Technical Specification
MEF 37

Abstract Test Suite
for
ENNI

January 2012

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1 Abstract

This document defines the updated version of the Abstract Test Suite for External Network Network Interface (ENNI) in accordance with the requirements and service attributes specified in the ENNI Phase 1 Metro Ethernet Forum Technical Committee document, MEF 26.
This document represents the updated versions of the former ENNI Basic ATS and ENNI Protection ATS documents. The original four parts of the project were resplit into two conformance testing levels in 2010. The MEF decided to prioritize test cases verifying a certain group of requirements, as documented in Appendix I. This document defines Abstract Test Cases covering these requirements.

2 Terminology

Term	Term Description
BIR	Burst Information Rate; rate in bits per second of service frames transmitted, back-to-back with minimum inter-frame gap. It does not include the inter-frame gap, preamble nor start of frame delimiter. It is called “Burst information rate” because it is equal to the maximum information rate at which bursts can be sent
CE	Customer Edge
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.
C-Tag	Subscriber VLAN Tag.
C-Tag frames	IEEE 802.1ad Ethernet frames with one tag: C-Tag. The values of the C-VLAN IDs are in the range between 1 and 4094.
BWP	Bandwidth Profile
Double-tagged frames	IEEE 802.1ad Ethernet frames with two tags. The outer tag is an S-Tag, the inner tag is a C-Tag.
DSCP	Diff-Serv Code Point
End Point Map	A mapping of specified S-Tag VLAN ID values to specified OVC End Point Identifiers
End Point Type	A parameter in the End Point Map (In this specification the End Point Type is always 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.
ENNI MTU	MTU of an ENNI frame at the ENNI
ENNI-N_i	The functional element administered by the Operator of the ith Operator MEN that supports the protocols and procedures required in [MEF 26].

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Term	Term Description
EVC	An association of two or more UNIs
External Interface	Either a UNI or an ENNI[1]
Minimum Inter-Frame Gap	Defined as 96 Bit Times [section 4.4.2 in IEEE Std 802.3-2005]
MEN	Metro Ethernet Network comprising a single administrative domain.
MTU	Maximum Transmission Unit
Network Operator	The Administrative Entity of a MEN.
N_G	Smallest compliant value of W_G for a given bandwidth profile
N_Y	Smallest compliant value of W_Y for a given bandwidth profile
Operator Virtual Connection	An association of OVC End Points
OVC	Operator Virtual Connection.
OVC End Point	An association of an OVC with a specific External Interface i.e., UNI, ENNI.
OVC Identifier	String that is unique among all OVCs in the Operator MEN
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 responsible for the UNI to UNI Ethernet service
S-Tag	Service VLAN Tag.
S-Tag frames	IEEE 802.1ad Ethernet frames with one tag: S-Tag. The values of the S-VLAN IDs are in the range between 1 and 4094.
Subscriber	The organization purchasing and/or using Ethernet Services.
S-VLAN ID	The 12 bit VID field in the S-Tag of an ENNI Frame.
Tag	An optional field in a frame header. In this document it is the 4-byte field that, when present, appears immediately after the Source Address, or another tag in an Ethernet frame header and which consists of the 2-byte Tag Protocol Identification Field (TPID) which indicates S-Tag or C-Tag, and the 2-byte Tag Control Information field (TCI) which contains the 3-bit Priority Code Point, and the 12-bit VLAN ID field
UNI	The physical demarcation point between the responsibility of the Service Provider and the responsibility of the Subscriber.
W_G	The amount of traffic declared green during any test duration, lower bounded by the definition in MEF10.2 section 7.11.1.
W_Y	The amount of traffic declared yellow during any test duration, lower bounded by the definition in MEF 10.2 section 7.11.1.

[1] MEF 4 considers several types of External Interfaces. This document is limited to consideration of the UNI and ENNI.

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3 Introduction

With the growing number of service providers, different services and the growing size of networks the market demands solutions for realizing EVC services over multiple carriers or administrative domains.
Carrier Ethernet is a technology that intends to cover such market demand. MEF specifies services, network interfaces, such ENNI or UNI, and the technologies that need to be supported by the network interfaces in order to provide the support for transparent services. The interface between two administrative domains is called External Network Network Interface (ENNI). It is crucial to Ethernet services spanning multiple MENs to run over well-specified ENNI because the two different MENs could consist of different network devices and transport technologies.

4 Scope

The Abstract Test Suite is defined according to the MEF 26 specification, which determines the conformance of several ENNI implementations to the specification. The test suite also intends to improve vendor and operator interoperability, which is crucial for services spanning more than one Metro Ethernet Network.

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5 Test Suite Design And Configuration

5.1 Design Aspects

The test suite defined in this document follows some basic design aspects listed below:

- The test method is black box testing, no assumptions about the internal design of the Operator MEN is made.
- Points of Control and Observation (PCOs) are External Interfaces only
- Capability Tables describe protocol features, which must or may be implemented.
- ENNI, UNI and OVC/EVC configuration may differ for various Operator MEN because of different sets of supported protocol capabilities.
- The field "Conditions" in each test case defines OVC, ENNI, and UNI capabilities that must be supported and enabled by the Operator MEN in order to execute that particular test case.
- Test cases indicate their mandatory,conditionally mandatory or optional status in the "Test Status" field:
    - Mandatory: The test case verifies a mandatory MEF26 requirement for any Operator MEN and must be performed.
    - Conditionally Mandatory: The test case verifies a MEF26 requirement that an Operator MEN must fulfill if a test case-specific combination of optional features are implemented and advertised as such. The test case must be performed if the Operator MEN is capable of meeting conditions specified in the "Conditions" field.
    - Optional: The test case covers an optional feature that may be implemented, but is not required to meet MEF26 compliance.
    -

Figure 1 shows the conceptual testing topology. At least two interfaces, one of them an ENNI, must be supported by an Operator MEN in order to be able to perform the tests specified in this document.

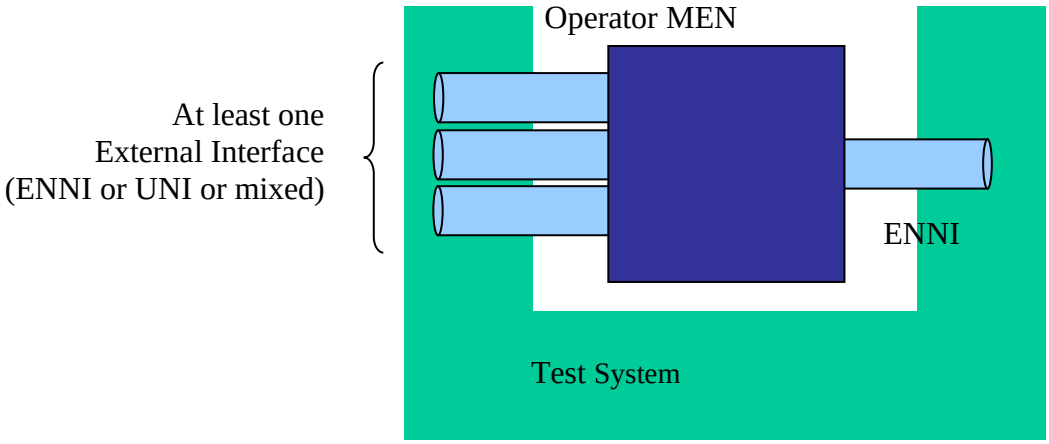

Figure 1: Conceptual testing topology

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5.2 ATS Structure and Usage Guidelines

This document describes a number of conformance test cases that verify ENNI requirements defined in MEF 26. Not all MEF 26 requirements are covered by test cases. Which particular requirements are covered by this document is described in the Appendix.

To parametrize each test case, the document specifies detailed configurations required for test execution at a central place in the next subsection. The ENNI, OVC, and end point configurations can become quite extensive. If listed individually with each test case, they would require multiple pages per test case. In order to reduce the total size of the ATS and the amount of duplicate information, all repeatedly-referenced configuration items are summarized in section 5. The configuration is split into two major parts: Operator MEN capabilities are described in section 5.3, ATS configuration is defined in section 5.4. Figure 2 illustrates the relationship of document sections:

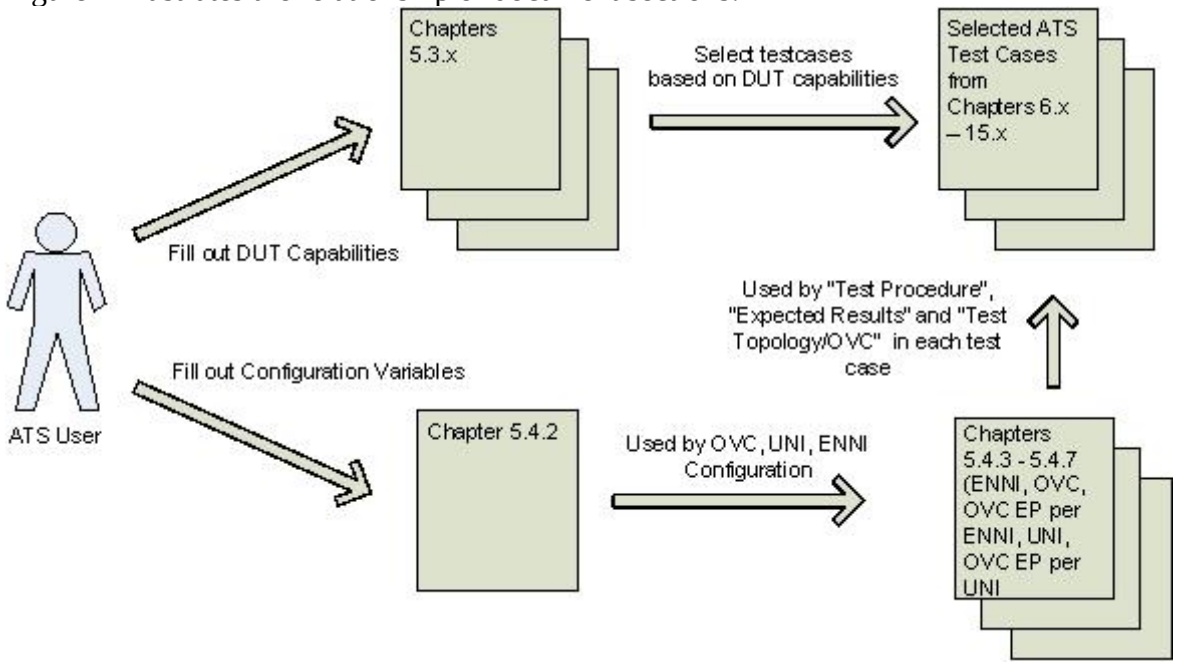

Figure 2: ATS Structure

Test cases contain links to the referenced configuration tables– typically the object names in the topology are linked. In order to navigate through the ATS efficiently, the following procedures are recommended:

Action	Solution in WinWord	Solution in Adobe PDF
Identify Reference	Mouseover while Ctrl key is pressed; mouse cursor shows hand symbol over active reference	
Follow Reference	Ctrl-Left click	Ctrl-Left click
Navigate Back To Source	Alt-Left Arrow	Alt-Left Arrow
Navigate Forward		Alt-Right Arrow

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5.3 Capabilities

A specific Operator MEN under test may not implement all optional features as described in MEF26. Any conditional test case is applicable under a combination of features supported by a given system under test as indicated in the test case's "Conditions" field. In order to simplify the test case selection process, this section describes and summarizes the ENNI specification capabilities below. The ENNI capabilities were derived from the requirements and attributes for ENNI, OVC, OVC End Point per ENNI, and OVC per UNI defined in the ENNI specification. The ENNI capabilities are grouped in the following tables, which provide:

- An overview over all ENNI capabilities
- Dependencies between particular ENNI specification capabilities
- Statement, whether a feature is mandatory or optional
- Precondition for an implementation that intends to perform this test suite.
- Test execution preconditions in terms of enabled or disabled ENNI capabilities

The status column indicates if the feature is mandatory (M) or optional (O). The status can be conditionally expressed:

- O.<n> means that this capability is optional, but at least one capability in the group of features labeled by the same number <n> must be supported.
- <feature>:<s> means that if the support of the feature <feature> is true (the feature is referenced by its ID), then the requirements are as per the status <s>, M or O.

Unique capability identification is provided by the "Item" column (short ID) and a more human readable "String ID". The text in "Item" is sometimes used in the "Status" column of capability tables to indicate a dependency. The "String ID" is used in the "Conditions" field of the test cases.

The Support column identifies whether a particular MEF26 feature is supported by the system under test. All Mandatory features (Status = "M") must be supported and indicated with "Yes" checked. There is no option for "No", because the system under test would be non-compliant to MEF26.

5.3.1 Major Capabilities

Table 1: Major capabilities

Item	String ID	Feature	Reference	Status	Support
MC1	Number of ENNIs > 0	Does the implementation support at least 1 ENNI?	[MEF 26], 7.1	M	Yes []
MC2	Number of ENNIs > 1	Does the implementation support at least 2 ENNIs?	[MEF 26], 7.1	O.1	Yes [] No []
MC3	Number of ENNIs > 2	Does the implementation support at least 3 ENNIs?	[MEF 26], 7.1	MC2:O	Yes [] No [] N/A []
MC4	Number of UNIs > 0	Does the implementation support at least 1 UNI?	[MEF 26], 7.2.3	O.1	Yes [] No []
MC5	Number of UNIs > 1	Does the implementation support at least 2 UNIs?	[MEF 26], 7.2.3	MC4:O	Yes [] No [] N/A []
MC6	Link OAM	Does the implementation support Link OAM as specified in section 8 of [MEF 26]?	[MEF 26], 8	O	Yes [] No []

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5.3.2 OVC Capabilities

Table 2: OVC capabilities

Item	String ID	Feature	Reference	Status	Support
CC1	Number of UNI OVC End Points > 0	Does the implementation support 0 or at least 1 UNI OVC End Point?	[MEF 26], 7.2.7	MC4:M	Yes [] N/A []
CC2	Number of UNI OVC End Points > 1	Does the implementation support at least 2 UNI OVC End Points?	[MEF 26], 7.2.7	MC5:M	Yes [] N/A []
CC3	Number of ENNI OVC End Points > 0	Does the implementation support at least 1 ENNI OVC End Point?	[MEF 26], 7.2.8	MC1:M	Yes [] N/A []
CC4	Number of ENNI OVC End Points > 1	Does the implementation support at least 2 ENNI OVC End Points at different ENNIs?	[MEF 26], 7.2.8	MC2:M	Yes [] N/A []
CC5	Number of ENNI OVC End Points > 2	Does the implementation support at least 3 ENNI OVC End Points at different ENNIs?	[MEF 26], 7.2.8	MC3:M	Yes [] N/A []
CC6	Number of OVC End Points per ENNI > 1	Does the implementation support at least 2 ENNI OVC End Points at a particular ENNI?	[MEF 26], 7.2.1, O1	O	Yes [] No []
CC7	End Point Map Bundling	Does the implementation support more than one S-VLAN ID value map to the OVC End Point in the End Point Map?	[MEF 26], 7.1.7.2	O	Yes [] No []
CC8	CE-VLAN ID preservation	Does the implementation supports the CE-VLAN ID preservation?	[MEF 26], 7.2.10	O	Yes [] No []
CC9	CE-VLAN CoS preservation	Does the implementation supports the CE-VLAN CoS preservation?	[MEF 26], 7.2.11	O	Yes [] No []
CC10	All OVC UNI's CE-VLAN IDs map to the OVC	Does the implementation support mapping of all CE-VLAN ID to an OVC at a UNI?	[MEF 26], R35	O	Yes [] No[]
CC11	S-VLAN ID preservation	Does the implementation supports the S-VLAN ID preservation and the S-VLAN ID preservation can be set to one of the following values: "Yes", "No"?	[MEF 26], 7.2.12	O	Yes [] No []
CC12	OVC MTU	Does the implementation support at least 1526 bytes OVC Maximum Transmission Unit Size?	[MEF 26], 7.2.9	M	Yes []
CC13	Unconditional Unicast Frame Delivery	Does the implementation support unconditional unicast frame delivery?	[MEF 26], 7.2.16	M	Yes []

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Item	String ID	Feature	Reference	Status	Support
CC14	Unconditional Multicast Frame Delivery	Does the implementation support unconditional multicast frame delivery?	[MEF 26], 7.2.17	M	Yes []
CC15	Unconditional Broadcast Frame Delivery	Does the implementation support unconditional broadcast frame delivery?	[MEF 26], 7.2.18	M	Yes []
CC16	Conditional Unicast Frame Delivery	Does the implementation support conditional unicast frame delivery?	[MEF 26], 7.2.16	O	Yes [] No []
CC17	MAC Address Learning	Does the implementation support MAC address learning?	[MEF 26], 7.2.16	CC16:O	Yes [] No [] N/A []
CC18	Conditional Multicast Frame Delivery	Does the implementation support conditional multicast frame delivery?	[MEF 26], 7.2.17	O	Yes [] No []
CC19	Conditional Broadcast Frame Delivery	Does the implementation support conditional broadcast frame delivery?	[MEF 26], 7.2.18	O	Yes [] No []
CC20	Frame Forwarding to Specific EI	Does the implementation support frame forwarding to specific External Interfaces (EI) only based on specific destination MAC addresses (MAC filtering)?	[MEF 26], 7.2.16, 7.2.17, 7.2.18	(CC18 OR CC19):O	Yes [] No [] N/A []

5.3.3 ENNI Capabilities

Table 3: ENNI capabilities

Item	String ID	Feature	Reference	Status	Support
EC1	Number of Links at ENNI = 2	Does the implementation support 2 links at ENNI?	[MEF 26], 7.1.4	O	Yes [] No[]
EC2	ENNI MTU	Does the implementation support at least 1526 bytes Maximum Transmission Unit Size at ENNI?	[MEF 26], 7.1.6	M	Yes []

5.3.4 OVC per ENNI Capabilities

Table 4: OVC per ENNI capabilities

Item	String ID	Feature	Reference	Status	Support
CEC1	End Point Map	Does the implementation support the End Point Map?	[MEF 26], 7.1.7	M	Yes []
CEC2	Number of ENNI CoS > 1	Does the implementation support at least 2 different Classes of Services at the ENNI?	[MEF 26], 7.3.2	O	Yes [] No[]

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Item	String ID	Feature	Reference	Status	Support
CEC3	Discard CoS at ENNI	Does the implementation support a CoS with 100% loss?	[MEF 26], 7.3.2	CEC2:O	Yes [] No[] N/A []
CEC4	Classifying based on S-Tag PCP	Does the implementation determine the different Classes of Service based on S-Tag Priority Code Point at the ENNI?	[MEF 26], 7.3.2	CEC2:M	Yes [] N/A []

5.3.5 OVC per UNI Capabilities

Table 5: OVC per UNI capabilities

Item	String ID	Feature	Reference	Status	Support
OU1	Untagged frames at UNI	Does the implementation support mapping of untagged frames at the UNI to an OVC?	[MEF 26], 7.5.2	O	Yes []
OU2	Priority Tagged Frames at UNI	Does the implementation support mapping of priority tagged frames at the UNI to an OVC?	[MEF 26], 7.5.2	O	Yes [] No []
OU3	Tagged frames at UNI	Does the implementation support mapping of tagged frames at the UNI to an OVC?	[MEF 26], 7.5.2	O	Yes [] No []
OU4	Number of UNI CoS > 1	Does the implementation support at least two different Classes of Services at the UNI?	[MEF 26], 7.5	MC4:O	Yes [] No [] N/A []
OU5	Discard CoS at UNI	Does the implementation support a CoS with 100% loss at UNI?	[MEF 26], 7.5	OU4:O	Yes [] No [] N/A []
OU6	Classifying based on OVC End Point	If the implementation supports UNI, does it determine the different Classes of Services based on OVC End Point at the UNI?	[MEF 26], 7.5.3.1, R71	OU4:O	Yes [] No [] N/A []
OU7	Classifying based on C-Tag PCP	If the implementation supports UNI, does it determine the different Classes of Services based on C-Tag Priority Code Point at the UNI?	[MEF 26], 7.5.3.2	OU4:O	Yes [] No [] N/A []
OU8	Classifying based on DSCP in IPv4	If the implementation supports UNI, does it determine the different Classes of Services based on DiffServ Code Points encoded in IPv4's ToS field at the UNI?	[MEF 26], 7.5.3.3	OU4:O	Yes [] No [] N/A []
OU9	Classifying based on DSCP in IPv6	If the implementation supports UNI, does it determine the different Classes of Services based on DiffServ Code Points encoded in IPv6's Traffic Class octet at the UNI?	[MEF 26], 7.5.3.3	OU4:O	Yes [] No [] N/A []
OU10	Bundling	Does the implementation support Bundling at the UNI?	[MEF 26], 7.1.7	OU4:O	Yes [] No []

5.3.6 Protection Capabilities

Table 6: Protection capabilities

Item	String ID	Feature	Reference	Status	Support
PR1	Protection Mechanism	Does the implementation support Protection Mechanism?	[MEF 26], 6	EC1:M	Yes [] N/A []

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Item	String ID	Feature	Reference	Status	Support
PR2	LAG	Does the implementation support Link Aggregation on the ENNI-Ni?	[MEF 26], 6	PR1:M	Yes [] N/A []
PR3	LACP	Does the implementation support Link Aggregation Control Protocol (LACP) on the ENNI-Ni?	[MEF 26], 6	PR2:M	Yes [] N/A []
PR4	Other Protection Mechanism	Does an implementation support other protection mechanism than LAG?	[MEF 26], 7.1.5	PR1:O	Yes [] No [] N/A []

5.3.7 Bandwidth Profile Capabilities

Table 7: Bandwidth Profile capabilities

Item	String ID	Feature	Reference	Status	Support
BWP1	Color Forwarding	Does the implementation support the Color Forwarding?	[MEF 26], 7.2.14	O	Yes[]……..No[]
BWP2	Ingress Bandwidth Profile per OVC End Point at ENNI	Does the implementation support Ingress Bandwidth Profile per OVC End Point at ENNI?	[MEF 26], 7.3.3	M	Yes[]……..No[]
BWP3	Egress Bandwidth Profile per OVC End Point at ENNI	Does the implementation support Egress Bandwidth Profile per OVC End Point at ENNI?	[MEF 26], 7.3.4	M	Yes[]……..No[]
BWP4	Ingress Bandwidth Profile per Class of Service Identifier at ENNI	Does the implementation support Ingress Bandwidth Profile per Class Of Service Identifier at ENNI?	[MEF 26], 7.3.5	M	Yes[]……..No[]
BWP5	Egress Bandwidth Profile per Class Of Service Identifier at ENNI	Does the implementation support Egress Bandwidth Profile per Class Of Service Identifier at ENNI?	[MEF 26], 7.3.6	M	Yes[]……..No[]
BWP6	Ingress Bandwidth Profile per OVC End Point at UNI	Does the implementation support Ingress Bandwidth Profile per OVC End Point at UNI?	[MEF 26], 7.5.4	O	Yes[]……..No[]
BWP7	Ingress Bandwidth Profile per Class of Service Identifier at UNI	Does the implementation support Ingress Bandwidth Profile per Class of Service Identifier at UNI?	[MEF 26], 7.5.5	M	Yes[]……..No[]
BWP8	Egress Bandwidth Profile per OVC End Point at UNI	Does the implementation support Egress Bandwidth Profile per OVC End Point at a UNI?	[MEF 26], 7.5.6	O	Yes[]……..No[]
BWP9	Egress Bandwidth Profile per Class of Service Identifier at UNI	Does the implementation support Egress Bandwidth Profile per Class of Service Identifier at a UNI?	[MEF 26], 7.5.7	M	Yes[]……..No[]
BWP10	Simultaneous Ingress Bandwidth Profile	Does the implementation support simultaneous Ingress Bandwidth Profile?	[MEF 26], 7.6.2.1	O	Yes[]……..No[]
BWP11	Simultaneous Egress Bandwidth Profile	Does the implementation support simultaneous Egress Bandwidth Profile?	[MEF 26], 7.6.3.1	O	Yes[]……..No[]
BWP12	Per Frame Color Identifier	Does the implementation support per frame color Identifier?	[MEF 23], 6.3.3	M	Yes[]……..No[]

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Item	String ID	Feature	Reference	Status	Support
BWP13	DEI Color Indication	Does the implementation support the use of DEI field to indicate color	[MEF 23], 6.3.3	**Error! Reference source not found.**:O	Yes[]……..No[] N/A []
BWP14	S-tag PCP Color Indication	Does the implementation support the use of S-Tag PCP field for color indication?	[MEF 23], 6.3.3	**Error! Reference source not found.**:M	Yes[]……..No[] N/A []
BWP15	Color Aware for ENNI Ingress Bandwidth Profile per CoS	Does the implementation support color aware mode for ENNI ingress bandwidth profile per CoS	[MEF26], 7.3.5	M	Yes[]
BWP16	Color Aware for ENNI Egress Bandwidth Profile per CoS	Does the implementation support color aware mode for ENNI egress bandwidth profile per CoS	[MEF26], 7.3.6	M	Yes[]
BWP17					
BWP18					

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5.4 Configuration

This chapter specifies configuration and configuration parameters of the Operator Metro Ethernet Network (MEN) and the Tester needed for test suite execution.
Before a test suite execution a particular test topology and configuration will be selected based on the supported Operator MEN capabilities.
The configuration is provided by multiple tables. A table consists of an "Attribute Name", "Description", and "Value" column. "Attribute Name" identifies Service Attributes defined in ENNI specification [MEF 26]. The Service Attributes may be referenced by their names from the test case procedure and test case expected results. The column "Value" specifies a specific fixed value of the Service Attribute or a variable, which need to be set prior the test suite execution. All configuration variables are defined in Table 8.

5.4.1 Test Case Test Topologies

Each test case reference to one of the topologies defined in this section that is at minimum required for the test case execution.
The Test Topology 1 as shown in Figure 3 is referenced by test cases that require "Number of UNIs > 0" and "Number of ENNIs > 0"capabilities to be supported.

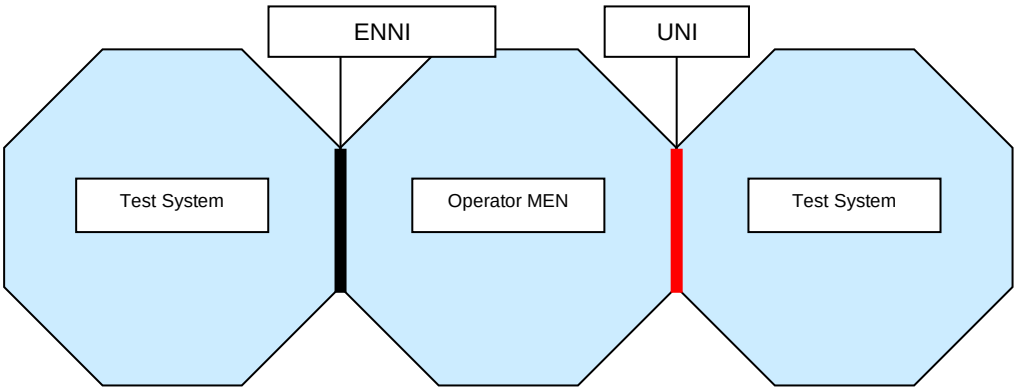

Figure 3: Test Topology 1

The Test Topology 2 as shown in Figure 4 is referenced by test cases that require "Number of ENNIs > 1"capability to be supported.

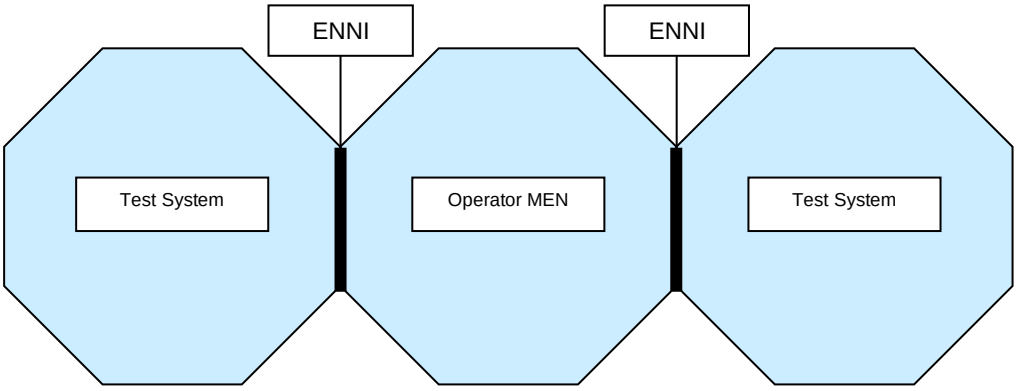

Figure 4: Test Topology 2

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The Test Topology 3 as shown in Figure 5 is referenced by test cases that require "Number of ENNIs > 0" and "Number of UNIs > 1"capability to be supported.

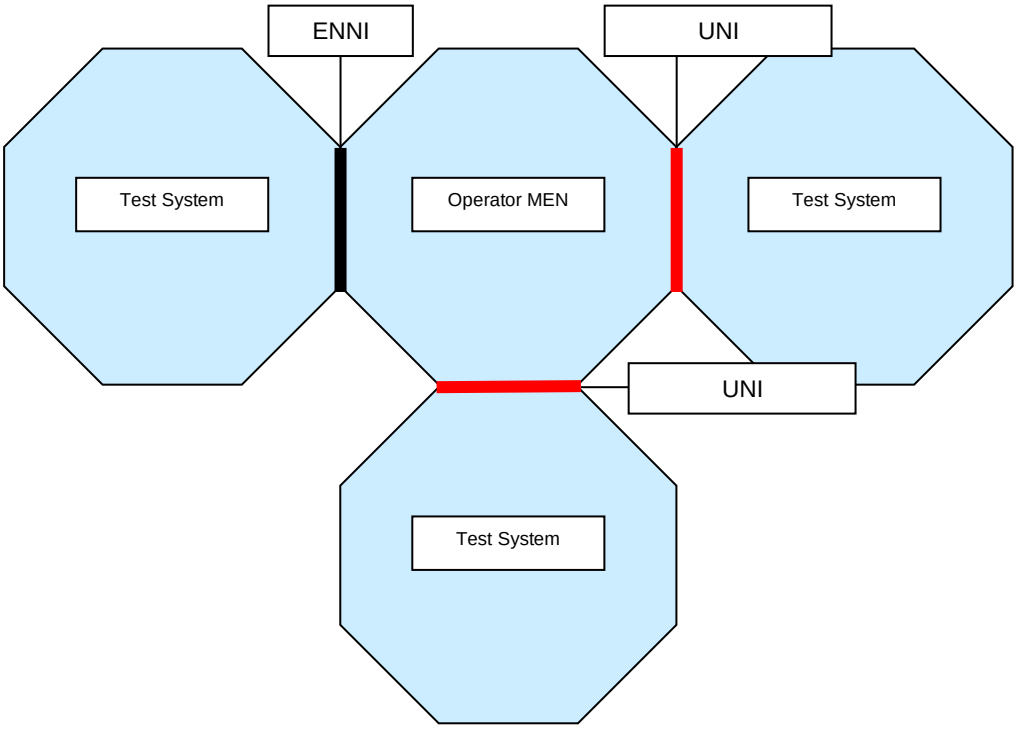

Figure 5: Test Topology 3

The Test Topology 4 as shown in Figure 6 is referenced by test cases that require "Number of ENNIs > 2" capability to be supported.

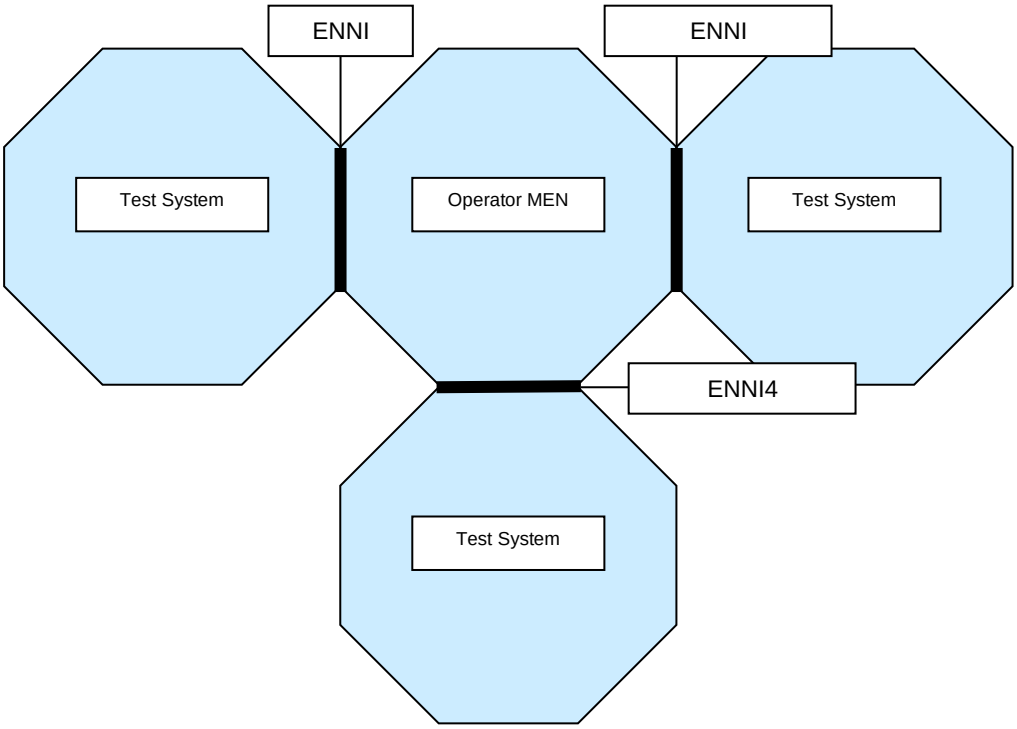

Figure 6: Test Topology 4

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The Test Topology 5 as shown in Figure 7 is referenced by test cases that require "Number of ENNIs > 1" and "Number of UNIs > 0"capabilities to be supported.

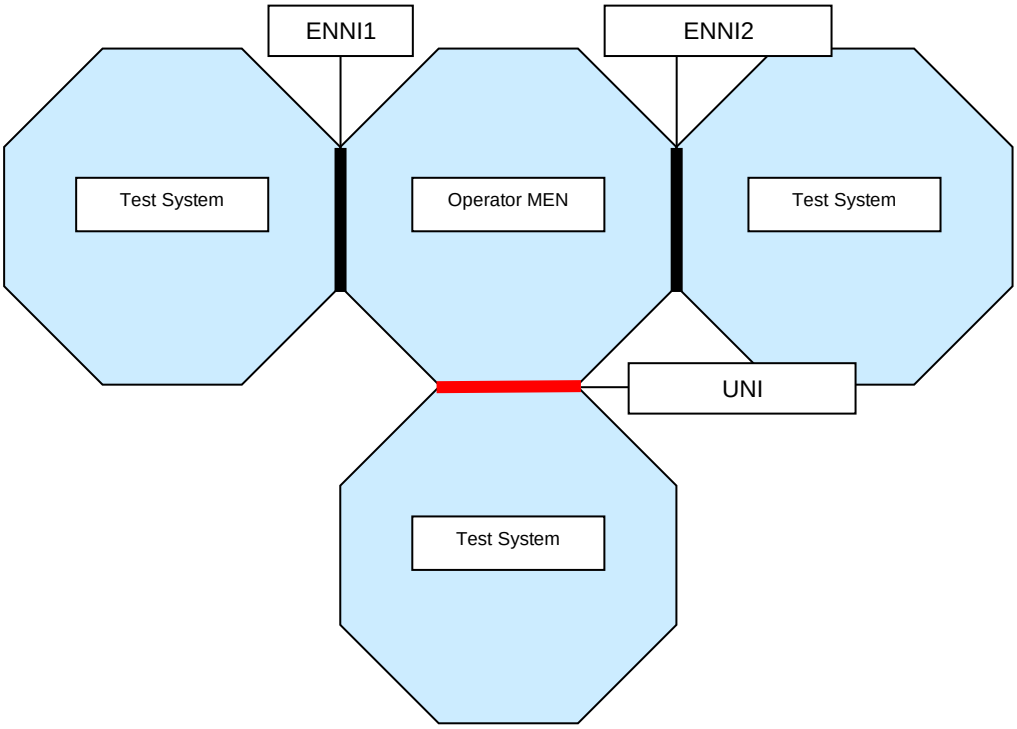

Figure 7: Test Topology 5

5.4.2 Variables

A test case procedure and expected results often need to operate with some specific values, e.g. if a specific S-VLAN ID value in the received frames is expected. One way would be to directly specify these values in the test case, e.g. all received frames are expected to have an S-VLAN ID 12, if the tester generated the test frames with C-VLAN ID 10. The specific values however would make the usage of the ATS inflexible, then for some specific reasons the Operator MEN might not configure a test OVC with that values, e.g. because the S-VLAN ID 12 is reserved in the Operator MEN for management purposes. Each test procedure in this ATS refers back to one or more of the tables in this section.
Instead of specifying specific values in the test cases, the ATS uses variables. The variables and requirements for the values of these variables are listed in the table below.

Table 8: Implementation specific variables

String ID	Description	Possible Values
ENNI_MTU	The variable defines Maximum Transmission Unit size of frames at ENNI.	An integer number of bytes greater than or equal to 1526 and less than 2000.
OVC_MTU	The variable defines Maximum Transmission Unit size of frames transmitting over an OVC.	An integer number of bytes greater than or equal to 1526 and less than 2000.
UNI_MTU	The variable defines Maximum Transmission Unit size of frames at UNI.	An integer number of bytes greater than or equal to 1522

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String ID	Description	Possible Values
EVC_MTU	The variable defines Maximum Transmission Unit size of frames for EVCs.	An integer number of bytes greater than or equal to 1522
ENNI_PHY	The physical layer of the links supporting the ENNI	One of the list as specified in R6 of [MEF 26]
UNI_PHY	The physical layer of the links supporting the UNI	One of the list as specified in section 7.2 of [MEF 10.2]
OVC_Max_Number_ENNI	The maximum number of OVCs that can be configured at ENNI.	An integer number greater than or equal to 1
EVC_Max_Number_UNI	The maximum number of EVCs that can be configured at UNI.	An integer number greater than or equal to 1
OVC/EVC_Max_Number_EI	A maximum number of OVCs or EVCs that are supported at all External Interfaces used for ATS execution	A minimum value of OVC_Max_Number_ENNI and EVC_Max_Number_UNI
SVID1	An S-VLAN ID value	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID2	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID3	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID4	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID5	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID6	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID7	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID8	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID9	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID10	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID11	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID12	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID13	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.

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String ID	Description	Possible Values
SVID14	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID15	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID16	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID17	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID18	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID19	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID20	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID21	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID22	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID23	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID24	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID25	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID26	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID27	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID28	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID29	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID30	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID31	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.

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String ID	Description	Possible Values
SVID32	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID33	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID34	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID35	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID36	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID37	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID38	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID39	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID40	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID41	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID42	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID43	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID44	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID45	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
SVID46	An S-VLAN ID value.	An integer number between 1 and 4094. The value must be unique among all SVID variable values.
CVID_Default	A CE-VLAN ID value for untagged and priority tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID1	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID2	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.

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String ID	Description	Possible Values
CVID3	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID4	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID5	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID6	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID7	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID8	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID9	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID10	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID11	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID12	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID13	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID14	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID15	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID16	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID17	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID18	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID19	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID20	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.

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String ID	Description	Possible Values
CVID21	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID22	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID23	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID24	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID25	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID26	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID27	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID28	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID29	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID30	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID31	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
CVID32	A CE-VLAN ID value for tagged frames at UNI.	An integer number between 1 and 4094. The value must be unique among all CVID variable values.
Multicast MAC Address	A MAC multicast address used for testing	Any valid MAC multicast address.
ENNI_Green_CoS1_IDs	A list of CoS ID identifiers applied at ENNI.	S-Tag PCP values between 0 and 7 or S-Tag PCP values between 0 and 7 and DEI set to 0. The value must be disjoint with other ENNI CoS IDs defined in this table.
ENNI_Yellow_CoS1_IDs	A list of CoS ID identifiers applied at ENNI.	The variable is set either to ENNI_Yellow_PCP_CoS1_IDs, if "S-Tag PCP Color Indication" = "Yes" or to ENNI_Yellow_DEI_CoS1_IDs, if "DEI Color Indication" = "Yes". The value must be disjoint with other ENNI CoS IDs defined in this table.
ENNI_Yellow_PCP_CoS1_IDs	A list of CoS ID identifiers applied at ENNI.	S-Tag PCP values between 0 and 7. The value must be disjoint with other ENNI CoS IDs defined in this table.

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String ID	Description	Possible Values
ENNI_Yellow_DEI_CoS1_IDs	A list of CoS ID identifiers applied at ENNI.	S-Tag PCP values between 0 and 7 and DEI is set to 1. S-Tag PCP value must be equal to S-Tag PCP value of ENNI_Green_CoS1_IDs.
ENNI_Residual_CoS_IDs	A list of CoS ID identifiers applied at ENNI.	S-Tag PCP values between 0 and 7 and DEI bit. ENNI_Residual_CoS_IDs must be disjoint with other ENNI CoS IDs defined in this table.
UNI_Green_CoS1_IDs	A list of CoS ID identifiers applied at UNI.	C-Tag PCP values between 0 and 7 or DSCP values between 0 and 63. The value must be disjoint with other UNI CoS IDs defined in this table.
UNI_Yellow_CoS1_IDs	A list of CoS ID identifiers applied at UNI.	C-Tag PCP values between 0 and 7 or DSCP values between 0 and 63. The value must be disjoint with other UNI CoS IDs defined in this table..
UNI_Residual_CoS_IDs	A list of CoS ID identifiers applied at UNI.	C-Tag PCP values between 0 and 7 or DSCP values between 0 and 63. UNI_Residual_CoS_IDs must be disjoint with other UNI CoS IDs defined in this table.
EI_Green_CoS1_IDs	A list of CoS ID identifiers applied at an External Interface.	If the External Interface is UNI, the EI_Green_CoS1_IDs is equal to UNI_Green_CoS1_IDs, otherwise to ENNI_Green_CoS1_IDs.
EI_Yellow_CoS1_IDs	A list of CoS ID identifiers applied at an External Interface.	If the External Interface is UNI, the EI_Yellow_CoS1_IDs is equal to UNI_ Yellow_CoS1_IDs, otherwise to ENNI_ Yellow_CoS1_IDs.
CIR1	Non-zero Committed Information Rate applied in bandwidth profiles.	Positive value, expressed in bits/s.
EIR1	Non-zero Excess Information Rate applied in bandwidth profiles.	Positive value, expressed in bits/s.
CIR2	Non-zero Committed Information Rate applied in bandwidth profiles.	Positive value, expressed in bits/s. CIR2 = CIR/2 .
EIR2	Non-zero Excess Information Rate applied in bandwidth profiles.	Positive value, expressed in bits/s.
CBS1	Non-zero Committed Burst Size applied in bandwidth profiles.	Positive value, expressed in bytes. The recommended value for testing is at least 2*ENNI_MTU and can be different for a given testing scenario
EBS1	Excess Burst Size applied in bandwidth profiles.	Positive value, expressed in bytes. The recommended value for testing is at least 2*ENNI_MTU and can be different for a given testing scenario
BIR	Burst Information Rate	Line Rate * FrameSize / (Frame Size + 20) Rate in bits per second of frames transmitted, back-to-back with minimum inter-frame gap. BIR does not include the inter-frame gap, preamble nor start of frame delimiter.

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5.4.3 ENNI configuration

The ENNI configuration used by the ATS is given in the tables below. The Table 9 specifies the entire configuration of ENNI1, which is used in a different test topology as shown in Figure 2, Figure 3, Figure 4 and Figure 5. The configuration of other ENNIs is specified only for Service Attributes which configuration is different than for ENNI1. If an ENNI configuration table does not specify a Service Attribute, the configuration of that Service Attribute should be considered as specified for ENNI1.
The "Link OAM" capability is disabled on ENNI1 and ENNI2.

Table 9: ENNI1

Attribute Name	Description	Value
Operator ENNI Identifier	An identifier for the ENNI intended for management purposes	"ENNI1"
Physical Layer	The physical layer of the links supporting the ENNI	ENNI_PHY
Frame Format	The format of the PDUs at the ENNI	Frame formats as specified in Section 7.1.3 of [MEF 26]
Number of Links	The number of physical links in the ENNI	1
Protection Mechanism	The method for protection, if any, against a failure	"none"
ENNI Maximum Transmission Unit Size	The maximum length ENNI Frame in bytes allowed at the ENNI	"ENNI_MTU"
End Point Map	The map that associates each ENNI S-Tag Frame with an End Point	Test Topology1: ENNI1 End Point Map1; Test Topology 2: ENNI1 End Point Map2; Test Topology 3:ENNI1 End Point Map3 and ENNI1 End Point Map1; Test Topology 4: ENNI1 End Point Map4 and ENNI1 End Point Map2; Test Topology 5: ENNI1 End Point Map1 and ENNI1 End Point Map2 and ENNI1 End Point Map5;
Maximum Number of OVCs	The maximum number of OVCs that the Operator can support at the ENNI	OVC_Max_Number_ENNI
Maximum Number of OVC End Points per OVC	The maximum number of OVC End Points that the Operator can support at the ENNI for an OVC.	1

Table 10: ENNI2

Attribute Name	Description	Value
Operator ENNI Identifier	An identifier for the ENNI intended for management purposes	"ENNI2"
End Point Map	The map that associates each S-Tagged ENNI Frame with an End Point	Test Topology 2: ENNI2 End Point Map1; Test Topology 4: ENNI2 End Point Map2 Test Topology 5: ENNI2 End Point Map1 and ENNI2 End Point Map3

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Table 11: ENNI3

Attribute Name	Description	Value
Operator ENNI Identifier	An identifier for the ENNI intended for management purposes	"ENNI3"
ENNI Maximum Transmission Unit Size	The maximum length ENNI Frame in bytes allowed at the ENNI	1526
Protection Mechanism	The method for protection, if any, against a failure	"Link Aggregation"
Number of Links	The number of physical links in the ENNI	2
End Point Map	The map that associates each S-Tagged ENNI Frame with an End Point	ENNI3 End Point Map1

Table 12: ENNI4

Attribute Name	Description	Value
Operator ENNI Identifier	An identifier for the ENNI intended for management purposes	"ENNI4"
End Point Map	The map that associates each S-Tagged ENNI Frame with an End Point	ENNI4 End Point Map1

The tables below provide the ENNI End Point maps used in the ENNI configuration tables above.
ENNI1 End Point Map1 is used for Test Topology 1. It lists End Points on ENNI1 for point-to-point OVCs or multipoint-to-multipoint OVCs with multiple Endpoints on ENNI1 and a single End Point a UNI.

Table 13: ENNI1 End Point Map1

SVID	ENNI End Point	Type
SVID1	ENNI1_OVC1_End_Point_1	OVC End Point
SVID5	ENNI1_OVC3_End_Point_1**Error! R eference source not found.**	OVC End Point
SVID6	ENNI1_OVC4_End_Point_1	OVC End Point
SVID18	ENNI1_OVC14_End_Point_1	OVC End Point
SVID21	ENNI1_OVC17_End_Point_1	OVC End Point
SVID23	ENNI1_OVC19_End_Point_1	OVC End Point
SVID25	ENNI1_OVC21_End_Point_1	OVC End Point
SVID27	ENNI1_OVC23_End_Point_1	OVC End Point
SVID28	ENNI1_OVC24_End_Point_1	OVC End Point
SVID30	ENNI1_OVC26_End_Point_1	OVC End Point
SVID34	ENNI1_OVC30_End_Point_1	OVC End Point
SVID36	ENNI1_OVC31_End_Point_1	OVC End Point
SVID37	ENNI1_OVC32_End_Point_1	OVC End Point
SVID44	ENNI1_OVC34_End_Point_1	OVC End Point
SVID45	ENNI1_OVC29_End_Point_1	OVC End Point

ENNI1 End Point Map2 is used for Test Topology 2. It lists End Points on ENNI1 for point-to-point OVCs with a single End Point.on ENN1 and another ENNI.

Table 14: ENNI1 End Point Map2

SVID	ENNI End Point	Type
SVID2	ENNI1_OVC2_End_Point_1	OVC End Point

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SVID	ENNI End Point	Type
SVID9	ENNI1_OVC7_End_Point_1	OVC End Point
SVID32	ENNI1_OVC28_End_Point_1	OVC End Point

ENNI1 End Point Map3 is used for Test Topology 3. It lists End Points on ENNI1 for multipoint-to-multipoint OVCs that associate ENNI1, and two UNIs.

Table 15: ENNI1 End Point Map3

SVID	ENNI End Point	Type
SVID7	ENNI1_OVC5_End_Point_1	OVC End Point
SVID8	ENNI1_OVC6_End_Point_1	OVC End Point

ENNI1 End Point Map4 is used for Test Topology 4. It lists End Points on ENNI1 for multipoint-to-multipoint OVCs that associate ENNI1, and two other ENNIs.

Table 16: ENNI1 End Point Map4

SVID	ENNI End Point	Type
SVID11	ENNI1_OVC8_End_Point_1	OVC End Point

ENNI1 End Point Map5 is used for Test Topology 5. It lists End Points on ENNI1 for multipoint-to-multipoint OVCs that associate ENNI1, another ENNI, and an UNI.

Table 17: ENNI1 End Point Map5

SVID	ENNI End Point	Type
SVID46	ENNI1_OVC35_End_Point_1	OVC End Point
SVID3	ENNI1_OVC36_End_Point_1	OVC End Point

ENNI2 End Point Map1 is used for Test Topology 2. It lists End points on ENNI2 for point-to-point OVCs that associate ENNI2 and an other ENNI.

Table 18: ENNI2 End Point Map1

SVID	ENNI End Point	Type
SVID2	ENNI2_OVC2_End_Point_1	OVC End Point
SVID10	ENNI2_OVC7_End_Point_1	OVC End Point
SVID33	ENNI2_OVC28_End_Point_1	OVC End Point

ENNI2 End Point Map2 is used for Test Topology 4. It lists End Points on ENNI2 for multipoint-to-multipoint OVCs that associate ENNI2, and two other ENNIs.

Table 19: ENNI2 End Point Map2

SVID	ENNI End Point	Type
SVID12	ENNI2_OVC8_End_Point_1	OVC End Point

ENNI2 End Point Map3 is used for Test Topology 5. It lists End Points on ENNI2 for multipoint-to-multipoint OVCs that associate ENNI2, another ENNI and an UNI..

Table 20: ENNI2 End Point Map3

SVID	ENNI End Point	Type
SVID45	ENNI2_OVC35_End_Point_1	OVC End Point
SVID4	ENNI2_OVC36_End_Point_1	OVC End Point

ENNI3 End Point Map1 is used for Test Topology 1 (on ENNI3 the protection is enabled). It lists End Points on ENNI3 for point-to-point OVCs that associate ENNI3 and UNI1.

Table 21: ENNI3 End Point Map1

SVID	ENNI End Point	Type
SVID17	ENNI3_OVC13_End_Point_1	OVC End Point

ENNI4 End Point Map1 is used for Test Topology 4. It lists End Points on ENNI4 for multipoint-to-multipoint OVCs that associate ENNI4 and two other ENNIs.

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Table 22: ENNI4 End Point Map1

SVID	ENNI End Point	Type
SVID12	ENNI4_OVC8_End_Point_1	OVC End Point

5.4.4 OVC configuration

The OVC configuration used by the test suite is provided in the tables below. Table 23 specifies the entire configuration of OVC1. The configuration of other OVCs is specified only for OVC Service Attributes whose configuration is different from the OVC1 configuration. If an OVC configuration table does not specify a Service Attribute, the configuration of that Service Attribute should be considered as specified for OVC1.

Table 23: OVC1

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC1"
OVC Type	An indication of the number of OVC End Points associated by the OVC.	"Point-to-Point"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC1_End_Point_1", "UNI1_OVC1_End_Point"]
Maximum Number of UNI OVC End Points	The bound on the number of OVC End Points at different UNIs that can be associated by the OVC.	1
Maximum Number of ENNI OVC End Points	The bound on the number of OVC End Points at ENNIs that can be associated by the OVC.	1
OVC Maximum Transmission Unit Size	The maximum length in bytes allowed in a frame mapped to an OVC End Point that is associated by the OVC.	OVC_MTU
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"No"
CE-VLAN CoS Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN CoS value of the Service Frame to be derived from the ENNI Frame and vice versa.	"No"
S-VLAN ID Preservation	A relationship between the S-VLAN ID of a frame at one ENNI and the S-VLAN ID of the corresponding frame at another ENNI.	"No"
Color Forwarding	The relationship between the Color of an egress ENNI Frame and the Color of the corresponding ingress ENNI Frame or Service Frame.	"No"

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Attribute Name	Description	Value
Unicast Service Frame Delivery	This attribute describes how ingress frames mapped to an OVC End Point with a unicast destination MAC address are delivered to the other External Interfaces with OVC End Points associated by the OVC.	"Deliver Unconditionally"
Multicast Service Frame Delivery	This attribute describes how ingress frames mapped to an OVC End Point with a multicast destination MAC address are delivered to the other External Interfaces with OVC End Points associated by the OVC.	"Deliver Unconditionally"
Broadcast Service Frame Delivery	This attribute describes how ingress frames mapped to an OVC End Point with the broadcast destination MAC address are delivered to the other External Interfaces with OVC End Points associated by the OVC.	"Deliver Unconditionally"

Table 24: OVC2

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC2"
Maximum Number of UNI OVC End Points	The number of OVC End Points located at different UNIs.	0
Maximum Number of ENNI OVC End Points	The number of OVC End Points at ENNIs.	2
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC2_End_Point_1", "ENNI2_OVC2_End_Point_1"]
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"
CE-VLAN CoS Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN CoS value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"
S-VLAN ID Preservation	A relationship between the S-VLAN ID of a frame at one ENNI and the S-VLAN ID of the corresponding frame at another ENNI.	"No"

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Table 25: OVC3

Attrihbute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC3"
OVC End Point List	A list of OVC End Point Identifiers	[ENNI1_OVC3_End_Point_1, UNI2_OVC3_End_Point]

Table 26: OVC4

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC4"
OVC End Point List	A list of OVC End Point Identifiers	[ENNI1_OVC4_End_Point_1, UNI5_OVC4_End_Point]

Table 27: OVC5

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC5"
OVC Type	An indication of the number of OVC End Points associated by the OVC.	"Multipoint-to-Multipoint"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC5_End_Point_1", "UNI3_OVC5_End_Point", "UNI4_OVC5_End_Point",]
Maximum Number of UNI OVC End Points	The bound on the number of OVC End Points at different UNIs that can be associated by the OVC.	2
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"
CE-VLAN CoS Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN CoS value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

Table 28: OVC6

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC6"
OVC Type	An indication of the number of OVC End Points associated by the OVC.	"Multipoint-to-Multipoint"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC6_End_Point_1", "UNI1_OVC6_End_Point", "UNI2_OVC6_End_Point",]

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Attribute Name	Description	Value
Maximum Number of UNI OVC End Points	The bound on the number of OVC End Points at different UNIs that can be associated by the OVC.	2
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

Table 29: OVC7

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC7"
Maximum Number of UNI OVC End Points	The number of OVC End Points located at different UNIs.	0
Maximum Number of ENNI OVC End Points	The number of OVC End Points at ENNIs.	2
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC7_End_Point_1", "ENNI2_OVC7_End_Point_1"]
S-VLAN ID Preservation	A relationship between the S-VLAN ID of a frame at one ENNI and the S-VLAN ID of the corresponding frame at another ENNI.	"No"

Table 30: OVC8

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC8"
OVC Type	An indication of the number of OVC End Points associated by the OVC	“Multipoint-to-Multipoint”
Maximum Number of UNI OVC End Points	The number of OVC End Points located at different UNIs.	0
Maximum Number of ENNI OVC End Points	The number of OVC End Points at ENNIs.	3
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC8_End_Point_1", "ENNI2_OVC8_End_Point_1", "ENNI4_OVC8_End_Point_1"]

Note: The " Unicast Frame Delivery", " Multicast Frame Delivery", and " Broadcast Frame Delivery " Service Attributes for OVC9 must be set to "Deliver Conditionally".
The ATS assumes that "Conditional Unicast Frame Delivery" is realized via MAC Address Learning, so the Operator MEN should support "MAC Address Learning" capability.
The ATS assumes that "Conditional Multicast Frame Delivery" and "Conditional Broadcast Frame Delivery" are realized via filtering of specific MAC addresses, so the Operator MEN should support "Frame Forwarding to Specific EI" capability. In case of OVC9 the ATS assumes that broadcast frames and multicast frames with the destination MAC address "Multicast MAC Address" are blocked towards ENNI2.

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Table 31: OVC10

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC10"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC10_End_Point_1", "UNI1_OVC10_End_Point"]

Table 32: OVC11

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC11"
OVC End Point List	A list of OVC End Point Identifiers	[ENNI1_OVC11_End_Point_1, UNI1_OVC11_End_Point]

Table 33: OVC12

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC12"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC12_End_Point_1", "UNI1_OVC12_End_Point"]

Table 34: OVC13

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC13"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI3_OVC13_End_Point_1", "UNI1_OVC13_End_Point"]

Table 35: OVC14

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC14"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC14_End_Point_1"], "UNI1_OVC14_End_Point"]

Table 36: OVC17

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC17"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC17_End_Point_1"], "UNI1_OVC17_End_Point"]

Table 37: OVC19

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC19"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC19_End_Point_1"], "UNI1_OVC19_End_Point"]

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Table 38: OVC21

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC21"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC21_End_Point_1"], "UNI1_OVC21_End_Point"]

Table 39: OVC23

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC23"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC23_End_Point_1"], "UNI1_OVC23_End_Point"]

Table 40: OVC24

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC24"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC24_End_Point_1"], "UNI1_OVC24_End_Point"]

Table 41: OVC26

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC26"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC26_End_Point_1"], "UNI1_OVC26_End_Point"]
Color Forwarding	The relationship between the Color of an egress ENNI Frame and the Color of the corresponding ingress ENNI Frame or Service Frame.	"Yes"

Table 42: OVC28

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC28"
Maximum Number of UNI OVC End Points	The number of OVC End Points located at different UNIs.	0
Maximum Number of ENNI OVC End Points	The number of OVC End Points at ENNIs.	2
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC28_End_Point_1"], "ENNI2_OVC28_End_Point_1"]
Color Forwarding	The relationship between the Color of an egress ENNI Frame and the Color of the corresponding ingress ENNI Frame or Service Frame.	"Yes"

Table 43: OVC29

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC29"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC29_End_Point_1", "UNI1_OVC29_End_Point"]

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Table 44: OVC31

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC31"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC31_End_Point_1"], "UNI1_OVC31_End_Point"]
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

Table 45: OVC32

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC32"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC32_End_Point_1**Error! Reference source not found.**", "UNI1_OVC32_End_Point"]
Color Forwarding	The relationship between the Color of an egress ENNI Frame and the Color of the corresponding ingress ENNI Frame or Service Frame.	"Yes"

Table 46: OVC34

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC34"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC34_End_Point_1"], "UNI1_OVC34_End_Point"]
CE-VLAN CoS ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

Table 47: OVC35

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC35"
OVC Type	An indication of the number of OVC End Points associated by the OVC.	"Multipoint-to-Multipoint"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC35_End_Point_1", "ENNI2_OVC35_End_Point_1", "UNI7_OVC35_End_Point",]

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Attribute Name	Description	Value
Maximum Number of ENNI OVC End Points	The bound on the number of OVC End Points at ENNIs that can be associated by the OVC.	2
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"
CE-VLAN CoS Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN CoS value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

Table 48: OVC36

Attribute Name	Description	Value
OVC Identifier	A string that uniquely identifies the OVC.	"OVC36"
OVC Type	An indication of the number of OVC End Points associated by the OVC.	"Multipoint-to-Multipoint"
OVC End Point List	A list of OVC End Point Identifiers	["ENNI1_OVC36_End_Point_1", "ENNI2_OVC36_End_Point_1" "UNI1_OVC36_End_Point",]
Maximum Number of ENNI OVC End Points	The bound on the number of OVC End Points at ENNIs that can be associated by the OVC.	2
CE-VLAN ID Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN ID value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"
CE-VLAN CoS Preservation	A relationship between the format and certain field values of the frame at one External Interface and the format and certain field values of the corresponding frame at another External Interface that allows the CE-VLAN CoS value of the Service Frame to be derived from the ENNI Frame and vice versa.	"Yes"

5.4.5 OVC End Point per ENNI configuration

The OVC End Point per ENNI configuration used by the test suite is given in tables below. The Table 49 specify entire configuration of ENNI1_OVC1_End_Point_1. The configuration of other OVC End Points per ENNI is specified only for Service Attributes which

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configuration is different than for ENNI1_OVC1_End_Point_1. If a configuration table does not specify a Service Attribute, the configuration of that Service Attribute should be considered as specified for ENNI1_OVC1_End_Point_1.

Table 49: ENNI1_OVC1_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC1_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for ENNI Frames.	[<"BestEffort", "OVC", [all]>,]
Ingress Bandwidth Profile Per OVC End Point	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"No"
Ingress Bandwidth Profile Per ENNI Class of Service Identifier	Ingress policing by the Operator MEN on all ingress ENNI Frames with the Class of Service Identifier for the receiving Operator MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"No"
Egress Bandwidth Profile Per End Point	Egress policing by the Operator MEN on all egress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"No"
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"No"

Table 50: ENNI1_OVC2_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC2_End_Point_1"

Table 51: ENNI2_OVC2_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC2_End_Point_1"

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Table 52: ENNI1_OVC3_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC3_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for ENNI Frames.	[< "BestEffort", "PCP", [0]>, < "Discard", "PCP", [1,2,3,4,5,6,7]>,]
Ingress Bandwidth Profile Per OVC End Point	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	[<CIR1,CBS1,0,0,0,1>, "BestEffort">]

Table 53: ENNI1_OVC4_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC4_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for ENNI Frames.	[<"BestEffort", "PCP", [0]>, <"Discard", "PCP", [1,2,3,4,5,6,7]>,]
Ingress Bandwidth Profile Per OVC End Point	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	[<<CIR1,CBS1,0,0,0,1>, "BestEffort">, <<0,0,0,0,0,1>, "Discard">,]

Table 54: ENNI1_OVC5_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC5_End_Point_1"

Table 55: ENNI1_OVC6_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC6_End_Point_1"

Table 56: ENNI1_OVC7_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC7_End_Point_1"

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Table 57: ENNI2_OVC7_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC7_End_Point_1"

Table 58: ENNI1_OVC8_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC8_End_Point_1"

Table 59: ENNI2_OVC8_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC8_End_Point_1"

Table 60: ENNI4_OVC8_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI4_OVC8_End_Point_1"

Table 61: ENNI2_OVC9_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC9_End_Point_1"

Table 62: ENNI4_OVC9_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI4_OVC9_End_Point_1"

Table 63: ENNI1_OVC10_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC10_End_Point_1"

Table 64: ENNI1_OVC11_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC11_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for ENNI Frames.	[< "BestEffort", [0]>, < "Discard", [1,2,3,4,5,6,7]>,]

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Attribute Name	Description	Value
Ingress Bandwidth Profile Per OVC End Point	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	[<<CIR1,CBS1,0,0,0,1>, "BestEffort">]

Table 65: ENNI1_OVC12_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC12_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for ENNI Frames.	[<"BestEffort", "PCP", [0]>, <"Discard", "PCP", [1,2,3,4,5,6,7]>,]
Ingress Bandwidth Profile Per OVC End Point	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	[<<CIR1,CBS1,0,0,0,1>, "BestEffort">, <<0,0,0,0,0,1>, "Discard">,]

Table 66: ENNI3_OVC13_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI3_OVC13_End_Point_1"

Table 67: ENNI1_OVC14_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC14_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1,0,0,0,1> CoS2:<0,0,0,0,0,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1,0,0,0,1> CoS2:<0,0,0,0,0,1>

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Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1,0,0,1,1> CoS2:<0,0,0,0,1,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1,0,0,1,1> CoS2:<0,0,0,0,1,1>

Table 68: ENNI1_OVC17_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC17_End_Point_1"
Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:<0,0,EIR1,EBS1,0,1> CoS2:<0,0,0,0,0,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:<0,0, EIR1,EBS1,0,1> CoS2:<0,0,0,0,0,1>

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Table 69: ENNI1_OVC19_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC19_End_Point_1"
Ingress Bandwidth Profile Per ENNI Class of Service Identifier	Ingress policing by the Operator MEN on all ingress ENNI Frames with the Class of Service Identifier for the receiving Operator MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"Yes"
Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1, EIR1,EBS1,0,1> CoS2:<0,0,0,0,0,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1, EIR1,EBS1,0,1> CoS2:<0,0,0,0,0,1>

Table 70: ENNI1_OVC21_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC21_End_Point_1"

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Table 71: ENNI1_OVC23_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC23_End_Point_1"

Table 72: ENNI1_OVC24_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC24_End_Point_1"

Table 73: ENNI1_OVC26_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC26_End_Point_1"

Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,1,1> CoS2:<0,0,0,0,1,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,1,1> CoS2:<0,0,0,0,1,1>

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Table 74: ENNI1_OVC28_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC28_End_Point_1"
Ingress Bandwidth Profile Per ENNI Class of Service Identifier	Ingress policing by the Operator MEN on all ingress ENNI Frames with the Class of Service Identifier for the receiving Operator MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"Yes"
Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>

Table 75: ENNI2_OVC28_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC28_End_Point_1"
Ingress Bandwidth Profile Per ENNI Class of Service Identifier	Ingress policing by the Operator MEN on all ingress ENNI Frames with the Class of Service Identifier for the receiving Operator MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	"Yes"
Class of Service Identifiers	The way that a Class of Service is determined for an ENNI Frame at each ENNI.	[ENNI_Yellow_CoS1_IDs, ENNI_Green_CoS1_IDs, ENNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service	Ingress policing by the Operator MEN on all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>

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Attribute Name	Description	Value
Egress Bandwidth Profile Per ENNI Class of Service Identifier	Egress policing by the Operator MEN on all egress ENNI Frames with the Class of Service Identifier for the receiving MEN. The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>

Table 76: ENNI1_OVC29_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC29_End_Point_1"

Table 77: ENNI1_OVC31_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC31_End_Point_1"

Table 78: ENNI1_OVC32_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC32_End_Point_1"

Table 79: ENNI1_OVC34_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC34_End_Point_1"

Table 80: ENNI1_OVC35_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC35_End_Point_1"

Table 81: ENNI2_OVC35_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC35_End_Point_1"

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Table 82: ENNI1_OVC36_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI1_OVC36_End_Point_1"

Table 83: ENNI2_OVC36_End_Point_1

Attribute Name	Description	Value
OVC End Point Identifier	An identifier for the OVC End Point, which is unique across the Operator MEN	"ENNI2_OVC36_End_Point_1"

5.4.6 UNI configuration

The configuration of the UNI used by the ATS is given in Table 84 below. The Table 84 specify entire configuration of UNI1. The configuration of other UNIs is specified only for Service Attributes which configuration is different than for UNI1. If a configuration table does not specify a Service Attribute, the configuration of that Service Attribute should be considered as specified for UNI1.

Table 84: UNI1

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI1"
Physical Layer	The physical layer of the links supporting the UNI	UNI_PHY
MAC Layer	The format of the PDUs at the UNI	Frame formats as specified in Section 7.3 of [MEF 10.2]
UNI Maximum Transmission Unit Size	The maximum frame length in bytes allowed at the UNI	UNI_MTU
Service Multiplexing	This attribute indicates if more than one EVC can be configured on the UNI	"Yes"
CE-VLAN ID/EVC Map	The attribute specifies the mapping table of CE-VLAN IDs to the EVC at the UNI.	The subscriber frames for OVC services are mapped to OVCs as specified by "OVC End Point Map" End Point Service Attribute, e.g. Table 91.
Maximum Number of EVCs	The maximum number of EVCs supported at the ENNI.	EVC_Max_Number_UNI

Table 85: UNI2

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI2"
CE-VLAN ID/EVC Map	The attribute specifies the mapping table of CE-VLAN IDs to the EVC at the UNI.	The subscriber frames for OVC services are mapped to OVCs as specified by "OVC End Point Map" End Point Service Attribute, e.g. Table 91.

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Table 86: UNI3

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI3"
Service Multiplexing	This attribute indicates if more than one EVC can be configured on the UNI	"No"
Maximum Number of EVCs	The maximum number of EVCs supported at the ENNI.	1

Table 87: UNI4

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI4"
Service Multiplexing	This attribute indicates if more than one EVC can be configured on the UNI	"No"
Maximum Number of EVCs	The maximum number of EVCs supported at the ENNI.	1

Table 88: UNI5

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI5"
CE-VLAN ID/EVC Map	The attribute specifies the mapping table of CE-VLAN IDs to the EVC at the UNI.	The subscriber frames for OVC services are mapped to OVCs as specified by "OVC End Point Map" End Point Service Attribute, e.g. Table 91.

Table 89: UNI6

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI6"
Service Multiplexing	This attribute indicates if more than one EVC can be configured on the UNI	"No"
Maximum Number of EVCs	The maximum number of EVCs supported at the ENNI.	1

Table 90: UNI7

Attribute Name	Description	Value
UNI Identifier	An identifier for the UNI, which is unique across the Operator MEN	"UNI6"
Service Multiplexing	This attribute indicates if more than one EVC can be configured on the UNI	"No"
Maximum Number of EVCs	The maximum number of EVCs supported at the ENNI.	1

5.4.7 OVC per UNI configuration

The OVC per UNI configuration used by the test suite is given in Table 91 below.
The "Bundling", "Untagged frames at UNI", and "Tagged frames at UNI" capabilities must be supported and enabled on MEN in order to configure UNI1_OVC1_End_Point.

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The configuration of other UNI End Points than UNI1_OVC1_End_Point is specified in tables of the currect section below the Table 91. These tables define only Service Attributes which configuration is different than for UNI1_OVC1_End_Point. If a UNI End Point configuration table does not specify a Service Attribute, the configuration of that Service Attribute should be considered as specified for UNI1_OVC1_End_Point.

Table 91: UNI1_OVC1_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC1_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID1, CVID_Default]
Class of Service Identifiers	The way that a Class of Service is determined for a frame at each UNI	[<"BestEffort", "OVC", [all]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator on all ingress Service Frames with a given Class of Service Identifier	"No"
Egress Bandwidth Profile Per OVC End Point at a UNI	Egress policing by the Operator on all egress Service Frames mapped to the OVC End Point	"No"
Egress Bandwidth Profile Per Class of Service Identifier at a UNI	Egress policing by the Operator on all egress Service Frames with a given Class of Service Identifier	"No"
Color Mode	CM is a Bandwidth Profile parameter. The Color Mode parameter indicates whether the color-aware or color-blind property is employed by the Bandwidth Profile.	Color-Blind

Table 92: UNI2_OVC3_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI2_OVC3_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID31, CVID_Default]
Class of Service Identifiers	The way that a Class of Service is determined for Service Frames. The attribute value is OVC endpoint plus PCP. a list of the following values: <CoS Name, CoS ID values>.	[<"BestEffort", [0]>, <"Discard", [1,2,3,4,5,6,7]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 93: UNI5_OVC4_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI5_OVC4_End_Point"

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Attribute Name	Description	Value
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID2, CVID_Default]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN.. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[<"BestEffort", ("DSCP", [0] OR "Non-IP[2]")>,<"Discard", "DSCP", [1..63]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 94: UNI3_OVC5_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI3_OVC5_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[All CE-VLAN IDs]

Table 95: UNI4_OVC5_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI4_OVC5_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[All CE-VLAN IDs]

Table 96: UNI1_OVC6_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC6_End_Point""
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID3, CVID4]

Table 97: UNI2_OVC6_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI2_OVC6_End_Point""
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID5]

[2] All non-IP packets and IP packets with DSCP set to 0 are mapped to "BestEffort" class

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Table 98: UNI1_OVC10_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC10_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID6]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[<"BestEffort", "OVC", [all]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 99: UNI1_OVC11_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC11_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID7]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN.. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[<"BestEffort", "PCP", [0]>, <"Discard", "PCP", [1,2,3,4,5,6,7]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 100: UNI1_OVC12_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC12_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID8, CVID_Default]

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Attribute Name	Description	Value
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN.. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[<"BestEffort", "DSCP", [0]>, <"Discard", "DSCP", [1..63]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 101: UNI1_OVC13_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC13_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID10]

Table 102: UNI1_OVC14_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC14_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID11]

Table 103: UNI1_OVC17_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC17_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID14]

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Table 104: UNI1_OVC19_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC19_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID16]

Table 105: UNI1_OVC21_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC21_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID18]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[UNI_Yellow_CoS1_IDs, UNI_Green_CoS1_IDs, UNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1,CBS1,0,0,0,0> CoS2:<0,0,0,0,0,0>

Table 106: UNI1_OVC23_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC23_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID20]

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Attribute Name	Description	Value
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[UNI_Yellow_CoS1_IDs, UNI_Green_CoS1_IDs, UNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1,0,0,1,1> CoS2:<0,0,0,0,1,1>

Table 107: UNI1_OVC24_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC24_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID21]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[UNI_Yellow_CoS1_IDs, UNI_Green_CoS1_IDs, UNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:<0, 0, EIR1, EBS1,0,0> CoS2:<0,0,0,0,0,0>

Table 108: UNI1_OVC26_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC26_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID23]

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Attribute Name	Description	Value
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[UNI_Yellow_CoS1_IDs, UNI_Green_CoS1_IDs, UNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>

Table 109: UNI1_OVC29_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC29_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID25]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[<"Discard", "OVC", [all]>,]
Ingress Bandwidth Profile Per OVC End Point at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point	"No"

Table 110: UNI1_OVC31_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC31_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID27]

Table 111: UNI1_OVC32_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC32_End_Point"

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Attribute Name	Description	Value
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID28]
Class of Service Identifiers	The way that a Class of Service is determined for UNI Frames. The attribute value is a list of the following values: <CoS Label, Color, CoS ID type, CoS ID values>. CoS Label represents an internal CoS label of a MEN. CoS ID type is one of the following: OVC, PCP (C-Tag Priority Code Point), or DSCP. If CoS ID type is set to OVC, CoS ID values are set to [all].	[UNI_Yellow_CoS1_IDs, UNI_Green_CoS1_IDs, UNI_Residual_CoS_IDs]
Ingress Bandwidth Profile Per Class of Service Identifier at a UNI	Ingress policing by the Operator MEN on all ingress Service Frames mapped to the OVC End Point The attribute specifies mapping between Bandwidth Profile instances and CoS Labels. The mapping is one-to-one mapping.	CoS1:< CIR1, CBS1, EIR1, EBS1,0,1> CoS2:<0,0,0,0,0,1>

Table 112: UNI1_OVC34_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC34_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID32]

Table 113: UNI7_OVC35_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI7_OVC35_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[All CE-VLAN IDs]

Table 114: UNI1_OVC36_End_Point

Attribute Name	Description	Value
UNI OVC Identifier	An identifier for the instance of the OVC at a UNI intended for management purposes	"UNI1_OVC36_End_Point"
OVC End Point Map	The CE-VLAN ID(s) that map to the OVC End Point at the UNI	[CVID26]

5.4.8 Suggested Test Flow Configuration

In all test cases the tester must monitor frames on the External Interfaces and evaluate their format. In almost each test case a tester transmits test frames. Unless a test case procedure otherwise stipulates, a test flow may be configured using the suggested values as specified in Table 115, or any other reasonable values.
The terms “sent”, “transmitted” and “received” are relative to the tester unless otherwise specified.

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Table 115: Suggested Test Flow Configuration

String ID	Description	Suggested Value
Frame Sizes[3]	MAC frame sizes of frames (without taking any C-tag or S-Tag into account) in bytes (with FCS)	[64, 128, 512, 1024]
PCP value in CoS ID	The default PCP value used in the test frames.	0
Flow Definition	Definition of the default unidirectional traffic flow per OVC and pair of Ethernet clients. The field "Value" defines the flow's frame sequence.	[Broadcast frames of "Frame Sizes", Multicast frames of "Frame Sizes", Unicast frames of "Frame Sizes"]
Frame Rate / Information Rate	The rate (in fps or in bits/s) of the test traffic	1 frame per 10ms
Number of Ethernet clients per External Interface and OVC	Number of Ethernet clients per External Interface connected over OVC	2
Flow Transmission Duration	The timer defines the transmission duration of the specified flow.	120 s
Sequence Numbers	Specifies whether the sequence numbers are used in the payload of the test frames. The sequence numbers are used in order to identify reordering, frame drop and duplicated frames.	"Yes"
Reordered Frames	Specifies if the tester accepts reordered frames on the receive side	"Yes"
Duplicated Frames	Specifies if the tester accepts duplicated frames on the receive side	"Yes"
Signature	A string located within frame payload that uniquely identifies the frame as belonging to this flow in a test step.	Not specified
ToleranceFactor	A factor (percentage) describing the accepted tolerance of the bandwidth profile (policing) implementation	2 %

Table 116: Test frames A configuration

String ID	Description	Default Value
CoS ID	The default CoS ID used in the test frames.	ENNI_Green_CoS1_IDs
Frame Rate /Information Rate	The rate (in fps or in bits/s) of the test traffic	0.5*CIR1
Signature	A string located within frame payload that uniquely identifies this flow in a test step.	Not specified

Table 117: Test frames B configuration

String ID	Description	Default Value
Default CoS ID	The default CoS ID used in the test frames.	ENNI_Yellow_CoS1_IDs
Frame Rate /Information Rate	The rate (in fps or in bits/s) of the test traffic	0.5*EIR1
Signature	A string located within frame payload that uniquely identifies this flow in a test step.	Not specified

[3] Tester can send untagged, priority tagged or C-tagged Service Frames at the UNI. Tester can send S-tagged only or C-tagged and S-tagged ENNI Frames at ENNI

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5.4.9 Default Test Suite Configuration

Every test case shares a test suite specific configuration, which depends on the test method used by the test suite. Unless a test case procedure otherwise stipulates, a test case uses test suite specific configuration as specified in Table 118.

Table 118: Default Test Suite configuration

String ID	Description	Default Value
Test Case Execution Time	Every test case runs at most "Test Case Execution Time". The default value specified in this table may be redefined in a particular test case. At the beginning of every test case execution a timer with "Test Case Execution Time" is started. If this timer timeout the test case execution will be terminated. Usually the test case execution will terminated before the "Test Case Execution" timeout by receiving of a pass or failure condition.	2*Flow Transmission Duration s
Ethernet Client MAC Address	The MAC address of a first emulated Ethernet client. This parameter will be specified for each emulated Ethernet client used for the test suite execution.	00:01:01:01:01:01
Ethernet Client MAC Address Step	This parameter is used to automatically generate MAC addresses of all emulated MAC clients. The MAC address of a particular client is the MAC address of the previous generated address plus the Ethernet Client MAC Address Step.	00:00:00:00:00:01
Multicast MAC Address	The multicast MAC address used during the test suite execution.	01:01:01:01:01:01

5.4.10 Default LACP Configuration

The following table defines the default configuration of Link Aggregation Group configured on the protected ENNI of the Operator MEN.

Table 119: Default LACP Configuration

String ID	Description	Value
Actor_Admin_Port_State .LACP_Activity	This Variable indicates the Activity control value with regard to this link. ([802.3 – 2005] section 43.4.7 and 43.4.2.2)	ACTIVE
Actor_Admin_Port_State .LACP_Timeout	This variable indicates the Timeout control value with regard to this link ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	LONG
Actor_Admin_Port_State .LACP_Aggregation	This variable indicates that the System considers this link to be Aggregateable ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	TRUE
Actor_Admin_Port_State .Synchronization	If TRUE, this link has been allocated to the correct Link Aggregation Group, the group has been associated with a compatible Aggregator, and the identify of the Link Aggregation Group is consistent with the System ID and operational Key information transmitted If FALSE, then this link is not in the right Aggregation ([802.3 – 2005] section 43.4.7 and 43.4.2.2.)	FALSE
Actor_Admin_Port_State .Collecting	TRUE means collection of incoming frames on this link is definitely enabled; i.e., collection is currently enabled and is not expected to be disabled in the absence of administrative changes or changes in received protocol information. Its value is otherwise FALSE. ([802.3 – 2005] section 43.4.7 and 43.4.2.2.)	FALSE

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String ID	Description	Value
Actor_Admin_Port_State .Distributing	FALSE means distribution of outgoing frames on this link is definitely disabled; i.e., distribution is currently disabled and is not expected to be enabled in the absence of administrative changes or changes in received protocol information. ([802.3 – 2005] section 43.4.7 and 43.4.2.2.)	FALSE
Partner_Admin_Port_State.LACP_Activity	This Variable indicates the Activity control value with regard to this link. ([802.3 – 2005] section 43.4.7 and 43.4.2.2.)	PASSIVE
Partner_Admin_Port_State.LACP_Timeout	This variable indicates the Timeout control value with regard to this link ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	LONG
Partner_Admin_Port_State_LACP_Aggregation	This variable indicates that the System considers this link to be Aggregateable ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	TRUE
Partner_Admin_Port_State.Synchronization	If TRUE, this link has been allocated to the correct Link Aggregation Group, the group has been associated with a compatible Aggregator, and the identify of the Link Aggregation Group is consistent with the System ID and operational Key information transmitted If FALSE, then this link is not in the right Aggregation ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	FALSE
Partner_Admin_Port_State.Collecting	TRUE means collection of incoming frames on this link is definitely enabled; i.e., collection is currently enabled and is not expected to be disabled in the absence of administrative changes or changes in received protocol information. Its value is otherwise FALSE ([802.3 – 2005] section 43.4.7 and 43.4.2.2.)	FALSE
Actor_Admin_Port_State .Distributing	FALSE means distribution of outgoing frames on this link is definitely disabled; i.e., distribution is currently disabled and is not expected to be enabled in the absence of administrative changes or changes in received protocol information ([802.3 – 2005] section 43.4.7 and 43.4.2.2)	FALSE
Partner_Admin_Key	Default value for the Partner's Key, assigned by administrator or System policy for use when the Partner's information is unknown or expired ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	20
Actor_Admin_Aggregaor_Key	The administrative Key value associated with the Aggregator ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	40
Actor_Admin_Port_Key	The administrative value of Key assigned to this port by administrator or System policy ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	Actor_Admin_ Aggregationor_ Key
Actor_Port_Number	The port number assigned to the port ([802.3 – 2005] section 43.4.7 and 43.4.2.2).	1 for link of ENNI configured as Standby, 2 for link of ENNI configured as Active

5.4.11 LACP Configuration

Many test cases require the tester to send LACPDUs towards the LAG interfaces. Default values of the LACPDU fields are provided in the "LACPDU: (Default Configuration)" table below. The tables after the "LACPDU: (Default Configuration)" define LACPDUs that are used by the Tester in order to trigger a special event on the LACP instance, e.g. "LACPDU: (Request for FastMode)". These tables specify just the fields of a LACPDU that have different value than as specified by "LACPDU: (Default Configuration)".

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Table 120: LACPDU (Default Configuration)

Segment	String ID	Description	Value
	Version Number	This identifies the LACP version; implementations conformant to this version of the standard carry the value 0x01 ([802.3 – 2005] section 43.4.2.2).	0x01
Actor Information TLV	Actor_System_Priority	The priority assigned to this System (by management or administration policy), encoded as an unsigned integer. ([802.3 – 2005] section 43.4.2.2).	0x0001
	Actor_System	The Actor's System ID, encoded as a MAC address ([802.3 – 2005] section 43.4.2.2).	01-01-01-01-01-01
	Actor_Key	The operational Key value assigned to the port by the Actor, encoded as an unsigned integer ([802.3 – 2005] section 43.4.2.2).	Partner_Admin_Key
	Actor_Port	The port number assigned to the port by the Actor (the System sending the PDU), encoded as an unsigned integer. ([802.3 – 2005] section 43.4.2.2).	1 for link of ENNI configured as Standby, 2 for link of ENNI configured as Active
	Actor_Port_Priority	The priority assigned to the port by the Actor (the System sending the PDU), encoded as an unsigned integer ([802.3 – 2005] section 43.4.2.2).	0x0001
	Actor_State.LACP_Activity	This flag indicates the Activity control value with regard to this link. ([802.3 – 2005] section 43.4.2.2)	ACTIVE
	Actor_State.LACP_Timeout	This flag indicates the Timeout control value with regard to this link ([802.3 – 2005] section 43.4.2.2).	LONG
	Actor_State.LACP_Aggregation	This flag indicates that the System considers this link to be Aggregateable ([802.3 – 2005] section 43.4.2.2).	TRUE
	Actor_State.Synchronization	If TRUE, this link has been allocated to the correct Link Aggregation Group, the group has been associated with a compatible Aggregator, and the identify of the Link Aggregation Group is consistent with the System ID and operational Key information transmitted If FALSE, then this link is not in the right Aggregation ([802.3 – 2005] section 43.4.2.2).	FALSE
	Actor_State.Collecting	TRUE means collection of incoming frames on this link is definitely enabled; i.e., collection is currently enabled and is not expected to be disabled in the absence of administrative changes or changes in received protocol information. Its value is otherwise FALSE ([802.3 – 2005] section 43.4.2.2).	FALSE
	Actor_State.Distributing	FALSE means distribution of outgoing frames on this link is definitely disabled; i.e., distribution is currently disabled and is not expected to be enabled in the absence of administrative changes or changes in received protocol information ([802.3 – 2005] section 43.4.2.2).	FALSE
	Actor_State.Defaulted	This flag indicates that the Actor's Receive machine is using Defaulted operational Partner information, administratively configured for the Partner. If FALSE, the operational Partner information in use has been received in a LACPDU ([802.3 – 2005] section 43.4.2.2)	FALSE
	Actor_State.Expired	If TRUE, this flag indicates that the Actor's Receive machine is in the EXPIRED state; if FALSE, this flag indicates that the Actor Receive machine is not in the EXPIRED state ([802.3 – 2005] section 43.4.2.2).	FALSE
Partner Information TLV	Partner_System_Priority	The priority assigned to this System (by management or administration policy), encoded as an unsigned integer ([802.3 – 2005] section 43.4.2.2).	0x0001

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Segment	String ID	Description	Value
	Partner_System	The Partner's System ID, encoded as a MAC address ([802.3 – 2005] section 43.4.2.2).	01-01-01-01-01-02
	Partner_Key	The operational Key value assigned to the port by the Partner, encoded as an unsigned integer ([802.3 – 2005] section 43.4.2.2).	Actor_Admin_Aggregationor_Key
	Partner_Port_Priority	The priority assigned to the port by the Partner, encoded as an unsigned integer ([802.3 – 2005] section 43.4.2.2).	0x0001
	Partner_Port	([802.3 – 2005] section 43.4.2.2).	0x0001
	Partner_State.LACP_Activity	This flag indicates the Activity control value with regard to this link. ([802.3 – 2005] section 43.4.2.2).	ACTIVE
	Partner_State.LACP_Timeout	This flag indicates the Timeout control value with regard to this link ([802.3 – 2005] section 43.4.2.2).	LONG
	Partner_State.LACP_Aggregation	This flag indicates that the System considers this link to be Aggregateable ([802.3 – 2005] section 43.4.2.2).	TRUE
	Partner_State.Synchronization	If TRUE, this link has been allocated to the correct Link Aggregation Group, the group has been associated with a compatible Aggregator, and the identify of the Link Aggregation Group is consistent with the System ID and operational Key information transmitted If FALSE, then this link is not in the right Aggregation ([802.3 – 2005] section 43.4.2.2).	FALSE
	Partner_State.Collecting	TRUE means collection of incoming frames on this link is definitely enabled; i.e., collection is currently enabled and is not expected to be disabled in the absence of administrative changes or changes in received protocol information. Its value is otherwise FALSE ([802.3 – 2005] section 43.4.2.2).	FALSE
	Partner_State.Distributing	FALSE means distribution of outgoing frames on this link is definitely disabled; i.e., distribution is currently disabled and is not expected to be enabled in the absence of administrative changes or changes in received protocol information ([802.3 – 2005] section 43.4.2.2).	FALSE
	Partner_State.Defaulted	This flag indicates that the Actor's Receive machine is using Defaulted operational Partner information, administratively configured for the Partner. If FALSE, the operational Partner information in use has been received in a LACPDU ([802.3 – 2005] section 43.4.2.2).	FALSE
	Partner_State.Expired	If TRUE, this flag indicates that the Actor's Receive machine is in the EXPIRED state; if FALSE, this flag indicates that the Actor Receive machine is not in the EXPIRED state ([802.3 – 2005] section 43.4.2.2).	FALSE
	CollectorMaxDelay	This field contains the value of CollectorMaxDelay of the station transmitting the LACPDU ([802.3 – 2005] section 43.4.2.2).	0

Table 121: LACPDU (Request for Fast Mode)

String ID	Description	Value
Actor_State.LACP_Timeout	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of this flag	SHORT

Table 122: LACPDU (Request for detaching)

String ID	Description	Value
Actor_Key	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of this flag	Actor_Admin_Aggregationor_Key + 1

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Table 123: LACPDU (Request for disabling Collection and Distribution)

String ID	Description	Value
Actor_State.Synchronization	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of these flags	FALSE
Actor_State.Collecting		FALSE
Actor_State.Distributing		FALSE

Table 124: LACPDU (Request for enabling Collection/disabling Distribution)

String ID	Description	Value
Actor_State.Synchronization	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of these flags	TRUE
Actor_State.Collecting		FALSE
Actor_State.Distributing		FALSE

Table 125: LACPDU (Request for enabling Distribution)

String ID	Description	Value
Actor_State.Synchronization	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of these flags	TRUE
Actor_State.Collecting		TRUE
Actor_State.Distributing		FALSE

Table 126: LACPDU (Request for informing current states)

String ID	Description	Value
Partner_State.LACP_Activity	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of this flag	PASSIVE

Table 127: LACPDU (Request for being Individual)

String ID	Description	Value
Partner_State.LACP_Aggregation	Some tests request the tester to send a LACPDU based on the default configuration with change in the value of this flag	FALSE

The following tables define the test traffic to be sent by the Tester towards the Operator MEN for different test cases.

Table 128: Flow Definition1 (Default traffic flow definition)

String ID	Description	Value
Traffic Flow Definition 1	This is the default configuration of traffic flow.	Test frames as defined in "Flow Definition" in Suggested Test Flow Configuration.

Table 129: Flow Definition2 (Traffic flow for negative test cases)

String ID	Description	Value
Traffic Flow Definition 2	Special unidirectional traffic flow at the protected ENNI for negative test cases	Frames with Invalid Slow Protocol subtype values defined in [802.3 – 2005] Table 43B–2, LACPDU, Marker PDU, OAM PDU, and test frames as defined in "Flow Definition" in Suggested Test Flow Configuration.

The following table references default LACP timer values used by the test suite, as defined in [802.3 – 2005], section 43.4.4.

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Table 130: LACP timers

String ID	Description	Value
Fast_Periodic_Time	The number of seconds between periodic transmissions using Short Timeouts ([802.3 – 2005] section 43.4.4)	1 s
Slow_Periodic_Time	The number of seconds between periodic transmissions using Long Timeouts ([802.3 – 2005] section 43.4.4)	30 s
Short_Timeout_Time	The number of seconds before invalidating received LACPDU information when using Short Timeouts (3 x Fast_Periodic_Time) ([802.3 – 2005] section 43.4.4)	3 s
Long_Timeout_Time	The number of seconds before invalidating received LACPDU information when using Long Timeouts (3 x Slow_Periodic_Time) ([802.3 – 2005] section 43.4.4)	90 s

The following table defines implementation-specific timing values used by the test suite. The provided values do not represent constants, but are implementation-specific and must be determined and filled in before executing the test suite.

Table 131: LACP-specific Parameters

Parameter	Description	Value
Reboot time	The amount of time the LACP instance needs to perform a full Reboot operation	300 s
LACPDU listen time	The maximum time interval required by the LACP instance to generate a LACP/Marker PDU	3 s
LACP process time	The time required by a LACP instance to process the received information.	1 s

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5.5 Template for Abstract Test Cases

The table below defines a format for the test cases in current ATS.

Table 132: Abstract Test Cases template

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	Concatenation of the group name, requirement number and an ID, which is unique within group name and the requirement, e.g. ENNI_ATTRIBUTES.R9.1
Reference Document Source	Reference document and section, e.g. MEF 26, Section 9.1
Test Status	Mandatory, Conditional Mandatory, Optional
Requirement	Service requirement, e.g. R9: An ingress ENNI Frame that is invalid as defined in Clause 3.4 of [802.3 – 2005] MUST be discarded by the receiving Operator MEN.
Test Purpose	The short description of the test. E.g. Verify the single-tagged and double-tagged frame forwarding for subscriber frames at ENNI by sending C-tagged and untagged frames at UNI and single-tagged and double-tagged frames at ENNI.
Conditions	Feature/capability settings (e.g. service attributes, supported features) of the Operator MEN needed to perform this test case.
Test Topology/OVC	A picture of the minimum required test topology for execution and a reference to OVC and OVC End Point configuration.
Test Procedure	The detailed test instructions. The test frames specified in the test procedure relate to the OVCs specified in "Conditions".
Expected Results	A list of expected results. If all of the test results match the expected results list, the test verdict is PASS, if some of the results don't match the list, the test verdict is FAIL, and otherwise the test verdict is INCONCLUSIVE.
Verdict	Possible verdict of the test case. A verdict can be one of the following: PASS, or INCONCLUSIVE

6 Test Group: Foundation

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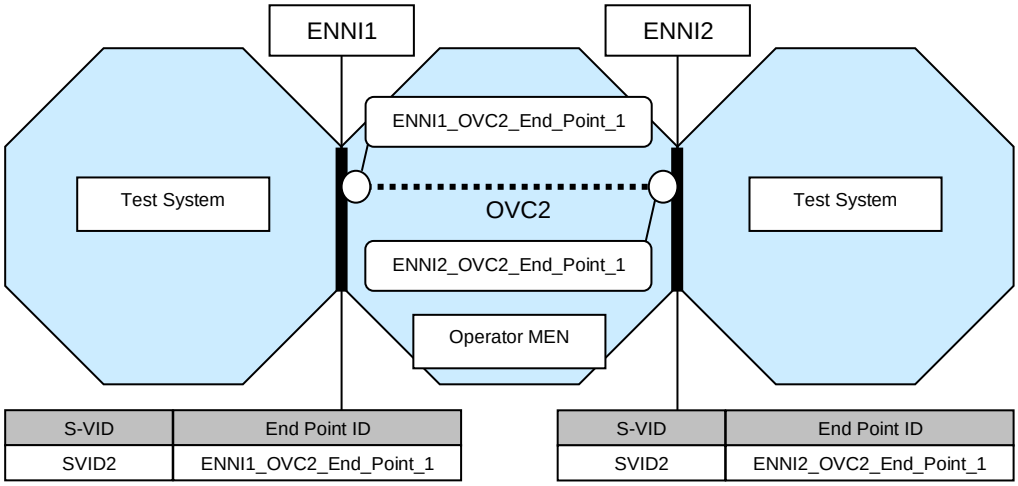
6.1 PHY of ENNI Links

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R5.1
Reference Document Source	MEF 26, R5
Test Status	Mandatory
Requirement	Each link in an ENNI MUST be one of the following physical layers in full duplex mode as defined in [IEEE 802.3 – 2005]: 1000Base-SX, 1000Base-LX, 1000Base T, 10GBASE-SR, 10GBASE-LX4, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, 10GBASE-EW.
Test Purpose	Verify that all ENNI links operate in full duplex mode and the physical type is one of the following: 1000Base-SX, 1000Base-LX, 1000Base T, 10GBASE-SR, 10GBASE-LX4, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, 10GBASE-EW.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits S-Tag test frames at each ENNI, that are mapped to OVC2.
Expected Results	The physical link on each ENNI is operational The physical link on each ENNI is one of the following types: 1000Base-SX, 1000Base-LX, 1000Base T, 10GBASE-SR, 10GBASE-LX4, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, 10GBASE-EW The physical link of each ENNI operates in full duplex mode. All test frames sent at ENNI1 are received at ENNI2. All test frames sent at ENNI2 are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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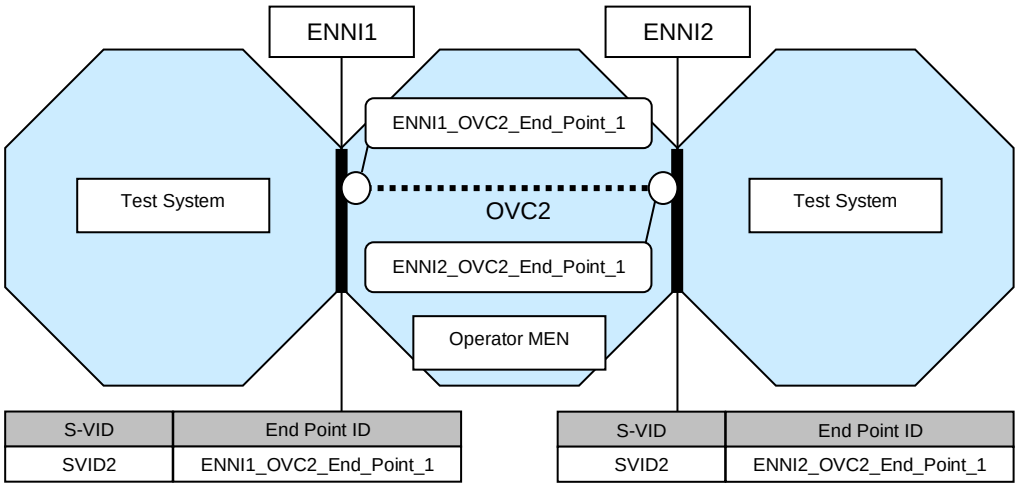
6.2 Single-tagged Frames at ENNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R7.1
Reference Document Source	MEF 26, R7, R6
Test Status	Mandatory
Requirement	R6: Each ENNI Frame MUST have the standard Ethernet format with one of the tag configurations specified in Table 3 of [MEF 26]. [DA = Destination Address, SA = Source Address, ET = Ethertype/Length, S-Tag with Tag Protocol Identification Field (TPID) = 0x88A8.] R7: An S-Tag MUST have the format specified in Sections 9.5 and 9.7 of [IEEE 802.1ad].
Test Purpose	Verify the S-Tag frame format at ENNI1 by sending S-Tag frames at both ENNI1 and ENNI2
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	
Test Procedure	Tester transmits single S-tagged test frames at each ENNI, that are mapped to OVC2.
Expected Results	Single S-tagged test frames are received mapped to OVC2 at ENNI1 and ENNI2: The Destination Address, the Source Address, the Ethertype/Length and S-Tag format is set according to the IEEE standard 802.1ad; the S-Tag TPID is set to 0x88A8.
Verdict	PASS, FAIL, or INCONCLUSIVE

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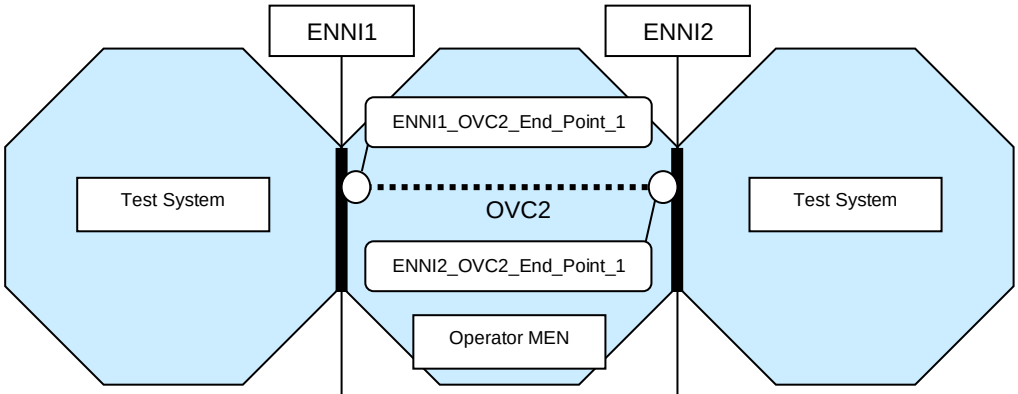
6.3 Double-tagged Frames at ENNI, ENNI frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R8.2
Reference Document Source	MEF 26, R7, R6, R8
Test Status	Mandatory
Requirement	R6: Each ENNI Frame MUST have the standard Ethernet format with one of the tag configurations specified in Table 3 of [MEF 26]. [DA = Destination Address, SA = Source Address, ET = Ethertype/Length, S-Tag with Tag Protocol Identification Field (TPID) = 0x88A8, C-Tag with TPID = 0x8100.] R7: An S-Tag MUST have the format specified in Sections 9.5 and 9.7 of [IEEE 802.1ad]. A C-Tag MUST has the format specified in Sections 9.5 and 9.6 of [IEEE 802.1ad]. R8: A C-Tag MUST have the format specified in Sections 9.5 and 9.6 of [IEEE 802.1ad].
Test Purpose	Verify the double-tagged frame format at ENNI1 by sending double-tagged frames at both ENNI1 and ENNI2.
Conditions	None
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames at each ENNI, that are mapped to OVC2. The inner tag (CE-VID) can be chosen arbitrarily at each ENNI, respectively.
Expected Results	Double-tagged test frames are received at ENNI1 and ENNI2, mapped to OVC2: The Destination Address, the Source Address, the Ethertype/Length and S-Tag format are set according to the IEEE standard 802.1ad; the TPID of the outer tag is 0x88A8, the TPID of the inner tag is 0x8100; the TPID and CE-VID of the inner tag received at ENNI1 or ENNI2, respectively, must match what has been transmitted at the other interface.
Verdict	PASS, FAIL, or INCONCLUSIVE

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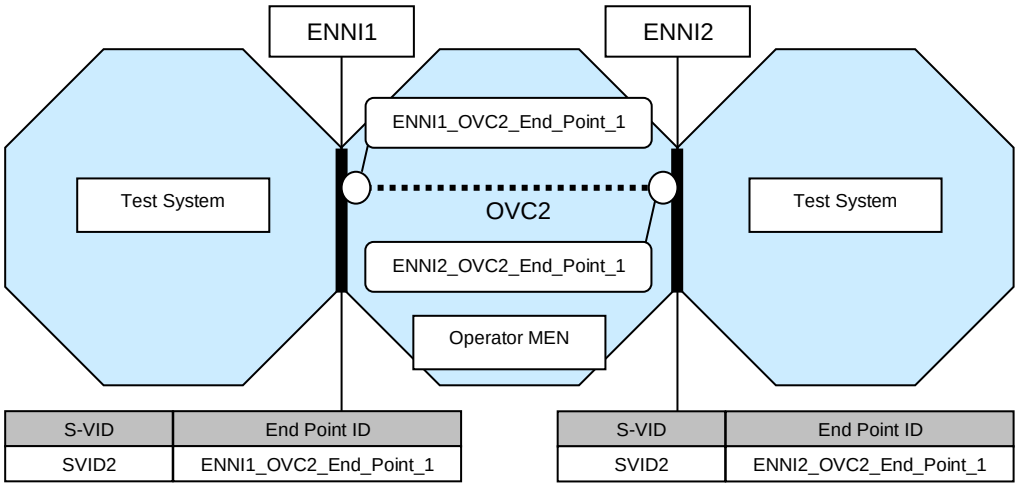
6.4 Single-tagged Frames at ENNI with an Invalid FCS, ENNI frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R9.2
Reference Document Source	MEF 26, R9
Test Status	Mandatory
Requirement	An ingress ENNI Frame that is invalid as defined in Clause 3.4 of [802.3 – 2005] MUST be discarded by the receiving Operator MEN.
Test Purpose	Verify that if the tester sends single-tagged frames at ENNI with an invalid FCS, the Operator MEN discards them.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	
Test Procedure	Tester transmits single S-Tagged test frames at ENNI1, that are mapped to OVC2: the FCS is incorrect. Tester transmits single S-Tagged test frames at ENNI2, that are mapped to OVC2: the FCS is incorrect.
Expected Results	No test frames received at ENNI1 or at ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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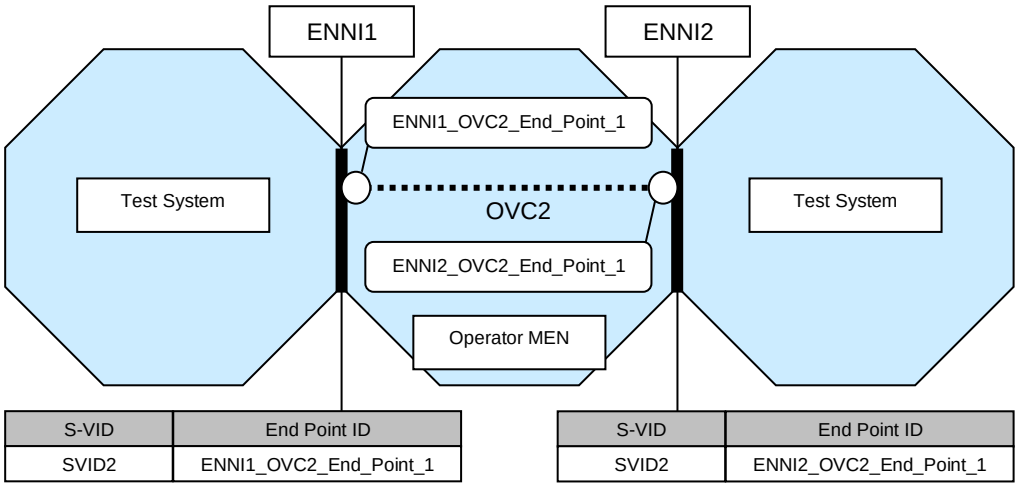
6.5 Double-tagged Frames at ENNI with an Invalid FCS, ENNI frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R9.4
Reference Document Source	MEF 26, R9
Test Status	Mandatory
Requirement	An ingress ENNI Frame that is invalid as defined in Clause 3.4 of [802.3 – 2005] MUST be discarded by the receiving Operator MEN.
Test Purpose	Verify that if the tester sends double-tagged frames at ENNIs with an invalid FCS, the Operator MEN discards them.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames, that are mapped to OVC2 at ENNI1: the FCS is incorrect. Tester transmits double-tagged test frames, that are mapped to OVC2 at ENNI2: the FCS is incorrect.
Expected Results	No test frames received at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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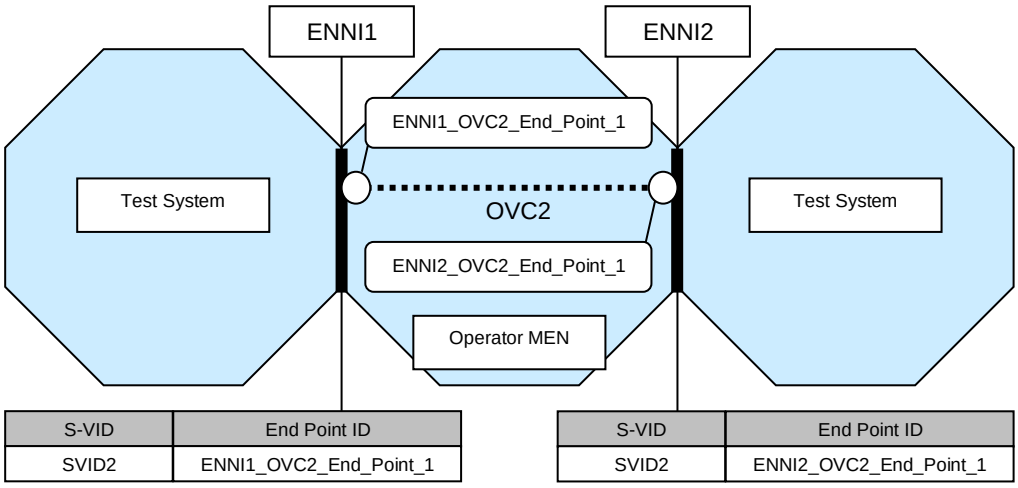
6.6 Discarding of Single-tagged ENNI Frames Below Minimum Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R10.1
Reference Document Source	MEF 26, R10
Test Status	Mandatory
Requirement	An ingress ENNI Frame whose length is less than 64 octets MUST be discarded by the receiving Operator MEN as per Clause 4.2.4.2.2 of [802.3 – 2005]
Test Purpose	Verify that the Operator MEN discards single-tagged ENNI frames with size below 64 octets.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits single S-Tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 63 octets.
Expected Results	No test frames are received at ENNI1 or ENNI2
Verdict	PASS, FAIL, or INCONCLUSIVE

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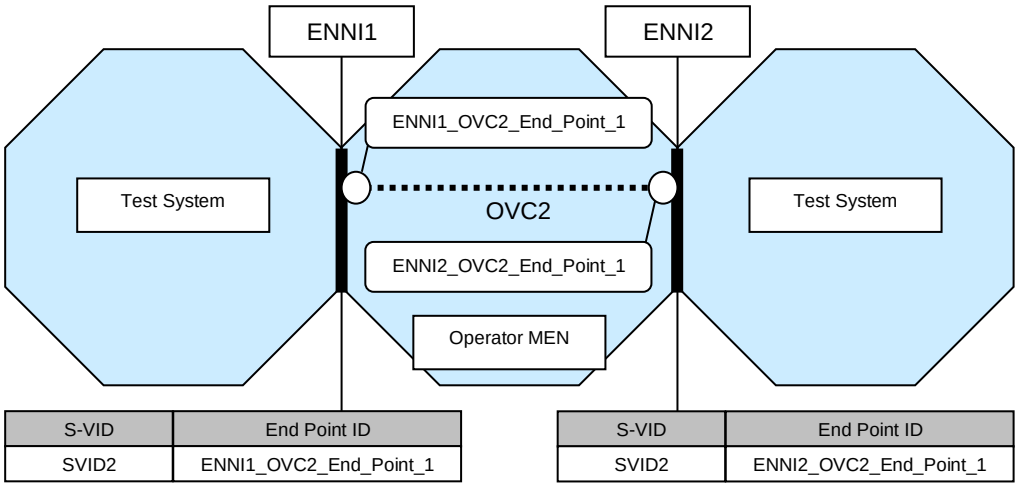
6.7 Discarding of Double-tagged ENNI Frames Below Minimum Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R10.2
Reference Document Source	MEF 26, R10
Test Status	Mandatory
Requirement	An ingress ENNI Frame whose length is less than 64 octets MUST be discarded by the receiving Operator MEN as per Clause 4.2.4.2.2 of [802.3 – 2005]
Test Purpose	Verify that the Operator MEN discards double-tagged ENNI Frames with size below 64 octets.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 63 octets.
Expected Results	No test frames are received at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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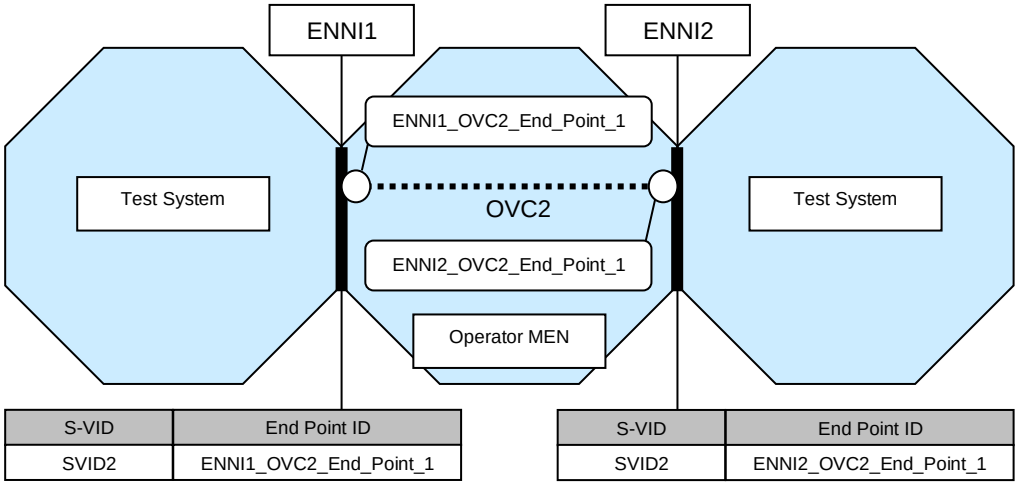
6.8 Single-tagged Frame Forwarding at ENNI and at Maximum Frame Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R14.1
Reference Document Source	MEF 26, R14
Test Status	Mandatory
Requirement	The ENNI Maximum Transmission Unit Size MUST be at least 1526 bytes.
Test Purpose	Verify the single-tagged frame forwarding at ENNI MTU size.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits single-tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 1526 octets.
Expected Results	All test frames are received at ENNI1 or ENNI2, are mapped to OVC2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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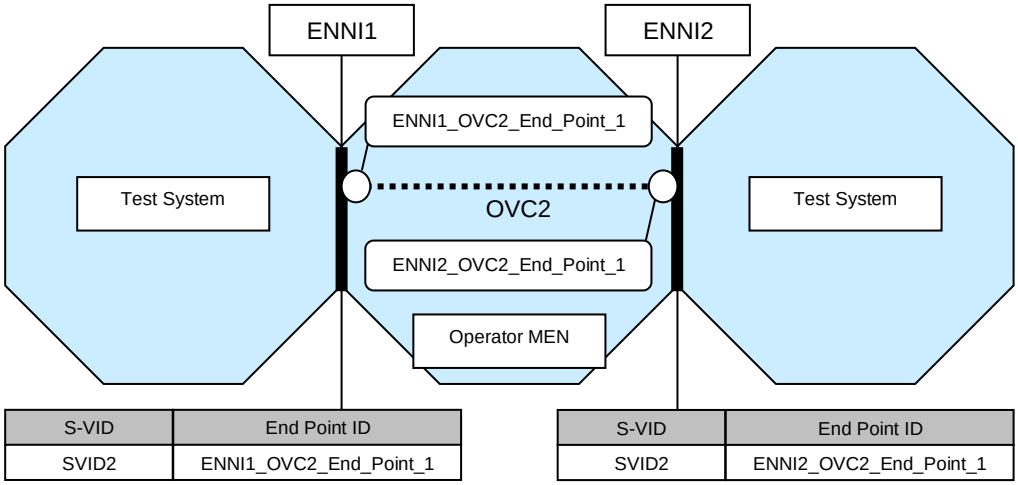
6.9 Double-tagged Frame Forwarding at ENNI and at Maximum Frame Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R14.2
Reference Document Source	MEF 26, R14
Test Status	Mandatory
Requirement	The ENNI Maximum Transmission Unit Size MUST be at least 1526 bytes.
Test Purpose	Verify the double-tagged frame forwarding at ENNI MTU size.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 1526 octets.
Expected Results	All test frames are received at ENNI1 and ENNI2, mapped to OVC2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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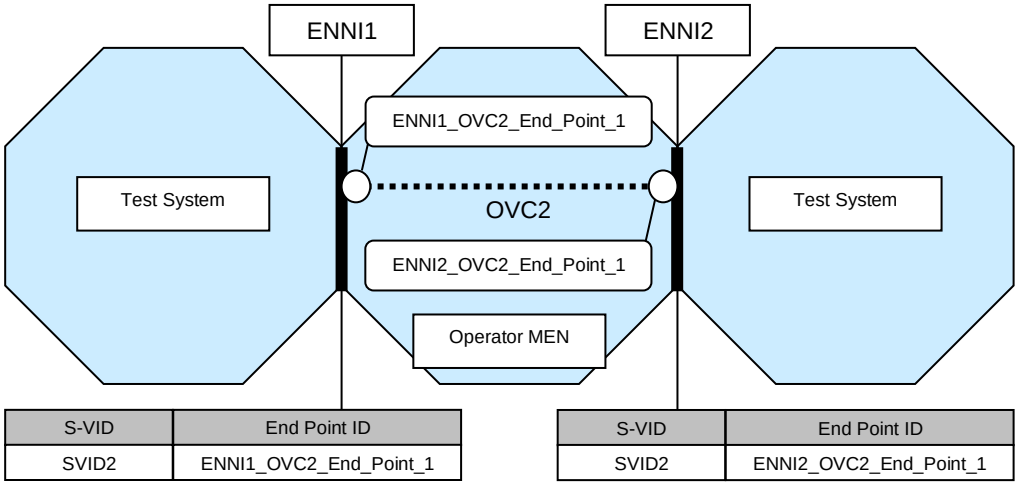
6.10 Frames at ENNI Larger than MTU

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R15.1
Reference Document Source	MEF 26, R15
Test Status	Mandatory
Requirement	When an ENNI Frame is larger than the MTU, the receiving Operator MEN for this frame **MUST** discard it, and the frame may or may not be ignored in the operation of a Bandwidth Profile that applies to this ENNI Frame.
Test Purpose	Verify that the Operator MEN discards ENNI Frames that exceed the MTU of the receiving Operator MEN.
Conditions	none
Test Topology/OVC	
Test Procedure	Tester transmits test frames at each ENNI, that are mapped to OVC2: Frame size is set to "ENNI_MTU"+1 octets.
Expected Results	No test frames are received at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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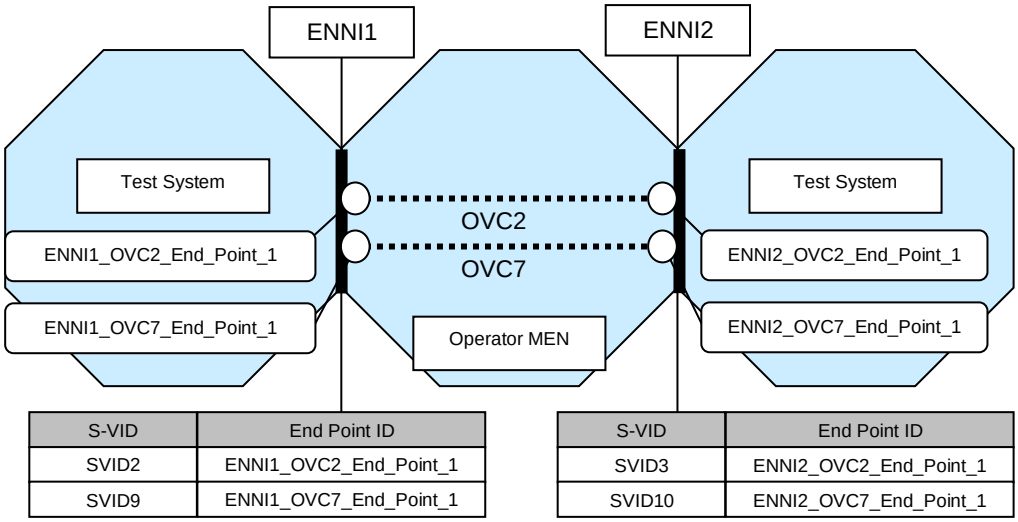
6.11 OVC Mapping by S-VLAN ID

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R16.1
Reference Document Source	MEF 26, R16
Test Status	Mandatory
Requirement	For a given S-Tagged ENNI Frame, the End Point to which it is mapped **MUST** be determined by the S-VLAN ID value in the S-Tag.
Test Purpose	Verify that the Operator MEN selects an OVC to map the ingress frame to by its S-VLAN ID.
Conditions	Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID / End Point ID: SVID2 / ENNI1_OVC2_End_Point_1; SVID9 / ENNI1_OVC7_End_Point_1 S-VID / End Point ID: SVID3 / ENNI2_OVC2_End_Point_1; SVID10 / ENNI2_OVC7_End_Point_1
Test Procedure	Tester transmits single S-Tagged test frames A at each ENNI, that are mapped to OVC2: the S-VLAN ID is mapped to OVC2 Tester transmits single S-Tagged test frames B at each ENNI: the S-VLAN ID is not mapped to any OVC Tester transmits single S-Tagged test frames C at each ENNI, that are mapped to OVC7: the S-VLAN IDs is mapped to OVC7 Tester transmits single S-Tagged test frames D at each ENNI: the S-VLAN IDs is not mapped to any OVC
Expected Results	All test frames A are received at ENNI1 and ENNI2, mapped to OVC2. No test frames B are received at any External Interfaces . All test frames C are received at ENNI1 and ENNI2, mapped to OVC7. No test frames D are received at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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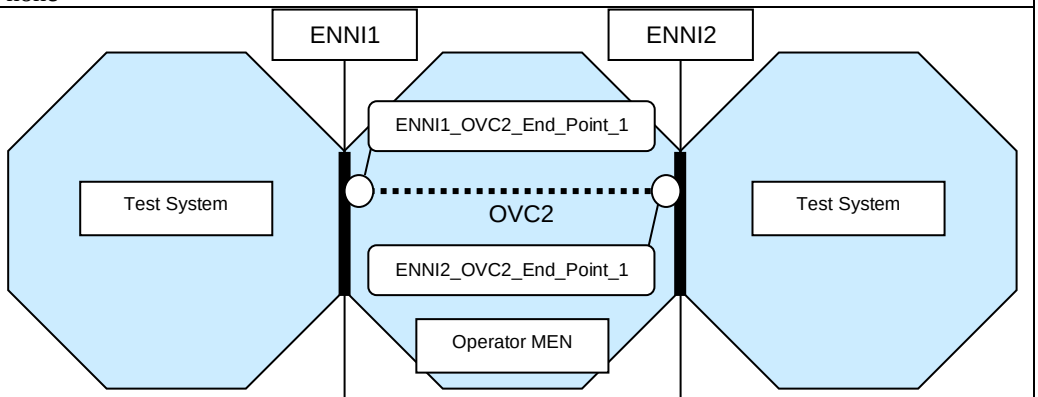
6.12 Not mapped S-Tagged ENNI Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R19.1
Reference Document Source	MEF 26, R19
Test Status	Mandatory
Requirement	An ingress S-Tagged ENNI Frame that is not mapped to an existing End Point **MUST NOT** be forwarded to an External Interface by the receiving Operator MEN.
Test Purpose	Verify that ingress S-Tagged ENNI Frames containing an S-VLAN ID not mapped to any OVC are not forwarded by the receiving Operator MEN.
Conditions	none
Test Topology/OVC	 S-VID / End Point ID: SVID2 – ENNI1_OVC2_End_Point_1; SVID40 – none S-VID / End Point ID: SVID2 – ENNI2_OVC2_End_Point_1; SVID40 – none
Test Procedure	Tester transmits test frames tagged with SVID40 at each ENNI: S-VLAN ID SVID40 is not mapped to any OVC at ENNI1 or ENNI2.
Expected Results	None of the unmapped test frames are received at at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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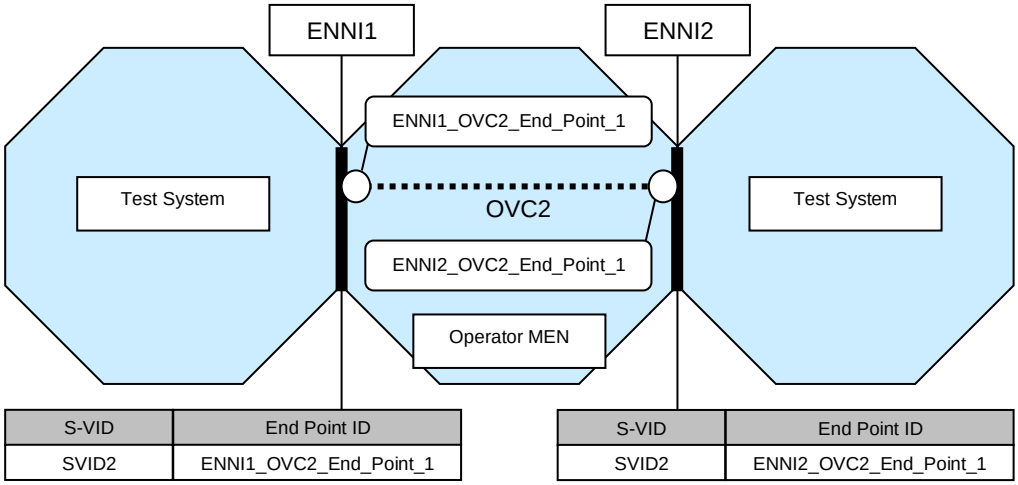
6.13 Not mapped Untagged ENNI Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_ATTRIBUTES.R20.1
Reference Document Source	MEF 26, R20
Test Status	Mandatory
Requirement	An untagged ENNI Frame **MUST** NOT be mapped to an OVC End Point.
Test Purpose	Verify that untagged ingress ENNI Frames are not forwarded by the receiving Operator MEN.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits untagged test frames at each ENNI.
Expected Results	No test frames are received at ENNI1 or ENNI2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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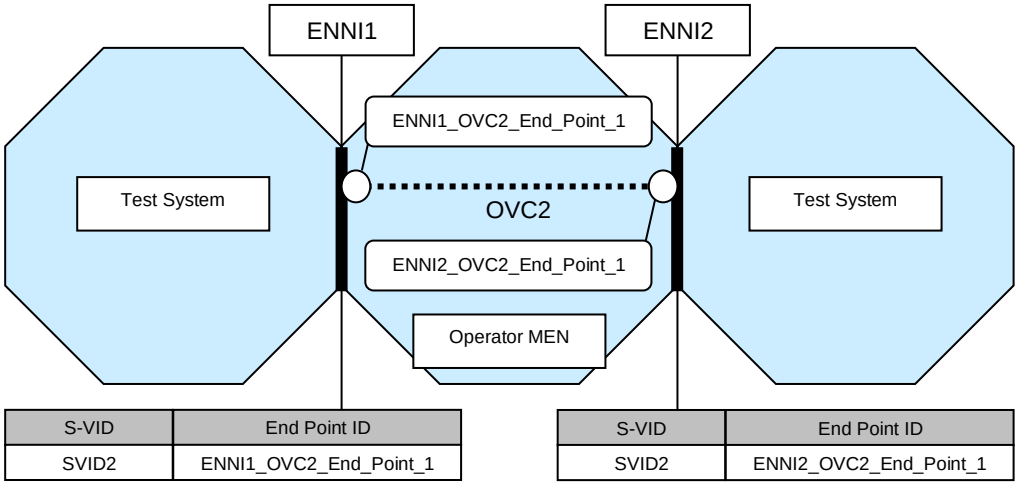
6.14 Frame Delivery without Looping

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI _ATTRIBUTES.R28.1
Reference Document Source	MEF 26, R28
Test Status	Mandatory
Requirement	If an egress frame mapped to an OVC End Point results from an ingress frame mapped to an OVC End Point, there MUST be an OVC that associates the two OVC End Points. And, the two OVC End Points MUST be different from each other.
Test Purpose	Verify that no ENNI frame sent through an ingress OVC endpoint is delivered to the same OVC end point.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits unicast, broadcast, multicast, and unknown test frames at ENNI2, that are mapped to OVC2.
Expected Results	All test frames are received at ENNI1, mapped to OVC2. No test frames are received at ENNI2
Verdict	PASS, FAIL, or INCONCLUSIVE

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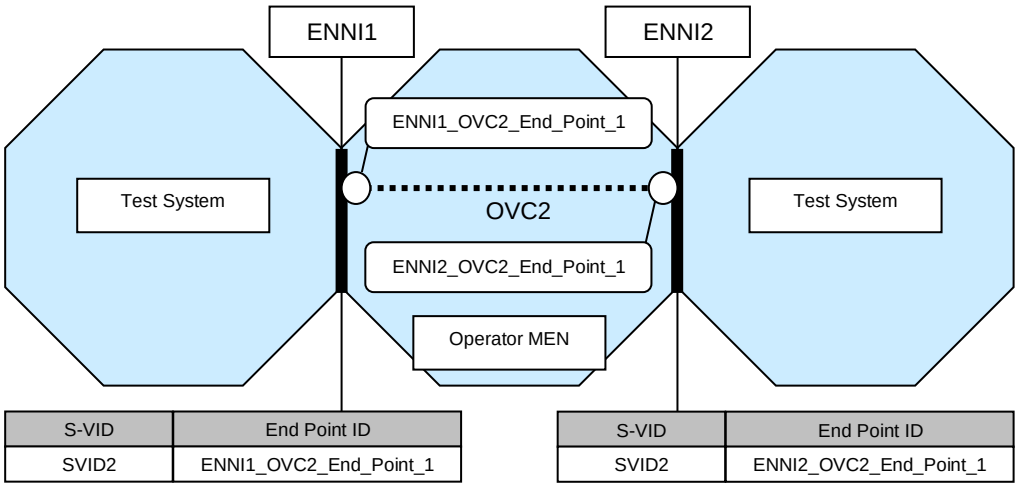
6.15 Forwarding of Untagged Service Frames of OVC MTUSize

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R32.1
Reference Document Source	MEF 26, R32
Test Status	Mandatory
Requirement	The OVC Maximum Transmission Unit Size **MUST** be at least 1526 bytes.
Test Purpose	Verify that the OVC is able to forward single-tagged ENNI frames with at least the size of 1526 octets.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits single S-Tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 1526 octets.
Expected Results	All test frames transmitted at ENNI1 are received at ENNI2, mapped to OVC2. All test frames transmitted at ENNI2 are received at ENNI1, mapped to OVC2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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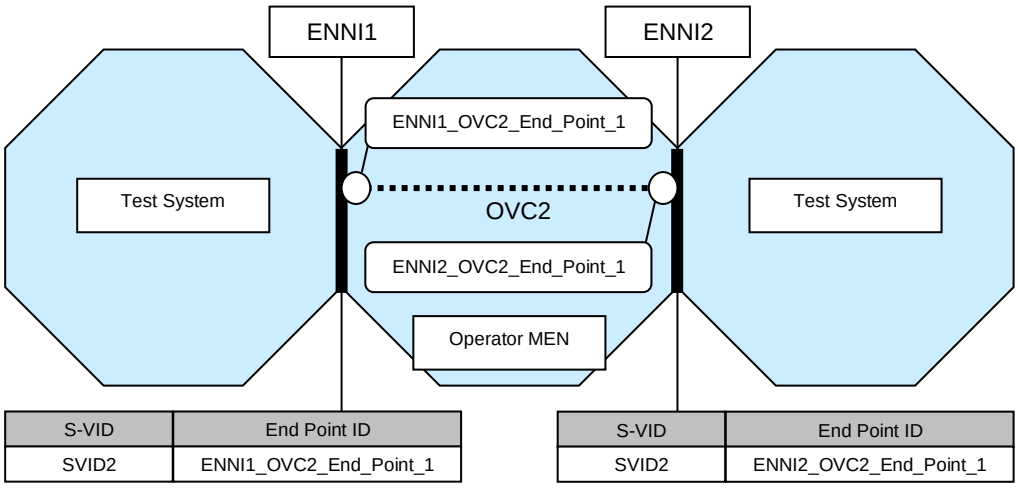
6.16 Forwarding of Double-Tagged ENNI Frames of OVC MTU Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R32.2
Reference Document Source	MEF 26, R32
Test Status	Mandatory
Requirement	The OVC Maximum Transmission Unit Size **MUST** be at least 1526 bytes.
Test Purpose	Verify that the OVC is able to forward double-tagged ENNI frames with at least a size of 1526 octets.
Conditions	none
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames at each ENNI, that are mapped to OVC2: Frame size is set to 1526 octets
Expected Results	All test frames transmitted at ENNI1 are received at ENNI2, mapped to OVC2. All test frames transmitted at ENNI2 are received at ENNI1, mapped to OVC2.
Verdict	PASS, FAIL, or INCONCLUSIVE

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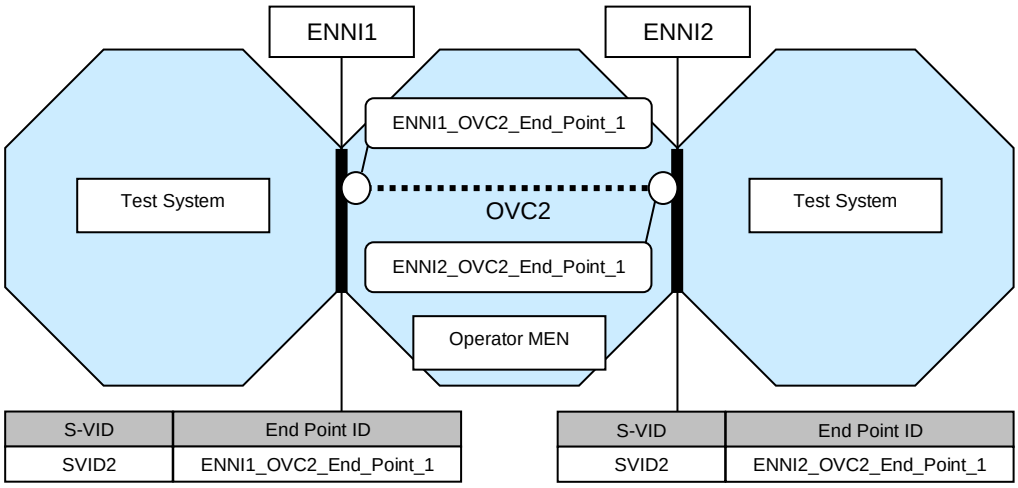
6.17 ENNI Frames Larger Than The OVC MTU Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R33.1
Reference Document Source	MEF 26, R33
Test Status	Mandatory
Requirement	When an ENNI Frame or a Service Frame is larger than the OVC MTU Size for the OVC associating the OVC End Point to which it is mapped, the receiving Operator for this frame MUST discard it, and the operation of a Bandwidth Profile that applies to this frame is not defined.
Test Purpose	Verify that the ENNI frames are discarded, if they are larger than the MTU size of the OVC to which the frames are mapped.
Conditions	none
Test Topology/OVC	
Test Procedure	Tester transmits test frames at each ENNI, that are mapped to OVC2: Frame size is set to OVC_MTU+1 octets.
Expected Results	None of the test frames may be received at any External Interface
Verdict	PASS, FAIL, or INCONCLUSIVE

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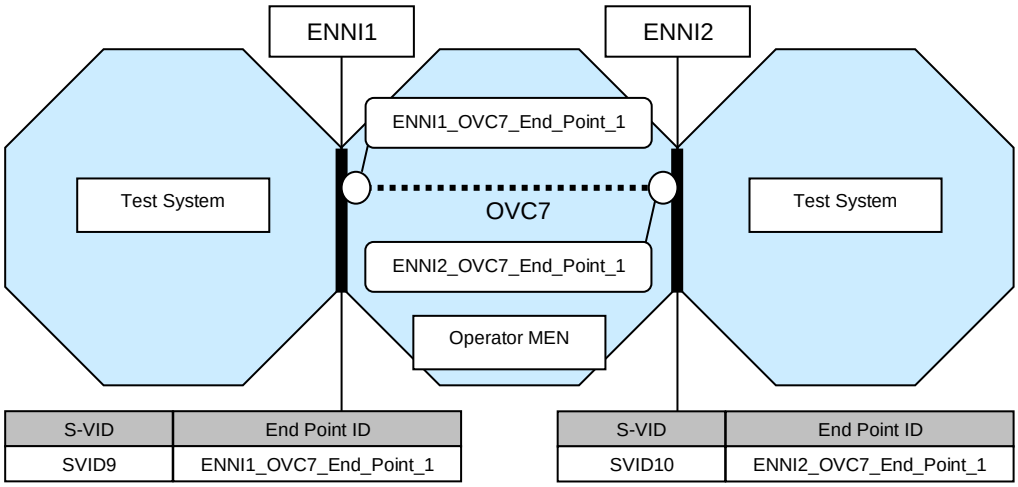
6.18 S-VLAN ID Preservation Set to "No"

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R41.1
Reference Document Source	MEF 26, R41
Test Status	Mandatory
Requirement	When an OVC has the S-VLAN ID Preservation attribute with a value of No, an egress ENNI Frame mapped to an OVC End Point resulting from an ingress ENNI Frame mapped to a different OVC End Point MUST have an S-VLAN ID value that has a one-to-one association with the S-VLAN ID of the ingress service frame.
Test Purpose	Verify that if S-VLAN ID preservation is set to "No" for a particular OVC associated with two ENNIs, the ENNI frames can be forwarded between the two OVC end points and the S-VLAN IDs of the ingress and egress frames have a one-to-one association.
Conditions	S-VLAN ID Preservation = "No"
Test Topology/OVC	 S-VID: SVID9 — End Point ID: ENNI1_OVC7_End_Point_1 S-VID: SVID10 — End Point ID: ENNI2_OVC7_End_Point_1
Test Procedure	Tester transmits double-tagged and single S-Tagged test frames mapped to OVC7 at ENNI1. Tester transmits double-tagged and single S-Tagged test frames mapped to OVC7 at ENNI2.
Expected Results	All test frames transmitted from ENNI1 are received at ENNI2, mapped to OVC7. All test frames transmitted from ENNI2 are received at ENNI1, mapped to OVC7.
Verdict	PASS, FAIL, or INCONCLUSIVE

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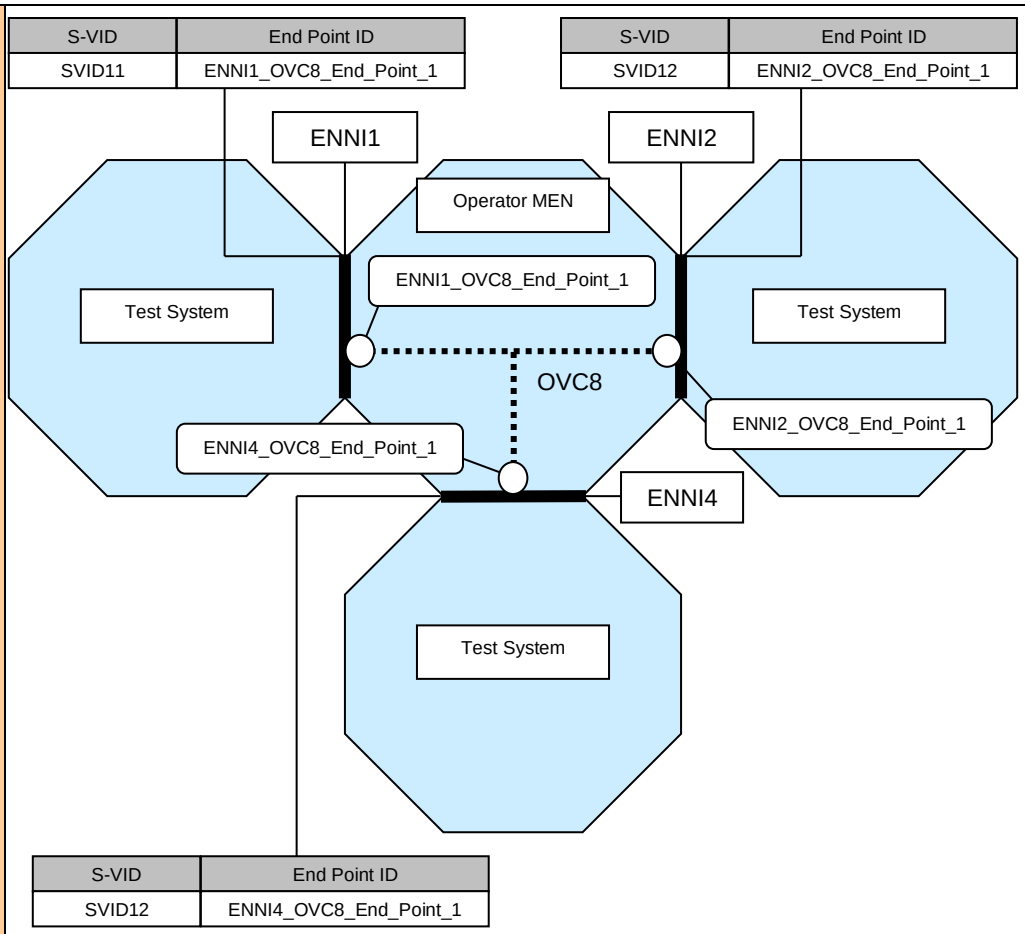
6.19 Unconditional Unicast frame Delivery

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R44.1
Reference Document Source	MEF 26, R44
Test Status	Conditional Mandatory
Requirement	When the Unicast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with a unicast destination MAC address MUST be delivered to all of the other OVC End Points in the OVC.
Test Purpose	Verify that all unicast ENNI Frames sent at ENNI1, ENNI2, and ENNI4 which are mapped to an OVC are forwarded to ENNI1, ENNI2 and ENNI4, if Unconditional Unicast Frame Delivery is enabled for the OVC over which the frames were forwarded.
Conditions	Unconditional Unicast Frame Delivery = "Yes", Number of ENNI OVC End Points > 2
Test Topology/OVC	
Test Procedure	Tester transmits test frames that are mapped to OVC8 at ENNI1,: "Flow Definition" is set to "[Unicast frames of "Frame Sizes"]" Tester transmits test frames that are mapped to OVC8 at ENNI2: "Flow Definition" is set to "[Unicast frames of "Frame Sizes"]" Tester transmits test frames that are mapped to OVC8 at ENNI4: "Flow Definition" is set to "[Unicast frames of "Frame Sizes"]".
Expected Results	All test frames transmitted at the ENNI1 are received at ENNI2 and ENNI4, mapped to OVC8. All test frames transmitted at ENNI2 are received at ENNI1 and ENNI4, mapped to OVC8. All test frames transmitted at ENNI4 are received at ENNI1 and ENNI2, mapped to OVC8.
Verdict	PASS, FAIL, or INCONCLUSIVE

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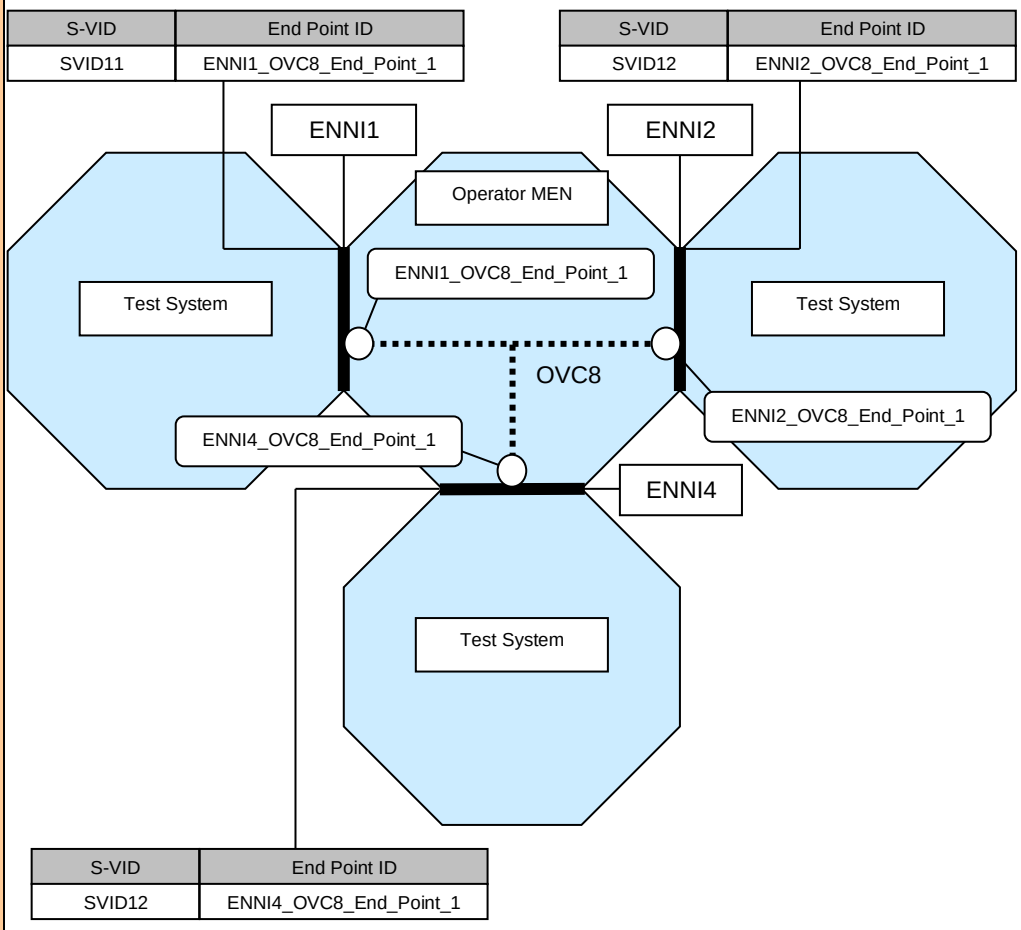
6.20 Unconditional Multicast Frame Delivery

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R46.1
Reference Document Source	MEF 26, R46
Test Status	Conditional Mandatory
Requirement	When the Multicast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with a multicast destination MAC address MUST be delivered to all of the other End Points associated by the OVC.
Test Purpose	Verify that all multicast ENNI Frames sent at ENNI1, ENNI2 or ENNI4 are forwarded to ENNI2 and ENNI4, or ENNI1 and ENNI4, or ENNI1 or ENNI2, if unconditional multicast frame delivery is enabled for the OVC over which the multicast ENNI Frames were forwarded.
Conditions	Unconditional Multicast Frame Delivery = "Yes", Number of ENNI OVC End Points > 2
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC8 at ENNI1: "Flow Definition" is set to "[Multicast frames of "Frame Sizes"]" Tester transmits test frames mapped to OVC8 at ENNI2: "Flow Definition" is set to "[Multicast frames of "Frame Sizes"]" Tester transmits test frames mapped to OVC8 at ENNI4: "Flow Definition" is set to "[Multicast frames of "Frame Sizes"]"
Expected Results	All test frames transmitted at the ENNI1 are received at both ENNI2 and ENNI4, mapped to OVC8. All test frames transmitted at the ENNI2 are received at both ENNI1 and ENNI4, mapped to OVC8. All test frames transmitted at the ENNI4 are received at both ENNI1 and ENNI2, mapped to OVC8.

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Verdict	PASS, FAIL, or INCONCLUSIVE

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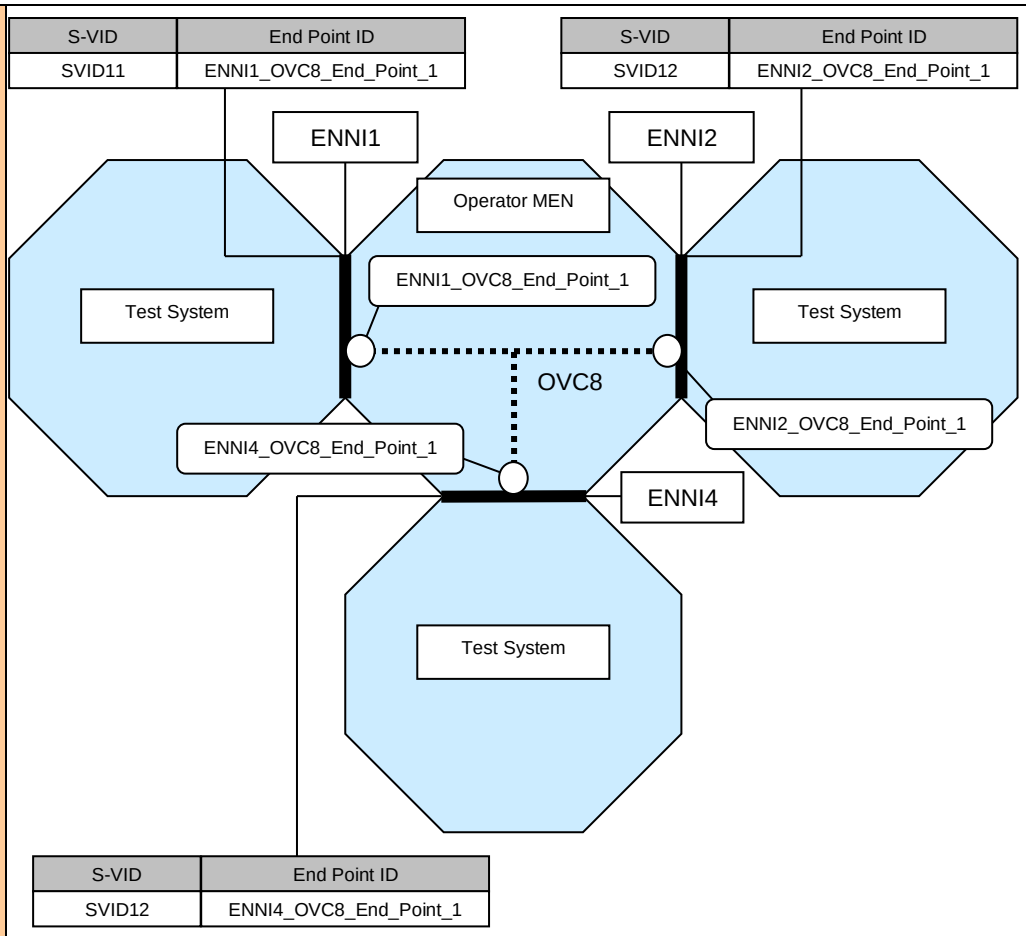
6.21 Unconditional Broadcast Frame Delivery

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R48.1
Reference Document Source	MEF 26, R48
Test Status	Conditional Mandatory
Requirement	When the Broadcast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with the broadcast destination MAC address MUST be delivered to all of the other OVC End Points associated by the OVC.
Test Purpose	Verify that all broadcast ENNI Frames sent at ENNI1, ENNI2 and ENNI4 are forwarded to ENNI2 and ENNI4, or ENNI1 and ENNI4, or ENNI1 and ENNI4, if unconditional broadcast frame delivery is enabled for the OVC over which the test frames were forwarded.
Conditions	Unconditional Broadcast Frame Delivery = "Yes", Number of ENNI OVC End Points > 2
Test Topology/OVC	
Test Procedure	Tester transmits test frames that are mapped to OVC8 at ENNI1: "Flow Definition" is set to "[Broadcast frames of "Frame Sizes"]" Tester transmits test frames that are mapped to OVC8 at ENNI2: "Flow Definition" is set to "[Broadcast frames of "Frame Sizes"]" Tester transmits test frames that are mapped to OVC8 at ENNI4: "Flow Definition" is set to "[Broadcast frames of "Frame Sizes"]"
Expected Results	All test frames transmitted at the ENNI1 are received at both ENNI2 and ENNI4, mapped to OVC8. All test frames transmitted at the ENNI2 are received at both ENNI1 and ENNI4, mapped to OVC8. All test frames transmitted at the ENNI4 are received at both ENNI1 and ENNI2, mapped to OVC8.
Verdict	PASS, FAIL, or INCONCLUSIVE

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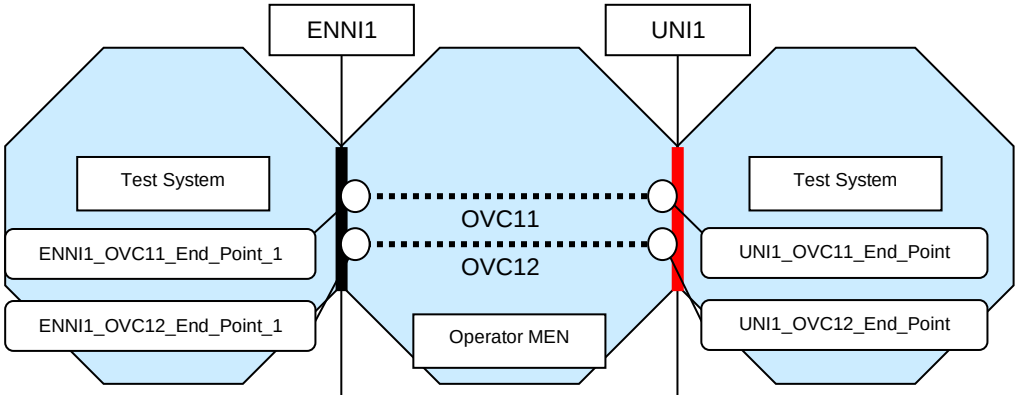
6.22 OVC End Point Selection at the UNI by the CE-VLAN ID of Tagged Service Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R66.1
Reference Document Source	MEF 26, R66
Test Status	Mandatory
Requirement	The OVC End Point at the UNI for a Service Frame **MUST** be identified by the value of CE-VLAN ID of the Service Frame.
Test Purpose	Verify that the correct OVC End Point for Service Frames on a UNI is identified by the CE-VLAN ID of this frame.
Conditions	None
Test Topology/OVC	 S-VID / End Point ID: SVID15 – ENNI1_OVC11_End_Point_1; SVID16 – ENNI1_OVC12_End_Point_1 CE-VID / End Point ID: CVID7 – UNI1_OVC11_End_Point; CVID8 – UNI1_OVC12_End_Point
Test Procedure	1. Tester transmits C-tagged test frames mapped to OVC11 at UNI1. 2. Tester transmits double-tagged test frames mapped to OVC11 at ENNI1. 3. Tester transmits C-tagged test frames mapped to OVC12 at UNI1. 4. Tester transmits double-tagged test frames mapped to OVC12 at ENNI1.
Expected Results	1. All test frames are received at ENNI1, mapped to OVC11 2. All test frames are received at UNI1, mapped to OVC11. 3. All test frames are received at ENNI1, mapped to OVC12 4. All test frames are received at UNI1, mapped to OVC12.
Verdict	PASS, FAIL, or INCONCLUSIVE

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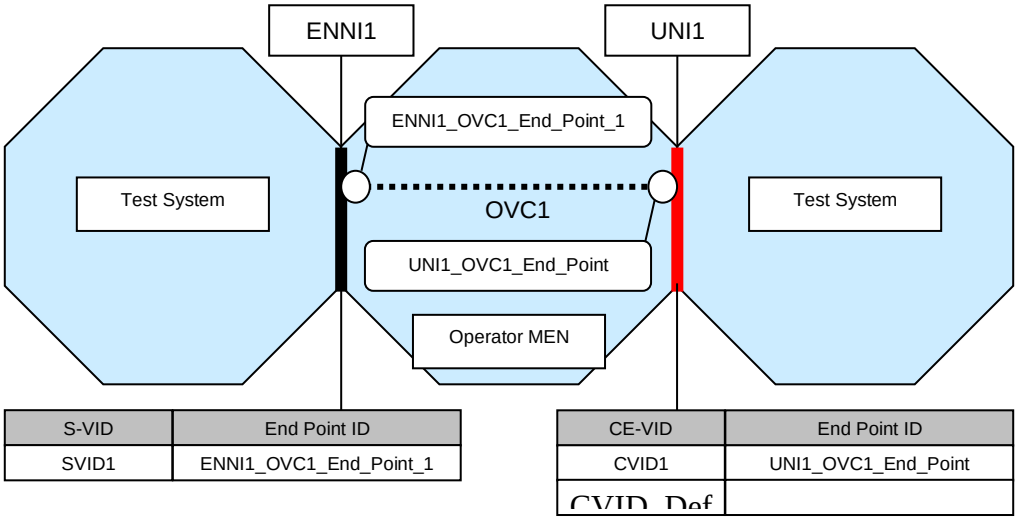
6.23 Discarding of Tagged Service Frames at the UNI with CE-VLAN ID not Mapped to any OVC End Point

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R67.1
Reference Document Source	MEF 26, R67
Test Status	Mandatory
Requirement	An ingress Service Frame that is not mapped to an existing OVC End Point or EVC at the UNI **MUST** be discarded.
Test Purpose	Verify that the Operator MEN discards Service Frames at the UNI, if the CE-VLAN ID is not mapped to any OVC endpoints on that interface.
Conditions	None
Test Topology/OVC	 S-VID / End Point ID: SVID1 / ENNI1_OVC1_End_Point_1 CE-VID / End Point ID: CVID1 / UNI1_OVC1_End_Point CVID Def
Test Procedure	1. Tester transmits C-tagged test frames with CVID1 mapped to OVC1 at UNI1. 2. Tester transmits C-tagged test frames with CVID2 at UNI1: the CE-VLAN ID is not mapped to any OVC at UNI1. 3. Tester transmits untagged test frames at UNI1: the CE-VLAN ID is not mapped to any OVC at UNI1. 4. Tester transmits Priority tagged test frames at UNI1: the CE-VLAN ID is not mapped to any OVC at UNI1.
Expected Results	1. All test frames are received at ENNI1, mapped to OVC1. 2.-4. No test frames are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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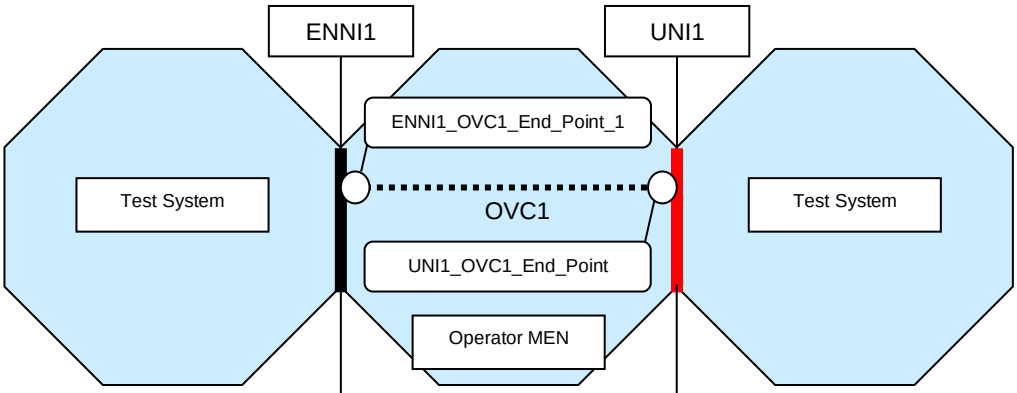
6.24 Single-tagged Frame Forwarding at ENNI Without CE-VLAN ID Preservation

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R69.1
Reference Document Source	MEF 26, R69
Test Status	Mandatory
Requirement	When an OVC associating the OVC End Point to which the CE-VLAN ID for untagged and priority tagged Service Frames is mapped does not have the CE-VLAN ID Preservation attribute in force, egress Service Frames for this OVC End Point at the given UNI **MUST** be untagged.
Test Purpose	Verify that egress Services Frames for an OVC End Point are untagged, if the ingress Service Frame were single S-Tagged frames at ENNI, the UNI OVC End Point has a mapping for untagged and priority tagged Service Frames, and the OVC CE-VLAN ID Preservation attribute is not in force.
Conditions	CE-VLAN ID Preservation = "No"
Test Topology/OVC	 S-VID / End Point ID: SVID1 / ENNI1_OVC1_End_Point_1 CE-VID / End Point ID: CVID1 / UNI1_OVC1_End_Point; CVID_Default / UNI1_OVC1_End_Point
Test Procedure	Tester transmits single S-Tagged test frames mapped to OVC1 at ENNI1.
Expected Results	All test frames are received at UNI1: frames are untagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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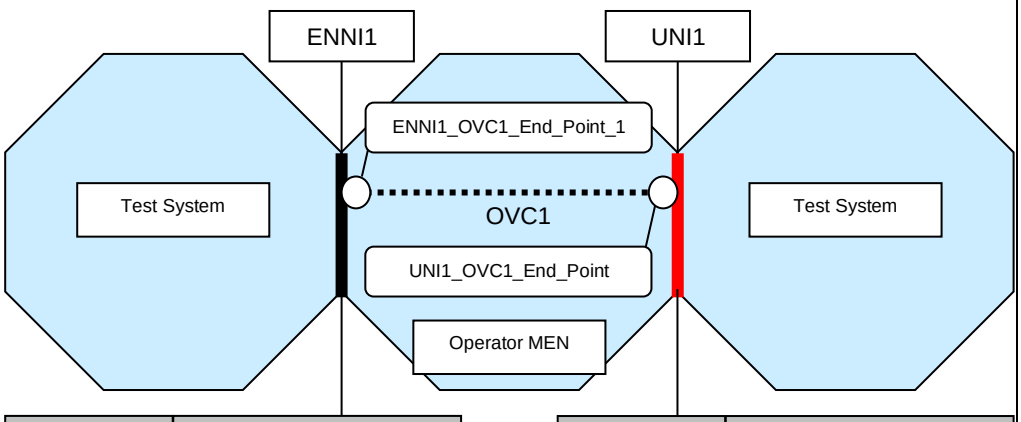
6.25 Priority C-tagged Frame Forwarding at ENNI Without CE-VLAN ID Preservation

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R69.2
Reference Document Source	MEF 26, R69
Test Status	Conditional Mandatory
Requirement	When an OVC associating the OVC End Point to which the CE-VLAN ID for untagged and priority tagged ENNI Frames is mapped does not have the CE-VLAN ID Preservation attribute in force, egress Service Frames for this OVC End Point at the given UNI **MUST** be untagged.
Test Purpose	Verify that egress Services Frames for an OVC End Point are untagged, if the ingress ENNI Frames were double-tagged frames at ENNI, the C-Tag of the ingress ENNI Frames was priority tag, the OVC UNI End Point has a mapping for untagged and priority tagged Service Frames, and the OVC CE-VLAN ID Preservation attribute is not in force.
Conditions	CE-VLAN ID Preservation = "No"
Test Topology/OVC	 S-VID / End Point ID: SVID1 / ENNI1_OVC1_End_Point_1 CE-VID / End Point ID: CVID1 / UNI1_OVC1_End_Point; CVID_Default / UNI1_OVC1_End_Point
Test Procedure	Tester transmits double-tagged test frames mapped to OVC1 at ENNI1: the CE-VLAN ID is set to 0 (priority C-tag).
Expected Results	All test frames are received at UNI1: frames are untagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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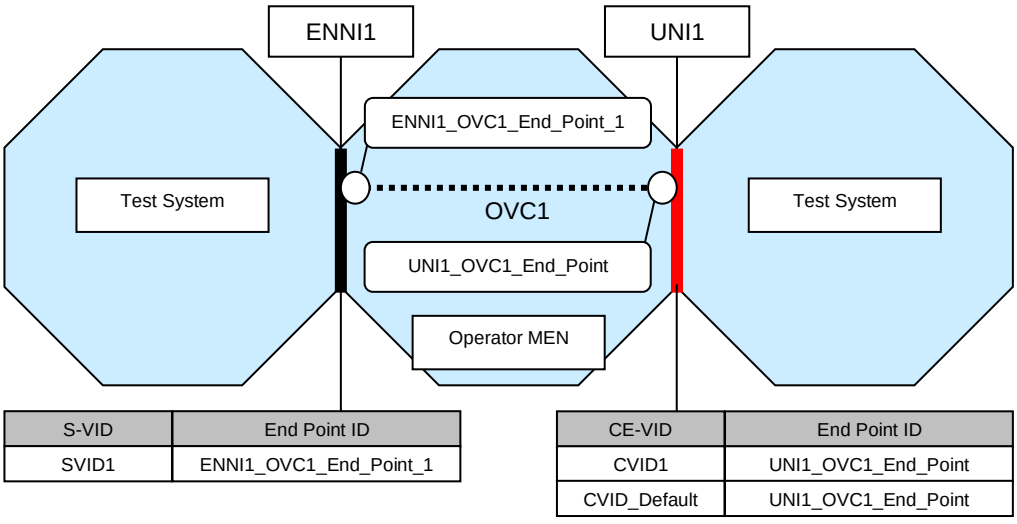
6.26 C-tagged Frame Forwarding at ENNI Without CE-VLAN ID Preservation

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R69.3
Reference Document Source	MEF 26, R69
Test Status	Conditional Mandatory
Requirement	When an OVC associating the OVC End Point to which the CE-VLAN ID for untagged and Priority tagged Service Frames is mapped does not have the CE-VLAN ID Preservation attribute in force, egress Service Frames for this OVC End Point at the given UNI **MUST** be untagged.
Test Purpose	Verify that egress Services Frames for an OVC End Point are untagged, if the ingress ENNI Frames were double-tagged frames at ENNI, the OVC UNI End Point has a mapping for untagged Service Frames, and the OVC CE-VLAN ID Preservation attribute is not in force.
Conditions	CE-VLAN ID Preservation = "No"
Test Topology/OVC	 S-VID / End Point ID: SVID1 / ENNI1_OVC1_End_Point_1 CE-VID / End Point ID: CVID1 / UNI1_OVC1_End_Point; CVID_Default / UNI1_OVC1_End_Point
Test Procedure	Tester transmits double-tagged test frames mapped to OVC1 at ENNI1: CE-VLAN ID is not 0
Expected Results	All test frames are received at UNI1: frames are untagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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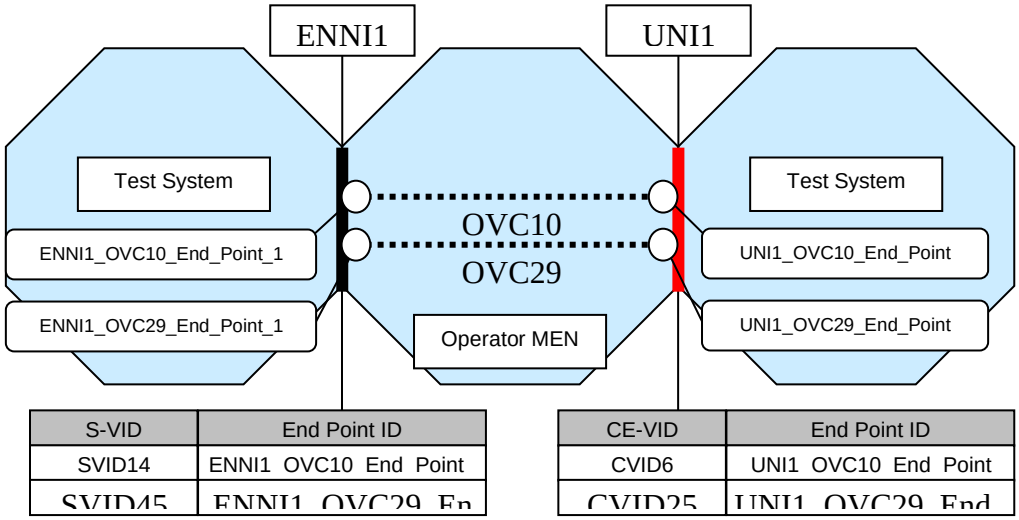
6.27 Determination of CoS ID on UNI – OVC End Point at UNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R71.1
Reference Document Source	MEF 26, R71
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on OVC End Point, all ingress Data Service Frames mapped to the same OVC End Point at the UNI MUST have the same Class of Service Identifier.
Test Purpose	Verify that the Class of Service of all Service Frames received from a single UNI End Point on a UNI is the same, if Classifying based on OVC End Point is enabled.
Conditions	Classifying based on OVC End Point = "Yes"
Test Topology/OVC	 S-VID / End Point ID: SVID14 — ENNI1 OVC10 End Point; SVID45 — ENNI1 OVC29 En CE-VID / End Point ID: CVID6 — UNI1 OVC10 End Point; CVID25 — UNI1 OVC29 End
Test Procedure	Tester transmits C-tagged test frames mapped to OVC10 at UNI1: C-tag PCP is set to each of the values in range [0..7]. Tester transmits C-tagged test frames mapped to OVC29 at UNI1: C-tag PCP is set to each of the values in range [0..7].
Expected Results	All test frames sent over OVC10 at UNI1 are received at ENNI1, mapped to OVC10. None of the test frames sent over OVC29 at UNI1 are received at ENNI1, mapped to OVC29. NOTE: There is no condition on the PCP values of frames egressing on ENNI1 for this test.
Verdict	PASS, FAIL, or INCONCLUSIVE

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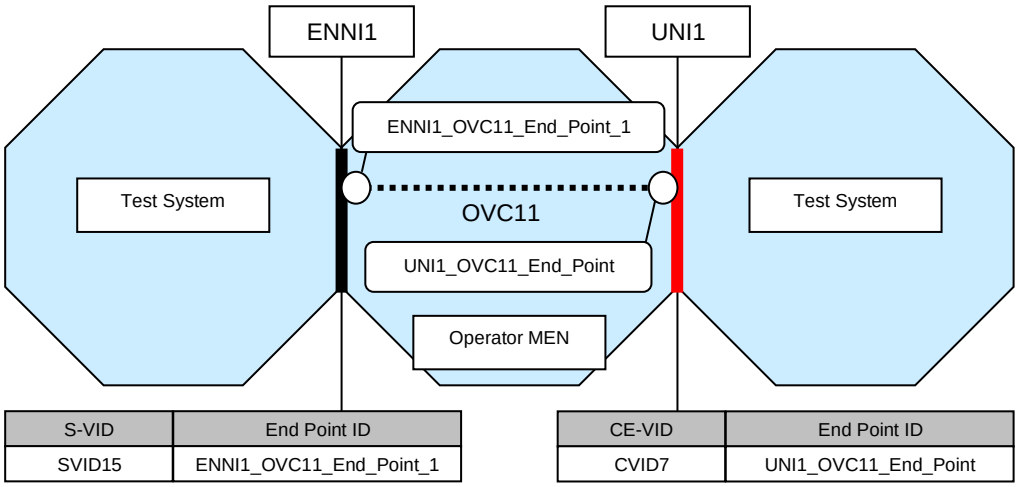
6.28 Determination of CoS ID on UNI – C-Tag Priority Code Point

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R72.1
Reference Document Source	MEF 26, R72
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on Priority Code Point field, the Class of Service Identifier for an ingress Data Service Frame at the UNI MUST be determined by the OVC End Point and non-overlapping sets of values of the PCP field in the C-Tag.
Test Purpose	Verify that the Class of Service of a Service Frame on a UNI is determined by the non-overlapping sets of values of the C-Tag Priority Code Point, if the Number of UNI CoS is greater then one.
Conditions	Number of UNI CoS > 1, Classifying based on C-Tag PCP = "Yes", Discard CoS at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits C-tagged test frames mapped to OVC11 at UNI1: C-tag PCP is set to each of the values 0 (“BestEffort”), 1, 2, 3, 4, 5, 6 and 7 (“Discard”).
Expected Results	All test frames transmitted with C-tag PCP value 0 are received at ENNI1 and mapped to OVC11. Test frames transmitted with any other C-tag PCP values are not received at any External Interface. NOTE: The test procedure should not rely on egress PCP values at the ENNI but validate the streams using the test frame signature instead.
Verdict	PASS, FAIL, or INCONCLUSIVE

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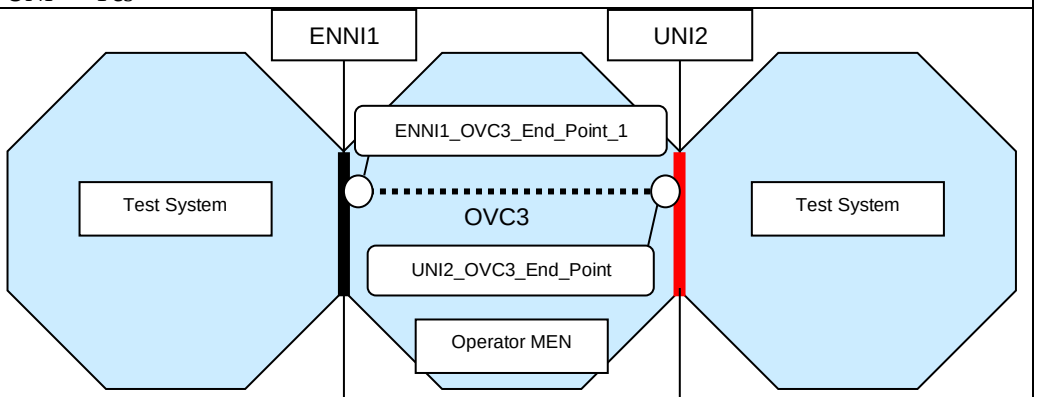
6.29 Determination of CoS ID on UNI – Service Frames Without C-Tag

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R73.1
Reference Document Source	MEF 26, R73
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on Priority Code Point field, if the ingress frame does not contain a C-Tag, it MUST have the same Class of Service Identifier as an ingress frame with Priority Code Point field = 0 in the C-Tag.
Test Purpose	Verify that the Class of Service of untagged Service Frames on a UNI is mapped to the same CoS as an ingress frame with the C-Tag Priority Code Point set to 0.
Conditions	Classifying based on C-Tag PCP = "Yes" , Discard CoS at UNI = "Yes", Untagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID / End Point ID: SVID5 / ENNI1_OVC3_End_Point_1 CE-VID / End Point ID: CVID31 / UNI2_OVC3_End_Point; CVID_Default / UNI2_OVC3_End_Point
Test Procedure	Tester transmits untagged and C-Tagged frames mapped to OVC3 at UNI1: PCP of C-tagged frames is set to each value from 0 to 7.
Expected Results	Untagged test frames and test frames with PCP=0 are received at ENNI1, mapped to OVC3. Test frames transmitted with any other C-tag PCP values are not received at ENNI1. NOTE: The test procedure should not rely on egress PCP values at the ENNI but validate the streams using the test frame signature instead.
Verdict	PASS, FAIL, or INCONCLUSIVE

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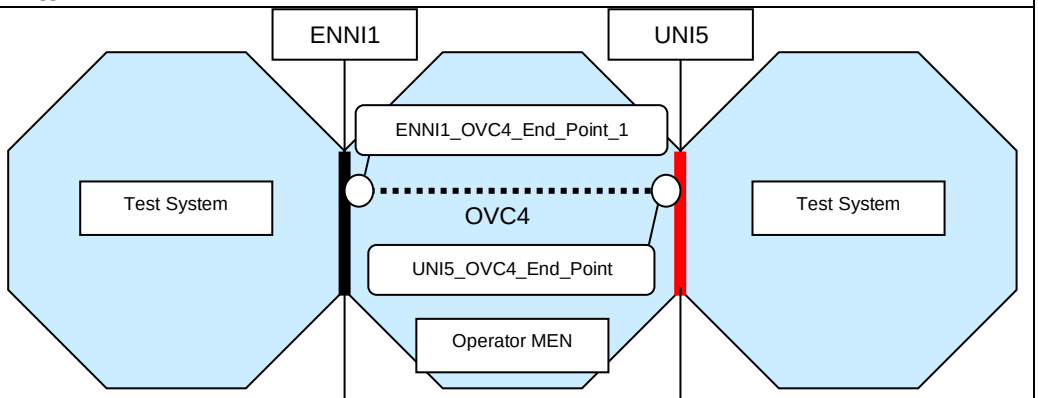
6.30 Determination of CoS ID on UNI – DSCP in IPv4

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R75.1
Reference Document Source	MEF 26, R75
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on DSCP, the Class of Service Identifier for an ingress Data Service Frame at the UNI containing an IP packet MUST be determined by the OVC End Point and non-overlapping sets of values of the DSCP.
Test Purpose	Verify that Class of Services at UNI of the ingress frames is determined by the non-overlapping sets of values of the DiffServ Code Points (DSCP) encoded in IPv4 ToS field, if the Number of UNI CoS is greater then one and Classifying based on DSCP in IPv4 are enabled.
Conditions	Number of UNI CoS > 1, Classifying based on DSCP in IPv4 = "Yes", Discard CoS at UNI = "Yes"
Test Topology/OVC	 S-VID / End Point ID: SVID6 / ENNI1_OVC4_End_Point_1 CE-VID / End Point ID: CVID2 / UNI5_OVC4_End_Point; CVID_Default / UNI5_OVC4_End_Point
Test Procedure	Tester transmits C-tagged and untagged test frames mapped to OVC4 at UNI5: frames contain IPv4 packets, C-tag PCP is set to 7 for C-tagged test frames, DSCP is set to each value from 0 to 63.
Expected Results	All tagged and untagged test frames transmitted with DSCP value 0 are received at ENNI1, and mapped to OVC4. No other test frames are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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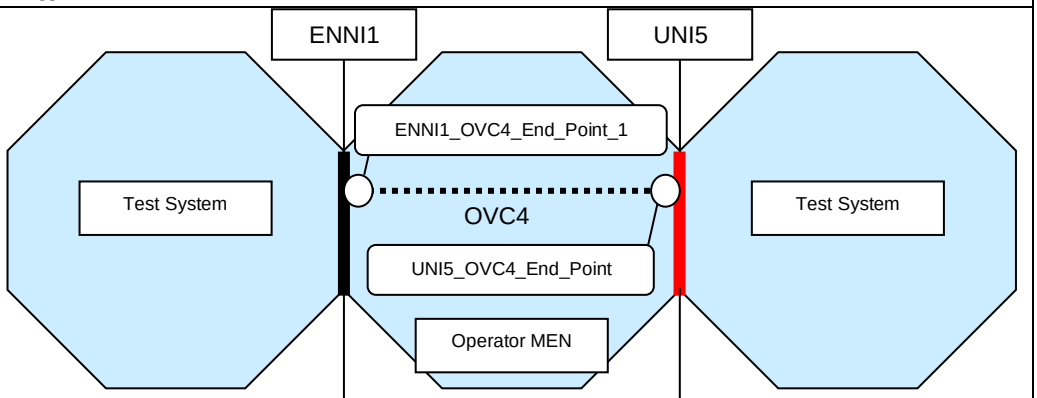
6.31 Determination of CoS ID on UNI – DSCP in IPv6

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R75.2
Reference Document Source	MEF 26, R75
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on DSCP, the Class of Service Identifier for an ingress Data Service Frame at the UNI containing an IP packet MUST be determined by the OVC End Point and non-overlapping sets of values of the DSCP.
Test Purpose	Verify that Class of Services at UNI of the ingress frames is determined by the non-overlapping sets of values of the DiffServ Code Points (DSCP) encoded in IPv6 Traffic Class octet, if the Number of UNI CoS is greater then one and Classifying based on DSCP in IPv6 are enabled.
Conditions	Number of UNI CoS > 1, Classifying based on DSCP in IPv6 = "Yes", Discard CoS at UNI = "Yes"
Test Topology/OVC	 S-VID / End Point ID: SVID6 / ENNI1_OVC4_End_Point_1 CE-VID / End Point ID: CVID2 / UNI5_OVC4_End_Point; CVID_Default / UNI5_OVC4_End_Point
Test Procedure	Tester transmits C-tagged and untagged test frames mapped to OVC4 at UNI5: frames contain IPv6 packets, C-tag PCP is set to 7 for tagged test frames, DSCP is set to each value from 0 to 63.
Expected Results	All tagged and untagged test frames transmitted with DSCP value 0 are received at ENNI1 and mapped to OVC4. No other test frames are received at ENNI1,
Verdict	PASS, FAIL, or INCONCLUSIVE

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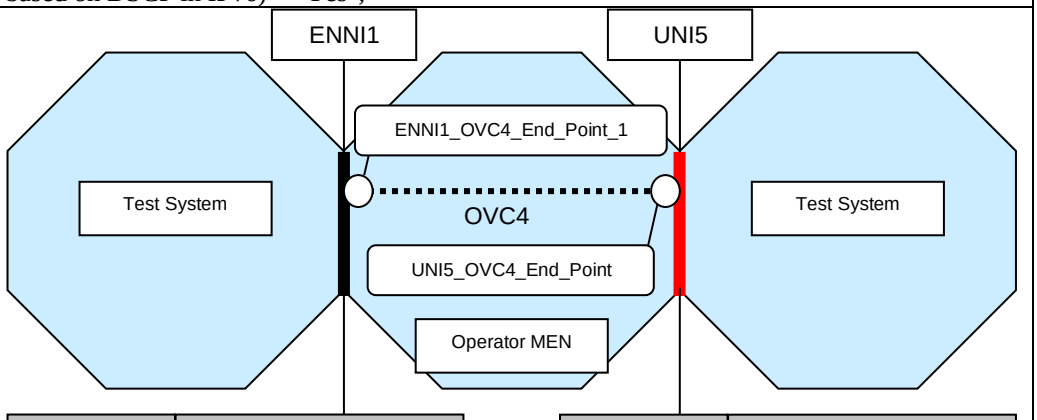
6.32 Determination of CoS ID on UNI – DSCP and Non-IP Service Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_per_UNI_ATTRIBUTES.R77.1
Reference Document Source	MEF 26, R77
Test Status	Conditional Mandatory
Requirement	When the Class of Service Identifier is based on DSCP, each ingress Data Service Frame at the UNI not containing an IP packet and mapped to a given OVC End Point MUST have the same Class of Service Identifier with a value agreed upon by the Operator and the Service Provider.
Test Purpose	Verify that the Class of Service of Service Frames on a UNI not containing an IP packet is mapped to the same CoS agreed upon by the Operator and the Service Provider.
Conditions	Number of UNI OVC End Points > 0, (Classifying based on DSCP in IPv4 or Classifying based on DSCP in IPv6) = "Yes",
Test Topology/OVC	 S-VID / End Point ID: SVID6 / ENNI1_OVC4_End_Point_1 CE-VID / End Point ID: CVID2 / UNI5_OVC4_End_Point; CVID_Default / UNI5_OVC4_End_Point
Test Procedure	Tester transmits C-tagged and untagged test frames mapped to OVC4 at UNI5: frames contain non-IP and IP packets, PCP of tagged frames is set to each value from 0 to 7, DSCP value of IP packets is set to each value from 0 to 63.
Expected Results	All non-IP and IP packets transmitted with DSCP value 0 are received at ENNI1, and mapped to OVC4. No other test frames are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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7 Test Group: Protection

For sake of simplicity, all test cases in this section use the same topology with one protected ENNI and one UNI, and a single point-to-point OVC configured between the ENNI and UNI. In some test cases, the test procedure is limited to behavior at the ENNI. For these cases, the expected results do not require configuration of OVC, UNI and test traffic across the OVC.

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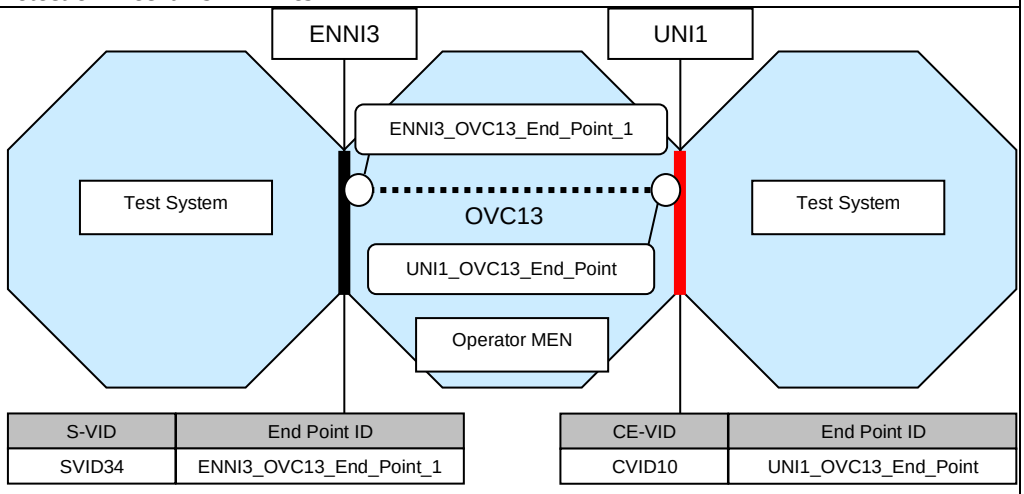
7.1 Link Aggregation on ENNI with Two Links

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_PROTECTION.R1.1
Reference Document Source	MEF 26, Requirement R1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	When there are two physical links in the ENNI, an ENNI-Ni MUST be capable of implementing Link Aggregation as in Clause 43.6.1 of [5] with one Link Aggregation Group (LAG) across the ports supporting an instance of ENNI and with one link in active mode and the other in standby mode.
Test Purpose	Verify that an ENNI equipped with two links activates Link Aggregation. Verify that both links are configured in the same LAG.
Conditions	Protection Mechanism = "Yes"
Test Topology/OVC	
Test Procedure	Tester listens at the links of ENNI3.
Expected Results	LACPDUs are received at both links of ENNI3: Actor_State.Aggregation flag is set to TRUE, Actor_Key value is equal in all LACPDUs.
Verdict	PASS, FAIL, or INCONCLUSIVE

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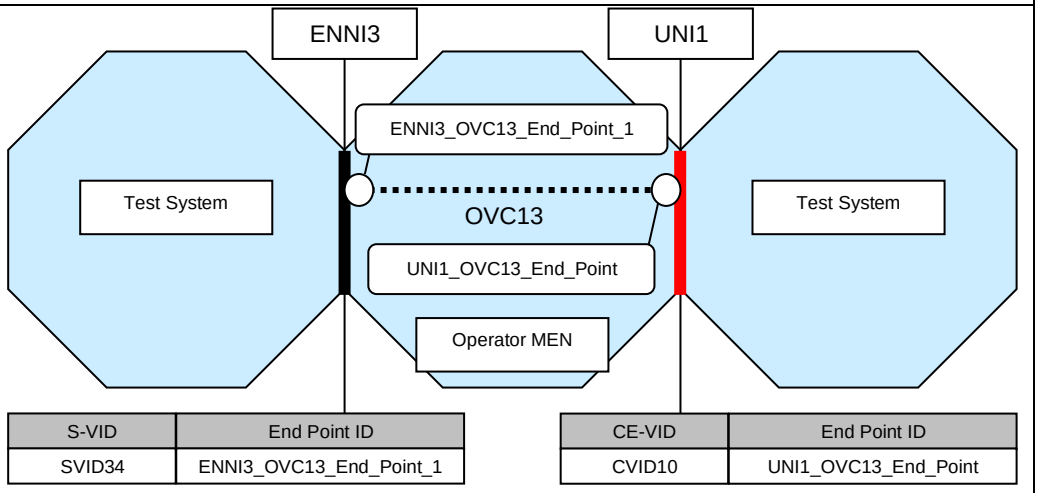
7.2 Basic Interconnection: LACP

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_PROTECTION.R2.1
Reference Document Source	MEF 26, Requirement R2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	When Link Aggregation is used at the ENNI, LACP MUST be used by each ENNI-Ni per [5].
Test Purpose	Verify that the Operator MEN component with ENNI functionality sends LACPDU at each link on the protected ENNI to initiate the link aggregation.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester listens for up to (LACP process time + LACPDU listen time + Slow_Periodic_Time) seconds at the links of ENNI3.
Expected Results	At least one LACPDU must be received at each of the links of ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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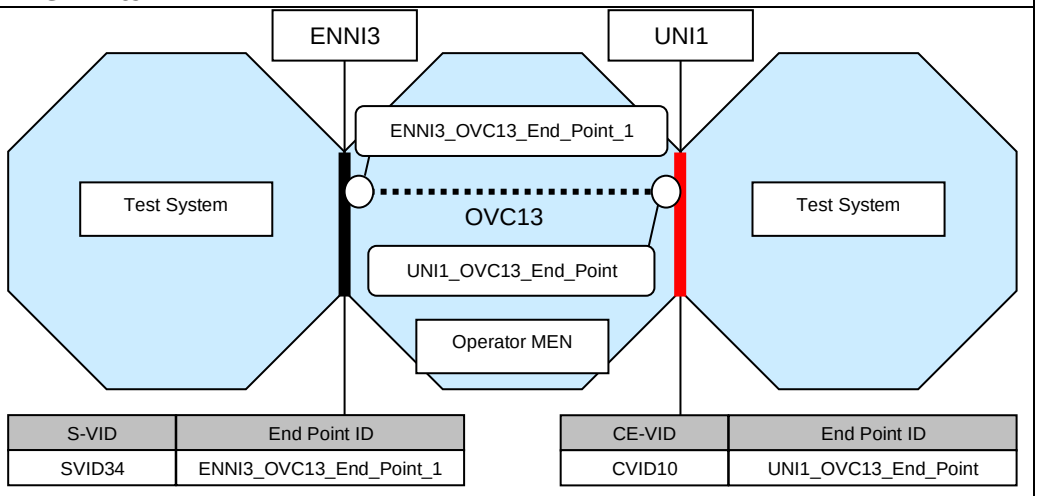
7.3 Active Link in the Protection LAG

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_PROTECTION.R1.2
Reference Document Source	MEF 26, Requirement R1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	When there are two physical links in the ENNI, an ENNI-Ni MUST be capable of implementing Link Aggregation as in Clause 43.6.1 of [5] with one Link Aggregation Group (LAG) across the ports supporting an instance of ENNI and with one link in active mode and the other in standby mode.
Test Purpose	Verify that in the Link Aggregation Group configured in the ENNI contains one active link.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at the link of ENNI3 configured as Active. Tester sends test frames Flow Definition1 (Default traffic flow definition) at UNI1 and at the link ofENNI3 configured as Active: the test frames are mapped to OVC13.
Expected Results	All test frames sent at ENNI3 are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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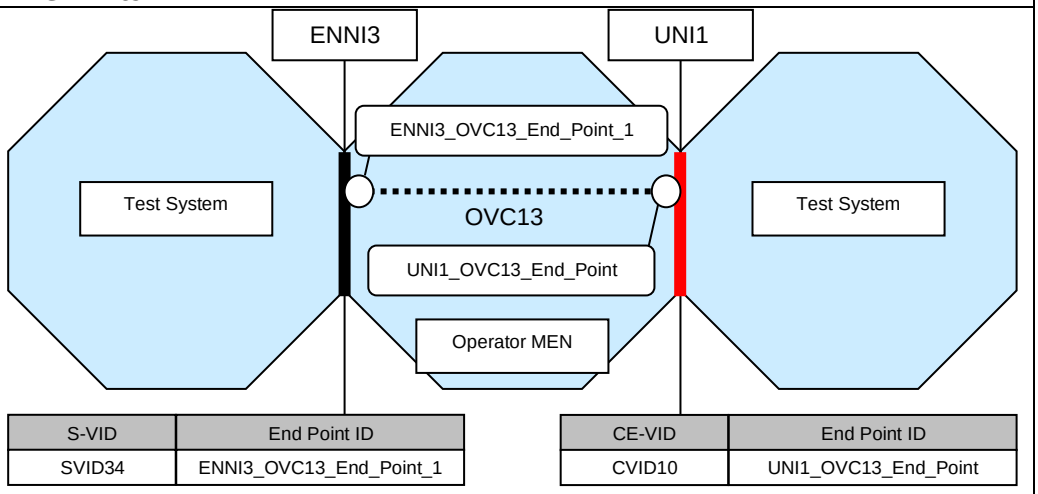
7.4 Passive Link in the Protection LAG

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_PROTECTION.R1.3
Reference Document Source	MEF 26, Requirement R1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	When there are two physical links in the ENNI, an ENNI-Ni MUST be capable of implementing Link Aggregation as in Clause 43.6.1 of [5] with one Link Aggregation Group (LAG) across the ports supporting an instance of ENNI and with one link in active mode and the other in standby mode.
Test Purpose	Verify that in the Link Aggregation Group configured in the ENNI contains one passive (standby) link.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for disabling Collection and Distribution) at the link of ENNI3 configured as Standby. Tester transmits test frames Flow Definition1 (Default traffic flow definition) at UNI1 and at the link of ENNI3 configured as Standby: the test frames are mapped to OVC13.
Expected Results	Test frames are not received on the standby or active link of ENNI3 or at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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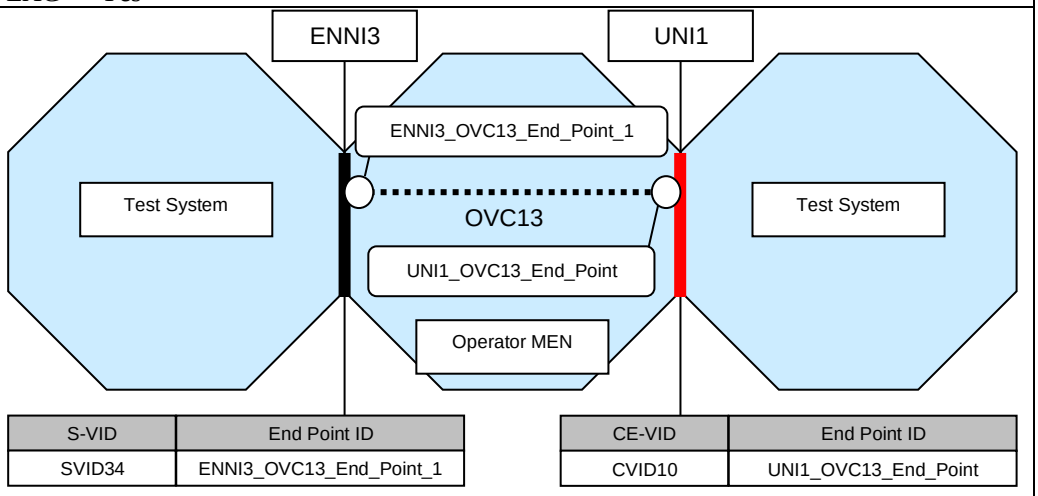
7.5 Aggregator Parser–forward valid frames (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM3.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–5 and associated definitions in 43.2.7.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality doesn't forward any Slow Protocol PDUs with invalid Protocol Subtype value or LACP/Marker PDUs to the EIs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3 Tester transmits test frames Flow Definition2 (Traffic flow for negative test cases) mapped to OVC13 at ENNI3
Expected Results	Slow Protocol PDUs with invalid Protocol Subtype value or LACP/Marker PDUs are not received on the standby or active link of ENNI3 or at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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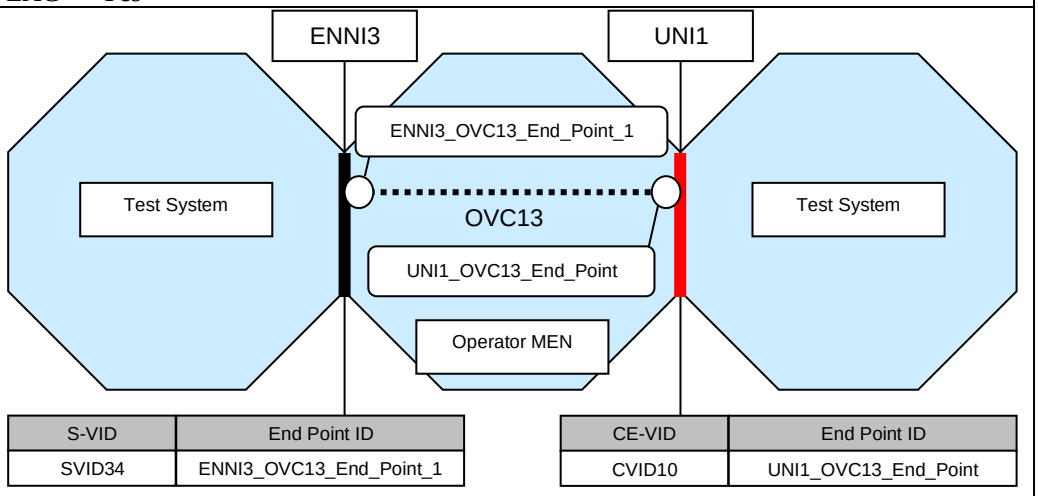
7.6 Aggregator Parser–discard frames (No Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM4.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM4
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–5 and associated definitions in 43.2.7.1 The Aggregator Parser shall pass all other frames to the Frame Collector for passage to the MAC Client only when the port state is Collecting; otherwise such frames shall be discarded.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are NOT in the Collecting state, doesn't forward any frames from the ENNI to the EIs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for disabling Collection and Distribution) at each link of ENNI3 Tester transmits test frames Flow Definition2 (Traffic flow for negative test cases) mapped to OVC13 at ENNI3
Expected Results	Test frames are not received on the standby or active link of ENNI3 or at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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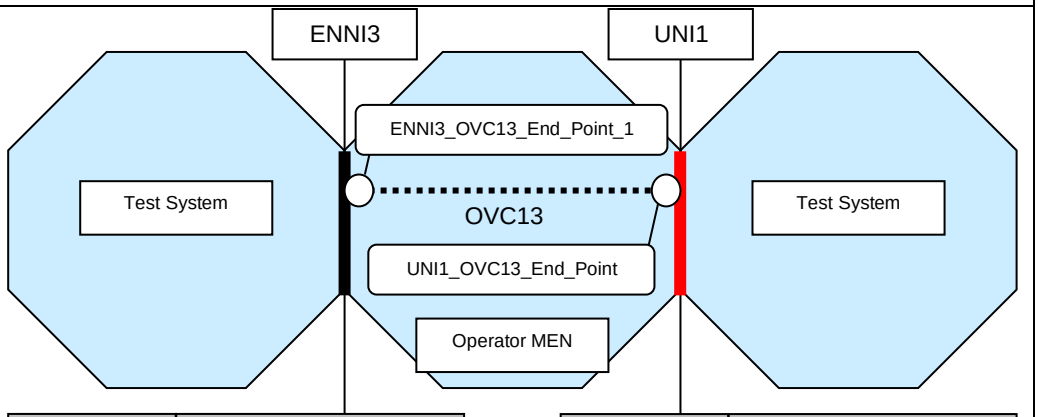
7.7 Aggregator Parser–forward Marker PDUs (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM3.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–5 and associated definitions in 43.2.7.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are in the Collecting state, forwards Marker PDUs from the ENNI to the Marker Responder. On receipt of a Marker PDU the Marker Responder sends a Marker PDU for answering.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3 Tester transmits a Marker PDU at each link of ENNI3
Expected Results	Marker PDU is received at the link of ENNI3 configured as Active. Marker PDU is not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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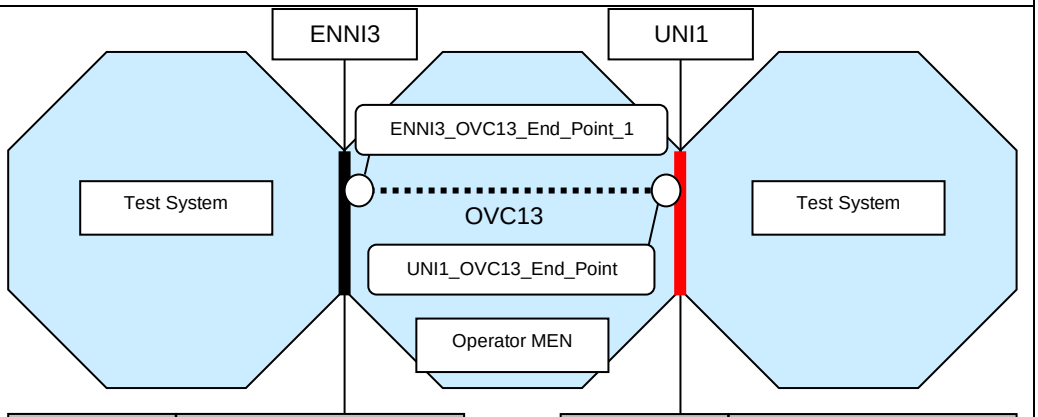
7.8 Aggregator Parser–forward Marker PDUs (No Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM3.4
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–5 and associated definitions in 43.2.7.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are NOT in the Collecting state, forwards Marker PDUs from the ENNI to the Marker Responder. On receipt of a Marker PDU the Marker Responder should send a Marker PDU for answering.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3 Tester transmits Marker PDU at each link of ENNI3
Expected Results	Marker PDU is received at the link of ENNI3 configured as Active. Marker PDU is not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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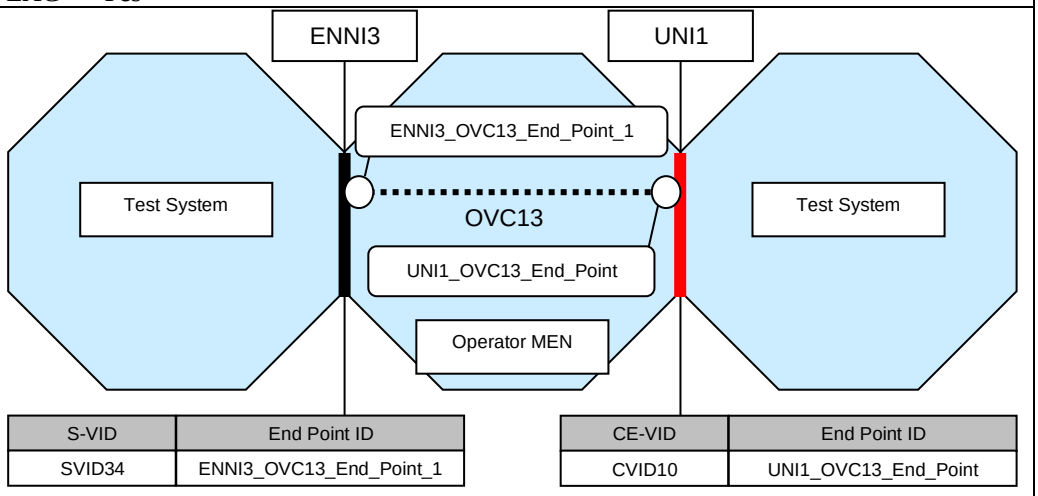
7.9 Aggregator Parser–discard invalid Marker PDUs–inopportune

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM3.6
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–5 and associated definitions in 43.2.7.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality discards invalid Marker PDUs received at ENNI3.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for disabling Collection and Distribution) at each link of ENNI3 Tester transmits a Marker PDU at each link of ENNI3
Expected Results	Marker PDU is not received on the standby or active link of ENNI3 or at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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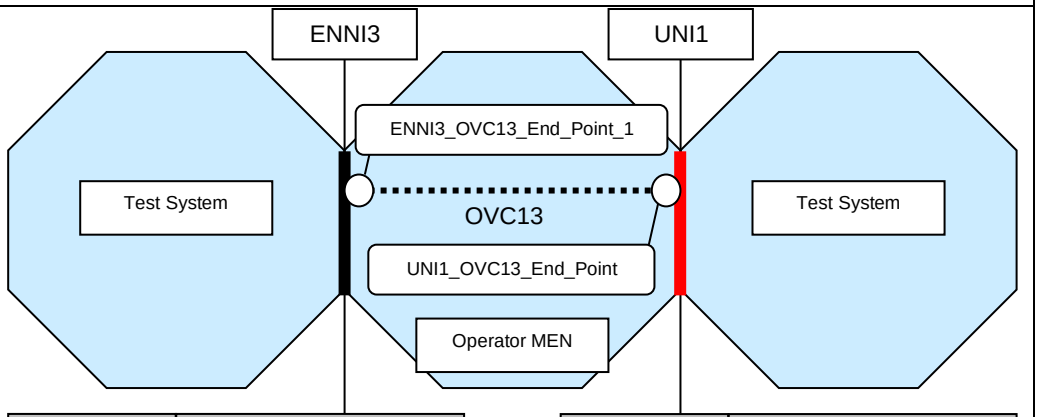
7.10 Aggregator Multiplexer–forward Marker PDU (No Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	On transmission, the Aggregator Multiplexer shall provide transparent pass-through of frames submitted by the Marker Responder and optional Marker Generator to the port specified in the transmission request.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are NOT in the Distributing state, forwards Marker PDUs submitted by the Marker Responder to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3. Tester transmits a Marker PDU at each link of ENNI3.
Expected Results	Marker PDU is received at the link of ENNI3 configured as Active. Marker PDU is not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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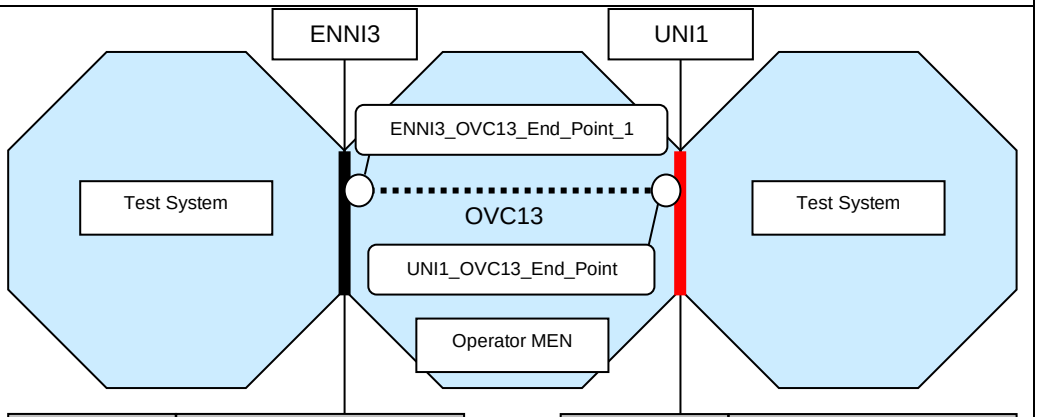
7.11 Aggregator Multiplexer– forward Marker PDU (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM1.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	On transmission, the Aggregator Multiplexer shall provide transparent pass-through of frames submitted by the Marker Responder and optional Marker Generator to the port specified in the transmission request.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are in the Distributing state, forwards Marker PDUs submitted by the Marker Responder to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3. Tester transmits a Marker PDU at each link of ENNI3.
Expected Results	Marker PDU is received at the link of ENNI3 configured as Active. Marker PDU is not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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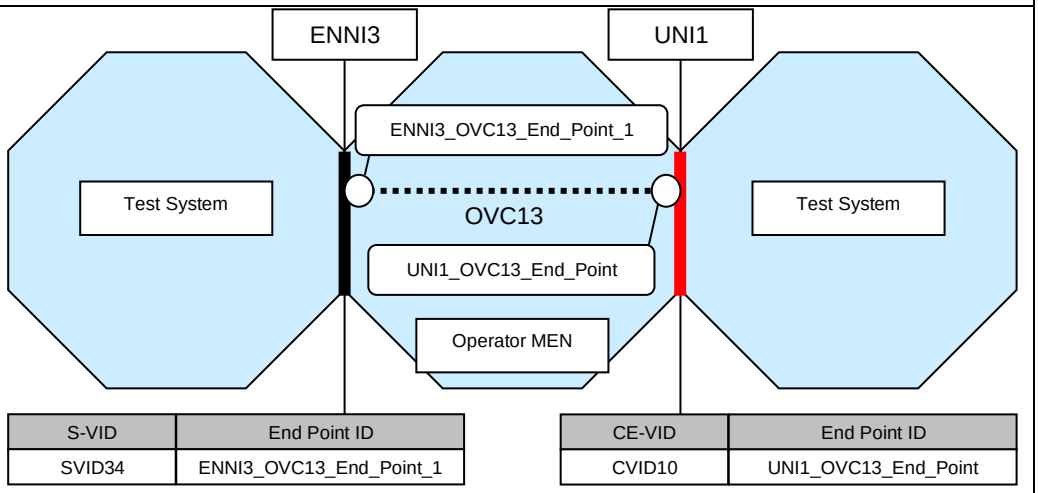
7.12 Aggregator Multiplexer–forward frames (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM1.5
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The Aggregator Multiplexer shall provide transparent pass-through of frames submitted by the Frame Distributor to the port specified in the transmission request only when the port state is Distributing;
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are in the Distributing state, forwards frames from the EIs to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at UNI1.
Expected Results	All test frames are received at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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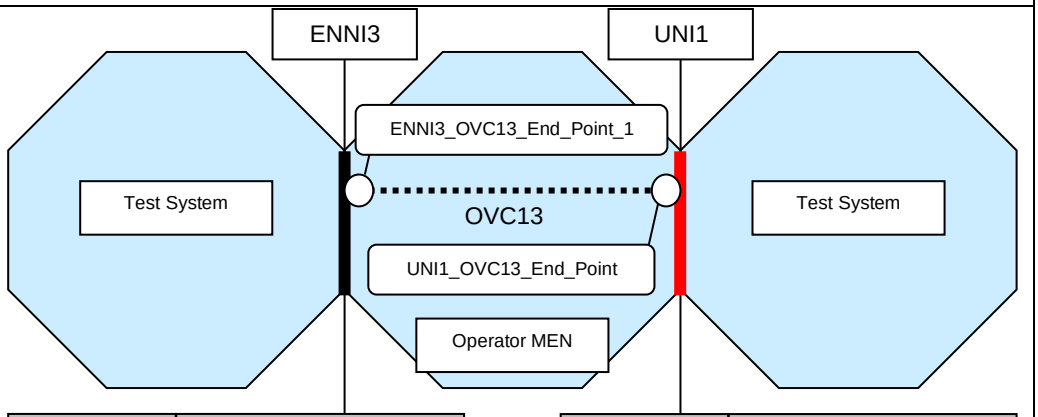
7.13 Aggregator Multiplexer–discard frames (No Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.APM2.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.7; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item APM2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The Aggregator Multiplexer shall provide transparent pass-through of frames submitted by the Frame Distributor to the port specified in the transmission request only when the port state is Distributing; Otherwise, such frames shall be discarded
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when the ports on the protected ENNI are NOT in the Distributing state, doesn't forward any frames from the EIs to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at UNI1.
Expected Results	Test frames are not received at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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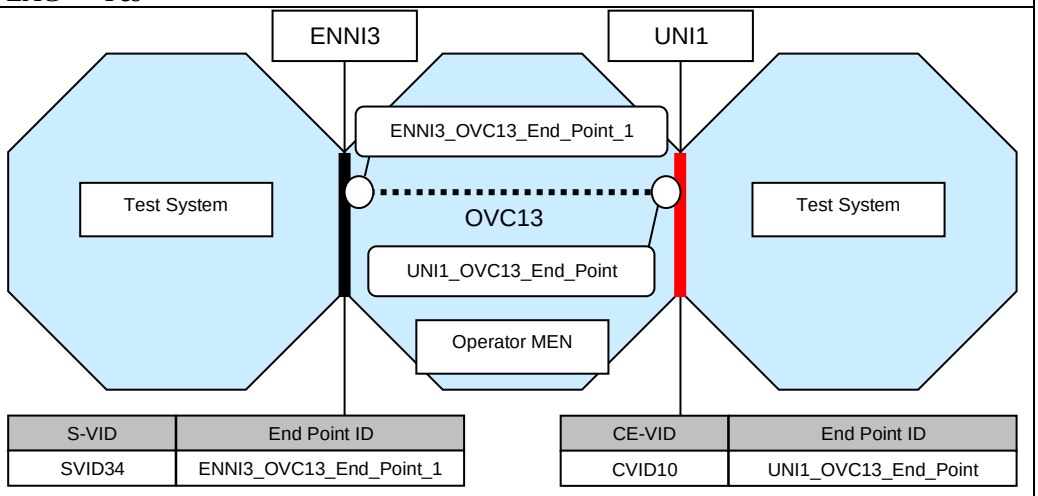
7.14 Control Parser–transparent pass- through (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.CMP1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.9; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item CPM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified in the state diagram shown in Figure 43–3 and associated definitions in 43.2.3.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality forwards frames transparently from the ENNI to the EIs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at each link of ENNI3.
Expected Results	Test frames are received at UNI1: payload is unmodified.
Verdict	PASS, FAIL, or INCONCLUSIVE

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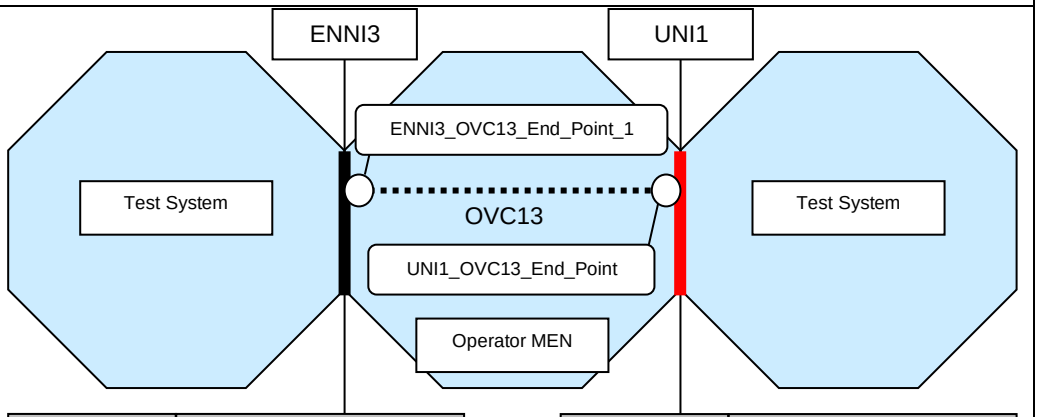
7.15 Control Parser–LACPDU–inopportune

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.CMP2.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.9; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item CPM2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–6 and associated definitions in 43.2.9.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality is receiving LACPDUs from the links not attached to the LAG. On receipt of a LACPDU (Request for informing current states) the Operator MEN component with ENNI functionality should send a LACPDU.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3.
Expected Results	LACPDU is received at each link of ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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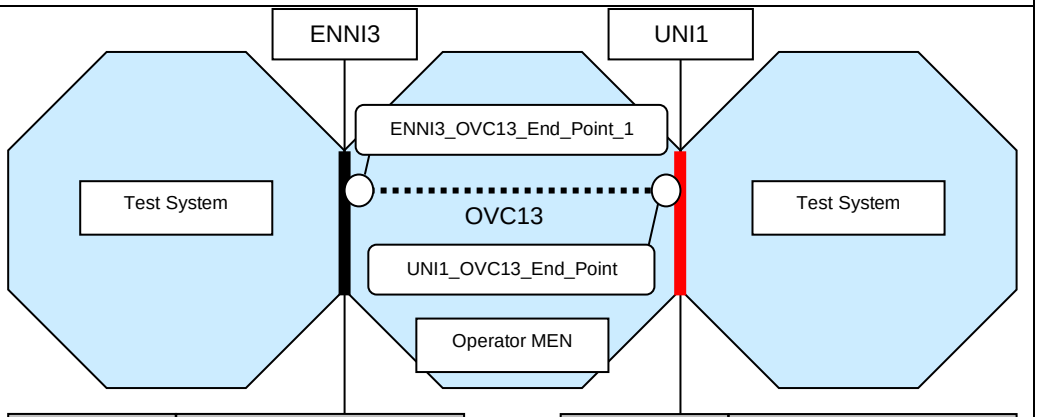
7.16 Control Parser–LACPDU

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.CMP2.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.9; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item CPM2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified by state diagram shown in Figure 43–6 and associated definitions in 43.2.9.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality is receiving LACPDUs from the links attached to the LAG. On receipt of a LACPDU LACPDU (Request for informing current states)**Error! Reference source not found.** the Operator MEN component with ENNI functionality should send a LACPDU.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3.
Expected Results	LACPDU is received at each link of ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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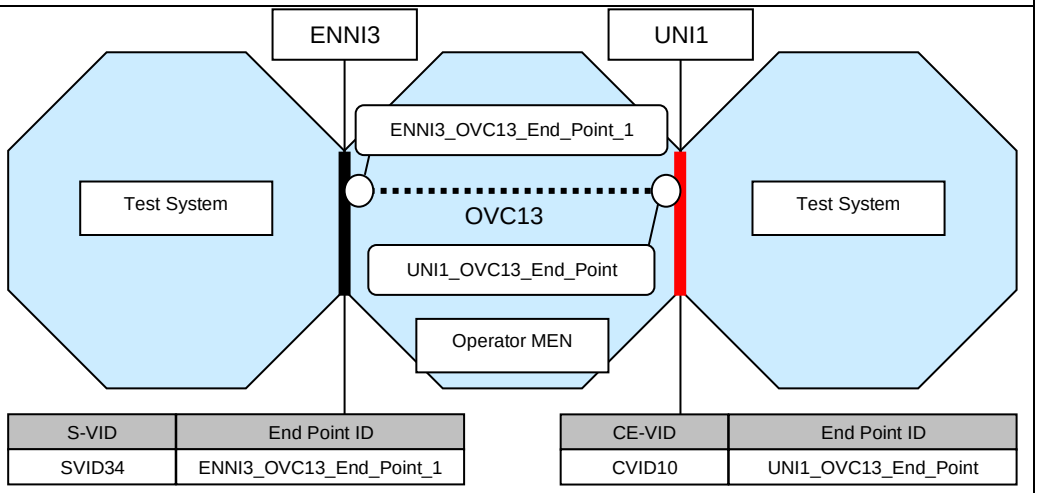
7.17 Control Multiplexer–forward LACPDU

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.CMP1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.9; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item CPM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	On transmission, the Control Multiplexer shall provide transparent pass-through of frames submitted by the Aggregator and Link Aggregation Control Protocol to the port specified in the transmission request.
Test Purpose	Verify that the Operator MEN component with ENNI functionality forwards LACPDU submitted from LACP to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3 Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at each link of ENNI3
Expected Results	LACPDU is received at each link of ENNI3
Verdict	PASS, FAIL, or INCONCLUSIVE

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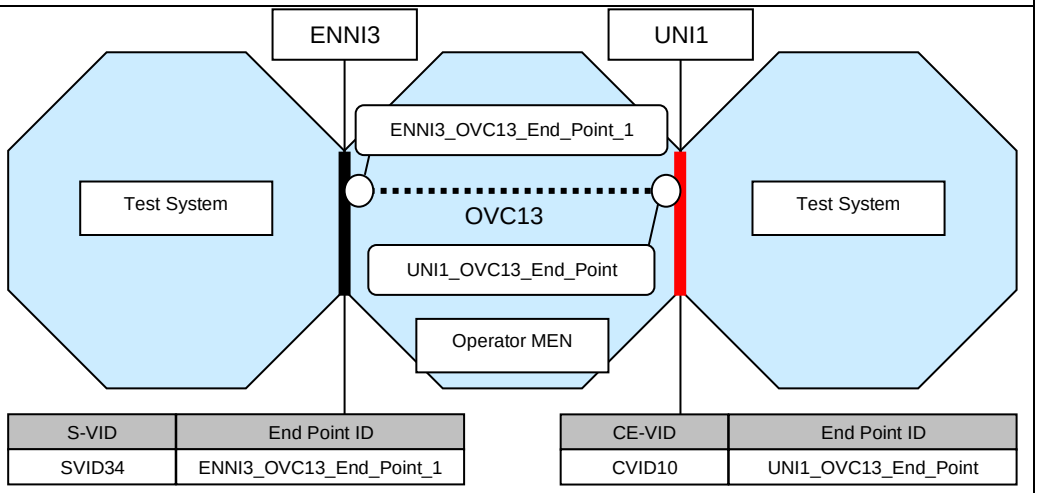
7.18 Control Multiplexer–transparent pass- through (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.CMP1.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.9; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item CPM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	On transmission, the Control Multiplexer shall provide transparent pass-through of frames submitted by the Aggregator and Link Aggregation Control Protocol to the port specified in the transmission request.
Test Purpose	Verify that the Operator MEN component with ENNI functionality forwards frames transparently from the EIs to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3 Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at UNI1.
Expected Results	Test frames are received at ENNI3: payload is unmodified.
Verdict	PASS, FAIL, or INCONCLUSIVE

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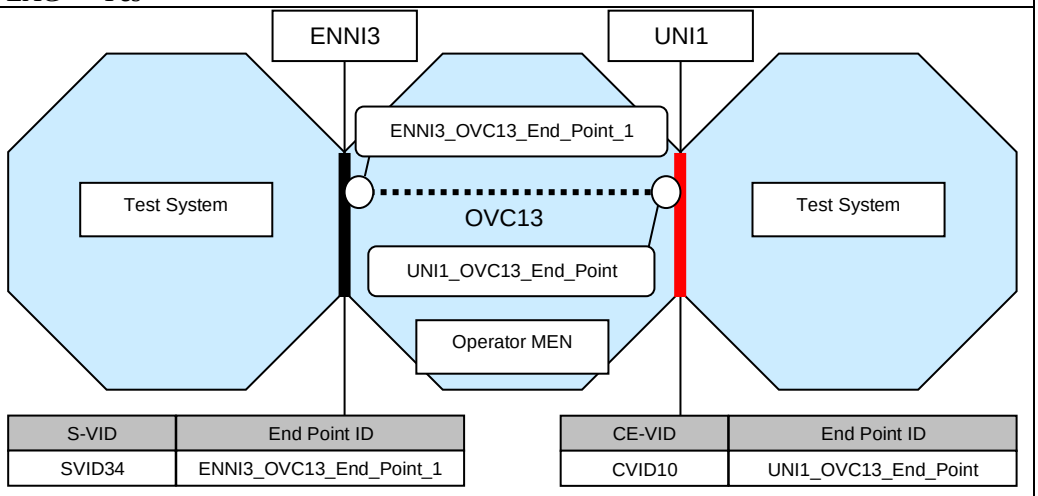
7.19 Frame Distributor–Frames (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.FD3.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.4; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item FD3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function as specified in the state diagram shown in Figure 43–4 and associated definitions in 43.2.3.4.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality distributes frames from the EIs to the ENNI.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13**Error! Reference source not found.** at UNI1.
Expected Results	All test frames are received at the link of ENNI3 configured as Active. Test frames are not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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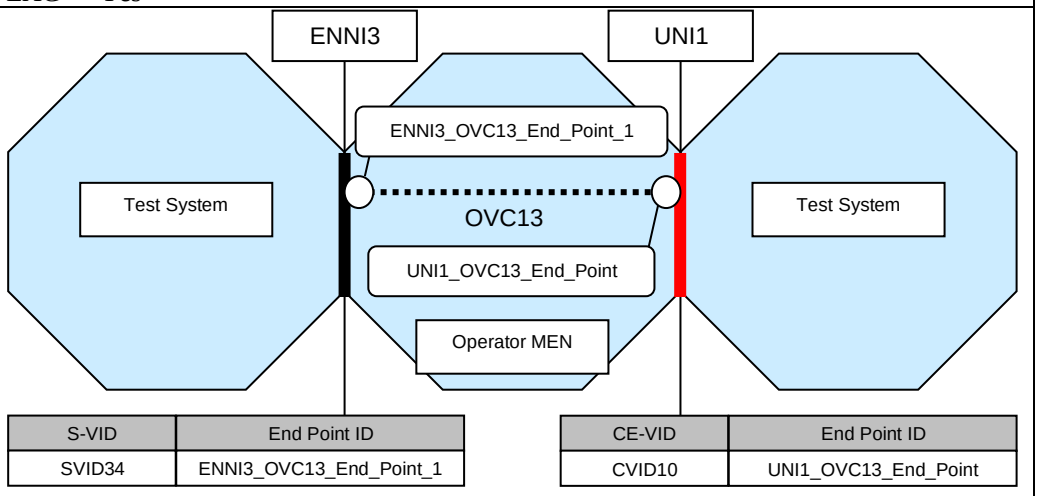
7.20 Frame Collector–Frames (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.FC1.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.3; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item FC1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Function specified in the state diagram shown in [5] Figure 43–3 and associated definitions in 43.2.3.1
Test Purpose	Verify that the Operator MEN component with ENNI functionality collects frames from the ENNI to the EIs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3 Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at the link of ENNI3 configured as Active.
Expected Results	All test frames are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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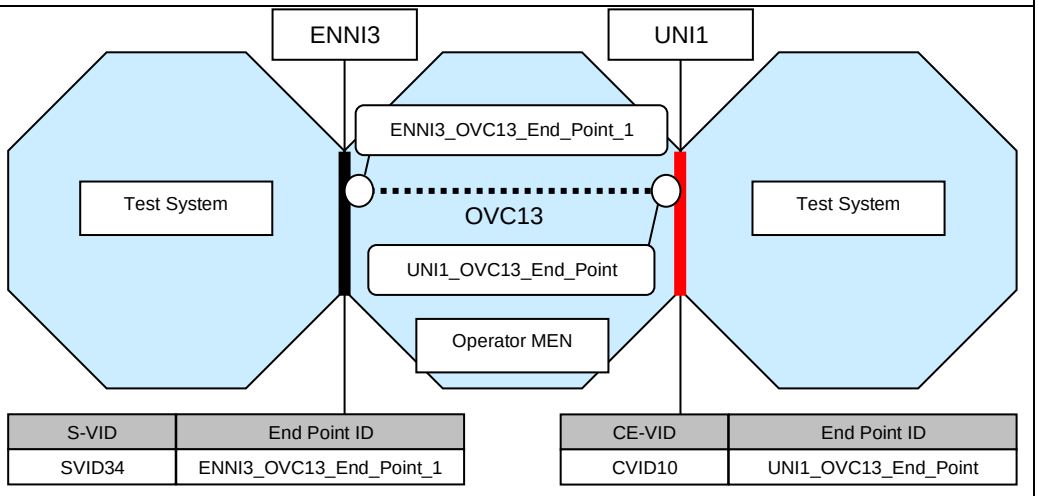
7.21 Marker protocol–Marker Responder (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.MGR2.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.6; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item MGR2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The Marker Responder receives Marker PDUs (generated by a Partner System's Marker Generator), and transmits a Marker Response PDU through the same port from which the Marker PDU was received. While implementation of the Marker Generator/Receiver is optional, the ability to respond to a Marker PDU (the Marker Responder) is mandatory. An implementation conformant to this clause shall implement the Marker Responder as specified in 43.5.4.2, thus ensuring that implementation that need to make use of the protocol can do so.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a Marker PDU, sends a properly formatted Marker PDU specified in [5] Figure 43–18.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3 Tester transmits a Marker PDU at each link of ENNI3.
Expected Results	Marker PDU is received at the link of ENNI3 configured as Active. Marker PDU is not received at the link of ENNI3 configured as Standby.
Verdict	PASS, FAIL, or INCONCLUSIVE

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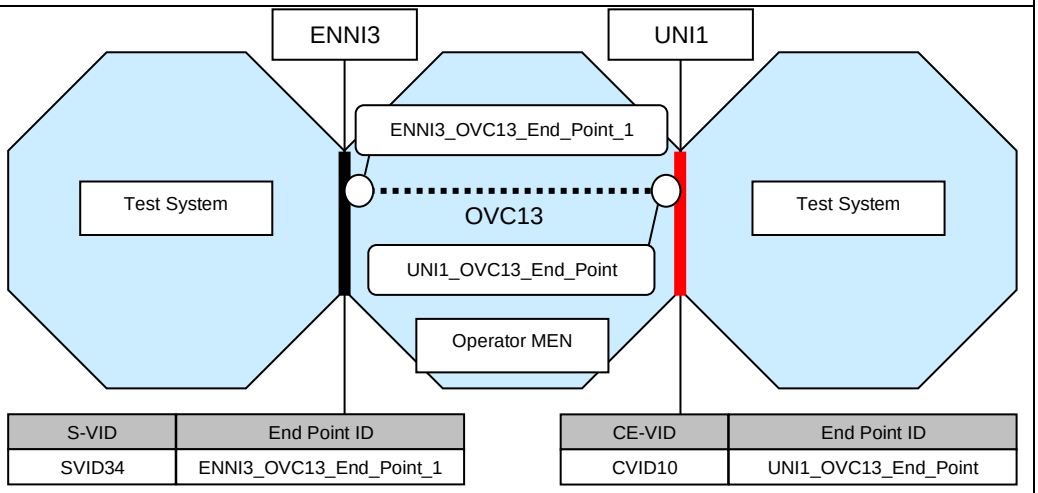
7.22 Port identification

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.PID1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.3.4 Protocol implementation conformance statement (PICS) proforma for Clause 43, Item PID1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Link Aggregation Control uses a Port Identifier comprising the concatenation of a Port Priority and a Port Number, to identify the port. Port Numbers (and hence, Port Identifiers) shall be uniquely assigned within a System. Port Number 0 shall not be assigned to any port.
Test Purpose	Verify that the Operator MEN component with ENNI functionality supports valid Port Priority and unique Port Number.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3.
Expected Results	One LACPDU is received at each link of ENNI3: fields Actor_Port_Priority and Actor_Port are present, the value of Actor_Port is not equal 0, and the values of Actor_Port are different for LACPDUs received at different links.
Verdict	PASS, FAIL, or INCONCLUSIVE

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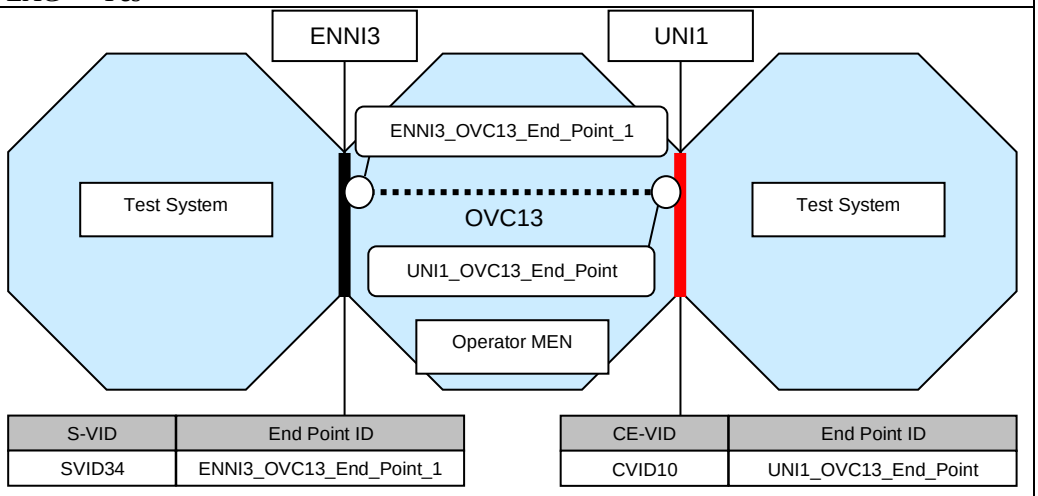
7.23 System Identification

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	MANUEL_TC.SID1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.3.2, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SID1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The globally unique identifier used to identify a System shall be the concatenation of a globally administered individual MAC address and the System Priority.
Test Purpose	Verify that the Operator MEN component with ENNI functionality uses the globally administered individual MAC address and valid System Priority for exchanging LACPDUs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3.
Expected Results	One LACPDU is received at each link of ENNI3: fields Actor_System_Priority and Actor_System are present, the value of Actor_System is a globally unique MAC address.
Verdict	PASS, FAIL, or INCONCLUSIVE

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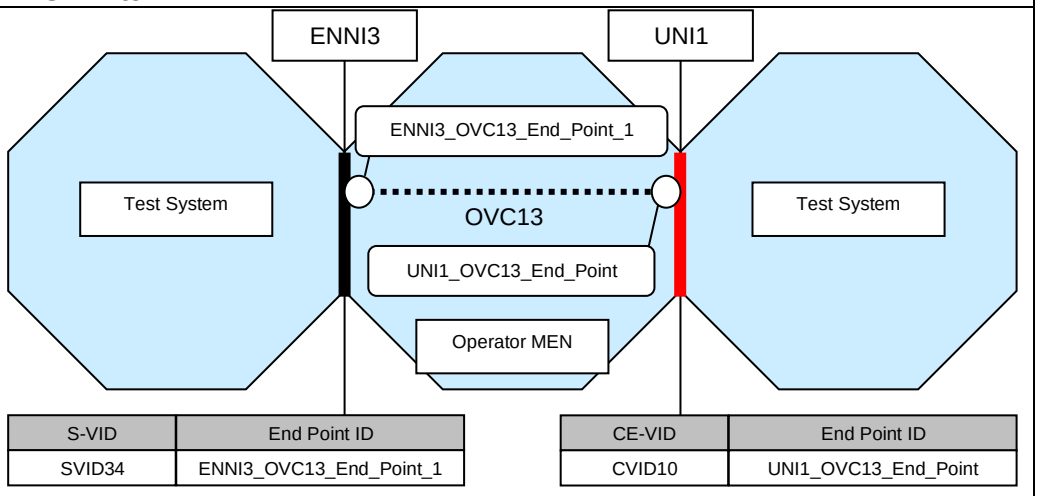
7.24 Link Aggregation Group identification

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.LAG1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.3.6.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item LAG1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The local System's values for the LAG ID values shall be non-zero
Test Purpose	Verify that the local System's values for the LAG ID values shall be non-zero.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3: Partner_Key is set to 0.
Expected Results	LACPDU is received at each link of ENNI3: fields Actor_System, Actor_System_Priority, Actor_Port, Actor_Port_Priority and Actor_Key are present, values of Actor_System, Actor_System_Priority, Actor_Port, Actor_Port_Priority and Actor_Key are not equal 0.
Verdict	PASS, FAIL, or INCONCLUSIVE

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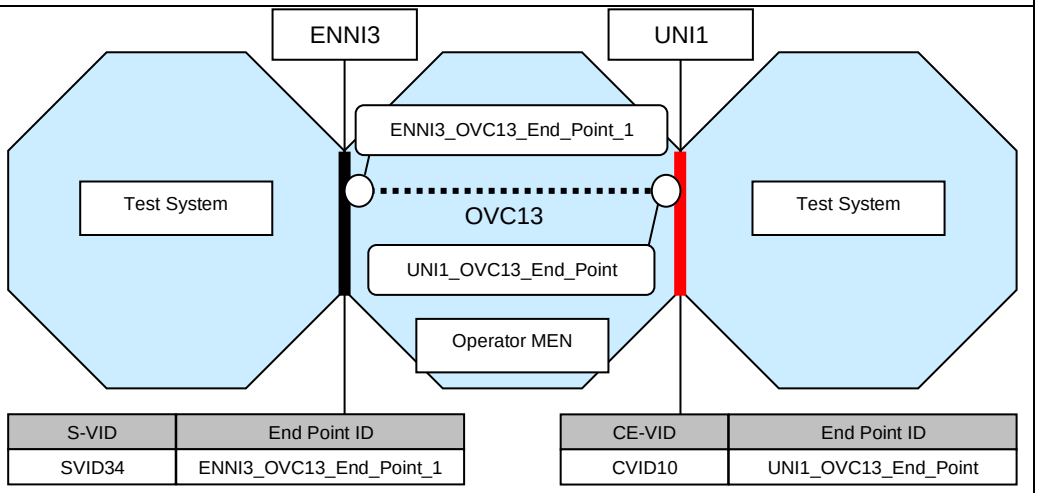
7.25 Reallocation conversation (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LA_OPERATION.DLA1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.3.13; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item DLA1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Any conversation that is reallocated to a different link as result of detaching a link from an Aggregator shall have its frame ordering preserved.
Test Purpose	Verify that the Operator MEN component with ENNI functionality preserves frame ordering when a conversation is reallocated to a different link as result of detaching a link from an Aggregator.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 **Error! Reference source not found.** at UNI1 Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active.
Expected Results	Test frames are received at ENNI3: order of the frames is unchanged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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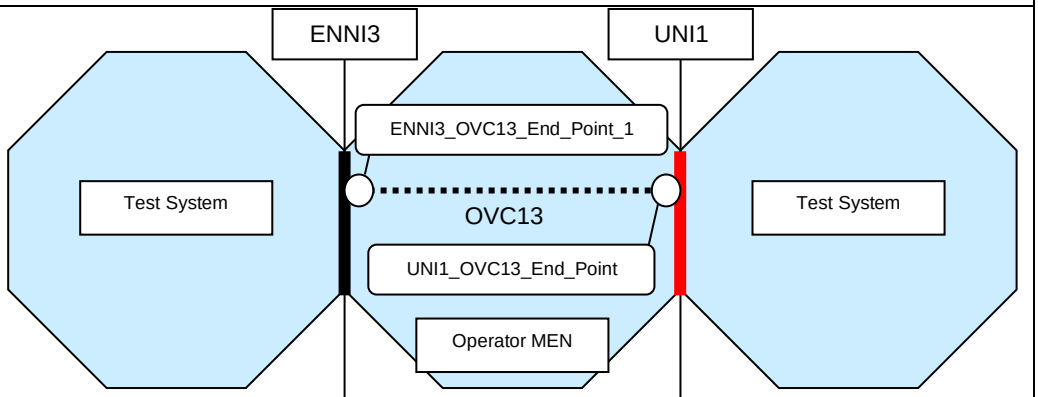
7.26 RM–Entering CURRENT state after Initialization

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.RM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after a successful initialization, on receipt of a LACPDU, enters CURRENT state.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34; End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10; End Point ID: UNI1_OVC13_End_Point
Test Procedure	Reboot the Operator MEN component with the ENNI functionality. Tester transmits a LACPDU (Request for informing current states) at each link at ENNI3 after Reboot time
Expected Results	A LACPDU is received at each link at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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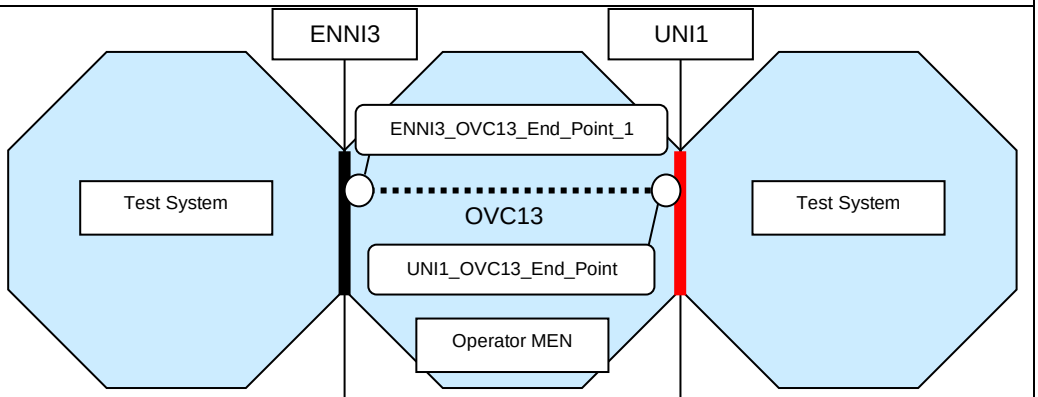
7.27 RM–Entering CURRENT state after port up

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.RM1.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after a port becoming up, on receipt of a LACPDU, enters CURRENT state.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Shut down tester port facing ENNI Bring up tester port facing ENNI Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3.
Expected Results	A LACPDU is received at the link connected to the port that was shut down in the test procedure.
Verdict	PASS, FAIL, or INCONCLUSIVE

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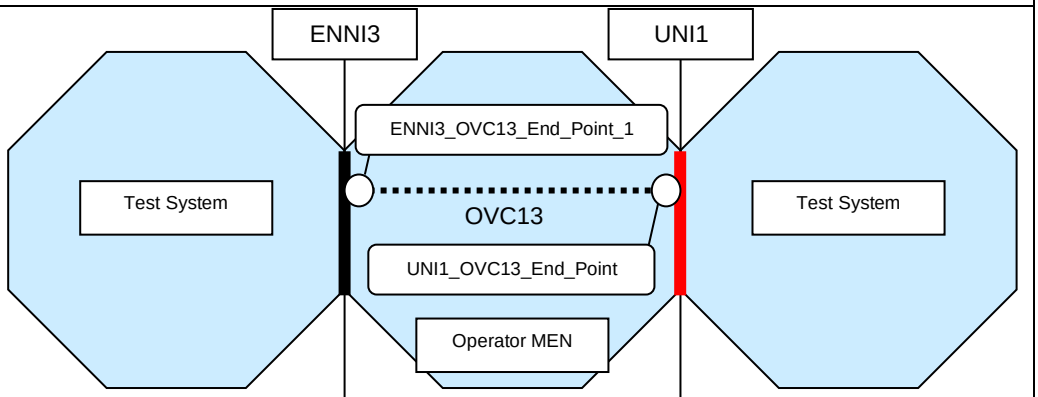
7.28 RM–Entering CURRENT state from CURRENT State

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.RM1.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering CURRENT state, on receipt of a LACPDU, enters CURRENT state again.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at each link of ENNI3 Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	A LACPDU is received at each link of ENNI3: field Actor_State.Expired is set to FALSE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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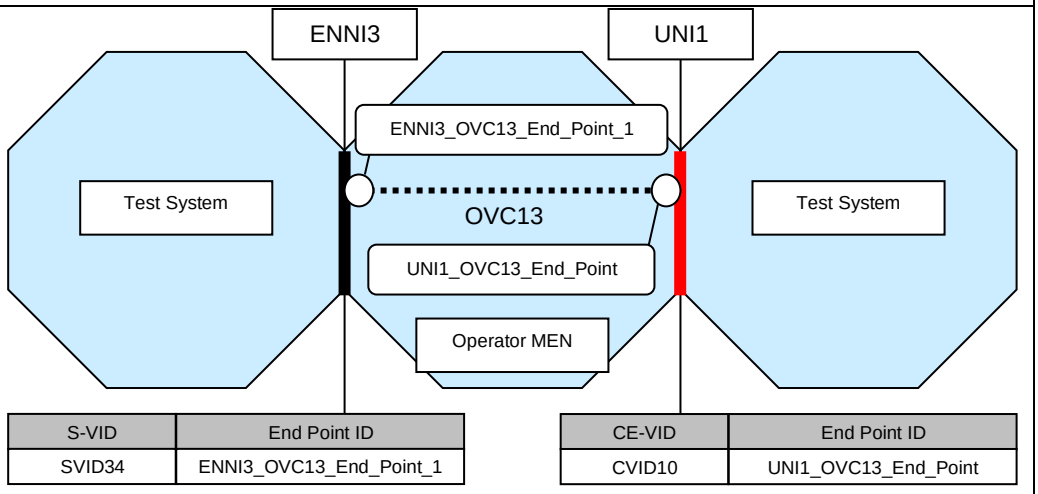
7.29 PM–No Periodic LACPDU when both LACP_Activity are passive

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.PM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.13, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item PM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Periodic Transmission machine as defined in Figure 43–11 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when LACP_Activity of Actor and Partner both are PASSIVE, doesn't send any LACPDUs periodically.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Configure the Operator MEN component with ENNI functionality: set Actor_Admin_Port_State.LACP_Activity to FALSE. Tester listens for up to (LACPDU listen time + 2 x Slow_Periodic_Time) seconds at ENNI3.
Expected Results	LACPDUs are not received at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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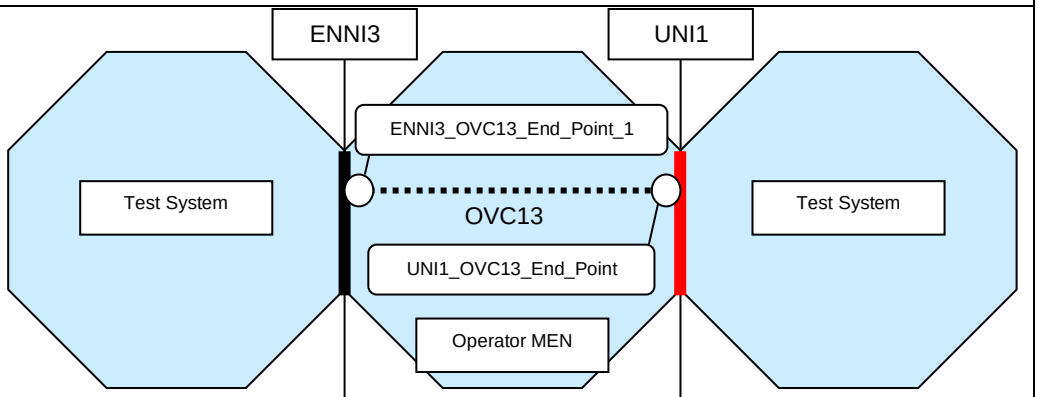
7.30 PM–Periodic LACPDU during initialization

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.PM1.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.13, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item PM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Periodic Transmission machine as defined in Figure 43–11 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, during initialization, doesn't send any LACPDUs periodically.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Reboot the Operator MEN component with ENNI functionality Tester listens for up to Reboot time at ENNI3
Expected Results	LACPDUs are not received at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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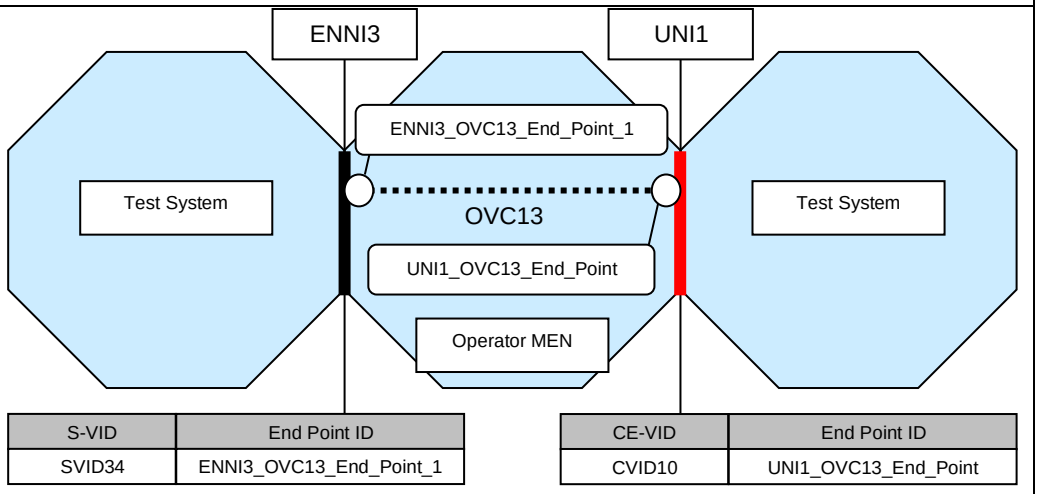
7.31 MUX–Entering DETACHED state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.15, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU requesting for detaching, enters DETACHED state.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34; End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10; End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active.
Expected Results	LACPDUs are received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to FALSE, field Actor_State.Collecting is set to FALSE, field Actor_State.Distributing is set to FALSE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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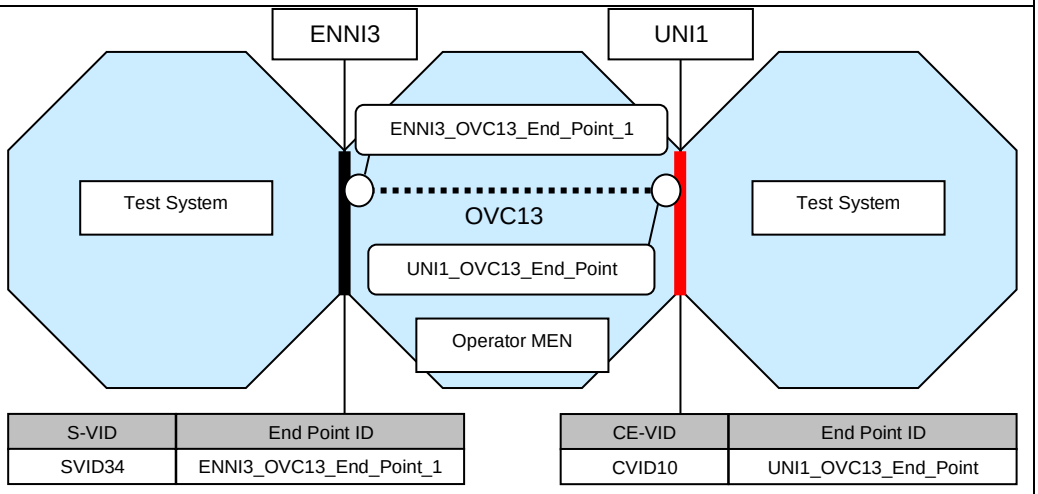
7.32 MUX–Entering ATTACHED state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.15, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, according to the configuration, enters ATTACHED state.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDUs are received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to TRUE LACPDUs are received at the link of ENNI3 configured as Standby: field Actor_State.Synchronization is set to FALSE
Verdict	PASS, FAIL, or INCONCLUSIVE

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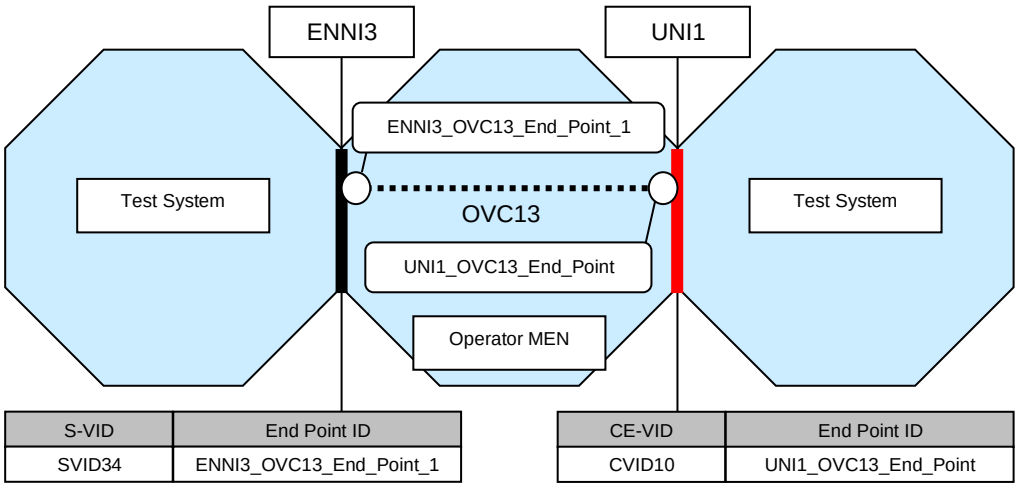
7.33 MUX–Entering COLLECTING state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.15, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU requesting for collection, enters the COLLECTING state.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at each link of ENNI3
Expected Results	LACPDUs are received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to TRUE, field Actor_State.Collecting is set to TRUE, Actor_State.Distributing is set to FALSE. LACPDUs are received at the link of ENNI3 configured as Standby: field Actor_State.Synchronization is set to FALSE, field Actor_State.Collecting is set to FALSE, Actor_State.Distributing is set to FALSE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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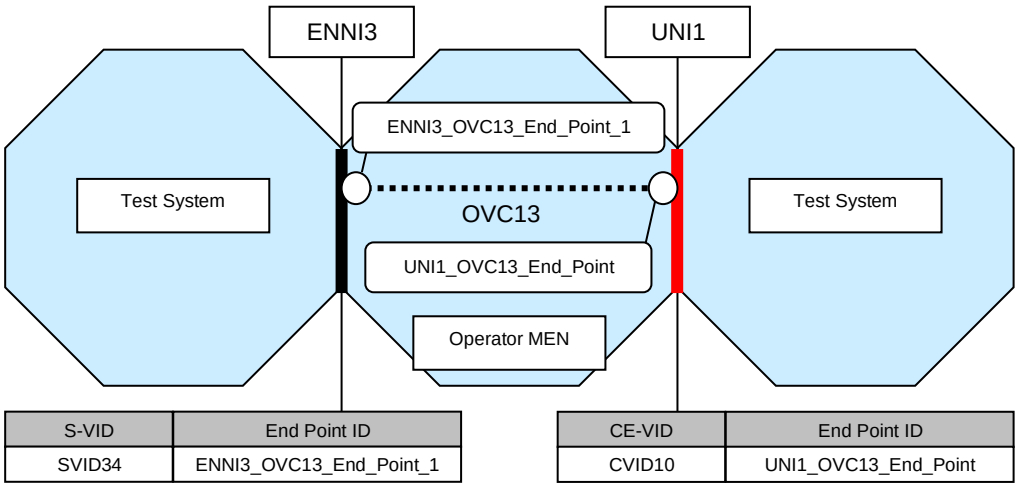
7.34 MUX–Entering DISTRIBUTING state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.4
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.15, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU requesting for distribution, enters the DISTRIBUTING state.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3
Expected Results	LACPDUs are received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to TRUE, field Actor_State.Collecting is set to TRUE, Actor_State.Distributing is set to TRUE. LACPDUs are received at the link of ENNI3 configured as Standby: field Actor_State.Synchronization is set to FALSE, field Actor_State.Collecting is set to FALSE, Actor_State.Distributing is set to FALSE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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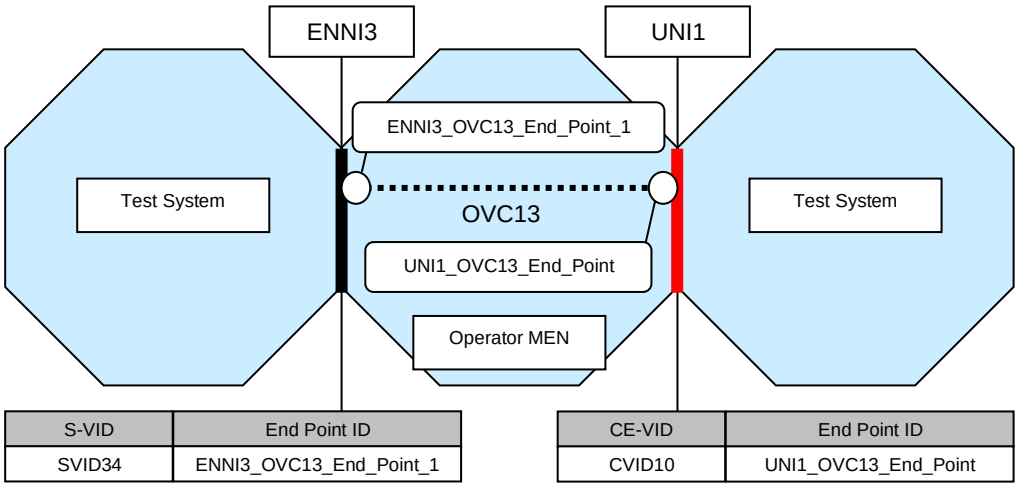
7.35 TM–No Transmission when No Periodic LACPDU

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.TM10.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.25, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item TM10
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The Transmission machine shall set NTT to FALSE and doesn't transmit when Periodic machine is in the NO_PERIODIC state.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when Periodic machine is in the NO_PERIODIC state, doesn't send LACPDUs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Configure the Operator MEN component with ENNI functionality: set Actor_Admin_Port_State.LACP_Activity to FALSE Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3 Tester listens for up to (LACPDU listen time + LACP process time) seconds at ENNI3
Expected Results	LACPDUs are not received at ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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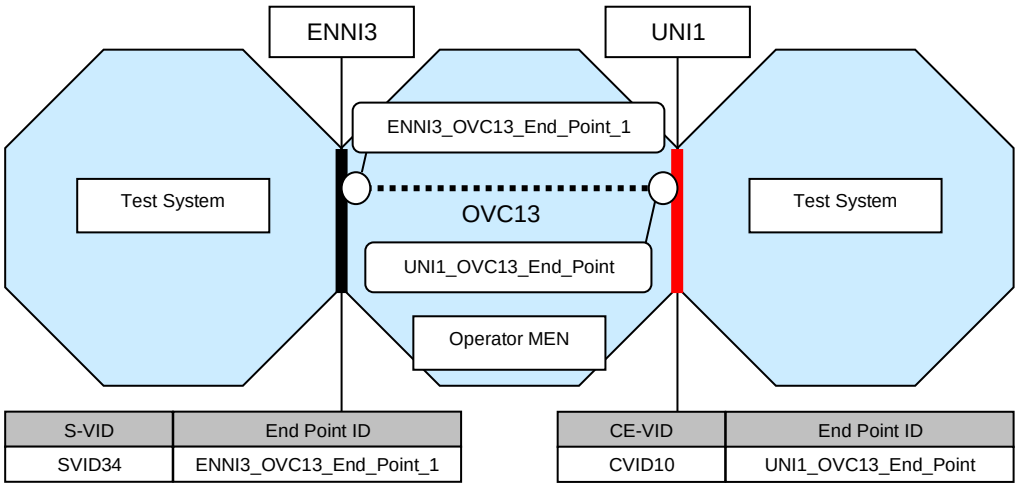
7.36 RM–Update Partner's view

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.RM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU carrying not up-to-date LACP_Activity information about ENNI, sends a LACPDU.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	A LACPDU is received at each link of ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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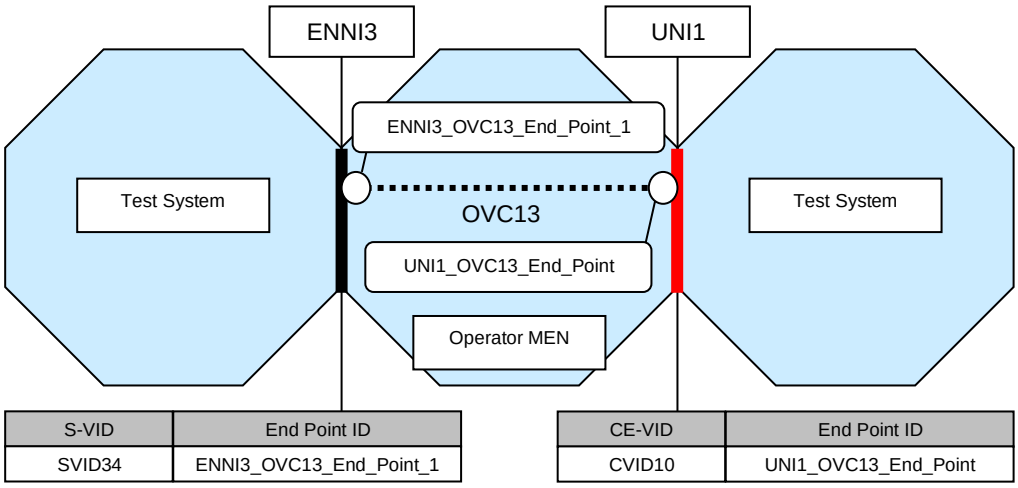
7.37 RM–Unselected in DEFAULTED state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.RM1.4
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conditional Mandatory
Test Status	Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality detaches links from the LAG. Before enters DEFAULTED state, the Operator MEN component with ENNI functionality should, on receipt of a LACPDU with a different LAG ID, changes its partner Key with received LAG ID. After enters the DEFAULTED state, the Operator MEN component with ENNI functionality changes its partner Key with default configured LAG ID.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active. Tester listens for up to (3 x LACPDU listen time +3 x LACP process time + Short_Timeout_Time + Long_Timeout_Time) seconds at ENNI3.
Expected Results	LACPDU is received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to FALSE, field Partner_Key is set to Actor_Admin_Aggregationor_Key + 1 LACPDU is received at the link of ENNI3 configured as Standby: field Actor_State.Synchronization is set to FALSE, field Partner_Key is set to Actor_Admin_Aggregationor_Key
Verdict	PASS, FAIL, or INCONCLUSIVE

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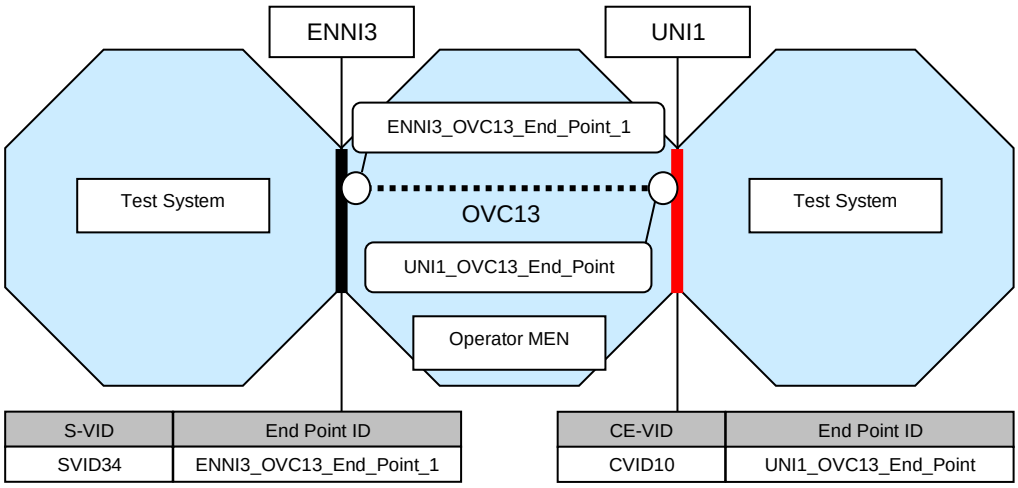
7.38 RM–Unselected in CURRENT state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.RM1.6
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU with a different LAG ID, enters the CURRENT state and detaches the link from the LAG.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active.
Expected Results	LACPDU is received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to FALSE, field Partner_Key is set to Actor_Admin_Aggregationor_Key + 1
Verdict	PASS, FAIL, or INCONCLUSIVE

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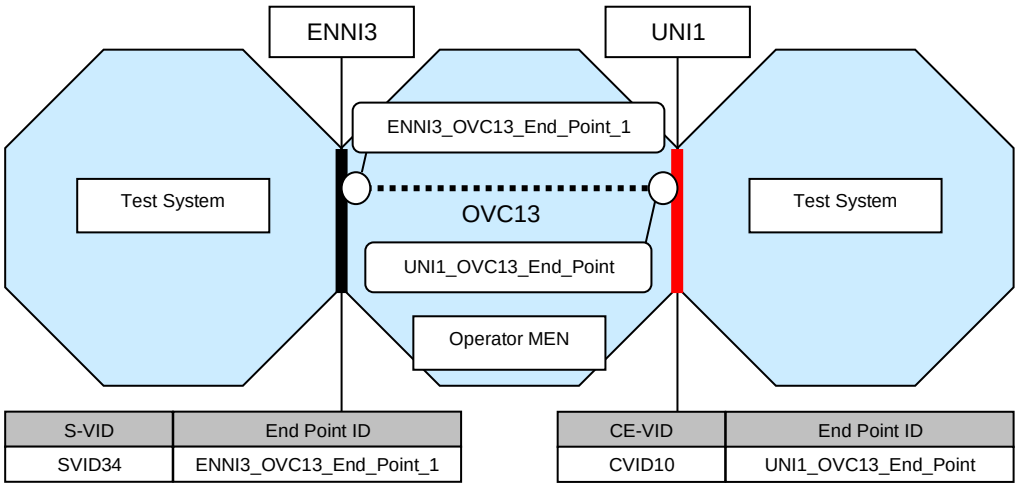
7.39 RM–Selected in CURRENT state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.RM1.7
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU with no changes on LAG ID, remains the link to be attached to the LAG.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at the link of ENNI3 configured as Active. Tester transmits a LACPDU (Request for informing current states) at the link of ENNI3 configured as Active.
Expected Results	LACPDU is received at the link of ENNI3 configured as Active: field Actor_State.Synchronization is set to TRUE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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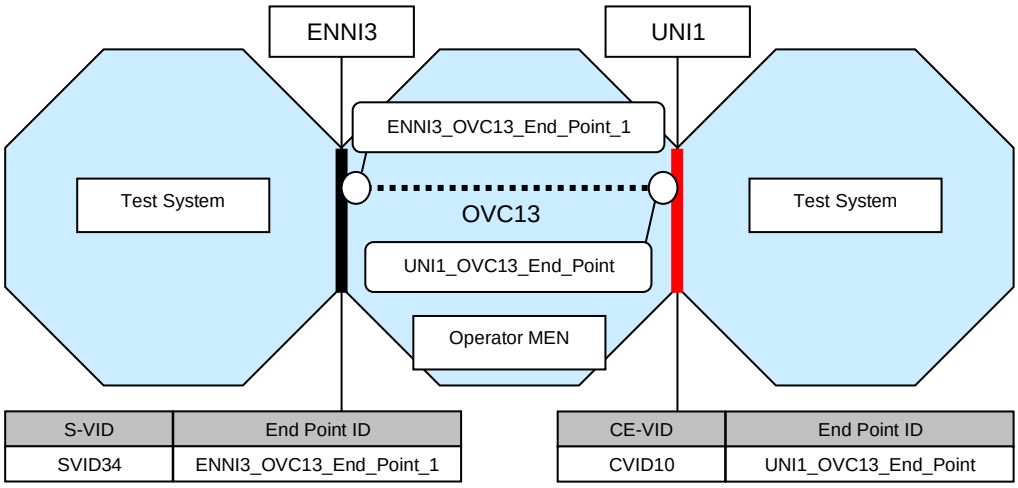
7.40 RM–Not validated fields

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_STATE_TRANSITIONS.RM1.11
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	In the process of executing the recordPDU function, a Receive machine compliant to this standard shall not validate the Version Number, TLV_type, or Reserved fields in received LACPDUs. The same actions are taken regardless of the values received in these fields.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, In the process of executing the recordPDU function, doesn't validate the Version Number, TLV_type, or Reserved fields in received LACPDUs. The same actions are taken regardless of the values received in these fields.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at each link of ENNI3: all reserved fields are set to 1, field Version Number is set to 2, all TLV_type fields are set to 1.
Expected Results	A LACPDU is received at each link of ENNI3: field Version number is set to 0x01, field TLV_type (Actor Information) is set to 0x01, field TLV_type (Partner Information) is set to 0x02, field TLV_type (Collector Information) is set to 0x03, TLV_type (Terminator) is set to 0x00, all Reserved fields are set to 0.
Verdict	PASS, FAIL, or INCONCLUSIVE

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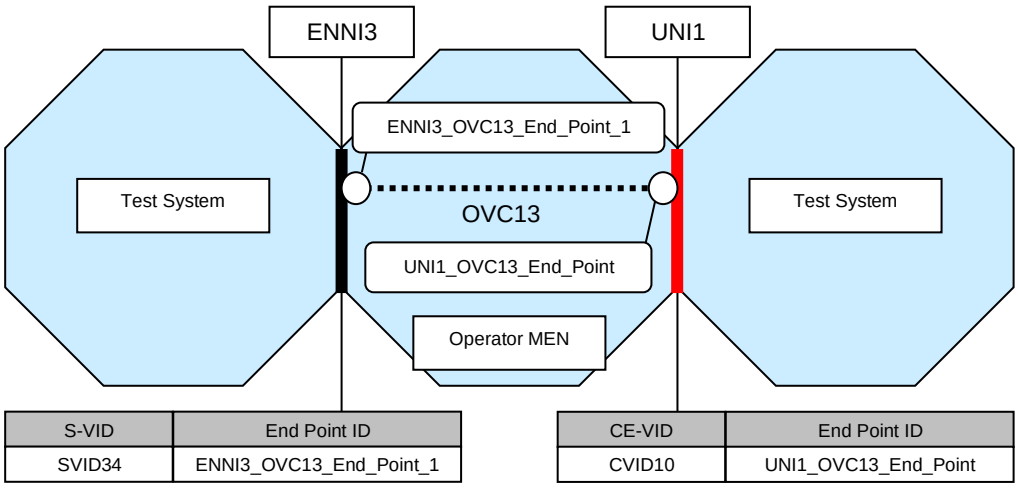
7.41 MUX–Disabled Distributing in DETACHED state (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering DETACHED state, disables distribution of the link.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at the link of ENNI3 configured as Active. Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at UNI1.
Expected Results	Test frames are not received at the link of ENNI3 configured as Active.
Verdict	PASS, FAIL, or INCONCLUSIVE

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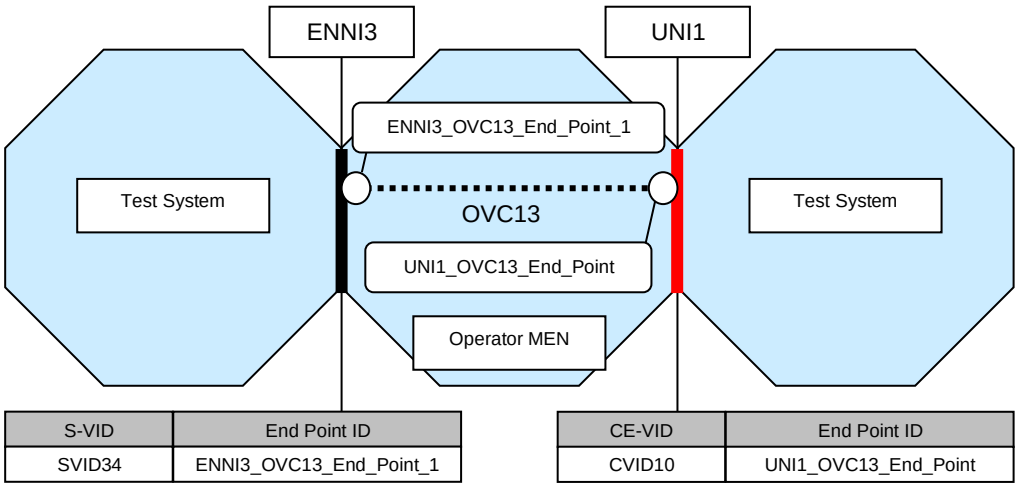
7.42 MUX–Disabled Collecting in DETACHED state (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering DETACHED state, disables collection of the links.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at the link of ENNI3 configured as Active. Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at the link of ENNI3 configured as Active.
Expected Results	Test frames are not received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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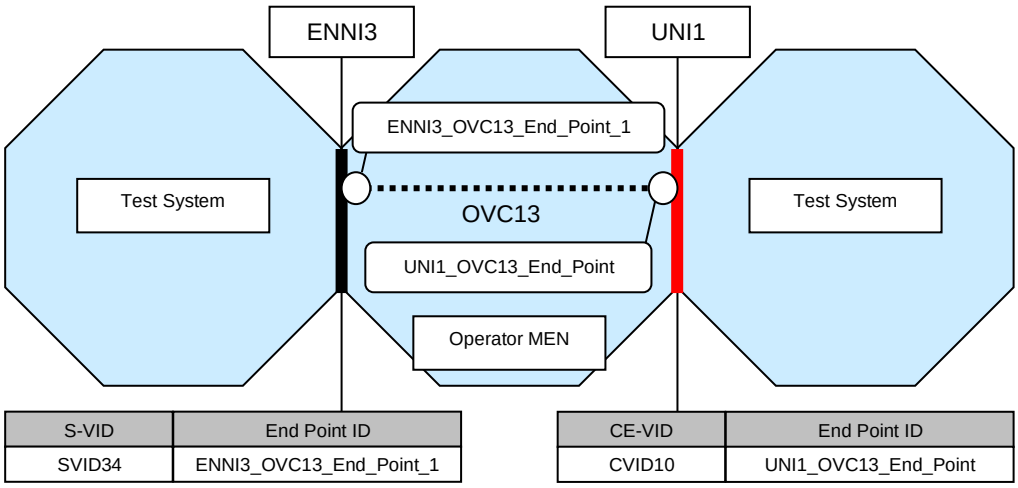
7.43 MUX–Disabled Collecting in ATTACHED state

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.4
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering ATTACHED state, disables Collecting of the links.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at the link of ENNI3 configured as Active.
Expected Results	Test frames are not received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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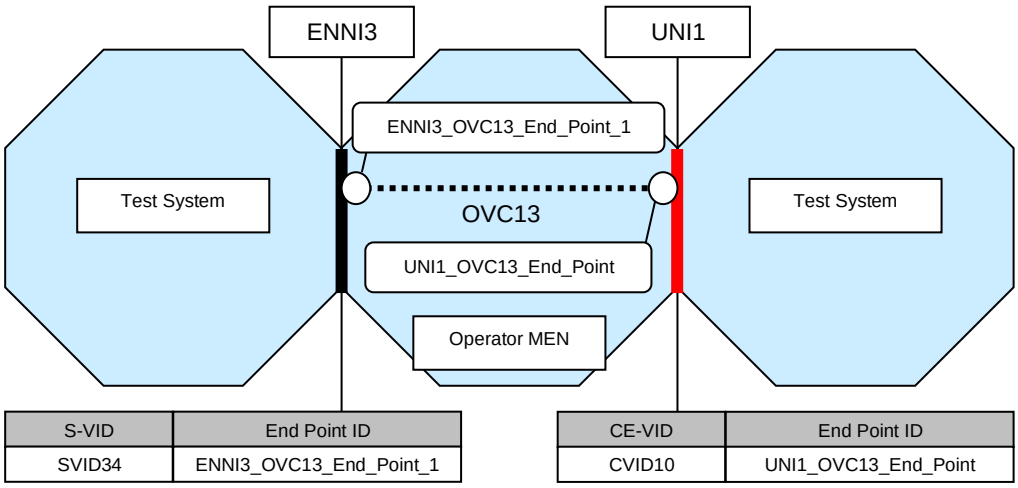
7.44 MUX–Disabled Distributing in COLLECTING state (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.6
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering COLLECTING state, disables Distributing of the links.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at the link of ENNI3 configured as Active. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13 at UNI1.
Expected Results	Test frames are not received at the link of ENNI3 configured as Active.
Verdict	PASS, FAIL, or INCONCLUSIVE

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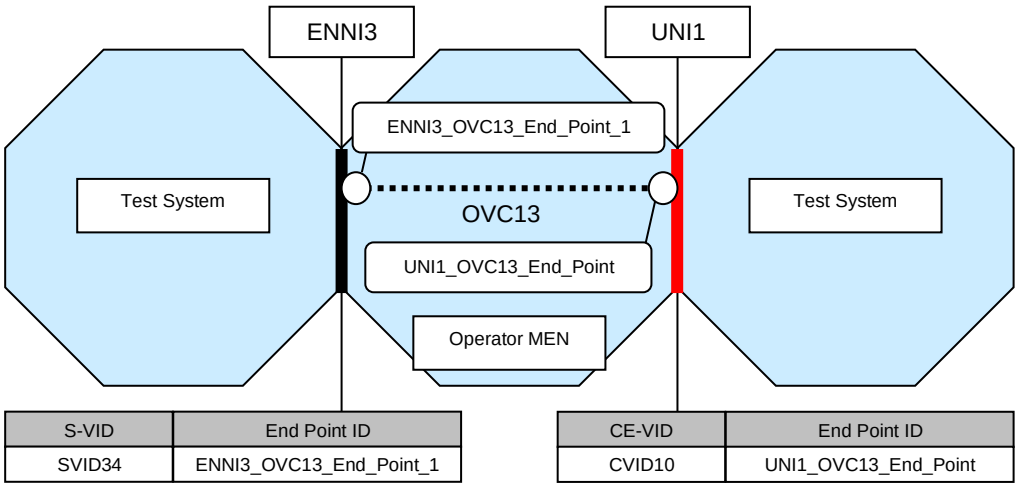
7.45 MUX–Enabled Collecting in COLLECTING state (Collection)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.7
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering COLLECTING state, enables collection of the link.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Collection/disabling Distribution) at the link of ENNI3 configured as Active. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13**Error! Reference source not found.** at the link of ENNI3 configured as Active.
Expected Results	All test frames are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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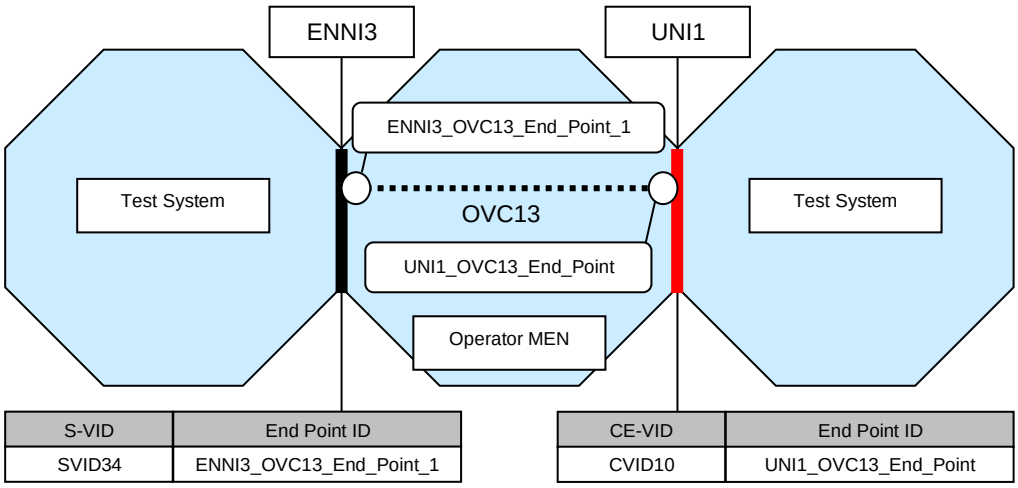
7.46 MUX–Enabled Distributing in DISTRIBUTING state (Distribution)

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.XM1.9
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item XM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	MUX machine as defined in Figure 43–13 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after entering DISTRIBUTING state for links on the protected ENNI, enables Distributing of the links.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for enabling Distribution) at the link of ENNI3 configured as Active. Tester transmits test frames Flow Definition1 (Default traffic flow definition) mapped to OVC13**Error! Reference source not found.**) at UNI1.
Expected Results	All test frames are received at the link of ENNI3 configured as Active.
Verdict	PASS, FAIL, or INCONCLUSIVE

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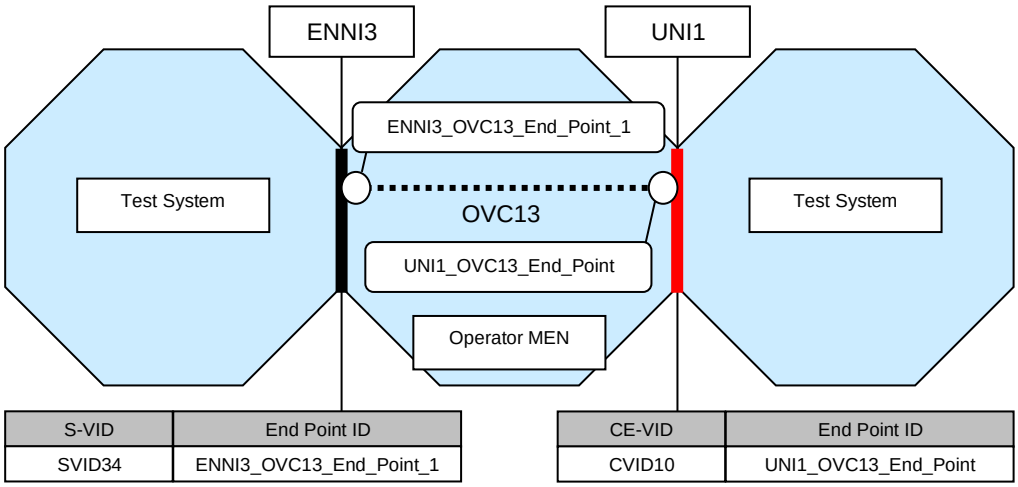
7.47 LACPDU–All reserved octets

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.LPS3.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.2, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item LPS3
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	These octets are reserved for use in future extensions to the protocol. They are ignored on receipt and are transmitted as zeros to claim compliance with Version 1 of this protocol
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt ignores all reserved octets of LACPDUs and on transmission ensures these to be zero.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at each link of ENNI3: all Reserved fields are set to 1.
Expected Results	LACPDU is received at each link of ENNI3: all Reserved fields are set to 0.
Verdict	PASS, FAIL, or INCONCLUSIVE

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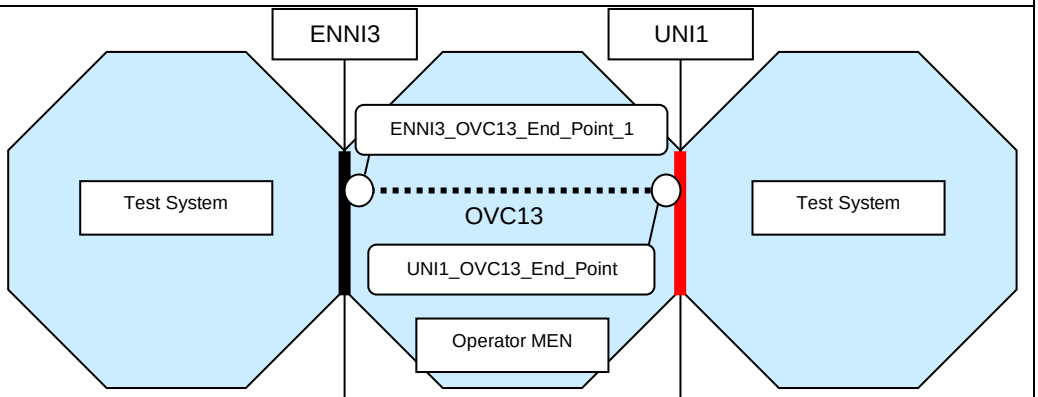
7.48 LACPDU–Not tagged

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.LPS1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.2.2, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item LPS1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	LACPDUs are basic IEEE 802.3 frames; they shall not be tagged
Test Purpose	Verify that the Operator MEN component with ENNI functionality doesn't transmit tagged LACPDUs.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDU is received at each link of ENNI3: frame is untagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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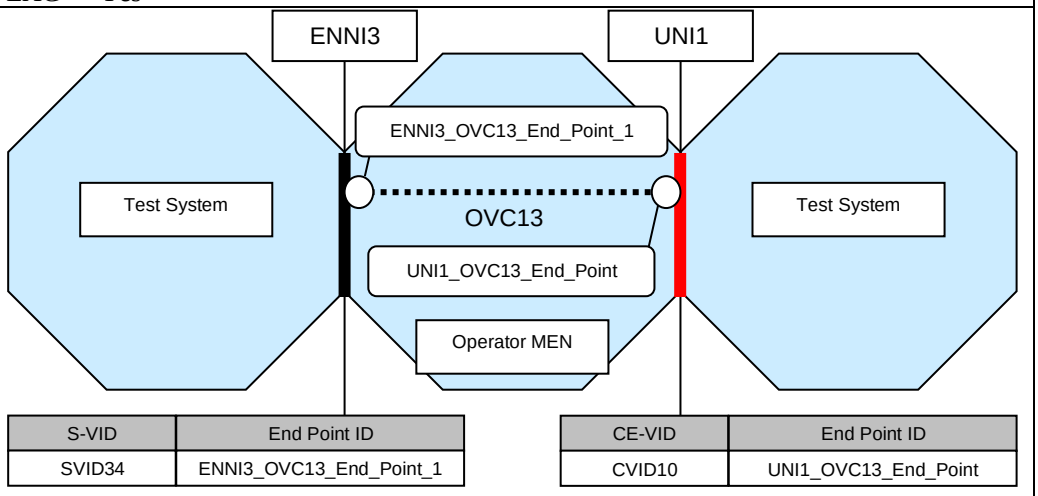
7.49 LACPDU–Structure

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.LPS2.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.2.2, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item LPS2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The LACPDU structure shall be shown in Figure 43–7 and as further described in the following field definitions
Test Purpose	Verify that the Operator MEN component with ENNI functionality transmits LACPDUs with structure as shown in [5] Figure 43–7 and as described.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDU is received at each link of ENNI3: frame is formatted in accordance with section 43.4.2.2 of [5].
Verdict	PASS, FAIL, or INCONCLUSIVE

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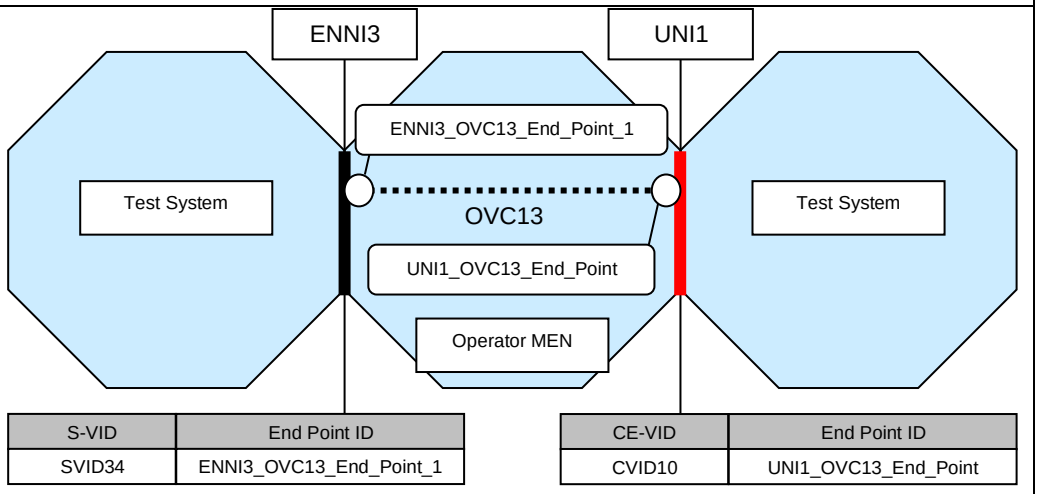
7.50 SMV–Full Duplex

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SMV2.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.8, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SMV2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	LACP_Enabled is FALSE for half duplex ports, otherwise TRUE
Test Purpose	Verify that the Operator MEN component with ENNI functionality in FULL Duplex mode asserts LACP_Enabled TRUE.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for informing current states)at each link of ENNI3.
Expected Results	LACPDU is received at each link of ENNI3.
Verdict	PASS, FAIL, or INCONCLUSIVE

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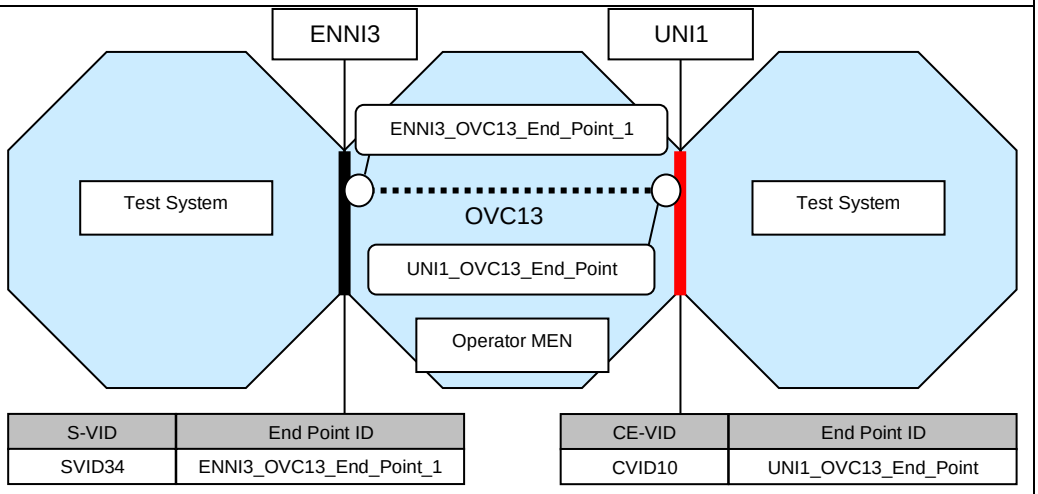
7.51 SLM–Aggregator

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SLM1.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.14.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SLM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	The implementation shall support at least one Aggregator per System
Test Purpose	Verify that the Operator MEN component with ENNI functionality supports at least one Aggregator.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDU is received at each link of ENNI3: field Actor_State.Synchronization is set to TRUE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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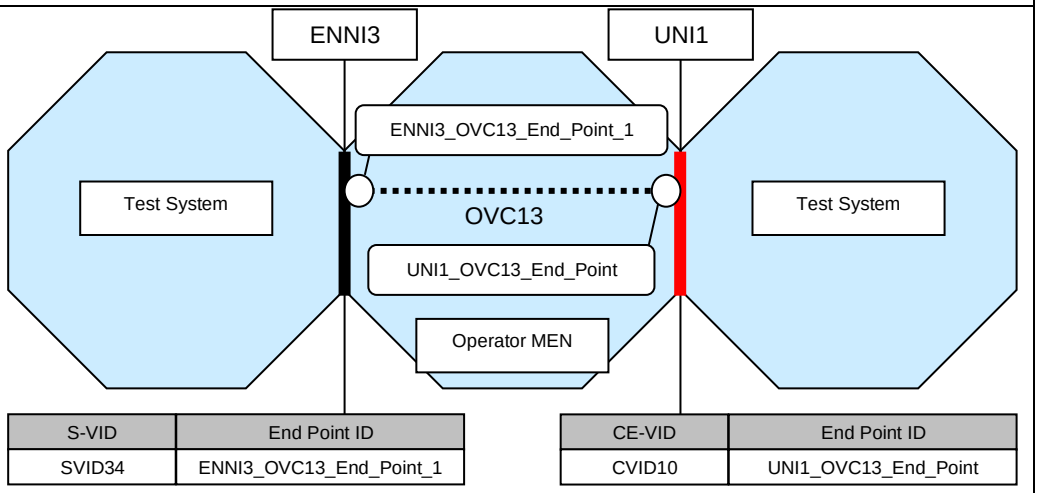
7.52 SLM–Port Key

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SLM2.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.14.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SLM2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Each Port shall be assigned an operational Key (43.3.5). Ports that can aggregate together are assigned the same operational Key as the other ports with which they can aggregate; ports that cannot aggregate with any other port are allocated unique operational Keys.
Test Purpose	Verify that the Operator MEN component with ENNI functionality assigns each port an operational Key.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDU is received at each link of ENNI3: field Actor_Key is present (value as default configured)
Verdict	PASS, FAIL, or INCONCLUSIVE

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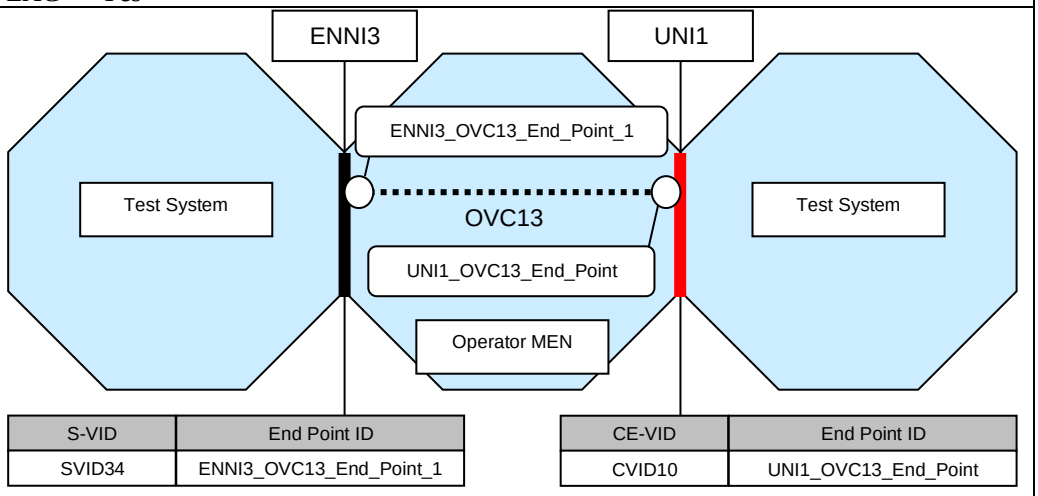
7.53 SLM–Keys same for Aggregator

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SLM5.2
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.14.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SLM5
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	A Port shall only select an Aggregator that has the same operational Key assignment as its own operational Key
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when a port has the same Key value as a Aggregator, attaches it to the Aggregator.
Conditions	LAG = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDUs are received at ENNI3: all frames with field Actor_State.Synchronization set to TRUE have the same value of the field Actor_Key.
Verdict	PASS, FAIL, or INCONCLUSIVE

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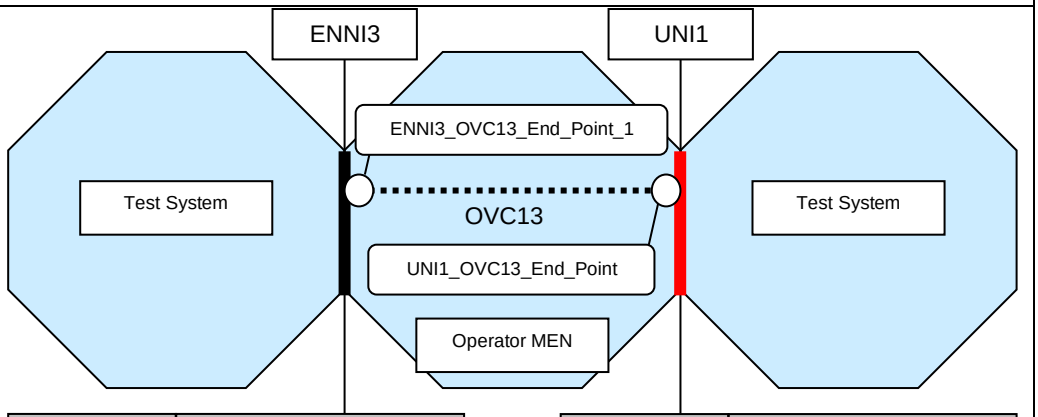
7.54 SLM–Keys same for LAG

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SLM6.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.14.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SLM6
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Subject to the exception stated in item g), ports that are members of the same Link Aggregation Group (i.e., two or more ports that have the same Actor_System_ID, Actor_Key, Partner_System ID, and Partner Key, and that are not required to be Individual) shall select the same Aggregator.
Test Purpose	Verify that the Operator MEN component with ENNI functionality, when links have the same LAG ID value, attaches them to the same Aggregator.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for detaching) at the link of ENNI3 configured as Active. Tester transmits a LACPDU (Request for informing current states) at each link of ENNI3
Expected Results	LACPDUs are received at ENNI3: all frames with field Actor_State.Synchronization set to TRUE have identical values in the fields Actor_System_Priority, Actor_System, Actor_Key, Partner_System_Priority, Partner_System and Partner_Key[4]
Verdict	PASS, FAIL, or INCONCLUSIVE

[4] These six values comprise the LAG Identity, as defined in [802.3 – 2005], section 43.3.6.

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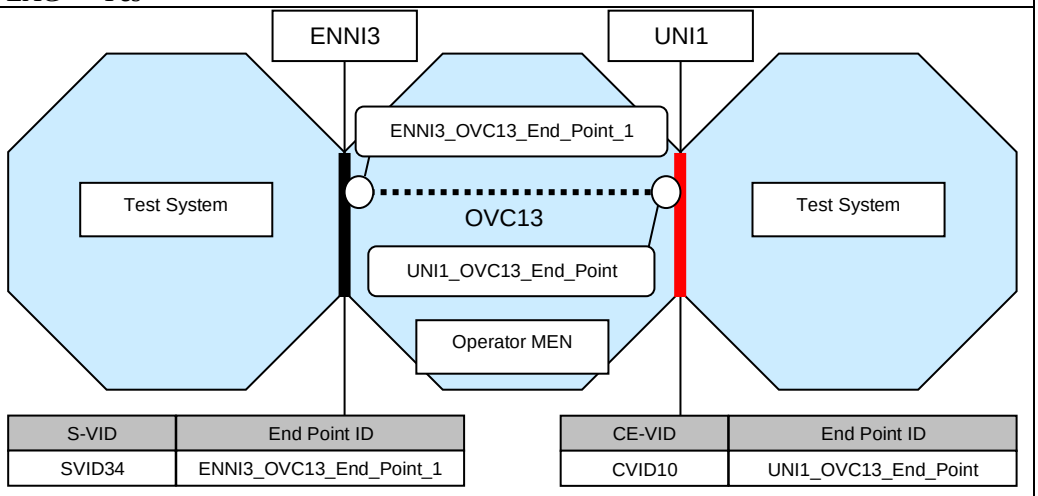
7.55 SLM–Not select the same Aggregator

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	LACP_FUNCTIONALITY.SLM9.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.14.1, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item SLM9
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Any port that is Aggregateable shall not select an Aggregator to which an Individual port is already attached.
Test Purpose	Verify that the Operator MEN component with ENNI functionality when an Individual port is attached to an Aggregator with, doesn't select this Aggregator for an Aggregateable port.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for being Individual) at the link of ENNI3 configured as Active. Tester transmits a LACPDU (Request for informing current states)at each link of ENNI3
Expected Results	LACPDU is received at the link of ENNI3 configured as Active: field Partner_State.LACP_Aggregation is set to FALSE, field Actor_State.Synchronization is set to FALSE. LACPDU is received at the link of ENNI3 configured as Standby: field Partner_State.LACP_Aggregation is set to TRUE, field Actor_State.Synchronization is set to TRUE.
Verdict	PASS, FAIL, or INCONCLUSIVE

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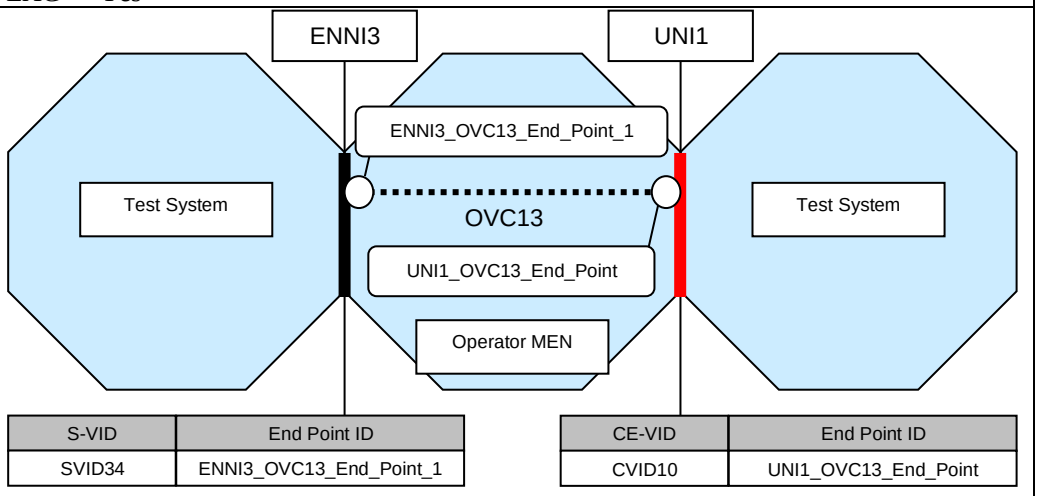
7.56 PM–SLOW to FAST periodic

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	TIMERS.PM1.3
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.13, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item PM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Periodic Transmission machine as defined in Figure 43–11 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU carrying Actor_State.LACP_Timeout=Short at each link on the protected ENNI, enters FAST_PERIODIC.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Request for Fast Mode) at each link of ENNI3 Tester listens for up to (4 x Fast_Periodic_Time) seconds at ENNI3
Expected Results	At least two LACPDUs are received at each link of ENNI3: the arrival timestamp difference between two consecutive frames received at the same link equals Fast_Periodic_Time.
Verdict	PASS, FAIL, or INCONCLUSIVE

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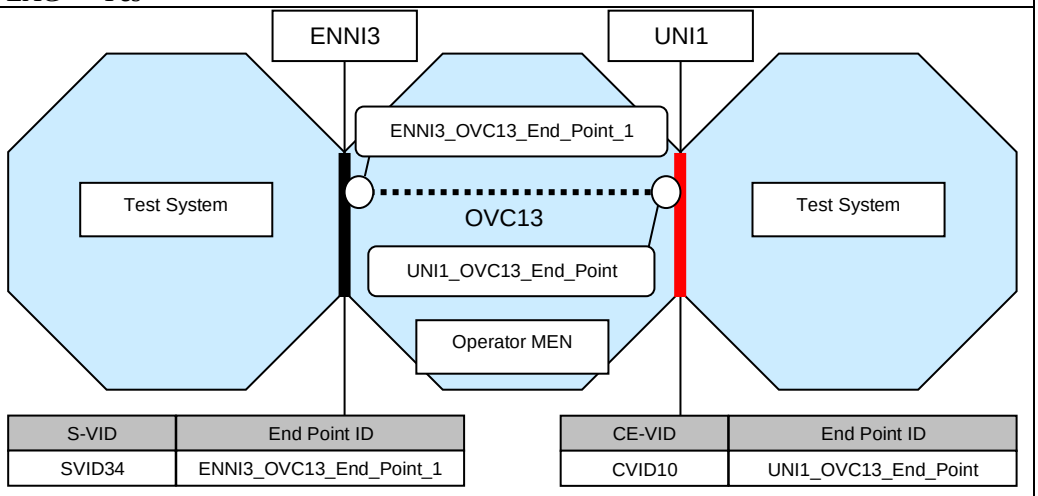
7.57 PM–FAST to SLOW periodic

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	TIMERS.PM1.4
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.13, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item PM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Periodic Transmission machine as defined in Figure 43–11 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, on receipt of a LACPDU carrying Actor_State.LACP_Timeout=Long at each link on the protected ENNI, enters SLOW_PERIODIC.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at each link of ENNI3 Tester listens for up to.(4 x Slow_Periodic_Time) seconds at ENNI3
Expected Results	At least two LACPDUs are received at each link of ENNI3: the arrival timestamp difference between two consecutive frames received at the same link equals Slow_Periodic_Time.
Verdict	PASS, FAIL, or INCONCLUSIVE

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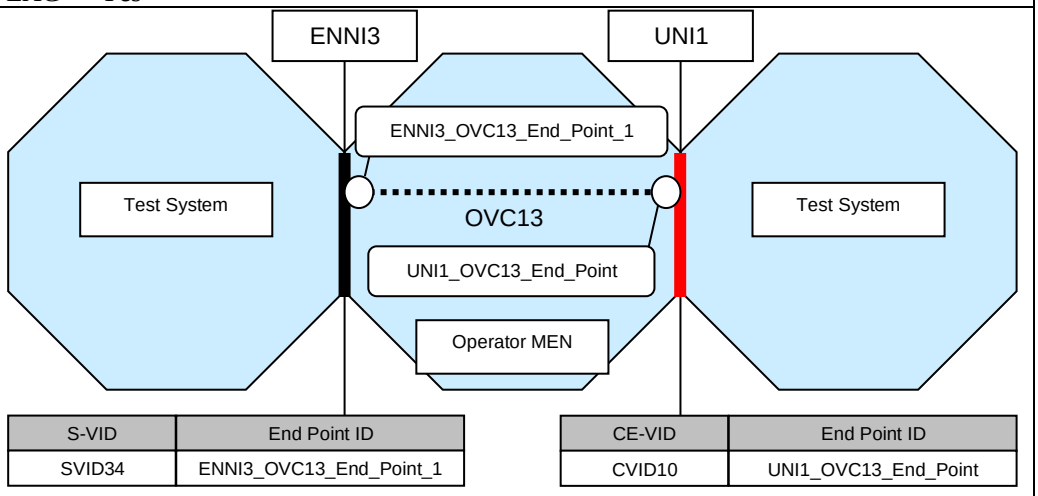
7.58 RM–Current_While_timer expired

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	TIMERS.RM1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.4.12, Protocol implementation conformance statement (PICS) proforma for Clause 43, Item RM1
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	Receive machine as defined in Figure 43–10 and associated parameters
Test Purpose	Verify that the Operator MEN component with ENNI functionality, after current_while_timer expired at CURRENT state and expired again at EXPIRED state, enters FAST_PERIODIC state.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	Tester transmits a LACPDU (Default Configuration) at each link of ENNI3. Tester listens for up to (Long_Timeout_Time + LACP process time + LACPDU listen time + Fast_Periodic_time)
Expected Results	At least one LACPDU is received at each link of ENNI3
Verdict	PASS, FAIL, or INCONCLUSIVE

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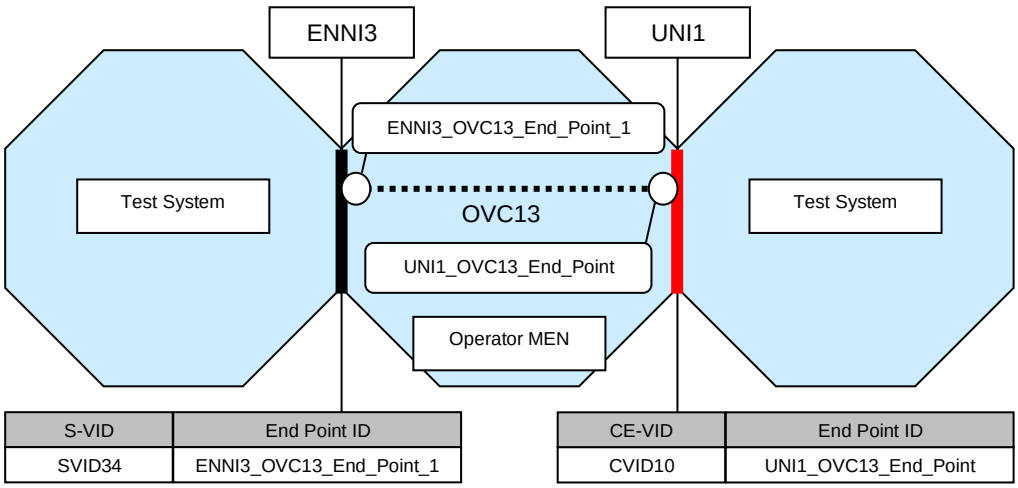
7.59 Frame Collector–discard frames within a CollectorMaxDelay time

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	TIMERS.FC2.1
Reference Document Source	IEEE Std 802.3 – 2005, Clause 43.2.3; Protocol implementation conformance statement (PICS) proforma for Clause 43, Item FC2
Test Type	Conformance
Test Status	Conditional Mandatory
Requirement	In order to ensure that frame delivery is not delayed indefinitely (which could cause a frame ordering problem when moving conversations from one link to another), the Frame Collector shall, upon receiving a frame from an Aggregator Parser, either deliver the frame to its MAC Client, or discard the frame within a CollectorMaxDelay time.
Test Purpose	Verify that the Operator MEN component with ENNI functionality delivers or discards frame within a CollectorMaxDelay time.
Conditions	LAG = "Yes"
Test Topology/OVC	 S-VID: SVID34 — End Point ID: ENNI3_OVC13_End_Point_1 CE-VID: CVID10 — End Point ID: UNI1_OVC13_End_Point
Test Procedure	1. Tester transmits a LACPDU (Request for enabling Distribution) at each link of ENNI3. 2. Tester transmits test frames mapped to OVC13 at ENNI3. 3. Wait for (CollectorMaxDelay + D2 - D1), where D1 is the delay of frames transmission from ENNI to EIs without Link Aggregation entity, D2 is the Delay of frames transmission from ENNI to EIs with Link Aggregation entity. 4. Wait for until timeout of Test Case Execution Time .
Expected Results	2-3. All test frames are received at UNI1, mapped to OVC13. 4. No test frames are received on the standby or active link of ENNI3 or at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

8 Test Group: CE-VLAN ID Preservation

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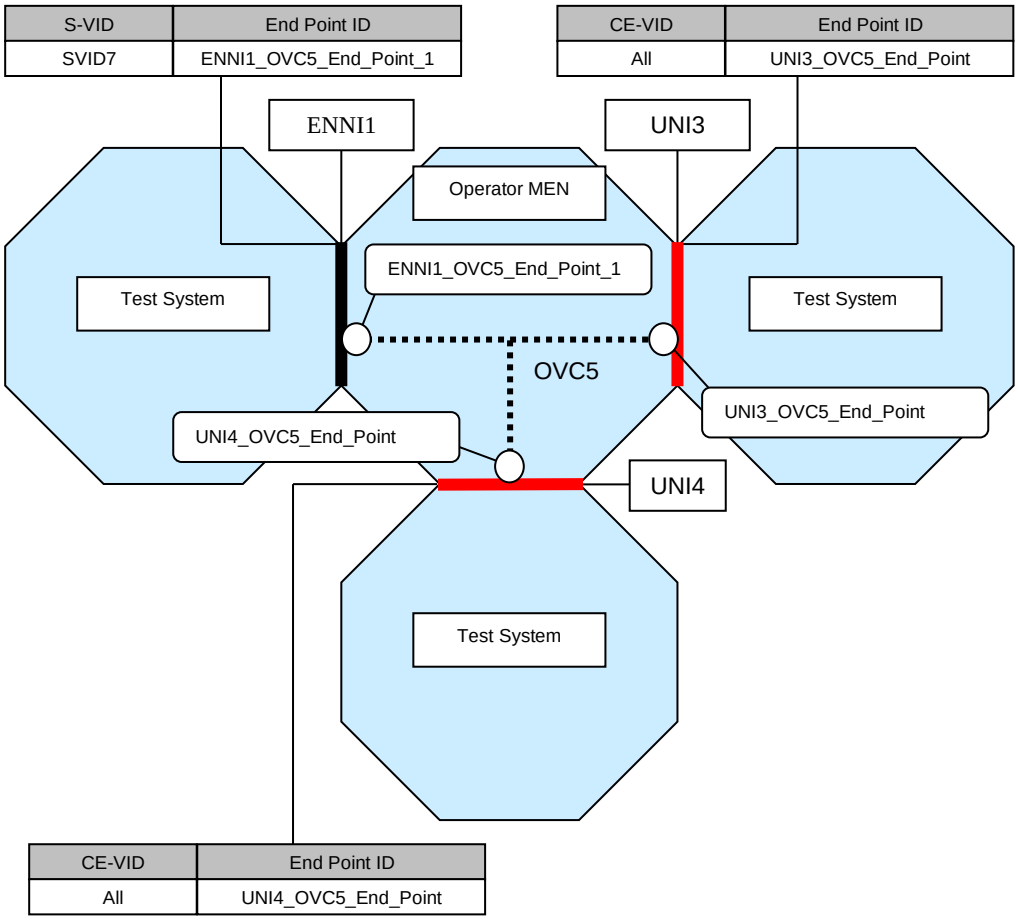
8.1 CE-VLAN ID Preservation for Untagged Service Frames – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.1
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for untagged Service Frames if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 1 and 2 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes" , All OVC UNI's CE-VLAN IDs map to the OVC = "Yes", Number of UNI OVCEnd Points > 2
Test Topology/OVC	
Test Procedure	Tester transmits untagged broadcast test frames mapped to OVC5 at UNI3
Expected Results	All test frames are received at UNI4; frames are untagged, preserving the CE-VLAN ID. All test frames are received at ENNI1 S-tagged only, preserving the CE-VLAN ID.
Verdict	PASS, FAIL, or INCONCLUSIVE

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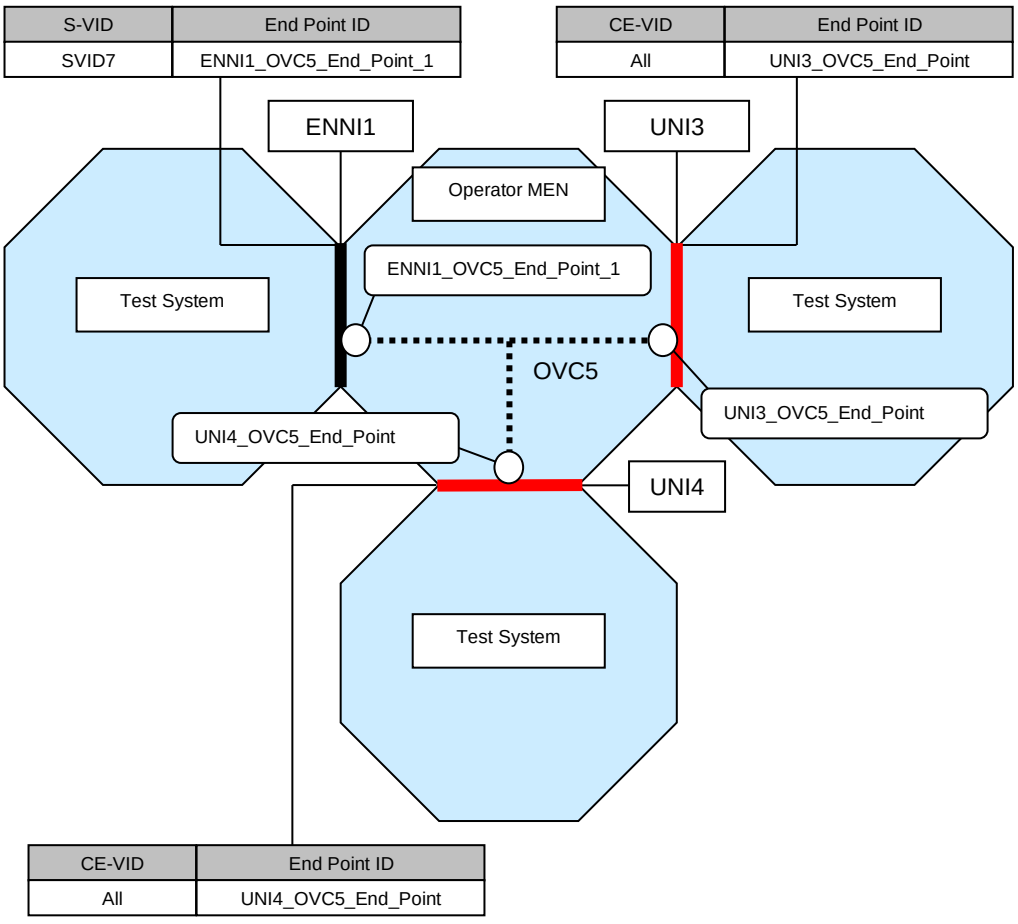
8.2 CE-VLAN ID Preservation for Untagged Service Frames – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.2
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that the format of the ingress untagged Service Frames are forwarded unchanged to thesingle S-Tag at the Egress ENNI after the S tag was inserted. The CE-VLAN ID Preservation has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 2 of Table 5 of [MEF 26]– alternative configuration for point-to-point OVCs)
FeaturesConditions	CE-VLAN ID Preservation = "Yes", Number of UNI OVC End Points > 0, All OVC UNI's CE-VLAN IDs map to the OVC = "Yes", Untagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits untagged test frames at UNI4 that are mapped to OVC5.
Expected Results	All test frames are received at ENNI1: frames are single-tagged, S-VLAN ID is mapped to OVC5 at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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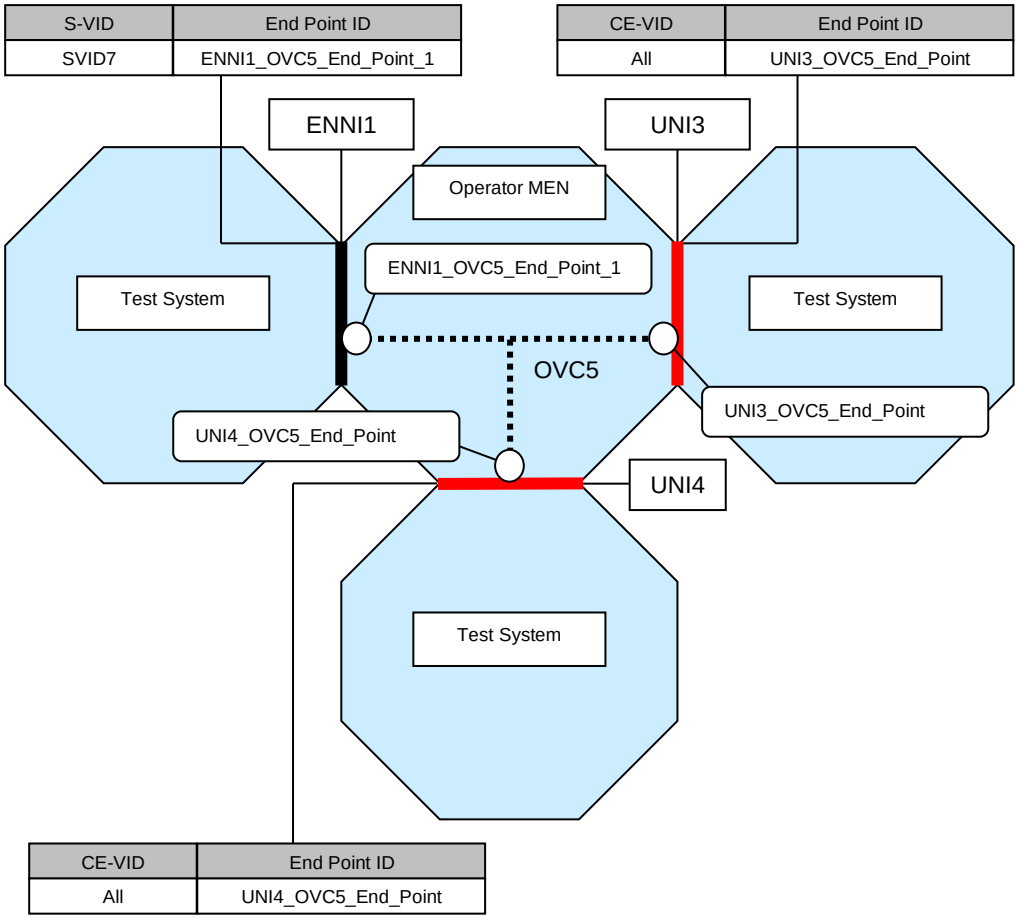
8.3 CE-VLAN ID Preservation for C-tagged Service Frames – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.3
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for C-tagged Service Frames if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Rows 3 and 4 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", All OVC UNI's CE-VLAN IDs map to the OVC = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits C-Tag test frames at UNI3 that are mapped to OVC5.
Expected Results	All test frames are received at UNI4: frames carry a C-Tag preserving the original CE-VLAN ID. All test frames are received at ENNI1 double-tagged, preserving the original CE-VLAN ID.
Verdict	PASS, FAIL, or INCONCLUSIVE

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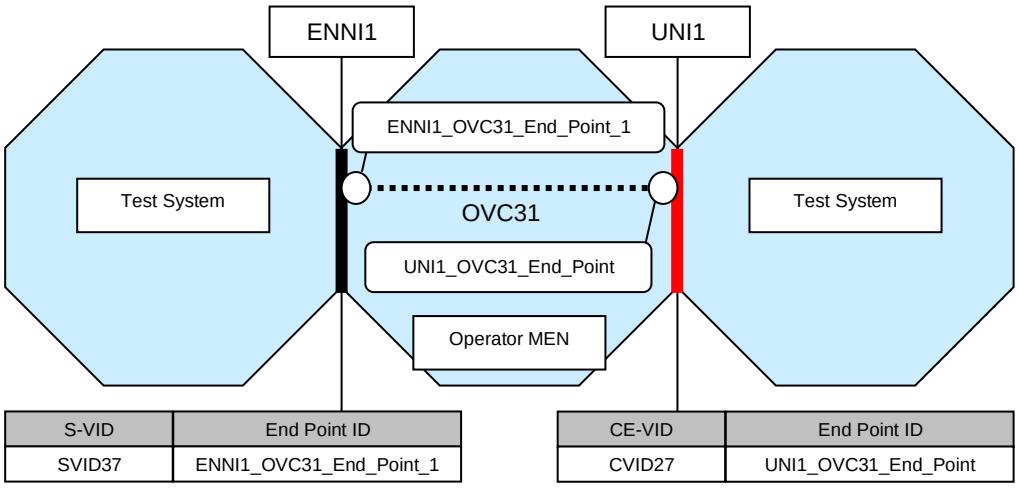
8.4 CE-VLAN ID Preservation for C-tagged Service Frames –All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.4
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for C-tagged Service frames if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 4 of Table 5 of [MEF 26], alternative test case for point-to-point OVCs)
FeaturesConditions	CE-VLAN ID Preservation = "Yes", Number of UNI OVC End Points > 0, All OVC UNI's CE-VLAN IDs map to the OVC = "Yes", Tagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID37 — End Point ID: ENNI1_OVC31_End_Point_1 CE-VID: CVID27 — End Point ID: UNI1_OVC31_End_Point
Test Procedure	Tester transmits C-tagged test frames at UNI1 that are mapped to OVC31.
Expected Results	All test frames are received at ENNI1: frames are double-tagged, with the original CE-VLAN ID preserved, S-VLAN ID is mapped to OVC5 at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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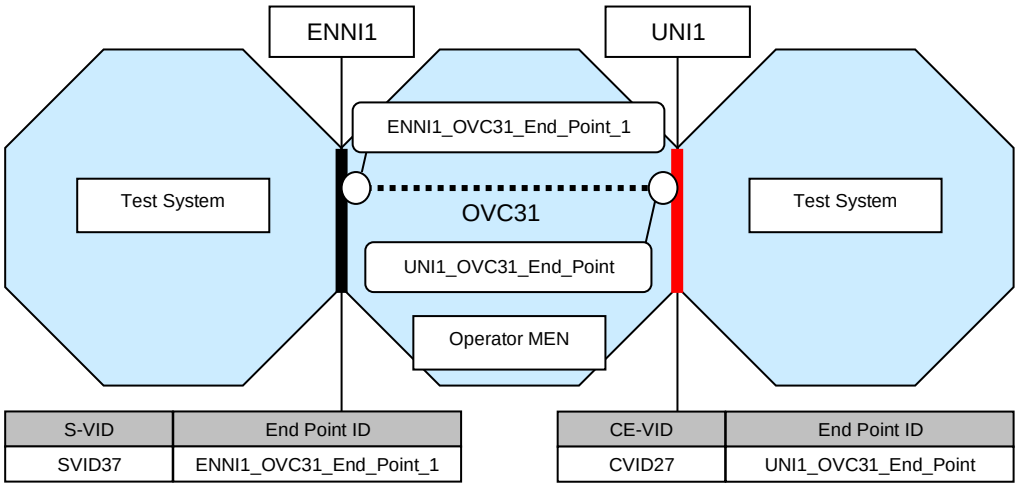
8.5 CE-VLAN ID Preservation for ENNI Frames With S- and C-tag – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.5
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that the ENNI Frames with S- and C-tags are forwarded to the UNI after the S-Tag was deleted. The CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 5 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", All OVC UNI's CE-VLAN IDs map to the OVC = "Yes", Tagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID37 — End Point ID: ENNI1_OVC31_End_Point_1 CE-VID: CVID27 — End Point ID: UNI1_OVC31_End_Point
Test Procedure	Tester transmits double-tagged test frames mapped to OVC31 at ENNI1, with C-VLAN ID set to CVID27.
Expected Results	All test frames are received at their destination UNIs: Frames are C-tagged with the original C-VLAN ID preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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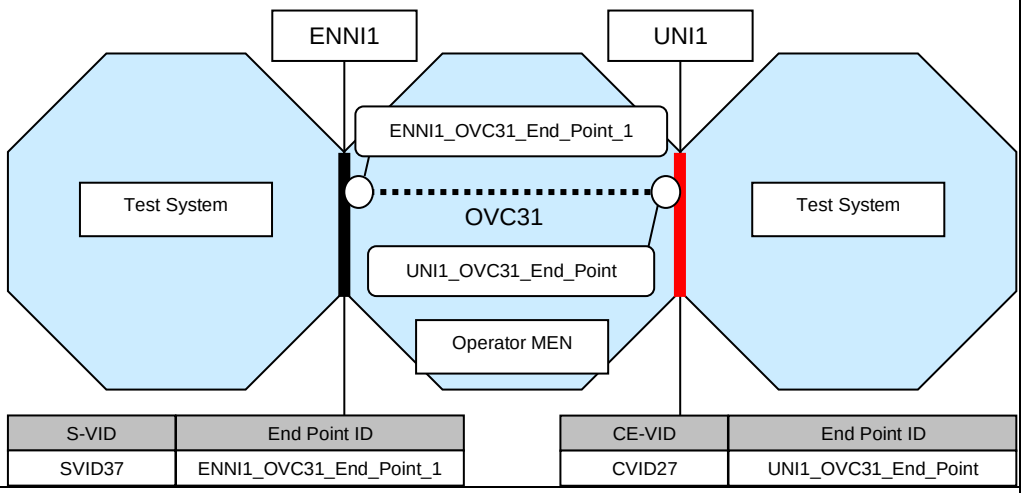
8.6 CE-VLAN ID Preservation for ENNI Frames With S-Tag Only – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.6
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that the ENNI Frames with S-Tag only are forwarded unchanged to the UNI after the S-Tag was deleted. The CE-VLAN ID Preservation attribute has a value of Yesfor that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 6 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes" All OVC UNI's CE-VLAN IDs map to the OVC = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits single S-tagged test frames that are mapped to OVC31 at ENNI1.
Expected Results	All test frames are received at their destination UNIs: frames are untagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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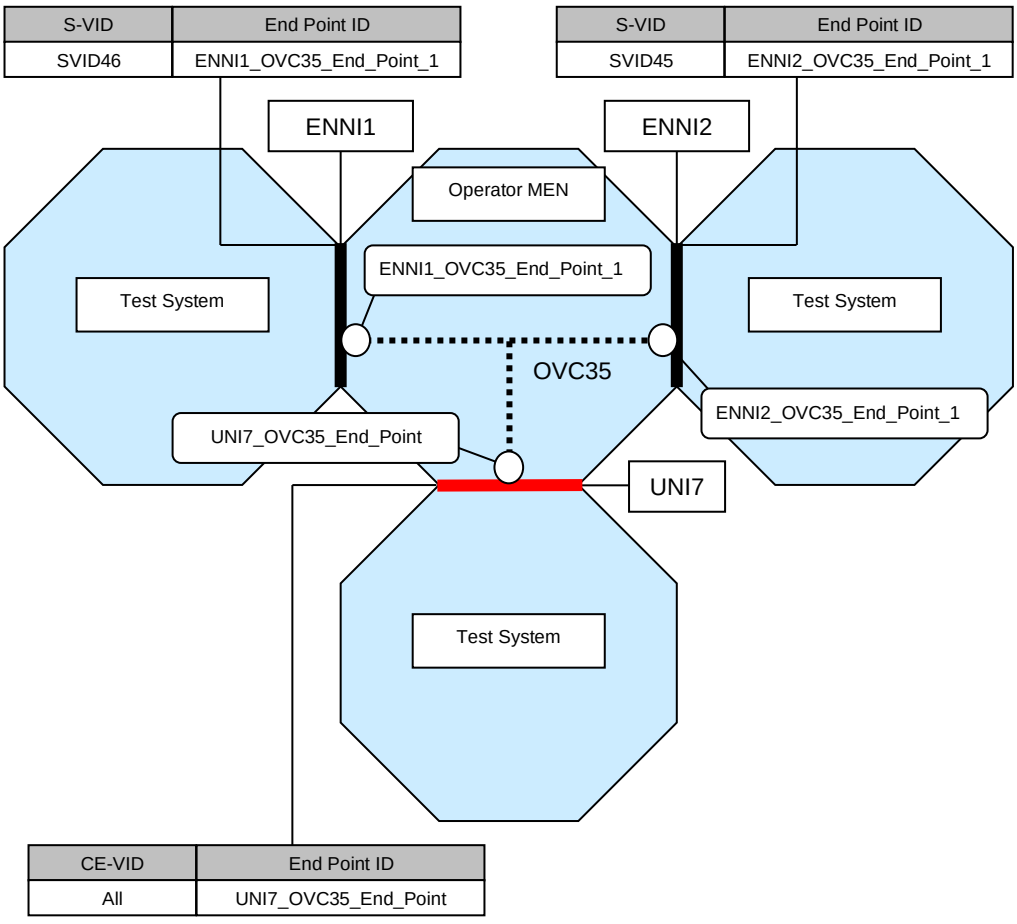
8.7 CE-VLAN ID Preservation for ENNI Frames With S- and C-tag – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.7
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that ENNI Frames with S- and C-Tags are forwarded to another ENNI. The CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 7 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", Number of ENNI OVC End Points > 1, All OVC UNI's CE-VLAN IDs map to the OVC = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits double-tagged test frames mapped to OVC35 at ENNI1: CE-VLAN ID is set to to values from CVID1 to CVID30, destination MAC addresses are emulated behind ENNI2.
Expected Results	All test frames are received at ENNI2 or UNI7: ENNI frames are double-tagged, with the original CE-VLAN ID preserved:
Verdict	PASS, FAIL, or INCONCLUSIVE

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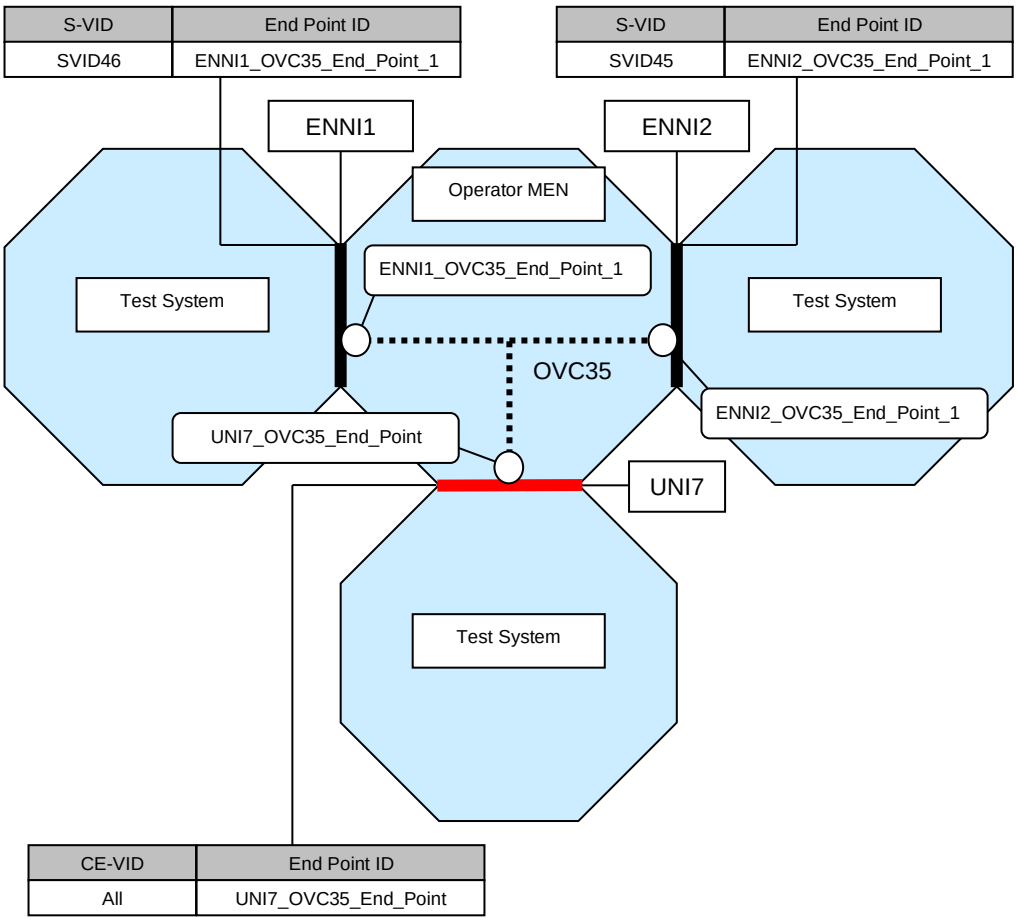
8.8 CE-VLAN ID Preservation for ENNI frames With S-tag Only – All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R35.8
Reference Document Source	MEF 26, R35
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of [MEF 26].
Test Purpose	Verify that the ENNI frames with S-Tag only are forwarded unchanged to the destination ENNI except the S tag, which may change. The CE-VLAN ID Preservation attribute has a value of Yes for that OVC and all OVC UNI's CE-VLAN IDs map to that OVC. (Row 8 of Table 5 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", Number of ENNI OVC End Points > 1, All OVC UNI's CE-VLAN IDs map to the OVC = "Yes", Untagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits single S-tagged test frames mapped to OVC35 at ENNI1: destination MAC addresses are emulated behind ENNI2.
Expected Results	All test frames are received at ENNI2 or UNI7: ENNI frames are single-tagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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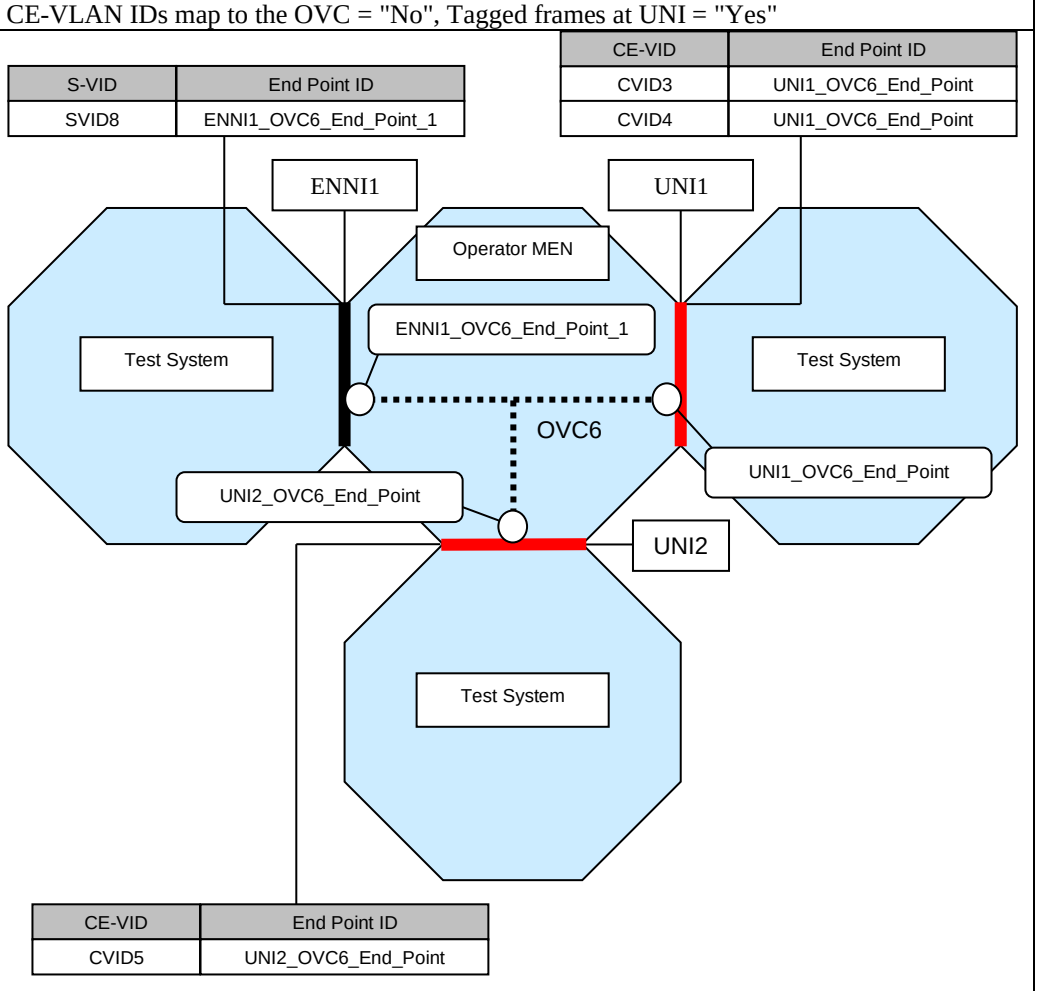
8.9 CE-VLAN ID Preservation for C-tagged Service Frames – Not All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R36.1
Reference Document Source	MEF 26, R36
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and not all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationships between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 6 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for Service Frames if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and not all OVC UNI's CE-VLAN IDs map to that OVC. (Rows 1 and 2 of Table 6 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", Number of UNI OVC End Points > 1, All OVC UNI's CE-VLAN IDs map to the OVC = "No", Tagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits C-tagged broadcast test frames at UNI1 that are mapped to OVC6.
Expected Results	All test frames are received at UNI2, preserving the original CE-VLAN ID. All test frames are received at ENNI1 with the original CE-VLAN ID preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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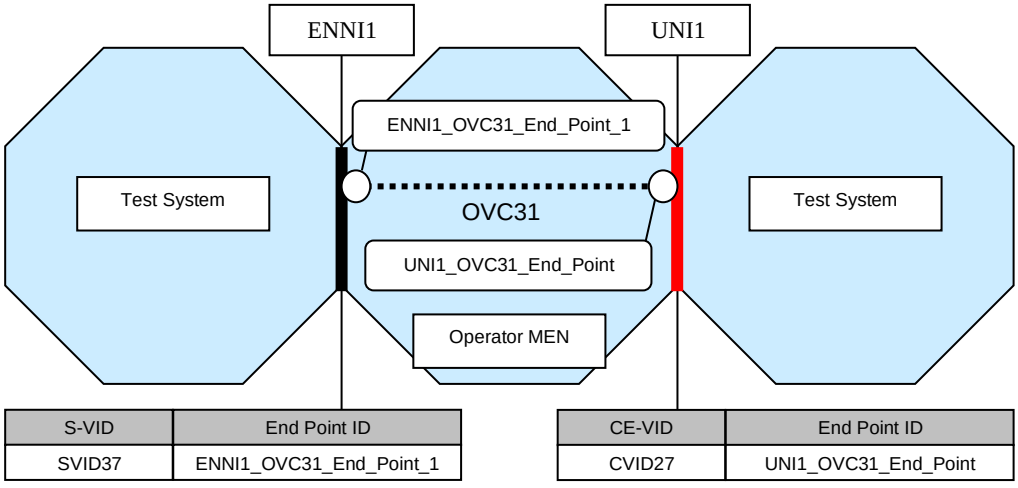
8.10 CE-VLAN ID Preservation for C-tagged Service Frames – Not All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R36.2
Reference Document Source	MEF 26, R36
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and not all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationships between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 6 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and not all OVC UNI's CE-VLAN IDs map to that OVC. (Row 2 of Table 6 of [MEF 26], alternative test case for point-to-point OVCs)
Conditions	CE-VLAN ID Preservation = "Yes", , All OVC UNI's CE-VLAN IDs map to the OVC = "No", Tagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID37 — End Point ID: ENNI1_OVC31_End_Point_1 CE-VID: CVID27 — End Point ID: UNI1_OVC31_End_Point
Test Procedure	Tester transmits C-tagged test frames at UNI1
Expected Results	All test frames are received at ENNI1: frames are double-tagged, original CE-VLAN ID is preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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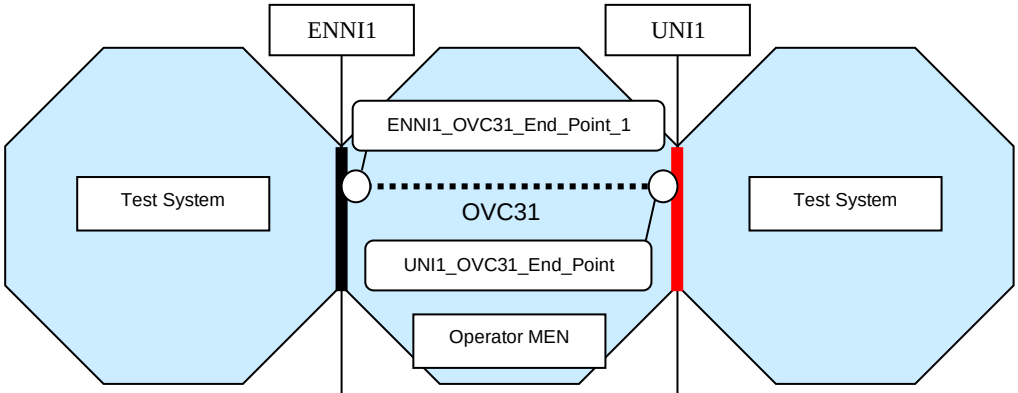
8.11 CE-VLAN ID Preservation for ENNI Frames – Not All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R36.3
Reference Document Source	MEF 26, R36
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and not all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationships between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 6 of [MEF 26].
Test Purpose	Verify that the ENNI Frames are forwarded to the UNI after the S-Tag was deleted. The CE-VLAN ID Preservation attribute has a value of Yes for that OVC and not all OVC UNI's CE-VLAN IDs map to that OVC. (Row 3 of Table 6 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", , All OVC UNI's CE-VLAN IDs map to the OVC = "No", Tagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID37 — End Point ID: ENNI1_OVC31_End_Point_1 CE-VID: CVID27 — End Point ID: UNI1_OVC31_End_Point
Test Procedure	Tester transmits double-tagged test frames at ENNI1 that are mapped to OVC31 with CVID 27, destination MAC addresses are emulated behind UNI1.
Expected Results	C-Tag test frames are received at UNI1: original CE-VLAN ID is preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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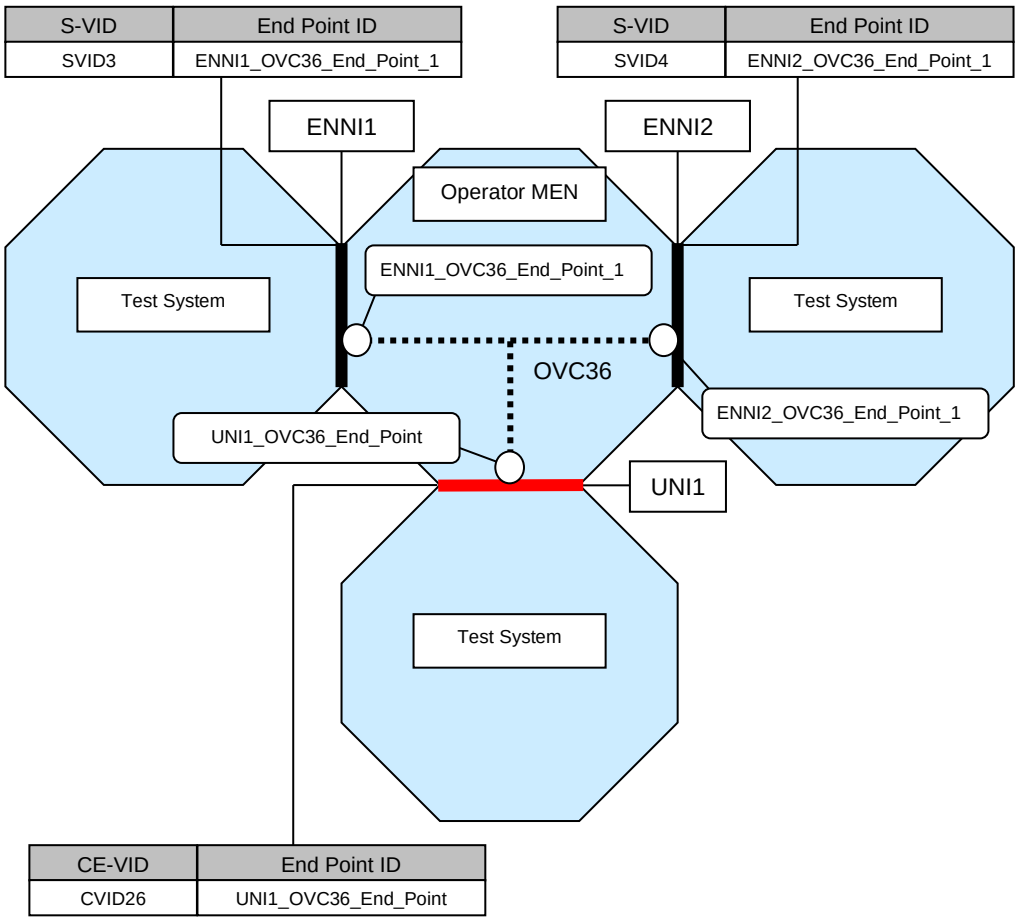
8.12 CE-VLAN ID Preservation for ENNI frames – Not All OVC UNI's CE-VLAN IDs Map to the OVC

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R36.4
Reference Document Source	MEF 26, R36
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and not all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of [MEF 26]), then the relationships between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 6 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for ENNI frames if CE-VLAN ID Preservation attribute has a value of Yes for that OVC and not all OVC UNI's CE-VLAN IDs map to that OVC. (Row 4 of Table 6 of [MEF 26])
Features	CE-VLAN ID Preservation = "Yes", Number of ENNI OVC End Points > 1, All OVC UNI's CE-VLAN IDs map to the OVC = "No", Tagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits double-tagged test frames mapped to OVC36 at ENNI1: with C-VLAN ID is set to values from CVID1 to CVID30, destination MAC addresses are emulated behind ENNI2.
Expected Results	All test frames are received at their destination ENNIs: frames are double-tagged, with original CE-VLAN ID preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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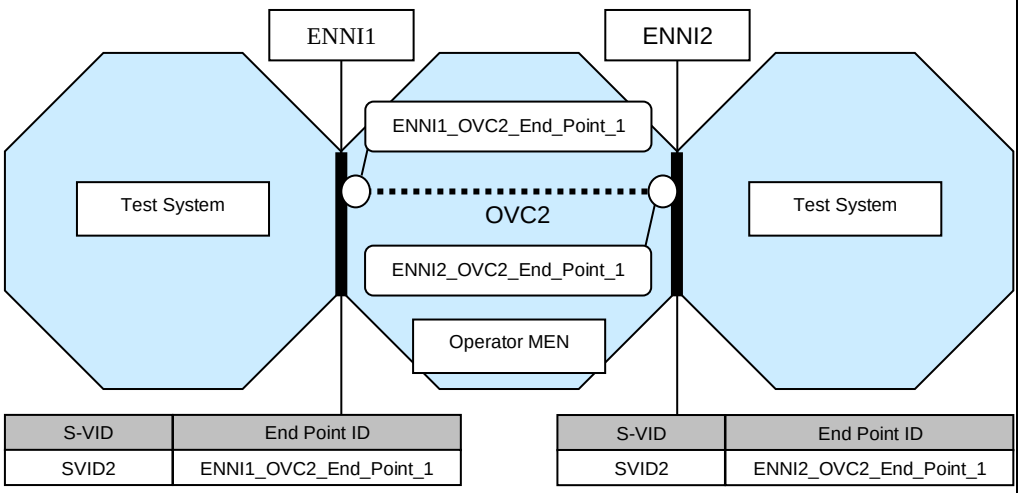
8.13 CE-VLAN ID Preservation for ENNI frames With C- and S-Tag – OVC Without UNI End Points

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R37.1
Reference Document Source	MEF 26, R37
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and none of the End Points associated by the OVC are at UNIs, then the relationships between the format of the frame at the ingress ENNI and the corresponding frame at the egress ENNI MUST be as specified in Table 7 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for double-tagged frames of OVC without End Points at UNIs if CE-VLAN ID Preservation attribute has a value of Yes for that OVC. (Row 1 of Table 7 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", Number of UNI OVC End Points = 0, Number of ENNIs > 1
Test Topology/OVC	
Test Procedure	Tester transmits double-tagged test frames at ENNI1 that are mapped to OVC2.
Expected Results	All test frames are received at ENNI2: frames are double-tagged, original CE-VLAN ID is preserved.
Verdict	PASS, FAIL, or INCONCLUSIVE

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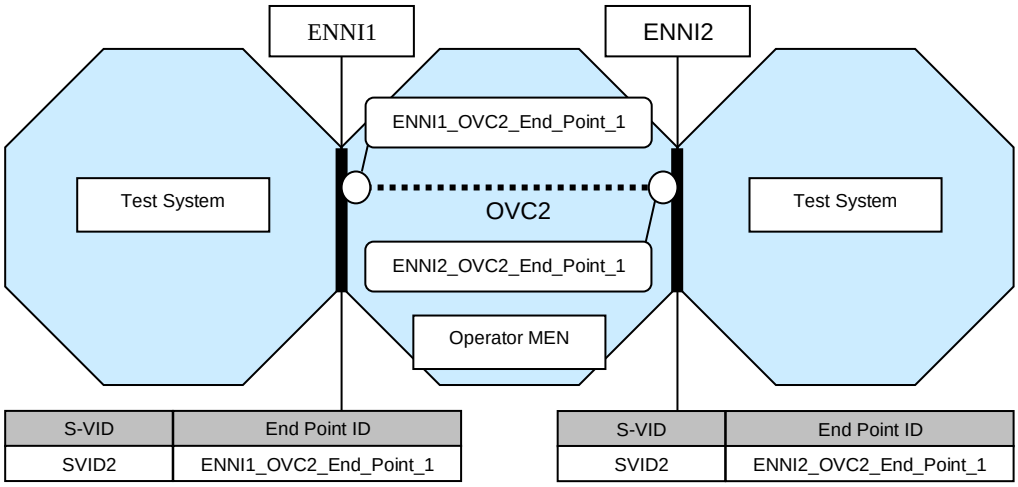
8.14 CE-VLAN ID Preservation for ENNI frames With S-Tag Only – OVC Without UNI End Points

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES.R37.2
Reference Document Source	MEF 26, R37
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and none of the End Points associated by the OVC are at UNIs, then the relationships between the format of the frame at the ingress ENNI and the corresponding frame at the egress ENNI MUST be as specified in Table 7 of [MEF 26].
Test Purpose	Verify that CE-VLAN ID is preserved for frames without C-tag for an OVC without End Points at UNIs if CE-VLAN ID Preservation attribute has a value of Yes for that OVC. (Row 2 of Table 7 of [MEF 26])
Conditions	CE-VLAN ID Preservation = "Yes", Number of UNI OVC End Points = 0, Number of ENNIs > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits single S-tagged test frames at ENNI1 that are mapped to OVC2.
Expected Results	test frames are received at ENNI2 single S-tagged.
Verdict	PASS, FAIL, or INCONCLUSIVE

9 Test Group: CE-VLAN CoS Preservation

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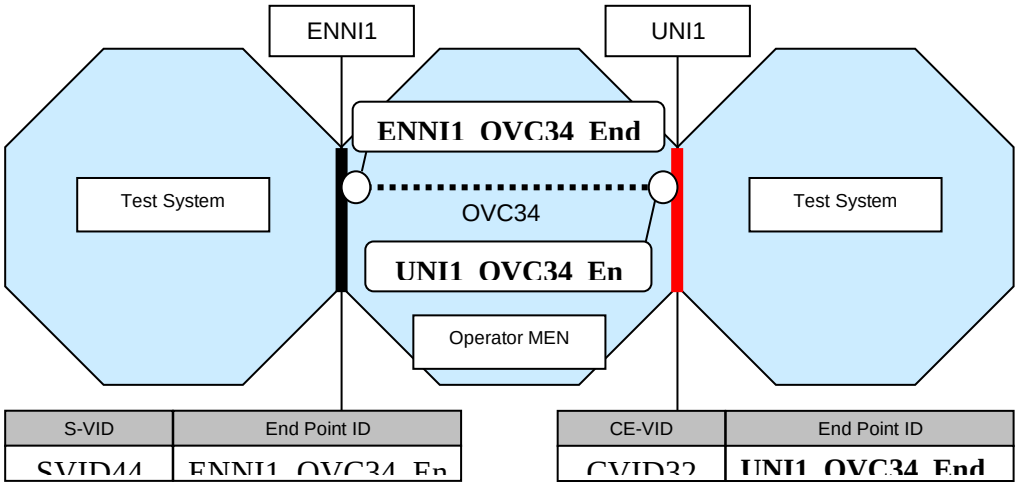
9.1 CE-VLAN CoS Preservation for ENNI Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES. R38.1
Reference Document Source	MEF 26, R38
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN CoS Preservation attribute with a value of Yes the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 8 of [MEF 26].
Test Purpose	Verify that the ENNI Frames are forwarded to the UNI with unchanged CE-VLAN CoS field if CE-VLAN CoS preservation is enabled for that OVC. (Row 3 of Table 8 of [MEF 26])
Conditions	CE-VLAN CoS preservation = "Yes", Tagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits double-tagged test frames at ENNI1 that are mapped to OVC34 with CE VLAN CoS set to values from 0 to 7.
Expected Results	All test frames are received at UNI1, mapped to OVC34: frames are C-tagged, each CE VLAN CoS is received unchanged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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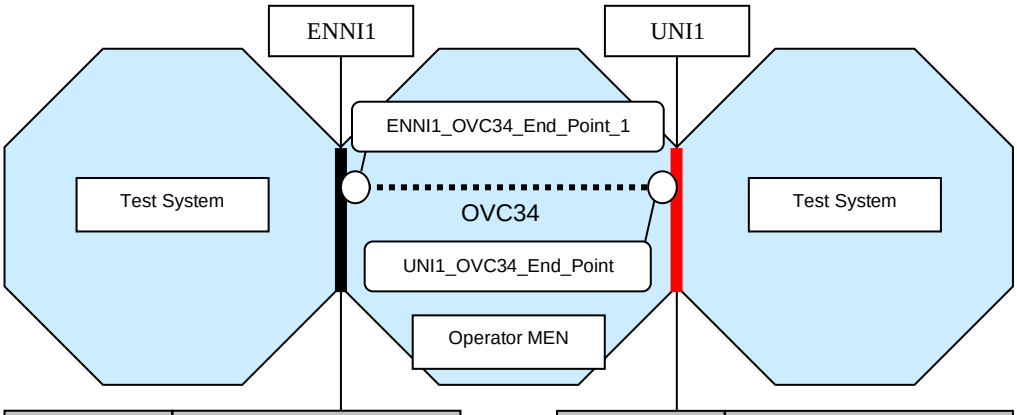
9.2 CE-VLAN CoS Preservation for C-tagged Service Frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES. R38.2
Reference Document Source	MEF 26, R38
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN CoS Preservation attribute with a value of Yes the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 8 of [MEF 26].
Test Purpose	Verify that the Service Frames are forwarded to their destination ENNIs with unchanged CE-VLAN CoS field if CE-VLAN CoS preservation is enabled for that OVC. (Row 2 of Table 8 of [MEF 26])
Conditions	CE-VLAN CoS preservation = "Yes", , Tagged frames at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID44; End Point ID: ENNI1_OVC34_End_Point_1 CE-VID: CVID32; End Point ID: UNI1_OVC34_End_Point
Test Procedure	Tester transmits C-tagged test frames at UNI1 that are mapped to OVC34 with CE VLAN CoS values of 0 to 7.
Expected Results	All test frames are received at ENNI1, mapped to OVC34: frames are double-tagged, CE-VLAN CoS values are unchanged.
Verdict	PASS, FAIL, or INCONCLUSIVE

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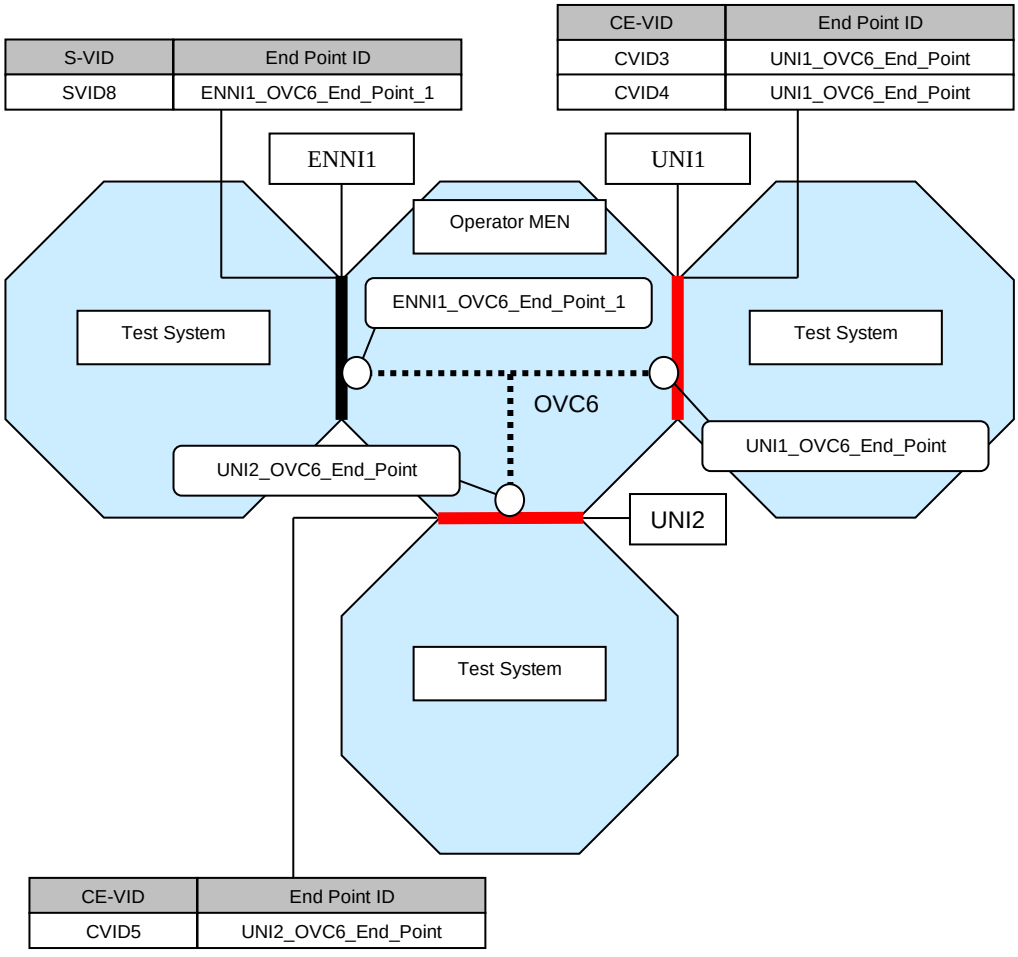
9.3 CE-VLAN CoS Preservation for C-Tagged Service Frames to UNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES. R38.3
Reference Document Source	MEF 26, R38
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN CoS Preservation attribute with a value of Yes the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 8 of [MEF 26].
Test Purpose	Verify that the Service Frames are forwarded to their destination UNIs with unchanged CE-VLAN CoS field if CE-VLAN CoS preservation is enabled for that OVC. (Row 1 of Table 8 of [MEF 26])
Conditions	CE-VLAN CoS preservation = "Yes", Number of UNI OVC End Points > 1, Tagged frames at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits C-tagged broadcast test frames at UNI1 that are mapped to OVC6 with CE VLAN CoS values of 0 to 7.
Expected Results	All test frames are received at UNI2: CE VLAN CoS values are unchanged. NOTE: Test frames are received at ENNI1. This test is only focused on UNI1 to UNI2 functionality.
Verdict	PASS, FAIL, or INCONCLUSIVE

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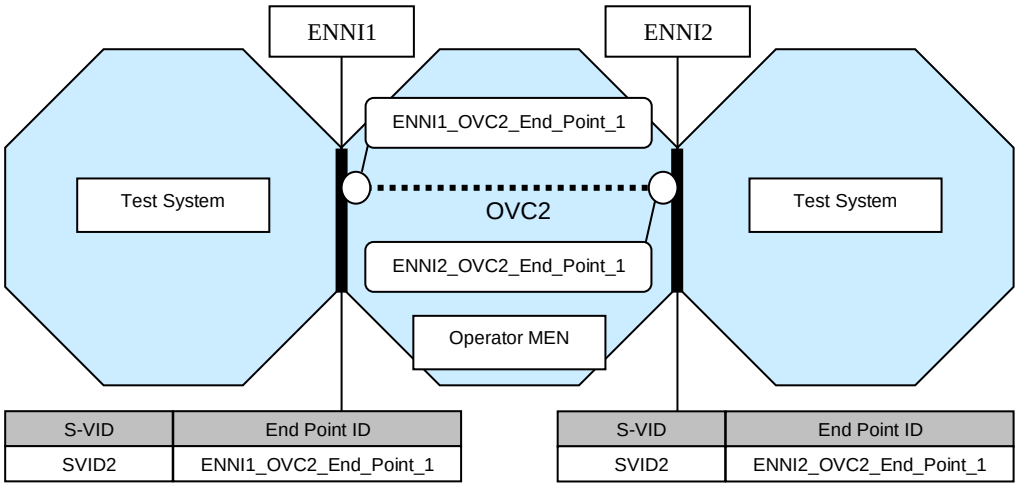
9.4 CE-VLAN CoS Preservation for ENNI frames

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	OVC_ATTRIBUTES. R38.4
Reference Document Source	MEF 26, R38
Test Status	Conditional Mandatory
Requirement	When an OVC has the CE-VLAN CoS Preservation attribute with a value of Yes the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 8 of [MEF 26].
Test Purpose	Verify that the ENNI frames are forwarded to their destination ENNIs with unchanged CE-VLAN CoS field if CE-VLAN CoS preservation is enabled for that OVC. (Row 4 of Table 8 of [MEF 26])
Conditions	CE-VLAN CoS preservation = "Yes", Number of ENNI OVC End Points > 1
Test Topology/OVC	 S-VID: SVID2 — End Point ID: ENNI1_OVC2_End_Point_1 S-VID: SVID2 — End Point ID: ENNI2_OVC2_End_Point_1
Test Procedure	Tester transmits double-tagged test frames at ENNI1 that are mapped to OVC2 with CE VLAN CoS values of 0 to 7.
Expected Results	All test frames are received at ENNI2: frames are double-tagged with CE-VLAN CoS values unchanged.
Verdict	PASS, FAIL, or INCONCLUSIVE

10 Test Group: Color Forwarding

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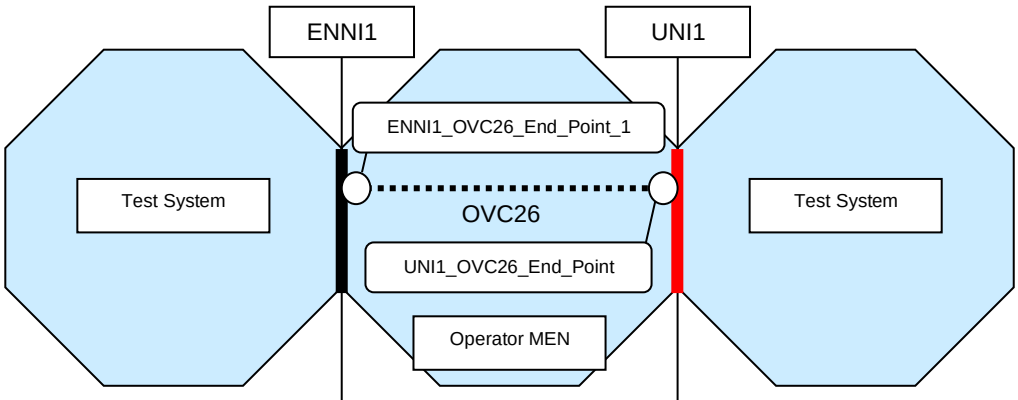
10.1 Yellow Color Declaration by UNI Ingress BWP, ENNI Yellow Color Indication by S-VLAN PCP

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.1
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames are mapped to an UNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously declared Yellow by an Ingress Bandwidth Profile associated with that OVC at UNI • The Color Forwarding is enabled for that OVC • S-Tag PCP color indication is enabled at egress ENNI for the OVC
Conditions	Color Forwarding = "Yes", S-Tag PCP Color Indication = "Yes", Ingress Bandwidth profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID30 — End Point ID: ENNI1_OVC26_End_Point_1 CE-VID: CVID23 — End Point ID: UNI1_OVC26_End_Point
Test Procedure	Tester transmits test frames mapped to OVC26 at UNI1 per CoS: the information rate is set to (1.0 - ToleranceFactor)*CIR1 + 0.5*EIR1, the CoS ID of all frames is set to UNI_Green_CoS1_IDs.
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is at least (1.0 - ToleranceFactor)*CIR1.

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	Larger than zero test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs, information rate is 0.5*EIR1.or less
Verdict	PASS, FAIL, or INCONCLUSIVE

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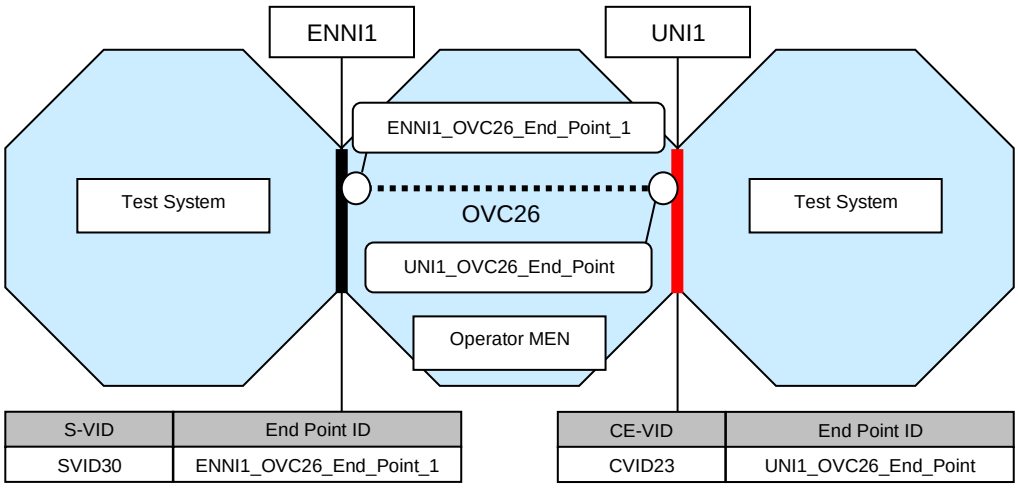
10.2 Yellow Color Declaration by UNI Ingress BWP, ENNI Yellow Color Indication by S-VLAN DEI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.2
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an UNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously declared Yellow by the OVC Ingress Bandwidth Profile at UNI • The Color Forwarding and S-Tag DEI color indication are enabled at egress ENNI for the OVC
Conditions	, Color Forwarding = "Yes", DEI Color Indication = "Yes", Ingress Bandwidth profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC26 at UNI1 per CoS: the information rate is set to (1.0 - ToleranceFactor)*CIR1 + 0.5*EIR1, the CoS ID of all frames is set to UNI_Green_CoS1_IDs..
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information

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	rate is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs, information rate is 0.5*EIR1 or less.
Verdict	PASS, FAIL, or INCONCLUSIVE

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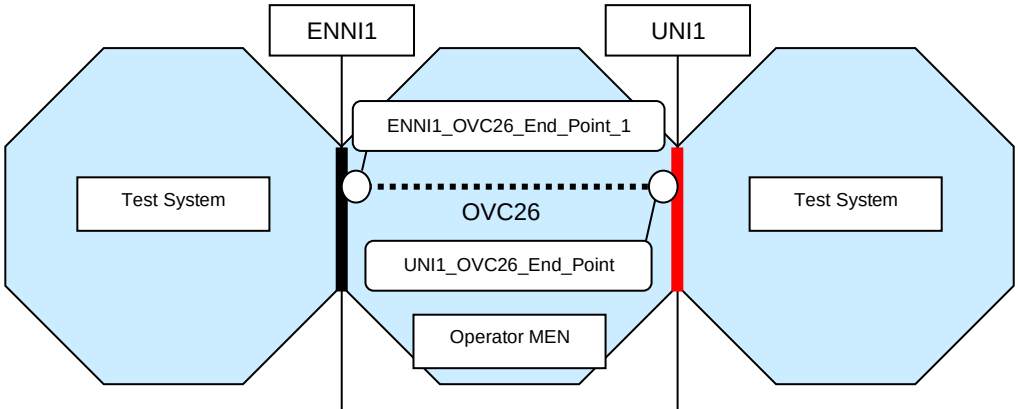
10.3 Yellow Ingress Frames at UNI, ENNI Yellow Color Indication by S-VLAN PCP

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.3
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an UNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress UNI • The Color Forwarding and S-Tag PCP color indication are enabled at egress ENNI for the OVC
Conditions	, Color Forwarding = "Yes", S-Tag PCP Color Indication = "Yes", Ingress Bandwidth profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID30 — End Point ID: ENNI1_OVC26_End_Point_1 CE-VID: CVID23 — End Point ID: UNI1_OVC26_End_Point
Test Procedure	Tester transmits test frames mapped to OVC26 at UNI1 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to UNI_Yellow_CoS1_IDs
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs.
Verdict	PASS, FAIL, or INCONCLUSIVE

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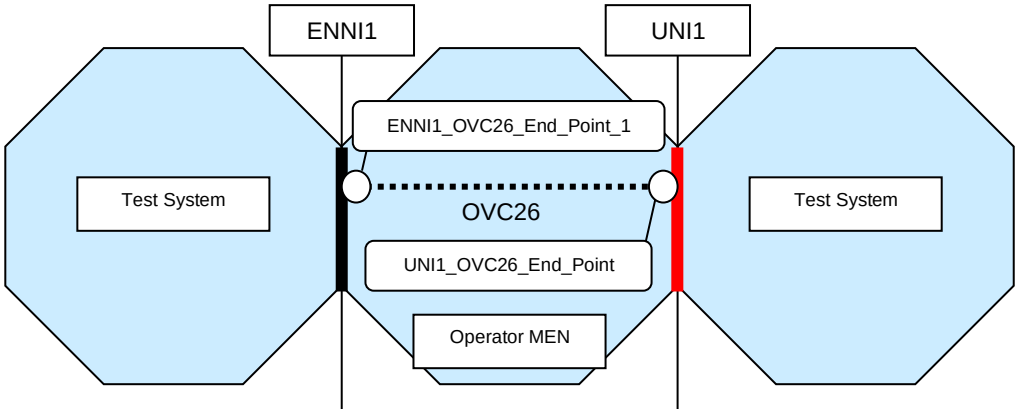
10.4 Yellow Ingress Frames at UNI, ENNI Yellow Color Indication by S-VLAN DEI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.4
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an UNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress UNI • The Color Forwarding and S-Tag DEI color indication are enabled at egress ENNI for the OVC
Conditions	, Color Forwarding = "Yes", DEI Color Indication = "Yes", Ingress Bandwidth profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID30 — End Point ID: ENNI1_OVC26_End_Point_1 CE-VID: CVID23 — End Point ID: UNI1_OVC26_End_Point
Test Procedure	Tester transmits test frames mapped to OVC26 at UNI1 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to UNI_Yellow_CoS1_IDs.
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs.
Verdict	PASS, FAIL, or INCONCLUSIVE

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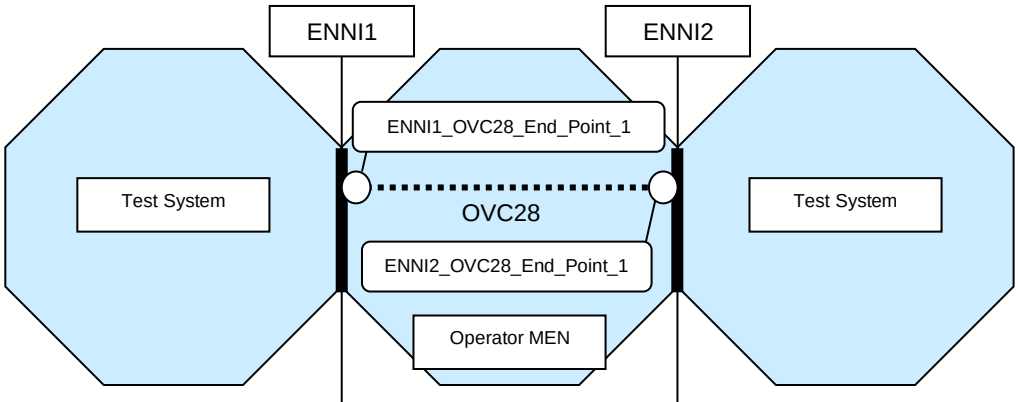
10.5 Yellow Color Declaration by ENNI Ingress BWP, ENNI Yellow Color Indication by S-VLAN PCP

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.5
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously declared Yellow by the OVC Ingress Bandwidth Profile at ENNI • The Color Forwarding and S-Tag PCP color indication are enabled at egress ENNI for the OVC
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1: S-Tag PCP Color Indication = "Yes", ENNI2: Ingress Bandwidth profile perClass of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID32 — End Point ID: ENNI1_OVC28_End_Point_1 S-VID: SVID33 — End Point ID: ENNI2_OVC28_End_Point_1
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to (10 - ToleranceFactor)*CIR1 + 0.5*EIR1, the CoS ID of all frames is set to ENNI_Green_CoS1_IDs.
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information

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	rate is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs, information rate is 0.5*EIR1 or less.
Verdict	PASS, FAIL, or INCONCLUSIVE

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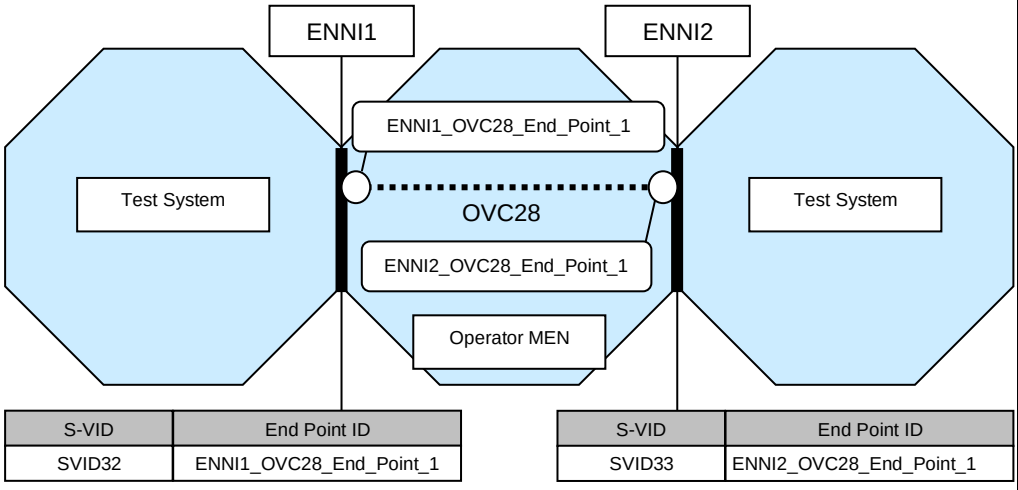
10.6 Yellow Color Declaration by ENNI Ingress BWP, ENNI Yellow Color Indication by S-VLAN DEI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.6
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously declared Yellow by the OVC Ingress Bandwidth Profile at ENNI • The Color Forwarding and the S-Tag DEI color indication are enabled at the egress ENNI for the OVC
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1: DEI Color Indication = "Yes", ENNI2: Ingress Bandwidth profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID32 — End Point ID: ENNI1_OVC28_End_Point_1 S-VID: SVID33 — End Point ID: ENNI2_OVC28_End_Point_1
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to (1.0 - ToleranceFactor)*CIR1 + 0.5*EIR1, the CoS ID is set to ENNI_Green_CoS1_IDs.
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is at least (1.0 - ToleranceFactor)*CIR1.

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	More than zero test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs, information rate is 0.5 * EIR1 or less.
Verdict	PASS, FAIL, or INCONCLUSIVE

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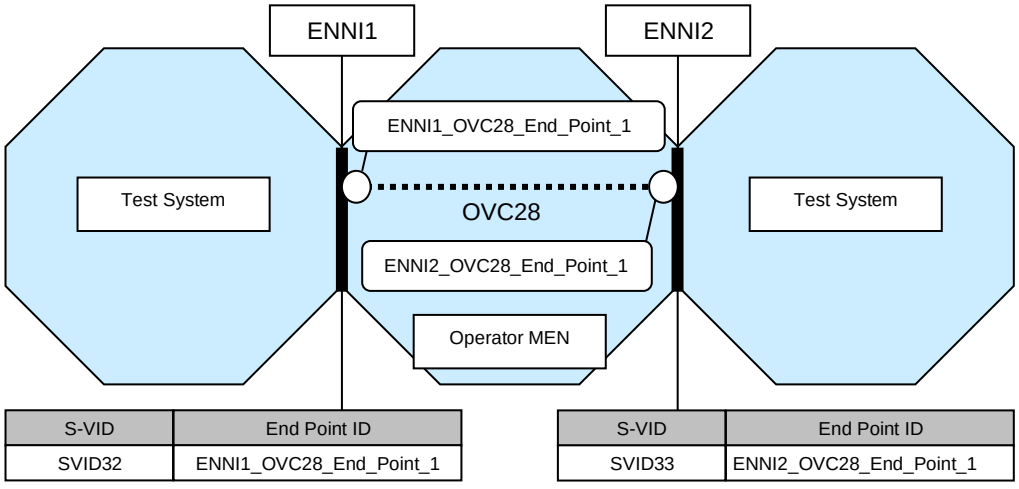
10.7 Yellow Ingress Frames at ENNI, Yellow Color Indication by S-VLAN PCP at Ingress and Egress ENNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.6
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress ENNI • The Color Forwarding and the S-Tag PCP color indication are enabled at the ingress and egress ENNIs for the OVC
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1 & ENNI2: S-Tag PCP Color Indication = "Yes", ENNI2: Ingress Bandwidth profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs.
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs.
Verdict	PASS, FAIL, or INCONCLUSIVE

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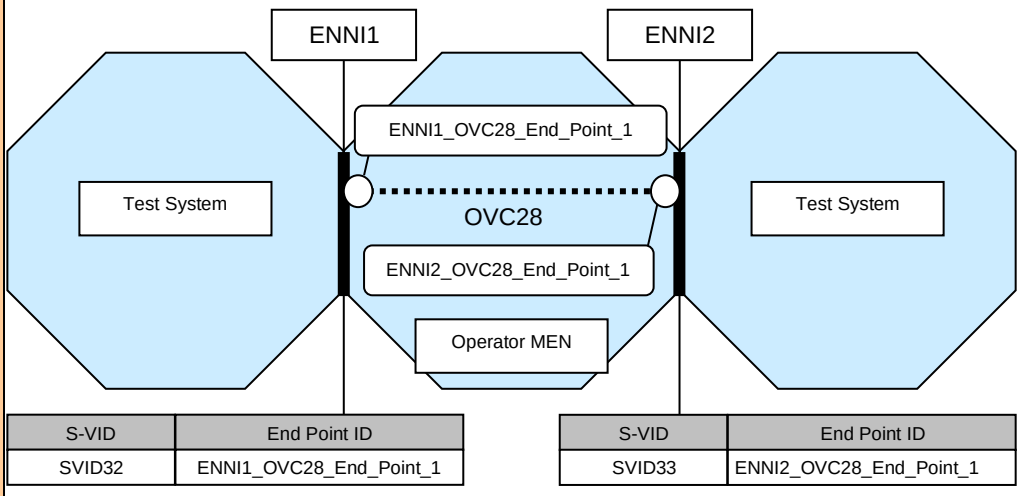
10.8 Yellow Ingress Frames at ENNI, Yellow Color Indication by S-VLAN DEI at Ingress and Egress ENNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.6
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress ENNI • The Color Forwarding and the S-Tag DEI color indication are enabled at the ingress and egress ENNIs for the OVC
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1 & ENNI2: DEI Color Indication = "Yes", ENNI2: Ingress Bandwidth profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs.
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs.
Verdict	PASS, FAIL, or INCONCLUSIVE

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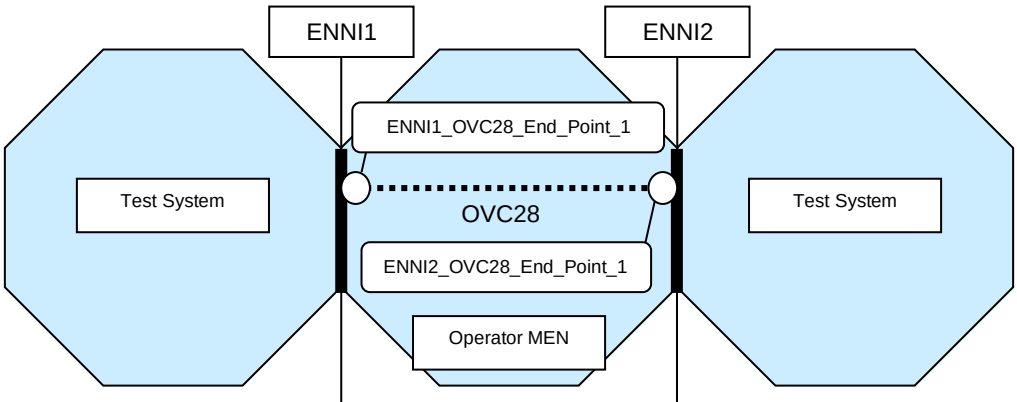
10.9 Yellow Ingress Frames at ENNI, Yellow Color Indication by S-VLAN PCP at Ingress and by S-VLAN DEI at Egress ENNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.6
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress ENNI • The following OVC attributes are enabled: the Color Forwarding, the S-Tag PCP color indication at the ingress ENNI, and the S-Tag DEI color indication at the egress ENNI
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1: DEI Color Indication = "Yes", ENNI2: S-Tag PCP Color Indication = "Yes", ENNI2: Ingress Bandwidth profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs.
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs.

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Verdict	PASS, FAIL, or INCONCLUSIVE

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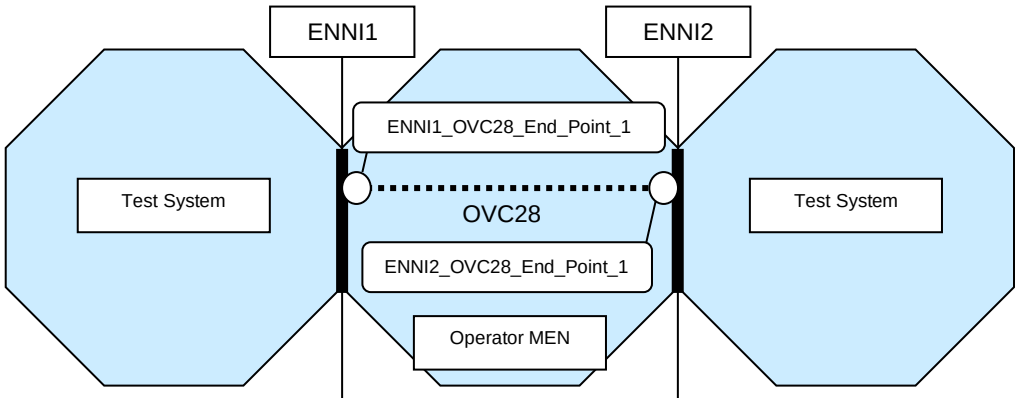
10.10 Yellow Ingress Frames at ENNI, Yellow Color Indication by S-VLAN DEI at Ingress and by S-VLAN PCP at Egress ENNI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	COLOR_FORWARDING. R43.6
Reference Document Source	MEF 26, R43
Test Status	Conditional Mandatory
Requirement	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.
Test Purpose	Verify that each egress ENNI Frame is marked Yellow, if the following conditions are fulfilled: • The egress ENNI Frames were mapped to an ENNI OVC End Point associated by an OVC, • The egress ENNI Frames were previously indicated Yellow at the ingress ENNI • The following OVC attributes are enabled: the Color Forwarding, the S-Tag DEI color indication at the ingress ENNI, and the S-Tag PCP color indication at the egress ENNI
Conditions	Number of ENNI OVC End Points > 1, Color Forwarding = "Yes", ENNI1: DEI Color Indication = "Yes", ENNI2: S-Tag PCP Color Indication = "Yes", ENNI1: Ingress Bandwidth profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID32 — End Point ID: ENNI1_OVC28_End_Point_1 S-VID: SVID33 — End Point ID: ENNI2_OVC28_End_Point_1
Test Procedure	Tester transmits test frames mapped to OVC28 at ENNI2 per CoS: the information rate is set to 0.5*EIR1, the CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs.
Expected Results	All test frames are received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs.

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Verdict	PASS, FAIL, or INCONCLUSIVE

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11 Test Group: Class of Service Identifier

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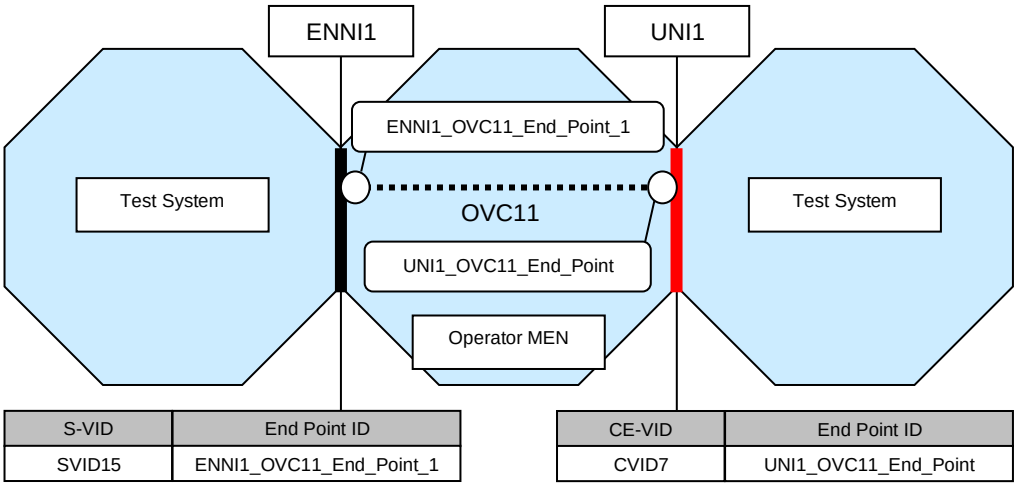
11.1 S-Tag PCP Value's for Class of Service Identifiers Attribute in Exactly one Class of Service Identifier

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	STANDARD_COS.R52
Reference Document Source	MEF 26, R52
Test Status	Mandatory
Requirement	For each OVC End Point at an ENNI, each possible S-Tag PCP value **MUST** be included in exactly one Class of Service Identifier
Test Purpose	Verify that at each OVC End Point the set of S-Tag PCP values of Class of Service Identifier attribute is disjoint and their union content all possible S-Tag PCP values.
Conditions	Number of ENNI CoS > 1, Classifying based on S-Tag PCP = "Yes", Discard CoS at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID15 — End Point ID: ENNI1_OVC11_End_Point_1 CE-VID: CVID7 — End Point ID: UNI1_OVC11_End_Point
Test Procedure	Tester transmits S-Tagged test frames mapped to OVC11 at ENNI1: S-Tag PCP is set to each of the values 0 ("BestEffort"), 1, 2, 3, 4, 5, 6 and 7 ("Discard").
Expected Results	All test frames transmitted with S-Tag PCP value 0 are received at UNI1 and mapped to OVC11 Test frames transmitted with any other S-Tag PCP value are not received at any External Interface.
Verdict	PASS, FAIL, or INCONCLUSIVE

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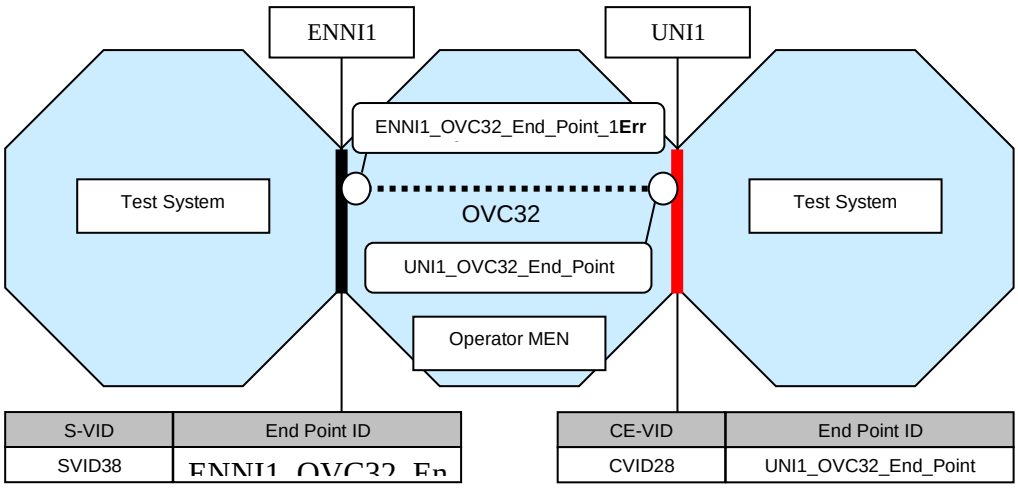
11.2 Color Indication at ENNI with S-Tag PCP Value

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	STANDARD_COS.R54.1
Reference Document Source	MEF 26, R54
Test Status	Mandatory
Requirement	Color indication for each ENNI Frame MUST conform to requirements [R3] and [R4] of MEF 23 [MEF 23].
Test Purpose	Verify that the color of an Egress frame is indicated using S-Tag PCP value, if S-Tag PCP color indication is enabled at the ENNI.
Conditions	S-Tag PCP Color Indication = "Yes", Number of UNIs > 0,:Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC32 at UNI1 per CoS: the information rate is set to (1.0 - ToleranceFactor)*CIR1 + 0.5*EIR1, the CoS ID of all frames is set to UNI_Green_CoS1_IDs
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames received at ENNI1: CoS ID is set to ENNI_Yellow_PCP_CoS1_IDs, information rate is 0.5*EIR1 or less
Verdict	PASS, FAIL, or INCONCLUSIVE

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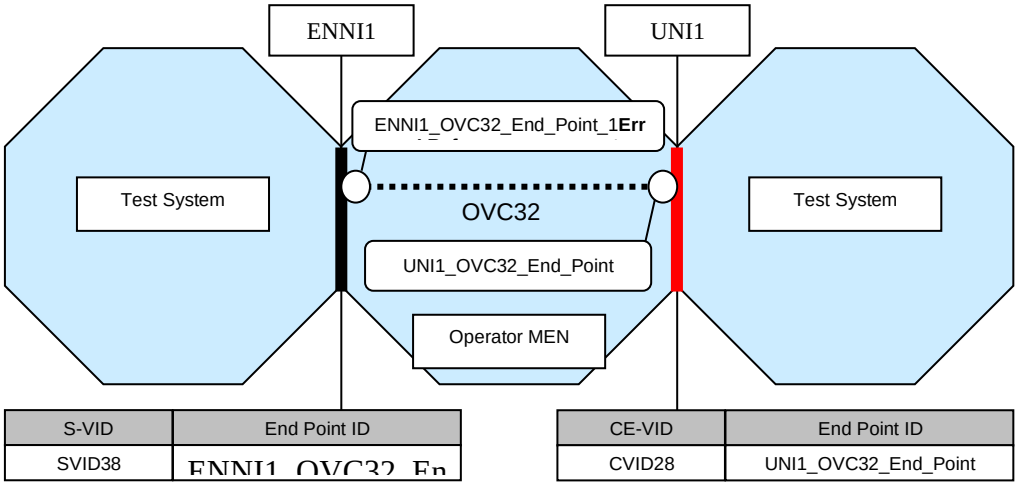
11.3 Color Indication at ENNI with S-Tag DEI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	STANDARD_COS.R54.2
Reference Document Source	MEF 26, R54
Test Status	Conditional Mandatory
Requirement	Color indication for each ENNI Frame MUST conform to requirements [R3] and [R4] of MEF 23 [MEF 23].
Test Purpose	Verify that the color of an Egress frame is indicated using S-Tag DEI value, if DEI color indication is enabled at the ENNI.
Conditions	DEI Color Indication = "Yes", Number of UNIs > 0, Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	Tester transmits test frames mapped to OVC32 at UNI1 per CoS: the information rate is set to (1.0 - ToleranceFactor) *CIR1 + 0.5*EIR1 , the CoS ID of all frames is set to UNI_Green_CoS1_IDs
Expected Results	Test frames are received at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames received at ENNI1: CoS ID is set to ENNI_Yellow_DEI_CoS1_IDs, information rate is 0.5*EIR1 or less.
Verdict	PASS, FAIL, or INCONCLUSIVE

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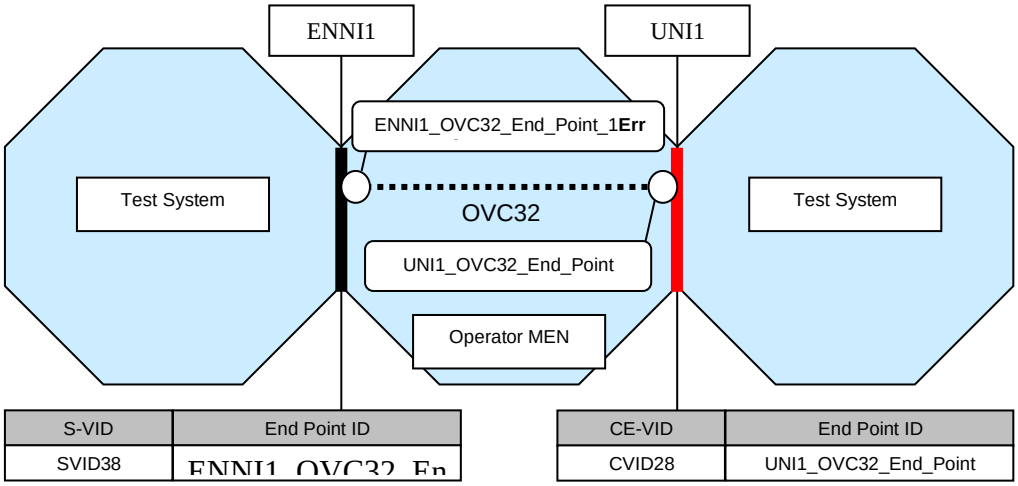
11.4 S-Tag PCP Mapping for MEF 23 CoS Label, Color Indication with S-Tag PCP

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	STANDARD_COS.R55
Reference Document Source	MEF 26, R55
Test Status	Mandatory
Requirement	If the S-Tag PCP field is used to indicate Color for the ENNI Frame, then the Class of Services attribute MUST map S-Tag PCP values to L, M, and H as per [R8] of MEF 23 [MEF 23].
Test Purpose	Verify that the PCP values are indicating L, M, and H classes as specified by table 2 column "color Green or Color Yellow" of MEF 23 and the S-Tag PCP is used to identify the color.
Conditions	S-Tag PCP Color Indication = "Yes" Number of UNIs > 0: UNI1: Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	For each PCP value tester transmits test frames mapped to OVC32 at UNI1sequentially: CoS ID is set to UNI_Green_CoS1_IDs , information rate is set to (1.0 - ToleranceFactor) * CIR1 + EIR1
Expected Results	Test frames are received at ENNI1 and at least one of the following condition must be fulfilled: • For frames with S-Tag PCP set to 1, the information rate is at least (1.0 - ToleranceFactor) * CIR1 and for frames with S-Tag PCP set to 0, the information rate is larger than zero and up to EIR1. • For frames with S-Tag PCP set to 3, the information rate is at least (1.0 - ToleranceFactor) * CIR1 and for frames with S-Tag PCP set to 2, the information rate is larger than zero and up to EIR1. • For frames with S-Tag PCP set to 5, the information rate is (1.0 - ToleranceFactor) * CIR1
Verdict	PASS, FAIL, or INCONCLUSIVE

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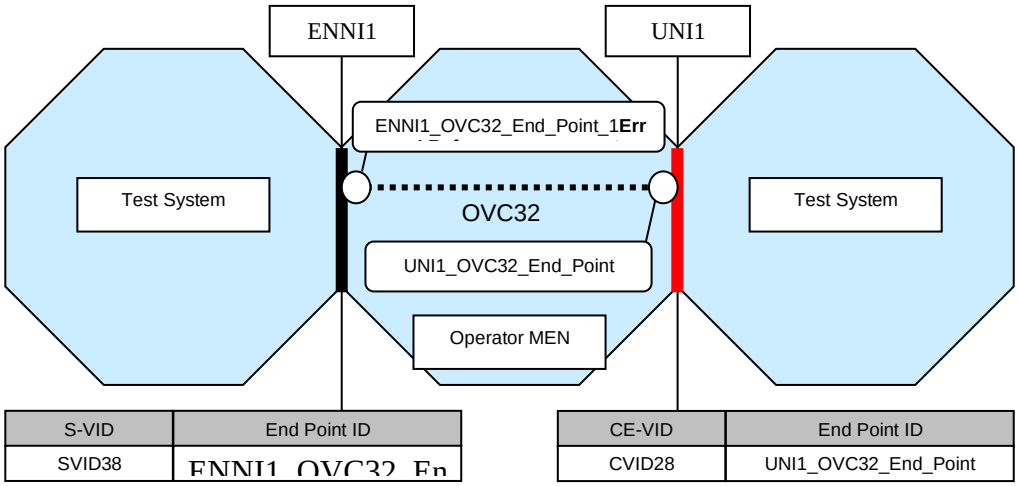
11.5 S-Tag PCP Mapping for MEF CoS Label, Color Indication with DEI

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	STANDARD_COS.R56
Reference Document Source	MEF 26, R56
Test Status	Conditional Mandatory
Requirement	If the DEI bit is used to indicate Color for the ENNI Frame, then the Class of Services attribute MUST map S-Tag PCP values to L, M, and H as per [R9] of MEF 23 [MEF 23].
Test Purpose	Verify that the PCP values are indicating L, M, and H classes as specified by table 2 column "CoS w/DEI Green or Color Yellow" of MEF 23 and the DEI is used to identify the color. Verify that the PCP value is mapped to MEF 23 CoS Label as per the table 2 column labeled CoS w/DEI if the DEI bit is used to indicate color
Conditions	DEI Color Indication = "Yes" Number of UNIs > 0, Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	For each PCP value tester transmits test frames mapped to OVC32 at UNI1 sequentially: CoS ID is set to UNI_Green_CoS1_IDs , information rate is set to (1.0 - ToleranceFactor) * CIR1 + EIR1
Expected Results	Test frames are received at ENNIs and at least one of the following condition must be fulfilled: • For frames with S-Tag PCP set to 1 and DEI bit set to 0, the information rate is at least (1.0 - ToleranceFactor) * CIR1 and for frames with S-Tag PCP set to 1 and DEI bit set to 1, the information rate larger than zero and up to EIR1. • For frames with S-Tag PCP set to 3 and DEI bit set to 0, the information rate is at least (1.0 - ToleranceFactor) *CIR1 and for frames with S-Tag PCP set to 3 and DEI bit set to 1, the information rate is larger than zero and up to EIR1. • For frames with S-Tag PCP set to 5 and DEI bit set to 0, the information rate is at least (1.0 - ToleranceFactor) *CIR1 and for frames with S-Tag PCP set to 5 and DEI bit set to 1, the information rate is larger than zero and up to EIR1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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12 Test Group: ENNI Ingress Bandwidth Profile per CoS

Please note that the tests of Excess Information Rate (EIR) and of Egress bandwidth profile implementations requires a controlled environment for the Operator MEN. Since there are no performance guarantees on EIR/EBS, the system under test might drop frames below EIR/EBS – which would be compliant with MEF26 but not helpful for the test purpose. Similarly, if traffic moving through the network would exhibit noticeable frame delay variation before hitting the Egress bandwidth profile, the test could not be carried out.

In the sections 12-15, the ATS assumes that the entity conducting the test is able to control congestion in the Operator MEN during the test, ensuring that the tests can be carried out according to their purposes.

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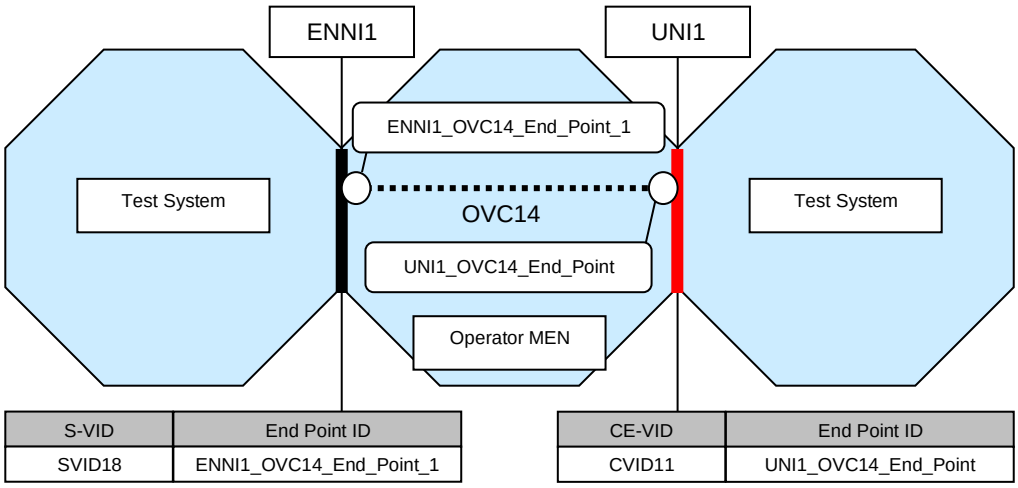
12.1 ENNI Ingress BWP per CoS with CIR>0, EIR=0, CF=0, EBS=0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_INGRESS_BWP_COS.R61.1
Reference Document Source	MEF 26, R61, R62, R82, R84, R86, R88
Test Status	Mandatory
Requirement	[R61] When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and the algorithm of Section 7.6.1 of [MEF 26] **MUST** be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. [R62] The Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R86] For a sequence of ENNI Frames, $\{t_j, l_j\}, j \geq 0, t_{j+1} \geq t_j$, with arrival times at the reference point t_j and lengths l_j, the level of compliance color assigned to each ENNI Frame **MUST** be defined according to the algorithm in Figure 10 of [MEF 26]. [R88] The disposition of each ENNI Frame for delivery to each egress External Interface **MUST** be as described in Table 11 of [MEF 26].
Test Purpose	Verify that the ENNI ingress bandwidth profile per CoS with CIR>0 and EIR=0 and CF=0 will limit the information rate of the incoming Green traffic to CIR and drop all other frames.
Conditions	Color Aware for ENNI Ingress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID18 — End Point ID: ENNI1_OVC14_End_Point_1 CE-VID: CVID11 — End Point ID: UNI1_OVC14_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0-ToleranceFactor)* CIR1 3. Tester transmits test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 1.5*CIR1 4. Tester transmits test frames A mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames B mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1 5. Tester transmits test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. A number of frames representing traffic of at least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) and at most "Flow Transmission

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	Duration" * (1 + ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. 4. All test frames A are received at UNI1. Test frames B are not received at any External Interface used in this test case. 5. Test frames are not received at any External Interface used in this test case.
Verdict	PASS, FAIL, or INCONCLUSIVE

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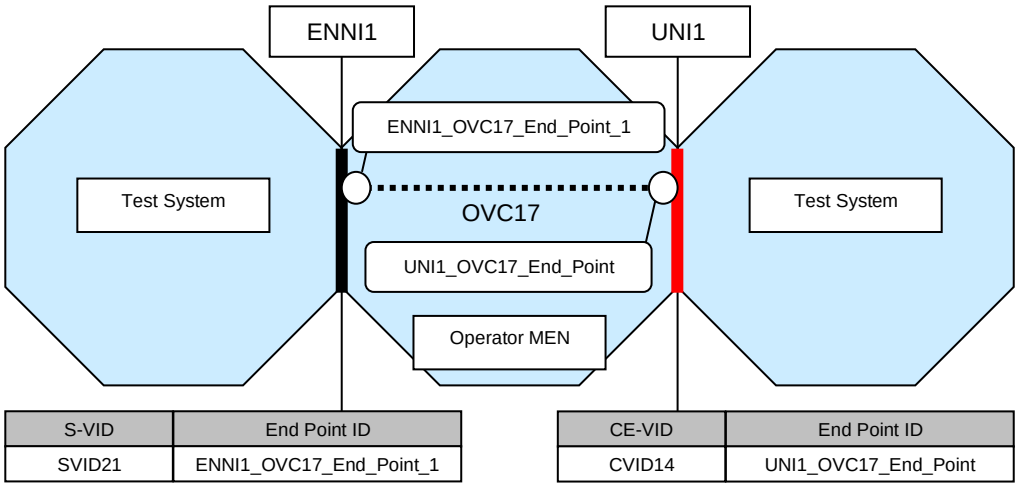
12.2 ENNI Ingress BWP per CoS with CIR=0, CBS=0, EIR>0, CF=0, EBS>0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_INGRESS_BWP_COS.R61.4
Reference Document Source	MEF 26, R61, R62, R82, R84, R86, R88
Test Status	Mandatory
Requirement	[R61] When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and the algorithm of Section 7.6.1 of [MEF 26] **MUST** be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. [R62] The Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R86] For a sequence of ENNI Frames, $\{t_j, l_j\}, j \geq 0, t_{j+1} \geq t_j$, with arrival times at the reference point t_j and lengths l_j, the level of compliance color assigned to each ENNI Frame **MUST** be defined according to the algorithm in Figure 10 of [MEF 26]. [R88] The disposition of each ENNI Frame for delivery to each egress External Interface **MUST** be as described in Table 11 of [MEF 26].
Test Purpose	Verify that the ENNI ingress bandwidth profile per CoS with CIR=0 and EIR>0, will limit the total information rate of the incoming traffic to EIR and drop any excess traffic. All green traffic must be discarded.
Conditions	Color Aware for ENNI Ingress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*EIR1 2. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1 3. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 1.5*EIR1 4. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 5. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1 6. Tester transmits test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 7. Tester transmits test frames A mapped to OVC17 at ENNI1: CoS ID is set to

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	ENNI_Green_CoS1_IDs, information rate is 0.4*EIR1. Tester transmits test frames B mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.4*EIR1 8. Tester transmits test frames A mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*EIR1. Tester transmits test frames B mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 9. Tester transmits test frames A mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.6*EIR1. Tester transmits test frames B mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.6*EIR1
Expected Results	1. No test frames are received at UNI1. 2. No test frames are received at UNI1. 3. No test frames are received at UNI1. 4. More than zero test frames are received at UNI1. 5. More than zero test frames are received at UNI1. 6. More than zero test frames are received at UNI1. 7. No test frames A are received at UNI1. More than zero test frames B are received at UNI1. 8. No test frames A are received at UNI1. More than zero test frames B are received at UNI1. 9. No test frames A are received at UNI1 More than zero test frames B are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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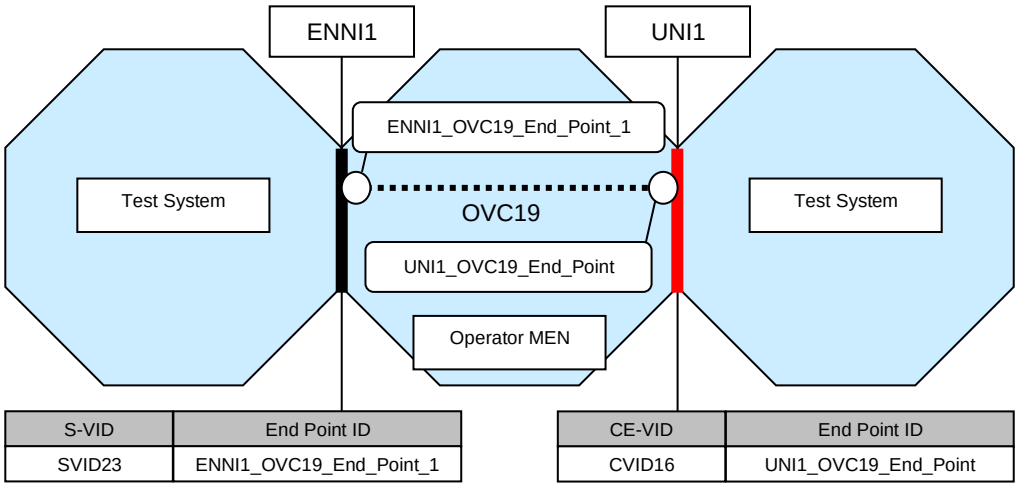
12.3 ENNI Ingress BWP per CoS with CIR>0, CBS>0, EIR>0, CF=0, EBS>0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_INGRESS_BWP_COS.R61.6
Reference Document Source	MEF 26, R61, R62, R82, R84, R86, R88
Test Status	Mandatory
Requirement	[R61] When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and the algorithm of Section 7.6.1 of [MEF 26] **MUST** be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. [R62] The Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R86] For a sequence of ENNI Frames, $\{t_j, l_j\}, j \geq 0, t_{j+1} \geq t_j$, with arrival times at the reference point t_j and lengths l_j, the level of compliance color assigned to each ENNI Frame **MUST** be defined according to the algorithm in Figure 10 of [MEF 26]. [R88] The disposition of each ENNI Frame for delivery to each egress External Interface **MUST** be as described in Table 11 of [MEF 26].
Test Purpose	Verify that the ENNI ingress bandwidth profile per CoS with CIR>0 and EIR>0, will limit the information rate of the incoming Green traffic to CIR, limit the sum of the excess Green traffic and the Yellow traffic to EIR and drop any excess traffic.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes", Color Aware for ENNI Ingress Bandwidth Profile per CoS = “Yes”
Test Topology/OVC	 S-VID: SVID23 — End Point ID: ENNI1_OVC19_End_Point_1 CE-VID: CVID16 — End Point ID: UNI1_OVC19_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1 3. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+0.5*EIR1 4. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+1.0*EIR1 5. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+1.5*EIR1

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	6. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 7. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1 8. Tester transmits test frames mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 9. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames mapped to OVC19 B at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 10. Tester transmits test frames A mapped to OVC19 A at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1. 11. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*EIR1. 12. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 13. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+0.6*EIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.6*EIR1. 14. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+1.0*EIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 15. Tester transmits test frames A mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1+1.5*EIR1. Tester transmits test frames B mapped to OVC19 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. All test frames are received at UNI1. 4. All test frames are received at UNI1. 5. Test frames are partially received at UNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor) * CIR1 . 6. More than zero test frames are received at UNI1. 7. More than zero test frames are received at UNI1. 8. More than zero test frames are received at UNI1. 9. All test frames A are received at UNI1. More than zero test frames B are received at UNI1. 10. All test frames A are received at UNI1. More than zero test frames B are received at UNI1. 11. A number of test frames A representing traffic of at least “Flow Transmission Duration” * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) and at most “Flow Transmission Duration” * (1 + ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. More than zero test frames B are received at UNI1. 12. A number of test frames A representing traffic of at least “Flow Transmission Duration” * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) and at most “Flow Transmission Duration” * (1 + ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. More than zero test frames B are received at UNI1. 13. A number of test frames A representing traffic of least “Flow Transmission Duration” * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) A are received at UNI1. More than zero test frames B are received at UNI1. 14. A number of test frames A representing traffic of least “Flow Transmission Duration” * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at UNI1. More than zero test frames B are received at UNI1.

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	15. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. More than zero test frames B are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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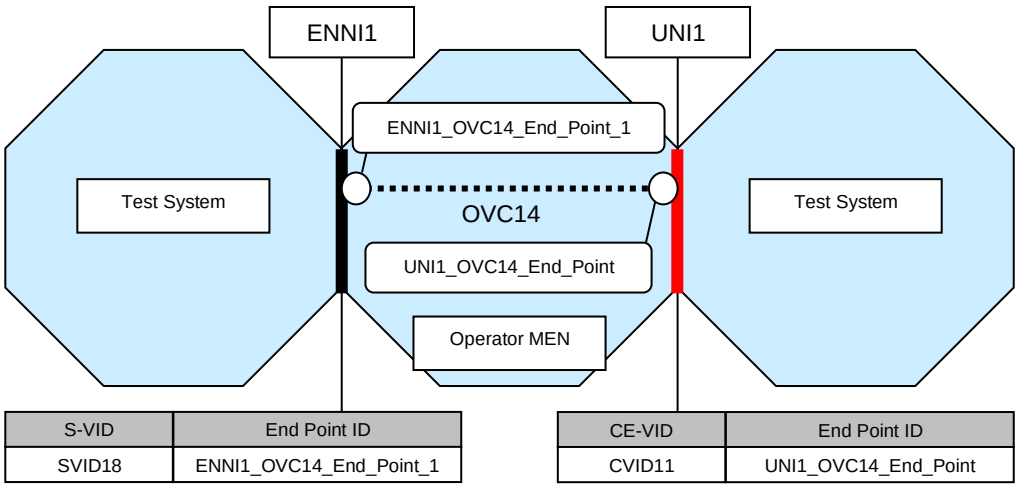
12.4 ENNI Ingress BWP per CoS: Commited Burst Size, EBS = 0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_INGRESS_BWP_COS. R61.8
Reference Document Source	MEF 26, R61, R83
Test Status	Mandatory
Requirement	[R61] When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and the algorithm of Section 7.6.1 of [MEF 26] **MUST** be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. [R83] When CIR > 0, CBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that ENNI ingress bandwidth profile per CoS with CIR>0 will forward bursts of Green traffic of at least MTU size and at most CBS size.
Conditions	Color Aware for ENNI Ingress Bandwidth Profile per CoS = “Yes” S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, total burst size is 0.5*CBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, total burst size is 1.0*CBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs, total burst size rounded up to the nearest whole frame is 1.25 * CBS1 * BIR /(BIR-CIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames mapped to OVC14 at ENNI1: CoS ID is set to ENNI_Green_CoS1_IDs. Perform the burst procedure described in section 17.3 in this document.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. The amount of traffic received at UNI1 is lower bound by N_G and upper bound by N_G plus half of the transmitted traffic in excess of N_G. 4. All expected test frames are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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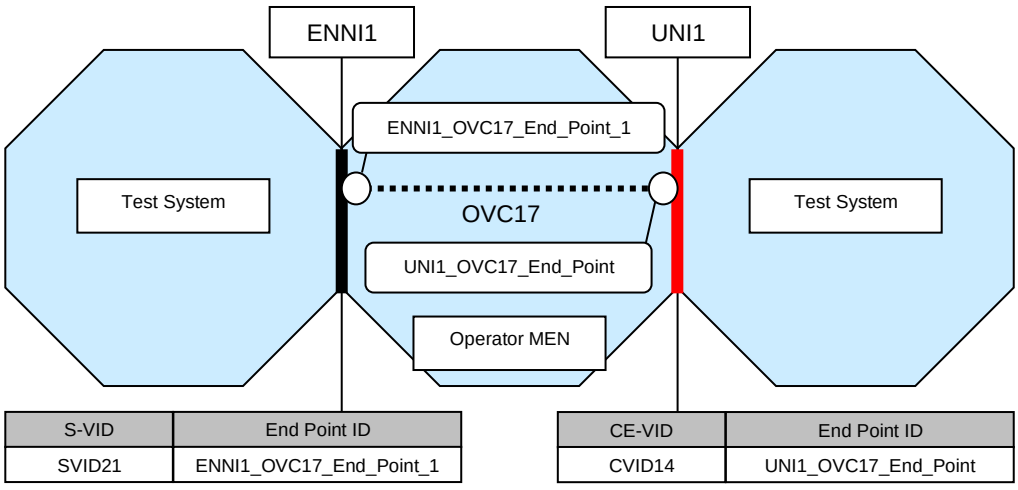
12.5 ENNI Ingress BWP per CoS: Excess Burst Size.

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_INGRESS_BWP_COS. R61.9
Reference Document Source	MEF 26, R61, R85
Test Status	Mandatory
Requirement	[R61] When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and the algorithm of Section 7.6.1 of [MEF 26] **MUST** be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier. [R85] When EIR > 0, EBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that ENNI ingress bandwidth profile per CoS with CIR>0 will forward bursts of Yellow traffic of at least MTU size and at most EBS size.
Conditions	Color Aware for ENNI Ingress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, total burst size is 0.5*EBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, total burst size is 1.0*EBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs, total burst size is (1.25* EBS1 rounded up to the nearest whole frame) * BIR /(BIR-EIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames mapped to OVC17 at ENNI1: CoS ID is set to ENNI_Yellow_CoS1_IDs. Perform the burst test procedure described in section 17.3 in this document).
Expected Results	1. More than zero test frames are received at UNI1. 2. More than zero test frames are received at UNI1. 3. The amount of traffic received at UNI1 is larger than zero frames and upper bound by N_Y plus half of the transmitted traffic in excess of N_Y. 4. All green test frames are received at UNI1, and more than zero yellow frames are received.
Verdict	PASS, FAIL, or INCONCLUSIVE

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13 Test Group: ENNI Egress Bandwidth Profile per CoS

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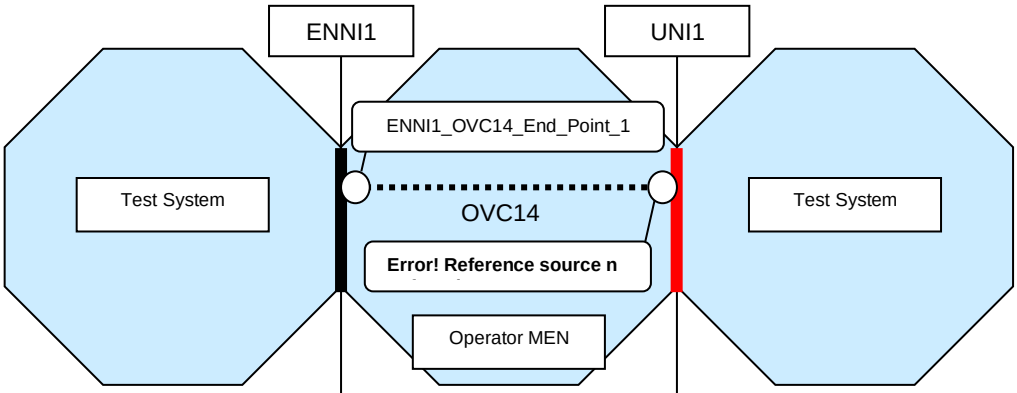
13.1 ENNI Egress BWP per CoS with CIR>0, EIR=0, CF=0, EBS=0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_EGRESS_BWP_COS.R63.1
Reference Document Source	MEF 26, R63, R64, R82, R84, R89
Test Status	Conditional Mandatory
Requirement	[R63] When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier **MUST** have the property defined in Section 7.6.3 of [MEF 26]. [R64] The Color Mode for the Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R89] When a sequence of egress ENNI Frames with arrival times and lengths at the ENNI, $\{t_j, l_j\}, j \geq 0$ are subjected to an Egress Bandwidth Profile with parameters <CIR, CBS, EIR, EBS, CF, CM>, the result of applying the algorithm of Section 7.6.1 of [MEF 26] to these frames **MUST** be to declare each ENNI Frame either Green or Yellow.
Test Purpose	Verify that the ENNI egress bandwidth profile per CoS with CIR>0 and EIR=0 and CF=0 will limit the information rate of the incoming Green traffic to CIR and drop all other frames.
Conditions	Color Aware for ENNI Egress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID18 — End Point ID: ENNI1_OVC14_End_Point_1 CE-VID: CVID11 — End Point ID: UNI1_OVC14_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *CIR1 3. Tester transmits test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 1.5*CIR1 4. Tester transmits test frames A mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames B mapped to OVC14 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.1*CIR1 5. Tester transmits test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.1*CIR1.
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. Test frames are partially received at ENNI1: in total a number of frames representing traffic of at least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) and at most "Flow Transmission Duration" * (1 + ToleranceFactor) * CIR1 + (CBS1 * 8):

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	4. All test frames A are received at ENNI1. Test frames B are not received at any External Interface used in this test. 5. Test frames are not received at any External Interface used in this test.
Verdict	PASS, FAIL, or INCONCLUSIVE

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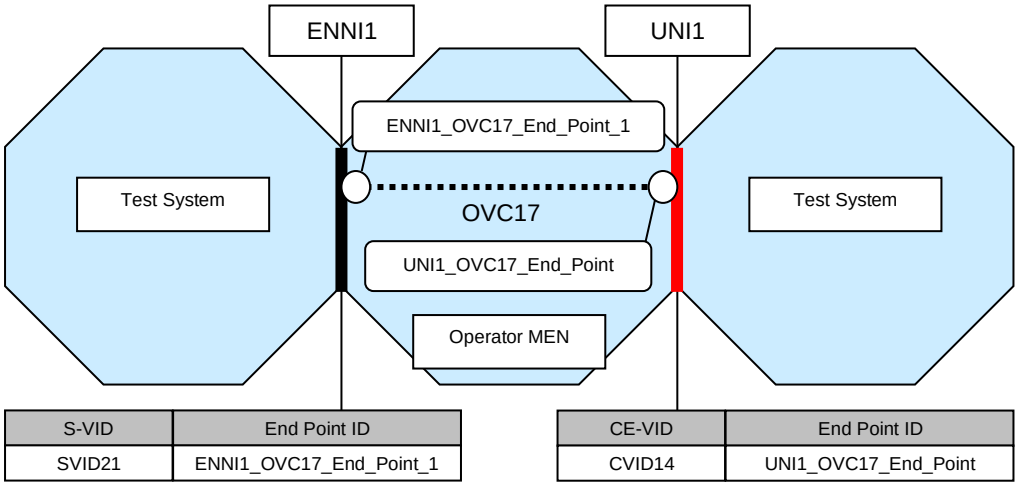
13.2 ENNI Egress BWP per CoS with CIR=0, EIR>0, CF=0, EBS>0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_EGRESS_BWP_COS.R63.4
Reference Document Source	MEF 26, R63, R64, R82, R84, R89
Test Status	Conditional Mandatory
Requirement	[R63] When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier **MUST** have the property defined in Section 7.6.3 of [MEF 26]. [R64] The Color Mode for the Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R89] When a sequence of egress ENNI Frames with arrival times and lengths at the ENNI, $\{t_j, l_j\}, j \geq 0$ are subjected to an Egress Bandwidth Profile with parameters <CIR, CBS, EIR, EBS, CF, CM>, the result of applying the algorithm of Section 7.6.1 of [MEF 26] to these frames **MUST** be to declare each ENNI Frame either Green or Yellow.
Test Purpose	Verify that the ENNI egress bandwidth profile per CoS with CIR=0 and EIR>0, will limit the total information rate of the incoming traffic to EIR and drop any excess traffic. All green traffic must be discarded.
Conditions	Color Aware for ENNI Egress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.5*EIR1 2. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1 3. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 1.5*EIR1 4. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 5. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) *EIR1 6. Tester transmits test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 7. Tester transmits test frames A mapped to OVC17 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.4*EIR1. Tester transmits test frames B mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.4*EIR1 8. Tester transmits test frames A mapped to OVC17 at UNI1: CoS ID is set to

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	EI_Green_CoS1_IDs, information rate is 0.5*EIR1. Tester transmits test frames B mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 9. Tester transmits test frames A mapped to OVC17 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.6*EIR1. Tester transmits test frames B mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.6*EIR1
Expected Results	1. No test frames are received at ENNI1. 2. No test frames are received at ENNI1. 3. No test frames are received at ENNI1. 4. More than zero test frames are received at ENNI1. 5. More than zero test frames are received at ENNI1. 6. More than zero test frames are received at ENNI1. 7. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 8. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 9. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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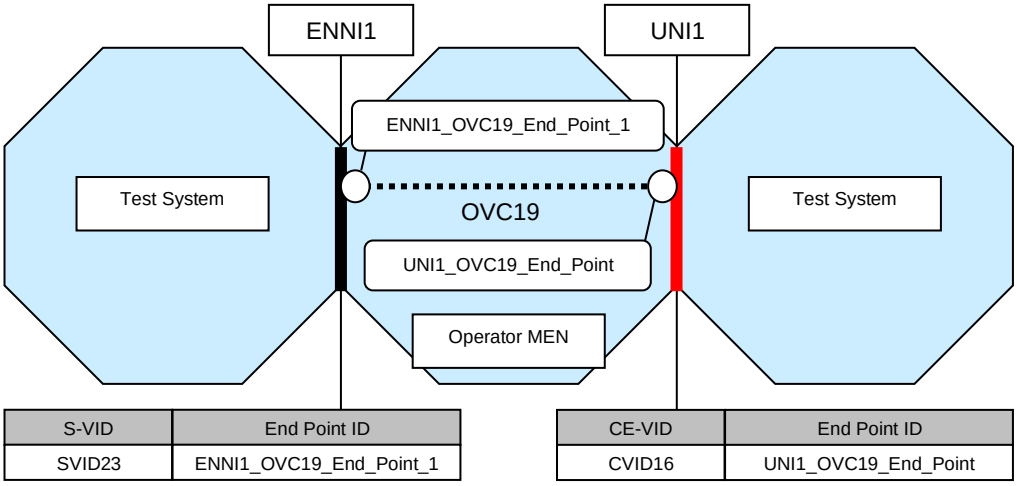
13.3 ENNI Egress BWP per CoS with CIR>0, EIR>0, CF=0, EBS>0, CM=1

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_EGRESS_BWP_COS.R63.6
Reference Document Source	MEF 26, R63, R64, R82, R84, R89
Test Status	Conditional Mandatory
Requirement	[R63] When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier **MUST** have the property defined in Section 7.6.3 of [MEF 26]. [R64] The Color Mode for the Bandwidth Profile Algorithm **MUST** be color-aware. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0 [R89] When a sequence of egress ENNI Frames with arrival times and lengths at the ENNI, $\{t_j, l_j\}, j \geq 0$ are subjected to an Egress Bandwidth Profile with parameters <CIR, CBS, EIR, EBS, CF, CM>, the result of applying the algorithm of Section 7.6.1 of [MEF 26] to these frames **MUST** be to declare each ENNI Frame either Green or Yellow.
Test Purpose	Verify that the ENNI egress bandwidth profile per CoS with CIR>0 and EIR>0, will limit the information rate of the incoming Green traffic to CIR, limit the sum of the excess Green traffic and the Yellow traffic to EIR and drop any excess traffic.
Conditions	Color Aware for ENNI Egress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID23 — End Point ID: ENNI1_OVC19_End_Point_1 CE-VID: CVID16 — End Point ID: UNI1_OVC19_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * CIR1 3. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * CIR1+0.5*EIR1 4. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * CIR1+1.0*EIR1 5. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * CIR1+1.5*EIR1 6. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 7. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * EIR1 8. Tester transmits test frames mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 9. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to

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	EI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames B mapped to OVC19 at External Interface not equal to ENNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 10. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * CIR1. Tester transmits test frames B mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) EIR1. 11. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.1*EIR1. 12. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 13. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.6*EIR1. Tester transmits test frames B mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.6*EIR1. 14. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.0*EIR1. Tester transmits test B frames mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 15. Tester transmits test frames A mapped to OVC19 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.5*EIR1. Tester transmits test frames B mapped to OVC19 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, information rate is 0.5*EIR1.
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. All test frames are received at ENNI1. 4. All test frames are received at ENNI1. 5. Test frames are partially received at ENNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor) * CIR1. 6. More than zero test frames are received at ENNI1. 7. More than zero test frames are received at ENNI1. 8. More than zero test frames are partially received at ENNI1. 9. All test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 10. All test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 11. All test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 12. All test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 13. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) are received at ENNI1. More than zero test frames B are received at ENNI1. 14. Test frames A are partially received at ENNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames B are received at ENNI1. 15. Test frames A are partially received at ENNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor)*CIR1. More than zero test frames B are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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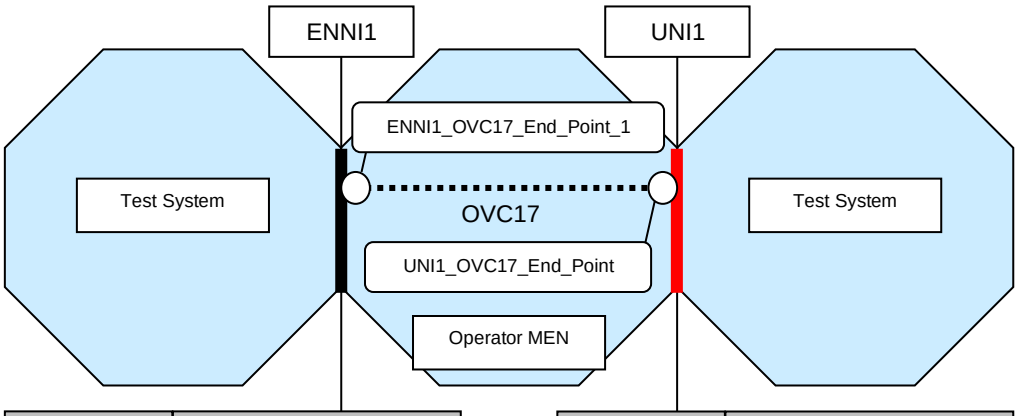
13.4 ENNI Egress BWP per CoS: Excess Burst Size.

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_EGRESS_BWP_COS.R63.9
Reference Document Source	MEF 26, R63, R85
Test Status	Conditional Mandatory
Requirement	[R63] When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier **MUST** have the property defined in Section 7.6.3 of [MEF 26]. [R85] When EIR > 0, EBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that ENNI egress bandwidth profile per CoS with CIR>0 will forward bursts of Yellow traffic of at least MTU size and at most EBS size.
Conditions	Color Aware for ENNI Egress Bandwidth Profile per CoS = "Yes" S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID21 — End Point ID: ENNI1_OVC17_End_Point_1 CE-VID: CVID14 — End Point ID: UNI1_OVC17_End_Point
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, total burst size is 0.5* EBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, total burst size is 1.0*EBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs, total burst size is (1.25*EBS1 rounded up to the nearest whole frame) * BIR /(BIR-CIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames mapped to OVC17 at UNI1: CoS ID is set to EI_Yellow_CoS1_IDs. Perform the burst procedure described in section 17.3 in this document.
Expected Results	1. More than zero test frames are received at ENNI1. 2. More than zero test frames are received at ENNI1. 3. The amount of traffic received at UNI1 is larger than zero frames and upper bound by N_Y plus half of the transmitted traffic in excess of N_Y All green test frames are received at ENNI1, and more than zero yellow frames are received.
Verdict	PASS, FAIL, or INCONCLUSIVE

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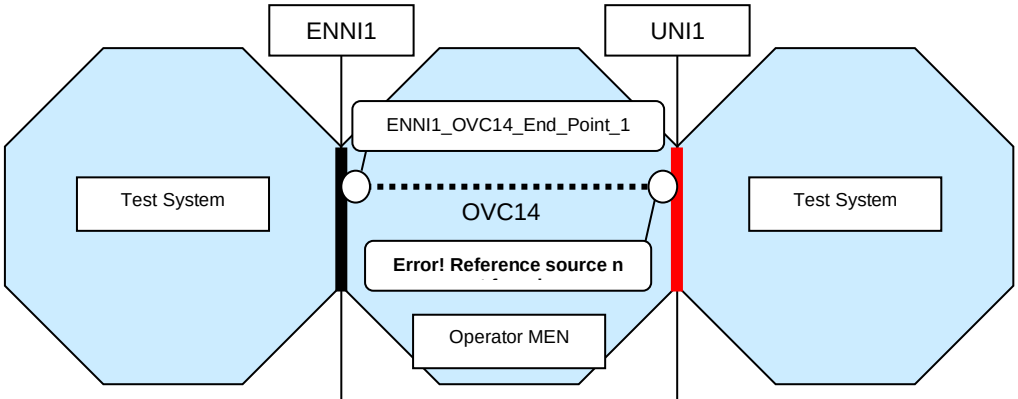
13.5 ENNI Egress BWP per CoS: Commited Burst Size, EBS = 0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	ENNI_EGRESS_BWP_COS.R63.8
Reference Document Source	MEF 26, R63, R83
Test Status	Conditional Mandatory
Requirement	[R63] When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF 26] **MUST** be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier **MUST** have the property defined in Section 7.6.3 of [MEF 26]. [R83] When CIR > 0, CBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that ENNI egress bandwidth profile per CoS with CIR>0 will forward bursts of Green traffic of at least MTU size and at most CBS size.
Conditions	Color Aware for ENNI Egress Bandwidth Profile per CoS = “Yes” S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at ENNI = "Yes"
Test Topology/OVC	 S-VID: SVID18 — End Point ID: ENNI1_OVC14_End_Point_1 CE-VID: CVID11 — End Point ID: UNI1_OVC14_End_Point
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, total burst size is 0.5*CBS1-octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, total burst size is 1.0*CBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC14 at UNI1: CoS ID is set to EI_Green_CoS1_IDs, total burst size is (1.25*CBS1 rounded up to the nearest whole frame) * BIR /(BIR-CIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames mapped to OVC14 at interface not equal to ENNI1: CoS ID is set to EI_Green_CoS1_IDs. Perform the burst procedure described in section 17.3 in this document.
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. The amount of traffic received at UNI1 is lower bound by N_G and upper bound by N_G plus half of the transmitted traffic in excess of N_G.All expected test frames are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

14 Test Group: UNI Ingress Bandwidth Profile per CoS

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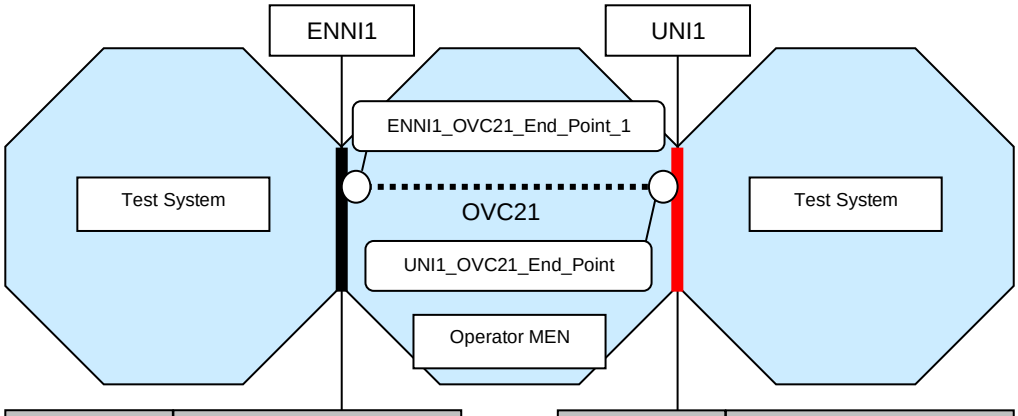
14.1 UNI Ingress BWP per CoS with CIR>0, EIR=0, EBS=0, CF=0, CM=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_INGRESS_BWP_COS.R79.1
Reference Document Source	MEF 26, R79, R82, R84
Test Status	Conditional Mandatory
Requirement	[R79] When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <*CIR*, *CBS*, *EIR*, *EBS*, *CF*, *CM*> as defined in Section 7.11.1 of [MEF 10.2] **MUST** be specified and the algorithm of Section 7.11.1 of [MEF 10.2] **MUST** be applied to all ingress Service Frames with the given Class of Service Identifier. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Ingress bandwidth profile per CoS with CIR>0 and EIR=0 and CF=0 will limit the information rate of the incoming Green traffic to CIR and drop all other frames.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID25 — End Point ID: ENNI1_OVC21_End_Point_1 CE-VID: CVID18 — End Point ID: UNI1_OVC21_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0-ToleranceFactor)*CIR1 3. Tester transmits test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 1.5*CIR1 4. Tester transmits test frames A mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames B at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1 5. Tester transmits test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1.
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. Test frames are partially received at ENNI1: In total a number of frames representing traffic of at least "Flow Transmission Duration" * (1-ToleranceFactor) * CIR1 + (CBS1 * 8) and at most "Flow Transmission Duration" * (1 + ToleranceFactor) * CIR1 + (CBS1 * 8) 4. All test frames A are received at ENNI1. Test frames B are not received at any External Interface used in this test. 5. Test frames are not received at any External Interface used in this test.
Verdict	PASS, FAIL, or INCONCLUSIVE

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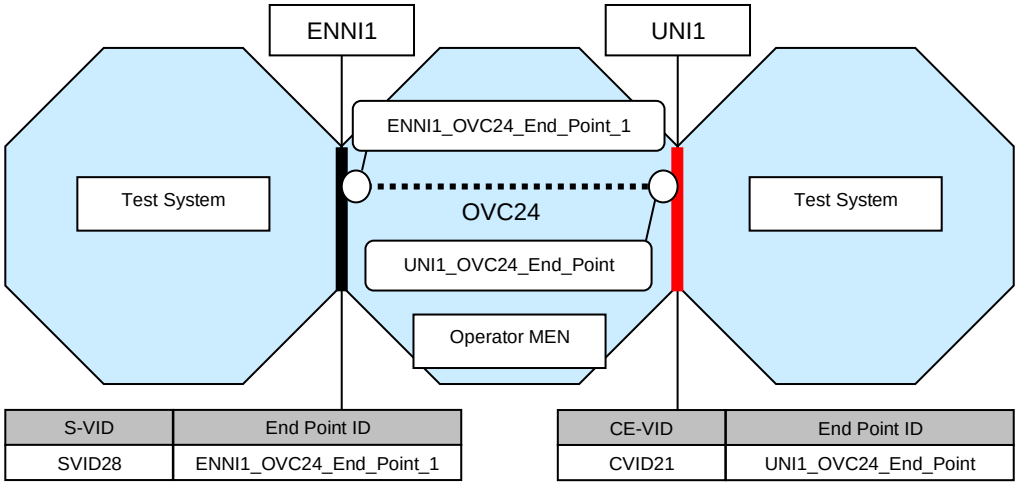
14.2 UNI Ingress BWP per CoS with CIR=0, EIR>0, EBS>0, CF=0, CM=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_INGRESS_BWP_COS.R79.4
Reference Document Source	MEF 26, R79, R82, R84
Test Status	Conditional Mandatory
Requirement	[R79] When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <*CIR*, *CBS*, *EIR*, *EBS*, *CF*, *CM*> as defined in Section 7.11.1 of [MEF 10.2] **MUST** be specified and the algorithm of Section 7.11.1 of [MEF 10.2] **MUST** be applied to all ingress Service Frames with the given Class of Service Identifier. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Ingress bandwidth profile per CoS with CIR=0 and EIR>0, configured in color-blind mode, will limit the total information rate of the incoming traffic to EIR and drop any excess traffic.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID28 — End Point ID: ENNI1_OVC24_End_Point_1 CE-VID: CVID21 — End Point ID: UNI1_OVC24_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.5*EIR1 2. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 – ToleranceFactor) *EIR1 3. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 1.5*EIR1 4. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 5. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 1.0*EIR1 6. Tester transmits test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 7. Tester transmits test frames A mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.4*EIR1. Tester transmits test frames B mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.4*EIR1 8. Tester transmits test frames A mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.5*EIR1. Tester transmits test frames B mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 9. Tester transmits test frames A mapped to OVC24 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.6*EIR1. Tester transmits test frames B mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information

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	rate is 0.6*EIR1
Expected Results	1. No test frames are received at ENNI1. 2. No test frames are received at ENNI1. 3. No test frames are received at ENNI1: In total a number of frames representing traffic larger than zero and at most “Flow Transmission Duration” * (1 + ToleranceFactor) * EIR1 + (EBS1 * 8) 4. More than zero test frames are received at ENNI1. 5. More than zero test frames are received at ENNI1. 6. More than zero test frames are received at ENNI1. 7. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 8. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 9. No test frames A are received at ENNI1. More than zero test frames B are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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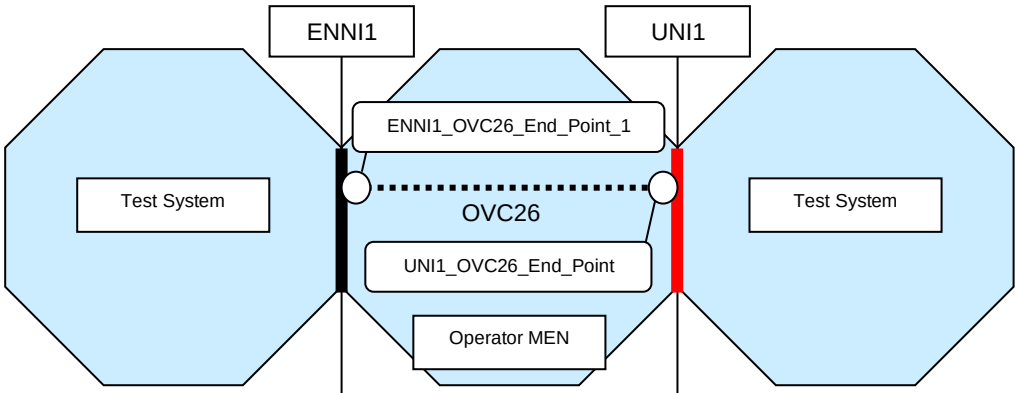
14.3 UNI Ingress BWP per CoS with CIR>0, EIR>0, CF=0, CM=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_INGRESS_BWP_COS.R79.6
Reference Document Source	MEF 26, R79, R82, R84
Test Status	Conditional Mandatory
Requirement	[R79] When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <*CIR*, *CBS*, *EIR*, *EBS*, *CF*, *CM*> as defined in Section 7.11.1 of [MEF 10.2] **MUST** be specified and the algorithm of Section 7.11.1 of [MEF 10.2] **MUST** be applied to all ingress Service Frames with the given Class of Service Identifier. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Ingress bandwidth profile per CoS with CIR>0 and EIR>0, will limit the information rate of the incoming Green traffic to CIR, limit the sum of the excess Green traffic and the Yellow traffic to EIR and drop any excess traffic.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID30 — End Point ID: ENNI1_OVC26_End_Point_1 CE-VID: CVID23 — End Point ID: UNI1_OVC26_End_Point
Test Procedure	1. Tester transmits test frames mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1 3. Tester transmits test frames mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1 4. Tester transmits test frames mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.0*EIR1 5. Tester transmits test frames mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.5*EIR1 6. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) EIR1. 7. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.1*EIR1. 8. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 9. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to

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	UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.6*EIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.6*EIR1. 10. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.0*EIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 11. Tester transmits test frames A mapped to OVC26 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.5*EIR1. Tester transmits test frames B mapped to OVC26 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1.
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. All test frames are received at ENNI1. 4. All test frames are received at ENNI1. 5. Test frames are partially received at ENNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor) * CIR1. 6. All test frames A are received at ENNI1. More than zero test frames B are received at ENNI1. 7. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at ENNI1. More than zero test frames B are received at ENNI1. 8. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)A are received at ENNI1. More than zero test frames B are received at ENNI1. 9. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at ENNI1. More than zero test frames B are received at ENNI1. 10. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at ENNI1. More than zero test frames B are received at ENNI1. 11. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) are received at ENNI1. More than zero test frames B are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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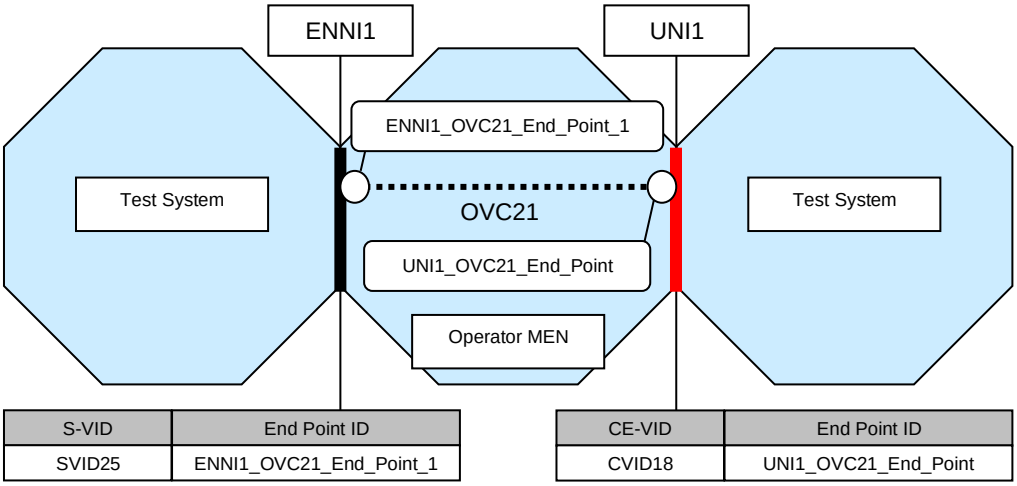
14.4 UNI Ingress BWP per CoS: Commited Burst Size, EBS = 0.

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_INGRESS_BWP_COS.R79.8
Reference Document Source	MEF 26, R79, R83
Test Status	Conditional Mandatory
Requirement	[R79] When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <*CIR*, *CBS*, *EIR*, *EBS*, *CF*, *CM*> as defined in Section 7.11.1 of [MEF 10.2] **MUST** be specified and the algorithm of Section 7.11.1 of [MEF 10.2] **MUST** be applied to all ingress Service Frames with the given Class of Service Identifier. [R83] When CIR > 0, CBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that UNI Ingress bandwidth profile per CoS with CIR>0 will forward bursts of Green traffic of at least MTU size and at most CBS size.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, total burst size is 0.5*CBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, total burst size is 1.0*CBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs, total burst size is (1.25*CBS1 rounded up to the nearest whole frame) * BIR /(BIR-CIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames mapped to OVC21 at UNI1: CoS ID is set to UNI_Green_CoS1_IDs. Perform the burst procedure described in section 17.3 in this document)
Expected Results	1. All test frames are received at ENNI1. 2. All test frames are received at ENNI1. 3. 4. The amount of traffic received at ENNI1 is lower bound by N_G and upper bound by N_G plus half of the transmitted traffic in excess of N_G.All expected test frames are received at ENNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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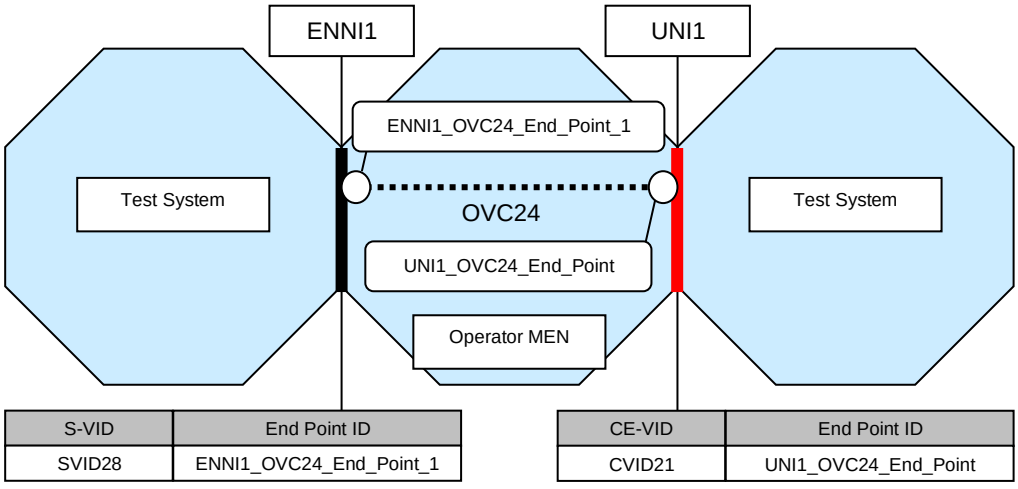
14.5 UNI Ingress BWP per CoS: Excess Burst Size.

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_INGRESS_BWP_COS.R79.9
Reference Document Source	MEF 26, R79, R85
Test Status	Conditional Mandatory
Requirement	[R79] When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <*CIR*, *CBS*, *EIR*, *EBS*, *CF*, *CM*> as defined in Section 7.11.1 of [MEF 10.2] **MUST** be specified and the algorithm of Section 7.11.1 of [MEF 10.2] **MUST** be applied to all ingress Service Frames with the given Class of Service Identifier. [R85] When EIR > 0, EBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that UNI Ingress bandwidth profile per CoS with CIR>0 will forward bursts of Yellow traffic of at least MTU size and at most EBS size.
Conditions	S-Tag PCP Color Indication = "Yes", Ingress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	 S-VID: SVID28 — End Point ID: ENNI1_OVC24_End_Point_1 CE-VID: CVID21 — End Point ID: UNI1_OVC24_End_Point
Test Procedure	1. Tester transmits bursts of test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, total burst size is 0.5*EBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames mapped to OVC24 at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs, total burst size is 1.0*EBS1 octets, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames mapped to OVC24 test frames at UNI1: CoS ID is set to UNI_Yellow_CoS1_IDs. Perform the burst procedure described in section 17.4 in this document.
Expected Results	1. More than zero test frames are received at ENNI1. 2. More than zero test frames are received at ENNI1. 3. All green test frames are received at ENNI1, and more than zero yellow frames are received.
Verdict	PASS, FAIL, or INCONCLUSIVE

15 Test Group: UNI Egress Bandwidth Profile per CoS

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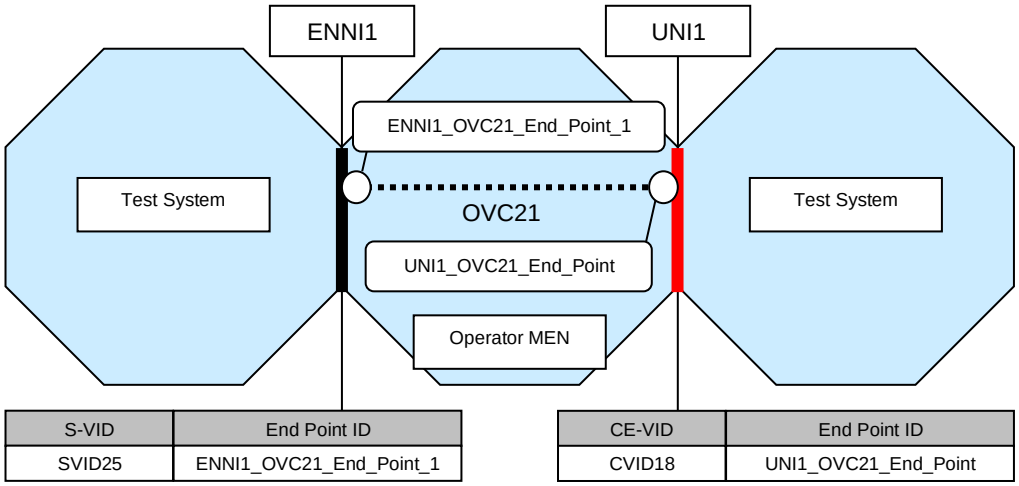
15.1 UNI Egress BWP per CoS with CIR>0, EIR=0, EBS= 0, CF=0, CM=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_EGRESS_BWP_COS.R81.1
Reference Document Source	MEF 26, R81, R82, R84
Test Status	Conditional Mandatory
Requirement	[R81] When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Egress bandwidth profile per CoS with CIR>0 and EIR=0 and CF=0 will limit the information rate of the incoming Green traffic to CIR and drop all other frames.
Conditions	S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 1.0*CIR1 3. Tester transmits test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 1.5*CIR1 4. Tester transmits test frames A at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1 5. Tester transmits test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*CIR1.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. Test frames are partially received at UNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor) * CIR1. 4. All test frames A are received at UNI1. Test frames B are not received at any External Interface. 5. Test frames are not received at any External Interface used in this test.
Verdict	PASS, FAIL, or INCONCLUSIVE

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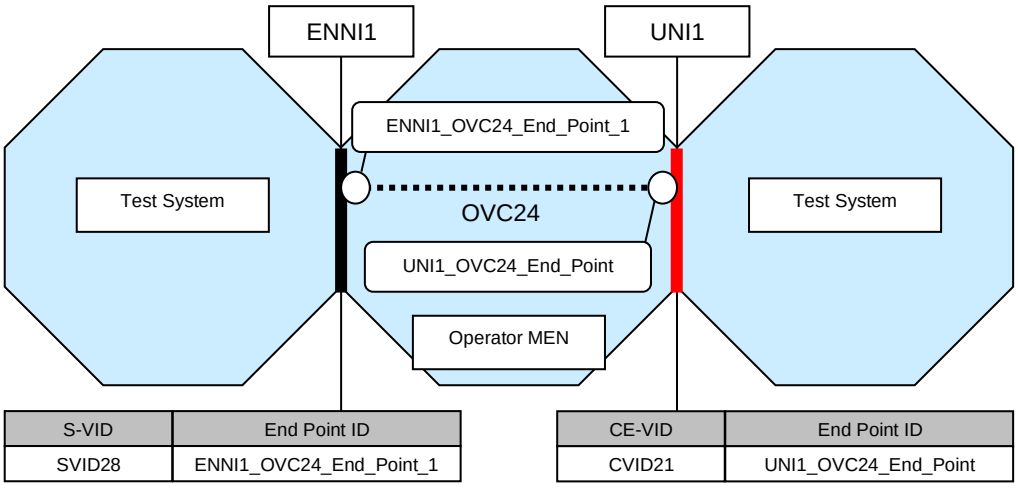
15.2 UNI Egress BWP per CoS with CIR=0, EIR>0, CF=0, CM=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_EGRESS_BWP_COS.R81.4
Reference Document Source	MEF 26, R81, R82, R84
Test Status	Conditional Mandatory
Requirement	[R81] When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Egress bandwidth profile per CoS with CIR=0 and EIR>0, configured in color-blind mode, will limit the total information rate of the incoming traffic to EIR and drop any excess traffic.
Conditions	S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*EIR1 2. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * EIR1 3. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 1.5*EIR1 4. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 5. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) * EIR1 6. Tester transmits test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 1.5*EIR1 7. Tester transmits test frames A at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.4*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.4*EIR1 8. Tester transmits test frames A at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1 9. Tester transmits test frames A at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.6*EIR1. Tester transmits test frames

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	B at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.6*EIR1
Expected Results	1. More than zero test frames are received at UNI1. 2. More than zero test frames are received at UNI1. 3. More than zero test frames are received at UNI1. 4. More than zero test frames are received at UNI1. 5. More than zero test frames are received at UNI1. 6. More than zero test frames are received at UNI1. 7. More than zero test frames (A + B) in an arbitrary combination are received at UNI1. 8. More than zero test frames (A + B) in an arbitrary combination are received at UNI1. 9. More than zero test frames (A + B) are received in an arbitrary combination at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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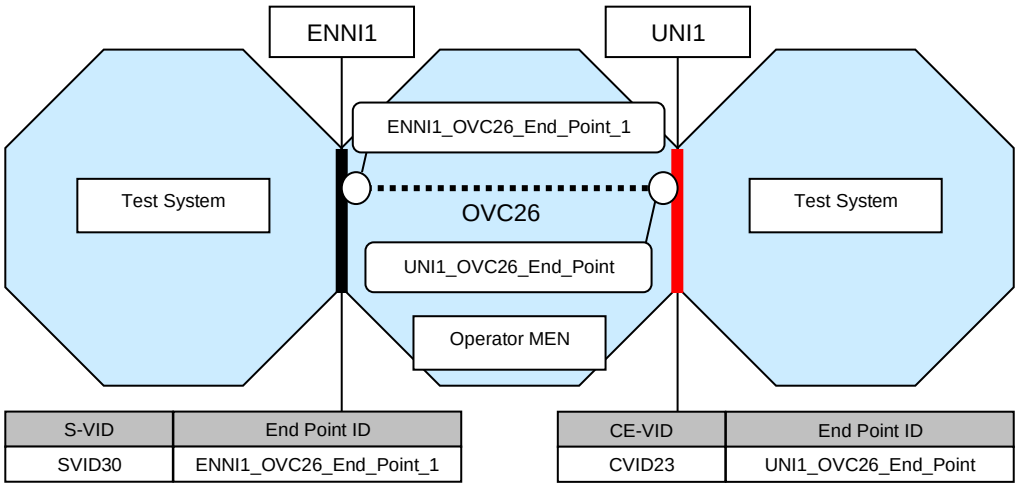
15.3 UNI Egress BWP per CoS with CIR>0, EIR>0, CF=0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_EGRESS_BWP_COS.R81.6
Reference Document Source	MEF 26, R81, R82, R84
Test Status	Conditional Mandatory
Requirement	[R81] When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow. [R82] CIR **MUST** be ≥ 0 [R84] EIR **MUST** be ≥ 0
Test Purpose	Verify that the UNI Egress bandwidth profile per CoS with CIR>0 and EIR>0, will limit the information rate of the incoming Green traffic to CIR, limit the sum of the excess Green traffic and the Yellow traffic to EIR and drop any excess traffic.
Conditions	S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits test frames at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is 0.5*CIR1 2. Tester transmits test frames at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1 3. Tester transmits test frames at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1 4. Tester transmits test frames at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.0*EIR1 5. Tester transmits test frames at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.5*EIR1 6. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is (1.0 - ToleranceFactor) EIR1. 7. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.1*EIR1. 8. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.5*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1.

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	9. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+0.6*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.6*EIR1. 10. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.0*EIR1. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1. 11. Tester transmits test frames A at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Green_CoS1_IDs, information rate is (1.0 - ToleranceFactor) CIR1+1.5*EIR1. Tester transmits test frames B at ENNI1 that are mapped to OVC26: CoS ID is set to ENNI_Yellow_CoS1_IDs, information rate is 0.5*EIR1.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. All test frames are received at UNI1. 4. All test frames are received at UNI1. 5. Test frames are partially received at UNI1: the information rate of the received test frames is at least (1.0 - ToleranceFactor) * CIR1. 6. All test frames A are received at UNI1. More than zero test frames B are received at UNI1. 7. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at UNI1. More than zero test frames B are received at UNI1. 8. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. More than zero test frames B are received at UNI1. 9. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8) are received at UNI1. More than zero test frames B are received at UNI1. 10. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at UNI1. More than zero test frames B are received at UNI1. 11. A number of test frames A representing traffic of least "Flow Transmission Duration" * (1 - ToleranceFactor) * CIR1 + (CBS1 * 8)are received at UNI1. More than zero test frames B are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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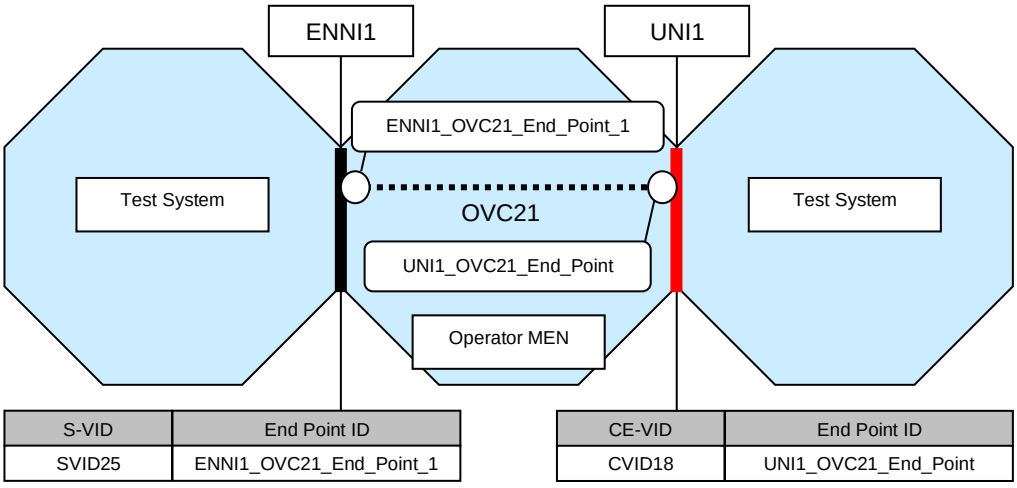
15.4 UNI Egress BWP per CoS: Commited Burst Size, EBS = 0

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_EGRESS_BWP_COS.R81.8
Reference Document Source	MEF 26, R81, R83
Test Status	Conditional Mandatory
Requirement	[R81] When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow. [R83] When CIR > 0, CBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that UNI Egress bandwidth profile per CoS with CIR>0 will forward bursts of Green traffic of at least MTU size and at most CBS size.
Conditions	S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, total burst size is 0.5*CBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs, total burst size is 1.0*CBS1 octets rounded down to the next whole frame, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC21CoS ID is set to ENNI_Green_CoS1_IDs, total burst size is (1.25*CBS1 rounded up to the nearest whole frame) * BIR /(BIR-CIR1), at a rate of 1 burst every 1 second 4. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC21: CoS ID is set to ENNI_Green_CoS1_IDs. Perform the burst described in section 17.3 in this document.
Expected Results	1. All test frames are received at UNI1. 2. All test frames are received at UNI1. 3. The amount of traffic received at ENNI1 is lower bound by N_G and upper bound by N_G plus half of the transmitted traffic in excess of N_G. 4. All expected test frames are received at UNI1.
Verdict	PASS, FAIL, or INCONCLUSIVE

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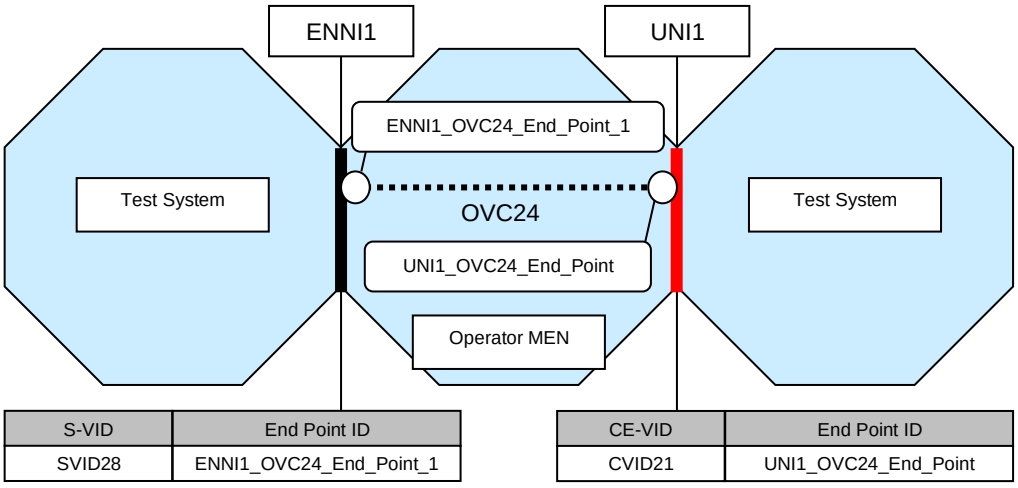
15.5 UNI Egress BWP per CoS: Excess Burst Size

ABSTRACT TEST CASES FOR ENNI PHASE 1	
Test Case ID	UNI_EGRESS_BWP_COS.R81.9
Reference Document Source	MEF 26, R81, R85
Test Status	Conditional Mandatory
Requirement	[R81] When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow. [R85] When EIR > 0, EBS **MUST** be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.
Test Purpose	Verify that UNI Egress bandwidth profile per CoS with CIR>0 will forward bursts of Yellow traffic of at least MTU size and at most EBS size.
Conditions	S-Tag PCP Color Indication = "Yes", Egress Bandwidth Profile per Class of Service Identifier at UNI = "Yes"
Test Topology/OVC	
Test Procedure	1. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, total burst size is 0.5*EBS1 octets, at a rate of 1 burst every 1 second 2. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs, total burst size is 1.0*EBS1octets, at a rate of 1 burst every 1 second 3. Tester transmits bursts of test frames at ENNI1 that are mapped to OVC24: CoS ID is set to ENNI_Yellow_CoS1_IDs. Perform the burst procedure described in section 17.4 in this document.
Expected Results	1. More than zero test frames are received at UNI1. 2. More than zero test frames are received at UNI1. 3. All expected green test frames are received at UNI1, and more than zero yellow frames are received.
Verdict	PASS, FAIL, or INCONCLUSIVE

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16 References

[MEF 26] External Network Network (ENNI) – Phase 1, including MEF26.0.1 and MEF26.0.2 updates
[MEF 12.1] Carrier Ethernet Network Architecture Framework, Part 2: Ethernet Services Layer - Base Elements
[802.3 – 2005] IEEE 802.3 – 2005 Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications, 8 December 2005.
[802.1ad – 2005] IEEE 802.1ad – 2005 IEEE Standard for Local and metropolitan Area Networks – Virtual Bridged Local Area Networks Amendment 4: Provider Bridges, May 2005.
[MEF 10.2] Ethernet Services Attributes Phase 2, MEF 10.2
[MEF 9] Abstract Test Suite for Ethernet Services at the UNI, MEF 9
[MEF 6.1] Ethernet Services Definitions - Phase 2, MEF 6.1
[RFC 2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, http://www.ietf.org/rfc/rfc2119.txt (Normative)
[RFC 2285] "Benchmarking Terminology for LAN Switching Devices", R. Mandeville, http://www.ietf.org/rfc/rfc2285.txt
[MEF 23] Carrier Ethernet Class of Service – Phase 1, MEF 23
[MEF 17] Service OAM Requirements & Framework – Phase 1, MEF 17
[ISO9646] OSI Conformance testing methodology and framework, ISO/IEC 9646-1
[802.1ag – 2007] IEEE Standard for Local and metropolitan Area Net-works – Virtual Bridged Local Area Networks Amendment 5: Connectivity Fault Management, December 2007, IEEE Std 802.1ag – 2007
[RFC 2544] Benchmarking Methodology for Network Interconnect Devices, S. Bradner, J. McQuaid, http://www.ietf.org/rfc/rfc2544.txt
[RFC 2889] Benchmarking Methodology for LAN Switching Devices, R. Mandeville, J. Perser, http://www.ietf.org/rfc/rfc2889.txt

17 Appendix

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17.1 Table of Requirements Derived from the ENNI Specification

The test cases in this document are derived from the requirements of the MEF 26 specification ([MEF 26]). Not every requirement specified in the [MEF 26] can be translated into test cases, for example, as, some requirements specify contractual obligations. Such requirements are marked in the table below as not applicable. The table also represents a creation status of conformance test cases for that requirement ("Done", or "Planned"). The "Done" status means, that at least one test case is fully specified for the requirement. The "Planned" status means the requirement is applicable, and there are no test cases specified yet for that requirement. The creation status and type are only meaningful if the requirement is applicable.
The Abstract Test Suite for ENNI is split in to two parts: Level 1 and Level 2 ATS. The column ATS Part identifies the mapping of the requirement to the ENNI ATS part and the test group. This document includes test cases of Level 1 ATS only.

Table 133: Table of requirements

Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R1	When there are two physical links in the ENNI, an ENNI-Ni MUST be capable of implementing Link Aggregation as in Clause 43.6.1 of [802.3 – 2005] with one Link Aggregation Group (LAG) across the ports supporting an instance of ENNI and with one link in active mode and the other in standby mode.	Yes	Done	Level 1/ Protection
R2	When Link Aggregation is used at the ENNI, LACP MUST be used by each ENNI-Ni per [802.3 – 2005].	Yes	Done	Level 1/ Protection
R3	The Operator ENNI Identifier MUST be unique among all such identifiers for ENNIs supported by the Operator MEN.	No	Done	N/A
R4	The Operator ENNI Identifier MUST contain no more than 45 bytes.	No	Done	N/A
R5	Each link in an ENNI MUST be one of the following physical layers in full duplex mode as defined in [IEEE 802.3 – 2005]: 1000Base-SX, 1000Base-LX, 1000Base T, 10GBASE-SR, 10GBASE-LX4, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, 10GBASE-EW.	Yes	Done	Level 1/ Foundation
R6	Each ENNI Frame MUST have the standard Ethernet format with one of the tag configurations specified in Table 3 of [MEF 26]. [DA = Destination Address, SA = Source Address, ET = Ethertype/Length, S-Tag with Tag Protocol Identification Field (TPID) = 0x88A8, C-Tag with TPID = 0x8100.]	Yes	Done	Level 1/ Foundation
R7	An S-Tag MUST have the format specified in Sections 9.5 and 9.7 of [IEEE 802.1ad].	Yes	Done	Level 1/ Foundation
R8	A C-Tag MUST have the format specified in Sections 9.5 and 9.6 of [IEEE 802.1ad].	Yes	Done	Level 1/ Foundation
R9	An ingress ENNI Frame that is invalid as defined in Clause 3.4 of [802.3 – 2005] MUST be discarded by the receiving Operator MEN.	Yes	Done	Level 1/ Foundation
R10	An ingress ENNI Frame whose length is less than 64 octets MUST be discarded by the receiving Operator MEN as per Clause 4.2.4.2.2 of [802.3 – 2005].	Yes	Done	Level 1/ Foundation
R11	If the Number of Links is one, then the Protection Mechanism attribute MUST be set to "none."	No	Done	N/A

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R12	If the Number of Links is 2 and LAG as specified in [R1] is implemented, then the Protection Mechanism attribute MUST be set to "Link Aggregation."	No	Done	N/A
R13	If the conditions specified [R11] and [R12] are not met, then the Protection Mechanism attribute MUST be set to "other."	No	Done	N/A
R14	The ENNI Maximum Transmission Unit Size MUST be at least 1526 bytes.	Yes	Done	Level 1/ Foundation
D1	The ENNI Maximum Transmission Unit Size SHOULD be at least 2000 bytes.	Yes	Done	Level 2/ Optional Requiremetns
R15	When an ENNI Frame is larger than the MTU, the receiving Operator MEN for this frame MUST discard it, and the frame may or may not be ignored in the operation of a Bandwidth Profile that applies to this ENNI Frame.	Yes	Done	Level 1/ Foundation
R16	For a given S-Tagged ENNI Frame, the End Point to which it is mapped MUST be determined by the S-VLAN ID value in the S-Tag.	Yes	Done	Level 1/ Foundation
R17	An S-VLAN ID value MUST be used in no more than one row of the map.	Yes	Done	Level 1/ Foundation
R18	The End Point Type MUST be OVC End Point.	No	Done	N/A
R19	An ingress S-Tagged ENNI Frame that is not mapped to an existing End Point MUST NOT be forwarded to an External Interface by the receiving Operator MEN.	Yes	Done	Level 1/ Foundation
R20	An ENNI Frame without an S-Tag MUST NOT be mapped to an OVC End Point.	Yes	Done	Level 1/ Foundation
R21	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. This OVC MUST have its S-VLAN ID Preservation attribute set to Yes. (See Section 7.2.12 of [MEF 26].)	Yes	Done	Level 2/ Bundling
R22	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. This OVC MUST have its CE-VLAN ID Preservation attribute set to Yes. (See Section 7.2.10 of 0.)	Yes	Done	Level 2/ Bundling
R23	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. This OVC MUST have its CE-VLAN CoS Preservation attribute set to Yes. (See Section 7.2.11 of 0.)	Yes	Done	Level 2/ Bundling
R24	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. The OVC End Points associated by this OVC MUST be at an ENNI.	Yes	Done	Level 2/ Bundling
R25	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. This OVC MUST associate exactly two OVC End Points.	Yes	Done	Level 2/ Bundling
R26	Consider the OVC that associates an OVC End Point where more than one S-VLAN ID value map to the OVC End Point in the End Point Map. Each End Point Map at the other ENNIs where there is an OVC End Point associated by this OVC MUST map the same list of S-VLAN ID values to the OVC End Point associated by the OVC.	Yes	Done	Level 2/ Bundling

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R27	A given OVC MUST associate at most one OVC End Point at a given UNI.	Yes	Done	Level 1/ Foundation
O1	A given OVC MAY associate more than one OVC End Point at a given ENNI.	Yes	Done	Level 2/ Optional Requiremetns
R28	If an egress frame mapped to an OVC End Point results from an ingress frame mapped to an OVC End Point, there MUST be an OVC that associates the two OVC End Points. And, the two OVC End Points MUST be different from each other.	Yes	Done	Level 1/ Foundation
R29	At least one of the OVC End Points in an OVC MUST be at an ENNI .	Yes	Done	Level 1/ Foundation
R30	The OVC Identifier MUST be unique among all such identifiers for OVCs supported by the Operator MEN.	No	Done	N/A
R31	The OVC Identifier MUST contain no more than 45 bytes.	No	Done	N/A
R32	The OVC Maximum Transmission Unit Size MUST be at least 1526 bytes.	Yes	Done	Level 1/ Foundation
D2	The OVC Maximum Transmission Unit Size SHOULD be at least 2000 bytes.	Yes	Done	Level 2/ Optional Requiremetns
R33	When an ENNI Frame or a Service Frame is larger than the OVC MTU Size for the OVC associating the OVC End Point to which it is mapped, the receiving Operator for this frame MUST discard it, and the operation of a Bandwidth Profile that applies to this frame is not defined.	Yes	Done	Level 1/ Foundation
R34	The OVC Maximum Transmission Unit Size MUST be less than or equal to the MTU Size of each UNI where an OVC End Point exists that is associated by the OVC.	Yes	Done	Level 1/ Foundation
R35	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of 0), then the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 5 of 0.	Yes	Done	Level 1/ CE-VLAN ID Preservation
R36	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and not all of the UNIs with an OVC End Point associated by the OVC are such that all CE-VLAN IDs map to the OVC End Point (see Section 7.5.2 of 0), then the relationships between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 6 of 0.	Yes	Done	Level 1/ CE-VLAN ID Preservation
R37	When an OVC has the CE-VLAN ID Preservation attribute with a value of Yes and none of the End Points associated by the OVC are at UNIs, then the relationships between the format of the frame at the ingress ENNI and the corresponding frame at the egress ENNI MUST be as specified in Table 7 of 0.	Yes	Done	Level 1/ CE-VLAN ID Preservation
R38	When an OVC has the CE-VLAN CoS Preservation attribute with a value of Yes the relationship between the format of the frame at the ingress External Interface and the corresponding frame at the egress External Interface MUST be as specified in Table 8 of 0.	Yes	Done	Level 1/ CE-VLAN CoS Preservation

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R39	When an OVC has the S-VLAN ID Preservation attribute with a value of Yes, an egress ENNI Frame at an ENNI resulting from an ingress ENNI Frame at a different ENNI MUST have an S-VLAN ID value identical to the S-VLAN ID value of the ingress ENNI Frame.	Yes	Done	Level 2/ S-VLAN ID Preservation
R40	When an OVC has the S-VLAN ID Preservation attribute with a value of Yes, it MUST associate at most one OVC End Point located at a given ENNI.	Yes	Done	Level 2/ S-VLAN ID Preservation
R41	When an OVC has the S-VLAN ID Preservation attribute with a value of No, an egress ENNI Frame mapped to an OVC End Point resulting from an ingress ENNI Frame mapped to a different OVC End Point MUST have an S-VLAN ID value that has a one-to-one association with the S-VLAN ID of the ingress service frame.	Yes	Done	Level 1/ Foundation
R42	When an OVC has the S-VLAN CoS Preservation attribute with a value of Yes, an egress ENNI Frame at an ENNI resulting from an ingress ENNI Frame at a different ENNI MUST have an S-VLAN PCP value identical to the S-VLAN PCP value of the ingress ENNI Frame.	Yes	Done	Level 2/ S-VLAN CoS Preservation
R43	When the Color Forwarding attribute is Yes for an OVC, each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MUST be marked Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] if the corresponding ingress frame into the Operator MEN satisfied one or more of the following: • The corresponding ingress frame was a Service Frame that was declared Yellow by an Ingress Bandwidth Profile and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was a Service Frame with a frame header indicating Yellow as specified in MEF 23 [MEF 23] and the Service Frame was mapped to an OVC End Point at the UNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame that was declared Yellow by an Ingress Bandwidth Profile and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC, • The corresponding ingress frame was an ENNI Frame with a frame header indicating Yellow using one of the formats specified in Section 7.3.2 of [MEF 26] and the ENNI Frame was mapped to an OVC End Point at the ENNI that is associated by the OVC.	Yes	Planned	Level 1/ Color Forwarding
O2	When the Color Forwarding attribute is No, the Color marking of each egress ENNI Frame mapped to an OVC End Point that is associated by the OVC MAY be related to the Color of the corresponding ingress frame into the Operator Network in any way.	Yes	Planned	Level 2/ Optional Requiremetns

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R44	When the Unicast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with a unicast destination MAC address MUST be delivered to all of the other OVC End Points in the OVC. NOTE: The MEF26 editors clarified each R44 and R45 are conditional requirements by themselves.	Yes	Done	Level 1/ Foundation
R45	When the Unicast Frame Delivery is "conditional," a properly formatted ingress frame mapped to an OVC End Point at an External Interface with a unicast destination MAC address is delivered to all or a subset of all of the other OVC End Points in the OVC depending on certain conditions being met. When "conditional" is in force, the conditions for delivery MUST be specified. NOTE This requirement is not testable due to lack of specific *conditions* specified in MEF26. This is a service specification/configuration issue.	Yes	Done	Level 1/ Foundation
R46	When the Multicast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with a multicast destination MAC address MUST be delivered to all of the other End Points associated by the OVC.	Yes	Done	Level 1/ Foundation
R47	When the Multicast Frame Delivery is "conditional," a properly formatted ingress frame mapped to an OVC End Point at an External Interface with a multicast destination MAC address is delivered to all or a subset of all of the other OVC End Points associated by the OVC depending on certain conditions being met. When "conditional" is in force, the conditions for delivery MUST be specified.	Yes	Done	Level 1/ Foundation
R48	When the Broadcast Frame Delivery is "unconditional," all properly formatted ingress frames mapped to an OVC End Point at an External Interface with the broadcast destination MAC address MUST be delivered to all of the other OVC End Points associated by the OVC.	Yes	Done	Level 1/ Foundation
R49	When the Broadcast Frame Delivery is "conditional," a properly formatted ingress frame mapped to an OVC End Point at an External Interface with the broadcast destination MAC address is delivered to all or a subset of all of the other OVC End Points associated by the OVC depending on certain conditions being met. When "conditional" is in force, the conditions for delivery MUST be specified.	Yes	Done	Level 1/ Foundation
R50	The OVC End Point Identifier MUST be unique among all such identifiers for OVC End Points supported by the Operator MEN.	No	Done	N/A
R51	The OVC End Point Identifier MUST contain no more than 45 bytes.	No	Done	N/A
R52	For each OVC End Point at an ENNI, each possible S-Tag PCP value MUST be included in exactly one Class of Service Identifier.	Yes	Planned	Level 1/ Class of Service Identifier
O3	One of the Class of Service Identifiers MAY indicate 100% discard.	Yes	Planned	Level 2/ Optional Requiremetns

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R53	At a given ENNI, all OVC End Points associated by the same OVC MUST have the same Class of Service Identifiers. NOTE: This requirement is applicable for n > 1 OVC End Points at a given ENNI in the case of hairpin switching as covered in O1.	Yes	Planned	Level 2/ Optional Requirements
D3	An Operator MEN SHOULD support the use of different Class of Service Identifiers attributes for OVC End Points at an ENNI that are associated by different OVCs.	Yes	Planned	Level 2/ Optional Requiremetns
R54	Color indication for each ENNI Frame MUST conform to requirements [R3] and [R4] of MEF 23 [MEF 23].	Yes	Planned	Level 1/ Class of Service Identifier
R55	If the S-Tag PCP field is used to indicate Color for the ENNI Frame, then the Class of Services attribute MUST map S-Tag PCP values to L, M, and H as per [R8] of MEF 23 [MEF 23].	Yes	Planned	Level 1/ Class of Service Identifier
R56	If the DEI bit is used to indicate Color for the ENNI Frame, then the Class of Services attribute MUST map S-Tag PCP values to L, M, and H as per [R9] of MEF 23 [MEF 23].	Yes	Planned	Level 1/ Class of Service Identifier
R57	When the Ingress Bandwidth Profile per OVC End Point is in force for a given OVC End Point, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of 0 MUST be specified and the algorithm of Section 7.6.1 of 0 MUST be applied to all ingress ENNI Frames that are mapped to the given OVC End Point.	Yes	Planned	Level 2 / ENNI Ingress OVC End Point Bandwidth Profile
R58	The Color Mode for the Bandwidth Profile Algorithm MUST be color-aware.	Yes	Planned	Level 2 / ENNI Ingress OVC End Point Bandwidth Profile
R59	When the Egress Bandwidth Profile per OVC End Point is in force for a given OVC End Point, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of 0 MUST be specified and all egress ENNI Frames mapped to the given OVC End Point MUST have the property defined in 7.6.3 of 0.	Yes	Planned	Level 2 / ENNI Egress OVC End Point Bandwidth Profile
R60	The Color Mode for the Bandwidth Profile Algorithm MUST be color-aware.	Yes	Planned	Level 2 / ENNI Egress OVC End Point Bandwidth Profile
R61	When the Ingress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of [MEF26] MUST be specified and the algorithm of Section 7.6.1 of [MEF26] MUST be applied to all ingress ENNI Frames mapped to the OVC End Point that have the given ENNI Class of Service Identifier.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile
R62	The Bandwidth Profile Algorithm MUST be color-aware.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R63	When the Egress Bandwidth Profile per Class of Service Identifier is in force for a given ENNI Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.6.1 of 0 MUST be specified and all egress ENNI Frames mapped to the OVC End Point with the given Class of Service Identifier MUST have the property defined in Section 7.6.3 of 0.	Yes	Planned	Level 1 / ENNI Egress CoS Bandwidth Profile
R64	The Color Mode for the Bandwidth Profile Algorithm MUST be color-aware.	Yes	Planned	Level 1 / ENNI Egress CoS Bandwidth Profile
R65	The UNI OVC Identifier MUST be the concatenation of the UNI Identifier and the OVC Identifier.	No	Done	N/A
R66	The OVC End Point at the UNI for a Service Frame MUST be identified by the value of CE-VLAN ID of the Service Frame.	Yes	Done	Level 1/ Foundation
R67	An ingress Service Frame that is not mapped to an existing OVC End Point or EVC at the UNI MUST be discarded.	Yes	Done	Level 1/ Foundation
O4	Multiple CE-VLAN IDs MAY map to a single OVC End Point.	Yes	Done	Level 2/ Optional Requiremetns
R68	Each CE-VLAN ID MUST have one of the following mutually exclusive properties; 1) it maps to one OVC End Point, 2) it maps to one EVC that associates UNIs within the Operator MEN, 3) it does not map to either such an EVC or an OVC End Point.	Yes	Done	Level 1/ Foundation
R69	When an OVC associating the OVC End Point to which the CE-VLAN ID for untagged and priority tagged Service Frames is mapped does not have the CE-VLAN ID Preservation attribute in force, egress Service Frames for this OVC End Point at the given UNI MUST be untagged.	Yes	Done	Level 1/ Foundation
R70	There MUST be three mutually exclusive ways to determine the Class of Service Identifier from the content of a given Service Frame at UNI as described in Sections 7.5.3.1, 7.5.3.2, and 7.5.3.3 of 0. This requirement is meant to explain that there ARE three mutually exclusive ways to determine the CoS ID available. It is not mentioned to mandate the support of all three for any MEF26-compliant implementation. This requirement is not testable.	Yes	Done	Level 1/ Foundation
R71	When the Class of Service Identifier is based on OVC End Point, all ingress Data Service Frames mapped to the same OVC End Point at the UNI MUST have the same Class of Service Identifier.	Yes	Done	Level 1/ Foundation
R72	The Class of Service Identifier for an ingress Data Service Frame at the UNI MUST be determined by the OVC End Point and non-overlapping sets of values of the PCP field in the C-Tag.	Yes	Done	Level 1/ Foundation
R73	If the ingress frame does not contain a C-Tag, it MUST have the same Class of Service Identifier as an ingress frame with Priority Code Point field = 0 in the C-Tag.	Yes	Done	Level 1/ Foundation
R74	The union of the sets of PCP field values MUST contain all of the possible values. NOTE: Not testable by this ATS.	No	Done	N/A

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R75	The Class of Service Identifier for an ingress Data Service Frame at the UNI containing an IP packet MUST be determined by the OVC End Point and non-overlapping sets of values of the DSCP.	Yes	Done	Level 1/ Foundation
R76	The union of the sets of DSCP values MUST contain all of the possible DSCP values. NOTE: Not testable by this ATS.	No	Done	N/A
R77	Each ingress Data Service Frame at the UNI not containing an IP packet and mapped to a given OVC End Point MUST have the same Class of Service Identifier with a value agreed upon by the Operator and the Service Provider.	Yes	Done	Level 1/ Foundation
R78	When the Ingress Bandwidth Profile per OVC End Point at a UNI is in force for a given OVC End Point, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and the algorithm of Section 7.11.1 of [MEF 10.2] MUST be applied to all ingress ENNI Frames that are mapped to the given OVC End Point.	Yes	Planned	Level 2 / UNI Ingress OVC End Point Bandwidth Profile
R79	When the Ingress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and the algorithm of Section 7.11.1 of [MEF 10.2] MUST be applied to all ingress ENNI Frames with the given Class of Service Identifier.	Yes	Planned	Level 1 / UNI Ingress CoS Bandwidth Profile
R80	When the Egress Bandwidth Profile per OVC End Point at a UNI is in force for a given OVC End Point, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow.	Yes	Planned	Level 2 / UNI Egress OVC End Point Bandwidth Profile
R81	When the Egress Bandwidth Profile per Class of Service Identifier at a UNI is in force for a given Class of Service Identifier, suitable parameters <CIR, CBS, EIR, EBS, CF, CM> as defined in Section 7.11.1 of [MEF 10.2] MUST be specified and when the algorithm of Section 7.11.1 of [MEF 10.2] using these parameters is applied to these egress Service Frames, the result for each Service Frame MUST be to declare the Service Frame either Green or Yellow.	Yes	Planned	Level 1 / UNI Egress CoS Bandwidth Profile

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R82	CIR MUST be ≥ 0.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile, ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile, ENNI Egress OVC End Point Bandwidth Profile
R83	When CIR > 0, CBS MUST be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile, ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile, ENNI Egress OVC End Point Bandwidth Profile
R84	EIR MUST be ≥ 0.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile, ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile, ENNI Egress OVC End Point Bandwidth Profile

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
R85	When EIR > 0, EBS MUST be greater than or equal to the largest Maximum Transmission Unit size allowed for the ENNI Frames that the Bandwidth Profile applies to.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile, ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile, ENNI Egress OVC End Point Bandwidth Profile
R86	For a sequence of ENNI Frames, with arrival times at the reference point and lengths , the level of compliance color assigned to each ENNI Frame MUST be defined according to the algorithm in Figure 10.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile
O5	Multiple models of Ingress Bandwidth Profile application MAY exist simultaneously at an ENNI.	Yes	Planned	Level 2/ Optional Requiremetns
R87	An ENNI MUST be configured such that at most a single Ingress Bandwidth Profile applies to any given ingress ENNI Frame.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile
R88	The disposition of each ENNI Frame for delivery to each egress External Interface MUST be as described in Table 11 of 0.	Yes	Planned	Level 1 / ENNI Ingress CoS Bandwidth Profile Level 2 / ENNI Ingress OVC End Point Bandwidth Profile
R89	When a sequence of egress ENNI Frames with arrival times and lengths at the ENNI, are subjected to an Egress Bandwidth Profile with parameters <CIR, CBS, EIR, EBS, CF, CM>, the result of applying the algorithm of Section 7.6.1 of 0 to these frames MUST be to declare each ENNI Frame either Green or Yellow.	Yes	Planned	Level 1 / ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Egress OVC End Point Bandwidth Profile

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Req. ID	Requirement	Applicable	Creation Status	ATS Part/ATS Group
O6	Multiple models of Egress Bandwidth Profile application MAY exist simultaneously for an egress ENNI.	Yes	Planned	Level 2/ Optional Requiremetns
R90	However, an egress ENNI Frame MUST be subject to at most one Egress Bandwidth Profile.	Yes	Planned	Level 1 / ENNI Egress CoS Bandwidth Profile Level 2 / ENNI Egress OVC End Point Bandwidth Profile
R91	For each physical link in the ENNI, an ENNI-N MUST be capable of supporting Active DTE mode capabilities as specified in clause 57.2.9 of IEEE 802.3 [802.3 – 2005].	Yes	Planned	Level 2/ Link OAM
R92	For each physical link in the ENNI, an ENNI-N MUST be capable of supporting Passive DTE mode capabilities as specified in clause 57.2.9 of IEEE 802.3 [802.3 – 2005].	Yes	Planned	Level 2/ Link OAM
D4	When Link OAM is enabled on an ENNI-N, the loopback capability SHOULD be disabled.	Yes	Planned	Level 2/ Link OAM
D5	When Link OAM is enabled on an ENNI-N, it SHOULD not advertise its loopback capability, as defined in Section 57.2.11 of IEEE 802.3ah, during the discovery phase if Loopback is not enabled.	Yes	Planned	Level 2/ Link OAM
D6	The ENNI MTU size SHOULD be greater or equal to the MTU size of : • Each EVC MTU size crossing the ENNI plus 4 bytes (to accommodate the potential addition, at the ENNI, of an S-TAG), and • Each OVC which has an OVC End Point at this ENNI.	Yes	Done	Level 2/ Optional Requiremetns
R93	The OVC MTU size MUST be greater or equal to the EVC MTU size of each EVC supported by this OVC plus 4 bytes (to accommodate the potential addition, at the ENNI, of an S-TAG).	Yes	Done	Level 1/ Foundation

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17.2 Metro Ethernet Network (MEN) Interior

The most important aspect of a MEN in the context of this Abstract Test Suite is its opaque interior. In our case, the MEN may either consist of a single device, be spread across multiple devices each implementing modules of the ENNI specification, or even consist of a whole network.

The ENNI ATS does not need to differentiate between these alternative uses and physical topologies: In the end the MEN remains the same from the outside point of view – a black box with ENNI and UNI interfaces subject to conformance testing independent of its interior structure.

17.2.1 Single Device MEN

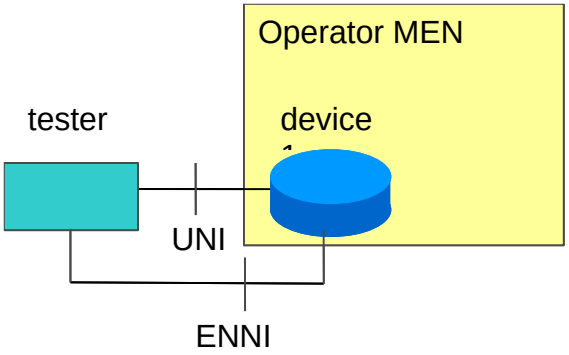

Figure 8: Single device MEN

In this case, all aspects of the ENNI implementation – actual ENNI port(s), UNI port(s) and a provisioning/management solution – are implemented in a single device. The conformance test solution can be directly connected with this device and the tests can be executed in an isolated way.

It is important to note that the MEN is required to implement all applicable (mandatory or conditional) ENNI requirements in order to pass all test cases of the ATS. If the *device1* would only implement a single ENNI port or would not provide a management solution to enable testing of [R3], for example, it could be tested against this ATS but would not pass all of the mandatory or conditional test cases.

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17.2.2 Multiple Device MEN

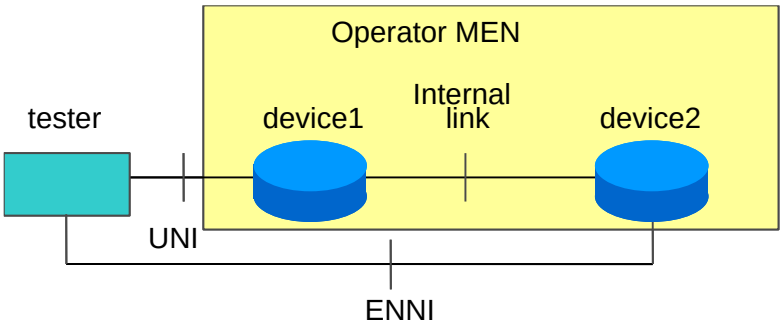

Figure 9: Multiple device MEN

In this case, the ENNI implementation is spread across multiple physical devices inside the MEN. The MEN consists of the collection of all devices jointly implementing ENNI. The nature of the *link* between the devices inside the MEN is completely opaque to the test suite.

In this case, one of the devices (*device1*) only implements a UNI where the other one (*device2*) implements only an ENNI. The management is implemented on either one.

If the MEN is implemented correctly, it can pass all mandatory and conditional test cases of the ATS. Individual devices inside the MEN, if tested by their own, would fail some of the test cases or would not even qualify for any test case to be executed (otherwise the *Single Device MEN* configuration above would work as well).

17.2.3 Multiple Device, Separate Management

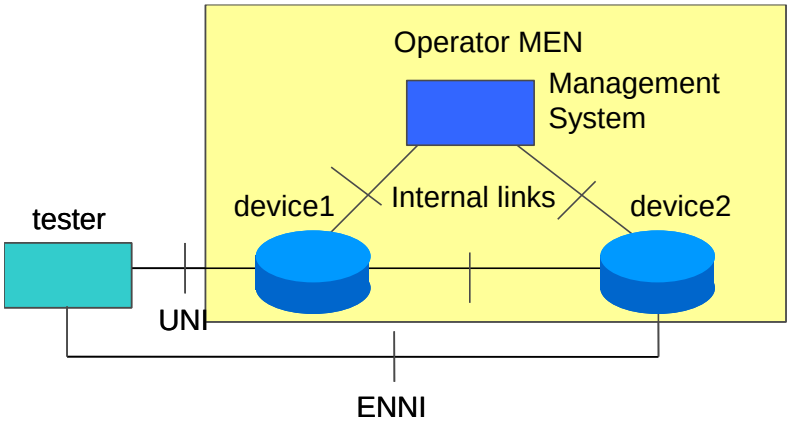

Figure 10: Multiple devices with separate management MEN

In this final example, major functions are spread across three types of devices. In addition to the separation of ENNIs and UNIs as above, the management (provisioning) system is contained in a separate, third device as well. Again, the interior links inside the MEN are completely opaque to the test suite.

All these are just examples of physical implementations of MENs. There can be a myriad more types of MENs – it is an explicit non-goal for the ATS to differentiate between them.

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17.2.4 Vendor vs. Service Provider Testing

Any of the structures above qualify for service provider testing as well as for vendor testing. Sometimes it seems to be common sense that service provider infrastructure testing must be large and complex whereas vendors would only submit a single device to a conformance test. This assumption is wrong with ENNI. As seen above, there are good reasons why vendors might sometimes want to submit an MEN with ENNI functionality consisting of multiple devices to a test. On the other hand, a service provider could pass network conformance testing with a "Single Device" MEN configuration as above, given a suitable implementation.

Whether the result of a single-device service provider test is useful is beyond the scope of this ATS and needs to be decided by the user (recipient) of the conformance test results.

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17.3 CBS Test Procedure

This test procedure has been modeled following ITU-T Y.1564, Appendix I.2 (with stricter parameters suited to a conformance test scenario). It is applicable for a color-aware or non-color-aware service with CBS > 0. The variable names in this appendix reference variables in section 5.

1. The transmitter turns off for the minimum time necessary to fill the token bucketto or greater than 102% * CBS1*8/CIR1 to initialize the measurement with the B_c CBS Token Bucket full and has overflown by an amount equal to or greater than 2% * CBS1.
2. Then the transmitter bursts the largest number of back-to-back (minimum interframe gap) frames that will draw down the number of remaining bytes in the B_c Token Bucket to more than or equal to the greatest of[5]:
    a. 0.5% of CBS1
    b. 0.5 times ENNI_MTU
    c. The lesser of (25%*CBS1) and (0.0003 s *CIR1/8)

    (After the last frame of the burst, the transmitter turns off for the smallest amount of time necessary to refill the CBS Token Bucket to at least 50% full. Then the transmitter resumes non-bursty transmission at the CIR1. Frames should be transmitted at constant intervals, e.g. without burstiness or interval variation. The period *T* is defined to end when the total number of frames transmitted during the period is 10 times the number of frames transmitted during the burst. The transmitter continues to cycle the frame bursting over successive periods of *T* in this sequence starting from step 1 until the FlowTransmissionDuration time as defined in section 5.4.8 has passed.
3. Measure the received frames upon egress at the other end of the network. All green frames shall be received.

[5] Note: These numbers represent a tolerance margin for token bucket implementations such that the token bucket is never completely emptied during the test procedure.

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17.4 EBS Test Procedure

This test procedure has been modeled following ITU-T Y.1564, Appendix I.3 (with stricter parameters suited to a conformance test scenario). It is applicable for a color-aware service with CIR > 0 and EBS > 0.

In this test there will be two test flows, the first for the Green/CBS test flow and the second for the Yellow/EBS test flow.

The green cycle has a period of nominal length T_G, and the yellow cycle has a period of nominal length T_Y both defined later. The green cycle and the yellow cycle run asynchronously with each other.

1. The green frame transmitter turns off for the minimum time necessary to fill the token bucket to or greater than 102% * (CBS*8/CIR) to initialize the measurement with the B_c Token Bucket full and has overflown by at least 2 % * CBS.
   At the same time, the yellow frame transmitter turns off for the time equal to or greater than 102% * (EBS*8/EIR) to initialize the measurement with the B_e Token Bucket full and has overflown by at least 2 % * EBS.
2. Then the transmitter bursts the largest number of green frames that will draw down the number of remaining bytes in the B_c Token Bucket, to more than or equal to the greatest of[6]:
   a. 0.5% of the CBS1
   b. 0.5 times ENNI_MTU
   c. The lesser of (25%*CBS1) and (0.0003 s *CIR1/8)

   Likewise, the transmitter bursts the largest number of yellow frames that will draw down the number of remaining bytes in the B_e Token Bucket to more than or equal to the greatest of:
   a. 0.5% of the EBS1
   b. 0.5 times ENNI_MTU
   c. The lesser of (25%*EBS1) and (0.0003*EIR1/8)

   After the last frame of the green frame burst, the transmitter stops transmitting green frames for the smallest amount of time necessary to refill the CBS Token Bucket to at least 50% full. Likewise, after the last frame of the yellow frame burst, the transmitter stops transmitting yellow frames for the smallest amount of time necessary to refill the EBS Token Bucket to at least 50% full. Then the transmitter resumes non-bursty green and yellow frame transmission at the CIR1 and EIR1 for the rest of the periods T_G and T_Y, respectively. Each period is defined to end when the total number of frames transmitted during that period is 10 times the number of frames transmitted during the burst. At the end of each period, the cycle is repeated from the beginning of this step 1 until the FlowTransmissionDuration time as defined in section 5.4.8 has passed.

[6] Note: These numbers represent a tolerance margin for token bucket implementations such that the token bucket is never completely emptied during the test procedure.

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3. Measure the green-colored frames, the yellow-colored frames and the total combined information rate upon egress at the other end of the network. All green frames shall be received, and more than zero yellow frames shall be received.
   NOTE: The intent of this test procedure is not to test for the yellow portion of the bandwidth profile; it is only testing whether the implementation allows yellow traffic to get through at all.

Further Notes (not part of the test procedure):

Note that the bursting may include periods of burst green frames only, burst yellow frames only, burst green – burst yellow frames combined, and burst frames from one cycle transmitted during EIR- or CIR-spaced frames from the other cycle. When a burst frame competes for a transmission time with a spaced frame, the burst frame shall take precedence if it is the first frame in the burst. If a later frame of the burst competes with an EIR- or CIR-spaced frame for transmission, then the timing of the spaced frame shall take precedence, and the burst frame shall wait in queue.

Note that burst frames from one cycle may be transmitted freely at line rate in the spaced period of the frames from the other cycle transmitting at CIR or EIR. When burst frames of both cycles compete for the transmitter, the transmitter may be shared on a pro-rata basis between the bursts, or one burst may be served with preference while the other stream waits its turn for bursting while continuing to be served at EIR or CIR. During non-burst periods, if a green frame transmitted at CIR competes for a transmit time with a yellow frame transmitted at EIR, then the green CIR frame shall be transmitted at the proper time while the yellow frame is queued. Green CIR frames may be transmitted during the idle time between yellow frames transmitted at EIR, and yellow EIR frames may be transmitted during the idle time between green frames transmitted at CIR.

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