# MEF

# Technical Specification MEF 34

# Abstract Test Suite For Ethernet Access Services

February 2012

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## 1. Abstract

This document defines test procedures for testing and certification of Ethernet Access Services namely Access EPL and Access EVPL deployed in operator networks. The test cases are based on requirements defined in MEF 33 'Ethernet Access Services Definitions' and in MEF 23.1 'Carrier Ethernet Class of Service Phase 2'.

## 2. Terminology

CE-VLAN ID	The 12 bit VLAN ID field in the C-Tag of a Service Frame
Color Forwarding	An OVC attribute defining the relationship between the Color of an egress ENNI Frame and the Color of the corresponding ingress ENNI Frame or Service Frame
CoS Frame Set	A set of Service or ENNI Frames that have a commitment from the Operator or Service Provider subject to a particular set of performance objectives.
CoS Identifier for Service Frames	The mechanism and/or values of the parameters in the mechanism to be used to identify the CoS Name that applies to the frame at a given UNI
CoS Identifier for EFO	The mechanism and/or values of the parameters in the mechanism to be used to identify the CoS Name that applies to the frame at a given ENNI that maps to an OVC End Point.
CoS Label	A CoS Name that is standardized in this document. Each CoS Label identifies four Performance Tiers where each Performance Tier contains a set of performance objectives and associated parameters.
CoS Name	A designation given to one or more sets of performance objectives and associated parameters by the Service Provider or Operator.
СРО	CoS Performance Objective
C-Tag	Subscriber VLAN Tag
EFO	ENNI Frame that maps to OVC End Point
ENNI	A reference point representing the boundary between two Operator MENs that are operated as separate administrative domains
ENNI Frame	The first bit of the Destination Address to the last bit of the Frame Check Sequence of the Ethernet Frame transmitted across the ENNI
EVC	An association of two or more UNIs
External Interface	Either a UNI or an ENNI
FD	Frame Delay
FDR	Frame Delay Range
FLR	Frame Loss Ratio
IFDV	Inter-Frame Delay Variation
MEN	A Metro Ethernet Network comprising a single administrative domain
MFD	Mean Frame Delay
MTU	Maximum Transmission Unit
Operator	Also Network Operator . The Administrative Entity of a MEN
-	



Operator Virtual Connection	An association of OVC EPs
OVC	Operator Virtual Connection
OVC End Point	An association of an OVC with a specific External Interface i.e., UNI, ENNI
OVC EP	OVC End Point
OVC Identifier	String that is unique among all OVCs in the Operator MEN
РТ	Performance Tier
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 Provider	The organization providing UNI to UNI Ethernet service(s)
Subscriber	The organization purchasing and/or using Ethernet Services.
S-Tag	Service VLAN Tag.
S-VLAN ID	The 12 bit VLAN ID field in the S-Tag of an ENNI Frame
UNI	The physical demarcation point between the responsibility of the Service Provider and the responsibility of the Subscriber

## 3. Scope

The Abstract Test Suite for Ethernet Access Services describes test procedures based on requirements defined in MEF 33 'Ethernet Access Services Definitions' and in MEF 23.1 'Carrier Ethernet Class of Service Phase 2'.

An overview of the different groups of tests for Access EPL is provided as follows:

- Test cases for Operator Service Attributes
- o Test cases for Service OAM
- o Test cases for Bandwidth Profile
- Test Cases for Performance Attributes

An overview of the different groups of tests for Access EVPL is provided as follows:

- o Test cases for Operator Service Attributes
- o Test cases for Service OAM
- o Test cases for Bandwidth Profile
- Test Cases for Performance Attributes

Point-to-point OVCs from ENNI to ENNI and Multipoint OVCs are outside the scope of this document. The Abstract Test Suite for Ethernet Access Services may be updated in the future to reflect new work done in the MEF Technical Committee.

### 4. References

MEF 23.1Carrier Ethernet Class of Service Phase 2MEF 26.1External Network Network Interface (ENNI) Phase 1MEF 33 Ethernet Access Services Definitions

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## 5. Compliance Levels

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

## 6. Test Status Definitions

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

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

## 7. Introduction

This document defines test procedures for Access EPL and Access EVPL services, the OVC-based services defined in MEF 33 'Ethernet Access Service Definitions'.

The conformance requirements of Access EPL and Access EVPL Services verified in this Abstract Test Suite are defined in MEF 33 'Ethernet Access Service Definitions' whereas the requirements to verify Service Performance such as One-Way Frame Delay, One-Way Mean Frame Delay, Inter-Frame Delay Variation, Frame Delay Range and Frame Loss Ratio are defined in MEF 23.1 'Carrier Ethernet Class of Service Phase 2'.

These test procedures and associated certification program intend to help Operators to ensure that the OVC-based services they deploy are compliant to MEF technical specifications and support MEF defined Service Level Specifications.

These test procedures and associated certification program also intend to help Service Providers streamline the process for interconnecting OVC-based services and ensure that their end-to-end EVC-based services will preserve their attributes when delivered across out-of-franchise Operator MENs.

This Abstract Test Suite complements the existing Abstract Test Suites defined for EVC-based services, MEF 9 'Abstract Test for Ethernet Services at the UNI' and MEF 14 'Abstract Test Suite for Traffic Management Phase 1'.



## 8. Test Configuration for Ethernet Access Services

All test cases for Access EPL and Access EVPL Services defined in this document must be executed using a single test topology, where testers with PHYs that match the UNIs and the ENNI are attached to the external interfaces. A recommended minimum topology is depicted in Figure 1.

Configurations details such as OVC End Point maps at the UNI and at the ENNI, Bandwidth Profile parameters, values and variables are specified for each test case in Section 10 for Access EPL and in Section 11 for Access EVPL.

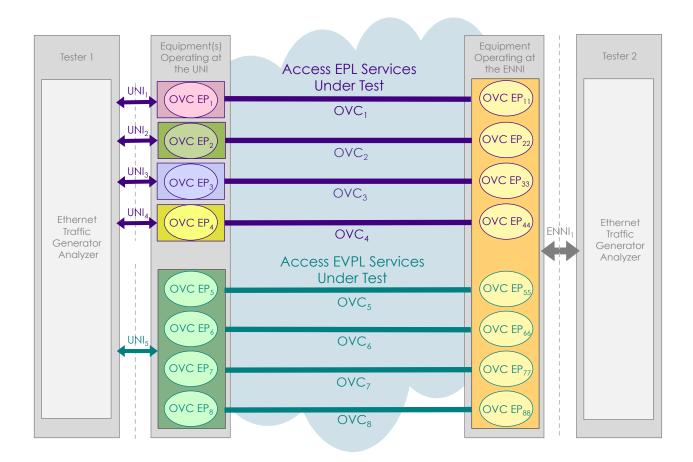


Figure 1: Ethernet Access Services overall test configuration

For Operator Service Attributes and Service OAM handling test cases, it is important to note:

- C-tag and S-tag formats of the Service Frames and ENNI Frames are specified in IEEE 802.1ad sections 9.5, 9.6 and 9.7.
- The OVC MTU size (in bytes) and the maximum number of CE-VLAN IDs per OVC are to be provided by the Operator.



For Bandwidth Profile test cases, the measurements are made in terms of Service Frame traffic or ENNI Frame traffic where the Service Frame or the ENNI Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence.

At the UNI and at the ENNI, one Bandwidth Profile is defined for each range of values, 1Mbps - 10 Mbps, 10Mbps - 100 Mbps, 100 Mbps - 1 Gbps and 1 Gbps - 10 Gbps associated with the applicable UNI speeds. It is to be noted that the requirement to support increments for each applicable range equal to  $1/10 \times UNI$  speed is tested by using prime number values for CIR.

The Bandwidth Profile enforcement verifications are executed by measuring the amount of traffic (in bytes) delivered at the egress OVC End Point that needs to be within a tolerance of the calculated amount of traffic (in bytes) accepted as Green at the ingress OVC End Point during the test time interval.

For the test cases where the Bandwidth Profile enforcement verification is executed from the UNI to the ENNI, appending the S-Tag adds four bytes per frame. These need to be subtracted when calculating the amount of traffic (in bytes) delivered to the egress OVC End Point.

For the test cases where the Bandwidth Profile enforcement verification is executed from the ENNI to the UNI, removing the S-Tag eliminates four bytes per frame. These need to be added when calculating the amount of traffic (in bytes) delivered to the egress OVC End Point.

For the test cases defined to verify One-Way Frame Delay, One-Way Mean Frame Delay, Inter-Frame Delay Variation, Frame Delay Range and Frame Loss Ratio, the OVC Related Performance Service Attributes apply to "Qualified" Service Frames or "Qualified" ENNI Frames as defined in MEF 26.1 section 7.2.16 Service Level Specification.

Also for the Access EPL and Access EVPL performance test cases, the applicable CoS Label and Performance Tier are to be provided by the Operator.

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## 9. Test Case Template for Ethernet Access Services

	Abstract Test Suite for Ethernet Access Services
Test Name	Name derived from reference documents
Test Definition ID	<ul> <li>A unique punctuated alphanumeric string assigned to each test case.</li> <li>Example: AEPL1_R3_R12 <ul> <li>AEPL1: Test Case number 1 applicable to Access EPL</li> <li>R3_R12: Requirement numbers of the requirements that need to be satisfied (See Annex 1 for the list of requirements for Access EPL and Access EVPL Services)</li> </ul> </li> </ul>
Test Type	Conformance or Performance
Test Status	Mandatory, Conditional Mandatory or Optional
Requirement Description	Description of the requirements that <b>MUST</b> or <b>SHOULD</b> be satisfied
Test Object	Succinct description of the test purpose
Test Configuration	Succinct description of the test bed configuration
Test Configuration Schematic	Test bed schematic. The variables can augment it
End Point Maps	Samples of OVC EP Maps are suggested. Variables augment them
Bandwidth Profile	Samples of Bandwidth Profile tables are suggested. Variables augment it
Test Procedure	Succinct description of the test procedure
Units	Units can be time units, rates, counts, etc, such as milliseconds, frames per second or numbers of valid frames
Variables	If any, variables such as UNI and ENNI interface speeds and bandwidth profile parameters are to be described
Results	Pass or Fail
Remarks	Description of any particular observations that might affect the test result

## 10.1 Test Cases for Access EPL – Operator Service Attributes

Test Case 1.1: CE-VLAN ID For Untagged and Priority Tagged Frames

			Abstract Test	Suite for Etherne	et Acc	ess Services			
Test Name		CE-VLAN ID For	Untagged and Priorit	ty Tagged Frames					
Test Definit ID	tion	AEPL1_R1_R3_R13							
Test Type		Conformance							
Test Status		Mandatory							
Requiremer Description		[R1] For an Access EPL service, the CE-VLAN ID for untagged and priority tagged Frames MUST be a value from 1 – 4094 [R3] For an Access EPL service, the OVC EP Map at the UNI MUST contain all CE-VLAN ID values {1, 24095} mapped to a single OVC EP [R13] Each S-VLAN ID value associated with an instance of Access EPL Service MUST map to a distinct End Point, of Type = "OVC"							
Test Object	t	Verify that for an A	Verify that for an Access EPL service, the CE-VLAN ID for untagged and priority tagged Frames is a value from 1 – 4094						
Test Configurati	ion		At least two OVCs, each one associating one OVC EP at a UNI and one OVC EP at the ENNI are configured. All CE-VLAN ID values are mapped to the OVC EP at each UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI						
Test Configurati Schematic	ion	Tester 1 Ethernet Traffic Generator Analyzer	UNI <sub>2</sub> UVI <sub>2</sub> UVI <sub>2</sub> UVVC EP	at Access Ur	s EPL S nder Te OVC <sub>1</sub> OVC <sub>2</sub>	Services est	Equipment Operating at the ENNI	Tester 2 ENNI1 Ethernet Traffic Generator Analyzer	
		CE MLA	Map at UNI <sub>1</sub>	OVC Erd Drint	-	C MI AN D	Map at 2		
		CE-VLA 1,2*4		OVC End Point OVC EP1	-	S-VLAN I 111	U	OVC End Point OVC EP11	
End Point N		1,21				222		OVC EP22	
			Map at $UNI_2$						
		CE-VLA 1,2*4 Note: Use of other S- configuration confor	095 -VLAN IDs at the ENNI	OVC End Point OVC EP2 and of other CE-VLAN ID <sup>4</sup>	* for unta	gged and priority tagged f	frames is permit	ted provided that the	
		1,2*4 Note: Use of other S- configuration conformess Bandwidth Pro-	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 offile per OVC EP a	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI1 and UNI2	for unta	Ingress Ba	*	file per OVC EP at ENNI <sub>1</sub>	
		1,2*4 Note: Use of other S- configuration conformess Bandwidth Pro- C End Point	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 ofile per OVC EP a Par	OVC EP <sub>2</sub> and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> rameters	* for unta	Ingress Bar OVC End Point	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters	
Bandwidth	0	1,2*4 Note: Use of other S- configuration conformess Bandwidth Pro-	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 offile per OVC EP a Par CIR <sub>1</sub> CBS <sub>1</sub> E	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI1 and UNI2	for unta	Ingress Ba	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub>	
Bandwidth Profile	Note 1: 0 Note 2: 0 Note 3: 1	1,2*4 Note: Use of other S- configuration confor ess Bandwidth Pro C End Point OVC EP1 OVC EP2 CIR1 = 3 Mbps, CIR2 CIR1 = 12176 Bytes, EIR1, EIR 2, EBS1, EBS CIR1, and CM2 in colo	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 offile per OVC EP a CIR <sub>1</sub> CBS <sub>1</sub> E CIR <sub>2</sub> CBS <sub>2</sub> E = 30 Mbps CBS <sub>2</sub> $\geq$ 12176 Bytes SS <sub>2</sub> , CF <sub>1</sub> and CF <sub>2</sub> equator- blind mode	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> rameters IR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> IR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub>		Ingress Bar           OVC End Point           OVC EP11           OVC EP22           Note 1: CIR11 = 3 Mb           Note 2: CBS11 ≥ 1217           Note 3: EIR11, EIR 22,           Note 4: CM11 and CM	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters R <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM R <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM 0 Mbps CBS <sub>22</sub> $\geq$ 12176 Bytes c, CF <sub>11</sub> and CF <sub>22</sub> equal to 0 vare mode	
Profile	Note 1: 0 Note 2: 0 Note 3: 1 Note 4: 0	1,2*4         Note: Use of other S- configuration confor         ess Bandwidth Pro         C End Point         OVC EP1         OVC EP2         CIR1 = 3 Mbps, CIR2         EB31 ≥ 12176 Bytes,         ER1, EIR 2, EB51, EE         M1 and CM2 in color         Note: Use of other ba         • Tester 1 offers 1         • Tester 2 verifies         that the priority         equal to 111 at         single-tagged with CE         • Tester 2 offers 3         equal to 0 and S         equal to 222 and         OVC2         • Tester 1 verifies         tagged ENNI fr         UNI, configure         untagged and th	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 ofile per OVC EP a CIR1 CBS1 EI CIR2 CBS2 EI 30 Mbps CBS2 2 12176 Bytes S2 CF1 and CF2 equa or-blind mode andwidth profile paramete untagged and priority s that the untagged Service Fram ENNI1 configured in ith S-VLAN ID equa to d double-tagged ENNI H S-VLAN ID equal to C single-tagged ENNI H S-VLAN ID equal to d double-tagged ENNI s that the single-tagged in OVC1. Tester 1 hat the double-tagged	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> armeters IR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> IR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> at to 0 er values at the UNIs & ENN tagged Service Frames ervice Frames offered at es offered at UNI <sub>1</sub> are d OVC <sub>1</sub> . Tester 2 also ve d to 222 and that the prid 0 and S-VLAN ID equal Frames with S-VLAN ID equal to 1 and S-VLAN II1 at ENNI <sub>1</sub> configured If frames with CE-VLA ed ENNI Frames with S-VLAN S ID equal to 0 and S-VI also verifies that the sin ENNI frames with CE-	NI is perm at UNI1 a deliverece erifies th iority tag l to 222 i D equal d in OV N ID eq -VLAN LAN ID ggle-tagg	Ingress Bar OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 Mb Note 2: CBS11 ≥ 1217 Note 3: EIR11. EIR 22. Note 4: CM11 and CM nitted provided that the co configured in OVC1 a re delivered single-tag double-tagged with C at the untagged Service gred Service Frames o at ENNI1 configured in to 111 and double-tagg C1 and also offers sing ual to 0 and S-VLAN ID equal to 111 are deliv equent to 111 are deliv equent to 111 are delived equent to 111 are delived pequal to 111 are delived	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters R <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM R <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM 0 Mbps CBS <sub>22</sub> $\geq$ 12176 Bytes p, CF <sub>11</sub> and CF <sub>22</sub> equal to 0 vare mode forms to MEF 26.1 onfigured in OVC <sub>2</sub> LAN ID equal to 111 and equal to 0 and S-VLAN ID red at UNI <sub>2</sub> are delivered p are delivered double-	
Profile Test Proced	Note 1: 0 Note 2: 0 Note 3: 1 Note 4: 0	1,2*4         Note: Use of other S- configuration confor         ess Bandwidth Pre         C End Point         OVC EP1         OVC EP2         CIR1 = 3 Mbps, CIR2         DSS1 ≥ 12176 Bytes,         ER1, EIR 2, EBS1, EE         M1 and CM2 in colc         Note: Use of other ba         • Tester 1 offers u         • Tester 2 verifies         that the priority         equal to 111 at         single-tagged with CE         • Tester 2 offers s         equal to 0 and S         equal to C22 and         • Tester 1 verifies         tagged ENNI fr         UNI: configuree         untagged and th         CE-VLAN ID e	N ID 095 VILAN IDs at the ENNI ms to MEF 26.1 offile per OVC EP a CIR <sub>1</sub> CBS <sub>1</sub> EI CIR <sub>2</sub> CBS <sub>2</sub> EI = 30 Mbps CBS <sub>2</sub> ≥ 12176 Bytes 3S <sub>2</sub> CF <sub>1</sub> and CF <sub>2</sub> equa or-blind mode ndwidth profile parameted untagged and priority s that the untagged Sc tagged Service Fram ENNI <sub>1</sub> configured in ith S-VLAN ID equal to 0 single-tagged ENNI S-VLAN ID equal to 0 double-tagged ENN s that the single-tagged ames with CE-VLAN d in OVC <sub>1</sub> . Tester 1	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> armeters IR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> IR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> at to 0 er values at the UNIs & ENN tagged Service Frames ervice Frames offered at es offered at UNI <sub>1</sub> are d OVC <sub>1</sub> . Tester 2 also ve d to 222 and that the prid 0 and S-VLAN ID equal Frames with S-VLAN ID equal to 1 and S-VLAN II1 at ENNI <sub>1</sub> configured If frames with CE-VLA ed ENNI Frames with S-VLAN S ID equal to 0 and S-VI also verifies that the sin ENNI frames with CE-	NI is perm at UNI1 a deliverece erifies th iority tag l to 222 i D equal d in OV N ID eq -VLAN LAN ID ggle-tagg	Ingress Bar OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 Mb Note 2: CBS11 ≥ 1217 Note 3: EIR11. EIR 22. Note 4: CM11 and CM nitted provided that the co configured in OVC1 a re delivered single-tag double-tagged with C at the untagged Service gred Service Frames o at ENNI1 configured in to 111 and double-tagg C1 and also offers sing ual to 0 and S-VLAN ID equal to 111 are deliv equent to 111 are deliv equent to 111 are delived equent to 111 are delived pequal to 111 are delived	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters R <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM R <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM 0 Mbps CBS <sub>22</sub> $\geq$ 12176 Bytes $\geq$ CF <sub>11</sub> and CF <sub>22</sub> equal to 0 vare mode forms to MEF 26.1 onfigured in OVC <sub>2</sub> LAN ID equal to 111 and equal to 0 and S-VLAN ID red at UNI <sub>2</sub> are delivered $\geq$ are delivered double- nes with CE-VLAN ID NI Frames with S-VLAN ID 22 at ENNI <sub>1</sub> configured in ged and that the double- -VLAN ID equal to 0 at equal to 222 are delivered	
	Note 1: 0 Note 2: 0 Note 3: 1 Note 4: 0	1,2*4 Note: Use of other S- configuration confor ess Bandwidth Pre (C End Point OVC EP1 OVC EP2 CIR1 = 3 Mbps, CIR2 CBS1 ≥ 12176 Bytes, ER1, EIR 2, EBS1, EE CM1 and CM2 in colc Note: Use of other ba • Tester 1 offers to • Tester 2 verifiet that the priority equal to 111 at single-tagged with CE • Tester 2 offers s equal to 2ad as equal to 2ad and S equal to 2ad and th CE-VLAN ID and	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 ofile per OVC EP a CIR <sub>1</sub> CBS <sub>1</sub> EI CIR <sub>2</sub> CBS <sub>2</sub> EI = 30 Mbps CBS <sub>2</sub> ≥ 12176 Bytes SS <sub>2</sub> CF <sub>1</sub> and CF <sub>2</sub> equa or-blind mode untagged and priority s that the untagged Sat tagged Service Fram ENNI <sub>1</sub> configured in vith S-VLAN ID equal to d double-tagged ENNI IF S-VLAN ID equal to d double-tagged ENNI F s that the single-tagged ames with CE-VLAN d in OVC <sub>1</sub> . Tester 1 hat the double-tagged equal to 0 at UNI <sub>2</sub> cor S-VLAN ID values	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> armeters IR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> IR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> at to 0 er values at the UNIs & ENN tagged Service Frames ervice Frames offered at es offered at UNI <sub>1</sub> are d OVC <sub>1</sub> . Tester 2 also ve d to 222 and that the prid 0 and S-VLAN ID equal Frames with S-VLAN ID equal to 1 and S-VLAN II1 at ENNI <sub>1</sub> configured If frames with CE-VLA ed ENNI Frames with S-VLAN S ID equal to 0 and S-VI also verifies that the sin ENNI frames with CE-	NI is perm at UNI1 a delivered erifies th iority tag 1 to 222 d D equal d in OV N ID equ -VLAN ID gle-tage VLAN I	Ingress Bar OVC End Point OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 Mb Note 2: CBS11 ≥ 1217 Note 3: EIR11, EIR 22, Note 4: CM11 and CM nitted provided that the co configured in OVC1 a re delivered single-tag I double-tagged with C at the untagged Service rged Service Frames o at ENNI1 configured in to 111 and double-tagg C1 and also offers sing ual to 0 and S-VLAN ID equal to 111 are deliv ged ENNI Frames with ID equal to 0 and S-VI	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters R <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM R <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM 0 Mbps CBS <sub>22</sub> $\geq$ 12176 Bytes $\geq$ CF <sub>11</sub> and CF <sub>22</sub> equal to 0 vare mode forms to MEF 26.1 onfigured in OVC <sub>2</sub> LAN ID equal to 111 and equal to 0 and S-VLAN ID red at UNI <sub>2</sub> are delivered $\geq$ are delivered double- nes with CE-VLAN ID NI Frames with S-VLAN ID 22 at ENNI <sub>1</sub> configured in ged and that the double- -VLAN ID equal to 0 at equal to 222 are delivered	
Profile Test Proced Units	Note 1: 0 Note 2: 0 Note 3: 1 Note 4: 0	1,2*4 Note: Use of other S- configuration confor ess Bandwidth Pre (C End Point OVC EP1 OVC EP2 CIR1 = 3 Mbps, CIR2 CBS1 ≥ 12176 Bytes, ER1, EIR 2, EBS1, EE CM1 and CM2 in colc Note: Use of other ba • Tester 1 offers to • Tester 2 verifiet that the priority equal to 111 at single-tagged with CE • Tester 2 offers s equal to 2ad as equal to 2ad and S equal to 2ad and th CE-VLAN ID and	N ID 095 VLAN IDs at the ENNI ms to MEF 26.1 ofile per OVC EP a CIR <sub>1</sub> CBS <sub>1</sub> EI CIR <sub>2</sub> CBS <sub>2</sub> EI = 30 Mbps CBS <sub>2</sub> ≥ 12176 Bytes SS <sub>2</sub> CF <sub>1</sub> and CF <sub>2</sub> equa or-blind mode untagged and priority s that the untagged Sat tagged Service Fram ENNI <sub>1</sub> configured in vith S-VLAN ID equal to d double-tagged ENNI IF S-VLAN ID equal to d double-tagged ENNI F s that the single-tagged ames with CE-VLAN d in OVC <sub>1</sub> . Tester 1 hat the double-tagged equal to 0 at UNI <sub>2</sub> cor S-VLAN ID values	OVC EP2 and of other CE-VLAN ID <sup>4</sup> at UNI <sub>1</sub> and UNI <sub>2</sub> rameters IR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> IR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> at to 0 er values at the UNIs & ENN tagged Service Frames ervice Frames offered at use offered at UNI <sub>1</sub> are d OVC <sub>1</sub> . Tester 2 also ve d to 222 and that the prive 1 to 222 and that the prive 1 to 222 and that the prive 111 at ENNI <sub>1</sub> configures If rames with S-VLAN II 111 at ENNI <sub>1</sub> configures If frames with CE-VLA ed ENNI Frames with S-VLA also verifies that the sin, ENNI frames with CE- figured in OVC <sub>2</sub>	NI is perm at UNI1 a delivered erifies th iority tag 1 to 222 d D equal d in OV N ID equ -VLAN ID gle-tage VLAN I	Ingress Bar OVC End Point OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 Mb Note 2: CBS11 ≥ 1217 Note 3: EIR11, EIR 22, Note 4: CM11 and CM nitted provided that the co configured in OVC1 a re delivered single-tag I double-tagged with C at the untagged Service rged Service Frames o at ENNI1 configured in to 111 and double-tagg C1 and also offers sing ual to 0 and S-VLAN ID equal to 111 are deliv ged ENNI Frames with ID equal to 0 and S-VI	ndwidth Pro	file per OVC EP at ENNI <sub>1</sub> Parameters R <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM R <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM 0 Mbps CBS <sub>22</sub> $\geq$ 12176 Bytes $\geq$ CF <sub>11</sub> and CF <sub>22</sub> equal to 0 vare mode forms to MEF 26.1 onfigured in OVC <sub>2</sub> LAN ID equal to 111 and equal to 0 and S-VLAN ID red at UNI <sub>2</sub> are delivered $\geq$ are delivered double- nes with CE-VLAN ID NI Frames with S-VLAN ID 22 at ENNI <sub>1</sub> configured in ged and that the double- -VLAN ID equal to 0 at equal to 222 are delivered	



#### Test Case 3.1: OVC Maximum Transmission Unit Size

	Abstra	act Test Suite for Ethernet	Acc	ess Services				
Test Name	OVC Maximum Transmissio	on Unit Size						
Test Definition ID	AEPL3_R3_R6_R13							
Test Type	Conformance							
Test Status	Mandatory							
Requirement Description	[R3] For an Access EPL serving over the single OVC EP	vice, the OVC Maximum Transmissic vice, the OVC EP Map at the UNI <b>MI</b> ue associated with an instance of Acce	UST c	ontain all CE-VLAN I	D values {	1, 24095} mapped to a		
Test Object	Verify that for an Access EPL service, the OVC Maximum Transmission Unit Size is an integer number of bytes $\geq$ 1526							
Test Configuration	At least two OVCs, each one associating one OVC EP at a UNI and one OVC EP at the ENNI are configured. All CE-VLAN ID values are mapped to the OVC EP at each UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI							
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer		EPL S ler Te DVC <sub>1</sub>	ervices est	Equipment operating of the ENNI OVC EP11 OVC EP22			
	Ма	ip at UNI <sub>1</sub>	Γ		Map at I	ENNI,		
	CE-VLAN ID	OVC End Point		S-VLAN ID		OVC End Point		
	1,2*4095	OVC EP1		111		OVC EP11		
			L	222		OVC EP <sub>22</sub>		
End Point Maps	Map at UNI <sub>2</sub>							
	CE-VLAN ID	OVC End Point						
	1,2*4095	OVC EP <sub>2</sub>						
	Note: Use of other S-VLAN IDs	at the ENNI and of other CE-VLAN ID* for	or untag	ged and priority tagged fr	ames is perr	nitted provided that the		
	configuration conforms to MEF	26.1				*		
	Ingress Bandwidth Pr	ofile per OVC EP at UNI <sub>1</sub> and UNI <sub>2</sub>		Ingress Bandwic	lth Profil	e per OVC EP at ENNI <sub>1</sub>		
	OVC End Print	OVC End Point Parameters		OVC End Point Parameters		~		
	OVC End Point	Parameters		OVC Life I offic		Parameters		
	OVC End Point OVC EP1	Parameters CIR <sub>1</sub> CBS <sub>1</sub> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub>	-	OVC EP11	CIR <sub>1</sub>	1 CBS11 EIR11 EBS11 CF11		
						1 CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> 2 CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub>		
Bandwidth Profile	OVC EP1 OVC EP2	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$	-	OVC EP11	CIR <sub>2</sub>	1 CBS11 EIR11 EBS11 CF11 CM11 2 CBS22 EIR22 EBS22 CF22 CM22		
	OVC EP1 OVC EP2 Note 1: CIR1 = 3 Mbps, Cl	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$ $IR_2 = 30 Mbps$	-	OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> $\geq$ 121	CIR <sub>2</sub> bps, CIR <sub>2</sub> 76 Bytes,	$1 CBS_{11} EIR_{11} EBS_{11} CF_{11} CM_{11} 2 CBS_{22} EIR_{22} EBS_{22} CF_{22} CM_{22} 2 = 30 Mbps and CBS_{22} \geq 12176 Bytes$		
	OVC EP1OVC EP2Note 1: CIR1 = 3 Mbps, CINote 2: CBS1 $\geq$ 12176 Byt	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$ $IR_2 = 30 Mbps$ tes, CBS_2 \ge 12176 Bytes		OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> $\geq$ 12 Note 3: EIR <sub>11</sub> , EIR <sub>2</sub>	CIR <sub>2</sub> bps, CIR <sub>2</sub> 76 Bytes,	$1 CBS_{11} EIR_{11} EBS_{11} CF_{11} CM_{11} 2 CBS_{22} EIR_{22} EBS_{22} CF_{22} CM_{22} 3 0 Mbps and CBS_{22} > 12176 Bytes $		
	OVC EP1OVC EP2Note 1: CIR1 = 3 Mbps, CINote 2: CBS1 $\geq$ 12176 Byt	$\label{eq:circuit} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline IR_2 = 30 \mbox{ Mbps} \\ tes, CBS_2 \geq 12176 \mbox{ Bytes} \\ EBS_2, CF_1 \mbox{ and } CF_2 \mbox{ equal to } 0 \end{array}$	-	$\begin{tabular}{ c c c c c }\hline OVC \ EP_{11}\\\hline OVC \ EP_{22}\\\hline Note \ 1: \ CIR_{11} = 3 \ M\\ Note \ 2: \ CBS_{11} \ge 121\\ Note \ 3: \ EIR_{11}, \ EIR_{2}\\ 0\end{tabular}$	CIR2 lbps, CIR2 76 Bytes, 2, EBS11, E	$\begin{array}{c} {}_{1} CBS_{11} EIR_{11} EBS_{11} CF_{11} \\ CM_{11} \\ {}_{2} CBS_{22} EIR_{22} EBS_{22} CF_{22} \\ \underline{CM_{22}} \\ {}_{2} = 30 \ Mbps \\ and CBS_{22} \geq 12176 \ Bytes \\ EBS_{22}, CF_{11} \ and CF_{22} \ equal \ to \end{array}$		
	$\begin{array}{c} OVC \ EP_1 \\ \\ OVC \ EP_2 \\ \\ \hline \\ Note \ 1: \ CIR_1 = 3 \ Mbps, \ CI \\ Note \ 2: \ CBS_1 \geq 12176 \ Byt \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 4: \ CM_1 \ and \ CM_2 \ in \ c \\ \end{array}$	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$ $IR_2 = 30 \text{ Mbps}$ tes, CBS_2 $\geq 12176 \text{ Bytes}$ $EBS_2 CF_1 \text{ and } CF_2 \text{ equal to } 0$ solor-blind mode		$\begin{array}{c} \textbf{OVC EP}_{11} \\ \hline \\ \textbf{OVC EP}_{22} \\ \hline \\ \textbf{Note 1: CIR}_{11} = 3 \text{ M} \\ \textbf{Note 2: CBS}_{11} \geq 121 \\ \textbf{Note 3: EIR}_{11}, \text{ EIR}_{2} \\ 0 \\ \hline \\ \textbf{Note 4: CM}_{11} \text{ and C} \\ \end{array}$	CIR2 bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo	$\begin{array}{c} {}_{1}\text{CBS}_{11}\text{ EIR}_{11}\text{ EBS}_{11}\text{ CF}_{11}\\ {}_{CM_{11}}\\ {}_{2}\text{CBS}_{22}\text{ EIR}_{22}\text{ EBS}_{22}\text{ CF}_{22}\\ {}_{2}=30\text{ Mbps}\\ {}_{and}\text{ CBS}_{22}\geq 12176\text{ Bytes}\\ {}_{BS}_{22},\text{ CF}_{11}\text{ and CF}_{22}\text{ equal to}\\ {}_{or-aware mode}\end{array}$		
	$\begin{array}{c} OVC \ EP_1 \\ \\ OVC \ EP_2 \\ \\ \hline \\ Note \ 1: \ CIR_1 = 3 \ Mbps, \ CI \\ Note \ 2: \ CBS_1 \geq 12176 \ Byt \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 4: \ CM_1 \ and \ CM_2 \ in \ c \\ \hline \\ Note: \ Use \ of \ other \ bandwidth \ processor \\ \end{array}$	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$ $IR_2 = 30 Mbps$ tes, $CBS_2 \ge 12176 Bytes$ $EBS_2 CF_1 and CF_2 equal to 0$ rolor-blind mode ofile parameter values at the UNIs & ENNI i		OVC EP11       OVC EP22       Note 1: CIR11 = 3 M       Note 2: CBS11 $\geq$ 121       Note 3: EIR11, EIR 2       0       Note 4: CM11 and C       itted provided that the con	CIR2 (bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration co	$\begin{array}{c} {}_{1} CBS_{11} EIR_{11} EBS_{11} CF_{11} \\ CM_{11} \\ {}_{2} CBS_{22} EIR_{22} EBS_{22} CF_{22} \\ CM_{22} \\ {}_{2} = 30 Mbps \\ and CBS_{22} \geq 12176 Bytes \\ EBS_{22}, CF_{11} and CF_{22} equal to \\ or-aware mode \\ onforms to MEF 26.1 \end{array}$		
	$\begin{tabular}{ c c c c c } \hline OVC \ EP_1 \\ \hline OVC \ EP_2 \\ \hline \\ \hline \\ Note \ 1: \ CIR_1 = 3 \ Mbps, \ Cl \\ Note \ 2: \ CBS_1 \ge 12176 \ Byt \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 4: \ CM_1 \ and \ CM_2 \ in \ c \\ \hline \\ \hline \\ Note: \ Use \ of \ other \ bandwidth \ pre \\ \hline \hline \\ \bullet \ Tester \ 1 \ offers \ untagged, \end{tabular}$	$CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1$ $CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2$ $IR_2 = 30 \text{ Mbps}$ tes, CBS_2 $\geq 12176 \text{ Bytes}$ $EBS_2 CF_1 \text{ and } CF_2 \text{ equal to } 0$ solor-blind mode solie parameter values at the UNIs & ENNI is priority tagged and C-tagged Service	Frame	OVC EP11       OVC EP22       Note 1: CIR11 = 3 M       Note 2: CBS11 $\geq$ 121       Note 3: EIR11, EIR 2       0       Note 4: CM11 and C       itted provided that the con       es with CE-VLAN ID	CIR2 (bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration co equal to 11	$\begin{array}{c} 1 \ CBS_{11} \ EIR_{11} \ EBS_{11} \ CF_{11} \\ CM_{11} \\ 2 \ CBS_{22} \ EIR_{22} \ EBS_{22} \ CF_{22} \\ 2 \ = \ 30 \ Mbps \\ and \ CBS_{22} \ \geq \ 12176 \ Bytes \\ EBS_{22}, \ CF_{11} \ and \ CF_{22} \ equal \ to \\ or-aware \ mode \\ onforms \ to \ MEF \ 26.1 \\ 1 \ and \ frame \ size \ equal \ to \ the \\ \end{array}$		
	$\begin{tabular}{ c c c c c } \hline OVC \ EP_1 \\ \hline OVC \ EP_2 \\ \hline \\ \hline \\ Note \ 1: \ CIR_1 = 3 \ Mbps, \ Cl \\ Note \ 2: \ CBS_1 \ge 12176 \ Byt \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 3: \ EIR_1, \ EIR_2, \ EBS_1, \\ Note \ 4: \ CM_1 \ and \ CM_2 \ in \ c \\ \hline \\ \hline \\ Note: \ Use \ of \ other \ bandwidth \ pre \\ \hline \hline \\ \bullet \ Tester \ 1 \ offers \ untagged, \end{tabular}$	$\begin{array}{c} CIR_1 \ CBS_1 \ EIR_1 \ EBS_1 \ CF_1 \ CM_1 \\ \hline CIR_2 \ CBS_2 \ EIR_2 \ EBS_2 \ CF_2 \ CM_2 \\ \hline IR_2 = 30 \ Mbps \\ tes, \ CBS_2 \ge 12176 \ Bytes \\ EBS_2 \ CF_1 \ and \ CF_2 \ equal to \ 0 \\ otolor-blind \ mode \\ \hline ofile \ parameter \ values \ at the \ UNIs \ ENNI \ i \\ priority \ tagged \ and \ C-tagged \ Service \\ configured \ in \ OVC_1 \ and \ with \ CE-VL \end{array}$	Frame	OVC EP11       OVC EP22       Note 1: CIR11 = 3 M       Note 2: CBS11 $\geq$ 121       Note 3: EIR11, EIR 2       0       Note 4: CM11 and C       itted provided that the con       es with CE-VLAN ID	CIR2 (bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration co equal to 11	$\begin{array}{c} 1 \ CBS_{11} \ EIR_{11} \ EBS_{11} \ CF_{11} \\ CM_{11} \\ 2 \ CBS_{22} \ EIR_{22} \ EBS_{22} \ CF_{22} \\ \hline CM_{22} \\ 2 \ = \ 30 \ Mbps \\ and \ CBS_{22} \ \geq \ 12176 \ Bytes \\ EBS_{22}, \ CF_{11} \ and \ CF_{22} \ equal \ to \\ or-aware \ mode \\ \hline onforms \ to \ MEF \ 26.1 \\ \hline l \ and \ frame \ size \ equal \ to \ the \\ \end{array}$		
	$\begin{tabular}{ c c c c c } \hline OVC EP_1 \\ \hline OVC EP_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CL \\ Note 2: CBS_1 \ge 12176 Byt \\ Note 3: EIR_1, EIR_2, EBS_1, \\ Note 4: CM_1 and CM_2 in c \\ \hline Note : Use of other bandwidth processory \\ \hline Note : Use of other bandwidth processory \\ \hline OVC_1 MTU size at UN1_1 \\ UNI_2 configured in OVC_2 \\ \hline OVC_2 & OVC_$	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline R_2 = 30 \ Mbps \\ tes, CBS_2 \geq 12176 \ Bytes \\ EBS_2, CF_1 and CF_2 equal to 0 \\ olor-blind mode \\ \hline oblic-blind mode \\ \hline ofile parameter values at the UNIs & ENNI i \\ priority tagged and C-tagged Service \\ configured in OVC_1 and with CE-VL \\ 2 \end{array}$	Fram AN II	$\begin{array}{c} \hline OVC \ EP_{11} \\ \hline OVC \ EP_{22} \\ \hline Note \ 1: \ CIR_{11} = 3 \ M \\ Note \ 2: \ CBS_{11} \ge 12 \\ \hline Note \ 3: \ EIR_{11}, \ EIR \ 2 \\ 0 \\ \hline Note \ 4: \ CM_{11} \ and \ C \\ \hline itted \ provided \ that \ the \ con \\ es \ with \ CE-VLAN \ ID \ 0 \\ \hline D \ equal \ to \ 11 \ and \ frame$	CIR2 (bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration co equal to 11 e size equa	$\begin{array}{c} 1 \ CBS_{11} \ EIR_{11} \ EBS_{11} \ CF_{11} \\ CM_{11} \\ 2 \ CBS_{22} \ EIR_{22} \ EBS_{22} \ CF_{22} \\ CM_{22} \\ 2 \ = 30 \ Mbps \\ and \ CBS_{22} \ \ge 12176 \ Bytes \\ EBS_{22}, \ CF_{11} \ and \ CF_{22} \ equal \ to \\ or-aware \ mode \\ onforms \ to \ MEF \ 26.1 \\ 1 \ and \ frame \ size \ equal \ to \ the \\ d \ to \ the \ OVC_2 \ MTU \ size \ at \ a$		
	$\begin{tabular}{ c c c c c }\hline OVC EP_1\\ \hline OVC EP_2\\ \hline OVC EP_2\\ \hline Note 1: CIR_1 = 3 Mbps, CINote 2: CBS_1 \ge 12176 BytNote 3: EIR_1, EIR_2, EBS_1,Note 4: CM_1 and CM_2 in c\\ \hline Note: Use of other bandwidth pre}\\ \hline OVC_1 wrtu Size at UNI_1\\ UNI_2 configured in OVC\\ \hline Tester 2 verifies that all the second se$	$\begin{array}{c} CIR_1 \ CBS_1 \ EIR_1 \ EBS_1 \ CF_1 \ CM_1 \\ \hline CIR_2 \ CBS_2 \ EIR_2 \ EBS_2 \ CF_2 \ CM_2 \\ \hline IR_2 = 30 \ Mbps \\ tes, \ CBS_2 \ge 12176 \ Bytes \\ EBS_2 \ CF_1 \ and \ CF_2 \ equal to \ 0 \\ otolor-blind \ mode \\ \hline ofile \ parameter \ values \ at the \ UNIs \ ENNI \ i \\ priority \ tagged \ and \ C-tagged \ Service \\ configured \ in \ OVC_1 \ and \ with \ CE-VL \end{array}$	Framo AN II t UNI	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         es with CE-VLAN ID         D         qual to 11 and frame         1 are delivered single-t	CIR2 bps, CIR2 76 Bytes, 2, EBS11, E M22 in colu- figuration co- equal to 11 e size equa- agged with	$\begin{array}{c} 1 \mbox{ CBS}_{11} \ \mbox{EIR}_{11} \ \ \mbox{EIR}_{11} \ \ \mbox{EIR}_{11} \ \ \mbox{CM}_{11} \\ 2 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$		
	$\begin{tabular}{ c c c c c } \hline OVC EP_1 \\ \hline OVC EP_2 \\ \hline OVC EP_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CI \\ Note 2: CBS_1 \ge 12176 Byt \\ Note 3: EIR_1, EIR_2, EBS_1, \\ Note 4: CM_1 and CM_2 in c \\ \hline Note: Use of other bandwidth product of the standard of the sta$	CIR <sub>1</sub> CBS <sub>1</sub> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> CIR <sub>2</sub> CBS <sub>2</sub> EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> IR <sub>2</sub> = 30 Mbps tes, CBS <sub>2</sub> $\geq$ 12176 Bytes EBS <sub>2</sub> CF <sub>1</sub> and CF <sub>2</sub> equal to 0 olor-blind mode Sfile parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC <sub>1</sub> and with CE-VL he untagged Service Frames offered a	Framo AN II t UNI d at U	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         cs with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         NI1 are delivered doub	CIR2 bps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration cr equal to 11 e size equa agged with le-tagged vith	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CH}_{11} \\ \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2176} \mbox{ Bytes} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2176} \mbox{ Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ or-aware mode} \\ \mbox{ or-aware mode} \\ \mbox{ onforms to } \mbox{ MEF} \mbox{ 26.1} \\ \mbox{ and frame size equal to the} \\ \mbox{ al to the } \mbox{ OVC}_2 \mbox{ MTU size at a} \\ \mbox{ at of S-VLAN ID equal to 111} \\ \mbox{ and solution 11} \\  and solution $		
	$\begin{tabular}{ c c c c c } \hline OVC EP_1 \\ \hline OVC EP_2 \\ \hline Note 1: CIR_1 = 3 Mbps, Cl \\ Note 2: CBS_1 \ge 12176 Byt \\ Note 3: CBS_1 \ge 12176 Byt \\ Note 3: EIR_1, EIR_2, EBS_1, \\ Note 4: CM_1 and CM_2 in c \\ \hline Note: Use of other bandwidth product of the second seco$	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CF_1 and CF_2 equal to 0 \\ \hline Olor-blind mode \\ \hline olor-blind mode \\ \hline offie parameter values at the UNIs & ENNI i i \\ \hline offie parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIs & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNI i \\ \hline offic parameter values at the UNIS & ENNIS \\ \hline offic parameter values at the UNIS & ENNIS \\ \hline offic parameter values at the UNIS & ENNIS \\ \hline offic$	Frame AN II t UNI d at U e unta OVC <sub>2</sub>	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         se with CE-VLAN ID 0         O equal to 11 and frame         1 are delivered single-tt         NI1 are delivered doub         gged Service Frames of and that all the priority	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, F M22 in colo figuration cr equal to 11 e size equa agged with le-tagged vith le-tagged vith	$\begin{array}{c} 1 \ CBS_{11} \ EIR_{11} \ EBS_{11} \ CF_{11} \\ CM_{11} \\ 2 \ CBS_{22} \ EIR_{22} \ EBS_{22} \ CF_{22} \\ CM_{22} \\ 2 \ = 30 \ Mbps \\ and \ CBS_{22} \ \geq 12176 \ Bytes \\ EBS_{22}, \ CF_{11} \ and \ CF_{22} \ equal to \\ or-aware \ mode \\ onforms to \ MEF \ 26.1 \\ and \ frame \ size \ equal to the \\ all to the \ OVC_2 \ MTU \ size \ at a \\ an \ S-VLAN \ ID \ equal to \ 111 \ an \\ with \ S-VLAN \ ID \ equal to \ 111 \ an \\ INI_2 \ are \ delivered \ single- \\ ad \ C-tagged \ Service \ Frames \end{array}$		
	$\begin{tabular}{ c c c c c }\hline OVC EP_1\\ \hline OVC EP_2\\ \hline Note 1: CIR_1 = 3 Mbps, CINote 2: CBS_1 \ge 12176 BytNote 2: CBS_1 \ge 12176 BytNote 3: EIR_1, EIR_2, EBS_1,Note 4: CM_1 and CM_2 in cNote: Use of other bandwidth pro-Tester 1 offers untagged,OVC_1 MTU size at UNI_1UNI_2 configured in OVC_2• Tester 2 verifies that all thethat all the priority taggedat ENNI_1 configured in Otagged with S-VLAN IDoffered at UNI_2 are delived$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Frame AN II t UNI d at U e unta OVC <sub>2</sub> equal	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         es with CE-VLAN ID 0         D equal to 11 and frames         1 are delivered single-t         NI1 are delivered doub         ged Service Frames of         and that all the priority         to 222 at ENNI1 config	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration er equal to 11 e size equa agged with le-tagged at ffered at U tagged at U tagged an U	$\begin{array}{c} 1 \ CBS_{11} \ EIR_{11} \ EBS_{11} \ CF_{11} \\ CM_{11} \\ 2 \ CBS_{22} \ EIR_{22} \ EBS_{22} \ CF_{22} \\ CM_{22} \\ 2 \ = 30 \ Mbps \\ and \ CBS_{22} \ \geq 12176 \ Bytes \\ EBS_{22}, \ CF_{11} \ and \ CF_{22} \ equal to \\ or-aware mode \\ onforms to \ MEF 26.1 \\ 1 \ and \ frame \ size \ equal to the \\ 1 \ to \ the \ OVC_2 \ MTU \ size \ at \ at \\ n \ S-VLAN \ ID \ equal to \ 111 \ at \\ with \ S-VLAN \ ID \ equal to \ 111 \ at \\ with \ S-VLAN \ ID \ equal to \ 111 \ at \\ MI_2 \ are \ delivered \ single- \\ d \ C-tagged \ Service \ Frames \\ VC_2 \end{array}$		
Profile	OVC EP1           OVC EP2           Note 1: CIR1 = 3 Mbps, CI           Note 2: CBS1 ≥ 12176 By1           Note 3: EIR1, EIR 2, EBS1,           Note 4: CM1 and CM2 in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC1 MTU size at UN1,           UN12 configured in OVC2           • Tester 2 verifies that all the that all the priority tagged at ENNI1 configured in O           that BVI1_configured in O           tagged with S-VLAN ID           offered at UN12 are delive           • Tester 2 offers single-tagging	CIR <sub>1</sub> CBS <sub>1</sub> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> CIR <sub>2</sub> CBS <sub>2</sub> EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> IR <sub>2</sub> = 30 Mbps tes, CBS <sub>2</sub> $\geq$ 12176 Bytes EBS <sub>2</sub> CF <sub>1</sub> and CF <sub>2</sub> equal to 0 olor-blind mode Sfile parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC <sub>1</sub> and with CE-VL he untagged Service Frames offered a 1 and C-tagged Service Frames offered a 1 and Service Frames offered a 1 and C-tagged Service Frames offered a 1 and C-tagged Service Frames offered a 1 and Service F	Frame AN II t UNI d at U e unta DVC <sub>2</sub> equal equal t	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         inted provided that the context of the set of	CIR2 lbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration cr figuration cr equal to 11 e size equa agged with le-tagged ' ffered at U ' tagged ar to agged ar i agged an ffered at U ' tagged ar of agged ar of agged ar to agged ar of agged ar to agged ar	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \hline \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \hline \mbox{ cM}_{22} \\ = 30 \mbox{ Mbps} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2176 Bytes} \\ \hline \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2176 Bytes} \\ \hline \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2176 Bytes} \\ \hline \mbox{ and } \mbox{ CF}_{21} \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ cqual to} \mbox{ 11} \\ \mbox{ and } \mbox{ mode} \\ \hline \mbox{ and } \mbox{ CF}_{2} \mbox{ MEF} \mbox{ 26.1} \\ \mbox{ and } \mbox{ the } \mbox{ equal to} \mbox{ 111 an} \\ \mbox{ with } \mbox{ S-VLAN \mbox{ ID equal to} \mbox{ 111 an} \\ \mbox{ MC}_{2} \mbox{ ervice Frames} \\ \mbox{ VC}_{2} \\ \mbox{ eswith } \mbox{ C-VLAN \mbox{ ID equal} \mbox{ equal} \mbox{ equal} \\ \mbox{ equal} \mbox{ C-VLAN \mbox{ ID equal} \mbox{ equal} \\ \mbox{ mode} \mbox{ C-VLAN \mbox{ ID equal} \mbox{ equal} \mbox{ equal} \\ \mbox{ H}_{2} \mbox{ equal} \mbox{ equal} \mbox{ equal} \mbox{ equal} \\ \mbox{ MC}_{2} \mbox{ equal} \mbox{ E-VLAN \mbox{ ID equal} \mbox{ equal} \mb$		
Profile	$\begin{tabular}{ c c c c c }\hline OVC EP_1\\\hline OVC EP_2\\\hline Note 1: CIR_1 = 3 Mbps, CINote 2: CBS_1 \ge 12176 BytNote 2: CBS_1 \ge 12176 BytNote 3: EIR_1, EIR_2, EBS_1,Note 4: CM_1 and CM_2 in c\\\hline Note: Use of other bandwidth pre• Tester 1 offers untagged,OVC_1 MTU size at UNI_1UNI_2 configured in OVC• Tester 2 verifies that all thethat all the priority taggedat ENNI_1 configured in Otagged with S-VLAN IDoffered at UNI_2 are delive• Tester 2 offers single-tagg0 and S-VLAN ID equal to$	CIR1 CBS1 EIR1 EBS1 CF1 CM1         CIR2 CBS2 EIR2 EBS2 CF2 CM2         IR2 = 30 Mbps         tes, CBS2 $\ge$ 12176 Bytes         EBS2, CF1 and CF2 equal to 0         oolor-blind mode         file parameter values at the UNIs & ENN1 i         priority tagged and C-tagged Service         configured in OVC1 and with CE-VL2         he untagged Service Frames offered at         1 and C-tagged Service Frames offered at         1 and couble-tagged with S-VLAN ID         ged ENNI Frames with S-VLAN ID         to 111 and double-tagged ENNI frame	Frame AN II t UNI d at U e unta OVC <sub>2</sub> equal equal t es with	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         cs with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         NI1 are delivered doub         gged Service Frames o         and that all the priority         to 222 at ENNI1 config         o 111, double-tagged F         h CE-VLAN ID equal	CIR2 bps, CIR2 76 Bytes, 2, EBS11, E M22 in cold figuration cr figuration cr qual to 11 e size equa agged with le-tagged ar the tagged ar the ta	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 12176 Bytes} \\ \mbox{ BS}_{22} \mbox{ CF}_{11} \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 12176 Bytes} \\ \mbox{ BS}_{22}, \mbox{ CF}_{11} \mbox{ and } \mbox{ CF}_{22} \mbox{ equal to} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CBS}_{22} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CB}_{22} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CB}_{22} \mbox{ 2} \mbox{ 2} \\ \mbox{ and } \mbox{ CB}_{22} \mbox{ 2} \mbox{ 2} \\ \mbox{ BS}_{22} \mbox{ All D} \mbox{ 2} \mbox{ 2} \\ \mbox{ All D} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ All D} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ 2} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ 2} \mbox{ 2} \mbox{ 2} \mbox{ 2} \mbox{ 2} \\ \mbox{ 2} \mbox{ 2}$		
Profile	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 Byt           Note 3: EIR₁, EIR₂, EBS₁           Note 4: CM₁ and CM₂ in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC₁ MTU size at UNI₁           UNI₂ configured in OVC           • Tester 2 verifies that all th           that all the priority tagged           at ENNI₁ configured in O           tagged with S-VLAN ID           offered at UNI₂ are delive           • Tester 2 offers single-tagg           0 and S-VLAN ID equal           frame size equal to the O	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CF_1 and CF_2 equal to 0 \\ \hline Color-blind mode \\ \hline file parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC_1 and with CE-VL_2 \\ \hline he untagged Service Frames offered a 1 and C-tagged with S-VLAN ID ged ENNI Frames with S-VLAN ID eto 111 and double-tagged ENNI framVC_1 MTU size at ENNI_1 configured in C 111 and ConfigureD 111 CONFIGURED C 101 C 101 CONFIGURED C$	Frame AN II d at U e unta OVC <sub>2</sub> equal equal t es with n OVC	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         cs with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         N11 are delivered doub         gged Service Frames o         and that all the priority         to 22 at ENN1, config         o 111, double-tagged H         C1. Tester 2 also offers	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration cf qual to 11 e size equa agged with le-tagged at the form of the size yured in O SNNI fram to 11 and 5 single-tag	1 CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> 2 CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub> 2 = 30 Mbps         and CBS <sub>22</sub> ≥ 12176 Bytes         EBS <sub>22</sub> , CF <sub>11</sub> and CF <sub>22</sub> equal to         or-aware mode         onforms to MEF 26.1         and frame size equal to the         alt to the OVC <sub>2</sub> MTU size at a         n S-VLAN ID equal to 111 and         with S-VLAN ID equal to 111 and         VC <sub>2</sub> es with CE-VLAN ID equal to 111 and         S-VLAN ID equal to 111 and         ged ENNI Frames with S-		
Profile	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 By1           Note 3: EIR₁, EIR₂, EBS₁,           Note 4: CM₁ and CM₂ in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC₁ MTU size at UN1₁           UN2 configured in OVC₂           • Tester 2 verifies that all th           that all the priority tagged           at ENN₁ configured in OVC₂           • Tester 2 offers single-tagg           0 and S-VLAN ID           offered at UN1₂ are delive           • Tester 2 offers single-tagg           0 and S-VLAN ID equal 1           frame size equal to the O           VLAN ID equal to 222, d	$\label{eq:constraint} \begin{array}{ c c c c c } \hline CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EGS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EGS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 \\ \hline CIR_2 CBS_2 EIR_2 \\ \hline CIR_2$	Frame AN II d at U e unta OVC2 equal equal t es with n OVC	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frames         1 are delivered single-t         NI1 are delivered doub         gged Service Frames o         and that all the priority         to 222 at ENNI1 config         0 111, double-tagged F         h CE-VLAN ID equal         C1. Tester 2 also offers         VID equal to 0 and S-V	CIR2 bbps, CIR2, 76 Bytes, 2, EBS11, E M22 in colo figuration cr equal to 11 e size equa agged with le-tagged a frered at U r tagged ar frered at U r tagged ar gured in O 2NNI fram to 11 and 3 single-tag (LAN ID é	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \hline \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \hline \mbox{ CM}_{22} \\ 2 \mbox{ = 30 Mbps} \\ and \mbox{ CBS}_{22} \mbox{ = 12176 Bytes} \\ \hline \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \hline \mbox{ or-aware mode} \\ \hline \mbox{ or-aware mode} \\ \hline \mbox{ onforms to MEF} \mbox{ 26.1} \\ and \mbox{ CF}_{22} \mbox{ equal to} \mbox{ to the} \\ and \mbox{ CF}_{20} \mbox{ MTU size at a} \\ and \mbox{ S-VLAN ID equal to 111 an} \\ mbox{ with S-VLAN ID equal to 111 and C-tagged Service Frames} \\ VC_2 \\  esw with CE-VLAN ID equal to 111 and ged ENVI Frames with S-sequal to 222 and double-tagged Sequal to 222 and double-tagged Se$		
Profile	OVC EP1           OVC EP2           Note 1: CIR1 = 3 Mbps, Cl           Note 2: CBS1 ≥ 12176 By1           Note 3: EIR1, EIR 2, EBS1,           Note 4: CM1 and CM2 in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC1 MTU size at UN11           UN12 configured in OVC2           • Tester 2 verifies that all the that all the priority tagged at ENN11 configured in O           tagged with S-VLAN ID           offered at UN12 are delive           • Tester 2 offers single-tagg           0 and S-VLAN ID equal 1           frame size equal to the O           VLAN ID equal to 2222, d           ENNI frames with CE-VI	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CF_1 and CF_2 equal to 0 \\ \hline Color-blind mode \\ \hline file parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC_1 and with CE-VL_2 \\ \hline he untagged Service Frames offered a 1 and C-tagged with S-VLAN ID ged ENNI Frames with S-VLAN ID eto 111 and double-tagged ENNI framVC_1 MTU size at ENNI_1 configured in C 111 and ConfigureD 111 CONFIGURED C 101 C 101 CONFIGURED C$	Frame AN II d at U e unta OVC2 equal equal t es with n OVC	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frames         1 are delivered single-t         NI1 are delivered doub         gged Service Frames o         and that all the priority         to 222 at ENNI1 config         0 111, double-tagged F         h CE-VLAN ID equal         C1. Tester 2 also offers         VID equal to 0 and S-V	CIR2 bbps, CIR2, 76 Bytes, 2, EBS11, E M22 in colo figuration cr equal to 11 e size equa agged with le-tagged a frered at U r tagged ar frered at U r tagged ar gured in O 2NNI fram to 11 and 3 single-tag (LAN ID é	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \hline \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \hline \mbox{ CM}_{22} \\ 2 \mbox{ = 30 Mbps} \\ and \mbox{ CBS}_{22} \mbox{ = 12176 Bytes} \\ \hline \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \hline \mbox{ or-aware mode} \\ \hline \mbox{ or-aware mode} \\ \hline \mbox{ onforms to MEF}_{26.1} \\ and \mbox{ frame size equal to the} \\ al \mbox{ oth the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ at the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ at s-VLAN ID equal to 111 an} \\ \mbox{ with S-VLAN ID equal to 111 and } \\ \mbox{ S-VLAN ID equal to 111 and ged ENVI Frames with S- \\ \mbox{ sequal to 222 and double-tagged} \\ \hline \mbox{ sequal to 222 and double-tagged} \\ \hline \mbox{ and box of the S-sequal to 222 and double-tagged} \\ \hline \mbox{ model}_{22} \mbox{ and box of the S-sequal to 222 and double-tagged} \\ \hline \mbox{ model}_{22} \mbox{ model}_{23} \mbox$		
Profile	OVC EP1           OVC EP2           Note 1: CIR1 = 3 Mbps, CI           Note 2: CBS1 ≥ 12176 By1           Note 3: EIR1, EIR 2, EBS1,           Note 4: CM1 and CM2 in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC1 MTU size at UN11           UN12 configured in OVC2           • Tester 2 verifies that all the that all the priority tagged at ENNI1 configured in O           • Tester 2 offers single-tagg           0 and S-VLAN ID equal 1           frame size equal to the O           VLAN ID equal to 222, d           ENNI frames with CE-VI           configured in OVC2	CIR <sub>1</sub> CBS <sub>1</sub> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> CIR <sub>2</sub> CBS <sub>2</sub> EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> IR <sub>2</sub> = 30 Mbps tes, CBS <sub>2</sub> ≥ 12176 Bytes EBS <sub>2</sub> , CF <sub>1</sub> and CF <sub>2</sub> equal to 0 olor-blind mode olor-blind mode offie parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC <sub>1</sub> and with CE-VL <sup>2</sup> he untagged Service Frames offered at 1 and C-tagged With S-VLAN ID ged ENNI Frames with S-VLAN ID et to 111 and double-tagged ENNI frames VC <sub>1</sub> . Tister 2 at ENNI <sub>1</sub> configured in 0 served double-tagged ENNI frames with CE- <sup>1</sup> LAN ID equal to 11 and S-VLAN ID	Frame AN II d at U e unta OVC <sub>2</sub> equal equal cqual t es with n OVC VLAM equal	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         es with CE-VLAN ID 0         0 equal to 11 and frame         1 are delivered single-t         NI1, are delivered doub         gged Service Frames to         0 c222 at ENNI1 config         0 111, double-tagged H         h CE-VLAN ID equal         C1. Tester 2 also offers         VID equal to 0 and S-V         to 222 and frame size	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration cr equal to 11 e size equa agged with le-tagged ' ffered at U tragged are yured in O SNNI fram to 11 and 5 single-tag 'LAN ID e equal to th	$\label{eq:response} \begin{split} &1 \mbox{CBS}_{11} \mbox{EIR}_{11} \mbox{EBS}_{11} \mbox{CF}_{11} \\ & \mbox{CM}_{11} \\ &2 \mbox{CBS}_{22} \mbox{EIR}_{22} \mbox{EBS}_{22} \mbox{CF}_{22} \\ &2 \mbox{=} 30 \mbox{Mbps} \\ ∧ \mbox{CBS}_{22} \mbox{=} 12176 \mbox{Bytes} \\ & \mbox{EBS}_{22}, \mbox{CF}_{11} \mbox{ and } \mbox{CF}_{22} \mbox{ equal to} \\ & \mbox{or-aware mode} \\ & \mbo$		
	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 Byt           Note 3: EIR₁, EIR ₂, EBS₁           Note 4: CM₁ and CM₂ in cC           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC₁ MTU size at UNI₁           UNI₂ configured in OVC           • Tester 2 verifies that all the thriority tagged at ENNI₁ configured in OV           • Tester 2 offers single-tagg           0 and S-VLAN ID equal to frame size equal to the O           VLAN ID equal to 222, d           ENNI frames with CE-VI configured in OVC2           • Tester 1 verifies that all the direct to the O	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CF_1 and CF_2 equal to 0 \\ \hline color-blind mode \\ \hline file parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC_1 and with CE-VL_2 \\ \hline he untagged Service Frames offered a 1 and C-tagged Service Frames offered a 0 color-blind mode \\ \hline OVC_1. Tester 2 also verifies that all th equal to 222 at ENNI configured in 0 ged ENNI Frames with S-VLAN ID e to 111 and double-tagged ENNI frames with CE-LAN ID equal to 11 and S-VLAN ID \\ \hline LAN ID equal to 11 and S-VLAN ID 11 \\ \hline he ENNI Frames with S-VLAN ID 11 \\ \hline \end{array}$	Frame AN II t UNI d at U e unta OVC2 equal cqual t es with n OVC VLAM equal 1 offe	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the context of the	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colu- figuration car equal to 11 e size equa agged with le-tagged i the-tagged with le-tagged with le-tagged and transformed at U tagged and single-tag LAN ID e equal to th ed in OVC	$\begin{array}{c} 1 \mbox{ CBS}_{11} \ \mbox{EIR}_{11} \ \mbox{EBS}_{11} \ \mbox{CH}_{11} \\ \mbox{CM}_{11} \\ 2 \ \mbox{CBS}_{22} \ \mbox{EIR}_{22} \ \mbox{EBS}_{22} \ \mbox{CF}_{22} \\ \mbox{CM}_{22} \\ \mbox{and CBS}_{22} \ \mbox{EIS}_{22} \ \mbox{EIS}_{22} \ \mbox{CF}_{11} \ \mbox{and CF}_{22} \ \mbox{equal to} \\ \mbox{and CBS}_{22} \ \mbox{EIS}_{22} \ \mbox{equal to} \\ \mbox{and CB}_{22} \ \mbox{EIS}_{22} \ \mbox{equal to} \\ \mbox{and CB}_{22} \ \mbox{equal to} \ \mbox{to} \\ \mbox{and CB}_{22} \ \mbox{equal to} \ \mbox{to} \\ \mbox{and CB}_{22} \ \mbox{equal to} \\ \mbox{and CB}_{22} \ \mbox{and CB}_{21} \ \mbox{and CB}_{22} \ a$		
Profile	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 Byt           Note 3: EIR₁, EIR₂, EBS₁           Note 4: CM₁ and CM₂ in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged, OVC₁ MTU size at UNI₁           UNI₂ configured in OVC           • Tester 2 verifies that all the that all the priority tagged at ENNI₁ configured in OVC           • Tester 2 offers single-tagg           0 and S-VLAN ID offered at UNI₂ are delivo           • Tester 2 offers single-tagg           0 and S-VLAN ID equal frame size equal to the O           VLAN ID equal to 222, d ENNI frames with CE-VI configured in OVC2           • Tester 1 verifies that all th priority tagged and C-tagg	CIR1 CBS1 EIR1 EBS1 CF1 CM1         CIR2 CBS2 EIR2 EBS2 CF2 CM2         IR2= 30 Mbps         tes, CBS2 2 12176 Bytes         EBS2 CF1 and CF2 equal to 0         oilor-blind mode         offile parameter values at the UNIs & ENNI i         priority tagged and C-tagged Service         configured in OVC1 and with CE-VL2         he untagged Service Frames offered at         at and C-tagged Service Frames offered at         ouble-tagged Service Frames Service Frames Offered at         ouble-tagged Service Frames Service Frames Service Frames         text of the service Frames Service Servic	Frame AN II t UNI d at U e unta OVC2 equal cqual t es with n OVC VLAN equal 1 offe	OVC EP11         OVC EP22         Note 1: $CIR_{11} = 3 M$ Note 2: $CBS_{11} \ge 121$ Note 3: $EIR_{11}$ , $EIR_2$ 0         Note 4: $CM_{11}$ and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         N11 are delivered doub         ged Service Frames o         and that all the priority         to 22 at ENNI, config         c1. Tester 2 also offers         NID equal to 0 and S-V         to 222 and frame size         ered at ENNI <sub>1</sub> configur         . Tester 1 also verifies	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration ce qual to 11 e size equa agged with le-tagged v ffered at U tagged ar gured in O SNNI fram to 11 and 3 single-tag t_LAN ID e equal to th ed in OVC that all th	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \mbox{ CM}_{22} \\ 2 \mbox{ = 30 } \mbox{ Mbps} \\ and \mbox{ CBS}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CBS}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CB}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and Frame size equal to fill and frame size equal to the al to the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ a to the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ a to the OVC}_2 \mbox{ Bytes} \mbox{ eddivered single-additional to 111 and the classed double-tagged envire frames with S-classe additional to 222 and double-tagge e OVC}_2 \mbox{ MTU size at ENNI} \\ \mbox{ a treceived untagged, e ENNI Frames with S-VLAY} \mbox{ Interpretational constant} \mbox{ CI}_2 \mbox{ and CS}_2 \mbox{ modes} \mbox{ and CS}_2  equal to 111 and trane size additional to 222 and to 222 and$		
Profile	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 Byt           Note 3: EIR₁, EIR₂, EBS₁           Note 4: CM₁ and CM₂ in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged, OVC₁ MTU size at UNI₁           UNI₂ configured in OVC           • Tester 2 verifies that all the that all the priority tagged at ENNI₁ configured in OVC           • Tester 2 offers single-tagg           0 and S-VLAN ID offered at UNI₂ are delivo           • Tester 2 offers single-tagg           0 and S-VLAN ID equal frame size equal to the O           VLAN ID equal to 222, d ENNI frames with CE-VI configured in OVC2           • Tester 1 verifies that all th priority tagged and C-tagg	$\label{eq:constraint} \begin{array}{ c c c c c } CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline CIR_2 CF_1 and CF_2 equal to 0 \\ \hline color-blind mode \\ \hline file parameter values at the UNIs & ENNI i priority tagged and C-tagged Service configured in OVC_1 and with CE-VL_2 \\ \hline he untagged Service Frames offered a 1 and C-tagged Service Frames offered a 0 color-blind mode \\ \hline OVC_1. Tester 2 also verifies that all th equal to 222 at ENNI configured in 0 ged ENNI Frames with S-VLAN ID e to 111 and double-tagged ENNI frames with CE-LAN ID equal to 11 and S-VLAN ID \\ \hline LAN ID equal to 11 and S-VLAN ID 11 \\ \hline he ENNI Frames with S-VLAN ID 11 \\ \hline \end{array}$	Frame AN II t UNI d at U e unta OVC2 equal cqual t es with n OVC VLAN equal 1 offe	OVC EP11         OVC EP22         Note 1: $CIR_{11} = 3 M$ Note 2: $CBS_{11} \ge 121$ Note 3: $EIR_{11}$ , $EIR_2$ 0         Note 4: $CM_{11}$ and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         N11 are delivered doub         ged Service Frames o         and that all the priority         to 22 at ENNI, config         c1. Tester 2 also offers         NID equal to 0 and S-V         to 222 and frame size         ered at ENNI <sub>1</sub> configur         . Tester 1 also verifies	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration ce qual to 11 e size equa agged with le-tagged v ffered at U tagged ar gured in O SNNI fram to 11 and 3 single-tag t_LAN ID e equal to th ed in OVC that all th	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \mbox{ CM}_{22} \\ 2 \mbox{ = 30 } \mbox{ Mbps} \\ and \mbox{ CBS}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CBS}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CB}_{22} \mbox{ = 1276 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and Frame size equal to fill and frame size equal to the al to the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ a to the OVC}_2 \mbox{ MTU size at a} \\ \mbox{ a to the OVC}_2 \mbox{ Bytes} \mbox{ eddivered single-additional to 111 and the classed double-tagged envire frames with S-classe additional to 222 and double-tagge e OVC}_2 \mbox{ MTU size at ENNI} \\ \mbox{ a treceived untagged, e ENNI Frames with S-VLAY} \mbox{ Interpretational constant} \mbox{ CI}_2 \mbox{ and CS}_2 \mbox{ modes} \mbox{ and CS}_2  equal to 111 and trane size additional to 222 and to 222 and$		
Profile Test Procedure Units	OVC EP1           OVC EP2           Note 1: CIR₁ = 3 Mbps, Cl           Note 2: CBS₁ ≥ 12176 By1           Note 3: EIR₁, EIR₂, EBS₁,           Note 4: CM₁ and CM₂ in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC₁ MTU size at UN₁           UN1₂ configured in OVC₂           • Tester 1 offers untagged with S-VLAN ID           offered at UN1₂ are delive           • Tester 2 offers single-tag;           0 and S-VLAN ID equal 1           frame size equal to the C-VI           configured in OVC₂           • Tester 1 verifies that all th           priority tagged and C-tag;           ID 222 offered at ENNI₁           UN1₂	CIR1 CBS1 EIR1 EBS1 CF1 CM1         CIR2 CBS2 EIR2 EBS2 CF2 CM2         IR2= 30 Mbps         tes, CBS2 2 12176 Bytes         EBS2 CF1 and CF2 equal to 0         oilor-blind mode         offile parameter values at the UNIs & ENNI i         priority tagged and C-tagged Service         configured in OVC1 and with CE-VL2         he untagged Service Frames offered at         at and C-tagged Service Frames offered at         ouble-tagged Service Frames Service Frames Offered at         ouble-tagged Service Frames Service Frames Service Frames         text of the service Frames Service Servic	Frame AN II t UNI d at U e unta OVC2 equal cqual t es with n OVC VLAN equal 1 offe	OVC EP11         OVC EP22         Note 1: $CIR_{11} = 3 M$ Note 2: $CBS_{11} \ge 121$ Note 3: $EIR_{11}$ , $EIR_2$ 0         Note 4: $CM_{11}$ and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         N11 are delivered doub         ged Service Frames o         and that all the priority         to 22 at ENNI, config         c1. Tester 2 also offers         NID equal to 0 and S-V         to 222 and frame size         ered at ENNI <sub>1</sub> configur         . Tester 1 also verifies	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration ce qual to 11 e size equa agged with le-tagged v ffered at U tagged ar gured in O SNNI fram to 11 and 3 single-tag t_LAN ID e equal to th ed in OVC that all th	$\begin{array}{c} 1 \mbox{ CBS}_{11} \mbox{ EIR}_{11} \mbox{ EBS}_{11} \mbox{ CF}_{11} \\ \mbox{ CM}_{11} \\ 2 \mbox{ CBS}_{22} \mbox{ EIR}_{22} \mbox{ EBS}_{22} \mbox{ CF}_{22} \\ \mbox{ CM}_{22} \\ 2 \mbox{ = 30 Mbps} \\ and \mbox{ CBS}_{22} \mbox{ = 12176 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CBS}_{22} \mbox{ = 12176 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and CB}_{22} \mbox{ = 12176 Bytes} \\ \mbox{ EBS}_{22}, \mbox{ CF}_{11} \mbox{ and CF}_{22} \mbox{ equal to} \\ \mbox{ and F}_{22} \mbox{ equal to} \\ \mbox{ and F}_{21} \mbox{ and CB}_{22} \mbox{ equal to} \\ \mbox{ and F}_{21} \mbox{ equal to} \mbox{ 111 and} \\ \mbox{ with S-VLAN ID equal to} \mbox{ 111 and} \\ \mbox{ sew with CE-VLAN ID equal to} \mbox{ 111 and} \\ \mbox{ ged ENNI Frames with S-equal to} \mbox{ 222 and double-tagge} \\ \mbox{ e OVC}_{2} \mbox{ MTU size at ENNI}_{1} \\ \mbox{ are received untagged}, \\ \mbox{ e ENNI Frames with S-VLA} \mbox{ S-VLA} \mbox{ equal} \mbox{ source} \mbox{ equal} \\ \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ source} \mbox{ equal} \mbox{ source} \mbox{ equal}$		
Profile Fest Procedure	OVC EP1           OVC EP2           Note 1: CIR1 = 3 Mbps, CI           Note 2: CBS1 ≥ 12176 Byt           Note 3: EIR1, EIR 2, EBS1,           Note 4: CM1 and CM2 in c           Note: Use of other bandwidth pro           • Tester 1 offers untagged,           OVC1 MTU size at UNI1           UNI2 configured in OVC2           • Tester 2 verifies that all th           that all the priority tagged           at ENN11 configured in OVC           • Tester 2 offers single-tag;           0 and S-VLAN ID           offered at UN12 are delive           • Tester 1 offers with CE-VI           configured in OVC2           • Tester 1 verifies that all th           frame size equal to the O           VLAN ID equal to 222, d           ENNI frames with CE-VI           configured in OVC2           • Tester 1 verifies that all th           priority tagged and C-tag;           ID 222 offered at ENNI1           UNI2           Number of valid frames rece	CIR1 CBS1 EIR1 EBS1 CF1 CM1         CIR2 CBS2 EIR2 EBS2 CF2 CM2         IR2=30 Mbps         tes, CBS2 $\geq$ 12176 Bytes         EBS2, CF1 and CF2 equal to 0         olor-blind mode         olor-blind mode         olor-blind mode         offie parameter values at the UNIs & ENNI i         priority tagged and C-tagged Service         configured in OVC1 and with CE-VL2         he untagged Service Frames offered a         at and C-tagged Service Frames offered at         d and C-tagged Service Frames offered at         with equal to 222 at ENNI1 configured in O         ouble-tagged With S-VLAN ID         ged ENNI Frames with S-VLAN ID         ged ENNI Frames with CE-LAN ID         LAN ID equal to 11 and S-VLAN ID         he ENNI Frames with S-VLAN ID         he ENNI Frames with S-VLAN ID         the ENNI Frames with S-VLAN ID         ged with CE-VLAN ID equal to 11 at         configured in OVC2 are received unta	Frame AN II t UNI d at U e unta DVC2 equal qual t es witi n OVC VLAN equal 1 offe t UNI <sub>1</sub> ggged,	OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 ≥ 121         Note 3: EIR11, EIR 2         0         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         itted provided that the con         se with CE-VLAN ID 0         D equal to 11 and frame         1 are delivered single-t         NI1 are delivered doub         gged Service Frames o         and that all the priority         to 222 at ENNI1 config         C1. Tester 2 also offers         VID equal to 0 and S-V         to 222 and frame size         ered at ENN11 configur         . Tester 1 also verifies         priority tagged and C-	CIR2 bbps, CIR2 76 Bytes, 2, EBS11, E M22 in colo figuration ce equal to 11 e size equa agged with le-tagged vith le-tagged with le-tagged ar y tagged ar of the tagged ar the tagged ar of the tagged ar the tagged ar of the tagged ar of	$\label{eq:response} \begin{array}{c} 1 \ \text{CBS}_{11} \ \text{EIR}_{11} \ \text{EBS}_{11} \ \text{CF}_{11} \\ \ \text{CM}_{11} \\ 2 \ \text{CBS}_{22} \ \text{EIR}_{22} \ \text{EBS}_{22} \ \text{CF}_{22} \\ \ \ \text{CM}_{22} \\ 2 \ = 30 \ \text{Mbps} \\ \text{and} \ \text{CBS}_{22} \ \geq 12176 \ \text{Bytes} \\ \text{EBS}_{22}, \ \text{CF}_{11} \ \text{and} \ \text{CF}_{22} \ \text{equal to} \\ \text{or-aware mode} \\ \ \ \text{onforms to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frame size equal to} \ \text{theorem} \\ \text{and} \ \text{CBS}_{22} \ \geq 12176 \ \text{Bytes} \\ \text{EBS}_{22}, \ \text{CF}_{11} \ \text{and} \ \text{CF}_{22} \ \text{equal to} \\ \ \ \text{and} \ \text{Charmes to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ \text{frames to} \ \text{MEF} \ 26.1 \\ \ \ \text{and} \ 11.1 \ 11.1 \ 10.1 \\ \ \ \text{and} \ 11.1 \ 10.1 \ 10.1 \\ \ \text{and} \ 10.1 \ 11.1 \ 10.1 \\ \ \text{and} \ 10.1 \ 10.1 \ 10.1 \ 10.1 \\ \ \text{and} \ 11.1 \ 10.$		



Remarks

 Note 1: OVC MTU size of the Access Services under test are to be provided by the Operator

 Note 2: The OVC MTU size MUST be ≤ to the MTU size of each External Interface where an OVC EP exists that is associated by the OVC

Test Case 4.1: CE-VLAN ID Preservation

	Abstract Test Suite for Ethernet Acc	cess Services
Test Name	CE-VLAN ID Preservation	
Test Definition ID	AEPL4_R3_R7_R13	
Test Type	Conformance	
Test Status	Mandatory	
Requirement Description	[R7] For an Access EPL service, CE-VLAN ID Preservation MUST b [R3] For an Access EPL service, the OVC EP Map at the UNI MUST single OVC EP [R13] Each S-VLAN ID value associated with an instance of Access E "OVC"	contain all CE-VLAN ID values $\{1,24095\}$ mapped to a
Test Object	Verify that for an Access EPL service, all CE-VLAN IDs mapped to the	he OVC are preserved
Test Configuration	At least two OVCs, each one associating one OVC EP at a UNI and on values are mapped to the OVC EP at each UNI and a specific S-VLAN	
Test Configuration Schematic	Tester I     Equipment(s) Operating at the UNI     Access EPL S Under T       Ethernet Traffic Generator Analyzer     OVC EP)     OVC	Test OVC EP11 OVC EP22 ENNI1 Ethernet Traffic Generator Andivær
	Map at UNI1           CE-VLAN ID         OVC End Point           1.2*4095         OVC EP1	Map at ENNI1           S-VLAN ID         OVC End Point           111         OVC EP11
End Point Maps	Map at UNI2           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for unta configuration conforms to MEF 26.1	222         OVC EP22           tagged and priority tagged frames is permitted provided that the
	Ingress Bandwidth Profile per OVC EP at UNI <sub>1</sub> and UNI <sub>2</sub>	Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$
Test Procedure	<ul> <li>Note: Use of other bandwidth profile parameter values at the UNIs &amp; ENNI is period of the second s</li></ul>	I to 1,24095 at UNI <sub>1</sub> configured in OVC <sub>1</sub> and at UNI <sub>2</sub> are delivered double-tagged with CE-VLAN IDs equal to VC <sub>1</sub> . Tester 2 also verifies that the C-tagged Service Frames qual to 1,24095 and S-VLAN ID equal to 222 at ENNI <sub>1</sub> qual to 1,24095 and S-VLAN ID equal to 111 at ENNI <sub>1</sub> AN IDs equal to 1,24095 and S-VLAN ID equal to 222 at the
	<ul> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> double-tag equal to 111 are received C-tagged at UNI<sub>1</sub> configured in OVC<sub>1</sub> wit offered at ENNI<sub>1</sub> double-tagged with CE-VLAN IDs equal to 1,2 UNI<sub>2</sub> configured in OVC<sub>2</sub> with CE-VLAN IDs equal to 1,24095</li> </ul>	th CE-VLAN IDs equal to 1,24095 and that the ENNI Frames
Units	equal to 111 are received C-tagged at UNI <sub>1</sub> configured in OVC <sub>1</sub> wit offered at ENNI <sub>1</sub> double-tagged with CE-VLAN IDs equal to 1,2	th CE-VLAN IDs equal to 1,24095 and that the ENNI Frames
Units Variables	equal to 111 are received C-tagged at UNI <sub>1</sub> configured in OVC <sub>1</sub> wit offered at ENNI <sub>1</sub> double-tagged with CE-VLAN IDs equal to 1,2 UNI <sub>2</sub> configured in OVC <sub>2</sub> with CE-VLAN IDs equal to 1,24095	th CE-VLAN IDs equal to 1,24095 and that the ENNI Frames .4095 and S-VLAN ID equal to 222 are received C-tagged at



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Remarks C-tag and S-tag formats are specified in IEEE 802.1ad sections 9.5, 9.6 and 9.7

Test Case 5.1: CE-VLAN CoS ID Value Preservation

	Abstra	act Test S	uite for Ethernet A	Acc	ess Services		
Test Name	CE-VLAN CoS ID Value Pr	reservation					
Test Definition ID	AEPL5_R3_R8_R13						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	[R8] For an Access EPL service, CE-VLAN CoS ID Value Preservation MUST be Yes [R3] For an Access EPL service, the OVC EP Map at the UNI MUST contain all CE-VLAN ID values {1, 24095} mapped to a single OVC EP [R13] Each S-VLAN ID value associated with an instance of Access EPL Service MUST map to a distinct End Point, of Type = "OVC"						
Test Object	Verify that for an Access EF	PL service, th	e CE-VLAN CoS are pres	erve	d		
Test Configuration	At least two OVCs, each one associating one OVC EP at a UNI and one OVC EP at the ENNI are configured. All CE-VLAN ID values with specific CoS are mapped to the OVC EP at each UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI						
Test Configuration Schematic	Tester 1 Equipment(s) Operating at the UN1 Ethernet Traffic Generator Analyzer Cyc EP <sub>1</sub> OVC EP <sub>2</sub> OVC EP <sub>2</sub> OVC CP <sub>2</sub> OVC CP <sub>2</sub> OVC CP <sub>2</sub> OVC CP <sub>2</sub> OVC CP <sub>2</sub>					ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer	
End Point Maps	CE-VLAN ID 1,2*4095 Ma CE-VLAN ID 1,2*4095	ap at $UNI_1$ ap at $UNI_2$ at the ENNI at	OVC End Point OVC EP1 OVC End Point OVC EP2 dof other CE-VL AN ID* for	untac	S-VLAN ID 111 222	Map at ENNI1 OVC End Point OVC EP11 OVC EP22	
Bandwidth Profile	Note 4: CM <sub>1</sub> and CM <sub>2</sub> in c	UNI <sub>2</sub> CIR <sub>1</sub> CBS CIR <sub>2</sub> CBS IR <sub>2</sub> = 30 Mbp tes, CBS <sub>2</sub> $\geq$ 1 ,EBS <sub>2</sub> , CF <sub>1</sub> and color-blind m	Parameters $i_1$ EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_3$ $i_1$ EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> EIR <sub>2</sub> $i_2$ EIR <sub>2</sub> </th <th></th> <th><math display="block">\begin{array}{c} \hline OVC \ End \ Point \\ \hline OVC \ EP_{11} \\ \hline OVC \ EP_{22} \\ \hline Note \ 1: \ CIR_{11} = 3 \ M \\ Note \ 2: \ CBS_{11} \ge 121 \\ \hline Note \ 3: \ EIR_{11}, \ EIR_{22} \\ 0 \\ \hline Note \ 4: \ CM_{11} \ and \ CM_{11} \\ \end{array}</math></th> <th></th>		$\begin{array}{c} \hline OVC \ End \ Point \\ \hline OVC \ EP_{11} \\ \hline OVC \ EP_{22} \\ \hline Note \ 1: \ CIR_{11} = 3 \ M \\ Note \ 2: \ CBS_{11} \ge 121 \\ \hline Note \ 3: \ EIR_{11}, \ EIR_{22} \\ 0 \\ \hline Note \ 4: \ CM_{11} \ and \ CM_{11} \\ \end{array}$		
Test Procedure	<ul> <li>Note 3: EIR<sub>1</sub>, EIR 2; EBS<sub>1</sub>, EBS<sub>2</sub> CF<sub>1</sub> and CF<sub>2</sub> equal to 0 Note 4: CM<sub>1</sub> and CM<sub>2</sub> in color-blind mode</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in color-blind mode</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in color-blind mode</li> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN IDs equal to 1,2500 and CE-VLAN CoS equal to 0, CE-VLAN IDs equal to 501,5021000 and CE-VLAN CoS equal to 1, CE-VLAN IDs equal to 501,5021500 and CE-VLAN CoS equal to 2, CE-VLAN IDs equal to 4, CE-VLAN IDs equal to 5201,2023000 and CE-VLAN CoS equal to 2, CE-VLAN IDs equal to 4, CE-VLAN IDs equal to 5201,25023000 and CE-VLAN CoS equal to 2, and CE-VLAN IDs equal to 2, CE-VLAN IDs equal to 4, CE-VLAN IDs equal to 6, CE-VLAN IDs equal to 3501,35024095 and CE-VLAN IDs equal to 3001,30023500 and CE-VLAN CoS equal to 0, CE-VLAN IDs equal to 7, at UN<sub>1</sub> configured in OVC<sub>1</sub> and at UN<sub>2</sub> configured in OVC<sub>2</sub></li> <li>Tester 2 verifies that the C-tagged Service Frames offered at UN<sub>1</sub> are delivered double-tagged with CE-VLAN IDs equal to 1,2500, CE-VLAN IDs equal to 501,5021000, CE-VLAN CoS equal to 1, and S-VLAN ID equal to 111, CE-VLAN IDs equal to 511,5021000, CE-VLAN COS equal to 1 and S-VLAN ID equal to 501,5021000, CE-VLAN CoS equal to 1 and S-VLAN ID equal to 501,5021000, CE-VLAN CoS equal to 222, etc at ENN<sub>1</sub> configured in OVC<sub>2</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 501,5021000, CE-VLAN COS equal to 1 and S-VLAN ID equal to 201,202500, CE-VLAN COS equal to 1,2500, CE-VLAN COS equal to 0 and S-VLAN ID equal to 222, etc at ENN<sub>1</sub> configured in OVC<sub>2</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs equal to 1,2500, CE-VLAN COS equal to 1,2500, CE-VLAN COS equal to 1 and S-VLAN ID equal to 111, etc -VLAN IDs equal to 110, CE-VLAN IDs equal to 1,2500, CE-VLAN COS equal to 1 and S-VLAN ID equal to 222, etc at ENN<sub>1</sub> configured in OVC<sub>2</sub></li> <li>Tester</li></ul>						
		tc					
Units	VLAN CoS equal to 1, et CE-VLAN ID, CE-VLAN C		AN ID values				
Units Variables	VLAN CoS equal to 1, et	CoS and S-VI		CBS	1, CBS <sub>2</sub> , CBS <sub>11</sub> , CBS <sub>22</sub>		



Remarks C-tag and S-VLAN ID formats are specified in IEEE 802.1ad sections 9.5, 9.6 and 9.7

Test Case 6.1: Unicast, Multicast and Broadcast Unconditional Frame Delivery

	Abstract Test Suite for Ethernet A	lcces	ss Services				
Test Name	Unicast, Multicast and Broadcast Unconditional Frame Delivery						
Test Definition ID	AEPL6_R3_R10_R13						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	[R10] For an Access EPL service, unicast, multicast and broadcast fram [R3] For an Access EPL service, the OVC EP Map at the UNI <b>MUST</b> c EP [R13] Each S-VLAN ID value associated with an instance of Access EP	contain	all CE-VLAN ID val	lues {1, 2			
Test Object	Verify that for an Access EPL service, the unicast, multicast and broadc	ast fra	mes are delivered une	conditional	у		
Test Configuration	At least two OVCs, each one associating one OVC EP at a UNI and one mapped to the OVC EP at each UNI and a specific S-VLAN ID is mapp				All CE-VLAN ID values are		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Equipment(s) Operating at the UNI OVC EP1 OVC EP2 OVC EP2 OV	er Test /C <sub>1</sub>	rvices t	quipment berating at the ENNI	Tester 2 Ethernet Traffic Generator Analyzer		
	Map at UNI <sub>1</sub>			Map at H	ENNI <sub>1</sub>		
	CE-VLAN ID         OVC End Point           1.2*4095         OVC EP1		S-VLAN ID 111		OVC End Point OVC EP11		
	1,2*4095 OVC EP]		222		OVC EP11 OVC EP22		
End Point Maps	Map at UNI2           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untage conforms to MEF 26.1	ged and	d priority tagged frames i	s permitted p	rovided that the configuration		
	Ingress Bandwidth Profile per OVC EP at UNI <sub>1</sub> and UNI <sub>2</sub>			dth Profile	e per OVC EP at ENNI <sub>1</sub>		
	OVC End Point         Parameters           OVC EP1         CIR1 CB51 EIR1 EB51 CF1 CM1		OVC End Point OVC EP11	CIR <sub>11</sub> C	Parameters BS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub>		
Bandwidth	OVC EP2     CIR2 CBS2 EIR2 EBS2 CF2 CM2		OVC EP <sub>22</sub>		$BS_{22} EIR_{22} EBS_{22} CF_{22} CM_{22}$		
Profile	Note 1: $CIR_1 = 3$ Mbps, $CIR_2 = 30$ Mbps         Note 2: $CBS_1 \ge 12176$ Bytes, $CBS_2 \ge 12176$ Bytes         Note 3: $EIR_1$ , $EIR_2$ , $EBS_1$ , $EBS_2$ , $CF_1$ and $CF_2$ equal to 0         Note 4: $CM_1$ and $CM_2$ in color-blind mode         Note 4: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEF 26.1						
Test Procedure	<ul> <li>Tester 1 offers untagged, priority tagged and C-tagged Service Frame destination address at UNI<sub>1</sub> configured in OVC<sub>1</sub> and at UNI<sub>2</sub> configu</li> <li>Tester 2 verifies that all the unicast, multicast and broadcast untagged VLAN ID equal to 111 and that all the unicast, multicast and broadcast untagged with S-VLAN ID equal to 111 at ENNI<sub>1</sub> cor and broadcast untagged Service Frames offered at UNI<sub>1</sub> are delivered OVC<sub>2</sub> and that all the unicast, multicast and broadcast priority tagged tagged with S-VLAN ID equal to 222 at ENNI<sub>1</sub> configured in OVC<sub>2</sub></li> <li>Tester 2 offers unicast, multicast and broadcast priority tagged tagged with S-VLAN ID equal to 222 at ENNI<sub>1</sub> configured in OVC<sub>2</sub></li> <li>Tester 2 offers unicast, multicast and broadcast single-tagged ENNI I with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 and doul ID equal to 111 at ENNI<sub>1</sub> configured in OVC<sub>1</sub>. Tester 2 also offers u VLAN ID equal to 222, double-tagged ENNI Frames with CE-VLAN ID equal to 222</li> <li>Tester 1 verifies that all the unicast, multicast and broadcast ENNI Frames with CE-VLAN ID equal to 222 at ENNI Frames with CE-VLAN ID equal to 222 double-tagged and C-tagged with CE-VLAN ID multicast and broadcast ENNI Frames with CE-VLAN ID equal to 222 offered and C-tagged with CE-VLAN ID equal to 222 offered and C-tagged with CE-VLAN ID equal to 221 offered and C-tagged with CE-VLAN ID equal to 221 offered and C-tagged with CE-VLAN ID equal to 221 offered and C-tagged with CE-VLAN ID equal to 221 at C-VLAN ID equal to 220 offered and C-tagged with CE-VLAN ID equal to 221 at C-VLAN ID equal to 220 offered and C-tagged with CE-VLAN ID equal to 221 at C-VLAN ID equal to 220 offered and C-tagged with CE-VLAN ID equal to 220 offered and C-tagged with CE-VLAN ID equal to 211 at UNI<sub>2</sub></li> </ul>	es with ured in d Serv ast prio nfigure d singl d and C Frame: ble-tag unicast N ID ec at EN rames equal	n CE-VLAN ID equal OVC <sub>2</sub> ice Frames offered at ority tagged and C-tag ed in OVC1. Tester 2 e-tagged with S-VLA C-tagged Service Fran s with S-VLAN ID en gged ENNI frames wi , multicast and broad- qual to 0 and S-VLAN IN <sub>1</sub> configured in OV with S-VLAN ID 11 to 11 at UNI <sub>1</sub> . Tester	to 11 with UNI <sub>1</sub> are d gged Servic also verifie N ID equal nes offered qual to 111, th CE-VLA cast single- V ID equal to $C_2$ 1 offered at 1 also veri	unicast, multicast and broadcast elivered single-tagged with S- e Frames offered at UNI <sub>1</sub> are s that all the unicast, multicast to 222 at ENNI <sub>1</sub> configured in at UNI <sub>2</sub> are delivered double- double-tagged ENNI frames N ID equal to 11 and S-VLAN tagged ENNI Frames with S- to 222 and double-tagged ENNI ENNI <sub>1</sub> configured in OVC <sub>1</sub> are fies that all the unicast,		
Units	Number of valid frames received at the external interfaces						
Units Variables	Number of valid frames received at the external interfaces           UNI and ENNI interface speeds and bandwidth profile parameters CBS.	1, CBS	2, CBS11, CBS22				
	-	ı, CBS	22, CBS11, CBS22				



## 10.2 Test Cases for Access EPL – Service OAM Frames Handling

Test Case 7.1: Service OAM Connectivity Check Messages (CCM) Handling

	Abstract Test Suite for Ethernet Ac	cess Services					
Test Name	Service OAM Connectivity Check Messages (CCM) Handling						
Test Definition ID	AEPL7_R3_R13_R14						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	[R14] The Access EPL and Access EVPL Services <b>MUST</b> be configu <b>Subscriber</b> MEG levels as defined in the SOAM FM IA (MEF 30) do [R3] For an Access EPL service, the OVC EP Map at the UNI <b>MUST</b> single OVC EP [R13] Each S-VLAN ID value associated with an instance of Access E "OVC"	cument, section 7.1. contain all CE-VLAN	ID values {1, 24095} mapped to a				
Test Object	Verify that for an Access EPL service, CCM frames are tunneled at the SOAM FM IA (MEF 30), section 7.1	e default Test, and Subs	scriber MEG levels as defined in the				
Test Configuration	At least two OVCs, each one associating one OVC EP at a UNI and or values are mapped to the OVC EP at each UNI and a specific S-VLAN						
Test Configuration Schematic	Tester 1 Lithernet Troffic Generator Analyzer Tester 1 Lithernet Troffic Generator Analyzer CVC EP <sub>2</sub> OVC EP <sub>2</sub> OVC	Services Test	Equipment Operating at the ENNI OVC EP11 OVC EP22				
	Map at UNI <sub>1</sub>		Map at ENNI <sub>1</sub>				
	CE-VLAN ID         OVC End Point           1.2*4095         OVC EP1	S-VLAN ID 111	OVC End Point OVC EP11				
	1,2 OVC EI 1	222	OVC EP <sub>22</sub>				
End Point Maps	Map at UNI2           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for unta configuration conforms to MEF 26.1	agged and priority tagged fr	rames is permitted provided that the				
	Ingress Bandwidth Profile per OVC EP at UNI1 and	Ingress Bandwi	dth Profile per OVC EP at ENNI <sub>1</sub>				
	UNI <sub>2</sub>	-	-				
	UNI2           OVC End Point         Parameters	OVC End Point	Parameters				
Randwidth	OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1	OVC End Point OVC EP <sub>11</sub>	Parameters CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub>				
Bandwidth Profile	$\begin{tabular}{ c c c c c } \hline UN1_2 & UN1_2 \\ \hline OVC End Point & Parameters \\ \hline OVC EP_1 & CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline OVC EP_2 & CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CIR_2 = 30 Mbps \\ \hline Note 2: CBS_1 \ge 12176 Bytes, CBS_2 \ge 12176 Bytes \\ \hline Note 3: EIR_1, EIR_2, EBS_1, EBS_2 CF_1 and CF_2 equal to 0 \\ \hline Note 4: CM_1 and CM_2 in color-blind mode \\ \hline \end{tabular}$	$\begin{array}{c} OVC \ End \ Point\\ OVC \ Ep_{11}\\ OVC \ Ep_{22}\\ Note \ 1: \ CIR_{11} = 3 \ M\\ Note \ 2: \ CBS_{11} \ge 121\\ Note \ 3: \ EIR_{11}, \ EIR_{22}\\ 0\\ Note \ 4: \ CM_{11} \ and \ and$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
	$\begin{tabular}{ c c c c c } \hline UN1_2 & UN1_2 \\ \hline OVC End Point & Parameters \\ \hline OVC EP_1 & CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline OVC EP_2 & CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CIR_2 = 30 Mbps \\ Note 2: CBS_1 \ge 12176 Bytes, CBS_2 \ge 12176 Bytes \\ Note 3: EIR_1, EIR_2, EBS_1, EBS_2 CF_1 and CF_2 equal to 0 \\ \hline \end{tabular}$	$\begin{array}{c} OVC \ End \ Point\\ OVC \ Ep_{11}\\ OVC \ Ep_{22}\\ Note \ 1: \ CIR_{11} = 3 \ M\\ Note \ 2: \ CBS_{11} \ge 121\\ Note \ 3: \ EIR_{11}, \ EIR_{22}\\ 0\\ Note \ 4: \ CM_{11} \ and \ and$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
	$\begin{tabular}{ c c c c c } \hline UN1_2 & UN1_2 \\ \hline OVC End Point & Parameters \\ \hline OVC EP_1 & CIR_1 CBS_1 EIR_1 EBS_1 CF_1 CM_1 \\ \hline OVC EP_2 & CIR_2 CBS_2 EIR_2 EBS_2 CF_2 CM_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CIR_2 = 30 Mbps \\ \hline Note 2: CBS_1 \ge 12176 Bytes, CBS_2 \ge 12176 Bytes \\ \hline Note 3: EIR_1, EIR_2, EBS_1, EBS_2 CF_1 and CF_2 equal to 0 \\ \hline Note 4: CM_1 and CM_2 in color-blind mode \\ \hline \end{tabular}$	OVC End Point         OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         mitted provided that the co         JNI1 configured in OVG         5, and 6 offered at UN         o verifies that all the un         equal to 222 at ENNI1         y with S-VLAN ID equa         AN ID equal to 222 at Evel 5, and 6 with S-V         erifies that all the singl	Parameters         CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> CIR <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub> Ibps, CIR <sub>22</sub> = 30 Mbps         176 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes         2, EBS <sub>11</sub> , EBS <sub>22</sub> , CF <sub>11</sub> and CF <sub>22</sub> equal to         M <sub>22</sub> in color-aware mode         nfiguration conforms to MEF 26.1         C1         C1 and at UNI <sub>2</sub> configured in OVC <sub>2</sub> I <sub>1</sub> are delivered single-tagged with S-tagged CCM messages at MEG level 5, configured in OVC <sub>2</sub> al to 111 at ENNI <sub>1</sub> configured in OVC <sub>2</sub> LAN ID equal to 111 offered at ENNI <sub>1</sub> e-tagged CCM messages at MEG level 5,				
Profile	UN12           OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1           OVC EP2         CIR2 CBS2 EIR2 EBS2 CF2 CM2           Note 1: CIR1 = 3 Mbps, CIR2 = 30 Mbps         Note 2: CBS1 ≥ 12176 Bytes, CBS2 ≥ 12176 Bytes           Note 2: CBS1 ≥ 12176 Bytes, CBS2 ≥ 12176 Bytes         Note 3: EIR1, EIR2, EBS1, EBS2 CF1 and CF2 equal to 0           Note 4: CM1 and CM2 in color-blind mode         Note 4: CM1 and CM2 in color-blind mode           Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is per         • Tester 1 offers untagged CCM messages at MEG level 5, and 6 at U           • Tester 2 verifies that all the untagged CCM messages at MEG level 5, and 6 offered at UNI2 are delivered single-tagged with S-VLAN ID         • Tester 2 offers single-tagged CCM messages at MEG level 5, and 6 with S-VI           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VI         • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 and single-tagged CCM messages at MEG level 5, and 6 with S-VI	OVC End Point         OVC EP11         OVC EP22         Note 1: CIR11 = 3 M         Note 2: CBS11 $\geq$ 121         Note 3: EIR11, EIR 2         0         Note 4: CM11 and C         mitted provided that the co         JNI1 configured in OVG         5, and 6 offered at UN         o verifies that all the un         equal to 222 at ENNI1         y with S-VLAN ID equa         AN ID equal to 222 at Evel 5, and 6 with S-V         erifies that all the singl	Parameters         CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> CIR <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub> Ibps, CIR <sub>22</sub> = 30 Mbps         176 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes         2, EBS <sub>11</sub> , EBS <sub>22</sub> , CF <sub>11</sub> and CF <sub>22</sub> equal to         M <sub>22</sub> in color-aware mode         nfiguration conforms to MEF 26.1         C1         C1 and at UNI <sub>2</sub> configured in OVC <sub>2</sub> I <sub>1</sub> are delivered single-tagged with S-tagged CCM messages at MEG level 5, configured in OVC <sub>2</sub> al to 111 at ENNI <sub>1</sub> configured in OVC <sub>2</sub> LAN ID equal to 111 offered at ENNI <sub>1</sub> e-tagged CCM messages at MEG level 5,				
Profile Test Procedure	UN12           OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1           OVC EP2         CIR2 CBS2 EIR2 EBS2 CF2 CM2           Note 1: CIR1 = 3 Mbps, CIR2 = 30 Mbps         Note 2: CBS1 ≥ 12176 Bytes, CBS2 ≥ 12176 Bytes           Note 3: EIR1, EIR2, EBS1, EBS2 CF1 and CF2 equal to 0         Note 4: CM1 and CM2 in color-blind mode           Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is per         • Tester 1 offers untagged CCM messages at MEG level 5, and 6 at I           • Tester 2 verifies that all the untagged CCM messages at MEG level 5, and 6 of fored at UNI2 are delivered single-tagged with S-VLAN ID         • Tester 2 offers single-tagged CCM messages at MEG level 5, and 6 with S-VI           • Tester 1 offers untagged CCM messages at MEG level 5, and 6 with S-VLAN ID         • Tester 2 offers single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VI         • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VI           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VI         • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VI	OVC End Point OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> ≥ 12] Note 3: EIR <sub>11</sub> , EIR 2 0 Note 4: CM <sub>11</sub> and C mitted provided that the co JNI <sub>1</sub> configured in OV( 15, and 6 offered at UN 0 verifies that all the un equal to 222 at ENNI <sub>1</sub> 5 with S-VLAN ID equa LAN ID equal to 222 at level 5, and 6 with S-V verifies that all the singl untagged at UNI <sub>2</sub> confi	Parameters         CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> CIR <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub> Ibps, CIR <sub>22</sub> = 30 Mbps         176 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes         2, EBS <sub>11</sub> , EBS <sub>22</sub> , CF <sub>11</sub> and CF <sub>22</sub> equal to         M <sub>22</sub> in color-aware mode         nfiguration conforms to MEF 26.1         C1 and at UNI <sub>2</sub> configured in OVC <sub>2</sub> I <sub>1</sub> are delivered single-tagged with S-tagged CCM messages at MEG level 5, configured in OVC <sub>2</sub> al to 111 at ENNI <sub>1</sub> configured in OVC <sub>1</sub> ENNI <sub>1</sub> configured in OVC <sub>2</sub> LAN ID equal to 111 offered at ENNI <sub>1</sub> e-tagged CCM messages at MEG level 5, igured in OVC <sub>2</sub>				
Profile Test Procedure Units	UN12           OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1           OVC EP2         CIR2 CBS2 EIR2 EBS2 CF2 CM2           Note 1: CIR1 = 3 Mbps, CIR2 = 30 Mbps         Note 2: CBS1 ≥ 12176 Bytes, CBS2 ≥ 12176 Bytes           Note 2: CBS1 ≥ 12176 Bytes, CBS2 ≥ 12176 Bytes         Note 3: EIR1, EIR 2, EBS1, EBS2 CF1 and CF2 equal to 0           Note 4: CM1 and CM2 in color-blind mode         Note 4: CM1 and CM2 in color-blind mode           Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is per         •           • Tester 1 offers untagged CCM messages at MEG level 5, and 6 at U         •           • Tester 2 verifies that all the untagged CCM messages at MEG level 5, and 6 offered at UN12 are delivered single-tagged with S-VLAN ID         •           • Tester 2 offers single-tagged CCM messages at MEG level 5, and 6 with S-VI         •           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID         •           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID         •           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID         •           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID         •           • Tester 1 verifies that all the single-tagged CCM messages at MEG level 5, and 6 with S-VLAN ID equal to 222 o	OVC End Point OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> ≥ 12] Note 3: EIR <sub>11</sub> , EIR 2 0 Note 4: CM <sub>11</sub> and C mitted provided that the co JNI <sub>1</sub> configured in OV( 15, and 6 offered at UN 0 verifies that all the un equal to 222 at ENNI <sub>1</sub> 5 with S-VLAN ID equa LAN ID equal to 222 at level 5, and 6 with S-V verifies that all the singl untagged at UNI <sub>2</sub> confi	Parameters         CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub> CM <sub>11</sub> CIR <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub> Ibps, CIR <sub>22</sub> = 30 Mbps         176 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes         2, EBS <sub>11</sub> , EBS <sub>22</sub> , CF <sub>11</sub> and CF <sub>22</sub> equal to         M <sub>22</sub> in color-aware mode         nfiguration conforms to MEF 26.1         C1 and at UNI <sub>2</sub> configured in OVC <sub>2</sub> I <sub>1</sub> are delivered single-tagged with S-tagged CCM messages at MEG level 5, configured in OVC <sub>2</sub> al to 111 at ENNI <sub>1</sub> configured in OVC <sub>1</sub> ENNI <sub>1</sub> configured in OVC <sub>2</sub> LAN ID equal to 111 offered at ENNI <sub>1</sub> e-tagged CCM messages at MEG level 5, igured in OVC <sub>2</sub>				



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#### Test Case 8.1: Service OAM Linktrace Messages (LTM/LTR) Handling

	Abstra	act Test S	uite for Ethernet A	Acce	ess Services	
Test Name	Service OAM Linktrace Mes	ssages (LTM	/LTR) Handling			
Test Definition ID	AEPL8_R3_R13_R14					
Test Type	Conformance					
Test Status	Mandatory					
Requirement Description	<ul> <li>[R14] The Access EPL and Access EVPL Services MUST be configurable to tunnel all SOAM frames at the default Test and Subscriber MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1.</li> <li>[R3] For an Access EPL service, the OVC EP Map at the UNI MUST contain all CE-VLAN ID values {1, 24095} mapped to a single OVC EP</li> <li>[R13] Each S-VLAN ID value associated with an instance of Access EPL Service MUST map to a distinct End Point, of Type = "OVC"</li> </ul>					
Test Object	Verify that for an Access EP the SOAM FM IA (MEF 30)		TM and LTR frames are to	innel	ed at the default Test, a	nd Subscriber MEG levels as defined in
Test Configuration	At least two OVCs, each one values are mapped to the OV					are configured. All CE-VLAN ID VC EP at the ENNI
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Equipment(s Operating a the UNI	Access E Unde		ervices est	Tester 2 Tester 2 ENNI ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer
		p at UNI1				Map at ENNI <sub>1</sub>
	CE-VLAN ID 1,2*4095		OVC End Point OVC EP1	-	S-VLAN ID 111	OVC End Point OVC EP <sub>11</sub>
End Point Maps		p at UNI <sub>2</sub>	01011		222	OVC EP <sub>22</sub>
	CE-VLAN ID 1,2*4095 Note: Use of other S-VLAN IDs configuration conforms to MEF 2 Ingress Bandwidth Pr	26.1		untag		nes is permitted provided that the the the the the the the the the th
		UNI <sub>2</sub>	-	_		
	OVC End Point OVC EP1	CIR <sub>1</sub> CBS	Parameters S1 EIR1 EBS1 CF1 CM1		OVC End Point OVC EP11	Parameters CIR <sub>11</sub> CBS <sub>11</sub> EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub>
Bandwidth	OVC EP2	CIR <sub>2</sub> CBS	$S_2 EIR_2 EBS_2 CF_2 CM_2$		OVC EP <sub>22</sub>	CM <sub>11</sub> CIR <sub>22</sub> CBS <sub>22</sub> EIR <sub>22</sub> EBS <sub>22</sub> CF <sub>22</sub>
Profile	Note 1: $CIR_1 = 3$ Mbps, $CIR_2 = 30$ Mbps Note 2: $CBS_1 \ge 12176$ Bytes, $CBS_2 \ge 12176$ Bytes Note 3: $EIR_1$ , $EIR_2$ , $EBS_1$ , $EBS_2$ , $CF_1$ and $CF_2$ equal to 0					CM
	Note 2: $CBS_1 \ge 12176$ Byt Note 3: $EIR_1$ , $EIR_2$ , $EBS_1$ ,	tes, $CBS_2 \ge 1$ EBS <sub>2</sub> , $CF_1$ ar	2176 Bytes nd CF <sub>2</sub> equal to 0		Note 2: $CBS_{11} \ge 121$	$\begin{array}{l} CM_{22} \\ \text{bps, CIR}_{22} = 30 \text{ Mbps} \\ 76 \text{ Bytes, and CBS}_{22} \geq 12176 \text{ Bytes} \\ \text{, EBS}_{11}, \text{EBS}_{22}, \text{CF}_{11} \text{ and CF}_{22} \text{ equal to} \end{array}$
	Note 2: $CBS_1 \ge 12176$ Byt Note 3: $EIR_1$ , $EIR_2$ , $EBS_1$ , Note 4: $CM_1$ and $CM_2$ in c	tes, $CBS_2 \ge 1$ EBS <sub>2</sub> , $CF_1$ are olor-blind me	2176 Bytes nd CF <sub>2</sub> equal to 0 ode		Note 2: $CBS_{11} \ge 121$ Note 3: $EIR_{11}$ , $EIR_{22}$ 0 Note 4: $CM_{11}$ and $CR_{11}$	pps, $CIR_{22} = 30$ Mbps 76 Bytes, and $CBS_{22} \ge 12176$ Bytes , $EBS_{11}$ , $EBS_{22}$ , $CF_{11}$ and $CF_{22}$ equal to $M_{22}$ in color-aware mode
Test Procedure	<ul> <li>Note 2: CBS<sub>1</sub> ≥ 12176 Byt</li> <li>Note 3: EIR<sub>1</sub>, EIR<sub>2</sub>, EBS<sub>1</sub>,</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in c</li> <li>Note: Use of other bandwidth proc</li> <li>Tester 1 offers untagged I OVC<sub>2</sub></li> <li>Tester 2 verifies that all th with S-VLAN ID equal to MEG level 5, and 6 offerc</li> <li>Tester 2 offers single-tagg OVC<sub>1</sub> and single-tagged I OVC<sub>2</sub></li> <li>Tester 1 verifies that all th ENNI<sub>1</sub> are received untag</li> </ul>	tes, $CBS_2 \ge 1$ $EBS_2, CF_1$ are olor-blind mu- blind mu- blind parameter LTM and LT. the untagged I b) 111 at ENN ed at UNI <sub>2</sub> are ged LTM and LTM and LT. the single-tagged at UNI <sub>1</sub>	2176 Bytes d CF <sub>2</sub> equal to 0 ode values at the UNIs & ENNI is R messages at MEG level LTM and LTR messages at I, configured in OVC <sub>1</sub> . T e delivered single-tagged I LTR messages at MEG R messages at MEG level ged LTM and LTR messa configured in OVC <sub>1</sub> . Tes	5, an at ME Cester with level 5, ar ges at ter 1	Note 2: CBS <sub>11</sub> $\geq$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0 Note 4: CM <sub>11</sub> and CM itted provided that the conf d 6 at UNI <sub>1</sub> configured CG level 5, and 6 offere 2 also verifies that all f S-VLAN ID equal to 2 5, and 6 with S-VLAN d 6 with S-VLAN ID co the configured for the configured the configured for the configured set MEG level 5, and 6 with set the configured the configured for the configured the configured for the configured for the configured set MEG level 5, and 6 with set the configured for the configured the configured for the configured	pps, $CIR_{22} = 30$ Mbps 76 Bytes, and $CBS_{22} \ge 12176$ Bytes , $EBS_{11}$ , $EBS_{22}$ , $CF_{11}$ and $CF_{22}$ equal to $M_{22}$ in color-aware mode
Test Procedure Units	<ul> <li>Note 2: CBS<sub>1</sub> ≥ 12176 Byt</li> <li>Note 3: EIR<sub>1</sub>, EIR<sub>2</sub>, EBS<sub>1</sub>,</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in c</li> <li>Note: Use of other bandwidth proc</li> <li>Tester 1 offers untagged I OVC<sub>2</sub></li> <li>Tester 2 verifies that all th with S-VLAN ID equal to MEG level 5, and 6 offerc</li> <li>Tester 2 offers single-tagg OVC<sub>1</sub> and single-tagged I OVC<sub>2</sub></li> <li>Tester 1 verifies that all th ENNI<sub>1</sub> are received untag</li> </ul>	tes, $CBS_2 \ge 1$ $EBS_2, CF_1$ ar olor-blind mo- blind mo- blind model of the second second the untagged I the untagged	2176 Bytes d CF <sub>2</sub> equal to 0 ode values at the UNIs & ENNI is R messages at MEG level LTM and LTR messages : I <sub>1</sub> configured in OVC <sub>1</sub> . Te e delivered single-tagged LTR messages at MEG level ged LTM and LTR messa configured in OVC <sub>1</sub> . Tes D equal to 222 offered at	5, an at ME Cester with level 5, ar ges at ter 1	Note 2: CBS <sub>11</sub> $\geq$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0 Note 4: CM <sub>11</sub> and CM itted provided that the conf d 6 at UNI <sub>1</sub> configured CG level 5, and 6 offere 2 also verifies that all f S-VLAN ID equal to 2 5, and 6 with S-VLAN d 6 with S-VLAN ID co the configured for the configured the configured for the configured set MEG level 5, and 6 with set the configured the configured for the configured the configured for the configured for the configured set MEG level 5, and 6 with set the configured for the configured the configured for the configured	pps, CIR <sub>22</sub> = 30 Mbps 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CFS <sub>22</sub> cqual to M <sub>22</sub> in color-aware mode iguration conforms to MEF 26.1 1 in OVC <sub>1</sub> and at UNI <sub>2</sub> configured in d at UNI <sub>1</sub> are delivered single-tagged the untagged LTM and LTR messages at 22 at ENNI <sub>1</sub> configured in OVC <sub>2</sub> ID equal to 111 at ENNI <sub>1</sub> configured in equal to 222 at ENNI <sub>1</sub> configured in ith S-VLAN ID equal to 111 offered at single-tagged LTM and LTR messages
	<ul> <li>Note 2: CBS<sub>1</sub> ≥ 12176 Byt</li> <li>Note 3: EIR<sub>1</sub>, EIR<sub>2</sub>, EBS<sub>1</sub>,</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in c</li> <li>Note: Use of other bandwidth pro</li> <li>Tester 1 offers untagged I</li> <li>OVC<sub>2</sub></li> <li>Tester 2 verifies that all th</li> <li>with S-VLAN ID equal to</li> <li>MEG level 5, and 6 offers</li> <li>OVC<sub>2</sub></li> </ul>	tes, $CBS_2 \ge 1$ $EBS_2, CF_1$ are olor-blind mo- blind mo- blind mo- file parameter LTM and LT. the untagged I b) 111 at ENN ed at UNI <sub>2</sub> are ged LTM and LTM and LT. the single-tagg aged at UNI <sub>1</sub> th S-VLAN I ived at the ex-	2176 Bytes d CF <sub>2</sub> equal to 0 ode values at the UNIs & ENNI is R messages at MEG level LTM and LTR messages at I, configured in OVC <sub>1</sub> . Te e delivered single-tagged I LTR messages at MEG level ged LTM and LTR messa configured in OVC <sub>1</sub> . Tes D equal to 222 offered at sternal interfaces	15, an at ME Cester with level 15, ar ges at ter 1 ENN	Note 2: CBS <sub>11</sub> $\ge$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0 Note 4: CM <sub>11</sub> and CN itted provided that the conf d 6 at UNI <sub>1</sub> configured CG level 5, and 6 offere 2 also verifies that all to S-VLAN ID equal to 2 5, and 6 with S-VLAN ID co the with S-VLAN ID co the configured for the configured the configured for the configured the configured for the configured the configured for the configured the configured for the configured for the configured the configured for the configured for the configured the configured for the configured	pps, CIR <sub>22</sub> = 30 Mbps 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CFS <sub>22</sub> cqual to M <sub>22</sub> in color-aware mode iguration conforms to MEF 26.1 1 in OVC <sub>1</sub> and at UNI <sub>2</sub> configured in d at UNI <sub>1</sub> are delivered single-tagged the untagged LTM and LTR messages at 22 at ENNI <sub>1</sub> configured in OVC <sub>2</sub> ID equal to 111 at ENNI <sub>1</sub> configured in equal to 222 at ENNI <sub>1</sub> configured in ith S-VLAN ID equal to 111 offered at single-tagged LTM and LTR messages
Units	<ul> <li>Note 2: CBS<sub>1</sub> ≥ 12176 Byt</li> <li>Note 3: EIR<sub>1</sub>, EIR<sub>2</sub>, EBS<sub>1</sub>,</li> <li>Note 4: CM<sub>1</sub> and CM<sub>2</sub> in c</li> <li>Note: Use of other bandwidth proc</li> <li>Tester 1 offers untagged I OVC<sub>2</sub></li> <li>Tester 2 verifies that all th with S-VLAN ID equal to MEG level 5, and 6 offerc</li> <li>Tester 2 offers single-tagge OVC<sub>1</sub> and single-tagge OVC<sub>2</sub></li> <li>Tester 1 verifies that all th ENNI<sub>1</sub> are received untag at MEG level 5, and 6 with Number of valid frames received</li> </ul>	tes, $CBS_2 \ge 1$ $EBS_2, CF_1$ are olor-blind mo- blind mo- blind mo- file parameter LTM and LT. the untagged I b) 111 at ENN ed at UNI <sub>2</sub> are ged LTM and LTM and LT. the single-tagg aged at UNI <sub>1</sub> th S-VLAN I ived at the ex-	2176 Bytes d CF <sub>2</sub> equal to 0 ode values at the UNIs & ENNI is R messages at MEG level LTM and LTR messages at I, configured in OVC <sub>1</sub> . Te e delivered single-tagged I LTR messages at MEG level ged LTM and LTR messa configured in OVC <sub>1</sub> . Tes D equal to 222 offered at sternal interfaces	15, an at ME Cester with level 15, ar ges at ter 1 ENN	Note 2: CBS <sub>11</sub> $\geq$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0 Note 4: CM <sub>11</sub> and CN itted provided that the conf d 6 at UNI <sub>1</sub> configured CG level 5, and 6 offere 2 also verifies that all to S-VLAN ID equal to 2 5, and 6 with S-VLAN ID co the with S-VLAN ID co the configured for the configured the configured for the configured the configured for the configured the configured for the configured the configured for the configured for the configured the configured for the configured for the configured the configured for the configured	pps, CIR <sub>22</sub> = 30 Mbps 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CBS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes, and CFS <sub>22</sub> $\geq$ 12176 Bytes 76 Bytes 76 Bytes 76 Bytes 76 Bytes 76 Bytes 77 Bytes 78 Bytes 78 Bytes 79 Bytes 70 B



#### Test Case 9.1: Service OAM Loopback Messages (LBM/LBR) Handling

	Abstra	act Test S	uite for Ethernet A	Acce	ess Services		
Test Name	Service OAM Loopback Me	ssages (LBM	/LBR) Handling				
Test Definition ID	AEPL9_R3_R13_R14						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	<ul> <li>[R14] The Access EPL and Access EVPL Services MUST be configurable to tunnel all SOAM frames at the default Test and Subscriber MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1.</li> <li>[R3] For an Access EPL service, the OVC EP Map at the UNI MUST contain all CE-VLAN ID values {1, 24095} mapped to a single OVC EP</li> <li>[R13] Each S-VLAN ID value associated with an instance of Access EPL Service MUST map to a distinct End Point, of Type = "OVC"</li> </ul>						
Test Object	Verify that for an Access EP the SOAM FM IA (MEF 30)		BM and LBR frames are to	unnel	ed at the default Test, a	and Subsc	riber MEG levels as defined in
Test Configuration	At least two OVCs, each one values are mapped to the OV						
Test Configuration Schematic	Tester 1     Equipment(s) Operating at the UNI     Access EPL Services Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP1 OVC EP2     OVC1     OVC EP1 OVC EP2     Ethernet Traffic Generator Analyzer     Tester 2						
		p at UNI <sub>1</sub>		ļ		Map at I	
	CE-VLAN ID 1,2*4095		OVC End Point OVC EP1	ŀ	S-VLAN ID 111		OVC End Point OVC EP11
End Point Maps	,				222		OVC EP <sub>22</sub>
	Map at UNI2           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2   Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1						
	configuration conforms to MEF 2	26.1		1		th Profil	e per OVC EP at ENNI <sub>1</sub>
	configuration conforms to MEF 2 Ingress Bandwidth Pr	26.1	VC EP at $UNI_1$ and		Ingress Bandwid	th Profil	e per OVC EP at ENNI <sub>1</sub>
	configuration conforms to MEF 2 Ingress Bandwidth Pr OVC End Point	26.1 rofile per OV UNI <sub>2</sub>	VC EP at UNI <sub>1</sub> and Parameters		Ingress Bandwid		Parameters
	configuration conforms to MEF 2 Ingress Bandwidth Pr OVC End Point OVC EP1	26.1 rofile per OV UNI <sub>2</sub> CIR <sub>1</sub> CBS	VC EP at UNI <sub>1</sub> and Parameters 1 EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub>	-	Ingress Bandwid OVC End Point OVC EP11	CIR	Parameters 11 CBS11 EIR11 EBS11 CF11 CM11
Bandwidth Profile	configuration conforms to MEF 2 Ingress Bandwidth Pr OVC End Point	26.1 Tofile per OV UNI <sub>2</sub> CIR <sub>1</sub> CBS CIR <sub>2</sub> CBS CIR <sub>2</sub> CBS CIR <sub>2</sub> CBS CIR <sub>2</sub> CBS EBS <sub>2</sub> CF <sub>1</sub> an	VC EP at UNI <sub>1</sub> and Parameters <sup>1</sup> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> <sup>2</sup> EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> <sup>8</sup> <sup>2</sup> 176 Bytes d CF <sub>2</sub> equal to 0	-	Ingress Bandwid OVC End Point OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> $\geq$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0	CIR1 CIR2 bps, CIR2 76 Bytes, 5, EBS11, F	$\begin{array}{c} \hline Parameters \\ \hline 11 CBS_{11} EIR_{11} EBS_{11} CF_{11} \\ CM_{11} \\ \hline 22 CBS_{22} EIR_{22} EBS_{22} CF_{22} \\ CM_{22} \\ \hline 22 = 30 Mbps \\ and CBS_{22} \geq 12176 Bytes \\ \hline 3BS_{22}, CF_{11} and CF_{22} equal to \\ \hline \end{array}$
	$\begin{tabular}{ c c c c c } \hline configuration conforms to MEF 2 \\ \hline Ingress Bandwidth Pr \\ \hline OVC End Point \\ \hline OVC EP_1 \\ \hline OVC EP_2 \\ \hline OVC EP_2 \\ \hline Note 1: CIR_1 = 3 Mbps, CI \\ Note 2: CBS_1 \ge 12176 Byt \\ Note 3: EIR_1, EIR_2, EBS_1, \\ Note 4: CM_1 and CM_2 in c \\ \hline \end{tabular}$	26.1 Tofile per OV UNI2 CIR1 CBS CIR2 CBS CIR2 CBS R2 = 30 Mbp; EBS2 CF1 an olor-blind mo	VC EP at UNI <sub>1</sub> and Parameters <sup>1</sup> EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> <sup>2</sup> EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> s <sup>2</sup> 176 Bytes d CF <sub>2</sub> equal to 0 ode	-	Ingress Bandwid OVC End Point OVC EP <sub>11</sub> OVC EP <sub>22</sub> Note 1: CIR <sub>11</sub> = 3 M Note 2: CBS <sub>11</sub> $\geq$ 121 Note 3: EIR <sub>11</sub> , EIR <sub>22</sub> 0 Note 4: CM <sub>11</sub> and CP	CIR1 CIR2 bps, CIR2 76 Bytes, c, EBS11, E M22 in col	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$
	configuration conforms to MEF 2 Ingress Bandwidth Pr OVC End Point OVC EP1 OVC EP2 Note 1: CIR <sub>1</sub> = 3 Mbps, CI Note 2: CBS <sub>1</sub> ≥ 12176 BV Note 3: EIR <sub>1</sub> , EIR <sub>2</sub> , EBS <sub>1</sub> , Note 4: CM <sub>1</sub> and CM <sub>2</sub> in c Note: Use of other bandwidth prc Note: Use of other bandwidth prc Note: Use of other bandwidth prc OVC <sub>2</sub> Tester 2 verifies that all th with S-VLAN ID equal to MEG level 5, and 6 offers Tester 2 offers single-tagg OVC <sub>2</sub> Tester 1 verifies that all th	26.1 Tofile per OV UNI2 CIR1 CBS CIR2 CBS CIR2 CBS CIR2 CBS2 2 12 EBS2 CF1 an rolor-blind mc blie parameter v file parameter v file parameter v color-blind mc blie at UNI2 ard ged LBM and LBI he untagged L blie at UNI2 ard ged at UNI2 ard color-blind mc color-blind mc	VC EP at UNI <sub>1</sub> and Parameters 1 EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> 2 EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> s 2176 Bytes d CF <sub>2</sub> equal to 0 yde ralues at the UNIs & ENNI is R messages at MEG level BM and LBR messages at MEG LBR messages at MEG is a configured in OVC <sub>1</sub> . Te b delivered single-tagged LBR messages at MEG is a messages at MEG is configured in OVC <sub>1</sub> . Tes a configured in OVC <sub>1</sub> . Tes b delivered single-tagged configured in OVC <sub>1</sub> . Tes configured in OVC <sub>1</sub> . Tes	permi 15, ar Mevel 15, ar ges a ter 1	Ingress Bandwid OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 M Note 2: CBS11 $\geq$ 121 Note 3: EIR11, EIR 22 0 Note 4: CM11 and Cl itted provided that the configured G level 5, and 6 offere 2 also verifies that all 1 S-VLAN ID equal to 2 5, and 6 with S-VLAN ID of the d with S-VLAN ID of the d configured that the configured the d with S-VLAN ID of the d configured to 2 5, and 6 with S-VLAN ID of the d configured that all the the d configured that all the the d configured that all the	CIR CIR CIR CIR CIR CIR CIR CIR CIR CIR	Parameters         Parameters $CM_{11}$ $CM_{11}$ $CM_{11}$ $CM_{22}$ $CB_{22}$ $CM_{22}$ $CM_{21}$ $CM_{21}$ $CM_{22}$ $CM_{21}$ <tr< td=""></tr<>
Profile	$\begin{tabular}{ c c c c c } \hline configuration conforms to MEF 2 \\ \hline Ingress Bandwidth Pr \\ \hline OVC End Point \\ \hline OVC EP_1 \\ \hline OVC EP_2 \\ \hline OVC \\ \hline OVC$	26.1 rofile per OV UNI2 CIR1 CBS CIR2 CBS CIR2 CBS CIR2 CBS2 212 EBS2 CF1 an rolor-blind mc offle parameter v LBM and LBI he untagged L bo 111 at ENN2 ed at UNI2 are ged LBM and LBM and LBI he single-tagg gged at UNI4 G	VC EP at UNI <sub>1</sub> and Parameters 1 EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> 2 EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> s 2176 Bytes d CF <sub>2</sub> equal to 0 32 34 34 35 37 36 37 37 38 39 39 30 30 30 30 30 30 30 30 30 30	permi 15, ar Mevel 15, ar ges a ter 1	Ingress Bandwid OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 M Note 2: CBS11 $\geq$ 121 Note 3: EIR11, EIR 22 0 Note 4: CM11 and Cl itted provided that the configured G level 5, and 6 offere 2 also verifies that all 1 S-VLAN ID equal to 2 5, and 6 with S-VLAN ID of the d with S-VLAN ID of the d configured that the configured the d with S-VLAN ID of the d configured to 2 5, and 6 with S-VLAN ID of the d configured that all the the d configured that all the the d configured that all the	CIR CIR CIR CIR CIR CIR CIR CIR CIR CIR	Parameters         Parameters $CM_{11}$ $CM_{11}$ $CM_{11}$ $CM_{22}$ $CB_{22}$ $CM_{22}$ $CM_{21}$ $CM_{21}$ $CM_{22}$ $CM_{21}$ <tr< td=""></tr<>
Profile Test Procedure	configuration conforms to MEF 2         Ingress Bandwidth Pr         OVC End Point         OVC EP1         OVC EP2         Note 1: CIR1 = 3 Mbps, CI         Note 2: CBS1 ≥ 12176 Byt         Note 3: EIR1, EIR2, EBS1,         Note 4: CM1 and CM2 in c         OVC2         Tester 1 offers untagged 1         OVC2         Tester 2 verifies that all th         with S-VLAN ID equal to         MEG level 5, and 6 offerer         Tester 1 verifies single-tagged 1         OVC2         Tester 1 verifies that all th         ENNI1 are received untag         at MEG level 5, and 6 with	26.1 Tofile per OV UNI2 CIR1 CBS CIR2 CBS CIR2 CBS CIR2 CBS2 ≥ 12 EBS2, CF1 an rolor-blind mc file parameter v LBM and LBI he untagged L bo 111 at ENN2 ed at UN12 ar ged LBM and LBM and LBI he single-tagg gged at UN14 of th S-VLAN II rived at the ex	VC EP at UNI <sub>1</sub> and Parameters 1 EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> 2 EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> 8 2176 Bytes d CF <sub>2</sub> equal to 0 yde ralues at the UNIs & ENNI is R messages at MEG level LBM and LBR messages at MEG LBR messages at MEG level LBR messages at MEG level the delivered single-tagged LBR messages at MEG level the delivered in OVC <sub>1</sub> . Tes D equal to 222 offered at ternal interfaces	permi 1 5, ar at ME level 1 5, ar level 1 5, ar ges a ter 1 : ENN	Ingress Bandwid OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 M Note 2: CBS11 $\geq$ 121 Note 3: EIR11, EIR 22 0 Note 4: CM11 and CP itted provided that the configured EG level 5, and 6 offere 2 also verifies that all 1 S-VLAN ID equal to 2 5, and 6 with S-VLAN ID of the devel 5, a	CIR CIR CIR CIR CIR CIR CIR CIR CIR CIR	Parameters         Parameters $CM_{11}$ $CM_{11}$ $CM_{11}$ $CM_{22}$ $CB_{22}$ $CM_{22}$ $CM_{21}$ $CM_{21}$ $CM_{22}$ $CM_{21}$ <tr< td=""></tr<>
Profile Test Procedure Units	configuration conforms to MEF 2         Ingress Bandwidth Pr         OVC End Point         OVC EP1         OVC EP2         Note 1: CIR₁ = 3 Mbps, CI         Note 2: CBS₁ ≥ 12176 Byt         Note 3: EIR₁, EIR₂, EBS₁,         Note 4: CM₁ and CM₂ in c         Note: Use of other bandwidth pr         • Tester 1 offers untagged I         OVC₂         • Tester 2 verifies that all th         with S-VLAN ID equal to         MEG level 5, and 6 offer         • Tester 1 verifies that all th         ENC₂         • Tester 1 verifies that all th         ENN₁ are received untag         at MEG level 5, and 6 with         Number of valid frames rece	26.1 Tofile per OV UNI2 CIR1 CBS CIR2 CBS CIR2 CBS CIR2 CBS2 ≥ 12 EBS2, CF1 an rolor-blind mc file parameter v LBM and LBI he untagged L bo 111 at ENN2 ed at UN12 ar ged LBM and LBM and LBI he single-tagg gged at UN14 of th S-VLAN II rived at the ex	VC EP at UNI <sub>1</sub> and Parameters 1 EIR <sub>1</sub> EBS <sub>1</sub> CF <sub>1</sub> CM <sub>1</sub> 2 EIR <sub>2</sub> EBS <sub>2</sub> CF <sub>2</sub> CM <sub>2</sub> 8 2176 Bytes d CF <sub>2</sub> equal to 0 yde ralues at the UNIs & ENNI is R messages at MEG level LBM and LBR messages at MEG LBR messages at MEG level LBR messages at MEG level the delivered single-tagged LBR messages at MEG level the delivered in OVC <sub>1</sub> . Tes D equal to 222 offered at ternal interfaces	permi 1 5, ar at ME level 1 5, ar level 1 5, ar ges a ter 1 : ENN	Ingress Bandwid OVC End Point OVC EP11 OVC EP22 Note 1: CIR11 = 3 M Note 2: CBS11 $\geq$ 121 Note 3: EIR11, EIR 22 0 Note 4: CM11 and CP itted provided that the configured EG level 5, and 6 offere 2 also verifies that all 1 S-VLAN ID equal to 2 5, and 6 with S-VLAN ID of the devel 5, a	CIR CIR CIR CIR CIR CIR CIR CIR CIR CIR	Parameters         Parameters $CM_{11}$ $CM_{11}$ $CM_{11}$ $CM_{22}$ $CB_{22}$ $CM_{22}$ $CM_{21}$ $CM_{21}$ $CM_{22}$ $CM_{21}$ <tr< td=""></tr<>



## 10.3 Test Cases for Access EPL – Bandwidth Profile

Test Case 10.1: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 1

	Abstract Test Suite for Ethernet Ac	ccess Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement	nt Range 1		
Test Definition ID	AEPL10_R4_R5_R9			
Test Type	Conformance			
Test Status	Mandatory			
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li>			
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIF at the UNI and Color Forwarding is Yes, the bandwidth profile is app OVC EP and the amount of Green traffic delivered at the egress OVC accepted as Green at the ingress during a time interval <i>T</i> , provided the	blied to all ingress Service Frames that are mapped to the given $C$ EP is within +/- ( $F_{CIR}$ ) of the calculated amount of traffic		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the the OVC EP at the UNI and a specific S-VLAN ID is mapped to the			
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP1     OVC C     Image: Construction of the ENNI     Image: Construction of the ENNI			
	Map at UNI <sub>1</sub>	Map at ENNI <sub>1</sub>		
End Point Maps	CE-VLAN ID         OVC End Point           1.2*4095         OVC EP1	S-VLAN ID         OVC End Point           111         OVC EP11		
End i onit maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for un configuration conforms to MEF 26.1			
	Ingress Bandwidth Profile per OVC EP at UNI <sub>1</sub>	Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>		
	OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1	OVC End Point         Parameters           OVC EP11         CIR11 CBS11 EIR11 EBS11 CF11		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 11 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>1</sub> to the ingress OVC End Point (OVC EP<sub>1</sub> at UNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 11, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 111 and S-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 111 and S-VLAN CoS equal to 0,1,27 and compared at the egress OVC EP<sub>11</sub> at ENNI<sub>1</sub> must be within +/- (<i>F</i><sub>CR</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>11</sub> at ENNI<sub>1</sub></li> </ul>			
Units	Number of valid frames received at the ENNI			
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interva	al $T$ , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>1</sub> , CBS <sub>11</sub>		
Results	Pass or fail			
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffi Destination MAC Address through the last bit of the Frame Check Se Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number traffic received over the duration of the test	equence		

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#### Test Case 11.1: Ingress Bandwidth Profile per OVC EP at the UNI - CBS Enforcement Range 1

	Abstract Test Suite for Ethernet A	Acces	s Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcem	ment Ra	nge 1		
Test Definition ID	AEPL11_R4_R5_R9				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with Cl at the UNI, and color forwarding is yes, the bandwidth profile is app OVC EP and the amount of Green traffic delivered at the egress OV accepted as Green at the ingress during a time interval <i>T</i> , provided ti idle periods where each burst <i>B</i> is longer than necessary to empty th the token bucket	plied to VC EP i that the	all ingress Service F s within $+/-(F_{CBS})$ of ingress traffic is offer	rames that are may the calculated and red as a pattern of	pped to the given nount of traffic f repeated bursts and
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the OVC EP at the UNI and a specific S-VLAN ID is mapped to the			CE-VLAN ID va	alues are mapped to
Test Configuration Schematic		EPL Ser er Test	rvice	puipment berating at the ENNI	Tester 2 Ethernet Traffic Generator Analyzer
	Map at UNI <sub>1</sub>		Ν	Iap at ENNI1	
End Point Maps	CE-VLAN ID         OVC End Point           1,2*4095         OVC EP1		S-VLAN I 111	D	OVC End Point OVC EP11
End I onit Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for u configuration conforms to MEF 26.1	untagged		es is permitted prov	
	Ingress Bandwidth Profile per OVC EP at UNI <sub>1</sub>		Ingress Bandwidth		
~	OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1		OVC End Point OVC EP <sub>11</sub>		EIR <sub>11</sub> EBS <sub>11</sub> CF <sub>11</sub>
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equinput traffic pattern of repeated bursts and idle periods where eace each idle period <i>I</i> is longer than necessary to fill the token bucket interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with S-VLAN ID equal to 111 and S-VLAN CoS equal to Green delive</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>11</sub> at accepted as Green over the time interval <i>T</i> that should be delivered.</li> </ul>	th burst et, to the vith CE- ivered at tt ENNI	t <i>B</i> is longer than necc e ingress OVC End Po VLAN ID equal to 11 t the egress OVC End must be within +/- ( <i>A</i>	essary to empty th point (OVC EP <sub>1</sub> at , CE-VLAN CoS Point (OVC EP <sub>1</sub> $F_{CBS}$ ) of the calcul	the token bucket and UNI <sub>1</sub> ) during a time the equal to $0,1,27$ and the tennI <sub>1</sub> )
Units	Number of valid frames received at the ENNI		-		
Variables	UNI and ENNI interface speeds, Service Frame length λ, Burst leng profile parameters CBS <sub>1</sub> , CBS <sub>11</sub>	gth <i>B</i> , id	lle period <i>I</i> , time inter	val T, tolerance F	<i>CBS</i> and bandwidth
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traf Destination MAC Address through the last bit of the Frame Check S Note 2: Green Color Identifiers defined in MEF 23.1 Table 4			onsists of the firs	t bit of the



#### Test Case 12.1: Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 2

	Abstract Test Suite for Ethernet Acc	cess Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement	Range 2		
Test Definition ID	AEPL12_R4_R5_R9			
Test Type	Conformance			
Test Status	Mandatory if the UNI Speed is greater than 10 Mbps			
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li>			
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = at the UNI and Color Forwarding is Yes, the bandwidth profile is applied OVC EP and the amount of Green traffic delivered at the egress OVC E accepted as Green at the ingress during a time interval <i>T</i> , provided that	ted to all ingress Service Frames that are mapped to the given EP is within $+/-$ ( $F_{CR}$ ) of the calculated amount of traffic		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OV			
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Under T       Ethernet Traffic Generator Analyzer     UNI2     OVC EP2	Test OVC EP <sub>22</sub> Ethernet Generator		
	Map at UNI <sub>2</sub>	Map at $ENNI_1$		
End Point Maps	CE-VLAN ID OVC End Point 1.2*4095 OVC EP2	S-VLAN ID         OVC End Point           222         OVC EP22		
End Font Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untag configuration conforms to MEF 26.1			
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>2</sub> to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 222 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>22</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>22</sub> at ENNI<sub>1</sub></li> </ul>			
Units	Number of valid frames received at the ENNI			
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval $\lambda$	<i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
Results	Pass or fail			
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic Destination MAC Address through the last bit of the Frame Check Sequ Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number traffic received over the duration of the test	uence		



#### Test Case 13.1: Ingress Bandwidth Profile per OVC EP at the UNI - CBS Enforcement Range 2

	Abstract Test Suite for Ethernet	Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CBS Enforcement	Range 2		
Test Definition ID	AEPL13_R4_R5_R9			
Test Type	Conformance			
Test Status	Mandatory if the UNI Speed is greater than 10 Mbps			
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Pot [R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and M <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mod [R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI I the S-Tag as per MEF 23.1</li> </ul>	MUST allow configuration	to support CIR of: $J$ <b>ST</b> have CBS $\geq 12$	176 Bytes
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = the UNI, and color forwarding is yes, the bandwidth profile is applied to and the amount of Green traffic delivered at the egress OVC EP is with the ingress during a time interval $T$ , provided that the ingress traffic is or burst $B$ is longer than necessary to empty the token bucket and each idle	o all ingress Service Frame in $+/-$ ( $F_{CBS}$ ) of the calculate offered as a pattern of repeat	s that are mapped to ed amount of traffic ted bursts and idle p	the given OVC EP accepted as Green at eriods where each
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC I		E-VLAN ID values	are mapped to the
Test Configuration Schematic	Tester 1 Ethernet Troffic Generator Analyzer	PL Service r Test	equipment perating at the ENNI OVC EP22	Tester 2 Ethernet Traffic Generator Analyzer
	Map at UNI <sub>2</sub>		Map at ENNI <sub>1</sub>	
End Point	CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2	S-VLAN 222	ID	OVC End Point OVC EP22
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untag conforms to MEF 26.1	gged and priority tagged frames	is permitted provided t	hat the configuration
	Ingress Bandwidth Profile per OVC EP at UNI <sub>2</sub>	Ingress Bandwidt	h Profile per OV	C EP at ENNI <sub>1</sub>
	OVC End Point Parameters	OVC End Point		ameters
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			222 EBS22 CF22 CM22
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to traffic pattern of repeated bursts and idle periods where each burst <i>B</i> period <i>I</i> is longer than necessary to fill the token bucket, to the ingre</li> <li>Tester 2 measures the number of double-tagged ENNI frames with CVLAN ID equal to 222 and S-VLAN CoS equal to Green delivered is</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>22</sub> at EN accepted as Green over the time interval <i>T</i> that should be delivered to the time interval the structure of the struct</li></ul>	B is longer than necessary to so OVC End Point (OVC E CE-VLAN ID equal to 12, G at the egress OVC End Point $NI_1$ must be within +/- ( $F_C$	empty the token bu P2 at UNI2) during a CE-VLAN CoS equa nt (OVC EP22 at EN BS) of the calculated	cket and each idle a time interval $T$ al to 0,1,27 and S- NI <sub>1</sub> )
Units	Number of valid frames received at the ENNI			
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length <i>E</i> parameters CBS <sub>2</sub> , CBS <sub>22</sub>	B, idle period I, time interva	$T$ , tolerance $F_{CBS}$ a	nd bandwidth profile
Results	Pass or fail			
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	where the ENNI Frame cor	sists of the first bit	of the Destination

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#### Test Case 14.1: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 3		
Test Definition ID	AEPL14_R4_R5_R9		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 100 Mbps		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Tester 2 Equipment Operating at the UNI OVC EP <sub>3</sub> OVC EP <sub>3</sub> OVC CEP <sub>3</sub> OVC EP <sub>3</sub> OVC EP <sub>3</sub>		
	Map at UNI <sub>3</sub> Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1,2*4095         OVC EP3         333         OVC EP33		
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 13 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>3</sub> to the ingress OVC End Point (OVC EP<sub>3</sub> at UN<sub>3</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 333 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>33</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>33</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>33</sub> at ENNI<sub>1</sub></li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval <i>T</i> , tolerance <i>F</i> <sub>CIR</sub> and bandwidth profile parameters CBS <sub>3</sub> , CBS <sub>33</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic where the ENNI Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



#### Test Case 15.1: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 3		
Test Definition ID	AEPL15_R4_R5_R9		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 100 Mbps		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI, and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP3     OVC3     Ethernet Traffic     Ethernet Traffic		
End Point Maps	Map at UNI3         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP3             Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 13 and CE-VLAN CoS equal to 0,1,27 of length à, using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>3</sub> at UNI<sub>3</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 333 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>3</sub> at ENNI<sub>1</sub>)</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>33</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>33</sub> at ENNI<sub>1</sub></li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length $B$ , idle period $I$ , time interval $T$ , tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>3</sub> , CBS <sub>33</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic where the ENNI Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4		



#### Test Case 16.1: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 4

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 4		
Test Definition ID	AEPL16_R4_R5_R9		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC_4     Equipment Operating at the ENNI     Ethernet Traffic Generator Analyzer		
	Map at UNI <sub>4</sub> Map at ENNI <sub>1</sub>		
End Point Maps	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1,2*4095         OVC EP4         444         OVC EP44   Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 14 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>4</sub> to the ingress OVC End Point (OVC EP<sub>4</sub> at UNI<sub>4</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 14, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 444 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>44</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>44</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>44</sub> at ENNI<sub>1</sub></li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>4</sub> , CBS <sub>44</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic where the ENNI Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



#### Test Case 17.1: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 4

	Abstract Test Suite for Ethernet A	Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CBS Enforcement	Range 4	
Test Definition ID	AEPL17_R4_R5_R9		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = UNI, and Color Forwarding is Yes, the bandwidth profile is applied to a the amount of Green traffic delivered at the egress OVC EP is within $+/$ ingress during a time interval <i>T</i> , provided that the ingress traffic is offer <i>B</i> is longer than necessary to empty the token bucket and each idle period	Ill ingress Service Frames the calculated are ed as a pattern of repeated by $F_{CBS}$	hat are mapped to the given OVC EP and nount of traffic accepted as Green at the bursts and idle periods where each burst
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the I OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC E		E-VLAN ID values are mapped to the
Test Configuration Schematic	Tester I Ethernet Troffic Generator Analyzer	L Service Test	ENNI ENNI ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer
End Point Maps	Map at UNI4           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP4   Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untag conforms to MEF 26.1	S-VLAN 444	OVC EP <sub>44</sub>
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Ingress Bandwidth OVC End Point OVC EP <sub>44</sub> Note 1: CIR <sub>44</sub> = 3 Gbps Note 2: CBS <sub>44</sub> $\geq$ 12176 E Note 3: EIR <sub>44</sub> , EBS <sub>44</sub> , and Note 4: CM <sub>44</sub> in color-aw	1 CF <sub>44</sub> equal to 0
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to traffic pattern of repeated bursts and idle periods where each burst <i>B</i> period <i>I</i> is longer than necessary to fill the token bucket, to the ingres</li> <li>Tester 2 measures the number of double-tagged ENNI frames with C VLAN ID equal to 444 and S-VLAN CoS equal to Green delivered a</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>44</sub> at EN accepted as Green over the time interval <i>T</i> that should be delivered to the time interval <i>T</i>.</li> </ul>	is longer than necessary to ss OVC End Point (OVC E CE-VLAN ID equal to 14, C at the egress OVC End Poin $NI_1$ must be within +/- ( $F_{CL}$	empty the token bucket and each idle P4 at UNI4) during a time interval T 2E-VLAN CoS equal to 0,1,27 and S- tt (OVC EP44 at ENNI1) hts) of the calculated amount of traffic
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length <i>B</i> parameters CBS <sub>4</sub> , CBS <sub>44</sub>	, idle period <i>I</i> , time interva	1 <i>T</i> , tolerance $F_{CBS}$ and bandwidth profile
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic v MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	where the ENNI Frame con	sists of the first bit of the Destination

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#### Test Case 18.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 1

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 1		
Test Definition ID	AEPL18_R11_R12		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Equipment Operating at the UNI Equipment Operating at the UNI Equipment Operating at the ENNI OVC EP OVC 1 OVC 1 OV		
End Point	Map at UNI1         Map at ENNI1           CE-VLAN ID         OVC End Point           S-VLAN ID         OVC End Point		
Maps	1,2*4095         OVC EP1         111         OVC EP11           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1         000000000000000000000000000000000000		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 11, CE-VLAN CoS equal to 1, S-VLAN ID equal to 111 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>11</sub> to the ingress OVC End Point (OVC EP<sub>11</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 11 and CE-VLAN CoS equal to 1 delivered at the egress OVC End Point (OVC EP<sub>1</sub> at UNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>1</sub> at UNI<sub>1</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>1</sub> at UNI<sub>1</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 11, CE-VLAN CoS equal to 1, S-VLAN ID equal to 111 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>11</sub> to the ingress OVC End Point (OVC EP<sub>11</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 11 and CE-VLAN CoS equal to 1 delivered at the egress OVC End Point (OVC EP<sub>11</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>1</sub> , CBS <sub>11</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



#### Test Case 19.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 1

	Abstract Test Suite for Ethernet Access Services			
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CBS Enforcement Range 1			
Test Definition ID	AEPL19_R11_R12			
Test Type	Conformance			
Test Status	Mandatory			
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>			
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( $F_{CBS}$ ) of the calculated amount of traffic accepted as Green at the ingress during a time interval $T$ , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst $B$ is longer than necessary to empty the token bucket			
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI			
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP1     Ethernet Traffic Generator Analyzer     Ethernet Traffic Generator     Ethernet Traffic Generator     Ethernet Traffic Generator			
	Map at UNI <sub>1</sub> Map at ENNI <sub>1</sub>			
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP1         111         OVC EP1			
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1			
	Ingress Bandwidth Profile per OVC EP at UNI <sub>1</sub> Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>			
	OVC End Point         Parameters         OVC End Point         Parameters           OVC EP1         CIR1 CBS1 EIR1 EBS1 CF1 CM1         OVC EP11         CIR11 CBS11 EIR11 EBS11 CF11 CM11			
Bandwidth Profile	Ove $Er_1$ Crk[ CB3] Er[ CH]Ove $Er_1$ Crk[ CB3] Er[ CH]Note 1: CIR1 = 3 MbpsNote 1: CIR1 = 3 MbpsNote 2: CB51 $\geq$ 12176 BytesNote 2: CB51 $\geq$ 12176 BytesNote 3: EIR1, EB51, and CF1 equal to 0Note 3: EIR1, EB51, and CF1 equal to 0Note 4: CM1 in color-blind modeNote 4: CM1 in color-aware mode			
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 11, CE-VLAN CoS equal to 1, S-VLAN ID equal to 111 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>11</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 11 and CE-VLAN CoS equal to 1 delivered at the egress OVC End Point (OVC EP<sub>1</sub> at UNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>1</sub> at UNI<sub>1</sub> must be within +/- (<i>F</i><sub>CEB</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>1</sub> at UNI<sub>1</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 11, CE-VLAN CoS equal to 1, S-VLAN ID equal to 111 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>11</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 11 and CE-VLAN CoS equal to 1 delivered at the egress OVC End Point (OVC EP<sub>11</sub> at UNI<sub>1</sub>). The amount of traffic delivered at the egress OVC End Point (OVC EP<sub>1</sub> at UNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>1</sub> at UNI<sub>1</sub> must be zero</li> </ul>			
Units	Number of valid frames received at the UNI			
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>1</sub> , CBS <sub>11</sub>			
Results	Pass or fail			
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4			

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#### Test Case 20.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 2

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 2				
Test Definition ID	AEPL20_R11_R12				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[R11] The CoS Identifier for ENNI Frames <b>MUST</b> be the OVC End Point to which the ENNI Frame is mapped; that OVC <b>MUST</b> have a single CoS Name which is associated with the entire set of S-Tag PCP values $\{0 - 7\}$ [R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and <b>MUST</b> allow configuration to support CIR of: • 1 - 10 Mb/s, increments of 1 Mbps (Range 1) • 10 - 100 Mb/s, increments of 10 Mbps (Range 2) • 100 - 1000 Mb/s, increments of 10 Mbps (Range 3) • 1 - 10 Gb/s, increments of 1 Gbps (Range 4) It <b>MUST</b> allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it <b>MUST</b> have CBS $\geq$ 12176 Bytes				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet Traffic Generator Analyzer     Tester 2				
	Map at UNI <sub>2</sub> Map at ENNI <sub>1</sub>				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP2         222         OVC EP22				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEP 26.1				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>22</sub> to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 12 and CE-VLAN CoS equal to 2 delivered at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>). The amount of traffic delivered at the egress OVC EP<sub>2</sub> at UNI<sub>2</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>2</sub> at UNI<sub>2</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>22</sub> to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>22</sub> to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 12 and CE-VLAN CoS equal to 2 delivered at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>). The amount of traffic delivered at the egress OVC EP<sub>2</sub> at UNI<sub>2</sub> must be zero</li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test				



#### Test Case 21.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 2

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CBS Enforcement Range 2				
Test Definition ID	AEPL21_R11_R12				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( $F_{CBS}$ ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet traffic Generator Analyzer     Tester 2				
	Map at UNI <sub>2</sub> Map at ENNI <sub>1</sub>				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP2         222         OVC EP22				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEP 26.1				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 12 and CE-VLAN CoS equal to 2 delivered at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>). The amount of traffic delivered at the egress OVC EP<sub>2</sub> at UNI<sub>2</sub> must be within +/- (<i>F</i><sub>CEB</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>2</sub> at UNI<sub>2</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 12 and CE-VLAN CoS equal to 2 delivered at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>). The amount of traffic delivered at the egress OVC EP<sub>2</sub> at UNI<sub>2</sub> must be zero</li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4				

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#### Test Case 22.1: Ingress Bandwidth Profile per OVC EP at the ENNI - CIR Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 3				
Test Definition ID	AEPL22_R11_R12				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	$ [R11] \text{ The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values \{0-7\}[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of:• 1 - 10 Mb/s, increments of 1 Mbps (Range 1)• 10 - 100 Mb/s, increments of 10 Mbps (Range 2)• 100 - 1000 Mb/s, increments of 10 Mbps (Range 3)• 1 - 10 Gb/s, increments of 1 Gbps (Range 4)It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS \geq 12176 Bytes$				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP <sub>3</sub> OVC a Equipment Operating at the UNI OVC EP <sub>3</sub> OVC EP <sub>3</sub> OVC a Construction Const				
	Map at UNI <sub>3</sub> Map at ENNI <sub>1</sub>				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP3         333         OVC EP33				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEP 26.1				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 3, S-VLAN ID equal to 333 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>33</sub> to the ingress OVC End Point (OVC EP<sub>33</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 13 and CE-VLAN CoS equal to 3 delivered at the egress OVC End Point (OVC EP<sub>3</sub> at UNI<sub>3</sub>). The amount of traffic delivered at the egress OVC EP<sub>3</sub> at UNI<sub>3</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>3</sub> at UNI<sub>3</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 3, S-VLAN ID equal to 333 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>33</sub> to the ingress OVC End Point (OVC EP<sub>33</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN CoS equal to 3, S-VLAN ID equal to 333 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>33</sub> to the ingress OVC End Point (OVC EP<sub>33</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 13 and CE-VLAN CoS equal to 3 delivered at the egress OVC End Point (OVC EP<sub>3</sub> at UNI<sub>3</sub>). The amount of traffic delivered at the egress OVC EP<sub>3</sub> at UNI<sub>3</sub> must be zero</li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>3</sub> , CBS <sub>33</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test				



#### Test Case 23.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 3				
Test Definition ID	AEPL23_R11_R12				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( $F_{CBS}$ ) of the calculated amount of traffic accepted as Green at the ingress during a time interval $T$ , provided that the ingress traffic is offered as a pattern of repeated bursts and ille periods where each burst $B$ is longer than necessary to empty the token bucket and each idle period $I$ is longer than necessary to fill the token bucket				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP3     OVC3     Environ				
	Map at UNI <sub>3</sub> Map at ENNI <sub>1</sub>				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP3         333         OVC EP33				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1				
	Ingress Bandwidth Profile per OVC EP at UNI3         Ingress Bandwidth Profile per OVC EP at ENNI1           OVC End Point         Parameters         OVC End Point         Parameters				
Bandwidth	OVC EP3         CIR3 CBS3 EIR3 EBS3 CF3 CM3         OVC EP33         CIR33 CBS33 EIR33 EBS33 CF33 CM33				
Profile	Note 1: $CIR_3 = 300$ MbpsNote 1: $CIR_{33} = 300$ MbpsNote 2: $CBS_3 \ge 12176$ BytesNote 2: $CBS_{33} \ge 12176$ BytesNote 3: $EIR_3$ , $EBS_3$ , and $CF_3$ equal to 0Note 3: $EIR_{33}$ , $EBS_{33}$ , and $CF_{33}$ equal to 0Note 4: $CM_3$ in color-blind modeNote 4: $CM_{33}$ in color-aware mode				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 3, S-VLAN ID equal to 333 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>3</sub> at ENNI,) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 13 and CE-VLAN CoS equal to 3 delivered at the egress OVC End Point (OVC EP<sub>3</sub> at UNI<sub>3</sub>). The amount of traffic delivered at the egress OVC EP<sub>3</sub> at UNI<sub>3</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>3</sub> at UNI<sub>3</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 13, CE-VLAN CoS equal to 3, S-VLAN ID equal to 333 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>3</sub> at ENNI,) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 13 and CE-VLAN CoS equal to 3 delivered at the egress OVC End Point (OVC EP<sub>3</sub> at UNI<sub>3</sub>). The amount of traffic delivered at the egress OVC EP<sub>3</sub> at UNI<sub>3</sub> insust be zero</li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>3</sub> , CBS <sub>33</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4				

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#### Test Case 24.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 4

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 4				
Test Definition ID	AEPL24_R11_R12				
Test Type	Conformance				
Test Status	Mandatory if the ENNI Speed is greater than 1Gbps				
Requirement Description	$ [R11] \text{ The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values \{0-7\}[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of:• 1 - 10 Mb/s, increments of 1 Mbps (Range 1)• 10 - 100 Mb/s, increments of 10 Mbps (Range 2)• 100 - 1000 Mb/s, increments of 100 Mbps (Range 3)• 1 - 10 Gb/s, increments of 1 Gbps (Range 4)It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS \geq 12176 Bytes$				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP4     OVC4     Environ				
	Map at $UNI_4$ Map at $ENNI_1$				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP4         444         OVC EP44				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEP 26.1				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 14, CE-VLAN CoS equal to 4, S-VLAN ID equal to 444 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>44</sub> to the ingress OVC End Point (OVC EP<sub>44</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 14 and CE-VLAN CoS equal to 4 delivered at the egress OVC End Point (OVC EP<sub>4</sub> at UNI<sub>4</sub>). The amount of traffic delivered at the egress OVC EP<sub>4</sub> at UNI<sub>4</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>4</sub> at UNI<sub>4</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 14, CE-VLAN CoS equal to 4, S-VLAN ID equal to 444 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>44</sub> to the ingress OVC End Point (OVC EP<sub>44</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 14 and CE-VLAN CoS equal to 4 delivered at the egress OVC End Point (OVC EP<sub>44</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>4</sub> , CBS <sub>44</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test				



#### Test Case 25.1: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 4

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 4				
Test Definition ID	AEPL25_R11_R12				
Test Type	Conformance				
Test Status	Mandatory if the ENNI Speed is greater than 1Gbps				
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R12] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( $F_{CBS}$ ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP4     Ethernet OVC EP4     Ethernet Traffic Generator Analyzer     Ethernet Traffic				
	Map at UNI <sub>4</sub> Map at ENNI <sub>1</sub>				
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1.2*4095         OVC EP4         444         OVC EP44				
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1				
	Ingress Bandwidth Profile per OVC EP at UNI <sub>4</sub> Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>				
	OVC End Point         Parameters         OVC End Point         Parameters           OVC EP4         CIR4 CBS4 EIR4 EBS4 CF4 CM4         OVC EP4         CIR44 CBS44 EIR44 EBS44 CF44 CM44				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c } \hline OVC EP_4 & CIR_4 CBS_4 EIR_4 EBS_4 CF_4 CM_4 & OVC EP_{44} & CIR_{44} EBS_{44} EIR_{44} EBS_{44} CF_{44} CM_{44} \\ \hline Note 1: CIR_4 = 3 Gbps & Note 1: CIR_{44} = 3 Gbps & Note 2: CBS_4 \ge 12176 Bytes & Note 2: CBS_4 \ge 12176 Bytes & Note 3: EIR_{4}, EBS_{44}, and CF_4 equal to 0 & Note 4: CM_4 in color-blind mode & Note 4: CM_{44} in color-aware mode & \\ \hline \end{tabular}$				
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 14, CE-VLAN CoS equal to 4, S-VLAN ID equal to 444 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>44</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 14 and CE-VLAN CoS equal to 4 delivered at the egress OVC End Point (OVC EP<sub>4</sub> at UNI<sub>4</sub>). The amount of traffic delivered at the egress OVC EP<sub>4</sub> at UNI<sub>4</sub> must be within +/- (<i>F</i><sub>CBS</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>4</sub> at UNI<sub>4</sub>.</li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 14, CE-VLAN CoS equal to 4, S-VLAN ID equal to 444 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>4</sub> at ENNI<sub>1</sub>). The amount of <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>4</sub> at ENNI<sub>1</sub>). The amount of <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>4</sub> at ENNI<sub>1</sub>). The amount of <i>I</i> traffic delivered at the egress OVC EP<sub>4</sub> at ENNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>4</sub> at ENNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>4</sub> at UNI<sub>4</sub>.</li> </ul>				
Units	Number of valid frames received at the UNI				
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CBS}$ and bandwidth profile parameters CBS4, CBS44				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4				

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## 11.1 Test Cases for Access EVPL – Operator Service Attributes

Test Case 1.2: CE-VLAN ID For Untagged and Priority Tagged Frames

	Abstract Test Suite for Etherne	t Acc	cess Services			
Test Name	CE-VLAN ID For Untagged and Priority Tagged Frames					
Test Definition ID	AEVPL1_R21_R22_R23_R25_R35					
Test Type	Conformance					
Test Status	Mandatory if untagged and priority tagged frames are supported					
Requirement Description	[R21] For an Access EVPL service, the CE-VLAN ID for untagged tagged frames are to be supported, and that CE-VLAN ID <b>MUST</b> to [R25] For an Access EVPL service, the OVC EP Map <b>MUST</b> spec contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI <b>MUST</b> be ≥ 1 [R23] Maximum number of CE-VLAN IDs per OVC: The end poin [R35] Each S-VLAN ID value associated with an instance of Acces	be inclu ify map nt Map	ided in the OVC End po pping table of CE-VLAM <b>MUST</b> support a value	int Map N ID to = 1	OVC EP and it <b>MUST NOT</b>	
Test Object	Verify that if untagged and priority tagged frames are supported for tagged frames is specified and included in the OVC End point Map		cess EVPL service, the	CE-VL	AN ID for untagged and priority	
Test Configuration	At least two OVCs, each one associating one OVC EP at the UNI a mapped to each OVC EP at the UNI and a specific S-VLAN ID is a				gured. One CE-VLAN ID is	
Test Configuration Schematic	Ethernet Traffic Generator Analyzer	EVPL S der Te OVC5	Services	OVC EP	at Tester 2	
	Map at UNI <sub>5</sub>			Map at	ENNI <sub>1</sub>	
End Point	CE-VLAN ID         OVC End Point           15*         OVC EP5	_	S-VLAN ID 555		OVC End Point OVC EP55	
Maps	16         OVC EP6           Note: Use of other S-VLAN IDs at the ENNI, use of other CE-VLAN IDs at the ENNI, use of other CE-VLAN IDs at the ENNI of the CE-VLAN IDs at the ENNI of the CE-VLAN IDs at the ENNI of	the UNI	666 and of other CE-VLAN ID <sup>3</sup>	* for unta	OVC EP <sub>66</sub> agged and priority tagged frames is	
	permitted provided that the configuration conforms to MEF 26.1 Ingress Bandwidth Profile per OVC EP at UNI <sub>5</sub>		Ingress Bandwidt	h Profi	le per OVC EP at ENNI <sub>1</sub>	
	OVC End Point Parameters		OVC End Point		Parameters	
<b>D</b> 1 111	OVC EP5 CIR5 CBS5 EIR5 EBS5 CF5 CM5	_	OVC EP55 OVC EP66		CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub>	
Bandwidth	OVC EP6         CIR6 CBS6 EIR6 EBS6 CF6 CM6           Note 1: CIR5 = 3 Mbps and CIR6 = 30 Mbps				$CBS_{66} EIR_{66} EBS_{66} CF_{66} CM_{66}$ $R_{66} = 30 Mhps$	
Profile	Note 2: $CBS_5 \ge 12176$ Bytes and $CBS_6 \ge 12176$ Bytes		Note 1: CIR <sub>55</sub> = 3 Mbps and CIR <sub>66</sub> = 30 Mbps Note 2: CBS <sub>55</sub> $\ge$ 12176 Bytes and CBS <sub>66</sub> $\ge$ 12176 Bytes			
	Note 3: EIR <sub>5</sub> , EIR <sub>6</sub> , EBS <sub>5</sub> , EBS <sub>6</sub> , CF <sub>5</sub> and CF <sub>6</sub> equal to 0 Note 4: CM <sub>5</sub> and CM <sub>6</sub> in color-blind mode		Note 3: EIR <sub>55</sub> , EIR <sub>66</sub> , EBS <sub>55</sub> , EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 Note 4: CM <sub>55</sub> and CM <sub>66</sub> in color-aware mode			
	Note 4: CM <sub>5</sub> and CM <sub>6</sub> in color-blind mode Note: Use of other bandwidth profile parameter values at the UNI & ENNI is permitted provided that the configuration conforms to MEF 26.1					
Test Procedure	<ul> <li>Tester 1 offers untagged and priority tagged Service Frames at U</li> <li>Tester 2 verifies that the untagged Service Frames offered at UN the priority tagged Service Frames offered at UNI<sub>5</sub> are delivered 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 offers single-tagged ENNI Frames with S-VLAN ID ect to 0 and S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC</li> <li>Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN UOVC<sub>5</sub> and that the double-tagged ENNI frames with CE-VLAN VLAN ID equal to 0 at UNI<sub>5</sub> configured in OVC<sub>5</sub></li> </ul>	II5 are o l double qual to 5 ₅ AN ID	delivered single-tagged e-tagged with CE-VLA1 555 and double-tagged I equal to 555 are delive	N ID eq ENNI fi red unta	ual to 0 and S-VLAN ID equal to ames with CE-VLAN ID equal agged at UNIs configured in	
Units	CE-VLAN ID and S-VLAN ID values					
	UNI and ENNI interface speeds and bandwidth profile parameters CBS <sub>5</sub> , CBS <sub>6</sub> , CBS <sub>55</sub> , CBS <sub>66</sub>					
Variables						
Variables Results	Pass or fail					



#### Test Case 2.2: Maximum Number of CE-VLAN IDs per OVC

	Abstract T	est Suite for Ethernet	Access Services		
Test Name	Maximum Number of CE-VLAN IDs	per OVC			
Test Definition ID	AEVPL2_R22_R24_R25_R35				
Test Type	Conformance				
Test Status	Mandatory if the maximum number of	f OVCs per UNI is greater than	1		
Requirement Description	[R24] Maximum number of CE-VLAN IDs per OVC for an Access EVPL Service: The end point Map <b>SHOULD</b> support a value > 1 [R25] For an Access EVPL service, the OVC EP Map <b>MUST</b> specify mapping table of CE-VLAN ID to OVC EP and it <b>MUST NOT</b> contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI <b>MUST</b> be $\geq$ 1 [R35] Each S-VLAN ID value associated with an instance of Access EVPL Service <b>MUST</b> map to a distinct End Point, of Type = "OVC"				
Test Object	Verify that for an Access EVPL service	ce, the Maximum number of CH	E-VLAN IDs mapped to the	OVC EP is $> 1$	
Test Configuration	At least two OVCs, each one associati mapped to each OVC EP at the UNI a				
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	EP <sub>6</sub>	PL Services er Test VC <sub>5</sub>	quipment     Tester 2       berding at     Fillen       the ENNI     Ethernet       Traffic     Generator       Analyzer	
	Map at LINIc Map at ENNI.				
	Map at UN	NI <sub>5</sub>	Ν	Map at ENNI <sub>1</sub>	
End Point	CE-VLAN ID	OVC End Point	S-VLAN ID	OVC End Point	
End Point Maps	CE-VLAN ID X5Y5 X6Y6	OVC End Point OVC EP5 OVC EP6	S-VLAN ID 555 666	OVC End Point           OVC EP55           OVC EP66	
Maps	CE-VLAN ID X5Y5 X6Y6 Note: Use of other S-VLAN IDs at the ENN Ingress Bandwidth Profile p OVC End Point OVC EP5 CIR5 CB	OVC End Point         OVC EP5         OVC EP6         II and of other CE-VLAN IDs at the         Der OVC EP at UNI5         Parameters         S5 EIR5 EBS5 CF5 CM5	S-VLAN ID 555 666 UNI is permitted provided that th Ingress Bandwidtl OVC End Point OVC EP55	OVC End Point OVC EP <sub>35</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1 h Profile per OVC EP at ENNI <sub>1</sub> Parameters CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub>	
	CE-VLAN ID X5Y5 X6Y6 Note: Use of other S-VLAN IDs at the ENN Ingress Bandwidth Profile p OVC End Point OVC EP5 CIR5 CB	$\begin{tabular}{ c c c c } \hline OVC End Point \\ \hline OVC EP_5 \\ \hline OVC EP_6 \\ \hline \hline \\ \hline $	S-VLAN ID 555 666 UNI is permitted provided that th OVC End Point OVC EP <sub>65</sub> OVC EP <sub>66</sub> Note 1: CIR <sub>55</sub> = 3 Mbps Note 2: CBS <sub>55</sub> ≥ 12176 Note 3: EIR <sub>55</sub> , EIR <sub>66</sub> , EI Note 4: CM <sub>55</sub> and CM <sub>66</sub>	OVC End Point         OVC EP <sub>55</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1         h Profile per OVC EP at ENNI1         Parameters         CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>56</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps         Bytes and CBS <sub>66</sub> ≥ 12176 Bytes         BS <sub>55</sub> EBS <sub>56</sub> CF <sub>55</sub> and CF <sub>66</sub> equal to 0         s in color-aware mode	
Maps Bandwidth	$\begin{tabular}{ c c c c c } \hline CE-VLAN ID \\ \hline X_5Y_5 \\ \hline X_6Y_6 \\ \hline Note: Use of other S-VLAN IDs at the ENN \\ \hline Ingress Bandwidth Profile p \\ \hline OVC End Point \\ \hline OVC EP_5 \\ \hline CIR_5 CB \\ \hline OVC EP_6 \\ \hline CIR_6 CB \\ \hline OVC 2P_6 \\ \hline CIR_6 CB \\ \hline Note 1: CIR_5 = 3 Mbps and CIR_6 = 1 \\ \hline Note 2: CBS_5 \ge 12176 Bytes and CI \\ \hline Note 3: EIR_5, EIR_6, EBS_5 EBS_6, CF: \\ \hline Note 3: EIR_5, EIR_6, EBS_5, EBS_6, CF: \\ \hline Note 4: CM_3 and CM_6 in color-blind \\ \hline Note: Use of other bandwidth profile param \\ \hline tester 1 offers C-tagged Service Frier Frames with CE-VLAN ID equal to \\ \hline Tester 2 verifies that all the C-tagge \\ \hline with S-VLAN ID equal to 555 at E \\ VLAN ID equal to X_6Y_6 offered \\ \hline Tester 2 offers double-tagged ENN \\ \hline configured in OVC_5. Tester 2 also \\ \hline equal to 666 at ENNI_1 configured i \\ \hline Tester 1 verifies that all the ENNI \\ \hline \end{tabular}$	OVC End Point           OVC EP5           OVC EP6           II and of other CE-VLAN IDs at the           per OVC EP at UNI5           Parameters           S5 EIR5 EBS5 CF5 CM5           S6 EIR6 EBS6 CF6 CM6           30 Mbps           BS6 ≥ 12176 Bytes           s and CF6 equal to 0           d mode           eter values at the UNI & ENNI is per           rames with CE-VLAN ID equal to 0 × 6Y6 at UNI5 configured in o X6Y6 at UNI5 configured in OVCs. Tes           et UNI5 are delivered double-t           II tuNI5 are delivered double-t           II mes with CE-VLAN ID equal to 0 offers double-tagged ENNI frain oVC6           Frames with S-VLAN ID 555 c           offers double-tagged ENNI frain oVC6           Frames with S-VLAN ID 555 c	S-VLAN ID 555 666 UNI is permitted provided that th Ingress Bandwidtl OVC End Point OVC EP <sub>55</sub> OVC EP <sub>66</sub> Note 1: CIR <sub>55</sub> = 3 Mbps Note 2: CBS <sub>55</sub> = 12176 Note 3: EIR <sub>55</sub> , EIR <sub>66</sub> , EI Note 4: CM <sub>55</sub> and CM <sub>66</sub> ermitted provided that the configu to X <sub>5</sub> Y <sub>5</sub> at UNIs configur n OVC <sub>6</sub> AN ID equal to X <sub>5</sub> Y <sub>5</sub> offe ster 2 also verifies that all the agged with S-VLAN ID equa ual to equal to X <sub>5</sub> Y <sub>5</sub> and S mes with CE-VLAN ID equal to X <sub>1</sub> Y <sub>5</sub> and S mes with CE-VLAN ID equal offered at ENNI <sub>1</sub> configured i s that all the ENNI Frames w	OVC End Point           OVC EP <sub>55</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1           h Profile per OVC EP at ENNI1           Parameters           CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps           Bytes and CBS <sub>66</sub> ≥ 12176 Bytes           BS <sub>55</sub> EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0           in color-aware mode           ration conforms to MEF 26.1           red in OVC <sub>5</sub> and C-tagged Service           ered at UNI <sub>5</sub> are delivered double-tagged           c-tagged Service Frames with CE-           al to 666 at ENNI <sub>1</sub> configured in OVC <sub>6</sub> S-VLAN ID equal to 555 at ENNI <sub>1</sub> al to equal to X <sub>6</sub> Y <sub>6</sub> and S-VLAN ID           in OVC <sub>5</sub> are received C-tagged with CE-           vith S-VLAN ID 666 offered at ENNI <sub>1</sub>	
Maps Bandwidth Profile	$\begin{tabular}{ c c c c c } \hline CE-VLAN ID \\ \hline X_5Y_5 \\ \hline X_6Y_6 \\ \hline Note: Use of other S-VLAN IDs at the ENN \\ \hline Ingress Bandwidth Profile p \\ \hline OVC End Point \\ \hline OVC EP_5 \\ \hline CIR_5 CB \\ \hline OVC EP_6 \\ \hline CIR_6 CB \\ \hline OVC 2CB_5 \ge 12176 \mbox{ Byts and } CIR_6 = : \\ Note 1: CIR_5 = 3 \mbox{ Mps and } CIR_6 = : \\ Note 2: CBS_5 \ge 12176 \mbox{ Byts and } CIR_6 = : \\ Note 3: EIR_5, EIR_6, EBS_5, EBS_6, CF: \\ Note 4: CM_5 \mbox{ and } CM_6 \mbox{ in color-blinc} \\ \hline Note: Use of other bandwidth profile param \\ \hline Tester 1 \mbox{ of ther S C-tagged Service FI} \\ Frames with CE-VLAN ID equal to \\ Tester 2 \mbox{ verifies that all the C-tagge } \\ with S-VLAN ID equal to 555 \mbox{ at } ULAN ID equal to 555 \mbox{ at } 2 \mbox{ offered} \\ \hline Tester 2 \mbox{ offers double-tagged ENN1} \\ configured in OVC5. \mbox{ Tester 2 also } \\ equal to 666 \mbox{ at } SNI_1 \mbox{ configured i} \\ VLAN ID equal to equal to X_5Y_6$	OVC End Point         OVC EP5         OVC EP6         II and of other CE-VLAN IDs at the         per OVC EP at UNI5         Parameters         S5 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         BS6 $\geq$ 12176 Bytes         s and CF6 equal to 0         d mode         reter values at the UNI & ENNI is per         rames with CE-VLAN ID equal to 0 × 6	S-VLAN ID 555 666 UNI is permitted provided that th Ingress Bandwidtl OVC End Point OVC EP <sub>55</sub> OVC EP <sub>66</sub> Note 1: CIR <sub>55</sub> = 3 Mbps Note 2: CBS <sub>55</sub> = 12176 Note 3: EIR <sub>55</sub> , EIR <sub>66</sub> , EI Note 4: CM <sub>55</sub> and CM <sub>66</sub> ermitted provided that the configu to X <sub>5</sub> Y <sub>5</sub> at UNIs configur n OVC <sub>6</sub> AN ID equal to X <sub>5</sub> Y <sub>5</sub> offe ster 2 also verifies that all the agged with S-VLAN ID equa ual to equal to X <sub>5</sub> Y <sub>5</sub> and S mes with CE-VLAN ID equal to X <sub>1</sub> Y <sub>5</sub> and S mes with CE-VLAN ID equal offered at ENNI <sub>1</sub> configured i s that all the ENNI Frames w	OVC End Point           OVC EP <sub>55</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1           h Profile per OVC EP at ENNI1           Parameters           CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps           Bytes and CBS <sub>66</sub> ≥ 12176 Bytes           BS <sub>55</sub> EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0           in color-aware mode           ration conforms to MEF 26.1           red in OVC <sub>5</sub> and C-tagged Service           ered at UNI <sub>5</sub> are delivered double-tagged           c-tagged Service Frames with CE-           al to 666 at ENNI <sub>1</sub> configured in OVC <sub>6</sub> S-VLAN ID equal to 555 at ENNI <sub>1</sub> al to equal to X <sub>6</sub> Y <sub>6</sub> and S-VLAN ID           in OVC <sub>5</sub> are received C-tagged with CE-           vith S-VLAN ID 666 offered at ENNI <sub>1</sub>	
Maps Bandwidth Profile Test Procedure	$\begin{tabular}{ c c c c c } \hline CE-VLAN ID \\ \hline X_5Y_5 \\ \hline X_6Y_6 \\ \hline Note: Use of other S-VLAN IDs at the ENN \\ \hline Ingress Bandwidth Profile p \\ \hline OVC End Point \\ \hline OVC EP_5 \\ \hline CIR_5 CB \\ \hline OVC EP_6 \\ \hline CIR_6 CB \\ \hline Note 1: CIR_5 = 3 Mbps and CIR_6 = : \\ Note 2: CBS_5 \ge 12176 Bytes and CI \\ Note 3: EIRs, EIR_6, EBS_5 EBS_6, CF: \\ Note 4: CM_5 and CM_6 in color-blind \\ \hline Note: Use of other bandwidth profile param \\ \hline tester 1 offers C-tagged Service Fr \\ Frames with CE-VLAN ID equal to \\ Tester 2 verifies that all the C-tagg \\ with S-VLAN ID equal to 555 at E \\ VLAN ID equal to X_6Y_6 offered \\ \hline Tester 2 offers double-tagged ENN \\ configured in OVC_5. Tester 2 also equal to 666 at ENNI1 configured i \\ VLAN ID equal to equal to X_5Y \\ configured in OVC_6 are received C \\ \hline \end{tabular}$	OVC End Point         OVC EP5         OVC EP6         II and of other CE-VLAN IDs at the         Der OVC EP at UNI5         Parameters         S5 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         BS6 $\geq$ 12176 Bytes         s and CF6 equal to 0         d mode         reares with CE-VLAN ID equal to 0         a tox         rames with CE-VLAN ID equal to 0X6Y6 at UNI5 configured in ed Service Frames with CE-VL         INI1 configured in OVC5. Test at UNI5 are delivered double-t         II frames with CE-VLAN ID equal to 0         offers double-tagged ENNI frain OVC6         Frames with S-VLAN ID 555 cf         s at UNI5. Tester 1 also verifie         2-tagged with CE-VLAN ID equal	S-VLAN ID         555         666         UNI is permitted provided that th         OVC End Point         OVC EP65         OVC EP66         Note 1: CIR55 = 3 Mbps         Note 2: CB555 ≥ 12176         Note 3: EIR55, EIR66, EI         Note 4: CM55 and CM66         Ermitted provided that the configure         n OVC6         AN ID equal to X5Y5 offee         ster 2 also verifies that all the agged with S-VLAN ID equal         qual to equal to X5Y5 and S         mes with CE-VLAN ID equal         Offered at ENN1 configured is         s that all the ENN1 Frames w         tal to equal to X6Y6 at UN	OVC End Point           OVC EP <sub>55</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1           h Profile per OVC EP at ENNI <sub>1</sub> Parameters           CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps           Bytes and CBS <sub>66</sub> ≥ 12176 Bytes           BSs, EBS <sub>56</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0           s in color-aware mode           ration conforms to MEF 26.1           red in OVC <sub>5</sub> and C-tagged Service           ered at UNI <sub>5</sub> are delivered double-tagged           c-tagged Service Frames with CE- al to 666 at ENNI <sub>1</sub> configured in OVC <sub>6</sub> S-VLAN ID equal to 555 at ENNI <sub>1</sub> al to equal to X <sub>6</sub> Y <sub>6</sub> and S-VLAN ID           in OVC <sub>5</sub> are received C-tagged with CE- rith S-VLAN ID 666 offered at ENNI <sub>1</sub>	
Maps Bandwidth Profile Test Procedure Units	CE-VLAN ID         X5Y5         X6Y6         Note: Use of other S-VLAN IDs at the ENN         Ingress Bandwidth Profile p         OVC End Point         OVC EP5       CIR5 CB         OVC EP6       CIR6 CB         Note 1: CIR5 = 3 Mbps and CIR6 = 1         Note 2: CB5 $\geq$ 12176 Bytes and CI         Note 3: EIR5, EIR5, EB5, EB56, CF3         Note 4: CM3 and CM6 in color-blind         Note: Use of other bandwidth profile param         • Tester 1 offers C-tagged Service Fr         Frames with CE-VLAN ID equal to         Note: Use of other bandwidth profile param         • Tester 2 verifies that all the C-tagg         with S-VLAN ID equal to 555 at E         VLAN ID equal to 555. Tester 2 also         equal to 666 at ENNI1 configured i         • Tester 1 verifies that all the ENNI1         VLAN ID equal to equal to 56Y6 offered         • Tester 1 verifies that all the ENNI1         VLAN ID equal to equal to 55Y6 configured i         • Tester 1 verifies that all the ENNI1         VLAN ID equal to equal to 55Y6 configured i         • Tester 1 verifies that all the ENNI1         VLAN ID equal to equal to 55Y6 configured in OVC6 are received C         Number of valid frames received at th <td>OVC End Point         OVC EP5         OVC EP6         II and of other CE-VLAN IDs at the         Der OVC EP at UNI5         Parameters         S5 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         BS6 <math>\geq</math> 12176 Bytes         s and CF6 equal to 0         d mode         reares with CE-VLAN ID equal to 0         a tox         rames with CE-VLAN ID equal to 0X6Y6 at UNI5 configured in ed Service Frames with CE-VL         INI1 configured in OVC5. Test at UNI5 are delivered double-t         II frames with CE-VLAN ID equal to 0         offers double-tagged ENNI frain OVC6         Frames with S-VLAN ID 555 cf         s at UNI5. Tester 1 also verifie         2-tagged with CE-VLAN ID equal</td> <td>S-VLAN ID         555         666         UNI is permitted provided that th         OVC End Point         OVC EP65         OVC EP66         Note 1: CIR55 = 3 Mbps         Note 2: CB555 ≥ 12176         Note 3: EIR55, EIR66, EI         Note 4: CM55 and CM66         Ermitted provided that the configure         n OVC6         AN ID equal to X5Y5 offee         ster 2 also verifies that all the agged with S-VLAN ID equal         qual to equal to X5Y5 and S         mes with CE-VLAN ID equal         Offered at ENN1 configured is         s that all the ENN1 Frames w         tal to equal to X6Y6 at UN</td> <td>OVC End Point           OVC EP<sub>55</sub>           OVC EP<sub>66</sub>           e configuration conforms to MEF 26.1           h Profile per OVC EP at ENNI<sub>1</sub>           Parameters           CIR<sub>55</sub> CBS<sub>55</sub> EIR<sub>55</sub> EBS<sub>55</sub> CF<sub>55</sub> CM<sub>55</sub>           CIR<sub>66</sub> CBS<sub>66</sub> EIR<sub>66</sub> EBS<sub>66</sub> CF<sub>66</sub> CM<sub>66</sub>           s and CIR<sub>66</sub> = 30 Mbps           Bytes and CBS<sub>66</sub> ≥ 12176 Bytes           BSs, EBS<sub>56</sub>, CF<sub>55</sub> and CF<sub>66</sub> equal to 0           s in color-aware mode           ration conforms to MEF 26.1           red in OVC<sub>5</sub> and C-tagged Service           ered at UNI<sub>5</sub> are delivered double-tagged           c-tagged Service Frames with CE- al to 666 at ENNI<sub>1</sub> configured in OVC<sub>6</sub>           S-VLAN ID equal to 555 at ENNI<sub>1</sub> al to equal to X<sub>6</sub>Y<sub>6</sub> and S-VLAN ID           in OVC<sub>5</sub> are received C-tagged with CE- rith S-VLAN ID 666 offered at ENNI<sub>1</sub></td>	OVC End Point         OVC EP5         OVC EP6         II and of other CE-VLAN IDs at the         Der OVC EP at UNI5         Parameters         S5 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         BS6 $\geq$ 12176 Bytes         s and CF6 equal to 0         d mode         reares with CE-VLAN ID equal to 0         a tox         rames with CE-VLAN ID equal to 0X6Y6 at UNI5 configured in ed Service Frames with CE-VL         INI1 configured in OVC5. Test at UNI5 are delivered double-t         II frames with CE-VLAN ID equal to 0         offers double-tagged ENNI frain OVC6         Frames with S-VLAN ID 555 cf         s at UNI5. Tester 1 also verifie         2-tagged with CE-VLAN ID equal	S-VLAN ID         555         666         UNI is permitted provided that th         OVC End Point         OVC EP65         OVC EP66         Note 1: CIR55 = 3 Mbps         Note 2: CB555 ≥ 12176         Note 3: EIR55, EIR66, EI         Note 4: CM55 and CM66         Ermitted provided that the configure         n OVC6         AN ID equal to X5Y5 offee         ster 2 also verifies that all the agged with S-VLAN ID equal         qual to equal to X5Y5 and S         mes with CE-VLAN ID equal         Offered at ENN1 configured is         s that all the ENN1 Frames w         tal to equal to X6Y6 at UN	OVC End Point           OVC EP <sub>55</sub> OVC EP <sub>66</sub> e configuration conforms to MEF 26.1           h Profile per OVC EP at ENNI <sub>1</sub> Parameters           CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps           Bytes and CBS <sub>66</sub> ≥ 12176 Bytes           BSs, EBS <sub>56</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0           s in color-aware mode           ration conforms to MEF 26.1           red in OVC <sub>5</sub> and C-tagged Service           ered at UNI <sub>5</sub> are delivered double-tagged           c-tagged Service Frames with CE- al to 666 at ENNI <sub>1</sub> configured in OVC <sub>6</sub> S-VLAN ID equal to 555 at ENNI <sub>1</sub> al to equal to X <sub>6</sub> Y <sub>6</sub> and S-VLAN ID           in OVC <sub>5</sub> are received C-tagged with CE- rith S-VLAN ID 666 offered at ENNI <sub>1</sub>	



#### Test Case 3.2: OVC Maximum Transmission Unit Size

Test Name	OVC Maximum Transmission U	OVC Maximum Transmission Unit Size			
Test Definition ID	AEVPL3_R22_R23_R25_R28_R35				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[R28] For an Access EVPL service, the OVC Maximum Transmission Unit Size MUST be integer number of bytes ≥1526 [R25] For an Access EVPL service, the OVC EP Map MUST specify mapping table of CE-VLAN ID to OVC EP and it MUST NOT contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI MUST be ≥ 1 [R23] Maximum number of CE-VLAN IDs per OVC: The end point Map MUST support a value = 1 [R35] Each S-VLAN ID value associated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC"				
Test Object	Verify that for an Access EVPL	service, the OVC Maximum Transr	nission Unit Size is an integer	r number of bytes ≥1526	
Test Configuration		ociating one OVC EP at the UNI ar JNI and a specific S-VLAN ID is m		are configured. One CE-VLAN ID is ENNI	
Test Configuration Schematic	Ethernet Traffic Generator		VPL Services ler Test	quipment berating at the ENNI CVC EP55 CVC EP66	
	Map at UNI <sub>5</sub> Map at ENI		Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID	OVC End Point	S-VLAN ID	OVC End Point	
Maps	15	OVC EP5 OVC EP6	555 666	OVC EP55 OVC EP66	
	Ingress Bandwidth Prop	file per OVC EP at UNL	Ingress Bandwidt	h Profile per OVC EP at ENNI <sub>1</sub>	
	OVC EP <sub>6</sub> CIR	Parameters 5 CBS5 EIR5 EBS5 CF5 CM5 6 CBS6 EIR6 EBS6 CF6 CM6	OVC End Point OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbp	CIR66 CBS66 EIR66 EBS66 CF66 CM66	
Bandwidth Profile	$\begin{tabular}{ c c c c } \hline OVC EP_5 & CIR \\ \hline OVC EP_6 & CIR \\ \hline Note 1: CIR_5 = 3 Mbps and CI \\ Note 2: CBS_5 \ge 12176 Bytes a \\ Note 3: EIR_5, EIR_5, EBS_5, EBS \\ Note 4: CM_5 and CM_6 in color \\ \hline \end{tabular}$	Parameters $L_5$ CBS <sub>5</sub> EIR <sub>5</sub> EBS <sub>5</sub> CF <sub>5</sub> CM <sub>5</sub> $L_6$ CBS <sub>6</sub> EIR <sub>6</sub> EBS <sub>6</sub> CF <sub>6</sub> CM <sub>6</sub> $R_6 = 30$ Mbps         nd CBS <sub>6</sub> $\geq$ 12176 Bytes $L_6$ CF <sub>5</sub> and CF <sub>6</sub> equal to 0	OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbp; Note 2: CBS55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM66	$\frac{\text{CIR}_{55} \text{ CBS}_{55} \text{ EIR}_{55} \text{ EBS}_{55} \text{ CF}_{55} \text{ CM}_{55}}{\text{CIR}_{66} \text{ CBS}_{66} \text{ EIR}_{66} \text{ EBS}_{66} \text{ CF}_{66} \text{ CM}_{66}}{\text{s}} \text{ and CIR}_{66} = 30 \text{ Mbps}}{\text{Bytes and CBS}_{66} \ge 12176 \text{ Bytes}}{\text{BS}_{55}, \text{EBS}_{66}, \text{CF}_{55} \text{ and CF}_{66} \text{ equal to } 0}{\text{s}}_{5} \text{ in color-aware mode}}$	
	$\begin{tabular}{ c c c c } \hline OVC EP_5 & CIR \\ \hline OVC EP_6 & CIR \\ \hline OVC EP_6 & CIR \\ \hline Note 1: CIR_5 = 3 Mbps and CI \\ Note 2: CBS_5 \ge 12176 Bytes a \\ Note 3: EIR_5, EIR_5, EBS_5 EBS \\ \hline Note 4: CM_5 and CM_6 in color \\ \hline Note: Use of other bandwidth profile \\ \hline Tester 1 offers C-tagged Serv \\ configured in OVC_5 and C-tag \\ configured in OVC_6 \\ \hline Tester 2 verifies that all the C \\ CE-VLAN ID equal to 15 and \\ Service Frames with CE-VL/2 \\ VLAN ID equal to 666 at EN \\ \hline Tester 2 offers double-tagged \\ OVC_5 MTU size at ENNI1 co \\ VLAN ID equal to 666 and fr \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 666 and If \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 666 and If \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 5 at UNI \\ \hline \end{array}$	Parameters         25 CBS5 EIR5 EBS5 CF5 CM5         26 CBS6 EIR6 EBS6 CF6 CM6         R6 = 30 Mbps         nd CBS6 $\geq$ 12176 Bytes         36, CF5 and CF6 equal to 0         -blind mode         parameter values at the UNI & ENNI is p         ice Frames with CE-VLAN ID equal         ged Service Frames with CE-VLA         tagged Service Frames with CE-VLA         NI D equal to 16 offered at UNI5 a         NI1 configured in OVC6         ENNI frames with CVC6 AIU S         NNI Frames with S-VLAN ID 555	OVC EP55           OVC EP66           Note 1: CIR55 = 3 Mbp;           Note 2: CBS55 ≥ 12176           Note 3: EIR55, EIR66, E           Note 4: CM35 and CM66           Deemitted provided that the configureal to 15 and frame size equal to           IN ID equal to 16 and frame si           LAN ID equal to 15 offered a           I1 configured in OVC5. Tester           re delivered double-tagged ENNI fram           size at ENNI1 configured in O           ext at ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured	CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CMs <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps Bytes and CBS <sub>66</sub> $\geq$ 12176 Bytes BS <sub>55</sub> , EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 s in color-aware mode ration conforms to MEF 26.1 to the OVC <sub>5</sub> MTU size at UNI <sub>5</sub> ize equal to the OVC <sub>6</sub> MTU size at UNI <sub>5</sub> ize equal to the OVC <sub>6</sub> MTU size at UNI <sub>5</sub> it coverifies that all the C-tagged with r 2 also verifies that all the C-tagged ith CE-VLAN ID equal to 16 and S- l to 555 and frame size equal to the nes with CE-VLAN ID equal to 16, S- VC <sub>6</sub>	
Profile Test Procedure	$\begin{tabular}{ c c c c } \hline OVC EP_5 & CIR \\ \hline OVC EP_6 & CIR \\ \hline OVC EP_6 & CIR \\ \hline Note 1: CIR_5 = 3 Mbps and CI \\ Note 2: CBS_5 \ge 12176 Bytes a \\ Note 3: EIR_5, EIR_5, EBS_5 EBS \\ \hline Note 4: CM_5 and CM_6 in color \\ \hline Note: Use of other bandwidth profile \\ \hline Tester 1 offers C-tagged Serv \\ configured in OVC_5 and C-tag \\ configured in OVC_6 \\ \hline Tester 2 verifies that all the C \\ CE-VLAN ID equal to 15 and \\ Service Frames with CE-VL/2 \\ VLAN ID equal to 666 at EN \\ \hline Tester 2 offers double-tagged \\ OVC_5 MTU size at ENNI1 co \\ VLAN ID equal to 666 and fr \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 666 and If \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 666 and If \\ \hline Tester 1 verifies that all the E \\ VLAN ID equal to 5 at UNI \\ \hline \end{array}$	Parameters $a_5 CBS_5 EIR_5 EBS_5 CF_5 CM_5$ $a_6 CBS_6 EIR_6 EBS_6 CF_6 CM_6$ $R_6 = 30$ Mbps $nd CBS_6 \ge 12176$ Bytes $a_6 CF_5$ and CF_6 equal to 0 $-blind mode$ parameter values at the UNI & ENNI is p         ice Frames with CE-VLAN ID equal         ged Service Frames with CE-VLA $tagged$ Service Frames with CE-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with C	OVC EP55           OVC EP66           Note 1: CIR55 = 3 Mbp;           Note 2: CBS55 ≥ 12176           Note 3: EIR55, EIR66, E           Note 4: CM35 and CM66           Deemitted provided that the configureal to 15 and frame size equal to           IN ID equal to 16 and frame si           LAN ID equal to 15 offered a           I1 configured in OVC5. Tester           re delivered double-tagged ENNI fram           size at ENNI1 configured in O           ext at ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured           ENNI1 configured	CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps Bytes and CBS <sub>66</sub> $\geq$ 12176 Bytes BS <sub>55</sub> , EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 s in color-aware mode ration conforms to MEF 26.1 to the OVC <sub>5</sub> MTU size at UNI5 ize equal to the OVC <sub>6</sub> MTU size at UNI5 ize equal to the OVC <sub>6</sub> MTU size at UNI5 it UNI5 are delivered double-tagged with r 2 also verifies that all the C-tagged ith CE-VLAN ID equal to 16 and S- l to 555 and frame size equal to the ness with CE-VLAN ID equal to 16, S- VC <sub>6</sub> in OVC <sub>5</sub> are received C-tagged with CE	
Profile Test Procedure Units	OVC EPsCIROVC EP6CIRNote 1: CIR5 = 3 Mbps and CINote 2: CBS5 $\geq$ 12176 Bytes aNote 3: EIR5, EIR5, EBS5, EBS5Note 4: CM5 and CM6 in colorNote: Use of other bandwidth profile• Tester 1 offers C-tagged Servconfigured in OVC5 and C-tagconfigured in OVC6• Tester 2 verifies that all the CCE-VLAN ID equal to 15 andService Frames with CE-VL4VLAN ID equal to 666 at EN• Tester 1 offers double-taggedOVC5 MTU size at ENNI1 coVLAN ID equal to 566 and fr• Tester 1 verifies that all the EVLAN ID equal to 15 at UNIOVC6 are received C-taggedNumber of valid frames received	Parameters $a_5 CBS_5 EIR_5 EBS_5 CF_5 CM_5$ $a_6 CBS_6 EIR_6 EBS_6 CF_6 CM_6$ $R_6 = 30$ Mbps $nd CBS_6 \ge 12176$ Bytes $a_6 CF_5$ and CF_6 equal to 0 $-blind mode$ parameter values at the UNI & ENNI is p         ice Frames with CE-VLAN ID equal         ged Service Frames with CE-VLA $tagged$ Service Frames with CE-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with S-VLAN ID e $tagged$ Service Frames with C	OVC EP55           OVC EP66           Note 1: CIR55 = 3 Mbp; Note 2: CBS55 ≥ 12176           Note 3: EIR55, EIR66, E           Note 4: CM35 and CM67           bermitted provided that the configured           al to 15 and frame size equal to           IN ID equal to 16 and frame s           LAN ID equal to 15 offered a           I1 configured in OVC5. Tester           rere delivered double-tagged W           equal to 15, S-VLAN ID equal           fers double-tagged ENNI fram           size at ENNI1 configured in O           Offered at ENNI1 configured           ENNI Frames with S-VLAN           NI5	CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CMs <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps Bytes and CBS <sub>66</sub> $\geq$ 12176 Bytes BS <sub>55</sub> , EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 s in color-aware mode ration conforms to MEF 26.1 to the OVC <sub>5</sub> MTU size at UNIs ize equal to the OVC <sub>6</sub> MTU size at UNIs ize equal to the OVC <sub>6</sub> MTU size at UNIs it UNIs are delivered double-tagged with r 2 also verifies that all the C-tagged ith CE-VLAN ID equal to 16 and S- 1 to 555 and frame size equal to the nes with CE-VLAN ID equal to 16, S- VC <sub>6</sub> in OVC <sub>5</sub> are received C-tagged with CE ID 666 offered at ENNI <sub>1</sub> configured in	
Profile	OVC EPsCIROVC EP6CIRNote 1: CIR5 = 3 Mbps and CINote 2: CBS5 $\geq$ 12176 Bytes aNote 3: EIR5, EIR5, EBS5, EBS5Note 4: CM5 and CM6 in colorNote: Use of other bandwidth profile• Tester 1 offers C-tagged Servconfigured in OVC5 and C-tagconfigured in OVC6• Tester 2 verifies that all the CCE-VLAN ID equal to 15 andService Frames with CE-VL4VLAN ID equal to 666 at EN• Tester 1 offers double-taggedOVC5 MTU size at ENNI1 coVLAN ID equal to 566 and fr• Tester 1 verifies that all the EVLAN ID equal to 15 at UNIOVC6 are received C-taggedNumber of valid frames received	Parameters $3_5$ CBS <sub>5</sub> EIR <sub>3</sub> EBS <sub>5</sub> CF <sub>5</sub> CM <sub>5</sub> $3_6$ CBS <sub>6</sub> EIR <sub>6</sub> EBS <sub>6</sub> CF <sub>6</sub> CM <sub>6</sub> $R_6 = 30$ Mbps         nd CBS <sub>6</sub> ≥ 12176 Bytes $i_6$ CF <sub>5</sub> and CF <sub>6</sub> equal to 0         -blind mode         parameter values at the UNI & ENNI is p         icce Frames with CE-VLAN ID equa         tagged Service Frames with CE-VLA         -tagged Service Frames with CE-VLA         un ID equal to 16 offered at UNI <sub>5</sub> at NI <sub>1</sub> configured in OVC <sub>6</sub> ENNI frames with CE-VLAN ID e qual to 555 at SNI         NII configured in OVC <sub>6</sub> .         ENNI frames with CE-VLAN ID e the of C <sub>6</sub> MTU s         NII Frames with S-VLAN ID 555         S. Tester 1 also verifies that all the with CE-VLAN ID equal to 16 at U         at the external interfaces	OVC EP55           OVC EP66           Note 1: CIR55 = 3 Mbp; Note 2: CBS55 ≥ 12176           Note 3: EIR55, EIR66, E           Note 4: CM35 and CM67           bermitted provided that the configured           al to 15 and frame size equal to           IN ID equal to 16 and frame s           LAN ID equal to 15 offered a           I1 configured in OVC5. Tester           rere delivered double-tagged W           equal to 15, S-VLAN ID equal           fers double-tagged ENNI fram           size at ENNI1 configured in O           Offered at ENNI1 configured           ENNI Frames with S-VLAN           NI5	CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CMs <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> s and CIR <sub>66</sub> = 30 Mbps Bytes and CBS <sub>66</sub> $\geq$ 12176 Bytes BS <sub>55</sub> , EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 s in color-aware mode ration conforms to MEF 26.1 to the OVC <sub>5</sub> MTU size at UNIs ize equal to the OVC <sub>6</sub> MTU size at UNIs ize equal to the OVC <sub>6</sub> MTU size at UNIs it UNIs are delivered double-tagged with r 2 also verifies that all the C-tagged ith CE-VLAN ID equal to 16 and S- 1 to 555 and frame size equal to the nes with CE-VLAN ID equal to 16, S- VC <sub>6</sub> in OVC <sub>5</sub> are received C-tagged with CE ID 666 offered at ENNI <sub>1</sub> configured in	

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#### Test Case 4.2: CE-VLAN ID Preservation

	Abstract Test Suite for Ethernet Ac	ccess Services			
Test Name	CE-VLAN ID Preservation				
Test Definition ID	AEVPL4_R22_R23_R25_R29_R35				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[R29] For an Access EVPL service, CE-VLAN ID Preservation <b>MUST</b> I [R25] For an Access EVPL service, the OVC EP Map <b>MUST</b> specify ma contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI <b>MUST</b> be $\geq 1$ [R23] Maximum number of CE-VLAN IDs per OVC: The end point Ma [R35] Each S-VLAN ID value associated with an instance of Access EV	apping table of CE-VLA p <b>MUST</b> support a value	e = 1		
Test Object	Verify that for an Access EVPL service, all CE-VLAN IDs mapped to the	he OVC are preserved			
Test Configuration	At least two OVCs, each one associating one OVC EP at the UNI and on mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped				
Test Configuration Schematic	Tester 1     Equipment(s) Operating at the UNI     Access EVPL Services Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP <sub>5</sub> OVC <sub>5</sub> OVC C EP <sub>5</sub>				
End Point Maps	Map at UNI5         CE-VLAN ID       OVC End Point         15       OVC EP5         16       OVC EP6         Note: Use of other S-VLAN IDs at the ENNI and use of other CE-VLAN IDs at the	S-VLAN ID 555 666	Map at ENNI <sub>1</sub> OVC End Point OVC EP55 OVC EP66 hat the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	OVC End Point OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbp Note 2: CBS55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM6	Bytes and $CBS_{66} \ge 12176$ Bytes BS <sub>55</sub> EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0 6 in color-aware mode		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 at UNIs configured in OVCs and C-tagged Service Frames with CE-VLAN ID equal to 16 at UNIs configured in OVC6</li> <li>Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to 15 at UNIs are delivered double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC5. Tester 2 also verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 at UNIs are delivered double-tagged with CE-VLAN ID equal to 16 at UNIs are delivered double-tagged with CE-VLAN ID equal to 16 at S-VLAN ID equal to 16 at UNIs are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 at S-VLAN ID equal to 16 at S-VLAN ID equal to 16 at S-VLAN ID equal to 16 and S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC5 and double-tagged ENNI Frames with CE-VLAN IDs equal to 16 and S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC6</li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 are received C-tagged at UNIs configured in OVC5 with CE-VLAN ID equal to 15 and that the ENNI Frames offered at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC6 with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 and S-VLAN ID equal to 15 and that the ENNI Frames offered at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC5 with CE-VLAN ID equal to 15 and that the ENNI Frames offered at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC6 with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 and S-VLAN ID equal to 15 and that the ENNI Frames offered at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC6 with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 and S-VLAN ID equal to 16 and S-VLAN ID equal to 16 at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC6 with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 and S-VLAN ID equal to 16 at ENNI<sub>1</sub> double-tagged at UNIs configured in OVC6 w</li></ul>				
Units	CE-VLAN ID and S-VLAN ID values				
Variables	UNI and ENNI interface speeds and bandwidth profile parameters CBS5,	5, CBS6, CBS55, CBS66			
Results	Pass or fail				



#### Test Case 5.2: CE-VLAN CoS ID Value Preservation

	Abstract	Test Suite for Ethernet A	access Services		
Test Name	CE-VLAN CoS ID Value Preservat	ion			
Test Definition ID	AEVPL5_R22_R23_R25_R30_R35				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R30] For an Access EVPL service, CE-VLAN CoS ID Value Preservation MUST be Yes</li> <li>[R30] For an Access EVPL service, the OVC EP Map MUST specify mapping table of CE-VLAN ID to OVC EP and it MUST NOT contain all CE-VLAN ID values mapped to a single OVC</li> <li>[R22] The Maximum number of OVCs per UNI MUST be ≥ 1</li> <li>[R23] Maximum number of CE-VLAN IDs per OVC: The end point Map MUST support a value = 1</li> <li>[R35] Each S-VLAN ID value associated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC"</li> </ul>				
Test Object	Verify that for an Access EVPL ser	vice, the CE-VLAN CoS are presen	ved		
Test Configuration	At least two OVCs, each one associ CE-VLAN CoS values is mapped to				
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator	C EP <sub>6</sub>	L Services Test	DVC EP <sub>55</sub>	Tester 2 Ethernet Traffic Generator Andiyzer
	Map at U CE-VLAN ID	OVC End Point	S-VLAN ID	$Aap at ENNI_1$	OVC End Point
End Point	15	OVC EP5	555		OVC EP55
Maps	16 Note: Use of other S-VLAN IDs at the E!	OVC EP <sub>6</sub> NI and use of other CE-VLAN IDs at th	666 e UNI is permitted provided that	at the configuratio	OVC EP <sub>66</sub> n conforms to MEF 26.1
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			Parameters EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> 0 Mbps $_{66} \ge 12176$ Bytes $_{55}$ and CF <sub>66</sub> equal to 0 mode	
	<ul> <li>Note: Use of other bandwidth profile parameter values at the UNI &amp; ENNI is permitted provided that the configuration conforms to MEF 26.1</li> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 at UNI<sub>5</sub> configured in OVC<sub>5</sub> and C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 at UNI<sub>5</sub> configured in OVC<sub>5</sub> and C-tagged Service Frames offered at UNI<sub>5</sub> with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 at UNI<sub>5</sub> configured in OVC<sub>6</sub></li> <li>Tester 2 verifies that the C-tagged Service Frames offered at UNI<sub>5</sub> with CE-VLAN ID equal to 15 and CE-VLAN ID equal to 55 at ENNI<sub>1</sub> configured in OVC<sub>5</sub>. Tester 2 also verifies that the C-tagged Service Frames offered at UNI<sub>5</sub> with CE-VLAN ID equal to 16, and CE-VLAN ID equal to 0,1,27 and S-VLAN ID equal to 16 and CE-VLAN ID equal to 0,1,27 and S-VLAN ID equal to 0C<sub>6</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 at the ENNI<sub>1</sub> configured in OVC<sub>6</sub></li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> configured in OVC<sub>6</sub></li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> configured in OVC<sub>6</sub></li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> configured in OVC<sub>5</sub> with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 and S-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 at the ENNI<sub>1</sub> configured in OVC<sub>6</sub></li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> configured in OVC<sub>5</sub> with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 and S-VLAN COS equal to 0,1,27 and S-VLAN ID equal to 666 at the ENNI<sub>1</sub> configured in OVC<sub>6</sub></li> <li>Tester 1 verifies that the ENNI Frames offered at ENNI<sub>1</sub> configured in OVC<sub>5</sub> with CE-VLAN ID equal to 15 and CE-VLAN COS equal to 0,1,2</li></ul>				
Test Procedure	<ul> <li>and S-VLAN ID equal to 666 at</li> <li>Tester 2 offers double-tagged EN ID equal to 555 at ENNI, config equal to 0,1,27 and S-VLAN I</li> <li>Tester 1 verifies that the ENNI F 0,1,27 and S-VLAN ID equal VLAN CoS equal to 0,1,27 an</li> </ul>	ENNI <sub>1</sub> configured in OVC <sub>6</sub> INI Frames with with CE-VLAN I ured in OVC <sub>5</sub> and double-tagged E D equal to 666 at the ENNI <sub>1</sub> config- irames offered at ENNI <sub>1</sub> double-tag to 555 are received C-tagged at UN d that the ENNI Frames offered at d S-VLAN ID equal to 666 are rec	D equal to 15 and CE-VLA NNI Frames with CE-VLA gured in OVC6 (ged with CE-VLAN ID equ IIs configured in OVC5 with ENNI1 double-tagged with	N CoS equal to N ID equal to 1 ual to 15 and Cl h CE-VLAN ID CE-VLAN ID	6 and CE-VLAN CoS E-VLAN CoS equal to 0 equal to 15 and CE- equal to 16 and CE-
	and S-VLAN ID equal to 666 at Tester 2 offers double-tagged EN ID equal to 555 at ENNI, config equal to 0,1,27 and S-VLAN ID Tester 1 verifies that the ENNI F 0,1,27 and S-VLAN ID equal VLAN CoS equal to 0,1,27 an VLAN CoS equal to 0,1,27 an equal to 16 and CE-VLAN CoS	ENNI <sub>1</sub> configured in OVC <sub>6</sub> INI Frames with with CE-VLAN I ured in OVC <sub>5</sub> and double-tagged E D equal to 666 at the ENNI <sub>1</sub> config rames offered at ENNI <sub>1</sub> double-tag to 555 are received C-tagged at UN d that the ENNI Frames offered at d S-VLAN ID equal to 666 are rec equal to 0,1,27	D equal to 15 and CE-VLA NNI Frames with CE-VLA gured in OVC6 (ged with CE-VLAN ID equ IIs configured in OVC5 with ENNI1 double-tagged with	N CoS equal to N ID equal to 1 ual to 15 and Cl h CE-VLAN ID CE-VLAN ID	6 and CE-VLAN CoS E-VLAN CoS equal to 0 equal to 15 and CE- equal to 16 and CE-
Test Procedure Units Variables	and S-VLAN ID equal to 666 at • Tester 2 offers double-tagged EN ID equal to 555 at ENNI config equal to 0,1,27 and S-VLAN I • Tester 1 verifies that the ENNI F 0,1,27 and S-VLAN ID equal VLAN CoS equal to 0,1,27 an VLAN CoS equal to 0,1,27 an equal to 16 and CE-VLAN CoS CE-VLAN ID, CE-VLAN CoS and	ENNI <sub>1</sub> configured in OVC <sub>6</sub> NI Frames with with CE-VLAN I ured in OVC <sub>5</sub> and double-tagged E D equal to 666 at the ENNI <sub>1</sub> config irames offered at ENNI <sub>1</sub> double-tag to 555 are received C-tagged at UN d that the ENNI Frames offered at d S-VLAN ID equal to 666 are rec equal to 0,1,27 S-VLAN ID values	D equal to 15 and CE-VLA NNI Frames with CE-VLA gured in OVC <sub>6</sub> (ged with CE-VLAN ID equ (I <sub>5</sub> configured in OVC <sub>5</sub> with ENNI <sub>1</sub> double-tagged with eived C-tagged at UNI <sub>5</sub> cor	N CoS equal to N ID equal to 1 ual to 15 and Cl h CE-VLAN ID CE-VLAN ID	6 and CE-VLAN CoS E-VLAN CoS equal to 0 equal to 15 and CE- equal to 16 and CE-
Units	and S-VLAN ID equal to 666 at Tester 2 offers double-tagged EN ID equal to 555 at ENNI, config equal to 0,1,27 and S-VLAN ID Tester 1 verifies that the ENNI F 0,1,27 and S-VLAN ID equal VLAN CoS equal to 0,1,27 an VLAN CoS equal to 0,1,27 an equal to 16 and CE-VLAN CoS	ENNI <sub>1</sub> configured in OVC <sub>6</sub> NI Frames with with CE-VLAN I ured in OVC <sub>5</sub> and double-tagged E D equal to 666 at the ENNI <sub>1</sub> config irames offered at ENNI <sub>1</sub> double-tag to 555 are received C-tagged at UN d that the ENNI Frames offered at d S-VLAN ID equal to 666 are rec equal to 0,1,27 S-VLAN ID values	D equal to 15 and CE-VLA NNI Frames with CE-VLA gured in OVC <sub>6</sub> (ged with CE-VLAN ID equ (I <sub>5</sub> configured in OVC <sub>5</sub> with ENNI <sub>1</sub> double-tagged with eived C-tagged at UNI <sub>5</sub> cor	N CoS equal to N ID equal to 1 ual to 15 and Cl h CE-VLAN ID CE-VLAN ID	6 and CE-VLAN CoS E-VLAN CoS equal to 0 equal to 15 and CE- equal to 16 and CE-

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## Test Case 6.2: Unicast, Multicast and Broadcast Unconditional Frame Delivery

	P	Abstract Test Suite for Etherne	t Access Se	rvices		
Test Name	Unicast, Multicast and E	Broadcast Unconditional Frame Delivery				
Test Definition ID	AEVPL6_R22_R23_R25_R32_R35					
Test Type	Conformance					
Test Status	Mandatory					
Requirement Description	delivered conditionally, [R25] For an Access EV contain all CE-VLAN II [R22] The Maximum nu [R23] Maximum numbe	PL service, deliver unicast, multicast and b <b>MUST</b> specify the delivery criteria. PL service, the OVC EP Map <b>MUST</b> spec D values mapped to a single OVC mber of OVCs per UNI <b>MUST</b> be $\geq 1$ r of CE-VLAN IDs per OVC: The end poin D value associated with an instance of Acce	ify mapping tabl nt Map <b>MUST</b> s	e of CE-VL	AN ID to $ie = 1$	OVC EP and it <b>MUST NOT</b>
Test Object	Verify that for an Acces	s EVPL service, the unicast, multicast and	broadcast frames	are delivere	d uncond	itionally
Test Configuration		n one associating one OVC EP at the UNI a P at the UNI and a specific S-VLAN ID is a				gured. One CE-VLAN ID is
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer		VPL Service der Test DVC₅ DVC <sub>6</sub>	(	Equipmen Operating the ENN OVC EP,	at ENNI1 Ethernet Traffic Generator
End Point Maps	CE-VLAN 1 15 16 Note: Use of other S-VLAN	Map at UNI5           ID         OVC End Point           OVC EP5         OVC EP6           IDs at the ENNI and use of other CE-VLAN IDs		-VLAN ID 555 666 tted provided	Map at	OVC End Point OVC EP55 OVC EP66
Bandwidth Profile	$\begin{tabular}{ c c c c c } \hline OVC & End Point \\ \hline OVC & EP_5 \\ \hline OVC & EP_6 \\ \hline Note 1: CIR_5 = 3 & Mbp \\ Note 2: CBS_5 \ge 12176 \\ Note 2: CBS_5 \ge 12176 \\ Note 3: EIR_5, EIR_6, EI \\ Note 4: CM_5 & and CM_6 \\ \hline \end{tabular}$	Bytes and $CBS_6 \ge 12176$ Bytes BS <sub>5</sub> , EBS <sub>6</sub> , CF <sub>5</sub> and CF <sub>6</sub> equal to 0	OVC I OVC OVC Note 1: C Note 2: C Note 3: E Note 4: C	End Point $C EP_{55}$ $C EP_{66}$ $IR_{55} = 3 Mb$ $BS_{55} \ge 1217$ $IR_{55}, EIR_{66}$ , $M_{55}$ and CM	CIR55 CIR66 ps and CI 6 Bytes a EBS55, EI 166 in colo	$\label{eq:restricted_less} \begin{tabular}{ c c c c c } \hline Parameters & & & \\ \hline Parameters & & \\ \hline CBS55 EIR55 EBS55 CF55 CM55 & \\ \hline CBS66 EIR66 EBS66 CF66 CM66 & \\ \hline R66 = 30 Mbps & & \\ nd CBS66 \geq 12176 Bytes & \\ 3S66, CF55 and CF66 equal to 0 & \\ r-aware mode & & \\ forms to MEF 26.1 & \\ \hline \end{tabular}$
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 with unicast, multicast and broadcast destination address at UNIs configured in OVC5 and C-tagged Service Frames with CE-VLAN ID equal to 16 with unicast, multicast and broadcast destination address at UNIs configured in OVC6</li> <li>Tester 2 verifies that all the unicast, multicast and broadcast C-tagged Service Frames with CE-VLAN ID equal to 15 offered at UNIs are delivered double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI1 configured in OVC5. Tester 2 also verifies that all the unicast, multicast and broadcast C-tagged Service Frames with CE-VLAN ID 16 offered at UNIs are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 555 at ENNI1 configured in OVC5. Tester 2 also verifies that all the unicast, multicast and broadcast C-tagged ENNI frames with CE-VLAN ID 16 offered at UNIs are delivered double-tagged in OVC5. Tester 2 also offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI1 configured in OVC5. Tester 2 also offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI1 configured in OVC5. Tester 2 also offers unicast, multicast and broadcast ENNI frames with S-VLAN ID equal to 16 and S-VLAN ID equal to 666 at ENNI1 configured in OVC6</li> <li>Tester 1 verifies that all the unicast, multicast and broadcast ENNI Frames with S-VLAN ID 555 offered at ENNI1 configured in OVC5 are received C-tagged with CE-VLAN ID equal to 16 at UNIs. Tester 1 also verifies that all the unicast and broadcast ENNI Frames with S-VLAN ID equal to 16 at UNIs</li> </ul>					
Units		received at the external interfaces				
	1			CDC		
Variables	UNI and ENNI interface	e speeds and bandwidth profile parameters	$CBS_{5}, CBS_{6}, CB$	355, CD366		
Variables Results	UNI and ENNI interface Pass or fail	e speeds and bandwidth profile parameters	CBS5, CBS6, CB	355, CD366		

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# 11.2 Test Cases for Access EVPL – Service OAM Frames Handling

Test Case 7.2: Service OAM Connectivity Check Messages (CCM) Handling

	Abstract Test Suite for Ethernet A	Access Services			
Test Name	Service OAM Connectivity Check Messages (CCM) Handling				
Test Definition ID	AEVPL7_R22_R23_R25_R35_R36				
Test Type	Conformance				
Test Status	Mandatory if untagged and priority tagged frames are supported				
Requirement Description	<ul> <li>[R36] The Access EVPL Service MUST be configurable to tunnel all SOAM frames at the default Test and Subscriber MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1</li> <li>[R25] For an Access EVPL service, the OVC EP Map MUST specify mapping table of CE-VLAN ID to OVC EP and it MUST NOT contain all CE-VLAN ID values mapped to a single OVC</li> <li>[R22] The Maximum number of OVCs per UNI MUST be ≥ 1</li> <li>[R23] Maximum number of CE-VLAN IDs per OVC: The end point Map MUST support a value = 1</li> <li>[R35] Each S-VLAN ID value associated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC"</li> </ul>				
Test Object	Verify that for an Access EVPL service, CCM frames are tunneled at SOAM FM IA (MEF 30), section 7.1	t the default Test, and Subscriber MEG levels as defined in the			
Test Configuration	At least two OVCs, each one associating one OVC EP at the UNI and mapped to each OVC EP at the UNI and a specific S-VLAN ID is ma				
Test Configuration Schematic	Tester 1     Equipment(s) Operating at the UNI     Access EVPL Services Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP <sub>5</sub> OVC <sub>5</sub> OVC C       OVC EP <sub>6</sub> OVC <sub>6</sub> OVC EP <sub>6</sub>				
End Point Maps	Map at UNI5           CE-VLAN ID         OVC End Point           15*         OVC EP5           16         OVC EP6           Note: Use of other S-VLAN IDs at the ENNI, use of other CE-VLAN IDs at the permitted provided that the configuration conforms to MEF 26.1	Map at ENNI1           S-VLAN ID         OVC End Point           555         OVC EP55           666         OVC EP66           UNI and of other CE-VLAN ID* for untagged and priority tagged frames is			
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 1 offers untagged CCM messages at MEG level 5 and 6 at UNI<sub>5</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 verifies that all the untagged CCM messages at MEG level 5 and 6 offered at UNI<sub>5</sub> are delivered single-tagged with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 offers single-tagged CCM messages at MEG level 5 and 6 with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 1 verifies that all the single-tagged CCM messages at MEG level 5 and 6 with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 1 verifies that all the single-tagged CCM messages at MEG level 5 and 6 with S-VLAN ID equal to 555 offered at ENNI<sub>1</sub> are received untagged at UNI<sub>5</sub> configured in OVC<sub>5</sub></li> </ul>				
Units	Number of valid frames received at the external interfaces				
Onto					
Variables	UNI and ENNI interface speeds and bandwidth profile parameters CE	BS5, CBS6, CBS55, CBS66			
	UNI and ENNI interface speeds and bandwidth profile parameters CE Pass or fail	BS <sub>5,</sub> CBS <sub>6</sub> , CBS <sub>55</sub> , CBS <sub>66</sub>			

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#### Test Case 8.2: Service OAM Linktrace Messages (LTM/LTR) Handling

	Abstract Te	est Suite for Ethernet A	Access Services		
Test Name	Service OAM Linktrace Messages (LTM/LTR) Handling				
Test Definition ID	AEVPL8_R22_R23_R25_R35_R36				
Test Type	Conformance				
Test Status	Mandatory if untagged and priority tagged frames are supported				
Requirement Description	<ul> <li>[R36] The Access EVPL Service MUST be configurable to tunnel all SOAM frames at the default Test and Subscriber MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1</li> <li>[R25] For an Access EVPL service, the OVC EP Map MUST specify mapping table of CE-VLAN ID to OVC EP and it MUST NOT contain all CE-VLAN ID values mapped to a single OVC</li> <li>[R22] The Maximum number of OVCs per UNI MUST be ≥ 1</li> <li>[R23] Maximum number of CE-VLAN ID ser OVC: The end point Map MUST support a value = 1</li> <li>[R35] Each S-VLAN ID value associated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC"</li> </ul>				
Test Object	Verify that for an Access EVPL servic the SOAM FM IA (MEF 30), section 7		neled at the default Test, a	nd Subscriber MEG levels as defined in	
Test Configuration	At least two OVCs, each one associatin mapped to each OVC EP at the UNI ar				
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Access EVP Under EPs OV0	L Services	Quipment berating at the ENNI DVC EP55 DVC EP66	
	Map at UN CE-VLAN ID	I <sub>5</sub> OVC End Point	S-VLAN ID	Map at ENNI <sub>1</sub> OVC End Point	
End Point	15*	OVC End Point OVC EP5	555	OVC EP55	
Maps	16         OVC EP6         666         OVC EP66           Note: Use of other S-VLAN IDs at the ENNI, use of other CE-VLAN IDs at the UNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1         MEF 26.1				
	permitted provided that the configuration cor				
	Ingress Bandwidth Profile p			h Profile per OVC EP at ENNI <sub>1</sub> Parameters	
	Ingress Bandwidth Profile p OVC End Point OVC EP5 CIR5 CB5	er OVC EP at UNI5 Parameters S5 EIR5 EBS5 CF5 CM5	OVC End Point OVC EP55	Parameters CIR55 CBS55 EIR55 EBS55 CF55 CM55	
Bandwidth Profile	Ingress Bandwidth Profile p OVC End Point OVC EP5 CIR5 CB5	er OVC EP at UNI <sub>5</sub> Parameters $S_5 \text{ EIR}_5 \text{ EBS}_5 \text{ CF}_5 \text{ CM}_5$ $S_6 \text{ EIR}_6 \text{ EBS}_6 \text{ CF}_6 \text{ CM}_6$ 30  Mbps $S_6 \ge 12176 \text{ Bytes}$ $s_1 \text{ and } \text{ CF}_6 \text{ equal to } 0$ 1  mode	$\begin{tabular}{ c c c c } \hline OVC End Point \\ \hline OVC EP_{55} \\ \hline OVC EP_{66} \\ \hline Note 1: CIR_{55} = 3 \ Mbp; \\ Note 2: CBS_{55} \ge 12176 \\ \hline Note 3: EIR_{55}, EIR_{66}, E \\ \hline Note 4: CM_{55} \ and CM_{66} \\ \hline end{tabular}$	$\label{eq:response} \hline Parameters \\ \hline CIR_{55} CBS_{55} EIR_{55} EBS_{55} CF_{55} CM_{55} \\ \hline CIR_{66} CBS_{66} EIR_{66} EBS_{66} CF_{66} CM_{66} \\ \hline and CIR_{66} = 30 Mbps \\ Bytes and CBS_{66} \geq 12176 Bytes \\ BS_{55} EBS_{66}, CF_{55} and CF_{66} equal to 0 \\ \hline a in color-aware mode \\ \hline \end{array}$	
	$\begin{tabular}{ c c c c c } \hline Ingress Bandwidth Profile pOVC End Point & & & & & & & & & & & & & & & & & & &$	ter OVC EP at UNI <sub>5</sub> Parameters S <sub>5</sub> EIR <sub>5</sub> EBS <sub>5</sub> CF <sub>5</sub> CM <sub>5</sub> S <sub>6</sub> EIR <sub>6</sub> EBS <sub>6</sub> CF <sub>6</sub> CM <sub>6</sub> 30 Mbps 38 <sub>6</sub> $\geq$ 12176 Bytes 3 and CF <sub>6</sub> equal to 0 1 mode ter values at the UNI & ENNI is perm LTR messages at MEG level 5 a ed LTM and LTR messages at MEG level and LTR messages at MEG level tagged LTM and LTR messages	OVC End Point         OVC EP55         OVC EP66         Note 1: CIR55 = 3 Mbp:         Note 2: CBS55 $\ge$ 12176         Note 3: EIR55, EIR66, E         Note 4: CM55 and CM66         inited provided that the configure         Ind 6 at UNIs configured in         IEG level 5 and 6 offered a         1 5 and 6 with S-VLAN ID	$\label{eq:restricted_restrict} \hline Parameters \\ \hline CIR_{55} CBS_{55} EIR_{55} EBS_{55} CF_{55} CM_{55} \\ \hline CIR_{66} CBS_{66} EIR_{66} EBS_{66} CF_{66} CM_{66} \\ \hline a and CIR_{66} = 30 Mbps \\ Bytes and CBS_{66} \geq 12176 Bytes \\ BS_{55}, EBS_{66}, CF_{55} and CF_{66} equal to 0 \\ \hline a in color-aware mode \\ \hline ation conforms to MEF 26.1 \\ \hline OVC_5 \\ t UNI_5 are delivered single-tagged with \\ equal to 555 at ENNI_1 configured in \\ \hline \end{array}$	
Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	er OVC EP at UNI <sub>5</sub> Parameters S <sub>5</sub> EIR <sub>5</sub> EBS <sub>5</sub> CF <sub>5</sub> CM <sub>5</sub> S <sub>6</sub> EIR <sub>6</sub> EBS <sub>6</sub> CF <sub>6</sub> CM <sub>6</sub> 30 Mbps 3S <sub>6</sub> $\geq$ 12176 Bytes and CF <sub>6</sub> equal to 0 1 mode eter values at the UNI & ENNI is perm LTR messages at MEG level 5 ar ed LTM and LTR messages at MEG level tagged LTM and LTR messages at MEG level	OVC End Point         OVC EP55         OVC EP66         Note 1: CIR55 = 3 Mbp:         Note 2: CBS55 $\ge$ 12176         Note 3: EIR55, EIR66, E         Note 4: CM55 and CM66         inited provided that the configure         Ind 6 at UNIs configured in         IEG level 5 and 6 offered a         1 5 and 6 with S-VLAN ID	$\label{eq:restricted_restrict} \hline Parameters \\ \hline CIR_{55} CBS_{55} EIR_{55} EBS_{55} CF_{55} CM_{55} \\ \hline CIR_{66} CBS_{66} EIR_{66} EBS_{66} CF_{66} CM_{66} \\ \hline a and CIR_{66} = 30 Mbps \\ Bytes and CBS_{66} \geq 12176 Bytes \\ BS_{55}, EBS_{66}, CF_{55} and CF_{66} equal to 0 \\ \hline a in color-aware mode \\ \hline ation conforms to MEF 26.1 \\ \hline OVC_5 \\ t UNI_5 are delivered single-tagged with \\ equal to 555 at ENNI_1 configured in \\ \hline \end{array}$	
Profile Test Procedure	$\begin{tabular}{ c c c c c } \hline Ingress Bandwidth Profile prove the point $$OVC EP_5$ CIR_5 CBS$ $$OVC EP_6$ CIR_6 CBS$ $$OVC EP_6$ CIR_6 CBS$ $$OVC EP_6$ CIR_6 CBS$ $$Note 1: CIR_5 = 3 Mbps and CIR_6 = 3 Note 2: CBS_5 \ge 12176 Bytes and CB$ Note 3: EIR_5, EIR_6, EBS_5, EBS_6, CF_5$ Note 4: CM_5 and CM_6 in color-blind $$Note: Use of other bandwidth profile parame$$$Ovte 4: CM_5 and CM_6 in color-blind $$Note: Use of other bandwidth profile parame$$$$$Ovte 4: CM_5 and CM_6 in color-blind $$$Note: Use of other bandwidth profile parame$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$	er OVC EP at UNI5         Parameters         S3 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         386 $\geq$ 12176 Bytes         5 and CF6 equal to 0         I mode         eter values at the UNI & ENNI is perm         LTR messages at MEG level 5 a         ed LTM and LTR messages at MEG level         and LTR messages at MEG level         tagged LTM and LTR messages         tagged LTM and LTR messages         vits configured in OVC5         e external interfaces	OVC End Point OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbp Note 2: CB55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM66 inited provided that the configured in 6 at UNIs configured in IEG level 5 and 6 offered a 1 5 and 6 with S-VLAN ID at MEG level 5 and 6 with	$\label{eq:restricted_restrict} \hline Parameters \\ \hline CIR_{55} CBS_{55} EIR_{55} EBS_{55} CF_{55} CM_{55} \\ \hline CIR_{66} CBS_{66} EIR_{66} EBS_{66} CF_{66} CM_{66} \\ \hline a and CIR_{66} = 30 Mbps \\ Bytes and CBS_{66} \geq 12176 Bytes \\ BS_{55}, EBS_{66}, CF_{55} and CF_{66} equal to 0 \\ \hline a in color-aware mode \\ \hline ation conforms to MEF 26.1 \\ \hline OVC_5 \\ t UNI_5 are delivered single-tagged with \\ equal to 555 at ENNI_1 configured in \\ \hline \end{array}$	
Profile Test Procedure Units	$\begin{tabular}{ c c c c c } \hline Ingress Bandwidth Profile pOVC End Point & OVC EP_5 & CIR_5 CB_5 & OVC EP_6 & CIR_6 CB_5 & OVC EP_6 & CIR_6 CB_5 & OVC EP_5 & CIR_5 CB_5 & Start S$	er OVC EP at UNI5         Parameters         S3 EIR5 EBS5 CF5 CM5         S6 EIR6 EBS6 CF6 CM6         30 Mbps         386 $\geq$ 12176 Bytes         5 and CF6 equal to 0         I mode         eter values at the UNI & ENNI is perm         LTR messages at MEG level 5 a         ed LTM and LTR messages at MEG level         and LTR messages at MEG level         tagged LTM and LTR messages         tagged LTM and LTR messages         vits configured in OVC5         e external interfaces	OVC End Point OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbp Note 2: CB55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM66 inited provided that the configured in 6 at UNIs configured in IEG level 5 and 6 offered a 1 5 and 6 with S-VLAN ID at MEG level 5 and 6 with	Parameters         CIR <sub>55</sub> CBS <sub>55</sub> EIR <sub>55</sub> EBS <sub>55</sub> CF <sub>55</sub> CM <sub>55</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> and CIR <sub>66</sub> = 30 Mbps         Bytes and CBS <sub>66</sub> ≥ 12176 Bytes         BS <sub>55</sub> EBS <sub>66</sub> , CF <sub>55</sub> and CF <sub>66</sub> equal to 0         ation conforms to MEF 26.1         OVC <sub>5</sub> t uNI <sub>5</sub> are delivered single-tagged with         equal to 555 at ENNI <sub>1</sub> configured in	



#### Test Case 9.2: Service OAM Loopback Messages (LBM/LBR) Handling

	Abstract Test Suite for Ethern	et Access Services			
Test Name	Service OAM Loopback Messages (LBM/LBR) Handling				
Test Definition ID	AEVPL9_R22_R23_R25_R35_R36				
Test Type	Conformance				
Test Status	Mandatory if untagged and priority tagged frames are supported				
Requirement Description	[R36] The Access EVPL Service <b>MUST</b> be configurable to tunnel all SOAM frames at the default <b>Test</b> and <b>Subscriber</b> MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1 [R25] For an Access EVPL service, the OVC EP Map <b>MUST</b> specify mapping table of CE-VLAN ID to OVC EP and it <b>MUST NOT</b> contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI <b>MUST</b> be $\geq 1$ [R23] Maximum number of CE-VLAN IDs per OVC: The end point Map <b>MUST</b> support a value = 1 [R35] Each S-VLAN ID value associated with an instance of Access EVPL Service <b>MUST</b> map to a distinct End Point, of Type = "OVC"				
	Verify that for an Access EVPL service, LBM and LBR frames a the SOAM FM IA (MEF 30), section 7.1	re tunneled at the default Test, and Subscriber MEG levels as defined in			
	At least two OVCs, each one associating one OVC EP at the UN mapped to each OVC EP at the UNI and a specific S-VLAN ID	I and one OVC EP at the ENNI are configured. One CE-VLAN ID is s mapped to each OVC EP at the ENNI			
Test Configuration Schematic		EVPL Services     Equipment Operating at the ENNI     Tester 2       OVC5     OVC EP55     Ethernet Traffic Generator Analyzer			
	Map at UNI5           CE-VLAN ID         OVC End Point           15*         OVC EP5           16         OVC EP6           Note: Use of other S-VLAN IDs at the ENNI, use of other CE-VLAN IDs at permitted provided that the configuration conforms to MEF 26.1	Map at ENNI1           S-VLAN ID         OVC End Point           555         OVC EP55           666         OVC EP66           t the UNI and of other CE-VLAN ID* for untagged and priority tagged frames is			
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 1 offers untagged LBM and LBR messages at MEG level 5 and 6 at UNI<sub>5</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 verifies that all the untagged LBM and LBR messages at MEG level 5 and 6 offered at UNI<sub>5</sub> are delivered single-tagged with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 offers single-tagged LBM and LBR messages at MEG level 5 and 6 with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 2 offers single-tagged LBM and LBR messages at MEG level 5 and 6 with S-VLAN ID equal to 555 at ENNI<sub>1</sub> configured in OVC<sub>5</sub></li> <li>Tester 1 verifies that all the single-tagged LBM and LBR messages at MEG level 5 and 6 with S-VLAN ID equal to 555 offered at ENNI<sub>1</sub> are received untagged at UNI<sub>5</sub> configured in OVC<sub>5</sub></li> </ul>				
Units	Number of valid frames received at the external interfaces				
Variables	UNI and ENNI interface speeds and bandwidth profile parameter	\$ CBS5, CBS6, CBS55, CBS66			
	UNI and ENNI interface speeds and bandwidth profile parameter Pass or fail	S CBS <sub>5</sub> , CBS <sub>6</sub> , CBS <sub>55</sub> , CBS <sub>66</sub>			

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## 11.3 Test Cases for Access EVPL – Bandwidth Profile

Test Case 10.2: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 1

	Abstract Test Suite for Ethernet	Access Services			
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 1				
Test Definition ID	AEVPL10_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F<sub>CR</sub></i> ) of the calculated amount of traffic accepted as Green at the ingress the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Ethernet Traffic Generator	VPL Service er Test VVC <sub>5</sub> Equipment Operating at the ENNI ENNI ENNI ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer			
	Map at UNI <sub>5</sub>	Map at ENNI <sub>1</sub>			
End Point	CE-VLAN ID OVC End Point	S-VLAN ID OVC End Point			
Maps	15 OVC EP5	555         OVC EP55			
	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U				
	Ingress Bandwidth Profile per OVC EP at UNI5 OVC End Point Parameters	Ingress Bandwidth Profile per OVC EP at ENNI1           OVC End Point         Parameters			
Bandwidth	OVC EP5 CIR5 CBS5 EIR5 EBS5 CF5 CM5	OVC EP55 CIR55 CBS55 EIR55 EBS55 CF55 CM55			
Profile	Note 1: $CIR_5 = 3$ Mbps Note 2: $CBS_5 \ge 12176$ Bytes	Note 1: $CIR_{55} = 3$ Mbps Note 2: $CBS_{55} \ge 12176$ Bytes			
	Note 3: EIR <sub>5</sub> , EBS <sub>5</sub> , and CF <sub>5</sub> equal to 0 Note 4: CM <sub>5</sub> in color-blind mode	Note 3: EIR <sub>55</sub> , EBS <sub>55</sub> , and CF <sub>55</sub> equal to 0 Note 4: CM <sub>55</sub> in color-aware mode			
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>5</sub> to the ingress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 555 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>5</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>55</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>55</sub> at ENNI<sub>1</sub></li> </ul>				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interv	al T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>5</sub> , CBS <sub>55</sub>			
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traff MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the numb traffic received over the duration of the test				



## Test Case 11.2: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 1

	Abstract Test Suite for Ethernet	Access Services			
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 1				
Test Definition ID	AEVPL11_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI, and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the		CE-VLAN ID is m	apped to the OVC EP	
Test Configuration Schematic	Ethernet Traffic Generator	(PL Service er Test	equipment perating at the ENNI	Tester 2 Ethernet Traffic Generator Analyzer	
	Map at UNI <sub>5</sub>	1	Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID         OVC End Point           15         OVC EP5	S-VLAN 1 555	D	OVC End Point OVC EP55	
Maps	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UN		configuration conform		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Ingress Bandwidth OVC End Point OVC EP55 Note 1: CIR55 = 3 Mbps Note 2: CBS55 ≥ 12176 H Note 3: EIR55, EBS55, an Note 4: CM55 in color-aw	Para CIR55 CBS55 EIR Bytes d CF55 equal to 0	C EP at ENNI <sub>1</sub> meters 55 EBS55 CF55 CM55	
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 of length λ, using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 555 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>)</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>55</sub> at ENNI<sub>1</sub></li> </ul>				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length profile parameters CBS <sub>5</sub> , CBS <sub>55</sub>	<i>B</i> , idle period <i>I</i> , time interv	al $T$ , tolerance $F_{CBS}$	and bandwidth	
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	c where the ENNI Frame co	nsists of the first bit	t of the Destination	

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#### Test Case 12.2: Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 2

	Abstract Test Suite for Ethernet Access Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 2				
Test Definition ID	AEVPL12_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory if the UNI Speed is greater than 10 Mbps				
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\ge$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CR</sub> ) of the calculated amount of traffic accepted as Green at the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP6     OVC6     Ethernet Traffic				
	Map at $UNI_5$ Map at $ENNI_1$				
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point				
Maps	16         OVC EP <sub>6</sub> 666         OVC EP <sub>66</sub> Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1				
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>6</sub> to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>66</sub> at ENNI<sub>1</sub> must be within +/- (<i>F</i><sub>CIR</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>66</sub> at ENNI<sub>1</sub></li> </ul>				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval <i>T</i> , tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>				
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic where the ENNI Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test				



## Test Case 13.2: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 2

	Abstract Test Suite for Ethernet	Access Services			
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 2				
Test Definition ID	AEVPL13_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory if the UNI Speed is greater than 10 Mbps				
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> </ul> </li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green</li>				
Test Object	via the S-Tag as per MEF 23.1 Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI, and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at t at the UNI and a specific S-VLAN ID is mapped to the OVC EP at t		CE-VLAN ID is mapped to the OVC EP		
Test Configuration Schematic		VPL Service er Test	Quipment berating at the ENNI     Tester 2       ENNI     Ethernet Traffic Generator Analyzer		
	Map at UNI <sub>5</sub>		Iap at ENNI <sub>1</sub>		
End Point Maps	CE-VLAN ID OVC End Point 16 OVC EP <sub>6</sub>	S-VLAN II 666	D OVC End Point OVC EP <sub>66</sub>		
Maps	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the I				
	Ingress Bandwidth Profile per OVC EP at UNI5	Ingress Bandwidth	Profile per OVC EP at ENNI <sub>1</sub>		
	OVC End Point Parameters	OVC End Point	Parameters		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 of length λ, using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>6</sub> at ENNI<sub>1</sub>)</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>66</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>66</sub> at ENNI<sub>1</sub></li> </ul>				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst lengt profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>	h $B$ , idle period $I$ , time interva	l T, tolerance $F_{CBS}$ and bandwidth		
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traf MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	fic where the ENNI Frame con	sists of the first bit of the Destination		



#### Test Case 14.2: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 3

	Abstract Test Suite for Ethernet Ac	ccess Services			
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 3				
Test Definition ID	AEVPL14_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory if the UNI Speed is greater than 100 Mbps				
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = at the UNI and Color Forwarding is Yes, the bandwidth profile is applied EP and the amount of Green traffic delivered at the egress OVC EP is with Green at the ingress during a time interval $T$ , provided that the ingress traffic delivered that that the ingress	to all ingress Service Frames that are mapped to the given OVC ithin +/- ( <i>F<sub>CIR</sub></i> ) of the calculated amount of traffic accepted as			
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI				
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Covc EP77			
	Map at UNI₅	Map at ENNI <sub>1</sub>			
End Point	CE-VLAN ID OVC End Point	S-VLAN ID OVC End Point			
Maps	17 OVC EP <sub>7</sub> Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI i	777 OVC EP <sub>77</sub>			
	Ingress Bandwidth Profile per OVC EP at UNI5	Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>			
Bandwidth	OVC End Point         Parameters           OVC EP7         CIR7 CBS7 EIR7 EBS7 CF7 CM7	OVC End Point         Parameters           OVC EP77         CIR77 CBS77 EIR77 EBS77 CF77 CM77			
Profile	Note 1: CIR $_7$ CIR $_7$ = 300 MbpsNote 2: CBS $_7 \ge 12176$ BytesNote 3: EIR $_7$ , EBS $_7$ , and CF $_7$ equal to 0Note 4: CM $_7$ in color-blind modeNote 4: CM $_7$ in color-aware mode				
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 17 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>7</sub> to the ingress OVC End Point (OVC EP<sub>7</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 777 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>77</sub> at ENNI<sub>1</sub> must be within +/- (<i>Fc</i><sub>IR</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>77</sub> at ENNI<sub>1</sub></li> </ul>				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T	tolerance $\overline{F_{CIR}}$ and bandwidth profile parameters CBS <sub>7</sub> , CBS <sub>77</sub>			
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic w MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number o traffic received over the duration of the test				



## Test Case 15.2: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 3

	Abstract Test Suite for Ethernet	Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 3		
Test Definition ID	AEVPL15_R26_R27_R31		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 100 Mbps		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI, and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( $F_{CBS}$ ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     UNIS     OVC EP     OVC7		
	Map at UNI <sub>5</sub>		Map at ENNI <sub>1</sub>
End Point Maps	CE-VLAN ID         OVC End Point           17         OVC EP7   Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U	S-VLAN 777 JNI is permitted provided that the	OVC EP77
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 17 and CE-VLAN CoS equal to 0,1,27 of length λ, using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>7</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 777 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>)</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>77</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>77</sub> at ENNI<sub>1</sub></li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length <i>B</i> , idle period <i>I</i> , time interval <i>T</i> , tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>7</sub> , CBS <sub>77</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traft MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	fic where the ENNI Frame co	nsists of the first bit of the Destination

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#### Test Case 16.2: Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Range 4

	Abstract Test Suite for Ethernet	Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement Range 4		
Test Definition ID	AEVPL16_R26_R27_R31		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic		VPL Service er Test VC <sub>8</sub> Equipment Operating at the ENNI ENNI ENNI ENNI ENNI ENNI ENNI ENNI	
	Map at UNI <sub>5</sub>	Map at ENNI <sub>1</sub>	
End Point	CE-VLAN ID OVC End Point	S-VLAN ID OVC End Point	
Maps	18         OVC EP8           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U	888 OVC EP <sub>88</sub> NI is permitted provided that the configuration conforms to MEF 26.1	
	Ingress Bandwidth Profile per OVC EP at UNI <sub>5</sub> OVC End Point Parameters	Ingress Bandwidth Profile per OVC EP at ENNI	
Bandwidth	OVC End Point         Parameters           OVC EP8         CIR8 CBS8 EIR8 EBS8 CF8 CM8	OVC End Point         Parameters           OVC EP <sub>88</sub> CIR <sub>88</sub> CBS <sub>88</sub> EIR <sub>88</sub> EBS <sub>88</sub> CF <sub>88</sub> CM <sub>88</sub>	
Profile	Note 1: $CIR_8 = 3$ Gbps Note 2: $CBS_8 \ge 12176$ Bytes Note 3: $EIR_8$ , $EBS_8$ , and $CF_8$ equal to 0 Note 4: $CM_8$ in color-blind mode	Note 1: $CIR_{ss} = 3$ Gbps Note 2: $CBS_{ss} \ge 12176$ Bytes Note 3: $EIR_{ss}$ , $EBS_{ss}$ , and $CF_{ss}$ equal to 0 Note 4: $CM_{ss}$ in color-aware mode	
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 18 and CE-VLAN CoS equal to 0,1,27 of length λ at a constant rate greater than CIR<sub>8</sub> to the ingress OVC End Point (OVC EP<sub>8</sub> at UNI<sub>5</sub>) during a time interval <i>T</i></li> <li>Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 888 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP<sub>88</sub> at ENNI<sub>1</sub>).</li> <li>The amount of Green traffic delivered at the egress OVC EP<sub>88</sub> at ENNI<sub>1</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>88</sub> at ENNI<sub>1</sub></li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>8</sub> , CBS <sub>88</sub>		
Results	Pass or fail		
Remarks	Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



## Test Case 17.2: Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 4

	Abstract Test Suite for Ethernet	Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enforcement Range 4		
Test Definition ID	AEVPL17_R26_R27_R31		
Test Type	Conformance		
Test Status	Mandatory if the UNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" and it MUST have CBS ≥ 12176 Bytes</li> <li>[R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green via the S-Tag as per MEF 23.1</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the UNI, and Color Forwarding is Yes, the bandwidth profile is applied to all ingress Service Frames that are mapped to the given OVC EP and the amount of Green traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester I     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP8     OVC8     Equipment Operating at the ENNI     Equipment Operating at the ENNI		
	Map at UNI <sub>5</sub>		Map at ENNI <sub>1</sub>
End Point Maps	CE-VLAN ID         OVC End Point           18         OVC EP8	S-VLAN 888	ID OVC End Point OVC EP <sub>88</sub>
Bandwidth Profile	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U         Ingress Bandwidth Profile per OVC EP at UNI5         OVC End Point       Parameters         OVC EPs       CIRs CBSs EIRs EBSs CFs CMs         Note 1: CIRs = 3 Gbps         Note 2: CBSs $\geq 12176$ Bytes         Note 3: EIRs, EBSs, and CFs equal to 0	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	h Profile per OVC EP at ENNI <sub>1</sub> Parameters CIR <sub>88</sub> CBS <sub>88</sub> EIR <sub>88</sub> EBS <sub>88</sub> CF <sub>88</sub> CM <sub>88</sub> Bytes
Test Procedure	Note 3: EIR <sub>8</sub> , EBS <sub>8</sub> , and CF <sub>8</sub> equal to 0       Note 3: EIR <sub>88</sub> , EBS <sub>88</sub> , and CF <sub>88</sub> equal to 0         Note 4: CM <sub>8</sub> in color-blind mode       Note 4: CM <sub>88</sub> in color-aware mode         • Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 18 and CE-VLAN CoS equal to 0,1,27 of length λ, using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP <sub>8</sub> at UNI <sub>5</sub> ) during a time interval <i>T</i> • Tester 2 measures the number of double-tagged ENNI frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 888 and S-VLAN CoS equal to Green delivered at the egress OVC End Point (OVC EP <sub>88</sub> at ENNI <sub>1</sub> )         • The amount of Green traffic delivered at the egress OVC EP <sub>88</sub> at ENNI <sub>1</sub> must be within +/- ( <i>F<sub>CBS</sub></i> ) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP <sub>88</sub> at ENNI <sub>1</sub>		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length $\lambda$ , Burst length $B$ , idle period $I$ , time interval $T$ , tolerance $F_{CBS}$ and bandwidth profile parameters CBSs, CBSss		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traff MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	fic where the ENNI Frame co	onsists of the first bit of the Destination



#### Test Case 18.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 1

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 1		
Test Definition ID	AEVPL18_R33_R34		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 1 00 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CIR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP <sub>5</sub> OVC <sub>5</sub> Ethernet CVC EP <sub>5</sub> Ethernet Traffic Generator Analyzer		
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           15         OVC EP5         555         OVC EP55		
Bandwidth Profile	Note Set of data 5 that is beneficially build of other CE that is beneficial provided and a configuration controls to that 2011Ingress Bandwidth Profile per OVC EP at UNI5Ingress Bandwidth Profile per OVC EP at ENNI1OVC End PointParametersOVC EP5CIR5 CBS5 EIR5 EBS5 CF5 CM5Note 1: CIR5 = 3 MbpsOVC E1 CIR5 = 3 MbpsNote 2: CBS5 $\geq$ 12176 BytesNote 2: CBS5 $\geq$ 12176 BytesNote 3: EIR5, EBS5, and CF5 equal to 0Note 4: CM5 in color-blind mode		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 5, S-VLAN ID equal to 555 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>55</sub> to the ingress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>5</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>5</sub> at UNI<sub>5</sub>.</li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 5, S-VLAN ID equal to 555 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>55</sub> to the ingress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>55</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>).</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>5</sub> , CBS <sub>55</sub>		
Results	Pass or fail		
Remarks	Pass of fail Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



## Test Case 19.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 1 $\,$

	Abstract Test Suite for Ethernet Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 1	
Test Definition ID	AEVPL19_R33_R34	
Test Type	Conformance	
Test Status	Mandatory	
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>	
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CRS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EPs     OVCs     Ethernet Traffic Generator     Ethernet Traffic Generator	
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           15         OVC EP5         555         OVC EP55	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 5, S-VLAN ID equal to 555 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>5</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>5</sub> at UNI<sub>5</sub> must be within +/- (<i>F</i><sub>CBS</sub>) of the calculated amount of traffic active the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>5</sub> at UNI<sub>5</sub>.</li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15, CE-VLAN CoS equal to 5, S-VLAN ID equal to 555 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 15 and CE-VLAN CoS equal to 5 delivered at the egress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) the amount of traffic delivered at the egress OVC End Point (OVC EP<sub>55</sub> at ENNI<sub>1</sub>) the interval <i>T</i></li> </ul>	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>5</sub> , CBS <sub>55</sub>	
Results	Pass or fail	
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4	



#### Test Case 20.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 2

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CIR Enforcement Range 2		
Test Definition ID	AEVPL20_R33_R34		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force for a the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP <sub>60</sub> Ethernet Traffic Generator Analyzer     Ethernet Traffic     Traffic Generator Analyzer		
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>66</sub> to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 16 and CE-VLAN CoS equal to 6 delivered at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>6</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>6</sub> at UNI<sub>5</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to 7 years of length λ at a constant rate greater than CIR<sub>66</sub> to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to 7 years of length λ at a constant rate greater than CIR<sub>66</sub> to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 16 and CE-VLAN CoS equal to 6 delivered at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>6</sub> at UNI<sub>5</sub> must be zero</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



## Test Case 21.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 2

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 2		
Test Definition ID	AEVPL21_R33_R34		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 − 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 − 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 − 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 − 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 − 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the LINI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI Tester 1  Equipment Operating at the UNI  Access EVPL Service Under Test Under Test OVC EP OVC EV Ethernet Traffic Generator Analyzer		
	Map at UNI <sub>5</sub> Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           16         OVC EP <sub>6</sub> 666         OVC EP <sub>66</sub>		
Maps	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
	Ingress Bandwidth Profile per OVC EP at UNI <sub>5</sub> Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub>		
	OVC End Point Parameters OVC End Point Parameters		
Bandwidth	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Profile	Note 1: $CH_{66}^{-50}$ Inform       Note 1: $CH_{66}^{-50}$ Inform         Note 2: $CBS_{62}^{-50}$ I176 Bytes       Note 2: $CBS_{66}^{-50}$ I176 Bytes         Note 3: $EIR_{6}$ , $EBS_{66}$ , and $CF_{66}$ equal to 0       Note 4: $CM_{6}$ in color-blind mode         Note 4: $CM_{66}$ in color-blind mode       Note 4: $CM_{66}$ in color-aware mode		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 16 and CE-VLAN CoS equal to 6 delivered at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>6</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>6</sub> at UNI<sub>5</sub>.</li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 16 and CE-VLAN CoS equal to 6 delivered at the egress OVC End fill the token bucket, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>). The amount of traffic delivered at the egress OVC EP<sub>6</sub> at UNI<sub>5</sub>. The amount of traffic delivered at the egress OVC EP<sub>6</sub> at UNI<sub>5</sub> must be zero</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4		

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#### Test Case 22.2: Ingress Bandwidth Profile per OVC EP at the ENNI - CIR Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CIR Enforcement Range 3		
Test Definition ID	AEVPL22_R33_R34		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 100 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force for a the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>Fcm</i> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     UNIs     OVC EP7     OVC7		
End Point	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point		
Maps	17         OVC EP7         777         OVC EP77           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1         000000000000000000000000000000000000		
Bandwidth Profile	Ingress Bandwidth Profile per OVC EP at UNI5OVC End PointParametersOVC EP7CIR7 CBS7 EIR7 EBS7 CF7 CM7Note 1: CIR7 = 300 Mbps Note 2: CBS7 $\geq$ 12176 Bytes Note 3: EIR7, EBS7, and CF7 equal to 0 Note 4: CM7 in color-blind modeNote 1: CIR7 = 300 Mbps Note 2: CBS77 $\geq$ 12176 Bytes Note 3: EIR7, EBS7, and CF7 equal to 0 Note 4: CM7 in color-blind modeNote 1: CIR7 = 300 Mbps Note 2: CBS77 $\geq$ 12176 Bytes Note 3: EIR77, EBS77, and CF77 equal to 0 Note 4: CM77 in color-aware mode		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 7, S-VLAN ID equal to 777 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>77</sub> to the ingress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 17 and CE-VLAN CoS equal to 7 delivered at the egress OVC End Point (OVC EP<sub>7</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>7</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>7</sub> at UNI<sub>5</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 7, S-VLAN ID equal to 777 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>77</sub> to the ingress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID and CE-VLAN CoS equal to 7, S-VLAN ID equal to 777 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>77</sub> to the ingress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 17 and CE-VLAN CoS equal to 7 delivered at the egress OVC End Point (OVC EP<sub>77</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>7</sub> at UNI<sub>5</sub> must be zero</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>7</sub> , CBS <sub>77</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



## Test Case 23.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 3

	Abstract Test Suite for Ethernet Access Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CBS Enforcement Range 3	
Test Definition ID	AEVPL23_R33_R34	
Test Type	Conformance	
Test Status	Mandatory	
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>	
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 300 Mbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CBS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC7     ENNI     Ethernet Traffic Generator Analyzer	
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           17         OVC EP7         777         OVC EP77	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 7, S-VLAN ID equal to 777 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 17 and CE-VLAN CoS equal to 7 delivered at the egress OVC End Point (OVC EP<sub>7</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>7</sub> at UNI<sub>5</sub> must be within +/- (<i>F</i><sub>CBS</sub>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>7</sub> at UNI<sub>5</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 17, CE-VLAN CoS equal to 7, S-VLAN ID equal to 777 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 17 and CE-VLAN CoS equal to 7 delivered at the egress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 17 and CE-VLAN CoS equal to 7 delivered at the egress OVC End Point (OVC EP<sub>77</sub> at ENNI<sub>1</sub>) to time interval <i>T</i></li> </ul>	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>7</sub> , CBS <sub>77</sub>	
Results	Pass or fail	
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4	

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#### Test Case 24.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CIR Enforcement Range 4

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI - CIR Enforcement Range 4		
Test Definition ID	AEVPL24_R33_R34		
Test Type	Conformance		
Test Status	Mandatory if the ENNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force for a the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CR</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered at a constant rate greater than CIR		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Equipment Operating at the UNI     Tester 2       Ethernet Traffic Generator Analyzer     UNIs     OVC EP8     OVC		
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point           18         OVC EP8           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0, S-VLAN ID equal to 888 and S-VLAN CoS equal to Green of length λ at a constant rate greater than CIR<sub>88</sub> to the ingress OVC End Point (OVC EP<sub>88</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 18 and CE-VLAN CoS equal to 0 delivered at the egress OVC End Point (OVC EP<sub>8</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>8</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CIR</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>8</sub> at UNI<sub>5</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0, S-VLAN ID equal to 888 and S-VLAN CoS equal to Yellow of length λ at a constant rate greater than CIR<sub>88</sub> to the ingress OVC End Point (OVC EP<sub>8</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 18 and CE-VLAN CoS equal to 0 delivered at the egress OVC End Point (OVC EP<sub>8</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 18 and CE-VLAN CoS equal to 0 delivered at the egress OVC End Point (OVC EP<sub>8</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>8</sub> at UNI<sub>5</sub> must be zero</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CIR}$ and bandwidth profile parameters CBS <sub>8</sub> , CBS <sub>88</sub>		
Results	Pass or fail		
Remarks	Pass of fail Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4 Note 3: The length of the time interval <i>T</i> must be such that the number of bytes in CBS is negligible compared to the total volume of traffic received over the duration of the test		



## Test Case 25.2: Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 4 $\,$

	Abstract Test Suite for Ethernet Access Services		
Test Name	Ingress Bandwidth Profile per OVC EP at the ENNI – CBS Enforcement Range 4		
Test Definition ID	AEVPL25_R33_R34		
Test Type	Conformance		
Test Status	Mandatory if the ENNI Speed is greater than 1 Gbps		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R34] Ingress Bandwidth Profile per OVC EP at a ENNI is required and MUST allow configuration to support CIR of: <ul> <li>1 - 10 Mb/s, increments of 1 Mbps</li> <li>(Range 1)</li> <li>10 - 100 Mb/s, increments of 10 Mbps</li> <li>(Range 2)</li> <li>100 - 1000 Mb/s, increments of 10 Mbps</li> <li>(Range 3)</li> <li>1 - 10 Gb/s, increments of 1 Gbps</li> <li>(Range 4)</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" and it MUST have CBS ≥ 12176 Bytes</li> </ul>		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 3 Gbps, CBS $\geq$ 12176 Bytes, EIR = 0 and EBS = 0 is in force at the ENNI, the bandwidth profile is applied to all ingress ENNI Frames that are mapped to the given OVC EP and the amount of traffic delivered at the egress OVC EP is within +/- ( <i>F</i> <sub>CRS</sub> ) of the calculated amount of traffic accepted as Green at the ingress during a time interval <i>T</i> , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP8     OVC8     ENNI     Ethernet Traffic Generator Analyzer		
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point           18         OVC EP8           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0, S-VLAN ID equal to 888 and S-VLAN CoS equal to Green of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>88</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 18 and CE-VLAN CoS equal to 0 delivered at the egress OVC End Point (OVC EP<sub>8</sub> at UNI<sub>5</sub>). The amount of traffic delivered at the egress OVC EP<sub>8</sub> at UNI<sub>5</sub> must be within +/- (<i>F<sub>CBS</sub></i>) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP<sub>8</sub> at UNI<sub>5</sub></li> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 18, CE-VLAN CoS equal to 0, S-VLAN ID equal to 888 and S-VLAN CoS equal to Yellow of length λ using an input traffic pattern of repeated bursts and idle periods where each burst <i>B</i> is longer than necessary to empty the token bucket and each idle period <i>I</i> is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP<sub>88</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> <li>Tester 1 measures the number of single-tagged Service Frames with CE-VLAN ID 18 and CE-VLAN CoS equal to 0 delivered at the egress OVC End Point (OVC EP<sub>88</sub> at ENNI<sub>1</sub>) during a time interval <i>T</i></li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T, tolerance $F_{CBS}$ and bandwidth profile parameters CBS <sub>8</sub> , CBS <sub>88</sub>		
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of Service Frame traffic where the Service Frame consists of the first bit of the Destination MAC Address through the last bit of the Frame Check Sequence Note 2: Green and Yellow Color Identifiers defined in MEF 23.1 Table 4		

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## 12 Test Cases for Access EPL – Performance Attributes

Test Case 26.1: One-Way Frame Delay Performance From UNI To ENNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Frame Delay Performance From UNI To ENNI		
Test Definition ID	AEPL26_R4_R15_R16		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R16] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes FD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>d</sub> and Time Interval T parameters for FD defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified Service Frames associated with the a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Frame Delay Performance is less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet Traffic Generator Analyzer     Ethernet Traffic		
	Map at UNI <sub>2</sub> Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point		
Maps	1,2*4095         OVC EP2         222         OVC EP22           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1         OVC EP22		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27, of length λ at an average rate up to CIR<sub>2</sub>, using a test traffic profile which exercises both configured CIR<sub>2</sub> and CBS<sub>2</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the P-percentile of the Frame Delay for all frames successfully delivered between the External Interfaces (UNI<sub>2</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
	Cos Ease, 11, 614 and EA14 michael species, 564 fee 1 and english, and mice val 1 and shad what promo parameters CB52, CB522		
Results	Pass or fail		



#### Test Case 27.1: One-Way Frame Delay Performance From ENNI To UNI

	Abstract Test Suite for Ethernet	Access Services	
Test Name	One-Way Frame Delay Performance From ENNI to UNI		
Test Definition ID	AEPL27_R11_R15_R16		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 – 7}</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R16] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS. And, in an SLS that includes FD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>d</sub> and Time Interval T parameters for FD defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Delay Performance is less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC		
Test Configuration Schematic		PL Service r Test /C <sub>2</sub> Equipment Operating at the ENNI ENNI ENNI Ethernet Traffic Generator Analyzer	
End Point Maps	Map at UNI2           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2   Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untaconforms to MEF 26.1	Map at ENNI1           S-VLAN ID         OVC End Point           222         OVC EP22	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>22</sub>, using a test traffic profile which exercises both configured CIR<sub>22</sub> and CBS<sub>22</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>)</li> <li>One-Way Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> is then calculated for a time interval <i>T</i>, as the P-percentile of the Frame Delay for all frames successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>2</sub>)</li> <li>The One-Way Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length	I, time interval $T$ and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>	
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



## Test Case 28.1: One-Way Mean Frame Delay Performance From UNI To ENNI

	Abstract Test Suite for Etherne	t Access Services	
Test Name	One-Way Mean Frame Delay Performance From UNI To ENNI		
Test Definition ID	AEPL28_R4_R15_R17		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R17] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:         <ul> <li>MFD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Mean Frame Delay Performance is less than or equal to the One-Way Mean Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Ethernet Traffic Generator	EPL Service er Test	Tester 2 Ethernet Traffic Generator Analyzer
	Map at UNI <sub>2</sub> Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID OVC End Point	S-VLAN ID	OVC End Point
Maps	1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for un conforms to MEF 26.1	222 tagged and priority tagged frames is permitted provide	OVC EP <sub>22</sub> d that the configuration
	Ingress Bandwidth Profile per OVC EP at UNI <sub>2</sub> OVC End Point Parameters	Ingress Bandwidth Profile per OV OVC End Point Pa	/C EP at ENNI <sub>1</sub> rameters
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27, of length <i>λ</i> at an average rate up to CIR<sub>2</sub>, using a test traffic profile which exercises both configured CIR<sub>2</sub> and CBS<sub>2</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the arithmetic mean of Frame Delays for all frames successfully delivered between the External Interfaces (UNI<sub>2</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame leng	th $\lambda$ , time interval T and bandwidth profile parameters	meters CBS <sub>2</sub> , CBS <sub>22</sub>
Results	Pass or fail		
Results			

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## Test Case 29.1: One-Way Mean Frame Delay Performance From ENNI To UNI

	Abstract Test Suite for Ethernet	Access Services		
Test Name	One-Way Mean Frame Delay Performance From ENNI To UNI			
Test Definition ID	AEPL29_R11_R15_R17			
Test Type	Conformance			
Test Status	Mandatory			
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R17] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>MFD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5</li> </ul>			
Test Object	For the Access EPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Mean Frame Delay Performance is less than or equal to the One-Way Mean Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT			
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC I		E-VLAN ID values :	are mapped to the
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Equipment Operating at the UNI OVC EP <sub>2</sub> OVC EP <sub>2</sub>	PL Service r Test	Equipment perating at the ENNI OVC EP22	Tester 2 Ethernet Traffic Generator Analyzer
End Point	Map at UNI <sub>2</sub> CE-VLAN ID OVC End Point	S-VLAN	Map at ENNI <sub>1</sub> ID	OVC End Point
Maps	1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untag conforms to MEF 26.1	gged and priority tagged frames	is permitted provided th	OVC EP <sub>22</sub> at the configuration
	Ingress Bandwidth Profile per OVC EP at UNI <sub>2</sub> OVC End Point Parameters	Ingress Bandwidtl OVC End Point		EP at ENNI <sub>1</sub>
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\label{eq:overlap} \begin{array}{ c c } \hline OVC \ EP_{22} \\ \hline Note 1: \ CIR_{22} = 30 \ Mbps \\ Note 2: \ CBS_{22} \geq 12176 \ E \\ Note 3: \ EIR_{22}, \ EBS_{22}, \ an \\ Note 4: \ CM_{22} \ in \ color-aw \\ itted \ provided \ that \ the \ configuration \ configuration \ and \ configuration \ and \$	s Bytes d CF <sub>22</sub> equal to 0 vare mode	2 EBS <sub>22</sub> CF <sub>22</sub> CM <sub>22</sub>
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>22</sub>, using a test traffic profile which exercises both configured CIR<sub>22</sub> and CBS<sub>22</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>)</li> <li>One-Way Mean Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> is then calculated for a time interval <i>T</i>, as the arithmetic mean of Frame Delays for all frames successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>2</sub>)</li> <li>The One-Way Mean Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from ENNI<sub>1</sub> to the applicable CoS Label and PT</li> </ul>			
Units	Time units			
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ ,	, time interval T and bandw	idth profile paramete	rs CBS <sub>2</sub> , CBS <sub>22</sub>
Results	Pass or fail			

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## Test Case 30.1: One-Way Inter- Frame Delay Variation Performance From UNI To ENNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Inter-Frame Delay Variation Performance From UNI To ENNI		
Test Definition ID	AEPL30_R4_R15_R18		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R18] An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS.</li> <li>And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>IFDV Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>i</sub>, Pair Interval □ t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Inter-Frame Delay Variation Performance is less than or equal to the One-Way Inter-Frame Delay Variation Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet Traffic Generator Analyzer     Ethernet Traffic		
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27, of length <i>λ</i> at an average rate up to CIR<sub>2</sub>, using a test traffic profile which exercises both configured CIR<sub>2</sub> and CBS<sub>2</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames</li> <li>One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i> as the P-percentile of the absolute value of the difference between the Frame Delays of all Qualified Frame pairs whose difference in the arrival times of the first bit of each frame in the pair at the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) was exactly <i>Δt</i></li> <li>The One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
Results	Pass or fail		

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## Test Case 31.1: One-Way Inter- Frame Delay Variation Performance From ENNI To UNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Inter-Frame Delay Variation Performance From ENNI To UNI		
Test Definition ID	AEPL31_R11_R15_R18		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R18] An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS. And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>v</sub>, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Inter-Frame Delay Variation Performance is less than or equal to the One-Way Inter-Frame Delay Variation Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     ENNI     Ethernet Traffic Generator Analyzer		
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           1,2*4095         OVC EP2         222         OVC EP22		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>22</sub>, using a test traffic profile which exercises both configured CIR<sub>22</sub> and CBS<sub>22</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames</li> <li>One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> is then calculated for a time interval <i>T</i> as the P-percentile of the absolute value of the difference between the Frame Delays of all Qualified Frame pairs whose difference in the arrival times of the first bit of each frame in the pair at the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) was exactly Δt</li> <li>The One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way I</li></ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
	Pass or fail		
Results	Pass or fail		



#### Test Case 32.1: One-Way Frame Delay Range Performance From UNI To ENNI

	Abstract Test Suite for Ethernet	Access Services	
Test Name	One-Way Frame Delay Range Performance From UNI To ENNI		
Test Definition ID	AEPL32_R4_R15_R19		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	CoS Labels defined in MEF 23.1 Table 4 [R19] An SLS, that is based on a MEF CoS Label <b>MUST</b> include at le And, in an SLS that includes FDR Performance and is based on a MEI • FDR Performance Objective for the associated CoS Labe	indicate the same CoS Name and the CoS Label <b>MUST</b> be one of the east one of either FDR or IFDV Performance as part of the SLS. F CoS Label, the SLS <b>MUST</b> be specified per: I and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, T CPOs, or Table 9 for Global PT CPOs, where Table selection is	
Test Object	For the Access EPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Frame Delay Range Performance is less than or equal to the One-Way Frame Delay Range Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic		PL Service PL Service or Test VC <sub>2</sub> Equipment Operating at the ENNI OVC EP <sub>22</sub> Tester 2 Ethernet Traffic Generator Analyzer	
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27, of length λ at an average rate up to CIR<sub>2</sub>, using a test traffic profile which exercises both configured CIR<sub>2</sub> and CBS<sub>2</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P<sub>r</sub></i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (UNI<sub>2</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length	$\lambda$ , time interval <i>T</i> and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>	
	Pass or fail		
Results	Pass or fail		

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#### Test Case 33.1: One-Way Frame Delay Range Performance From ENNI To UNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Frame Delay Range Performance From ENNI To UNI		
Test Definition ID	AEPL33_R11_R15_R19		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R19] An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS. And, in an SLS that includes FDR Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FDR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>r</sub>, and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Delay Range Performance is less than or equal to the One-Way Frame Delay Range Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet Traffic Generator     Ethernet Traffic Generator		
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>22</sub>, using a test traffic profile which exercises both configured CIR<sub>22</sub> and CBS<sub>22</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>)</li> <li>One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P<sub>r</sub></i> and the minimum measured delay value, for all fravmes successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>2</sub>)</li> <li>The One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> have belay the or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> have belay the or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> have belay and the first of the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
Variables Results	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval <i>T</i> and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub> Pass or fail		

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## Test Case 34.1: One-Way Frame Loss Ratio Performance From UNI To ENNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Frame Loss Ratio Performance From UNI To ENNI		
Test Definition ID	AEPL34_R4_R15_R20		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R20] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>FLR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Frame Loss Ratio Performance is less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet Traffic Generator     Ethernet Traffic Generator		
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 12 and CE-VLAN CoS equal to 0,1,27, of length λ at an average rate up to CIR<sub>2</sub>, using a test traffic profile which exercises both configured CIR<sub>2</sub> and CBS<sub>2</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) and the number of ingress Qualified Frames and the number of unique (not duplicated) corresponding frames successfully delivered at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) are counted</li> <li>One-Way Frame Loss Ratio Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the ratio, expressed as a percentage, of the number of ingress Qualified Frames not delivered at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) divided by the total number of ingress Ratio Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Loss Ratio Performance from UNI<sub>2</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Loss Ratio</li> </ul>		
Units	Number of valid frames received at the ENNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
Results	Pass or fail		
Remarks			

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#### Test Case 35.1: One-Way Frame Loss Ratio Performance From ENNI To UNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Frame Loss Ratio Performance From ENNI To UNI		
Test Definition ID	AEPL35_R11_R15_R20		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R11] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 – 7}</li> <li>[R15] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R20] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per:         <ul> <li>FLR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Loss Ratio Performance is less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP2     OVC2     Ethernet OVC EP2     Ethernet Traffic Generator Analyzer		
End Point Maps	Map at UNI2         Map at ENNI1           CE-VLAN ID         OVC End Point           1,2*4095         OVC EP2           Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 12, CE-VLAN CoS equal to 2, S-VLAN ID equal to 222 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>22</sub>, using a test traffic profile which exercises both configured CIR<sub>22</sub> and CBS<sub>22</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) and the number of ingress Qualified Frames and the number of unique (not duplicated) corresponding frames successfully delivered at the egress OVC End Point (OVC EP<sub>22</sub> at ENNI<sub>1</sub>) are counted</li> <li>One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> is then calculated for a time interval <i>T</i>, as the ratio, expressed as a percentage, of the number of ingress Qualified Frames not delivered at the egress OVC End Point (OVC EP<sub>2</sub> at UNI<sub>2</sub>) divided by the total number of ingress Qualified Frames that should have been delivered</li> <li>The One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>2</sub> must be less than or equal to the One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to the applicable CoS Label and PT</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>2</sub> , CBS <sub>22</sub>		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		

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## 13 Test Cases for Access EVPL – Performance Attributes

Test Case 26.2: One-Way Frame Delay Performance From UNI To ENNI

	Abstract Test Suite for Ethernet Access Services	
Test Name	One-Way Frame Delay Performance From UNI To ENNI	
Test Definition ID	AEVPL26_R26_R37_R38	
Test Type	Conformance	
Test Status	Mandatory	
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R38] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS. And, in an SLS that includes FD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile Pd and Time Interval T parameters for FD defined in MEF 23.1 Table 5</li> </ul>	
Test Object	For the Access EVPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Frame Delay Performance is less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Equipment Operating at the UNI     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     UNIs     OVC EP     OVC C     Ethernet Traffic Generator Analyzer     Ethernet Traffic	
	Map at UNI <sub>3</sub> Map at ENNI <sub>1</sub>	
End Point Maps	CE-VLAN ID         OVC End Point         S-VLAN ID         OVC End Point           16         OVC EP6         666         OVC EP66	
101up5	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27, of length λ at an average rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both configured CIR<sub>6</sub> and CBS<sub>6</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the P-percentile of the Frame Delay for all frames successfully delivered between the External Interfaces (UNI<sub>5</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>	
Units	Time units	
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>	
Results	Pass or fail	
Remarks		

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#### Test Case 27.2: One-Way Frame Delay Performance From ENNI To UNI

	Abstract Test Suite for Ethernet	Access Services	
Test Name	One-Way Frame Delay Performance From ENNI to UNI		
Test Definition ID	AEVPL27_R33_R37_R38		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames <b>MUST</b> be the OVC End Point to which the ENNI Frame is mapped; that OVC <b>MUST</b> have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI <b>MUST</b> indicate the same CoS Name and the CoS Label <b>MUST</b> be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R38] An SLS, that is based on a MEF CoS Label <b>MUST</b> include at least one of either MFD or FD Performance as part of the SLS. And, in an SLS that includes FD Performance and is based on a MEF CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>d</sub> and Time Interval T parameters for FD defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Delay Performance is less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic		PL Service r Test /C_6 Equipment Operating at the ENNI ENNI ENNI ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer	
End Point Maps	Map at UNI5           CE-VLAN ID         OVC End Point           16         OVC EP6           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UN	Map at ENNI1         S-VLAN ID       OVC End Point         666       OVC EP <sub>66</sub> I is permitted provided that the configuration conforms to MEF 26.1	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>66</sub>, using a test traffic profile which exercises both configured CIR<sub>66</sub> and CBS<sub>66</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>)</li> <li>One-Way Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> is then calculated for a time interval <i>T</i>, as the P-percentile of the Frame Delay for all frames successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>5</sub>)</li> <li>The One-Way Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length	, time interval $T$ and bandwidth profile parameters $CBS_6$ , $CBS_{66}$	
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		

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#### Test Case 28.2: One-Way Mean Frame Delay Performance From UNI To ENNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Mean Frame Delay Performance From UNI To ENNI		
Test Definition ID	AEVPL28_R26_R37_R39		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R39] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS. And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>MFD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Mean Frame Delay Performance is less than or equal to the One-Way Mean Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating at the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP_6     OVC C     Ethernet Traffic Generator Analyzer     Ethernet Traffic		
End Point Maps	Map at UNI5       Map at ENNI1         CE-VLAN ID       OVC End Point         16       OVC EP6         Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27, of length <i>\u03c4</i> at an average rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both configured CIR<sub>6</sub> and CBS<sub>6</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>6</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> in the calculated for a time interval <i>T</i>, as the arithmetic mean of Frame Delay for all frames successfully delivered between the External Interfaces (UNI<sub>5</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> the order of th</li></ul>		
Units	Time units		
Waniahlaa	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub> Pass or fail		

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#### Test Case 29.2: One-Way Mean Frame Delay Performance From ENNI To UNI

	Abstract Test Suite for Etherne	t Access Services	
Test Name	One-Way Mean Frame Delay Performance From ENNI To UNI		
Test Definition ID	AEVPL29_R33_R37_R39		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an El MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R39] An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS. And, in an SLS that includes MFD Performance and is based on a MEF CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified UNI during a time interval <i>T</i> , the One-Way Mean Frame Delay Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, or Table 9 for Global PT CPOs, where the table selection is defined as the table selection of the selection of the table selection is defined as the table selection of the table selection is defined as the table	CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OV		
Test Configuration Schematic	Ethernet Traffic Generator	VPL Service er Test VVC <sub>6</sub> Equipment Operating at the ENNI OVC EP <sub>60</sub> Tester 2 Ethernet Traffic Generator Analyzer	
	Mon of UNI		
End Point	Map at UNI5           CE-VLAN ID         OVC End Point	Map at ENNI <sub>1</sub> S-VLAN ID OVC End Point	
Maps	16         OVC EP6           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U	666         OVC EP <sub>66</sub> NI is permitted provided that the configuration conforms to MEF 26.1	
	Ingress Bandwidth Profile per OVC EP at UNI <sub>5</sub> OVC End Point Parameters	Ingress Bandwidth Profile per OVC EP at ENNI <sub>1</sub> OVC End Point Parameters	
	OVC End Point         Parameters           OVC EP <sub>6</sub> CIR <sub>6</sub> CBS <sub>6</sub> EIR <sub>6</sub> EBS <sub>6</sub> CF <sub>6</sub> CM <sub>6</sub>	OVC End Point         Parameters           OVC EP <sub>66</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub>	
Bandwidth Profile	Note 1: $CIR_6 = 30$ Mbps Note 2: $CBS_6 \ge 12176$ Bytes Note 3: $EIR_6$ , $EBS_6$ , and $CF_6$ equal to 0 Note 4: $CM_6$ in color-blind mode	Note 1: $CIR_{66} = 30$ Mbps Note 2: $CBS_{66} \ge 12176$ Bytes Note 3: $EIR_{66}$ , $EBS_{66}$ , and $CF_{66}$ equal to 0 Note 4: $CM_{66}$ in color-aware mode	
	Note: Use of other bandwidth profile parameter values at the UNI & ENNI is pe	rmitted provided that the configuration conforms to MEF 26.1	
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>66</sub>, using a test traffic profile which exercises both configured CIR<sub>66</sub> and CBS<sub>66</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>)</li> <li>One-Way Mean Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> is then calculated for a time interval <i>T</i>, as the arithmetic mean of Frame Delays for all frames successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>5</sub>)</li> <li>The One-Way Mean Frame Delay Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Mean Frame Delay Performance from the amplicable CoS Label and PT</li> </ul>		
	Performance Objective specified in MEF 23.1 for the applicable C	CoS Label and PT	
Units		CoS Label and PT	
Units Variables	Performance Objective specified in MEF 23.1 for the applicable C		
	Performance Objective specified in MEF 23.1 for the applicable C Time units		



#### Test Case 30.2: One-Way Inter- Frame Delay Variation Performance From UNI To ENNI

Abstract Test Suite for Ethernet Access Services			
Test Name	One-Way Inter-Frame Delay Variation Performance From UNI To ENNI		
Test Definition ID	AEVPL30_R26_R37_R40		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R40] An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS. And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>IFDV Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>r</sub>, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Inter-Frame Delay Variation Performance is less than or equal to the One-Way Inter-Frame Delay Variation Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNIs     Equipment Operating at the UNI     Tester 2       Ethernet Traffic Generator Analyzer     UNIs     OVC EP       OVC EP     OVC6		
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point           16         OVC EP6           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27, of length <i>λ</i> at an average rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both configured CIR<sub>6</sub> and CBS<sub>6</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames</li> <li>One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i> as the P-percentile of the absolute value of the difference between the Frame Delays of all Qualified Frame pairs whose difference in the arrival times of the first bit of each frame in the pair at the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) was exactly <i>Δt</i></li> <li>The One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> nust be less than or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> use Less than or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than Or equal to the One-Way Inter-Frame Delay Variation Performance Parcentile I in the part of the applicable CoS Label and PT</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length $\lambda$ , time interval T bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	1		

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#### Test Case 31.2: One-Way Inter- Frame Delay Variation Performance From ENNI To UNI

Abstract Test Suite for Ethernet Access Services			
Test Name	One-Way Inter-Frame Delay Variation Performance From ENNI To UNI		
Test Definition ID	AEVPL31_R33_R37_R40		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an El MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R40] An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS. And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>IFDV Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>v</sub>, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul> </li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Inter-Frame Delay Variation Performance is less than or equal to the One-Way Inter-Frame Delay Variation Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP,6 OVC 6 OVC 6 Constant		
End Point Maps	Map at UNI5         Map at ENNI1           CE-VLAN ID         OVC End Point           16         OVC EP6           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>66</sub>, using a test traffic profile which exercises both configured CIR<sub>66</sub> and CBS<sub>66</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames</li> <li>One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> is then calculated for a time interval <i>T</i> as the P-percentile of the absolute value of the difference between the Frame Delays of all Qualified Frame pairs whose difference in the arrival times of the first bit of each frame in the pair at the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Inter-Frame Delay Variation Performance Dipertue value of the applicable CoS Label and PT&lt;</li></ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



#### Test Case 32.2: One-Way Frame Delay Range Performance From UNI To ENNI

	Abstract Test Suite for Ethernet	Access Services	
Test Name	One-Way Frame Delay Range Performance From UNI To ENNI		
Test Definition ID	AEVPL32_R26_R37_R41		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R26] The CoS Identifier for Service Frames MUST be the OVC End single CoS Name</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI MUST CoS Labels defined in MEF 23.1 Table 4</li> <li>[R41] An SLS, that is based on a MEF CoS Label MUST include at 1 And, in an SLS that includes FDR Performance and is based on a ME</li> <li>FDR Performance Objective for the associated CoS Labe Table 7 for Regional PT CPOs, Table 8 for Continental F dependent on the PT selected</li> <li>Specified Percentile P<sub>r</sub>, and Time Interval T parameters for the second secon</li></ul>	T indicate the same CoS Name east one of either FDR or IFI F CoS Label, the SLS <b>MUS</b> el and OVC Type defined in 1 PT CPOs, or Table 9 for Glob	are and the CoS Label <b>MUST</b> be one of the DV Performance as part of the SLS. <b>T</b> be specified per: MEF 23.1 Table 6 for Metro PT CPOs, and PT CPOs, where Table selection is
Test Object	For the Access EVPL Service under test, verify that for all Qualified Service Frames associated with a particular CoS Label, that arrive at the ENNI during a time interval <i>T</i> , the One-Way Frame Delay Range Performance is less than or equal to the One-Way Frame Delay Range Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic		/PL Service er Test	Equipment aperating at the ENNI ENNI ENNI ENNI ENNI Ethernet Traffic Generator Analyzer
End Point Maps	Map at UNI5           CE-VLAN ID         OVC End Point           16         OVC EP6   Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI at the UNI and of other CE-VLAN ID at the UNI at the	S-VLAN 666	OVC EP <sub>66</sub>
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27, of length <i>λ</i> at an average rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both configured CIR<sub>6</sub> and CBS<sub>6</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>6</sub> at ENNI<sub>1</sub>)</li> <li>One-Way Frame Delay Range Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P<sub>r</sub></i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (UNI<sub>5</sub> to ENNI<sub>1</sub>)</li> <li>The One-Way Frame Delay Range Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> must be less than or equal to the One-Way Frame Delay Range</li> </ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length	h $\lambda$ , time interval T and band	width profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>
	Pass or fail		
Results Remarks	Pass of fail		

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#### Test Case 33.2: One-Way Frame Delay Range Performance From ENNI To UNI

	Abstract Test Suite for Ethernet Access Services		
Test Name	One-Way Frame Delay Range Performance From ENNI To UNI		
Test Definition ID	AEVPL33_R33_R37_R41		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames <b>MUST</b> be the OVC End Point to which the ENNI Frame is mapped; that OVC <b>MUST</b> have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI <b>MUST</b> indicate the same CoS Name and the CoS Label <b>MUST</b> be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R41] An SLS, that is based on a MEF CoS Label <b>MUST</b> include at least one of either FDR or IFDV Performance as part of the SLS. And, in an SLS that includes FDR Performance and is based on a MEF CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile <i>P<sub>r</sub></i>, and Time Interval <i>T</i> parameters for FDR idefined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Delay Range Performance is less than or equal to the One-Way Frame Delay Range Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Equipment Operating at the UNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP 6     OVC 6		
End Point Maps	Map at UNI5       Map at ENNI1         CE-VLAN ID       OVC End Point         16       OVC EP6         Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green, of length λ at an average rate up to CIR<sub>66</sub>, using a test traffic profile which exercises both configured CIR<sub>66</sub> and CBS<sub>66</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) and Frame Delay is measured as the time elapsed from the reception of the first bit of the ingress frame declared Green until the transmission of the last bit of the corresponding frame at the egress OVC End Point (OVC EP<sub>66</sub> at UNI<sub>5</sub>)</li> <li>One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P<sub>r</sub></i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (ENNI<sub>1</sub> to UNI<sub>5</sub>)</li> <li>The One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Delay Range Performance Delay Cange Performance Parame Delay C</li></ul>		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		

#### Test Case 34.2: One-Way Frame Loss Ratio Performance From UNI To ENNI

	Abstract Test Suite for Ethernet	Access Services	
Test Name	One-Way Frame Loss Ratio Performance From UNI To ENNI		
Test Definition ID	AEVPL34_R26_R37_R42		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description		ndicate the same CoS Name and the CoS Label <b>MUST</b> be one of the <sup>7</sup> CoS Label, the SLS <b>MUST</b> be specified per: and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, or Table 9 for Global PT CPOs, where Table selection is	
Test Object	For the Access EVPL Service under test, verify that for all Qualified Se the ENNI during a time interval <i>T</i> , the One-Way Frame Loss Ratio Per Performance Objective specified in MEF 23.1 Table 6 for Metro PT CF CPOs, or Table 9 for Global PT CPOs, where the table selection is dep	formance is less than or equal to the One-Way Frame Loss Ratio POs, Table 7 for Regional PT CPOs, Table 8 for Continental PT	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the the UNI and a specific S-VLAN ID is mapped to the OVC EP at the EN		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	r Test	
	Map at UNI <sub>5</sub> Map at ENNI <sub>1</sub>		
End Point	CE-VLAN ID OVC End Point	S-VLAN ID OVC End Point	
Maps	16         OVC EP6           Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI	666         OVC EP <sub>66</sub> is permitted provided that the configuration conforms to MEF 26.1	
Bandwidth	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Ingress Bandwidth Profile per OVC EP at ENNI1           OVC End Point         Parameters           OVC EP <sub>66</sub> CIR <sub>66</sub> CBS <sub>66</sub> EIR <sub>66</sub> EBS <sub>66</sub> CF <sub>66</sub> CM <sub>66</sub> Note 1: CIR <sub>66</sub> = 30 Mbps	
Profile	Note 2: $CBS_6 \ge 12176$ Bytes       Note 2: $CBS_{66} \ge 12176$ Bytes         Note 3: $EIR_6$ , $EBS_6$ , and $CF_6$ equal to 0       Note 3: $EIR_{66}$ , $EBS_{66}$ , and $CF_{66}$ equal to 0         Note 4: $CM_6$ in color-blind mode       Note 4: $CM_{66}$ in color-aware mode         Note: Use of other bandwidth profile parameter values at the UNI & ENNI is permitted provided that the configuration conforms to MEF 26.1		
Test Procedure	<ul> <li>Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal trate up to CIR<sub>6</sub>, using a test traffic profile which exercises both conf Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and, the number of ingress Qualified Framsuccessfully delivered at the egress OVC End Point (OVC EP<sub>66</sub> at E</li> <li>One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is the percentage, of the number of ingress Qualified Frames not delivered total number of ingress Qualified Frames that should have been deli</li> <li>The One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub></li> </ul>	igured CIR <sub>6</sub> and CBS <sub>6</sub> at the same time, to the ingress OVC End tes and the number of unique (not duplicated) corresponding frames NNI <sub>1</sub> ) are counted en calculated for a time interval $T$ , as the ratio, expressed as a at the egress OVC End Point (OVC EP <sub>66</sub> at ENNI <sub>1</sub> ) divided by the vered must be less than or equal to the One-Way Frame Loss Ratio	
	<ul> <li>rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both conf Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and, the number of ingress Qualified Fran successfully delivered at the egress OVC End Point (OVC EP<sub>66</sub> at E</li> <li>One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is th percentage, of the number of ingress Qualified Frames not delivered total number of ingress Qualified Frames that should have been deli</li> <li>The One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub></li> </ul>	igured CIR <sub>6</sub> and CBS <sub>6</sub> at the same time, to the ingress OVC End tes and the number of unique (not duplicated) corresponding frames NNI <sub>1</sub> ) are counted en calculated for a time interval $T$ , as the ratio, expressed as a at the egress OVC End Point (OVC EP <sub>66</sub> at ENNI <sub>1</sub> ) divided by the vered must be less than or equal to the One-Way Frame Loss Ratio	
Procedure	<ul> <li>rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both conf Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and, the number of ingress Qualified Fram successfully delivered at the egress OVC End Point (OVC EP<sub>66</sub> at E</li> <li>One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is the percentage, of the number of ingress Qualified Frames not delivered total number of ingress Qualified Frames that should have been deli</li> <li>The One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> Performance Objective specified in MEF 23.1 for the applicable Complexity of the specified in MEF 23.1 for the applicable Complexity of the specified in MEF 23.1 for the applicable Complexity of the specified in MEF 23.1 for the applicable Complexity of the specified in MEF 23.1 for the specified Provide the specified in MEF 23.1 for the specified Provide the specified pr</li></ul>	igured CIR <sub>6</sub> and CBS <sub>6</sub> at the same time, to the ingress OVC End test and the number of unique (not duplicated) corresponding frames NNI <sub>1</sub> ) are counted en calculated for a time interval <i>T</i> , as the ratio, expressed as a at the egress OVC End Point (OVC EP <sub>66</sub> at ENNI <sub>1</sub> ) divided by the vered must be less than or equal to the One-Way Frame Loss Ratio S Label and PT	
Procedure Units	<ul> <li>rate up to CIR<sub>6</sub>, using a test traffic profile which exercises both conf Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) and, the number of ingress Qualified Fram successfully delivered at the egress OVC End Point (OVC EP<sub>6</sub> at E</li> <li>One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub> is the percentage, of the number of ingress Qualified Frames not delivered total number of ingress Qualified Frames that should have been deli</li> <li>The One-Way Frame Loss Ratio Performance from UNI<sub>5</sub> to ENNI<sub>1</sub></li> <li>Performance Objective specified in MEF 23.1 for the applicable Configuration of valid frames received at the ENNI</li> </ul>	igured CIR <sub>6</sub> and CBS <sub>6</sub> at the same time, to the ingress OVC End test and the number of unique (not duplicated) corresponding frames NNI <sub>1</sub> ) are counted en calculated for a time interval <i>T</i> , as the ratio, expressed as a at the egress OVC End Point (OVC EP <sub>66</sub> at ENNI <sub>1</sub> ) divided by the vered must be less than or equal to the One-Way Frame Loss Ratio S Label and PT	

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#### Test Case 35.2: One-Way Frame Loss Ratio Performance From ENNI To UNI

Abstract Test Suite for Ethernet Access Services			
Test Name	One-Way Frame Loss Ratio Performance From ENNI To UNI		
Test Definition ID	AEVPL35_R33_R37_R42		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	<ul> <li>[R33] The CoS Identifier for ENNI Frames MUST be the OVC End Point to which the ENNI Frame is mapped; that OVC MUST have a single CoS Name which is associated with the entire set of S-Tag PCP values {0 - 7}</li> <li>[R37] The CoS ID for each frame in a CoS Frame Set at an EI MUST indicate the same CoS Name and the CoS Label MUST be one of the CoS Labels defined in MEF 23.1 Table 4</li> <li>[R42] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FLR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5</li> </ul>		
Test Object	For the Access EVPL Service under test, verify that for all Qualified ENNI Frames associated with a particular CoS Label, that arrive at the UNI during a time interval <i>T</i> , the One-Way Frame Loss Ratio Performance is less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where the table selection is dependent on the applicable PT		
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. All CE-VLAN ID values are mapped to the OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI		
Test Configuration Schematic	Tester 1     Equipment Operating at the UNI     Access EVPL Service Under Test     Equipment Operating of the ENNI     Tester 2       Ethernet Traffic Generator Analyzer     OVC EP <sub>6</sub> OVC CP <sub>6</sub> Ethernet Traffic Generator Analyzer     Tester 2		
End Point Maps	Map at UNI2       Map at ENNI1         CE-VLAN ID       OVC End Point         16       OVC EP2         666       OVC EP2         Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Test Procedure	<ul> <li>Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 6, S-VLAN ID equal to 666 and S-VLAN CoS equal to Green, of length <i>λ</i> at an average rate up to CIR<sub>66</sub>, using a test traffic profile which exercises both configured CIR<sub>66</sub> and CBS<sub>66</sub> at the same time, to the ingress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) and, the number of ingress Qualified Frames and the number of unique (not duplicated) corresponding frames successfully delivered at the egress OVC End Point (OVC EP<sub>66</sub> at ENNI<sub>1</sub>) are counted</li> <li>One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> is then calculated for a time interval <i>T</i>, as the ratio, expressed as a percentage, of the number of ingress Qualified Frames not delivered at the egress OVC End Point (OVC EP<sub>6</sub> at UNI<sub>5</sub>) divided by the total number of ingress Qualified Frames that should have been delivered</li> <li>The One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Loss Ratio Performance from ENNI<sub>1</sub> to UNI<sub>5</sub> must be less than or equal to the One-Way Frame Loss Ratio</li> </ul>		
Units	Number of valid frames received at the UNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length $\lambda$ , time interval T and bandwidth profile parameters CBS <sub>6</sub> , CBS <sub>66</sub>		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		

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## Annex A.1

# Requirements for Access EPL

# Requirements for Operator Service Attributes

Requirement Number	Requirement Description for UNI Service Attributes	Reference
1	The CE-VLAN ID for untagged and priority tagged Frames <b>MUST</b> be a value from $1 - 4094$	Ethernet Access Services Definition Table 4
2	The maximum number of OVCs per UNI <b>MUST</b> be 1	Ethernet Access Services Definition Table 4

Requirement Number	Requirements for OVC per UNI Service Attributes	Reference
3	The OVC EP Map <b>MUST</b> contain all CE-VLAN ID values {1, 2,4095} mapped to a single OVC End Point	Ethernet Access Services Definition Table 5
4	The CoS Identifier for Service Frames <b>MUST</b> be the OVC End Point; that OVC <b>MUST</b> have a single CoS Name	Ethernet Access Services Definition Table 5
5	Ingress Bandwidth Profile per OVC EP at a UNI is required and <b>MUST</b> allow configuration to support CIR values* up to 70% of the UNI speed in the following increments: • $1 - 10$ Mb/s, increments of 1 Mbps • $10 - 100$ Mb/s, increments of 10 Mbps • $10 - 1000$ Mb/s, increments of 100 Mbps • $1 - 10$ Gb/s, increments of 1 Gbps It <b>MUST</b> allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" It <b>MUST</b> have CBS $\geq 12176$ Bytes It <b>MUST</b> NOT be combined with any other type of ingress bandwidth profile When the ingress Bandwidth Profile of the OVC End Point at the UNI has CIR > 0 and EIR = 0, each egress ENNI Frame <b>MUST</b> be marked Green via the S-Tag as per [MEF 23]. * MEF Bandwidth Profile traffic parameters such as CIR count only Service Frame bits, not interframe gap or preamble bits. Setting CIR above 76% of the physical layer speed of the EI has consequences, which are discussed in more detail in Ethernet Services Definitions Appendix A.	Ethernet Access Services Definition Table 5



Requirement Number	Requirements for OVC Service Attributes	Reference
6	The OVC Maximum Transmission Unit Size <b>MUST</b> be an integer number of bytes $\ge 1526$	Ethernet Access Services Definition Table 6
7	CE-VLAN ID Preservation <b>MUST</b> be Yes	Ethernet Access Services Definition Table 6
8	CE-VLAN CoS ID Value Preservation MUST be Yes	Ethernet Access Services Definition Table 6
9	Color Forwarding <b>SHOULD</b> be yes. When Ingress BWP at UNI has $EIR = 0$ frames egressing at ENNI <b>MUST</b> be marked green via the S-Tag as per MEF 23.1.	Ethernet Access Services Definition Tables 5 & 6
10	Unicast, multicast and broadcast frame delivery MUST be unconditional	Ethernet Access Services Definition Table 6

Requirement Number	Requirements for OVC EP per ENNI Service Attributes	Reference
11	The CoS Identifier for ENNI Frames <b>MUST</b> be the OVC End Point to which the ENNI Frame is mapped; that OVC <b>MUST</b> have a single CoS Name which is associated with the entire set of S-Tag PCP values $\{0-7\}$	Ethernet Access Services Definition Table 7
12	<ul> <li>Ingress Bandwidth Profile per OVC EP at an ENNI** is required and MUST allow configuration to support CIR values* up to 70% of the ENNI speed, in the following increments: <ul> <li>1 – 10 Mb/s, increments of 1 Mbps</li> <li>10 – 100 Mb/s, increments of 10 Mbps</li> <li>100 – 1000 Mb/s, increments of 100 Mbps</li> <li>1 – 10 Gb/s, increments of 1 Gbps</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware"</li> <li>It MUST have CBS ≥ 12176 bytes</li> <li>It MUST NOT be combined with any other type of ingress bandwidth profile</li> <li>MEF Bandwidth Profile traffic parameters such as CIR count only Service Frame bits, not interframe gap or preamble bits. Setting CIR above 76% of the physical layer speed of the EI has consequences, which are discussed in more detail in Ethernet Services Definitions Appendix A.</li> <li>**The ingress CIR for an OVC at the ENNI should be greater than the corresponding ingress CIR at the UNI due to the presence of the added SVLAN tag (4 bytes) at the ENNI. As an example, if the average frame size was 200 bytes, the CIR should be increased by 2%.</li> </ul>	Ethernet Access Services Definition Table 7

Requirement Number	Requirements for ENNI Service Attributes	Reference
13	Each S-VLAN ID value associated with an instance of Access EPL Service <b>MUST</b> map to a distinct End Point, of Type = "OVC"	Ethernet Access Services Definition Table 8

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## Requirements for Service OAM Frames Handling

Requirement Number	Requirement for Service OAM	Reference
14	The Access EPL Service <b>MUST</b> be configurable to tunnel all SOAM frames at the default <b>Test</b> and <b>Subscriber</b> MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1.	Ethernet Access Services Definition [R13]

# Requirement for CoS Labels and Performance Attributes

Requirement Number	Requirements for Cos Labels	Reference
15	The CoS ID for each frame in a CoS Frame Set at an EI <b>MUST</b> indicate the same CoS Name and the CoS Label <b>MUST</b> be one of the CoS Labels defined in MEF 23.1 Table 4	Carrier Ethernet Class of Service Phase 2 [R1]





Requirement Number	Requirements for Performance Attributes	Reference
16	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes FD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>FD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>d</sub> and Time Interval T parameters for FD defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R18], [R19]
17	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>MFD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval <i>T</i> parameter for MFD defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R18], [R20]
18	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS.</li> <li>And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>IFDV Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>v</sub>, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R21], [R22]
19	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS.</li> <li>And, in an SLS that includes FDR Performance and is based on a MEF CoS Label, the SLS MUST be specified per:         <ul> <li>FDR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile <i>P<sub>r</sub></i>, and Time Interval <i>T</i> parameters for FDR idefined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R21], [R23]
20	<ul> <li>In an SLS that is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FLR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval <i>T</i> parameter for FLR defined in MEF 23.1 Table 5</li> </ul>	Carrier Ethernet Class of Service Phase 2 [R24]



# Annex A.2

# Requirements for Access EVPL

# Requirements for Operator Service Attributes

Requirement Number	Requirements Description for UNI Service Attributes	Reference
21	The CE-VLAN ID for untagged and priority tagged frames <b>MUST</b> be specified if untagged / priority tagged frames are to be supported, and that CE-VLAN ID <b>MUST</b> be included in the OVC End point Map	Ethernet Access Services Definition Table 9
22	The Maximum number of OVCs per UNI <b>MUST</b> be $\geq 1$	Ethernet Access Services Definition Table 9
23	Maximum number of CE-VLAN IDs per OVC: The end point Map <b>MUST</b> support a value = 1	Ethernet Access Services Definition Table 9
24	Maximum number of CE-VLAN IDs per OVC: The end point Map <b>SHOULD</b> support a value > 1	Ethernet Access Services Definition Table 9

Requirement Number	Requirements for OVC per UNI Service Attributes	Reference
25	The OVC EP Map <b>MUST</b> specify mapping table of CE-VLAN ID to OVC End Point. It <b>MUST NOT</b> contain all CE-VLAN ID values mapped to a single OVC End Point. (This configuration is reserved for the Access EPL Service)	Ethernet Access Services Definition Table 10
26	The CoS Identifier for Service Frames <b>MUST</b> be the OVC End Point to which the Service Frame is mapped; that OVC <b>MUST</b> have a single CoS Name	Ethernet Access Services Definition Table 10
27	Ingress Bandwidth Profile per OVC EP at a UNI is required and <b>MUST</b> allow configuration to support CIR values* up to 70% of the UNI speed in the following increments: • 1 – 10 Mb/s, increments of 1 Mbps • 10 – 100 Mb/s, increments of 10 Mbps • 100 – 1000 Mb/s, increments of 100 Mbps • 1 – 10 Gb/s, increments of 1 Gbps It <b>MUST</b> allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" It <b>MUST</b> have CBS ≥ 12176 Bytes It <b>MUST</b> NOT be combined with any other type of ingress bandwidth profile When the ingress Bandwidth Profile of the OVC End Point at the UNI has CIR > 0 and EIR = 0, each egress ENNI Frame <b>MUST</b> be marked Green via the S- Tag as per [MEF 23]. * MEF Bandwidth Profile traffic parameters such as CIR count only Service Frame bits, not interframe gap or preamble bits. Setting CIR above 76% of the physical layer speed of the EI has consequences, which are discussed in more detail in Ethernet Services Definitions Appendix A.	Ethernet Access Services Definition Table 10

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Requirement Number	Requirements for OVC Service Attributes	Reference
28	The OVC Maximum Transmission Unit Size <b>MUST</b> be an integer number of bytes $\geq 1526$	Ethernet Access Services Definition Table 11
29	CE-VLAN ID Preservation MUST be Yes	Ethernet Access Services Definition Table 11
30	CE-VLAN CoS ID Value Preservation MUST be Yes	Ethernet Access Services Definition Table 11
31	Color Forwarding <b>SHOULD</b> be yes. When Ingress BWP at UNI has $EIR = 0$ frames egressing at ENNI <b>MUST</b> be marked green via the S-Tag as per MEF 23.1	Ethernet Access Services Definition Table 11
32	Deliver Unconditionally or Deliver Conditionally. If Delivered Conditionally, <b>MUST</b> specify the delivery criteria.	Ethernet Access Services Definition Table 11

Requirement Number	Requirements for OVC EP per ENNI Service Attributes	Reference
33	The CoS Identifier for ENNI Frames <b>MUST</b> be the OVC End Point to which the ENNI Frame is mapped; that OVC <b>MUST</b> have a single CoS Name which is associated with the entire set of S-Tag PCP values $\{0 - 7\}$	Ethernet Access Services Definition Table 12
34	<ul> <li>Ingress Bandwidth Profile per OVC EP at an ENNI** is required and MUST allow configuration to support CIR values* up to 70% of the ENNI speed, in the following increments: <ul> <li>1 – 10 Mb/s, increments of 1 Mbps</li> <li>10 – 100 Mb/s, increments of 10 Mbps</li> <li>100 – 1000 Mb/s, increments of 100 Mbps</li> <li>1 – 10 Gb/s, increments of 1 Gbps</li> </ul> </li> <li>It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware"</li> <li>It MUST have CBS ≥ 12176 Bytes</li> <li>It MUST have CBS ≥ 12176 Bytes</li> <li>It MUST NOT be combined with any other type of ingress bandwidth profile</li> <li>MEF Bandwidth Profile traffic parameters such as CIR count only Service Frame bits, not interframe gap or preamble bits. Setting CIR above 76% of the physical layer speed of the EI has consequences, which are discussed in more detail in Ethernet Services Definitions Appendix A.</li> <li>** The ingress CIR for an OVC at the ENNI should be greater than the corresponding ingress CIR at the UNI due to the presence of the added SVLAN tag (4 bytes) at the ENNI. As an example, if the average frame size was 200 bytes, the CIR should be increased by 2%.</li> </ul>	Ethernet Access Services Definition Table 12

Requirement Number	Requirements for ENNI Service Attributes	Reference
35	Each S-VLAN ID value associated with an instance of Access EVPL Service <b>MUST</b> map to a distinct End Point, of Type = "OVC"	Ethernet Access Services Definition Table 13

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## Requirements for Service OAM Frames Handling

Requirement Number	Requirement for Service OAM	Reference
36	The Access EVPL Service <b>MUST</b> be configurable to tunnel all SOAM frames at the default <b>Test</b> and <b>Subscriber</b> MEG levels as defined in the SOAM FM IA (MEF 30) document, section 7.1	Ethernet Access Services Definition [R13]

### Requirement for CoS Labels and Performance Attributes

irement Imber	Requirements for Cos Labels	Reference
37	The CoS ID for each frame in a CoS Frame Set at an EI <b>MUST</b> indicate the same CoS Name and the CoS Label <b>MUST</b> be one of the CoS Labels defined in MEF 23.1 Table 4	Carrier Ethernet Class of Service Phase 2 [R1]

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Requirement Number	Requirements for Performance Attributes	Reference
38	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes FD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>FD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile <i>P<sub>d</sub></i> and Time Interval <i>T</i> parameters for FD defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R18], [R19]
39	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either MFD or FD Performance as part of the SLS.</li> <li>And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>MFD Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval <i>T</i> parameter for MFD defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R18], [R20]
40	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS.</li> <li>And, in an SLS that includes IFDV Performance and is based on a MEF CoS Label, the SLS MUST be specified per: <ul> <li>IFDV Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>v</sub>, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R21], [R22]
41	<ul> <li>An SLS, that is based on a MEF CoS Label MUST include at least one of either FDR or IFDV Performance as part of the SLS.</li> <li>And, in an SLS that includes FDR Performance and is based on a MEF CoS Label, the SLS MUST be specified per:         <ul> <li>FDR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Percentile P<sub>r</sub>, and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5</li> </ul> </li> </ul>	Carrier Ethernet Class of Service Phase 2 [R21], [R23]
42	<ul> <li>In an SLS that is based on a MEF CoS Label, the SLS MUST be specified per:</li> <li>FLR Performance Objective for the associated CoS Label and OVC Type defined in MEF 23.1 Table 6 for Metro PT CPOs, Table 7 for Regional PT CPOs, Table 8 for Continental PT CPOs, or Table 9 for Global PT CPOs, where Table selection is dependent on the PT selected</li> <li>Specified Time Interval <i>T</i> parameter for FLR defined in MEF 23.1 Table 5</li> </ul>	Carrier Ethernet Clas of Service Phase 2 [R24]