

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – In Car Communication**

**Infotainment Subsystem Part Specific Specification (SPSS)**

Version 1.1

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**Version Date: September 8, 2021**

**FORD CONFIDENTIALF**

**Revision History**

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| **Date** | **Version** | **Notes** | | |
| **August 9, 2021** | **1.0** | **Initial Release** |  | |
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| **September 8, 2021** | **1.1** |  | | |
|  | STR-865093/B-Architectural Design | | | semani4:update a new CLD |
| ICC-CLD-REQ-408886/B-In Car Communication Interface Client | | | semani4:Updated Client information |
| ICC-CLD-REQ-436410/A-InputOutputClient | | | semani4:New CLD for HMI |
| DOC-865094/B-Physical Mapping of Classes | | | semani4:Added new Classes |
| STR-865095/B-Logical Signal Mapping | | | semani4:Added Ignition Status |
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| MD-REQ-408892/B-ICC\_Rq | | | semani4:uupdate Description |
| STR-865097/B-General Requirements | | | Semani4:added the Use case matrix to the general requirements |
| ICC-REQ-408882/B-Powermode Condition | | | semani4:updated description with more details |
| ICC-REQ-408883/B-Feature Configuration | | | semani4:Updated Configuration for the Server also |
| ICC-REQ-408884/B-Missing Message Strategy | | | semani4:updated description |
| ICC-REQ-423223/B-ICC Use Case Matrix | | | semani4:added AudioSource St Signal detail |
| STR-865098/B-Functional Definition | | | semani4:Updated description, moved the use case matrix section to general requirements |
| ICC-UC-REQ-414599/B-Enable/Disable from Sync/ URC | | | semani4:update in Description |
| ICC-REQ-415425/B-Enable/Disable ICC Settings | | | semani4:Updated Description |
| ICC-REQ-408877/B-Interface Request | | | semani4:Updated Description |
| ICC-REQ-408878/B-Interface Response | | | semani4:Updated Description |
| ICC-UC-REQ-414600/B-Initiate ICC | | | semani4:updated Inputoutputclient |
| ICC-REQ-415426/B-Initiate ICC | | | semani4:update Description |
| ICC-UC-REQ-414601/B-Incoming Phone call - ICC active | | | semani4:update Active incoming phone info |
| ICC-REQ-415427/B-Incoming Phone Call - ICC Active | | | semani4:update Active incoming phone info |
| STR-909892/B-Requirements | | | semani4:updated requirements |
| ICC-REQ-415428/B- ICC Active - Phone call accepted | | | semani4:update audio server information |
| ICC-REQ-431234/B-Phone call ends - ICC active/inactive Previously | | | semani4:update in audio Server information combine two requirements |
| ICC-UC-REQ-414602/B-Mixed Prompts/Chimes- ICC active | | | semani4:updated Description |
| ICC-REQ-415429/B-Mixed Prompts -ICC active | | | semani4:updated Description |
| ICC-REQ-415431/B-Priority Assist-ICC active | | | semani4:updated description |
| ICC-REQ-415433/B-ICC Vs VR | | | semani4:updated Description |
| ICC-UC-REQ-420578/B-ICC active Vs DND | | | semani4:updated Description |
| ICC-REQ-415430/B-ICC active vs DND | | | semani4:update Description |
| ICC-REQ-417047/B-ICC Active-Vehicle Audio mode Switches to Full Cabin Mode | | | semani4:update description |
| ICC-REQ-417066/B-ICC Active-Vehicle Audio Mode Switches to Zone mode | | | semani4:update description |
| ICC-REQ-408880/B-Memory Storage | | | semani4:update description |
| ICC-REQ-436414/A-Future Requirements | | | semani4:added section for future requirments |

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# Overview

Front row occupants can easily communicate to 3rd row occupants and vice versa with the use of mics and speakers

# Architectural Design

## ICC-CLD-REQ-408886/B-In Car Communication Interface Client

The In Car Communication Interface Client (ICCClient) is responsible for the tasks listed below:

* Receiving data and status from ICCServer
* sending ICC information data and status to InputOutputClient
* Receives user input and sends request to the ICCServer

|  |
| --- |
| **Acceptance Criteria** |
|  |

## ICC-CLD-REQ-408887/A-In Car Communication Interface Server

The In Car Communication Server (ICCServer) is responsible for the tasks listed below:

* Monitoring and handling active data and status
* Receive Request from the ICCClient
* Transmitting data and status to ICCClient

|  |
| --- |
| **Acceptance Criteria** |
|  |

## ICC-CLD-REQ-436410/A-InputOutputClient

The InputOutputClient is responsible for the tasks listed below:

1. Receiving ICC data status
2. Displaying active ICC information data and status on user interface
3. Receives user input and sends request to the ICCClient

|  |
| --- |
| **Acceptance Criteria** |
|  |

## Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the feature can be mapped into physical modules. This mapping is an example only and does not necessarily carryover to other carlines or vehicle architectures.

|  |  |  |
| --- | --- | --- |
| **Logical Class** | **Physical Module (ECU)** | **Description** |
| ICCServer | PAC |  |
| ICCClient | PDC |  |
| Audio Resource Server | PDC |  |
| Volume Settings Server | PDC |  |
| InputOutputClient | NA | SYNC HMI , URC App, Off Board devices |

## Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal’s logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

|  |  |  |
| --- | --- | --- |
| **CAN Msg Name** | **Logical Name** | **CAN Signal Name** |
| 0x69 | ICC.St | InCarComm\_D\_Stat |
| 0x66 | ICC.Rq | InCarComm\_B\_Rq |
|  | Ignition\_Status | Ignition\_Status |

## ICC Client Interface

### ICC-IIR-REQ-408888/B-ICCClient\_Rx

The interface client shall receive the following signals for the feature to work as needed.

|  |
| --- |
| **Acceptance Criteria** |
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#### MD-REQ-408889/B-ICC\_St

Message Type: Status

The ICCClient shall receive this message which gives the status of the feature.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| ICC.St | - | - | Response to inform the ICC Operational status |
|  | InActive | 0x0 | ICCServer in ready state to accept User input |
|  | Active | 0x1 | ICC Session is active |
|  | Temporary Disabled | 0x2 | ICC session is temporarily disabled |

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| --- |
| **Acceptance Criteria** |
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#### MD-REQ-273750/A-Ignition\_Status

**Message Type**: Status

Signal sent to the infotainment system indicating the ignition status of the vehicle

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| Ignition\_Status | Unknown | 0x0 |  |
| OFF | 0x1 |  |
| Accessory | 0x2 |  |
| Run | 0x4 |  |
| Start | 0x8 |  |
| Invalid | 0xF |  |

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| **Acceptance Criteria** |
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### ICC-IIR-REQ-408891/A-ICCInterfaceClient\_Tx

The system shall transmit the following messages

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| **Acceptance Criteria** |
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#### MD-REQ-408892/B-ICC\_Rq

Message Type: Request

This signal shall be sent by the ICCClient as request to the ICCServer to change the operation mode of this feature.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| ICC\_Rq | - | - | Request to change the ICC Operational status |
|  | InActive | 0x0 | User input to Cancel ICC Session |
|  | Active | 0x1 | User input to activate ICC session |

|  |
| --- |
| **Acceptance Criteria** |
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# General Requirements

## ICC-REQ-408882/B-Powermode Condition

The ICC feature shall be available/operational only when HMIAudioMode=On.

* ICCClient shall allow User Input when HMIAudioMode is ON
* When the HMIAudioMode moves from OFF to ON the ICC.St shall retain the value from the previous cycle and operate as per defined Use Case Matrix ICC-REQ-423223/B-ICC Use Case Matrix

|  |
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| **Acceptance Criteria** |
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## ICC-REQ-408883/B-Feature Configuration

The ICCClient and ICCServer shall have a configurable parameter to determine whether the vehicle supports this Feature. This Configuration parameter shall be set by the Diagnostics DID programmed at the End of line.

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| **Acceptance Criteria** |
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## ICC-REQ-408884/B-Missing Message Strategy

If the **ICC.St** goes missing for more than 5 seconds, the ICCClient shall disable the feature for user selection.

For error recovery if the ICC.St becomes available within the current ignition cycle, for 3 periodic messages then the ICCClient shall sync up and adopt the current state of the ICCServer and then the functionality shall be made available for user selection.

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| **Acceptance Criteria** |
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## ICC-REQ-425944/A-Manual Mute Mode

During Manual Audio mute the ICC session audio shall remain unaltered.

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| **Acceptance Criteria** |
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## ICC-REQ-423223/B-ICC Use Case Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Use Case** | **Pre-Condition** | **New Action / Event** | **ICCServer Post Condition** | **Comment** |
| CA over ICC | ICC.St=Active  CA.St=InActive | CA.Rq=Active \*\*  CA.St=Active | ICC.St=Temporary Disabled | ICC.St shall stay temporary disabled till CA.St=Active |
| CA ends while ICC was active previously | ICC.St=InActive  CA.St=Active | CA.St = InActive  (CA ends by CA Server) | ICC.St=Active | ICC.St becomes Active/resumes previous state after CA ends. |
| Call Ring in Any Zone and ICC Active | ICC.St=Active | AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 1,2,3,4) | AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 1,2,3,4)  ICC.St=temporary Disabled | Call Ring is active and ICC goes to temporary disable |
| ICC active and Phone Call is accepted | ICC.St=Active | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted) | ICC.St=Temporary Disabled AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted) | ICC session is Temporarily Disabled and Phone call audio plays  ICC HMI setting shall be greyed out not allowing any user selection for ICC |
| Phone call ends while ICC was active previously | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)  AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)  ICC.St=Temporary disabled | AudioSource.St (SourceType = Phone, SourceTypeStatus = deallocated)  AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = deallocated),(x=zones 2,3, | ICC.St=Active | ICC session resumes once the Phone call ends |
| Phone call ends while ICC was inactive | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)  AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)  ICC.St=Temporary disabled | AudioSource.St (SourceType = Phone, SourceTypeStatus = deallocated)  AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = deallocated),(x=zones 2,3,4) | ICC.St=Inactive | ICC resumes its previous state |
| Mixed Prompts | ICC.St=Active | MixableCabinPrompts = Active | ICC.St=Active  MixableCabinPrompts = Active | Mixed Audio for both prompts and ICC |
| ICC active and Priority Assist is initiated | ICC.St=Active | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted | ICC.St=Temporary Disabled  AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted | ICC session is Temporarily Disabled and Priority Assist audio plays  ICC HMI setting shall be greyed out not allowing any user selection for ICC |
| Priority assist ends while ICC was active previously | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted ICC.St=Temporary disabled | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Type = Priority assist,  SourceTypeStatus = Deallocated | ICC.St=Active | ICC session resumes once the Priority assist ends |
| Priority Assist ends while ICC was inactive | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted ICC.St=inacvtive | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Type = Priority assist,  SourceTypeStatus = Deallocated | ICC.St=Inactive | ICC resumes its previous state |
| Media initiated and ICC active | ICC.St=Active | AudioSource.St (SourceType = Media, SourceTypeStatus = Granted) | ICC.St=Active  AudioSource.St (SourceType = Media, SourceTypeStatus = Granted) | Mixed Audio for both Media and ICC |
| VR is initiated when ICC is active | ICC.St=Active | AudioSource.St (SourceType = VR, SourceTypeStatus = Granted) | ICC.St=Temporary Disable  AudioSource.St (SourceType = VR, SourceTypeStatus = Granted) | ICC.St shall stay temporarily disabled till VR is active. When the ICC is Temporarily disabled state the ICC cannot be Activated |
| Radio Announcement is initiated and ICC is active | ICC.St=Active | AudioSource.St (SourceType = RadioAnnouncement, SourceTypeStatus = Granted) | ICC.St=Active  AudioSource.St (SourceType = RadioAnnouncement, SourceTypeStatus = Granted) | Concurrent Audio for both Radio announcement and ICC for both driver and passenger |
| ICC Vs DND | ICC.St=Active | DND is activated | ICC.St=Active  DND is also active | When ICC is active and DND is initiated the ICC session shall remain unaltered |

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| **Acceptance Criteria** |
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# Functional Definition

## ICC-FUN-REQ-408873/A-Enable/Disable Sync/URC

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| --- |
| **Acceptance Criteria** |
|  |

### Use Cases

#### ICC-UC-REQ-414599/B-Enable/Disable from Sync/ URC

|  |  |
| --- | --- |
| **Actors** | ICCServer, ICCClient, InputOutputClient User (Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active  HMI is available (Sync/URC) |
| **Scenario Description** | The InputOutputClient shall display the ICC feature settings/menu option to be available for selection  The user selects the ICC feature on the Display to be Active/ Inactive |
| **Post-conditions** | The InputOutputClient displays the ICC Active/ Inactive and sends user input to ICCClient |
| **List of Exception Use Cases** | HMI is off  Display not available |
| **Interfaces** | ICCServer, ICCClient, CAN, A2B |

### Requirements

#### ICC-REQ-415425/B-Enable/Disable ICC Settings

The InputoutputClient shall display the ICC feature providing the user with the ability to turn it Active/Inactive via the HMI when the ICCClient updates information.

* The Feature shall be available when the Power mode Conditions are met as referred by ICC-REQ-408882/A-Powermode Condition.
* The Feature shall not be available when the Power mode conditions are not met or if the ICC.St signal goes missing on the bus refer ICC-REQ-408884/B-Missing Message Strategy

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| --- |
| **Acceptance Criteria** |
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##### ICC-REQ-408877/B-Interface Request

The InputOutputClient shall receive user input and ICCClient shall set and send ICCServer with the following encodings:

* When the User selects Enable/Active, ICC.Rq = “(0x1) Active”,
* When the User selects Disable/Inactive, ICC.Rq = “(0x0) Inactive”

|  |
| --- |
| **Acceptance Criteria** |
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##### ICC-REQ-408878/B-Interface Response

The InputOutputClient shall update the display as received by the ICCClient with ICC.St from the ICCServer

* If the ICC.St= “(0x1) Active” update the display to indicate Enable or
* If the ICC.St = “(0x0) Inactive” update the display to indicate ICC deactivated
* If the ICC.St = “(0x2) temporary Disable” update the display to indicate ICC cannot be selected or no user input allowed in this state

|  |
| --- |
| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421537/A-Enable and Disable ICC

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421538/A-Enable and Disable ICC

Sequence Diagram



## ICC-FUN-REQ-421539/A-Initiate ICC

|  |
| --- |
| **Acceptance Criteria** |
|  |

### Use Cases

#### ICC-UC-REQ-414600/B-Initiate ICC

|  |  |
| --- | --- |
| **Actors** | ICCServer, ICCClient, InputOutputClient User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active, ICC is activated via HMI,  Mics are available |
| **Scenario Description** | The user selects the ICC feature on the display  Driver/Passenger audio is accepted by the seat microphones and played in the headrest speakers of driver/passenger |
| **Post-conditions** | Driver/Passenger speaks through the headrest mics  Driver/Passenger audio is heard in the 1St or 3rd row head rest speakers |
| **List of Exception Use Cases** | Audio System is unavailable  Emergency announcement is in progress |
| **Interfaces** | ICCServer, ICCClient, CAN, A2B |

### Requirements

#### ICC-REQ-415426/B-Initiate ICC

When the ICCClient sends ICC.Rq = Active request to the ICCServer, it shall wait for the server to respond with in a timeframe of 75ms

With:

If ICC.St=Active:

* The ICCClient sends ICC.Rq=Active to the ICCServer
* The ICCServer shall respond ICC.St=Active
* When the user speaks through the mic the ICCServer plays 1st row or 3rd row seat occupant audio through the speakers.
* The ICC session remains active and the ICCServer continues to send ICC.St=Active as the audio source until the ICC.Rq=Inactive is received or another higher priority Audio Source is granted which would result in ICCServer updating the ICC.St = Temporary Disabled refer to the ICC-REQ-423223/B-ICC Use Case Matrix for more details

Else if ICC.St=InActive:

* update the display to indicate Disable.

Else ICC.St=Temporary Disable

* User input cannot be accepted at this state.

|  |
| --- |
| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421540/A-Initiate ICC

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421541/A-Initiate ICC

Sequence Diagram



## ICC-FUN-REQ-421542/A-ICC vs CA

|  |
| --- |
| **Acceptance Criteria** |
|  |

### Use Cases

#### ICC-UC-REQ-421548/A-ICC vs CA

|  |  |
| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | When CA session is active ICC session cannot be initiated.  When ICC is active and CA session is initiated then ICC shall be temporarily disabled and CA session shall continue.  ICC resumes its previous state after CA session ends. |
| **Post-conditions** | CA plays and ICC resumes after CA is complete |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-421565/A-ICC vs CA

If ICCServer is sending ICC.St=Active and CAClient sends CA.Rq = Active request then ICCServer shall send ICC.St=Temporary disabled until the CA session is complete or CAServer sends CA.St=Inactive then the ICCServer shall send the ICC.St =active again allowing the ICC session to be available.

ICC session cannot be initiated when CA session is active.

ICC resumes its previous state after CA session ends.

|  |
| --- |
| **Acceptance Criteria** |
|  |

### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421577/A-ICC Vs CA

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421578/A-ICC Vs CA

Sequence Diagram



## ICC-FUN-REQ-421579/A-Incoming Phone Call ICC active

|  |
| --- |
| **Acceptance Criteria** |
|  |

### Use Cases

#### ICC-UC-REQ-414601/B-Incoming Phone call - ICC active

|  |  |
| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active PiorityAssist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | If ICC is active and phone call comes in, then call ring audio is active |
| **Post-conditions** | Phone call ring plays but ICC session is active |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient, CAN, A2B |

### Requirements

#### ICC-REQ-415427/B-Incoming Phone Call - ICC Active

If there is an incoming call ring then Audio Server shall send the AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 1,2,3,4) to ICCServer and ICC Server shall update the status to ICC.St= Temporary Disabled for the duration of AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 1,2,3,4).Once the AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = deallocated) the ICC.St moves to the previous state.

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421580/A-ICC and incoming Phone Call

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421581/A-ICC and incoming Phone Call

Sequence Diagram



## ICC-FUN-REQ-421582/A-ICC Vs Phone Call

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414603/A-Initiate ICC- Phone call Active

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| --- | --- |
| **Actors** | ICCServer, ICCClient, User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | When phone call is accepted then ICC is disabled temporarily and ICC resumes its previous state once the phone call ends. |
| **Post-conditions** | Phone call is active and ICC is disabled until phone call is active |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient, CAN, A2B  CAN, A2B |

### Requirements

#### ICC-REQ-415428/B- ICC Active - Phone call accepted

When ICC.St=Active/Inactive and the audio source server updated to AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted) or AudioSourceZone(x).St(SourceType(x) = Phone, SourceTypeStatus(x) = Granted)(x=zones 2,3,4) then ICCServer sends ICC.St=Temporarily Disabled not allowing the user to reselect ICC session or disabling the ICC session temporarily.

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| **Acceptance Criteria** |
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#### ICC-REQ-431234/B-Phone call ends - ICC active/inactive Previously

When ICC.St=Active/Inactive previously and the audio source server updated to AudioSource.St (SourceType = Phone, SourceTypeStatus = deallocated) or AudioSourceZone(x).St(SourceType(x) = Phone, SourceTypeStatus(x) = deallocared)(x=zones 2,3,4) then ICCServer sends ICC.St=Active/Inactive resuming

to its previous state.

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421583/A-ICC and Phone Call

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421584/A-ICC and Phone Call

Sequence Diagram



## ICC-FUN-REQ-421617/A-Mixed Prompts- ICC active

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414602/B-Mixed Prompts/Chimes- ICC active

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | ICC and mixed Prompts are played concurrently |
| **Post-conditions** | ICC and mixed Prompts are played concurrently |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient, CAN, A2B  CAN, A2B |

### Requirements

#### ICC-REQ-415429/B-Mixed Prompts -ICC active

When ICC session is active with the ICCClient is receiving ICC.St = Active and If MixablePrompts = active then the ICCServer shall mix and play the ICC audio and the mixed prompts concurrently.

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421618/A-ICC and Mixed Prompts

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421619/A-ICC and Mixed Prompts

Sequence Diagram



## ICC-FUN-REQ-421620/A-Priority Assist -ICC is active

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414605/A-Priority Assist Vs ICC

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, PriorityAssist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | When ICC is active and priority assist becomes active then ICC will be temporarily disabled and resumes its previous status once the priority assist is complete |
| **Post-conditions** | Priority assist audio plays.  ICC resumes once the assist audio completes. |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-415431/B-Priority Assist-ICC active

When ICC.St=Active and and when the Audio Source Server updates AudioSource.St(SourceType = Priority Assist, SourceTypeStatus = Granted)

ICCserver shall send ICC.St=Temporary Disabled,

Else if

AudioSource.St(SourceType = Priority Assist, SourceTypeStatus =deallocated)

while ICC.St=Active/Inactive previously, the ICCServer shall change the status from ICC.St=Temporary Disabled to ICC.St=Active/Inactive

Refer to MSS-SR-REQ-425218/A-Summary of Zone to Cabin mode for zone behavior when priority assist is enabled.

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421621/A-ICC and Priority Assist

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421622/A-ICC and Priority Assist



Sequence Diagram



## ICC-FUN-REQ-421623/A-ICC while Media Active USB/Bluetooth, AM/FM/Sirius XM

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414606/A-ICC while Media Active USB/Bluetooth, AM/FM/Sirius XM

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, PriorityAssist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | When Media and ICC active or initiated at the same time both the audios are mixed. |
| **Post-conditions** | ICC and Media audio are mixed. |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-415432/A-Initiate ICC- Media active USB/Bluetooth,AM/FM/Sirius XM

When ICC is active and Media is initiated the ICCServer shall keep the ICC status active and Mix Audio for both Media and ICC

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421624/A-ICC and Media

Activity Diagram

VS 

#### Sequence Diagrams

##### ICC-SD-REQ-421625/A-ICC VS Media

Sequence Diagram



## ICC-FUN-REQ-421626/A-ICC Vs VR

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414608/A-ICC Vs VR

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | VR is initiated when ICC is active ICC.St shall be temporarily disabled till VR is active. When the ICC is Temporarily disabled state and VR session ends the ICC status goes back to active.  ICC cannot be initiated when VR is active |
| **Post-conditions** | ICC goes to active when VR session ends. |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-415433/B-ICC Vs VR

If ICC.St=active/Inactive and AudioSource.St (SourceType = VR, SourceTypeStatus = Granted) then the ICCServer shall send ICC.St=Temporary disabled until the VR session is completed. Once the VR session completed AudioSource.St (SourceType = VR, SourceTypeStatus = deallocated) the ICCServer shall send ICC.St=Active/Inactive.

The ICC session retains its previous state at the end of the VR session.

ICC cannot be Selectable/activated when VR session is active.

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421627/A-ICC Vs VR

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421628/A-ICC Vs VR

Sequence Diagram



## ICC-FUN-REQ-421629/A-Radio Announcement- ICC is active

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-414609/A-Radio Announcement- ICC is active

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, PriorityAssist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | When ICC is active and RA initiates then the ICC and RA shall be played concurrently |
| **Post-conditions** | ICC and RA play concurrently |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-415434/A-Radio Announcement - ICC is active

When ICC session is active and the ICCClient is receiving ICC.St = Active and if the Radio Announcement is active (i.e., SourceType = Radio Announcement, SourceTypeStatus =Granted) the ICCInterfaceServer shall allow the ICC audio with the Radio Announcement concurrently.

If the driver gets a Radio Announcement the driver shall be able to play the Radio Announcement and be able to play with the ICC session concurrently and while Radio Announcement is granted the ICCServer shall keep sending ICC.St=Active

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421630/A-ICC VS RA

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421631/A-ICC VS RA

Sequence Diagram



## ICC-FUN-REQ-421648/A-ICC active Vs DND

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-420578/B-ICC active Vs DND

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| --- | --- |
| **Actors** | ICCServer, ICCClient,User(Driver/Passenger),1st and 3rd row headrest speakers and mics |
| **Pre-conditions** | Infotainment System is powered ON, Phone call not active, PriorityAssist not active, CA not active, URC app available in a Personal Device |
| **Scenario Description** | ICC can be initiated while DND is active  Full cabin mode – NA  Zone mode-the seat requesting DND will go into the DND mode but ICC shall still remain active |
| **Post-conditions** | ICC session stays unaltered  Zone mode-the seat requesting DND will go into the DND mode but ICC shall still remain active |
| **List of Exception Use Cases** | Audio System is unavailable |
| **Interfaces** | ICCServer, ICCClient,  CAN, A2B |

### Requirements

#### ICC-REQ-415430/B-ICC active vs DND

ICCClient shall allow to Initiate ICC when DND is active

The ICC session remains unaltered. In zone mode-the seat requesting DND will go into the DND mode but ICC shall still remain active

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| **Acceptance Criteria** |
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### White Box View

#### Activity Diagrams

##### ICC-ACT-REQ-421649/A-ICC vs DND

Activity Diagram



#### Sequence Diagrams

##### ICC-SD-REQ-421650/A-ICC vs DND

Sequence Diagram



## ICC-FUN-REQ-421642/A-ICC Active-Vehicle Audio mode Switches to Full Cabin Mode

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| **Acceptance Criteria** |
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### Requirements

#### ICC-REQ-417047/B-ICC Active-Vehicle Audio mode Switches to Full Cabin Mode

When the ICCClient sends ICC.Rq= Active request and ICCServer is playing ICC audio through the speakers and if the ICCClient switches from zone mode to Full cabin mode then the ICC session stays unaltered and ICC session plays in Cabin mode. Refer to MSS-FUN-REQ-410639/A-Cabin and Zone mode – Operation for more details

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| **Acceptance Criteria** |
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## ICC-FUN-REQ-421645/A-ICC Active-Vehicle Audio Mode Switches to Zone Mode

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| **Acceptance Criteria** |
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### Use Cases

#### ICC-UC-REQ-417049/A-ICC active- Vehicle Audio mode Switches to zone mode

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| --- | --- |
| **Actors** | ICCServer, ICCClient, User (Driver/Passenger), Cabin Speakers, Zone speakers |
| **Pre-conditions** | Infotainment System is powered ON,  Vehicle Audio mode is Zone mode  Atleast one phone is connected to the rear seat zones  No phone call is active  The audio for the individual passenger(s) are played through headrest speakers.  ICC is activated |
| **Scenario Description** | While ICC is in progress and the Full cabin mode switches to Zone mode then the ICC shall continue in Zone mode. |
| **Post-conditions** | The active ICC session shall be continued in the Zone mode and the active ICC session should not be interrupted.  Vehicle audio mode shall switch to Zone mode.  All the passengers in the vehicle shall be able to listen to same audio source selected by the Driver and the audio shall be sounded through Cabin speakers |
| **List of Exception Use Cases** | Audio system is off |
| **Interfaces** | ICCClient, ICCServer,  CAN, A2B |

### Requirements

#### ICC-REQ-417066/B-ICC Active-Vehicle Audio Mode Switches to Zone mode

When the ICCClient sends ICC.Rq= Active request and ICCServer is playing ICC audio through the speakers and if the ICCClient switches from full cabin mode to zone mode then the ICC session stays unaltered ICC session plays in zone mode. Refer to MSS-FUN-REQ-410639/A-Cabin and Zone mode – Operation for more details

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| **Acceptance Criteria** |
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## ICC-REQ-408880/B-Memory Storage

The following default values shall be used by the ICCServer at the time of Battery Connect or Module Wakeup.

|  | **Battery connect /Master Reset** | **Ignition Cycle** | **Default** |
| --- | --- | --- | --- |
| ICC.St | **Inactive** | **Retain the Previous cycle** | **Inactive** |

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| **Acceptance Criteria** |
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## ICC-REQ-408879/A-System Accuracy

Within 100msec of receiving the signal that results in a change of state, the ICCClient shall update the display to the proper status.

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| **Acceptance Criteria** |
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## ICC-REQ-436414/A-Future Requirements

The CAN signals should include all the Vehicle Closure signals. Example signals may include: Door status (front/ rear doors/ hatch)

· Window status

· Vehicle speed

· Occupation of seats (if available)

· Fan setting

· Volume setting of entertainment signal (TBD)

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| **Acceptance Criteria** |
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# Appendix: Reference Documents

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| --- | --- |
| Reference # | Document Title |
| 1 |  |
| 2 |  |
| 3 |  |
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