

Technical Specification

MEF 27

Abstract Test Suite For

UNI Type 2
Part 5: Enhanced UNI Attributes
& Part 6: L2CP Handling

May 20th, 2010

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1. Abstract

This document includes the fifth and sixth parts of the Abstract Test Suite for User to Network Interface (UNI) Type 2. It defines test procedures based on requirements for UNI Type 2 described in MEF 20 *UNI Type 2 Implementation Agreement*. The overall Abstract Test Suite for UNI Type 2 will be composed of the following parts: Link OAM, E-LMI, Service OAM, Protection, Enhanced UNI Attributes and L2CP handling.

2. Terminology

Bandwidth Profile	A characterization of ingress Service Frame arrival times and lengths at a reference point and a specification of the disposition of each Service Frame based on its level of compliance with the Bandwidth Profile. In this document the reference point is the UNI
CBS	Committed Burst Size
CE	Customer Edge
CE-VLAN CoS	Customer Edge VLAN CoS
CE-VLAN ID	Customer Edge VLAN ID
CE-VLAN ID/EVC Map	An association of CE-VLAN IDs with EVCs at a UNI
CE-VLAN Tag	Customer Edge VLAN Tag
CIR	Committed Information Rate
Class of Service	A set of Service Frames that have a commitment from the Service Provider to receive a particular level of performance
Class of Service Identifier CoSID	Information derivable from a) the EVC to which the Service Frame is mapped or b) the combination of the EVC to which the Service Frame is mapped and a set of one or more CE-VLAN CoS values
Color Mode	CM is a Bandwidth Profile parameter. The Color Mode parameter indicates whether the color-aware or color-blind property is employed by the Bandwidth Profile. It takes a value of "color-blind" or "color-aware" only
Committed Burst Size	CBS is a Bandwidth Profile parameter. It limits the maximum number of bytes available for a burst of ingress Service Frames sent at the UNI speed to remain CIR-conformant
Committed Information Rate	CIR is a Bandwidth Profile parameter. It defines the average rate in bits/s of ingress Service Frames up to which the network delivers Service Frames and meets the performance objectives defined by the CoS Service Attribute
Customer Edge	Equipment on the Subscriber side of the UNI
Customer Edge VLAN CoS	The user priority bits in the IEEE 802.1Q Tag in a Service Frame that is either tagged or priority tagged
Customer Edge VLAN ID	The identifier derivable from the content of a Service Frame that allows the Service Frame to be associated with an EVC at the UNI
Customer Edge VLAN Tag	The IEEE 802.1Q Tag in a tagged Service Frame
EBS	Excess Burst Size

Egress Service Frame	A Service Frame sent from the Service Provider network to the CE
EIR	Excess Information Rate
E-LAN Service	Ethernet LAN Service
E-Line Service	Ethernet Line Service
E-Tree	Ethernet Tree Service
UNI-C	Compound architectural component on the Subscriber side of the UNI that represents all the functions required to connect a subscriber to a MEN
UNI-N	Compound architectural component on the Service Provider side of the UNI that represents all the functions required to connect a MEN to a MEN subscriber

3. Scope

The Enhanced UNI Attributes and L2CP Handling parts of the Abstract Test Suite for UNI Type 2 describes test procedures based on the requirements for UNI Type 2 enhanced attributes and L2CP handling described in MEF 20 *UNI Type 2 Implementation Agreement*.

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

- o Bandwidth Profile Requirements
- Maximum Transmission Unit Requirements
- Physical Medium and Auto-negotiation Requirements
- o L2CP Requirements

The UNI Type 2 Link OAM, E-LMI, Service OAM and Protection 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.

4. 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.

5. 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, MEF 24 Abstract Test Suite for UNI Type 2 – Part 2: E-LMI and MEF 25 Abstract Test Suite for UNI Type 2 – Part 3: Service OAM by adding test procedures based on the requirements for UNI Type 2 enhanced attributes and L2CP handling defined in MEF 20 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*.

6. Test Configuration for UNI-N Type 2 Enhanced UNI Attributes and L2CP Handling

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 one of the three following test configurations for Point-to-Point (Figure 1), Multipoint-to-Multipoint (Figure 2) and Rooted-Multipoint (Figure 3) EVCs.



Figure 1: Test Configuration for UNI-N Type 2 - Point-to-Point EVC

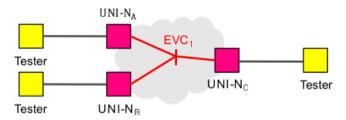


Figure 2: Test Configuration for UNI-N Type 2 – Multipoint-to-Multipoint EVC

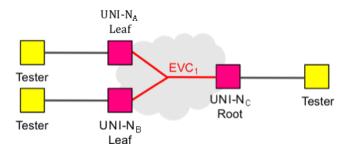


Figure 3: Test Configuration for UNI-N Type 2 - Rooted-Multipoint EVC

7. Test Configuration for UNI-C Type 2 Enhanced UNI Attributes

All UNI-C test cases defined in this document are to be executed using the following test configuration (Figure 4).

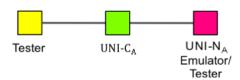


Figure 4: Test Configuration for UNI-C Type 2 – Point-to-Point EVC

8. 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".

9. Test Cases Summary

Number	Test Case Name	UNI Type	Test Status
1	Per UNI Egress Bandwidth Profile - CIR Configuration Granularity	UNI-N	Mandatory
2	Per EVC Egress Bandwidth Profile - CIR Configuration Granularity	UNI-N	Mandatory
3	Per CoS ID Egress Bandwidth Profile - CIR Configuration Granularity	UNI-N	Mandatory
4	Mandatory MTU Size	UNI-N & UNI-C	Mandatory
5	Recommended MTU Size	UNI-N & UNI-C	Optional
6	Optional MTU Size	UNI-N & UNI-C	Optional
7	Point-to-Point EVC Support	UNI-N	Mandatory
8	Multipoint-to-Multipoint EVC Support	UNI-N	Mandatory
9	Rooted-Multipoint EVC Support	UNI-N	Optional
10	UNI-N Root and Leaf Support	UNI-N	Optional
11	UNI-N Root and Leaf Concurrent Support	UNI-N	Optional
12	UNI-N Type 2 Physical Medium	UNI-N & UNI-C	Mandatory
13	Auto-Negotiation Support	UNI-N & UNI-C	Mandatory
14	Disabling the Auto-Negotiation Function	UNI-N & UNI-C	Mandatory
15	L2CP Mandated Filtering	UNI-N	Mandatory
16	L2CP Recommended Filtering	UNI-N	Optional
17	L2CP Mandated Configurability	UNI-N	Mandatory

10. Template for Abstract Test Cases for UNI Type 2 Enhanced UNI Attributes and L2CP Handling

The following template is adopted for the definition of Abstract Test Cases for UNI Type 2 Enhanced UNI Attributes and L2CP Handling

Abstra	ct Test Suite for Enhanced UNI Attributes and L2CP Handling			
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, R73 ² : MEF 20 requirement 73, second Test Case related to requirement 73)			
Reference Document	MEF 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, SHOULD or MAY 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 CE-VLAN ID/EVC Map is suggested. Variables augment it. INGRESS UNI 'A' EGRESS UNI 'B'			
Bandwidth Profile	A sample Bandwidth Profile table 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			

11. Abstract Test Cases for UNI-N Type 2 Enhanced UNI Attributes and L2CP Handling

This section contains 17 Test Cases for UNI-N Type 2. The section is divided in 2 different subsections as follows:

Section 11.1

Enhanced UNI Attributes Requirements contains a total of 14 Test Cases covering the UNI Type 2 Requirements R70, R71, R72, R73, R75, R76, R77, R78, R79 and R80.

Section 11.2

L2CP Handling Requirements contains a total of 3 Test Cases covering the UNI Type 2 Requirements R81, R82 and R83.

11.1 UNI-N Type 2 Enhanced UNI Attributes

TEST CASE 1N: Per UNI Egress Bandwidth Profile - CIR Configuration Granularity

	Abstract Test Suite for En	hanced l	UNI Attribi	ites & L2C	P		
Test Name	Per UNI Egress Bandwidth Prof	file - CIR	Configuration	n Granularity	7		
Test Definition ID	UNIN-R70			<u></u>			
Reference Document	MEF 20 UNI Type 2 Implemen	itation Agi	reement Secti	on 12			
Test Type	Conformance			<u> </u>			
Test Status	Mandatory						
1 cst Status	•	le to suppo	ort Per UNI e	gress BW pro	ofiling	of CIR as specific	ed in MEF10.1,
MEF Requirement Description	A UNI-N Type 2 MUST be able to support Per UNI egress BW profiling of CIR as specified in MEF in the following granularities: • ≤ 1Mbps steps up to 10Mpbs [CIR range 1] • ≤ 5 Mbps steps beyond 10Mbps and up to 100Mbps [CIR range 2] • ≤ 50 Mbps steps beyond 100Mpbs and up to 1Gbps [CIR range 3]					,	
•	• ≤ 500 Mbps steps beyond 1Gl			CIR range 5	J		
Test Object	Verify that a UNI-N Type 2 sup granularities described in the red	ports per	UNI egress E			ation to modify C	IR in the
	At least two EVCs, each one ass					s UNI Type 2 are	configured and at
Test Configuration	least one CE-VLAN ID is mapp						
Ö	Testers with proper PHY that m						
			UNI-N _A				
			Ingress				
Test Configuration				VC ₁	_	_	
Schematic		Tester					
Schematic				VC ₂ UNI-N _C	Te	ester	
		Tester	UNI-N _B	Egress			
			Ingress				
	INGRESS UNI 'A'	C	INGRESS U				S UNI 'C'
	CE-VLAN ID EVC 11* EVC ₁	CI	E-VLAN ID	EVC		CE-VLAN ID	EVC EVC ₁
CE VI AN ID/EVC	11" EVC ₁		10				-
CE-VLAN ID/EVC				FVC-		12	EVC-
	Use of other CE VI AN IDs is not	rmittad pro	12	EVC ₂	o CE V	I AN IDs conforms	EVC ₂
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	* The CE-VLAN ID for untagged UNIs UNIs UNI UNI Vote 1: (0 < Egress CIR.	se 2], Section I and priorit UNI 'C' C < Egress	vided that conf on 7.7 ty tagged Servi- PER UNI F	iguration of the ce Frames is co	onfigure	LAN IDs conforms ed to 11 at both ingr ofile Parameters EIR _C EBS _C	to MEF 10.1
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Map Bandwidth Profile	[Ethernet Services Attributes Phase * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * UNI	we 2], Section and priorital and priorital and priorital and priorital and priorital and priorital and $\frac{UNI \cdot C'}{C_C}$. Egress $\frac{C_C}{C_C}$ Egress $\frac{C_C}{C_C}$ in a specific and $\frac{C_C}{C_C}$ and $\frac{C_C}{C_C}$ and $\frac{C_C}{C_C}$ set to the range. Rep	PER UNI F UNI Speed), (Findwidth Profile CIRC) No d CE-VLAN interval T an of traffic delive Green that she could be minimum variation of the country of the	iguration of the ce Frames is concerning to the ce Frames is concerning to the certain CIR_{c} and CIR_{c} applies to the certain CIR_{c} and CIR_{c} applies to the certain CIR_{c} and CIR_{c} are in the certain CIR_{c} and	idth Pr CBS _c Maxim 0) and (I 1) \(\lambda\) at rathe num ssociate	cofile Parameters EIR _C EBS _C um Transmission U EBSs = 0) tes equal to the induction of Service Fred egress UNI mu by the egress UNI d increment Egre	Ito MEF 10.1 Tess and egress Unit size
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Map Bandwidth Profile	[Ethernet Services Attributes Phase * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * UNI	we 2], Section and priorital and priorital and priorital and priorital and priorital and priorital and $\frac{UNI \cdot C'}{C}$. Egress $\frac{C}{C}$ et al. $\frac{C}{C}$ express $\frac{C}{C}$ in a paper $\frac{C}{C}$ and $\frac{C}{C}$ and $\frac{C}{C}$ express $\frac{C}{C}$ of the priorital angle. Represented the speed.	PER UNI F UNI Speed), (Indwidth Profile CIR _C) No d CE-VLAN interval T an of traffic deliv Green that she is (CIR _C *T + C) in the control of the control	GRESS BP Bandw CIRc Egress CBS _C ≥ applies to) te 3: (EIRs = 0 IDs of length d measures the ered at the ast ould be delived by the could be deli	idth Pr CBS _c Maxim)) and (I a λ at rathe num ssociated	contact to the ingress of the Parameters EIR EBSC LEBSS = 0) LEBSS = 0 LEBSS = UNI LEBSS =	Ito MEF 10.1 Tess and egress Unit size Ingress UNI Tess delivered at last fall within the last fall within the last CIR _C by the last CIR _C has been
Map Bandwidth Profile Test Procedure	[Ethernet Services Attributes Phase * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * UNI	we 2], Section and priorital and priorital and priorital and priorital and priorital and priorital and $\frac{UNI \cdot C'}{C}$. Egress $\frac{C}{C}$ Egress $\frac{C}{C}$ ith mapped ing a time and amount of the control and $\frac{C}{C}$ est to the range. Representation and $\frac{C}{C}$ is $\frac{C}{C}$ in $\frac{C}{C}$	PER UNI F UNI Speed), (Indwidth Profile CIR _C) No d CE-VLAN interval T and of traffic deliv Green that she (CIR _C *T + C) a minimum value a minimum value the test for the control of th	GRESS BP Bandw CIRc Egress CBS _C ≥ applies to) te 3: (EIRs = 0 IDs of length d measures the ered at the ast ould be delived by the could be deli	idth Pr CBS _c Maxim)) and (I a λ at rathe num ssociated	contact to the ingress of the Parameters EIR EBSC LEBSS = 0) LEBSS = 0 LEBSS = UNI LEBSS =	Ito MEF 10.1 Tess and egress Unit size Ingress UNI Tess delivered at last fall within the last fall within the last CIR _C by the last CIR _C has been
Bandwidth Profile Test Procedure Units Variables	[Ethernet Services Attributes Phase * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * UNI	we 2], Section and priorital and priorital and priorital and priorital and priorital and priorital and $\frac{UNI \cdot C'}{C}$. Egress $\frac{C}{C}$ Egress $\frac{C}{C}$ ith mapped ing a time and amount of the control and $\frac{C}{C}$ est to the range. Representation and $\frac{C}{C}$ is $\frac{C}{C}$ in $\frac{C}{C}$	PER UNI F UNI Speed), (Indwidth Profile CIR _C) No d CE-VLAN interval T and of traffic deliv Green that she (CIR _C *T + C) a minimum value a minimum value the test for the control of th	GRESS BP Bandw CIRc Egress CBS _C ≥ applies to) te 3: (EIRs = 0 IDs of length d measures the ered at the ast ould be delived by the could be deli	idth Pr CBS _c Maxim)) and (I a λ at rathe num ssociated	contact to the ingress of the Parameters EIR EBSC LEBSS = 0) LEBSS = 0 LEBSS = UNI LEBSS =	Ito MEF 10.1 Tess and egress Unit size Ingress UNI Tess delivered at last fall within the last fall within the last CIR _C by the last CIR _C has been
Map Bandwidth Profile Test Procedure Units	[Ethernet Services Attributes Phase * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * The CE-VLAN ID for untagged UNIs * UNI	we 2], Section and priorital and priorital and priorital and priorital and priorital and priorital and $\frac{UNI \cdot C'}{C}$. Egress $\frac{C}{C}$ Egress $\frac{C}{C}$ ith mapped ing a time and amount of the control and $\frac{C}{C}$ est to the range. Representation and $\frac{C}{C}$ is $\frac{C}{C}$ in $\frac{C}{C}$	PER UNI F UNI Speed), (Indwidth Profile CIR _C) No d CE-VLAN interval T and of traffic deliv Green that she (CIR _C *T + C) a minimum value a minimum value the test for the control of th	GRESS BP Bandw CIRc Egress CBS _C ≥ applies to) te 3: (EIRs = 0 IDs of length d measures the ered at the ast ould be delived by the could be deli	idth Pr CBS _c Maxim)) and (I a λ at rathe num ssociated	contact to the ingress of the Parameters EIR EBSC LEBSS = 0) LEBSS = 0 LEBSS = UNI LEBSS =	Ito MEF 10.1 Tess and egress Unit size Ingress UNI In

TEST CASE 2N: Per EVC Egress Bandwidth Profile - CIR Configuration Granularity

	Abstract Test Suite for Enhanced UNI Attributes & L2CP				
Test Name	Per EVC Egress Bandwidth Profile - CIR Configuration Granularity				
Test Definition ID	UNIN-R71				
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12				
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description	Mandatory A UNI-N Type 2 MUST be able to support Per EVC egress BW profiling of CIR as specified in MEF10.1, in the following granularities: • ≤ 1Mbps steps up to 10Mpbs [CIR range 1] • ≤ 5 Mbps steps beyond 10Mbps and up to 100Mbps [CIR range 2] • ≤ 50 Mbps steps beyond 100Mpbs and up to 1Gbps [CIR range 3] • ≤ 500 Mbps steps beyond 1Gbps [CIR range 4]				
Test Object	Verify that a UNI-N Type 2 supports per EVC egress BW profile configuration to modify CIR in the granularities described in the requirement description section above.				
Test Configuration	At least two EVCs, associating ingress UNIs and an egress UNI Type 2 are configured and at least one CEVLAN ID is mapped per EVC. Per EVC egress bandwidth profile is applied at the egress UNI. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVCs.				
Test Configuration Schematic	Tester UNI-N _A Ingress EVC UNI-N _C Egress Tester UNI-N _B Ingress				
CE-VLAN ID/EVC Map	INGRESS UNI 'A' INGRESS UNI 'B' EGRESS UNI 'C'				
Bandwidth Profile	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				
Test Procedure	Tester offers Service Frames with mapped CE-VLAN IDs of length λ into the configured EVCs at the ingress UNIs during a time interval T , at rates equal to the ingress UNI speeds and measures the number of Service Frames delivered at the associated egress UNI. For each EVC the amount of traffic delivered at the associated egress UNI must fall within the range $X \le W_G \le Z$ where: $W_G \text{ is the amount of traffic declared Green that should be delivered by the egress UNI over the time interval } T$ $X_I = (\text{CIR}_1*T + \text{CBS}_1 - \text{F}) \text{ and } Z_I = (\text{CIR}_1*T + \text{CBS}_1 + \text{F})$ $X_2 = (\text{CIR}_2*T + \text{CBS}_2 - \text{F}) \text{ and } Z_2 = (\text{CIR}_2*T + \text{CBS}_2 + \text{F})$ Begin the test with Egress CIRs set to the minimum value (i.e. 1 Mbps) and increment Egress CIRs by the step value defined for the CIR range. Repeat the test for each Egress CIR value until (Σ Egress CIRs) has been				
Units	incremented to the Egress UNI speed. Number of valid Service Frames				
Variables	Bandwidth Profile Parameters $CIR_{1, 2}$, $CBS_{1, 2}$, UNIs interface speed, time interval T , tolerated variance F , number and length λ of the offered Service Frames				
Results	Pass or fail				
Remarks					

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TEST CASE 3N: Per CoS ID Egress Bandwidth Profile - CIR Configuration Granularity

	Abstract Test Suite for Enhanced UNI Attributes & L2CP					
Test Name	Per CoS ID Egress Bandwidth Profile - CIR Configuration Granularity					
Test Definition ID	UNIN-R72					
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12					
Test Type	Conformance					
Test Status	Mandatory					
MEF Requirement Description	in the following granularities: • ≤ 1Mbps steps up to 10Mpbs [CIR range 1] • ≤ 5 Mbps steps beyond 10Mbps and up to 100Mbps [CIR range 2] • ≤ 50 Mbps steps beyond 100Mpbs and up to 1Gbps [CIR range 3] • ≤ 500 Mbps steps beyond 1Gbps [CIR range 4]	A UNI-N Type 2 MUST be able to support Per CoS ID egress BW profiling of CIR as specified in MEF10.1, in the following granularities: • ≤ 1Mbps steps up to 10Mpbs [CIR range 1] • ≤ 5 Mbps steps beyond 10Mbps and up to 100Mbps [CIR range 2] • ≤ 50 Mbps steps beyond 100Mpbs and up to 1Gbps [CIR range 3]				
Test Object	Verify that a UNI-N Type 2 supports per CoS ID egress BW profile configured granularities described in the requirement description section above.					
Test Configuration	At least one EVC, associating two ingress UNIs and one egress UNI Type 2 VLAN ID is mapped per EVC with 2 CoS IDs. Per CoS ID egress bandwid egress UNI. Testers with proper PHY that matches each UNI are attached to EVCs.	lth profiles are a	oplied at the			
Test Configuration Schematic	UNI-N _A Ingress EVC Tester UNI-N _C Egress Tester UNI-N _B Ingress	ler				
	INGRESS UNI 'A' INGRESS UNI 'B'	EGRESS				
CE-VLAN ID/EVC Map	CE-VLAN ID EVC 11* EVC 11* EVC 11* EVC Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLA [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured UNIs					
	PER CoS ID EGRESS BP					
Bandwidth Profile			Unit			
Test Procedure	Tester offers Service Frames with mapped CE-VLAN IDs/CoS IDs of length λ into the configured EVC at the ingress UNIs during a time interval T , at rates equal to the ingress UNI speeds and measures the number of Service Frames delivered at the associated egress UNI. For each CoS ID the amount of traffic delivered at the associated egress UNI must fall within the range $X \le W_G \le Z$ where: $W_G \text{ is the amount of traffic declared Green that should be delivered by the egress UNI over the time interval T X_I = (\text{CIR}_{11} * T + \text{CBS}_{11} - \text{F}) \text{ and } Z_I = (\text{CIR}_{11} * T + \text{CBS}_{11} + \text{F}) X_2 = (\text{CIR}_{13} * T + \text{CBS}_{13} - \text{F}) \text{ and } Z_2 = (\text{CIR}_{13} * T + \text{CBS}_{13} + \text{F}) Begin the test with Egress CIRs set to the minimum value (i.e. 1 Mbps) and increment Egress CIRs by the step value defined for the CIR range. Repeat the test for each Egress CIR value until (\Sigma Egress CIRs) has been$					
Units	incremented to the Egress UNI speed. Number of valid Service Frames					
Variables	Bandwidth Profile Parameters $CIR_{11, 13}$, $CBS_{11, 13}$, UNIs interface speed, time number and length λ of the offered Service Frames	e interval T, tole	rated variance F,			
Results	Pass or fail					
Remarks						

TEST CASE 4N: Mandatory MTU Size

	Abstract Test Suite for Enhanced UNI Attributes & L2CP
Test Name	Mandatory MTU Size
Test Definition ID	UNIN-R73 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-N Type 2 MUST support an MTU size of 1522 Bytes as per [IEEE 802.3].
Test Object	Verify that a UNI-N Type 2 supports an MTU size of 1522 Bytes as per [IEEE 802.3].
Test Configuration	At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVCs.
Test Configuration Schematic	Tester UNI-N _A UNI-N _B Tester
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EVC 11* UNI 'B' CE-VLAN ID EVC 11* Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs
Bandwidth Profile	Not specified
Test Procedure	Tester offers 1522-Byte Service Frames, as specified in IEEE 802.3 bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N.
Units	Number of valid Service Frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 5N: Recommended MTU Size

	Abstract Test Suite for Enhanced UNI Attributes & L2CP
Test Name	Recommended MTU Size
Test Definition ID	UNIN-R73 ²
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12
Test Type	Conformance
Test Status	Optional
MEF Requirement Description	A UNI-N Type 2 SHOULD support an MTU size of 2000 Bytes as per [IEEE 802.3as].
Test Object	Verify that a UNI-N Type 2 supports an MTU size of 2000 Bytes as per [IEEE 802.3as].
Test Configuration	At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVCs.
Test Configuration Schematic	Tester UNI-N _A UNI-N _B Tester
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EVC 11* EVC 11* UNI 'B' CE-VLAN ID EVC 11* EVC 11* Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs
Bandwidth Profile	Not specified
Test Procedure	Tester offers 2000-Byte Service Frames, as specified in IEEE 802.3as, bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N.
Units	Number of valid Service Frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 6N: Optional MTU Size

	Abstract Test Suite for En	hanced UNI Attrib	utes & L2CP		
Test Name	Optional MTU Size				
Test Definition ID	UNIN-R73 ³				
Reference Document	MEF 20 UNI Type 2 Implemen	tation Agreement Sect	ion 12		
Test Type	Conformance				
Test Status	Optional				
MEF Requirement Description	A UNI-N Type 2 MAY support 9600-Byte jumbo frames.				
Test Object	Verify that a UNI-N Type 2 sup	pports 9600-Byte jumb	o frames.		
Test Configuration	At least one EVC associating at mapped per EVC. Testers with pronfigured EVCs.				
Test Configuration					
Schematic	Те	ester UNI-N _A	UNI-N _B Tester		
Schematic	UNI 'A' CE-VLAN ID		UNI-N _B Tester	B' EVC	
CE-VLAN ID/EVC	UNI 'A' CE-VLAN ID 11*	EVC EVC1	UNI-N _B Tester UNI ' CE-VLAN ID 11*	EVC EVC ₁	
	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes P	EVC EVC permitted provided that c hase 2], Section 7.7	UNI-N _B Tester UNI ' CE-VLAN ID	EVC EVC ₁ conforms to MEF 10.1	
CE-VLAN ID/EVC	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes PI * The CE-VLAN ID for untagg	EVC EVC permitted provided that c hase 2], Section 7.7	UNI-N _B Tester UNI CE-VLAN ID 11* onfiguration of the CE-VLAN IDs c	EVC EVC ₁ conforms to MEF 10.1	
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes P] * The CE-VLAN ID for untagg egress UNIs	EVC EVC permitted provided that chase 2], Section 7.7 ged and priority tagged Se	UNI-N _B Tester UNI CE-VLAN ID 11* onfiguration of the CE-VLAN IDs cervice Frames is configured to 11 at a cervical certain the certain testing at each UNI-N configuration.	EVC EVC ₁ conforms to MEF 10.1 both ingress and	
CE-VLAN ID/EVC Map Bandwidth Profile	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes PI * The CE-VLAN ID for untage egress UNIs Not specified Tester offers 9600-Byte jumbo	EVC EVC permitted provided that chase 2], Section 7.7 ged and priority tagged Section 5.7 get and priority tagged Section 5.7	UNI-N _B Tester UNI CE-VLAN ID 11* onfiguration of the CE-VLAN IDs cervice Frames is configured to 11 at a cervical certain the certain testing at each UNI-N configuration.	EVC EVC ₁ conforms to MEF 10.1 both ingress and	
CE-VLAN ID/EVC Map Bandwidth Profile Test Procedure	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes PI * The CE-VLAN ID for untagg egress UNIs Not specified Tester offers 9600-Byte jumbo verifies that the corresponding S	EVC EVC permitted provided that chase 2], Section 7.7 ged and priority tagged Section 5.7 get and priority tagged Section 5.7	UNI-N _B Tester UNI CE-VLAN ID 11* onfiguration of the CE-VLAN IDs cervice Frames is configured to 11 at a cervical certain the certain testing at each UNI-N configuration.	EVC EVC ₁ conforms to MEF 10.1 both ingress and	
CE-VLAN ID/EVC Map Bandwidth Profile Test Procedure Units	UNI 'A' CE-VLAN ID 11* Use of other CE-VLAN IDs is [Ethernet Services Attributes P] * The CE-VLAN ID for untage egress UNIs Not specified Tester offers 9600-Byte jumbo services that the corresponding Service Frames	EVC EVC permitted provided that chase 2], Section 7.7 ged and priority tagged Section 5.7 get and priority tagged Section 5.7	UNI-N _B Tester UNI CE-VLAN ID 11* onfiguration of the CE-VLAN IDs cervice Frames is configured to 11 at a cervical certain the certain testing at each UNI-N configuration.	EVC EVC ₁ conforms to MEF 10.1 both ingress and	

TEST CASE 7N: Point-to-Point EVC Support

	Abstract Test Suite for Enhanced UN	NI Attributes & I	L2CP		
Test Name	Point-to-Point EVC Support				
Test Definition ID	UNIN-R75 ¹				
Reference Document	MEF 20 UNI Type 2 Implementation Agree	ement Section 12			
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description	A UNI-N Type 2 MUST be able to support	Point-to-point EVC	's.		
Test Object	Verify that a UNI-N Type 2 supports Point-	to-point EVCs.			
Test Configuration	At least one Point-to-Point EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. The UNI Type must be Root for each UNI. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVC.				
Test Configuration Schematic	Tester	Tester UNI-N _A UNI-N _B Tester			
	UNI 'A'		UNI		
CE VI AN ID/EVC	CE-VLAN ID EVC 11* EVC		CE-VLAN ID	EVC ₁	
CE-VLAN ID/EVC Map	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs				
Bandwidth Profile	Not specified				
	Tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N.				
Test Procedure				d verifies that the	
Test Procedure Units				d verifies that the	
	corresponding Service Frames are delivered			d verifies that the	
Units	Corresponding Service Frames are delivered Number of valid Service Frames			d verifies that the	

TEST CASE 8N: Multipoint-to-Multipoint EVC Support

	Abstract Test Suite for Enhanced UNI Attributes & L2CP				
Test Name	Multipoint-to-Multipoint EVC Support				
Test Definition ID	UNIN-R75 ²				
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12				
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description	A UNI-N Type 2 MUST be able to support Multipoint-to-Multipoint EVCs.				
Test Object	Verify that a UNI-N Type 2 supports Multipoint-to-Multipoint EVCs.				
Test Configuration	At least one Multipoint-to-Multipoint EVC associating at least three Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. The UNI Type must be Root for each UNI. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVC.				
Test Configuration Schematic	Tester UNI-N _B UNI-N _A EVC UNI-N _C Tester				
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 1				
Bandwidth Profile	Not specified				
Test Procedure	Tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N.				
Units	Number of valid Service Frames				
Variables	None				
Results	Pass or fail				
Remarks					

TEST CASE 9N: Rooted-Multipoint EVC Support

	Abstract Test Suite for Enhanced UNI Attributes & L2CP				
Test Name	Rooted-Multipoint EVC Support				
Test Definition ID	UNIN-R75 ³				
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12				
Test Type	Conformance				
Test Status	Optional				
MEF Requirement Description	A UNI-N Type 2 SHOULD be able to support Rooted-Multipoint EVCs.				
Test Object	Verify that a UNI-N Type 2 supports Rooted-Multipoint EVCs.				
Test Configuration	At least one Rooted-Multipoint EVC associating at least three Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. The UNI Type of one UNI must be Root and all UNIs that are not UNI Type Root must be UNI Type Leaf. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVC.				
Test Configuration Schematic	UNI-N _A Leaf Tester UNI-N _C Root Tester Leaf				
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EV				
Bandwidth Profile	Not specified				
Test Procedure	Tester offers Service Frames, at the UNI-N of the Type Root UNI configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-Ns of the Type Leaf UNIs. Then, tester offers Service Frames, at the UNI-Ns of the Type Leaf UNIs configured in the EVC and verifies that the corresponding Service Frames are only delivered at the associated UNI-N of the Type Root UNI.				
Units	Number of valid Service Frames				
Variables	None				
Results	Pass or fail				
Remarks					

TEST CASE 10N: UNI-N Root and Leaf Support

	Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	UNI-N Root and Leaf Support		
Test Definition ID	UNIN-R76		
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12		
Test Type	Conformance		
Test Status	Optional		
MEF Requirement Description	A UNI-N Type 2 SHOULD be able to take on the role of a "Root" or "Leaf" for each Rooted-Multipoint EVC it supports.		
Test Object	Verify that a UNI-N Type 2 can take on the role of a "Root" or "Leaf" for each Rooted-Multipoint EVC it supports.		
Test Configuration	At least one Rooted-Multipoint EVC associating at least three Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. The UNI Type of one UNI must be Root and all UNIs that are not UNI Type Root must be UNI Type Leaf. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVC.		
Test Configuration Schematic	UNI-N _A Leaf/Root Tester UNI-N _C Root/Leaf Tester UNI-N _B Leaf		
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EV		
Bandwidth Profile	Not specified		
Test Procedure	Tester offers Service Frames, at the UNI-N of the Type Root UNI configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-Ns of the Type Leaf UNIs. Then, tester offers Service Frames, at the UNI-Ns of the Type Leaf UNIs configured in the EVC and verifies that the corresponding Service Frames are only delivered at the associated UNI-N of the Type Root UNI. Re-configure one of the UNI Type Root as a Type Leaf and one of the UNI Type Leaf as a Type Root and repeat the test.		
Units	Number of valid Service Frames		
Variables	None		
Results	Pass or fail		
Remarks			

TEST CASE 11N: UNI-N Root and Leaf Concurrent Support

	Abstract Test Su	ite for En	ihanced (UNI Attribu	ites & L2CP	•	
Test Name	UNI-N Root and Lea	UNI-N Root and Leaf Concurrent Support					
Test Definition ID	UNIN-R77	UNIN-R77					
Reference Document	MEF 20 UNI Type 2	2 Implemen	ntation Agr	greement Secti	on 12		
Test Type	Conformance						
Test Status	Optional						
MEF Requirement Description	A UNI-N Type 2 SH "leaf" on another Ro					ne Rooted-Multipoint E	EVC and as a
Test Object	Verify that a UNI-N "leaf" on another Ro					e Rooted-Multipoint E	VC and as a
Test Configuration	At least two Rooted- CE-VLAN ID is ma Type Leaf for the se Type Leaf for the fir	At least two Rooted-Multipoint EVCs associating at least three Type 2 UNIs are configured and at least one CE-VLAN ID is mapped per EVC. One UNI must be Type Root for the first Rooted-Multipoint EVC and Type Leaf for the second one. Another UNI must be Type Root for the second Rooted-Multipoint EVC and Type Leaf for the first one. All other UNIs must be Type Leaf. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVC.					
	UNI-N _A Leaf/Root EVC UNI-N _C Root/Leaf Tester UNI-N _B Leaf						
Test Configuration Schematic		[EVC ₂ UNI-N _C	Tester	
	UNI 'A'	T	Tester	UNI-N _B Leaf	EVC ₂ UNI-N _C Root/Leaf	ÜN	I.C.
	UNI 'A' CE-VLAN ID 11*	[Tester	UNI-N _B Leaf	EVC ₂ UNI-N _C Root/Leaf		EVC EVC ₁
Schematic CE-VLAN ID/EVC	CE-VLAN ID	EVC	Tester	UNI B Leaf	EVC UNI-N _C Root/Leaf	UNI CE-VLAN ID	EVC
Schematic	CE-VLAN ID 11* 12 Use of other CE-VLA	EVC EVC ₁ EVC ₂ AN IDs is per	Tester Cl	UNI-N _B Leaf UNI 'B CE-VLAN ID 11* 12 ovided that confi	EVC EVC1 EVC2	CE-VLAN ID	EVC EVC ₁ EVC ₂
Schematic CE-VLAN ID/EVC	CE-VLAN ID 11* 12 Use of other CE-VLA [Ethernet Services A	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase	Tester CI crmitted pro se 2], Section	UNI 'B Leaf UNI 'B EE-VLAN ID 11* 12 ovided that confiion 7.7	EVC EVC1 EVC2 iguration of the C	UNI CE-VLAN ID 11*	EVC EVC ₂ to MEF 10.1
Schematic CE-VLAN ID/EVC	CE-VLAN ID 11* 12 Use of other CE-VLA [Ethernet Services A] * The CE-VLAN ID	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase	Tester CI crmitted pro se 2], Section	UNI 'B Leaf UNI 'B EE-VLAN ID 11* 12 ovided that confiion 7.7	EVC EVC1 EVC2 iguration of the C	CE-VLAN ID 11* 12 CE-VLAN IDs conforms	EVC EVC ₂ to MEF 10.1
CE-VLAN ID/EVC Map	Use of other CE-VLAN ID 11* 12 Use of other CE-VLAN ID [Ethernet Services Are the CE-VLAN ID UNIS Not specified Tester offers Services tester verifies that the the associated UNI-IP Frames at the UNI-IP Tester of the transport of the trans	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase for untagged e Frames, at the Service F. Ns of the Let Ns of the	ermitted prose 2], Section I and priorite the UNI-Frames inge af Type Ueaf Type U	UNI-N _B Leaf UNI 'B CE-VLAN ID 11* 12 ovided that confion 7.7 ity tagged Service -N of the Root gressing at the UNIs associate UNIs and verification and verification and verification in the confidence of the confidence o	EVC EVC1 EVC2 iguration of the Core Frames is con t Type UNIs core UNI-N of the ed with the species that frames	CE-VLAN ID 11* 12 CE-VLAN IDs conforms	EVC EVC ₁ EVC ₂ to MEF 10.1 ess and egress For each EVC, ly delivered at er offers Service -Ns of Leaf Type
CE-VLAN ID/EVC Map Bandwidth Profile	Use of other CE-VLAN ID 11* 12 Use of other CE-VLAN ID [Ethernet Services Are the CE-VLAN ID UNIS Not specified Tester offers Services tester verifies that the the associated UNI-IP Frames at the UNI-IP Tester of the transport of the trans	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase for untagged ee Frames, at the Service Found of the Letthe Associate the associate the associate the service for the Letthe Associate the associate the service for the Letthe Associate the associate the associate the service for the Letthe Associate the Letthe Associate the service for the Letthe Associate t	ermitted prose 2], Section of and priorit the UNI-Frames ingual eaf Type Ueaf Type Uated UNI-I	UNI-N _B Leaf UNI 'B CE-VLAN ID 11* 12 ovided that confion 7.7 ity tagged Service -N of the Root gressing at the UNIs associate UNIs and verification and verification and verification in the confidence of the confidence o	EVC EVC1 EVC2 iguration of the Core Frames is con t Type UNIs core UNI-N of the ed with the species that frames	CE-VLAN ID 11* 12 CE-VLAN IDs conforms figured to 11 at both ingreen to 11 at both ingreen to 12 configured in the EVCs. Root Type UNI are on excific EVC. Then Test is ingressing at the UNI	EVC EVC ₁ EVC ₂ to MEF 10.1 ess and egress For each EVC, ly delivered at er offers Service -Ns of Leaf Type
CE-VLAN ID/EVC Map Bandwidth Profile Test Procedure	Use of other CE-VLAN ID Use of other CE-VLAN ID Ethernet Services AI * The CE-VLAN ID UNIS Not specified Tester offers Service tester verifies that th the associated UNI-I Frames at the UNI-N are only delivered at	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase for untagged ee Frames, at the Service Found of the Letthe Associate the associate the associate the service for the Letthe Associate the associate the service for the Letthe Associate the associate the associate the service for the Letthe Associate the Letthe Associate the service for the Letthe Associate t	ermitted prose 2], Section of and priorit the UNI-Frames ingual eaf Type Ueaf Type Uated UNI-I	UNI-N _B Leaf UNI 'B CE-VLAN ID 11* 12 ovided that confion 7.7 ity tagged Service -N of the Root gressing at the UNIs associate UNIs and verification and verification and verification in the confidence of the confidence o	EVC EVC1 EVC2 iguration of the Core Frames is con t Type UNIs core UNI-N of the ed with the species that frames	CE-VLAN ID 11* 12 CE-VLAN IDs conforms figured to 11 at both ingreen to 11 at both ingreen to 12 configured in the EVCs. Root Type UNI are on excific EVC. Then Test is ingressing at the UNI	EVC EVC ₁ EVC ₂ to MEF 10.1 ess and egress For each EVC, ly delivered at er offers Service -Ns of Leaf Type
CE-VLAN ID/EVC Map Bandwidth Profile Test Procedure Units	Use of other CE-VLAN ID 11* 12 Use of other CE-VLAN ID UNIS Not specified Tester offers Service tester verifies that the the associated UNI-Frames at the UNI-Nare only delivered at Number of valid Service tester verifies that the the associated UNI-Prames at the UNI-Nare only delivered at	EVC EVC ₁ EVC ₂ AN IDs is per ttributes Phase for untagged ee Frames, at the Service Found of the Letthe Associate the associate the associate the service for the Letthe Associate the associate the service for the Letthe Associate the associate the associate the service for the Letthe Associate the Letthe Associate the service for the Letthe Associate t	ermitted prose 2], Section of and priorit the UNI-Frames ingual eaf Type Ueaf Type Uated UNI-I	UNI-N _B Leaf UNI 'B CE-VLAN ID 11* 12 ovided that confion 7.7 ity tagged Service -N of the Root gressing at the UNIs associate UNIs and verification and verification and verification in the confidence of the confidence o	EVC EVC1 EVC2 iguration of the Core Frames is con t Type UNIs core UNI-N of the ed with the species that frames	CE-VLAN ID 11* 12 CE-VLAN IDs conforms figured to 11 at both ingreen to 11 at both ingreen to 12 configured in the EVCs. Root Type UNI are on excific EVC. Then Test is ingressing at the UNI	EVC EVC ₁ EVC ₂ to MEF 10.1 ess and egress For each EVC, ly delivered at er offers Service -Ns of Leaf Type

TEST CASE 12N: UNI-N Type 2 Physical Medium

	Abstract Test Suite for Enhanced UNI Attributes & L2CP				
Test Name	UNI-N Type 2 Ethernet Physical Medium				
Test Definition ID	UNIN-R78 ¹				
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12				
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description	A UNI-N Type 2 MUST support at least one of the PHYs listed in [IEEE 802.3], excluding 1000BASE-PX-D and 1000BASE-PX-U, since Link OAM is not supported on these PHYs.				
Test Object	Verify that a UNI-N Type 2 supports at least one of the PHYs listed in [IEEE 802.3], excluding 1000BASE-PX-D and 1000BASE-PX-U.				
Test Configuration	At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI and is one of the PHYs listed in [IEEE802.3] excluding 1000BASE-PX-D and 1000BASE-PX-U are attached to all UNI-Ns in the configured EVCs.				
Test Configuration Schematic	Tester UNI-N _A UNI-N _B Tester				
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EVC 11* EVC 11* EVC 11* EVC 11* USe of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs				
Bandwidth Profile	Not specified				
Test Procedure	Tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N.				
Units	Number of valid Service Frames				
Variables	UNIs interface speed				
Results	Pass or fail				

TEST CASE 13N: Auto-Negotiation Support

	Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	Auto-Negotiation Support		
Test Definition ID	UNIN-R79		
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12		
Test Type	Conformance		
Test Status	Mandatory		
MEF Requirement Description	A UNI-N Type 2 MUST support auto-negotiation for 10/100 and 10/100/1000 UNI rates for the PHYs that support auto-negotiation.		
Test Object	Verify that a UNI-N Type 2 supports auto-negotiation for 10/100 and 10/100/1000 UNI rates for the PHYs that support auto-negotiation.		
Test Configuration	At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVCs.		
Test Configuration Schematic	Tester UNI-N _A UNI-N _B Tester		
CE-VLAN ID/EVC Map	UNI 'A' CE-VLAN ID EVC 11* EVC 11* EVC 11* EVC 11* UNI 'B' CE-VLAN ID EVC 11* EVC 11* USe of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CF-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and		
	CE-VLAN ID EVC CE-VLAN ID EVC 11* EVC ₁ 11* EVC ₁ Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1		
	CE-VLAN ID EVC 11* EVC Not specified		
Мар	CE-VLAN ID EVC 11* EVC 11* EVC Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs		
Map Bandwidth Profile	CE-VLAN ID EVC 11* EVC 11* EVC 11* Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs Not specified Enable auto-negotiation on the UNI-Ns under test. Set speed and mode of the tester to advertise 10 Mbps Full Duplex and verify that the UNI-Ns under tests automatically adjust their speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N. Set speed and mode of the tester to advertise 100 Mbps Full Duplex and repeat the test. If the UNI-Ns support 10/100/1000, set speed and mode of the tester to advertise 1000 Mbps Full Duplex and		
Map Bandwidth Profile Test Procedure	CE-VLAN ID EVC 11* EVC 11* EVC 11* Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 *The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs Not specified Enable auto-negotiation on the UNI-Ns under test. Set speed and mode of the tester to advertise 10 Mbps Full Duplex and verify that the UNI-Ns under tests automatically adjust their speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N. Set speed and mode of the tester to advertise 100 Mbps Full Duplex and repeat the test. If the UNI-Ns support 10/100/1000, set speed and mode of the tester to advertise 1000 Mbps Full Duplex and repeat the test.		
Map Bandwidth Profile Test Procedure Units	CE-VLAN ID 11* EVC 11* Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs Not specified Enable auto-negotiation on the UNI-Ns under tests. Set speed and mode of the tester to advertise 10 Mbps Full Duplex and verify that the UNI-Ns under tests automatically adjust their speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI-N. Set speed and mode of the tester to advertise 100 Mbps Full Duplex and repeat the test. If the UNI-Ns support 10/100/1000, set speed and mode of the tester to advertise 1000 Mbps Full Duplex and repeat the test. Number of valid Service Frames		

TEST CASE 14N: Disabling the Auto-Negotiation Function

	Abstract Test Suite for Enh	nanced UNI Attril	outes & L2CP		
Test Name	Disabling the Auto-Negotiation Function				
Test Definition ID	UNIN-R80				
Reference Document	MEF 20 UNI Type 2 Implementa	MEF 20 UNI Type 2 Implementation Agreement Section 12			
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description			sable the auto-negotiation function disabled for unidirectional link of		
Test Object	Verify that a UNI-N Type 2 supp	ports the capability to	o disable the auto-negotiation fund	ction.	
Test Configuration			Is is configured and at least one C thes each UNI are attached to all I		
Test Configuration Schematic	Tester UNI-N _A UNI-N _B Tester				
	UNI 'A'	TVG	UNI 'I		
CE-VLAN ID/EVC Map	11* Use of other CE-VLAN IDs is p [Ethernet Services Attributes Ph.	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and			
Bandwidth Profile	Not specified				
Test Procedure	Disable auto-negotiation on the UNI-Ns under test and on the tester ports. Force the speed and mode of the tester ports to 10 Mbps Full Duplex and the UNI-Ns to 100 Mbps Half Duplex** and verify that the UNI-Ns under tests do not automatically adjust their speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames bidirectionally at each UNI-N configured in the EVC and verifies that the corresponding Service Frames are not delivered at the associated UNI-N.				
Units	Number of valid Service Frames				
Variables	UNIs interface speed				
Results	Pass or fail				
Remarks	-				

11.2 UNI-N Type 2 L2CP Handling

TEST CASE 15N: L2CP Mandated Filtering

	Abstract Test Suite for Enl	hanced UNI Attri	butes & L2CP		
Test Name	L2CP Mandated Filtering				
Test Definition ID	UNIN-R81				
Reference Document	MEF 20 UNI Type 2 Implement	tation Agreement Sec	ction 12		
Test Type	Conformance				
Test Status	Mandatory				
MEF Requirement Description	1-2				
Test Object	Verify that a UNI-N Type 2 filted description section.	Verify that a UNI-N Type 2 filters all L2CP packets with the Multicast MAC DA defined in the requirement			
Test Configuration		At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the			
Test Configuration Schematic	Te	Tester UNI-N _A UNI-N _B Tester			
	UNI 'A'		UNI	B'	
	CE-VLAN ID	EVC	CE-VLAN ID	EVC	
CE-VLAN ID/EVC Map	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs				
Bandwidth Profile	Not specified				
Test Procedure	Tester offers Layer 2 Control prodescription at the ingress UNI at	Tester offers Layer 2 Control protocol frames with multicast MAC DAs defined in the requirement description at the ingress UNI and verifies that they are not delivered at the egress UNI.			
Units	Number of valid Service Frames	S			
Variables	Service Type				
Results	Pass or fail				
	1 833 01 1811				

TEST CASE 16N: L2CP Recommended Filtering

	Abstract Test Suite for En	hanced UNI Attrib	outes & L2CP			
Test Name	L2CP Recommended Filtering					
Test Definition ID	UNIN-R82					
Reference Document	MEF 20 UNI Type 2 Implement	tation Agreement Sect	tion 12			
Test Type	Conformance					
Test Status	Optional					
MEF Requirement Description	A UNI-N Type 2 SHOULD "Fi • 01-80-C2-00-00-01	ilter" PAUSE frames v	with the following Multicast MA	C DA:		
Test Object	Verify that a UNI-N Type 2 filted description section.	ers PAUSE frames wit	th the Multicast MAC DA define	d in the requirement		
Test Configuration			Is is configured and at least one C hes each UNI are attached to all I			
Test Configuration Schematic	Te	Tester UNI-N _A UNI-N _B Tester				
	UNI 'A' CE-VLAN ID	EVC	UNI 'I	B' EVC		
CE-VLAN ID/EVC Map	11* EVC ₁ 11* EVC ₁ Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs					
Bandwidth Profile	Not specified					
Test Procedure	Tester offers Layer 2 Control protocol frames with multicast MAC DA defined in the requirement description section at the ingress UNI and verifies that they are not delivered at the egress UNI.					
Units	Number of valid Service Frame	s		Number of valid Service Frames		
Variables	Service Type					
Results	Service Type Pass or fail					

TEST CASE 17N: L2CP Mandated Configurability

	Abstract Test Suite for Enl	hanced UNI Attrib	outes & L2CP	
Test Name	L2CP Recommended Filtering			
Test Definition ID	UNIN-R83			
Reference Document	MEF 20 UNI Type 2 Implement	ation Agreement Sec	tion 12	
Test Type	Conformance			
Test Status	Mandatory			
MEF Requirement Description	A UNI-N Type 2 MUST have the capability to be configured to either "Pass to EVC" or "Filter" all packets with the following Multicast MAC DA: • 01-80-C2-00-00-00 • 01-80-C2-00-00-0B • 01-80-C2-00-00-0F • 01-80-C2-00-00-20 to 01-80-C2-00-00-2F • 01-80-C2-00-00-30 to 01-80-C2-00-00-3F			
Test Object	Verify that a UNI-N Type 2 has	the capability to be c	configured to either "Pass to EVC ent description section.	" or "Filter" all packets
Test Configuration	At least one EVC associating at	with the Multicast MAC DA defined in the requirement description section. At least one EVC associating at least two Type 2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Testers with proper PHY that matches each UNI are attached to all UNI-Ns in the configured EVCs.		
Test Configuration Schematic	Te	Tester UNI-N _A UNI-N _B Tester		
	UNI 'A'		UNI '	
CE VI AN IDÆVIC	CE-VLAN ID	EVC ₁	CE-VLAN ID	EVC EVC ₁
CE-VLAN ID/EVC Map	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10.1 [Ethernet Services Attributes Phase 2], Section 7.7 * The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs			
Bandwidth Profile	Not specified			
Test Procedure	Configure the UNI-N to "Pass to EVC" all packets with the Multicast MAC DA defined in the requirement description section. Tester offers Layer 2 Control protocol frames with the Multicast MAC DA defined in the requirement description section at the ingress UNI and verifies that they are delivered at the egress UNI and that they are identical to the corresponding ingress frames. Configure the UNI-N to "Filter" all packets with the Multicast MAC DA defined in the requirement description section. Tester offers Layer 2 Control protocol frames with multicast MAC DA defined in the requirement description section at the ingress UNI and verifies that they are not delivered at the egress UNI			
Units	Number of valid Service Frames	3		
Variables	Service Type			
Results	Pass or fail			
Remarks	"Filter" means the L2CP could be section 8.1	be either Peered or Di	iscarded depending on the service	e type. See MEF 6.1

12. Abstract Test Cases for UNI-C Type 2 Enhanced UNI Attributes

This section contains 6 Test Cases for UNI-C Type 2.

Section 12.1

Enhanced UNI Attributes Requirements contains a total of 6 Test Cases covering the UNI Type 2 Requirements R74, R78, R79 and R80.

12.1 UNI-C Type 2 Enhanced UNI Attributes

TEST CASE 4C: Mandatory MTU Size

	Abstract Test Suite for Enhanced UNI Attributes & L2CP
Test Name	Mandatory MTU Size
Test Definition ID	UNIC-R74 ¹
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12
Test Type	Conformance
Test Status	Mandatory
MEF Requirement Description	A UNI-C Type 2 MUST support an MTU size of 1522 Bytes as per [IEEE 802.3].
Test Object	Verify that a UNI-C Type 2 supports an MTU size of 1522 Bytes as per [IEEE 802.3].
Test Configuration	Tester and UNI-N emulator with proper PHY that match the UNI-C are exchanging Service Frames across the UNI-C
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator
CE-VLAN ID/EVC Map	Not specified
Bandwidth Profile	Not specified
Test Procedure	Tester offers 1522-Byte Service Frames, as specified in IEEE 802.3, to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are delivered across the UNI-C. Then in the opposite direction, UNI-N Emulator offers 1522-Byte Service Frames, as specified in IEEE 802.3, to the UNI-C and the tester verifies that the corresponding Service Frames are delivered across the UNI-C
Units	Number of valid Service Frames
Variables	None
Results	Pass or fail
Remarks	

TEST CASE 5C: Recommended MTU Size

Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	Recommended MTU Size	
Test Definition ID	UNIC-R74 ²	
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12	
Test Type	Conformance	
Test Status	Optional	
MEF Requirement Description	A UNI-C Type 2 SHOULD support an MTU size of 2000 Bytes as per [IEEE 802.3as].	
Test Object	Verify that a UNI-C Type 2 supports an MTU size of 2000 Bytes as per [IEEE 802.3as].	
Test Configuration	Tester and UNI-N emulator with proper PHY that match the UNI-C are exchanging Service Frames across the UNI-C	
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator	
CE-VLAN ID/EVC Map	Not specified	
Bandwidth Profile	Not specified	
Test Procedure	Tester offers 2000-Byte Service Frames, as specified in IEEE 802.3as, to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are delivered across the UNI-C. Then in the opposite direction, UNI-N Emulator offers 2000-Byte Service Frames, as specified in IEEE 802.3, to the UNI-C and the tester verifies that the corresponding Service Frames are delivered across the UNI-C	
Units	Number of valid Service Frames	
Variables	None	
Results	Pass or fail	
Remarks		

TEST CASE 6C: Optional MTU Size

Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	Optional MTU Size	
Test Definition ID	UNIC-R74 ³	
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12	
Test Type	Conformance	
Test Status	Optional	
MEF Requirement Description	A UNI-C Type 2 MAY support 9600-Byte jumbo frames.	
Test Object	Verify that a UNI-C Type 2 supports 9600-Byte jumbo frames.	
Test Configuration	Tester and UNI-N emulator with proper PHY that match the UNI-C are exchanging Service Frames across the UNI-C	
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator	
CE-VLAN ID/EVC Map	Not specified	
Bandwidth Profile	Not specified	
Test Procedure	Tester offers 9600-Byte jumbo Service Frames to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are delivered across the UNI-C. Then in the opposite direction, UNI-N Emulator offers 9600-Byte Service Frames to the UNI-C and the tester verifies that the corresponding Service Frames are delivered across the UNI-C	
Units	Number of valid Service Frames	
Variables	None	
Results	Pass or fail	
Remarks		

TEST CASE 12C: UNI-C Type 2 Physical Medium

Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	UNI-C Type 2 Ethernet Physical Medium	
Test Definition ID	UNIC-R78 ¹	
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12	
Test Type	Conformance	
Test Status	Mandatory	
MEF Requirement Description	A UNI-C Type 2 MUST support at least one of the PHYs listed in [IEEE 802.3], excluding 1000BASE-PX-D and 1000BASE-PX-U, since Link OAM is not supported on these PHYs.	
Test Object	Verify that a UNI-C Type 2 supports at least one of the PHYs listed in [IEEE 802.3], excluding 1000BASE-PX-D and 1000BASE-PX-U.	
Test Configuration	Tester and UNI-N emulator with proper PHYs that match the UNI-C and are one of the PHYs listed in [IEEE802.3] excluding 1000BASE-PX-D and 1000BASE-PX-U are exchanging Service Frames across the UNI-C	
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator	
CE-VLAN ID/EVC Map	Not specified	
Bandwidth Profile	Not specified	
Test Procedure	Tester offers Service Frames to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are delivered across the UNI-C. Then in the opposite direction, UNI-N Emulator offers Service Frames to the UNI-C and the tester verifies that the corresponding Service Frames are delivered across the UNI-C	
Units	Number of valid Service Frames	
Variables	UNIs interface speed	
Results	Pass or fail	
Remarks		

TEST CASE 13C: Auto-Negotiation Support

Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	Auto-Negotiation Support	
Test Definition ID	UNIC-R79	
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12	
Test Type	Conformance	
Test Status	Mandatory	
MEF Requirement Description	A UNI-C Type 2 MUST support auto-negotiation for 10/100 and 10/100/1000 UNI rates for the PHYs that support auto-negotiation.	
Test Object	Verify that a UNI-C Type 2 supports auto-negotiation for 10/100 and 10/100/1000 UNI rates for the PHYs that support auto-negotiation.	
Test Configuration	Tester and UNI-N emulator with proper PHY that match the UNI-C are exchanging Service Frames across the UNI-C	
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator	
CE-VLAN ID/EVC Map	Not specified	
Bandwidth Profile	Not specified	
Test Procedure	Enable auto-negotiation on the UNI-C under test and on the tester port. Set speed and mode of the tester to advertise 10 Mbps Full Duplex and verify that the UNI-C under tests automatically adjusts its speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are delivered across the UNI-C. In the opposite direction, UNI-N Emulator offers Service Frames to the UNI-C and the tester verifies that the corresponding Service Frames are delivered across the UNI-C. Set speed and mode of the tester to advertise 100 Mbps Full Duplex and repeat the test. If the UNI-C supports 10/100/1000, set speed and mode of the tester to advertise 1000 Mbps Full Duplex and repeat the test.	
Units	Number of valid Service Frames	
Variables	UNIs interface speed	
Results	Pass or fail	
Remarks		

TEST CASE 14C: Disabling the Auto-Negotiation Function

Abstract Test Suite for Enhanced UNI Attributes & L2CP		
Test Name	Disabling the Auto-Negotiation Function	
Test Definition ID	UNIC-R80	
Reference Document	MEF 20 UNI Type 2 Implementation Agreement Section 12	
Test Type	Conformance	
Test Status	Mandatory	
MEF Requirement	A UNI-C Type 2 MUST support the capability to disable the auto-negotiation function.	
Description	Note: The Auto-negotiation function may need to be disabled for unidirectional link operation	
Test Object	Verify that a UNI-C Type 2 supports the capability to disable the auto-negotiation function.	
Test Configuration	Tester and UNI-N emulator with proper PHY that match the UNI-C are exchanging Service Frames across the UNI-C	
Test Configuration Schematic	Tester UNI-C _A UNI-N _A Emulator	
CE-VLAN ID/EVC Map	Not specified	
Bandwidth Profile	Not specified	
Test Procedure	Disable auto-negotiation on the UNI-C under test and on the tester port. Force the speed and mode of the tester port to 10 Mbps Full Duplex and the UNI-C to 100 Mbps Half Dulpex** and verify that the UNI-C under test does not automatically adjust its speed and mode to 10 Mbps full Duplex. Then, tester offers Service Frames to the UNI-C and UNI-N Emulator verifies that the corresponding Service Frames are not delivered across the UNI-C. In the opposite direction, UNI-N Emulator offers Service Frames to the UNI-C and the tester verifies that the corresponding Service Frames are not delivered across the UNI-C.	
Units	Number of valid Service Frames	
Variables	UNIs interface speed	
Results	Pass or fail	
Remarks	** If 100 Mbps Half Duplex mode is not supported, use 100 Mbps Full Duplex mode	

13. References

References	Details
MEF 20	UNI Type 2 Implementation Agreement
MEF 10.1	Ethernet Services Attributes Phase 2
MEF 6.1	Ethernet Services Definition Phase 2
IEEE 802.3	IEEE, Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications
RFC 2119	RFC 2119, "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, http://www.ietf.org/rfc/rfc2119.txt (Normative)
RFC 2285	RFC 2285, "Benchmarking Terminology for LAN Switching Devices", R. Mandeville, http://www.ietf.org/rfc/rfc2285.txt
RFC 2544	RFC 2544, "Benchmarking Methodology for Network Interconnect Devices", S. Bradner, J. McQuaid, http://www.ietf.org/rfc/rfc2544.txt
RFC 2889	RFC 2889, "Benchmarking Methodology for LAN Switching Devices", R. Mandeville, J. Perser, http://www.ietf.org/rfc/rfc2889.txt