

MEF

Abstract Test Suite

MEF 25

**UNI Type 2
Part 3: Service OAM**

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1. ABSTRACT

This document is the third part of the Abstract Test Suite for User to Network Interface (UNI) Type 2. It defines test procedures based on a combination of requirements for Service OAM described in MEF 20 *UNI Type 2 Implementation Agreement*, ITU-T Y.1731 and IEEE 802.1ag. The overall Abstract Test Suite for UNI Type 2 will be composed of the following six parts: Link OAM, E-LMI, Service OAM, Protection, Enhanced UNI Attributes and L2CP handling.

2. Terminology

AIS	Alarm Indication Signal
CCM	Continuity Check Message
CoS	Class of Service
Down MEP	A MEP residing in a Bridge that receives CFM PDUs from, and transmits them towards, the direction of the LAN
EMS	Element Management System
ETH-AIS	Ethernet Alarm Indication Signal
EVC	Ethernet Virtual Connection
EVC-MA	Ethernet Virtual Connection Maintenance Association
FM	Fault Management
LBM	Loopback Message
LBR	Loopback Reply
MAC	Media Access Control
MA	Maintenance Association
MAID	Maintenance Association Identifier
MD	Maintenance Domain
MD Level	Maintenance Domain Level
ME	Maintenance Entity
MEG	Maintenance Entity Group
MEP	Maintenance association End Point
MP	Maintenance Point. One of either a MEP or a MIP
MTU	Maximum Transmission Unit
NE	Network Element
NMS	Network Management System
OAM	Operations, Administration, and Maintenance
OAM Domain	Equivalent to "Maintenance Domain" (MD)

Operator-MA	Operator Maintenance Association
P2P	Point-to-Point
PDU	Protocol Data Unit
RDI	Remote Defect Indication
SOAM	Service Operations, Administration, and Maintenance
Subscriber-MA	Subscriber Maintenance Association
Test-MA	Test Maintenance Association
UNI	User-to-Network Interface
UNI-C	Subscriber side UNI functions
UNI-MA	User-to-Network Interface Maintenance Association
UNI-N	Network side UNI functions
Up MEP	A MEP residing in a Bridge that transmits CFM PDUs towards, and receives them from, the direction of the Bridge Relay Entity
VID	VLAN Identifier
VLAN	Virtual LAN

3. Terminology Mapping between MEF, IEEE and ITU-T

MEF 20	IEEE 802.1ag	ITU-T Y.1731
MEG	MA	MEG
MAID	MAID	MEG ID
MEG Level	MD Level	MEG Level

4. Scope

The Service OAM part of the Abstract Test Suite for UNI Type 2 describes test procedures based on a combination of the requirements for Service OAM described in MEF 20 *UNI Type 2 Implementation Agreement*, ITU-T Y.1731 and IEEE 802.1ag.

An overview of the different groups of requirements that compose this test suite is provided as follows:

- Configuration Requirements
- Maintenance Entity Requirements
- MEG End Points Requirements
- Continuity Check Requirements
- Loopback Requirements

The UNI Type 2 Link OAM, E-LMI, Protection, Enhanced UNI Attributes and L2CP handling functionalities are outside the scope of this Abstract Test Suite.

This document may be updated in the future to reflect new work done in the MEF Technical Committee.

5. Compliance Levels

The key words “**MUST**”, “**MUST NOT**”, “**REQUIRED**”, “**SHALL**”, “**SHALL NOT**”, “**SHOULD**”, “**SHOULD NOT**”, “**RECOMMENDED**”, “**MAY**”, and “**OPTIONAL**” in this document are to be interpreted as described in RFC 2119. All key words **MUST** be use upper case, bold text.

6. Introduction

This document supplements the existing MEF test specifications MEF 9 *Abstract Test Suite for Ethernet Services at the UNI*, MEF 14 *Abstract Test Suite for Traffic Management Phase 1*, MEF 18 *Abstract Test Suite for Circuit Emulation Services*, MEF 19 *Abstract Test Suite for UNI Type 1*, MEF 21 *Abstract Test Suite for UNI Type 2 – Part 1: Link OAM* and MEF 24 *Abstract Test Suite for UNI Type 2 – Part 2: E-LMI* by adding test procedures based on the requirements for Service OAM defined in the *User Network Interface (UNI) Type 2 Implementation Agreement*.

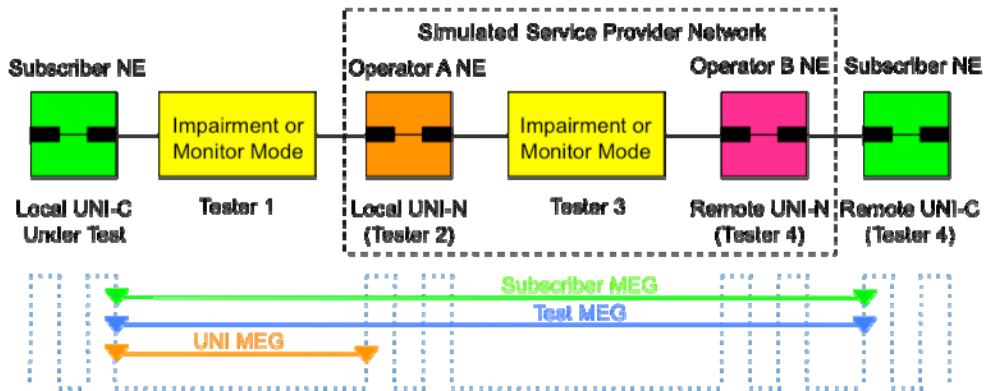
As with existing Abstract Test Suites, vendors can refer to the requirements and test procedures defined in this specification in the development and commercial cycles of their products and carriers can use them to ensure that the network elements they deploy or add to their existing network will have the ability to deliver Ethernet Services based on the MEF technical specifications.

The requirements, framework and functional model on how the UNI reference point operates in a Metro Ethernet Network is defined in the Metro Ethernet Forum technical specification MEF 11 *User to Network Interface Requirements and Framework*.

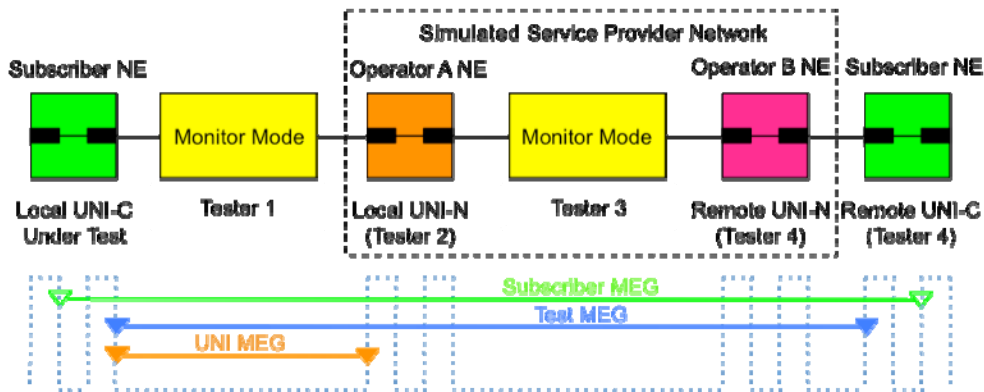
7. Test Configuration for UNI-C Type 2 Service OAM

Although some UNI-C test cases may require very specific test configurations, most UNI-C test cases defined in this document are to be executed using one of the two following test configurations. (Tester 1 and Tester 2) and (Tester 3 and Tester 4) may be combined into single test devices.

Configuration 1: Down MEPs for the UNI-MEG, Test-MEG and Subscriber-MEG

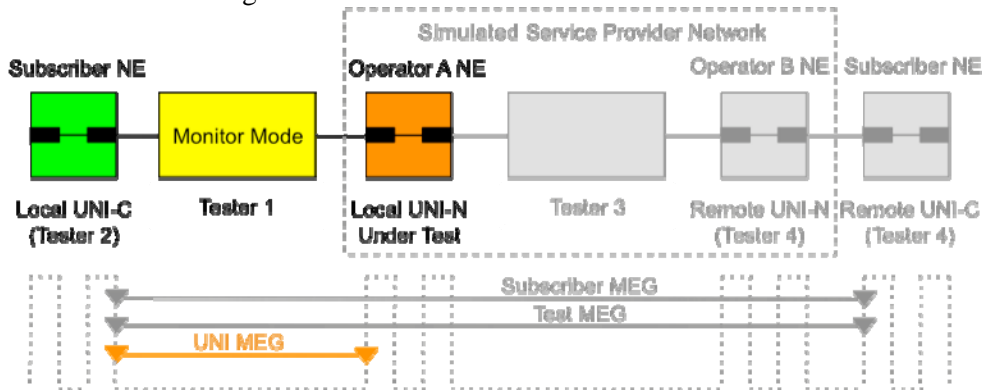


Configuration 2: Down MEPs for the UNI-MEG and Test-MEG and Up MEP for Subscriber-MEG



8. Test Configuration for UNI-N Type 2 Service OAM

Although some UNI-N test cases may require very specific test configurations, most UNI-N test cases defined in this document are to be executed using the following test configuration. Tester 1 and Tester 2 may be combined into a single test device.



9. Default Protocol Values

When not otherwise specified in the Test Procedure, use the default values for the following Service OAM Protocol parameters:

Parameter	Default Value
MEG-Level, UNI-MEG	1
MEG-Level, Test-MEG	5
MEG-Level, Subscriber-MEG	6
CCM frame rate	1 frame/s
CCM transmission, UNI-MEG	Enabled
CCM transmission, Test-MEG	Disabled
CCM transmission, Subscriber-MEG	Disabled
CCM frames priority, UNI-MEG	The highest priority supported by the UNI
CCM frames priority, Test-MEG	The CoS ID supported by the EVC, which yields the lowest frame loss performance
CCM frames priority, Subscriber-MEG	The CoS ID supported by the EVC, which yields the lowest frame loss performance
Minimum fault level	RDI
CC fault alarm time	2.5 s
CC fault reset time	10 s
LBM frames priority	The CoS ID supported by the EVC, which yields the lowest frame loss performance
Number of LBM transmissions per session	3
Interval between LBM transmissions	1 s
Timeout after a LBM transmission	5 s
LBM frame size	64 bytes

10. CC Messages Group Destination MAC Addresses

01-80-C2-00-00-3Y

MEG-Level of CCM	Four address bits "y"
7	7
6	6
5	5
4	4
3	3
2	2
1	1
0	0

11. CC Messages Interval Field Encoding

Transmission Interval	CCM Interval Field
Invalid	0
3 1/3 ms	1
10 ms	2
100 ms	3
1 s	4
10 s	5
1 min	6
10 min	7

12. Test Status Definitions

MANDATORY status: This means that a test case **MUST** be executed because it verifies an absolute requirement or an absolute requirement dependent on an optional feature. If the requirement is absolute the test must be executed. If the requirement is absolute but dependent on an optional feature and that feature is supported, the test case must be executed. If the optional feature is not supported, the test case is not executed and it is declared as "not applicable".

OPTIONAL status: This word means that a test case **MAY** or **MAY NOT** be executed because it verifies a requirement that is not absolute. The decision to execute such a test case will usually depend on the ability to support a particular feature that is not tied to an absolute requirement. If such a test case is not executed it is declared as "not applicable".

13. Test Cases Summary

Number	Test Case Name	UNI Type	Test Status
1	UNI-MEG Administrative Configuration	UNI-C & UNI-N	Mandatory
2	Test-MEG Administrative Configuration	UNI-C	Mandatory
3	MEP Instance on the Subscriber-MEG	UNI-C	Mandatory
4	Tagged OAM Frames on the Subscriber-MEG	UNI-C	Optional
5	MEP Instance on the Test-MEG	UNI-C	Optional
6	Tagged OAM Frames on the Test-MEG	UNI-C	Optional
7	MEP Instance on the UNI-MEG	UNI-C & UNI-N	Mandatory
8	Untagged OAM Frames on the UNI-MEG	UNI-C & UNI-N	Mandatory
9	IEEE 802.1 Bridge MEPs Corresponding to UNI-MEG	UNI-C & UNI-N	Optional
10	IEEE 802.1 Bridge MEPs Corresponding to Test-MEG	UNI-C	Optional
11	IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Down-MEP	UNI-C	Optional
12	IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Up-MEP	UNI-C	Optional
13	Configurable MEG-Level	UNI-C & UNI-N	Mandatory
14	Processing Received Multicast CCM Frames – Source Address	UNI-C & UNI-N	Mandatory
15	Processing Received Multicast CCM Frames – Sender ID TLV	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
16	Processing Received Multicast CCM Frames – Chassis ID Length	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
17	Processing Received Multicast CCM Frames – Port Status TLV	UNI-C & UNI-N	Mandatory if Port Status TLVs are supported
18	Processing Received Multicast CCM Frames – Interface Status TLV	UNI-C & UNI-N	Mandatory if Interface Status TLVs are supported
19	Processing Received Multicast CCM Frames – CCM Interval	UNI-C & UNI-N	Mandatory
20	Processing Received Multicast CCM Frames – First TLV Offset	UNI-C & UNI-N	Mandatory
21	Processing Received Multicast CCM Frames – MEP ID	UNI-C & UNI-N	Mandatory
22	Processing Received Multicast CCM Frames – Short MA Name Length 1	UNI-C & UNI-N	Mandatory
23	Processing Received Multicast CCM Frames – Short MA Name Length 2	UNI-C & UNI-N	Mandatory
24	Processing Received Multicast CCM Frames	UNI-C & UNI-N	Mandatory
25	Processing & Response to Unicast & Multicast LBM Frames – Destination Address	UNI-C & UNI-N	Mandatory
26	Processing & Response to Unicast & Multicast LBM Frames – Source Address	UNI-C & UNI-N	Mandatory
27	Processing & Response to Unicast & Multicast LBM Frames – Sender ID TLV	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
28	Processing & Response to Unicast & Multicast LBM Frames – First TLV Offset	UNI-C & UNI-N	Mandatory
29	Processing & Response to Unicast & Multicast LBM Frames – LBR Header	UNI-C & UNI-N	Mandatory
30	Processing & Response to Unicast & Multicast LBM Frames – LBR Content	UNI-C & UNI-N	Mandatory
31	Generating Multicast CCM Frames – Destination Address	UNI-C & UNI-N	Mandatory
32	Generating Multicast CCM Frames – Source Address	UNI-C & UNI-N	Mandatory
33	Generating Multicast CCM Frames – Protocol Version Number	UNI-C & UNI-N	Mandatory
34	Generating Multicast CCM Frames – OpCode	UNI-C & UNI-N	Mandatory

35	Generating Multicast CCM Frames – Flags	UNI-C & UNI-N	Mandatory
36	Generating Multicast CCM Frames – First TLV Offset	UNI-C & UNI-N	Mandatory
37	Generating Multicast CCM Frames – Sequence Number	UNI-C & UNI-N	Mandatory
38	Generating Multicast CCM Frames – MEP ID	UNI-C & UNI-N	Mandatory
39	Generating Multicast CCM Frames – MAID Total Length	UNI-C & UNI-N	Mandatory
40	Generating Multicast CCM Frames – Maintenance Domain Name Format	UNI-C & UNI-N	Optional
41	Generating Multicast CCM Frames – Short MA Name Format	UNI-C & UNI-N	Optional
42	Generating Multicast CCM Frames – Short MA Name Length	UNI-C & UNI-N	Mandatory
43	Generating Multicast CCM Frames – Short MA Name	UNI-C & UNI-N	Optional
44	Generating Multicast CCM Frames – Sender ID TLV	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
45	Generating Multicast CCM Frames – Chassis ID Length	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
46	Generating Multicast CCM Frames – Management Address Domain Field	UNI-C & UNI-N	Optional
47	Generating Multicast CCM Frames – Management Address Field	UNI-C & UNI-N	Optional
48	Generating Multicast CCM Frames – Port Status TLV	UNI-C & UNI-N	Mandatory if Port Status TLVs are supported
49	Generating Multicast CCM Frames – Interface Status TLV	UNI-C & UNI-N	Mandatory if Interface Status TLVs are supported
50	Generating Multicast CCM Frames – Organization Specific TLV	UNI-C & UNI-N	Mandatory if Organization TLVs are supported
51	Generating Multicast CCM Frames – End TLV	UNI-C & UNI-N	Mandatory
52	Generating Multicast LBM Frames – Destination Address	UNI-C & UNI-N	Optional
53	Generating Unicast LBM Frames – Destination Address	UNI-C & UNI-N	Mandatory
54	Generating Unicast LBM Frames – Source Address	UNI-C & UNI-N	Mandatory
55	Generating Unicast LBM Frames – Protocol Version Number	UNI-C & UNI-N	Mandatory
56	Generating Unicast LBM Frames – OpCode	UNI-C & UNI-N	Mandatory
57	Generating Unicast LBM Frames – Flags	UNI-C & UNI-N	Mandatory
58	Generating Unicast LBM Frames – First TLV Offset	UNI-C & UNI-N	Mandatory
59	Generating Unicast LBM Frames – Loopback Transaction Identifier	UNI-C & UNI-N	Mandatory
60	Generating Unicast LBM Frames – Sender ID TLV	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
61	Generating Unicast LBM Frames – Chassis ID Length	UNI-C & UNI-N	Mandatory if Sender ID TLVs are supported
62	Generating Unicast LBM Frames – Management Address Domain Field	UNI-C & UNI-N	Optional
63	Generating Unicast LBM Frames – Management Address Field	UNI-C & UNI-N	Optional
64	Generating Unicast LBM Frames – Data TLV	UNI-C & UNI-N	Mandatory
65	Generating Unicast LBM Frames – Organization Specific TLV	UNI-C & UNI-N	Mandatory if Organization TLVs are supported
66	Generating Unicast LBM Frames – End TLV	UNI-C & UNI-N	Mandatory
67	Administratively Enable and Disable CCM Transmission	UNI-C & UNI-N	Mandatory
68	Mandatory CCM Frame Rate	UNI-C & UNI-N	Mandatory
69	Optional CCM Frame Rate	UNI-C & UNI-N	Optional

70	Configurable CCM Frames Priority for Subscriber-MEG & Test-MEG	UNI-C	Mandatory
71	UNI-C Counter – Number of CCM Frames Transmitted	UNI-C & UNI-N	Optional
72	Lowest Priority CC Defect – DefRDICCM	UNI-C & UNI-N	Mandatory
73	CC Defect & Fault Alarm Hierarchy – DefRDICCM vs DefMACstatus	UNI-C & UNI-N	Optional
74	CC Defect & Fault Alarm Hierarchy – DefMACstatus vs DefRemoteCCM	UNI-C & UNI-N	Optional
75	CC Defect & Fault Alarm Hierarchy – DefRemoteCCM vs DefErrorCCM	UNI-C & UNI-N	Optional
76	CC Defect & Fault Alarm Hierarchy – DefErrorCCM vs DefXconCCM	UNI-C & UNI-N	Optional
77	CC Fault Alarm Time & CC Fault Reset Time	UNI-C & UNI-N	Mandatory if IEEE clause 12.14 7 (Maintenance association End Point managed object) is implemented
78	Administratively Initiate & Stop Loopback Sessions	UNI-C & UNI-N	Mandatory
79	Configurable LBM Frames Priority	UNI-C	Mandatory
80	Configurable Number of LBM Transmissions per Session	UNI-C & UNI-N	Mandatory
81	Configurable Interval between LBM Transmissions	UNI-C & UNI-N	Mandatory
82	Configurable Timeout after a LBM Transmission	UNI-C & UNI-N	Optional
83	Configurable LBM Frame Size	UNI-C & UNI-N	Mandatory
84	UNI-N Counter – Number of LBM Frames Transmitted	UNI-C & UNI-N	Mandatory
85	UNI-N Counter – Number of LBM Frames Received	UNI-C & UNI-N	Mandatory
86	UNI-N Counter – Number of LBR Frames Received	UNI-C & UNI-N	Mandatory
87	UNI-N Statistic – Percentage of Unanswered LB Requests (Lost LBM/LBR)	UNI-C & UNI-N	Mandatory
88	UNI-N Statistic – Minimum, Maximum & Average Round-Trip Latency	UNI-C & UNI-N	Mandatory

14. Template for Abstract Test Cases for UNI Type 2 Service OAM

The following template is adopted for the definition of Abstract Test Cases for UNI Type 2 Service OAM

Abstract Test Suite for Service OAM	
Test Name	Name derived from reference document
Test Definition ID	A punctuated alphanumeric string assigned to each defined requirement and test procedure couple using the following convention: Four characters defining the UNI type + 4 to 8 characters defining the MEF requirement number. Example: UNIC-R60 ⁵ (UNIC: User Network Interface C under test, R60 ⁵ : MEF 20 requirement 60, fifth Test Case related to requirement 60)
Reference Document	MEF Reference document and section IEEE or ITU-T Reference document and section
Test Type	Functional, Conformance, Interoperability or Performance
Test Status	Mandatory, Optional or Recommended
MEF Requirement Description	Brief description of the MEF requirement that MUST or SHOULD be satisfied
Test Object	Succinct description of test purpose
Test Configuration	Succinct description of test bed configuration
Test Configuration Schematic	Test bed schematic. The variables can augment it.
CE-VLAN ID / EVC Map	A sample VLAN ID/EVC Map is suggested. Variables augment it.
Test Procedure	Succinct description of the test procedure
Units	Units can be time units, rates and counts in integers such as milliseconds, frames per second and numbers of valid frames
Variables	Variables such as number of UNIs, EVCs and CE-VLAN IDs and frame formats and lengths MUST be described
Results	Description of the textual, numerical and/or graphical format in which to display test results. Results can be Pass or Fail
Remarks	Description of any particular observations that might affect the test result

15. Abstract Test Cases for UNI-C Type 2 Service OAM

This section contains 88 Test Cases for UNI-C. The section is divided in 5 different subsections as follows:

Section 15.1

Configuration Requirements contains a total of 2 Test Cases covering the UNI Type 2 Requirements R16 and R17.

Section 15.2

Maintenance Entity Requirements contains a total of 10 Test Cases covering the UNI Type 2 Requirements R32, R33, R34, R35 and R36.

Section 15.3

MEG End Points Requirements contains a total of 54 Test Cases covering the UNI Type 2 Requirements R39, R40, R41, R42 and R43.

Section 15.4

Continuity Check Requirements contains a total of 11 Test Cases covering the UNI Type 2 Requirements R44, R45, R46, R47, R48, R49, R50, R51 and R52.

Section 15.5

Loopback Requirements contains a total of 11 Test Cases covering the UNI Type 2 Requirements R53, R54, R55, R56, R57, R58, R59 and R60.

15.1 UNI-C Type 2 Configuration Requirements

TEST CASE 1C: UNI-MEG Administrative Configuration

Abstract Test Suite for Service OAM	
Test Name	UNI-MEG Administrative Configuration
Test Definition ID	UNIC-R16
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-C Type 2 MUST be administratively configurable with the UNI-N MEP ID and MEG-Level corresponding to the UNI-MEG
Test Object	Verify that a UNI-C Type 2 can be administratively configurable with the UNI-N MEP ID and MEG-Level corresponding to the UNI-MEG
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and the local UNI-N. Configure the UNI-C with the UNI-N MEP ID. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This setup is connected to an orange box labeled 'Local UNI-N (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator A NE' connected to 'Tester 3', which is connected to another grey box 'Operator B NE' connected to 'Remote UNI-N (Tester 4)'. This is connected to a final grey box 'Subscriber NE' containing a 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows indicate MEG paths: a grey arrow for 'Subscriber MEG' spanning from the Local UNI-C to the Remote UNI-C; a grey arrow for 'Test MEG' spanning from the Local UNI-N to the Remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that they contain the configured UNI-C MEP ID, that their MEG-Level is equal to "1" and that the RDI bit of the Flags field is clear. Re-configure the UNI-N with a different MEP ID but do not update the UNI-C configuration with this new information. Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that they contain the configured UNI-C MEP ID, that their MEG-Level is equal to "1" and that the RDI bit of the Flags field is set
Units	MEG-Level, MEP ID and RDI bit values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 2C: Test-MEG Administrative Configuration

Abstract Test Suite for Service OAM													
Test Name	Test-MEG Administrative Configuration												
Test Definition ID	UNIC-R17												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST be administratively configurable with the MEG-Level for the Test-MEG												
Test Object	Verify that a UNI-C Type 2 can be administratively configurable with the MEG-Level for the Test-MEG												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5", with a unique MAID. Configure MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Test-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their MEG-Level is equal to "5"												
Units	MEG-Level value												
Variables	None												
Results	Pass or fail												
Remarks													

15.2 UNI-C Type 2 Maintenance Entity Requirements

TEST CASE 3C: MEP Instance on the Subscriber-MEG

Abstract Test Suite for Service OAM																	
Test Name	MEP Instance on the Subscriber MEG																
Test Definition ID	UNIC-R32 ¹																
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2																
Test Type	Conformance																
Test Status	Mandatory																
MEF Requirement Description	A UNI-C Type 2 MUST be able to support a MEP instance on the Subscriber-MEG for each configured EVC																
Test Object	Verify that a UNI-C Type 2 is able to support a MEP instance on the Subscriber-MEG for each configured EVC																
Test Configuration	Configure at least two EVCs associating at least two UNIs (local + remote) and configure a Subscriber-MEG with a MEG-Level = "6", with a unique MAID for each EVC. Configure MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames																
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green box) contains a Local UNI-C Under test (green box) and Tester 1 (yellow box labeled Monitor Mode). In the center, a Simulated Service Provider Network (dashed box) contains Operator A NE (orange box) with Local UNI-N (Tester 2) (orange box) and Tester 3 (yellow box labeled Monitor Mode). On the right, Operator B NE (pink box) contains Remote UNI-N (Tester 4) (pink box) and Tester 4 (yellow box labeled Monitor Mode). Further right, a Subscriber NE (green box) contains Remote UNI-C (Tester 4) (green box). A green arrow labeled 'Subscriber MEG' and a grey arrow labeled 'Test MEG' span from the Local UNI-C to the Remote UNI-C. A grey arrow labeled 'UNI MEG' spans from the Local UNI-N to the Remote UNI-N.</p>																
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> <tr> <td style="background-color: #ffffcc;">11</td> <td style="background-color: #ffffcc;">EVC₂</td> <td style="background-color: #ffffcc;">11</td> <td style="background-color: #ffffcc;">EVC₂</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁	11	EVC ₂	11	EVC ₂
LOCAL UNI		REMOTE UNI															
CE-VLAN ID	EVC	CE-VLAN ID	EVC														
10	EVC ₁	10	EVC ₁														
11	EVC ₂	11	EVC ₂														
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that CCM frames are transmitted from each configured MEP instances (verify MEP IDs) and that the MEG-Level of each CCM frame is equal to "6"																
Units	MEG-Level and MEP ID values																
Variables	Number of EVCs																
Results	Pass or fail																
Remarks																	

TEST CASE 4C: Tagged OAM Frames on the Subscriber-MEG

Abstract Test Suite for Service OAM																	
Test Name	Tagged OAM Frames on the Subscriber MEG																
Test Definition ID	UNIC-R32 ²																
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2																
Test Type	Conformance																
Test Status	Optional																
MEF Requirement Description	The OAM frames on the Subscriber-MEG SHOULD be tagged and use the smallest CE-VLAN ID mapped into that EVC																
Test Object	Verify that the OAM frames on the Subscriber-MEG are tagged and use the smallest CE-VLAN ID mapped into that EVC																
Test Configuration	Configure at least two EVCs associating at least two UNIs (local + remote) and configure a Subscriber-MEG with a MEG-Level = "6", with a unique MAID for each EVC. Configure MEP instances with specific MEP IDs for each end point of each configured EVCs. Enable CCM transmission on the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames																
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C Under Test'. This is connected to a yellow 'Monitor Mode' box labeled 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network', containing an orange 'Operator A NE' with a 'Local UNI-N (Tester 2)' and a yellow 'Monitor Mode' box labeled 'Tester 3'. To the right, a pink 'Operator B NE' with a 'Remote UNI-N (Tester 4)' is connected to a green 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows indicate MEG paths: a green arrow for 'Subscriber MEG' spanning from the local to the remote Subscriber NE, a grey arrow for 'Test MEG' spanning from the local to the remote Operator A NE, and another grey arrow for 'UNI MEG' spanning from the local to the remote Operator A NE.</p>																
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10, 11</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10, 11</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> <tr> <td style="background-color: #ffffcc;">12, 13</td> <td style="background-color: #ffffcc;">EVC₂</td> <td style="background-color: #ffffcc;">12, 13</td> <td style="background-color: #ffffcc;">EVC₂</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10, 11	EVC ₁	10, 11	EVC ₁	12, 13	EVC ₂	12, 13	EVC ₂
LOCAL UNI		REMOTE UNI															
CE-VLAN ID	EVC	CE-VLAN ID	EVC														
10, 11	EVC ₁	10, 11	EVC ₁														
12, 13	EVC ₂	12, 13	EVC ₂														
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that there are CCM frames transmitted from each configured MEP instances (verify MEP IDs) and that they are tagged with the smallest CE-VLAN ID mapped into each EVC																
Units	CCM frames VLAN tag and MEP ID values																
Variables	Number of EVCs																
Results	Pass or fail																
Remarks																	

TEST CASE 5C: MEP Instance on the Test-MEG

Abstract Test Suite for Service OAM																	
Test Name	MEP Instance on the Test-MEG																
Test Definition ID	UNIC-R33 ¹																
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2																
Test Type	Conformance																
Test Status	Optional																
MEF Requirement Description	A UNI-C Type 2 SHOULD be able to support a MEP instance on the Test-MEG for each configured EVC																
Test Object	Verify that a UNI-C Type 2 is able to support a MEP instance on the Test-MEG for each configured EVC																
Test Configuration	Configure at least two EVCs associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5", with a unique MAID for each EVC. Configure MEP instances with specific MEP IDs for each end point of each configured EVCs. Enable CCM transmission on the Test-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames																
Test Configuration Schematic																	
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> <tr> <td style="background-color: #ffffcc;">11</td> <td style="background-color: #ffffcc;">EVC₂</td> <td style="background-color: #ffffcc;">11</td> <td style="background-color: #ffffcc;">EVC₂</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁	11	EVC ₂	11	EVC ₂
LOCAL UNI		REMOTE UNI															
CE-VLAN ID	EVC	CE-VLAN ID	EVC														
10	EVC ₁	10	EVC ₁														
11	EVC ₂	11	EVC ₂														
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that CCM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of each CCM frame is equal to "5"																
Units	MEG-Level and MEP ID values																
Variables	Number of EVCs																
Results	Pass or fail																
Remarks																	

TEST CASE 6C: Tagged OAM Frames on the Test-MEG

Abstract Test Suite for Service OAM																	
Test Name	Tagged OAM Frames on the Test-MEG																
Test Definition ID	UNIC-R33 ²																
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2																
Test Type	Conformance																
Test Status	Optional																
MEF Requirement Description	The OAM frames on the Test-MEG SHOULD be tagged and use the smallest CE-VLAN ID mapped into that EVC																
Test Object	Verify that the OAM frames on the Test-MEG are tagged and use the smallest CE-VLAN ID mapped into that EVC																
Test Configuration	Configure at least two EVCs associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5", with a unique MAID for each EVC. Configure MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Test-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames																
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A central dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' and 'Operator B NE'. To the left is a 'Subscriber NE'. 'Local UNI-C Under Test' is connected to 'Local UNI-N (Tester 2)'. 'Operator A NE' is connected to 'Local UNI-N (Tester 2)'. 'Operator B NE' is connected to 'Remote UNI-N (Tester 4)'. 'Remote UNI-N (Tester 4)' is connected to 'Remote UNI-C (Tester 4)'. 'Subscriber NE' is connected to 'Remote UNI-C (Tester 4)'. Testers 1, 3, and 4 are in 'Monitor Mode'. Arrows show 'Subscriber MEG' (grey), 'Test MEG' (blue), and 'UNI MEG' (grey) paths between the UNIs.</p>																
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10, 11</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10, 11</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> <tr> <td style="background-color: #ffffcc;">12, 13</td> <td style="background-color: #ffffcc;">EVC₂</td> <td style="background-color: #ffffcc;">12, 13</td> <td style="background-color: #ffffcc;">EVC₂</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10, 11	EVC ₁	10, 11	EVC ₁	12, 13	EVC ₂	12, 13	EVC ₂
LOCAL UNI		REMOTE UNI															
CE-VLAN ID	EVC	CE-VLAN ID	EVC														
10, 11	EVC ₁	10, 11	EVC ₁														
12, 13	EVC ₂	12, 13	EVC ₂														
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that there are CCM frames transmitted from each configured MEP instances (verify MEP IDs) and that they are tagged with the smallest CE-VLAN ID mapped into each EVC																
Units	CCM frames VLAN tag and MEP ID values																
Variables	Number of EVCs																
Results	Pass or fail																
Remarks																	

TEST CASE 7C: MEP Instance on the UNI-MEG

Abstract Test Suite for Service OAM													
Test Name	MEP Instance on the UNI-MEG												
Test Definition ID	UNIC-R34 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST be able to support a single MEP instance on the UNI-MEG, regardless of whether any EVC is configured for that UNI or not												
Test Object	Verify that a UNI-C Type 2 can support a single MEP instance on the UNI-MEG, regardless of whether any EVC is configured for that UNI or not												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and the local UNI-N. Enable CCM transmission on the UNI-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network'. On the left, a green 'Subscriber NE' is connected to a yellow 'Local UNI-C Under Test' (labeled 'Tester 1'). This is connected to an orange 'Operator A NE', which is connected to a yellow 'Local UNI-N (Tester 2)'. This is connected to a pink 'Operator B NE', which is connected to a yellow 'Remote UNI-N (Tester 4)'. Finally, the 'Remote UNI-N (Tester 4)' is connected to a green 'Subscriber NE' on the right. Below the network, two horizontal arrows represent MEG paths: a grey arrow labeled 'Subscriber MEG' and a yellow arrow labeled 'Test MEG'. Both arrows span from the local UNI-C to the remote UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that they contain the configured MEP ID and that their MEG-Level is equal to "1". Delete the configured EVC(s) and use Tester 1 to verify that the Continuity Check Messages are still transmitted by the UNI-C under test, that they still contain the configured MEP ID and that their MEG-Level is still equal to "1"												
Units	MEG-Level and MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 8C: Untagged OAM Frames on the UNI-MEG

Abstract Test Suite for Service OAM	
Test Name	Untagged OAM Frames on the UNI-MEG
Test Definition ID	UNIC-R34 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-C Type 2 must be able to support a single MEP instance on the UNI-MEG, this UNI-MEG is called the “default UNI-MEG” and MUST use Untagged OAM frames
Test Object	Verify that a UNI-C Type 2 is able to support a single MEP instance on the UNI-MEG and that it uses untagged OAM frames
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C (Uncer Test)'. A yellow box labeled 'Monitor Mode' and 'Tester 1' is connected to the UNI-C. This connects to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' with a 'Local UNI-N (Tester 2)'. This is connected to 'Operator B NE' with a 'Remote UNI-N (Tester 4)'. Finally, a 'Subscriber NE' contains a 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' and 'Test MEG' paths between the local and remote UNI-Ns. A specific 'UNI MEG' path is highlighted in orange between the local UNI-C and the local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their MEG-Level is equal to “1” and that they are untagged
Units	MEG-Level value and CCM frames VLAN tag (absence)
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 9C: IEEE 802.1 Bridge MEPs Corresponding to UNI-MEG

Abstract Test Suite for Service OAM	
Test Name	IEEE 802.1 Bridge MEPs Corresponding to UNI-MEG
Test Definition ID	UNIC-R35 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When the CE is an IEEE 802.1 Bridge, the MEPs corresponding to the UNI-MEG on a UNI-C Type 2 SHOULD be Down-MEPs
Test Object	Verify that when the CE is an IEEE 802.1 Bridge, the MEPs corresponding to the UNI-MEG on a UNI-C Type 2 are Down-MEPs
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure Down-MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-C under test and if the bridge implements IEEE 802.1ag clause 12.14.7, use the management system of the UNI-C under test to verify that the value indicating the direction in which the MEP is facing on the interface is "Down"
Units	MEP direction
Variables	None
Results	Pass or fail
Remarks	To perform this test, the bridge must implement IEEE 802.1ag clause 12.14.7 (Maintenance association End Point managed object). If this is not the case, there is no obligation to perform the test

TEST CASE 10C: IEEE 802.1 Bridge MEPs Corresponding to Test-MEG

Abstract Test Suite for Service OAM													
Test Name	IEEE 802.1 Bridge MEPs Corresponding to Test-MEG												
Test Definition ID	UNIC-R35 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Test-MEG on a UNI-C Type 2 SHOULD be Down-MEPs												
Test Object	Verify that when the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Test-MEG on a UNI-C Type 2 are Down-MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5", with a unique MAID. Configure Down-MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Test-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The schematic shows a network topology. On the left, a green box represents the 'Local UNI-C Under Test' connected to a yellow box 'Monitor Mode' labeled 'Tester 1'. This connects to a dashed box 'Simulated Service Provider Network'. Inside this network, an orange box 'Operator A NE' connects to another yellow box 'Monitor Mode' labeled 'Tester 3'. This connects to a pink box 'Operator B NE' which connects to a green box 'Subscriber NE'. Below the network, arrows indicate 'Subscriber MEG' (grey), 'Test MEG' (blue), and 'UNI MEG' (grey) directions.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and if the bridge implements IEEE 802.1ag clause 12.14.7, use the management system of the UNI-C under test to verify that the values indicating the directions in which the MEPs are facing on the interface are "Down"												
Units	MEP direction												
Variables	None												
Results	Pass or fail												
Remarks	To perform this test, the bridge must implement IEEE 802.1ag clause 12.14.7 (Maintenance association End Point managed object). If this is not the case, there is no obligation to perform the test												

TEST CASE 11C: IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Down-MEP

Abstract Test Suite for Service OAM													
Test Name	IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Down-MEP												
Test Definition ID	UNIC-R36 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Subscriber-MEG on a UNI-C Type 2 MAY either be Up-MEP or Down-MEP												
Test Object	Verify that when the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Subscriber-MEG on a UNI-C Type 2 are Down-MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Subscriber-MEG with a MEG-Level = “6”, with a unique MAID. Configure Down-MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and if the bridge implements IEEE 802.1ag clause 12.14.7, use the management system of the UNI-C under test to verify that the values indicating the directions in which the MEPs are facing on the interface are “Down”												
Units	MEP direction												
Variables	None												
Results	Pass or fail												
Remarks	To perform this test, the bridge must implement IEEE 802.1ag clause 12.14.7 (Maintenance association End Point managed object). If this is not the case, there is no obligation to perform the test												

TEST CASE 12C: IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Up-MEP

Abstract Test Suite for Service OAM													
Test Name	IEEE 802.1 Bridge MEPs Corresponding to Subscriber-MEG – Up-MEP												
Test Definition ID	UNIC-R36 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Subscriber-MEG on a UNI-C Type 2 MAY either be Up-MEP or Down-MEP												
Test Object	Verify that when the CE is an IEEE 802.1 Bridge, the MEPs corresponding to Subscriber-MEG on a UNI-C Type 2 are Up-MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Subscriber-MEG with a MEG-Level = “6”, with a unique MAID. Configure Up-MEP instances with specific MEP IDs for each end point of each configured EVC. Enable CCM transmission on the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a simulated service provider network. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is connected to 'Tester 1' in 'Monitor Mode'. The network then splits into two paths: one through 'Operator A NE' (orange box) to 'Local UNI-N (Tester 2)', and another through 'Operator B NE' (pink box) to 'Remote UNI-N (Tester 4)'. Both paths terminate at 'Remote UNI-C (Tester 4)'. A green arrow labeled 'Subscriber MEG' points from the local UNI-C to the remote UNI-C. A grey arrow labeled 'Test MEG' points from the remote UNI-C back to the local UNI-C. Dotted lines indicate the boundaries of the local and remote UNIs.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and if the bridge implements IEEE 802.1ag clause 12.14.7, use the management system of the UNI-C under test to verify that the values indicating the directions in which the MEPs are facing on the interface are “Up”												
Units	MEP direction												
Variables	None												
Results	Pass or fail												
Remarks	To perform this test, the bridge must implement IEEE 802.1ag clause 12.14.7 (Maintenance association End Point managed object). If this is not the case, there is no obligation to perform the test												

15.3 UNI-C Type 2 MEG End Points Requirements

TEST CASE 13C: Configurable MEG-Level

Abstract Test Suite for Service OAM													
Test Name	Configurable MEG-Level												
Test Definition ID	UNIC-R39												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST support a configurable MEG-Level for the MEPs												
Test Object	Verify that a UNI-C Type 2 can support a configurable MEG-Level for the MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, on the Test-MEG and on the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a Simulated Service Provider Network. On the left, a Subscriber NE (green) is connected to a Local UNI-C Under Test. In the center, Operator A NE (orange) is connected to a Local UNI-N (Tester 2). On the right, Operator B NE (pink) is connected to a Remote UNI-N (Tester 4) and a Remote UNI-C (Tester 4). A Subscriber NE (green) is also shown on the far right. Arrows indicate the flow of MEGs: a green arrow for Subscriber MEG, a blue arrow for Test MEG, and an orange arrow for UNI MEG. Testers 1, 3, and 4 are positioned to monitor these MEGs.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that CCM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6"												
Units	MEG-Level and MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 14C: Processing Received Multicast CCM Frames – Source Address

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Source Address												
Test Definition ID	UNIC-R40 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.3.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Source address validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the source address parameter contains a Group address, and not an Individual MAC address												
Test Object	Verify that any CCM frame received with a source address parameter that contains a Group MAC address is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). A dashed box in the center represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Arrows indicate MEGs: a blue arrow for 'UNI MEG' between the local and remote UNI-Ns, a green arrow for 'Subscriber MEG' between the local and remote UNI-Cs, and a blue arrow for 'Test MEG' between the local and remote UNI-Ns.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a source address parameter that contains a Group MAC address to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 15C: Processing Received Multicast CCM Frames – Sender ID TLV

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Sender ID TLV												
Test Definition ID	UNIC-R40 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Sender ID TLV validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Sender ID TLV Length field is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Object	Verify that any CCM frame received with a Sender ID TLV Length field that is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with Sender ID TLV Length field not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 16C: Processing Received Multicast CCM Frames – Chassis ID Length

Abstract Test Suite for Service OAM																	
Test Name	Processing Received Multicast CCM Frames – Chassis ID Length																
Test Definition ID	UNIC-R40 ³																
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3.1)																
Test Type	Conformance																
Test Status	Mandatory if Sender ID TLVs are supported																
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Chassis ID length validation																
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Chassis ID Length field is not 0, nor less than (TLV Length field value – 1)																
Test Object	Verify that any CCM frame received with a Chassis ID Length field that is not 0, nor less than (TLV Length field value – 1) is considered invalid and discarded																
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames																
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and a yellow box for 'Impairment or Monitor Mode' (Tester 1). In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Impairment or Monitor Mode' (Tester 3), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Impairment or Monitor Mode' (Tester 4). On the right, another green box represents the 'Subscriber NE' containing a 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green) and 'Test MEG' (blue) paths between the Subscriber NEs, and a 'UNI MEG' (orange) path between the Local and Remote UNI-Ns.</p>																
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> <tr> <td colspan="4">Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</td> </tr> </tbody> </table>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1			
LOCAL UNI		REMOTE UNI															
CE-VLAN ID	EVC	CE-VLAN ID	EVC														
10	EVC ₁	10	EVC ₁														
Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1																	
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a Chassis ID Length field that is not 0, nor less than (TLV Length field value – 1) to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG																
Units	CCM database MEP ID values																
Variables	None																
Results	Pass or fail																
Remarks																	

TEST CASE 17C: Processing Received Multicast CCM Frames – Port Status TLV

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Port Status TLV												
Test Definition ID	UNIC-R40 ⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.4)												
Test Type	Conformance												
Test Status	Mandatory if Port Status TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Port Status TLV validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Port Status TLV contains a value other than (0x01) or (0x02)												
Test Object	Verify that any CCM frame received with a Port Status TLV that contains a value other than (0x01) or (0x02) is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' (with 'Local UNI-N (Tester 2)' and 'Tester 3') and 'Operator B NE' (with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'). On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Arrows indicate MEGs: a green arrow for 'Subscriber MEG' spanning from the left Subscriber NE to the right Subscriber NE; a blue arrow for 'Test MEG' spanning from the left Subscriber NE to the right Subscriber NE; and an orange arrow for 'UNI MEG' spanning from the left Subscriber NE to the right Subscriber NE.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a Port Status TLV that contains a value other than (0x01) or (0x02) to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 18C: Processing Received Multicast CCM Frames – Interface Status TLV

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Interface Status TLV												
Test Definition ID	UNIC-R40 ⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.5)												
Test Type	Conformance												
Test Status	Mandatory if Interface Status TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Interface Status TLV validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Interface Status TLV contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07)												
Test Object	Verify that any CCM frame received with an Interface Status TLV that contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07) is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Impairment or Monitor Mode' (Tester 1). The network then enters a dashed box representing the 'Simulated Service Provider Network'. Inside, an orange box 'Operator A NE' is connected to another yellow 'Impairment or Monitor Mode' box (Tester 3). This is followed by a pink box 'Operator B NE' connected to a green 'Subscriber NE' (Tester 4). Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG' (Tester 4), a blue arrow for 'Test MEG' (Tester 4), and an orange arrow for 'UNI MEG' (Tester 2). The 'Local UNI-N (Tester 2)' is also indicated within the SPSN.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with an Interface Status TLV that contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07) to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 19C: Processing Received Multicast CCM Frames – CCM Interval

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – CCM Interval												
Test Definition ID	UNIC-R40 ⁶												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.1.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – CCM Interval validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the CCM Interval field contains the value 0												
Test Object	Verify that any CCM frame received with a CCM Interval field that contain the value 0 is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C (Under Test)' and 'Tester 1'. This is connected to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3', and 'Operator B NE' with 'Remote UNI-N (Tester 3)' and 'Remote UNI-C (Tester 4)'. A 'Subscriber NE' is also shown on the right. Arrows indicate MEG paths: a green arrow for 'Subscriber MEG' from Local UNI-N to Remote UNI-C, a blue arrow for 'Test MEG' from Local UNI-N to Remote UNI-C, and an orange arrow for 'UNI MEG' from Local UNI-C to Remote UNI-C. 'Impairment or Monitor Mode' blocks are placed between the Subscriber NE and Operator A NE, and between Operator A NE and Operator B NE.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a CCM Interval field that contain the value 0 to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 20C: Processing Received Multicast CCM Frames – First TLV Offset

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – First TLV Offset												
Test Definition ID	UNIC-R40 ⁷												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – First TLV Offset validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the First TLV Offset field of the Common CFM Header in a CCM does not contain a value greater than or equal to 70												
Test Object	Verify that any CCM frame received with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 70 is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' (with 'Local UNI-N (Tester 2)') and 'Operator B NE' (with 'Remote UNI-N (Tester 4)'). On the right, another green box represents the 'Subscriber NE' containing 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green) and 'Test MEG' (blue) paths between the local and remote Subscriber NEs, and a 'UNI MEG' (orange) path between the local and remote UNI-Ns. 'Impairment or Monitor Mode' blocks are placed between the Subscriber NEs and the SPSN, and between the two Operator NEs.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 70 to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 21C: Processing Received Multicast CCM Frames – MEP ID

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – MEP ID												
Test Definition ID	UNIC-R40 ⁸												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.4)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – MEP ID validation												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the MEP ID is not in the range 1-8191												
Test Object	Verify that any CCM frame received with a MEP ID that is not in the range 1-8191 is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. It features a 'Simulated Service Provider Network' (dashed box) containing 'Operator A NE' and 'Operator B NE'. To the left is a 'Subscriber NE' with a 'Local UNI-C Under Test'. To the right is another 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. Within the operator networks, there are 'Local UNI-N (Tester 2)' and 'Remote UNI-N (Tester 4)'. Each network element is connected to an 'Impairment or Monitor Mode' block. Arrows show the flow of MEGs: 'Subscriber MEG' (green), 'Test MEG' (blue), and 'UNI MEG' (orange).</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a MEP ID that is not in the range 1-8191 to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 22C: Processing Received Multicast CCM Frames – Short MA Name Length 1

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Short MA Name Length 1												
Test Definition ID	UNIC-R40 ⁹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.5.5)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Short MA Name length validation 1												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Short MA Name Length does not contain a value greater than or equal to 1												
Test Object	Verify that any CCM frame received with a Short MA Name Length that does not contain a value greater than or equal to 1 is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' (with 'Local UNI-N (Tester 2)') and 'Operator B NE' (with 'Remote UNI-N (Tester 4)'). On the right, another green box represents the 'Subscriber NE' containing a 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green), 'Test MEG' (blue), and 'UNI MEG' (orange) paths between the local and remote UNI-C and UNI-N components.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a Short MA Name Length that does not contain a value greater than or equal to 1 to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 23C: Processing Received Multicast CCM Frames – Short MA Name Length 2

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames – Short MA Name Length 2												
Test Definition ID	UNIC-R40 ¹⁰												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.5.5)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Short MA Name length validation 2												
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Short MA Name Length indicates that the Short MA Name runs over the 48-octet limit for the MAID												
Test Object	Verify that any CCM frame received with a Short MA Name Length that indicates that the Short MA Name runs over the 48-octet limit for the MAID is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' (with 'Local UNI-N (Tester 2)' and 'Tester 3') and 'Operator B NE' (with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'). On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Arrows show 'UNI MEG' (orange) between local UNIs, 'Test MEG' (blue) between local and remote UNIs, and 'Subscriber MEG' (green) between remote UNIs. 'Impairment or Monitor Mode' blocks are placed between the Subscriber NE and the SPSN.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send Continuity Check Messages with a Short MA Name Length that indicates that the Short MA Name runs over the 48-octet limit for the MAID to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 24C: Processing Received Multicast CCM Frames

Abstract Test Suite for Service OAM													
Test Name	Processing Received Multicast CCM Frames												
Test Definition ID	UNIC-R40 ¹¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG												
IEEE Requirement Description	Further to the successful PDU validation tests (described in Test Cases 14 through 23) a receiving MEP SHALL examine every CCM to be sure that its MAID matches that configured in the receiving MEP, check to ensure that its own MEPID does <i>not</i> match that in the received CCM and catalog CCMs in its MEP CCM Database												
Test Object	Verify that further to the successful PDU validation tests (described in Test Cases 14 through 23) the receiving MEP examines every CCM to be sure that its MAID matches that configured in the receiving MEP, checks to ensure that its own MEPID does <i>not</i> match that in the received CCM and catalog CCMs in its MEP CCM Database												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a 'Subscriber NE' contains a 'Local UNI-C Under Test' (green box) and 'Tester 1' (yellow box). This is connected to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' (orange box) with 'Local UNI-N (Tester 2)' (yellow box) and 'Tester 3' (yellow box), and 'Operator B NE' (pink box) with 'Remote UNI-N (Tester 4)' (pink box) and 'Remote UNI-C (Tester 4)' (green box). Arrows indicate the flow of MEGs: 'Subscriber MEG' (green), 'Test MEG' (blue), and 'UNI MEG' (orange).</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 2 and Tester 4 to send valid Continuity Check Messages to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG, for the Test-MEG and for the Subscriber-MEG												
Units	CCM database MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 25C: Processing & Response to Unicast & Multicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Destination Address												
Test Definition ID	UNIC-R41 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Destination address validation												
IEEE Requirement Description	When an LBM is received by an MEP Loopback Responder, if the destination address matches neither the MAC address of the receiving MEP, nor the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) of the receiving MEP, the MEP SHALL discard the LBM												
Test Object	Verify that any LBM frame received with a destination address that does not match the MAC address of the receiving MEP, nor the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green) is connected to a Local UNI-C Under Test (green). This is followed by an Impairment or Monitor Mode block (yellow) labeled Tester 1. A dashed box represents the Simulated Service Provider Network, containing Operator A NE (orange) connected to a Local UNI-N (Tester 2) (orange), which is connected to another Impairment or Monitor Mode block (yellow) labeled Tester 3. This is followed by Operator B NE (pink) connected to a Remote UNI-N (Tester 4) (pink), which is connected to a Remote UNI-C (Tester 4) (green). A Subscriber NE (green) is also connected to the Remote UNI-C. Below the network, three MEGs are shown: Subscriber MEG (green), Test MEG (blue), and UNI MEG (orange), with arrows indicating their paths across the network.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send Loopback Messages with a destination address that does not match the MAC address of the receiving MP, nor the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the messages transmitted by the UNI-C under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)												
Units	OpCode value												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 26C: Processing & Response to Unicast & Multicast LBM Frames – Source Address

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Source Address												
Test Definition ID	UNIC-R41 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.3.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Source address validation												
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the source address parameter contains a Group address, and not an Individual MAC address												
Test Object	Verify that any LBM frame received with a source address parameter that contains a Group MAC address is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send Loopback Messages with a source address parameter that contains a Group MAC address to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the messages transmitted by the UNI-C under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)												
Units	OpCode value												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 27C: Processing & Response to Unicast & Multicast LBM Frames – Sender ID TLV

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Sender ID TLV												
Test Definition ID	UNIC-R41 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Sender ID TLV validation												
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the Sender ID TLV Length field is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Object	Verify that any LBM frame received with a Sender ID TLV Length field that is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. It features a 'Simulated Service Provider Network' (SPN) enclosed in a dashed box. On the left, a 'Subscriber NE' (green) connects to a 'Local UNI-C Under Test' (green). This is connected to 'Tester 1' (yellow 'Impairment or Monitor Mode'). The SPN contains 'Operator A NE' (orange) connected to 'Local UNI-N (Tester 2)' (orange), which is connected to 'Tester 3' (yellow 'Impairment or Monitor Mode'). This is further connected to 'Operator B NE' (pink) connected to 'Remote UNI-N (Tester 4)' (pink), which is connected to 'Tester 4' (yellow 'Impairment or Monitor Mode'). On the right, 'Remote UNI-C (Tester 4)' (green) connects to 'Subscriber NE' (green). Three horizontal arrows at the bottom represent MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send Loopback Messages with Sender ID TLV Length field not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the messages transmitted by the UNI-C under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)												
Units	OpCode value												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 28C: Processing & Response to Unicast & Multicast LBM Frames – First TLV Offset

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – First TLV Offset												
Test Definition ID	UNIC-R41 ⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – First TLV Offset validation												
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the First TLV Offset field of the Common CFM Header in an LBM does not contain a value greater than or equal to 4												
Test Object	Verify that any LBM frame received with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 4 is considered invalid and discarded												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration within a Simulated Service Provider Network. On the left, a Subscriber NE (green) is connected to a Local UNI-C Under Test (green). This is connected to Operator A NE (orange), which is connected to a Local UNI-N (Tester 2) (orange). Operator A NE is also connected to Operator B NE (pink), which is connected to a Remote UNI-N (Tester 4) (pink). Operator B NE is connected to a Remote UNI-C (Tester 4) (green). A Subscriber NE (green) is also connected to the Remote UNI-C (Tester 4). Three MEGs are shown: Subscriber MEG (green), Test MEG (blue), and UNI MEG (orange). Arrows indicate the flow of these MEGs between the various components.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send Loopback Messages with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 4 to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the messages transmitted by the UNI-C under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)												
Units	OpCode value												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 29C: Processing & Response to Unicast & Multicast LBM Frames – LBR Header

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – LBR Header												
Test Definition ID	UNIC-R41 ⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG												
IEEE Requirement Description	Further to the successful PDU validation tests (described in Test Cases 25 through 28), the receiving MEP generates an LBR and transmits it to the originating MEP. The source address parameter of the received LBM is used as the destination address parameter for the transmitted LBR, the source address parameter for the LBR is the MAC address of the replying MEP and the OpCode field is changed from LBM to LBR												
Test Object	Verify that further to the successful PDU validation tests (described in Test Cases 25 through 28) the receiving MEP generates an LBR and transmits it to the originating MEP with the source address parameter of the received LBM used as the destination address parameter for the transmitted LBR, with the MAC address of the replying MEP used as the source address parameter for the LBR and with the OpCode field changed from LBM to LBR												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A central 'Simulated Service Provider Network' contains two Network Elements (NEs): 'Operator A NE' and 'Operator B NE'. 'Operator A NE' is connected to a 'Local UNI-N (Tester 2)'. 'Operator B NE' is connected to a 'Remote UNI-N (Tester 4)'. Both Operator NEs are connected to 'Subscriber NE' blocks. The 'Local Subscriber NE' contains a 'Local UNI-C Under Test' and is connected to 'Tester 1'. The 'Remote Subscriber NE' contains a 'Remote UNI-C (Tester 4)'. A 'Subscriber MEG' (green arrow) spans from the Local UNI-C to the Remote UNI-C. A 'Test MEG' (blue arrow) spans from the Local UNI-N to the Remote UNI-N. A 'UNI MEG' (orange arrow) spans from the Local UNI-N to the Local UNI-C. Each NE block includes an 'Impairment or Monitor Mode' component.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send valid Loopback Messages to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the Loopback Reply messages transmitted by the UNI-C under test and to verify that the source address parameter of the received LBM is used as the destination address parameter for the transmitted LBR, the source address parameter for the LBR is the MAC address of the replying MEP and the OpCode field is changed from LBM to LBR												
Units	Source address, destination address and OpCode values												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 30C: Processing & Response to Unicast & Multicast LBM Frames – LBR Content

Abstract Test Suite for Service OAM													
Test Name	Processing & Response to Unicast & Multicast LBM Frames – LBR Content												
Test Definition ID	UNIC-R41 ⁶												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG												
IEEE Requirement Description	A receiving MEP that receives a valid LBM, shall not interpret any of the other fields or TLVs than the source address, destination address and OpCode. The contents of any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), shall be ignored, not interpreted by the receiver and SHALL be copied to the LBR												
Test Object	Verify that when a receiving MEP receives a valid LBM, it does not interpret any of the other fields or TLVs than the source address, destination address and OpCode, and the contents of any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), are ignored and copied to the LBR												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network'. On the left, a green box labeled 'Subscriber NE' is connected to a yellow box 'Impairment or Monitor Mode' (Tester 1), which is connected to an orange box 'Operator A NE'. Inside the dashed box, 'Operator A NE' is connected to another yellow box 'Impairment or Monitor Mode' (Tester 3), which is connected to a pink box 'Operator B NE'. On the right, 'Operator B NE' is connected to a green box 'Subscriber NE'. Below the dashed box, there are four boxes representing network interfaces: 'Local UNI-C Under Test' (green), 'Local UNI-N (Tester 2)' (orange), 'Remote UNI-N (Tester 4)' (pink), and 'Remote UNI-C (Tester 4)' (green). Arrows show the flow of frames: a green arrow labeled 'Subscriber MEG' from Local UNI-C to Remote UNI-C; a blue arrow labeled 'Test MEG' from Local UNI-N to Remote UNI-N; and an orange arrow labeled 'UNI MEG' from Local UNI-N to Local UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct Tester 2 and Tester 4 to send valid Loopback Messages to the UNI-C under test. Use Tester 1 and Tester 3 to monitor the Loopback Reply messages transmitted by the UNI-C under test and to verify that any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), are ignored and copied to the LBR												
Units	LBR TLV fields value												
Variables	LBM frame type (Unicast or Multicast)												
Results	Pass or fail												
Remarks													

TEST CASE 31C: Generating Multicast CCM Frames – Destination Address

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Destination Address												
Test Definition ID	UNIC-R42 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Destination address validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; CCMs monitoring a service instance distinguished by its VID use the Group MAC addresses listed in the MAC addresses Table in section 10, as the destination address												
Test Object	Verify that the destination address parameter of the CCM frames generated by the UNI-C under test is one of the Group MAC addresses listed in the MAC addresses Table in section 10												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a 'Subscriber NE' (green box) contains a 'Local UNI-C Under Test' (green box) and 'Tester 1' (yellow box). In the center, a 'Simulated Service Provider Network' (dashed box) contains 'Operator A NE' (orange box) with 'Local UNI-N (Tester 2)' (orange box) and 'Tester 3' (yellow box), and 'Operator B NE' (pink box) with 'Remote UNI-N (Tester 4)' (pink box) and 'Remote UNI-C (Tester 4)' (green box). On the right, another 'Subscriber NE' (green box) contains 'Remote UNI-C (Tester 4)' (green box). Arrows indicate MEGs: a green arrow for 'Subscriber MEG' spanning from the left Subscriber NE to the right Subscriber NE; a blue arrow for 'Test MEG' spanning from the local UNI-C to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their destination address parameter contains one of the Group MAC addresses listed in the MAC addresses Table in section 10												
Units	Destination address												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 32C: Generating Multicast CCM Frames – Source Address

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Source Address												
Test Definition ID	UNIC-R42 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Source address validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The CCM frames source address is the Individual MAC address of the MEP transmitting the PDU. The source address parameter contains an individual, and not a Group, MAC address												
Test Object	Verify that the source address parameter of the CCM frames generated by the UNI-C under test contains an individual, and not a Group, MAC address												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). This is connected to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A second green box on the right represents another 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Below the network, three MEGs are shown: 'Subscriber MEG' (green), 'Test MEG' (blue), and 'UNI MEG' (orange), with arrows indicating their scope across the network elements.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their source address parameter contains an individual, and not a Group, MAC address												
Units	Source address												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 33C: Generating Multicast CCM Frames – Protocol Version Number

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Protocol Version Number												
Test Definition ID	UNIC-R42 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Protocol Version Number validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The protocol version number is always 0												
Test Object	Verify that the protocol version number of the CCM frames generated by the UNI-C under test is always 0												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their protocol version number is always 0												
Units	Protocol version number												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 34C: Generating Multicast CCM Frames – OpCode

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – OpCode												
Test Definition ID	UNIC-R42 ⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – OpCode validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The OpCode field specifies the format and meaning of the remainder of the CFM PDU. The value for CCM PDUs is (0x01)												
Test Object	Verify that the OpCode value of the CCM frames generated by the UNI-C under test is (0x01)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that their OpCode value is (0x01)												
Units	OpCode value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 35C: Generating Multicast CCM Frames – Flags

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Flags

Test Definition ID	UNIC-R42 ⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.1)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Flags validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Flags field of the Common CFM Header is split into three parts for the CCM: the RDI field, the Reserved field and the CCM Interval field. The most significant bit of the Flags field is the RDI bit. This bit is set to 1 if the transmitting MEP's presentRDI variable is set, and 0 if not. The bits of the Flags field not including the RDI field and the CCM Interval field are set to 0 by the transmitting MEP. The least-significant three bits of the Flags field constitute the CCM Interval field. The CCM Interval field is encoded as specified in the CCM Interval Table in section 11												
Test Object	Verify that the Flags field bits of the CCM frames generated by the UNI-C under test that are not included in the CCM Interval field are set to 0 and that the CCM Interval field contains a value in the range 1-7												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Flags field bits that are not included in the CCM Interval field are set to 0 and that the CCM Interval field contains a value in the range 1-7												
Units	Flags field value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 36C: Generating Multicast CCM Frames – First TLV Offset

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – First TLV Offset
Test Definition ID	UNIC-R42 ⁶

Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – First TLV Offset validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The First TLV Offset field of the Common CFM Header in a CCM contains a value greater than or equal to 70												
Test Object	Verify that the First TLV Offset field of the Common CFM Header in the CCM frames generated by the UNI-C under test contains a value greater than or equal to 70												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the First TLV Offset field contains a value greater than or equal to 80												
Units	First TLV Offset field value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 37C: Generating Multicast CCM Frames – Sequence Number

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Sequence Number												
Test Definition ID	UNIC-R42 ⁷												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Sequence Number validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; A MEP transmits either a 0 in the Sequence Number field of the CCM frames, or copies to it the contents of the CCIscntCCMs variable												
Test Object	Verify that the Sequence Number field of the CCM frames generated by the UNI-C under test contains either a 0 or a copy of the CCIscntCCMs variable												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Sequence Number field contains either a 0 or a copy of the CCIscntCCMs variable												
Units	Sequence Number value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 38C: Generating Multicast CCM Frames – MEP ID

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – MEP ID												
Test Definition ID	UNIC-R42 ⁸												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.4)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – MEP ID validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The MEP ID TLV specifies from which MEP the CCM was transmitted and is in the range 1-8191												
Test Object	Verify that the MEP ID TLV of the CCM frames generated by the UNI-C under test contains a value in the range 1-8191												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A central 'Simulated Service Provider Network' contains 'Operator A NE' and 'Operator B NE'. To the left is a 'Subscriber NE'. The network is connected to a 'Local UNI-C Under Test' (green box) and a 'Local UNI-N (Tester 2)' (orange box). The 'Local UNI-N' is connected to 'Operator A NE', which is connected to 'Operator B NE', which is connected to a 'Remote UNI-N (Tester 4)' (pink box) and a 'Remote UNI-C (Tester 4)' (green box). 'Impairment or Monitor Mode' blocks (yellow) are placed between the Subscriber NE and Operator A NE, and between Operator A NE and Operator B NE. Testers 1, 3, and 4 are positioned at various points. Below the network, three MEGs are shown: 'UNI MEG' (orange arrow), 'Subscriber MEG' (green arrow), and 'Test MEG' (blue arrow), all spanning from the Local UNI-C to the Remote UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the MEP ID TLV contains a value in the range 1-8191												
Units	MEP ID value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 39C: Generating Multicast CCM Frames – MAID Total Length

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – MAID Total Length												
Test Definition ID	UNIC-R42 ⁹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – MAID total length validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The total length of the MAID field, including padding, if present, SHALL be exactly 48 octets.												
Test Object	Verify that the total length of the MAID field, including padding, of the CCM frames generated by the UNI-C under test is exactly 48 octets												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a 'Subscriber NE' (green box) contains a 'Local UNI-C Under Test' (green box) and is connected to 'Tester 1' (yellow box) in 'Impairment or Monitor Mode'. This connects to a 'Simulated Service Provider Network' (dashed box) containing 'Operator A NE' (orange box) with 'Local UNI-N (Tester 2)' and 'Tester 3' (yellow box) in 'Impairment or Monitor Mode', and 'Operator B NE' (pink box) with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)' (green box). Arrows show 'Subscriber MEG' (green), 'Test MEG' (blue), and 'UNI MEG' (orange) paths between the local and remote UNI-C components.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the total length of the MAID field, including padding is exactly 48 octets												
Units	MAID field total length												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 40C: Generating Multicast CCM Frames – Maintenance Domain Name Format

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Maintenance Domain Name Format												
Test Definition ID	UNIC-R42 ¹⁰ -R48 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.1)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Maintenance Domain Name SHOULD use the “null” format (value equal to 0x01)												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Maintenance Domain Name Format specifies the format of the Maintenance Domain Name field. When no Maintenance Domain Name is present, the value is equal to 0x01												
Test Object	Verify that the Maintenance Domain Name of the CCM frames generated by the UNI-C under test uses the “null” format (value equal to 0x01)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). A dashed box in the center represents the 'Simulated Service Provider Network', containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Arrows indicate the flow of MEGs: a green arrow for 'Subscriber MEG' from the left to the right, a blue arrow for 'Test MEG' from the left to the right, and an orange arrow for 'UNI MEG' from the left to the right.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Maintenance Domain Name of the CCM frames generated by the UNI-C under test uses the “null” format (value equal to 0x01)												
Units	Maintenance Domain Name format												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 41C: Generating Multicast CCM Frames – Short MA Name Format

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Short MA Name Format												
Test Definition ID	UNIC-R42 ¹¹ -R48 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.4)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Short MA Name SHOULD use the “text” format (value equal to 0x02)												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name format specifies the format of the Short MA Name field. The “text” format or character string value is 0x02												
Test Object	Verify that the Short MA Name format of the CCM frames generated by the UNI-C under test uses the “text” format (value equal to 0x02)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network'. On the left, a green box labeled 'Subscriber NE' is connected to a yellow box 'Impairment or Monitor Mode' (Tester 1). This connects to an orange box 'Operator A NE', which is connected to another yellow box 'Impairment or Monitor Mode' (Tester 3). This connects to a pink box 'Operator B NE', which is connected to a green box 'Subscriber NE'. Below the network, four nodes are shown: 'Local UNI-C Under Test' (green), 'Local UNI-N (Tester 2)' (orange), 'Remote UNI-N (Tester 4)' (pink), and 'Remote UNI-C (Tester 4)' (green). Arrows indicate MEG paths: a green arrow for 'Subscriber MEG' from Local UNI-C to Remote UNI-C; a blue arrow for 'Test MEG' from Local UNI-N to Remote UNI-N; and an orange arrow for 'UNI MEG' from Local UNI-C to Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Short MA Name format of the CCM frames generated by the UNI-C under test uses the “text” format (value equal to 0x02)												
Units	Short MA Name format												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 42C: Generating Multicast CCM Frames – Short MA Name Length

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Short MA Name Length												
Test Definition ID	UNIC-R42 ¹²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.5)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Short MA name length validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name length in a CCM contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID												
Test Object	Verify that the Short MA Name length of the CCM frames generated by the UNI-C under test contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is connected to 'Tester 1' (Impairment or Monitor Mode). A dashed box labeled 'Simulated Service Provider Network' contains 'Operator A NE' connected to 'Local UNI-N (Tester 2)', which is connected to 'Tester 3' (Impairment or Monitor Mode). This is further connected to 'Operator B NE' connected to 'Remote UNI-N (Tester 4)', which is connected to 'Remote UNI-C (Tester 4)'. On the far right, another green box represents the 'Subscriber NE'. Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C, a blue arrow for 'Test MEG' spanning from the local UNI-N to the remote UNI-N, and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Short MA Name length of the CCM frames generated by the UNI-C under test contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID												
Units	Short MA Name length												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 43C: Generating Multicast CCM Frames – Short MA Name

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Short MA Name												
Test Definition ID	UNIC-R42 ¹³ -R48 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.6)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Short MA Name is provisioned, has a maximum length of 45 ASCII characters and SHOULD default to a Representative Value that is uniquely related, but not necessarily equal, to the EVC ID or UNI ID as following: <ol style="list-style-type: none"> The Representative Value of the UNI ID for the default UNI-MEG The Representative Value of the EVC ID for the Test-MEG The Representative Value of the EVC ID for the Subscriber-MEG 												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name field contains the Short MA Name, in the format specified by the Short MA Name Format field												
Test Object	Verify that the Short MA Name has a maximum length of 45 ASCII characters and defaults to a Representative Value that is uniquely related, but not necessarily equal to the UNI ID for the default UNI-MEG, the EVC ID for the Test-MEG and the EVC ID for the Subscriber-MEG												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network'. On the left, a 'Subscriber NE' contains a 'Local UNI-C Under Test' and 'Tester 1' in 'Impairment or Monitor Mode'. In the center, 'Operator A NE' contains a 'Local UNI-N (Tester 2)' and 'Tester 3' in 'Impairment or Monitor Mode'. On the right, 'Operator B NE' contains a 'Remote UNI-N (Tester 4)' and 'Tester 4' in 'Impairment or Monitor Mode'. A final 'Subscriber NE' contains a 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green) and 'Test MEG' (blue) paths between the local and remote UNI-Ns, and a 'UNI MEG' (orange) path between the local and remote UNI-Cs.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Short MA Name of the CCM frames generated by the UNI-C under test is uniquely related, but not necessarily equal to the UNI ID for the default UNI-MEG, the EVC ID for the Test-MEG and the EVC ID for the Subscriber-MEG												
Units	Short MA Name length												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 44C: Generating Multicast CCM Frames – Sender ID TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Sender ID TLV												
Test Definition ID	UNIC-R42 ¹⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Sender ID TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Sender ID TLV identifies the Bridge on which the transmitting MEP is configured, and may also include a management address for that Bridge. The Sender ID TLV Type is equal to (0x01) and the Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Object	Verify that the Sender ID TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Impairment or Monitor Mode' (Tester 1). The network then enters a dashed box labeled 'Simulated Service Provider Network'. Inside, it connects to an orange box 'Operator A NE' (Local UNI-N, Tester 2), followed by another yellow 'Impairment or Monitor Mode' box (Tester 3), then a pink box 'Operator B NE' (Remote UNI-N, Tester 4), and finally a green box 'Subscriber NE' (Remote UNI-C, Tester 4). Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'. Dotted lines indicate the boundaries of the Local and Remote UNIs.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Sender ID TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Units	Sender ID TLV Type and Length values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 45C: Generating Multicast CCM Frames – Chassis ID Length

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Chassis ID Length												
Test Definition ID	UNIC-R42 ¹⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Chassis ID length validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The chassis ID length is the length, in octets, of the Chassis ID field, it is either 0, or is less than (TLV Length field value – 1)												
Test Object	Verify that the Chassis ID length of the CCM frames generated by the UNI-C under test is either 0 or less than (TLV Length field value – 1)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C Under Test'. This is connected to an orange box representing 'Operator A NE' with a 'Local UNI-N (Tester 2)'. Both are connected to a yellow box representing 'Operator B NE' with a 'Remote UNI-N; Remote UNI-C (Tester 4)'. A green box on the far right represents another 'Subscriber NE'. Testers 1, 3, and 4 are shown in 'Impairment or Monitor Mode'. Arrows indicate the flow of MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Chassis ID length of the CCM frames generated by the UNI-C under test is either 0 or less than (TLV Length field value – 1)												
Units	Chassis ID length value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 46C: Generating Multicast CCM Frames – Management Address Domain Field

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Management Address Domain Field												
Test Definition ID	UNIC-R42 ¹⁶												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Management Address Domain field validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address Domain Length field contains the length, in octets, of the Management Address Domain field. If 0, or if the TLV's Length field indicates that the Management Address Domain Length field is not present, then the Management Address Domain, Management Address Length, and Management Address fields are not present												
Test Object	Verify that the Management Address Domain field of the CCM frames generated by the UNI-C under test is empty												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Management Address Domain field of the CCM frames generated by the UNI-C under test is empty												
Units	Management Address Domain field												
Variables	None												
Results	Pass or fail												
Remarks	The Management Address Domain field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)												

TEST CASE 47C: Generating Multicast CCM Frames – Management Address Field

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Management Address Field												
Test Definition ID	UNIC-R42 ¹⁷												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Management Address field validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address length and the Management Address fields are not present if the Management Address Domain Length field is not present or contains a 0, or if the Management Address Length field is not present or contains a 0												
Test Object	Verify that the Management Address field of the CCM frames generated by the UNI-C under test is empty												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is followed by a yellow box labeled 'Impairment or Monitor Mode' and 'Tester 1'. A dashed box represents the 'Simulated Service Provider Network', containing an orange box for 'Operator A NE' connected to a 'Local UNI-N (Tester 2)', followed by another yellow 'Impairment or Monitor Mode' box and 'Tester 3', then a pink box for 'Operator B NE' connected to a 'Remote UNI-N (Tester 4)', and finally a green box for 'Remote UNI-C (Tester 4)'. On the far right, another green box represents the 'Subscriber NE'. Below the network, three horizontal arrows indicate MEG paths: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C, a blue arrow for 'Test MEG' spanning from the local UNI-C to the remote UNI-C, and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Management Address field of the CCM frames generated by the UNI-C under test is empty												
Units	Management Address field												
Variables	None												
Results	Pass or fail												
Remarks	The Management Address field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)												

TEST CASE 48C: Generating Multicast CCM Frames – Port Status TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Port Status TLV												
Test Definition ID	UNIC-R42 ¹⁸												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.4)												
Test Type	Conformance												
Test Status	Mandatory if Port Status TLVs are supported												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Port Status TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Port Status TLV indicates the ability of the Bridge Port on which the transmitting MEP resides to pass ordinary data, regardless of the status of the MAC. The Port Status TLV Type is equal to (0x02) and the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp												
Test Object	Verify that the Port Status TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x02) and that the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. A dashed box represents the 'Simulated Service Provider Network'. On the left, a 'Subscriber NE' contains a 'Local UNI-C Under Test' and an 'Impairment or Monitor Mode' block labeled 'Tester 1'. This connects to 'Operator A NE', which contains a 'Local UNI-N (Tester 2)' and another 'Impairment or Monitor Mode' block labeled 'Tester 3'. This connects to 'Operator B NE', which contains a 'Remote UNI-N (Tester 4)' and an 'Impairment or Monitor Mode' block labeled 'Tester 4'. On the far right, a 'Subscriber NE' contains a 'Remote UNI-C (Tester 4)'. Three MEGs are shown with arrows: a green 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C; a blue 'Test MEG' spanning from the local UNI-N to the remote UNI-N; and an orange 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Port Status TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x02) and that the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp												
Units	Port Status TLV Type and TLV field values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 49C: Generating Multicast CCM Frames – Interface Status TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Interface Status TLV												
Test Definition ID	UNIC-R42 ¹⁹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.5)												
Test Type	Conformance												
Test Status	Mandatory if Interface Status TLVs are supported												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Interface Status TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Interface Status TLV indicates the status of the interface on which the MEP transmitting the CCM is configured, or the next-lower interface in the IETF RFC 2863 IF-MIB. The Interface Status TLV Type is equal to (0x04) and the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown												
Test Object	Verify that the Interface Status TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x04) and that the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. This is connected to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3', and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A yellow box labeled 'Impairment or Monitor Mode' is placed between the Subscriber NE and the SPSN, and between Operator A NE and Operator B NE. Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Interface Status TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x04) and that the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown												
Units	Interface Status TLV Type and TLV field values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 50C: Generating Multicast CCM Frames – Organization Specific TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – Organization Specific TLV												
Test Definition ID	UNIC-R42 ²⁰												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.2)												
Test Type	Conformance												
Test Status	Mandatory if Organization TLVs are supported												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Organization Specific TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; Any organization can define TLVs for use in Connectivity Fault Management. The Organization TLV Type is equal to 31 (0x1F)												
Test Object	Verify that the Organization TLV Type of the CCM frames generated by the UNI-C under test is equal to 31 (0x1F)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). A dashed box in the center represents the 'Simulated Service Provider Network', containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE' with 'Subscriber NE' and 'Tester 4'. Arrows indicate MEGs: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C; a blue arrow for 'Test MEG' spanning from the local UNI-C to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the Organization Specific TLV Type of the CCM frames generated by the UNI-C under test is equal to 31 (0x1F)												
Units	Organization Specific TLV Type value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 51C: Generating Multicast CCM Frames – End TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast CCM Frames – End TLV												
Test Definition ID	UNIC-R42 ²¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.7)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-C Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – End TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The End TLV is required and is the last TLV in the CFM PDU and is Required. The End TLV Type is equal to (0x00)												
Test Object	Verify that the End TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x00)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the End TLV Type of the CCM frames generated by the UNI-C under test is equal to (0x00)												
Units	End TLV Type value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 52C: Generating Multicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM													
Test Name	Generating Multicast LBM Frames – Destination Address												
Test Definition ID	UNIC-R43 ¹ -R54 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MAY be able to generate Multicast LBM frames. For each LB session, Multicast destinations MAY be supported using the reserved CCM multicast MAC DA in the range of 01-80-C2-00-00-30 to 01-80-C2-00-00-37 that corresponds to the MEG-Level of the MEP												
Test Object	Verify that when the UNI-C under test uses Loopback messages to check bidirectional connectivity between itself and the other MEPs in the same MEG, the destination address parameter of the LBM frames generated by the UNI-C under test contains one of the Group MAC address listed in the MAC addresses Table in section 10												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green box) is connected to a Local UNI-C Under Test (green box). This is followed by an Impairment or Monitor Mode block (yellow box) labeled Tester 1. A dashed box represents the Simulated Service Provider Network, containing an Operator A NE (orange box) connected to a Local UNI-N (Tester 2) (orange box), followed by another Impairment or Monitor Mode block (yellow box) labeled Tester 3, then an Operator B NE (pink box) connected to a Remote UNI-N (Tester 4) (pink box), and finally a Remote UNI-C (Tester 4) (green box). On the far right, another Subscriber NE (green box) is connected to the Remote UNI-C. Below the network, three MEGs are shown: Subscriber MEG (green arrows), Test MEG (blue arrows), and UNI MEG (orange arrows). The Subscriber MEG and Test MEG span the entire distance from the Local UNI-C to the Remote UNI-C. The UNI MEG spans only the distance between the Local UNI-C and the Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the destination address parameter of the LBM message destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and on the Test-MEG contains one of the Group MAC address listed in the MAC addresses Table in section 10												
Units	Destination address												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 53C: Generating Unicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Destination Address												
Test Definition ID	UNIC-R43 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames. For each LB session, the destination address MUST be configurable to any Unicast MAC DA												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The LBM frames are addressed to a single specific MP												
Test Object	Verify that the destination address parameter of the LBM message sent by the UNI-C under test contain the Unicast address of the its peer MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the destination address parameter of the LBM message destined to the local UNI-N on the UNI-MEG contains the Unicast address of the local UNI-N, that the destination address parameter of the LBM message destined to the remote UNI-C on the Subscriber-MEG contains the Unicast address of the remote UNI-C and that the destination address parameter of the LBM message destined to the remote UNI-C on the Test-MEG also contains the Unicast address of the remote UNI-C												
Units	Destination address												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 54C: Generating Unicast LBM Frames – Source Address

Abstract Test Suite for Service OAM

Test Name	Generating Unicast LBM Frames – Source Address												
Test Definition ID	UNIC-R43 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Source address validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The LBM frames source address is the Individual MAC address of the MEP transmitting the PDU. The source address parameter contains an individual, and not a Group, MAC address												
Test Object	Verify that the source address parameter of the LBM frames generated by the UNI-C under test contains an individual, and not a Group, MAC address												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration within a Simulated Service Provider Network. On the left, a Subscriber NE (green box) is connected to a Local UNI-C Under Test (green box). This is followed by an Impairment or Monitor Mode block (yellow box) labeled Tester 1. The network then splits into two paths: one through Operator A NE (orange box) to a Local UNI-N (Tester 2) (orange box), and another through Operator B NE (pink box) to a Remote UNI-N (Tester 4) (pink box). Both paths then lead to a Remote UNI-C (Tester 4) (green box) on the far right. A Subscriber NE (green box) is also shown at the top right. Below the network, three horizontal arrows represent MEGs: a green arrow for Subscriber MEG, a blue arrow for Test MEG, and an orange arrow for UNI MEG. Vertical dashed lines represent network segments.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the source address parameter of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG contain an individual, and not a Group, MAC address												
Units	Source address												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 55C: Generating Unicast LBM Frames – Protocol Version Number

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Protocol Version Number
Test Definition ID	UNIC-R43 ⁴

Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Protocol Version Number validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The protocol version number is always 0												
Test Object	Verify that the protocol version number of the LBM frames generated by the UNI-C under test is always 0												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE contains a Local UNI-C Under Test and an Impairment or Monitor Mode block (Tester 1). In the center, a Simulated Service Provider Network contains Operator A NE with a Local UNI-N (Tester 2) and an Impairment or Monitor Mode block (Tester 3). On the right, Operator B NE contains a Remote UNI-N (Tester 4) and an Impairment or Monitor Mode block (Tester 4), connected to a Subscriber NE with a Remote UNI-C (Tester 4). Three MEG paths are shown: UNI MEG (orange), Subscriber MEG (green), and Test MEG (blue). Dotted lines indicate the network boundaries.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the protocol version number of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is always 0												
Units	Protocol version number												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 56C: Generating Unicast LBM Frames – OpCode

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – OpCode												
Test Definition ID	UNIC-R43 ⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – OpCode validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The OpCode field specifies the format and meaning of the remainder of the CFM PDU. The value for LBM PDUs is (0x03)												
Test Object	Verify that the OpCode value of the LBM frames generated by the UNI-C under test is (0x03)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the OpCode of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is (0x03)												
Units	OpCode value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 57C: Generating Unicast LBM Frames – Flags

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Flags												
Test Definition ID	UNIC-R43 ⁶												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.1)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Flags validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; In an LBM, the Flags field of the Common CFM Header is set to 0 by the transmitting MEP												
Test Object	Verify that the Flags field bits of the LBM frames generated by the UNI-C under test that are set to 0												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration within a Simulated Service Provider Network. On the left, a Subscriber NE (green) is connected to a Local UNI-C Under Test (green). This UNI-C is connected to a Local UNI-N (orange), which is associated with Tester 2. The Local UNI-N is connected to Operator A NE (orange), which is associated with Tester 3. Operator A NE is connected to Operator B NE (pink), which is associated with Tester 4. Operator B NE is connected to a Remote UNI-N (pink), which is associated with Tester 4. The Remote UNI-N is connected to a Remote UNI-C (pink), which is associated with Tester 4. The Remote UNI-C is connected to a Subscriber NE (green). Three MEG paths are shown: a green arrow for Subscriber MEG, a blue arrow for Test MEG, and an orange arrow for UNI MEG. All MEG paths are shown as bidirectional between the Local UNI-C and the Remote UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Flags field bits of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG are set to 0												
Units	Flags field value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 58C: Generating Unicast LBM Frames – First TLV Offset

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – First TLV Offset												
Test Definition ID	UNIC-R43 ⁷												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – First TLV Offset validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The First TLV Offset field of the Common CFM Header in a LBM contains a value greater than or equal to 4												
Test Object	Verify that the First TLV Offset field of the Common CFM Header in the LBM frames generated by the UNI-C under test contains a value greater than or equal to 4												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the First TLV Offset field of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG contain a value greater than or equal to 4												
Units	First TLV Offset field value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 59C: Generating Unicast LBM Frames – Loopback Transaction Identifier

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Loopback Transaction Identifier												
Test Definition ID	UNIC-R43 ⁸												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.3)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Loopback Transaction Identifier validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; A MEP copies the contents of the nextLBMtransID variable to the Loopback Transaction Identifier field of the LBM frames												
Test Object	Verify that the Loopback Transaction Identifier field of the LBM frames generated by the UNI-C under test contains a copy of the nextLBMtransID variable												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration within a Simulated Service Provider Network. On the left, a Subscriber NE (green box) contains a Local UNI-C Under Test (green box) and is connected to Tester 1 (yellow box) via an Impairment or Monitor Mode block. This network is connected to Operator A NE (orange box) containing a Local UNI-N (Tester 2) (orange box), which is also connected to Tester 3 (yellow box) via an Impairment or Monitor Mode block. Operator A NE is connected to Operator B NE (pink box) containing a Remote UNI-N (Tester 4) (pink box), which is connected to Tester 4 (yellow box) via an Impairment or Monitor Mode block. Finally, Operator B NE is connected to a Subscriber NE (green box) containing a Remote UNI-C (Tester 4) (green box). Three MEG paths are shown: a green arrow for Subscriber MEG from Local UNI-C to Remote UNI-C; a blue arrow for Test MEG from Local UNI-C to Remote UNI-C; and an orange arrow for UNI MEG from Local UNI-C to Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Loopback Transaction Identifier field of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG contain a copy of the nextLBMtransID variable												
Units	Loopback Transaction Identifier field value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 60C: Generating Unicast LBM Frames – Sender ID TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Sender ID TLV												
Test Definition ID	UNIC-R43 ⁹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Sender ID TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Sender ID TLV identifies the Bridge on which the transmitting MEP is configured, and may also include a management address for that Bridge. The Sender ID TLV Type is equal to (0x01) and the Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Object	Verify that the Sender ID TLV Type of the LBM frames generated by the UNI-C under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network'. On the left, a 'Subscriber NE' (green) is connected to a 'Local UNI-C Under Test' (green). This is connected to 'Tester 1' (yellow 'Impairment or Monitor Mode'). The network continues to 'Operator A NE' (orange), which is connected to a 'Local UNI-N (Tester 2)' (orange). This is connected to 'Tester 3' (yellow 'Impairment or Monitor Mode'). The network then goes to 'Operator B NE' (pink), which is connected to a 'Remote UNI-N (Tester 4)' (pink). This is connected to 'Tester 4' (yellow 'Impairment or Monitor Mode'). Finally, it connects to a 'Remote UNI-C (Tester 4)' (green) and another 'Subscriber NE' (green). Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C; a blue arrow for 'Test MEG' spanning from the local UNI-N to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Sender ID TLV Type field of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields												
Units	Sender ID TLV Type and Length values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 61C: Generating Unicast LBM Frames – Chassis ID Length

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Chassis ID Length												
Test Definition ID	UNIC-R43 ¹⁰												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Mandatory if Sender ID TLVs are supported												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Chassis ID length validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The chassis ID length is the length, in octets, of the Chassis ID field, it is either 0, or is less than (TLV Length field value – 1)												
Test Object	Verify that the Chassis ID length of the LBM frames generated by the UNI-C under test is either 0 or less than (TLV Length field value – 1)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A central 'Simulated Service Provider Network' contains 'Operator A NE' and 'Operator B NE'. To the left, a 'Subscriber NE' is connected to a 'Local UNI-C Under Test' (green box) and a 'Local UNI-N (Tester 2)' (orange box). An 'Impairment or Monitor Mode' block (yellow) is between the Local UNI-C and Local UNI-N. To the right, a 'Remote UNI-N (Tester 4)' (pink box) and a 'Remote UNI-C (Tester 4)' (green box) are connected to 'Operator B NE'. Another 'Impairment or Monitor Mode' block is between Operator A NE and Operator B NE. Arrows show MEG paths: a green arrow for 'Subscriber MEG' from Local UNI-C to Remote UNI-C; a blue arrow for 'Test MEG' from Local UNI-C to Remote UNI-C; and an orange arrow for 'UNI MEG' from Local UNI-C to Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Chassis ID length of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is either 0 or less than (TLV Length field value – 1)												
Units	Chassis ID length value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 62C: Generating Unicast LBM Frames – Management Address Domain Field

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Management Address Domian Field												
Test Definition ID	UNIC-R43 ¹¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address Domain Length field contains the length, in octets, of the Management Address Domain field. If 0, or if the TLV's Length field indicates that the Management Address Domain Length field is not present, then the Management Address Domain, Management Address Length, and Management Address fields are not present												
Test Object	Verify that the Management Address Domain field of the LBM frames generated by the UNI-C under test is empty												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Management Address Domain field of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is empty												
Units	Management Address Domain field												
Variables	None												
Results	Pass or fail												
Remarks	The Management Address Domain field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)												

TEST CASE 63C: Generating Unicast LBM Frames – Management Address Field

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Management Address Field												
Test Definition ID	UNIC-R43 ¹²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address length and the Management Address fields are not present if the Management Address Domain Length field is not present or contains a 0, or if the Management Address Length field is not present or contains a 0												
Test Object	Verify that the Management Address field of the LBM frames generated by the UNI-C under test is empty												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Impairment or Monitor Mode' (Tester 1). The network then enters a dashed box labeled 'Simulated Service Provider Network'. Inside, an orange box represents 'Operator A NE' with a 'Local UNI-N (Tester 2)' and another yellow 'Impairment or Monitor Mode' box (Tester 3). This is connected to a pink box representing 'Operator B NE' with a 'Remote UNI-N (Tester 4)' and a green box representing 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows indicate MEG paths: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C; a blue arrow for 'Test MEG' spanning from the local UNI-C to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Management Address field of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is empty												
Units	Management Address field												
Variables	None												
Results	Pass or fail												
Remarks	The Management Address field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)												

TEST CASE 64C: Generating Unicast LBM Frames – Data TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Data TLV												
Test Definition ID	UNIC-R43 ¹³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.6)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Data TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Data TLV contains zero or more octets of arbitrary data and serves several purposes, including the transmission of different frame sizes to test MTU capabilities, and the testing for data-specific error dependencies. The Data TLV may be included in the Loopback Messages and the Data TLV Type is equal to (0x03)												
Test Object	Verify that the Data TLV Type of the LBM frames generated by the UNI-C under test is equal to (0x03)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Impairment or Monitor Mode' (Tester 1). The network then enters a dashed box labeled 'Simulated Service Provider Network'. Inside, it passes through an orange box 'Operator A NE' (containing 'Local UNI-N (Tester 2)') and another yellow 'Impairment or Monitor Mode' box (Tester 3). It then reaches a pink box 'Operator B NE' (containing 'Remote UNI-N (Tester 4)') and finally a green box 'Subscriber NE' (containing 'Remote UNI-C (Tester 4)'). Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote UNI-C; a blue arrow for 'Test MEG' spanning from the local UNI-N to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-N to the local UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Data TLV Type of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is equal to (0x03)												
Units	Data TLV Type value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 65C: Generating Unicast LBM Frames – Organization Specific TLV

Abstract Test Suite for Service OAM													
Test Name	Generating Unicast LBM Frames – Organization Specific TLV												
Test Definition ID	UNIC-R43 ¹⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.2)												
Test Type	Conformance												
Test Status	Mandatory if Organization TLVs are supported												
MEF Requirement Description	UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Organization Specific TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; Any organization can define TLVs for use in Connectivity Fault Management. The Organization TLV Type is equal to 31 (0x1F)												
Test Object	Verify that the Organization TLV Type of the LBM frames generated by the UNI-C under test is equal to 31 (0x1F)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the Organization Specific TLV Type of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is equal to 31 (0x1F)												
Units	Organization Specific TLV Type value												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 66C: Generating Unicast LBM Frames – End TLV

Abstract Test Suite for Service OAM

Test Name	Generating Unicast LBM Frames – End TLV												
Test Definition ID	UNIC-R43 ¹⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.7)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	UNI-C Type 2 MEP implementation MUST be able to generate Unicast LBM frames – End TLV validation												
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The End TLV is required and is the last TLV in the CFM PDU and is Required. The End TLV Type is equal to (0x00)												
Test Object	Verify that the End TLV Type of the LBM frames generated by the UNI-C under test is equal to (0x00)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = “1” and with a unique MAID, a Test-MEG with a MEG-Level = “5” and with a unique MAID, and a Subscriber-MEG with a MEG-Level = “6” and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBM messages transmitted by the UNI-C under test and to verify that the End TLV Type of the LBM messages destined to the local UNI-N on the UNI-MEG, to the remote UNI-C on the Subscriber-MEG and to the remote UNI-C on the Test-MEG is equal to (0x00)												
Units	End TLV Type value												
Variables	None												
Results	Pass or fail												
Remarks													

15.4 UNI-C Type 2 Continuity Check Requirements

TEST CASE 67C: Administratively Enable and Disable CCM Transmission

Abstract Test Suite for Service OAM													
Test Name	Administratively Enable and Disable CCM Transmission												
Test Definition ID	UNIC-R44 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST have the capability to administratively enable and disable CCM transmission on all local MEPs												
Test Object	Verify that the UNI-C Type 2 under test has the capability to administratively enable and disable CCM transmission on all local MEPs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that CCM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6". Disable CCM transmission on the UNI-MEG and verify that only CCMs with MEG-Level = 5 and 6 are still being transmitted. Disable CCM transmission on the Test-MEG and verify that only CCMs with MEG-Level = 6 are still being transmitted. Disable CCM transmission on the Subscriber-MEG and verify that no CCMs are transmitted. Re-enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG and verify that CCM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6"												
Units	MEP IDs MEG-Level values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 68C: Mandatory CCM Frame Rate

Abstract Test Suite for Service OAM													
Test Name	Mandatory CCM Frame Rate												
Test Definition ID	UNIC-R45 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST support a CCM frame rate of 1 frame per second												
Test Object	Verify that the UNI-C Type 2 under test supports a CCM frame rate of 1 frame per second												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration within a Simulated Service Provider Network. On the left, a Subscriber NE (green box) contains a Local UNI-C Under Test (green box) connected to Tester 1 (yellow box, Impairment or Monitor Mode). In the center, Operator A NE (orange box) contains a Local UNI-N (Tester 2) (orange box) connected to Tester 3 (yellow box, Impairment or Monitor Mode). On the right, Operator B NE (pink box) contains a Remote UNI-N (Tester 4) (pink box) connected to Tester 4 (yellow box, Impairment or Monitor Mode). Further right, a Subscriber NE (green box) contains a Remote UNI-C (Tester 4) (green box). Below the network, three MEGs are shown: Subscriber MEG (green arrow), Test MEG (blue arrow), and UNI MEG (orange arrow), all spanning between the local and remote UNI-C components.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the CCM Interval field of the CCM frames generated by the UNI-C under test contains the value 4. Also use Tester 2 and Tester 4 to verify that the CCMs are received within the CCM maximum lifetime												
Units	CCM frame rate												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 69C: Optional CCM Frame Rate

Abstract Test Suite for Service OAM													
Test Name	Optional CCM Frame Rate												
Test Definition ID	UNIC-R45 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 MAY support other frame rates specified in section 7.1.1 of ITU-T Y.1731												
ITU-T Requirement Description	When Ethernet Continuity Check is enabled, a MEP periodically transmits CCM frames as often as the configured transmission period. Transmission period can be one of the following seven values: 3.33ms, 10ms, 100ms, 1s, 10s, 1min or 10min												
Test Object	Verify that the UNI-C Type 2 under test supports transmission periods of: 3.33ms, 10ms, 100ms, 10s, 1min or 10min												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test setup. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is followed by a yellow box labeled 'Impairment or Monitor Mode' and 'Tester 1'. A dashed box represents the 'Simulated Service Provider Network', containing an orange box for 'Operator A NE' (with 'Local UNI-N (Tester 2)' and 'Impairment or Monitor Mode') and a pink box for 'Operator B NE' (with 'Remote UNI-N (Tester 4)' and 'Impairment or Monitor Mode'). On the right, another green box represents the 'Subscriber NE' connected to a 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows indicate MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Configure the transmission period of the UNI-C under test MEPs to 3.33ms. Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the CCM Interval field of the CCM frames contains the value 1. Also use Tester 2 and Tester 4 to verify that the CCMs are received within the CCM maximum lifetime. Configure the transmission period of the UNI-C under test MEPs to 10ms and repeat the test. Configure the transmission period of the UNI-C under test MEPs to 100ms and repeat the test. Configure the transmission period of the UNI-C under test MEPs to 10s and repeat the test. Configure the transmission period of the UNI-C under test MEPs to 1min and repeat the test. Configure the transmission period of the UNI-C under test MEPs to 10min and repeat the test.												
Units	CCM frame rate												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 70C: Configurable CCM Frames Priority for Subscriber-MEG & Test-MEG

Abstract Test Suite for Service OAM													
Test Name	Configurable CCM Frames Priority for Subscriber-MEG & Test-MEG												
Test Definition ID	UNIC-R47 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MUST support a configurable priority for transmitted CCM frames for Test-MEG and subscriber-MEG												
Test Object	Verify that the CoS ID of the CCM frames transmitted by the UNI-C Type 2 under test is configurable and set in the transmitted CCM PDUs												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and for each end point of each configured EVC. Enable CCM transmission on the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a 'Local UNI-C Under Test' (green box) is connected to 'Tester 1' (yellow box) in 'Impairment or Monitor Mode'. This connects to a 'Simulated Service Provider Network' (dashed box) containing 'Operator A NE' (orange box) and 'Operator B NE' (pink box). 'Operator A NE' is connected to 'Local UNI-N (Tester 2)' (orange box) and 'Tester 3' (yellow box) in 'Impairment or Monitor Mode'. 'Operator B NE' is connected to 'Remote UNI-N (Tester 4)' (pink box) and 'Remote UNI-C (Tester 4)' (green box). A 'Subscriber NE' (green box) is also connected to the network. Arrows show 'Subscriber MEG' (green) and 'Test MEG' (blue) frames being transmitted from the Local UNI-C to the Remote UNI-C. A 'UNI MEG' (grey) arrow is also shown between the Local UNI-C and the Remote UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the CCM frames transmitted from each configured MEP instance are C-tagged with a specific COS ID*												
Units	CCM PDUs CoS ID												
Variables	None												
Results	Pass or fail												
Remarks	*The CoS ID supported by the EVC which yields the lowest frame loss performance												

TEST CASE 71C: UNI-C Counter – Number of CCM Frames Transmitted

Abstract Test Suite for Service OAM													
Test Name	UNI-C Counter – Number of CCM Frames Transmitted												
Test Definition ID	UNIC-R49 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 SHOULD support counters for each MEP that counts the number of CCM frames transmitted												
Test Object	Verify that the UNI-C Type 2 under test supports counters for each MEP that counts the number of CCM frames transmitted												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' (with 'Local UNI-N (Tester 2)' and 'Tester 3') and 'Operator B NE' (with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'). On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green) and 'Test MEG' (blue) paths between the Subscriber NEs, and a 'UNI MEG' (orange) path between the Local and Remote UNI-Cs.</p>												
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LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use Tester 1 and Tester 3 to monitor and count the Continuity Check Messages transmitted by the UNI-C under test. Disable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG and verify that the number of CCMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of CCM frames transmitted indicated by the UNI-C MEP counter for the UNI-MEG, that the number of CCMs with MEG-Level = 5 counted by the Tester 1 and Tester 3 is equal to the number of CCM frames transmitted indicated by the UNI-C MEP counter for the Test-MEG and that the number of CCMs with MEG-Level = 6 counted by the Tester 1 and Tester 3 is equal to the number of CCM frames transmitted indicated by the UNI-C MEP counter for the Subscriber-MEG												
Units	Number of CCM frames												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 72C: Lowest Priority CC Defect – DefRDICCM

Abstract Test Suite for Service OAM													
Test Name	Lowest Priority CC Defect – DefRDICCM												
Test Definition ID	UNIC-R51 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-C Type 2 MEP MUST support the minimum CC fault priority level defined in IEEE 802.1ag for which a CC alarm will be generated. An alarm will be generated only if the fault has equal or greater priority than this minimum fault level												
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm												
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (No defect vs DefRDICCM)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
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LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Clear all alarms. Use Tester 2 and Tester 4 to stop transmitting CCMs to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Use Tester 1 and Tester 3 to monitor the CCMs transmitted by the UNI-C under test and to verify that the RDI bit of the Flags field is set in all messages and use the management system of the UNI-C under test to verify that the DefRDICCM defect triggers a Fault Alarm												
Units	Fault Alarm hierarchy												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 73C: CC Defect & Fault Alarm Hierarchy – DefRDICCM vs DefMACstatus

Abstract Test Suite for Service OAM													
Test Name	CC Defect & Fault Alarm Hierarchy – DefRDICCM vs DefMACstatus												
Test Definition ID	UNIC-R50 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms												
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm												
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefRDICCM vs DefMACstatus)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' in 'Impairment or Monitor Mode'. In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' in 'Impairment or Monitor Mode', and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Clear all alarms. Use Tester 2 and Tester 4 to stop transmitting CCMs to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefRDICCM defects trigger Fault Alarms on the three local UNI-C MEPs. Before the CC fault reset time expires, use Tester 2 and Tester 4 to send CCMs with Port Status TLV values equal to "psBlocked" (0x01) or with Interface TLV values not equal to "isUp" (0x01) to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefMACstatus defects trigger new Fault Alarms on the three local UNI-C MEPs and that the lower priority alarms are masked by the new ones												
Units	Fault Alarm hierarchy												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 74C: CC Defect & Fault Alarm Hierarchy – DefMACstatus vs DefRemoteCCM

Abstract Test Suite for Service OAM													
Test Name	CC Defect & Fault Alarm Hierarchy – DefMACstatusCCM vs DefRemoteCCM												
Test Definition ID	UNIC-R50 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms												
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm												
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefMACstatus vs DefRemoteCCM)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C Under Test'. This is connected to a yellow box labeled 'Impairment or Monitor Mode' (Tester 1). In the center, a dashed box represents the 'Simulated Service Provider Network'. It contains an orange box 'Operator A NE' connected to a 'Local UNI-N (Tester 2)', which is also connected to another yellow 'Impairment or Monitor Mode' box (Tester 3). To the right of this is a pink box 'Operator B NE' connected to a 'Remote UNI-N', which is further connected to a green box 'Subscriber NE' and a 'Remote UNI-C (Tester 4)'. Below the network, three horizontal arrows represent MEGs: a green arrow for 'Subscriber MEG' spanning from the local UNI-C to the remote Subscriber NE; a blue arrow for 'Test MEG' spanning from the local UNI-C to the remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the local UNI-C to the local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Clear all alarms. Use Tester 2 and Tester 4 to send CCMs with Port Status TLV values equal to "psBlocked" (0x01) or with Interface TLV values not equal to "isUp" (0x01) to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefMACstatus defects trigger Fault Alarms on the three local UNI-C MEPs. Before the CC fault reset time expires, use Tester 2 and Tester 4 to send CCMs with the RDI bit of the Flags field set to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefRemoteCCM status defects trigger new Fault Alarms on the three local UNI-C MEPs and that the lower priority alarms are masked by the new ones												
Units	Fault Alarm hierarchy												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 75C: CC Defect & Fault Alarm Hierarchy – DefRemoteCCM vs DefErrorCCM

Abstract Test Suite for Service OAM													
Test Name	CC Defect & Fault Alarm Hierarchy – DefRemoteCCM vs DefErrorCCM												
Test Definition ID	UNIC-R50 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms												
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm												
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefRemoteCCM vs DefErrorCCM)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Clear all alarms. Use Tester 2 and Tester 4 to send CCMs with the RDI bit of the Flags field set to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefRemoteCCM defects trigger Fault Alarms on the three local UNI-C MEPs. Before the CC fault reset time expires, use Tester 2 and Tester 4 to send invalid CCMs (with a multicast source address) to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefErrorCCM status defects trigger new Fault Alarms on the three local UNI-C MEPs and that the lower priority alarms are masked by the new ones												
Units	Fault Alarm hierarchy												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 76C: CC Defect & Fault Alarm Hierarchy – DefErrorCCM vs DefXconCCM

Abstract Test Suite for Service OAM													
Test Name	CC Defect & Fault Alarm Hierarchy – DefErrorCCM vs DefXconCCM												
Test Definition ID	UNIC-R50 ⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	A UNI-C Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms												
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm												
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefErrorCCM vs DefXconCCM)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Clear all alarms. Use Tester 2 and Tester 4 to send invalid CCMs (with a multicast source address) to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefErrorCCM defects trigger Fault Alarms on the three local UNI-C MEPs. Before the CC fault reset time expires, use Tester 2 and Tester 4 to send CCMs with a valid but unknown Short MA Name to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and use the management system to verify that the DefXconCCM status defects trigger new Fault Alarms on the three local UNI-C MEPs and that the lower priority alarms are masked by the new ones												
Units	Fault Alarm hierarchy												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 77C: CC Fault Alarm Time & CC Fault Reset Time

Abstract Test Suite for Service OAM													
Test Name	CC Fault Alarm Time & CC Fault Reset Time												
Test Definition ID	UNIC-R52 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)												
Test Type	Conformance												
Test Status	Mandatory if IEEE clause 12.14 7 (Maintenance association End Point managed object) is implemented												
MEF Requirement Description	A UNI-C Type 2 MEP MUST support a CC fault Alarm time and a CC Fault Reset Time												
IEEE Requirement Description	A Fault Alarm is issued when the MEP Fault Notification Generator state machine detects that a configured time period (default, 2.5s) has passed with one or more defects indicated, and Fault Alarms are enabled. The state machine can transmit no further Fault Alarms until it is reset by the passage of a configured time period (default, 10s) during which no defect indication is present												
Test Object	Verify that the UNI-C Type 2 MEP under test supports a CC fault Alarm time and a CC Fault Reset Time												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Enable CCM transmission on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	If IEEE clause 12.14 7 (Maintenance association End Point managed object) is implemented, verify that the variable someRMEPCCMdefect is cleared and clear all alarms. Use Tester 2 and Tester 4 to stop transmitting CCMs to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG. Use the management system of the UNI-C under test to verify that 2.5 seconds after the variable someRMEPCCMdefect changes from clear to set and the DefRemoteCCM is triggered, a Fault alarm is transmitted. Use Tester 2 and Tester 4 to start transmitting CCMs to the UNI-C under test on the UNI-MEG, the Test-MEG and the Subscriber-MEG and verify that the variable someRMEPCCMdefect changes from set to clear. Use the management system of the UNI-C under test to verify that 10 seconds after the variable someRMEPCCMdefect changes from set to clear the Fault alarm is cleared												
Units	CC Fault Alarm & CC Fault Reset times												
Variables	None												
Results	Pass or fail												
Remarks													

15.5 UNI-C Type 2 Loopback Requirements

TEST CASE 78C: Administratively Initiate & Stop Loopback Sessions

Abstract Test Suite for Service OAM													
Test Name	Administratively Initiate & Stop Loopback Sessions												
Test Definition ID	UNIC-R53 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	Each LB session MUST have the ability to be administratively initiated and stopped												
Test Object	Verify that the UNI-C Type 2 under test has the ability to administratively initiate and stop LB sessions												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send Loopback Messages (repeatedly until aborted) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that LBM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6". Instruct the local UNI-C under test to abort the loopback session on the UNI-MEG and use Tester 1 and Tester 3 to verify that only LBMs with MEG-Level = 5 and 6 are still being transmitted. Instruct the local UNI-C under test to abort the loopback session on the Test-MEG and use Tester 1 and Tester 3 to verify that only LBMs with MEG-Level = 6 are still being transmitted. Instruct the local UNI-C under test to abort the loopback session on the Subscriber-MEG and use Tester 1 and Tester 3 to verify that no LBMs are transmitted. Instruct the local UNI-C under test to send Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that LBM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6"												
Units	MEP IDs MEG-Level values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 79C: Configurable LBM Frames Priority

Abstract Test Suite for Service OAM													
Test Name	Configurable LBM Frames Priority												
Test Definition ID	UNIC-R55 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, the priority of LBM frames MUST be configurable												
Test Object	Verify that the CoS ID of the LBM frames transmitted by the UNI-C Type 2 under test is configurable and set in the transmitted LBM PDU												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and for each end point of each configured EVC. Enable CCM transmission on the Test-MEG and the Subscriber-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic													
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Use Tester 1 and Tester 3 to monitor the Continuity Check Messages transmitted by the UNI-C under test and to verify that the CCM frames transmitted from each configured MEP instance are C-tagged with a specific COS ID*. Instruct the local UNI-C under test to send 3 Loopback Messages to the remote UNI-C on both Subscriber-MEG and Test-MEG and use Tester 1 and Tester 3 to monitor the LBM frames transmitted by the UNI-C under test and to verify that the LBM frames transmitted from each configured MEP instance are C-tagged with a specific COS ID* equal to the COS ID of the CCM frames.												
Units	CCM and LBM PDUs CoS ID												
Variables	None												
Results	Pass or fail												
Remarks	*The CoS ID supported by the EVC which yields the lowest frame loss performance												

TEST CASE 80C: Configurable Number of LBM Transmissions per Session

Abstract Test Suite for Service OAM													
Test Name	Configurable Number of LBM Transmissions per Session												
Test Definition ID	UNIC-R56 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, the number of LBM transmissions MUST be configurable												
Test Object	Verify that for each LB session, the number of LBM transmissions is configurable												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1'. This connects to a 'Simulated Service Provider Network' (dashed box) which contains 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3', and 'Operator B NE' with 'Remote UNI-N (Tester 4)'. This connects to another 'Subscriber NE' on the right with 'Remote UNI-C (Tester 4)'. Arrows show 'Subscriber MEG' (green) between the two Subscriber NEs, 'Test MEG' (blue) between Local UNI-N and Remote UNI-N, and 'UNI MEG' (orange) between Local UNI-C and Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that LBM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6". Instruct the local UNI-C under test to send 1024 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that LBM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6". Instruct the local UNI-C under test to send Loopback Messages (repeatedly until aborted) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that LBM frames are transmitted from each configured MEP instance (verify MEP IDs) and that the MEG-Level of the UNI-MEG is = "1", the MEG-Level of the Test-MEG is = "5", and the MEG-Level of Subscriber-MEG is = "6".												
Units	MEP IDs MEG-Level values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 81C: Configurable Interval between LBM Transmissions

Abstract Test Suite for Service OAM													
Test Name	Configurable Interval between LBM Transmissions												
Test Definition ID	UNIC-R57 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, the interval between LBM transmissions MUST be configurable												
Test Object	Verify that for each LB session, the interval between LBM transmissions is configurable												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing LBM transmissions. On the left, a 'Subscriber NE' (green box) contains a 'Local UNI-C Under Test' (green box) and is connected to 'Tester 1' (yellow box labeled 'Impairment or Monitor Mode'). This connects to a 'Simulated Service Provider Network' (dashed box) containing 'Operator A NE' (orange box) with 'Local UNI-N (Tester 2)' (orange box) and 'Tester 3' (yellow box labeled 'Impairment or Monitor Mode'). This connects to 'Operator B NE' (pink box) with 'Remote UNI-N (Tester 4)' (pink box) and 'Tester 4' (yellow box labeled 'Impairment or Monitor Mode'). Finally, it connects to a 'Subscriber NE' (green box) with 'Remote UNI-C (Tester 4)' (green box). Below the network, three horizontal arrows represent MEG paths: a green arrow for 'Subscriber MEG' between the two Subscriber NEs, a blue arrow for 'Test MEG' between the Local UNI-N and Remote UNI-N, and an orange arrow for 'UNI MEG' between the Local UNI-C and Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send 3 Loopback Messages with a period of 1 second to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that the interval between LBM transmissions is 1 second. Instruct the local UNI-C under test to send 3 Loopback Messages at an interval of 'T' seconds with ('T' > 1) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to verify that the interval between LBM transmissions is 'T' seconds. Instruct the local UNI-C under test to send 3 Loopback Messages with a period of 0 second (send the next LBM upon receipt of last LBR) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Using the MEP counters, verify that the total number of (LBMs transmitted) is never greater than the number of (LBRs received +1)												
Units	LBM transmissions interval and number of LBM and LBR frames												
Variables	Interval between LBM transmissions												
Results	Pass or fail												
Remarks													

TEST CASE 82C: Configurable Timeout after a LBM Transmission

Abstract Test Suite for Service OAM													
Test Name	Configurable Timeout after a LBM Transmission												
Test Definition ID	UNIC-R58 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8												
Test Type	Conformance												
Test Status	Optional												
MEF Requirement Description	For each LB session, the timeout after a LBM transmission, for an expected LBR result MAY be configurable												
Test Object	Verify that for each LB session, the timeout after a LBM transmission, for an expected LBR result is configurable												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green) contains a Local UNI-C Under Test (green) and Tester 1 (yellow). In the center, a Simulated Service Provider Network (dashed box) contains Operator A NE (orange) with Local UNI-N (Tester 2) (orange) and Tester 3 (yellow). On the right, Operator B NE (pink) contains Remote UNI-N (Tester 4) (pink) and Remote UNI-C (Tester 4) (green). Arrows show Subscriber MEG (green) and Test MEG (blue) paths between the Subscriber NE and the Remote UNI-C. An orange arrow shows UNI MEG paths between the Local UNI-C and the Local UNI-N.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send 3 Loopback Messages with a period of 0 second (send the next LBM upon receipt of last LBR) and with a timeout of 5 seconds to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Instruct the local UNI-N (Tester 2) and the remote UNI-C (Tester 4) not to respond to any of the received LBMs. Use Tester 1 and Tester 3 to monitor the LBMs sent by the UNI-C under test and to verify that the interval between LBM transmissions is at least 5 seconds												
Units	LBM transmissions interval												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 83C: Configurable LBM Frame Size

Abstract Test Suite for Service OAM													
Test Name	Configurable LBM Frame Size												
Test Definition ID	UNIC-R59 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, the size of the LBM frame MUST be configurable. This requires that the optional Data TLV MUST be supported to allow for frames up to the MTU size												
Test Object	Verify that for each LB session, the size of the LBM frame is configurable and that the optional Data TLV is supported to allow for frames up to the MTU size												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green) contains a Local UNI-C Under Test (green) and an Impairment or Monitor Mode block (yellow) labeled Tester 1. In the center, a Simulated Service Provider Network (dashed box) contains Operator A NE (orange) with a Local UNI-N (Tester 2) and an Impairment or Monitor Mode block (yellow) labeled Tester 3. On the right, another Subscriber NE (green) contains a Remote UNI-N (pink) and a Remote UNI-C (Tester 4) (green), with an Impairment or Monitor Mode block (yellow) labeled Tester 4. Below the network, three MEG paths are shown: a green path for Subscriber MEG, a blue path for Test MEG, and an orange path for UNI MEG.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>EVC₁</td> <td>10</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Instruct the local UNI-C under test to send three 64-byte Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBMs sent by the UNI-C under test and to verify that the LBM frame size is 64 bytes. Instruct the local UNI-C under test to send three Loopback Messages (frame size equal to the maximum transmission unit of the EVC) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG. Use Tester 1 and Tester 3 to monitor the LBMs sent by the UNI-C under test and to verify that the LBM frame size is equal to the maximum transmission unit of the EVC												
Units	LBM frame size												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 84C: UNI-C Counter – Number of LBM Frames Transmitted

Abstract Test Suite for Service OAM													
Test Name	UNI-C Counter – Number of LBM Frames Transmitted												
Test Definition ID	UNIC-R60 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, counters for LBM frames transmitted MUST be maintained												
Test Object	Verify that the UNI-C Type 2 under test maintains counters for each MEP that counts the number of LBM frames transmitted												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE'. Below the network, three MEG paths are shown: a green path for 'Subscriber MEG' between the two Subscriber NEs, a blue path for 'Test MEG' between the Local UNI-C and Remote UNI-C, and an orange path for 'UNI MEG' between the Local UNI-C and Local UNI-N.</p>												
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LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters. Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG and use Tester 1 and Tester 3 to monitor and count the LBMs transmitted by the UNI-C under test. Verify that the number of LBMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBM frames transmitted indicated by the UNI-C MEP counter for the UNI-MEG, that the number of LBMs with MEG-Level = 5 counted by the Tester 1 and Tester 3 is equal to the number of LBM frames transmitted indicated by the UNI-C MEP counter for the Test-MEG and that the number of LBMs with MEG-Level = 6 counted by the Tester 1 and Tester 3 is equal to the number of LBM frames transmitted indicated by the UNI-C MEP counter for the Subscriber-MEG												
Units	Number of LBM frames												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 85C: UNI-C Counter – Number of LBM Frames Received

Abstract Test Suite for Service OAM													
Test Name	UNI-C Counter – Number of LBM Frames Received												
Test Definition ID	UNIC-R60 ²												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, counters for LBM frames Received MUST be maintained												
Test Object	Verify that the UNI-C Type 2 under test maintains counters for each MEP that counts the number of LBM frames received												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE'. Arrows show three MEG paths: a green arrow for 'Subscriber MEG' between the two Subscriber NEs, a blue arrow for 'Test MEG' between the Local UNI-N and Remote UNI-C, and an orange arrow for 'UNI MEG' between the Local UNI-C and Remote UNI-C.</p>												
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LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters. Instruct the local UNI-N (Tester 2) and the remote UNI-C (Tester 4) to send 3 Loopback Messages to the UNI-C under test on the UNI-MEG, on the Test-MEG and on the Subscriber-MEG. Use Tester 1 and Tester 3 to monitor and count the LBMs transmitted by the local UNI-N (Tester 2) and the remote UNI-C (Tester 4). Verify that the number of LBMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBM frames received indicated by the UNI-C MEP counter for the UNI-MEG, that the number of LBMs with MEG-Level = 5 counted by the Tester 1 and Tester 3 is equal to the number of LBM frames received indicated by the UNI-C MEP counter for the Test-MEG and that the number of LBMs with MEG-Level = 6 counted by the Tester 1 and Tester 3 is equal to the number of LBM frames received indicated by the UNI-C MEP counter for the Subscriber-MEG												
Units	Number of LBM frames												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 86C: UNI-C Counter – Number of LBR Frames Received

Abstract Test Suite for Service OAM													
Test Name	UNI-C Counter – Number of LBR Frames Received												
Test Definition ID	UNIC-R60 ³												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, counters for LBR frames Received MUST be maintained												
Test Object	Verify that the UNI-C Type 2 under test maintains counters for each MEP that counts the number of LBR frames received												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A central dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' and 'Operator B NE'. To the left is a 'Subscriber NE'. On the far left is a 'Local UNI-C Under Test' (green box) connected to 'Tester 1' (yellow box). This is connected to 'Local UNI-N (Tester 2)' (orange box) within Operator A NE. Operator A NE is connected to 'Operator B NE' (pink box), which is connected to 'Remote UNI-N (Tester 4)' (pink box). This is connected to 'Remote UNI-C (Tester 4)' (green box) on the far right. 'Tester 3' (yellow box) is also connected to the Local UNI-N. Arrows show 'Subscriber MEG' (green) from Local UNI-C to Remote UNI-C, 'Test MEG' (blue) from Local UNI-N to Remote UNI-N, and 'UNI MEG' (orange) from Local UNI-N to Local UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters. Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG and use Tester 1 and Tester 3 to monitor and count the LBMs transmitted by the UNI-C under test and also count the number of LBRs transmitted by the local UNI-N (Tester 2) and the remote UNI-C (Tester 4). Verify that the number of LBRs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBR frames received indicated by the UNI-C MEP counter for the UNI-MEG, that the number of LBRs with MEG-Level = 5 counted by the Tester 1 and Tester 3 is equal to the number of LBR frames received indicated by the UNI-C MEP counter for the Test-MEG and that the number of LBRs with MEG-Level = 6 counted by the Tester 1 and Tester 3 is equal to the number of LBR frames received indicated by the UNI-C MEP counter for the Subscriber-MEG												
Units	Number of LBR frames												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 87C: UNI-C Statistic – Percentage of Unanswered LB Requests (Lost LBM/LBR)

Abstract Test Suite for Service OAM													
Test Name	UNI-C Statistic – Percentage of Unanswered LB Requests (Lost LBM/LBR)												
Test Definition ID	UNIC-R60 ⁴												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, statistics on the percentage of unanswered LB requests (lost LBM/LBR) MUST be maintained												
Test Object	Verify that the UNI-C Type 2 under test maintains statistics on the percentage of unanswered LB requests (lost LBM/LBR)												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. A dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' and 'Operator B NE'. Outside this box are 'Subscriber NE' on both ends. 'Local UNI-C Under Test' is connected to 'Local UNI-N (Tester 2)'. 'Remote UNI-N (Tester 4)' is connected to 'Remote UNI-C (Tester 4)'. 'Impairment or Monitor Mode' blocks are placed between the NEs. Arrows show 'Subscriber MEG' (green) from local UNI-C to remote UNI-C, 'Test MEG' (blue) from local UNI-C to local UNI-N, and 'UNI MEG' (orange) from local UNI-N to local UNI-C.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">LOCAL UNI</th> <th colspan="2" style="text-align: center;">REMOTE UNI</th> </tr> <tr> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> <th style="text-align: center;">CE-VLAN ID</th> <th style="text-align: center;">EVC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> <td style="text-align: center;">10</td> <td style="text-align: center;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters and statistics. Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG and use Tester 1 and Tester 3 to verify that the number of LBMs transmitted by the UNI-C under test and is equal to the number of LBRs transmitted by the local UNI-N (Tester 2) and the remote UNI-C (Tester 4). Verify that the percentage of unanswered LB requests is 0% for the 3 UNI-C under test MEPs. DO NOT Reset the UNI-C under test counters and statistics. Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG and instruct the local UNI-N (Tester 2) and the remote UNI-C (Tester 4) not to respond to any of the received LBMs. Verify that the percentage of unanswered LB requests is 50% for the 3 UNI-C under test MEPs. Reset the UNI-C under test counters and statistics. Instruct the local UNI-C under test to send 3 Loopback Messages to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG and instruct the local UNI-N (Tester 2) and the remote UNI-C (Tester 4) not to respond to any of the received LBMs. Verify that the percentage of unanswered LB requests is 100% for the 3 UNI-C under test MEPs												
Units	Percentage of unanswered LB requests												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 88C: UNI-C Statistic – Minimum, Maximum & Average Round-Trip Latency

Abstract Test Suite for Service OAM													
Test Name	UNI-C Statistic – Minimum, Maximum & Average Round-Trip Latency												
Test Definition ID	UNIC-R60 ⁵												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	For each LB session, statistics on the minimum, maximum and average round-trip latency MUST be maintained												
Test Object	Verify that the UNI-C Type 2 under test maintains statistics on the minimum, maximum and average round-trip latency												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1" and with a unique MAID, a Test-MEG with a MEG-Level = "5" and with a unique MAID, and a Subscriber-MEG with a MEG-Level = "6" and with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C, local UNI-N and for each end point of each configured EVC. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C Under Test' and 'Tester 1' (Impairment or Monitor Mode). In the center, a dashed box represents the 'Simulated Service Provider Network' containing 'Operator A NE' with 'Local UNI-N (Tester 2)' and 'Tester 3' (Impairment or Monitor Mode), and 'Operator B NE' with 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. On the right, another green box represents the 'Subscriber NE'. Below the network, three horizontal arrows indicate MEG paths: a green arrow for 'Subscriber MEG', a blue arrow for 'Test MEG', and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">LOCAL UNI</th> <th colspan="2" style="background-color: #f4a460;">REMOTE UNI</th> </tr> <tr> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> <th style="background-color: #f4a460;">CE-VLAN ID</th> <th style="background-color: #f4a460;">EVC</th> </tr> </thead> <tbody> <tr> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> <td style="background-color: #ffffcc;">10</td> <td style="background-color: #ffffcc;">EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10	EVC ₁	10	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10	EVC ₁	10	EVC ₁										
Test Procedure	Reset the UNI-C under test counters and statistics. Instruct the local UNI-C under test to send Loopback Messages (repeatedly until aborted) to the local UNI-N on the UNI-MEG, and to the remote UNI-C on both Subscriber-MEG and Test-MEG for a period of time T and verify the UNI-C under test maintains statistics on the minimum, maximum and average round-trip latency												
Units	Minimum, maximum and average round-trip latency												
Variables	None												
Results	Pass or fail												
Remarks													

16. Abstract Test Cases for UNI-N Type 2 Service OAM

This section contains 78 Test Cases for UNI-N. The section is divided in 5 different subsections as follows:

Section 16.1

Configuration Requirements contains a total of 1 Test Case covering the UNI Type 2 Requirements R15.

Section 16.2

Maintenance Entity Requirements contains a total of 3 Test Cases covering the UNI Type 2 Requirements R35, R37 and R38.

Section 16.3

MEG End Points Requirements contains a total of 54 Test Cases covering the UNI Type 2 Requirements R39, R40, R41, R42 and R43.

Section 16.4

Continuity Check Requirements contains a total of 10 Test Cases covering the UNI Type 2 Requirements R44, R45, R46, R48, R49, R50, R51 and R52.

Section 16.5

Loopback Requirements contains a total of 10 Test Cases covering the UNI Type 2 Requirements R53, R54, R56, R57, R58, R59 and R60.

16.1 UNI-N Type 2 Configuration Requirements

TEST CASE 1N: UNI-MEG Administrative Configuration

Abstract Test Suite for Service OAM	
Test Name	UNI-MEG Administrative Configuration
Test Definition ID	UNIN-R15
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 8
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MUST be administratively configurable with the UNI-C MEP ID and MEG-Level corresponding to the UNI-MEG
Test Object	Verify that a UNI-N Type 2 can be administratively configurable with the UNI-C MEP ID and MEG-Level corresponding to the UNI-MEG
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and the local UNI-N. Configure the UNI-N with the UNI-C MEP ID. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' containing a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' and 'Tester 1' is connected to the Subscriber NE. A dashed box labeled 'Simulated Service Provider Network' contains an orange box for 'Operator A NE' with a 'Local UNI-N Under Test', a grey box for 'Tester 3', a grey box for 'Operator B NE' with a 'Remote UNI-N (Tester 4)', and a grey box for 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. Arrows indicate MEG levels: 'Subscriber MEG' spans from the Subscriber NE to the Remote UNI-N; 'Test MEG' spans from the Local UNI-N to the Remote UNI-N; and 'UNI MEG' spans from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that they contain the configured UNI-N MEP ID, that their MEG-Level is equal to "1" and that the RDI bit of the Flags field is clear. Re-configure the UNI-C with a different MEP ID but do not update the UNI-N configuration with this new information. Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that they contain the configured UNI-N MEP ID, that their MEG-Level is equal to "1" and that the RDI bit of the Flags field is set
Units	MEG-Level, MEP ID and RDI bit values
Variables	None
Results	Pass or fail
Remarks	

16.2 UNI-N Type 2 Maintenance Entity Requirements

TEST CASE 7N: MEP Instance on the UNI-MEG

Abstract Test Suite for Service OAM													
Test Name	MEP Instance on the UNI-MEG												
Test Definition ID	UNIN-R37 ¹												
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2												
Test Type	Conformance												
Test Status	Mandatory												
MEF Requirement Description	A UNI-N Type 2 MUST be able to support a single MEP instance on the UNI-MEG, regardless of whether any EVC is configured for that UNI or not												
Test Object	Verify that a UNI-N Type 2 can support a single MEP instance on the UNI-MEG, regardless of whether any EVC is configured for that UNI or not												
Test Configuration	Configure at least one EVC associating at least two UNIs (local + remote) and configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances with specific MEP IDs for the local UNI-C and the local UNI-N. Enable CCM transmission on the UNI-MEG. Testers with proper PHYs that match the UNIs are monitoring the Service OAM frames												
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test' (Tester 3). To its right, a dashed box labeled 'Simulated Service Provider Network' contains 'Operator A NE' (Tester 3), 'Operator B NE' (Tester 4), and 'Remote UNI-N (Tester 4)'. Further right is another 'Subscriber NE' connected to 'Remote UNI-C (Tester 4)'. Below the network, two horizontal arrows represent MEGs: a grey arrow for 'Subscriber MEG' (Tes: MEG) and an orange arrow for 'UNI MEG'.</p>												
CE-VLAN ID/EVC Map	<table border="1"> <thead> <tr> <th colspan="2">LOCAL UNI</th> <th colspan="2">REMOTE UNI</th> </tr> <tr> <th>CE-VLAN ID</th> <th>EVC</th> <th>CE-VLAN ID</th> <th>EVC</th> </tr> </thead> <tbody> <tr> <td>10*</td> <td>EVC₁</td> <td>10*</td> <td>EVC₁</td> </tr> </tbody> </table> <p>Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1</p>	LOCAL UNI		REMOTE UNI		CE-VLAN ID	EVC	CE-VLAN ID	EVC	10*	EVC ₁	10*	EVC ₁
LOCAL UNI		REMOTE UNI											
CE-VLAN ID	EVC	CE-VLAN ID	EVC										
10*	EVC ₁	10*	EVC ₁										
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that they contain the configured MEP ID and that their MEG-Level is equal to "1". Delete the configured EVC(s) and use Tester 1 to verify that the Continuity Check Messages are still transmitted by the UNI-N under test, that they still contain the configured MEP ID and that their MEG-Level is still equal to "1"												
Units	MEG-Level and MEP ID values												
Variables	None												
Results	Pass or fail												
Remarks													

TEST CASE 8N: Untagged OAM Frames on the UNI-MEG

Abstract Test Suite for Service OAM	
Test Name	Untagged OAM Frames on the UNI-MEG
Test Definition ID	UNIN-R37 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 must be able to support a single MEP instance on the UNI-MEG, this UNI-MEG is called the “default UNI-MEG” and MUST use Untagged OAM frames
Test Object	Verify that a UNI-N Type 2 is able to support a single MEP instance on the UNI-MEG and that it uses untagged OAM frames
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box labeled 'Subscriber NE' is connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the green box is 'Local UNI-C (Tester 2)'. In the center, an orange box labeled 'Operator A NE' is connected to a grey box labeled 'Tester 3'. Below the orange box is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box labeled 'Operator B NE' connected to a grey box labeled 'Subscriber NE'. Below the Operator B NE box is 'Remote UNI-N (Tester 4)' and below the Subscriber NE box is 'Remote UNI-C (Tester 4)'. At the bottom, a horizontal line represents the MEG. An orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N. A grey arrow labeled 'Subscriber MEG' spans from the Local UNI-C to the Remote UNI-C. A grey arrow labeled 'Test MEG' spans from the Local UNI-N to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that their MEG-Level is equal to “1” and that they are untagged
Units	MEG-Level value and CCM frames VLAN tag (absence)
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 9N: IEEE 802.1 Bridge MEPs Corresponding to UNI-MEG

Abstract Test Suite for Service OAM	
Test Name	IEEE 802.1 Bridge MEPs Corresponding to UNI-MEG
Test Definition ID	UNIN-R38 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When the CE is an IEEE 802.1 Bridge, the MEPs corresponding to the UNI-MEG on a UNI-N Type 2 SHOULD be Down-MEPs
Test Object	Verify that when the CE is an IEEE 802.1 Bridge, the MEPs corresponding to the UNI-MEG on a UNI-N Type 2 are Down-MEPs
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure Down-MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is a 'Local UNI-C (Tester 2)'. This connects to a 'Simulated Service Provider Network' (dashed box). Inside, an orange box 'Operator A NE' is connected to a grey box 'Tester 3'. This connects to another grey box 'Operator B NE' (Remote UNI-N, Tester 4), which is connected to a final grey box 'Subscriber NE' (Remote UNI-C, Tester 4). Below the network, arrows show 'Subscriber MEG' and 'Test MEG' paths between the Subscriber NE and the Remote UNI-C, and a 'UNI MEG' path between the Local UNI-C and the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and if the bridge implements IEEE 802.1ag clause 12.14.7, use the management system of the UNI-N under test to verify that the value indicating the direction in which the MEP is facing on the interface is "Down"
Units	MEP direction
Variables	None
Results	Pass or fail
Remarks	To perform this test, the bridge must implement IEEE 802.1ag clause 12.14.7 (Maintenance association End Point managed object). If this is not the case, there is no obligation to perform the test

16.3 UNI-N Type 2 MEG End Points Requirements

TEST CASE 13N: Configurable MEG-Level

Abstract Test Suite for Service OAM	
Test Name	Configurable MEG-Level
Test Definition ID	UNIN-R39
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MUST support a configurable MEG-Level for the MEPs
Test Object	Verify that a UNI-N Type 2 can support a configurable MEG-Level for the MEPs
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the Subscriber NE is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Operator A NE' connected to a grey box labeled 'Local UNI-N Under Test' (Tester 3). Below the Operator A NE is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains 'Operator B NE' (Tester 4) and 'Remote UNI-N; Remote UNI-C (Tester 4)'. Below the Operator B NE is 'Remote UNI-N; Remote UNI-C (Tester 4)'. On the far right, a grey box represents the 'Subscriber NE'. Below it is 'Subscriber NE'. A long double-headed arrow labeled 'Subscriber MEG' spans from the Local UNI-C to the Remote UNI-C. A shorter double-headed arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N Under Test.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that CCM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1"
Units	MEG-Level and MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 14N: Processing Received Multicast CCM Frames – Source Address

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Source Address
Test Definition ID	UNIN-R40 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.3.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Source address validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the source address parameter contains a Group address, and not an Individual MAC address
Test Object	Verify that any CCM frame received with a source address parameter that contains a Group MAC address is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the Subscriber NE connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is the Local UNI-C (Tester 2). In the center, an orange box represents the Local UNI-N Under Test. To its right is a dashed box labeled 'Simulated Service Provider Network' containing a grey box for Operator A NE and another for Operator B NE. Further right is another grey box for Remote UNI-N (Tester 4) and a final grey box for Subscriber NE. Below the network, two horizontal arrows indicate MEG flows: a shorter orange arrow labeled 'UNI MEG' and a longer grey arrow labeled 'Subscriber MEG Tag: MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a source address parameter that contains a Group MAC address to the UNI-C under test and use the management system of the UNI-C under test to verify that the received CCMs are not catalogued (MEP IDs of the remote MEPs) in the UNI-C MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 15N: Processing Received Multicast CCM Frames – Sender ID TLV

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Sender ID TLV
Test Definition ID	UNIN-R40 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Sender ID TLV validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Sender ID TLV Length field is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Object	Verify that any CCM frame received with a Sender ID TLV Length field that is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test' connected to a grey box 'Operator A NE' (Tester 3). Below this is 'Local UNI-N Under Test'. To the right, another grey box 'Operator B NE' (Tester 4) is connected to a final grey box 'Remote UNI-C (Tester 4)'. Below this is 'Remote UNI-N (Tester 4)'. A dashed box encloses the 'Operator A NE', 'Operator B NE', and 'Remote UNI-N' components, labeled 'Simulated Service Provider Network'. Arrows at the bottom show 'Subscriber MEG' and 'Test MEG' frames being sent from the Subscriber NE towards the Remote UNI-C. A specific orange arrow labeled 'UNI MEG' points from the Local UNI-C towards the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with Sender ID TLV Length field not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 16N: Processing Received Multicast CCM Frames – Chassis ID Length

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Chassis ID Length
Test Definition ID	UNIN-R40 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3.1)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Chassis ID length validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Chassis ID Length field is not 0, nor less than (TLV Length field value – 1)
Test Object	Verify that any CCM frame received with a Chassis ID Length field that is not 0, nor less than (TLV Length field value – 1) is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the Subscriber NE connected to a Local UNI-C (Tester 2). A yellow box labeled 'Monitor Mode' (Tester 1) is connected to the Local UNI-C. The Local UNI-N Under Test (orange box) is connected to the Monitor Mode. This Local UNI-N is part of a Simulated Service Provider Network (dashed box) that includes Operator A NE (orange), Tester 3 (grey), Operator B NE (grey), and Remote UNI-N (grey). The Remote UNI-N is connected to a Remote UNI-C (grey) and a Subscriber NE (grey). Arrows show the UNI MEG path from the Local UNI-N to the Remote UNI-N, and the Subscriber MEG (Test MEG) path from the Remote UNI-N to the Subscriber NE.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a Chassis ID Length field that is not 0, nor less than (TLV Length field value – 1) to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 17N: Processing Received Multicast CCM Frames – Port Status TLV

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Port Status TLV
Test Definition ID	UNIN-R40 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.4)
Test Type	Conformance
Test Status	Mandatory if Port Status TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Port Status TLV validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Port Status TLV contains a value other than (0x01) or (0x02)
Test Object	Verify that any CCM frame received with a Port Status TLV that contains a value other than (0x01) or (0x02) is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test' connected to a grey box 'Operator A NE' (Tester 3). Below this is 'Local UNI-N Under Test'. To the right, a grey box 'Operator B NE' (Tester 4) is connected to another grey box 'Subscriber NE' (Tester 4). Below this is 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Local UNI-N Under Test', 'Operator A NE', and 'Operator B NE'. Arrows indicate 'UNI MEG' between the local UNI-C and UNI-N, 'Subscriber MEG' between the local and remote UNI-Ns, and 'Test MEG' between the local and remote UNI-Cs.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a Port Status TLV that contains a value other than (0x01) or (0x02) to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 18N: Processing Received Multicast CCM Frames – Interface Status TLV

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Interface Status TLV
Test Definition ID	UNIN-R40 ⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.5)
Test Type	Conformance
Test Status	Mandatory if Interface Status TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Interface Status TLV validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Interface Status TLV contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07)
Test Object	Verify that any CCM frame received with an Interface Status TLV that contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07) is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a 'Subscriber NE' (green box) is connected to a 'Local UNI-C (Tester 2)'. This is connected to a 'Monitor Mode' box (yellow), which is connected to 'Tester 1'. 'Tester 1' is connected to the 'Local UNI-N Under Test' (orange box) within the 'Simulated Service Provider Network'. This network also includes 'Operator A NE' (grey box) and 'Operator B NE' (grey box). The 'Local UNI-N Under Test' is connected to 'Tester 3'. 'Operator B NE' is connected to 'Remote UNI-N (Tester 4)', which is connected to 'Remote UNI-C (Tester 4)'. The 'Remote UNI-N (Tester 4)' is also connected to another 'Subscriber NE' (grey box). Arrows at the bottom indicate the flow of traffic: 'UNI MEG' (orange arrow) from Local UNI-C to Local UNI-N; 'Subscriber MEG' (grey arrow) from Local UNI-N to Remote UNI-N; and 'Test MEG' (grey arrow) from Remote UNI-N to Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with an Interface Status TLV that contains a value other than (0x01), (0x02), (0x03), (0x04), (0x05), (0x06) or (0x07) to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 19N: Processing Received Multicast CCM Frames – CCM Interval

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – CCM Interval
Test Definition ID	UNIN-R40 ⁶
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.1.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – CCM Interval validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the CCM Interval field contains the value 0
Test Object	Verify that any CCM frame received with a CCM Interval field that contain the value 0 is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' (Local UNI-C, Tester 2). It is connected to a yellow box labeled 'Monitor Mode' (Tester 1). This connects to a dashed box representing the 'Simulated Service Provider Network'. Inside this network, an orange box represents 'Operator A NE' (Local UNI-N Under Test, Tester 3). This is connected to a grey box for 'Operator B NE' (Remote UNI-N, Tester 4), which is further connected to another grey box for 'Subscriber NE' (Remote UNI-C, Tester 4). Below the network, two horizontal arrows indicate MEG paths: a shorter orange arrow labeled 'UNI MEG' and a longer grey arrow labeled 'Subscriber MEG Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a CCM Interval field that contain the value 0 to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 20N: Processing Received Multicast CCM Frames – First TLV Offset

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – First TLV Offset
Test Definition ID	UNIN-R40 ⁷
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – First TLV Offset validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the First TLV Offset field of the Common CFM Header in a CCM does not contain a value greater than or equal to 70
Test Object	Verify that any CCM frame received with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 70 is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' (Tester 1) is connected to the Local UNI-C. This is connected to an orange box representing the 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box for 'Operator A NE' (connected to the Local UNI-N) and another grey box for 'Operator B NE'. To the right of Operator B NE is a 'Subscriber NE' connected to a 'Remote UNI-N (Tester 4)'. Below the network, two horizontal arrows indicate MEGs: an orange arrow for 'UNI MEG' spanning from the Local UNI-C to the Local UNI-N, and a grey arrow for 'Subscriber MEG (Test MEG)' spanning from the Local UNI-N to the Remote UNI-N. Testers 2, 3, and 4 are also indicated at their respective network points.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 70 to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 21N: Processing Received Multicast CCM Frames – MEP ID

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – MEP ID
Test Definition ID	UNIN-R40 ⁸
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.4)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – MEP ID validation
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the MEP ID is not in the range 1-8191
Test Object	Verify that any CCM frame received with a MEP ID that is not in the range 1-8191 is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This connects to an orange box representing 'Operator A NE' with a 'Local UNI-N Under Test'. This is connected to a grey box representing 'Operator B NE' with a 'Remote UNI-N (Tester 4)'. Finally, this connects to another grey box representing 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encompasses the Operator A NE and Operator B NE. Below the network, two horizontal arrows indicate MEGs: a grey arrow for 'Subscriber MEG' and an orange arrow for 'UNI MEG'. Vertical dashed lines represent network boundaries.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a MEP ID that is not in the range 1-8191 to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 22N: Processing Received Multicast CCM Frames – Short MA Name Length 1

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Short MA Name Length 1
Test Definition ID	UNIN-R40 ⁹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.5.5)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Short MA Name length validation 1
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Short MA Name Length does not contain a value greater than or equal to 1
Test Object	Verify that any CCM frame received with a Short MA Name Length that does not contain a value greater than or equal to 1 is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a Short MA Name Length that does not contain a value greater than or equal to 1 to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 23N: Processing Received Multicast CCM Frames – Short MA Name Length 2

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames – Short MA Name Length 2
Test Definition ID	UNIN-R40 ¹⁰
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.5.5)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG – Short MA Name length validation 2
IEEE Requirement Description	The receiving system SHALL consider a CCM PDU invalid and discard it if the Short MA Name Length indicates that the Short MA Name runs over the 48-octet limit for the MAID
Test Object	Verify that any CCM frame received with a Short MA Name Length that indicates that the Short MA Name runs over the 48-octet limit for the MAID is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test' connected to a grey box 'Operator A NE' (Tester 3). Below this is 'Local UNI-N Under Test'. On the right, a grey box 'Operator B NE' (Tester 4) is connected to another grey box 'Subscriber NE' (Tester 4). Below this is 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Operator A NE' and 'Operator B NE' components, labeled 'Simulated Service Provider Network'. Two horizontal arrows at the bottom indicate frame flow: a blue arrow labeled 'Subscriber MEG' and a red arrow labeled 'UNI MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send Continuity Check Messages with a Short MA Name Length that indicates that the Short MA Name runs over the 48-octet limit for the MAID to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are not catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 24N: Processing Received Multicast CCM Frames

Abstract Test Suite for Service OAM	
Test Name	Processing Received Multicast CCM Frames
Test Definition ID	UNIN-R40 ¹¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process received Multicast CCM frames for each required MEG
IEEE Requirement Description	Further to the successful PDU validation tests (described in Test Cases 14 through 23) a receiving MEP SHALL examine every CCM to be sure that its MAID matches that configured in the receiving MEP, check to ensure that its own MEPID does <i>not</i> match that in the received CCM and catalog CCMs in its MEP CCM Database
Test Object	Verify that further to the successful PDU validation tests (described in Test Cases 14 through 23) the receiving MEP examines every CCM to be sure that its MAID matches that configured in the receiving MEP, checks to ensure that its own MEPID does <i>not</i> match that in the received CCM and catalog CCMs in its MEP CCM Database
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This connects to an orange box representing 'Operator A NE' with a 'Local UNI-N Under Test'. This is connected to a grey box for 'Operator B NE' with a 'Remote UNI-N (Tester 4)'. Finally, it connects to another grey box for 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses Operator A NE and Operator B NE. Below the network, arrows indicate 'Subscriber MEG' and 'Test MEG' paths between Local UNI-C (Tester 2) and Remote UNI-C (Tester 4). A 'UNI MEG' arrow is shown between Local UNI-C and Local UNI-N (Under Test).</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 2 to send valid Continuity Check Messages to the UNI-N under test and use the management system of the UNI-N under test to verify that the received CCMs are catalogued (MEP ID of the remote MEP) in the UNI-N MEP CCM Database for the UNI-MEG
Units	CCM database MEP ID values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 25N: Processing & Response to Unicast & Multicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Destination Address
Test Definition ID	UNIN-R41 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Destination address validation
IEEE Requirement Description	When an LBM is received by an MEP Loopback Responder, if the destination address matches neither the MAC address of the receiving MEP, nor the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) of the receiving MEP, the MEP SHALL discard the LBM
Test Object	Verify that any LBM frame received with a destination address that does not match the MAC address of the receiving MEP, nor the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send Loopback Messages with a destination address that does not match the MAC address of the receiving MP, or the Group MAC address listed in the MAC addresses Table in section 10, appropriate to the MD Level (MEG-Level) to the UNI-N under test. Use Tester 1 to monitor the messages transmitted by the UNI-N under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)
Units	OpCode value
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 26N: Processing & Response to Unicast & Multicast LBM Frames – Source Address

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Source Address
Test Definition ID	UNIN-R41 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.3.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Source address validation
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the source address parameter contains a Group address, and not an Individual MAC address
Test Object	Verify that any LBM frame received with a source address parameter that contains a Group MAC address is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This connects to an orange box labeled 'Operator A NE' and 'Local UNI-N Under Test'. This is connected to a grey box labeled 'Tester 3'. This connects to a grey box labeled 'Operator B NE' and 'Remote UNI-N; Remote UNI-C (Tester 4)'. This connects to a final grey box labeled 'Subscriber NE'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A NE, Tester 3, Operator B NE, and Remote UNI-N; Remote UNI-C (Tester 4). Below the network, two horizontal arrows indicate MEGs: a shorter orange arrow labeled 'UNI MEG' and a longer grey arrow labeled 'Subscriber MEG Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send Loopback Messages with a source address parameter that contains a Group MAC address to the UNI-N under test. Use Tester 1 to monitor the messages transmitted by the UNI-C under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)
Units	OpCode value
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 27N: Processing & Response to Unicast & Multicast LBM Frames – Sender ID TLV TLV

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – Sender ID TLV
Test Definition ID	UNIN-R41 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – Sender ID TLV validation
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the Sender ID TLV Length field is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Object	Verify that any LBM frame received with a Sender ID TLV Length field that is not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the Subscriber NE, connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' connected to a grey box 'Operator B NE'. Below this is 'Local UNI-N Under Test' and 'Remote UNI-N (Tester 4)'. To the right is another grey box 'Subscriber NE' with 'Remote UNI-C (Tester 4)' below it. Arrows indicate traffic: a grey arrow labeled 'Subscriber MEG' and 'Tes: MEG' spans from the Subscriber NE to the Remote UNI-C. An orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send Loopback Messages with Sender ID TLV Length field not large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields to the UNI-N under test. Use Tester 1 to monitor the messages transmitted by the UNI-N under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)
Units	OpCode value
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 28N: Processing & Response to Unicast & Multicast LBM Frames – First TLV Offset

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – First TLV Offset
Test Definition ID	UNIN-R41 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.46 & 21.6.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG – First TLV Offset validation
IEEE Requirement Description	The receiving system SHALL consider an LBM PDU invalid and discard it if the First TLV Offset field of the Common CFM Header in an LBM does not contain a value greater than or equal to 4
Test Object	Verify that any LBM frame received with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 4 is considered invalid and discarded
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send Loopback Messages with a First TLV Offset field of the Common CFM Header that does not contain a value greater than or equal to 4 to the UNI-N under test. Use Tester 1 to monitor the messages transmitted by the UNI-N under test and to verify that it does not generate any Loopback Replies (because the received LBMs are considered invalid and discarded)
Units	OpCode value
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 29N: Processing & Response to Unicast & Multicast LBM Frames – LBR Header

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – LBR Header
Test Definition ID	UNIN-R41 ⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG
IEEE Requirement Description	Further to the successful PDU validation tests (described in Test Cases 25 through 28), the receiving MEP generates an LBR and transmits it to the originating MEP. The source address parameter of the received LBM is used as the destination address parameter for the transmitted LBR, the source address parameter for the LBR is the MAC address of the replying MEP and the OpCode field is changed from LBM to LBR
Test Object	Verify that further to the successful PDU validation tests (described in Test Cases 25 through 28) the receiving MEP generates an LBR and transmits it to the originating MEP with the source address parameter of the received LBM used as the destination address parameter for the transmitted LBR, with the MAC address of the replying MEP used as the source address parameter for the LBR and with the OpCode field changed from LBM to LBR
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' (Local UNI-C) connected to a yellow box 'Monitor Mode' (Tester 1). This connects to an orange box 'Local UNI-N Under Test' (Tester 2). This is part of a 'Simulated Service Provider Network' (dashed box) containing a grey box 'Operator A NE' (Tester 3), another grey box 'Operator B NE' (Tester 4), and a final grey box 'Subscriber NE' (Tester 4). Arrows show 'UNI MEG' (orange) and 'Subscriber MEG Test MEG' (grey) flows between the Local UNI-N and the Subscriber NE in the SPSN.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send valid Loopback Messages to the UNI-N under test. Use Tester 1 to monitor the Loopback Reply messages transmitted by the UNI-N under test and to verify that the source address parameter of the received LBM is used as the destination address parameter for the transmitted LBR, the source address parameter for the LBR is the MAC address of the replying MEP and the OpCode field is changed from LBM to LBR
Units	Source address, destination address and OpCode values
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 30N: Processing & Response to Unicast & Multicast LBM Frames – LBR Content

Abstract Test Suite for Service OAM	
Test Name	Processing & Response to Unicast & Multicast LBM Frames – LBR Content
Test Definition ID	UNIN-R41 ⁶
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.2.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to process and respond to both Unicast and Multicast LBM frames for each required MEG
IEEE Requirement Description	A receiving MEP that receives a valid LBM, shall not interpret any of the other fields or TLVs than the source address, destination address and OpCode. The contents of any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), shall be ignored, not interpreted by the receiver and SHALL be copied to the LBR
Test Object	Verify that when a receiving MEP receives a valid LBM, it does not interpret any of the other fields or TLVs than the source address, destination address and OpCode, and the contents of any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), are ignored and copied to the LBR
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents 'Operator A NE' connected to a grey box 'Tester 3'. Below this is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains 'Operator A NE' and 'Operator B NE'. Further right, a grey box 'Tester 4' is connected to 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. Below the network, arrows show 'UNI MEG' (orange) and 'Subscriber MEG Test: MEG' (grey) paths between the Subscriber NE and the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct Tester 2 to send valid Loopback Messages to the UNI-N under test. Use Tester 1 to monitor the Loopback Reply messages transmitted by the UNI-N under test and to verify that any TLVs that do not violate the validation criteria (described in Test Cases 25 through 28), are ignored and copied to the LBR
Units	LBR TLV fields value
Variables	LBM frame type (Unicast or Multicast)
Results	Pass or fail
Remarks	

TEST CASE 31N: Generating Multicast CCM Frames – Destination Address

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Destination Address
Test Definition ID	UNIN-R42 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Destination address validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; CCMs monitoring a service instance distinguished by its VID use the Group MAC addresses listed in the MAC addresses Table in section 10, as the destination address
Test Object	Verify that the destination address parameter of the CCM frames generated by the UNI-N under test is one of the Group MAC addresses listed in the MAC addresses Table in section 10
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that their destination address parameter contains one of the Group MAC addresses listed in the MAC addresses Table in section 10
Units	Destination address
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 32N: Generating Multicast CCM Frames – Source Address

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Source Address
Test Definition ID	UNIN-R42 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Source address validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The CCM frames source address is the Individual MAC address of the MEP transmitting the PDU. The source address parameter contains an individual, and not a Group, MAC address
Test Object	Verify that the source address parameter of the CCM frames generated by the UNI-N under test contains an individual, and not a Group, MAC address
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is linked to a yellow box labeled 'Monitor Mode' (Tester 1). The 'Local UNI-N Under Test' is connected to the 'Monitor Mode' box. This UNI-N is part of a 'Simulated Service Provider Network' which includes 'Operator A NE' (Tester 3), 'Operator B NE', 'Remote UNI-N (Tester 4)', and 'Remote UNI-C (Tester 4)'. The 'Subscriber NE' is also connected to the 'Remote UNI-C (Tester 4)'. Arrows show the flow of 'UNI MEG' from the Local UNI-N and 'Subscriber MEG / Test MEG' from the Remote UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that their source address parameter contains an individual, and not a Group, MAC address
Units	Source address
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 33N: Generating Multicast CCM Frames – Protocol Version Number

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Protocol Version Number
Test Definition ID	UNIN-R42 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Protocol Version Number validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The protocol version number is always 0
Test Object	Verify that the protocol version number of the CCM frames generated by the UNI-N under test is always 0
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that their protocol version number is always 0
Units	Protocol version number
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 34N: Generating Multicast CCM Frames – OpCode

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – OpCode
Test Definition ID	UNIN-R42 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – OpCode validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The OpCode field specifies the format and meaning of the remainder of the CFM PDU. The value for CCM PDUs is (0x01)
Test Object	Verify that the OpCode value of the CCM frames generated by the UNI-N under test is (0x01)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is linked to a yellow box labeled 'Monitor Mode' with 'Tester 1' below it. This connects to an orange box representing the 'Local UNI-N Under Test'. This UNI-N is part of a 'Simulated Service Provider Network' (indicated by a dashed box) which includes 'Operator A NE' (grey), 'Tester 3', 'Operator B NE', 'Remote UNI-N (Tester 4)', and 'Remote UNI-C (Tester 4)'. The network ends with another 'Subscriber NE'. Below the network, two horizontal arrows show the flow of frames: an orange arrow labeled 'UNI MEG' and a grey arrow labeled 'Subscriber MEG / Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that their OpCode value is (0x01)
Units	OpCode value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 35N: Generating Multicast CCM Frames – Flags

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Flags
Test Definition ID	UNIN-R42 ⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.1)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Flags validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Flags field of the Common CFM Header is split into three parts for the CCM: the RDI field, the Reserved field and the CCM Interval field. The most significant bit of the Flags field is the RDI bit. This bit is set to 1 if the transmitting MEP’s presentRDI variable is set, and 0 if not. The bits of the Flags field not including the RDI field and the CCM Interval field are set to 0 by the transmitting MEP. The least-significant three bits of the Flags field constitute the CCM Interval field. The CCM Interval field is encoded as specified in the CCM Interval Table in section 11
Test Object	Verify that the Flags field bits of the CCM frames generated by the UNI-N under test that are not included in the CCM Interval field are set to 0 and that the CCM Interval field contains a value in the range 1-7
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Flags field bits that are not included in the CCM Interval field are set to 0 and that the CCM Interval field contains a value in the range 1-7
Units	Flags field value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 36N: Generating Multicast CCM Frames – First TLV Offset

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – First TLV Offset
Test Definition ID	UNIN-R42 ⁶
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – First TLV Offset validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The First TLV Offset field of the Common CFM Header in a CCM contains a value greater than or equal to 70
Test Object	Verify that the First TLV Offset field of the Common CFM Header in the CCM frames generated by the UNI-N under test contains a value greater than or equal to 70
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This yellow box is connected to an orange box representing the 'Operator A NE' with a 'Local UNI-N Under Test'. This orange box is connected to a grey box labeled 'Tester 3'. This grey box is connected to another grey box labeled 'Operator B NE' with 'Remote UNI-N (Tester 4)'. This is connected to a final grey box labeled 'Subscriber NE' with 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Operator A NE', 'Tester 3', and 'Operator B NE' components, labeled 'Simulated Service Provider Network'. Below the network, two horizontal arrows indicate traffic flow: a blue arrow labeled 'Subscriber MEG' and a red arrow labeled 'Test MEG', both pointing from left to right.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the First TLV Offset field contains a value greater than or equal to 70
Units	First TLV Offset field value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 37N: Generating Multicast CCM Frames – Sequence Number

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Sequence Number
Test Definition ID	UNIN-R42 ⁷
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Sequence Number validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; A MEP transmits either a 0 in the Sequence Number field of the CCM frames, or copies to it the contents of the CCI sentCCMs variable
Test Object	Verify that the Sequence Number field of the CCM frames generated by the UNI-N under test contains either a 0 or a copy of the CCI sentCCMs variable
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Sequence Number field contains either a 0 or a copy of the CCI sentCCMs variable
Units	Sequence Number value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 38N: Generating Multicast CCM Frames – MEP ID

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – MEP ID
Test Definition ID	UNIN-R42 ⁸
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.4)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – MEP ID validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The MEP ID TLV specifies from which MEP the CCM was transmitted and is in the range 1-8191
Test Object	Verify that the MEP ID TLV of the CCM frames generated by the UNI-N under test contains a value in the range 1-8191
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the MEP ID TLV contains a value in the range 1-8191
Units	MEP ID value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 39N: Generating Multicast CCM Frames – MAID Total Length

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – MAID Total Length
Test Definition ID	UNIN-R42 ⁹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – MAID total length validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The total length of the MAID field, including padding, if present, SHALL be exactly 48 octets.
Test Object	Verify that the total length of the MAID field, including padding, of the CCM frames generated by the UNI-N under test is exactly 48 octets
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. This connects to an orange box labeled 'Local UNI-N Under Test'. A dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator A NE' (Tester 3), a grey box 'Operator B NE', and a grey box 'Remote UNI-N'. Below the SPSN is 'Remote UNI-C (Tester 4)'. To the right is another 'Subscriber NE'. Arrows indicate 'Subscriber MEG' and 'Test MEG' paths between the Subscriber NEs, and a 'UNI MEG' path between the Local UNI-C and Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the total length of the MAID field, including padding is exactly 48 octets
Units	MAID field total length
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 40N: Generating Multicast CCM Frames – Maintenance Domain Name Format

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Maintenance Domain Name Format
Test Definition ID	UNIN-R42 ¹⁰ -R48 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.1)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Maintenance Domain Name SHOULD use the “null” format (value equal to 0x01)
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Maintenance Domain Name Format specifies the format of the Maintenance Domain Name field. When no Maintenance Domain Name is present, the value is equal to 0x01
Test Object	Verify that the Maintenance Domain Name of the CCM frames generated by the UNI-N under test uses the “null” format (value equal to 0x01)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' (Local UNI-C, Tester 2). A yellow box labeled 'Monitor Mode' (Tester 1) is connected to it. This connects to an orange box representing 'Operator A NE' (Local UNI-N Under Test). This is connected to a dashed box labeled 'Simulated Service Provider Network' containing a grey box for 'Tester 3'. The network continues to a grey box for 'Operator B NE' (Remote UNI-N; Remote UNI-C, Tester 4) and finally to another grey box for 'Subscriber NE' (Remote UNI-C, Tester 4). Arrows at the bottom show 'UNI MEG' (orange) and 'Subscriber MEG / Test MEG' (grey) paths between the local and remote components.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Maintenance Domain Name of the CCM frames generated by the UNI-N under test uses the “null” format (value equal to 0x01)
Units	Maintenance Domain Name format
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 41N: Generating Multicast CCM Frames – Short MA Name Format

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Short MA Name Format
Test Definition ID	UNIN-R42 ¹¹ -R48 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.4)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Short MA Name SHOULD use the “text” format (value equal to 0x02)
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name format specifies the format of the Short MA Name field. The “text” format or character string value is 0x02
Test Object	Verify that the Short MA Name format of the CCM frames generated by the UNI-N under test uses the “text” format (value equal to 0x02)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Short MA Name format of the CCM frames generated by the UNI-N under test uses the “text” format (value equal to 0x02)
Units	Short MA Name format
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 42N: Generating Multicast CCM Frames – Short MA Name Length

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Short MA Name Length
Test Definition ID	UNIN-R42 ¹²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.5)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Short MA name length validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name length in a CCM contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID
Test Object	Verify that the Short MA Name length of the CCM frames generated by the UNI-N under test contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' (Local UNI-N Under Test) connected to a grey box 'Tester 3', which is connected to another grey box 'Operator B NE' (Remote UNI-N; Tester 4), which is connected to a final grey box 'Subscriber NE' (Remote UNI-C; Tester 4). Below the network, three horizontal arrows represent MEGs: a blue arrow for 'Subscriber MEG' spanning from the Subscriber NE to the Remote UNI-C; a grey arrow for 'Test MEG' spanning from the Local UNI-N to the Remote UNI-C; and an orange arrow for 'UNI MEG' spanning from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Short MA Name length of the CCM frames generated by the UNI-N under test contains a value greater than or equal to 1 and does not indicate that the Short MA Name runs over the 48-octet limit for the MAID
Units	Short MA Name length
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 43N: Generating Multicast CCM Frames – Short MA Name

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Short MA Name
Test Definition ID	UNIN-R42 ¹³ -R48 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.6.5.6)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP must be able to generate Multicast CCM frames. The Short MA Name is provisioned, has a maximum length of 45 ASCII characters and SHOULD default to a Representative Value that is uniquely related, but not necessarily equal, to UNI ID as following: a. The Representative Value of the UNI ID for the default UNI-MEG
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Short MA Name field contains the Short MA Name, in the format specified by the Short MA Name Format field
Test Object	Verify that the Short MA Name has a maximum length of 45 ASCII characters and defaults to a Representative Value that is uniquely related, but not necessarily equal to the UNI ID for the default UNI-MEG
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test' connected to a grey box 'Operator A NE'. Below this is 'Tester 3'. To the right, a grey box 'Operator B NE' is connected to another grey box 'Subscriber NE'. Below this is 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A and Operator B NEs. A double-headed arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N. Another double-headed arrow labeled 'Test MEG' spans from the Local UNI-N to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Short MA Name of the CCM frames generated by the UNI-N under test is uniquely related, but not necessarily equal to the UNI ID for the default UNI-MEG
Units	Short MA Name length
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 44N: Generating Multicast CCM Frames – Sender ID TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Sender ID TLV
Test Definition ID	UNIN-R42 ¹⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Sender ID TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Sender ID TLV identifies the Bridge on which the transmitting MEP is configured, and may also include a management address for that Bridge. The Sender ID TLV Type is equal to (0x01) and the Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Object	Verify that the Sender ID TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is linked to a yellow box labeled 'Monitor Mode' with 'Tester 1' below it. This connects to an orange box labeled 'Local UNI-N Under Test'. This is part of a 'Simulated Service Provider Network' (indicated by a dashed box) which includes 'Operator A NE' and 'Tester 3'. This network connects to 'Operator B NE' and 'Remote UNI-N (Tester 4)'. Finally, it connects to a grey box labeled 'Subscriber NE' with 'Remote UNI-C (Tester 4)' below it. Below the network, three horizontal arrows represent MEGs: a blue arrow for 'Subscriber MEG' spanning from the first Subscriber NE to the second, a grey arrow for 'Test MEG' spanning from the Local UNI-N Under Test to the Remote UNI-N, and an orange arrow for 'UNI MEG' spanning from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Sender ID TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Units	Sender ID TLV Type and Length values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 45N: Generating Multicast CCM Frames – Chassis ID Length

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Chassis ID Length
Test Definition ID	UNIN-R42 ¹⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Chassis ID length validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The chassis ID length is the length, in octets, of the Chassis ID field, it is either 0, or is less than (TLV Length field value – 1)
Test Object	Verify that the Chassis ID length of the CCM frames generated by the UNI-N under test is either 0 or less than (TLV Length field value – 1)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Chassis ID length of the CCM frames generated by the UNI-N under test is either 0 or less than (TLV Length field value – 1)
Units	Chassis ID length value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 46N: Generating Multicast CCM Frames – Management Address Domain Field

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Management Address Domian Field
Test Definition ID	UNIN-R42 ¹⁶
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Management Address Domain field validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address Domain Length field contains the length, in octets, of the Management Address Domain field. If 0, or if the TLV’s Length field indicates that the Management Address Domain Length field is not present, then the Management Address Domain, Management Address Length, and Management Address fields are not present
Test Object	Verify that the Management Address Domain field of the CCM frames generated by the UNI-N under test is empty
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is a 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. To its right is a dashed box labeled 'Simulated Service Provider Network' containing a grey box 'Operator A NE' (Tester 3), another grey box 'Operator B NE', and a 'Remote UNI-N' connected to a 'Remote UNI-C (Tester 4)'. Below the SPSN is another 'Subscriber NE'. Arrows indicate 'Subscriber MEG' and 'UNI MEG' paths between the Subscriber NE and the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Management Address Domain field of the CCM frames generated by the UNI-N under test is empty
Units	Management Address Domain field
Variables	None
Results	Pass or fail
Remarks	The Management Address Domain field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)

TEST CASE 47N: Generating Multicast CCM Frames – Management Address Field

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Management Address Field
Test Definition ID	UNIN-R42 ¹⁷
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Management Address field validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address length and the Management Address fields are not present if the Management Address Domain Length field is not present or contains a 0, or if the Management Address Length field is not present or contains a 0
Test Object	Verify that the Management Address field of the CCM frames generated by the UNI-N under test is empty
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the Subscriber NE, connected to a yellow box labeled 'Monitor Mode' (Tester 1) and a green box labeled 'Local UNI-C (Tester 2)'. This connects to an orange box labeled 'Local UNI-N Under Test'. This is part of a 'Simulated Service Provider Network' enclosed in a dashed box, which includes an orange box for 'Operator A NE', a grey box for 'Tester 3', and a grey box for 'Operator B NE'. To the right, a grey box represents the Subscriber NE, connected to a grey box for 'Remote UNI-N (Tester 4)' and a grey box for 'Remote UNI-C (Tester 4)'. Arrows show 'UNI MEG' (orange) and 'Subscriber MEG / Test MEG' (grey) paths between the local and remote components.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Management Address field of the CCM frames generated by the UNI-N under test is empty
Units	Management Address field
Variables	None
Results	Pass or fail
Remarks	The Management Address field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)

TEST CASE 48N: Generating Multicast CCM Frames – Port Status TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Port Status TLV
Test Definition ID	UNIN-R42 ¹⁸
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.4)
Test Type	Conformance
Test Status	Mandatory if Port Status TLVs are supported
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Port Status TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Port Status TLV indicates the ability of the Bridge Port on which the transmitting MEP resides to pass ordinary data, regardless of the status of the MAC. The Port Status TLV Type is equal to (0x02) and the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp
Test Object	Verify that the Port Status TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x02) and that the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE'. Below it is a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' is connected to the Subscriber NE and is labeled 'Tester 1'. This connects to a 'Simulated Service Provider Network' enclosed in a dashed box. Inside this network, an orange box represents the 'Operator ANE' with a 'Local UNI-N Under Test' below it, labeled 'Tester 3'. This is connected to another 'Operator B NE' (grey box) with a 'Remote UNI-N (Tester 4)' below it, labeled 'Tester 4'. This is further connected to a 'Subscriber NE' (grey box) with a 'Remote UNI-C (Tester 4)' below it, also labeled 'Tester 4'. Below the network, two horizontal arrows represent MEGs: a grey arrow for 'Subscriber MEG' and a red arrow for 'Test MEG', both spanning from the Local UNI-C to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Port Status TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x02) and that the Port Status TLV field contains one of the following values (0x01) psBlocked or (0x02) psUp
Units	Port Status TLV Type and TLV field values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 49N: Generating Multicast CCM Frames – Interface Status TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Interface Status TLV
Test Definition ID	UNIN-R42 ¹⁹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.5)
Test Type	Conformance
Test Status	Mandatory if Interface Status TLVs are supported
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Interface Status TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Interface Status TLV indicates the status of the interface on which the MEP transmitting the CCM is configured, or the next-lower interface in the IETF RFC 2863 IF-MIB. The Interface Status TLV Type is equal to (0x04) and the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown
Test Object	Verify that the Interface Status TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x04) and that the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents 'Operator A NE' labeled 'Local UNI-N Under Test'. To its right is a grey box for 'Operator B NE'. Further right is another grey box for 'Remote UNI-N (Tester 4)' and a final grey box for 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A and Operator B NEs. Arrows at the bottom show 'UNI MEG' (orange) and 'Subscriber MEG / Test MEG' (grey) paths between the Subscriber NE and the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Interface Status TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x04) and that the Interface Status TLV field contains one of the following values (0x01) isUp, (0x02) isDown, (0x03) isTesting, (0x04) isUnknown, (0x05) isDormant, (0x06) isNotPresent or (0x07) isLowerLayerDown
Units	Interface Status TLV Type and TLV field values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 50N: Generating Multicast CCM Frames – Organization Specific TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – Organization Specific TLV
Test Definition ID	UNIN-R42 ²⁰
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.2)
Test Type	Conformance
Test Status	Mandatory if Organization TLVs are supported
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – Organization Specific TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; Any organization can define TLVs for use in Connectivity Fault Management. The Organization TLV Type is equal to 31 (0x1F)
Test Object	Verify that the Organization TLV Type of the CCM frames generated by the UNI-N under test is equal to 31 (0x1F)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' and 'Tester 1' is connected to the 'Local UNI-C'. This 'Local UNI-C' is connected to the 'Local UNI-N Under Test' (orange box). The 'Local UNI-N Under Test' is connected to 'Operator A NE' (grey box), which is connected to 'Tester 3'. 'Operator A NE' is connected to 'Operator B NE' (grey box), which is connected to 'Remote UNI-N (Tester 4)'. Finally, 'Operator B NE' is connected to a 'Subscriber NE' (grey box). A dashed box encloses the 'Local UNI-N Under Test', 'Operator A NE', 'Operator B NE', and 'Remote UNI-N (Tester 4)'. Below the network, two horizontal arrows represent MEGs: an orange arrow labeled 'UNI MEG' spanning from the 'Local UNI-C' to the 'Local UNI-N Under Test', and a grey arrow labeled 'Subscriber MEG' and 'Test MEG' spanning from the 'Local UNI-C' to the 'Remote UNI-N (Tester 4)'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the Organization Specific TLV Type of the CCM frames generated by the UNI-N under test is equal to 31 (0x1F)
Units	Organization Specific TLV Type value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 51N: Generating Multicast CCM Frames – End TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast CCM Frames – End TLV
Test Definition ID	UNIN-R42 ²¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.7)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	When CCM transmission is enabled for a MEP in a UNI-N Type 2 implementation, the MEP MUST be able to generate Multicast CCM frames – End TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The End TLV is required and is the last TLV in the CFM PDU and is Required. The End TLV Type is equal to (0x00)
Test Object	Verify that the End TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x00)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a Subscriber NE (green box) is connected to a Local UNI-C (Tester 2, green box). This is connected to Tester 1 (yellow box) in Monitor Mode. Tester 1 is connected to a Local UNI-N Under Test (orange box). This is connected to Operator A NE (grey box), which is connected to Tester 3 (grey box). Operator A NE is connected to Operator B NE (grey box), which is connected to Remote UNI-N (Tester 4, grey box). Remote UNI-N is connected to Remote UNI-C (Tester 4, grey box). A dashed box labeled 'Simulated Service Provider Network' encloses Operator A NE, Operator B NE, Remote UNI-N, and Remote UNI-C. Below the network, three MEG paths are shown: Subscriber MEG (grey arrow), Test MEG (grey arrow), and UNI MEG (orange arrow). The UNI MEG path is shown between the Local UNI-C and Local UNI-N. The Subscriber MEG and Test MEG paths are shown between the Local UNI-C and Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the End TLV Type of the CCM frames generated by the UNI-N under test is equal to (0x00)
Units	End TLV Type value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 52N: Generating Multicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM	
Test Name	Generating Multicast LBM Frames – Destination Address
Test Definition ID	UNIN-R43 ¹ -R54 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 MEP implementation MAY be able to generate Multicast LBM frames. For each LB session, Multicast destinations MAY be supported using the reserved CCM multicast MAC DA in the range of 01-80-C2-00-00-30 to 01-80-C2-00-00-37 that corresponds to the MEG-Level of the MEP
Test Object	Verify that when the UNI-N under test uses Loopback messages to check bidirectional connectivity between itself and the other MEPs in the same MEG, the destination address parameter of the LBM frames generated by the UNI-C under test contains one of the Group MAC address listed in the MAC addresses Table in section 10
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. In the center, an orange box represents the 'Operator A NE' connected to a grey box labeled 'Local UNI-N Under Test'. This is connected to a grey box labeled 'Tester 3'. To the right, a grey box represents the 'Operator B NE' connected to a grey box labeled 'Remote UNI-N (Tester 4)'. This is connected to a grey box labeled 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A NE and Operator B NE. Below the network, two horizontal arrows indicate MEGs: a shorter orange arrow labeled 'UNI MEG' and a longer grey arrow labeled 'Subscriber MEG Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the destination address parameter of the LBM message destined to the local UNI-C on the UNI-MEG contains one of the Group MAC address listed in the MAC addresses Table in section 10
Units	Destination address
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 53N: Generating Unicast LBM Frames – Destination Address

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Destination Address
Test Definition ID	UNIN-R43 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.1)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames. For each LB session, the destination address MUST be configurable to any Unicast MAC DA
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The LBM frames are addressed to a single specific MP
Test Object	Verify that the destination address parameter of the LBM message sent by the UNI-N under test contain the Unicast address of the its peer MEPs
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' connected to a grey box 'Operator B NE'. Below this is 'Local UNI-N Under Test' (Tester 3) and 'Remote UNI-N; Remote UNI-C (Tester 4)'. On the far right is another 'Subscriber NE'. A long double-headed arrow labeled 'Subscriber MEG' spans from the left Subscriber NE to the right Subscriber NE. A shorter orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the destination address parameter of the LBM message destined to the local UNI-C on the UNI-MEG contains the Unicast address of the local UNI-C
Units	Destination address
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 54N: Generating Unicast LBM Frames – Source Address

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Source Address
Test Definition ID	UNIN-R43 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.3.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Source address validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The LBM frames source address is the Individual MAC address of the MEP transmitting the PDU. The source address parameter contains an individual, and not a Group, MAC address
Test Object	Verify that the source address parameter of the LBM frames generated by the UNI-N under test contains an individual, and not a Group, MAC address
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the Subscriber NE is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Operator A NE' connected to a grey box labeled 'Local UNI-N Under Test'. Below the Operator A NE is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator B NE' connected to another grey box 'Subscriber NE'. Below the Operator B NE is 'Remote UNI-N; Remote UNI-C (Tester 4)'. Below the Subscriber NE is 'Remote UNI-C (Tester 4)'. A grey arrow labeled 'Subscriber MEG' spans from the Local UNI-C to the Remote UNI-C. An orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N. A grey arrow labeled 'Test MEG' spans from the Local UNI-N to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the source address parameter of the LBM messages destined to the local UNI-C on the UNI-MEG contain an individual, and not a Group, MAC address
Units	Source address
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 55N: Generating Unicast LBM Frames – Protocol Version Number

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Protocol Version Number
Test Definition ID	UNIN-R43 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Protocol Version Number validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The protocol version number is always 0
Test Object	Verify that the protocol version number of the LBM frames generated by the UNI-N under test is always 0
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the Subscriber NE, connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the Subscriber NE is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. Below it is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box for 'Operator A NE' (with 'Tester 3' below it) and another grey box for 'Operator B NE' (with 'Remote UNI-N (Tester 4)' below it). Further right is another Subscriber NE (grey box) with 'Remote UNI-C (Tester 4)' below it. Two horizontal arrows represent MEGs: a grey arrow labeled 'Subscriber MEG Test: MEG' spans from the Subscriber NE on the left to the Remote UNI-C on the right; an orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the protocol version number of the LBM messages destined to the local UNI-C on the UNI-MEG is always 0
Units	Protocol version number
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 56N: Generating Unicast LBM Frames – OpCode

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – OpCode
Test Definition ID	UNIN-R43 ⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.4.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – OpCode validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The OpCode field specifies the format and meaning of the remainder of the CFM PDU. The value for LBM PDUs is (0x03)
Test Object	Verify that the OpCode value of the LBM frames generated by the UNI-N under test is (0x03)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. To its right is a grey box for 'Operator A NE' (Tester 3). Further right is another grey box for 'Operator B NE' (Tester 4), which is connected to a final grey box for 'Subscriber NE'. Below this chain is 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Local UNI-N Under Test', 'Operator A NE', and 'Operator B NE'. Two horizontal arrows at the bottom indicate MEG paths: a grey arrow for 'Subscriber MEG' and an orange arrow for 'Test MEG', both spanning from the local UNI-C area to the remote UNI-C area.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the OpCode of the LBM messages destined to the local UNI-C on the UNI-MEG is (0x03)
Units	OpCode value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 57N: Generating Unicast LBM Frames – Flags

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Flags
Test Definition ID	UNIN-R43 ⁶
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.1)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Flags validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; In an LBM, the Flags field of the Common CFM Header is set to 0 by the transmitting MEP
Test Object	Verify that the Flags field bits of the LBM frames generated by the UNI-N under test that are set to 0
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Tester 1' in 'Monitor Mode'. This tester is connected to an orange box labeled 'Local UNI-N Under Test'. This UNI-N is connected to a grey box labeled 'Operator A NE', which is connected to another grey box labeled 'Tester 3'. This is connected to a grey box labeled 'Operator B NE', which is connected to a grey box labeled 'Remote UNI-N (Tester 4)'. Finally, this is connected to a grey box labeled 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Local UNI-N Under Test', 'Operator A NE', 'Operator B NE', and 'Remote UNI-N (Tester 4)'. Below the network, two horizontal arrows indicate MEG paths: a grey arrow labeled 'Subscriber MEG Test: MEG' spanning from the Subscriber NE to the Remote UNI-C, and an orange arrow labeled 'UNI MEG' spanning from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Flags field bits of the LBM messages destined to the local UNI-C on the UNI-MEG are set to 0
Units	Flags field value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 58N: Generating Unicast LBM Frames – First TLV Offset

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – First TLV Offset
Test Definition ID	UNIN-R43 ⁷
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – First TLV Offset validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The First TLV Offset field of the Common CFM Header in a LBM contains a value greater than or equal to 4
Test Object	Verify that the First TLV Offset field of the Common CFM Header in the LBM frames generated by the UNI-N under test contains a value greater than or equal to 4
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' (Local UNI-N Under Test), a grey box 'Tester 3', a grey box 'Operator B NE', and another grey box 'Subscriber NE'. Below this is 'Remote UNI-N; Remote UNI-C (Tester 4)'. Arrows indicate 'Subscriber MEG' and 'UNI MEG' paths between the local and remote components.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the First TLV Offset field of the LBM messages destined to the local UNI-C on the UNI-MEG contain a value greater than or equal to 4
Units	First TLV Offset field value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 59N: Generating Unicast LBM Frames – Loopback Transaction Identifier

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Loopback Transaction Identifier
Test Definition ID	UNIN-R43 ⁸
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.7.3)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Loopback Transaction Identifier validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; A MEP copies the contents of the nextLBMtransID variable to the Loopback Transaction Identifier field of the LBM frames
Test Object	Verify that the Loopback Transaction Identifier field of the LBM frames generated by the UNI-N under test contains a copy of the nextLBMtransID variable
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents 'Operator A NE' which is the 'Local UNI-N Under Test'. Below it is 'Tester 3'. To the right, a grey box represents 'Operator B NE' with 'Remote UNI-N; Remote UNI-C (Tester 4)' below it. Further right is another grey box for 'Subscriber NE' with '(Tester 4)' below it. A dashed box labeled 'Simulated Service Provider Network' encompasses Operator A and Operator B. Arrows show 'UNI MEG' (orange) from Local UNI-C to Local UNI-N, 'Subscriber MEG' (grey) from Local UNI-N to Remote UNI-N, and 'Test MEG' (grey) from Remote UNI-N to Local UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Loopback Transaction Identifier field of the LBM messages destined to the local UNI-C on the UNI-MEG contain a copy of the nextLBMtransID variable
Units	Loopback Transaction Identifier field value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 60N: Generating Unicast LBM Frames – Sender ID TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Sender ID TLV
Test Definition ID	UNIN-R43 ⁹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Sender ID TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Sender ID TLV identifies the Bridge on which the transmitting MEP is configured, and may also include a management address for that Bridge. The Sender ID TLV Type is equal to (0x01) and the Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Object	Verify that the Sender ID TLV Type of the LBM frames generated by the UNI-N under test is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box labeled 'Subscriber NE' is connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the green box is 'Local UNI-C (Tester 2)'. In the center, an orange box labeled 'Operator A NE' is connected to a grey box labeled 'Tester 3'. Below the orange box is 'Local UNI-N Under Test'. To the right, a grey box labeled 'Operator B NE' is connected to another grey box labeled 'Subscriber NE'. Below these are 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A dashed box encloses the 'Operator A NE', 'Tester 3', 'Operator B NE', and 'Subscriber NE' components, labeled 'Simulated Service Provider Network'. Arrows at the bottom show 'UNI MEG' (orange) and 'Test MEG' (grey) paths between the local and remote components.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Sender ID TLV Type field of the LBM messages destined to the local UNI-C on the UNI-MEG is equal to (0x01) and that the Sender ID Length field is large enough to contain all of the fields indicated as being present by the Chassis ID Length, Management Address Domain Length, and/or Management Address Length fields
Units	Sender ID TLV Type and Length values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 61N: Generating Unicast LBM Frames – Chassis ID Length

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Chassis ID Length
Test Definition ID	UNIN-R43 ¹⁰
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Mandatory if Sender ID TLVs are supported
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Chassis ID length validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The chassis ID length is the length, in octets, of the Chassis ID field, it is either 0, or is less than (TLV Length field value – 1)
Test Object	Verify that the Chassis ID length of the LBM frames generated by the UNI-N under test is either 0 or less than (TLV Length field value – 1)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Chassis ID length of the LBM messages destined to the local UNI-C on the UNI-MEG is either 0 or less than (TLV Length field value – 1)
Units	Chassis ID length value
Variables	None
Results	Pass or fail
Remarks	

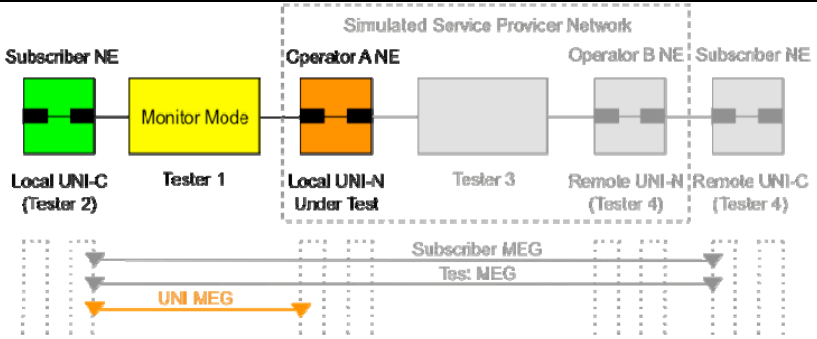
TEST CASE 62N: Generating Unicast LBM Frames – Management Address Domain Field

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Management Address Domian Field
Test Definition ID	UNIN-R43 ¹¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address Domain Length field contains the length, in octets, of the Management Address Domain field. If 0, or if the TLV’s Length field indicates that the Management Address Domain Length field is not present, then the Management Address Domain, Management Address Length, and Management Address fields are not present
Test Object	Verify that the Management Address Domain field of the LBM frames generated by the UNI-N under test is empty
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents 'Operator A NE' which is the 'Local UNI-N Under Test'. To its right is a grey box for 'Operator B NE'. Further right is another grey box for 'Remote UNI-N (Tester 4)' and a final grey box for 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A NE and Operator B NE. Below the network, arrows indicate 'Subscriber MEG' and 'UNI MEG' paths between the Subscriber NE and the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Management Address Domain field of the LBM messages destined to the local UNI-C on the UNI-MEG is empty
Units	Management Address Domain field
Variables	None
Results	Pass or fail
Remarks	The Management Address Domain field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)

TEST CASE 63N: Generating Unicast LBM Frames – Management Address Field

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Management Address Field
Test Definition ID	UNIN-R43 ¹²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.3)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Management Address length and the Management Address fields are not present if the Management Address Domain Length field is not present or contains a 0, or if the Management Address Length field is not present or contains a 0
Test Object	Verify that the Management Address field of the LBM frames generated by the UNI-N under test is empty
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' and 'Tester 1' is connected to the Local UNI-C. In the center, an orange box represents the 'Local UNI-N Under Test'. To its right is a dashed box labeled 'Simulated Service Provider Network' containing a grey box 'Operator A NE' (with 'Tester 3' below it), another grey box 'Operator B NE', and a final grey box 'Subscriber NE'. Below the Local UNI-N and within the SPSN, there are labels for 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. At the bottom, two horizontal arrows indicate MEG paths: a grey arrow labeled 'Subscriber MEG' and an orange arrow labeled 'Test MEG', both spanning from the Local UNI-C area to the Remote UNI-C area.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Management Address field of the LBM messages destined to the local UNI-C on the UNI-MEG is empty
Units	Management Address field
Variables	None
Results	Pass or fail
Remarks	The Management Address field SHOULD be empty in the Sender ID TLV by default as a security precaution (MEF Service OAM FM IA)

TEST CASE 64N: Generating Unicast LBM Frames – Data TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Data TLV
Test Definition ID	UNIN-R43 ¹³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.6)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Data TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The Data TLV contains zero or more octets of arbitrary data and serves several purposes, including the transmission of different frame sizes to test MTU capabilities, and the testing for data-specific error dependencies. The Data TLV may be included in the Loopback Messages and the Data TLV Type is equal to (0x03)
Test Object	Verify that the Data TLV Type of the LBM frames generated by the UNI-N under test is equal to (0x03)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	 <p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' connected to a grey box 'Operator B NE'. Below this is 'Local UNI-N Under Test' (Tester 3) and 'Remote UNI-N; Remote UNI-C (Tester 4)'. On the far right is another 'Subscriber NE' connected to a grey box 'Subscriber NE' (Tester 4). Arrows indicate MEG paths: an orange arrow for 'UNI MEG' from Local UNI-N to Local UNI-C; a grey arrow for 'Subscriber MEG' from Local UNI-N to the right Subscriber NE; and a grey arrow for 'Tes: MEG' from Local UNI-N to the right Subscriber NE.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Data TLV Type of the LBM messages destined to the local UNI-C on the UNI-MEG is equal to (0x03)
Units	Data TLV Type value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 65N: Generating Unicast LBM Frames – Organization Specific TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – Organization Specific TLV
Test Definition ID	UNIN-R43 ¹⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.2)
Test Type	Conformance
Test Status	Mandatory if Organization TLVs are supported
MEF Requirement Description	UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – Organization Specific TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; Any organization can define TLVs for use in Connectivity Fault Management. The Organization TLV Type is equal to 31 (0x1F)
Test Object	Verify that the Organization TLV Type of the LBM frames generated by the UNI-N under test is equal to 31 (0x1F)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates a network topology for testing. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' and 'Tester 1'. This connects to an orange box representing 'Operator A NE' with a 'Local UNI-N Under Test'. This is connected to a grey box representing 'Operator B NE' with a 'Remote UNI-N (Tester 4)'. Finally, this connects to another grey box representing 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the two Operator NEs. Below the network, two horizontal arrows indicate MEG paths: a shorter orange arrow labeled 'UNI MEG' between the local UNI-C and UNI-N, and a longer grey arrow labeled 'Subscriber MEG Test MEG' between the local UNI-C and the remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the Organization Specific TLV Type of the LBM messages destined to the local UNI-C on the UNI-MEG is equal to 31 (0x1F)
Units	Organization Specific TLV Type value
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 66N: Generating Unicast LBM Frames – End TLV

Abstract Test Suite for Service OAM	
Test Name	Generating Unicast LBM Frames – End TLV
Test Definition ID	UNIN-R43 ¹⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (21.5.7)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	UNI-N Type 2 MEP implementation MUST be able to generate Unicast LBM frames – End TLV validation
IEEE Requirement Description	An implementation that conforms to the provisions of this standard for Connectivity Fault Management SHALL Transmit required CFM PDUs in the formats specified in Clause 21; The End TLV is required and is the last TLV in the CFM PDU and is Required. The End TLV Type is equal to (0x00)
Test Object	Verify that the End TLV Type of the LBM frames generated by the UNI-N under test is equal to (0x00)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is connected to a yellow box labeled 'Monitor Mode' with 'Tester 1' below it. This monitor mode is connected to an orange box representing the 'Local UNI-N Under Test'. This UNI-N is connected to a dashed box representing the 'Simulated Service Provider Network'. Inside this network, there is a grey box for 'Operator A NE' connected to 'Tester 3', which is connected to another grey box for 'Operator B NE' connected to 'Tester 4'. The network also includes a 'Remote UNI-N (Tester 4)' and a 'Subscriber NE (Tester 4)'. Below the network, two horizontal arrows indicate MEG paths: a grey arrow for 'Subscriber MEG' and an orange arrow for 'Test MEG', both spanning from the Local UNI-C area to the Remote UNI-N area.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBM messages transmitted by the UNI-N under test and to verify that the End TLV Type of the LBM messages destined to the local UNI-C on the UNI-MEG is equal to (0x00)
Units	End TLV Type value
Variables	None
Results	Pass or fail
Remarks	

16.4 UNI-N Type 2 Continuity Check Requirements

TEST CASE 67N: Administratively Enable and Disable CCM Transmission

Abstract Test Suite for Service OAM	
Test Name	Administratively Enable and Disable CCM Transmission
Test Definition ID	UNIN-R44 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MUST have the capability to administratively enable and disable CCM transmission on all local MEPs
Test Object	Verify that the UNI-N Type 2 under test has the capability to administratively enable and disable CCM transmission on all local MEPs
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that CCM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1". Disable CCM transmission on the UNI-MEG and verify that no CCMs are transmitted. Re-enable CCM transmission on the UNI-MEG and verify that CCM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1"
Units	MEP IDs MEG-Level values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 68N: Mandatory CCM Frame Rate

Abstract Test Suite for Service OAM	
Test Name	Mandatory CCM Frame Rate
Test Definition ID	UNIN-R45 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MUST support a CCM frame rate of 1 frame per second
Test Object	Verify that the UNI-N Type 2 under test supports a CCM frame rate of 1 frame per second
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is linked to a yellow box labeled 'Monitor Mode' with 'Tester 1' below it. The network then connects to an orange box 'Local UNI-N Under Test'. This is followed by a dashed box representing the 'Simulated Service Provider Network', which contains a grey box 'Operator A NE' connected to 'Tester 3', and another grey box 'Operator B NE' connected to 'Remote UNI-N (Tester 4)'. Finally, 'Operator B NE' connects to a 'Subscriber NE' and a 'Remote UNI-C (Tester 4)'. Two horizontal arrows at the bottom indicate the flow of MEGs: an orange arrow labeled 'UNI MEG' from the Local UNI-C to the Local UNI-N, and a grey arrow labeled 'Subscriber MEG Test: MEG' from the Local UNI-N to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the CCM Interval field of the CCM frames generated by the UNI-N under test contains the value 4. Also use Tester 2 to verify that the CCMs are received within the CCM maximum lifetime
Units	CCM frame rate
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 69N: Optional CCM Frame Rate

Abstract Test Suite for Service OAM	
Test Name	Optional CCM Frame Rate
Test Definition ID	UNIN-R45 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 MAY support other frame rates specified in section 7.1.1 of ITU-T Y.1731
ITU-T Requirement Description	When Ethernet Continuity Check is enabled, a MEP periodically transmits CCM frames as often as the configured transmission period. Transmission period can be one of the following seven values: 3.33ms, 10ms, 100ms, 1s, 10s, 1min or 10min
Test Object	Verify that the UNI-N Type 2 under test supports transmission periods of: 3.33ms, 10ms, 100ms, 10s, 1min or 10min
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' with a 'Local UNI-C (Tester 2)'. A yellow box labeled 'Monitor Mode' (Tester 1) is connected to the Subscriber NE. In the center, an orange box represents the 'Operator A NE' with a 'Local UNI-N Under Test'. To its right is a grey box for 'Tester 3'. Further right is a grey box for 'Operator B NE' with a 'Remote UNI-N (Tester 4)'. On the far right, another grey box represents the 'Subscriber NE' with a 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encompasses the Operator A NE, Tester 3, Operator B NE, and Remote UNI-N. Below the network, two horizontal arrows indicate MEG paths: a grey arrow for 'Subscriber MEG' and an orange arrow for 'UNI MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Configure the transmission period of the UNI-N under test MEP to 3.33ms. Use Tester 1 to monitor the Continuity Check Messages transmitted by the UNI-N under test and to verify that the CCM Interval field of the CCM frames contains the value 1. Also use Tester 2 to verify that the CCMs are received within the CCM maximum lifetime. Configure the transmission period of the UNI-N under test MEP to 10ms and repeat the test. Configure the transmission period of the UNI-N under test MEP to 100ms and repeat the test. Configure the transmission period of the UNI-N under test MEP to 10s and repeat the test. Configure the transmission period of the UNI-N under test MEP to 1min and repeat the test. Configure the transmission period of the UNI-N under test MEP to 10min and repeat the test.
Units	CCM frame rate
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 71N: UNI-N Counter – Number of CCM Frames Transmitted

Abstract Test Suite for Service OAM	
Test Name	UNI-N Counter – Number of CCM Frames Transmitted
Test Definition ID	UNIN-R49 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support counters for each MEP that counts the number of CCM frames transmitted
Test Object	Verify that the UNI-N Type 2 under test supports counters for each MEP that counts the number of CCM frames transmitted
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a 'Local UNI-C (Tester 2)'. This is linked to a yellow box labeled 'Monitor Mode' (Tester 1). The network then connects to an orange box 'Local UNI-N Under Test'. This is followed by a grey box 'Operator A NE' (Tester 3), which is connected to another grey box 'Operator B NE' (Tester 4). The 'Operator B NE' is connected to a final 'Subscriber NE' and a 'Remote UNI-C (Tester 4)'. A dashed box labeled 'Simulated Service Provider Network' encloses the Operator A and Operator B NEs. Below the network, two horizontal arrows indicate the flow of traffic: an orange arrow labeled 'UNI MEG' and a grey arrow labeled 'Subscriber MEG Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Reset the UNI-N under test counters. Enable CCM transmission on the UNI-MEG and use Tester 1 to monitor and count the Continuity Check Messages transmitted by the UNI-N under test. Disable CCM transmission on the UNI-MEG and verify that the number of CCMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of CCM frames transmitted indicated by the UNI-C MEP counter for the UNI-MEG
Units	Number of CCM frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 72N: Lowest Priority CC Defect – DefRDICCM

Abstract Test Suite for Service OAM	
Test Name	Lowest Priority CC Defect – DefRDICCM
Test Definition ID	UNIN-R51 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MEP MUST support the minimum CC fault priority level defined in IEEE 802.1ag for which a CC alarm will be generated. An alarm will be generated only if the fault has equal or greater priority than this minimum fault level
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (No defect vs DefRDICCM)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' connected to a grey box 'Operator B NE'. Below Operator A NE is 'Local UNI-N Under Test' (Tester 3), and below Operator B NE is 'Remote UNI-N' (Tester 4). To the right of Operator B NE is another grey box 'Subscriber NE' (Tester 4), with 'Remote UNI-C (Tester 4)' below it. Arrows show 'UNI MEG' (orange) from Local UNI-C to Local UNI-N, and 'Subscriber MEG Test MEG' (grey) from Local UNI-N to Remote UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Clear all alarms. Use Tester 2 to stop transmitting CCMs to the UNI-N under test on the UNI-MEG. Use Tester 1 to monitor the CCMs transmitted by the UNI-N under test and to verify that the RDI bit of the Flags field is set in all messages and use the management system of the UNI-N under test to verify that the DefRDICCM defect triggers a Fault Alarm
Units	Fault Alarm hierarchy
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 73N: CC Defect & Fault Alarm Hierarchy – DefRDICCM vs DefMACstatus

Abstract Test Suite for Service OAM	
Test Name	CC Defect & Fault Alarm Hierarchy – DefRDICCM vs DefMACstatus
Test Definition ID	UNIN-R50 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefRDICCM vs DefMACstatus)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Clear all alarms. Use Tester 2 to stop transmitting CCMs to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefRDICCM defects trigger Fault Alarms on the local UNI-N MEP. Before the CC fault reset time expires, use Tester 2 to send CCMs with Port Status TLV values equal to “psBlocked” (0x01) or with Interface TLV values not equal to “isUp” (0x01) to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefMACstatus defects trigger new Fault Alarms on the local UNI-N MEP and that the lower priority alarms are masked by the new ones
Units	Fault Alarm hierarchy
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 74N: CC Defect & Fault Alarm Hierarchy – DefMACstatus vs DefRemoteCCM

Abstract Test Suite for Service OAM	
Test Name	CC Defect & Fault Alarm Hierarchy – DefMACstatusCCM vs DefRemoteCCM
Test Definition ID	UNIN-R50 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefMACstatus vs DefRemoteCCM)
Test Configuration	Configure a UNI-MEG with a MEG-Level = “1”, with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Clear all alarms. Use Tester 2 to send CCMs with Port Status TLV values equal to “psBlocked” (0x01) or with Interface TLV values not equal to “isUp” (0x01) to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefMACstatus defects trigger Fault Alarms on the local UNI-N MEP. Before the CC fault reset time expires, use Tester 2 to send CCMs with the RDI bit of the Flags field set to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefRemoteCCM status defects trigger new Fault Alarms on the local UNI-N MEP and that the lower priority alarms are masked by the new ones
Units	Fault Alarm hierarchy
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 75N: CC Defect & Fault Alarm Hierarchy – DefRemoteCCM vs DefErrorCCM

Abstract Test Suite for Service OAM	
Test Name	CC Defect & Fault Alarm Hierarchy – DefRemoteCCM vs DefErrorCCM
Test Definition ID	UNIN-R50 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefRemoteCCM vs DefErrorCCM)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Clear all alarms. Use Tester 2 to send CCMs with the RDI bit of the Flags field set to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefRemoteCCM defects trigger Fault Alarms on the local UNI-N MEP. Before the CC fault reset time expires, use Tester 2 to send invalid CCMs (with a multicast source address) to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefErrorCCM status defects trigger new Fault Alarms on the local UNI-N MEP and that the lower priority alarms are masked by the new ones
Units	Fault Alarm hierarchy
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 76N: CC Defect & Fault Alarm Hierarchy – DefErrorCCM vs DefXconCCM

Abstract Test Suite for Service OAM	
Test Name	CC Defect & Fault Alarm Hierarchy – DefErrorCCM vs DefXconCCM
Test Definition ID	UNIN-R50 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support the CC defect and fault alarm hierarchy per clause 20.1.2 of IEEE 802.1ag. If this is supported, the highest priority alarm MUST be made available to management and SHOULD mask lower priority alarms
IEEE Requirement Description	A number of separate defects are maintained by a MEP. The defects are ranked by priority. If a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm
Test Object	Verify that if a higher priority defect occurs after a lower priority defect has triggered a Fault Alarm, but before the Fault Alarm has reset, then the MEP will immediately issue another Fault Alarm. Only the highest-priority defect is reported in the Fault Alarm. (DefErrorCCM vs DefXconCCM)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Clear all alarms. Use Tester 2 to send invalid CCMs (with a multicast source address) to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefErrorCCM defects trigger Fault Alarms on the local UNI-N MEP. Before the CC fault reset time expires, use Tester 2 to send CCMs with a valid but unknown Short MA Name to the UNI-N under test on the UNI-MEG and use the management system to verify that the DefXconCCM status defects trigger new Fault Alarms on the local UNI-N MEP and that the lower priority alarms are masked by the new ones
Units	Fault Alarm hierarchy
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 77N: CC Fault Alarm Time & CC Fault Reset Time

Abstract Test Suite for Service OAM	
Test Name	CC Fault Alarm Time & CC Fault Reset Time
Test Definition ID	UNIN-R52 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2 IEEE 802.1ag (20.1.2)
Test Type	Conformance
Test Status	Mandatory if IEEE clause 12.14 7 (Maintenance association End Point managed object) is implemented
MEF Requirement Description	A UNI-N Type 2 MEP MUST support a CC fault Alarm time and a CC Fault Reset Time
IEEE Requirement Description	A Fault Alarm is issued when the MEP Fault Notification Generator state machine detects that a configured time period (default, 2.5s) has passed with one or more defects indicated, and Fault Alarms are enabled. The state machine can transmit no further Fault Alarms until it is reset by the passage of a configured time period (default, 10s) during which no defect indication is present
Test Object	Verify that the UNI-N Type 2 MEP under test supports a CC fault Alarm time and a CC Fault Reset Time
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Enable CCM transmission on the UNI-MEG. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	If IEEE clause 12.14 7 (Maintenance association End Point managed object) is implemented, verify that the variable someRMEPCCMdefect is cleared and clear all alarms. Use Tester 2 to stop transmitting CCMs to the UNI-N under test on the UNI-MEG. Use the management system of the UNI-N under test to verify that 2.5 seconds after the variable someRMEPCCMdefect changes from clear to set and the DefRemoteCCM is triggered, a Fault alarm is transmitted. Use Tester 2 to start transmitting CCMs to the UNI-N under test on the UNI-MEG and verify that the variable someRMEPCCMdefect changes from set to clear. Use the management system of the UNI-N under test to verify that 10 seconds after the variable someRMEPCCMdefect changes from set to clear the Fault alarm is cleared
Units	CC Fault Alarm & CC Fault Reset times
Variables	None
Results	Pass or fail
Remarks	

16.5 UNI-N Type 2 Loopback Requirements

TEST CASE 78N: Administratively Initiate & Stop Loopback Sessions

Abstract Test Suite for Service OAM	
Test Name	Administratively Initiate & Stop Loopback Sessions
Test Definition ID	UNIN-R53 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	Each LB session MUST have the ability to be administratively initiated and stopped
Test Object	Verify that the UNI-N Type 2 under test has the ability to administratively initiate and stop LB sessions
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. To its right is a dashed box labeled 'Simulated Service Provider Network' containing a grey box for 'Operator A NE' and another for 'Operator B NE'. Further right is another grey box for 'Remote UNI-N (Tester 4)' and a final grey box for 'Remote UNI-C (Tester 4)'. Below the network, arrows indicate 'Subscriber MEG' and 'Test MEG' paths. An orange arrow labeled 'UNI MEG' points from the Local UNI-N Under Test to the Local UNI-C (Tester 2).</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send Loopback Messages (repeatedly until aborted) to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that LBM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1". Instruct the local UNI-N under test to abort the loopback session on the UNI-MEG and use Tester 1 to verify that no LBMs are transmitted. Instruct the local UNI-N under test to send Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that LBM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1"
Units	MEP IDs MEG-Level values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 80N: Configurable Number of LBM Transmissions per Session

Abstract Test Suite for Service OAM	
Test Name	Configurable Number of LBM Transmissions per Session
Test Definition ID	UNIN-R56 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, the number of LBM transmissions MUST be configurable
Test Object	Verify that for each LB session, the number of LBM transmissions is configurable
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the Subscriber NE is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Operator A NE' connected to a grey box labeled 'Tester 3'. Below the Operator A NE is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator B NE' and a grey box 'Subscriber NE'. Below the Operator B NE is 'Remote UNI-N; Remote UNI-C (Tester 4)'. Below the Subscriber NE in the SPSN is 'Remote UNI-C (Tester 4)'. Arrows indicate connections: a grey arrow from Local UNI-C to Local UNI-N, a grey arrow from Local UNI-N to Operator B NE, and a grey arrow from Operator B NE to Remote UNI-C. Two horizontal arrows at the bottom represent MEGs: an orange arrow labeled 'UNI MEG' spanning from Local UNI-C to Local UNI-N, and a grey arrow labeled 'Subscriber MEG' and 'Test MEG' spanning from Local UNI-C to Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that LBM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1". Instruct the local UNI-N under test to send 1024 Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that LBM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1". Instruct the local UNI-N under test to send Loopback Messages (repeatedly until aborted) to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that LBM frames are transmitted from the UNI-N MEP instance (verify MEP ID) and that the MEG-Level of the UNI-MEG is = "1"
Units	MEP IDs MEG-Level values
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 81N: Configurable Interval between LBM Transmissions

Abstract Test Suite for Service OAM	
Test Name	Configurable Interval between LBM Transmissions
Test Definition ID	UNIN-R57 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, the interval between LBM transmissions MUST be configurable
Test Object	Verify that for each LB session, the interval between LBM transmissions is configurable
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test setup. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. To its right is a dashed box labeled 'Simulated Service Provider Network' containing a grey box 'Operator A NE' (Tester 3) and another grey box 'Operator B NE' (Tester 4). Further right is another 'Subscriber NE' connected to 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. Below the network, two horizontal arrows indicate MEG paths: a grey arrow for 'Subscriber MEG' and a yellow arrow for 'Test MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send 3 Loopback Messages with a period of 1 second to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that the interval between LBM transmissions is 1 second. Instruct the local UNI-N under test to send 3 Loopback Messages at an interval of 'T' seconds with ('T' > 1) to the local UNI-C on the UNI-MEG. Use Tester 1 to verify that the interval between LBM transmissions is equal to 'T' seconds.. Instruct the local UNI-N under test to send 3 Loopback Messages with a period of 0 second (send the next LBM upon receipt of last LBR) to the local UNI-C on the UNI-MEG. Using the MEP counters, verify that the total number of (LBMs transmitted) is never greater than the number of (LBRs received +1)
Units	LBM transmissions interval and number of LBM and LBR frames
Variables	Interval between LBM transmissions
Results	Pass or fail
Remarks	

TEST CASE 82N: Configurable Timeout after a LBM Transmission

Abstract Test Suite for Service OAM	
Test Name	Configurable Timeout after a LBM Transmission
Test Definition ID	UNIN-R58 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	For each LB session, the timeout after a LBM transmission, for an expected LBR result MAY be configurable
Test Object	Verify that for each LB session, the timeout after a LBM transmission, for an expected LBR result is configurable
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE'. A yellow box labeled 'Monitor Mode' (Tester 1) is connected to a green box labeled 'Local UNI-C (Tester 2)'. This Local UNI-C is connected to an orange box labeled 'Local UNI-N Under Test' (Tester 3). This Local UNI-N is part of a 'Simulated Service Provider Network' (dashed box) which includes an 'Operator A NE' and a 'Remote UNI-N (Tester 4)'. The Remote UNI-N is connected to a grey box labeled 'Operator B NE', which is in turn connected to another 'Remote UNI-N (Tester 4)'. This Remote UNI-N is connected to a grey box labeled 'Remote UNI-C (Tester 4)'. Below the network, arrows indicate the flow of messages: a blue arrow labeled 'UNI MEG' points from the Local UNI-N to the Local UNI-C; a red arrow labeled 'Test MEG' points from the Local UNI-N to the Remote UNI-N; and a green arrow labeled 'Subscriber MEG' points from the Remote UNI-N to the Remote UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send 3 Loopback Messages with a period of 0 second (send the next LBM upon receipt of last LBR) and with a timeout of 5 seconds to the local UNI-C on the UNI-MEG. Instruct the local UNI-C (Tester 2) not to respond to any of the received LBMs. Use Tester 1 to monitor the LBMs sent by the UNI-N under test and to verify that the interval between LBM transmissions is at least 5 seconds
Units	LBM transmissions interval
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 83N: Configurable LBM Frame Size

Abstract Test Suite for Service OAM	
Test Name	Configurable LBM Frame Size
Test Definition ID	UNIN-R59 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, the size of the LBM frame MUST be configurable. This requires that the optional Data TLV MUST be supported to allow for frames up to the MTU size
Test Object	Verify that for each LB session, the size of the LBM frame is configurable and that the optional Data TLV is supported to allow for frames up to the MTU size
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1) at the 'Local UNI-C (Tester 2)'. This is connected to a dashed box representing the 'Simulated Service Provider Network'. Inside this network, an orange box 'Operator ANE' is connected to a grey box 'Local UNI-N Under Test' (Tester 3). This is further connected to another grey box 'Operator B NE' and finally to a grey box 'Remote UNI-N; Remote UNI-C (Tester 4)'. Below the network, two horizontal arrows indicate MEG paths: a grey arrow for 'Subscriber MEG' and an orange arrow for 'UNI MEG'.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Instruct the local UNI-N under test to send three 64-byte Loopback Messages to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBMs sent by the UNI-N under test and to verify that the LBM frame size is 64 bytes. Instruct the local UNI-N under test to send three Loopback Messages (frame size equal to the maximum transmission unit of the UNI) to the local UNI-C on the UNI-MEG. Use Tester 1 to monitor the LBMs sent by the UNI-N under test and to verify that the LBM frame size is equal to the maximum transmission unit of the EVC
Units	LBM frame size
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 84N: UNI-N Counter – Number of LBM Frames Transmitted

Abstract Test Suite for Service OAM	
Test Name	UNI-N Counter – Number of LBM Frames Transmitted
Test Definition ID	UNIN-R60 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, counters for LBM frames transmitted MUST be maintained
Test Object	Verify that the UNI-N Type 2 under test maintains counters for each MEP that counts the number of LBM frames transmitted
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. In the center, an orange box represents the 'Local UNI-N Under Test'. Below it is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator A NE' (Tester 3) and another grey box 'Operator B NE' (Tester 4). Below these are 'Remote UNI-N (Tester 4)' and 'Remote UNI-C (Tester 4)'. A green box on the far right is another 'Subscriber NE'. Arrows indicate 'Subscriber MEG' and 'Test MEG' paths between the Subscriber NE and the Remote UNI-C. An orange arrow labeled 'UNI MEG' points from the Local UNI-N Under Test to the Local UNI-C.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Reset the UNI-N under test counters. Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI-C on the UNI-MEG and use Tester 1 to monitor and count the LBMs transmitted by the UNI-N under test. Verify that the number of LBMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBM frames transmitted indicated by the UNI-N MEP counter for the UNI-MEG
Units	Number of LBM frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 85N: UNI-N Counter – Number of LBM Frames Received

Abstract Test Suite for Service OAM	
Test Name	UNI-N Counter – Number of LBM Frames Received
Test Definition ID	UNIC-R60 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, counters for LBM frames Received MUST be maintained
Test Object	Verify that the UNI-N Type 2 under test maintains counters for each MEP that counts the number of LBM frames received
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Reset the UNI-N under test counters. Instruct the local UNI-C (Tester 2) to send 3 Loopback Messages to the UNI-N under test on the UNI-MEG. Use Tester 1 to monitor and count the LBMs transmitted by the local UNI-C (Tester 2). Verify that the number of LBMs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBM frames received indicated by the UNI-N MEP counter for the UNI-MEG
Units	Number of LBM frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 86N: UNI-N Counter – Number of LBR Frames Received

Abstract Test Suite for Service OAM	
Test Name	UNI-N Counter – Number of LBR Frames Received
Test Definition ID	UNIN-R60 ³
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, counters for LBR frames Received MUST be maintained
Test Object	Verify that the UNI-C Type 2 under test maintains counters for each MEP that counts the number of LBR frames received
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box labeled 'Subscriber NE' is connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below the Subscriber NE is 'Local UNI-C (Tester 2)'. In the center, an orange box labeled 'Operator ANE' is connected to a grey box labeled 'Local UNI-N Under Test'. Below the Operator ANE is 'Local UNI-N Under Test'. To the right, a dashed box labeled 'Simulated Service Provider Network' contains a grey box 'Operator B NE' connected to a grey box 'Subscriber NE'. Below the Operator B NE is 'Remote UNI-N; Remote UNI-C (Tester 4)'. Below the Subscriber NE is 'Remote UNI-N; Remote UNI-C (Tester 4)'. A grey arrow labeled 'Subscriber MEG' spans from the Local UNI-C to the Remote UNI-N. An orange arrow labeled 'UNI MEG' spans from the Local UNI-C to the Local UNI-N. A grey arrow labeled 'Test MEG' spans from the Local UNI-N to the Remote UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Reset the UNI-N under test counters. Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI-C on the UNI-MEG and use Tester 1 to monitor and count the LBMs transmitted by the UNI-N under test and also count the number of LBRs transmitted by the local UNI-C (Tester 2). Verify that the number of LBRs with MEG-Level = 1 counted by the Tester 1 is equal to the number of LBR frames received indicated by the UNI-N MEP counter for the UNI-MEG
Units	Number of LBR frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 87N: UNI-N Statistic – Percentage of Unanswered LB Requests (Lost LBM/LBR)

Abstract Test Suite for Service OAM	
Test Name	UNI-N Statistic – Percentage of Unanswered LB Requests (Lost LBM/LBR)
Test Definition ID	UNIN-R60 ⁴
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, statistics on the percentage of unanswered LB requests (lost LBM/LBR) MUST be maintained
Test Object	Verify that the UNI-N Type 2 under test maintains statistics on the percentage of unanswered LB requests (lost LBM/LBR)
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	<p>Reset the UNI-N under test counters and statistics. Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI-C on the UNI-MEG and use Tester 1 to verify that the number of LBMs transmitted by the UNI-N under test and is equal to the number of LBRs transmitted by the local UNI-C (Tester 2). Verify that the percentage of unanswered LB requests is 0% for the UNI-N under test MEP.</p> <p>DO NOT Reset the UNI-N under test counters and statistics. Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI- on the UNI-MEG and instruct the local UNI-C (Tester 2) not to respond to any of the received LBMs. Verify that the percentage of unanswered LB requests is 50% for the UNI-N under test MEP. Reset the UNI-N under test counters and statistics. Instruct the local UNI-N under test to send 3 Loopback Messages to the local UNI-C on the UNI-MEG and instruct the local UNI-C (Tester 2) not to respond to any of the received LBMs. Verify that the percentage of unanswered LB requests is 100% for the UNI-N under test MEP</p>
Units	Percentage of unanswered LB requests
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 88N: UNI-N Statistic – Minimum, Maximum & Average Round-Trip Latency

Abstract Test Suite for Service OAM	
Test Name	UNI-N Statistic – Minimum, Maximum & Average Round-Trip Latency
Test Definition ID	UNIN-R60 ⁵
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 10.2
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	For each LB session, statistics on the minimum, maximum and average round-trip latency MUST be maintained
Test Object	Verify that the UNI-N Type 2 under test maintains statistics on the minimum, maximum and average round-trip latency
Test Configuration	Configure a UNI-MEG with a MEG-Level = "1", with a unique MAID. Configure MEP instances on the local UNI-C and the local UNI-N with specific MEP IDs. Tester 1 with proper PHYs that match the UNIs is monitoring the Service OAM frames
Test Configuration Schematic	<p>The diagram illustrates the test configuration. On the left, a green box represents the 'Subscriber NE' connected to a yellow box labeled 'Monitor Mode' (Tester 1). Below this is 'Local UNI-C (Tester 2)'. A dashed box labeled 'Simulated Service Provider Network' contains an orange box 'Operator A NE' connected to a grey box 'Operator B NE'. Below Operator A NE is 'Local UNI-N Under Test' (Tester 3). Below Operator B NE is 'Remote UNI-N (Tester 4)' connected to 'Remote UNI-C (Tester 4)'. A final 'Subscriber NE' is shown on the far right. Arrows indicate 'Subscriber MEG' and 'Test MEG' paths between the Subscriber NE and the Remote UNI-C. An orange arrow labeled 'UNI MEG' points from the Local UNI-C to the Local UNI-N.</p>
CE-VLAN ID/EVC Map	Not Specified
Test Procedure	Reset the UNI-N under test counters and statistics. Instruct the local UNI-N under test to send Loopback Messages (repeatedly until aborted) to the local UNI-C on the UNI-MEG for a period of time T and verify the UNI-N under test maintains statistics on the minimum, maximum and average round-trip latency
Units	Minimum, maximum and average round-trip latency
Variables	None
Results	Pass or fail
Remarks	

17. References

References	Details
UNI Type 2 IA	MEF 20 [UNI Type 2 Implementation Agreement]
Abstract Test Suite for Ethernet Services at the UNI	MEF 9 [Abstract Test Suite for Ethernet Services at the UNI]
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