



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

**Feature – MSS Passenger  
Phone Call**

**Subsystem Part Specific Specification  
(SPSS)**

Version 1.0

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## Revision History

Date	Version	Notes	
August 9, 2021	1.0	Initial Release	



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# 1 Overview

## 1.1 Feature Assumptions

1. Cabin mode is defined when there are no individual sound zones for the Driver and other vehicle passengers. Generally, audio is played throughout the entire vehicle in cabin mode.
2. Zone mode is defined when there are individual sound zones for the Driver and other vehicle passengers. The audio is played through the individual sound zone speakers.
3. The table below shall be used to define the individual audio zones. When individual audio zones are like below the vehicle is considered in zone mode.

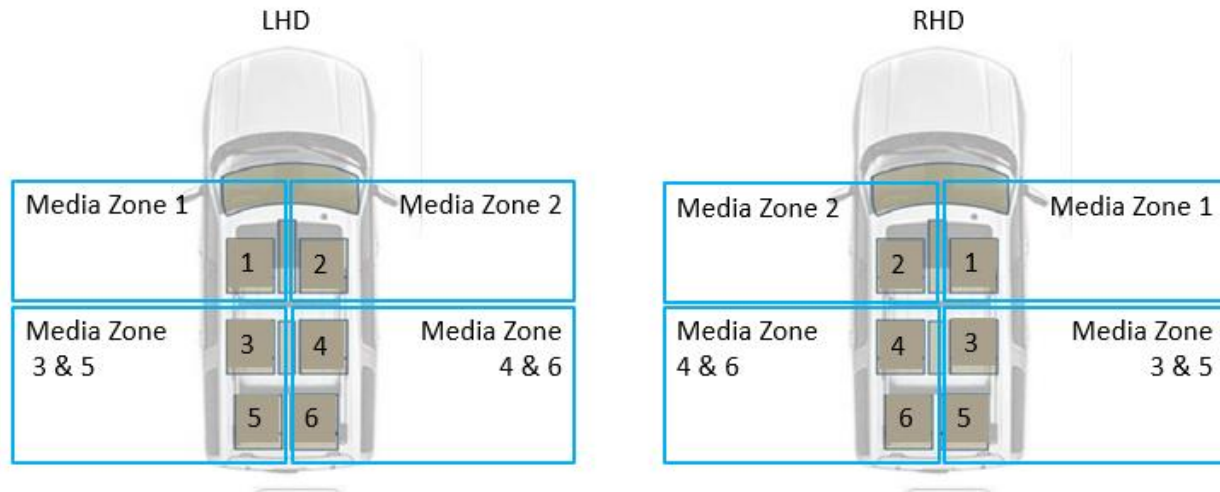
### In a 2 Media zone system:

1. Seat 1 & 2 – shall share same media source.
2. Seat 3/5 & 4/6 – shall share same media source.



### In a 4 Media zone system:

1. Seat 1 – Can be in independent (or) shared media source.
2. Seat 2 – Can be in independent (or) shared media source.
3. Seat 3/5 – Can be in independent (or) shared media source.
4. Seat 4/6 – Can be in independent (or) shared media source.



## 1.2 Terminology and Abbreviations

The following table lists terminologies that are used in this document along with a brief description.

Term	Description
MSS	My Seat Space
URC	Ultimate Remote control
CA	Captains Announcement
ICC	In Car Communication
BT	Bluetooth

## 1.3 3rd Row Seat Assumptions

In an MSS vehicle with the infotainment system operating in individual zone audio mode then

1. The seat 3 and seat 5 shall share same audio source.
2. The seat 4 and seat 6 shall share same audio source.

All the applicable requirement (like Audio source allocation/deallocation, Mute/Unmute, Volume Up/Down, DND, etc.,) that is addressed for Seat 3 and Seat 4 is also applicable to seat 5 and Seat 6 respectively. Unless until the exceptional(s) is called out explicitly in the individual feature specification.



## 2 Architectural Design

### 2.1 Deployment Table

The table below shows how the logical classes may be mapped to physical modules to support this specification.

At the time the specification was written the below table was the latest. If there are additional modules deployed to the class descriptions or the vehicle architecture changed since the spec was written and released, then the applicable implementation guide class description would cover those modules. If there is a conflict between the implementation guide and the table below the implementation guide takes precedent.

Logical Class	Physical Module (ECU)	Comments
MSS Zone Manager	APIM PDC	SW application hosted by PDC to support MSS feature
MSSApplicationServer	APIM PDC	MSS Zone Manager object
Beep Generator	APIM PDC	MSS Zone Manager object
Prompt Generator	APIM PDC	MSS Zone Manager object
Audio Resource Server	APIM PDC	Overall Audio manager
Volume Settings Server	APIM PDC	Volume master
Audio Source Client(s)	APIM PDC	Internal audio sources
URC Application Server	APIM PDC	SW application hosted by PDC to support URC feature
BT Phone Server	APIM PDC	Bluetooth connection Server for the Driver phone mapped to Seat1
Audio IO Controller	DSP AMP	Controls the audio outputted to the vehicle speakers
Passenger BT Phone Client	PAC	Client for the passenger phone(s) mapped and connected to Seat 2, Seat 3 & Seat 4
MSSOnboardClient	-	Client to handle the Infotainment HMI input/output
URC Client	-	Client to handle the URC HMI input/output

### 2.2 MSS-CLD-REQ-407310/A-BT Phone Server

The 'BT Phone Server' maintains and controls status information for everything related to the Driver Phone belongs to Zone1 (i.e. pairing, Phone Connection, and phone calls).

### 2.3 MSS-CLD-REQ-410679/A-MSSApplicationServer

The 'MSSApplicationServer' object is responsible to co-ordinate and interface between the Audio Source Client(s), Input Client(s) and 'AudioResourceServer'. The 'MSSApplicationServer' is also responsible for controlling and updating the MSS Zone Manager objects when incoming service requests are received. The 'MSSApplicationServer' also transmits related status information to the Input client(s) (i.e. 'MSSOnboardClient', 'URC Client'). The 'MSSApplicationServer' shall interface with 'Passenger BT Phone Client' to handle the passenger BT phone calling and BT Media streaming. It also requests the 'Audio Resource Server' if the audio resources are needed.

### 2.4 AUMGNTv2-CLD-REQ-410572/A-Audio IO Controller

The Audio IO Controller is the object that controls the audio outputted to the vehicle speakers.

### 2.5 MSS-CLD-REQ-416064/A-Passenger BT Phone Client

The 'Passenger BT Phone Client' is responsible for establishing BT Classic connection and Pairing with the passenger phones.

### 2.6 MSS-IIR-REQ-407311/A-MSSApplicationServer\_Tx

#### 2.6.1 MD-REQ-418211/A-PhoneCall\_Zone2\_St

Message Type: Status



Status signal from 'MSSApplicationServer' to switch the active phone call. This message is intended only for the phones connected and mapped to seat 2.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone2_St	-	-	
	Inactive	0x0	
	Privacy	0x1	
	HandsFree	0x2	
	Not Used	0x3	

## 2.6.2 MD-REQ-418213/A-PhoneCall\_Zone3\_St

Message Type: Status

Status signal from 'MSSApplicationServer' to switch the active phone call. This message is intended only for the phones connected and mapped to seat 3.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone3_St	-	-	
	Inactive	0x0	
	Privacy	0x1	
	HandsFree	0x2	
	Not Used	0x3	

## 2.6.3 MD-REQ-418214/A-PhoneCall\_Zone4\_St

Message Type: Status

Status signal from 'MSSApplicationServer' to switch the active phone call. This message is intended only for the phones connected and mapped to seat 4.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone4_St	-	-	
	Inactive	0x0	
	Privacy	0x1	
	HandsFree	0x2	
	Not Used	0x3	

## 2.6.4 MD-REQ-425838/A-PhoneCall\_Zone5\_St

Message Type: Status

Status signal from 'MSSApplicationServer' to switch the active phone call. This message is intended only for the phones connected and mapped to seat 5.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone5_St	-	-	
	Inactive	0x0	
	Privacy	0x1	
	HandsFree	0x2	
	Not Used	0x3	

Note: This signal definition is currently not used and is added for future use.

**2.6.5 MD-REQ-425839/A-PhoneCall\_Zone6\_St**

Message Type: Status

Status signal from 'MSSApplicationServer' to switch the active phone call. This message is intended only for the phones connected and mapped to seat 6.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone6_St	-	-	
	Inactive	0x0	
	Privacy	0x1	
	HandsFree	0x2	
	Not Used	0x3	

Note: This signal definition is currently not used and is added for future use.

**2.7 MSS-IIR-REQ-407314/A-MSSApplicationServer\_Rx****2.7.1 MD-REQ-407316/A-PhoneCall\_Zone2\_Rq**

Message Type: Request

Request signal from 'Passenger BT Phone Client' indicating the call status for the Phones connected and mapped to seat 2.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone2_Rq	-	-	
	Inactive / Call Inactive	0x0	
	Call Ringing	0x1	
	Call Active	0x2	
	Not Used	0x3	

**2.7.2 MD-REQ-417080/A-PhoneCall\_Zone3\_Rq**

Message Type: Request

Request signal from 'Passenger BT Phone Client' indicating the call status for the Phones connected and mapped to seat 3.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone3_Rq	-	-	
	Inactive / Call Inactive	0x0	
	Call Ringing	0x1	
	Call Active	0x2	
	Not Used	0x3	

**2.7.3 MD-REQ-417081/A-PhoneCall\_Zone4\_Rq**

Message Type: Request

Request signal from 'Passenger BT Phone Client' indicating the call status for the Phones connected and mapped to seat 4.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone4_Rq	-	-	
	Inactive / Call Inactive	0x0	
	Call Ringing	0x1	
	Call Active	0x2	
	Not Used	0x3	



**2.7.4 MD-REQ-425840/A-PhoneCall\_Zone5\_Rq**

Message Type: Request

Request signal from 'Passenger BT Phone Client' indicating the call status for the Phones connected and mapped to seat 5.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone5_Rq	-	-	
	Inactive / Call Inactive	0x0	
	Call Ringing	0x1	
	Call Active	0x2	
	Not Used	0x3	

Note: This signal definition is currently not used and is added for future use.

**2.7.5 MD-REQ-425841/A-PhoneCall\_Zone6\_Rq**

Message Type: Request

Request signal from 'Passenger BT Phone Client' indicating the call status for the Phones connected and mapped to seat 6.

Logical Signal Name	Literals	Value	Description
PhoneCall_Zone6_Rq	-	-	
	Inactive / Call Inactive	0x0	
	Call Ringing	0x1	
	Call Active	0x2	
	Not Used	0x3	

Note: This signal definition is currently not used and is added for future use.

**2.8 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
PhoneCall_Zone2_St	
PhoneCall_Zone3_St	
PhoneCall_Zone4_St	
PhoneCall_Zone5_St	
PhoneCall_Zone6_St	
PhoneCall_Zone2_Rq	
PhoneCall_Zone3_Rq	
PhoneCall_Zone4_Rq	
PhoneCall_Zone5_Rq	
PhoneCall_Zone6_Rq	

Table: Logical name/CAN signal mapping



### 3 General Requirements

#### 3.1 MSS-SR-REQ-410783/A-MSSApplicationServer interaction with URCAApplicationServer

'MSSApplicationServer' and 'URCAApplicationServer' shall interface to be aware of individual Seat status. The typical elements of Seat 1 to 6 status include

1. Seat Phone call status.
2. Seat Mute status.
3. Seat DND status.
4. Vehicle audio mode status (Cabin, 2 Media or 4 Media Zone mode).
5. 'MSS Global Switch' status.



## 4 Functional Definition

### 4.1 MSS-FUN-REQ-407294/A-Passenger Phone Call Handling

#### 4.1.1 Requirements

##### 4.1.1.1 MSS-SR-REQ-418391/A-Phone call status signal usage

The 'MSSApplicationServer' shall support to monitor the request of individual seats on 'PhoneCall\_ZoneX\_Rq' signal from 'Passenger BT Phone Client'. Based on the request, the 'MSSApplicationServer' shall request the 'Audio Resource Server' for phone call or Phone VR source allocation/deallocation (if required).

1. 'Call Inactive' – shall request to deallocate the last allocated VR or Phone Call source.
2. 'Call Ringing/Call Active' - shall request to allocate Phone Call source.
3. 'Phone VR' – shall request to allocate VR session for phone.

Note: X on the 'PhoneCall\_ZoneX\_Rq' signal represent the possible phone call status sent by the 'Passenger BT Phone Client' for the phones connected and mapped to the seats (i.e. PhoneCall\_Zone2\_Rq/PhoneCall\_Zone3\_Rq/PhoneCall\_Zone4\_Rq). Refer URC SPSS for zone phones pairing and mapping.

##### 4.1.1.2 MSS-SR-REQ-407295/A-Allowed number of Hands-Free phone calls in zone mode

When the vehicle audio mode is in Zone mode, then the MSSApplicationServer shall restrict the number of hands-free phone calls in the seat(s) as follows.

1. Between Zone1 & Zone2 – Allow one hands free phone call to be active at a time through zone speakers.
2. Between Zone 3 & Zone4 – Allow one hands free phone call to be active at a time through zone speakers.

##### 4.1.1.3 MSS-SR-REQ-407297/A-Passenger phone call activation in zone mode

When the vehicle audio mode is in 'Zone mode' and when the 'MSSApplicationServer' receives a phone call request on 'PhoneCall\_ZoneX\_Rq' signal,

1. The 'MSSApplicationServer' shall, switch the new incoming phone call to Hands Free by sending 'PhoneCall\_ZoneX\_St=HandsFree' within 'T\_Switch\_call'.
2. The 'MSSApplicationServer' shall, request the 'Audio Resource Server' to allocate phone audio source for that zone based on the below criteria.

##### 'PhoneCall\_Zone2\_Rq=Call Ringing/Call Active'

1. When the Zone 2 is sharing its phone media source (i.e. Z2\_BTMedia) with other zone(s) in the vehicle, then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to assign 'Audio OFF' (i.e. either stacked or deallocated based on Audio management rules) for those shared zone(s). The 'MSSApplicationServer' shall also request the 'AudioResourceServer' to allocate Zone 2 with phone call audio(i.e. Ringing or Phone Call depending upon the incoming call status).
2. When the Zone 2 is listening to its own phone media source (i.e. Z2\_BTMedia) (or) listening to other media source shared by other zone(s), then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate Zone 2 with phone call audio (i.e. Ringing or Call depending upon the incoming call status).

Once the phone call audio is Granted by the 'AudioResourceServer', the 'MSSApplicationServer' shall set the status of the phone call to 'PhoneCall\_Zone2\_St=Hands Free/Privacy' depending upon the phone call zone rules.

##### 'PhoneCall\_Zone3\_Rq=Call Ringing/Call Active'

1. When the Zone 3 is sharing phone media source (i.e. Z3\_BTMedia) with other zone(s) in the vehicle, then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to assign 'Audio OFF' (i.e. either stacked or deallocated based on Audio management rules) for those shared zone(s). The



- 'MSSApplicationServer' shall also request the 'AudioResourceServer' to allocate Seat 3 & 5 with phone call audio(i.e. Ringing or Phone Call depending upon the incoming call status).
2. When the Zone 3 is listening to its own phone media source (i.e. Z3\_BTMedia) (or) listening to other media source shared by other zones(s), then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate Seat 3 & 5 with phone call audio (i.e. Ringing or Call depending upon the incoming call status).

Once the phone call audio is Granted by the 'AudioResourceServer', the 'MSSApplicationServer' shall set the status of the phone call to 'PhoneCall\_Zone3\_St=Hands Free/Privacy' depending upon the phone call zone rules. At the same time 'MSSApplicationServer' shall also interface with 'Volume Server' and shall set Zone 5 phone volume to 'Mute' (i.e. 0 Volume) when the zone 5 is Granted for Phone audio by the 'Audio Resource Server'.

'PhoneCall\_Zone4\_Rq=Call Ringing/Call Active'

1. When the Zone 4 is sharing phone media source (i.e. Z4\_BTMedia) with other zone(s) in the vehicle, then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to assign 'Audio OFF' (i.e. either stacked or deallocated based on Audio management rules) for those shared zone(s). The 'MSSApplicationServer' shall also request the 'AudioResourceServer' to allocate Seat 4 & 6 with phone call audio(i.e. Ringing or Phone Call depending upon the incoming call status).
2. When the Zone 4 is listening to its own phone media source (i.e. Z4\_BTMedia) (or) listening to other media source shared by other zones(s), then for the incoming call request the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate Seat 4 & 6 with phone call audio (i.e. Ringing or Call depending upon the incoming call status).

Once the phone call audio is Granted by the 'AudioResourceServer', the 'MSSApplicationServer' shall set the status of the phone call to 'PhoneCall\_Zone4\_St=Hands Free/Privacy' depending upon the phone call zone rules. At the same time 'MSSApplicationServer' shall also interface with 'Volume Server' and shall set Zone 6 phone volume to 'Mute' (i.e. 0 Volume) when the zone 6 is Granted for Phone audio by the 'Audio Resource Server'.

Note1: Refer Volume SPSS for the different volume levels in zone mode when phone call is active/ended.

Note2: Once the audio source is allocated for Phone call audio, then stacking/deallocating the last active audio source shall be based on Audio management strategy defined in Audio Management SPSS.

4.1.1.4 MSS-SR-REQ-407298/A-Passenger phone call deactivation in zone mode

When the vehicle audio mode is in 'Zone mode' and when the last active phone call and at the same time the 'MSSApplicationServer' receives a phone call request on 'PhoneCall\_ZoneX\_Rq=Call Inactive' signal, then the 'MSSApplicationServer' shall

'PhoneCall\_Zone2\_Rq=Call Inactive'

1. Request the 'AudioResourceServer' to 'Release' the phone call for zone 2.
2. When Zone2 was the source originator and was sharing its phone media (i.e. Zx\_BTMedia) with other zone(s) prior to that phone call, then the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate phone media source for those shared zone(s) **only if** they are available.

'PhoneCall\_Zone3\_Rq=Call Inactive'

1. Request the 'Audio Resource Server' to 'Release' the phone call for Zone 3 & 5.
2. Only when the last active audio source is allocated back to Zone 3, the 'MSSApplicationServer' shall interface with 'Volume Settings Server' to unmute seat 5.
3. When Zone3 was the source originator and was sharing its phone media (i.e. Zx\_BTMedia) with other zone(s) prior to that phone call, then the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate phone media source for those shared zone(s) **only if** they are available.

'PhoneCall\_Zone4\_Rq=Call Inactive'

1. Request the 'Audio Resource Server' to 'Release' the phone call for zone 4 & 6.



- Only when the last active audio source is allocated back to Zone 4, the 'MSSApplicationServer' shall interface with 'Volume Settings Server' to unmute seat 6.
- When Zone4 was the source originator and was sharing its phone media (i.e. Zx\_BTMedia) with other zone(s) prior to that phone call, then the 'MSSApplicationServer' shall request the 'AudioResourceServer' to allocate phone media source for those shared zone(s) only if they are available.

Note1: Refer Volume SPSS for the different volume levels in zone mode when phone call is active/ended.

Note2: Once the audio source is deallocated, then the next audio source allocation for that zone shall be based on Audio management source allocation strategy defined in Audio Management SPSS.

#### 4.1.1.5 MSS-SR-REQ-407303/A-Passenger phone call in full cabin mode

When the vehicle audio mode is in Full Cabin and playing the passenger phone media source (i.e. Zx\_BTMedia) to entire cabin and when the same passenger phone receives a phone call 'PhoneCall\_ZoneX\_Rq=Call Ringing/Call Active' then

- The 'MSSApplicationServer' shall request the 'Audio Resource Server' to set 'Audio OFF' for entire cabin.
- Once the last active source is set to 'Audio OFF' by the
- 'AudioResourceServer', the 'MSSApplicationServer' shall switch the incoming phone call to privacy by sending 'PhoneCall\_ZoneX\_St= Privacy' signal within 'T\_Switch\_call'.
- Only when the phone call is ended 'PhoneCall\_ZoneX\_Rq=Call Inactive' the 'MSSApplicationServer' shall request the 'Audio Resource Server' to 'Release' the phone call audio source.

When the vehicle audio mode is in cabin mode and when the cabin is listening to other audio sources (i.e. other than Passenger media audio) and when the passenger phone receives a phone call on 'PhoneCall\_ZoneX\_Rq=Call Ringing/Call Active', then

- The 'MSSApplicationServer' shall switch the incoming phone call session to privacy by sending 'PhoneCall\_ZoneX\_St= Privacy' signal within 'T\_Switch\_call'.

(Example. 'REQ-419847' & 'REQ-419848' details the 'MSSApplicationServer' and 'Passenger BT Phone Client' interaction).

#### 4.1.1.6 MSS-SR-REQ-407296/A-Request to switch the 2nd phone call to privacy

When the vehicle audio mode is in zone mode and when any of the passenger is in phone call and at the same time when the adjacent passenger or the Driver receives a new incoming/active phone call,

- Then the 'MSSApplicationServer' shall request the 'Audio Resource Server' to allocate phone audio source for that zone.
- Once the phone audio source is Granted by the 'AudioResourceServer', the 'MSSApplicationServer' shall switch the new phone call to privacy by sending 'PhoneCall\_ZoneX\_St= Privacy' within 'T\_Switch\_call'.

Only when the phone call is ended the 'MSSApplicationServer' shall request the 'Audio Resource Server' to 'Release' the Phone call audio source.

Scenarios	Pre-Condition: Vehicle audio Mode is in zone mode	Event	Post Condition
Case 1	1. Zone 1 is in phone call. (either HF or privacy). 2. Zone 2 is not in Phone Call.	Zone 2 phone call becomes active.	1. Zone 1 remains in phone call (either HF or privacy). 2. Zone 2 phone call is switched to privacy by 'MSSApplicationServer'
Case 2	1. Zone 2 is in phone call. (either HF or privacy). 2. Zone 1 is not in Phone Call.	Zone 1 phone call becomes active.	1. Zone 1 phone call becomes active in Zone 1 (i.e. HF Call). 2. Zone 2 phone call is switched to privacy by 'MSSApplicationServer'
Case 3	1. Zone 3 is in phone call. (either HF or privacy).	Zone 4 phone call becomes active.	1. Zone 3 remains in phone call (either HF or privacy).



	2. Zone 4 is not in Phone Call.		2. Zone 4 phone call is switched to privacy by 'MSSApplicationServer'
Case 4	1. Zone 4 is in phone call. (either HF or privacy). 2. Zone 3 is not in Phone Call.	Zone 3 phone call becomes active.	1. Zone 4 remains in phone call (either HF or privacy). 2. Zone 3 phone call is switched to privacy by 'MSSApplicationServer'

Note: X on the 'PhoneCall\_ZoneX\_St' signal represent the possible status message sent by 'MSSApplicationServer' for the phones connected and mapped to the seat (i.e. 'PhoneCall\_Zone2\_St/ PhoneCall\_Zone3\_St/ PhoneCall\_Zone4\_St')

#### 4.1.1.7 MSS-SR-REQ-407305/A-Driver phone call priority in zone mode

While the vehicle audio mode is in zone mode, the 'MSSApplicationServer' shall support to give higher precedence to Zone1 phone call (i.e. connected to 'BT Phone Server') than the Zone2 passenger phone call (i.e. connected to 'Passenger BT Phone Client').

- When the Zone1 driver phone call is already active (i.e. either Ringing or Phone Call) and when the Zone2 phone call status becomes active (i.e. 'PhoneCall\_Zone2\_Rq=Call Ringing/Call Active')
  - The 'MSSApplicationServer' shall interface with 'Audio Resource Server' to allocate phone call audio source for zone 2.
  - Once the phone call audio source is Granted by the 'AudioResourceServer', the 'MSSApplicationServer' shall switch Zone2 phone call to privacy by sending 'PhoneCall\_Zone2\_St= Privacy'.
  - Only when the call status for the zone 2 is ended (i.e. 'PhoneCall\_Zone2\_Rq=Call Inactive') the 'MSSApplicationServer' shall request the 'Audio Resource Server' to end the phone call audio source.
- When the zone2 is already in active call (i.e. 'PhoneCall\_Zone2\_Rq=Call Ringing/Call Active') and when the Zone1 driver phone call becomes active (i.e. either Ringing or Call active),
  - The 'BT Phone Server' shall request the 'AudioResourceServer' to allocate Zone1 with phone call audio source. The incoming driver phone call shall be played through zone speakers (i.e. hands-free call).
  - Only when the zone 1 is Granted with phone call by 'AudioResourceServer', the 'MSSApplicationServer' shall switch the Zone2 phone call to privacy by sending 'PhoneCall\_Zone2\_St= Privacy'.
  - Only when the call status for the zone 2 is ended (i.e. 'PhoneCall\_Zone2\_Rq=Call Inactive') 'MSSApplicationServer' shall request the 'Audio Resource Server' to 'Release' the phone call audio source for Zone 2.

#### 4.1.1.8 MSS-TMR-REQ-425137/A-T\_Switch\_call

Name	Description	Units	Range	Resolution	Default
T_Switch_call	The maximum time allowed from when the 'MSSApplicationServer' receives 'PhoneCall_ZoneX_Rq=Call Ringing/Call Active' signal until when the 'MSSApplicationServer' send the status to switch the phone call to private/Hands Free mode on 'PhoneCall_ZoneX_St' signal. Note: Use default	msec	0-1000	10	125

### 4.1.2 Use Cases

#### 4.1.2.1 UC-REQ-421359/A-Passenger receives a phone call, when entire cabin is listening to PDC media source

<b>Actors</b>	Vehicle User
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>Infotainment System is ON.</li><li>Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>1 Phone is paired and mapped to zone1 (i.e. Driver phone).</li></ol>





	4. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4).
	5. Entire Cabin is listening to the Infotainment audio source (ex. AM/FM, USB, Driver BT Media, SXM, iPod) played through full cabin speakers.
	6. No phone call is active in the Vehicle.
<b>Scenario Description</b>	7. Phones connected to the passenger seat receives an incoming phone call.
<b>Post-conditions</b>	8. The vehicle audio mode shall remain in full cabin mode. 9. The active phone call session for the passenger shall be in privacy. 10. The current audio played in the entire cabin shall not be interrupted by the passenger phone call.
<b>List of Exception Use Cases</b>	
<b>Notes</b>	11. The above use case is also applicable when the Passenger makes an outgoing call.
<b>Interfaces</b>	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.2 UC-REQ-421360/A-Passenger streaming BT Media to the entire cabin receives a phone call

<b>Actors</b>	Vehicle User
<b>Pre-conditions</b>	1. Infotainment System is ON. 2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed. 3. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 4. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4). 5. No phone call is active in the Vehicle. 6. Entire cabin is listening to the phone media played through the passenger phone (ex. Zone 3).
<b>Scenario Description</b>	7. The passenger phone streaming music to entire cabin receives an incoming call.
<b>Post-conditions</b>	8. The vehicle audio mode shall remain in full cabin mode. 9. The active phone call session for that passenger shall be in privacy mode. 10. Active audio source for the entire cabin shall be 'Audio OFF' (i.e. Passenger phone media deallocated). 11. When the passenger phone call is ended, the audio source for entire cabin shall be allocated back and shall play passenger phone Media.
<b>List of Exception Use Cases</b>	
<b>Notes</b>	12. The above use case is also applicable when the Passenger streaming music makes an outgoing call from the same phone.
<b>Interfaces</b>	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.3 UC-REQ-421361/A-Passenger receives a phone call when the other passenger in that media zone is listening to PDC media source



<b>Actors</b>	Vehicle User
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>1. Infotainment System is ON.</li><li>2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>3. Vehicle audio mode is in 2 media zone.</li><li>4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone).</li><li>5. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4).</li><li>6. Front Media Zone occupants (i.e. Zone 1 &amp; 2) is listening to the Infotainment audio source(ex. AM/FM,USB, Driver BT Media, SXM, iPod).</li><li>7. Rear Media Zone occupants (i.e. Zone 3 &amp; 4) is listening to different media source (ex. Zone 3 phone media).</li></ol>
<b>Scenario Description</b>	<ol style="list-style-type: none"><li>8. Front passenger (i.e. Zone2 Passenger) receives an incoming phone call or makes an outgoing phone call.</li></ol>
<b>Post-conditions</b>	<ol style="list-style-type: none"><li>9. The active phone call session for Zone 2 passenger shall continue through zone speakers (hands Free).</li><li>10. Current playing audio source for the driver shall not be interrupted and shall continue to play through Zone 1 speakers.</li><li>11. When the Zone 2 phone call is ended, the vehicle audio mode shall remain in zone mode and the current active Zone 1 media shall also be played in Zone 2 .</li><li>12. Phone call on Front zone (either Zone1 or Zone2) shall not interrupt the current playing in Rear Media zone.</li></ol>
<b>List of Exception Use Cases</b>	
<b>Notes</b>	<ol style="list-style-type: none"><li>13. The above use case is also applicable to any passenger phone that receives or activates a Phone call while in Zone mode and listening to PDC media source.</li></ol>
<b>Interfaces</b>	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.4 UC-REQ-421362/A-Passenger receives a phone call when the passenger(s) on that media zone is listening to BT Media streamed from the same Phone

<b>Actors</b>	Vehicle user
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>1. Infotainment System is ON.</li><li>2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>3. Vehicle audio mode is in 2 media Zone.</li><li>4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone).</li><li>5. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4).</li><li>6. Front Media Zone is listening to the Zx_BTMedia streamed from Zone2 phone.</li></ol>
<b>Scenario Description</b>	<ol style="list-style-type: none"><li>7. Zone2 passenger receives an incoming phone call or makes an outgoing phone call.</li></ol>
<b>Post-conditions</b>	<ol style="list-style-type: none"><li>8. The active phone call session for front passenger shall continue through zone2 speakers (hands Free) and the active audio source for the driver shall be audio OFF (i.e. deallocated zone 2 phone media).</li></ol>





	9. When the Zone 2 call is ended, the vehicle audio mode shall remain in zone mode. 10. The audio source for the Front Media zone (driver and front passenger) shall be allocated back and shall play Zone 2 phone media.
List of Exception Use Cases	
Notes	11. The above use case is also applicable to any passenger phone that receives or activates a Phone call while streaming music to their Zone, other passenger(s) in that zone shall have no audio.
Interfaces	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

**4.1.2.5 UC-REQ-421363/A-Passenger receives a phone call when the passenger(s) on that media zone is listening to BT Media streamed from different phone**

Actors	Vehicle User
Pre-conditions	1. Infotainment System is ON. 2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed. 3. Vehicle audio mode is in 2 media Zone. 4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 5. Minimum of two phone is connected and mapped to passenger seat on Zone 3 and Zone 4 respectively. 6. Rear Media Zone is listening to phone media streamed by Zone3 phone.
Scenario Description	1. Zone 4 passenger receives an incoming phone call.
Post-conditions	2. The active phone call session for Zone4 passenger shall play through zone4 speaker's (hands free). 3. The current active Zone 3 phone media other passenger's audio shall not be interrupted. 4. When the Zone4 call is ended, the vehicle audio mode shall remain in zone mode. 5. The audio source for Zone 4 passenger shall be the current active Zone 3 media.
List of Exception Use Cases	
Notes	6. The above use case is also applicable to any passenger phone that receives or activates a Phone call while music is streaming through different passenger phone on that same media zone.
Interfaces	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

**4.1.2.6 UC-REQ-421364/A-Another passenger in the same seat row receives a phone call when the phone call is already active**

Actors	Vehicle User
Pre-conditions	1. Infotainment System is ON. 2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.



	3. Vehicle audio mode is in 2 or 4 media Zone mode. 4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 5. Minimum of two phone is connected and mapped to passenger seat 3 and Zone 4 respectively. 1. Zone 3 Passenger is in active phone call and the call audio is played through Zone3 speakers.
Scenario Description	2. The other passenger on the rear zone (i.e. Zone 4 passenger) receives an incoming call or makes an outgoing phone call.
Post-conditions	3. The active phone call session of Zone 3 passenger should not be interrupted. 4. The audio source for seat4 shall be in Phone source and the new incoming or outgoing phone call for that Zone 4 passenger shall be in privacy mode.
List of Exception Use Cases	
Notes	1. At a given time, for a given seat row (1 <sup>st</sup> row or 2 <sup>nd</sup> row) only one phone call is allowed through zone speakers.
Interfaces	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.7 UC-REQ-421365/A-While Driver phone call is in progress and when the Zone 2 passenger receives a phone call

Actors	Vehicle User
Pre-conditions	1. Infotainment System is ON. 2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed. 3. Vehicle audio mode is in 2 or 4 media zone mode. 4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 5. 1 Phone is paired and mapped to seat2 (i.e. Passenger phone). 6. Driver Phone call is in progress.
Scenario Description	1. Front passenger (Zone2) receives or makes a phone call.
Post-conditions	2. The active phone call session for the driver shall continue through driver zone speakers. 3. The audio source for seat2 shall be allocated with Phone source and the new incoming (or) outgoing phone call shall be switched to privacy mode.
List of Exception Use Cases	
Notes	1. At a given time, for a given seat row (1 <sup>st</sup> row or 2 <sup>nd</sup> row) only one phone call is allowed through zone speakers.
Interfaces	BT Phone Server, Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.8 UC-REQ-421366/A-Zone 2 passenger phone call is in progress and when driver receives a phone call

Actors	Vehicle User
Pre-conditions	1. Infotainment System is ON.



	2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed. 3. Vehicle audio mode is in Zone mode. 4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 5. 1 Phone is paired and mapped to seat2 (i.e. Passenger phone). 6. Zone 2 passenger phone call is active through zone speakers (Hands Free).
Scenario Description	7. Driver receives a phone call.
Post-conditions	8. The active phone call session for driver shall be active through driver zone speakers. 9. The active phone call session for seat2 shall be switched to privacy mode and the active audio source for Zone 2 shall be in Phone Call.
List of Exception Use Cases	
Notes	10. Driver phone call takes priority over Zone 2 passenger phone call, hence Zone 2 passenger active phone call is pushed to privacy.
Interfaces	BT Phone Server, Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.9 UC-REQ-421367/A-Driver receives a phone call when vehicle in full cabin mode and playing passenger phone media

Actors	Vehicle User
Pre-conditions	1. Infotainment System is ON. 2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed. 3. Vehicle audio mode is in Zone mode. 4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone). 5. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4). 6. Vehicle in full cabin mode playing audio source from passenger phone (ex. Z2_BTMedia).
Scenario Description	7. Driver receives an incoming phone call or makes an outgoing phone call.
Post-conditions	8. The vehicle audio mode shall remain in full cabin mode. 9. The active phone call session for the driver shall be in full cabin mode (Hands Free). 10. When the driver's phone call is ended the prior passenger audio (ex. Z2_BTMedia) shall resume to play in full cabin mode.
List of Exception Use Cases	
Notes	
Interfaces	BT Phone Server, Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.10 UC-REQ-421369/A-Driver receives a phone call while the media zone is listening to the audio played through driver phone



<b>Actors</b>	Vehicle user
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>1. Infotainment System is ON.</li><li>2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>3. Vehicle audio mode is in Zone mode.</li><li>4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone).</li><li>5. 1 Phone is paired and mapped to seat2 (i.e. Passenger phone).</li><li>6. Front Media zone (zone 1&amp;2) in the vehicle is listening to media source streamed from the Driver phone (i.e. BT Media) through zone speakers.</li></ol>
<b>Scenario Description</b>	<ol style="list-style-type: none"><li>1. While listening to BT media the driver receives an incoming phone call or makes an outgoing phone call.</li></ol>
<b>Post-conditions</b>	<ol style="list-style-type: none"><li>1. The active phone call session for the driver shall continue through driver zone speakers.</li><li>2. Front passenger (Zone 2) audio shall be in 'Audio OFF' (last active PDC source is deallocated).</li><li>3. When the driver's active call is ended, the vehicle audio mode shall remain in zone mode and media source for Zone 1 and Zone 2 shall resume playback in last active audio source (i.e. Drive BT media).</li><li>4. Because of Drive phone call, the audio source for the rear Media zone shall not be interrupted unless they were listening to the same audio source streamed and played by the Driver.</li></ol>
<b>List of Exception Use Cases</b>	
<b>Notes</b>	
<b>Interfaces</b>	BT Phone Server, Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN

#### 4.1.2.11 UC-REQ-421370/A-BT Connection with Passenger phone is lost while the active phone call is through zone speakers

<b>Actors</b>	Vehicle User
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>1. Infotainment System is ON.</li><li>2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>3. Vehicle audio mode is in Zone mode.</li><li>4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone).</li><li>5. Minimum of one phone is connected and mapped to passenger seat (i.e. either Seat 2/3/4).</li><li>6. Zone2 passenger phone call is active and played through zone speakers.</li></ol>
<b>Scenario Description</b>	<ol style="list-style-type: none"><li>1. While in active phone call the BT connection with the passenger phone is lost (ex. Bluetooth turned off or link loss).</li></ol>
<b>Post-conditions</b>	<ol style="list-style-type: none"><li>2. When the bluetooth connection with the Phone is lost, 'Passenger BT Phone Client' shall send the request as 'PhoneCall_Zone2_Rq= Call Inactive'.</li><li>3. When the Phone connection is lost the phone audio source for that seat shall be ended.</li></ol>
<b>List of Exception Use Cases</b>	
<b>Notes</b>	<ol style="list-style-type: none"><li>4. The above use case is also applicable for the passenger phones connected and mapped to Zone3/Zone4.</li></ol>



<b>Interfaces</b>	BT Phone Server, Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN
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#### 4.1.2.12 UC-REQ-421371/A-BT Connection with Passenger phone is established while the passenger phone is in active phone call already

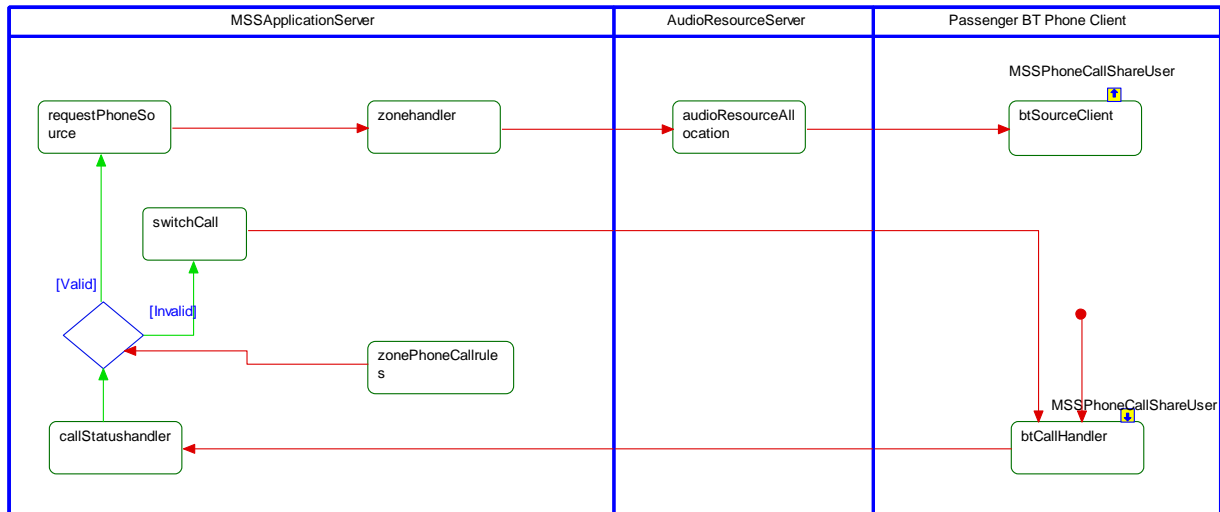
<b>Actors</b>	Vehicle User
<b>Pre-conditions</b>	<ol style="list-style-type: none"><li>1. Infotainment System is ON.</li><li>2. Vehicle audio mode transition between 'Cabin' and 'Zone' mode is allowed.</li><li>3. Vehicle audio mode is in 4 media zone mode.</li><li>4. 1 Phone is paired and mapped to seat1 (i.e. Driver phone).</li><li>5. Minimum of two phone is connected and mapped to passenger seat Zone 3 and Zone 4 respectively.</li><li>6. No Phone Call is active in the Rear Media Zone.</li><li>7. Zone 3 &amp; 4 is listening to the audio source played by the infotainment system ex. USB Media.</li><li>8. When the BT Connection with Zone 3 is lost, and at the same time Zone 3 phone goes in an active phone call session.</li></ol>
<b>Scenario Description</b>	<ol style="list-style-type: none"><li>1. While being in active call, the Zone 3 phone is brought in to visible BT range and the Zone 3 phone connects to the vehicle again.</li></ol>
<b>Post-conditions</b>	<ol style="list-style-type: none"><li>1. The active phone call session for the Zone3 passenger (i.e. when PhoneCall_Zone3_Rq= Call Ringing/Active") shall be played through passenger zone speakers.</li><li>2. The current active media source for Zone 3 &amp; 4 shall be allocated to phone audio source.</li><li>3. The phone call audio shall be continued through zone3 speakers and Zone 4 shall be in USB media.</li><li>4. When the Zone3 passenger's active call is ended, the vehicle audio mode shall remain in zone mode.</li><li>5. The audio source for Zone 3 passenger shall resume playback from USB media.</li></ol>
<b>List of Exception Use Cases</b>	
<b>Notes</b>	
<b>Interfaces</b>	Passenger BT Phone Client, MSSApplicationServer, Audio IO Controller, HMI, CAN



#### 4.1.3 White Box View

##### 4.1.3.1 Activity Diagrams

###### 4.1.3.1.1 MSS-ACT-REQ-407293/A-Zone Passenger Phone Call



##### 4.1.3.2 Sequence Diagrams

###### 4.1.3.2.1 MSS-SD-REQ-419848/A-Passenger receives a phone call when in Cabin mode

**Pre-condition**

1. Vehicle audio mode is in Cabin Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. No Phone call is active in the vehicle.
4. Vehicle Passengers are listening to the audio source selected by the Driver from the infotainment system (ex. AM/FM Tuner, USB Media, Driver BT Media, etc., ).

**Scenario**

1. Zone 2 Passenger receives a Phone Call.

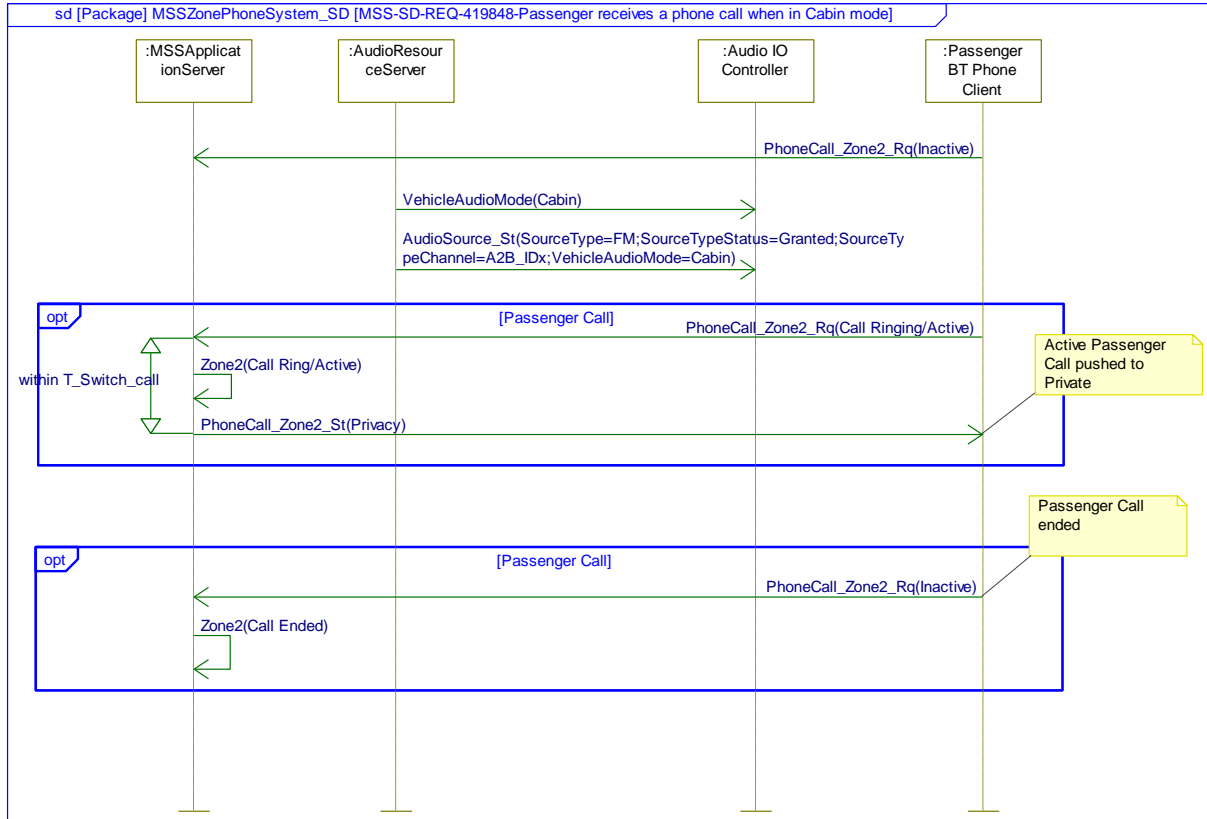
**Post-condition**

1. Vehicle audio mode shall remain in cabin mode and the current audio sounded in cabin shall not be interrupted.
2. The phone call of zone 2 passenger shall go in privacy. Zone 2 passenger phone call status shall not interrupt current audio source in cabin.

Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.



## Sequence Diagram



## 4.1.3.2.2 MSS-SD-REQ-428177/A-Passenger receives a phone call when in Zone mode

**Pre-condition**

1. Vehicle audio mode is in Zone Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. No Phone call is active in the vehicle.
4. Zone 3 & 5 vehicle passenger is listening to the audio source selected by the Driver played through their zone speakers.
  1. Zone 1 & 2 listening to FM Tuner
  2. Zone 3 & 5 listening to USB media.
  3. Zone 4 & 6 listening to Zone 4 BT media.

**Scenario**

1. Zone 3 Passenger receives a Phone Call.

**Post-condition**

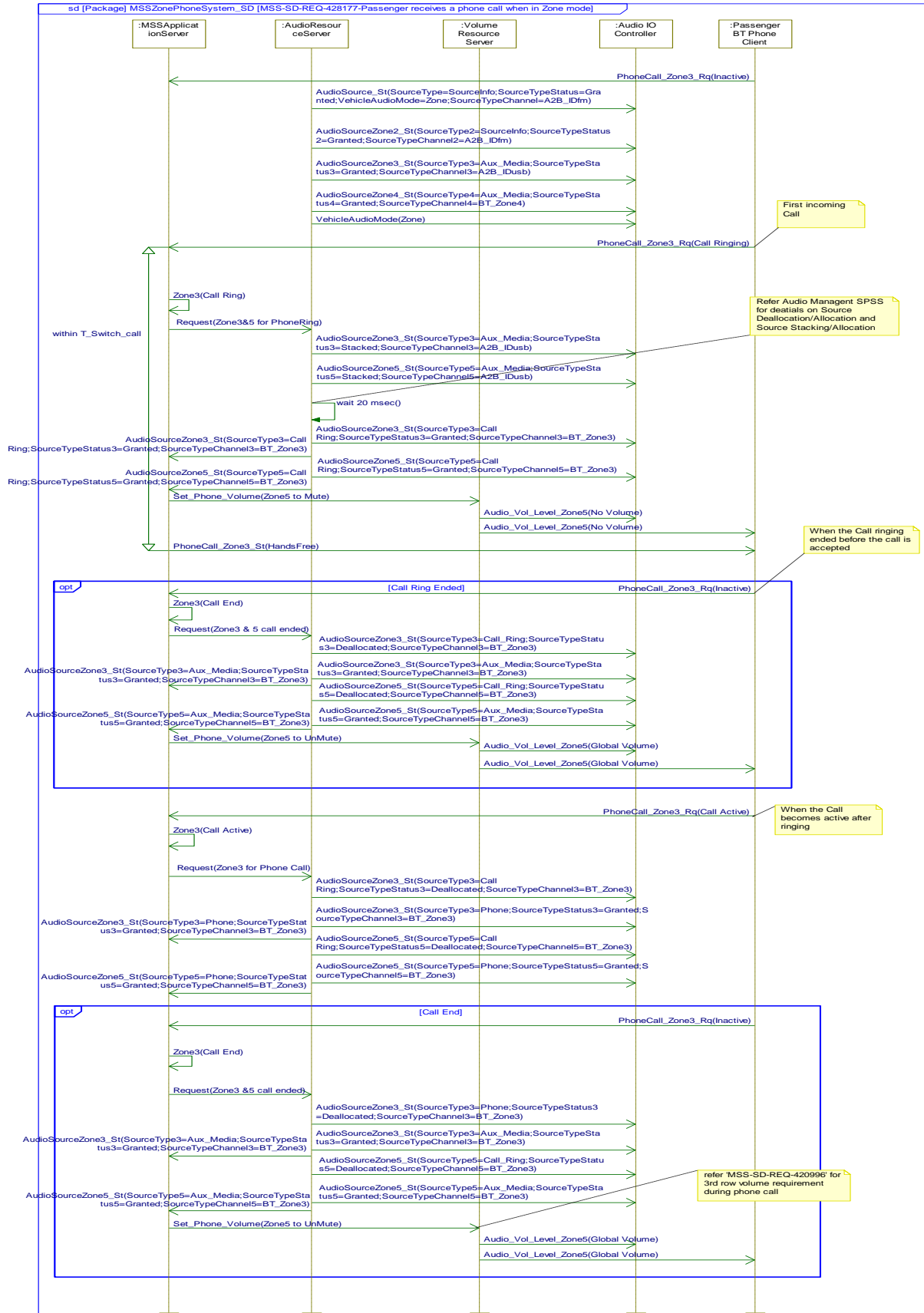
1. Vehicle audio mode shall remain in zone mode and the current audio sounded in zone 3 shall be stacked.
2. The new incoming phone call ringing/active shall be played through Zone 3 speakers.
3. The volume level for the zone 3 shall be set to volume level defined in the Volume SPSS. However, the volume level for the seat 5 shall be muted for the duration of the call.
4. Only when the phone call is ended the zone 3 shall resume play back in last active media source and the volume level for both seat 3 and 5 shall resume in global volume level.

Note1: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.

Note2: The above use case is also applicable to zone 4, when the zone 4 receives a phone call then the seat 6 will be muted for the duration of the call.



## Sequence Diagram





**4.1.3.2.3 MSS-SD-REQ-423260/A-Driver receives a phone call in Zone Mode****Pre-condition**

1. Vehicle audio mode is in Zone Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. No Phone call is active in the vehicle.
4. Driver is listening to the audio source selected by the Driver from the infotainment system (ex. USB Media).
5. Front row Passenger is listening to Zx\_BTMedia streamed from the Front passenger phone (i.e. Zone 2).
6. Rear zone Passenger(s) Zone 3 and Zone 4 is listening to Zx\_BTMedia streamed from the Rear Zone passenger phone (ex. Zone 3).

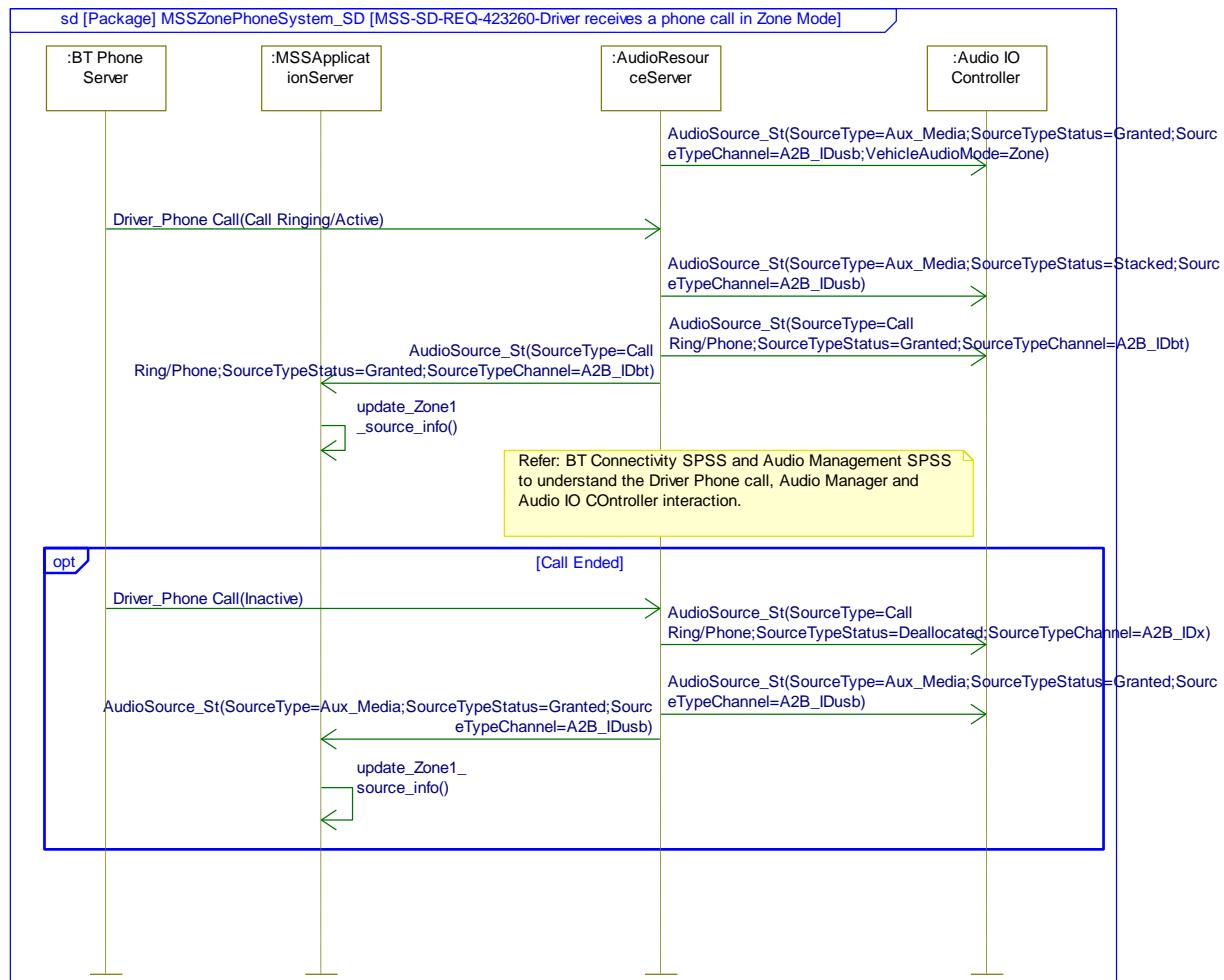
**Scenario**

1. Driver receives a Phone Call.

**Post-condition**

1. Vehicle audio mode shall remain in Zone mode.
2. When the Driver receives the phone call, the current audio source played in the driver zone shall pause and driver phone audio shall be played through Driver Zone speakers.
3. The driver phone call shall be in hands free mode.
4. Once the driver phone call is ended the vehicle audio mode shall remain in zone mode and driver audio source shall resume playback.

Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.

**Sequence Diagram**

**4.1.3.2.4 MSS-SD-REQ-419847/A-Passenger streaming Music to entire Cabin receives Phone Call****Pre-condition**

1. Vehicle audio mode is in Cabin Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. No Phone call is active in the vehicle.
4. Vehicle Passengers are listening to the Zx\_BTMedia streamed by the Passenger from Zone 2.

**Scenario**

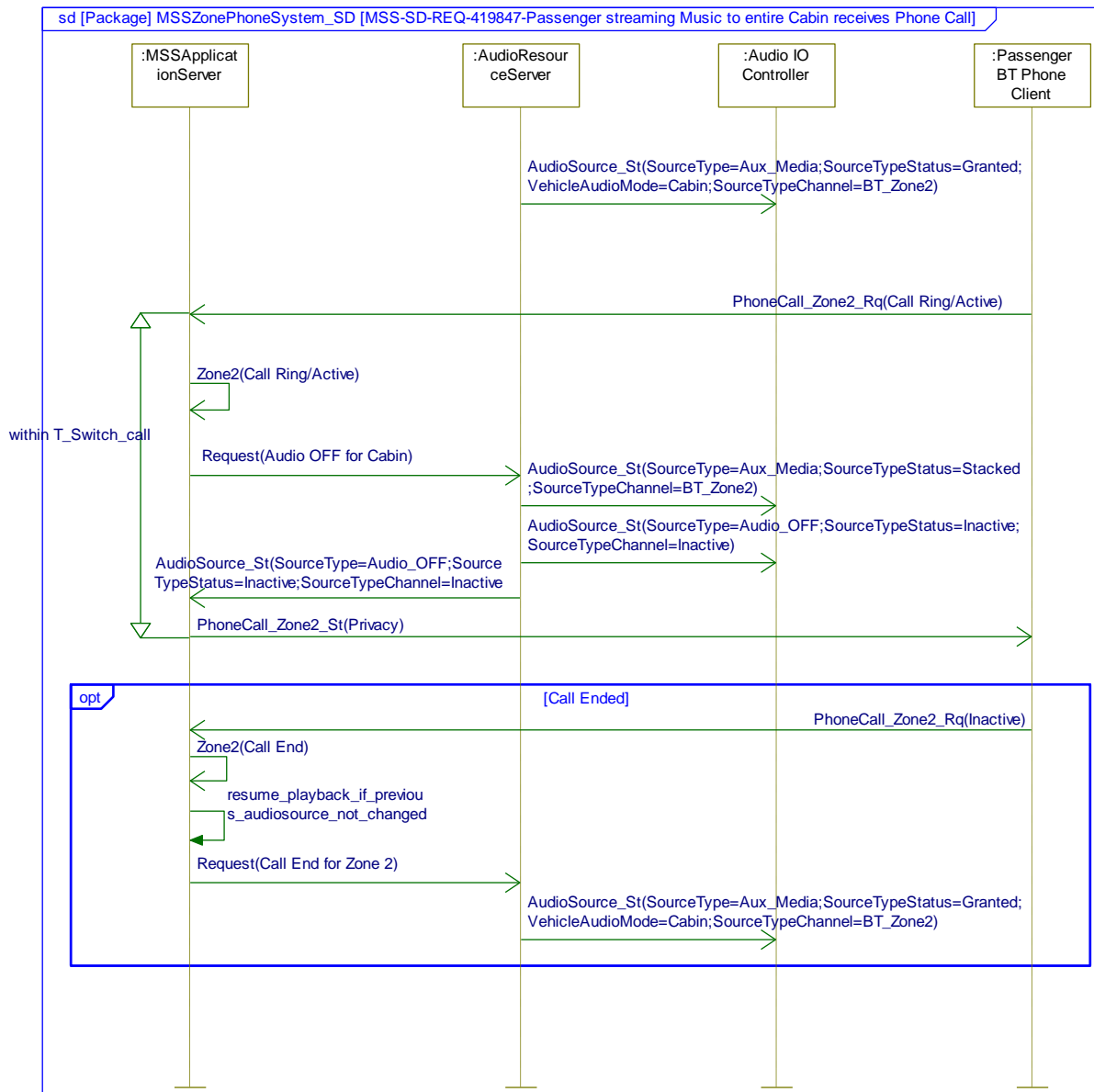
1. Zone 2 Passenger receives a Phone Call.

**Post-condition**

1. Vehicle audio mode shall remain in Cabin mode.
2. Last active audio source for entire cabin shall be paused or deallocated.
3. Incoming phone call for Zone 2 passenger phone shall go in privacy mode.
4. The passenger shall be able to speak to the phone call privacyly (not Hands Free).
5. The audio source for the cabin shall resume playback in last active audio source (i.e. BT Music from Zone2 phone) only when the passenger phone call is ended and when the audio source for the cabin is not changed during the phone call.

Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.

**Sequence Diagram**



#### 4.1.3.2.5 MSS-SD-REQ-419849/A-Passenger streaming Music to their Media zone receives Phone Call in Zone mode

##### Pre-condition

1. Vehicle Audio mode is in Zone Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. No Phone call is active in the vehicle.
4. Vehicle Passengers in the Rear Media Zone is listening to the BT music streamed from the phone in zone 3.

##### Scenario

1. Zone 3 Passenger receives a Phone Call.

##### Post-condition

1. Vehicle audio mode shall remain in Zone mode.
2. Audio source for the Front Media Zone shall be uninterrupted.
3. Zone 3 Passenger phone call shall switch to Hands free audio and the call audio shall be played through zone 3 speakers.
4. The audio source for the Rear media zone shall resume playback in last active audio source (i.e. Zx\_BTMedia) only when the passenger phone call is ended.



Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.

[illegible]

**4.1.3.2.6 MSS-SD-REQ-419850/A-Second Incoming Call for a given Media zone is sent privacy mode****Pre-condition**

1. Vehicle Audio mode is in Zone Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. Zone 3 Phone call is active, and the Call audio is routed through Zone 3 speakers.
4. Vehicle Passenger on that Media zone (i.e. Zone 4) is listening to different audio source.

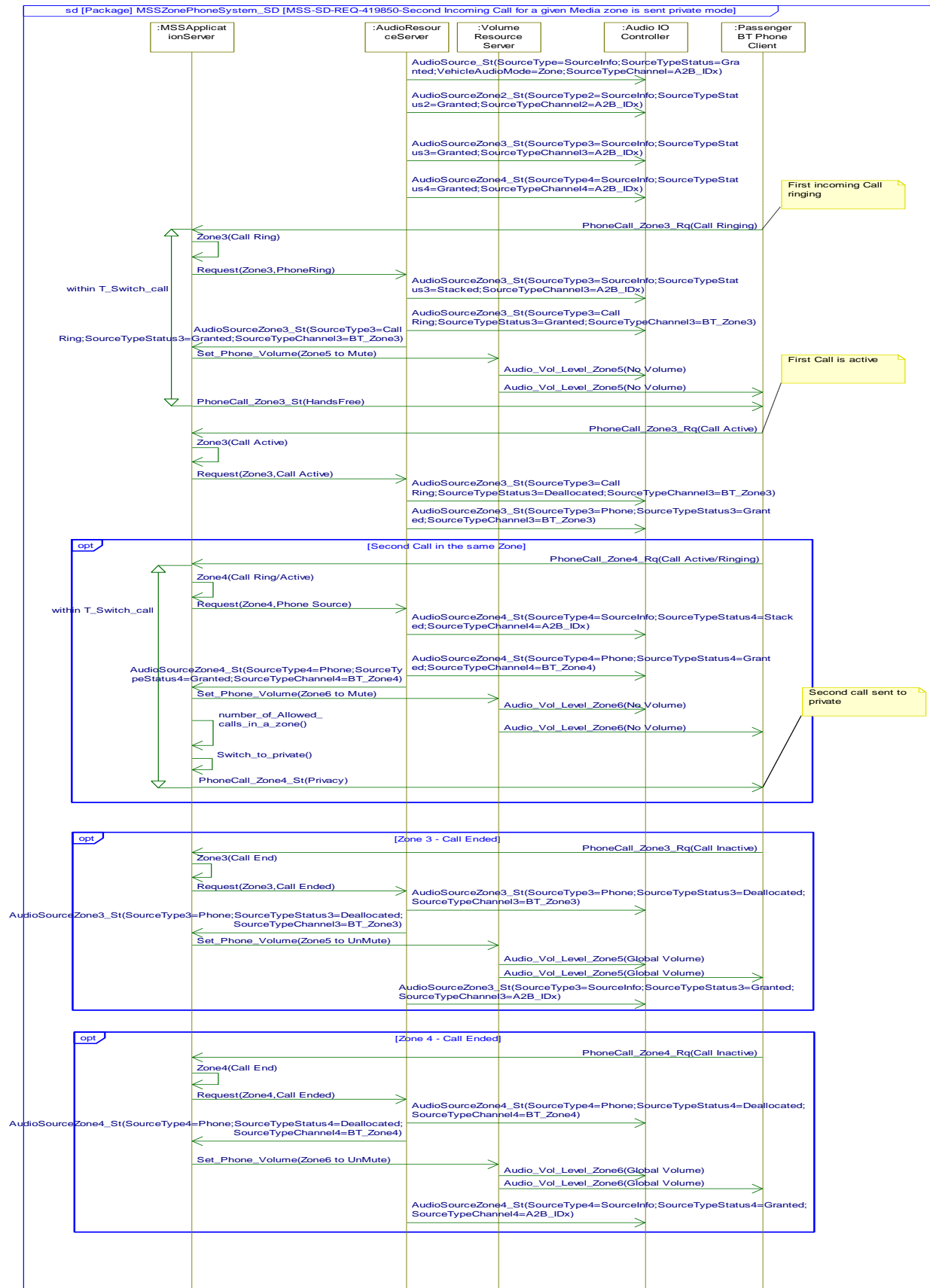
**Scenario**

1. Zone 4 Passenger receives a Phone Call.

**Post-condition**

1. Vehicle audio mode shall remain in Zone mode.
2. Audio source for the Zone 3 passengers shall remain in hands free call audio.
3. The current active audio source for the Zone 4 Passenger phone call shall be allocated to phone audio and the Incoming phone call shall be pushed to privacy mode as there is already an active phone call session in that media zone.
4. When the Zone 3 phone is ended the audio source for that zone shall resume in last active audio source.
5. When the Zone 4 phone is ended the audio source for that zone shall resume in last active audio source.

Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.



**4.1.3.2.7 MSS-SD-REQ-425846/A-Driver phone call switches the existing passenger phone call to privacy****Pre-condition**

1. Vehicle audio mode is in Zone Mode.
2. Vehicle audio mode transition between cabin and Zone mode is allowed.
3. Zone 2 Passenger phone call is active in the vehicle.
4. Driver is listening to USB Media.

**Scenario**

1. Driver receives a Phone Call.

**Post-condition**

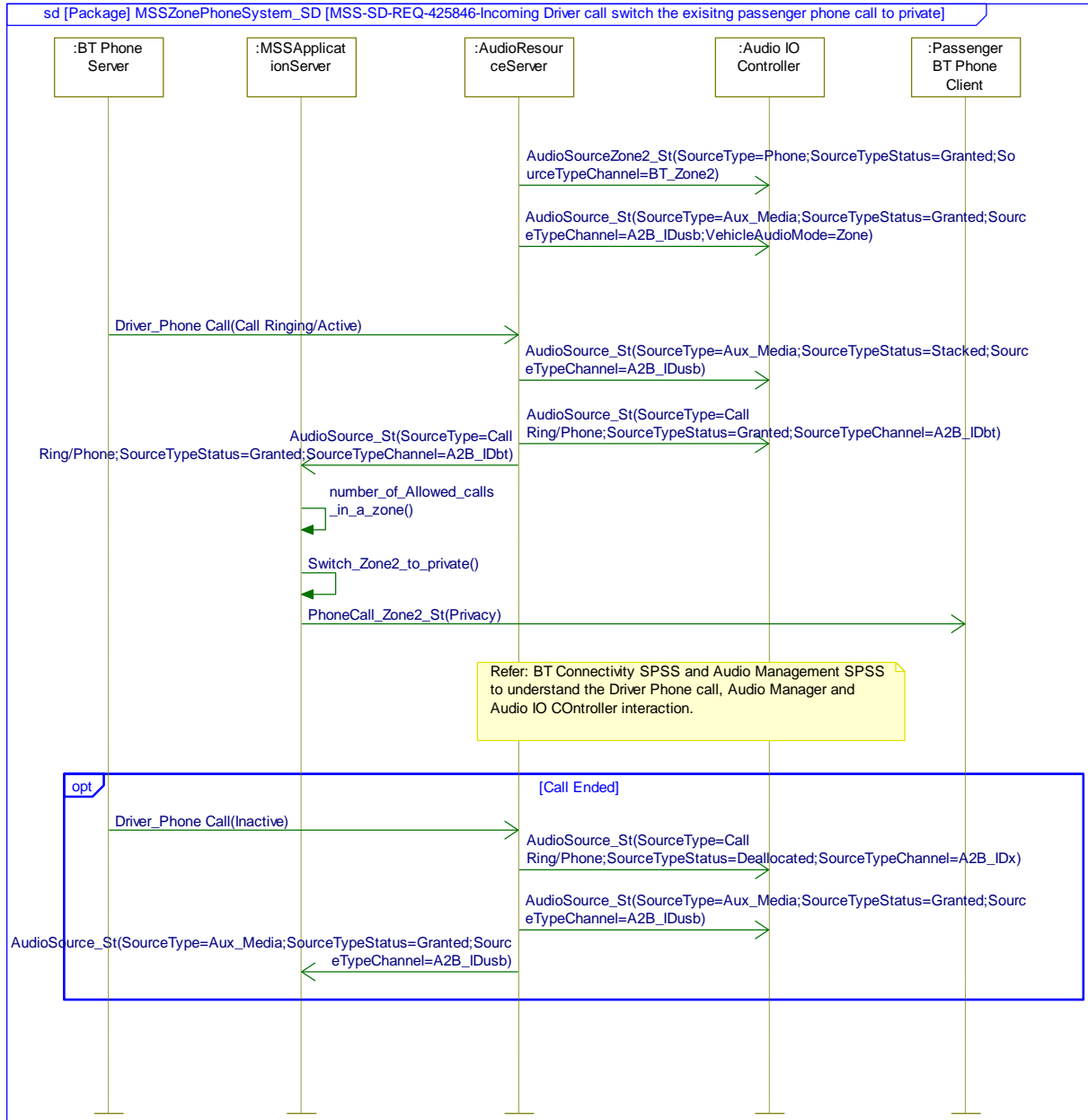
1. When the Driver receives the phone call, the current audio source played in the driver zone shall pause and driver phone audio shall be played through Driver Zone speakers.
2. The existing Zone 2 passenger phone call shall be switched to privacy and the audio source for the Zone 2 shall be still allocated with phone source.
3. Once the driver phone call is ended the vehicle audio mode shall remain in zone mode and driver audio source for Zone 1 shall resume playback.
4. The Zone 2 passenger phone call shall be continued over privacy.

Note: When there is any conflict between this spec for Audio Resource Server and Audio IO Controller then the Audio Management spec would take priority.





## Sequence Diagram



## 4.2 MSS-FUN-REQ-407301/A-Call status notification and phone media stream handling

## 4.2.1 Requirements

## 4.2.1.1 MSS-SR-REQ-407302/A-Phone Call status indicator

Regardless of the current vehicle audio mode (i.e. Cabin or Zone mode), the 'Passenger BT Phone Client' shall support to report the status of the Phone call for the phones that are connected/mapped to the seat on their respective 'PhoneCall\_ZoneX\_Rq' signal.

The 'Passenger BT Phone Client' shall

1. Load the 'PhoneCall\_ZoneX\_Rq' with appropriate call status as mentioned below and shall send the status.



1. 'Call Inactive' – When there is no active call (or) when the active call is ended.
  2. 'Call Ringing' – When the connected phone receives incoming call ringing (or) Outgoing Call Alerting notification.
  3. 'Call Active' – When the phone call is active on the Phone (regardless of Hands Free or privacy call).
2. The status on the 'PhoneCall\_ZoneX\_Rq' signal shall remain unchanged unless the call status reported by the phone is changed.

Note: X on the 'PhoneCall\_ZoneX\_Rq' signal represent the possible phone call status from the 'Passenger BT Phone Client' for the phones connected and mapped to the seat (i.e. PhoneCall\_Zone2\_Rq/PhoneCall\_Zone3\_Rq/PhoneCall\_Zone4\_Rq). Refer URC SPSS for zone phones pairing and mapping.

#### 4.2.1.2 MSS-SR-REQ-408199/A-Phone call mode transition

Regardless of the current vehicle audio mode (i.e. Cabin or Zone mode), 'Passenger BT Phone Client' shall support to switch the active phone call to privacy (or) Handsfree, based on the status message received from 'MSSApplicationServer' on 'PhoneCall\_ZoneX\_St' signal.

##### Switch to privacy

1. When the 'Passenger BT Phone Client' receives 'PhoneCall\_ZoneX\_St=Privacy' then the 'Passenger BT Phone Client' shall transfer the active phone call to Privacy mode within 'T\_Phone\_audio'.
2. The 'Passenger BT Phone Client' shall route the call audio through the phone privacy.
3. Even when 'Passenger BT Phone Client' is allocated with Phone call audio source for the corresponding seat, the phone call audio **shall not** route through zone speakers.

##### Switch to Hands Free

1. When the 'Passenger BT Phone Client' receives 'PhoneCall\_ZoneX\_St=Hands Free' then the 'Passenger BT Phone Client' shall transfer the active phone call to Hands Free immediately.
2. The 'Passenger BT Phone Client' shall route the phone call audio within 'T\_Phone\_audio' through zone speakers when 'AudioResourceServer' allocates the corresponding zone with Phone call audio source.

Note: When the status message 'PhoneCall\_ZoneX\_St' is not received for more than 500 ms then the 'Passenger BT Phone Client' shall switch the phone call audio to 'Privacy' mode as default.

Note1: X on the 'PhoneCall\_ZoneX\_St' signal represent the possible phone call status from the 'MSSApplicationServer' for the phones connected and mapped to the seat (i.e. PhoneCall\_Zone2\_St/ PhoneCall\_Zone3\_St / PhoneCall\_Zone4\_St). Refer URC SPSS for zone phones pairing and mapping.

#### 4.2.1.3 MSS-SR-REQ-423281/A-Phone call status indicator - connection loss

Regardless of the current vehicle audio Mode, when the 'Passenger Phone Call Client' losses connection with the phone then the 'Passenger Phone Call Client' shall support to report the call request for that phone as 'PhoneCall\_ZoneX\_Rq=Call Inactive'

Note: X on the 'PhoneCall\_ZoneX\_Rq' signal represent the possible phone call request from the 'Passenger Phone Call Client' for the phones connected and mapped to the seat (i.e. PhoneCall\_Zone2\_Rq/PhoneCall\_Zone3\_Rq/PhoneCall\_Zone4\_Rq). Refer URC SPSS for zone phones pairing and mapping.

#### 4.2.1.4 MSS-SR-REQ-421044/A-Phone media playback activation/deactivation

Regardless of vehicle audio mode, when the 'Passenger Phone BT Client' receives the resource update from 'AudioResourceServer' on the 'AudioSourceZoneX.St' or on the 'AudioSource.St' message with the signals loaded as (SourceType=Aux\_Media; SourceTypeStatus= Granted/Stacked/Deallocated; SourceTypeChannel=BT\_ZoneX). Then based on the resource update received for that zone, the 'Passenger Phone BT Client' shall support to change phone BT media play back for the phone that is connected and mapped to that Zone.

1. When 'SourceTypeStatus=Granted', the 'Passenger Phone BT Client' shall support to start/resume the phone media playback.



2. When 'SourceTypeStatus= Stacked', the 'Passenger Phone BT Client' shall support to pause the ongoing phone media playback within 'T\_Phone\_media'.
3. When 'SourceTypeStatus= Deallocated', the 'Passenger Phone BT Client' shall support to stop the ongoing phone media playback within 'T\_Phone\_media'.

Note: The X on the above 'AudioSourceZoneX.St' message represents the possible resource update message that can be sent by 'Audio Resource Server' to the 'Passenger Phone BT Client' for the passenger seat 2,3,4.

#### 4.2.1.5 MSS-TMR-REQ-433066/A-T\_Phone\_audio

Name	Description	Units	Range	Resolution	Default
T_Phone_audio	Maximum time allowed from when the 'Passenger BT Phone Client' receives 'PhoneCall_ZoneX_St=Hands Free/Privacy' signal until when the 'Passenger BT Phone Client' starts transferring the phone call audio either through zone speakers or phone speakers respectively.  Note: Use default	msec	0-1000	10	150

#### 4.2.1.6 MSS-TMR-REQ-433067/A-T\_Phone\_media

Name	Description	Units	Range	Resolution	Default
T_Phone_media	The maximum time allowed for the 'Passenger BT Phone Client' to alter or change the phone media play status.  Note: Use default	msec	0-1000	10	100



## 5 Appendix: Reference Documents

Reference #	Document Title
1	MSS Zone Manager SPSS
2	MSS Media Share SPSS
3	Audio Management SPSS
4	Volume SPSS
5	
6	
7	
8	
9	
10	
11	
12	
13	
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