

---

# **Car Connectivity Consortium**

## **MirrorLink<sup>®</sup>**

---

### **Handling of Application Certificates Test Specification**

Version 1.1.10  
(CCC-TS-037)



Copyright © 2011-2015 Car Connectivity Consortium LLC  
All rights reserved  
Confidential

## 1 VERSION HISTORY

Version	Date	Comment
1.1.0	05 March 2013	Approved Version
1.1.1	18 June 2013	Approved Errata Version
1.1.2	18 March 2014	Approved Errata Version
1.1.3	22 May 2014	Approved Errata Version
1.1.4	29 May 2014	Approved Errata Version
1.1.5	04 June 2014	Approved Errata Version
1.1.6	16 October 2014	Approved Errata Version
1.1.7	10 November 2014	Approved Errata Version
1.1.8	29 January 2015	Approved Errata Version
1.1.9	18 March 2015	Approved Errata Version
1.1.10	17 June 2015	Approved Errata Version

## 3 LIST OF CONTRIBUTORS

Brakensiek, Jörg (Editor)	Microsoft Corporation
S. Murali	Samsung
Pichon, Ed	E-Qualus Partners, LLC (for CCC)

## LEGAL NOTICE

The copyright in this Specification is owned by the Car Connectivity Consortium LLC ("CCC LLC"). Use of this Specification and any related intellectual property (collectively, the "Specification"), is governed by these license terms and the CCC LLC Limited Liability Company Agreement (the "Agreement").

Use of the Specification by anyone who is not a member of CCC LLC (each such person or party, a "Member") is prohibited. The legal rights and obligations of each Member are governed by the Agreement and their applicable Membership Agreement, including without limitation those contained in Article 10 of the LLC Agreement.

CCC LLC hereby grants each Member a right to use and to make verbatim copies of the Specification for the purposes of implementing the technologies specified in the Specification to their products ("Implementing Products") under the terms of the Agreement (the "Purpose"). Members are not permitted to make available or distribute this Specification or any copies thereof to non-Members other than to their Affiliates (as defined in the Agreement) and subcontractors but only to the extent that such Affiliates and subcontractors have a need to know for carrying out the Purpose and provided that such Affiliates and subcontractors accept confidentiality obligations similar to those contained in the Agreement. Each Member shall be responsible for the observance and proper performance by such of its Affiliates and subcontractors of the terms and conditions of this Legal Notice and the Agreement. No other license, express or implied, by estoppel or otherwise, to any intellectual property rights are granted herein.

Any use of the Specification not in compliance with the terms of this Legal Notice, the Agreement and Membership Agreement is prohibited and any such prohibited use may result in termination of the applicable Membership Agreement and other liability permitted by the applicable Agreement or by applicable law to CCC LLC or any of its members for patent, copyright and/or trademark infringement.

**THE SPECIFICATION IS PROVIDED "AS IS" WITH NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, AND COMPLIANCE WITH APPLICABLE LAWS.**

Each Member hereby acknowledges that its Implementing Products may be subject to various regulatory controls under the laws and regulations of various jurisdictions worldwide. Such laws and regulatory controls may govern, among other things, the combination, operation, use, implementation and distribution of Implementing Products. Examples of such laws and regulatory controls include, but are not limited to, road safety regulations, telecommunications regulations, technology transfer controls and health and safety regulations. Each Member is solely responsible for the compliance by their Implementing Products with any such laws and regulations and for obtaining any and all required authorizations, permits, or licenses for their Implementing Products related to such regulations within the applicable jurisdictions.

Each Member acknowledges that nothing in the Specification provides any information or assistance in connection with securing such compliance, authorizations or licenses.

**NOTHING IN THE SPECIFICATION CREATES ANY WARRANTIES, EITHER EXPRESS OR IMPLIED, REGARDING SUCH LAWS OR REGULATIONS. ALL LIABILITY, INCLUDING LIABILITY FOR INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS OR FOR NONCOMPLIANCE WITH LAWS, RELATING TO USE OF THE SPECIFICATION IS EXPRESSLY DISCLAIMED. BY USE OF THE SPECIFICATION, EACH MEMBER EXPRESSLY WAIVES ANY CLAIM AGAINST CCC LLC AND ITS MEMBERS RELATED TO USE OF THE SPECIFICATION.**

CCC LLC reserve the right to adopt any changes or alterations to the Specification as it deems necessary or appropriate.

**Copyright © 2011-2015. CCC LLC.**

# TABLE OF CONTENTS

<b>VERSION HISTORY</b>	<b>2</b>
<b>LIST OF CONTRIBUTORS</b>	<b>2</b>
<b>LEGAL NOTICE</b>	<b>3</b>
<b>TABLE OF CONTENTS</b>	<b>4</b>
<b>TERMS AND ABBREVIATIONS</b>	<b>5</b>
<b>1 ABOUT</b>	<b>6</b>
<b>2 DEFINITIONS</b>	<b>7</b>
2.1 EXECUTION OF TEST CASES	7
2.2 SERVER DEFINITIONS	7
2.2.1 MirrorLink Server Connect	7
2.2.2 MirrorLink Application Installation	7
2.2.3 App Certification Status	8
2.3 CLIENT DEFINITIONS	9
<b>3 SERVER FEATURE TEST CASES</b>	<b>10</b>
3.1 APPLICATION CERTIFICATE RETRIEVAL	10
3.1.1 SR/APPCERT/HTTP/HttpErrorResponse	10
3.1.2 SR/APPCERT/HTTP/NonMlApp	11
3.1.3 SR/APPCERT/HTTP/HttpOkResponseRetry	11
3.1.4 SR/APPCERT/HTTP/HttpOkResponseNoRetry	13
3.2 CERTIFICATE REVOCATION	14
3.2.1 SR/APPCERT/OCSP/FailureNoRetry	14
3.2.2 SR/APPCERT/OCSP/FailureQueryRetry	14
3.2.3 SR/APPCERT/OCSP/FailureGraceRetry	15
3.2.4 SR/APPCERT/OCSP/ZeroQueryPeriod	16
3.2.5 SR/APPCERT/OCSP/Query	17
3.2.6 SR/APPCERT/OCSP/RestrictedGrace	18
3.2.7 SR/APPCERT/OCSP/NonRestrictedGrace	20
3.2.8 SR/APPCERT/OCSP/PostGrace	22
3.2.9 SR/APPCERT/OCSP/QueryPeriodUpdate	24
3.3 UPDATE	25
3.3.1 SR/APPCERT/UPDATE/AppUpdateWithCert	25
3.3.2 SR/APPCERT/UPDATE/AppUpdateNoCert	26
3.3.3 SR/APPCERT/UPDATE/CertUpdateFailure	27
<b>4 CLIENT FEATURE TEST CASES</b>	<b>29</b>
4.1 CERTIFIED APPLICATIONS	29
4.1.1 CL/APPCERT/APP/LaunchBaseCertifiedApplication	29
4.1.2 CL/APPCERT/APP/LaunchDriveCertifiedApplication	29
<b>5 REFERENCES</b>	<b>31</b>

## 1 TERMS AND ABBREVIATIONS

2	ACMS	Application Certification Management System
3	ACMS-TS	Application Certification Management System – Test System
4	BT	Bluetooth
5	CTS	Conformance Test System
6	ML	MirrorLink
7	RFB	Remote Framebuffer
8	UPnP	Universal Plug and Play
9	USB	Universal Serial Bus
10	VNC	Virtual Network Computing

12 MirrorLink is a registered trademark of Car Connectivity Consortium LLC

13 Bluetooth is a registered trademark of Bluetooth SIG Inc.

14 RFB and VNC are registered trademarks of RealVNC Ltd.

15 UPnP is a registered trademark of UPnP Forum.

16 Other names or abbreviations used in this document may be trademarks of their respective owners.

# 1 ABOUT

This document specifies all MirrorLink protocol test cases for handling application certificates.

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

Note: To maintain system security, for certification testing purposes, the DUT must be configured to accept certificates and OCSP responses signed by the ACMS-TS root certificate. See [2] for additional information

### 2.2 Server Definitions

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

#### 2.2.1 MirrorLink Server Connect

This definition contains all necessary steps to make an UPnP “connection” to the UPnP Server.

Step	Name	Description	Expected Result
1	UPnP Connect	Preparing the UPnP connection by making an initialization, registering the client and waiting for the device to announce itself.	
2	UPnP MSearch	Send MSearch request	<ul style="list-style-type: none"><li>• Device announces itself</li></ul>
3	UPnP Device Description	Test the service description for parsable XML formatting and availability of service types and their control and event URLs.	<ul style="list-style-type: none"><li>• Valid device description (according to specification)</li><li>• Support for TmApplication-Server:1 service</li><li>• Support for TmClientProfile:1 service</li></ul>

#### 2.2.2 MirrorLink Application Installation

The definition contains the necessary steps to install the application, retrieve the certificate and check for revocation. Application is available from the application listing.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall all required apps from the MirrorLink Server device (if installed)	<ul style="list-style-type: none"><li>• Apps not listed in application listing and certified application listings, available via the UPnP Application Server service.</li></ul>
2	MirrorLink Server Connect	See Definitions	

Step	Name	Description	Expected Result
3	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs all required app on DUT.	<ul style="list-style-type: none"> <li>All apps successfully installed on the MirrorLink Server device.</li> </ul>
4	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
5	Application revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> <li>Cert: Ok</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for each app certificate</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are drive-certified</li> <li>AppListUpdate event received</li> </ul>

1

## 2 2.2.3 App Certification Status

3 The definition contains the necessary steps to validate the application's certification status.

Step	Name	Description	Expected Result
1	UPnP App List Event	DUT sends an AppListUpdate event, if the certified app listing is expected to change.	<ul style="list-style-type: none"> <li>Application identifier listed, of applications, which have changed; multiple changed apps may be included in one or in multiple events.</li> </ul>
2	UPnP Application Listing	CTS retrieves UPnP Application listings (GetApplicationList)	<b>App is Drive-Certified:</b> <ul style="list-style-type: none"> <li>Application is listed in the received application listing</li> <li>Trust levels set to 0x00A0</li> <li>Application Certificate is available from the appCertificateURL</li> <li>App listing content matches certificate content.</li> </ul> <b>App is Base-certified only:</b> <ul style="list-style-type: none"> <li>Application is listed in the received application listing</li> <li>Trust levels set to 0x00A0</li> <li>Application Certificate is available from the appCertificateURL</li> <li>App listing content matches certificate content.</li> </ul> <b>App is not certified:</b> <ul style="list-style-type: none"> <li>Application MAY be listed in the received application listing</li> <li>If listed, trust levels set to 0x0080 or below</li> <li>If listed, app listing content matches certificate content.</li> </ul>
3	UPnP Certified Application Listing	CTS retrieves UPnP Certified Applications Listing	<b>App is Drive-Certified:</b> <ul style="list-style-type: none"> <li>Application identifier is listed in certified application listings</li> </ul>



Step	Name	Description	Expected Result
		(GetCertifiedApplicationsList)	<b>App is Base-certified only:</b> <ul style="list-style-type: none"> <li>Application identifier is listed in certified application listings</li> </ul> <b>App is not certified:</b> <ul style="list-style-type: none"> <li>Application identifier is not listed in certified application listings</li> </ul>
4	UPnP Certificate Info	CTS retrieves the Certificate Information for the new Application (GetApplicationCertificateInfo)	<b>App is Drive-Certified:</b> <ul style="list-style-type: none"> <li>Certificate info content matches certificate content.</li> <li>nonRestricted element contains list of locales.</li> <li>restricted element contains list of locales</li> </ul> <b>App is Base-certified only:</b> <ul style="list-style-type: none"> <li>Certificate info content matches certificate content.</li> <li>nonRestricted element contains list of locales;</li> <li>restricted element is empty.</li> </ul> <b>App is not certified:</b> <ul style="list-style-type: none"> <li>Certificate info content matches certificate content.</li> <li>nonRestricted element is empty.</li> <li>restricted element is empty.</li> </ul> OR <ul style="list-style-type: none"> <li>Certificate info does not exist</li> </ul>

## 2.3 Client Definitions

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

There are no Client Definitions.

## 3 SERVER FEATURE TEST CASES

### 3.1 Application Certificate Retrieval

#### 3.1.1 SR/APPCERT/HTTP/HttpErrorResponse

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server does not include the newly installed application, if it cannot retrieve the certificate. The ACMS responds with messages, which require the DUT to either retry or to not retry the request.

The test case requires a 6 CCC drive-certified test applications, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall the test application from the MirrorLink Server device (if installed)	<ul style="list-style-type: none"> <li>Test application not listed in application listing and certified application listings, available via the UPnP Application Server service.</li> </ul>
2	Manual revocation	Test Engineer conducts a manual revocation check. Requires a MirrorLink app installed on the DUT (MUST be different from App 1 - 6). OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>OCSP request received</li> </ul>
3	MirrorLink Server Connect	See Definitions	
4	Application Install	Test Engineer connects DUT to Internet. Test Engineer Installs app on DUT	<ul style="list-style-type: none"> <li>Application successfully installed on the MirrorLink Server device.</li> </ul>
5	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>App 1: Error 400</li> <li>App 2: Error 500/800</li> <li>App 3: Error 500/801</li> <li>App 4: Error 500/8xx</li> <li>App 5: Error 500/900</li> <li>App 6: Error 500/9yy</li> </ul> xx and yy are random values.	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate 1-6</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are non-certified</li> </ul>
7	Retry	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for app certificate 2 &amp; 3 &amp; 4</li> <li>No HTTP-Get request for app certificate 1 &amp; 5 &amp; 6</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>

Step	Name	Description	Expected Result
			<ul style="list-style-type: none"> <li>Request for app 3 received between 1h and 24h after the initial HTTP-Get request.</li> <li>Request for app 2 &amp; 4 received between 50% and 100% of the query period after the initial HTTP-Get request.</li> </ul>
8	Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Cert: Ok</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate 2 &amp; 3 &amp; 4</li> <li>No OCSP request for app certificate 1 &amp; 5 &amp; 6</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
9	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 &amp; 5 &amp; 6 are non-certified</li> <li>App 2 &amp; 3 &amp; 4 are drive-certified</li> <li>AppListUpdate event received</li> </ul>
10	MirrorLink Server Disconnect	See Definitions	

Table 1: Retrieval of the Application Certificate – HTTP Response Error

### 3.1.2 SR/APPCERT/HTTP/NonMIApp

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server does not checks from the ACMS whether an application certificate is available for a newly installed application, which is not MirrorLink aware.

The test case requires a connectivity to an application store.

Step	Name	Description	Expected Result
1	MirrorLink Server Connect	See Definitions	
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs non-MirrorLink app on DUT.	<ul style="list-style-type: none"> <li>Application successfully installed on the MirrorLink Server device.</li> </ul>
3	Certificate Retrieval	CTS waits for 2h	<ul style="list-style-type: none"> <li>No HTTP-Get request received</li> </ul>
4	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App is non-certified.</li> </ul>
5	MirrorLink Server Disconnect	See Definitions	

Table 2: No Retrieval of the Application Certificate for Non-MirrorLink aware Applications

### 3.1.3 SR/APPCERT/HTTP/HttpOkResponseRetry

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server validates the application certificate's expiration date, the black-listed platform versions, the platform identifier and the runtime identifier. The ACMS responds with an ok response, but the validation fails, which require the DUT to retry the request within the query period.

- 1 The test case requires a 4 CCC drive-certified test applications, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall the test application from the MirrorLink Server device (if installed)	<ul style="list-style-type: none"> <li>Test application not listed in application listing and certified application listings, available via the UpnP Application Server service.</li> </ul>
2	Manual revocation	Test Engineer conducts a manual revocation check. Requires a MirrorLink app installed on the DUT (MUST be different from App 1 - 6). OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>OCSP request received</li> </ul>
3	MirrorLink Server Connect	See Definitions	
4	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs app on DUT.	<ul style="list-style-type: none"> <li>Application successfully installed on the MirrorLink Server device.</li> </ul>
5	Certificate Retrieval	DUT performs HTTP-Get request for app certificate ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> <li>App 1: Expiration date in the past.</li> <li>App 2: All platform versions black listed.</li> <li>App 3: Wrong platform identifier</li> <li>App 4: Wrong runtime identifier</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate 1-4</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> <li>No OCSP request received</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are non-certified.</li> </ul>
7	Retry	DUT performs HTTP-GET request for app certificate ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate 1-4</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> <li>Request received between 50% and 100% of the query period after the initial HTTP-Get request.</li> </ul>
8	OCSP Request	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Cert: Ok</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate 1-4</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
9	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are drive-certified.</li> <li>AppListUpdate event received</li> </ul>
10	MirrorLink Server Disconnect	See Definitions	

- 2 Table 3: Validation of the Application Certificate – Retry Certificate Retrieval

### 3.1.4 SR/APPCERT/HTTP/HttpOkResponseNoRetry

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server validates the application identifier, the root certificate, the trust chain and the signature. In case of a mismatch the application must not be included into the certified application list. The ACMS responds with an ok response, but the validation fails, which require the DUT to not retry the request.

The test case requires a 3 CCC drive-certified test applications, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall the test application from the MirrorLink Server device (if installed)	<ul style="list-style-type: none"> <li>Test application not listed in application listing and certified application listings, available via the UpnP Application Server service.</li> </ul>
2	Manual revocation	Test Engineer conducts a manual revocation check. Requires a MirrorLink app installed on the DUT (MUST be different from App 1 - 6). OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>OCSP request received</li> </ul>
3	MirrorLink Server Connect	See Definitions	
4	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs app on DUT.	<ul style="list-style-type: none"> <li>Application successfully installed on the MirrorLink Server device.</li> </ul>
5	Certificate Retrieval	DUT performs HTTP-GET request for app certificate ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> <li>App 1: Wrong App identifier</li> <li>App 2: Wrong intermediate certificate signature</li> <li>App 3: Wrong app certificate signature</li> <li>App 4: Wrong intermediate CA issuer common name (CN)</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate 1-4</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All app are non-certified.</li> </ul>
7	Certificate Retrieval	CTS waits for 2h	<ul style="list-style-type: none"> <li>No HTTP-Get request received</li> <li>No OCSP request received</li> </ul>
8	MirrorLink Server Disconnect	See Definitions	

Table 4: Validation of the Application Certificate – No Retry Certificate Retrieval

## 3.2 Certificate Revocation

### 3.2.1 SR/APPCERT/OCSP/FailureNoRetry

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server checks from the ACMS whether an application certificate has been revoked. The ACMS responds with error messages, which require the DUT to not retry the request.

The test case requires a 4 CCC drive-certified test applications, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	MirrorLink App Installation	See definitions	
2	Wait for Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> <li>Cert 1: Unknown</li> <li>Cert 2: Malformed request</li> <li>Cert 3: Sig required</li> <li>Cert 4: Unauthorized</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for each app certificate</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
3	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are non-certified</li> </ul>
4	Application certificate revocation	CTS waits for 2h	<ul style="list-style-type: none"> <li>No OCSP request received</li> </ul>
5	MirrorLink Server Disconnect	See Definitions	

Table 5: Revocation of the Application Certificate – No OCSP retry

### 3.2.2 SR/APPCERT/OCSP/FailureQueryRetry

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server checks from the ACMS whether an application certificate has been revoked. The ACMS responds with error messages, which require the DUT to retry the request within the query period.

The test case requires a 4 CCC drive-certified test applications, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	MirrorLink App Installation	See definitions	
2	Wait for Application certificate revocation	While CTS waits for the expiration of the restricted grace period (2.5h): DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Query: 1h</li> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for each app certificate</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> <li>OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>

Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>• Cert 1: try Later</li> <li>• Cert 2: Wrong nonce</li> <li>• Cert 3: Wrong intermediate certificate signature</li> <li>• Cert 4: Wrong application certificate signature</li> </ul>	
3	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• All apps are base-certified</li> <li>• <code>AppListUpdate</code> event received</li> </ul>
4	Wait for Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> <li>• Cert: Good</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for each app certificates</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
5	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• All apps are drive-certified</li> <li>• <code>AppListUpdate</code> event received</li> </ul>
6	MirrorLink Server Disconnect	See Definitions	

Table 6: Revocation of the Application Certificate – OCSP retry in Query Period

### 3.2.3 SR/APPCERT/OCSP/FailureGraceRetry

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server checks from the ACMS whether an application certificate has been revoked. The ACMS responds with error messages, which require the DUT to retry the request within the grace period.

The test case requires a 1 CCC drive-certified test application, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	MirrorLink App Installation	See definitions	
2	Wait for Application certificate revocation	While CTS waits for the expiration of the restricted grace period (2.5h): DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> <li>• Cert: internal Error</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for each app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
3	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App is base-certified</li> <li>• <code>AppListUpdate</code> event received</li> </ul>
4	Wait for Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Query: 1h</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for each app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>

Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>R-Grace: 2h</li> <li>NR-Grace: 3h</li> <li>Cert: Good</li> </ul>	<ul style="list-style-type: none"> <li>OCSP request received between 50% and 100% of the restricted grace period after last OCSP request.</li> </ul>
5	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>All apps are drive-certified</li> <li>AppListUpdate event received</li> </ul>
6	MirrorLink Server Disconnect	See Definitions	

Table 7: Revocation of the Application Certificate – OCSP retry in Grace Period

### 3.2.4 SR/APPCERT/OCSP/ZeroQueryPeriod

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server does a revocation check within the query period. As the query period is set to zero, the revocation check is done with every MirrorLink Connection Setup.

The test case requires a test application, which driver-level certified from the CCC to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall the test application from the MirrorLink Server device (if installed)	Test application not listed in application listing and certified application listings, available via the UPnP Application Server service.
2	MirrorLink Server Connect	See Definitions	
3	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs app on DUT.	Application successfully installed on the MirrorLink Server device.
4	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
5	Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Query: 0h</li> <li>R-Grace: 10h</li> <li>NR-Grace: 20h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App is drive-certified</li> <li>AppListUpdate event received</li> </ul>
7	MirrorLink Server Disconnect	See Definitions	
8	MirrorLink Server Connect	See Definitions	
9	Application certificate revocation	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Query: 0h</li> <li>R-Grace: 10h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>



Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>NR-Grace: 20h</li> </ul>	
10	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App is drive-certified.</li> </ul>
11	MirrorLink Server Disconnect	See Definitions	

### 3.2.5 SR/APPCERT/OCSP/Query

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server manages the ACMS interface correctly, for 3 main revocation check use cases: Ok, Update, and Revoke, when staying within the query period.

The test case requires a 3 CCC drive-certified applications, to be available for installation on the DUT.

- App 1: ACMS MUST always respond with OCSP "Ok" results.
- App 2: ACMS MUST change its OCSP response from "Ok" to "Update" at a specific time.
- App 3: ACMS MUST change its OCSP response from "Ok" to "Revoke" at a specific time.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall test apps from MirrorLink Server device (if installed)	
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs apps 1, 2 and 3 on DUT.	Application successfully installed on the MirrorLink Server device.
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificates 1, 2 & 3. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
4	Application certificate revocation	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"> <li>Cert 1: Ok</li> <li>Cert 2: Ok</li> <li>Cert 3: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for each app certificate</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
5	MirrorLink Server Connect	See Definitions	
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is drive-certified.</li> <li>App 2 is drive-certified.</li> <li>App 3 is drive-certified.</li> </ul>
7	Power-cycle the device	Test Engineer <ul style="list-style-type: none"> <li>Switch off DUT.</li> <li>Switch on DUT</li> <li>Connect Wi-Fi</li> </ul>	
8	Wait for Revocation Check	DUT performs OCSP request for app certificates 1, 2 & 3.	<ul style="list-style-type: none"> <li>No HTTP-Get request received.</li> <li>Single OCSP request for app certificate 1,2 &amp; 3</li> </ul>

Step	Name	Description	Expected Result
		OCSP response: <ul style="list-style-type: none"> <li>• Cert 1: Ok</li> <li>• Cert 2: Update</li> <li>• Cert 3: Revoke</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
9	Certificate Retrieval	DUT performs HTTP-Get request for app certificate 2. ACMS response: <ul style="list-style-type: none"> <li>• App 2: Error 200</li> <li>• App 3: Error 500/900</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request for app 1</li> <li>• Single HTTP-Get request for app 2</li> <li>• Single HTTP-Get request for app 3 (optional)</li> <li>• Correct HTTP-Get request format</li> <li>• Correct app identifier value</li> </ul>
10	Application certificate revocation	DUT performs Revocation Check for app 2. OCSP response: <ul style="list-style-type: none"> <li>• Cert 2: Ok</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for app certificate 2</li> <li>• No OCSP request for app certificate 1 &amp; 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>
11	MirrorLink Server Connect	See Definitions	
12	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App 1 is drive-certified.</li> <li>• App 2 is drive-certified.</li> <li>• App 3 is non-certified.</li> </ul>
13	Reboot the device	Test Engineer <ul style="list-style-type: none"> <li>• SW Reboot the DUT.</li> <li>• Connect Wi-Fi</li> </ul>	
14	Wait for Revocation Check	DUT performs Revocation Check for test applications 1 & 2. OCSP response: <ul style="list-style-type: none"> <li>• Cert 1: Ok</li> <li>• Cert 2: Ok</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate 1 &amp; 2</li> <li>• No OCSP request for app certificate 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
15	MirrorLink Server Connect	See Definitions	
16	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App 1 is drive-certified.</li> <li>• App 2 is drive-certified.</li> <li>• App 3 is non-certified.</li> </ul>
17	MirrorLink Server Disconnect	See Definitions	

Table 8: Long Run AMCS Test – Query Period

### 3.2.6 SR/APPCERT/OCSP/RestrictedGrace

Requirement: MANDATORY

Condition: None

- 1 Test Case verifies that the MirrorLink Server manages the ACMS interface correctly, for 3 main revocation
- 2 check use cases: Ok, Update, and Revoke, when running into the restricted grace period.
- 3 The test case requires a 3 test applications, which driver-level certified from the CCC to be available for
- 4 installation on the DUT.
- 5 - App 1: ACMS MUST always respond with OCSP "Ok" results.
- 6 - App 2: ACMS MUST change its OCSP response from "Ok" to "Update" at a specific time.
- 7 - App 3: ACMS MUST change its OCSP response from "Ok" to "Revoke" at a specific time.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall test apps from the MirrorLink Server device (if installed)	
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs apps 1, 2 and 3 on DUT.	Application successfully installed on the MirrorLink Server device.
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificates 1, 2 & 3. ACMS response: <ul style="list-style-type: none"><li>• Error 200</li></ul>	<ul style="list-style-type: none"><li>• Single HTTP-Get request for each app certificate</li><li>• Correct HTTP-Get request format</li><li>• Correct app identifier value</li></ul>
4	Application certificate revocation	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"><li>• Cert 1: Ok</li><li>• Cert 2: Ok</li><li>• Cert 3: Ok</li><li>• Query: 2h</li><li>• R-Grace: 6h</li><li>• NR-Grace: 12h</li></ul>	<ul style="list-style-type: none"><li>• Single OCSP request for app certificate 1, 2 &amp; 3</li><li>• Correct OCSP request format</li><li>• Correct certificate identifier value</li></ul>
5	Power-cycle the device	Test Engineer <ul style="list-style-type: none"><li>• Switch off DUT.</li><li>• Wait 4h (+/- 1h)</li><li>• Switch on DUT (no Wi-Fi connection).</li><li>• MirrorLink Server Connect (see definitions)</li></ul>	
6	App Certification Status	See Definitions	<ul style="list-style-type: none"><li>• App 1 is drive-certified.</li><li>• App 2 is drive-certified.</li><li>• App 3 is drive-certified.</li></ul>
7	Power-cycle the device	Test Engineer <ul style="list-style-type: none"><li>• Switch off DUT.</li><li>• Switch on DUT</li><li>• Connect Wi-Fi</li></ul>	
8	Wait for Revocation Check	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"><li>• Cert 1: Ok</li><li>• Cert 2: Update</li><li>• Cert 3: Revoke</li><li>• Query: 2h</li></ul>	<ul style="list-style-type: none"><li>• No HTTP-Get request received.</li><li>• Single OCSP request for app certificate 1,2 &amp; 3</li><li>• Correct OCSP request format</li><li>• Correct certificate identifier value</li><li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li></ul>

Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	
9	Certificate Retrieval	DUT performs HTTP-Get request for app certificate 2. ACMS response: <ul style="list-style-type: none"> <li>App 2: Error 200</li> <li>App 3: Error 500/900</li> </ul>	<ul style="list-style-type: none"> <li>No HTTP-Get request for app 1</li> <li>Single HTTP-Get request for app 2</li> <li>Single HTTP-Get request for app 3 (optional)</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
10	Application certificate revocation	DUT performs Revocation Check for app 2. OCSP response: <ul style="list-style-type: none"> <li>Cert 2: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate 2</li> <li>No OCSP request for app certificate 1 &amp; 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
11	MirrorLink Server Connect	See Definitions	
12	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is drive-certified.</li> <li>App 2 is drive-certified.</li> <li>App 3 is non-certified.</li> </ul>
13	MirrorLink Server Disconnect	See Definitions	
14	Wait for Revocation Check	DUT performs Revocation Check for test applications 1 & 2. OCSP response: <ul style="list-style-type: none"> <li>Cert 1: Ok</li> <li>Cert 2: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>No HTTP-Get request received.</li> <li>Single OCSP request for app certificate 1 &amp; 2</li> <li>No OCSP request for app certificate 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> <li>OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
15	MirrorLink Server Connect	See Definitions	
16	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is drive-certified.</li> <li>App 2 is drive-certified.</li> <li>App 3 is non-certified.</li> </ul>
17	MirrorLink Server Disconnect	See Definitions	

Table 9: Long Run AMCS Test – Restricted Grace Period

### 3.2.7 SR/APPCERT/OCSP/NonRestrictedGrace

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server manages the ACMS interface correctly, for 3 main revocation check use cases: Ok, Update, and Revoke, when running into the non-restricted grace period.

The test case requires a 3 test applications, which driver-level certified from the CCC to be available for installation on the DUT.

- App 1: ACMS MUST always respond with OCSP "Ok" results.
- App 2: ACMS MUST change its OCSP response from "Ok" to "Update" at a specific time.

- 1 - App 3: ACMS MUST change its OCSP response from "Ok" to "Revoke" at a specific time.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall test apps from the MirrorLink Server device (if installed)	
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs apps 1, 2 and 3 on DUT.	Application successfully installed on the MirrorLink Server device.
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificates 1, 2 & 3. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request for each app certificate</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> </ul>
4	Application certificate revocation	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"> <li>Cert 1: Ok</li> <li>Cert 2: Ok</li> <li>Cert 3: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate 1, 2 &amp; 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
5	Power-cycle the device	Test Engineer <ul style="list-style-type: none"> <li>Switch off DUT.</li> <li>Wait 9h (+/- 2h)</li> <li>Switch on DUT (no Wi-Fi connection).</li> <li>MirrorLink Server Connect (see definitions)</li> </ul>	
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is base-certified.</li> <li>App 2 is base-certified.</li> <li>App 3 is base-certified.</li> </ul>
7	Power-cycle the device	Test Engineer <ul style="list-style-type: none"> <li>Switch off DUT.</li> <li>Switch on DUT</li> <li>Connect Wi-Fi</li> </ul>	
8	Wait for Revocation Check	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"> <li>Cert 1: Ok</li> <li>Cert 2: Update</li> <li>Cert 3: Revoke</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>No HTTP-Get request received.</li> <li>Single OCSP request for app certificate 1,2 &amp; 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> <li>OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
9	Certificate Retrieval	DUT performs HTTP-Get request for app certificate 2. ACMS response: <ul style="list-style-type: none"> <li>App 2: Error 200</li> </ul>	<ul style="list-style-type: none"> <li>No HTTP-Get request for app 1</li> <li>Single HTTP-Get request for app 2</li> <li>Single HTTP-Get request for app 3 (optional)</li> <li>Correct HTTP-Get request format</li> </ul>

Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>App 3: Error 500/900</li> </ul>	<ul style="list-style-type: none"> <li>Correct app identifier value</li> </ul>
10	Application certificate revocation	DUT performs Revocation Check for app 2. OCSP response: <ul style="list-style-type: none"> <li>Cert 2: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate 2</li> <li>No OCSP request for app certificate 1 &amp; 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
11	MirrorLink Server Connect	See Definitions	
12	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is drive-certified.</li> <li>App 2 is drive-certified.</li> <li>App 3 is non-certified.</li> </ul>
13	MirrorLink Server Disconnect	See Definitions	
14	Wait for Revocation Check	DUT performs Revocation Check for test applications 1 & 2. OCSP response: <ul style="list-style-type: none"> <li>Cert 1: Ok</li> <li>Cert 2: Ok</li> <li>Query: 2h</li> <li>R-Grace: 6h</li> <li>NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>No HTTP-Get request received.</li> <li>Single OCSP request for app certificate 1 &amp; 2</li> <li>No OCSP request for app certificate 3</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> <li>OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
15	MirrorLink Server Connect	See Definitions	
16	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App 1 is drive-certified.</li> <li>App 2 is drive-certified.</li> <li>App 3 is non-certified.</li> </ul>
17	MirrorLink Server Disconnect	See Definitions	

Table 10: Long Run AMCS Test – Non-Restricted Grace Period

### 3.2.8 SR/APPCERT/OCSP/PostGrace

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server manages the ACMS interface correctly, for 3 main revocation check use cases: Ok, Update, and Revoke, when running beyond the non-restricted grace period.

The test case requires a test applications, which driver-level certified from the CCC to be available for installation on the DUT.

- Test App 1: ACMS MUST always respond with OCSP "Ok" results.
- Test App 2: ACMS MUST change its OCSP response from "Ok" to "Update" at a specific time.
- Test App 3: ACMS MUST change its OCSP response from "Ok" to "Revoke" at a specific time.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall test apps from the MirrorLink Server device (if installed)	

Step	Name	Description	Expected Result
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs apps 1, 2 and 3 on DUT.	Application successfully installed on the MirrorLink Server device.
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificates 1, 2 & 3. ACMS response: <ul style="list-style-type: none"> <li>• Error 200</li> </ul>	<ul style="list-style-type: none"> <li>• Single HTTP-Get request for each app certificate</li> <li>• Correct HTTP-Get request format</li> <li>• Correct app identifier value</li> </ul>
4	Application certificate revocation	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"> <li>• Cert 1: Ok</li> <li>• Cert 2: Ok</li> <li>• Cert 3: Ok</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for app certificate 1, 2 &amp; 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>
5	Power-cycle the device	Test Engineer <ul style="list-style-type: none"> <li>• Switch off DUT.</li> <li>• Wait 18h (+/- 4h)</li> <li>• Switch on DUT (no Wi-Fi connection).</li> <li>• MirrorLink Server Connect (see definitions)</li> </ul>	
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App 1 is non-certified.</li> <li>• App 2 is non-certified.</li> <li>• App 3 is non-certified.</li> </ul>
7	Power-cycle the device	Test Engineer <ul style="list-style-type: none"> <li>• Switch off DUT.</li> <li>• Switch on DUT</li> <li>• Connect Wi-Fi</li> </ul>	
8	Wait for Revocation Check	DUT performs OCSP request for app certificates 1, 2 & 3. OCSP response: <ul style="list-style-type: none"> <li>• Cert 1: Ok</li> <li>• Cert 2: Update</li> <li>• Cert 3: Revoke</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate 1,2 &amp; 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
9	Certificate Retrieval	DUT performs HTTP-Get request for app certificate 2. ACMS response: <ul style="list-style-type: none"> <li>• App 2: Error 200</li> <li>• App 3: Error 500/900</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request for app 1</li> <li>• Single HTTP-Get request for app 2</li> <li>• Single HTTP-Get request for app 3 (optional)</li> <li>• Correct HTTP-Get request format</li> <li>• Correct app identifier value</li> </ul>
10	Application certificate revocation	DUT performs Revocation Check for app 2. OCSP response:	<ul style="list-style-type: none"> <li>• Single OCSP request for app certificate 2</li> </ul>

Step	Name	Description	Expected Result
		<ul style="list-style-type: none"> <li>• Cert 2: Ok</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• No OCSP request for app certificate 1 &amp; 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>
11	MirrorLink Server Connect	See Definitions	
12	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App 1 is drive-certified.</li> <li>• App 2 is drive-certified.</li> <li>• App 3 is non-certified.</li> </ul>
13	MirrorLink Server Disconnect	See Definitions	
14	Wait for Revocation Check	DUT performs Revocation Check for test applications 1 & 2. OCSP response: <ul style="list-style-type: none"> <li>• Cert 1: Ok</li> <li>• Cert 2: Ok</li> <li>• Query: 2h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 12h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate 1 &amp; 2</li> <li>• No OCSP request for app certificate 3</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
15	MirrorLink Server Connect	See Definitions	
16	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App 1 is drive-certified.</li> <li>• App 2 is drive-certified.</li> <li>• App 3 is non-certified.</li> </ul>
17	MirrorLink Server Disconnect	See Definitions	

Table 11: Long Run AMCS Test – Post-Grace Period

### 3.2.9 SR/APPCERT/OCSP/QueryPeriodUpdate

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server manages the ACMS interface correctly, when the query period is updated.

The test case requires a CCC drive-certified application, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	Application Uninstall	Uninstall test apps from MirrorLink Server device (if installed)	
2	Application Install	Test Engineer connects DUT to Internet. Test Engineer installs app on DUT.	Application successfully installed on the MirrorLink Server device.
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>• Error 200</li> </ul>	<ul style="list-style-type: none"> <li>• Single HTTP-Get request for app certificate</li> <li>• Correct HTTP-Get request format</li> <li>• Correct app identifier value</li> </ul>
4	Application certificate revocation	DUT performs OCSP request for app certificate.	<ul style="list-style-type: none"> <li>• Single OCSP request for each app certificate</li> </ul>



Step	Name	Description	Expected Result
		OCSP response: <ul style="list-style-type: none"> <li>• Cert: Ok</li> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>
5	Wait for Revocation Check	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Cert: Ok</li> <li>• Query: 3h</li> <li>• R-Grace: 6h</li> <li>• NR-Grace: 9h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
6	Wait for Revocation Check	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Cert: Ok</li> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
7	Wait for Revocation Check	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Cert: Ok</li> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>• No HTTP-Get request received.</li> <li>• Single OCSP request for app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• OCSP request received between 50% and 100% of the query period after last OCSP request.</li> </ul>
8	MirrorLink Server Connect	See Definitions	
9	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App is drive-certified.</li> </ul>
10	MirrorLink Server Disconnect	See Definitions	

Table 12: Long Run AMCS Test – Query Period Update

## 3.3 Update

### 3.3.1 SR/APPCERT/UPDATE/AppUpdateWithCert

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server checks from the ACMS whether an application certificate is available for an update of an already installed application. The new app certificate belonging to the updated app version, is available, and can be installed with the first attempt.

The test case requires a CCC drive-certified application in two versions, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	MirrorLink Application Installation	See Definition	

Step	Name	Description	Expected Result
2	MirrorLink Application Update	Test Engineer updates the app on DUT	<ul style="list-style-type: none"> <li>Application successfully updated on the MirrorLink Server device.</li> </ul>
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request</li> <li>Correct HTTP-Get request format</li> <li>Correct updated app identifier value</li> </ul>
4	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>Updated App is drive-certified.</li> <li>AppListUpdate event received</li> </ul>
5	MirrorLink Server Disconnect	See Definitions	

Table 13: Retrieval of the Application Certificate - AppUpdate With Cert

### 3.3.2 SR/APPCERT/UPDATE/AppUpdateNoCert

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server checks from the ACMS whether an application certificate is available for an update of an already installed application. The new app certificate belonging to the updated app version, is initially not available, and can only be installed with the first retry.

The test case requires a CCC drive-certified application in two versions, to be available for installation on the DUT.

Step	Name	Description	Expected Result
1	MirrorLink Application Installation	See Definition	
2	MirrorLink Application Update	Test Engineer updates the app on DUT	<ul style="list-style-type: none"> <li>Application successfully updated on the MirrorLink Server device.</li> </ul>
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 500/800</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request</li> <li>Correct HTTP-Get request format</li> <li>Correct updated app identifier value</li> </ul>
4	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>Updated App is non-certified.</li> <li>AppListUpdate event received</li> </ul>
5	Retry	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>Error 200</li> </ul>	<ul style="list-style-type: none"> <li>Single HTTP-Get request</li> <li>Correct HTTP-Get request format</li> <li>Correct app identifier value</li> <li>Request received between 50% and 100% of the query period after the initial HTTP-Get request.</li> </ul>
6	OCSP Request	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>Cert: Ok</li> </ul>	<ul style="list-style-type: none"> <li>Single OCSP request for app certificate</li> <li>Correct OCSP request format</li> <li>Correct certificate identifier value</li> </ul>
7	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>App is drive-certified.</li> <li>AppListUpdate event received</li> </ul>
8	MirrorLink Server Disconnect	See Definitions	

Table 14: Retrieval of the Application Certificate - AppUpdate Without Cert

### 3.3.3 SR/APPCERT/UPDATE/CertUpdateFailure

Requirement: MANDATORY

Condition: None

Test Case verifies that the MirrorLink Server excludes the application from the certified application listing after the existing certificate is flagged as updated, but the retrieval of the new certificate fails during the grace period.

The application loses its drive certification after the expiration of the restricted grace period and the base certification after the expiration of the non-restricted grace period respectively..

Step	Name	Description	Expected Result
1	MirrorLink Application Installation	See Definition	
2	Application certificate revocation	DUT executes Revocation Check. OCSP response: <ul style="list-style-type: none"> <li>• Cert: Update</li> <li>• Query: 1h</li> <li>• R-Grace: 2h</li> <li>• NR-Grace: 3h</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for app</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> <li>• Sent to ACMS between 50% and 100% of the query period</li> </ul>
3	Certificate Retrieval	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>• Error 500/800</li> </ul>	<ul style="list-style-type: none"> <li>• HTTP-Get request to ACMS</li> <li>• Correct HTTP message format</li> <li>• Correct identifier values</li> </ul>
4	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App is drive-certified.</li> </ul>
5	Wait for restricted Grace Period to expire	CTS waits for 2.5h.  DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>• Error 500/800</li> </ul>	<ul style="list-style-type: none"> <li>• HTTP-Get request to ACMS</li> <li>• Correct HTTP message format</li> <li>• Correct identifier values</li> <li>• HTTP-Get request sent to ACMS between 50% and 100% of the query period after last request.</li> </ul>
6	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App is base-certified.</li> <li>• <code>AppListUpdate</code> event received</li> </ul>
7	Wait for non-restricted Grace Period to expire	CTS waits for 1h.  DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>• Error 500/800</li> </ul>	<ul style="list-style-type: none"> <li>• HTTP-Get request to ACMS</li> <li>• Correct HTTP message format</li> <li>• Correct identifier values</li> <li>• HTTP-Get request sent to ACMS between 50% and 100% of the query period after last request.</li> </ul>
8	App Certification Status	See Definitions	<ul style="list-style-type: none"> <li>• App is non-certified.</li> <li>• <code>AppListUpdate</code> event received</li> </ul>
9	Retry	DUT performs HTTP-Get request for app certificate. ACMS response: <ul style="list-style-type: none"> <li>• Error 200</li> </ul>	<ul style="list-style-type: none"> <li>• Single HTTP-Get request</li> <li>• Correct HTTP-Get request format</li> <li>• Correct app identifier value</li> <li>• Request received between 50% and 100% of the query period after the initial HTTP-Get request.</li> </ul>
10	OCSP Request	DUT performs OCSP request for app certificate. OCSP response: <ul style="list-style-type: none"> <li>• Cert: Ok</li> </ul>	<ul style="list-style-type: none"> <li>• Single OCSP request for app certificate</li> <li>• Correct OCSP request format</li> <li>• Correct certificate identifier value</li> </ul>

Step	Name	Description	Expected Result
11	App Certification Status	See Definitions	<ul style="list-style-type: none"><li>• App is drive-certified.</li><li>• AppListUpdate event received</li></ul>
12	MirrorLink Server Disconnect	See Definitions	

Table 15: Certificate Update – Certificate Update Failure

Approved

## 4 CLIENT FEATURE TEST CASES

### 4.1 Certified Applications

#### 4.1.1 CL/APPCERT/APP/LaunchBaseCertifiedApplication

Requirement: CONDITIONAL

Condition: MirrorLink Client supports Park Mode

Tests if the MirrorLink Client can launch and display base-certified applications in park mode.

Step	Name	Description	Expected Result
1	UPnP Control Point Connect	See definitions in [3]	
2	UPnP Action Get Application List	CTS provides a list of the following applications: <ul style="list-style-type: none"> <li>• 2 standard base-certified apps</li> <li>• 1 base-certified app, with enabled reserved content category bit.</li> <li>• 1 base-certified app, with reserved application category value.</li> <li>• 1 base-certified app, with enabled video content category bit.</li> </ul>	<ul style="list-style-type: none"> <li>• Invoke Get Application List action</li> </ul>
3	UPnP Action Get Certified Applications List	Test Engineer MAY execute steps to trigger this action on the DUT	<ul style="list-style-type: none"> <li>• Invoke Get Certified Applications List action</li> </ul>
4	Enable Park Mode	Test engineer enables park mode on the DUT.	<ul style="list-style-type: none"> <li>• All application accessible on the DUT</li> <li>• Park Mode enabled</li> </ul>
5	UPnP Action Launch Application	Test Engineer MUST launch all certified applications one-by-one.	<ul style="list-style-type: none"> <li>• Invoke Launch Application action</li> <li>• AppID is known</li> </ul>
6	VNC Session	VNC Context Information contains application and content category values defined above.	<ul style="list-style-type: none"> <li>• VNC session established</li> <li>• User Interface is shown</li> <li>• No Framebuffer Blocking Notification message received</li> </ul>

Table 16: Launch Base Certified Applications

#### 4.1.2 CL/APPCERT/APP/LaunchDriveCertifiedApplication

Requirement: CONDITIONAL

Condition: MirrorLink Client supports Drive Mode

Tests if the MirrorLink Client can launch and display drive-certified applications in drive mode.

Step	Name	Description	Expected Result
1	UPnP Control Point Connect	See definitions in [3]	

Step	Name	Description	Expected Result
2	UPnP Action Get Application List	CTS provides a list of the following applications: <ul style="list-style-type: none"> <li>• 2 standard drive-certified apps</li> <li>• 1 drive -certified app, with enabled reserved content category bit.</li> <li>• 1 drive -certified app, with reserved application category value.</li> <li>• 1 drive -certified app, with enabled video content category bit.</li> <li>• 1 drive-certified app, with drive mode content category bit disabled.</li> </ul>	<ul style="list-style-type: none"> <li>• Invoke Get Application List action</li> </ul>
3	UPnP Action Get Certified Applications List	Test Engineer MAY execute steps to trigger this action on the DUT	<ul style="list-style-type: none"> <li>• Invoke Get Certified Applications List action</li> </ul>
4	Enable Drive Mode	Test engineer enables drive mode on the DUT.	<ul style="list-style-type: none"> <li>• All application accessible on the DUT</li> <li>• Drive Mode enabled</li> </ul>
5	UPnP Action Launch Appli- cation	Test Engineer MUST launch all certified applications one-by-one.	<ul style="list-style-type: none"> <li>• Invoke Launch Application action</li> <li>• AppID is known</li> </ul>
6	VNC Session	VNC Context Information contains application and content category values defined above.	<ul style="list-style-type: none"> <li>• VNC session established</li> <li>• User Interface is shown</li> <li>• No Framebuffer Blocking Notification message received</li> </ul>

Table 17: Launch Drive Certified Applications

## 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 – Handling of Application Certificates”, Version 1.1; CCC-TS-036
- [3] Car Connectivity Consortium, “MirrorLink – UPnP Server Device Test Specification”, Version 1.1, CCC-TS-031

Approved