

CableLabs[®]

Certification Wave Requirements and Guidelines

April 2013 Revision 40

These Guidelines are for devices built to the Specifications for DOCSIS[®], PacketCable[™] and OpenCable[™]. For “verification” guidelines applicable to Unidirectional Digital Cable Products (“Plug and Play”) devices built in accordance with FCC regulations, please see http://www.cablelabs.com/opencable/udcp/downloads/UDCP_Guidelines.pdf

Cable Television Laboratories, Inc.
858 Coal Creek Circle
Louisville, CO 80027-1266
www.cablelabs.com

© Cable Television Laboratories, Inc. 2013. All Rights Reserved
“CableLabs”, “DOCSIS”, “eDOCSIS”, “PacketCable”, “OCAP”, “CableCARD”, “OpenCable” and “tru2way” are trademarks of Cable Television Laboratories, Inc. All other trademarks are the property of their respective owners.

TABLE OF CONTENTS

OVERVIEW	4
1 PRODUCT SUBMISSION CATEGORIES	5
1.1 CERTIFICATION/QUALIFICATION SUBMISSIONS	5
1.2 RECERTIFICATION/REQUALIFICATION SUBMISSIONS	5
1.3 VERIFIED FOR INTEROPERABILITY	6
1.4 PAPER CERTIFICATION FOR OPENCABLE DEVICES	6
1.5 “SELF CERTIFICATION” FOR OPENCABLE DEVICES	7
1.6 PRACTICE RUN SUBMISSIONS	7
1.6.1 <i>Converting from Certification/Qualification or Recertification/Requalification to Practice Run</i>	7
1.7 OEM OF A CERTIFIED/QUALIFIED PRODUCT	7
1.8 INTEGRATION AND INTEROPERABILITY TESTING FOR OPENCABLE DEVICES	8
1.9 INTEROPERABILITY EVENTS	8
1.10 DEVELOPMENT LAB ACTIVITIES	8
2 SPECIAL TESTING CONSIDERATIONS	10
2.1 COMBINED PRODUCT CERTIFICATION	10
2.2 CORE TESTING	10
2.3 RESULTS DURING THE WAVE	10
2.4 RESUBMISSION OF FAILED DEVICES	11
3 APPEALS PROCESS	12
4 SUBMISSION REQUIREMENTS	13
4.1 SPECIFICATION COMPLIANCE REQUIREMENTS	13
4.2 PRE-SUBMISSION REQUIREMENTS	13
4.2.1 <i>Integration and Interoperability Testing for OpenCable Devices</i>	13
4.3 SCHEDULE	13
4.4 FEES	13
4.5 PRODUCT	14
4.5.1 <i>Products with Battery Power</i>	14
4.5.2 <i>Special considerations for PacketCable Vendors</i>	14
4.5.3 <i>Number of units required for Certification and Retention</i>	14
4.6 LABELING AND PRODUCT IDS	17
4.7 PRODUCT DELIVERY REQUIREMENTS	22
4.8 SUBMISSION DOCUMENTATION	22
4.8.1 <i>Submission Information provided via web-form</i>	22
4.8.2 <i>Additional Submission Information provided via web-form upload utility</i>	22
5 DOCSIS SUBMISSION REQUIREMENTS	26
5.1 DOCSIS PRODUCTS	26
5.1.1 <i>DOCSIS 3.0, 2.0, or 1.1 Cable Modem Submissions</i>	26
5.1.2 <i>eDOCSIS Products</i>	26
5.1.3 <i>DSG eCM Requirements</i>	26
5.1.4 <i>Embedded Cable Modem Modules (eCMMs) and eCMM-Based Devices</i>	27
5.1.5 <i>Wireless Devices</i>	28
5.1.6 <i>Bridges</i>	28
5.1.7 <i>CMTS (DOCSIS only)</i>	28
5.1.8 <i>EQAM</i>	29
5.1.9 <i>DTI-Server</i>	29
5.2 SOFTWARE IMAGES AND DIGITAL CERTIFICATES	29
5.2.1 <i>DOCSIS 3.0, 2.0 or 1.1 Cable Modems</i>	29
5.2.2 <i>Additional Files for DOCSIS 3.0, 2.0 or 1.1 Cable Modems</i>	30
5.3 CMTS SUBMISSION REQUIREMENTS FOR SNMP COEXISTENCE MODES OF OPERATION AND EVENT NOTIFICATIONS	30
5.3.1 <i>CMTS Configuration</i>	30
5.3.2 <i>Default Operation for pre-3.0 DOCSIS CMTSs</i>	31
5.3.3 <i>SNMP Notifications and syslog</i>	31
5.3.4 <i>SNMP access list, if required</i>	31
5.3.5 <i>SNMPv3 Coexistence Mode</i>	31
5.3.6 <i>Notes</i>	32
5.4 DOCSIS CMCI DATA PORT VERIFICATION GUIDELINES	32

6	PACKETCABLE SUBMISSION REQUIREMENTS	33
6.1	E-MTA & E-DVA	33
6.1.1	<i>PacketCable High Definition Voice</i>	33
6.2	PACKETCABLE 1.5, PACKETCABLE MULTIMEDIA, AND PACKETCABLE RESIDENTIAL SIP TELEPHONY CERTIFICATION	33
6.3	PACKETCABLE MGC QUALIFICATION	34
6.4	ENUM-SIP ADDRESSING SERVER.....	35
7	OPENCABLE SUBMISSION REQUIREMENTS.....	36
7.1	PRODUCT DOCUMENTATION	36
7.1.1	<i>OpenCable Host Submissions:</i>	38
7.1.2	<i>OCUR Submissions</i>	39
7.1.3	<i>Tuning Adapter Submissions</i>	39
7.1.4	<i>OpenCable Host Device Self-Certification</i>	39
7.2	ADDITIONAL SUBMISSION INSTRUCTIONS	39
7.2.1	<i>Operational Code Image (OpenCable Host Device)</i>	39
7.2.2	<i>Digital Certificate Files:</i>	40
7.2.3	<i>Operational Code Image (OCUR)</i>	40
7.2.4	<i>Modes of operation for OpenCable Host Devices and the DRCA units</i>	40
7.2.5	<i>Wireless Keyboard (OpenCable Host Device)</i>	41
8	DPOE SUBMISSION REQUIREMENTS	42
8.1	DPOE PRODUCTS	42
8.1.1	<i>DPoE 1.0 ONU Submissions</i>	42
8.1.2	<i>eDOCSIS Products</i>	42
8.1.3	<i>DPoE System</i>	42
8.2	SOFTWARE IMAGES AND DIGITAL CERTIFICATES.....	42
8.2.1	<i>DPoE 1.0 ONUs:</i>	42
8.2.2	<i>Additional Files for DPoE 1.0 ONUs:</i>	43
8.3	DPOE SYSTEM SUBMISSION REQUIREMENTS FOR SNMP COEXISTENCE MODES OF OPERATION AND EVENT NOTIFICATIONS	43
8.3.1	<i>DPoE System Configuration</i>	43
8.3.2	<i>Default Operation for DPoE Systems</i>	43
8.3.3	<i>SNMP Notifications and syslog</i>	44
8.3.4	<i>SNMP access list, if required</i>	44
8.3.5	<i>Notes</i>	44
8.4	DPOE ONU CMCI DATA PORT VERIFICATION GUIDELINES	44
9	DIGITAL CERTIFICATE PROCESSES AND CERTIFICATION.....	45
9.1	OBTAINING CABLELABS DIGITAL CERTIFICATES AND CVCs	45
9.2	CABLELABS ROOT CA	45
9.3	CABLELABS CA	46
9.4	CERTIFICATE REQUIREMENTS.....	46
9.4.1	<i>Digital Certificate Necessary for DOCSIS 3.0, 2.0 and 1.1 Cable Modem Vendor</i>	46
9.4.2	<i>Digital Certificate Necessary for the PacketCable E-MTA/E-DVA</i>	46
9.4.3	<i>Digital Certificate Necessary for OpenCable Host Devices and OCAP</i>	46
9.4.4	<i>Digital Certificates Necessary for DPoE 1.0 ONU & DPoE System Devices</i>	47
9.5	DIGITAL CERTIFICATE ISSUANCE PROCESS	47
9.6	DIGITAL CERTIFICATE AUTHORIZATION AGREEMENTS (DCAAs).....	47
9.7	DIGITAL CERTIFICATE FOR THE OEM CABLE MODEMS	47
9.8	CABLELABS CERTIFIED CABLE MODEM CODE FILES	47
10	QUESTIONS.....	48
11	SUBMISSION CHECKLISTS	49

OVERVIEW

Working in cooperation with cable operators and cable equipment manufacturers, Cable Television Laboratories, Inc. ("CableLabs") has developed various specifications to facilitate the manufacture of interoperable cable devices, including cable modems, set top boxes, digital televisions, and telephony devices ("Specifications"). The Specifications, and other information, can be found at www.cablelabs.com. Interoperable devices based on common specifications facilitate consumer choice, wide spread deployment of new technologies, and lower costs to both cable operators and consumers.

The Certification process defined herein has been developed to provide cable operators, retail distributors, and consumers' confidence that Certified products interoperate with products made by other manufacturers, and that the integrity and security of the cable operators' network is maintained. Manufacturers are required to internally test their products for conformance to the Specifications. CableLabs then performs independent audit testing to verify compliance with the Specifications. Although testing is performed by the manufacturer, with audit testing by CableLabs, the benchmark for all devices is compliance with the Specifications. All Certification decisions are made by respective Certification Boards comprising technical cable operator personnel.

Certification "Waves" are scheduled throughout the year based on estimated participation and input from manufacturers. See <http://www.cablelabs.com/certqual/> for the current schedule.

The CableLabs Certification/Qualification process determines equipment compliance with the Specifications. The Certification/Qualification process does not test for performance, quality, or other subjective characteristics. Non-Consumer Premises Equipment (non-CPE) or cable network element devices (e.g., CableCARDS, CMTS) are determined to be "Qualified" rather than Certified because they are only purchased by cable operators and not the consuming public at retail. As used herein, the word "Certification" means "Qualification" for purposes of these non-CPE network products. Similarly, certain test tools and other devices that are purchased only by cable operators and may present deviations from the "full" specification may be submitted to CableLabs for testing. These devices, if approved, will be labeled "Verified for Interoperability".

A separate process of "Verification" is performed for so-called "Plug & Play" devices; also called Unidirectional Digital Cable Products, or UDCPs. Please see the [UDCP](#) area on CableLabs' website for more information.

"CableLabs Certified[®]", "CableLabs Qualified[™]" or "Verified for Interoperability" means that the device has passed a series of tests for compliance with the applicable Specification, and has thus demonstrated interoperable functionality with other CableLabs certified devices. Manufacturers are encouraged to add additional functions and features to their devices to meet the requirements of other industry specifications and standards. However, "CableLabs Certified[®]", "CableLabs Qualified[™]" or "Verified for Interoperability" should not be understood as an endorsement of these other attributes, or that the device is certified to such other specifications or standards. Such claims are solely the responsibility of the manufacturer making the additional claims. In addition, testing hereunder does not certify or indicate that the product is in conformance with FCC rules, any applicable license agreements, or the manufacturer's claims.

Unless otherwise specified the terms certification, qualification, and verification are used indistinctively in the document. Similarly, unless explicitly specified, certified, qualified, and verified all share the meaning, certification board approved.

1 PRODUCT SUBMISSION CATEGORIES

CableLabs has developed the following product submission categories to meet the needs of vendors and cable operators to speed the availability of products suitable for deployment in an end-to-end, interoperable, high-speed cable network.

1.1 Certification/Qualification Submissions

A product **MUST** be submitted for certification/qualification if any **one or more** of the following conditions apply:

- Any product that has not achieved certification/qualification status for all of the requested specification(s), including:
 - Products submitted for the first time for any of the requested specification(s).
 - Products that did not achieve certification/qualification status for any of the requested specification(s) in previous wave(s).
- Any previously Certified product that has undergone major changes that are not acceptable under Recertification option. This may include, for example, changes to power supply, hardware (silicon, tuner, active components, etc.), software, or other major changes as determined in the sole discretion of CableLabs and the Certification Boards.
- OEM products in which the hardware and/or software has changed (as appropriate).

The product must be labeled (color, logo, artwork, model number, etc.) as it will be marketed, with the model number matching the application form; and the model, SW and HW revs shown on the application must appear in the sysDescr field or “internal readout”.

1.2 Recertification/Requalification Submissions

The following sections describe the different requirements and procedures for the recertification submissions. Unless explicitly addressed below, all requirements and guidelines for regular Certification Waves and submissions apply to Recertification submissions. A product **MAY** be submitted for recertification or requalification under the following guidelines:

- Minor changes to a previously certified/qualified product may be presented to the Certification Board for consideration. Minor changes are determined through the sole discretion of CableLabs and its Certification Boards.
- The recertification submission is not associated with a particular Certification Wave, may be submitted at any time, and will be evaluated independently of the regular certification wave testing upon satisfaction of the prerequisites for application as described below.
- Recertification submissions will be considered on a case-by-case basis based upon board approval. Please contact us at se-mail@cablelabs.com regarding submission details.

The submission process for recertification is the same as for a full certification wave, with the noted fee difference.

Note that products submitted for recertification must implement the ECNs as required for the Certification Wave (see section 4.1, “Specification Compliance Requirements”).

Vendors considering a recertification submission to DOCSIS, PacketCable or DPoE must meet the same submission requirements that apply to regular submissions, re: documentation, labeling, etc., as well as a signed statement, on Vendor company letterhead, detailing any changes, and affirmatively stating that:

- Vendor has completed regression testing and has retained the test results;
- Vendor is able to provide such test results to CableLabs within one day from CableLabs’ request; and
- Based on such tests, Vendor in good faith believes that the product submitted for Recertification complies with the appropriate CableLabs’ specifications.
- The product must be labeled (color, logo, artwork, model number, etc.) as it will be marketed, with the model number matching the application form; and the model, SW and HW revs shown on the application must appear in the sysDescr field or “internal readout”.
- To request Recertification, a vendor must submit a Recertification Request and Affidavit. The request must contain the company’s name, the model number of the product, and when the product was previously certified. The affidavit, in affect a written affirmative declaration, **MUST** be signed by an Officer and the Quality Assurance Manager, must list all of the changes from when the product was last certified, and a statement that the product remains in active production.
- **In addition, Recertification submissions MUST include an “Impact Analysis” showing what, if any, differences exists between the original product and the Recertification submission. A discrepancy between the Impact Analysis and CableLabs test results is likely to result in non-certification.**

Recertification submissions MUST be complaint to current specifications including ALL applicable ECNs. Resulting changes to the original software must be part of the “Impact Analysis” document previously mentioned. CableLabs must receive the request via email at se-mail@cablelabs.com at least 14 days before Recertification submissions are received. Vendors will be notified as to whether their request has been accepted less than ten days after receipt by CableLabs. If approved, the product will be added to the CableLabs website listing of certified products. If not approved for Recertification, applicant may submit for Certification described in this section.

1.3 Verified for Interoperability

Certain CPE devices and test tools that are purchased only by cable operators may be submitted to CableLabs for testing. These devices are not eligible to become certified; instead they must be submitted to be "Verified for Interoperability." Devices accepted for such testing currently include the DSG eCMs, line power test tools, MDUs, special DPoE devices, etc. A DSG eCM is a set-top device with embedded Conditional Access (CA) that includes an embedded cable modem (eCM) that complies with the requirements of the DSG specification.

Products that are “Verified for Interoperability” undergo a series of tests for compliance with the applicable Specification and demonstration of interoperable functionality with other CableLabs Certified, Qualified, and/or Verified for Interoperability devices. Functionality that is outside of the applicable Specification is not tested.

The submitted product must be labeled (color, logo, artwork, model number, etc.) as it will be marketed, with the model number matching the application form; and the model, SW and HW revs shown on the application must appear in the sysDescr field or “internal readout”.

Vendors desiring to submit product for “Verified for Interoperability” must complete the following a minimum of 30 days prior to submission:

- Request Certification Board approval to submit
- Provide an executive summary detailing functionality included in the product, areas of non-conformance to the CableLabs specifications, and summary of why of the product is ineligible for certification and why “verified for interoperability” is being requested
- Describe any known limitations that will prevent testing in the CableLabs test environment
- Verified for Interoperability submissions will be considered on a case-by-case basis based upon board approval. Please contact us at se-mail@cablelabs.com regarding submission details.
- The submission process for “Verified for Interoperability” is the same as for a full certification wave. The product will undergo a complete testing cycle with the exception of the functionality explicitly excluded by the vendor and approved by the Certification board.

VFI submissions are not restricted to any particular submission day. Devices may be submitted at any time, and will be evaluated independently of the regular certification wave-testing schedule. Test cycle length will be considered on a case-by-case basis based upon the differences requested from “regular” devices. If approved, the product will be added to the CableLabs website listing of “certified” products.

1.4 Paper Certification for OpenCable Devices

A product may be submitted for OpenCable Paper Certification under the following conditions:

- Minor changes to a previously certified product may be presented to the Certification Board for consideration. Minor changes are determined through the sole discretion of CableLabs and its Certification Boards.
- Software maintenance upgrades or a new code version of a previously certified device that consist of changes representing functionality entirely outside the scope of the then-current Specifications. Vendors may make and distribute Certified Host Devices with such minor changes concurrently with submission for Paper Certification; provided that Vendor acknowledges that any upgrades made to Certified Host Devices prior to the grant of Paper Certification shall be undertaken at Licensee’s sole risk and Licensee will remain responsible for any breach of applicable license agreements, Compliance Rules, Robustness Rules and Specifications.
- Host devices with different model numbers submitted in same Certification Wave. The first product submission will require full certification testing. For **concurrent** submissions in the same Certification Wave with no hardware or software changes, but with different screen sizes or power supply, a paper submission may be submitted along with two devices for regression testing.

Paper Certification is not associated with a particular Certification Wave, may be submitted at any time, and will be evaluated independently of the regular certification wave testing schedule. Paper Certification submissions will be considered on a case-by-case basis based upon Certification Board approval. Applications will be evaluated within two to three weeks after submission. If approved, the product will be added to the CableLabs website listing of certified products. If not approved for

paper submission, applicant may submit under the other submission categories described in this section. Please contact us at se-mail@cablelabs.com regarding submission details.

Vendors considering a Paper Certification must complete, and have a company officer sign, the Paper Certification Application; available through the online admission application. The application includes affirmative statements that:

- Vendor has completed testing under the then-current test suite and test plan, and has retained the test results;
- Vendor is able to provide such test results to CableLabs within one day from CableLabs' request;
- Based on such tests, Vendor in good faith believes that the product submitted for Paper Submission complies with the appropriate Specifications.
- Vendor confirms the availability of one (1) unit of the upgraded device for audit testing upon CableLabs request.

1.5 “Self Certification” for OpenCable Devices

Licensees who have demonstrated that they are consistently capable of obtaining Certification of OpenCable Host Devices may apply for Self Certification status. Subject to the conditions of this section, successful Certification of three (3) unique Host Devices in three (3) separate CableLabs Certification Waves within a two (2) year period, together with no Certification failures or breaches of the applicable Agreements (CHILA, OCAP, tru2way) over such two (2) year period, shall serve as *prima facie* evidence of such capability. After successful Certification in such third Certification Wave, Vendor may apply to the Certification Board for Self-Certification status by written request. Once granted, the Certification Board may revoke Self-Certification status for any material breach of the applicable Agreements. The Self-Certification election is optional under the sole discretion of the Vendor, who may notwithstanding the acquiring of the Self-Certification status continue to use CableLabs Certification.

For Self Certification of an OpenCable Host Device, see Self Certification Submission Form available in the online-application form: <http://www.cablelabs.com/certwave/>.

1.6 Practice Run Submissions

Practice Run product submissions may be made at any time, without correlation to a specific Certification Wave. A product submitted for a Practice Run is tested under the following conditions:

- All Certification/Qualification submission guidelines apply to Practice Run submissions (including the fee structure).
- Practice Run submissions are tested the same way and at the same time as product submitted for Certification/Qualification.
- Failing results are provided as they occur, after they are verified. All collected test results will be provided at the end of the wave.
- Practice Run products are allowed to upgrade software one time only during the Certification Wave. The upgrade must be completed prior to the end of the wave, and vendors must identify what tests they would like run after the upgrade, as we cannot guarantee that a complete set of tests will be executed.
- We will discuss any test results at the end of the wave cycle, when testing is complete.
- Practice Run test results may be shared with the respective Certification Boards for information only.
- Practice Run submissions are not eligible for Certification/Qualification decision by any Certification Board.

1.6.1 **Converting from Certification/Qualification or Recertification/Requalification to Practice Run**

- A product submitted to a Certification Wave for Certification/Qualification or Recertification/Requalification may switch to “Practice Run” at any time during the wave.
- The “Practice Run” product may upgrade one time. This is the only opportunity to perform a software upgrade on the product.
- CableLabs, at its discretion, will complete as much testing as possible and will attempt to honor a single request for a specific prioritized list of tests to be conducted.
- The “Practice Run” product will no longer be eligible to receive a Certification/Qualification decision by the Certification Board, and all other Practice Run submission considerations, will apply.
- A product submitted for Practice Run may not be transitioned to Certification/Qualification status during a Certification Wave.

1.7 OEM of a Certified/Qualified Product

OEM (Original Equipment Manufacturer) product submissions of an existing certified product may be made at any time, without correlation to a specific Certification Wave. The OEM product submission will be evaluated independently from the regular Certification Wave testing schedule upon satisfaction of the prerequisites for application as described below.

The OEM product must meet all of the following conditions:

- Identical software as certified/qualified product
- Identical hardware as certified/qualified product
- Identical docsDevSwCurrentVers as certified/qualified product (for DOCSIS cable modem products)

The **only** acceptable differences permitted between the certified/qualified product and the OEM submissions are the company logo affixed to the outer casing of the modem and, if applicable, the System Descriptor (sysDescr), the product OUI (vendor portion of the MAC address), and the device digital certificate.

The sysDescr on OEM products with DOCSIS functionality may be changed from that of the original equipment manufactured product, enabling differentiation between products. An OEM product submission with a change in the sysDescr will be accepted for certification only if it does not change the original code image. For example, the method can consist of implementing code in the software image that would compose the contents of the sysDescr MIB “on the fly”. In this case, certain fields would be obtained from the software image (such as the software version), while others could be obtained from non-volatile memory, set at the time of manufacture (such as hardware version or vendor name).

Also, an OEM submission may include a change to the device certificate if the vendors prefer to use their own rather than that of the original manufacturer; however, a change to software revision as a result of the certificate change is not permissible.

CableLabs, in conjunction with the Certification Boards, may consider additional changes that qualify for OEM submissions.

The same submission requirements apply to OEM products as to regular submissions, re: documentation, labeling, etc.

OEM submissions and paper submissions may be made at any time. Certified products will be listed on the Certified/Qualified website.

If the OEM product submission is based on a non-certified/qualified product, the OEM submission is considered a “new” product and must follow the guidelines outlined above in Section 1.1.

1.8 Integration and Interoperability Testing for OpenCable Devices

CableLabs maintains electronic program guides (“guides”) as well as certain suites of tests from the major cable operators. Prior to submitting an OpenCable Host Device for Certification, it is **highly recommended** that the vendor submit the device to the OpenCable Integration and Interoperability Testing process. The OpenCable Integration and Interoperability Testing process is a highly interactive process with support from CableLabs staff as well as cable operators. The intent of the process is to determine if a device meets the basic functional requirements of running cable operator guides and other basic functionality prior to entering the formal Certification testing process. OpenCable Integration and Interoperability Testing is generally made available on an as-needed basis 8-10 weeks prior to a formal Certification wave. Please contact se-mail@cablelabs.com for more information and scheduling.

1.9 Interoperability Events

Interoperability Events, when offered by CableLabs, provide vendors with the opportunity to test their products in a multi-vendor environment and/or with CableLabs-provided testing platforms within CableLabs’ test facilities. Vendors are not required to use the CableLabs test platform when participating in these events. The test platform used in these events may not be identical to what is used for certification or qualification testing during a Certification Wave.

Because these events usually involve products that are not fully developed, they require extra lab facilities and CableLabs’ staff time. Thus, these events are offered only when necessary, in CableLabs sole judgment, such as a new Specification and/or improving the product maturity. The guidelines for these events are subject to change, as project needs change.

Interoperability Events are held for the benefit of product maturity only, and will not result in Certification Board decisions. The event may be held prior to a Certification Wave, or at any other time, for the purpose of validating multi-vendor interoperability in a complete end-to-end network environment. Interoperability Event results, when collected, will be shared with the vendor and may be shared with the Business Team and/or the Certification Board as appropriate. CableLabs reserves the right to charge a fee for participation in Interoperability Events.

1.10 Development Lab Activities

A vendor participating in CableLabs projects developing products against CableLabs Specifications may gain access to the CableLabs Development Lab and related facilities in order to advance the development of interoperable products and services for cable networks. Vendors can take advantage of the Development Lab for several different purposes, depending upon the targeted project, some of which are as follows:

- **Pre-Certification Preparation:** Vendors may bring their products in for pre-certification preparation. CableLabs will provide some test equipment and test scripts for this purpose, based on the areas identified in the vendor’s application. Vendors should note that use of the lab for a single week may not be enough time to execute the entire test suite, and

that not all of the test equipment may be available for the entire suite of tests. Vendors should also note that this is not the equivalent of a practice run, and that test results obtained during pre-certification preparation do not guarantee that the product will pass certification.

- **Implementation of New ECNs:** As the specifications change based on new requirements, test plans, engineering change notices (ECNs) to specifications, and scripts and, ultimately, the products may change to meet these new specifications. The Development Lab may be used to test specification changes. Based on new ECNs, tests may be performed manually until such time that a test execution plan (TEP) or acceptance test plan (ATP) is available for use.
- **Product Development:** Vendors may use the Development Lab for project-specific product development.
- **Bug Identification and Troubleshooting:** Based on the type of issue and the nature of the troubleshooting testing, the Development Lab may be able to support such testing. If this testing requires access to other vendors' products, CableLabs will provide previously certified and qualified products, subject to availability. Vendors must identify in their application any specific products they may wish to utilize during testing.
- **Multi-Vendor Interoperability Activities:** A vendor may test and interoperate in a multi-vendor environment. Such testing is sometimes necessary after certification testing for problem resolution, or with the development of new technology. CableLabs will provide previously certified and qualified products, subject to availability, for testing purposes. Vendors must identify in their application any specific products they may wish to utilize during testing.

The CableLabs Development Lab Use Policy is applicable to use of the labs under this section. See http://www.cablelabs.com/cablemodem/downloads/DevLab_Guidelines.pdf to download this document.

2 SPECIAL TESTING CONSIDERATIONS

2.1 Combined Product Certification

Due to the relationship between the DOCSIS and PacketCable specifications, combined product certification is available for various combinations of DOCSIS and PacketCable Products. Combined product certification is not available for OpenCable products. For example, the DSG functionality of an OpenCable Host Device cannot receive certification separately from the terminal or set-top box host. Similarly, the OCAP stack cannot be certified separately from the OpenCable host hardware. The combined product certification program is not applicable to Practice Run products as practice runs do not lead to Certification.

CMTSs that apply for PacketCable Qualification, fail PacketCable testing, and pass DOCSIS testing, will receive DOCSIS Qualification, but not PacketCable Qualification. However, CMTSs that apply for PacketCable Qualification and fail DOCSIS testing will fail both PacketCable and DOCSIS qualification.

The current possible combined product certifications are listed below:

- 1) A product that undergoes DOCSIS Certification (or recertification) testing will, upon a favorable Certification Board Decision, achieve DOCSIS Certification as listed below:
 - a) DOCSIS 3.0 products may become DOCSIS 3.0, 2.0 and 1.1 certified.
 - b) DOCSIS 2.0 products may become DOCSIS 2.0 and 1.1 certified.
 - c) DOCSIS 1.1 products may become DOCSIS 1.1 certified only.

- 2) A product that undergoes PacketCable Certification (or recertification) testing will, upon favorable Certification Board Decision, achieve PacketCable Certification as listed below:
 - a) PacketCable Multimedia products may become PacketCable Multimedia and PacketCable 1.5 certified.
 - b) PacketCable Multimedia products may become PacketCable Multimedia certified.
 - c) PacketCable Residential SIP Telephony products may become PacketCable Residential SIP Telephony certified.
 - d) PacketCable ENUM-SIP Addressing Servers may become PacketCable ENUM-SIP Server qualified.
 - e) PacketCable 1.5 products may become PacketCable 1.5.
 - f) PacketCable E-MTA, E-DVA and CMTS products
 - i) will undergo DOCSIS 3.0, DOCSIS 2.0 or DOCSIS 1.1 Certification/Qualification testing, as appropriate
 - ii) may become PacketCable and DOCSIS certified
 - iii) must submit for PacketCable E-MTA, E-DVA or CMTS Recertification/Requalification if any changes are made to either the PacketCable or DOCSIS functionality

2.2 Core Testing

During the certification wave, if the product fails any tests for basic functionality, the Certification Board will review the test results; however, any failure of core functionality may prevent Certification. CableLabs will provide the vendor with the results, after board approval, as soon as possible during the certification wave, and may discontinue testing.

Core functionality parameters include, but are not limited to:

- Will the product register?
- Does the product adversely impact the network?
- Can the product be successfully upgraded through secure software downloads?
- Does the device perform the basics of the expected functionality?

If a product fails certification due to a failure of core functionality, the fee will not be refunded, nor can it be carried forward to the next wave. However, the manufacturer may opt to perform a software upgrade to resolve identified core failures. While we will make every effort to meet the originally-scheduled certification board meeting, CableLabs will restart all testing on the new software. This likely will result in a delay in presentation of the results to the Certification Board(s). Note that such an upgrade requires a fee equivalent to the recertification fee. In addition, the manufacturer will have the opportunity to resubmit within 30 days of the board decision for the cost of the recertification fee.

2.3 Results During the Wave

CableLabs may provide results during the wave for all devices. Only failures will be provided, and such data is subject to change by the end of the wave based upon continued testing and analysis. CableLabs may provide additional information to follow up questions solely at its own discretion.

The manufacturer may opt to perform a software upgrade to resolve identified during-the-wave failures. While we will make every effort to meet the originally-scheduled certification board meeting, CableLabs will restart all testing on the new software. This likely will result in a delay in presentation of on the results to the Certification Board(s). Note that such an upgrade requires

a fee equivalent to the recertification fee. Once withdrawn from the wave, the device may be resubmitted within 30 days after the end of the wave. Interim results will not be presented to the board, and the device may be resubmitted to the same wave, without consideration of new ECNs,

2.4 Resubmission of Failed Devices

Devices that fail the certification process may be resubmitted within 30 days of the board decision for the cost of the recertification fee. These products may be resubmitted to the same wave, without consideration of new ECNs.

3 APPEALS PROCESS

The Certification Board will consider appeals for products that do not achieve Certification.

For a valid appeal, the vendor must follow these steps, in the order listed:

1. After the Certification Wave, participate in an optional conference call with CableLabs technical staff for detailed discussions of test results. The Program Manager will schedule this call at the request of the vendor after Certification test results have been circulated to the vendor.
2. If the conference call does not resolve all questions about why the product did not achieve Certification, CableLabs, through the Program Manager, will schedule an optional visit (at a mutually agreed time) for the vendor to view the results of tests performed at CableLabs.
3. If the vendor believes there are grounds for an appeal, the vendor may submit a formal appeal request to the Program Manager, **complete with backup data to document any test results the vendor believes the Certification Board should consider**. The formal appeal and backup data will be forwarded to the Certification Board for review.
4. The appropriate appeals fee equivalent to the recertification fee must accompany the formal appeal request. The fee will be refunded to the vendor if the Certification Board grants the appeal.
5. The deadline for filing an appeal will be presented in the Certification Wrap-Up email sent to participating vendors prior to the end of the wave.

The Certification Board(s) will evaluate appeals fairly and in a non-discriminatory manner. The Certification Board may request whatever additional information or tests from the vendor and/or CableLabs it deems necessary and advisable in order to resolve the issue on appeal.

The Program Manager will communicate the decision of the Certification Board to the appealing vendor. Vendors should be aware that while the Certification Board makes every effort to act on a timely basis, it might take several weeks before any decision is reached on an appeal.

Devices will be retained until after the appeals process is completed so that additional testing and lab visits may be supported, as needed.

4 SUBMISSION REQUIREMENTS

4.1 Specification Compliance Requirements

Unless stated otherwise, CableLabs verifies compliance against the current version of the applicable Specifications for which the product is submitted.

The most recent, published version of CableLabs Specifications can be found on the CableLabs webpage applicable to the product in question. Issued Specifications undergo changes through an open Engineering Change Process involving Engineering Change Requests (ECRs), Engineering Change Orders (ECOs), and Engineering Change Notices (ECNs) as detailed on the applicable CableLabs webpage. Engineering Change Notices are considered to be part of the applicable Specification, even though they may not yet be included in a published version of that Specification.

Therefore, for purposes of compliance testing, CableLabs considers the current version of a Specification to consist of the most recent, published version of the Specification, as it appears on CableLabs' website, as modified by any and all ECNs that are applicable for that Certification Wave as noted in the ECN.

OCAP compliance testing now includes an OC-SP-Bundle document that contains the hardware and software specification versions that apply for OCAP bundle release testing. The version number of this specification corresponds to the release version of the OpenCable Bundle that it describes.

In order to allow vendors an appropriate period of time to comply with Engineering Change Notices, the Certification Wave Schedule indicates a "Mandatory ECNs Accepted" cutoff date, typically 60 days before the start of a Certification Wave. ECNs that are accepted after the cutoff date are not considered mandatory for Certification/Qualification in the Certification Wave to which the date applies except in unusual circumstances, in which case an announcement will be made as far in advance of the Certification Wave as possible detailing any additional ECNs that will be mandatory for a wave.

4.2 Pre-Submission Requirements

Before submitting products to the certification process, the vendor must conduct internal testing, preferably using standard off-the-shelf testing equipment, to show conformance with the applicable CableLabs Specifications. A vendor's internal testing should be as rigorous as possible. Conformance tests are generally made available by CableLabs prior to Certification testing.

Vendors are encouraged to add functionality outside the scope of the applicable Specification, but such enhancements will not be tested or certified as part of the certification wave process, nor should such proprietary enhancements interfere with interoperability or compliance with the Specification.

4.2.1 Integration and Interoperability Testing for OpenCable Devices

CableLabs maintains electronic program guides ("guides") as well as certain suites of tests from the major cable operators. Prior to submitting an OpenCable Host Device for Certification, it is **highly recommended** that the vendor bring the device to the OpenCable Integration and Interoperability Testing process. The OpenCable Integration and Interoperability Testing process is a highly interactive process to be completed by vendor's representatives with support from CableLabs staff as well as cable operators. The intent of the process is to determine if a device meets the basic functional requirements of running cable operator guides and other basic functionality prior to entering the formal Certification testing process. OpenCable Integration and Interoperability Testing is generally made available on an as-needed basis 8-10 weeks prior to a formal Certification wave. Please contact se-mail@cablelabs.com for more information and scheduling.

4.3 Schedule

OpenCable devices, headend equipment and DOCSIS-based CPE devices (with the exception of PacketCable 2.0) may be submitted at any time, and will not be held to the eight submission points. The same consideration of anytime-entry applies to Practice Run submissions of any kind. We request at least two-week's notice of intent to submit via email to se-mail@cablelabs.com. PacketCable 2.0-based CPE devices may enter on one of the eight defined submission points. Submitting to a certification wave on the posted submission date is the only guarantee to a specific end date. Testing on devices submitted outside of the normal wave cycle make take longer than the 8-12 weeks, depending upon current work load.

The Certification Wave Schedules can be found at <http://www.cablelabs.com/certqual/>. CableLabs reserves the right to alter the schedules as necessary.

4.4 Fees

The fee schedule for all types of Certification Wave submissions, other submissions (such as OEM submissions), and appeals can be found at <http://www.cablelabs.com/certqual/>. CableLabs reserves the right to change fees by posting changes to the applicable website, 30 days prior to commencement of an event to which the fee relates. Fees are non-refundable, and are due on submission day.

Please advise the CableLabs accounting office at j.tahara@cablelabs.com if your company requires an invoice. Please include "CableLabs Certification Invoice" in the subject line of your email. When requesting an invoice, please include the following information in your email:

- a) Name of company making the payment
- b) Vendor name of submitted product and certification wave to which you are applying
- c) Corporate Officer or contact information for submitted product
- d) Product type as identified on the fee schedule
- e) CableLabs Product ID as listed on the application
- f) Type of invoice required (i.e.; certification, re-certification, OEM, appeal, etc.)
- g) Mailing address and email address, or fax number to which the invoice should be sent

Payment for submission indicates acceptance of the terms and conditions of the CableLabs' application process. When making a payment, please include the following information for all products that the payment applies to:

- a) CableLabs Product ID as listed on the application
- b) Corresponding invoice number (if known)

4.5 Product

Unless otherwise noted, devices submitted for certification must be of production quality, as they would be marketed and sold, and must be labeled as manufactured. Products risk rejection otherwise.

All products submitted to CableLabs shall be configured for 120 volts, 60 hertz, 20 or 30 amps. Devices utilizing other power requirements shall be submitted with the necessary transformers, power adapters, etc., to ensure compatibility to the existing CableLabs power distribution system.

Vendors requiring a UPS (uninterruptible power supply) must submit the UPS along with their product.

All products must have all functionality for all requested Specification(s).

4.5.1 Products with Battery Power

The executive summary must state whether the hardware and/or software support operation under battery power and if so, must describe any functional or operational differences from operation on main power. Specifically, information on usage ('Battery Backup' only or 'Battery Backup and UPS') and any deviations from operations on A/C power (e.g.; Ethernet port disabled during battery being used for 'backup' only) is encouraged.

CableLabs compliance testing does not mandate that CPE products be capable of operating on battery power. However, if the product is capable of operating on battery power, cable operators encourage vendors to include the appropriate batteries with the CPE product when submitted for testing. All submitted units must be identical and must be capable of operating on battery power. CableLabs reserves the right to test such product while it is operating on a second power source (i.e., batteries). Failure to submit batteries and/or pertinent information in the executive summary can result in delays in the testing and certification process.

Note: 'Battery Backup' functionality in the context of this document refers to the ability to switch to 'backup power' only when the primary power source to the device fails, provided secondary power sources are present. 'UPS' (Uninterruptible Power Supply) functionality is defined as the ability to provide power using either the primary or secondary power sources at all times, provided additional sources are present.

4.5.2 Special considerations for PacketCable Vendors:

PacketCable CMS, MGC and MG vendors must ensure that two each of compatible CMS, MGC, and MG products are available in the PacketCable Certification Lab to support off-net functionality. These vendors are responsible for supplying this compatible equipment to support off-net functionality. Please contact se-mail@cablelabs.com for more information.

4.5.3 Number of units required for Certification and Retention

The table below shows the number of units that must be submitted for a Certification Wave, as well as the number of units that will be retained by CableLabs following the Certification Wave.

As new vendors come into the market, interoperating with previously certified equipment is paramount. After certification is awarded, CableLabs will keep units of products as described below. CableLabs will conduct testing to resolve technical difficulties that may arise from product deployment at CableLabs or one or more other laboratories under CableLabs' control and supervision. At its option, CableLabs reserves the right to retain units of failing components, as well as a limited number of practice run devices, and will contact the vendor if such a need becomes evident. Any devices retained would be for use by

CableLabs in device testing and/or test development. Retained devices will not be used or provided for use by other manufacturers or entities other than Cablelabs staff, without permission from the vendor.

Vendors are responsible for the cost of shipping all returned units. Also, in the event that an appeal is filed, devices will be retained until after the entire process is completed so that additional testing and lab visits may be supported, as needed.

A vendor may resubmit retained headend hardware units for qualification testing if the following conditions are met:

- The retained headend hardware is a CMTS, EQAM, DTI Server, CMS, MGC, MG, Policy Server or an ENUM-SIP Addressing Server.
- The retained hardware will be submitted along with the new software
- There is a reliable mechanism to change (upgrade/downgrade) the software images on the retained hardware.
 - The special instructions of the submitted product must include a detailed description of the mechanism to switch between the two software images.
 - CableLabs will hold copies of both the previously qualified and the newly submitted software images.
 - The vendor must successfully demonstrate to CableLabs personnel the mechanism and procedure to switch between the two software images held by CableLabs.
- If the submitted hardware requires any changes to auxiliary hardware components, then there must be a reliable mechanism to change (upgrade/downgrade) the auxiliary hardware components.
 - The special instructions of the submitted product must include a detailed description of the steps to switch the auxiliary hardware components.
 - CableLabs will hold both the retained and the newly submitted auxiliary hardware components.
 - The vendor must successfully demonstrate to CableLabs personnel the mechanism and procedure to switch between the auxiliary hardware components.
- The application for the newly submitted product shows the “hardware revision” of the retained hardware.
- In addition to using the retained hardware, vendors may need to submit additional hardware units to fulfill the number of units required for submission.
 - Qualification submissions: Most product submissions will require a vendor to supply between 1 and 4 additional units. CMS, MGC, MG, and Policy Server vendors must always supply 1 additional unit.
 - OEM or Paper submissions: Most product submissions will not require additional units; however, in some cases a vendor may need to supply one additional unit.
 - Upon qualification, the current retention policy will apply.

Vendors agree that CableLabs shall bear no liability for loss for damage or injury to vendor's staff, employees or agents, or to the property of the vendor, including but not limited to the product being submitted and other equipment, tools, supplies, or records, from any cause or causes whatsoever, while in or on the premises of CableLabs or elsewhere.

	Certification / Qualification / Verification for Interoperability / Practice Waves¹		Recertification / Requalification/ OEM
Product	Submission	Retention	Submission and retention
DOCSIS CM DSG eCM eCMM	28 units (including two test DRCA units) or 29 units for DOCSIS 3.0 (including two test DRCA units plus one diagnostic modem as described in section 5.1.1) NOTE: batteries for 4 units should also be submitted if the product supports battery backup or UPS functionality.	11 units (10 regular units + the diagnostic device as described in Section 5.1.1)	5 units
DPoE ONU	14 units. In the case of units requiring an Ethernet adapter, as per section 8.4, 14 adapters should be provided.	10 units. In the case of units requiring an Ethernet adapter, as per section 8.4, 5 adapters will be retained.	5 units. In the case of units requiring an Ethernet adapter, as per section 8.4, 5 adapters will be retained.

¹ All units submitted for practice run will be returned, unless vendor is contacted by special request and agrees to leave some units in the lab.

eCMM-based	5 units	2 units	2 units
PacketCable E-MTA PacketCable E-DVA	60 units (including two test SPRCA units and two test DRCA unit) or 61 units for DOCSIS 3.0 based devices (including two test SPRCA units and two test DRCA units plus one diagnostic modem as described in section 5.1.1.2) NOTE: batteries for 8 units should also be submitted if the product supports battery backup or UPS functionality.	21 units (20 regular units + the diagnostic device as described in Section 5.1.1.2)	10 units
DOCSIS CMTS M-CMTS Core DOCSIS CMTS + MM M-CMTS Core + MM EQAM DTI Server	4 units	2 units	1 unit
DPoE System	2 units	2 units	1 unit
PacketCable CMTS M-CMTS Core + PacketCable PacketCable + Multimedia CMTS M-CMTS Core + PacketCable + Multimedia	6 units	4 units	1 unit
PacketCable CMS PacketCable MGC PacketCable MG PacketCable PS PacketCable ENUM-SIP Addressing Server	2 units	2 units	1 units
OpenCable Host TV set ²	28 units (including four Test Certificate units ^{3 4}). 8 units must be TVs, 20 units must be modules.	2 units + 8 modules	2 units
OpenCable Host STB	28 units (including four Test Certificate units ^{3 4})	10 units	5 units
OpenCable Unidirectional Receiver	4 units	2 units	2 units
CableCARD	20 units	20 units	20 units
Tuning Adapter	2 units	2 units	2 units

² CableLabs requires a limited number of “module” devices in lieu of complete digital televisions. Such set-top box devices submitted solely for “terminal device” testing purposes do not necessarily need to be in production-intent form. Vendors are advised to contact the Program Manager at se-mail@cablelabs.com before submitting set-top box devices in lieu of terminal host devices.

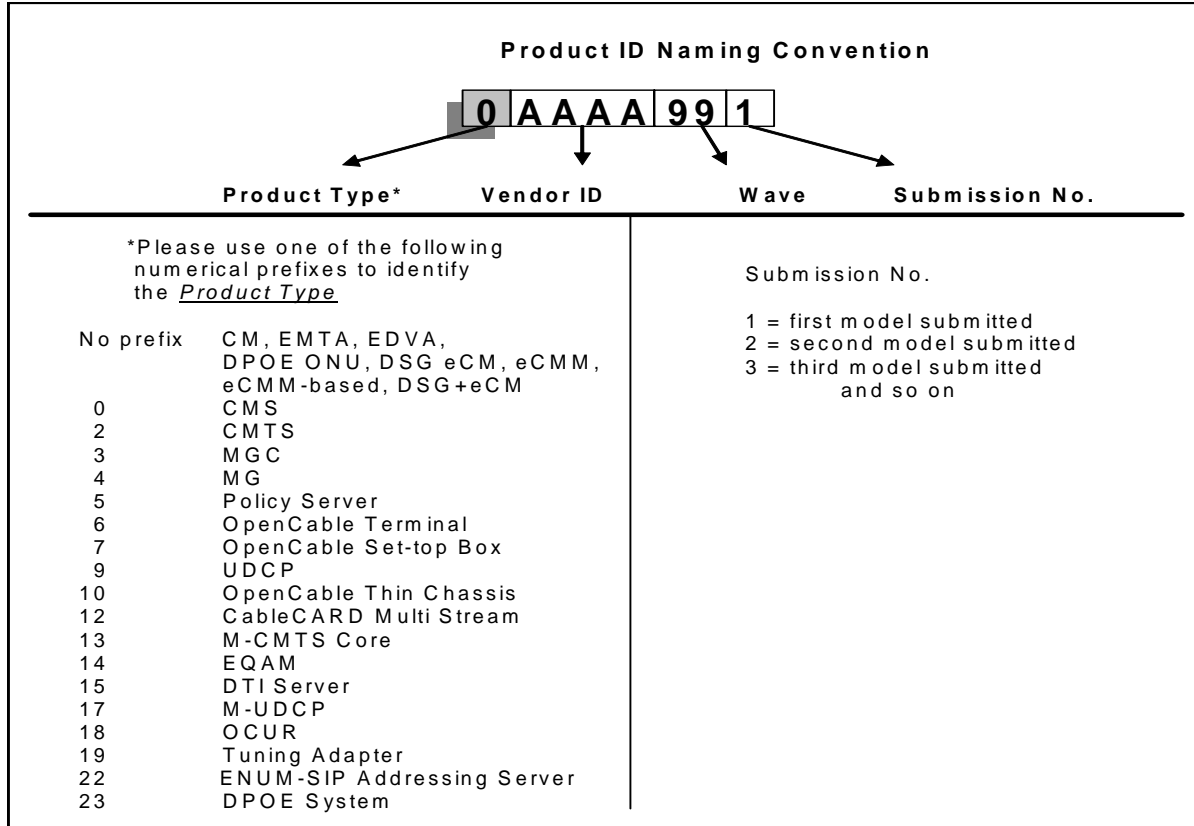
³ Certificates for the OpenCable Host Test Certificate units are defined in the Section 7 of this document.

⁴ The ideal scenario is one in which CableLabs can change the DRCA unit from DSG operation mode to DOCSIS operation mode. If that is not the case, then one of the Test Certificate units MUST boot in DOCSIS mode, and the other DRCA three units MUST boot in DSG mode.

4.6 Labeling and Product IDs

The CableLabs Product ID label will identify each product submitted for certification. CableLabs uses the following Product ID convention to track products submitted for certification:

This seven or eight-character “product id” will be used as the tracking identifier for the physical products submitted (including ancillary hardware), all submission documentation, and all test data. Since some company names may be similar, please contact CableLabs at se-mail@cablelabs.com to determine the correct 4-letter company abbreviation for your products.



Product Type	Example Label for a device submitted for CW99	Additional Requirements
CM	ABCD991 Unit:01 CMx.x RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX ===== ABCD991 Unit: 27 CMx.x (Test DRCA) RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF, Ethernet and USB), each must be shown and clearly identified as “RF”, “Eth”, or “USB”. 1) A unit number 2) Label as “CMx.x”, according to the version of DOCSIS Specification. 3) Units 27 and 28 must be labeled as “Test DRCA” units. <u>Note: Submissions must correspond to the numbers and MAC addresses shown on the MAC Address Form included with the application.</u>
D-ONU	ABCD991 Unit:01 DONUx.x Device MAC: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH

Product Type	Example Label for a device submitted for CW99	Additional Requirements
	USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX	PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual D-ONU (i.e. RF, Ethernet and USB), each must be shown and clearly identified as “RF”, “Eth”, or “USB”. 2) A unit number 3) Label as “DONUx.x”, according to the version of DPoE Specification. <u>Note: Submissions must correspond to the numbers and MAC addresses shown on the MAC Address Form included with the application.</u>
E-MTA/E-DVA	For an E-MTA: ABCD991 Unit:01 CMx.x/E-MTAy.y For an E-DVA: ABCD991 Unit:01 CMx.x/E-DVAy.y RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX MTA MAC: XX:XX:XX:XX:XX:XX <hr/> For an E-MTA: ABCD991 Unit: 27 CMx.x/E-MTAx.x For an E-DVA: ABCD991 Unit: 27 CMx.x/E-DVAy.y (Test DRCA) RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX MTA MAC: XX:XX:XX:XX:XX:XX <hr/> For an E-MTA: ABCD991 Unit: 59 CMx.x/E-MTAx.x For an E-DVA: ABCD991 Unit: 59 CMx.x/E-DVAx.x (Test SPRCA) RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX MTA MAC: XX:XX:XX:XX:XX:XX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF, Ethernet and USB), each must be shown and clearly identified as “RF”, “Eth”, or “USB”. Note that both the CM and E-MTA MAC addresses must be shown. 2) A unit number 3) Label as “CMx.x/E-MTA y.y”, according to the version of DOCSIS (x.x) and PacketCable (y.y) Specifications. 4) Units 27 and 28 must be labeled as “test DRCA” units 5) Units 59 and 60 must be labeled as “test SPRCA” units <u>Note: Submissions must correspond to the numbers and MAC addresses shown on the MAC Address Form included with the application.</u>
DSG eCM	ABCD991 Unit:01 CMx.x DSG Advanced RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX ===== ABCD991 Unit: 27 CMx.x DSG Advanced (Test DRCA) RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF, Ethernet and USB), each must be shown and clearly identified as “RF”, “Eth”, or “USB”. 2) A unit number 3) Label as “CMx.x” according to the version of DOCSIS Specification. 4) The notation “DSG Advanced,” “DSG Basic,” or “DSG Both” must appear on the label. 5) Units 27 and 28 must be labeled as “Test DRCA” units.

Product Type	Example Label for a device submitted for CW99	Additional Requirements
		<p><u>Note: Submissions must correspond to the numbers and MAC addresses shown on the MAC Address Form included with the application.</u></p>
DOCSIS CMTS	2ABCD991 Unit:01 CMTS x.x MAC: XXXX:XXXX:XXXX	<p>Clearly mark ON THE FRONT OF EACH PRODUCT:</p> <ol style="list-style-type: none"> 1) MAC addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2). A unit number 3) Label as “DOCSIS x.x”, according to the version of the DOCSIS Specification.
DOCSIS CMTS w/DSG Agent	2ABCD991 Unit:01 CMTS x.x DSG MAC: XXXX:XXXX:XXXX	<p>Clearly mark ON THE FRONT OF EACH PRODUCT:</p> <ol style="list-style-type: none"> 1) MAC addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2) A unit number 3) Label as “DOCSIS x.x DSG”, according to the version of the DOCSIS Specification.
DPoE System	23ABCD991 Unit: 01	<p>Clearly mark ON THE FRONT OF EACH PRODUCT:</p> <ol style="list-style-type: none"> 1) MAC addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2) A unit number <p>Label as “DPoE x.x”, according to the version of the DPoE Specification.</p>
PacketCable CMTS PacketCable Multimedia CMTS PacketCable + Multimedia CMTS	2ABCD991 Unit:01 CMTSx.x/PCy.y/MM MAC: XXXX:XXXX:XXXX	<p>Clearly mark ON THE FRONT OF EACH PRODUCT:</p> <ol style="list-style-type: none"> 1) MAC Addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2) A unit number 3) Label as “CMTS x.x/PCx.x/MM”, according to the version of DOCSIS (x.x) and PacketCable (y.y) Specifications.
CMS	0ABCD991 Unit:01 CMSx.x Serial Number: abcdefg	<p>Clearly mark ON THE FRONT OF EACH PRODUCT:</p> <ol style="list-style-type: none"> 1) Serial Number of each unit being submitted for qualification. 2) A unit number 3) Label as “CMS x.x”, according to the version of PacketCable Specification. <u>Submissions must correspond to the serial</u>

Product Type	Example Label for a device submitted for CW99	Additional Requirements
MGC	3ABCD991 Unit:01 MGCx.x Serial Number: abcdefg	<u>numbers included with the application.</u> Clearly mark ON THE FRONT OF EACH PRODUCT: 1) Serial Number of each unit being submitted for qualification. 2) A unit number 3) Label as “MGCx.x”, according to the version of PacketCable Specification. <u>Submissions must correspond to the serial numbers included with the application.</u>
MG	4ABCD991 Unit:01 MGx.x Serial Number: abcdefg	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) Serial Number of each unit being submitted for qualification. 2) A unit number 3) Label as “MGx.x”, according to the version of PacketCable Specification. <u>Submissions must correspond to the serial numbers included with the application.</u>
Policy Server	5ABCD991 Unit:01 PolSrv/MM Serial Number: abcdefg	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) Serial Number of each unit being submitted for qualification. 2) A unit number 3) Label as “PolSrv/MM”. <u>Submissions must correspond to the serial numbers included with the application.</u>
ENUM-SIP Addressing Server	22ABCD991 Unit: 01 ENUM-SIP Addr. Svr. Serial Number: abcdefg	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) Serial Number of each unit being submitted for qualification. 2) A unit number 3) Label as “ENUM-SIP Addr. Svr.” <u>Submissions must correspond to the serial numbers included with the application.</u>
OpenCable Terminal	6ABCD991 Unit:01 OC x.x RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX ETH: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF, Ethernet and USB), each must be shown and clearly identified as “RF”, “Eth”, or “USB”. 2) A unit number. 3) Label units as described in section 7.1.1 with regard to Production, Test, and DSG mode.
OpenCable Set-top Box	7ABCD991 Unit:01 OC x.x RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF and USB), each must be shown and clearly identified as “RF” or “USB”. 2) A unit number. 3) Label units as described in section 7.1.1 with regard to Production, Test, and DSG mode.

Product Type	Example Label for a device submitted for CW99	Additional Requirements
OpenCable Thin Chassis Device	10ABCD991 Unit:01 OC x.x RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF and USB), each must be shown and clearly identified as “RF” or “USB”. 2) A unit number. Label units as described in section 7.1.1 with regard to Production, Test, and DSG mode.
OpenCable Unidirectional Receiver	16ABCD991 Unit:01 OC x.x RF: XXXX:XXXX:XXXX USB: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for certification. Note that if there is more than one MAC address for the individual modem (i.e. RF and USB), each must be shown and clearly identified as “RF” or “USB”. 2) A unit number.
CableCARD Multi-Stream	12ABCD991 Unit:01 OC x.x Code Version: XXX.XXX	Clearly mark Code Version being submitted ON THE FRONT OF EACH PRODUCT.
Tuning Adapter	19ABCD991 Unit : 01 OC xx Code Version : XXX.XXX	Clearly mark ON THE FRONT OF EACH PRODUCT: Code Version being submitted
M-CMTS Core	13ABCD991 Unit:01 CMTS x.x MAC: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2). A unit number 3) Label as “DOCSIS x.x”, according to the version of the DOCSIS Specification.
EQAM	14ABCD991 Unit:01 MAC: XXXX:XXXX:XXXX	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) MAC addresses of each unit being submitted for qualification. <u>Submissions must correspond to the numbers & MAC addresses shown on the MAC Address Form included with the application.</u> 2) A unit number
DTI Server	15ABCD991 Unit:01	Clearly mark ON THE FRONT OF EACH PRODUCT: 1) A unit number
Power Supplies, E-MTA Batteries, UPS, & other Support products		All products must be supplied with a means to power the device with 120v AC. Label the front of each accompanying power supply, and personal computer with the corresponding Product ID as described above. Backup batteries must be also be tagged with printed labels clearly showing the Product ID and the CPE unit number, unlabeled batteries or AC adaptors will not be accepted. AC power cords do not require labels.

4.7 Product Delivery Requirements

Please note that on-site vendor representation is not required for product drop-off. Shipping all of the required equipment is acceptable. Vendors choosing to ship incomplete submissions or submissions for which the actual products do not correspond to the products described in the documentation risk rejection and return of their product prior to the wave, unless an on-site vendor representative is present and can correct the submission immediately prior to submission cut-off. The mode of delivery is up to the vendor's discretion.

All materials are required to be delivered by **noon Mountain Time** on the designated day.

Please address submissions to:

c/o Cable Television Laboratories, Inc.
Attn: CableLabs Systems Evaluation: Senior Manager
858 Coal Creek Circle
Louisville, CO 80027-9750 USA

4.8 Submission Documentation

All the information listed in this section is required for product submission.

4.8.1 Submission Information provided via web-form

The web-based application is available at <https://www.cablelabs.com/certwave/>. To request a vendor login/password to access the web-based application, please contact se-mail@cablelabs.com.

The following submission information must be provided via the web-based application:

Certification Wave Admission Application.

- The vendor must use the current version of the web-based form to provide all necessary product submission information.
- When submitting for the first time, the vendor must submit a signed, original, signature page to be downloaded from the web-based form. An Officer and Quality Assurance Manager of the vendor company must sign this document to affirm the accuracy of all Admission Application information related to the product.
- Hardware and software revisions and SysDescriptor, or internal software readouts, **must** match the product as submitted or resubmission will be required.
- DOCSIS, PacketCable, and OpenCable optional functionality must be provided via the web-based application. Misrepresentation of such information may impact certification/qualification test reporting and results. Note that optional functionality may be listed on the CableLabs public certification/qualification list.
- MAC Address and/or Serial Number List. A soft-copy of the MAC Address and/or Serial Number List must be submitted on the website. Note that all product units should exhibit the same OUI (organizational unique identifier).

4.8.2 Additional Submission Information provided via web-form upload utility

The additional documentation listed below must be provided via the web-form file upload utility.

In order to best assist our certification team, all documentation must be organized according to the folder hierarchy shown below:

Create a top-level folder with the same name as the product ID, for example: "VEND871". This top-level folder contains high-level information about the product, such as the executive summary, interoperability test report, etc.

Create a sub-folder for information specific to each specification (DOCSIS, PacketCable). Note that some products require multiple sub-folders. For example, an E-MTA will require two sub-folders: "DOCSIS" and "PacketCable".

Executive Summary. The Executive Summary should not exceed four pages. For certification requests, vendors must include a list of the test cases performed and verified against the product being submitted. Also included should be any exceptions or additional information that a vendor believes the Certification Board should know, or that is required for testing.

Submission Documentation Folder Hierarchy:

VEND991 (top-level folder)
Executive Summary
Images (subfolder) Image and Driver Files: DOCSIS, PacketCable, OpenCable (Manufacturer-signed OCAP image in object code form)
DOCSIS (subfolder) CM: <ul style="list-style-type: none">▪ Requirements Checklist (DOCSIS, eDOCSIS and DSG, if applicable)▪ Digital Certificates for DOCSIS CM▪ DSG eCM Special Instructions (if applicable) CMTS: <ul style="list-style-type: none">▪ Requirements Checklist (DOCSIS, M-CMTS and DSG, if applicable)▪ DOCSIS CMTS Special Instructions▪ CMTS Operations Manual EQAM: <ul style="list-style-type: none">▪ Requirements Checklist (M-CMTS and DRFI)▪ DOCSIS M-CMTS EQAM Special Instructions DTI Server: <ul style="list-style-type: none">▪ Requirements Checklist (M-CMTS)▪ DTI Server Special Instructions
PacketCable (subfolder) <ul style="list-style-type: none">▪ Requirements Checklist (formally known as a Component Checklist)▪ Test Case Checklist▪ Vendor's ATP (if applicable)▪ Interoperability Report▪ PacketCable CMTS, CMS, MGC, MG, Policy Server or ENUM-SIP Addressing Server Vendor Product Operating Instructions
DPoE (subfolder) D-ONU: <ul style="list-style-type: none">▪ Requirements Checklist (Applicable DPoE requirements)▪ Digital Certificates for D-ONU▪ D-ONU Special Instructions (if applicable)▪ D-ONU Operations Manual DPoE System: <ul style="list-style-type: none">▪ Requirements Checklist (Applicable DPoE requirements)▪ DPoE System Special Instructions (if applicable)▪ DPoE System Operations Manual
OpenCable (subfolder) <ul style="list-style-type: none">▪ Completed Requirements Checklist▪ Detailed ATP▪ Digital Certificates (see section 7)▪ OCAP Test Results (based on the OCAP CTP from CableLabs)▪ Vendor letter confirming Sun Personal Basis Profile (PBP) 1.1 compliance
M-UDCP or UDCP (subfolder) <ul style="list-style-type: none">▪ Completed Requirements Checklist▪ Detailed ATP▪ Vendor Submitted Documentation Recommendations
Tuning Adapter (subfolder) <ul style="list-style-type: none">▪ Completed Requirements Checklist▪ Detailed ATP
OCUR (subfolder) <ul style="list-style-type: none">▪ Completed Requirements Checklist▪ Detailed ATP▪ Production Signed Code Object (Signed by Submitting Manufacturer)▪ Unsigned development object (To be signed by evaluation certificate at CableLabs)

DOCSIS Documentation Requirements. Products submitted for DOCSIS certification testing may submit a signed declaration stating compliance to the applicable specifications in lieu of submitting the normally required supporting documentation as detailed in the guidelines, with the exception of the applicable Special Instructions and the Requirements Checklist. Any exceptions to the Requirements Checklist should be clearly noted within the declaration document. Digital certificates, drivers and image files are also required.

In the event that additional documentation is required to provide the test team with more data, CableLabs reserves the right to request this information with vendor response within a 48-hour time frame at any time during the wave.

Note that this applies to DOCSIS devices, only, and submissions must adhere to PacketCable, DPoE and OpenCable documentation requirements as detailed.

Interoperability Test Report. The Interoperability Test Report is a summary of all the testing performed at CableLabs, MSO locations (field trial), other Interops, third-party locations and other vendor sites. The testing performed and summarized in the Interoperability Test Report should demonstrate that the product submitted for certification interoperates with multiple vendor products. E-MTA and E-DVA submissions should demonstrate interoperability with a minimum of three qualified CMTS products. PacketCable CMTS, CMS, MGC, MG, Policy Server and ENUM-SIP Addressing Server submissions should list all interoperable PacketCable network products.

Completed Conformance and Requirements Checklists

The DOCSIS, M-CMTS, DSG, OpenCable, and PacketCable “Requirements Checklist” (formerly known as the Component Checklist for PacketCable, and sometimes known as a Requirements Checklist for DOCSIS) are available on the DocZone web site. “Completed” means each line item is clearly marked with a “Yes” or “No”. Each Requirements line item must refer to a given test procedure that was used to verify that specific Requirement item. The Requirements Checklist is a vendor’s formal declaration to the level of the product’s conformance to the specifications. The document *must* match the product.

The PacketCable “Requirements Checklist” documents are available on the PacketCable DocZone web site in “Certification Wave Documentation”, then “CW## Documentation”.

Detailed Acceptance Test Plan (ATP) / Compliance Test Plan (CTP)

For DOCSIS, DSG, OpenCable, and/or PacketCable. Each vendor is responsible for its own product, writing and verifying each test procedure on each line item of the DOCSIS, DSG, OpenCable, and PacketCable Requirements Checklist, and testing the product against it. The actual data gathered for each test must be attached to support each of the verifying Requirement item. The various sources of test procedures for product vendors are: 1) silicon vendors (for chip conformance to specs); 2) commonly used or widely available ATPs for the cable industry, such as the CableLabs ATP, which is available via the project websites; 3) the vendor’s internally developed ATPs. The Certification Board requests that each test procedure be documented in a similar manner as the CableLabs ATP.

The “PacketCable Test Case” is available on the PacketCable DocZone web site in “Certification Wave Documentation”, then “CW## Documentation”. The PacketCable Test Case Checklist is a listing of all PacketCable test cases and requirements contained in the PacketCable Compliance/Acceptance Test Plans (CTPs/ATPs). PacketCable CTPs/ATPs are available on the PacketCable DocZone website. By executing these test plans and supplying CableLabs with the results in the format provided in the appendices, vendors will expedite results reporting process to the board for evaluation. In the event vendors choose to utilize their own proprietary test plans, they must submit those test plans, results and a traceability matrix depicting how every applicable PacketCable requirement is addressed by test case.

Image and Driver Files.

Image and Driver Files for all products must be included in the “images” folder. This includes DOCSIS, PacketCable, and OpenCable (Manufacturer-signed OCAP image in object code form).

- If the CPE product contains a CM component: The MAC-14 test image file and an original image file must be included in the uploaded .zip file. If the cable modem is a USB or internal, device drivers must also be provided in the file upload. See Section 5.2 for details.

Digital Certificates.

For testing of DOCSIS 3.0, 2.0 or 1.1 cable modems, the images must contain all of the certificates and signatures required for secure software downloading and authentication. For testing of OpenCable hosts and CableCARDS, such devices must contain all of the certificates and signatures required for device authentication, including DSG, and verification of the OCAP code image. See Sections 7 and 9 for details.

Special Instructions Documents:

DOCSIS CMTS Special Instructions: For testing DOCSIS CMTSs and M-CMTS Cores, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view)

must be included in the uploaded .zip file. Vendors must include in this form a list of “Conditional MUSTs” and Programmable Features that the product supports.

CMTS Operations Manual: CMTS vendors should also provide a soft-copy of the operations manual. If one is not available, a hard copy should be provided with the submission materials upon delivery of the units.

DOCSIS M-CMTS EQAM Special Instructions: For testing DOCSIS M-CMTS EQAMs, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view) must be included in the uploaded .zip file.

DPoE System Special Instructions: For testing **DPoE System**, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view) must be included in the uploaded .zip file. Vendors must include in this form a list of “Conditional MUSTs” and Programmable Features that the product supports.

DPoE System Operations Manual: DPoE System vendors should also provide a soft-copy of the operations manual. If one is not available, a hard copy should be provided with the submission materials upon delivery of the units.

D-ONU Special Instructions: For testing **D-ONU**, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view) must be included in the uploaded .zip file. Vendors must include in this form a list of “Conditional MUSTs” and Programmable Features that the product supports.

D-ONU Operations Manual: **D-ONU** vendors should also provide a soft-copy of the operations manual. If one is not available, a hard copy should be provided with the submission materials upon delivery of the units.

DTI Server Special Instructions: For testing DTI Servers, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view) must be included in the uploaded .zip file.

DSG eCM Special Instructions: For testing DSG eCMs, the special instructions posted under the specific certification wave folder on DocZone (https://www.cablelabs.com/doczone/docsis/testing/DocZoneFolder_view/) must be included in the uploaded .zip file.

PacketCable CMTS, CMS, MGC, MG and Policy Server Vendor Product Operating Instructions: The submission must include the CMTS, CMS, MGC, MG, and/or Policy Server Vendor Product Operating Instructions, as appropriate. The Vendor Product Operating Instructions must be provided for product submitted to the Certification Wave, as well as for supporting product necessary to support off-net functionality. Templates for the Vendor Product Operating Instruction documents can be found on the PacketCable DocZone web site in “Certification Wave Documentation”, then “CW## Documentation”.

PacketCable ENUM-SIP Addressing Server Vendor Product Operating Instructions: The submission must include the ENUM-SIP Addressing Server Vendor Product Operating Instructions, as appropriate. The Vendor Product Operating Instructions must be provided for the product submitted to the Certification Wave, as well as for supporting product necessary to support off-net functionality. Templates for the Vendor Product Special Instructions can be found on the PacketCable DocZone web site in “Certification Wave Documentation”, then “CW## Documentation”.

5 DOCSIS SUBMISSION REQUIREMENTS

5.1 DOCSIS PRODUCTS

The following information provides specific product submission requirements.

5.1.1 DOCSIS 3.0, 2.0, or 1.1 Cable Modem Submissions

Each DOCSIS 3.0, 2.0 or 1.1 cable modem submission must include 28 units, which consist of 26 product cable modems (units #1 - #26) and 2 Test DRCA cable modems (units #27 – #28). The unit configurations are represented in the following table:

	DOCSIS CM Units 1– 26	DOCSIS CM Units 27 & 28
DOCSIS ROOT PUBLIC KEY	X	
TEST DOCSIS ROOT PUBLIC KEY		X
DOCSIS MFG CA CERTIFICATE	X	X
DOCSIS CM CERT	X	X
DOCSIS CM PRIVATE KEY	X	X

5.1.1.1 DOCSIS 3.0 and 2.0 Cable Modem Submissions

The submission, for check-in purposes, must provide read-only access to the MIB objects listed as a MAY in Section 8.5.4.1 in the current OSSI specification: sysDescr, sysUptime and ifTable.

5.1.1.2 DOCSIS 3.0 Cable Modem Submissions

In addition to the requirements in Section 5.1.1.1, vendors should supply one additional DOCSIS 3.0 cable modem, with the same software and hardware, but which has console port access to be used for diagnostic purposes only.

5.1.2 eDOCSIS Products

Products being submitted with an embedded cable modem must comply with the Embedded DOCSIS (eDOCSIS) Specification, in addition to the DOCSIS 3.0, 2.0, or 1.1 specifications as they may apply.

PacketCable E-MTA and E-DVAs are classified as eDOCSIS devices, and must comply with the eDOCSIS Specification.

The following is a summary of the key requirements of the eDOCSIS Specification:

- It contains specific requirements for the embedded cable modem component of the E-MTA and E-DVA for the reporting of a "logical interface" to represent the data path between the CM and the E-MTA or E-DVA. This logical interface is given a well-known ifIndex and is required to follow the same data forwarding and address learning rules as a "normal" CPE interface (e.g. Ethernet).
- It requires that the DOCSIS device-specific MIBs not be made available to an SNMP manager that queries the E-MTA or E-DVA IP address. Similarly, the E-MTA or E-DVA device-specific MIBs are not to be made available to an SNMP manager that queries the CM IP address.
- For the complete set of requirements, please refer to the eDOCSIS Specification published in the CableLabs website at <http://www.cablemodem.com/>. Note that these requirements apply to the embedded cable modem regardless of which version of the DOCSIS specification it complies with (DOCSIS 3.0, 2.0 or 1.1).

5.1.3 DSG eCM Requirements

- Products being submitted with a DSG eCM to be Verified for Interoperability must comply with the DSG specification, in addition to the eDOCSIS Specification and the DOCSIS 3.0, 2.0, or 1.1 specifications as they may apply.
- The DOCSIS, eDOCSIS, and DSG Requirements Checklist documents must be completed.
- The document *DSG eCM Special Instructions* available on DocZone (<https://www.cablelabs.com/doczone/>) under "Certification Documents" must be completed.
- The devices must include a CPE Interface, such as an accessible Ethernet port. Note that per DSG requirements, this interface must not bridge DSG traffic. This port is for the purpose of sending two-way data traffic to verify DOCSIS functionality.
- In order to support DOCSIS testing, the device must support a "non-DSG" mode (commonly referred to as 'DOCSIS mode'), in which the device will not require the presence of DSG messages or traffic in order to lock to a downstream channel. The method for switching between modes must be described in the document *DSG eCM Special Instructions* available on DocZone (<https://www.cablelabs.com/doczone/>) under "Certification Documents". It is assumed that this will

be the only difference between this mode and the device's normal operating mode. If there are other differences that place constraints upon device testing, please describe them in the special instructions as well.

- In the case where the support of DOCSIS-mode requires vendor intervention and the units must adhere to the table in section 7.1.1, a method for querying the CM diagnostic address must be provided for use on submission day.
- In the event the method for switching between modes requires manual intervention by the vendor, the DRCA units must be configured to boot;
 - one in DOCSIS only test mode
 - one in DSG mode.
- The requirements for Stand Alone Cable Modems as defined in Sections 5.1.2 and 5.1.2.1 must also be followed.

5.1.4 Embedded Cable Modem Modules (eCMMs) and eCMM-Based Devices

An embedded DOCSIS cable modem module (eCMM) is a cable modem, functionally equivalent to a stand-alone cable modem, except that, because it is intended to be embedded into another device (eCMM-based device), it has a vendor-specific CPE interface rather than the DOCSIS-required CMCI. An eCMM-based device consists of an eCMM and an embedded CPE device that provides the application-specific function of the eCMM-based device. eCMMs may be submitted to CableLabs only for qualification.

eCMM requirements vary depending upon the eCMM-based device they are embedded in. For example, an eCMM embedded in an OpenCable Host 2.1 eCMM-based device will have different requirements than one embedded in a stand-alone DOCSIS cable modem eCMM-based device. An eCMM submitted for qualification must support all the requirements of the eCMM-based device it will be embedded in (see appropriate specification and Certification Guidelines section).

Any eCMM-based device that then incorporates a qualified eCMM may be submitted for an "eCMM based-device Certification" with reduced fees. This doesn't preclude a vendor from submitting an eCMM based-device for full certification.

It is strongly recommended for the safety and integrity of the vendor equipment, collection of test data and testing staff, that these devices be submitted in an enclosed housing. This recommendation could be fulfilled by the usage of non-production quality clear plastic houses, with the appropriated holes to reach interfaces.

Each eCMM-based device implementation must be certified by CableLabs in order to be labeled as CableLabs Certified. Certification of one particular eCMM-based device implementation does not automatically convey certification to another, even if the two devices are built with identical eCMMs.

Qualification Submission Guidelines for eCMMs:

1. Each eCMM, if submitted with a vendor-specific CPE interface, must be submitted with an appropriate CMCI translator to convert the vendor-specific CPE interface (e.g. MII) to an Ethernet interface.
2. Detailed descriptions of all vendor-specific CPE interfaces and their functions must be included in the Executive Summary (note that CMCI access requirements for an eCMM are the same as for a standalone cable modem).
3. Each eCMM with CMCI and power supply is equivalent to a standalone cable modem.
4. All other requirements applicable to the eCMM-based device it will be embedded in apply.
5. The full DOCSIS certification fee applies.

Requalification Submission Guidelines for eCMMs:

1. eCMM products may be submitted for requalification in the event of hardware and /or software changes.
2. Each eCMM, if submitted with a vendor-specific CPE interface, must be submitted with an appropriate CMCI translator to convert the vendor-specific CPE interface (e.g. MII) to an Ethernet interface.
3. Detailed descriptions of all vendor-specific CPE interfaces and their functions must be included in the Executive Summary (note that CMCI access requirements for an eCMM are the same as for a standalone cable modem).
4. Each eCMM with CMCI and power supply is equivalent to a standalone cable modem.
5. All other requirements applicable to the eCMM-based device it will be embedded in apply.
6. The full DOCSIS recertification fee applies.

Certification Submission Guidelines for eCMM-based devices:

1. In order to be considered for certification, an eCMM-based device must be based on a qualified eCMM (no eCMM hardware or software changes are allowed from the originally submitted product).
2. The eCMM-based device may be submitted for certification during the same wave that the eCMM is submitted for qualification or at any future wave within one year of the original qualification.

3. The eCMM-based device is expected to have the same sysDescr as the originally qualified eCMM, with the exception of the model number.
4. The certification requirements that apply to eCMM-based devices are the same as for any other device submitted for certification. However, a reduced certification fee applies.
5. An eCMM-based device is not required to have an externally exposed CMCI interface.
6. Vendor must supply vendor-specific instructions on:
 - a. enabling and disabling the embedded CPE device,
 - b. generating typical traffic through the CPE interface when the embedded CPE is active.

Recertification Submission Guidelines for eCMM-based devices:

An eCMM-based device may be considered for recertification under either or both of the following conditions:

1. An eCMM was requalified due to a hardware modification to the eCMM itself.
2. A modification of the hardware of the eCMM-based device, excluding the eCMM.
3. If an eCMM is requalified due to a software change *only*, the eCMM-based device does not need to be recertified.
4. The submission requirements are the same as the submission requirements for eCMM-based device certification.

5.1.5 Wireless Devices

No special equipment is required when submitting a product with an 802.11a/b/g Access Point wireless interface. If a product containing any other version of a wireless interface is submitted, appropriate Layer 2 bridging station devices must be included with the submission. The SSID for an 802.11 wireless device submitted for CableLabs testing should be the Product ID concatenated with the unit number (i.e.: for a product submitted in CW99 by ABCD, the SSID of the unit 12 should read ABCD991-12); please use all capital letters. All wireless enabled products must not transmit the aforementioned SSID or any other SSID. Also, the configuration user name for a wireless device should be set to “cablelabs” and the password to “admin”. Wireless device submissions must include documentation describing clearly and completely how to configure wireless settings, including SSID.

5.1.6 Bridges

If the product utilizes any other data interface, please submit two bridges for Ethernet. Exceptions include USB or 802.11a/b/g, for which bridges are not required.

5.1.7 CMTS (DOCSIS only)

- Documentation as detailed in Section 4.8, including one operations manual.
- CMTS vendors must also submit the ‘CMTS Special Instructions and Programmable Features’ available for download from DocZone (<https://www.cablelabs.com/doczone/>) under “Certification Documents”.
- CMTS equipment must be submitted with a 100Base-T NSI interface or functional equivalent.
- Four console cables (one per CMTS) must be provided. As required in the CMTS Special Instructions, detailed instructions on how to configure the CMTS using the console port **must** be provided.
- On the CMTS application form, the supplier must list the MIB object(s) that contains the CMTS hardware and software revisions. The revisions listed in these MIB objects must match what is on the application for certification.
- All of the four submitted CMTSs must be pre-configured with the DOCSIS Root CA Certificate and the Test DOCSIS Root CA Certification so that they appear in the docsBpi2CmtsCACertTable. For further information of the Test DRCA, see Section 9.1.
- DOCSIS 3.0 and 2.0 compliant products must support the current version of the DOCSIS Testing MIB as posted on DocZone (<https://www.cablelabs.com/doczone/>).
- In order to support "CMTS Load Balancing and DCC Operation" testing, a DOCSIS 3.0 or 2.0 compliant product must support a rule/policy that demonstrates load balancing operations in the conditions defined in the ATP, either by default or via a vendor specific rule/policy. If the latter, instructions for configuring this rule/policy must be included in the CMTS Special Instructions document.
- For a CMTS that supports more than one downstream in a single unit, at least one of the four CMTS units submitted for qualification must be configured with at least two active downstream ports. For a chassis/blade based CMTS, this could be done with multiple blades, or with multiple downstream ports on the same blade. However, all cards/blades in the CMTS must be consistent from unit to unit (i.e., it is not permissible for one CMTS to have a blade with two downstreams, and all

others to have different blades with a single downstream). The unit that has multiple downstreams active must be labeled appropriately to indicate this.

- A DOCSIS 3.0 CMTS or a CMTS that supports multiple downstream channels per RF port must support the requirements in the DRFI specification. As such, the DRFI Requirements Checklist must be completed and included with the submission.

5.1.7.1 CMTSs with DSG Agent Functionality

In addition to the requirements in Section 5.1.7 for a DOCSIS CMTS, a CMTS that also implements DSG Agent functionality must meet the following requirements:

- These products must comply with the DSG specification, in addition to the DOCSIS 3.0, 2.0, or 1.1 specifications as it may apply.
- The DOCSIS and DSG Requirements Checklist documents must be completed.
- The DSG section of the *CMTS Special Instructions* document available on DocZone (<https://www.cablelabs.com/doczone/>) under “Certification Documents” must be completed.

5.1.7.2 M-CMTS Core

An M-CMTS Core submission must meet the requirements for a CMTS as noted in section 5.1.7, which the following additions and exceptions:

- The DEPI and M-OSSI specifications must be supported in addition to the appropriate DOCSIS specifications.
- A DTI Client as defined in the DTI Specification must be supported.
- In addition to the appropriate DOCSIS Requirements Checklist, the DEPI, M-OSSI, and DTI Requirements Checklist documents must be completed.
- A 100Base-T NSI interface is not required. Copper Gigabit Ethernet is strongly advised. If your product does not support copper Gigabit Ethernet, vendors must contact CableLabs *two weeks* in advance of the certification wave to discuss what additional hardware may be required in order for CableLabs to perform testing.
- A downstream RF port is not required for this device. However, if supported it must comply with the requirements from the appropriate DOCSIS specification.

5.1.8 EQAM

- The DEPI, DRFI, and M-OSSI specifications must be supported.
- A DTI Client as defined in the DTI Specification must be supported.
- Documentation as detailed in Section 4.8, including DEPI, DRFI, and M-OSSI Requirements Checklists, must be included.
- If the ERMI specification is supported, the ERMI Requirements Checklist must be included as well.
- EQAM vendors must also submit the ‘EQAM Special Instructions’ available for download from DocZone (<https://www.cablelabs.com/doczone/>) under “Certification Documents”.

5.1.9 DTI-Server

- The DTI Server requirements of the DTI specification and M-OSSI specification must be supported.
- Documentation as detailed in Section 4.8 must be included.
- DTI Server vendors must also submit the ‘DTI Server Special Instructions’ available for download from DocZone (<https://www.cablelabs.com/doczone/>) under “Certification Documents”.

5.2 Software Images and Digital Certificates

Note that there are specific software and digital certificate requirements per project.

5.2.1 DOCSIS 3.0, 2.0 or 1.1 Cable Modems:

Two software image files must be provided to CableLabs in the submission .zip file.

First is the current image for the certification wave, with a file name according to the following convention:

<Product_ID>.img

The current image is digitally signed by the manufacturer CVC.

The second file is a test image that is a duplicate of the current image except that, when the following MIB element is queried,

iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1).system(1).sysDescr(1)

the response from the modem contains the text "MAC-14 test image for CW##."

Note that as a result of this modification to the sysDescr MIB object, the docsDevSwCurrentVers MIB object is also required to display a different software version number for this second image file containing the text "MAC14_ver" relative to the first image file.

The test image must also have the same signing time as the current image.

The second file name must follow the following convention:

<Product_ID>-MAC-14.img

5.2.2 Additional Files for DOCSIS 3.0, 2.0 or 1.1 Cable Modems:

5.2.2.1 Software Image Files

In the case of the DOCSIS 3.0, 2.0, or 1.1 cable modem submission, in addition to the above two (2) software images for the products (unit #1-#26), the following two (2) additional software images must also be provided in the submission .zip file.

The third file is the current image for the Test DRCA products (unit #27-#28), with a file name according to the following convention:

<Product_ID>-TestDRCA.img

The current image for Test DRCA products is digitally signed by a test manufacturer CVC issued from the Test DRCA.

The fourth file is a test image that is a duplicate of the current image for the Test DRCA products (unit #27-#28) except when the following MIB element is queried,

iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1).system(1).sysDescr(1)

the response from the modem contains the text "BPI-23 test image for CW##".

Note that as a result of this modification to the sysDescr MIB object, the docsDevSwCurrentVers MIB object is also required to display a different software version number for this fourth image file containing the text "BPI23_ver" relative to the third image file.

The fourth file name must follow this convention:

<Product_ID>-TestDRCA-BPI-23.img

5.2.2.2 Digital Certificate Files

Digital Certificate File: In the case of the DOCSIS 3.0, 2.0, or 1.1 cable modem submission, in order to download the MAC-14 image file (<Product_ID>-MAC-14.img) and the current image file (<Product_ID>.img) to the product cable modems (unit #1-#26), these two image files must contain: (a) the identical Manufacturer CVC (Code Verification Certificate) issued by the DOCSIS Root CA, and (b) the same signingTime values of the CVS (Code Verification Signature). For further information on the Manufacturer CVC issuance by the DOCSIS Root CA, see the Section 9. This Manufacturer CVC must also be provided in the submission .zip file, with a file name according to the following convention:

<Product_ID>-CVC.der

Digital Certificate Test File: In order to download the fourth image file (<Product_ID>-TestDRCA-BPI-23.img) and the third current image file (<Product_ID>-TestDRCA-BPI-23.img) to the Test DRCA cable modems (unit #27-#28) these two image files must contain: (a) the identical Test Manufacturer CVC signed by the Test DRCA private key, and (b) the same signing Time values of the CVS. For further information on the Test DRCA, see Section 9.3. This Test Manufacturer CVC must also be provided in the submission documentation, with a file name according to the following convention:

<Product_ID>-TestDRCA-CVC.der.

5.3 CMTS Submission Requirements for SNMP Coexistence Modes of Operation and Event Notifications

The following setup is required for CMTS OSS testing to cover SNMP modes of operation requirements contained in RFC 3411 through RFC 3416 and RFC 3584.

5.3.1 CMTS Configuration

The vendor must configure one CMTS and provide written step-by-step instructions for that purpose in case of a full configuration reset. The vendor may use any of the following or other procedure:

- CLI script with the specific parameters contained in the CMTS Special Instructions and Programmable Features

- Automated Application/script
- Config File
- SNMP commands (provide the details as object-by-object SNMP SET commands)
- usmUserTable from RFC 3414, for Authentication and Privacy Passwords: if the CLI or any other procedure requires localize the keys from the passwords, provide the tools and procedures.

5.3.2 Default Operation for pre-3.0 DOCSIS CMTSs

If SNMPv1/v2c NmAccess or proprietary mode is supported, the CMTS should be in SNMPv1/v2c NmAccess or proprietary mode by default, including instructions for switching between SNMPv1/v2c NmAccess or proprietary mode and SNMP Coexistence Mode. Proprietary mode stands for a SNMPv1/v2c setup that doesn't configure docsDevNmAccessTable or any table in RFC 3411 through RFC 3415 and RFC 2576.

5.3.2.1 SNMPv1/v2c NmAccess/Proprietary Mode if supported for pre-3.0 DOCSIS CMTSs

The following community strings are used:

Community string "public" with read-only/traps access

Community string "private" with read-write access

5.3.3 SNMP Notifications and syslog

Syslog must be set for an IP that will be supplied on submission day, and syslog event reporting must be active, including instructions for changing the syslog IP address.

SNMP Notifications for all required events, including DOCSIS events, must be enabled. SNMP Notifications must only be enabled for the SNMPv1/v2c users/community strings. SNMPv3 users must have SNMP Notifications disabled by default (see snmpTargetAddrRowStatus 'notInService' in snmpTargetAddrTable of RFC 3413).

The IP address of the SNMP Notification receiver will be supplied on submission day. Instructions for changing the SNMP Notification receiver IP address must be supplied.

5.3.4 SNMP access list, if required

All nodes on the 10.50.1.x subnet should have access (a list of specific nodes will be provided on submission day). The CMTS vendor must provide instructions to change the access list.

5.3.5 SNMPv3 Coexistence Mode

Users/Group: Users must have the following setup:

securityName:"rotesting" v1/v2c read-only/traps

securityName:"rwtesting" v1/v2c read-write/traps

User: "noAuthNoPrivUser" v3 read-write/traps access
security level: "noAuthNoPriv"

User: "AuthNoPrivMD5User" v3 read-write/traps access
security level: "AuthNoPriv"

authProtocol: MD5

authPassword: "AuthPassword"

User: "AuthNoPrivSHAUser" v3 read-write/traps access
security level: "AuthNoPriv"

authProtocol: SHA

authPassword: "AuthPassword" (if SHA is supported)

User:"AuthPrivMD5User" v3 read-write/traps access
security level: "AuthPriv"

authProtocol: MD5

authPassword: "AuthPassword"

privProtocol: DES

privPassword: "PrivPassword"

User "AuthPrivSHAUser" v3 read-write/traps access
security level: "AuthPriv"

authProtocol: SHA

authPassword: "AuthPassword" (if SHA is supported)

privProtocol: DES

privPassword: "PrivPassword"

Views: All coexistence users must have a view named "docsisManagerView" with access to the entire MIB tree starting with "internet" or below.

After setup, the snmpCommunityTable, snmpTargetAddrExtTable, usmUserTable, vacmSecurityToGroupTable, vacmAccessTable, vacmViewTreeFamilyTable, vacmContextTable, snmpTargetAddrTable, snmpTargetParamsTable, snmpNotifyTable, snmpNotifyFilterProfileTable and snmpNotifyFilterTable, should resemble the tables in Appendix A of the OSSIV3.0 ATP.

5.3.6 Notes

Specify information about:

- Objects and indexes taking values other than the solicited because CLI autoseup
- Objects/Tables not supported by the implementation
- Special operation conditions and requirements

5.4 DOCSIS CMCI Data Port Verification Guidelines

CMCI data ports must adhere to the following guidelines:

All visible data ports must be labeled appropriately. If a modem with covered ports is certified, the cover must remain intact in order to retain certification status. If a visible port is not active, a full disclosure of such condition is expected. The Certification Board(s) will have final decision, therefore it is highly recommended to make such a disclosure available to CableLabs and the board prior to submission.

Data ports that are not explicitly defined in the CMCI Specification (e.g. HomePNA, wireless, etc.) will be verified for proper operation by CableLabs, utilizing equipment submitted by the vendor as part of that vendor's submission to the wave.

All products with non-specified data ports must have a means to convert to an Ethernet interface, using a vendor-supplied electronic translation adapter or exhibit an Ethernet data port, in addition to the non-specified data port.

CableLabs will provide only a CMTS and a cable plant to connect the device. The vendor must provide required data port-specific test equipment.

Products may contain ports for other uses beyond data ports. For example, a PacketCable™ E-MTA will contain RJ-11 phone jacks and an OpenCable™ Set Top Box may contain digital video ports. Such ports must be both labeled and operational, and may be used to provide stimulus to a device for DOCSIS certification testing.

Any exception to these guidelines must be presented to CableLabs in advance of submission for approval by the Certification Board(s) and noted in the Executive Summary for submission.

Note: Console and/or serial ports are not allowed on cable modems. These ports, whether active or inactive, should not be physically present on the cable modem. Cable modems that are submitted for certification which include a console and/or serial port will be returned upon submission. This rule does not apply to the additional unit expected to be submitted for DOCSIS 3.0 devices.

6 PACKETCABLE SUBMISSION REQUIREMENTS

The following required functionality will be optional unless manufacturers are notified otherwise in advance; CMSS extensions and TLS – optional for CMS and MGC (basic SIP per RFC3261 is required for both components)

Vendors submitting for certification are required to identify optional functionality that has been implemented in the application form.

6.1 E-MTA & E-DVA

1. E-MTA/E-DVA units must contain the DOCSIS CM configuration described in Section 5 as well as the PacketCable configuration described in the table below. The table below summarizes E-MTA/E-DVA certificate configuration requirements.

	E-MTA/E-DVA Units 1-26 and 19-48	E-MTA/E-DVA Units 27, 28	E-MTA/E-DVA Units 59, 60
DOCSIS ROOT PUBLIC KEY	X		X
TEST DOCSIS ROOT PUBLIC KEY		X	
DOCSIS MFG CA CERT	X	X	X
DOCSIS CM CERT	X	X	X
DOCSIS CM PRIVATE KEY	X	X	X
PC SERVICE PROVIDER ROOT CERT	X	X	
TEST PC SERVICE PROVIDER ROOT CERT			X
PC MTA MFG CA CERT	X	X	X
PC MTA CERT	X	X	X
PC MTA PRIVATE KEY	X	X	X
CL SERVICE PROVIDER ROOT CERT			
TEST CL SERVICE PROVIDER ROOT CERT			

2. PacketCable E-MTA and E-DVA devices are classified as eDOCSIS devices, and must comply with the eDOCSIS Specification.

6.1.1 PacketCable High Definition Voice

For PacketCable E-MTA and E-DVA device submitted for certification that include the optional High Definition Voice feature the following will apply:

- The device must implement either an Embedded DECT Interface or a Wideband SLIC Interface or both an Embedded DECT Interface and a Wideband SLIC Interface.
- For devices with Embedded DECT Interface, each unit must be submitted with at least one DECT handset for testing purposes. The vendor must supply proof that the Embedded DECT Components have successfully been certificated by the DECT Forum for highest level of CAT-iq certification at the time of production. The devices will be tested using DECT handsets from a range of vendors for interoperability and results will be reported to the Certification Board.
- The device may have voice quality testing performed and results will be presented as supplemental information to the Certification Board. If such testing is preformed, all devices submitted for that certification wave will be tested equally.

6.2 PacketCable 1.5, PacketCable Multimedia, and PacketCable Residential SIP Telephony Certification

PacketCable products may be submitted for PacketCable 1.5 Certification or Qualification, PacketCable Multimedia Qualification, or PacketCable Residential SIP Telephony Certification or Qualification.

The following products are eligible for PacketCable Residential SIP Telephony Certification/Qualification: E-DVA. The following products are eligible for PacketCable 1.5 Certification/Qualification: E-MTA, CMTS, CMS, MGC, MG. The table below shows the PacketCable 1.5 required interfaces.

The following products are eligible for PacketCable Multimedia Qualification: CMTS, Policy Server.

The table below shows the PacketCable 1.5, PacketCable Multimedia and PacketCable Residential SIP Telephony required interfaces.

Component	PacketCable 1.5	PacketCable Multimedia	PacketCable 2.0	PacketCable RST
E-MTA	NCS, DQoS, SEC, Prov, CODEC, MEM , Battery Backup , MIBs	N/A	N/A	N/A
E-DVA	N/A	N/A	SIP, SEC, Prov, NAT, CODEC, MEM, Dual Stack, Battery Backup MIBS	PacketCable 2.0 + RST
CMTS PacketCable	DQoS, SEC, LAESS , EM	MM	N/A	N/A
CMTS Multimedia	N/A	MM	N/A	N/A
CMTS PacketCable + Multimedia	DQoS, SEC, LAESS , EM	MM	MM I04 or later	
CMS	NCS, DQoS, SEC, CMSS (Basic SIP), LAESS , EM	N/A	N/A	N/A
MG	TGCP, SEC, CODEC, LAESS	N/A	N/A	N/A
MGC	TGCP, SEC, CMSS (Basic SIP), LAESS , EM	N/A	N/A	N/A
Policy Server	N/A	MM	N/A	N/A

6.3 PacketCable MGC Qualification

CableLabs allows independent qualification of PacketCable CMS and PacketCable MGC components that have been implemented in a single, integrated CMS/MGC hardware device. Note that the following terms and conditions apply only to an integrated CMS/MGC device. Policy and terms for other integrated devices will be considered on a case-by-case basis.

A manufacturer of an integrated CMS/MGC device may apply for independent MGC qualification as long as the CMS component within the device has been qualified in one of the three previous Certification Waves.

The manufacturer must also provide documentation of their internal architecture that verifies that the internal PacketCable components (CMS and MGC) are discrete, separate subsystems and that the MGC component can be isolated and tested separately for all required MGC interfaces and test cases.

The manufacturer must provide CableLabs with validation via a written declaration and hardware/software documentation that the CMS provided is the identical hardware/software implementation that has been previously qualified. CableLabs may conduct audit protocol tests to verify that the hardware/software configuration is identical to that of the previously qualified device.

If CableLabs determines that there have been any hardware/software changes to the CMS implementation from the version that was originally qualified, then the MGC is not eligible for independent qualification.

Manufacturers who meet the above criteria are required to pay the published fee for independent MGC qualification or re-qualification as appropriate.

CableLabs will execute all protocol tests against the MGC component during the Wave. Qualification for the MGC will be based on the results of the MGC protocol tests only.

CableLabs will also run system and stability tests on the MGC component, to observe the interaction of the CMS and MGC with other PacketCable certified-qualified components (CMTS, E-MTA, MG) in off-net call scenarios. These results will be presented as information only to the Certification Board and not for certification decision.

Manufacturers who have made changes to the CMS component of their CMS/MGC device subsequent to being CableLabs qualified may submit their integrated device for CMS re-qualification and MGC qualification. In this case, the CMS re-qualification fee and the MGC qualification fee apply.

6.4 ENUM-SIP Addressing Server

CableLabs allows independent qualification of the PacketCable ENUM-SIP Addressing Server.

The following products are eligible for PacketCable ENUM-SIP Addressing Server Certification/Qualification: ENUM Addressing Server, ENUM-SIP Addressing Server

CableLabs will also run system and stability tests on the ENUM-SIP Addressing Server to observe the interaction with other PacketCable certified-qualified components (CMS, SBE, IMS, and AS) in off-net call scenarios. These results will be presented as supplemental information to the Certification Board.

If the server is a software only solution, then hardware hosting equipment must be supplied with the submission. The hardware must be preconfigured and properly licensed for use. The software server must be preloaded and operational before submission.

If any special hardware or software is required to access the command console of the server, the hardware or software must be provided with the submission.

7 OPENCABLE SUBMISSION REQUIREMENTS

7.1 Product Documentation

Manufacturer must provide CableLabs with the following documentation in one .zip file.

- **Executive Summary.** The Executive Summary should include the following:
 - a. **Product Summary.** A high level description of the product being submitted for certification and why the product should be accepted for certification. Details on tasks and efforts conducted by the vendor may be highlighted here.
 - b. **Testing Efforts Description:** A summary of the activities the Manufacturer has undertaken to ensure the product is compliant to OpenCable specifications and is stable and ready to proceed for certification testing. The summary should include a list of all of the testing activities conducted not just the effort to test for Requirements compliance. Note, *prior to* formal Certification testing submission, it is **highly recommended** that the device be submitted to the OpenCable Interoperability and Integration Testing process.
 - c. **Test Results Summary.** A report of the applicable Requirements Checklist results shall be provided which summarizes the results of the Manufacturer’s testing (actual completed Requirements Checklist data is also required for submission). The report should include;
 - Total Requirements items Compliant
 - Total Requirements items Non-Compliant
 - Total Requirements items Not Applicable
 - The detailed test procedure used for each REQ
 - A detailed explanation and justification of compliant items that were passed based on design reviews or implied success based on indirect testing. Such design review or indirect testing should be minimized.
 - A detailed explanation of any Non-Compliant items with justification why the requirement will not impact the certification process results
 - An explanation of why any Not Applicable items are not relevant to the certification testing process
 - OpenCable Host Devices must also include OCAP test results based on the CableLabs CTP
 - d. CableLabs will not conduct 1394 interface connection testing. Vendors are required to submit a proof of compliance statement affirming their 1394 interface connection(s) are fully compliant to the specifications. Vendors may use their own internal test procedures, or may they may use a third party test facility.
 - e. Although JavaTV 1.0 is required under the OCAP 1.1.1 Specification, it is acceptable to provide documentation on successful testing of the Sun JavaTV 1.1.1 TCK.
- **OpenCable Certification Admission Application Form (“Application”).**

The web-based application is available at <https://www.cablelabs.com/certwave/>. To request a vendor login/password to access the web-based application, please contact se-mail@cablelabs.com.

The following submission information must be provided via the web-based application:

- The vendor must use the current version of the web-based form to provide all necessary product submission information
 - When submitting for the first time, the vendor must submit a signed original signature page to be downloaded from the web-based form. An Officer and Quality Assurance Manager of the vendor company must sign this document to affirm the accuracy of all Admission Application information related to the product.
 - Hardware and software revisions and SysDescriptor, or internal software readouts, **must** match the product as submitted or resubmission will be required
- **Completed Vendor Checklist.** The Vendor Checklist should be a completed version of the latest OpenCable Vendor Checklist document available at <https://www.cablelabs.com/doczone/>. “Completed” means each line item is clearly marked with a “Yes” or “No” or “N/A”. Each REQ line item must refer to a given test procedure that was used to verify that specific REQ item. The Vendor Checklist is a manufacturer’s formal declaration to the level of the product’s conformance to the Specification. Vendor Checklist and support documents must accurately represent the product submitted.
 - **Detailed Acceptance Test Plan (ATP).** Each manufacturer is responsible, with respect to its own product, for writing and verifying each test procedure on each line item of the Vendor Checklist, and for testing the product against it. The actual data gathered for each test must be attached to support each of the verifying REQs. Acceptable sources of test procedures for product manufacturers are: (1) Silicon manufacturers (for chip conformance to specs); (2) Commonly used or widely available ATPs for the cable industry, such as the CableLabs ATP, which is available via the project websites; (3) The manufacturer’s internally developed ATPs. The Certification Board requests that each test procedure be documented in a similar manner as the CableLabs ATP located at <https://www.cablelabs.com/doczone/>. (Note that manufacturer is responsible for providing to CableLabs an appropriate “DRM plug-in” for the OCUR test tool, as applicable.)

- **Sun Technology.** Vendors are now required to verify that their implementations have been validated against the Sun Technology Compatibility Kit (TCK) components shown in the following table:

Java Technology and Version:	TCK level
Java ME Connected Device Configuration(CDC) – Version 1.1.1.04	Java ME Connected Device Configuration TCK :1_1_2a (04-Jun-2007)
Java ME Foundation Profile(FP) - Version 1.1.2	Java ME Foundation Profile TCK:1_1_2b(23-Oct-2006)
Java ME Personal Basis Profile(PBP) - Version 1.1.2.02	Java ME Personal Basis Profile TCK: 1_1(22_Jul_2005)
Security Optional Package Specification - Version 1.0	Security Optional Package TCK: 1_0_1(23-Aug-2006)
Java TV Version 1.1.1 (Maintenance Release 2)	Java TV TCK: 1_1_1 (_oct_2008)

A letter, signed by the vendor, asserting compliance and included in the OpenCable Product Documentation package (see **Submission Documentation Folder Hierarchy** on page 24), is sufficient to provide such compliance verification for purposes of OpenCable Certification Wave submission. **It is the responsibility of the submitting vendor to take the required steps** (including TCK licensing and test execution) necessary to establish PBP 1.1 compliance of the OpenCable Host Device.

Please verify any applicable exclusion lists for these TCKs with Sun Microsystems. Any questions about licensing, acquiring, or supporting the TCK for PBP 1.1 should be directed to our contact at Sun Microsystems:

Larry Jarac

Account Manager, OEM Software Licensing
 Sun Microsystems, Inc.
 3000 Bayport Drive, Suite 850
 Tampa, FL 34695 US
 Phone x41127/+1 727 489 7216
 Mobile 727-480-1494
 Fax 727-489-7216
 Email Larry.Jarac@Sun.COM

- **Interoperability Test Report.** The Interoperability Test Report is a summary of all the testing performed at CableLabs (e.g., Dry Runs), MSO locations (field trial), other Interops, third-party locations and other manufacturer sites. The testing performed and summarized in the Interoperability Test Report should demonstrate that the product for which certification is applied operates with as many other products as possible. Specifically, interoperability goals are as follows:

CableCARD Modules: demonstrate interoperability with the available OpenCable features on at least three (3) Host devices or appropriate test platforms.

Host Devices: demonstrate interoperability with the available OpenCable features on (1) at least two CableCARD Modules based on different hardware platforms and (2) each of the deployed headend networks (currently Motorola, Scientific Atlanta, Conax, NDS and Nagravision) and at least 3 major cable operator electronic program guides. Note, *prior to* formal Certification testing submission, it is **highly recommended** that the device be submitted to the OpenCable Interoperability and Integration Testing process.

- **OpenCable Host Devices.** OpenCable Host Devices submitted for certification must be accompanied by a complete set of test results, in electronic form, for the OCAP Conformance Test Plan (CTP). The DOCSIS, eDOCSIS, and DSG Requirements Checklist documents must be completed. Products submitted for certification must be accompanied by a complete set of documentation for DOCSIS as defined in Section 5, inclusive.
- **OCAP CTP Configuration Files.** OpenCable Host Devices submitted for certification must be accompanied by the IUTValues configuration file used by the vendor to produce the OCAP CTP test results described in the previous bullet item. In case the Host Device also implements the OCAP Home Networking API, the vendor needs to provide an additional configuration file – IUTHNValues. Two example files, IUTValues.html and IUTHNValues.html are available on DocZone (https://www.cablelabs.com/doczone/opencable/workinggroups/ocap_ctp/documents/) for the vendor to describe how each configuration value in either of these files should be configured before submission. The vendor supplied file should take the form “iutvalues_XXXXX.cfg” (or “iuthnvalues_XXXXX.cfg”), where XXXXX is the CableLabs Product ID label (see section 4.6) for this device.
- **Digital Certificates.** Host (including OCUR) and CableCARD products require signed X.509 Device Digital Certificates. The monolithic code image must be signed with the Manufacturer Code Verification Certificate (CVC) issued under the CableLabs CVC CA for two-way products (and not the Manufacturer CVC issued under the DOCSIS Root CA), and the OCUR firmware signed with OCUR CVC for OCUR devices. Host Products may also contain

applications signed by an OCAP App CVC. See the OpenCable Security Specification (www.opencable.com/specifications): the OpenCable Host Device Digital Certificate Authorization Agreement (DCAA) (www.opencable.com/documents) ; and the OpenCable Unidirectional Receiver DCAA for details. CableLabs also requires the list of Host and/or CABLECARD ID's of the products submitted for certification. If the CableCARD or Host ID is not on any external label, the relationship between the unique serial number or MAC address and the CableCARD/Host ID is required to be identified.

- **DFAST Parameters.** Host and CableCARD products submitted for certification require production DFAST parameters. See the OpenCable Security Specification (www.opencable.com/specifications) and the Digital Certificate Authorization Agreement (DCAA) (www.opencable.com/documents) for details.

7.1.1 OpenCable Host Submissions:

OpenCable Host Devices submitted for certification must include production:

- DFAST secrets
- Host Device certificate
- DOCSIS CM device certificate
- Code Verification Certificate
- Any other production certificates, Root CAs, CAs and other Critical Security Parameters required by specifications

Submitted products consist of Production Units and Test Certificate units. The certificate configurations for these units are represented in the following table:

Unit No.	Purpose	CableLabs Manufacturer Root CA Certificate and Device CA Certificate	CableLabs Code Verification Root Certificate and CVC CA Certificate	CableLabs Application CVC CA Certificates	DOCSIS Mfg CA Certificate, DOCSIS CM Cert and Private Key	1394 Certificate	DSG / DOCSIS Mode
1 - 18	DOCSIS Testing	Production	Production	Production	Production	Production	DOCSIS Mode
19 -20	DOCSIS / DSG Testing	Production	Production	Production	Production	Production	DSG Mode
21-24	OCAP CTP / OCHD / DSG Testing	Production	Production	Production	Production	Production	DSG Mode
25-26	OCAP CTP Testing	Production	Test	Test	Production	Production	DSG Mode
27	BPI Testing	Production	Test	Test	Production	Production	DSG Mode
28	BPI Testing	Production	Test	Test	Production	Production	DOCSIS Mode

Products submitted for Practice Runs must have production DFAST secrets and host device certificates; the monolithic code image provided must be signed using the CableLabs Manufacturer CVC. Neither OCAP CTP results, nor DOCSIS certification is required as pre-requisite for products being submitted for Practice Runs.

For OpenCable Host terminal devices with different model numbers, the first product submission will require full certification testing. For concurrent submissions in the same Certification Wave with no hardware or software changes, but with different screen sizes or power supply, a paper submission may be submitted along with two devices for regression testing. The paper submission process may also be used in subsequent Certification waves. See Paper Certification process above.

Additional OpenCable eCM Requirements

- Two way OpenCable products must comply with OpenCable Host Device eCM specifications, in addition to the DSG specification, the eDOCSIS Specification and the DOCSIS 3.0, 2.0, or 1.1 specifications as it may apply.
- The DOCSIS, eDOCSIS, and DSG Requirements Checklist documents must be completed.
- In order to support DOCSIS testing, the device must support a “non-DSG” mode, in which the device will not require the presence of DSG messages or traffic in order to lock to a downstream channel. Section 4 of the document *DSG eCM Special Instructions* available on DocZone (<https://www.cablelabs.com/doczone/>) under “Certification Documents” must be completed to detail how the device is put into this non-DSG mode (all other sections of that document are not applicable to an OpenCable Host Device). It is assumed that this will be the only difference between this mode and the device’s normal operating mode. If there are other differences that place constraints upon device testing, please describe them in Section 4 of the special instructions as well.

- The submission, for check-in purposes, must provide read-only access to the MIB objects listed as a MAY in Section 8.5.4.1 in the current OSSI specification: sysDescr, sysUptime and ifTable.
- The devices must include a CPE Interface, such as an accessible Ethernet port. Note that per DSG requirements, this interface must not bridge DSG traffic. This port is for the purpose of sending two-way data traffic to verify DOCSIS functionality.
- The requirements for Stand Alone Cable Modems as defined in Section 5.1 must also be followed.

7.1.2 OCUR Submissions

OpenCable Unidirectional Receiver products submitted for certification must include production:

- DFAST secrets
- OCUR device certificate
- Any other production certificates, Root CAs, CAs and Critical Security Parameters required by specifications

OpenCable Unidirectional Receivers may only be submitted for certification with two or more CableLabs-approved Digital Rights Management (DRM) solutions. Manufacturer is responsible for ensuring that the DRM is submitted to CableLabs for review and approval prior to the submission of product for certification testing. In addition, the manufacturer is responsible for ensuring that applicable licenses are in place with CableLabs, and that a suitable “DRM plug-in” is provided to CableLabs for use in the OCUR test tools used for certification testing.

7.1.3 Tuning Adapter Submissions

These requirements are for stand-alone Tuning Adapter submissions. Requirements for M-UDCP devices with tuning adapters are available in the guidelines available at: <http://www.cablelabs.com/udcp/>.

Tuning adapter products submitted for certification must include:

- Completed Requirements Checklist
- Detailed ATP

7.1.4 OpenCable Host Device Self-Certification

Licensees who have demonstrated that they are consistently capable of obtaining Certification of OpenCable Host Devices may apply for Self Certification status. Subject to the conditions of this section, successful Certification of three (3) unique Host Devices in three (3) separate CableLabs Certification Waves within a two (2) year period, together with no Certification failures or breaches of the applicable agreements (CHILA, OCAP, tru2way over such two (2) year period, shall serve as prima facia evidence of such capability. After successful Certification in such third Certification Wave, Vendor may apply to the Certification Board for Self-Certification status by written request. Once granted, the Certification Board may revoke Self-Certification status for any material breach of the applicable Agreements. The Self-Certification election is optional under the sole discretion of the Vendor, who may notwithstanding the acquiring of the Self-Certification status continue to use CableLabs Certification.

For Self Certification of an OpenCable Host Device, see Self Certification Submission Form available in the online-application form: <http://www.cablelabs.com/certwave/>.

7.2 Additional Submission Instructions

7.2.1 Operational Code Image (OpenCable Host Device)

Manufacturer must provide one signed operational code image for Common Download and Secure Software Download testing following the procedure described in section 4.8.2. The signed image in the .zip file must exactly match the operational code image included in the product(s) being submitted for testing. If the OpenCable product is certified, CableLabs will co-sign the operational code image provided in the .zip file and will return the signed code to the manufacturer.

This is the current image for the certification wave, with a file name according to the following convention:

<Product_ID>.img

The current image is digitally signed by the manufacturer CVC.

Note: The OpenCable Host device is considered to be a single device running a monolithic code image, not a separate eCM and eSTB running separate signed images. So the signed operational code image provided should be the monolithic code image that should be downloaded in its entirety and verified regardless of the download path. The same signed image will be used for testing Common Download to the eSTB as well as Secure Software Download to the eCM.

7.2.1.1 Additional Image Files for eCM Testing

In addition to the current image file, three additional software image files must be provided to CableLabs in the submission .zip file for Secure Software Download testing.

The second file is a test image that is a duplicate of the current image except that, when the following MIB element is queried,

iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1).system(1).sysDescr(1)

the response from the modem contains the text "MAC-14 test image for CW##."

Note that as a result of this modification to the sysDescr MIB object, the docsDevSwCurrentVers MIB object is also required to display a different software version number for this second image file containing the text "MAC14_ver" relative to the first image file.

The second file name must follow the following convention:

<Product_ID>-MAC-14.img

The third file is the current image for the Test Certificate products, with a file name according to the following convention:

<Product_ID>-TestCertificate.img

The current image for Test Certificate products is digitally signed by a test manufacturer CVC issued from the Test CableLabs CVC CA.

The fourth file is a test image that is a duplicate of the current image for the Test Certificate products except when the following MIB element is queried,

iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1).system(1).sysDescr(1)

the response from the modem contains the text "BPI-23 test image for CW##".

Note that as a result of this modification to the sysDescr MIB object, the docsDevSwCurrentVers MIB object is also required to display a different software version number for this fourth image file containing the text "BPI23_ver" relative to the third image file.

The fourth file name must follow this convention:

<Product_ID>-TestCertificate-BPI-23.img

7.2.2 Digital Certificate Files:

Digital Certificate File: In the case of the DOCSIS 3.0, 2.0, and 1.1 eCM submission, in order to download the MAC-14 image file (<Product_ID>-MAC-14.img) and the current image file (<Product_ID>.img) to the production units these two image files must contain: (a) the identical Manufacturer CVC (Code Verification Certificate) issued by the CableLabs CVC CA, and (b) the same signingTime values of the CVS (Code Verification Signature). This Manufacturer CVC must also be provided in the submission .zip file, with a file name according to the following convention:

<Product_ID>-CVC.der

Digital Certificate Test File: In order to download the fourth Test Certificate image file (<Product_ID>-TestCertificate-BPI-23.img) and the third current Test Certificate image file (<Product_ID>-TestCertificate.img) to the Test certificate cable modems alternatively, these two image files must contain: (a) the identical Test Manufacturer CVC signed by the Test CA private key, and (b) the same signing Time values of the CVS. This Test Manufacturer CVC must also be provided in the submission documentation, with a file name according to the following convention:

<Product_ID>-TestCertificate-CVC.der.

7.2.3 Operational Code Image (OCUR)

Manufacturer must provide one signed operational code image as specified in the OCUR specification. The signed image in the .zip file must exactly match the operational code image included in the product(s) being submitted for testing. If the OCUR product is certified, CableLabs will co-sign the operational code image provided in the .zip file and will return the signed code to the manufacturer.

7.2.4 Modes of operation for OpenCable Host Devices and the DRCA units

For the purposes of testing Digital Certificate manipulation, the DRCA unit must be able to boot in both modes (DOCSIS mode and DSG mode). If the method for switching between modes requires manual intervention by the vendor, one DRCA units must be configured to boot in DOCSIS-only test mode and three in DSG mode.

7.2.5 Wireless Keyboard (OpenCable Host Device)

At the time of submission, the Host manufacture must provide a functional wireless keyboard with their device to allow for the testing of key event requirements. The keyboard must have all the keys necessary to produce the key events described in Table 25-6 of the OCAP specification.

8 DPOE SUBMISSION REQUIREMENTS

8.1 DPoE PRODUCTS

The following information provides specific product submission requirements.

8.1.1 DPoE 1.0 ONU Submissions

Each DPoE 1.0 ONU submission must include 14 units. All 14 units must contain the real device certificate and real CableLabs DPoE Mfr CA certificate (DPoE CA00008).

8.1.2 eDOCSIS Products

eDOCSIS products being submitted must comply with the Embedded DOCSIS (eDOCSIS) Specification, in addition to the DPoE 1.0 specifications as they may apply.

The following is a summary of the key requirements of the eDOCSIS Specification:

- It contains specific requirements for the embedded cable modem component of the E-MTA and E-DVA for the reporting of a "logical interface" to represent the data path between the ONU component and the E-MTA or E-DVA. This logical interface is given a well-known ifIndex and is required to follow the same data forwarding and address learning rules as a "normal" CPE interface (e.g. Ethernet).
- It requires that the DPoE device-specific MIBs not be made available to an SNMP manager that queries the E-MTA or E-DVA IP address. Similarly, the E-MTA or E-DVA device-specific MIBs are not to be made available to an SNMP manager that queries the vCM IP address.
- For the complete set of requirements, please refer to the eDOCSIS Specification published in the CableLabs website at <http://www.cablemodem.com/>. Note that these requirements apply to the embedded cable modem regardless of which version of the DOCSIS specification it complies with (DOCSIS 3.0, 2.0 or 1.1).

8.1.3 DPoE System

- Documentation as detailed in Section 4.8, including one operations manual.
- DPoE System vendors must also submit the 'DPoE System Special Instructions and Programmable Features' available for download from DocZone (<https://www.cablelabs.com/doczone/>) under "Certification Documents".
- DPoE System equipment must be submitted with a 100Base-T NSI interface or functional equivalent.
- Two console cables (one per DPoE System) must be provided. As required in the DPoE System Special Instructions, detailed instructions on how to configure the DPoE System using the console port **must** be provided.
- On the DPoE System application form, the supplier must list the MIB object(s) that contains the DPoE System hardware and software revisions. The revisions listed in these MIB objects must match what is on the application for certification.
- All of the four submitted DPoE Systems must be pre-configured with:
 - Real CableLabs Mfr Root CA certificate. Used for ONU authentication testing (DSEC-01)
 - Test CableLabs Mfr Root CA certificate. Used for ONU authentication testing (DSEC-01)
 - Real CableLabs CVC Root CA certificate and real CableLabs CVC CA certificate. Used by vCMs to validate signed code images (DSEC-06)
 - Test CableLabs CVC Root CA certificate and test CableLabs CVC CA certificate. Used by vCMs to validate signed code images (DSEC-05)

8.2 Software Images and Digital Certificates

Note that there are specific software and digital certificate requirements per project.

8.2.1 DPoE 1.0 ONUs:

Two software image files must be provided to CableLabs in the submission .zip file.

First is the current image for the certification wave, with a file name according to the following convention:

<Product_ID>.img

The current image is digitally signed by the DPoE manufacturer CVC.

The second file is a test image that is a duplicate of the current image except that it has a different software version number.

The test image must also have the same signing time as the current image.

The second file name must follow the following convention:

<Product_ID>-DSEC-06.img

8.2.2 Additional Files for DPoE 1.0 ONUs:

8.2.2.1 Software Image Files

In the case of the DPoE 1.0 ONU submission, in addition to the above two (2) software images, the following two (2) additional software images must also be provided in the submission .zip file.

The third file is the current image with a file name according to the following convention:

<Product_ID>-TestCLCA.img

This file is digitally signed by a test DPoE manufacturer CVC issued from the test CableLabs CVC CA certificate.

The fourth file is a duplicate of the current image except that it has a different software version number.

The fourth file name must follow this convention:

<Product_ID>-TestCLCA-DSEC-05.img

This file is digitally signed by a test DPoE manufacturer CVC issued from the test CableLabs CVC CA certificate.

8.2.2.2 Digital Certificate Files

Digital Certificate File: In the case of the DPoE 1.0 ONU submission, in order to download the DSEC-06 image file (<Product_ID>-DSEC-06.img) and the current image file (<Product_ID>.img) to the ONUs, these two image files must contain: (a) the identical DPoE Manufacturer CVC (Code Verification Certificate) issued by the CableLabs CVC CA, and (b) the same signingTime values of the CVS (Code Verification Signature). For further information on the DPoE Manufacturer CVC issuance by the CableLabs CVC CA, see the Section 9. This DPoE Manufacturer CVC must also be provided in the submission .zip file, with a file name according to the following convention:

<Product_ID>-CVC.der

Digital Certificate Test File: In order to download the fourth image file (<Product_ID>-TestCLCA-DSEC-05.img) and the third current image file (<Product_ID>-TestCLCA.img) to the ONUs these two image files must contain: (a) the identical Test DPoE Manufacturer CVC signed by the Test Cablelabs CVC CA private key, and (b) the same signingTime values of the CVS. For further information on the Test CableLabs CVC CA, see Section 9.3. This Test DPoE Manufacturer CVC must also be provided in the submission documentation, with a file name according to the following convention:

<Product_ID>-TestCLCA-CVC.der.

8.3 DPoE System Submission Requirements for SNMP Coexistence Modes of Operation and Event Notifications

The following setup is required for DPoE System OSS testing to cover SNMP modes of operation requirements contained in RFC 3411 through RFC 3416 and RFC 3584.

8.3.1 DPoE System Configuration

The vendor must configure one DPoE System and provide written step-by-step instructions for that purpose in case of a full configuration reset. The vendor may use any of the following or other procedure:

- CLI script with the specific parameters contained in the DPoE System Special Instructions and Programmable Features
- Automated Application/script
- Config File
- SNMP commands (provide the details as object-by-object SNMP SET commands)
- usmUserTable from RFC 3414, for Authentication and Privacy Passwords: if the CLI or any other procedure requires localize the keys from the passwords, provide the tools and procedures.

8.3.2 Default Operation for DPoE Systems

If SNMPv1/v2c NmAccess or proprietary mode is supported, the DPoE System should be in SNMPv1/v2c NmAccess or proprietary mode by default, including instructions for switching between SNMPv1/v2c NmAccess or proprietary mode and SNMP Coexistence Mode. Proprietary mode stands for a SNMPv1/v2c setup that doesn't configure docsDevNmAccessTable or any table in RFC 3411 through RFC 3415 and RFC 2576.

8.3.2.1 SNMPv1/v2c NmAccess/Proprietary Mode

The following community strings are used:

- Community string “public” with read-only/traps access
- Community string “private” with read-write access

8.3.3 SNMP Notifications and syslog

Syslog must be set for an IP that will be supplied on submission day, and syslog event reporting must be active, including instructions for changing the syslog IP address.

SNMP Notifications for all required events, including DOCSIS and DPoE events, must be enabled. SNMP Notifications must only be enabled for the SNMPv1/v2c users/community strings.

The IP address of the SNMP Notification receiver will be supplied on submission day. Instructions for changing the SNMP Notification receiver IP address must be supplied.

8.3.4 SNMP access list, if required

All nodes on the 10.50.1.x subnet should have access (a list of specific nodes will be provided on submission day). The DPoE System vendor must provide instructions to change the access list.

8.3.5 Notes

Specify information about:

- Objects and indexes taking values other than the solicited because CLI autoseup
- Objects/Tables not supported by the implementation
- Special operation conditions and requirements

8.4 DPoE ONU CMCI Data Port Verification Guidelines

CMCI data ports must adhere to the following guidelines:

All visible data ports must be labeled appropriately. If a DPoE ONU with covered ports is certified, the cover must remain intact in order to retain certification status. If a visible port is not active, a full disclosure of such condition is expected. The Certification Board(s) will have final decision; therefore it is highly recommended to make such a disclosure available to CableLabs and the board prior to submission.

Data ports that are not explicitly defined in the CMCI Specification (e.g. HomePNA, wireless, etc.) will be verified for proper operation by CableLabs, utilizing equipment submitted by the vendor as part of that vendor’s submission to the wave.

All products with non-specified data ports must have a means to convert to an Ethernet interface, using a vendor-supplied electronic translation adapter or exhibit an Ethernet data port, in addition to the non-specified data port.

CableLabs will provide only a DPoE System and a cable plant to connect the device. The vendor must provide required data port-specific test equipment.

Products may contain ports for other uses beyond data ports. For example, a PacketCable™ E-MTA will contain RJ-11 phone jacks and an OpenCable™ Set Top Box may contain digital video ports. Such ports must be both labeled and operational, and may be used to provide stimulus to a device for DOCSIS certification testing.

Any exception to these guidelines must be presented to CableLabs in advance of submission for approval by the Certification Board(s) and noted in the Executive Summary for submission.

Note: Console and/or serial ports are not allowed on DPoE ONUs. These ports, whether active or inactive, should not be physically present on the DPoE ONU. DPoE ONUs that are submitted for certification which include a console and/or serial port will be returned upon submission.

9 DIGITAL CERTIFICATE PROCESSES AND CERTIFICATION

This section describes Digital Certificate Processes for Certification Wave submission. Additional supporting documentation may be found at the CableLabs Certification and Qualification website at <http://www.cablelabs.com/certqual/>.

9.1 Obtaining CableLabs Digital Certificates and CVCs

One month in advance of submission date*:

1. Review [CableLabs Certificate Issuance Process](#)
2. Complete the appropriate [Digital Certificate Authorization Agreement\(s\) \(DCAAs\)](#) (listed below):
 - a. [DOCSIS](#)
 - b. [PacketCable](#)
 - c. [DPoE](#)
 - d. OpenCable
3. Submit agreement to CableLabs for approval.
 - CableLabs authenticates contacts listed on the Customer Profile and invoices manufacturer for the appropriate fee.
 - CableLabs must receive completed DCAA agreement, naming document, responses to contact authentication emails and payment prior to authorizing activation of the Certificate Requesting Account.
 - Account activation will take approximately one week from the authorization date.
4. Completion is reliant upon prompt vendor response time and document accuracy. Complete the [DOCSIS Code Verification Certificate \(CVC\) agreement](#) or the [DPoE Code Verification Certificate \(CVC\) agreement](#) if you do not already have a CVC**.
5. Submit agreement to CableLabs for approval.
 - CableLabs authenticates contacts listed on the agreement and invoices manufacturer for the appropriate fee.
 - CVC Signing Ceremonies occur on the second and fourth Fridays of each month.
 - CableLabs must receive the following before the first or third Friday of the month to ensure manufacturer's inclusion in the next ceremony:
 - a. Completed CVC agreement
 - b. Naming Document
 - c. Code Signing Request (CSR) – (PKCS#10 file)
 - d. Contact Authentication Email Responses
 - e. Payment

Note: OpenCable DCAA may be submitted up to 10 weeks in advance. Additionally, for OpenCable Host Devices, DSG & OCAP CVC are part of the DCAA. For OCUR devices, CVC is part of the OCUR DCAA.

Contact Tara Gratz at t.gratz@cablelabs.com regarding questions about obtaining certificates.

9.2 CableLabs Root CA

Symantec, on behalf of CableLabs, operates the following CableLabs Root Certification Authorities:

1. DOCSIS Root Certification Authority (DRCA) for the DOCSIS 3.0, 2.0, and 1.1 systems.
2. PacketCable Root CA (PRCA) for PacketCable
3. CableLabs Manufacturer Root CA (CMRCA) for OpenCable and DPoE
4. CableLabs Service Provider Root CA (CSPRCA) for PacketCable
5. CableLabs Code Verification Certificate Root CA (CCVCRCA) for OpenCable

All of the above CableLabs Root CAs can be downloaded at the following location:

<http://www.cablelabs.com/certqual/security>

CableLabs also maintains a set of Test Root CAs for testing purposes:

1. Test DOCSIS Root CA (Test DRCA)
2. Test CableLabs Service Provider Root CA
3. Test CableLabs Manufacturer Root CA
4. Test CableLabs CVC Root CA

All of the above CableLabs Test Root CAs can be downloaded at the following location under the appropriate project:

<http://www.cablelabs.com/certqual/security>

Additional Test CAs for OpenCable may be obtained by contacting OpenCable and signing appropriate licenses. Please note that OpenCable Terminal equipment or OpenCable Set-top boxes designated for OCAP testing must have OpenCable Test CAs.

9.3 CableLabs CA

CableLabs supports a Centralized CA model, whereby CableLabs manages a shared CA, and issues device certificates to manufacturers, who are then responsible for embedding the certificates into the appropriate devices. Manufacturers that already have a CA may continue to use it, or may transition to the new centralized model. Manufacturers that do not have a CA will be provided certificates through the Centralized model.

Manufacturers who continue to operate their own CAs to issue DOCSIS 3.0 CM device certificates are required to successfully complete a CableLabs audit. This audit must be performed before submitting DOCSIS 3.0 CMs for certification testing. To schedule an audit, please Contact Tara Gratz (303-661-9100 or t.gratz@cablelabs.com) at least one month before the desired date. The DOCSIS Certification Authority Audit Policy document is posted on the DocZone website (<https://www.cablelabs.com/doczone/docsis/requirements/supportdocs>).

Symantec, on behalf of CableLabs, operates the following Shared CAs in support of the Centralized model:

1. CableLabs Shared DOCSIS CA for DOCSIS 3.0, 2.0, and 1.1
2. CableLabs Shared PacketCable CA for PacketCable
3. CableLabs Shared Manufacturer CA for OpenCable
4. CableLabs Shared Manufacturer CA for DPoE
5. CableLabs Shared CVC CA for OpenCable and DPoE
6. OCAP App CVC CA for OpenCable
7. CableLabs Shared Service Provider CA for PacketCable

CableLabs Shared CAs can be downloaded at the following location:

<http://www.cablelabs.com/certqual/security>

CableLabs also maintains a set of Test CAs for testing purposes:

1. Test CableLabs Code Verification Certificate CA

CableLabs Test CAs can be downloaded at the following location:

<http://www.cablelabs.com/certqual/security>

Additional Test CVC CAs for OpenCable may be obtained by contacting OpenCable and signing appropriate licenses.

Within this document, the term Manufacturer CA will mean either the Manufacturer's CA, or the Shared CA, depending on which model the manufacturer is in.

9.4 Certificate Requirements

9.4.1 Digital Certificate Necessary for DOCSIS 3.0, 2.0 and 1.1 Cable Modem Vendor

Compliant CMs must contain the Manufacturer CA issued by the DOCSIS Root CA, and the CM device certificate issued by the Manufacturer CA. They must also contain the DOCSIS Root CA public key for validating Secure Software Download CVCs.

For BPI-21.1 (CM Authentication by CMTS) and BPI-23.1 (Secure Software Download), CableLabs uses the Test DOCSIS Root CA (Test DRCA) and the digital certificates generated by it. The Test DRCA CMs (units #27-28) must contain the Test DRCA public key for CVC verification of Secure Software Download as specified in Section 9. The submitted CMTS must be capable of supporting the Test DRCA Certificate as specified in Section 9.

Test DRCA Data including the Test DRCA Certificate, its PSA Private Key and additional information can be found at the CableLabs Certification/Qualification website at <http://www.cablelabs.com/certqual/security>.

9.4.2 Digital Certificate Necessary for the PacketCable E-MTA/E-DVA

As defined in the PacketCable Security specification, E-MTAs/E-DVAs must contain the PacketCable Manufacturer CA certificate issued by the PacketCable MTA Root CA, and the E-MTA/E-DVA device certificate issued by the Manufacturer CA. E-MTAs/E-DVAs must also contain either the CableLabs Service Provider Root CA certificate or Test CableLabs Service Provider Root CA certificate (refer to the table in Section 6.1 for more information). E-MTAs/E-DVAs are embedded with DOCSIS 3.0, 2.0, and 1.1 compliant CMs. Refer to Section 9.3 for information on DOCSIS 3.0, 2.0, and 1.1 cable modem certificate requirements.

9.4.3 Digital Certificate Necessary for OpenCable Host Devices and OCAP

The CableCARD Copy Protection Specification requires the use of X.509 digital certificates in accordance with the OpenCable Security Specification (both specifications at www.opencable.com/specifications). Test/evaluation certificates for hosts and OCAP are provided by CableLabs when Manufacturer signs the CableCARD-Host Interface License Agreement (CHILA), and

the OCAP Implementers Agreement, respectively. While production digital certificates are required for most phases of CableLabs certification testing, the current OCAP testing process requires that some devices under test be loaded with Test/evaluation certificates. See the table in Section 4.6 for information on which submitted units require test certificates. See the table in Section 7.1.1 for information on test/evaluation certificate configurations. Access to production digital certificates requires execution of either the OpenCable Host Device Digital Certificate Authorization Agreement or the OCUR Digital Certificate Authorization Agreement. All required OpenCable licenses are located at www.opencable.com/documents.

9.4.4 Digital Certificates Necessary for DPoE 1.0 ONU & DPoE System Devices

Compliant ONUs must contain the real DPoE Manufacturer CA certificate (CA00008) issued by the real CableLabs Mfr Root CA, and the real ONU device certificate (along with its associated private key) issued by the DPoE Manufacturer CA.

For DSEC-01 (ONU Authentication by DPoE System) CableLabs uses the real CableLabs Mfr Root CA certificate and the Test CableLabs Mfr Root CA certificate. For DSEC-05 (Secure Software Download), CableLabs uses the Test CableLabs CVC Root CA, Test CableLabs CVC CA and the digital certificates generated by them. The submitted DPoE System must be capable of supporting these real and test CA certificates. CA certificates can be found at CableLabs Certification/Qualification website at <http://www.cablelabs.com/certqual/security>.”

9.5 Digital Certificate Issuance Process

Refer to the CableLabs Certificate Issuance documentation located at: <http://www.cablelabs.com/certqual/security>

9.6 Digital Certificate Authorization Agreements (DCAAs)

The following DCAAs can be found at: <http://www.cablelabs.com/certqual/security>

- DOCSIS DCAA
- PacketCable DCAA
- OpenCable DCAAs
- DPoE DCAA

9.7 Digital Certificate for the OEM Cable Modems

Neither the Certification Process nor the CableLabs Digital Certificate Authorization Agreement prohibits the digital certificates issued by Root CA's from being used for the third-party cable modems, as long as the digital certificates are used in compliance with the CableLabs DOCSIS Specification and the Digital Certificate Authorization Agreement. The manufacturer specified in the digital certificate shall be responsible for the usage of the digital certificate.

9.8 CableLabs Certified Cable Modem Code Files

CableLabs may sign the DOCSIS 3.0, 2.0, or 1.1 Certified cable modem code files. The code-signing procedure shall take place at CableLabs under industry standard certificate policies and procedures. In spite of such security procedures, there is always a risk of security breach or error. The vendor agrees that CableLabs is not liable under any legal theory for any problems arising from or related to the CableLabs' code signing.

E-MTAs/E-DVAs are embedded in DOCSIS 3.0, 2.0, or 1.1 cable modems. Thus, CableLabs may sign certified E-MTA/E-DVA images using the CableLabs DOCSIS CVC.

10 QUESTIONS

Email: se-mail@cablelabs.com

Fax: 303-661-3830

Phone: 303-661-9100

Additional information regarding the certification process, security processes, press releases, and rules of engagement may be found at the CableLabs Certification and Qualification website at <http://www.cablelabs.com/certqual/>.

11 SUBMISSION CHECKLISTS

CPE DEVICES:

<p>Stand-alone Cable Modems and eCM devices</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <input type="checkbox"/> Application including MAC addresses <input type="checkbox"/> Required documentation <ul style="list-style-type: none"> <input type="checkbox"/> Executive summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Image & Driver Files for MAC-14 & Test DRCA <input type="checkbox"/> Cable Modem Device Certificates and DOCSIS Code Verification Certificate (CVC) <input type="checkbox"/> eCM Special Instructions (for eCM products only) <input type="checkbox"/> Successful completion of a CableLabs audit if you operate your own CA (distributed model) to issue DOCSIS 3.0 CM device certificates.
<p>E-MTA and E-DVA</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <input type="checkbox"/> Application including CM and MTA MAC addresses <input type="checkbox"/> Required documentation (Main Folder) <ul style="list-style-type: none"> <input type="checkbox"/> Executive summary for both DOCSIS and PacketCable functionality <input type="checkbox"/> Interoperability Test Report for PacketCable functionality <input type="checkbox"/> PacketCable/DOCSIS Image and Driver files DOCSIS (Sub Folder) <ul style="list-style-type: none"> <input type="checkbox"/> Completed Requirements Checklist (DOCSIS) PacketCable (sub-folder) <ul style="list-style-type: none"> <input type="checkbox"/> Component Checklist (PacketCable) <ul style="list-style-type: none"> <input type="checkbox"/> ATP (PacketCable)
<p>DPoE ONU</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <input type="checkbox"/> Application including MAC addresses <input type="checkbox"/> Required documentation <ul style="list-style-type: none"> <input type="checkbox"/> Executive summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Device Certificates and Code Verification Certificate (CVC) <input type="checkbox"/> Special Instructions, if applicable
<p>OpenCable Host</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> OpenCable Certification Admission Application – signed original, <u>complete</u> <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <ul style="list-style-type: none"> <input type="checkbox"/> Executive Summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Detailed ATP <input type="checkbox"/> Host Device Certificates and OpenCable Code Verification Certificate (CVC) <input type="checkbox"/> Interoperability Test Report OCAP Test Results (based on the OCAP CTP from CableLabs) <input type="checkbox"/> Manufacturer-signed OCAP image in object code form
<p>OpenCable Unidirectional Receiver</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> OpenCable Certification Admission Application – signed original, <u>complete</u> <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <ul style="list-style-type: none"> <input type="checkbox"/> Executive Summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Detailed ATP <input type="checkbox"/> Host Device Certificates and OpenCable Code Verification Certificate (CVC) <input type="checkbox"/> DRM Plug-in for OCUR test tool

OpenCable CableCARD	<input type="checkbox"/> The required number of products complete with power supplies with required labeling. <input type="checkbox"/> OpenCable Certification Admission Application – signed original, <u>complete</u> <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Executive Summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Detailed ATP <input type="checkbox"/> CableCARD Device Certificates <input type="checkbox"/> Interoperability Test Report
Tuning Adapter	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Executive Summary <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> Detailed ATP

HEADEND DEVICES:

DOCSIS CMTS	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 100Base-T Interface or equivalent <input type="checkbox"/> Four console cables (one per CMTS) <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Application with MAC addresses <input type="checkbox"/> Required documentation <input type="checkbox"/> Executive summary <input type="checkbox"/> Software Image File(s) required to rebuild the system <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> CMTS Special Instructions & Programmable Features <input type="checkbox"/> Operations manual
DPoE System	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 100Base-T Interface or equivalent <input type="checkbox"/> Two console cables (one per DPoE System) <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Application with MAC addresses <input type="checkbox"/> Required documentation <input type="checkbox"/> Executive summary <input type="checkbox"/> Software Image File(s) required to rebuild the system <input type="checkbox"/> Supported data rates (1G/1G, 10G/1G, 10G/10G) <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> DPoE System Special Instructions & Programmable Features <input type="checkbox"/> Operations manual
DOCSIS M-CMTS Core	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 100Base-T Interface or equivalent <input type="checkbox"/> Four console cables (one per CMTS) <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Application with MAC addresses <input type="checkbox"/> Required documentation <input type="checkbox"/> Executive summary <input type="checkbox"/> Software Image File(s) required to rebuild the system <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> CMTS Special Instructions & Programmable Features <input type="checkbox"/> Operations manual
EQAM	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <u>To be uploaded via the web form:</u> <input type="checkbox"/> Application with MAC addresses <input type="checkbox"/> Required documentation <input type="checkbox"/> Executive summary <input type="checkbox"/> Software Image File(s) required to rebuild the system <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> EQAM Special Instructions & Programmable Features
DTI Server	<input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee

	<p><u>To be uploaded via the web form:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Application <input type="checkbox"/> Required documentation <ul style="list-style-type: none"> <input type="checkbox"/> Executive summary <input type="checkbox"/> Software Image File(s) required to rebuild the system <input type="checkbox"/> Completed Requirements Checklist <input type="checkbox"/> DTI Server Special Instructions & Programmable Features
<p>PacketCable CMTS</p> <p>DOCSIS + PacketCable Multimedia CMTS</p> <p>PacketCable + Multimedia CMTS</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 100Base-T Interface or equivalent <input type="checkbox"/> Six console cables (one per CMTS) <input type="checkbox"/> Fee <p><u>To be uploaded via the web form:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Application including CMTS MAC addresses <input type="checkbox"/> Required documentation (Main Folder) <ul style="list-style-type: none"> o Executive summary for both DOCSIS and PacketCable functionality o Interoperability Test Report for PacketCable functionality o Software Image File(s) required to rebuild the system <u>DOCSIS (sub-folder)</u> <ul style="list-style-type: none"> o Completed Requirements Checklist DOCSIS) o CMTS Special Instructions & Programmable Features (DOCSIS) o Operations Manual <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> o Component Checklist (PacketCable) o ATP (PacketCable) <ul style="list-style-type: none"> o PacketCable CMTS Vendor Product Operating Instructions
<p>PacketCable CMS</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 2 supporting MGC, MG, SG units provided to support off-net functionality with the CMS in the Certification Wave <input type="checkbox"/> Fee <p><u>To be uploaded via the web form:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Application including serial numbers <input type="checkbox"/> Required documentation (Main folder) <ul style="list-style-type: none"> o Executive summary o Interoperability Test Report o Software Image File(s) required to rebuild the system <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> o Component Checklist (PacketCable) o ATP (PacketCable) o PacketCable CMS Vendor Product Operating Instructions o Vendor Product Operating Instructions for supporting MGC, MG, SG
<p>PacketCable MGC</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 2 supporting CMS, MG, SG units provided to support off-net functionality with the MGC in the Certification Wave <input type="checkbox"/> Fee <p><u>To be uploaded via the web form:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Application <input type="checkbox"/> Required documentation (Main Folder) <ul style="list-style-type: none"> o Executive summary o Interoperability Test Report o Software Image File(s) required to rebuild the system <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> o Component Checklist (PacketCable) o ATP (PacketCable) o PacketCable MGC Vendor Product Operating Instructions o Vendor Product Operating Instructions for supporting CMS, MG, SG product
<p>PacketCable MG</p>	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> 2 supporting CMS, MGC, SG units provided to support off-net functionality with the MG in the Certification Wave <input type="checkbox"/> Fee <p><u>To be uploaded via the web form:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Application including serial numbers <input type="checkbox"/> Required documentation (Main Folder)

	<ul style="list-style-type: none"> ○ Executive summary ○ Interoperability Test Report ○ Software Image File(s) required to rebuild the system <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> ○ Component Checklist (PacketCable) ○ ATP (PacketCable) ○ PacketCable MG Vendor Product Operating Instructions ○ Vendor Product Operating Instructions for supporting CMS, MGC, SG product
PacketCable Policy Server	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <input type="checkbox"/> Application including serial numbers <input type="checkbox"/> Required documentation (Main Folder) <ul style="list-style-type: none"> ○ Executive summary ○ Interoperability Test Report ○ Software Image File(s) required to rebuild the system <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> ○ Component Checklist (PacketCable) ○ ATP (PacketCable) ○ PacketCable Policy Server Vendor Product Operating Instructions
PacketCable ENUM-SIP Addressing Server	<ul style="list-style-type: none"> <input type="checkbox"/> The required number of products complete with power supplies with required labeling <input type="checkbox"/> Fee <i>To be uploaded via the web form:</i> <input type="checkbox"/> Application including serial numbers <input type="checkbox"/> Required documentation (Main folder) <ul style="list-style-type: none"> ○ Executive summary ○ Interoperability Test Report ○ Software Image File(s) required to rebuild the system <u>PacketCable (sub-folder)</u> <ul style="list-style-type: none"> ○ ATP (PacketCable) ○ Vendor Product Operating Instructions ○ Completed Requirements Checklist ○ Special Instructions & Programmable Features