



Research & Vehicle Technology
“Infotainment Systems Product Development”

Feature – In Car Communication

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

Version 1.1

UNCONTROLLED COPY IF PRINTED

Version Date: September 8, 2021

FORD CONFIDENTIAL



Revision History

Date	Version	Notes	
August 9, 2021	1.0	Initial Release	
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
	ICC-IIR-REQ-408888/B-ICCClient_Rx		semani4: removed an MD
	MD-REQ-408889/B-ICC_St		semani4: description updated
	MD-REQ-408892/B-ICC_Rq		semani4:update 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



Table of Contents

REVISION HISTORY	2
1 OVERVIEW	5
2 ARCHITECTURAL DESIGN.....	6
2.1 ICC-CLD-REQ-408886/B-In Car Communication Interface Client.....	6
2.2 ICC-CLD-REQ-408887/A-In Car Communication Interface Server	6
2.3 ICC-CLD-REQ-436410/A-InputOutputClient.....	6
2.4 Physical Mapping of Classes	6
2.5 Logical Signal Mapping	6
2.6 ICC Client Interface.....	6
2.6.1 ICC-IIR-REQ-408888/B-ICCCClient_Rx.....	6
2.6.2 ICC-IIR-REQ-408891/A-ICCInterfaceClient_Tx.....	7
3 GENERAL REQUIREMENTS	8
3.1 ICC-REQ-408882/B-Powermode Condition.....	8
3.2 ICC-REQ-408883/B-Feature Configuration	8
3.3 ICC-REQ-408884/B-Missing Message Strategy.....	8
3.4 ICC-REQ-425944/A-Manual Mute Mode	8
3.5 ICC-REQ-423223/B-ICC Use Case Matrix	8
4 FUNCTIONAL DEFINITION	10
4.1 ICC-FUN-REQ-408873/A-Enable/Disable Sync/URC	10
4.1.1 Use Cases.....	10
4.1.2 Requirements	10
4.1.3 White Box View	11
4.2 ICC-FUN-REQ-421539/A-Initiate ICC.....	12
4.2.1 Use Cases.....	12
4.2.2 Requirements	13
4.2.3 White Box View	14
4.3 ICC-FUN-REQ-421542/A-ICC vs CA.....	17
4.3.1 Use Cases.....	17
4.3.2 Requirements	17
4.3.3 White Box View	18
4.4 ICC-FUN-REQ-421579/A-Incoming Phone Call ICC active.....	20
4.4.1 Use Cases.....	20
4.4.2 Requirements	20
4.4.3 White Box View	21
4.5 ICC-FUN-REQ-421582/A-ICC Vs Phone Call.....	22
4.5.1 Use Cases.....	22
4.5.2 Requirements	23
4.5.3 White Box View	24
4.6 ICC-FUN-REQ-421617/A-Mixed Prompts- ICC active.....	25
4.6.1 Use Cases.....	25
4.6.2 Requirements	26
4.6.3 White Box View	26



4.7	ICC-FUN-REQ-421620/A-Priority Assist -ICC is active	27
4.7.1	Use Cases	27
4.7.2	Requirements	28
4.7.3	White Box View	28
4.8	ICC-FUN-REQ-421623/A-ICC while Media Active USB/Bluetooth, AM/FM/Sirius XM.....	31
4.8.1	Use Cases	31
4.8.2	Requirements	32
4.8.3	White Box View	32
4.9	ICC-FUN-REQ-421626/A-ICC Vs VR	33
4.9.1	Use Cases	33
4.9.2	Requirements	34
4.9.3	White Box View	34
4.10	ICC-FUN-REQ-421629/A-Radio Announcement- ICC is active	35
4.10.1	Use Cases	35
4.10.2	Requirements	36
4.10.3	White Box View	36
4.11	ICC-FUN-REQ-421648/A-ICC active Vs DND.....	38
4.11.1	Use Cases	38
4.11.2	Requirements	39
4.11.3	White Box View	39
4.12	ICC-FUN-REQ-421642/A-ICC Active-Vehicle Audio mode Switches to Full Cabin Mode	42
4.12.1	Requirements	42
4.13	ICC-FUN-REQ-421645/A-ICC Active-Vehicle Audio Mode Switches to Zone Mode	42
4.13.1	Use Cases	42
4.13.2	Requirements	42
4.14	ICC-REQ-408880/B-Memory Storage.....	42
4.15	ICC-REQ-408879/A-System Accuracy	43
4.16	ICC-REQ-436414/A-Future Requirements	43
5	APPENDIX: REFERENCE DOCUMENTS.....	44



1 Overview

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



2 Architectural Design

2.1 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

2.2 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

2.3 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

2.4 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

2.5 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

2.6 ICC Client Interface

2.6.1 ICC-IIR-REQ-408888/B-ICCClient_Rx

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

**2.6.1.1 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

2.6.1.2 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	

2.6.2 ICC-IIR-REQ-408891/A-ICCInterfaceClient_Tx

The system shall transmit the following messages

2.6.2.1 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



3 General Requirements

3.1 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

3.2 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.

3.3 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.

3.4 ICC-REQ-425944/A-Manual Mute Mode

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

3.5 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)	AudioSource.St (SourceType = Phone, SourceTypeStatus = deallocated) AudioSourceZone(X).St (SourceType(x)= Phone,	ICC.St=Inactive	ICC resumes its previous state



	AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4) ICC.St=Temporary disabled	SourceTypeStatus(x) = deallocated),(x=zones 2,3,4)		
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=inactive	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



4 Functional Definition

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

4.1.1 Use Cases

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

Actors	ICCServer, ICCClient, InputOutputClient User (Driver/Passenger), 1st and 3 rd 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

4.1.2 Requirements

4.1.2.1 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

4.1.2.1.1 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"

4.1.2.1.2 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

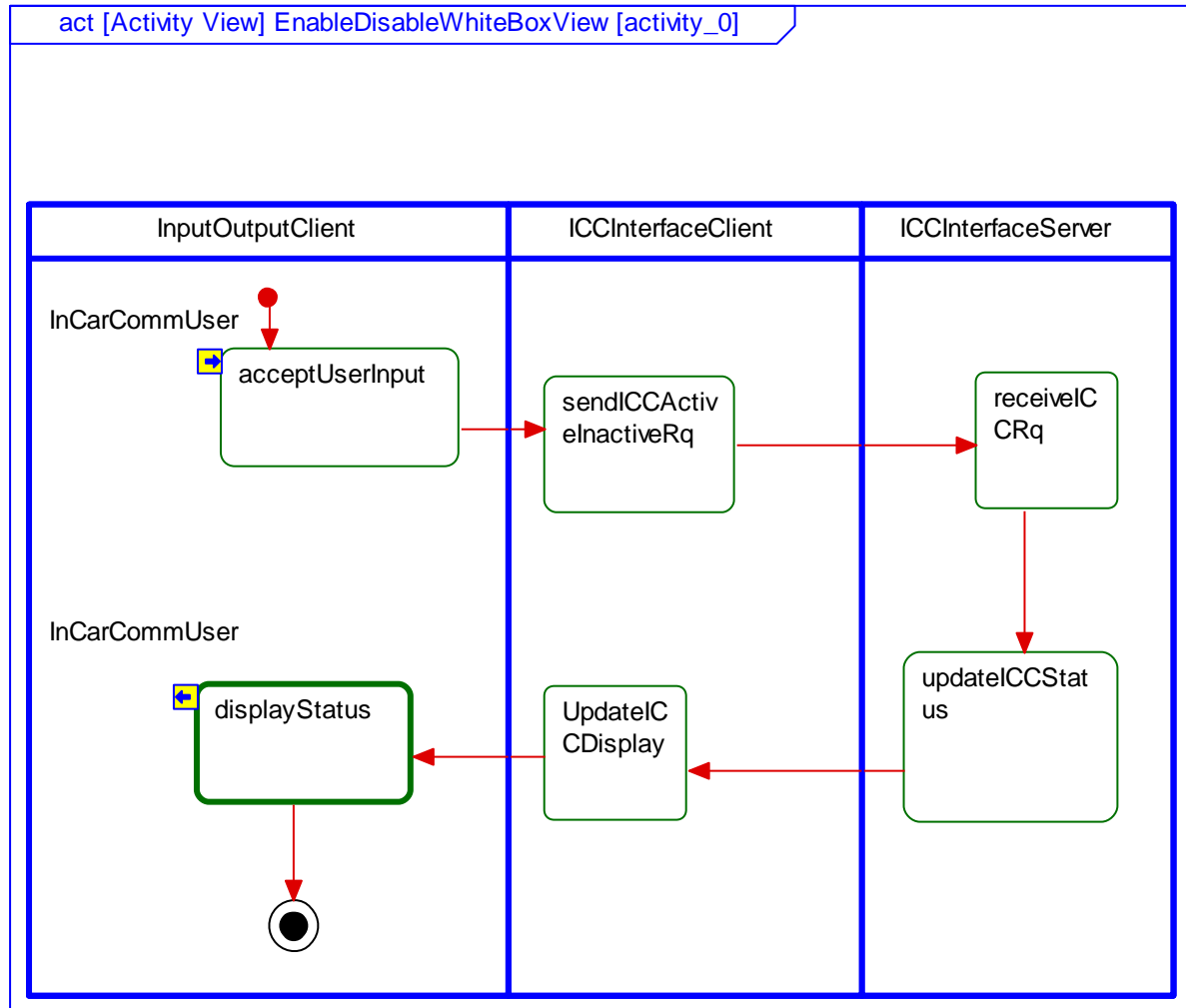


4.1.3 White Box View

4.1.3.1 Activity Diagrams

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

Activity Diagram

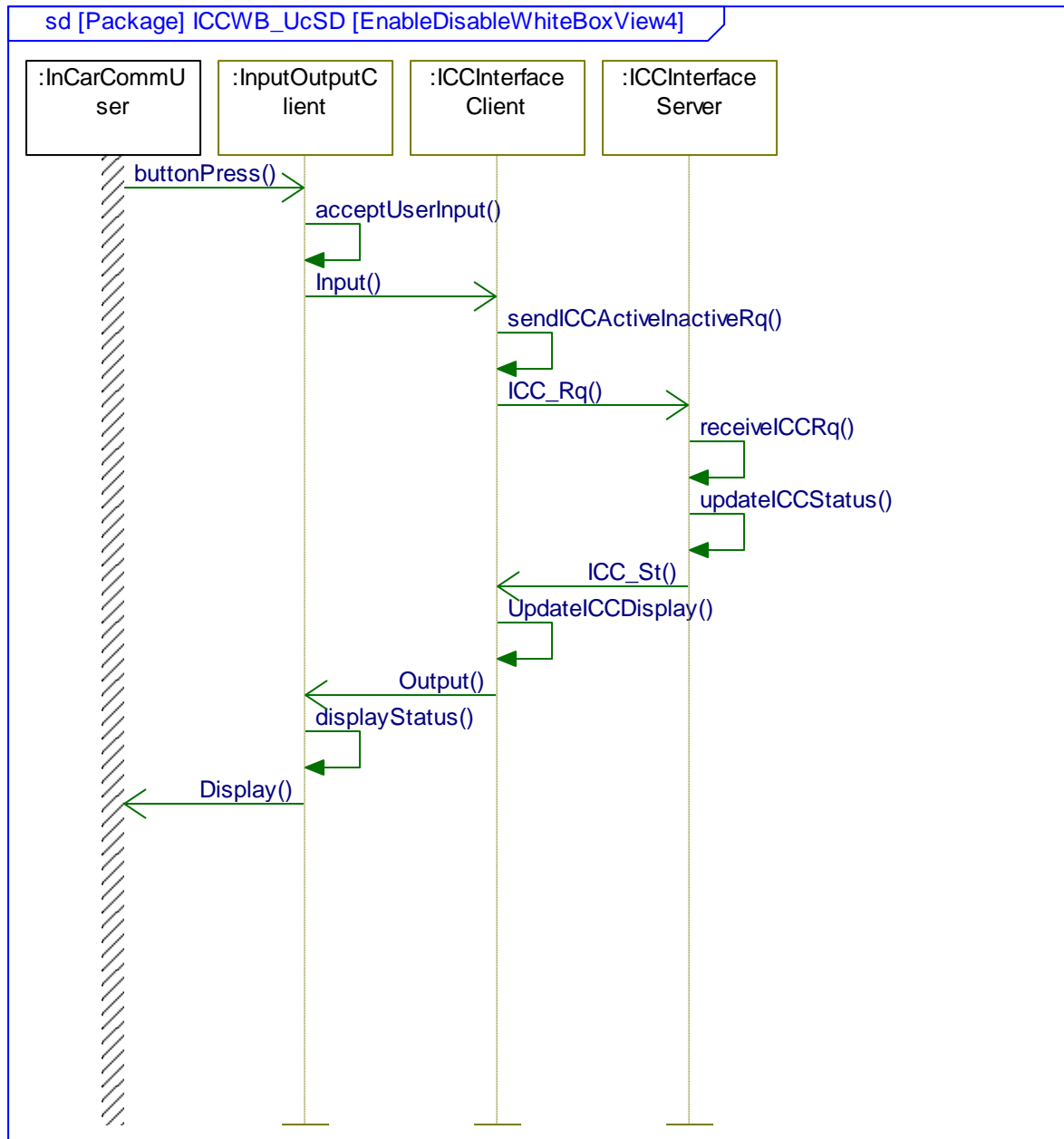




4.1.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.2.1 Use Cases

4.2.1.1 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 1 st or 3 rd row head rest speakers
List of Exception Use Cases	Audio System is unavailable Emergency announcement is in progress
Interfaces	ICCServer, ICCClient, CAN, A2B

4.2.2 Requirements

4.2.2.1 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.

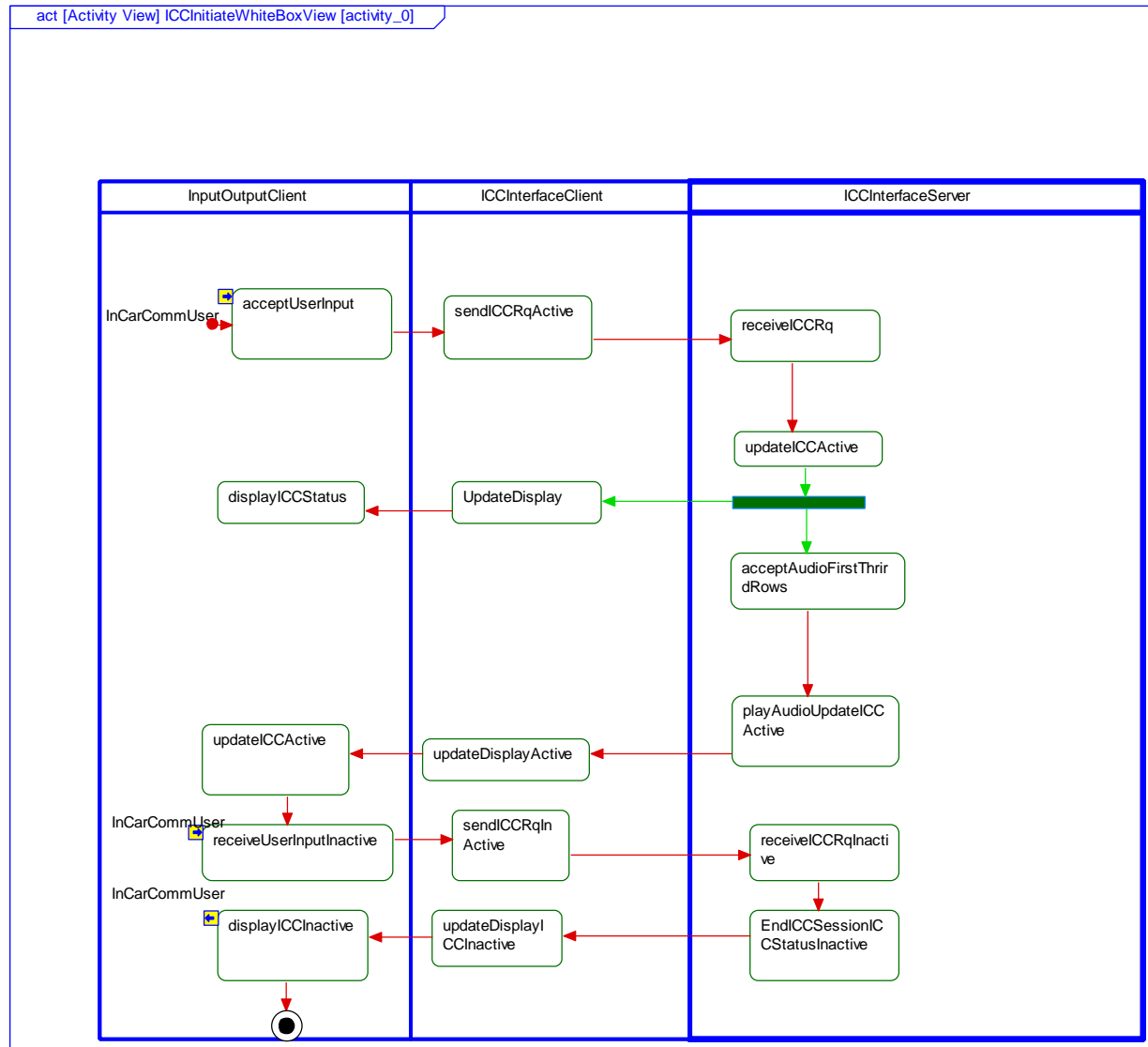


4.2.3 White Box View

4.2.3.1 Activity Diagrams

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

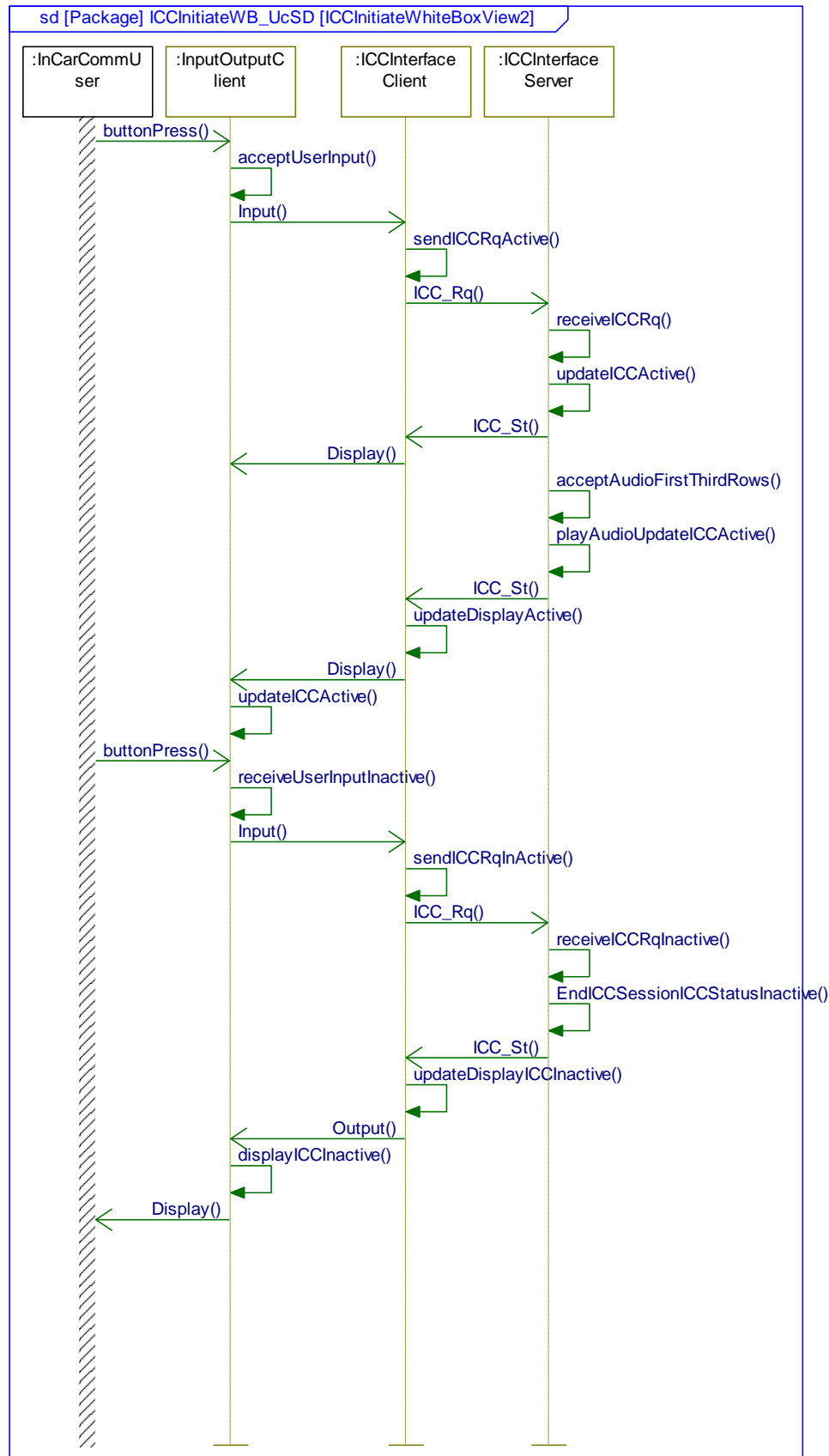
Activity Diagram





4.2.3.2 Sequence Diagrams

4.2.3.2.1 ICC-SD-REQ-421541/A-Initiate ICC Sequence Diagram





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

4.3.1 Use Cases

4.3.1.1 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

4.3.2 Requirements

4.3.2.1 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.

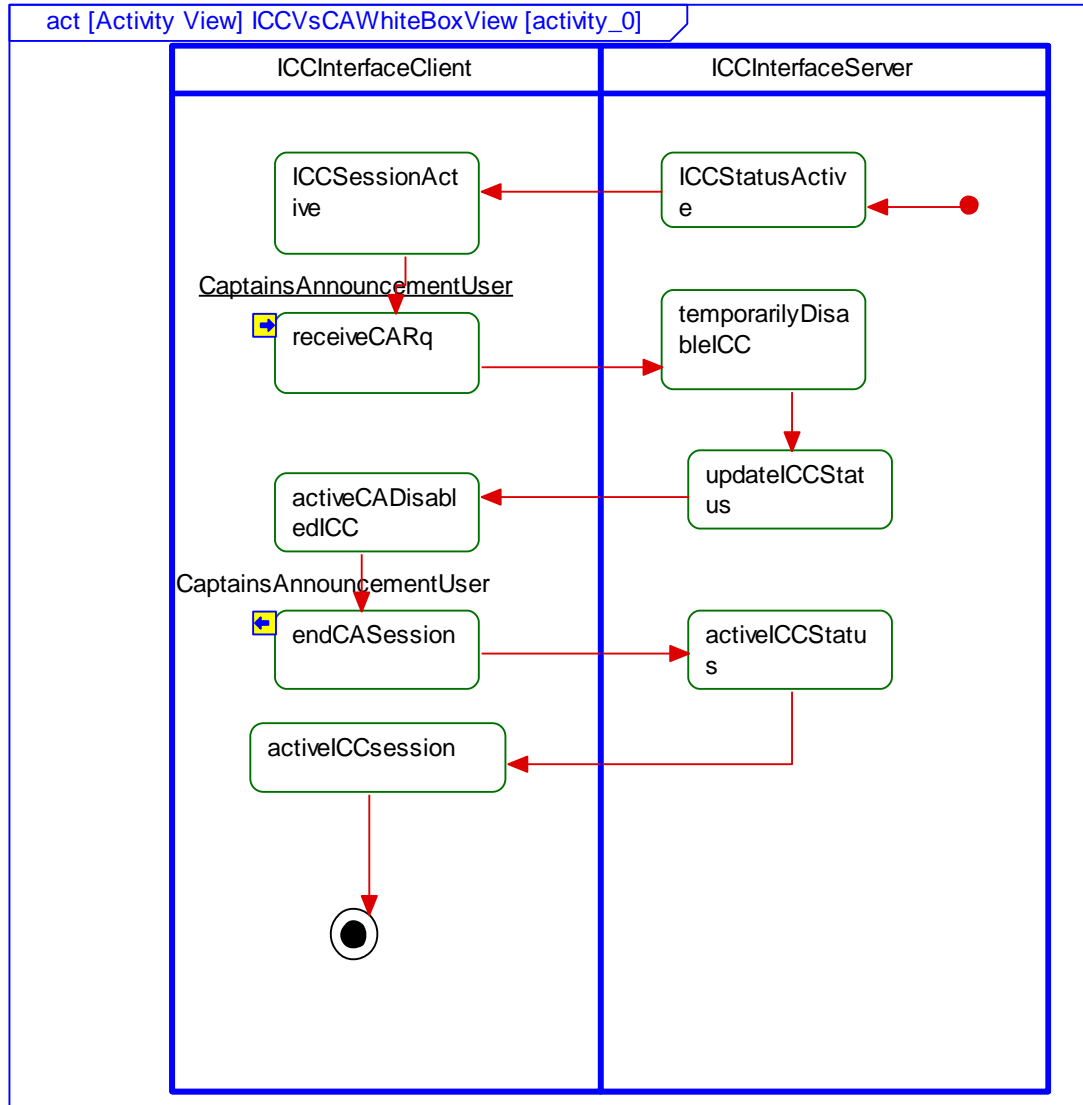


4.3.3 White Box View

4.3.3.1 Activity Diagrams

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

Activity Diagram

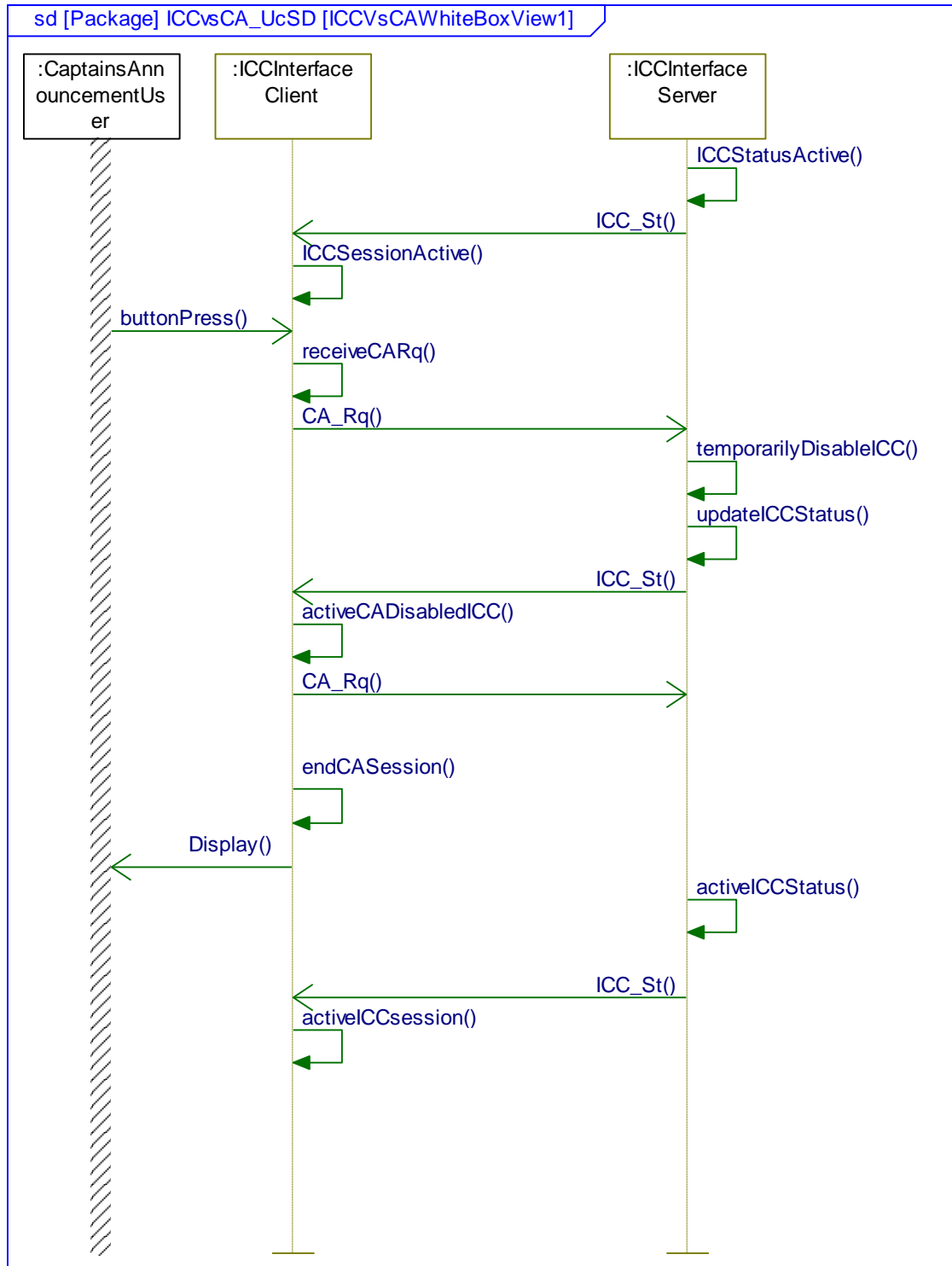




4.3.3.2 Sequence Diagrams

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

Sequence Diagram





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

4.4.1 Use Cases

4.4.1.1 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 PriorityAssist 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

4.4.2 Requirements

4.4.2.1 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.

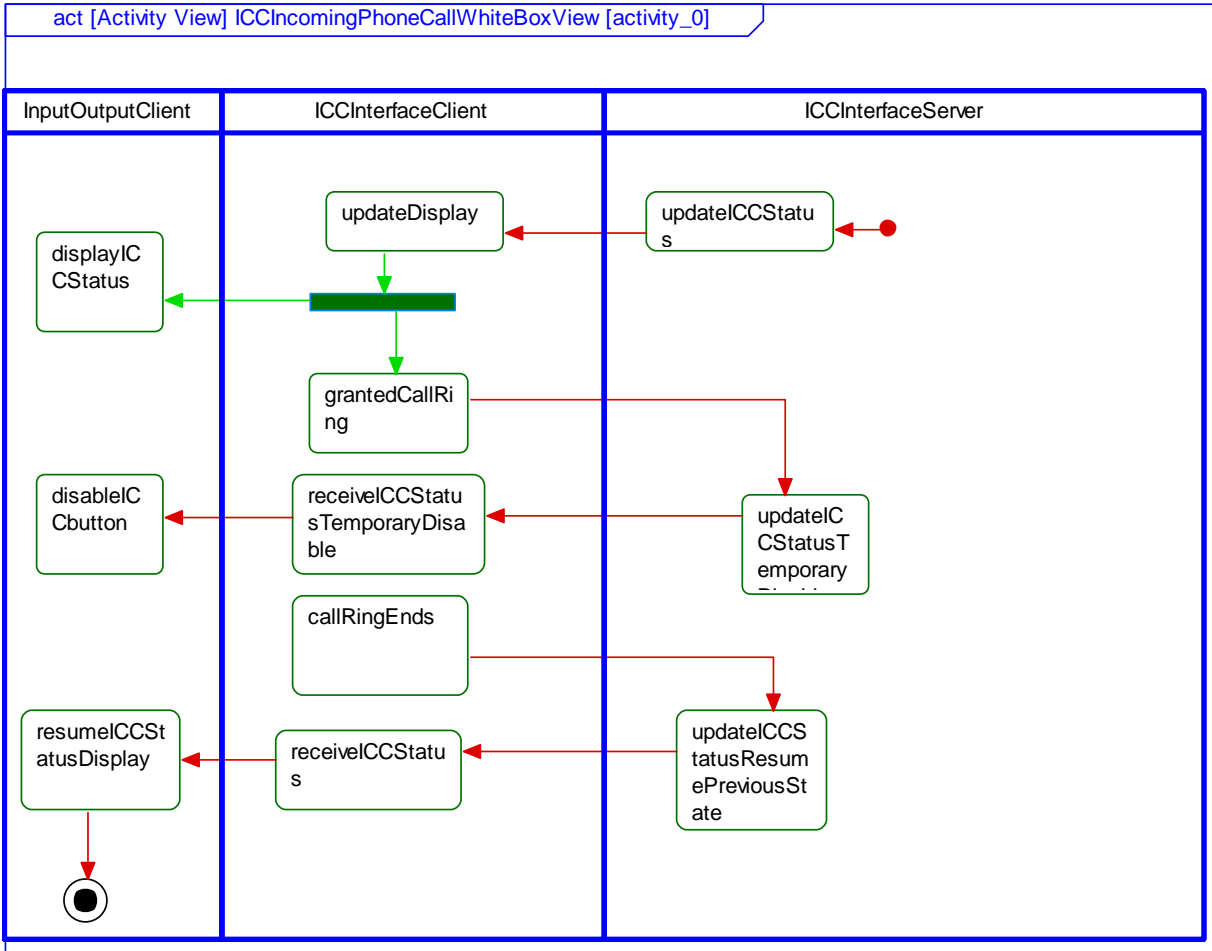


4.4.3 White Box View

4.4.3.1 Activity Diagrams

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

Activity Diagram

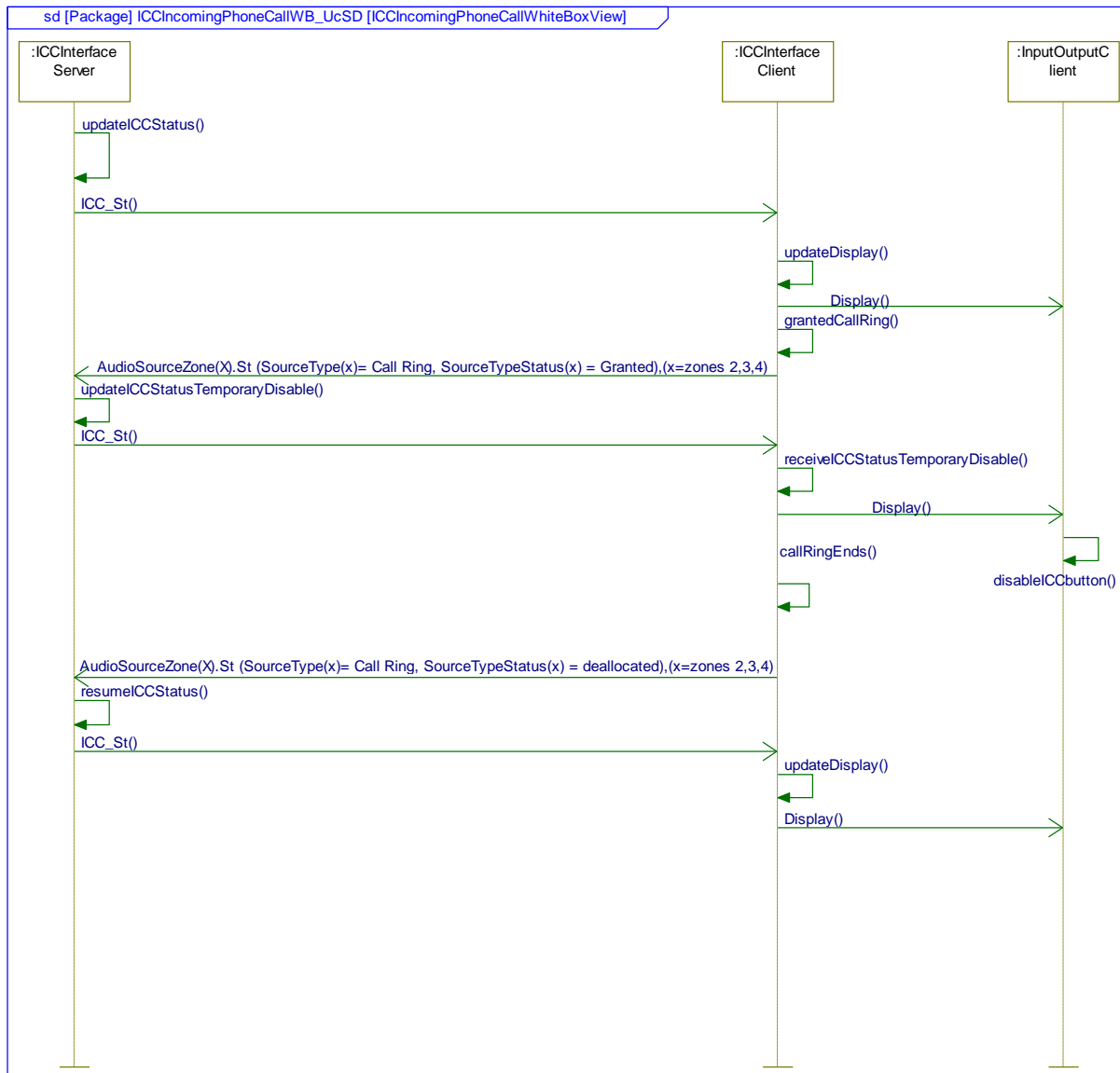




4.4.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.5.1 Use Cases

4.5.1.1 ICC-UC-REQ-414603/A-Initiate ICC- Phone call 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, 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

4.5.2 Requirements

4.5.2.1 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.

4.5.2.2 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) = deallocated)(x=zones 2,3,4) then ICCServer sends ICC.St=Active/Inactive resuming to its previous state.

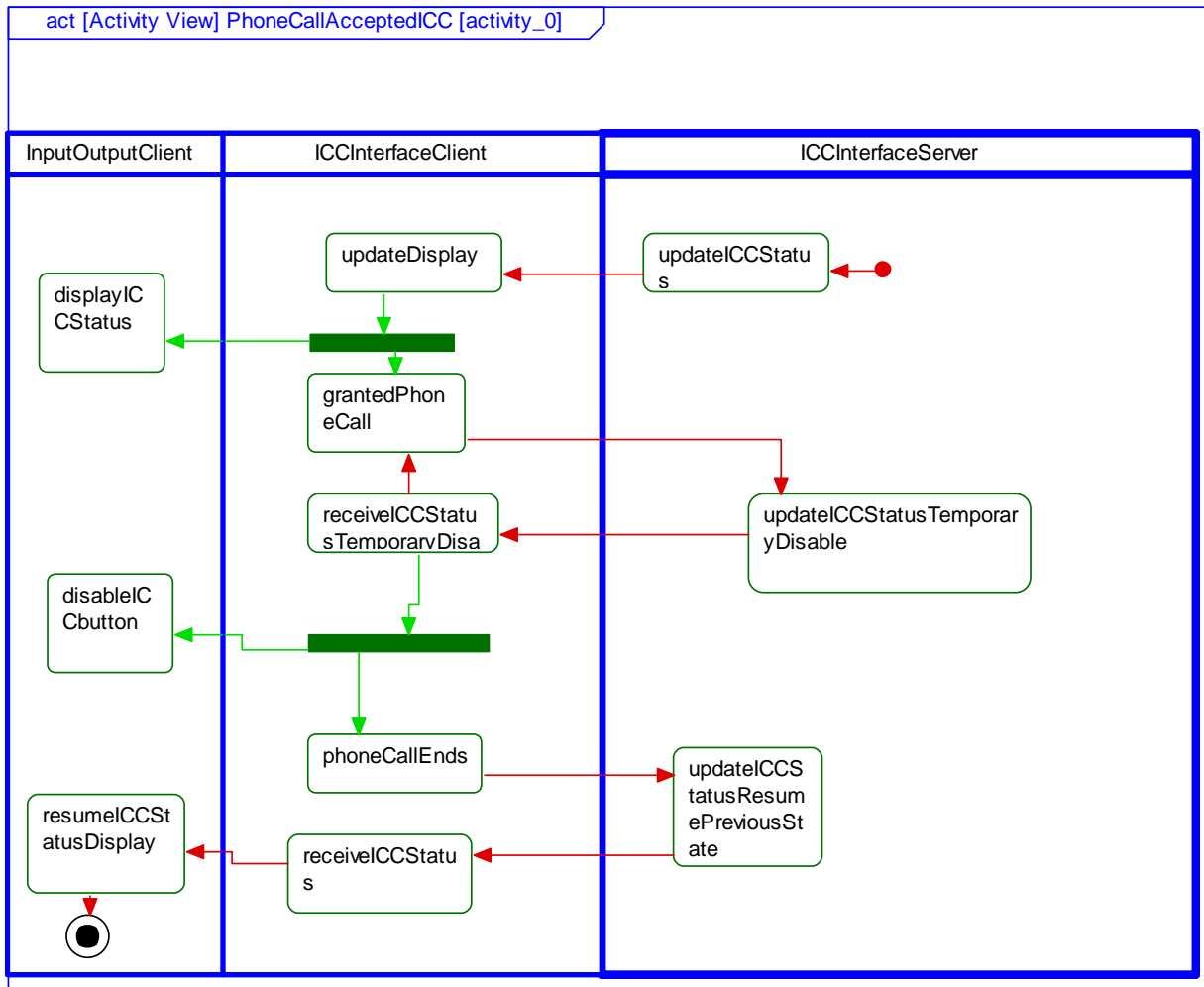


4.5.3 White Box View

4.5.3.1 Activity Diagrams

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

Activity Diagram

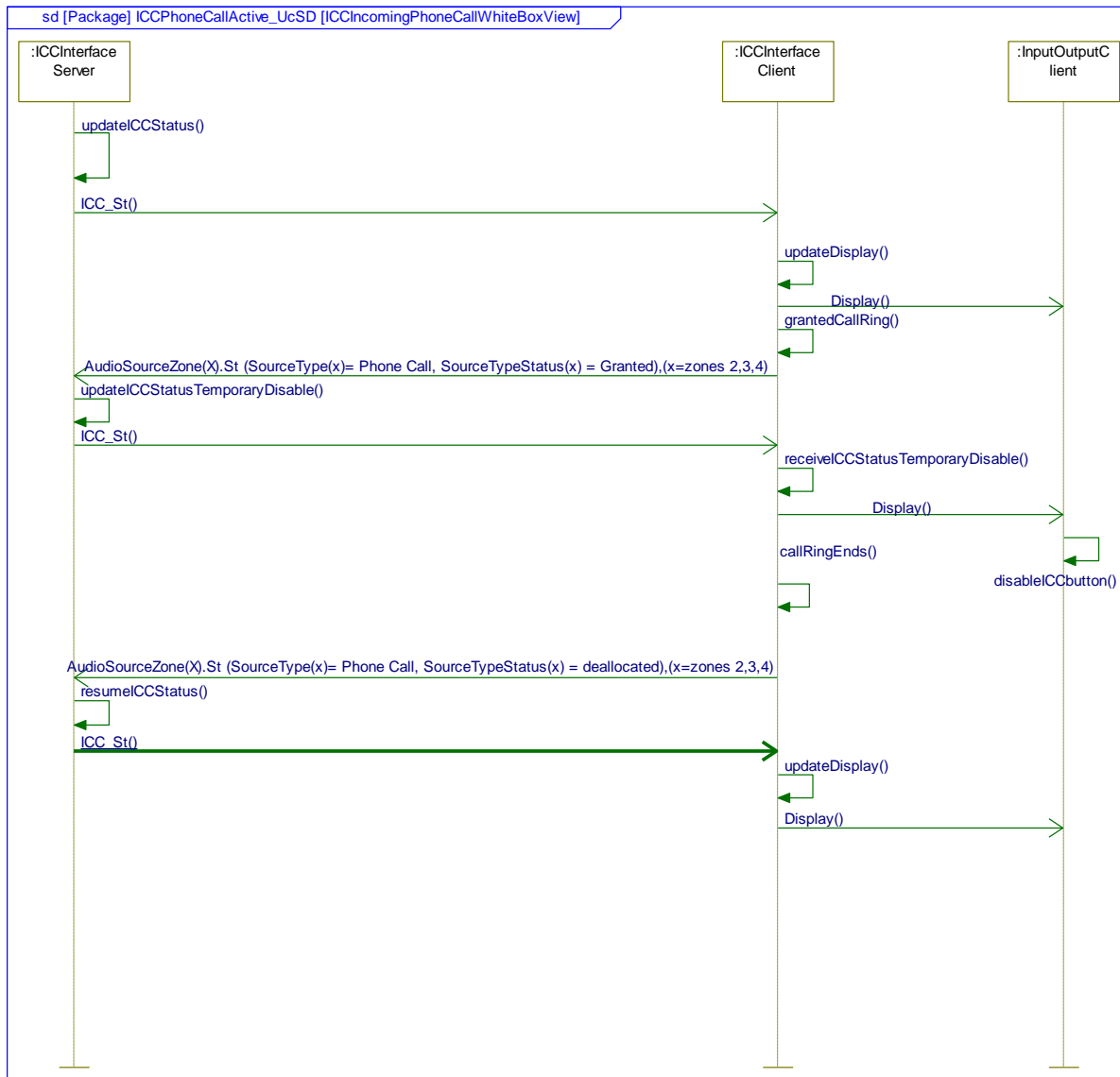




4.5.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.6.1 Use Cases

4.6.1.1 ICC-UC-REQ-414602/B-Mixed Prompts/Chimes- 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, 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

4.6.2 Requirements

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

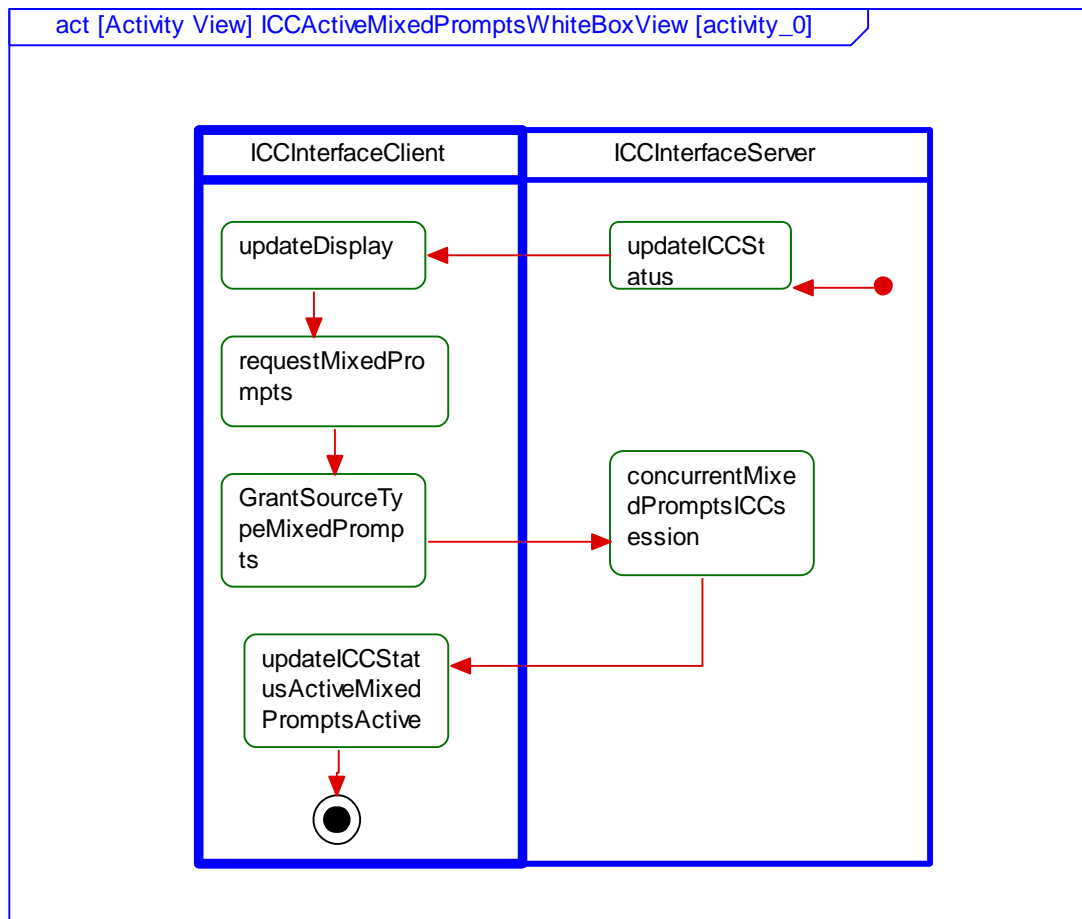
When ICC session is active with the ICCClient is receiving ICC.St = Active and If MixablePrompts = active then the ICCServer shall mix and play the ICC audio and the mixed prompts concurrently.

4.6.3 White Box View

4.6.3.1 Activity Diagrams

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

Activity Diagram

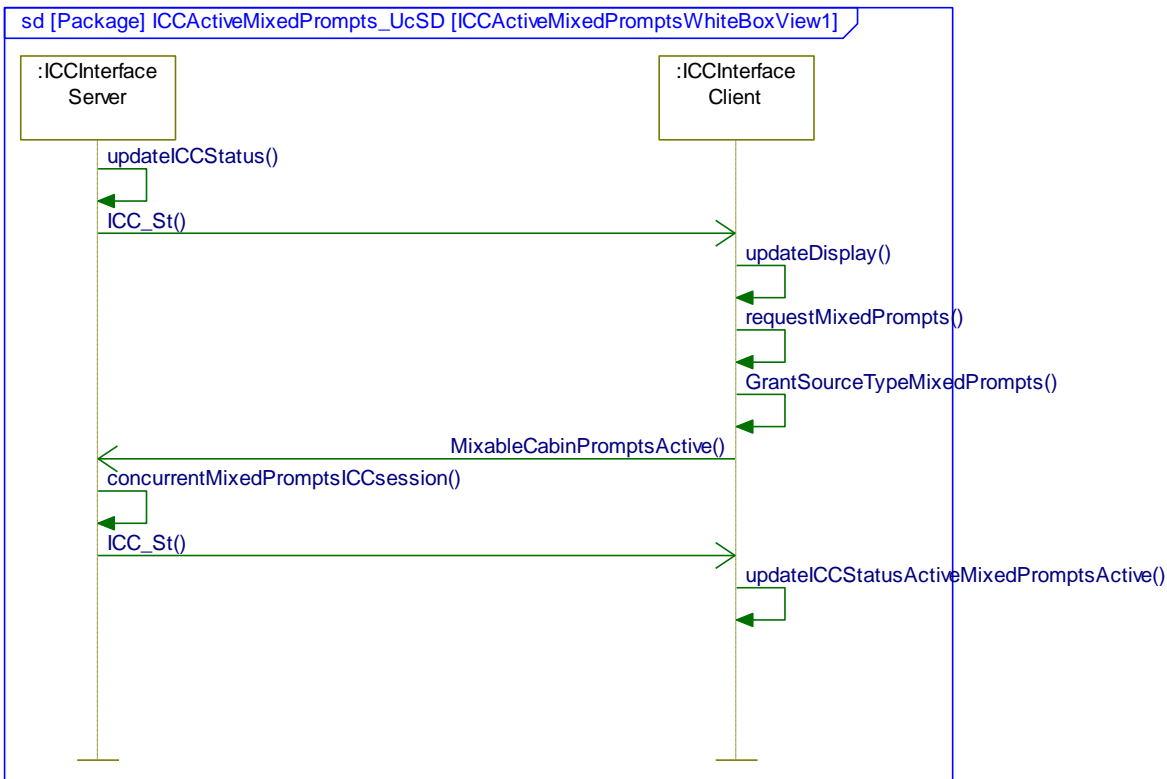




4.6.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.7.1 Use Cases

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

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



4.7.2 Requirements

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

When ICC.St=Active 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.

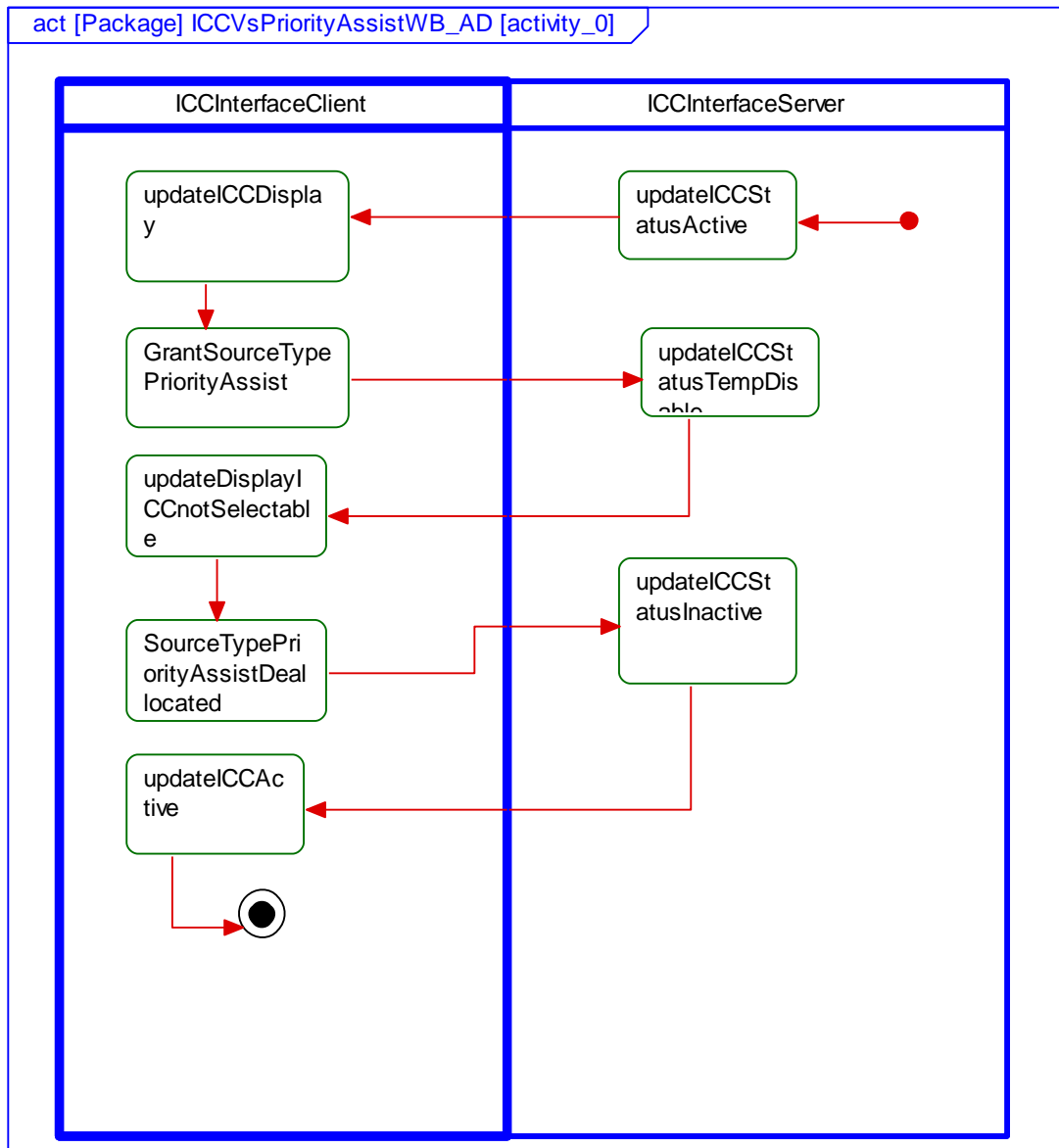
4.7.3 White Box View

4.7.3.1 Activity Diagrams

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



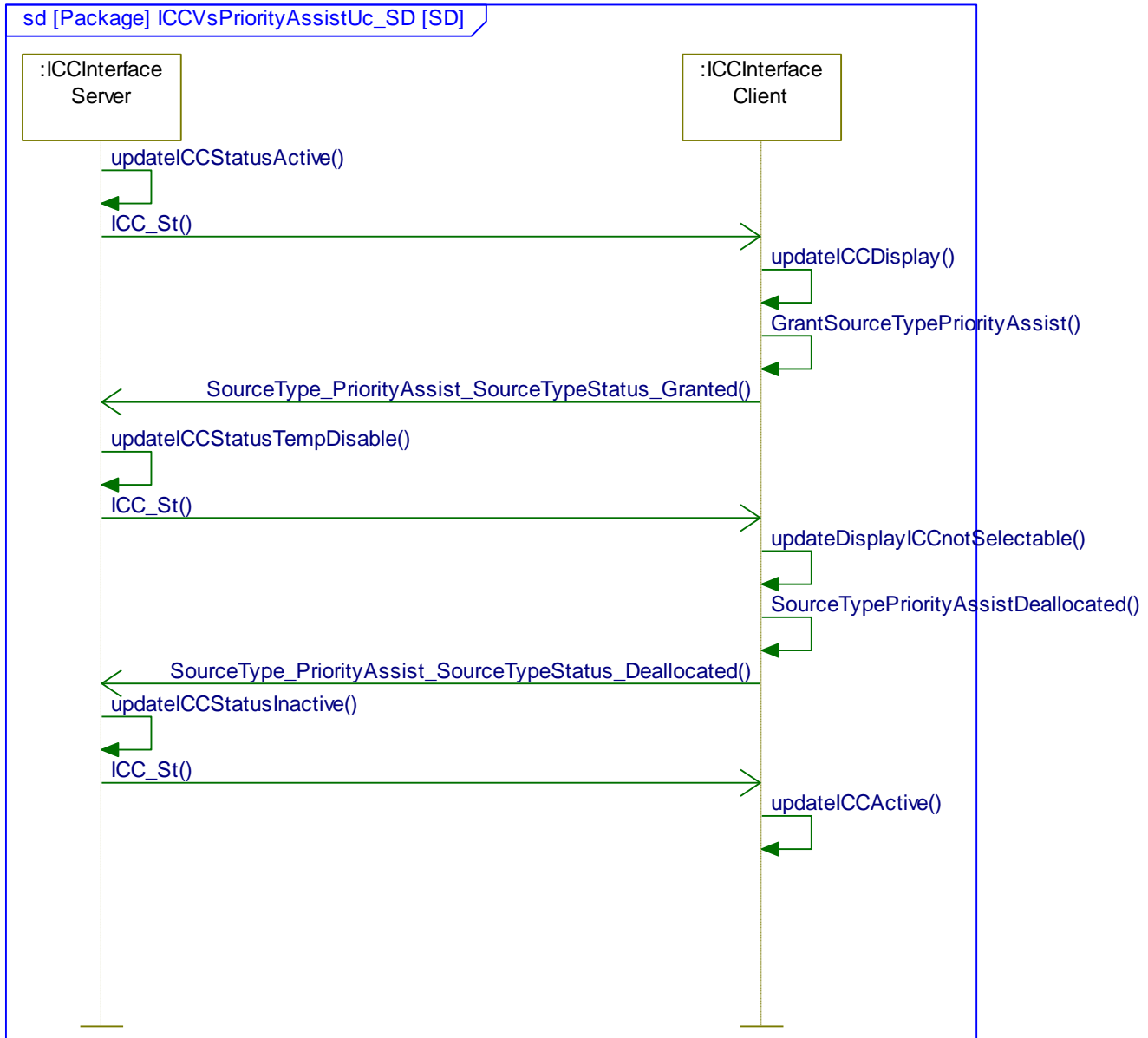
Activity Diagram





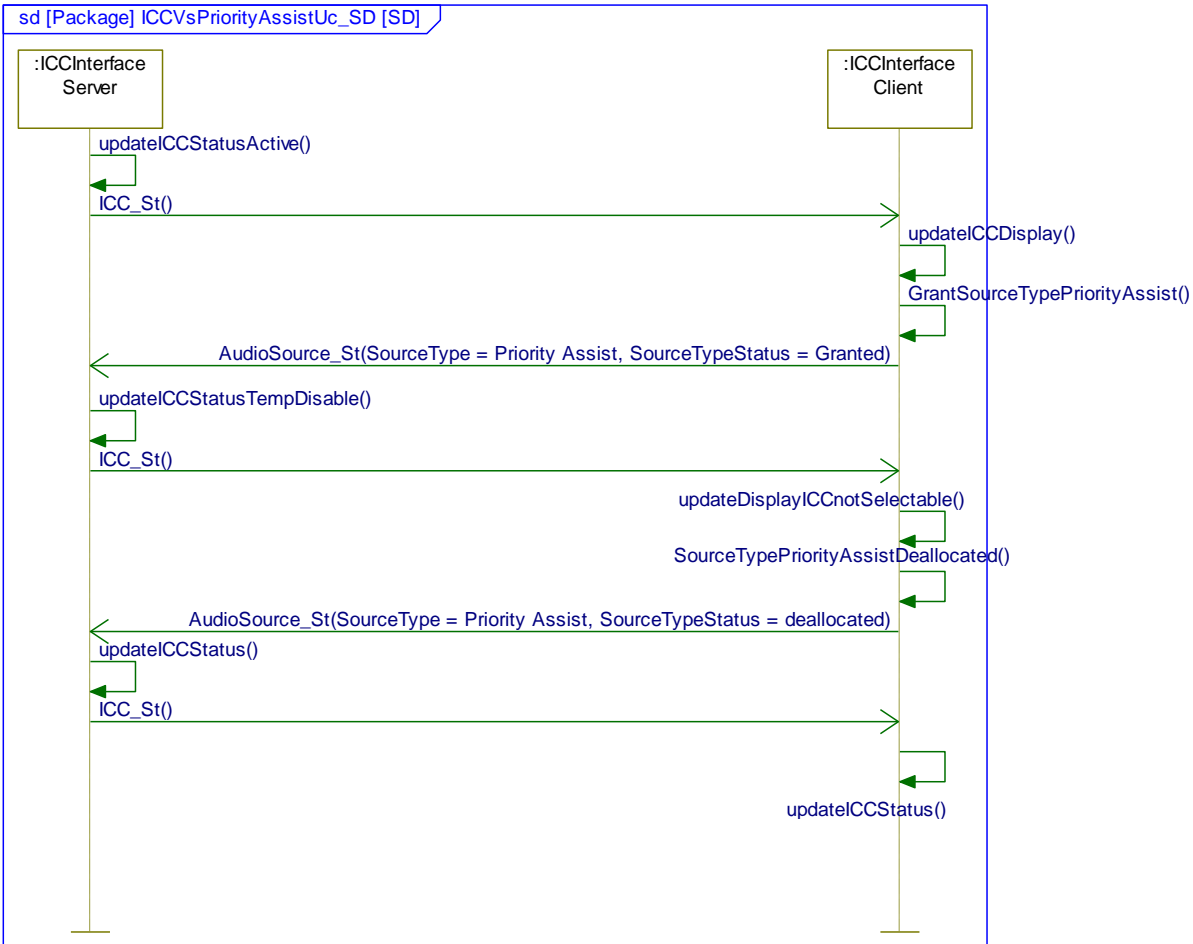
4.7.3.2 Sequence Diagrams

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





Sequence Diagram



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

4.8.1 Use Cases

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

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



4.8.2 Requirements

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

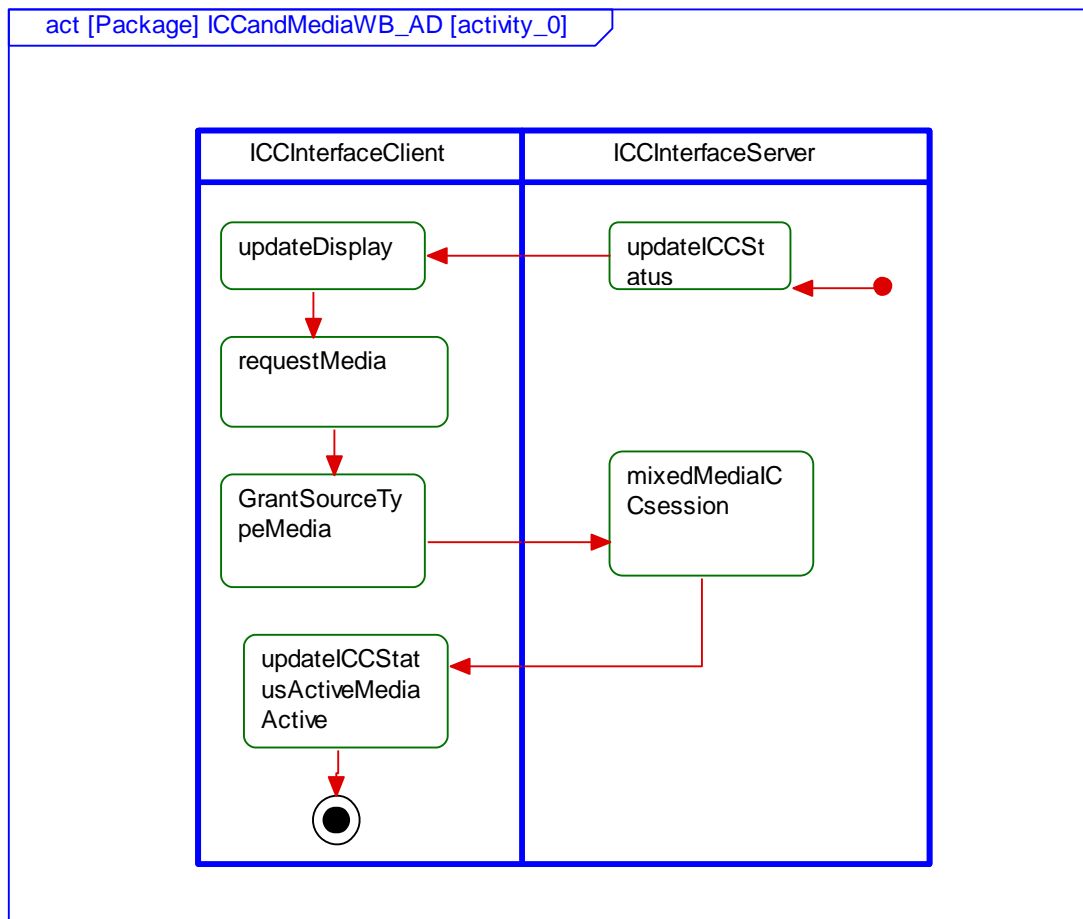
When ICC is active and Media is initiated the ICCServer shall keep the ICC status active and Mix Audio for both Media and ICC

4.8.3 White Box View

4.8.3.1 Activity Diagrams

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

Activity Diagram



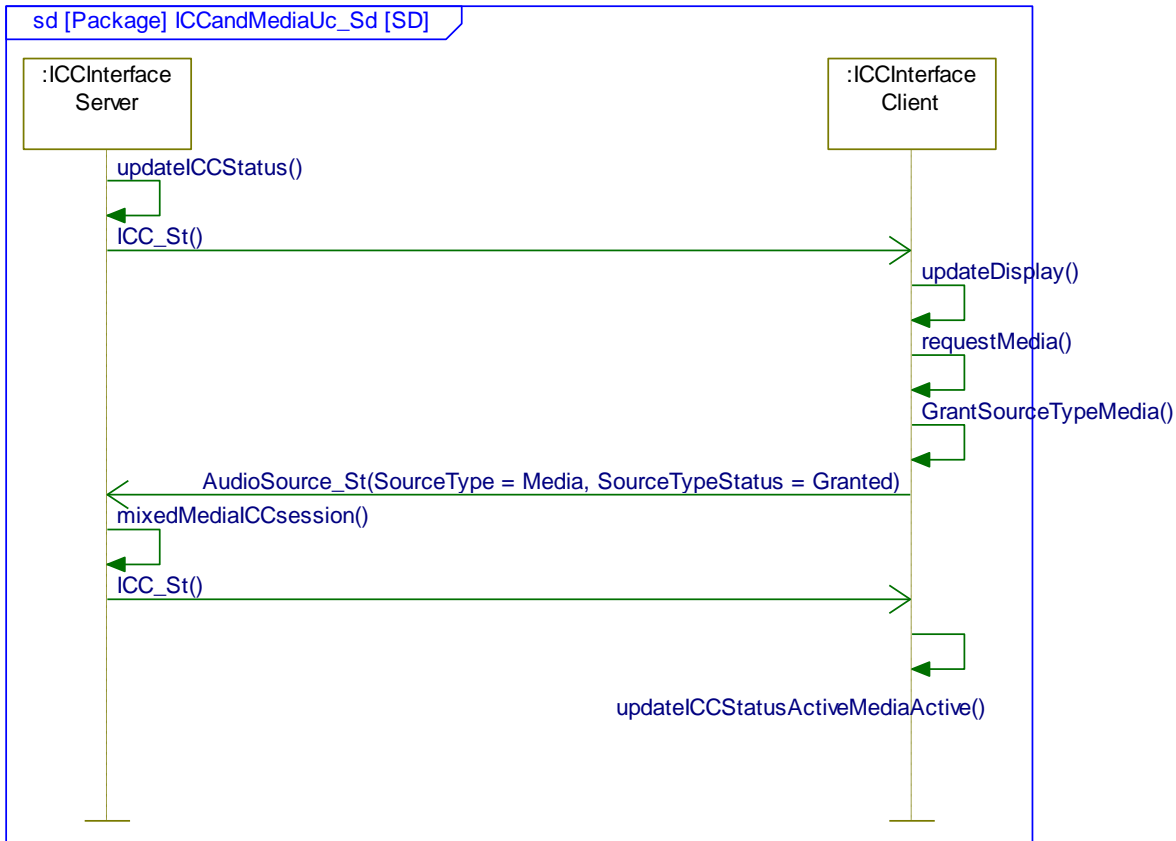
VS



4.8.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.9.1 Use Cases

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

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



4.9.2 Requirements

4.9.2.1 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.

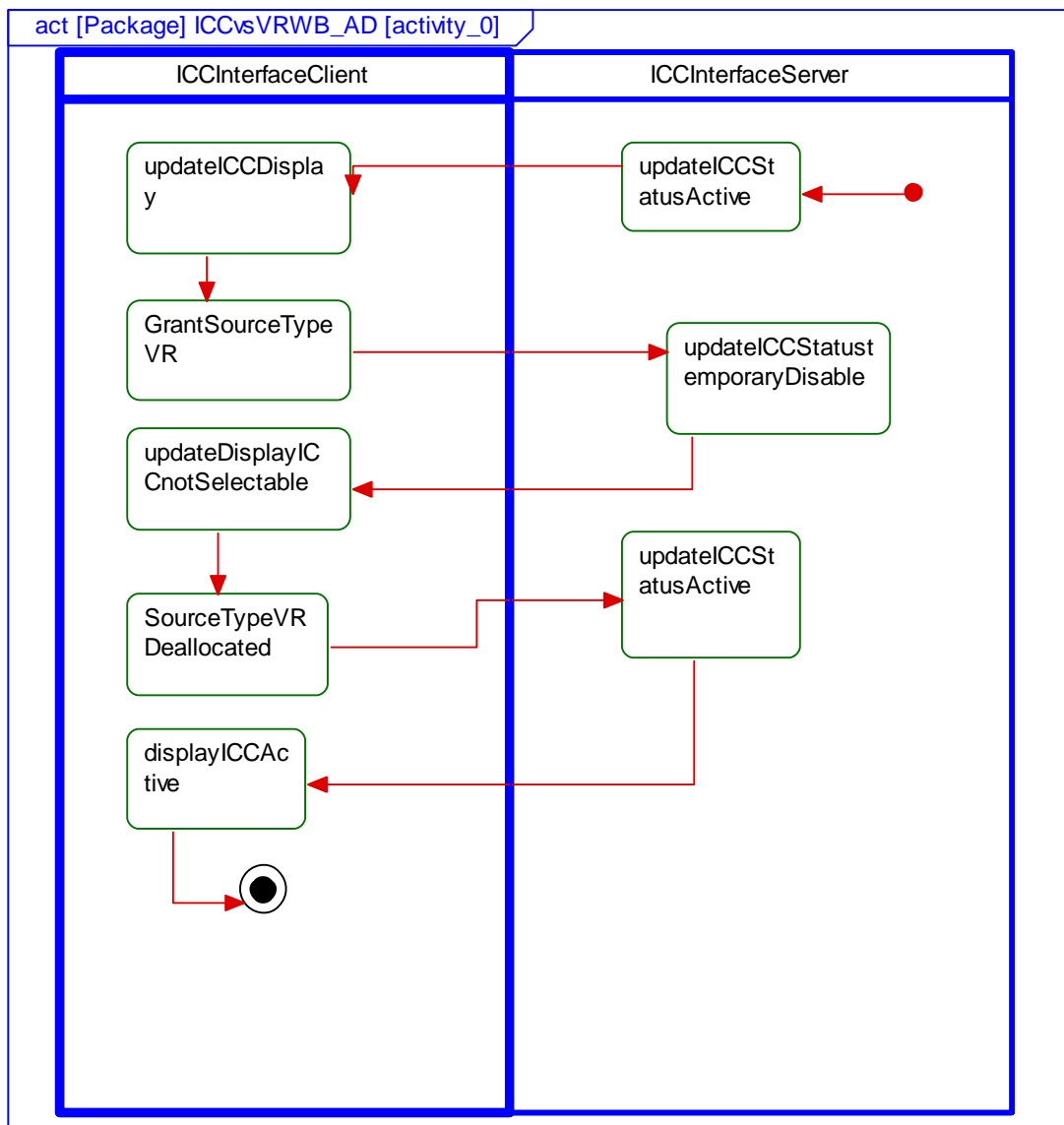
ICC cannot be Selectable/activated when VR session is active.

4.9.3 White Box View

4.9.3.1 Activity Diagrams

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

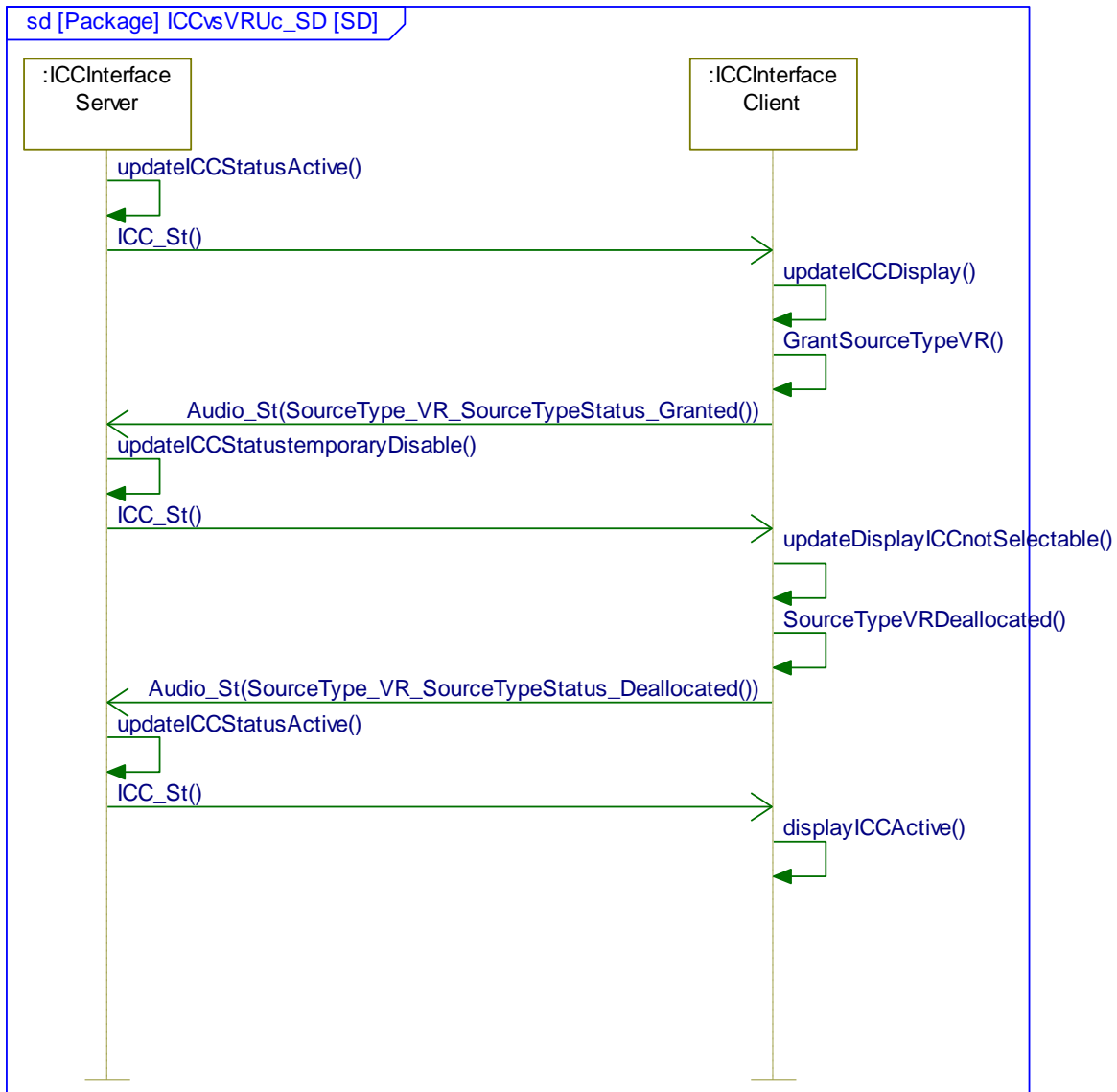
Activity Diagram





4.9.3.2 Sequence Diagrams

4.9.3.2.1 ICC-SD-REQ-421628/A-ICC Vs VR Sequence Diagram



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

4.10.1 Use Cases

4.10.1.1 ICC-UC-REQ-414609/A-Radio Announcement- ICC is 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, 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

4.10.2 Requirements

4.10.2.1 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

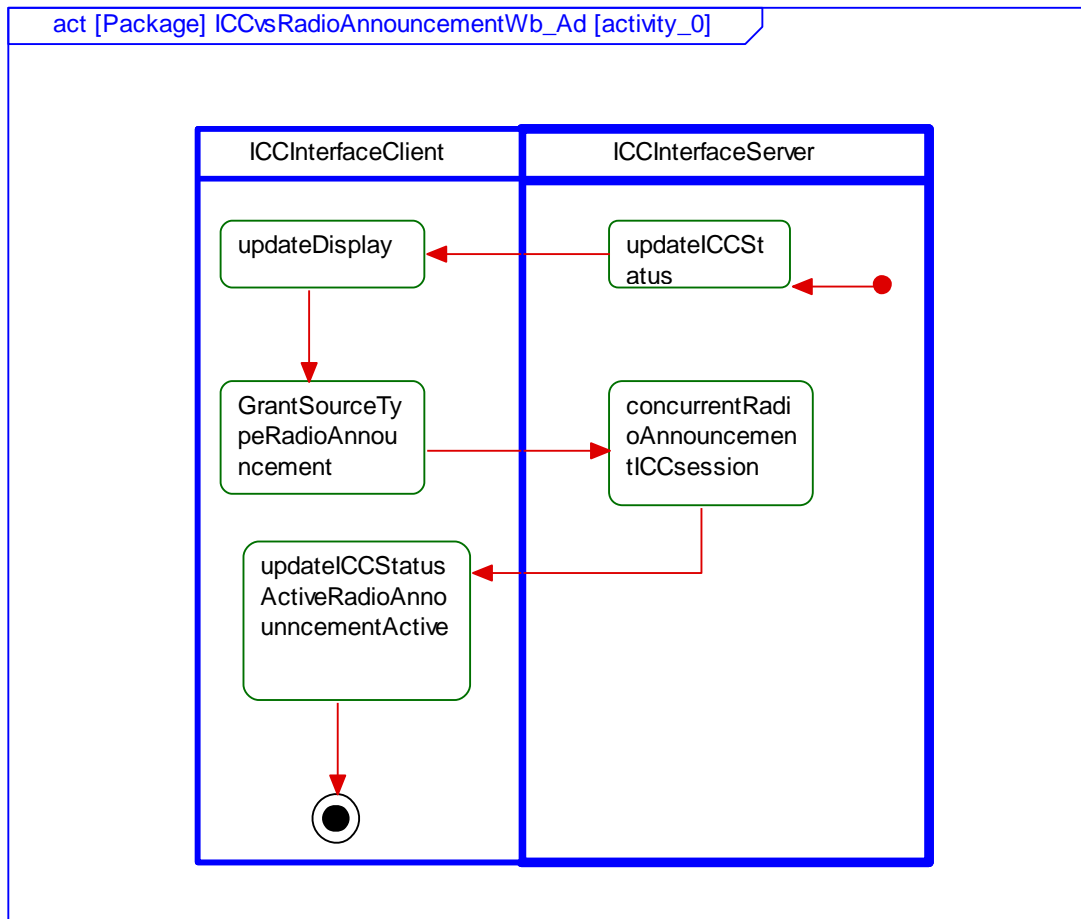
4.10.3 White Box View

4.10.3.1 Activity Diagrams

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



Activity Diagram

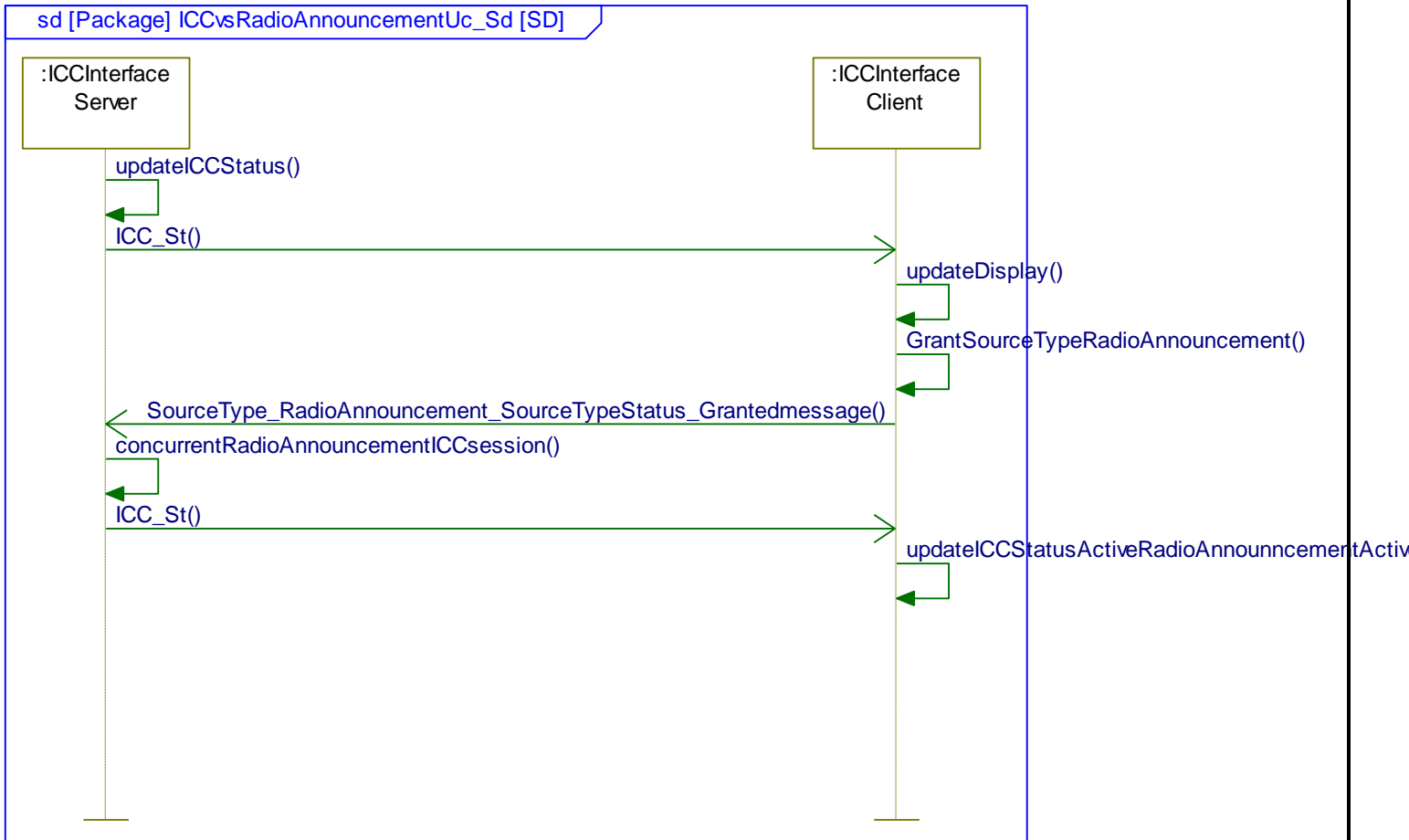




4.10.3.2 Sequence Diagrams

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

Sequence Diagram



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

4.11.1 Use Cases

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

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 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

InterfacesICCServer, ICCClient,
CAN, A2B**4.11.2 Requirements****4.11.2.1 ICC-REQ-415430/B-ICC active vs DND**

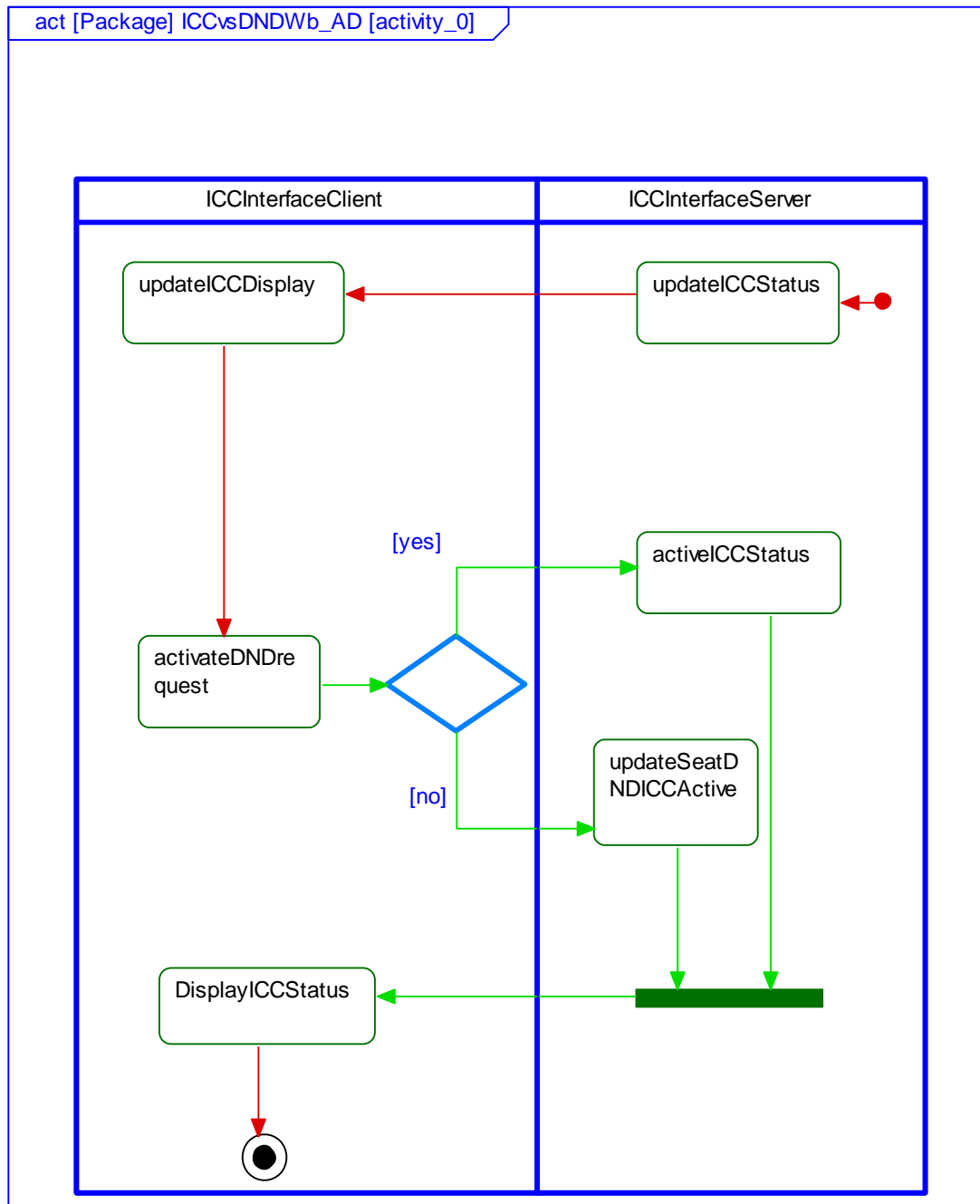
ICCClient shall allow to Initiate ICC when DND is active

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

4.11.3 White Box View**4.11.3.1 Activity Diagrams****4.11.3.1.1 ICC-ACT-REQ-421649/A-ICC vs DND**



Activity Diagram

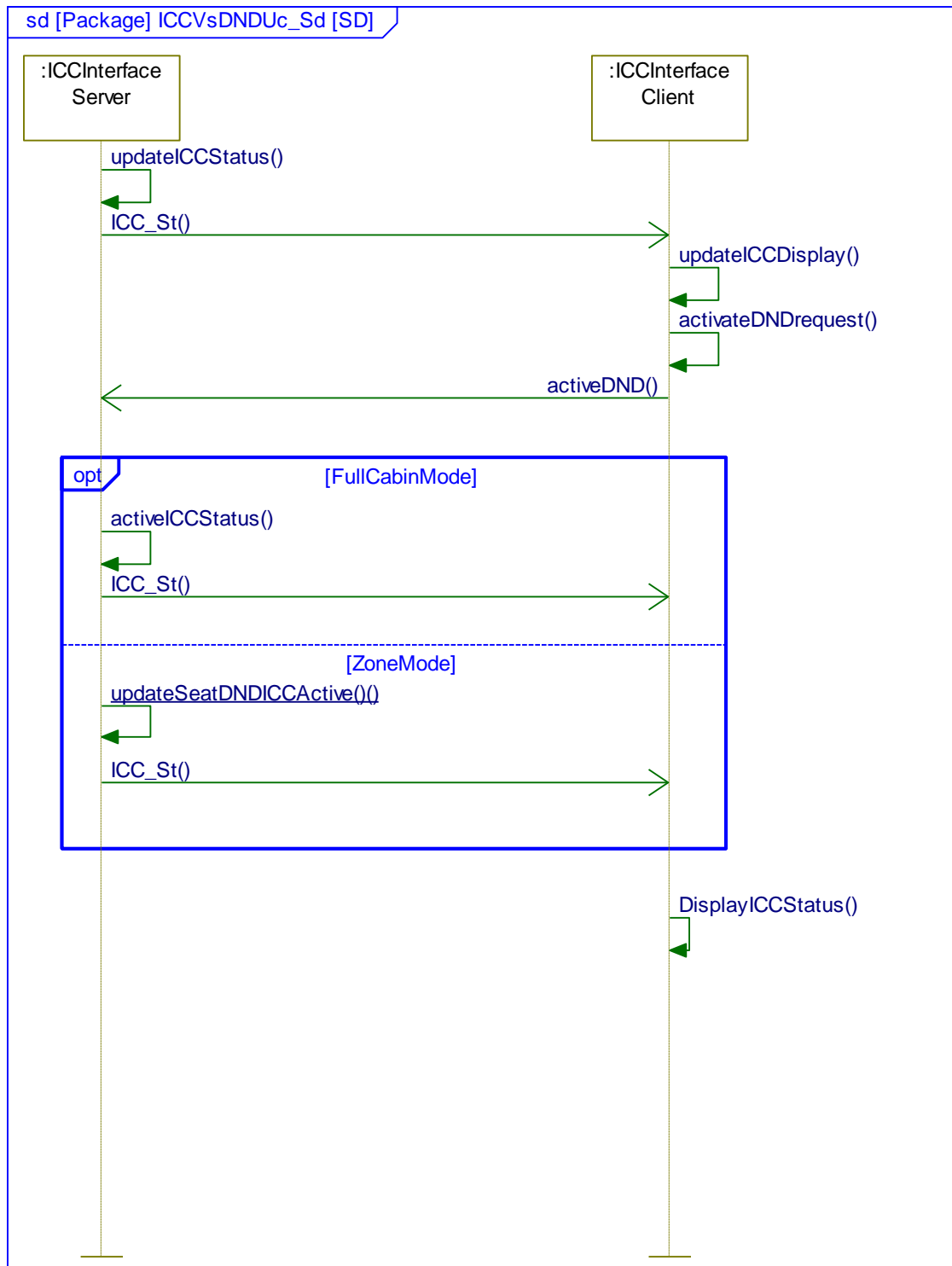




4.11.3.2 Sequence Diagrams

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

Sequence Diagram





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

4.12.1 Requirements

4.12.1.1 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

4.13 ICC-FUN-REQ-421645/A-ICC Active-Vehicle Audio Mode Switches to Zone Mode

4.13.1 Use Cases

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

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

4.13.2 Requirements

4.13.2.1 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

4.14 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

4.15 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.

4.16 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)



5 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	