Car Connectivity Consortium

MirrorLink®

Connectivity Test Specification

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LEGAL NOTICE

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TERMS AND ABBREVIATIONS

BT	Bluetooth
CDC	Communications Device Class
DHCP	Dynamic Host Configuration Protocol
IP	Internet Protocol
NCM	Network Control Mode
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UPnP	Universal Plug and Play
USB	Universal Serial Bus

1 ABOUT

This document specifies MirrorLink protocol conformance test cases for the Connectivity Specification [2].

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 DEFINITIONS

2.1 Execution of Test Cases

Every test case is uniquely identified by an identifier.

- A MirrorLink server MUST pass all test cases, starting with SR.
- A MirrorLink client MUST pass all test cases, starting with CL

Every test case description includes an entry, whether the test cases is considered mandatory or not.

- Test cases marked as MANDATORY, MUST be executed.
- Test cases marked as CONDITIONAL, MUST be executed if the given condition is met.
- Test cases marked as CONDITIONAL, MUST NOT be executed if the given condition is not met.
- Test cases marked as NONE, MUST NOT be executed.

2.2 Server Definitions

The following definitions are frequently used in different server test cases. Usage is indicated by the given designator name.

2.2.1 USB Connection Setup

This definition contains all necessary steps to complete the USB connection setup.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	USB device identification	Test that the Server USB device has been identified by the Client	• USB Host is able to read the USB device
3	CDC/NCM personality selection	Make sure that CDC/NCM personality is loaded in the Server	• USB Host has USB CDC/NCM device class or personality including CDC/NCM • CDC/NCM interface descriptors inside the USB device descriptor o (bInterfaceClass : 0x02) o (bInterfaceSubclass: 0x0D)

2.2.2 WLAN Connection Setup

This definition contains all necessary steps to complete the WLAN connection setup.

Step	Name	Description	Expected Result
1	Power on WLAN radio	Switch on WLAN radio Start ML Server and ML Client (if not done automatically).	• WiFi on MirrorLink Server is detectable.

Step	Name	Description	Expected Result
2	WLAN connection	Establish WLAN connection between MirrorLink Server and MirrorLink Client Enter WLAN keys if needed ML Server or ML Client MAY have access point role	• WLAN connection established • Access point role agreed

2.2.3 DHCP Negotiation

If the MirrorLink server is using USB connectivity, or the server is using WLAN connectivity and the server is in AP role, the MirrorLink server MUST follow DHCP server negotiation, otherwise DHCP client negotiation.

This definition contains all necessary steps to complete the DHCP Server negotiation.

Step	Name	Description	Expected Result
1	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports	• DHCP Client requests receive reply from Server • Server sends to port 68 for DHCP negotiation
2	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• IP address assigned • Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254
3	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address netmask	• IP address in valid range has been assigned • Assigned netmask is 255.255.255.z where z can be from 0 to 254.

The definition contains all necessary steps to complete the DHCP Client negotiation

Step	Name	Description	Expected Result
1	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports	• DHCP Server receives negotiation requests • Client sends to port 68 for DHCP negotiation • Client accepts offered IP address

2.3 Client Definitions

The following definitions are frequently used in different client test cases. Usage is indicated by the given designator name.

2.3.1 USB Connection Setup

The definition contains all necessary steps to complete the USB connection setup.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	Switch to CDC/NCM	Provide USB device descriptor with USB CDC/NCM device class.	• USB host MAY send MirrorLink USB command • wValue is giving the correct MirrorLink version. • USB host reads USB device descriptor • USB client is asked to activate CDC/NCM

2.3.2 WLAN Connection Setup

This definition contains all necessary steps to complete the WLAN connection setup.

Step	Name	Description	Expected Result
1	Power on WLAN radio	Switch on WLAN radio. Start ML Server and ML Client (if not done automatically).	• WiFi on MirrorLink Server is detectable.
2	WLAN connection	Establish WLAN connection between MirrorLink Server and MirrorLink Client Enter WLAN keys if needed ML Server or ML Client MAY have access point role	• WLAN connection established • Access point role agreed

2.3.3 DHCP Negotiation

If the MirrorLink client is using WLAN connectivity and the client is in AP role, the MirrorLink client MUST follow DHCP server negotiation, otherwise DHCP client negotiation.

This definition contains all necessary steps to complete the DHCP Server negotiation.

Step	Name	Description	Expected Result
1	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports	• DHCP Client requests receive reply from Server • Server use port 68 for DHCP negotiation

Step	Name	Description	Expected Result
2	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• IP address assigned • Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 254 and y the range of 0 to 254
3	Valid IP net-mask	Test if, after discovery, DHCP server provides valid IP address netmask	• IP address in valid range has been assigned • Assigned netmask is 255.255.255.z and z in the range of 0 to 254

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2 The definition contains all necessary steps to complete the DHCP Client negotiation

Step	Name	Description	Expected Result
1	DHCP nego-tiation	Test that a DHCP discovery takes place between client and Server in the specified ports	• DHCP Server receives negoti-ation requests • Client uses port 68 for DHCP negotiation • Client accepts offered IP ad-dress

3 SERVER FEATURE TEST CASES

3.1 USB Device at MirrorLink Server

3.1.1 SR/CON/USB/UsbDeviceConnect

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink server is connected as a USB device to the USB host

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	USB device identification	Test that the Server USB device has been identified by the Client	• USB Host is able to read the USB device descriptor
3	USB disconnection	Unplug the USB cable connecting Server and Client	

3.1.2 SR/CON/USB/UsbVendorIdProductId

Requirement: MANDATORY

Condition: None

This test checks that the USB device send vendor and product ID

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	idVendor and idProduct Check	Checking if idVendor and idProduct are valid and correct	• IdVendor MUST be the same as assigned for the USB device by USB-IF • idProduct MUST be the same as specified by product vendor

3.1.3 SR/CON/USB/Usb20

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink server is advertised as USB 2.0 compliant

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device

Step	Name	Description	Expected Result
2	USB device identification	Test that the Server USB device has been identified by the Client	• USB Host is able to read the USB device descriptor
3	USB version verification	Test that the Server provides at least USB 2.0 support	• USB Host can read and correctly parse the Server USB descriptor • USB Host reads the value 0x0200 or higher from the bcdUSB field in the Server's USB device descriptor
4	USB disconnection	Unplug the USB cable connecting Server and Client	

3.1.4 SR/CON/USB/MLCommand

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink Server can read the MirrorLink USB command from the Client without stalling or otherwise misbehaving.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	USB device identification	Test that the Server USB device has been identified by the Client	• USB Host is able to read the USB device descriptor
3	Sending MirrorLink USB Command	Send MirrorLink USB command to Server. Run test case with MirrorLink Version 1.0, 1.1 and 3 random versions > 1.1. Wait for 2s. Read Client USB Device descriptor	• USB Host is able to read the USB device descriptor
4	USB disconnection	Unplug the USB cable connecting Server and Client	

3.1.5 SR/CON/USB/MLCommandAutomaticSwitch

Requirement: CONDITIONAL

Condition: Server supports automatic USB switching

This test checks that the MirrorLink Server automatically enables CDC/NCM mode when receiving a MirrorLink USB command from the Client.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	USB device identification	Test that the Server USB device has been identified by the Client	• USB Host is able to read the USB device descriptor
3	Sending MirrorLink USB Command	Send MirrorLink USB command to Server. Run test case with MirrorLink Version 1.0, 1.1 and 3 random versions > 1.1.	• USB Host is able to read the USB device descriptor
4	CDC/NCM personality selection	Read MirrorLink Server's USB Device descriptor after MirrorLink USB command sending	• USB Host provides USB CDC/NCM device class or USB personality including CDC/NCM • CDC/NCM interface descriptors inside the USB device descriptor ○ (bInterfaceClass : 0x02) ○ (bInterfaceSubclass: 0x0D)
5	USB disconnection	Unplug the USB cable connecting Server and Client	

3.1.6 SR/CON/USB/MLCommandManualSwitch

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink Server enables manual CDC/NCM mode selection.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Server to MirrorLink Client via a USB cable	• MirrorLink Server is recognized as a USB device
2	USB device identification	Test that the Server USB device has been identified by the Client No ML USB command is sent.	• USB Host is able to read the USB device descriptor
3	Manual selection of CDC/NCM personality	User executes the known steps to switch to MirrorLink CDC/NCM personality.	• USB Device disconnects and connects USB • USB Host is able to read the USB device descriptor

Step	Name	Description	Expected Result
4	CDC/NCM personality selection	Read MirrorLink Server's USB Device descriptor after MirrorLink USB command sending	• USB Device changes its USB personality to CDC/NCM, if it was not already enabled • CDC/NCM interface descriptors inside the USB device descriptor ○ (bInterfaceClass : 0x02) ○ (bInterfaceSubclass: 0x0D)
5	USB disconnection	Unplug the USB cable connecting Server and Client	

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3.2 DHCP Server

3.2.1 SR/CON/DHCP/USB/ServerAvailability

Requirement: MANDATORY

Condition: None

This test checks if the MirrorLink Server provides a DHCP Server and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	USB Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	USB disconnection	Unplug the USB cable connecting Server and Client	

3.2.2 SR/CON/DHCP/USB/ValidIpAddressRange

Requirement: MANDATORY

Condition: None

This test checks if the MirrorLink DHCP Server provides the client with an IP address within a valid range

Step	Name	Description	Expected Result
1	USB Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254
5	USB disconnection	Unplug the USB cable connecting Server and Client	

3.2.3 SR/CON/DHCP/USB/ValidIpNetmask

Requirement: MANDATORY

Condition: None

This test checks if the MirrorLink DHCP Server provides the client with the correct IP netmask.

Step	Name	Description	Expected Result
1	USB Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254
5	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address net-mask	• Assigned netmask is 255.255.255.z and z in the range of 0 to 254
6	USB disconnection	Unplug the USB cable connecting Server and Client	

3.2.4 SR/CON/DHCP/USB/DHCPDECLINE

Requirement: MANDATORY

Condition: None

This test checks if the MirrorLink DHCP Server reassigns another subnet when DHCPDECLINE is requested.

Step	Name	Description	Expected Result
1	USB Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	DHCP Decline	Send DHCPDECLINE to DUT	
5	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
6	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
7	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range Note: The test engineer MAY need to manually set the new IP address.	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254 • New IP address is different at the x position.

Step	Name	Description	Expected Result
8	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address net-mask	• Assigned netmask is 255.255.255.z with z in the range of 0 to 254
9	USB disconnection	Unplug the USB cable connecting Server and Client	

3.2.5 SR/CON/DHCP/WLAN/ServerAvailability

Requirement: CONDITIONAL

Condition: Server is supporting WLAN connectivity AND
Server is in AP role

This test checks if the MirrorLink Server provides a DHCP Server and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

3.2.6 SR/CON/DHCP/WLAN/ValidIpAddressRange

Requirement: CONDITIONAL

Condition: Server is supporting WLAN connectivity AND
Server is in AP role

This test checks if the MirrorLink DHCP Server provides the client with an IP address within a valid range

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254

Step	Name	Description	Expected Result
5	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

3.2.7 SR/CON/DHCP/WLAN/ValidIpNetmask

Requirement: CONDITIONAL

Condition: Server is supporting WLAN connectivity AND
Server is in AP role

This test checks if the MirrorLink DHCP Server provides the client with the correct IP netmask.

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254
5	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address net-mask	• Assigned netmask is 255.255.255.z and z in the range of 0 to 254
6	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

3.2.8 SR/CON/DHCP/WLAN/DHCPDECLINE

Requirement: CONDITIONAL

Condition: Server is supporting WLAN connectivity AND
Server is in AP role

This test checks if the MirrorLink DHCP Server reassigns another subnet when DHCPDECLINE is requested.

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68

Step	Name	Description	Expected Result
4	DHCP Decline	Send DHCPDECLINE to DUT	
5	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
6	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
7	Valid IP address	Test if, after discovery, DHCP server provides IP within the valid range Note: The test engineer MAY need to manually set the new IP address.	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 127 and y the range of 0 to 254 • New IP address is different at the x position.
8	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address net-mask	• Assigned netmask is 255.255.255.z and z in the range of 0 to 254
9	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

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3.3 DHCP Client

3.3.1 SR/CON/DHCP/WLAN/ClientAvailability

Requirement: CONDITIONAL

Condition: Server is supporting WLAN and server is in non-AP role

This test checks if the MirrorLink Server provides a DHCP Client and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports DHCP Server MUST ignore DHCPREQUEST messages and wait until DHCP Client sends a DHCPDISCOVER. Test case fails, if the DHCP Server does not receive any DHCPDISCOVER message within 60s.	• DHCP Server receives negotiation requests • Client sends to port 67 for DHCP negotiation
3	WLAN disconnection	Unplug the USB cable connecting Server and Client	

3.4 IP Networking

IP networking is implicitly tested via regular UPnP test cases.

3.5 UPnP Identification

3.5.1 SR/CON/UPnP/DeviceManufacturerAndModelName

Requirement: MANDATORY

Condition: None

This test checks that the server provides UPnP device manufacturer and model name

Step	Name	Description	Expected Result
1	USB connection	See definitions	
2	DHCP negotiation	See definitions	
3	UDP support	Check for UPnP SSDP Advertisements SSDP alive messages are broadcasted over UDP	• UPnP Control Point receives SSDP:alive advertisement
4	TCP support	Check for UPnP device descriptor UPnP device descriptor is access via HTTP over TCP.	• UPnP Control Point receives XML device descriptor
5	Device manufacturer and model name check	Checking if XML device descriptor contains valid and correct device manufacturer and model name	• Device manufacturer and model name MUST correspond to the ones provided by the vendor

4 CLIENT FEATURE TEST CASES

4.1 USB Host at MirrorLink Client

4.1.1 CL/CON/USB/UsbHostConnect

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink client is connected as a USB 2.0 host

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	USB 2.0 host identification	Test that USB 2.0 host is connected to the client Provide USB device descriptor without USB CDC/NCM	• MirrorLink Client is identified as a USB 2.0 host • USB host reads USB device descriptor
3	USB disconnection	Unplug the USB cable connecting Server and Client	

4.1.2 CL/CON/USB/MLCommand

Requirement: CONDITIONAL

Condition: MirrorLink Client supports the MirrorLink USB command

This test checks that the MirrorLink client sends the MirrorLink USB command. This test case MUST be executed, if the MirrorLink Client can be triggered either manually or automatically to send a MirrorLink USB command.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	MirrorLink USB command sending	Execute steps to trigger sending the MirrorLink USB command	• USB Device receives the MirrorLink USB command • wValue is giving the correct MirrorLink version.
3	USB disconnection	Unplug the USB cable connecting Server and Client	

4.1.3 CL/CON/USB/UsbConnect

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink client switches to CDC/NCM after either sending the MirrorLink USB command or after manually switching to CDC/NCM support.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	MirrorLink USB command sending	Execute the steps to trigger sending the MirrorLink USB command or to manually switch to CDC/NCM support (if not done automatically)	• USB Device MAY receive the MirrorLink USB command • wValue is giving the correct MirrorLink version (if received)
3	Switch to CDC/NCM	Provide USB device descriptor with USB CDC/NCM device class.	• USB host reads USB device descriptor • USB client is asked to activate CDC/NCM
4	USB disconnection	Unplug the USB cable connecting Server and Client	

4.1.4 CL/CON/USB/MLCommandStallPID

Requirement: CONDITIONAL

Condition: MirrorLink Client supports the MirrorLink USB command

This test checks that the MirrorLink client is still operational, if the MirrorLink USB command is responded with STALL_PID. This test case MUST be executed, if the MirrorLink Client can be triggered either manually or automatically to send a MirrorLink USB command.

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	MirrorLink USB command sending	Execute steps to trigger sending the MirrorLink USB command	• USB Device receives the MirrorLink USB command • wValue is giving the correct MirrorLink version.
3	Stall PID	Respond with STALL_PID	• USB connection MAY be reset
4	Switch to CDC/NCM	Provide USB device descriptor with USB CDC/NCM device class.	• USB host reads USB device descriptor • USB client is asked to activate CDC/NCM
5	USB disconnection	Unplug the USB cable connecting Server and Client	

4.1.5 CL/CON/USB/MaxEthernetFrameSize

Requirement: MANDATORY

Condition: None

This test checks that the MirrorLink Server USB host follows the maximum Ethernet size frame indicated by the USB device

Step	Name	Description	Expected Result
1	Physical USB cable connection	Connect MirrorLink Client to MirrorLink Server via a USB cable	• MirrorLink Client is recognized as a USB host
2	Switch to CDC/NCM	Provide USB device descriptor with USB CDC/NCM device class.	• USB host MAY send MirrorLink USB command • USB host reads USB device descriptor • USB client is asked to activate CDC/NCM
3	Ethernet frame size verification	The test checks that Ethernet frame size of MirrorLink USB host is not bigger than the one provided by the Server	• Client Ethernet frame size is not bigger than wMaxSegmentSize provided by Server
4	USB disconnection	Unplug the USB cable connecting Server and Client	

4.2 DHCP Server

4.2.1 CL/CON/DHCP/WLAN/ServerAvailability

Requirement: CONDITIONAL

Condition: Client is supporting WLAN connectivity AND

Client is in AP role

This test checks if the MirrorLink Server provides a DHCP Server and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

4.2.2 CL/CON/DHCP/WLAN/ValidIpAddressRange

Requirement: CONDITIONAL

Condition: Client is supporting WLAN connectivity AND

Client is in AP role

This test checks if the MirrorLink DHCP Server provides the client with an IP address within a valid range

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Wait for 3s Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 254 and y the range of 0 to 254
5	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

4.2.3 CL/CON/DHCP/WLAN/ValidIpNetmask

Requirement: CONDITIONAL

Condition: Client is supporting WLAN connectivity AND

Client is in AP role

This test checks if the MirrorLink DHCP Server provides the client with the correct IP netmask.

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP Discover	Send DHCPDISCOVER to DUT	• Receive DHCPOFFER • Server sends to port 68
3	DHCP Request	Send DHCPREQUEST to DUT	• Receive DHCPACK • Server sends to port 68
4	Valid IP address	Wait for 3s Test if, after discovery, DHCP server provides IP within the valid range	• Assigned IP address is in the range 192.168.x.y with x in the range of 2 to 254 and y the range of 0 to 254
5	Valid IP netmask	Test if, after discovery, DHCP server provides valid IP address net-mask	• Assigned netmask is 255.255.255.z and z in the range of 0 to 254
6	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

4.3 DHCP Client

4.3.1 CL/CON/DHCP/USB/ClientAvailability

Requirement: MANDATORY

Condition: None

This test checks if the MirrorLink Server provides a DHCP Client and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	USB Connection Setup	See Definitions	
2	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports DHCP Server MUST ignore DHCPREQUEST messages and wait until DHCP Client sends a DHCPDISCOVER. Test case fails, if the DHCP Server does not receive any DHCPDISCOVER message within 60s.	• DHCP Server receives negotiation requests • Client sends to port 67 for DHCP negotiation
3	USB disconnection	Unplug the USB cable connecting Server and Client	

4.3.2 CL/CON/DHCP/WLAN/ClientAvailability

Requirement: CONDITIONAL

Condition: Client is supporting WLAN AND

Client is in non-AP role

This test checks if the MirrorLink Server provides a DHCP Client and negotiates through the mandated ports

Step	Name	Description	Expected Result
1	WLAN Connection Setup	See Definitions	
2	DHCP negotiation	Test that a DHCP discovery takes place between client and Server in the specified ports DHCP Server MUST ignore DHCPREQUEST messages and wait until DHCP Client sends a DHCPDISCOVER. Test case fails, if the DHCP Server does not receive any DHCPDISCOVER message within 60s.	• DHCP Server receives negotiation requests • Client sends to port 67 for DHCP negotiation
3	WLAN disconnection	Power off WLAN radio at MirrorLink Server and Client.	

4.4 IP Networking

IP networking is implicitly tested via regular UPnP test cases.

5 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] Car Connectivity Consortium, “MirrorLink – Connectivity”, Version 1.1, CCC-TS-008