



Technical Specification MEF 19

Abstract Test Suite for UNI Type 1

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1. Abstract

This document defines test procedures based on the requirements for the User to Network Interface (UNI) Type 1 mode or manual configuration mode. The UNI Type 1 mode provides data-plane connectivity services without control-plane or management-plane capabilities.

2. Terminology

All to One Bundling A UNI attribute in which all CE-VLAN IDs are associated with a single EVC

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

Broadcast Service Frame A Service Frame that has the broadcast destination MAC address

Bundling A UNI attribute in which more than one CE-VLAN ID can be associated with

an EVC

CBS Committed Burst Size

CE Customer Edge

CE-VLAN CoS Customer Edge VLAN CoS
CE-VLAN ID Customer Edge VLAN ID

CE-VLAN ID Preservation An EVC attribute in which the CE-VLAN ID of an egress Service Frame is

identical in value to the CE-VLAN ID of the corresponding ingress Service

Frame

CE-VLAN ID/EVC Map

An association of CE-VLAN IDs with EVCs at a UNI

CE-VLAN Tag Customer Edge VLAN Tag

CF Coupling Flag

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

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

CM Color Mode

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

Color-aware A Bandwidth Profile property where a pre-determined level of Bandwidth

Profile compliance for each Service Frame is taken into account when

determining the level of compliance for each Service Frame



Color-blind A Bandwidth Profile property where a pre-determined level of Bandwidth

Profile compliance for each Service Frame, if present, is ignored when

determining the level of compliance for each Service Frame

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

between two modes of operations of the rate enforcement algorithm. It takes

a value of 0 or 1 only

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

Ethernet LAN Service An Ethernet Service Type distinguished by its use of a Multipoint-to-

Multipoint EVC

Ethernet Line Service An Ethernet Service Type distinguished by its use of a Point-to-Point EVC

Ethernet Virtual Connection An association of two or more UNIs that limits the exchange of Service

Frames to UNIs in the Ethernet Virtual Connection

EVC Ethernet Virtual Connection

Excess Burst Size EBS 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 EIR-conformant

Excess Information Rate EIR is a Bandwidth Profile parameter. It defines the average rate in bits/s of

ingress Service Frames up to which the network may deliver Service

Frames without any performance objectives

FD Frame Delay

FDV Frame Delay Variation

FLR Frame Loss Ratio

Frame Short for Ethernet frame



Frame Delay The time required to transmit a Service Frame from source to destination

across the metro Ethernet network

Frame Delay Performance A measure of the delays experienced by Service Frames belonging to the

same CoS instance

Frame Delay Variation The difference in delay of two Service Frames

Frame Delay Variation A measure of the variation in the delays experienced by Service Frames

belonging to the same CoS instance

Frame Loss Ratio

Performance

Performance

Frame Loss Ratio is a measure of the number of lost frames inside the

MEN. Frame Loss Ratio is expressed as a percentage

Ingress Service Frame A Service Frame sent from the CE into the Service Provider network

Layer 2 Control Protocol

Service Frame

A Service Frame that is used for Layer 2 control, e.g., Spanning Tree

Protocol

Layer 2 Control Protocol

Tunneling

The process by which a Layer 2 Control Protocol Service Frame is passed through the Service Provider network without being processed and is

delivered unchanged to the proper UNI(s)

Multicast Service Frame A Service Frame that has a multicast destination MAC address

Multipoint-to-Multipoint EVC An EVC with two or more UNIs. A Multipoint-to-Multipoint EVC with two

UNIs is different from a Point-to-Point EVC because one or more additional

UNIs can be added to it

Point-to-Point EVC An EVC with exactly 2 UNIs

Service Frame An Ethernet frame transmitted across the UNI toward the Service Provider

or an Ethernet frame transmitted across the UNI toward the Subscriber

Service Level Agreement The contract between the Subscriber and Service Provider specifying the

agreed to service level commitments and related business agreements

Service Level Specification The technical specification of the service level being offered by the Service

Provider to the Subscriber

Service Multiplexing A UNI service attribute in which the UNI can be in more than one EVC

instance

Service Provider The organization providing Ethernet Service(s)

SLA Service Level Agreement
SLS Service Level Specification

Subscriber The organization purchasing and/or using Ethernet Services

UNI User Network Interface

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

Unicast Service Frame A Service Frame that has a unicast destination MAC address



User Network Interface

The physical demarcation point between the responsibility of the Service Provider and the responsibility of the Subscriber

W_G

W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the egress UNI

W_Y

W_Y is the amount of traffic accepted as Yellow over the time interval T that may be delivered to the egress UNI



3. Scope

The **Abstract Test Suite for UNI Type 1** describes the test procedures based on the requirements for the User to Network Interface (UNI) Type 1 mode or manual configuration mode. Test Cases in this Test Specification are only defined for the UNI-N and each different physical interface MUST be tested independently.

The UNI Type 1 requirements are described in sections 5, 6.1 and 6.2 of MEF 13 *User Network Interface (UNI) Type 1 Implementation Agreement.*

Section 5 of MEF 13 defines the common characteristics of a UNI Type 1 such as the supported physical media and Ethernet frame formats.

Section 6.1 of MEF 13 defines the specific characteristics of a UNI Type 1.1 which is a subset of the UNI Type 1 and which is not meant to support service multiplexing.

Section 6.2 of MEF 13 defines the specific characteristics of a UNI Type 1.2 which is also a subset of the UNI Type 1 but which is meant to support service multiplexing.

UNI Type 2 mode (Service Management) and UNI Type 3 mode (Dynamic Connection Setup) are out of the scope of this document.

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", "SHOULD", "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 and MEF 14 Abstract Test Suite for Traffic Management Phase 1, by adding test procedures based on the requirements for the User to Network Interface (UNI) Type 1 mode (manual configuration) defined in MEF 13 User Network Interface (UNI) Type 1 implementation agreement.

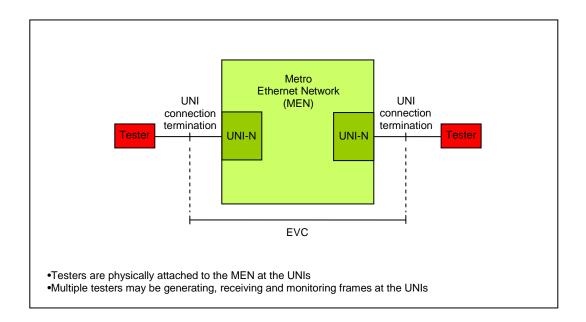
As with MEF 9 and MEF 14, vendors can refer to the requirements and test procedures defined in this specification in the development and commercial cycles of their products and carriers can use them to ensure that the network elements they deploy or add to their existing network will have the ability 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 on the Metro Ethernet Forum technical specification MEF 11 *User to Network Interface Requirements and Framework.*



6. Test Configuration

Although some Test Cases may require very specific test configurations, most Test Cases defined in this document are to be executed by attaching the Ethernet interface of a tester to the Ethernet User Network Interface (UNI).



Test Configuration for UNI Type 1

- In each Test Case, the Test Configuration section describes the number of EVCs associating the number of UNIs and the number of CE-VLAN IDs mapped to the EVCs
- Testers are attached to all UNIs in the configured EVCs
- CE-VLAN ID/EVC Maps are given for each Test Case
- Applicable Bandwidth Profile and Service Performance parameters are provided when necessary



7. Template for Abstract Test Cases for UNI Type 1

The following template is adopted for the definition of Abstract Test Cases for UNI Type 1:

	ABSTRACT TEST SUITE FOR UNI TYPE 1							
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: 'one to three letter abbreviated source document name'. 'section number' - 'specific requirement number in the section from which requirement is derived'. This number always figures as the last number of an ID. UNI Type 1 = U1; Ethernet Services Definitions = S; etc. Example: U1.5.1-1							
Reference Document	Reference document (and section and paragraph when useful for clarity)							
Test Type	Functional, Conformance, Interoperability or Performance							
Test Status	Mandatory, Optional							
Requirement Description	Brief description of the service requirement that MUST or SHOULD be satisfied							
Test Object	Succinct description of test purpose							
Test Configuration	Succinct description of test bed configuration							
CE-VLAN ID/EVC Map	A sample CE-VLAN ID/EVC Map is suggested. Variables augment it. INGRESS UNI 'A'							
Bandwidth Profile	A sample Bandwidth Profile table is suggested. Variables augment it.							
Service Performance	A sample EVC Performance Objectives table is suggested. Variables augment it. CoS							
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. For the most part units used are defined in RFCs 2285, 2544, 2889							
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 effect the test result							



8. Abstract Test Cases for UNI Type 1 Common Characteristics

In this section we assume familiarity with MEF 13 *User Network Interface (UNI) Type 1 Implementation Agreement* and, in particular, its section 5 which defines the common characteristics of the UNI Type 1.

Three Abstract Test Cases based on the common characteristics of the UNI Type 1 are defined in this section.

Abstract Test Cases for UNI-N Type 1 Common Characteristics

Test Case 1: Type 1 UNI-N Ethernet Physical Medium

Test Case 2: Type 1 UNI-N Ethernet Frame Format - Tagged, Untagged and Priority Tagged

Test Case 3: Type 1 UNI-N Minimum and Maximum Ethernet Frame Size



TEST CASE 1: Type 1 UNI-N Ethernet Physical Medium

	ABSTRACT TEST SUITE FOR UNI TYPE 1								
Test Name	Type 1 UN	Type 1 UNI-N Ethernet Physical Medium							
Test Definition ID	U1.5.1-2								
Reference Document	MEF 13 [U:	ser Network Interface (U	INI) Type 1 Imple	mentation A	.greement]				
Test Type	Conforman	ce							
Test Status	Mandatory								
Requirement Description	· 10B/ · 1006 · 1006 · 10G	1000BASE-X including 1000BASE-SX, 1000BASE-LX, and 1000BASE-T in Full-duplex mode							
Test Object	Verify that a Type 1 UNI-N supports at least one of the IEEE 802.3 Ethernet PHYs listed in the requirement description section above								
Test Configuration	One EVC associating two Type 1 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC								
		UNI 'A'				3']		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC			
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁			
Мар	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1								
		The CE-VLAN ID for u both UNIs	intagged and prio	ity tagged S	Service Frames is confi	gured to 11 at			
			PEF	RINGRESS	UNI				
		UNI		E	Bandwidth Profile Parameters				
Bandwidth Profile		UNI			CIR CBS EIR	EBS			
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR s Note 3: (EIR = 0) and	≤ Egress UNI Spe		aximum Service Frame	size)			
Service Performance	Not Specifi	ed							
Test Procedure		rs Service Frames bidire ames are successfully de				ifies that the corres	sponding		
Units	Number of	valid Service Frames							
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed					
Results	Pass or fail								
Remarks									



TEST CASE 2: Type 1 UNI-N Ethernet Frame Format - Tagged, Untagged and Priority Tagged

		ABSTRAC	CT TEST SUITE	FOR UN	TYPE 1				
Test Name	Type 1 UNI	Type 1 UNI-N Ethernet Frame Format - Tagged, Untagged and Priority Tagged							
Test Definition ID	U1.5.2-4								
Reference Document	MEF 13 [Us	ser Network Interface (U	NI) Type 1 Impler	nentation A	(greement				
Test Type	Conforman	ce							
Test Status	Mandatory								
Requirement Description		A Type 1 UNI-N MUST support the transmission and reception of untagged, VLAN-tagged and priority-tagged Ethernet frames according to IEEE 802.3-2002							
Test Object	Ethernet fra	Verify that a Type 1 UNI-N supports the transmission and reception of untagged, VLAN-tagged and priority-tagge Ethernet frames according to IEEE 802.3-2002							
Test Configuration	Ingress UN	One EVC associating two Type 1 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. A per ngress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached both UNIs in the configured EVC							
		I IN II CA				11511 (1	n;		
		UNI 'A'				UNI 'I	1		
		CE-VLAN ID	EVC		CE-VLAN	ID	EVC		
CE-VLAN ID/EVC		11*	EVC₁		11*		EVC ₁		
Мар		Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs							
	conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at								
	,	both UNIs	ntagged and prior	ity tagged .	Service Frames	is conii	gured to 11 at		
			PE	INGRESS	HINI				
		UNI			Bandwidth Profile Parameters				
Bandwidth Profile		UNI			CIR CBS	EIR	EBS		
		Note 1: (0 < CIR < Inc	ress UNI Speed)	(CBS ≥ m					
		Note 2: (Ingress CIR ≤	Egress UNI Spe				-,		
		Note 3: (EIR = 0) and	(EB2 = 0)						
Service Performance	Not Specific	ed							
Test Procedure	and verifies	rs tagged, untagged and s that the corresponding ames must be the one co	Service Frames a	re received	d at the associat	lly at ea ted UNI.	ch UNI configured i The VLAN ID of the	n the EVC he tagged	
Units	Number of	valid Service Frames							
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed					
Results	Pass or fail								
Remarks									



TEST CASE 3: Type 1 UNI-N Minimum and Maximum Ethernet Frame Size

		ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1				
Test Name	Type 1 UN	Type 1 UNI-N Minimum and Maximum Ethernet Frame Size							
Test Definition ID	U1.5.2-6								
Reference Document	MEF 13 [U	ser Network Interface (U	NI) Type 1 Impler	nentation A	greement]				
Test Type	Conforman	ce							
Test Status	Mandatory	Mandatory							
Requirement Description		A Type 1 UNI-N MUST support the transmission and reception of minimum and maximum size Ethernet frames as specified in IEEE 802.3-2002							
Test Object	as specifie	Verify that a Type 1 UNI-N supports the transmission and reception of minimum and maximum size Ethernet frames as specified in IEEE 802.3-2002							
Test Configuration	Ingress UN	One EVC associating two Type 1 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC							
		11011 (41				11111 (5		1	
		UNI 'A'				UNI 'B			
		CE-VLAN ID	EVC		CE-VLAN	ID	EVC		
CE-VLAN ID/EVC		11*	EVC₁		11*		EVC₁		
Мар		Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs							
	conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at								
		both UNIs	ntagged and prior	ty tagged s	service Frames	is config	gured to 11 at		
	PER INGRESS UNI								
		UNI				Bandwidth Profile Parameters			
Bandwidth Profile		UNI			CIR CBS EIR EBS				
		Note 1: (0 < CIR < Ing			aximum Service	Frame	size)		
		Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and (∌d)					
Service Performance	Not Specifi	ed							
Test Procedure		rs minimum and maximu ured in the EVC and verit							
Units	Number of	valid Service Frames							
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interfa	ace speed					
Results	Pass or fail								
Remarks									



9. Abstract Test Cases for UNI Type 1.1 Specific Characteristics

In this section we assume familiarity with MEF 13 *User Network Interface (UNI) Type 1 Implementation Agreement* and, in particular, its section 6.1 which defines the specific characteristics of the UNI Type 1.1.

Fourteen Abstract Test Cases based on the specific characteristics of the UNI Type 1.1 are defined in this section.

Abstract Test Cases for UNI-N Type 1.1 Specific Characteristics

Test Case 4: Type 1.1 UNI-N CE-VLAN ID - Single EVC

Test Case 5: Type 1.1 UNI-N Configurable CE-VLAN ID/EVC Map - No CE-VLAN ID

Test Case 6: Type 1.1 UNI-N Bandwidth Profile per Ingress UNI

Test Case 7: Type 1.1 UNI-N Bandwidth Profile Rate Enforcement when CIR > 0 and EIR = 0

Test Case 8: Type 1.1 UNI-N Mandatory CIR Configuration Granularity

Test Case 9: Type 1.1 UNI-N Optional CIR Configuration Granularity

Test Case 10: Type 1.1 UNI-N CBS Configuration

Test Case 11: Type 1.1 UNI-N Mandatory Layer 2 Control Protocol Processing

Test Case 12: Type 1.1 UNI-N Optional Layer 2 Control Protocol Processing

Test Case 13: Type 1.1 UNI-N Optional Layer 2 Control Protocol Discard

Test Case 14: Type 1.1 UNI-N Point-to-Point EVC

Test Case 15: Type 1.1 UNI-N CE-VLAN ID Preservation

Test Case 16: Type 1.1 UNI-N CE-VLAN CoS Preservation

Test Case 17: Type 1.1 UNI-N Service Frame Unconditional Delivery



TEST CASE 4: Type 1.1 UNI-N CE-VLAN ID - Single EVC

ABSTRACT TEST SUITE FOR UNI TYPE 1								
Test Name	Type 1.1 U	NI-N CE-VLAN ID - Sinç	gle EVC					
Test Definition ID	U1.6.1.1-7,	U1.6.1.1-7, 8						
Reference Document	MEF 13 [Us	ser Network Interface (U	INI) Type 1 Imple	mentation A	greement]			
Test Type	Conforman	ce						
Test Status	Mandatory							
Requirement Description	A Type 1.1	A Type 1.1 UNI-N MUST be able to support a single EVC and to accept any CE-VLAN ID received from the UNI-C						
Test Object	Verify that a Type 1.1 UNI-N can support a single EVC and accept any CE-VLAN ID received from the UNI-C							
Test Configuration	EVC. A pe	One EVC associating at least two Type 1.1 UNIs is configured and all possible CE-VLAN IDs are mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to all UNIs in the configured EVC						
	UNI 'A'				UNI 'E	B'	1	
		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC Map		All possible values allowed at the UNI-C	EVC ₁		All possible values allowed at the UNI-C	EVC ₁		
			PEF	RINGRESS	UNI]	
		UNI		E				
Bandwidth Profile		UNI		CIR CBS EIR EBS				
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR s Note 3: (EIR = 0) and	≤ Egress UNI Spe	, (CBS ≥ ma ed)	aximum Service Frame	size)		
Service Performance	Not Specific	ed						
Test Procedure	Service Fra	rs tagged Service Frame ames bidirectionally at ea e delivered at the associa	ach UNI configure	= 1,, 409 ed in the EV	95, untagged Service Fr C and verifies that the o	rames and priority corresponding Ser	tagged vice	
Units	Number of	valid Service Frames						
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed				
Results	Pass or fail							
Remarks								



TEST CASE 5: Type 1.1 UNI-N Configurable CE-VLAN ID/EVC Map - No CE-VLAN ID

	ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.1 U	Type 1.1 UNI-N Configurable CE-VLAN ID/EVC Map - No CE-VLAN IDs						
Test Definition ID	U1.6.1.2-9							
Reference Document	MEF 13 [Us	ser Network Interface (L	JNI) Type 1 Imple	mentation A	greement]			
Test Type	Conforman	ce						
Test Status	Mandatory	Mandatory						
Requirement Description		A Type 1.1 UNI-N MUST be configurable to map no CE-VLAN ID to an EVC. (Temporary disconnection without earing down the EVC)						
Test Object	-	/erify that a Type 1.1 UNI-N can be configured to map no CE-VLAN ID to an EVC						
Test Configuration	UNI bandw	One EVC associating two Type 1.1 UNIs is configured and no CE-VLAN ID is mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC						
OF VI AN ID/EVO		UNI 'A'			UNI 'B'			
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
·		None	EVC ₁		None	EVC ₁	<u></u>	
	PER INGRESS UNI							
		UNI			Bandwidth Profile Para			
Bandwidth Profile		UNI		_	CIR CBS EIR			
		Note 1: (0 < CIR < Inc Note 2: (Ingress CIR : Note 3: (EIR = 0) and	≤ Egress UNI Spe	, (CBS ≥ ma ed)	aximum Service Frame	size)		
Service Performance	Not Specific	ed						
Test Procedure	Service Fra	rs tagged Service Frame ames bidirectionally at e e not delivered at the as	ach UNI configure					
Units	Number of	valid Service Frames						
Variables	Bandwidth	Profile Parameters CIR	CBS, UNIs interf	ace speed				
Results	Pass or fail							
Remarks								



TEST CASE 6: Type 1.1 UNI-N Bandwidth Profile per Ingress UNI

		ADOTDA	OT TEST SUITE	FOR UNI	TVDE 4			
		ABSTRA	CT TEST SUITE	FUR UNI	TTPE 1			
Test Name	Type 1.1 U	Type 1.1 UNI-N Bandwidth Profile per Ingress UNI						
Test Definition ID	U1.6.1.3-10							
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]						
Test Type	Conforman	Conformance						
Test Status	Mandatory	Mandatory						
Requirement Description	A Type 1.1	A Type 1.1 UNI-N MUST be able to support a per Ingress UNI bandwidth profile based on MEF 10						
Test Object	Verify that a	Verify that a Type 1.1 UNI-N can support a per Ingress UNI bandwidth profile based on MEF 10						
Test Configuration	Ingress UN	associating two Type 1.1 Il bandwidth profile is ap both UNIs in the config	plied at the ingres					
		INGRESS L	INI 'Δ'		EGRESS U	INI 'B'		
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
Мар		All possible values	EVC ₁		All possible values	EVC ₁		
	•							
			PER	INGRESS	UNI			
		UNI			Bandwidth Profile Parameters			
Bandwidth Profile		UNI _A			IR _A CBS _A EIR _A	EBS _A		
		Note 1: $(0 < CIR_A < IR)$ Note 2: $(Ingress CIR_A = 0)$ and	≤ Egress UNI Spe		maximum Service Fram	ie siże)		
Service								
Performance	Not Specific	ed						
Test Procedure	Tester offers tagged Service Frames with VLAN IDs = 1,4095, untagged Service Frames and priority tagged Service Frames of length λ into the configured EVC at the ingress UNI and verifies that over a time interval T at least one Service Frame of each CE-VLAN ID is delivered at the associated egress UNI. Service Frames are offered at equal average rates into the configured EVC, at an aggregate average rate greater than CIR _A . Tester also verifies that the amount of traffic delivered at the egress UNI falls within the range $X \le W_G \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the							
	. <i>v</i>	$W_{ m G}$ is the amount of traff	fic accepted as Gr	een over th	e time interval T that sh		to the	
	. <i>V</i>		·				to the	
Units	· // e · //	$W_{ m G}$ is the amount of traff	·				to the	
Units Variables	· V e · X Number of Bandwidth	W_G is the amount of traffegress UNI. $G_A = (CIR_A * T + CBS_A - I)$	F) and $Z_A = (CIR_A)$ A, CBS _A , UNIs inte	*T+CBS _A	+ F)	ould be delivered t		
	· V e · X Number of Bandwidth	W_G is the amount of traffegress UNI. $X_A = (CIR_A*T + CBS_A - I)$ valid Service Frames Profile Parameters CIR the offered Service Frame	F) and $Z_A = (CIR_A)$ A, CBS _A , UNIs inte	*T+CBS _A	+ F)	ould be delivered t		



TEST CASE 7: Type 1.1 UNI-N BW Profile Rate Enforcement when CIR > 0 and EIR = 0

	ABSTRACT TEST SUITE FOR UNI TYPE 1								
Test Name	Type 1.1 U	NI-N Bandwidth Profile I	Rate Enforcement	when CIR	> 0 and EIR = 0				
Test Definition ID	U1.6.1.3-12	U1.6.1.3-12							
Reference Document	MEF 13 [Us	ser Network Interface (U	INI) Type 1 Impler	nentation A	greement]				
Test Type	Conforman	ce							
Test Status	Mandatory	Mandatory							
Requirement Description	A Type 1.1 non-zero	Type 1.1 UNI-N MUST be able to support color-blind bandwidth profile where EIR=EBS=0 and CIR and CBS are on-zero							
Test Object	zero	/erify that a Type 1.1 UNI-N can support color-blind bandwidth profile where EIR=EBS=0 and CIR and CBS are non- tero							
Test Configuration	Bandwidth	One EVC associating two Type 1.1 UNIs is configured and all possible CE-VLAN IDs are mapped to the EVC. One Bandwidth Profile where EIR=EBS=0 and CIR and CBS are non-zero is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC							
		INGRESS U	NI 'A'		EGRESS UNI 'B']		
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC			
		All possible values	EVC ₁		All possible values	EVC ₁			
	PER INGRESS UNI								
Bandwidth Profile		UNI			Bandwidth Profile Para				
bandwidth Proffle		- //	arasa LINII Casad		CIR _A CBS _A EIR _A maximum Service Fram	EBS _A			
		Note 2: (Ingress $CIR_A < II$ Note 3: (EIR _A = 0) and	≤ Egress UNI Sp		maximum Service Fram	ie siże)			
Service Performance	Not Specific	ed							
	interval T a	rs Service Frames of len nd measures the numbe ered at the associated e	er of Service Fram	es delivere	d at the associated egre	ess UNI. The amo			
Test Procedure	UNI.	the amount of traffic acc $CIR_A*T + CBS_A - F$) and			e interval <i>T</i> that should	be delivered to the	e egress		
Units	Number of	valid Service Frames							
	5 1 1 11	Number of valid Service Frames Bandwidth Profile Parameters CIRA, CBSA, UNIs interface speed, time interval <i>T</i> , tolerated variance F, number and							
Variables		andwidth Profile Parameters CIR_A , CBS_A , UNIs interface speed, time interval T , tolerated variance F , number and ingth λ of the offered Service Frames							
Variables Results		the offered Service Fran				200 Vananoo 1 , 11			



TEST CASE 8: Type 1.1 UNI-N Mandatory CIR Configuration Granularity

		ABSTRAG	CT TEST SUITE	FOR UNI	TYPE 1			
Test Name	Type 1.1 UI	NI-N Mandatory CIR Co	onfiguration Granu	larity				
Test Definition ID	U1.6.1.3-13							
Reference Document	MEF 13 [Us	ser Network Interface (L	JNI) Type 1 Impler	mentation A	greement]			
Test Type	Conforman	ce						
Test Status	Mandatory							
Requirement Description	A Type 1.1 UNI-N MUST allow configuration to modify CIR in the following granularities 1 Mbps steps up to 10 Mbps [CIR range 1] 5 Mbps steps beyond 10 Mbps and up to 100 Mbps [CIR range 2] 50 Mbps steps beyond 100 Mbps and up to 1 Gbps [CIR range 3] 500 Mbps steps beyond 1 Gbps [CIR range 4]							
	Verify that a Type 1.1 UNI-N allows configuration to modify CIR in the granularities described in the requirement description section above						requirement	
Configuration	One EVC associating two Type 1.1 UNIs is configured. All possible CE-VLAN IDs are mapped to the EVC and one Bandwidth Profile is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC							
	INGRESS UNI 'A' EGRESS UN				JNI 'B']		
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
Мар	:	All possible values	EVC ₁		All possible values	EVC ₁		
	PER INGRESS UNI							
		UNI			Bandwidth Profile Para			
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	EBS _A	=	
	Note 1: $(0 < CIR_A < Ingress UNI Speed)$, $(CBS_A \ge maximum Service Frame size)$ Note 2: $(Ingress CIR_A \le Egress UNI Speed)$ Note 3: $(EIR_A = 0)$ and $(EBS_A = 0)$							
Service Performance	Not Specifie	ed						
	interval T a		er of Service Fram	es delivere	ter than CIR_A to the ing d at the associated egre $W_G \le Z$ where:			
Test Procedure	UNI.	the amount of traffic acc $CIR_A*T+CBS_A-F$) and			e interval <i>T</i> that should	be delivered to the	e egress	
	CIR range.				and increment CIR_A by ented to the UNI speed		ined for the	
	Number of	valid Service Frames						
Units		Jumber of valid Service Frames Bandwidth Profile Parameters CIR _A , CBS _A , UNIs interface speed, time interval <i>T</i> , tolerated variance F, number and						
Variables		Profile Parameters CIR, the offered Service Fran		erface speed	d, time interval <i>T</i> , tolera	ted variance F, nu	mber and	
Variables		the offered Service Fran		erface speed	d, time interval <i>T</i> , tolera	ted variance F, nu	mber and	



TEST CASE 9: Type 1.1 UNI-N Optional CIR Configuration Granularity

ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.1 UNI-N Optional CIR Configuration Granularity						
100120111111111111	U1.6.1.3-14						
Reference Document	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]						
Test Type	Conformano	ce					
Test Status	Optional						
Requirement Description	A Type 1.1 UNI-N SHOULD allow configuration to modify CIR in the following granularities: 64 Kbps (DS0 rate) steps up to 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) [CIR range 1] 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) steps up to 50 Mbps [CIR range 2] 43.008 Mbps (VC3 rate) steps beyond 50 Mbps and up to 150 Mbps [CIR range 3] 133.12 Mbps (VC4 rate) steps beyond 150 Mbps [CIR range 4]						
	Verify that a Type 1.1 UNI-N allows configuration to modify CIR in the granularities described in the requireme description section above					equirement	
Configuration	One EVC associating two Type 1.1 UNIs is configured. All possible CE-VLAN IDs are mapped to the EVC and one Bandwidth Profile is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC						
	INGRESS UNI 'A'			EGRESS L	INI 'R'	1	
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
Мар		All possible values	EVC ₁		All possible values	EVC ₁	
		All possible values	2001		All possible values	LVO1	
	PER INGRESS UNI						
		UNI		Bandwidth Profile Parameters			
Bandwidth Profile		UNIA		С	IR _A CBS _A EIR _A	EBS _A	
		Note 1: $(0 < CIR_A < Ir$ Note 2: $(Ingress CIR_A$ Note 3: $(EIR_A = 0)$ and	≤ Egress UNI Spe), (CBS _A ≥ ı eed)	maximum Service Fram	ne size)	
Service Performance	Not Specifie	ed					
	interval T ar	rs Service Frames of lend measures the numbered at the egress UNI r	er of Service Fram	es delivere	d at the associated egre		
Test Procedure	traffic delivered at the egress UNI must fall within the range $X \le W_G \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should UNI. • $X_A = (CIR_A * T + CBS_A - F)$ and $Z_A = (CIR_A * T + CBS_A + F)$					be delivered to the	e egress
	$X_A = 0$	$CIR_A*T + CBS_A - F)$ and	$dZ_A = (CIR_A * T + 0)$	CBS _A + F)			
	Begin the te	est with CIR _A set to the I	minimum value (i.e	e. 64 Kbps)			fined for
	Begin the te the CIR ran Repeat the	est with CIR_A set to the ige.	minimum value (i.e	e. 64 Kbps)			fined for
Units	Begin the te the CIR ran Repeat the Number of v	est with CIR _A set to the rige. test for each CIR _A value	minimum value (i.e until CIR _A has b	e. 64 Kbps)	ented to the UNI speed		
Units Variables	Begin the te the CIR ran Repeat the Number of v	est with CIR _A set to the rige. test for each CIR _A value valid Service Frames Profile Parameters CIR, the offered Service France	minimum value (i.e until CIR _A has b	e. 64 Kbps)	ented to the UNI speed		



TEST CASE 10: Type 1.1 UNI-N CBS Configuration

		ABSTRAG	CT TEST SUITE	FOR UNI	TYPE 1						
Test Name	Type 1.1 U	NI-N CBS Configuration									
Test Definition ID	U1.6.1.3-15										
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]									
Test Type	Conforman	ce									
Test Status	Mandatory										
Requirement Description		UNI-N MUST be able to tes = 12176 bytes	at least support (CBS values	that are equal to or gre	eater than 8 x MTU	J =				
Test Object		a Type 1.1 UNI-N can a rtes = 12176 bytes	least support CB	S values th	at are equal to or greate	er than 8 x MTU =					
Test Configuration	Bandwidth	ssociating two Type 1.1 Profile is applied at the n the configured EVC									
		INGRESS U	NI 'A'		EGRESS L	JNI 'B'	1				
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC					
Мар		All possible values	EVC ₁		All possible values	EVC ₁					
			PER	INGRESS	UNI		1				
		UNI		E	Bandwidth Profile Para						
Bandwidth Profile		UNIA		С	IR _A CBS _A EIR _A	EBS _A	_				
		Note 1: (0 < CIR _A < Ir Note 2: (Ingress CIR _A Note 3: (EIR _A = 0) and	≤ Egress UNI Spe		12176 bytes)						
Service Performance	Not Specifie	ed									
Test Procedure	At time T/2 Service Fra fall within the W _G is	Tester offers Service Frames of length λ at an average rate equal to CIR_A to the ingress UNI during a time interval T . At time $T/2$ tester injects a burst of ingress Service Frames greater than CBS_A . Tester measures the number of Service Frames delivered at the associated egress UNIs. The amount of traffic delivered at each egress UNI must fall within the range $X \le W_G \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the egress UNI • $X_A = (CIR_A*T + CBS_A - F)$ and $Z_A = (CIR_A*T + CBS_A + F)$									
Units	Number of	valid Service Frames									
Variables		Profile Parameters CIR, the offered Service Fran		rface speed	d, time interval T , tolera	ted variance F, nu	ımber and				
Results	Pass, fail										
Remarks											



TEST CASE 11: Type 1.1 UNI-N Mandatory Layer 2 Control Protocol Processing

		ABSTRAC	CT TEST SUITE	FOR UN	I TYPE 1				
Test Name	Type 1.1 U	NI-N Mandatory Layer 2	Control Protocol	Processing	3				
Test Definition ID	U1.6.1.4-16	3							
Reference Document	MEF 13 [Us	ser Network Interface (L	INI) Type 1 Imple	mentation A	Agreement]				
Test Type	Conforman	ce							
Test Status	Mandatory								
Requirement Description	A Type 1.1	A Type 1.1 UNI-N MUST be able to pass the following L2 Control Protocols to the EVC: Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP) All LANs Bridge Management Group Block of Protocol Generic Attribute Registration Protocol (GARP)							
Test Object	Verify that above to th	a Type 1.1 UNI-N can e EVC	pass each L2 Co	ontrol Proto	ocol described in the re	quirement descrip	tion section		
Test Configuration	per Ingress	ssociating two Type 1.1 UNI bandwidth profile i both UNIs in the config	s applied at the U						
		INGRESS U	NI 'A'		EGRESS U	JNI 'B']		
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC	=		
Мар		All possible values	EVC ₁		All possible values	EVC ₁			
							<u> </u>		
		UNI	PER	INGRESS					
Bandwidth Profile		UNIA			Bandwidth Profile Para CIR _A CBS _A EIR _A	EBS _A			
			≤ Egress UNI Sp), (CBS _A ≥	maximum Service Fran				
Service Performance	Not Specific	<u> </u>	2 (120)						
Test Procedure	Tester offers Service Frames carrying Layer 2 Control protocols described in the requirement description section above at the ingress UNI and verifies that the corresponding Service Frames are delivered at the associated egress UNI. The L2CPs Destination Address and Ethertype/Length fields must be defined as per the IEEE standards								
Units	Number of	valid Service Frames ca	rrying the L2CPs						
Variables	L2CP, Band	dwidth Profile Paramete	rs CIR _{A,} CBS _A , U	NIs interfac	ce speed				
Results	Pass or fail								
Remarks									



TEST CASE 12: Type 1.1 UNI-N Optional Layer 2 Control Protocol Processing

		ABSTRA	CT TEST SUITE	FOR UNI	TYPE 1						
Test Name	Type 1.1 U	NI-N Optional Layer 2 C	Control Protocol Pr	ocessing							
Test Definition ID	U1.6.1.4-17	J1.6.1.4-17									
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]									
Test Type	Conforman	се									
Test Status	Optional										
Requirement Description	A Type 1.1	Type 1.1 UNI-N SHOULD be able to pass the following L2 Control Protocols to the EVC: Link Aggregation Control Protocol (LACP) Marker Protocol Authentication (802.1x)									
Test Object	Verify that above to th	a Type 1.1 UNI-N can e EVC	pass each L2 Co	ntrol Protoc	cols described in the re	quirement descript	tion section				
Test Configuration	Ingress UN	One EVC associating two Type 1.1 UNIs is configured and all possible CE-VLAN IDs are mapped to the EVC. A per Ingress UNI bandwidth profile is applied at the UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC									
CE-VLAN ID/EVC		INGRESS UNI 'A' EGRESS UNI 'B'									
Мар		CE-VLAN ID All possible values	EVC ₁		CE-VLAN ID All possible values	EVC ₁					
			<u> </u>				l				
			PEF	RINGRESS							
Bandwidth Profile		UNI UNI A			Bandwidth Profile Para						
Bandwidth Frome			ngress UNI Speed ≤ Egress UNI Sp), (CBS _A ≥ i	E <mark>IR_A CBS_A EIR_A</mark> maximum Service Fran	EBS _A ne size)					
Service Performance	Not Specific	ed									
Test Procedure	above at th	rs Service Frames carry e ingress UNI and verifi 2CPs Destination Addr	es that the corres	oonding Sei	rvice Frames are delive	red at the associat	ed egress				
Units	Number of	valid Service Frames ca	arrying the L2CPs								
Variables	L2CP, Band	dwidth Profile Paramete	ers CIR _{A,} CBS _A , U	NIs interfac	e speed						
Results	Pass or fail										
Remarks											



TEST CASE 13: Type 1.1 UNI-N Optional Layer 2 Control Protocol Discard

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1						
Test Name	Type 1.1 UI	pe 1.1 UNI-N Optional Layer 2 Control Protocol Discard									
Test Definition ID	U1.6.1.4-18	J1.6.1.4-18									
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]									
Test Type	Conforman	ce									
Test Status	Optional										
Requirement Description	A Type 1.1	UNI-N SHOULD be abl	e to discard 802.3	3x PAUSE fi	rames						
Test Object	Verify that a	a Type 1.1 UNI-N can di	scard 802.3x PAI	JSE frames							
Test Configuration	Ingress UN	ssociating two Type 1.1 I bandwidth profile is ap n the configured EVC									
		INGRESS U	NI 'A'		EGRESS U	JNI 'B'					
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC					
Мар		All possible values	EVC ₁		All possible values	EVC ₁					
			PEF	RINGRESS	UNI						
		UNI		E	Bandwidth Profile Para	ameters					
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	EBS _A					
		Note 1: $(0 < CIR_A < In$ Note 2: $(Ingress CIR_A$ Note 3: $(EIR_A = 0)$ and	≤ Egress UNI Sp), (CBS _A ≥ l eed)	maximum Service Fram	ne size)					
Service Performance	Not Specifie	ed									
Test Procedure	Tester offer egress UNI standards	s 802.3x PAUSE frames The L2CPs Destination	s at the ingress U on Address and E	NI and verif thertype/Lei	ies that they are not dength fields must be define	livered at the asso ned as per the IEE	ciated E				
Units	Number of	valid Service Frames ca	rrying the L2CPs								
Variables	Bandwidth	Profile Parameters CIR	A, CBSA, UNIs into	erface spee	d						
Results	Pass or fail										
Remarks											



TEST CASE 14: Type 1.1 UNI-N Point-to-Point EVC

		ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1						
Test Name	Type 1.1 UI	pe 1.1 UNI-N Point-to-Point EVC									
Test Definition ID	U1.6.1.5-19	J1.6.1.5-19									
Reference Document	MEF 13 [Us	ser Network Interface (U	NI) Type 1 Imple	mentation A	greement]						
Test Type	Conforman	ce									
Test Status	Mandatory										
Requirement Description	A Type 1.1	UNI-N MUST be able to	support point-to-	point EVC							
Test Object	Verify that a	a Type 1.1 UNI-N can su	ipport point-to-po	int EVC							
Test Configuration	the EVC. A	o-point EVC associating oper Ingress UNI bandw ached to both UNIs in th	idth profile is app	lied at both							
		UNI 'A'			UNI 'E	3'	1				
CE-VLAN ID/EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC					
Мар		All possible values	EVC ₁		All possible values	EVC ₁					
			PEF	RINGRESS	UNI]				
		UNI		Е	Bandwidth Profile Para	ameters					
Bandwidth Profile		UNI			CIR CBS EIR	EBS					
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR < Note 3: (EIR = 0) and	Egress UNI Spe	, (CBS ≥ ma ed)	aximum Service Frame	size)					
Service Performance	Not Specifie	ed									
Test Procedure		s Service Frames bidire mes are delivered at the		UNI configu	red in the EVC and veri	ifies that the corres	sponding				
Units	Number of	valid Service Frames									
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed							
Results	Pass or fail										
Remarks											



TEST CASE 15: Type 1.1 UNI-N CE-VLAN ID Preservation

		ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1					
Test Name	Type 1.1 U	NI-N CE-VLAN ID Prese	rvation							
Test Definition ID	U1.6.1.6-20	J1.6.1.6-20								
Reference Document	MEF 13 [Us	ser Network Interface (U	NI) Type 1 Impler	nentation A	greement]					
Test Type	Conforman	ce								
Test Status	Mandatory									
Requirement Description	A Type 1.1	UNI-N MUST be able to	support CE-VLA	N ID preser	vation					
Test Object	Verify that a	a Type 1.1 UNI-N can su	ipport CE-VLAN I	O preservat	tion					
Test Configuration	Ingress UN	ssociating two Type 1.1 I bandwidth profile is app s in the configured EVC								
OF W AN ID/EVO		UNI 'A'			UNI 'E	3,	1			
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC				
		All possible values	EVC ₁		All possible values	EVC ₁	•			
	-						= 			
			PER	INGRESS	-					
Bandwidth Profile		UNI		E	Bandwidth Profile Para					
Bandwidth Frome		UNI		(0.0.0.i	CIR CBS EIR	EBS				
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and	Egress UNI Spec		aximum Service Frame	size)				
Service Performance	Not Specific	ed								
Test Procedure	Service Fra	rs tagged Service Frame imes bidirectionally at ea delivered at the associa	ch UNI configure	d in the EV	C and verifies that the c					
Units	Number of	Number of valid Service Frames								
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interfa	ace speed						
Results	Pass or fail									
Remarks										



TEST CASE 16: Type 1.1 UNI-N CE-VLAN CoS Preservation

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1					
Test Name	Type 1.1 UI	Гуре 1.1 UNI-N CE-VLAN CoS Preservation								
Test Definition ID	U1.6.1.7-21									
Reference Document	MEF 13 [Us	ser Network Interface (U	NI) Type 1 Imple	mentation A	greement]					
Test Type	Conforman	ce								
Test Status	Mandatory									
Requirement Description	A Type 1.1	UNI-N MUST be able to	support CE-VLA	N CoS pres	ervation					
Test Object	Verify that a	a Type 1.1 UNI-N can su	upport CE-VLAN	CoS preserv	vation					
Test Configuration	Ingress UN	ssociating two Type 1.1 I bandwidth profile is ap s in the configured EVC	plied at both UNI:							
		UNI 'A	,		UNI 'E	3'				
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC	•			
Wap		All possible values	EVC ₁		All possible values	EVC ₁				
			PEF	RINGRESS	UNI					
		UNI		E	Bandwidth Profile Para	ameters				
Bandwidth Profile		UNI			CIR CBS EIR	EBS				
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and	Egress UNI Spe		aximum Service Frame	size)				
Service Performance	Not Specifie	ed								
Test Procedure	Tester offer and verifies preservation	rs tagged Service Frame that the corresponding n	es with all possible Service Frames a	e CoS value are delivered	es bidirectionally at each d at the associated UNI	n UNI configured in with CE-VLAN Co	n the EVC oS			
Units	Number of	valid Service Frames								
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed						
Results	Pass or fail									
Remarks										



TEST CASE 17: Type 1.1 UNI-N Service Frame Unconditional Delivery

		ABSTRAC	T TEST SUITE	FOR UN	TYPE 1					
Test Name	Type 1.1 U	NI-N Service Frame Unc	onditional Deliver	у						
Test Definition ID	U1.6.1.8-22	2								
Reference Document	MEF 13 [U:	ser Network Interface (U	NI) Type 1 Impler	nentation A	.greement]					
Test Type	Conforman	се								
Test Status	Mandatory									
Requirement Description		A Type 1.1 UNI-N MUST be able to deliver unicast, multicast and broadcast Service Frames, except 802.3x PAUSE rames unconditionally								
Test Object	Verify that a frames unc	a Type 1.1 UNI-N can de onditionally	liver unicast, mul	ticast and b	proadcast Service Frame	es, except 802.3x	PAUSE			
Test Configuration	per Ingress	ssociating two Type 1.1 UNI bandwidth profile is both UNIs in the configu	applied at both l							
CE-VLAN ID/EVC		UNI 'A'								
Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC				
		All possible values	EVC ₁		All possible values	EVC ₁				
			PER	INGRESS	UNI]			
		UNI		E	Bandwidth Profile Para	meters				
Bandwidth Profile		UNI			CIR CBS EIR	EBS				
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and (Egress UNI Spe	(CBS ≥ m ed)	aximum Service Frame	size)				
Service Performance	Not Specifi	ed								
Test Procedure		rs unicast, multicast and t the corresponding Serv				NI configured in th	ne EVC and			
Units	Number of	valid Service Frames								
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interfa	ace speed						
Results	Pass or fail									
Remarks										



10. Abstract Test Cases for UNI Type 1.2 Specific Characteristics

In this section we assume familiarity with MEF 13 *User Network Interface (UNI) Type 1 Implementation Agreement* and, in particular, its section 6.2 which defines the specific characteristics of the UNI Type 1.2.

Twenty-seven Abstract Test Cases based on the specific characteristics of the UNI Type 1.2 are defined in this section.

Abstract Test Cases for UNI-N Type 1.2 Specific Characteristics

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Test Case 18: Type 1.2 UNI-N Service Multiplexing
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Test Case 19: Type 1.2 UNI-N Service Multiplexing - Minimum Number of EVCs

Test Case 20: Type 1.2 UNI-N Minimum Number of CE-VLAN IDs

Test Case 21: Type 1.2 UNI-N CE-VLAN ID Range

Test Case 22: Type 1.2 UNI-N Configurable CE-VLAN ID/EVC Map

Test Case 23: Type 1.2 UNI-N CE-VLAN ID/EVC Map Service Frame Discard

Test Case 24: Type 1.2 UNI-N All-to-One Bundling

Test Case 25: Type 1.2 UNI-N Bandwidth Profile per Ingress UNI

Test Case 26: Type 1.2 UNI-N Bandwidth Profile per EVC

Test Case 27: Type 1.2 UNI-N Bandwidth Profile per Class of Service

Test Case 28: Type 1.2 UNI-N Multiple Bandwidth Profiles

Test Case 29: Type 1.2 UNI-N Bandwidth Profile Rate Enforcement when CIR > 0 and EIR = 0

Test Case 30: Type 1.2 UNI-N Bandwidth Profile Rate Enforcement when CIR = 0 and EIR > 0

Test Case 31: Type 1.2 UNI-N Bandwidth Profile Rate Enforcement when CIR > 0 and EIR > 0

Test Case 32: Type 1.2 UNI-N Mandatory CIR Configuration Granularity

Test Case 33: Type 1.2 UNI-N Mandatory EIR Configuration Granularity

Test Case 34: Type 1.2 UNI-N Optional CIR Configuration Granularity

Test Case 35: Type 1.2 UNI-N Optional EIR Configuration Granularity

Test Case 36: Type 1.2 UNI-N CBS Configuration

Test Case 37: Type 1.2 UNI-N EBS Configuration

Test Case 38: Type 1.2 UNI-N Optional Layer 2 Control Protocol Discard

Test Case 39: Type 1.2 UNI-N Optional Layer 2 Control Protocol Generation

Test Case 40: Type 1.2 UNI-N Concurrent Point-to-Point and Multipoint EVCs

Test Case 41: Type 1.2 UNI-N CE-VLAN ID Preservation

Test Case 42: Type 1.2 UNI-N CE-VLAN CoS Preservation

Test Case 43: Type 1.2 UNI-N Broadcast & Multicast Service Frame Unconditional Delivery

Test Case 44: Type 1.2 UNI-N Unicast Service Frame Unconditional Delivery



TEST CASE 18: Type 1.2 UNI-N Service Multiplexing

			ABSTRAG	CT TE	ST SUITE FOR I	UNI TYPE	1					
Test Name	Type 1.2 l	JNI-N Servi	ce Multiplexir	ng								
Test Definition ID	U1.6.2.1-2	.6.2.1-23										
Reference Document	MEF 13 [U	EF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]										
Test Type	Conforma	nce										
Test Status	Mandatory	/										
Requirement Description	A Type 1.2	pe 1.2 UNI-N MUST be able to support Service Multiplexing as defined in MEF 10										
Test Object	Verify that	a Type 1.2	UNI-N can s	upport \$	Service Multiplexin	g as defined	in MEF	10				
Test Configuration	configured	d and at leas	st one CE-VL	AN ID is	a given Type 1.2 in s mapped per EVC ch UNI are attache	. Per EVC l	pandwid	Ith profiles are app				
		UNI 'A	۸'		UNI 'B	3'		UNI	'C'			
	CE-	VLAN ID	EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC			
		11*	EVC ₁					11*	EVC ₁			
CE-VLAN ID/EVC Map		12	EVC ₂		12	EVC ₂						
	10 [E	thernet Ser	vices Attribut	es Phas	ed provided that co se 1], Section 7.5.1 riority tagged Serv	1						
					PER E	VC						
			EVC			th Profile Pa	aramete	ers				
Donahuidth Dost			EVC ₁			BS ₁ EIR ₁	EBS ₁					
Bandwidth Profile			EVC ₂		CIR ₂ CE	BS ₂ EIR ₂	EBS ₂					
		Note 2: (2		Rs ≤ Egi	UNI Speed), (CBS ress UNI Speed) _{1,2} = 0)	_{1,2} ≥ maximu	m Servi	ice Frame size)				
Service Performance	Not Speci	fied										
Test Procedure					d CE-VLAN IDs bio ames are successf				the EVCs and e associated UNIs.			
Units	Number o	f valid Servi										
				I INI		- D	s CIR ₄	CBS, CIP, CBS				
Variables	Number of speed	f UNIs, num	ber of EVCs	per UN	I, Bandwidth Profil	e Parameter	<u> </u>		52, UNIs interface			
Variables Results			ber of EVCs	per UN	I, Bandwidth Profil	e Parameter	<u> </u>		2, UNIs interface			



TEST CASE 19: Type 1.2 UNI-N Service Multiplexing - Minimum Number of EVCs

		ABSTRACT TES	ST SUITE FOR	UNI TYPE	1		
Test Name	Type 1.2 UNI-N Servi	ioo Multiploving Mini	imum Number of E	=\/Co			
Test Definition ID	U1.6.2.1-24	ice Multiplexing - Mini	illulli Nullibel oi i	2008			
Reference		d. l. (1811) T	. 4	Α	.1		
Document	MEF 13 [User Netwo	rk Interface (UNI) Typ	e 1 implementation	on Agreemer	ntj		
Test Type	Conformance						
Test Status	Optional						
Doguiroment	A Type 1.2 UNI-N SH table	IOULD at least be ab	le to support a mir	nimum numb	er of EVCs a	s described in	the following
Requirement Description		ink Speed	10/100 Mbps	1	Gbps	10 Gbp	s
Description	Minimum	Number of EVCs	8		64	512	
Test Object	Verify that a Type 1.3	2 UNI-N can support	a minimum numb	er of EVCs	as described	d in the requir	ement description
rest Object	table above		· T 10		1 .1 .		4.0.1.11.11
Test Configuration	At least eight EVCs, e configured and at lea Testers with proper P	st one CE-VLAN ID is	mapped per EVC	C. Per EVC b	oandwidth pr	ofiles are appl	e 1.2 UNI are ied at all UNIs.
	UNI 'A	Α'	UNI 'E	3'		UNI 'C)
	CE-VLAN ID	EVC	CE-VLAN ID	EVC	CI	E-VLAN ID	EVC
	1	EVC ₁				1	EVC ₁
	2	EVC ₂				2	EVC ₂
	3	EVC ₃				3	EVC ₃
CE-VLAN ID/EVC	4	EVC ₄				4	EVC ₄
Map	5	EVC ₅	5	EVC ₅			
	6 7	EVC ₆	6 7	EVC ₆			
	8	EVC ₈	8	EVC ₇			
		-VLAN IDs is permitte	-		of the CF-VI	AN IDs confor	ms to MFF
	10 [Ethernet Sei	vices Attributes Phas	se 1], Section 7.5.	1	51 tillo OL 12	, 120 como.	IIIO to MEI
	This mapping ap	oplies for 10/100 Mbp	s UNI speeds. Thout with respective	ne same map	ping principle 2 EVCs	es should be a	applied for
	-		•				
			PER E	VC			
		EVC	Bandwidth F	Profile Paran	neters		
		EVC ₁	CIR ₁ CBS ₁		3S₁		
Bandwidth Profile		EVC ₂	CIR ₂ CBS ₂	EIR ₂ EE	3S ₂		
Danawidin Prome							
		EVC ₈	CIR ₈ CBS ₈	EIR ₈ EE	3S ₈		
	Note 2: (Σ Ir	$CIR_{1,2,3,4,5,6,7,8}$ < Ingresers CIRs \leq Egress $c_{1,2,3,4,5,6,7,8}$ = 0) and (E	UNI Speed)	CBS _{1,2,3,4,5,6,7,8}	₃ ≥ maximum	Service Fram	e size)
Service Performance	Not Specified						
Test Procedure	Tester offers Service verifies that the corre					configured in t	ne EVCs and
Units	Number of valid Serv	ice Frames					
Variables	UNIs interface speed CBS ₂ , CIR ₃ , CBS ₃ , C					arameters CII	R ₁ , CBS ₁ , CIR ₂ ,
Results	Pass or fail						
Remarks							



TEST CASE 20: Type 1.2 UNI-N Minimum Number of CE-VLAN IDs

		ABSTRACT 1	EST SUITI	FOR UN	I TYPE 1						
Test Name	Type 1.2 U	NI-N Minimum Number of C	E-VLAN Ids								
Test Definition ID	U1.6.2.2-2	U1.6.2.2-25.1									
Reference Document	MEF 13 [U	ser Network Interface (UNI)	Гуре 1 Imple	mentation A	Agreement]						
Test Type	Conforman	ce									
Test Status	Optional	Optional									
Requirement Description		Type 1.2 UNI-N SHOULD be able to support at least a minimum number of CE-VLAN IDs as described in the billowing table Link Speed 10/100 Mbps 1 Gbps 10 Gbps Minimum Number of CE-VLAN IDs 8 64 512									
Test Object	requiremen	a Type 1.2 UNI-N can a tdescription table above									
Test Configuration	per Ingress	One EVC associating two Type 1.2 UNIs is configured and at least eight CE-VLAN IDs are mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC									
		UNI 'A']	UNI	'B']				
		CE-VLAN ID	EVC	-	CE-VLAN ID	EVC	<u> </u>				
CE-VLAN ID/EVC		11, 12, 13, 14, 15, 16, 17, 18	EVC ₁		11, 12, 13, 14, 15, 16, 17, 18	EVC ₁	-				
Map		Use of other CE-VLAN IDs conforms to MEF 10 [Ethe			at configuration of the						
		This mapping applies for 1 be applied for the 1Gbps a VLAN IDs	0/100 Mbps nd 10Gbps l	JNI speeds JNI speeds	. The same mapping public but with respectively 6	orinciples should 4 and 512 CE-					
							 1				
		LINII	PE	RINGRESS			=				
Bandwidth Profile		UNI		E	CIR CRS FIR						
, , , , , , , , , , , , , , , , , , ,		UNI CIR CBS EIR EBS Note 1: (0 < CIR < Ingress UNI Speed), (CBS ≥ maximum Service Frame size) Note 2: (Ingress CIR ≤ Egress UNI Speed) Note 3: (EIR = 0) and (EBS = 0)									
Service Performance	Not Specifi	ed									
Test Procedure		rs Service Frames with map t the corresponding Service				onfigured in the EV	C and				
Units	Number of	valid Service Frames									
Variables	UNIs interfa	ace speed, number of mapp	ed CE-VLAN	IDs, Bandw	ridth Profile Parameter	s CIR, CBS					
Results	Pass or fail										
Remarks											



TEST CASE 21: Type 1.2 UNI-N CE-VLAN ID Range

		ABSTRACT T	EST SUITE FO	OR UNI TY	PE 1						
Test Name	Type 1.2 U	NI-N CE-VLAN ID Range									
Test Definition ID	U1.6.2.2-25	1.6.2.2-25.2									
Reference Document	MEF 13 [Us	ser Network Interface (UNI) T	ype 1 Implemen	tation Agree	ement]						
Test Type	Conforman	се									
Test Status	Optional										
Requirement Description	A Type 1.2 the range o	UNI-N should be able to sup f 1-4095	port a minimum	number of (CE-VLAN IDs that SHO	ULD be config	urable in				
Test Object	Verify that a	a Type 1.2 UNI-N can at supp	oort a minimum r	number of C	E-VLAN IDs configurat	ole in the range	e of 1-4095				
Test Configuration	per Ingress	ssociating two Type 1.2 UNI UNI bandwidth profile is app both UNIs in the configured	lied at both UNIs								
		UNI 'A'			UNI 'B'						
		CE-VLAN ID	EVC		CE-VLAN ID	EVC					
CE-VLAN ID/EVC		1, 56, 212, 1087, 1460, 2228, 3999, 4095	EVC ₁	1	, 56, 212, 1087, 1460, 2228, 3999, 4095	EVC ₁					
Мар		Use of other CE-VLAN IDs conforms to MEF 10 [Ether	is permitted prov net Services Attr	vided that co	onfiguration of the CE-\se 1], Section 7.5.1	/LAN IDs					
		This mapping applies for 10 be applied for the 1Gbps at VLAN IDs, including VLAN	nd 10Gbps UNI s]				
			PER IN	GRESS UN	l		ĺ				
		UNI		Band	dwidth Profile Parame	ters					
Bandwidth Profile		UNI		CIF							
		Note 1: (0 < CIR < Ingress Note 2: (Ingress CIR ≤ Egr Note 3: (EIR = 0) and (EBS	ess UNI Speed)	BS ≥ maxim	um Service Frame size	:)					
Service Performance	Not Specific	ed									
Test Procedure		Tester offers Service Frames with mapped CE-VLAN IDs bidirectionally at each UNI configured in the EVC and verifies that the corresponding Service Frames are delivered at the associated UNI									
Units	Number of	valid Service Frames									
Variables	UNIs interfa	ace speed, number of mappe	d CE-VLAN IDs,	, Bandwidth	Profile Parameters CIF	R, CBS					
Results	Pass or fail										
Remarks											



TEST CASE 22: Type 1.2 UNI-N Configurable CE-VLAN ID/EVC Map

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1		
Test Name	ame Type 1.2 UNI-N Configurable CE-VLAN ID/EVC Map						
Test Definition ID	U1.6.1.3-26						
Reference Document	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	A Type 1.2 UNI-N MUST have a configurable CE-VLAN ID/EVC mapping table						
Test Object	Verify that a Type 1.2 UNI-N can have a configurable CE-VLAN ID/EVC mapping table						
Test Configuration	One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. At least two different mapping configurations are required. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC						
		UNI 'A'			UNI 'B'		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁	
Map Configuration 1	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1						
	The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs						
CE-VLAN ID/EVC Map Configuration 2		UNI 'A'			UNI 'B'		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
		12	EVC ₁		12	EVC ₁	
		Use of other CE-VLAN conforms to MEF 10 [E	I IDs is permitted p Ethernet Services	provided that Attributes F	at configuration of the Phase 1], Section 7.5	e CE-VLAN IDs .1	
Bandwidth Profile							
		PER INGRESS UNI					
		UNI			Bandwidth Profile Parameters		
		UNI			CIR CBS EIR		
		Note 1: (0 < CIR < Ingress UNI Speed), (CBS ≥ maximum Service Frame size) Note 2: (Ingress CIR ≤ Egress UNI Speed) Note 3: (EIR = 0) and (EBS = 0)					
Service Performance	Not Specified						
	Not Specifi	ed					
Tost Procedure	Tester offer the EVC as are delivered	rs Service Frames with r s per the CE-VLAN ID/EV ed and the ones with the	VC map 1 and ver unmapped CE-VI	fies that the _AN IDs are	e Service Frames wit	h the mapped CE-VL	
Test Procedure	Tester offer the EVC as are delivered Change the Tester offer the EVC as	rs Service Frames with r	VC map 1 and ver unmapped CE-VI -VLAN ID/EVC mapped and unma VC map 2 and ver	fies that the AN IDs are ap 2. pped CE-V fies that the	e Service Frames wit e not delivered at the LAN IDs bidirectiona e Service Frames wit	th the mapped CE-VL/ associated UNI. ally at each UNI config th the mapped CE-VL/	AN IDs ured in AN IDs
Test Procedure Units	Tester offer the EVC as are delivered Change the Tester offer the EVC as are delivered	rs Service Frames with r s per the CE-VLAN ID/E\ ed and the ones with the e configuration to the CE rs Service Frames with r s per the CE-VLAN ID/E\	VC map 1 and ver unmapped CE-VI -VLAN ID/EVC mapped and unma VC map 2 and ver	fies that the AN IDs are ap 2. pped CE-V fies that the	e Service Frames wit e not delivered at the LAN IDs bidirectiona e Service Frames wit	th the mapped CE-VL/ associated UNI. ally at each UNI config th the mapped CE-VL/	AN IDs ured in AN IDs
	Tester offer the EVC as are delivered Change the Tester offer the EVC as are delivered Number of	rs Service Frames with rs per the CE-VLAN ID/E\ ed and the ones with the e configuration to the CE rs Service Frames with rs per the CE-VLAN ID/E\ ed and the ones with the	VC map 1 and ver unmapped CE-VI -VLAN ID/EVC mapped and unma VC map 2 and ver unmapped CE-VI	fies that the LAN IDs are ap 2. pped CE-V fies that the LAN IDs are	e Service Frames with a not delivered at the LAN IDs bidirectionale Service Frames with a not delivered at the	th the mapped CE-VL/ associated UNI. ally at each UNI config th the mapped CE-VL/ associated egress UI	AN IDs ured in AN IDs
Units	Tester offer the EVC as are delivered Change the Tester offer the EVC as are delivered Number of	rs Service Frames with rs per the CE-VLAN ID/EVed and the ones with the econfiguration to the CE rs Service Frames with rs per the CE-VLAN ID/EVed and the ones with the valid Service Frames D/EVC maps, Bandwidtl	VC map 1 and ver unmapped CE-VI -VLAN ID/EVC mapped and unma VC map 2 and ver unmapped CE-VI	fies that the LAN IDs are ap 2. pped CE-V fies that the LAN IDs are	e Service Frames with a not delivered at the LAN IDs bidirectionale Service Frames with a not delivered at the	th the mapped CE-VL/ associated UNI. ally at each UNI config th the mapped CE-VL/ associated egress UI	AN IDs ured in AN IDs



TEST CASE 23: Type 1.2 UNI-N CE-VLAN ID/EVC Map Service Frame Discard

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1				
Test Name	Type 1.2 U	ype 1.2 UNI-N CE-VLAN ID/EVC Map Service Frame Discard							
Test Definition ID	U1.6.1.3-27	7							
Reference Document	MEF 13 [U	ser Network Interface (U	NI) Type 1 Impler	nentation A	greement]				
Test Type	Conforman	ce							
Test Status	Mandatory								
Requirement Description	A Type 1.2	UNI-N MUST be able to	drop the frames	if a match ir	n the CE-VLAN	ID/EVC ı	map table cannot	be found	
Test Object	Verify that	erify that a Type 1.2 UNI-N can drop the frames if a match in the CE-VLAN ID/EVC map table cannot be found the EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. A per							
Test Configuration	Ingress UN	associating two Type 1.2 II bandwidth profile is ap in the configured EVC							
		INGRESS U	NI 'A'		EG	RESS U	NI 'B'		
		CE-VLAN ID	EVC		CE-VLAN	ID	EVC		
CE-VLAN ID/EVC		11*	EVC ₁		11*		EVC ₁		
Мар		Use of other CE-VLAN conforms to MEF 10 [8					E-VLAN IDs		
		The CE-VLAN ID for u both ingress and egres		ity tagged S	Service Frames	is config	ured to 11 at	<u> </u>	
			PER	INGRESS	LINI]	
		UNI	1 21		Bandwidth Prof	file Para	meters		
Bandwidth Profile		UNIA			IR _A CBS _A	EIR _A	EBS _A		
		Note 1: (0 < CIR _A < In Note 2: (Ingress CIR ≤ Note 3: (EIR _A = 0) and	≦ Egress UNI Spe		maximum Servi	ce Frame	e size)		
Service Performance	Not Specifi	ed							
Test Procedure	and verifies	rs Service Frames with r s that the Service Frame Ds are not delivered at t	s with the mapped	ČE-VLAN					
Units	Number of	valid Service Frames							
Variables	Bandwidth	Profile Parameters CIR,	CBS _A , UNIs inte	erface spee	d				
Results	Pass or fail								
Remarks									



TEST CASE 24: Type 1.2 UNI-N All-to-One Bundling

		ABSTRAC	CT TEST SUITE	FOR UN	TYPE 1			
Test Name	Type 1.2 U	NI-N All-to-One Bundlin	g					
Test Definition ID	U1.6.2.4-28	3						
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]						
Test Type	Conforman	onformance						
Test Status	Mandatory	andatory						
Requirement Description	A Type 1.2	Type 1.2 UNI-N MUST be able to support All-to-one bundling						
Test Object	Verify that a	erify that a Type 1.2 UNI-N can support All-to-one bundling						
Test Configuration	Ingress UN	One EVC associating two Type 1.2 UNIs is configured and all possible CE-VLAN IDs are mapped to the EVC. A per ngress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached be both UNIs in the configured EVC						
		UNI 'A	,		UNI 'E	3'	Ī	
CE-VLAN ID/EVC Map		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
		All possible values	EVC ₁		All possible values	EVC ₁		
			PEF	RINGRESS				
Bandwidth Profile		UNI		E	Bandwidth Profile Para	EBS		
Banaman Frome			Egress UNI Spe	, (CBS ≥ ma ed)	CIR CBS EIR aximum Service Frame	-		
Service Performance	Not Specific	ed						
Test Procedure	Service bid	rs tagged Service Frame irectionally at each UNI t the associated UNI wit	configured in the	EVC and ve				
Units	Number of	valid Service Frames						
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed				
Results	Pass or fail							
Remarks								



TEST CASE 25: Type 1.2 UNI-N Bandwidth Profile per Ingress UNI

		ARSTDAG	CT TEST SUITE	EOD IIN	I TVDE 1				
		ADSTRAC	71 1231 30112	I OK ON	IIIFEI				
Test Name	Type 1.2 U	INI-N Bandwidth Profile	per Ingress UNI						
Test Definition ID	U1.6.2.5-29	9							
Reference Document	MEF 13 [U	ser Network Interface (U	INI) Type 1 Impler	nentation A	(greement]				
Test Type	Conforman	nce							
Test Status	Mandatory								
Requirement Description	A Type 1.2	UNI-N MUST be able to	support a per Inç	jress UNI b	andwidth profile based of	on MEF 10			
Test Object	Verify that	a Type 1.2 UNI-N can sı	upport a per Ingre	ss UNI ban	dwidth profile based on	MEF 10			
Test Configuration	Ingress UN	wo EVCs associating two Type 1.2 UNIs are configured and at least one CE-VLAN ID is mapped per EVC. A per ngress UNI bandwidth profile is applied at the ingress UNI. Testers with proper PHY that matches each UNI are ttached to both UNIs in the configured EVCs							
		INGRESS U	INI 'Δ'		EGRESS U	INI 'R'			
		CE-VLAN ID	EVC		CE-VLAN ID	EVC			
CE-VLAN ID/EVC		11	EVC ₁		11	EVC ₁			
Мар		12	EVC ₂		12	EVC ₂			
		Use of other CE-VLAN conforms to MEF 10 [8	IDs is permitted Ethernet Services	orovided the Attributes F	at configuration of the C Phase 1], Section 7.5.1	E-VLAN IDs			
							 1		
			PER	INGRESS			1		
Bandwidth Profile		UNI			Bandwidth Profile Para		4		
		Note 1: (0 < CIR _A < Ir	gress UNI Speed		CIR _A CBS _A EIR _A maximum Service Fram	EBS _A	4		
		Note 2: (Ingress CIR _A							
Service Performance	Not Specifi	ed							
Test Procedure	verifies tha egress UN aggregate falls within · · · · · · · · · · · · · · · · · · ·	Tester offers Service Frames with mapped CE-VLAN IDs of length λ into the configured EVCs at the ingress UNI and verifies that over a time interval T at least one Service Frame of each CE-VLAN ID is delivered at the associated egress UNI. Service Frames are offered at equal average rates into the configured EVCs at the ingress UNI, at an aggregate average rate greater than CIR_A . Tester also verifies that the amount of traffic delivered at the egress UNI falls within the range $X \le (W_G + W_Y) \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the egress UNI • W_Y is the amount of traffic accepted as Yellow over the time interval T that may be delivered to the egress UNI • $X_A = ((CIR_A + EIR_A)^*T + CBS_A + EBS_A - F)$ and $Z_A = ((CIR_A + EIR_A)^*T + CBS_A + EBS_A + F)$							
Units	Number of	valid Service Frames							
Variables		Profile Parameters CIR, d length λ of the offered		S _A , UNIs in	nterface speed, time inte	erval <i>T</i> , tolerated v	ariance F,		
Results	Pass or fai	I							



TEST CASE 26: Type 1.2 UNI-N Bandwidth Profile per EVC

				-					
		ABSTRAC	CT TEST SUIT	E FOR UNI	TYPE 1				
Test Name	Type 1.2 U	Type 1.2 UNI-N Bandwidth Profile per EVC U1.6.2.5-30							
Test Definition ID	U1.6.2.5-30	0							
Reference Document	MEF 13 [U	ser Network Interface (U	INI) Type 1 Impl	ementation A	greement]				
Test Type	Conforman	ice							
Test Status	Mandatory								
Requirement Description	A Type 1.2	Type 1.2 UNI-N MUST be able to support a per EVC bandwidth profile based on MEF 10							
Test Object		erify that a Type 1.2 UNI-N can support a per EVC bandwidth profile based on MEF 10							
Test Configuration	EVC bandy	Two EVCs associating two Type 1.2 UNIs are configured and at least one CE-VLAN ID is mapped per EVC. Per EVC bandwidth profiles are applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVCs							
		INGRESS U	INI 'A'		EGRESS I	UNI 'B'			
		CE-VLAN ID	EVC		CE-VLAN ID	EVC			
CE-VLAN ID/EVC Map		11	EVC ₁		11	EVC ₁			
шар		12	EVC ₂		12	EVC ₂			
		Use of other CE-VLAN conforms to MEF 10 [8	IDs is permitted Ethernet Service	I provided the Attributes F	at configuration of the C Phase 1], Section 7.5.1	CE-VLAN IDs			
				PER EVC					
		EVC			Profile Parameters				
		EVC ₁			EIR ₁ EBS ₁				
Bandwidth Profile		EVC ₂	-		EIR ₂ EBS ₂				
		Note 1: (CIR ₁ = 0), (CE	3S ₁ = 0) and (EII	R ₁ = 0) and (I	EBS ₁ = 0)	i)			
		Note 3: $(0 < CIR_2 < IR_2)$ Note 3: $(\Sigma \text{ Ingress CIR})$			naximum Service Frame	e size)			
Service	N . O								
Performance	Not Specifi	ed							
		rs Service Frames with r							
		ne interval <i>T,</i> at an aggre ires the number of Servi							
		ered at the associated e							
Test Procedure		W_G is the amount of traff	ic accepted as 0	reen over th	e time interval <i>T</i> that sh	nould be delivered to	o the		
	ϵ	egress UNI							
		W_Y is the amount of traff JNI	ic accepted as Y	ellow over th	ie time interval <i>I</i> that m	lay be delivered to t	ne egress		
	.)	$X_1 = ((CIR_1 + EIR_1)^*T + C$							
11.5		$X_2 = ((CIR_2 + EIR_2)^*T + C$	JBS ₂ + EBS ₂ - F) and $Z_2 = (($	$(\text{CIR}_2 + \text{EIR}_2)^*T + \text{CBS}_2$	₂ + EBS ₂ + F)			
Units	Number of	valid Service Frames							
Variables		Profile Parameters CIR_2 d length λ of the offered		3S ₂ , UNIs int	terface speed, time inte	erval <i>T</i> , tolerated var	riance F,		
Results	Pass or fail	I							
Remarks									
	l .								



TEST CASE 27: Type 1.2 UNI-N Bandwidth Profile per Class of Service

					<u>-</u>				
			ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1			
Test Name	Type 1.2 U	NI-N Ban	dwidth Profile p	er Class of Serv	ce				
Test Definition ID	U1.6.2.5-3	1.1							
Reference Document	MEF 13 [U	ser Netwo	ork Interface (UN	NI) Type 1 Imple	mentation A	greement]			
Test Type	Conforman	ice							
Test Status	Optional								
Requirement Description	A Type 1.2	Type 1.2 UNI-N SHOULD be able to support a per CoS bandwidth profile based on MEF 10							
Test Object	,	rify that a Type 1.2 UNI-N can support a per CoS bandwidth profile based on MEF 10							
Test Configuration	of Service Service ap	ne EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped per EVC. Per Class Service bandwidth profiles are applied at the ingress UNI. Two CoS Identifiers are used to identify the Class of ervice applicable to the Service Frames offered at the UNI. Testers with proper PHY that matches each UNI are tached to both UNIs in the configured EVC							
			INGRESS UN	NI 'A'		EGRESS	UNI 'B'		
		CE-	VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC			11*	EVC ₁		11*	EVC ₁		
Мар						at configuration of the Ohase 1], Section 7.5.1	CE-VLAN IDs		
					rity tagged S	Service Frames is confi	igured to 11 at		
		both ing	ress and egres	s UNIs					
				PER C	LASS OF SI	ERVICE			
		EVC	CoS Identifier	CE-VLAN CoS	Bandwidt	h Profile Parameters			
Bandwidth Profile		EVC ₁	1	1	CIR ₁₁ CE	BS ₁₁ EIR ₁₁ EBS ₁₁			
		2001	2	7	CIR ₁₂ CE	BS ₁₂ EIR ₁₂ EBS ₁₂			
				$SS_{11} = 0$) and (EI		I (EBS ₁₁ = 0) maximum Service Frar	mo sizo)		
				s ≤ Egress UNI S		maximum Service i lai	ne size)		
Service								=	
Performance	Not Specifi	ed							
						λ into the configured			
						of the sum of the CIRs sociated egress UNI.			
						the range $X \le (W_G + W_G)$		ano anno an	
Test Procedure				accepted as G	reen over th	e time interval ${\it T}$ that sh	hould be delivered	d to the	
		egress UN N_Y is the		accepted as Ye	ellow over th	e time interval <i>T</i> that m	nay be delivered to	o the egress	
		JNI V ((CII	D . FID * <i>T</i> .	CDC . EDC	E) and 7	//CID . FID *T.	CDC LEBS	. =\	
						₁ = ((CIR ₁₁ + EIR ₁₁)* <i>T</i> + ₂ = ((CIR ₁₂ + EIR ₁₂)* <i>T</i> +			
Units	Number of	valid Ser	vice Frames			<u> </u>			
Variables	Bandwidth of the offer			, CBS _{12,} EIR _{12,} I	EBS ₁₂ , time	interval T, tolerated va	riance F, number	and length λ	
Results	Pass or fai	1							
Remarks									
	l								



TEST CASE 28: Type 1.2 UNI-N Multiple Bandwidth Profiles

		ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1		
Test Name	Type 1.2 UNI-N M	ultiple Bandwidth	Profiles				
Test Definition ID	U1.6.2.5-31.2						
Reference Document	MEF 13 [User Net	work Interface (UN	NI) Type 1 Imple	mentation A	.greement]		
Test Type	Conformance						
Test Status	Optional						
Requirement Description	Multiple models of	<u>'</u>					
Test Object	Verify that a Type				<u> </u>	 	
Test Configuration	EVC bandwidth pr	ofile and a per Cla	ss of Service ba	andwidth pro	least one CE-VLAN ID file are applied at the in the configured EVC		
		INGRESS UN	li 'A'		EGRESS	UNI 'B'	
	С	E-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11	EVC ₁		11	EVC ₁	
Мар		12	EVC ₂		12	EVC ₂	
					at configuration of the Phase 1], Section 7.5.1	CE-VLAN IDs	
				PER EVC			
		EVC		E	Bandwidth Profile Par	ameters	
		EVC ₁			CIR ₁ CBS ₁ EIR ₁	EBS ₁	
	Note 1: (0 < CIR₁ < ingress UNI Speed), (CBS₁ ≥ maximum Service Frame size)						
							•
			Ti-	LASS OF S	ERVICE		
Bandwidth Profile	EVC	CoS Identifier	CE-VLAN CoS		th Profile Parameters		
	EVC ₂	1	1		BS ₂₁ EIR ₂₁ EBS ₂₁		
		2: (CIR ₂₁ = 0), (CB	7 (C 0) and (F)		BS ₂₂ EIR ₂₂ EBS ₂₂		
					maximum Service Fran	ne size)	
	Note -	4: (∑ Ingress CIRs	s < Ingress UNI	Speed)			
	Note	5: (Σ Ingress CIRs	≤ Egress UNI S	Speed)			
Comileo							
Service Performance	Not Specified						
					gth λ into the configure		
					of the sum of the CIRs rered at the associated		
					ssociated egress UNI		
	$X \leq (W_G + W_Y) \leq 2$	Z where:					
Test Procedure	· W _G is th	ne amount of traffic	accepted as G	reen over th	e time interval T that s	hould be delivered t	o the
700100044.3	egress l			alleni - · · · ·	a than a later and Tollar	and the state of the state of the state of	
	· Wylstn UNI	e amount of traffic	accepted as Ye	ellow over tr	e time interval T that n	nay be delivered to t	ne egress
	_	CIR ₁ + EIR ₁)*T+ CI	BS₁ + EBS₁ - F	and $Z_1 = 0$	(CIR ₁ + EIR ₁)*T + CBS	1 + EBS1 + F)	
	$X_{21} = (0$	CIR ₂₁ + EIR ₂₁)*T+	CBS ₂₁ + EBS ₂₁	- F) and Z ₂	$_{1} = ((CIR_{21} + EIR_{21})^{*}T -$	+ CBS ₂₁ + EBS ₁₁ +	
			CBS ₂₂ + EBS ₂₂	- F) and Z ₂	$_{2} = ((CIR_{22} + EIR_{22})^{*}T -$	+ CBS ₂₂ + EBS ₂₂ +	F)
Units	Number of valid S	ervice Frames					
Variables					BS _{22,} EIR _{22,} EBS _{22,} UN ed Service Frames	Ils interface Speed,	time
Results	Pass or fail						
Remarks							
	II.						



TEST CASE 29: Type 1.2 UNI-N BW Profile Rate Enforcement when CIR > 0 and EIR = 0

		ABSTRAC	T TEST SUITE	FOR UNI	TYPE 1			
Test Name		INI-N Bandwidth Profile I	Rate Enforcemen	when CIR	> 0 and EIR = 0			
Test Definition ID Reference	U1.6.2.5-3	3.1						
Document	MEF 13 [U	ser Network Interface (U	NI) Type 1 Implei	mentation A	greement]			
Test Type	Conforman	nce						
Test Status	Mandatory							
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to support color-blind bandwidth profiling to enforce CIR, CBS, EIR and EBS Verify that a Type 1.2 UNI-N can support color-blind bandwidth profiling to enforce CIR, CBS, EIR and EBS when						
Test Object	CIR > 0 an	d EIR = 0						
Test Configuration	Bandwidth	associating two Type 1.2 Profile where EIR=EBS: Y that matches each UN	=0 and CIR and C	BS are non	-zero is applied at the in	mapped to the EV0 ngress UNI. Teste	C. One rs with	
		INGRESS U	All (A)		EGRESS L	INII (D)		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁		
Мар		Use of other CE-VLAN		provided that	at configuration of the C			
		conforms to MEF 10 [8						
		The CE-VLAN ID for u both ingress and egres		rity tagged S	Service Frames is config	gured to 11 at		
			PEF	INGRESS	UNI			
Danish de Danish		UNI		Е	Bandwidth Profile Para	ameters		
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	EBS _A		
		Note 1: $(0 < CIR_A < Ir$ Note 2: $(Ingress CIR_A$ Note 3: $(EIR_A = 0)$ and	≤ Egress UNI Sp		maximum Service Fram	ne size)		
Service			4 (LDOA - 0)					
Performance	Not Specified							
		rs Service Frames with r						
	ingress UN		and measures th	e number o	of Service Frames deliver	ered at the associa	ted egress	
Test Procedure	ingress UN UNI. The a	rs Service Frames with r	and measures that the associated	ne number o d egress Ul	of Service Frames deliver NI must fall within the ra	ered at the associa ange $X \le W_G \le Z$ w	ted egress here:	
Test Procedure	ingress UN UNI. The a · W _G is UNI	rs Service Frames with r Il during a time interval 7 amount of traffic delivere	and measures the dat the associated as Green of	ne number of ed egress Ul	of Service Frames deliver NI must fall within the ra	ered at the associa ange $X \le W_G \le Z$ w	ted egress here:	
Test Procedure Units	ingress UN UNI. The a W_G is UNI $X_A = 0$	rs Service Frames with r Il during a time interval 7 amount of traffic delivere the amount of traffic acc	and measures the dat the associated as Green of	ne number of ed egress Ul	of Service Frames deliver NI must fall within the ra	ered at the associa ange $X \le W_G \le Z$ w	ted egress here:	
	ingress UN UNI. The a W_G is UNI $X_A = 0$ Number of	rs Service Frames with r Il during a time interval 7 amount of traffic delivere the amount of traffic acc (CIR _A *T + CBS _A - F) and	and measures the dat the associated septed as Green of $Z_A = (CIR_A * T + CRS_A)$, UNIs into	ne number of ed egress Ul over the time CBS _A + F)	of Service Frames deliver MI must fall within the rate interval <i>T</i> that should	ered at the associa ange $X \le W_G \le Z$ where $Z = X \le W_G \le Z$ is the delivered to the	ted egress here: e egress	
Units	ingress UN UNI. The a W_G is UNI $X_A = 0$ Number of	rs Service Frames with rall during a time interval 7 amount of traffic delivered the amount of traffic acceptation (CIR _A *T + CBS _A - F) and valid Service Frames Profile Parameters CIR, the offered Service Frame	and measures the dat the associated septed as Green of $Z_A = (CIR_A * T + CRS_A)$, UNIs into	ne number of ed egress Ul over the time CBS _A + F)	of Service Frames deliver MI must fall within the rate interval <i>T</i> that should	ered at the associa ange $X \le W_G \le Z$ where $Z = X \le W_G \le Z$ is the delivered to the	ted egress here: e egress	



TEST CASE 30: Type 1.2 UNI-N BW Profile Rate Enforcement when CIR = 0 and EIR > 0

		ARSTDAC	T TEST SUITE	FOR LINI	TVPF 1			
		ABSIKAC	, 1E31 3011E	FUR UNI	ITE			
Test Name	Type 1.2 U	INI-N Bandwidth Profile I	Rate Enforcemen	t when CIR	= 0 and EIR > 0			
Test Definition ID	U1.6.2.5-33	3.2						
Reference Document	MEF 13 [U	ser Network Interface (U	NI) Type 1 Imple	mentation A	greement]			
Test Type	Conforman	nce						
Test Status	Mandatory							
Requirement Description	A Type 1.2	UNI-N MUST be able to	support color-bli	nd bandwidt	th profiling to enforce C	IR, CBS, EIR and I	EBS	
Test Object	CIR = 0 and	Verify that a Type 1.2 UNI-N can support color-blind bandwidth profiling to enforce CIR, CBS, EIR and EBS when CIR = 0 and EIR > 0 One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One						
Test Configuration	Bandwidth	associating two Type 1.2 Profile where CIR=CBS Y that matches each UN	=0 and EIR and E	BS are non	-zero is applied at the in	mapped to the EVO ngress UNI. Teste	C. One rs with	
		INGRESS U	NI 'A'		EGRESS L	INI 'R'		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁		
Мар					at configuration of the C	E-VLAN IDs		
		conforms to MEF 10 [E						
		both ingress and egree		nty tagged s	Service Frames is config	gured to 11 at		
			PEF	RINGRESS	UNI			
		UNI		Е	Bandwidth Profile Para	ameters		
Bandwidth Profile		UNIA		С	IR _A CBS _A EIR _A	EBS _A		
		Note 1: (CIR _A = 0) and Note 2: (0 < EIR _A < In Note 3: (Ingress EIR _A	gress UNI Speed		maximum Service Fram	e size)		
O-mile								
Service	Not Specified							
Performance	Not Specifi	ed						
Performance	Tester offe	rs Service Frames with r						
Performance Test Procedure	Tester offer ingress UN		and measures th	ne number o	of Service Frames deliver	ered at associated	egress	
	Tester offer ingress UN UNI. The a	rs Service Frames with r II during a time interval 7 amount of traffic delivere the amount of traffic acc	and measures that at the associated epted as Yellow	ne number of ed egress Ul over the time	of Service Frames deliver NI must fall within the ra	ered at associated ange $X \le W_Y \le Z$ w	egress here:	
Test Procedure	Tester offer ingress UN UNI. The answer W_Y is $X_A = 0$	rs Service Frames with r II during a time interval 7 amount of traffic delivere the amount of traffic acc (EIR _A *T + EBS _A - F) and	and measures that at the associated epted as Yellow	ne number of ed egress Ul over the time	of Service Frames deliver NI must fall within the ra	ered at associated ange $X \le W_Y \le Z$ w	egress here:	
	Tester offer ingress UN UNI. The answer W_Y is $X_A = 0$	rs Service Frames with r II during a time interval 7 amount of traffic delivere the amount of traffic acc	and measures that at the associated epted as Yellow	ne number of ed egress Ul over the time	of Service Frames deliver NI must fall within the ra	ered at associated ange $X \le W_Y \le Z$ w	egress here:	
Test Procedure	Tester offer ingress UN UNI. The analysis $X_A = 0$ Number of Bandwidth	rs Service Frames with r II during a time interval 7 amount of traffic delivere the amount of traffic acc (EIR _A *T + EBS _A - F) and	and measures the dat the associated as Yellow $dZ_A = (EIR_A*T + I)$	ne number of ed egress Ul over the time EBS _A + F)	of Service Frames deliventh of Service Frames deliventh of the rate of the service of the servic	ered at associated ange $X \le W_Y \le Z$ we delivered to the e	egress here: egress UNI	
Test Procedure Units	Tester offer ingress UN UNI. The analysis $X_A = 0$ Number of Bandwidth	rs Service Frames with r Ill during a time interval 7 amount of traffic delivere the amount of traffic acc (EIR _A *T + EBS _A - F) and valid Service Frames Profile Parameters EIR _A the offered Service Fran	and measures the dat the associated as Yellow $dZ_A = (EIR_A*T + I)$	ne number of ed egress Ul over the time EBS _A + F)	of Service Frames deliventh of Service Frames deliventh of the rate of the service of the servic	ered at associated ange $X \le W_Y \le Z$ we delivered to the e	egress here: egress UNI	



TEST CASE 31: Type 1.2 UNI-N BW Profile Rate Enforcement when CIR > 0 and EIR > 0

Test Definition ID Reference Document Test Type Conformance Test Status Mandatory Requirement Description Test Object CIR > 0 and EIR > 0 Test Object CIR > 0 and EIR > 0 Test Configuration Test Configur			ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1				
Reference Document Test Type Conformance	Test Name	Type 1.2 U	NI-N Bandwidth Profile	Rate Enforcement	when CIR	> 0 and EIR >	0			
Test Type Conformance Test Status Mandatory Requirement Description Test Object CIR > 0 and EiR > 0 CIR > 0 and EiR > 0 Test Configuration PHY that matches each UNI are attached to both UNIs in the configured EVC Wap To the CE-VLAN ID For III EVC, UNIS III	Test Definition ID	U1.6.2.5-33	3.3							
Requirement Description		MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]							
Requirement Description	Test Type	Conforman	onformance							
Test Object Verify that a Type 1.2 UNI-N can support color-blind bandwidth profiling to enforce CIR, CBS, EIR and EBS when CIR > 0 and EIR > 0 One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One EWC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One EVC associating two Type 1.2 UNIs is a configured EVC INGRESS UNI 'A'	Test Status	Mandatory								
Test Configuration Test Configuration One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. One Bandwidth Profile where CIR, CBS, EIR and EBS are non-zero is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC INGRESS UNI 'A' CE-VLAN ID EVC I1¹ EVC Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs PER INGRESS UNI UNI Bandwidth Profile Parameters UNIA CBA EIR EBSA Note 1: (0 < CIR, < Ingress UNI Speed), (CBS _A ≥ maximum Service Frame size) Note 2: (0 < EIR, < Ingress UNI Speed), (EBS _A ≥ maximum Service Frame size) Note 4: (Σ Ingress CIRs + EIRs ≤ Egress UNI Speed) Note 4: (Σ Ingress CIRs + EIRs ≤ Egress UNI Speed) Tester offers Service Frames with mapped CE-VLAN IDs of length A at an average rate greater than CIR _A + EIR _A to the ingress UNI during a time interval T and measures the number of Service Frames delivered at the associated egress UNI must fall within the range X ≤ (W _C + W _V) ≤ Z where: W _C is the amount of traffic accepted as Green over the time interval T that may be delivered to the egress UNI Number of valid Service Frames Units Number of valid Service Frames Bandwidth Profile Parameters CIR _A CBS _A EIR _A , EBS _A , UNIs interface speed, time interval T, tolerated variance F, number and length A of the offered Service Frames		A Type 1.2	UNI-N MUST be able to	support color-bli	nd bandwidt	h profiling to e	nforce C	CIR, CBS, EIR and	I EBS	
Bandwidth Profile where CIR, CBS, EIR and EBS are non-zero is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC INGRESS UNI 'A'	Test Object	CIR > 0 and	d EIR > 0							
	Test Configuration	Bandwidth	Profile where CIR, CBS	, EIR and EBS are	e non-zero i	s applied at the				
CE-VLAN ID/EVC Map 11* EVC₁ 11* EVC₁ Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs PER INGRESS UNI UNI Bandwidth Profile Parameters UNIA CIRA CIRA EBSA Note 1: (0 < CIRA, c Ingress UNI Speed), (CBSA, ≥ maximum Service Frame size) Note 2: (0 < EIRA, < Ingress UNI Speed), (EBSA, ≥ maximum Service Frame size) Note 3: (CIRA, + EIRA, ≤ Ingress UNI Speed) Service Performance Not Specified Tester offers Service Frames with mapped CE-VLAN IDs of length λ at an average rate greater than CIRA, + EIRA, to the ingress UNI during a time interval T and measures the number of Service Frames delivered at the associated egress UNI must fall within the range X ≤ (Wa + W·) ≤ Z where: W _S is the amount of traffic accepted as Green over the time interval T that may be delivered to the egress UNI T that the ingress of the egress UNI T that T that the profile Parame			INGRESS U	JNI 'A'		EC	RESS (UNI 'B'		
Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 at both ingress and egress UNIs VINI			CE-VLAN ID	EVC		CE-VLAN	I ID	EVC		
Bandwidth Profile PER INGRESS UNI	CE-VLAN ID/EVC		11*	EVC ₁		11*		EVC₁		
Bandwidth Profile PER INGRESS UNI	Мар		Use of other CE-VLAN conforms to MEF 10 [I	NIDs is permitted Ethernet Services	provided that Attributes F	at configuration hase 1], Section	of the 0 on 7.5.1	CE-VLAN IDs		
Bandwidth Profile Service Performance					ity tagged S	Service Frames	s is confi	gured to 11 at		
Bandwidth Profile Service Performance				DEC	INCDESS	LINI				
Bandwidth Profile UNI CIR CBS EIR EBS Note 1: (0 < CIR < Ingress UNI Speed), (CBS ≥ maximum Service Frame size) Note 2: (0 < EIR < Ingress UNI Speed), (EBS ≥ maximum Service Frame size) Note 3: (CIR + EIR < Ingress UNI Speed) Note 4: (Σ Ingress CIRs + EIRs ≤ Egress UNI Speed) Note 4: (Σ Ingress CIRs + EIRs ≤ Egress UNI Speed) Note 4: (Σ Ingress CIRs + EIRs ≤ Egress UNI Speed) Tester offers Service Frames with mapped CE-VLAN IDs of length λ at an average rate greater than CIR + EIR to the ingress UNI during a time interval λ and measures the number of Service Frames delivered at the associated egress UNI must fall within the range X ≤ (W _G + W _Y) ≤ Z where: W _G is the amount of traffic accepted as Green over the time interval λ that should be delivered to the egress UNI W _Y is the amount of traffic accepted as Yellow over the time interval λ that may be delivered to the egress UNI X _A = ((CIR + EIR + ENS + ENS			LINI	FER	1		file Par	ameters	-	
Note 1: $(0 < CIR_A < Ingress UNI Speed)$, $(CBS_A \ge maximum Service Frame size)$ Note 2: $(0 < EIR_A < Ingress UNI Speed)$, $(EBS_A \ge maximum Service Frame size)$ Note 3: $(CIR_A + EIR_A < Ingress UNI Speed)$ Note 4: $(\Sigma Ingress CIRs + EIRs \le Egress UNI Speed)$ Note 4: $(\Sigma Ingress CIRs + EIRs \le Egress UNI Speed)$ Tester offers Service Frames with mapped CE-VLAN IDs of length λ at an average rate greater than $CIR_A + EIR_A$ to the ingress UNI during a time interval T and measures the number of Service Frames delivered at the associated egress UNI. The amount of traffic delivered at the associated egress UNI must fall within the range $X \le (W_G + W_V) \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the egress UNI W_G is the amount of traffic accepted as Yellow over the time interval T that may be delivered to the egress UNI W_G is the amount of valid Service Frames Units Number of valid Service Frames	Dandwidth Drofile									
Test Procedure Test Procedur	Bandwidth Frome		Note 2: $(0 < EIR_A < In$ Note 3: $(CIR_A + EIR_A)$	ngress UNI Speed < Ingress UNI Sp), (EBS _A \geq r eed)	naximum Servi	ice Fram	ne size)		
Test Procedure Test Procedur		Not Specific	ed							
Units Number of valid Service Frames Variables Bandwidth Profile Parameters CIR _A , CBS _A , EIR _A , EBS _A , UNIs interface speed, time interval <i>T</i> , tolerated variance F, number and length λ of the offered Service Frames	Test Procedure	the ingress egress UNI $X \le (W_G + W_G)$ is UNI W_Y is	UNI during a time intent. The amount of traffic W_Y) $\leq Z$ where: the amount of traffic act the amount of traffic act	val T and measure delivered at the as cepted as Green cepted as Yellow	es the numb ssociated egover the time	er of Service Foress UNI must T that interval T that interval T that	rames d t fall with t should at may b	delivered at the as nin the range be delivered to the delivered to the	sociated ne egress	
number and length λ of the offered Service Frames	Units		•	- 1 - 1 - 1 - 1	((=	,,	- 71	/		
	Variables				S _A , UNIs in	terface speed,	time inte	erval T , tolerated	variance F,	
Results Pass or fail	Results	Pass or fail								
Remarks	Remarks									



TEST CASE 32: Type 1.2 UNI-N Mandatory CIR Configuration Granularity

		ABSTRA	CT TEST SUITE	FOR UNI	TYPE 1			
Test Name	Type 1 2 11	NI N Mandatony CIP Co	onfiguration Granu	larity				
Test Definition ID	U1.6.2.5-34	NI-N Mandatory CIR Co	oringulation Granu	ianty				
Reference		•••	INII) Toma 4 Image	t-ti A				
Document	MEF 13 [US	ser Network Interface (L	Type Timple	nentation A	greementj			
Test Type	Conforman	ce						
Test Status	Mandatory							
	A Type 1.2	UNI-N MUST allow cor	nfiguration to modi	fy CIR in the	following granu	ularities		
Requirement Description		1 Mbps steps up to 10 5 Mbps steps beyond 50 Mbps steps beyond 500 Mbps steps beyond	10 Mbps and up to I 100 Mbps and up	100 Mbps [to 1 Gbps [
Test Object	description	a Type 1.2 UNI-N allo section above						
Test Configuration	Bandwidth	ssociating two Type 1.2 Profile is applied at the n the configured EVC						
		INGRESS U	INI 'A'		FGI	RESS U	NI 'B'	1
		CE-VLAN ID	EVC	•	CE-VLAN		EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*		EVC ₁	
Map		Use of other CE-VLAI conforms to MEF 10 [E-VLAN IDs	
		The CE-VLAN ID for upoth ingress and egre		rity tagged S	ervice Frames	is config	jured to 11 at	
			DEF	NODECC	LINII			1
		UNI	PER	RINGRESS	andwidth Prof	ile Dere	meters	
Bandwidth Profile		UNI			R _A CBS _A	EIR _A	EBS _A	
24.14.11.4.11.1.15.11.5		Note 1: (0 < CIR _A < II Note 2: (Ingress CIR _A Note 3: (EIR _A = 0) an	ngress UNI Speed), (CBS _A ≥ r			,,	
Service Performance	Not Specific	ed						
	ingress UN	rs Service Frames with I during a time interval amount of traffic delivere	T and measures th	ne number o	f Service Frame	es delive	red at the associ	ated egress
Test Procedure	$UNI \cdot X_A = ($	the amount of traffic ac $CIR_A*T + CBS_A - F$) an	$nd Z_A = (CIR_A * T +$	CBS _A + F)				
	CIR range.	est with CIR _A set to the					the step value de	fined for the
Units		test for each CIR _A valu valid Service Frames	ie untii CIR _A has b	een increme	ented to the UN	ı speed		
Variables	Bandwidth	Profile Parameters CIR the offered Service Frai		erface speed	, time interval 7	Γ, tolerat	ed variance F, nu	ımber and
Results	Pass or fail							
Remarks								
Remarks								



TEST CASE 33: Type 1.2 UNI-N Mandatory EIR Configuration Granularity

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1			
Test Name	Type 1.2 U	NI-N Mandatory EIR Co	nfiguration Granu	arity				
Test Definition ID	U1.6.2.5-34	1.2						
Reference Document	MEF 13 [U	ser Network Interface (L	JNI) Type 1 Implei	nentation A	.greement]			
Test Type	Conforman	ce						
Test Status	Mandatory							
Requirement Description		A Type 1.2 UNI-N MUST allow configuration to modify EIR in the following granularities 1 Mbps steps up to 10 Mbps [EIR range 1] 5 Mbps steps beyond 10 Mbps and up to 100 Mbps [EIR range 2] 50 Mbps steps beyond 100 Mbps and up to 1 Gbps [EIR range 3] 500 Mbps steps beyond 1 Gbps [EIR range 4]						
Test Object	description	Verify that a Type 1.2 UNI-N allows configuration to modify EIR in the granularities described in the requirement description section above One EVC associating two Type 1.2 UNIs is configured. At least one CE-VLAN ID is mapped to the EVC and one						
Test Configuration	Bandwidth	associating two Type 1.2 Profile is applied at the n the configured EVC	UNIs is configure UNI. Tes	d. At least ers with pro	one CE-VLAN I oper PHY that m	D is map atches e	oped to the EVC a each UNI are attace	ind one ched to
		INGRESS U	JNI 'A'		EGI	RESS UI	NI 'B']
		CE-VLAN ID	EVC		CE-VLAN		EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*		EVC ₁	=
Map		Use of other CE-VLAN	N IDs is permitted				·	,
		The CE-VLAN ID for uboth ingress and egre	intagged and prior				ured to 11 at	
			PEF	INGRESS	UNI			
		UNI		E	Bandwidth Prof	ile Paraı	meters	
Bandwidth Profile		UNIA			IR _A CBS _A	EIRA	EBS _A	
24.14.11.4.11.1.10.110		Note 1: (CIR _A = 0) an Note 2: (0 < EIR _A < Ir Note 3: (Ingress EIR _A	gress UNI Speed), (EBS _A ≥ r				
Service Performance	Not Specifi	ed						
	ingress UN UNI. The a	rs Service Frames with I I during a time interval in Amount of traffic delivered the amount of traffic acc	Tand measures the associated	e number o d egress U	of Service Frame NI must fall with	es delive in the rai	red at the associange $X \le W_Y \le Z$ w	ated egress /here:
Test Procedure		the amount of traffic acc EIR _A * T + EBS _A - F) and			e miervar / iffat	ппау ве	delivered to tile (zgress UNI
	Begin the to EIR range.	est with EIR _A set to the	minimum value (i.	e. 1 Mbps) a	and increment E	IR _A by th	he step value defi	ned for the
	Repeat the	test for each EIR _A value	e until EIR _A has b	een increm	ented to the UNI	speed		
Units	Number of	valid Service Frames						
Variables		Profile Parameters EIR, the offered Service Frar		rface speed	d, time interval 7	, tolerate	ed variance F, nui	mber and
Results	Pass or fail							-
Remarks								
	l							



TEST CASE 34: Type 1.2 UNI-N Optional CIR Configuration Granularity

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1				
Test Name	Type 1.2 UNI-N Option	nal CIR Conf	iguration Granula	rity					
Test Definition ID	U1.6.2.5-35.1								
Reference Document	MEF 13 [User Network	k Interface (L	INI) Type 1 Implei	mentation A	greement]				
Test Type	Conformance								
Test Status	Optional								
	A Type 1.2 UNI-N SHO	Type 1.2 UNI-N SHOULD allow configuration to modify CIR in the following granularities							
Requirement Description	1.422 Mbp43.008 Mb	 64 Kbps (DS0 rate) steps up to 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) [CIR range 1] 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) steps up to 50 Mbps [CIR range 2] 43.008 Mbps (VC3 rate) steps beyond 50 Mbps and up to 150 Mbps [CIR range 3] 133.12 Mbps (VC4 rate) steps beyond 150 Mbps [CIR range 4] 							
Test Object	Verify that a Type 1.2 UNI-N allows configuration to modify CIR in the granularities described in the requirement description section above								
Test Configuration	Bandwidth Profile is ap	One EVC associating two Type 1.2 UNIs is configured. At least one CE-VLAN ID is mapped to the EVC and one Bandwidth Profile is applied at the ingress UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC							
		INGRESS U	INI 'A'		FG	RESS U	NI 'R'	1	
		LAN ID	EVC		CE-VLAN		EVC		
OF MI AN ID/EMO		1*	EVC ₁		11*	טו	EVC ₁		
CE-VLAN ID/EVC Map	Use of oth	ner CE-VLAN	I IDs is permitted Ethernet Services		at configuration			=	
		/LAN ID for uess and egree	ntagged and priorss UNIs	rity tagged S	Service Frames	is config	jured to 11 at]	
			PEF	RINGRESS	UNI				
		UNI		В	andwidth Prof	file Para	meters		
Bandwidth Profile		UNIA		С	IR _A CBS _A	EIRA	EBS _A		
	Note 2 : (Ingress CIR,	ngress UNI Speed $\Delta \leq \text{Egress UNI Speed}$ d (EBS $\Delta = 0$)		maximum Serv	ice Fram	ne size)		
Service	Not Specified								
Performance		Framos with	manned CE \/I ^A	LIDe of long	th A at an avar	ago roto	groater than CID	to the	
	Tester offers Service F ingress UNI during a ti UNI. The amount of tr	me interval	and measures th	ne number o	f Service Fram	es delive	red at the associa	ated egress	
	 W_G is the amount 			•			•		
Test Procedure	UNI $X_A = (CIR_A * T + CIR_A * T + CIR_A$	CBS, - F) and	$dZ_{\Lambda} = (CIR_{\Lambda} * T +$	CBS ₄ + F)					
	Begin the test with CIF the CIR range.	•	,	,	and increment	CIR _A by	the step value de	fined for	
	Repeat the test for each	ch CIR , valu	e until CIR⊼ has h	een increme	ented to the UN	ll speed			
Units	Number of valid Service					.,			
Variables	Bandwidth Profile Para Service Frames, amou				d, time interval	T, numbe	er and length λ of	the offered	
Results	Pass or fail								
Nesuits	. add or fall								



Remarks

TEST CASE 35: Type 1.2 UNI-N Optional EIR Configuration Granularity

ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.2 U	Type 1.2 UNI-N Optional EIR Configuration Granularity					
Test Definition ID	U1.6.2.5-35	U1.6.2.5-35.2					
Reference Document	MEF 13 [U	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	Conformance					
Test Status	Optional						
Requirement Description		A Type 1.2 UNI-N SHOULD allow configuration to modify EIR in the following granularities - 64 Kbps (DS0 rate) steps up to 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) [EIR range 1] - 1.422 Mbps (VC11 rate) or 1.932 Mbps (VC12 rate) steps up to 50 Mbps [EIR range 2] - 43.008 Mbps (VC3 rate) steps beyond 50 Mbps and up to 150 Mbps [EIR range 3] - 133.12 Mbps (VC4 rate) steps beyond 150 Mbps [EIR range 4]					
Test Object		a Type 1.2 UNI-N allow section above	ws configuration	o modify E	IR in the granularities	described in the	requirement
Test Configuration	Bandwidth	ssociating two Type 1.2 Profile is applied at the in the configured EVC					
		INGRESS U	NI 'A'		EGRESS	UNI 'B'	
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁	
Мар		Use of other CE-VLAN conforms to MEF 10 [8				CE-VLAN IDs	=
		The CE-VLAN ID for u both ingress and egree		ity tagged S	Service Frames is confi	igured to 11 at	
			PFF	RINGRESS	UNI		
		UNI	<u> </u>		Sandwidth Profile Par	ameters	
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	EBS _A	
		Note 1: (CIR _A = 0) and Note 2: (0 < EIR _A < In Note 3: (Ingress EIR _A	gress UNI Speed		naximum Service Fran	ne size)	
Service Performance	Not Specifi	ed					
Test Procedure	Tester offers Service Frames with mapped CE-VLAN IDs of length λ at an average rate greater than EIR _A to the ingress UNI during a time interval T and measures the number of Service Frames delivered at the associated egress UNI. The amount of traffic delivered at the associated egress UNI must fall within the range $X \le W_Y \le Z$ where: • W_Y is the amount of traffic accepted as Yellow over the time interval T that may be delivered to the egress UNI						
Units	•	test for each EIR _A value valid Service Frames	J GITHI LINA HAS D		Shicu to the Ohi speed	1	
Variables	Bandwidth	Profile Parameters EIR, the offered Service Fran		rface speed	I, time interval <i>T</i> , tolera	ated variance F, nu	mber and



Pomarke	
Results	Pass or fail



TEST CASE 36: Type 1.2 UNI-N CBS Configuration

	ABSTRA	CT TEST SUITE FO	OR UNI T	YPE 1			
Test Name	Type 1.2 UNI-N CBS Configuration	n					
Test Definition ID	U1.6.2.5-36.1	J1.6.2.5-36.1					
Reference Document	MEF 13 [User Network Interface (I	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	A Type 1.2 UNI-N MUST be able t 8 x 1522 bytes = 12176 bytes	o at least support CB	S values th	nat are equal to or g	greater than 8 x M	1TU =	
Test Object	Verify that a Type 1.2 UNI-N can a 8 x 1522 bytes = 12176 bytes						
Test Configuration	One EVC associating two Type 1.2 Bandwidth Profile is applied at the both UNIs in the configured EVC						
	INGRESS	INI 'A'		EGRESS	S UNL 'B'		
	CE-VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC	11*	EVC ₁		11*	EVC ₁		
Мар	Use of other CE-VLAI conforms to MEF 10 [
	The CE-VLAN ID for to both ingress and egre		tagged Se	ervice Frames is cor	nfigured to 11 at		
	PER WORLDOWN						
	115.0	PER IN	NGRESS U				
Bandwidth Profile	UNI UNI		CIF	ndwidth Profile Pa			
	Note 1: (0 < CIR _A < In Note 2: (Ingress CIR _A Note 3: (EIR _A = 0) an	ngress UNI Speed), (CBS _A ≥ 12				
Service Performance	Not Specified	Not Specified					
	Tester offers Service Frames with mapped CE-VLAN IDs of length λ at an average rate equal to CIR _A to the ingress UNI during a time interval T . At time $T/2$ tester injects a burst of ingress Service Frames greater than CBS _A . Tester measures the number of Service Frames delivered at the associated egress UNI. The amount of traffic delivered at the associated egress UNI must fall within the range $X \le W_G \le Z$ where: • W_G is the amount of traffic accepted as Green over the time interval T that should be delivered to the egress UNI • $X_A = (CIR_A*T + CBS_A - F)$ and $Z_A = (CIR_A*T + CBS_A + F)$						
Test Procedure	UNI during a time interval <i>T</i> . At tin measures the number of Service F the associated egress UNI must fa • W _G is the amount of traffic ac UNI	ne $\overline{T}/2$ tester injects a Frames delivered at that within the range X scepted as Green over	burst of in the associated $\leq W_G \leq Z$ where the time	ngress Service Fram ted egress UNI. Th where:	nes greater than (e amount of traffi	CBS _A . Tester c delivered at	
Test Procedure Units	UNI during a time interval <i>T</i> . At tin measures the number of Service F the associated egress UNI must fa • W _G is the amount of traffic ac UNI	ne $\overline{T}/2$ tester injects a Frames delivered at that within the range X scepted as Green over	burst of in the associated $\leq W_G \leq Z$ where the time	ngress Service Fram ted egress UNI. Th where:	nes greater than (e amount of traffi	CBS _A . Tester c delivered at	
	UNI during a time interval T . At tin measures the number of Service F the associated egress UNI must far W_G is the amount of traffic ac UNI $X_A = (CIR_A*T + CBS_A - F)$ and	the $T/2$ tester injects a Frames delivered at the all within the range X succepted as Green ove and $Z_A = (CIR_A*T + CB)$ $X_{A_A} = CBS_{A_A}$ UNIs interfal	a burst of inne associated $\leq W_G \leq Z$ when the time $\leq S_A + F$	ngress Service Fram ted egress UNI. Th where: interval T that shou	nes greater than on e amount of trafficulation and trafficulation to the delivered to the d	CBS _A . Tester c delivered at o the egress	
Units	UNI during a time interval T . At tin measures the number of Service F the associated egress UNI must far W_G is the amount of traffic ac UNI $X_A = (CIR_A*T + CBS_A - F)$ and Number of valid Service Frames Bandwidth Profile Parameters CIR	the $T/2$ tester injects a Frames delivered at the all within the range X succepted as Green ove and $Z_A = (CIR_A*T + CB)$ $X_{A_A} = CBS_{A_A}$ UNIs interfal	a burst of inne associated $\leq W_G \leq Z$ when the time $\leq S_A + F$	ngress Service Fram ted egress UNI. Th where: interval T that shou	nes greater than on e amount of trafficulation and trafficulation to the delivered to the d	CBS _A . Tester c delivered at o the egress	



TEST CASE 37: Type 1.2 UNI-N EBS Configuration

		ABSTRAG	CT TEST SUITE	FOR UNI	TYPE 1			
					/			
Test Name		NI-N EBS Configuration	1					
Test Definition ID Reference	U1.6.2.5-36	5.2						
Document	MEF 13 [Us	IEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]						
Test Type	Conformano	ce						
Test Status	Mandatory							
Requirement Description		A Type 1.2 UNI-N MUST be able to at least support EBS values that are equal to or greater than 8 x MTU = 8 x 1522 bytes = 12176 bytes						
Test Object		Verify that a Type 1.2 UNI-N can at least support EBS values that are equal to or greater than 8 x MTU = 3 x 1522 bytes = 12176 bytes						
Test Configuration	Bandwidth F					apped to the EVC and one each UNI are attached to		
	Г	Monroe	INII (A)	Г	FORFOO	LINI (D)		
		INGRESS U	EVC	-	CE-VLAN ID	EVC		
05.1/1.411.15/51/0	-	11*	EVC ₁		11*	EVC ₁		
CE-VLAN ID/EVC		Use of other CE-VLAN		provided the		· · · · · · · · · · · · · · · · · · ·		
Мар		conforms to MEF 10 [Ethernet Services	Attributes P	hase 1], Section 7.5.1	CL-VLAIN IDS		
		The CE-VLAN ID for u		ity tagged S	ervice Frames is conf	igured to 11 at		
		both ingress and egre	ss UNIs					
	ſ							
	PER INGRESS UNI							
			PER	INGRESS	UNI			
		UNI		В	andwidth Profile Par			
Bandwidth Profile		UNIA		В		ameters EBS _A		
Bandwidth Profile		UNI _A Note 1: (CIR _A = 0) an	d (CBS _A = 0)	B C	andwidth Profile Par			
Bandwidth Profile		UNIA	d (CBS _A = 0) ngress UNI Speed	B Cl), (EBS _A ≥ 1	andwidth Profile Par			
Bandwidth Profile Service Performance	Not Specifie		d (CBS _A = 0) ngress UNI Speed	B Cl), (EBS _A ≥ 1	andwidth Profile Par			
Service	Tester offer UNI during a measures that the associ	Note 1: (CIR _A = 0) an Note 2: (0 < EIR _A < Ir Note 3: (Ingress EIR _A) ed s Service Frames with a time interval <i>T</i> . At time number of Service Fraited egress UNI must	d (CBS _A = 0) ngress UNI Speed ≤ Egress UNI Speed mapped CE-VLAN ne 7/2 tester inject frames delivered a fall within the rang	B Cl), (EBS _A ≥ 1 eed) I IDs of leng s a burst of t the associa ge $X \le W_Y \le$ over the time	andwidth Profile Par RA CBSA EIRA 2176 bytes) th \(\lambda \) at an average rate ingress Service Frame ated egress UNI. The Z where:		ster ed	
Service Performance	Tester offer UNI during a measures that the associate W_Y is the $X_A = (I_1 \cup I_2)$	Note 1: (CIR _A = 0) an Note 2: (0 < EIR _A < Ir Note 3: (Ingress EIR _A) ed s Service Frames with a time interval <i>T</i> . At time number of Service F ciated egress UNI must the amount of traffic acceptable.	d (CBS _A = 0) ngress UNI Speed ≤ Egress UNI Speed mapped CE-VLAN ne 7/2 tester inject frames delivered a fall within the rang	B Cl), (EBS _A ≥ 1 eed) I IDs of leng s a burst of t the associa ge $X \le W_Y \le$ over the time	andwidth Profile Par RA CBSA EIRA 2176 bytes) th \(\lambda \) at an average rate ingress Service Frame ated egress UNI. The Z where:	e equal to EIR _A to the ingress greater than EBS _A . Teste amount of traffic delivered	ster ed	
Service Performance Test Procedure	Tester offer UNI during a measures that the associous $X_A = (I$	Note 1: (CIR _A = 0) an Note 2: (0 < EIR _A < Ir Note 3: (Ingress EIR _A) ed s Service Frames with a time interval <i>T</i> . At time number of Service Frated egress UNI must the amount of traffic accellr _A * <i>T</i> + EBS _A - F) and walid Service Frames	d (CBS _A = 0) ngress UNI Speed	B Cl (EBS _A ≥ 1 eed) I IDs of leng s a burst of t the associa ge $X \le W_Y \le$ over the time EBS _A + F)	andwidth Profile Par RA CBSA EIRA 2176 bytes) th A at an average rate ingress Service Frame ated egress UNI The Z where:	e equal to EIR _A to the ingress greater than EBS _A . Teste amount of traffic delivered	ed UNI	
Service Performance Test Procedure Units	Tester offer UNI during a measures that the associous $X_A = (I$	Note 1: (CIR _A = 0) an Note 2: (0 < EIR _A < Ir Note 3: (Ingress EIR _A) ed s Service Frames with a time interval <i>T</i> . At time number of Service Frated egress UNI must the amount of traffic acted the amount of traffic acted EIR _A * <i>T</i> + EBS _A - F) and walid Service Frames Profile Parameters EIR	d (CBS _A = 0) ngress UNI Speed	B Cl (EBS _A ≥ 1 eed) I IDs of leng s a burst of t the associa ge $X \le W_Y \le$ over the time EBS _A + F)	andwidth Profile Par RA CBSA EIRA 2176 bytes) th A at an average rate ingress Service Frame ated egress UNI The Z where:	e equal to EIR _A to the ingrees greater than EBS _A . Test the amount of traffic delivered to the egress to the eg	ster ed UNI	



TEST CASE 38: Type 1.2 UNI-N Optional Layer 2 Control Protocol Discard

ABSTRACT TEST SUITE FOR UNI TYPE 1								
Test Name	Type 1.2 U	NI-N Optional Layer 2 C	ontrol Protocol Di	iscard				
Test Definition ID	U1.6.2.6-37	U1.6.2.6-37						
Reference Document	MEF 13 [Us	ser Network Interface (U	NI) Type 1 Imple	mentation A	greement]			
Test Type	Conforman	ce						
Test Status	Optional	Optional						
Requirement Description	A Type 1.2	A Type 1.2 UNI-N SHOULD be able to discard the following L2 Control Protocols Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP) All LANs Bridge Management Group Block of Protocol Generic Attribute Registration Protocol (GARP) Link Aggregation Control Protocol (LACP) Marker Protocol Authentication (802.1x) 802.3x (PAUSE) frames						
Test Object	Verify that above	a Type 1.2 UNI-N can d	liscard each L2 C	Control Proto	ocol described in the re	equirement descrip	otion section	
Test Configuration	One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. A per Ingress UNI bandwidth profile is applied at the UNI. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC							
		INGRESS UNI 'A' EGRESS UNI 'B'						
						1		
		CE-VLAN ID	EVC		CE-VLAN ID	EVC		
CE-VLAN ID/EVC Map		11*	EVC ₁		11*	EVC ₁		
Мар		Use of other CE-VLAN conforms to MEF 10 [at configuration of the C Phase 11. Section 7.5.1	CE-VLAN IDs		
			ntagged and prio		Service Frames is confi	gured to 11 at		
			PEF	RINGRESS	UNI			
		UNI		E	Bandwidth Profile Para	ameters		
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	EBS _A	_	
		Note 1: $(0 < CIR_A < In$ Note 2: $(Ingress CIR_A$ Note 3: $(EIR_A = 0)$ and	≤ Egress UNI Sp	l), (CBS _A ≥ l eed)	maximum Service Fram	ne size)		
Service Performance	Not Specific	ed						
Test Procedure	above at th	rs Service Frames carryi e ingress UNI and verifie . The L2CPs Destinatio	es that the corres	ponding Sei	rvice Frames are not de	elivered at the ass	ociated	
Units	Number of	valid Service Frames ca	rrying the L2CPs					
Variables	L2CP, Ban	dwidth Profile Paramete	rs CIR _{A,} CBS _A , U	NIs interfac	e speed			
Results	Pass or fail							
Remarks								



TEST CASE 39: Type 1.2 UNI-N Optional Layer 2 Control Protocol Generation

ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.2 U	NI-N Optional Layer 2 C	ontrol Protocol G	eneration			
Test Definition ID	U1.6.2.6-38	J1.6.2.6-38					
Reference Document	MEF 13 [U	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	ce					
Test Status	Optional						
Requirement Description	A Type 1.2	UNI-N SHOULD NOT 9	jenerate 802.3x P	AUSE fram	es		
Test Object	Verify that	a Type 1.2 UNI-N does	not generate 802.	3x PAUSE 1	frames		
Test Configuration	Bandwidth	associating two Type 1.2 Profile is applied at the PHY that matches each	ingress UNI. A pe	r Ingress Ul	NI bandwidth profile is a	pplied at the UNI	
		INODESC II	INII (A)		F005001	INII (D)	1
		INGRESS U			EGRESS U		
CE-VLAN ID/EVC		CE-VLAN ID	EVC ₁		CE-VLAN ID	EVC ₁	+
Map		Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs					
	conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1 The CE-VLAN ID for untagged and priority tagged Service Frames is configured to 11 a						
		both ingress and egre		ity tagged s	Service Frames is comi	gured to 11 at	
			DEI	INGRESS	LIMI		1
		UNI	PER	1	Bandwidth Profile Para	amotors	
Bandwidth Profile		UNIA			IR _A CBS _A EIR _A	_	
			$d (EBS_A = 0)$	/2), (CBS _A	≥ maximum Service Fra	EBS _A ame size)	
Service Performance	Not Specifi	ed					
Test Procedure		rs Service Frames with verifies that no 802.3x F				age rate equal to	the UNI
Units	Number of	valid Service Frames ca	rrying he L2CPs				
Variables	Bandwidth	Profile Parameters CIR	$_{A,}$ CBS $_{A,}$ UNIs int	erface spee	ed		
Results	Pass or fail						
Remarks							



TEST CASE 40: Type 1.2 UNI-N Concurrent Point-to-Point and Multipoint EVCs

ABSTRACT TEST SUITE FOR UNI TYPE 1									
Test Name	Type 1.2 l	JNI-N Concu	urrent Point-1	to-Point	and Multipoint EV	Cs			
Test Definition ID	U1.6.2.7-4	10							
Reference Document	MEF 13 [L	Jser Networl	k Interface (l	JNI) Typ	oe 1 Implementation	on Agreemer	nt]		
Test Type	Conforma	onformance							
Test Status	Mandatory	/							
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to support Point-to-Point and Multipoint EVCs concurrently							
Test Object	Verify that	Verify that a Type 1.2 UNI-N can support Point-to-Point and Multipoint EVCs concurrently							
Test Configuration	are config	One Multipoint and one Point-to-Point EVCs associating one Type 1.2 ingress UNI and two Type 1.2 egress UNIs are configured and at least one CE-VLAN ID is mapped per EVC. Per EVC bandwidth profiles are applied at all UNIs. Testers with proper PHY that matches each UNI are attached to all UNIs in the configured EVCs							
		UNI 'A	,		UNI 'E	3'		UNI '	C'
	CE-	VLAN ID	EVC		CE-VLAN ID	EVC		CE-VLAN ID	EVC
		11*	EVC ₁		11*	EVC ₁		11*	EVC ₁
CE-VLAN ID/EVC Map		12	EVC ₂		12	EVC ₂			
	10 [E	thernet Serv	ices Attribut	es Pha	ed provided that cose 1], Section 7.5. riority tagged Serv	1			
					PER E	NC.			
			EVC						
			EVC ₁			th Profile Pa	EBS ₁	10	
Bandwidth Profile			EVC ₂			BS ₂ EIR ₂	EBS ₂		
		Note 2: (Σ) < CIR _{1,2} < I	Rs ≤ Egi	UNI Speed), (CBS ress UNI Speed)			ice Frame size)	
Service Performance	Not Specif	fied							
Test Procedure					d CE-VLAN IDs bio ames are successf				the EVCs and e associated UNIs.
Units	Number of	f valid Servi	ce Frames						
Variables	Bandwidth	Profile Para	ameters CIR	1, CBS ₁	, CIR _{2,} CBS _{2,} UNI	s interface s	peed		
Results	Pass or fa	il							
Remarks									



TEST CASE 41: Type 1.2 UNI-N CE-VLAN ID Preservation

ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.2 U	NI-N CE-VLAN ID Prese	ervation				
Test Definition ID	U1.6.2.8-41	J1.6.2.8-41					
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	Conformance					
Test Status	Mandatory	Mandatory					
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to support CE-VLAN ID preservation					
Test Object	·	a Type 1.2 UNI-N can su		•			
Test Configuration	Ingress UN	associating two Type 1.2 Il bandwidth profile is ap Is in the configured EVC	plied at both UNIs				
		UNI 'A	,		UNI 'E	3'	1
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁	
Мар		Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1					
		The CE-VLAN ID for u both ingress and egree		ity tagged S	Service Frames is confi	gured to 11 at	
			PFF	RINGRESS	UNI		
		UNI		Bandwidth Profile Parameters			
Bandwidth Profile		UNI		_	CIR CBS EIR	EBS	
		Note 1: (0 < CIR < Inc Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and	Egress UNI Spe		aximum Service Frame	size)	
Service Performance	Not Specific	ed					
Test Procedure	Tester offer verifies that	rs Service Frames with r t the corresponding Serv	mapped CE-VLAN vice Frames are d	I IDs bidired elivered at t	ctionally at each UNI control the associated UNI with	nfigured in the EV0 CE-VLAN ID pres	C and ervation
Units	Number of	valid Service Frames					
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed			
Results	Pass or fail						
Remarks							



TEST CASE 42: Type 1.2 UNI-N CE-VLAN CoS Preservation

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1		
Test Name	Type 1.2 U	NI-N CE-VLAN CoS Pre	eservation				
Test Definition ID	U1.6.2.9-42	J1.6.2.9-42					
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	Conformance					
Test Status	Mandatory	Mandatory					
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to support CE-VLAN CoS preservation					
Test Object	Verify that a	a Type 1.2 UNI-N can sı	upport CE-VLAN (CoS preserv	vation		
Test Configuration	Ingress UN	ssociating two Type 1.2 I bandwidth profile is ap s in the configured EVC	plied at both UNIs				
	ı	UNI 'A	,		UNI 'E	3'	1
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁	
Мар	Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VL conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1				E-VLAN IDs		
		The CE-VLAN ID for u both ingress and egree		rity tagged S	Service Frames is confiç	gured to 11 at	<u> </u>
			PEF	RINGRESS	UNI		
		UNI		E	Bandwidth Profile Para	ameters	
Bandwidth Profile		UNI			CIR CBS EIR	EBS	
		Note 1: (0 < CIR < Inc Note 2: (Ingress CIR s Note 3: (EIR = 0) and	Egress UNI Spe		aximum Service Frame	size)	
Service Performance	Not Specific	ed					
Test Procedure	UNI configu	rs tagged Service Frame ured in the EVC and veri AN CoS preservation					
Units	Number of	valid Service Frames					
Variables	Bandwidth	Profile Parameters CIR	CBS, UNIs interf	ace speed			
Results	Pass or fail						
Remarks							



TEST CASE 43: Type 1.2 UNI-N Broadcast & Multicast Service Frame Unconditional Delivery

ABSTRACT TEST SUITE FOR UNI TYPE 1							
Test Name	Type 1.2 U	NI-N Broadcast & Multic	ast Service Fram	e Uncondition	onal Delivery		
Test Definition ID	U1.6.2.10-4	U1.6.2.10-43					
Reference Document	MEF 13 [U	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	ce					
Test Status	Mandatory						
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to deliver multicast and broadcast Service Frames unconditionally, except: Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP) All LANs Bridge Management Group Block of Protocol Generic Attribute Registration Protocol (GARP) Link Aggregation Control Protocol (LACP) Marker Protocol Authentication (802.1x) 802.3x (PAUSE) frames					
Test Object	listed in the	a Type 1.2 UNI-N can de requirement description	n above				
Test Configuration	Ingress UN	One EVC associating two Type 1.2 UNIs is configured and at least one CE-VLAN ID is mapped to the EVC. A per Ingress UNI bandwidth profile is applied at both UNIs. Testers with proper PHY that matches each UNI are attached to both UNIs in the configured EVC					
		UNI 'A' UNI 'B'					
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC ₁	
Map		Use of other CE-VLAN conforms to MEF 10 [E			at configuration of the C Phase 1], Section 7.5.1	CE-VLAN IDs	
		The CE-VLAN ID for u both ingress and egres		ity tagged S	Service Frames is confi	gured to 11 at	
			PEF	INGRESS	UNI]
		UNI		E	Bandwidth Profile Para	ameters	
Bandwidth Profile		UNI			CIR CBS EIR	EBS	
		Note 1: (0 < CIR < Ingress UNI Speed), (CBS ≥ maximum Service Frame size) Note 2: (Ingress CIR ≤ Egress UNI Speed) Note 3: (EIR = 0) and (EBS = 0)					
Service Performance	Not Specifi						
Test Procedure		rs multicast and broadca ally at each UNI configurented UNI					
Units	Number of	valid Service Frames					
Variables	Frame Form	mat (broadcast, multicas	t), Bandwidth Pro	file Parame	eters CIR, CBS, UNIs in	terface speed	
Results	Pass or fail						
Remarks							



TEST CASE 44: Type 1.2 UNI-N Unicast Service Frame Unconditional Delivery

		ABSTRAC	CT TEST SUITE	FOR UNI	TYPE 1		
Test Name	Type 1.2 U	NI-N Unicast Service Fra	ame Unconditions	al Delivery			
Test Definition ID	U1.6.1.8-44	J1.6.1.8-44					
Reference Document	MEF 13 [Us	MEF 13 [User Network Interface (UNI) Type 1 Implementation Agreement]					
Test Type	Conforman	Conformance					
Test Status	Mandatory	Mandatory					
Requirement Description	A Type 1.2	A Type 1.2 UNI-N MUST be able to deliver all unicast Service Frames unconditionally					
Test Object	Verify that a	a Type 1.2 UNI-N can de	eliver all unicast S	ervice Fran	ne unconditionally		
Test Configuration	Ingress UN	associating two Type 1.2 Il bandwidth profile is ap Is in the configured EVC	plied at both UNIs	ed and at lea s. Testers v	ast one CE-VLAN ID is with proper PHY that ma	mapped to the EV atches each UNI a	C. A per re attached
		UNI 'A	,		UNI 'I	3'	
		CE-VLAN ID	EVC		CE-VLAN ID	EVC	
CE-VLAN ID/EVC		11*	EVC ₁		11*	EVC₁	
Мар		Use of other CE-VLAN IDs is permitted provided that configuration of the CE-VLAN IDs conforms to MEF 10 [Ethernet Services Attributes Phase 1], Section 7.5.1					
		The CE-VLAN ID for u both ingress and egres		ity tagged S	Service Frames is confi	gured to 11 at]
			PEF	RINGRESS	UNI		1
		UNI		E	Bandwidth Profile Para	ameters	<u>-</u>
Bandwidth Profile		UNI			CIR CBS EIR	EBS	
		Note 1: (0 < CIR < Ing Note 2: (Ingress CIR ≤ Note 3: (EIR = 0) and	Egress UNI Spe	, (CBS ≥ ma ed)	aximum Service Frame	size)	
Service Performance	Not Specific	ed					
Test Procedure		rs unicast Service Frame onfigured in the EVC an					
Units	Number of	valid Service Frames					
Variables	Bandwidth	Profile Parameters CIR,	CBS, UNIs interf	ace speed			
Results	Pass or fail						
Remarks							



11. References

References	Details
IEEE 802.3	IEEE P 802.3 – 2002, Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications, 8 March 2002. (Normative)
IEEE 802.3ae	IEEE 802.3ae-2002Information Technology - Local & Metropolitan Area Networks - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Media Access Control Parameters, Physical Layers and Management Parameters for 10 Gb/s Operation
IEEE 802.1Q	IEEE 802.1Q, 2003 Edition, IEEE Standards for Local and metropolitan area networks—Virtual Bridged Local Area Networks
MEF 4	Metro Ethernet Network Architecture Framework - Part 1: Generic Framework
MEF 6	Ethernet Services Definitions
MEF 10	Ethernet Services Attributes Phase 1
MEF 11	User Network Interface (UNI) Requirements and Framework
MEF 13	User Network Interface (UNI) Implementation Agreement
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