Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Test Suite Structure and Test Purposes for WirelessMAN-SC**
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Re:	RE: 1802.16.2-03/01
Abstract	This document contains Test Purposes developed within the WiMAX forum for IEEE Std 802.16.
Purpose	To aid TGC in the development of a TSS&TP document
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

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IEEE 802.16 10-66 GHz Conformance Testing

Sub-part 2: Test Suite Structure and Test Purposes (TSS & TP) Specification

Introduction

To evaluate conformance of a particular implementation, it is necessary to have a common testing document together with common test procedures. The Test Suite Structure (TSS) and Test Purposes (TP) document serves this purpose.

1. Scope

This standard represents the Test Suite Structure and Test Purposes (TSS&TP), per ISO/IEC Standards 9646-1, and 9646-2 (1995) and ITU-T Standards X.290 and X.291, for conformance specification of base stations and subscriber stations based upon theWirelessMAN-SC (10-66 GHz) air interface specified in IEEE Std 802.16.

2. Purpose

3. References

The following documents contain provisions, which, through reference in this text, constitute provisions of the present document.

References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

For a specific reference, subsequent revisions do not apply.

For non-specific references, the latest versions apply.

[1] IEEE Std 802.16-2001 (4/8/2002): "Local and Metropolitan Area Networks – Part 16: Standard Air Interface for Fixed Wireless Access Systems"

[2] ISO/IEC 9646-1: "Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts"

[3] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection – Conformance testing methodology and framework - Part 6: Protocol profile test specification"

[4] ISO/IEC 9646-7: "Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements"

[5] IEEE 802.16c-2002: "Amendment to IEEE Standard for Local and Metropolitan Area Networks – Part 16: Air Interface for Broadband Fixed Wireless Access Systems – Detailed System profiles for 10-66 GHz"

[6] IEEE P1802.16.1/D1-2002: "Protocol Implementation Conformance Statements for 10-66 GHz WirelessMAN–SC Air Interface"

4. Definitions and Abbreviations

4.1 Definitions

For the purposes of the present document, the terms defined in 1 as amended by 5, 2,3, and 4 apply.

4.2 Acronyms

For the purposes of the present document, the acronyms defined in 1 as amended by 5, 2,3, and 4 apply.

5. Test Suite Structure (TSS)

5.1 Structure

The following table shows the Test Suite Structure (TSS) including its defined subgroups for conformance testing.

Table 1 Test Suite Groups

Test Suite Groups	Protocol Groups	Protocol Subgroups	Test Groups				
			CA	BV	BI	BO	TI
Frame Structure							
SS Basic Capabilites negotiation							
Privacy and Key Management							
Registration functions							
Dynamic Services							
Bandwidth allocation and Polling							
MAC PDU							
ATM CS							
Packet CS							
Clock Comparison							
Radio Link Control							
Physical Layer							

5.2 Test Groups

The test groups are organized into four levels of groups. The levels include the test suite groups, protocol groups, protocol subgroups, and test groups. The test suites are the highest level breakdowns. The second level separates the protocol services in functional modules within each test suite. The third level breaks the protocol groups into individual test case headings. The last level in each branch contains one or more of the standard ISO subgroups CA, BV, BI, BO and TI (defined below).

5.3 Test Suites and Protocol Groups

The protocol groups identify the each of the subdivisions of the test suites.

The Test Suites define the top level testable areas for conformance testing. The test suites include TBD.

The protocol groups within each test suite are defined below.

5.3.1 Channel Descriptors and Maps

5.3.2 Ranging, Burst and Capability Negotiation

5.3.3 Registration and TFTP

5.3.4 Privacy Key Management & Authentication Test Suite

5.3.4.1 Privacy Key Management (PKM) Function

The Privacy Key Management function group is divided into two functional modules. These include the Authentication, Traffic Encryption Keys (TEKs) and Authorization Keys (AKs), and Security Associations (SAIDs). This function is primarily responsible for validating conformance of the normal operation of the authorization and key exchanges and to validate security associations between the SS and BS.

5.3.4.2 PKM State Machines Function

The PKM State Machines function group is divided into two functional modules. These include the Authorization State Machine (ASM) and the Traffic Encryption Key (TEK) State Machine (TSM). This function is primarily responsible for validating conformance of the normal operation of the two state machines as it validates all states, state transitions, events and messages between the SS and BS function properly.

5.3.4.3 PKM Configuration Settings Function

The PKM Configuration Settings function group is divided into one functional module. It includes the PKM Timeouts and PKM Lifetimes. This function is primarily responsible for validating conformance of the normal operation of all timers associated with PKM between the SS and BS function properly.

5.3.4.4 Inopportune PKM Messages Received Function

The Inopportune PKM Messages Received function group is divided into two functional modules. These include the Inopportune PKM Request and Inopportune PKM Response Messages. This function is primarily responsible for validating conformance to all inopportune messages received by the SS and BS.

5.3.5 Dynamic Services

The Dynamic Services test suite is broken down into three protocol groups. These are Dynamic Service Addition (DSA), Dynamic Service Change (DSC), and Dynamic Service Deletion (DSD). Those three protocol groups are further broken down into functional test groups, state machine groups, and timer test groups wherever applicable.

5.3.5.1 Dynamic Service Addition

This protocol group covers the tests to validate conformance to the Dynamic Service Addition functions. Normal DSA message flows are validated as well as invalid or inopportune DSA message behavior between a BS and SS. Timer tests are also identified to test timeouts during the DSA process, both BS and SS initiated.

5.3.5.1.1 Dynamic Service Addition State Machine Function

This sub-group tests the conformance of valid DSA-REQ, DSA-RSP, and DSA-ACK messages between the BS and SS. This would be the expected, or normal operation during which service addition takes place. This sub-group covers normal receipt of DSA-REQ messages, normal DSA-RSP messages, and normal DSA-ACK messages (as well as the normal Request Received message in an SS initiated DSA message flow).

5.3.5.1.2 Dynamic Service Addition Message Format

This sub-group verifies the DSA message formats for selected service flows and functions. Some default message formats are validated as well as non-default setups.

5.3.5.1.3 Invalid Dynamic Service Addition Message Formats Function

This sub-group tests the reaction of the BS and SS to invalid DSA message formats. These include invalid DSA-REQ, DSA-RSP, DSX-RVD, and DSA-ACK messages.

5.3.5.1.4 Inopportune Dynamic Service Addition Message Formats Function

This sub-group tests the reaction of the BS and SS to inopportune DSA message flows. Tests include sending DSA messages in the wrong order, receipt of DSA messages in the wrong order, and duplicate message transmission/reception.

5.3.5.1.5 Dynamic Service Addition Timeouts

This sub-group tests the conformance of the BS and SS to all DSA timeouts identified by the standards. This sub-group of tests requires that timers be changed to simulate timeouts, or that special test utilities be implemented allowing message flows to be broken such that timers expire as described in the standards.

5.3.5.2 Dynamic Service Change

This protocol group covers the tests to validate conformance to the Dynamic Service Change functions. Normal DSC message flows are validated as well as invalid or inopportune DSC message behavior between a BS and SS. Timer tests are also identified to test timeouts during the DSC process, both BS and SS initiated.

5.3.5.2.1 Dynamic Service Change State Machine Function

This sub-group tests the conformance of valid DSC message flows between the BS and SS. This would be the expected, or normal operation during which service change takes place. This sub-group covers normal receipt of DSC-REQ messages, normal DSC-RSP messages, and normal DSC-ACK messages (as well as the normal DSC-RVD message in a SS initiated DSC message flow).

5.3.5.2.2 Dynamic Service Change Message Format

This sub-group verifies the DSC message formats for selected service flows and functions. Some default message formats are validated as well as non-default setups.

5.3.5.2.3 Invalid Dynamic Service Change Message Formats Function

This sub-group tests the reaction of the BS and SS to invalid DSC messages. These include invalid DSC-REQ, DSC-RSP, DSC-RVD, and DSC –ACK messages.

5.3.5.2.4 Inopportune Dynamic Service Change Message Formats Function

This sub-group tests the reaction of the BS and SS to inopportune DSC message flows. Tests include sending DSC messages in the wrong order, receipt of DSC messages in the wrong order, and duplicate message transmission/reception.

5.3.5.2.5 Dynamic Service Change Timeouts

This sub-group tests the conformance of the BS and SS to all DSC timeouts identified by the standards. This sub-group of tests requires that timers be changed to simulate timeouts, or that special test utilities be implemented allowing message flows to be broken such that timers expire as described in the standards.

5.3.5.3 Dynamic Service Deletion

This protocol group covers the tests to validate conformance to the Dynamic Service Deletion functions. Normal DSD message flows are validated as well as invalid or inopportune DSD message behavior between a BS and SS. Timer tests are also identified to test timeouts during the DSD process, both BS and SS initiated.

5.3.5.3.1 Dynamic Service Deletion State Machine Function

This sub-group tests the conformance of valid DSD-REQ, and DSD-RSP messages between the BS and SS. This would be the expected, or normal operation during which service addition takes place. This sub-group covers normal receipt of DSD-REQ messages, and normal DSD-RSP messages.

5.3.5.3.2 Dynamic Service Deletion Message Format

This sub-group verifies the DSD message formats for selected service flows and functions. Some default message formats are validated as well as non-default setups.

5.3.5.3.3 Invalid Dynamic Service Deletion Message Formats Function

This sub-group tests the reaction of the BS and SS to invalid DSD message formats. These include invalid DSD-REQ, and DSD-RSP messages.

5.3.5.3.4 Inopportune Dynamic Service Deletion Message Formats Function

This sub-group tests the reaction of the BS and SS to inopportune DSD message flows. Tests include sending DSD messages in the wrong order, receipt of DSD messages in the wrong order, and duplicate message transmission/reception.

5.3.5.3.5 Dynamic Service Deletion Timeouts

This sub-group tests the conformance of the BS and SS to all DSD timeouts identified by the standards. This sub-group of tests requires that timers be changed to simulate timeouts, or that special test utilities be implemented allowing message flows to be broken such that timers expire as described in the standards.

5.3.6 Polling

5.3.7 Reset and Registration

5.3.8 Clock Comparison

5.3.9 Uplink Scheduling

5.3.10 MAC PDUs

5.3.11 Bandwidth Allocation

5.3.12 RLC

5.3.13 PHY

5.3.14 ATM Convergence Sublayer

5.3.15 Packet Convergence Sublayer

5.3.16 Main Test Groups

The main test groups are the capability (CA), the valid behavior (BV), the invalid behavior (BI), inopportune behavior (BO) and the timer (TI) tests group.

5.3.16.1 Capability (CA) tests

This test sub group shall provide limited testing of the major IUT capabilities aiming to insure that the claimed capabilities are correctly supported, according to the PICS. Note that CA tests are very

similar to Valid Behavior (BV) tests. The distinction will be that CA tests will be the normal default case of messages and BV tests will be any legal normal variants (for example, change the cryptographic suite selection from the default).

5.3.16.2 Valid Behavior (BV) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt or exchange of valid Protocol Data Units (PDUs). Valid PDUs means that the exchange of messages and the content of the exchanged messages are considered as valid. Note that CA tests are very similar to Valid Behavior (BV) tests. The distinction will be that CA tests will be the normal default case of messages and BV tests will be any legal normal variants (for example, change the cryptographic suite selection from the default).

Notes:

² It is assumed that a method to look at messages at a protocol level is available (this may be a serial port session, a protocol analyzer, etc.)

5.3.16.3 Invalid Behavior (BI) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt of a syntactically invalid PDU.

Notes:

² It is assumed that a method to look at messages at a protocol level is available (this may be a serial port session, a protocol analyzer, etc.).

² Care must be taken when defining tests in this group as they should be according to requirements in IEEE 802.16 or in the PICS Proforma.

5.3.16.4 Inopportune Behavior (BO) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt of a syntactically correct PDU not expected in the actual message exchange.

Notes:

² It is assumed that a method to look at messages at a protocol level is available (this may be a serial port session, a protocol analyzer, etc.).

² Care must be taken when defining tests in this group as they should be according to requirements in IEEE 802.16 or in the PICS Proforma.

5.3.16.5 Timer (TI) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after timer activity (start, stop, expiration, etc.).

6. Test Purposes (TP)

6.1 Introduction

This section contains the details pertaining to each TP defined in the TSS. Each test purpose contains a description of a well defined objective of testing, focusing on a single conformance requirement or a set of related conformance requirements.

6.1.1 TP definition conventions

The TPs are defined following particular rules as shown in the following table.

Table 2 TP Definition Rules

TP Id according to the TP naming conventions	Reference. IEEE P802.16/D5-2001 - xyz Initial condition. Stimulus. Expected behavior.
TP Id	The TP Id is a unique identifier it shall be specified according to the TP naming conventions defined in sub clause TP naming conventions
Reference	The reference should contain the references of the subject to be validated by the actual TP (specification reference, clause, and paragraph).
Condition	The condition defines in which initial state the IUT has to be to apply the actual TP.
Stimulus	The stimulus defines the test event to which the TP is related.
Expected behavior	Definition of the events that are expected from the IUT to conform to the base specification.

6.1.2 TP naming conventions

The identifier of the TP is built according to the following table.

Table 3 TP Naming Convention

Identifier Format: TP/<st>/<pg>/<fm>/<x>-<nnn>	Abbreviation	Abbreviation Meaning
<st> = side type	BS	Base Station
	SS	Subscriber Station
<pg> = protocol group	PKM	Privacy Key Management
	PSM	PKM State Machines
	PCS	PKM Configuration Settings
	DCT	Digital Certificates Tests
	IVP	Invalid PKM Message Formats
	IOP	Inopportune PKM Messages Received
	DSA	Dynamic Service Addition
	DSC	Dynamic Service Change
	DSD	Dynamic Service Deletion
	TBD …	More Will be Added as more sections are completed
<fm> = functional module	ATA	Authentication, TEKs and AKs
	SAIDS	Security Associations
	ASM	Authorization State Machine
	TSM	Traffic Encryption Key State Machine
	PTL	PKM Timeouts and Lifetimes
	DCP	Digital Certificates and Processing

This is an unapproved draft, subject to change.

Table 3 TP Naming Convention

	INREQ	Invalid PKM Request Messages
	INRSP	Invalid PKM Response Messages
	IOREQ	Inopportune PKM Request Messages
	IORSP	Inopportune PKM Response Messages
	TBD …	More Will be Added as more sections are completed
<x> = type of testing	CA	Capability Tests
	BV	Valid Behavior Tests
	BI	Invalid Behavior Tests
	BO	Inopportune Behavior Tests
	TI	Timer Tests
<nnn> = sequential number	(000 – 999)	Test Purpose Number

6.1.2.1 Example:

TP/SS/PSM/TSM/BV-010 is the valid behaiviour test purpose number 010 of the Traffic Encryption Key State Machine (TSM) of the PKM State Machines (PSM) function implemented at SS side.

6.1.3 Sources of TP definitions

All TPs are specified according to reference [1].

6.2 Test purposes for SS

6.2.1 Channel Descriptors and Maps

6.2.1.1 Channel parameter acquisition

Table 4

TP/SS/INI/MAP/CA-000	Reference: IEEE 1802.16.1, Table A21/TBD Initial condition. SS has not acquired DL parameters Stimulus. Switch on Expected behavior. Check that the IUT starts scanning for DL channels
TP/SS/INI/MAP/CA-001	Reference. IEEE 1802.16.1, Table A21 Initial condition. SS scanning for downlink channel Stimulus. Switch On Expected behavior. Check that IUT only scans channels contained in its Frequency list
TP/SS/INI/MAP/CA-002	Reference: IEEE 1802.16.1, Table A21 Initial condition. SS scanning for downlink channel Stimulus. BS sends DL-MAP messages with a period of 1ms Expected behavior. Check that DL-MAP message received with a period of 1ms
TP/SS/INI/MAP/CA-003	Reference: IEEE 1802.16.1, Table A21/1 Initial condition. SS scanning for downlink channel Stimulus. BS sends DL-MAP messages with a period of 1ms Expected behavior. Check that the IUT moves on to scanning next channel if BS ID is not found on the list of allowed values.
TP/SS/INI/MAP/CA-004	Reference: IEEE 1802.16.1, Table A21/1,2 Initial condition. SS scanning for downlink channel Stimulus. BS sends DL-MAP messages with a period of 1ms. BS sends a DCD message within 10 s. Expected behavior. Check that DCD message is received correctly and that downlink PHY parameters are established correctly
TP/SS/INI/MAP/CA-005	Reference: IEEE 1802.16.1, Table A22/1 Initial condition. SS synchronized downlink channel Stimulus. BS sends DL-MAP and UL-MAP with a period of 1ms. BS sends a UCD message within 10 s. Expected behavior. Check that UCD message is received correctly and that downlink PHY parameters are established correctly

6.2.1.2 Channel parameter maintenance

Table 5

TP/SS/OP/MAP/TI-000	Reference: Initial condition. SS synchronized Stimulus. BS sends DL-MAP messages with a period of 1ms. BS omits DL-MAP for 600 ms. Expected behavior. Check that SS starts scanning for next downlink channel.

Table 5

TP/SS/INI/MAP/TI-001	Reference. Initial condition. SS synchronized Stimulus. BS sends DL-MAP messages with a period of 1ms. BS does not send any DCD message. Expected behavior. Check that SS starts scanning for next downlink channel after 50 s.
TP/SS/INI/MAP/TI-002	Reference. Initial condition. SS synchronized and UL parameters established Stimulus. BS sends DL-MAP but omits UL-MAP for 600 ms. BS sends a UL-MAP with a grant to the SS Expected behavior. Check that SS does not transmit
TP/SS/INI/MAP/TI-003	Reference. Initial condition. SS synchronized and UL parameters established Stimulus. BS sends UL-MAP messages containing grants with a period of 1ms. BS does not send any UCD message. Expected behavior. Check that SS ceases to transmit after 50s

6.2.1.3 Update of channel descriptors

Table 6

TP/SS/RLC/MAP/CA-000	Reference: IEEE 1802.16.1, Table A30/1,TBR Initial condition. SS operational Stimulus. SS receives DCD message with incremented Configuration Change Count twice. Subsequently the SS receives a DL-MAP with DCD Count equal to the old Configuration Change Count. BS is provoked to send data using each burst profile. Expected behavior. SS receives data correctly with old profile.
TP/SS/RLC/MAP/CA-001	Reference: IEEE 1802.16.1, Table A30/1,TBR Initial condition. SS operational Stimulus. SS receives UCD message with incremented Configuration Change Count twice. Subsequently the SS receives a UL-MAP with UCD Count equal to the old Configuration Change Count. This UL-MAP shall have grants using each burst profile. Expected behavior. .SS sends correctly data using the old set of burst profiles .
TP/SS/RLC/XCD/CA-002	Reference: IEEE 1802.16.1, Table A30/1,TBR Initial condition. SS has received UCD with incremented Configuration Change Count at least twice. Stimulus: BS sends UL-MAP with UCD Count. corresponding to the new Configuration Change Count with grants. This UL-MAP shall have grants using each burst profile. Expected behavior. SS sends correctly data using the new set of burst profiles .

Table 6

TP/SS/RLC/XCD/CA-003	Reference: IEEE 1802.16.1, Table A30/1,3
	Initial condition.SS has received DCD with incremented Configuration Change Count at least twice.
	Stimulus: BS sends DL-MAP with DCD Count. corresponding to the new Configuration Change Count. BS is provoked to send data using each burst profile.
	Expected behavior. SS receives data correctly with new profile..

6.2.2 Ranging, Burst and Capability Negotiation

6.2.2.1 Initial ranging

6.2.2.1.1 Initial ranging – State machine

Table 7

TP/SS/INI/RNG/CA-000	Reference: IEEE 1802.16.1, Table A23/1-3
	Initial condition. SS synchronized with UL and DL parameters established
	Stimulus. BS sends UL-MAP message containing 2^**Ranging Backoff Start** Initial Maintenance IEs.
	Expected behavior. SS sends properly formatted RNG-REQ within one of the indicated intervals.
TP/SS/INI/RNG/CA-001	Reference: IEEE 1802.16.1, Table A23/5,6,9
	Initial condition. SS waiting for RNG-RSP
	Stimulus. BS sends RNG-RSP with status /= Abort
	Expected behavior. SS establishes Basic and Primary Management CID.
	SS applies timing and power corrections and sends RNG-REQ with corrected timing and power on the Basic connection in invited station maintenance slot.
TP/SS/INI/RNG/CA-002	Reference: IEEE 1802.16.1, Table A23/8
	Initial condition. SS waiting for RNG-RSP
	Stimulus. BS sends RNG-RSP with status = Abort containing DL-Frequency Override Parameter.
	Expected Behavior. SS moves to frequency designated in RNG-RSP and starts Initial Ranging on said channel.

Table 8

TP/SS/INI/RNG/BV-000	Reference
	Initial condition. SS waiting for RNG-RSP
	Stimulus. BS sends RNG-RSP with status = Abort not containing a DL-Frequency Override.
	Expected behavior. SS resets MAC and start scanning for DL-Channel

Table 8

TP/SS/INI/RNG/BV-001	Reference: IEEE 1802.16.1, Table A23/2
	Initial condition. SS waiting for RNG-RSP. Retry counter set to < **Contention Ranging Retries**. T3 timed out. **Ranging Backoff Start< Ranging Backoff End**
	Stimulus. BS sends UL-MAP(s) message containing 2^**Ranging Backoff End** Initial Maintenance IEs.
	Expected behavior. SS sends properly formatted RNG-REQ within one of the indicated intervals with increased power. SS increases back-off window.
TP/SS/INI/RNG/BV-002	Reference: IEEE 1802.16.1, Table A23/2
	Initial condition. SS waiting for RNG-RSP. Retry counter set to < **Contention Ranging Retries**. T3 timed out. SS at maximum power.
	Stimulus. BS sends UL-MAP(s) message containing 2^**Ranging Backoff End** Initial Maintenance IEs.
	Expected behavior. SS sends properly formatted RNG-REQ within one of the indicated intervals with minimum power
TP/SS/INI/RNG/BV-003	Reference: IEEE 1802.16.1, Table A23/2
	Initial condition. SS waiting for RNG-RSP
	Stimulus. BS sends RNG-RSP with status /= Abort and asks for unreasonable power and timing adjustments. BS sends UL-MAP(s) message containing 2^**Ranging Backoff End** Initial Maintenance IEs
	Expected behavior. SS sends properly formatted RNG-REQ within one of the indicated intervals with Ranging Anomalies correctly indicated.

Table 9

TP/SS/INI/RNG/TI-000	Reference.
	Initial condition. SS waiting for RNG-RSP. Retry counter set to **Contention Ranging Retries**.
	Stimulus. None
	Expected behavior. SS resets MAC and start scanning for DL-Channel after 200ms.

6.2.2.1.2 Initial Ranging Message Format

Table 10

TP/SS/INI/RNGMF/CA-000	Reference.
	Initial condition. BS has granted Initial Maintenance IEs.
	Stimulus. SS sends initial RNG-REQ
	Expected behavior. Check that CID=0x000, SS MAC Address = MAC address of IUT, Ranging Anomalies = 0.

6.2.2.1.3 Initial Ranging- Invalid Message Format

Table 11

TP/SS/INI/RNGMF/BV-000	Reference. Initial condition. SS waits for RNG-RSP Stimulus. SS receives invalid RNG-RSP with correct CID and MAC address Expected behavior. Check that IUT restarts Initial Ranging .

6.2.2.2 Periodic Ranging

6.2.2.2.1 Ranging State machine

Table 12

TP/SS/XXX/RNG/CA-000	Reference. Initial condition. SS Tx power not at max or min limit. RNG-RSP power change request does not exceed limits. Stimulus. SS receives RNG-RSP message to change power level Expected behavior. SS raises or lowers power as requested.
TP/SS/XXX/RNG/CA-001	Reference. Initial condition. SS Tx power not at max or min limit. RNG-RSP power change request does not exceed limits. Stimulus. SS receives RNG-RSP message to change timing advance. Expected behavior. SS changes timing as requested. Subsequent transmissions with corrected timing.

6.2.2.2.2 Ranging Message Formats

Table 13

TP/SS/xxx/RNGMF/CA-000	Reference. Initial condition. BS has granted SS capacity Stimulus. SS sends RNG-REQ Expected behavior. Check that CID=Basic CID, SS MAC Address = MAC address of IUT, Ranging Anomalies = 0.

6.2.2.2.3 Ranging Invalid Message Formats

Table 14

TP/SS/xxx/RNGMF/BO-000	Reference. Initial condition. BS has granted SS capacity Stimulus. SS receives RNG-RSP with unreasonable timing or power adjustments. Expected behavior. Check that IUT ignores RNG-RSP.

6.2.2.3 Downlink Burst Profile Management

6.2.2.3.1 DBPC- State machine

Table 15

TP/SS/XXX/YYY/CA-000	Reference: IEEE 1802.16.1, Table A29/4 Initial condition. SS operational at DIUC n. Stimulus. SS received signal S/N goes below threshold for change to more robust DIUC k Expected behavior. Upon receiving next grant the IUT sends a DBPC-REQ for DIUC k
TP/SS/XXX/YYY/CA-001	Reference: IEEE 1802.16.1, Table A29/4 Initial condition. SS operational at DIUC n. Operation at less robust DIUC k is allowed. Stimulus. SS received signal S/N goes above threshold for change to less robust DIUC k Expected behavior. The IUT sends a DBPC-REQ for DIUC k

Table 16

TP/SS/XXX/YYY/BV-000	Reference: IEEE 1802.16.1, Table A29/6 Initial condition. SS operational at DIUC n, but has sent request to move to more robust DIUC k. Stimulus. BS sends data/management message to SS using DIUC n before sending the DBPC-RSP message Expected behavior. SS receives the data/message on DIUC n.
TP/SS/XXX/YYY/BV-001	Reference: Initial condition. SS operational at DIUC n. Operation at less robust DIUC k is not allowed. Stimulus. SS received signal S/N goes above threshold for change to less robust DIUC k Expected behavior. IUT refrains from sending a DBPC-REQ for DIUC k

Table 16

TP/SS/XXX/YYY/BV-002	Reference. IEEE 1802.16.1, Table A29/6
	Initial condition. SS has sent request to move to less robust DIUC k.
	Stimulus. BS sends data/ messages using DIUC k after sending DBPC-RSP using DIUC n in the same DL- frame.
	Expected behavior. SS receives the data/message sent at DIUC k correctly.

6.2.2.3.2 DBPC Message format

Table 17

TP/SS/xxx/DBPCMF/CA-000	Reference.
	Initial condition. None required
	Stimulus. SS received signal S/N goes below threshold for change to more or less robust DIUC
	Expected behavior. SS sends DBPC-REQ requesting DIUC=k. Check that: Management message type = 23. DIUC=k is one of DIUC values allowed.

6.2.2.4 Negotiate Basic Capabilities

6.2.2.4.1 Negotiate Basic Capabilities-state machine

Table 18

TP/SS/INI/SBC/CA-000	Reference: IEEE 1802.16.1, Table A24/1
	Initial condition. Initial ranging performed.
	Stimulus. SS granted bandwidth
	Expected behavior. SS sends SBC-REQ listing its capabilities
TP/BS/INI/SBC/CA-001	Reference: IEEE 1802.16.1, Table A24/2
	Initial condition. Waiting for SBC-RSP
	Stimulus. SS receives SBC-RSP
	Expected behavior. SS enables/disables capabilities as commanded in SBC-RSP

Table 19

TP/SS/INI/SBC/TI-000	Reference: IEEE 1802.16.1, Table A24/3
	Initial condition. SS waiting for SBC-RSP retries not exhausted
	Stimulus. T18 expires
	Expected behavior. After timer expires SS retransmits SBC-REQ when receiving UL-grant.
TP/SS/INI/SBCMF/TI-001	Reference.
	Initial condition. SS waiting for SBC-RSP, retries exhausted.
	Stimulus. T18 expires.
	Expected behavior. Check that IUT resets and starts over.

6.2.2.4.2 Negotiate Basic Capabilities-message format

Table 20

TP/SS/INI/SBCMF/CA-000	Reference: IEEE 1802.16.1, Table A84
	Initial condition. Initial Ranging completed .
	Stimulus. SS is granted bandwidth.
	Expected behavior. SS sends SBC Request. Check that SS Demod Support correctly reflects capabilities of IUT SS Modulator Support correctly reflects capabilities of IUT SS DL FEC Types correctly reflects capabilities of IUT SS UL FEC Types correctly reflects capabilities of IUT BW Allocation support indicates GPSS and that only one of the Half-Duplex or Full duplex flags are set reflecting correctly the implementation.

6.2.2.4.3 Negotiate Basic Capabilities-invalid message format

Table 21

TP/SS/INI/SBCMF/BI-000	Reference.
	Initial condition. SS waiting for SBC-RSP retries not exhausted.
	Stimulus. SS receives invalid SBC-RSP
	Expected behavior. Check that SS retransmits SBC-REQ at earliest possible opportunity.
TP/SS/INI/SBCMF/BI-001	Reference.
	Initial condition. SS waiting for SBC-RSP, retries exhausted.
	Stimulus. SS receives invalid SBC-RSP
	Expected behavior. Check that IUT resets and starts over.

6.2.3 Registration IP connectivity and TFTP

6.2.3.1 Registration

6.2.3.1.1 State Machine

Table 22

TP/SS/INI/REG/CA-000	Reference: IEEE 1802.16.1, Table A26/1 Initial condition. SS authorized. Primary SA established. Stimulus. SS granted bandwidth. Expected behavior. SS sends REG-REQ with capabilities correctly reported.
TP/BS/INI/REG/CA-001	Reference: IEEE 1802.16.1, Table A24/2 Initial condition. Waiting for REG-RSP. Stimulus. SS receives REG-RSP. Expected behavior. IUT establishes Secondary Management connection with correct IP version. IUT send DHCP Discover on said connection.
TP/BS/INI/REG/CA-002	Reference: IEEE 1802.16.1, Table A24/2, IEEE 1802.16.1, Table A52/5-11 Initial condition. Waiting for REG-RSP. Stimulus. SS receives REG-RSP with capabilities reduced from the set reported by the SS. Expected behavior. IUT establishes Secondary Management connection with correct IP version. IUT sets up internal parameters as per REG-RSP. IUT send DHCP Discover on said connection.

Table 23

TP/SS/INI/REG/TI-000	Reference: IEEE 1802.16.1, Table A24/3 Initial condition. SS waiting for REG-RSP, retries not exhausted Stimulus.Timer T6 expires. Expected behavior. After timer expires IUT retransmits REG-REQ when receiving UL-grant.
TP/SS/INI/REG/TI-001	Reference. Initial condition. SS waiting for REG-RSP, retries exhausted Stimulus.Timer T6 expires. Expected behavior. IUT resets.

6.2.3.1.2 Registration message formats

Table 24

TP/SS/INI/REGMF/CA-000	Reference:IEEE 1802.16.1, Table A51
	Initial condition. SS is Authorized
	Stimulus. SS granted bandwidth.
	Expected behavior. SS sends REG-REQ Check that Response field indicates OK . Check that message contain the parameters listed below with valid values and that HMAC Tuple is correct. MAC Version UL CID support HMAC Tuple. Check that if the following parameters are present the values are within allowed limits. Vendor ID Encoding PKM Flow Control DSx Flow Control MCA Flow Control IP version MAC CRC Support Multicast Polling Group CID Support Vendor Specific Extensions Check that the parameters are transmitted in the correct order.

Table 25

TP/SS/INI/REGMF/BI-000	Reference. IEEE 1802.16.1, Table A52/
	Initial condition. SS waiting for REG-RSP, retries not exhausted
	Stimulus. SS Receives REG-RSP with invalid HMAC
	Expected behavior. SS retransmits RNG-REQ after receiving UL-grant.
TP/SS/INI/REGMF/BI-001	Reference: IEEE 1802.16.1, Table A52/6-13
	Initial condition. SS waiting for REG-RSP, retries not exhausted
	Stimulus. SS Receives REG-RSP with valid HMAC but with invalid values in any of the following parameters: UL CID Support PKM Flow Control DSx Flow Control MCA Flow Control IP version MAC CRC Support Multicast Polling Group CID Support Vendor ID Encoding Vendor Specific Extensions Expected behavior. SS retransmits REG-REQ after receiving UL-grant.

6.2.3.2 Establish IP connectivity, ToD and TFTP

6.2.3.2.1 Establish IP connectivity- Protocols

Table 26

TP/SS/INI/IPC/CA-000	Reference: IEEE 1802.16.1, Table A27/1-5 Initial condition. SS registered. Stimulus. SS granted bandwidth. Expected behavior. SS implements DHCP correctly over Secondary Management Connection.
TP/SS/INI/IPC/CA-001	Reference: IEEE 1802.16.1, Table A28/1-3 Initial condition. SS has established IP address Stimulus. SS granted bandwidth. Expected behavior. SS implements Time Protocol correctly over the Secondary Management Connection
TP/SS/INI/IPC/CA-002	Reference: IEEE 1802.16.1, Table A41/1 Initial condition. SS has established IP address and ToD Stimulus. SS granted bandwidth. Expected behavior. SS download configuration file via TFTP over the Secondary Management Connection., if applicable (refer to PIXIT). In any case, SS sends TFTP-CPLT when ready for data connection establishment.
TP/SS/INI/IPC/CA-003	Reference: IEEE 1802.16.1, Table A41/2 Initial condition. IUT has sent TFTP-CPLT Stimulus. IUT reveives TFTP-RSP Expected behavior. IUT does not retransmit TFTP-CPLT. IUT becomes 'operational' by performin vendor specific actions.

6.2.3.2.2 Establish IP connectivity Timers and Counters

Table 27

TP/SS/INI/IPCTI/TI-000	Reference. Initial condition. SS awaiting TFTP-RSP, retries not exhausted. Stimulus. Timer expires Expected behavior. SS resends TFTP-CPLT .
TP/SS/INI/IPCTI/TI-001	Reference. Initial condition. SS awaiting TFTP-RSP, retries not exhausted. Stimulus.Timer expires Expected behavior. IUT resets and starts over.

6.2.3.2.3 Establish IP connectivity -Message format

Table 28

TP/SS/INI/IPCMF/CA-000	Reference. Initial condition. SS has received configuration file. Stimulus. SS granted bandwidth. Expected behavior. SS sends TFTP-CPLT. Check that message format is correct.

6.2.4 Privacy Key Management and Authentication

6.3 Authorization State Machine

Table 29

TP/SS/PKM/AUTH/ CA-000	Reference: IEEE 1802.16.1, Table A39/1,2 Intial condition:Basic Capabilities negotiation ongoing Stimulus: IUT receives SBC-RSP Expected Behavior: IUT sends Authent Info and Auth Request. The Auth request correctly mirrors the security capabilties supported by the SS.
TP/SS/PKM/AUTH/ CA-001	Reference:IEEE 1802.16.1, Table A39/1-3 Intial condition: IUT has sent Authent Info and Auth Req Stimulus: IUT receives Auth Reply Expected Behavior: IUT sends one Key Request message for each SA in the Auth Reply
TP/SS/PKM/AUTH/ CA-002	Reference: IEEE 1802.16.1, Table A39/8 Intial condition: IUT is authorized Stimulus: A change in the set of Static SAs of the IUT in the BS has been made. SS reauthorization is triggered through means described in PIXIT statement. Expected Behavior: IUT sends an Auth Request that correctly mirrors the current set of Static SAs.

Table 30

TP/SS/PKM/AUTH/ BV-000	Reference: IEEE 1802.16.1, Table A39/1 Intial condition: IUT is authorized Stimulus: IUT receives Auth Invalid Expected Behavior: IUT sends an Auth Request

Table 30

TP/SS/PKM/AUTH/ BV-001	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition: IUT has received Auth Invalid and responded with a Auth Request
	Stimulus: IUT receives Auth Invalid
	Expected Behavior: IUT sends an Auth Request after Reauth Wait Timeout
TP/SS/PKM/AUTH/ BV-002	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition: IUT has received Auth Invalid and responded with a Auth Request
	Stimulus: IUT receives Perm Auth Reject
	Expected Behavior: TBR
TP/SS/PKM/AUTH/ BV-003	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition: IUT has received Auth Invalid and responded with a Auth Request
	Stimulus: IUT receives Auth Reject other than Perm Auth Reject.
	Expected Behavior: IUT sends an Autthent Info and Auth Request after Auth Reject Wait Timeout.
TP/SS/PKM/AUTH/ BV-004	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition: IUT has sent Authent Info and Auth Request
	Stimulus: IUT receives Perm Auth Reject
	Expected Behavior: TBR
TP/SS/PKM/AUTH/ BV-005	Reference: IEEE 1802.16.1, Table A39/1,3
	Intial condition: IUT has sent Auth Request. 'PKM flow control' parameter value set to non-zero value.
	Stimulus: IUT receives Auth Reply with a number of SAs larger than 'PKM flow control'.
	Expected Behavior: IUT sends a Key Request for each SA. The number of outstanding transactions is less than the number indicated by the PKM flow control parameter.

Table 31

TP/SS/PKM/AUTH/TI-000	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition:IUT has sent Authent Info and Auth Req
	Stimulus: None
	Expected Behavior: IUT resends Authent Info and Auth Request after Authorize Wait Timeout
TP/SS/PKM/AUTH/TI-001	Reference: IEEE 1802.16.1, Table A39/1
	Intial condition: IUT has sent Authent Info and Auth Req
	Stimulus: IUT receives Auth Reject
	Expected Behavior: IUT sends Authent Info and Auth Request after Auth Reject Wait Timeout

Table 31

TP/SS/PKM/AUTH/TI-002	Reference: IEEE 1802.16.1, Table A39/1 Intial condition: IUT has received Auth Reply with valid AKs Stimulus: None Expected Behavior: IUT sends Auth Request after Authorization Grace Timeout
TP/SS/PKM/AUTH/TI-003	Reference: IEEE 1802.16.1, Table A39/1 Intial condition: Stimulus: IUT receives Auth Reply with values overriding the default ones. Expected Behavior: Check that IUT uses the updated values.

Table 32

TP/SS/PKM/AUTH/BI-000	Reference: IEEE 1802.16.1, Table A39/1 Intial condition:IUT has sent Authent Info and Auth Req Stimulus: IUT receives an improperly formatted PKM-RSP message. Expected Behavior: IUT resends Authent Info and Auth Request after Authorize Wait Timeout
TP/SS/PKM/AUTH/BI-001	Reference: IEEE 1802.16.1, Table A39/1 Intial condition: IUT has sent Authent Info and Auth Request. Stimulus: IUT receives Auth Reply indicating unsupported version of the security protocol. Expected Behavior: TBR

Table 33

TP/SS/PKM/AUTH/B0-000	Reference: Intial condition:IUT has sent Authent Info and Auth Req Stimulus: IUT receives an properly formatted PKM-RSP with code other than 5 or 6 (Auth Reply/Reject) Expected Behavior: IUT silently discards PKM-RSP message IUT resends Authent Info and Auth Request after Authorize Wait Timeout
TP/SS/PKM/AUTH/B0-001	Reference: Intial condition:IUT has sent Authent Info and Auth Req Stimulus: IUT receives a MAC Management message other than RNG-RSP Expected Behavior: IUT silently discards said message IUT resends Authent Info and Auth Request after Authorize Wait Timeout

6.3.1 Message formats

Table 34

TP/SS/PKM/AUTH/ MF-000	Reference:IEEE 1802.16.1, Table A62 Intial condition:IUT has negotiated Basic Capabilities Stimulus: IUT has received SBC-RSP Expected Behavior: IUT sends Authent Info Check that message format is correct, the message parameters are correct and that they are sent in the correct order.
TP/SS/PKM/AUTH/ MF-001	Reference:IEEE 1802.16.1, Table A54 Intial condition:IUT has negotiated Basic Capabilities Stimulus: IUT has received SBC-RSP Expected Behavior: IUT sends Auth Request Check that message format is correct, the message parameters are correct and that they are sent in the correct order.

6.4 TEK

Table 35

TP/SS/PKM/TEK/CA-000	Reference: IEEE 1802.16.1, Table A39/3,7, IEEE 1802.16.1, Table A55, IEEE 1802.16.1, Table A57 Intial condition:IUT has sent Authent Info and Auth Req Stimulus: IUT receives Auth Reply specifying the Primary SA Expected Behavior: IUT sends Key Request
TP/SS/PKM/TEK/CA-001	Reference: IEEE 1802.16.1, Table A39/3,11 Intial condition:IUT has sent Key Request Stimulus: IUT receives valid Key Reply with keys for an SA. Subsequently the IUT receives data to be transmitted from the user network to be sent on a connection mapped to this SA Expected Behavior: IUT transmits the user data encrypted using the correct encryption method and the newer of the two keys.
TP/SS/PKM/TEK/CA-002	Reference:IEEE 1802.16.1, Table A39/11 Intial condition:IUT has two valid TEKs for an SA with SAID=i Stimulus: IUT receives transport PDUs on a connection mapped to SAID=i encrypted with the older TEK Expected Behavior: IUT correctly decrypts the PDUs and delivers the data to an external interface. Note: This test to be done for all supported encryption algorithms including 'No encryption'.
TP/SS/PKM/TEK/CA-003	Reference: IEEE 1802.16.1, Table A39/11 Intial condition:IUT has two valid TEKs for an SA with SAID=i Stimulus: IUT receives transport PDUs on a connection mapped to SAID=i encrypted with the newer TEK Expected Behavior: IUT correctly decrypts the PDUs and delivers the data to an external interface. Note: This test to be done for all supported encryption algorithms.

Table 36

TP/SS/PKM/TEK/BI-000	Reference: IEEE 1802.16.1, Table A39/3 Intial condition:IUT has sent Key Request for Primary SA Stimulus: IUT receives Key Reject indicating 'Unauthorized SAID'. Expected Behavior: TBR Note: It is assumed that the authentication of the Key Request was successful.
TP/SS/PKM/TEK/BI-001	Reference: IEEE 1802.16.1, Table A39/3 Intial condition:IUT has sent Key Request for Primary SA. Stimulus: IUT receives Auth Invalid with error code = 6 (Message Authentication Failure). Expected behavior: IUT resends Key Request. Note: This TP is in contradiction with 802.16-2001 which needs to be fixed.
TP/SS/PKM/TEK/BI-002	Reference: IEEE 1802.16.1, Table A39/3 Intial condition:IUT has sent Key Request for Primary SA Stimulus: IUT receives Key Reject that fails message authentication. Expected behavior: IUT resends Key Request after timeout Note: It is assumed that the authentication of the Key Request was successful.

Table 37

TP/SS/PKM/TEK/TI-000	Reference: IEEE 1802.16.1, Table A39/3 Intial condition:IUT has sent Key Request. Stimulus: None. Expected Behavior: IUT resends Key Request after timeout.
TP/SS/PKM/TEK/TI-001	Reference: IEEE 1802.16.1, Table A39/3 Intial condition:IUT has sent Key Request Stimulus:IUT receives Key Reply. Expected Behavior: IUT sends Key Request after TEK Refresh Timeout.

6.4.1 Message Formats

Table 38

TP/SS/PKM/TEK/MF-000	Reference:IEEE 1802.16.1, Table A57 Intial condition:IUT has negotiated Basic Capabilities Stimulus: IUT has received Auth Reply Expected Behavior: IUT sends Key Request Check that message format is correct

6.4.2 Security association addition

Table 39

TP/BS/PKM/SAM/CA-000	Reference:IEEE 1802.16.1, Table A39/10
	Intial condition: IUT is authorized.
	Stimulus: IUT receives SA add message for a new SA using supported cryptographic methods.
	Expected Behavior: SS sends Key Request for the added SA.

Table 40

TP/BS/PKM/SAM/BI-000	Reference: IEEE 1802.16.1, Table A39/10
	Intial condition: IUT is authorized.
	Stimulus: IUT receives SA add message for a new SA calling for unsupported cryptographic methods.
	Expected Behavior: TBR
	Note: Error in spec.
TP/BS/PKM/SAM/BI-001	Reference: IEEE 1802.16.1, Table A39/10
	Intial condition: IUT is authorized. SS has established a number of SAs equal to the maximum number supported as reported in the SBC-REQ
	Stimulus: IUT receives SA add message calling for an additional SA.
	Expected Behavior: TBR
	Note: Error in spec.

6.4.3 Dynamic Services

6.4.3.1 Dynamic Service Addition

6.4.3.1.1 Capabilities

Table 41 Dynamic Service Addition - Capabilities

TP/SS/DS/DSA/CA-000	Reference: IEEE 1802.16.1, Table A34/1,2
	Initial Condition: SS has transmitted TFTP-CPLT to BS. (SS is authenticated and registered.)
	Stimulus: BS transmits to the SS a DSA-REQ message instructing the SS to create and activate both the UL and DL portions of a service
	Expected Behavior: The SS shall transmit to the BS a DSA-RSP message accepting the creation and activation of both the UL and DL portions of the service.
	Repeat this test for all service types supported by the SS.

Table 41 Dynamic Service Addition - Capabilities

TP/SS/DS/DSA/CA-001	Reference: IEEE 1802.16.1, Table A34/3
	Initial Condition: End of TP/SS/DS/DSA/CA-000 - the SS has transmitted a DSA-RSP to the BS.
	Stimulus: SS receives valid DSA-ACK from BS.
	Expected Behavior: SS performs necessary actions (vendor specific) to utilize activated service.

6.4.3.1.2 Valid Behavior

Table 42 Dynamic Service Addition - Valid Behavior

TP/SS/DS/DSA/BV-000	Reference: IEEE 1802.16.1, Table A34/1,2
	Initial Condition: SS has transmitted TFTP-CPLT to BS. (SS is authenticated and registered.)
	Stimulus: BS transmits to the SS a DSA-REQ message instructing the SS to initiate and activate a service containing only a downlink portion.
	Expected Behavior: The SS shall transmit to the BS a DSA-RSP message accepting the creation and activation of the DL service.
	Repeat this test for all downlink-only service types supported by the SS.
TP/SS/DS/DSA/BV-001	Reference: IEEE 1802.16.1, Table A34/1,2
	Initial Condition: SS has transmitted TFTP-CPLT to BS. (SS is authenticated and registered.)
	Stimulus: BS transmits to the SS a DSA-REQ message instructing the SS to initiate and activate a service containing only an uplink portion.
	Expected Behavior: The SS shall transmit to the BS a DSA-RSP message accepting the creation and activation of the UL service.
	Repeat this test for all uplink-only service types supported by the SS.
TP/SS/DS/DSA/BV-002	Reference:
	Initial Condition: SS has transmitted DSA-RSP to BS.
	Stimulus: SS receives a redundant copy of the DSA-REQ that stimulated the DSA-RSP, within 110% of the maximum value of timer T7.
	Expected Behavior: SS resends DSA-RSP to BS.
TP/SS/DS/DSA/BV-003	Reference:
	Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.)
	Stimulus: BS transmits to the SS a DSA-REQ message instructing the SS to initiate a service to the provisioned state.
	Expected Behavior: The SS shall transmit to the BS a DSA-RSP message accepting the creation of the service in the provisioned state.
TP/SS/DS/DSA/BV-004	Reference:
	Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.)
	Stimulus: BS transmits to the SS a DSA-REQ message instructing the SS to initiate a service to the admitted state.
	Expected Behavior: The SS shall transmit to the BS a DSA-RSP message accepting the creation of the service in the admitted state

6.4.3.1.3 Invalid Behavior

Table 43 Dynamic Service Addition - Invalid Behavior

TP/SS/DS/DSA/BI-000	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS transmits to the SS an erroneous DSA-REQ message. Expected Behavior: The SS transmits a DSA-RSP message indicating the errored parameter.
TP/SS/DS/DSA/BI-001	Reference: Initial Condition: SS has transmitted a DSA-RSP message to the SS. Stimulus: SS receives an erroneous DSA-ACK message from the BS. Expected Behavior: The SS resends the DSA-RSP. This test asumes the Transaction ID in the DSA-ACK matched the one in the DSA-RSP. The other case is covered as BO.
TP/SS/DS/DSA/BI-002	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) DSx Flow Control SS Capability was set lower than the capability of the BS. Stimulus: BS sends more DSA-REQ messages than DSx Flow Control SS Capability before sending any DSA-ACK messages. Expected Behavior: SS ignores all DSA-REQ messages while SS DSx Flow Control DSA-ACK messages are outstanding.
TP/SS/DS/DSA/BI-003	Reference: Initial Condition: End of test TP/SS/DS/DSA/BV-003 - BS sent more DSA-REQ messages than DSx Flow Control SS Capability before sending any DSA-ACK messages. Stimulus: BS sends DSA-ACK messages sufficient to reduce outstanding DSA-REQ transactions to less than DSx Flow Control SS Capability. BS then sends a DSA-REQ message Expected Behavior: SS responds with a DSA-RSP message.
TP/SS/DS/DSA/BI-004	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) UL CID Support SS Capability was set lower than the capability of the BS. Stimulus: BS sends more DSA-REQ messages for UL services than allowed by UL CID Support SS Capability without deleting any connections. Expected Behavior: SS responds with a DSA-RSP message declaring the service to be in error.
TP/SS/DS/DSA/BI-005	Reference: Initial Condition: End of test TP/SS/DS/DSA/BV-005 - BS sent more DSA-REQ messages than allowed by UL CID Support SS Capability without deleting any connections. Stimulus: BS deletes enough uplink connections to reduce the number of UL CIDs being used to less than UL CID Support SS Capability. BS then sends a DSA-REQ message Expected Behavior: SS responds with a DSA-RSP message accepting the service.

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6.4.3.1.4 Inopportune Behavior

Table 44 Dynamic Service Addition - Inopportune Behavior

TP/SS/DS/DSA/BO-000	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: SS receives a DSA-ACK for a non-existant service. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSA/BO-001	Reference: Initial Condition: SS has has transmitted DSA-RSP to BS. Stimulus: SS receives a redundant copy of the DSA-REQ that stimulated the DSA-RSP, after the maximum value of timer T7. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSA/BO-002	Reference: Initial Condition: SS has has transmitted DSA-RSP to BS and has received a DSA-ACK for the service. Stimulus: SS receives a redundant copy of the DSA-REQ that stimulated the DSA-RSP, after receiving the DSA-ACK. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSA/BO-003	Reference: Initial Condition: SS has has transmitted DSA-RSP to BS and has received a DSA-ACK for the service. Stimulus: SS receives a redundant copy of the DSA-ACK. Expected Behavior: SS ignores the message.

6.4.3.1.5 Timer

Table 45 Dynamic Service Addition - Timer

TP/SS/DS/DSA/TI-000	Reference: Initial Condition: SS has transmitted a DSA-RSP message to the BS. The SS has retried less than "DSx Response Retries" times. Stimulus: SS does not receive a DSA-ACK message from the BS within T8 timeout. Expected Behavior: SS resends the DSA-RSP message.
TP/SS/DS/DSA/TI-001	Reference: Initial Condition: SS has transmitted a DSA-RSP message to the BS. The SS has retried "DSx Response Retries" times. Stimulus: SS does not receive a DSA-ACK message from the BS within T8 timeout. Expected Behavior: SS does not resend the DSA-RSP message

6.4.3.1.6 Message Formats

For all TP/SS/DS/DSA tests ensure that messages transmitted by the SS contain the correct parameters in the correct order.

6.4.3.2 Dynamic Service Change

6.4.3.2.1 Capabilities

Table 46 Dynamic Service Change - Capabilities

TP/SS/DS/DSC/CA-000	Reference: IEEE 1802.16.1, Table A36/1,2
	Initial Condition: BS has established an active service, consisting of both an uplink and downlink portion, with the SS.
	Stimulus: BS transmits to the SS a DSC-REQ message instructing the SS to change the parameters of both the UL and DL portions of the service.
	Expected Behavior: The SS responds with a DSA-RSP massage acknowledging the change.
	Repeat this test for all service types supported by the SS.
TP/SS/DS/DSC/CA-001	Reference:IEEE 1802.16.1, Table A36/3
	Initial Condition: End of TP/SS/DS/DSA/CA-000 - the SS has transmitted a DSA-RSP to the BS.
	Stimulus: SS receives valid DSA-ACK from BS.
	Expected Behavior: SS performs necessary actions (vendor specific) to change service parameters.

6.4.3.2.2 Valid Behavior

Table 47 Dynamic Service Change - Valid Behavior

TP/SS/DS/DSC/BV-000	Reference:
	Initial Condition: BS has established an active service, consisting of at least a downlink portion, with an SS.
	Stimulus: BS transmits a DSC-REQ message to the SS instructing it to change the parameters of the downlink portion of the service.
	Expected Behavior: The SS shall transmit to the BS a DSC-RSP message accepting the change in the DL parameters of the service.
	Repeat this test for all downlink service types supported by the SS.
TP/SS/DS/DSC/BV-001	Reference:
	Initial Condition: BS has established an active service, consisting of at least an uplink portion, with an SS.
	Stimulus: BS transmits a DSC-REQ message to the SS instructing it to change the parameters of the uplink portion of the service.
	Expected Behavior: The SS shall transmit to the BS a DSC-RSP message accepting the change in the UL parameters of the service.
	Repeat this test for all uplink service types supported by the SS

Table 47 Dynamic Service Change - Valid Behavior

TP/SS/DS/DSC/BV-002	Reference: Initial Condition: SS has transmitted DSC-RSP to BS. Stimulus: SS receives a redundant copy of the DSC-REQ that stimulated the DSC-RSP, within 110% of the maximum value of timer T7. Expected Behavior: SS resends DSC-RSP to BS.
TP/SS/DS/DSC/BV-003	Reference: Initial Condition: BS has established an active service with an SS. DSx Flow Control SS Capability was set lower than the capability of the BS. Stimulus: BS sends more DSx-REQ messages than DSx Flow Control SS Capability before sending any DSx-ACK messages. SS then receives a DSC-REQ mesage from the BS. Expected Behavior: SS does not transmit DSC-RSP message.
TP/SS/DS/DSC/BV-004	Reference: Initial Condition: A service exists in the provisioned state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the admitted state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the admitted state.
TP/SS/DS/DSC/BV-005	Reference: Initial Condition: A service exists in the provisioned state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the active state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the active state.
TP/SS/DS/DSC/BV-006	Reference: Initial Condition: A service exists in the active state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the admitted state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the admitted state.
TP/SS/DS/DSC/BV-007	Reference: Initial Condition: A service exists in the active state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the provisioned state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the provisioned state.
TP/SS/DS/DSC/BV-008	Reference: Initial Condition: A service exists in the admitted state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the provisioned state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the provisioned state.

Table 47 Dynamic Service Change - Valid Behavior

TP/SS/DS/DSC/BV-009	Reference: Initial Condition: A service exists in the admitted state between the BS and the SS. Stimulus: BS transmits DSC-REQ message to SS instructing it to change the service to the active state. Expected Behavior: The SS shall transmit a DSC-RSP message instructing the BS accepting the request to change the service to the active state.

6.4.3.2.3 Invalid Behavior

Table 48 Dynamic Service Change - Invalid Behavior

TP/SS/DS/DSC/BI-000	Reference: Initial Condition: A service exists between the BS and the SS. Stimulus: SS receives an erroneous DSC-REQ message from the BS. Expected Behavior: SS sends a DSC-RSP message indicating the error.
TP/SS/DS/DSC/BI-001	Reference: Initial Condition: SS has transmitted a DSC-RSP message to the BS. Stimulus: SS receives an erroneous DSC-ACK message from the BS. Expected Behavior: SS resends the DSC-RSP message.

6.4.3.2.4 Inopportune Behavior

Table 49 Dynamic Service Change - Inopportune Behavior

TP/SS/DS/DSC/BO-000	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: SS receives a DSC-ACK for a non-existant service. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSC/BO-001	Reference: Initial Condition: SS has has transmitted DSS-RSP to BS. Stimulus: SS receives a redundant copy of the DSC-REQ that stimulated the DSCRSP, after the maximum value of timer T7. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSC/BO-002	Reference: Initial Condition: SS has has transmitted DSC-RSP to BS and has received a DSC-ACK for the service. Stimulus: SS receives a redundant copy of the DSC-REQ that stimulated the DSC-RSP, after receiving the DSC-ACK. Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.

Table 49 Dynamic Service Change - Inopportune Behavior

TP/SS/DS/DSC/BO-003	Reference:
	Initial Condition: SS has has transmitted DSC-RSP to BS and has received a DSC-ACK for the service.
	Stimulus: SS receives a redundant copy of the DSC-ACK.
	Expected Behavior: SS ignores the message.

6.4.3.2.5 Timer

Table 50 Dynamic Service Change - Timer

TP/SS/DS/DSC/TI-000	Reference:
	Initial Condition: SS has transmitted a DSC-RSP message to the BS. The SS has retried less than "DSx Response Retries" times.
	Stimulus: SS does not receive a DSC-ACK message from the BS within T8 timeout.
	Expected Behavior: SS resends the DSC-RSP message.
TP/SS/DS/DSC/TI-001	Reference:
	Initial Condition: SS has transmitted a DSC-RSP message to the BS. The SS has retried "DSx Response Retries" times.
	Stimulus: SS does not receive a DSC-ACK message from the BS within T8 timeout.
	Expected Behavior: SS does not resend the DSC-RSP message

6.4.3.2.6 Message Formats

For all TP/BS/DS/DSC tests ensure that messages transmitted by the SS contain the correct parameters in the correct order.

6.4.3.3 Dynamic Service Deletion

6.4.3.3.1 Capabilities

Table 51 Dynamic Service Deletion - Capabilities

TP/SS/DS/DSD/TI-000	Reference: IEEE 1802.16.1, Table A38/1,2
	Initial Condition: Service consisting of both an uplink and a donwlink portion exists between BS and SS.
	Stimulus: BS transmits DSD-REQ to SS instructing it to delete the uplink portion and another DSD-REQ instructing it to delete the downlink portion of the service.
	Expected Behavior: SS sends a DSD-RSP for the UL portion and a separate DSD-RRSP for the DL portion.

6.4.3.3.2 Valid Behavior

Table 52 Dynamic Service Deletion - Valid Behavior

TP/SS/DS/DSD/BV-000	Reference: Initial Condition: Service with at least a downlink portion exists between the BS and SS. Stimulus: BS transmits DSD-REQ to SS instructing it to delete the downlink portion of a service. Expected Behavior: The SS shall transmit to the BS a DSD-RSP message indicating that it has deleted the DL service. Repeat this test for all downlink service types supported by the SS.
TP/SS/DS/DSD/BV-001	Reference: Initial Condition: Service with at least an uplink portion exists between the BS and SS. Stimulus: BS transmits a DSD-REQ message to the SS instructing it to delete the uplink portion of a service. Expected Behavior: The SS shall transmit to the BS a DSD-RSP message indicating that it has deleted the UL service. Repeat this test for all uplink service types supported by the SS.
TP/SS/DS/DSD/BV-002	Reference: Initial Condition: SS has transmitted DSD-RSP to BS. Stimulus: SS receives a redundant copy of the DSD-REQ that stimulated the DSD-RSP, within 110% of the maximum value of timer T7. Expected Behavior: SS resends DSD-RSP to BS.

6.4.3.3.3 Invalid Behavior

Table 53 Dynamic Service Deletion - Invalid Behavior

TP/SS/DS/DSD/BI-000	Reference: Initial Condition: Service exists between BS and SS. Stimulus: SS receives an erroneous DSD-REQ message from the BS. Expected Behavior: SS transmits a DSD-RSP message indicating the error.

6.4.3.3.4 Inopportune Behavior

Table 54 Dynamic Service Deletion - Inopportune Behavior

TP/SS/DS/DSD/BO-000	Reference:
	Initial Condition: Service exists between BS and SS.
	Stimulus: SS receives a DSD-REQ for a non-existant service.
	Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.
TP/SS/DS/DSD/BO-001	Reference:
	Initial Condition: Service exists between BS and SS. BS has transmitted DSD-REQ to SS.
	Stimulus: SS receives a redundant DSD-REQ for the service service, substantially later than the maximum value of T7 after sending the DSD-RSP.
	Expected Behavior: SS ignores the message. Reporting the error to the management plane is allowed.

6.4.3.3.5 Timer

There are no DSD timer expiration tests for the SS.

6.4.3.3.6 Message Formats

For all TP/SS/DS/DSC tests ensure that messages transmitted by the SS contain the correct parameters in the correct order.

6.4.4 Bandwidth allocation and Polling

6.4.4.1 Bandwidth allocation

Table 55

TP/SS/BWA/GNT/CA-000	Reference:
	Initial condition. SS operational. Burst profile for UIUC =x defined (x=4–9). No data on user connections. No outstanding protocol exchanges. Steady state channel conditions.
	Stimulus. SS receives UL-MAP with UIUC=x addressed to it.
	Expected behavior. Check that the IUT transmits stuff pattern using burst profile associated with UIUC=x.
TP/SS/BWA/GNT/CA-001	Reference
	Initial condition. SS operational. Burst profile for UIUC =x defined (x=4–9). Packets in user connection queues.
	Stimulus. SS receives UL-MAP with UIUC=x addressed to it.
	Expected behavior. Check that the IUT transmits MAC PDUs using burst profile associated with UIUC=x.

Table 55

TP/SS/BWA/GNT/CA-002	Reference: IEEE 1802.16.1, Table A16/7
	Initial condition. SS operational. Burst profile for UIUC =x defined (x=4–9). A few small packets in user connection queues.
	Stimulus. SS receives UL-MAP with a large grant of bandwidth.
	Expected behavior. Check that the IUT transmits MAC PDUs followed by stuff pattern using burst profile associated with UIUC=x.

6.4.4.2 Polling

Table 56

TP/SS/ BWA/POL/CA-000	Reference: IEEE 1802.16.1, Table A16/10
	Initial condition. UGS connection in Active state. Non-UGS connection in Active state
	Stimulus: BS allocates exactly enough bandwidth for UGS connection and no more.
	Expected behavior. Check that the SS sets PM bit correctly depending on occupancy of the non-UGS connection queue
TP/SS/ BWA/POL/CA-001	Reference: IEEE 1802.16.1, Table A16/ TBD
	Initial condition. UGS connection in Active state.
	Stimulus: BS allocates 1/2% less bandwidth than is required by UGS connection.
	Expected behavior. Check that the SS sets SI bit correctly depending on occupancy of the UGS connection queue

6.4.4.3 Multicast Polling

These purposes test the procedures for an SS to join and leave a Multicast Polling group.

6.4.4.3.1 Multicast polling state machine

Table 57

TP/SS/ BWA/MCP/CA-000	Reference:IEEE 1802.16.1, Table A31/1,3
	Initial condition. SS with nRT polling uplink connection in Active state. Number of multicast groups less than negotiated value of MCA Flow Control.
	Stimulus: BS sends MCA-REQ/Add message.
	Expected behavior. Check that IUT sends MCA-RSP with Condition Code OK/Success

Table 57

TP/SS/ BWA/MCP/CA-001	Reference:IEEE 1802.16.1, Table A31/1,3 Initial condition. SS with BE polling uplink connection in Active state. Number of multicast groups less than negotiated value of MCA Flow Control. Stimulus: BS sends MCA-REQ/Add message. Expected behavior. Check that IUT sends MCA-RSP with Condition Code OK/Success

Table 58

TP/SS/ BWA/MCP/BV-000	Reference: IEEE 1802.16.1, Table A16/9 Initial condition. SS with nRT uplink connection in Active state Stimulus: BS sends MCA-REQ/Add and starts allocating bandwidth request contention intervals to the multicast group. Expected behavior. Check that after received MCA-REQ/Add IUT starts using allocated multicast polling opportunities
TP/SS/ BWA/MCP/BV-001	Reference: IEEE 1802.16.1, Table A16/9 Initial condition. SS with BE uplink connection in Active state Stimulus: BS sends MCA-REQ/Add and starts allocating bandwidth request contention intervals to the multicast group. Expected behavior. Check that after MCA-REQ/Add IUT starts using allocated multicast polling opportunities
TP/SS/ BWA/MCP/BV-002	Reference: IEEE 1802.16.1, Table A19/2 Initial condition. SS allocated to multicast polling group.SS has transmitted BW request in contention slot allocated to multicast polling group. Stimulus: Timer T16 expires. BS allocates additional contention slots to multicast polling group. Expected behavior. Check that IUT performs Random Back-off algorithm correctly
TP/SS/ BWA/MCP/BV-003	Reference Initial condition. SS allocated to multicast polling group Stimulus: BS sends MCA-REQ/Remove. BS continues to allocate contention slots to multicast polling group. Expected behavior. Check that after received MCA-REQ/Remove IUT refrains from using allocated multicast polling opportunities
TP/SS/ BWA/MCP/BV-004	Reference:IEEE 1802.16.1, Table A31/1,3 Initial condition. SS with BE uplink connection in Active state. Number of multicast groups less than negotiated value of MCA Flow Control. SS has previously received a MCA-REQ/Add with Transaction ID= i and has sent MCA-RSP with Condition Code =OK/Success. Stimulus: BS sends MCA-REQ/Add message with Transaction ID =i. Expected behavior. Check that IUT sends MCA-RSP with Condition Code OK/Success.

6.4.4.3.2 Multicast Polling Inopportune Behavior

Table 59

TP/SS/ BWA/MCP/BO-000	Reference: Initial condition. SS with RT polling uplink connection in Active state. No other connections active. Number of multicast groups less than negotiated value of MCA Flow Control. Stimulus: BS sends MCA-REQ/Add message. Expected behavior. Check that IUT sends MCA-RSP with Condition Code Reject-add-aborted.
TP/SS/ BWA/MCP/BO-001	Reference: Initial condition. SS with nRT polling uplink connection in Active state. No other connections active. Number of multicast groups less than negotiated value of MCA Flow Control. Stimulus: BS sends MCA-REQ/Add message. Expected behavior. Check that IUT sends MCA-RSP with Condition Code Reject-add-aborted.
TP/SS/ BWA/MCP/BO-002	Reference: Initial condition. SS with nRT polling uplink connection in Active state. No other connections active. Number of multicast groupsequal to negotiated value of MCA Flow Control. Stimulus: BS sends MCA-REQ/Add message. Expected behavior. Check that IUT sends MCA-RSP with Condition Code Reject-add-aborted.
TP/SS/ BWA/MCP/BO-003	Reference: Initial condition. SS with BE uplink connection in Active state. No other connections active. Number of multicast groups is equal to negotiated value of MCA Flow Control. Stimulus: BS sends MCA-REQ/Add message. Expected behavior. Check that IUT sends MCA-RSP with Condition Code Reject-add-aborted.
TP/SS/ BWA/MCP/BO-004	Reference Initial condition. SS not assigned to any multicast group Stimulus: SS receives MCA-REQ/Remove Expected behavior. Check that IUT sends correct MCA-RSP with positive acknowledgement.

6.4.4.3.3 Multicast Polling message formats

Table 60

TP/SS/BWA/MCPMF/CA-000	Reference: IEEE 1802.16.1, Table A80 Initial condition. SS with nRT polling uplink connection in Active state Stimulus. SS has receives MCA-REQ Expected behavior. SS sends MCA-RSP . Check MCA-RSP is properly formatted.

6.4.4.3.4 Multicast Polling invalid message formats

Table 61

TP/SS/BWA/MCPMF/CA-000	Reference. Initial condition. SS operational Stimulus. SS receives invalid MCA-REQ Expected behavior. Check that message is discarded and IUT continues operation.

6.4.5 Reset and re-Registration

Table 62

TP/SS/xxx/xxx/CA-000	Reference: IEEE 1802.16.1, Table A87/1,3 Initial condition: Subscriber Station is operational. At least one bi-directional service active. Stimulus: RES-CMD from BS. Expected behavior: SS resets and performs network entry and initialization Service is disrupted then resumes.
TP/SS/xxx/xxx/CA-001	Reference: IEEE 1802.16.1, Table A87/1,3 Initial condition: Subscriber Station is operational. At least one bi-directional service active. SS has at least 2 channels available. Stimulus: DREG-CMD from BS to the SS telling it to go to another channel (action code 0x00). Expected behavior: SS attempts to access a different channel in it's channel list. Service is terminated.
TP/SS/xxx/xxx/CA-002	Reference: IEEE 1802.16.1, Table A87/1,3: Initial condition: Subscriber Station is operational. At least one bi-directional service active. Stimulus: BS sends DREG-CMD to the SS telling it to wait for a RES-CMD (action code 0x01). Expected behavior: SS listens but does not transmit. Service is disrupted.
TP/SS/xxx/xxx/CA-003	Reference: IEEE 1802.16.1, Table A87/1,3 Initial condition: End of TP/SS/xxx/xxx/xx-002 Stimulus: RES-CMD from BS. Expected behavior: SS resumes communication with the BS. Service resumes.
TP/BS/xxx/xxx/CA-004	Reference: IEEE 1802.16.1, Table A87/1,3 Initial condition: Subscriber Station is operational. At least one bi-directional service active. Stimulus: BS sends DREG-CMD to the SS telling it to go to listen only mode (action code 0x02). Expected behavior: SS listens, but only transmits on its basic, primary management, or secondary management connections. Service is disrupted.

Table 62   *(continued)*

TP/BS/xxx/xxx/CA-005	Reference: IEEE 1802.16.1, Table A87/1,3
	Initial condition: End of TP/BS/xxx/xxx/xx-004.
	Stimulus: BS sends DREG-CMD to the SS telling it to return to normal operation (action code 0x03).
	Expected behavior: Service resumes.

6.4.6 Clock Comparison

Table 63

TP/SS/xxx/xxx/CA-000	Reference: IEEE 1802.16.1, Table A86
	Initial condition: BS has initiated broadcast connection and is transmitting CLK-CMP messages. BS is using different sources for symbol and network clock. At least one T1/E1 UGS service is established with the SS.
	Stimulus: Vary the network clock at the BS.
	Expected behavior: The SS should vary the clocking of the T1/E1 accordingly such that the T1/E1 does not alarm.

6.4.7 MAC PDUs

Table 64

TP/SS/xxx/xxx/xx-000	Reference:IEEE 1802.16.1,Table A13/1
	Initial condition: SS registered and authenticated with BS. One ATM data service established with data rate greater than 2000 ATM cells per second. Packing on for the connection.
	Stimulus: 2000 cells/s arrive at SS from user network. The BS allocates the bandwidth needed for 2 packed cells.
	Expected behavior: The SS will pack the cells from the same connection into a single MAC PDU each frame.
TP/SS/xxx/xxx/xx-001	Reference: IEEE 1802.16.1,Table A13/1
	Initial condition: SS registered and authenticated with BS. One data service established with data rate of at least 768 kbps. Packing on for the connection.
	Stimulus: The test BS sends two or more SDUs from the same connection packed into a single MAC PDU
	Expected behavior: The SS forwards both SDUs to the user network as individual entities.
TP/SS/xxx/xxx/xx-002	Reference: IEEE 1802.16.1,Table A13/7
	Initial condition: System running. All SSs at QPSK. Enough ATM connections with enough uplink data rate to cause congestion.
	Stimulus: Continuous reception of uplink data from user network.
	Expected behavior: No ATM cells are fragmented. Secondary management connection traffic is fragmented.

Table 64

TP/SS/xxx/xxx/xx-003	Reference: IEEE 1802.16.1,Table A12/1
	Initial condition: System running. All SSs at QPSK. Enough packet connections with enough uplink data rate to cause congestion.
	Stimulus: Continuous reception of uplink data from user network, including large (>1500 byte) packets.
	Expected behavior: Packets are fragmented. Secondary management connection traffic is fragmented.
TP/SS/xxx/xxx/xx-004	Reference: IEEE 1802.16.1,Table A12/4
	Initial condition: System running. All SSs at QPSK. A packet connection established.
	Stimulus: The test BS sends fragmented packets.
	Expected behavior: The SS correctly reconstructs the packets.
TP/SS/xxx/xxx/xx-005	Reference: IEEE 1802.16.1,Table A13/5
	Initial condition: System running. All SSs at QPSK. A packet connection established. Packing on for the connection.
	Stimulus: Continuous reception of uplink data from user network, including large (>1500 byte) and small (64 byte) packets on the same connection the same frame.
	Expected behavior: Packets are fragmented and packed. Secondary management connection traffic is fragmented, and packed if applicable.
TP/SS/xxx/xxx/xx-006	Reference: IEEE 1802.16.1,Table A13/5
	Initial condition: System running. All SSs at QPSK. A packet connection established. Packing on for the connection.
	Stimulus: The test BS sends packets simultaneously packed and fragmented on data, primary, and secondary connections.
	Expected behavior: The SS correctly reconstructs the packets.
TP/SS/xxx/xxx/xx-007	Reference: IEEE 1802.16.1,Table A14/1
	Initial condition: SS registered and authenticated with BS. One data service established. Encryption method is 56-bit DES. CRC is on for the connection.
	Stimulus: SS receives data from user network. SS receives data from BS.
	Expected behavior: Verify that the CRC is calculated on the encrypted payload and not encrypted itself for data transmitted by SS. Verify the SS properly checks CRC on data received from SS
TP/SS/xxx/xxx/BV-000	Reference: IEEE 1802.16.1,Table A14/2
	Initial condition: SS registered and authenticated with BS. One data service established. CRC is on for the connection.
	Stimulus: SS receives MAC PDU with incorrect CRC.
	Expected behavior: IUT discards errenous MAC PDU
TP/SS/xxx/xxx/xx-001	Reference: IEEE 1802.16.1,Table A42/2
	Initial condition: SS registered and authenticated with BS. One data service established.
	Stimulus: SS receives MAC PDU with incorrect HCS.
	Expected behavior: IUT discards errenous MAC PDU

6.4.8 RLC

6.4.9 PHY

6.4.9.1 Minimum Performance

Table 65

TP/SS/PHY/MNP/xx-001	Reference. Initial condition: Tx power is in minimum. Stimulus: TX power is increased in 0.5 dB steps. Expected behavior: TX dynamic range is >=40 dB. The transmitted signal shall be according to the spectrum mask and EVM requirements.
TP/SS/PHY/MNP/xx-002	Reference. Initial condition: SS is operating normally. Rx power is in minimum. Stimulus: RX power is increased in 0.5 dB steps. Expected behavior: Rx dynamic range is >=40 dB for QPSK.
TP/SS/PHY/MNP/xx-003	Reference. Initial condition: SS is operating normally. Stimulus: Tx power is in maximum. Expected behavior: RMS power level is >= 15dBm.
TP/SS/PHY/MNP/xx-004	Reference: Initial condition. SS is operating normally. Stimulus: Tx power level is adjusted. Expected behavior: Tx power level minimum adjustment step is 0.5 dB. Adjustment step accuracy: step size [0.5-2) dB monotonic, [2-5) dB: +/- 2 dB, >= 5 dB: +/- 3dB over the Tx dynamic range
TP/SS/PHY/MNP/xx-005	Reference: Initial condition: SS is operating normally Stimulus: Expected behavior: 2%
TP/SS/PHY/MNP/xx-006	Reference: Initial condition. SS is operating normally. Stimulus: Downlink signal received Expected behavior: SS shall lock its symbol lock to the BS.
TP/SS/PHY/MNP/xx-007	Reference: Initial condition: SS is operating normally. Stimulus: burst timing is adjusted. Expected behavior: burst timing step size ±0.25 of a symbol
TP/SS/PHY/MNP/xx-008	Reference: Initial condition: SS is operating normally. Stimulus: burst timing is adjusted Expected behavior: ±0.125 of a symbol
TP/SS/PHY/MNP/xx-009	Reference: Initial condition: SS is operating normally. Stimulus: Downlink signal received Expected behavior: SS locks its RF frequency to the BS.

Table 65 *(continued)*

TP/SS/PHY/MNP/xx-010	Reference: Initial condition: SS is operating normally. Transmitter is on. Stimulus: Transmitter is on. Expected behavior: Local regulations
TP/SS/PHY/MNP/xx-011	Reference: Initial condition: SS is operating normally. Stimulus: SS sends a burst Expected behavior: Ramp up / ramp down time is less than 24 symbols
TP/SS/PHY/MNP/xx-012	Reference: Initial condition: SS is operating. Tx is not transmitting Stimulus: Tx is not transmitting Expected behavior: Output noise power is <-80 dBm/MHz
TP/SS/PHY/MNP/xx-013	Reference: Initial condition: SS is operating Forced modulation mode Stimulus: SS configured into Forced modulation mode via method described in PIXIT statement. Repeat for all supported modulations. Test shall be performed over the whole power range. Expected behavior: SS meets the requirements for a given modulation as listed below. Modulation Accuracy without an equalizer for QPSK: 12% Modulation Accuracy with an equalizer for QPSK: 10% Modulation Accuracy without an equalizer for 16-QAM: 6% Modulation Accuracy with an equalizer for 16-QAM: 3% Modulation Accuracy with an equalizer for 64-QAM: 1.5% Note: Repeat for all supported modulations. Test shall be performed over the whole power range.
TP/SS/PHY/MNP/xx-014	Reference: Stimulus: IUT is conForced modulation, no FEC Expected behavior: QPSK BER 1E-3 = -94dBm QPSK BER 1E-6 = -90dBm 16-QAM BER 1E-3 = -87dBm 16-QAM BER 1E-6 = -83dBm 64-QAM BER 1E-3 = -79dBm 64-QAM BER 1E-6 = -74dBm
TP/SS/PHY/MNP/xx-015	Reference: Initial condition: IUT isTDD SS. IUT is operational and has active uplink and downlink connections. IUT is co-located with tester. RTG = 2us. Stimulus:SS receives DL-MAP and UL-MAP with a downlink allocation at the end of the dowlink subframe and an uplink allocation immediately at the start of the UL-portion. Expected behavior: IUT correctly sends and receives data.
TP/SS/PHY/MNP/xx-015	Reference: Initial condition: IUT is H-FDD SS. IUT is operational and has active uplink and downlink connections. IUT is co-located with tester. Stimulus: SS receives DL-MAP and UL-MAP with a downlink allocation and uplink allocation separated in time by 20us+rtd . Expected behavior: IUT successfully receives the data and transmits data in the allocated slot.

Table 65 *(continued)*

TP/SS/PHY/MNP/xx-016	Reference: Initial condition: SS is operating Forced modulation mode. Stimulus: IUT is brought to transmit Expected behavior: The measured 1st Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for QPSK: -9dB 1st Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for QPSK: -5dB 1st Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for QPSK: -5dB 1st Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for QPSK: -1dB 2nd Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for QPSK: -34dB 2nd Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for QPSK: -30dB 2nd Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for QPSK: -30dB 2nd Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for QPSK: -26dB
TP/SS/PHY/MNP/xx-017	1st Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for 16-QAM: -2dB 1st Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for 16-QAM: +2dB 1st Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for 16-QAM: +2dB 1st Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for 16-QAM: +6dB 2nd Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for 16-QAM: -27dB 2nd Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for 16-QAM: -22dB 2nd Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for 16-QAM: -23dB 2nd Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for 16-QAM: -20dB

Table 65 *(continued)*

TP/SS/PHY/MNP/xx-017	Reference: Initial condition: SS is operating Forced modulation mode and transmitting with 64-QAM. Stimulus: None Expected behavior: 1st Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for 64-QAM: +5dB 1st Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for 64-QAM: +9dB 1st Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for 64-QAM: +9dB 1st Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for 64-QAM: +13dB 2nd Adjacent channel interference at BER=1E-3 for 3dB degradation C/I for 64-QAM: -20dB 2nd Adjacent channel interference at BER=1E-3 for 1dB degradation C/I for 64-QAM: -16dB 2nd Adjacent channel interference at BER=1E-6 for 3dB degradation C/I for 64-QAM: -16dB 2nd Adjacent channel interference at BER=1E-6 for 1dB degradation C/I for 64-QAM: -12dB
TP/SS/PHY/MNP/xx-018	Reference: Initial condition: SS is operating normally. Stimulus: Tx power is brought to its maximum level. IUT granted transmission opportunities. Expected behavior: Measured Tx power is 15dBm +/- 6dB.

Table 66

TP/SS/PHY/CNT	Reference. IEEE P802.16/D5-2001 – 8.2.5.1.2 PICSA.6.4.2-1 Initial condition. power on Stimulus. BS transmits a frame with a control portion containing the downlink and uplink maps, a DCD message and an UCD message Expected behavior. The SS receives the control portion and is able to extract the downlink and uplink maps extract the DCD and UCD messages
TP/SS/PHY/TC	Reference. IEEE P802.16/D5-2001 – 8.2.5.3 PICSA6.4.2-2 Initial condition. SS registered Stimulus. BS sends a burst containing several TC PDUs. In the last TC PDU is the first MAC PDU that is addressed to the IUT. Expected behavior. Check that the SS is able to correctly receive its MAC PDUs.
TP/SS/PHY/RND	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.3 PICSA6.4.2-3 Initial condition. SS registered Stimulus. BS sends a PDU to the SS and it is received without FEC errors. Expected behavior. Check that the SS is able to correctly de-randomize the PDU.

Table 66

TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.6 PICSA6.4.2.-4
	Initial condition. power on
	Stimulus. DL frame
	Expected behavior. Decode the control portion with RS parameter t=10, K=26. Check that there no errors from the RS-decoder
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.1 PICSA6.4.2-5
	Initial condition. SS registered and BS defines burst profiles in the DCD message containing burst descriptors with RS parameter t having values 0,4,8,12
	Stimulus. DL frame containing bursts with all the defined t-values.
	Expected behavior. Check that SS is able to decode the bursts in the frame with RS parameter t (=0,4,8,12) according to the DIUC for the burst
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.1 PICSA6.4.2-6
	Repeat previous with t=(0,1,2,3), (4,5,6,7), (8,9,10,11) and (12,13,14,15,16)
	Initial condition.
	Stimulus.
	Expected behavior
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.1 PICSA6.4.2-7
	Initial condition. SS registered and BS defines a burst profile with fixed codeword operation in the DCD message.
	Stimulus. DL frame containing a burst with the defined fixed codeword operation to the SS.
	Expected behavior. Check that the SS is able to decode the burst.
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.1 PICSA6.4.2-8
	Initial condition. SS registered and BS defines a burst profile with shortened codeword operation in the DCD message.
	Stimulus. DL frame containing a burst with the defined shortened codeword operation to the SS.
	Expected behavior. Check that the SS is able to decode the burst.
TP/SS/PHY/BCC	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.2 PICSA6.4.2-9
	Initial condition. SS registered. SS has received a DCD message defining a burst profile to use BCC with RS t=0.
	Stimulus. DL frame with a burst using the defined burst profile with BCC inner code
	Expected behavior. SS decodes the burst correctly
TP/BS/PHYPC	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.4.3 PICSA6.4.2-10
	Initial condition. SS registered. SS has received a DCD message defining a burst profile to use parity check code with RS t=0.
	Stimulus. DL frame with a burst using the defined Parity check inner code
	Expected behavior. SS decodes the burst correctly
TP/SS/PHY/FPA	Reference. IEEE P802.16/D5-2001 – 8.2.5.1.1 PICSA6.4.2-12
	Initial condition. SS registered
	Stimulus. DL frame
	Expected behavior. SS shall detect the start of the frame with the aid of the preamble and get the synchronization parameters
TP/SS/PHY/BPA	Reference. IEEE P802.16/D5-2001 – 8.2.5.1.1 PICSA6.4.2-13
	Initial condition. SS registered
	Stimulus. DL frame containing a TDMA portion
	Expected behavior. SS shall get the synchronization parameters from the TDMA burst

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Table 66

TP/SS/PHY/GRA	Reference. IEEE P802.16/D5-2001 – 8.2.5.1.1 PICSA6.4.2-14 Initial condition. SS registered Stimulus. DL frame Expected behavior. SS shall be able to demap Gray coded constellation.
TP/SS/PHY/QPSK	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.7 PICSA6.4.2-15 Initial condition. SS registered. SS has received a DCD message defining a burst profile with QPSK modulation. Stimulus. DL frame containing bursts with QPSK modulated data addressed to the SS Expected behavior. SS shall be able to demodulate QPSK modulated data
TP/SS/PHY/16QAM	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.7 PICSA6.4.2-16 Initial condition. SS registered. SS has received a DCD message define a burst profile with 16-QAM modulation. Stimulus. DL frame containing bursts with 16-QAM modulated data addressed to the SS Expected behavior. SS shall be able to demodulate 16-QAM modulated data
TP/SS/PHY/64QAM	Reference. IEEE P802.16/D5-2001 – 8.2.5.4.7 PICSA6.4.2-17 Initial condition. SS registered. SS has received a DCD message define a burst profile with 64-QAM modulation. Stimulus. DL frame containing bursts with 64-QAM modulated data addressed to the SS Expected behavior. SS shall be able to demodulate 64-QAM modulated data

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Table 67

TP/SS/PHY/TC	Reference. IEEE P802.16/D5-2001 – 8.2.6.2 PICSA6.4.3-1 Initial condition. SS registered Stimulus. SS receives a grant in the uplink map to transmit Expected behavior. SS transmit the data using a TC layer with the pointer pointing to the first PDU in the TC packet
TP/SS/PHY/RND	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.1 PICSA6.4.3-2 Randomization with programmable seed Initial condition. SS registered and SS has received a UCD message defining an uplink burst profile with a scramble seed value <> 0 Stimulus. SS receives a grant in the uplink map to transmit Expected behavior. Check that the SS has performed the randomization correctly
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.6 PICSA6.4.3-3 Initial condition. SS registered Stimulus. SS sends an initial ranging message to the BS Expected behavior. Check that the message is encoded properly with RS parameter t=10, K=26

Table 67

TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.1 PICSA6.4.3-4
	Initial condition. SS registered and SS has received a UCD message defining uplink burst profiles with RS parameter t = (0,4,8,12)
	Stimulus. SS receives grants in the uplink map to transmit bursts with the defined parameters
	Expected behavior. Check that the data is encoded correctly with RS parameter t = (0,4,8,12)
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.1 PICSA6.4.3-5
	Repeat previous with t=(0,1,2,3), (4,5,6,7), (8,9,10,11) and (12,13,14,15,16)
	Initial condition. SS registered
	Stimulus.
	Expected behavior.
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.1 PICSA6.4.3-6
	Initial condition. SS registered and SS has received a UCD message defining an uplink burst profile with fixed codeword operation
	Stimulus. SS receives a grant in the uplink map to transmit a burst with the defined parameters
	Expected behavior. Check that the packet is encoded properly using fixed codeword operation
TP/SS/PHY/RS	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.1 PICSA6.4.3-7
	Initial condition. SS registered and SS has received a UCD message defining an uplink burst profile with shortened codeword operation
	Stimulus. SS receives a grant in the uplink map to transmit a burst with the defined parameters
	Expected behavior. Check that the packet is encoded properly using shortened codeword operation
TP/SS/PHY/BCC	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.2 PICSA6.4.3-8
	Initial condition. SS registered and SS has received a UCD message defining a burst profile to use BCC with RS t=0.
	Stimulus. SS receives a grant in the uplink map to transmit a burst with BCC inner code
	Expected behavior. Check that the packet is encoded properly using BCC inner code
TP/SS/PHY/PC	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.2.3 PICSA6.4.3-9
	Initial condition. SS registered and SS has received a UCD message defining a burst profile to use Parity check inner code with RS t=0.
	Stimulus. SS receives a grant in the uplink map to transmit a burst with Parity check inner code
	Expected behavior. Check that the packet is encoded properly using Parity check inner code
TP/SS/PHY/BPA	Reference. IEEE P802.16/D5-2001 – 8.2.6.1.1 PICSA6.4.3-11
	Initial condition. SS registered and SS has received a UCD message defining a burst profile with a preamble with repetition code 1 or 2
	Stimulus. SS receives a grant in the uplink map to transmit a burst with the given repetition of the preamble
	Expected behavior. Check that the preamble is correct
TP/SS/PHY/GRA	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.7 PICSA6.4.3-12
	Initial condition. SS registered
	Stimulus. SS receives a grant in the uplink map to transmit a burst
	Expected behavior. Check that SS uses Gray coded constellation mapping of the data

Table 67

TP/SS/PHY/QPSK	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.7 PICSA6.4.3-13 Initial condition. SS registered and SS has received a UCD message defining a burst profile with QPSK modulation Stimulus. SS receives a grant in the uplink map to transmit a burst with QPSK modulation Expected behavior. Check that SS transmits with QPSK modulation
TP/SS/PHY/16QAM	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.7 PICSA6.4.3-14 Initial condition. SS registered and SS has received a UCD message defining a burst profile with 16-QAM modulation Stimulus. SS receives a grant in the uplink map to transmit a burst with 16-QAM modulation Expected behavior. Check that SS transmits with 16-QAM modulation
TP/SS/PHY/64QAM	Reference. IEEE P802.16/D5-2001 – 8.2.6.3.7 PICSA6.4.3-15 Initial condition. SS registered and SS has received a UCD message defining a burst profile with 64-QAM modulation Stimulus. SS receives a grant in the uplink map to transmit a burst with 64-QAM modulation Expected behavior. Check that SS transmits with 64-QAM modulation

Table 68

Full Duplex FDD	Reference. Initial condition. SS registered with BS Stimulus. BS schedules receiving and transmitting to occur at the same time Expected behavior. Both BS and SS shall receive the transmitted data.
Tx/Rx transition gap	Reference. IEEE P802.16/D5-2001 – 8.2.2.1.2.1 Initial condition. SS registered with BS Stimulus. BS schedules transmission and reception with decreasing time intervals Expected behavior. BS receives the transmitted data without errors and error correction until the time interval is too small
Rx/Tx transition gap	Reference. IEEE P802.16/D5-2001 – 8.2.2.1.2.2 Initial condition. SS registered with BS Stimulus. BS schedules transmission and reception with decreasing time intervals Expected behavior. BS receives the transmitted data without errors and error correction until the time interval is too small
Downlink - Demodulate TDM portion of burst	Reference. IEEE P802.16/D5-2001 – 8.2.2.1.2.3 Initial condition. SS registered with BS Stimulus. BS sends TDM portion consisting of predefined data pattern Expected behavior. SS shall receive the transmitted data without errors
Downlink - Demodulate TDMA portion of burst	Reference. IEEE P802.16/D5-2001 – 8.2.2.1.3 Initial condition. SS registered with BS Stimulus. BS sends TDMA portion consisting of predefined bursts Expected behavior. SS shall receive the transmitted data without errors

Table 68

Uplink Burst Subframe Structure – support contention slots for initial access	Reference. IEEE P802.16/D5-2001 – 8.2.2.2 PICSA6.4.1-9 Initial condition. SS not registered with BS Stimulus. Perform a reset of SS by power cycling or by any means supported Expected behavior. SS shall obtain the position of the contention slots for initial access from the uplink map UIUC=2. The SS shall then transmit its RNG-REQ to the BS in the contention slot
Uplink Burst Subframe Structure – support contention slots for bandwidth request	Reference. IEEE P802.16/D5-2001 – 8.2.2.2 Initial condition. SS is registered with BS Stimulus. Perform a transmit request to the SS Expected behavior. SS shall send a bandwidth request message in the contention slot defined by the uplink map UIUC=1
Uplink Burst Subframe Structure – support scheduled slots	Reference. IEEE P802.16/D5-2001 – 8.2.2.2 Initial condition. SS is registered with BS and the SS has performed an initial bandwidth request Stimulus: The BS sends a grant to the SS in an uplink map message Expected behavior. SS shall transmit its uplink burst in the position indicated by the UL map in the next frame
Uplink Burst Profile Modes	Reference. IEEE P802.16/D5-2001 – 8.2.2.3 Initial condition. Stimulus: Expected behavior.

Table 69

Table A-102 in PICS	
SS adjusts TX power based on power level data from BS // SS TX power control algorithm dynamic range // SS TX power control algorithm slew rate	Reference. IEEE P802.16/D5-2001 – PICS A-102 Initial condition. SS registered with BS with output power set to minimum Stimulus. BS sends power adjustment commands to change the output power by more than 40 dB Expected behavior. SS increases the power level according to the command within 4 seconds
SS algorithm accounts for effects of different burst profiles on RF amplifier	Reference. IEEE P802.16/D5-2001 – PICS A-102 Initial condition. SS registered with BS with output power set to maximum Stimulus. BS commands the SS to alternatingly send QPSK and 16QAM modulated bursts. Expected behavior. Spectrum mask requirements shall be met and the amplifier must not be saturated.

6.4.10 ATM Convergence Sublayer

Note that if the SS accepts other than ATM cells from the user network, and does the appropriate inter-working function internally, the ATM classification tests must be verified either at that inter-working function, or by comparing the SDUs mapped to and from ATM cells at the interface to the user network.

Table 70

TP/SS/CL/ATM/BV-000	Reference: IEEE 1802.16.1, Table A3 Initial condition: Subscriber station is operational and has more than one operational user port. At least 2 downlink services are set up, 1 for one port, 1 for the other. At least one service is VC switched and at least one is VP switched. Stimulus: ATM cells received from BS over air link. Expected behavior: SS forwards ATM cells to correct port.
TP/SS/CL/ATM/BV-001	Reference: IEEE 1802.16.1, Table A3/1,2 Initial condition: Subscriber station is operational. At least 2 uplink services are set up, 1 from one port, 1 from another. At least one service is VC switched and at least one is VP switched. Stimulus: ATM cells received from port (ingress). Expected behavior: SS forwards ATM cells on correct CID to BS. ATM cells not mapped to a service are discarded.
TP/SS/CL/ATM/BV-002	Reference: IEEE 1802.16.1, Table A3/1,2 Initial condition: Subscriber station is operational. At least one VC switched bi-directional service and at least one bi-directional VP switched service are set up. No PHS. Stimulus: ATM cells received from port (ingress) and from the airlink. Expected behavior: SS forwards ATM cells from port on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded. SS forwards cells from the airlink to the correct port..
TP/SS/CL/ATM/BV-003	Reference: IEEE 1802.16.1, Table A3/2 Initial condition: Subscriber station is operational. At least one VC switched uplink service is set up. No PHS. At least 2 classifiers are set up. Stimulus: ATM cells received from port (ingress). Expected behavior: SS forwards ATM cells from port on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded.
TP/SS/CL/ATM/BV-004	Reference: IEEE 1802.16.1, Table A3/1 Initial condition: Subscriber station is operational. At least one VP switched uplink service is set up. No PHS. At least 2 classifiers are set up. At least one of the classifiers has at least 2 VCIs. Stimulus: ATM cells received from port (ingress). Expected behavior: SS forwards ATM cells from port on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded.
TP/SS/CL/ATM/BV-005	Reference: IEEE 1802.16.1, Table A3/4 Initial condition: Subscriber station is operational. At least one VC switched bi-directional service is set up. PHS. Stimulus: ATM cells received from port (ingress) and from the airlink. Expected behavior: SS forwards ATM cells from port on correct CID with 49–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. SS forwards ATM cells from airlink to correct port, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 49–byte SDU format

Table 70

TP/SS/CL/ATM/BV-006	Reference: IEEE 1802.16.1, Table A3/3 Initial condition: Subscriber station is operational. At least one VP switched bi-directional service is set up. PHS. Classifier specifies no VCIs. Stimulus: ATM cells received from port (ingress) and from the airlink. Expected behavior: SS forwards ATM cells from port on correct CID with 51–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. SS forwards ATM cells from airlink to correct port, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 51–byte SDU format
TP/SS/CL/ATM/BV-007	Reference: IEEE 1802.16.1, Table A3/1,3 Initial condition: Subscriber station is operational. At least one VP switched bi-directional service is set up. PHS. Classifier with multiple VCI specified. Stimulus: ATM cells received from port (ingress) and from the airlink. Expected behavior: SS forwards ATM cells from port on correct CID with 51–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. SS forwards ATM cells from airlink to correct port, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 51–byte SDU format
TP/SS/CL/ATM/BV-008	Reference: Initial condition: Subscriber station is operational. At least one uplink service is set up. At least one classifier specified. Cells entering from port that match the classifier, and other cells that do not match the classifier. Those that do not match are being discarded, those that do match are being forwarded. Stimulus: Replace classifier so that originally discarded cells are now forwarded and originally forwarded cells are now discarded. Expected behavior: Originally discarded cells are now forwarded and originally forwarded cells are now discarded.
TP/SS/CL/ATM/BV-009	Reference: Initial condition: End of TP/SS/CL/ATM/BV-008. Stimulus: Add original version of classifier that was replaced in TP/SS/xxx/xxx/xx-008 so that originally forwarded cells are now forwarded once more, but newly forwarded cells are still forwarded. Expected behavior: Originally forwarded cells are now forwarded once more, but newly forwarded cells are still forwarded.
TP/SS/CL/ATM/BV-010	Reference: Initial condition: End of TP/SS/CL/ATM/BV-009. Stimulus: Delete version of classifier that was created by replace in TP/SS/CL/ATM/BV-008 so that originally discarded cells are now discarded once more, but originally forwarded cells are still forwarded. Expected behavior: Originally discarded cells are now discarded once more, but originally forwarded cells are still forwarded.

6.4.11 Packet Convergence Sublayer

6.4.11.1 PHS

6.4.11.1.1 State machine

Table 71

TP/SS/CL/PKT/CA-000	Reference: IEEE 1802.16.1, Table A5/7 Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with no verification. No other transport connections active. All packets match the classifier. Stimulus: The SS receives from an external port packets. Expected behavior: The SS will transmit over the air the packet with headers suppressed correctly Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.
TP/SS/PCS/PHS/CA-001	Reference: IEEE 1802.16.1, Table A5/7 Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with verification. No other transport connections active. All packets match the classifier. Stimulus: The SS receives from an external port packets that fulfill for every byte to be suppressed PacketByte[i] XOR PHSF[i] == 0 Expected behavior: The SS will transmit over the air the packet with headers suppressed correctly Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.
TP/SS/PCS/PHS/CA-002	Reference: IEEE 1802.16.1, Table A5/7 Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with verification. No other transport connections active. All packets match the classifier. Stimulus: The SS receives from an external port packets some of which don't fulfill for every byte to be suppressed PacketByte[i] XOR PHSF[i] == 0 Expected behavior: The SS will transmit packets that fulfill above condition with headers suppressed and the ones that don't fulfill above criteria unsuppressed. Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.
TP/SS/PCS/PHS/CA-003	Reference: IEEE 1802.16.1, Table A5/7 Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0. Stimulus: The SS receives MAC PDU with PHSI=j on the correct connection. Expected behavior: SS will deliver packet on correct interface with headers correctly restored. Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.

Table 71

TP/SS/PCS/PHS/CA-003	Reference: IEEE 1802.16.1, Table A5/7
	Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0.
	Stimulus: The SS receives MAC PDU with PHSI=0 on that connection.
	Expected behavior: SS will deliver packet on correct interface without restoring headers.
	Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.

Table 72

TP/SS/PCS/PHS/BV-000	Reference: IEEE 1802.16.1, Table A5/7
	Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0 on CID=A. The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0 on CID=B.
	Stimulus: The SS receives MAC PDUs with PHSI=j on both connections
	Expected behavior: SS will deliver packets on correct interface(s) with headers correctly restored.

Table 73

TP/SS/PCS/PHS/BO-000	Reference: IEEE 1802.16.1, Table A5/7
	Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0. The SS has another connection in the active state
	Stimulus: The SS receives MAC PDU with PHSI=j on a connection not associated with a PHSI=j.
	Expected behavior: SS will silently discard the packet.
TP/SS/PCS/PHS/BO-001	Reference IEEE 1802.16.1, Table A5/7:
	Initial condition: The SS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0. The SS has another connection in the active state
	Stimulus: The SS receives MAC PDU with incorrect (unknown) PHSI.
	Expected behavior: SS will silently discard the packet.

6.5 Test purposes for BS

6.5.1 Channel Descriptors and Maps

This section contains tests verifying that the BS correctly transmits channel descriptor and map messages.

Table 74

TP/BS/INI/MAP/CA-000	Reference:IEEE 1802.16.1, Table A138/ 1 or 5 Initial condition. BS operational Stimulus. None. Expected behavior. Check that BS transmits properly formatted DL-MAP message every frame immediately following preamble.
TP/BS/INI/MAP/CA-001	Reference: IEEE 1802.16.1, Table A138/ 1 or 5 Initial condition. BS operational Stimulus. None. Expected behavior. Check that BS transmits properly formatted UL-MAP message every frame immediately following the DL-MAP.
TP/BS/INI/MAP/CA-002	Reference: IEEE 1802.16.1, Table A138/ 1 or 5 Initial condition. BS operational Stimulus. None. Expected behavior. Check that BS transmits a properly formatted DCD message with an interval of less than 10 s.
TP/BS/INI/MAP/CA-003	Reference: IEEE 1802.16.1, Table A138/ 1 or 5 Initial condition. BS operational Stimulus. None. Expected behavior. Check that BS transmits a properly formatted UCD message with an interval of less than 10 s.

6.5.1.1 Update of Channel Descriptors

Tests of transition from one set of burst profiles to another.

Table 75

TP/BS/RLC/XCD/CA-000	Reference: IEEE 1802.16.1, Table A150/1,4,5,7 Initial condition. BS operational Stimulus: Via some management operation, the BS is commanded to change the current set of downlink burst profiles. Expected behavior. Check that BS sends DCD with incremented Configuration Change Count at least twice before sending DL-MAP with the corresponding DCD Count
TP/BS/RLC/XCD/CA-001	Reference: IEEE 1802.16.1, Table A150/ 1,2,3,6 Initial condition. BS operational Stimulus: Via some management operation, the BS is commanded to change the current set of uplink burst profiles. Expected behavior. Check that BS sends UCD with incremented Configuration Change Count at least twice before sending UL-MAP with the corresponding UCD Count

Table 75

TP/BS/RLC/XCD/CA-002	Reference: IEEE 1802.16.1, Table A150/6 Initial condition. BS has sent UCD with incremented Configuration Change Count at least twice before Stimulus: BS sends UL-MAP with UCD Count. corresponding to the new Configuration Change Count with grants. This UL-MAP shall have grants using each burst profile. Expected behavior. BS receives correctly data using the new set of burst profiles .
TP/BS/RLC/XCD/CA-003	Reference: IEEE 1802.16.1, Table A150/7 Initial condition. BS has sent DCD with incremented Configuration Change Count at least twice before. Stimulus: BS sends DL-MAP with DCD Count. corresponding to the new Configuration Change Count. BS is provoked to send data using each burst profile. Expected behavior. BS uses the new set of burst profiles for its transmissions.
TP/BS/RLC/XCD/CA-004	Reference: IEEE 1802.16.1, Table A150 Initial condition. BS has sent UCD with incremented Configuration Change Count at least twice before Stimulus: BS sends UL-MAP with UCD Count. corresponding to the old Configuration Change Count with grants. This UL-MAP shall have grants using each burst profile. Expected behavior. BS receives correctly data using the old set of burst profiles .
TP/BS/RLC/XCD/CA-005	Reference: IEEE 1802.16.1, Table A150 Initial condition. BS has sent DCD with incremented Configuration Change Count at least twice before. Stimulus: BS sends DL-MAP with DCD Count. corresponding to the old Configuration Change Count. BS is provoked to send data using each burst profile. Expected behavior. BS uses the old set of burst profiles for its transmissions.

6.5.2 Ranging, Burst and Capability Negotiation

6.5.2.1 Initial Ranging

This section contains tests of the Initial Ranging process

6.5.2.1.1 Initial ranging-state machine

Tests for the Initial Ranging state machine.

Table 76

TP/BS/INI/RNG/CA-000	Reference: IEEE 1802.16.1, Table A143/1 Initial condition. BS operational Stimulus. BS is stimulated to allocate Initial Maintenance IEs. Expected behavior. BS allocates Initial Maintenance IEs.

Table 76

TP/BS/INI/RNG/CA-001	Reference: IEEE 1802.16.1, Table A143//3
	Initial condition. BS has allocated Initial Maintenance IEs.
	Stimulus.IUT receives a RNG-REQ in one of the allocated Initial Maintenance slots
	Expected behavior. BS determines correct timing and power adjustments, allocates Basic and Primary CID and generates a properly formatted RNG-RSP and transmits it and starts issuing invited Initial Maintenance opportunities.

Table 77

TP/BS/INI/RNG/BV-000	Reference: IEEE 1802.16.1, Table A143
	Initial condition. BS has sent RNG-RSP in response to initial RNG-REQ
	Stimulus. BS receives again initial RNG-REQ from SS to which it already sent a RNG-RSP.
	Expected behavior. BS retransmits RNG-RSP (with updated power adjust if necessary).
TP/BS/INI/RNG/BV-001	Reference: IEEE 1802.16.1, Table A143
	Initial condition. SS has reported Tx power at max.
	Stimulus.IUT receives RNG-REQ message indicating power at maximum level. RSL at BS drops further.
	Expected behavior. BS refrains from requesting SS to increase power until after SS has been asked to reduce power.
TP/BS/INI/RNG/BV-002	Reference: IEEE 1802.16.1, Table A143
	Initial condition. SS has registered and is passing data. IUT has initiated Periodic Ranging by sending a RNG-RSP(continue) to decrease power..
	Stimulus. BS receives RNG-REQ message indicating SS at min power
	Expected behavior. BS stops sending RNG-RSP messages with request to decrease power until it has asked SS to increase power

Table 78

TP/BS/INI/RNG/BO-000	Reference.
	Initial condition. BS has allocated invited Initial Maintenance IEs.
	Stimulus. BS receives RNG-REQ message with incorrect CID in allocated slot.
	Expected behavior. IUT ignores RNG-REQ.
TP/BS/INI/RNG/BO-001	Reference.
	Initial condition. BS has allocated Initial Maintenance IEs.
	Stimulus. BS receives a message other than RNG-REQ message in slot.
	Expected behavior. IUT ignores message.

6.5.2.1.2 Initial Ranging Message Format

Tests of MAC Management messages involved in Initial Ranging.

Table 79

TP/BS/INI/RNGMF/CA-000	Reference: Initial condition. BS has allocated Initial Maintenance IEs. Stimulus. BS has receives a RNG-REQ in an initial ranging slot with CID=0x0000 Expected behavior. Check that RNG-RSP message is transmitted with CID=0x0000. Ranging Status = continue Timing Adjust within limits Power Adjust within limits DL operational Burst Profile, DIUC specified in RNG-REQ or 0x0 SS MAC Address equals MAC address in RNG-REQ Basic CID within valid range Primary Management CID within valid range Check that TLV parameter order is correct.
TP/BS/INI/RNGMF/CA-001	Reference. Initial condition. BS has allocated Initial Maintenance IEs. Stimulus.BS has received a RNG-REQ in an initial ranging slot with CID=0x0000 containing a request for DL Burst Profile not equal to DIUC=0. Expected behavior. BS transmits RNG-RSP commanding timing and power adjusts and assigning the SS to the DIUC requested. Check that RNG-RSP message is transmitted with CID=0x0000. Ranging Status = continue Timing Adjust within limits Power Adjust within limits DL operational Burst Profile DIUC specified in RNG-REQ SS MAC Address equals MAC address in RNG-REQ Basic CID within valid range Primary Management CID within valid range Check that TLV parameter order is correct.
TP/BS/INI/RNGMF/CA-002	Reference. Initial condition. BS has been told to move SS to other frequency. BS has allocated Initial Maintenance IEs. Stimulus. BS has received a RNG-REQ in an initial ranging slot with CID=0x0000. Expected behavior. BS transmits RNG-RSP ordering SS to move to other frequency. Check that RNG-RSP message is transmitted with CID=0x0000. Ranging Status = 2 DL-frequency Override = valid center frequency DL operational Burst Profile SS MAC Address equals MAC address in RNG-REQ Check that TLV parameter order is correct.

6.5.2.1.3 Initial Ranging - Invalid Message Format

Table 80

TP/BS/INI/RNGMF/BI-000	Reference. Initial condition. BS has allocated Initial Maintenance IEs. Stimulus. BS has receives an improperly formatted RNG-REQ in an initial ranging slot with CID=0x0000 Expected behavior. BS ignores message and continues operation.

6.5.2.2 Periodic Ranging

6.5.2.2.1 Ranging State Machine

Table 81

TP/BS/RLC/RNG/CA-000	Reference: IEEE 1802.16.1, Table A149 Initial condition. SS registered and passing data. Stimulus.SS sends normal UL traffic with wrong timing offset. Expected behavior. BS detects timing adjustment required. BS correctly measures and calculates timing offset requirement. Sends unsolicited RNG-RSP messages to adjust timing offset.
TP/BS/XXX/RNG/CA-001	Reference: IEEE 1802.16.1, Table A149/3 Initial condition. SS registered and passing data. Stimulus. BS receives signal with a power outside the allowed envelope. Expected behavior. BS sends RNG-RSP messages to SS to change power until desired level met.

6.5.2.2.2 BS valid behavior

Table 82

TP/SS/XXX/YYY/BV-000	Reference: Initial condition. SS registerd Stimulus. BS determines (TBD) SS message parameters are out of tolerance. Expected behavior. BS issues RNG-RSP with Ranging Status bit set to 4 to initiate re-ranging.

Table 82

TP/BS/XXX/YYY/BV-001	Reference. Initial condition. SS has reported Tx power at max. Stimulus.IUT receives RNG-REQ message indicating power at maximum level. RSL at BS drops further. Expected behavior. BS refrains from requesting SS to increase power until after SS has been asked to reduce power.
TP/BS/XXX/YYY/BV-002	Reference. Initial condition. SS has registered and is passing data. IUT has initiated Periodic Ranging by sending a RNG-RSP(continue) to decrease power.. Stimulus. BS receives RNG-REQ message indicating SS at min power Expected behavior. BS stops sending RNG-RSP messages with request to decrease power until it has asked SS to increase power

6.5.2.2.3 Ranging Message Formats

Table 83

TP/BS/xxxI/RNGMF/CA-000	Reference. Initial condition. SS registered and passing data. Stimulus. BS detects need to adjust power or timing Expected behavior. BS sends RNG-RSP. Check that message is transmitted with CID= Basic CID. Ranging Status = continue Timing Adjust within limits Power Adjust within limits DL operational Burst Profile, DIUC specified in RNG-REQ or more robust if present Check that TLV parameter order is correct.

6.5.2.3 Downlink Burst Profile Management

The purposes in this section test the implementation of the control functionality for adaptive modulation and coding.

6.5.2.3.1 DBPC – State machine

Table 84

TP/BS/xxx/DBPC/CA-000	Reference: IEEE 1802.16.1, Table A149/5 Initial condition. BS communicating with SS at DIUC n. Stimulus. BS receives DBPC-REQ for more robust DIUC k. Expected behavior. BS sends DBPC-RSP indication change to DIUC k using DIUC k.

Table 84

TP/BS/xxx/DBPC/CA-001	Reference: IEEE 1802.16.1, Table A149/ 5 Initial condition. BS communicating with SS at DIUC n. Stimulus. BS receives DBPC-REQ for less robust DIUC k Expected behavior. BS sends DBPC-RSP indication change to DIUC k using DIUC n. Check that subsequent DL transmissions utilize DIUC k.

Table 85

TP/BS/xxx/DBPC/BO-000	Reference. Initial condition. BS communicating with SS at DIUC n. Stimulus. BS receives DBPC-REQ for less robust DIUC k not enabled in SBC exchange. Expected behavior. BS sends DBPC-RSP indication DIUC n.

6.5.2.3.2 DBPC–Message format

Table 86

TP/BS/xxx/DBPCMF/CA-000	Reference. Initial condition. BS communicating with SS at a DIUC less robust than the most robust defined in the current DCD. Stimulus. BS has received DBPC-REQ for more robust DIUC Expected behavior. BS sends DBPC-RSP. Check that: Management message type = 24. DIUC is the one requested.
TP/BS/xxx/DBPCMF/CA-001	Reference. Initial condition. BS communicating with SS at a DIUC more robust than the least robust defined in the current DCD and allowed by the SBC exchange. Stimulus. BS has receives DBPC-REQ for less robust DIUC Expected behavior. BS sends DBPC-RSP. Check that: Management message type = 24. DIUC is the one requested or the current operational one.

6.5.2.4 Negotiate Basic Capabilities

Tests of functionality involved in basic capability negotiation.

6.5.2.4.1 Negotiate Basic Capabilities-state machine

Table 87

TP/BS/INI/SBC/CA-000	Reference: IEEE 1802.16.1, Table A144/ 1,2
	Initial condition. Initial ranging done.
	Stimulus. BS receives SBC-REQ
	Expected behavior. IUT determines which capabilities are usable based on capabilities reported and sends a corresponding SBC-RSP
TP/BS/INI/SBC/CA-001	Reference: IEEE 1802.16.1, Table A144/1,2
	Initial condition. Initial ranging done. Policies to restrict the use of supported features in place.
	Stimulus. BS receives SBC-REQ
	Expected behavior. BS disables reported capabilities as prescribed by policy and sends a corresponding SBC-RSP

6.5.2.4.2 Negotiate Basic Capabilities-message format

Table 88

TP/BS/INI/SBCMF/CA-000	Reference.
	Initial condition. SS has completed initial ranging.
	Stimulus. BS has received a SBC-REQ.
	Expected behavior. BS transmits SBC-RSP. Check that IUT does not set in SBC-RSP any bit that was not set in SBC-RSP in the following parameters SS Demod Support SS Modulator Support TBD SS DL FEC Types SS UL FEC Types BW Allocation support Check that TLV parameter order is correct.

6.5.2.4.3 Negotiate Basic Capabilities-invalid message format

Table 89

TP/BS/INI/SBCMF/BI-000	Reference.
	Initial condition. Initial Ranging of SS completes successfully
	Stimulus. BS Receives invalid SBC-REQ
	Expected behavior. Check that IUT silently discards message and continues operation.

6.5.2.4.4 Negotiate Basic Capabilities-inopportune messages

Table 90

TP/BS/INI/SBCMF/BI-000	Reference. Initial condition. BS operational Stimulus. BS receives SBC-REQ from Operational SS Expected behavior. Check that IUT silently discards message and continues operation.
TP/BS/INI/SBCMF/BI-001	Reference. Initial condition. BS operational Stimulus. BS receives SBC-REQ from unknown SS Expected behavior. Check that IUT silently discards message and continues operation.

6.5.2.5 Registration

The tests in this section test the implemantation of the Registration procedure.

6.5.2.5.1 Registration State Machine

Table 91

TP/BS/INI/REG/CA-000	Reference: IEEE 1802.16.1, Table A146/1,2,3 Initial condition. BS has sent PKM-RSP:Auth Reply to SS entering the network. Stimulus. BS receives REG-REQ from said SS. Expected behavior. IUT verifies HMAC digest and generates Secondary Management CID. IUT determines which capabilities are enabled based on implemented options and policy. BS sends REG-RSP

Table 92

TP/BS/INI/REG/BV-000	Reference: IEEE 1802.16.1, Table A146/1,2,3 Initial condition. BS has sent REG-RSP to SS entering the network, but has not received TFTP-CPLT. Stimulus. BS receives REG-REQ anew from said SS. Expected behavior. IUT verifies HMAC digest and generates Secondary Management CID. IUT determines which capabilities are enabled based on implemented options and policy. BS sends REG-RSP

6.5.2.5.2 Registration message formats

Table 93

TP/BS/INI/REGMF/CA-000	Reference.
	Initial condition. BS has sent PKM-RSP:Auth Reply to SS entering the network.
	Stimulus. BS has received REG-REQ
	Expected behavior. BS sends REG-RSP
	Check that Response field indicates OK . Check that message contain the parameters listed below with valid values. MAC Version Secondary Management CID UL CID support HMAC Tuple.
	Check that the following parameters are present if and only if present in REG-REQ Vendor ID Encoding PKM Flow Control DSx Flow Control MCA Flow Control IP version MAC CRC Support Multicast Polling Group CID Support Vendor Specific Extensions
	Check that the parameters are transmitted in the correct order.
TP/BS/INI/REGMF/CA-001	Reference.
	Initial condition. BS has sent PKM-RSP:Auth Reply to SS entering the network.
	Stimulus. BS has received REG-REQ but has message authentication has failed
	Expected behavior. BS sends REG-RSP
	Check that Response field indicates Message authentication failure. Check that message contain the parameters listed below with valid values. HMAC Tuple.
	Check that the parameters are transmitted in the correct order.

6.5.2.5.3 Registration - invalid message formats

Table 94

TP/BS/INI/REGMF/BI-000	Reference.
	Initial condition. SS has completed authentication.
	Stimulus. BS receives REG-REQ with invalid HMAC.
	Expected behavior. IUT sends REG-RSP with Response Authentication Failure.

Table 94

TP/BS/INI/REGMF/BI-001	Reference. Initial condition. SS has completed authentication. Stimulus. BS has receives invalid but correctly authenticated REG-REQ Expected behavior. IUT silently discards message and continues operation.

6.5.2.5.4 Registration - inopportune messages

Table 95

TP/BS/INI/REGMF/BO-000	Reference. Initial condition.BS has already received a TFTP-CPLT message from the SS. Stimulus. BS receives REG-REQ from Operational SS Expected behavior. IUT discards message and continues operation
TP/BS/INI/REGMF/BO-001	Reference. Initial condition. SS entering network. Stimulus. BS receives REG-REQ from SS that has not completed Authentication and Authorization. Expected behavior. IUT discards message and continues operation

6.5.2.6 Establish IP connectivity

Tests of the functionality involved in establishing IP connectivity.

6.5.2.6.1 Establish IP connectivity state machine

Table 96

TP/BS/INI/IPC/CA-000	Reference: IEEE 1802.16.1, Table A147/2 Initial condition. SS has completed registration. Stimulus. SS sends DHCP Discover on Secondary Management Connection. Expected behavior. BS implements DHCP server functionality correctly.
TP/BS/INI/IPC/CA-001	Reference: IEEE 1802.16.1, Table A147/4 Initial condition.SS has completed registration. Stimulus. SS sends ToD request on Secondary Management Connection Expected behavior. BS implements Time Protocol server functionality correctly.
TP/BS/INI/IPC/CA-002	Reference: IEEE 1802.16.1, Table A147/6 Initial condition. SS has completed registration.l Stimulus. TFTP Request? on Secondary Management Connection Expected behavior. BS implements TFTP server functionality correctly.

Table 96

TP/BS/INI/IPC/CA-003	Reference: IEEE 1802.16.1, Table A147/1,3,5 Initial condition. SS has completed registration. Stimulus. IP traffic received on Secondary Management Connection Expected behavior. IUT routes packets to external interface.
TP/BS/INI/IPC/CA-004	Reference. Initial condition: SS has established IP connectivity over secondary management connection. Stimulus: BS receives TFTP-CPLT message. Expected results: BS responds with TFTP-RSP message.

6.5.2.6.2 Establish IP connectivity Message Format

Table 97

TP/BS/INI/IPCMF/CA-000	Reference. Initial condition. SS has established IP connectivity over secondary management connection. Stimulus. BS receives TFTP-CPLT. Expected behavior. BS sends TFTP-RSP Check that TBD

6.5.2.6.3 Establish IP connectivity Invalid Message Format

Table 98

TP/BS/INI/IPCMF/BI-000	Reference. Initial condition. BS operational. Stimulus. BS receives incorrect TFTP-CPLT. Expected behavior. IUT silently discards message.

6.5.2.6.4 Establish IP connectivity Timers and Counters

Table 99

TP/BS/INI/IPC/TI-000	Reference. Initial condition. BS has sent REG-RSP to SS Stimulus. None Expected behavior. IUT deregisters SS no sooner than 15min later. TBR is an explicit deregistration message transmitted?

6.5.2.6.5 Establish IP connectivity Inopportune messages

Table 100

TP/BS/INI/IPCMF/BO-000	Reference. Initial condition. BS in normal operation Stimulus. Operational SS sends TFTP-CPLT Expected behavior. IUT silently discards the message
TP/BS/INI/IPCMF/BO-001	Reference. Initial condition. BS in normal operation Stimulus. TFTP-CPLT received from non-existent SS Expected behavior. IUT IUT silently discards the message

6.5.3 Privacy Key Management and Authentication

Tests of the implementation of the PKM protocol.

6.5.3.1 Authorization State Machine

TP/BS/PKM/AUTH/CA-000	Reference: IEEE 1802.16.1, Table A159/3 Intial condition:Basic Capabilities successfully negotiated with SS Stimulus: IUT receives Auth Request containing a valid certificate for an SS authorized to enter the network. Expected Behavior: IUT authenticates certificate, checks for SS authorization and transmits a Auth Reply containing the encrypted AK, the Primary SA and all static SAs configured for the SS.
TP/BS/PKM/AUTH/CA-001	Reference: IEEE 1802.16.1, Table A159/3 Intial condition: SS Authorized and has valid AK Stimulus: IUT receives valid Auth Request Expected Behavior: IUT authenticates certificate, checks for SS authorization and transmits an Auth Reply with new AK.
TP/BS/PKM/AUTH/CA-002	Reference: IEEE 1802.16.1, Table A159/3 Intial condition: IUT is operating with an SS that has an valid AK . Stimulus: SS authorization is revoked by means specified in PIXIT statement. Expected Behavior: IUT transmits Auth Invalid to said SS.

TP/BS/PKM/AUTH/ BV-000	Reference: IEEE 1802.16.1, Table A159/3
	Intial condition:Basic Capabilities successfully negotiated
	Stimulus: IUT receives Auth Request containing a valid certificate for an for an SS unauthorized to enter the network
	Expected Behavior: IUT authenticates certificate, checks for SS authorization through method explained in PIXIT and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)
TP/BS/PKM/AUTH/ BV-001	Reference: IEEE 1802.16.1, Table A159/3
	Intial condition: IUT has been reset. First SS entering network has completed SBC negotiation.
	Stimulus: IUT receives Auth Info and Auth Request, containing a valid certificate, from said SS. IUT is reset after successful test and it is repeated.
	Expected Behavior: IUT authenticates certificate, checks for SS authorization and transmits a Auth Reply with different unpredictable AK each time test is repeated

TP/BS/PKM/AUTH/ BO-000	Reference:
	Intial condition:Basic Capabilities successfully negotiated
	Stimulus: IUT receives Auth Info and Auth Request containing a syntactically valid certificate for an SS signed by an unknown manufacturer.
	Expected Behavior: IUT authenticates certificate, checks for SS authorization and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)
TP/BS/PKM/AUTH/ BO-001	Reference:
	Intial condition:Basic Capabilities successfully negotiated
	Stimulus: IUT receives Auth Request containing a valid certificate for an for an SS but is incapable of determining whether it is authorized to enter the network or not.
	Expected Behavior: IUT authenticates certificate, checks for SS authorization through method explained in PIXIT and transmits an Auth Reject with Error code = 1 (Unauthorized SS)

TP/BS/PKM/AUTH/BI-000	Reference:
	Intial condition:Basic Capabilities successfully negotiated
	Stimulus: IUT receives Auth Info and Auth Request containing a syntactically invalid certificate for an SS.
	Expected Behavior: IUT attempts to validate certificate but fails and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)

TP/BS/PKM/AUTH/BI-001	Reference: Intial condition:Basic Capabilities successfully negotiated Stimulus: IUT receives Auth Request containing a syntactically valid certificate containing an invalid signature Expected Behavior: IUT attempts to validate certificate but fails and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)
TP/BS/PKM/AUTH/BI-002	Reference: Intial condition:Basic Capabilities successfully negotiated Stimulus: IUT receives Auth Request with security capabilities showing lack of support for any of the mandatory cryptographic methods. Expected Behavior: IUT attempts to validate certificate but fails and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)
TP/BS/PKM/AUTH/BI-003	Reference: Intial condition:Basic Capabilities successfully negotiated Stimulus: IUT receives Auth Request with a valid certificate but the the SS is listed on the revocation list. Expected Behavior: IUT attempts to validate certificate but fails and transmits an Auth Reject with Error code = 6 (Permanent Authorization Failure)

6.5.3.1.1 Message Formats

TP/BS/PKM/ AUTHMF/CA-000	Reference: Intial condition:IUT has negotiated Basic Capabilities with an SS Stimulus: IUT receives Auth Request from said authorized SS Expected Behavior: IUT sends Auth Reply Check that message format is correct
TP/BS/PKM/ AUTHMF/CA-001	Reference: Intial condition:IUT has negotiated Basic Capabilities with an SS Stimulus: IUT has received Auth Request from said unauthorized SS. Expected Behavior: IUT sends Auht Reject Check that message format is correct

6.5.3.2 TEK

6.5.3.2.1 State Machine

TP/BS/PKM/TEK/CA-000	Reference: IEEE 1802.16.1, Table A159/5 Intial condition: IUT has sent Auth Reply to an SS Stimulus: IUT receives Key Request for an authorized SA Expected Behavior: IUT sends Key Reply Check that message format is correct

TP/BS/PKM/TEK/BV-000	Reference:IEEE 1802.16.1, Table A159/5 Intial condition: IUT has sent Auth Reply to an SS Stimulus: IUT receives Key Request for an unauthorized SA. Expected Behavior: IUT sends Key Reject Check that message format is correct.
TP/BS/PKM/TEK/BV-001	Reference: IEEE 1802.16.1, Table A159/5 Intial condition: IUT has sent Auth Reply to an SS Stimulus: IUT receives Key Request with an invalid HMAC digest Expected Behavior: IUT sends Key Reject Check that message format is correct.
TP/BS/PKM/TEK/BV-002	Reference: IEEE 1802.16.1, Table A159/4 Intial condition: IUT has been reset. The first SS entering the network has been sent a Auth Reply containing only the parameters for the Primary SA. Stimulus: IUT receives Key Request for the Primary SA of the SS. Expected Behavior: IUT sends the Key Reply containing the key for the Primary SA.. Test is repeated several times. Check that the keys generated are unpredictable.

6.5.3.2.2 Message formats

TP/BS/PKM/TEK/MF-000	Reference: Intial condition: IUT has sent Auth Reply to an SS Stimulus: IUT receives Key Request for an authorized SA Expected Behavior: IUT sends Key Reply Check that message format is correct
TP/BS/PKM/TEK/MF-001	Reference: Intial condition: IUT has sent Auth Reply to an SS Stimulus: IUT receives Key Request for an unauthorized SAt Expected Behavior: IUT sends Key Reject Check that message format is correct

6.5.3.3 Security Associations

6.5.3.3.1 Security association addition

TP/BS/PKM/SAM/CA-000	Reference: IEEE 1802.16.1, Table A159/8 Intial condition: IUT has been stimulated by means specified in PIXIT to add an addtional SA to an operational SS. Stimulus: IUT is stimulated by means specified in PIXIT to add an addtional SA to an operational SS. Expected Behavior: IUT sends SA add message to said SS.

TP/BS/PKM/SAM/BV-000	Reference: Intial condition: SA has been added to an SS through the use of an SA-Add. SA still to be utilized in the future. Stimulus: IUT receives Auth Request from authorized terminal Expected Behavior: IUT sends Auth Reply and following that a new SA Add renewing the SA.
TP/BS/PKM/SAM/BV-001	Reference: Intial condition: SA has been added to an SS through the use of an SA-Add. SA still to be utilized in the future and has been added by some means to the set of Static SAs. Stimulus: IUT receives Auth Request from authorized terminal Expected Behavior: IUT sends Auth Reply listing the SA as authorized.

TP/BS/PKM/SAM/MF-000	Reference: Intial condition: IUT has been stimulated by means specified in PIXIT to add an addtional SA to an operational SS. Stimulus: IUT is stimulated by means specified in PIXIT to add an addtional SA to an operational SS. Expected Behavior: IUT sends SA add message. Check that message format is correct.

6.5.3.3.2 Encryption and key scheduling

TP/BS/PKM/SA/CA-000	Reference: IEEE 1802.16.1, Table A159/11 Intial condition: IUT has a uplink connection in active state mapped to the primary SA with an SS. The keying material for the primary SA has been exchanged. Stimulus: IUT receives data encrypted with the older TEK Expected Behavior: IUT receives and decrypts data correctly. Note: Test should be preformed for all supported encryption methods.
TP/BS/PKM/SA/CA-001	Reference:IEEE 1802.16.1, Table A159/11 Intial condition: IUT has an uplink connection in active state mapped to the primary SA with an SS. The keying material for the primary SA has been exchanged. Stimulus: IUT receives data encrypted with the older TEK Expected Behavior: IUT receives and decrypts data correctly. Note: Test should be preformed for all supported encryption methods.
TP/BS/PKM/SA/CA-002	Reference: IEEE 1802.16.1, Table A159/11 Intial condition: IUT has an downlink connection in active state with an SS. The keying material for the primary SA has been exchanged. The connection is mapped to the primary SA. Stimulus: IUT receives data destined to said SS on its backhaul connection. Expected Behavior: IUT sends the data to the SS encrypted using the older TEK. Note: Test should be preformed for all supported encryption methods.
TP/BS/PKM/SA/CA-003	Reference: IEEE 1802.16.1, Table A159/11 Intial condition: IUT has an downlink connection in active state with an SS. The keying material for an Static SA has been exchanged. The connection is mapped to the said Static SA.. Stimulus: IUT receives data destined to said SS on its backhaul connection. Expected Behavior: IUT sends the data to the SS encrypted using the older TEK. Note: Test should be preformed for all supported encryption methods.
TP/BS/PKM/SA/CA-004	Reference: IEEE 1802.16.1, Table A159/11 Intial condition: IUT has more than one downlink connection in active state with an SS. The keying material for the Primary SA and an Static SA has been exchanged. One of the connection is mapped to the said Static SA. The remaining connections are mapped to the Primary SA.. Stimulus: IUT receives data destined to said SS on its backhaul connection. Expected Behavior: IUT sends the data to the SS encrypted using the older TEK of the respective SAs. Note: Test should be preformed for all supported encryption methods.

TP/BS/PKM/SA/CA-005	Reference: IEEE 1802.16.1, Table A159/11
	Intial condition: More than one SSs registered with IUT. At least one downlink connection in active state establsihed with each SS. Keying material for all Primary SAs valid.
	Stimulus: IUT receives data destened to saids SSs on its backhaul connection.
	Expected Behavior: IUT sends the data to the SSs encrypted using the older TEK of the respective Primary SAs.
	Note: Test should be preformed for all supported encryption methods.
TP/BS/PKM/SA/CA-006	Reference: IEEE 1802.16.1, Table A159/11
	Intial condition: More than one SSs registered with IUT. At least one uplink connection in active state establsihed with each SS. Keying material for all Primary SAs valid.
	Stimulus: Each SS has data to send on its user connection. IUT grants bandwidth to each SS.
	Expected Behavior: IUT receives the transmission from each SS and applies the correct SA on the received data.
	Note: Test should be preformed for all supported encryption methods.

TP/BS/PKM/SA/BI -000	Reference: IEEE 1802.16.1, Table A159/11
	Intial condition: One SSs registered with IUT. At least one uplink connection in active state establsihed with the SS. Keying material for Primary SA valid. Encryption method other than 'don't encrypt'.
	Stimulus: SS sends a MAC on said connection. The EC bit in the MAC Header is set to zero. HCS computed correctly.
	Expected Behavior: IUT discards said MAC PDU and may log event.
	Note: Test should be preformed for all supported encryption methods.

6.5.4 Dynamic Services

6.5.4.1 Dynamic Service Addition- BS Initiated

6.5.4.1.1 Capabilities

Table 101 Dynamic Service Addition - Capabilities

TP/BS/DS/DSA/CA-000	Reference: IEEE 1802.16.1, Table A154/1
	Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.)
	Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate and activate a service containing uplink and downlink portions.
	Expected Behavior: Either the BS shall transmit to the SS a DSA-REQ message instructing the SS to create and activate both the UL and DL portions of the service, or the BS shall transmit two DSA-REQ messages to the SS, one to create and activate the UL portion and one to create and activate the DL portion.
	Repeat this test for all service types supported by the BS.

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Table 101 Dynamic Service Addition - Capabilities

TP/BS/DS/DSA/CA-001	Reference: IEEE 1802.16.1, Table A154/2,3 Initial Condition: End of TP/BS/DS/DSA/CA-000 Stimulus: BS receives valid DSA-RSP from SS. Expected Behavior: BS transmits DSA-ACK to SS.

6.5.4.1.2 Valid Behavior

Table 102 Dynamic Service Addition - Valid Behavior

TP/BS/DS/DSA/BV-000	Reference: IEEE 1802.16.1, Table A154/1 Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate and activate a service containing only a downlink portion. Expected Behavior: The BS shall transmit to the SS a DSA-REQ message instructing the SS to create and activate the DL service. Repeat this test for all downlink-only service types supported by the BS.
TP/BS/DS/DSA/BV-001	Reference: IEEE 1802.16.1, Table A154/2,3 Initial Condition: End of TP/BS/DS/DSA/BV-000 Stimulus: BS receives valid DSA-RSP from SS. Expected Behavior: BS transmits DSA-ACK to SS.
TP/BS/DS/DSA/BV-002	Reference:IEEE 1802.16.1, Table A154/1 Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate and activate a service containing only an uplink portion. Expected Behavior: The BS shall transmit to the SS a DSA-REQ message instructing the SS to create and activate the UL service. Repeat this test for all uplink-only service types supported by the BS.
TP/BS/DS/DSA/BV-003	Reference: IEEE 1802.16.1, Table A154/2.3 Initial Condition: End of TP/BS/DS/DSA/BV-002 Stimulus: BS receives valid DSA-RSP from SS. Expected Behavior: BS transmits DSA-ACK to SS.
TP/BS/DS/DSA/BV-004	Reference: Initial Condition: BS has transmitted DSA-ACK to SS. Stimulus: BS receives a redundant copy of the DSA-RSP that stimulated the DSA-ACK, within 110% of the maximum value of timer T8. Expected Behavior: BS resends DSA-ACK to SS.
TP/BS/DS/DSA/BV-005	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) DSx Flow Control SS Capability was set lower than the capability of the BS. Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate at least one more service activation than DSx Flow Control SS Capability. Expected Behavior: BS initiates all services by sending DSA-REQ messages, metered such that at most SS DSx Flow Control DSA-REQ or DSA-ACK (timer T8 max value) messages are outstanding.

Table 102 Dynamic Service Addition - Valid Behavior

TP/BS/DS/DSA/BV-006	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate a service to the provisioned state. Expected Behavior: The BS shall transmit to the SS a DSA-REQ message instructing the SS to create service in the provisioned state.
TP/BS/DS/DSA/BV-007	Reference: Initial Condition: End of TP/BS/DS/DSA/BV-006 Stimulus: BS receives valid DSA-RSP from SS. Expected Behavior: BS transmits DSA-ACK to SS.
TP/BS/DS/DSA/BV-008	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate a service to the admitted state. Expected Behavior: The BS shall transmit to the SS a DSA-REQ message instructing the SS to create service in the admitted state.
TP/BS/DS/DSA/BV-009	Reference: Initial Condition: End of TP/BS/DS/DSA/BV-008 Stimulus: BS receives valid DSA-RSP from SS. Expected Behavior: BS transmits DSA-ACK to SS.
TP/BS/DS/DSA/BV-010	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Uplink CID support SS Capability was set lower than the capability of the BS. Stimulus: BS receives stimulus (outside scope of standard) causing it to initiate at least one more service activation than Uplink CID support SS Capability. Expected Behavior: BS initiates only Uplink CID support services by sending DSA-REQ messages, metered, if necessary, such that at most SS DSx Flow Control DSA-REQ or DSA-ACK (timer T8 max value) messages are outstanding

6.5.4.1.3 Invalid Behavior

Table 103 Dynamic Service Addition - Invalid Behavior

TP/BS/DS/DSA/BI-000	Reference: Initial Condition: BS has transmitted a DSA-REQ message to the SS. Stimulus: BS receives an erroneous DSA-RSP message from the SS. Expected Behavior: BS resends the DSA-REQ message.

6.5.4.1.4 Inopportune Behavior

Table 104 Dynamic Service Addition - Inopportune Behavior

TP/BS/DS/DSA/BO-000	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives a DSA-RSP for a non-existant service. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSA/BO-001	Reference: Initial Condition: BS has received TFTP-CPLT from SS. (SS is authenticated and registered.) BS has transmitted DSA-ACK to SS. Stimulus: BS receives a DSA-RSP for an existing service, substantially later than the maximum value of T8 after sending the DSA-ACK. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSA/BO-002	Reference: Initial Condition: BS, not capable of supporting SS initiated dynamic services, has received TFTP-CPLT from SS. (SS is authenticated and registered.) Stimulus: BS receives a DSA-REQ message from the SS. Expected Behavior: BS sends a DSA-RSP to the SS indicating that the service is not allowed.

6.5.4.1.5 Timer

Table 105 Dynamic Service Addition - Timer

TP/BS/DS/DSA/TI-000	Reference: Initial Condition: BS has transmitted a DSA-REQ message to the SS. The BS has retried less than "DSx Request Retries" times. Stimulus: BS does not receive a DSA-RSP message from the SS within T7 timeout. Expected Behavior: BS resends the DSA-REQ message.
TP/BS/DS/DSA/TI-001	Reference: Initial Condition: BS has transmitted a DSA-REQ message to the SS. The BS has retried "DSx Request Retries" times. Stimulus: BS does not receive a DSA-RSP message from the SS within T7 timeout. Expected Behavior: BS does not resend the DSA-REQ message

6.5.4.1.6 Message Formats

For all TP/BS/DS/DSA tests ensure that messages transmitted by the BS contain the correct parameters in the correct order.

6.5.4.2 Dynamic Service Change

6.5.4.2.1 Capabilities

Table 106 Dynamic Service Change - Capabilities

TP/BS/DS/DSC/CA-000	Reference: IEEE 1802.16.1, Table A156/1 Initial Condition: BS has established an active service, consisting of both an uplink and downlink portion, with an SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change parameters of the active service containing uplink and downlink portions. Expected Behavior: Either the BS shall transmit to the SS a DSC-REQ message instructing the SS to change the parameters of both the UL and DL portions of the service, or the BS shall transmit two DSC-REQ messages to the SS, one to modify the UL portion and one to modify the DL portion. Repeat this test for all service types supported by the BS.
TP/BS/DS/DSC/CA-001	Reference: IEEE 1802.16.1, Table A156/2,3 Initial Condition: End of TP/BS/DS/DSC/CA-000 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.

6.5.4.2.2 Valid Behavior

Table 107 Dynamic Service Change - Valid Behavior

TP/BS/DS/DSC/BV-000	Reference: IEEE 1802.16.1, Table A156/1 Initial Condition: BS has established an active service, consisting of at least a downlink portion, with an SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the parameters of the downlink portion of the service. Expected Behavior: The BS shall transmit to the SS a DSC-REQ message instructing the SS to change the DL parameters of the service. Repeat this test for all downlink-only service types supported by the BS.
TP/BS/DS/DSC/BV-001	Reference: IEEE 1802.16.1, Table A156/2.3 Initial Condition: End of TP/BS/DS/DSC/BV-000 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-002	Reference: IEEE 1802.16.1, Table A156/1 Initial Condition: BS has established an active service, consisting of at least an uplink portion, with an SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the parameters of the uplink portion of the service. Expected Behavior: The BS shall transmit to the SS a DSC-REQ message instructing the SS to change the UL parameters of the service. Repeat this test for all uplink-only service types supported by the BS.

Table 107 Dynamic Service Change - Valid Behavior

TP/BS/DS/DSC/BV-003	Reference: IEEE 1802.16.1, Table A156/2,3 Initial Condition: End of TP/BS/DS/DSC/BV-002 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-004	Reference: Initial Condition: BS has transmitted DSC-ACK to SS. Stimulus: BS receives a redundant copy of the DSC-RSP that stimulated the DSC-ACK, within 110% of the maximum value of timer T8. Expected Behavior: BS resends DSC-ACK to SS.
TP/BS/DS/DSC/BV-005	Reference: Initial Condition: BS has established an active service with an SS. DSx Flow Control SS Capability was set lower than the capability of the BS. Stimulus: BS receives stimuli (outside scope of standard) causing it to initiate at least one more service activation than DSx Flow Control SS Capability then receives a stimulus to change the parameters of the previously established service. Expected Behavior: BS does not transmit DSC-REQ message until the number of outstanding DSx mesages drops below DSx Flow Control.
TP/BS/DS/DSC/BV-006	Reference: Initial Condition: A service exists in the provisioned state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the admitted state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the admitted state.
TP/BS/DS/DSC/BV-007	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-006 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-008	Reference: Initial Condition: A service exists in the provisioned state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the active state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the active state.
TP/BS/DS/DSC/BV-009	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-008 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-010	Reference: Initial Condition: A service exists in the active state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the provisioned state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the provisioned state.
TP/BS/DS/DSC/BV-011	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-010 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.

Table 107 Dynamic Service Change - Valid Behavior

TP/BS/DS/DSC/BV-012	Reference: Initial Condition: A service exists in the active state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the admitted state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the admitted state.
TP/BS/DS/DSC/BV-013	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-012 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-014	Reference: Initial Condition: A service exists in the admitted state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the active state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the active state.
TP/BS/DS/DSC/BV-015	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-014 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.
TP/BS/DS/DSC/BV-016	Reference: Initial Condition: A service exists in the admitted state between the BS and the SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to change the service to the provisioned state. Expected Behavior: The BS shall transmit a DSC-REQ message instructing the SS to change the service to the provisioned state.
TP/BS/DS/DSC/BV-017	Reference: Initial Condition: End of TP/BS/DS/DSC/BV-016 Stimulus: BS receives valid DSC-RSP from SS. Expected Behavior: BS transmits DSC-ACK to SS.

6.5.4.2.3 Invalid Behavior

Table 108 Dynamic Service Change - Invalid Behavior

TP/BS/DS/DSC/BI-000	Reference: Initial Condition: BS has transmitted a DSC-REQ message to the SS. Stimulus: BS receives an erroneous DSC-RSP message from the SS. Expected Behavior: BS resends the DSC-REQ message.

6.5.4.2.4 Inopportune Behavior

Table 109 Dynamic Service Change - Inopportune Behavior

TP/BS/DS/DSC/BO-000	Reference: Initial Condition: Service exists between BS and SS. Stimulus: BS receives a DSC-RSP for a non-existant service. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSC/BO-001	Reference: Initial Condition: Service exists between BS and SS. BS has transmitted DSC-ACK to SS. Stimulus: BS receives a DSC-RSP for an existing service, substantially later than the maximum value of T8 after sending the DSC-ACK. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSC/BO-002	Reference: Initial Condition: BS, not capable of supporting SS initiated dynamic services, has service established between BS and SS. Stimulus: BS receives a DSC-REQ message from the SS. Expected Behavior: BS sends a DSC-RSP to the SS indicating that the service is not allowed.

6.5.4.2.5 Timer

Table 110 Dynamic Service Change - Timer

TP/BS/DS/DSC/TI-000	Reference: Initial Condition: BS has transmitted a DSC-REQ message to the SS. The BS has retried less than "DSx Request Retries" times. Stimulus: BS does not receive a DSC-RSP message from the SS within T7 timeout. Expected Behavior: BS resends the DSC-REQ message.
TP/BS/DS/DSC/TI-001	Reference: Initial Condition: BS has transmitted a DSC-REQ message to the SS. The BS has retried "DSx Request Retries" times. Stimulus: BS does not receive a DSC-RSP message from the SS within T7 timeout. Expected Behavior: BS does not resend the DSC-REQ message

6.5.4.2.6 Message Formats

For all TP/BS/DS/DSC tests ensure that messages transmitted by the BS contain the correct parameters in the correct order.

6.5.4.3 Dynamic Service Deletion

6.5.4.3.1 Capabilities

Table 111 Dynamic Service Deletion - Capabilities

TP/BS/DS/DSD/TI-000	Reference: Initial Condition: Service consisting of both an uplink and a donwlink portion exists between BS and SS. Stimulus: BS receives stimulus (outside of scope of standard) to delete the service.. Expected Behavior: Sends a DSD-REQ for the UL portion and a separate DSD-REQ for the DL portion.
TP/BS/DS/DSD/TI-001	Reference: Initial Condition: End of TP/BS/DS/DSD/TI-000. Stimulus: BS receives a DSD-RSP from the SS. Expected Behavior: BS does not resend the DSD-REQ.

6.5.4.3.2 Valid Behavior

Table 112 Dynamic Service Deletion - Valid Behavior

TP/BS/DS/DSD/BV-000	Reference:IEEE 1802.16.1, Table A158/1 Initial Condition: Service with at least a downlink portion exists between the BS and SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to delete the downlink portion of a service. Expected Behavior: The BS shall transmit to the SS a DSD-REQ message instructing the SS to delete the DL service. Repeat this test for all downlink service types supported by the BS.
TP/BS/DS/DSD/BV-001	Reference: IEEE 1802.16.1, Table A158/1 Initial Condition: Service with at least an uplink portion exists between the BS and SS. Stimulus: BS receives stimulus (outside scope of standard) causing it to delete the uplink portion of a service. Expected Behavior: The BS shall transmit to the SS a DSD-REQ message instructing the SS to delete the UL service. Repeat this test for all uplink service types supported by the BS.
TP/BS/DS/DSD/BV-002	Reference: Initial Condition: BS has established a service with an SS. DSx Flow Control SS Capability was set lower than the capability of the BS. Stimulus: BS receives stimuli (outside scope of standard) causing it to initiate at least one more service activation than DSx Flow Control SS Capability then receives a stimulus to delete the previously established service. Expected Behavior: BS does not transmit DSD-REQ message until the number of outstanding DSx mesages drops below DSx Flow Control.

6.5.4.3.3 Invalid Behavior

Table 113 Dynamic Service Deletion - Invalid Behavior

TP/BS/DS/DSD/BI-000	Reference: Initial Condition: BS has transmitted a DSD-REQ message to the SS. Stimulus: BS receives an erroneous DSD-RSP message from the SS. Expected Behavior: BS resends the DSD-REQ message.

6.5.4.3.4 Inopportune Behavior

Table 114 Dynamic Service Deletion - Inopportune Behavior

TP/BS/DS/DSD/BO-000	Reference: Initial Condition: Service exists between BS and SS. Stimulus: BS receives a DSD-RSP for a non-existant service. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSD/BO-001	Reference: Initial Condition: Service exists between BS and SS. BS has transmitted DSD-ACK to SS. Stimulus: BS receives a redundant DSD-RSP for an newly deleted service. Expected Behavior: BS ignores the message. Reporting the error to the management plane is allowed.
TP/BS/DS/DSD/BO-002	Reference: Initial Condition: Service exists between BS and SS. BS has transmitted DSD-ACK to SS. Stimulus: BS receives a DSD-RSP for an existing service for which no DSD-REQ was transmitted. Expected Behavior: BS ignores the message, but may need to take (vendor specific) action to restore the service. Reporting the error to the management plane is allowed.
TP/BS/DS/DSD/BO-003	Reference: Initial Condition: BS, not capable of supporting SS initiated dynamic services, has service established between BS and SS. Stimulus: BS receives a DSD-REQ message from the SS. Expected Behavior: BS sends a DSD-RSP to the SS indicating that the service is not allowed.

6.5.4.3.5 Timer

Table 115 Dynamic Service Deletion - Timer

TP/BS/DS/DSD/TI-000	Reference: IEEE 1802.16.1, Table A158/1,2 Initial Condition: BS has transmitted a DSD-REQ message to the SS. The BS has retried less than "DSx Request Retries" times. Stimulus: BS does not receive a DSD-RSP message from the SS within T7 timeout. Expected Behavior: BS resends the DSD-REQ message.
TP/BS/DS/DSD/TI-001	Reference: Initial Condition: BS has transmitted a DSD-REQ message to the SS. The BS has retried "DSx Request Retries" times. Stimulus: BS does not receive a DSD-RSP message from the SS within T7 timeout. Expected Behavior: BS does not resend the DSD-REQ message
TP/BS/DS/DSD/TI-002	Reference: Initial Condition: BS has successfully deleted a service. Stimulus: Before the expiration of T10, the BS is stimulated to add a new service. Expected Behavior: The BS sends a DSA-REQ, but does not resue the CID of the recently deleted connection.

6.5.4.3.6 Message Formats

For all TP/BS/DS/DSC tests ensure that messages transmitted by the BS contain the correct parameters in the correct order.

6.5.5 Bandwidth allocation and Polling

6.5.5.1 Polling

Table 116

TP/BS/BWA/POL/CA-000	Reference: IEEE 1802.16.1, Table A136/1 Initial condition. UGS uplink connection in active state with SS Expected behavior. Check that the IUT grants sufficient amount of capacity at correct intervals
TP/BS/BWA/POL/CA-001	Reference: IEEE 1802.16.1, Table A137/10 Initial condition. UGS uplink connection in active state. RT Polling connection in active state. Expected behavior. Check that upon receiving a MAC PDU on the UGS connection with PM bit set the IUT issues poll within 10 ms
TP/BS/BWA/POL/CA-002	Reference: IEEE 1802.16.1, Table A137/10 Initial condition. UGS uplink connection in active state. nRT Polling connection in active state. Expected behavior. Check that upon receiving a MAC PDU on the UGS connection with PM bit set the IUT issues poll within QoS limits

Table 116

TP/BS/BWA/POL/CA-003	Reference: IEEE 1802.16.1, Table A137/11 Initial condition. UGS uplink connection in active state with SS Expected behavior. Check that IUT issues additional grant in response to a set SI bit.
TP/BS/BWA/POL/CA-004	Reference: IEEE 1802.16.1, Table A136/2 Initial condition. RT Polling uplink connection in active state. Expected behavior. Check that the IUT issues poll within sufficient time to meet the connections latency requirement.
TP/BS/BWA/POL/CA-005	Reference: IEEE 1802.16.1, Table A136/3 Initial condition. nRT Polling uplink connection in active state. Expected behavior. Check that the IUT issues poll within sufficient time to meet the connections latency requirement.

6.5.5.2 Request-grant

Table 117

TP/BS/BWA/REQ /CA-000	Reference: IEEE 1802.16.1, Table A137/1; IEEE 1802.16.1, Table A136/4 Initial condition. BE uplink connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an aggregate request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.
TP/BS/BWA/REQ /CA-001	Reference. IEEE 1802.16.1, Table A137/1; IEEE 1802.16.1, Table A136/4 Initial condition. BE uplink connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an incremental request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.
TP/BS/BWA/REQ /CA-002	Reference: IEEE 1802.16.1, Table A137/2; IEEE 1802.16.1, Table A136/4 Initial condition. BE uplink connection in active state with SS. Link not congested. Outstanding BW request. Stimulus. BS receives a MAC PDU with a piggyback request for more BW. Expected behavior. Check that the IUT issues one or more grants to requesting SS allocating capacity in excess of original request.
TP/BS/BWA/REQ /CA-003	Reference:IEEE 1802.16.1, Table A137/1; IEEE 1802.16.1, Table A136/3 Initial condition. NRT polling uplink connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an aggregate request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.

Table 117

TP/BS/BWA/REQ /CA-004	Reference:IEEE 1802.16.1, Table A137/1; IEEE 1802.16.1, Table A136/3 Initial condition. NRT-polling uplink connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an incremental request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.
TP/BS/BWA/REQ /CA-005	Reference:IEEE 1802.16.1, Table A137/2; IEEE 1802.16.1, Table A136/3 Initial condition. RT-polling uplink connection in active state with SS. Link not congested. Outstanding BW request. Stimulus. BS receives a MAC PDU with a piggyback request for more BW. Expected behavior. Check that the IUT issues one or more grants to requesting SS allocating capacity in excess of original request.
TP/BS/BWA/REQ /CA-006	Reference: IEEE 1802.16.1, Table A137/2; IEEE 1802.16.1, Table A136/2 Initial condition. RT polling connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an aggregate request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.
TP/BS/BWA/REQ /CA-007	Reference: IEEE 1802.16.1, Table A137/2; IEEE 1802.16.1, Table A136/2 Initial condition. RT polling uplink connection in active state with SS. Link not congested. No outstanding BW requests. Stimulus. BS receives a BW request with an incremental request. Expected behavior. Check that the IUT issues one or more grants to requesting SS.
TP/BS/BWA/REQ /CA-008	Reference: IEEE 1802.16.1, Table A137/2; IEEE 1802.16.1, Table A136/2 Initial condition. RT polling uplink connection in active state with SS. Link not congested. Outstanding BW request. Stimulus. BS receives a MAC PDU with a piggyback request for more BW. Expected behavior. Check that the IUT issues one or more grants to requesting SS allocating capacity in excess of original request.

Table 118

TP/BS/BWA/REQ /BV-000	Reference. Initial condition. BE uplink connection in active state with SS. Link not congested. Outstanding BW request for large quantity of BW. Stimulus. BS receives a BW request with an aggregate request of zero bytes Expected behavior. Check that the IUT refrains from issuing more grants to requesting SS (grant in next DL-frame excepted).
TP/BS/BWA/REQ /BV-001	Reference. Initial condition. NRT polling uplink connection in active state with SS. Link not congested. Outstanding BW request for large quantity of BW. Stimulus. BS receives a BW request with an aggregate request of zero bytes Expected behavior. Check that the IUT refrains from issuing more grants to requesting SS (grant in next DL-frame excepted).

Table 118

TP/BS/BWA/REQ /BV-002	Reference.
	Initial condition. RT polling uplink connection in active state with SS. Link not congested. Outstanding BW request for large quantity of BW.
	Stimulus. BS receives a BW request with an aggregate request of zero bytes
	Expected behavior. Check that the IUT refrains from issuing more grants to requesting SS (grant in next DL-frame excepted).

6.5.5.3 Multicast Polling

6.5.5.3.1 Multicast Polling-State machine

Table 119

TP/BS/ BWA/MCP/CA-000	Reference: IEEE 1802.16.1, Table A151/2
	Initial condition. BS has nRT polling uplink connection in Active state with an SS.
	Stimulus. BS is caused to assign said SS to polling group
	Expected behavior. Check that IUT sends MCA-REQ:Add
TP/BS/ BWA/MCP/CA-001	Reference: IEEE 1802.16.1, Table A151/3; IEEE 1802.16.1, Table A137/9
	Initial condition: End of TP/BS/ BWA/MCP/CA-000
	Stimulus. IUT receives MCA-RSP indicating success.
	Expected behavior. IUT issues multicast polls to poll said SS.
TP/BS/ BWA/MCP/CA-002	Reference: IEEE 1802.16.1, Table A151/2
	Initial condition. BS has BE uplink connection in Active statewith an SS.
	Stimulus. BS is caused to assign SS to polling group
	Expected behavior. Check that IUT sends MCA-REQ:Add
TP/BS/ BWA/MCP/CA-003	Reference: IEEE 1802.16.1, Table A151/3; IEEE 1802.16.1, Table A137
	Initial condition: End of TP/BS/ BWA/MCP/CA-002
	Stimulus. IUT receives MCA-RSP indicating success.
	Expected behavior. IUT issues multicast polls to poll said SS.
TP/BS/ BWA/MCP/CA-002	Reference: IEEE 1802.16.1, Table A151/2-3
	Initial condition. Multicast polling group established with an SS added to it. An active nRT polling connection between the BS and said SS has been set up.
	Stimulus. BS is caused to remove said SS polling group
	Expected behavior. Check that IUT performs MCA signaling correctly and subsequently starts to issue unicast polls to said SS.

Table 120

TP/BS/ BWA/MCP/BV-000	Reference
	Initial condition. BS in normal operation
	Expected behavior. Check that IUT refrains from adding SSs with only UGS or RT polling connections to Multicast Polling groups

Table 121

TP/BS/ BWA/MCP/TI-000	Reference
	Initial condition. BS waiting for MCA-RSP.
	Stimulus:Timer T15 expires.
	Expected behavior. BS resends MCA-REQ

6.5.5.3.2 Multicast Polling-Message Formats

Table 122

TP/BS/BWA/MCPMF/CA-000	Reference
	Initial condition. SS registered and BE or nRT service is active.
	Stimulus: BS is caused to add SS to multicast polling group.
	Expected behavior. BS sends MCA-REQ with Add command Check that message format is correct
TP/BS/BWA/MCPMF/CA-001	Reference
	Initial condition. SS registered and BE or nRT service is active. SS assigned to Multicast Polling Group.
	Stimulus: BS is caused to remove SS from said multicast polling group.
	Expected behavior. BS sends MCA-REQ with Remove command Check that message format is correct

6.5.5.3.3 Multicast Polling- Invalid Message Formats

Table 123

TP/BS/BWA/MCPMF/BI-000	Reference
	Initial condition. BS waiting for MCA-RSP
	Stimulus: BS receives improperly formatted MCA-RSP
	Expected behavior. BS silently discards improperly formatted message. After timeout, BS resends MCA-REQ.

6.5.5.3.4 Multicast Polling- Inopportune behavior

Table 124

TP/BS/BWA/MCPMF/BI-000	Reference Initial condition. No multicast polling group transactions outstanding Stimulus: BS receives MCA-RSP Expected behavior. Check that IUT silently discards message and does not crash.
TP/BS/BWA/MCPMF/BI-000	Reference Initial condition. BS waiting for MCA-RSP on CID=i. No other transactions outstanding Stimulus: BS receives properly formatted MCA-RSP on CID=j Expected behavior. Check that IUT does not crash.

6.5.6 Reset and re-Registration

Table 125

TP/BS/xxx/xxx/xx-000	Reference: Initial condition: Base Station is operational. At least 1 SS is operational. At least one bi-directional service active. Stimulus: Network management stimulated request to reset the SS. Expected behavior: BS sends the RES-CMD on the SS's basic CID. BS successfully accepts re-entry to the system by the SS. Service is disrupted then resumes.
TP/BS/xxx/xxx/xx-001	Reference: Initial condition: Base Station is operational. At least 1 SS is operational. At least one bi-directional service active. Stimulus: Network management stimulated request to deregister the SS telling it to go to another channel (action code 0x00). Expected behavior: BS sends the DREG-CMD on the SS's basic CID. Service is terminated.
TP/BS/xxx/xxx/xx-002	Reference: Initial condition: Base Station is operational. At least 1 SS is operational. At least one bi-directional service active. Stimulus: Network management stimulated request to deregister the SS telling it to wait for a RES-CMD (action code 0x01). Expected behavior: BS sends the DREG-CMD on the SS's basic CID. Service is disrupted.
TP/BS/xxx/xxx/xx-003	Reference: Initial condition: End of TP/BS/xxx/xxx/xx-002 Stimulus: Network management stimulated request to reset the SS. Expected behavior: BS sends the RES-CMD on the SS's basic CID. BS successfully accepts re-entry to the system by the SS. Service resumes.

Table 125

TP/BS/xxx/xxx/xx-004	Reference: Initial condition: Base Station is operational. At least 1 SS is operational. At least one bi-directional service active. Stimulus: Network management stimulated request to deregister the SS telling it to go to listen only mode (action code 0x02). Expected behavior: BS sends the DREG-CMD on the SS's basic CID. Service is disrupted.
TP/BS/xxx/xxx/xx-005	Reference: Initial condition: End of TP/BS/xxx/xxx/xx-004. Stimulus: Network management stimulated request to re-register the SS (action code 0x03). Expected behavior: BS sends the DREG-CMD on the SS's basic CID. Service resumes.

6.5.7 Clock Comparison

Table 126

TP/BS/xxx/xxx/xx-000	Reference: Initial condition: Base station is operational. Stimulus: At a minimum, before the first UGS connection is established, but may be performed earlier. Expected behavior: BS transmits, every 50 ms, a CLK-CMP message on the Broadcast connection.
TP/BS/xxx/xxx/xx-001	Reference: Initial condition: BS has initiated TBD connection and is transmitting TBD messages. BS is using different sources for symbol and network clock. Stimulus: Vary the network clock. Expected behavior: The values in the TBD message should change accordingly.

6.5.8 MAC PDUs

Table 127

TP/BS/xxx/xxx/xx-000	Reference: IEEE 1802.16.1, Table A134/1 Initial condition: One SS registered and authenticated with BS. One ATM data service established with data rate greater than 2000 ATM cells per second. Packing on for the connection. Stimulus: Two or more cells from the same connection arrive at BS from backhaul in a 1 ms frame. Expected behavior: The BS will pack the cells from the same connection into a single MAC PDU each frame.

Table 127 *(continued)*

TP/BS/xxx/xxx/xx-001	Reference: IEEE 1802.16.1, Table A134/2 Initial condition: One SS registered and authenticated with BS. One ATM data service established with data rate of at least 768 kbps. Packing on for the connection. Stimulus: The test SS sends two or more MAC SDUs from the same connection packed into a single MAC PDU Expected behavior: The BS forwards the ATM cells to the backhaul as individual entities.
TP/BS/xxx/xxx/xx-002	Reference: IEEE 1802.16.1, Table A133/1,6 Initial condition: System running. All SSs at QPSK. Enough ATM connections with enough downlink data rate to cause congestion. Stimulus: Continuous reception of downlink data from backhaul. Expected behavior: No ATM cells are fragmented. Secondary management connection traffic may be fragmented.
TP/BS/xxx/xxx/xx-003	Reference: IEEE 1802.16.1, Table A133/1 Initial condition: System running. All SSs at QPSK. Enough packet connections with enough downlink data rate to cause congestion. Stimulus: Continuous reception of downlink data from backhaul, including large (>1500 byte) packets. Expected behavior: Packets are fragmented. Secondary management connection traffic is fragmented.
TP/BS/xxx/xxx/xx-004	Reference: IEEE 1802.16.1, Table A133/4 Initial condition: System running. All SSs at QPSK. Enough packet connections with enough uplink data rate to cause congestion. Stimulus: The test SS sends fragmented packets. Expected behavior: The BS correctly reconstructs the packets.
TP/BS/xxx/xxx/xx-005	Reference: IEEE 1802.16.1, Table A134/5 Initial condition: System running. All SSs at QPSK. Enough packet connections with enough downlink data rate to cause congestion. Packing on for the connections. Stimulus: Continuous reception of downlink data from backhaul, including large (>1500 byte) and small (64 byte) packets on the same connection the same frame. Expected behavior: Packets are fragmented and packed. Secondary management connection traffic is fragmented, and packed if applicable.
TP/BS/xxx/xxx/xx-006	Reference: IEEE 1802.16.1, Table A134/6 Initial condition: System running. All SSs at QPSK. Enough packet connections with enough uplink data rate to cause congestion. Packing on for the connections. Stimulus: The test SS sends packets simultaneously packed and fragmented on data, primary, and secondary connections. Expected behavior: The BS correctly reconstructs the packets.
TP/BS/xxx/xxx/CA-007	Reference: IEEE 1802.16.1, Table A135/2 Initial condition: One SS registered and authenticated with BS. One data service established. CRC is on for the connection. Stimulus: BS receives data for this connection from the backhaul. Expected behavior: BS sends data over said connection in MAC PDUs with correctly computed CRC.

TP/BS/xxx/xxx/BV-000	Reference: IEEE 1802.16.1, Table A133 /3
	Initial condition: One SS registered and authenticated with BS. One data service established.
	Stimulus: SS sends a MAC SDU fragmented into several MAC PDUs but omits one of the intermediate fragments.
	Expected behavior: BS attempts to reassemble SDU but fails and discards the entire MAC SDU.

TP/BS/xxx/xxx/BI-000	Reference: IEEE 1802.16.1, Table A135/2
	Initial condition: One SS registered and authenticated with BS. One data service established. CRC is on for the connection.
	Stimulus: BS receives data from this SS with incorrect CRC.
	Expected behavior: BS silently discards the PDU.
TP/BS/xxx/xxx/BI-001	Reference:
	Initial condition: One SS registered and authenticated with BS. One data service established.
	Stimulus: BS receives data from this SS with incorrect HCS.
	Expected behavior: BS silently discards the PDU.

6.5.9 RLC

6.5.10 PHY

6.5.10.1 Minimum Performance

TP/BS/PHY/MNP/ xx-001	Reference: Initial condition: BS operating normally Stimulus: Expected behavior: 2%
TP/BS/PHY/MNP/ xx-002	Reference: Initial condition: BS is operating. Modulation is off. (Test mode) Stimulus: Tx Frequency and accuracy measured in CV Expected behavior: Frequency is between 10-66GHz Frequency accuracy is $\pm$ 10 ppm
TP/BS/PHY/MNP/ xx-003	Reference: Initial condition: BS is operating normally Stimulus: Expected behavior: Local regulations
TP/BS/PHY/MNP/ xx-004	Reference: Initial condition: BS is operating normally Stimulus: Expected behavior: Local regulations

TP/BS/PHY/MNP/xx-005	Reference: Initial condition: BS is operating normally Stimulus: Expected behavior: Ramp up / ramp down time is less than 24 symbols
TP/BS/PHY/MNP/xx-006	Reference: Initial condition: SS is operating Forced modulation mode Stimulus: Forced modulation QPSK, 16-QAM and 64-QAM Expected behavior: Modulation Accuracy without an equalizer for QPSK: 12% Modulation Accuracy with an equalizer for QPSK: 10% Modulation Accuracy without an equalizer for 16-QAM: 6% Modulation Accuracy with an equalizer for 16-QAM: 3% Modulation Accuracy with an equalizer for 64-QAM: 1.5%
TP/BS/PHY/MNP/xx-007	Reference: Initial condition: BS is operating normally. Tx power is in minimum. Stimulus: TX power is increased in 0.5 dB steps Expected behavior: 27dB for QPSK
TP/BS/PHY/MNP/xx-008	Reference: Initial condition: BS is operating Forced modulation mode. Stimulus: Forced modulation Expected behavior: QPSK BER 1E-3 = -94dBm QPSK BER 1E-6 = -90dBm 16-QAM BER 1E-3 = -87dBm 16-QAM BER 1E-6 = -83dBm 64-QAM BER 1E-3 = -79dBm 64-QAM BER 1E-6 = -74dBm

6.5.11 ATM Convergence Sublayer

Table 128

TP/BS/xxx/xxx/xx-001	Reference: IEEE 1802.16.1, Table A127/1,2
	Initial condition: Base station is operational. Four downlink services are set up, 2 for one SS, 2 for another. At least one service is VC switched and at least one is VP switched.
	Stimulus: ATM cells received from backhaul (ingress).
	Expected behavior: BS forwards ATM cells on correct CID to correct SS. ATM cells with VPI/VCI not mapped to a service are discarded. Cells are correctly encapsulated.

Table 128

TP/BS/xxx/xxx/xx-002	Reference: IEEE 1802.16.1, Table A127/1,2 Initial condition: Base station is operational. At least one VC switched bi-directional service and at least one bi-directional VP switched service are set up. No PHS. Stimulus: ATM cells received from backhaul (ingress) and from the airlink. Expected behavior: BS forwards ATM cells from backhaul on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded. BS forwards cells from the airlink to the backhaul, preserving the VPI/VCI from the MAC PDU.
TP/BS/xxx/xxx/xx-003	Reference: IEEE 1802.16.1, Table A127/2 Initial condition: Base station is operational. At least one VC switched downlink service is set up. No PHS. At least 2 classifiers are set up. Stimulus: ATM cells received from backhaul (ingress). Expected behavior: BS forwards ATM cells from backhaul on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded.
TP/BS/xxx/xxx/xx-004	Reference: IEEE 1802.16.1, Table A127/1 Initial condition: Base station is operational. At least one VP switched downlink service is set up. No PHS. At least 2 classifiers are set up. At least one of the classifiers has at least 2 VCIs. Stimulus: ATM cells received from backhaul (ingress). Expected behavior: BS forwards ATM cells from backhaul on correct CID with VPI/VCI preserved in the MAC PDU (53 –byte SDU). ATM cells with VPI/VCI not mapped to a service are discarded.
TP/BS/xxx/xxx/xx-005	Reference: IEEE 1802.16.1, Table A127/4 Initial condition: Base station is operational. At least one VC switched bi-directional service is set up. PHS. Stimulus: ATM cells received from backhaul (ingress) and from the airlink. Expected behavior: BS forwards ATM cells from backhaul on correct CID with 49–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. BS forwards ATM cells from airlink on backhaul, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 49–byte SDU format
TP/BS/xxx/xxx/xx-006	Reference: IEEE 1802.16.1, Table A127/3 Initial condition: Base station is operational. At least one VP switched bi-directional service is set up. PHS. Classifier specifies no VCIs. Stimulus: ATM cells received from backhaul (ingress) and from the airlink. Expected behavior: BS forwards ATM cells from backhaul on correct CID with 51–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. BS forwards ATM cells from airlink on backhaul, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 51–byte SDU format

Table 128

TP/BS/xxx/xxx/xx-007	Reference: IEEE 1802.16.1, Table A127/2,4 Initial condition: Base station is operational. At least one VP switched bi-directional service is set up. PHS. Classifier with multiple VCI specified. Stimulus: ATM cells received from backhaul (ingress) and from the airlink. Expected behavior: BS forwards ATM cells from backhaul on correct CID with 51–byte SDU format. ATM cells with VPI/VCI not mapped to a service are discarded. BS forwards ATM cells from airlink on backhaul, correctly reconstituting VPI/VCI and remainder of ATM header from CID and 51–byte SDU format
TP/BS/xxx/xxx/xx-008	Reference: IEEE 1802.16.1, Table A127/1,2 Initial condition: Base station is operational. At least one downlink service is set up. At least one classifier specified. Cells entering from backhaul that match the classifier, and other cells that do not match the classifier. Those that do not match are being discarded, those that do match are being forwarded. Stimulus: Replace classifier so that originally discarded cells are now forwarded and originally forwarded cells are now discarded. Expected behavior: Originally discarded cells are now forwarded and originally forwarded cells are now discarded.
TP/BS/xxx/xxx/xx-009	Reference: IEEE 1802.16.1, Table A127/1,2 Initial condition: End of TP/BS/xxx/xxx/xx-008. Stimulus: Add original version of classifier that was replaced in TP/BS/xxx/xxx/xx-008 so that originally forwarded cells are now forwarded once more, but newly forwarded cells are still forwarded. Expected behavior: Originally forwarded cells are now forwarded once more, but newly forwarded cells are still forwarded.
TP/BS/xxx/xxx/xx-010	Reference: IEEE 1802.16.1, Table A127/1,2 Initial condition: End of TP/BS/xxx/xxx/xx-009. Stimulus: Delete version of classifier that was created by replace in TP/BS/xxx/xxx/xx-008 so that originally discarded cells are now discarded once more, but originally forwarded cells are still forwarded. Expected behavior: Originally discarded cells are now discarded once more, but originally forwarded cells are still forwarded.

6.5.12 Packet Convergence Sublayer

Table 129

TP/BS/PCS/xxx/CA-000	Reference: Initial condition: BS has set up an active transport connection for one of the packet services supported Stimulus: IUT receives packets from backhaul destined for said connection Expected behavior: Packet convergence layer PDU is correctly formed and encapsulated in MAC PDU. MAC PDU is transmitted upon recieving a grant.

6.5.12.1 PHS

6.5.12.1.1 State machine

Table 130

TP/BS/PCS/PHS/CA-000	Reference: IEEE 1802.16.1, Table A129/1
	Initial condition: The BS has completed a dynamic service exchange setting up payload header suppression with on a connection with CID=J, and non-zero PHSI=[a,b,…,x]
	Stimulus: The BS receives from external interface packets destined for CID=J.
	Expected behavior: The BS will transmit over the air the packet with headers suppressed as indicated in the DSx-REQ message for PHSIs [a, b,…,x]. and unsuppressed for PHSI=0.
	Note: Test for all supported protocols. Test with different number of PHSI, PHSF, PHSM and PHSS.
TP/BS/PCS/PHS/CA-001	Reference: IEEE 1802.16.1, Table A129/1
	Initial condition: The BS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0.
	Stimulus: The BS receives MAC PDU with PHSI=j on the correct connection.
	Expected behavior: BS will deliver packet on external interface with headers correctly restored.
	Note: Test for all supported protocols. Test with different PHSF and PHSM and PHSS.
TP/BS/PCS/PHS/CA-002	Reference: IEEE 1802.16.1, Table A129/1
	Initial condition: The BS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0.
	Stimulus: The BS receives MAC PDU with PHSI=0 on that connection.
	Expected behavior: BS will deliver packet on correct interface without restoring headers.

Table 131

TP/BS/PCS/PHS/BO-000	Reference: IEEE 1802.16.1, Table A129/1
	Initial condition: The BS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0. The BS has another connection in the active state with the same SS.
	Stimulus: The BS receives MAC PDU with PHSI=j on a connection that is not associated with PHSI=j.
	Expected behavior: BS will silently discard the packet.
TP/BS/PCS/PHS/BO-001	Reference: IEEE 1802.16.1, Table A129/1
	Initial condition: The BS has completed a dynamic service exchange setting up payload header suppression with PHSI=j, j>0. . The BS has another connection in the active state with the same SS.
	Stimulus: The BS receives MAC PDU with a PHSI not used in the BS.
	Expected behavior: BS will silently discard the packet.

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