



**Research & Vehicle Technology**  
**“Infotainment Systems Product Development”**

**Feature – Captain’s Announcement**

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

Version 1.1

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**FORD CONFIDENTIAL**



## Revision History

| Date            | Version   | Notes   |  |
|-----------------|---|---|--|
| August 9, 2021  | 1.0   | Initial Release   |  |
|                 |   |   |  |
| August 20, 2021 | 1.1   |   |  |
|                 | STR-857035/B-Architectural Design   | semani4: Added new CLD  |  |
|                 | CPA-CLD-REQ-407817/B-Captain's Announcement Interface Client                                    | semani4 :update per the new CLD                               |  |
|                 | CPA-CLD-REQ-436263/A-InputOutputClient  | semani4: New Class Description                                |  |
|                 | DOC-857036/B-Physical Mapping of Classes  | semani4: added all classes                                    |  |
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|                 | MD-REQ-407820/B-CA_St   | semani4: update in description                                |  |
|                 | MD-REQ-407823/B-CA_Rq   | semani4:update in description                                 |  |
|                 | CPA-REQ-407813/B-Powermode Condition  | semani4 : Added Ref to Power Management spec                  |  |
|                 | CPA-REQ-407815/B-Missing Message Strategy   | semani4: clarity  |  |
|                 | CPA-UC-REQ-407805/B-Enable/Disable CA Settings  | semani4:update in clarification                               |  |
|                 | CPA-REQ-421450/B-Enable/Disable CA Settings   | semani4:update in clarification with new CLD                  |  |
|                 | CPA-UC-REQ-414084/B-Initiate CA   | semani4: Updated Scenario                                     |  |
|                 | CPA-REQ-414457/B-Initiate CA  | semani4 updated Description                                   |  |
|                 | CPA-REQ-423318/B-CA Use Case Matrix   | semani4:update in clarification with proper CAN signal        |  |
|                 | CPA-UC-REQ-407806/B-Incoming Phone call - CA active   | semani4:update in clarification                               |  |
|                 | CPA-REQ-414460/B-Incoming Phone Call - CA Active  | semani4:update in clarification                               |  |
|                 | CPA-UC-REQ-414086/B-CA active and Phone Call is accepted/initiated                              | semani4:update in clarification                               |  |
|                 | CPA-UC-REQ-428373/B-Phone Call is active in any zone(rear or front) and CA is tried to initiate | semani4:update in clarification                               |  |
|                 | CPA-REQ-414483/B-CA active and Phone Call is accepted/initiated                                 | semani4:update in clarification                               |  |
|                 | CPA-REQ-428376/B-Phone Call is active in any zone(rear or front) and CA is tried to initiate    | semani4:update in clarification                               |  |
|                 | CPA-REQ-428377/B-Active Phone call ends CA ready for input                                      | semani4:update in clarification                               |  |
|                 | STR-909716/B-Use Cases  | semani4: updated usecase Description                          |  |
|                 | CPA-UC-REQ-414085/B-Mixed Prompts/Chimes- CA active   | semani4:update in clarification no mixed prompts in rear Zone |  |
|                 | CPA-REQ-414478/B-Mixed Prompts -CA active   | semani4:update in clarification no mixed prompts in rear Zone |  |
|                 | CPA-SD-REQ-421486/B-Mixed Prompts and CA  | semani4 :no mixed prompts in rear Zone                        |  |
|                 | CPA-REQ-425938/B-CA Vs Priority Assist  | semani4: Updated clarification                                |  |
|                 | CPA-UC-REQ-420626/B-CA active Vs DND  | semani4:updated to CA client requirement                      |  |
|                 | CPA-REQ-414550/B-CA active Vs DND   | semani4:updated to CA client requirement                      |  |
|                 | CPA-UC-REQ-414089/B-Initiate CA -Media active USB/Bluetooth, AM/FM/Sirius XM                    | semani4:clarification   |  |
|                 | CPA-REQ-414553/B-Initiate CA- Media active USB/Bluetooth,AM/FM/Sirius XM                        | semani4:clarification to add volume server                    |  |
|                 | CPA-ACT-REQ-421497/B-Initiate CA- Media active USB/Bluetooth, AM/FM/Sirius XM                   | semani4: updated Diagram                                      |  |
|                 | STR-909769/B-Sequence Diagrams  | semani4: updated Diagram                                      |  |
|                 | CPA-REQ-414547/B-ICC vs CA  | semani4:update in Verbeage                                    |  |
|                 | CPA-REQ-414485/B-CA Active-Vehicle Audio mode Switches to Full Cabin Mode                       | semani4:update in verbeage                                    |  |
|                 | CPA-REQ-414479/B-CA Active-Vehicle Audio Mode Switches to Zone mode                             | semani4:update in Verbeage                                    |  |
|                 | CPA-REQ-407811/B-Memory Storage   | semani4:changed ignition cycle to HMIModeON requirement       |  |
|                 | STR-857041/B-Appendix: Reference Documents  | semani4: :update Appendix                                     |  |



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# 1 Overview

This feature allows the Driver to make announcement or communicate with the rear Passengers through the vehicle speakers.



## 2 Architectural Design

### 2.1 AUMGNTv2-CLD-REQ-410571/A-Audio Resource Server

The Audio Resource Server object acts as the overall audio manager which is responsible for the interfaces between the requesters for the audio system (ie source clients/resource clients).

The Audio Resource Server is the audio prioritizer for audio requests.

The Audio Resource Server is responsible for providing the status of the audio sources to the source clients and status of the infotainment system.

The Audio Resource Server can stream audio to the Audio I/O controller for applicable sources

The Audio Resource Server mutes/unmutes its audio output signal as necessary for source changes.

### 2.2 CPA-CLD-REQ-407817/B-Captain's Announcement Interface Client

The Captain Announcement Interface Client (CAClient) is responsible for the tasks listed below:

1. Receiving Captain Announcement data status from CAServer
2. Sending the status to the InputOutputClient
3. Receives user input from InputOutputClient and sends Request to the CAServer

### 2.3 CPA-CLD-REQ-407818/A-Captain's Announcement Interface Server

The Captain Announcement Interface Server (CAServer) is responsible for the tasks listed below:

1. Monitoring and handling active Captain Announcement data and status
2. Receive Request from the CAClient
3. Transmitting Captains Announcement status to CAClient

### 2.4 CPA-CLD-REQ-436263/A-InputOutputClient

The InputOutputClient is responsible for the tasks listed below:

1. Receiving Captain Announcement data status
2. Displaying active Captain Announcement information data and status on user interface
3. Receives user input and sends Request to the CAClient

### 2.5 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the CA 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        |
|------------------------|-----------------------|--------------------|
| CAServer               | PAC                   |                    |
| CAClient               | PDC                   |                    |
| Audio Resource Server  | PDC                   |                    |
| Volume Settings Server | PDC                   |                    |
| InputOutputClient      | NA                    | SYNC HMI , URC App |

### 2.6 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.



| Logical Name | CAN Signal Name |
|--------------|-----------------|
| CA.St        |                 |
| CA.Rq        |                 |
| Ignition_ST  |                 |

## 2.7 CA Client Interface

### 2.7.1 CPA-IIR-REQ-407819/B-CA InterfaceClient\_Rx

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

Message Type: Request

The CAInterfaceClient shall send this message which gives the status of the feature

#### 2.7.1.1 MD-REQ-407820/B-CA\_St

Message Type: Status

The CAServer shall send the status of the feature to the CAClient via this message.

| Name  | Literals | Value | Description   |
|-------|----------|-------|---|
| CA.St | -        | -     | Response to change the CA Operational Mode                                      |
|       | InActive | 0x0   | No active CA Session and CA Server is in ready state to activate the CA Session |
|       | Active   | 0x1   | Captains Announcement Session is active   |
|       | Disabled | 0x2   | CA server disables functionality temporarily                                    |

### 2.7.2 CPA-IIR-REQ-407822/A-CA InterfaceClient\_Tx

The system shall transmit the following messages

#### 2.7.2.1 MD-REQ-407823/B-CA\_Rq

Message Type: Request

The CAClient shall send request message to the CAServer to change the operation mode of this feature.

| Name  | Literals | Value | Description                               |
|-------|----------|-------|---|
| CA.Rq | -        | -     | Request to change the CA Operational Mode |
|       | Null     | 0x0   |   |
|       | Activate | 0x1   | User input for activate request           |
|       | Cancel   | 0x2   | User input for Cancelling                 |



### 3 General Requirements

#### 3.1 CPA-REQ-407813/B-Powermode Condition

The CAClient shall only allow the functionality defined by this feature/SPSS when the HMIAudioMode = ON.(refer to MD-REQ-273358/D-HMIAudioMode PowerManagement SPSS)

#### 3.2 CPA-REQ-407814/A-Feature Configuration

The CAClient 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 CPA-REQ-407815/B-Missing Message Strategy

If CA.St goes missing for greater than 5 seconds, the CAClient shall not allow the display of the Feature for selection by the user.

#### 3.4 CPA-REQ-425939/A-Manual Mute Mode

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





## 4 Functional Definition

### 4.1 CPA-FUN-REQ-421452/A-Enable/Disable CA

#### 4.1.1 Use Cases

##### 4.1.1.1 CPA-UC-REQ-407805/B-Enable/Disable CA Settings

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, InputOutputClient, User (Driver/Passenger), Cabin Speakers  |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, Phone call not active, Priority Assist not active  |
| <b>Scenario Description</b>        | The CAClient shall allow InputOutputClient to have a settings/menu available for selection for the CA feature<br>The user selects the Captain's Announcement feature on the Display to Activate/Cancel. |
| <b>Post-conditions</b>             | The InputOutputClient displays the CA Activate/Cancel option.<br>CA session is initiated or cancelled3  |
| <b>List of Exception Use Cases</b> | Display not available   |
| <b>Interfaces</b>                  | CAClient, CAServer, CAN, A2B  |

#### 4.1.2 Requirements

##### 4.1.2.1 CPA-REQ-421450/B-Enable/Disable CA Settings

The InputOutputClient shall display the CA feature providing the user with the ability to turn it Activate/Cancel via the HMI.

- The Feature shall be available when the Power mode Conditions are met.
- The Feature shall not be available when the Power mode conditions are not met or if the status signal goes missing on the bus.
- The InputOutputClient shall send the inputs to the CAClient and receive the output to be displayed from the CAClient

##### 4.1.2.1.1 Interface Request

Once the InputOutputClient sends the user input to the CAClient then the CACleint shall send the CAServer with the following encodings:

- When the user input received is Activate, CA.Rq = "(0x1) Activate" the feature is enabled
- When the user input received is Cancel, CA.Rq = "(0x2) Cancel" the feature is disabled and the CA session ends

##### 4.1.2.1.2 Interface Response

The CAClient shall update the InputOutputClient as received from the CAServer with the CA.St

- If the CA.St = "(0x1) Active" then the CA session is active
- If the CA.St = "(0x0) Inactive" represents the CA has timed out or received a Cancel Request.
- If the CA.St = "(0x2) Disabled" during this state the CA setting display cannot be selectable. (HMI will use this state for a Popup stating CA disabled, or Button greyed out or Request won't be accepted from CA Client). This state occurs due to other high priority external audio request.

Note: The CA button shall always remain inactive state unless user input is received.

Note: The CA Status can never go from disable to Active state it can only go from Disable to inactive.

Refer to CPA-REQ-407815/B-Missing Message Strategy for missing message error.

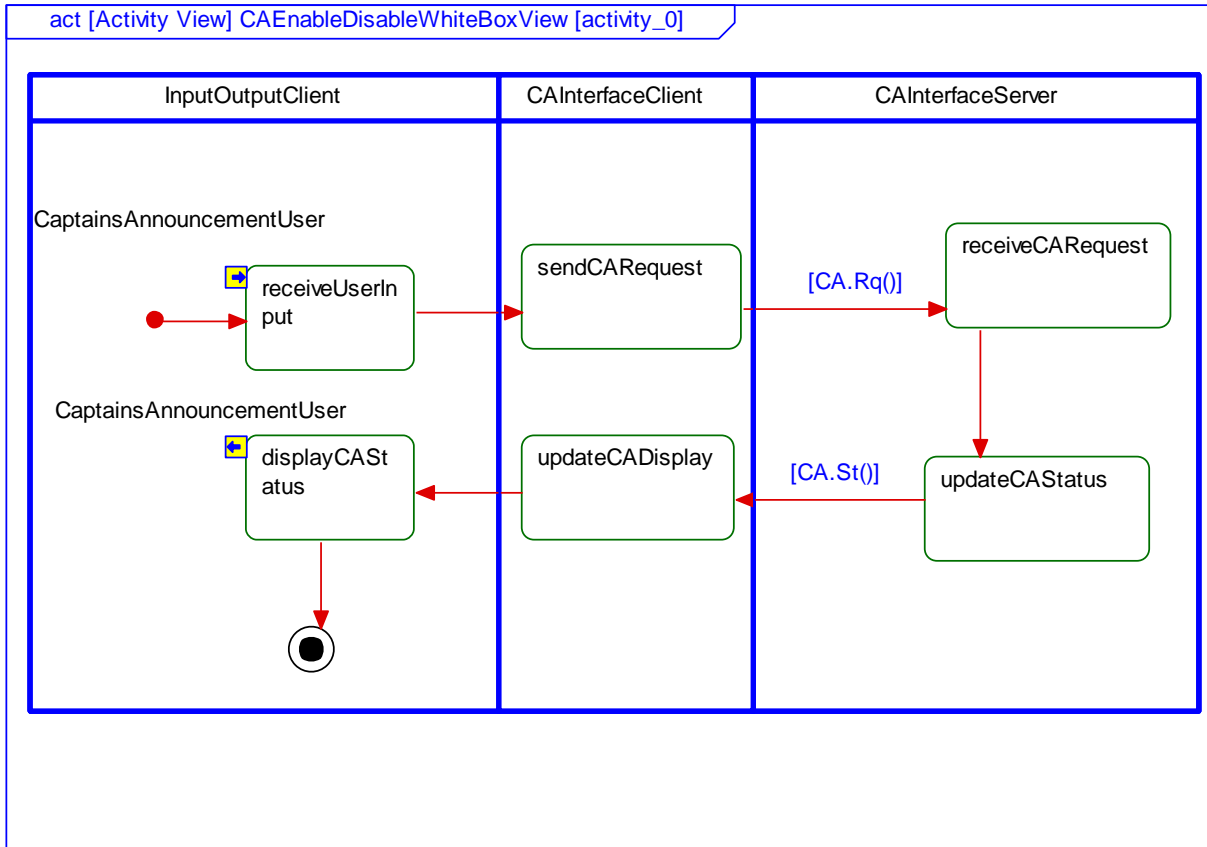


### 4.1.3 White Box View

#### 4.1.3.1 Activity Diagrams

##### 4.1.3.1.1 CPA-ACT-REQ-421453/A-Enable and Disable CA

##### Activity Diagram

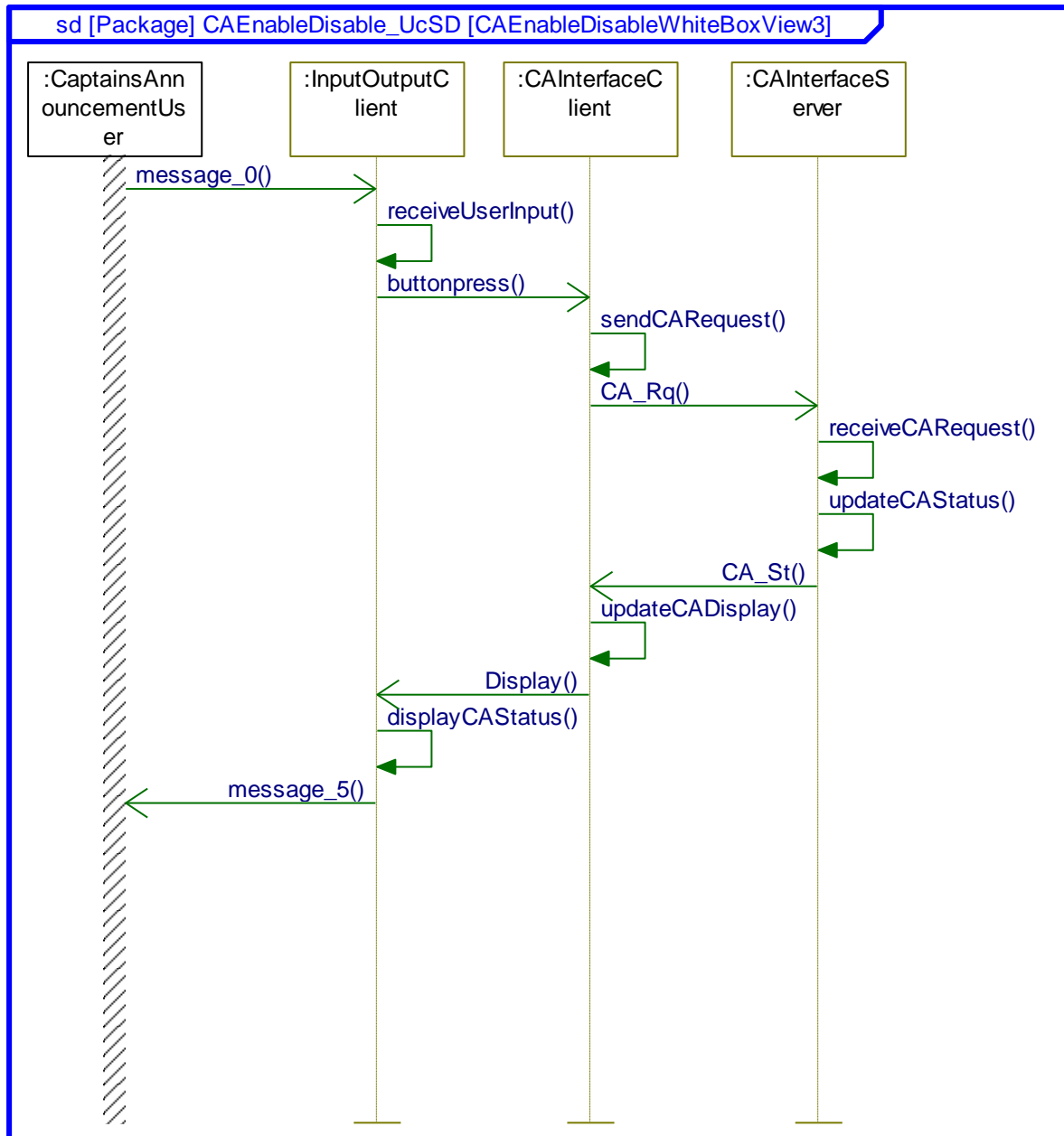




## 4.1.3.2 Sequence Diagrams

## 4.1.3.2.1 CPA-SD-REQ-421454/A-Enable and Disable CA

## Sequence Diagram





## 4.2 CPA-FUN-REQ-421462/A-Initiate CA

### 4.2.1 Use Cases

#### 4.2.1.1 CPA-UC-REQ-414084/B-Initiate CA

|                                    |  |
|------------------------------------|--|
| <b>Actors</b>                      | CAServer, CAClient, InputOutputClient, User (Driver/Passenger), Cabin Speakers   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, Phone call not active, Priority Assist not active CA feature is enabled by the user   |
| <b>Scenario Description</b>        | The user selects the Captain's Announcement feature on the display<br>HMI displays announcement in progress<br>Driver audio is accepted by the microphones and played in the speakers  |
| <b>Post-conditions</b>             | Driver starts speaking through the mic<br>Driver/Passenger audio is heard in the 2 <sup>nd</sup> and 3 <sup>rd</sup> row seats<br>End the voice session when no speech is detected or CA session timer times out or user input is received to end the CA Session |
| <b>List of Exception Use Cases</b> | Audio System is unavailable<br>Emergency announcement is in progress   |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B  |

### 4.2.2 Requirements

#### 4.2.2.1 CPA-REQ-414457/B-Initiate CA

When the CAClient sends CA.Rq = Activate request to the CAServer, it shall wait for the server response with in a timeframe of 75ms

With:

If CA.St= Active:

- the Volume Settings server shall mute current audio and the CAClient shall update the InputOutputClient which shall display a HMI indication that announcement is in progress simultaneously.
- The driver/front row mic accepts audio and CA session timer is set to 20s
- The CA audio plays through the speakers
- The CAServer shall update CA.St=Inactive and the CA session ends when either of the following occurs:
  - CAServer receives user input CA.Rq=Cancel.
  - Absence of voice detection (tunable 1-5 seconds absence of voice would terminate session) (TBD)
  - CA session timer ends (20s) (TBD)
- Unmute audio that was playing previously from the speakers

Else If CA.St=Inactive:

- the InputOutputClient shall update the display to indicate the CA is inactive or canceled state and display HMI indication to indicate CA is Inactive/Failed to activate.

Else CA.St=Disable

- The InputOutputClient shall not allow user input.

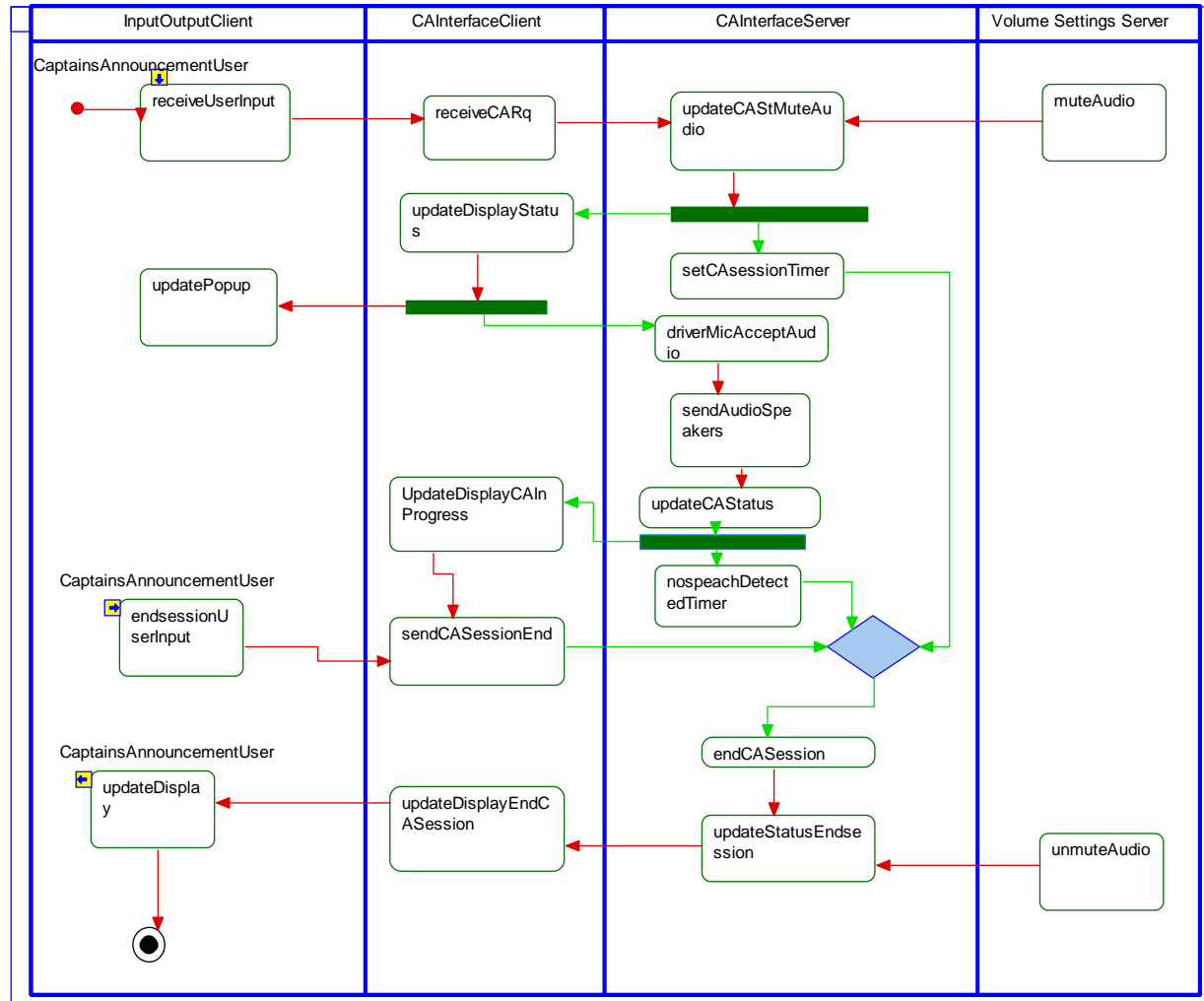


## 4.2.3 White Box View

## 4.2.3.1 Activity Diagrams

## 4.2.3.1.1 CPA-ACT-REQ-421463/A-Initiate CA

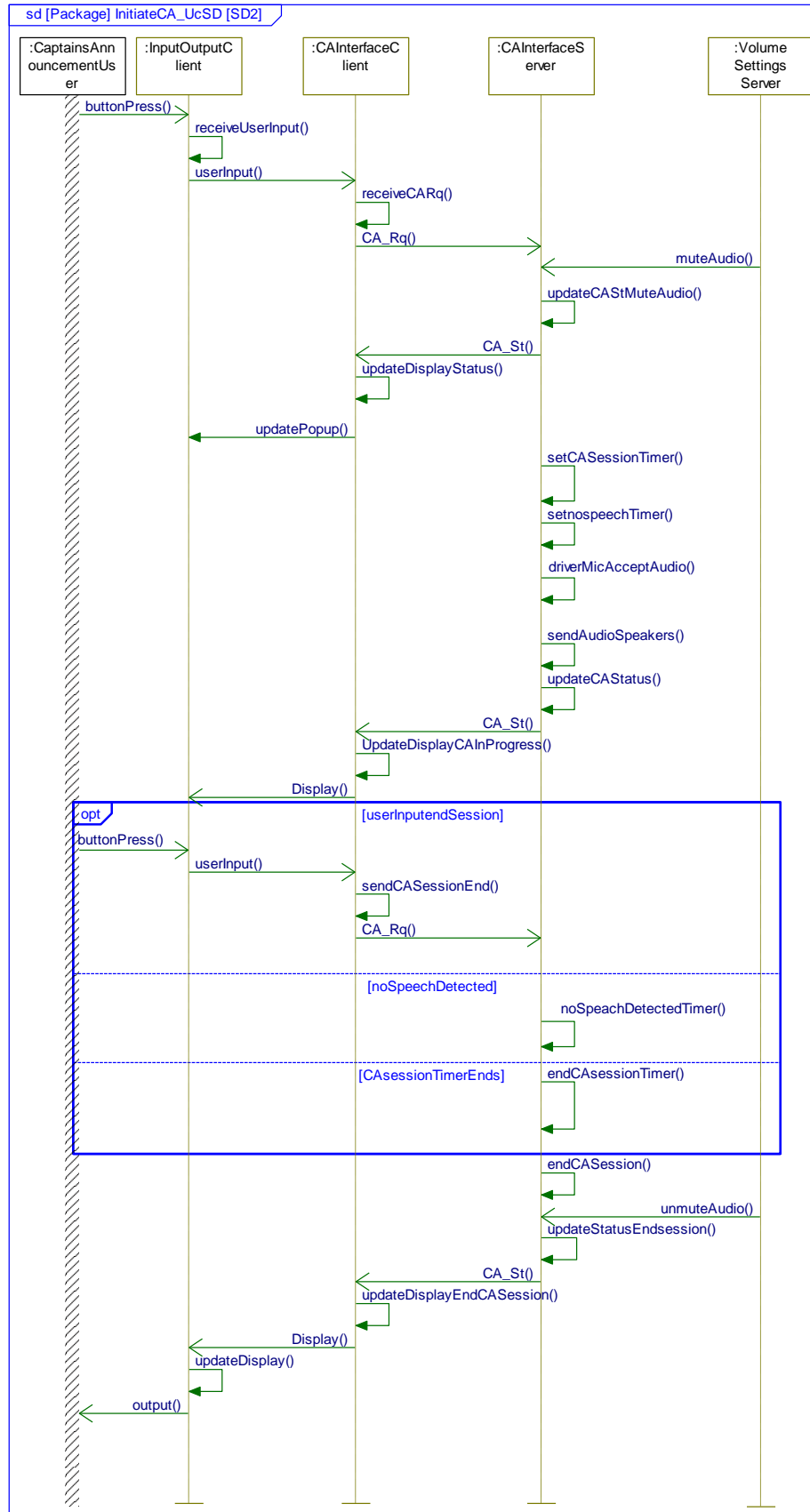
## Activity Diagram





#### 4.2.3.2 Sequence Diagrams

##### 4.2.3.2.1 CPA-SD-REQ-421464/A-Initiate CA Sequence Diagram





## 4.3 CPA-REQ-423318/B-CA Use Case Matrix

| Use Case   | Pre-Condition   | New Action / Event   | CAServer Post Condition   | Comment  |
|--|---|--|---|--|
| ICC Active and CA is Initiated                                     | ICC.St=Active   | CA.St = CA Active  | CA.St= CA Active<br>ICC.St=Temporary Disable  | CA is Activated and ICC is temporarily disabled                        |
| Passenger Call Ring in Any Zone and CA Active                      | CA.St=Active  | AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)  | CA.St=Active<br>AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)   | Call Ring and CA are active concurrently                               |
| Driver Call Ring in full cabin mode and CA Active                  | CA.St=Active  | AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted)  | CA.St=Disable<br>AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted)  | CA is deactivated when call ring comes for a driver in full cabin mode |
| Driver Call Ring in zone mode and CA Active                        | CA.St=Active  | AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted)  | CA.St=Active<br>AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted)   | Call Ring and CA are active concurrently                               |
| CA active and Phone Call is accepted/initiated                     | CA.St=Active  | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)  | CA.St=Disable<br>AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)  | CA is deactivated when Phone call is enabled                           |
| Phone Call is active in any zone(rear or front) or CA is initiated | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)<br>AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)                  | CA.Rq= Activate  | CA.St=Disable<br>AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)<br>AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4) | CA cannot be activated if Phone call is active                         |
| Active Phone call in any zone ends CA server status change         | AudioSource.St (SourceType = Phone, SourceTypeStatus = Granted)<br>AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = Granted),(x=zones 2,3,4)<br>CA.St=Disable | AudioSource.St (SourceType = Phone, SourceTypeStatus = deallocated)<br>AudioSourceZone(X).St (SourceType(x)= Phone, SourceTypeStatus(x) = deallocated),(x=zones 2,3,4) | CA.St= Inactive   | CA client is in ready state to accept user input                       |
| Mixed Prompts  | CA.St=Active  | MixableCabinPrompts = Active   | CA.St=Active<br>MixableCabinPrompts = Active  | Concurrent audio for both prompts and CA session                       |
| Priority Assist is initiated when CA is active                     | CA.St=Active  | AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted)  | CA.St=Disable<br>AudioSource.St (SourceType = Priority Assist, SourceTypeStatus = Granted)  | CA is deactivated when Priority Assist is enabled                      |
| Priority Assist is active in any                                   | AudioSource.St (SourceType = Priority   | CA.Rq= Activate  | CA.St=Disable   | CA cannot be activated if  |





|   |  |   |   |   |
|---|--|---|---|---|
| zone(rear or front) or CA is initiated  | Assist,<br>SourceTypeStatus =<br>Granted)  |   | AudioSource.St<br>(SourceType = Priority<br>Assist,<br>SourceTypeStatus =<br>Granted)                       | Priority Assist<br>is active  |
| Active Priority<br>assist in any<br>zone ends CA<br>server status<br>change   | AudioSource.St<br>(SourceType = Priority<br>Assist,<br>SourceTypeStatus =<br>Granted)<br>CA.St=Disable | AudioSource.St (SourceType =<br>Priority Assist, SourceTypeStatus<br>= deallocated) | CA.St= Inactive   | CA client is in<br>ready state to<br>accept user<br>input                                       |
| Media initiated<br>and CA active  | CA.St=Active   | AudioSource.St (SourceType =<br>Media, SourceTypeStatus =<br>Granted)               | CA.St=Active<br>AudioSource.St<br>(SourceType = Media,<br>SourceTypeStatus =<br>Granted)                    | Media is<br>muted and CA<br>continues<br>Media<br>resumes after<br>the CA session               |
| VR is initiated<br>when CA is<br>active                                       | CA.St=Active   | AudioSource.St (SourceType =<br>VR, SourceTypeStatus = Granted)                     | CA.St=Active  | CA Session<br>and VR will be<br>concurrent  |
| CA is initiated<br>when VR is<br>active                                       | AudioSource.St<br>(SourceType = VR,<br>SourceTypeStatus =<br>Granted)                                  | CA.St=Active  | CA.St=Active  | CA Session<br>and VR will be<br>concurrent  |
| CA can be<br>initiated when<br>DND active                                     | DND active   | CA.Rq=Activate  | CA.St=Active  | CA can be<br>initiated when<br>DND is active<br>in the<br>passenger<br>zone                     |
| Radio<br>Announcement is<br>active and CA is<br>initiated                     | CA.St=Active   | AudioSource.St (SourceType =<br>RadioAnnouncement,<br>SourceTypeStatus = Granted)   | CA.St=Active<br><br>AudioSource.St<br>(SourceType =<br>RadioAnnouncement,<br>SourceTypeStatus =<br>Granted) | Radio<br>announcement<br>and CA<br>session are<br>Concurrent                                    |
| Radio<br>Announcement is<br>active for Rear<br>passengers and<br>CA is active | CA.St=Active   | SourceType=RadioAnnouncement,<br>SourceTypeStatus = Granted                         | CA.St=Active<br>AudioSource.St<br>(SourceType =<br>RadioAnnouncement,<br>SourceTypeStatus =<br>Granted)     | Radio<br>Announcement<br>is muted and<br>CA continues.<br>RA resumes<br>after the CA<br>session |



#### 4.4 CPA-FUN-REQ-421475/A-Incoming Phone Call CA Active

##### 4.4.1 Use Cases

##### 4.4.1.1 CPA-UC-REQ-407806/B-Incoming Phone call - CA active

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, Driver/Passenger, Cabin Speakers  |
| <b>Pre-conditions</b>              | Infotainment System is powered ON,<br>CA feature is enabled by the user<br>CA is in Progress  |
| <b>Scenario Description</b>        | When CA session is active and the system receives a phone call ring then <ol style="list-style-type: none"><li>If the Driver gets a phone call the CA session shall<ul style="list-style-type: none"><li>end in Full cabin mode</li><li>play concurrently with call ring in zone mode</li></ul></li><li>If the passenger in the 2<sup>nd</sup> /3<sup>rd</sup> row gets a phone call, the CA session shall be active and the passengers shall be able to hear the call ring from the phone, in both full cabin and zone mode.</li></ol> |
| <b>Post-conditions</b>             | CA is in progress and the Phone call ring can be heard concurrently.  |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |

##### 4.4.2 Requirements

##### 4.4.2.1 CPA-REQ-414460/B-Incoming Phone Call - CA Active

When CAServer is sending CA.St = Active and if CAServer receives a phone call ring with AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted) and:

- If the Driver gets a phone call with AudioSource.St (SourceType = Call Ring, SourceTypeStatus = Granted) then the CA session shall
  - end in Full cabin mode. CAServer shall CA.St=Disable.
  - play concurrently with call ring in zone mode CAServer shall send CA.St=active
- If the passenger in the 2<sup>nd</sup> /3<sup>rd</sup> row gets a phone call AudioSourceZone(X).St (SourceType(x)= Call Ring, SourceTypeStatus(x) = Granted),(x=zones 2,3,4), the CA session shall be active and the passengers shall be able to hear the call ring from the phone, in the Zone mode. CAServer shall send CA.St=active.

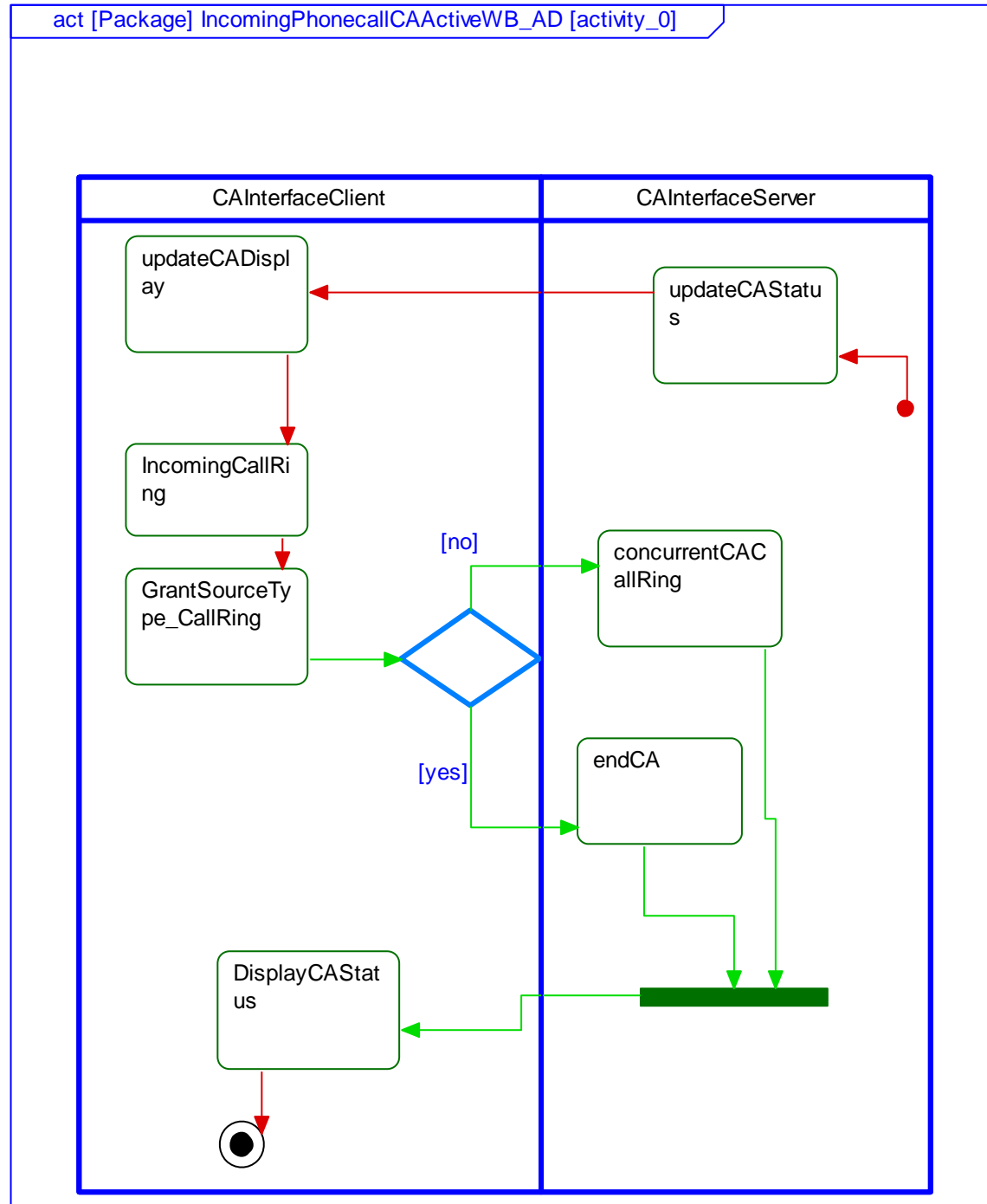


## 4.4.3 White Box View

## 4.4.3.1 Activity Diagrams

## 4.4.3.1.1 CPA-ACT-REQ-421476/A-Incoming Phone Call - CA

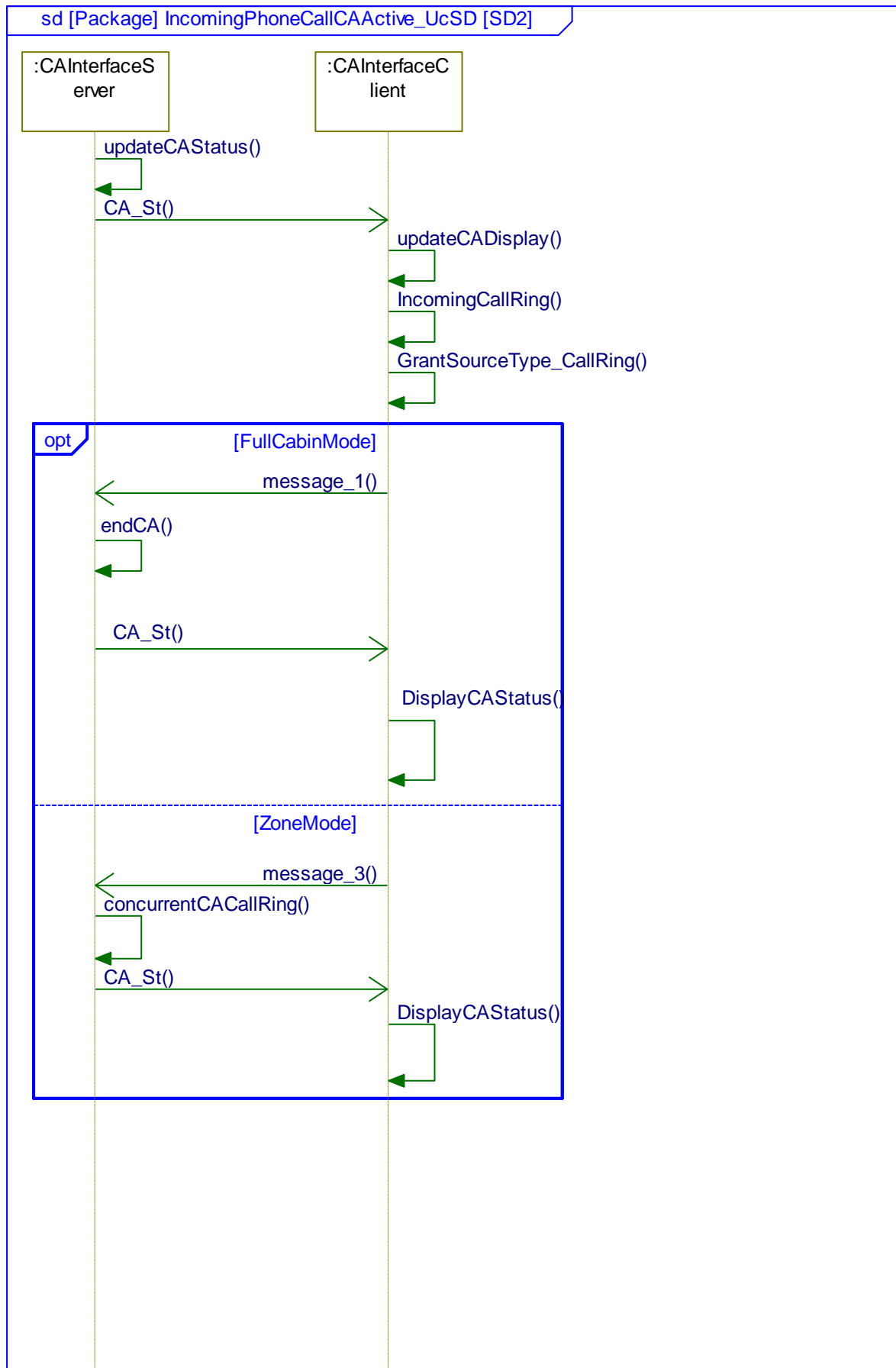
## Activity Diagram





#### 4.4.3.2 Sequence Diagrams

##### 4.4.3.2.1 CPA-SD-REQ-421477/A-Incoming Phone Call - CA Sequence Diagram





## 4.5 CPA-FUN-REQ-421481/A-Phone call vs CA

### 4.5.1 Use Cases

#### 4.5.1.1 CPA-UC-REQ-414086/B-CA active and Phone Call is accepted/initiated

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers                                       |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>Phone call is in progress |
| <b>Scenario Description</b>        | When CA active and Phone Call is accepted/initiated then CA session is disabled.                  |
| <b>Post-conditions</b>             | CA is canceled with a HMI Indication CA canceled due to Phone call active.                        |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |

#### 4.5.1.2 CPA-UC-REQ-428373/B-Phone Call is active in any zone(rear or front) and CA is tried to initiate

|                                    |  |
|------------------------------------|--|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers                  |
| <b>Pre-conditions</b>              | Infotainment System is powered ON,<br>Phone call is in progress              |
| <b>Scenario Description</b>        | When Phone Call is active in any zone(rear or front) CA cannot be initiated. |
| <b>Post-conditions</b>             | CA cannot be initiated when phone call is active                             |
| <b>List of Exception Use Cases</b> | Audio system is off.   |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B  |

#### 4.5.1.3 CPA-UC-REQ-428374/A-Active Phone call ends CA ready for input

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers                                       |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>Phone call is in progress |
| <b>Scenario Description</b>        | When Active Phone call in any zone ends, then the CA session will be available for selection      |
| <b>Post-conditions</b>             | CA is ready for user input  |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |



## 4.5.2 Requirements

### 4.5.2.1 CPA-REQ-414483/B-CA active and Phone Call is accepted/initiated

When CA session is either 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 the CAsServer shall send CA.St=Disable not allowing the user to reselect CA session or disabling the CA session.

### 4.5.2.2 CPA-REQ-428376/B-Phone Call is active in any zone(rear or front) and CA is tried to initiate

When the Audio Source Server updated AudioSource.St(SourceType = Phone, SourceTypeStatus = Granted) or AudioSourceZone(x).St(SourceType(x) = Phone, SourceTypeStatus(x) = Granted)(x=zones 2,3,4) in either of the zones then the CAsServer shall send CA.St=Disable not allowing the user to select CA session or the CA session cannot be initiated.

### 4.5.2.3 CPA-REQ-428377/B-Active Phone call ends CA ready for input

When the Audio resource server updated AudioSource.St(SourceType = Phone, SourceTypeStatus = deallocated) or AudioSourceZone(x).St(SourceType(x) = Phone, SourceTypeStatus(x) = deallocated)(x=zones 2,3,4) then CAsServer shall send CA.St= Inactive and the CA session will be available for selection.

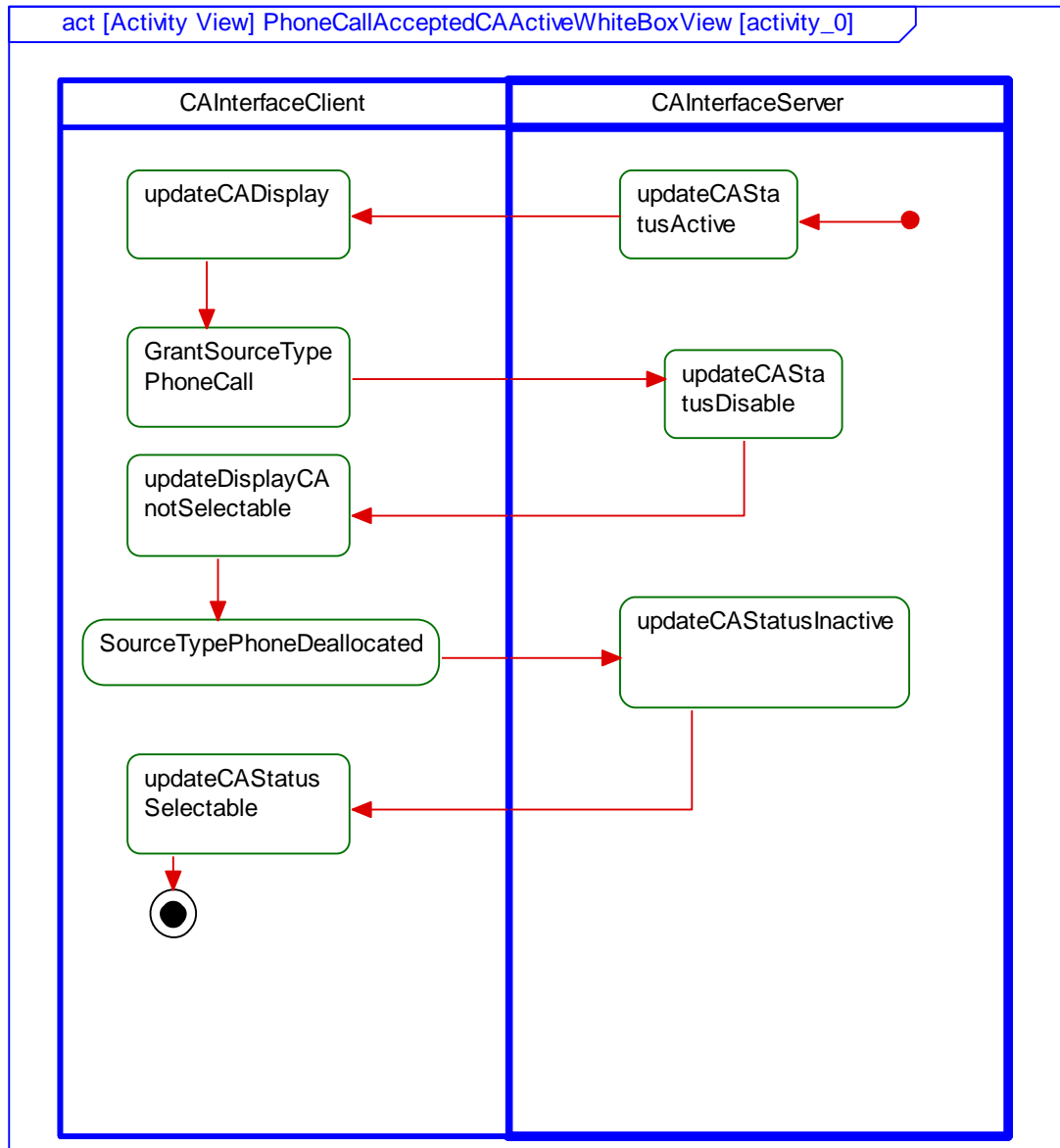


#### 4.5.3 White Box View

##### 4.5.3.1 Activity Diagrams

###### 4.5.3.1.1 CPA-ACT-REQ-421482/A-Phone Call Vs CA

###### Activity Diagram



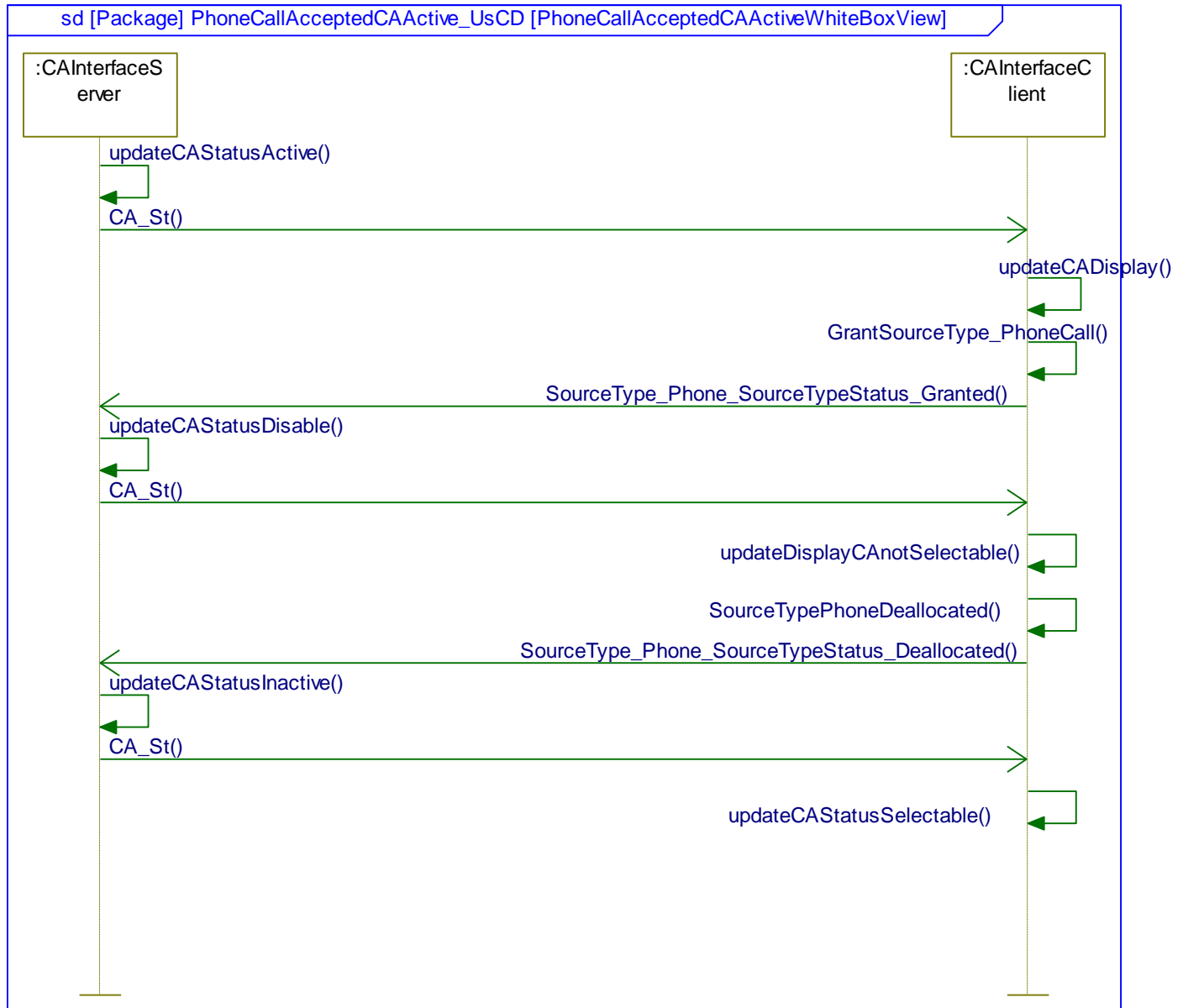




#### 4.5.3.2 Sequence Diagrams

##### 4.5.3.2.1 CPA-SD-REQ-421483/A-Phone Call Vs CA

##### Sequence Diagram



#### 4.6 CPA-FUN-REQ-421484/A-Mixed Prompts CA Active

##### 4.6.1 Use Cases

##### 4.6.1.1 CPA-UC-REQ-414085/B-Mixed Prompts/Chimes- CA active



|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers                                   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>CA is in Progress     |
| <b>Scenario Description</b>        | When CA is active CAServer shall allow the audio of prompts concurrent with the announcement. |
| <b>Post-conditions</b>             | CA audio as well as prompts audio is heard concurrently                                       |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |

#### 4.6.2 Requirements

##### 4.6.2.1 CPA-REQ-414478/B-Mixed Prompts -CA active

When CA session is active i.e. CA.St = CA Active and if mixable prompts are active in driver zone then CAServer shall keep the CA.St= CA Active and play the CA audio and the mixed prompts concurrently.

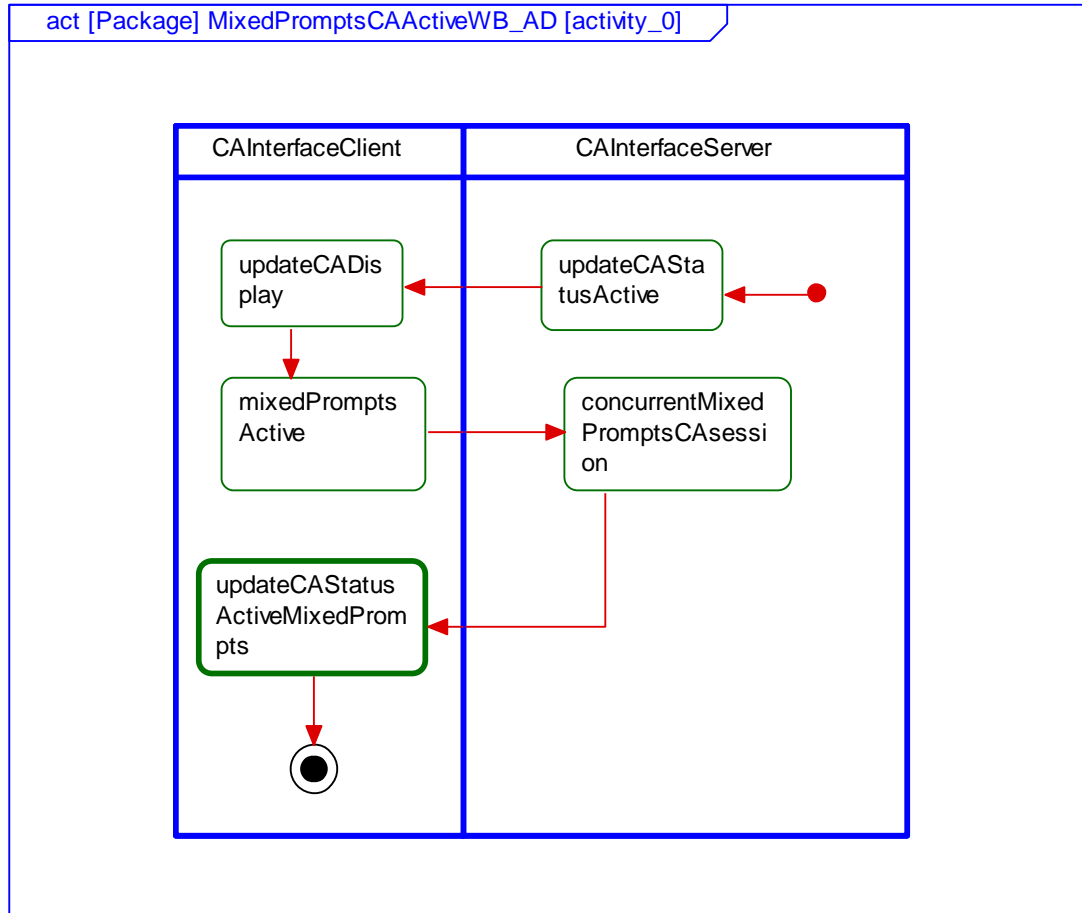
i.e. If the driver gets a prompt the driver shall be able to hear the prompt and be able to finish the announcement concurrently.



#### 4.6.3 White Box View

##### 4.6.3.1 Activity Diagrams

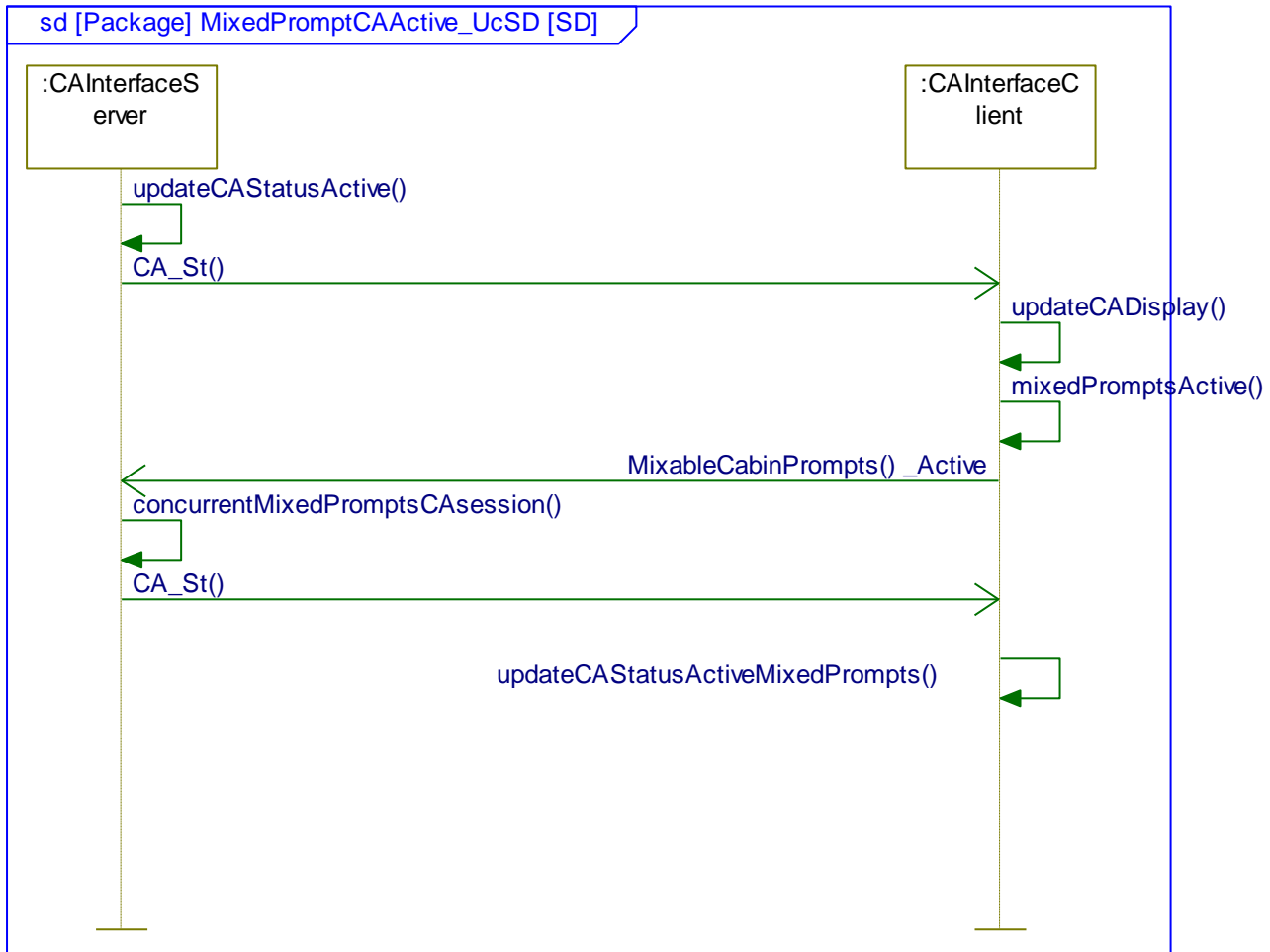
##### 4.6.3.1.1 CPA-ACT-REQ-421485/A-Mixed Prompts and CA Activity Diagram





#### 4.6.3.2 Sequence Diagrams

##### 4.6.3.2.1 CPA-SD-REQ-421486/B-Mixed Prompts and CA



Sequence Diagram

#### 4.7 CPA-FUN-REQ-421493/A-Priority Assist Vs CA

##### 4.7.1 Use Cases

##### 4.7.1.1 CPA-UC-REQ-414088/A-Priority Assist Vs CA

|                                    |  |
|------------------------------------|--|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers  |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>CA is inprogress             |
| <b>Scenario Description</b>        | While CA is in Progress if a Priority assist audio or prompt is played the CAServer shall disable CA |
| <b>Post-conditions</b>             | Priority assist audio or prompt plays  |
| <b>List of Exception Use Cases</b> | Audio system is off.   |
| <b>Interfaces</b>                  | CAClient, CAServer, CAN, A2B   |



## 4.7.2 Requirements

### 4.7.2.1 CPA-REQ-425938/B-CA Vs Priority Assist

When CA session is active and when the Audio Source Server updates AudioSource.St(SourceType = Priority Assist, SourceTypeStatus = Granted)

then the CAServer shall send CA.St=Disable not allowing the user to select CA session.

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

then CAServer shall send CA.St= Inactive and the CA session will be available for selection.

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

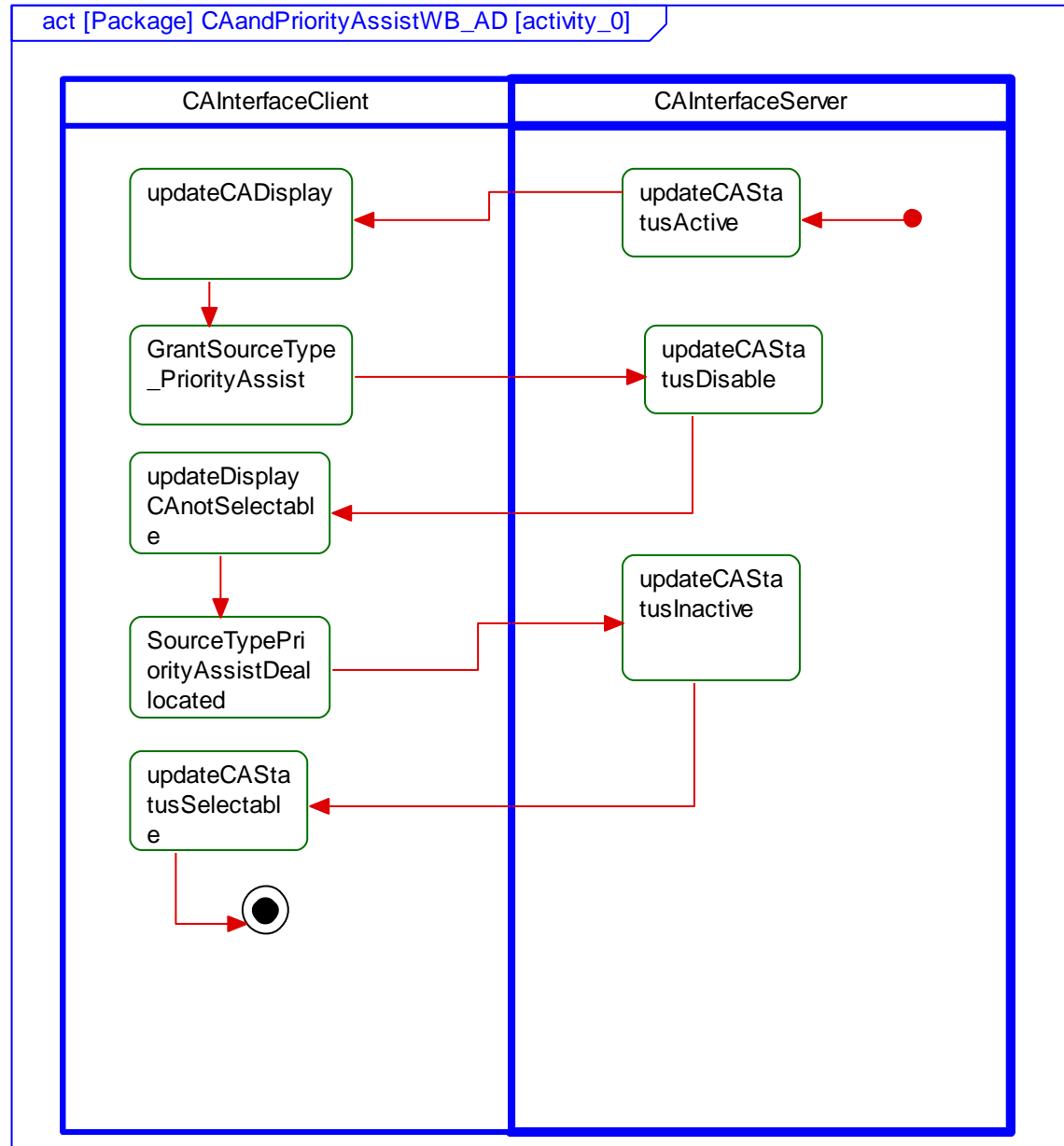


#### 4.7.3 White Box View

##### 4.7.3.1 Activity Diagrams

###### 4.7.3.1.1 CPA-ACT-REQ-421494/A-CA Vs Priority Assist

###### Activity Diagram

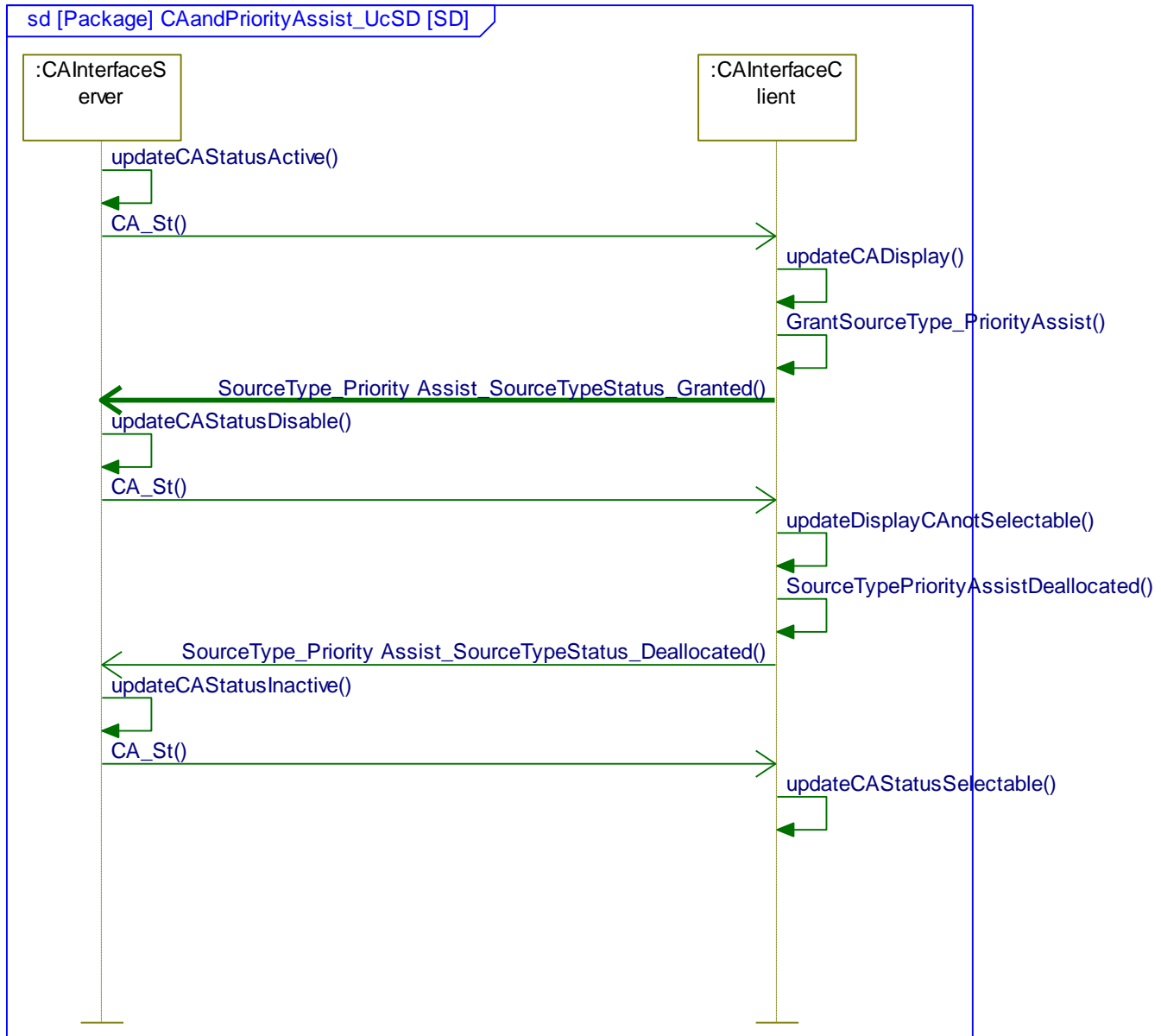




#### 4.7.3.2 Sequence Diagrams

##### 4.7.3.2.1 CPA-SD-REQ-421495/A-CA Vs Priority Assist

###### Sequence Diagram



#### 4.8 CPA-FUN-REQ-407804/A-CA active Vs DND

##### 4.8.1 Use Cases

###### 4.8.1.1 CPA-UC-REQ-420626/B-CA active Vs DND

|                |   |
|----------------|---|
| Actors         | CAClient, User (Driver/Passenger), Cabin Speakers, Zone speakers  |
| Pre-conditions | Infotainment System is powered ON,<br>Vehicle Audio mode is in Full Cabin mode<br>Atleast one phone is connected to the rear seat zones |



|                                    |   |
|------------------------------------|---|
|                                    | No phone call is active<br>The audio for the individual passenger(s) are played through headrest speakers.<br>CA is activated by the Driver |
| <b>Scenario Description</b>        | When DND is active CA can be initiated.   |
| <b>Post-conditions</b>             | The CA session remains unaltered due to DND<br>.  |
| <b>List of Exception Use Cases</b> | Audio system is off   |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |

## 4.8.2 Requirements

### 4.8.2.1 CPA-REQ-414550/B-CA active Vs DND

CAClient shall allow to Initiate CA when DND is active in passenger zone.

## 4.8.3 White Box View

### 4.8.3.1 Activity Diagrams

#### 4.8.3.1.1 CPA-ACT-REQ-407803/A-CA vs DND

Activity Diagram

### 4.8.3.2 Sequence Diagrams

#### 4.8.3.2.1 CPA-SD-REQ-407812/A- CA vs DND

Sequence Diagram

## 4.9 CPA-FUN-REQ-421496/A-Initiate CA- Media Active USB/Bluetooth, AM/FM/Sirius XM

### 4.9.1 Use Cases

#### 4.9.1.1 CPA-UC-REQ-414089/B-Initiate CA -Media active USB/Bluetooth, AM/FM/Sirius XM

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>Media/ music is playing via USB/BT  |
| <b>Scenario Description</b>        | While music is playing from USB/BT, AM/FM/Sirius XM and CAClient initiates the CA session, the Media shall be muted and CA shall continue and at the end of CA session Media is unmuted |
| <b>Post-conditions</b>             | CA audio plays from the speakers  |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B, USB, BT  |





## 4.9.2 Requirements

### 4.9.2.1 CPA-REQ-414553/B-Initiate CA- Media active USB/Bluetooth,AM/FM/Sirius XM

When media (e.g.: USB/BT or AM/FM/Sirius XM) is playing in the Zone or cabin mode through the speakers and the CAClient sends CA.Rq = Activate request, the Volume settings Server shall mute the media and the CAServer shall send CA.St=Active until the end of CA voice session.

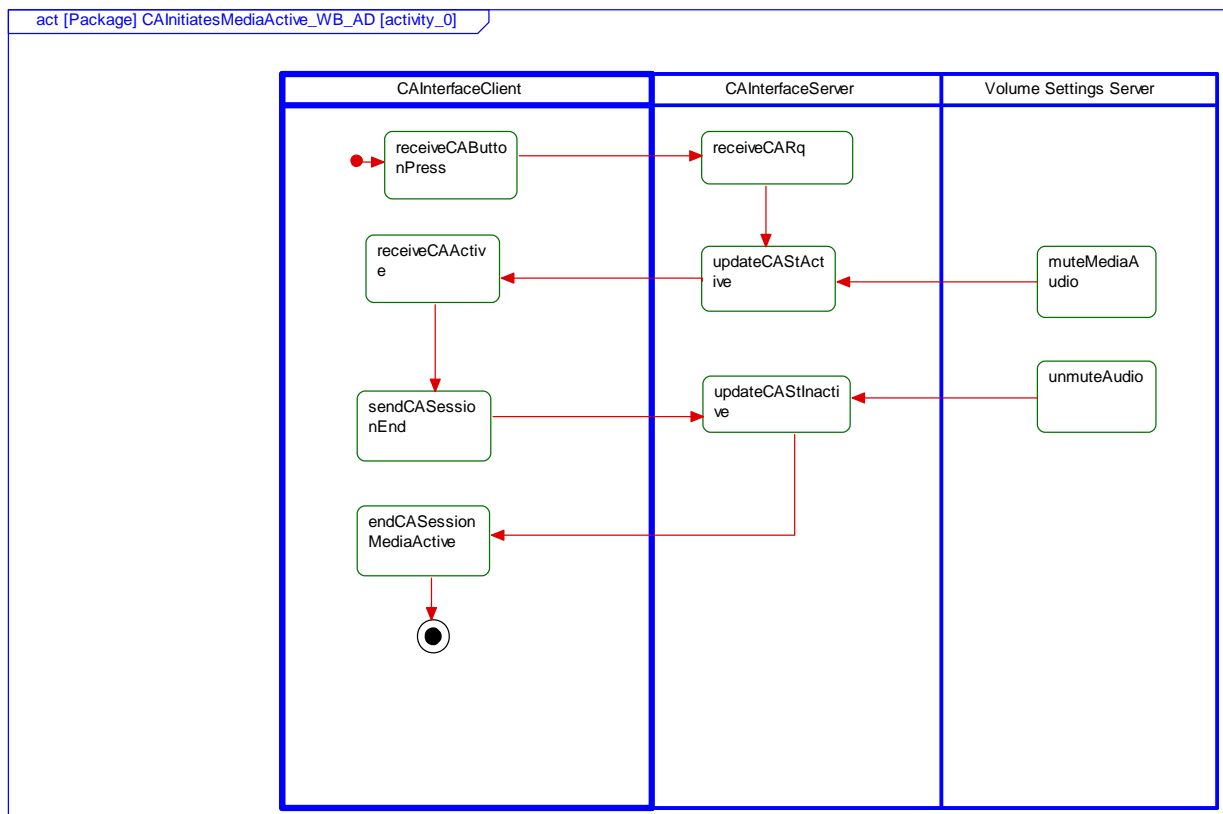
Once the CA voice session is complete the CAServer shall send CA.St=Inactive then the Volume settings server shall unmute USB/BT, AM/FM/SiriusXM media.

## 4.9.3 White Box View

### 4.9.3.1 Activity Diagrams

#### 4.9.3.1.1 CPA-ACT-REQ-421497/B-Initiate CA- Media active USB/Bluetooth, AM/FM/Sirius XM

##### Activity Diagram

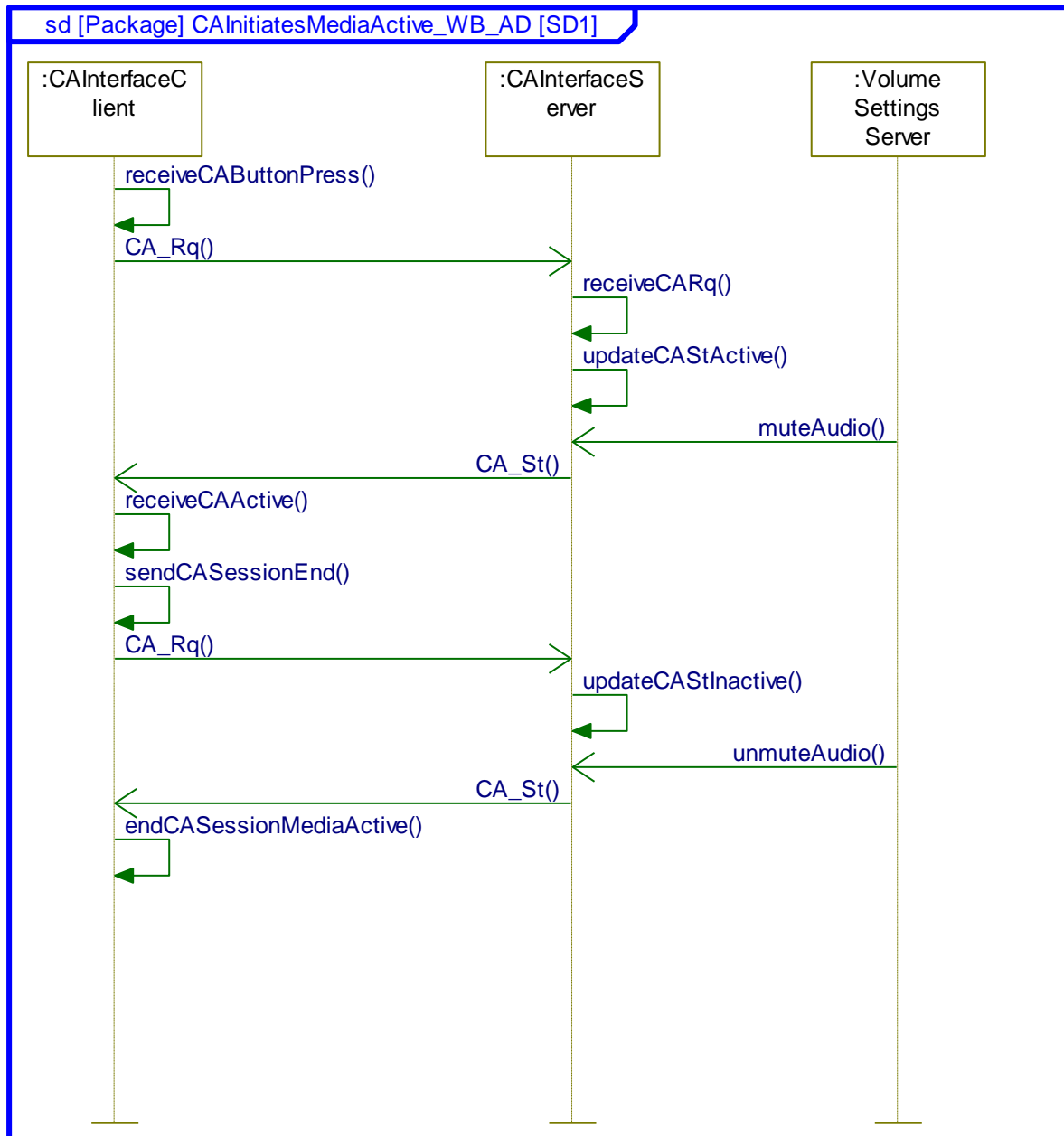




## 4.9.3.2 Sequence Diagrams

## 4.9.3.2.1 CPA-SD-REQ-421498/A-Initiate CA- Media active USB/Bluetooth,AM/FM/Sirius XM

## Sequence Diagram





## 4.10 CPA-FUN-REQ-421499/A-Initiate CA- VR active

### 4.10.1 Use Cases

#### 4.10.1.1 CPA-UC-REQ-414138/A-CA Vs VR

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, CA feature is enabled by the user<br>VR is inprogress  |
| <b>Scenario Description</b>        | While VR is active CAClient initiates the CA the CAServer shall Start the CA session concurrent to the VR session<br>Or when CA session is active and VR session is initiated then then both the sessions shall be concurrent |
| <b>Post-conditions</b>             | Both shall be concurrent  |
| <b>List of Exception Use Cases</b> | Audio system is off   |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B   |

### 4.10.2 Requirements

#### 4.10.2.1 CPA-REQ-414565/A-Initiate CA- VR active

If VR session is active SourceType = VR, SourceTypeStatus = Granted and the CAClient sends CA.Rq=Activate CA request, then the CAServer shall send CA.St= CA Active, activate the CA session. Both VR and CA are concurrent

When VR is initiated during CA is active, the CA Server shall keep sending CA.St=CA Active and SourceType=VR, SourceTypeStatus = Granted in other words CA Session and VR shall be concurrent.

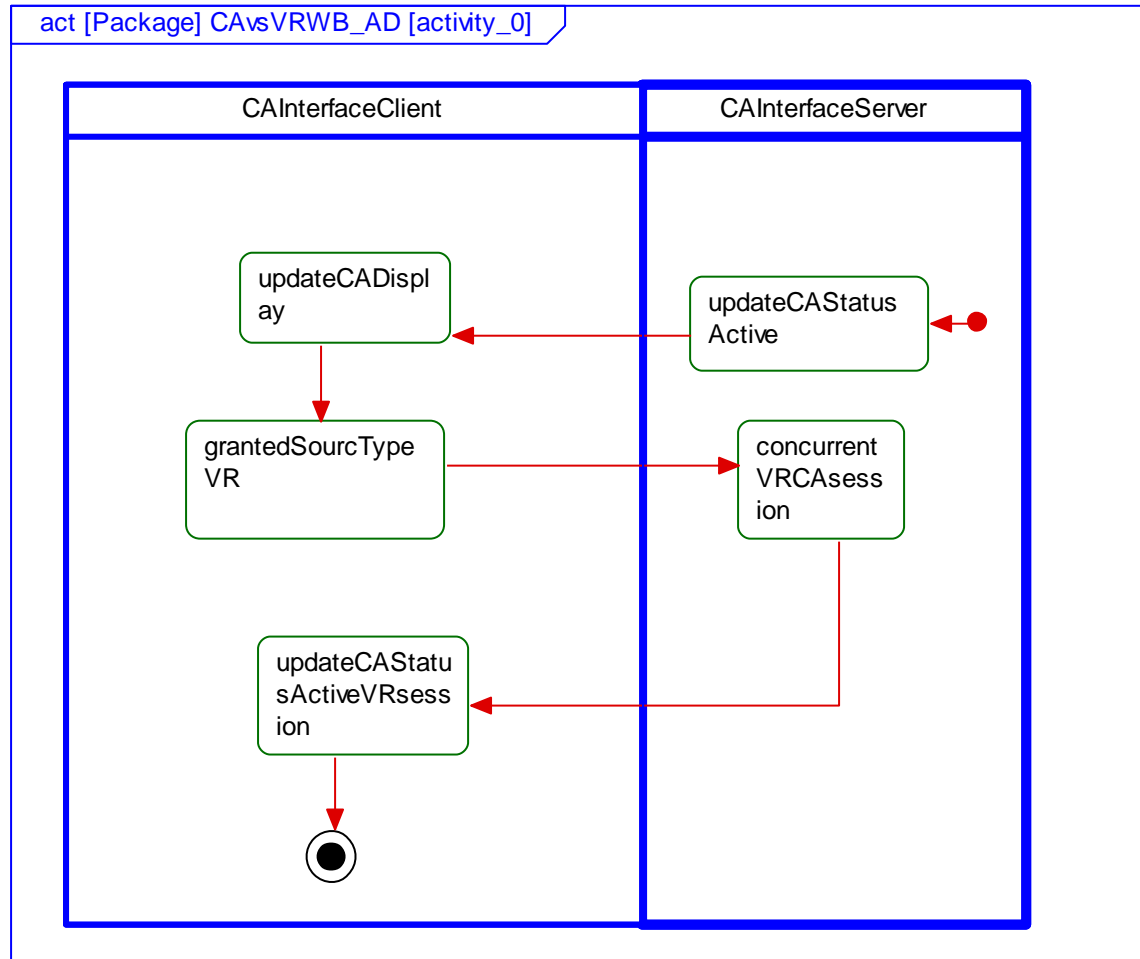


### 4.10.3 White Box View

#### 4.10.3.1 Activity Diagrams

##### 4.10.3.1.1 CPA-ACT-REQ-421500/A-CA vs VR

##### Activity Diagram

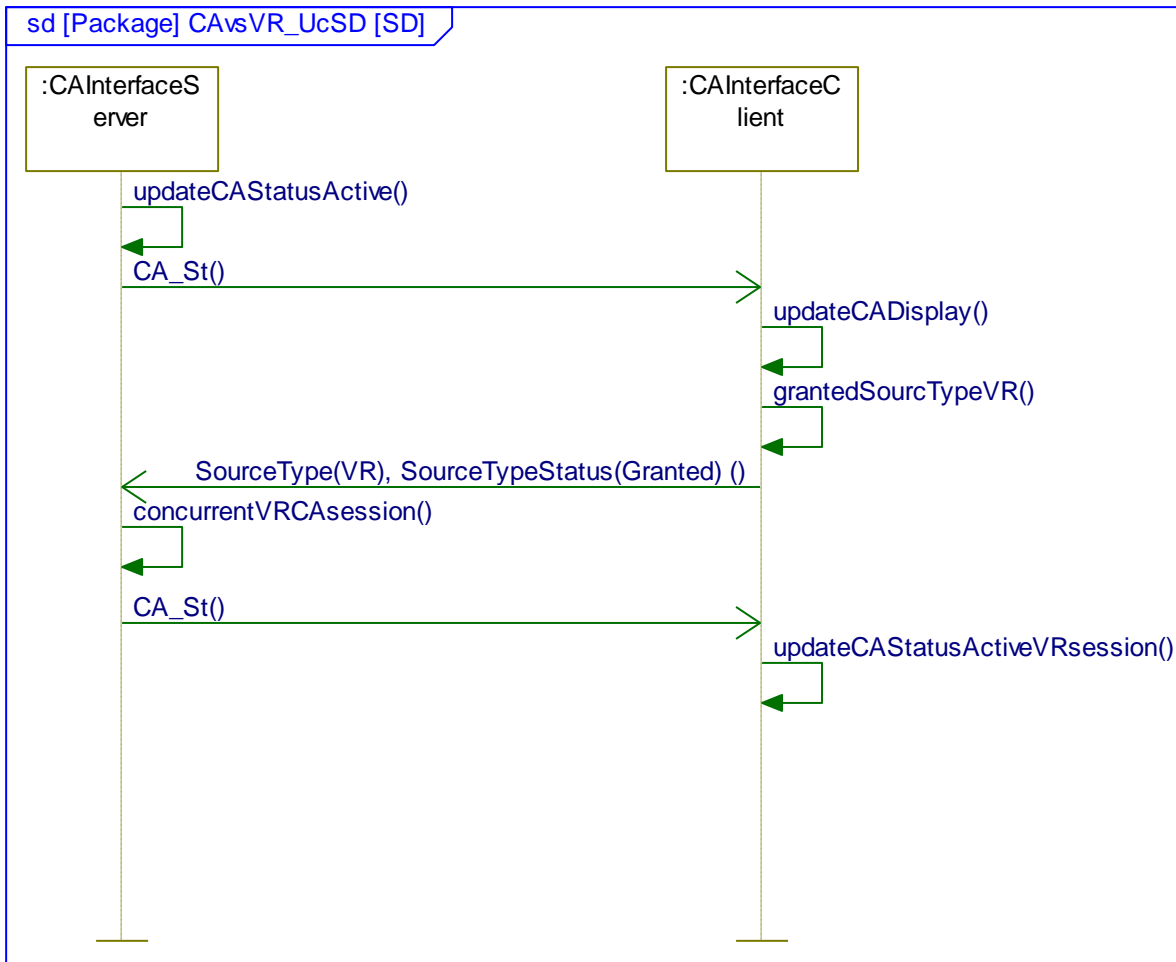




#### 4.10.3.2 Sequence Diagrams

##### 4.10.3.2.1 CPA-SD-REQ-421501/A-CA Vs VR

###### Sequence Diagram



#### 4.11 CPA-FUN-REQ-421502/A-Radio Announcement -CA active

##### 4.11.1 Use Cases

###### 4.11.1.1 CPA-UC-REQ-414456/A-Radio Announcement Vs CA

|                      |   |
|----------------------|---|
| Actors               | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers   |
| Pre-conditions       | Infotainment System is powered ON, CA feature is enabled by the user<br>CA is in progress   |
| Scenario Description | When Radio Announcement is active and CA is initiated then Radio announcement and CA session are Concurrent<br>Or<br>While CA is in Progress and if a Radio announcement audio or prompt is played in the rear zone then <b>Radio Announcement is muted and CA continues. RA resumes after the CA session</b> |



|                             |  |
|-----------------------------|--|
| Post-conditions             | Both are Concurrent but in rear zone RA is muted until CA is active. |
| List of Exception Use Cases | Audio system is off  |
| Interfaces                  | CAClient, CAServer,<br>CAN, A2B                                      |

#### 4.11.2 Requirements

##### 4.11.2.1 CPA-REQ-415422/A-Radio Announcement - CA is active

When Radio Announcement is active SourceType=RadioAnnouncement, SourceTypeStatus = Granted and CA is initiated then CA.St=CA Active and

SourceType=RadioAnnouncement, SourceTypeStatus = Granted then Radio announcement and CA session are Concurrent Or

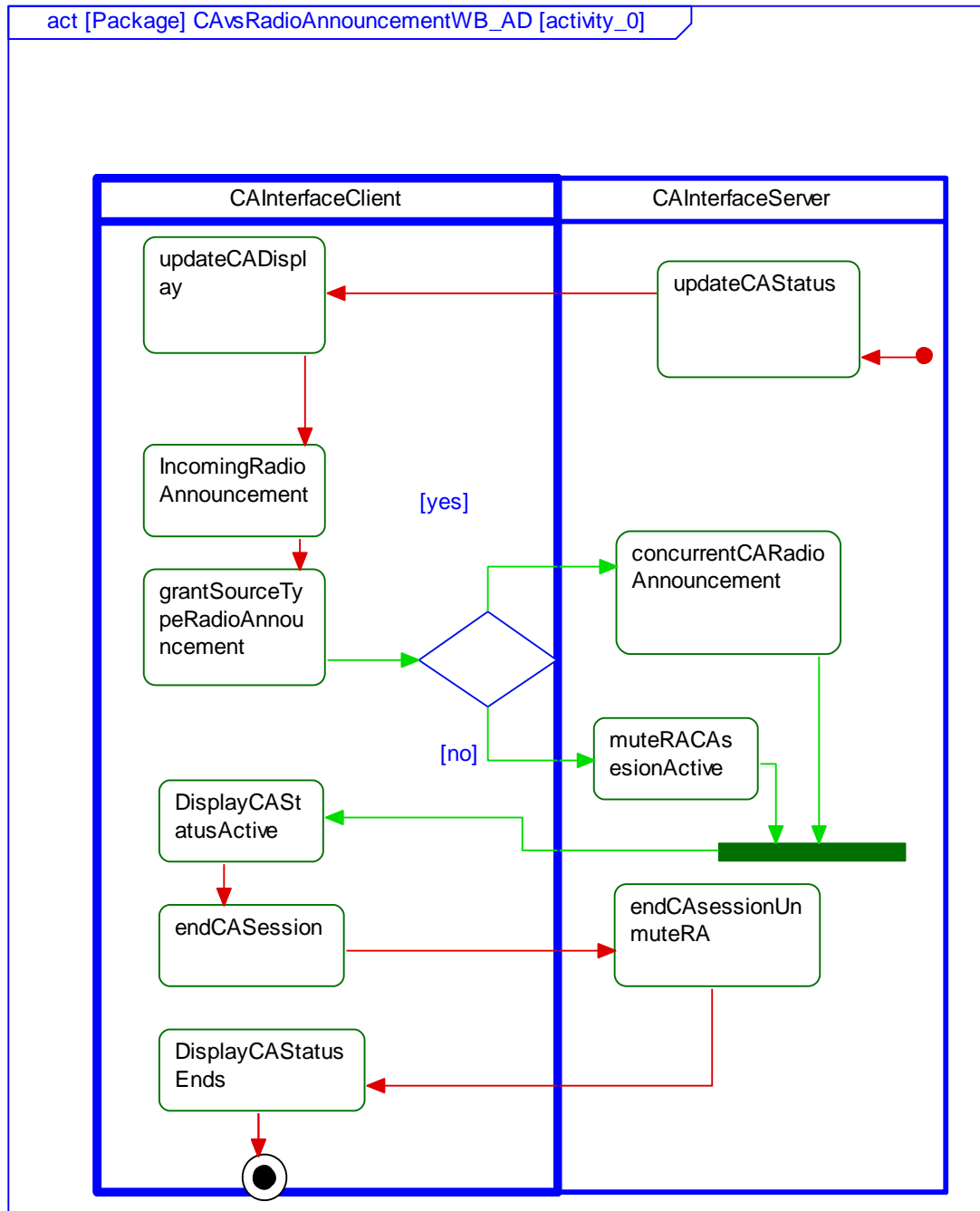
While CA is in Progress and if a Radio announcement audio or prompt is played in the rear zone then CA.St=CA Active and

SourceType=RadioAnnouncement, SourceTypeStatus = Granted but the Volume Server shall set **Radio Announcement to muted and CA continues. RA resumes after the CA session**



## 4.11.3 White Box View

## 4.11.3.1 Activity Diagrams

4.11.3.1.1 CPA-ACT-REQ-421503/A-CA vs Radio Announcement  
Activity Diagram



#### 4.11.3.2 *Sequence Diagrams*

##### 4.11.3.2.1 CPA-SD-REQ-421504/A-CA vs Radio Announcement Sequence Diagram





sd [Package] CAVsRadioAnnouncement\_UcSD [SD]

:CAInterfaceS  
erver:CAInterfaceC  
lient

updateCAStatus()

CA\_St()

updateCADisplay()

IncomingRadioAnnouncement()

grantSourceTypeRadioAnnouncement()

SourceType\_RadioAnnouncement\_SourceTypeStatus\_Granted()

opt

[RearZoneRadioAnnouncement]

concurrentCARadioAnnouncement()

CA\_St()

DisplayCAStatusActive()

endCASession()

CA\_Rq()

endCASessionUnmuteRA()

[FrontZoneRadioAnnouncement]

muteRACAsessionActive()

CA\_St()

DisplayCAStatusActive()

endCASession()

CA\_Rq()

endCASessionUnmuteRA()

CA\_St()



## 4.12 CPA-FUN-REQ-421490/A-ICC Vs CA

### 4.12.1 Use Cases

#### 4.12.1.1 CPA-UC-REQ-414087/A-ICC vs CA

|                                    |   |
|------------------------------------|---|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON, Phone call not active, Priority Assist not active, CA feature is enabled by the user |
| <b>Scenario Description</b>        | While CA is InProgress any request for ICC will be temporarily disabled.  |
| <b>Post-conditions</b>             | CA audio plays and ICC temporarily disabled and a HMI indication shows ICC temporarily disabled due to CA active        |
| <b>List of Exception Use Cases</b> | Audio system is off.  |
| <b>Interfaces</b>                  | CAClient, CAServer, CAN, A2B  |

### 4.12.2 Requirements

#### 4.12.2.1 CPA-REQ-414547/B-ICC vs CA

If the ICC session is active and the CAClient sends CA.Rq= Activate request then the CAServer shall send CA.St=Active and ICC status shall become temporary disable.  
ICC session cannot be activated when CA session is active.  
ICC session shall resume after CA session has ended.

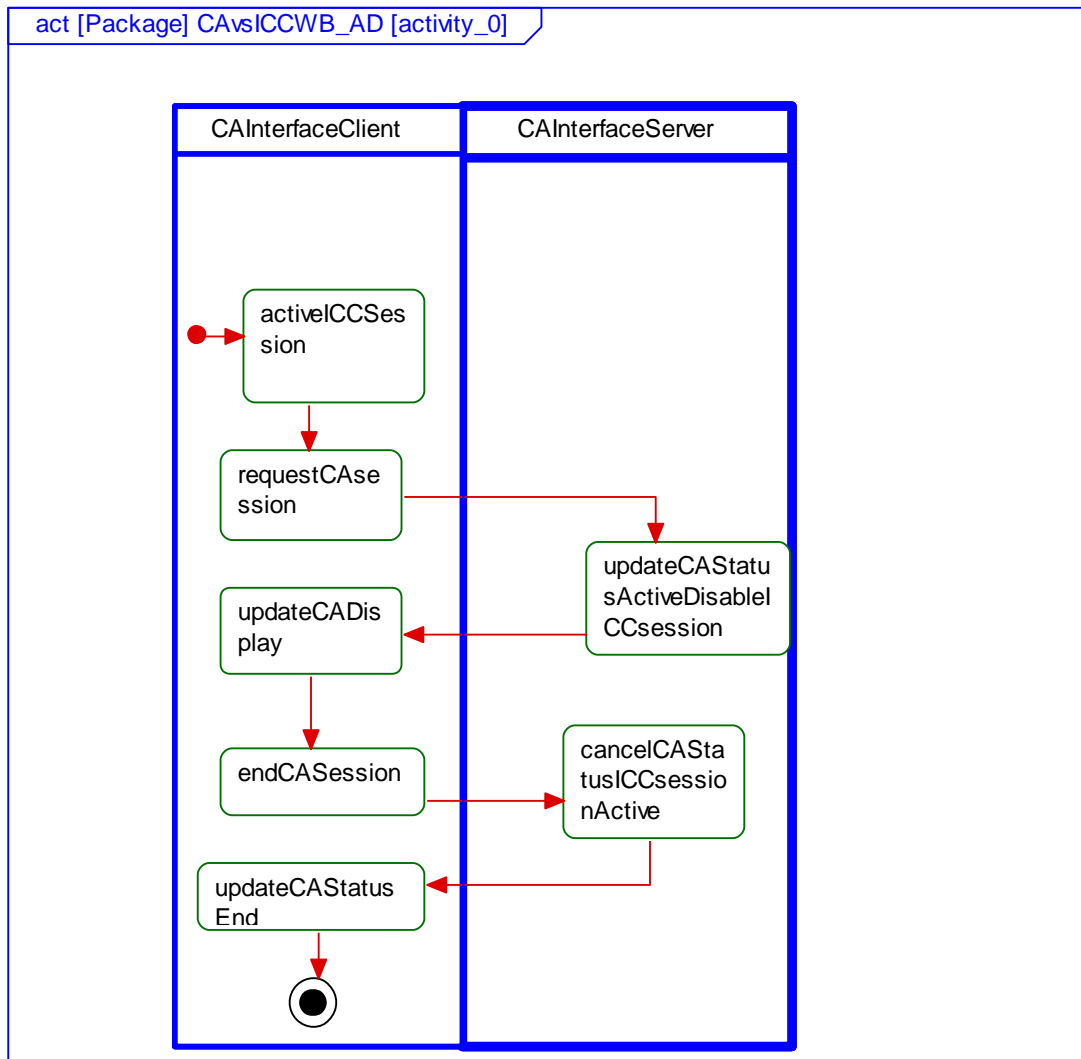
### 4.12.3 White Box View

#### 4.12.3.1 Activity Diagrams

##### 4.12.3.1.1 CPA-ACT-REQ-421491/A-CA Vs ICC



## Activity Diagram

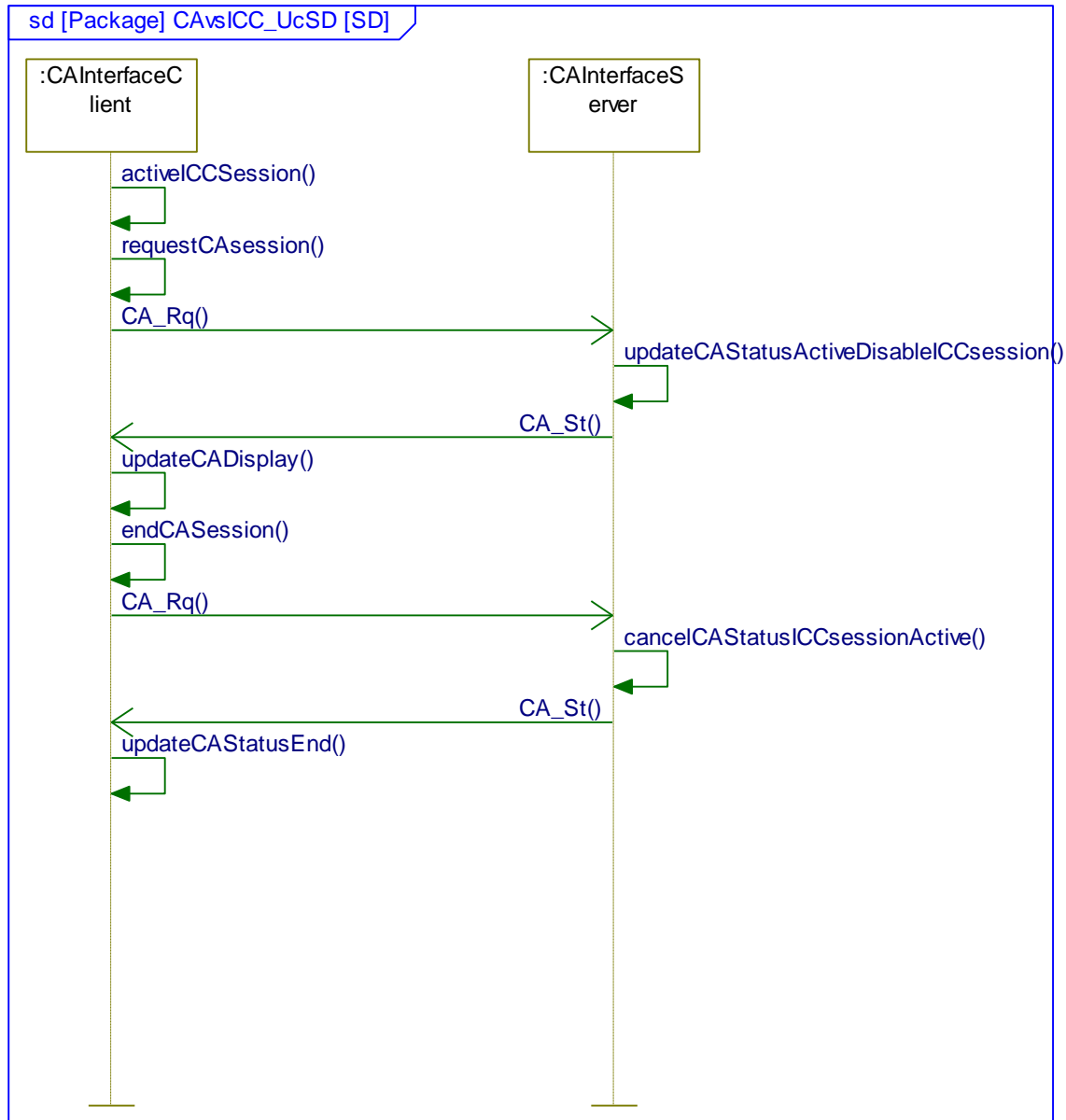




#### 4.12.3.2 Sequence Diagrams

##### 4.12.3.2.1 CPA-SD-REQ-421492/A-CA vs ICC

###### Sequence Diagram



#### 4.13 CPA-FUN-REQ-421520/A-CA Active-Vehicle Audio mode Switches to Full Cabin Mode

##### 4.13.1 Use Cases

###### 4.13.1.1 CPA-UC-REQ-416928/A-CA active- Vehicle Audio mode Switches to Full Cabin mode

|                |  |
|----------------|--|
| Actors         | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers, Zone speakers |
| Pre-conditions | Infotainment System is powered ON,<br>Vehicle Audio mode is Zone mode      |



|                                    |  |
|------------------------------------|--|
|                                    | Atleast one phone is connected to the rear seat zones<br>No phone call is active<br>The audio for the individual passenger(s) are played through headrest speakers.<br>CA is activated by the Driver   |
| <b>Scenario Description</b>        | While CA is in progress and the Zone mode switches to full cabin mode then the CA shall continue to play in full cabin mode.   |
| <b>Post-conditions</b>             | The active CA session shall be continued in the Full cabin mode and the active CA session should not be interrupted.<br>Vehicle audio mode shall switch to Full Cabin mode.<br>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 |
| <b>List of Exception Use Cases</b> | Audio system is off  |
| <b>Interfaces</b>                  | CAClient, CAServer,<br>CAN, A2B  |

#### 4.13.2 Requirements

##### 4.13.2.1 CPA-REQ-414485/B-CA Active-Vehicle Audio mode Switches to Full Cabin Mode

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

#### 4.14 CPA-FUN-REQ-421523/A-CA Active-Vehicle Audio mode Switches to Zone Mode

##### 4.14.1 Use Cases

##### 4.14.1.1 CPA-UC-REQ-416946/A-CA active- Vehicle Audio mode Switches to Zone mode

|                                    |  |
|------------------------------------|--|
| <b>Actors</b>                      | CAServer, CAClient, User (Driver/Passenger), Cabin Speakers, Zone speakers   |
| <b>Pre-conditions</b>              | Infotainment System is powered ON,<br>Vehicle Audio mode is in Full Cabin mode<br>Atleast one phone is connected to the rear seat zones<br>No phone call is active<br>The audio for the individual passenger(s) are played through headrest speakers.<br>CA is activated by the Driver |
| <b>Scenario Description</b>        | While CA is in progress and the Vehicle mode switches to Zone mode then the CA is shall continue to play in zone mode.   |
| <b>Post-conditions</b>             | The active CA session shall be continued in the zone mode and the active CA session should not be interrupted.<br>Vehicle audio mode shall switch to Zone mode.  |
| <b>List of Exception Use Cases</b> | Audio system is off  |

**Interfaces**CAClient, CAServer,  
CAN, A2B**4.14.2 Requirements****4.14.2.1 CPA-REQ-414479/B-CA Active-Vehicle Audio Mode Switches to Zone mode**

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

**4.15 CPA-REQ-407811/B-Memory Storage**

The following default values shall be used at the time of Battery Connect or Module Wakeup. When the CA server is powered ON from an OFF state (ie HMIAudioMode = OFF to ON) then the CA server shall have CA.St=Inactive

| Signal | Battery connect | HMI Audio Mode | Default  |
|--------|-----------------|----------------|----------|
| CA.st  | Inactive        | Inactive       | Inactive |

**4.16 CPA-REQ-407810/A-System Accuracy**

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



## 5 Appendix: Reference Documents

| Reference # | Document Title        |
|-------------|-----------------------|
| 1           | Power Management SPSS |
| 2           | MSS zone manager SPSS |
| 3           | Audio Management SPSS |
| 4           | Volume SPSS           |
| 5           |                       |
| 6           |                       |
| 7           |                       |
| 8           |                       |
| 9           |                       |
| 10          |                       |
| 11          |                       |
| 12          |                       |
| 13          |                       |
| 14          |                       |
| 15          |                       |
| 16          |                       |
| 17          |                       |