Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Bluetooth Connectivity

APIM Phoenix Domain Controller Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.0

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Revision History

Date	Version	Notes	
October 1, 2021	1.0	Initial Release	

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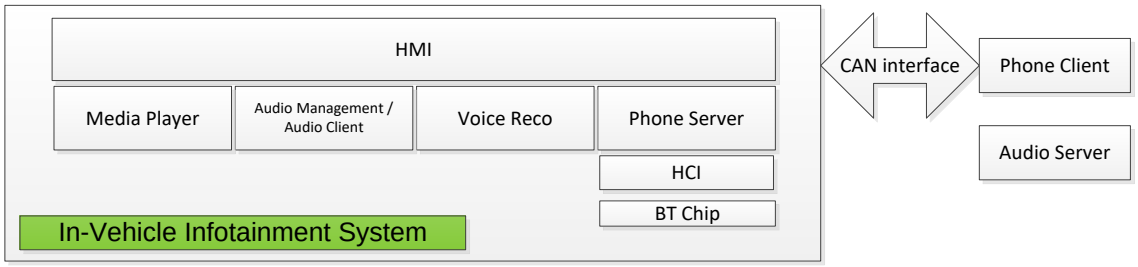
1 Architectural Design

1.1 BTC-REQ-245833/A-Foreword - Architecture

This document applies to several platforms in Ford's offering of APIMs.
A diagram similar to the one below applies to all of them.



This document will clarify the behavior of the Phone Server and its interactions with other components of the APIM, like: Media Player, Audio Management component, Voice component.

The Phone Server will also, directly or indirectly, interface via CAN with a Phone Client (for example, a cluster).

The Phone Server, in general, will also interface directly or indirectly via an HCI interface to the Bluetooth chip.

1.2 BTP-CLD-REQ-439378/A-BT Phone Server

The Phone server maintains and controls status information for everything related to paired and connected phones, and phone calls. It provides this status to the BT Phone Client via a CAN interface described here below.

Through this interface the Phone Client not only gets status information, but can also control the Phone Server.

The Phone Server shall also provide all list browse information to the BT Phone Client upon request from the Client, and act upon selections that the user makes to these List browse selections.

1.2.1 Interface Requirements

1.2.1.1 BTP-IIR-REQ-439379/A-BT Phone Server Status Signals

These are unsolicited status signals sent from the Phone Server to the Phone Client.

Method	Notes	Parameters
BTCallerIdentification.St()	Message Type: Status The CallerIdentification attribute carries the CLI number and the caller name (stored in the phone book). If the information for the validity is not available, validity should be set to "0x4: CLID Incoming Not available". If the information for Caller number/Caller name is not available, the corresponding attributes should be populated with end of string character (0x0).	int *Phone Type:* 0x0 No category 0x1 Home 0x2 Office 0x3 Mobile 0x4 Other 0x5 Unknown 0x6 Fax int *Validity :* 0x0: CLID Incoming Available 0x1: CLID Second incoming call

	The attribute also holds information about the index of the currently used phone. It is sent over the ISO 15765-2 protocol.	available 0x2: CLID Outgoing Call 0x3: CLID Incoming SMS available 0x4: CLID Incoming Not available 0x5: CLID Incoming SMS Not available int *Index of Phone :* 3 bits, index 1-6 (1 = Cradle Phone if fitted); 0x0 = Reserved int *Caller number :* 25 bytes chars int *Caller name :* 18 bytes chars
BTCallerIdentification2.St()	Message Type: Status The CallerIdentification attribute carries the CLI number and the caller name (stored in the phone book). If the information for the validity is not available, validity should be set to "0x4: CLID Incoming Not available". If the information for Caller number/Caller name is not available, the corresponding attributes should be populated with end of string character (0x0). The attribute also holds information about the index of the currently used phone. It is sent over the ISO 15765-2 protocol.	int *Phone Type:* 0x0 No category 0x1 Home 0x2 Office 0x3 Mobile 0x4 Other 0x5 Unknown 0x6 Fax int *Validity :* 0x0: CLID Incoming Available 0x1: CLID Second incoming call available 0x2: CLID Outgoing Call 0x3: CLID Incoming SMS available 0x4: CLID Incoming Not available 0x5: CLID Incoming SMS Not available int *Index of Phone :* 0x0 – Reserved 0x1 – BT device index 1 ... 0xF – BT device index 15 int *Caller number :* 25 bytes chars int *Caller name :* 80 bytes chars
BTNetworkStatus.St()	Message Type: Status This status notifies about the current network status of the default phone.	int *Status :* 0x0: Invalid 0x1: No Network 0x2: In Network

	When no BT device is connected value *0x04: No link to Phone* should be used.	0x3: Roaming 0x4: No Link to Phone 0x5: Not supported by phone
PhMicrophoneMute.St()	Message Type : Status Shows actual state of microphone if set to silent ot not while active phone call.	int *Mode :* 0x0 Invalid 0x1 MicrophoneIsMuted 0x2 MicrophoneIsUnmuted 0x3 Reserved
BluetoothStatus.St()	Message Type: Status This status shows the state of the bluetooth unit.	int *Status :* 0x0: Invalid 0x1: On 0x2: Off
BTBatteryLevel.St()	Message Type: Status This status shows the Battery Level of the default BT Phone. When no BT device is connected value *0x07: No link to Phone* should be used.	int *Level :* 0x0: Invalid 0x1: Battery Level 0 0x2: Battery Level 1 0x3: Battery Level 2 0x4: Battery Level 3 0x5: Battery Level 4 0x6: Battery Level 5 0x7: No Link to BT Phone 0x8: Not supported by BT phone
BTPhoneSts.St()	Message Type: Status The Atttribute BTPhoneSts shall reflect the current state of the Phone. When no BT device is connected value *0x07: No link to Phone* should be used.	int *Status :* 0x00: Invalid 0x01: Idle, Existing link to BT Phone 0x02: Dialing 0x03: Connected 0x04: Cradle Phone not ready 0x05: Number Unobtainable 0x06: Incoming Call 0x07: No link to Phone 0x08: Initialising BT connection 0x09: Phone busy 0x0A: VR Session active in phone 0x0B: Device Not supported (only Cradle phone) 0x0C: BT phone in Private 0x0D: Conference Call 0x0E: Connected, Second Incoming Call 0x0F: Connected, other call on hold 0x10: Connected, Call on hold
BTSignalStrength.St()	Message Type: Status This status shows status of the Signal Strength of the default BT phone. When no BT device is connected value *0x07: No link to Phone* should be used.	int *SignalStrength :* 0x0: Invalid 0x1: Signal Strength 0 0x2: Signal Strength 1 0x3: Signal Strength 2 0x4: Signal Strength 3 0x5: Signal Strength 4

		0x6: Signal Strength 5 0x7: No Link to BT Phone 0x8: Not supported by BT phone
CallDuration.St()	Message Type: Status This status informs the HMI about the call duration time of the BT phone. If there Is a multiple party call, the timer shall be updated internally but invalid shall be sent on the CAN bus.	int *Duration :* Time in seconds
NewSMS.St()	Message Type: Status This status informs the HMI if there are any new SMS.	int *SMS :* 0x0: Invalid 0x1: New SMS available 0x2: No New SMS available 0x3: Unread SMS messages available

1.2.1.2 BTP-IIR-REQ-439380/A-BT Phone Client Request Signals

This is the list and description of requests that the Phone Client can send to the Phone Server. They all follow the naming convention SignalName.Rq() and are answered by the corresponding SignalName.Rsp() described in the paragraph below.

Method	Notes	Parameters
GetBTPhoneName.Rq()	Message Type: Request with Response This method is used to request the Bluetooth phone name from the BTPhone Server.	int RequestStatus: 0x0: Inactive 0x1: GetPhoneName
BTEndTelService.Rq()	Message Type: Request with Response This method is used to terminate the currently active BT Phone Call. When the call is disconnected, a response signal shall be sent with "Final Result". This method is from the BT Phone Client to the BT Phone Server.	int *SingleParam* : 0x0: Inactive 0x1: End Ongoing Telephony Call
BTInCallOptions.Rq()	Message Type: Request with Response Configuration: All This method handles all in call options such as switch calls, join calls, privacy mode, handsfree mode, hold call	int *SingleParam* : 0x0: Inactive 0x1: Switch Calls 0x2: Join Calls 0x3: Go to Privacy Mode 0x4: Go to Handsfree Mode 0x5: Hold Call 0x6: End Hold Call
BTIncomingCall.Rq()	Message Type: Request with Response This method handles the request for accepting or declining an incoming BT Telephony call. The object responds with information whether the incoming call has been accepted or declined. This method is from the BT Phone Client to the BT Phone Server.	int *SingleParam :* 0x0: Inactive 0x1: Accept Incoming Call 0x2: Decline Incoming Call
InitiateBTCall.Rq()	Message Type : Request This method is used to create a new BT Phone call. Before the call is created, audio resources must be requested. It is sent over the ISO 15765-2 protocol.	int *TypeOfCall :* 0x0: Invalid 0x1: Telephony Call 0x2: Last Incoming Call 0x3: Last Outgoing Call 0x4: Last Missed Call 0x5: Redial int *TelNbr :* Telephone Number: 25 bytes chars else = EOS
PhMicrophoneMute.Rq()	Message Type : Request Request from the Phone Client to Phone Server to set microphone to silent while active phone call.	int *Mode :* 0x1 MicrophoneMute 0x2 MicrophoneUnmute 0x3 Reserved
TextMessage.Rq()	Message Type : Request Request from the Phone client to the Phone Server to take action on a new incoming text message.	int *Opcode :* 0x0 Invalid 0x1 Listen 0x2 Ignore 0x3 Cancel

1.2.1.3 BTC-IIR-REQ-439381/A-BT Phone Server Response Signals

Method	Notes	Parameters
BTPhoneName.Rsp()	Message Type: Request with Response This method is used to transmit the BTPhoneName to the BTPhone Client	Int Phone Name: 80 bytes chars
BTEndTelService.Rsp()	Message Type: Request with Response This method is used to terminate the currently active BT Phone Call. When the call is disconnected, a response signal shall be sent with "Final Result".	int *Result :* 0x0: Inactive 0x1: Intermediate Result 0x2: Final Result 0x3: Error
BTInCallOptions.St()	Message Type: Status This method is used to indicate all in call options such as switch calls, join calls, privacy mode, handsfree mode, hold call.	int *Result :* 0x0: Inactive 0x1: Switched 0x2: Joined 0x3: In Privacy Mode 0x4: In Hands Free Mode 0x5: In Hold Mode 0x6: Hold Mode Off
BTIncomingCall.Rsp()	Message Type: Request with Response This method handles the request for accepting or declining an incoming BT Telephony call. The object responds with information whether the incoming call has been accepted or declined.	int *Result :* 0x00: Inactive 0x01: Accepted 0x02: Declined 0x03: Failed
InitiateBTCall.Rsp()	Message Type: Request with Response This method is used to create a new BT Phone call. Before the call is created audio resources must be requested. It is sent over the ISO 15765-2 protocol.	int CES Code Result 0x0y: Final Result - Sucess 0x1y: Final Result-Fail 0x2y: Final Result-Information 0x3y: Intermediate Result-Wait **Special Codes** No Service – CES 0x24 Final Result – Requested Command not supported Network Error- CES 0x26 Final Result – Connected device not present Number Invalid – CES 0x27 Final Result- Feature not supported Number Busy – CES 0x28 Final Result – List Full

Method	Notes	Parameters
BTPhoneName.Rsp()	Message Type: Request with Response This method is used to transmit the BTPhoneName to the BTPhone Client	Int Phone Name: 80 bytes chars
BTEndTelService.Rsp()	Message Type: Request with Response This method is used to terminate the currently active BT Phone Call. When the call is disconnected, a response signal shall be sent with "Final Result".	int *Result :* 0x0: Inactive 0x1: Intermediate Result 0x2: Final Result 0x3: Error
BTInCallOptions.St()	Message Type: Status This method is used to indicate all in call options such as switch calls, join calls, privacy mode, handsfree mode, hold call.	int *Result :* 0x0: Inactive 0x1: Switched 0x2: Joined 0x3: In Privacy Mode 0x4: In Hands Free Mode 0x5: In Hold Mode 0x6: Hold Mode Off
BTIncomingCall.Rsp()	Message Type: Request with Response This method handles the request for accepting or declining an incoming BT Telephony call. The object responds with information whether the incoming call has been accepted or declined.	int *Result :* 0x00: Inactive 0x01: Accepted 0x02: Declined 0x03: Failed
TextMessage.Rsp()	Message Type : Response From Phone Server to Phone Client, response message to TextMessage.Rq. Informs Client that action was completed successfully.	int *ResponseCode :* 0x0 Invalid 0x1 Listening 0x2 Message ignored 0x3 Cancelled

1.2.2 Requirements

1.2.2.1 BTC-SR-REQ-247273/A-General Phone Server Requirement

The Phone Server maintains and controls all BT related information, and is responsible to communicate those information to the HMI layer and Phone Client.

The Bluetooth connection and phone call statuses can change for several reasons:

- User action on Phone Client: for example, user can decide to connect or disconnect a phone or initiate a call from phone client interface.
- User action on Phone Server: for example, user can decide to connect or disconnect a phone or initiate a call from IVIS HMI.
- User action on connected phone: for example, user can connect or disconnect to IVIS or initiate a call from phone HMI.
- Cellular network notifications: for example a phone call can terminate because the remote party hanged up.

No matter which item above causes a change, the interface between Phone Server and Client, and between Phone Server and connected phone (via Bluetooth communication) shall make sure that the Bluetooth Connection status and the Phone Call status is the same on

- Paired Bluetooth Phone,
- Phone Server, IVIS HMI
- Phone Client

1.2.2.2 BTC-SR-REQ-247418/A-BTPhoneName.Rsp - Device User Friendly Name

If there is a device connected for Phone functionality and the user friendly name of this device is available, the BT Phone server shall respond to the corresponding request and send this name in the BTPhoneName.Rsp.

See also BTC-FUR-REQ-194148-Device Friendly Name

1.2.2.3 BTC-SR-REQ-239848/A-BTCallerIdentification.St

Whenever this requirement is applicable the Phone Server shall send out the message BTCallerIdentification.St() with the available information.

1.2.2.4 BTC-SR-REQ-239840/A-BTCallerIdentification2.St

Whenever this requirement is applicable the Phone Server shall send out the message BTCallerIdentification2.St() with the available information.

1.2.2.5 BTC-SR-REQ-242068/A-Sending BTCallerIdentification signals

If both requirements BTC-SR-REQ-239848 and BTC-SR_REQ-239840 are applicable, the Phone Server shall transmit the new BTCallerIdentification2_St signal first followed by the old BTCallerIdentification.St() signal.

1.2.2.6 BTC-SR-REQ-242069/B-Receiving BTCallerIdentification signals

The Phone Client shall do the following monitoring upon each system start up to identify the correct message:

- The Phone Client shall use the old signal BTCallerIdentification_St within the current ignition cycle until the new signal was received once.
- The Phone Client shall use the new signal BTCallerIdentification2_St within the current ignition cycle, as soon as this signal was received once.

1.2.2.7 BTC-SR-REQ-239828/A-Incoming Call - CLID available

If there is an incoming call and the caller id is available, the Validity parameter shall be set to "0x0 CLID Incoming Available" and the CallID Number and/or CallID Name parameter shall be send with the information about the caller name and the caller number.

1.2.2.8 BTC-SR-REQ-239829/A-Outgoing Call - CLID available

If there is an outgoing call and the caller id is available, the Validity parameter shall be set to "0x2 CLID Outgoing Call" and the CallID Number and/or CallID Name parameter shall be send with the information about the caller name and the caller number.

1.2.2.9 BTP-SR-REQ-030687/B-Second Incoming Call - CLID available (TcSE ROIN-150831-2)

If there is an second incoming call and the caller id is available, the Validity parameter shall be set to "0x1 CLID Second Incoming Call Available" and the CallID Number and/or CallID Name parameter shall be send with the information about the caller name and the caller number.

1.2.2.10 BTP-SR-REQ-030690/C-Ongoing Call (TcSE ROIN-159118-1)

If the phone is connected with an already ongoing call, the CLID should be reported with the Validity parameter set to "0x0 CLID Incoming Available", and the CallID Number and/or CallID Name parameter shall be send with the information about the caller name and the caller number.

1.2.2.11 BTC-SR-REQ-247274/A-Switch calls - CLID available

If the there is an active call and another call on hold, and the calls are switched, the CLID should be reported with the Validity parameter set to "0x0 CLID Incoming Available", and the CallID Number and/or CallID Name parameter shall be send with the information about the caller name and the caller number of the active call.

1.2.2.12 BTP-SR-REQ-030691/B-Incoming text message from Email Address (TcSE ROIN-166939-1)

If there is an incoming Text message that has been sent by an email address, the Validity parameter shall be set to "0x5: CLID Incoming SMS Not available" by the BT Phone Server.

1.2.2.13 BTP-SR-REQ-030692/A-NewSMS.St while Do Not Disturb is active (TcSE ROIN-185288-1)

If Do Not Disturb is set to ON, and a new text message is received on the phone, the BT Phone Server shall set the NewSMS.St status message to Unread SMS messages available ($3).

1.2.2.14 BTP-SR-REQ-030693/A-NewSMS.St = New SMS Available (TcSE ROIN-185289-1)

The BT Phone Server shall set the NewSMS.St status message to New SMS Available ($1) only if an incoming text message is received by the server after the phone has been connected, and while there is not an active phone call. If a text message is received in any other phone states, NewSMS.St shall be set to Unread SMS Messages Available ($3).

1.2.2.15 BTC-SR-REQ-239830/A-Caller ID is not available

For the case that the caller information is not available the CallID Number and/or CallID Name parameter shall be send with an end of string character (0x0).

1.2.2.16 BTP-HMI-REQ-030678/B-Caller Identification - CallerID Name or Number is unknown (TcSE ROIN-280513-1)

If the BT Phone Client receives the BTCallerIdentification.St and/or BTCallerIdentification2.St and the CallID Number or CallID Name parameter in this TP method is only populated with an end of string character (0x0) then the respective field shall indicate information is not available. See HMI documentation for exact text to be shown.

1.2.2.17 BTC-SR-REQ-239831/A-Validity is not available

For the case that the information about the category of a call is not available –meaning if it is e.g. an incoming or outgoing call - the validity shall be set to “0x4: CLID Incoming Not available”.

1.2.2.18 BTP-SR-REQ-030677/B-Caller Identification data when one call ends during Conference Call function (TcSE ROIN-202938-1)

When BTPhoneSts.St changes from ConferenceCall (0xD) to Connected (0x3) [one of the two calls in the conference ends or is dropped], the BT Phone Server shall re-send the message for the BT Caller Information for remaining call.
Validity shall be set to CLID Incoming Available (0x0).

1.2.2.19 BTP-SR-REQ-030676/C-Caller Identification data during Call Waiting function (TcSE ROIN-202936-1)

If there is one call active, and the other call on hold, and one of the two calls is ended or dropped, by the BT Phone Server, the BT Phone Server shall re-send the message for the BT Caller Information to the BT Phone Client to indicate the caller id for the remaining call. The Validity parameter shall be set to CLID Incoming Available (0x0).

1.2.2.20 BTP-SR-REQ-030686/A-InitiateBTCall.Rsp - Other Failures (TcSE ROIN-150830-1)

If the BT phone fails to make connection for any other reason not previously specified, the result code "0x2 Final Result-Failure" shall be returned to the BT Phone Client.

1.2.2.21 BTP-SR-REQ-030682/A-InitiateBTCall.Rsp - Successful Connection to BT Phone (TcSE ROIN-150826-1)

The Result code of "0x1 Final Result - Success" shall be sent to the BT Phone Client if a connection has been established with the requested call.

1.2.2.22 BTP-SR-REQ-030684/A-InitiateBTCall.Rsp - Network Error (TcSE ROIN-150828-1)

If the Bluetooth phone failed to create a connection because there is a network error, the result code "0x6 Final Result-Failure, Network Error" shall be returned to the BT Phone Client.

1.2.2.23 BTP-SR-REQ-030680/A-InitiateBTCall.Rsp - Audio Resources (TcSE ROIN-150824-1)

If audio resources cannot be requested successfully during an InitiateBTCall.Rq, CES 0x1X "Final Result - Failure" shall be returned, and the dial request shall not be forwarded to the BT Phone.

1.2.2.24 BTP-SR-REQ-030683/A-InitiateBTCall.Rsp - No network connection (TcSE ROIN-150827-1)

If the Bluetooth phone failed to create a connection because there is no network, the result code "0x4 Final Result-Failure, No Service" shall be returned to the BT Phone Client.

1.2.2.25 BTP-SR-REQ-030685/A-InitiateBTCall.Rsp - Feature not Supported (TcSE ROIN-150829-1)

If the Bluetooth phone does not support the feature (redial or dial a number), the result code "0x5 Final Result-Failure, Feature not Supported" shall be returned to the BT Phone Client.

2 General Requirements

2.1 BTP-FUR-REQ-097661/B-In Vehicle Infotainment System Name

The In-Vehicle Infotainment System shall be named according to the HMI specification H83 such that each vehicle line has a unique In-Vehicle Infotainment System name assigned to it. The In-Vehicle Infotainment System name shall be broadcasted during discoverable modes and used to identify the system with connected devices during other operable modes.

The HMI might offer an option for the customer to edit the default name. The individual chosen name shall have a maximum length of 20 characters. See HMI specification for more information.

2.2 BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

The In-Vehicle Infotainment System shall allow the user via GUI to turn Bluetooth OFF, and to turn it ON when OFF. By default Bluetooth shall be ON.
If Bluetooth is turned OFF by the user, it shall be turned back ON only by explicit action by the user.

Exceptions:

- Qualified crash event, see also EASSIST-REQ-017674/B-Feature Set to On - Infotainment Bluetooth Setting.
- Pairing an Android Auto Device, see also BTP-FUR-REQ-226425.
- Pairing a Wireless CarPlay device, see Connection Manager section.

When turning Bluetooth OFF, the In-Vehicle Infotainment System shall close Bluetooth connections with the connected devices (all connections: ACL and SCO/eSCO) and shall not allow reconnections. It then shall turn off the Bluetooth chip so that it stops transmitting and receiving data over the air, so that the In-Vehicle Infotainment System cannot be connected or connect to any other Bluetooth devices.
The process of turning Bluetooth off shall not require more than 3 sec, no matter the device behavior upon request for disconnection.

Upon turning Bluetooth ON, the connection sequence described in section BTP-FUR-REQ-033782-Connection Order and Requirements shall be followed.

2.3 BTP-FUR-REQ-439383/A-eSCO Requirements

When connected to an AG that includes support for Wideband Speech, the In-Vehicle Infotainment System shall use Wideband Speech as the default audio solution. The In-Vehicle Infotainment System shall revert to legacy eSCO or SCO in the event an error is detected with the use of Wideband Speech.

The phone application shall ignore SCO requests from a connected phone when those requests are not associated with any In-Vehicle Infotainment System phone related feature.
In this case the SCO request shall be ignored, but not rejected. Audio shall not be routed through the IVIS.

2.4 BTP-FUR-REQ-047503/A-eSCO Error Requirements (TcSE ROIN-295047-1)

If the in-vehicle infotainment system can not allocate eSCO / SCO audio due to an internal or vehicle system issue, the in-vehicle infotainment system shall route the eSCO/SCO audio to the handset and display a notification to the end user.

2.5 BTP-FUR-REQ-047497/B-Noise Suppression and Noise Recognition Activation / Deactivation (TcSE ROIN-295045-1)

In-Vehicle Infotainment System shall send NREC to the connected AG upon each connection. Based on the connected AG's response In-Vehicle Infotainment System shall take the following action:

Initial AG NREC Response	In-Vehicle Infotainment System Noise Suppression and Echo Cancellation Algorithm
OK	Active
Error	Active
No Response	Active

2.6 BTP-FUR-REQ-047508/D-Advanced Error Correction (TcSE ROIN-295108-2)

The intent of this feature is for In-Vehicle Infotainment System to determine when a phone has reached an uncorrectable error state within a single connection. Upon detection of this feature the In-Vehicle Infotainment System shall modify its' behavior to increase functionality for the end user. The entrance criteria for this state shall be as follows:

- While in a single party or joined call, In-Vehicle Infotainment System attempts to end the call, and the connected AG does not end the call within 5 seconds with a call status equal to 0 the In-Vehicle Infotainment System shall attempt to end the call again. If the second attempt fails, the In-Vehicle Infotainment System may provide an alert that the connected AG has not responded to the In-Vehicle Infotainment System per the requirements provided in Phone HMI specification. The In-Vehicle Infotainment System shall return the audio source to the audio source prior to phone call.

-In the event In-Vehicle Infotainment System does not receive a response to the following commands at initial HFP set up within 5 seconds:

-AT+BRSF=X
-AT+CIND?
-AT+CHLD=?

The In-Vehicle Infotainment System shall send the message that failed to get a response again. The In-Vehicle Infotainment System shall repeat this process a total of 3 times. If each attempt results in a failed response, the In-Vehicle Infotainment System shall automatically disconnect HFP from the connected device. After a successful HFP disconnect, the In-Vehicle Infotainment System shall initiate a new HFP connection to the recently disconnected device. In the event that a HFP reconnection does not prompt the device to respond to the specific AT command, the In-Vehicle Infotainment System shall determine that an HFP connection could not be established. Depending on HMI specifications, when this situation occurs, an alert may be presented to the customer.

2.7 BTP-FUR-REQ-047498/B-Displaying Call Metadata (TcSE ROIN-295052-1)

The phone application shall display the phone number for any initiated or incoming call (active or held), or if available, the phonebook information (including name, phone number type, photo, etc.) associated with the call. If the data is available via CLCC, this information shall be displayed.

2.8 BTP-FUR-REQ-047504/C-Ringer Options (TcSE ROIN-295099-2)

In-Vehicle Infotainment System shall support the following ring notification types:

-Pre-Recorded Ringer

-Phone's Ringtone: In-band ringing (if supported by the device). If the connected phone supports in-band ringing, this feature shall be the default until the user has opted to change it. If the phone does not support in-band ringing then the default ringtone shall be the first pre-recorded ringtone.

-Silent: This option shall not interrupt the current Primary Audio Source (PAS) unless the PAS Bluetooth audio and the SOURCE is also the AG. In this case, the ring notification shall interrupt the current PAS.

2.9 BTP-FUR-REQ-047505/C-Signal Strength (TcSE ROIN-295105-2)

This feature shall only be present when there is a connected AG, and that AG provides Signal Strength information to In-Vehicle Infotainment System. The Signal Indicator shall include a total of 5 bars. No cellular signal shall be defined as a '0' value.
To verify the correct signal strength indication the service indicator shall be considered as well. If the device is communicating “no service availability” by value 0 the signal strength indication shall show 0 bars.

If the system is unable to obtain the signal strength from the connected phone the information shall not be displayed.

2.10 BTP-FUR-REQ-047506/A-Roaming Report (TcSE ROIN-295106-1)

This feature shall only be present when there is a connected AG, and that AG provides Roaming information to In-Vehicle Infotainment System. If the connected AG is Roaming, and the user attempts to place a call, then In-Vehicle Infotainment System shall inform the user that their phone is reporting that it is roaming and ask them if they would still like to complete this call. The alert, should have an option to turn this feature on/off. This feature shall be defaulted ‘ON’.

2.11 BTP-FUR-REQ-047507/B-Battery Level (TcSE ROIN-295107-2)

This feature shall only be present when there is a connected AG, and that AG provides Battery Strength information to In-Vehicle Infotainment System. In-Vehicle Infotainment System's battery strength indicator shall include a total of 6 states, with 0 representing no battery strength (i.e. the lowest possible response from the connected AG) and 5 representing full battery strength (i.e. the highest possible response from the connected AG).

The in-vehicle infotainment system shall determine that the AG's battery is low when the connected AG reports battery strength of value 0.

2.12 BTP-FUR-REQ-047509/E-AG Device Storage (TcSE ROIN-295109-2)

In-Vehicle Infotainment System shall store the following information for each AG that has been previously paired (provided the device has not been deleted or the module has not been reset by the user):

- Manufacturer
- Phone Name (make / model)
- All Bluetooth Profiles Supported (HFP 1.x, A2DP 1.x, etc.) *Based on SDP.
- BRSF Value
- CHLD Capabilities
- CIND capabilities (signal strength, battery level, roaming etc.)
- Phonebook Download Support
- Text Messaging Capabilities (if supported by IVIS)
- Email Capabilities (if supported by IVIS)
- In-Band Ringing Support
- Available Codec (if A2DP is supported)

The In-Vehicle Infotainment System shall retrieve relevant information from Device ID Profile and the relevant AT commands from the GSM Mobile Equipment specification (3GPP TS), and the relevant BT specifications to store some of the information above.

2.13 BTP-FUR-REQ-047511/A-Voice / Phone Interaction (TcSE ROIN-295111-2)

If the user initiates a Voice Session while in a phone call, In-Vehicle Infotainment System shall not pass the audio of the voice session to the far end. In-Vehicle Infotainment System shall also mute the caller on the far end while the voice session is active. Once the voice session is complete, In-Vehicle Infotainment System shall un-mute the caller on the far end, and return to passing audio to the user on the far end.

This section shall only be implemented, if supported by the current voice engine.

2.14 BTP-FUR-REQ-047510/B-Phone Call Priorities (TcSE ROIN-295110-1)

There are a total of 2 phone call types that the phone application can initiate.
These types are:

Priority 1: Highest Priority, used for Emergency Calls (i.e. e911 during a Crash Event, etc.) as defined in A08_E911_Assist Functional Specification.

Priority 2: Medium-High Priority, used for phone calls initiated and/or received by the user (i.e. normal usage)

Priority 1 Calls shall not be interrupted under any circumstances other than those outlined within the latest version of A08_E911_Assist Functional Specification.

Priority 2 Calls shall not be interrupted by any application, but can be interrupted as defined in the latest version of A08_E911_Assist_Functional Specification. The user shall have command and control of priority 2 phone calls as defined within this specification.

Ford Motor Co. shall have the ability to add additional Priority Levels and modify their priority rankings within In-Vehicle Infotainment System.

2.15 BTP-FUR-REQ-439384/A-Device specific settings

The In-Vehicle Infotainment System should offer following settings to the customer via HMI. The settings shall apply for each paired device individually. Not all settings may apply, please consider also referred requirements and the Implementation Guide.

1. Auto-Download Phonebook
   The customer shall have the option to enable and disable Auto-Phonebook download as described in BTP-FUR-REQ-033836-Auto Phonebook Download Options.
   The default for this setting shall be Automatic Download on (refer to BTP-FUR-REQ-033834-Auto Phonebook Download).

2. Phonebook Sorting
   The In-Vehicle Infotainment System shall offer a setting to the customer to select the sorting order of the downloaded phonebook either via First Name or via Last Name (refer to BTP-FUR-REQ-033846). The default setting for the sorting order is defined in BTP-FUR-REQ-093327.

3. Ringtone Option
   The In-Vehicle Infotainment System shall offer an HMI setting to the customer for selecting a ringtone for incoming calls. If the connected phone supports in-band ringing, this feature shall be the default until the user has opted to change it. If the phone does not support in-band ringing then the default ringtone shall be the first pre-recorded ringtone (Refer to BTP-FUR-REQ-047504-Ringer Options)

4. Text Messaging (if available)
   The In-Vehicle Infotainment System shall offer an HMI setting to the customer for enabling and disabling the text messaging feature entirely (refer to BTP-FUR REQ-133777 Text Messaging Availability).
   The Infotainment System shall provide an option to select the alert type for incoming text messages if the feature is enabled (default). The default alert shall be the first pre-recorded alert (refer to BTP-FUR-REQ-041775-Audible Alerts).
   This entire option is only applicable if IVIS and connected device are supporting the text messaging feature

5. Email (if available)
   The In-Vehicle Infotainment System shall offer an HMI setting to the customer for enabling and disabling the email feature entirely (refer to BTP-FUN-REQ-041734 and BTP-FUR REQ-133777 Text Messaging Availability).

The Infotainment System shall provide an option to select the alert type for incoming emails if the feature is enabled (default). The default alert shall be the first pre-recorded alert (refer to BTP-FUR-REQ-041775-Audible Alerts).
This entire option is only applicable if IVIS and connected device are supporting the email feature.

6. Roaming Indicator
   The In-Vehicle Infotainment System should offer an option to activate or deactivate this alert. The default setting shall be on (refer to BTP-FUR-REQ-047506-Roaming Report).

7. Low Battery Warning
   The In-Vehicle Infotainment System should offer an option to activate or deactivate this warning alert. The default setting shall be off (refer to BTP-FUR-REQ-047507-Battery Level).

8. Phone Volume Adjustment (if available)
   The In-Vehicle Infotainment System shall offer an opportunity for the costumer to adjust the phone volume level to the media volume level. This setting shall be stored and shall apply for each paired device separately.
   The default value is specified in STMGNT-FUR-REQ-014654-AHU-DSP AMP Default Parameters (TcSE ROIN-119131-11).

   This entire option is only applicable if IVIS is supporting this feature. (see BTP-FUR-REQ-439399/A Phone Volume Adjustment)

2.16 BTP-FUR-REQ-041732/B-Configuration Requirements (TcSE ROIN-304265-1)

All timers included within this document as well as within HMI specifications shall be configurable.
All attributes of Device ID Profile shall be configurable.

3 Bluetooth Core

3.1 Requirements

3.1.1 BTP-REQ-047923/A-Definitions (TcSE ROIN-297117-1)

Term	Definition
IVIS	In-Vehicle Infotainment System
HCI	Host Controller Interface
SD	Storage Device
GUI	Guided User Interface

3.1.2 BTP-REQ-047924/C-Bluetooth Core Requirements (TcSE ROIN-297118-1)

The In-Vehicle Infotainment System shall support the following core specification:

Bluetooth 4.2

3.1.3 BTP-REQ-047925/C-Bluetooth Profile Requirements (TcSE ROIN-297120-1)

The In-Vehicle Infotainment System shall support the following Profiles:

- Handsfree Profile 1.7
- Message Access Profile 1.3
- Phonebook Access Profile 1.2
- Advanced Audio Distribution Profile 1.3
- Audio / Video Remote Control Profile 1.6
- Device Identification Profile 1.3
- Generic Object Exchange Profile 2.0+

3.1.4 BTP-REQ-047926/G-Minimum Profile Specific Requirements (TcSE ROIN-297121-1)

Bluetooth Profile Support / Features	**In-Vehicle System Support**
Bluetooth Core 4.2 (SmartReady)	X
iAP Pairing	X
iAP2 over BT	X
Handsfree Profile 1.7	X
Supported Features BRSF	X
HF indicators BIND	X
Redial: BLDN	X
Dial and Hangup (ATD, CHUP)	X
Answer ATA	X
Call Waiting: CCWA	X
Operator – COPS	X
Call Indication – CIND and CLCC	X

Identification – CGMI – CGMM - CGMR	X
Call Release: CHLD 0	X
Call Release: CHLD 1	X
Call Toggle: CHLD 2	X
Join: CHLD 3	X
Caller ID: CLIP	X
DTMF	X
Remote Volume: VGM	X
Remote Volume: VGS	X
# Recognition: CNUM	X
Echo / Noise: NREC	X
Voice: BVRA	X
Wideband Speech	X
Phonebook Access Profile 1.2	X
PbapSupportedFeatures	X
Call History Download	X
Favorites	X
Address Download[4]	X
FN	X
N	X
Photo Download[2]	X
Phone Numbers (multiple)	X
E-Mail Address[1]	X
SIM contacts download	X
Phonebook via AT Commands	N/A
Phonebook via SyncML	N/A
Message Access Profile 1.3[1]	X
SMS[1]	X
email[1,1]	X
Message Notification[1]	X
Get Message Listing[1]	X
Send Message[1]	X
Set Message Status[1]	X
Messaging via AT Commands[1]	N/A
A2DP 1.3	X
SBC Codec	X
MP3 Codec	N/A
Delay reporting	X
AVRCP 1.6	X
Play	X
Pause	X
Next Track	X

Previous Track	X
Stop	N/A
Shuffle	X
Shuffle Off	X
All Tracks Shuffle	X
Group Shuffle	X
Repeat	X
Repeat Off	X
Single Track Repeat	X
All Track Repeat	X
Group Shuffle	X
Absolute Volume	X
Indexing	N/A
GetPlayStatus	X
GetElementAttributes	X
RegisterNotification	X
EVENT_PLAYBACK_STATUS_CHANGED	X
EVENT_TRACK_CHANGED	X
EVENT_TRACK_REACHED_END	N/A
EVENT_TRACK_REACHED_START	N/A
EVENT_PLAYBACK_POS_CHANGED	X
EVENT_PLAYER_APPLICATION_SETTING_CHANGED	X
EVENT_AVAILABLE_PLAYERS_CHANGED	X
EVENT_NOW_PLAYING_CONTENT_CHANGED	X
EVENT_UIDS_CHANGED	X
EVENT_ADDRESSED_PLAYER_CHANGED	X
ChangePath	X
PlayItem	X
GetFolderItems	X
GetTotalNumberOfItems	X
SetBrowsedPlayer	X
Personal Area Networking	N/A
Device ID Profile 1.3	X
AppLink[3]	X

Additional information relative to profile support is included within the Phone, Messaging, and Pairing specifications. If a specific feature is not listed within this document, but support for the feature is implied through another specification it shall be assumed that the feature is required.

[1] only required when Messaging Feature is supported
[1,1] only required when email Feature is supported
[2] only required when HMI is able to show photo for contacts
[3] only required when AppLink is supported
[4] only required when Navigation Feature is supported

3.1.5 BTP-FUR-REQ-041730/D-Device ID Profile (TcSE ROIN-304263-1)

The In-Vehicle Infotainment System shall retain the following information using Device ID Profile from the connected device:

- Vendor ID
- Product ID
- Version
- Vendor ID Source

The In-Vehicle Infotainment System shall use the following values when reporting the above characteristics to a device:

Attribute	Value		
Specification ID	Current supported version of DID		
VendorID	0x1BC4 (Ford Motor Co.)		
ProductID	Will be communicated separately (eg. 0x0003)		
Version	Model Year	Release	Version
	17	1	0x1701
		2	0x1702
	18	1	0x1801
		2	0x1802
		3	0x1803
	19	1	0x1901
PrimaryRecord		True	
VendorIDSource		0x0002 (USB)	

The version shall be updated per each official release to production.
It is made up of model year and the number of the release.
All pre-released development versions shall begin with a ProductID of 99xx.

The In-Vehicle Infotainment System shall use the values defined in this requirement for all other ways to advertise its characteristics via Bluetooth.
For example, for the Apple specific XAPL command, the In-Vehicle Infotainment System shall send: AT+XAPL=1BC4-0003-1702,8

3.1.6 BTP-REQ-047984/A-Bluetooth Stack Error Detection and Recovery (TcSE ROIN-304545-1)

The IVIS shall monitor key characteristics (to be defined below) within the Bluetooth stack to determine when the Bluetooth stack has entered an unstable state. Upon detecting that the Bluetooth stack has entered an unstable state the IVIS shall complete a soft reset of the Bluetooth stack in an attempt to get the stack to recover.

3.1.7 BTP-REQ-047985/B-Bluetooth Stack Error Detection and Recovery - Monitoring Characteristics (TcSE ROIN-304546-1)

After the IVIS has attempted its 5th unsolicited connection attempt as described in the Section BTP-FUR-REQ-033809-Automatic Connection AND is not connected to any other device via Bluetooth, the IVIS shall determine that the Bluetooth stack has entered an unstable state.

*Note: This could also mean that the device was not present, however to ensure that the IVIS is attempting any and all measures, this criteria shall be used.

3.1.8 BTP-REQ-047986/B-Bluetooth Stack Error Detection and Recovery - Bluetooth Stack Soft Reset (TcSE ROIN-304547-1)

Upon detecting that the Bluetooth stack has entered an unstable state, the IVIS shall complete the following:

1. Toggle Bluetooth Off then ON within the IVIS
2. Reload all Bluetooth Profiles
3. Attempt the unsolicited connection sequence described in section BTP-FUR-REQ-033809-Automatic Connection

*Note: The IVIS shall not disconnect ANY devices connected via Wi-Fi during this process.

4 Functional Definition

4.1 BTP-FUN-REQ-439385/A-Pairing

4.1.1 Use Cases

4.1.1.1 BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)

Linked Elements
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process
BTC-FUR-REQ-247389/B-Primary Device Setting

Actors	Customer Mobile Phone
Pre-conditions	Device supports Bluetooth 2.1 (SSP) or above. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Customer opts to add a new phone In-Vehicle infotainment system is placed into discoverable mode Customer searches for system from their device. Customer selects system from their device Once pairing request is received from the device, In-Vehicle Infotainment System displays Secure Simple PIN. Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device The user will have the option to cancel the procedure from the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the phone to favorite. A HFP connection is established between the In-Vehicle Infotainment System The In-Vehicle Infotainment System attempts to download the phonebook and call history of the connected phone. (if supported) The In-Vehicle Infotainment System synchronizes the text messages from the connected phone. (if supported) Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display Audio Streaming Connections are established (if supported). *Note: The In-Vehicle Infotainment System might alert the customer to look at their phone to authorize the phonebook download and/or text message access (if supported by the newly paired phone).
List of Exception Use Cases	E1 - Customer chooses ‘No’ the PIN doesn’t match on the In-Vehicle Infotainment System. E2 - Customer chooses ‘No’ the PIN doesn’t match on the device. E3 - Customer does not initiate pairing from device. E4 - Unexpected Device Disconnect During Pairing prior to authentication. E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection cannot be established / maintained for Calling Features.

	E8 - Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages. E9 - Customer Cannot be Notified of New Messages. E10 - Phonebook cannot be downloaded. E11 - Signal strength , phone battery strength and/or roaming status not available. E12 - Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options. E13 – Pairing a Non-Audio / Phone Device. E14 - Connection Cannot be established for audio source. E15 - Connection Cannot be established for audio control. E16 – Unexpected Device Disconnect After Authentication, but prior to completing the overall connection / pairing process.
Interfaces	V-HMI G-HMI Audio Out

4.1.1.2 BTC-UC-REQ-280655/A-Pairing a phone via SSP Just Works - Discoverable Mode

Linked Elements
BTC-FUR-REQ-283783/A-Just Works Pairing
BTC-FUR-REQ-247389/B-Primary Device Setting
BTC-FUR-REQ-280651/A-Just Works Pairing
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)

Actors	Customer, Mobile Phone
Pre-conditions	Infotainment System and device support Bluetooth 2.1 with Just Works capability. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Customer opts to add a new phone In-Vehicle infotainment system is placed into discoverable mode. In-Vehicle infotainment system is placed into discoverable mode Customer searches for system from their device. Customer selects system from their device, and confirms via G-HMI that he wants to pair with the mobile device. The costumer will have the option to cancel the procedure from the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the newly paired phone as favorite. A HFP connection is established between the In-Vehicle Infotainment System and the mobile device. The In-Vehicle Infotainment System attempts to download the phonebook and call history of the connected phone. The In-Vehicle Infotainment System synchronizes the text messages from the connected phone. Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display Audio Streaming Connections are established (if supported)
List of Exception Use Cases	E1 - Unexpected Device Disconnect During Pairing. E2 - Pairing Fails. E3 - Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages.

	E4 - Customer Cannot be Notified of New Messages. E5 - Phonebook cannot be downloaded. E6 - Signal strength, phone battery strength and/or roaming status not available. E7 - Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options.
Interfaces	V-HMI G-HMI

4.1.1.3 BTP-UC-REQ-033736/A-Customer chooses 'No' the PIN doesn't match on the In-Vehicle Infotainment System (TcSE ROIN-290832-1)

Linked Elements
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System Customer indicates that the PIN does not match that displayed on the device.
Post-conditions	The In-Vehicle Infotainment System return to original use case for the specified length of time.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.4 BTP-UC-REQ-033737/A-Customer chooses 'No' the PIN doesn't match on the device (TcSE ROIN-290833-1)

Linked Elements
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System Customer indicates that the PIN does not match that displayed on the In-Vehicle Infotainment System.
Post-conditions	When notified by connected device; the In-Vehicle Infotainment System return to original use case for the specified length of time.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.5 BTP-UC-REQ-033738/A-Customer Does Not Initiate Pairing from Device (TcSE ROIN-290834-1)

Linked Elements
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	A pairing request is not received from the device.
Post-conditions	After the specified amount time, the IVS will indicate that the time allotted for pairing a device has expired. The In-Vehicle Infotainment System is no longer in a pairing mode.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.6 BTP-UC-REQ-033739/A-Unexpected Device Disconnect During Pairing (TcSE ROIN-290835-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	The authentication process has begun but not completed. An unexpected device disconnect is detected.
Post-conditions	The Customer is alerted that an error has occurred. The In-Vehicle Infotainment System returns to discovery / discoverable mode (based on entry condition) for specified time.
List of Exception Use Cases	N/A

Interfaces	G-HMI

4.1.1.7 BTP-UC-REQ-033740/A-Pairing Fails (TcSE ROIN-290836-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	The authentication and connection process has begun but not completed. Pairing Fails
Post-conditions	The Customer is alerted that an error has occurred. The In-Vehicle Infotainment System returns to discovery / discoverable mode (based on entry condition for specified time.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.8 BTP-UC-REQ-033741/A-Customer Initiates pairing but does not confirm PIN (TcSE ROIN-290837-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System. Customer does not confirm PIN (on device and/or In-Vehicle Infotainment System).
Post-conditions	After specified amount of time, the Customer is alerted that an error has occurred. The In-Vehicle Infotainment System is no longer in a pairing mode.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.9 BTP-UC-REQ-033742/A-Connection cannot be established / maintained for Calling Features (TcSE ROIN-290838-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System The connection for Calling features fails (i.e. HFP)
Post-conditions	An error message shall be displayed.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.10 BTP-UC-REQ-033743/A-Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages (TcSE ROIN-290839-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-041735/A-Messaging Synchronization (TcSE ROIN-290968-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System Messages can't be synced or new messages can't be indicated (i.e. MAP)
Post-conditions	Text Messaging feature is not accessible to the customer
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.11 BTP-UC-REQ-033744/A-Customer Cannot be Notified of New Messages (TcSE ROIN-290840-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-041737/A-Messaging New Message Notification (TcSE ROIN-290970-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System New messages can't be indicated (i.e. MNS)
Post-conditions	Potentially, User is notified that an error has occurred.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.12 BTP-UC-REQ-033745/A-Phonebook cannot be downloaded (TcSE ROIN-290841-1)

Linked Elements

BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System Phonebook cannot be downloaded (i.e. PBAP)
Post-conditions	An error message is displayed to customer via G-HMI and V-HMI
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.1.1.13 BTP-UC-REQ-033746/A-Signal, Phone Battery Strength and/or Roaming Status not available (TcSE ROIN-290842-1)

Linked Elements

BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System Signal, Phone Battery Strength and/or Roaming Status not available (i.e. HFP)
Post-conditions	The unavailable information is not displayed to the customer

List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.14 BTP-UC-REQ-033747/A-Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options (TcSE ROIN-290843-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	Customer opts to add a new phone. In-Vehicle infotainment system is placed into discoverable mode. Customer opts to cancel action prior to completing the pairing process.
Post-conditions	The In-Vehicle Infotainment System is no longer in discoverable / discovery mode (based on entry condition).
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.15 BTP-UC-REQ-033748/A-Pairing a Non- Audio / Phone Device (TcSE ROIN-290844-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Non-Audio / Phone Device
Pre-conditions	Infotainment System and device support ability to pair. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Customer opts to add a new device (non-audio / phone) In-Vehicle infotainment system is placed into discovery / discoverable mode The Customer attempts to complete the pairing process *Note: To see specific use cases for pairing in discoverable / discovery modes see examples listed in Phone Pairing section.
Post-conditions	The non-audio / phone device is not paired to the In-Vehicle Infotainment System. The In-Vehicle Infotainment System has the ability to notify the customer that pairing failed because the device does not have the required profiles.
List of Exception Use Cases	N/A
Interfaces	V-HMI G-HMI

4.1.1.16 BTP-UC-REQ-033749/B-Connection Cannot be established for audio source (TcSE ROIN-290857-1)

Linked Elements
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033763/B-Pairing a phone with other device(s) connected and Pairing / Connecting Not Successful (TcSE ROIN-290855-2)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System cannot establish a connection for audio source (i.e. A2DP)
Post-conditions	A retry shall be attempted as specified in BTC-UC-REQ-226428. When not successful the audio connection is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.17 BTP-UC-REQ-033750/B-Connection Cannot be established for audio control (TcSE ROIN-290858-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033763/B-Pairing a phone with other device(s) connected and Pairing / Connecting Not Successful (TcSE ROIN-290855-2)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System cannot establish a connection for audio control (i.e. AVRCP)
Post-conditions	A retry shall be attempted as specified in BTC-UC-REQ-226428. When not successful the audio control is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.18 BTP-UC-REQ-033751/B-Unexpected Device Disconnect After Authentication, but prior to completing the overall connection / pairing process (TcSE ROIN-304164-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	There was an unexpected Bluetooth disconnect after pairing authentication, but prior to completing the overall connection / pairing process.
Post-conditions	The In-Vehicle Infotainment System shall attempt to reconnect to the device for 180 seconds. The In-Vehicle Infotainment System shall follow the requirements listed within HMI specification with regards to error messages.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.19 BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)

Linked Elements
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer, Mobile Phone
Pre-conditions	Infotainment System and device support Bluetooth 2.1 or above. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Customer opts to add a new phone In-Vehicle infotainment system is placed into discovery mode The In-Vehicle Infotainment System searches for available devices to pair with. The In-Vehicle Infotainment System displays all of the available devices Customer chooses one of the devices The In-Vehicle Infotainment System initiates pairing with the selected device, and displays secure simple PIN Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the newly paired phone as favorite. A HFP connection is established between the In-Vehicle Infotainment System The In-Vehicle Infotainment System attempts to download the phonebook and call history of the connected phone. The In-Vehicle Infotainment System synchronizes the text messages from the connected phone. Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display Audio Streaming Connections are established (if supported)
List of Exception Use Cases	E1 - Customer chooses 'No' the PIN doesn't match on the In-Vehicle Infotainment System. E2 - Customer chooses 'No' the PIN doesn't match on the device. ~~E3 - Customer does not initiate pairing from device.~~ E4 - Unexpected Device Disconnect During Pairing.

	E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection cannot be established / maintained for Calling Features. E8 - Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages. E9 - Customer Cannot be Notified of New Messages. E10 - Phonebook cannot be downloaded. E11 - Signal strength , phone battery strength and/or roaming status not available. E12 - Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options. E13 – Pairing a Non-Audio / Phone Device. E14 - Connection Cannot be established for audio source. E15 - Connection Cannot be established for audio control. E16 – In-Vehicle Infotainment System did not find any devices.
Interfaces	V-HMI G-HMI

4.1.1.20 BTC-UC-REQ-280656/A-Pairing a phone via SSP Just Works - Discovery Mode

Linked Elements
BTC-FUR-REQ-283783/A-Just Works Pairing
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)
BTC-FUR-REQ-280651/A-Just Works Pairing
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)

Actors	Customer, Mobile Phone
Pre-conditions	Infotainment System and device support Bluetooth 2.1 with Just Works capability. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Customer opts to add a new phone In-Vehicle infotainment system is placed into discovery mode The In-Vehicle Infotainment System searches for available devices to pair with. The In-Vehicle Infotainment System displays all of the available devices Customer chooses one of the devices. The In-Vehicle Infotainment System initiates pairing with the selected device. Customer may need to confirm the pairing on the mobile device.
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the newly paired phone as favorite. A HFP connection is established between the In-Vehicle Infotainment System and the mobile device. The In-Vehicle Infotainment System attempts to download the phonebook and call history of the connected phone. The In-Vehicle Infotainment System synchronizes the text messages from the connected phone. Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display Audio Streaming Connections are established (if supported)
List of Exception Use Cases	E1 - Unexpected Device Disconnect During Pairing. E2 - Pairing Fails. E3 - Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages. E4 - Customer Cannot be Notified of New Messages. E5 - Phonebook cannot be downloaded. E6 - Signal strength , phone battery strength and/or roaming status not available. E7 - Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options. E8 – In-Vehicle Infotainment System did not find any devices.
Interfaces	V-HMI G-HMI

4.1.1.21 BTP-UC-REQ-033756/B-In-Vehicle Infotainment System did not find any devices (TcSE ROIN-304492-1)

Linked Elements
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System did not find any devices.
Post-conditions	The In-Vehicle Infotainment System does not display any devices, but offers an opportunity to search again
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.22 BTP-UC-REQ-033757/A-Customer Does Not Enter PIN on device (TcSE ROIN-290849-1)

Linked Elements
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer, Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	Customer does not enter PIN on device
Post-conditions	The In-Vehicle Infotainment System remains in originating mode for the specified length of time.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.23 BTP-UC-REQ-033758/A-Customer inputs the incorrect PIN on device (TcSE ROIN-290850-1)

Linked Elements
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer, Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System. Customer indicates enters the incorrect PIN on device
Post-conditions	Error Message Displayed In-Vehicle Infotainment System remains discoverable for specified length of time.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.1.1.24 BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)

Linked Elements
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTP-FUR-REQ-033774/B-Legacy Pairing (TcSE ROIN-295149-1)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer, Mobile Phone
Pre-conditions	Mobile phone supports ability to pair to the In-Vehicle Infotainment System Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device. Another device is connected
Scenario Description	Customer opts to add a new phone while other device(s) connected to IVIS. In-Vehicle Infotainment System is placed into a 'pair-able' mode (i.e. Discoverable / Discovery). All other steps are consistent with the described scenarios for pairing a mobile phone within this section.
Post-conditions	Currently connected device(s) will be disconnected. All post conditions are consistent with the described scenarios for pairing a mobile phone within this section.
List of Exception Use Cases	E1 - Pairing a phone with another phone connected and Pairing / Connecting Not Successful. E2 - Customer chooses 'No' the PIN doesn't match on the In-Vehicle Infotainment System. E3 - Customer chooses 'No' the PIN doesn't match on the device. E4 - Customer does not initiate pairing from device. E5 - Unexpected Device Disconnect During Pairing. E6 - Pairing Fails. E7 - Customer initiates pairing but does not confirm PIN. E8 - Connection cannot be established / maintained for Calling Features. E9 - Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages. E10 - Customer Cannot be Notified of New Messages. E11 - Phonebook cannot be downloaded. E12 - Signal strength , phone battery strength and/or roaming status not available. E13 - Customer exits pairing by canceling action via In-Vehicle Infotainment System G-HMI options. E14 – Pairing a Non-Audio / Phone Device. E15 - Connection Cannot be established for audio source. E16 - Connection Cannot be established for audio control. E17 - Customer does not enter PIN on Device. E18 - Customer inputs the incorrect PIN in Device.
Interfaces	V-HMI G-HMI

4.1.1.25 BTP-UC-REQ-033763/B-Pairing a phone with other device(s) connected and Pairing / Connecting Not Successful (TcSE ROIN-290855-2)

Linked Elements
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer, Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	Customer opts to add a new phone while other device(s) connected. The pairing and connecting process fails.
Post-conditions	Previously connected device(s) disconnected. Customer is updated via G-HMI that the pairing process failed.
List of Exception Use Cases	N/A
Interfaces	V-HMI G-HMI

4.1.1.26 BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)

Linked Elements

BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer Audio Device
Pre-conditions	Infotainment System and device support Bluetooth 2.1 or above. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device.
Scenario Description	Customer opts to add a new audio device In-Vehicle Infotainment System is placed into discoverable mode Customer searches for system from their device. Customer selects system from their device Once pairing request is received from the device, In-Vehicle Infotainment System displays Secure Simple PIN. Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the newly paired device as favorite. A connection is established between the device and In-Vehicle Infotainment System.
List of Exception Use Cases	E1 - Customer chooses ‘No’ the PIN doesn’t match on the In-Vehicle Infotainment System. E2 - Customer chooses ‘No’ the PIN doesn’t match on the device. E3 - Customer does not initiate pairing from device. E4 - Unexpected Device Disconnect During Pairing. E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection Cannot be established for audio source. E8 - Connection Cannot be established for audio control.
Interfaces	V-HMI G-HMI

4.1.1.27 BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)

Linked Elements

BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer Audio Device
Pre-conditions	Infotainment System and device support Bluetooth 2.1 or above. Another device is paired to In-Vehicle Infotainment System Another device is connected to In-Vehicle Infotainment System
Scenario Description	Customer opts to add a new audio device. In-Vehicle Infotainment System is placed into discoverable mode Customer searches for system from their device. Customer selects system from their device. Once pairing request is received from the device, In-Vehicle Infotainment System displays Secure Simple PIN. Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device.
Post-conditions	The In-Vehicle Infotainment System is disconnected from the previously connected device(s). The In-Vehicle Infotainment System is paired to the new device and provides the Customer with the option to set the device to favorite. A connection is established between the newly paired audio device and In-Vehicle Infotainment System. If the previously connected device was connected for Phone functionality then the device shall be re-connected for Phone functionality again.
List of Exception Use Cases	E1 - Customer chooses ‘No’ the PIN doesn’t match on the In-Vehicle Infotainment System. E2 - Customer chooses ‘No’ the PIN doesn’t match on the device. E3 - Customer does not initiate pairing from device. E4 - Unexpected Device Disconnect During Pairing. E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection Cannot be established for audio source. E8 - Connection Cannot be established for audio control.
Interfaces	V-HMI G-HMI

4.1.1.28 BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)

Linked Elements
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer Audio Device
Pre-conditions	Infotainment System and device support Bluetooth 2.1 or above. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device.
Scenario Description	Customer opts to add a new audio device In-Vehicle Infotainment System is placed into discovery mode. The In-Vehicle Infotainment System searches for available devices to pair with. The In-Vehicle Infotainment System displays all of the available devices

	Customer chooses one of the devices. The In-Vehicle Infotainment System initiates pairing with the selected device, and displays Secure Simple PIN. Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device.
Post-conditions	The In-Vehicle Infotainment System is paired to the device. When no other device was paired before the newly paired device will be set as favorite device. When another device was paired already the In-Vehicle Infotainment System might provide the Customer with the option to set the newly paired device as favorite. A connection is established between the device and In-Vehicle Infotainment System
List of Exception Use Cases	E1 - Customer chooses 'No' the PIN doesn't match on the In-Vehicle Infotainment System. E2 - Customer chooses 'No' the PIN doesn't match on the device. E3 - Customer does not initiate pairing from device. E4 - Unexpected Device Disconnect During Pairing. E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection Cannot be established for audio source. E8 - Connection Cannot be established for audio control.
Interfaces	V-HMI G-HMI

4.1.1.29 BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)

Linked Elements
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033779/E-Pairing Process (TcSE ROIN-295154-2)
BTC-FUR-REQ-247389/B-Primary Device Setting
BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)
BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)
BTP-FUR-REQ-439386/A-Pairing Process
BTP-FUR-REQ-410317/A-Pairing Process

Actors	Customer Audio Device
Pre-conditions	Infotainment System and device support Bluetooth 2.1 or above. Device(s) paired to In-Vehicle Infotainment System Device(s) connected to In-Vehicle Infotainment System
Scenario Description	Customer opts to add a new audio device. In-Vehicle infotainment system is placed into discovery mode. The In-Vehicle Infotainment System searches for available devices to pair with. The In-Vehicle Infotainment System displays all of the available devices Customer chooses one of the devices. The In-Vehicle Infotainment System initiates pairing with the selected device, and displays the secure Simple PIN. Customer confirms that Secure Simple PIN is the same on In-Vehicle Infotainment System and device.
Post-conditions	The In-Vehicle Infotainment System is disconnected from the previously connected device(s). The In-Vehicle Infotainment System is paired to the new device and provides the Customer with the option to set the device to favorite. A connection is established between the newly paired audio device and In-Vehicle Infotainment System. If the previously connected device was connected for Phone functionality then the device shall be re-connected for Phone functionality again.
List of Exception Use Cases	E1 - Customer chooses 'No' the PIN doesn't match on the In-Vehicle Infotainment System.

	E2 - Customer chooses 'No' the PIN doesn't match on the device. E3 - Customer does not initiate pairing from device. E4 - Unexpected Device Disconnect During Pairing. E5 - Pairing Fails. E6 - Customer initiates pairing but does not confirm PIN. E7 - Connection Cannot be established for audio source. E8 - Connection Cannot be established for audio control.
Interfaces	V-HMI G-HMI

4.1.2 Requirements

4.1.2.1 BTP-FUR-REQ-033773/B-Secure Simple Pairing (TcSE ROIN-295148-2)

In-Vehicle Infotainment System shall support Secure Simple Pairing (SSP), and use the number comparison association model (as defined within the Bluetooth Core Specification v2.1) for devices that support this feature.
The In-Vehicle Infotainment System shall detect SSP capability of the device by the LMP_Feature Request "SSP=YES" and the IO_Capability_Transfer.
The in-vehicle infotainment system shall provide the user with the option of confirming the complete 6 digit PIN via the HMI (note: this includes PIN's that may lead with 0's).

Once the In-Vehicle Infotainment System calculates the "User Confirm Value" the value shall be displayed to the customer.

Once the In-Vehicle Infotainment System receives the LMP_dhkey_Check from the initiating side, the In-Vehicle Infotainment System shall assume that the Calculated User Confirm Value is accurate and continue to check the "E" value. If the check is successful, the in-vehicle infotainment shall accept the LMP_dhkey from the initiator and complete the pairing process by exchanging and storing authentication information.

The user will still have the option of confirming the 'User Confirm Value' via the GUI within the In-Vehicle Infotainment System.

4.1.2.2 BTC-FUR-REQ-280651/A-Just Works Pairing

In-Vehicle Infotainment System shall support Secure Simple Pairing (SSP), and the just works association model (as defined within the Bluetooth Core Specification v2.1) for devices that support this feature.
The In-Vehicle Infotainment System shall set MITM Protection Not Required – Dedicated Bonding.

The In-Vehicle Infotainment system shall provide the user with the option of confirming the pairing request from the mobile device, when paired in discoverable mode.
For discovery mode no further confirmation is required.

4.1.2.3 BTP-FUR-REQ-033776/C-Discovery Mode (Find Devices) (TcSE ROIN-295151-2)

The user shall have the option of placing In-Vehicle Infotainment System into discovery mode. This mode enables In-Vehicle Infotainment System to search for devices that are discoverable.
The discovery search shall take place for a maximum of 10 seconds. In-Vehicle Infotainment System shall populate a list of found devices as it searches. In-Vehicle Infotainment System shall display a maximum of 20 devices during this search. The user shall have the option of stopping the search, by selecting one of the found devices. In-Vehicle Infotainment System shall broadcast its' name (refer to BTP-FUR-REQ-097661-In Vehicle Infotainment System Name) to the selected device.

If the selected device supports SSP and the number association model, In-Vehicle Infotainment System shall use this method to complete pairing. See BTP-FUR-REQ-033773.

While the In-Vehicle Infotainment System is discovering devices and displaying found devices on screen it should also be discoverable for other mobile devices simultaneously. See HMI specification for more information.

4.1.2.4 BTP-FUR-REQ-033777/C-Discoverable Mode (Find In-Vehicle Infotainment System) (TcSE ROIN-295152-2)

The user shall have the option of placing In-Vehicle Infotainment System into discoverable mode. While in this mode, In-Vehicle Infotainment System shall broadcast its' name (refer to BTP-FUR-REQ-097661-In Vehicle Infotainment System Name) and its' Bluetooth address so that other Bluetooth enabled devices can find it.
For Wireless CarPlay support see also BTC-FUR-REQ 270979.

If the initiating device supports SSP and the number association model, In-Vehicle Infotainment System shall use this method to complete pairing. Once the PIN's have been confirmed on both devices, the pairing routine shall be completed by exchanging and storing authentication information on each device. This shall be the default method for pairing all devices.

If the initiating device does not support SSP, In-Vehicle Infotainment System shall use the legacy pairing method and In-Vehicle Infotainment System shall generate a 4 digit PIN (). Once this PIN is entered into the other Bluetooth device, it will complete the pairing routine by exchanging and storing authentication information on each device.

In-Vehicle Infotainment System shall remain in discoverable mode until either one of the following criteria is met:

- A device successfully pairs with it.
- A maximum of 180 seconds has passed.
- Driver Restrictions have been enabled.

The user shall have the option to exit this mode at any time.

4.1.2.5 BTP-FUR-REQ-439386/A-Pairing Process

In-Vehicle Infotainment System shall allow a maximum of 24 devices to be paired at one time. If the user attempts to place In-Vehicle Infotainment System into Discovery or Discoverable Mode when there are already 24 devices paired, the user shall be prompted to delete one or more of the previously paired devices prior to proceeding.

In-Vehicle Infotainment System shall disconnect all connected Bluetooth devices if the user has entered Discovery or Discoverable mode, or the customer has confirmed the iAP pairing or the Android Auto pairing. If In-Vehicle Infotainment System was connected to a device upon entering Discovery or Discoverable mode and pairing fails or is not completed, In-Vehicle Infotainment System shall not reconnect to the device that was disconnected.
In the case that other devices are already paired, the In-Vehicle Infotainment System shall only connect or allow an incoming connection request to / from the newly paired device.

When a successful pairing has taken place, In-Vehicle Infotainment System shall indicate that a device has been successfully paired, and the identity of the paired device.

In-Vehicle Infotainment System shall notify the user in the event that their pairing attempt has failed and/or timed out.

In the scenario that a previous paired device was deleted from IVIS, but the pairing is still present on the mobile device and the customer is trying to pair that device again, a connection request may be sent out by the device instead of a pairing request.
In such a case instead of reporting a failed pairing the In-Vehicle Infotainment System shall initiate a pairing attempt to that device 3 seconds after the connection request was received.

4.1.2.6 BTC-FUR-REQ-226425/A-Pairing an Android Auto device

The In-Vehicle Infotainment System shall support the automatic pairing of a Bluetooth device when this is connected via AAP, and the device is not yet paired with the system.
If BT is turned off at this point of time the IVIS shall turn on Bluetooth automatically.
IVIS shall only automatically accept the Bluetooth pairing request from that device which is connected via AAP. To do so, the BT MAC ADDRESS of the AAP connected mobile device shall be used for comparison.

For more information about the details how to pair please see the Google Android Auto specification, and Ford GAL SPSS GAL-FUN-REQ-089547/B-Google Automotive Link Device Connection.

If IVIS is in a state where it is not ready for pairing in less than 1 second it shall follow the procedure described in the Google Android Auto specification: IVIS shall immediately send BluetoothPairingResponse with STATUS_BLUETOOTH_PAIRING_DELAYED, and communicate that it is ready to pair, when that is the case, at a later stage.
This could be the case, for example, when a different Bluetooth device is connected with an active call, or when the device list is full (see also BTP-REQ 33785 Delete Device).

When pairing fails the HMI should show a proper error message, and the In-Vehicle Infotainment System shall not take any further action.
For more details see HMI specification.

4.1.2.7 BTP-FUR-REQ-033780/E-Service Discovery (TcSE ROIN-295155-2)

When a customer opts to pair a new device, the In-Vehicle Infotainment System shall use Service Discovery prior to pairing to determine if the device supports the following profiles and profile versions:

- Handsfree Profile
- Message Access Profile (if supported by IVIS)
- Message Notification Service (if supported by IVIS)
- Phonebook Access Profile
- Advanced Audio Distribution Profile
- Audio / Video Remote Control Profile
- Device ID Profile
- AppLink (if supported by IVIS)
- Serial Port Profile (if supported by IVIS)

4.1.2.8 BTP-FUR-REQ-439387/A-Device Display Requirements

When displaying paired devices, In-Vehicle Infotainment System shall always show the paired devices in order of last connection.

4.1.2.9 BTP-FUR-REQ-033784/A-Connecting to Device that has Lost Pairing Information (TcSE ROIN-295159-2)

The In-Vehicle Infotainment System shall have the ability to detect when a device has no longer retained authentication information from a pairing perspective. Once this issue has been detected, as defined within the Connection Error States section of this document, the In-Vehicle Infotainment System shall have the ability to alert the customer that they will have to repair their device.

4.1.2.10 BTC-FUR-REQ-280650/A-Incompatible Bluetooth devices

Mobile devices which are neither supporting HFP nor A2DP, or trying to pair via the legacy pairing method shall be treated as incompatible devices.

The In-Vehicle Infotainment System shall display a meaningful error message to the customer when an incompatible mobile device is trying to pair with the system.

4.1.2.11 BTP-FUR-REQ-439388/A-Delete Device

The costumer shall have the option of deleting a previously paired device. The stored device information for that Bluetooth device will be removed, thus preventing that device from being able to connect with In-Vehicle Infotainment System. In order to connect the Bluetooth device again, the user will need to pair the device again.

In-Vehicle Infotainment System shall allow a maximum of 24 devices to be paired at one time. If the user attempts to place In-Vehicle Infotainment System into Discovery or Discoverable Mode when there are already 24 devices paired, the user shall

be prompted to delete one or more of the previously paired devices prior to proceeding. (see also BTP-FUR-REQ-439386 Pairing Process).

For the best customer experience when pairing an Android Auto or Wireless CarPlay device the In-Vehicle Infotainment System shall ensure that pairing a new device is supported in all cases.
For the case that the device list is full at the point of time when an AAP/WCP device initiates a pairing, IVIS shall delete a device from the device list to support the new pairing request.
The device to be deleted shall be the device, which was not connected for the longest time.
For more information see also BTC-FUR 226425 Pairing an Android Auto device, and
BTC-FUR-REQ-270985 Maximum Bluetooth devices exceeded.

For testing purpose the number of maximum paired devices shall be configurable for Ford with a minimum value of 3 and a maximum value of 12.

4.1.2.12 BTP-FUR-REQ-033786/B-Secure Simple Pairing Debug Mode (TcSE ROIN-295161-1)

The supplier shall provide two USB based installation files for the following actions:

1. Place In-Vehicle Infotainment System into Secure Simple Pairing Debug Mode. This forces In-Vehicle Infotainment System to use a pre-defined Diffie-Hellman private key during pairing to enable debug equipment to monitor an encrypted Bluetooth connection.
2. Disable Secure Simple Pairing Debug Mode.

The intent of these installation files will be to enable / disable Secure Simple Pairing Debug mode by accessing the file via In-Vehicle Infotainment System via the available USB port.

4.1.2.13 BTP-FUR-REQ-033787/B-Link Key Extraction (TcSE ROIN-295162-1)

The In-Vehicle Infotainment System shall provide the ability to extract the link key via USB by accessing a supplier provided installation file stored within a USB Flash drive. The In-Vehicle Infotainment System shall write following information of each paired device to a text file on the USB Flash drive:

- Link Key
- Bluetooth Mac Address
- Friendly Name

4.1.2.14 BTP-FUR-REQ-033788/B-Bluetooth Trace Extraction (TcSE ROIN-295163-1)

The In-Vehicle Infotainment System shall provide the ability to write a .CFA file to a USB Flash drive. This .CFA file shall include all HCI traffic from the Bluetooth IC. The supplier shall provide an installation file to enable / disable this mode within the In-Vehicle Infotainment System. This .CFA shall be accessible via the Frontline Bluetooth Trace Analysis tools.

4.1.2.15 BTP-FUR-REQ-033789/A-Pairing Exceptions (TcSE ROIN-304235-1)

The in-vehicle infotainment system shall have the ability to determine that an error has occurred during the process as defined via the Bluetooth Core Specification v2.1.

More specifically, the secure simple pairing errors and process states as outlined within section 4.2 (pg. 870) within the Bluetooth Core Specification v2.1 shall be taken into consideration when secure simple pairing is the method used to pair a new device.

4.2 BTP-FUN-REQ-439389/A-Connecting a Paired Phone

4.2.1 Use Cases

4.2.1.1 BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)

Linked Elements
BTC-FUR-REQ-194148/B-Device Friendly Name
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-113744/C-Connection method

Actors	Customer Mobile Phone
Pre-conditions	A mobile phone is currently paired to the In-Vehicle Infotainment System. Bluetooth must be on in In-Vehicle Infotainment System and mobile device.
Scenario Description	Upon entering and activating the vehicle's In-Vehicle Infotainment System, the In-Vehicle Infotainment System will initiate a connection to a previously paired phone.
Post-conditions	A HFP and A2DP connection is established between the In-Vehicle Infotainment System and the primary device. A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System. (if supported) If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported). Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone upon Resume. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available.
Interfaces	G-HMI Vehicle System Interface

4.2.1.2 BTP-UC-REQ-033746/A-Signal, Phone Battery Strength and/or Roaming Status not available (TcSE ROIN-290842-1)

Linked Elements
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System Signal, Phone Battery Strength and/or Roaming Status not available (i.e. HFP)
Post-conditions	The unavailable information is not displayed to the customer
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.2.1.3 BTP-UC-REQ-033792/A-Failed to Connect to Previously Paired Phone upon Resume (TcSE ROIN-290868-1)

Linked Elements
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	Upon resume, the In-Vehicle Infotainment System cannot connect to any previously paired device and / or unable to connect to the previously paired device for phone features.
Post-conditions	The user is not indicated that a connection was not successful. The In-Vehicle Infotainment System continues to attempt to connect to previously paired devices for phone features.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.2.1.4 BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name

Linked Elements
BTC-SD-REQ-249149/A-Transmit BTPhone friendly name
BTC-FUR-REQ-194148/B-Device Friendly Name

Actors	User BTPhoneOperationSystem Mobile Phone
Pre-conditions	In-Vehicle Infotainment System is On Previously paired phone is connected successfully.
Scenario Description	The BTPhone Client requests the BTPhone “friendly” name.
Post-conditions	The BTPhone “friendly” name is transferred and indicated to the user via <<HMI output>>
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.2.1.5 BTP-UC-REQ-033793/A-Connected to previously paired phone for phone features, but Phonebook Download Fails (TcSE ROIN-290869-1)

Linked Elements

BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The In-Vehicle Infotainment System was able to connect to the previously paired phone for phone features, but was not able to download the phonebook.
Post-conditions	The user is not indicated that the failed action was unsuccessful. *Note: Reason we are not displaying an error message here is because the user would have already seen the error message if when they paired and connected for the first time or when they set 'Auto-Phonebook' download to 'On'.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.2.1.6 BTP-UC-REQ-033794/A-Connected to previously paired phone for phone features, but Call History Download Fails (TcSE ROIN-290870-1)

Linked Elements
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The In-Vehicle Infotainment System was able to connect to the previously paired phone for phone features, but was not able to download the Call History. The user attempts to access the Call History via the In-Vehicle Infotainment System.
Post-conditions	The user is indicated that the failed action was unsuccessful.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.2.1.7 BTP-UC-REQ-033795/A-Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails (TcSE ROIN-290871-1)

Linked Elements
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The In-Vehicle Infotainment System was able to connect to the previously paired phone for phone features, but was not able to synchronize the text messages from the connected device.

	The user attempts to access text messaging features via the In-Vehicle Infotainment System.
Post-conditions	The user is indicated that the failed action was unsuccessful.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.2.1.8 BTP-UC-REQ-033796/B-Connected to previously paired phone for phone features, but Message Notification Fails (TcSE ROIN-290872-1)

Linked Elements
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The In-Vehicle Infotainment System was able to connect to the previously paired phone for phone features, but was message notification fails (i.e. In-Vehicle Infotainment System is not able to display new incoming messages)
Post-conditions	IVIS should indicate according HMI specification that this feature is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.2.1.9 BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)

Linked Elements
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-113744/C-Connection method
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-194148/B-Device Friendly Name

Actors	Customer, Mobile Phone
Pre-conditions	A phone is currently paired to the In-Vehicle Infotainment System. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	Upon entering and activating the vehicle's In-Vehicle Infotainment System, the In-Vehicle Infotainment System will initiate a connection to the primary phone. In this case, there is an active call present during the connection.
Post-conditions	A HFP and A2DP connection is established between the In-Vehicle Infotainment System and the primary device The active call becomes active and audio is routed out of the In-Vehicle Infotainment System's speakers. The active phone call metadata is displayed A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System. If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported).

	Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display.
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone upon Resume. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available. E7 - The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System.
Interfaces	G-HMI Vehicle System Interface

4.2.1.10 BTP-UC-REQ-033799/A-The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System (TcSE ROIN-290875-1)

Linked Elements
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The In-Vehicle Infotainment System was able to connect to the previously paired phone for phone features and an active call was present at the time of the connection. The active call audio was not able to be routed to the speakers of the In-Vehicle Infotainment System.
Post-conditions	The customer is alerted that the audio In-Vehicle Infotainment System was not able to route the call audio via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System alerts the customer that the audio is on the handset for the active call.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.2.1.11 BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Linked Elements
BTP-UC-REQ-033796/B-Connected to previously paired phone for phone features, but Message Notification Fails (TcSE ROIN-290872-1)
BTP-FUR-REQ-113744/C-Connection method
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-UC-REQ-033793/A-Connected to previously paired phone for phone features, but Phonebook Download Fails (TcSE ROIN-290869-1)
BTP-UC-REQ-033746/A-Signal, Phone Battery Strength and/or Roaming Status not available (TcSE ROIN-290842-1)
BTP-UC-REQ-033794/A-Connected to previously paired phone for phone features, but Call History Download Fails (TcSE ROIN-290870-1)
BTP-UC-REQ-033795/A-Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails (TcSE ROIN-290871-1)
BTP-UC-REQ-033801/A-Failed to Connect to Previously Paired Phone w/Phone Connected (TcSE ROIN-290877-1)

Actors	Customer Mobile Phone
Pre-conditions	More than one phone is currently paired to the In-Vehicle Infotainment System.

	The In-Vehicle Infotainment System is connected to one of the phones for phone features. Another paired phone is available.
Scenario Description	The In-Vehicle Infotainment System is connected to a mobile phone for phone features, and paired one or more phones other than the one currently connected. The customer has indicated via the In-Vehicle Infotainment System G-HMI that they want to establish a connection to one of the other previously paired phones to access phone related features.
Post-conditions	The In-Vehicle Infotainment System releases the connection to the device(s) that was initially connected - either for phone feature or media player feature - when the Customer indicated a desire to connect to a new phone for phone features. The In-Vehicle Infotainment System establishes a connection for phone and for media player functionality to the phone which was manually selected by the customer. If the newly selected device is only supporting phone functionality, then the A2DP connection to another device shall remain as is. A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System. If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported). Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display.
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone w/Phone Connected. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available.
Interfaces	G-HMI V-HMI

4.2.1.12 BTP-UC-REQ-033801/A-Failed to Connect to Previously Paired Phone w/Phone Connected (TcSE ROIN-290877-1)

Linked Elements
BTP-UC-REQ-033800/D-Connecting to a previously paired phone w/phone connected (No Active Call) (TcSE ROIN-290876-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	While connected to a phone, the customer has opted to initiate a connection via the In-Vehicle Infotainment System to another paired phone. The connection to the selected phone has failed.
Post-conditions	The user is notified via G-HMI that a connection could not be established to the selected phone.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.2.1.13 BTP-UC-REQ-033802/C-Connecting to a previously paired phone w/phone connected (Active Call) (TcSE ROIN-290878-1)

Linked Elements
BTP-UC-REQ-033796/B-Connected to previously paired phone for phone features, but Message Notification Fails (TcSE ROIN-290872-1)
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-113744/C-Connection method
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTP-UC-REQ-033746/A-Signal, Phone Battery Strength and/or Roaming Status not available (TcSE ROIN-290842-1)
BTP-UC-REQ-033792/A-Failed to Connect to Previously Paired Phone upon Resume (TcSE ROIN-290868-1)
BTP-UC-REQ-033793/A-Connected to previously paired phone for phone features, but Phonebook Download Fails (TcSE ROIN-290869-1)
BTP-UC-REQ-033794/A-Connected to previously paired phone for phone features, but Call History Download Fails (TcSE ROIN-290870-1)
BTP-UC-REQ-033795/A-Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails (TcSE ROIN-290871-1)
BTP-UC-REQ-033799/A-The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System (TcSE ROIN-290875-1)

Actors	Customer Mobile Phone
Pre-conditions	More than one phone is currently paired to the In-Vehicle Infotainment System. The In-Vehicle Infotainment System is connected to one of the phones for phone features. Another paired phone is available and in an active call
Scenario Description	The In-Vehicle Infotainment System is connected to a mobile phone for phone features, and paired one or more phones other than the one currently connected. The customer has indicated via the In-Vehicle Infotainment System G-HMI that they want to establish a connection to one of the other previously paired phones to access phone related features.
Post-conditions	The In-Vehicle Infotainment System releases the connection to the device(s) that was initially connected - either for phone feature or media player feature - when the Customer indicated a desire to connect to a new phone for phone features. The In-Vehicle Infotainment System establishes a connection for phone and for media player functionality to the phone which was manually selected by the customer. The active call becomes active and audio is routed out of the In-Vehicle Infotainment System's speakers. A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System (if supported). If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported). Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display.
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone upon Resume. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available. E7 - The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System.
Interfaces	G-HMI V-HMI Vehicle System Interface

4.2.1.14 BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)

Linked Elements
BTP-FUR-REQ-113744/C-Connection method
BTP-UC-REQ-033796/B-Connected to previously paired phone for phone features, but Message Notification Fails (TcSE ROIN-290872-1)
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-UC-REQ-033746/A-Signal, Phone Battery Strength and/or Roaming Status not available (TcSE ROIN-290842-1)
BTP-UC-REQ-033792/A-Failed to Connect to Previously Paired Phone upon Resume (TcSE ROIN-290868-1)
BTP-UC-REQ-033793/A-Connected to previously paired phone for phone features, but Phonebook Download Fails (TcSE ROIN-290869-1)
BTP-UC-REQ-033794/A-Connected to previously paired phone for phone features, but Call History Download Fails (TcSE ROIN-290870-1)
BTP-UC-REQ-033795/A-Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails (TcSE ROIN-290871-1)

Actors	Customer Mobile Phone
Pre-conditions	A mobile phone is currently paired to the In-Vehicle Infotainment System No phone is connected to In-Vehicle Infotainment System for phone features. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The In-Vehicle Infotainment System is not connected to another mobile phone for either phone or media features. A paired phone has indicated that it wants to connect to the In-Vehicle Infotainment System for phone features.
Post-conditions	A HFP and A2DP connection is established between the In-Vehicle Infotainment System and the selected device. A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System (if supported). If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported). Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display.
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone upon Resume. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available.
Interfaces	G-HMI

4.2.1.15 BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)

Linked Elements
BTP-UC-REQ-033796/B-Connected to previously paired phone for phone features, but Message Notification Fails (TcSE ROIN-290872-1)
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name
BTC-FUR-REQ-194148/B-Device Friendly Name
BTC-UC-REQ-192200/C-Transition to ECALL/ ERA-Glonass state while on an active call
BTP-UC-REQ-033792/A-Failed to Connect to Previously Paired Phone upon Resume (TcSE ROIN-290868-1)
BTP-UC-REQ-033793/A-Connected to previously paired phone for phone features, but Phonebook Download Fails (TcSE ROIN-290869-1)
BTP-UC-REQ-033794/A-Connected to previously paired phone for phone features, but Call History Download Fails (TcSE ROIN-290870-1)
BTP-UC-REQ-033795/A-Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails (TcSE ROIN-290871-1)
BTP-UC-REQ-033799/A-The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System (TcSE ROIN-290875-1)

Actors	Customer Mobile Phone
Pre-conditions	A mobile phone is currently paired to the In-Vehicle Infotainment System No phone is connected to In-Vehicle Infotainment System for phone features. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device.
Scenario Description	The In-Vehicle Infotainment System is not connected to another mobile phone for phone or for media features. A paired phone has indicated that it wants to connect to the In-Vehicle Infotainment System for either phone or media features.
Post-conditions	A HFP and A2DP connection is established between the In-Vehicle Infotainment System and the selected device. The active call becomes active and audio is routed out of the In-Vehicle Infotainment System's speakers. A Message Notification Service has been established between the connected phone and In-Vehicle Infotainment System (if supported). If the requirements are met to download the phonebook, the phonebook of the connected phone is downloaded (if supported). The In-Vehicle Infotainment System downloads the call history of the connected phone (if supported). The In-Vehicle Infotainment System synchronizes the text messages from the connected phone (if supported). Signal strength, phone battery strength and roaming status will be available for the In-Vehicle Infotainment System to display.
List of Exception Use Cases	E1 – Failed to Connect to Previously Paired Phone upon Resume. E2 – Connected to previously paired phone for phone features, but Phonebook Download Fails. E3 – Connected to previously paired phone for phone features, but Call History Download Fails. E4 – Connected to previously paired phone for phone features, but Text Messaging Synchronization Fails. E5 – Connected to previously paired phone for phone features, but Message Notification Fails. E6 - Signal, Phone Battery Strength and/or Roaming Status not available. E7 - The active call does not become Handsfree after a connection to the In-Vehicle Infotainment System.
Interfaces	G-HMI

4.2.1.16 BTP-UC-REQ-033805/B-Incoming Connection Received from a previously paired phone , while already connected to another previously paired phone (TcSE ROIN-290881-1)

Linked Elements
BTP-FUR-REQ-113744/C-Connection method
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-194148/B-Device Friendly Name

Actors	Customer Mobile Phone
Pre-conditions	More than one mobile phone is currently paired to the In-Vehicle Infotainment System. A phone is connected to In-Vehicle Infotainment System for phone or media player features, or both. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The In-Vehicle Infotainment System is connected to another mobile phone for phone or for media player features. A paired phone has indicated that it wants to connect to the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System remains connected to the current phone. The In-Vehicle Infotainment System rejects the connection request from the non-connected paired phone.

	No customer notification required.
List of Exception Use Cases	N/A
Interfaces	N/A

4.2.1.17 BTP-UC-REQ-192203/A-Turning Bluetooth on

Linked Elements
BTP-UC-REQ-033791/C-Connecting to a previously paired phone upon resume (No Active Call) (TcSE ROIN-290867-1)
BTP-UC-REQ-033798/C-Connecting to a previously paired phone upon resume (Active Call) (TcSE ROIN-290874-1)
BTP-UC-REQ-033803/C-Connecting to a previously paired phone via phone (No Active Call) (TcSE ROIN-290879-1)
BTP-UC-REQ-033804/C-Connecting to a previously paired phone via phone (Active Call) (TcSE ROIN-290880-1)
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone Customer
Pre-conditions	Bluetooth has be turned off by the user
Scenario Description	The customer has indicated that they want to turn Bluetooth back on
Post-conditions	The In-Vehicle Infotainment System restarts the Bluetooth chip. The sequence described in section BTP-FUR-REQ-033782-Connection Order and Requirements shall be followed. The current media source shall not change. If the re-connected phone has an active call, please see BTP-FUR-REQ-033798 and BTP-UC-REQ-033804.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.2.2 Requirements

4.2.2.1 BTP-FUR-REQ-033807/B-Number of Connections and Connection Confirmation (TcSE ROIN-295039-2)

The HFP Port of In-Vehicle Infotainment System will support being connected to one device at a time. The In-Vehicle Infotainment System shall query the AG for the correct RFCOMM port via SDP at every connection attempt, to ensure the correct port is used.

4.2.2.2 BTP-FUR-REQ-033810/B-Connection Error States (TcSE ROIN-304240-1)

The In-Vehicle Infotainment System shall have the ability to detect the following error states when attempting to connect to a previously paired device:

ECS-1	Authentication has failed.
ECS-2	The device is present, but has rejected the In-Vehicle Infotainment's request to connect to a specific profile.

See also:
- BTP-FUR-REQ-033811-Authentication Failed
- BTP-FUR-REQ-033812-Device is Preset, but has rejected or failed to allow a connection to HFP/A2DP

4.2.2.3 BTP-FUR-REQ-033811/B-Authentication Failed (TcSE ROIN-304241-1)

The In-Vehicle Infotainment System shall determine that authentication has failed when the device that it is attempting to connect to responds with Not Accepted with a reason code PIN or Key Missing to its au_rand request.

The HMI may display a special error case in this situation (ECS-1)*, letting the user know that he/she might need to repair the phone with the IVIS.

*See BTP-FUR-REQ-033810-Connection Error States

4.2.2.4 BTC-FUR-REQ-226888/B-Remote Audio Volume Control

The In-Vehicle Infotainment System shall support “Remote Audio Volume Control” in that way, that it shall announce the feature via BRSF, but shall ignore all +VGM and +VGS requests which are sent out by the connected device.

This procedure allows the In-Vehicle Infotainment System to inform the HFP connected device of the current gain settings corresponding to the current speaker volume and microphone gain. For detailed information please see Bluetooth HFP Spec v1.6.
This feature will be used to “force” the connected mobile device to set its own volume level to maximum to ensure a most comfortable customer experience with regards to volume synchronization between the different sources e.g. SIRI EYES FREE and PHONE CALL.

On every connection to the HFP device the own volume level should be communicated via the commands AT+VGM and AT+VGS. The initial value for both AT commands shall be “8” by default.

4.2.2.5 BTC-FUR-REQ-194148/B-Device Friendly Name

The In-Vehicle Infotainment System shall request the user-friendly name associated with the paired device. Upon each connection the name shall be requested again to ensure that it is up to date.
This name shall be shown to the customer according the HMI specification, e.g. in the device list or on the BTAudio base screen, with a maximum length of 19 characters.

4.2.2.6 BTP-FUR-REQ-041731/A-Device Indentification (TcSE ROIN-304264-1)

The in-vehicle infotainment system shall identify a device as an Apple iOS device when the vendor identification of the connected device is reported as Apple.

4.2.2.7 BTC-FUR-REQ-267621/A-Getting time information from the connected mobile device

Every time the In-Vehicle Information System gets a successful Messages Listing from the connected phone, the MSETime parameter will be received.
The content of this parameter shall be propagated up from the Bluetooth stack and made available to other application layers in the IVIS.

4.2.3 Sequence Diagrams

4.2.3.1 BTC-SD-REQ-249149/A-Transmit BTPhone friendly name

Linked Elements
BTC-UC-REQ-248020/B-Transmit BTPhone Friendly name

Scenarios
Normal Usage
The BTPhone Client requests the BTPhone “friendly” name.

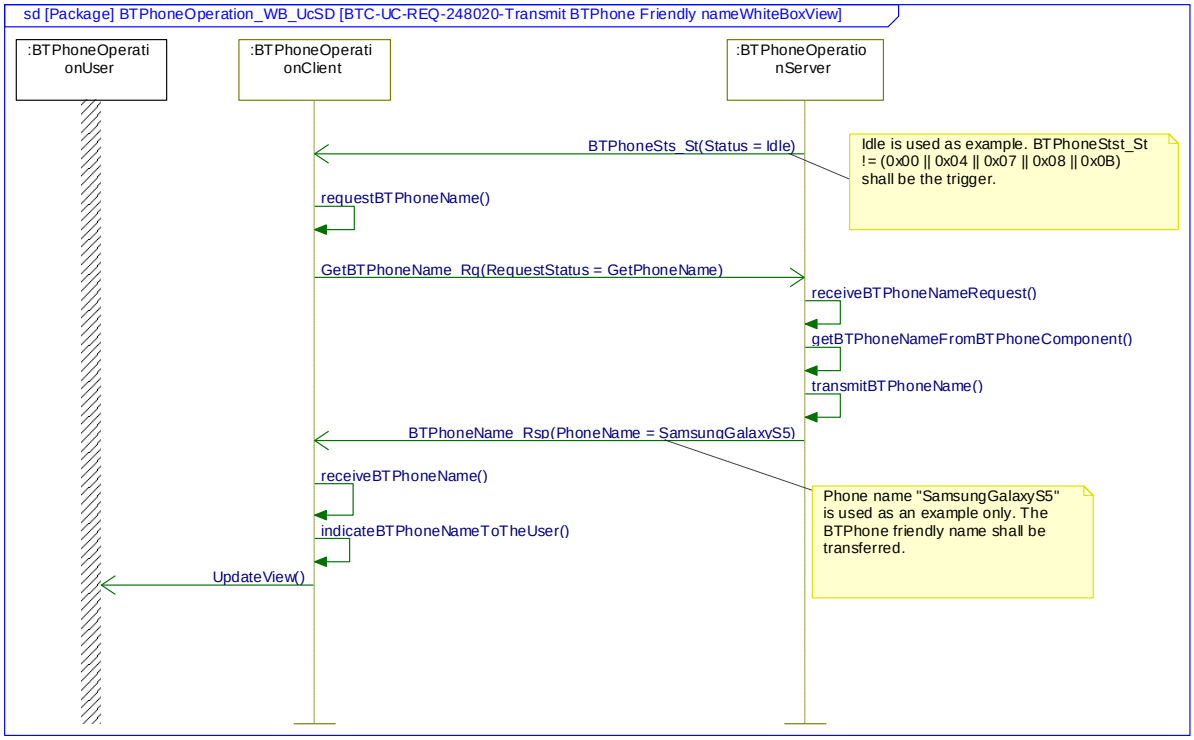
Constraints

Pre-Condition
In-Vehicle Infotainment System is On

Pre-Condition
Previously paired phone is connected successfully.

Post-Condition
The BTPhone “friendly” name is transferred and indicated to the user via <<HMI output>>

Sequence Diagram



4.3 BTP-FUN-REQ-439390/A-Connecting a Paired Audio Device

4.3.1 Use Cases

4.3.1.1 BTP-UC-REQ-033814/E-Connecting an Audio Player Upon Resume (TcSE ROIN-290883-1)

Linked Elements
BTC-FUR-REQ-192160/B-Media Player Resume for Bluetooth
BTC-FUR-REQ-116805/E-Bluetooth Audio Volume Set
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-192235/A-Metadata Information
BTC-FUR-REQ-192178/A-Track ID
BTC-FUR-REQ-192207/A-Track time
BTC-FUR-REQ-192236/A-Register for Event Notifiction
BTC-FUR-REQ-192237/A-Resume robustness
BTC-FUR-REQ-194148/B-Device Friendly Name
BTC-FUR-REQ-192174/B-Repeat and Shuffle

BTC-FUR-REQ-226428/A-Bluetooth Audio Connection Robustness
BTP-UC-REQ-033749/B-Connection Cannot be established for audio source (TcSE ROIN-290857-1)
BTP-UC-REQ-033750/B-Connection Cannot be established for audio control (TcSE ROIN-290858-1)
BTC-FUR-REQ-439391/A-Media Player Resume for Bluetooth
BTC-FUR-REQ-192173/B-BTAudio Reconnection Order

Actors	Customer Audio Player
Pre-conditions	Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). At prior suspend (or system shut down) In-Vehicle Infotainment System was sourced and connected to Audio Player (via Bluetooth)
Scenario Description	The customer has returned to the vehicle and activated the In-Vehicle Infotainment System.
Post-conditions	The same device will be connected for Media Player Functionality which is connected for Phone Functionality. The newly connected audio player is now the active source and playback resumes.
List of Exception Use Cases	E1 – Connection Cannot be established for audio source. E2 – Connection Cannot be established for audio control. E3 – Another BTAudio device is connected after resume
Interfaces	G-HMI Vehicle System Interface

4.3.1.2 BTP-UC-REQ-033749/B-Connection Cannot be established for audio source (TcSE ROIN-290857-1)

Linked Elements
BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033763/B-Pairing a phone with other device(s) connected and Pairing / Connecting Not Successful (TcSE ROIN-290855-2)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System cannot establish a connection for audio source (i.e. A2DP)
Post-conditions	A retry shall be attempted as specified in BTC-UC-REQ-226428. When not successful the audio connection is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.3.1.3 BTP-UC-REQ-033750/B-Connection Cannot be established for audio control (TcSE ROIN-290858-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033770/D-Pairing an Audio Device via non-SSP – Discovery Mode (TcSE ROIN-290864-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-033764/C-Pairing an Audio Device via SSP – Discoverable Mode (TcSE ROIN-290856-1)

BTP-UC-REQ-033766/C-Pairing an Audio Device via SSP – Discovery Mode (TcSE ROIN-290860-1)
BTP-UC-REQ-033768/C-Pairing an Audio Device via non-SSP – Discoverable Mode (TcSE ROIN-290862-1)
BTP-UC-REQ-033772/C-Pairing an Audio Device with other Device(s) paired – Discoverable / Discovery Mode (TcSE ROIN-290866-1)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033763/B-Pairing a phone with other device(s) connected and Pairing / Connecting Not Successful (TcSE ROIN-290855-2)
BTP-UC-REQ-033765/C-Pairing an Audio Device via SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290859-1)
BTP-UC-REQ-033767/C-Pairing an Audio Device via SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290861-1)
BTP-UC-REQ-033769/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discoverable Mode (TcSE ROIN-290863-1)
BTP-UC-REQ-033771/B-Pairing an Audio Device via non-SSP with other Device(s) connected – Discovery Mode (TcSE ROIN-290865-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System cannot establish a connection for audio control (i.e. AVRCP)
Post-conditions	A retry shall be attempted as specified in BTC-UC-REQ-226428. When not successful the audio control is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.3.1.4 BTP-UC-REQ-131104/A-Another BTAudio Device is connected after resume

Linked Elements
BTC-FUR-REQ-192160/B-Media Player Resume for Bluetooth
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)
BTC-FUR-REQ-192173/B-BTAudio Reconnection Order
BTC-FUR-REQ-439391/A-Media Player Resume for Bluetooth

Actors	Customer Audio Player
Pre-conditions	Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). At prior suspend (or system shut down) In-Vehicle Infotainment System was sourced and connected to an Audio Player (via Bluetooth)
Scenario Description	The customer has returned to the vehicle and activated the In-Vehicle Infotainment System.
Post-conditions	The same device will be connected for Media Player Functionality which is connected for Phone Functionality. If another Audio player was connected prior to system shut down the new device shall not be the active source. The In-Vehicle Infotainment System shall switch to the previous Audio Source, which was active prior to BTAudio.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.3.1.5 BTP-UC-REQ-033815/C-Connecting an Audio Player (TcSE ROIN-290884-1)

Linked Elements
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-113744/C-Connection method
BTC-FUR-REQ-194148/B-Device Friendly Name
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)

Actors	Customer Audio Player
Pre-conditions	Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). An audio player must be paired. No other device is connected currently.
Scenario Description	The customer has indicated that they intend to connect a previously paired device for Media Player functionality
Post-conditions	The In-Vehicle Infotainment System connects the selected device for Phone and for Media Player functionality.
List of Exception Use Cases	E1 – Connection Cannot be established for audio source. E2 – Connection Cannot be established for audio control.
Interfaces	G-HMI Vehicle System Interface

4.3.1.6 BTP-UC-REQ-033816/D-Connecting an Audio Player w/Audio Player Already Connected (TcSE ROIN-290885-1)

Linked Elements
BTP-FUR-REQ-113744/C-Connection method
BTC-FUR-REQ-194148/B-Device Friendly Name
BTC-FUR-REQ-226427/A-Switching BTAudio devices while sourced
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)

Actors	Customer Audio Player
Pre-conditions	Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). An audio player must be paired. Another device is connected for media player functionality. (A) BTAudio is active audio source. (B) Any other audio source is active.
Scenario Description	The customer has indicated that they intend to connect a previously paired audio player.
Post-conditions	The In-Vehicle Infotainment System releases the connection to the device that was initially connected for media player feature when the Customer indicated a desire to connect to a new device for Media Player feature. The In-Vehicle Infotainment System connects the selected device for Media Player functionality. (A) The newly connected audio player is now the active audio source. (B) BTAudio won't be sourced automatically, if not already sourced before.
List of Exception Use Cases	E1 – Connection Cannot be established for audio source. E2 – Connection Cannot be established for audio control.
Interfaces	G-HMI

4.3.1.7 BTP-UC-REQ-113756/C-Connecting an Audio Player w/Phone Already Connected

Linked Elements
BTP-FUR-REQ-113744/C-Connection method
BTC-FUR-REQ-194148/B-Device Friendly Name
BTC-FUR-REQ-226427/A-Switching BTAudio devices while sourced
BTP-FUR-REQ-192089/B-Master/slave roles in a Bluetooth connection and role switch strategies
BTP-FUR-REQ-033782/E-Connection Order and Requirements (TcSE ROIN-295157-2)

Actors	Customer Audio Player
Pre-conditions	Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). An audio player must be paired. Another device is already connected for Phone and for Media Player Functionality

	(A) BTAudio is active audio source. (B) Any other audio source is active.
Scenario Description	The customer has indicated that they intend to connect a previously paired audio player, either by selecting the device for media feature only, or by selecting a device which does only support media player functionality.
Post-conditions	The In-Vehicle Infotainment System connects the selected device for Media Player functionality. The previous connected device is still connected for Phone functionality. (A) The newly connected audio player is now the active audio source. (B) BTAudio won't be sourced automatically, if not already sourced before.
List of Exception Use Cases	E1 – Connection Cannot be established for audio source. E2 – Connection Cannot be established for audio control.
Interfaces	G-HMI

4.3.1.8 BTP-UC-REQ-192204/A-Turning Bluetooth off while listening to BTAudio

Linked Elements
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Device Customer
Pre-conditions	A mobile device is connected and streaming Bluetooth audio to the In-Vehicle Infotainment System
Scenario Description	The customer has indicated that they want to turn Bluetooth off
Post-conditions	The In-Vehicle Infotainment System attempts to pause media playback on the device and then closes Bluetooth connections with the connected device before turning the Bluetooth chip off. After this operation, the current media source shall switch to the default media source.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.3.1.9 BTP-UC-REQ-193065/A-Handling iOS Devices with Multiple Connection Methods (iAP2)

Actors	User, Infotainment System, iAP2 device
Pre-conditions	Infotainment System On Media device is paired over Bluetooth and supports Bluetooth Stereo Media device is connected over USB
Scenario Description	The user has paired and connected the device via Bluetooth, and USB
Post-conditions	System detects that the device is connected over both Bluetooth audio and USB Digital Audio. System shall allow to source the device either via BTAudio or via USB. According to the selected source the stream shall resume via the associated interface. When the system or the customer is sourcing away from USB the system shall stop the USB Audio stream.

List of Exception Use Cases	
Interfaces	G-HMI, V-HMI, USB Interface, BT Interface, Vehicle System Interface

4.3.2 Requirements

4.3.2.1 BTC-FUR-REQ-439391/A-Media Player Resume for Bluetooth

Once an A2DP device is connected, the IVIS shall send a play command to the device within 500 msec.
For the case that no connection can be established within 30 seconds the default source shall be sourced*. This timer should be configurable and aligned with HMI specification.

*note, see applicable Audio Management / Station Management SPSS for details.

4.3.2.2 BTC-FUR-REQ-231386/A-Media Player Device Presence Check

The In-Vehicle Infotainment System shall check for the presence of connected media devices according BTP-FUR-REQ-033782 Connection order and requirements.

When this requirement here is applicable and IVIS connects to an A2DP device after system start up and that same device was sourced on suspend, then the A2DP device shall be sourced. Otherwise, the default source shall be sourced*.

*note, see applicable Audio Management / Station Management SPSS for details.

4.3.2.3 BTC-FUR-REQ-192172/A-A2DP Connection while not sourced

The Bluetooth A2DP connection shall be maintained if the user changes the Media Player source away from Bluetooth A2DP.

See also MP-FUR-REQ-020211-Bluetooth Connections – Connecting while not sourced

4.3.2.4 BTC-FUR-REQ-226427/A-Switching BTAudio devices while sourced

The Bluetooth Audio source shall be kept active when the user changes paired Bluetooth devices.
If the manual connection attempt fails (see BTP-FUR-REQ-033782 Connection Order and Requirements) the BTAudio source shall be released.

4.3.2.5 BTC-FUR-REQ-226428/A-Bluetooth Audio Connection Robustness

When the IVIS is detected following error state after trying to connect a device for MEDIA functionality, a retry attempt should be made to recover the error state

1) AVRCP is connected but A2DP is not
2) A2DP is connected but AVRCP is not

In such a case IVIS shall disconnect the connected profile and try to reconnect both profiles again.
If the retry mechanism is not successful, no other retry should be made, and no profile should be disconnected.

4.3.2.6 BTC-FUR-REQ-116805/E-Bluetooth Audio Volume Set

The In-Vehicle Infotainment System shall advertise itself as an AVRCP target to be able to implement the absolute volume feature described in the AVRCP 1.4 Bluetooth specifications.
IVIS shall advertise support of the volume changed event notification.
The system should advertise its current volume level, but will never send an event to notify the connected phone that the volume changed, and will not change its volume in case the phone sends absolute volume change commands.
When receiving a change request from the mobile device the corresponding response shall contain the value which was requested by the device.
See also the associated requirement in the Media SPSS (*MP-FUR-REQ-093951/A-Bluetooth Audio Volume)*

4.3.2.7 BTC-FUR-REQ-192174/B-Repeat and Shuffle

Upon connection to the device the In-Vehicle Infotainment System shall request the AVRCP List Application Setting Attributes and their values to get the capabilities for the repeat and shuffle feature and their status. Based on the capabilities the costumer should have an option via GUI to set the different supported repeat and shuffle states.

If the device is not supporting the event notification for repeat and shuffle (EVENT_PLAYER_APPLICATION_SETTING_CHANGED) or is not reporting the current player application setting value for repeat and shuffle, the feature should not be offered via HMI.
IVIS shall monitor the event notification at any time to keep track of eventual changes of the value from the phone side.
When the connected media device is the active audio source, the HMI shall reflect the repeat and shuffle status within 500 milliseconds of detecting a change to the repeat and shuffle status of the active media player application in the connected media device.

If supported, the repeat state shall be set to “all track repeat” by default upon device connection for the case the system recognizes repeat state is OFF upon device connection.
If supported, the shuffle state shall be not changed by the In-Vehicle Infotainment System upon device connection.

Repeat and shuffle state set by the user shall not be persisted across connection cycles.

The In-Vehicle Infotainment System shall monitor the EVENT_ADDRESSED_PLAYER_CHANGED and ensure whether the Repeat and Shuffle application settings are supported in the newly addressed player. The HMI shall reflect the support of Repeat and Shuffle in the currently addressed player.

See also MP-FUR-REQ-020053-Controls – Repeat on Smart Devices, and
MP-FUR-REQ-020044/B-Controls – Shuffle on Smart Devices

4.3.2.8 BTC-FUR-REQ-192235/A-Metadata Information

Upon connection to the mobile device the In-Vehicle Information System shall gather all available information for current media item:

- Title
- Artist Name
- Album name
- Track Number
- Total Number of Tracks
- Genre
- Playing Time (SongPosition)
- Total track time (SongLength)

On every track change event the information shall be requested again.

4.3.2.9 BTC-FUR-REQ-192178/A-Track ID

The In-Vehicle Infotainment System shall gather information about the track number of the active track and the total number of tracks of the active folder.

The gathered information is not valid and shall be handled as unavailable if unknown or equal to 0.

HMI guideline:

a. Only the current track number shall be shown, if only this information is available.
b. Only the current track number shall be shown, if the track number is greater than the total amount of tracks.
c. The track number and total amount of tracks in the active folder shall be shown, if both information are available.
d. If the active track number is greater than the total number of tracks the total number of tracks shall not be shown.
e. No track number shall be shown, and no total number of tracks, if neither of this information is available.

4.3.2.10 BTC-FUR-REQ-192207/A-Track time

The IVIS shall gather information about the track time of the track that is being played via Bluetooth Audio.
Both total track time and elapsed time shall be gathered.
In general this information might be used by the GUI display to the user the progress of the track.
Notice that in no case the total track time shall be displayed if unknown or equal to 0, or equals -1 (Hex 0xFFFFFFFF).
Also, the total time shall not be displayed if the elapsed time is greater than the total time, or equals -1 (Hex 0xFFFFFFFF).
Some care should also be taken to avoid displaying at all times an elapsed time of ZERO, which is a problem with certain families of Bluetooth devices. In that case, if the elapsed time stays at zero for more than 5 seconds, for a device that is playing a song (as determined by player status) then the elapsed time shall not be displayed.

a. The elapsed time shall be shown on the left side of the progress bar.
b. The total time shall be shown on the right side of the progress bar.
c. The progress bar and total play time shall not be displayed if the total play time is unknown or equal to 0.
d. The progress bar and total play time shall not be displayed if the elapsed time is greater than the total time or equals -1 (Hex 0xFFFFFFFF), for Bluetooth devices.
e. The progress bar and total play time shall not be displayed if the total play time equals -1 (Hex 0xFFFFFFFF), for Bluetooth devices.
f. The progress bar shall always be the same length.
g. The progress bar shall fill proportional to the current playback position to that of the total track play time.
h. The progress bar shall fill left to right.

4.3.2.11 BTC-FUR-REQ-284423/A-AVRCP Cover Art

The IVIS shall advertise support for Cover Art in its SDP record.
The IVIS shall only attempt to use the Cover Art feature with phones that advertise Cover Art in their SDP record.
When the connected phone advertises support for Cover Art via SDP, the IVIS shall monitor the value of bit 68 of the currently addressed player.
When the bit is set to signify that Cover Art is supported, the IVIS shall try to establish the Cover Art Obex connection, per AVRCP specifications.
If the addressed player changes and does not support the feature, the Cover Art Obex connection shall be closed.
If the AVRCP connection is closed, the Cover Art Obex connection shall be closed.

GetLinkedThumbnail shall be the only method used to retrieve Cover Art by the IVIS.
The Cover Art shall be retrieved every time the Cover Art handle is advertised by the connected phone.

4.3.2.12 BTC-FUR-REQ-192236/A-Register for Event Notifiction

Upon connection of an AVRCP channel the In-Vehicle Infotainment System shall register for following event notifications:

- Event_Playback_Status_Changed
- Event_Track_Changed
- Event_Player_Application_Setting_Changed
- Event_Addressed_Player_Changed
- Event_Now_Palying_Content_Changed
- Event_UIDs_Changed

4.3.2.13 BTC-FUR-REQ-192237/A-Resume robustness

At any time where the Bluetooth Media Player should resume and the In-Vehicle Infotainment System is sending out a Play Request to the connected device the IVIS shall monitor if the Play request is executed and Audio data are received accordingly.

If a play request is not executed by the connected device as described in following scenarios the IVIS shall do a retry:

a. If the Play request is not acknowledged within 500ms.

b. If the Media player status of the connected device is not changed within 1000ms after play request is acknowledged.

c. If no A2DP data are received within 2000ms after media player status was set to “playing”.

4.3.2.14 BTP-FUR-REQ-041733/A-iPhone Connected via A2DP and USB (TcSE ROIN-304493-1)

The customer may opt to connect an iPhone to the in-vehicle infotainment system via A2DP and/or USB. In this scenario the customer could enter a state in which audio is from the connected iPhone is routed from the iPhone via a A2DP when the iPhone is sourced for USB and / or vice versa. The supplier shall be responsible for developing a solution that insures that the customer is sourced to the correct audio source in this scenario. The supplier shall be responsible for obtaining Ford Motor Company approval of the solution prior to implementation.

4.3.2.15 BTC-FUR-REQ-270513/A-Audio Delay

The In-Vehicle Infotainment System shall not introduce more than 1000msec of delay between the time when a sbc audio packet is received and when it is played out to the speakers.
The In-Vehicle Infotainment System needs to introduce some delay for buffering purposes to guarantee a smooth playback, but this shall not exceed 1000msec.
Buffering shall be 250msec, and the In-Vehicle Infotainment System shall be capable of storing additional 750msec of music in case sbc packets are received at a higher rate than at which they are played back.

When this 1000msec buffer is full, older packets shall be overridden by newer packets even if they have not yet been played out.

4.3.2.16 BTC-FUR-REQ-270514/A-Audio Delay Reporting

The In-Vehicle Infotainment System shall advertise support for AVDTP delay reporting.
The In-Vehicle Infotainment System, as the SNK in the A2DP connection, shall initiate the Delay reporting procedure per AVDTP and A2DP specifications right after the stream configuration procedure, if the audio SRC (connected mobile device) supports it. The first delay report shall be set to the buffering delay and subsequent reports shall be sent whenever the delay is outside the accuracy range of the previously reported delay.

For more information see AVDTP and A2DP specifications.

4.4 BTP-FUN-REQ-041857/A-Display Phone Home Screen Information (TcSE ROIN-294457-1)

4.4.1 Sequence Diagrams

4.4.1.1 BTP-SD-REQ-030695/D-Phone Home Screen-no call is active (TcSE ROIN-118778-2)

Linked Elements
BTP-FUN-REQ-047958/B-Bluetooth Diagnostics Strategies and Procedures (TcSE ROIN-304518-1)
BTP-FUN-REQ-041857/A-Display Phone Home Screen Information (TcSE ROIN-294457-1)
BTP-FUN-REQ-047944/A-Hands-Free Audio Performance (TcSE ROIN-303968-1)

Scenarios

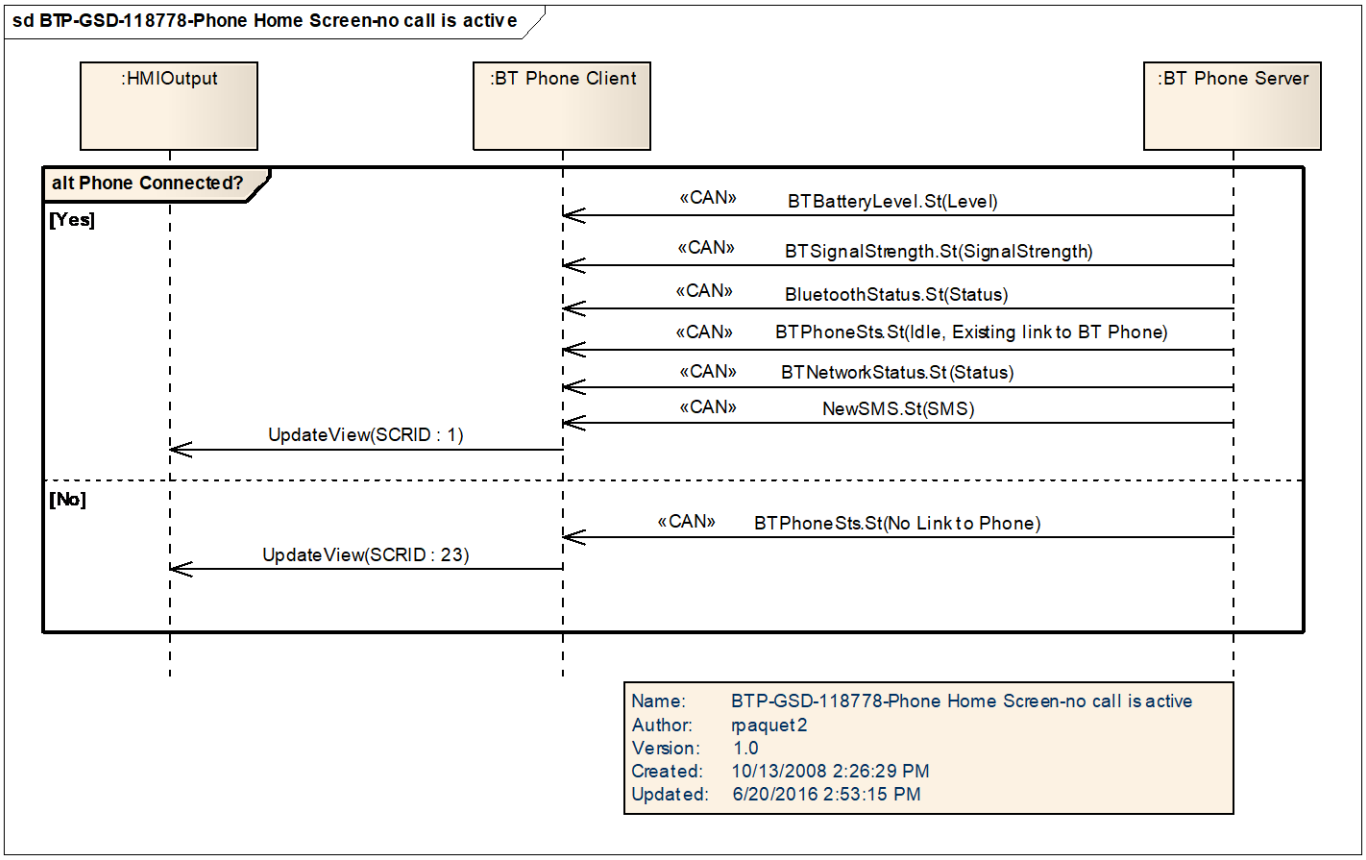
Normal Usage
User is monitoring status of the BT phone that is connected, via the cluster display.

Constraints

Pre-condition
User is on the Cluster Phone home screen. HMI displays status for {Battery level, Signal strength, Bluetooth, Network, Text message or email message available indication if supported by IVIS}

Post-condition
User is on the Cluster Phone home screen. HMI displays status for {Battery level, signal strength, Bluetooth connection, Network, Text message or email message available indication if supported by IVIS}

Sequence Diagram



4.5 BTP-FUN-REQ-439392/A-Incoming Call

4.5.1 Use Cases

4.5.1.1 BTP-UC-REQ-041846/A-Incoming Call Ringing (TcSE ROIN-290908-2)

Linked Elements
BTC-FUR-REQ-191908/A-Caller ID format
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing. The In-Vehicle Infotainment System notifies the Customer that an incoming call is present by having the ability to: Provide ring from connected phone Provide a default ring Show the information provided by the connected phone relative to the incoming call (i.e. phone number, etc.) Show the phonebook metadata if available
Post-conditions	The Customer would have the option to: Ignore (no action) Answer Reject the incoming call
List of Exception Use Cases	E1 – Connected phone does not indicate to In-Vehicle Infotainment System that an incoming call is present. E2 – Network Coverage Lost
Interfaces	G-HMI Vehicle System Interface SWC

4.5.1.2 BTP-UC-REQ-041847/A-Connected phone does not indicate to In-Vehicle Infotainment System that an incoming call is present (TcSE ROIN-292572-1)

Linked Elements
BTP-UC-REQ-041846/A-Incoming Call Ringing (TcSE ROIN-290908-2)
BTP-UC-REQ-041855/A-Incoming Call Waiting Notification (TcSE ROIN-290917-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	Connected phone does not indicate to In-Vehicle Infotainment System that an incoming call is present.
Post-conditions	No Action
List of Exception Use Cases	N/A
Interfaces	N/A

4.5.1.3 BTP-UC-REQ-041848/A-Incoming Call Answer via In-Vehicle Infotainment System (TcSE ROIN-290909-2)

Linked Elements
BTC-FUR-REQ-191908/A-Caller ID format
BTP-SD-REQ-030699/A-Incoming Call - Accept Call (TcSE ROIN-118785-3)
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)
BTP-SD-REQ-439393/A-Incoming Call - Accept Call

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated (i.e. ringing), and the customer has opted to answer the incoming call via the In-Vehicle Infotainment System.
Post-conditions	The incoming call has been answered. The incoming ring notification is no longer present. The audio for the call is available through the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System has the ability to display the information as provided by the connected phone relating to the name or number of the currently active call. The Customer has the active call options available to them.
List of Exception Use Cases	E1 – The incoming call is not answered. E2 – Incoming Call is answered, but Audio is not Handsfree. E3 – Network Coverage Lost
Interfaces	G-HMI Vehicle System Interface SWC

4.5.1.4 BTP-UC-REQ-041849/A-The incoming call is not answered (TcSE ROIN-290910-1)

Linked Elements
BTP-UC-REQ-041848/A-Incoming Call Answer via In-Vehicle Infotainment System (TcSE ROIN-290909-2)
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)

Actors	Connected Phone Customer
Pre-conditions	Same as original use case
Scenario Description	The customer has opted to answer an incoming call via the means available within the In-Vehicle Infotainment System, but the call is not answered.
Post-conditions	An error message is displayed to the customer. The In-Vehicle Infotainment System is no longer alerting the user of an incoming call. The In-Vehicle Infotainment System returns to its prior state
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.5.1.5 BTP-UC-REQ-041850/A-Incoming Call is answered, but Audio is not Handsfree (TcSE ROIN-290911-1)

Linked Elements
BTP-UC-REQ-041848/A-Incoming Call Answer via In-Vehicle Infotainment System (TcSE ROIN-290909-2)
BTP-UC-REQ-041851/A-Incoming Call Answer via Mobile Phone (TcSE ROIN-290912-1)

Actors	Connected Phone Customer
Pre-conditions	Same as original use case
Scenario Description	The customer has opted to answer an incoming call via the means available within the In-Vehicle Infotainment System the call has been answered, but the call audio is not Handsfree
Post-conditions	An error message is displayed to the customer. The In-Vehicle Infotainment System routes the call audio to the connected phone (if audio was routed from the connected phone to In-Vehicle Infotainment System).

	The In-Vehicle Infotainment System is no longer alerting the user of an incoming call. The In-Vehicle Infotainment System indicates that there is an active call, and the audio should be on the connected phone. Display call metadata if available.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.5.1.6 BTP-UC-REQ-041851/A-Incoming Call Answer via Mobile Phone (TcSE ROIN-290912-1)

Linked Elements
BTC-FUR-REQ-191908/A-Caller ID format
BTP-SD-REQ-030699/A-Incoming Call - Accept Call (TcSE ROIN-118785-3)
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)
BTP-SD-REQ-439393/A-Incoming Call - Accept Call

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated (i.e. ringing), and the customer has opted to answer the incoming call from the connected mobile phone.
Post-conditions	The incoming call has been answered. The incoming ring notification is no longer present. The audio for the call is available via the means indicated from the mobile phone. The In-Vehicle Infotainment System has the ability to display the information as provided by the connected phone relating to the name or number of the currently active call. The Customer has the active call options available to them. Display phone call metadata.
List of Exception Use Cases	E1 – Incoming Call is answered, but Audio is not Handsfree.
Interfaces	G-HMI Vehicle System Interface

4.5.1.7 BTP-UC-REQ-041852/A-Incoming Call Ringing (No Answer) (TcSE ROIN-290913-1)

Linked Elements
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing / alerting. In this scenario, the Customer has opted not to answer the call and ignore it until the call stops alerting.
Post-conditions	The incoming call is no longer alerting A customer is indicated that a missed call is present. The In-Vehicle Infotainment System returns to prior state.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.5.1.8 BTP-UC-REQ-041853/A-Incoming Call Ringing (Reject from In-Vehicle Infotainment System) (TcSE ROIN-290914-1)

Linked Elements
BTP-SD-REQ-030700/A-Incoming Call - Reject Call (TcSE ROIN-149690-3)
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)
BTP-SD-REQ-439394/A-Incoming Call - Reject Call

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing / alerting. In this scenario, the Customer has opted to manually reject the call from the In-Vehicle Infotainment System. .
Post-conditions	The incoming call is no longer alerting via the In-Vehicle Infotainment System and connected phone. A customer is indicated that the call was rejected. The In-Vehicle Infotainment System returns to prior state.
List of Exception Use Cases	E1 – Rejecting Call via In-Vehicle Infotainment System fails.
Interfaces	G-HMI SWC Vehicle System Interface

4.5.1.9 BTP-UC-REQ-033869/B-Rejecting Call via In-Vehicle Infotainment System fails (TcSE ROIN-290915-1)

Linked Elements
BTP-UC-REQ-033868/A-Do Not Disturb Active– Incoming Call (TcSE ROIN-290918-1)
BTP-UC-REQ-041853/A-Incoming Call Ringing (Reject from In-Vehicle Infotainment System) (TcSE ROIN-290914-1)

Actors	Connected Phone Customer
Pre-conditions	Same as original use case
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing / alerting. In this scenario, the Customer has opted to manually reject the call from the In-Vehicle Infotainment System – or when DND is set to on – IVIS is rejecting the call automatically, but the call is not rejected.
Post-conditions	The incoming call is no longer alerting via the In-Vehicle Infotainment System. The In-Vehicle Infotainment System returns to the prior state
List of Exception Use Cases	N/A
Interfaces	G-HMI SWC Vehicle System Interface

4.5.1.10 BTP-UC-REQ-041854/A-Incoming Call Ringing (Reject from connected phone) (TcSE ROIN-290916-1)

Linked Elements
BTP-SD-REQ-030700/A-Incoming Call - Reject Call (TcSE ROIN-149690-3)
BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)
BTP-SD-REQ-439394/A-Incoming Call - Reject Call

Actors	Connected Phone, Customer,
Pre-conditions	Mobile phone is connected
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing / alerting. In this scenario, the Customer has opted to manually reject the call from the connected phone.

Post-conditions	The incoming call is no longer alerting via the In-Vehicle Infotainment System and connected phone. Customer is alerted that there is a missed call. The In-Vehicle Infotainment System returns to the prior state.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.5.1.11 BTP-UC-REQ-041855/A-Incoming Call Waiting Notification (TcSE ROIN-290917-1)

Linked Elements
BTP-FUR-REQ-041823/A-Call Waiting Call Rejected (TcSE ROIN-295059-1)
BTP-FUR-REQ-041824/A-Call Waiting Call Ignored (TcSE ROIN-295060-1)
BTC-FUR-REQ-191908/A-Caller ID format
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)
BTP-FUR-REQ-410320/A-Max Number of Calls
BTP-FUR-REQ-041822/B-Call Waiting Call Accepted (TcSE ROIN-295058-1)
BTP-FUR-REQ-041820/B-Max Number of Calls (TcSE ROIN-295056-1)

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected Active call is present
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected and in an active call, an incoming call waiting call has been indicated by the phone. The In-Vehicle Infotainment System notifies the Customer that an incoming call is present by having the ability to: Show the information provided by the connected phone relative to the incoming call (i.e. phone number, etc.) Show the phonebook metadata if available
Post-conditions	The Customer would have the option to: Ignore (no action) Answer Reject the incoming call
List of Exception Use Cases	E1 – Connected phone does not indicate to In-Vehicle Infotainment System that an incoming call is present.
Interfaces	G-HMI Vehicle System Interface SWC

4.5.2 Requirements

4.5.2.1 BTP-FUR-REQ-041856/A-Incoming Calls (TcSE ROIN-295050-1)

During an incoming call notification the user will have the following options:

-Rejecting the incoming call by physically rejecting the call via In-Vehicle Infotainment System

-Accepting the call by answering the call via In-Vehicle Infotainment System

-Ignore the call: No Action, In-Vehicle Infotainment System shall consider this as a missed call

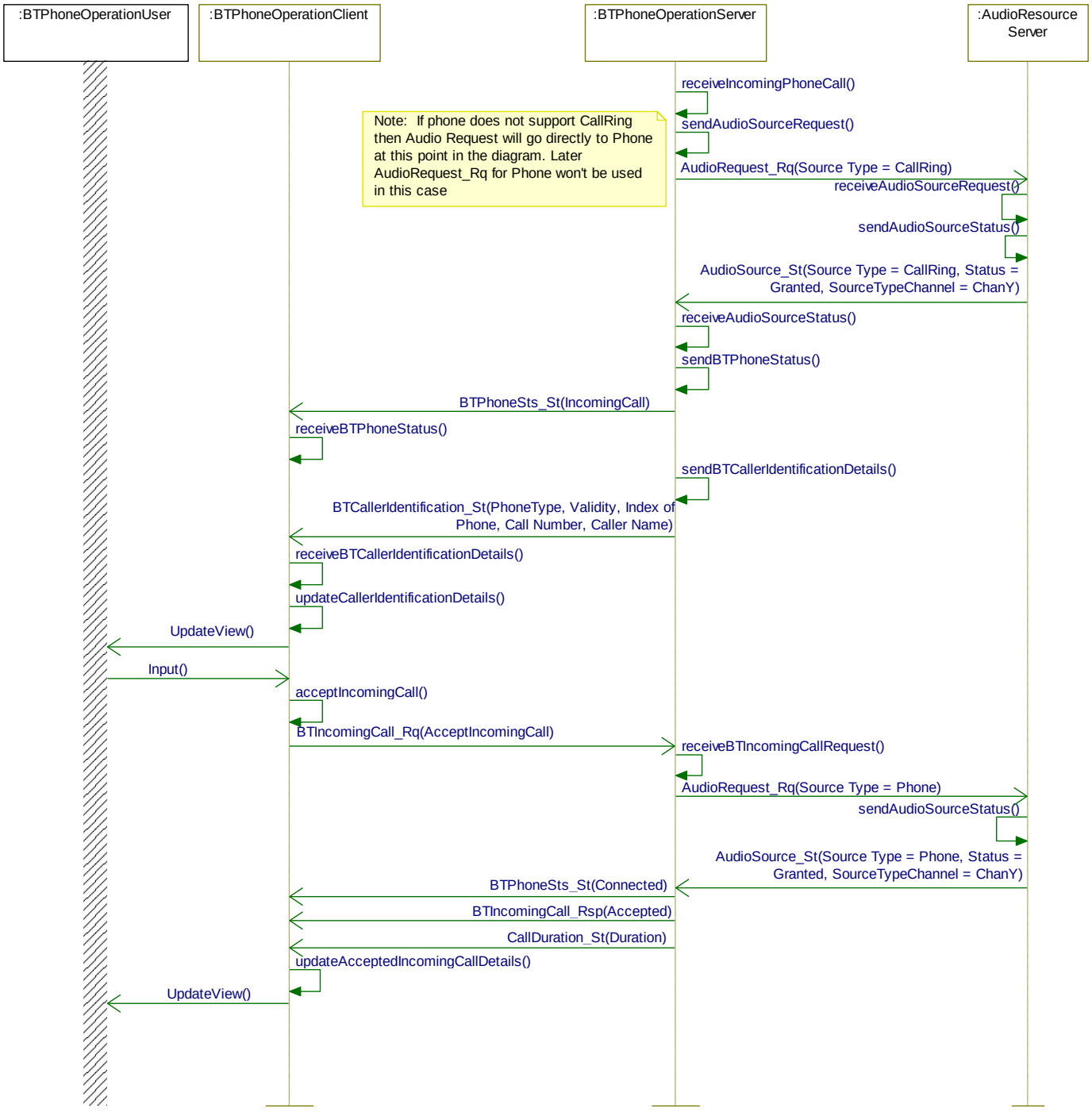
-Accepting the call by answering the call via the AG

-Rejecting the call via the AG

4.5.3 Sequence Diagrams

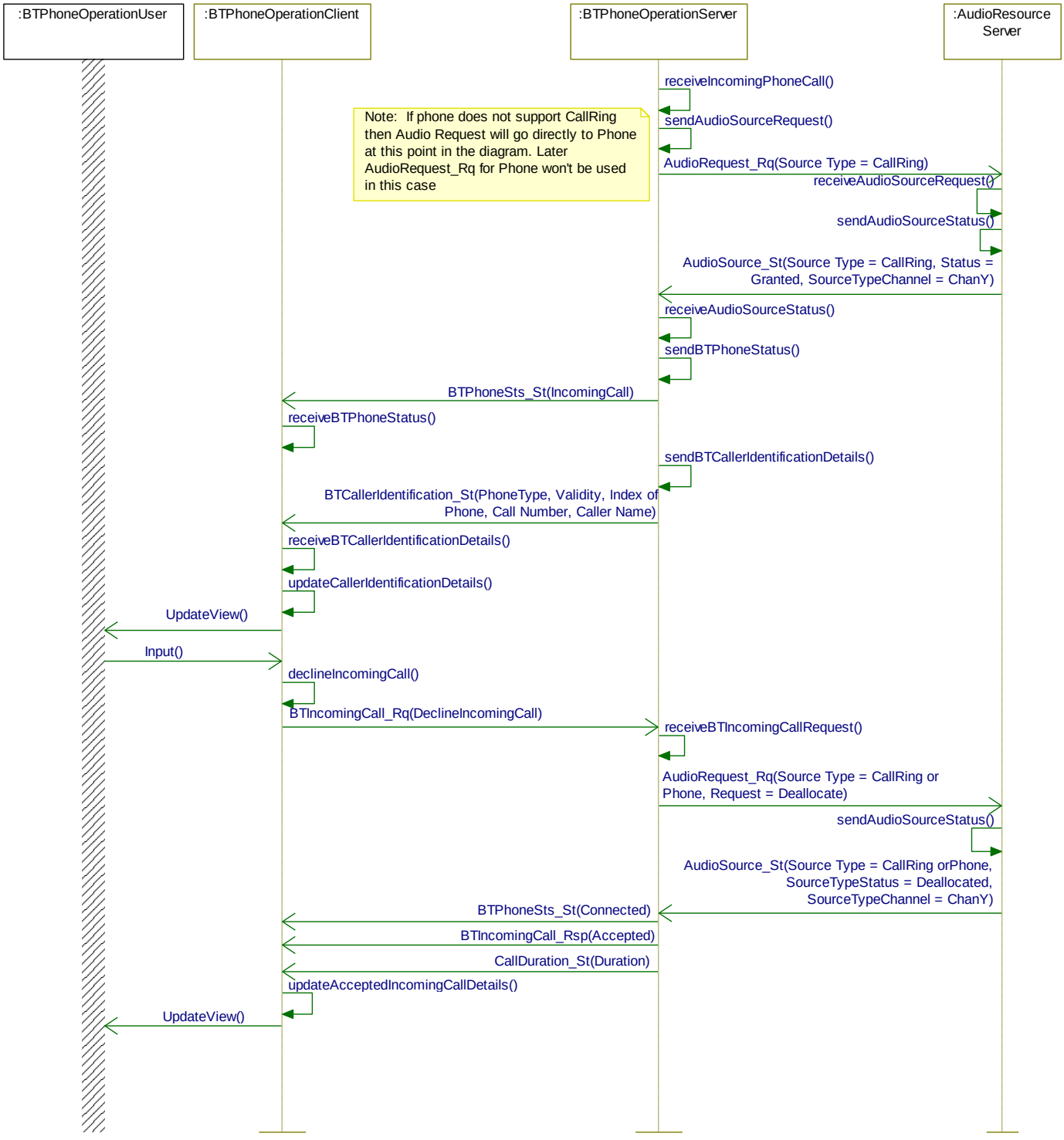
4.5.3.1 BTP-SD-REQ-439393/A-Incoming Call - Accept Call

Linked Elements
BTP-UC-REQ-041851/A-Incoming Call Answer via Mobile Phone (TcSE ROIN-290912-1)
BTP-UC-REQ-041848/A-Incoming Call Answer via In-Vehicle Infotainment System (TcSE ROIN-290909-2)



4.5.3.2 BTP-SD-REQ-439394/A-Incoming Call - Reject Call

Linked Elements
BTP-UC-REQ-041853/A-Incoming Call Ringing (Reject from In-Vehicle Infotainment System) (TcSE ROIN-290914-1)
BTP-UC-REQ-041854/A-Incoming Call Ringing (Reject from connected phone) (TcSE ROIN-290916-1)



4.6 BTP-FUN-REQ-439395/A-Outgoing Call

4.6.1 Use Cases

4.6.1.1 BTP-UC-REQ-033852/C-Outgoing Call to Phonebook Contact (TcSE ROIN-290897-1)

Linked Elements
BTP-FUR-REQ-033833/G-PBAP Requirements and Characteristics (TcSE ROIN-295079-1)
BTP-UC-REQ-033853/A-Outgoing Call Failed (TcSE ROIN-290898-1)
BTP-UC-REQ-033854/A-No Audio Available for Call (TcSE ROIN-290899-1)
BTP-UC-REQ-033856/A-Call Failed and No network coverage (TcSE ROIN-290901-1)
BTP-FUR-REQ-033830/A-Phonebook Accessibility (TcSE ROIN-295076-1)
BTP-UC-REQ-153575/B-Phonebook is empty
BTP-FUR-REQ-410321/A-PBAP Requirements and Characteristics
BTP-FUR-REQ-410335/A-Contact Characteristics / Data
BTP-FUR-REQ-033864/B-Outgoing Call Methods (TcSE ROIN-295048-2)
BTP-FUR-REQ-033834/C-Auto Phonebook Download (TcSE ROIN-295080-1)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)
BTP-FUR-REQ-033837/C-Phonebook Download Error (TcSE ROIN-295083-1)
BTP-FUR-REQ-033835/C-Phonebook Updating (TcSE ROIN-295081-1)
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)
BTP-FUR-REQ-033841/I-Contact Characteristics / Data (TcSE ROIN-295087-1)
BTP-FUR-REQ-033839/D-PBAP Access Failure (TcSE ROIN-295085-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook has been downloaded AND is available
Scenario Description	The Customer has opted to initiate a phone call to a contact within his / her phonebook. This action can be completed via V-HMI, manually selecting a contact from the phonebook, or manually selecting a contact to call from the call history (if available).
Post-conditions	A call is established to the chosen contact. The In-Vehicle Infotainment System displays the name of the called contact. The In-Vehicle Infotainment System displays the photo of the contact (if available) Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options: End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Outgoing call failed. E2 – No audio available for call. E3 – Call failed and no network coverage E4 – Phonebook is empty
Interfaces	V-HMI G-HMI

4.6.1.2 BTP-UC-REQ-033853/A-Outgoing Call Failed (TcSE ROIN-290898-1)

Linked Elements
BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)
BTP-UC-REQ-033863/A-Outgoing call initiated while Roaming (TcSE ROIN-290907-1)
BTP-UC-REQ-033852/C-Outgoing Call to Phonebook Contact (TcSE ROIN-290897-1)
BTP-UC-REQ-033857/B-Outgoing Call via Digit Dial (TcSE ROIN-290902-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	When attempting to make an outgoing call, the call was unsuccessful.
Post-conditions	The customer is notified that the call is unsuccessful. The In-Vehicle Infotainment System returns to prior state.

List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.6.1.3 BTP-UC-REQ-033854/A-No Audio Available for Call (TcSE ROIN-290899-1)

Linked Elements
BTP-UC-REQ-033852/C-Outgoing Call to Phonebook Contact (TcSE ROIN-290897-1)
BTP-UC-REQ-033857/B-Outgoing Call via Digit Dial (TcSE ROIN-290902-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	When attempting to make an outgoing call, the call audio was not routed via the speakers within the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System routes call audio back to connected phone. The customer is notified that the call audio is not routed through the In-Vehicle Infotainment System speakers, and that the call audio is on the handset.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.6.1.4 BTP-UC-REQ-033855/A-Number busy (TcSE ROIN-290900-1)

Linked Elements
BTP-UC-REQ-033852/C-Outgoing Call to Phonebook Contact (TcSE ROIN-290897-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	When attempting to make an outgoing call, the number is busy. *Note: Based on the implementation of the connected phone, the customer is informed by a busy tone transferred via SCO.
Post-conditions	The customer is notified that the call is unsuccessful (via connected phone). The In-Vehicle Infotainment System returns to prior state. **Note: No specific action is required by the In-Vehicle Infotainment System.
List of Exception Use Cases	N/A
Interfaces	N/A

4.6.1.5 BTP-UC-REQ-033856/A-Call Failed and No network coverage (TcSE ROIN-290901-1)

Linked Elements
BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)
BTP-UC-REQ-033852/C-Outgoing Call to Phonebook Contact (TcSE ROIN-290897-1)
BTP-UC-REQ-033858/B-Outgoing call initiated from the connected phone (TcSE ROIN-290903-2)
BTP-UC-REQ-033857/B-Outgoing Call via Digit Dial (TcSE ROIN-290902-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	When attempting to make an outgoing call, the call failed and the phone has no network coverage.
Post-conditions	The customer is notified that the call is unsuccessful. The In-Vehicle Infotainment System returns to prior state.

List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.6.1.6 BTP-UC-REQ-033857/B-Outgoing Call via Digit Dial (TcSE ROIN-290902-2)

Linked Elements
BTP-FUR-REQ-033864/B-Outgoing Call Methods (TcSE ROIN-295048-2)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)
BTP-UC-REQ-033853/A-Outgoing Call Failed (TcSE ROIN-290898-1)
BTP-UC-REQ-033854/A-No Audio Available for Call (TcSE ROIN-290899-1)
BTP-UC-REQ-033856/A-Call Failed and No network coverage (TcSE ROIN-290901-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook has been downloaded AND available
Scenario Description	The Customer has opted to initiate a phone call to a contact within his / her phonebook, but manually dialing (via V-HMI or In-Vehicle Infotainment System G-HMI options) a phone number that is matched to a contact name within the In-Vehicle Infotainment System.
Post-conditions	A call is established to the chosen contact. The In-Vehicle Infotainment System displays the metadata of the called contact (if available); if the metadata is not available the number is displayed. Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options: End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Outgoing call failed. E2 – No audio available for call. E3 – Call Failed and no network coverage.
Interfaces	V-HMI G-HMI Vehicle System Interface

4.6.1.7 BTP-UC-REQ-033858/B-Outgoing call initiated from the connected phone (TcSE ROIN-290903-2)

Linked Elements
BTP-FUR-REQ-033864/B-Outgoing Call Methods (TcSE ROIN-295048-2)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	During an active phone connection (i.e. HFP), the Customer has opted to initiate an outgoing call from the connected phone opposed to the In-Vehicle Infotainment System.
Post-conditions	A call is established to the specified number is established The In-Vehicle Infotainment System displays the phone number of the active call or the phonebook contact metadata if the phone number of the active call is stored within the phonebook. Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options:

	End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – The mobile phone does not provide the In-Vehicle Infotainment System with the appropriate call set up information to indicate that a new call is being established. E2 – Connected Phone Failed to Provide the In-Vehicle Infotainment System with the Phone number of the Active Call. E3- Call failed and no network coverage.
Interfaces	G-HMI Vehicle System Interface

4.6.1.8 BTP-UC-REQ-033859/B-The mobile phone does not provide the In-Vehicle Infotainment System with the appropriate call set up information (TcSE ROIN-292571-1)

Linked Elements
BTP-UC-REQ-033858/B-Outgoing call initiated from the connected phone (TcSE ROIN-290903-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The mobile phone does not provide the In-Vehicle Infotainment System with the appropriate call set up information to indicate that a new call is being established.
Post-conditions	No Action
List of Exception Use Cases	N/A
Interfaces	N/A

4.6.1.9 BTP-UC-REQ-033860/A-Connected Phone Failed to Provide the In-Vehicle Infotainment System with the Phone number of the Active Call (TcSE ROIN-290904-1)

Linked Elements
BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)
BTP-UC-REQ-033863/A-Outgoing call initiated while Roaming (TcSE ROIN-290907-1)
BTP-UC-REQ-033858/B-Outgoing call initiated from the connected phone (TcSE ROIN-290903-2)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The phone has indicated that an active call is present, but it has not provided the phone number of the active call.
Post-conditions	In-Vehicle Infotainment System displays specified default text.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.6.1.10 BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)

Linked Elements
BTP-SD-REQ-030719/A-Redial (TcSE ROIN-149530-3)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)
BTP-FUR-REQ-033864/B-Outgoing Call Methods (TcSE ROIN-295048-2)
BTP-SD-REQ-439396/A-Redial

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). In-Vehicle Infotainment System supports this feature within HMI and/or VUI.
Scenario Description	During an active phone connection (i.e. HFP), the Customer has opted to initiate a redial via the In-Vehicle Infotainment System.
Post-conditions	A call is established to the specified number is established The In-Vehicle Infotainment System displays the phone number of the active call or the phonebook contact metadata if the phone number of the active call is stored within the phonebook. Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options: End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Outgoing call failed. E2 – Connected Phone Failed to Provide the In-Vehicle Infotainment System with the Phone number of the Active Call. E3 – The mobile phone dials an call other than the last outgoing call (i.e. incoming call or missed call) E4 – Number busy E5 – Call failed and no network coverage
Interfaces	G-HMI Vehicle System Interface

4.6.1.11 BTP-UC-REQ-033862/A-The mobile phone dials an call other than the last outgoing call (i.e. incoming call or missed call) (TcSE ROIN-290906-1)

Linked Elements
BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	The customer indicated a redial action, but the phone dialed another phone number other than the last outgoing call.
Post-conditions	In-Vehicle Infotainment System displays the dialed number or the phonebook contact that was dialed (if available within the phonebook)
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.6.1.12 BTP-UC-REQ-033863/A-Outgoing call initiated while Roaming (TcSE ROIN-290907-1)

Linked Elements
BTP-FUR-REQ-047506/A-Roaming Report (TcSE ROIN-295106-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected, and roaming notification is set to ON.
Scenario Description	During an active phone connection (i.e. HFP), the Customer has opted to initiate an outgoing call via the In-Vehicle Infotainment System while the mobile phone is reporting that it is roaming. In-Vehicle Infotainment System
Post-conditions	The In-Vehicle Infotainment System will have the ability to notify the Customer that they are roaming, and request a confirmation that they still want to place the call.

	If the Customer opts not to place the call because the connected mobile phone is roaming, the outgoing call is not established. If the Customer opts to place the call: A call is established to the specified number is established The In-Vehicle Infotainment System displays the phone number of the active call or the phonebook contact metadata if the phone number of the active call is stored within the phonebook. Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options: End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Outgoing call failed. E2 – Connected Phone Failed to Provide the In-Vehicle Infotainment System with the Phone number of the Active Call.
Interfaces	G-HMI

4.6.1.13 BTC-UC-REQ-193015/A-Voice Recognition - Outgoing Call to Phonebook Contact

Linked Elements
BTP-UC-REQ-033853/A-Outgoing Call Failed (TcSE ROIN-290898-1)
BTP-UC-REQ-033854/A-No Audio Available for Call (TcSE ROIN-290899-1)
BTP-UC-REQ-033855/A-Number busy (TcSE ROIN-290900-1)
BTP-UC-REQ-033856/A-Call Failed and No network coverage (TcSE ROIN-290901-1)
BTC-UC-REQ-192662/A-Voice Recognition - No HFP device connected
BTC-UC-REQ-192663/A-Voice Recognition - Phonebook is empty
BTC-UC-REQ-192664/A-Voice Recognition - Phonebook is not present yet
BTC-UC-REQ-192665/A-Voice Recognition - Phonebook download is not supported
BTC-UC-REQ-192666/A-Voice Recognition - Phonebook is not available due to missing access
BTC-UC-REQ-192667/A-Voice Recognition - Phonebook download is not activated
BTC-UC-REQ-192668/A-Voice Recognition - Phonebook contact contains no number but only an address
BTC-UC-REQ-193014/A-Voice Recognition - Phonebook is available, but will be updated in the background
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook has been downloaded AND is available
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	A call is established to the chosen contact. The In-Vehicle Infotainment System displays the name of the called contact. The In-Vehicle Infotainment System displays the photo of the contact (if available) Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options via G-HMI End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Voice Recognition - No HFP device connected E2 – Voice Recognition - Phonebook is empty E3 – Voice Recognition - Phonebook is not present yet E4 – Voice Recognition - Phonebook download is not supported

	E5 – Voice Recognition - Phonebook is not available due to missing access E6 – Voice Recognition - Phonebook download is not activated. E7 – Voice Recognition - Call failed and no network coverage. E8 – Voice Recognition - Phonebook contact contains no number but only an address E9 – Voice Recognition - Phonebook is available, but will be updated in the background E10 – Outgoing call failed. E11 – No audio available for call. E12 – Number busy. E13 – Call failed and no network coverage
Interfaces	Customer, Connected Phone, In-Vehicle Infotainment System

4.6.1.14 BTC-UC-REQ-193016/A-Voice Recognition - Dial a number

Linked Elements
BTP-UC-REQ-033853/A-Outgoing Call Failed (TcSE ROIN-290898-1)
BTP-UC-REQ-033854/A-No Audio Available for Call (TcSE ROIN-290899-1)
BTP-UC-REQ-033856/A-Call Failed and No network coverage (TcSE ROIN-290901-1)
BTC-UC-REQ-192662/A-Voice Recognition - No HFP device connected

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected.
Scenario Description	The Customer has opted to initiate a phone call by manually dialing a phone number via Voice Control.
Post-conditions	A call is established to the chosen phone number. The In-Vehicle Infotainment System displays the metadata of the called contact (if available); if the metadata is not available the number is displayed. Two way audio (i.e. SCO, eSCO, etc.) is available. A call timer is available to display the time of the active call. The Customer presented with the following options: End Call Return the audio to the handset (i.e. Privacy) Mute Call
List of Exception Use Cases	E1 – Outgoing call failed. E2 – No audio available for call. E3 – Call Failed and no network coverage. E4 – Voice Recognition - No HFP device connected
Interfaces	V-HMI G-HMI Vehicle System Interface

4.6.1.15 BTC-UC-REQ-192662/A-Voice Recognition - No HFP device connected

Linked Elements
BTP-FUR-REQ-033830/A-Phonebook Accessibility (TcSE ROIN-295076-1)

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is no connected phone, hence no phonebook is available
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact

Post-conditions	The In-Vehicle Infotainment System shall notify the user that there is no phone connected / no phonebook available and it is not possible to use voice controls to dial a number of a contact.
List of Exception Use Cases	n/a
Interfaces	V-HMI

4.6.1.16 BTC-UC-REQ-192663/A-Voice Recognition - Phonebook is empty

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook has been downloaded successfully (see PHB2a) but it is empty.
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook is empty. Optionally, it might prompt the user to retry phonebook download.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook download is not supported E3 - Phonebook is not available due to missing access E4 – Phonebook download is not activated.
Interfaces	V-HMI G-HMI

4.6.1.17 BTC-UC-REQ-192664/A-Voice Recognition - Phonebook is not present yet

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook is being downloaded for the first time or has not been downloaded yet.
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook is not available yet, and to try after it becomes available. The GUI shall alert that the phonebook has become available via a status message or a popup.
List of Exception Use Cases	E1 - Phonebook download is not supported E2 - Phonebook is not available due to missing access E3 – Phonebook download is not activated. E4 – Phonebook available but will be updated in the background
Interfaces	V-HMI G-HMI

4.6.1.18 BTC-UC-REQ-192665/A-Voice Recognition - Phonebook download is not supported

Linked Elements
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook feature is not available in the connected phone

Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook feature is not present in the connected phone.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook is not available due to missing access E3 – Phonebook available but will be updated in the background E4 – Phonebook download is not activated.
Interfaces	V-HMI G-HMI

4.6.1.19 BTC-UC-REQ-192666/A-Voice Recognition - Phonebook is not available due to missing access

Linked Elements
BTP-FUR-REQ-033839/D-PBAP Access Failure (TcSE ROIN-295085-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook download has failed because the phone has not granted permission to download the contacts from the phonebook
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook feature is not available because of a permission issue. The In-Vehicle Infotainment System might prompt the user to retry the download and approve access from the phone.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook download is not supported E3 – Phonebook available but will be updated in the background E4 – Phonebook download is not activated.
Interfaces	V-HMI

4.6.1.20 BTC-UC-REQ-192667/A-Voice Recognition - Phonebook download is not activated

Linked Elements
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook download feature is turned off and there is no available phonebook for the connected device.
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook feature is turned off and there is no available phonebook for the connected device. The In-Vehicle Infotainment System might prompt the user to turn the feature back on to be able to make calls via VUI.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook download is not supported E3 – Phonebook available but will be updated in the background E4 - Phonebook is not available due to missing access

Interfaces	V-HMI

4.6.1.21 BTC-UC-REQ-192668/A-Voice Recognition - Phonebook contact contains no number but only an address

Linked Elements
BTP-FUR-REQ-033833/G-PBAP Requirements and Characteristics (TcSE ROIN-295079-1)
BTP-FUR-REQ-033830/A-Phonebook Accessibility (TcSE ROIN-295076-1)
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)
BTP-FUR-REQ-033841/I-Contact Characteristics / Data (TcSE ROIN-295087-1)
BTP-FUR-REQ-410321/A-PBAP Requirements and Characteristics
BTP-FUR-REQ-410335/A-Contact Characteristics / Data

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook is available, VUI is ready to accept commands to make calls to a contact.
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook. The contact contains an address (email address or street address) but no phone numbers
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the chosen contact does not have any phone numbers associated with it and hence the call cannot be completed.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook download is not supported E3 – Phonebook available but will be updated in the background E4 - Phonebook is not available due to missing access E5 – Phonebook download is not activated.
Interfaces	V-HMI

4.6.1.22 BTC-UC-REQ-193014/A-Voice Recognition - Phonebook is available, but will be updated in the background

Linked Elements
BTP-FUR-REQ-033835/C-Phonebook Updating (TcSE ROIN-295081-1)

Actors	Customer, Connected Phone, In-Vehicle Infotainment System
Pre-conditions	A phone has been paired and is connected. The phonebook is being re-downloaded or has been downloaded but voice grammar is not ready yet
Scenario Description	The Customer has opted to initiate a phone call via voice control to a contact within his / her phonebook.
Post-conditions	The In-Vehicle Infotainment System shall notify the user that the phonebook grammar is being prepared. During this time, the phonebook GUI shall allow the user to make a call via GUI.
List of Exception Use Cases	E1 – Phonebook is not present yet E2 - Phonebook download is not supported E3 - Phonebook is not available due to missing access E4 – Phonebook download is not activated.
Interfaces	V-HMI G-HMI

4.6.2 Requirements

4.6.2.1 BTP-FUR-REQ-033864/B-Outgoing Call Methods (TcSE ROIN-295048-2)

Voice Digit Entry with a maximum of 22 digits
Voice Phonebook Name Selection
Digit Entry (i.e. Touch screen) with a maximum of 22 digits (including #, * and +).
Phonebook Entry Selection (i.e. user selects an entry from their downloaded phonebook)
From the handset
From Call History Selection
Redial –

If there is valid call history present for outgoing calls, the last outgoing number shall be used as smart dial (redial) number.
When there is outgoing call from handset or SYNC while the device is connected, then the number is stored as new smart dial (redial) number.
If there is no call history present and there is no call made from handset or SYNC after connecting, executing REDIAL shall use AT+BLDN.

4.6.2.2 BTP-FUR-REQ-033865/A-Network Compatibility (TcSE ROIN-295049-1)

In-Vehicle Infotainment System shall manage the cases of invalid numbers, loss of network, and busy lines in the same manner as commercial available AG's currently manage them.

If the user enters an invalid number, the call will fail. Some mobile phones allow the user to send (ATD) a number even there is no signal available. This behavior shall be replicated on In-Vehicle Infotainment System.

4.6.2.3 BTP-FUR-REQ-033866/C-Outgoing Call Failures (TcSE ROIN-304248-1)

When the In-Vehicle Infotainment System attempts to place a call by sending an ATD or BLDN, it expects to receive an 'OK' and corresponding CIEV notifications. The In-Vehicle Infotainment System shall assume that an outgoing call failure has occurred under the following scenarios (when the In-Vehicle Infotainment System initiated the outgoing call):

1. If an 'OK' is not received within 15 seconds of the In-Vehicle Infotainment System sending the ATD or BLDN.
2. If a callsetup value of 2 or 3 is not received within 15 seconds of receiving an 'OK'

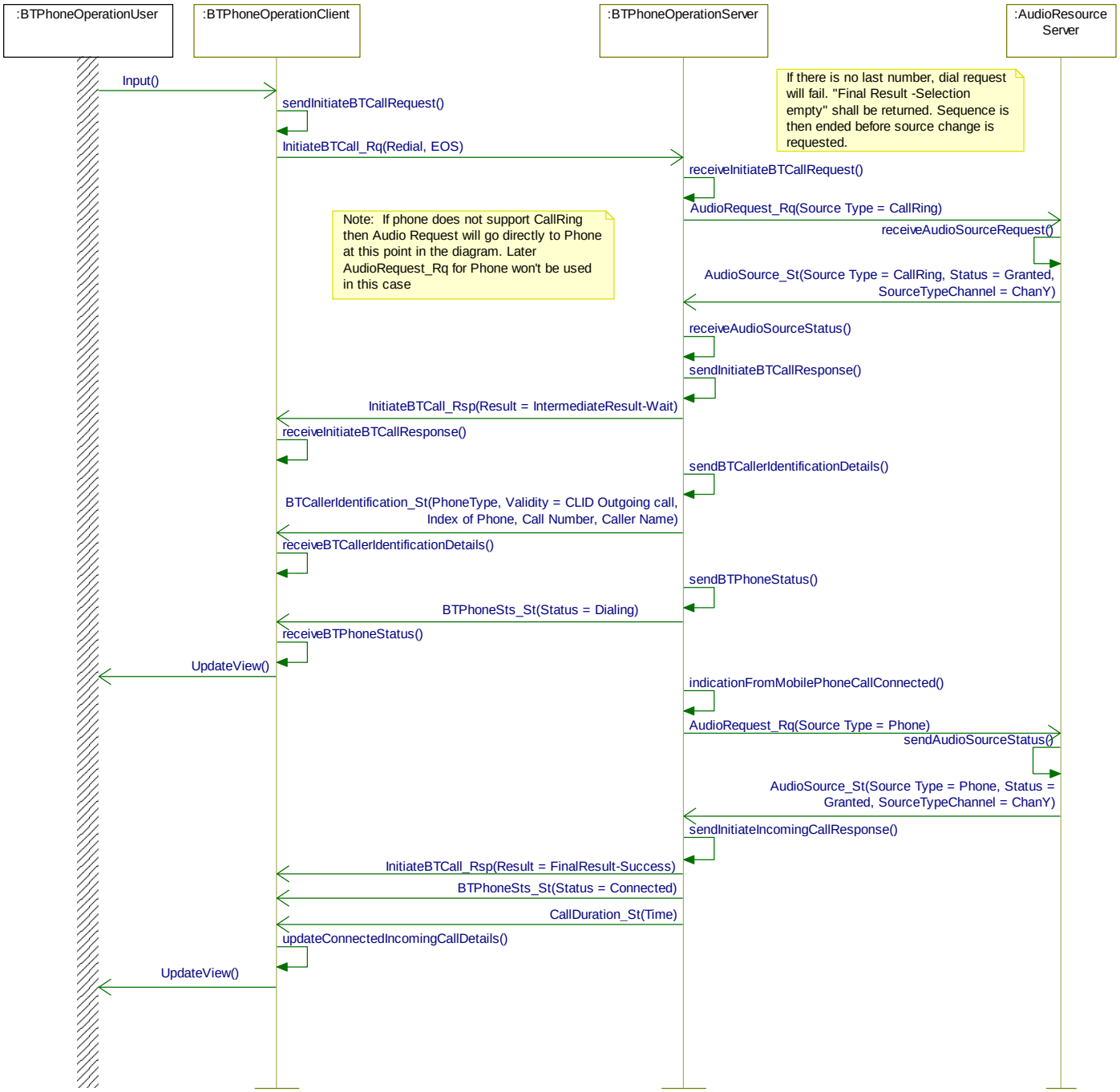
If either of the above scenarios occurs, the In-Vehicle Infotainment System shall request the +CLCC information to verify the call setup status. IVIS should attempt to place the outgoing call again. If second attempt fails, the In-Vehicle Infotainment System shall determine that the call was not connected successfully. The In-Vehicle Infotainment System shall provide an alert that the connected AG has not responded accordingly to the In-Vehicle Infotainment System per the HMI requirements.

The In-Vehicle Infotainment System shall monitor the service availability (as reported via unsolicited CIEV responses) of the connected AG at the time of a placed call. In the event that the callsetup value 2 or 3 was not received - or value 0 was received again without receiving value 3 before - and the service status of the connected phone is reported as 0, then the In-Vehicle Infotainment System shall assume that the call failed due to network availability.
The In-Vehicle Infotainment System shall provide an alert that the call failed due to no signal per the HMI requirements.

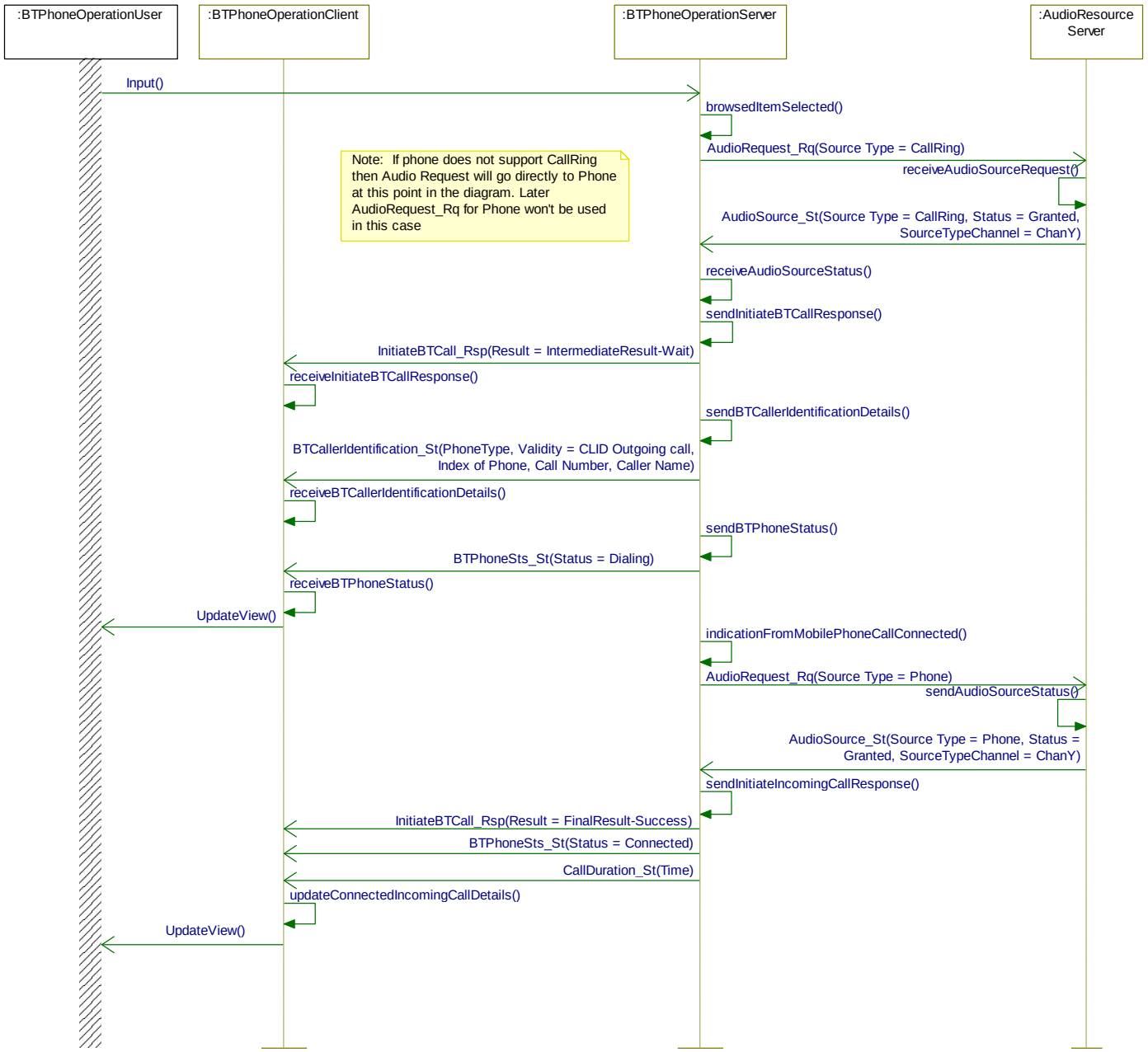
4.6.3 Sequence Diagrams

4.6.3.1 BTP-SD-REQ-439396/A-Redial

Linked Elements
BTP-UC-REQ-033861/A-Outgoing call initiated via Redial from the In-Vehicle Infotainment System (TcSE ROIN-290905-3)


:BTPhoneOperationUser
:BTPhoneOperationClient
:BTPhoneOperationServer
:AudioResource Server
Input()
sendInitiateBTCallRequest()
InitiateBTCall_Rq(Redial, EOS)
If there is no last number, dial request will fail. "Final Result -Selection empty" shall be returned. Sequence is then ended before source change is requested.
receiveInitiateBTCallRequest()
AudioRequest_Rq(Source Type = CallRing)
receiveAudioSourceRequest()
Note: If phone does not support CallRing then Audio Request will go directly to Phone at this point in the diagram. Later AudioRequest_Rq for Phone won't be used in this case
AudioSource_St(Source Type = CallRing, Status = Granted, SourceTypeChannel = ChanY)
receiveAudioSourceStatus()
sendInitiateBTCallResponse()
InitiateBTCall_Rsp(Result = IntermediateResult-Wait)
receiveInitiateBTCallResponse()
sendBTCallerIdentificationDetails()
BTCallerIdentification_St(PhoneType, Validity = CLID Outgoing call, Index of Phone, Call Number, Caller Name)
receiveBTCallerIdentificationDetails()
sendBTPhoneStatus()
BTPhoneSts_St(Status = Dialing)
receiveBTPhoneStatus()
UpdateView()
indicationFromMobilePhoneCallConnected()
AudioRequest_Rq(Source Type = Phone)
sendAudioSourceStatus()
AudioSource_St(Source Type = Phone, Status = Granted, SourceTypeChannel = ChanY)
sendInitiateIncomingCallResponse()
InitiateBTCall_Rsp(Result = FinalResult-Success)
BTPhoneSts_St(Status = Connected)
CallDuration_St(Time)
updateConnectedIncomingCallDetails()
UpdateView()

4.6.3.2 BTP-SD-REQ-439397/A-Initiate a Phone Call from Browse



4.7 BTP-FUN-REQ-439398/A-Active Call Management

4.7.1 Use Cases

4.7.1.1 BTP-UC-REQ-041789/A-Ending a Single or Joined Active Call via In-Vehicle Infotainment System (TcSE ROIN-290920-1)

Linked Elements
BTP-FUR-REQ-041819/A-Ability to End a Single Call (TcSE ROIN-295051-1)
BTP-SD-REQ-030705/A-End Call (TcSE ROIN-149457-3)
BTP-SD-REQ-439401/A-End Call

Actors	Mobile Phone Customer
Pre-conditions	A mobile phone is connected to the In-Vehicle Infotainment System, and a call is active
Scenario Description	The customer is in an active phone call, and has opted to end the phone call via the In-Vehicle Infotainment System. In-Vehicle Infotainment System
Post-conditions	The phone call is ended. The In-Vehicle Infotainment System has the ability to indicate that a call has ended. Phone audio (i.e. SCO, eSCO, etc.) is not present via the In-Vehicle Infotainment System. The In-Vehicle Infotainment System returns to its prior state as specified.
List of Exception Use Cases	E1 – Ending a Call via In-Vehicle Infotainment System Failed.
Interfaces	G-HMI SWC Vehicle System Interface

4.7.1.2 BTP-UC-REQ-041790/A-Ending a Call via In-Vehicle Infotainment System Failed (TcSE ROIN-290921-1)

Linked Elements

BTP-UC-REQ-041789/A-Ending a Single or Joined Active Call via In-Vehicle Infotainment System (TcSE ROIN-290920-1)
BTP-UC-REQ-041791/A-Ending a Single Active Call w/ Call on Hold via In-Vehicle Infotainment System (TcSE ROIN-290922-1)

Actors	Mobile Phone Customer
Pre-conditions	Same as original use case
Scenario Description	The customer is in an active phone call, and has opted to end the phone call via the In-Vehicle Infotainment System. The connected phone has indicated that the call is not ended.
Post-conditions	An error is provided to the customer The phone call audio is no longer present via the In-Vehicle Infotainment System. The In-Vehicle Infotainment System returns to the prior state (as specified) as if the call has ended.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.3 BTP-UC-REQ-041791/A-Ending a Single Active Call w/ Call on Hold via In-Vehicle Infotainment System (TcSE ROIN-290922-1)

Actors	Mobile Phone Customer
Pre-conditions	A mobile phone is connected, and one call is active and another call is on hold.
Scenario Description	The customer has one active call, and one call on hold. The customer wants to end the active call and return to the held call. As a result, the customer uses the G-HMI available via the In-Vehicle Infotainment System to end the active call.
Post-conditions	The active call is ended. The held call becomes the active call. The In-Vehicle Infotainment System has the ability to indicate that a call has ended. The In-Vehicle Infotainment System has the ability to indicate the current active call. The In-Vehicle Infotainment System provides the customer with the option to end the active call.
List of Exception Use Cases	E1 – Ending a Call via In-Vehicle Infotainment System Failed.
Interfaces	G-HMI Vehicle System Interface

4.7.1.4 BTP-UC-REQ-041792/A-Ending a Single or Joined Active Call via Mobile Phone (TcSE ROIN-290923-1)

Actors	Mobile Phone, Customer
Pre-conditions	A mobile phone is connected to the In-Vehicle Infotainment System, and a call is active
Scenario Description	The customer is in an active phone call, and the connected mobile phone has indicated that the active call is no longer active.
Post-conditions	The phone call is ended. The In-Vehicle Infotainment System has the ability to indicate that the call has ended. Phone audio (i.e. SCO, eSCO, etc.) is not present via the In-Vehicle Infotainment System. In-Vehicle Infotainment System returns to prior state.
List of Exception Use Cases	E1 – Phone does not notify In-Vehicle Infotainment System that a call(s) has ended.
Interfaces	G-HMI Vehicle System Interface

4.7.1.5 BTP-UC-REQ-041794/A-Ending a Single Call while in a Joined Call or in an Active Call with a Call on Hold via Mobile Phone (TcSE ROIN-290924-1)

Actors	Mobile Phone Customer
Pre-conditions	A mobile phone is connected to the In-Vehicle Infotainment System, and a joined call is active or a single call is active, with a call on hold (i.e. multi-party call).
Scenario Description	The customer is in an active multi-party call (joined call or single call w/ call on hold) and the connected mobile phone has indicated that one of the calls is no longer present.
Post-conditions	The phone call is ended. The In-Vehicle Infotainment System has the ability to indicate that the call has ended. The In-Vehicle Infotainment System has the ability to indicate the current active call. Phone audio (i.e. SCO, eSCO, etc.) is present via the In-Vehicle Infotainment System for the remaining call. The In-Vehicle Infotainment System provides the customer with the option to end the active call. The call timer is still present
List of Exception Use Cases	E1 – Mobile phone does not indicate that a call has ended in a multi-party call.
Interfaces	G-HMI Vehicle System Interface

4.7.1.6 BTP-UC-REQ-041793/A-Phone does not notify In-Vehicle Infotainment System that a call(s) has ended (TcSE ROIN-292573-1)

Linked Elements
BTP-UC-REQ-041792/A-Ending a Single or Joined Active Call via Mobile Phone (TcSE ROIN-290923-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as in original use case
Scenario Description	Phone does not notify In-Vehicle Infotainment System that a call(s) has ended
Post-conditions	No Action

List of Exception Use Cases	N/A
Interfaces	N/A

4.7.1.7 BTP-UC-REQ-041795/A-Mobile phone does not indicate that a call has ended in a multi-party call (TcSE ROIN-290925-1)

Linked Elements
BTP-UC-REQ-041794/A-Ending a Single Call while in a Joined Call or in an Active Call with a Call on Hold via Mobile Phone (TcSE ROIN-290924-1)

Actors	Mobile Phone Customer
Pre-conditions	Same as original use case
Scenario Description	The customer is in an active multi-party call (joined call or single call w/ call on hold) and that one of the calls is no longer present, but the phone has not indicated that call was no longer present.
Post-conditions	The In-Vehicle Infotainment System will still indicate that a multi-party call is active.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.8 BTP-UC-REQ-041796/A-Muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290926-1)

Linked Elements
BTP-FUR-REQ-041831/A-Muting an Active Call(s) (TcSE ROIN-295067-1)
BTP-SD-REQ-030709/A-Mute Phone (TcSE ROIN-149429-1)
BTP-SD-REQ-439400/A-Mute Phone

Actors	Customer, Connected Mobile Phone, Microphone
Pre-conditions	A mobile is connected. A call is active The active call audio is Handsfree and available via the In-Vehicle Infotainment System.
Scenario Description	In this scenario, there is an active call present and the audio is available through the speakers of the In-Vehicle Infotainment System. The customer has opted to mute the in-vehicle microphone by using the options available via the In-Vehicle Infotainment System G-HMI.
Post-conditions	The In-Vehicle Infotainment System indicates that the in-vehicle microphone is muted. The in-vehicle microphone is muted, and no audio from the vehicle cabin can be heard on the far end of the phone call. The far end audio is available via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System provides the Customer with option of un-muting the microphone.
List of Exception Use Cases	E1 – Fault Recognized with the microphone or muting effort failed. E2 – The call is placed into privacy while the call is muted.
Interfaces	G-HMI Vehicle System Interface SWC

4.7.1.9 BTP-UC-REQ-041797/A-Fault Recognized with the microphone or muting effort failed (TcSE ROIN-290927-2)

Linked Elements
BTP-UC-REQ-041796/A-Muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290926-1)
BTP-UC-REQ-041799/A-Un-muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290929-1)

Actors	Customer Connected Mobile Phone Microphone
Pre-conditions	Same as original use case
Scenario Description	In this scenario, there is an active call present and the audio is available through the speakers of the In-Vehicle Infotainment System. The customer has opted to mute the in-vehicle microphone by using the options available via the In-Vehicle Infotainment System G-HMI, but In-Vehicle Infotainment System has been alerted to a fault with the microphone and/or the muting effort failed.
Post-conditions	~~Error message displayed to customer~~ The In-Vehicle Infotainment System does not indicate that the call is muted.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.10 BTP-UC-REQ-041798/A-The call is placed into Privacy while the Call is muted (TcSE ROIN-290928-1)

Linked Elements
BTP-UC-REQ-041796/A-Muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290926-1)

Actors	Customer Connected Mobile Phone Microphone
Pre-conditions	Same as original use case
Scenario Description	In this scenario, there is an active call present and the audio is available through the speakers of the In-Vehicle Infotainment System. The customer has opted to mute the in-vehicle microphone by using the options available via the In-Vehicle Infotainment System G-HMI, but In-Vehicle Infotainment System has been alerted that the call has been placed into privacy (i.e. call audio is routed to the handset.)
Post-conditions	Customer is alerted that the microphone is no longer muted. The In-Vehicle Infotainment System indicates that the call is in privacy, as described in the privacy use cases.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.11 BTP-UC-REQ-041799/A-Un-muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290929-1)

Linked Elements
BTP-FUR-REQ-041831/A-Muting an Active Call(s) (TcSE ROIN-295067-1)
BTP-SD-REQ-030709/A-Mute Phone (TcSE ROIN-149429-1)
BTP-SD-REQ-439400/A-Mute Phone

Actors	Customer Connected Mobile Phone Microphone
Pre-conditions	A mobile is connected. A call is active The active call audio is Handsfree and the in-vehicle microphone is muted.
Scenario Description	In this scenario, there is an active call present and the in-vehicle microphone is muted. The customer has opted to un-mute the in-vehicle microphone by using the options available via the G-HMI.
Post-conditions	The In-Vehicle Infotainment System indicates that the in-vehicle microphone is un-muted.

	The in-vehicle microphone is un-muted, and audio from the vehicle cabin can be heard on the far end of the phone call. The In-Vehicle Infotainment System provides the Customer with the option of muting the microphone
List of Exception Use Cases	E1 – Fault Recognized with the microphone or muting effort failed.
Interfaces	G-HMI Vehicle System Interface

4.7.1.12 BTP-UC-REQ-041800/A-Customer opts to Mute / Unmute call via connected phone (TcSE ROIN-290930-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active
Scenario Description	In this scenario, there is an active call present, and the customer opts to mute / unmute the call via the connected phone.
Post-conditions	The In-Vehicle Infotainment System does not take any action, as the In-Vehicle Infotainment System is not alerted to the mute / unmute status of the connected phone.
List of Exception Use Cases	N/A
Interfaces	N/A

4.7.1.13 BTP-UC-REQ-041801/C-Answering an Incoming Call Waiting Call via In-Vehicle Infotainment System (TcSE ROIN-290931-1)

Linked Elements
BTP-FUR-REQ-041822/B-Call Waiting Call Accepted (TcSE ROIN-295058-1)
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)
BTP-SD-REQ-030715/A-Call Waiting Call (TcSE ROIN-149471-2)
BTP-FUR-REQ-041820/B-Max Number of Calls (TcSE ROIN-295056-1)
BTP-FUR-REQ-410320/A-Max Number of Calls
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The Customer opts to answer the incoming call via the In-Vehicle Infotainment System G-HMI options available – see linked requirements.
Post-conditions	The incoming call waiting call becomes the active call. The call that was the active call when the incoming call waiting call was indicated becomes the held call or is hanged up, depending on the option chosen by the user. The In-Vehicle Infotainment System has the ability to indicate to the Customer that there is an active call (and a call on hold, if that is the case) If there is an active call and a call on hold, the In-Vehicle Infotainment System provides the Customer with the opportunity to toggle between the two. The appropriate call timer information are shown.
List of Exception Use Cases	E1 – Answering an Incoming Call Waiting Call via In-Vehicle Infotainment System Failed.
Interfaces	G-HMI

4.7.1.14 BTP-UC-REQ-041802/A-Answering an Incoming Call Waiting Call via In-Vehicle Infotainment System Failed (TcSE ROIN-290932-1)

Linked Elements
BTP-UC-REQ-041801/C-Answering an Incoming Call Waiting Call via In-Vehicle Infotainment System (TcSE ROIN-290931-1)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The Customer opts to answer the incoming call via the In-Vehicle Infotainment System G-HMI options available, but the call is not answered.
Post-conditions	Error message is provided to the customer. In-Vehicle Infotainment System indicates that the active call is the call that was present when the incoming call was received.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.15 BTP-UC-REQ-041803/C-Answering an Incoming Call Waiting Call via Mobile Phone (TcSE ROIN-290933-1)

Linked Elements
BTP-SD-REQ-030715/A-Call Waiting Call (TcSE ROIN-149471-2)
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)
BTP-FUR-REQ-041822/B-Call Waiting Call Accepted (TcSE ROIN-295058-1)
BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The mobile phone indicates that the incoming call awaiting call has been answered.
Post-conditions	The incoming call waiting call becomes the active call. The In-Vehicle Infotainment System correctly indicates whether the call that was the active call is now held or not present any more. If there is an active and a held call, the In-Vehicle Infotainment System provides the Customer with the opportunity to toggle between the two. The appropriate call timer information are shown.
List of Exception Use Cases	E1 – Mobile phone does not indicate that a call has been answered during an active call.
Interfaces	G-HMI Vehicle System Interface

4.7.1.16 BTC-UC-REQ-247276/B-Switching calls via In-Vehicle Infotainment System or Connected Mobile Phone

Linked Elements
BTP-FUR-REQ-041826/B-Toggle Calls (TcSE ROIN-295062-1)

Actors	Customer Connected Mobile Phone In-Vehicle Infotainment System
Pre-conditions	Mobile Phone is connected. There are two calls. One is active, one is held.
Scenario Description	In this scenario, there are two calls present, one is active and one is held. Both Mobile Phone and In-Vehicle Infotainment System indicate that there are two calls and that one is active, one is held The Customer opts to swap the calls (hold the active call, make the held call active) via the In-Vehicle Infotainment System, or via the connected Mobile Phone.
Post-conditions	Both - Mobile Phone and In-Vehicle Infotainment System - indicate that there are two calls and that one is active, one is held, and correctly display which call is held, which one is active. The appropriate call timer information shall be displayed for each call.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.7.1.17 BTC-UC-REQ-247275/A-Joining calls via In-Vehicle Infotainment System or Connected Mobile Phone

Linked Elements
BTP-SD-REQ-030717/B-Join Calls (TcSE ROIN-149478-3)
BTP-FUR-REQ-041828/B-Join Calls (TcSE ROIN-295064-1)

Actors	Customer Connected Mobile Phone In-Vehicle Infotainment System
Pre-conditions	Mobile Phone is connected There are two calls. One is active, one is held
Scenario Description	In this scenario, there are two calls present, one is active and one is held. Both Mobile Phone and In-Vehicle Infotainment System indicate that there are two calls and that one is active, one is held The Customer opts to join the calls together into a conference call via the In-Vehicle Infotainment System G-HMI, or via a cluster interface, or via the connected Mobile Phone.
Post-conditions	Both Mobile Phone and In-Vehicle Infotainment System (G-HMI and cluster interface) indicate that there are two calls joined into a conference call.
List of Exception Use Cases	
Interfaces	G-HMI, Cluster interface, Mobile Phone

4.7.1.18 BTC-UC-REQ-235611/A-Setting single held call to active

Linked Elements
BTP-FUR-REQ-041826/B-Toggle Calls (TcSE ROIN-295062-1)

Actors	Mobile Phone

	Customer
Pre-conditions	A mobile phone is connected, and one call is on hold.
Scenario Description	The customer has one call on hold. The In-Vehicle Infotainment System provides the customer with the option to end the held call. The In-Vehicle Infotainment System provides the customer with the option to unhold the held call. The customer wants to set the held call to active. As a result, the customer uses the G-HMI available via the In-Vehicle Infotainment System to unhold the call.
Post-conditions	The held call becomes the active call. The In-Vehicle Infotainment System has the ability to indicate the current active call. The In-Vehicle Infotainment System provides the customer with the option to end the active call.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.7.1.19 BTP-UC-REQ-041804/B-Mobile phone does not indicate that a call has been answered during an active call (TcSE ROIN-290934-1)

Linked Elements
BTP-UC-REQ-041803/C-Answering an Incoming Call Waiting Call via Mobile Phone (TcSE ROIN-290933-1)

Actors	Mobile Phone Customer
Pre-conditions	Same as original use case
Scenario Description	During an incoming call waiting call, the incoming call is answered by the connected mobile phone, but the mobile phone does not update the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System indicates that the current call is the active call. (No In-Vehicle Infotainment System action required)
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.20 BTP-UC-REQ-041805/A-Rejecting an Incoming Call Waiting Call via In-Vehicle Infotainment System (TcSE ROIN-290935-1)

Linked Elements
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)
BTP-FUR-REQ-041823/A-Call Waiting Call Rejected (TcSE ROIN-295059-1)

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The Customer opts to reject the incoming call via the In-Vehicle Infotainment System G-HMI options available.
Post-conditions	The incoming call waiting call is no longer presented to the Customer via the In-Vehicle Infotainment System. The call that was the active call when the incoming call waiting call was indicated remains the active call.

List of Exception Use Cases	E1 – The incoming call waiting call is not rejected when Customer initiates rejection from In-Vehicle Infotainment System.
Interfaces	G-HMI Vehicle System Interface SWC

4.7.1.21 BTP-UC-REQ-041806/A-The incoming call waiting call is not rejected when Customer initiates rejection from In-Vehicle Infotainment System (TcSE ROIN-290936-1)

Linked Elements
BTP-UC-REQ-041805/A-Rejecting an Incoming Call Waiting Call via In-Vehicle Infotainment System (TcSE ROIN-290935-1)
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)

Actors	Mobile Phone Customer
Pre-conditions	Same as original use case
Scenario Description	During an incoming call waiting call, the incoming call is rejected by the In-Vehicle Infotainment System, but the connected mobile phone does not indicate that the call is rejected.
Post-conditions	The In-Vehicle Infotainment System no longer displays the incoming call waiting call. The In-Vehicle Infotainment System indicates that the call that was active upon receipt of the incoming call waiting call is the active call.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.22 BTP-UC-REQ-041807/A-Rejecting an Incoming Call Waiting Call via Connected Mobile Phone (TcSE ROIN-290937-1)

Linked Elements
BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)
BTP-FUR-REQ-041823/A-Call Waiting Call Rejected (TcSE ROIN-295059-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The connected mobile phone indicates that the incoming call waiting call is no longer present.
Post-conditions	The incoming call waiting call is no longer presented to the Customer via the In-Vehicle Infotainment System. The call that was the active call when the incoming call waiting call was indicated remains the active call.
List of Exception Use Cases	E1 – Mobile Phone did not indicate that the incoming call waiting call was rejected.
Interfaces	G-HMI Vehicle System Interface

4.7.1.23 BTP-UC-REQ-041808/A-Mobile Phone did not indicate that the incoming call waiting call was rejected (TcSE ROIN-290938-1)

Linked Elements
BTP-UC-REQ-041807/A-Rejecting an Incoming Call Waiting Call via Connected Mobile Phone (TcSE ROIN-290937-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	In this scenario, there is an active call present and the connected mobile phone indicates that an incoming call waiting call is present. As a result of this notification the In-Vehicle Infotainment System notifies the Customer of the incoming call by displaying the phone number of the incoming call or the phonebook contact name if the contact name is available. The connected mobile phone indicates that the incoming call waiting call is no longer present, but that indication was not provided to the In-Vehicle Infotainment System.
Post-conditions	The In-Vehicle Infotainment System continues to display the incoming call waiting call as long as the connected phone provides a notification of the incoming call waiting call.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.24 BTP-UC-REQ-041809/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the In-Vehicle Infotainment System (i.e. Transfer to Privacy) (TcSE ROIN-290939-1)

Linked Elements
BTP-SD-REQ-030711/A-Go to Privacy Mode (TcSE ROIN-149464-1)
BTP-FUR-REQ-041834/E-Enabling Privacy (TcSE ROIN-295070-1)
BTP-SD-REQ-439402/A-Go to Privacy Mode

Actors	Customer Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active The audio is Handsfree and available via the In-Vehicle Infotainment System speakers.
Scenario Description	An active Handsfree call is present and the customer has opted to have a private conversation by requesting that the call audio be transferred from the In-Vehicle Infotainment System speakers to the connected mobile phone. The customer opted to do this via the In-Vehicle Infotainment System G-HMI options available.
Post-conditions	The active call is still active. The active call audio can no longer be heard via the In-Vehicle Infotainment System speakers. The active call audio is on the connected mobile phone. The In-Vehicle Infotainment System indicates that the audio is now present on the connected mobile phone. The In-Vehicle Infotainment System provides the Customer with the option to place the audio back to the In-Vehicle Infotainment System speakers.
List of Exception Use Cases	E1 – Transferring the audio (via In-Vehicle Infotainment System) to handset failed.
Interfaces	G-HMI Vehicle System Interface

4.7.1.25 BTP-UC-REQ-041810/A-Transferring the audio (via In-Vehicle Infotainment System) to handset failed (TcSE ROIN-290940-1)

Linked Elements

BTP-UC-REQ-041809/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the In-Vehicle Infotainment System (i.e. Transfer to Privacy) (TcSE ROIN-290939-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	An active Handsfree call is present and the customer has opted to have a private conversation by requesting that the call audio be transferred from the In-Vehicle Infotainment System speakers to the connected mobile phone. The customer opted to do this via the In-Vehicle Infotainment System G-HMI options available, but the transfer failed.
Post-conditions	An error message is displayed to the customer. The call remains Handsfree via the In-Vehicle Infotainment System.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.26 BTP-UC-REQ-041811/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (TcSE ROIN-290941-1)

Linked Elements
BTP-SD-REQ-030711/A-Go to Privacy Mode (TcSE ROIN-149464-1)
BTP-FUR-REQ-041834/E-Enabling Privacy (TcSE ROIN-295070-1)
BTP-SD-REQ-439402/A-Go to Privacy Mode

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active The audio is Handsfree and available via the In-Vehicle Infotainment System speakers.
Scenario Description	An active Handsfree call is present and the customer has opted to have a private conversation by requesting that the call audio be transferred from the In-Vehicle Infotainment System speakers to the connected mobile phone. The connected mobile phone has requested that the audio be transferred to the connected mobile phone.
Post-conditions	The active call is still active. The In-Vehicle Infotainment System grants the connected mobile phone's request. The active call audio can no longer be heard via the In-Vehicle Infotainment System speakers. The active call audio is on the connected mobile phone. The In-Vehicle Infotainment System indicates that the audio is now present on the connected mobile phone. The In-Vehicle Infotainment System provides the Customer with the option to place the audio back to the In-Vehicle Infotainment System speakers.
List of Exception Use Cases	E1 – Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (Failed).
Interfaces	G-HMI Vehicle System Interface

4.7.1.27 BTP-UC-REQ-041812/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (Failed (TcSE ROIN-290942-1)

Linked Elements
BTP-SD-REQ-030711/A-Go to Privacy Mode (TcSE ROIN-149464-1)
BTP-UC-REQ-041811/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (TcSE ROIN-290941-1)
BTP-FUR-REQ-041834/E-Enabling Privacy (TcSE ROIN-295070-1)
BTP-SD-REQ-439402/A-Go to Privacy Mode

Actors	Customer Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	An active Handsfree call is present and the customer has opted to have a private conversation by requesting that the call audio be transferred from the In-Vehicle Infotainment System speakers to the connected mobile phone. The connected mobile phone has requested that the audio be transferred to the connected mobile phone, but failed to notify the In-Vehicle Infotainment System
Post-conditions	In-Vehicle Infotainment System continues to indicate an active Handsfree call
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.28 BTP-UC-REQ-041813/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290943-1)

Linked Elements
BTP-FUR-REQ-041835/A-Disabling Privacy (TcSE ROIN-295071-1)
BTP-SD-REQ-030713/A-Go to Hands Free Mode (TcSE ROIN-150117-1)
BTP-SD-REQ-439817/A-Go to Hands Free Mode
BTP-SD-REQ-439819/A-Browse Phone
BTP-SD-REQ-439403/A-Go to Hands Free Mode

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active The audio is present on the connected phone.
Scenario Description	An active call is present and the audio is presently available via the connected mobile phone. The customer has opted to transfer the audio from the connected mobile phone to the speakers of the In-Vehicle Infotainment System.
Post-conditions	The active call is still active. The active call audio can no longer be heard via the connected mobile phone. The active call audio is now available via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System indicates that the audio is now present via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System provides the Customer with the option to place the audio back to the connected mobile phone.
List of Exception Use Cases	E1 – Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. Transfer to Handsfree) (Failed).
Interfaces	G-HMI Vehicle System Interface

4.7.1.29 BTP-UC-REQ-041814/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290944-1)

Linked Elements
BTP-FUR-REQ-041835/A-Disabling Privacy (TcSE ROIN-295071-1)
BTP-SD-REQ-030713/A-Go to Hands Free Mode (TcSE ROIN-150117-1)
BTP-UC-REQ-041813/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290943-1)
BTP-SD-REQ-439817/A-Go to Hands Free Mode
BTP-SD-REQ-439819/A-Browse Phone
BTP-SD-REQ-439403/A-Go to Hands Free Mode

Actors	Customer, Connected Mobile Phone
Pre-conditions	Same as original use case.

Scenario Description	An active call is present and the audio is presently available via the connected mobile phone. The customer has opted to transfer the audio from the connected mobile phone to the speakers of the In-Vehicle Infotainment System, but the transfer failed.
Post-conditions	Error message is indicated to the customer. The audio is still routed to the connected phone.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.30 BTP-UC-REQ-041815/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via the Connected Mobile Phone (i.e. Trans (TcSE ROIN-290945-1)

Linked Elements
BTP-FUR-REQ-041835/A-Disabling Privacy (TcSE ROIN-295071-1)
BTP-SD-REQ-030713/A-Go to Hands Free Mode (TcSE ROIN-150117-1)
BTP-SD-REQ-439817/A-Go to Hands Free Mode
BTP-SD-REQ-439819/A-Browse Phone
BTP-SD-REQ-439403/A-Go to Hands Free Mode

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile is connected. A call is active The audio is present on the connected phone.
Scenario Description	An active call is present and the audio is presently available via the connected mobile phone. The mobile phone has indicated that the active call audio is to be transferred from the connected mobile phone to the In-Vehicle Infotainment System speakers.
Post-conditions	The active call is still active. The In-Vehicle Infotainment System grants the connected mobile phone's request. The active call audio can no longer be heard via the connected mobile phone. The active call audio is now available via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System indicates that the audio is now present via the In-Vehicle Infotainment System speakers. The In-Vehicle Infotainment System provides the Customer with the option to place the audio back to the connected mobile phone.
List of Exception Use Cases	E1 – Transferring the Audio from the Connected Mobile Phone to the In-Vehicle Infotainment System via the Connected Mobile Phone (i.e. Transfer to Handsfree) (Failed).
Interfaces	G-HMI Vehicle System Interface

4.7.1.31 BTP-UC-REQ-041816/B-Transferring the Audio from the Connected Mobile Phone to the In-Vehicle Infotainment System via the Connected Mobile Phone (i.e (TcSE ROIN-290946-1)

Linked Elements
BTP-UC-REQ-041815/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via the Connected Mobile Phone (i.e. Trans (TcSE ROIN-290945-1)
BTP-FUR-REQ-041835/A-Disabling Privacy (TcSE ROIN-295071-1)

Actors	Customer Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	An active call is present and the audio is presently available via the connected mobile phone. The customer has opted to transfer the call audio to the In-Vehicle Infotainment System via the connected phone, but the phone has failed to indicate this to the In-Vehicle Infotainment System.

Post-conditions	In-Vehicle Infotainment System continues to indicate an active call in privacy The audio is still present on the connected phone.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.7.1.32 BTP-UC-REQ-041817/A-Entering DTMF Tones During an Active Phone Call (TcSE ROIN-290947-1)

Linked Elements
BTP-FUR-REQ-041830/B-DTMF Tones (TcSE ROIN-295066-1)

Actors	Customer, Connected Mobile Phone
Pre-conditions	A mobile phone is connected. A call is active (Handsfree or Privacy)
Scenario Description	In this case there is an active call present, and Customer wants to send DTMF tones to the far end. (As an example, the Customer may want to join a conference call, etc.) Via the In-Vehicle Infotainment System G-HMI available, the Customer indicates which DTMF tones to send to the far end.
Post-conditions	The call is still active As each DTMF tone is requested by the Customer, it is sent to the connected mobile phone. The In-Vehicle Infotainment System displays to the Customer which DTMF tones have been sent to the far end.
List of Exception Use Cases	E1 – DTMF tones from the In-Vehicle Infotainment System fails.
Interfaces	G-HMI

4.7.1.33 BTP-UC-REQ-041818/A-DTMF tones from the In-Vehicle Infotainment System fails (TcSE ROIN-290948-1)

Linked Elements
BTP-UC-REQ-041817/A-Entering DTMF Tones During an Active Phone Call (TcSE ROIN-290947-1)

Actors	Customer, Connected Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	In this case there is an active call present, and Customer wants to send DTMF tones to the far end. (As an example, the Customer may want to join a conference call, etc.) Via the In-Vehicle Infotainment System G-HMI available, the Customer indicates which DTMF tones to send to the far end, but the connected phone has failed to respond appropriately.
Post-conditions	An error is displayed to the customer. The In-Vehicle Infotainment System remains in an active call.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.7.1.34 BTP-UC-REQ-192191/A-Turning Bluetooth off with an active call

Linked Elements
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone Customer
Pre-conditions	The mobile phone is connected, a voice call is ongoing

Scenario Description	The customer has indicated that they want to turn Bluetooth off
Post-conditions	The In-Vehicle Infotainment System closes Bluetooth connections with the connected device (all connections: ACL and SCO/eSCO) and does not allow reconnections. It then turns off the Bluetooth chip so that it stops transmitting and receiving data over the air. The phone call is not explicitly ended by the In-Vehicle Infotainment System and depending on devices' implementation should continue on the handset. The process of turning Bluetooth off shall not require more than 3 sec, no matter the device behavior upon request for disconnection. A similar behavior shall be followed for the case when a phone call is not present, or it is present and in privacy, or when multiple devices are connected at the same time.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.7.2 Requirements

4.7.2.1 BTP-FUR-REQ-041819/A-Ability to End a Single Call (TcSE ROIN-295051-1)

The ability to end a single active call shall only be available while in a single call. This will allow the user to end the call.
The user shall be able to end a call via In-Vehicle Infotainment System or the AG
After a call has been ended, the phone application shall release Primary Audio Source.

4.7.2.2 BTP-FUR-REQ-041820/B-Max Number of Calls (TcSE ROIN-295056-1)

The In-Vehicle Infotainment System shall be able to control a maximum of two calls simultaneously.
While in a single active call, the user shall be able to accept a second call.
While in a multi-party call state, the user will not have the option via the In-Vehicle Infotainment System to answer any other incoming call waiting call.

The call which is not supported anymore shall be ignored by the In-Vehicle Infotainment System.

4.7.2.3 BTP-FUR-REQ-041821/B-Call Waiting Call (TcSE ROIN-295057-1)

When a call waiting notification is received from the connected AG, the phone application shall notify the user by displaying the calls characteristics as described in the Phonebook Matching section of this specification. The user shall be able to accept, reject, or ignore this call.

Depending on HMI design, the user might be able to choose between 2 different ways to accept the call –

1. Accept and make the previous active call into a held call
2. Accept and hang-up the previous active call

If only one option is available to the user to accept the call, it shall be option #1.
The two options correspond to different CHLD values that will be sent from the IVIS to the connected phone – see BT SIG HFP specifications for more details.

4.7.2.4 BTP-FUR-REQ-041822/B-Call Waiting Call Accepted (TcSE ROIN-295058-1)

If accepted via In-Vehicle Infotainment System or the AG, the phone application shall reflect that the incoming call waiting call is now the active call.
The phone application shall also correctly reflect the status of the previously active call.

4.7.2.5 BTP-FUR-REQ-041823/A-Call Waiting Call Rejected (TcSE ROIN-295059-1)

If rejected via the In-Vehicle Infotainment System, the phone application shall block the incoming call waiting call's caller ID, send it to voicemail (if supported by the connected AG), and shall continue with the active call.

4.7.2.6 BTP-FUR-REQ-041824/A-Call Waiting Call Ignored (TcSE ROIN-295060-1)

If the user ignores the incoming call waiting call (i.e. not pressing any buttons via In-Vehicle Infotainment System), the phone core shall continue to report an incoming call waiting call until the phone stops reporting a CCWA notification. At that time In-Vehicle Infotainment System shall inform the user they have a Missed Call, and a Missed Call shall be recorded in the Call History section within THE IN-VEHICLE INFOTAINMENT SYSTEM.

4.7.2.7 BTP-FUR-REQ-041826/B-Toggle Calls (TcSE ROIN-295062-1)

This function allows the user to switch between an active call and a held call. This function shall only be allowed in a multi-party call state where one call is on hold and one is active.
IVIS shall determine that switching the calls was successful based on the CIND and CLCC information.

4.7.2.8 BTP-FUR-REQ-041827/B-Ending Specific Call (TcSE ROIN-295063-1)

This function allows the user to end an active call, and return to a held call.

Note: For CDMA devices, the user will not be able to end the active call. In this case, the user will end both calls, and the holding call will begin to ring as a new incoming call.
No specific handling required for this case.

4.7.2.9 BTP-FUR-REQ-041828/B-Join Calls (TcSE ROIN-295064-1)

This function shall allow the user to join two calls, and create a conference call. This function shall only be allowed in a multi-party call state where one call is on hold and one is active.
IVIS shall determine that joining the calls was successful based on the CIND and CLCC information.

4.7.2.10 BTP-FUR-REQ-041829/A-Ending Joined Calls (TcSE ROIN-295065-1)

This function shall allow the user to end a joined call. This function shall only be allowed in a multi-party call state where both calls are active. After the calls have been ended, the phone application shall release Primary Audio Source.

4.7.2.11 BTP-FUR-REQ-041830/B-DTMF Tones (TcSE ROIN-295066-1)

This feature shall only be available while in an active call. It shall allow the user to send DTMF tones during active calls. All numerals, asterisks, and pound shall be supported. The user shall be allowed to enter these tones using the GUI. The connected device might send a short tone over the audio channel each time a user sends a DTMF tone. This will provide some audio feedback to assure the user that their action was registered.

4.7.2.12 BTP-FUR-REQ-041831/A-Muting an Active Call(s) (TcSE ROIN-295067-1)

This feature shall only be available while in an active call. It shall mute the In-Vehicle Infotainment System microphone, and not pass audio to the connected AG. When this feature is set to 'ON', the In-Vehicle Infotainment System microphone will be muted. SCO shall still be connected, and the user shall be able to hear the party on the far end.

4.7.2.13 BTP-FUR-REQ-041832/B-Privacy Availability (TcSE ROIN-295068-1)

The ability to place a call into privacy / Handsfree shall be available as an in-call option.
It will allow a user to transfer their call from the HF to the AG and vice versa via In-Vehicle Infotainment System or the AG while a call is active or in dialing state.

4.7.2.14 BTP-FUR-REQ-041833/A-Privacy / Handsfree Call Management (TcSE ROIN-295069-1)

The call shall still be managed by the Handsfree connection with HF, while the call audio is on the handset.

4.7.2.15 BTP-FUR-REQ-041834/E-Enabling Privacy (TcSE ROIN-295070-1)

While the setting “Mute audio in privacy” is set to 'ON', and when the active call is in privacy, the In-Vehicle Infotainment System shall not play music from any source. See HMI specification for more information.

While the setting “Mute audio in privacy” is set to “OFF”, and when the active call is in privacy, the In-Vehicle Infotainment System shall fall back to the previous Audio Source.
*Note: It might not be possible to play music from the same Bluetooth device.

The state of “Mute audio in privacy” shall be set according to the default value of customer market requirement as specified in BTP-FUR-REQ-113745 Device Specific settings. The customer shall have the ability to change the state for mute audio in privacy via a GUI option in the device specific settings.

4.7.2.16 BTP-FUR-REQ-041835/A-Disabling Privacy (TcSE ROIN-295071-1)

While this feature is set to 'OFF' audio will be transferred to the HF, and the phone application shall take Primary Audio Source.

4.7.2.17 BTP-FUR-REQ-193063/A-Handling of call audio and privacy indicator

The In-Vehicle Infotainment System, when a phone is connected and a call is present or established, shall try to make the call handsfree (call audio via the In-Vehicle Infotainment System speakers and microphone) in the following situations (described by relative use cases):

- Whenever the In-Vehicle Infotainment System connects to a phone and a call is already present (either on resume or on connection)
- Whenever the call is outgoing (either dialed from the In-Vehicle Infotainment System or from the handset)
- When an incoming call is answered by the In-Vehicle Infotainment System

The In-Vehicle Infotainment System shall not try to make the call handsfree for incoming calls answered via the handset. Depending on handset design, however, answering the call from the handset might result in a handsfree call.

At the same time the GUI for a call shall provide the user with the option to transfer the call audio from the In-Vehicle Infotainment System to the handset (and viceversa), and communicate the current status of the call audio.

For incoming calls answered via the handset, the In-Vehicle Infotainment System GUI shall always indicate to the user the current status of the call audio. In this case the In-Vehicle Infotainment System shall not try to make the call handsfree and shall try to modify the call audio status according to user input.

For all other cases (see bullet point list above) the In-Vehicle Infotainment System, to avoid flicker of the privacy status on the call GUI at the start of the call, shall show to the user that the call is NOT in privacy even if it is still trying to make the call handsfree. After the attempt to make the call handsfree is done, the privacy indicator shall correctly reflect the privacy status. If the user presses the button to make the call private, then the In-Vehicle Infotainment System shall either stop trying to make the call handsfree, or transfer audio to the phone, following the user input. From then on the privacy indicator shall correctly reflect the privacy status.

4.7.2.18 BTP-FUR-REQ-041836/A-Privacy Exception (TcSE ROIN-295072-1)

The In-Vehicle Infotainment System shall not indicate that the active call is in privacy when the customer is ending the call. To achieve this goal, the In-Vehicle Infotainment System shall wait 500ms before indicating that a call has been transferred into privacy when a Release SCO notification is received from the connected AG. Also, if the customer has opted to end the call via the In-Vehicle Infotainment System, the In-Vehicle Infotainment System shall not indicate that the call has transferred to privacy prior to phone call disconnect.

4.7.2.19 BTP-FUR-REQ-041837/A-Automatic Transfer to Privacy (TcSE ROIN-295073-1)

In the event that In-Vehicle Infotainment System has to release the Handsfree Connection with the AG while there is an active call present, it shall transfer the audio to the AG. In this case, In-Vehicle Infotainment System shall present a 180 second timer once the power mode transitions to Wait-Suspend. This timer shall indicate that the call will be transferred to privacy. The call shall be transferred if In-Vehicle Infotainment System receives a Driver Door open signal after a transition to Wait-Suspend. In the event that there is an active call, and In-Vehicle Infotainment System recognizes that the Driver Door is open and receives an ignition off In-Vehicle Infotainment System shall transfer the call to privacy. These scenarios can be found in In-Vehicle Infotainment System Welcome Power Modes.

4.7.2.20 BTP-FUR-REQ-041838/A-Automatic Transfer to Handsfree (TcSE ROIN-295074-1)

In the event that In-Vehicle Infotainment System connects to an AG, and it is in an active call, In-Vehicle Infotainment System shall transfer the call to Handsfree within 2 seconds.

4.7.2.21 BTP-FUR-REQ-130713/A-Hold Call

In the event that the connected device is capable of indicating the hold status of a connected call, the In-Vehicle Infotainment System shall be able to display this status to the customer.

4.7.2.22 BTP-FUR-REQ-041839/A-Advanced Call Tracking (TcSE ROIN-295103-1)

If supported by the connected AG, In-Vehicle Infotainment System shall use the Advance Call Tracking (i.e. CLCC) indicators as the call status indicator.

In the event of an Emergency Call, In-Vehicle Infotainment System shall use either CIEV and/or AT+CLCC updates to determine if an Emergency Call has been established.

4.7.2.23 BTP-FUR-REQ-041840/B-Call Timer (TcSE ROIN-295104-1)

During an active call, a call timer shall be maintained for hands-free calls.
In call hold scenarios, the appropriate call timer for each call shall be maintained.
In multi-party scenarios, the timer shall continue until the final call is terminated.

*****Note: In-Vehicle Infotainment System will not be able to display an accurate call timer when the call was active at the time of connection.

4.7.2.24 BTP-FUR-REQ-041841/B-Blower Motor Reduction / Activation (TcSE ROIN-295114-2)

The In-Vehicle Infotainment System shall request that the climate module reduce the blower motor when a Handsfree call is active. The In-Vehicle Infotainment System shall enable / disable the blower motor within 50ms of a handsfree phone call or the release of eSCO/SCO.

Reference
BTP-REQ-032098-Blower Motor Reduction Activation/Deactivation
BTP-REQ-032099-Incoming Call (Setting Blower Motor Reduction Activation)
BTP-REQ-032100-Outgoing Call Initiated from HF/AG (Setting Blower Motor Reduction Activation)
BTP-REQ-032101-Active Call at Time of Connection (Setting Blower Motor Reduction Activation)
BTP-REQ-032102-End of Call (Setting Blower Motor Reduction Activation)
BTP-REQ-032103-AG Disconnect (Setting Blower Motor Reduction Activation)
BTP-REQ-032104-Unspecified (per Handsfree Profile 1.5) Conditions Handling
BTP-REQ-032105-Audio is placed into Privacy (i.e. SCO is Released)
BTP-REQ-032106-Audio is placed into Handsfree from Privacy (i.e. SCO is granted)
BTP-REQ-032107-Additional Notes.

4.7.2.25 BTP-FUR-REQ-041842/B-Active Call Audio Error Detection (TcSE ROIN-304249-1)

The In-Vehicle Infotainment System shall have the ability to detect when eSCO / SCO should be active per the requirements within Handsfree Profile Specification.

Outgoing Call:

When an outgoing call is initiated via the In-Vehicle Infotainment System, it shall determine that an external error with the AG has occurred when the following scenario takes place:

1. If the connected AG fails to establish the audio connection within 3 seconds of receiving a callsetup value of 2.

When the above scenario is detected, the In-Vehicle Infotainment System shall try to establish the audio connection.

Incoming Call:

If incoming call is answered from IVIS, and there is no call audio being established by the phone in 3 sec from when the call becomes active, then IVIS shall try to establish the audio connection.

In-Band Ringing Support:

When the in-vehicle infotainment system is alerted to an incoming phone call via a callsetup value =1, it shall determine that an external audio routing error with AG has occurred when the following scenario takes place:

1. In-band ringing is active (as reported from the device)
2. If the connected AG fails to establish the audio connection within 3 seconds of receiving a callsetup value = 1.

When the above scenario is detected, the In-Vehicle Infotainment System shall try to establish the audio connection.

Non In-Band Ringing Support:

When the in-vehicle infotainment system provides and ATA to the connected AG and has received the corresponding call value = 1 and callsetup value = 0 shall determine that an external audio routing error with the AG has occurred when the following scenario takes place:

1. The connected AG fails to establish the audio connection within 3 seconds of receiving the callsetup value = 0.

When the above scenario is detected, the In-Vehicle Infotainment System shall try to establish the audio connection.

Retrieval From Privacy:

The In-Vehicle Infotainment System determines that an external audio routing error has taken place when attempting to retrieve a call from the handset (i.e. eSCO / SCO request) when the following scenario takes place:

1. The In-Vehicle Infotainment System has requested eSCO / SCO from the connected AG, but the AG has either:
    a. Failed to respond to the request within 3 seconds
    b. Rejected the request

4.7.2.26 BTP-FUR-REQ-041843/B-Incoming Call Answer Failure (TcSE ROIN-304250-1)

The In-Vehicle Infotainment System shall have the ability to detect when the connected AG has not responded to the request to answer an incoming call correctly per the requirements within Handsfree Phone Specification.

When the In-Vehicle Infotainment System provides an ATA or CHLD = 2 to the connected AG the In-Vehicle Infotainment System shall determine that an external error has occurred when the following scenario takes place:

1. The connected AG fails to respond with an OK within 5 seconds

*Note: For CHLD = 2; the categorization of an incoming call failure is only applicable when it is used in response to answering an incoming call waiting call (i.e. CCWA notification).

When the above scenario occurs the In-Vehicle Infotainment System shall consider this as an error while accepting the call. The In-Vehicle Infotainment System shall continue to attempt to answer the call by repeating the message to the AG every 5 seconds until the AG is no longer indicating that an incoming call is present or the user has indicated that the In-Vehicle Infotainment System should stop trying.

4.7.2.27 BTP-FUR-REQ-041844/C-Incoming Call Rejection Failure (TcSE ROIN-304251-1)

The In-Vehicle Infotainment System shall have the ability to detect when the connected AG has not responded to the request to reject an incoming call correctly per the requirements within Handsfree Phone Specification.

When the In-Vehicle Infotainment system provides a CHUP to the connected AG the in-vehicle infotainment system shall determine that an external error has occurred when the following scenario takes place:

1. The connected AG fails to respond with an OK within 5 seconds

When the above scenario occurs the In-Vehicle Infotainment system shall consider this as an Error while rejecting the call. The In-Vehicle Infotainment System shall continue to reject the call by repeating the message to the AG every 5 seconds until the AG is no longer indicating that an incoming call is present or the user has indicated that the In-Vehicle Infotainment System should stop trying.
Dependent on the HMI specification an error message may be displayed to the customer.

4.7.2.28 BTP-FUR-REQ-439399/A-Phone Volume Adjustment

The In-Vehicle Infotainment System shall offer an opportunity for the costumer to adjust the phone volume level to the media volume level (e.g. USB, FM). This setting shall be stored and shall apply for each paired device separately.
This adjustment shall apply prior to the phone feature volume setting.
The offset shall cover a gain of –10 dB to + 10 dB in 15 steps.

The default value is specified in STMGNT-FUR-REQ-014654-AHU-DSP AMP Default Parameters (TcSE ROIN-119131-11).
This requirement shall consider the existing requirement AHU-HR-REQ-102963-Mode Balancing - Media Level Matching For Audio Outputs. It is furthermore an additional option to compensate different behavior of consumer electronics.

Note: This setting shall NOT apply to Emergency Assistance calls.

4.7.2.29 BTC-FUR-REQ-191908/A-Caller ID format

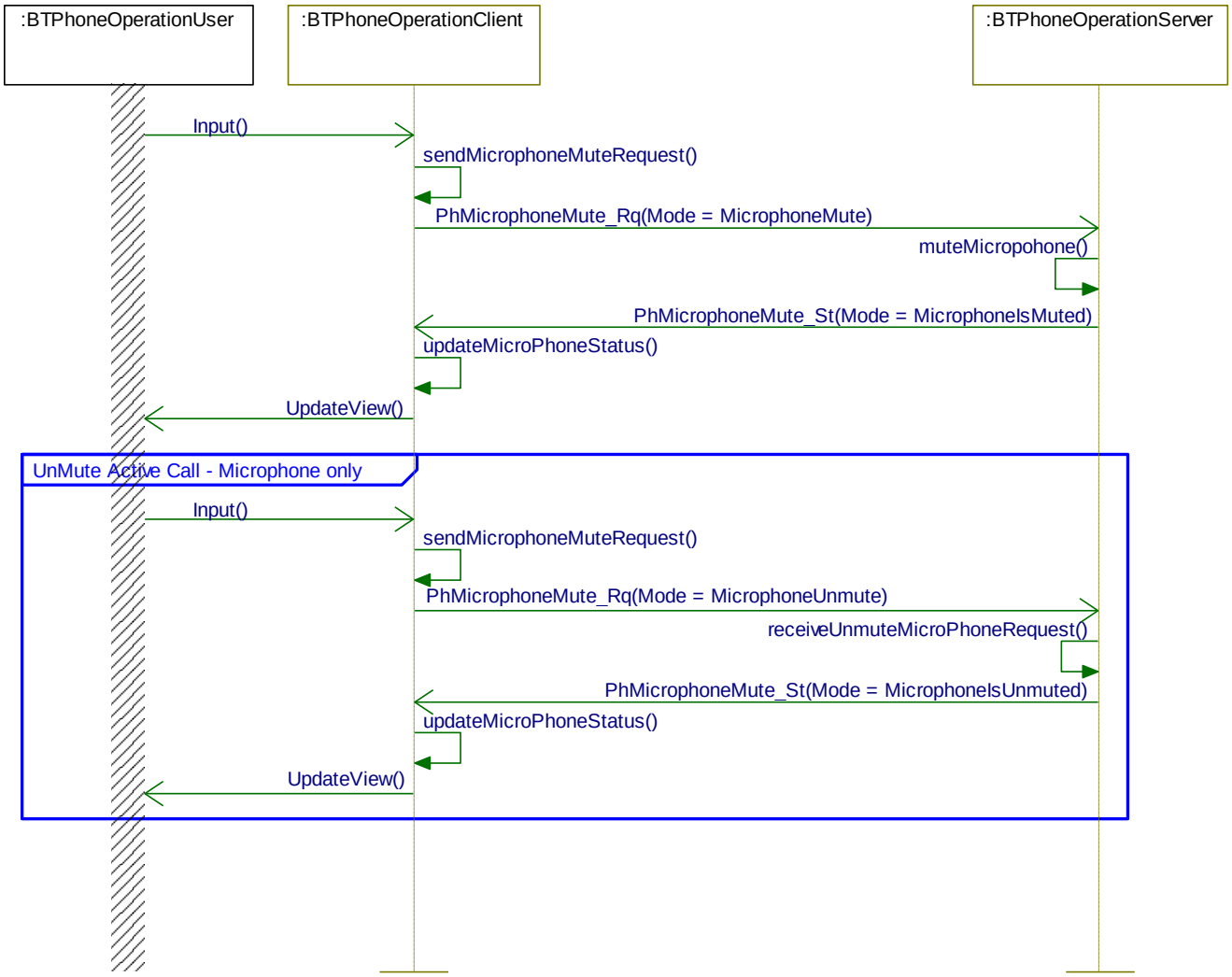
The caller ID shall be displayed in the static format {FirstName LastName} independently from the chosen phonebook sorting order.

Exception:
For the APA countries which are specified in “BTP-FUR-REQ Phonebook Sorting per Market“ the format shall be dynamically handled according the selected phonebook sorting order, meaning if the phonebook is sorted via LastName the caller ID shall be displayed as {LastName Firstname}.
If the phonebook is currently sorted via FirstName then the caller name shall also have the format {Firstname Lastname}.
As soon as the costumer is changing the order for the phonebook sorting the change should apply to the caller ID as well.

4.7.3 Sequence Diagrams

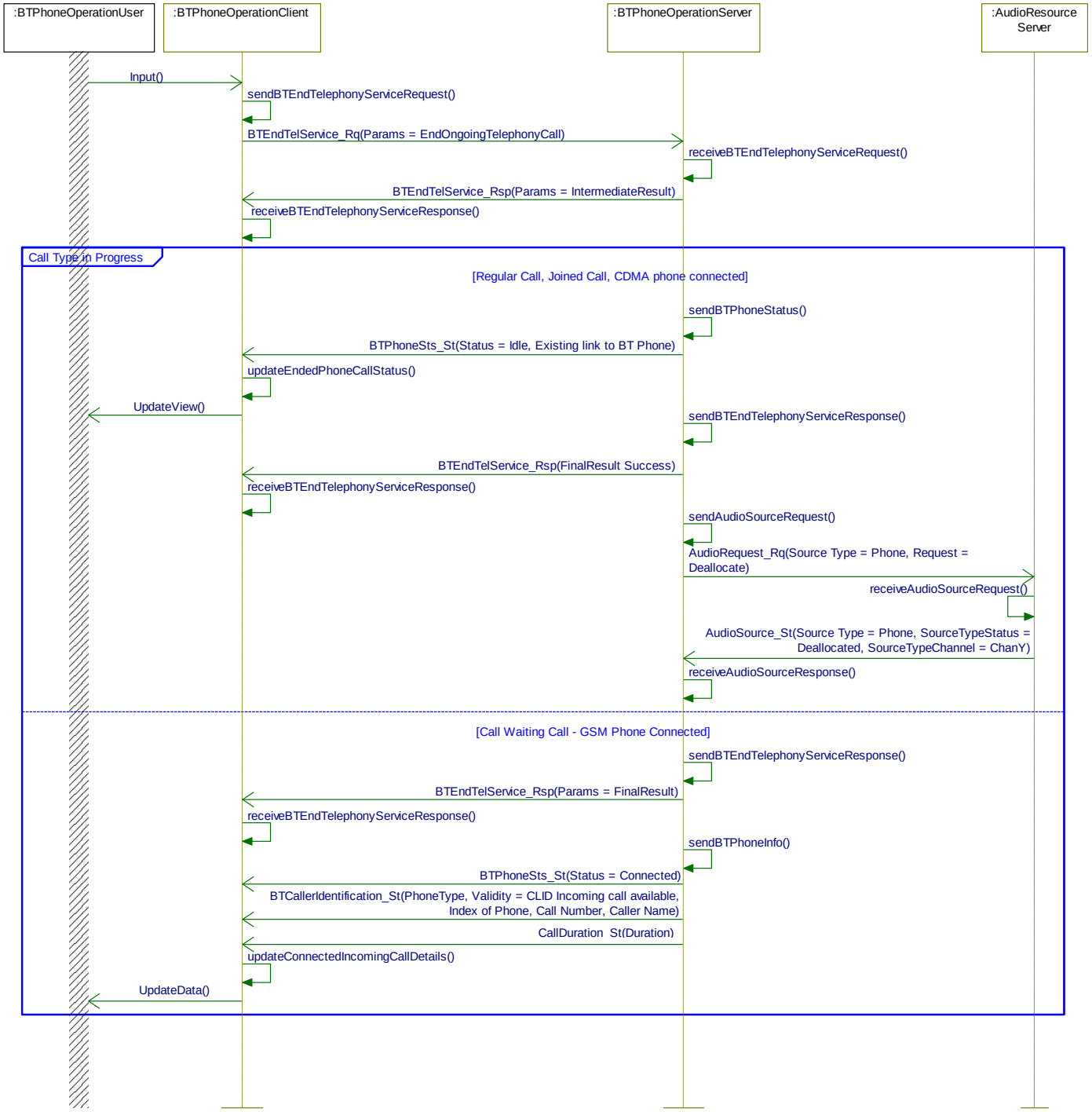
4.7.3.1 BTP-SD-REQ-439400/A-Mute Phone

Linked Elements
BTP-UC-REQ-041796/A-Muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290926-1)
BTP-UC-REQ-041799/A-Un-muting the In-Vehicle Infotainment System Microphone while in an Active Call (TcSE ROIN-290929-1)



4.7.3.2 BTP-SD-REQ-439401/A-End Call

Linked Elements
BTP-UC-REQ-041789/A-Ending a Single or Joined Active Call via In-Vehicle Infotainment System (TcSE ROIN-290920-1)



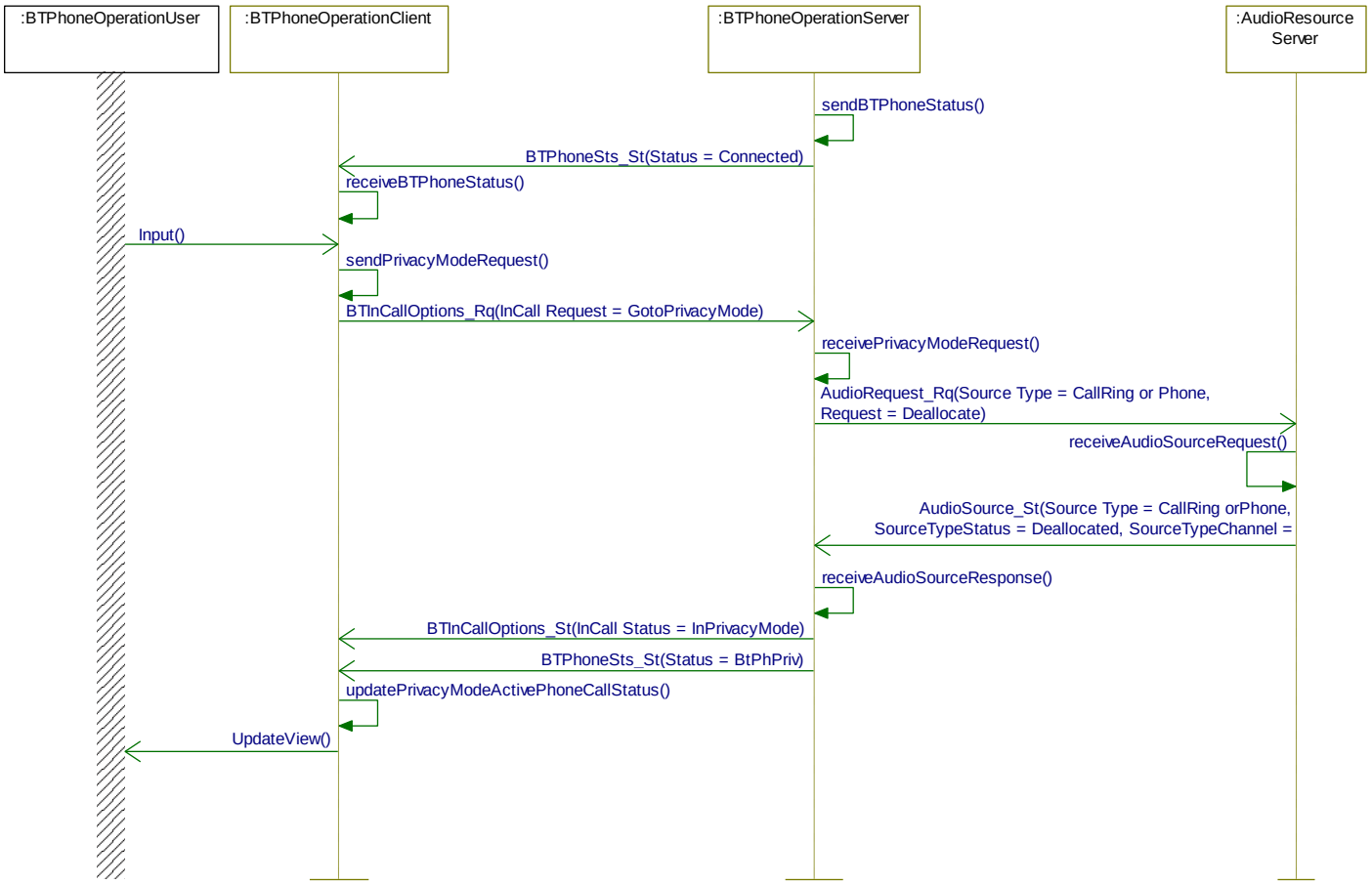
4.7.3.3 BTP-SD-REQ-439402/A-Go to Privacy Mode

Linked Elements

BTP-UC-REQ-041811/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (TcSE ROIN-290941-1)

BTP-UC-REQ-041812/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the Connected Mobile Phone (i.e. Transfer to Privacy) (Failed (TcSE ROIN-290942-1)

BTP-UC-REQ-041809/A-Transferring the Handsfree Audio to the Connected Mobile Phone via the In-Vehicle Infotainment System (i.e. Transfer to Privacy) (TcSE ROIN-290939-1)



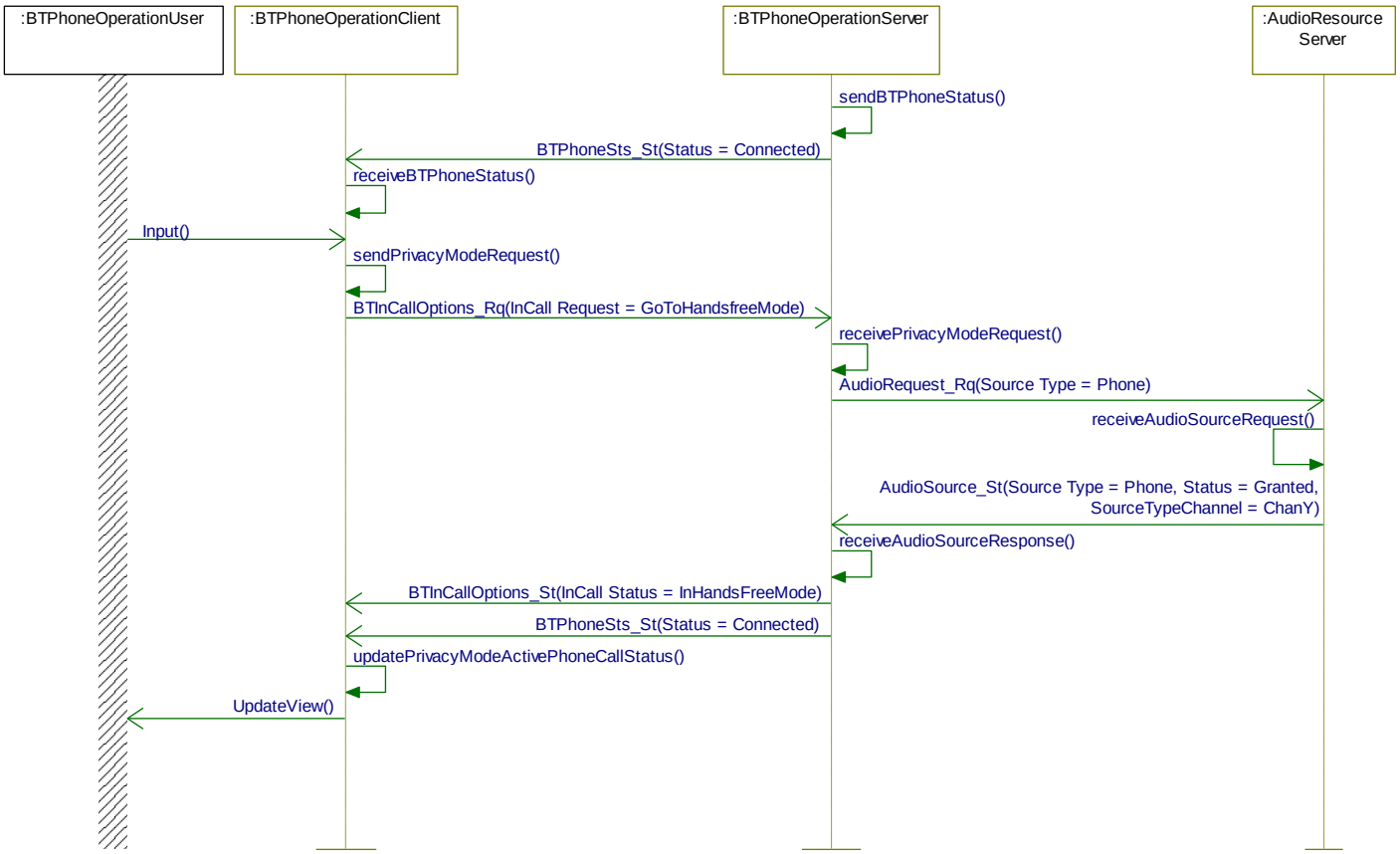
4.7.3.4 BTP-SD-REQ-439403/A-Go to Hands Free Mode

Linked Elements

BTP-UC-REQ-041815/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via the Connected Mobile Phone (i.e. Trans (TcSE ROIN-290945-1)

BTP-UC-REQ-041813/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290943-1)

BTP-UC-REQ-041814/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290944-1)



4.7.3.5 BTP-SD-REQ-030715/A-Call Waiting Call (TcSE ROIN-149471-2)

Linked Elements
BTP-UC-REQ-041801/C-Answering an Incoming Call Waiting Call via In-Vehicle Infotainment System (TcSE ROIN-290931-1)
BTP-UC-REQ-041803/C-Answering an Incoming Call Waiting Call via Mobile Phone (TcSE ROIN-290933-1)

Scenarios

Normal Usage

The user is currently in an active call. HMI indicates {Calling waiting call, caller id, and accept/reject}. User selects <Accept / Reject> via HMI.

Constraints

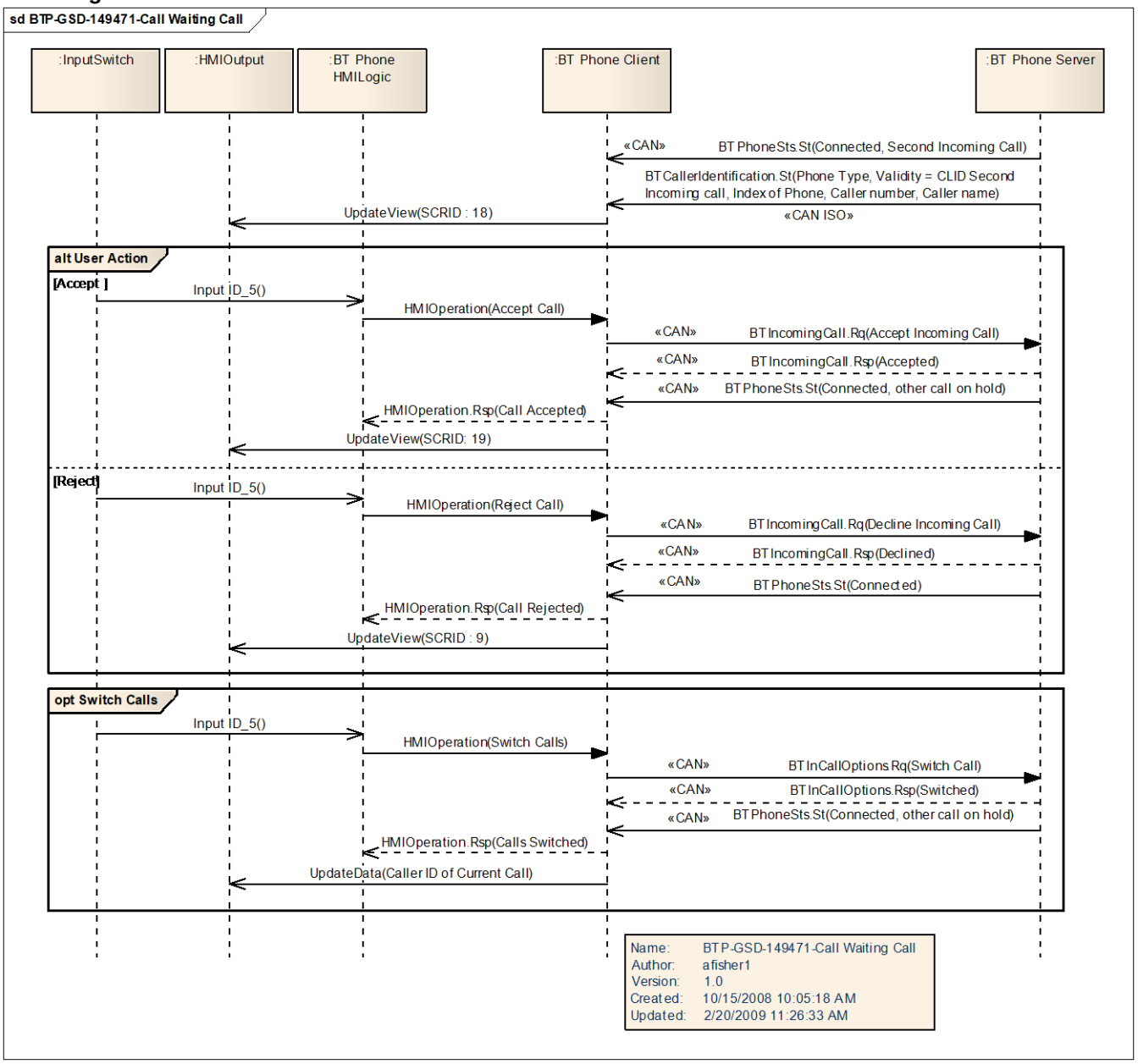
Pre-condition

A Bluetooth phone is connected to the vehicle interface. Vehicle power is On. User is in an active phone call. Another incoming call is received.

Post-condition

The user accepts or rejects second call, and continues in phone call. If second call is accepted, the first call is placed on hold.

Sequence Diagram



4.7.3.6 BTP-SD-REQ-030717/B-Join Calls (TcSE ROIN-149478-3)

Linked Elements

BTC-UC-REQ-247275/A-Joining calls via In-Vehicle Infotainment System or Connected Mobile Phone

Scenarios

Normal Usage

The user selects <join calls> via the HMI. Both active calls are joined into one active call.

Constraints

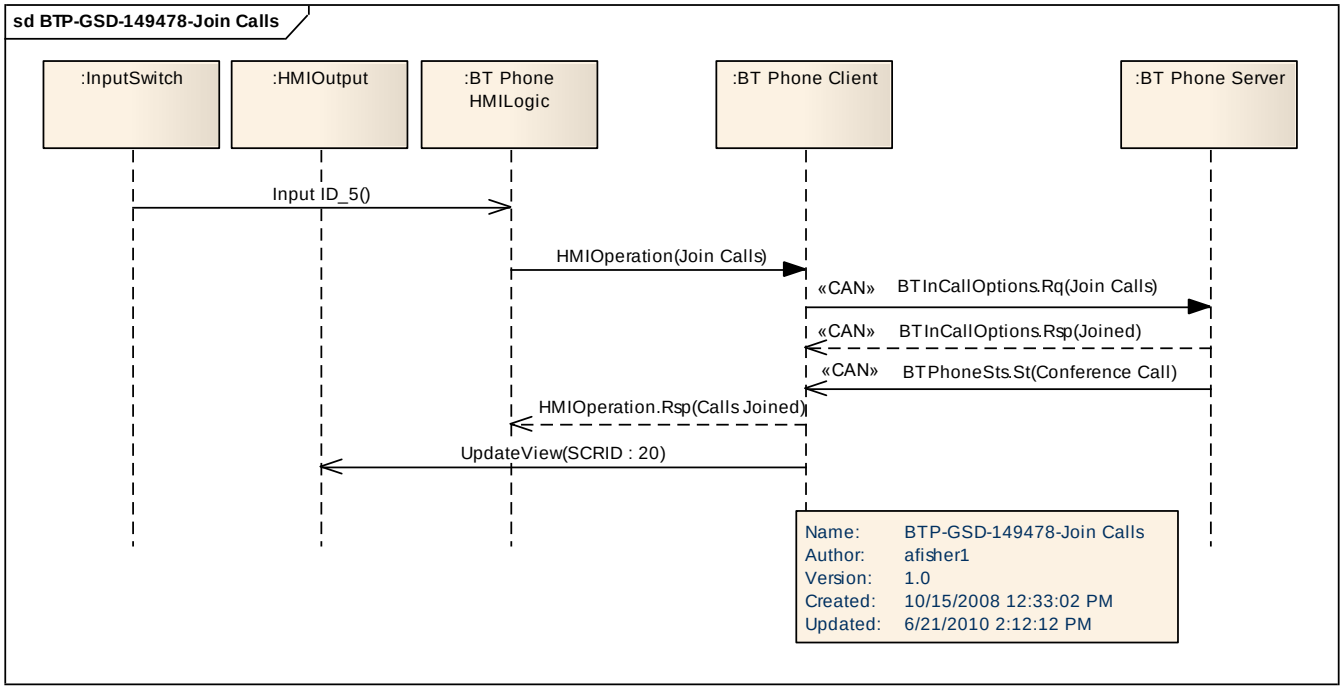
Pre-condition

A Bluetooth phone is connected to the vehicle interface. Vehicle power is On. User is in an active ~~handsfree~~ phone call with another call on hold.

Post-condition

The active and held call are joined into one active call

Sequence Diagram



4.8 BTP-FUN-REQ-439818/A-Phonebook and Call History Download, Browse and Management

4.8.1 Use Cases

4.8.1.1 BTP-UC-REQ-033818/D-Phonebook Download (TcSE ROIN-290886-2)

Linked Elements
BTC-FUR-REQ-243375/A-PBAP 2.1 specific features
BTP-FUR-REQ-033830/A-Phonebook Accessibility (TcSE ROIN-295076-1)
BTP-FUR-REQ-033833/G-PBAP Requirements and Characteristics (TcSE ROIN-295079-1)
BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)
BTP-FUR-REQ-033841/I-Contact Characteristics / Data (TcSE ROIN-295087-1)
BTP-FUR-REQ-033846/C-Phonebook Display Requirements (TcSE ROIN-295092-2)
BTP-FUR-REQ-410321/A-PBAP Requirements and Characteristics
BTP-FUR-REQ-410335/A-Contact Characteristics / Data

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected phone supports ability to download the phonebook Infotainment system must be on. In-Vehicle Infotainment System
Scenario Description	The mobile phone has been paired and a phonebook download has been initiated by the In-Vehicle Infotainment System. Once completed, the In-Vehicle Infotainment System will have the ability to display the following type of information from the phone's phonebook: First and / or Last Name Cell Phone Number Work / Office Number Home Number Photo Address *Note: If this is the first time that the phonebook download has been initiated between the In-Vehicle Infotainment System and the connected phone or if this

	function has been manually triggered by the Customer, he / she will more than likely waiting for this operation to be completed.
Post-conditions	The In-Vehicle Infotainment System has requested a download of the connected phone's phonebook. The In-Vehicle Infotainment System has stored the connected phone's phonebook to its' internal memory. The In-Vehicle Infotainment System makes the connected phone's phonebook available for use and display via the In-Vehicle Infotainment System G-HMI.
List of Exception Use Cases	E2 – First time phonebook download access notification. E3 – Phonebook is empty
Interfaces	G-HMI, V-HMI

4.8.1.2 BTP-UC-REQ-033820/B-First Time Phonebook Download Access Notification (TcSE ROIN-290888-1)

Linked Elements
BTP-UC-REQ-033818/D-Phonebook Download (TcSE ROIN-290886-2)

Actors	In-Vehicle Infotainment System Connected Phone
Pre-conditions	Same as original
Scenario Description	The In-Vehicle Infotainment System may ask to download the phonebook for the first time.
Post-conditions	The In-Vehicle Infotainment System may alert the customer that they need to confirm automatic phonebook download, and that they may need to provide the In-Vehicle Infotainment System with access to the Phonebook via the connected mobile phone.
List of Exception Use Cases	N/A
Interfaces	G-HMI, V-HMI

4.8.1.3 BTP-UC-REQ-033821/A-Call History Download (TcSE ROIN-290889-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The mobile phone has been paired and a call history download has been initiated by the In-Vehicle Infotainment System. *Note: If this is the first time that the call history download has been initiated between the In-Vehicle Infotainment System and the connected phone or if this function has been manually triggered by the Customer, he / she will more than likely waiting for this operation to be completed. The type of information that the In-Vehicle Infotainment System can display from the Call History should be: Incoming Call Outgoing Call Missed Call All calls
Post-conditions	The In-Vehicle Infotainment System has requested a download of the connected phone's Call History. The In-Vehicle Infotainment System has stored the connected phone's Call History to its' internal memory. The In-Vehicle Infotainment System makes the connected phone's Call History available for use.

List of Exception Use Cases	E1 – Call History download not successful. E2 – Call history (empty).
Interfaces	G-HMI V-HMI

4.8.1.4 BTP-UC-REQ-033822/A-Call History Download Not Successful (TcSE ROIN-290890-1)

Linked Elements
BTP-UC-REQ-033821/A-Call History Download (TcSE ROIN-290889-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Same as original use case
Scenario Description	The In-Vehicle Infotainment System has requested the connected phone's call history, but was not successful in obtaining it.
Post-conditions	The In-Vehicle Infotainment System has the ability to display an error message to the customer when they opt to access the call history.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.8.1.5 BTP-UC-REQ-033823/A-Call History (Empty) (TcSE ROIN-290891-1)

Linked Elements
BTP-UC-REQ-033821/A-Call History Download (TcSE ROIN-290889-1)
BTP-FUR-REQ-153579/B-Requirements for Handling of Phonebook and Call History Feature in VUI/GUI

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Same as original use case
Scenario Description	The In-Vehicle Infotainment System has requested the connected phone's call history, but the call history was empty.
Post-conditions	The In-Vehicle Infotainment System has the ability to display an notification message to the customer when they opt to access the call history.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.8.1.6 BTP-UC-REQ-033824/A-User Opts to Turn Phonebook / Call History Download Off (TcSE ROIN-290892-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history and phonebook. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The user does not want to update their phonebook / call history automatically.
Post-conditions	The In-Vehicle Infotainment System turns off the automatic update of phonebook and call history.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.8.1.7 BTP-UC-REQ-033825/A-User Opts to Access Phonebook Features w/o Phonebook Available (TcSE ROIN-290893-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history and phonebook. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The customer has requested a phonebook feature, but a phonebook is not stored within the In-Vehicle Infotainment System.
Post-conditions	The customer is notified that the phonebook is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.8.1.8 BTP-UC-REQ-033826/A-Phonebook Downloaded from Connected Not Completely Available via In-Vehicle Infotainment System (TcSE ROIN-290894-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history and phonebook. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s).
Scenario Description	The In-Vehicle Infotainment System has initiated a phonebook download, but the In-Vehicle Infotainment System could not store the complete phonebook.
Post-conditions	The customer is notified that the complete phonebook is not available.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.8.1.9 BTP-UC-REQ-033827/A-Phonebook Browsing (TcSE ROIN-290895-1)

Linked Elements
BTP-SD-REQ-030721/B-Browse Phone (TcSE ROIN-149541-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history and phonebook. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). Phonebook is available within In-Vehicle Infotainment System.
Scenario Description	The customer has accessed the phonebook section of the In-Vehicle Infotainment System.
Post-conditions	The customer has the option to scroll, jump from letter to letter, select specific contacts via the In-Vehicle Infotainment System.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.8.1.10 BTP-UC-REQ-033828/A-Phonebook Sorting (TcSE ROIN-290896-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Connected Phone supports ability to download the call history and phonebook. Infotainment system must be on. Bluetooth must be on in In-Vehicle Infotainment System and mobile device(s). Phonebook is available within In-Vehicle Infotainment System. Phonebook must be available within the In-Vehicle Infotainment System.
Scenario Description	The customer wants to choose the sorting order of their phonebook (i.e. Last name/First Name or First Name / Last Name)
Post-conditions	The phonebook will be sorted in the order selected by the customer.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.8.1.11 BTP-UC-REQ-153575/B-Phonebook is empty

Linked Elements
BTP-FUR-REQ-153579/B-Requirements for Handling of Phonebook and Call History Feature in VUI/GUI
BTP-FUR-REQ-033837/C-Phonebook Download Error (TcSE ROIN-295083-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Same as original use case
Scenario Description	The In-Vehicle Infotainment System has requested the connected phone's phonebook, but the phonebook is empty. The customer opted to enter the phonebook or to initiate an outgoing call to a contact name.
Post-conditions	The In-Vehicle Infotainment System has the ability to display a notification message or play a voice prompt to the customer when they opt to use the phonebook feature.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.8.2 Requirements

4.8.2.1 BTP-FUR-REQ-033829/D-Phonebook Download Availability (TcSE ROIN-295075-1)

In-Vehicle Infotainment System shall provide the user with the option to download their AG's phonebook automatically and/or manually, when the connected device is supporting this feature.

In-Vehicle Infotainment System might – depending on HMI specification - provide some indication to the user when this task has been successfully completed when initiated for the first time or when manually initiated.

4.8.2.2 BTP-FUR-REQ-033830/A-Phonebook Accessibility (TcSE ROIN-295076-1)

A user's phonebook shall only be accessible when the user's AG is connected.

4.8.2.3 BTP-FUR-REQ-033831/A-Phonebook Menu Option (TcSE ROIN-295077-1)

The user shall be able to initiate a call to any contact while in the phonebook menu.

4.8.2.4 BTP-FUR-REQ-033843/E-Phonebook Delete (TcSE ROIN-295089-1)

This feature shall only be available when the connected AG has a phonebook associated with it.

It will allow a user to delete their entire phonebook from In-Vehicle Infotainment System. After a user has deleted their phonebook, all contact information associated with that particular AG shall be removed from the In-Vehicle Infotainment System.

The user will have to re-download their phonebook if they wanted to access the phonebook features via In-Vehicle Infotainment System.

If the user deletes their phonebook, In-Vehicle Infotainment System shall insure that all reference to contacts within the deleted phonebook are also removed (i.e. call history, text messages, emails, etc.). However, if caller id data is provided by the phone during a phone call, it shall be shown on the screen. Call History shall show the numbers and not contact data after deleting the phonebook
Deleting the phonebook shall also invalidate the stored folder and database version for the phone's phonebook repositories, for the case they are available.

Deleting the phonebook shall also turn off Automatic Phonebook Download if that feature was previously set to 'ON'. The In-Vehicle Infotainment System may provide the user with a notification that the phonebook was successfully deleted. Please see HMI specification for more information.

4.8.2.5 BTP-FUR-REQ-033833/G-PBAP Requirements and Characteristics (TcSE ROIN-295079-1)

The In-Vehicle Infotainment System shall request phonebook contacts from the following directories in following order, when the feature is activated (see BTP-FUR-REQ 033829 Phonebook Download Availability and BTP-FUR-REQ-113745-Device specific settings):

- telecom\pb
- SIM1\telecom\pb

The In-Vehicle Infotainment System shall request the following vCard characteristics via Phonebook Access Profile:

-version
-FN
-N [3]
-Photo [1, 2]
-ADR [1]
-TEL
-EMAIL
-X-IRMC-CALL-DATETIME

[1] Note: The HMI application shall have the opportunity to activate/deactivate the download of the categories PHOTO and ADDRESS via separate APIs.

[2] Note: To speed up the phonebook download process the photo of a contact may be downloaded separately and on demand whenever the details of a contact need to be displayed to the user – independently of the auto-download phonebook setting. This might alleviate storage problems and download performance for large phonebooks.
Reconnecting a device with an active call might be a use case which should be considered.

[3] Note: When N is empty FN should be used to get the name of the contact.

4.8.2.6 BTP-FUR-REQ-033841/I-Contact Characteristics / Data (TcSE ROIN-295087-1)

The phone application shall provide the following information to the user regarding their contacts:

-First and Last Name

-Telephone Number(s)
-Telephone Number Type: Home, Work, Cell, and Other
-Address(es)
-Photo

If a telephone number type is received other than the specified ones, than this phone number should be binned to category "other".

A valid contact shall include at a minimum:

-Name (First and/or Last)
AND
-Phone Number (Home, Work, Cell and/or Other)
OR
Address (if IVIS does offer an embedded navigation application)

To detect the correct name in a vcard in a most robust way IVIS shall look for the information with the following priority:

1. N Field of the vcard
2. FN Field of the vcard, only when N is empty
3. ORG Field of the vcard, only when FN is empty

In the event that the In-Vehicle Infotainment System receives contacts with special characters within the phonebook's phone number sections (i.e. Home, Work, Cell, etc.), In-Vehicle Infotainment System shall treat them as valid characters, expecting that the connected device is able to handle them correctly.

Some contacts might have multiple phone numbers associated with them. The IVIS shall present the phonebook as available to the user.

The IVIS shall display the phonebook as available from the phone. If duplicate contacts are available, they shall be shown as is.

Note: Please consider also BTP-FUR-REQ-033846/B-Phonebook Display Requirements

4.8.2.7 BTP-FUR-REQ-033845/C-Phonebook Storage Management (TcSE ROIN-295091-1)

The user's phonebook shall guarantee a minimum of 6000 contacts per phone. The user's phonebook shall also be limited to a maximum of 10.000 contacts per phone, and to a maximum of 8 phone numbers, 1 email address, and up to 2 addresses per contact.
For the address the In-Vehicle Infotainment System shall store the home and the business address. If any of those addresses is not available IVIS shall save the next addresses which are transmitted independently from the category, up to a maximum of 2 addresses.

4.8.2.8 BTP-FUR-REQ-033842/A-Photo Compression and Resizing (TcSE ROIN-295088-1)

In-Vehicle Infotainment System shall compress the received / uploaded photo to a maximum of 200Kb per image. In-Vehicle Infotainment System shall resize the image, based on the requirements defined within the HMI Specification(s).

4.8.2.9 BTP-FUR-REQ-033846/C-Phonebook Display Requirements (TcSE ROIN-295092-2)

The In-Vehicle Infotainment System shall have the ability to present the downloaded phonebook to the customer. This shall be in a form defined by HMI specification. The phonebook list shall be sorted in alphabetical order. The customer shall have

the option of choosing the sort order by First Name or by Last Name (*note: VR will need to accommodate the sort order), (refer to BTP-FUR-REQ-093327-Phonebook Sorting by Market).

If the in-vehicle infotainment system does not have the ability to display characters provided by the connected device, the in-vehicle infotainment system shall not display those characters. The in-vehicle infotainment system shall sort the contact based on the first character that we can parse and display correctly.

4.8.2.10 BTP-FUR-REQ-047499/B-Phonebook Matching (TcSE ROIN-295053-2)

In-Vehicle Infotainment System shall try to match a call number to a contact within the phonebook.

This matching procedure shall not be used for calls for which the matching is immediately clear, like calls initiated from Sync using the available phonebook (via G-HMI or V-HMI).
This matching procedure shall be used for cases like calls dialed by entering digits (via keypad or voice) or incoming calls, for which the matching is not immediately clear.

To determine whether the call number matches a phonebook entry, the following rules shall be followed:

General rules:

1. The In-Vehicle Infotainment System shall compare the digits from right to left, between the call number and the available phonebook entries.

2. The In-Vehicle Infotainment System shall ignore in the comparison any character that is not “0 to 9, *, #”.

3. If one of the numbers which are compared contains 6 or less digits, then the numbers match only if they are exactly the same.

Additional rules for 7 digits or more:

1. If the number contains 7 digits or more, then start also from the right.

2. If the part that matches is 6 or less digits, then the numbers do no match. Otherwise consider the following rules.

3. If the first unmatch digit is a trunk code and it is in the shorter number, ignore this and proceed with comparison. If there is another unmatch digit the number is not matching. Trunk prefix numbers are 0, 1, 6 and 8.

4. If a number is shorter than the other and the longer number contains the shorter one completely (starting from the right…) then you have a match.

5. If none of the above applies then you do not have a match

4.8.2.11 BTP-FUR-REQ-033838/C-Phonebook Download Strategy (TcSE ROIN-295084-1)

The In-Vehicle Infotainment System shall query the connected AG to determine its phonebook download capabilities. In-Vehicle Infotainment System shall look for the following phonebook download profiles / strategies:

-Phonebook Access Profile 1.0

4.8.2.12 BTC-FUR-REQ-243375/A-PBAP 2.1 specific features

When connecting to a mobile phone, the IVIS shall check whether the device in its SDP record presents its PbapSupportedFeatures. If that is the case, the IVIS shall use the PbapSupportedFeatures header in the OBEX connection request.

In the header the IVIS shall set the following bits:
Bit 0 = Download
Bit 1 = Browsing
Bit 2 = Database Identifier
Bit 3 = Folder Version Counters
Bit 9 = Default Contact Image Format

4.8.2.13 BTC-FUR-REQ-243374/B-Download and re-download strategy for mobile phones that support Database Identifier and Folder Version

If the connected mobile phone supports Database Identifier and Folder Version counters, then the In-Vehicle Infotainment System shall use these values on a per folder basis, to decide whether - upon reconnection - a new full download of a folder's content is necessary or not.

For example, the IVIS could start the download process by asking for the total number of entries for a specific folder, and use the response from the mobile phone to gather the Database Identifier and Folder Version counters.
If those values are valid and unchanged from last full download for that folder, then the IVIS shall not proceed with the download for that folder and consider the folder unchanged.

If the folder download returns an error or zero entries, then the Database Identifier and Folder Version counters shall be considered invalid and the IVIS shall try a new download.

If the user is requesting a manual download, then the IVIS shall download the phonebook, no matter whether the Database Identifier and Folder Version have changed, or not.

4.8.2.14 BTP-FUR-REQ-033834/C-Auto Phonebook Download (TcSE ROIN-295080-1)

If supported by the AG, the In-Vehicle Infotainment System shall automatically download the phonebook upon the first connection of a PSE/AG. Please see HMI specification for correct trigger of downloading the phonebook after pairing. The default for this setting shall be set to Automatically Download. If the user opts to download their phonebook automatically, the In-Vehicle Infotainment System shall download the phonebook and the vCARD listing as described in PBAP Requirements and Characteristics / Phonebook Download Strategy upon each HFP connection.

4.8.2.15 BTP-FUR-REQ-033836/A-Auto Phonebook Download Options (TcSE ROIN-295082-1)

The user shall have the option to enable / disable Auto Phonebook Download.

4.8.2.16 BTP-FUR-REQ-033835/C-Phonebook Updating (TcSE ROIN-295081-1)

When auto phonebook download is enabled the In-Vehicle Infotainment System shall download and updated the phonebook, while allowing the customer to have immediate access to the phonebook that was made available during the AG's prior connection. Once the download is complete, In-Vehicle Infotainment System shall update the available phonebook by adding/removing data based on the new download.
See also BTP-FUR-REQ-243374-Download and re-download for mobile phones that support Database Identifier and Folder Version

4.8.2.17 BTP-FUR-REQ-033837/C-Phonebook Download Error (TcSE ROIN-295083-1)

If the user has Automatic Phonebook download set to on or has manually triggered a download, and upon a download the AG reports an error during the phonebook download procedure, then In-Vehicle Infotainment System shall maintain the previously stored phonebook.

This shall include the following cases:

- PBAP connection error
- PBAP connection denied/ timed out
- Zero contacts downloaded

Basically in the cases above, and in case there is any other error in phonebook download, the previously stored phonebook shall be maintained.

4.8.2.18 BTP-FUR-REQ-033839/D-PBAP Access Failure (TcSE ROIN-295085-1)

The In-Vehicle Infotainment system shall alert the user that they may have to provide the In-Vehicle Infotainment System access to the phone's phonebook if PBAP is detected within the connected device, but

a) Access is denied
b) Response to the request for access is ignored
c) OBEX GET request is not responded, or responded with an error
d) Zero contacts downloaded, and no older database available within the system

4.8.2.19 SMSR-FUR-REQ-246478/B-Chinese Surnames pronunciation exception

Some Chinese Surnames shall be mapped differently to Pinyin.
The exception list for the pronunciation of Chinese Surnames as defined in the HMI spec shall apply here.

4.8.2.20 BTP-FUR-REQ-033844/A-Phonebook Speak It (TcSE ROIN-295090-1)

This feature shall only be available when the connected AG has a phonebook associated with it. It will allow a user to select a phonebook entry for In-Vehicle Infotainment System to TTS. This will provide the user with the opportunity to hear how In-Vehicle Infotainment System interprets a particular phonebook entry. When this option is selected the phone application shall generate a Voice prompt that TTS's the first and/or last name of the chosen phonebook entry over the dedicated mono channel.

4.8.2.21 BTC-FUR-REQ-204078/F-Smart Phonebook Search

The IVIS might offer a search functionality to allow the customer to look for a specific contact within the downloaded phonebook.

If the search functionality is allowed, it shall work according to the following principles in general:

- A full keyboard for the search will be offered. Language dependent keyboards shall be offered per HMI specification. A smart speller functionality shall be implemented – at all times, only some keys of the keyboard should be activated – the keys that correspond to valid completion of the previously entered string in the set of phonebook items. The underlying application shall narrow down the number of possible candidates (based upon a reference database) with each successive character entered by the user.
  Special characters – as defined in the HMI spec – should be considered by the smart spelled as well.
- The search shall not be case sensitive.
- The set of phonebook items shall be searchable in first name and last name fields simultaneously and independently of the sorting order, starting in each name field
- Searches begin from the beginning at whole words. For multiple words within a text field, special characters shall be valid word separators as defined in within the HMI spec.

- The result shall be shown in the same format the contacts are sorted in the phone settings. (see also BTP-FUR-REQ-033846-Phonebook Display Requirements)

For a simple example, if the phonebook contains the 2 contacts:

First name	Last name
John	Smith
Jean Luc	Grant

The keyboard for search will initially only activate the following letters: G, J, L, S.
If the user presses initially G, then only one contact will match the search.
If the user presses initially J, then the following letters will be activated: E, O
If the user presses initially L, then only one contact will match the search.
If the user presses initially S, then only one contact will match the search.

4.8.2.22 SMSR-FUR-REQ-247419/B-Smart Search - Simplified input method for fly-out characters

All applicable fly-out characters which are associated to a main character shall be considered for the search when selecting this main character on the keyboard.
This will simplify the input method for those characters.
All fly-out characters are specified in the HMI specification.

Example:
When the customer is selecting “A” the search result shall contain the item “Arndt”, and “Ährens”

4.8.2.23 SMSR-FUR-REQ-247390/C-Smart Search Special Character Handling

The defined special characters need a specific handling, as also described in the HMI spec.

1. A Space shall be valid input for any special characters, and should be handled as such.
2. Special characters (incl. Space) shall be handled as a separator.
3. Consecutive special characters shall be handled as one separator. As soon as the first separator is detected the search shall move to the next valid character/word.
4. Special characters at the beginning of a word will be ignored and cannot be searched.

Example: The phonebook entry “*Dr Alba”* shall be found using the following inputs:

- Dr.Alba
- Dr Alba
- Dr.Alba
- Dr_Alba
- Dr._Alba

4.8.2.24 SMSR-FUR-REQ-246477/B-Smart Search Chinese Keyboard Inputs

For the country of China and Taiwan, IVIS shall provide the user with English input keyboard only. Offering Chinese handwriting or Pinying input method is not required.

4.8.2.25 SMSR-FUR-REQ-246476/B-Smart Search Chinese Acronyms

For the country of China and Taiwan, multiword entries shall be searched when the letters entered match the initial letters from each word simultaneously.

For example, the name Song Heng Tian shall be found by searching for SHT
The order shall be considered here. It shall not be possible to find the contact by searching for THS, for example.

4.8.2.26 SMSR-FUR-REQ-246480/B-Smart Search Multilanguage String

For the country of China and Taiwan, IVIS shall map all the Chinese characters to Pinyin, and each Pinyin shall be treated as an English word. The search results shall contain both English metadata and Chinese metadata. User shall be able to search for metadata that contains both Chinese characters and English letters.

For example, if the phone book has these names:
(Pinyin are : 宋 Song , 恒 Heng ,天 Tian , 尚 Shang , 飞 Fei , 王 Wang , 华 Hua).

Name	Corresponding Word
宋恒天	Song Heng Tian
尚飞	Shang Fei
王华 Finny	Wang Hua Finny

The keyboard for search will initially only activate the following letters: S, H, T, F, W.

If user presses S, then the following letters should be activated: O, H, F, and search candidates are 宋航天，尚飞.
If user presses S and then H, then the following letters should be activated: T, A , and search candidates are 宋航天，尚飞 .
If user presses S and then H and then T, then only 宋恒天 matches the search.
If user presses H , then the following letters should be activated : E , T , U , F, and search candidates are 宋恒天，王华 Finny .
If user presses H and then T, then only 宋恒天 matches the search.
If user presses H and then U, then only 王华 Finny matches the search.
If user presses F, then the following letters should be activated: E , I , and search candidates are 尚飞, 王华 Finny .
If user presses F and then I, then only 王华 Finny matches the search.

4.8.2.27 BTC-FUR-REQ-243378/A-Contact Favorites

If the HMI supports showing and accessing Favorites, the HMI application shall have the opportunity to activate/deactivate the download of Favorites via separate APIs.
If activated the IVIS shall check the SDP record of the phone for its supported repositories, and if bit 3 for Favorites is set then the IVIS shall download telecom/fav.vcf.
If bit 3 is not set by the connected device this feature shall be communicated as
Not Supported to the HMI layer.

4.8.2.28 BTP-FUR-REQ-033847/C-Call History Requirements (TcSE ROIN-295093-1)

This feature shall only be available when AG is connected to the HFP port.

The Call History will be AG specific, and the Call History data made available shall only be associated with the connected AG.

Call History shall be downloaded as part of the automatic / manual phonebook download routine. The order of call history download and phonebook download shall be such that call history entries are downloaded first followed by the phonebook
In-Vehicle Infotainment System shall download up to 25 outgoing, 25 incoming, and 25 missed calls from the AG.

A new call history is downloaded each time the AG's phonebook is automatically downloaded, which will overwrite the copy previously stored.

The call history shall be updated as new phone call activity occurs while connected to In-Vehicle Infotainment System. However the 25 number limit is the maximum storage capacity for each category. If new calls are placed that fill the call history, the details of the least recently place call shall be dropped from In-Vehicle Infotainment System's call history.
The In-Vehicle Infotainment System shall request the call history from the following directories:
-telecom\ich
-telecom\och
-telecom\mch

Telecom\ich shall be downloaded first. The In-Vehicle Infotainment System shall only request a maximum of 25 entries per directory.

The In-Vehicle Infotainment System shall request the following vCard characteristics via Phonebook Access Profile:

-version
-FN
-N
-TEL
-X-IRMC-CALL-DATETIME

4.8.2.29 BTP-FUR-REQ-047501/C-Call History Matching (TcSE ROIN-295055-1)

The phone application shall use all information which are received via the vcard when receiving Call History information.
The phone application shall also try to complete missing information by matching the contents downloaded within the Call History to the phonebook entries. When a match is identified, In-Vehicle Infotainment System shall display the name and phone number type of the Call History entry.
The IVIS shall display the phone number but no contact name if no match was found.

4.8.2.30 BTP-FUR-REQ-033848/C-Call History Display Requirements (TcSE ROIN-295094-1)

The call history shall be sorted by timestamp.
When the call history is tracked by the In-Vehicle-Infotainment System, the timestamp for each call shall refer to when the call was initiated, accepted or rejected (missed).

When there is no timestamp available the calls without a timestamp should appear at the bottom of the list.

The combined group shall be the default group when a user enters Call History.

There should be an indication available to the user to indicate which calls are from outgoing, incoming, and missed categories.

The caller information shall be shown in the static format {Firstname Lastname}, except for countries in APA. For these countries the caller name shall be displayed in the same format which is currently set for phonebook sorting (refer to BTP-FUR-REQ-093327 Phonebook Sorting by Market).

The user shall also have the option to sort the combined list by category (i.e. outgoing, incoming, etc.).

The user shall be able to initiate a call to any entry displayed within the call history categories.

4.8.2.31 BTP-FUR-REQ-033849/C-Call History Principles (TcSE ROIN-295095-1)

New call history entries are always added on the top of the list. If the call history is full and a new entry is added, then the last one shall be removed from the list.

If the user chooses to delete his/her phonebook or delete his/her paired device, the In-Vehicle Infotainment System shall ensure that all reference to contacts within the deleted phonebook are also removed.

If two call events of the same type are from or to the same phone number, and are sequential to each other then only one instance shall be displayed but shall be accompanied by a number in brackets showing the number of calls that was clubbed together

If a call history entry is ever downloaded from the AG or received while the phone is connected to In-Vehicle Infotainment System without a phone number (i.e., it was dialed from the handset or was an incoming call from an unknown number), that particular entry(ies) shall not be recorded in the call history.

In-Vehicle Infotainment System shall use the entries reported in all of the directories to populate the displayed call history.

4.8.2.32 BTP-FUR-REQ-033850/B-Phonebook/Call History Download Errors and Status Definitions (TcSE ROIN-304252-1)

The In-Vehicle Infotainment System shall be able to determine if the connected server has denied the In-Vehicle Infotainment System access to the Phonebook Access Profile or if the server has not responded per the requirements within the phonebook access profile.

When the In-Vehicle Infotainment System requests to connect to the Phonebook Access Profile of the connected AG / PSE the In-Vehicle Infotainment System shall determine that the AG / PSE has not granted access to Phonebook Access Profile when either of the following the scenarios takes place:

1. The connected AG / PSE does not respond to the connect request within 30 seconds.
2. The connected AG / PSE responds with a response code other than Success

When the In-Vehicle Infotainment System requests to retrieve the call history of the connected AG / PSE the In-Vehicle Infotainment System shall determine that the AG / PSE has experienced an internal error when the following scenario takes place

1. The connected PSE does not respond to more than 1 of the following Get requests (within 15 seconds) from the In-Vehicle Infotainment System:
    a. –telecom\ich
    b. –telecom\och
    c. –telecom\mch

When the In-Vehicle Infotainment System requests to retrieve the phonebook of the connected AG / PSE the In-Vehicle Infotainment System shall determine that the AG / PSE has experienced an internal error when either of the following scenarios takes place

1. The connected PSE does not respond to the following Get request from the in-vehicle infotainment system within 30 seconds:
    a. -telecom\pb

2. The connected PSE responds to Get –telecom\pb, and provides more than 1 vCARD with at least one phone number, but the in-vehicle infotainment system is not able to parse any of the received vCARDs.

Contacts / Recent Calls Download in Progress Definition:

The In-Vehicle Infotainment System shall define that a “Contacts / Recent Calls Download is in Progress” in the following condition(s):

1. The In-Vehicle Infotainment System has received at least one vCard but not the final vCard during the current connection from the connected PSE.

The In-Vehicle Infotainment System shall consider Contacts / Recent Calls Download complete once the final vCard has been received. *Note: This includes the final vCard received due to memory constraints.

Contacts Too Large for Internal Memory:

The In-Vehicle Infotainment System shall define that the contacts are too large for its internal memory when In-Vehicle Infotainment System has downloaded and parsed vCards that were not stored within internal memory due to the internal memory being full.

4.8.2.33 BTP-FUR-REQ-093327/C-Phonebook Sorting by Market

The sorting order will be specified separately for GUI (Graphical User Interface) and
VUI (Voice User Interface). If the Voice Engine is capable of recognizing both order directions in parallel, a configuration for VIU is not necessary.
The sorting order “FirstName LastName” is defined via value 1
The sorting order “LastName FirstName” is defined via value 2

The sorting order of the phonebook shall have no impact on the caller ID format for the call history or any other screen where the caller ID is shown (refer to BTP-FUR-REQ-191908 and BTP-FUR-REQ-033841).

Exception:
The APA countries shall follow the same format which is currently set for the phonebook sorting, meaning if the customer is changing the sorting order for the phonebook, the caller ID shall be shown in the same format.

North America:

Code	WERS Country Code	Country Code Vehicle Order	Country Name	GUI	VUI
CAN	WANAC	CA	CANADA	1	1
MEX	WANAD	MX	MEXICO	1	1
USA	WANAB	US	UNITED STATES OF AMERICA	1	1
BHS	WSIAB	BF	BAHAMAS	1	1
BRD	WSIAC	BB	BARBADOS	1	1
BLZ	WSCAB	BH	BELIZE	1	1
CRI	WSCAC	CS	COSTA RICA	1	1
CUB	WSICA	CU	CUBA	1	1
DMA	WSIAE	DO	DOMINACA	1	1
DOM	WSIAF	DR	DOMINICAN REPUBLIC	1	1
SLV	WSCAD	ES	EL SALVADOR	1	1
GRD	WSIAG	GJ	GRENADA	1	1
GTM	WSCAE	GT	GUATEMALA	1	1
HTI	WSIAI	HA	HAITI	1	1
HND	WSCAF	HO	HONDURAS	1	1
JAM	WSIAJ	JM	JAMAICA	1	1
NIC	WSCAG	NU	NICARAGUA	1	1
PAN	WSCAH	PM	PANAMA	1	1
KNA	WSIAL	SC	SAINT KITS & NEVIS	1	1
LCA	WSIAM	ST	SAINT LUCIA	1	1
VCT	WSIAN	VC	SAINT VINCENT & THE GRENEDINES	1	1
TTO	WSIAR	TD	TRINIDAD & TOBAGO	1	1

South America:

Code	WERS Country Code	Country Code Vehicle Order	Country Name	GUI	VUI
ARG	WASAB	AR	ARGENTINA	1	1
BOL	WSSAC	BL	BOLIVIA	1	1
BRA	WASAC	BR	BRAZIL	1	1
CHL	WSSAE	CI	CHILE	1	1
COL	WSSAF	CO	COLOMBIA	1	1
ECU	WSSAH	EC	ECUADOR	1	1
FLK	WSSAI	FK	FALKLAND ISLANDS	1	1
GUY	WSSAK	GY	GUYANA	1	1
PRY	WSSAL	PA	PARAGUAY	1	1
PER	WSSAM	PE	PERU	1	1
SUR	WSSAN	NS	SURINAME	1	1
URY	WSSAP	UY	URUGUAY	1	1
VEN	WASAD	VE	VENEZUELA	1	1

APA:

Code	WERS Country Code	Country Code Vehicle Order	Country Name	GUI	VUI
BWA	WSABC	BC	BOTSWANA	1	1
CHN	WSPAD	CH	CHINA	2	2
HKG	WSPAH	HK	HONG KONG	2	2
IND	WSPAI	IN	INDIA	1	1
IDN	WSPAJ	ID	INDONESIA	1	1
JPN	WSPAL	JA	JAPAN	2	2
PRK	WSPCH	KN	KOREA DEM PEOPLE REPUB OF NORTH	2	2
KOR	WSPAW	KS	KOREA, REPUBLIC OF (SOUTH)	2	2
MYS		MY	MALAYSIA	1	1
NPL	WSPBR	NP	NEPAL	1	1
PHL	WSPAR	RP	PHILIPPINES	1	1
ZAF	WSAAT	SF	SOUTH AFRICA	1	1
SWZ	WSABG	WS	SWAZILAND	1	1
TWN	WAPAD	TW	TAIWAN	2	2
THA	WSPAY	TH	THAILAND	1	1
VNM	WSPA5	VM	VIETNAM	2	2

Australia:

Code	WERS Country Code	Country Code Vehicle Order	Country Name	GUI	VUI
AUS	WAPAB	AS	AUSTRALIA	1	1
NZL	WAPAC	NZ	NEW ZEALAND	1	1
AIA	WSIAY	AV	ANGUILLA	1	1
ATG	WSIAA	AC	ANTIGUA & BARBUDA	1	1
FJI	WSPAG	FJ	FIJI	1	1
PNG	WSPAQ	PP	PAPUA NEW GUINEA	1	1
KIR	WSPCR	KR	KIRIBATI	1	1
MHL	WSPCD	RM	MARSHALL ISLANDS	1	1
PLW	WAPAH	PS	PALAU	1	1
SLB	WSPAV	BP	SOLOMON ISLANDS	1	1
ASM	WATAF	AQ	AMERICAN SAMOA	1	1
TON	WSPAZ	TN	TONGA	1	1
TUV	WAPAJ	TV	TUVALU	1	1
VUT	WAPAE	NH	VANUATU	1	1
FSM	WAPAG	FM	MICRONESIA	1	1

Europe:

Code	WERS Country Code	Country Code Vehicle Order	Country Name	GUI	VUI
ALB	WSEAY	AL	ALBANIA	2	1
DZA	WSABB	AG	ALGERIA	2	1
AND	WSEAB	AN	ANDORRA	2	1
ARM	WSPA7	AM	ARMENIA	2	1
AUT	WAEAX	AU	AUSTRIA	2	1
AZE	WSPBK	AJ	AZERBAIJAN	2	1
BLR	WSPA6	BO	BELARUS	2	1
BEL	WAEBX	BE	BELGIUM	2	1
BIH	WSEAX	BK	BOSNIA HERZEGOVINA	2	1
BGR	WSEAP	BU	BULGARIA	2	1
HRV	WSEAS	HR	CROATIA	2	1
CYP	WSPAE	CY	CYPRUS	2	1
CZE	WSEAT	EZ	CZECH REPUBLIC	2	1
DNK	WAEDK	DA	DENMARK	2	1
EGY	WSAAE	EG	EGYPT	2	1
EST	WSPBA	EN	ESTONIA	2	1
FRO	WSEAE	FO	FAROE ISLANDS	2	1
FIN	WAESF	FI	FINLAND	2	1
FRA	WAEFX	FR	FRANCE	2	1
FXX			FRENCH METROPOLITAN	2	1

GEO	WSPBF	GG	GEORGIA	2	1
DEU	WAEDX	GM	GERMANY	2	1
GIB	WSEAF	GI	GIBRALTAR	2	1
GRC	WSEAG	GR	GREECE	2	1
GRL	WAENG	GL	GREENLAND	2	1
JUN	WSEAH	HU	HUNGARY	2	1
ISL	WSEAI	IC	ICELAND	2	1
IRL	WAEIR	EI	IRELAND	2	1
ITA	WAEIX	IT	ITALY	2	1
KAZ	WSPBH	KZ	KAZAKSHTAN	2	1
KGZ	WSPBP	KG	KYRGYZSTAN	2	1
LVA	WSPBB	LG	LATVIA	2	1
LBY	WSACF	LY	LIBYA	2	1
LIE	WSEAV	LS	LIECHTENSTEIN	2	1
LIT	WSPBC	LH	LITHUANIA	2	1
LUX	WSEAJ	LU	LUXEMBOURG	2	1
MKD	WSEAW	MK	MACEDONIA	2	1
MLT	WSEAK	MT	MALTA	2	1
MDA	WSPBN	MD	MOLDOVA	2	1
MCO	WAEIZ	MN	MONACO	2	1
MAR	WSABA	MO	MOROCCO	2	1
NLD	WAENL	NL	NETHERLANDS	2	1
NOR	WAENX	NO	NORWAY	2	1
POL	WSEAL	PL	POLAND	2	1
PRT	WAEPX	PO	PORTUGAL	2	1
ROM	WSEAM	RO	ROMANIA	2	1
RUS	WSPA2	RS	RUSSIAN FEDERATION	2	1
SMR	WAEI2	SM	SAN MARINO	2	1
	WSEAZ	SR	SERBIA	2	1
SVK	WSEAU	LO	SLOVAKIA	2	1
SVN	WSEAR	SI	SLOVENIA	2	1
ESP	WAEEX	SP	SPAIN	2	1
SJM		SV	SVALBARD & JAN MAYEN	2	1
SWE	WAESX	SW	SWEDEN	2	1
CHE	WAECH	SZ	SWITZERLAND	2	1
TJK	WSPBM	TI	TAJISKISTAN	2	1
TUN	WSAAW	TS	TUNISIA	2	1
TUR	WSPA1	TU	TURKEY	2	1
TKM	WSPBL	TX	TURKMENISTAN	2	1
UKR	WSPBE	UP	UKRAINE	2	1
GBR	WAEGB	UK	UNITED KINGDOM	2	1
UZB	WSPBJ	UZ	UZBEKISTAN	2	1
VAT	WAEIY	VT	VATICAN CITY	2	1

RoW (Rest of World)

Code	WERS Country Code	Country Code	Country Name	GUI	VUI

		Vehicle Order			
BTN	WSPBQ	BT	BHUTAN	1	1
BDI	WSADA	BY	BURUNDI	1	1
CAF	WSADL	CT	CENTRAL AFRICAN REPUBLIC	1	1
TCD	WSADM	CD	CHAD	1	1
CXR		KT	CHRISTMAS ISLAND	1	1
CCK		CK	COCOS (KEELING) ISLAND	1	1
COM	WSABD	CN	COMOROS ISLAND	1	1
COK	WSPCB	CW	COOK ISLANDS	1	1
AFG	WSPBG	AF	AFGHANISTAN	1	1
AGO	WSAA7	AO	ANGOLA	1	1
ABW	WSSAB	AA	ARUBA	1	1
BHR	WSAAA	BA	BAHRAIN	1	1
BGD	WSPAB	BG	BANGLADESH	1	1
BEN	WSACJ	BN	BENIN	1	1
BMU	WSIAD	BD	BERMUDA	1	1
BRN	WSPAC	BX	BRUNEI	1	1
BFA	WSADB	UV	BURKINA FASO	1	1
KHM	WSPCA	CB	CAMBODIA	1	1
CMR	WSAAC	CM	CAMEROON	1	1
CPV	WSAAD	CV	CAPE VERDE	1	1
CYM	WSIAT	CJ	CAYMAN ISLANDS	1	1
COG	WSAAZ	CG	DEMOCRATIC REPUBLIC OF CONGO	1	1
CIV	WSAAH	IV	COTE D'IVOIRE (IVORY COAST)	1	1
DJI	WSADC	DJ	DJIBOUTI	1	1
TMP	WSADY		EAST TIMOR	1	1
GNQ	WSADN	EK	EQUATORIAL GUINEA	1	1
ERI	WSADP	ER	ERITREA	1	1
ETH	WSAAF	ET	ETHIOPIA	1	1
GAB	WSACE	GB	GABON	1	1
GMB	WSADD	GA	GAMBIA	1	1
GHA	WSACA	GH	GHANA	1	1
GUM	WATAB	GQ	GUAM	1	1
GIN	WSAAG	GV	GUINEA (REPUBLIC)	1	1
GNB	WSADQ	PU	GUINEA-BISSAU	1	1
HMD			HEARD & MCDONALD ISLANDS	1	1
IRN	WSADJ	IR	IRAN	1	1
IRQ	WSADV	IZ	IRAQ	1	1
ISR	WSPAK	IS	ISRAEL	1	1
JOR	WSAA3	JO	JORDAN	1	1
KEN	WSAAI	KE	KENYA	1	1
KWT	WSAAJ	KU	KUWAIT	1	1
LAO	WSPCC	LA	LAO PEOPLE DEM REPUBLIC (Laos)	1	1
LBN	WSAA8	LE	LEBANON	1	1
LBR	WSACB	LI	LIBERIA	1	1
MAC	WSPBT	MC	MACAU	1	1
MDG	WSACC	MA	MADAGASCAR	1	1

MWI	WSAAK	MI	MALAWI	1	1
MDV	WSPBS	MV	MALDIVES	1	1
MLI	WSADR	ML	MALI	1	1
MTQ	WSIAK	MB	MARTINIQUE	1	1
MRT	WSADS	MR	MAURITANIA	1	1
MUS	WSAAL	MP	MAURITIUS	1	1
MNG	WSPA8	MG	MONGOLIA	1	1
MSR	WSIAU	MH	MONTSERRAT	1	1
MOZ	WSAAN	MZ	MOZAMBIQUE	1	1
MMR	WSPA9	BM	MYANMAR (BURMA)	1	1
NRU	WSPAM	NR	NAURU	1	1
ANT	WSIA1	NT	NETHERLANDS ANTILLIES	1	1
NER	WSADU	NG	NIGER	1	1
NGA	WSAAP	NI	NIGERIA	1	1
NIU		NE	NIUE	1	1
NFK	WSPCE	NF	NORFOLK ISLANDS	1	1
MNP	WATAC	CQ	NORTHERN MARIANA ISLES (SAIPAN)	1	1
OMN	WSAA5	MU	OMAN	1	1
PAK	WSPAP	PK	PAKISTAN	1	1
PCN		PC	PITCAIRN	1	1
PRI	WATAE	RQ	PUERTO RICO	1	1
QAT	WSAAQ	QA	QATAR	1	1
REU	WSAAR	RE	REUNION	1	1
RWA	WSADE	RW	RWANDA	1	1
SHN	WSACK	SH	SAINT HELENA	1	1
STP	WSADF	TP	SAO TOME & PRINCIP	1	1
SAU	WSAA4	SA	SAUDI ARABIA	1	1
SEN	WSAAS	SG	SENEGAL	1	1
SYC	WSPAT	SE	SEYCHELLES	1	1
SLE	WSADG	SL	SIERRA LEONE	1	1
SGP	WSPAU	SN	SINGAPORE	1	1
SOM	WSACD	SO	SOMALIA	1	1
LKA	WSPAX	CE	SRI LANKA	1	1
SDN	WSAAU	SU	SUDAN	1	1
SYR	WSAA9	SY	SYRAN ARAB REPUBLIC (Syria)	1	1
TZA	WSAAV	TZ	TANZANIA	1	1
TGO	WSADK	TO	TOGO	1	1
TKL	WAPAL	TL	TOKELAU	1	1
TCA	WSICB	TK	TURKS & CAICOS ISLANDS	1	1
UGA	WSAAX	UG	UGANDA	1	1
ARE	WSAAY	TC	UNITED ARAB EMIRIATES	1	1
VGE	WSIAS	VI	VIRGIN ISLANDS (BRITISH)	1	1
VIR	WATAD	VQ	VIRGIN ISLANDS (USA)	1	1
WLF	WAPAK	WF	WALLIS & FUTUNA ISLANDS	1	1
YEM	WSAA6	YM	YEMEN	1	1
ZMB	WSAA1	ZA	ZAMBIA	1	1
ZWE	WSAA2	ZI	ZIMBABWE	1	1

???	WAFAB	US	Government Service Admin / Direct E&G	1	1
???	WSAAH	IV	Ivory Coast	1	1
???	WAFAC	US	Military Personnel	1	1
???	WSPAN	NC	New Caledonia	1	1
???	WSIAP	FP	Tahiti (French Polynesia)	1	1

4.8.2.34 BTP-FUR-REQ-153579/B-Requirements for Handling of Phonebook and Call History Feature in VUI/GUI

Any VUI/GUI that intends to support the phonebook / call history functionality shall clearly define its behavior for the following error conditions and special cases.

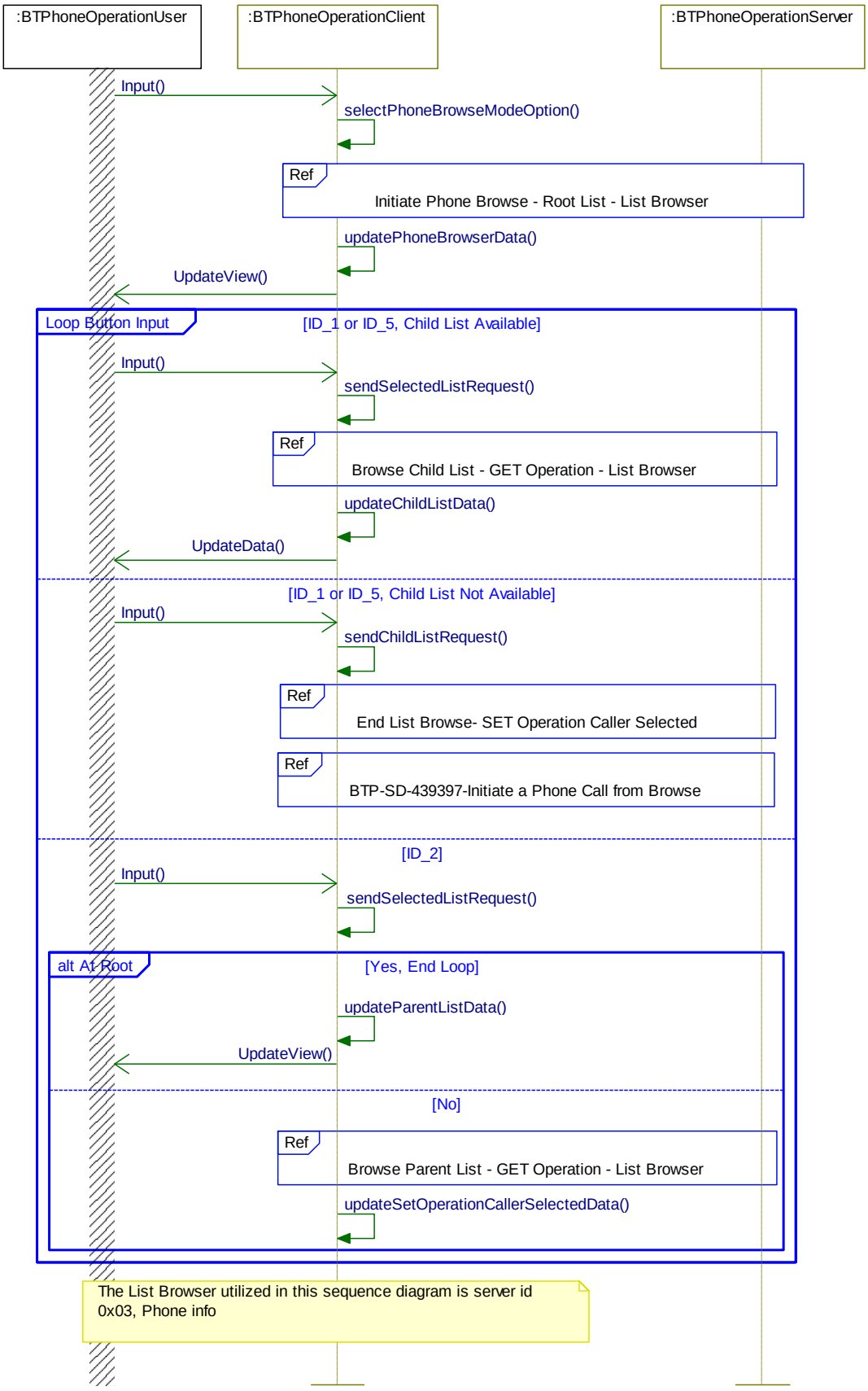
Short	Condition	Notes	See also…
PHB1	Connected device supports phonebook/ call history download, phonebook / call history is present and downloaded	All features are available to the user.	BTP-FUR-REQ-033829-Phonebook Download Availability, and related phonebook requirements after that. BTP-UC-REQ-033852-Outgoing Call to Phonebook Contact
PHB2a	Connected device supports phonebook download, phonebook is empty.	User shall be notified, when trying to access contact information, that the phonebook is empty.	BTP-FUR-REQ-033829-Phonebook Download Availability, and related phonebook requirements after that. BTP-UC-REQ-153575-Phonebook is empty
PHB2b	Connected device supports phonebook / call history download, call history is empty.	User shall be notified, when trying to access call history information that there are no entries	BTP-UC-REQ-033823-Call History (Empty)
PHB3a	Phonebook/call history features are being setup. No phonebook/call history for the connected device is present yet.	User shall be notified, when trying to use the feature, that the feature is not ready yet.	BTP-FUR-REQ-033850-Phonebook/Call History Download Errors and Status Definitions
PHB3b	Phonebook/call history are being updated.	User has still access to the data which where downloaded before starting the update.	BTP-FUR-REQ-033835-Phonebook Updating
PHB4	Connected device does not support phonebook/call history features	User shall be informed when trying to use the feature that the phonebook feature is not available with this device.	Updated: BTP-FUR-REQ-033829 Phonebook Download Availability
PHB5	Access to phonebook/call history feature not granted from connected device	User shall be informed when trying to use the feature that the phonebook feature is not available because access was not granted from the connected device. Optionally	BTP-FUR-REQ-033839/A-PBAP Access Failure

		the user might be guided on how to try to fix this problem.	
PHB6	Phonebook feature disabled – no phonebook/call history is present and auto download is set to off	User shall be informed when trying to use the feature that the phonebook feature has been disabled. Optionally the user might be guided on how to re-enable the feature.	BTP-FUR-REQ-033834-Auto Phonebook Download and BTP-FUR-REQ-033836/A-Auto Phonebook Download Options
PHB7	Phonebook/call history features are not available because of a failure, and no phonebook is present	User shall be informed when trying to use the feature that the phonebook feature experienced a failure. Optionally the user might be guided on how to try again to download the phonebook from the connected device.	BTP-FUR-REQ-033837-Phonebook Download Error
PHB8	Phonebook contact contains no number but an address	User shall be informed when trying to use the call feature that the contact has no phone number.	BTP-UC-REQ-192668 Phonebook contact contains no number but only an address BTP-FUR-REQ-033841/E-Contact Characteristics / Data

4.8.3 Sequence Diagrams

4.8.3.1 BTP-SD-REQ-439819/A-Browse Phone

Linked Elements
BTP-UC-REQ-041813/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290943-1)
BTP-UC-REQ-041814/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via In-Vehicle Infotainment System (i.e. (TcSE ROIN-290944-1)
BTP-UC-REQ-041815/A-Transferring the Audio to the In-Vehicle Infotainment System from the Connected Phone via the Connected Mobile Phone (i.e. Trans (TcSE ROIN-290945-1)


:BTPhoneOperationUser
:BTPhoneOperationClient
:BTPhoneOperationServer
Input()
selectPhoneBrowseModeOption()
Ref
Initiate Phone Browse - Root List - List Browser
updatePhoneBrowserData()
UpdateView()
Loop Button Input
[ID_1 or ID_5, Child List Available]
Input()
sendSelectedListRequest()
Ref
Browse Child List - GET Operation - List Browser
updateChildListData()
UpdateData()
[ID_1 or ID_5, Child List Not Available]
Input()
sendChildListRequest()
Ref
End List Browse- SET Operation Caller Selected
Ref
BTP-SD-439397-Initiate a Phone Call from Browse
[ID_2]
Input()
sendSelectedListRequest()
alt At Root
[Yes, End Loop]
updateParentListData()
UpdateView()
[No]
Ref
Browse Parent List - GET Operation - List Browser
updateSetOperationCallerSelectedData()
The List Browser utilized in this sequence diagram is server id 0x03, Phone info

4.9 BTP-FUN-REQ-439404/A-Messaging - SMS and eMail

The messaging feature relies on the Bluetooth MAP profile. This section refers to both SMS and eMail.

Nomenclature:
Message: Any SMS message or eMail message
SMS/ text message: SMS only
eMail message: eMails only

4.9.1 Use Cases

4.9.1.1 BTP-UC-REQ-041735/A-Messaging Synchronization (TcSE ROIN-290968-1)

Linked Elements
BTP-FUR-REQ-041750/D-Retrieving the Message Listing (Upon Connection) (TcSE ROIN-295115-2)
BTP-FUR-REQ-041753/B-Message Listing Display Requirements (TcSE ROIN-295118-2)
BTP-FUR-REQ-133777/C-Text Messaging Availability
BTP-FUR-REQ-041752/A-Message Listing Parameters (TcSE ROIN-295117-1)
BTP-FUR-REQ-041751/A-Retrieving the Message Listing (Upon Entry Into Text Messaging Application) (TcSE ROIN-295116-2)
BTP-FUR-REQ-041754/A-Message Listing Retention (TcSE ROIN-295119-1)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected
Scenario Description	The mobile phone is connected to the In-Vehicle Infotainment System, and has the ability to transfer the text messages stored within internal memory. The In-Vehicle Infotainment System recognizes this capability and requests to synchronize specific text messages so that the customer can access them via the In-Vehicle Infotainment System G-HMI.
Post-conditions	The mobile phone and the In-Vehicle Infotainment System remain connected for phone features. The In-Vehicle Infotainment System “downloads” the specified text messages (i.e. Unread, Read, Sent, etc.). The customer has the option to access the text messages via the G-HMI available within the In-Vehicle Infotainment System.
List of Exception Use Cases	E1- Messages cannot be synchronized and customer cannot be notified of new messages. E2 – First Time Notification
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.2 BTP-UC-REQ-033743/A-Messages Cannot be Synchronized and Customer Cannot be Notified of New Messages (TcSE ROIN-290839-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-041735/A-Messaging Synchronization (TcSE ROIN-290968-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)
BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone

Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System Messages can't be synced or new messages can't be indicated (i.e. MAP)
Post-conditions	Text Messaging feature is not accessible to the customer
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.9.1.3 BTP-UC-REQ-041736/A-First Time Notification (TcSE ROIN-290969-1)

Linked Elements
BTP-UC-REQ-041735/A-Messaging Synchronization (TcSE ROIN-290968-1)

Actors	In-Vehicle Infotainment System and Connected Phone
Pre-conditions	Same as original
Scenario Description	The In-Vehicle Infotainment System has opted to download synchronize the messages for the first time.
Post-conditions	The In-Vehicle Infotainment System alerts the customer that they may need to provide the In-Vehicle Infotainment System with access to the messages via the connected mobile phone.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.9.1.4 BTP-UC-REQ-041737/A-Messaging New Message Notification (TcSE ROIN-290970-1)

Linked Elements
BTP-FUR-REQ-041758/A-Receipt of a New Message Event (TcSE ROIN-295123-2)
BTP-FUR-REQ-041759/B-Message Notification (End User) (TcSE ROIN-295124-2)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected
Scenario Description	The mobile phone is connected to the In-Vehicle Infotainment System, and has the ability to transfer the text messages stored within it. The connected mobile phone receives a new message, and notifies the In-Vehicle Infotainment System that a new message is received.
Post-conditions	The In-Vehicle Infotainment System has the ability to display to the Customer key characteristics of the newly received message. For example, Sender, Date / Time, type of message, etc. The In-Vehicle Infotainment System provides the Customer with the option of retrieving the newly received message via the In-Vehicle Infotainment System
List of Exception Use Cases	E1- Customer cannot be notified of new message.
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.5 BTP-UC-REQ-033744/A-Customer Cannot be Notified of New Messages (TcSE ROIN-290840-1)

Linked Elements
BTP-UC-REQ-033735/C-Pairing a phone via SSP – Discoverable Mode (TcSE ROIN-290831-2)
BTP-UC-REQ-033761/B-Pairing a phone with phone paired via non SSP – Discovery Mode (TcSE ROIN-290853-1)
BTP-UC-REQ-033762/B-Pairing a phone with other device(s) connected (TcSE ROIN-290854-1)
BTP-UC-REQ-033760/B-Pairing a phone via non-SSP – Discovery Mode (TcSE ROIN-290852-1)
BTP-UC-REQ-041737/A-Messaging New Message Notification (TcSE ROIN-290970-1)
BTP-UC-REQ-033759/B-Pairing a phone with other phone(s) paired via non SSP – Discoverable Mode (TcSE ROIN-290851-2)
BTP-UC-REQ-033752/A-Pairing a phone with other phone(s) paired via SSP – Discoverable Mode (TcSE ROIN-290845-1)
BTP-UC-REQ-033754/A-Pairing a phone with phone paired via SSP – Discovery Mode (TcSE ROIN-290847-2)

BTP-UC-REQ-033753/C-Pairing a phone via SSP – Discovery Mode (TcSE ROIN-290846-2)
BTP-UC-REQ-033755/B-Pairing a phone via non-SSP – Discoverable Mode (TcSE ROIN-290848-1)

Actors	Customer Mobile Phone
Pre-conditions	Same as normal use case
Scenario Description	In-Vehicle Infotainment System In-Vehicle Infotainment System New messages can't be indicated (i.e. MNS)
Post-conditions	Potentially, User is notified that an error has occurred.
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.9.1.6 BTP-UC-REQ-041738/A-Messaging New Message 'Download' (TcSE ROIN-290971-1)

Linked Elements
BTP-FUR-REQ-041761/C-Audible Notification (TcSE ROIN-295126-2)
BTP-FUR-REQ-041759/B-Message Notification (End User) (TcSE ROIN-295124-2)
BTP-FUR-REQ-041760/C-UI Notification (TcSE ROIN-295125-2)
BTP-FUR-REQ-041764/B-Downloading Messages Received as a result of a New Message Event (TcSE ROIN-295129-1)
BTP-FUR-REQ-041758/A-Receipt of a New Message Event (TcSE ROIN-295123-2)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected The mobile phone has indicated that a new message has been received
Scenario Description	The customer has indicated that they want to download the unread message to access it via the G-HMI available via the In-Vehicle Infotainment System
Post-conditions	The In-Vehicle Infotainment System accessed the newly received text message. The In-Vehicle Infotainment System provides the newly received message per the G-HMI and V-HMI they chose via the In-Vehicle Infotainment System. The message is marked as read on the In-Vehicle Infotainment System and connected mobile phone.
List of Exception Use Cases	E1- The In-Vehicle Infotainment System was not able to download the messages.
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.7 BTP-UC-REQ-041739/A-The In-Vehicle Infotainment System was not able to download the messages (TcSE ROIN-290972-1)

Linked Elements
BTP-UC-REQ-041738/A-Messaging New Message 'Download' (TcSE ROIN-290971-1)

Actors	Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	The customer has indicated that they want to download the unread message to access it via the G-HMI available via the In-Vehicle Infotainment System, but the action has failed.
Post-conditions	The In-Vehicle Infotainment System alerts the customer that there was an error with downloading the messages.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.8 BTP-UC-REQ-041740/A-Messaging Message Status Updated (TcSE ROIN-290973-1)

Linked Elements
BTP-FUR-REQ-041762/A-Unread to Read Notification (TcSE ROIN-295127-1)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected
Scenario Description	While the In-Vehicle Infotainment System is connected to the mobile phone, a message status has changed. These changes can range from unread to read, read to deleted, etc. As a result, the customer expects for that status to be consistent across the connected devices.
Post-conditions	The In-Vehicle Infotainment System and/or mobile is updated to reflect the new status of the selected message(s). *For those items that have been deleted or removed, the In-Vehicle Infotainment System will not display them.
List of Exception Use Cases	N/A
Interfaces	G-HMI Vehicle System Interface

4.9.1.9 BTP-UC-REQ-041741/A-Messaging Call Sender (TcSE ROIN-290974-1)

Linked Elements
BTP-FUR-REQ-041771/C-Call (TcSE ROIN-295136-2)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone has the ability to provide the sender information. Mobile phone is paired and connected
Scenario Description	While the In-Vehicle Infotainment System is connected to the mobile phone, and the Customer indicates that they intend to place a call to the sender of a specific message
Post-conditions	See Outgoing Call Section
List of Exception Use Cases	E1 – Sender of message is not a phone number. See Outgoing Call Section
Interfaces	See Outgoing Call Section

4.9.1.10 BTP-UC-REQ-041742/B-Sender of Message is not a Phone number (TcSE ROIN-290975-1)

Linked Elements
BTP-UC-REQ-041741/A-Messaging Call Sender (TcSE ROIN-290974-1)
BTP-FUR-REQ-041771/C-Call (TcSE ROIN-295136-2)

Actors	Mobile Phone
Pre-conditions	Same as original use case
Scenario Description	The In-Vehicle Infotainment System has received a message from an email address or a name.
Post-conditions	The option to call the sender via the In-Vehicle Infotainment System is not available, unless the email or the name is stored in the phonebook and relative to a contact that also has a phone number, in which case the user might be allowed to call one or any of the numbers stored in the phonebook for that contact (G-HMI / V-HMI).
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.11 BTP-UC-REQ-041743/C-Messaging Reply to Sender (TcSE ROIN-290976-1)

Linked Elements
BTP-FUR-REQ-041770/D-Reply (TcSE ROIN-295135-3)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports text messaging and supports ability to send messages. Mobile phone has the ability to provide the sender information. Mobile phone is paired and connected. Message inbox is not empty.
Scenario Description	While the In-Vehicle Infotainment System is connected to the mobile phone, the Customer indicates that they intend to reply to the sender of a specific message.
Post-conditions	The desired message is delivered to the connected mobile phone with the intent of delivery to the intended recipient.
List of Exception Use Cases	E1 – Sending a message failed.
Interfaces	G-HMI V-HMI

4.9.1.12 BTP-UC-REQ-041744/C-Sending a Message Failed (TcSE ROIN-290977-1)

Linked Elements
BTP-UC-REQ-041745/A-Messaging Sending (TcSE ROIN-290978-1)
BTP-UC-REQ-041743/C-Messaging Reply to Sender (TcSE ROIN-290976-1)

Actors	Mobile Phone
Pre-conditions	Same as original
Scenario Description	The customer has opted to reply to a message and the action has failed.
Post-conditions	The In-Vehicle Infotainment System displays an error message to the customer
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI

4.9.1.13 BTP-UC-REQ-041745/A-Messaging Sending (TcSE ROIN-290978-1)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected
Scenario Description	While the In-Vehicle Infotainment System is connected to the mobile phone, and the Customer indicates that they intend to send a message to someone.
Post-conditions	The desired message is delivered to the connected mobile phone with the intent of delivery to the intended recipient.
List of Exception Use Cases	E1 – Sending a message failed.
Interfaces	G-HMI V-HMI

4.9.1.14 BTP-UC-REQ-041748/A-Accessing Messages (via G-HMI) (TcSE ROIN-290981-1)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected Text messages are available from the connected phone within the In-Vehicle Infotainment System

Scenario Description	The customer has indicated that they want to access a text message via In-Vehicle Infotainment System
Post-conditions	The In-Vehicle Infotainment System displays the requested message
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.9.1.15 BTP-UC-REQ-041749/B-Accessing Messages (TTS) (TcSE ROIN-290982-1)

Actors	Mobile Phone
Pre-conditions	Mobile phone supports ability to transfer text messages Mobile phone is paired and connected Text messages are available from the connected phone within the In-Vehicle Infotainment System
Scenario Description	The customer has indicated that they want to access a text message via the TTS option within In-Vehicle Infotainment System
Post-conditions	The In-Vehicle Infotainment System reads out the content of the message.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.9.1.16 BTC-UC-REQ-193017/A-Voice Recognition - Listen to a message

Linked Elements
BTC-UC-REQ-193021/A-Voice recognition - Access messaging via VUI when connected device does not support messaging
BTC-UC-REQ-193022/A-Voice recognition - Access messaging via VUI when inbox is empty
BTC-UC-REQ-193023/A-Voice recognition - Access messaging via VUI when access to messaging features is denied by connected phone
BTC-UC-REQ-193024/A-Voice recognition - Access messaging via VUI when messaging is disabled in the In-Vehicle Infotainment System
BTP-SD-REQ-030702/A-Incoming Text Message- Listen (TcSE ROIN-149436-3)
BTP-FUR-REQ-133777/C-Text Messaging Availability
BTC-UC-REQ-193020/A-Voice Recognition - Access messaging via VUI when messaging connection is not yet finalized
BTP-SD-REQ-439820/A-Incoming Text Message- Ignore
BTP-SD-REQ-439405/A-Incoming Text Message- Listen

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature, there are new messages from new message notifications or messages in the message inbox
Scenario Description	The Customer has opted to listen to a message from the list of available messages in the inbox or from a message notifications
Post-conditions	The In-Vehicle Infotainment System shall read the message to the user
List of Exception Use Cases	E1: Voice recognition - Messaging connection not finalized yet E2: Voice recognition - Connected device does not support messaging E3: Voice recognition - Inbox is empty E4: Voice recognition - Access to messaging feature not granted from connected device E5: Voice recognition - Messaging is disabled
Interfaces	V-HMI

4.9.1.17 BTC-UC-REQ-193018/A-Voice Recognition - Reply to a message

Linked Elements
BTC-UC-REQ-193022/A-Voice recognition - Access messaging via VUI when inbox is empty
BTC-UC-REQ-193020/A-Voice Recognition - Access messaging via VUI when messaging connection is not yet finalized
BTC-UC-REQ-193021/A-Voice recognition - Access messaging via VUI when connected device does not support messaging
BTC-UC-REQ-193023/A-Voice recognition - Access messaging via VUI when access to messaging features is denied by connected phone
BTC-UC-REQ-193024/A-Voice recognition - Access messaging via VUI when messaging is disabled in the In-Vehicle Infotainment System
BTC-UC-REQ-193026/A-Voice recognition - Reply to a message that does not have a sender number

BTC-UC-REQ-193027/A-Voice recognition - Reply to a message when connected iOS device does not support replying to messages
BTP-FUR-REQ-041770/D-Reply (TcSE ROIN-295135-3)
BTP-FUR-REQ-133777/C-Text Messaging Availability

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature, there are new messages from new message notifications or messages in the message inbox
Scenario Description	The Customer has opted to reply to a message from the list of available messages in the inbox or from a message notifications via the VUI
Post-conditions	The In-Vehicle Infotainment System shall guide the user via VUI and GUI to reply to the message with some stock messages
List of Exception Use Cases	E1: Voice Recognition - Messaging connection not finalized yet E2: Voice Recognition - Connected device does not support messaging E3: Voice Recognition - Replying to messages not available for connected device E4: Voice Recognition - Access to messaging feature not granted from connected device E5: Voice Recognition - Messaging is disabled
Interfaces	V-HMI

4.9.1.18 BTC-UC-REQ-193019/A-Voice recognition - Access messaging via voice when there is no phone connected

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is no connected phone
Scenario Description	The Customer tries to access the messaging feature via VUI when there is no phone connected
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the messaging feature is not available because there is no phone connected
List of Exception Use Cases	N/A
Interfaces	V-HMI

4.9.1.19 BTC-UC-REQ-193020/A-Voice Recognition - Access messaging via VUI when messaging connection is not yet finalized

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone but the messaging connection is not yet finalized: the connection is still being setup, messages are still being downloaded or messaging notifications channel is still being opened
Scenario Description	The Customer tries to access the messaging feature via VUI when the messaging connection is not yet finalized
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the messaging feature is not available yet because the messaging connection is still being set up
List of Exception Use Cases	E1: Voice Recognition - Connected device does not support messaging E2: Voice Recognition - Access to messaging feature not granted from connected device E3: Voice Recognition - Messaging is disabled
Interfaces	V-HMI

4.9.1.20 BTC-UC-REQ-193021/A-Voice recognition - Access messaging via VUI when connected device does not support messaging

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone but the connected phone does not support the messaging feature
Scenario Description	The Customer tries to access the messaging feature via VUI
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the messaging feature is not available for the connected phone
List of Exception Use Cases	E1: No phone is connected E2: Access to messaging feature not granted from connected device E3: Messaging is disabled E4: Message inbox is empty
Interfaces	V-HMI

4.9.1.21 BTC-UC-REQ-193022/A-Voice recognition - Access messaging via VUI when inbox is empty

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The message inbox is empty
Scenario Description	The Customer tries to access the messaging feature via VUI
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the inbox is empty and there are no messages to view or listen to or reply
List of Exception Use Cases	E1: No phone is connected E2: Access to messaging feature not granted from connected device E3: Messaging is disabled E4: Connected device does not support messaging
Interfaces	V-HMI

4.9.1.22 BTC-UC-REQ-193023/A-Voice recognition - Access messaging via VUI when access to messaging features is denied by connected phone

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The phone has denied the In-Vehicle Infotainment System request to access the messaging features
Scenario Description	The Customer tries to access the messaging feature via VUI
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the phone did not grant access to the messaging feature. Also, the VUI might instruct the user on how to try to fix the issue and retry to access the messaging feature. Also, the VUI prompt might be different depending on the way the messaging feature is enabled on the connected phone (for example, iPhones and Android, where access must be granted before or after the connection request is performed by the In-Vehicle Infotainment System)
List of Exception Use Cases	E1: No phone is connected E2: Messaging is disabled E3: Access to messaging feature not granted from connected device
Interfaces	V-HMI

4.9.1.23 BTC-UC-REQ-193024/A-Voice recognition - Access messaging via VUI when messaging is disabled in the In-Vehicle Infotainment System

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The messaging feature has been disabled on the In-Vehicle Infotainment System
Scenario Description	The Customer tries to access the messaging feature via VUI
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the messaging feature has been disabled. The VUI might also guide the user to re-enable the feature and try to setup a messaging connection with the connected phone
List of Exception Use Cases	E1: No phone is connected E2: Messaging connection denied by connected phone E3: Connected device does not support messaging E4: Message inbox is empty
Interfaces	V-HMI

4.9.1.24 BTC-UC-REQ-193025/A-Voice Recognition - Listen to a message that has no readable content

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The messaging feature is enabled, the phone allowed access to messages, the inbox is not empty
Scenario Description	The Customer tries to listen via VUI to a message that has no readable content
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the selected message has no readable content
List of Exception Use Cases	E1: No phone is connected E2: Messaging connection denied by connected phone E3: Connected device does not support messaging E4: Message inbox is empty E5: Messaging is disabled on the The In-Vehicle Infotainment System E6: Message has more than 2000 characters
Interfaces	V-HMI

4.9.1.25 BTC-UC-REQ-193026/A-Voice recognition - Reply to a message that does not have a sender number

Linked Elements
BTP-FUR-REQ-041770/D-Reply (TcSE ROIN-295135-3)

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The messaging feature is enabled, the phone allowed access to messages, the inbox is not empty
Scenario Description	The Customer tries to reply to a message that does not have a sender number associated with it
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the selected message cannot be replied to because there is no sender number available
List of Exception Use Cases	E1: No phone is connected E2: Messaging connection denied by connected phone E3: Connected device does not support messaging E4: Message inbox is empty

	E5: Messaging is disabled on the The In-Vehicle Infotainment System
Interfaces	V-HMI

4.9.1.26 BTC-UC-REQ-193027/A-Voice recognition - Reply to a message when connected iOS device does not support replying to messages

Linked Elements
BTP-FUR-REQ-041770/D-Reply (TcSE ROIN-295135-3)

Actors	Customer, In-Vehicle Infotainment System
Pre-conditions	There is a connected phone that supports the messaging feature. The connected iOS device does not allow to reply to messages
Scenario Description	The Customer tries to reply to a message
Post-conditions	The In-Vehicle Infotainment System shall notify the user via VUI that the selected message cannot be replied to because the connected phone does not allow to reply to messages from the In-Vehicle Infotainment System. The use case applies whether the message access was granted or not.
List of Exception Use Cases	E1: No phone is connected E2: Connected device does not support messaging E3: Message inbox is empty E4: Messaging is disabled on the In-Vehicle Infotainment System
Interfaces	V-HMI

4.9.2 Requirements

4.9.2.1 BTC-FUR-REQ-203864/A-SMS via MAP support

If the IVIS is required, via Implementation Guide, to support this present requirement, then all requirements and use cases and parts below that mention SMS messages shall be implemented.

4.9.2.2 BTC-FUR-REQ-203865/A-eMail via MAP support

If the IVIS is required, via Implementation Guide, to support this present requirement, then all requirements and use cases and parts below that mention email messages shall be implemented.

4.9.2.3 BTC-FUR-REQ-321281/A-MMS Support

If this requirement is applicable per Implementation Guide, then the In-Vehicle Infotainment System shall support MMS in the same way SMS is supported.
All requirements and use cases for SMS are valid for MMS as well.

To present the MMS in a readable format to the customer the content of the message shall be parsed accordingly.

4.9.2.4 BTP-FUR-REQ-041750/D-Retrieving the Message Listing (Upon Connection) (TcSE ROIN-295115-2)

Upon connecting to an AG that supports messaging via Bluetooth, the In-Vehicle Infotainment System shall

- Connect to the SMS MAS instance, register for notifications and wait for notification channel to be opened (see also BTP-FUR-REQ-041784-Message Notification Not Established).
- Request the message listing of the last 25 SMS messages received by the connected MSE

- Connect to all other MAS instances available in the MSE, up to 4 (SMS and 3 email inboxes), and register for notifications for each of these instances.
- For each MAS instance successfully connected, if the SDP record advertises support for the GetMASInstanceInformation function, the In-Vehicle Infotainment System shall query the GetMASInstanceInformation and use the information retrieved to distinguish the various instances in the HMI. If this is not supported, the instances will be named by default “SMS”, “e-mail”, “e-mail 2”, etc.
- Request the message listing of the last 25 email messages received by the connected MSE, for each inbox.

Upon the customer successfully accessing the message menu via the GUI/ VUI the In-Vehicle Infotainment System shall provide the details of the message listing as described in BTP-FUR-REQ-041753/A-Message Listing Display Requirements in this document and in the format defined within the HMI spec, within 2 seconds of the customer entering the messaging menu. While the In-Vehicle Infotainment System is waiting to display the message listing, the In-Vehicle Infotainment System shall display a graphic / message as defined within HMI spec.

4.9.2.5 BTP-FUR-REQ-041752/A-Message Listing Parameters (TcSE ROIN-295117-1)

Within the message listing request, the In-Vehicle Infotainment System shall request the following parameters:

- Subject (future use)
- DateTime
- Sender_name
- Sender_Addressing
- Replyto_addressing (future use)
- Recipient_name (future use)
- Recipient_addressing (future_use)
- Type
- Reception_Status
- Size
- Text
- Read
- Sent
- Protected (future use)
- Priority (future use)

4.9.2.6 BTP-FUR-REQ-041753/B-Message Listing Display Requirements (TcSE ROIN-295118-2)

The In-Vehicle Infotainment System shall use the information provided by the MSE via the message listing to present the following information within a message list via the UI as defined within the HMI specification:

- Sender of the message
- Date / Time of the message
- Read / Unread status

When presenting the message listing via the UI, the In-Vehicle Infotainment System shall present a reference number for each message beginning with number 1 as defined within HMI specification. This will assist the customer in identifying the order in which messages were received. The messages shall be presented in chronological order, with the most recent messages presented first, thus having a reference number of 1.

The numbering shall be implemented for each of the inboxes/MAS instances to which the In-Vehicle Infotainment System is connected to.

The user will have the option of selecting any of the messages displayed, and they shall be directed the viewing pane of that individual message (as described within the View (Specific Message) section of this specification).

The IVIS shall always display the most recent 25 messages per MAS instance. In the event that a new message is received and the IVIS already has received a message listing with 25 messages, the new message will be displayed and the oldest message shall no longer be available.
If the IVIS has been alerted that a specific message(s) has been deleted within the MSE, the IVIS shall no longer display the deleted message(s) within the message listing and update the reference number(s) accordingly.

4.9.2.7 BTP-FUR-REQ-041754/A-Message Listing Retention (TcSE ROIN-295119-1)

The message listing shall be retained throughout the current Message Access Service connection.

Once the connection is terminated, the IVIS shall not persist the message listing.

*Note: See deleted message requirements within the Message Listing Display Requirements of this document.

4.9.2.8 BTP-FUR-REQ-041755/B-Message Listing Request Failed (TcSE ROIN-295120-2)

In the event the MSE fails to respond (including error or abort) to the request to provide the message listing after 30 seconds, the In-Vehicle Infotainment System shall attempt to retrieve the message listing again.

If the second attempt fails, for SMS instance, upon entry into the messaging option via any provided user interface, the In-Vehicle Infotainment System shall alert the customer it was not able to retrieve messages from the connected MSE as described within HMI Specification.

If the second attempt fails for a MAS instance that supports email, the instance shall be considered as unavailable and not presented to the user.

4.9.2.9 BTP-FUR-REQ-041756/B-Setting Message Notification to ON (TcSE ROIN-295121-1)

Upon connecting to a MSE that indicates support for Message Notification, the In-Vehicle Infotainment System shall set message notification to 'ON', for every MAS instance that is present on the MSE and to which the In-Vehicle Infotainment System connected successfully to.

4.9.2.10 BTP-FUR-REQ-041757/B-Setting Message Notification 'On' Failure (TcSE ROIN-295122-1)

If the IVIS has attempted to set message notification to 'ON', but the MAS Server of the MSE did not respond within 30 seconds or the MNS Client of the MSE does not request to connect the Message Notification Service within 30 seconds of receipt of the MAS Server response, the IVIS shall attempt to set message notification to 'ON' again. If the second attempt fails, based on the criteria within this section the IVIS shall provide a notice to the customer that it will not be able to provide the customer with new messages received while connected to the current MSE.

If this error happens on a MAS instance that supports email, this instance shall be considered as unavailable and not presented to the user.

4.9.2.11 BTP-FUR-REQ-041758/A-Receipt of a New Message Event (TcSE ROIN-295123-2)

During a connection, the MNS Client of the MSE may alert the in-vehicle infotainment system that it has received a new message(s). Upon notification of a new message event from the connected MSE, the in-vehicle infotainment system shall request a message listing for the unread messages only. The message listing request shall include the same parameters and guidelines within the GREQ-295117 "~~Retrieving~~ Message Listing Parameters (Functional)" section of this document.

4.9.2.12 BTP-FUR-REQ-041759/B-Message Notification (End User) (TcSE ROIN-295124-2)

Notifications of new incoming messages shall be consistent with the settings contained within the phone application. Regardless of the setting within the phone application, the new message Envelope Icon shall be displayed in the event of a new message notification.

The Envelope Icon shall not be shown for unread messages received upon connection.

The new message icon shall be removed in the following scenarios:

a) Once the user has chosen to read or listen to all of their new messages.
b) Once the user has chosen to enter the inbox of the newly received message

More information regarding these notifications are included within the Incoming Message Alerts section of this document.

4.9.2.13 BTP-FUR-REQ-041760/C-UI Notification (TcSE ROIN-295125-2)

When a new message is received, the user shall be notified within 2 seconds that they have received a new unread message. This notification shall include the following sender's information:

Name (if available from contact list); if not the phone number or e-mail address shall be displayed.

*Note: If the sender is an e-mail address and that e-mail address is stored within the phonebook, then In-Vehicle Infotainment System shall display the name of that contact.

The notification shall also include the following options via the GUI and Voice:

-Listen (TTS)
-Ignore
-View (if driver restrictions are not enabled)

For a more detailed description of the behavior of these options, follow the requirements included within HMI specification.

The HMI specification might include the possibility of disabling notifications on a per – instance basis, allowing the user to receive, for example, email notification from one email inbox, but no notifications for SMSs or from another email inbox.

The HMI specification might include the possibility of disabling notifications for all messaging instances in the device settings menu. When this setting is changed to disable notifications, all eventual per instance notification settings shall be changed to disabled. When this setting is changed to enable notifications, all eventual per instance notification settings shall be changed to what they were before changing the device setting to disabled.

By default both the device setting for messaging notifications and the per-instance notification settings shall be set to enabled.

Both these settings, when present, shall be maintained across connection cycles.

Note: Please also consider BTP-FUR-REQ-033871- Do Not Disturb.

4.9.2.14 BTP-FUR-REQ-041761/C-Audible Notification (TcSE ROIN-295126-2)

When a new message is received, the user shall be notified by the alert defined within BTP-FUR-REQ-041775-Audible Alerts and within the HMI Text Messaging Specification.

Note: Please also consider BTP-FUR-REQ-033871- Do Not Disturb.

4.9.2.15 BTP-FUR-REQ-041762/A-Unread to Read Notification (TcSE ROIN-295127-1)

The receipt of a new message shall not prompt the In-Vehicle Infotainment System to update the status of that message as read on the MSE. The In-Vehicle Infotainment System shall only update the status of an unread message to read if the user has opted to perform any of the following actions:

- View the message
- Listen to the message

The In-Vehicle Infotainment System shall provide the MSE this notification within 2 seconds of performing either of the actions listed above.

4.9.2.16 BTP-FUR-REQ-041764/B-Downloading Messages Received as a result of a New Message Event (TcSE ROIN-295129-1)

The IVIS shall automatically download a message received as a result of a new message event, as defined in the “Receipt of a New Message Event” section of this document. This will insure that the message is available to the customer when and/or if they choose to access it. The message download shall take place within 2 seconds of a new message event, for all MAS instances to which the IVIS is connected to.

4.9.2.17 BTP-FUR-REQ-041765/A-Downloaded Message Retention (TcSE ROIN-295130-1)

Downloaded messages shall be retained until one of the following conditions are met:

- a disconnect of the current Message Access Service connection
- MSE has indicated that the message has been deleted.

Once the connection is terminated, the IVIS shall not persist the downloaded messages.

4.9.2.18 BTP-FUR-REQ-041766/A-Unsolicited Message Notification of a Message Status Change (TcSE ROIN-295131-1)

During a connection, the MSE may alert The In-Vehicle Infotainment System that the status of a message has changed. Upon receipt of this notification, The In-Vehicle Infotainment System shall update the status of the referenced message if it was one of the messages previously downloaded. In event that the message notification is related to a deleted message, The In-Vehicle Infotainment System shall remove the message from the text messaging list within 2 seconds.

4.9.2.19 BTP-FUR-REQ-041767/C-Listen HMI (TcSE ROIN-295132-1)

If the user chooses to 'Listen' to a text message, then In-Vehicle Infotainment System shall TTS the message. The In-Vehicle Infotainment System shall TTS a maximum of 2000 characters. If the contents of a message exceed this limit, the IVIS shall notify the customer that they will have to review the remainder of the message on their handset when it is safe to do so.

In-Vehicle Infotainment System shall reference a language based Text-To-Speech library to interpret common words, emoticons, names, etc. For example, LOL is "Laughing out Loud", etc.
At the conclusion of the Text-To-Speech session, the user might have the following options:

- Reply
- Next Message
- Previous Message
- Call the sender of the message (see BTP-FUR-REQ 041771/ Call)

4.9.2.20 BTP-FUR-REQ-041768/A-Ignore (TcSE ROIN-295133-1)

If the user chooses to 'Ignore' an incoming message notification, then In-Vehicle Infotainment System shall return to the previous function / source. The downloaded messages shall remain 'Unread' and the envelope icon shall still be present.

4.9.2.21 BTP-FUR-REQ-041769/C-View (TcSE ROIN-295134-2)

If the user chooses 'View', In-Vehicle Infotainment System shall display the specific message so that the user can read the message. This feature is subject to driver distraction rules. This display shall also include the following items:

- Name (if available from phonebook); if not the phone number or e-mail address shall be displayed.

- The date and time associated with the message.
  The date and time shall be displayed based on the format set within the Global Clock Specification.

While viewing a message the user shall have the following options with text content displayed or a message stating there is no text content when text data is not available:

-Listen (TTS) (to message content or getting the information that there is no text data)

-Reply
-Call (see BTP-FUR-REQ-041771/B-Call)

The In-Vehicle Infotainment Systems shall display the 2000 characters of a received message. If the contents of a message exceed this limit, the IVIS shall notify the customer that they will have to review the remainder of the message on their handset when it is safe to do so.

If supported by the HMI/GUI specifications, the IVIS shall display eventual
- phone numbers
- street addresses
- email addresses

inside the body of the message in a special way to allow a richer interaction with the user (call the phone number, navigate to street address, etc.)

4.9.2.22 BTP-FUR-REQ-041770/D-Reply (TcSE ROIN-295135-3)

The option to reply to a message shall be present or enabled only when the connected device is supporting this feature.

See the following logic to determine when the option to reply shall be present or enabled:

SMS:
- If only one number is present: Reply to the number
- Else, if an email is present: Reply to the email
- Else, do not allow reply

EMAIL:
- If an email is present: Reply to this email address
- Else, do not allow reply

For display purposes only the IVIS might show the sender's name from the message, if available.
If that is not available then the IVIS might try to match the sender number or email to an entry in the phonebook information.

If the user chooses 'Reply' via GUI or VUI In-Vehicle Infotainment System shall provide the user with the canned message options described in requirement GREQ-295135 of this specification and the HMI specification.

*Note: The reply function shall not be available when connecting to an iOS device.

4.9.2.23 BTP-FUR-REQ-041771/C-Call (TcSE ROIN-295136-2)

This option to Call shall be present or enabled following the logic below:
- If a number is present: Call this number
- Else, if a contact name is present: try to match the contact name to a contact in the phonebook.
  - if a match is found, and the contact has one number only: call this number
  - Else, if a match is found and the contact has more than one number, allow calling, allow user to select which number to dial.
- Else, if an email is present: try to match the email to a contact in the phonebook.
  - if a match is found, and the contact has one number only: call this number
  - Else, if a match is found and the contact has more than one number, allow calling, allow user to select which number to dial.

4.9.2.24 BTP-FUR-REQ-041774/B-Insert Message Alert Options (TcSE ROIN-295139-2)

The user shall have the option of selecting one of two incoming message notifications.
They are:

- An Audible Alert (as defined within the HMI specification.

- Envelope Icon Alert (i.e. no pop-up notification of a newly received message)

Regardless of Incoming Message Alert settings, In-Vehicle Infotainment System shall always display the new message Envelope Icon once a new message(s) are received.

4.9.2.25 BTP-FUR-REQ-041775/A-Audible Alerts (TcSE ROIN-295140-1)

The user shall have a total of 1 audible alert to choose from for an incoming message notification. This audible alert shall be pre-recorded and stored on In-Vehicle Infotainment System.

4.9.2.26 BTP-FUR-REQ-041776/A-Envelope Icon Only (TcSE ROIN-295141-2)

When this setting is enabled, In-Vehicle Infotainment System shall not display a pop-up notification once a new message(e) has been received, nor shall it play an audible alert. In-Vehicle Infotainment System shall only display the Envelope Icon to alert the user that they have received a new message(s). This is the messaging alert to be used when the user has set Do Not Disturb on as described within ~~Handsfree Phone Requirements~~ the phone section of the SPSS.

4.9.2.27 BTP-FUR-REQ-041777/B-Canned Messages Requirements (TcSE ROIN-295142-1)

There shall be a maximum of 15 canned messages available to the user for sending and/or replying to a text message.

4.9.2.28 BTP-FUR-REQ-041778/A-Canned Message Selection Options (TcSE ROIN-295143-1)

The user shall be able to choose one of the canned messages via GUI or Voice. The user shall be able to:

Choose a canned message via numerical list selection (i.e. text message number 1, etc.).

If the user selects a canned message via Voice, they shall be required to confirm or cancel the message selection prior to In-Vehicle Infotainment System actually sending the message.

4.9.2.29 BTP-FUR-REQ-041779/C-Canned Message List (TcSE ROIN-295145-1)

The canned messages shall be defined in the HMI specification to cover regional aspects. The following messages are only for reference, and not mandatory.

I'll call you back in a few minutes.
I just left. I'll be there soon.
I am driving. Can you give me a call?
I'm on my way.
I'm running a few minutes late.
I'm ahead of schedule, so I'll be there early.
I'm outside.
I'll call you when I get there.
OK
Yes
No
Thanks
Stuck in traffic.
Call me later.
LOL

4.9.2.30 BTP-FUR-REQ-041780/B-Sending Messages (TcSE ROIN-295146-2)

The In-Vehicle Infotainment System shall use the following application parameters when sending any message:

Parameter	Setting
Transparent	Off

Retry	On
Charset	UTF-8 or Native (based on device and suppliers experience with devices within the industry) Supplier shall provide Ford Motor Company with details regarding the use of both of these options.

4.9.2.31 BTP-FUR-REQ-041782/A-Message Access Error States (TcSE ROIN-304253-1)

The in-vehicle infotainment system shall be able to determine if the connected server has denied the in-vehicle infotainment system access to the Message Access Profile, if the server has not responded per the requirements within the message access profile, or the server has failed to establish a message notification service with it.

4.9.2.32 BTP-FUR-REQ-041783/A-Message Access Not Granted (TcSE ROIN-304254-1)

When the in-vehicle infotainment system requests to connect to the Message Access Profile of the connected AG / MSE the in-vehicle infotainment system shall determine that the AG / MSE has not granted access to Message Access Profile when either of the following scenarios takes place:

1. The connected AG / MSE does not respond to the connect request within 15 seconds.
2. The connected AG / MSE responds with a response code other than Success

4.9.2.33 BTP-FUR-REQ-041784/B-Message Notification Not Established (TcSE ROIN-304255-1)

When the In-Vehicle Infotainment System establishes a Message Access Server connection it shall determine that the MSE has experienced an internal message notification error under the following scenario(s):

1. The MSE supports Message Notification as reported via SDP and does not establish a Message Notification Service (MNS) within 30 seconds of the In-Vehicle Infotainment System establishing a connection to the Message Access Server for the SMS MAS instance and registering for notifications

When the above occurs, the In-Vehicle Infotainment System shall attempt to force the MSE to establish a MNS connection by disabling notifications, disconnecting MAS instance for SMS, reconnecting MAS instance for SMS, re-enabling notifications. In the event of a MAS reconnect the In-Vehicle Infotainment System shall retrieve the SMS message listing of the last 25 received messages.

*Note: In this case, the In-Vehicle Infotainment System shall not wait for the MSE to establish a MNS connection, and shall not connect to any other MAS instance available on the phone

If the MSE fails to establish MNS within 30 seconds again, the In-Vehicle Infotainment system shall consider that the connected MSE has experienced a “Text Message Notification Failure”

The In-Vehicle Infotainment System shall connect to all other MAS instances presented by the phone only after the MNS connection has been setup successfully.

If the MNS connection has not been setup successfully, then the In-Vehicle Infotainment System shall not connect to any non-SMS MAS instances.

If the MNS connection is unexpectedly disconnected, the In-Vehicle Infotainment System shall unregister for notifications and close the MAS connection for all non-SMS instances.

4.9.2.34 BTP-FUR-REQ-041785/B-Message Download Failed (TcSE ROIN-304256-1)

When the In-Vehicle Infotainment System establishes a Message Access Server connection it shall determine that the MSE has experienced an internal message download error under one of the following scenario(s):

1. The In-Vehicle Infotainment System is not able to get the message listing
2. The In-Vehicle Infotainment System is not able to download any of the listed messages.
3. The In-Vehicle Infotainment System is not able to parse any of the requested messages within the inbox.

In that error case the customer shall be notified with a meaningful error message according HMI specification.

4.9.2.35 BTP-FUR-REQ-041786/B-Sending Message Failed (TcSE ROIN-304257-1)

When the In-Vehicle Infotainment System establishes a Message Access Server connection it shall determine that the MSE has experienced an internal send message error under one of the following scenario(s):

1. Failure of the MSE to respond within 10 seconds to any of the set path requests.
2. The MSE responds with error to any of the outbox set path requests.
3. The MSE responds with a result code of error to the in-vehicle infotainment system's request to send the message
4. The MSE fails to respond to the in-vehicle infotainment system's request to send the message within 10 seconds.

The In-Vehicle Infotainment System shall alert the customer of the failure within 2 seconds of a failed indication.

4.9.2.36 BTP-FUR-REQ-041787/B-Message Exceptions (TcSE ROIN-304258-1)

When the In-Vehicle Infotainment Systems receives a vCARD without an entry within the TEL field it shall use the FN and/or N or email field of the vCard to determine the sender of a text message.

If the MSE reports an error in sending a message due to the service unavailable, the in-vehicle infotainment system shall alert the user that the MSE does not have a network signal, and that the MSE will continue to try to send the message.

4.9.2.37 BTP-FUR-REQ-133777/C-Text Messaging Availability

The messaging feature(s) shall only be announced to the customer via VUI or GUI when a device is paired and the connected device is supporting that feature(s), separately for text messaging and for email.

In that case the In-Vehicle Infotainment System shall provide the user with the option to enable or disable the messaging feature(s) manually.
If disabled the In-Vehicle Infotainment System shall not establish a connection to the corresponding MAS instance - which were disabled - of the connected HFP device.
If this setting gets set to disabled for email and text messages, the In-Vehicle Infotainment System shall close the Bluetooth messaging connections via unregistering for notifications and closing the connection(s) to the connected device's MAS instances.
If this setting gets set to enabled, the In-Vehicle Infotainment System shall immediately try to establish a map connection to register for messaging notifications and download of messages as described in BTP-FUR-REQ-041758/A-Receipt of a New Message Event and BTP-FUR-REQ-041750/A-Retrieving the Message Listing (Upon Connection).
The alert option which was set before disabling the feature shall be valid again.

4.9.2.38 BTP-FUR-REQ-146186/C-Requirements for Handling of Messaging Feature in VUI/GUI

Any VUI/GUI that intends to support the messaging functionality shall clearly define its behavior for the following error conditions and special cases.

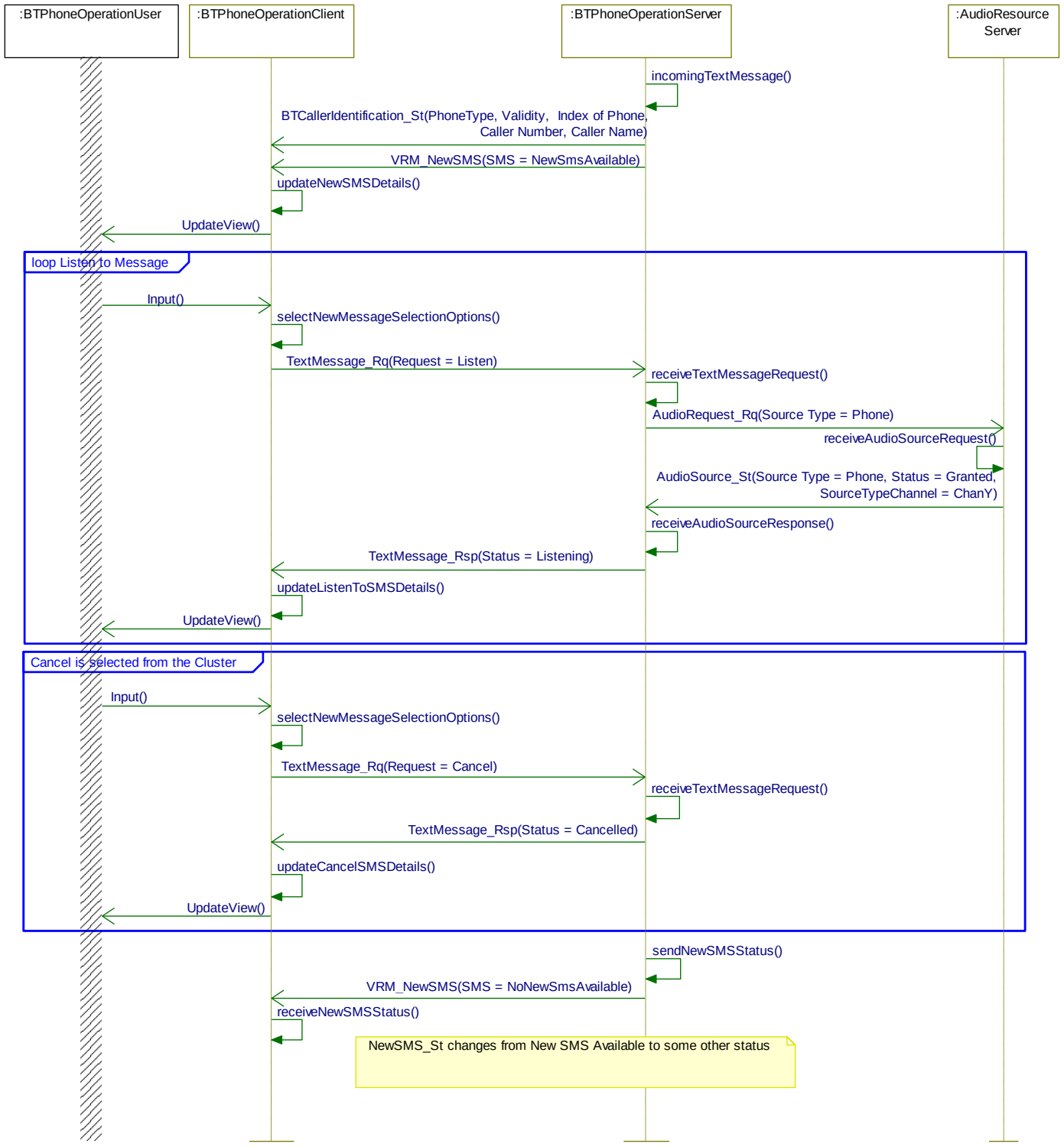
Short	Condition	Notes	See also…
MSG1	Connected device supports all messaging features, connection	All features are available to the user.	Messaging requirements under BTP-FUN-REQ-041734-Messaging

	is successful and initialization of feature has completed		
MSG2	Messaging connection not finalized yet	When trying to use this feature, the user shall be informed that the feature is not ready yet.	BTP-FUR-REQ-041784-Message Notification Not Established
MSG3	Connected device does not support messaging	When trying to use this feature, the user shall be informed when trying to use the feature that the messaging feature is not available with this device. The help prompts and the HMI should not show this feature.	BTP-FUR-REQ-133777-Text Messaging Availability
MSG4	Replying to messages not available for connected device (iOS devices OR empty inbox)	User shall not be led to believe that replies are available.	BTP-FUR-REQ-041770-Reply
MSG5	Access to messaging feature not granted from connected device	When trying to use this feature, the user shall be informed when trying to use the feature that the messaging feature is not available because access was not granted from the connected device. Optionally the user might be guided on how to try to fix this problem.	BTP-FUR-REQ-041783-Message Access Not Granted BTP-FUR-REQ-041784-Message Notification Not Established
MSG6	Messaging disabled	When trying to use this feature, the user shall be informed when trying to use the feature that the messaging feature has been disabled. Optionally the user might be guided on how to re-enable the feature.	BTP-FUR-REQ-133777-Text Messaging Availability
MSG7	Message has no readable content	When trying to listen to a message which has no readable content (e.g. only a picture attached), the user shall be informed that there is no readable content.	BTP-UC-REQ-193025-VR - Listen to a message that has no readable content, BTP-FUR-REQ-041769/B-View
MSG8	Sender of a message is not a phone number	When trying to call the sender of a message and the sender is not a phone number or no phone number can be associated with the sender of the message, the feature should not be available.	BTP-FUR-REQ-041771/B-Call

4.9.3 Sequence Diagrams

4.9.3.1 BTP-SD-REQ-439405/A-Incoming Text Message- Listen

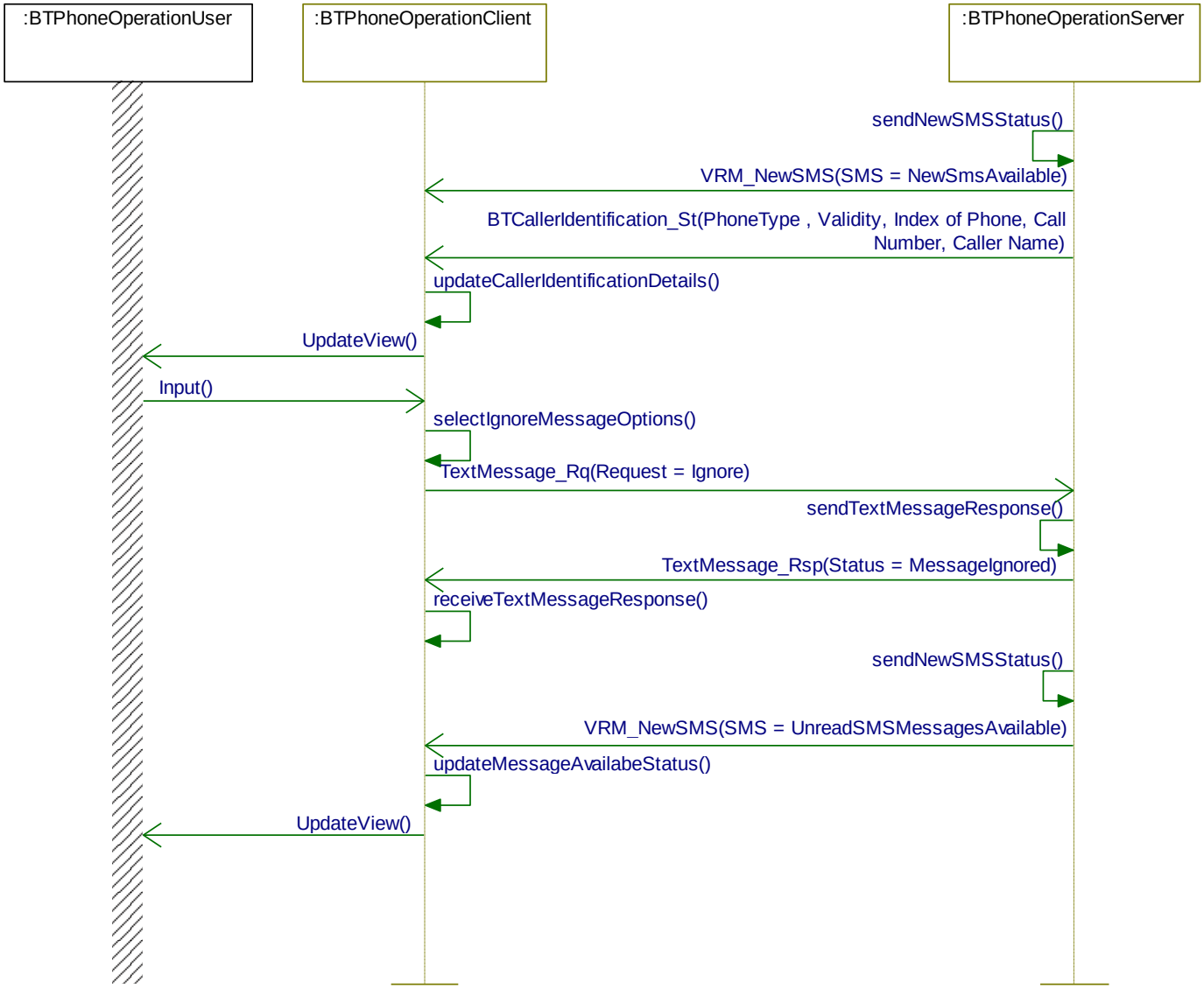
Linked Elements
BTC-UC-REQ-193017/A-Voice Recognition - Listen to a message



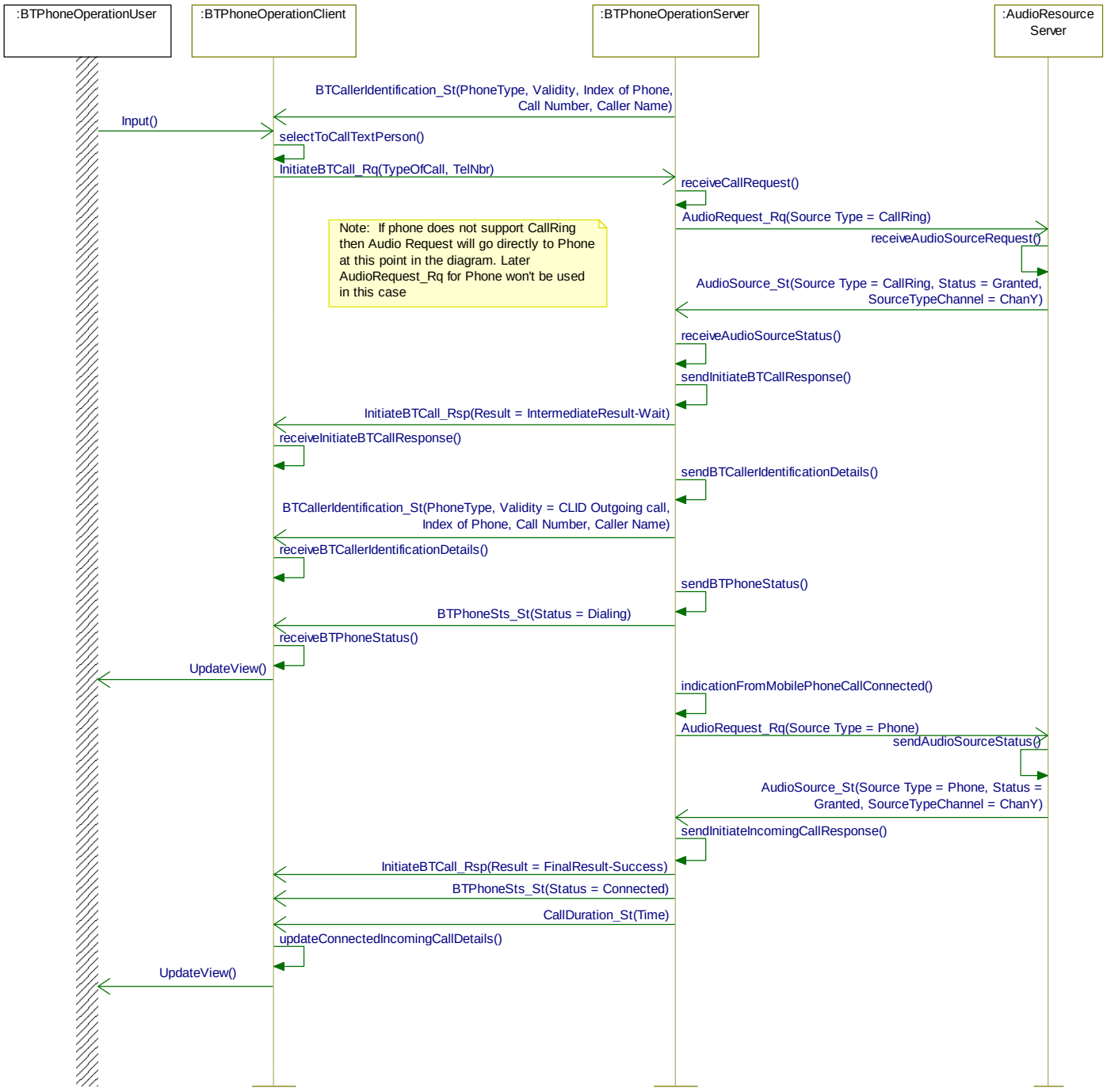
4.9.3.2 BTP-SD-REQ-439820/A-Incoming Text Message- Ignore

Linked Elements

BTC-UC-REQ-193017/A-Voice Recognition - Listen to a message


:BTPhoneOperationUser
:BTPhoneOperationClient
:BTPhoneOperationServer
sendNewSMSStatus()
VRM_NewSMS(SMS = NewSmsAvailable)
BTCallerIdentification_St(PhoneType , Validity, Index of Phone, Call Number, Caller Name)
updateCallerIdentificationDetails()
UpdateView()
Input()
selectIgnoreMessageOptions()
TextMessage_Rq(Request = Ignore)
sendTextMessageResponse()
TextMessage_Rsp(Status = MessageIgnored)
receiveTextMessageResponse()
sendNewSMSStatus()
VRM_NewSMS(SMS = UnreadSMSMessagesAvailable)
updateMessageAvailabeStatus()
UpdateView()

4.9.3.3 BTP-SD-REQ-439406/A-Initiate a Phone Call from Text Message



4.10 BTP-FUN-REQ-033867/A-Do Not Disturb (TcSE ROIN-294323-1)

4.10.1 Use Cases

4.10.1.1 BTP-UC-REQ-033868/A-Do Not Disturb Active– Incoming Call (TcSE ROIN-290918-1)

Actors	Connected Phone
Pre-conditions	Mobile phone is connected

Scenario Description	The Customer has opted to set Do Not Disturb to active / on, and has received an incoming call. As a result, the In-Vehicle Infotainment System does not alert the Customer to the incoming call and requests that the connected phone stop ringing.
Post-conditions	The incoming call is no longer alerting via the In-Vehicle Infotainment System and connected phone.
List of Exception Use Cases	E1 -Rejecting Call via In-Vehicle Infotainment System fails.
Interfaces	G-HMI

4.10.1.2 BTP-UC-REQ-033869/B-Rejecting Call via In-Vehicle Infotainment System fails (TcSE ROIN-290915-1)

Linked Elements
BTP-UC-REQ-033868/A-Do Not Disturb Active– Incoming Call (TcSE ROIN-290918-1)
BTP-UC-REQ-041853/A-Incoming Call Ringing (Reject from In-Vehicle Infotainment System) (TcSE ROIN-290914-1)

Actors	Connected Phone Customer
Pre-conditions	Same as original use case
Scenario Description	A mobile phone is connected to the In-Vehicle Infotainment System, and while it is connected an incoming call has been indicated by ringing / alerting. In this scenario, the Customer has opted to manually reject the call from the In-Vehicle Infotainment System – or when DND is set to on – IVIS is rejecting the call automatically, but the call is not rejected.
Post-conditions	The incoming call is no longer alerting via the In-Vehicle Infotainment System. The In-Vehicle Infotainment System returns to the prior state
List of Exception Use Cases	N/A
Interfaces	G-HMI SWC Vehicle System Interface

4.10.1.3 BTP-UC-REQ-033870/A-Do Not Disturb Active– Incoming Message (TcSE ROIN-290919-1)

Actors	Connected Phone
Pre-conditions	Mobile phone is connected and supports messaging
Scenario Description	The Customer has opted to set Do Not Disturb to active / on, and has received an incoming new message.
Post-conditions	The In-Vehicle Infotainment System does not interrupt the customer's infotainment experience or display a pop-up indicating a new message. (*Note: This is not to imply that a message icon cannot be displayed to indicate that a new message has been received)
List of Exception Use Cases	N/A
Interfaces	G-HMI

4.10.1.4 BTC-UC-REQ-274082/A-Do Not Disturb Active - Exceptions

Actors	Connected Phone Customer
Pre-conditions	Mobile phone is connected
Scenario Description	The Customer has opted to set Do Not Disturb to active, and has excluded a certain category e.g. Contact Favorites.

	The Customer received an incoming event from a contact which is part of the exception list. As a result, the In-Vehicle Infotainment System does alert the Customer to the incoming event.
Post-conditions	The customer has all the options which are associated with the incoming event.
List of Exception Use Cases	
Interfaces	G-HMI System Interface

4.10.2 Requirements

4.10.2.1 BTP-FUR-REQ-033871/E-Do Not Disturb (TcSE ROIN-295096-2)

This feature shall only be available when there is a connected AG. When set to on, this feature will prevent the user from being interrupted by incoming phone calls, and other SMS or eMails from the AG. While in this mode, In-Vehicle Infotainment System shall automatically reject any incoming calls received and shall only display the Envelope Icon to alert the user that they have received new message(s).
When the feature is set to off, the previous alert options for incoming calls and new messages shall be valid again.

The user shall be able to place calls and send messages while this mode is set to 'ON'. If the user is in an active call and they receive an incoming call waiting call, In-Vehicle Infotainment System shall not present the user with the Call Waiting Notification pop-up.

If the user is streaming audio from the connected AG, their audio experience will be briefly interrupted. In-Vehicle Infotainment System shall still send the reject command to the connected AG, and In-Vehicle Infotainment System shall return to streaming audio.

4.10.2.2 BTP-FUR-REQ-033872/B-Do Not Disturb Retention Settings (TcSE ROIN-295097-1)

This feature will automatically be set to off upon an intentional disconnect of the HFP device from In-Vehicle Infotainment System.

If a disconnect is a result of a Link Loss, this setting shall be maintained upon next connection provided).

This setting shall never be retained across power cycles.

4.10.2.3 BTP-FUR-REQ-033873/C-Do Not Disturb Exceptions (TcSE ROIN-295098-1)

If the connected mobile device does support contact favorites per BTP-FUR-REQ 243378, the In-Vehicle Infotainment System shall offer an option to exclude this category from the Do Not Disturb feature.

Incoming calls and other specified incoming events like text message notifications should be presented to the customer when Do Not Disturb is enabled and Favorites are excluded.

This requirement is NOT applicable when Do Not Disturb is enabled via MyKey.

4.11 BTC-FUN-REQ-446697/A-AVRCP Browsing

4.11.1 Requirements

4.11.1.1 BTC-FUR-REQ-192161/A-AVRCP Browsing Channel

Upon connection of an AVRCP channel, system shall establish an AVRCP browsing connection if supported by the connected Bluetooth device.

See also MP-FUR-REQ-134103-AVRCP Browsing Channel

4.11.1.2 BTC-FUR-REQ-270509/A-AVRCP Browsed Player upon connection

The In-Vehicle Infotainment System shall show the list of available players on the device after the AVRCP browsing channel is established. The information is available via a GetfolderItems command with scope MediaPlayerList.

The In-Vehicle Infotainment System shall try to set the browsed player upon connection. The player to be set as browsed player upon connection shall be the player whose id is returned in the interim response when the IVIS is registering for the EVENT_ADDRESSED_PLAYER_CHANGED.
That id shall also correspond to the id of a player in the list of players returned via a GetfolderItems command with scope MediaPlayerList.
The In-Vehicle Infotainment System shall only ever browse the addressed player and shall not attempt to browse a player that is not addressed.

If GetfolderItems command with scope MediaPlayerList returns no players, browsing shall not be considered as supported.
If setting the browsed player fails, the In-Vehicle Infotainment System shall consider browsing not supported until it will succeed in setting a browsed player.

4.11.1.3 BTC-FUR-REQ-192162/A-AVRCP Addressed Media Player has changed

The In-Vehicle Infotainment System shall detect whether the addressed media player and the now playing playlist has changed on the sourced AVRCP device and update the now playing HMI as necessary (refer to BTP-FUR-REQ-192236 Register for Event Notification).

See also MP-FUR-REQ-134110-AVRCP Addressed Media Player has changed

4.11.1.4 BTC-FUR-REQ-270511/A-AVRCP Browsed Player upon addressed Player changes

The addressed player can change either from a SetAddressedPlayer command sent from the In-Vehicle Infotainment System, or as notified by an EVENT_ADDRESSED_PLAYER_CHANGED from the connected phone.
In both these cases the In-Vehicle Infotainment System shall set the browsed player to be the same as the addressed player.

If setting the browsed player fails, the In-Vehicle Infotainment System shall consider browsing not supported until it will succeed in setting a browsed player.

4.11.1.5 BTC-FUR-REQ-270512/A-AVRCP Choosing a player

If the connected device advertises the presence of more than one player, the V-HMI and G-HMI might give the user the option to select a different player than the currently addressed and browsed one.
When the user selects a different player, the In-Vehicle Infotainment System shall send a “SetAddressedPlayer” command.
In case the command is successful, the In-Vehicle Infotainment System shall follow the requirements above on setting a browsed player.
Also, if the command is successful, the In-Vehicle Infotainment System shall refresh the information on Shuffle/Repeat and Shuffle/Repeat support, and consider the Now-Playing-List to be changed, and re-register for event notifications.

If the command is not successful, the user shall be alerted of the failure.

4.11.1.6 BTC-FUR-REQ-192163/A-AVRCP Browsing Configuration

The In-Vehicle Infotainment System shall use device ID/PNP profile matching to enable or disable the browsing feature on a per-device basis.
If the connected device does not support device ID/PNP profile, then the feature will be turned off.
System's HMI might present the user with the option to disable the feature for a paired Bluetooth device or all paired Bluetooth devices.

The supplier shall provide the possibility to easily:

- Disable the feature for all Bluetooth devices
- Disable the feature for all but some types of Bluetooth devices
- Enable the feature for all Bluetooth devices
- Enable the feature for all but some types of Bluetooth devices
- Ability to update the list of supported Bluetooth devices by an installation file via USB or IVSU

See also MP-FUR-REQ-134193-AVRCP 1.4 Configuration

4.11.1.7 BTC-FUR-REQ-192164/B-AVRCP Browsing not available

When Browsing is not available on the connected Bluetooth device via AVRCP 1.4 or later, system shall not present the browse option on HMI.
In general though we can distinguish between the following different situations (see AVRCP 1.6 specifications from Bluetooth SIG for reference):

BRO-1	The device is not supporting AVRCP browsing	Device SDP record for AVRCP, supported features, bit 6 – "supports browsing" IS NOT set
BRO-2	The device is supporting AVRCP browsing but the currently addressed media player on the device does not support AVRCP browsing	Device SDP record for AVRCP, supported features, bit 6 – "supports browsing" is set Feature bit mask bit 59 "browsing" of currently addressed player IS NOT set.
BRO-3	The device is supporting AVRCP browsing and the currently addressed media player on the device supports AVRCP browsing	Device SDP record for AVRCP, supported features, bit 6 – "supports browsing" is set Feature bit mask bit 59 "browsing" of currently addressed player IS set.

The HMI may specify a different GUI for each of the cases above, e.g. hiding the browse button in scenario BRO-1, showing the browse button in scenario BRO-2 and adding meaningful information on the browse screen.

Notice that the IVIS shall not try to browse a player that is different than the currently addressed player. The IVIS shall only browse the currently addressed player. If the currently addressed player changes, the IVIS shall discard any ongoing browsing session and start a new browsing session at the root of the new addressed player. The HMI shall clearly specify what should happen when the addressed player changes while the user is browsing the device via the GUI/VUI.

See also MP-FUR-REQ-134111-AVRCP Browsing not available

4.11.1.8 BTC-FUR-REQ-192165/A-AVRCP Database Unaware Browsing

The In-Vehicle Infotainment System shall allow user via it's HMI to explore and select media content from the connected AVRCP database unaware device. While exploring the media content, system shall consistently obtain the new list of UIDs at each hierarchy within the Bluetooth device.

All database aware devices shall be treated as database unaware devices.

See also MP-FUR-REQ-134190-AVRCP Database Unaware Browsing

4.11.1.9 BTC-FUR-REQ-192166/A-AVRCP 1.4 Library HMI Requirements

If the connected device is communicating the folder type, the IVIS shall use an appropriate associated icon for this folder type.

For more information about supported folder types and icons see also USB and iPOD requirements and HMI specifications

Value Parameter Description
0x00 Mixed
0x01 Titles
0x02 Albums
0x03 Artists
0x04 Genres
0x05 Playlists
0x06 Years
0x07 – 0xFF Reserved

See also FUR-REQ-155151-AVRCP 1.4 Library HMI Requirements

4.11.1.10 BTC-FUR-REQ-247552/B-AVRCP Browsing - Now Playing List

The In-Vehicle Infotainment System shall allow user via it's HMI to access the Now Playing List.
To scale the length of the list without the need of requesting all items the In-Vehicle Infotainment System shall use the following method.

1. Use the AVRCP 1.6 command *GetTotalNumberOfItems* whenever the connected device is supporting this according the feature bit mask flag *NumberOfItems*.
2. Otherwise use the attribute ID 0x5 *TotalNumberOfTracks* of the *GetElemetAttributes* command.

When asking for the meta data the In-Vehicle Infotainment System shall not ask for attributes. This will provide only the display name of the item. Requesting attributes is not needed because the provided information are not used in the NPL.

Whenever the active media player on the connected device does not share the requested information the HMI should show a meaningful error message to the customer.

Whenever an AddressedPlayerChanged Notification or a NowPlayingContentChanged Notification is received while showing the NowPlayingList to the customer, this list should be exited.
See HMI specification for more information.

4.11.1.11 BTC-FUR-REQ-343579/A-AVRCP Browsing Meta data

When asking for the meta data while browsing through the virtual file system the In-Vehicle Infotainment System shall not ask for attributes. This will provide only the display name of the item when using the GetFolderItem request.

Requesting attributes is not needed because the provided information are not used while browsing through file system or NPL.

4.11.1.12 BTC-FUR-REQ-192167/A-AVRCP Database Unaware Voice Commands

System shall not support play all, play and browse voice commands for Bluetooth AVRCP database unaware devices. This shall apply to database aware devices as well.

See also MP-FUR-REQ-155149-AVRCP Database Unaware Voice Commands

4.11.1.13 BTC-FUR-REQ-192169/A-AVRCP 1.4 Root folder Browsing

If the connected device at the root of its virtual file system presents to the IVIS only one folder, and no other media items, then the IVIS shall "hide" this folder level to the user while browsing up and down the file system.

See also MP-FUR-REQ-155153-AVRCP 1.4 Root folder Browsing

4.11.1.14 BTC-FUR-REQ-432638/A-Indexing – AVRCP 1.4 Support

The system shall be able to configure AVRCP 1.4 and AVRCP 1.5 Indexing to On or Off.

System shall index the content of Bluetooth AVRCP database aware devices only and shall allow the user to select media for playback via Voice Recognition commands.

Devices which only support the A2DP profile, and not the AVRCP profile, shall not be indexed.

4.11.1.15 BTC-FUR-REQ-432639/A-Indexing – AVRCP 1.4 Performance

The System shall be able to fully index each set of one thousand (1,000) media files in one minute or less.

4.11.1.16 BTC-FUR-REQ-432640/A-Indexing – AVRCP 1.4 Track Limits

The System shall be able to index 50,000 media files for each supported AVRCP 1.4 device when connected.

4.11.1.17 BTC-FUR-REQ-432641/A-Indexing –AVRCP Profile Indexing Support

Devices which support a version of AVRCP earlier than version 1.4 shall not be indexed.

4.11.1.18 BTC-FUR-REQ-432666/A-AVRCP Addressed Media Player selection

System shall obtain a list of available media players from Bluetooth devices at connection. The list shall be updated by the system using notifications from the connected Bluetooth device.

System shall only select and browse one media player per connected Bluetooth device.

System shall select and browse a media player that can access the on-board and off-board media content of the connected device. If multiple media players have access to the on-board and off-board media content, system shall select one media player that have the most coverage of the AVRCP features. Video only players shall not be selected and browsed.

4.11.1.19 BTC-FUR-REQ-432667/A-AVRCP Media Player not Active

If browsing is not permitted due to media player not being active on the connected AVRCP device, system shall then inform user via HMI to start media player on the AVRCP device.

4.11.1.20 BTC-FUR-REQ-432669/A-AVRCP Voice Commands Not Used No Voice Commands

System's Voice Recognition commands for AVRCP database aware devices shall be the same as the Voice Recognition commands for USB devices.

4.12 BTP-FUN-REQ-439407/A-Phone VR

4.12.1 Use Cases

4.12.1.1 BTP-UC-REQ-041723/A-Activating the Phone's Voice Recognition (From Phone / In-Vehicle Infotainment System) (TcSE ROIN-290987-1)

Linked Elements

BTP-UC-REQ-041726/B-The customer cancels the phone voice recognition feature (TcSE ROIN-290990-1)
BTP-FUR-REQ-041730/D-Device ID Profile (TcSE ROIN-304263-1)
BTP-FUR-REQ-041731/A-Device Indentification (TcSE ROIN-304264-1)
BTP-FUR-REQ-041728/F-Phone Voice Recognition Activation (TcSE ROIN-295112-1)
BTP-FUR-REQ-191150/B-Phone Voice Service Device handling
BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)
BTP-FUR-REQ-191151/A-Phone Voice Service Automotive Mode
BTP-FUR-REQ-041733/A-iPhone Connected via A2DP and USB (TcSE ROIN-304493-1)
BTP-UC-REQ-041724/A-The connected mobile phone fails to enable the voice recognition feature (TcSE ROIN-290988-1)
BTP-UC-REQ-041725/A-The connected mobile phone cancels the phone voice recognition feature (TcSE ROIN-290989-1)
BTP-FUR-REQ-041732/B-Configuration Requirements (TcSE ROIN-304265-1)
BTP-FUR-REQ-410327/A-Configuration Requirements
BTC-FUR-REQ-273958/A-Active Phone Voice Session
BTC-FUR-REQ-443737/A-Active Phone Voice Session
BTP-FUR-REQ-410323/A-Phone Voice Recognition Activation
BTP-FUR-REQ-410324/A-Apple Siri Eyes-Free
BTP-FUR-REQ-410325/A-Device ID Profile
BTP-FUR-REQ-410326/A-Device Indentification

Actors	Mobile Phone Customer
Pre-conditions	The mobile phone is connected. The mobile phone has voice recognition support accessible via the in-vehicle infotainment system
Scenario Description	The customer has indicated that they want to access the voice recognition features of the connected mobile phone.
Post-conditions	The current audio source is switched to phone. The customer has the opportunity to speak commands to the connected phone via the in-vehicle microphone. The customer has the opportunity to end the voice recognition session.

	The customer has the opportunity to 'barge-in' via options provided by the G-HMI.
List of Exception Use Cases	E1 - The connected mobile phone fails to enable the voice recognition feature. E2 - The connected mobile phone cancels the phone voice recognition feature. E3 - The customer cancels the phone voice recognition feature.
Interfaces	G-HMI V-HMI Vehicle System Interface

4.12.1.2 BTP-UC-REQ-041724/A-The connected mobile phone fails to enable the voice recognition feature (TcSE ROIN-290988-1)

Linked Elements
BTP-FUR-REQ-041730/D-Device ID Profile (TcSE ROIN-304263-1)
BTP-FUR-REQ-191150/B-Phone Voice Service Device handling
BTC-FUR-REQ-275839/A-Phone Voice Recognition Activation error handling
BTC-FUR-REQ-275844/A-Phone Voice Service media playback integration
BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)
BTP-FUR-REQ-191151/A-Phone Voice Service Automotive Mode
BTP-FUR-REQ-041731/A-Device Indentification (TcSE ROIN-304264-1)
BTP-FUR-REQ-041733/A-iPhone Connected via A2DP and USB (TcSE ROIN-304493-1)
BTP-FUR-REQ-041732/B-Configuration Requirements (TcSE ROIN-304265-1)
BTP-FUR-REQ-410324/A-Apple Siri Eyes-Free
BTP-FUR-REQ-410325/A-Device ID Profile
BTP-FUR-REQ-410326/A-Device Indentification
BTP-FUR-REQ-410327/A-Configuration Requirements

Actors	Same as original use case.
Pre-conditions	Same as original use case.
Scenario Description	Enabling the phone voice recognition feature failed.
Post-conditions	The customer is alerted that action was not successful.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.12.1.3 BTP-UC-REQ-041725/A-The connected mobile phone cancels the phone voice recognition feature (TcSE ROIN-290989-1)

Linked Elements
BTP-FUR-REQ-041730/D-Device ID Profile (TcSE ROIN-304263-1)
BTP-FUR-REQ-041728/F-Phone Voice Recognition Activation (TcSE ROIN-295112-1)
BTP-FUR-REQ-191150/B-Phone Voice Service Device handling
BTC-FUR-REQ-275843/A-Phone Voice Service De-Activation
BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)
BTP-FUR-REQ-191151/A-Phone Voice Service Automotive Mode
BTP-FUR-REQ-041731/A-Device Indentification (TcSE ROIN-304264-1)
BTP-FUR-REQ-041733/A-iPhone Connected via A2DP and USB (TcSE ROIN-304493-1)
BTP-FUR-REQ-041732/B-Configuration Requirements (TcSE ROIN-304265-1)
BTP-FUR-REQ-410323/A-Phone Voice Recognition Activation
BTP-FUR-REQ-410324/A-Apple Siri Eyes-Free
BTP-FUR-REQ-410325/A-Device ID Profile
BTP-FUR-REQ-410326/A-Device Indentification
BTP-FUR-REQ-410327/A-Configuration Requirements

Actors	Same as original use case.
Pre-conditions	Same as original use case.
Scenario Description	The mobile phone cancels the phone voice recognition feature.
Post-conditions	The customer is alerted that the phone voice recognition feature has been cancelled.

List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.12.1.4 BTP-UC-REQ-041726/B-The customer cancels the phone voice recognition feature (TcSE ROIN-290990-1)

Linked Elements
BTP-FUR-REQ-041728/F-Phone Voice Recognition Activation (TcSE ROIN-295112-1)
BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)
BTC-FUR-REQ-275843/A-Phone Voice Service De-Activation
BTP-FUR-REQ-191150/B-Phone Voice Service Device handling
BTP-FUR-REQ-410323/A-Phone Voice Recognition Activation
BTP-FUR-REQ-410324/A-Apple Siri Eyes-Free

Actors	Same as original use case.
Pre-conditions	Same as original use case.
Scenario Description	The customer cancels the phone voice recognition feature.
Post-conditions	The customer is alerted that the phone voice recognition feature has been cancelled.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.12.1.5 BTP-UC-REQ-041727/A-Customer Activates 'Barge-In' During Active Phone Voice Recognition (TcSE ROIN-290991-1)

Linked Elements
BTP-FUR-REQ-041728/F-Phone Voice Recognition Activation (TcSE ROIN-295112-1)
BTC-FUR-REQ-275842/A-Phone Voice Service Barge-In
BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)
BTP-FUR-REQ-410323/A-Phone Voice Recognition Activation
BTP-FUR-REQ-410324/A-Apple Siri Eyes-Free

Actors	Mobile Phone Customer
Pre-conditions	The in-vehicle infotainment system and connected mobile phone are in an active phone voice recognition session
Scenario Description	The customer has indicated that they want to 'barge-in' to speak a voice command.
Post-conditions	The in-vehicle infotainment system remains in its current state, and allows the customer to speak new voice commands.
List of Exception Use Cases	N/A
Interfaces	G-HMI V-HMI Vehicle System Interface

4.12.2 Requirements

4.12.2.1 BTP-FUR-REQ-191150/B-Phone Voice Service Device handling

The In-Vehicle Infotainment System shall allow the user to enable the phone's voice recognition feature for all phones that advertise support for the feature via BRSF (bit 2, see Handsfree Profile Specification v1.5). The In-Vehicle Infotainment System shall advertise support for the feature via AT+BRSF (bit 3).

In the effort to minimize compatibility problems and customer complaints, the In-Vehicle Infotainment System shall maintain a list of devices for which the feature shall not be used. The list shall be based on Device ID profile (see BTP-FUR-REQ-041730-Device ID Profile) or AT+CGMI (manufacturer) and AT+CGMM (model information).
When the device to be connected is in such list, the In-Vehicle Infotainment System shall not advertise support for the feature via BRSF and shall disregard support for the feature advertised from the connected device.

The supplier shall provide the possibility to easily:
• Disable the feature for all Bluetooth devices
• Disable the feature for all but some types of Bluetooth devices (see above)

• Ability to update the list of supported Bluetooth devices by an installation file via USB or IVSU

System's HMI might present the user with the option to disable the feature for a paired Bluetooth device or all paired Bluetooth devices.
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4.12.2.2 BTP-FUR-REQ-041728/F-Phone Voice Recognition Activation (TcSE ROIN-295112-1)

In-Vehicle Infotainment System shall have the ability of activating the connected phone's voice recognition activation by supporting section 4.25 of the Handsfree Profile Specification v1.5. The user shall not be able to enable phone voice recognition while in a phone call.

The phone voice session shall be established as soon as the SCO channel is opened by the connected device. Only in that case the phone voice session shall be communicated to the customer. The In-Vehicle Infotainment System should not play a tone when the phone voice recognition session is activated. The latency between the SCO channel opening and audio being completely routed to the car's loudspeaker should be at minimum possible value, but not more than 100ms.

4.12.2.3 BTC-FUR-REQ-443737/A-Active Phone Voice Session

For an active Phone Voice Session the AudioSource.St with Source Type = 0xA VR shall be used.
Additionally to the source request the correct BTPhoneSts.St 0x0A shall be sent out.

See Audio Management Variant 2 SPSS for more details about audio management signals.

4.12.2.4 BTC-FUR-REQ-275839/A-Phone Voice Recognition Activation error handling

If the SCO channel is not established 5 seconds after the connected device has send +BVRA=1 or accepted AT+BVRA=1, the In-Vehicle Infotainment System shall send AT+BVRA=0, and the phone voice session is not established successfully.
If the connected device is not responding to AT+BVRA=0 or the device is responding with an error the voice session is also not established successfully.
HMI is responsible to communicate these scenarios to the customer with a meaningful error message.

4.12.2.5 BTC-FUR-REQ-275843/A-Phone Voice Service De-Activation

To end the phone voice session the In-Vehicle Infotainment System must wait for the connected device to end each voice session, unless the system is prompted to do so by user interaction. After the connected device has ended the voice session by sending BVRA=0 a defined delay shall be added before de-allocating the voice session source within the In-Vehicle Infotainment System.
This delay could be needed to eliminate or to minimize a possible gap between an ended voice session and the indication of an outgoing call or a started media stream. As soon as the connected device is indicating such - but latest after the defined delay - the voice session should be ended internally. When the system is prompted by user interaction to end the voice session no delay shall be added.
The value for the delay time for Siri devices shall be 1000ms and the time for all other devices (which are supported according BTP-FUR-REQ-191150 Phone Voice Service device handling) shall be 1000ms. Both values are subject to change following jury evaluation.

4.12.2.6 BTC-FUR-REQ-275842/A-Phone Voice Service Barge-In

In-Vehicle Infotainment System shall have the ability to 'Barge-In', in terms of HFP specifications, simply means sending, from IVIS to Phone, an AT command AT+BVRA=1 while the phone voice recognition session is already active.
In general that will cause the phone to stop current processing, play a short sound, and be ready for voice input from the user.

4.12.2.7 BTC-FUR-REQ-275844/A-Phone Voice Service media playback integration

As a result of accessing the Phone Voice Recognition via the In-Vehicle Infotainment System, the customer has the option of requesting that the connected device play a specific track, album, etc.
In that case the In-Vehicle Infotainment System shall play the media from the connected device via A2DP. The supplier shall be responsible for developing a solution to cover this scenario. The supplier shall be responsible for obtaining Ford Motor Company approval of the solution prior to implementation.
In general, such a solution shall monitor the status of the media player on the device for the 5 sec after the end of the Voice Recognition session. If the media player advertises a change of status and starts playing, the In-Vehicle Infotainment System shall assume that the user requested to play an item, and switch source to allow playback via the in-car speakers.

This requirement is only applicable when the same device is connected for Media and for Phone Voice Recognition functionality.
Identification of the connected device shall be done via the Bluetooth address.

4.12.2.8 BTP-FUR-REQ-041729/F-Apple Siri Eyes-Free (TcSE ROIN-295113-2)

This section shall only be applied to devices that are identified as an Apple iOS device and which supports SIRI (via Device ID/PNP profile and AT+XAPL custom command).

The In-Vehicle Infotainment System shall also support the Apple Siri Eye's free voice recognition activation HFP AT commands as described within section 6 of the Bluetooth Accessory Design Guidelines for Apple Products r7.

Upon each connection of a Siri Eyes Free supported device, the In-Vehicle Infotainment System shall enable the Siri Eyes-Free mode.

The In-Vehicle Infotainment System shall use the noise suppression algorithms associated with the In-Vehicle Infotainment's voice engine when Siri is active.
*Note: Echo Cancellation shall still be active.

The In-Vehicle Infotainment System shall have the ability to alert the user that Siri is supported, but not enabled by the connected device as described within section 6.2.1.1 of the Bluetooth Accessory Design Guidelines for Apple Products r7.

4.12.2.9 BTP-FUR-REQ-191151/A-Phone Voice Service Automotive Mode

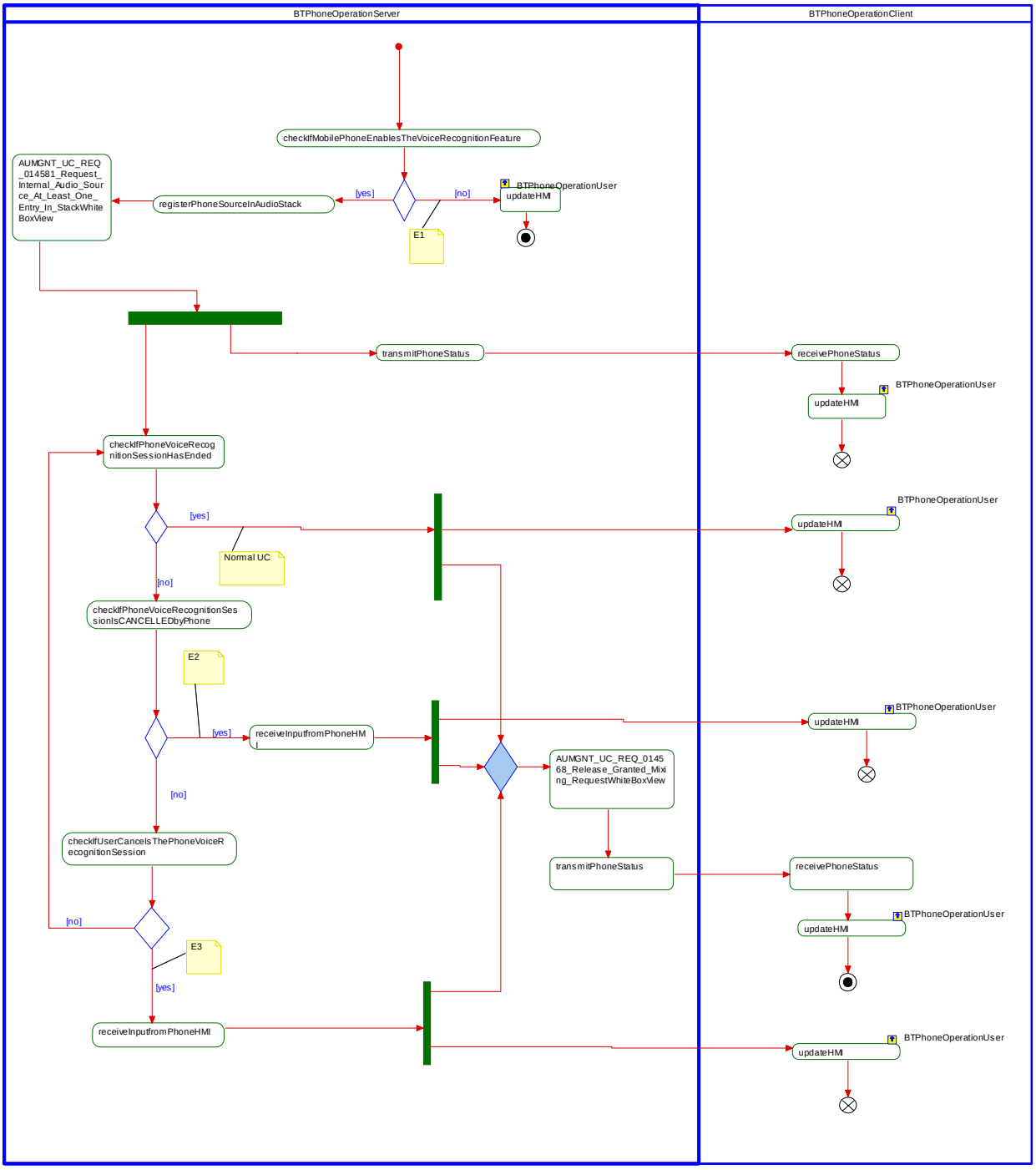
The In-Vehicle Infotainment System shall not allow the user to enable the phone's voice recognition feature unless the phone support a Voice Recognition mode designed for automotive usage that does not require to look at or touch the connected phone.

At the time of writing Apple/iOS devices (Siri Eyes-Free) and Android (Google Hands-Free Advanced) devices support such a mode.
In case the connected phone does not support an automotive specific mode, but still support voice recognition activation, then the In-Vehicle Infotainment System:

- Shall not allow the user to initiate or barge into a session from the car's commands.
- Shall allow the user to terminate the session from the car's commands.
- Shall communicate visually to the user that a session has started, and relay the audio for the session via the car speakers.

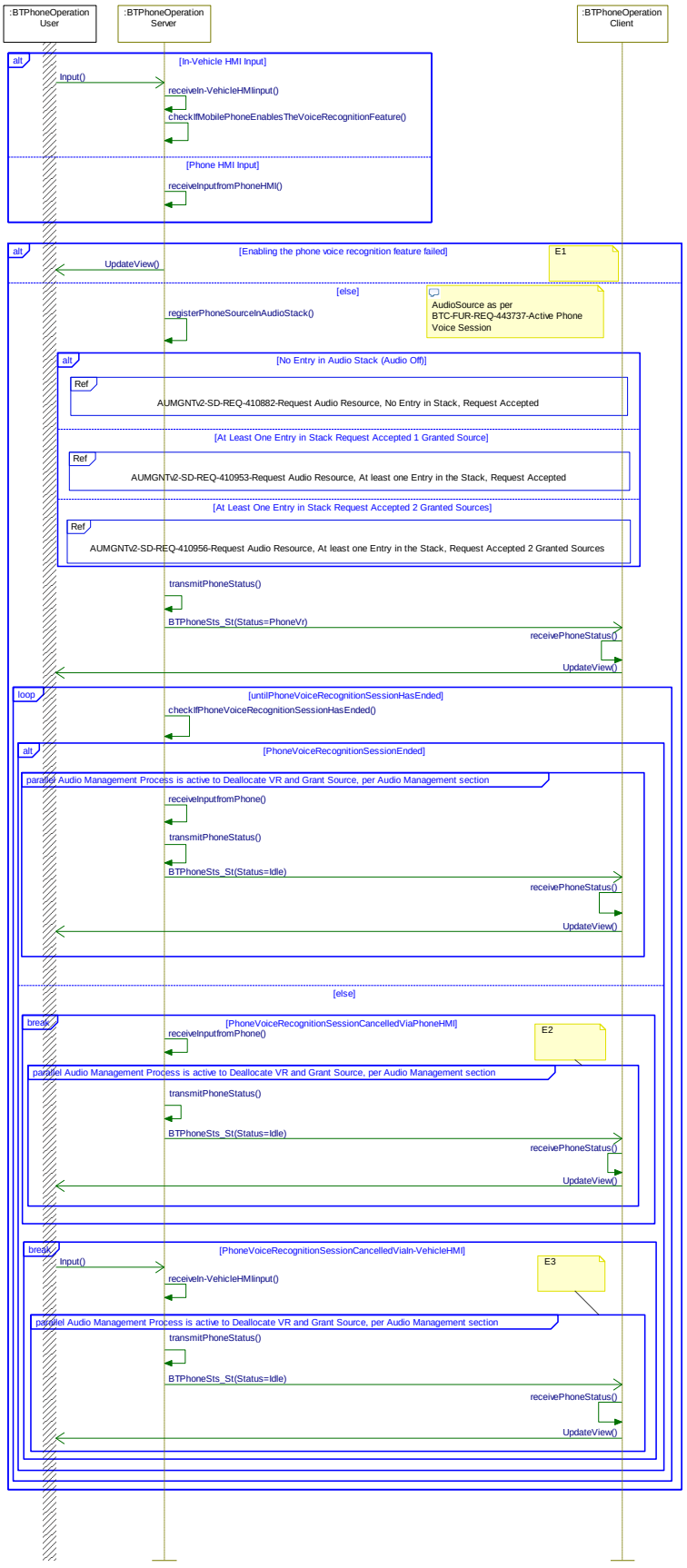
4.12.3 Activity Diagrams

4.12.3.1 ACT-REQ-439408/A-Activating the Phones Voice Recognition



4.12.4 Sequence Diagrams

4.12.4.1 SD-REQ-439409/A-Activating the Phones Voice Recognition


:BTPhoneOperation User
:BTPhoneOperation Server
:BTPhoneOperation Client
alt
[In-Vehicle HMI Input]
Input()
receiveIn-VehicleHMIinput()
checkIfMobilePhoneEnablesTheVoiceRecognitionFeature()
[Phone HMI Input]
receiveInputfromPhoneHMI()
alt
[Enabling the phone voice recognition feature failed]
E1
UpdateView()
[else]
AudioSource as per BTC-FUR-REQ-443737-Active Phone Voice Session
registerPhoneSourceInAudioStack()
alt
[No Entry in Audio Stack (Audio Off)]
Ref
AUMGNTv2-SD-REQ-410882-Request Audio Resource, No Entry in Stack, Request Accepted
[At Least One Entry in Stack Request Accepted 1 Granted Source]
Ref
AUMGNTv2-SD-REQ-410953-Request Audio Resource, At least one Entry in the Stack, Request Accepted
[At Least One Entry in Stack Request Accepted 2 Granted Sources]
Ref
AUMGNTv2-SD-REQ-410956-Request Audio Resource, At least one Entry in the Stack, Request Accepted 2 Granted Sources
transmitPhoneStatus()
BTPhoneSts_St(Status=PhoneVr)
receivePhoneStatus()
UpdateView()
loop
[untilPhoneVoiceRecognitionSessionHasEnded]
checkIfPhoneVoiceRecognitionSessionHasEnded()
alt
[PhoneVoiceRecognitionSessionEnded]
parallel Audio Management Process is active to Deallocate VR and Grant Source, per Audio Management section
receiveInputfromPhone()
transmitPhoneStatus()
BTPhoneSts_St(Status=Idle)
receivePhoneStatus()
UpdateView()
[else]
break
[PhoneVoiceRecognitionSessionCancelledViaPhoneHMI]
receiveInputfromPhone()
E2
parallel Audio Management Process is active to Deallocate VR and Grant Source, per Audio Management section
transmitPhoneStatus()
BTPhoneSts_St(Status=Idle)
receivePhoneStatus()
UpdateView()
break
[PhoneVoiceRecognitionSessionCancelledVialn-VehicleHMI]
Input()
receiveIn-VehicleHMIinput()
E3
parallel Audio Management Process is active to Deallocate VR and Grant Source, per Audio Management section
transmitPhoneStatus()
BTPhoneSts_St(Status=Idle)
receivePhoneStatus()
UpdateView()

4.13 BTC-FUN-REQ-192197/B-ECALL/ ERA-GLONASS

4.13.1 Use Cases

4.13.1.1 BTC-UC-REQ-192297/C-Transition to ECALL/ ERA-Glonass state

Linked Elements
BTC-FUR-REQ-192199/B-ECALL/ ERA-GLONASS Events
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone ECALL/ ERA-Glonass
Pre-conditions	A mobile phone is connected to the In-Vehicle Infotainment System. No call is present.
Scenario Description	ECALL/ ERA-Glonass event is triggered.
Post-conditions	The In-Vehicle Infotainment System shall close the Bluetooth connections with the connected devices and shall not allow reconnections. It then turns off the Bluetooth chip so that it stops transmitting and receiving data over the air. The process of turning Bluetooth off shall not require more than 3 sec, no matter the device behavior upon request for disconnection.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.13.1.2 BTC-UC-REQ-192200/C-Transition to ECALL/ ERA-Glonass state while on an active call

Linked Elements
BTC-FUR-REQ-192199/B-ECALL/ ERA-GLONASS Events
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone ECALL/ ERA-Glonass
Pre-conditions	A mobile phone is connected to the In-Vehicle Infotainment System. One or more active calls are present, in or out of privacy
Scenario Description	ECALL/ ERA-Glonass event is triggered.
Post-conditions	The In-Vehicle Infotainment System attempts to end all calls and then closes Bluetooth connections with the connected device and does not allow reconnections. It then turns off the Bluetooth chip so that it stops transmitting and receiving data over the air.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.13.1.3 BTC-UC-REQ-192201/C-Transition to ECALL/ ERA-Glonass state while listening to Bluetooth Audio

Linked Elements
BTC-FUR-REQ-192199/B-ECALL/ ERA-GLONASS Events
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone ECALL/ ERA-Glonass
Pre-conditions	A mobile phone is connected this or another mobile device is streaming Bluetooth audio to the In-Vehicle Infotainment System
Scenario Description	ECALL/ ERA-Glonass event is triggered.
Post-conditions	The In-Vehicle Infotainment System attempts to pause media playback on the phone and then closes Bluetooth connections with the connected device and does not allow reconnections. It then turns off the Bluetooth chip so that it stops transmitting and receiving data over the air. After this operation, the current media source shall switch to the default audio source The audio source then shall be muted until ECALL / ERA-Glonass event is completed
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.13.1.4 BTC-UC-REQ-192202/B-Transition out of ECALL/ ERA-Glonass state

Linked Elements
BTC-FUR-REQ-192199/B-ECALL/ ERA-GLONASS Events
BTP-FUR-REQ-192187/E-Turning Bluetooth off/on
BTP-FUR-REQ-439382/A-Turning Bluetooth off/on

Actors	Mobile Phone ECALL/ ERA-Glonass
Pre-conditions	In-Vehicle Infotainment System is in ERA-Glonass state
Scenario Description	ECALL / ERA-Glonass event is completed
Post-conditions	The In-Vehicle Infotainment System turns Bluetooth back on (provided it was on before the ECALL/ ERA-Glonass state was entered). After Bluetooth is back on, the sequence described in section BTP-FUR-REQ-033782-Connection Order and Requirements shall be followed. The current media source shall not change, but shall be unmuted. If the connected phone has an active call, please see BTP-UC-REQ-033804-Connecting to a previously paired phone via phone (Active Call)
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

4.13.2 Requirements

4.13.2.1 BTC-FUR-REQ-192199/B-ECALL/ ERA-GLONASS Events

Please refer to ECALL/ ERA-Glonass_APIM_SPSS for more details on this feature.

The Bluetooth component of the In-Vehicle Infotainment System shall monitor the messages from the ECALL/ ERA-Glonass interfaces. This shall allow the Bluetooth component to maintain a simple state machine that can respond to ECALL/ ERA-Glonass events.

The In-Vehicle Infotainment System shall consider the specified events per ECALL/ ERA GLONASS SPSS.

The ERA-Glonass ManualEmergencyCallMute status message 0x3 shall be ignored by the Bluetooth component - the event will only last a maximum of 10 sec after startup.

When receiving an ECALL/ ERA GLONASS event the In-Vehicle Infotainment System shall transition to the ECALL/ ERA-Glonass state, end all active call, and then turn Bluetooth OFF (see also BTP-FUR-REQ-192187/Turning Bluetooth off/on). Bluetooth shall be turned off in no more than 3 sec, which means that this should happen even if connected device does not acknowledge termination of the calls. If at the time this message is received more than one active call is present, all calls shall be terminated.
While the system is in this state, the user shall not be able to turn Bluetooth on. If Bluetooth is already off when this state is entered, no action is necessary.

Receiving the status that the event is completed shall cause the In-Vehicle Infotainment System to transition out of the ECALL/ ERA-Glonass state. If the System was NOT in the ECALL/ ERA-Glonass state, then no action is necessary.
If before entering the ECALL/ ERA-Glonass state Bluetooth had been turned off by the user, then also no action is necessary. Else, the In-Vehicle Infotainment System shall turn Bluetooth on (see also BTP-FUR-REQ-192187/Turning Bluetooth off/on). Upon turning Bluetooth ON, the connection sequence described in section BTP-FUR-REQ-033782/D-Connection Order and Requirements shall be followed.

The In-Vehicle Infotainment System on startup shall always assume not to be in the ECALL/ ERA-Glonass state.

4.14 BTP-FUN-REQ-041858/A-Phone Blower Motor Reduction Strategy (TcSE ROIN-303956-1)

4.14.1 Requirements

4.14.1.1 BTP-REQ-032098/A-Blower Motor Reduction Activation / Deactivation (TcSE ROIN-297103-1)

The intent of this specification is to outline the scenarios that the phone application will request to reduce the climate controlled blower motor with the goal of reducing cabin noise. There are multiple scenarios that could apply for this function, but at this time, the primary focus is cabin quietness during a phone call.

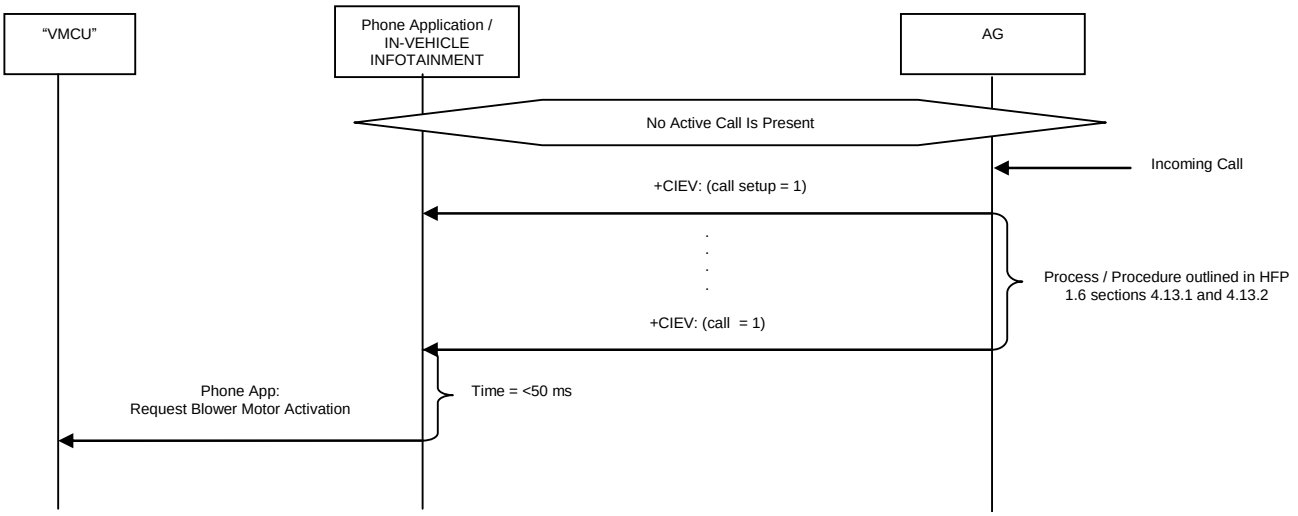
For purposes of determining when to request the Blower Motor Reduction Activation / Deactivation, the phone application shall determine the status of a call by monitoring the following:

- CIEV: Call Setup
- CIEV: Call
- Connection status of AG

Since all AG's must support CIEV indicators, these indicators have been chosen over CLCC indicators.

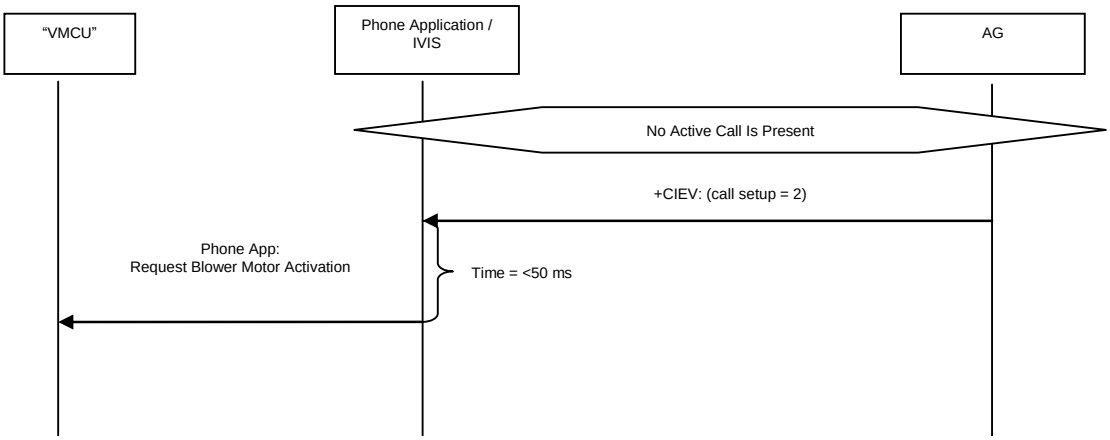
4.14.1.2 BTP-REQ-032099/A-Incoming Call (Setting Blower Motor Reduction Activation) (TcSE ROIN-297104-1)

In this scenario, the phone application shall request to reduce the blower motor after the phone call status has been updated to "call in progress". The request should not be made while the incoming phone call is alerting (or ringing).



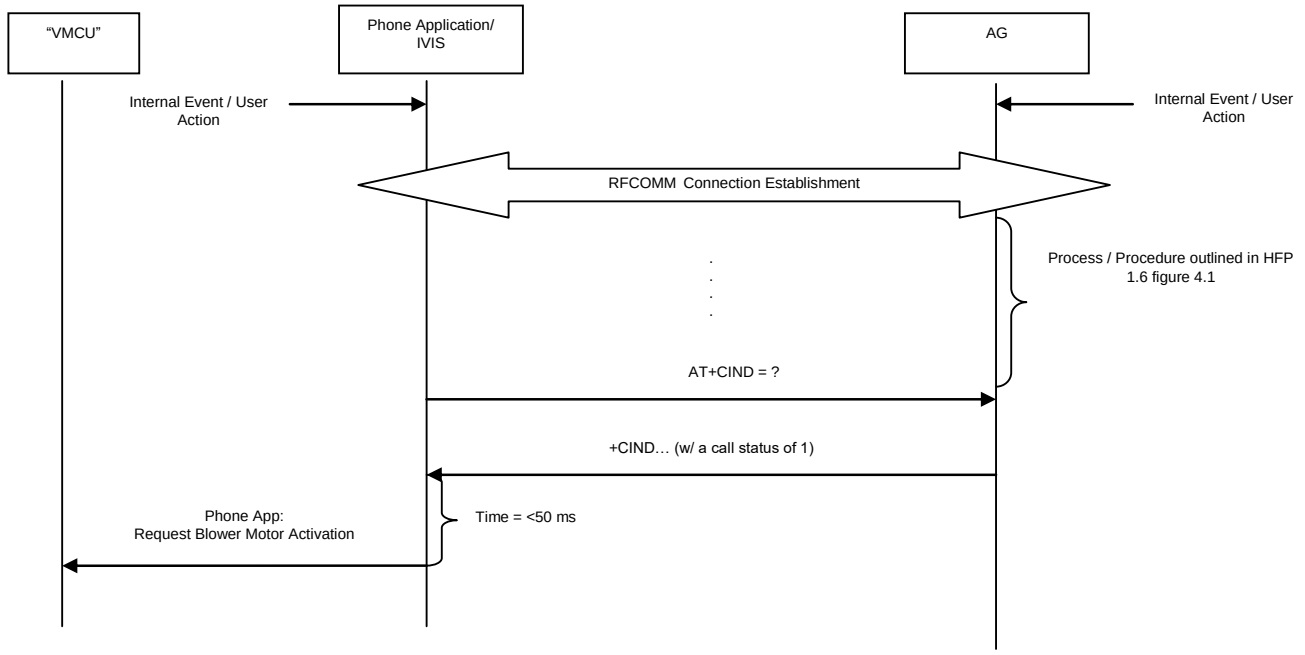
4.14.1.3 BTP-REQ-032100/A-Outgoing Call initiated from HF / AG (Setting Blower Motor Reduction Activation) (TcSE ROIN-297105-1)

In this scenario, the phone application shall request to reduce the blower motor after the phone call set up status has been updated to "outgoing call set up is ongoing".



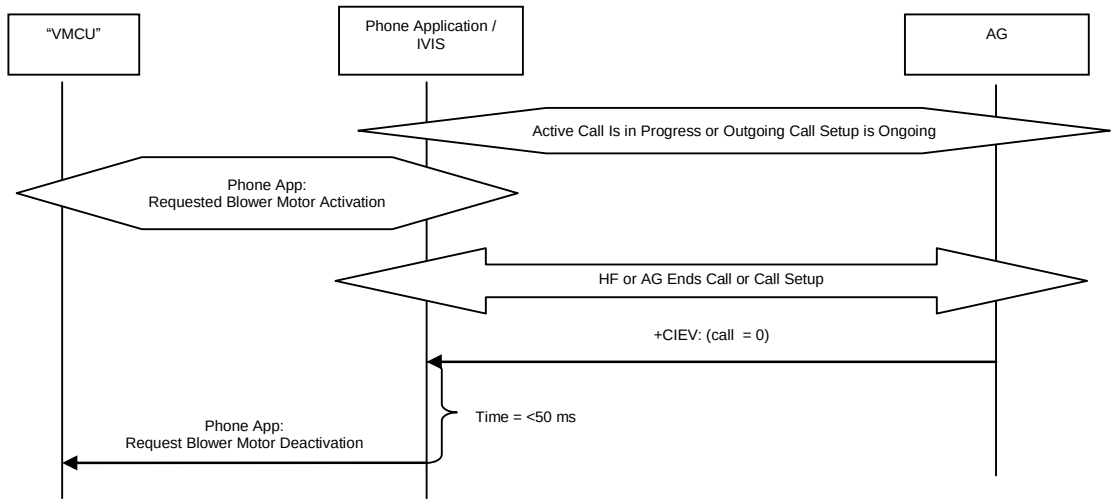
4.14.1.4 BTP-REQ-032101/A-Active Call at Time of Connection (Setting Blower Motor Reduction Activation) (TcSE ROIN-297106-1)

This scenario is meant to capture the use cases of an automatic AG connection upon resume as well as a manual connection request from the user. In this case, the phone application will follow the connection sequence outlined within the Handsfree Profile 1.5 specification. Upon notification of a "call in progress" via the AG's CIND response, the phone application shall request to reduce the blower motor.



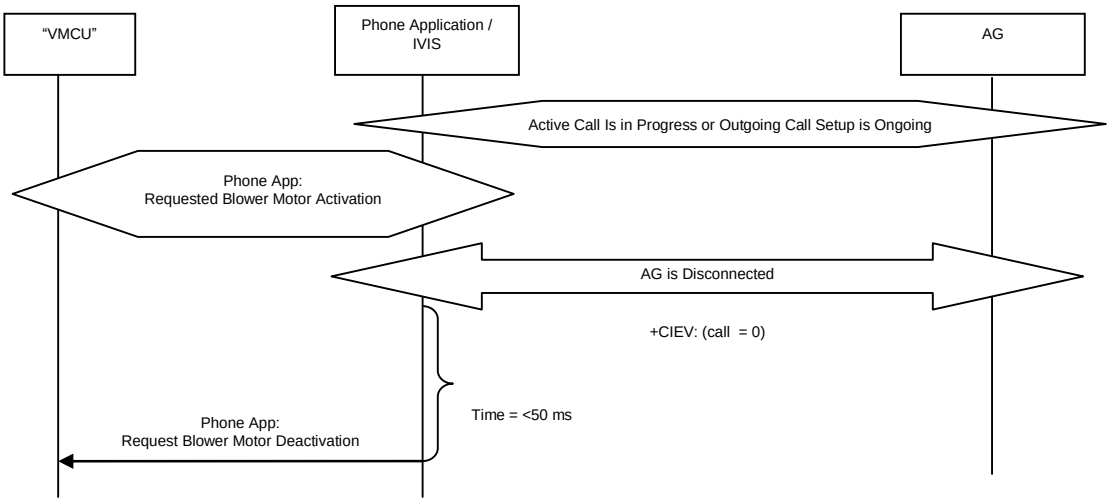
4.14.1.5 BTP-REQ-032102/A-End of a Call (Setting Blower Motor Reduction Deactivation) (TcSE ROIN-297107-1)

In this scenario, the phone application will request to deactivate the blower motor reduction due to conclusion of a phone call and/or outgoing call setup.



4.14.1.6 BTP-REQ-032103/A-AG Disconnect (Setting Blower Motor Reduction Deactivation) (TcSE ROIN-297108-1)

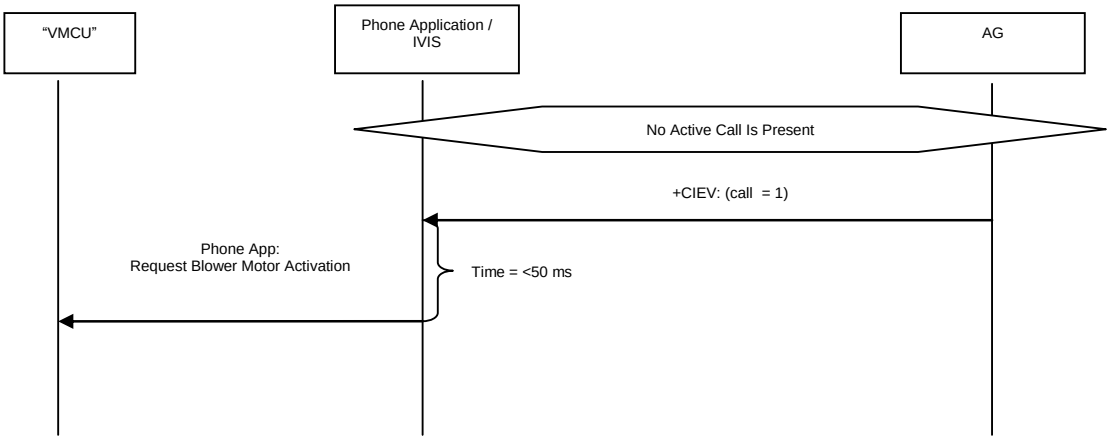
In this scenario the phone application will need to deactivate the blower motor reduction in the event of an intentional or random disconnect.



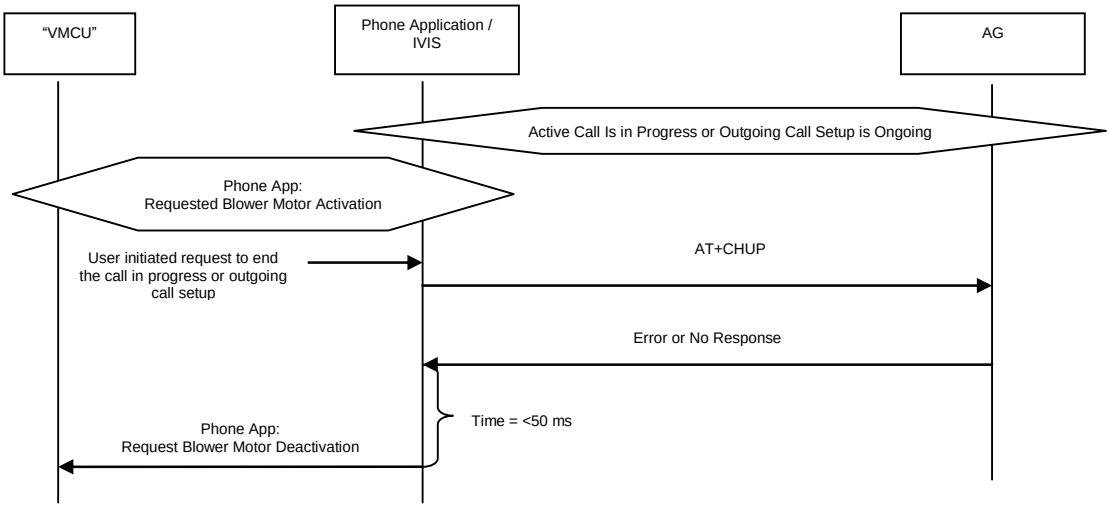
4.14.1.7 BTP-REQ-032104/A-Unspecified (per Handsfree Profile 1.5) Conditions Handling (TcSE ROIN-297109-1)

The phone application shall anticipate the following unspecified conditions and activate / deactivate the blower motor reduction.

1. An AG updates the phone application that an Ongoing Call is in process without any corresponding CIEV notifications. In this case, the phone application shall request to reduce the blower motor reduction. The phone application shall send this request within 50ms of receiving the ongoing call is in process notification.

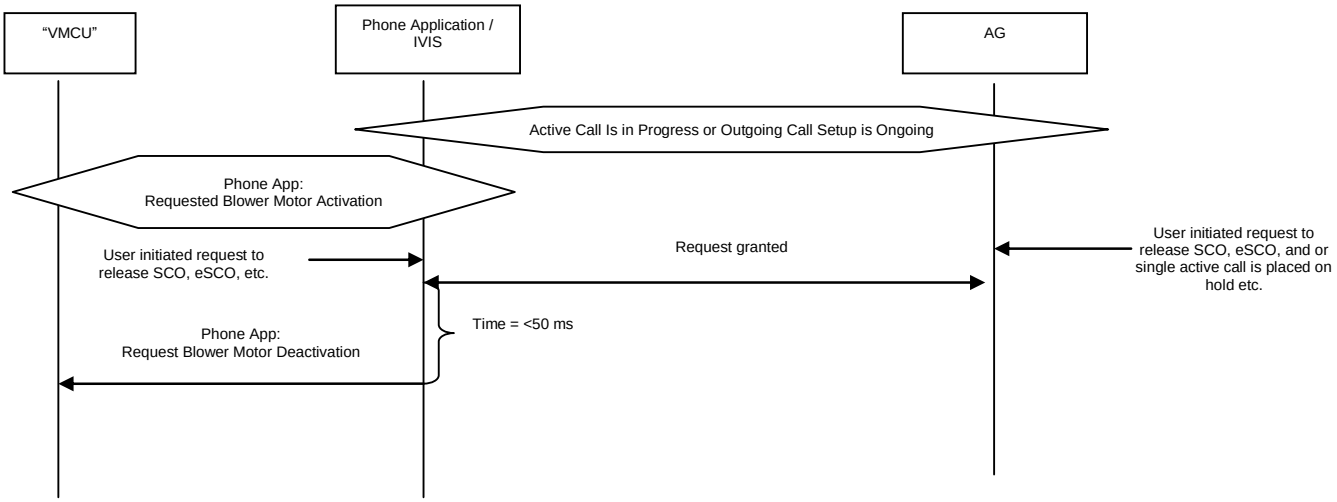


2. The user directs the phone application to end the ongoing call that is in process or the outgoing call setup, and phone application sends an AT+CHUP to the connected AG, but the AG fails to end the call. In this case, the phone application shall request to deactivate the blower motor reduction.



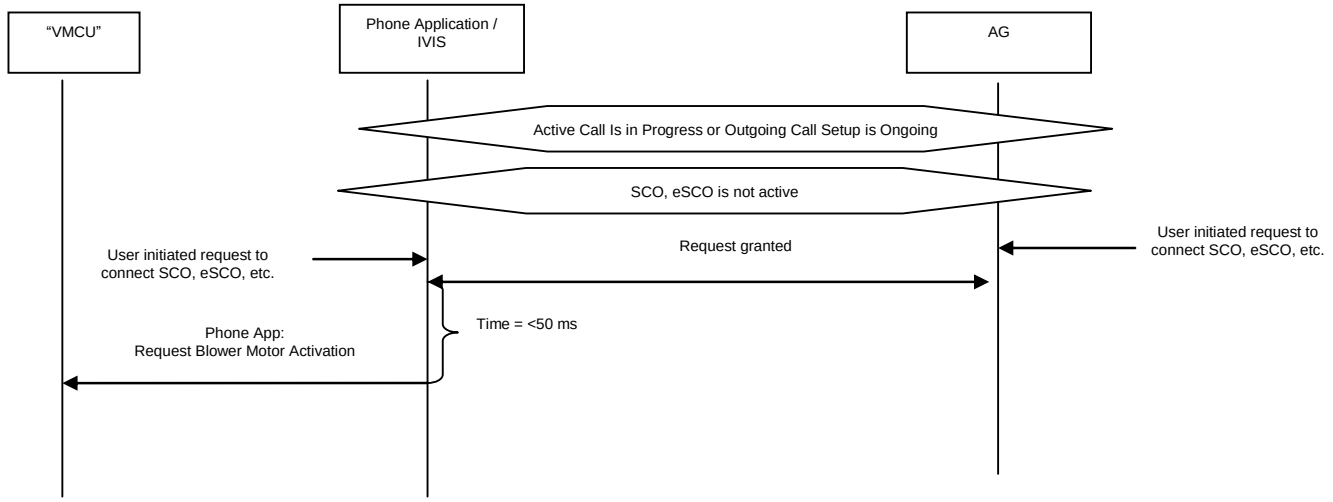
4.14.1.8 BTP-REQ-032105/A-Audio is placed into Privacy (i.e. SCO is Released) (TcSE ROIN-297110-1)

The phone application shall accommodate scenarios when an action has placed a call into privacy. In this scenario, the Blower Motor does not need to be reduced. (*Note: the phone application shall treat notifications of a single active call on hold from the connected AG in the manner as described within this section for purposes of activating / deactivating the blower motor.)



4.14.1.9 BTP-REQ-032106/A-Audio is placed into Handsfree from Privacy (i.e. SCO is Granted) (TcSE ROIN-297111-1)

The phone application shall accommodate scenarios when an action has placed a call into Handsfree from privacy. In this scenario, the Blower Motor does need to be reduced. (*Note: the phone application shall treat notifications of a single active retrieved from hold from the connected AG in the manner as described within this section for purposes of activating / deactivating the blower motor.)



4.14.1.10 BTP-REQ-032107/A-Additional Notes (TcSE ROIN-297112-1)

While in an active call, there are other scenarios in which the call set up value can change to "incoming call process ongoing" or "outgoing call set up is ongoing". They include an incoming call waiting notification and the initiation of a conference call respectively. These scenarios were purposely excluded from the scenarios above because the entry conditions for each of these scenarios include one of the processes outlined in prior sections.

4.15 BTP-FUN-REQ-047944/A-Hands-Free Audio Performance (TcSE ROIN-303968-1)

4.15.1 Requirements

4.15.1.1 BTP-REQ-047945/A-Hands-free Purpose (TcSE ROIN-297142-1)

Acoustic echo cancellation and noise suppression (AEC/NS) aims to cancel echo and noise during hands-free phone conversations. AEC/NS monitors speaker, microphone, and digitized audio coming from the far end phone to perform the necessary signal modifications.

4.15.1.2 BTP-REQ-047946/A-Hands-free Terminology and Abbreviations (TcSE ROIN-297143-1)

Term	Description
AEC	Acoustic echo cancellation
AES	Acoustic echo suppression
AGC	Automatic gain control
BT	Bluetooth
ERLE	Echo return loss enhancement
ITU-T	ITU Telecommunications Standardization Sector
SNR	Signal-To-Noise Ratio
SLR	Sender Loudness Rating
VAD	Voice Activity Detector
VDA	German Quality Management System (QMS) based on ISO 9001 (*Verband des Automobilindustrie*) specifically for the Automotive industry. This standard is broken into Management and Products/Processes. For the purposes of this document, VDA will refer to the testing process for AEC/NS.

4.15.1.3 BTP-REQ-047947/A-Hands-free Goals (TcSE ROIN-297144-1)

The goals of this feature is to meet audio performance for communication both at the far end and near end of a phone call made using the in-vehicle BT hands-free system.

4.15.1.4 BTP-REQ-047948/A-Hands-free Non-Goals (TcSE ROIN-297145-1)

This feature does not intend to define voice recognition AEC/NS or other in-vehicle audio inputs outside of the scope of the BT hands-free system.

4.15.1.5 BTP-REQ-047949/A-Hands-free Performance - ITU-T P.1100 and ITU-T P.1110 (TcSE ROIN-297146-1)

The hands-free audio performance shall meet the requirements defined in ITU-T P.1100 (version 03/2011)and the ITU-T P.1110 wideband hands-free communication (version 12/2009) Narrowband hands-free communication in motor vehicles test specification.

4.15.1.6 BTP-REQ-047950/A-Hands-free Performance - Best-in-Class/Competitive Performance (TcSE ROIN-304502-1)

The hands-free audio system implemented for Ford Motor Company shall perform on par or above the competitors of the vehicle programs and/or vehicle segments on which the system is installed.

4.15.1.7 BTP-REQ-047951/B-Hands-free Performance - Configuration and Tuning (TcSE ROIN-304503-1)

The hands-free audio system implemented for Ford Motor Company shall be able to adapt and/or be able to be dynamically tuned with a software enabled tool in the vehicle to meet the performance needs of several sizes of vehicle cabins as well as vehicle NVH differences.

The supplier shall provide a potentially tunable calibration file for each vehicle cabin. This file shall adhere to requirements included within the withint he Ford Diagnostics Part 1 and Part 2 specifications.

4.15.1.8 BTP-REQ-047952/A-Hands-free Performance - System Performance in Presence of Vehicle Genereated Cockpit Derived Sounds (TcSE ROIN-304500-1)

The hands-free audio system shall have the ability to detect and peform with quality in the presence of vehicle generated cockpit generated sounds (e.g. rear collision warning, navigation prompts, increase / decrease phone call volume via in-vehicle infotainment system, etc.)

4.15.1.9 BTP-REQ-047953/B-Hands-free Performance - General System Requirement (TcSE ROIN-304501-1)

~~The supplier shall be responsible for identifitying the flat equalization, maximum audio delay, and all other parameters to each audio control module.~~

The supplier shall be responsible for tuning the parameters of the phone audio quality in correspondence with the AHU functionality and requirements.

4.15.1.10 BTP-REQ-047954/A-Hands-free Testing Requirements - ITU-T P.1100 and ITU-T p.1110 (TcSE ROIN-297148-1)

The handsfree audio performance shall adhere to the requirements included in section 11 of ITU-T P.1100 and section 11 of ITU-T P.1110.

4.15.1.11 BTP-REQ-047955/B-Hands-free Testing Requirements - Far End Audio Quality Testing - CETP-L-4065 Hands Free Phone System Performance Test Procedure (TcSE ROIN-304504-1)

The hands-free audio performance (including its AEC/NS algorithm, parameters, and signal chain) shall be tested using the ITU-T P.1100 Narrowband hands-free communication and the ITU-T P.1110 wideband hands-free communication in motor vehicles test specification., particularly using the CETP-L-4065 Hands Free Phone System Performance Test Procedure CETP released by Ford Motor Company.

The handsfree audio performance shall meet the following requirements for the N20 test condition:

1. NMOS Score 3.1 or higher
2. SMOS 2.6 or higher

4.15.1.12 BTP-REQ-047956/A-Hands-free Testing Requirements - Subjective Listening Testing (Average) (TcSE ROIN-304505-1)

The hands-free audio system shall be subject to a Ford Motor Company subjective listening test by the implementation leads at the supplier as well as the Ford Motor Company project leads. Each partipant within this test shall rate the audio performance from a score of 1 (Low Performance) to 10 (High Performance). The pass / fail criteria for the subjective listening test shall be based on the average score. The minimum average score is 8.

The rating should adhere to the following scale:

Vehicle and Attribute Customer Rating System								90% Customer Satisfaction Imperative		
VER	1	2	3	4	5	6	7	8	9	10
Evaluation of Attribute Performance	Not Acceptable		Poor		Borderline	Acceptable	Fair	Good	Very Good	Excellent
Customer Satisfaction	Very Dissatisfied			Somewhat Dissatisfied		Fairly Well Satisfied		Very Satisfied	Completely Satisfied	
Improvement desired by	All Customers		Average Customer			Critical Customer		Trained Observer		Not Perceptible

4.15.1.13 BTP-REQ-047957/B-Hands-free Testing Tools (TcSE ROIN-304506-1)

The supplier shall provide a CAB with the means of recording audio at the following points within the platform:

~~1. Microphone Input (pre-processed audio)~~
~~2. Input to the NREC~~
~~3. Output of the NREC~~
~~4. Input to the Bluetooth Codec~~
~~5. Output of the Bluetooth Codec~~
1. Raw Microphone Inputs
2. Processed Microphone Output to BT Phone
1. Raw Receive Input from BT Phone
2. Processed Receive Output to AHU\Loudspeaker

This tool shall store these files in .wav format on a USB based storage device. This tool shall begin recording to a USB based storage device when a phone call is active. The tool shall stop recording once the phone call is completed.
This tool shall store on the USB stick the configuration file and the tunable parameters of the phone audio quality library used in that specific vehicle

This tool shall also have the ability to ~~and~~ provide and log to a file the following system characteristics:

~~1. Signal – Noise – Ratio (SNR)~~
~~2. Automatic Gain Control (AGC)~~
~~3. Any and all internal audio parameters that are dynamic~~
1. The SYNC shall have the capabilities to log any logging information provided by the QNX library about the system parameters performance

This tool shall be enabled by installing the CAB via a USB based storage device.

4.16 BTP-FUN-REQ-047958/B-Bluetooth Diagnostics Strategies and Procedures (TcSE ROIN-304518-1)

*Note: The ability to enable / disable the Bluetooth Diagnostics Strategies and Procedures shall be configurable.

4.16.1 HCI Logging

4.16.1.1 BTP-REQ-047927/C-HCI Logging (TcSE ROIN-297122-1)

The In-Vehicle Infotainment System shall provide the ability to write a .CFA file to a USB Flash drive. This .CFA file shall include all HCI traffic from the Bluetooth IC. The supplier shall provide a first installation file to enable Logging and a second installation file to disable this mode within the In-Vehicle Infotainment System. The installation file to enable the feature will also copy all HCI traffic already logged to the USB Flash Drive, once logging is enabled. Logging shall persist, even through power state changes, until it is disabled by the second installation file. The installation file to disable the feature will stop any current logging activity and also delete all HCI traffic already logged. A master reset shall disable the Logging and delete all HCI traffic already logged as well.

4.16.1.2 BTP-REQ-047928/B-Logging HCI Data upon Connection/Initialization (TcSE ROIN-297123-1)

Upon IVIS ON (Resume) the In-Vehicle Infotainment System, when HCI logging is enabled, shall begin logging Bluetooth communication or attempts of communication to any Bluetooth enable device.

4.16.1.3 BTP-REQ-047929/B-Logging the HCI Data after Connection to Phone (TcSE ROIN-297124-1)

Upon the IVIS successfully connecting to a phone in the pairing listing, when HCI logging is enabled, the IVIS shall begin creating a folder labeled with the appropriate Paired/Connected phone and begin logging communication traffic.

4.16.1.4 BTP-REQ-047930/A-HCI Logging Parameters (TcSE ROIN-297126-1)

Within the HCI logging, the In-Vehicle Infotainment System shall request the following parameters:

- Phone Name (TBD)
- Phone Manufacturer
- HCI Content
- ETC

4.16.1.5 BTP-REQ-047931/B-HCI Logging Requirements (TcSE ROIN-297127-1)

The In-Vehicle Infotainment System, when HCI logging is enabled, shall log HCI data into a type of storage device (memory, disc space, etc) in order to extract or send data to any type of serial port communications from IVIS (reference the HCI Serial Port Initialization section).

Logging the following information within a storage device shall have an organized format:

- IVIS Information
- Phone Information
- Date / Time of the Logging
- .cfa file

4.16.1.6 BTP-REQ-047932/A-HCI Logging Failed (TcSE ROIN-297128-1)

In the event the HCI fails to log (including error or abort) to the request to provide the HCI logging after 20 seconds, the in-vehicle infotainment system shall attempt to request HCI logging again. After 20 seconds, if the second attempt fails, the in-vehicle infotainment system shall have the ability to display a message on the GUI that it was not able to log HCI data.

4.16.1.7 BTP-REQ-047933/B-Writing HCI Data upon Suspend (TcSE ROIN-297130-2)

Upon IVIS OFF (Suspend) the In-Vehicle Infotainment System shall begin writing Bluetooth communication from storage device to serial port, if HCI logging is enabled.

Writing the following information within a serial port referenced in the HCI Writing Parameters section:

The IVIS shall flash the screen to tell that the data was written to serial port.

4.16.1.8 BTP-REQ-047934/B-HCI Writing upon Trigger Sequence (TcSE ROIN-297131-2)

The in-vehicle infotainment system shall write HCI data into any type of serial port communications from IVIS logging storage device upon a specified trigger command (steering wheel controls/combination of button presses/etc).

Writing the following information within a serial port referenced in HCI Writing Parameters section:

The IVIS shall flash the screen to tell that the data was written to serial port.

4.16.1.9 BTP-REQ-047935/B-HCI Writing upon Disconnection of Phone (TcSE ROIN-297132-2)

The In-Vehicle Infotainment System shall, if HCI logging is enabled, write HCI data into any type of serial port communications from IVIS logging storage device upon a Phone disconnection.

Writing the following information within a serial port referenced in HCI Writing Parameters section:
The IVIS shall flash the screen to tell that the data was written to serial port.

4.16.1.10 BTP-REQ-047936/A-HCI Writing Parameters (TcSE ROIN-297133-1)

Within the HCI writing, the In-Vehicle Infotainment System shall write the following folder structure:

- IVIS Information
    - Phone Name
        - HCI Logging Number
            - HCI Date/Time
                - HCI Content

4.16.1.11 BTP-REQ-047937/A-HCI Writing Requirements (TcSE ROIN-297134-2)

The in-vehicle infotainment system shall write HCI data into any type of serial port communications from IVIS logging storage device.

Writing the following information within a serial port shall have an organized format:

- IVIS Information (TBD)
- Phone Information
- Date / Time of the Logging

When writing, the in-vehicle infotainment system shall present a reference number for each writing session beginning with number 1. Depending on the maximum capacity we allow to be written to storage device, we will then begin to write data to a serial port connection. This will assist in identifying the order in which logging is written to this port. The writing shall be written in chronological order, with the most recent log presented first, thus having a reference number of 1 in the appropriate folder structure.

4.16.1.12 BTP-REQ-047938/A-HCI Writing Failed (TcSE ROIN-297136-2)

In the event the HCI fails to write (including error or abort) to the request to provide the HCI write function after 30 seconds, the in-vehicle infotainment system shall attempt to request HCI writing again.

4.16.1.13 BTC-REQ-267625/A-Real time HCI data

The Bluetooth component of the IVIS shall be able to receive HCI data from the Bluetooth stack, in real time, as it is sent and received, either via a function callback or a message queue.
The Bluetooth component of the IVIS shall be able to start/stop the HCI data being sent.

4.16.2 Event Logging

4.16.2.1 BTP-FUR-REQ-047959/A-Event Logging Initialization - Event Logging (TcSE ROIN-304520-1)

Event logging is defined as gathering key characteristics of the IVIS phone application.
The data will be used to gather analytics regarding the IVIS and the associated device connected to it.
The data will also be used to investigate and troubleshoot potential error states in the IVIS.

4.16.2.2 BTP-FUR-REQ-047960/A-Event Logging Initialization - Logging Event Data upon Connection/Initialization (TcSE ROIN-304521-1)

Upon In-Vehicle Infotainment System ON (Resume), the IVIS shall begin creating a folder labeled with IVIS Current Software. The system will begin to log Events in the Phone Domain that relate to “Success” and “Failure” responses from phone, Bluetooth and system.

4.16.2.3 BTP-FUR-REQ-047961/A-Event Logging Initialization - Logging the Event Data after Connection to Phone (TcSE ROIN-304522-1)

Upon the IVIS ON (Resume), the IVIS shall begin creating a Device folder labeled within the appropriate Paired/Connected phone and begin logging events triggered by the phone application within IVIS.

*Note: If there isn’t a Phone Paired/Connected, IVIS will create a temporary folder with generic label until able to determine which label to be inserted/changed.

4.16.2.4 BTP-FUR-REQ-047962/A-Event Logging Initialization - Event Logging Parameters (TcSE ROIN-304523-1)

Within the Event logging, the In-Vehicle Infotainment System shall request the following parameters:

Device ID Information:
- Phone Name

- Phone Manufacturer
- Phone Carrier
- Phone Software Version
- Bluetooth Profiles Supported
- Bluetooth Address
- Primary/Non-Primary Status
- Number of Phonebook Contacts
- PBAP Access
- MAP Access
- ETC (Can add field)

4.16.2.5 BTP-REQ-047963/B-Event Logging Initialization - Event Category (TcSE ROIN-304524-1)

Within the Event logging, the In-Vehicle Infotainment System shall define an Event Category using the features below with criteria of “Success” or “Failure”:

		Pass Criteria	Fail Criteria
Connection	Pairing	Pairing was successful as defined in HMI specification.	Anytime pairing was not successful as defined in HMI specification.
	HFP Connection	When the post conditions are met for the use cases within BTP-FUN-REQ-033790/B-Connecting a Paired Phone	When any of the conditions are met within: BTP-FUR-REQ-047508-Advanced Error Correction
	A2DP Connection	When the post conditions are met for the use cases within BTP-FUN-REQ-033813/B-Connecting a Paired Audio Device	The In-Vehicle Infotainment System has received some Bluetooth communication from the source, but receives a negative response from the Open (via AVDTP) request or does not receive a response to the Open Stream request within 10 seconds.
	AVRCP and AVRCP browsing connection	The in-vehicle infotainment system has received a negative response to a connection attempt of AVRCP or AVRCP browsing.	The in-vehicle infotainment system has received a negative response to a connection attempt of AVRCP or AVRCP browsing.
	MAP Connection	Gathering of message listing succeeds. Notification connection is opened from the phone	Any of the conditions are met within: 1) BTP-FUR-REQ-041783-Message Access Not Granted 2) BTP-FUR-REQ-041784-Message Notification Not Established 3) BTP-FUR-REQ-041785-Message Download Failed
	MAP sending a message	Message sending succeeded	Any condition presented in BTP-FUR-REQ-041786-Sending Message Failed

	Connecting Upon Resume	When the post conditions are met for the use cases within BTP-FUN-REQ-033790/B-Connecting a Paired Phone	After the third unsuccessful auto connection attempt within section BTP-FUR-REQ-033809-Automatic Connection. Only one unsuccessful event shall be recorded per detection.
	Disconnecting	Number of graceful disconnects	When any of the conditions are met within: BTP-UC-REQ-041705 – In-Vehicle Infotainment System not able to maintain a connection to mobile phone
Calling	Outgoing Call	Successful outgoing call	When any of the conditions are met within: BTP-FUR-REQ-033866-Outgoing Call Failures
	Incoming Call	Successful incoming call	When any of the conditions are met within: BTP-FUR-REQ-041843-Incoming Call Answer Failure
	Call Audio (SCO / eSCO)	N/A	When any of the conditions are met within: BTP-FUR-REQ-041842-Active Call Audio Error Detection
Phonebook / Call List	Phonebook Download	Upon phonebook download complete	When any of the conditions are met within: BTP-FUR-REQ-033850-Phonebook/Call History Download Errors and Status Definitions
Phone VR	BVRA/Siri	BVRA/Siri Session is established successfully	See requirement BTP-FUR-REQ-041728-Phone Voice Recognition Activation And following for failure conditions

4.16.2.6 BTP-REQ-047964/A-Event Logging Initialization - Event Logging Requirements (TcSE ROIN-304525-1)

The in-vehicle infotainment system shall log Event data into a type of storage device (memory, disc space, etc) in order to extract or send data to any type of serial port communications from IVIS (reference Data Acquisition Log (DAlog) Serial Port Initialization requirements).

Each Event Category will have a counter for the overall IVIS and each device paired and previously paired to IVIS. It will keep track of how many success and fail occurrences. This number is to be written to the appropriate Event Logging File with the appropriate category aligned with the event (segregated by device as well as an overall sum) in order to be accessed/extracted. This data will be stored and available upon request.

4.16.2.7 BTP-REQ-047965/A-Event Logging Initialization - Event Category Success (TcSE ROIN-304526-1)

Event Category Success is defined as an Event Category with a “Success” Event. The Success counter is incremented in the file with the Event logging data and the category that aligns with the success.

4.16.2.8 BTP-REQ-047966/A-Event Logging Initialization - Event Category Failure (TcSE ROIN-304527-1)

Event Category Failure is defined as an Event Category with a “Failure” Event. The Failure counter is incremented in the file with the Event logging data and the category that aligns with the failure. There shall also be a Screenshot of the current screen associated with the Event Category Failure.

4.16.2.9 BTP-REQ-047967/A-Event Logging Initialization - Event Category Failure Screenshot (TcSE ROIN-304528-1)

Event Category Failure Screenshot is defined as a screenshot of the IVIS at the time of an Event Category Failure. The Event Category Failure Screenshot should reference the data and the category of the triggered failure. This screenshot will be stored and available upon request and can’t exceed 10KB in size.

4.16.2.10 BTP-REQ-047968/A-Event Logging Initialization - Event Logging File (TcSE ROIN-304529-1)

The IVIS will create an Event Logging File with the extension .txt. This Event Logging File is compiled of the Event Category (referenced in BTP-GREQ-304524) with associated Event data (referenced in BTP-GREQ-304526 and BTP-GREQ-304527).

4.16.2.11 BTP-REQ-047969/A-Event Logging Initialization - Event Logging Failure (TcSE ROIN-304530-1)

If Event fails to log (including error or abort), the in-vehicle infotainment system shall log and create a separate folder than Phone SPSS. In the background, Event logging will continue to attempt to log events if possible.

4.16.2.12 BTP-FUR-REQ-047970/B-HCI Logging Initialization - Logging HCI Data upon Connection/Initialization (TcSE ROIN-304531-1)

Upon the IVIS successfully connecting to a phone in the pairing listing, the IVIS shall begin writing HCI data to memory of the associated Paired/Connected phone and begin logging communication traffic.

4.16.2.13 BTP-FUR-REQ-047971/B-HCI Logging Initialization - Logging the HCI Data after Connection to Phone (TcSE ROIN-304532-1)

Upon the IVIS successfully connecting to a phone in the pairing listing, the IVIS shall begin writing HCI data to memory of the associated Paired/Connected phone and begin logging communication traffic.

4.16.2.14 BTP-FUR-REQ-047972/B-HCI Logging Initialization - HCI Logging Buffer Mechanism (TcSE ROIN-304533-1)

HCI logging will continue to write HCI logs up to 100KB size in memory (configurable). As the data reaches its capacity, the data previously written is deleted in order to continuously write real-time data. The size of the buffer will be 100KB (configurable).

4.16.2.15 BTP-FUR-REQ-047973/A-HCI Logging Initialization - HCI Logging Requirements (TcSE ROIN-304534-1)

The in-vehicle infotainment system shall log HCI data into a type of storage device (memory, disc space, etc) in order to extract or send data to any type of serial port communications from IVIS (reference Data Acquisition Log (DAlog) Serial Port Initialization requirements).

4.16.2.16 BTP-REQ-047974/A-HCI Logging Initialization - HCI Logging File (TcSE ROIN-304535-1)

Within the HCI logging, the In-Vehicle Infotainment System shall request the following parameters to name the file appropriately:

- Phone Name
- Bluetooth Address
- Starting Time/Date Stamp

Bluetooth_Address_ Phone_Name_Starting_Time_Date_Stamp.cfa

4.16.2.17 BTP-REQ-047975/A-HCI Logging Initialization - Event Category Failure Trigger for HCI Writing (TcSE ROIN-304536-1)

Upon an Event Category Failure, this will trigger the IVIS to stop the buffer deletion (referenced in BTP-GREQ-304533). The Event Category Failure trigger will then increase the file size allotted to capture HCI data in order to capture all the communications traffic preceding the Event Category Failure and after (up to a maximum amount of 150KB).

4.16.2.18 BTP-REQ-047976/A-HCI Logging Initialization - HCI Logging Failure (TcSE ROIN-304537-1)

If HCI fails to log, (including error or abort), the in-vehicle infotainment system shall log and create a separate folder than Phone SPSS. In the background, HCI logging system will continue to attempt to log HCI if possible.

4.16.2.19 BTP-REQ-047977/A-DTM (Diagnostic Troubleshooting Message) Logging Initialization - DTM Logging (TcSE ROIN-304538-1)

Diagnostic Troubleshooting Message is defined as a message that is logged into storage device (memory, etc) in IVIS (reference Data Acquisition Log (DAlog) Serial Port Initialization requirements), created upon the following triggers:

- Event Category Failure
  - Covered in Phone SPSS and Phone HMI Specification (reference BTP-GREQ-304527)
  - Event Logging Failure
  - HCI Logging Failure

4.16.2.20 BTP-REQ-047978/A-DTM (Diagnostic Troubleshooting Message) Logging Initialization - DTM Logging File (TcSE ROIN-304539-1)

The DTM logging file is compiled with the following:

- Error Type: Event Category Failure
- Event Trigger: Event that triggered or preceded the Failure.
- Occurrence: Number of occurrences of same error type.
- Timestamp: Date/Time
- Event Screenshot: Event Category Failure Screenshot
- Error Description: Reason for error if it is provided by the implementation according to Phone SPSS and Phone HMI specification. (For Example: Mobile Phone rejected PBAP request).

The DTM logging file should be named:

DTM_Error Type_Time_Date_Stamp.txt

4.16.2.21 BTP-REQ-047979/A-DTM (Diagnostic Troubleshooting Message) Logging Initialization - DTM Logging Buffer Mechanism (TcSE ROIN-304540-1)

DTM logging will continue to write DTM log Files up to 800KB size in memory. As the data reaches its capacity, the previously written DTM's are deleted (from oldest time/date stamp first to newest time/date stamp last) in order to continuously write new DTM's. The size of the buffer will be 800KB.

4.16.2.22 BTP-REQ-047980/A-Data Acquisitoin Log (DAlog) Serial Port Initialization - DAlog (TcSE ROIN-304541-1)

A DALog is a file comprised of the data described in the following sections:

- Event Logging Initialization
- HCI Logging Initialization
- DTM Logging Initialization

This log can be extracted from the IVIS based on the requirements within section DAlog Writing.

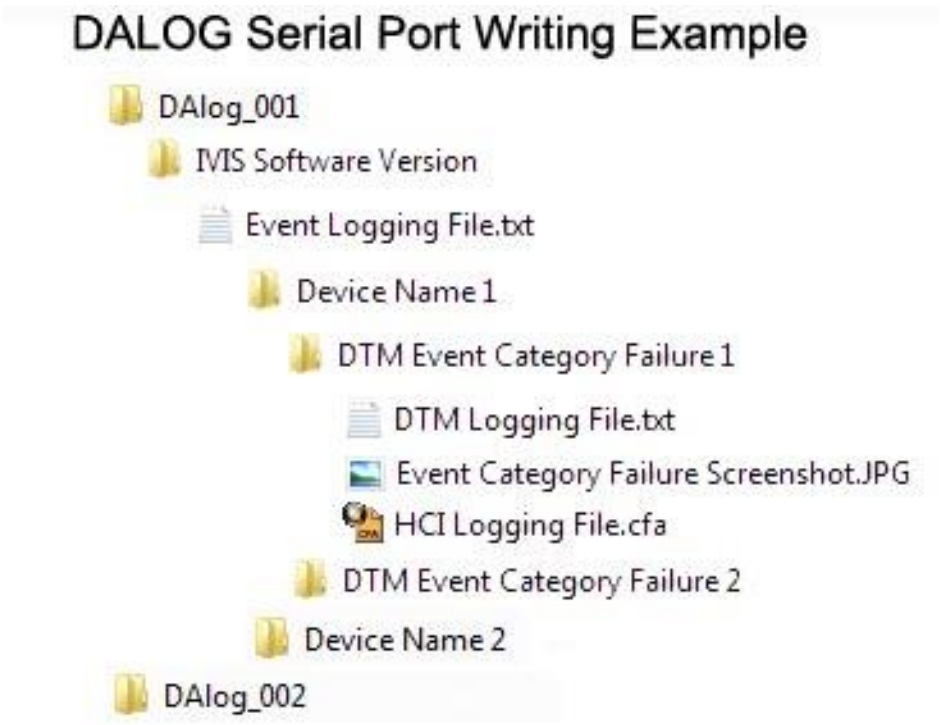
4.16.2.23 BTP-REQ-047981/A-Data Acquisitoin Log (DAlog) Serial Port Initialization - DAlog Writing - Writing DAlog Data (TcSE ROIN-304542-1)

The supplier shall provide a CAB to enable writing to a Universal Serial Bus (USB) storage device connected to the In-Vehicle Infotainment System upon insertion. The IVIS shall display a message (or flash screen) to tell that the data was written to USB.

The supplier shall provide a separate CAB to enable writing to a Universal Serial Bus (USB) storage device connected to the In-Vehicle Infotainment System upon IVIS OFF (Suspend).

4.16.2.24 BTP-REQ-047982/A-Data Acquisitoin Log (DAlog) Serial Port Initialization - DAlog Writing - DAlog Writing Requirements (TcSE ROIN-304543-1)

The In-Vehicle Infotainment System shall write the following folder structure:



4.16.2.25 BTP-REQ-047983/A-Data Acquisitoin Log (DAlog) Serial Port Initialization - DAlog Writing - DAlog Writing Requirements 2 (TcSE ROIN-304544-1)

Each DAlog saved to USB shall have a unique naming convention per USB storage device. The IVIS shall name the first DAlog 001, the second DAlog 002, the third DAlog003, etc.

4.16.3 Text Logging

4.16.3.1 BTP-FUR-REQ-114652/B-Bluetooth Text Logging and details

The In-Vehicle Infotainment System shall create text files that log the Bluetooth activity in the system.
The level of detail provided in the logs shall be by default such to allow the troubleshooting of Bluetooth issues without requiring extra text logs to be enabled and gathered.
Every line in the log shall contain a timestamp.
The text log files shall periodically flush old information and replace it with newer information, in order to avoid filling the In-Vehicle Infotainment System memory.
It shall be possible to retrieve the text log files from the system via a USB stick.

The text log shall at least contain the following information about the Bluetooth activity:

What	Example	Description
Connection/Disconnection of a profile	HFP connected with Device 70d4f2f08472 PBAP disconnected with Device 70d4f2f08472	Logging of connections and disconnections for each profile with each device.
HFP AT commands	HFP RX: “+BRSF:487” HFP TX: “AT+CHLD=?”	Hands Free Profile AT commands sent and received by the IVIS.
PBAP objects	telecom/pb.vcf download started from Device 70d4f2f08472 telecom/pb.vcf download ended from Device 70d4f2f08472 – 132 vCards were found <And similar lines for all other PBAP transactions>	List what phonebook is being downloaded, and how many vCards were found in it.
AVRCP commands and events	Sent AVRCP command 0x44 to device 70d4f2f08472 AVRCP command 0x44 response from device 70d4f2f08472 : Result = ACCEPTED Registered for EVENT_TRACK_CHANGED with device 70d4f2f08472 EVENT_PLAYER_APPLICATION_SETTING_CHANGED triggered from device 70d4f2f08472. New values are XXXX / YYYY	AVRCP commands sent to devices, command results. AVRCP events subscribed to, event notifications.
A2DP Data & status	A2DP is in streaming state A2DP data started coming in A2DP data stopped A2DP is not in streaming state	Status of A2DP link (streaming or not) and whether A2DP data is being sent from A2DP Source to Sink. The data stopped message should be printed only after the data started message, when data stops arriving for a certain amount of msec (500)
MAP objects	x-BT/MAP-msg-Listing from Device 70d4f2f08472 downloaded successfully – XX messages found MAP-EVENT-REPORT – New Message from Device 70d4f2f08472 <And similar lines for all other MAP transactions>	
SCO connections	SCO Turned ON with Device 70d4f2f08472 SCO Turned OFF with Device 70d4f2f08472	Status of SCO connections –

		creation and deletion of SCO connections

4.17 BTC-FUN-REQ-446428/A-Connection Manager

Basic function of the connection manager is to maintain a list of devices that was paired to sync. There could be many ways a device can pair which is covered in the ways to pair the device. This device list shall be modified based on the rules defined in rules for maintaining the list section. The list shall separately identify projection device vs a Bluetooth only device and under BT device, shall separately remember the profiles that were connected to the device to support dual phone use cases when implemented.

4.17.1 Requirements

4.17.1.1 Rules to Maintain the List - STR's

4.17.1.1.1 BTC-REQ-446478/A-Last Paired Device

Last paired device is always at the top of the list unless manually changed by the user through some of the rules in this section.

4.17.1.1.2 BTC-REQ-446479/A-List HMI

The list of paired devices on the hmi shall reflect the actual list in the system. (84, Device Management) The device list shall show the friendly name of the device. The device list shall not show the transport medium.

4.17.1.1.3 BTC-REQ-446480/A-Device Manual Connection

If user manually connects to another device, that device shall move to the top of the list.

4.17.1.1.4 BTC-REQ-446481/A-Phone List on Device Deletion

If one of the devices is deleted by the user, the entry in the table shall be deleted and the entries that follow move up a row.

4.17.1.1.5 BTC-REQ-446482/A-Duplicate Listing in Device List

A device shall only be listed once regardless of the way it was paired. (84, Device Management) One device shall only be listed once.

4.17.1.1.6 BTC-REQ-446483/A-LE Paired Device shall not be Shown

URC devices paired for LE functionality shall not be shown in the settings app.

4.17.1.1.7 BTC-REQ-446484/A-HID Paired Device shall not be shown

HID devices shall not be shown in the connectivity settings page. Connection manager shall provide an api to gaming app for pairing/connecting HID devices.

4.17.1.1.8 BTC-REQ-446485/A-API to modify order of list of devices

Connection manager shall provide an api to move a device in the sorting order to the top of the connection manager list. This API shall accept a device mac address and upon execution, move the device to the top of the list.

4.17.1.1.9 BTC-REQ-446486/A-List Size

List shall be able to maintain a max of 24 device.

4.17.1.2 Devices Connected - STR's

4.17.1.2.1 BTC-REQ-446487/A-Connection on pairing a device

A newly paired device shall stay connected to the system, replacing the already connected device if any.

4.17.1.2.2 BTC-REQ-446488/A-Independent Phone, Media or Projection

If any of these are not offered, hmi shall not show it to the user or gray out the button based on the hmi spec. User should be able to switch between wireless carplay, projection and BT on two connected devices. The device list shall show the active/inactive carplay session. The device list shall show the active/inactive BT session. The device list shall not offer carplay as an option if the feature is not available or disabled from the device. User shall be able to switch between two carplay devices from the device list.

4.17.1.2.3 BTC-REQ-446489/A-Request Processing Order

When the system is connecting to a device/profile, the user shall not be allowed to connect to any other device until the first activity is complete (connection succeeds or fails). This can be achieved by not receiving the request from connection manager side. HMI shall be grayed out or show animation to prevent the user from making this action.

4.17.1.2.4 BTC-REQ-446490/A-Plugging in USB for Wireless Device

If a device which was wirelessly connected gets plugged in using USB, device shall get charged and the carplay session active shall not be disturbed.

4.17.1.2.5 BTC-REQ-446491/A-Second Wired Device

If a device is wirelessly connected for carplay, and a second device gets connected via USB, the first wireless connection shall continue projection.

4.17.1.3 Reconnection Sequence

4.17.1.3.1 BTC-REQ-446492/A-Reconnection on Startup

On startup, sync shall try to reproduce the last condition before shutdown. This shall apply to phone only or media only connections. (86, Device Management) Sync shall reconnect to the last active device upon ignition cycle. (75, Reconnection) If out of band pairing device is the last device used, it should be the first reconnected device after an ignition cycle. If projection fails to resume on reconnection, sync shall try to connect to other devices as per the device list. When the system is attempting to resume a Wireless CarPlay session, the IVIS shall try to reconnect to this device for 10 seconds before moving to connecting other devices as per the device list and rules.

4.17.1.3.2 BTC-REQ-446493/A-CarPlay over Wireless

If CarPlay over wireless is available on the Apple device as indicated by the Bluetooth EIR then the Sync must start iAP2 prior to any additional Bluetooth profiles. Verify that startup connection request latency and session start latency do not exceed the specified time. Note: If the Sync enters a standby mode after ignition off and does not immediately terminate the CarPlay session, wait for the session to terminate before proceeding.

4.17.1.3.3 BTC-REQ-446494/A-Manual Device Connection and Disconnection

If a device was manually disconnected, sync shall not try a reconnection sequence until the next ignition cycle. In a case of a failed manual connection attempt to a device which is unavailable or unresponsive no other device(s) shall be reconnected automatically.

4.17.1.3.4 BTC-REQ-446495/A-Device Linkloss with Door Open

If there was a linkloss after a door open signal in the last 300 seconds, sync shall assume that the device is no longer in the vehicle and shall not connect to any other device in the vehicle. If another door open event is detected in the same ignition cycle, sync shall try to connect to the device again for 180 seconds.

4.17.1.3.5 BTC-REQ-446496/A-Device Linkloss without Door Open

If there was a linkloss without the door open, sync shall try to reconnect to this device. If the user was using a phone feature, sync shall try to establish the connection within 1 seconds, the user shall be notified of the disconnect if that is not possible and sync shall try to connect the device for another 180 seconds. If ther user was not using a phone feature, user shall only be notified at the end of the 180 seconds period. For the case of a link loss event only the previously connected device shall be reconnected as described in BTP-FUR-REQ-041712-Linkloss Door Open Signal and BTP-FUR-REQ-041713-Linkloss No Door Open Signal.

4.17.1.3.6 BTC-REQ-446497/A-Multiple Linkloss

If the device undergoes 5 linkloss in any 300 second period, sync shall assume this to be an unstable connection and shall not try to connect to this device.

4.17.1.3.7 BTC-REQ-446498/A-Profile Disconnection

If sync undergoes disconnection to a particular profile, sync shall try to connect that profile as per the BT SIG spec.

4.17.1.3.8 BTC-REQ-446499/A-Phone Call Timer and Delayed Accessory Timer

If doors are not open, and delayed accessory is enabled, the phone shall stay connected until the delayed accessory ends or times out after ignition off. If on a phone call, the phone call timer shall take precedence to delayed accessory, however if the door opens before the call ends or timer runs out, phone shall be disconnected. If the user initiates a disconnect from the phone or sync, all timers shall end and vehicle shall shutdown.

4.17.1.4 General

4.17.1.4.1 BTC-REQ-446500/A-Bluetooth Component Information

Bluetooth Component Information message is not used in iAP2 together with CarPlay.

4.17.1.4.2 BTC-REQ-446501/A-Legacy Bluetooth Link Key Exchange if Only Wireless Carplay

if sync supports only wireless carplay, ensure Legacy Bluetooth Link Key Exchange messages are not registered for.

4.17.1.4.3 BTC-REQ-446502/A-CarPlay Availability Message

Sync must not offer CarPlay to the user if CarPlay Availability message was not received and must proceed with pairing for classic Bluetooth.
If sync supports HFP and other BT profiles, they should be connected if wireless carplay is turned off.

4.17.1.4.4 BTC-REQ-446503/A-Data during Initial Pairing

During initial pairing, sync:
- Supports standard Bluetooth Secure Simple Pairing using Numeric Comparison.
- Provides the following information in its Extended Inquiry Response packet:
    a. The local name of the accessory. It must match the iAP2 Identification information.
    b. The TX Power Level
    c. The Service Class UUID for the iAP2 protocol
    d. The Service Class UUID for CarPlay protocol
- Provides the following information in its SDP record:
    a. The Service Class UUID for the iAP2 protocol
- Runs periodic inquiry scans and responds to an inquiry from the Apple device with a FHS packet with the BT EIR bit set. It returns an Extended Inquiry Response packet 1250 microseconds after the FHS of the packet.
- Provides accurate accessory information in BT Device ID (DID) record.
-

4.17.1.4.5 BTC-REQ-446504/A-APIs for Applications

Connection manager shall provide an api for URC app/phone app/other app to connect/disconnect/delete a specific device.

4.17.1.4.6 BTC-REQ-446505/A-Profile Connection Order

Lap should come up as soon as possible upon connection to facilitate the fastest carplay experience.
Sync shall connect to the profiles in the following order:
    a. Service Discovery Profile
    b. Device ID Profile
    c. IAP
    d. Handsfree Profile
    e. Advanced Audio Distribution Profile
    f. Audio / Video Remote Control Profile
    g. Message Access Profile and Phonebook Access Profile

4.17.1.4.7 BTC-REQ-446506/A-Selecting a Previously Paired Device

The user shall be able to select any previously paired device and attempt to connect it manually. In this case, In-Vehicle Infotainment System shall drop any device that is currently connected and using that service. In-Vehicle Infotainment System shall attempt to connect to the selected device for a total of 30 seconds. In-Vehicle Infotainment System shall attempt to connect to an A2DP device when prompted by the user (through pairing, activating an A2DP Source, or suspending and resuming when the source is an A2DP device).

4.17.1.4.8 BTC-REQ-446507/A-Bluetooth ON

If the user turns Bluetooth 'ON' and In-Vehicle Infotainment System does not receive a connection request from a paired device within 5 seconds, then In-Vehicle Infotainment System shall attempt to connect to an AG as described above.

4.17.1.4.9 BTC-REQ-446508/A-Phone and Media Manual Connections

If the user selects the device manually on the In-Vehicle Infotainment System via the Bluetooth Device List for phone functionality only (eg. Phone icon in phone list) then the device shall connect for phone only. If the device requests for a media connection, it shall be ignored. If there is another phone connection available already, it that device shall be disconnected for phone. If the user selects the device manually on the In-Vehicle Infotainment System for Media functionality, the device shall be connected for media only. if device request for phone as well, that request shall be ignored. if there is another media connected device, that device shall be disconnected If the user selects the device manually on the In-Vehicle Infotainment System for Phone+Media functionality, the device shall be connected for phone and media. If we fail to connect to one service and connects to another, hmi shall show the accurate representation of this. Connection manager shall retry to

connect the unconnected technology for 'x' seconds. This is also the case if the newly selected device is supporting A2DP only. The HFP connection shall remain on the device which was connected already. Mobile devices which are neither supporting HFP nor A2DP, or trying to pair via the legacy pairing method shall be treated as incompatible devices. The In-Vehicle Infotainment System shall display a meaningful error message to the customer when an incompatible mobile device is trying to pair with the system.

4.17.1.4.10BTC-REQ-446509/A-Device has no longer retained Authentication Information

The In-Vehicle Infotainment System shall have the ability to detect when a device has no longer retained authentication information from a pairing perspective. Once this issue has been detected, as defined within the Connection Error States section of this document,, the In-Vehicle Infotainment System shall have the ability to alert the customer that they will have to repair their device.

4.17.1.4.11BTC-REQ-446510/A-Delete a Device

The costumer shall have the option of deleting a previously paired device. The stored device information for that Bluetooth device will be removed, thus preventing that device from being able to connect with In-Vehicle Infotainment System. In order to connect the Bluetooth device again, the user will need to pair the device again.

4.17.1.4.12BTC-REQ-446511/A-Device List Full

For the case that the device list is full at the point of time when an AAP/WCP device initiates a pairing, IVIS shall delete a device from the device list to support the new pairing request. The device to be deleted shall be the device, which was not connected for the longest time. In-Vehicle Infotainment System shall allow a maximum of 24 devices to be paired at one time. If the user attempts to place In-Vehicle Infotainment System into Discovery or Discoverable Mode when there are already 24 devices paired, the user shall be prompted to delete one or more of the previously paired devices prior to proceeding.

4.17.1.4.13BTC-REQ-446512/A-Power On

An automatic connection shall be triggered within 2 seconds of In-Vehicle Infotainment System entering a power state in which Infotainment is set to on as defined in the latest released version of Power Management APIM SPSS.In-Vehicle Infotainment System shall attempt to connect to a device for a total of 10 seconds each before moving to the next device. The automatic connection sequence shall take no more than 240 seconds for all previously paired devices. In the event that the In-Vehicle Infotainment System does not receive any Bluetooth communication from any previously paired devices upon an automatic connection, the In-Vehicle Infotainment System shall initiate another automatic connection attempt to each device of the device list. The system should be configured in that way that incoming connection requests are allowed while paging, but the outgoing connection request shall have the priority in case of both devices are available.If this is not supported by the system a pause of 90s should be added whenever the last device of the device list was tried to connect, before moving to the beginning of the device list again, to allow some time for incoming connections.The In-Vehicle Infotainment System shall determine that a profile connection has failed or been rejected in the following scenarios:

a. Handsfree Profile: The In-Vehicle Infotainment System is attempting to connect to an AG for Handsfree Profile and has received some Bluetooth communication from an AG, but does not receive a response from the AG to the commands included within BTP-FUR-REQ-047508-Advanced Error Correction This shall be determined by the process defined within BTP-FUR-REQ-047508-Advanced Error Correctio
b. Advanced Audio Streaming: The In-Vehicle Infotainment System has received some Bluetooth communication from the source, but receives a negative response from the Open (via AVDTP) request or does not receive a response to the Open Stream request within 10 seconds.

The HMI may display a special error case in these 2 situations (ECS-2)*, letting the user know that the phone is present and available but refused the connection for one or both the profiles.

4.17.1.4.14BTC-REQ-446513/A-Disconnection of device while Pairing

If In-Vehicle Infotainment System was connected to a device upon entering Discovery or Discoverable mode, and pairing fails or is not completed, In-Vehicle Infotainment System shall NOT reconnect to the device that was disconnected.

4.17.1.4.15BTC-REQ-446514/A-Device to become Master of the Connection

When the IVIS initiate a Bluetooth connection, it shall allow the connected device to become master of the connection, to make sure we guarantee the maximum interoperability of Bluetooth and Wi-Fi functions, and a good handling of the situations were more than one Bluetooth device is connected to the mobile device.

4.17.1.4.16BTC-REQ-446515/A-Carplay Connection req

The Sync sends the CarPlayStartSession message only after the user has accepted to use CarPlay. Verify that the Sync sends all required CarPlay Bonjour Service Keys: flags, features, deviceid, model, and srcvers. The Sync must use the CarPlay Control Bonjour Service to discover CarPlay-enabled devices and to initiate the CarPlay session to a specific device. After the credentials are exchanged and the Apple device joins the Sync's access point, verify that an IP link to the device is established. Verify that the Sync stores the DHCP IP address lease information across multiple reboots. The DHCP IP address lease time must be at least 3 days with an address pool size of at least 100. Verify that if the Sync prompts the user to always enable CarPlay, that the vehicle does not prompt the user again for that device. If the Sync prompts the user to enable CarPlay on initial connection, verify that the user can decline and then re-enable CarPlay If the Sync supports other phone technologies (e.g. MirrorLink, Android Auto, etc.), ensure that Apple CarPlay remains enabled after using another device. Verify that non-iOS devices (AirPod case, battery pack, etc.) are identified correctly by Sync. Sync uses CarPlayAvailability to receive notifications about the availability of CarPlay over wireless on a device. The CarPlay session must be re-established over multiple ignition cycles.

4.17.1.4.17BTC-REQ-446516/A-Initial Pairing Support

During initial pairing, the Sync must support standard Bluetooth Secure Simple Pairing using Numeric Comparison. Once a secure Bluetooth link is established, the Sync must negotiate the iAP2 profile and establish an iAP2session, see "3.2.6.2 iAP2 Client over Bluetooth" (page 60).After starting iAP2, accessories using 5 GHz Wi-Fi access points for CarPlay may negotiate all of the relevant Bluetooth profiles such as HFP, A2DP, AVRCP, etc. Accessories using 2.4 GHz must only negotiate the iAP2 profile and no other legacy profiles. However, once a CarPlay session is established, the device will notify the Sync to disconnect all active profiles, see "3.3.8.3 disable Bluetooth" (page 163).During reconnections for CarPlay, the Sync must start iAP2 prior to any additional Bluetooth profiles. Accessories must use "15.6.1 CarPlay Availability" (page 216) to receive notifications about the availability of CarPlay over wireless on a device. If legacy Bluetooth profiles, such as HFP, A2DP, etc. are supported and not already connected, the Sync must re-establish the connection when CarPlay over wireless is no longer available on the device.

4.17.1.4.18BTC-REQ-446517/A-WiFi Access Point before Reconnection

During reconnection, the Sync must ensure that the Wi-Fi access point is fully operational before Bluetooth reconnection, as the device will initiate Wi-Fi association as soon as any Bluetooth profile is connected with the Sync.

4.17.1.4.19BTC-REQ-446518/A-OOB Pairing – Wired

Supporting USB Data Ports: This section defines requirements for accessories supporting CarPlay over wireless that also have USB ports that support data transfer. Accessories supporting CarPlay over wireless that also have USB ports that support data transfer must support Out Of-Band Bluetooth Pairing as described in Accessory Interface Specification. Accessories that support iAP2 over USB or CarPlay over USB must implement Out-Of-Band Bluetooth Pairing (see Accessory Interface Specification) to optimize the initial pairing procedure. After Out-Of-Band Bluetooth Pairing has completed, the Sync must store the device as the last used device on the system so it can be reconnected automatically after an ignition cycle.

4.17.1.4.20BTC-REQ-446519/A-IAP

During the pairing process IVIS shall consider the iAP2 message over Bluetooth WirelessCarPlayUpdate(Status = Available) to detect Wireless CarPlay support on the device as specified in the latest Apple's MFi specification. After pairing a new mobile device the In-Vehicle Infotainment System shall establish an iAP2 session for the purpose of detecting Wireless CarPlay support. When the device won't be used for Wireless CarPlay (e.g. by user selection or device capabilities), the iAP2 session stops and all other supported Bluetooth profiles shall be connected If no session started within the timeout (refer to CPY-FUR-REQ-268105 -Subsequent startup timeout), the Wireless CarPlay session startup will be considered as failed and user gets notified through HMI. If the Wireless CarPlay startup failed IVIS shall restore the same Bluetooth status as before the startup attempt. If a previous connected Bluetooth device cannot be reconnected IVIS shall follow BTP-UC-REQ-033792-Failed to Connect to Previously Paired Phone upon Resume.

4.17.1.4.21BTC-REQ-446520/A-Confirm Wireless Carplay

If IVIS detected Wireless CarPlay support of a newly paired device, the user shall be prompted to confirm Wireless CarPlay start and the associated privacy and terms of use. Until user did not decline Wireless CarPlay start, no other BT profiles than iAP2 shall be connected.

4.17.1.4.22BTC-REQ-446521/A-Carplay UUID

IVIS shall include CarPlay UUID in its Bluetooth Extended Inquiry Response (EIR) during every Discoverable mode pairing process (refer to Apple MFi specification).

4.17.1.4.23BTC-REQ-446522/A-Delete Device for Carplay

If the user choose to add a CarPlay device through the CarPlay menu and the maximum number of allowed Bluetooth devices is exceeded (refer to BTP-FUR-REQ-033779-Pairing Process), IVIS shall delete a paired device following BTP-FUR-REQ-033785-Delete Device. The new paired device gets added to the Bluetooth device list.

4.17.1.4.24BTC-REQ-446523/A-BT Linkloss with EA

During the Emergency Call Event, if the phone gets disconnected from SYNC before the call ends (ex. due to the user moving with the phone outside of the Infotainment Bluetooth's range), SYNC shall not automatically re-connect to the same phone.

4.17.1.4.25BTC-FUR-REQ-432915/A-Bluetooth Connections – Concurrent Devices

The Media Player shall support one A2DP/AVRCP connection.

4.17.1.4.26BTC-FUR-REQ-432916/A-Bluetooth Connections – A2DP Disconnection

The Media Player shall disconnect the A2DP audio channel when transitioning from the Infotainment power state to another power state.

4.17.1.4.27BTC-FUR-REQ-432918/A-Bluetooth Connections – Reconnection Attempt

Each time the System's power state changes from Infotainment power state to another power state and back to Infotainment, the System Media Player shall attempt to resume the previous A2DP source, please refer to BTP-FUR-REQ-033782/B-Connection Order and Requirements.

Each time the user selects a disconnected Bluetooth source using the System's Media Player, the Bluetooth A2DP connection shall be re-established and the Bluetooth device shall be sourced.

4.17.1.4.28 BTC-FUR-REQ-432919/A-Bluetooth Connections – Connecting while not sourced

The Bluetooth A2DP connection shall be maintained if the user changes the Media Player source away from Bluetooth A2DP.

4.17.1.4.29 BTC-FUR-REQ-432920/A-Bluetooth Connections – Reconnection Order

The Media Player shall attempt to reconnect to the list of paired A2DP devices, please refer to BTP-FUR-REQ-033782/B-Connection Order and Requirements. If there are no paired A2DP sources to which a connection can be made, then the A2DP source choice inside the Audio sources menu shall guide the customer to add a Bluetooth device.

4.17.1.4.30 BTC-FUR-REQ-433018/A-Bluetooth Testing

The system shall pass all relevant tests specified by the Bluetooth Specification 2.0 + EDR Certification/Qualification.

4.17.1.4.31 BTC-FUR-REQ-434946/A-Bluetooth Audio Device Information

Bluetooth Audio Device: Device Name, Manufacturer, Model Number, Bluetooth MAC Address.

4.17.1.5 AA Requirements

4.17.1.5.1 BTC-REQ-446524/A-Android UUID Advertisement

To indicate that it supports wireless projection, Sync MUST advertise the Android Auto UUID 4de17a00-52cb-11e6-bdf4-0800200c9a66 at all times it participates in Bluetooth service discovery.

4.17.1.5.2 BTC-REQ-446525/A-Services in Service Discovery Phase

Sync MUST NOT advertise more than 21 services in the service discovery phase, since this is the maximum number of UUIDs Android devices can parse at a time.

4.17.1.5.3 BTC-REQ-446526/A-RFCOMM Connection

Sync MUST support version 1.0 of the Bluetooth Radio frequency communication (RFCOMM) protocol and implement a Bluetooth RFCOMM server. An MD that supports wireless projection may initiate a RFCOMM connection to Sync before or after a Bluetooth HFP connection is established and the Sync MUST be able to handle both scenario. The HU MUST establish and maintain the RFCOMM connection even if a wired projection session is started and/or the Bluetooth connection itself is triggered by AAP as part of the AAP connection and launch process.

4.17.1.5.4 BTC-REQ-446527/A-Bluetooth RFCOMM Error Handling

If a read error occurs in the HU Bluetooth RFCOMM socket, the HU MUST wait for the MD to reconnect RFCOMM and then send the MD a WifiVersionRequest . If the MD does not connect to the HU's access point within 45 seconds of receiving the WifiStartRequest, the HU MAY display a message asking the user to restart Bluetooth on the MD.

4.17.1.5.5 BTC-REQ-446528/A-Naming Devices in Native Screens

An MD will have the following names associated with it (in order of preference):

1. Bluetooth device name. Advertised by the MD as part of Bluetooth service discovery and is user editable, e.g. *Alice's Pixel*.

2. AAP device_name. Sent by the MD in its ServiceDiscoveryRequest during AAP service discovery and is not user editable, e.g. *Google Pixel 2*.
3. USB device manufacturer and product. Available after a device enumerates itself via USB. Not user editable, e.g. *Google Pixel 2*.

The HU SHOULD use the most preferred name available when showing a device in a native screen.

4.17.1.6 Connection Manager Timing Requirements for Carplay

4.17.1.6.1 BTC-REQ-446529/A-The Startup Connection Request Latency for Wireless CarPlay

The startup connection request latency for wireless CarPlay is defined as the period from explicit user action to put the car into a “ready to drive” state (e.g. pressing a “Start” button or turning the ignition on) to accessory transmission of the first Bluetooth connection packet after the Wi-Fi access point is ready to accept a connection. The startup connection request latency must not exceed 2 seconds.

4.17.1.6.2 BTC-REQ-446530/A-Latency If Sync UI and Audio would remain Active when the CarPlay Session Starts

If sync UI and audio would remain active when the CarPlay session starts, the startup connection request latency may be as long as 7 seconds.

4.17.1.6.3 BTC-REQ-446531/A-The Session Start Latency for Wireless CarPlay

The session start latency for wireless CarPlay is defined as the period from Sync transmission of the first Bluetooth connection packet to the start of the CarPlay session. The session start latency must not exceed three seconds.

4.17.1.6.4 BTC-REQ-446532/A-The Overall Time from System Wake-up to Start of the CarPlay Session

The overall time from system wake-up to start of the CarPlay session must not exceed 10 seconds.

4.17.1.6.5 BTC-REQ-446533/A-Latency For a User Initiated Reconnection after Vehicle has Booted Up

For a user initiated reconnection after vehicle has booted up, connection shall not exceed session start latency shall.

4.17.1.7 MSS-URC Interactions

4.17.1.7.1 BTC-REQ-446534/A-URC/BLE Connected Devices

Connection Manager shall provide the api to retrieve entire device list. URC app shall get this list of devices, filter for devices connected for LE and request connection manager to connect to those device. URC shall try to reconnect to all the LE devices connected in the previous cycle.

4.17.1.8 HID Requirements

4.17.1.8.1 BTC-REQ-446535/A-Gaming Device Identification

HID devices shall be identified separately from phones and should be paged and connected when in gaming mode. connection manager shall provide an API for IVG application to a list of HId connected devices.

4.17.1.8.2 BTC-REQ-446536/A-HID and HFP Coexistence

Connection manager shall be able to connect to HID devices and always maintain other connections. However, if it’s found that there is a degraded user experience connecting all the devices at once while gaming, team can decide to disconnect all other connections to maintain a good gaming experience.

4.17.1.8.3 BTC-REQ-446537/A-Paging and Incoming HID Connection

Sync shall not page for HID devices unless the user is in gaming mode. Incoming requests to connect shall be ignored unless the user is in gaming mode. IVG shall communicate to Connection manager when sync is in gaming mode.

4.17.1.8.4 BTC-REQ-446538/A-Pairing a HID Device when not in Gaming Mode

If the user pairs an HID device when not in gaming mode, this device shall be paired to but not connected to unless the user is in gaming mode. This pairing should however not disrupt the current connection/s.

5 BT Interoperability Testing

5.1 Requirements

5.1.1 BTP-REQ-047939/A-Developing Device Testing Requirements (TcSE ROIN-297137-2)

The supplier shall test a minimum of 300 different devices during the development of the In-Vehicle Infotainment System. These devices shall be selected by the supplier and approved by Ford Motor Company. These devices will be segregated into the following categories:

Platinum – 30 Devices
Gold – 70 Devices
Silver – 100 Devices
Bronze – 100 Devices

Platinum Devices shall be tested against every official release (that includes any Bluetooth related features) delivered to Ford Motor Company. At the time of delivery the supplier shall provide a test report containing the tested results. The supplier shall implement “work arounds” when technically possible to insure that all features supported by the In-Vehicle Infotainment System and the device interoperates per the defined use cases. Ford Motor Company has the right to update 10 of the Platinum devices at mutually agreed point in time with the supplier.

Gold Devices shall be tested against select releases delivered to Ford Motor Company. The targeted releases (which shall be chosen by Ford Motor Company) will be those that include most Bluetooth phone enabled functionality. At the time of release delivery, the supplier shall report a test report containing the tested results. The supplier shall implement “work arounds” when technically possible to insure that all features supported by the In-Vehicle Infotainment System and the device interoperates per the defined use cases.

Silver Devices shall be tested against select releases delivered to Ford Motor Company. The targeted releases (which shall be chosen by Ford Motor Company) will be those that include all Bluetooth phone enabled functionality. At the time of release delivery, the supplier shall report a test report containing the tested results. The supplier shall implement “work arounds” when technically possible to insure that all key features supported by the In-Vehicle Infotainment System and the device interoperates per the defined use cases. Examples of core features are: Connecting, Making / Receiving Calls, Ending Calls, Phonebook and Call History Downloading, New Text Messaging Notifications, Streaming Audio, basic command and control of audio. *Note: The final set of core features shall be defined by Ford.

Bronze Devices shall be tested against the last three official releases delivered to Ford Motor Company. At the time of release delivery, the supplier shall report a test report containing the tested results. The supplier shall resolve any interoperability issue identified that is the fault of the in-vehicle infotainment system. For example, if the fault is due to a specification implementation issue.

5.1.2 BTP-REQ-047940/A-Ongoing Interoperability Testing (TcSE ROIN-297138-2)

The supplier shall provide Ford Motor Company with interoperability test results for 35 devices monthly until 10 years after start of production of the In-Vehicle Infotainment System. The supplier shall choose the devices and they shall be chosen based on a methodology approved by Ford Motor Company. At any point during this time Ford Motor Company shall have the option of choosing the devices for a specific month or for all remaining months. The test results shall cover all of the use cases defined. The format of the results shall be defined by Ford Motor Company.

5.1.3 BTP-REQ-047941/A-Special Release Interoperability Testing (TcSE ROIN-297139-1)

There are key devices (including s/w upgrades) that are released into the market with a significant amount of anticipation. When these devices are identified the supplier shall provide Ford Motor Company interoperability results within 7 days of market release. Special Release Interoperability Testing will be limited to 10 devices annually until 10 years after start of production of the In-Vehicle Infotainment System. *Note: If 10 devices are not selected within one calendar year, the remaining devices can be carried over to the following years. The test results shall cover all of the use cases defined. The format of the results shall be defined by Ford Motor Company.

5.1.4 BTP-REQ-047942/A-Ongoing Update Schedule (TcSE ROIN-297140-1)

The supplier shall provide updates to the Bluetooth Core and Profiles twice a year until 10 years after start of production of the In-Vehicle Infotainment System. These updates shall be based on device testing against 100 devices (total 200 per year). These updates shall include bug fixes identified with current/past in-vehicle infotainment system releases, profile enhancements when necessary to improve interoperability, and device specific “work arounds” for the tested devices when technically possible to insure that all features supported by the In-Vehicle Infotainment System and the 100 devices interoperates per the defined use cases.

These updates shall be made available to Ford Motor Company, and the updates shall have the ability to be installed on devices within the field as well as new production vehicles. It shall not be required to update the entire platform to update the Bluetooth Core and Profiles.

Ford Motor Company shall of the option of choosing the 100 devices for these releases.

5.1.5 BTP-REQ-047943/A-Special Release Update Availability (TcSE ROIN-297141-1)

There are key devices (including s/w upgrades) that are released into the market with a significant amount of anticipation. When these devices are released, and it has been identified that there is a major interoperability issue with the device, the supplier shall make available (when technically possible) a Bluetooth Core / Profile update to resolve the specific issue(s). To limit risk, this device update may be limited to the specific device in question as identified through Device ID Profile (or other means if available). This update should be made available as soon as possible and outside of the update schedule outlined within the Ongoing Update Schedule section. These updates shall be limited to 10 per year until 10 years after start of production of the In-Vehicle Infotainment System.

6 Appendix: Reference Documents

Reference #	Document Title
1	Handsfree Profile 1.7
2	Message Access Profile 1.3
3	Phonebook Access Profile 1.2
4	Advanced Audio Distribution Profile 1.3
5	Audio/Video Remote Control Profile 1.6
6	Personal Area Networking Profile 1.0
7	Device Identification Profile 1.3
8	Generic Object Exchange Profile 2.0+