Car Connectivity Consortium

MirrorLink®

Interoperability Test Specification

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LIST OF CONTRIBUTORS

Brakensiek, Jörg (Editor) Microsoft Corporation
Hrabak, Robert General Motors Corporation
Lehner, Martin jambit GmbH
Luennemann, Patrick Carmeq / Volkswagen
Paxson, Mark VTM

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TABLE OF CONTENTS

TERMS AND ABBREVIATIONS

A2DP	Bluetooth Advanced Audio Distribution Profile
DAP	Device Attestation Protocol
Disabled	The term disabled is used in this specification to describe the situation, where an application is available on the MirrorLink Client, but not available for the user to launch. E.g. the application's icon or application's name may be dimmed or shaded.
Drive Mode	Drive mode defines the mode, in which the MirrorLink Client requires the application to follow driver distraction guidelines. In other specification, the term driving mode is used to describe the same.
GPS	Global Positioning System
IOP	Interoperability
Park Mode	Park mode defines the mode, in which the MirrorLink Client does not require the application to follow driver distraction guidelines. In other specifications, the terms non-drive mode or non-restrictive driving mode are used to describe the same.
PIXIT	Product Implementation Extra Information for Testing; the PIXIT contains product specific instructions and information that facilitates testing of the product. The PIXIT is provided by the product developer.
Present	The term present is used in this specification to describe the situation, where that an application is available on the MirrorLink Client for the user to launch. This can be e.g. via the application's icon and/or the application's name.
RTP	Real-time Transport Protocol
UI	User Interface
USB	Universal Serial Bus
VNC	Virtual Network Computing
WLAN	Wireless Local Area Network

1 ABOUT

This document specifies all MirrorLink interoperability test cases.

The specification lists a series of requirements, either explicitly or within the text, which are mandatory elements for a compliant solutions. Recommendations are given, to ensure optimal usage and to provide suitable performance. All recommendations are optional.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are following the notation as described in RFC 2119 [1].

1. MUST: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
2. MUST NOT: This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.
3. SHOULD: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
4. SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
5. MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

2 INTRODUCTION

In terms of compliance, interoperability testing is most important as it proves and validates the product design in terms of the *consumer's* perspective. Interoperability demonstrates the device's ability to operate, *as expected*, in a MirrorLink session irrespective of the MirrorLink version. This document defines the interoperability methodologies of the MirrorLink compliance program.

MirrorLink is a single standard that defines how clients and servers communicate and share data. Compliance with the standard is enforced through the MirrorLink Certification Program. The MirrorLink Certification Program, however, is not intended to restrict competitiveness among vendors that implement the technology. Innovation and differentiation among MirrorLink products is encouraged and expected. The ability for the MirrorLink compliance program to adapt to testing unforeseen product innovation and differentiation is necessary. This document attempts to define the test procedures for MirrorLink interoperability while remaining flexible to adapt to new and original designs.

Fundamental tenets of the MirrorLink technology covered by this interoperability document are:

- Paired MirrorLink certified devices MUST just work (are plug and play)
- At no time MAY a certified MirrorLink server or client in a MirrorLink session appear broken
- MirrorLink certified components MUST meet regional regulatory requirements
- Messages presented to the user MUST be accurate, brief and informative and not be misleading or esoteric.
- All MirrorLink actions MUST NOT require user interaction with the server

Interoperability is a demonstration of the MirrorLink implementation on the device being tested. In order to pass the requirements of interoperability, the underlying MirrorLink technology must perform correctly. Interoperability requires the device being tested to be connected to a known good MirrorLink device, e.g. a certified device, which is being part of the IOP test bed [2]. However, both the client and the server behavior is monitored regardless of which device is being tested. If the known good MirrorLink device exhibits behavior considered improper during interoperability, a failure is marked against the device being tested. When testing products targeted for the automotive environment, the test engineer is to be aware of the consumer experience of the MirrorLink pairs and identify any area that MAY qualify as distracting. A vendor MAY challenge any failure. Challenges to failures are governed by the PMD, MirrorLink compliance program and the Certification Body.

The interoperability test is to be performed from the perspective of the consumer in the intended operating MirrorLink environments. Each test cases consists of a sequence of test steps. The test engineer MUST NOT skip or change the order of the test steps, unless specifically stated in the test case. A failure of any test step, MUST fail the test case.

The individual conducting the interoperability test is empowered by this document to use common sense and include additional, ad hoc, tests as deemed necessary based on the features of the product. This freedom enables testing of innovative designs and allows differentiation among MirrorLink products. Additional tests or modified tests necessary to satisfactorily examine a product are to be fully documented in the test report so to be reproducible by others. The test lab SHOULD consult the device vendors and the Certification Body for advice or assistance with innovations.

Areas of assessment for MirrorLink interoperability include the following:

- Establishment of the MirrorLink session
- Exercise of each available function of the server and client via MirrorLink (phone calling, media control, navigation, voice recognition, data entry (keys), etc.)
- Execution and interoperability of common server applications available via the client (*e.g.* user contact listing, navigation, music player, messaging, etc…)
- Exercise of the client user interface
- Graceful handling of common and expected failures (negative testing)

Test Labs MUST verify whether the DUT is at all times behaving as laid out in the User Experience Requirements document [3]. The compliance of those requirements MUST be verified during the entire IOP test session. Deviations MUST be noted in the test report.

Both servers and clients MUST satisfactorily complete the interoperability test cases that begin with "IOP." Servers have additional interoperability tests to verify their ability to interact with the Application Certificate Management System (ACMS). These tests have test case names that begin with "SR" and MUST be satisfactorily performed.

Use of certified applications or MirrorLink test applications on the server is required to exercise the functions of the server and client, such as audio; video; key, touch and pointer events; authentication; blocking and other functions. Applications that are targeted specifically for the MirrorLink ecosystem MUST be exercised if available; such as, navigation, music player and telephony. Quality, fitness and usability of the applications are not part of the examination. The examination is only to ensure the application is usable in the MirrorLink environment by forcing interoperability between the client and server. Please see section 8 for more information.

Negative testing is included in the interoperability methodologies. Negative testing verifies acceptable behavior of common failures and possible recovery. Examples of negative testing include, but are not limited to, the unexpected loss of the MirrorLink connection; loss or lack of GPS satellites; and various phone calling conditions. Any features on the phone that could by annoying to a driver SHOULD be reported to the vendor as a failure. For example, if the input timeout feature on the phone activates while in a MirrorLink session and the driver MUST enter the unlock code in order to regain control is an example of a phone feature that SHOULD be disabled in a MirrorLink session.

During the execution of some IOP test cases, the test engineer is asked to visually confirm, that the received VNC Framebuffer content is replicating the MirrorLink Server's framebuffer. Should the MirrorLink Server implement a virtual framebuffer, the transmitted content may not be visible on the Server's display. In that case, the framebuffer content MUST be provided from the server manufacturer as images and/or video clips.

When supported, a MirrorLink Server and a MirrorLink Client MUST each use a DAP certificate chain that links to the CCC root certificate. An exception is made only for software implementations of MirrorLink Servers, seeking device certification as a building block, where the security of the software implementation does not permit the CCC root to be used. In this case, software implementations of MirrorLink Servers MUST use the CTS root certificate. Note, that MirrorLink Clients MUST handle CCC and CTS root certificates during certification testing.

This Interoperability Specification cannot predict future designs that MAY appear in MirrorLink devices and therefore MAY NOT have a test plan to handle those sufficiently. The ATL or the DUT vendor MUST therefore contact the Certification Body about any unexpected behavior or new innovations seen, to discuss them and to agree on how to appropriately test them in the context of MirrorLink.

3 DEFINITIONS

3.1 Definition: Power-On Devices

Objective

The objective of these test steps is to establish a MirrorLink session between a MirrorLink Server and Client device from a Powered-down state to a state where MirrorLink Server applications are visible on the MirrorLink Client display. Bluetooth will be enabled only; if needed for the respective test case.

If the MirrorLink Server and Client support Wi-Fi, the respective test case MUST be executed twice, once with a USB transport and once with a Wi-Fi transport.

Preparation Steps

- MirrorLink Server is powered off.
- MirrorLink Client is powered off.
- USB cable is detached / Wi-Fi radio is turned off.

Test Case Steps

Step	Name	Description	Expected Result
1	Power on	Power on Client and Server Bring up Client in unrestricted "Park" mode (if supported).	Client and Server are fully operational
2	Bluetooth Connection	Enable Bluetooth, if Bluetooth is required for the test case. Pair both devices, if automatic pairing is not done. Otherwise Bluetooth is left in the default stage.	Bluetooth Connection established, if is needed for a particular test case.
3	Connect	Attach USB cable to both units or switch on the Wi-Fi radio and pair both devices.	
4	MirrorLink Session Setup	Establish MirrorLink session between MirrorLink Server and Client. The test engineer MAY need to execute a proprietary manual action from the MirrorLink Server or Client (PIXIT ID 1000)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client.

Step	Name	Description	Expected Result
			Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

3.2 Definition: Establish Connection

Objective

The objective of these test steps is to establish a MirrorLink session between a MirrorLink Server and Client device from an unconnected USB state, while both devices are otherwise already powered and fully operational, to a state where MirrorLink Server applications are visible on the MirrorLink Client display.

If the MirrorLink Server and Client support Wi-Fi, the respective test case MUST be executed twice, once with a USB transport and once with a Wi-Fi transport.

Preparation Steps

- MirrorLink Server is powered on.
- MirrorLink Client is powered on; Client is in "Park" mode (if supported)
- Bluetooth Connection is established, if needed for the test case; devices are paired.
- USB cable is detached.
- Wi-Fi radio is off.

Note: If these preoperational conditions cannot be met, the test engineer MUST apply the steps defined above in "`Power-On Devices`".

Test Case Steps

Step	Name	Description	Expected Result
1	Connect	USB Physical Transport: • Attach USB cable to both units Wi-Fi Physical Transport: • Switch on Wi-Fi radio • Pair both devices (if needed)	
2	MirrorLink Session Setup	Establish MirrorLink session between MirrorLink Server and Client. The test engineer MAY need to execute a proprietary action from the MirrorLink Server or Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
3	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

3.3 Definition: MirrorLink Application Listing

Objective

The objective of these test steps is to establish a MirrorLink session between a MirrorLink Server and Client device from an unconnected USB state, while both devices are otherwise already powered and fully operational, to a state where MirrorLink Server applications are visible on the MirrorLink Client display.

Preparation Steps

- MirrorLink Server is powered on.
- MirrorLink Client is powered on; Client is in "Park" mode (if supported)
- Bluetooth Connection is established, if needed for the test case; devices are paired.
- USB cable connected or Wi-Fi radio is powered-on and paired (dependent on physical transport)
- MirrorLink session has been established
- No running VNC connection, i.e. no MirrorLink application's user interface visible on the MirrorLink Client display; DAP/RTP/CDB session MAY be established;

Note: If these preoperational conditions cannot be met, the test engineer MUST apply the steps defined above in "`Establish Connection`".

Test Case Steps

Step	Name	Description	Expected Result
1	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 1: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 1: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4 MIRRORLINK SESSION

4.1 MirrorLink USB Sessions

Objective of these tests is to verify that a MirrorLink session can be established and terminated gracefully from various common starting conditions. Starting conditions include the initial power state of the device and the attached state of the USB cable. The client or server MAY have non-MirrorLink operating states from which the MirrorLink session SHOULD be initiated.

The test engineer is free to add or remove other connection test scenarios as appropriate given the nature of the devices involved. For example, the server MAY be a USB On-The-Go device with an Accessory Charger Adapter which would require additional connection tests. Alternately, the MirrorLink server could be USB bus powered, which would render some tests not applicable.

4.1.1 IOP/USB/ConnectionClientOnServerOn

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be connected to a MirrorLink Client via USB. In this test, the MirrorLink Client is switched on and the MirrorLink Server is switched off, while the USB connection is made. The test case validates, whether the MirrorLink Client and the MirrorLink Server will reach a state, where MirrorLink Server applications are visible on the MirrorLink Client display.

It does not matter, whether the MirrorLink Server or Client side is switched on first.

Preparation Steps

- MirrorLink Server is powered off.
- MirrorLink Client is powered off.
- USB cable is detached

Test Case Steps

Step	Name	Description	Expected Result
1	Power on	Power on Client Bring up Client in unrestricted “Park” mode (if supported).	Client is fully operational
2	Power on	Power on Server	Server is fully operational
3	Connect	Attach cable to both units	
4	MirrorLink Session Setup	Establish MirrorLink session between MirrorLink Server and Client. The test engineer MAY need to execute a proprietary action from the MirrorLink Server or Client (PIXIT ID 1000)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.2 IOP/USB/ConnectionClientOffServerOn

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be connected to a MirrorLink Client via USB. In this test, the MirrorLink Client is switched off and the MirrorLink Server is switched on, while the USB connection is made. The test case validates, whether the MirrorLink Client and the MirrorLink Server will reach a state, where MirrorLink Server applications are visible on the MirrorLink Client display.

Preparation Steps

- MirrorLink Server is powered off.

- MirrorLink Client is powered off.
- USB cable is detached

Test Case Steps

Step	Name	Description	Expected Result
1	Power on	Power on Server	Server is fully operational
2	Connect	Attach cable to both units	
3	Power on	Power on Client Note: Bring up Client in unrestricted “Park” mode (if supported).	Client is fully operational
4	MirrorLink Session Setup	Establish MirrorLink session between MirrorLink Server and Client. The test engineer MAY need to execute a proprietary action from the MirrorLink Server or Client (PIXIT ID 1000)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality, if the same user action is also required in test case `ConnectionClientOnServerOn`. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.3 IOP/USB/ConnectionClientOnServerOff

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be connected to a MirrorLink Client via USB. In this test, the MirrorLink Client is switched on and the MirrorLink Server is switched off, while the USB connection is made. The test case validates, whether the MirrorLink Client and the MirrorLink Server will reach a state, where MirrorLink Server applications are visible on the MirrorLink Client display.

Preparation Steps

- MirrorLink Server is powered off.
- MirrorLink Client is powered off.
- USB cable is detached

Test Case Steps

Step	Name	Description	Expected Result
1	Power on	Power on Client Bring up Client in unrestricted "Park" mode (if supported).	Client is fully operational
2	Connect	Attach cable to both units	
3	Power on	Power on Server	Server is fully operational
4	MirrorLink Session Setup	Establish MirrorLink session between MirrorLink Server and Client. The test engineer MAY need to execute a proprietary action from the MirrorLink Server or Client (PIXIT ID 1000)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality, if the same user action is also required in test case `ConnectionClientOnServerOn`.

Step	Name	Description	Expected Result
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No list of MirrorLink applications visible from the MirrorLink Client. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.4 IOP/USB/TerminationDisconnectCable

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be disconnected from a MirrorLink Client by disconnecting the USB cable. The MirrorLink Client and Server are expected to operate normally after the disconnection, while no MirrorLink content remains visible on the MirrorLink Client's display.

It does not matter, whether the MirrorLink Server or Client side is disconnected first.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Power-On Devices	See definitions (USB transport)	

Step	Name	Description	Expected Result
2	Run App	Launch an application	Application user interface visible on the MirrorLink Client display.
3	Disconnect	Disconnect the USB cable	Test step MUST fail because one of the following conditions is met: • MirrorLink Server's UI is still visible on Client display • MirrorLink Client is unresponsive • MirrorLink Server is unresponsive • Error message is displayed on Server • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.5 IOP/USB/TerminationReconnectCable

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be reconnected to a MirrorLink Client via an USB cable, after it has previously disconnected. The MirrorLink Client and Server are expected to operate normally after the disconnection, while being fully operational within a MirrorLink after the reconnection. The MirrorLink session is 3 times disconnected & reconnected.

The reconnection is facilitated through connecting & disconnecting the USB cable. It does not matter, whether the MirrorLink Server or Client side is connected/disconnected first.

MirrorLink specification does not provide any timing requirements for the disconnect/reconnect cycle to complete. The test engineer MUST measure and report any time, which takes longer than 20s.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Power-On Devices	See definitions (USB transport)	
2	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No MirrorLink application listed. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.
3	Disconnect	Disconnect the USB cable	Test step MUST fail because one of the following conditions is met: • MirrorLink Server's UI is still visible on Client display • MirrorLink Client is unresponsive • MirrorLink Server is unresponsive • Error message is displayed on Server • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.
4	Reconnect	Connect the USB cable	Test step MUST fail because one of the following conditions is met: • MirrorLink Client display is unresponsive. Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality, if the same user action is

Step	Name	Description	Expected Result
			also required in test case `ConnectionClientOnServerOn`. • Manual user action required on the MirrorLink Client to start MirrorLink functionality, if the same user action is also required in test case `ConnectionClientOnServerOn`.
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No MirrorLink application listed. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.
6	Disconnect	Disconnect the USB cable	See step 3
7	Reconnect	Connect the USB cable	See step 4
8	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No MirrorLink application listed. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 2

Step 8: Same as step 2

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 2

Step 8: Same as step 2

4.1.6 IOP/USB/TerminationPowerOffClient

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be disconnected from a MirrorLink Client by powering off the MirrorLink Client. The MirrorLink Server is expected to operate normally after the disconnection, e.g. it is responsive to input events.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Power-On Devices	See definitions (USB transport)	
2	Run App	Launch an application	Application user interface visible on the MirrorLink Client display.
3	Power Off	Power off Client	Test step MUST fail because one of the following conditions is met: • MirrorLink Server is unresponsive • Error message is displayed on Server Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0

Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.7 IOP/USB/TerminationPowerOffServer

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server can be disconnected from a MirrorLink Client by powering off the MirrorLink Server. The MirrorLink Client is expected to operate normally after the disconnection, e.g. it is responsive to input events.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Power-On Devices	See definitions (USB transport)	
2	Run App	Launch an application	Application user interface visible on the MirrorLink Client display.
3	Power Off	Power off Server	Test step MUST fail because one of the following conditions is met: • MirrorLink Server's UI is still visible on Client display • MirrorLink Client is unresponsive • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

The provided notification MUST be added to the IOP test report and the test case MUST be set to N/A. For further details please refer to section 8.3.

4.1.8 IOP/USB/MultipleNonMlPersonalities

Requirement: CONDITIONAL

Condition: Server exposes different USB device classes based on user selection AND

Server has a USB personality, which does not include CDC/NCM

Objective

The objective of this test is to ensure that the MirrorLink Server can be connected to a MirrorLink Client via USB, even if the MirrorLink Server has different USB personalities. The test case validates that switching the MirrorLink Server into another personality, which does not include CDC/NCM, will successfully terminate the MirrorLink session. Enabling a personality, which includes CDC/NCM, will re-establish the MirrorLink session.

Preparation Steps

The test engineer obtains a list of available USB personalities on the MirrorLink Server device, and which of those include CDC/NCM.

- MirrorLink Server is powered off.
- MirrorLink Client is powered off.
- USB cable is detached

Test Case Steps

Step	Name	Description	Expected Result
1	Power on	Power on Client Bring up Client in unrestricted "Park" mode (if supported).	Client is fully operational
2	Power on	Power on Server	Server is fully operational
3	Connect	Attach cable to both units	
4	Switch to CDC/NCM	Switch the MirrorLink Server into CDC/NCM. The test engineer MAY need to execute a proprietary action from the MirrorLink Server (PIXIT ID 2002) or Client (PIXIT ID 2140)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
5	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No MirrorLink application listed. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.
6	Switch to other USB personality	Switch the MirrorLink Server into another USB personality, which does not include CDC/NCM The test engineer MAY need to execute a proprietary action from the MirrorLink Server (PIXIT ID 2003)	Test step MUST fail because one of the following conditions is met: • MirrorLink Server's UI is still visible on Client display • MirrorLink Client is unresponsive • MirrorLink Server is unresponsive • Error message is displayed on Server • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.
7	Switch to CDC/NCM	Switch the MirrorLink Server into CDC/NCM. The test engineer MAY need to execute a proprietary action from the MirrorLink Server (PIXIT ID 2002) or Client (PIXIT ID 2140)	Test step MUST fail because one of the following conditions is met: • Error message appears • User need to enter an IP address or other networking properties Test step MUST NOT fail because one of the following conditions is met: • Manual user action required on the MirrorLink Server to start MirrorLink functionality. • Manual user action required on the MirrorLink Client to start MirrorLink functionality.
8	Application Listing	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • No MirrorLink application listed.

Step	Name	Description	Expected Result
9	Repeat	Repeat this test from step 6, for each non-MirrorLink USB personality on the Server (PIXIT ID 2004).	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY show an empty list or a notification to the user before returning to a native screen in that case. Such behavior MUST NOT be considered a failure.

Step 7: Same as step 4.

Step 8: Same as step 5.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink Client MAY even show an empty list in that case. Such empty list MUST NOT be considered a failure.

Step 8: Same as step 5.

4.1.9 IOP/USB/MultipleNetworkConnections

Requirement: Conditional

Condition: Wi-Fi available on MirrorLink Client AND
Wi-Fi available on MirrorLink Server

Objective

The objective of this test is to ensure that the MirrorLink Session (over USB) operates correctly when a Wi-Fi connection is available. Dropping the Wi-Fi connection does not interrupt the MirrorLink Session.

Preparation Steps

- MirrorLink Server and Client are connected over Wi-Fi (no MirrorLink connection).

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Wi-Fi Connection	Connect the MirrorLink Client and Server over a Wi-Fi connection	• Wi-Fi connection established • No MirrorLink session established
2	Establish USB Connection	See definitions	
3	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is not visible • User interface is not usable
4	Switch off Wi-Fi	Switch off the Wi-Fi radio	Test step MUST fail because one of the following conditions is met: • Interruption in MirrorLink session • User interface is not visible • User interface is not usable

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

4.2 MirrorLink WLAN Sessions

4.2.1 IOP/WLAN/MultipleNetworkConnections

Requirement: Conditional

Condition: Wi-Fi available on MirrorLink Client AND

Wi-Fi available on MirrorLink Server AND

Devices can be connected via USB without forming a MirrorLink connection

Objective

The objective of this test is to ensure that the MirrorLink Session (over Wi-Fi) operates correctly when a USB connection is available. Dropping the USB connection does not interrupt the MirrorLink Session.

Preparation Steps

- MirrorLink Server and Client are connected over USB (no MirrorLink connection).

Test Case Steps

Step	Name	Description	Expected Result
1	Connect USB	Connect the MirrorLink Client and Server via a USB cable	• USB connection established • No MirrorLink session established
2	Establish Wi-Fi Connection	See definitions	MirrorLink connection established over Wi-Fi
3	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is not visible • User interface is not usable
4	Disconnect USB	Detach the USB cable.	Test step MUST fail because one of the following conditions is met: • Interruption in MirrorLink session • User interface is not visible • User interface is not usable

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

4.3 Bluetooth

4.3.1 IOP/BT/AutomaticPairingA2DP

Requirement: Conditional

Condition: Server and Client support Bluetooth A2DP within MirrorLink

Objective

The objective of this test is to ensure that the MirrorLink Server and the MirrorLink Client device can be paired over Bluetooth. This will validate that a MirrorLink session can use Bluetooth A2DP to provide audio.

During the initial pairing, the test case allows the test engineer to enter a PIN or other required authentication to setup the initial Bluetooth pairing. Any follow up pairing need to happen automatically without any further user intervention.

In both cases it is acceptable though, that the test engineer needs to switch on the Bluetooth radio manually (if required).

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Clean BT	Clean list of already known BT devices (PIXIT)	
2	Establish USB Connection	See definitions	MirrorLink connection established over USB
3	Launch application	Launch any application, which requires BT A2DP. Play audio from the application.	Test step MUST fail because one of the following conditions is met: • Application's user interface is not visible on MirrorLink Client's display • Audio via BT not heard Test step MUST NOT fail because one of the following conditions is met: • Test Engineer needs to switch on BT manually • Test Engineer needs to enter a PIN Code or authenticates the BT connection otherwise.
4	Disconnect	Detach USB cable and switch-off BT at the MirrorLink Server and Client (if possible)	
5	Establish USB Connection	See definitions	MirrorLink connection established over USB
6	Launch application	Launch any application, which requires BT A2DP.	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
		Play audio from the application.	• Application's user interface is not visible on MirrorLink Client's display • Audio via BT not heard • Test Engineer needs to enter a PIN Code or authenticates the BT connection otherwise. Test step MUST NOT fail because one of the following conditions is met: • Test Engineer needs to switch on BT manually

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 6: Same as step 3

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 6: Same as step 3

4.3.2 IOP/BT/AutomaticPairingHFP

Requirement: Conditional

Condition: Server and Client support Bluetooth HFP within MirrorLink

Objective

The objective of this test is to ensure that the MirrorLink Server and the MirrorLink Client device can be paired over Bluetooth. This will validate that a MirrorLink session can use Bluetooth HFP to exchange audio.

During the initial pairing, the test case allows the test engineer to enter a PIN or other required authentication to setup the initial Bluetooth pairing. Any follow up pairing need to happen automatically without any further user intervention.

In both cases it is acceptable though, that the test engineer needs to switch on the Bluetooth radio manually (if required).

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Clean BT	Clean list of already known BT devices (PIXIT)	
2	Establish USB Connection	See definitions	MirrorLink connection established over USB
3	Launch application	Launch any application, which requires BT HFP. Setup a call.	Test step MUST fail because one of the following conditions is met: • Application's user interface is not visible on MirrorLink Client's display • Audio via BT not heard Test step MUST NOT fail because one of the following conditions is met: • Test Engineer needs to switch on BT manually • Test Engineer needs to enter a PIN Code or authenticates the BT connection otherwise.
4	Disconnect	Detach USB cable and switch-off BT at the MirrorLink Server and Client (if possible)	
5	Establish USB Connection	See definitions	MirrorLink connection established over USB
6	Launch application	Launch any application, which requires BT HFP. Setup a call.	Test step MUST fail because one of the following conditions is met: • Application's user interface is not visible on MirrorLink Client's display • Audio via BT not heard • Test Engineer needs to enter a PIN Code or authenticates the BT connection otherwise. Test step MUST NOT fail because one of the following conditions is met: • Test Engineer needs to switch on BT manually

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 6: Same as step 3

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 6: Same as step 3

4.3.3 IOP/BT/A2DP

Requirement: Conditional

Condition: Server and Client support BT A2DP

Objective

The objective of this test is to ensure that the MirrorLink Server and Client can use the audio link from A2DP for audio streaming. The test case validates as well, that the audio streaming is not disrupted by connecting and disconnecting a MirrorLink session.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Establish BT A2DP connection	This is system specific	
2	Start Audio Streaming	Stream should be audible on MirrorLink Client (via A2DP)	Stream is audible
3	Establish USB Connection	See definitions	
4	Listen	Listen to the audio	Test step MUST fail because one of the following conditions is met: • Audio not heard from the MirrorLink Client, but continues playing on the MirrorLink Server • Audio is heard from the MirrorLink Server Test step MUST NOT fail because one of the following conditions is met: • Audio is automatically paused on MirrorLink Server (and can be resumed)
5	Disconnect USB	Detach the USB cable	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• MirrorLink Server's UI is still visible on Client display • MirrorLink Client is unresponsive • MirrorLink Server is unresponsive • Error message is displayed on Server • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.
6	Listen	Listen to the audio	Test step MUST fail because one of the following conditions is met: • Audio not heard from the MirrorLink Client, but continues playing on the MirrorLink Server • Audio is heard from the MirrorLink Server Test step MUST NOT fail because one of the following conditions is met: • Audio is automatically paused on MirrorLink Server (and can be resumed) • Test engineer need to establish the BT A2DP connection again.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

None

Exceptions for MirrorLink 1.0 Clients

None

4.3.4 IOP/BT/A2DPtoRTP

Requirement: Conditional

Condition: Server and Client support BT A2DP AND

Server and Client support RTP

Objective

The objective of this test is to ensure that the MirrorLink Server and Client can transition the audio link from A2DP audio streaming to RTP audio streaming in case the BT connection is lost. The test case validates that a BT A2DP connection can be successfully transfer to a RTP based audio connection, once a MirrorLink session has been established over USB.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Establish BT A2DP connection	This is system specific	
2	Start Audio Streaming	Stream should be audible on MirrorLink Client (via A2DP)	Stream is audible
3	Establish USB Connection	See definitions Conduct the necessary steps to establish an RTP connection.	
4	Switch off BT	Switch off the BT radio at the MirrorLink Server	Test step MUST fail because one of the following conditions is met: • Audio not heard from the MirrorLink Client • Audio is heard from the MirrorLink Server Test step MUST NOT fail because one of the following conditions is met: • Audio is automatically paused on MirrorLink Server (and can be resumed)
5	Launch Application	Launch an application, which provides an audio stream (e.g. music player)	Test step MUST fail because one of the following conditions is met: • Audio not heard from the MirrorLink Client • Audio is heard from the MirrorLink Server

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5 USER INTERFACE INTERACTION

5.1 Display

The objective of these tests is to verify that the client is able to properly render the server's framebuffer contents. The tests include orientation, scaling and updates.

The display related test cases will examine how the content of MirrorLink applications is made available via the MirrorLink Client. Therefore the term "`User Interface`" refers to the Application's User Interface as being made visible on the MirrorLink Client's display.

In case an orientation is associated with the server or client, this always refer to the orientation of the application's user interface and not to the physical orientation of the MirrorLink Client's display.

5.1.1 IOP/DIS/LandscapeLaunchParkMode

Requirement: Conditional

Condition: Client supports Park Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support landscape orientation and that they can launch an application in landscape, while being in park mode. In addition, the test case validates the correct behavior, when a portrait-only application is launched.

Preparation Steps

The test engineer obtains the information, which applications support landscape or portrait-only orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Park mode	Enable "Park" mode on the MirrorLink Client (PIXIT).	Park mode enabled on MirrorLink Client
3	Landscape mode	Enable Landscape mode on the MirrorLink Client.	Landscape mode enabled
4	Launch Landscape application	From the MirrorLink Client, launch a landscape application.	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode
5	Launch Portrait-only application	From the MirrorLink Client, launch a portrait-only application.	If MirrorLink Server or Client does not support portrait-only applications, the test case is completed. Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• User interface is clipped, rotated or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) Test step MUST NOT fail because one of the following conditions is met: • Application is terminated or blocked (i.e. the MirrorLink Server's or Client's home screen is shown) • User interface in Portrait mode

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 4.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 4.

5.1.2 IOP/DIS/LandscapeLaunchDriveMode

Requirement: Conditional

Condition: Client supports Drive Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support landscape orientation and that they can launch an application in landscape, while being in drive mode.

Preparation Steps

The test engineer obtains the information, which applications support landscape or portrait-only orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	

Step	Name	Description	Expected Result
2	Drive mode	Enable “Drive” mode on the MirrorLink Client (PIXIT).	Drive mode enabled on MirrorLink Client
3	Landscape mode	Enable Landscape mode on the MirrorLink Client.	Landscape mode enabled
4	Launch Landscape application	From the MirrorLink Client, launch an application.	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client’s listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.3 IOP/DIS/PortraitLaunchParkMode

Requirement: Conditional

Condition: Client supports Park Mode AND

Client supports Portrait Mode AND

Server supports Portrait Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support portrait orientation and that they can launch an application in portrait if requested to do so, while being in park mode. In addition, the test case validates the correct behavior, when a landscape-only application is launched.

Preparation Steps

The test engineer obtains the information, about which applications support portrait or landscape-only orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Park mode	Enable “Park” mode on the MirrorLink Client (PIXIT).	Park mode enabled on MirrorLink Client
3	Portrait mode	Enable Portrait mode on the MirrorLink Client.	Portrait mode enabled If Portrait Mode cannot be enabled on the MirrorLink Client, this test case is completed.
4	Launch portrait application	From the MirrorLink Client, launch an application, supporting Portrait mode.	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode
5	Launch Landscape-only application	From the MirrorLink Client, launch a landscape-only application.	Test step MUST fail because one of the following conditions is met: • User interface is clipped, rotated or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • Application is terminated or blocked (i.e. the MirrorLink Server’s or Client’s home screen is shown)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 4.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client’s listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 4.

5.1.4 IOP/DIS/PortraitLaunchDriveMode

Requirement: Conditional

Condition: Client supports Drive Mode AND
Client supports Portrait Mode AND
Server supports Portrait Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support portrait orientation and that they can launch an application in portrait if requested to do so, while being in drive mode. In addition, the test case validates the correct behavior, when a landscape-only application is launched.

Preparation Steps

The test engineer obtains the information, which applications support portrait or landscape-only orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable “Drive” mode on the MirrorLink Client (PIXIT).	Drive mode enabled on MirrorLink Client
3	Portrait mode	Enable Portrait mode on the MirrorLink Client.	Portrait mode enabled If Portrait Mode cannot be enabled on the MirrorLink Client, this test case is completed.
4	Launch portrait application	From the MirrorLink Client, launch an application, supporting Portrait mode.	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode
5	Launch Landscape-only application	From the MirrorLink Client, launch a landscape-only application.	Test step MUST fail because one of the following conditions is met: • User interface is clipped, rotated or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • Application is terminated or blocked (i.e. the MirrorLink Server’s or Client’s home screen is shown)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 4.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 4.

5.1.5 IOP/DIS/OrientationSwitchParkMode

Requirement: Conditional

Condition: Client supports Park Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support portrait orientation and that they can switch into portrait if requested to do so. In addition, the test validates, whether the MirrorLink devices can switch the orientation back to Landscape.

Preparation Steps

The test engineer obtains the information, about which applications support a portrait orientation and a switch from portrait to landscape.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Park mode	Enable "Park" mode on the MirrorLink Client (PIXIT).	Park mode enabled on MirrorLink Client
3	Landscape mode	Enable Landscape mode on the MirrorLink Client and Server (PIXIT ID 5320).	Landscape mode enabled
4	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input)

Step	Name	Description	Expected Result
			• User interface in Portrait mode
5	Switch to Portrait mode	Switch to Portrait mode, triggered from the MirrorLink Client (PIXIT)	If the MirrorLink Client cannot trigger a switch to Portrait mode go to step 7. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode, if the MirrorLink Server does supports portrait mode.
6	Switch to Landscape mode	Switch to Landscape mode, triggered from the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode
7	Switch to Portrait mode	Switch to Portrait mode, triggered from the MirrorLink Server or the launched MirrorLink application (PIXIT)	If the MirrorLink Server cannot trigger a switch to Portrait mode this test case is completed. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode if MirrorLink Client supports portrait mode.
8	Switch to Landscape mode	Switch to Landscape mode, triggered from the MirrorLink Server or the launched MirrorLink application (PIXIT)	If the MirrorLink Server cannot trigger a switch to Landscape mode, this test case is completed. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait Mode.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.6 IOP/DIS/OrientationSwitchDriveMode

Requirement: Conditional

Condition: Client supports Drive Mode

Objective

The objective of this test case is to ensure that the MirrorLink devices support portrait orientation and that they can switch into portrait if requested to do so. In addition, the test validates, whether the MirrorLink devices can switch the orientation back to Landscape.

Preparation Steps

The test engineer obtains the information, which applications support a portrait orientation and a switch from portrait to landscape.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the MirrorLink Client (PIXIT).	Drive mode enabled on MirrorLink Client
3	Landscape mode	Enable Landscape mode on the MirrorLink Client and Server (PIXIT ID 5320).	Landscape mode enabled
4	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode

Step	Name	Description	Expected Result
5	Switch to Portrait mode	Switch to Portrait mode, triggered from the MirrorLink Client (PIXIT)	If the MirrorLink Client cannot trigger a switch to Portrait mode go to step 7. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode, if the MirrorLink Server does supports portrait mode.
6	Switch to Landscape mode	Switch to Landscape mode, triggered from the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode
7	Switch to Portrait mode	Switch to Portrait mode, triggered from the MirrorLink Server or the launched MirrorLink application (PIXIT)	If the MirrorLink Server cannot trigger a switch to Portrait mode this test case is completed. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Landscape mode if MirrorLink Client supports portrait mode.
8	Switch to Landscape mode	Switch to Landscape mode, triggered from the MirrorLink Server or the launched MirrorLink application (PIXIT)	If the MirrorLink Server cannot trigger a switch to Landscape mode, this test case is completed. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait Mode.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.7 IOP/DIS/SwitchToLandscapeParkMode

Requirement: Conditional

Condition: Client supports Park Mode AND

Server supports Portrait Mode

Objective

The objective of this test case is to ensure that the MirrorLink Server device, being in Portrait mode, automatically switches to Landscape mode, when getting connected to a MirrorLink Client in Landscape mode, when requested by the MirrorLink Client.

Preparation Steps

The test engineer obtains the information, about which applications support a portrait orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Park mode	Enable "Park" mode on the MirrorLink Client (PIXIT).	Park mode enabled on MirrorLink Client
2	Set Orientation	Enable Landscape mode on the MirrorLink Client and Portrait on the MirrorLink Server.	Landscape mode enabled on the MirrorLink Client. Portrait mode enabled on the MirrorLink Server.
3	Establish Connection	See definitions	
4	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) Test step MUST NOT fail because one of the following conditions is met: • User interface stays in Portrait mode

Step	Name	Description	Expected Result
5	Switch to landscape	From the MirrorLink Client, switch to landscape.	Test case is completed, if the user interface is already in landscape in step 4. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.8 IOP/DIS/SwitchToLandscapeDriveMode

Requirement: Conditional

Condition: Client supports Drive Mode AND

Server supports Portrait Mode

Objective

The objective of this test case is to ensure that the MirrorLink Server device, being in Portrait mode, automatically switches to Landscape mode, when getting connected to a MirrorLink Client in Landscape mode, when requested by the MirrorLink Client.

Preparation Steps

The test engineer obtains the information, about which applications support a portrait orientation.

Test Case Steps

Step	Name	Description	Expected Result
1	Drive mode	Enable "Drive" mode on the MirrorLink Client (PIXIT).	Drive mode enabled on MirrorLink Client

Step	Name	Description	Expected Result
2	Set Orientation	Enable Landscape mode on the MirrorLink Client and Portrait on the MirrorLink Server.	Landscape mode enabled on the MirrorLink Client. Portrait mode enabled on the MirrorLink Server.
3	Establish Connection	See definitions	
4	Launch application	From the MirrorLink Client, launch an application	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) Test step MUST NOT fail because one of the following conditions is met: • User interface stays in Portrait mode
5	Switch to landscape	From the MirrorLink Client, switch to landscape.	Test case is completed, if the user interface is already in landscape in step 4. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.9 IOP/DIS/OrientationSwitchAutomatic

Requirement: MANDATORY

Condition: None

Objective

The objective of this test case is to ensure that the MirrorLink Server is not automatically changing the display orientation when the MirrorLink Server device is moving or rotating. This should emulate the movement of the MirrroLink Server device within the vehicle.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable “Drive” mode on the MirrorLink Client (PIXIT).	Drive mode enabled on MirrorLink Client
3	Landscape mode	Enable Landscape mode on the MirrorLink Client.	Landscape mode enabled
4	Launch application	From the MirrorLink Client, launch an application supporting portrait and landscape.	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • User interface in Portrait mode
5	Move device	Manually rotate and shake the MirrorLink Server device, emulating the movement of the device within a vehicle.	Test step MUST fail because one of the following conditions is met: • User interface changes orientation. • Application gets blocked or terminated.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.10 IOP/DIS/ScalingLandscape

Requirement: MANDATORY

Condition: None

Objective

The objective of this test case is to ensure that the MirrorLink Server display content is correctly shown on the MirrorLink Client's display. In particular the test case validates, that the display content is correctly scaled and not clipped on the Client display or requires any panning or scrolling introduced by the MirrorLink Client. Testing is done while the MirrorLink Client displays the Server's screen in Landscape.

In case the MirrorLink Client allows switching between different resolutions, this has to be handled appropriately as explained above. No rescaling artefacts must be visible.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Landscape mode	Set the MirrorLink Client's display to Landscape mode (PIXIT).	Landscape mode enabled on MirrorLink Client
3	Launch application	From the MirrorLink Client, launch several applications	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • Incorrect aspect ratio • No additional padding on both directions
4	Change resolution	From the MirrorLink Client, change the client's display scaling settings to change the resolution of the MirrorLink Server's remote content.	If the MirrorLink Client does not support this, this test case is completed. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input)

Step	Name	Description	Expected Result
			• Incorrect aspect ratio • No additional padding on both directions
5	Repeat	Repeat step 4 for each available client display scaling setting.	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.11 IOP/DIS/ScalingPortrait

Requirement: Conditional

Condition: Client supports Portrait Mode AND

Server supports Portrait Mode

Objective

The objective of this test case is to ensure that the MirrorLink Server display content is correctly shown on the MirrorLink Client's display. In particular the test case validates, that the display content is correctly scaled and not clipped on the Client display or requires any panning or scrolling introduced by the MirrorLink Client. Testing is done while the MirrorLink Client displays the Server's screen in Portrait.

In case the MirrorLink Client allows switching between different resolutions, this has to be handled appropriately as explained above. No rescaling artefacts must be visible.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	

Step	Name	Description	Expected Result
2	Portrait mode	Set the MirrorLink Client's display to Portrait mode (PIXIT).	Portrait mode enabled on MirrorLink Client
3	Launch application	From the MirrorLink Client, launch several applications	Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • Incorrect aspect ratio • No additional padding on both directions
4	Change resolution	From the MirrorLink Client, change the client's display scaling settings to change the resolution of the MirrorLink Server's remote content.	If the MirrorLink Client does not support this, this test is complete. Test step MUST fail because one of the following conditions is met: • User interface is clipped or requires panning/scrolling • User interface is not readable • User interface is not usable (i.e. does not respond to user input) • Incorrect aspect ratio • No additional padding on both directions
5	Repeat	Repeat step 4 for each available client display scaling setting.	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.1.12 IOP/DIS/NightMode

Requirement: CONDITIONAL

Condition: Client supports Night Mode

Objective

The objective of this test case is to ensure that the MirrorLink Server application or the MirrorLink Server device recognize a change of the MirrorLink Device Status Night Mode flag. When switching between night mode and day mode (and back), a supporting application will change its user interface (e.g. the contrast value).

Note that the test case only validates the application or MirrorLink Server behavior. I.e. the MirrorLink Client is not expected to do any changes in the color values. The MirrorLink Client MAY adapt the brightness though.

Note: This test case MAY require that the MirrorLink Server has an application installed, which will change its user interface based on the night mode setting. It is allowed to use a Common API based test application for this test case.

Preparation Steps

The test engineer obtains the information how the MirrorLink Server device or the applications are responding to changes in the device status night mode.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch an application, which listens to the night mode signal	
3	Switch on Night Mode	Activate Night Mode on MirrorLink Client device (PIXIT)	Test step MUST fail because one of the following conditions is met: • Test Engineer cannot validate a change in the user interface, e.g. via a Common API status change. It is acceptable that the MirrorLink Server has a platform-level indication, which responds to the night mode device status change. Note, that a change in the brightness is not sufficient to validate correct behavior of the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.2 User Interface Control

5.2.1 IOP/UI/SingleTouchControls

Requirement: Conditional

Condition: Client supports single-touch controls OR

Client does not support the minimum rotary knob

Objective

The objective of this test case is to ensure that the MirrorLink Server can be correctly controlled from the MirrorLink Client's touch screen via single touch control events. The test case validates the different touch controls.

Preparation Steps

The test engineer obtains the respective application, which MUST be used to validate the individual touch events, listed below, and obtains the expected behavior of the application in response to the respective event.

- Click: Press & release
- Double Click: Press & release & press & release
- Long Click: Press & hold & release
- Drag: Press & hold & move in any direction & release
- Swipe: Press & move in x or y direction & release (Application and platform level swipe)

The test engineer obtains the information, whether the MirrorLink Server supports platform level swipes, initiated from the edges of the MirrorLink Server's screen.

Notes:

- Please note any additional touch behavior and include it into the testing.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that validates the Click event.	
3	Click Event	On the MirrorLink Client display, perform a Click event.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
4	Perimeter Click Events	On the MirrorLink Client display, perform click events around the perimeter of the MirrorLink portion of the display.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
5	Launch Application	Launch the app that validates the Double Click event.	

Step	Name	Description	Expected Result
6	Double Click Event	On the MirrorLink Client display, perform a Double Click event	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
7	Launch Application	Launch the app that validates the Long Click event.	
8	Long Click Event	On the MirrorLink Client display, perform a Long Click event	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
9	Launch Application	Launch the app that validates the Drag event.	
10	Drag Event	On the MirrorLink Client display, perform a Drag event.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
11	Launch Application	Launch the app that validates the Swipe event.	
12	Application level Swipe Event	On the MirrorLink Client display, perform an application-level Swipe event.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
13	Platform level Swipe Event	On the MirrorLink Client display, perform a platform-level Swipe event.	Test step MUST fail because one of the following conditions is met: • The platform does not show the expected behavior.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 2

Step 7: Same as step 2

Step 9: Same as step 2

Step 11: Same as step 2

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 2

Step 7: Same as step 2

Step 9: Same as step 2

Step 11: Same as step 2

5.2.2 IOP/UI/MultiTouchControls

Requirement: Conditional

Condition: Client supports multi-touch controls AND

Server supports multi-touch controls

Objective

The objective of this test case is to ensure that the MirrorLink Server can be correctly controlled from the MirrorLink Client's touch screen via multi-touch control events. The test case validates the different multi-touch controls.

Preparation Steps

The test engineer obtains the respective application, which MUST be used to validate the individual multi-touch events, listed below, and obtains the expected behavior of the application in response to the respective event.

- Multi-Touch event
- Perimeter Multi-Touch event
- Multi-Touch event with pressure values

The test engineer obtains gestures, which use at least two simultaneous fingers, for the above listed events, which are supported from the MirrorLink Server's applications.

Notes:

- Please note any additional touch behavior and include it into the testing.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that validates the Multi-Touch event.	
3	Multi-Touch Event	On the MirrorLink Client display, perform the different Multi-Touch gestures, using at least two fingers simultaneously.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.

Step	Name	Description	Expected Result
4	Perimeter Multi-Touch Event	On the MirrorLink Client display, perform different Touch gestures around the perimeter of the MirrorLink-portion of the display, using at least two fingers simultaneously.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
5	Launch Application	Launch the app that validates the Multi-Touch event with pressure values.	If pressure value gestures are not supported from the MirrorLink Client and Server, the test case is completed.
6	Multi-Touch Event with Pressure	On the client display, perform the different Multi-Touch with pressure value gestures, using at least two fingers simultaneously.	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 2

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 2

5.2.3 IOP/UI/KnobControls

Requirement: Conditional

Condition: Client supports knob controls

Objective

The objective of this test case is to ensure that the MirrorLink Server can be correctly controlled from the MirrorLink Client's knob controller events. The test case validates the different knob controller events. Knob

controller events include a minimum set of knob events (i.e. those events listed explicitly below) and an extended set of knob events. The extended set of knob events includes all events from any additional supported knob.

The MirrorLink Client MUST support all knob events from the knob controller minimum set, in case it does not support a single touch events. The MirrorLink Client MAY NOT support all events within the minimum knob controller set, in case it supports single touch events.

Preparation Steps

The test engineer obtains the application, which MUST be used to validate the minimum set of knob controller events, listed below, and the expected behavior of the application in response to these events.

- Rotate-left
- Rotate-right
- Push
- Shift-up
- Shift-down
- Shift-right
- Shift-left

The test engineer obtains the list of additional knob controller events (extended set), which are supported from the MirrorLink Client and the MirrorLink Server beyond the minimum knob controller set, and the expected behavior of the application in response to these events.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that validates the Knob controller events	
3	Knob Control – Minimum set	On the MirrorLink Client, trigger the individual knob-events • Rotate-left • Rotate-right • Push • Shift-up • Shift-down • Shift-right • Shift-left	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.
4	Knob Control – Extended set	On the MirrorLink Client, trigger the supported extended knob events	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.2.4 IOP/UI/OtherKeyEvents

Requirement: Conditional

Condition: Client supports additional key event controls AND

Server supports additional key event controls

Objective

The objective of this test case is to ensure that the MirrorLink Server can be correctly controlled from the MirrorLink Client's multimedia, device and function key events. The test case MUST only validate those key events, which are supported from both, the MirrorLink Server and MirrorLink Client.

Preparation Steps

The test engineer obtains the list of multimedia, device and function key events, supported from the MirrorLink Server and MirrorLink Client.

The test engineer obtains the list of application, which MUST be used to validate the different multimedia, device and function key events, and the expected behavior of the application in response to these events.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that validates multimedia key events	If Multimedia Keys are not supported, go to step 4.
3	Multimedia Keys	On the MirrorLink Client, trigger additional multimedia key events (e.g. next audio track).	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior. Test step MUST NOT fail because one of the following conditions is met: • Test engineer needs to launch other apps, to validate some events
4	Launch Application	Launch the app that validates device key events	If Device Keys are not supported, go to step 6.

Step	Name	Description	Expected Result
5	Device Keys	On the MirrorLink Client, trigger additional device key events (e.g. back)	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior. Test step MUST NOT fail because one of the following conditions is met: • Test engineer needs to launch other apps, to validate some events
6	Launch Application	Launch the app that validates function key events	If Function Keys are not supported, the test case is completed.
7	Function Keys	On the MirrorLink Client, trigger additional function key events	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior. Test step MUST NOT fail because one of the following conditions is met: • Test engineer needs to launch other apps, to validate some events
8	Launch Application	Launch the app that validates function key events	If Function Keys are not supported, the test case is completed.
9	ITU Keys	On the MirrorLink Client, trigger ITU keys	Test step MUST fail because one of the following conditions is met: • The application does not show the expected behavior. Test step MUST NOT fail because one of the following conditions is met: • Test engineer needs to launch other apps, to validate some events

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 4: Same as step 2

Step 6: Same as step 2

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 4: Same as step 2

Step 6: Same as step 2

5.2.5 IOP/UI/ClientVirtualKeyboard_ServerTriggered

Requirement: Conditional

Condition: Client supports VNC Virtual Keyboard Trigger AND

Server supports VNC Virtual Keyboard Trigger

Objective

The objective of this test case is to ensure that the MirrorLink Server can use the MirrorLink Client's virtual keyboard. The test case validates, whether the user can trigger a virtual keyboard to show up on the MirrorLink Client, can enter text and/or manipulate text using the virtual keyboard, which is then passed to the application on the MirrorLink Server.

Preparation Steps

The test engineer obtains, whether the MirrorLink Client and Server support the manipulation of existing text elements.

The test engineer obtains the list of applications supporting keyboard entries via the MirrorLink Client's virtual keyboard.

The activation of the MirrorLink Client's virtual keyboard is initiated from the MirrorLink Server's User Interface, visible on the MirrorLink Client's screen. The activation MAY require the test engineer to click into a text entry field provided from the launched application.

The deactivation of the MirrorLink Client's virtual keyboard is initiated from the MirrorLink Server's User Interface, visible on the MirrorLink Client's screen. The deactivation MAY require the test engineer to click onto a special button or to click into a space outside the virtual keyboard.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that supports keyboard entries via the MirrorLink Client's virtual keyboard.	
3	Activate Virtual Keyboard	Activate the MirrorLink Client's virtual keyboard	Test step MUST fail because one of the following conditions is met: • The virtual keyboard is not visible on the client display • The virtual keyboard of the MirrorLink Server appears, when the test engineer selects a text entry box.

Step	Name	Description	Expected Result
4	Enter text	Test engineer enters text, including available special characters.	Test step MUST fail because one of the following conditions is met: • The test engineer cannot enter text
5	Deactivate Virtual Keyboard	Deactivate the MirrorLink Client's virtual keyboard and checks the text in the application's designated text entry.	Test step MUST fail because one of the following conditions is met: • Entered text is not available on the MirrorLink Server's application user interface. • Virtual keyboard does not disappear
6	Activate Virtual Keyboard	Select text on the MirrorLink Server's user interface and activate the MirrorLink Client's virtual keyboard.	If the MirrorLink Server and Client do not support the modification of existing text, the test case is completed. Test step MUST fail because one of the following conditions is met: • The virtual keyboard is not visible on the client display. • The selected text is not displayed. • The virtual keyboard of the MirrorLink Server appears, when the test engineer selects a text entry box.
7	Modify text	Test engineer enters and modifies text, including available special characters on the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • The test engineer cannot enter and modify text
8	Deactivate Virtual Keyboard	Deactivate the MirrorLink Client's virtual keyboard and checks the text in the application's designated text entry.	Test step MUST fail because one of the following conditions is met: • Entered text is not available on the MirrorLink Server's application user interface. • Virtual keyboard does not disappear

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0

Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.2.6 IOP/UI/ClientVirtualKeyboard_ClientTriggered

Requirement: Conditional

Condition: Client provides its own virtual keyboard, activated without Server involvement.

Objective

The objective of this test case is to ensure that the user can use the MirrorLink Client's virtual keyboard. The test case validates, whether the user can trigger a virtual keyboard to show up on the MirrorLink Client, can enter text using the virtual keyboard, which is then passed to the application on the MirrorLink Server.

Note: The MirrorLink Server is not aware that the MirrorLink Client is providing its own virtual keyboard. Therefore, the MirrorLink Server may still show its own virtual keyboard, which is overlaid by the Client's virtual keyboard. This means that the text entered via the MirrorLink Client virtual keyboard will show up in the Server's virtual keyboard, after the test engineer has completed the text entry on the Client's virtual keyboard.

Preparation Steps

The test engineer obtains the list of applications supporting keyboard entries.

The activation of the MirrorLink Client's virtual keyboard is initiated from the MirrorLink Client's User Interface. The activation MAY require the test engineer to click onto button under control of the MirrorLink Client. The activation MUST NOT require the test engineer to click into the MirrorLink Server's user interface. The test engineer MAY need to select a text entry field on the MirrorLink Server's user interface though, which will consume the entered text.

The deactivation of the MirrorLink Client's virtual keyboard is initiated from the MirrorLink Client's User Interface. The deactivation MAY require the test engineer to click onto a special button. The deactivation MUST NOT require the test engineer to click into MirrorLink Server's User Interface, visible on the MirrorLink Client's screen.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that supports keyboard entries from the MirrorLink Client's virtual keyboard.	
3	Activate Virtual Keyboard	Activate the MirrorLink Client's virtual keyboard	Test step MUST fail because one of the following conditions is met: • The virtual keyboard is not visible on the client display Test step MUST NOT fail because one of the following conditions is met: • The virtual keyboard of the MirrorLink Server appears, when the test engineer selects a text entry box.
4	Enter text	Test engineer enters text, including available	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
		special characters on the MirrorLink Client.	• The test engineer cannot enter text
5	Deactivate Virtual Keyboard	Deactivate the MirrorLink Client's virtual keyboard and checks the text in the application's designated text entry.	Test step MUST fail because one of the following conditions is met: • Entered text is not available on the MirrorLink Server's application user interface. • Virtual keyboard does not disappear Test step MUST NOT fail because one of the following conditions is met: • The text entry from the MirrorLink Client's virtual keyboard is absorbed from the MirrorLink Server's virtual keyboard.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.2.7 IOP/UI/ServerVirtualKeyboard

Requirement: Conditional

Condition: Server supports its own virtual keyboard

Objective

The objective of this test case is to ensure that the use can use the MirrorLink Server's own virtual keyboard in a MirrorLink session. The test case validates, whether the user can trigger the MirrorLink Server's virtual keyboard to show up on the MirrorLink Client, and can enter text using that virtual keyboard.

Preparation Steps

The test engineer obtains the list of applications supporting virtual keyboard entries.

The activation of the MirrorLink Server's virtual keyboard is initiated from the MirrorLink Server's User Interface, visible on the MirrorLink Client's screen. The activation may require the test engineer to click into a text entry field provided from the launched application.

The deactivation of the MirrorLink Server's virtual keyboard is initiated from the MirrorLink Server's User Interface, visible on the MirrorLink Client's screen. The deactivation MAY require the test engineer to click onto a special button or to click into a space outside the virtual keyboard.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Launch Application	Launch the app that supports keyboard entries	
3	Activate Virtual Keyboard	Activate the MirrorLink Server's virtual keyboard.	Test step MUST fail because one of the following conditions is met: • The virtual keyboard is not visible on the client display
4	Enter text	Test engineer enters text, including available special characters on the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • The test engineer cannot enter text
5	Deactivate Virtual Keyboard	Deactivate the MirrorLink Server's virtual keyboard and checks the text in the application's designated text entry.	Test step MUST fail because one of the following conditions is met: • Entered text is not available on the MirrorLink Server's application user interface. • Virtual keyboard does not disappear

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.2.8 IOP/UI/KeyLock

Requirement: Conditional

Condition: Client supports Device Key Lock AND

Server supports Device Key Lock

Objective

The objective of this test case is to ensure that the MirrorLink Server event entry at the MirrorLink Server can be disabled, i.e. the user cannot interact with the application using key and/or touch event from the MirrorLink Server; key and/or touch entry is always possible via the MirrorLink Client though.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
Park Mode			
2	Park mode	Enable “Park” mode on the client (PIXIT).	Park mode enabled on client If park mode is not supported, go to step 6.
3	Launch App	Launch an application	Application is visible on the MirrorLink Client
4	Enable Key Lock	Enable Key Lock on the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • User event entry is not possible from the MirrorLink Client. • User event entry is possible from the MirrorLink Server
5	Disable Key Lock	Disable Key Lock on the MirrorLink Client (PIXIT)	If MirrorLink Client does not support to disable the key lock, then skip this step. Test step MUST fail because one of the following conditions is met: • User event entry is not possible from the MirrorLink Client. • User event entry is not possible from the MirrorLink Server
Drive Mode			
6	Drive mode	Enable “Drive” mode on the client (PIXIT)	Drive mode enabled on client If drive mode is not supported, test case is completed.
7	Launch App	Launch an application	Application is visible on the MirrorLink Client
8	Enable Key Lock	Enable Key Lock on the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • User event entry is not possible from the MirrorLink Client. • User event entry is possible from the MirrorLink Server

Step	Name	Description	Expected Result
9	Disable Key Lock	Disable Key Lock on the MirrorLink Client (PIXIT)	If MirrorLink Client does not support to disable the key lock, then skip this step. Test step MUST fail because one of the following conditions is met: • User event entry is not possible from the MirrorLink Client. • User event entry is not possible from the MirrorLink Server

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 7: Same as step 3

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 7: Same as step 3

5.2.9 IOP/UI/ScreenSaver

Requirement: Conditional

Condition: Client supports Device Screen Saver AND

Server supports Device Screen Saver

Objective

The objective of this test case is to ensure that the MirrorLink Server's display can be put into a state, where the user cannot or only hardly visually interact with. The handling of this status flag is vendor specific, but acceptable solutions are dimming or disabling the Server display's backlight, or showing no or static content on the MirrorLink Server screen, while at the same time the MirrorLink Client is still showing the original content.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
Park Mode			
2	Park mode	Enable “Park” mode on the client (PIXIT).	Park mode enabled on client If park mode is not supported, go to step 6.
3	Launch App	Launch an application	Application is visible on the MirrorLink Client
4	Enable Screen Saver	Enable Screen Saver on the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • MirrorLink Server’s screen is not looking dimmed or disabled, or still showing the original content (prior to enabling the screen saver). • MirrorLink Client’s screen is showing a blank or dimmed screen, or a copy of the MirrorLink Server’s “Screen Saver” view. • User event entry is not possible from the MirrorLink Client.
5	Disable Screen Saver	Disable Screen Saver on the MirrorLink Client (PIXIT)	If MirrorLink Client does not support to disable the screen saver, then skip this step. Test step MUST fail because one of the following conditions is met: • MirrorLink Server is showing a “Screen Saver” view. • User event entry is not possible from the MirrorLink Client.
Drive Mode			
6	Drive mode	Enable “Drive” mode on the client (PIXIT)	Drive mode enabled on client If drive mode is not supported, test case is completed.
7	Launch App	Launch an application	Application is visible on the MirrorLink Client
8	Enable Screen Saver	Enable Screen Saver on the MirrorLink Client (PIXIT)	Test step MUST fail because one of the following conditions is met: • MirrorLink Server’s screen is not looking dimmed or disabled, or still showing the original content (prior to enabling the screen saver). • MirrorLink Client’s screen is showing a blank or dimmed screen, or a copy of the MirrorLink Server’s “Screen Saver” view. • User event entry is not possible from the MirrorLink Client.

Step	Name	Description	Expected Result
9	Disable Screen Saver	Disable Screen Saver on the MirrorLink Client (PIXIT)	If MirrorLink Client does not support to disable the screen saver, then skip this step. Test step MUST fail because one of the following conditions is met: • MirrorLink Server is showing a “Screen Saver” view. • User event entry is not possible from the MirrorLink Client.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 7: Same as step 3

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client’s listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 7: Same as step 3

5.2.10 IOP/UI/DeviceLock

Requirement: Conditional

Condition: Client supports Device Lock within a MirrorLink session AND

Server supports Device Lock within a MirrorLink session

Objective

The objective of this test case is to ensure that the MirrorLink Client can handle the MirrorLink Server going into and out of Device Lock. While being in device lock, the device is unresponsive to some or all requests from the MirrorLink Server. A user may need to enter to pin code in order to unlock the device again. Pin entry MAY be allowed only on the MirrorLink Server device itself.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT)	Drive mode enabled on client If drive mode is not supported, skip this test step.
3	Unlock the device	Unlock the MirrorLink Server device, if not already unlocked.	Server device is not locked
4	Launch App	Launch an application	Application is visible on the MirrorLink Client
5	Activate Device Lock	Activate the Device lock from the MirrorLink Client (PIXIT) If the Device lock cannot be activated from the MirrorLink Client, activate the Device lock manually from the MirrorLink Server Device.	Test step MUST fail because one of the following conditions is met: • MirrorLink Server Device is unlocked. Test step MUST NOT fail because one of the following conditions is met: • User Interface MAY become unresponsive • User Interface MAY disappear.
6	Deactivate Device Lock	Deactivate the Device lock from the MirrorLink Client (PIXIT)	If the MirrorLink Server cannot be unlocked, this test case is completed. Test step MUST fail because one of the following conditions is met: • MirrorLink Server Device is locked. Test step MUST NOT fail because one of the following conditions is met: • The user MAY be asked for a password to unlock. • The user MAY need to enter a password on the MirrorLink Client device

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client’s listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0

5.2.11 IOP/UI/TerminateWithLocks

Requirement: Conditional

Condition: Client and Server support Screen Saver OR

Client and Server support Key Lock

Objective

The objective of this test case is to ensure that the MirrorLink Server is fully operational, after key lock and screen saver has been enabled and the MirrorLink connection suddenly disappears, prior any enable message can be send. The MirrorLink Server's screen is expected to go back into its normal state, the display is showing regular content, display does not appear dimmed or switched off and the user can interact with the user interface from the MirrorLink Server.

Preparation Steps

None

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	If drive mode is not supported, then skip this step. Drive mode enabled on client
3	Launch App	Launch an application	Application is visible on the MirrorLink Client
4	Enable Screen Saver	Enable Screen Saver on the MirrorLink Client (PIXIT)	If MirrorLink Client or Server does not support to enable the screen saver, then skip this step. Test step MUST fail because one of the following conditions is met: • MirrorLink Server's screen is not looking dimmed or disabled, or still showing the original content (prior to enabling the screen saver). • MirrorLink Client's screen is showing a blank or dimmed screen, or a copy of the MirrorLink Server's "Screen Saver" view.
5	Enable Key Lock	Enable Key Lock on the MirrorLink Client (PIXIT)	If MirrorLink Client or Server does not support to enable the key lock, then skip this step. Test step MUST fail because one of the following conditions is met: • User event entry is not possible from the MirrorLink Client. • User event entry is possible from the MirrorLink Server
6	Disconnect	Disconnect the USB cable	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• MirrorLink Server's UI is still visible on Client display • Screen-saver mode on MirrorLink Server cannot be deactivated. • Key-lock mode on MirrorLink Server cannot be deactivated • MirrorLink Client is unresponsive • MirrorLink Server is unresponsive • Error message is displayed on Server • Error message is displayed on Client Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Server displays an informative message • The MirrorLink Client displays an informative message • MirrorLink Server's UI is visible on Client display, while an information message regarding the disconnection is shown.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.3 Voice Command

5.3.1 IOP/VC/ClientTriggeredRtpVC

Requirement: Conditional

Condition: Client supports Voice Command via RTP AND
Server supports Voice Command via RTP AND
Client can initiate Voice Command

Objective

The objective of this test case is to ensure that the MirrorLink Server can receive Voice Command audio from the MirrorLink Client and that this Voice Command audio is handled correctly. On reception of the voice command, the MirrorLink Server and/or the currently in-focus application has to process the voice command as expected.

The voice command has to be input on the MirrorLink Client and provided to the MirrorLink Server via RTP.

The test engineer will need to start the VC from the MirrorLink Client, e.g. by pushing a push-to-talk button or something similar from the car dashboard/steering wheel.

Preparation Steps

The test engineer obtains voice commands and the expected behavior of an application, which can react upon received voice commands.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server’s voice controlled application.
3	Launch Application	Launch the application that supports voice command input	
4	VC connection	Establish an audio backchannel via RTP (PIXIT)	Test step MUST fail because one of the following conditions is met: • Audio backchannel for VC not established. • Manually setup required
5	Initiate VC	Executes the steps to initiate voice recognition on the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Test engineer cannot initiate VC. • Test engineer need to interact with the MirrorLink Server or the MirrorLink application’s user interface to initiate the VC.
6	Issue VC	Speak the known voice command into the	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
		MirrorLink Client's microphone. Note: The microphone of the MirrorLink Server MUST be covered.	• Application does not show the expected behavior in response to the issued VC. Test step MUST NOT fail because one of the following conditions is met: • The test engineer MAY need to exercise command input more than once.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.3.2 IOP/VC/ServerTriggeredRtpVC

Requirement: Conditional

Condition: Client supports Voice Command via RTP AND

Server supports Voice Command via RTP

Objective

The objective of this test case is to ensure that the MirrorLink Server can receive Voice Command audio from the MirrorLink Client and that this Voice Command audio is handled correctly. On reception of the voice command, the MirrorLink Server and/or the currently in-focus application has to process the voice command as expected.

The voice command has to be input on the MirrorLink Client and provided to the MirrorLink Server via RTP.

The test engineer will need to start the VC from the MirrorLink Server, e.g. by pushing a push-to-talk button or something similar on the application's user interface.

Preparation Steps

The test engineer obtains voice commands and the expected behavior of an application, which can react upon the received voice commands.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server’s voice controlled application.
3	Launch Application	Launch the application that supports voice command input	
4	VC connection	Establish an audio backchannel via RTP (PIXIT)	Test step MUST fail because one of the following conditions is met: • Audio backchannel for VC not established. • Manually setup required
5	Initiate VC	Executes the steps to initiate voice recognition on the MirrorLink Server.	Test step MUST fail because one of the following conditions is met: • Test engineer cannot initiate VC. • Test engineer need to interact with the MirrorLink Client outside the MirrorLink application’s user interface to initiate the VC.
6	Issue VC	Speak the known voice command into the MirrorLink Client’s microphone. Note: The microphone of the MirrorLink Server MUST be covered.	Test step MUST fail because one of the following conditions is met: • Application does not show the expected behavior in response to the issued VC. Test step MUST NOT fail because one of the following conditions is met: • The test engineer MAY need to exercise command input more than once.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.3.3 IOP/VC/ClientTriggeredBtHfpVC

Requirement: Conditional

Condition: Client supports Voice Command via BT HFP AND

Server supports Voice Command via BT HFP AND

Client can initiate Voice Command

Objective

The objective of this test case is to ensure that the MirrorLink Server can receive Voice Command audio from the MirrorLink Client and that this Voice Command audio is handled correctly. On reception of the voice command, the MirrorLink Server and/or the currently in-focus application has to process the voice command as expected.

The voice command has to be input on the MirrorLink Client and provided to the MirrorLink Server via BT HFP.

The test engineer will need to start the VC from the MirrorLink Client, e.g. by pushing a push-to-talk button or something similar from the car dashboard/steering wheel.

Preparation Steps

The test engineer obtains voice commands and the expected behavior of an application, which can react upon the received the voice commands.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's voice controlled application.
3	Launch Application	Launch the application that supports voice command input	
4	VC connection	Establish an audio backchannel via BT HFP (PIXIT)	Test step MUST fail because one of the following conditions is met: • Audio backchannel for VC not established. • Manually setup required Test step MUST NOT fail because one of the following conditions is met: • BT pairing requires the entry of initial pass keys.

Step	Name	Description	Expected Result
5	Initiate VC	Executes the steps to initiate voice recognition on the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Test engineer cannot initiate VC. • Test engineer need to interact with the MirrorLink Server or the MirrorLink application's user interface to initiate the VC.
6	Issue VC	Speak the known voice command into the MirrorLink Client's microphone. Note: The microphone of the MirrorLink Server MUST be covered.	Test step MUST fail because one of the following conditions is met: • Application does not show the expected behavior in response to the issued VC. Test step MUST NOT fail because one of the following conditions is met: • The test engineer MAY need to exercise command input more than once.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

5.3.4 IOP/VC/ServerTriggeredBtHfpVC

Requirement: Conditional

Condition: Client supports Voice Command via BT HFP AND

Server supports Voice Command via BT HFP

Objective

The objective of this test case is to ensure that the MirrorLink Server can receive Voice Command audio from the MirrorLink Client and that this Voice Command audio is handled correctly. On reception of the voice command, the MirrorLink Server and/or the currently in-focus application has to process the voice command as expected.

The voice command has to be input on the MirrorLink Client and provided to the MirrorLink Server via BT HFP.

The test engineer will need to start the VC from the MirrorLink Server, e.g. by pushing a push-to-talk button or something similar on the application's user interface.

Preparation Steps

The test engineer obtains voice commands and the expected behavior of an application, which can react upon the received the voice commands.

Test Case Steps

Step	Name	Description	Expected Result
1	MirrorLink Application Listing	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's voice controlled application.
3	Launch Application	Launch the application that supports voice command input	
4	VC connection	Establish an audio backchannel via BT HFP (PIXIT)	Test step MUST fail because one of the following conditions is met: • Audio backchannel for VC not established. • Manually setup required Test step MUST NOT fail because one of the following conditions is met: • BT pairing requires the entry of initial pass keys.
5	Initiate VC	Executes the steps to initiate voice recognition on the MirrorLink Server.	Test step MUST fail because one of the following conditions is met: • Test engineer cannot initiate VC. • Test engineer need to interact with the MirrorLink Client outside the MirrorLink application's user interface to initiate the VC.
6	Issue VC	Speak the known voice command into the MirrorLink Client's microphone. Note: The microphone of the MirrorLink Server MUST be covered.	Test step MUST fail because one of the following conditions is met: • Application does not show the expected behavior in response to the issued VC. Test step MUST NOT fail because one of the following conditions is met: • The test engineer MAY need to exercise command input more than once.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

6 APPLICATION HANDLING

6.1 Generic Applications

Applications are to be used only as a tool for testing interoperability between the client and server. No assessment is to be made on the quality of the application itself. Unless specifically called out in this document, all actions MUST be performed from the client. An assumption is to be made that the MirrorLink Server is not accessible by the user (driver).

A MirrorLink Server submitted for IOP Testing MUST be prepared in accordance with the following requirements:

- Advertised CCC drive-certified Applications MUST be available.
- Advertised CCC base-only certified Applications MUST be available.
- Advertised Member drive-certified Applications SHOULD be available.
- Advertised Member base-only certified Applications SHOULD be available.
- Advertised non-certified, MirrorLink-aware Applications MUST be available, if the MirrorLink Server supports them in its advertisements.
- Advertised non-certified, non-MirrorLink-aware Applications MUST be available, if the MirrorLink Server supports them in its advertisements.
- A MirrorLink Server MUST support park and drive mode.

A MirrorLink Client submitted for IOP Testing MUST be prepared in accordance with the following requirements:

- A MirrorLink Client MUST at least support either drive or park mode

A CCC provided or approved "Test App" MAY be used to provide any of the above functionality. The MirrorLink Server vendor MAY use development applications, to provide CCC certified applications, as long as the Client Manufacturer is not listed in the Developer Certificate Blacklist, in which case, the MirrorLink Client Manufacturer MUST provide a temporary Member-drive certificate.

The test cases use the term notification in situations, where the test engineer is supposed to get notified that an intended action cannot be completed (e.g. launch of an application). Such notifications MUST address the intended behavior and that it cannot be completed. The notification SHOULD provide a reason.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

- Advertised CCC drive-certified Applications MUST NOT be available.
- Advertised CCC base-only certified Applications MUST NOT be available.
- Advertised Member drive-certified Applications MUST NOT be available.
- Advertised Member base-only certified Applications MUST NOT be available.
- Advertised non-certified, MirrorLink-aware Applications MUST be available.
- Advertised non-certified, non-MirrorLink-aware Applications SHOULD be available.

Exceptions for MirrorLink 1.0 Clients

None

6.1.1 IOP/APP/ApplicationListing

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Server is correctly advertising MirrorLink enabled applications and that the MirrorLink Client correctly displaying them, under drive and park condition. The test case therefore validates, whether a consumer is able to see, which MirrorLink applications are available for use in park and drive mode respectively. MirrorLink Clients have vendor specific implementations where and how to provide consumers with the list of supported MirrorLink applications.

Not all applications exposed in the application listing are allowed while being in drive mode. This must be communicated to the driver in some fashion. This may be achieved in one of the following three ways:

1. The application is not listed in the application listing, or
2. The application is listed in the application listing in a fashion that is looks different from the allowed applications, or
3. The application is listed in the application listing, but a notification is displayed, that the application is not accessible, when the application is launched.

Preparation Steps

The test engineer obtains the information where the list of available applications is accessible from the MirrorLink Client's user interface.

The test engineer obtains a list of all MirrorLink enabled applications, installed on the MirrorLink Server, with the following criteria:

- List A: Advertised non-certified, non-MirrorLink aware applications
- List B: Advertised non-certified, MirrorLink aware applications
- List C: Advertised CCC and Member base-certified-only applications
- List D: Advertised CCC and Member drive-certified applications

Notes:

- For MirrorLink 1.1 Servers, List A and B MAY be empty; List C and D MUST NOT be empty.
- For MirrorLink 1.0 Servers, List A or B MUST NOT be both empty; List C and D MUST be empty.
- Member certified applications, included in List C and D MUST match the connected MirrorLink Client, i.e. the MirrorLink Client device manufacturer MUST be the certifying entity.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
Park Mode			
2	Park mode	Enable "park" mode on the client (PIXIT).	Park mode enabled on client If park mode is not supported, go to step 4.
3	Browse Applications	From the client, browse the list of available applications.	Test step MUST fail because one of the following conditions is met: • An application from list C and D is not present. Test step MUST NOT fail because one of the following conditions is met: • Applications from List A or B can be visually distinguished from those applications from List C and D applications.

Step	Name	Description	Expected Result
			• The MirrorLink Client automatically launches an application from the MirrorLink Server.
Drive Mode			
4	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. If drive mode is not supported, this test case is completed.
5	Browse Applications	Check the list of available applications. Note: The test engineer is not expected to manually trigger the update of the list.	Test step MUST fail because one of the following conditions is met: • An application from List D is not present • The list of available applications does not update automatically when switching from park into drive mode. • Applications from List A, B or C are present. AND The test engineer cannot visually distinguish those applications from List D applications. AND No notification appears, when the test engineer attempts to launch those applications. Test step MUST NOT fail because one of the following conditions is met: • The MirrorLink Client automatically launches an application from the MirrorLink Server.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

A MirrorLink 1.1 Client MAY show Car Mode applications from list A or B from MirrorLink 1.0 Servers in drive mode. Car Mode applications are limited to the following application categories:

- `0x0001 0001`: Home Screen
- `0x0002 0000`: General Phone Call applications
- `0x0003 0001`: Music
- `0x0005 0000`: General Navigation

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

The Client MAY present an application from List A or B or C, while being in drive mode.

The Client MAY NOT present an application from List D, while being in drive mode.

6.1.2 IOP/APP/ApplicationLaunchAndTerminate

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to verify each enabled MirrorLink application can be launched, used and terminated from the client as appropriate for the driving context. Applications that are not drive certified cannot be launched. The test case therefore validates, whether a consumer is able to launch any of the available applications, in the respective park or drive mode. The consumer must not be able to launch a non-drive certified applications, while the MirrorLink Client is in drive mode. Mechanisms preventing the consumer from running non-drive certified applications are vendor specific and may include not listing non-drive certified applications, changing their appearance or providing notifications on a launch attempt.

Preparation Steps

The test engineer obtains a list of all MirrorLink enabled applications, installed on the MirrorLink Server, with the following criteria:

- List A: Advertised non-certified, non-MirrorLink aware applications
- List B: Advertised non-certified, MirrorLink aware applications
- List C: Advertised CCC and Member base-certified-only applications
- List D: Advertised CCC and Member drive-certified applications

Notes:

- For MirrorLink 1.1 Servers, List A and B MAY be empty; List C and D MUST NOT be empty.
- For MirrorLink 1.0 Servers, List A or B MUST NOT be both empty; List C and D MUST be empty.
- Member certified applications, included in List C and D MUST match the connected MirrorLink Client, i.e. the MirrorLink Client device manufacturer MUST be the certifying entity.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	

Step	Name	Description	Expected Result
Drive Mode			
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. If drive mode is not supported, go to step 6.
3	Browse Applications	From the client, browse the list of available applications.	
4	Launch Application	Attempt to launch any available application.	Test step MUST fail because one of the following conditions is met: • An application from list D cannot be launched and the graphical user interface does not become visible. • The graphical user interface of any application from List A, B or C can be made available. Test step MUST NOT fail because one of the following conditions is met: • None
5	Use Application	Use the features of the launched application. The applications to be used and the used features of those, is specified in a separate document.	Test step MUST fail because one of the following conditions is met: • Features of the applications are not usable. Test step MUST NOT fail because one of the following conditions is met: • Application could not be launched, because it is from List A, B or C.
6	Terminate Application	Terminate the application from the MirrorLink Client, if supported (PIXIT); otherwise browse to the list of available applications.	Test step MUST fail because one of the following conditions is met: • Application is still visible on the MirrorLink Client screen Test step MUST NOT fail because one of the following conditions is met: • None
7	Repeat	Repeat step 4 for each listed application.	
Park Mode			
8	Park mode	Enable “park” mode on the client (PIXIT).	Park mode enabled on client. If park mode is not supported, this test case is completed.
9	Browse Applications	From the client, browse the list of available applications.	
10	Launch Application	Attempt to launch any available application.	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• An application from List C and D cannot be launched and the graphical user interface does not become visible. Test step MUST NOT fail because one of the following conditions is met: • Applications from List A or B can be launched • Applications from List A or B cannot be launched but are visually distinguished from those applications from List C and D applications. • Applications from List A or B cannot be launched, but a notification appears, when the test engineer attempts to launch those applications.
11	Use Application	Use the features of the launched application.	Test step MUST fail because one of the following conditions is met: • Features of the applications are not usable. Test step MUST NOT fail because one of the following conditions is met: • Application could not be launched, because it is from List A, B.
12	Terminate Application	Terminate the application from the MirrorLink Client, if supported (PIXIT); otherwise browse to the list of available applications.	Test step MUST fail because one of the following conditions is met: • Application is still visible on the MirrorLink Client screen Test step MUST NOT fail because one of the following conditions is met: • None
13	Repeat	Repeat step 10 for each listed application	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

A MirrorLink 1.1 Client MAY show Car Mode applications from list A or B from MirrorLink 1.0 Servers in drive mode. Car Mode applications are limited to the following application categories:

- `0x0001 0001`: Home Screen
- `0x0002 0000`: General Phone Call applications
- `0x0003 0001`: Music
- `0x0005 0000`: General Navigation

Step 8: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 8: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

The Client MAY present an application from List A or B or C, while being in drive mode.

The Client MAY NOT present an application from List D, while being in drive mode.

6.1.3 IOP/APP/ApplicationSwitch

Requirement: Conditional

Condition: MirrorLink Server supports running multiple MirrorLink applications at the same time

Objective

The objective of this test is to verify that the consumer can switch to another MirrorLink application, while the initial application is still running in the background. In case the initial application is providing an audio stream, e.g. a music player application or a navigation application with turn-by-turn guidance, the audio stream is expected to continue, while another MirrorLink application is brought into the foreground.

Preparation Steps

The test case requires the MirrorLink Server to have a drive-certified application installed, which provides an audio stream, e.g. a music player application.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
Drive Mode			
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. If drive mode is not supported, go to step 7.
3	Browse Applications	From the client, browse the list of available applications.	.
4	Use first application	Launch a first application, which	Audio is played from the MirrorLink Client

Step	Name	Description	Expected Result
		provides an audio stream Start the audio playback.	
5	Use second Application	Launch any available second application. 1. Use features of the launched application 2. Switch to first application 3. Use features of the first application 4. Switch to second application 5. Use features of the second application 6. Terminate the second app, if supported (PIXIT).	Test step MUST fail because one of the following conditions is met: • Audio from the first application does not continue. • Audio sounds abnormal. • First application is terminated on application switch • Second application is terminated on application switch • First application is not usable, when in foreground • Second application is not usable, when in foreground Test step MUST NOT fail because one of the following conditions is met: • None
6	Repeat	Repeat step 5 for each listed application.	
Park Mode			
7	Park mode	Enable “park” mode on the client (PIXIT).	Park mode enabled on client. If park mode is not supported, this test case is completed.
8	Browse Applications	From the client, browse the list of available applications.	
9	Use first application	Launch a first application, which provides an audio stream Start the audio playback.	Audio is played from the MirrorLink Client
10	Use Application	Launch any available second application. 1. Use features of the launched application 2. Switch to first application 3. Use features of the first application 4. Switch to second application	Test step MUST fail because one of the following conditions is met: • Audio from the first application does not continue. • Audio sounds abnormal. • First application is terminated on application switch • Second application is terminated on application switch • First application is not usable, when in foreground • Second application is not usable, when in foreground

Step	Name	Description	Expected Result
		5. Use features of the second application 6. Terminate the second app, if supported (PIXIT).	Test step MUST NOT fail because one of the following conditions is met: • None
11	Repeat	Repeat step 10 for each available application.	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Preparation: The required application, providing an audio stream, MAY NOT be drive-certified.

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 5: Same as step 4

Step 10: Same as step 4

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 5: Same as step 4

Step 10: Same as step 4

6.1.4 IOP/APP/ApplicationBlocking

Requirement: Conditional

Conditions: Client supports Drive and Park mode

Objective

The objective of this test is to ensure that the MirrorLink Client is correctly blocking a non-drive certified application, when switching from park into drive mode. The test case therefore validates, that a consumer is not able to continue accessing the non-drive certified application's user interface. The MirrorLink Client display is expected to be fully operational after the transition and the consumer is made aware of what and why the application is blocked.

Preparation Steps

The test engineer obtains the information where the list of available applications is accessible from the MirrorLink Client's user interface.

The test engineer obtains a list of all MirrorLink enabled applications, installed on the MirrorLink Server, with the following criteria:

- List A: Advertised non-certified, non-MirrorLink aware applications
- List B: Advertised non-certified, MirrorLink aware applications
- List C: Advertised CCC and Member base-certified-only applications
- List D: Advertised CCC and Member drive-certified applications

Notes:

- For MirrorLink 1.1 Servers, List A and B MAY be empty; List C and D MUST NOT be empty.
- For MirrorLink 1.0 Servers, List A or B MUST NOT be both empty; List C and D MUST be empty.
- Member certified applications, included in List C and D MUST match the connected MirrorLink Client, i.e. the MirrorLink Client device manufacturer MUST be the certifying entity.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Park mode	Enable “Park” mode on the client (PIXIT).	Park mode enabled on client.
3	Browse Applications	From the client, browse the list of available applications.	
Non-Drive-Certified Applications			
4	Launch application	Launch an available application from list A, B or C	Application launches and graphical user interface becomes visible on the MirrorLink Client.
5	Drive Mode	Enable “Drive” Mode on the client (PIXIT)	Drive mode enabled on client.
6	Blocking	Verify that the application is blocked by the client.	Test step MUST fail because one of the following conditions is met: • Graphical user interface of the launched application is still visible. • Graphical user interface of another application from list A, B or C is visible. • The consumer is not informed about the blocking. Test step MUST NOT fail because one of the following conditions is met: • Graphical user interface of the Native MirrorLink Client is visible. • Graphical user interface of an application from list D is visible. • Audio of the blocked application continues to play. • Blocked application is terminated from the MirrorLink Client.
7	Return to Park mode	Enable “Park” mode on the client (PIXIT).	Park mode enabled on client.

Step	Name	Description	Expected Result
8	Unblocking	Verify that the blocked app is no longer blocked.	Test step MUST fail because one of the following conditions is met: • Graphical user interface of the application is not visible or not operational. Test step MUST NOT fail because one of the following conditions is met: • The test engineer needs to launch the application again. • The test engineer needs to manually switch back to the application.
9	Terminate App	Terminate the app launched in step 4 (if supported)	
10	Repeat	Repeat at step 4 above for each of the apps	
Drive-Certified Applications			
11	Launch drive-certified App	Launch an available application from list D	Application launches and graphical user interface becomes visible on the MirrorLink Client.
12	Drive Mode	Enable “Drive” Mode on the client (PIXIT).	Drive mode enabled on client.
13	Blocking	Verify that the application is not blocked by the client.	Test step MUST fail because one of the following conditions is met: • Graphical user interface of the application is not visible or not operational.
14	Park mode	Enable “Park” mode on the client (PIXIT).	Park mode enabled on client.
15	Unblocking	Verify that the application is not blocked by the client.	Test step MUST fail because one of the following conditions is met: • Graphical user interface of the application is not visible or not operational.
16	Terminate App	Terminate the app launched in step 11	
17	Repeat	Repeat at step 11 above for each of the apps	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Step 6: A MirrorLink 1.1 Client MAY show Car Mode applications from list A or B from MirrorLink 1.0 Servers in drive mode. Car Mode applications are limited to the following application categories:

- `0x0001 0001`: Home Screen
- `0x0002 0000`: General Phone Call applications
- `0x0003 0001`: Music
- `0x0005 0000`: General Navigation

Exceptions for MirrorLink 1.0 Clients

Step 4: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

Step 6: Non-drive-certified application MAY NOT be blocked, if the application is within the MirrorLink Client's listing policy. In this case a MirrorLink 1.0 Client MAY show an available application from List A, B or C.

Note, that a MirrorLink 1.0 Client does not distinguish between certified and non-certified applications.

Step 13: Drive-certified application MAY be blocked, if the application is not within the MirrorLink Client's listing policy. In this case a MirrorLink 1.0 Client MAY NOT show an available application from List A, B or C.

Note, that a MirrorLink 1.0 Client does not distinguish between certified and non-certified applications.

Step 15: Same as step 13.

6.2 Telephony

The Call application is used only as a tool for testing interoperability between the client and server. No assessment is to be made on the quality of the call application itself. Unless specifically called out in this document, all actions MUST be performed from the client. An assumption is to be made that the MirrorLink Server is not accessible by the user (driver).

A MirrorLink device submitted for IOP Testing MUST be prepared in accordance with the following requirements:

- A MirrorLink Server MUST contain an activated SIM card for the region where the testing is carried out. If the MirrorLink Server is not able to register to the live network, it is also allowed to use a network emulator and a corresponding test SIM card.
- A MirrorLink Client MUST contain a microphone and speakers
- A MirrorLink Server, supporting telephony over RTP, MUST provide a call application, which is either CCC drive or base-level certified.

The objective of the telephony test cases is to ensure that the consumer can handle phone calls from the MirrorLink Client. The consumer will either

- Use the MirrorLink Client's native call user interface together with a BT HFP connection to the MrrorLink Server, or
- Use the MirrorLink Server's call user interface together with an bi-directional RTP connection, or
- Use the MirrorLink Server's call user interface and transition to the MirrorLink Client's native call user interface to manage the call using BT HFP.

The consumer will be able to use the MirrorLink Client's native call user interface in the following ways:

- Via the interaction with UI application running on the Client display, or
- Via hardware controls available from the MirrorLink Client device, or
- Via a combination of both.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

- CCC drive or base-level certification MAY NOT be available for the call application

Exceptions for MirrorLink 1.0 Clients

None

6.2.1 IOP/TEL/OutgoingCall

Requirement: Conditional

Condition: Server and Client support phone call AND

MirrorLink Server supports RTP and/or BT HFP for telephony AND

MirrorLink Client supports RTP and/or BT HFP for telephony

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can select, setup, control and terminate an outgoing phone call from the MirrorLink Client.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote handset).

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server’s call application
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 9.
4	Start phone application	From the client, launch a phone calling application on the server and select the number of the remote handset to call.	Test step MUST fail because one of the following conditions is met: • Caller cannot be selected either via contact list, recent calls, number entry or similar mechanisms.
5	Call remote handset	Initiate a call to the remote handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset.
6	Accept call	Accept the call on the remote handset .	Test step MUST fail because one of the following conditions is met: • Call not established
7	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
8	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated
BT HFP based Phone Call (Initiate from ML Client native UI)			
9	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP initiated from the ML Client’s native phone call app is not supported from the MirrorLink Server and Client, go to step 15.
10	Start phone application	Launch the native phone call application on the MirrorLink Client	

Step	Name	Description	Expected Result
11	Call remote handset	From the MirrorLink Client initiate a call to the remote handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset.
12	Accept call	Accept the call on the remote handset .	Test step MUST fail because one of the following conditions is met: • Call not established
13	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
14	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated
BT HFP based Phone Call (Initiate from ML Server call UI)			
15	Keep BT HFP	Keep BT HFP	Audio connected via BT HFP. If phone audio over BT HFP initiated from the ML Server's phone call app is not supported from the MirrorLink Server and Client, this test case is completed.
16	Start phone application	From the MirrorLink Client, launch a phone calling application on the MirrorLink Server.	
17	Call remote handset	From the MirrorLink Client initiate a call to the remote handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset.
18	Accept call	Accept the call on the remote handset .	Test step MUST fail because one of the following conditions is met: • Call not established
19	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
20	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Step 16: Same as Step 4

Exceptions for MirrorLink 1.0 Clients

None

6.2.2 IOP/TEL/OutgoingCallVC

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND
MirrorLink Server supports RTP and/or BT HFP for telephony AND
MirrorLink Client supports RTP and/or BT HFP for telephony AND
Server and Client support voice commands

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can select, setup, control and terminate an outgoing phone call from the MirrorLink Client at least partly using voice commands.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote hand-set).

The test engineer obtains the list of supported Voice Commands for the phone call scenario.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT). Skip step, if not supported by client or application	Drive mode enabled on client.
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 9.
4	Start phone application	From the client, launch a phone calling application on the server and select the number of the	Test step MUST fail because one of the following conditions is met: • Caller cannot be selected either via contact list, recent calls, number entry or similar mechanisms. • VC cannot be used (if supported)

Step	Name	Description	Expected Result
		remote handset to call. Use VC, if supported	
5	Call remote handset	Initiate a call to the remote handset. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset. • VC cannot be used (if supported)
6	Accept call	Accept the call on the remote handset . Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not established • VC cannot be used (if supported)
7	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
8	Terminate call	Terminate the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated • VC cannot be used (if supported)
BT HFP based Phone Call (Initiate from ML Client native UI)			
9	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP initiated from the ML Client's native phone call app is not supported from the MirrorLink Server and Client, go to step 15.
10	Start phone application	Launch the native phone call application on the MirrorLink Client	
11	Call remote handset	Initiate a call to the remote handset. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset. • VC cannot be used (if supported)
12	Accept call	Accept the call on the remote handset . Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not established • VC cannot be used (if supported)
13	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
14	Terminate call	Terminate the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated VC cannot be used (if supported)
BT HFP based Phone Call (Initiate from ML Server call UI)			

Step	Name	Description	Expected Result
15	Keep BT HFP	Keep BT HFP	Audio connected via BT HFP. If phone audio over BT HFP initiated from the ML Server's phone call app is not supported from the MirrorLink Server and Client, this test case is completed.
16	Start phone application	From the MirrorLink Client, launch a phone calling application on the MirrorLink Server.	
17	Call remote handset	Initiate a call to the remote handset. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • No incoming Call on the remote handset. • VC cannot be used (if supported)
18	Accept call	Accept the call on the remote handset . Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not established • VC cannot be used (if supported)
19	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
20	Terminate call	Terminate the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated • VC cannot be used (if supported)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 4: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Step 16: Same as Step 4

Exceptions for MirrorLink 1.0 Clients

None

6.2.3 IOP/TEL/IncomingCall

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND

MirrorLink Server supports RTP and/or BT HFP for telephony AND

MirrorLink Client supports RTP and/or BT HFP for telephony

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can accept an incoming phone call from the MirrorLink Client.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote handset).

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's call application
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 8.
4	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
5	Accept call	Accept the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not established
6	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
7	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated
BT HFP based Phone Call			
8	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP is not supported from the MirrorLink Server and Client, this test case is completed.
9	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• No incoming Call on the local handset. • No ring tone
10	Accept call	Accept the call form the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not established
11	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
12	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to show any MirrorLink (certified) application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Step 7: Same as step 5

Exceptions for MirrorLink 1.0 Clients

None

6.2.4 IOP/TEL/IncomingCallVC

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND

MirrorLink Server supports RTP and/or BT HFP for telephony AND

MirrorLink Client supports RTP and/or BT HFP for telephony AND

Server and Client support voice commands

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can accept an incoming phone call from the MirrorLink Client at least partly using voice commands.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote hand-set).

The test engineer obtains the list of supported Voice Commands for the phone call scenario.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server’s call application
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 8.
4	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
5	Accept call	Accept the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not established • VC cannot be used (if supported)
6	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible
7	Terminate call	Terminate the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated • VC cannot be used (if supported)
BT HFP based Phone Call			
8	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP is not supported from the MirrorLink Server and Client, this test case is completed.
9	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
10	Accept call	Accept the call from the MirrorLink Client Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not established • VC cannot be used (if supported)
11	Call Audio	Exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation not possible

Step	Name	Description	Expected Result
12	Terminate call	Terminate the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated • VC cannot be used (if supported)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to show any MirrorLink (certified) application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Step 7: Same as step 5

Exceptions for MirrorLink 1.0 Clients

None

6.2.5 IOP/TEL/RejectCall

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND

MirrorLink Server supports RTP and/or BT HFP for telephony AND

MirrorLink Client supports RTP and/or BT HFP for telephony

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can reject an incoming phone call from the MirrorLink Client.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote hand-set).

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's call application
RTP based Phone Call			

Step	Name	Description	Expected Result
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 6.
4	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
5	Reject call	Reject the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not rejected
BT HFP based Phone Call			
6	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP is not supported from the MirrorLink Server and Client, this test case is completed.
7	Call remote handset	From the remote handset call the local handset..	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
8	Reject call	Reject the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not rejected

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to show any MirrorLink (certified) application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Exceptions for MirrorLink 1.0 Clients

None

6.2.6 IOP/TEL/RejectCallVC

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND
MirrorLink Server supports RTP and/or BT HFP for telephony AND
MirrorLink Client supports RTP and/or BT HFP for telephony AND
Server and Client support voice commands

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can reject an incoming phone call from the MirrorLink Client, at least partly using voice commands.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote handset).

The test engineer obtains the list of supported Voice Commands for the phone call scenario.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's call application
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 6.
4	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
5	Reject call	Reject the call from the MirrorLink Client. Use VC, if supported	Test step MUST fail because one of the following conditions is met: • Call not rejected • VC cannot be used (if supported)
BT HFP based Phone Call			
6	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP is not supported from the MirrorLink Server and Client, this test case is completed.
7	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
8	Reject call	Reject the call from the MirrorLink Client. Use VC, if supported.	Test step MUST fail because one of the following conditions is met: • Call not rejected • VC cannot be used (if supported)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to show any MirrorLink (certified) application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Exceptions for MirrorLink 1.0 Clients

None

6.2.7 IOP/TEL/MuteUnmute

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND
MirrorLink Server supports RTP and/or BT HFP for telephony AND
MirrorLink Client supports RTP and/or BT HFP for telephony AND
Server and Client support Mute/Unmute

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that the consumer can mute and unmute an established phone call from the MirrorLink Client.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote hand-set).

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable "Drive" mode on the client (PIXIT).	Drive mode enabled on client. Skip step, if drive mode is not supported by MirrorLink Client or MirrorLink Server's call application
RTP based Phone Call			
3	Connect RTP	Disable BT HFP and connect audio via RTP (PIXIT)	Audio connected via RTP. If phone audio over RTP is not supported from the MirrorLink Server and Client got to step 8.

Step	Name	Description	Expected Result
4	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
5	Accept call	Accept the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not established
6	Mute Audio	Mute the Audio from the MirrorLink Client and exchange a couple of sentences	Test step MUST fail because one of the following conditions is met: • Audio conversation from the MirrorLink Client device is heard at the remote handset. • Audio conversation from the remote handset is not heard at the MirrorLink Client device.
7	Unmute Audio	Unmute the Audio from the MirrorLink Client and exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Bi-directional Audio conversation not heard
8	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated
BT HFP based Phone Call			
9	Connect BT HFP	Disable RTP and connect audio via BT HFP (PIXIT)	Audio connected via BT HFP. If phone audio over BT HFP is not supported from the MirrorLink Server and Client, this test case is completed.
10	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
11	Accept call	Accept the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call not established
12	Mute Audio	Mute the Audio from the MirrorLink Client and exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Audio conversation from the MirrorLink Client device is heard at the remote handset. • Audio conversation from the remote handset is not heard at the MirrorLink Client device.
13	Unmute Audio	Unmute the Audio from the MirrorLink Client and exchange a couple of sentences.	Test step MUST fail because one of the following conditions is met: • Bi-directional Audio conversation not heard

Step	Name	Description	Expected Result
14	Terminate call	Terminate the call from the MirrorLink Client.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 5: A MirrorLink Client MAY require successful DAP to show any MirrorLink (certified) application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show a phone call application to launch. Such situation MUST NOT be considered a failure.

Step 6: Same as step 5

Step 7: Same as step 5

Exceptions for MirrorLink 1.0 Clients

None

6.2.8 IOP/TEL/CallContinuity

Requirement: Conditional

Condition: Server and Client support phone calls via MirrorLink AND

MirrorLink Server supports RTP and/or BT HFP for telephony AND

MirrorLink Client supports RTP and/or BT HFP for telephony

Note: The test case MUST be marked "`Not Applicable`" without further testing, if one device supports telephony only over RTP, whereas the other device supports telephony only over BT HFP.

Objective

The objective of this test is to ensure that an active phone call is not disturbed by starting and terminating MirrorLink sessions.

The audio is expected to automatically transfer to the MirrorLink Client on connecting the MirrorLink session, and to automatically transfer back to the MirrorLink Server on disconnecting the MirrorLink session.

Preparation Steps

The test engineer MUST have an additional phone, with a known phone number available (the remote hand-set).

Test Case Steps

Step	Name	Description	Expected Result
1	Call remote handset	From the remote handset call the local handset.	Test step MUST fail because one of the following conditions is met: • No incoming Call on the local handset. • No ring tone
2	Accept call	Accept the call from the MirrorLink Server.	Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• Call not established
RTP based Phone Call			
3	Establish Connection	See definitions RTP is used for phone call audio	Test step MUST fail because one of the following conditions is met: • Phone call terminates • Phone call audio is not handled via the MirrorLink Client
4	Disconnect	Disconnect MirrorLink Client from MirrorLink Server.	Test step MUST fail because one of the following conditions is met: • Phone call terminates • Phone call audio is not handled via the MirrorLink Server
BT HFP based Phone Call			
5	Establish Connection	See definitions BT HFP is used for phone call audio	Test step MUST fail because one of the following conditions is met: • Phone call terminates • Phone call audio is not handled via the MirrorLink Client
6	Disconnect	Disconnect MirrorLink Client from MirrorLink Server.	Test step MUST fail because one of the following conditions is met: • Phone call terminates • Phone call audio is not handled via the MirrorLink Server
7	Terminate call	Terminate the call from the MirrorLink Server.	Test step MUST fail because one of the following conditions is met: • Call cannot be terminated

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

None

Exceptions for MirrorLink 1.0 Clients

None

6.3 Audio Handling

6.3.1 IOP/Audio/EntertainmentAudioSwitching

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink Client is correctly handling mixing of local and remote audio sources.

Preparation Steps

The test engineer obtains the information which applications on the MirrorLink Sever device provide audio, and which application category is used within the RTP extension header. Note: Preferable use already certified applications.

The test engineer obtains the audio mixing principles from the MirrorLink Client device vendor:

- Which application categories have higher priority than local entertainment sources?
- Is audio from non-certified applications blocked while driving?
- Is audio from unknown applications blocked while driving?

Notes:

- For MirrorLink 1.0 Servers, all applications are non-certified.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Drive mode	Enable “Drive” mode on the client (PIXIT).	Drive mode enabled on client. If drive mode is not supported, skip test step.
3	Browse Applications	From the client, browse the list of available applications.	No local audio is played from the MirrorLink Client.
4	Launch Application	Launch application, which provides an audio stream Start the audio playback.	Application’s audio is played from the MirrorLink Client
5	Switch on local audio	Start local entertainment audio.	• Application’s audio is played from the MirrorLink Client, without interruption, if the application audio source has higher priority. • MirrorLink Client is NOT playing local entertainment audio. OR • Application’s audio stopped playing from the MirrorLink Client, if application audio source has lower priority (Audio is NOT played from the MirrorLink Server) • MirrorLink Client is playing local entertainment audio. OR • Application’s audio is played from the MirrorLink Client, without interruption, if the MirrorLink Client does not support any local entertainment audio. Note: • For all options, MirrorLink Server MUST NOT play audio via its own speaker.

Step	Name	Description	Expected Result
6	Switch off local audio	Stop local entertainment audio.	• Application's audio is played from the MirrorLink Client, without interruption, if the application audio source has higher priority. • MirrorLink Client is NOT playing local entertainment audio. OR • Application's audio playing again from the MirrorLink Client. Note: Test engineer may resume the playback. • MirrorLink Client is NOT playing local entertainment audio. OR • Application's audio is played from the MirrorLink Client, without interruption, if the MirrorLink Client does not support any local entertainment audio. Note: • For all options, MirrorLink Server MUST NOT play audio via its own speaker.
7	Terminate application	Terminate application	• Application's audio is NOT played from the MirrorLink Client. • MirrorLink Client is NOT playing local entertainment audio.
8	Repeat	Go back to step 4 and repeat steps for each application, providing audio.	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 3: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 3: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

6.3.2 IOP/Audio/AudioBlocking

Requirement: MANDATORY

Condition: None

Objective

The objective of this test is to ensure that the MirrorLink devices are correctly blocking remote audio sources.

Preparation Steps

The test engineer obtains the information which applications on the MirrorLink Sever device provide audio, and which application category is used within the RTP extension header.

The test engineer obtains the audio mixing principles from the MirrorLink Client device vendor:

- What are the conditions for the MirrorLink Client (certification status, application identifier, application category), which will lead the MirrorLink Client to block audio from the MirrorLink Server?

Notes:

- For MirrorLink 1.0 Servers, all applications are non-certified.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Browse Applications	From the client, browse the list of available applications.	No local audio is played from the MirrorLink Client.
3	Mode Switch	Enable “Park” mode on the client (PIXIT). Skip test step, if park mode not supported.	Park Mode enabled on Client.
4	Launch Application	Launch application, providing audio. Start the audio playback.	• Application’s audio is played from the MirrorLink Client, if application’s audio is NOT blocked. OR • Application’s audio not playing from the MirrorLink Client, if application’s audio is blocked. • Audio is NOT played from the MirrorLink Server. • Application is not certified
5	Mode Switch	Enable “Drive” mode on the client (PIXIT). Skip test step, if drive mode not supported.	• Application’s audio is played from the MirrorLink Client, without interruption, if application’s audio is NOT blocked. OR • Application’s audio stopped playing from the MirrorLink Client, if application’s audio is blocked. • Audio is NOT played from the MirrorLink Server. • Application is not drive-certified
6	Mode Switch	Enable “Park” mode on the client (PIXIT).	• Application’s audio is played from the MirrorLink Client, without interruption, if

Step	Name	Description	Expected Result
		Skip test step, if park mode not supported.	application's audio has NOT been blocked before. OR • Application's audio is resumed from the MirrorLink Client, if application's audio is NOT blocked anymore. • Note: Test engineer MAY need to manually resume the audio playback • Application is not drive-certified OR • Application's audio stopped playing from the MirrorLink Client, if application's audio is blocked. • Audio is NOT played from the MirrorLink Server. • Application is not certified
7	Terminate application	Terminate application	• Application's audio is NOT played from the MirrorLink Client. • Audio is NOT played from the MirrorLink Server.
8	Repeat	Go back to step 4 and repeat steps for each application, providing audio.	

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Step 2: A MirrorLink Client MAY require successful DAP to list any MirrorLink application, which MAY NOT be available from a MirrorLink 1.0 Server. A MirrorLink Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

A MirrorLink 1.1 Client MUST provide a notification to the consumer that no applications are available from the MirrorLink 1.0 Server.

Exceptions for MirrorLink 1.0 Clients

Step 2: A MirrorLink 1.0 Client MAY NOT list any application, if the MirrorLink Client's listing policy does not include any of the advertised applications from the MirrorLink Server. A MirrorLink 1.0 Client MAY NOT show any application to launch. Such situation MUST NOT be considered a failure.

7 MISC FUNCTIONALITY

7.1 Notifications

7.1.1 IOP/NOT/ReceiveNotification

Requirement: Conditional

Condition: Server and Client support UPnP notification service.

Objective

The objective of this test is to ensure that UPnP notifications are correctly exchanged between client and server, while being in park and drive mode.

Preparation Steps

1. Test engineer obtains the list of applications, which provide notifications
2. Test engineer obtains the mechanisms required to trigger a notification from the applications listed in 1.
3. Test engineer obtains the response to actions from the notifications listed in 2, in case the application does provide notification action information to the MirrorLink Client.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
Park Mode			
2	Park mode	Enable “park” mode on the client (PIXIT).	Park mode enabled on client If park mode is not supported, go to step 7.
3	Activate notifications	From the MirrorLink Client, launch an application, which provides notifications (Preparation step 1)	
4	Move app to the background	Test Engineer brings a MirrorLink Client device native UI to the foreground (e.g. the application listing)	
5	Create notification	Perform necessary steps to create a notification (Preparation step 2)	Test step MUST fail because one of the following conditions is met: • Notification not visible on the MirrorLink Client screen or notifying application automatically not brought into foreground
6	Launch action	Launch an action corresponding to the notification if available (PIXIT)	Skip test case, if not dedicated notification user interface is provided. Test step MUST fail because one of the following conditions is met:

Step	Name	Description	Expected Result
			• Notification action is not executed by the MirrorLink Server (Preparation step 3)
Drive Mode			
7	Drive mode	Enable “drive” mode on the client (PIXIT).	Drive mode enabled on client If drive mode is not supported, test case is completed.
8	Activate notifications	From the MirrorLink Client, launch an application, which provides notifications (Preparation step 1)	
9	Move app to the background	Test Engineer brings a MirrorLink Client device native UI to the foreground (e.g. the application listing)	
10	Create notification	Perform necessary steps to create a notification (Preparation step 2)	Test step MUST fail because one of the following conditions is met: • Notification not visible on the MirrorLink Client screen or notifying application automatically not brought into foreground
11	Launch action	Launch an action corresponding to the notification if available (PIXIT)	Skip test case, if not dedicated notification user interface is provided. Test step MUST fail because one of the following conditions is met: • Notification action is not executed by the MirrorLink Server (Preparation step 3)

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Test Case is not applicable for MirrorLink 1.0 Servers.

Exceptions for MirrorLink 1.0 Clients

Test Case is not applicable for MirrorLink 1.0 Clients.

7.2 Data Services

7.2.1 IOP/SERVICES/Location

Requirement: Conditional

Condition: Server supports Location Data Service sink AND

Client supports Location Data Service source

Objective

The objective of this test is to ensure that Location Data is correctly exchanged between Client and Server.

Preparation Steps

Test engineer obtains the list of applications, which provide notifications.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Activate Data Service	Perform necessary steps to launch and advertise the Location data service.	
3	Subscribe to Data Service	Perform necessary steps to subscribe to the Location Data Service	
4	Launch application	Launch an application, which uses the Location data service (PIXIT)	• Location seen on application's UI • It is acceptable, if the Client is emulating the GPS position.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Test Case is not applicable for MirrorLink 1.0 Servers.

Exceptions for MirrorLink 1.0 Clients

Test Case is not applicable for MirrorLink 1.0 Clients.

7.2.2 IOP/SERVICES/GPS

Requirement: Conditional

Condition: Server supports GPS Data Service sink and

Client supports GPS Data Service source

Objective

The objective of this test is to ensure that GPS Data is correctly exchanged between Client and Server.

Preparation Steps

Test engineer obtains the list of applications, which provide notifications.

Test Case Steps

Step	Name	Description	Expected Result
1	Establish Connection	See definitions	
2	Activate Data Service	Perform necessary steps to launch and advertise the GPS data service.	
3	Subscribe to Data Service	Perform necessary steps to subscribe to the GPS Data Service	
4	Launch application	Launch an application, which uses the GPS data service (PIXIT)	• Location seen on application's UI • It is acceptable, if the Client is emulating the GPS position.

Exceptions for MirrorLink 1.1 Servers

None

Exceptions for MirrorLink 1.1 Clients

None

Exceptions for MirrorLink 1.0 Servers

Test Case is not applicable for MirrorLink 1.0 Servers.

Exceptions for MirrorLink 1.0 Clients

Test Case is not applicable for MirrorLink 1.0 Clients.

8 INTEROPERABILITY DEVICES

8.1 IOP between MirrorLink 1.0 Devices

MirrorLink 1.0 devices MUST demonstrate interoperability with other MirrorLink 1.0 devices, listed on the MirrorLink Interoperability Device list [2].

Most test cases, listed in this IOP specification, apply for MirrorLink 1.0 devices as well. Test cases, which do not apply, are specifically marked in the Exceptions section underneath each test case. Exceptions for MirrorLink 1.0 devices are listed at the end of each test case description. Those exceptions MUST be considered, when deciding on a pass or fail for the respective test case.

A MirrorLink 1.0 Client, which cannot interact with a MirrorLink 1.0 Server MUST make the reason visible to the consumer.

8.2 IOP between MirrorLink 1.1 Devices

MirrorLink 1.1 devices MUST demonstrate interoperability with other MirrorLink 1.1 devices, listed on the MirrorLink Interoperability Device list [2].

All test cases, listed in this IOP specification, apply for MirrorLink 1.1 devices.

Exceptions for MirrorLink 1.1 devices are listed at the end of each test case description. Those exceptions[1] MUST be considered, when deciding on a pass or fail for the respective test case.

8.3 IOP between MirrorLink 1.0 and 1.1 Devices

MirrorLink 1.0 devices and MirrorLink 1.1 devices MUST demonstrate interoperability with devices, listed on the MirrorLink Interoperability Device list [2], and implementing a different MirrorLink version.

Most test cases, listed in the IOP specification, apply for MirrorLink 1.0 as well. Test cases, which do not apply, are specifically marked in the Exceptions section underneath each test case. Exceptions for MirrorLink 1.0 and MirrorLink 1.1 devices are listed at the end of each test case description. Those exceptions MUST be considered, when deciding on a pass or fail for the respective test case.

A MirrorLink Client, which cannot interact with a MirrorLink Server, MUST make the reason visible to the consumer.

In case the MirrorLink Client does not list any application, due missing DAP support from the MirrorLink Server or due to its own filtering policy, the following reduced testing MUST be done:

- The following test cases MUST be executed:
  - IOP/USB/ConnectionClientOffServerOn
  - IOP/USB/ConnectionClientOnServerOff
  - IOP/USB/ConnectionClientOnServerOn
  - IOP/USB/TerminationDisconnectCable
  - IOP/USB/TerminationPowerOffClient
  - IOP/USB/TerminationPowerOffServer
- For each of the above test cases:
  - Test engineer MUST add a comment into the test report that "`No application list is available on the MirrorLink Client, due to missing DAP support from the MirrorLink Server.`"

[1] Exceptions may be given for MirrorLink 1.0 and 1.1 Clients and Servers. When doing an IOP test session with a MirrorLink 1.1 Server and a MirrorLink 1.0 Client, the test engineer MUST consider the exception listed under the MirrorLink 1.1 Server and the exceptions listed under the MirrorLink 1.0 Client, when deciding on the verdict for an individual test step.

- Test engineer MUST provide the MirrorLink Client's notification (text or screenshot) in the test report.
- In case no notification is provided, the test case MUST fail.
- All remaining test steps, which are possible MUST be executed.

- Other test cases MUST NOT be executed.

9 REFERENCES

[1] IETF, RFC 2119, “Keys words for use in RFCs to Indicate Requirement Levels”, March 1997. http://www.ietf.org/rfc/rfc2119.txt

[2] MirrorLink Interoperability Device List, https://causeway.carconnectivity.org/wg/Members/wiki/MirrorLink_Interoperability_Device_List

[3] Car Connectivity Consortium, “MirrorLink – User Experience Requirements”, Version 1.0, CCC-RQ-001.