g. the icons, the GUI or the sounds.

###R\_F\_SUL\_00010### Smart Unlock Audible Mislock Feedback

If

* Feature “Smart Unlock” is enabled AND
* Feature “Audible Lock & Mislock Feedback” is enabled AND
* Feature “Silent Mode” is disabled AND
* Feature “Smart Unlock” unlocks any exterior handles,

Feature Smart Unlock Ignition shall assign “Audible Lock & Mislock Feedback “ to give the user an audible mislock feedback with a double chirp/beep.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00010### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Interface | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00015### Delayed Smart Unlock

The Smart Unlock Request shall be generated one second after the lock action.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00015### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** | Ahmet Cinar | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Functional | | | **Priority** | High (Mandatory) | **Status** | Draft | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

## Other Requirements

### Design Requirements

***#Hint:*** *Requirements of a Logical Function should be typically agnostic of their SW/HW implementation*. If for specific reasons the function owner needs to define explicitly design constraints on the solution, it can be done in this chapter.

### Manufacturing Requirements

### Service Requirements

**#Hint:** Requirements in this section could specify, e.g. what needs to be considered, if individual ECUs are replaced or new SW is flashed to ECUs (parameter set in non-volatile memory might get inconsistent and needs also to be updated).

###R\_F\_SUL\_00011### Enable / Disable Smart Unlock Ignition at EOL

It shall be possible to enable and disable the feature “Smart Unlock Ignition” at Vehicle Operation End-of-Line.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00011### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00012### Enable / Disable Smart Unlock Door Open at EOL

It shall be possible to enable and disable the feature “Smart Unlock Door Open” at Vehicle Operation End-of-Line.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00012### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00013### Enable / Disable Smart Unlock Door Off to On upon Close at EOL

It shall be possible to enable and disable the feature “Smart Unlock Door Off to On upon Close” at Vehicle Operation End-of-Line.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00013### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

###R\_F\_SUL\_00014### Enable / Disable Passive Smart Unlock & Release at EOL

It shall be possible to enable and disable the feature “Passive Smart Unlock & Release” at Vehicle Operation End-of-Line.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement ID: ###R\_F\_SUL\_00014### | | | | | | | |
| **Rationale** |  | | | | | | | |
| **Acceptance Criteria** |  | | | | | | | |
| **Notes** |  | | | | | | | |
| **Source** |  | | | | | **Owner** |  | |
| **Source Req.** |  | | | | | **V&V Method** |  | |
| **Type** | Choose an item. | | | **Priority** | Choose an item. | **Status** | Choose an item. | |
| [Req. Template](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes) Version | | 6.0b | End of Requirement | | | | |

### After Sales Requirements

**#Hint:** Requirements in this section could specify, e.g. input for the Owner’s Manual could be gathered.

### Process requirements

**#Hint**: Requirements in this section are relevant for the development process of the feature, e.g. ISO26262 compliance.

# Functional Safety

**#Classification**: Functional Safety only

**#Hint:** This section is dedicated to the Ford Functional Safety (ISO26262) process. For details of this process refer **#Link:** [Ford Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx)

**#Contact:** [*RE Wiki Roles & Responsibilites page – Role: Application Functional Safety Engineer*](http://wiki.ford.com/display/RequirementsEngineering/Default+Contacts+for+Stakeholder+Roles#ApplicationFunctionalSafetyEngineer)

## System Behaviors for HARA

**#Classification**: Functional Safety only

**#Hint:** List of selected system behaviors is an input to the Hazard Analysis and Risk Assessment (HARA). There needs to be a rationale why other system behaviors / functions are not considered.

|  |  |
| --- | --- |
| ID | Name |
|  |  |

Table 12: System Behaviors for HARA

## Safety Assumptions

**#Hint:** Copy the assumptions from the document "FFSD 02 Hazard Analysis and Risk Assessment”, Tab. “2 - Assumptions” with “Ref/ID”, “Name”, “Category”, “Description”, “Purpose”. In this document, additionally a reference to the requirement ID is inserted.

**#Link:** [Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx) – HARA

|  |  |  |
| --- | --- | --- |
| ID | Assumption | |
| **1** | **Name** |  |
| **Description** |  |
| **Purpose** |  |
| **Category** |  |
| **Related Requirements IDs** |  |
| **2** | **Name** |  |
| **Description** |  |
| **Purpose** |  |
| **Category** |  |
| **Related Requirements IDs** |  |

Table 13: Functional Safety Assumptions

## Safety Goals

**#Classification**: Functional Safety only

**#Hint:** The list of Functional Safety Goals is an output of the Hazard Analysis and Risk Assessment (HARA) and therefore not required during the initial creation of the Feature Document.

**#Link:** [Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx) – HARA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Goal | | | |
| **1** | **Goal Name** |  | | |
| **Description** |  | | |
| **Safety Goal Concept** | <fill in Safety Goal Concept incl. the Warning & Recovery Concept and also the Safe Statel> | | |
| **ASIL** |  | **FTTI** |  |
| **Related FSR IDs** |  | | |
| **2** | **Goal Name** |  | | |
| **Description** |  | | |
| **Safety Goal Concept** | <fill in Safety Goal Concept incl. the Warning & Recovery Concept and also the Safe State> | | |
| **ASIL** |  | **FTTI** |  |
| **Related FSR IDs** |  | | |

Table 14: Functional Safety Goals

## Functional Safety Requirements

**#Classification**: Functional Safety only

**#Hint:** The section lists the Functional Safety Requirements (FSRs) derived from a Safety Goal and Assumptions.

The following should be noted for the use of the attribute fields for FSRs

- The “Source Req” trace link field in each FSR should have a reference to

- a safety goal in ch. 6.3 “Safety Goals” or

- an assumption in ch. 6.2 “Safety Assumptions”

**#Link:** [Functional Safety Sharepoint](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx) – Functional Safety Concept

[RE Wiki - Requirements Attributes](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Attributes)

### <Goal 1 Name>

### <Goal 2 Name>

### Derivation of Requirements on Assumptions

**#Classification**: Functional Safety only

**#Hint:** Derive requirements from the Assumptions (refer to section “Safety Assumptions”

## (Decomposed) Functional Safety Requirements

***#Classification:*** *Functional Safety Only*

***#Hint:*** *For ASIL D features additional measures like a requirements decomposition might be required. Fill out the following table for each ASIL D decomposition applied in the feature. The decomposition rationale is the reason why the decomposition was performed, whereas the rationale for each requirement expresses the reason and thought behind that particular requirement and should include how the requirement is able to independently fulfill the needs of the parent requirement.*

***#Link:***[*Functional Safety Sharepoint*](https://pd3.spt.ford.com/sites/GlobalFunctionalSafety/Pages/default.aspx) *- Functional Safety Concept*

| Initial Safety Requirement | Functional Safety Requirement X | |
| --- | --- | --- |
| Decomposition Rationale |  | |
| Method for Decomposition | Choose a Method | |
| Functional Safety Requirement 1 after Decomposition | F-S-Req-ID |  |
| F-S-Req. Title |  |
| ASIL |  |
| Rationale |  |
| Allocated to |  |
| Functional Safety Requirement 2 after Decomposition | F-S-Req-ID |  |
| F-S-Req. Title |  |
| ASIL |  |
| Rationale |  |
| Allocated to |  |
| Functional Safety Requirement for Independence  *Note: should consider commonly used input, output and processing*  *Note: additional row should be added if additional* *requirements for Independence are necessary* | F-S-Req.-ID |  |
| F-S-Req. Title |  |
| ASIL |  |
| Rationale |  |

Table 15: Requirements Decomposition Table

# Functional Architecture

**#Classification:** Optional (mandatory for Functional Safety)

**#Hint**: This section depicts the coarse Functional Architecture. This architectural step is needed to find the right functional partitioning for the function level. The function shown here are those, which are specified on function level. Either SysML activity diagrams or Data Flow Diagrams could be used to depict such a Functional Architecture. For bigger features, which are decomposed in a hierarchical manner down to atomic functions (and which do not follow the Functional Safety process), a function tree could be given here.

**#Links:**

* Functional Decomposition: [RE Wiki – Functional Decomposition](http://wiki.ford.com/display/RequirementsEngineering/Functional+Decomposition)
* SysML - Activity Diagrams or [RE Wiki - Data Flow Diagrams](http://wiki.ford.com/display/RequirementsEngineering/Data+Flow+Diagram?src=contextnavpagetreemodehttp://wiki.ford.com/display/RequirementsEngineering/Data+Flow+Diagram?src=contextnavpagetreemode)
* Data Flow Diagram: [RE Wiki – Data Flow Diagram](http://wiki.ford.com/display/RequirementsEngineering/Functional+Decomposition)

## List of Functions

**#Hint:** The functions shown in the Functional Architecture should be listed and described in the table below

| Function Name | Description | Comments |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Table 16: List of Functions

# Open Concerns

**#Hint:** The following list presents open concerns, which have to be discussed or clarified over the course of the on-going requirements engineering.

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

Table 17: Open Concerns

# 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) | Date | Description | Approved by | Responsible |
| --- | --- | --- | --- | --- |
| *001* |  | *Initial version* |  | *Acinar1 / Dvellara / Elindt* |
|  |  |  |  |  |

## Template Revisions

*#Important: Do not change this section*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| *0* | *6* | *2015-05-26* | * *Chapter “Feature Overview” and made a 2nd level heading.* * *Chapter “Feature Modeling” divided into 3 subchapter (“Scenarios”, “Use Cases”, “State Machines”) for different modeling methods* | *Jbaden1* |
| *0* | *7* | *2015-05-27* | * *Table of Content updated* * *Template Revision History chapter added* | *Jbaden1* |
| *0* | *8* | *2015-07-02* | * *Section “Unsettled Issues” added* | *Alevin7* |
| *0* | *9* | *2015-08-04* | * *Section “Feature Variants” added* * *Section “Feature Boundary Diagram” renamed to “Feature Context Diagram”* * *Document Properties adapted to match needs of VBA macros* | *Jbaden1, Awegman1* |
| *1* | *0* | *2015-09-11* | * *Section “Feature Variants” reworked* * *Feature Goals removed. Only “Safety Goals“ chapter remains.* * *Heading 2 formatting issues corrected.* * *Requirements / Use Cases Listing removed from traceability chapter.* * *Formatting of attribute table in Notation chapter corrected* * *Open Topics / Known Issues chapter moved to the end* | *Jbaden1* |
| *1* | *1* | *2015-11-16* | * *Table-Styles removed (for smooth VSEM import)* * *Some clean-up of sections “Purpose” and “Audience”* | *Awegman1, jbaden1* |
| *1* | *2* | *2016-02-26* | * *Minor corrections based on lessons learned from CC and PCL pilot (e.g. section market/regions) and discussion with Functional Safety Team (purpose of feature)* * *Footer corrected* * *Boundary diagram interface chapter renamed to influences.* | *Jbaden1* |
| *1* | *3* | *2016-02-26* | * *Minor corrections after review with Whitney Keith from Functional Safety team* | *Jbaden1* |
| *1* | *4* | *2016-03-10* | * *Some cleanup of meta-data in Word Properties* | *Jbaden1* |
| *1* | *5* | *2016-03-10* | * *Footer formatting corrected (Issue 19)* * *Results from review with Functional Safety Team incorporated (Issue 20).* | *jbaden1* |
| *1* | *6* | *2016-04-18* | * *Scenario Template added* | *Jbaden1* |
| *1* | *7* | *2016-04-18* | * *Chapter “Operation Modes and States” moved before “Use Case” section.* | *Jbaden1* |
| *1* | *8* | *2016-04-18* | * *Broken Wiki links repaired.* | *Jbaden1* |
| *2* | *0* | *2016-05-19* | * *Adapted to Specification\_Macros.dotm V2.0* * *Requirements Templates chapter (ch. 1.7.1) no longer has an attribute table, but refers directly to the Wiki..* | *Jbaden1* |
| *2* | *1* | *2016-06-10* | * *Table for Context Diagram modified (lists external entities and Influence Description only)* | *Jbaden1* |
| *2* | *2* | *2016-07-08* | * *Template version added to footer* * *Several hints added to the various sections* * *Findings from Functional Safety Team incorporated.* * *RE\_SafetyRequirement style added* | *Jbaden1* |
| *2* | *3* | *2016-09-21* | * *Update from Functional Safety Team incorporated (“Lessons Learned”, “System Behaviors for HARA”)* | *Jbaden1* |
| *2* | *4* | *2016-11-15* | * *Update from Functional Safety Team incorporated (“Lessons Learned”, “System Behaviors for HARA”)* * *Explanatory notes made more formal* | *Jbaden1* |
| *3* |  |  | *Skipped to synchronize with Specification\_Macros.dotm* |  |
| *4* |  |
| *5* | *0* | *2017-01-13* | * *Meta data updated for specification macros, version 3.1* * *SW Unit chapter removed for the time being* * *Green boxes added for user hints* | *Jbaden1* |
| *5* | *1* | *2017-01-18* | * *Minor editorial changes* | *Jbaden1* |
| *6* | *0* | *2017-02-03* | * *CR48: Chapter 6 renamed from “Safety” to “Functional Safety”. New sub-chapter “Safety” introduced in Non-Functional Requirements section* | *Jbaden1* |
| *6* | *0* | *2017-04-28* | * *CR7: “RequirementsTraceability” chapter removed* | *Jbaden1* |
| *6* | *0* | *2017-11-15* | * *CR32/53: New Cover Sheet + Disclaimer replaces FAP-150 like ones.* * *CR75: Some rewording -> Terminology to Glossary, Notation -> Document Conventions* * *CR49: Rename “Assumptions & Constraints” to “Assumptions”* * *CR74: Safety Assumptions added to chapter 6.* * *CR58: Add function allocation column to Logical Architecture chapter* | *Jbaden1* |
| *6* | *0* | *2018-01-31* | * *CR63: Updated links to Functional Safety Sharepoint* | *Jbaden1* |
| *6* | *0* | *2018-07-24* | * *CR69: Add FSR to FeatureDoc* * *CR64: Add new section "Design Requirements" to Function Spec and Feature Spec* | *Jbaden1* |
| *6* | *0* | *2018-08-06* | * *CR53: some corrections for metada and formatting* | *Jbaden1* |
| *6* | *0* | *2018-09-28* | * *Broken links to RE Wiki repaired* | *Jbaden1* |
| *6* | *0* | *2018-10-31* | * *Cover sheet and footer more GIS like. Functional Safety team feedback incorporated:*   + *New subsections “Functional Safety Requirements, (Decomposed) FSRs and Parameters / Values*   + *Removal of “Logical Architecture”* | *Jbaden1* |
| *6* | *0* | *2018-12-12* | * *FSR template removed, now as a macro in the Specification\_Macros.dotm* | *Jbaden1* |

# Appendix

Document ends here.