

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – CarPlay**

**Subsystem Part Specific Specification (SPSS)**

Version 0.1

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**Version Date:**

**FORD CONFIDENTIALF**

**Revision History**

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# Architectural Design

## ProjectionModeServer Interface

### IIR-REQ-226606/A-ProjectionModeServer\_Tx

#### MD-REQ-226608/A-ActiveProjectionMode\_St

Message Type: Status

Transfer status of projection mode and mode name. It is sent over the ISO 15765-2 protocol.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Refer to Transport Protocol SPSS for included parameter. | | | |

#### MD-REQ-226609/A-ProjMdeNavigationRepeater\_St

Message Type: Status

Transfer status of navigation feature and navigation repeater interface. It is sent over the ISO 15765-2 protocol.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Refer to Transport Protocol SPSS for included parameter. | | | |

#### MD-REQ-226610/A-ProjMdeMediaPlayerRepeater\_St

Message Type: Status

Transfer status of media player feature and media player repeater interface. It is sent over the ISO 15765-2 protocol.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Refer to Transport Protocol SPSS for included parameter. | | | |

#### MD-REQ-226611/A-ProjMdePhoneRepeater\_St

Message Type: Status

Transfer status of phone feature and phone repeater interface. It is sent over the ISO 15765-2 protocol

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Refer to Transport Protocol SPSS for included parameter. | | | |

# General Requirements

## FUN-REQ-889642/A-General Requirements

General Requirements

### Requirements

Requirements

#### CPY-FUR-REQ-889636/C-General Settings

SYNC+ shall have a settings menu in order to change options related to CarPlay feature per device that supports CarPlay:

“Enable” to enable CarPlay device upon subsequent connections

“Disable” to disable CarPlay device upon subsequent connections

“Delete” to delete the specific CPY device from SYNC+:

Erase all flags as the device has never been connected before.

(Reference HMI 80 – Screen 14 and 14a).

If a setting is changed within HMI from Disable to Enable, SYNC+ should re-initialize and activate CarPlay.

If a setting is changed within HMI from Enable to Disable, SYNC+ should deactive CarPlay.

If a setting is changed within HMI to Delete a specific CPY device, SYNC+ should deactivate CarPlay session if that same specific device is connected and running CarPlay session. The deleted device will be treated as a first connection device upon next connection.

Auto-Launch: “ON” is default setting upon initial connection of CarPlay when enabled. CarPlay shall be grant Video focus upon connection or any other subsequent connections.

Auto-Launch: “OFF” is a setting that can be changed, in order to not give video focus to CarPlay upon connection, unless (CPY device requests video focus in scenarios like: an active call is on device, audio is playing on device, etc).

(reference requirement CPY Connection). Note: Icon transitions still change at status/function bar, but the Native HMI stays at the current screen unless the Native HMI screen is not available upon connection.

For Example:

In Apps -> icons change -> transition to Home Screen

In Nav (not on active route) -> icons change -> transition to Home Screen

In Phone -> icons change -> transition to Home Screen

Currently listening to other BT Audio device -> icons change and audio stops -> taken to Source Selection screen with no audio playing

Currently in SYNC+ Voice Session -> reference requirement CPY Device connected during Voice Session.

(Reference HMI: H80)

#### CPY-FUR-REQ-889637/A-Discovery

SYNC+ shall advertise itself as defined in MFi Specification:

For Example:

SYNC+ will advertise itself on the network via Bonjour.

SYNC+ will utilize the Communication Plug-in to interface with SYNC+’s Bonjour implementation to configure and broadcast these **configurable** values below:

CarPlay Bonjour Service Keys below:

deviceid

features

model (For Example: SYNC+, or Flex SYNC+, etc).

name

srcvers

statusFlags

#### CPY-FUR-REQ-889638/A-Buttons

SYNC+ shall support button commands to activate a specific feature and/or function as defined in MFi Specification:

For Example:

SYNC+ will support (if applicable) common center console and steering wheel control buttons that CarPlay feature support utilizing the following HID usages defined in MFi Specification:

|  |  |  |
| --- | --- | --- |
| Usage Name | Usage Type | Apple Function |
|  |  |  |
| Play | On/Off Control | Play |
| Pause | On/Off Control | Pause |
| Scan Next Track | One shot control | Scan Next Track |
| Scan Previous Track | One shot control | Scan Previous Track |
| Play/Pause | One shot control | Toggle Play/Pause |
|  |  |  |
|  |  |  |
| Hook Switch | On/Off Control | Accept call |
|  |  |  |
| Drop | One shot control | Reject/End call |
|  |  |  |
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**Telephony:**

SYNC+ shall support:

Hook Switch and Drop

**Note:** Depending on the Steering wheel control button on Ford vehicle specific configuration.

**Voice:**

SYNC+ shall support Siri via Steering wheel control button when in a CarPlay active session.

To activate Siri, SYNC+ shall utilize and communicate the requestSiri command (reference general requirement Commands) with the parameter of the ButtonDown (Value: 2) for more than 1 second then ButtonUp (Value: 3) actions in order for CPY device to know when the button is physically long depressed and released.

**Media:**

SYNC+ Steering wheel control media buttons and center console media control buttons shall control Play, Pause, Scan Next Track, Scan Previous Track for media control.

**Volume:**

SYNC+ shall have control of volume and display of volume control on Sync+ Unit as CPY device only provides unattenuated line-level audio output.

SYNC+ Steering wheel control volume button and center console volume control shall control Audio channels (reference requirement Audio Output).

(Reference A65 for button associations for Phone, Voice, Media and Volume)

#### CPY-FUR-REQ-889639/C-Commands

SYNC+ shall support commands as defined in MFi Specification:

For Example:

SYNC+ will support messages exchanged between CPY Device and SYNC+ to perform an action.

These messages will be sent as HTTP requests using the /command URL on the control stream. CPY device will send its commands over the Controller control channel while the SYNC+ sends its commands over the Accessory control channel.

|  |  |  |
| --- | --- | --- |
| Sender | Command | Required to support, but not limited to: |
|  |  |  |
| CPY Device | duckAudio | durationMs  volume |
| CPY Device | unduckAudio | durationMs |
| CPY Device | disableBluetooth | deviceID |
| SYNC+ | changeModes | appStates(Optional)  resources  reasonSTR |
| SYNC+ | changeModes | appStateID (ask about which ones we want to support) |
| SYNC+ | changeModes | resourceID  transferType  transferPriority  takeConstraint  borrowConstraint  unborrowConstraint |
| SYNC+ | changeModes | modes  status |
| CPY Device | modesChanged | appStates (optional)  resources |
| CPY Device | modesChanged | appStateID  entity  speechMode  resourceID  entity |
| SYNC+ | forceKeyFrame |  |
| SYNC+ | hidSendReport | hidReport  timestamp  uuid |
| CPY Device | hidSetInputMode | hidInputMode  uuid |
| SYNC+ | requestSiri | siriAction |
| SYNC+ or CPY Device | requestUI | url |
| SYNC+ | setNightMode | nightMode |
| SYNC+ | setLimitedUI | limitedUI |

SYNC+ shall support setNightMode to indicate if it is dark outside. SYNC+ must first indicate that it supports night mode utilizing “nightMode” in the InfoMessage.

SYNC+ shall support disableBluetooth. SYNC+ must provide its BluetoothIDs in InfoMessage in order to receive a disableBluetooth command from the CPY device. Upon receiving this command, SYNC+ shall disable any existing BT connections with CPY Device and switch CPY carplay wireless connection or USB connected device. SYNC+ shall disable any other BT connected devices utilizing profiles (For Example: HFP/PBAP/MAP/etc).

(Reference BT Phone APIM Gen 3 2 Export from TcSE)

SYNC+ shall support extendedFeatures (in the InfoMessage) to indicate features like “oem back” or last CarPlay UI screen for applications (For Example: OEM Apps/etc). SYNC+ shall also support enhancedRequestCarUI and vocoderInfo as specified in MFi specification.

SYNC+ shall support oemIcons (in the InfoMessage) to allow color icons/logos to be presented if needed. SYNC+ shall also support imageData, heightPixels, widthPixels and prerendered as specified in MFi specification.

#### CPY-FUR-REQ-889640/A-Clock Settings (SYNC+hronization)

SYNC+ shall have Communication Plug-in to utilize clock SYNC+hronization as defined in MFi specification.

For Example:

The clocks between CPY Device and SYNC+ shall be SYNC+hronized to present media data at the correct time.

SYNC+ shall SYNC+hronize wall Clocks so both entities have an accurate notion of absolute presentation times.

SYNC+ shall map media Clocks to wall clocks so that a media timestamp from one device can be mapped to a media timestamp on another device.

SYNC+ shall drive all audio streams from the same media clock that is used for SYNC+hronization with the CPY Device.

SYNC+ shall provide local and media clocks using a high resolution tick counter to measure time intervals (such as a processor cycle counter). These counters must be stable (For example: less than 50 PPM of variance) and precise (For example: 10 MHz or higher) with minimal and consistent overhead (For example: less than 1 microsecond to sample each clock).

**Note:** This will not affect the Ford Display Clock in Native HMI

#### CPY-FUR-REQ-889641/C-Display Configurations

Ford Motor Company shall have the choice to utilize different display types/technologies in the future and not limited to existing screen.

For Example:

Higher Resolution/Refresh rate/fps, etc.

Larger/Smaller Size displays

Future display technologies

Etc.

CarPlay shall be able to be implemented correctly and integrated on such future display technologies and follow requirements defined in MFi specification.

**\*Note:** **CarPlay shall not be displayed or triggered upon connection of an iOS compatible device on displays smaller than 6.5 inches.**

#### CPY-FUR-REQ-913340/B-Cluster Configuration

**Phone:**

When CarPlay is connected to SYNC+ any phone messages (**if available from device connected**) shall be mapped to the existing CAN interfaces to the IPC (For Example: Phone Status, Signal Strength, Battery Level, etc).  In the event that phone messages are not available, match the appropriate CAN message/identifier existing for BT Phone Server Response and Status Signals in order to allow text to be shown when CarPlay device is connected or disconnected.

For Example: VRM\_BTPhoneSts\_St  from *”0x07: NoLinkToB - (No Phone Connected)*  to  *“0x01: Idle, Existing link to BT Phone” - (Phone Connected).*  Allowing the IPC to request the phone menu and therefore the APIM can send (For Example:  “See Touchscreen” or “Apple CarPlay Active” or anything else Ford Specifies in List Browser Protocol APIM SPSS).

CarPlay Phone Connected – (Existing Link to BT Phone)

CAN Value: 0x01: Idle (descriptor)

CAN Name: VRM\_Sent\_Signal

CAN ID: 2D0

CAN Signal Name: VRM\_BTPhoneSts\_sts

No Phone Connected - (No Link to B)

CAN Value: 0x07: Idle (descriptor)

CAN Name: VRM\_Sent\_Signal

CAN ID: 2D0

CAN Signal Name: VRM\_BTPhoneSts\_sts

**\*Note: Clusters that are older than MY 17.5 may behave differently (No Phonebook/etc), but must have text (For Example:  “See Touchscreen” or “Apple CarPlay Active” or anything else Ford Specifies in List Browser Protocol APIM SPSS).**

**\*\*Note:  If there are Phone interfaces provided by CarPlay API (For Example: Communication Usage/Update messages via iAP2) disregard this requirement and follow IPC mapping in Requirement – Establish iAP2 Session.**

**Media:**

Upon CarPlay being activated as a source from the cluster (see List Brower Protocol APIM SPSS), SYNC+ shall send a HID Send Report Command for play via the CarPlay Communication Protocol. SYNC+ must not initiate any change in video focus.

When CarPlay is the active audio source, available metadata from iAP2 NowPlayingUpdates shall be published to the Media Player Server (see Media Player APIM SPSS):

PlackbackQueueIndex -> ActiveTrackNum1.St()

PlaybackQueueCount -> NumberOfTracks.St()

MediaItemPlaybackDurationInMilliseconds -> TotalPlaytime.St()

PlaybackElapsedTimeInMilliseconds -> TrackPlaytime.St()

MediaItemArtist -> MediaInformation.St():Metadata1

MediaItemTitle -> MediaInformation.St():Metadata2

{Device Name} -> MediaInformation.St():SourceInformation

# Functional Definition

## GAL-FUN-REQ-888300/B-Audio Source Management for Projection Mode

### Use Cases

#### CPY-UC-REQ-888302/D-Projection Mode Audio Sources

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | Projection Mode is active  Infotainment System is ON |
| **Scenario Description** | Vehicle Occupant enters projection mode and activates a Projection Mode audio source (ex Phone, VR, Alert, Media) |
| **Post-conditions** | Audio source is Granted for the infotainment system to projection mode source |
| **Comments** |  |
| **Interfaces** | G-HMI, V-HMI, CBI, Interface, Audio Out |

### Requirements

#### CPY-FUR-REQ-888301/F-Projection Mode Audio Sources

Projection Mode Audio Sources (ie always use regardless of CarPlay, GAL or some other projection mode source):

|  |  |  |  |
| --- | --- | --- | --- |
| **Infotainment System Audio Source being requested for Projection Mode Audio Source** | **Requested Audio Source** | **Requested Priority** | **Comments** |
| Phone Call | APIM | Telephony Service | See audio management SPSS for details |
| Emergency Call | APIM | Priority Service | See audio management SPSS and emergency call SPSS for details on usage |
| Voice Recognition | Voice Recognizer | PTT Mute & Voice | Ex. PTT VR button press on SWC.  See audio management SPSS |
| Mixable Prompts (ex Nav Prompts, TTS…) | N/A | N/A | User the SYNC+\_Alerts message in Alert SPSS.  See A22B and A22C specifications |
| Media / Other | APIM | Aux\_ExtSource | Ex USB, BT Audio.  See Audio Management SPSS |
| Audio Attenuation (ie SYNC+\_Alerts) | N/A | N/A | See Alerts SPSS and Audio Attenuation function for system interface.  See A22C for attenuation level to use with mixable prompts if applicable. |

## FUN-REQ-888358/A-SYNC+ Requirements

### Use Case

Use Case

### Requirements

Requirements

#### CPY-FUR-REQ-888359/B-SYNC+ Requirements

SYNC+ to meet requirements as defined in MFi Specification.

## FUN-REQ-889558/A-CPY Connection

CPY Connection

### Use Cases

Use Cases

#### CPY-UC-REQ-888366/C-Mobile Device First Connection

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Device supports CPY |
| **Scenario Description** | 1. User connects mobile device via Bluetooth or the appropriate USB port. 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. User selects “Continue” 4. Auto-Launch default to “ON” |
| **Post-conditions** | 1. Privacy & Terms of Use Pop-up is displayed 2. EA Pop-up is displayed (if not setup before) 3. Option within settings menu for CPY updated for this specific device 4. Start CPY projection experience 5. Cluster Updated to CPY Experience. 6. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 7. Launch CPY homescreen 8. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | 1. User selects “Disable” on system pop-up 2. User does not provide Privacy & Terms of Use consent 3. EA set to ON previously 4. Mobile device already paired (via BT) to SYNC+. 5. Mobile device already paired and connected (via BT) to SYNC+. 6. Another mobile device is paired and connected (via BT) to SYNC+. 7. Another device is connected to SYNC+ with Another Projection Experience in setup and/or enabled. 8. Same device is connected to SYNC+ with Another Projection Experience in setup and/or enabled. 9. Mobile Device Connection when Safety Feature is Active 10. Mobile Device Connection when Parking Feature is Active 11. Voice button pressed during system pop-up 12. Mobile Device plugged in during active Voice session 13. Sync+ Unit Screen turned OFF 14. Same Mobile Device plugged in during incoming/outgoing/active phone call 15. Different Mobile Device plugged in during incoming/outgoing/active phone call |
| **Interfaces** |  |

##### CPY-UC-REQ-889294/A-User selects Disable on system pop-up

|  |  |
| --- | --- |
| **Actors** | User selects “Disable” on System pop-up |
| **Pre-conditions** | User |
| **Scenario Description** | Same as original use case. |
| **Post-conditions** | 1. User connects mobile device via Bluetooth or appropriate USB port 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. User selects “Disable” on System pop-up |
| **List of Exception Use Cases** | 1. Do not launch CPY whenever this phone is connected to this vehicle. 2. System sets flag to Not display pop-up at next connection 3. SYNC+ connects to device for USB Device Mode. |
| **Interfaces** |  |

##### CPY-UC-REQ-889372/B-User does not provide Privacy & Terms of Use consent

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case. |
| **Scenario Description** | 1. User selected ‘Disagree’ at the Privacy & Terms of Use Pop-up |
| **Post-conditions** | 1. SYNC+ returns to previous CarPlay system pop-up |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889373/A-EA set to ON previously

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case. |
| **Scenario Description** | 1. User selected ‘ON’ on the EA option when connected to device via Another projected experience, or paired and connected via BT. |
| **Post-conditions** | 1. Do not launch EA Pop-up. 2. Continue the CPY connection Sequence. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889376/B-Mobile device already paired (via BT) to SYNC+

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case and device is already paired. |
| **Scenario Description** | 1. Device is already paired (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port 3. System pop-up: Connect to CPY “Continue”, “Disable”. 4. User selects ‘Continue’ 5. Auto-Launch set to “ON” |
| **Post-conditions** | 1. System sets appropriate flag to not send system pop-up at next connection. 2. Privacy & Terms of Use is displayed 3. EA Pop-up displayed 4. Start CPY projection experience 5. Cluster Updated to CPY Experience. 7. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 8. Launch CPY homescreen 9. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889381/B-Mobile device already paired and connected (via BT) to SYNC+

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case and device is paired and connected. |
| **Scenario Description** | 1. Device is already paired and connected (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port 3. System pop-up: Connect to CPY “Continue”, “Disable”. 4. User selects ‘Continue’ 5. Auto-Launch set to “ON” |
| **Post-conditions** | 1. Disconnect device via Bluetooth. 2. System sets appropriate flag to not send system pop-up at next connection. 3. Privacy & Terms of Use is displayed 4. EA Pop-up displayed 5. Start CPY projection experience 6. Cluster Updated to CPY Experience. 8. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 9. Launch CPY homescreen 10. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889380/C-Another mobile device is paired and connected (via BT) to SYNC+

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same is Original Use Case and SYNC+ is connected and paired (via BT) to another device. |
| **Scenario Description** | 1. Another device is already paired and connected (via BT) to SYNC+ (not CPY device). 2. User connects mobile device via Bluetooth or appropriate USB port 3. System pop-up: Connect to CPY “Continue", “Disable”. 4. User selects ‘Continue’ 5. Auto-Launch set to “ON” |
| **Post-conditions** | 1. Disconnect all Bluetooth profiles (except A2DP/AVRCP) from other device that is not connected via CPY. 2. System sets appropriate flag to not send system pop-up at next connection. 3. Privacy & Terms of Use is displayed 4. EA Pop-up is displayed 5. Start CPY projection experience 6. Cluster Updated to CPY Experience. 8. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 9. Launch CPY home screen 10. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889298/C-Another device is connected to SYNC+ with Another Projection Experience (Carplay) in Setup and/or Enabled

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case and another device is connected and projection experience is setup and/or enabled. |
| **Scenario Description** | 1. SYNC+ is connected to Another Projection Experience enabled device and Projection Experience is in setup and/or enabled. 2. The user plugs in another device which supports CPY (or other Projection Experience (if applicable). |
| **Post-conditions** | 1. SYNC+ connects to the device via USB Device Mode (if applicable). The CPY device is also charging. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-937748/B-Same device is connected to SYNC+ with Another Projection Experience in Setup and/or Enabled

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case and same device is connected and projection experience is setup and/or enabled. |
| **Scenario Description** | 1. SYNC+ is connected to Same Device with Another Projection Experience in setup and/or enabled. 2. The user plugged in same device which supports CPY (or other Projection Experience (if applicable). |
| **Post-conditions** | 1. SYNC+ connects to the device and continues to run the First Projection Experience in setup and/or enabled session. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889367/A-Mobile Device Connection when Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive based on Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889368/A-Mobile Device Connection when Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive based Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889649/A-Voice Button Pressed During System Pop-up

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User Plugs in Mobile Device via proper USB 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. User presses PTT button or Mobile Device Voice button. |
| **Post-conditions** | 1. Native HMI retain video focus 2. SYNC+ grants audio focus to CPY Device 3. Launch CPY voice session |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889369/A-Mobile Device plugged in during Voice session

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Voice session active on Sync+ Unit 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Wait for Voice session to end 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. Follow Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889370/A-Sync+ Unit screen is turned OFF

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User has turned off the Sync+ Unit Screen 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Sync+ Unit Screen turns ON 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. Follow Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889371/B-USB device (non-CPY) connected to non-CPY enabled port (Hub dependent)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User connects USB device (non-CPY) to system via non-CPY enabled USB port (depending on which USB Hub if necessary, reference Media SPSS to identify supported Hubs). 2. User connects CPY mobile device via CPY enabled USB port |
| **Post-conditions** | 1. Non-CPY USB port becomes charge only 2. If non-CPY USB device had audio focus, audio focus given to last known audio source. If last known source not available, audio goes to Audio Source Selection. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | GUI |

##### CPY-UC-REQ-889650/B-Same Mobile Device plugged in during incoming/outgoing/active phone call

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is on an active call with no other means connected 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Start CarPlay Session 2. Device on Phone call is same device connected. 3. Native HMI grants video focus to CPY Device. 4. Native HMI grants audio focus to CPY Device. 5. Follow Mobile First Connection Use Case after active call session is ended. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-154994/A-Different Mobile Device plugged in during incoming/outgoing/active phone call

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is on an active call with no other means connected 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Start CarPlay Session 2. Device on Phone call is different device than connected. 3. Notify User via Transient Message if necessary (refer to H80). 4. Native HMI retains video focus. 5. Native HMI retains audio focus. 6. Follow Mobile First or Subsequent Connection Use Case (depending which connection it is) after active call session is ended. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889291/B-Mobile Device Subsequent Connection

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  CPY Application is installed on mobile device  User selected to launch CPY “Continue” during first connection  Auto-Launch set to “ON” |
| **Scenario Description** | 1. User connects mobile device via the appropriate USB port. |
| **Post-conditions** | 1. Option within settings menu for CPY updated for this specific device 2. Start CPY projection experience 3. Cluster Updated to CPY Experience. 4. Second USB port becomes a charging point. 5. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 6. Launch CPY homescreen. 7. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | 1. User selected “Disable” on system pop-up on Mobile first connection. 2. Mobile device already paired (via BT) to SYNC+. 3. Mobile device already paired and connected (via BT) to SYNC+. 4. Another mobile device is paired and connected (via BT) to SYNC+. 5. Another device is connected to SYNC+ with Another Projection Experience in setup and/or enabled. 6. Same device is connected to SYNC+ with Another Projection Experience in setup and/or enabled. 7. Mobile Device Connection when Safety Feature is Active 8. Mobile Device Connection when Parking Feature is Active 9. Mobile Device plugged in during active Voice session 10. Sync+ Unit Screen turned OFF 11. Auto-Launch set to “OFF” |
| **Interfaces** |  |

##### CPY-UC-REQ-889658/A-User selects "Disable" on System Pop-up on Mobile First Connection

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case. |
| **Scenario Description** | 1. User connects mobile device via Bluetooth or appropriate USB port 2. User selects “Disable” on System pop-up on Mobile First Connection. |
| **Post-conditions** | 1. Do not launch CPY whenever this phone is connected to this vehicle. 2. System verifies flag to Not display pop-up at next connection 3. SYNC+ connects to device for USB Device Mode |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889295/A-Mobile device already paired via BT to SYNC+

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case and device is already paired. |
| **Scenario Description** | 1. Device is already paired (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port 3. User selected ‘Continue’ on Mobile First Connection 4. Auto-Launch set to “ON” |
| **Post-conditions** | 1. System verifies appropriate flag to not send system pop-up at next connection. 2. Start CPY projection experience 3. Cluster Updated to CPY Experience. 5. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 6. Launch CPY homescreen 7. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889659/B-Mobile device already paired and connected (via BT) to SYNC+

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case and device is paired and connected. |
| **Scenario Description** | 1. Device is already paired and connected (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port 3. User selected ‘Continue’ from Mobile First Connection 4. Auto-Launch set to “ON” |
| **Post-conditions** | 1. Disconnect device via Bluetooth. 2. System verifies appropriate flag to not send system pop-up at next connection. 3. Start CPY projection experience 4. Cluster Updated to CPY Experience. 6. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 7. Launch CPY home screen. 8. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889296/C-Another mobile device is paired and connected via BT to SYNC+.

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same is Original Use Case and SYNC+ is connected and paired (via BT) to another device. |
| **Scenario Description** | 1. Another device is already paired and connected (via BT) to SYNC+ (not CPY device). 2. User connects mobile device via Bluetooth or appropriate USB port 3. User selected ‘Continue’ from Mobile First Connection 4. Auto-Launch set to “ON” |
| **Post-conditions** | 1. Disconnect all Bluetooth profiles (except A2DP/AVRCP) from other device that is not connected via CPY. 2. System verifies appropriate flag to not send system pop-up at next connection. 3. Start CPY projection experience 4. Cluster Updated to CPY Experience. 6. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 7. Launch CPY homescreen. 8. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889660/B-Another device is connected to SYNC+ with Another Projection Experience in Setup and/or Enabled

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case and another device is connected and projection experience is setup and/or enabled. |
| **Scenario Description** | 1. SYNC+ is connected to Another Projection Experience enabled device and Projection Experience is in setup and/or enabled. 2. The user plugs in another device which supports CPY (or other Projection Experience (if applicable). |
| **Post-conditions** | 1. SYNC+ connects to the device via USB Device Mode (if applicable). The CPY device is also charging. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-937760/B-Same device is connected to SYNC+ with Another Projection Experience in Setup and/or Enabled

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case and same device is connected and projection experience is setup and/or enabled. |
| **Scenario Description** | 1. SYNC+ is connected to Same Device with Another Projection Experience in setup and/or enabled. 2. The user plugged in same device which supports CPY (or other Projection Experience (if applicable). |
| **Post-conditions** | 1. SYNC+ connects to the device and continues to run the First Projection Experience in setup and/or enabled session. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889367/A-Mobile Device Connection when Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive based on Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889368/A-Mobile Device Connection when Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive based Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889369/A-Mobile Device plugged in during Voice session

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Voice session active on Sync+ Unit 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Wait for Voice session to end 2. System pop-up: Connect to CPY “Continue”, “Disable”. 3. Follow Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889661/A-Sync+ Unit screen is turned OFF

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User has turned off the Sync+ Unit Screen 2. User Plugs in Mobile Device via proper USB 3. User has selected “Continue” from Mobile Device First Connection 4. Auto-Launch set to “ON” |
| **Post-conditions** | 1. Sync+ Unit Screen turns ON 2. Follow Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889371/B-USB device (non-CPY) connected to non-CPY enabled port (Hub dependent)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User connects USB device (non-CPY) to system via non-CPY enabled USB port (depending on which USB Hub if necessary, reference Media SPSS to identify supported Hubs). 2. User connects CPY mobile device via CPY enabled USB port |
| **Post-conditions** | 1. Non-CPY USB port becomes charge only 2. If non-CPY USB device had audio focus, audio focus given to last known audio source. If last known source not available, audio goes to Audio Source Selection. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | GUI |

##### CPY-UC-REQ-889651/A-Auto-Launch set to "OFF"

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User has turned off the Auto-Launch in General Settings prior to connection 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Start CPY projection experience 2. Cluster Updated to CPY Experience. 3. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 4. CPY homescreen does not take video focus. 5. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889399/A-Ignition Cycle

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  CPY Application is installed on mobile device  Playing music through CPY prior to suspend.  User previously completed a connection of this mobile device via CPY and selected “Continue”  Auto-Launch set to “ON” |
| **Scenario Description** | 1. User brings vehicle to a full stop, shifts to park, and turns ignition to OFF while CPY is running (i.e. stopping at a gas station) 2. Mobile device is plugged in prior to USB initialization on Head Unit (up to 30 seconds after ignition ON) |
| **Post-conditions** | 1. Sync+ Unit is started in Native HMI 2. USB initialization completes (up to 30 seconds) 3. CPY connection established 4. Cluster Updated to CarPlay Experience. 6. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 7. Launch CPY homescreen 8. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | E1 Safety Feature Active  E2 Parking Feature Active  E3 USB fails to initialize when CPY is not detected: Default to AM/FM  E4 Auto-Launch is set to “OFF” |

##### CPY-UC-REQ-889367/A-Mobile Device Connection when Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive based on Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889368/A-Mobile Device Connection when Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active 2. User connects mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive based Mobile First or Subsequent Connection Use Case (depending which connection this is). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889404/A-USB fails to initialize when CPY is not detected: Default to AM/FM

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is plugged in prior to USB initialization on Head Unit (up to 30 seconds after ignition ON) |
| **Post-conditions** | 1. USB fails to initialize and CPY in not detected 2. Mobile Device Charging 3. IVI-AUDIO default to Audio Source Selection |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889651/A-Auto-Launch set to "OFF"

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User has turned off the Auto-Launch in General Settings prior to connection 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Start CPY projection experience 2. Cluster Updated to CPY Experience. 3. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 4. CPY homescreen does not take video focus. 5. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889395/A-CPY Enabled Device Connected via BT at the time when it was connected via USB for CarPlay.

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON / OFF  CPY Application is installed on mobile device.  User selected to launch CPY “Continue” during first connection.  CPY device is connected via BT.  Auto-Launch set to “ON” |
| **Scenario Description** | 1. CPY device is connected (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port. |
| **Post-conditions** | 1. SYNC+ disconnects all BT profiles with device. 2. Start CPY projection experience 3. Cluster Updated to CPY Experience. 5. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 6. Launch CPY homescreen. 7. SYNC+ provides current mode to CPY enabled device. |
| **List of Exception Use Cases** | E1 SYNC+ is connected to another device via Bluetooth, and user connects another device with CPY.  E2 Incoming/Outgoing/Active Phone Call and Connect via CPY.  E3 Auto-Launch set to “OFF” |

##### CPY-UC-REQ-889397/C-SYNC+ is connected to another device via Bluetooth and user connects another device with CPY.

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case and another device is connected via BT. |
| **Scenario Description** | 1. Another device is connected (via BT) to SYNC+. 2. User connects mobile device via Bluetooth or appropriate USB port. |
| **Post-conditions** | 1. Disconnect all Bluetooth profiles (except A2DP/AVRCP) from other device that is not connected via CPY (upon a disableBluetooth command from CPY Device). 2. Cluster Updated to CPY Experience. 4. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 5. Launch CPY homescreen. 6. SYNC+ provides current mode to CPY enabled device. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889662/B-Incoming/Outgoing/Active Phone Call and Connect via CPY

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is on an active call with no other means connected 2. User Plugs in Mobile Device via proper USB 3. User has selected “Continue” from Mobile Device First Connection 4. Auto-Launch is set to “ON” |
| **Post-conditions** | 1. Wait till SYNC+ receives a disableBluetooth command from the CPY device that is connected 2. Follow Mobile Device Subsequent Connection Use Case and give video focus to CPY and transfer audio to CPY |
| **List of Exception Use Cases** | Mobile Device First Connection |
| **Interfaces** |  |

##### CPY-UC-REQ-889651/A-Auto-Launch set to "OFF"

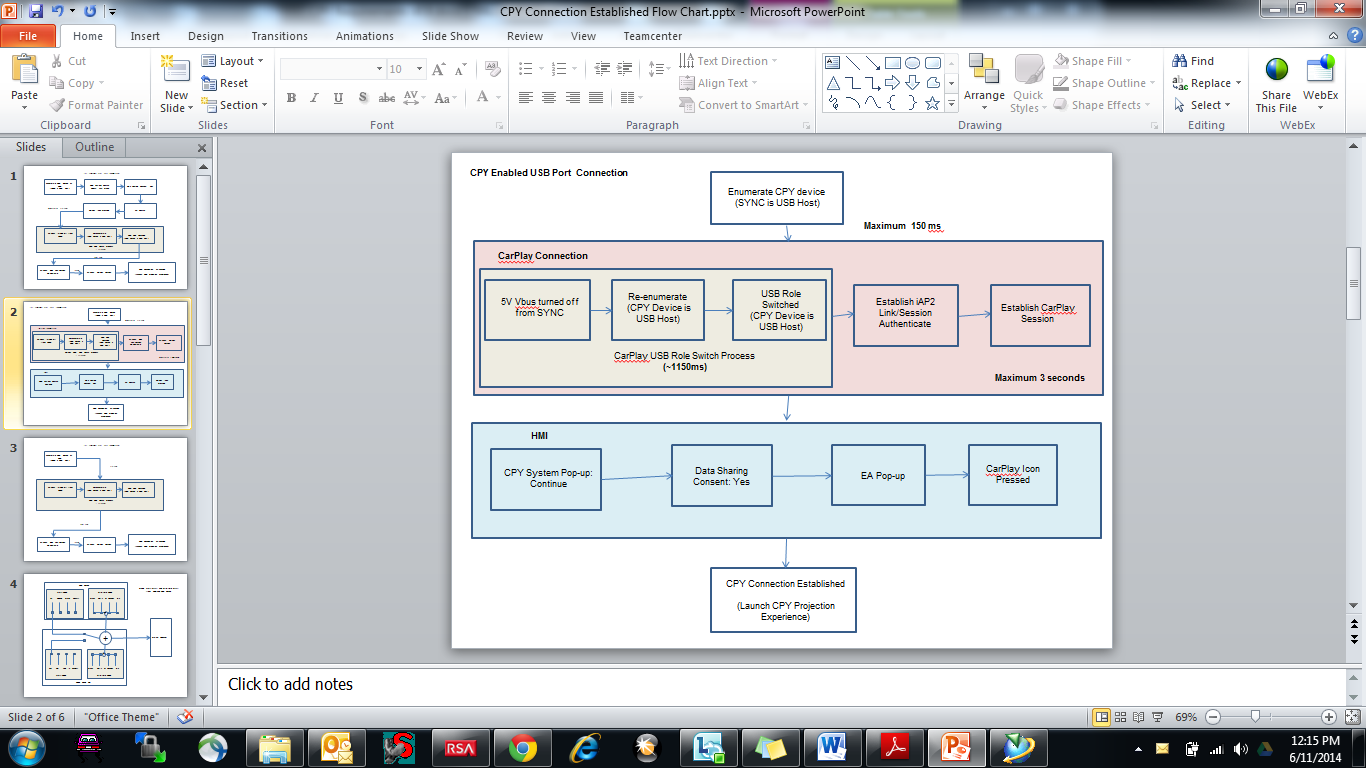
|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. User has turned off the Auto-Launch in General Settings prior to connection 2. User Plugs in Mobile Device via proper USB |
| **Post-conditions** | 1. Start CPY projection experience 2. Cluster Updated to CPY Experience. 3. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 4. CPY homescreen does not take video focus. 5. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889559/A-CPY Connection

SYNC+ shall be able to establish a connection to CPY Device according to MFi Specification:



##### CPY-FUR-REQ-889560/A-CPY Connection: Enumerate

Upon connection of a CPY mobile device to the appropriate ***enabled*** CPY USB port, SYNC+ is to:

Enumerate CPY device as CDP (Charging Downstream Port) as defined in MFi specification.

For Example:

Device Descriptor

Vendor ID = 0x05AC

Product ID = 0x12nn

Force other devices connected via USB to DCP (Dedicated Charging Port) charge only state (if available).

##### CPY-FUR-REQ-889564/A-Establishing a CarPlay Connection

###### CPY-FUR-REQ-889561/C-Establish USB Role-Switch

SYNC+ is to perform a CarPlay USB Role-Switch as defined in the MFi specification.

For Example:

Turn off 5V VBUS and effectively disconnect the CPY device from CDP (Charging Downstream Port) and the other USB Port switches to DCP (Dedicated Charging Port) mode (**maximum of 150ms).**

SYNC+ shall enumerate as a USB device (and **must wait at least 1000ms for CPY device (USB Host) to start enumeration**) to CPY device in CDP mode.

SYNC+ shall send Apple host flip command to CPY device

CPY device is to be the host and SYNC+ to receive commands from CPY device

**Note:** SYNC+ module will lose the ability to detect an overcurrent condition when the CPY device is in host mode. The power to the device shall still be protected for overcurrent.

If overcurrent condition does occur, the CPY device will disconnect and will have to re-enumerate and follow requirement (CPY Connection) in order to establish connection again. If overcurrent condition persists, follow: Media Player APIM SPSS regarding overcurrent.

Head unit continue the process to initiate CarPlay

**Note:** If **1000ms** passes without any traffic, SYNC+ shall become USB Host and device shall fall back to USB Device mode for audio (Follow: Media Player APIM SPSS).

**Note:** If CPY Device doesn’t support CarPlay (For Example: CarPlay is disabled under Settings – Restrictions upon device), CarPlay USB Role Switch will Fail and SYNC+ shall become USB Host. CPY Device shall fall back to USB Device mode for audio (Follow: Media Player APIM SPSS)

**Note:** If a Device doesn’t support CarPlay, do not send the USB role-swap command as defined in MFI specification. (Follow: Media Player APIM SPSS).

New MCM requirements coming in the future (approximately Model Year 2017) must support the following (Reference Media SPSS for identifying supported Hubs):

SYNC+ shall support Dual Role USB Hubs by integrating the required APIs and drivers.

SYNC+ shall be able to manage the role reversal functionality on the Dual Role USB Hubs.

SYNC+ shall be able to enumerate USB devices during a Carplay session. **Note: this is for logging support or media player/etc.**

SYNC+ shall be capable of enabling Carplay on all of the Dual Role USB Hub downstream ports.

SYNC+ shall be capable of disabling Carplay for a selected downstream port of the Dual Role USB Hub. **Note: this is to protect against long remote cables where Carplay is degraded.**

If multiple USB devices are enumerated at once, SYNC+ shall then prioritize the USB Carplay transactions.

Carplay Certification must be performed on all Carplay enabled downstream ports of the supported USB hub variants.

**\*\*SYNC+ shall enable Carplay on single and dual Role Ford USB Hubs. (To protect MY16 vehicles without above new MCM)**

SYNC+ shall support the USB Vendor Request (referered in MFi specification R21 and above) for Apple Device to get supported capabilities:

bmRequestType

bRequest

wValue

wIndex

wLength

SYNC+ shall also support USB Vendor Request for Apple Device to Host Mode Switch: wValues (bitfield)

For Example - 0x01 – Accesssory supports Apple CarPlay

Follow MFi specification and refer to H80 for complete logic flow.

###### CPY-FUR-REQ-889562/D-Establish iAP2 Session

Upon successful completion of a CarPlay USB Role-Switch, SYNC+ shall establish iAP2 link/control session with CPY device for authentication, identification, and exchange of metadata utilizing Hi-Speed USB Port (USB 2.0 Specification).

SYNC+ shall support the required iAP2 control session messages as specified for CarPlay in MFi requirements:

The supported messages include but not limited to:

***Accessory Authentication*** to CPY device utilizing these iAP2 control session messages in MFi Requirements:

RequestAuthenticationCertificate

AuthenticationCertificate

RequestAuthenticationChallengeResponse

AuthenticationResponse

AuthenticationFailed

***Accessory Identification*** to CPY device utilizing these iAP2 control session messages:

StartIdentification

IdentificationInformation

IdentifactionAccepted

IdentificationRejected

CancelIdentification

IdentificationInformationUpdate (optional)

Be prepared to start and stop providing ***Location Information*** from vehicle GPS to the CPY device at any time utilizing these iAP2 control session messages:

StartLocationInformation

LocationInformation

StopLocationInformation

SYNC+ shall provide ***Power*** to CPY device at all times unless direct user action (button press, power switch, menu item selection, detach of external power supply, etc.) is taken and device is put into an “off” state utilizing these iAP2 control session messages:

StartPowerUpdates

PowerUpdate

StopPowerUpdates

PowerSourceUpdate

SYNC+ shall only send ***Vehicle Status*** updates to the CPY device utilizing these iAP2 control session messages:

StartVehicleStatusUpdates

VehicleStatusUpdate

StopVehicleStatusUpdates

SYNC+ shall provide vehicle speed data and must include VehicleSpeedData in the IdentificationInformation message (Accessory Identification)

SYNC+ shall send ***Vehicle Information*** updates to the CPY device utilizing these iAP2 control session messages:

Identifier

Name

Engine Type

Display Name

SYNC+ shall send the appropriate ***Engine Type*** to CPY device as specified in MFi Specification.

For Example:

Gasoline = 0

Diesel = 1

Electric = 2

Plug-in Hybrid = 0,2 (An array: Follow the format Apple requests for the appropriate data to be sent)

SYNC+ shall provide the above ***VehicleInformationComponent*** as Accessory Identification stated in MFi specification.

\*\***Note: It is the supplier responsibility that Gen3 will comply with the appropriate control session commands required by the MFi requirements documentation.**

**\*\*\*Note: SYNC+ shall not send any vehicle data over to CPY device until “Agree” is accepted in Privacy & Terms of Use Pop-up requirement (For Example: Location Information, Vehicle Status, Vehicle Speed, etc.)**

***SYNC+ must identify themselves as sending and receiving all of the below Communication Usage messages and properly setup for these messages as specified in the MFi.***

SYNC+ shall support the ***Call State Updates*** feature via iAP2 containing the iAP2 control session messages:

***StartCallStateUpdates***

***CallStateUpdate***

***StopCallStateUpdates***

SYNC+ shall support the ***Communications Updates*** feature via iAP2 containing the iAP2 control sessions messages:

***StartCommunicationUpdates***

***CommunicationsUpdate***

***StopCommunicationsUpdates***

SYNC+ shall support the ***Call Controls*** feature via iAP2 containing the iAP2 control sessions messages:

***StartCallStateUpdates***

***CallStateUpdate***

***StopCallStateUpdates***

***InitiateCall***

***AcceptCall***

***EndCall***

***SwapCalls***

***MergeCalls***

***HoldStatusUpdate***

***MuteStatusUpdate***

***SendDTMF***

SYNC+ shall support the ***List Updates*** feature via iAP2 containing the iAP2 control sessions messages:

***StartListUpdates***

***ListUpdate***

***StopListUpdates***

SYNC+ shall support ***ListUpdate*** messages to be notified when a new call is started or status of a call changes on the Apple Device:

***StartListUpdates***

***StopListUpdates***

SYNC+ shall be able to utilize messages from ***List Update*** from Apple Device:

***RecentsList/RecentsListCount***

***FavoriteList/FavoritesListCount***

***RecentsList -> UnixTimestamp***

***RecentsList -> Duration***

***RecentsList -> Occurances***

***DeviceTimeUpdate***

**\*Note: SYNC+ may only cache list data while the Apple Device has an active iAP session with SYNC+. SYNC+ must clear any cached data when SYNC+ is disconnected from the device. If the device sends a list update where the available parameter is False, SYNC+ must clear any cached list data and display a message that the list is currently unavailable instead of any previously obtained list data.**

SYNC+ shall support ***Communications Update*** messages to be notified when the status of the supported communications parameters change on the Apple Device:

***StartCommunicationsUpdates***

***StopCommunicationsUpdates***

SYNC+ shall be able to utilize messages from ***Communications Update*** from Apple Device:

***SignalStrength***

***RegistrationStatus***

***CarrierName***

***CellularSupported***

***TelephonyEnabled***

***FaceTimeAudioEnabled/FacetimeVideoEnabled***

***MuteStatus***

SYNC+ shall be prepared for difference in carrier based technology (For Example: CDMA vs. GSM) communications parameters:

***InitiateCallAvailable***

***EndAndAcceptAvailable***

***HoldAndAcceptAvailable***

***SwapAvailable***

***MergeAvailable***

***HoldAvailable***

Phone interfaces provided by CarPlay API needs to be mapped to the existing CAN interfaces to the IPC. Please refer to Bluetooth Connectivity SPSS, Interface requirements (For Example: BT Phone Server Response Signals - BTP-IIR-REQ-030673, BT Phone Server Status Signals - BTP-IIR-REQ-030674 and BT Phone Client Request Signals - BTP-IIR-REQ-030675).

For Example:

SignalStrength - > BTSignalStrength.St()

BatteryChargeLevel -> BTBatteryLevel.St()

CallStateUpdate -> BTPhoneStatus.St()

EndCall -> BTEndTelService.Rsp()

**\*\*\*\*Note: Any of the pertaining messages above regarding Communication Usage that relate to Cluster should be relayed appropriately (matched with appropriate CAN message/identifier existing for BT Phone Server Response and Status Signals as well as BT Phone Client Request Signals) in order to have the “cluster updated” with the correct information specified in the Use Cases/Requirements within this document and H80. (refer to: List Browser Protocol APIM SPSS).**

###### CPY-FUR-REQ-889563/B-Establish CarPlay Session

Upon Completion of iAP2 Established Link/Control Session, SYNC+ is to utilize CarPlay Communication Plug-in and iAP2 to support message protocols and states (reference in: requirement Audio and Video Output) specific to each interface to establish a CarPlay Session.

CarPlay Session shall be established within 3 seconds upon CPY device connection (For Example: Physical USB connection - Requirement CPY Connection).

If this is the initial “CPY Connection” with this CPY Device follow requirement “CPY System Pop-up”

For Example:

CPY Device has never been connected previously

If this is a subsequent “CPY Connection” with this CPY Device and “Enable” flag has been set previously from requirement (CPY System Pop-up “Enable”) and “Agree” flag has been set previously in requirement (Privacy & Terms of Use “Agree”), follow requirement (Native HMI Function/Status bar Icons Transition to CarPlay Icons)

##### CPY-FUR-REQ-889565/A-CPY System Pop-up

Upon connection of a CPY mobile device to the appropriate ***enabled*** CPY USB port, the Head Unit is to:

Display System pop-up (“Continue”, “Disable”).

(Reference HMI: H80 – Screen 2).

###### CPY-FUR-REQ-889566/B-CPY System Pop-up "Enable"

User selects “Continue” when presented with CPY system pop-up, Head Unit is to:

Set flag to enable and provide CPY current mode for this mobile device. Do not display CPY System Pop-up on subsequent connections.

Head unit continue the process to initiate CarPlay (follow requirement Privacy & Terms of Use Pop-up)

Set default Auto Launch “ON”

The pop-up setting (“Enable”, “Disable” and Auto-Launch “ON/OFF”) that the user chooses will be able to be modified within another settings menu (reference general requirement General Settings and HMI: H80 - Screen 14).

###### CPY-FUR-REQ-889567/A-CPY System Pop-up "Disable"

User selects “Disable” when presented with CPY system pop-up:

SYNC+ shall Disable CarPlay application and CarPlay session and re-enumerate the media device in USB device mode (Follow: Media Player APIM SPSS).

For Example: Toggle power via software logic (Pin MCM\_ENBL from the processor that controls the power to MCM (MCM\_POWER)).

Set flag to disable request of CPY connection for this mobile device on subsequent connections.

As long as the flag is set to “Disable”, CPY device shall not connect via CarPlay (For Example: SYNC+ shall not send USB role-switch as specified in MFi specification).

The pop-up setting (“Enable”, “Disable” and Auto-Launch “ON/OFF”) that the user chooses will be able to be modified within another settings menu (reference general requirement General Settings and HMI: H80 - Screen 14).

##### CPY-FUR-REQ-889568/B-Privacy & Terms of Use Pop-up

After user has selected “Continue” on CPY System Pop-up, the Head Unit is to:

Display Privacy & Terms of Use Pop-up: (“Agree”, “Disagree”)

(Reference HMI: H80 – Screen 3).

###### CPY-FUR-REQ-889569/B-Privacy & Terms of Use Pop-up "Agree"

User selects “Agree” to Privacy & Terms of Use Pop-up:

Head unit is to continue the process to initiate CarPlay

Set flag to not request Privacy & Terms of Use Pop-up on subsequent connections

Follow requirements in Emergency Assistance Pop-up (if applicable).

###### CPY-FUR-REQ-889570/B-Privacy & Terms of Use Pop-up "Disagree"

User selects “Disagree” to Privacy & Terms of Use Pop-up:

Head unit is to connect CPY Device as USB Device mode (Follow: Media Player APIM SPSS)

Erase all flags related to and set in requirement (CPY System Pop-up).

##### CPY-FUR-REQ-889571/B-Emergency Assistance Pop-up

After user has selected “Agree” on Privacy & Terms of Use Pop-up and a previous phone has never connected via CarPlay prior to this connection, the Head Unit is to:

Display Emergency Pop-up: (“On”, “Off”)

(Reference HMI: H80 – Screen 4)

If EA has been set to “Off” from a previously connected Device and this is the initial connection to a specific CPY Device via USB, then display the EA Pop-up. After user has set either “On” or “Off” on this initial EA Pop-up for this device, do not show this pop-up upon subsequent device connections for this specific device.

If EA has previously been set to “On” or is set to “On”, EA Pop-up will not be displayed on any subsequent connections, unless the user turns “Off” EA in settings (reference HMI 31a).

##### CPY-FUR-REQ-889572/E-Native HMI Function/Status bar Icons Transition to CarPlay Icons

Upon Establishing a CarPlay Session, SYNC+ is to:

Shut down SYNC+ Native Voice and associate Steering wheel Voice button function to CarPlay Voice (For Example: Siri (reference general requirement Buttons)).

**Note: Keep VCA application alive and active to have the ability to build grammer (For Example: Sirius OTA update, etc.)**

Shut down SYNC+ Embedded Navigation **Renderer** in order not to render maps and associate Nav button function to CarPlay maps.

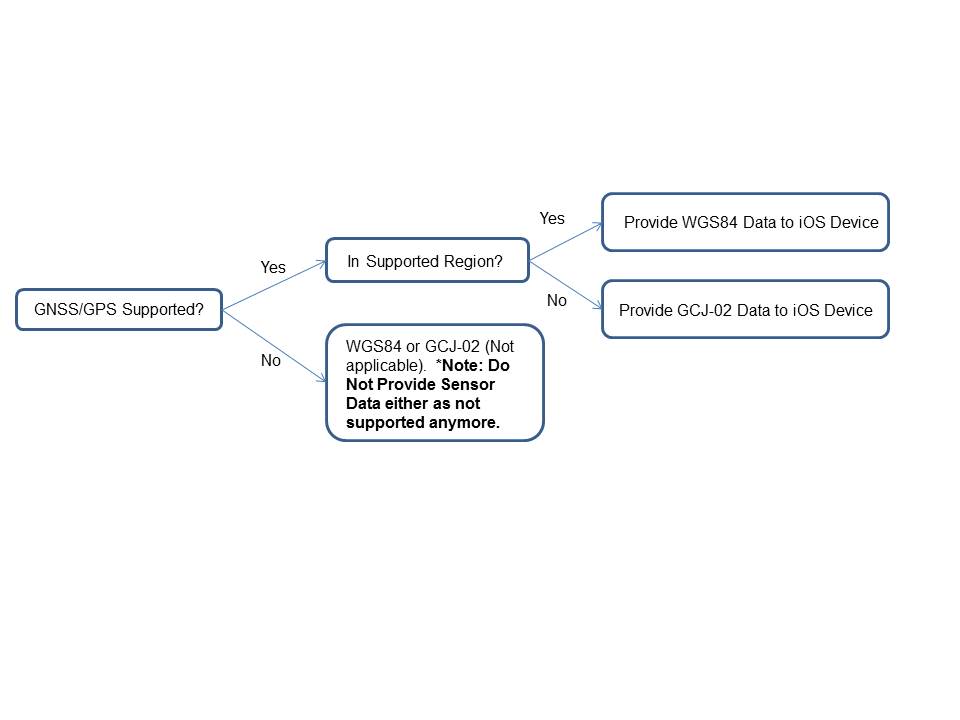
**Note: Keep Embedded Maps alive and active in order to allow Native Navigation Renderer to be turned on in the** **scenario which the vehicle gets into a qualified crash event (reference requirement Switch to Native EA HMI from CPY).**

In the event a vehicle supports GNSS/GPS information and is located in an area that requires GCJ-02 GPS information, SYNC+ shall provide that information to an iOS device as it conforms to Apple MFi Certification and Apple Location Information R4 document. In these situations, location of the vehicle shall be detected in the region via geo-fence and have the capability to revert to WGS84 GPS information if it is detected in an area that does allow WGS84.

In the event a vehicle supports GNSS/GPS information and is located in an area that supports WGS84 GPS information, SYNC+ shall provide that information to an iOS device as it conforms to Apple MFi Certification and Apple Location Information R4 document.  In these situations, location of the vehicle shall be detected in the region via geo-fence and have the capability to revert to GCJ-02 GPS information if it is detected in an area that doesn’t allow WGS84.

**\*Note: CarPlay no longer requires support for the GPHDT, PAGCD or PAACD NMEA sentences for Heading System, Gyro and Accelerometer. Do not include these sentences.**

All SYNC+ systems with CarPlay must validate their Location Information results with Apple and/or file appropriate exceptions for systems that are unable to meet these requirements (For example: Low-Cost Infotainment System - LCIS) as described in Apple MFi certification and Apple Location Information documentation.



**\*\*Exception Global Note:  If a region does not approve location data sent to device and/or SYNC+ Model Year doesn’t support GPRMC messages to indicate a minimum of GCJ-02 (For Example: GPRMCDataStatusValueX and GPRMCDataStatusValuesNotification parameters), SYNC+ should not send any location data to a device when the vehicle is configured for sale in that region (For Example: China).**

**If the vehicle’s WERS country code is set to the China region as defined in the Infotainment Diagnostics/Part II/A73 Specification (For Example: DID location 0xDE01, Byte-1 & Byte-2: “CH”=[0x43,0x48], then the SYNC+ system shall not send any location data (For Example: NMEA/Speed/Gyro/etc - defined in MFi specification) to the iPhone.**

**Vehicles configured to a China WERS code shall under no circumstance send/share any location data to the iOS device.**

Set SYNC+ Applink to run in background so that IVSU and mobile VHR can still run (reference Applink SPSS). Associate Apps button to CarPlay Homescreen.

Shut down SYNC+ Sirius Travel Link.

Associate Steering wheel Audio buttons function to CarPlay Audio (For Example: Seek Up/Down to Scan Next/Previous Track (reference general requirement Buttons)).

Wait to receive a Disable BT (reference general requirement Commands) from CPY Device (if applicable) then:

Associate Phone button function to CarPlay phone.

Associate Steering Wheel Control Phone Buttons to Accept/End/Reject Call (reference general requirement Buttons)

Associate Phone Buttons on console to CarPlay functions (if applicable (reference general requirement Buttons))

Disconnect all Bluetooth Profiles if USB connected device is connected via BT. (Refer to H80)

Ensure no other devices connected via BT profiles: HFP/PBAP/MAP (except if another device connected via BT is A2DP/AVRCP)

Ensure no previously paired devices to be connected to BT profiles: HFP/PBAP/MAP (except if another device connected via BT is A2DP/AVRCP)

Ensure no new devices to be paired for HFP.

Turn OFF Bluetooth profiles: HFP/PBAP/MAP (except A2DP/AVRCP in order for another device to be connected and stream BT music/etc).

**Note: Bluetooth shall not have the ability to be turned back “ON” for HFP unless CarPlay is disabled/disconnected or EA Crash Event (reference requirement Switch to Native EA HMI from CPY and CPY is Disconnected).**

**\*\*\*Exception depending on BT call handling status and disableBT:**

First Connection: Start CarPlay session and after determining if it is the same device, let CarPlay BORROW audio and video focus until the call ends. When those are released, go back to SYNC+ HMI and show first time pop up.

Same Device: Do not turn off Bluetooth until a disableBluetooth command is received from CarPlay device. If it is the same device based on that message’s body, then show CarPlay UI and move audio to CarPlay.

Different Device: Do not turn off Bluetooth until a disableBluetooth command is received from CarPlay device. If it is a different device based on the message body, then tell CarPlay via resource management that audio is currently occupied and do not grant audio or video access to CarPlay. SYNC+ should show the transient message (refer to H80).

Different Device + CarPlay device on a Call: Treat the same as Different Device.

BT Siri (Same Device): Upon receiving disableBT command and determining if the device is same then grant audio and video focus to CarPlay device.

BT Siri (Different Device): Treat the same as Different Device.

EA Call: Do not start any projected experience.

Send Current Mode from SYNC+ to CPY Device as defined in MFi specification (reference requirement Audio Output, Video Output and Resource Allocation Request).

For Example:

Car has Screen

Car has Main Audio

Car is doing speech

Car is engaged in a phone call

Car is performing turn-by-turn navigation

If Auto-Launch flag is “ON”, launch CPY Projection Experience

If Auto-Launch flag is “OFF”, stay in Native HMI with transitioned CarPlay buttons/functions.

##### CPY-FUR-REQ-889573/A-USB Host Mode Swap Not Available

Plugin USB to port in which USB Host mode swap is not available

If device has previously selected “Continue”:

Head Unit shows transient message to make customer aware that CPY device needs to be plugged into an enabled USB port (reference HMI: H80 – Screen 22)

Otherwise:

Head Unit not to show transient message.

##### CPY-FUR-REQ-889574/B-Another Projection Enabled Device Active

Plugin USB to port in which USB Host mode swap is available

Another Projection enabled device is already active

Head Unit is to utilize USB connection as USB Device Mode (if applicable) and the device is also charging.

#### CPY-FUR-REQ-889575/A-Connecting Mobile Device

##### CPY-FUR-REQ-889576/A-Safety Feature is Active during CPY device Connection

Safety Feature retains focus on Head Unit

When safety feature becomes inactive, follow “Requirement CPY Connection”

##### CPY-FUR-REQ-889577/A-Parking Feature Active during CPY device Connection

Parking Feature retains focus on Head Unit

When Parking feature becomes inactive, follow “Requirement CPY connection”

##### CPY-FUR-REQ-889578/A-Voice Button Pressed During System Pop-up

SYNC+ shall give audio focus to CPY Device.

SYNC+ will retain video focus and display the system pop-up it currently is on (For Example: CPY System Pop-up, Data Consent Pop-up, EA Pop-up).

##### CPY-FUR-REQ-889579/A-CPY Device connected during Voice Session

Head Unit to continue native voice session.

Transient message to make customer aware that CPY device will begin after voice session is ended (reference HMI: H80 – Screen 18).

When voice session is ended, follow requirement CPY Connection

**Note:** Pending specification deviation from Apple from this requirement regarding establishing a CarPlay session as defined in MFi specification (For Example: “The accessory must be able to establish a CarPlay session within 3 seconds of Apple device connection”

Otherwise, end voice session as defined in requirement Native HMI Function/Status bar Icons Transition to CarPlay Icons.

##### CPY-FUR-REQ-889580/A-Head Unit Screen off During CPY Connection

If Head Unit screen is off and CPY device is connected:

Turn head unit screen ON and follow “Requirement CPY Connection”

##### CPY-FUR-REQ-889581/B-USB device (non-CPY) connected to non-CPY enabled port

If USB device (Non-CPY) is connected to non-CPY enabled port and had audio focus when a CPY device is connected to CPY enabled port:

Follow requirement “CPY Connection”

Audio focus is given to last known audio source. If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8).

Non-CPY device becomes charge only

**Note:** Send pause to Non-CPY Device (For Example: So audio isn’t playing music from device speakers (if applicable).

If “Disable” has been previously selected and set from requirement (CPY System Pop-up “Disable”), continue to have audio focus to Non-CPY USB device. CPY Device will connect as USB Device mode or charge only (Follow: Media Player APIM SPSS).

##### CPY-FUR-REQ-889582/A-CPY Device Connection during another Active BT Device is receiving an Incoming Call/Active Call/Outgoing Call

Wait till the Incoming Call/Active Call/Outgoing Call session is ended via BT device.

Transient message to make customer aware that CPY device will begin after phone call is ended (reference HMI: H80 – Screen 18).

Follow requirement CPY Connection

**Note:** Pending specification deviation from Apple from this requirement regarding establishing a CarPlay session as defined in MFi specification (For Example: “The accessory must be able to establish a CarPlay session within 3 seconds of Apple device connection”

Otherwise, keep active BT session until Incoming Call/Active Call/Outgoing Call session is ended via BT device. CarPlay Video/Audio focus will begin after session is ended.

For Example:

**Reject disableBT command until BT session is ended (reference requirement IVI-AUDIO requests Video from Mobile Device). Then follow requirement Native HMI Function/Status bar Icons Transition to CarPlay Icons.**

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

Never: 1000

**Resource Ownership transfer type**

Take: 1

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

If “Disable” has been previously selected and set from requirement (CPY System Pop-up “Disable”), CPY Device will connect as USB Device mode (Follow: Media Player APIM SPSS).

##### CPY-FUR-REQ-889583/A-CPY Device Connection during Incoming/Active/Outgoing Phone Call

Follow requirement CPY Connection

Launch CPY in Phone Screen according to requirement (Mobile Device initiates Audio and Video Request when in Native HMI for CPY), during Incoming Call/Active Call/Outgoing Call. (Reference HMI: H80 – Screen 9).

**Note:** If this is the initial time connecting the CPY Device and the device is not connected via BT or other projection experience and it is in Privacy/Speaker: Follow requirement CPY Connection. If user doesn’t push “Continue” or “Disable” when CPY System Pop-up is displayed, allow CPY Device to have audio focus, but video focus remains on Native HMI.

If “Disable” has been previously selected and set from requirement (CPY System Pop-up “Disable”), CPY Device will connect as USB Device mode (Follow: Media Player APIM SPSS) and Head Unit to remain in Native HMI.

## FUN-REQ-889645/A-Audio Output

Audio Output

### Use Cases

Use Cases

### Requirements

Requirements

#### CPY-FUR-REQ-889588/A-Audio Output

##### CPY-FUR-REQ-889589/A-Audio Parameters

**Audio Parameters:**

Audio Stream Requirements:

Sample Rate: Up to 48kHz

Bit Depth: Up to 32 bit

Channels: Stereo

Duplexing: N/A

SYNC+ shall support different audio types as defined in the MFi specification.

For Example:

Main Audio will be received with a stream ID value of 100

Alternate Audio will be received with a stream ID value of 101

SYNC+ shall have the ability to support Ducking/Unducking request as defined in MFi specification.

For Example:

duckAudio

unduckAudio

(referenced in general requirement Commands)

##### CPY-FUR-REQ-889590/A-Main Audio

**Main Audio:**

Upon Completion of CPY Connection, SYNC+ will only support one source for ***main*** audio for Voice control, Telephony, Media.

###### CPY-FUR-REQ-889591/B-Voice Control

**Voice Control**:

SYNC+ shall disable all audio output while a voice session (speech is being recorded or going through the vehicle microphone) to prevent interference with recognition algorithms.

SYNC+ shall also engage the Blower Reduction requirement described in this document while a voice session (speech is being recorded or going through the vehicle microphone) to help prevent interference with recognition algorithms.

For Example:

App State Enum value (as specified in MFi Specification) – Speech with a value of 1.

Speech mode Enum value – Recognizing Speech with a value of 2

Speech mode Enum value – Speaking with a value of 1 (Only During a Siri Session).

SYNC+ shall accept and provide the below sample rate:

Sample Rate: Up to 48kHz

Bit Depth: Up to 32 bit

Channels: Stereo

Duplexing: Full-Duplex

Latency from the reception of sound at SYNC+’s microphone and the receipt by the CarPlay Communication Plug-in of a buffer of LPCM audio representing that sound must not exceed specified time as defined in MFi specification. (For Example: **60ms)**. Likewise, latency from the receipt of a buffer of LPCM audio by SYNC+ from the CarPlay Communication Plug-in to the time it is emitted by SYNC+’s output speaker must not exceed specified time as defined in MFi specification **(For Example: 35ms).**

###### CPY-FUR-REQ-889592/B-Telephony

**Telephony**:

SYNC+ shall engage the Blower Reduction requirement described in this document while a telephony session (speech is being recorded or going through the vehicle microphone during a phonecall) to help prevent interference with call sound quality.

For Example:

App State Enum value (as specified in MFi Specification) – Phone with a value of 2.

SYNC+ can also utilize Communication Usage messages outlined in MFi specification and Establish iAP2 Session to utilize specific times or confirmation of telephony/Facetime sessions.

For Example:

CallStateStatusUpdate enum values

Active with a value of 4

Disconnected with a value of 0

SYNC+ shall accept and provide the below sample rates:

Sample Rate: Up to 48kHz

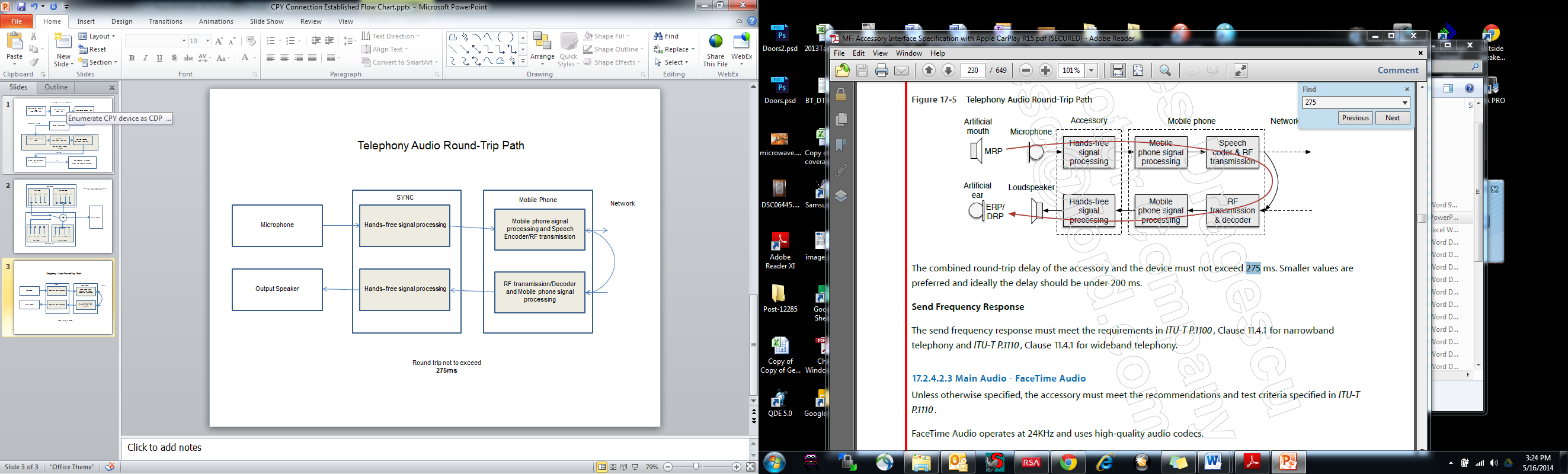
Bit Depth: Up to 32 bit

Channels: Stereo

Duplexing: Full-Duplex

SYNC+ will utilize its own echo cancellation and noise processing tuned for telephony.

The combined telephony audio round-trip delay of SYNC+ and the device must not exceed specified time as defined in MFi specification **(For Example 275ms). (Recommended to be below 200ms).**



###### CPY-FUR-REQ-889593/A-Media

**Media:**

SYNC+ shall support a minimum of both audio requirements below for Entertainment:

***Main*** Audio Requirement 1:

Sample Rate: 44.1kHz

Bit Depth: 16 bit

Channels: Stereo

Duplexing: N/A

***Main*** Audio Requirement 2:

Sample Rate: 48kHz

Bit Depth: 16 bit

Channels: Stereo

Duplexing: N/A

SYNC+ shall have control of volume and display of volume control on Sync+ Unit as CPY device only provides unattenuated line-level audio output.

Audio output streams encoded in the form of uncompressed LPCM.

Latency from the receipt of a buffer of LPCM audio by SYNC+ from the CarPlay Communication Plug-in to the time it is emitted by SYNC+’s audio speaker must not exceed specified time as defined in MFi specification **(For Example: 35ms)**.

##### CPY-FUR-REQ-889594/A-Alternate Audio

**Alternate Audio:**

SYNC+ shall support multiple sources of ***alternate*** audio that can be mixed together specified in MFi requirements.

For Example: UI sounds, alerts, navigation prompts, etc.

SYNC+ shall support a minimum of both audio requirements below:

***Alternate*** Audio Requirement 1:

Sample Rate: 44.1kHz

Bit Depth: 16 bit

Channels: Stereo

Duplexing: N/A

***Alternate*** Audio Requirement 2:

Sample Rate: 48kHz

Bit Depth: 16 bit

Channels: Stereo

Duplexing: N/A

Latency from the receipt of a buffer of LPCM audio by SYNC+ from the CarPlay Communication Plug-in to the time it is emitted by SYNC+’s audio speaker must not exceed specified time as defined in MFi specification **(For Example 35ms)**.

##### CPY-FUR-REQ-889595/A-Ducking

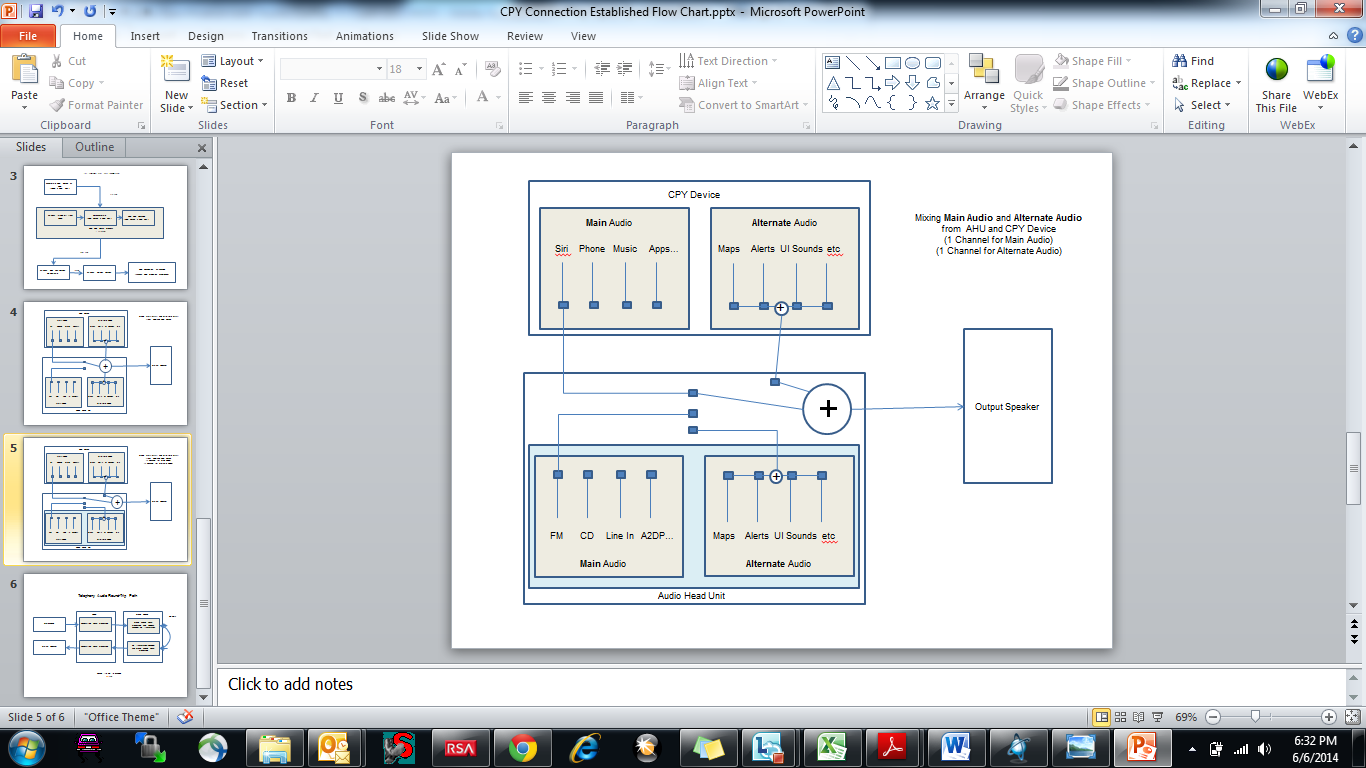
SYNC+ shall support ***Ducking*** as defined in MFi specification

SYNC+ shall also support ***Unducking*** as defined in MFi specification

SYNC+ shall support one main output and one alternate audio stream. These can be mixed together utilizing ***Ducking***.

SYNC+ shall ***Duck/UnDuck*** within specified time as defined in MFi specification **For Example (10-20ms)**. (Response within **maximum of 75ms** is required).

For Example:



##### CPY-FUR-REQ-889596/A-Audio Setup

**Audio Setup:**

SYNC+ shall support all audio setup requirements as defined in MFi specification.

For Example:

SYNC+ shall utilize the Communication Plug-in in order to setup and control audio streaming through a control channel. SYNC+ shall configure and manage the main and alternate audio streams, including callbacks to schedule audio delivery to SYNC+ and notifications from CPY Device whenever sample rate or format changes are required.

SYNC+ shall perform time SYNC+ negotiation with the CPY Device. SYNC+ shall furthermore utilize the Communication Plug-in to SYNC+hronize clocks between SYNC+ and CPY Device in order to be able to present media data at the correct time (reference requirement Clock Settings (SYNC+hronization)).

SYNC+ shall drive all audio streams (input and output) from the clock that is SYNC+hronized with the CPY Device (requirement Clock Settings (SYNC+hronization)).

SYNC+ shall report audio sample rates to CPY Device utilizing the ***Info Message***.

CPY Device shall communicate all sample rate transitions utilizing the ***Setup Message.*** Once SYNC+ receives this ***Setup Message,*** and is ready to receive audio from CPY Device, SYNC+ shall start emitting the first buffer of audio via the speaker within **100ms** of receiving the setup command from CPY Device.

##### CPY-FUR-REQ-889597/A-Audio Control

**Audio Control:**

SYNC+ shall support all audio control requirements as defined in MFi specification.

SYNC+ or the CPY Device shall be able to distinguish between app states and configurable modes of ***Resource Ownership*** as defined in MFi specification:

For Example:

***Take*** Audio as defined in MFi specification

***Untake*** Audio as defined in MFi specification

***Borrow*** Audio as defined in MFi specification

***Unborrow Audio*** as defined in MFi specification

The above Resource Ownership “states” shall utilize configurable constraint modifiers under different circumstances:

***Anytime*** as defined in MFi specification

***User-Initiated*** as defined in MFi specification

***Never*** as defined in MFi specification

SYNC+ shall honor any updates to the current mode within **100ms** of receiving them from the CPY Device.

SYNC+ shall update the CPY device with its current state, regardless of the current mode.

SYNC+ shall be ready to handle setup or record events from the CPY Device within **200ms** of the time that SYNC+ issues the ***changeModes*** command or receives a ***modesChanged*** command (reference requirement Commands)

***changeModes:*** Change audio resource states and/or app states sent by SYNC+ (as defined in MFi specification).

***modesChanged:*** CPY Device sends updates of the SYNC+’s current mode after a mode change by the CPY Device (as defined in MFi specification).

##### CPY-FUR-REQ-889598/A-Audio Termination

**Audio Termination:**

SYNC+ shall support all audio termination requirements as defined in MFi specification.

For Example:

When SYNC+ receives a **TEARDOWN** request from CPY Device to end one or more streams, SYNC+ stops processing for specified streams and releases corresponding audio resources.

When SYNC+ receives a **TEARDOWN** request from CPY Device to end the session, SYNC+ stops all audio processing and releases all session-specific audio resources.

SYNC+ shall switch to Last active audio source if available, If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8) as if there is no CPY Device connection (reference requirement CPY is Disconnected)).

## FUN-REQ-905762/A-Phone/Voice Blower Motor Reduction Strategy

### Requirements

#### CPY-FUR-REQ-905751/A-Phone/Voice Blower Motor Reduction Strategy

The In-Vehicle Infotainment System shall request that the climate module reduce the blower motor when a CarPlay call is active and a Siri Session is active. The In-Vehicle Infotainment System shall enable / disable the blower motor within 50ms of a CarPlay phone call or a Siri Session.

##### CPY-FUR-REQ-905752/A-Blower Motor Reduction Activation / Deactivation

The intent of this specification is to outline the scenarios that the phone application/IVIS 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 and Siri session.

For purposes of determining when to request the Blower Motor Reduction Activation / Deactivation, the CarPlay application shall determine the status of a call by SYNC+ monitoring the following:

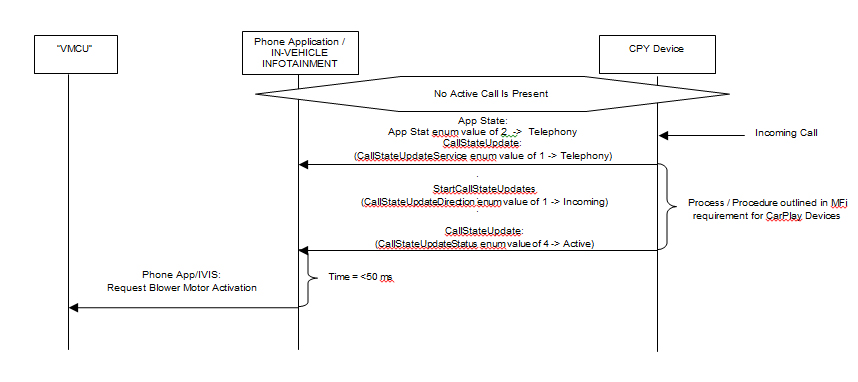
* ***AppStates***
* ***StartCallStateUpdates***
* ***CallStateUpdate***
* ***InitiateCall***
* ***AcceptCall***
* ***EndCall***

Since all CarPlay (CPY) Devices must support iAP2 control session messages, these indicators have been chosen over iAP2 indicators/messages.

**\*Note: If iAP2 Communication Usage/Update Messages are not utilized, disregard the following requirements pertaining to Phone/Voice Blower specific requirements and only reduce blower motor upon a CarPlay call is active and a Siri Session is active. The supplier shall utilize the Appstates (For Example: Telephony/Voice Sessions) with the assistance of available modechanges/changemodes/teardowns and perhaps resource allocation to generically reduce the blower motor when Telephony/Voice Session has begun and increase blower motor when Telephony/Voice Session has ended.**

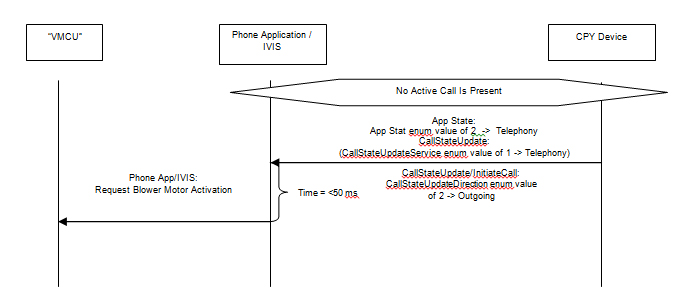
##### CPY-FUR-REQ-905753/A-Incoming Call (Setting Blower Motor Reduction Activation)

In this scenario, the phone application/IVIS 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).



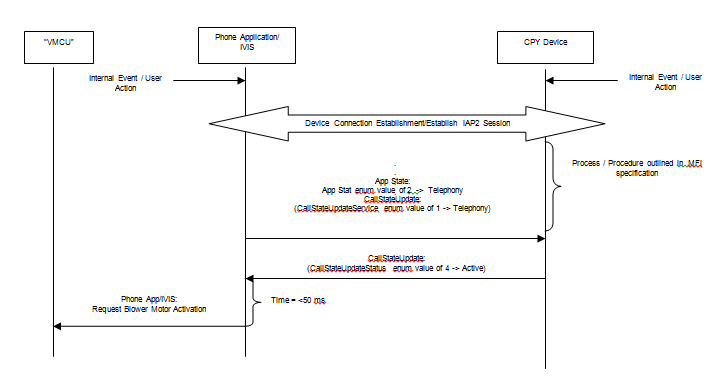
##### CPY-FUR-REQ-905754/A-Outgoing Call initiated from CarPlay (Setting Blower Motor Reduction Activation)

In this scenario, the phone application/IVIS shall request to reduce the blower motor after the phone call set up status has been updated to “outgoing call set up is ongoing”.



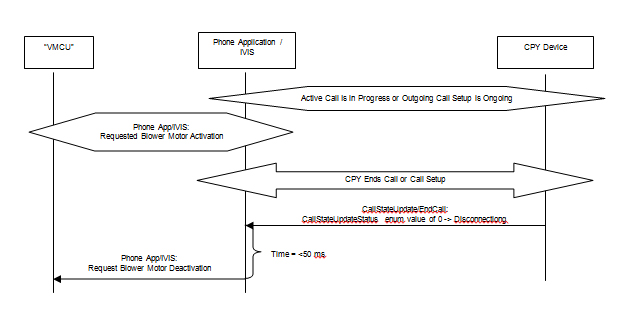
##### CPY-FUR-REQ-905755/A-Active Call at Time of Connection (Setting Blower Motor Reduction Activation)

This scenario is meant to capture the use cases of connection upon resume as well as a manual connection request from the user (For example: Settings/Preferences/etc). In this case, the phone application/IVIS will follow the connection sequence outlined within the MFi specification. Upon notification of a “call in progress” via the CPY’s iAP2 message response (For Example: App state/CallStateUpdate) response, the phone application shall request to reduce the blower motor.



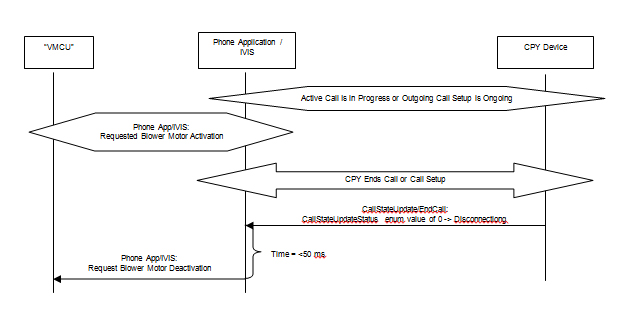
##### CPY-FUR-REQ-905756/A-End of a Call (Setting Blower Motor Reduction Deactivation)

In this scenario, the phone application/IVIS will request to deactivate the blower motor reduction due to conclusion of a phone call and/or disconnected call setup.



##### CPY-FUR-REQ-905757/A-Disconnect (Setting Blower Motor Reduction Deactivation)

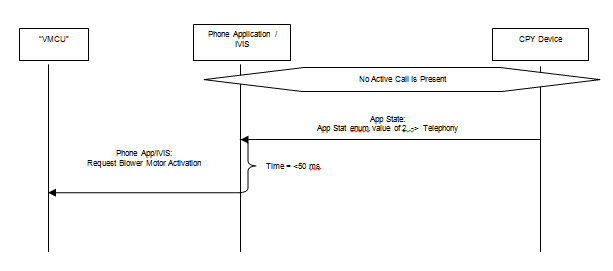
In this scenario the phone application/IVIS will need to deactivate the blower motor reduction in the event of an intentional or random disconnect.



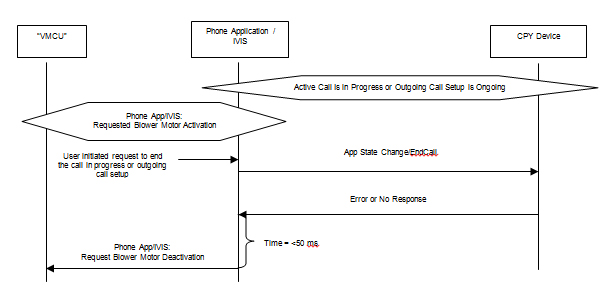
##### CPY-FUR-REQ-905758/A-Unspecified (per MFi) Conditions Handling

The phone application/IVIS shall anticipate the following unspecified conditions and activate / deactivate the blower motor reduction.

1. A CarPlay Device updates the phone application that an Ongoing Call is in process without any corresponding iAP2 messages/notifications (For Example: CallStateUpdate). In this case, the phone application shall request to reduce the blower motor reduction. The phone application/IVIS 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/IVIS sends an App State change or EndCall (CallStateUpdateStatus: Disconnected) to the connected CPY Device, but the CPY fails to end the call. In this case, the phone application/IVIS shall request to deactivate the blower motor reduction.

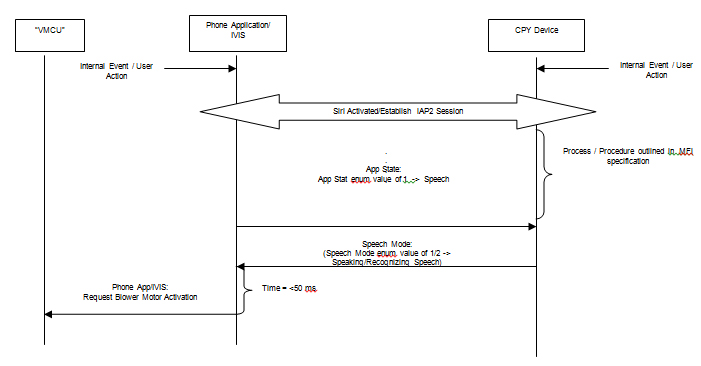


##### CPY-FUR-REQ-905759/A-Additional Notes

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.

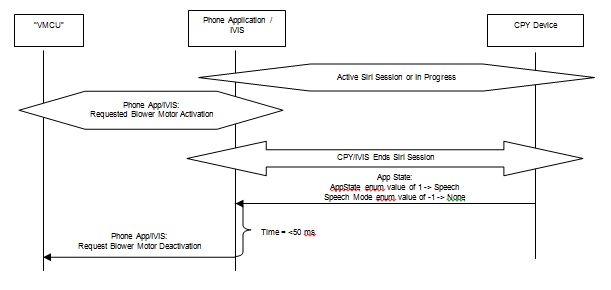
##### CPY-FUR-REQ-905760/A-Active Siri Session (Setting Blower Motor Reduction Activation)

This scenario is meant to capture the use cases of a Siri request from the user (For example: SWC/CPY Device/CPY Home Screen/etc). In this case, the phone application/IVIS will follow the sequence outlined within the MFi specification. Upon notification of a “Siri Session” via the CPY’s iAP2 message response (For Example: App state/Speech Mode) response, the phone application/IVIS shall request to reduce the blower motor.



##### CPY-FUR-REQ-905761/A-End of a Siri Session (Setting Blower Motor Reduction Deactivation)

In this scenario, the phone application/IVIS will request to deactivate the blower motor reduction due to conclusion of a Siri session.



## FUN-REQ-889646/A-Video Output

Video Output

### Use Cases

Use Cases

### Requirements

Requirements

#### CPY-FUR-REQ-889599/A-Video Output

##### CPY-FUR-REQ-889600/B-Video Parameters

**Video Parameters:**

Display Requirements:

Touchscreen

Resolution: Native Screen Resolution at 60 fps

24 bits of RGB color per pixel

Refresh Rate: 30 Hz

Decoder: H.264

YCbCr 4:2:0 Choma subsampling

SYNC+ shall support video types as defined in the MFi specification.

For Example:

Screen will be received with a stream ID value of 110

The touch surface shall be sampled at the same rate as the refresh rate of the video stream on the Touchscreen.

SYNC+ shall send CPY device fidelity information in order to utilize touchscreen interaction as specified in MFi specification.

For Example:

To claim support for high-fidelity touch, the time between a user touch input to the time a frame updates on the display must be less than 140ms.

Head Unit is to recognize a user touch input and send touch input data to mobile device **within 50ms.**

SYNC+ shall display Video content (UI stream) stream from the CPY Device on a dedicated channel.

SYNC+ will decrypt all control and video data packets which are encrypted (AES-128) utilizing the Communication Plug-in.

##### CPY-FUR-REQ-889601/B-Video Setup

**Video Setup:**

SYNC+ shall support all video setup requirements as defined in MFi specification.

For Example:

SYNC+ shall utilize the Communication Plug-in in order to setup and control video streaming through a control channel. SYNC+ shall configure the UI stream to resolution of the native display.

SYNC+ shall perform time SYNC+ negotiation with the CPY Device. SYNC+ shall furthermore utilize the Communication Plug-in to SYNC+hronize clocks between SYNC+ and CPY Device in order to be able to present video data at the correct time.(Note: Microsecond resolution clock or better is required).

SYNC+ shall report the target resolution and physical dimensions for the CPY Projection Content via the ***Info Message.***

CPY Device shall communicate configurations and set up of video stream utilizing the ***Setup Message.*** Once SYNC+ receives this ***Setup Message,*** and is ready to receive H.264 frames from CPY Device, SYNC+ shall start emitting the screen stream to the Sync+ Unit.

SYNC+ shall display CarPlay UI on Sync+ Unit within **500ms** of receiving a session configuration that includes a screen stream.

##### CPY-FUR-REQ-889602/A-Video Control

**Video Control:**

SYNC+ shall support all video control requirements as defined in MFi specification.

SYNC+ or the CPY Device shall be able to distinguish between app states and configurable modes of ***Resource Ownership*** as defined in MFi specification:

For Example:

***Take*** Video as defined in MFi specification

***Untake*** Video as defined in MFi specification

***Borrow*** Video as defined in MFi specification

***Unborrow Video*** as defined in MFi specification

The above Resource Ownership states shall utilize configurable constraint modifiers under different circumstances:

***Anytime*** as defined in MFi specification

***User-Initiated*** as defined in MFi specification

***Never*** as defined in MFi specification

SYNC+ shall honor any updates to the current mode within **100ms** of receiving them from the CPY Device.

SYNC+ shall update the CPY device with its current state, regardless of the current mode.

SYNC+ shall be ready to handle setup or record events from the CPY Device within **200ms** of the time that SYNC+ issues the ***changeModes*** command or receives a ***modesChanged*** command (reference requirement Commands).

***changeModes:*** Change video resource states and/or app states sent by SYNC+ (as defined in MFi specification).

***modesChanged:*** CPY Device sends updates of the SYNC+’s current mode after a mode change by the CPY Device (as defined in MFi specification).

##### CPY-FUR-REQ-889603/A-Video Termination

**Video Termination:**

SYNC+ shall support all video termination requirements as defined in MFi specification.

For Example:

When SYNC+ receives a **TEARDOWN** request from CPY Device to end one or more streams, SYNC+ stops processing for specified streams and releases corresponding video resources.

When SYNC+ receives a **TEARDOWN** request from CPY Device to end the session, SYNC+ stops all video processing and releases all session-specific video resources.

SYNC+ shall switch to Last Active Native HMI screen if available, if last known screen is not available default to Native Homescreen (as if there is no CPY Device connection (reference requirement CPY Device is Disconnected)).

## FUN-REQ-889644/A-CPY Projection Experience

CPY Projection Experience

### Use Cases

Use Cases

### Requirements

Requirements

#### CPY-FUR-REQ-889587/B-CPY Projection Experience

CPY Projection Experience to follow HMI Screen flow in SYNC+ Gen 3 H80 Specification. **\*\*Note: If there are any discrepancies from this document and the H80 HMI Screen flow, follow H80 as that will be the master document.**

SYNC+ shall utilize and receive/send the configurable Resource Allocation Requests (Requirement Resource Allocation Request) and app states to/from CPY Device, according to MFi Specification, in order to understand when to go into Projection Experience.

For Example:

SYNC+ shall send/receive Current Mode through mode changes: Mode changes originating from the CPY Device are communicated directly to SYNC+ as an update to the Current Mode; they are not preceded by a mode change request from the CPY Device to SYNC+ (reference general requirement Commands).

The CarPlay UI must appear on SYNC+ display within 500ms of SYNC+ receiving a session configuration that includes a screen stream (Requirement Video Setup) only if Auto-launch is set to “ON” or CPY Device requests screen for scenarios upon connection (For Example: active call on device, audio playing on device, etc.)

If Auto-Launch is set to “OFF”, Native HMI retains video focus and Icons transition (reference requirement Native HMI Function/Status bar Icons Transition to CarPlay Icons).

## FUN-REQ-889648/A-Connection with SYNC+ Features Active

Interaction with SYNC+ Features

### Use Cases

Use Cases

#### CPY-UC-REQ-889405/A-Connection with Embedded Navigation Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  CPY Application is installed on mobile device  User previously completed a connection of this mobile device via CPY and selected “Continue” |
| **Scenario Description** | 1. Embedded navigation route is active on Sync+ Unit 2. User plugs in mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. Cancel Route on Embedded Navigation 2. Cancel Route on Navigation Repeater 3. Disable Nav mode on cluster 4. Disable Navigation Renderer 5. Start CPY projection experience 6. Cluster Updated to CarPlay Experience. 7. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 8. SYNC+ provides CPY device with its current mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889421/A-Connection with Sirius Travel Link Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  CPY Application is installed on mobile device  User previously completed a connection of this mobile device via CPY and selected “Continue”  Sirius Travel Link is active on Sync+ Unit |
| **Scenario Description** | 1. User plugs in mobile device via Bluetooth or appropriate USB port |
| **Post-conditions** | 1. STL session ended 2. Start CPY projection experience 3. Cluster Updated to CPY Experience. 4. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 5. SYNC+ provides CPY device with its current mode. 6. SYNC+ goes to CPY Home screen |
| **List of Exception Use Cases** | N/A |

#### CPY-UC-REQ-889424/A-Connection when Applink is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  CPY Application is installed on mobile device  User previously completed a connection of this mobile device via CPY and selected “Continue”  Applink is Active on Mobile Device and Native HMI |
| **Scenario Description** | 1. User connects mobile device via USB |
| **Post-conditions** | 1. Applink session ended and notify user 2. If Applink has audio focus, audio focus goes to last known audio source. If last used audio source is not available go to Audio Selection Source. 3. Start CPY projection experience 4. Cluster Updated to CPY Experience. 5. SYNC+ updates Phone, Audio, Voice, Navigation and Apps features to CPY Experience. 6. SYNC+ provides CPY device with its current mode. 7. SYNC+ goes to CPY Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889585/A-Sirius Travel Link Active

End STL session

Follow requirement CPY Connection

Go to Native HMI Home Screen only if Auto-launch is disabled.

Go to CarPlay Homescreen if Auto-launch is enabled.

#### CPY-FUR-REQ-889586/A-Applink Session Active

End Applink session and notify user

Follow requirement CPY Connection

If Applink had Audio focus, audio focus is given to last known audio source. If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8).

Go to Native HMI Home Screen only if Auto-launch is disabled

Go to CarPlay Homescreen if Auto-launch is enabled.

#### CPY-FUR-REQ-889584/A-Embedded Navigation Route Active

Capture current location and destination location information (lat, long, and/or address) and encapsulate a message to be sent to CPY device on launch as defined in MFi specification.

Cancel Route on Embedded Navigation

Cancel Route on Navigation Repeater

Disable Nav mode on cluster

Send message with location information via URL Scheme to CPY Device so as to launch Maps application with corresponding information.

Follow requirement CPY Connection

Go to Native HMI Home Screen only if Auto-launch is disabled.

Go to CarPlay Homescreen if Auto-launch is enabled.

(Reference HMI: H80 – Screen 20a, 20b and 21).

## FUN-REQ-889655/A-SYNC+ Features while a Connection is Present

SYNC+ Features while a Connection is Present

### Use Cases

Use Cases

#### CPY-UC-REQ-889440/A-CPY to Native EA HMI

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Ignition Status RUN  Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via USB  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit |
| **Scenario Description** | 1. Vehicle is in a “qualified crash event”   Qualified Accident: Airbags deployed and/or fuel pump is shut-off – “eCallNotification” = 0x2 Active is transmitted on the HS CAN Bus   1. Emergency Assistance is initiated |
| **Post-conditions** | 1. SYNC+ sends CPY command to call Emergency Assistance: 911 2. Emergency assistance takes Video focus 3. Embedded navigation and renderer is activated to display map for EA screen 4. When Emergency assistance session ended: user can still access the EA Crash screen. CPY is given Video focus if user initiates CarPlay button press from status/function bar. |
| **List of Exception Use Cases** | E1 CPY Device is on Active call  E2 CPY Device is disconnected/ejected from USB port |

##### CPY-UC-REQ-889441/A-CPY Device is on Active call

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Device connected to system via USB and CPY enabled 2. CPY Device is on Active Call |
| **Post-conditions** | 1. End Active Call 2. SYNC+ sends CPY command to call Emergency Assistance: 911 3. Emergency assistance takes Video focus 4. Embedded navigation and renderer is activated to display map for EA screen 5. When Emergency assistance session ended: User can still access the EA Crash screen. CPY is given Video focus if user initiates CarPlay button press from status/function bar. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889442/A-CPY Device is disconnected/ejected from USB port

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Device gets disconnected/ejected from system via USB |
| **Post-conditions** | 1. CPY session is ended 2. SYNC+ attempts to connect to “disconnected/ejected” device via BT. 3. Emergency assistance takes Video, Audio and Microphone focus 4. Emergency assistance makes EA call via BT device. 5. Embedded navigation and renderer is activated to display map for EA screen |
| **List of Exception Use Cases** | N/A |

#### CPY-UC-REQ-889443/A-Voice Commands

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port.  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit |
| **Scenario Description** | 1. Sync+ Unit is in CPY HMI or Native HMI 2. Voice Command Button is pressed (PTT Button or Mobile Device) |
| **Post-conditions** | 1. CPY takes audio focus from native audio 2. CPY takes video focus from native HMI (if requested by Carplay). 3. Microphone audio is sent to mobile device |
| **List of Exception Use Cases** | E1 - Safety Feature Active  E2 - Parking Feature Active |
| **Interfaces** |  |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889446/A-Touchscreen Pressed Commands

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit |
| **Scenario Description** | 1. Sync+ Unit is in Native HMI 2. User initiates/presses Touchscreen Buttons |
| **Post-conditions** | 1. CPY takes audio focus from native audio 2. CPY does not take video focus from native HMI (if requested by CPY), until user is done with pressing touchscreen buttons on touchscreen (touch input response time) |
| **List of Exception Use Cases** | E1 - Safety Feature Active  E2 - Parking Feature Active |
| **Interfaces** |  |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889604/A-Switch to Native EA HMI from CPY

If user is in a “qualified crash event” and Emergency Assistance is initiated (reference Emergency Assistance APIM SPSS):

\*Qualified Crash Event: Airbags deployed and/or fuel pump is shut-off – “eCallNotification” = 0x2 Active is transmitted on the HS CAN Bus.

SYNC+ shall utilize the configurable URL scheme according to MFi Specification.

For Example:

SYNC+ shall utilize requestUI: “tel:xxx-xxx-xxx” – the CarPlay Phone application will not be shown, but the phone call with the region specific number for Emergency Assistance (For Example: 911 – North America) will be placed and retain audio focus.

If the CPY device is in an active personal call in the event of a “qualified accident”, SYNC+ will terminate the active personal phone call, and send the requestUI for Emergency Assistance.

If the CPY device is in an active emergency call (SYNC+ to verify phone call (For Example: metadata) to see if 911 is the active call) in the event of a “qualified accident”, SYNC+ will not terminate the active emergency phone call, and send the requestUI for Emergency Assistance after the call is ended.

For Example:

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: N/A

**Resource Contraint**

Never: 1000

**Resource Ownership transfer type**

Take: 1

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

**\*Note: SYNC+ should still send changeModes request, but will not wait for modesChanged notification before taking Video and Audio focus (if necessary).**

Native EA HMI Screen is in focus:

Embedded Navigation Maps Renderer is turned on in order to take vehicle location and render the map presented in the Native EA HMI Screen (reference HMI: H35 –Screen 12).

Emergency Contacts button will be available and if pressed a pop-up will display the Emergency Contacts (reference HMI: H35 – Screen 18). Once contact is pressed on pop-up, SYNC+ shall utilize the requestUI: <tel:xxx-xxx-xxx> to place the call. Native EA HMI will still have video focus, and CarPlay will have audio focus.

The buttons on the status function bar will still be available to link to CarPlay functionality screens to be displayed if pressed: Apple Phone, Apple Maps, CarPlay, Apple Music. (Reference requirement Native HMI to CPY Homescreen/Apple Maps/Apple Music/Apple Phone initiated by User).

**Note:** If the device gets disconnected/ejected from the system during a qualified accident (follow requirement CPY Device is Disconnected):

For Example:

CPY session is ended

Emergency assistance takes Video, Audio, and Microphone focus

Embedded navigation Renderer is activated to display map for Native EA HMI screen

BT will try to connect to the device that was previously connected (if applicable).

Once BT is connected (if available), the device will place an EA call.

(Follow Emergency Assistance APIM SPSS and HMI: H35).

#### CPY-FUR-REQ-889605/A-Voice Commands with CPY Enabled

CPY is enabled; the Voice button function shall associate with CarPlay speech, For Example: Siri (reference requirement Buttons).

When a CPY device is connected and CPY is enabled in either CPY HMI or Native HMI screen and a voice button is pressed (PTT Button: Steering Wheel Control or Mobile Device Button (CPY Device ability to activate Siri), the Sync+ Unit should grant CPY video focus from Native HMI (if requested by CPY) and grant CPY audio focus as defined in MFi specification. Microphone audio should be sent to the mobile device (reference HMI: H80 – Screen 10 and requirement Voice Control).

For Example:

SYNC+ shall utilize requestSiri (referenced in general requirements buttons and commands)

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

User-Initiated: 500

**Resource Ownership transfer type**

Borrow: 3

**Resource transfer priority**

User-Initiated: 500

**App State**

Speech: 1

**Speech Mode**

Recognizing Speech: 2

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement Parking/Safety Feature is Active during Mobile Device initiates Audio and/or, Video Request, or CPY grants Native Video/Audio to Sync+ Unit, when in Native HMI for CPY)

#### CPY-FUR-REQ-889606/A-Touchscreen Button Commands with CPY Enabled

When a CPY device is connected and CPY is enabled in Native HMI screen and a Touchscreen button is pressed, the Sync+ Unit should wait the amount of time the touch input takes for button to be released before it grants CPY video focus from Native HMI (if requested by CPY) and grant CPY audio focus immediately (reference requirement Video Parameters).

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

User-Initiated: 500

**Resource Ownership transfer type**

Borrow: 3

**Resource transfer priority**

User-Initiated: 500

**App State**

N/A

**Speech Mode**

N/A

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement in Resource Allocation Request)

## FUN-REQ-889653/A-CarPlay Function/Status Buttons

CarPlay Function/Status Buttons

### Use Cases

Use Cases

#### CPY-UC-REQ-889447/A-Native HMI to CPY Home screen initiated by User

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via USB  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit  Video Focus is on Native HMI: Audio/Climate/etc. |
| **Scenario Description** | 1. Apps button on bottom function bar has changed to the Apple “Carplay” icon 2. User indicates that they want to go to CarPlay function button. |
| **Post-conditions** | 1. SYNC+ grants video focus 2. CPY Home screen is launched 3. Audio focus is maintained on current audio source |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### CPY-UC-REQ-889448/A-Native HMI to Apple Maps initiated by User

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit  Video Focus is on Native HMI: Audio/Climate/etc. |
| **Scenario Description** | 1. Navigation button on bottom function bar has changed to the Apple Maps icon 2. User indicates they want to go to Apple Maps function button |
| **Post-conditions** | 1. SYNC+ grants video focus 2. Apple Maps is launched 3. Audio focus is maintained on current audio source |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### CPY-UC-REQ-889449/A-Native HMI to Apple Music initiated by User

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit  Video Focus is on Native HMI: Audio/Climate/etc |
| **Scenario Description** | 1. User presses “Audio” button on bottom function bar and then “Change Source” softkey in Audio menu 2. USB button in tiled buttons has changed to the Apple Music icon 3. User indicates they want to go to the Apple Music function button |
| **Post-conditions** | 1. SYNC+ grants video and audio focus 2. Apple Music is launched |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### CPY-UC-REQ-889450/A-Native HMI to Apple Phone Screen

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit  Video Focus is on Native HMI: Audio/Climate/etc. |
| **Scenario Description** | 1. Phone button on bottom function bar has changed to the Apple Phone/Dialer icon 2. User indicates they want to go to Apple Phone/Dialer function button |
| **Post-conditions** | 1. SYNC+ grants video focus 2. Apple Phone/Dialer is launched 3. Audio focus is maintained on current audio source |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889607/A-Native HMI to CPY Homescreen initiated by User

Head Unit Apps button on bottom function bar has changed to the Apple “Carplay” icon:

When a CPY device is connected and CPY is enabled in Native HMI screen and a user indicates that they want to go to CPY Homescreen via the CarPlay function button, the Sync+ Unit should grant

CPY video focus from Native HMI and launches CPY Homescreen and audio focus is maintained on current audio source. (reference requirement Resource Allocation Request)

SYNC+ shall utilize the configurable URL scheme according to MFi Specification.

For Example:

SYNC+ shall utilize requestUI: no url – the CarPlay screen will be shown (reference HMI: H80 – Screen 6 and requirement Commands).

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement in Resource Allocation Request).

#### CPY-FUR-REQ-889608/A-Native HMI to Apple Maps initiated by User

Head Unit Navigation button on bottom function bar has changed to the Apple Maps icon:

When a CPY device is connected and CPY is enabled in Native HMI screen and a user indicates that they want to go to Apple Maps via the Apple Maps function button, the Sync+ Unit should grant CPY video focus from Native HMI and launches Apple Maps and audio focus is maintained on current audio source. (reference requirement Resource Allocation Request)

SYNC+ shall utilize the configurable URL scheme according to MFi Specification.

For Example:

SYNC+ shall utilize requestUI: “maps” – the CarPlay Maps application will be shown (reference HMI: H80 – Screen 6 and requirement Commands).

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement in Resource Allocation Request).

#### CPY-FUR-REQ-889609/A-Native HMI to Apple Music initiated by User

Head Unit USB tiled function button in Audio function submenu has changed to the Apple Music icon:

When a CPY device is connected and CPY is enabled in Native HMI screen and a user indicates that they want to go to Apple Music via the Apple Music tiled function button in source selection, the Sync+ Unit should grant CPY video and audio focus from Native HMI and launches Apple Music. (reference requirement Resource Allocation Request)

SYNC+ shall utilize the configurable URL scheme according to MFi Specification.

For Example:

SYNC+ shall utilize requestUI: “music” – the CarPlay Music application will be shown (reference HMI: H80 – Screen 6 and requirement Commands).

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement in Resource Allocation Request).

#### CPY-FUR-REQ-889610/A-Native HMI to Apple Phone Screen initiatied by User

Head Unit Phone button on bottom function bar has changed to the Apple Phone/Dialer icon:

When a CPY device is connected and CPY is enabled in Native HMI screen and a user indicates that they want to go to Apple Phone/Dialer via the Apple Phone/Dialer function button, the Sync+ Unit should grant CPY video focus from Native HMI and launches Apple Phone/Dialer and audio focus is maintained on current audio source. (reference requirement Resource Allocation Request)

SYNC+ shall utilize the configurable URL scheme according to MFi Specification.

For Example:

SYNC+ shall utilize requestUI: “mobilephone” – the CarPlay Phone application will be shown (reference HMI: H80 – Screen 6 and requirement Commands).

If Parking Feature or Safety Feature is Active, Parking feature or Safety feature retains video focus on the IVI-AUDIO screen (follow requirement in Resource Allocation Request).

## FUN-REQ-889647/A-Resource Allocation Request

Resource Allocation Request

### Use Cases

Use Cases

#### CPY-UC-REQ-889476/A-Mobile Device initiates Audio and Video Request when in Native HMI

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CarPlay is present.  Sync+ Unit video and audio focus is in Native HMI |
| **Scenario Description** | 1. CPY request for video and audio focus |
| **Post-conditions** | 1. Sync+ Unit grants Audio and Video focus to CPY |
| **List of Exception Use Cases** | E1 - Parking Feature Active  E2 - Safety Feature Active |
| **Interfaces** |  |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889477/A-Mobile Device initiates Video Request when in Native HMI

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present  Sync+ Unit video focus is in Native HMI |
| **Scenario Description** | 1. CPY request for video focus |
| **Post-conditions** | 1. Sync+ Unit gives Video focus to CPY |
| **List of Exception Use Cases** | E1 Parking Feature Active  E2 Safety Feature Active |
| **Interfaces** |  |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889478/A-Mobile Device initiates Audio Request when in Native HMI

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present  Sync+ Unit audio focus is in Native HMI |
| **Scenario Description** | 1. CPY request for audio focus |
| **Post-conditions** | 1. Sync+ Unit gives audio focus to CPY |
| **List of Exception Use Cases** | E1 Parking Feature Active  E2 Safety Feature Active |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889480/A-Mobile device grants Native Audio to Sync+ Unit

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present |
| **Scenario Description** | 1. CPY grants audio focus to Native Audio to Sync+ Unit |
| **Post-conditions** | 1. CPY gives Audio focus to Sync+ Unit 2. Sync+ Unit returns to last active state, if not available Audio Source Selection is displayed |
| **List of Exception Use Cases** | E1 Parking Feature Active  E2 Safety Feature Active |
| **Interfaces** |  |

##### CPY-UC-REQ-889444/A-Safety Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Safety Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Safety Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when safety feature becomes inactive. |
| **List of Exception Use Cases** | N/A |

##### CPY-UC-REQ-889445/A-Parking Feature is Active

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original Use Case |
| **Scenario Description** | 1. Parking Feature is Active on Sync+ Unit 2. CPY requests video and/or audio |
| **Post-conditions** | 1. Parking Feature retains Video, Audio, and/or Microphone focus 2. Launch CPY when parking feature becomes inactive. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889481/A-Mobile Device grants Video to Sync+ Unit

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present  Sync+ Unit video focus is in CPY HMI |
| **Scenario Description** | 1. Mobile device grants Sync+ Unit video focus |
| **Post-conditions** | 1. Sync+ Unit returns to last active Native screen |
| **List of Exception Use Cases** | E1 – Last Native HMI function was USB (Note: Go to Change Source)  E2 – Last Native HMI function was Embedded Navigation (Note: Home screen)  E3 – Last Native HMI function was Phone (Note: Home screen)  E4 – Last Native HMI function was Apps (Note: Home screen) |
| **Interfaces** |  |

##### CPY-UC-REQ-889482/A-Last function was USB

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY can not be displayed because it was USB |
| **Post-conditions** | 1. Go To Change Source Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889484/A-Last function was Embedded Navigation

|  |  |
| --- | --- |
| **Use Case Title** | Last function was Embedded Navigation |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY can not be displayed because it was Embedded Navigation |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889491/A-Last Function was Phone

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY cannot be displayed because it was Phone |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889492/A-Last function was Apps

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY cannot be displayed because it was Apps |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889494/A-Sync+ Unit requests Video from Mobile Device

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present  Sync+ Unit video focus is in CPY HMI |
| **Scenario Description** | 1. Sync+ Unit request Video from Mobile Device (Anytime, User Initiated, Never) |
| **Post-conditions** | 1. Sync+ Unit returns to last active Native screen |
| **List of Exception Use Cases** | E1 – Last Native HMI function was USB (Note: Go to Change Source)  E2 – Last Native HMI function was Embedded Navigation (Note: Homescreen)  E3 – Last Native HMI function was Phone (Note: Homescreen)  E4 – Last Native HMI function was Apps (Note: Homescreen) |

##### CPY-UC-REQ-889482/A-Last function was USB

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY can not be displayed because it was USB |
| **Post-conditions** | 1. Go To Change Source Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889484/A-Last function was Embedded Navigation

|  |  |
| --- | --- |
| **Use Case Title** | Last function was Embedded Navigation |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY can not be displayed because it was Embedded Navigation |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889491/A-Last Function was Phone

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY cannot be displayed because it was Phone |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889492/A-Last function was Apps

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Last function of Native HMI prior to CPY cannot be displayed because it was Apps |
| **Post-conditions** | 1. Native HMI Home Screen |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

#### CPY-UC-REQ-889496/A-Sync+ Unit requests Audio from Mobile Device

|  |  |
| --- | --- |
| **Actors** | Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY is present  Sync+ Unit video focus is in Native HMI  CPY has audio focus |
| **Scenario Description** | 1. Sync+ Unit request Audio from Mobile Device (Anytime, User Initiated, Never) |
| **Post-conditions** | 1. Sync+ Unit Audio focus goes to the selected or last known audio source if available. If not available, Audio Source Selection is displayed. |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889612/A-Resource Allocation Request

SYNC+ shall utilize and receive/send the configurable Resource Ownership and app states to/from CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

Anytime: 100

User Initiated: 500

Never: 1000

**Resource Ownership transfer type**

Take: 1

Untake: 2

Borrow: 3

Unborrow: 4

**Resource transfer priority**

Nice-to-have: 100

User Initiated: 500

**App State**

Speech: 1 (SYNC+ won’t need to send but receive from CPY Device)

PhoneCall: 2 (SYNC+ won’t need to send but receive from CPY Device)

TurnByTurn: 3 (SYNC+ won’t need to send but receive from CPY Device)

**Speech Mode**

None: -1

Speaking: 1

Recognizing Speech: 2

##### CPY-FUR-REQ-889613/A-Mobile Device initiates Audio and Video Request when in Native HMI for CPY

If CPY device requests video focus for HMI and audio focus for speakers, SYNC+ shall grant access of video and audio to CPY.

SYNC+ shall utilize and receive/send the configurable Resource Ownership and app states to/from CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

N/A

**Resource Ownership transfer type**

N/A

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

##### CPY-FUR-REQ-889614/A-Mobile Device initiates Video Request when in Native HMI for CPY

If CPY device requests video focus for HMI, SYNC+ shall grant access of video to CPY.

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: 1

MainAudio: N/A

**Resource Contraint**

N/A

**Resource Ownership transfer type**

N/A

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

##### CPY-FUR-REQ-889615/A-Mobile Device initiates Audio Request when in Native HMI for CPY

If CPY device requests Audio focus for HMI, SYNC+ shall grant access of audio to CPY.

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: N/A

MainAudio: 2

**Resource Contraint**

N/A

**Resource Ownership transfer type**

N/A

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

##### CPY-FUR-REQ-889616/A-Mobile device grants Video to IVI-AUDIO

When CPY grants video focus for HMI, IVI-AUDIO return to last active Native HMI Screen.

If last Native HMI screen was USB or AppLink audio source, the head unit is to go to Audio Source Selection screen (reference requirement Last function was USB)

If last Native HMI screen was Navigation, Phone, Apps (non-audio) or an Application within the Apps Menu the head unit is to go to the Native Home Screen (reference requirement Last function was Embedded Navigation/Phone/Apps).

SYNC+ shall utilize and receive the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: 1

MainAudio: N/A

**Resource Contraint**

N/A

**Resource Ownership transfer type**

N/A

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

##### CPY-FUR-REQ-889617/A-Mobile Device grants Native Audio to IVI-AUDIO

CPY shall grant access for audio to SYNC+ in order to play last known Audio Source if available, If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8).

SYNC+ shall utilize and receive the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Controller (CPY Device): 1

**Resource ID**

MainScreen: N/A

MainAudio: 2

**Resource Contraint**

N/A

**Resource Ownership transfer type**

N/A

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

#### CPY-FUR-REQ-889618/A-Parking Feature is Active during Mobile Device initiates Audio and/or, Video Request, or CPY grants Native Video/Audio to IVI-AUDIO

Parking Feature retains Video and Audio focus on Head Unit

Launch CPY when Parking feature becomes inactive.

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

Never: 1000

**Resource Ownership transfer type**

Borrow: 1

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

#### CPY-FUR-REQ-889619/A-Safety Feature is Active during Mobile Device initiates Audio and/or, Video Request, or CPY grants Native Video/Audio to IVI-AUDIO

Safety Feature retains Video and Audio focus on Head Unit

Launch CPY when Safety feature becomes inactive.

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: 2

**Resource Contraint**

Never: 1000

**Resource Ownership transfer type**

Borrow: 1

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

#### CPY-FUR-REQ-889620/A-IVI-AUDIO requests Video from Mobile Device

When IVI-AUDIO requests video focus for HMI, CPY shall grant access of video to IVI-AUDIO (identified by parameters defined in MFi specification) and the IVI-AUDIO return to last active Native HMI Screen.

SYNC+ shall utilize and send the Resource Ownership CPY Device according to MFi Specification.

For Example:

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: 1

MainAudio: N/A

**Resource Contraint**

Anytime: 100

User-Initiated: 500

Never: 1000

**Resource Ownership transfer type**

Take: 1

Borrow: 3

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

##### CPY-FUR-REQ-889621/A-Last function was USB

When IVI-AUDIO requests video focus for HMI or Mobile Device grants Video to IVI-AUDIO, IVI-AUDIO will return to last active Native HMI Screen.

If last Native HMI screen was USB or AppLink/BT audio source, the head unit is to go to Audio Source Selection screen (reference HMI: H80 – Screen 8).

##### CPY-FUR-REQ-889622/A-Last function was Embedded Navigation

When IVI-AUDIO requests video focus for HMI or Mobile Device grants Video to IVI-AUDIO, IVI-AUDIO will return to last active Native HMI Screen.

If last Native HMI screen was Navigation, the head unit is to go to the Native Home Screen (reference HMI: H80 – Screen 11a, 11b or 12).

##### CPY-FUR-REQ-889623/A-Last function was Phone

When IVI-AUDIO requests video focus for HMI or Mobile Device grants Video to IVI-AUDIO, IVI-AUDIO will return to last active Native HMI Screen, unless the last function was Phone.

If last Native HMI screen was Phone, the head unit is to go to the Native Home Screen (reference HMI: H80 – Screen 11a, 11b or 12).

##### CPY-FUR-REQ-889624/A-Last function was Apps

When IVI-AUDIO requests video focus for HMI or Mobile Device grants Video to IVI-AUDIO, IVI-AUDIO will return to last active Native HMI Screen, unless the last function was Apps.

If last Native HMI screen was AppLink audio source, the head unit is to go to Audio Source Selection screen (reference HMI: H80 – Screen 8).

If last Native HMI screen was Apps (non-audio) or an Application within the Apps Menu the head unit is to go to the Native Home Screen (reference HMI: H80 – Screen 11a, 11b or 12).

#### CPY-FUR-REQ-889625/A-IVI-AUDIO requests Audio from Mobile Device

When IVI-AUDIO requests audio focus, CPY shall grant access of audio to IVI-AUDIO (identified by parameters defined in MFi specification) and the IVI-AUDIO shall play what is initiated from user or return to last active Native Audio. If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8).

For Example:

**Entity**

Accessory (SYNC+): 2

**Resource ID**

MainScreen: N/A

MainAudio: 2

**Resource Contraint**

Anytime: 100

User-Initiated: 500

Never: 1000

**Resource Ownership transfer type**

Take: 1

Borrow: 3

**Resource transfer priority**

N/A

**App State**

N/A

**Speech Mode**

N/A

## FUN-REQ-889652/A-CPY Disconnection

CPY Disconnection

### Use Cases

Use Cases

#### CPY-UC-REQ-889451/A-Mobile Device Disconnected

|  |  |
| --- | --- |
| **Actors** | User  Mobile Device running CPY  Sync+ Unit |
| **Pre-conditions** | Infotainment system is ON  Sync+ Unit is ON  Mobile device connected via Bluetooth or appropriate USB port  CPY Application is installed on mobile device  CPY Experience is running on Sync+ Unit |
| **Scenario Description** | 1. Mobile Device is disconnected from CPY |
| **Post-conditions** | 1. If CPY Video Focus at disconnect: Video Focus is given to Last known Native HMI screen. If not available/known, Native Home Screen is displayed. 2. If Native Video Focus at disconnect: No Change in video focus 3. If CPY Audio Focus at disconnect: Audio focus give to Last known audio source. If not available/known, Audio Selection Source is displayed. 4. If Native Audio Focus at disconnect: No change in audio focus 5. SYNC+ will not trigger the BT connection to device that was using CPY in Scenario Description 1 unless in a “qualified crash event.” |
| **List of Exception Use Cases** | E1 - Device in Scenario Description 1 is not Paired  E2 - Device in Scenario Description 1 is on an active call |
| **Interfaces** |  |

##### CPY-UC-REQ-889453/A-Device in Scenario Description 1 is not Paired

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is not paired with SYNC+ |
| **Post-conditions** | 1. If CPY Video Focus at disconnect: Video Focus is given to Last known Native HMI screen. If not available/known, Native Home Screen is displayed. 2. If Native Video Focus at disconnect: No Change in video focus 3. If CPY Audio Focus at disconnect: Audio focus give to Last known audio source. If not available/known, Audio Selection Source is displayed. 4. If Native Audio Focus at disconnect: No change in audio focus |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

##### CPY-UC-REQ-889454/A-Device in Scenario Description 1 is on an Active Call

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | 1. Mobile device is on an Active Call |
| **Post-conditions** | 1. If CPY Video Focus at disconnect: Video Focus is given to Last known Native HMI screen. If not available/known, Native Home Screen is displayed. 2. If Native Video Focus at disconnect: No Change in video focus 3. If CPY Audio Focus at disconnect: Audio focus give to Last known audio source. If not available/known, Audio Source Selection is displayed. 4. If Native Audio Focus at disconnect: No change in audio focus 5. Active Call routed to CPY Device. 6. BT doesn’t attempt to connect to disconnected device from scenario description 1 unless in a “qualified crash event.” |
| **List of Exception Use Cases** | N/A |
| **Interfaces** |  |

### Requirements

Requirements

#### CPY-FUR-REQ-889611/B-CPY Device is Disconnected

SYNC+ shall change icons/text back to initial icons/text in the bottom function bar for CarPlay phone, CarPlay maps, CarPlay apps and CarPlay media.

For Example:

The CarPlay phone icon/text shall change to Native Phone icon and text “Phone”,

The CarPlay maps icon/text shall change to a Native Navigation icon with text “Nav”

The CarPlay apps icon/text shall change to a Native Apps icon with text “Apps”

The CarPlay media icon/text (under audio/source selection) shall change to Native USB icon with text “USB”

If CPY Video Focus at disconnect: Video Focus is given to Last know Native HMI screen if available, if not default to Native Home Screen (reference HMI: H80 – Screen 29a and 29b).

If Native Video Focus at disconnect: No Change in video focus

If CPY Audio Focus at disconnect: Audio focus is given to Last known Audio Source if available, If last used audio source is not available go to Audio Source Selection (reference HMI: H80 – Screen 7 and 8).

If Native Audio Focus at disconnect: No change in audio focus

(Reference HMI: H80 – Screen 27 and 28).

SYNC+ will turn ON Bluetooth, but will ***not*** attempt a BT connection to the device that was previously connected via CarPlay, or any other paired device, ***unless*** the User initiates the request (For Example: Phone button/tile/etc). The same applies if there is an active call when the CPY Device gets disconnected.

**\*Note: If there is an active call during a qualified crash event, and the CPY Device gets disconnected**, SYNC+ will turn ON Bluetooth and attempt an Emergency Assist procedure via BT. If the device that was previously connected via CarPlay is paired with SYNC+, that will be the first device SYNC+ will try to connect for the EA procedure. Otherwise SYNC+ will just run the Emergency Assist procedure following the default connection order for the paired devices (Follow BT Phone APIM Gen 3 2 Export from TcSE), unless no Device was previously paired. If so, no BT connection is established.

SYNC+ shall be able to detect a disconnection to CPY Device according to MFi Specification.

For Example:

SYNC+ shall detect a physical disconnect or application disconnect (For Example: CarPlay gets disabled under Settings – Restrictions upon device) and terminate the CarPlay session within **1 second** of a physical detachment of the CPY Device.

If CPY device detects loss of VBUS it switches back to USB device Mode and SYNC+ becomes USB Host.

If SYNC+ detects a minimum of 200ms of bus inactivity it will transition back to USB Host Mode.

## FUN-REQ-889663/A-Device Testing Requirements

Device Testing Requirements

### Requirements

Requirements

#### CPY-FUR-REQ-889626/B-Device Testing Requirements

##### CPY-FUR-REQ-889627/A-Developing Device Test Requirements

The supplier shall test each CarPlay capable device per Network technology present (For Example: GSM/CDMA/etc) during the development of the In-Vehicle Infotainment System. The supplier shall provide Ford Motor Company the methods and test procedures to be executed.

The selected devices will have all system-supported protocols tested throughout the process. This includes, but is not limited to:

* iPod Accessory Protocol – Media/Phone
* iPod Accessory Protocol2 – Media/Phone
* USB Mass Storage Class - Media
* USB Media Transfer Protocol – Media
* CarPlay application – Media/Phone
* All WiFi Profiles/Protocol – Media/Phone

All CarPlay Capable Devices shall be tested against every official release 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 “workarounds” when technically possible to ensure that all features supported by the In-Vehicle Infotainment System and the device interoperates per the defined use cases.

Note: The supplier should anticipate a new hardware release from Apple in the 2nd half of 2014. If the released hardware supports CarPlay, the supplier shall obtain these device(s) and incorporate the device(s) within the test and development plan.

Note: The supplier shall provide Ford Motor Company with evidence that every requirement needed to implement CarPlay is tested.

##### CPY-FUR-REQ-154993/A-Apple Certification Testing

The supplier shall communicate with Apple to make sure that the CarPlay implementation integrated with SYNC+ from this document mentioned from the above requirements as well as the MFi specification must pass Apple Certification before PP.

Any updates or communication from Apple that deem recertification must be updated accordingly and must pass Apple Certification/recertification with the appropriate changes.

## FUN-REQ-889665/A-Interoperability Testing Requirements

Interoperability Testing Requirements

### Requirements

Requirements

#### CPY-FUR-REQ-889628/A-Interoperability Testing Requirements

##### CPY-FUR-REQ-889629/A-Ongoing Interoperability Testing

The supplier shall provide Ford Motor Company with interoperability test results for All CarPlay Capable Devices until 5 years after start of production of the In-Vehicle Infotainment System (which includes CarPlay). This testing shall take place with each release provided by Apple (including beta releases). The suppler shall deliver these results within 4 business days from Apple’s release. The test results shall cover all of the use cases defined. The format of the results shall be approved by Ford Motor Company.

##### CPY-FUR-REQ-889630/A-Special Release Interoperability Testing

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 30 devices annually until 5 years after start of production of the In-Vehicle Infotainment System. \*Note: If 30 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.

## FUN-REQ-889667/A-CarPlay Update Requirements

CarPlay Update Requirements

### Requirements

Requirements

#### CPY-FUR-REQ-889631/A-CarPlay Update Requirements

##### CPY-FUR-REQ-889632/A-Ongoing Update Schedule

The supplier shall provide updates to the CarPlay related components (For Example: Communication Plug-in/etc to run CarPlay) twice a year until 5 years after start of production of the In-Vehicle Infotainment System. These updates shall be based on device testing against all CarPlay Capable devices. 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 “workarounds” for the tested devices when technically possible to insure that all features supported by the In-Vehicle Infotainment System and all 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 CarPlay related components.

Ford Motor Company shall have the option of choosing the devices for these releases if the number of devices exceeds 30.

##### CPY-FUR-REQ-889633/A-Special Release Update Availability

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 CarPlay 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 iAP (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 8 per year until 5 years after start of production of the In-Vehicle Infotainment System.

## FUN-REQ-889668/A-Implementation Requirements

Implementation Requirements

### Requirements

Requirements

#### CPY-FUR-REQ-889634/A-Implementation Requirements

Panasonic shall review the CarPlay requirements from Ford Motor Company (as defined in this document) and from Apple (as defined in MFi specification) and identify any implementation issues.

Panasonic shall make Ford aware of these issues and shall provide an alternate solution in order to implement CarPlay with Gen 3 within their initial response.

## CPY-FUN-REQ-926602/A-Infotainment Repeater Configuration

### Use Cases

#### CPY-UC-REQ-914755/B-Infotainment repeater Interface: Projection Mode starts

|  |  |
| --- | --- |
| **Actors** | User, Infotainment System, External Device |
| **Pre-conditions** | Used external device is capable of projection mode, Projection Mode is enabled on Infotainment System |
| **Scenario Description** | Projection Mode starts (either in video foreground or background).  After starting it, Projection Mode features are available for the user. |
| **Post-conditions** | 1. Infotainment Repeater Server sends   ActiveProjectionMode\_St,  ProjMdeNavigationRepeater\_St,  ProjMdeMediaPlayerRepeater\_St and  ProjMdePhoneRepeater\_St  to Infotainment Repeater Client to allow configuration of user interface. Refer to Transport Protocol SPSS. |
| **List of Exception Use Cases** | E1: Data to be send to Infotainment Repeater Client is not available. |
| **Interfaces** | ISO-TP via CAN, USB, UI |

#### CPY-UC-REQ-914756/A-Data to be send to Infotainment Repeater Client is not available

|  |  |
| --- | --- |
| **Actors** | User or system |
| **Pre-conditions** | Same as original use case. |
| **Scenario Description** | Data of one or all signals to be send to Infotainment Repeater Client is not available. |
| **Post-conditions** | 1. Infotainment Repeater Server sends “Intermediate Result – Wait” as Command Execution Status for the affected signal in case data is not available after 3sec after Projection Mode start. Refer to Transport Protocol SPSS. 2. Infotainment Repeater Server sends “Final Result – Fail” as Command Execution Status for the affected signal in case data cannot be gathered. |
| **List of Exception Use Cases** | n/a |
| **Interfaces** | ISO-TP via CAN, USB |

#### CPY-UC-REQ-914757/B-Infotainment repeater Interface: Projection Mode stops

|  |  |
| --- | --- |
| **Actors** | User, Infotainment System, External Device |
| **Pre-conditions** | Projection mode is active |
| **Scenario Description** | Projection Mode stops. Projection Mode features are not available for the user. |
| **Post-conditions** | 1. Infotainment Repeater Server sends   ActiveProjectionMode\_St  to Infotainment Repeater Client to allow configuration of user interface. Refer to Transport Protocol SPSS. |
| **List of Exception Use Cases** |  |
| **Interfaces** | ISO-TP via CAN, USB, UI |

### Requirements

#### Active Projection Mode

##### CPY-FUR-REQ-914652/A-General description

The Projection Mode server shall provide the information described in signals

ActiveProjectionMode\_St,

ProjMdeNavigationRepeater\_St,

ProjMdeMediaPlayerRepeater\_St and

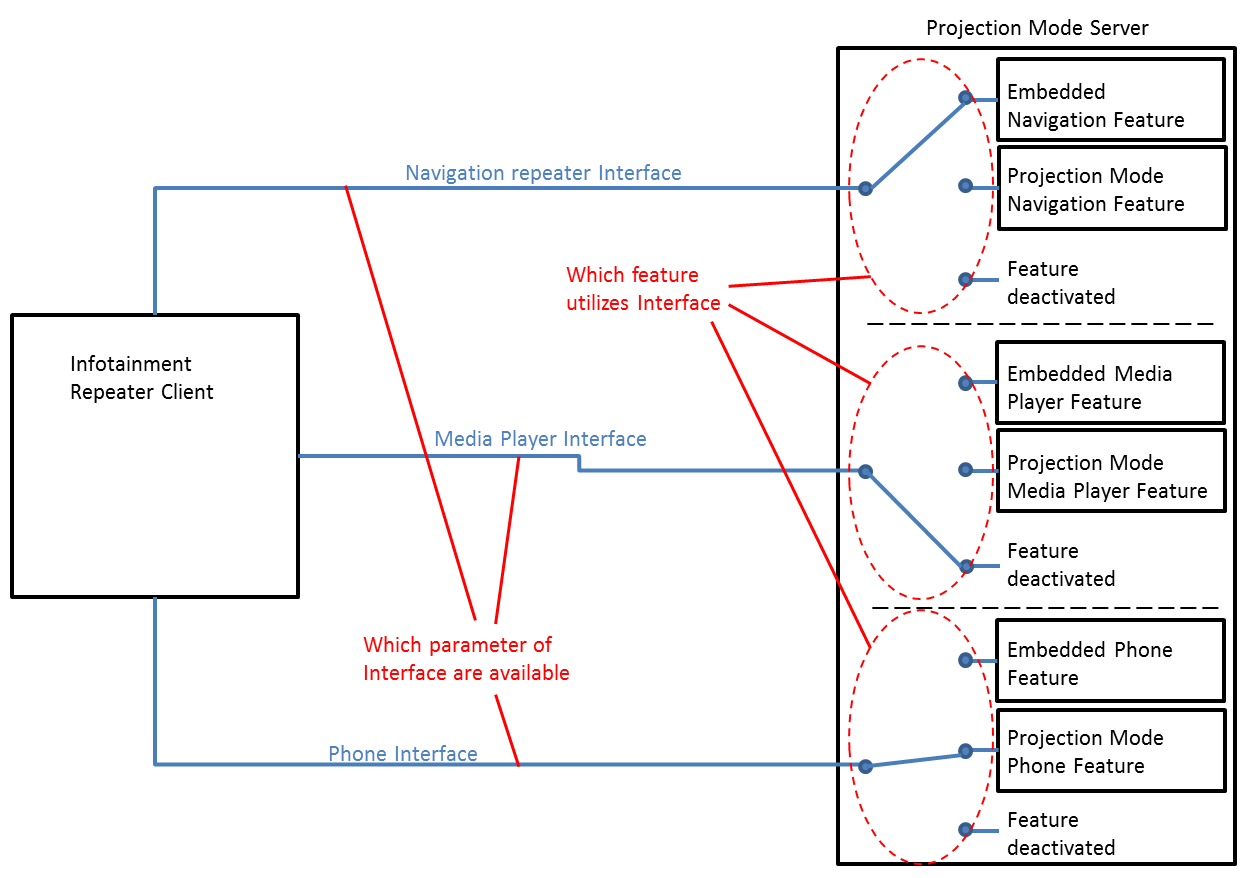
ProjMdePhoneRepeater\_St

to the Infotainment Repeater Client.

While a projection mode is active, a projection mode feature might utilize existing interfaces to the Infotainment Repeater Client. Dependent on the projection mode and feature only a subset of the existing Interface parameters might be available. By providing the information, which parameters are available and which are not, the Infotainment Repeater Client is able to adapt its behavior while a projection mode is active.

Example: If interfaces are not available while a projection mode is active, the Client could hide the correlated options from the user.

Below graphic describes system setup and transferred information:



##### CPY-FUR-REQ-914677/A-Known Active Projection Mode

Active Projection Mode in signal ActiveProjectionMode\_St shall be set to the currently running Projection Mode. The status shall be set independently of the projection mode is running in foreground or background of the Projection Mode Server's HMI.

##### CPY-FUR-REQ-914720/A-Unknown Active Projection Mode

Active Projection Mode in signal ActiveProjectionMode\_St shall be set to "Other Projection Mode active" if a projection mode is active, that does not have a dedicated value assigned.

##### CPY-FUR-REQ-914758/A-Projection Mode stops

Once the active projection mode is stopped (e.g. projection mode device disconnected or projection mode deactivated per setting); projection mode server shall send Active Projection Mode in signal ActiveProjectionMode\_St with value 0x0: No Projection Mode active.

For Projection Mode Name an End-of-String shall be send.

##### CPY-FUR-REQ-914759/A-Projection mode stops 2

Once Infotainment repeater Client got notified, that the active projection mode was stopped, it shall revert all HMI adoptions it made during active projection mode and all information received through signals ProjMdeNavigationRepeater\_St, ProjMdeMediaPlayerRepeater\_St and ProjMdePhoneRepeater\_St shall be cleared.

##### CPY-FUR-REQ-914721/A-Projection Mode Name

Projection Mode Name in signal ActiveProjectionMode\_St shall always be send to protect for backward compatibility. This enables the Infotainment Repeater Client to show the running projection mode name, even if the Active Projection Mode is set to "Other Projection Mode active" or the value for Active Projection Mode is out of the Client's value table.

##### CPY-FUR-REQ-914722/A-Projection Mode Name Consistency

Projection Mode Server shall send the exact text string for Projection Mode Name in signal ActiveProjectionMode\_St, that should be used for the specific Projection Mode. It should match to what is shown on other HMIs. This can be defined by Ford or by requirements from the Projection Mode Developer (e.g. Apple, Google, Baidu).

Example: If the center stack uses “Apple CarPlay” the Infotainment Repeater Server shall transfer this exact text string and not for example “CAR Play”.

##### CPY-FUR-REQ-914723/A-HMI impact

Infotainment Repeater Client shall adopt its HMI for each Projection Mode reported in Active Projection Mode per its HMI specification.

##### CPY-FUR-REQ-914725/A-Active Projection Mode out of value table

If the Infotainment Repeater Client receives a value exceeding the value table for Active Projection Mode in signal ActiveProjectionMode\_St, it shall react as if "Other Projection Mode active" was received.

#### General Requirement

##### CPY-FUR-REQ-914760/A-Interface Updates

Whenever the last transferred data to the Infotainment repeater Client has changed (e.g. projection mode media player changed; new player supports more/less Interface parameter), the Infotainment repeater Server shall send the relevant signal including the updated data again.

##### CPY-FUR-REQ-914754/A-Pseudo code: Projection Mode start

This pseudo code is for reference only; it does not include any exception handling. If there are discrepancies between requirements and this pseudo code, the requirements overrule the pseudo code.

The pseudo code covers the navigation signal as an example. The code applies similar for Media Player and Phone.

//Function executed when Projection Mode starts

SendNavDataUponProjectionModeStart()

{

//Check nav feature availability

If((native\_navigation==n/a)&&(projection\_mode\_nav==n/a))

{

//Nav feature not available

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 0 = 0;

//Setting all remaining Bits to “inactive”

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1 to Bit 72 = 0;

}

elseif(native\_navigation==available)||(projection\_mode\_nav==available))

{

//Nav feature available

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 0 = 1;

//Check interface utilization

If(nav\_interface\_utilization==native\_navigation)

{

//Embedded Nav utilized Nav Interface

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 = 1;

//Setting all remaining Bits to “inactive”

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 3 to Bit 72 = 0;

}

elseif((nav\_interface\_utilization==projection\_mode\_navigation)

{

//Projection Mode Nav utilized Nav Interface

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 = 2;

//Check List Server availibility

If(nav\_list\_server==n/a)

{

//No nav list server contant available

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 3-4 = 1;

}

Elseif(nav\_list\_server==available)

{

//Nav list server contant available

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 3-4 = 2;

}

//Check availability of all Navigation Repeater Interface parameters included in Bits 5-72.

do

{

If(Interface parameter==n/a)

{

//Parameter not supported

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit (n to n+1) = 1;

}

Elseif(Interface parameter==available)

{

//Parameter supported

ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit (n to n+1) = 2;

}

}while(still parameters left to be checked)

}

}

//Send collected data via Transport Protocol

Send\_signal();

}

#### Navigation Repeater Interface

##### CPY-FUR-REQ-914729/B-Navigation feature availability

In signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 0 shall be set to "0x0: Navigation feature NOT available" if:

* Native Navigation feature deactivated and active Projection Mode does not have Navigation feature
* No native Navigation available and active Projection Mode does not have Navigation feature

Otherwise Bit 0 shall be set to “0x1: Navigation feature available”.

Hint: If Bit 0 is set to "0x0: Navigation feature NOT available" this means no navigation is currently available at all. Infotainment Repeater HMI might want to hide all navigation content (this is only an example; please refer to HMI specification for expected behavior).

##### CPY-FUR-REQ-914730/B-Navigation feature availability 2

If in signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 0 is set to “0x0: Navigation feature NOT available”, then Bit 1 to Bit 72 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914731/A-Navigation Interface utilization

In signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1 shall be set to “0x1: Standard Navigation Interface utilization”, if the embedded navigation feature is utilizing the navigation repeater interface. This is independent off of a route guidance being active or not.

Bit 1-2 shall be set to “0x2: Projection Mode Navigation Interface utilization”, if a projection mode navigation feature is utilizing the navigation repeater interface. This is independent off of a route guidance being active or not.

##### CPY-FUR-REQ-914733/A-Navigation Interface utilization 2

If in signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 is set to “0x1: Standard Navigation Interface utilization”, the Infotainment Repeater Client shall utilize the navigation repeater interface as if no projection mode is active. Information send within Bit 3 to Bit 72 are not valid in this case and shall not influence the utilization of the interface.

##### CPY-FUR-REQ-914734/A-Navigation Interface utilization 3

If in signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 is set to “0x1: Standard Navigation Interface utilization”, then Bit 3 to Bit 72 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914735/A-List Server Navigation Info availibility

In signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 3-4 shall be set to “0x1: List Server Navigation Info NOT available”, if the navigation repeater interface is utilized by a projection mode navigation feature (ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 is set to “0x2: Projection Mode Navigation Interface utilization”) and no content is available in the list.   
For backward compatibility a placeholder text might be defined as list content (e.g. "See touchscreen"). The Server shall still transfer “0x1: List Server Navigation Info NOT available” in this case.

Please refer to List Browser Protocol SPSS.

##### CPY-FUR-REQ-914736/A-Navigation Interface parameter support

In signal ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 5 to Bit 72: Shall be set individually to “0x1 NOT supported”, if the navigation repeater interface is utilized by a projection mode navigation feature (ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2 is set to “0x2: Projection Mode Navigation Interface utilization”) and the Projection Mode Sever cannot support the corresponding parameter.

E.g. if the Projection Mode Navigation feature is running and does not provide the Street Name, then “0x1: StreetName.St() : StreetName NOT supported” shall be send.

##### CPY-FUR-REQ-914737/B-Navigation repeater Interface: Valid combinations

|  |  |  |  |
| --- | --- | --- | --- |
| *Combination* | *ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 0* | *ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 1-2* | *ProjMdeNavigationRepeater\_St, Byte 3-14: Navigation -> Bit 3-72* |
| 1 | 0x0: Navigation feature NOT available | 0x0: Inactive | 0x0: Inactive |
| 2 | 0x1: Navigation feature available | 0x1: Standard Navigation Interface utilization | 0x0: Inactive |
| 3 | 0x1: Navigation feature available | 0x2: Projection Mode Navigation Interface utilization | 0x1: NOT available  or  0x2: available |

#### Media Player Repeater Interface

##### CPY-FUR-REQ-914738/B-Media Player feature availability

In signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 0 shall be set to “0x0: Media Player feature NOT available”, if all native Media Players and all Projection Mode Media Players are deactivated or do not exist.

Otherwise it shall be set to “0x1: Media Player feature available”.

Deactivated means the Media Player cannot be used at all and are not just temporarily not available (e.g. currently no USB device connected).

Hint: If Bit 0 is set to “0x0: Media Player feature NOT available”, this means no media player is currently available at all. Infotainment repeater HMI might hide all Media Player content (this is only an example; please refer to HMI specification for expected behavior).

##### CPY-FUR-REQ-914743/B-Media Player feature availability 2

If in signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 0 is set to “0x0: Media Player feature NOT available”, then Bit 1 to Bit 26 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914739/A-Media Player Interface utilization

In signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 1-2 shall be set to “0x1: Standard Media Player Interface utilization”, if an embedded media player feature is utilizing the interface.

Bit 1-2 shall be set to “0x2: Projection Mode Media Player Interface utilization”, if a Projection Mode Media Player feature is utilizing the Media Player Interface.

##### CPY-FUR-REQ-914740/A-Media Player Interface utilization 2

If in signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 1-2 is set to “0x1: Standard Media Player Interface utilization”, the Infotainment Repeater Client shall utilize the media player interface as if no projection mode is active. Information send within Bit 3 to Bit 26 are not valid in this case and shall not influence the utilization of the interface.

##### CPY-FUR-REQ-914744/A-Media Player Interface utilization 3

If in signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 1-2 is set to “0x1: Standard Media Player Interface utilization”, then Bit 3 to Bit 26 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914741/A-List Server Generic Media availibility

In signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 3-4 shall be set to “0x1: List Server Generic Media NOT available”, if the media player interface is utilized by a projection mode media player feature (ProjMdeMediaPlayerRepeater\_St, Byte 3-7: MediaPlayer -> Bit 1-2 is set to “0x2: Projection Mode Media Player Interface utilization”) and no content is available in the list.   
For backward compatibility a placeholder text might be defined as list content (e.g. "See touchscreen"). The Server shall still transfer “0x1: List Server Generic Media NOT available”.

Please refer to List Browser Protocol SPSS.

##### CPY-FUR-REQ-914742/A-Media Player Interface parameter support

In signal ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 5 to Bit 26: Shall be set individually to “0x1 NOT supported”, if the media player interface is utilized by a projection mode media player feature (ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 1-2 is set to “0x2: Projection Mode Media Player Interface utilization”) and the Projection Mode Sever cannot support the corresponding parameter.

E.g. if a Projection Mode Media Player is active and does not provide the track playtime, “0x1: TrackPlaytime.St() : TrackPlaytimeSt NOT supported” shall be send.

##### CPY-FUR-REQ-914745/B-Media Player Interface: Valid combinations

|  |  |  |  |
| --- | --- | --- | --- |
| *Combination* | *ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 0* | *ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 1-2* | *ProjMdeMediaPlayerRepeater\_St, Byte 3-7: Media Player -> Bit 3-26* |
| 1 | 0x0: Media Player feature NOT available | 0x0: Inactive | 0x0: Inactive |
| 2 | 0x1: Media Player feature available | 0x1: Standard Media Player Interface utilization | 0x0: Inactive |
| 3 | 0x1: Media Player feature available | 0x2: Projection Mode Media Player Interface utilization | 0x1: NOT available  or  0x2: available |

#### Phone Repeater Interface

##### CPY-FUR-REQ-914746/B-Phone feature availability

In signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 0 shall be set to “0x0: Phone feature NOT available”, if native phone feature and Projection Mode phone feature are deactivated or do not exist.

Otherwise it shall be set to “0x1: Phone feature available”.

Deactivated means the phone feature cannot be used at all and is not just temporarily not available (e.g. currently no Bluetooth connection).

Hint: If Bit 0 is set to “0x0: Phone feature NOT available”, this means no phone feature is currently available at all. Infotainment repeater HMI might hide all Phone content (this is only an example; please refer to HMI specification for expected behavior).

##### CPY-FUR-REQ-914751/A-Phone feature availability 2

If in signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 0 is set to “0x0: Phone feature NOT available”, then Bit 1 to Bit 52 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914752/A-Phone Interface utilization 3

If in signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2 is set to “0x1: Standard Phone Interface utilization”, then Bit 3 to Bit 52 shall be set to “0x0 Inactive”.

##### CPY-FUR-REQ-914747/A-Phone Interface utilization

In signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2 shall be set to “0x1: Standard Phone Interface utilization”, if the embedded phone feature is utilizing the interface.

Bit 1-2 shall be set to “0x2: Projection Mode Phone Interface utilization”, if a Projection Mode Phone feature is utilizing the Phone Interface.

##### CPY-FUR-REQ-914748/A-Phone Interface utilization 2

If in signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2 is set to “0x1: Standard Phone Interface utilization”, the Infotainment Repeater Client shall utilize the phone interface as if no projection mode is active. Information send within Bit 3 to Bit 52 are not valid in this case and shall not influence the utilization of the interface.

##### CPY-FUR-REQ-914749/A-List Server Phone Info availibility

In signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 3-4 shall be set to “0x1: List Server Phone Info NOT available”, if the phone interface is utilized by the projection mode phone feature (ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2 is set to “0x2: Projection Mode Phone Interface utilization”) and no content is available in the list.   
For backward compatibility a placeholder text might be defined as list content (e.g. "See touchscreen"). The Server shall still transfer “0x1: List Server Phone Info NOT available”.

Please refer to List Browser Protocol SPSS.

##### CPY-FUR-REQ-914750/A-Phone Interface parameter support

In signal ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 5 to Bit 52: Shall be set individually to “0x1 NOT supported”, if the phone interface is utilized by the projection mode phone feature (ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2 is set to “0x2: Projection Mode Phone Interface utilization”) and the Projection Mode Sever cannot support the corresponding parameter.

E.g. if a Projection Mode Phone feature is active and does not provide the signal strenght, “0x1: BTSignalStrength.St() : SignalStrength NOT supported” shall be send.

##### CPY-FUR-REQ-914753/B-Phone Interface: Valid combinations

|  |  |  |  |
| --- | --- | --- | --- |
| *Combination* | *ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 0* | *ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 1-2* | *ProjMdePhoneRepeater\_St, Byte 3-11: Phone -> Bit 3-52* |
| 1 | 0x0: Phone feature NOT available | 0x0: Inactive | 0x0: Inactive |
| 2 | 0x1: Phone feature available | 0x1: Standard Phone Interface utilization | 0x0: Inactive |
| 3 | 0x1: Phone feature available | 0x2: Projection Mode Phone Interface utilization | 0x1: NOT available  or  0x2: available |

## CPY-FUN-REQ-968063/A-Wireless CarPlay

### FUR-REQ-968284/A-General description

Wireless CarPlay allows using the CarPlay feature over wireless connection. It uses Bluetooth and Wi-Fi instead of USB.

The Wireless CarPlay chapter describes the wireless specific portion of the feature. The existing chapters that are not connection method dependent are still applicable.

### Use Cases

#### CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

**Linked Elements**

CPY-UC-REQ-968133/A-User does not confirm CarPlay start

CPY-UC-REQ-968134/A-User does not confirm privacy and terms of use prompt

CPY-UC-REQ-968135/A-Startup fails

CPY-UC-REQ-968136/A-Device gets matched to an existing CarPlay device

CPY-UC-REQ-968137/A-CarPlay device list is full

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968140/A-User cancels CarPlay startup

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | User paired a wireless CarPlay capable device, using non-CarPlay menu. |
| **Scenario Description** | IVIS detects, that paired phone supports Wireless CarPlay (refer to *CPY-FUR-REQ-968066-Wireless CarPlay support detection – Discoverable mode pairing* + *CPY-FUR-REQ-968067-Wireless CarPlay support detection – Discovery mode pairing*).  User gets prompted to start CarPlay.  User confirms CarPlay start.  User gets prompted to accept privacy and terms of use.  User confirms privacy and terms of use. |
| **Post-conditions** | Wireless CarPlay session starts.  Device gets added to Wireless CarPlay device list.  Wireless CarPlay flag is set to ON (refer to *CPY-FUR-REQ-968123-Wireless CarPlay flag*). |
| **List of Exception Use Cases** | E1 - User does not confirm CarPlay start.  E2 - User does not confirm privacy and terms of use prompt.  E3 - Startup fails (per *CPY-FUR-REQ-968104-First time connection startup timeout*).  E4 - Device gets matched to an existing CarPlay device.  E5 - CarPlay device list is full.  E6 - User connects same device over USB.  E7 - User connects another projection mode capable device over USB.  E8 - User cancels CarPlay startup. |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968133/A-User does not confirm CarPlay start

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User does not confirm CarPlay start. |
| **Post-conditions** | CarPlay startup is canceled.  CarPlay setting (per *CPY-FUR-REQ-889636/C-General Settings)* is set to OFF/Disabled.  Device gets added to Wireless CarPlay device list.  Device is available for other Bluetooth features per Bluetooth Connectivity SPSS. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968134/A-User does not confirm privacy and terms of use prompt

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User does not confirm privacy and terms of use prompt. |
| **Post-conditions** | User gets prompted again to start CarPlay. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968135/A-Startup fails

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

CPY-UC-REQ-968148/A-Start CarPlay for known device

CPY-UC-REQ-968150/A-Change CarPlay between devices

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Startup fails (see *CPY-FUR-REQ-968104-First time connection startup timeout*  and *CPY-FUR-REQ-968105 -Subsequent startup timeout*) |
| **Post-conditions** | User gets notified that CarPlay startup failed. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968136/A-Device gets matched to an existing CarPlay device

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Device gets matched to an existing CarPlay device (per *CPY-FUR-REQ-968128-Match Wireless and Wired CarPlay devices*). |
| **Post-conditions** | Existing settings for matched device are applied. Based on these settings CarPlay start is eventually triggered (per *CPY-UC-REQ-968148-Start CarPlay for known device*). |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968137/A-CarPlay device list is full

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | CarPlay device list is full. |
| **Post-conditions** | IVIS removes the device whose last connection date is the oldest.  New paired device gets added to CarPlay device list. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968138/A-User connects same device over USB

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

CPY-UC-REQ-968148/A-Start CarPlay for known device

CPY-UC-REQ-968150/A-Change CarPlay between devices

CPY-UC-REQ-968152/A-Resume CarPlay session

CPY-UC-REQ-968154/A-Resume priorities

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User connects same device over USB |
| **Post-conditions** | IVIS initiate a USB role switch per Apple MFi specification. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

CPY-UC-REQ-968148/A-Start CarPlay for known device

CPY-UC-REQ-968150/A-Change CarPlay between devices

CPY-UC-REQ-968152/A-Resume CarPlay session

CPY-UC-REQ-968154/A-Resume priorities

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User connects same device over USB |
| **Post-conditions** | IVIS decides following *CPY-FUR-REQ-968112-Wireless CarPlay start/resume interruption* to continue with the Wireless CarPlay startup or start a projection from the other device. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968140/A-User cancels CarPlay startup

**Linked Elements**

CPY-UC-REQ-968132/A-First time connection through non-CarPlay menu pairing

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

CPY-UC-REQ-968148/A-Start CarPlay for known device

CPY-UC-REQ-968150/A-Change CarPlay between devices

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User cancels CarPlay startup |
| **Post-conditions** | IVIS stores any device settings that were set before the cancelation.  CarPlay startup is cancelled.  Device is available for other Bluetooth features per Bluetooth Connectivity SPSS. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968141/A-First time connection through CarPlay menu

**Linked Elements**

CPY-UC-REQ-968135/A-Startup fails

CPY-UC-REQ-968136/A-Device gets matched to an existing CarPlay device

CPY-UC-REQ-968137/A-CarPlay device list is full

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968140/A-User cancels CarPlay startup

CPY-UC-REQ-968142/A-User pairs a non-CarPlay capable device

CPY-UC-REQ-968143/A-User tries to pair a device that does not support Secure Simple Pairing

CPY-UC-REQ-968144/A-Paired device does not support any profiles supported by IVIS

CPY-UC-REQ-968145/A-There is an active CarPlay session on another device

CPY-UC-REQ-968146/A-Pairing fails

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | User selects HMI menu to add a CarPlay device. |
| **Scenario Description** | IVIS sets Bluetooth to discoverable mode.  IVIS prompts user to search from device.  Device pairs and connects (refer to *BTP-FUR-REQ-033773/B-Secure Simple Pairing*) |
| **Post-conditions** | Wireless CarPlay session starts.  Device gets added to Wireless CarPlay device list.  Wireless CarPlay flag is set to ON (refer to *CPY-FUR-REQ-968123-Wireless CarPlay flag*). |
| **List of Exception Use Cases** | E1 - Startup fails (per *CPY-FUR-REQ-968104-First time connection startup timeout*).  E2 - Device gets matched to an existing CarPlay device.  E3 - CarPlay device list is full.  E4 - User connects same device over USB.  E5 - User connects another projection mode capable device over USB.  E6 - User pairs a non-CarPlay capable device.  E7 - User tries to pair a device that does not support Secure Simple Pairing.  E8 - Paired device does not support any profiles supported by IVIS.  E9 - There is an active CarPlay session on another device.  E10 - Pairing fails.  E11 - User cancels CarPlay startup. |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968142/A-User pairs a non-CarPlay capable device

**Linked Elements**

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User pairs a non-CarPlay capable device |
| **Post-conditions** | User is notified that Wireless CarPlay could not be started.  Paired device connection is maintained.  Device is available for other Bluetooth features per Bluetooth Connectivity SPSS. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968143/A-User tries to pair a device that does not support Secure Simple Pairing

**Linked Elements**

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User tries to pair a device that does not support Secure Simple Pairing. |
| **Post-conditions** | IVIS rejects pairing request and stays in discoverable mode. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968144/A-Paired device does not support any profiles supported by IVIS

**Linked Elements**

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Paired device does not support any profiles supported by IVIS. |
| **Post-conditions** | User is notified that Wireless CarPlay could not be started.  Paired device connection is maintained. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968145/A-There is an active CarPlay session on another device

**Linked Elements**

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

CPY-UC-REQ-968148/A-Start CarPlay for known device

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | There is an active CarPlay session on another device |
| **Post-conditions** | User is prompted to allow active session to be interrupted. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968146/A-Pairing fails

**Linked Elements**

CPY-UC-REQ-968141/A-First time connection through CarPlay menu

CPY-UC-REQ-968147/A-First time connection through PTT long press

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Pairing fails. |
| **Post-conditions** | User is notified that pairing failed.  User is given the option to retry pairing. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968147/A-First time connection through PTT long press

**Linked Elements**

CPY-UC-REQ-968135/A-Startup fails

CPY-UC-REQ-968136/A-Device gets matched to an existing CarPlay device

CPY-UC-REQ-968137/A-CarPlay device list is full

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968140/A-User cancels CarPlay startup

CPY-UC-REQ-968142/A-User pairs a non-CarPlay capable device

CPY-UC-REQ-968145/A-There is an active CarPlay session on another device

CPY-UC-REQ-968146/A-Pairing fails

CPY-UC-REQ-968143/A-User tries to pair a device that does not support Secure Simple Pairing

CPY-UC-REQ-968144/A-Paired device does not support any profiles supported by IVIS

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | PTT button long press is not associated with any functionality. |
| **Scenario Description** | User performs a PTT long-press.  IVIS sets BT to discoverable mode (refer to *CPY-FUR-REQ-968078-Advertise Wireless CarPlay capabilities for Bluetooth pairing*).  IVIS prompts user to search from device.  Device pairs and connects (refer to *BTP-FUR-REQ-033773/B-Secure Simple Pairing*)  User is prompted to confirm privacy and terms of use popup. |
| **Post-conditions** | Wireless CarPlay session starts.  Device gets added to Wireless CarPlay device list.  Wireless CarPlay flag is set to ON (refer to *CPY-FUR-REQ-968123-Wireless CarPlay flag*). |
| **List of Exception Use Cases** | E1 - Startup fails (per *CPY-FUR-REQ-968104-First time connection startup timeout*).  E2 - Device gets matched to an existing CarPlay device.  E3 - CarPlay device list is full.  E4 - User connects same device over USB.  E5 - User connects another projection mode capable device over USB.  E6 - User pairs a non-CarPlay capable device.  E7 - User tries to pair a device that does not support Secure Simple Pairing.  E8 - Paired device does not support any profiles supported by IVIS.  E9 - There is an active CarPlay session on another device.  E10 - Pairing fails.  E11 - User cancels CarPlay startup. |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968148/A-Start CarPlay for known device

**Linked Elements**

CPY-UC-REQ-968135/A-Startup fails

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968140/A-User cancels CarPlay startup

CPY-UC-REQ-968145/A-There is an active CarPlay session on another device

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | IVIS stored at least one CarPlay device.  CarPlay is enabled for selected device. IVIS is operational. |
| **Scenario Description** | User selects device from CarPlay menu in order to start CarPlay session. |
| **Post-conditions** | CarPlay session starts for selected device. Also refer to *CPY-FUR-REQ-968101-Interface prioritization*.  Set Wireless CarPlay flag to ON. |
| **List of Exception Use Cases** | E1 - Startup fails (per *CPY-FUR-REQ-968105 -Subsequent startup timeout*).  E2 - User connects same device over USB.  E3 - User connects another projection mode capable device over USB.  E4 - There is an active CarPlay session on another device.  E5 - User cancels CarPlay startup. |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968149/A-Stop CarPlay session

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | CarPlay session active. |
| **Scenario Description** | User selects to stop CarPlay session from CarPlay menu. |
| **Post-conditions** | CarPlay session stops.  If it was a wireless session, set Wireless CarPlay flag to OFF. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968150/A-Change CarPlay between devices

**Linked Elements**

CPY-UC-REQ-968135/A-Startup fails

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968140/A-User cancels CarPlay startup

CPY-UC-REQ-968151/A-User does not confirm to stop CarPlay session for device A

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay devices |
| **Pre-conditions** | CarPlay session active on device A (wired or wireless).  IVIS stored at least two CarPlay devices. |
| **Scenario Description** | User selects to start CarPlay for device B. |
| **Post-conditions** | User is prompted to confirm that CarPlay will be stopped for device A.  User confirms to stop CarPlay session for device A.  CarPlay session stops for device A.  CarPlay session starts for device B. Also refer to *CPY-FUR-REQ-968101-Interface prioritization.* |
| **List of Exception Use Cases** | E1 - User does not confirm to stop CarPlay session for device A.  E2 - Startup fails (per *CPY-FUR-REQ-968105 -Subsequent startup timeout*).  E3 - User connects same device over USB.  E4 - User connects another projection mode capable device over USB.  E5 - User cancels CarPlay startup. |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968151/A-User does not confirm to stop CarPlay session for device A

**Linked Elements**

CPY-UC-REQ-968150/A-Change CarPlay between devices

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | User does not confirm to stop CarPlay session for device A |
| **Post-conditions** | CarPlay session for device A continues. Device B won’t be used for CarPlay. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968152/A-Resume CarPlay session

**Linked Elements**

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968241/A-Resume fails

CPY-UC-REQ-968153/A-Bluetooth is set to OFF

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay devices |
| **Pre-conditions** | CarPlay session active on device A (wired or wireless) during IVIS suspend.  Device A is not connected over USB during IVIS startup after suspend. |
| **Scenario Description** | Upon IVIS startup device A is attempted to be reconnected for Wireless CarPlay.  IVIS successfully connects to device A. |
| **Post-conditions** | Wireless CarPlay starts. |
| **List of Exception Use Cases** | E1 - Resume fails (per *CPY-FUR-REQ-968105 -Subsequent startup timeout*).  E2 - User connects same device over USB.  E3 - User connects another projection mode capable device over USB.  E4 - Bluetooth is set to OFF |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968241/A-Resume fails

**Linked Elements**

CPY-UC-REQ-968152/A-Resume CarPlay session

CPY-UC-REQ-968154/A-Resume priorities

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Resume fails |
| **Post-conditions** | Wireless CarPlay does not start for device A.  Bluetooth reconnection strategy per Bluetooth Connectivity SPSS is applied. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968153/A-Bluetooth is set to OFF

**Linked Elements**

CPY-UC-REQ-968152/A-Resume CarPlay session

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Bluetooth is set to OFF |
| **Post-conditions** | IVIS does not attempt to resume a Wireless CarPlay session. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

#### CPY-UC-REQ-968154/A-Resume priorities

**Linked Elements**

CPY-UC-REQ-968138/A-User connects same device over USB

CPY-UC-REQ-968139/A-User connects another projection mode capable device over USB

CPY-UC-REQ-968241/A-Resume fails

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device, projection mode device |
| **Pre-conditions** | Device A has an active Wireless CarPlay session.  Device B supports a projection mode and is connected via USB. |
| **Scenario Description** | User performs ignition cycle  Device B stays connected to USB. |
| **Post-conditions** | IVIS shall attempt to resume the Wireless CarPlay session.  If resume fails, projection mode from device B can start per applicable specification. |
| **List of Exception Use Cases** | E1 - Resume fails (per *CPY-FUR-REQ-968105 -Subsequent startup timeout*).  E2 - User connects same device over USB.  E3 - User connects another projection mode capable device over USB. |
| **Interfaces** | USB, BT, Wi-Fi |

#### CPY-UC-REQ-968155/A-Delete device

**Linked Elements**

CPY-UC-REQ-968156/A-Selected device has an active CarPlay session

|  |  |
| --- | --- |
| **Actors** | IVIS, User |
| **Pre-conditions** | IVIS stored at least one Wireless CarPlay device. |
| **Scenario Description** | User selects a device to be deleted from CarPlay menu. |
| **Post-conditions** | Device gets deleted from device list in CarPlay menu.  If the selected device was matched to a wired CarPlay device, it should be threated per *CPY-FUR-REQ-889636/C-General Settings*. |
| **List of Exception Use Cases** | E1 - Selected device has an active CarPlay session. |
| **Interfaces** | USB, BT, Wi-Fi |

#### CPY-UC-REQ-968156/A-Selected device has an active CarPlay session

**Linked Elements**

CPY-UC-REQ-968155/A-Delete device

|  |  |
| --- | --- |
| **Actors** | IVIS, User, CarPlay device |
| **Pre-conditions** | Same as original use case |
| **Scenario Description** | Selected device has an active CarPlay session. |
| **Post-conditions** | CarPlay session stops and device gets deleted. |
| **List of Exception Use Cases** | N/A |
| **Interfaces** | USB, BT, Wi-Fi, HMI |

### Requirements

#### Bluetooth

##### Wireless CarPlay support detection

###### CPY-FUR-REQ-968066/A-Wireless CarPlay support detection – Discoverable mode pairing

If pairing was done with IVIS in discoverable mode, the 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.

###### CPY-FUR-REQ-968067/A-Wireless CarPlay support detection – Discovery mode pairing

If IVIS is performing a Bluetooth device discovery, the IVIS shall consider the CarPlay UUID in the Bluetooth EIR to detect Wireless CarPlay support on the device as specified in the latest Apple’s MFi specification.

###### CPY-FUR-REQ-968068/A-Wireless CarPlay support detection – Dock connector pairing

If IVIS pairs a device using the dock connector pairing (refer to BTP-FUR-REQ-033778-Pairing via Dock Connector Requirement) the 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.

###### CPY-FUR-REQ-968069/A-Wireless CarPlay support detection timeout

Once IVIS announced its Wireless CarPlay capabilities over iAP2 via BT, it should wait for *WirelessCarPlaySupportDetectionTimeout* for receiving WirelessCarPlayUpdate from the connected iPhone. If this message is not received, IVIS shall consider this Wireless CarPlay setup as failed.

##### User prompts

###### CPY-FUR-REQ-968071/A-Wireless CarPlay user prompts – Discoverable mode pairing

If IVIS detected Wireless CarPlay support (per *CPY-FUR-REQ-968066-Wireless CarPlay support detection – Discoverable mode pairing*) of a newly paired device, the user shall be prompted to confirm Wireless CarPlay start and the associated privacy and terms of use only if the pairing was not initiated from the CarPlay menu.

Until user did not decline Wireless CarPlay start, no other Bluetooth profiles than iAP2 shall be connected. Once user declined Wireless CarPlay start IVIS shall proceed as defined in *BTP-FUN-REQ-833734-Pairing*; e.g. connect other Bluetooth profiles.

###### CPY-FUR-REQ-968072/A-Wireless CarPlay user prompts – Discovery mode pairing

If IVIS detected Wireless CarPlay support (per *CPY-FUR-REQ-968067-Wireless CarPlay support detection – Discovery mode pairing*) of a newly paired device, the user shall be prompted to confirm Wireless CarPlay start and the associated privacy and terms of use only if the pairing was not initiated from the CarPlay menu.

Until user did not decline Wireless CarPlay start, no other Bluetooth profiles than iAP2 shall be connected.

If user confirms prompts, iAP2 via BT session shall start.

Once user declined Wireless CarPlay start IVIS shall proceed as defined in *BTP-FUN-REQ-833734-Pairing*; e.g. connect other Bluetooth profiles.

###### CPY-FUR-REQ-968073/A-Wireless CarPlay user prompts – Dock connector pairing

If IVIS detected Wireless CarPlay support (per *CPY-FUR-REQ-968068-Wireless CarPlay support detection – Dock connector pairing*) 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 Bluetooth profiles than iAP2 shall be connected.

Once user declined Wireless CarPlay start IVIS shall proceed as defined in *BTP-FUN-REQ-833734-Pairing*; e.g. connect other Bluetooth profiles.

##### iAP2 over Bluetooth

###### CPY-FUR-REQ-968075/A-iAP2 over Bluetooth after Bluetooth pairing

If an iAP2 session over BT was established for the purpose of detecting wireless CarPlay support and the device won’t be used for Wireless CarPlay (e.g. by user selection or device capabilities), the iAP2 session stops and other supported Bluetooth profiles might get connected. Please refer to Bluetooth Connectivity SPSS.

###### CPY-FUR-REQ-968076/A-iAP2 over Bluetooth for reconnections

Whenever a known device shall be reconnected for Wireless CarPlay by user actions or system triggers, iAP2 over Bluetooth connection shall be established.

IVIS to consider the following rules:

1. If the selected device is not yet connected per Bluetooth, only start the iAP2 session after Bluetooth connection and do not connect any other Bluetooth profiles.
2. If the selected device is already connected as Bluetooth device, all connected Bluetooth profiles except SPP (serial port profile) for establishing the iAP2 session will be disconnected. iAP2 session starts exclusively.

##### EIR

###### CPY-FUR-REQ-968078/A-Advertise Wireless CarPlay capabilities for Bluetooth pairing

The IVIS shall announce support of all Bluetooth profiles required for wireless CarPlay as defined in the latest MFi specification.

These Bluetooth profiles shall be announced for each pairing independent of the HMI that was used to trigger a pairing.

See also *BTP-REQ-047925-Bluetooth Profile Requirements.*

###### CPY-FUR-REQ-968079/A-CarPlay UUID in EIR from IVIS

IVIS shall include CarPlay UUID in its Bluetooth Extended Inquiry Response (EIR) during every Discoverable mode pairing process (refer to Apple MFi specification).

###### CPY-FUR-REQ-968080/A-EIR filtering

If the user specifically chooses to add a CarPlay device and the IVIS is in discovery mode, then the IVIS shall filter for Bluetooth devices having the CarPlay UUID in their EIR.

##### Device list

###### CPY-FUR-REQ-968082/A-Bluetooth device list

Whenever a device gets paired for Wireless CarPlay it shall also be added to the Bluetooth device list.

###### CPY-FUR-REQ-968083/A-CarPlay device list

Whenever a wireless CarPlay capable device (per *CPY-FUR-REQ-968066-Wireless CarPlay support detection – Discoverable mode pairing*, *CPY-FUR-REQ-968067-Wireless CarPlay support detection – Discovery mode pairing* and *CPY-FUR-REQ-968068-Wireless CarPlay support detection – Dock connector pairing)* gets paired; it shall be added to the CarPlay device list.

If CarPlay startup was never initiated for this device any settings shown in the CarPlay device list are preliminary and the device shall be handled as a new device upon next connection. Refer to HMI specification H80 for default values to be shown for preliminary settings.

Example:

* iPhone was paired using a non-CarPlay menu
* IVIS detected Wireless CarPlay support and prompts user to confirm start of CarPlay and the associated privacy and terms of use
* iPhone gets disconnected, before user confirmed one or both prompts

###### CPY-FUR-REQ-968084/A-Deleting Wireless CarPlay device from Bluetooth device list

Deleting a Wireless CarPlay device from the Bluetooth device list (refer to *BTP-FUR-REQ-033785-Delete Device*) makes this device also unavailable for wireless CarPlay.

If the deleted device was a wireless only device, it shall get deleted from the CarPlay device list.

If the deleted device was matched (per *CPY-FUR-REQ-968128-Match Wireless and Wired CarPlay devices*) the device stays in the CarPlay device list. HMI may deactivate wireless specific options for this device, refer to HMI specification H80.

###### CPY-FUR-REQ-968085/A-Maintain Wireless CarPlay device list

IVIS shall maintain only one Bluetooth device list (also refer to BTP-FUR-REQ-033779-Pairing Process) that is shared between features.

##### Bluetooth activation / deactivation

###### CPY-FUR-REQ-968087/A-Disable Bluetooth

Once a wired or wireless CarPlay session is active and the CarPlay device notified to disconnect all active profiles, the IVIS shall disable BT as long as the CarPlay session is still active.

###### CPY-FUR-REQ-968088/A-Re-activating Bluetooth

In the case the Wireless CarPlay session is stopped Bluetooth shall be enabled again. Reconnection strategy shall follow the Bluetooth Connectivity SPSS.

See also *BTP-FUR-REQ-192187-Turning Bluetooth off/on*.

###### CPY-FUR-REQ-968089/A-Activating Bluetooth for Wireless CarPlay

If a user selects any CarPlay functionality (e.g. add new Wireless CarPlay device, start Wireless CarPlay session, etc.) requiring Bluetooth and Bluetooth is set to OFF, IVIS activates Bluetooth automatically.

If the system triggers any CarPlay functionality (e.g. resume CarPlay, link loss scenario, etc.) requiring Bluetooth and Bluetooth is set to OFF, IVIS shall not activate Bluetooth.

Also refer to *CPY-FUR-REQ-968120-Wireless CarPlay session stopped – Bluetooth connection*.

##### CPY-FUR-REQ-968092/A-Wireless CarPlay resume timeout

If IVIS attempts to establish a BT connection in order to resume a CarPlay session as specified in the MFi spec, it shall attempt for *WirelessCarPlayResumeTimeout*.

When the device is not connectable, the BT auto connection strategy shall be started, per *BTP-FUR-REQ-033809-Automatic Connection*.

##### CPY-FUR-REQ-968093/A-Context sensitive Bluetooth connection

If the user connects an already paired iPhone through the non-CarPlay menus offered by the HMI, Wireless CarPlay should not start regardless of the Wireless CarPlay flag status of the selected iPhone.

##### CPY-FUR-REQ-968096/A-Pairing authentication – CarPlay menu pairing

If Bluetooth pairing is triggered using the CarPlay menu IVIS shall only allow devices to pair that support Secure Simple Pairing as defined in latest MFi specification.

Pairing requests of devices not supporting Secure Simple Pairing shall be rejected.

See also *BTP-FUR-REQ-033773-Secure Simple Pairing*.

#### Wi-Fi

##### CPY-FUR-REQ-968097/A-Wi-Fi Access Point SSID

The IVIS’s Wi-Fi Access Points SSID shall be unique for each vehicle.

##### CPY-FUR-REQ-968098/A-Wi-Fi Access Point passphrase

The Wi-Fi’s Access Point passphrase shall be randomized for the first usage of Wireless CarPlay. It shall stay unchanged until the user performs a master reset of the system.

##### CPY-FUR-REQ-968090/A-Activating Wi-Fi for Wireless CarPlay

If a wireless CarPlay functionality requiring Wi-Fi is initiated (e.g. add new Wireless CarPlay device, start Wireless CarPlay session, etc.) and Wi-Fi is set to OFF, IVIS shall activate Wi-Fi automatically.

Refer also to *CPY-FUR-REQ-968121-Wireless CarPlay session stopped – Wi-Fi connection*.

##### CPY-FUR-REQ-968102/A-Wi-Fi credentials for first time connections

IVIS shall delay sending the Wi-Fi SSID and passphrase until the first time connection popup, privacy and terms of use popup (if applicable, see HMI specification) gets confirmed by the user.

##### CPY-FUR-REQ-968111/A-Wi-Fi credentials for interruption of active sessions

In case an active CarPlay session gets interrupted by starting CarPlay on a new device, the Wi-Fi credentials shall not be shared with the new device before the user gave consent on interrupting the active session.

##### CPY-FUR-REQ-968113/A-Wireless CarPlay start – Access Point setup

Whenever Wireless CarPlay must start for a known device, IVIS shall attempt to connect it via BT and start the Wireless CarPlay Wi-Fi Access Point immediately as defined in the MFi specification.

#### Resume / Start

##### CPY-FUR-REQ-968100/A-CarPlay start

User shall have the option to start a CarPlay session for a known CarPlay device using the HMI. Refer to *CPY-FUR-REQ-968101-Interface prioritization* with regards to interface utilization.

##### CPY-FUR-REQ-968101/A-Interface prioritization

If a CarPlay startup is initiated for a device that is already connected wired and over Bluetooth, the wired connection gets priority for CarPlay connection.

When a CarPlay device gets connected over USB while the IVIS is trying to start a wireless CarPlay session on the same device, the IVIS shall perform the role switch as specified in the MFi specification. The connection interface might be decided by the CarPlay plugin.

##### CPY-FUR-REQ-968103/A-Handling of wireless CarPlay startup failure

If a user triggered wireless CarPlay start fails, the IVIS shall notify the user via HMI that it could not establish the wireless Apple CarPlay session.

If the IVIS receives *WirelessCarPlayUpdate(Status = Unavailable)*, any wireless CarPlay setup timeouts shall be cancelled and the IVIS shall consider this wireless CarPlay setup as failed.

Note: If a wireless CarPlay setup fails the connected device might be used for native wireless features. Please refer to BT Connectivity SPSS.

##### CPY-FUR-REQ-968104/A-First time connection startup timeout

The first Wireless CarPlay session startup after IVIS detected Wireless CarPlay support of the connected device shall have no timeout. IVIS shall only consider startup as failed (per *CPY-FUR-REQ-968107-Startup error detection*), if a successful startup won’t happen for this attempt.

Example:

* Phone’s response is pending -> IVIS shall wait for response.
* Phone terminates iAP2 session before e.g. Wi-Fi credentials were exchanged -> IVIS shall consider startup as failed.

Note: For first time wireless CarPlay startup user might have to interact with the phone, e.g. confirm popup, change setting, etc. Because of the duration of such interaction is unknown to the IVIS the startup shall not time out.

##### CPY-FUR-REQ-968105/A-Subsequent startup timeout

Once a subsequent Wireless CarPlay session start is triggered (system triggered or user triggered), IVIS shall wait for *SubsequentStartupTimeout* for a successful session start. The timeout shall start with receiving the first Bluetooth connection packet from the iPhone. The timeout might include several retries of a session start.

This timeout shall stop; if the last retry fails (refer to *CPY-FUR-REQ-968106-Startup retry strategy*).

##### CPY-FUR-REQ-968106/A-Startup retry strategy

Once the first attempt of starting a wireless CarPlay session times out or fails, IVIS shall retry once.

Each attempt shall last for *StartupAttemptTimeout*.

##### CPY-FUR-REQ-968107/A-Startup error detection

IVIS shall detect fatal errors during a wireless CarPlay session start. Detecting such an error shall result in a failed connection attempt.

The supplier is expected to identify possible fatal errors and handle them accordingly.

##### CPY-FUR-REQ-968108/A-Startup timeout exceeded

If no session started within the timeout (refer to *CPY-FUR-REQ-968105 -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-833792-Failed to Connect to Previously Paired Phone upon Resume*.

##### CPY-FUR-REQ-968109/A-Startup cancelation

If the Wireless CarPlay startup is canceled 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-833792-Failed to Connect to Previously Paired Phone upon Resume*.

##### CPY-FUR-REQ-968110/A-Interruption active CarPlay session

While a CarPlay session is active (wired or wirelessly) and user selected to start CarPlay from another device (wired or wirelessly), IVIS shall prompt the user to confirm the termination of the ongoing CarPlay session before attempting to start from the selected device.

If the user confirms this, the active CarPlay session ends and IVIS attempts to start CarPlay from the other device.

If the user declines this, the ongoing CarPlay session remains active.

##### CPY-FUR-REQ-968112/A-Wireless CarPlay start/resume interruption

A Wireless CarPlay start or resume can be interrupted by an USB connection of another projection mode device. However once the IVIS successfully connected to the Wireless CarPlay device and determined, that Wireless CarPlay is available and enabled on the device (refer to *CPY-FUR-REQ-968066-Wireless CarPlay support detection – Discoverable mode pairing*, *CPY-FUR-REQ-968067-Wireless CarPlay support detection – Discovery mode pairing* and *CPY-FUR-REQ-968068-Wireless CarPlay support detection – Dock connector pairing*), the resuming must not be interrupted unless it eventually fails.

##### CPY-FUR-REQ-968114/A-Wireless CarPlay resume strategy

IVIS shall attempt to start Wireless CarPlay upon system startup, if the same device had an active CarPlay session (wired or wireless) upon system suspend.

##### CPY-FUR-REQ-968094/A-Add Wireless CarPlay device during active CarPlay session

While a CarPlay session is active (wired or wirelessly) and user selected to add a new Wireless CarPlay device, IVIS shall prompt the user to confirm the termination of the ongoing CarPlay session before attempting to add new devices.

If the user confirms this, the active CarPlay session ends, Bluetooth is re-activated and IVIS gets into discoverable mode (also refer to *CPY-UC-REQ-968141-First time connection through CarPlay menu*).

If the user declines this, the ongoing CarPlay session remains active

##### CPY-FUR-REQ-968115/A-Resume flow

Upon startup the IVIS shall apply the following flow:



#### Stop

##### CPY-FUR-REQ-968117/A-Stop CarPlay session

User shall have the option to stop an active CarPlay session (wired or wireless) using the HMI.

##### CPY-FUR-REQ-968118/A-CarPlay session stopped – iPod connection

Whenever a wired CarPlay session is stopped (e.g. by changing a setting or by stopping the active session using the HMI), the device shall get connected as iPod device.

##### CPY-FUR-REQ-968119/A-CarPlay session stopped – prevent reconnection detection

Whenever a wired CarPlay session stops, the IVIS must not interpret the role switch as a new USB connection. For example the role switch must not trigger any system behavior that a new USB connection would trigger.

##### CPY-FUR-REQ-968120/A-Wireless CarPlay session stopped – Bluetooth connection

If a wireless CarPlay session stopped, the requirements apply as defined in *CPY-FUR-REQ-889611-CPY Device is Disconnected* and *BTP-FUR-REQ-192187-Turning Bluetooth off/on* for Bluetooth reconnections.

##### CPY-FUR-REQ-968121/A-Wireless CarPlay session stopped – Wi-Fi connection

If the user stops a Wireless CarPlay session or a session ends upon suspend, the Wi-Fi Access Point gets deactivated. Wi-Fi stays activated and is available for other features per *WiFi Configuration SPSS*.

#### Settings

##### CPY-FUR-REQ-968123/A-Wireless CarPlay flag

IVIS shall set and store a Wireless CarPlay flag for each known Wireless CarPlay device. The flag has two states:

* ON: Is set whenever the user started a Wireless CarPlay session for this device. This includes first time connections. While another CarPlay session is active, the flag is only set to ON, if the user confirms to interrupt the active session. See *CPY-FUR-REQ-968094-Add Wireless CarPlay device during active CarPlay session* and *CPY-FUR-REQ-968110-Interruption active CarPlay session*.
* OFF: Is set whenever the user stopped an active Wireless CarPlay session using the HMI. The flag must not be set to OFF if a Wireless CarPlay session ends because of another CarPlay session starts on a different device (wired or wireless).

The flag does not change its state by changing the CarPlay setting per *CPY-FUR-REQ-968124-CarPlay setting*.

##### CPY-FUR-REQ-968124/A-CarPlay setting

The CarPlay setting as defined in *CPY-FUR-REQ-889636-General Settings* shall be applicable for both wired and wireless connections.

##### CPY-FUR-REQ-968125/A-CarPlay setting 2

Changing the CarPlay setting as defined in “CPY-FUR-REQ-889636-General Settings” from disabled / off to enabled / on shall start a Wireless CarPlay session only if the affected device is connected via Bluetooth for any profile and if the flag is set to ON (refer to Wireless CarPlay flag *CPY-FUR-REQ-968123-Wireless CarPlay flag*).

If the affected device is not connected via Bluetooth, a change of this setting should not trigger any connection attempts to this device.

##### CPY-FUR-REQ-968126/A-Maximum Bluetooth devices exceeded – Out of Band pairing

If a new device gets paired through Out of Band pairing 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.

##### CPY-FUR-REQ-968127/A-Maximum Bluetooth devices exceeded – CarPlay menu pairing

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.

##### CPY-FUR-REQ-968128/A-Match Wireless and Wired CarPlay devices

IVIS shall match Wireless and Wired CarPlay devices using the *DeviceTransportIdentifierNotification* as defined in the MFi specification.

Devices not supporting *DeviceTransportIdentifierNotification* shall not be matched. IVIS shall not apply other unique identification strategies (e.g. device name matching) but list duplicates in the CarPlay device list (refer to HMI specification H80, screen 14).

Devices shall be matched before the HMI shows any CarPlay related user prompts, e.g. first time connection popup as defined in *CPY-FUR-REQ-968071-Wireless CarPlay user prompts – Discoverable mode pairing*, *CPY-FUR-REQ-968072-Wireless CarPlay user prompts – Discovery mode pairing* and *CPY-FUR-REQ-968073-Wireless CarPlay user prompts – Dock connector pairing*.

##### CPY-FUR-REQ-968129/A-Match Wireless and Wired CarPlay device setting

If a new device gets connected, the IVIS will try to match it to a known device (see *CPY-FUR-REQ-968128-Match Wireless and Wired CarPlay devices*). Depending on how the new device gets connected the following rules apply for the CarPlay setting (per *CPY-FUR-REQ-889636-General Settings*):

1. If the new device gets paired using the CarPlay menu (refer to HMI specification H80) the CarPlay setting shall be set to ON for the matched device.

Example:

* User connects iPhone over USB and disables CarPlay on first time connection popup. iPhone gets added to CarPlay device list with setting = OFF.
* User pairs same iPhone over Bluetooth using the CarPlay menu.
* IVIS shall match the newly paired device to the existing wired CarPlay device.
* Setting is set to ON and CarPlay starts.

1. If the new device does not get connected using the CarPlay menu (e.g. USB connection, pairing through non-CarPlay menu, etc.) the setting of the known device shall be maintained and applied for the new device.

Example:

* User pairs iPhone using a non-CarPlay menu (e.g. dock connector pairing). User decides to not start CarPlay. iPhone gets added to CarPlay device list with setting = OFF.
* User connects same device over USB.
* IVIS shall match the newly connected device the existing wireless CarPlay device.
* Setting stays OFF and CarPlay does not start.

##### CPY-FUR-REQ-968095/A-CarPlay setting during active non-CarPlay projection mode session

IVIS shall not provide the ability to enter the CarPlay settings to the user when a non-CarPlay projection mode session is active.

#### Timer requirements

##### CPY-TMR-REQ-268249/A-WirelessCarPlaySupportDetectionTimeout

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| WirelessCarPlaySupportDetectionTimeout | WirelessCarPlaySupportDetectionTimeout is a timer defining how long IVIS shall wait for detecting Wireless CarPlay support of a connected device. | sec | 0 - 10 | 1 | 2 |

##### CPY-TMR-REQ-268250/A-WirelessCarPlayResumeTimeout

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| WirelessCarPlayResumeTimeout | WirelessCarPlayResumeTimeout is a timer defining how long the IVIS shall attempt to reconnect a Wireless CarPlay device over Bluetooth. | sec | 0 - 30 | 1 | 10 |

##### CPY-TMR-REQ-268251/A-SubsequentStartupTimeout

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| SubsequentStartupTimeout | SubsequentStartupTimeout is a timer defining how long the IVIS shall attempt to start a Wireless CarPlay session for a subsequent connection. | sec | 0 - 120 | 1 | 30 |

##### CPY-TMR-REQ-268252/A-StartupAttemptTimeout

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| StartupAttemptTimeout | StartupAttemptTimeout is a timer defining how long one startup attempt can last. | sec | 0 - 60 | 1 | 12 |

# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 | A22C |
| 2 | A22B |
| 3 | MFi Accessory Specification |
| 4 | Audio Management SPSS |
| 5 | Alerts SPSS |
| 6 | List Browse Protocol SPSS |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
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