

Technical Specification MEF 34

Abstract Test Suite For Ethernet Access Services

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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
PT	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
- Test cases for Service OAM
- 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:

- Test cases for Operator Service Attributes
- Test cases for Service OAM
- 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 23.1 Carrier Ethernet Class of Service Phase 2

MEF 26.1 External Network Network Interface (ENNI) Phase 1

MEF 33 Ethernet Access Services Definitions



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.

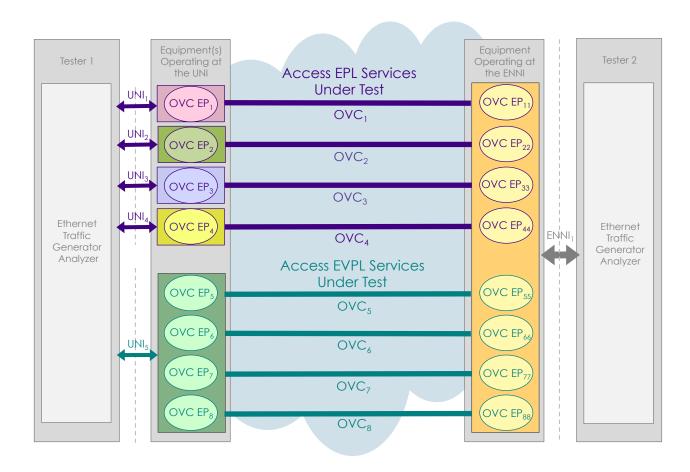


Figure 1: Ethernet Access Services overall test configuration

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, 1 Mbps - 10 Mbps, 10 Mbps, 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 $1/10 \times 100 \times 100$

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.



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	A unique punctuated alphanumeric string assigned to each test case. Example: AEPL1_R3_R12 • AEPL1: Test Case number 1 applicable to Access EPL • 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)		
Test Type	Conformance or Performance		
Test Status	Mandatory, Conditional Mandatory or Optional		
Requirement Description	Description of the requirements that MUST or SHOULD 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 Ethernet	Access Services			
Test Definition ID AEPL_RL_RL_RL_RL_RL_RL_RL_RL_RL_RL_RL_RL_RL	Test Name		CE-VLAN ID For	Untagged and Priority Tagged Frames				
Test Object Feet Object Feet Object Verify that for an Access EPL service, the CE-VLAN ID for untagged and priority tagged Frames MUST be a value from 1 – 4094 Requirement Description Require	Test Definit	tion						
Requirement Description Requirement Description Response Access EPI, service, the CEV LAN ID for untagged and priority tagged Frames MUST he a value from 1 – 4004 Response Access EPI, service, the CEV LAN ID for untagged and priority tagged Frames is a value from 1 – 4004 Test Object Verify that for an Access EPI, service, the CEV LAN ID for untagged and priority tagged Frames is a value from 1 – 4004 Test Configuration Test Configuration Test Configuration Test Configuration Test Configuration Access EPI, service MUST map to a distinct End Point, of Type = Verify that for an Access EPI, service, the CEV LAN ID for untagged and priority tagged Frames is a value from 1 – 4004 Al less 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 are configured. All CE-VLAN ID the property of the End of	Test Type		Conformance					
Requirement Description Rij For an Access EPL service, the OVC EP Map at the LNI MUST contain all CE-VLAN ID values (1, 2,4995) mapped to a single OVC EP Ril 3] Each S-VLAN ID value associated with an instance of Access EPL service MUST map to a distinct End Point, of Type =	Test Status		Mandatory					
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 Map at UNI, CE-VLAN ID OVC End Point 1,2*4095 OVC EP, OVC EP	•		[R3] For an Access single OVC EP [R13] Each S-VLA	s EPL service, the OVC EP Map at the UNI MU	JST contain all CE-VLAN ID val	lues {1, 24095} mapped to a		
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 Voc Ep	Test Object		Verify that for an A	Access EPL service, the CE-VLAN ID for untag	ged and priority tagged Frames i	s a value from 1 – 4094		
Test Configuration Schematic Map at UNI CE-VLAN ID 1,2**,4095 OVC End Point 1,2**,4095 OVC End		on						
End Point Maps CE-VLAN ID	Configurati	on	Tester 1 Operating at the UNI Access EPL Services Under Test OVC EP UNI Ethernet Traffic Generator Analyzer OVC EP UNI OVC EP OVC EP OVC EP OVC EP OVC EP OVC EP Analyzer					
End Point Maps CE-VLAN ID OVC End Point 222 OVC EP1			CE VII A					
End Point Maps Map at UNI2								
CE-VLAN ID		_	-,	2 2 2				
1,2*4095 OVC EP2 Note: Use of other S-VLAN IDs at the ENI 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 UNI1 and UNI2 OVC End Point Parameters	End Point N	Maps		Map at UNI ₂				
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, and UNI_ OVC End Point Parameters								
Ingress Bandwidth Profile per OVC EP at UNI₁ and UNI₂ OVC End Point Parameters OVC EP₁ CIR₁ CBS₁ EIR₁ EBS₁ CF₁ CM₁ OVC EP₂ CIR₂ CBS₂ EIR₂ EBS₂ CF₂ CM₂ OVC EP₂ CIR₂ CBS₂ EIR₂ EBS₂ CF₂ CM₂ OVC EP₂ CIR₃ CBS₂ EIR₃ EBS₁ CF₁ CM₁ OVC EP₂ CIR₃ CBS₂ EIR₃ EBS₂ CF₂ CM₂ OVC EP₂ CIR₃ CBS₂ EIR₃ EBS₂ CF₂ CM₂ OVC EP₂ CIR₃ CBS₂ EIR₃ EBS₂ CF₃ CM₂ OVC EP₂ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₂ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₂ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₃ CF₃ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₂ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₃ EBS₃ CF₃ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₃ EBS₃ CF₃ CF₃ CM₂ OVC EP₃ CIR₃ CBS₃ EIR₃ EBS₃ EBS₃ CF₃ CF₃ CM₃ CM₃ EIR₃, EIR₃ EIR₃ EIR₃ EIR₃ EIR₃ EIR₃ EIR₃ EIR₃			· · · · · · · · · · · · · · · · · · ·					
Ingress Bandwidth Profile per OVC EP at UNI₁ and UNI₂ OVC End Point Parameters			Note: Use of other S	-VLAN IDs at the ENNI and of other CE-VLAN ID* for	r untagged and priority tagged frames	is permitted provided that the		
OVC End Point	Γ	Incr			Ingrass Randwin	dth Profile per OVC ED at ENNI		
Bandwidth Profile Note 1: CIR ₁ = 3 Mbps, CIR ₂ = 30 Mbps Note 2: CBS ₁ ≥ 12176 Bytes, CBS ₂ ≥ 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: Use for other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the Capital to 3 that the through that the proirity tagged Service Frames at UNI₁ configured in OVC₁ and at UNI₂ are delivered with CE-VLAN ID equal to 111 and that the proirity tagged Service Frames offered at UNI₁ are delivered double-tagged with CS-VLAN ID equal to 111 and that the proirity tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to						*		
Profile 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 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁2 ≥ 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 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁₁ ≥ 12176 Bytes, and CBS₂2 ≥ 12176 Bytes Note 3: EIR₁, EIR₂2, EBS₁1, EBS₂2, CF₁1 and CF₂2 equal to 0 Note 4: CM₁1 and CM₂2 in color-aware mode Note 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁1 ≥ 12176 Bytes, and CBS₂2 ≥ 12176 Bytes Note 3: EIR₁, EIR₂2, EBS₁1, EBS₂2, CF₁1 and CF₂2 equal to 0 Note 4: CM₁1 and CM₂2 in color-aware mode Note 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁1 ≥ 12176 Bytes, and CBS₂2 ≥ 12176 Bytes Note 3: EIR₁, EIR₂2, EBS₁1, EBS₂2, CF₁1 and CF₂2 equal to 0 Note 4: CM₁1 and CM₂2 in color-aware mode Note 2: CBS₁1 ≥ 12176 Bytes, and CBS₂2 = 12176 Bytes, an						CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁ CM		
Profile 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 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁2 = 12176 Bytes, CBS₂2 = 12176 Bytes Note 3: EIR₁, EIR₂, EBS₁, EBS₂, CF₁ and CF₂ equal to 0 Note 4: CM₁ and CM₂ in color-blind mode Note 1: CIR₁1 = 3 Mbps, CIR₂2 = 30 Mbps Note 2: CBS₁2 = 12176 Bytes, and CBS₂2 ≥ 12176 Bytes Note 3: EIR₁, EIR₂, EBS₁, EBS₂, CF₁ and CF₂2 equal to 0 Note 4: CM₁1 and CM₂2 in color-aware mode Tester 1 offers untagged and priority tagged Service Frames at UN1₁ configured in OVC₁ and at UN1₂ configured in OVC₁ and that the configuration conforms to MEF 26.1 Tester 2 verifies that the untagged Service Frames offered at UN1₁ are delivered double-tagged with S-VLAN ID equal to 111 and that the priority tagged Service Frames offered at UN1₂ are delivered single-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 221 at ENNI₁ configured in OVC₂ Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 111 and double-tagged ENNI frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ Tester 1 verifies that the single-tagged ENNI frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames	Bandwidth		OVC EP ₂	CIR ₂ CBS ₂ EIR ₂ EBS ₂ CF ₂ CM ₂	OVC EP ₂₂	CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM		
Note 2: GBS₁ ≥ 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 & ENN1 is permitted provided that the configuration conforms to MEF 26.1 • Tester 1 offers untagged and priority tagged Service Frames at UNI₁ configured in OVC₁ and at UNI₂ configured in OVC₂ • Tester 2 verifies that the untagged Service Frames offered at UNI₁ are delivered single-tagged with S-VLAN ID equal to 111 and that the priority tagged Service Frames offered at UNI₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI₂ are delivered single-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI₂ are delivered single-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI₂ are delivered single-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 an	Profile							
Note 4: CM ₁ and CM ₂ in color-blind mode Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEP 26.1 • Tester 1 offers untagged and priority tagged Service Frames at UNI ₁ configured in OVC ₁ and at UNI ₂ configured in OVC ₂ • Tester 2 verifies that the untagged Service Frames offered at UNI ₁ are delivered single-tagged with S-VLAN ID equal to 111 and that the priority tagged Service Frames offered at UNI ₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₂ . Tester 2 also verifies that the untagged Service Frames offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 at UNI ₁ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI frames with S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values Variables Pass or fail								
Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEF 26.1 • Tester 1 offers untagged and priority tagged Service Frames at UNI₁ configured in OVC₁ and at UNI₂ configured in OVC₂ • Tester 2 verifies that the untagged Service Frames offered at UNI₁ are delivered single-tagged with S-VLAN ID equal to 111 at ENNI₁ configured in OVC₁. Tester 2 also verifies that the untagged Service Frames offered at UNI₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ • Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 211 and double-tagged ENNI frames with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ • Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI₁ configured in OVC₁. Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S								
Tester 1 offers untagged and priority tagged Service Frames at UNI ₁ configured in OVC ₁ and at UNI ₂ configured in OVC ₂ Tester 2 verifies that the untagged Service Frames offered at UNI ₁ are delivered single-tagged with S-VLAN ID equal to 111 and that the priority tagged Service Frames offered at UNI ₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₁ . Tester 2 also verifies that the untagged Service Frames offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI ₂ are delivered ouble-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are ENNI ₁ configured in OVC ₂ Tester 1 verifies that the single-tagged ENNI frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₂ . Tester 1 also verifies that the single-tagged ENNI frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged end that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN		11018 4: 0						
Tester 2 verifies that the untagged Service Frames offered at UNI ₁ are delivered single-tagged with S-VLAN ID equal to 111 and that the priority tagged Service Frames offered at UNI ₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0. Tester 2 also verifies that the untagged Service Frames offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI ₂ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal								
that the priority tagged Service Frames offered at UNI ₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₁ . Tester 2 also verifies that the untagged Service Frames offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI ₂ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 an								
single-tagged with S-VLAN ID equal to 222 and that the priority tagged Service Frames offered at UNI ₂ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 122 and also offers single-tagged ENNI Frames with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID eq			that the priority tagged Service Frames offered at UNI ₁ are delivered double-tagged with CE-VLAN ID equal to 0 and S-VLAN ID					
Test Procedure	Test Procedure							
Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111 and double-tagged ENNI Frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 at ENNI; configured in OVC1 and also offers single-tagged ENNI Frames with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI; configured in OVC2 Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI1; configured in OVC1. Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN I								
Test Procedure equal to 0 and S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₁ and also offers single-tagged ENNI Frames with S-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 222 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
Tester 1 verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 111 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI1 configured in OVC1. Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered with CE-VLAN ID equal to 0 at UNI2 configured in OVC2 Units CE-VLAN ID and S-VLAN ID values UNI and ENNI interface speeds and bandwidth profile parameters CBS1, CBS2, CBS11, CBS22 Results Pass or fail								
tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 are delivered with CE-VLAN ID equal to 0 at UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail			OVC_2					
UNI ₁ configured in OVC ₁ . Tester 1 also verifies that the single-tagged ENNI Frames with S-VLAN ID equal to 222 are delivered untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
untagged and that the double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 are delivered with CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
CE-VLAN ID equal to 0 at UNI ₂ configured in OVC ₂ Units CE-VLAN ID and S-VLAN ID values Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Results Pass or fail								
Results Pass or fail	Units		CE-VLAN ID and	S-VLAN ID values				
	Variables		UNI and ENNI int	erface speeds and bandwidth profile parameters	CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂			
Remarks C-tag and S-tag formats are specified in IEEE 802.1ad sections 9.5, 9.6 and 9.7	Results		Pass or fail					
	Remarks		C-tag and S-tag for	rmats are specified in IEEE 802.1ad sections 9.5	5, 9.6 and 9.7			



Test Case 3.1: OVC Maximum Transmission Unit Size

	Abstra	act Test Suite for Ethernet A	ccess Services			
Test Name	OVC Maximum Transmission	on Unit Size				
Test Definition ID	AEPL3_R3_R6_R13					
Test Type	Conformance					
Test Status	Mandatory					
Requirement Description	[R3] For an Access EPL ser- single OVC EP	[R6] For an Access EPL service, the OVC Maximum Transmission Unit Size MUST be integer number of bytes ≥ 1526 [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 =				
Test Object	Verify that for an Access EF	L service, the OVC Maximum Transmis	ssion Unit Size is an integ	ger number of bytes ≥ 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 Comparison of the Unit Compariso					
End Point Maps	CE-VLAN I 1,2*409: N CE-VLAN I 1,2*409: Note: Use of other S-VLAN IDs	OVC EP1	S-VLAN ID 111 222	Map at ENNI ₁		
	Ingress Bandwidth Pr	rofile per OVC EP at UNI ₁ and UNI ₂	Ingress Bandwi	dth Profile per OVC EP at ENNI ₁		
	OVC End Point	Parameters	OVC End Point	Parameters		
	OVC EP ₁	CIR ₁ CBS ₁ EIR ₁ EBS ₁ CF ₁ CM ₁	OVC EP ₁₁	CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁		
Bandwidth Profile	OVC EP ₂	CIR ₂ CBS ₂ EIR ₂ EBS ₂ CF ₂ CM ₂	OVC EP ₂₂	CM ₁₁ CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM ₂₂		
Tionic			2176 Bytes, and $CBS_{22} \ge 12176$ Bytes 22 , EBS_{11} , EBS_{22} , CF_{11} and CF_{22} equal to			
Test Procedure	 Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEF 26.1 Tester 1 offers untagged, priority tagged and C-tagged Service Frames with CE-VLAN ID equal to 11 and frame size equal to the OVC₁ MTU size at UNI₁ configured in OVC₁ and with CE-VLAN ID equal to 11 and frame size equal to the OVC₂ MTU size at at UNI₂ configured in OVC₂ Tester 2 verifies that all the untagged Service Frames offered at UNI₁ are delivered single-tagged with S-VLAN ID equal to 111 and that all the priority tagged and C-tagged Service Frames offered at UNI₁ are delivered double-tagged with S-VLAN ID equal to 111 at ENNI₁ configured in OVC₁. Tester 2 also verifies that all the untagged Service Frames offered at UNI₂ are delivered single-tagged with S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ and that all the priority tagged and C-tagged Service Frames offered at UNI₂ are delivered double-tagged with S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ Tester 2 offers single-tagged ENNI Frames with S-VLAN ID equal to 111, double-tagged ENNI frames with CE-VLAN ID equal to 111 and frame size equal to the OVC₁ MTU size at ENNI₁ configured in OVC₁. Tester 2 also offers single-tagged ENNI Frames with S-VLAN ID equal to 222, double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 111 and S-VLAN ID equal to 112 and S-VLAN					
	 configured in OVC₂ Tester 1 verifies that all the ENNI Frames with S-VLAN ID 111 offered at ENNI₁ configured in OVC₁ are received untagged, priority tagged and C-tagged with CE-VLAN ID equal to 11 at UNI₁. Tester 1 also verifies that all the ENNI Frames with S-VLAN ID 222 offered at ENNI₁ configured in OVC₂ are received untagged, priority tagged and C-tagged with CE-VLAN ID equal to 11 at UNI₂ 					
	Number of valid frames received at the external interfaces					
Units			C1	og GDG GDG		
Units Variables Results		NNI interface speeds and bandwidth pro	ofile parameters CBS ₁ , CE	3S ₂ , CBS ₁₁ , CBS ₂₂		



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 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 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 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 Equipment(s) Operating at the UNI UNI UNI UNI UNI OVC EP OVC OVC OVC OVC OVC	OVC EP ₂₂ OVC EP ₂₂ Ethernet Traffic Generator Analyzer			
End Point Maps	Map at UNI ₁	Map at ENNI ₁ S-VLAN ID OVC End Point 111 OVC EP ₁₁ 222 OVC EP ₂₂ agged and priority tagged frames is permitted provided that the			
Bandwidth Profile	$\begin{tabular}{ l l l l l l l l l l l l l l l l l l l$				
Test Procedure	Tester 1 offers C-tagged Service Frames with CE-VLAN IDs equal configured in OVC2 Tester 2 verifies that the C-tagged Service Frames offered at UNI ₁ at 1,24095 and S-VLAN ID equal to 111 at ENNI ₁ configured in O offered at UNI ₂ are delivered double-tagged with CE-VLAN IDs econfigured in OVC ₂ Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs econfigured in OVC ₁ and double-tagged ENNI Frames with CE-VLAN IDs econfigured in OVC ₁ and double-tagged ENNI Frames with CE-VLENNI ₁ configured in OVC ₂ Tester 1 verifies that the ENNI Frames offered at ENNI ₁ double-taged at UNI ₁ configured in OVC ₁ with offered at ENNI ₁ double-tagged with CE-VLAN IDs equal to 1,24095	I to 1,24095 at UNI ₁ configured in OVC ₁ and at UNI ₂ are delivered double-tagged with CE-VLAN IDs equal to VC ₁ . Tester 2 also verifies that the C-tagged Service Frames qual to 1,24095 and S-VLAN ID equal to 222 at ENNI ₁ and to 1,24095 and S-VLAN ID equal to 111 at ENNI ₁ AN IDs equal to 1,24095 and S-VLAN ID equal to 222 at the agged with CE-VLAN IDs equal to 1,24095 and S-VLAN ID the CE-VLAN IDs equal to 1,24095 and that the ENNI Frames			
Units	CE-VLAN ID and S-VLAN ID values				
Variables	UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂				



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

	Abstract Test Suite for Ethernet A	ccess Services			
Test Name	CE-VLAN CoS ID Value Preservation				
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 Preserva [R3] For an Access EPL service, the OVC EP Map at the UNI MUS single OVC EP [R13] Each S-VLAN ID value associated with an instance of Access "OVC"	T contain all CE-VLAN ID values {1, 24095} mapped to a			
Test Object	Verify that for an Access EPL service, the CE-VLAN CoS are present	rved			
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 UNI UNI UNI UNI UNI OVC EP OV OVC EP OV	C ₁ C ₂ Ehrnl ₁ Ethernet Troffic Generator Analyzer			
	Map at UNI ₁	Map at ENNI			
	CE-VLAN ID OVC End Point 1,2*4095 OVC EP ₁	S-VLAN ID OVC End Point			
	1,2 10/3	222 OVC EP ₂₂			
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	ntagged and priority tagged frames is permitted provided that the			
	Ingress Bandwidth Profile per OVC EP at UNI ₁ and Ingress Bandwidth Profile per OVC EP at ENN				
	OVC End Point Parameters	OVC End Point Parameters			
	OVC EP ₁ CIR ₁ CBS ₁ EIR ₁ EBS ₁ CF ₁ CM ₁	OVC EP ₁₁ CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁ CM ₁₁			
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	OVC EP ₂₂ CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM ₂₂ Note 1: CIR ₁₁ = 3 Mbps, CIR ₂₂ = 30 Mbps Note 2: CBS ₁₁ \geq 12176 Bytes, and CBS ₂₂ \geq 12176 Bytes Note 3: EIR ₁₁ , EIR ₂₂ , EBS ₁₁ , EBS ₂₂ , CF ₁₁ and CF ₂₂ equal to 0 Note 4: CM ₁₁ and CM ₂₂ in color-aware mode permitted provided that the configuration conforms to MEF 26.1			
	Tester 1 offers C-tagged Service Frames with CE-VLAN IDs equequal to 501,5021000 and CE-VLAN CoS equal to 1, CE-VLA CE-VLAN IDs equal to 1501,15022000 and CE-VLAN CoS ev VLAN CoS equal to 4, CE-VLAN IDs equal to 2501,25023000 3001,30023500 and CE-VLAN CoS equal to 6, CE-VLAN IDs UNI1 configured in OVC1 and at UNI2 configured in OVC2.	N IDs equal to 1001,10021500 and CE-VLAN CoS equal to 2, qual to 3, CE-VLAN IDs equal to 2001,20022500 and CE- 0 and CE-VLAN CoS equal to 5, CE-VLAN IDs equal to			
Test Procedure	Tester 2 verifies that the C-tagged Service Frames offered at UNI 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 11 to 1 and S-VLAN ID equal to 111, etc at ENNI1 configured in OV offered at UNI2 are delivered double-tagged with CE-VLAN IDs equal to 222, CE-VLAN IDs equal to 501,5021000, CE-VLAN configured in OVC2 Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDS 111, etc at ENNI1 configured in OVC1. Tester 2 also offers double CE-VLAN CoS equal to 0 and S-VLAN ID 222, etc at ENNI1 could be cequal to 10 and S-VLAN ID equal to 111, CE-VLAN IDs equal to 111, etc are received C-tagged at UNI1 configured in OV equal to 0, CE-VLAN IDs equal to 501,5021000 and CE-VLAN double-tagged with CE-VLAN IDs equal to 1,2500, CE-VLAN double-tagged with CE-VLAN IDs equal to 1,2500, CE-VLAN	1, CE-VLAN IDs equal to 501,5021000, CE-VLAN CoS equal VC1. Tester 2 also verifies that the C-tagged Service Frames equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID COS equal to 1 and S-VLAN ID equal to 222, etc at ENNI1 equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 1,2500, CE-VLAN IDs equal to 1,2500, nfigured in OVC2. agged with CE-VLAN IDs equal to 1,2500, CE-VLAN COS 501,5021000 and CE-VLAN COS equal to 1 and S-VLAN ID C1 with CE-VLAN IDs equal to 1,2500 and CE-VLAN COS N COS equal to 1, etc and that the ENNI Frames offered at ENNI1 COS equal to 0 and S-VLAN ID equal to 222, CE-VLAN IDS ID equal to 222, cet care received C-tagged at UNI2 configured in			
	Tester 2 verifies that the C-tagged Service Frames offered at UNI 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 11 to 1 and S-VLAN ID equal to 111, etc at ENNI₁ configured in 0V offered at UNI₂ are delivered double-tagged with CE-VLAN IDs equal to 222, CE-VLAN IDs equal to 501,5021000, CE-VLAN configured in OVC₂ Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs 111, etc at ENNI₁ configured in OVC₁. Tester 2 also offers double CE-VLAN CoS equal to 0 and S-VLAN ID 222, etc at ENNI₁ configured in OVC₁. Tester 1 verifies that the ENNI Frames offered at ENNI₁ double-tequal to 0 and S-VLAN ID equal to 111, CE-VLAN IDs equal to equal to 111, etc are received C-tagged at UNI₁ configured in OV equal to 0, CE-VLAN IDs equal to 501,5021000 and CE-VLAN double-tagged with CE-VLAN IDs equal to 1,2500, CE-VLAN OVC₂ with CE-VLAN IDs equal to 1,2500 and CE-VLAN OVC₂ with CE-VLAN IDs equal to 1,2500 and CE-VLAN COS equal to 1, etc	1, CE-VLAN IDs equal to 501,5021000, CE-VLAN CoS equal VC1. Tester 2 also verifies that the C-tagged Service Frames equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID COS equal to 1 and S-VLAN ID equal to 222, etc at ENNI1 equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 1,2500, CE-VLAN IDs equal to 1,2500, nfigured in OVC2. agged with CE-VLAN IDs equal to 1,2500, CE-VLAN COS 501,5021000 and CE-VLAN COS equal to 1 and S-VLAN ID C1 with CE-VLAN IDs equal to 1,2500 and CE-VLAN COS N COS equal to 1, etc and that the ENNI Frames offered at ENNI1 COS equal to 0 and S-VLAN ID equal to 222, CE-VLAN IDS ID equal to 222, cet care received C-tagged at UNI2 configured in			
Test Procedure Units Variables	Tester 2 verifies that the C-tagged Service Frames offered at UNI 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 11 to 1 and S-VLAN ID equal to 111, etc at ENNI₁ configured in OV offered at UNI₂ are delivered double-tagged with CE-VLAN IDs equal to 222, CE-VLAN IDs equal to 501,5021000, CE-VLAN configured in OVC₂ Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs 111, etc at ENNI₁ configured in OVC₁. Tester 2 also offers double 111, etc at ENNI₁ configured in OVC₁. Tester 2 also offers double CE-VLAN CoS equal to 0 and S-VLAN ID 222, etc at ENNI₁ double-tequal to 0 and S-VLAN ID equal to 111, CE-VLAN IDs equal to equal to 111, etc are received C-tagged at UNI₁ configured in OV equal to 0, CE-VLAN IDs equal to 501,5021000 and CE-VLAN double-tagged with CE-VLAN IDs equal to 1,2500, CE-VLAN equal to 501,5021000, CE-VLAN OVC₂ with CE-VLAN IDs equal to 1,2500 and CE-VLAN OVC₂ with CE-VLAN IDs equal to 1,2500 and CE-VLAN CoS equal to 1500	1, CE-VLAN IDs equal to 501,5021000, CE-VLAN CoS equal VC1. Tester 2 also verifies that the C-tagged Service Frames equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID (CoS equal to 1 and S-VLAN ID equal to 222, etc at ENNI1 equal to 1,2500, CE-VLAN CoS equal to 0 and S-VLAN ID equal to 1,2500, CE-VLAN IDs equal to 1,2500, nfigured in OVC2. agged with CE-VLAN IDs equal to 1,2500, CE-VLAN CoS 501,5021000 and CE-VLAN CoS equal to 1 and S-VLAN ID C1 with CE-VLAN IDs equal to 1,2500 and CE-VLAN CoS IV COS equal to 1, etc and that the ENNI Frames offered at ENNI1 COS equal to 0 and S-VLAN ID equal to 222, CE-VLAN IDS ID equal to 222, CE-VLAN IDS ID equal to 222, CE-VLAN IDS equal to 0, CE-VLAN IDS equal to 501,5021000 and CE-VLAN I			



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 Access 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 frame delivery MUST be unconditional [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 EPL service, the unicast, multicast and broadcast frames are delivered unconditionally			
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 Equipment(s) Operating at the UNI UNI Index Test OVC EP OVC EP			
End Point Maps	Map at UNI1			
Bandwidth Profile				
Test Procedure	 Tester 1 offers untagged, priority tagged and C-tagged Service Frames with CE-VLAN ID equal to 11 with unicast, multicast and broadcast destination address at UNI₁ configured in OVC₁ and at UNI₂ configured in OVC₂ Tester 2 verifies that all the unicast, multicast and broadcast untagged Service Frames offered at UNI₁ are delivered single-tagged with S-VLAN ID equal to 111 and that all the unicast, multicast and broadcast priority tagged and C-tagged Service Frames offered at UNI₁ are delivered double-tagged with S-VLAN ID equal to 111 at ENNI₁ configured in OVC₁. Tester 2 also verifies that all the unicast, multicast and broadcast untagged Service Frames offered at UNI₁ are delivered single-tagged with S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ and that all the unicast, multicast and broadcast priority tagged and C-tagged Service Frames offered at UNI₂ are delivered double-tagged with S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ Tester 2 offers unicast, multicast and broadcast single-tagged ENNI Frames with S-VLAN ID equal to 111, double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 111 and double-tagged ENNI frames with CE-VLAN ID equal to 111 at ENNI₁ configured in OVC₁. Tester 2 also offers unicast, multicast and broadcast single-tagged ENNI frames with CE-VLAN ID equal to 222, double-tagged ENNI frames with CE-VLAN ID equal to 0 and S-VLAN ID equal to 222 and double-tagged ENNI frames with CE-VLAN ID equal to 11 and S-VLAN ID equal to 222 at ENNI₁ configured in OVC₂ Tester 1 verifies that all the unicast, multicast and broadcast ENNI frames with S-VLAN ID equal to 111 at UNI₂. Tester 1 also verifies that all the unicast, multicast and broadcast ENNI frames with S-VLAN ID equal to 11 at UNI₂. Tester 1 also verifies that all the unicast, multicast and broadcast ENNI frames with S-VLAN ID equal to 11 at UNI₂. 			
Units	Number of valid frames received at the external interfaces			
Variables	UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂			
Results	Pass or fail			
Remarks	The multicast frames MUST NOT be Layer 2 Control Protocol frames			



10.2 Test Cases for Access EPL – Service OAM Frames Handling

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

	Abstr	act Test Suite for Ethernet A	ccess 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	Subscriber MEG levels as [R3] For an Access EPL ser 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 =			
Test Object	Verify that for an Access El SOAM FM IA (MEF 30), s	PL service, CCM frames are tunneled at t ection 7.1	the default Test, and Subs	scriber MEG levels as defined in the	
Test Configuration		ne associating one OVC EP at a UNI and oVC EP at each UNI and a specific S-VLA			
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer UNI,	Equipment(s) Operating at the UNI OVC EP1 OVC EP2 OV	L Services r Test	Equipment Operating at the ENNI OVC EP11 OVC EP22 ENNI Ethernet Traffic Generator Analyzer	
	1	Map at UNI ₁		Map at ENNI ₁	
	CE-VLAN 1,2*409		S-VLAN ID	OVC End Point OVC EP ₁₁	
	1,2 107	0,46221	222	OVC EP ₂₂	
End Point Maps	Map at UNI ₂				
	CE-VLAN 1,2*409 Note: Use of other S-VLAN IDs configuration conforms to MEF	OVC EP ₂ s at the ENNI and of other CE-VLAN ID* for un	ntagged and priority tagged fr	rames is permitted provided that the	
	Ingress Bandwidth P	rofile per OVC EP at UNI ₁ and UNI ₂	Ingress Bandwi	dth Profile per OVC EP at ENNI ₁	
	OVC End Point	Parameters	OVC End Point	Parameters	
D 1	OVC EP ₁	CIR ₁ CBS ₁ EIR ₁ EBS ₁ CF ₁ CM ₁	OVC EP	CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁ CM ₁₁	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		OVC EP ₂₂ CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM ₂₂ Note 1: CIR ₁₁ = 3 Mbps, CIR ₂₂ = 30 Mbps Note 2: CBS ₁₁ \geq 12176 Bytes, and CBS ₂₂ \geq 12176 Bytes Note 3: EIR ₁₁ , EIR ₂₂ , EBS ₁₁ , EBS ₂₂ , CF ₁₁ and CF ₂₂ equal to 0		
		rofile parameter values at the UNIs & ENNI is p		M ₂₂ in color-aware mode nfiguration conforms to MEF 26.1	
Test Procedure	Tester 1 offers untagged Tester 2 verifies that all VLAN ID equal to 111 a and 6 offered at UNI ₂ an Tester 2 offers single-tag and single-tagged CCM Tester 1 verifies that all are received untagged at	CCM messages at MEG level 5, and 6 at the untagged CCM messages at MEG level tenners at ENNI ₁ configured in OVC ₁ . Tester 2 at e delivered single-tagged with S-VLAN I gged CCM messages at MEG level 5, and messages at MEG level 5, and 6 with S-V the single-tagged CCM messages at MEG	t UNI ₁ configured in OVC vel 5, and 6 offered at UN lso verifies that all the un ID equal to 222 at ENNI ₁ 16 with S-VLAN ID equal VLAN ID equal to 222 at 5 level 5, and 6 with S-V verifies that all the single	C ₁ and at UNI ₂ configured in OVC ₂ II, are delivered single-tagged with S- tagged CCM messages at MEG level 5, configured in OVC ₂ al to 111 at ENNI ₁ configured in OVC ₁ ENNI ₁ configured in OVC ₂ LAN ID equal to 111 offered at ENNI ₁ e-tagged CCM messages at MEG level 5,	
	Number of valid frames received at the external interfaces				
Units	UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂				
Units Variables	UNI and ENNI interface sp	eeds and bandwidth profile parameters C	BS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂		
	UNI and ENNI interface sp Pass or fail	eeds and bandwidth profile parameters C	BS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂	: 	



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

	Abstra	act Test Suite for Ethernet Ac	ccess Services	
Test Name	Service OAM Linktrace Me	ssages (LTM/LTR) Handling		
Test Definition ID	AEPL8_R3_R13_R14			
Test Type	Conformance			
Test Status	Mandatory			
Requirement Description	[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. [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 EI the SOAM FM IA (MEF 30	PL service, LTM and LTR frames are tuni), section 7.1	neled at the default Test, a	nd Subscriber MEG levels as defined in
Test Configuration		e associating one OVC EP at a UNI and over EP at each UNI and a specific S-VLA		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Equipment(s) Operating at the UNI OVC EP1 OVC EP2 OVC	Services Test C ₁	Quipment Deroting at the ENNI Tester 2 ENNI DVC EP ₁₁ DVC EP ₂₂ Ethernet Traffic Generator Analyzer
End Point Maps	CE-VLAN 1,2*409 N CE-VLAN 1,2*409	5 OVC EP1 Map at UNI2 ID OVC End Point 5 OVC EP2 at the ENNI and of other CE-VLAN ID* for un	S-VLAN ID 111 222	Ap at ENNI ₁
	Ingress Bandwidth P	rofile per OVC EP at UNI ₁ and UNI ₂	Ingress Bandwid	th Profile per OVC EP at ENNI ₁
	OVC End Point	Parameters	OVC End Point	Parameters
	OVC EP ₁	CIR ₁ CBS ₁ EIR ₁ EBS ₁ CF ₁ CM ₁	OVC EP ₁₁	CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁ CM ₁₁
Bandwidth Profile	$\begin{aligned} & \text{OVC EP}_2 \\ & \text{Note 1: CIR}_1 = 3 \text{ Mbps, C} \\ & \text{Note 2: CBS}_1 \geq 12176 \text{ By} \\ & \text{Note 3: EIR}_1, \text{EIR}_2, \text{EBS}_1 \\ & \text{Note 4: CM}_1 \text{ and CM}_2 \text{ in other expressions} \end{aligned}$	tes, $CBS_2 \ge 12176$ Bytes , EBS_2 , CF_1 and CF_2 equal to 0	Note 2: $CBS_{11} \ge 121$ Note 3: EIR_{11} , EIR_{22}	CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM ₂₂ cps, CIR ₂₂ = 30 Mbps 76 Bytes, and CBS ₂₂ \geq 12176 Bytes 7, EBS ₁₁ , EBS ₂₂ , CF ₁₁ and CF ₂₂ equal to M_{22} in color-aware mode
Test Procedure	Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEF 26.1 • Tester 1 offers untagged LTM and LTR messages at MEG level 5, and 6 at UNI1 configured in OVC1 and at UNI2 configured in OVC2 • Tester 2 verifies that all the untagged LTM and LTR messages at MEG level 5, and 6 offered at UNI1 are delivered single-tagged with S-VLAN ID equal to 111 at ENNI1 configured in OVC1. Tester 2 also verifies that all the untagged LTM and LTR messages at MEG level 5, and 6 offered at UNI2 are delivered single-tagged with S-VLAN ID equal to 222 at ENNI1 configured in OVC2 • Tester 2 offers single-tagged LTM and LTR messages at MEG level 5, and 6 with S-VLAN ID equal to 111 at ENNI1 configured in OVC2 and single-tagged LTM and LTR messages at MEG level 5, and 6 with S-VLAN ID equal to 222 at ENNI1 configured in OVC2 • Tester 1 verifies that all the single-tagged LTM and LTR messages at MEG level 5, and 6 with S-VLAN ID equal to 111 offered at ENNI1 are received untagged at UNI2 configured in OVC1. Tester 1 also verifies that all the single-tagged LTM and LTR messages at MEG level 5, and 6 with S-VLAN ID equal to 222 offered at ENNI1 are received untagged at UNI2 configured in OVC2.			
Units		eived at the external interfaces	<i>56:</i>	<u> </u>
Variables	UNI and ENNI interface spe	eeds and bandwidth profile parameters CI	BS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂	
D 1.	UNI and ENNI interface speeds and bandwidth profile parameters CBS ₁ , CBS ₂ , CBS ₁₁ , CBS ₂₂ Pass or fail			
Results	Fass of fall			



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

	Abstra	act Test Sui	te for Ethernet A	Acce	ess Services	
Test Name	Service OAM Loopback Me	essages (LBM/L	BR) Handling			
Test Definition ID	AEPL9_R3_R13_R14					
Test Type	Conformance					
Test Status	Mandatory					
Requirement Description	[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. [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 the SOAM FM IA (MEF 30		and LBR frames are tu	ınnele	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 UNI1 UNI2	Equipment(s) Operating at the UNI OVC EP1 OVC EP2			ervices est	quipment perating at the ENNI DVC EP11 ENNI Ethernet Traffic Generator Analyzer
End Point Maps	CE-VLAN I 1,2*409: N CE-VLAN I 1,2*409:	Map at UNI ₂	OVC End Point OVC EP ₁ OVC End Point OVC EP ₂		S-VLAN ID 111 222	OVC End Point
	Note: Use of other S-VLAN IDs configuration conforms to MEF 2 Ingress Bandwidth P	26.1		ıntagg		th Profile per OVC EP at ENNI ₁
	OVC End Point	UNI ₂	nrameters		OVC End Point	Parameters
	OVC EP ₁		EIR ₁ EBS ₁ CF ₁ CM ₁		OVC EP ₁₁	CIR ₁₁ CBS ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁ CM ₁₁
Bandwidth	OVC EP ₂	CIR ₂ CBS ₂ F	EIR ₂ EBS ₂ CF ₂ CM ₂		OVC EP ₂₂	CIR ₂₂ CBS 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 3: EIR_{11} , EIR_{22} , EIR_{21} , $EIR_$			pps, $CIR_{22} = 30$ Mbps 76 Bytes, and $CBS_{22} \ge 12176$ Bytes , EBS_{11} , EBS_{22} , CF_{11} and CF_{22} equal to		
	Note: Use of other bandwidth profile parameter values at the UNIs & ENNI is permitted provided that the configuration conforms to MEF 26.1 • Tester 1 offers untagged LBM and LBR messages at MEG level 5, and 6 at UNI ₁ configured in OVC ₁ and at UNI ₂ configured in OVC ₂ • Tester 2 verifies that all the untagged LBM and LBR messages at MEG level 5, and 6 offered at UNI ₁ are delivered single-tagged with S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₁ . Tester 2 also verifies that all the untagged LBM and LBR messages at MEG level 5, and 6 offered at UNI ₂ are delivered single-tagged with S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 2 offers single-tagged LBM and LBR messages at MEG level 5, and 6 with S-VLAN ID equal to 111 at ENNI ₁ configured in OVC ₁ and single-tagged LBM and LBR messages at MEG level 5, and 6 with S-VLAN ID equal to 222 at ENNI ₁ configured in OVC ₂ • Tester 1 verifies that all the single-tagged LBM and LBR messages at MEG level 5, and 6 with S-VLAN ID equal to 111 offered at ENNI ₁ are received untagged at UNI ₁ configured in OVC ₂ . Tester 1 also verifies that all the single-tagged LBM and LBR messages at MEG level 5, and 6 with S-VLAN ID equal to 212 offered at ENNI ₁ are received untagged at UNI ₂ configured in OVC ₂ .					
Test Procedure	Tester 1 offers untagged OVC2 Tester 2 verifies that all t with S-VLAN ID equal to MEG level 5, and 6 offer Tester 2 offers single-tag OVC1 and single-tagged OVC2 Tester 1 verifies that all t ENNI1 are received untag	LBM and LBR in the untagged LB. of 111 at ENNI ₁ are diged LBM and LB	messages at MEG level M and LBR messages a configured in OVC ₁ . To elivered single-tagged v BR messages at MEG level LBM and LBR messages figured in OVC ₁ . To the messages at MEG level	5, and ME ester with a evel of 5, and ester 1 a	tted provided that the confided 6 at UNI ₁ configured 6G level 5, and 6 offere 2 also verifies that all t S-VLAN ID equal to 2: 5, and 6 with S-VLAN and 6 with S-VLAN ID 6 to MEG level 5, and 6 with S-VLAN id	guration conforms to MEF 26.1 in OVC ₁ and at UNI ₂ configured in d at UNI ₁ are delivered single-tagged he untagged LBM and LBR messages at 22 at ENNI ₁ configured in OVC ₂ ID equal to 111 at ENNI ₁ configured in equal to 222 at ENNI ₁ configured in ith S-VLAN ID equal to 111 offered at single-tagged LBM and LBR messages
Test Procedure Units	Tester 1 offers untagged OVC2 Tester 2 verifies that all t with S-VLAN ID equal to MEG level 5, and 6 offer Tester 2 offers single-tag OVC1 and single-tagged OVC2 Tester 1 verifies that all t ENNI1 are received untag	LBM and LBR in the untagged LB to 111 at ENNI ₁ of the detail UNI ₂ are defeated UNI ₂ are defeated at UNI ₂ are defeated at UNI ₂ are the single-tagged at UNI ₁ cout th S-VLAN ID of	mes at the UNIs & ENNI is messages at MEG level M and LBR messages a configured in OVC ₁ . To elivered single-tagged vBR messages at MEG level LBM and LBR messag ffigured in OVC ₁ . Test equal to 222 offered at I	5, and ME ester with a evel of 5, and ester 1 a	tted provided that the confided 6 at UNI ₁ configured 6G level 5, and 6 offere 2 also verifies that all t S-VLAN ID equal to 2: 5, and 6 with S-VLAN and 6 with S-VLAN ID 6 to MEG level 5, and 6 with S-VLAN id	guration conforms to MEF 26.1 in OVC ₁ and at UNI ₂ configured in d at UNI ₁ are delivered single-tagged he untagged LBM and LBR messages at 22 at ENNI ₁ configured in OVC ₂ ID equal to 111 at ENNI ₁ configured in equal to 222 at ENNI ₁ configured in ith S-VLAN ID equal to 111 offered at single-tagged LBM and LBR messages
	Tester 1 offers untagged OVC2 Tester 2 verifies that all t with S-VLAN ID equal to MEG level 5, and 6 offer Tester 2 offers single-tagged OVC1 and single-tagged OVC2 Tester 1 verifies that all t ENNI1 are received untag	LBM and LBR in the untagged LB to 111 at ENNI ₁ of ed at UNI ₂ are diged LBM and L LBM and LBR in the single-tagged at UNI ₁ conth S-VLAN ID of the extention of the extention of the extention of the single at the extention of the extention of the unitage of the extention of the unitage of the extention of the unitage	mes at the UNIs & ENNI is messages at MEG level M and LBR messages a configured in OVC ₁ . To elivered single-tagged with the messages at MEG lemessages at MEG level LBM and LBR messages at MEG level	5, and the ME ester with the evel of the e	tted provided that the confided 6 at UNI ₁ configured as UNI ₁ configured as Collection 1, and 6 offere 2 also verifies that all the S-VLAN ID equal to 2.5, and 6 with S-VLAN ID 6 at MEG level 5, and 6 was also verifies that all the I ₁ are received untagged.	guration conforms to MEF 26.1 in OVC ₁ and at UNI ₂ configured in d at UNI ₁ are delivered single-tagged he untagged LBM and LBR messages at 22 at ENNI ₁ configured in OVC ₂ ID equal to 111 at ENNI ₁ configured in equal to 222 at ENNI ₁ configured in ith S-VLAN ID equal to 111 offered at single-tagged LBM and LBR messages
Units	Tester 1 offers untagged OVC2 Tester 2 verifies that all t with S-VLAN ID equal to MEG level 5, and 6 offer Tester 2 offers single-tag OVC1 and single-tagged OVC2 Tester 1 verifies that all t ENNI1 are received untag	LBM and LBR in the untagged LB to 111 at ENNI ₁ of ed at UNI ₂ are diged LBM and L LBM and LBR in the single-tagged at UNI ₁ conth S-VLAN ID of the extention of the extention of the extention of the single at the extention of the extention of the unitage of the extention of the unitage of the extention of the unitage	mes at the UNIs & ENNI is messages at MEG level M and LBR messages a configured in OVC ₁ . To elivered single-tagged with the messages at MEG lemessages at MEG level LBM and LBR messages at MEG level	5, and the ME ester with the evel of the e	tted provided that the confided 6 at UNI ₁ configured as UNI ₁ configured as Collection 1, and 6 offere 2 also verifies that all the S-VLAN ID equal to 2.5, and 6 with S-VLAN ID 6 at MEG level 5, and 6 was also verifies that all the I ₁ are received untagged.	guration conforms to MEF 26.1 in OVC ₁ and at UNI ₂ configured in d at UNI ₁ are delivered single-tagged he untagged LBM and LBR messages at 22 at ENNI ₁ configured in OVC ₂ ID equal to 111 at ENNI ₁ configured in equal to 222 at ENNI ₁ configured in ith S-VLAN ID equal to 111 offered at single-tagged LBM and LBR messages



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 Su	ite for Ethernet Ac	ccess Services		
Test Name	Ingress Bandwidth Profile per OVC EP at	he UNI – CIR Enforceme	nt Range 1		
Test Definition ID	AEPL10_R4_R5_R9				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 100 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 blind" and it MUST have CBS ≥ 12176 Bytes [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				
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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , provided that the ingress traffic is offered at a constant rate greater than CIR				
Test Configuration	One OVC associating one OVC EP at the Uthe OVC EP at the UNI and a specific S-V.				values are mapped to
Test Configuration Schematic	Tester I Equipment Operating at the UNI Ethernet Traffic Generator Analyzer Equipment Operating at the UNI UNI OVC EP1	Access EP Under	^r Test	Equipment Operating at the ENNI	Tester 2 Ethernet Traffic Generator Analyzer
	Map at UNI ₁			Map at ENNI ₁	
End Point Maps	CE-VLAN ID 1,2*4095	OVC End Point OVC EP ₁		LAN ID 111	OVC End Point OVC EP ₁₁
Life I Offic Waps	Note: Use of other S-VLAN IDs at the ENNI and configuration conforms to MEF 26.1	-			
	Ingress Bandwidth Profile per O'			lwidth Profile per (
		R ₁ EBS ₁ CF ₁ CM ₁	OVC End Poir		Parameters S ₁₁ EIR ₁₁ EBS ₁₁ CF ₁₁
Bandwidth Profile	Note 1: $CIR_1 = 3$ Mbps Note 2: $CBS_1 \ge 12176$ Bytes Note 3: EIR_1 , EBS_1 , and CF_1 equal to 0 Note 4: CM_1 in color-blind mode		Note 1: $CIR_{11} = 3$ Note 2: $CBS_{11} \ge$ Note 3: EIR_{11} , ER_{11}	B Mbps	CM ₁₁
Test Procedure	 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 CIR₁ to the ingress OVC End Point (OVC EP₁ at UNI₁) during a time interval T 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 Green delivered at the egress OVC End Point (OVC EP₁1 at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₁1 at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₁1 at ENNI₁ 				
Units	Number of valid frames received at the EN	NI			
Variables	UNI and ENNI interface speeds, Service F	rame length λ , time interva	al T , tolerance F_{CIR} a	nd bandwidth profile	parameters CBS ₁ , CBS ₁₁
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in to Destination MAC Address through the last Note 2: Green Color Identifiers defined in Note 3: The length of the time interval <i>T</i> m traffic received over the duration of the test	bit of the Frame Check Se MEF 23.1 Table 4 ust be such that the number	equence		



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

	Abstract Test	Suite for Ethernet A	Access Se	rvices		
Test Name	Ingress Bandwidth Profile per OVC EP	at the UNI – CBS Enforcer	nent Range 1			
Test Definition ID	AEPL11_R4_R5_R9					
Test Type	Conformance					
Test Status	Mandatory					
Requirement Description	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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					
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 +/- (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 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			values are mapped to		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Equipmer Operating the UNI UNI OVC EP	Access E Unde	PL Service er Test VC ₁	o _p	quipment perating at the ENNI	Tester 2 Ethernet Traffic Generator Analyzer
	Map at UN				ap at ENNI ₁	
End Point Maps	CE-VLAN ID 1,2*4095	OVC End Point OVC EP ₁		S-VLAN II)	OVC End Point OVC EP ₁₁
zna i ome waps	Note: Use of other S-VLAN IDs at the ENNI a configuration conforms to MEF 26.1		untagged and pr		nes is permitted pro	
	Ingress Bandwidth Profile per					VC EP at ENNI ₁
B 1 111		Parameters EIR ₁ EBS ₁ CF ₁ CM ₁		End Point C EP ₁₁		arameters 11 EIR ₁₁ EBS ₁₁ CF ₁₁
Bandwidth Profile	$\begin{tabular}{lll} Note 1: CIR_1 = 3 Mbps \\ Note 2: CBS_1 \ge 12176 Bytes \\ Note 3: EIR_1, EBS_1, and CF_1 equal to \\ Note 4: CM_1 in color-blind mode \\ \end{tabular}$	0	Note 2: 0 Note 3: 1	$CIR_{11} = 3 \text{ Mbps}$ $CBS_{11} \ge 12176$ $EIR_{11}, EBS_{11}, and an arrow EIR_{11}$	Bytes nd CF ₁₁ equal to	O CM ₁₁
Test Procedure	 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, using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₁ at UNI₁) during a time interval T 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 Green delivered at the egress OVC End Point (OVC EP₁₁ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₁₁ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₁₁ at ENNI₁ 			the token bucket and at UNI ₁) during a time oS equal to 0,1,27 and P ₁₁ at ENNI ₁)		
Units	Number of valid frames received at the	ENNI				
Variables	UNI and ENNI interface speeds, Service profile parameters CBS ₁ , CBS ₁₁	e Frame length λ , Burst leng	gth B, idle per	iod I, time inter	val T, tolerance	F_{CBS} and bandwidth
Results	Pass or fail					
Remarks	Note 1: Bandwidth profile is measured Destination MAC Address through the Note 2: Green Color Identifiers defined	last bit of the Frame Check		ENNI Frame	consists of the fi	rst 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 Acce	ess Services	
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CIR Enforcement F	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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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		
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 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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 Ethe OVC EP at the UNI and a specific S-VLAN ID is mapped to the OV		
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Tester 1 Operating at the UNI OVC EP2 OVC EP2 OVC 2	OVC EP ₂₂	
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Map at ENNI ₁ S-VLAN ID OVC End Point 222 OVC EP ₂₂ ged and priority tagged frames is permitted provided that the	
Bandwidth Profile	$\begin{tabular}{ l l l l l l l l l l l l l l l l l l l$	$\begin{array}{c c} \textbf{Ingress Bandwidth Profile per OVC EP at ENNI}_1\\ \hline \textbf{OVC End Point} & \textbf{Parameters}\\ \hline \textbf{OVC EP}_{22} & \textbf{CIR}_{22} \textbf{CBS}_{22} \textbf{EIR}_{22} \textbf{EBS}_{22} \textbf{CF}_{22}\\ \hline \textbf{CM}_{22}\\ \hline \textbf{Note 1: CIR}_{22} = 30 \textbf{Mbps}\\ \textbf{Note 2: CBS}_{22} \geq 12176 \textbf{Bytes}\\ \textbf{Note 3: EIR}_{22}, \textbf{EBS}_{22}, \textbf{and CF}_{22} \textbf{equal to 0}\\ \hline \textbf{Note 4: CM}_{22} \textbf{in color-aware mode}\\ \hline \end{array}$	
Test Procedure	 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 CIR₂ to the ingress OVC End Point (OVC EP₂ at UNI₂) during a time interval T 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 EP₂₂ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₂₂ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₂₂ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval T ,	, tolerance F_{CIR} and bandwidth profile parameters CBS ₂ , CBS ₂₂	
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic we 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 traffic received over the duration of the test	ence	



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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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		
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 Mbps, CBS \geq 1217 the UNI, and color forwarding is yes, the bandwidth profile is applied to all ingress Service Fra and the amount of Green traffic delivered at the egress OVC EP is within +/- (F_{CBS}) of the calcuthe ingress during a time interval T , provided that the ingress traffic is offered as a pattern of reburst B is longer than necessary to empty the token bucket and each idle period I is longer than	mes that are mapped to the given OVC EP alated amount of traffic accepted as Green at peated bursts and idle periods where each	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the ENNI is configured. Al OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	l CE-VLAN ID values are mapped to the	
Test Configuration Schematic	Tester 1 Ethernet Troffic Generator Analyzer Tester 1 Operating at the UNI Access EPL Service Under Test OVC EP2 OVC 2	Equipment Operating at the ENNI ENNI ENNI Ethernet Traffic Generator Analyzer	
End Point Maps	Map at UNI2 CE-VLAN ID OVC End Point S-VLA	2 OVC EP ₂₂	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	76 Bytes and CF ₂₂ equal to 0	
Test Procedure	 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, using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₂ at UNI₂) during a time interval T 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 EP₂₂ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₂₂ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₂₂ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length B , idle period I , time interparameters CBS ₂ , CBS ₂₂	erval T , tolerance F_{CBS} and bandwidth profile	
Results	Pass or fail		
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic where the ENNI Frame MAC Address through the last bit of the Frame Check Sequence Note 2: Green Color Identifiers defined in MEF 23.1 Table 4	consists of the first bit of the Destination	



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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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		
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 $+/-(F_{CIR})$ of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNI3 OVC EP3 OVC EP3 OVC S OVC EP3 OVC S O		
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			
Test Procedure	 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 CIR₃ to the ingress OVC End Point (OVC EP₃ at UNI₃) during a time interval T 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 EP₃₃ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₃₃ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₃₃ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₃ , CBS ₃₃		
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 Enforcemen	at 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	[R4] The CoS Identifier for Service Frames MUST be the OVC End P [R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and I 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 Moc [R9] Color Forwarding SHOULD be yes. When Ingress BWP at UNI the S-Tag as per MEF 23.1	MUST allow configuration to de = "color blind" and it MU has EIR = 0 frames egressi	o support CIR of: IST have CBS ≥ 12176 Bytes ng at ENNI MUST be marked green via
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 and the amount of Green traffic delivered at the egress OVC EP is with the ingress during a time interval <i>T</i> , provided that the ingress traffic is burst <i>B</i> is longer than necessary to empty the token bucket and each idle	d to all ingress Service Fram hin $+/-$ (F_{CBS}) of the calculate offered as a pattern of repeat	es that are mapped to the given OVC EP ed amount of traffic accepted as Green at ted bursts and idle periods 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		E-VLAN ID values are mapped to the
Test Configuration Schematic	Ethernet Traffic Connector	PL Service er Test	erating at he ENNI WC EP ₃₃ WC EP ₃₃ ENNI Ethernet Troffic Generator Analyzer
	Map at UNI ₃		Map at ENNI ₁
End Point	CE-VLAN ID OVC End Point 1,2*4095 OVC EP ₃	S-VLAN I	D OVC End Point OVC EP ₃₃
Maps	Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for unta		
	Ingress Bandwidth Profile per OVC EP at UNI ₃	Ingress Bandwidt	h Profile per OVC EP at ENNI ₁
	OVC End Point Parameters	OVC End Point	Parameters
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	OVC EP ₃₃ Note 1: CIR ₃₃ = 300 Mb ₁ Note 2: CBS ₃₃ \geq 12176 E Note 3: EIR ₃₃ , EBS ₃₃ , an Note 4: CM ₃₃ in color-av	Bytes d CF ₃₃ equal to 0
Test Procedure	 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, using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₃ at UNI₃) during a time interval T 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 EP₃₃ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₃₃ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₃₃ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length parameters CBS $_3$, CBS $_{33}$	B, idle period I, time interva	1 T , tolerance F_{CBS} and 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 con	sists of the first bit of the Destination



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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST allow configuration to support CIR of: • 1 − 10 Mb/s, increments of 1 Mbps (Range 1) • 10 − 1000 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 blind" and it MUST have CBS ≥ 12176 Bytes [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		
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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 Equipment Operating at the UNI Access EPL Service Under Test OVC EP4 OVC EP4 OVC EP4 OVC EP4		
End Point Maps			
Bandwidth Profile			
Test Procedure	 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 CIR₄ to the ingress OVC End Point (OVC EP₄ at UNI₄) during a time interval T 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 EP₄₄ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₄₄ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₄₄ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₄ , CBS ₄₄		
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 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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R5] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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		
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 +/- (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 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	Equipment Operating at the UNI Ethernet Traffic Generator Analyzer Equipment Operating at the UNI Access EPL Service Under Test OVC EP4 OVC EP		
End Point Maps			
Bandwidth Profile			
Test Procedure	 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, using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₄ at UNI₄) during a time interval T 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 EP₄₄ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₄₄ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₄₄ at ENNI₁ 		
Units	Number of valid frames received at the ENNI		
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length B , idle period I , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₄ , CBS ₄₄		
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 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	[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} [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 100 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 ≥ 12176 Bytes		
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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNI OVC EP OVC EP		
End Point Maps	Map at UNI₁ Map at ENNI₁ CE-VLAN ID OVC End Point 1,2*4095 OVC EP₁ 111 OVC EP₁		
Waps	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	 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 CIR₁₁ to the ingress OVC End Point (OVC EP₁₁ at ENNI₁) during a time interval T 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 EP₁ at UNI₁). The amount of traffic delivered at the egress OVC EP₁ at UNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₁ at UNI₁ 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 CIR₁₁ to the ingress OVC End Point (OVC EP₁₁ at ENNI₁) during a time interval T 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 EP₁ at UNI₁). The amount of traffic delivered at the egress OVC EP₁ at UNI₁ must be zero 		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₁ , CBS ₁₁		
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	[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 $\{0-7\}$ [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 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 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	Equipment Operating at the UNI Ethernet Traffic Generator Analyzer Ethernet Traffic Generator Analyzer OVC EP OVC I Equipment Operating at the ENNI Equipment Operating at the ENNI OVC EP OVC EP I Ethernet Traffic Generator Analyzer		
End Point Maps	Map at UNI₁		
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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₁₁ at ENNI₁) during a time interval T 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 EP₁ at UNI₁). The amount of traffic delivered at the egress OVC EP₁ at UNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₁ at UNI₁ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₁₁ at ENNI₁) during a time interval T 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 EP₁ at UNI₁). The amount of traffic delivered at the egress OVC End Point (OVC EP₁ at UNI₁). 		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS_1 , CBS_{11}		
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 20.1: 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 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 = 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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNI2 OVC EP2 OVC EP2 OVC EP2 OVC EP2					
	Map at UNI ₂ Map at ENNI ₁					
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 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	 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 CIR₂₂ to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) during a time interval T 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 EP₂ at UNI₂). The amount of traffic delivered at the egress OVC EP₂ at UNI₂ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₂ at UNI₂ 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 CIR₂₂ to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) during a time interval T 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 EP₂ at UNI₂). The amount of traffic delivered at the egress OVC EP₂ at UNI₂ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₂ , CBS ₂₂					
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	[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 $\{0-7\}$ [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 = 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 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 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 Ethernet Traffic Generator Analyzer OVC EP2 OVC EP2 OVC EP2 OVC EP2 OVC EP2					
End Point Maps	Map at UNI2 Map at ENNI1					
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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) during a time interval T 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 EP₂ at UNI₂). The amount of traffic delivered at the egress OVC EP₂ at UNI₂ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₂ at UNI₂ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) during a time interval T 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 EP₂ at UNI₂). The amount of traffic delivered at the egress OVC EP₂ at UNI₂ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₂ , CBS ₂₂					
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 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] 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 ≥ 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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNI ₃ OVC EP ₃ OVC EP ₃ OVC EP ₃ OVC EP ₃					
	Map at UNI3 Map at ENNI1 CE-VLAN ID OVC End Point S-VLAN ID OVC End Point					
End Point	1,2*4095 OVC EP ₃ 333 OVC EP ₃₃					
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						
Test Procedure	 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 CIR₃₃ to the ingress OVC End Point (OVC EP₃₃ at ENNI₁) during a time interval T 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 EP₃ at UNI₃). The amount of traffic delivered at the egress OVC EP₃ at UNI₃ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₃ at UNI₃ 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 CIR₃₃ to the ingress OVC End Point (OVC EP₃₃ at ENNI₁) during a time interval T 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 EP₃ at UNI₃). The amount of traffic delivered at the egress OVC EP₃ at UNI₃ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₃ , CBS ₃₃					
Results	Pass or fail					
Remarks	Pass or 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 T 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	[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 $\{0-7\}$ [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 +/- (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 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 Ethernet Traffic Generator Analyzer Tester 2 Equipment Operating at the UNI Access EPL Service Under Test OVC EP3 OVC B OVC B					
End Point	Map at UNI3 Map at ENNI1 CE-VLAN ID OVC End Point S-VLAN ID OVC End Point					
Maps	1,2*4095 OVC EP ₃ 333 OVC EP ₃₃ 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						
Test Procedure	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₃₃ at ENNI₁) during a time interval T 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 EP₃ at UNI₃). The amount of traffic delivered at the egress OVC EP₃ at UNI₃ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₃ at UNI₃ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₃₃ at ENNI₁) during a time interval T 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 EP₃ at UNI₃). The amount of traffic delivered at the egress OVC EP₃ at UNI₃ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₃ , CBS ₃₃					
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 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] 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 = 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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 Equipment Operating at the ENNI OVC EP4 OVC EP4					
End Point Maps	Map at UNI₄ Map at ENNI₁					
Bandwidth Profile						
Test Procedure	 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 CIR₄₄ to the ingress OVC End Point (OVC EP₄₄ at ENNI₁) during a time interval T 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 EP₄ at UNI₄). The amount of traffic delivered at the egress OVC EP₄ at UNI₄ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₄ at UNI₄ 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 CIR₄₄ to the ingress OVC End Point (OVC EP₄₄ at ENNI₁) during a time interval T 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 EP₄ at UNI₄). The amount of traffic delivered at the egress OVC EP₄ at UNI₄ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₄ , CBS ₄₄					
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	[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 $\{0-7\}$ [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) • $100-100$ 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 +/- (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 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 UNI4 OVC EP4 OVC EP4 OVC EP4 OVC 4 Equipment Operating at the ENNI Equipment Operating at the ENNI OVC EP4 OVC EP4 OVC EP4 OVC EP4 OVC EP4					
End Point Maps	Map at UNI4					
Bandwidth Profile						
Test Procedure	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₄₄ at ENNI₁) during a time interval T 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 EP₄ at UNI₄). The amount of traffic delivered at the egress OVC EP₄ at UNI₄ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₄ at UNI₄ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₄₄ at ENNI₁) during a time interval T 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 EP₄ at UNI₄). The amount of traffic delivered at the egress OVC EP₄ at UNI₄ must be zero 					
Units	Number of valid frames received at the UNI					
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₄ , CBS ₄₄					
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					



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 Ethernet	Ac	ccess Services			
Test Name	CE-VLAN ID For Untagged and Pr	iority 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 and priority tagged frames MUST be specified if untagged / priority tagged frames are to be supported, and that CE-VLAN ID MUST be included in the OVC End point Map [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 if untagged and priority tagged frames is specified and inclu		an A	access EVPL service, the	CE-VL	AN ID for u	ntagged and priority
Test Configuration	At least two OVCs, each one associ mapped to each OVC EP at the UNI					gured. One	CE-VLAN ID is
Test Configuration Schematic	Tester 1 Equipment(s) Operating at the UNI Access EVPL Services Under Test OVC EP ₆						
			٥٧٥	6			
	Map at U	JNI ₅		I	Map at		
End Point	CE-VLAN ID	JNI ₅ OVC End Point		S-VLAN ID	Map at	OV	C End Point OVC EPss
End Point Maps	CE-VLAN ID 15* 16	OVC End Point OVC EP ₅ OVC EP ₆		S-VLAN ID 555 666	•	OV	OVC EP ₅₅ OVC EP ₆₆
	CE-VLAN ID 15*	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the		S-VLAN ID 555 666	•	OV	OVC EP ₅₅ OVC EP ₆₆
	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Elepermitted provided that the configuration Ingress Bandwidth Profile	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1		S-VLAN ID 555 666 VI and of other CE-VLAN ID Ingress Bandwidt	* for unta	OV gged and prio	OVC EP ₅₅ OVC EP ₆₆ rity tagged frames is
	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Elepermitted provided that the configuration Ingress Bandwidth Profile OVC End Point	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 e per OVC EP at UNI ₅ Parameters		S-VLAN ID 555 666 VI and of other CE-VLAN ID Ingress Bandwidt OVC End Point	* for unta	gged and prio	OVC EP ₅₅ OVC EP ₆₆ rity tagged frames is C EP at ENNI ₁ meters
Maps	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Elepermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EP5 CIR5 C	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 e per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅		S-VLAN ID 555 666 VI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP55	* for unta	gged and prio le per OVC Parar CBS ₅₅ EIR ₅	OVC EP ₅₅ OVC EP ₆₆ rity tagged frames is C EP at ENNI ₁ meters s EBS ₅₅ CF ₅₅ CM ₅₅
Maps Bandwidth	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Elepermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EP5 CIR5 C OVC EP6 CIR6 C	UNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 E per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆		S-VLAN ID 555 666 VI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP55 OVC EP66	* for unta	gged and prio le per OVC Parara CBS ₅₅ EIR ₅ CBS ₆₆ EIR ₆	OVC EP ₅₅ OVC EP ₆₆ rity tagged frames is C EP at ENNI ₁ meters s EBS ₅₅ CF ₅₅ CM ₅₅ s EBS ₆₆ CF ₆₆ CM ₆₆
Maps	CE-VLAN ID 15* 16	UNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes		S-VLAN ID 555 666 II and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbps Note 2: CBS ₅₅ > 12176	* for unta h Profil CIR ₅₅ CIR ₆₆ s and CI Bytes a	gged and prio le per OVC Paran CBS ₅₅ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt nd CBS ₆₆ \geq	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI ₁ meters 55 EBS55 CF55 CM55 66 EBS66 CF66 CM66 pps 12176 Bytes
Maps Bandwidth	CE-VLAN ID 15* 16	UNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes CF ₅ and CF ₆ equal to 0		S-VLAN ID 555 666 Il and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbps Note 2: CBS ₅₅ > 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E	* for unta h Profil CIR ₅₅ CIR ₆₆ s and CI Bytes at BS ₅₅ , EB	gged and prio le per OVC Parar CBS ₅₅ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt nd CBS ₆₆ ≥ SS ₆₆ , CF ₅₅ ar	OVC EP ₅₅ OVC EP ₆₆ rity tagged frames is C EP at ENNI ₁ meters is EBS ₅₅ CF ₅₅ CM ₅₅ is EBS ₆₆ CF ₆₆ CM ₆₆ ops 12176 Bytes in CF ₆₆ equal to 0
Maps Bandwidth	CE-VLAN ID 15* 16	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Eper OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes CF ₅ and CF ₆ equal to 0 ind mode	UN	S-VLAN ID 555 666 II and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP55 OVC EP66 Note 1: CIR55 = 3 Mbpr Note 2: CBS55 ≥ 12176 Note 3: EIR35, EIR66, E Note 4: CM55 and CM66	* for unta h Profil CIR55 CIR66 s and CI Bytes ai BS55, EB 5 in color	gged and prio le per OVC Parara CBS ₅₅ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 MB dl CBS ₆₆ CF ₅₅ arr r-aware mode	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI meters is EBS55 CF55 CM55 is EBS66 CF66 CM66 ops 12176 Bytes id CF66 equal to 0 de
Maps Bandwidth	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Eipermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EP ₅ CIR ₅ C OVC EP ₆ Note 1: CIR ₅ = 3 Mbps and CIR ₆ Note 2: CBS ₅ ≥ 12176 Bytes and INOTE 12 CBS ₅ ≥ 12176 Bytes and INOTE 25 CBS ₅ EBS ₆ . CER 15 Note 15 CBS ₅ and CM ₆ in color-blice Use of other bandwidth profile para • Tester 1 offers untagged and price 15 Tester 2 verifies that the untagge the priority tagged Service Fram 1555 at ENNI ₁ configured in OVC • Tester 2 offers single-tagged EN 15 Tester 1 verifies that the single-tagged Service Tester 1 verifies that the single-tagged EN 15 Tester 15 Verifies that the single-tagged EN	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 E per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ = 12176 Bytes CF ₅ and CF ₆ equal to 0 ind mode meter values at the UNI & ENNI is per ority tagged Service Frames at UNI described Service Frames Servic	ermittt NI ₅ c are doub	S-VLAN ID 555 666 Il and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbpr. Note 2: CBS ₅₅ > 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ ted provided that the configure configured in OVC ₅ e delivered single-tagged ole-tagged with CE-VLAI o 555 and double-tagged D equal to 555 are delive	* for unta h Profil CIR ₅₅ CIR ₆₆ S and CI Bytes an BS ₅₅ , EB 5 in color ation con with S-¹ N ID equ ENNI fra red unta	gged and prio le per OVC Parara CBS ₅₆ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt and CBS ₆₆ ≥ SS ₆₆ , CF ₅₅ ar r-aware moc forms to MEF VLAN ID ecual to 0 and ames with C gged at UNI	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI meters 55 EB555 CF55 CM55 66 EB566 CF66 CM66 Ops 12176 Bytes ad CF66 equal to 0 de 726.1 qual to 555 and that S-VLAN ID equal to CE-VLAN ID equal
Maps Bandwidth Profile	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Elpermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EPs CIRs C OVC EP6 CIRs C Note 1: CIRs = 3 Mbps and CIR6 Note 2: CBSs ≥ 12176 Bytes and INOTE 3: EIRs, EIRs, EBSs, EBS6 C Note 4: CMs and CM6 in color-blin Note: Use of other bandwidth profile para • Tester 1 offers untagged and price Tester 2 verifies that the untagge the priority tagged Service Frame 555 at ENNI₁ configured in OVC • Tester 2 offers single-tagged EN to 0 and S-VLAN ID equal to 55 • Tester 1 verifies that the single-tagged OVCs and that the double-tagged	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes CF ₅ and CF ₆ equal to 0 ind mode uneter values at the UNI & ENNI is per Ority tagged Service Frames at UNI describes offered at UNI ₅ Sorvice Frames with S-VLAN ID equals at ENNI ₁ configured in OVC ₅ Sorvice ENNI ₁ configured in OVC ₅ Sorvice ENNI ₁ rames with CE-VLAN II figured in OVC ₅	ermittt NI ₅ c are doub	S-VLAN ID 555 666 Il and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbpr. Note 2: CBS ₅₅ > 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ ted provided that the configure configured in OVC ₅ e delivered single-tagged ole-tagged with CE-VLAI o 555 and double-tagged D equal to 555 are delive	* for unta h Profil CIR ₅₅ CIR ₆₆ S and CI Bytes an BS ₅₅ , EB 5 in color ation con with S-¹ N ID equ ENNI fra red unta	gged and prio le per OVC Parara CBS ₅₆ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt and CBS ₆₆ ≥ SS ₆₆ , CF ₅₅ ar r-aware moc forms to MEF VLAN ID ecual to 0 and ames with C gged at UNI	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI meters 55 EB555 CF55 CM55 66 EB566 CF66 CM66 Ops 12176 Bytes ad CF66 equal to 0 de 726.1 qual to 555 and that S-VLAN ID equal to CE-VLAN ID equal
Maps Bandwidth Profile Test Procedure	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Epermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EP6 CIR5 C OVC EP6 CIR5 C OVC EP6 Note 1: CIR5 = 3 Mbps and CIR6 Note 2: CBS5 ≥ 12176 Bytes and Note 3: EIR5, EIR6, EBS5, EBS6, C Note 4: CM5 and CM6 in color-bli Note: Use of other bandwidth profile para • Tester 1 offers untagged and price • Tester 2 verifies that the untagge the priority tagged Service Framm 555 at ENNI₁ configured in OVC • Tester 2 offers single-tagged EN to 0 and S-VLAN ID equal to 55 • Tester 1 verifies that the single-te OVC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OVC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OVC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OVC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 at UNI₅ configured in OvC5 and that the double-tagged VLAN ID equal to 0 a	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes CF ₅ and CF ₆ equal to 0 ind mode uneter values at the UNI & ENNI is per ority tagged Service Frames at UNI ₅ d Service Frames offered at UNI ₅ ses offered at UNI ₅ are delivered of the control of th	NI ₅ caredouble to equal to	S-VLAN ID 555 666 Il and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbps Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ ted provided that the configure configured in OVC ₅ e delivered single-tagged ole-tagged with CE-VLAI o 555 and double-tagged D equal to 555 are delive qual to 0 and S-VLAN ID	* for unta h Profil CIR ₅₅ CIR ₆₆ S and CI Bytes an BS ₅₅ , EB 5 in color ation con with S-¹ N ID equ ENNI fra red unta	gged and prio le per OVC Parara CBS ₅₆ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt and CBS ₆₆ ≥ SS ₆₆ , CF ₅₅ ar r-aware moc forms to MEF VLAN ID ecual to 0 and ames with C gged at UNI	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI meters 55 EB555 CF55 CM55 66 EB566 CF66 CM66 Ops 12176 Bytes ad CF66 equal to 0 de 726.1 qual to 555 and that S-VLAN ID equal to CE-VLAN ID equal
Bandwidth Profile Test Procedure Units	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the Epermitted provided that the configuration Ingress Bandwidth Profile OVC End Point OVC EP5 CIR5 C OVC EP6 Note 1: CIR5 = 3 Mbps and CIR6 Note 2: CBS5 = 12176 Bytes and to Note 3: EIR5, EIR6, EBS5, EBS6, Condected to Service State of the Company of the Comp	JNI ₅ OVC End Point OVC EP ₅ OVC EP ₆ OVC EP ₆ OVC EP ₆ NNI, use of other CE-VLAN IDs at the conforms to MEF 26.1 Per OVC EP at UNI ₅ Parameters CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆ = 30 Mbps CBS ₆ ≥ 12176 Bytes CF ₅ and CF ₆ equal to 0 ind mode uneter values at the UNI & ENNI is per ority tagged Service Frames at UNI ₅ d Service Frames offered at UNI ₅ ses offered at UNI ₅ are delivered of the control of th	NI ₅ caredouble to equal to	S-VLAN ID 555 666 Il and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbps Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ ted provided that the configure configured in OVC ₅ e delivered single-tagged ole-tagged with CE-VLAI o 555 and double-tagged D equal to 555 are delive qual to 0 and S-VLAN ID	* for unta h Profil CIR ₅₅ CIR ₆₆ S and CI Bytes an BS ₅₅ , EB 5 in color ation con with S-¹ N ID equ ENNI fra red unta	gged and prio le per OVC Parara CBS ₅₆ EIR ₅ CBS ₆₆ EIR ₆ R ₆₆ = 30 Mt and CBS ₆₆ ≥ SS ₆₆ , CF ₅₅ ar r-aware moc forms to MEF VLAN ID ecual to 0 and ames with C gged at UNI	OVC EP55 OVC EP66 rity tagged frames is C EP at ENNI meters 55 EB555 CF55 CM55 66 EB566 CF66 CM66 Ops 12176 Bytes ad CF66 equal to 0 de 726.1 qual to 555 and that S-VLAN ID equal to CE-VLAN ID equal



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

	Abstr	ract Test Suite for Ethernet A	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 OVCs per UNI is greater than 1					
Requirement Description	[R25] For an Access EVPL se contain all CE-VLAN ID valu [R22] The Maximum number	of OVCs per UNI MUST be ≥ 1	mapping table of CE-VLA	N ID to O	VC EP and it MUST NOT	
Test Object	[R35] Each S-VLAN ID value associated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC" Verify that for an Access EVPL service, the Maximum number of CE-VLAN IDs mapped to the OVC EP is > 1					
Test Configuration		associating one OVC EP at the UNI and e UNI and a specific S-VLAN ID is map			ured. One CE-VLAN ID is	
Test Configuration Schematic	Tester 1 Equipment(s) Operating at the UNI					
End Point Maps	$\begin{array}{c} \text{CE-VLAN ID} \\ X_5Y_5 \\ X_6Y_6 \end{array}$	O at UNI5 OVC End Point OVC EP5 OVC EP6 the ENNI and of other CE-VLAN IDs at the U	S-VLAN ID 555 666	Map at E	OVC End Point OVC EP ₅₅ OVC EP ₆₆	
Bandwidth Profile	OVC End Point OVC EP5 C OVC EP6 C	rofile per OVC EP at UNI ₅ Parameters CIR ₅ CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ CIR ₆ CBS ₆ EIR ₆ EBS ₆ CF ₆ CM ₆	Ingress Bandwidt OVC End Point OVC EP55 OVC EP66	CIR ₅₅ C	Per OVC EP at ENNI ₁ Parameters CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆	
Tionic	Note 1: $CIR_5 = 3$ Mbps and Note 2: $CBS_5 \ge 12176$ Bytes Note 3: EIR_5 , EIR_6 , EBS_5 , E Note 4: CM_5 and CM_6 in col Note: Use of other bandwidth prof	s and CBS ₆ \geq 12176 Bytes BS ₆ , CF ₅ and CF ₆ equal to 0	Note 1: $CIR_{55} = 3$ Mbp: Note 2: $CBS_{55} \ge 12176$ Note 3: EIR_{55} , EIR_{66} , E Note 4: CM_{55} and CM_{66}	Bytes and BS ₅₅ , EBS 6 in color-	$_{66}$ = 30 Mbps d CBS $_{66}$ \geq 12176 Bytes $_{66}$, CF $_{55}$ and CF $_{66}$ equal to 0 aware mode	
Test Procedure	Note 2: CBS ₅ ≥ 12176 Bytes Note 3: EIR ₅ , EIR ₆ , EBS ₅ , E Note 4: CM ₅ and CM ₆ in col Note: Use of other bandwidth prof • Tester 1 offers C-tagged Se Frames with CE-VLAN ID • Tester 2 verifies that all the with S-VLAN ID equal to 3 VLAN ID equal to 4 VLAN ID equal to 4 Tester 2 offers double-tagg configured in OVC ₅ . Teste equal to 666 at ENNI ₁ conf • Tester 1 verifies that all the VLAN ID equal to equal to	s and CBS ₆ ≥ 12176 Bytes BS ₆ , CF ₅ and CF ₆ equal to 0 lor-blind mode file parameter values at the UNI & ENNI is perservice Frames with CE-VLAN ID equal to 2 equal to X ₆ Y ₆ at UNI ₅ configured in the C-tagged Service Frames with CE-VLA is a telNNI ₁ configured in OVC ₅ . Testing offered at UNI ₅ are delivered double-taged ENNI frames with CE-VLAN ID equal to Z ₆ Y ₆ and CE-VLAN ID equal to Z ₆ Y ₆ are delivered double-taged ENNI frames with CE-VLAN ID equal to Z ₆ Y ₆ and Z ₆ Y ₆ are delivered double-taged ENNI frames with CE-VLAN ID equal to Z ₆ Y ₆ and Z ₆ Y ₆ are delivered double-taged ENNI frames with CE-VLAN ID equal to Z ₆ Y ₆ and Z ₆ Y ₆ and Z ₆ Y ₆ are delivered double-taged ENNI frames with CE-VLAN ID equal to Z ₆ Y ₆ and Z	Note 1: CIR ₅₅ = 3 Mbp: Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ mitted provided that the configuratory C6 Note 1: CIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ to X ₅ Y ₅ at UNI ₅ configuratory C6 No ID equal to X ₅ Y ₅ offer 2 also verifies that all the gged with S-VLAN ID equal to General Equal to equal to EVLAN ID equal to ENNI ₁ configured that all the ENNI Frames v	Bytes and BS ₅₅ , EBS ₆ in color- ration confirmation co	$_{66}$ = 30 Mbps of CBS $_{66}$ \geq 12176 Bytes of CBS $_{66}$ \geq 12176 Bytes of CF $_{55}$ and CF $_{66}$ equal to 0 aware mode forms to MEF 26.1 C_{5} and C-tagged Service of Service Frames with CE-tate ENNI $_{1}$ configured in OVC $_{6}$ ID equal to 555 at ENNI $_{1}$ of to X_{6} Y_{6} and S-VLAN ID are received C-tagged with CE-tagged with	
	Note 2: CBS ₅ ≥ 12176 Bytes Note 3: EIR ₅ , EIR ₆ , EBS ₅ , E Note 4: CM ₅ and CM ₆ in col Note: Use of other bandwidth prof • Tester 1 offers C-tagged Se Frames with CE-VLAN ID • Tester 2 verifies that all the with S-VLAN ID equal to 3 VLAN ID equal to 4 VLAN ID equal to 4 Tester 2 offers double-tagg configured in OVC ₅ . Teste equal to 666 at ENNI ₁ conf • Tester 1 verifies that all the VLAN ID equal to equal to	s and CBS ₆ ≥ 12176 Bytes BS ₆ , CF ₅ and CF ₆ equal to 0 lor-blind mode ille parameter values at the UNI & ENNI is perfectly because the equal to X_6 Y_6 at UNI ₅ configured in 0 equal to X_6 Y_6 at UNI ₅ configured in 0 equal to X_6 Y_6 at UNI ₅ configured in 10 configured in OVC ₅ . Test is offered at UNI ₅ are delivered double-taged ENNI frames with CE-VLAN ID equal equal in OVC ₆ . ENNI frames with CE-VLAN ID equal in OVC ₆ . ENNI Frames with S-VLAN ID 555 of X_5 Y_5 at UNI ₅ . Tester 1 also verifies revived C-tagged with CE-VLAN ID equal in OVC ₆ .	Note 1: CIR ₅₅ = 3 Mbp: Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ mitted provided that the configuratory C6 Note 1: CIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ to X ₅ Y ₅ at UNI ₅ configuratory C6 No ID equal to X ₅ Y ₅ offer 2 also verifies that all the gged with S-VLAN ID equal to General Equal to equal to EVLAN ID equal to ENNI ₁ configured that all the ENNI Frames v	Bytes and BS ₅₅ , EBS ₆ in color- ration confirmation co	$_{66}$ = 30 Mbps of CBS $_{66}$ \geq 12176 Bytes of CBS $_{66}$ \geq 12176 Bytes of CF $_{55}$ and CF $_{66}$ equal to 0 aware mode forms to MEF 26.1 C_{5} and C-tagged Service of Service Frames with CE-tate ENNI $_{1}$ configured in OVC $_{6}$ ID equal to 555 at ENNI $_{1}$ of to X_{6} Y_{6} and S-VLAN ID are received C-tagged with CE-tagged with	
Test Procedure	Note 2: CBS ₅ ≥ 12176 Bytes Note 3: EIR ₅ , EIR ₆ , EBS ₅ , E Note 4: CM ₅ and CM ₆ in col Note: Use of other bandwidth prof • Tester 1 offers C-tagged Se Frames with CE-VLAN ID • Tester 2 verifies that all the with S-VLAN ID equal to : VLAN ID equal to YLAN ID equal to : VLAN ID equal to Configured in OVC ₅ . Teste equal to 666 at ENNI ₁ conf • Tester 1 verifies that all the VLAN ID equal to equal to configured in OVC ₆ are rec Number of valid frames receiv	s and CBS ₆ ≥ 12176 Bytes BS ₆ , CF ₅ and CF ₆ equal to 0 lor-blind mode ille parameter values at the UNI & ENNI is perfectly because the equal to X_6 Y_6 at UNI ₅ configured in 0 equal to X_6 Y_6 at UNI ₅ configured in 0 equal to X_6 Y_6 at UNI ₅ configured in 10 configured in OVC ₅ . Test is offered at UNI ₅ are delivered double-taged ENNI frames with CE-VLAN ID equal equal in OVC ₆ . ENNI frames with CE-VLAN ID equal in OVC ₆ . ENNI Frames with S-VLAN ID 555 of X_5 Y_5 at UNI ₅ . Tester 1 also verifies revived C-tagged with CE-VLAN ID equal in OVC ₆ .	Note 1: CIR ₅₅ = 3 Mbp: Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ mitted provided that the configuration X ₅ Y ₅ at UNI ₅ configuration X ₅ Y ₅ at UNI ₅ configuration X ₅ Y ₅ offer 2 also verifies that all the gged with S-VLAN ID equal to X ₅ Y ₅ and Shes with CE-VLAN ID equal to equal to X ₅ Y ₅ and Shes with CE-VLAN ID equal to EINII configured that all the ENNI ₁ configured that all the ENNI Frames will to equal to X ₆ Y ₆ at UN	Bytes and BS ₅₅ , EBS ₆ in color- ration conformation conformation conformation conformation conformation conformation conformation at UNe et al. to 666 as S-VLAN is all to equal in OVC ₅ a with S-VL II ₅	$_{66}$ = 30 Mbps of CBS $_{66}$ \geq 12176 Bytes of CBS $_{66}$ \geq 12176 Bytes of CF $_{55}$ and CF $_{66}$ equal to 0 aware mode orms to MEF 26.1 C_5 and C-tagged Service C_5 and C-tagged Service C_5 are delivered double-tagged of Service Frames with CE-at ENNI $_1$ configured in OVC $_6$ ID equal to 555 at ENNI $_1$ of C_5 and S-VLAN ID are received C-tagged with CE-AN ID 666 offered at ENNI $_1$	
Test Procedure Units	Note 2: CBS ₅ ≥ 12176 Bytes Note 3: EIR ₅ , EIR ₆ , EBS ₅ , E Note 4: CM ₅ and CM ₆ in col Note: Use of other bandwidth prof • Tester 1 offers C-tagged Se Frames with CE-VLAN ID • Tester 2 verifies that all the with S-VLAN ID equal to 3 VLAN ID equal to X ₆ Y ₆ • Tester 2 offers double-tagg configured in OVC ₅ . Teste equal to 666 at ENNI ₁ conf • Tester 1 verifies that all the VLAN ID equal to equal to configured in OVC ₆ are rec Number of valid frames receiv	s and CBS ₆ ≥ 12176 Bytes BS ₆ , CF ₅ and CF ₆ equal to 0 lor-blind mode file parameter values at the UNI & ENNI is perior of the period o	Note 1: CIR ₅₅ = 3 Mbp: Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆₆ mitted provided that the configuration X ₅ Y ₅ at UNI ₅ configuration X ₅ Y ₅ at UNI ₅ configuration X ₅ Y ₅ offer 2 also verifies that all the gged with S-VLAN ID equal to X ₅ Y ₅ and Shes with CE-VLAN ID equal to equal to X ₅ Y ₅ and Shes with CE-VLAN ID equal to EINII configured that all the ENNI ₁ configured that all the ENNI Frames will to equal to X ₆ Y ₆ at UN	Bytes and BS ₅₅ , EBS ₆ in color- ration conformation conformation conformation conformation conformation conformation conformation at UNe et al. to 666 as S-VLAN is all to equal in OVC ₅ a with S-VL II ₅	$_{66}$ = 30 Mbps of CBS $_{66}$ \geq 12176 Bytes of CBS $_{66}$ \geq 12176 Bytes of CF $_{55}$ and CF $_{66}$ equal to 0 aware mode orms to MEF 26.1 C_5 and C-tagged Service C_5 and C-tagged Service C_5 are delivered double-tagged of Service Frames with CE-at ENNI $_1$ configured in OVC $_6$ ID equal to 555 at ENNI $_1$ of C_5 and S-VLAN ID are received C-tagged with CE-AN ID 666 offered at ENNI $_1$	



Test Case 3.2: OVC Maximum Transmission Unit Size

Abstract Test Suite for Ethernet Access Services							
Test Name	OVC Maximum Transm	ission Unit Size	2				
Test Definition ID	AEVPL3_R22_R23_R25_R28_R35						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	[R25] For an Access EV contain all CE-VLAN II [R22] The Maximum nu [R23] Maximum number	PL service, the values mappe mber of OVCs of CE-VLAN	OVC EP Map MUST spd to a single OVC per UNI MUST be ≥ 1 IDs per OVC: The end p	ecify n	ap MUST support a value	N ID to	er of bytes ≥1526 OVC EP and it MUST NOT inct End Point, of Type = "OVC"
Test Object	Verify that for an Access	EVPL service	, the OVC Maximum Tra	nsmiss	ion Unit Size is an integer	r numbe	r of bytes ≥1526
Test Configuration					ne OVC EP at the ENNI a bed to each OVC EP at the		gured. One CE-VLAN ID is
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Equipmer Operation the UN OVC E	Access U	EVPI nder OVC	Services Test	equipmer perating the ENN OVC EP	Tester 2 I
		Map at UNI	5]	Map at	ENNI ₁
End Point	CE-VLAN I	D	OVC End Point] [S-VLAN ID		OVC End Point
Maps	15 16		OVC EP ₅ OVC EP ₆		555 666		OVC EP ₅₅ OVC EP ₆₆
		IDs at the ENNI		Os at the		at the con	figuration conforms to MEF 26.1
	Ingress Bandwid		r OVC EP at UNI ₅ Parameters		Ingress Bandwidt OVC End Point	h Profi	le per OVC EP at ENNI ₁ Parameters
	OVC EP ₅		5 EIR5 EBS5 CF5 CM5		OVC EP ₅₅		CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅
Bandwidth Profile					$R_{66} = 30 \text{ Mbps}$ nd $CBS_{66} \ge 12176 \text{ Bytes}$ $3S_{66}$, CF_{55} and CF_{66} equal to 0 r-aware mode		
Test Procedure	 Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 and frame size equal to the OVC₅ MTU size at UNI₅ configured in OVC₆ and C-tagged Service Frames with CE-VLAN ID equal to 16 and frame size equal to the OVC₆ MTU size at UNI₅ configured in OVC₆ Tester 2 verifies that all the C-tagged Service Frames with CE-VLAN ID equal to 15 offered at UNI₅ 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 C-tagged Service Frames with CE-VLAN ID equal to 16 offered at UNI₅ are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 at ENNI₁ configured in OVC₆ Tester 2 offers double-tagged ENNI frames with CE-VLAN ID equal to 15, S-VLAN ID equal to 555 and frame size equal to the OVC₅ MTU size at ENNI₁ configured in OVC₅. Tester 2 also offers double-tagged ENNI frames with CE-VLAN ID equal to 16, S-VLAN ID equal to 666 and frame size equal to the OVC₆ MTU size at ENNI₁ configured in OVC₆ Tester 1 verifies that all the ENNI Frames with S-VLAN ID 555 offered at ENNI₁ configured in OVC₅ are received C-tagged with CE-VLAN ID equal to 15 at UNI₅. Tester 1 also verifies that all the ENNI Frames with S-VLAN ID 666 offered at ENNI₁ configured in OVC₆ are received C-tagged with CE-VLAN ID equal to 16 at UNI₅ 						
Units	Number of valid frames	received at the	external interfaces				
Variables	OVC MTU size, UNI an	d ENNI interfa	ce speeds and bandwidth	profile	parameters CBS ₅ , CBS ₆ ,	CBS _{55,} C	CBS ₆₆
Results	Pass or fail						
Remarks	Note 1: OVC MTU size Note 2: The OVC MTU OVC					VC EP e	exists that is associated by the



Test Case 4.2: CE-VLAN ID Preservation

	s				
Test Name CE-VLAN ID Preservation					
Test Definition ID AEVPL4_R22_R23_R25_R29_R35	AEVPL4_R22_R23_R25_R29_R35				
Test Type Conformance					
Test Status Mandatory					
Requirement Description Contain all CE-VLAN ID values mapped to a single OVC [R22] The Maximum number of OVCs per UNI MUST be ≥ 1	[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				
Test Object Verify that for an Access EVPL service, all CE-VLAN IDs mapped to the OVC are preser	ved				
Test Configuration At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to each OVC EP at the UNI and D-VLAN ID is mapped to ea					
Test Configuration Schematic Test	Equipment Operating at the ENNI OVC EPss ENNI Ethernet Traffic Generator Analyzer				
Map at UNI ₅ CE-VLAN ID OVC End Point S-VLAN	Map at ENNI ₁ VID OVC End Point				
End Point	OVC EP ₅₅ OVC EP ₆₆				
OVC End Point Parameters OVC End Point OVC EP5 CIR5 CBS5 EIR5 EBS5 CF5 CM5 OVC EP55 OVC EP6 CIR6 CBS6 EIR6 EBS6 CF6 CM6 OVC EP66	ndwidth Profile per OVC EP at ENNI ₁				
Note 2: $CBS_5 \ge 12176$ Bytes and $CBS_6 \ge 12176$ Bytes Note 2: $CBS_{55} \ge 12176$ Bytes Note 3: EIR_5 , EIR_6 , EBS_5 , EBS_6 , CF_5 and CF_6 equal to 0 Note 3: EIR_{55} , E	12176 Bytes and CBS ₆₆ \geq 12176 Bytes IR ₆₆ , EBS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 d CM ₆₆ in color-aware mode				
	 Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 at UNI₅ configured in OVC₅ and C-tagged Service Frames with CE-VLAN ID equal to 16 at UNI₅ configured in OVC₆ Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to 15 at UNI₅ 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 the C-tagged Service Frames offered with CE-VLAN ID equal to 16 at UNI₅ are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16 at ENNI₁ configured in OVC₆ Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI₁ configured in OVC₆ Tester 1 verifies that the ENNI Frames offered at ENNI₁ double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 are received C-tagged at UNI₅ configured in OVC₅ with CE-VLAN ID equal to 15 and that the ENNI Frames offered at ENNI₁ double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal				
with CE-VLAN ID equal to 16 at UNI ₅ configured in OVC ₆ • Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Frames offered with CE-VLAN ID equal to 16 at UNI ₅ are delivered double-tagged wit equal to 666 at ENNI ₁ configured in OVC ₆ • Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15 and S-VLAN OVC ₅ and double-tagged ENNI Frames with CE-VLAN IDs equal to 16 and S-VLAN OVC ₆ • Tester 1 verifies that the ENNI Frames offered at ENNI ₁ double-tagged with CE-VLAN are received C-tagged at UNI ₅ configured in OVC ₅ with CE-VLAN ID equal to 15 and tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 are received C-tag	Tester 2 also verifies that the C-tagged Service h CE-VLAN ID equal to 16 and S-VLAN ID AN ID equal to 555 at ENNI ₁ configured in ID equal to 666 at the ENNI ₁ configured in ID equal to 15 and S-VLAN ID equal to 555 that the ENNI Frames offered at ENNI ₁ double-				
with CE-VLAN ID equal to 16 at UNI ₅ configured in OVC ₆ • Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Frames offered with CE-VLAN ID equal to 16 at UNI ₅ are delivered double-tagged wit equal to 666 at ENNI ₁ configured in OVC ₆ • Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15 and S-VLAN OVC ₅ and double-tagged ENNI Frames with CE-VLAN IDs equal to 16 and S-VLAN OVC ₆ • Tester 1 verifies that the ENNI Frames offered at ENNI ₁ double-tagged with CE-VLAN are received C-tagged at UNI ₅ configured in OVC ₅ with CE-VLAN ID equal to 15 and tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 are received C-tag	Tester 2 also verifies that the C-tagged Service h CE-VLAN ID equal to 16 and S-VLAN ID AN ID equal to 555 at ENNI ₁ configured in ID equal to 666 at the ENNI ₁ configured in ID equal to 15 and S-VLAN ID equal to 555 that the ENNI Frames offered at ENNI ₁ double-				
with CE-VLAN ID equal to 16 at UNI ₅ configured in OVC ₆ • Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Frames offered with CE-VLAN ID equal to 16 at UNI ₅ are delivered double-tagged wit equal to 666 at ENNI ₁ configured in OVC ₆ • Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15 and S-VLAN OVC ₅ and double-tagged ENNI Frames with CE-VLAN IDs equal to 16 and S-VLAN OVC ₆ • Tester 1 verifies that the ENNI Frames offered at ENNI ₁ double-tagged with CE-VLAN are received C-tagged at UNI ₅ configured in OVC ₅ with CE-VLAN ID equal to 15 and tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 16	Tester 2 also verifies that the C-tagged Service h CE-VLAN ID equal to 16 and S-VLAN ID AN ID equal to 555 at ENNI ₁ configured in ID equal to 666 at the ENNI ₁ configured in IV ID equal to 15 and S-VLAN ID equal to 555 that the ENNI Frames offered at ENNI ₁ doubleged at UNI ₅ configured in OVC ₆ with CE-				
with CE-VLAN ID equal to 16 at UNI₃ configured in OVC₆ • Tester 2 verifies that the C-tagged Service Frames offered with CE-VLAN ID equal to CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI₁ configured in OVC₆. Frames offered with CE-VLAN ID equal to 16 at UNI₃ are delivered double-tagged wit equal to 666 at ENNI₁ configured in OVC₆ • Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equal to 15 and S-VLAN OVC₆ • Tester 2 offers double-tagged ENNI Frames with CE-VLAN IDs equal to 16 and S-VLAN OVC₆ • Tester 1 verifies that the ENNI Frames offered at ENNI₁ double-tagged with CE-VLAN are received C-tagged at UNI₃ configured in OVC₆ with CE-VLAN ID equal to 15 and tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 are received C-tag VLAN ID equal to 16 Units CE-VLAN ID and S-VLAN ID values	Tester 2 also verifies that the C-tagged Service h CE-VLAN ID equal to 16 and S-VLAN ID and ID equal to 555 at ENNI ₁ configured in ID equal to 666 at the ENNI ₁ configured in ID equal to 15 and S-VLAN ID equal to 555 that the ENNI Frames offered at ENNI ₁ doubleged at UNI ₅ configured in OVC ₆ with CE-				



Test Case 5.2: CE-VLAN CoS ID Value Preservation

	A	bstract Te	est Suite for Etherne	t A	ccess Services		
Test Name	CE-VLAN CoS ID Value	Preservation					
Test Definition ID	AEVPL5_R22_R23_R25_R30_R35						
Test Type	Conformance						
Test Status	Mandatory						
Requirement Description	[R25] For an Access EVI contain all CE-VLAN ID [R22] The Maximum nun [R23] Maximum number	PL service, the values mappe of OVCs of CE-VLAN	ed to a single OVC s per UNI MUST be ≥ 1 I IDs per OVC: The end poi	rify m nt Ma	napping table of CE-VLA ap MUST support a value	e = 1	OVC EP and it MUST NOT inct End Point, of Type = "OVC"
Test Object	Verify that for an Access	EVPL service	e, the CE-VLAN CoS are pr	eserv	/ed		
Test Configuration			ng one OVC EP at a UNI and				ured. One CE-VLAN ID with all ach OVC EP at the ENNI
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer	Equipme Operatir the U	Access E Un		Services Test	equipment perating the ENN	Tester 2 ENNI Ethernet Traffic Generator
End Point Maps	CE-VLAN II	Map at UN	OVC End Point OVC EP ₅		S-VLAN ID 555	Map at	OVC End Point OVC EP ₅₅
Waps	Note: Use of other S-VLAN	Ds at the ENNI	OVC EP ₆ and use of other CE-VLAN IDs	at the	666 UNI is permitted provided the	at the con	OVC EP ₆₆ diguration conforms to MEF 26.1
		th Profile pe	er OVC EP at UNI5			h Profi	le per OVC EP at ENNI ₁
	OVC End Point OVC EP5	CID CDS	Parameters S ₅ EIR ₅ EBS ₅ CF ₅ CM ₅		OVC End Point OVC EP55	CID	Parameters CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅
Bandwidth	OVC EP ₅ OVC EP ₆		5 ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ 6 ₆ EIR ₆ EBS ₆ CF ₆ CM ₆		OVC EP ₅₅		CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆
Profile	Note 1: $CIR_5 = 3$ Mbps Note 2: $CBS_5 \ge 12176$ Note 3: EIR_5 , EIR_6 ,	and CIR ₆ = 3 Bytes and CB S ₅ , EBS ₆ , CF ₅ in color-blind	0 Mbps $S_6 \ge 12176$ Bytes and CF_6 equal to 0	permit	Note 1: $CIR_{55} = 3$ Mbp Note 2: $CBS_{55} \ge 12176$ Note 3: EIR_{55} , EIR_{66} , EIR_{65} , EIR_{65} , and EIR_{65} , and EIR_{65}	s and CI Bytes a BS ₅₅ , EE 6 in colo	$R_{66} = 30 \text{ Mbps}$ and $CBS_{66} \ge 12176 \text{ Bytes}$ $R_{66} = 12176 \text{ Bytes}$
Test Procedure	 Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 at UNI₅ configured in OVC₅ and C-tagged Service Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 at UNI₅ configured in OVC₆ Tester 2 verifies that the C-tagged Service Frames offered at UNI₅ with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 15. CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 555 at ENNI₁ configured in OVC₅. Tester 2 also verifies that the C-tagged Service Frames offered at UNI₅ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 are delivered double-tagged with CE-VLAN ID equal to 16, CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 066 at ENNI₁ configured in OVC₆ 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 555 at ENNI₁ configured in OVC₅ and double-tagged ENNI Frames with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 at the ENNI₁ configured in OVC₆ Tester 1 verifies that the ENNI Frames offered at ENNI₁ double-tagged with CE-VLAN ID equal to 15 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 555 are received C-tagged at UNI₅ configured in OVC₅ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 are received C-tagged at UNI₅ configured in OVC₆ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 are received C-tagged at UNI₅ configured in OVC₆ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 are received C-tagged at UNI₅ configured in OVC₆ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 and S-VLAN ID equal to 666 are received C-tagged at UNI₅ configured in OVC₆ with CE-VLAN ID equal to 16 and CE-VLAN CoS equal to 0,1,27 						
Units	CE-VLAN ID, CE-VLAI	N CoS and S-	VLAN ID values				
Variables	UNI and ENNI interface	speeds and ba	ndwidth profile parameters	CBS:	5, CBS ₆ , CBS ₅₅ , CBS ₆₆		
Results	Pass or fail						
Remarks	C-tag and S-VLAN ID fo	rmats are spe	cified in IEEE 802.1ad secti	ons 9	0.5, 9.6 and 9.7		



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

Test Definition B AEVPLA, R22, R23, R25, R32, R35 Test Type Conformance Test Status Requirement Description Read to the second of th		Abstract Tes	t Suite for Ethernet A	ccess Services			
Test Type Conformance Test Status Mandaory Requirement Description At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the ENNI are configurated. One CE-VLAN ID is mapped to each OVC EP at the UNI and one OVC EP at the UNI and one OVC EP at the ENNI are configurated one CE-VLAN ID is mapped to each OVC EP at the UNI and one OVC EP at the UNI an	Test Name	Unicast, Multicast and Broadcast Uncon-	ditional Frame Delivery				
Test Object Verify that for an Access EVPL service, the unicast, multicast and broadcast frames unconditionally or deliver them conditionally. If delivered conditionally, MLST specify the delivery criteria. [PA25] For an Access EVPL service, the OVC EP Map MLST specify mapping table of CE-VLAN ID to OVC EP and it MUST NOT [PA25] Maximum number of CE-VLAN ID to per OVC. The end point Map MUST support a value = 1 [PA35] Each SLANA ID value as consisted with an internet of Access EVPL service MUST mpot of a stinct End Point, of Type = "OVC" Test Object Verify that for an Access EVPL service, the unicast, multicast and broadcast frames are delivered unconditionally Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test Object Access EVPL service, the unicast, multicast and broadcast frames are delivered unconditionally Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test Object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test Object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Access EVPL service MUST map to a distinct End Point, of Type = "OVC" Test object Test ob		AEVPL6_R22_R23_R25_R32_R35					
Requirement Description Regularement Page P	Test Type	Conformance					
Requirement Description RE25 For a Access EVPL service, the OVE EP May 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 CE-VLAN IDs per OVC: The end point Map MUST support a value = 1 [R35] Each S-VLAN ID values mapped to OVCs per volk MUST be 2 [R35] Maximum number of CE-VLAN IDs per OVC: The end point Map MUST support a value = 1 [R35] Each S-VLAN ID value saccinated with an instance of Access EVPL Service MUST map to a distinct End Point, of Type = "OVC" Test Object Test Configuration At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the ENNI are configured. One CE-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI Test Configuration Schematic Test Configuration Test Configuration At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the ENNI are configured. One CE-VLAN ID is mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI Test Configuration At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the ENNI are configured. One CE-VLAN ID is mapped to each OVC EP at the ENNI ACCESS EVPL Services Under Test Configuration At least two OVCs, each one associated with an appetite S-VLAN ID one one of the ENNI Test Configuration At least two OVCs, each one associated with an appetite S-VLAN ID one one of the ENNI ACCESS EVPL Services Under Test OVC EP at CEN ENNI SVLAN ID OVC End Doint SVLAN ID OVC EPs OVC END OVC EPs O	Test Status	Mandatory					
At least two OVCs, each one associating one OVC EP at the UNI and one OVC EP at the ENNI are configured. One CE-VLAN ID is mapped to each OVC EP at the ENNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI and the ENNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI and the EN	_	delivered conditionally, MUST specify t [R25] For an Access EVPL service, the Contain all CE-VLAN ID values mapped [R22] The Maximum number of OVCs F [R23] Maximum number of CE-VLAN I	[R32] For an Access EVPL service, deliver unicast, multicast and broadcast frames unconditionally or deliver them conditionally. If delivered conditionally, MUST specify the delivery criteria. [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				
mapped to each OVC EP at the UNI and a specific S-VLAN ID is mapped to each OVC EP at the ENNI Test Configuration Schematic	Test Object	Verify that for an Access EVPL service,	the unicast, multicast and broad	dcast frames are delivered	l uncondi	tionally	
Test Configuration Schematic Map at UNIs	* ** *					gured. One CE-VLAN ID is	
CE-VLAN ID GVC End Point 15 GVC Eps 555 GVC Eps 555 GVC Eps 666 GVC Eps	Configuration	Tester 1 Operating the UNI Ethernet Traffic Generator	Access EVPL Under	Services Test	perating of the ENNI	Tester 2 ENNI Ethernet Traffic Generator	
Solution					Map at I		
Note: Use of other S-VLAN IDs at the ENNI and use of other CE-VLAN IDs at the UNI is permitted provided that the configuration conforms to MEF 26.1 Ingress Bandwidth Profile per OVC EP at UNIs	End Point						
Ingress Bandwidth Profile per OVC EP at UNIs OVC End Point Parameters	Maps						
Test Procedure Test Procedure Test Procedure Test Procedure Test Procedure UNI ₅ configured in OVC ₅ and C-tagged Service Frames with CE-VLAN ID equal to 15 offered at UNI ₅ are delivered double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Tester 2 also verifies that all the unicast, multicast and broadcast C-tagged Service Frames with CE-VLAN ID 16 offered at UNI ₅ are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 at ENNI ₁ configured in OVC ₆ . Tester 2 offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₆ . Tester 2 offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₆ . Tester 1 verifies that all the unicast, multicast and broadcast ENNI frames with S-VLAN ID 555 offered at ENNI ₁ configured in OVC ₆ Tester 1 verifies that all the unicast, multicast and broadcast ENNI Frames with S-VLAN ID 666 offered at ENNI ₁ configured in OVC ₆ Tester 1 verifies that all the unicast, multicast and broadcast ENNI Frames with S-VLAN ID 666 offered at ENNI ₁ configured in OVC ₆ are received C-tagged with CE-VLAN ID equal to 16 at UNI ₅ . Units Number of valid frames received at the external interfaces UNI and ENNI interface speeds and bandwidth profile parameters CBS ₅ , CBS ₆ , CBS ₅₅ , CBS ₆₆			Parameters EIR ₅ EBS ₅ CF ₅ CM ₅ EIR ₆ EBS ₆ CF ₆ CM ₆ Mbps $_{5} \ge 12176$ Bytes and CF ₆ equal to 0 anode	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	CIR ₅₅ CIR ₆₆ s and CIF Bytes and CBS ₅₅ , EBC ₆ in color	Parameters CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ $R_{66} = 30 \text{ Mbps}$ Id CBS ₆₆ $\geq 12176 \text{ Bytes}$ S ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 -aware mode	
Units Number of valid frames received at the external interfaces Variables UNI and ENNI interface speeds and bandwidth profile parameters CBS ₅ , CBS ₆ , CBS ₅₅ , CBS ₆₆	Test Procedure	UNI ₅ configured in OVC ₅ and C-tagged Service Frames with CE-VLAN ID equal to 16 with unicast, multicast and broadcast destination address at UNI ₅ configured in OVC ₆ • Tester 2 verifies that all the unicast, multicast and broadcast C-tagged Service Frames with CE-VLAN ID equal to 15 offered at UNI ₅ are delivered double-tagged with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Tester 2 also verifies that all the unicast, multicast and broadcast C-tagged Service Frames with CE-VLAN ID 16 offered at UNI ₅ are delivered double-tagged with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 at ENNI ₁ configured in OVC ₆ • Tester 2 offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 15 and S-VLAN ID equal to 555 at ENNI ₁ configured in OVC ₅ . Tester 2 also offers unicast, multicast and broadcast double-tagged ENNI frames with CE-VLAN ID equal to 16 and S-VLAN ID equal to 666 at ENNI ₁ configured in OVC ₆ • Tester 1 verifies that all the unicast, multicast and broadcast ENNI Frames with S-VLAN ID 555 offered at ENNI ₁ configured in OVC ₅ are received C-tagged with CE-VLAN ID equal to 15 at UNI ₅ . Tester 1 also verifies that all the unicast, multicast and broadcast ENNI					
	Units					•	
Results Pass or fail				5, CBS ₆ , CBS ₅₅ , CBS ₆₆			
	Results						
Remarks The multicast frames MUST NOT be Layer 2 Control Protocol frames			yer 2 Control Protocol frames				



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	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	[R36] The Access EVPL Service MUST be configurable to tunnel all defined in the SOAM FM IA (MEF 30) document, section 7.1 [R25] For an Access EVPL service, the OVC EP Map MUST specify 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 [R35] Each S-VLAN ID value associated with an instance of Access	w mapping table of CE-VLAN ID to OVC EP and it MUST NOT Map MUST support a value = 1 EVPL Service MUST map to a distinct End Point, of Type = "OVC"			
Test Object	Verify that for an Access EVPL service, CCM frames are tunneled at SOAM FM IA (MEF 30), section 7.1	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	Ethernet Traffic Generator Analyzer	PL Services PL Services OVC EP ₅₅ OVC EP ₆₆ PL Services Tester 2 Tester 2 Tester 2 Traffic Generator Analyzer			
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			
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	 Tester 1 offers untagged CCM messages at MEG level 5 and 6 at UNI₅ configured in OVC₅ Tester 2 verifies that all the untagged CCM messages at MEG level 5 and 6 offered at UNI₅ are delivered single-tagged with S-VLAN ID equal to 555 at ENNI₁ configured in OVC₅ Tester 2 offers single-tagged CCM messages at MEG level 5 and 6 with S-VLAN ID equal to 555 at ENNI₁ configured in OVC₅ 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 ENNI₁ are received untagged at UNI₅ configured in OVC₅ 				
Units	Number of valid frames received at the external interfaces				
Variables	UNI and ENNI interface speeds and bandwidth profile parameters CE	3S ₅ , CBS ₆ , CBS ₅₅ , CBS ₆₆			
Results	Pass or fail				
Remarks					



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

	Abstract Te	st Suite for Ethernet A	Access Services			
Test Name	Service OAM Linktrace Messages (LTI	M/LTR) Handling				
Test Definition ID	AEVPL8_R22_R23_R25_R35_R36					
Test Type	Conformance					
Test Status	Mandatory if untagged and priority tagg	ged frames are supported				
Requirement Description	defined in the SOAM FM IA (MEF 30) [R25] For an Access EVPL service, the contain all CE-VLAN ID values mappe [R22] The Maximum number of OVCs [R23] Maximum number of CE-VLAN	[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 [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 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 and					
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Tester 1 Equipme Operating the UN OVC E	Access EVP Under Ps	L Services Test C ₅	DVC EP66 DVC EP66 ENNI Ethernet Traffic Generator Analyzer		
	Map at UNI CE-VLAN ID	OVC End Point	S-VLAN ID	Map at ENNI ₁ OVC End Point		
End Point Maps	15* 16	OVC EP ₅	555	OVC EP55		
		OVC EP ₆	666	OVC EP ₆₆		
·	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration conf			OVC EP ₆₆ for untagged and priority tagged frames is		
·	Note: Use of other S-VLAN IDs at the ENNI,	use of other CE-VLAN IDs at the U	NI and of other CE-VLAN ID			
	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration confunction of the Ingress Bandwidth Profile per OVC End Point	use of other CE-VLAN IDs at the U forms to MEF 26.1 r OVC EP at UNI ₅ Parameters	NI and of other CE-VLAN ID ² Ingress Bandwidt OVC End Point	h Profile per OVC EP at ENNI ₁ Parameters		
·	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration c	use of other CE-VLAN IDs at the U forms to MEF 26.1 r OVC EP at UNI ₅ Parameters s EIR ₅ EBS ₅ CF ₅ CM ₅	Ingress Bandwidt OVC End Point OVC EP55	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅		
Bandwidth Profile	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration c	use of other CE-VLAN IDs at the U forms to MEF 26.1 r OVC EP at UNI ₅ Parameters $_5$ EIR $_5$ EBS $_5$ CF $_5$ CM $_5$ $_6$ EIR $_6$ EBS $_6$ CF $_6$ CM $_6$ O Mbps $_6$ \geq 12176 Bytes and CF $_6$ equal to 0 mode	NI and of other CE-VLAN ID: Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: $CIR_{55} = 3$ Mbp Note 2: $CBS_{55} \ge 12176$ Note 3: EIR_{55} , EIR_{66} , E Note 4: CM_{55} and CM_{66}	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode		
Bandwidth	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration confunction of the provided provided that the configuration confunction of the provided provided that the configuration confunction of the provided pro	use of other CE-VLAN IDs at the U forms to MEF 26.1 r OVC EP at UNI ₅ Parameters 5 EIR ₅ EBS ₅ CF ₅ CM ₅ 6 EIR ₆ EBS ₆ CF ₆ CM ₆ 0 Mbps 8 ₆ ≥ 12176 Bytes and CF ₆ equal to 0 mode er values at the UNI & ENNI is perm TR messages at MEG level 5 at 1 LTM and LTR messages at M configured in OVC ₅ and LTR messages at MEG level gged LTM and LTR messages	Ingress Bandwidt OVC End Point OVC EP66 Note 1: CIR55 = 3 Mbp Note 2: CBS55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM6 itted provided that the configured in EG level 5 and 6 offered a	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 in color-aware mode ration conforms to MEF 26.1 OVC ₅ t UNI ₅ are delivered single-tagged with equal to 555 at ENNI ₁ configured in		
Bandwidth Profile	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration configuration configuration provided that the configuration configura	use of other CE-VLAN IDs at the U orms to MEF 26.1 r OVC EP at UNI ₅ Parameters 5 EIR ₅ EBS ₅ CF ₅ CM ₅ 6 EIR ₆ EBS ₆ CF ₆ CM ₆ 0 Mbps 30 A ≥ 12176 Bytes 31 CF ₆ equal to 0 32 mode 33 er values at the UNI & ENNI is perm 34 LTM and LTR messages at M 35 configured in OVC ₅ 36 and LTR messages at MEG level 37 and LTR messages at MEG level 38 and LTM and LTR messages at MEG level 39 and LTM and LTR messages at MEG level 30 and LTM and LTR messages at MEG level 30 and LTM and LTR messages at MEG level 31 and LTM and LTM messages at MEG level 32 and LTM and LTM messages at MEG level	Ingress Bandwidt OVC End Point OVC EP66 Note 1: CIR55 = 3 Mbp Note 2: CBS55 ≥ 12176 Note 3: EIR55, EIR66, E Note 4: CM55 and CM6 itted provided that the configured in EG level 5 and 6 offered a	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 6 in color-aware mode ration conforms to MEF 26.1 OVC ₅ t UNI ₅ are delivered single-tagged with equal to 555 at ENNI ₁ configured in		
Bandwidth Profile	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration confunction of the provided provided that the configuration confunction of the provided provided that the configuration confunction of the provided prov	use of other CE-VLAN IDs at the User State of MEF 26.1 r OVC EP at UNI ₅ Parameters 5 EIR ₅ EBS ₅ CF ₅ CM ₅ 6 EIR ₆ EBS ₆ CF ₆ CM ₆ 0 Mbps S ₆ ≥ 12176 Bytes and CF ₆ equal to 0 mode er values at the UNI & ENNI is perm TR messages at MEG level 5 at LTM and LTR messages at M configured in OVC ₅ and LTM messages at MEG level gged LTM and LTR messages at Seconfigured in OVC ₅ configured in OVC ₅ external interfaces	Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆ iitted provided that the configuration of at UNI ₅ configured in EG level 5 and 6 offered at 15 and 6 with S-VLAN ID at MEG level 5 and 6 with	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 6 in color-aware mode ration conforms to MEF 26.1 OVC ₅ t UNI ₅ are delivered single-tagged with equal to 555 at ENNI ₁ configured in		
Bandwidth Profile Test Procedure Units	Note: Use of other S-VLAN IDs at the ENNI, permitted provided that the configuration	use of other CE-VLAN IDs at the User State of MEF 26.1 r OVC EP at UNI ₅ Parameters 5 EIR ₅ EBS ₅ CF ₅ CM ₅ 6 EIR ₆ EBS ₆ CF ₆ CM ₆ 0 Mbps S ₆ ≥ 12176 Bytes and CF ₆ equal to 0 mode er values at the UNI & ENNI is perm TR messages at MEG level 5 at LTM and LTR messages at M configured in OVC ₅ and LTM messages at MEG level gged LTM and LTR messages at Seconfigured in OVC ₅ configured in OVC ₅ external interfaces	Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆ iitted provided that the configuration of at UNI ₅ configured in EG level 5 and 6 offered at 15 and 6 with S-VLAN ID at MEG level 5 and 6 with	h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 in color-aware mode ration conforms to MEF 26.1 OVC ₅ t UNI ₅ are delivered single-tagged with equal to 555 at ENNI ₁ configured in		



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

	Abstract Tes	st Suite for Ethernet A	Access Services		
Test Name	Service OAM Loopback Messages (LBM	M/LBR) Handling			
Test Definition ID	AEVPL9_R22_R23_R25_R35_R36				
Test Type	Conformance				
Test Status	Mandatory if untagged and priority tagge	ed frames are supported			
Requirement Description		document, section 7.1 OVC EP Map MUST specify I to a single OVC per UNI MUST be ≥ 1 IDs per OVC: The end point M d with an instance of Access E	mapping table of CE-VLA fap MUST support a value VPL Service MUST map	N ID to OVC EP and it MUST NOT $= 1$ to a distinct End Point, of Type = "OVC"	
Test Object	Verify that for an Access EVPL service, the SOAM FM IA (MEF 30), section 7.1		neled at the default Test, a	nd Subscriber MEG levels as defined in	
Test Configuration	At least two OVCs, each one associating mapped to each OVC EP at the UNI and				
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Tester 1 UNIs OVC EF	Access EVP Under	L Services Test C ₅	DVC EP66 DVC EP66 ENNI Ethernet Traffic Generator Analyzer	
	Map at UNI₅ CE-VLAN ID			Map at ENNI ₁ OVC End Point	
End Point	CE-VLAN ID 15*	OVC End Point OVC EP ₅	S-VLAN ID 555	OVC End Point OVC EP ₅₅	
End Point Maps	CE-VLAN ID	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the U	S-VLAN ID 555 666	OVC End Point OVC EP ₅₅ OVC EP ₆₆	
	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, t permitted provided that the configuration confo	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the Urms to MEF 26.1	S-VLAN ID 555 666 NI and of other CE-VLAN ID	OVC End Point OVC EP ₅₅ OVC EP ₆₆ For untagged and priority tagged frames is	
	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, upermitted provided that the configuration conformation of the configuration conformation of the configuration conformation of the configuration of the con	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the Urms to MEF 26.1 OVC EP at UNI ₅ Parameters	S-VLAN ID 555 666 NI and of other CE-VLAN ID	OVC End Point OVC EP ₅₅ OVC EP ₆₆ For untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters	
Maps	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, t permitted provided that the configuration conformation of the configuration	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the U orms to MEF 26.1 OVC EP at UNI ₅ Parameters EIR ₅ EBS ₅ CF ₅ CM ₅	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP55	OVC End Point OVC EP ₅₅ OVC EP ₆₆ For untagged and priority tagged frames is Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅	
	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, t permitted provided that the configuration conformation of the configuration	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the U OVC EP at UNI ₅ Parameters EIR ₅ EBS ₅ CF ₅ CM ₅ EIR ₆ EBS ₆ CF ₆ CM ₆ Mbps ind CF ₆ equal to 0 mode	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt 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	OVC End Point OVC EP ₅₅ OVC EP ₆₆ * for untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ ≥ 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode	
Maps Bandwidth	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, t permitted provided that the configuration conformation of the configuration conformation of the configuration conformation of the configuration conformation of the configuration conformatical configuration conformation of the configuration conformation of the configuration conformation of the configuration of the conf	OVC EP OV	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆ itted provided that the configured in the configured	OVC End Point OVC EP ₅₅ OVC EP ₆₆ * for untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode ration conforms to MEF 26.1	
Maps Bandwidth Profile	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, upermitted provided that the configuration conformation of the configuration of the con	OVC End Point OVC EP ₅ OVC EP ₆ use of other CE-VLAN IDs at the U OTHER OF THE PART OF	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , E Note 4: CM ₅₅ and CM ₆ itted provided that the configured in the configured	OVC End Point OVC EP ₅₅ OVC EP ₆₆ For untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode ration conforms to MEF 26.1	
Bandwidth Profile Test Procedure	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, the permitted provided that the configuration conformation of the permitted provided that the permitted provided p	OVC EP OVC EV OVC EP OVC EP OVC EV OVC EP OVC EV OV	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , Ellow at CM ₅₅ and CM ₆ itted provided that the configured in the configured of at UNI ₅ configured in the configu	OVC End Point OVC EP ₅₅ OVC EP ₆₆ For untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode ration conforms to MEF 26.1	
Bandwidth Profile Test Procedure Units	CE-VLAN ID 15* 16 Note: Use of other S-VLAN IDs at the ENNI, the permitted provided that the configuration conformation of the permitted provided that the permitted provi	OVC EP OVC EV OVC EP OVC EP OVC EV OVC EP OVC EV OV	S-VLAN ID 555 666 NI and of other CE-VLAN ID Ingress Bandwidt OVC End Point OVC EP ₅₅ OVC EP ₆₆ Note 1: CIR ₅₅ = 3 Mbp Note 2: CBS ₅₅ ≥ 12176 Note 3: EIR ₅₅ , EIR ₆₆ , Ellow at CM ₅₅ and CM ₆ itted provided that the configured in the configured of at UNI ₅ configured in the configu	OVC End Point OVC EP ₅₅ OVC EP ₆₆ * for untagged and priority tagged frames is h Profile per OVC EP at ENNI ₁ Parameters CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ CIR ₆₆ CBS ₆₆ EIR ₆₆ EBS ₆₆ CF ₆₆ CM ₆₆ s and CIR ₆₆ = 30 Mbps Bytes and CBS ₆₆ \geq 12176 Bytes BS ₅₅ , EBS ₆₆ , CF ₅₅ and CF ₆₆ equal to 0 s in color-aware mode ration conforms to MEF 26.1	



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 Enforceme	nt Range 1			
Test Definition ID	AEVPL10_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[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 [R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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				
Test Object	the UNI and Color Forwarding is Yes, the bandwidth profile is applie and the amount of Green traffic delivered at the egress OVC EP is wi	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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNI and a specific S-VLAN ID is mapped to the OVC EP at the		CE-VLAN ID is mapped to the OVC EP		
Test Configuration Schematic	Ethernet Traffic Generator Government Over EPs		OVC EPss Tester 2 ENNI ENNI ENNI Ethernet Traffic Generator Analyzer		
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN I 555	OVC EP ₅₅		
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Ingress Bandwidtl OVC End Point OVC EP ₅₅ Note 1: CIR ₅₅ = 3 Mbps Note 2: CBS ₅₅ \geq 12176 l Note 3: EIR ₅₅ , EBS ₅₅ , an Note 4: CM ₅₅ in color-av	d CF ₅₅ equal to 0		
Test Procedure	 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 CIR₅ to the ingress OVC End Point (OVC EP₅ at UNI₅) during a time interval T 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 EP₅₅ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₅₅ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₅₅ at ENNI₁ 				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval	al T , tolerance F_{CIR} and band	width profile parameters CBS ₅ , CBS ₅₅		
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 number 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 Ether	net Access Servic	es		
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI – CBS Enfo	cement Range 1			
Test Definition ID	AEVPL11_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory				
Requirement Description	[R26] The CoS Identifier for Service Frames MUST be the OV a single CoS Name [R27] Ingress Bandwidth Profile per OVC EP at a UNI is requi • 1 – 10 Mb/s, increments of 1 Mbps (Rang • 10 – 100 Mb/s, increments of 10 Mbps (Rang • 100 – 1000 Mb/s, increments of 100 Mbps (Rang • 1 – 10 Gb/s, increments of 1 Gbps (Range It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Col [R31] Color Forwarding SHOULD be yes. When Ingress BWI via the S-Tag as per MEF 23.1	ed and MUST allow con 11) 2 2) 2 3) 4) or Mode = "color blind" a	figuration to supplement of the supplement of th	port CIR of: ve CBS ≥ 12176 Bytes	
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP withe UNI, and Color Forwarding is Yes, the bandwidth profile is EP and the amount of Green traffic delivered at the egress OVC Green at the ingress during a time interval <i>T</i> , provided that the where each burst <i>B</i> is longer than necessary to empty the token bucket	applied to all ingress Serv EP is within $+/-(F_{CBS})$ on gress traffic is offered as	vice Frames that of the calculated as a pattern of repe	are mapped to the given OVC amount of traffic accepted as eated bursts and idle periods	
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC E at the UNI and a specific S-VLAN ID is mapped to the OVC E		ed. One CE-VL	AN ID is mapped to the OVC EP	
Test Configuration Schematic		os EVPL Service Inder Test	Equipmel Operating the ENN	Tester 2 I	
End Point Maps	$\begin{tabular}{c c c c c c c c c c c c c c c c c c c $		Map at E VLAN ID 555	OVC End Point OVC EP ₅₅	
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Ingress Ba OVC End Po OVC EP55 Note 1: CIR55 = Note 2: CB555 Note 3: EIR55, E	ndwidth Profile	e per OVC EP at ENNI ₁ Parameters CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅ qual to 0	
Test Procedure	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₅ at UNI₅) during a time interval T 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 EP₅₅ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₅₅ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₅₅ at ENNI₁ 				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst profile parameters CBS ₅ , CBS ₅₅	ength B , idle period I , tin	ne interval T, tole	erance F_{CBS} and bandwidth	
Results	Pass or fail				
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame MAC Address through the last bit of the Frame Check Sequenc Note 2: Green Color Identifiers defined in MEF 23.1 Table 4		Frame consists of	the first bit of the Destination	



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

	Abstract Test Suite for Ethernet Acc	eess Services				
Test Name	Ingress Bandwidth Profile per OVC EP at the UNI - CIR Enforcement Rat	nge 2				
Test Definition ID	AEVPL12_R26_R27_R31					
Test Type	Conformance	Conformance				
Test Status	Mandatory if the UNI Speed is greater than 10 Mbps					
Requirement Description	a single CoS Name [R27] Ingress Bandwidth Profile per OVC EP at a UNI is required and MU • 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 =	[R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [R31] Color Forwarding SHOULD be yes. When Ingress BWP at UNI has EIR = 0 frames egressing at ENNI MUST be marked green				
Test Object	Verify that when an Ingress Bandwidth Profile per OVC EP with CIR = 30 the UNI and Color Forwarding is Yes, the bandwidth profile is applied to a and the amount of Green traffic delivered at the egress OVC EP is within the ingress during a time interval <i>T</i> , provided that the ingress traffic is offe	all ingress Service Frames that are mapped to the given OVC EP $+/-(F_{CIR})$ of the calculated amount of traffic accepted as Green at				
Test Configuration	One OVC associating one OVC EP at the UNI and one OVC EP at the EN at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the EN					
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP6 OVC 6					
	Map at UNI ₅	Map at ENNI ₁				
End Point Maps	CE-VLAN ID OVC End Point 16 OVC EP ₆	S-VLAN ID OVC End Point 666 OVC EP ₆₆				
•	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UNI is p	permitted provided that the configuration conforms to MEF 26.1				
Bandwidth Profile						
Test Procedure	 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 CIR₆ to the ingress OVC End Point (OVC EP₆ at UNI₅) during a time interval T 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 EP₆₆ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₆₆ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₆₆ at ENNI₁ 					
Units	Number of valid frames received at the ENNI					
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval T , to	olerance F_{CIR} and bandwidth profile parameters CBS ₆ , CBS ₆₆				
Results	Pass or fail					
Remarks	Note 1: Bandwidth profile is measured in terms of ENNI Frame traffic who 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 be 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	[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 [R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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				
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 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 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 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. 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 Ethernet Traffic Generator Analyzer OVC EP 6 OVC 6 Equipment Operating at the ENNI Ethernet Traffic Generator Analyzer OVC EP 6 OVC 6				
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					
Test Procedure	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₆ at UNI₃) during a time interval T 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 EP₆₆ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₆₆ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₆₆ at ENNI₁ 				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length B , idle period I , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₆ , CBS ₆₆				
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 14.2: 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	AEVPL14_R26_R27_R31				
Test Type	Conformance				
Test Status	Mandatory if the UNI Speed is greater than 100 Mbps				
Requirement Description	[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 [R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS \geq 12176 Bytes [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				
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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP,7 OVC T Equipment Operating at the ENNI ENNI Ethernet Traffic Generator Analyzer				
	Map at UNI ₅ Map at ENNI ₁				
End Point	CE-VLAN ID				
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				
Bandwidth Profile					
Test Procedure	 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 CIR₇ to the ingress OVC End Point (OVC EP₇ at UNI₅) during a time interval T 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 EP₇₇ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₇₇ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₇₇ at ENNI₁ 				
Units	Number of valid frames received at the ENNI				
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₇ , CBS ₇₇				
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 15.2: 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	[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 [R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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	
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 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 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. 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 UNIs Generator Analyzer OVC EP7 OVC 7 Equipment Operating at the ENNI Tester 2 Ethernet 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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₇ at UNI₅) during a time interval I ester 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 EP₇₇ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₇₇ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₇₇ at ENNI₁ 	
Units	Number of valid frames received at the ENNI	
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length B , idle period I , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₇ , CBS ₇₇	
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 16.2: 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 Enforceme	ent 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	[R26] The CoS Identifier for Service Frames MUST be the OVC En a single CoS Name [R27] Ingress Bandwidth Profile per OVC EP at a UNI is required at 1 - 10 Mb/s, increments of 1 Mbps (Range 1) 10 - 100 Mb/s, increments of 10 Mbps (Range 2) 10 - 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 M [R31] Color Forwarding SHOULD be yes. When Ingress BWP at Uvia the S-Tag as per MEF 23.1	lode = "color blind" and it MUST have CBS ≥ 12176 Bytes
Test Object	the UNI and Color Forwarding is Yes, the bandwidth profile is applied	$R=3$ Gbps, CBS ≥ 12176 Bytes, EIR = 0 and EBS = 0 is in force at led to all ingress Service Frames that are mapped to the given OVC EP within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at 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 UNI and a specific S-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 UNI and a specific S-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 UNI and a specific S-VLAN ID is mapped to the OVC EP at the UNI and the UNI and the OVC EP at the UNI and th	the ENNI is configured. One CE-VLAN ID is mapped to the OVC EP the ENNI
Test Configuration Schematic	Ethernet Traffic Generator	VPL Service er Test OVC EP 88 Equipment Operating at the ENNI Ethernet Troffic Generator Analyzer
	Map at UNI ₅	Map at ENNI ₁
End Point	CE-VLAN ID	S-VLAN ID OVC End Point 888 OVC EP ₈₈
Maps	Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the U	00
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ l l l l l l l l l l l l l l l l l l l$
Test Procedure	 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 CIR₈ to the ingress OVC End Point (OVC EP₈ at UNI₅) during a time interval T 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 EP₈₈ at ENNI₁). The amount of Green traffic delivered at the egress OVC EP₈₈ at ENNI₁ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₈₈ at ENNI₁ 	
Units	Number of valid frames received at the ENNI	
Variables	UNI and ENNI interface speeds, Service Frame length λ , time interv	al T , tolerance F_{CIR} and bandwidth profile parameters CBS_8 , CBS_{88}
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 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	[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 [R27] Ingress Bandwidth Profile per OVC EP at a UNI 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 blind" and it MUST have CBS ≥ 12176 Bytes [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
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 +/- (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 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. 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 Ethernet Traffic Generator Analyzer OVC EP 8 OVC EP 8 OVC EP 8 OVC EP 8
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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₈ at UNI₅) during a time interval T 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 EP₈₈ at ENNI₁) The amount of Green traffic delivered at the egress OVC EP₈₈ at ENNI₁ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₈₈ at ENNI₁
Units	Number of valid frames received at the ENNI
Variables	UNI and ENNI interface speeds, Service Frame length λ , Burst length B , idle period I , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₈ , CBS ₈₈
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 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	[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} [R34] 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 ≥ 12176 Bytes	
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_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNIs OVC EPs OVC FPs OVC FPs OVC FPs	
End Point Maps		
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	 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 CIR₅₅ to the ingress OVC End Point (OVC EP₅₅ at ENNI₁) during a time interval T 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 EP₅ at UNI₅). The amount of traffic delivered at the egress OVC EP₅ at UNI₅ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₅ at UNI₅ 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 CIR₅₅ to the ingress OVC End Point (OVC EP₅₅ at ENNI₁) during a time interval T 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 EP₅ at UNI₅). The amount of traffic delivered at the egress OVC EP₅ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₅ , CBS ₅₅	
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 19.2: 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	[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 $\{0-7\}$ [R34] 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 = 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 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 Ethernet Traffic Generator Analyzer OVC EPs OVC S Equipment Operating at the ENNI Ethernet Traffic Generator Analyzer
	Map at UNI ₅ Map at ENNI ₁
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point 15 OVC EP5 555 OVC EP55
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 ₅ Ingress Bandwidth Profile per OVC EP at ENNI ₁
Bandwidth	OVC End Point Parameters OVC End Point Parameters OVC EP ₅ CIR ₅ CBS ₅ EIR ₅ EBS ₅ CF ₅ CM ₅ OVC EP ₅₅ CIR ₅₅ CBS ₅₅ EIR ₅₅ EBS ₅₅ CF ₅₅ CM ₅₅
Profile	Note 1: $CIR_5 = 3$ Mbps Note 1: $CIR_{55} = 3$ Mbps
	Note 2: $CBS_5 \ge 12176$ BytesNote 2: $CBS_{55} \ge 12176$ BytesNote 3: EIR_5 , EBS_5 , and CF_5 equal to 0Note 3: EIR_5 , EBS_{55} , and CF_{55} equal to 0
	Note 4: CM ₅ in color-blind mode Note 4: CM ₅ in color-aware mode
Test Procedure	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₅₅ at ENNI₁) during a time interval T 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 EP₅ at UNI₅). The amount of traffic delivered at the egress OVC EP₅ at UNI₅ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₅ at UNI₅ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₅₅ at ENNI₁) during a time interval T 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 EP₅ at UNI₅). The amount of traffic delivered at the egress OVC EP₅ at UNI₅ must be zero
Units	Number of valid frames received at the UNI
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₅ , CBS ₅₅
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



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	[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} [R34] 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 ≥ 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 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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 6 OVC EP	
End Point Maps		
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	 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 CIR₆₆ to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) during a time interval T 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 EP₆ at UNI₅). The amount of traffic delivered at the egress OVC EP₆ at UNI₅ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₆ at UNI₅ 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 at a constant rate greater than CIR₆₆ to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) during a time interval T 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 EP₆₆ at UNI₅). The amount of traffic delivered at the egress OVC EP₆ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₆ , CBS ₆₆	
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	[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} [R34] 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 ≥ 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 +/- (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 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 Ethernet Traffic Generator Analyzer OVC EP 6 OVC 6 Equipment Operating at the ENNI Tester 2 Equipment Operating at the ENNI Tester 2 Equipment Operating at the ENNI OVC EP 6 OVC EP 6 OVC 6	
	Map at UNI ₅ Map at ENNI ₁	
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point 16 OVC EP ₆ 666 OVC EP ₆₆	
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	
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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) during a time interval T 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 EP₆ at UNI₅). The amount of traffic delivered at the egress OVC EP₆ at UNI₅ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₆ at UNI₅ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) during a time interval T 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 EP₆ at UNI₅). The amount of traffic delivered at the egress OVC EP₆ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS_6 , CBS_{66}	
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	



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

	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	[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} [R34] 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 ≥ 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 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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 UNIs Generator Analyzer OVC EP7 OVC T Equipment Operating at the ENNI ENNI Ethernet Traffic Generator Analyzer	
End Point Maps		
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	 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 CIR₇₇ to the ingress OVC End Point (OVC EP₇₇ at ENNI₁) during a time interval <i>T</i> 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 EP₇ at UNI₅). The amount of traffic delivered at the egress OVC EP₇ at UNI₅ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval <i>T</i> that should be delivered to the egress OVC EP₇ at UNI₅ 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 CIR₇₇ to the ingress OVC End Point (OVC EP₇₇ at ENNI₁) during a time interval <i>T</i> 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 EP₇ at UNI₅). The amount of traffic delivered at the egress OVC EP₇ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS ₇ , CBS ₇₇	
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	[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} [R34] 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 ≥ 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 +/- (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 T is longer than necessary to empty the token bucket and each idle period T 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 Ethernet Traffic Generator Analyzer OVC EP, OVC EP, OVC FP, OVC T Equipment Operating at the ENNI Ethernet Traffic Generator Analyzer OVC EP, OVC EP,	
	Map at UNI ₅ Map at ENNI ₁	
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point 17 OVC EP ₇ 777 OVC EP ₇	
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 ₅ Ingress Bandwidth Profile per OVC EP at ENNI ₁	
Bandwidth	OVC End Point Parameters OVC End Point Parameters OVC EP7 CIR7 CBS7 EIR7 EBS7 CF7 CM7 OVC EP77 CIR77 CBS77 EIR77 EBS77 CF77 CM77	
Profile	Note 1: CIR ₇ = 300 Mbps Note 1: CIR ₇₇ = 300 Mbps	
	Note 4: CM ₇ in color-blind mode Note 4: CM ₇₇ in color-aware mode	
Test Procedure	 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 \(\frac{1}{2}\) using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₇₇ at ENNI₁) during a time interval \(I\) 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 EP₇ at UNI₅). The amount of traffic delivered at the egress OVC EP₇ at UNI₅ must be within +/- (\(F_{CBS}\)) of the calculated amount of traffic accepted as Green over the time interval \(I\) that should be delivered to the egress OVC EP₇ at UNI₅ 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 \(\lambda\) using an input traffic pattern of repeated bursts and idle 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, to the ingress OVC End Point (OVC EP₇₇ at ENNI₁) during a time interval \(T\) 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 EP₇ at UNI₅). The amount of traffic delivered at the egress OVC EP₇ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₇ , CBS ₇₇	
	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₇ , CBS ₇₇ Pass or 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	



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	[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 $\{0-7\}$ [R34] 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 ≥ 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 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 +/- (F_{CIR}) of the calculated amount of traffic accepted as Green at the ingress during a time interval T , 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 EP8 OVC E	
	Map at UNI ₅ Map at ENNI ₁	
End Point Maps	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point 18 OVC EP ₈ 888 OVC EP ₈₈	
Миро	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	 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 CIR₈₈ to the ingress OVC End Point (OVC EP₈₈ at ENNI₁) during a time interval T 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 EP₈ at UNI₅). The amount of traffic delivered at the egress OVC EP₈ at UNI₅ must be within +/- (F_{CIR}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₈ at UNI₅ 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 CIR₈₈ to the ingress OVC End Point (OVC EP₈₈ at ENNI₁) during a time interval T 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 EP₈ at UNI₅). The amount of traffic delivered at the egress OVC EP₈ at UNI₅ must be zero 	
Units	Number of valid frames received at the UNI	
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CIR} and bandwidth profile parameters CBS_8 , CBS_{88}	
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 25.2: 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	[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 $\{0-7\}$ [R34] 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 = 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 T , provided that the ingress traffic is offered as a pattern of repeated bursts and idle periods where each burst T is longer than necessary to empty the token bucket and each idle period T 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 Ethernet Traffic Generator Analyzer OVC EP ₈		
	Map at UNI_5 Map at $ENNI_1$		
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point		
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		
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	 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₈₈ at ENNI₁) during a time interval T 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 EP₈ at UNI₅). The amount of traffic delivered at the egress OVC EP₈ at UNI₅ must be within +/- (F_{CBS}) of the calculated amount of traffic accepted as Green over the time interval T that should be delivered to the egress OVC EP₈ at UNI₅ 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 B is longer than necessary to empty the token bucket and each idle period I is longer than necessary to fill the token bucket, to the ingress OVC End Point (OVC EP₈₈ at ENNI₁) during a time interval T 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 EP₈ at UNI₅). The amount of traffic delivered at the egress OVC EP₈ at UNI₅ must be zero 		
Units	Number of valid frames received at the UNI		
Variables	UNI and ENNI interface speeds, ENNI Frame length λ , time interval T , tolerance F_{CBS} and bandwidth profile parameters CBS ₈ , CBS ₈₈		
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		



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	 [R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R15] 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 [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: 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 Specified Percentile P_d and Time Interval T parameters for FD defined in MEF 23.1 Table 5
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 T , 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 Ethernet Traffic Generator Analyzer OVC EP2 OVC EP2 Equipment Operating at the ENNI OVC EP2 Equipment Operating at the ENNI OVC EP2 ENNI Ethernet Traffic Generator Analyzer
End Point Maps	
Bandwidth Profile	
Test Procedure	 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 CIR₂, using a test traffic profile which exercises both configured CIR₂ and CBS₂ at the same time, to the ingress OVC End Point (OVC EP₂ at UNI₂) 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 EP₂₂ at ENNI₁) One-Way Frame Delay Performance from UNI₂ to ENNI₁ 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 (UNI₂ to ENNI₁) The One-Way Frame Delay Performance from UNI₂ to ENNI₁ 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
Units	Time units
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂
Results	Pass or fail
Remarks	



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	[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} [R15] 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 [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: • 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 • Specified Percentile P _d and Time Interval T parameters for FD defined in MEF 23.1 Table 5		
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 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 Troffic Generator Analyzer OVC EP2 OVC EP2 OVC EP2 Equipment Operating at the ENNI I 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 untagged and priority tagged frames is permitted provided that the configuration conforms to MEF 26.1		
Bandwidth Profile			
Test Procedure	 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 CIR₂₂, using a test traffic profile which exercises both configured CIR₂₂ and CBS₂₂ at the same time, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) 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 EP₂ at UNI₂) One-Way Frame Delay Performance from ENNI₁ to UNI₂ 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 (ENNI₁ to UNI₂) The One-Way Frame Delay Performance from ENNI₁ to UNI₂ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
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 Etherner	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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [R15] 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 [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. And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: • 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 • Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5		
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 T, 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		E-VLAN ID values are mapped to the
Test Configuration Schematic	Ethernet Troffic Generator	EPL Service er Test	Equipment Derating at the ENNI ENNI ENNI Ethernet Traffic Generator Analyzer
End Point Maps	Map at UNI ₂ CE-VLAN ID OVC End Point 1,2*4095 OVC EP ₂ Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for un conforms to MEF 26.1	S-VLAN I	OVC EP ₂₂
Bandwidth Profile			Parameters CIR ₂₂ CBS ₂₂ EIR ₂₂ EBS ₂₂ CF ₂₂ CM ₂₂ s Bytes d CF ₂₂ equal to 0 ware mode
Test Procedure	Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal rate up to CIR ₂ , using a test traffic profile which exercises both co Point (OVC EP ₂ at UNI ₂) and Frame Delay is measured as the tim declared Green until the transmission of the last bit of the correspt One-Way Mean Frame Delay Performance from UNI ₂ to ENNI ₁ is Delays for all frames successfully delivered between the External The One-Way Mean Frame Delay Performance from UNI ₂ to ENI Performance Objective specified in MEF 23.1 for the applicable Company of the succession of the successful to the successful that the successful	nfigured CIR ₂ and CBS ₂ at the elapsed from the reception onding frame at the egress O's then calculated for a time in Interfaces (UNI ₂ to ENNI ₁) NI ₁ must be less than or equa	ne same time, to the ingress OVC End of the first bit of the ingress frame VC End Point (OVC EP ₂₂ at ENNI ₁) tterval <i>T</i> , as the arithmetic mean of Frame
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame lengt	th λ , time interval T and band	width profile parameters CBS ₂ , CBS ₂₂
Dl4	Pass or fail		
Results	1 455 01 1411		



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	[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} [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 [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. And, in an SLS that includes MFD Performance and is based on a MEF CoS Label, the SLS MUST be specified per: • 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 • Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5		
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		-VLAN ID values are mapped to the
Test Configuration Schematic	Tester 1 Ethernet Traffic Generator Analyzer Tester 1 Equipment Operating at the UNI OVC EP2 OVC EP2 OVC EP2	PL Service r Test	vc EP ₂₂ Tester 2 Ethernet Traffic Generator Analyzer
	Map at UNI ₂	Ma	ap at ENNI ₁
End Point	CE-VLAN ID OVC End Point	S-VLAN ID	OVC End Point
Maps	1,2*4095 OVC EP ₂ Note: Use of other S-VLAN IDs at the ENNI and of other CE-VLAN ID* for untageneous to MEF 26.1		OVC EP ₂₂ permitted provided that the configuration
	Ingress Bandwidth Profile per OVC EP at UNI ₂	Ingress Dandwidth	Profile per OVC EP at ENNI ₁
	OVC End Point Parameters	OVC End Point	Parameters
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{llllllllllllllllllllllllllllllllllll$	
	Note: Use of other bandwidth profile parameter values at the UNI & ENNI is perm • Tester 2 offers double-tagged ENNI Frames with CE-VLAN ID equ		
Test Procedure	 VLAN CoS equal to Green, of length λ at an average rate up to CIR, and CBS₂₂ at the same time, to the ingress OVC End Point (OVC EI the reception of the first bit of the ingress frame declared Green unti egress OVC End Point (OVC EP₂ at UNI₂) One-Way Mean Frame Delay Performance from ENNI₁ to UNI₂ is t Delays for all frames successfully delivered between the External In The One-Way Mean Frame Delay Performance from ENNI₁ to UNI Performance Objective specified in MEF 23.1 for the applicable Co. 	22, using a test traffic profile v P22 at ENNI ₁) and Frame Dela Il the transmission of the last then calculated for a time inte terfaces (ENNI ₁ to UNI ₂) In must be less than or equal to	which exercises both configured CIR ₂₂ ay is measured as the time elapsed from bit of the corresponding frame at the rval <i>T</i> , as the arithmetic mean of Frame
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ ,	, time interval T and bandwid	th profile parameters CBS ₂ , CBS ₂₂
Results	Pass or fail		



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	[R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [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 [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, the SLS MUST be specified per: ■ 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 ■ Specified Percentile P₂, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5		
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 T , 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 UNI2 OVC EP2 OVC EP2 OVC EP2 OVC EP2		
End Point Maps			
Bandwidth Profile			
Test Procedure	 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 CIR₂, using a test traffic profile which exercises both configured CIR₂ and CBS₂ at the same time, to the ingress OVC End Point (OVC EP₂ at UNI₂) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames One-Way Inter-Frame Delay Variation Performance from UNI₂ to ENNI₁ 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 EP₂ at UNI₂) was exactly Δt The One-Way Inter-Frame Delay Variation Performance from UNI₂ to ENNI₁ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
Results	Pass or fail		
Remarks			



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	[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} [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 [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, the SLS MUST be specified per: • 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 • Specified Percentile P ₀ , Pair Interval □ t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5		
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 UNI2 OVC EP2 OVC EP2 OVC 2 Equipment Operating at the ENNI I Tester 2 Tester 2 Tester 2 Tester 2 Tester 2 OVC EP22		
End Point Maps	Map at UNI2 Map at ENNI1		
Bandwidth Profile			
Test Procedure	 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 CIR₂₂, using a test traffic profile which exercises both configured CIR₂₂ and CBS₂₂ at the same time, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames One-Way Inter-Frame Delay Variation Performance from ENNI₁ to UNI₂ 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 EP₂₂ at ENNI₁) was exactly Δt The One-Way Inter-Frame Delay Variation Performance from ENNI₁ to UNI₂ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



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	 [R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [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 [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: 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 Specified Percentile P_t, and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5 		
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 T, 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 Ethernet Traffic Generator Analyzer OVC EP2 OVC EP2 OVC EP2 Equipment Operating at the ENNI OVC EP2 OVC EP2 OVC EP2		
F 15.	Map at UNI2 Map at ENNI1 CE-VLAN ID OVC End Point S-VLAN ID OVC End Point		
End Point Maps	1,2*4095 OVC EP ₂ 222 OVC EP ₂₂ 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			
Test Procedure	 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 CIR₂, using a test traffic profile which exercises both configured CIR₂ and CBS₂ at the same time, to the ingress OVC End Point (OVC EP₂ at UNI₂) 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 EP₂₂ at ENNI₁) One-Way Frame Delay Range Performance from UNI₂ to ENNI₁ is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P_r</i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (UNI₂ to ENNI₁) The One-Way Frame Delay Range Performance from UNI₂ to ENNI₁ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
Results	Pass or fail		
Remarks			



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	[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} [R15] 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 [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: • 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 • Specified Percentile P _n and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5		
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 UNI2 OVC EP2 OVC EP2 OVC EP2 OVC EP2 OVC EP2		
End Point Maps	Map at UNI2		
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	 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 CIR₂₂, using a test traffic profile which exercises both configured CIR₂₂ and CBS₂₂ at the same time, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) 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 EP₂ at UNI₂) One-Way Frame Delay Range Performance from ENNI₁ to UNI₂ is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P_r</i> and the minimum measured delay value, for all fravmes successfully delivered between the External Interfaces (ENNI₁ to UNI₂) The One-Way Frame Delay Range Performance from ENNI₁ to UNI₂ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



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	 [R4] The CoS Identifier for Service Frames MUST be the OVC End Point; that OVC MUST have a single CoS Name [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 [R20] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per: 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 Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5 		
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 T , 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 UNI2 OVC EP2 OVC EP2 OVC EP2 OVC EP2		
End Point Maps			
Bandwidth Profile			
Test Procedure	 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 CIR₂, using a test traffic profile which exercises both configured CIR₂ and CBS₂ at the same time, to the ingress OVC End Point (OVC EP₂ at UNI₂) 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 EP₂₂ at ENNI₁) are counted One-Way Frame Loss Ratio Performance from UNI₂ to ENNI₁ 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 EP₂₂ at ENNI₁) divided by the total number of ingress Qualified Frames that should have been delivered The One-Way Frame Loss Ratio Performance from UNI₂ to ENNI₁ must be less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT 		
Units	Number of valid frames received at the ENNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
Results	Pass or fail		
Remarks			



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	[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} [R15] 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 [R20] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per: • 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 • Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5		
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 UNI2 OVC EP2 OVC EP2 OVC EP2		
End Point Maps	Map at UNI2 Map at ENNI1		
Bandwidth Profile			
Test Procedure	 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 CIR₂₂, using a test traffic profile which exercises both configured CIR₂₂ and CBS₂₂ at the same time, to the ingress OVC End Point (OVC EP₂₂ at ENNI₁) 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 EP₂₂ at ENNI₁) are counted One-Way Frame Loss Ratio Performance from ENNI₁ to UNI₂ 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 EP₂ at UNI₂) divided by the total number of ingress Qualified Frames that should have been delivered The One-Way Frame Loss Ratio Performance from ENNI₁ to UNI₂ must be less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT 		
Units	Number of valid frames received at the UNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₂ , CBS ₂₂		
	Pass or fail		
Results	Pass or fail		



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	 [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 [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 [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: 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 Specified Percentile P_d and Time Interval T parameters for FD defined in MEF 23.1 Table 5 			
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 at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	d to the OVC EP		
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP6 OVC 6 Equipment Operating at the ENNI OVC EP6 OVC EV6 O			
End Point Maps		C End Point DVC EP ₆₆ IEF 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	 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 CIR₆, using a test traffic profile which exercises both configured CIR₆ and CBS₆ at the same time, to the ingress OVC End Point (OVC EP₆ at UNI₅) 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 EP₆₆ at ENNI₁) One-Way Frame Delay Performance from UNI₅ to ENNI₁ 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 (UNI₅ to ENNI₁) The One-Way Frame Delay Performance from UNI₅ to ENNI₁ 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 			
Units	Time units			
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters	s CBS ₆ , CBS ₆₆		
Results	Pass or fail	Pass or fail		
Remarks				



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	[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} [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 [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: • 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 • Specified Percentile P _d and Time Interval T parameters for FD defined in MEF 23.1 Table 5		
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 OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC		E-VLAN ID values are mapped to the
Test Configuration Schematic	Equipment Operating at the UNI Ethernet Traffic Generator Analyzer Equipment Operating at the UNI Access EVPL Service Under Test OVC EP 6 OVC		
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN II 666	OVC EP ₆₆
	Ingress Bandwidth Profile per OVC EP at UNI ₅ OVC End Point Parameters	Ingress Bandwidtl	n Profile per OVC EP at ENNI ₁
Bandwidth Profile			Bytes 1 CF ₆₆ equal to 0 vare mode
Test Procedure	 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 CIR₆₆, using a test traffic profile which exercises both configured CIR₆₆ and CBS₆₆ at the same time, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) 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 EP₆ at UNI₅) One-Way Frame Delay Performance from ENNI₁ to UNI₅ 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 (ENNI₁ to UNI₅) The One-Way Frame Delay Performance from ENNI₁ to UNI₅ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length	λ, time interval T and bandwi	dth profile parameters CBS ₆ , CBS ₆₆
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



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	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 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 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: 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 Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5		
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 at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the		CE-VLAN ID is mapped to the OVC EP
Test Configuration Schematic	Ethernet Traffic Generator	/PL Service er Test	Decaying at the ENNI ENNI ENNI Ethernet Traffic Generator Analyzer
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN I 666	OVC EP ₆₆
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	Tester 1 offers C-tagged Service Frames with CE-VLAN ID equal rate up to CIR ₆ , using a test traffic profile which exercises both con Point (OVC EP ₆ at UNI ₃) and Frame Delay is measured as the time declared Green until the transmission of the last bit of the corresponsion one-Way Mean Frame Delay Performance from UNI ₅ to ENNI ₁ is Delays for all frames successfully delivered between the External I The One-Way Mean Frame Delay Performance from UNI ₅ to ENN Performance Objective specified in MEF 23.1 for the applicable Control of the Control of th	ffigured CIR_6 and CBS_6 at the elapsed from the reception inding frame at the egress OV then calculated for a time in interfaces $(UNI_5$ to $ENNI_1)$ II_1 must be less than or equal	the same time, to the ingress OVC End of the first bit of the ingress frame VC End Point (OVC EP ₆₆ at ENNI ₁) terval <i>T</i> , as the arithmetic mean of Frame
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₆ , CBS ₆₆		
v dridores			
Results	Pass or fail		



Test Case 29.2: 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	AEVPL29_R33_R37_R39		
Test Type	Conformance		
Test Status	Mandatory		
Requirement Description	[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} [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 [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: • 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 • Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5		
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 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 may OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the ENNI	pped to the	
Test Configuration Schematic	the UNI Access EVPL Service Under Test UNIs Generator OVC EP OVC	nernet raffic nerator ialyzer	
End Point Maps		End Point C EP ₆₆	
Bandwidth Profile			
Test Procedure	 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 CIR₆₆, using a test traffic profile which exercises both configured CIR₆₆ and CBS₆₆ at the same time, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) 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 EP₆ at UNI₅) One-Way Mean Frame Delay Performance from ENNI₁ to UNI₅ 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 (ENNI₁ to UNI₅) The One-Way Mean Frame Delay Performance from ENNI₁ to UNI₅ must be less than or equal to the One-Way Mean Frame Delay Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS	S ₆ , CBS ₆₆	
Results	Pass or fail		
Remarks	Green Color Identifiers defined in MEF 23.1 Table 4		



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	[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 [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 [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: ■ 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 ■ Specified Percentile P _v , Pair Interval □ t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5		
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 UNI Ethernet Traffic Generator Analyzer OVC EP6 OVC 6 Equipment Operating at the ENNI UNIs OVC EP66 OVC EP66 OVC EP66		
End Point Maps	Map at UNI ₅ CE-VLAN ID OVC End Point 16 OVC EP ₆ Note: Use of other S-VLAN ID at the ENNI and of other CE-VLAN ID at the UN	S-VLAN I 666	OVC EP ₆₆
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	 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 CIR₆, using a test traffic profile which exercises both configured CIR₆ and CBS₆ at the same time, to the ingress OVC End Point (OVC EP₆ at UNI₅) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames One-Way Inter-Frame Delay Variation Performance from UNI₅ to ENNI₁ 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 EP₆ at UNI₅) was exactly Δt The One-Way Inter-Frame Delay Variation Performance from UNI₅ to ENNI₁ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T bandwidth profile parameters CBS ₆ , CBS ₆₆		
Results Remarks	Pass or fail		
Kemarks			



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	[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} [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 [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: ■ 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 ■ Specified Percentile P _v , Pair Interval □ t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5		
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 OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC		E-VLAN ID values are mapped to the
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP 6 OVC EP 6 Equipment Operating at the ENNI UNIs OVC EP 6 OVC EP 6		
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN I 666	OVC EP ₆₆
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	 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 CIR₆₆, using a test traffic profile which exercises both configured CIR₆₆ and CBS₆₆ at the same time, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) and One-Way Inter-Frame Delay Variation is measured as the difference between the one-way delays of a pair of selected frames One-Way Inter-Frame Delay Variation Performance from ENNI₁ to UNI₅ is then calculated for a time interval T 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 EP₆₆ at ENNI₁) was exactly Δt The One-Way Inter-Frame Delay Variation Performance from ENNI₁ to UNI₅ must be less than or equal to the One-Way Inter-Frame Delay Variation Performance from ENNI₁ to UNI₅ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₆ , CBS ₆₆		
Results Remarks	Pass or fail Green Color Identifiers defined in MEF 23.1 Table 4		
Kemarks	GIGGI COIOI IGCIRIICIS GCIIIICU III MEF 25.1 TAUIC 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	[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 [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 [R41] 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: • 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 • Specified Percentile P _r , and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5		
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 at the UNI and a specific S-VLAN ID is mapped to the OVC EP at the		CE-VLAN ID is mapped to the OVC EP
Test Configuration Schematic	Tester 1 Equipment Operating at the UNI Ethernet Traffic Generator Analyzer OVC EP 6 OVC 6 Equipment Operating at the ENNI UNIs OVC EP 6 O		
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN I 666	OVC EP ₆₆
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	 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 CIR₆, using a test traffic profile which exercises both configured CIR₆ and CBS₆ at the same time, to the ingress OVC End Point (OVC EP₆ at UNI₅) 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 EP₆₆ at ENNI₁) One-Way Frame Delay Range Performance from UNI₅ to ENNI₁ is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P_r</i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (UNI₅ to ENNI₁) The One-Way Frame Delay Range Performance from UNI₅ to ENNI₁ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₆ , CBS ₆₆		
Results	Pass or fail		
Remarks			



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	[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} [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 [R41] 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: • 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 • Specified Percentile P _D and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5		
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 OVC EP at the UNI and a specific S-VLAN ID is mapped to the OVC		E-VLAN ID values are mapped to the
Test Configuration Schematic	Ethernet Traffic Generator OVC EP&	/PL Service er Test	DVC EP 66 Equipment perating at the ENNI ENNI Ethernet Traffic Generator Analyzer
End Point Maps	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	S-VLAN I 666	OVC EP ₆₆
Bandwidth Profile	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{c cccc} OVC \ End \ Point & Parameters \\ \hline OVC \ EP_{66} & CIR_{66} \ CBS_{66} \ EIR_{66} \ EBS_{66} \ CF_{66} \ CM_{66} \\ \hline Note \ 1: \ CIR_{66} = 30 \ Mbps \\ Note \ 2: \ CBS_{66} \ge 12176 \ Bytes \\ Note \ 3: \ EIR_{66}, \ EBS_{66}, \ and \ CF_{66} \ equal \ to \ 0 \\ Note \ 4: \ CM_{66} \ in \ color-aware \ mode \\ \hline \end{array}$	
Test Procedure	 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 CIR₆₆, using a test traffic profile which exercises both configured CIR₆₆ and CBS₆₆ at the same time, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) 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 EP₆ at UNI₅) One-Way Frame Delay Range Performance from ENNI₁ to UNI₅ is then calculated for a time interval <i>T</i>, as the difference between the delay value at percentile <i>P_r</i> and the minimum measured delay value, for all frames successfully delivered between the External Interfaces (ENNI₁ to UNI₅) The One-Way Frame Delay Range Performance from ENNI₁ to UNI₅ 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 		
Units	Time units		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , 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		



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	 [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 [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 [R42] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per: 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 Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5 			
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 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. 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 UNIs Generator Analyzer OVC EP 6 OVC 6 Equipment Operating at the ENNI ENNI Ethernet Troffic Generator Analyzer			
	Map at UNI $_5$ Map at ENNI $_1$			
End Point	CE-VLAN ID OVC End Point S-VLAN ID OVC End Point			
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			
Bandwidth Profile				
1 10 110	Note 3: EIR ₆ , EBS ₆ , and CF ₆ equal to 0 Note 4: CM ₆ 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	 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 CIR₆, using a test traffic profile which exercises both configured CIR₆ and CBS₆ at the same time, to the ingress OVC End Point (OVC EP₆ at UNI₃) 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 EP₆₆ at ENNI₁) are counted One-Way Frame Loss Ratio Performance from UNI₅ to ENNI₁ 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 EP₆₆ at ENNI₁) divided by the total number of ingress Qualified Frames that should have been delivered The One-Way Frame Loss Ratio Performance from UNI₅ to ENNI₁ must be less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT 			
Units	Number of valid frames received at the ENNI			
Variables	CoS Label, PT, UNI and ENNI interface speeds, Service Frame length λ , time interval T and bandwidth profile parameters CBS ₆ , CBS ₆₆			
Results	Pass or fail			
Remarks				



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	[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} [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 [R42] In an SLS that includes FLR Performance and is based on a MEF CoS Label, the SLS MUST be specified per: • 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 • Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5		
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 UNIs Generator Analyzer Access EVPL Service Under Test OVC EP,6 OVC EP,6 OVC 6		
End Point Maps			
Bandwidth Profile			
Test Procedure	 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 CIR₆₆, using a test traffic profile which exercises both configured CIR₆₆ and CBS₆₆ at the same time, to the ingress OVC End Point (OVC EP₆₆ at ENNI₁) 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 EP₆₆ at ENNI₁) are counted One-Way Frame Loss Ratio Performance from ENNI₁ to UNI₅ 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 EP₆ at UNI₅) divided by the total number of ingress Qualified Frames that should have been delivered The One-Way Frame Loss Ratio Performance from ENNI₁ to UNI₅ must be less than or equal to the One-Way Frame Loss Ratio Performance Objective specified in MEF 23.1 for the applicable CoS Label and PT 		
Units	Number of valid frames received at the UNI		
Variables	CoS Label, PT, UNI and ENNI interface speeds, ENNI Frame length λ , time interval T and bandwidth profile parameters CBS ₆ , CBS ₆₆		
Results	Pass or fail		
	Green Color Identifiers defined in MEF 23.1 Table 4		



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 MUST be a value from 1 – 4094	Ethernet Access Services Definition Table 4
2	The maximum number of OVCs per UNI MUST be 1	Ethernet Access Services Definition Table 4

Requirement Number	Requirements for OVC per UNI Service Attributes	Reference
3	The OVC EP Map MUST 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 MUST be the OVC End Point; that OVC MUST have a single CoS Name	Ethernet Access Services Definition Table 5
5	Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST 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 MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" It MUST have CBS ≥ 12176 Bytes It MUST 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 MUST 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 MUST be an integer number of bytes ≥ 1526	Ethernet Access Services Definition Table 6
7	CE-VLAN ID Preservation MUST 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 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.	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 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 $\{0-7\}$	Ethernet Access Services Definition Table 7
12	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: • 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 MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" It MUST have CBS ≥ 12176 bytes It MUST NOT be combined with any other type of ingress bandwidth profile • 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. **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%.	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 MUST map to a distinct End Point, of Type = "OVC"	Ethernet Access Services Definition Table 8



Requirements for Service OAM Frames Handling

Requirement Number	Requirement for Service OAM	Reference
14	The Access EPL 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.	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 MUST indicate the same CoS Name and the CoS Label MUST 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	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: • 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 • Specified Percentile P _d and Time Interval T parameters for FD defined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R18], [R19]
17	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: • 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 • Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R18], [R20]
18	 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: 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 Specified Percentile P_v, Pair Interval □t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5 	Carrier Ethernet Class of Service Phase 2 [R21], [R22]
19	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: • 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 • Specified Percentile P _r , and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R21], [R23]
20	 In an SLS that is based on a MEF CoS Label, the SLS MUST be specified per: 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 Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5 	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 MUST be specified if untagged / priority tagged frames are to be supported, and that CE-VLAN ID MUST be included in the OVC End point Map	Ethernet Access Services Definition Table 9
22	The Maximum number of OVCs per UNI MUST be ≥ 1	Ethernet Access Services Definition Table 9
23	Maximum number of CE-VLAN IDs per OVC: The end point Map MUST support a value = 1	Ethernet Access Services Definition Table 9
24	Maximum number of CE-VLAN IDs per OVC: The end point Map SHOULD 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 MUST specify mapping table of CE-VLAN ID to OVC End Point. It MUST NOT 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 MUST be the OVC End Point to which the Service Frame is mapped; that OVC MUST have a single CoS Name	Ethernet Access Services Definition Table 10
27	Ingress Bandwidth Profile per OVC EP at a UNI is required and MUST 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 • 100 − 1000 Mb/s, increments of 100 Mbps • 1 − 10 Gb/s, increments of 1 Gbps It MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color blind" It MUST have CBS ≥ 12176 Bytes It MUST 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 MUST 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



Requirement Number	Requirements for OVC Service Attributes	Reference
28	The OVC Maximum Transmission Unit Size MUST be an integer number of bytes ≥ 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 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	Ethernet Access Services Definition Table 11
32	Deliver Unconditionally or Deliver Conditionally. If Delivered Conditionally, MUST 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 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 $\{0-7\}$	Ethernet Access Services Definition Table 12
34	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: • 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 MUST allow configuration of EIR = 0, EBS = 0, CF = 0, Color Mode = "color aware" It MUST have CBS ≥ 12176 Bytes It MUST NOT be combined with any other type of ingress bandwidth profile • 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. ** 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%.	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 MUST map to a distinct End Point, of Type = "OVC"	Ethernet Access Services Definition Table 13



Requirements for Service OAM Frames Handling

Requirement Number	Requirement for Service OAM	Reference
36	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	Ethernet Access Services Definition [R13]

Requirement for CoS Labels and Performance Attributes

Requirement Number	Requirements for Cos Labels	Reference
37	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	Carrier Ethernet Class of Service Phase 2 [R1]



Requirement Number	Requirements for Performance Attributes	Reference
38	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: • 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 • Specified Percentile P _d and Time Interval T parameters for FD defined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R18], [R19]
39	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: • 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 • Specified Time Interval T parameter for MFD defined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R18], [R20]
40	 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: 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 Specified Percentile P_v, Pair Interval □ t and Time Interval T parameters for IFDV defined in MEF 23.1 Table 5 	Carrier Ethernet Class of Service Phase 2 [R21], [R22]
41	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: • 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 • Specified Percentile P _r , and Time Interval T parameters for FDR idefined in MEF 23.1 Table 5	Carrier Ethernet Class of Service Phase 2 [R21], [R23]
42	 In an SLS that is based on a MEF CoS Label, the SLS MUST be specified per: 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 Specified Time Interval T parameter for FLR defined in MEF 23.1 Table 5 	Carrier Ethernet Class of Service Phase 2 [R24]