

अनिवार्य आवश्यकताओं का अनुलग्नक
सं०: टीईसी/एसडी/डीडी/टीसीपी-222/02/जून19

ANNEXURES TO ERs

No.: TEC/SD/DD/TCP-222/02/June19

अनिवार्य आवश्यकताओं में इंगित मानकों का विवरण
संस्करण-2.0

DETAILS OF STANDARDS SPECIFIED IN ESSENTIAL REQUIREMENTS

VERSION-2.0

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| Annexure-A1: Safety Requirement for Telecom Equipment not having RF Interface | | | |
|--|--|---|--|
| Parameter Name | Standard | Limits/ Test Levels | Applicability/ Remarks |
| IT Equipment Safety | IS 13252 Part 1:2010 + Amd1:2013 + Amd2:2015 OR EN/IEC 62368:2014 OR EN/IEC 60950-1:2005 + Amd1:2009 + Amd2:2013 | Compliance to clauses applicable to the EUT | Older version of standard shall be accepted if it was in force on the date of issue of report. |

| Annexure-A2: Safety Requirement for Battery in portable equipment | | | |
|--|---------------------------------------|---|--|
| Battery Safety | IS 16046:2015 OR EN/IEC 62133:2012 | Compliance to clauses applicable to the EUT | Applicable only if it is portable equipment and uses secondary cells and batteries containing alkaline or non-acid electrolyte. BIS certificate or test reports from BIS approved labs in respect of batteries shall be accepted and repeat testing of batteries is not required. |

| Annexure-B: EMI/ EMC Requirement (Additional details, referred clauses and Tables in TEC EMI EMC document TEC/SD/DD/EMC-221/05/OCT-16) | | | |
|---|--|---|---|
| Parameter Name | Standard | Limits/ Test Levels | Applicability/ Remarks |
| Conducted and radiated emission - Class A | CISPR22 (2008)/ EN 55022 UPTO 31.03.2019 OR CISPR32/EN 55032 AFTER 31.03.2019 | AC/ DC Power input/ output ports: As per Table 7 (Refer Annex- B1) Telecom Ports: As per Table 8B (Refer Annex -B1) | Conducted Emission for Class A equipment as per applicable clauses/ ranges. |
| Conducted and radiated emission - Class A | CISPR22 (2008)/ EN 55022 UPTO 31.3.2019 OR CISPR32/EN 55032 AFTER 31.03.2019 | For 10 m measuring distance: As per Table 5a (Refer Annex B1) for frequency range up to 1 GHz. For 3 m measuring distance: As per Table 5a1 (Refer Annex-B1) for frequency range up to 1 GHz. For 3 m measuring distance: As per Table 5b (Refer Annex B1) frequency range beyond 1 GHz. | Radiated Emission for Class A equipment as per applicable clauses/ ranges. |
| Parameter Name | Standard | Limits/ Test Levels | Applicability/ Remarks |
| Conducted and radiated emission - Class B | CISPR22 (2008)/ EN 55022 UPTO 31.3.2019 OR CISPR32/EN 55032 AFTER 31.03.2019 | AC/ DC Power input/ output ports: As per Table 6 Telecom Ports: As per Table 8A | Conducted Emission for Class B equipment as per applicable clauses/ ranges. |
| Conducted and radiated emission - Class B | CISPR22 (2008)/ EN 55022 UPTO 31.3.2019 | For 10 m measuring distance: As per Table 4a for frequency range up to 1 GHz. | Radiated Emission for Class B equipment as per applicable clauses/ ranges. |

| | | | |
|---|---|--|--|
| | OR CISPR32/EN 55032 AFTER 31.03.2019 | For 3 m measuring distance: As per Table 4a1 for frequency range up to 1 GHz. Additional Test for EUTs with highest internal frequency \geq 108 MHz as per Clause 8.1.3: For 3 m measuring distance: As per Table 4b for frequency range beyond 1 GHz. | |
| Conducted And Radiated Emission - Electrical Appliances | CISPR14-1 (2016) | | Conducted and Radiated Emission applicable to Electricity Meter |

| Parameter Name | Standard | Limits/ Test Levels | Applicability/ Remarks |
|--|--|---|---|
| Immunity to Electrostatic Discharge | EN/IEC 61000-4-2(2008) Contact discharge | Level 2 {± 4 kV}, or higher voltage; Performance Criteria B | Compliance to clauses applicable to the EUT |
| Immunity to Electrostatic Discharge | EN/IEC 61000-4-2(2008) Air discharge | Level 3 {± 8 kV} or higher voltage; Performance Criteria B | Compliance to clauses applicable to the EUT |
| Immunity to Electrostatic Discharge- Level-4 | EN/IEC 61000-4-2(2008) Contact Discharge | Level 4 {± 8 kV}; Performance Criteria B | Applicable to Electricity Meter |
| Immunity to Electrostatic Discharge- Level-4 | EN/IEC 61000-4-2(2008) Air Discharge | Level 4 {± 15 kV}; Performance Criteria B | Applicable to Electricity Meter |
| Immunity to radiated RF | EN/IEC 61000-4-3(2010) | 80 MHz to 6 GHz: Test level 2 {Test field strength of 3 V/m}; Performance Criteria A. Plus, 800 MHz to 960 MHz & 1.4 to 6.0 GHz, Test level 3 {Test field strength of 10 V/m}; Performance Criteria A | Clauses applicable to Telecom Equipment or Telecom Terminal Equipment with voice interface. |
| Immunity to radiated RF | EN/IEC 61000-4-3(2010) | 80 MHz to 6.0 GHz: Test level 3 {Test field strength of 3 V/m}; Performance Criteria A | Clauses applicable to Telecom Terminal Equipment without voice interface. |
| Immunity to fast transients (burst) | EN/IEC 61000-4-4(2012) AC/DC power lines | Test Level 2 (1.0 kV): Performance Criteria B | Not applicable for devices having in-built or replaceable battery |
| Immunity to fast transients (burst) | EN/IEC 61000-4-4(2012) signal/control/data/telecom line | Test level 2 (0.5kV): Performance Criteria B | Not applicable for mobile devices having only radio interface |
| Immunity to surges | EN/IEC 61000-4-5(2014) line to ground – power port | 2kV: Performance Criteria B | Not applicable for devices having in-built or replaceable battery |
| Immunity to surges | EN/IEC 61000-4-5(2014) line to line – power port | 1kV: Performance Criteria B | Not applicable for devices having in-built or replaceable battery |
| Immunity to surges | EN/IEC 61000-4-5(2014) Common mode – telecom ports | 2kV: Performance Criteria C | Not applicable for mobile devices having only radio interface |

| Parameter Name | Standard | Limits/ Test Levels | Applicability/ Remarks |
|--|---|--|---|
| Immunity to conducted disturbance induced by Radio frequency fields | EN/IEC 61000-4-6(2013): AC/DC lines & signal control /telecom lines. | Test level 2 {3 V r.m.s.}: Performance Criteria A 150 kHz to 80 MHz. | Not applicable for mobile devices having only radio interface |
| Immunity to voltage dips & short interruption: Voltage dip corresponding to a reduction of supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500ms) | EN/IEC 61000-4-11(2004) | Performance criteria B | Applicable if AC power supply is used |
| Immunity to voltage dips & short interruption: Voltage dip corresponding to a reduction of supply voltage of 60% for 200ms; (i.e. 40% supply voltage for 200ms). | EN/IEC 61000-4-11(2004) | Performance criteria C | Applicable if AC power supply is used |
| Immunity to voltage dips & short interruption: Voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s. | EN/IEC 61000-4-11(2004) | Performance criteria C | If AC power supply is used |
| Immunity to voltage dips & short interruption: Voltage interruption corresponding to a reduction of supply voltage of >95% for 10ms. | EN/IEC 61000-4-11(2004) | Performance criteria B | Applicable if AC power supply is used |
| Immunity to voltage dips & short interruption: Voltage Interruption with 0% of supply for 10ms. | EN/IEC 61000-4-29 | Performance criteria B | Applicable if DC power supply is used |
| Immunity to voltage dips & short interruption: Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. | EN/IEC 61000-4-29 | Performance criteria C | Applicable if DC power supply is used |
| Immunity to voltage dips & short interruption: Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. | EN/IEC 61000-4-29 | Performance criteria B | Applicable if DC power supply is used |
| Immunity to voltage dips & short interruption: Voltage dip corresponding to 40% & 70% of supply for 100ms, 300ms and 1000 ms. | EN/IEC 61000-4-29 | Performance criteria C | Applicable if DC power supply is used |
| Immunity to voltage dips & short interruption: Voltage variations corresponding to 80% and 120% of supply for 100 ms to 10s as per Table 1c of IEC 61000-4-29. | EN/IEC 61000-4-29 | Performance criteria B | Applicable if DC power supply is used |

Note: Minimum required information related to EMI/EMC parameters have been captured in Annex-B to facilitate the applicants. However, for further details/clarity in this regard, TEC document for EMI/EMC standard – TEC/SD/DD/EMC-221/05/OCT-16 may kindly be referred to.

| Annexure- B1 | | |
|--|-------------------------|----------------------|
| Table 5 (b): Limits for radiated disturbance of class A equipment at a measuring distance of 3m. | | |
| Frequency Range (GHz) | Average Limit dB (uV/m) | Peak Limit dB (uV/m) |
| 1-3 GHz | 56 | 76 |
| 230-1000 MHz | 60 | 80 |
| Note: The lower limit shall apply at the transition frequency. | | |
| Table 5 (a): Limits for unwanted radiated emission of class A equipment (for telecommunication centres) at a measuring distance of 10m. | | |
| Frequency Range | Limits (quasi-peak) | |
| 30-230 MHz | 40 dB (uV/m) | |
| 230-1000 MHz | 47 dB (uV/m) | |
| Note: 1) The lower limit shall apply at the transition frequency. 2) Additional Provisions may be required for cases where interference occurs. | | |
| Table 5 (a1): Limits for unwanted radiated emission of class AE equipment (for telecommunication centres) at a measuring distance of 3m. | | |
| Frequency Range | Limits (quasi-peak) | |
| 30-230 MHz | 50.5 dB (uV/m) | |
| 230-1000 MHz | 57.5 dB (uV/m) | |
| Note: 1) The lower limit shall apply at the transition frequency. 2) Additional Provisions may be required for cases where interference occurs. | | |
| Table 7: Limits for conducted emission (disturbance) at the main ports of class A Telecom equipment | | |
| Frequency Range | Limits (quasi-peak) | Limit (Average) |
| 0.15 – 0.5 MHz | 79 dB (uV) | 66 dB (uV) |
| 0.5 – 30 MHz | 73 dB (uV) | 60 dB (uV) |
| Note: The lower limit shall apply at the transition frequency. | | |

| Table 8(B) : Limits for conducted common mode (asymmetric mode) emissions from telecommunication ports of Class A equipment (intended for use in telecommunication centers only). | | | | |
|--|------------------------|----------|------------------------|----------|
| Frequency Range MHz | Voltage Limits dB (uV) | | Current Limits dB (uA) | |
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 to 0.5 | 97 to 87 | 84 to 74 | 53 to 43 | 40 to 30 |
| 0.5 to 30 | 87 | 74 | 43 | 30 |

Note: 1. The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.
2. The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 ohm to the telecommunication port under test (conversion factor is 44 dB).

| Annexure-C1: Frequency Band of Operation For Non-Cellular Radio Equipment | | | |
|--|---|---|--|
| Parameter Group: Radio Conformance (RADCONF) | | | |
| Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| Frequency Band For MRTS | Latest NFAP issued by WPC. | 300/400 MHz or 800 MHz | MRTS Equipment |
| Frequency for HF equipment | Latest NFAP issued by WPC | | HF Equipment |
| Frequency for UHF/ VHF equipment | Latest NFAP issued by WPC | | VHF/UHF Equipment |
| Frequency for PTP Radio Interface | Latest NFAP issued by WPC. Testing as per EN 302 217-2 | 6/ 7/ 13/ 15/ 18/ 23 GHz. Applicable for full or split outdoor unit. | Point To Point Microwave Fixed Radio Systems |
| Frequency for PMP Radio Interface | Latest NFAP issued by WPC. Testing as per EN 302 326-2 | 10.5/ 26/ 28 GHz. Applicable for full or split outdoor unit. | Point to Multi-Point Microwave Fixed Radio Systems |
| Frequency of Operation - Satellite Equipment | Lower C-band Receive Frequency Trans Frequency | 3.400-3.700 GHz 6.425-6.725 GHz | Appendix-II, Test-2 |

| | | | |
|---|---|------------------------------------|---------------------|
| Frequency of Operation - Satellite Equipment | Normal C-band Receive Frequency Trans Frequency | 3.700-4.200 GHz 5.925-6.425 GHz | Appendix-II, Test-2 |
| Frequency of Operation - Satellite Equipment | Extended C-band Receive Frequency Trans Frequency | 4.500-4.800 GHz 6.725-7.025 GHz | Appendix-II, Test-2 |
| Frequency of Operation - Satellite Equipment | Ku band Receive Frequency Trans Frequency | 10.7-11.7 GHz 12.2-12.75 GHz | Appendix-II, Test-2 |

| Annexure-C2: Transmitted Power/ EIRP for Non-Cellular Radio Equipment | | | |
|--|--|-----------------------|--|
| Parameter Group: Radio Conformance (RADCONF) | | | |
| Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| Max RF Power Output MRTS Base Stn | WPC GSR | | MRTS Base Stations |
| Max RF Power Output MRTS Mobile Stn | WPC GSR | | MRTS Fixed Mobile Equipment |
| Max RF Power Output for MRTS Handheld Stn | WPC GSR | | MRTS Handheld Equipment |
| Max RF Power Output for MRTS Fixed Stn | WPC GSR | | MRTS Fixed Equipment |
| Max Transmit Power for HF Base Stn | WPC GSR | | HF Base Stations |
| Max Transmit Power for HF HH Stn | WPC GSR | | HF Handheld Equipment |
| Max Transmit Power for HF Mob Stn | WPC GSR | | HF Mobile Equipment |
| Max Transmit Power for HF Fixed Stn | WPC GSR | | HF Fixed Equipment |
| Max Transmit Power for UHF/VHF Base Stn | WPC GSR | | VHF/UHF Base Station |
| Max Transmit Power for UHF/VHF HH Stn | WPC GSR | | VHF/UHF Handheld Equipment |
| Max Transmit Power for UHF/VHF Mob Stn | WPC GSR | | VHF/UHF Mobile Equipment |
| Max Transmit Power for UHF/VHF Fixed Stn | WPC GSR | | VHF/UHF Fixed Equipment |
| Transmit Power for PTP Radio interface | WPC GSR Testing as per EN 302 217-2 | Appendix-II, Test-3 | Point To Point Microwave Fixed Radio Systems |
| Transmit Power for PMP Radio Interface | WPC GSR Testing as per EN 302 326-2 | Appendix-II, Test-3 | Point to Multi-Point Microwave Fixed Radio Systems |
| Transmit Power - Satellite Equipment | WPC GSR | Appendix-II, Test-2 | Satellite Equipment |

| Annexure-C3: Radio Conformance Requirement for Non-Cellular Radio Equipment | | | | |
|--|-----------------------------------|-----------------|-----------------------|---|
| Parameter Group: Radio Conformance (RADCONF) | | | | |
| Equipment Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 113 | Compliance | Applicable for equipment meant for transmission of data and/or speech and having antenna connector |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 390 | Compliance | Applicable for equipment meant for transmission of data and/or speech and having integral antenna |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 086 | Compliance | Applicable for equipment meant for analogue speech and having internal or external RF connector |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 296 | Compliance | Applicable for equipment meant for analogue speech and having integral antenna |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 219 | Compliance | Applicable for equipment meant to transmit signals to initiate specific receiver response |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 300 341 | Compliance | Applicable for equipment, using integral antenna, meant to transmit signals to initiate specific receiver response |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 301 166 | Compliance | Applicable for equipment meant for transmission of data and/or speech and operating on narrow band channels (<10KHz) and having antenna connector |
| MRTS Equipment | Conformance to standards for MRTS | ETSI EN 302 561 | Compliance | Applicable for Terrestrial Trunked Radio (TETRA) |

| Equipment Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
|-----------------------|--|-----------------|-----------------------|--|
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 113 | Compliance | Applicable for equipment meant for transmission of data and/or speech and having antenna connector |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 390 | Compliance | Applicable for equipment meant for transmission of data and/or speech and having integral antenna |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 086 | Compliance | Applicable for equipment meant for analog speech and having internal or external RF connector |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 296 | Compliance | Applicable for equipment meant for analog speech and having integral antenna |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 219 | Compliance | Applicable for equipment meant to transmit signals to initiate specific receiver response |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 341 | Compliance | Applicable for equipment, using integral antenna, meant to transmit signals to initiate specific receiver response |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 783 | Compliance | Applicable for commercial amateur radio equipment. |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 720 | Compliance | Applicable for UHF On-board vessels communication systems. |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 301 925 | Compliance | Applicable for Radiotelephone transmitters and receivers for maritime mobile service operating in VHF band |

| Equipment Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
|-----------------------------------|--|-------------------------------|-----------------------|--|
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 301 178 | Compliance | Applicable for portable VHF radiotelephone equipment for the maritime mobile service (for non-GMDSS applications only) |
| VHF/UHF Equipment | Conformance to standards for Equipment used in VHF/UHF Radio Systems | ETSI EN 300 698 | Compliance | Applicable for Radio telephone transmitters and receivers for the maritime mobile service operating in the VHF bands used on inland waterway |
| HF Equipment | HF Radio Systems | ETSI EN 300 433 | Compliance | Applicable to Citizen band (CB) Radio equipment. |
| HF Equipment | HF Radio Systems | ETSI EN 303 402 | Compliance | Applicable to maritime mobile transmitters and receivers. |
| HF Equipment | HF Radio Systems | ETSI EN 301 783 | Compliance | Applicable to commercially available amateur radio equipment. |
| PTP Microwave Fixed Radio Systems | PTP Fixed Digital Radio Requirements | ETSI EN 302 217-2 | Compliance | Applicable for full or split outdoor unit of Point To Point Microwave Fixed Radio Systems |
| PMP Microwave Fixed Radio Systems | PMP Fixed Digital Radio Requirements | ETSI EN 302 326-2 | Compliance | Applicable for full or split outdoor unit of Point to Multi-Point Microwave Fixed Radio Systems |
| VSAT | Conformance to standards for Satellite | Compliance to ETSI EN 301 443 | Compliance | For C Band |
| VSAT | Conformance to standards for Satellite | Compliance to ETSI EN 301 428 | Compliance | For Ku Band |

| Annexure-D: Parameters for 2-wire PSTN Lines, Trunks lines and CPEs connected thereon (INT2W & CPE2W) | | | | |
|--|---|---|-------------------------------|-------------------------------|
| Parameter Group: 2-Wire Interface (INT2W) and CPEs connected on 2-Wire (CPE2W) | | | | |
| Equipment Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| 2-Wire CPEs and Interfaces | Longitudinal/ Transverse Conversion Loss | Q.552 Clause 2.2.2 & Figure 2 / TBR.21 Clause 4.4.3 | As in Figure 2, Annexure-D4 | Refer Note 1 |
| 2-Wire CPEs and Interfaces | Return Loss | Q.552 Clause 2.2.1.2 and Figure 1 | As in Figure 1, Annexure-D4 | |
| 2-Wire CPEs and Interfaces | Over Voltage/ Over Current Protection | K.21 | Compliance | |
| 2-Wire CPEs and Interfaces | Maximum Loop Current | ETSI EN 300 001 | < 60 mA | |
| 2-Wire CPEs and Interfaces | Idle State Current | ETSI EN 300 001 | < 40 μ A/ 130 μ A | Without/ with CLIP display |
| 2-Wire CPEs and Interfaces | Insulation Test | ETSI EN 300 001 | \geq 5 M Ω | Refer Note 1 |
| 2-Wire CPEs and Interfaces | Resistance to Earth | TBR-21 Clause 4.4.4 | \geq 10 M Ω | |
| 2-wire Trunk Line | DC Resistance | ETSI TBR-21 Clause 4.4.1 | \geq 1 M Ω | |
| 2-wire Trunk Line | Minimum Current on MGW Trunk Line | ETSI EN 300 001 | \geq 60 μ A | |
| Telephones/ Fax with Handset | Acoustic Shock Absorption | P.360 Clause 4.1 | Compliance | |
| Audio Conferencing Equipment | Voice Conference Verification | Functional Test | Compliance | |
| Fax, Modem | Transmit Power for Fax Machine/ Modem | T.4 Clause 6 | -3dBm to -15 dBm | |
| Fax | Receiver Sensitivity for FAX | T.4 Clause 7 | > -43 dBm | |
| Modem | Receiver Signal for Modem | V.34 (para 6.6) | > -43 dBm ON < -48 dBm OFF | |
| 2-wire line and trunk | Transmission of DTMF Signals | Q.23 Clause 6 and 7 | Compliance | |
| 2- Wire Trunk | Minimum Current on Junction/ Trunk Line in PABX | | < 60 mA | |
| Note 1: This test is exempted provided an undertaking should be submitted by the supplier that 2-wire equipment is not intended to be connected to Earth. In case the 2- wire equipment is intended to be connected to Earth by any supplier then the test would be required. | | | | |

| Annexure-D1 | | | | |
|--|--|---|---------------------------|-----------------------------------|
| ISDN Layer-III Specifications Test | | | | |
| Parameter Group: ISDN Conformance (ISDNCONF) | | | | |
| Equipment Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| ISDN BRI and PRI | Layer III specification Messages for circuit-mode connection basic call control. | Q.931 Applicable to ISDN BRI and PRI | Compliance | |
| | ALERTING | Clause no. 3.1.1 | | |
| | CALL PROCEEDING | Clause no. 3.1.2 | | |
| | CONNECT | Clause no. 3.1.3 | | |
| | SETUP | Clause no. 3.1.14 | | |
| | SETUP ACKNOWLEDGE | Clause no. 3.1.15 | | |
| | DISCONNECT | Clause no. 3.1.5 | | |
| | RELEASE | Clause no. 3.1.9 | | |
| | RELEASE COMPLETE | Clause no. 3.1.10 | | |
| | Bearer capability | Clause no. 4.5.5 | | |
| | Called party number | Clause no. 4.5.8 | | |
| | Calling party number | Clause no. 4.5.10 | | |
| | Channel identification | Clause no. 4.5.13 | | |
| | Normal call clearing | As per Table 6-5 | | |
| | Call clearing User Busy | As per Table 6-5 | | |
| | Call clearing Invalid number format or incomplete number | As per Table 6-5 | | |
| | Call clearing No answer | As per Table 6-5 | | |

| Annexure-D2: Parameters for Cordless Telephone | | | |
|---|--|--|----------------|
| Parameter Group: Radio Conformance (RADCONF) | | | |
| Note : Maximum Range shall be 100 m. | | | |
| Parameter Name | Frequency | Power | Remarks |
| Frequency band of Operation and Transmit Power – Base Unit only | 1610, 1640, 1675, 1690 KHz | Transmit power < 500 mW | |
| Frequency band of Operation and Transmit Power – Base and Remote Unit | 26.375, 26.475, 26.575, 26.625, 46.675, 46.725, 46.775, 46.825, 46.830, 49.845, 49.860, 49.875 MHz. | Transmit power < 500 mW for Base Unit Transmit Power < 200 mW for Remote Unit | |
| Frequency band of Operation and Transmit Power – Remote Unit only | 150.360, 150.750, 150.850, 150.950 MHz. | Transmit power < 50 mW | |
| Transmitted frequency by Base Unit | 46.610, 46.630, 46.670, 46.710, 46.730, 46.770, 46.830, 46.870, 46.930, 46.970, 43.720, 43.740, 43.820, 43.840, 43.920, 43.960, 44.120, 44.160, 44.180, 44.200, 44.320, 44.360, 44.400, 44.460, 44.480 MHz | RF Power < 500 mW | |
| Transmitted frequency by Handset | 49.670, 49.845, 49.860, 49.770, 49.875, 49.830, 49.890, 49.930, 49.990, 49.970, 48.760, 48.840, 48.860, 48.920, 49.020, 49.080, 49.100, 49.160, 49.200, 49.240, 49.280, 49.360, 49.400, 49.460, 49.500 MHz | RF Power < 100 mW | |
| Frequency of Operation | 926-926.5 MHz | Very low power Cordless Phone | |
| Frequency and Power for FHSS | 2.4-2.4835 GHz | Power < 100 mW Power Spectral Density < 100 mW/100 KHz EIRP | |

| Parameter Name | Frequency | Power | Remarks |
|--|--|--|---------|
| Frequency and Power for other modulation types | 2.4-2.4835 GHz | Power < 100 mW Power Spectral Density < 10 mW/1 MHz EIRP | |
| Frequency and Power in 5 GHz band | 5.150-5.350 and 5.725-5.875 GHz | Mean EIRP < 200 mW Power Spectral Density < 10 mW/1 MHz EIRP | |
| Maximum Frequency Deviation | 5 KHz | | |
| Transmitter narrowband spurious emission | 30 MHz- 1 GHz | When operating: < -36dBm, When in stand-by: < -57 dBm. | |
| Transmitter narrowband spurious emission | >1GHz-12.75GHz | When operating: < -30dBm, When in stand-by: < -47 dBm. | |
| Transmitter narrowband spurious emission | >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz | When operating: < -47dBm, When in stand-by: < -47 dBm. | |
| Transmitter wideband spurious emission | 30 MHz-1GHz | When operating: < -86dBm/Hz, When in stand-by: < -107 dBm/Hz. | |
| Transmitter wideband spurious emission | >1GHz-12.75GHz | When operating: < -80dBm/Hz, When in stand-by: < -97 dBm/Hz. | |
| Transmitter wideband spurious emission | >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz | When operating: < -97dBm/Hz, When in stand-by: < -97 dBm/Hz. | |
| Receiver narrowband spurious emission | 30 MHz-1GHz | < -57 dBm | |
| Receiver narrowband spurious emission | >1GHz-12.75GHz | < -47 dBm | |
| Receiver wideband spurious emission | 30 MHz-1GHz | < -107 dBm/Hz | |
| Receiver wideband spurious emission | >1GHz-12.75GHz | < -97 dBm/Hz | |

| Annexure-D3: CCS#7 Conformance Parameters | | | | |
|--|---|-----------------------|-----------------|-------------------------------------|
| Parameter Group: ISDN Conformance (ISDNCONF) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Test no. | Applicability/ Remarks |
| CCS#7 MTP2 Parameters | Timer T2 | ITU-T Q.781. Annex-D3 | Test 1.2 | Signaling Gateway and Media Gateway |
| CCS#7 MTP2 Parameters | Timer T3 | ITU-T Q.781. Annex-D3 | Test 1.3 | |
| CCS#7 MTP2 Parameters | Timer T4 and T1 | ITU-T Q.781. Annex-D3 | Test 1.4 | |
| CCS#7 MTP2 Parameters | Normal Alignment | ITU-T Q.781. Annex-D3 | Test 1.5 | |
| CCS#7 MTP2 Parameters | Emergency Alignment T4E | ITU-T Q.781. Annex-D3 | Test 1.19 | |
| CCS#7 MTP3 Parameters | Signalling Linkset deactivation | ITU-T Q.782. Annex-D3 | Test 1.2 | |
| CCS#7 MTP3 Parameters | Signalling Linkset activation | ITU-T Q.782. Annex-D3 | Test 1.3 | |
| CCS#7 MTP3 Parameters | Message with Invalid DPC | ITU-T Q.782. Annex-D3 | Test 2.2 | |
| CCS#7 MTP3 Parameters | Message with erroneous SI | ITU-T Q.782. Annex-D3 | Test 2.3 | |
| CCS#7 MTP3 Parameters | Additional CBD | ITU-T Q.782. Annex-D3 | Test 4.3 | |
| CCS#7 MTP3 Parameters | No acknowledgement to first CBD | ITU-T Q.782. Annex-D3 | Test 4.4 | |
| CCS#7 MTP3 Parameters | Inhibition of available link | ITU-T Q.782. Annex-D3 | Test 7.1.1 | |
| CCS#7 MTP3 Parameters | Inhibition of unavailable link | ITU-T Q.782. Annex-D3 | Test 7.1.2 | |
| CCS#7 MTP3 Parameters | Signaling Link test: After activation of a link | ITU-T Q.782. Annex-D3 | Test 12.1 | |
| CCS#7 ISUP Parameters | Reset Received | ITU-T Q.784. Annex-D3 | Test 1.2.1 | Signaling Gateway |
| CCS#7 ISUP Parameters | Reset Sent | ITU-T Q.784. Annex-D3 | Test 1.2.2 | |
| CCS#7 ISUP Parameters | Circuit Group Reset Received | ITU-T Q.784. Annex-D3 | Test 1.2.5 | |
| CCS#7 ISUP Parameters | Circuit Group Reset Sent | ITU-T Q.784. Annex-D3 | Test 1.2.6 | |
| CCS#7 ISUP Parameters | CGB and CGU Received | ITU-T Q.784. Annex-D3 | Test 1.3.1.1 | |
| CCS#7 ISUP Parameters | CGB and CGU Sent | ITU-T Q.784. Annex-D3 | Test 1.3.1.2 | |
| CCS#7 ISUP Parameters | Circuit Blocking received | ITU-T Q.784. Annex-D3 | Test 1.3.2.1 | |
| CCS#7 ISUP Parameters | Circuit Blocking sent | ITU-T Q.784. Annex-D3 | Test 1.3.2.2 | |

Annexure-D4: Figures

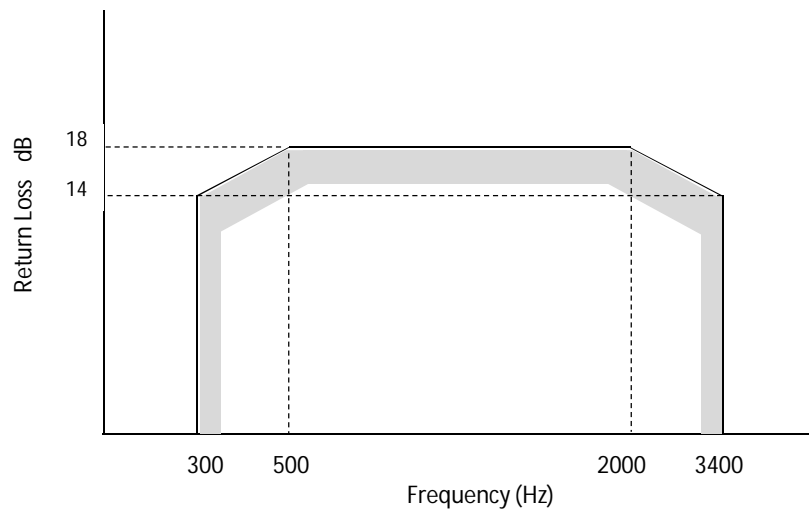


Fig. 1: Minimum Value of return Loss

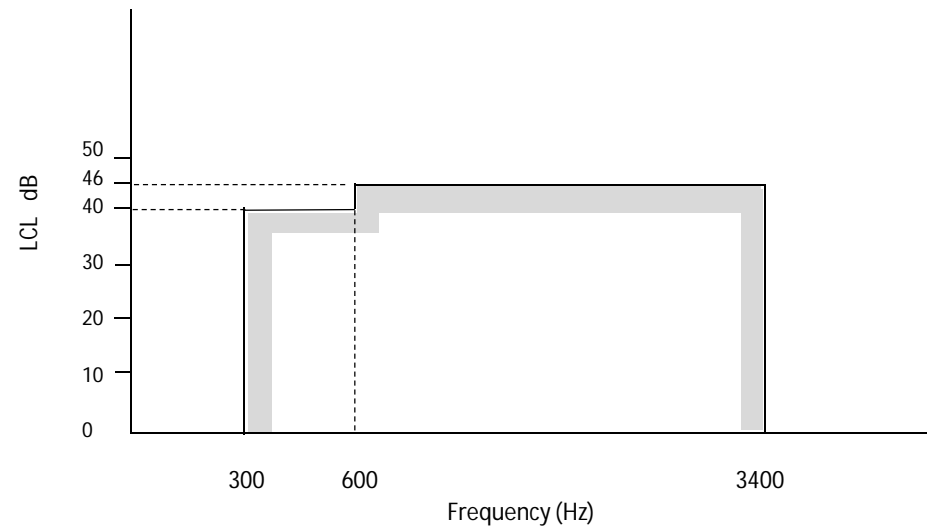


Fig. 2: Minimum Value of LCL

| Annexure-F: Frequency of Operation for Cellular Wireless Interfaces and Equipment | | | | |
|--|----------------------------------|-----------------|----------------------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Technology | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| CDMA2000 | Frequency of Operation | | Latest NFAP issued by WPC. | |
| 2G/ GSM/ GPRS/ EDGE | Frequency of Operation | | Latest NFAP issued by WPC. | |
| 3G/ WCDMA/ HSPA | Frequency of Operation | | Latest NFAP issued by WPC. | |
| 4G/ LTE/ LTE-A | Frequency of Operation | | Latest NFAP issued by WPC. | |
| BTS with MSR | BTS with MSR Operating Frequency | | Latest NFAP issued by WPC. | |
| BTS with AAS | BTS with AAS Operating Frequency | | Latest NFAP issued by WPC. | |

| Annexure-F1: Radio Conformance Test for Base Transmitting Station (BTS) and Compact Cellular Network (CCN) using 2G/ GSM/ GPRS/ EDGE Technology | | | | |
|--|--|-----------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| GSM BTS Output Power | Output Power | 3GPP TS 45.005 | Clause 4.1.2 | BTS and CCN |
| GSM BTS Transmitter Parameters | Adjacent channel power | 3GPP TS 51.021 | Clause 6.5 | |
| | Wideband noise and intra BSS intermodulation attenuation in multicarrier operation | 3GPP TS 51.021 | Clause 6.12 | |
| | Spurious emissions from the transmitter antenna connector | 3GPP TS 51.021 | Clause 6.6 | |
| | Mean transmitted RF carrier power and equivalent combined power | 3GPP TS 51.021 | Clause 6.3 | |
| | Intermodulation attenuation | 3GPP TS 51.021 | Clause 6.7 | |
| | Intra Base Station System intermodulation attenuation | 3GPP TS 51.021 | Clause 6.8 | |
| | Radiated spurious emissions | 3GPP TS 51.021 | Clause 8 | |
| GSM BTS Receiver Parameters | Static Reference Sensitivity Level | 3GPP TS 51.021 | Clause 7.3 | |
| | Reference interference level | 3GPP TS 51.021 | Clause 7.5 | |
| | Blocking Characteristics | 3GPP TS 51.021 | Clause 7.6 | |
| | Intermodulation characteristics | 3GPP TS 51.021 | Clause 7.7 | |
| | AM suppression | 3GPP TS 51.021 | Clause 7.8 | |
| | Spurious emissions from the receiver antenna connector | 3GPP TS 51.021 | Clause 7.9 | |

| Annexure-F2: Radio Conformance Test for NodeB (BTS) and Compact Cellular Network (CCN) using 3G/WCDMA/HSPA Technology | | | | |
|--|--|-----------------|----------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| WCDMA NodeB Transmitter Parameters | Spectrum emission mask | 3GPP TS 25.141 | Clause 6.5.2.1 | NodeB and CCN |
| | Adjacent Channel Leakage power Ratio (ACLR) | 3GPP TS 25.141 | Clause 6.5.2.2 | |
| | Spurious emissions | 3GPP TS 25.141 | Clause 6.5.3 | |
| | Base station output power | 3GPP TS 25.141 | Clause 6.2 | |
| | Transmitter intermodulation | 3GPP TS 25.141 | Clause 6.6 | |
| WCDMA NodeB Receiver Parameters | Spurious Emissions | 3GPP TS 25.141 | Clause 7.7 | |
| | Blocking characteristics | 3GPP TS 25.141 | Clause 7.5 | |
| | Intermodulation characteristics | 3GPP TS 25.141 | Clause 7.6 | |
| | Adjacent Channel Selectivity (ACS) | 3GPP TS 25.141 | Clause 7.4 | |
| | Reference sensitivity level | 3GPP TS 25.141 | Clause 7.2 | |
| WCDMA NodeB Home BTS Adj Chl Op Power | Home base station output power for adjacent channel protection | 3GPP TS 25.141 | Clause 6.4.6 | NodeB |

| Annexure-F3: Radio Conformance Test for eNodeB (BTS) and Compact Cellular Network (CCN) using 4G/LTE/LTE-A Technology | | | | |
|--|---|-----------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| LTE eNodeB Transmitter Parameters | Operating band unwanted emissions | 3GPP TS 36.141 | Clause 6.6.3 | eNodeB and CCN |
| | Adjacent Channel Leakage power Ratio (ACLR) | 3GPP TS 36.141 | Clause 6.6.2 | |
| | Home BS output power for adjacent E-UTRA channel protection: Applicable to Home base Station only | 3GPP TS 36.141 | Clause 6.2.7 | |
| | Home BS output power for co-channel E-UTRA protection: Applicable to Home base Station only | 3GPP TS 36.141 | Clause 6.2.8 | |
| | Transmitter spurious emissions | 3GPP TS 36.141 | Clause 6.6.4 | |
| | Base station output power | 3GPP TS 36.141 | Clause 6.2 | |
| | Transmitter intermodulation | 3GPP TS 36.141 | Clause 6.7 | |
| LTE eNodeB Receiver Parameters | Receiver spurious emissions | 3GPP TS 36.141 | Clause 7.7 | |
| | Blocking | 3GPP TS 36.141 | Clause 7.6 | |
| | Receiver intermodulation | 3GPP TS 36.141 | Clause 7.8 | |
| | Adjacent Channel Selectivity (ACS) and narrow-band blocking | 3GPP TS 36.141 | Clause 7.5 | |
| | Reference sensitivity level | 3GPP TS 36.141 | Clause 7.2 | |
| LTE eNodeB Home BS Parameters | Home BS output power for adjacent UTRA channel protection : Applicable to Home base Station only | 3GPP TS 36.141 | Clause 6.2.6 | eNodeB |

| Annexure-F4: Radio Conformance Test for BTS using Multi Standard Radio (MSR) Technology | | | | |
|--|---|-----------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| BTS with MSR Transmitter Parameters | Base Station output power | 3GPP TS 37.141 | Clause 6.2 | BTS with MSR |
| | Transmitter spurious emissions | 3GPP TS 37.141 | Clause 6.6.1 | |
| | Operating band unwanted emissions | 3GPP TS 37.141 | Clause 6.6.2 | |
| | Adjacent Channel Leakage power Ratio (ACLR) | 3GPP TS 37.141 | Clause 6.6.4 | |
| | Transmitter intermodulation | 3GPP TS 37.141 | Clause 6.7 | |
| BTS with MSR Receiver Parameters | Receiver spurious emissions | 3GPP TS 37.141 | Clause 7.6 | |
| | In-band selectivity and blocking | 3GPP TS 37.141 | Clause 7.4 | |
| | Out-of-band blocking | 3GPP TS 37.141 | Clause 7.5 | |
| | Receiver intermodulation | 3GPP TS 37.141 | Clause 7.7 | |
| | In-band selectivity and blocking | 3GPP TS 37.141 | Clause 7.4 | |
| | Reference sensitivity level | 3GPP TS 37.141 | Clause 7.2 | |

| Annexure-F5: Radio Conformance Test for BTS using Active Antenna System (AAS) | | | | |
|--|--|------------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| BTS with AAS Transmitter Parameters | Base Station output power | 3GPP TS 37.145-1 | Clause 6.2 | BTS with AAS |
| | Spurious emission | 3GPP TS 37.145-1 | Clause 6.6.6 | |
| | Operating band unwanted emission | 3GPP TS 37.145-1 | Clause 6.6.5 | |
| | Adjacent Channel Leakage power Ratio | 3GPP TS 37.145-1 | Clause 6.6.3 | |
| | Spectrum emission mask | 3GPP TS 37.145-1 | Clause 6.6.4 | |
| | Transmitter intermodulation | 3GPP TS 37.145-1 | Clause 6.7 | |
| BTS with AAS Receiver Parameters | Reference sensitivity level | 3GPP TS 37.145-1 | Clause 7.2 | |
| | Adjacent channel selectivity and narrowband blocking | 3GPP TS 37.145-1 | Clause 7.4 | |
| | Blocking | 3GPP TS 37.145-1 | Clause 7.5 | |
| | Receiver spurious emissions | 3GPP TS 37.145-1 | Clause 7.6 | |
| | Receiver intermodulation | 3GPP TS 37.145-1 | Clause 7.7 | |

| Annexure-F6: Radio Conformance Test for Cellular Wireless Repeaters using 2G/GSM Technology | | | | |
|--|----------------------------------|-----------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| GSM Repeater Station Parameters | Output Power | 3GPP TS 45.005 | Clause 4.1.2 | |
| | Spurious emissions | 3GPP TS 51.026 | Clause 5 | |
| | Frequency Error | 3GPP TS 51.026 | Clause 8 | |
| | Intermodulation Attenuation | 3GPP TS 51.026 | Clause 6 | |
| | Out of Band Gain | 3GPP TS 51.026 | Clause 7 | |

| Annexure-F7: Radio Conformance Test for Cellular Wireless Repeaters using 3G/WCDMA ULTRA FDD Technology | | | | |
|--|----------------------------------|-----------------|---------------|-------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | Clause | Applicability/ Remarks |
| WCDMA Repeater Station Parameters | Output Power | 3GPP TS 25.143 | Clause 6 | |
| | Out of band emission | 3GPP TS 25.143 | Clause 9.1 | |
| | Spurious emissions | 3GPP TS 25.143 | Clause 9.2 | |
| | Input intermodulation | 3GPP TS 25.143 | Clause 11 | |
| | Out of band gain | 3GPP TS 25.143 | Clause 8 | |
| | Adjacent Channel Rejection Ratio | 3GPP TS 25.143 | Clause 13 | |
| | Output intermodulation | 3GPP TS 25.143 | Clause 12 | |

| Annexure-F8: Radio Conformance Test for Cellular Wireless Repeaters using 4G/LTE FDD Technology | | | | |
|--|-----------------------------------|---------------------------|--|------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | | Applicability/Remarks |
| LTE Repeater Station Parameters | Output Power | 3GPP TS 36.143 Clause 6 | | |
| | Operating band unwanted emissions | 3GPP TS 36.143 Clause 9.1 | | |
| | Spurious emissions | 3GPP TS 36.143 Clause 9.2 | | |
| | Input intermodulation | 3GPP TS 36.143 Clause 11 | | |
| | Out of band gain | 3GPP TS 36.143 Clause 8 | | |
| | Adjacent Channel Rejection Ratio | 3GPP TS 36.143 Clause 13 | | |
| | Output intermodulation | 3GPP TS 36.143 Clause 12 | | |

| Annexure-F9: Radio Conformance Test for Devices having Cellular Wireless Interface using CDMA2000 Technology | | | | |
|---|---|------------------------|-----------------------------------|------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | | Applicability/Remarks |
| CDMA Int Parameters | Transmitter Maximum output power | 1x: S0011 Clause 4.4.5 | EN 301 908-04 (CDMA) Clause 4.2.3 | |
| | Transmitter Spectrum emissions mask | 1x: S0011 Clause 4.5.1 | EN 301 908-04 (CDMA) Clause 4.2.2 | |
| | Transmitter spurious emissions in active mode (Conducted) | 1x: S0011 Clause 4.5.1 | EN 301 908-04 (CDMA) Clause 4.2.2 | |
| | Receiver spurious emission in idle mode (Conducted) | 1x: S0011 Clause 3.6 | EN 301 908-04 (CDMA) Clause 4.2.5 | |
| | Receiver Adjacent Channel Selectivity (ACS) | | EN 301 908-04 (CDMA) Clause 4.2.8 | |
| | Receiver In-band blocking | | EN 301 908-04 (CDMA) Clause 4.2.6 | |

| Annexure-F10: Radio Conformance Test for Devices having Cellular Wireless Interface using GSM/ GPRS/ EDGE Technology | | | | |
|---|---|---|-----------------------------------|------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | | Applicability/Remarks |
| GSM Int Parameters | Transmitter Maximum output power | 3GPP TS 51 010-1 Clause 13.3 | EN 301 511 (GSM) Clause 4.2.5 | GSM |
| | Transmitter Maximum output power | 3GPP TS 51 010-1 Clause 13.16.2 | EN 301 511 (GSM) Clause 4.2.10 | GPRS/ EDGE |
| | Output RF Spectrum | 3GPP TS 51 010-1 Clause 13.4 | EN 301 511 (GSM) Clause 4.2.6 | GSM |
| | Output RF Spectrum | 3GPP TS 51 010-1 Clause 13.16.3 | EN 301 511 (GSM) Clause 4.2.11 | GPRS/ EDGE |
| | Spurious emissions (MS allocated a channel) | 3GPP TS 51 010-1 Clause 12.1.1 | EN 301 511 (GSM) Clause 4.2.12 | GSM |
| | Spurious emission (MS in idle mode) | 3GPP TS 51 010-1 Clause 12.1.2 | EN 301 511 (GSM) Clause 4.2.13 | GSM |
| | Frequency Error and phase error | 3GPP TS 51 010-1 Clause 13.1 | EN 301 511 (GSM) Clause 4.2.1 | GSM |
| | Frequency Error and phase error | GPRS:3GPP TS 51 010-1 Clause 13.16.1 | EN 301 511 (GSM) Clause 4.2.4 | GPRS/ EDGE |
| | Reference sensitivity level (speech channels) | 3GPP TS 51 010-1 Clause 14.2.1 | EN 301 511 (GSM) Clause 4.2.42 | GSM |
| | Adjacent Channel Rejection (speech channels) | 3GPP TS 51 010-1 Clause 14.5.1 | EN 301 511 (GSM) Clause 4.2.38 | GSM |
| | Receiver blocking | 3GPP TS 51 010-1 Clause 14.7.1 | EN 301 511 (GSM) Clause 4.2.20 | GSM |

| Annexure-F11: Radio Conformance Test for Devices having Cellular Wireless Interface using WCDMA/ HSPA Technology | | | | |
|---|---|------------------------------------|--------------------------------------|------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | | Applicability/Remarks |
| WCDMA Int Parameters | Transmitter Maximum output power | 3GPP TS 34.121-1 Clause 5.2 | EN 301 908-2 (UMTS) Clause 4.2.2 | |
| | Transmitter Spectrum emissions mask | 3GPP TS 34.121-1 Clause 5.9 | EN 301 908-2 (UMTS) Clause 4.2.3 | |
| | Transmitter spurious emissions | 3GPP TS 34.121-1 Clause 5.11 | EN 301 908-2 (UMTS) Clause 4.2.4 | |
| | Receiver spurious emission | 3GPP TS 34.121-1 Clause 6.8 | EN 301 908-2 (UMTS) Clause 4.2.10 | |
| | Transmitter Minimum Output Power | 3GPP TS 34.121-1 Clause 5.4.3 | EN 301 908-2 (UMTS) Clause 4.2.5 | |
| | Receiver Reference sensitivity level | 3GPP TS 34.121-1 Clause 6.2 | EN 301 908-2 (UMTS) Clause 4.2.13 | |
| | Receiver Adjacent Channel Selectivity (ACS) | 3GPP TS 34.121-1 Clause 6.4 | EN 301 908-2 (UMTS) Clause 4.2.6 | |
| | Receiver In-band blocking | 3GPP TS 34.121-1 Clause 6.5.2.1 | EN 301 908-2 (UMTS) Clause 4.2.7 | |

| Annexure-F12: Radio Conformance Test for Devices having Cellular Wireless Interface using LTE/ LTE-A Technology | | | | |
|--|---|--|--------------------------------------|------------------------------|
| Parameter Group: Cellular (CELLULAR) | | | | |
| Parameter Name | Individual Parameter Name | Standard | | Applicability/Remarks |
| LTE Int Parameters | Maximum output power | 3GPP TS 36.521-1 Clause 6.2.2 | EN 301 908-13 (LTE) Clause 4.2.2 | |
| | Spectrum emissions mask | 3GPP TS 36.521-1 Clause 6.6.2.1 | EN 301 908-13 (LTE) Clause 4.2.3 | |
| | Spurious emissions | 3GPP TS 36.521-1 Clauses 6.6.3.1, 6.6.3.2, 6.6.3.3 | EN 301 908-13 (LTE) Clause 4.2.4 | |
| | Receiver spurious emission | 3GPP TS 36.521-1 Clause 7.9 | EN 301 908-13 (LTE) Clause 4.2.10 | |
| | Receiver Reference Sensitivity level | 3GPP TS 36.521-1 Clause 7.3 | EN 301 908-13 (LTE) Clause 4.2.12 | |
| | Receiver Adjacent Channel Selectivity (ACS) | 3GPP TS 36.521-1 Clause 7.5 | EN 301 908-13 (LTE) Clause 4.2.6 | |
| | Receiver In-band blocking | 3GPP TS 36.521-1 Clause 7.6.1 | EN 301 908-13 (LTE) Clause 4.2.7 | |

| Annexure-G1: Parameters for Radio Interfaces for equipment operating in delicensed frequency bands of 2.4 GHz and 5 GHz | | | | |
|--|--|---------------------------|---|--|
| Parameter Group: Radio Conformance (RADCONF) | | | | |
| Parameter Group | Parameter Name | Standard/Parameter | Limits/ Values | Applicability/Remarks |
| RADCONF | Frequency of Operation for LoRa Int | Latest NFAP | | LoRa Interface |
| | Frequency of Operation for SigFox Int | Latest NFAP | | SigFox Interface |
| | Frequency of Operation for NFC Int | Latest NFAP | 13.56 MHz | NFC Interface |
| | Frequency of Operation for BLE Interface | Latest NFAP | 2.4 GHz | Bluetooth Low Energy Interface |
| | Frequency of Operation for RFID Int | Latest NFAP | 865-867 MHz | RFID Interface |
| | Frequency of Operation for RF Mesh Int | Latest NFAP | 865-867 MHz | RF Mesh interface |
| | Frequency for WiFi equipment | Latest NFAP | 2.4 GHZ Band: 2.4-2.4835 GHz 5 GHz Band: 5.150-5.350 GHz indoor usage 5.725-5.875 GHz indoor usage | Wifi Interface Appendix-II Test-1 |
| | Frequency for WiFi equipment | Latest NFAP | 2.4 GHZ Band: 2.4-2.4835 GHz 5 GHz Band: 5.150-5.350 GHz 5.725-5.875 GHz | Wifi Interface Appendix-II Test-1 |
| | Frequency for PTP/ PMP Radio Interface | Latest NFAP | 5.825-5.875 GHz with maximum EIRP of 4 W | PTP/ PMP Wireless Access Equipment in 5.8 GHz |

| Annexure-G2: Parameters for Radio Interfaces for equipment operating in delicensed frequency bands of 2.4 GHz and 5 GHz | | | | |
|--|--|----------------------------------|--|---|
| Parameter Group: Radio Conformance (RADCONF) | | | | |
| Parameter Group | Parameter Name | Standard/ Parameter | Limits/ Values | Remarks |
| RADCONF | Maximum Transmit Power LoRa | EN 300 220. WPC GSR | | LoRa Interface |
| | EIRP LoRa | EN 300 220. WPC GSR | | LoRa Interface |
| | Maximum Transmit Power SigFox | EN 300 220. WPC GSR | | SigFox Interface |
| | EIRP SigFox | EN 300 220. WPC GSR | | SigFox Interface |
| | Carrier Bandwidth for RFID Interface | EN 300 220. WPC GSR | 200 KHz | RFID Interface |
| | EIRP for RFID Interface | EN 300 220. WPC GSR | < 1W | RFID Interface |
| | Maximum Transmit Power RFID | EN 300 220. WPC GSR | < 1W | RFID Interface |
| | Carrier Bandwidth for NFC Interface | EN 300 220. WPC GSR | 200 KHz | NFC Interface |
| | EIRP for NFC Interface | EN 300 220. WPC GSR | < 4W | NFC Interface |
| | Maximum Transmit Power NFC | EN 300 220. WPC GSR | < 1W | NFC Interface |
| | Carrier Bandwidth for BLE Interface | EN 300 220. WPC GSR | 200KHz | Bluetooth Low Energy Interface |
| | EIRP for BLE Interface | EN 300 220. WPC GSR | < 4W | Bluetooth Low Energy Interface |
| | Maximum Transmit Power BLE | EN 300 220. WPC GSR | < 1W | Bluetooth Low Energy Interface |
| | Maximum Transmit Power RF Mesh | EN 300 220-1 or FCC part 15.247. | | RF Mesh interface |
| | EIRP for RF Mesh | EN 300 220-1 or FCC part 15.247. | | RF Mesh interface |
| | EIRP for equipment operating in 2.4 GHz | EN 300 328 | ≤ 4 W for outdoor usage ≤ 200 mW for indoor usage | Wifi Interface Appendix-II Test-1 |
| | EIRP for RLAN/ WLAN equipment operating in 5 GHz | EN 301 893 | ≤ 4 W for outdoor usage ≤ 200 mW for indoor usage | Wifi Interface Appendix-II Test-1 |
| | EIRP for PTP/ PMP fixed Radio systems operating in 5.825-5.875 GHz | EN 302 502 | ≤ 4 W for outdoor usage ≤ 200 mW for indoor usage | PTP/PMP Wireless Access Equipment in 5.8 GHz Appendix-II Test-1 |
| EIRP for Cordless Telephone | WPC GSR | | Cordless Phone | |

| Annexure-G3: Parameters for Radio Interfaces for equipment operating in delicensed frequency bands of 2.4 GHz and 5 GHz | | | | |
|--|--|---------------------------|---|----------------|
| Parameter Group: Radio Conformance (RADCONF) | | | | |
| Parameter Group | Parameter Name | Standard/Parameter | Applicability/Limits/ Values | Remarks |
| RADCONF | Compliance to 6LowPAN Standard | | | |
| | Compliance to ZigBee Standard | IEEE 802.15.4 | | |
| | In-band Spurious Emission for RFID Interface | WPC GSR | Frequency Offset: 550 KHz, Transmitted Power: < -20dBc. Frequency Offset: M*-N* =2, Transmitted Power: < -20dBm. Frequency Offset: M*-N* =3, Transmitted Power: < -40dBm. | |
| | Out-of-band Spurious Emission for RFID Interface | WPC GSR | Frequency range: 30 MHz-1GHz, When operating: < -36dBm, When in stand-by: < -57 dBm. Frequency range: > 1GHz-12.75GHz, When operating: < -30dBm, When in stand-by: < -47 dBm. Frequency range: >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz, When operating: < -47dBm, When in stand-by: < -47 dBm. | |
| | Basic RF Requirement RFID | ETSI EN 300 330. | | |
| | Receiver Spurious Emission for RFID Interface (measured in a 100 KHz bandwidth): | | Frequency range: 30 MHz-1GHz, < -57 dBm. Frequency range: >1GHz-12.75GHz, < -47 dBm. | |

| Parameter Group | Parameter Name | Standard/Parameter | Applicability/Limits/ Values | Remarks |
|-----------------|---|----------------------------------|---|---------|
| RADCONF | In-band Spurious Emission for NFC Interface | WPC GSR | Frequency Offset: 550 KHz, Transmitted Power : > -20dBc. Frequency Offset: $ M^*-N^* = 2$, Transmitted Power: < -20dBm. Frequency Offset: $ M^*-N^* = 3$, Transmitted Power: < -40dBm. | |
| | Out-of-band Spurious Emission for NFC Interface | WPC GSR | Frequency range: 30 MHz-1GHz, When operating: < -36dBm, When in stand-by: < -57 dBm. Frequency range: > 1GHz-12.75GHz, When operating: < -30dBm, When in stand-by: < -47 dBm. Frequency range: >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz, When operating: < -47dBm, When in stand-by: < -47 dBm. | Pos |
| | Receiver Spurious Emission for NFC Interface (measured in a 100 KHz bandwidth): | | Frequency range: 30 MHz-1GHz, -57 dBm Frequency range: >1GHz-12.75GHz, -47 dBm | Pos |
| | Unwanted Emission in Spurious Domain RF Mesh | EN 300 220-1 or FCC part 15.247. | | |

| Parameter Group | Parameter Name | Standard/Parameter | Applicability/Limits/ Values | Remarks |
|-----------------|---|----------------------------------|--|---------|
| RADCONF | In-band Spurious Emission for BLE Interface | WPC GSR | Frequency Offset: 550 KHz, Transmitted Power: < -20dBc. Frequency Offset: $ M^*-N^* = 2$, Transmitted Power: < -20dBm. Frequency Offset: $ M^*-N^* = 3$, Transmitted Power: < -40dBm. | |
| | Out-of-band Spurious Emission for BLE Interface | WPC GSR | Frequency range: 30 MHz-1GHz, When operating: < -36dBm, When in stand-by: < -57 dBm. Frequency range: >1GHz-12.75GHz, When operating: < -30dBm, When in stand-by: < -47 dBm. Frequency range: >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz, When operating: < -47dBm, When in stand-by: < -47 dBm. | |
| | Receiver Spurious Emission for BLE Interface (measured in a 100 KHz bandwidth): | | Frequency range: 30 MHz-1GHz, -57 dBm. Frequency range: >1GHz-12.75GHz, -47 dBm. | |
| | Unwanted Emission in Spurious Domain LoRa | EN 300 220-1 or FCC part 15.247. | | |
| | Unwanted Emission in Spurious Domain SigFox | EN 300 220-1 or FCC part 15.247. | | |

| Parameter Group | Parameter Name | Standard/Parameter | Applicability/Limits/ Values | Remarks |
|-----------------|---|--------------------|---|---------|
| RADCONF | Transmitter narrowband spurious emission for WiFi Interface | WPC GSR | Frequency range: 30 MHz-1GHz, When operating -36dBm, When in stand-by -57 dBm Frequency range: >1GHz-12.75GHz, When operating -30dBm, When in stand-by -47 dBm Frequency range: >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz, When operating -47dBm, When in stand-by -47 dBm | |
| | Transmitter wideband spurious emission for WiFi Interface | WPC GSR | Frequency range: 30 MHz-1GHz, When operating -80dBm/Hz, When in stand-by -107 dBm/Hz Frequency range: >1GHz-12.75GHz, When operating -86dBm/Hz, When in stand-by -97 dBm/Hz Frequency range: >1.8GHz-1.9GHz and 5.15 GHz-5.3 GHz, When operating -97dBm/Hz, When in stand-by -97 dBm/Hz | |
| | Receiver narrowband spurious emission for WiFi Interface | WPC GSR | Frequency range: 30 MHz-1GHz, -57 dBm Frequency range: >1GHz-12.75GHz, -47 dBm | |
| | Receiver wideband spurious emission for WiFi Interface | WPC GSR | Frequency range: 30 MHz-1GHz, -107 dBm/Hz Frequency range: >1GHz-12.75GHz, -97 dBm/Hz | |

| Parameter Group | Parameter Name | Standard/Parameter | Applicability/Limits/ Values | Remarks |
|-----------------|--|--|------------------------------|---------|
| RADCONF | 2.4 GHz Wideband Data Transmission Requirement | EN 300 328 Or FCC CFR47 Part15.247 or Part 15.249 | | |
| | 5 GHz Wireless Access Requirement | EN 301 893 Or FCC CFR47 Part 15.407 or Part 15.249 | | |
| | Radio Conformance for PTP/PMP Wireless Access Equipment operating in 5.725-5.875 GHz | EN 301 893 Or FCC CFR47 Part 15.249 | | |
| | Radio Conformance for PTP/PMP Wireless Access Equipment operating in 5.825-5.875 GHz | EN 302 502 (Except clauses 4.2.4, 4.2.6 and 4.2.8) Or FCC CFR47 Part 15.249 | | |

| Annexure-H: Ethernet Interface Parameters | | | | |
|--|--|---------------------|-----------------------|-------------------------------|
| Parameter Group: Ethernet Interface (INTETH) | | | | |
| Interface Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
| Gigabit Ethernet Electrical | Link Speed and Auto Negotiation GE | IEEE 802.3 | | Appendix-II, Test4 |
| Fast Ethernet Electrical | Link Speed and Auto Negotiation for GE | IEEE 802.3 Cl. 28 | | Appendix-II, Test4 |
| Gigabit Ethernet Optical | Average Launch power for 1 GE Opt | IEEE 802.3z Cl. 38 | | |
| Gigabit Ethernet Optical | Wavelength for 1 GE Opt | IEEE 802.3z Cl. 38 | | |
| Gigabit Ethernet Optical | Receiver Sensitivity 1 GE Opt | IEEE 802.3z Cl. 38 | | |
| 10 Gigabit Ethernet Optical | Wavelength for 10GE Int | IEEE 802.3ae Cl. 52 | | |
| 10 Gigabit Ethernet Optical | Receiver Sensitivity for 10GE Int | IEEE 802.3ae Cl. 52 | | |
| 10 Gigabit Ethernet Optical | Average Launch power for 10 GE Opt | IEEE 802.3ae Cl. 52 | | |

| Interface Name | Parameter Name | Standard | Limits/ Values | Applicability/ Remarks |
|------------------------------|-------------------------------------|-------------------------|-----------------------|-------------------------------|
| 40 Gigabit Ethernet Optical | Average Launch power for 40 GE Opt | IEEE 802.3ba Cl. 86, 87 | | |
| 40 Gigabit Ethernet Optical | Wavelength for 40 GE Opt | IEEE 802.3ba Cl. 86, 87 | | |
| 40 Gigabit Ethernet Optical | Receiver Sensitivity 40 GE Opt | IEEE 802.3ba Cl. 86, 87 | | |
| 100 Gigabit Ethernet Optical | Average Launch power for 100 GE Opt | IEEE 802.3ba Cl. 86, 88 | | |
| 100 Gigabit Ethernet Optical | Wavelength for 100 GE Opt | IEEE 802.3ba Cl. 86, 88 | | |
| 100 Gigabit Ethernet Optical | Receiver Sensitivity 100 GE Opt | IEEE 802.3ba Cl. 86, 88 | | |
| Fast Ethernet Optical | Average Launch power for FE Opt | IEEE 802.3u | | |
| Fast Ethernet Optical | Wavelength for FE Opt | IEEE 802.3u | | |
| Fast Ethernet Optical | Receiver Sensitivity for FE Opt | IEEE 802.3u | | |

| Annexure-I: PDH Interface Parameters | | | | |
|---|--|--|-----------------------|-------------------------------|
| Parameter Group: PDH Interface (INTPDH) | | | | |
| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
| 2Mbps-E1/ ISDN PRI | Input Jitter Tolerance for 2 MBPS Int/ ISDN PRI | G.823 Cl. 7.1.2, I.431 Cl. 5.4, ETSI TBR-4 Cl. 9.3.3 | | |
| 2Mbps-E1/ ISDN PRI | Input Return Loss for 2 MBPS Int/ ISDN PRI | G.703 Cl. 11.3, ETSI TBR-4 Cl. 9.3.1 | | |
| 2Mbps-E1/ ISDN PRI | Bit Rate Tolerance 2 MBPS Int/ ISDN PRI | G.703 Cl. 11.1, ETSI TBR-4 Cl. 9.2.3 | | |
| 2Mbps-E1/ ISDN PRI | Output Jitter for 2 MBPS Int/ ISDN PRI | G.823 Cl. 5.1, I.431 Cl. 5.4, ETSI TBR-4 Cl. 9.2.4 | | |
| 2Mbps-E1/ ISDN PRI | Pulse Mask for 2 MBPS Int/ ISDN PRI | G.703 Cl. 11.2, ETSI TBR-4 Cl. 9.2.1 | | |
| 8Mbps-E2 | Input Jitter Tolerance for 8 MBPS Int | G.823 Cl.7.1.3 | | |
| 8Mbps-E2 | Input Return Loss for 8 MBPS Int | G.703 Cl. 12.3 | | |
| 8Mbps-E2 | Bit Rate Tolerance 8 MBPS Int | G.703 Cl. 12.1 | | |
| 8Mbps-E2 | Output Jitter for 8 MBPS Int | G.823 Cl. 5.1 | | |
| 8Mbps-E2 | Pulse Mask for 8 MBPS Int | G.703 Cl. 12.2 | | |
| 34Mbps-E31 | Input Jitter Tolerance for 34 MBPS Int | G.823 Cl. 7.1.4 | | |
| 34Mbps-E31 | Input Return Loss for 34 MBPS Int | G.703 Cl. 13.3 | | |
| 34Mbps-E31 | Bit Rate Tolerance 34 MBPS Int | G.703 Cl. 13.1 | | |
| 34Mbps-E31 | Output Jitter for 34 MBPS Int | G.823 Cl. 5.1 | | |
| 34Mbps-E31 | Pulse Mask for 34 MBPS Int | G.703 Cl. 13.2 | | |

| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
|----------------|--|--|----------------|------------------------|
| 64 Kbps | Input Jitter Tolerance for 64 KBPS Int | G.823 Cl. 7.1.1 | | |
| 64 Kbps | Input Return Loss for 64 KBPS Int | G.703 Cl. 6.2.3.3 | | |
| 64 Kbps | Bit Rate Tolerance 64 KBPS Int | G.703 Cl. 6.2.3.1 | | |
| 64 Kbps | Output Jitter for 64 KBPS Int | G.823 Cl. 5.1 | | |
| 64 Kbps | Pulse Mask for 64 KBPS Int | G.703 Cl. 6.2.3.2 | | |
| N X 64 Kbps | Input Jitter Tolerance for NX64 KBPS Int | G.823 Cl. 7.1.2, I.431 Cl. 5.4, ETSI TBR-4 Cl. 9.3.3 | | |
| N X 64 Kbps | Input Return Loss for NX64 KBPS Int | G.703 Cl. 11.3 | | |
| N X 64 Kbps | Bit Rate Tolerance NX64 KBPS Int | G.703 Cl. 11.1 | | |
| N X 64 Kbps | Output Jitter for NX64 KBPS Int | G.823 Cl. 5.1, I.431 Cl. 5.4, ETSI TBR-4 Cl. 9.2.4 | | |
| N X 64 Kbps | Pulse Mask for NX64 KBPS Int | G.703 Cl. 11.2 | | |
| 45Mbps-E32 | Input Jitter Tolerance for 45 MBPS Int | G.824 Cl. 7.2.4 | | |
| 45Mbps-E32 | Input Return Loss for 45 MBPS Int | G.703 Cl. 10 | | |
| 45Mbps-E32 | No DC power | G.703 Cl. 10 | | |
| 45Mbps-E32 | Bit Rate Tolerance 45 MBPS Int | G.703 Cl. 10 | | |
| 45Mbps-E32 | Output Jitter for 45 MBPS Int | G.824 Cl. 5.1 | | |
| 45Mbps-E32 | Pulse Mask for 45 MBPS Int | G.703 Cl. 10 | | |
| 140Mbps-E4 | Input Jitter Tolerance for 140 MBPS Int | G.823 Cl. 7.1.5 | | |
| 140Mbps-E4 | Input Return Loss for 140 MBPS Int | G.703 Cl. 14.3 | | |
| 140Mbps-E4 | Bit Rate Tolerance 140 MBPS Int | G.703 Cl. 14.1 | | |
| 140Mbps-E4 | Output Jitter for 140 MBPS Int | G.823 Cl. 5.1 | | |
| 140Mbps-E4 | Pulse Mask for 140 MBPS Int | G.703 Cl. 14.2 | | |
| 1 PPS | Rise Time for 1 PPS Int | G.703 Cl. 19.2.1 | | |
| 1 PPS | Pulse Width for 1 PPS Int | G.703 Cl. 19.2.1 | | |
| 10 MBPS | Pulse Shape for 10 MHz Int | G.703 Cl. 20.2 | | |
| 10 MBPS | Min Peak Voltage for 10 MHz Int | G.703 Cl. 20.2 | | |
| 10 MBPS | Max Peak Voltage for 10 MHz Int | G.703 Cl. 20.2 | | |

| Annexure-J1: xDSL Interface Parameters | | | | |
|---|--|-------------------------------------|----------------|-----------|
| Parameter Group: DSL Interface (INTDSL) | | | | |
| Interface Name | Parameter Name | Standard | Remarks | |
| ADSLx | Insulation Test for 2 wire Int | ETSI EN 300 001 Cl. 2.2 | | |
| ADSLx | Loop resistance for ADSLx | ETSI EN 300 001 Table 2.3 | | |
| ADSLx | PSD for ADSL Int | G.992.3 Annexure A, B, I, J, G992.5 | | |
| ADSLx | Bit Rate for ADSL Int | ANSI.T1.413-2 | | |
| ADSLx | Insulation Test for ADSL Int | | | |
| ADSLx | Impulse Noise Protection for ADSL Int | G.992.3 Appendix V | | |
| ADSLx | Transmitted Power At ATU-C for ADSLx Int | G.992.3 Annexure-P | | |
| ADSLx | Line Port impedance for ADSLx Int | | | |
| VDSLx | Insulation Test for 2 wire Int | ETSI EN 300 001 | | |
| VDSLx | Loop resistance for VDSLx | ETSI EN 300 001 | | |
| VDSLx | Profiles for VDSLx | G.993.2 Cl. 7.2 | | |
| VDSLx | Return Loss for VDSLx | G.993.1 Cl. 6.5 | | |
| VDSLx | PSD for VDSLx Int | G.993.1 Cl. 6.2/ G.993.2 Cl. 7.2 | | |
| VDSLx | Line Port impedance for VDSLx Int | | | |
| VDSLx | Transmitted Power At ATU-C for VDSLx Int | | | |
| VDSLx | Bit Rate for VDSLx Int | G.993.1/ G993.2 | | |
| G.FAST | PPPoE for G.FAST Int | RFC 2516 Functional Test | | Annex-P11 |
| G.FAST | PVC Support for G.FAST Int | | | |
| G.FAST | VPI-VCI Support for G.FAST Int | | | |
| G.FAST | Loop Resistance for G.FAST IntSLx | ETSI EN 300 001 | | |
| G.FAST | Insulation Test for G.FAST Int | | | |
| G.FAST | Impulse Noise Protection for G.FAST Int | | | |
| G.FAST | Throughput Test for G.FAST Int | | | |
| G.FAST | Profiles for G.FAST Int | G.9700 | | |
| G.HN | Profiles for G.HN Int | G.9960 | | |
| G.HN | PSD for G.HN | G.9964 | | |

| | | | | |
|-------|---|---------|--|--|
| SHDSL | PSD for SHDSL Int | G.991.2 | | |
| SHDSL | Return Loss for SHDSL | G.991.2 | | |
| SHDSL | Transmitted Power for SHDSL Int | G.991.2 | | |
| SHDSL | Impedance Unbalance About Earth for SHDSL Int | G.991.2 | | |
| SHDSL | Insulation Resistance for SHDSL int | G.991.2 | | |
| SHDSL | Throughput for SHDSL Interface | G.991.2 | | |
| SHDSL | LCL for SHDSL Interface | G.991.2 | | |

| Annexure-J2: PON Interface Parameters | | | | |
|--|--|----------------------------|---------------|----------------|
| Parameter Group: PON Interface (INTPON) | | | | |
| Interface Name | Parameter Name | Standard/ Parameter | Clause | Remarks |
| GPON | Operating Wavelength Trans for GPON Int | G.984.2 Cl. 8.2.5.1 | | |
| GPON | Operating Wavelength Recv for GPON Int | G.984.2 Cl. 8.2.5.2 | | |
| GPON | Opt Output Power for GPON Int at OLT | G.984.2 | | |
| GPON | Opt Output Power for GPON Int at ONT | G.984.2 | | |
| GPON | Receiver Sensitivity for GPON Int at OLT | G.984.2 | | |
| GPON | Receiver Sensitivity for GPON Int at ONT | G.984.2 | | |
| GPON | Throughput for GPON Int | G.984.1, RFC 2544 | | |
| GPON | Protocol Test for GPON Int | EthOGEM/ G.984.2 | | |
| GPON | Line Test for GPON Int | IEEE 802.3ah | | |
| EPON | Operating Wavelength Trans for EPON Int | IEEE 802.3ah | | |
| EPON | Operating Wavelength Recv for EPON Int | IEEE 802.3ah | | |
| EPON | Opt Output Power for EPON Int at OLT | IEEE 802.3ah | | |
| EPON | Opt Output Power for EPON Int at ONT | IEEE 802.3ah | | |
| EPON | Receiver Sensitivity for EPON Int at OLT | IEEE 802.3ah | | |
| EPON | Receiver Sensitivity for EPON Int at ONT | IEEE 802.3ah | | |
| EPON | Throughput for EPON Int | RFC2544 | | |
| EPON | Line Test for EPON Int | IEEE 802.3ah | | |
| XGPON | Operating Wavelength Trans for XGPON Int | G.987.2 | | |
| XGPON | Operating Wavelength Recv for XGPON Int | G.987.2 | | |
| XGPON | Opt Output Power XGPON Int at OLT | G.987.2 | | |
| XGPON | Opt Output Power XGPON Int at ONT | G.987.2 | | |
| XGPON | Receiver Sensitivity XGPON Int at OLT | G.987.2 | | |
| XGPON | Receiver Sensitivity XGPON Int at ONT | G.987.2 | | |
| XGPON | Throughput for XGPON Int | G.987.1, RFC2544 | | |
| XGPON | Protocol test for XGPON Int | G.987.1, XGEM | | |
| XGPON | Line test for XGPON Int | IEEE 802.3ah | | |

| Interface Name | Parameter Name | Standard/ Parameter | Clause | Remarks |
|----------------|--|---------------------------|--------|---------|
| XGSPON | Operating Wavelength Trans XGSPON Int | G.9807.1 | | |
| XGSPON | Operating Wavelength Recv XGSPON Int | G.9807.1 | | |
| XGSPON | Opt Output Power XGSPON Int at OLT | G.9807.1 | | |
| XGSPON | Opt Output Power XGSPON Int at ONT | G.9807.1 | | |
| XGSPON | Receiver Sensitivity XGSPON Int at OLT | G.9807.1 | | |
| XGSPON | Receiver Sensitivity XGSPON Int at ONT | G.9807.1 | | |
| XGSPON | Throughput for XGSPON Int | G.9807.1, RFC2544 | | |
| XGSPON | Protocol Test for XGSPON Int | G.9807.1, XGEM | | |
| XGSPON | Line Test for XGSPON Int | IEEE 802.3ah | | |
| WDMPON | Operating Wavelength Trans WDMPON Int | G.694.1 | | |
| WDMPON | Operating Wavelength Recv WDMPON Int | G.694.1 | | |
| WDMPON | Opt Output Power WDMPON Int at OLT | G.694.1 | | |
| WDMPON | Opt Output Power WDMPON Int at ONT | G.694.1 | | |
| WDMPON | Receiver Sensitivity WDMPON Int at OLT | G.694.1 | | |
| WDMPON | Receiver Sensitivity WDMPON Int at ONT | G.694.1 | | |
| WDMPON | Throughput for WDMPON Int | RFC2544 | | |
| WDMPON | Protocol test for WDMPON Int | G.698.3 | | |
| WDMPON | Line Test for WDMPON Int | IEEE 802.3ah | | |
| NGNPON | Operating Wavelength Trans NGPON Int | G.989.2 | | |
| NGNPON | Operating Wavelength Recv NGPON Int | G.989.2 | | |
| NGNPON | Opt Output Power NGPON Int at OLT | G.989.2 | | |
| NGNPON | Opt Output Power NGPON Int at ONT | G.989.2 | | |
| NGNPON | Receiver Sensitivity NGPON Int at OLT | G.989.2 | | |
| NGNPON | Receiver Sensitivity NGPON Int at ONT | G.989.2 | | |
| NGNPON | Throughput for NGPON Int | G.989.2 | | |
| NGNPON | Protocol Test for NGPON Int | G.989.2, RFC2544 | | |
| NGNPON | Line Test for NGPON Int | IEEE 802.3ah | | |
| RF Video | RF Video Output Bandwidth, Level and Tilt-Values | 52±870 MHz, 14 dBmV, 0 dB | | |

| Annexure-J3: PON Conformance Parameters | | | |
|--|--|---|----------------|
| Parameter Group: PON Conformance (CONFPON) | | | |
| Product Group | Parameter Name | Standard | Remarks |
| CONFPON | DOS Prevention, SSH v1-2 for CLI in PON | ITU-T G.984.3 section V.2, SSH v2 RFC 4251. | |
| | Frameloss of PON | RFC 2544. | |
| | Latency of PON | RFC 2544. | |
| | MAC Address Learning and Aging Control | G.984.1. | |
| | MAC Address Limitation in PON | IEEE 802.3. | |
| | MAC Based 802.1x Authentication in PON | IEEE 802.1x. | |
| | MAC Learning Support at OLT | G.984.1. | |
| | Maximum Bandwidth Limiting in PON | ITU-T-REC-G.984.3-200803 Section 7.5. | |
| | Minimum Guaranteed Bandwidth in PON | ITU-T-REC-G.984.3-200803 Section 7.5. | |
| | Minimum Two Classification in PON | ITU-T-REC-G.984.3-200803 Section 7.5. | |
| | Password Based Authentication in PON | ITU-T G.984.3 section 9.2.2, 12. | |
| | Port-id Based VLAN Support at OLT | G.984.1, IEEE 802.1Q(testing procedure). | |
| | Switch Fabric Throughput Capability OLT | G.984.1. | |
| | Throughput of PON | RFC 2544. | |
| VLAN Stacking to Network Support at OLT | G.984.1, IEEE 802.1Q(testing procedure). | | |

| Interface Name | Parameter Name | Standard/ Parameter | Remarks | |
|-----------------------|------------------------------|-----------------------------|----------------|--|
| XGSPON | Line Test for XGSPON Int | IEEE 802.3ah. | | |
| GPON | Protocol Test for GPON Int | Ethernet over GEM, G.984.2. | | |
| NGPON | Protocol Test for NGPON Int | G.989.2, RFC 2544. | | |
| WDMPON | Protocol test for WDMPON Int | G.698.3. | | |
| XGPON | Protocol test for XGPON Int | G.987.2, XGEM. | | |
| XGSPON | Protocol Test for XGSPON Int | G.9807.1, XGEM. | | |
| EPON | Throughput for EPON Int | , RFC 2544. | | |
| GPON | Throughput for GPON Int | G.984.1, RFC 2544. | | |
| NGPON | Throughput for NGPON Int | G.989.2. | | |
| WDMPON | Throughput for WDMPON Int | , RFC 2544. | | |
| XGPON | Throughput for XGPON Int | G.987.1, RFC 2544. | | |
| XGSPON | Throughput for XGSPON Int | G.9807.1, RFC 2544. | | |

| Annexure-K: SDH Interface Parameters | | | | |
|---|---|-----------------------------------|-----------------------|-------------------------------|
| Parameter Group: PDH Interface (INTPDH) | | | | |
| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
| STM-1 Electrical | Input Jitter Tolerance STM-1 Electrical | G.825 Cl. 6.1.2.1 | | |
| STM-1 Electrical | Input Return Loss for STM-1 Electrical | G.703 Cl. 17.3 | | |
| STM-1 Electrical | Bit Rate Tolerance STM-1 Electrical Int | G.703 Cl. 17.1 | | |
| STM-1 Electrical | Output Jitter for STM-1 Electrical Int | G.825 Cl. 5.1 | | |
| STM-1 Electrical | Pulse Mask for STM-1 Electrical Int | G.703 Cl. 17.2 | | |
| STM-1 Optical | Input Jitter Tolerance for STM-1 Opt | G.825 Cl. 6.1.2.1 | | |
| STM-1 Optical | Mean Launched Power for STM-1 Opt Int | G.957 Table 2 | | |
| STM-1 Optical | Bit Rate Tolerance STM-1 Opt Int | G.957 Table 2 | | |
| STM-1 Optical | Operating Wavelength for STM-1 Opt Int | G.957 Table 2 | | |
| STM-1 Optical | Eye Pattern for STM-1 Opt Int | G.957 Cl.6.2.5 | | |
| STM-1 Optical | Output Jitter for STM-1 Opt Int | G.783 Table 9-6, G.825 Cl. 5.1 | | |
| STM-1 Optical | Receiver Overload for STM-1 Opt Int | G.957 Table 2 | | |
| STM-1 Optical | Receiver Sensitivity for STM-1 Opt Int | G.957 Table 2 | | |
| STM-4 Optical | Input Jitter Tolerance for STM-4 Opt | G.825 Cl. 6.1.2.2 | | |
| STM-4 Optical | Mean Launched Power for STM-4 Opt Int | G.957 Table 3, G.691 Table 3 | | |
| STM-4 Optical | Bit Rate Tolerance STM-4 Opt Int | G.957 Table 3 | | |
| STM-4 Optical | Operating Wavelength for STM-4 Opt Int | G.957 Table 3 | | |
| STM-4 Optical | Output Jitter for STM-4 Opt Int | G.783 Table 9-6, G.825 Cl. 5.1 | | |
| STM-4 Optical | Receiver Overload for STM-4 Opt Int | G.957 Table 3 G.691 Table 3 | | |
| STM-4 Optical | Receiver Sensitivity for STM-4 Opt Int | G.691 Table 3, G.957 Table 3 | | |
| STM-4 Optical | Eye Pattern for STM-4 Opt Int | G.957 Cl.6.2.5 | | |

| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
|-----------------------|--|-----------------------------------|-----------------------|-------------------------------|
| STM-16 Optical | Input Jitter Tolerance for STM-16 Opt | G.825 Cl. 6.1.2.3 | | |
| STM-16 Optical | Mean Launched Power for STM-16 Opt Int | G.957 Table 4, G.691 Table 4 | | |
| STM-16 Optical | Bit Rate Tolerance STM-16 Opt Int | G.957 Table 4, G.709 | | |
| STM-16 Optical | Operating Wavelength for STM-16 Opt Int | G.957 Table 4 | | |
| STM-16 Optical | Output Jitter for STM-16 Opt Int | G.783 Table 9-6, G.825 Cl. 5.1 | | |
| STM-16 Optical | Receiver Overload for STM-16 Opt Int | G.957 Table 4, G.691 Table 4 | | |
| STM-16 Optical | Receiver Sensitivity for STM-16 Opt Int | G.957 Table 4, G.691 Table 4 | | |
| STM-16 Optical | Eye Pattern for STM-16 Opt Int | G.957 Cl.6.2.5 | | |
| STM-64 Optical | Input Jitter Tolerance for STM-64 Opt | G.825 Cl. 6.1.2.4 | | |
| STM-64 Optical | Mean Launched Power for STM-64 Opt Int | G.691 Table 5 | | |
| STM-64 Optical | Bit Rate Tolerance STM-64 Opt Int | G.957 Table 5, G.709 | | |
| STM-64 Optical | Operating Wavelength for STM-64 Opt Int | G.957 Table 5 | | |
| STM-64 Optical | Output Jitter for STM-64 Opt Int | G.783, Table9-6 G.825 Cl. 5.1 | | |
| STM-64 Optical | Receiver Overload for STM-64 Opt Int | G.691 Table 5 | | |
| STM-64 Optical | Receiver Sensitivity for STM-64 Opt Int | G.691 Table 5 | | |
| STM-256 Optical | Input Jitter Tolerance for STM-256 Opt | G.825 Cl. 6.1.2.5 | | |
| STM-256 Optical | Mean Launched Power for STM-256 Opt Int | G.693 | | |
| STM-256 Optical | Bit Rate Tolerance STM-256 Opt Int | G.693 Cl. 6 | | |
| STM-256 Optical | Operating Wavelength for STM-256 Opt Int | G.693 | | |
| STM-256 Optical | Output Jitter for STM-256 Opt Int | G.825 Cl. 5.1 | | |
| STM-256 Optical | Receiver Overload for STM-256 Opt Int | G.693 | | |
| STM-256 Optical | Receiver Sensitivity for STM-256 Opt Int | G.693 | | |

| Annexure-L: OTN Interface Parameters | | | | |
|---|-------------------------------------|---------------------------------------|-----------------------|-------------------------------|
| Parameter Group: OTN Interface (INTOTN) | | | | |
| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
| OTU-1 | Central Frequency for OTU-1 | G.959.1 Cl. 7.2.2.3, G.694.1 Cl. 6 | | |
| OTU-1 | Input Jitter Tolerance for OTU-1 | G.8251 Cl. 6.1.1 | | |
| OTU-1 | Maximum Mean Output Power for OTU-1 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-1 | Minimum Mean Output Power for OTU-1 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-1 | Minimum Receiver Overload for OTU-1 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-1 | Bit Rate Tolerance OTU-1 | G.709 Cl. 7.3 | | |
| OTU-1 | Output Jitter for OTU-1 | G.8251 Cl. 5 | | |
| OTU-1 | Receiver Sensitivity for OTU-1 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-2 | Central Frequency for OTU-2 | G.959.1 Cl. 7.2.2.3, G.694.1 Cl. 6 | | |
| OTU-2 | Input Jitter Tolerance for OTU-2 | G.8251 Cl. 6.1.2 | | |
| OTU-2 | Maximum Mean Output Power for OTU-2 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-2 | Minimum Mean Output Power for OTU-2 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-2 | Minimum Receiver Overload for OTU-2 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-2 | Bit Rate Tolerance OTU-2 | G.709 Cl. 7.3 | | |
| OTU-2 | Output Jitter for OTU-2 | G.8251 Cl. 5 | | |
| OTU-2 | Receiver Sensitivity for OTU-2 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |

| Interface Name | Parameter Name | Standard/ Parameter | Limits/ Values | Applicability/ Remarks |
|-----------------------|-------------------------------------|---------------------------------------|-----------------------|-------------------------------|
| OTU-3 | Central Frequency for OTU-3 | G.959.1 Cl. 7.2.2.3, G.694.1 Cl. 6 | | |
| OTU-3 | Maximum Mean Output Power for OTU-3 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-3 | Minimum Mean Output Power for OTU-3 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-3 | Minimum Receiver Overload for OTU-3 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-3 | Bit Rate Tolerance OTU-3 | G.709 Cl. 7.3 | | |
| OTU-3 | Receiver Sensitivity for OTU-3 | G.959.1 Cl. 7, 8, G.693 Cl. 6, 7 | | |
| OTU-4 | Central Frequency for OTU-4 | G.959.1 Cl. 7.2.2.3, G.694.1 Cl. 6 | | |
| OTU-4 | Maximum Mean Output Power for OTU-4 | G.959.1 Cl. 8, G.695 Cl. 7, 8 | | |
| OTU-4 | Mean Total Output Power for OTU-4 | G.959.1 Cl. 8, G.695 Cl. 7, 8 | | |
| OTU-4 | Minimum Mean Output Power for OTU-4 | G.959.1 Cl. 8, G.695 Cl. 7, 8 | | |
| OTU-4 | Bit Rate Tolerance OTU-4 | G.709 Cl. 7.3 | | |
| OTU-4 | Receiver Sensitivity for OTU-4 | G.959.1 Cl. 8, G.695 Cl. 7, 8 | | |

| Annexure-M: Mobile Handset and Tablet Test Parameters | | | | |
|--|--|---|--|--------------------------------|
| Parameter Group: Mobile Functional (MOBFUNC) | | | | |
| Applicability | Parameter Name | Test Requirement | Standard | Test Procedure |
| Mobile Handset and Tablet | Mobile device - Non Zero IMEI/MEID/ESN | IMEI is displayed by pressing *#06# and is not all zeroes/ null. | | Appendix-II, Test-33 |
| Mobile Handset – Feature Phone | Mobile Emergency Support - Panic Button | Pressing “Numeric key -5” or “numeric key - 9” invokes emergency call. | G.S.R. No. 436 (E) dated 22-04-2016, 3GPP TS 22.101 for GSM/ UMTS/ LTE, 3GPP2 C.S0023 for CDMA. | Appendix-II, Test-34 |
| Mobile Handset – Smart Phone | Mobile Emergency Support - Panic Button | Emergency call is invoked by pressing soft emergency call button for long time, and by short pressing existing power on /off button thrice in quick succession | | Appendix-II, Test-35 |
| Mobile Handset – Smart Phone | Mobile Emergency Support - GPS Location | Facility of identifying the location through Satellite based GPS | G.S.R. No. 1441 (E) dated 23-11-2017. | Appendix-II, Test-36 |
| Mobile Handset | Mobile Emergency Support - Call on 112 | Possible to dial the emergency number 112 with locked keypad, with or without SIM and make emergency call attempts on an available PLMN, without PLMN selection, by mobile not successfully registered. | DoT 16-04/2015-AS-III/NP/67/120 dt 4.5.16, 3GPP2 C.S0023 for CDMA 2000, 3GPP TS 22.101 and TS 24.008 for GSM/ UMTS/ LTE. | Appendix-II, Test-37 |
| Mobile Handset | Mobile Device Indian Language Support | | IS 16333 (Part 3). | |
| Mobile Handset | SAR Display for Mobile Handset | SAR value is displayed by pressing *#07# and displayed SAR value is less than 1.6 W/kg. | TEC/GR/SAR/001/01.MAR.09 or IEC Standard 62209-1 | 62209-1: 2005 or later version |
| Mobile Handset | SAR Value for Mobile Handset | | IEC 62209-1:2005 TEC/GR/SAR/001/01.MAR.09 | 62209-1: 2005 or later version |
| IoT Devices | IoT Dev - Non-0 IMEI or MEID or Unique MAC | Check that IMEI is not all zeroes/ null. | | |

| Annexure-P1: IP Conformance Parameters – SIP and SIPI – RFC 3261 and Q.1912.5 | | | | |
|--|--|-----------------|----------------------------------|-------------------------------|
| Parameter Group: IP Conformance | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| SIP Parameters Set-A | SIP Header : Message Body Type | RFC 3261 | Clause 7.4.1 | SIP Terminal, PABX |
| SIP Parameters Set-A | Generating SIP request (To, R-URI, From, Call-ID, CSeq, Max-Forwards, Via) | RFC 3261 | Clause 8.1.1, 8.1.1.2 to 8.1.1.7 | SIP Terminal, PABX |
| SIP Parameters Set-A | SIP Dialog and Transaction | RFC 3261 | Clause 12, 12.1.1, 12.1.2 | SIP Terminal, PABX |
| SIP Parameters Set-A | SIP Terminating a Session with a BYE request. | RFC 3261 | Clause 15 | SIP Terminal, PABX |
| SIP Parameters Set-A | SIP Creating the initial invite | RFC 3261 | Clause 13.2.1 | SIP Terminal, PABX |
| SIP Parameters Set-A | User Authentication | RFC 3261 | Clause 21 | SIP Terminal, PABX |
| SIP Parameters Set-B | SIP - Call Flow | RFC 3261 | Clause 4 | LMGW |
| SIP Parameters Set-B | SIP Header : Message Body Type | RFC 3261 | Clause 7.4.1 | LMGW |
| SIP Parameters Set-B | Generating SIP request (To, R-URI, From, Call-ID, CSeq, Max-Forwards, Via) | RFC 3261 | Clause 8.1.1, 8.1.1.2 to 8.1.1.7 | LMGW |
| SIP Parameters Set-B | SIP Dialog and Transaction | RFC 3261 | Clause 12, 12.1.1, 12.1.2 | LMGW |
| SIP Parameters Set-B | SIP Terminating a Session with a BYE request. | RFC 3261 | Clause 15 | LMGW |
| SIP Parameters Set-B | SIP Creating the initial invite | RFC 3261 | Clause 13.2.1 | LMGW |
| SIP Parameters Set-B | User Authentication | RFC 3261 | Clause 21 | LMGW |

| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
|-----------------------|--|-----------------|------------------------|-------------------------------|
| SIP Parameters Set-C | SIP - Max Forwards (Not for SIPS URI) | RFC 3261 | Clause 8.1.1.6 | SBC |
| SIP Parameters Set-C | SIP - Message Body length (Not for SIPS URI) | RFC 3261 | Clause 7.4.2 | SBC |
| SIP Parameters Set-C | SIP - Responses (Not for SIPS URI) | RFC 3261 | Clause 7.2 | SBC |
| SIP Parameters Set-D | SIP - Max Forwards (Not for SIPS URI) | RFC 3261 | Clause 8.1.1.6 | SOFT SWITCH |
| SIP Parameters Set-D | SIP - Message Body length (Not for SIPS URI) | RFC 3261 | Clause 7.4.2 | SOFT SWITCH |
| SIP Parameters Set-D | SIP - Responses (Not for SIPS URI) | RFC 3261 | Clause 7.2 | SOFT SWITCH |
| SIP Parameters Set-D | SIP - Cancelling a Request | RFC 3261 | Clause 9 | SOFT SWITCH |
| SIP Parameters Set-D | SIP - Client Behaviour (Not for SIPS URI) | RFC 3261 | Clause 9.1 | SOFT SWITCH |
| SIPI Parameters | SIPI - Conventions for representation of ISUP PDU | Q 1912.5 | Clause 5.1 | SOFT SWITCH |
| SIPI Parameters | SIPI - Conventions for representation of SIP/SDP information | Q 1912.5 | Clause 5.2 | SOFT SWITCH |
| SIPI Parameters | SIPI - IAM parameters | Q 1912.5 | Clause 6.1.3 | SOFT SWITCH |
| SIPI Parameters | SIPI - INVITE received with an SDP offer | Q 1912.5 | Clause 6.1.2 | SOFT SWITCH |
| SIPI Parameters | SIPI - INVITE received without an SDP offer | Q 1912.5 | Clause 6.1.1 | SOFT SWITCH |
| SIPI Parameters | SIPI - ISUP encapsulation – detailed procedures | Q 1912.5 | Clause 5.4 | SOFT SWITCH |
| SIPI Parameters | SIPI - Sending of Initial Address Message (IAM) | Q 1912.5 | Clause 6.1 | SOFT SWITCH |

| Annexure-P2: IP Conformance Parameters – RTP – RFC 3550 | | | | |
|--|---|----------|-----------------|---------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| RTP Parameters Set-A | RTP: Sender report RTCP packet version | RFC 3550 | Clause 6.4.1 | SIP Terminal, PABX |
| RTP Parameters Set-A | RTP: Sequence number | RFC 3550 | Clause 5.1 | SIP Terminal, PABX |
| RTP Parameters Set-A | RTP: Version and Port | RFC 3550 | Clause 5.1 | SIP Terminal, PABX |
| RTP Parameters Set-A | RTP: Payload Type | RFC 3550 | Clause 5.1 | SIP Terminal, PABX |
| RTP Parameters Set-A | RTP: SSRC Identification | RFC 3550 | Clause 5.1 | SIP Terminal, PABX |
| RTP Parameters Set-B | RTP: Sender report RTCP packet version | RFC 3550 | Clause 6.4.1 | LMGW, MGW |
| RTP Parameters Set-B | RTP: Sequence number | RFC 3550 | Clause 5.1 | LMGW, MGW |
| RTP Parameters Set-B | RTP: Version and Port | RFC 3550 | Clause 5.1 | LMGW, MGW |
| RTP Parameters Set-B | RTP: Payload Type | RFC 3550 | Clause 5.1 | LMGW, MGW |
| RTP Parameters Set-C | RTP: Byte Order, Alignment, and Time Format | RFC 3550 | Clause 4 | Session Border Controller |
| RTP Parameters Set-C | RTP: Simple Multicast Audio Conference | RFC 3550 | Clause 2.1 | Session Border Controller |

| Annexure-P3: IP Conformance Parameters – RTCP – RFC 3551 | | | | |
|---|---|----------|-----------------|---------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| RTCP Parameters Set-A | RTCP: Port Assignment | RFC 3551 | Clause 8 | SIP Terminal |
| RTCP Parameters Set-A | RTCP: Registering Additional Encodings | RFC 3551 | Clause 3 | SIP Terminal |
| RTCP Parameters Set-A | RTCP: GSM-EFR | RFC 3551 | Clause 4.5.9 | SIP Terminal |
| RTCP Parameters Set-A | RTCP: Guidelines 1 for sample based audio encodings | RFC 3551 | Clause 4.3 | SIP Terminal |
| RTCP Parameters Set-A | RTCP: Guidelines 2 for sample based audio encodings | RFC 3551 | Clause 4.4 | SIP Terminal |
| RTCP Parameters Set-B | RTCP: Port Assignment | RFC 3551 | Clause 8 | Session Border Controller |
| RTCP Parameters Set-B | RTCP: Registering Additional Encodings | RFC 3551 | Clause 3 | Session Border Controller |

| Annexure-P4: IP Conformance Parameters – TCP – RFC 793 | | | | |
|---|------------------------------------|----------|--|------------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| TCP Parameters | Header Format and Sequence Numbers | RFC 793 | Clause 3.1, 3.3 Test terminology as per clause 3.2 | MGW, SIP Terminal, SBC, PABX |

| Annexure-P5: IP Conformance Parameters – UDP – RFC 768 and MGCP – H.248 | | | | |
|--|---------------------------|----------|-------------------|-----------------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| UDP Parameters | UDP Format | RFC 768 | | MGW, LMGW, SBC, Soft Switch, PABX |
| UDP Parameters | User Terminology | RFC 768 | | MGW, LMGW, SBC, Soft Switch, PABX |
| UDP Parameters | Sequence numbers | RFC 768 | | MGW, LMGW, SBC, Soft Switch, PABX |
| MGCP Parameters | Connection Model | H.248 | Clauses 6.1 & 6.2 | MGW, LMGW, Soft Switch |

| Annexure-P6: IP Conformance Parameters – IPV4 and Dual Stack – RFC 791 and RFC 4213 | | | | |
|--|---|----------|-----------------|---|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| IPV4 Parameters Set-A | Model of operation | RFC 791 | Clause 2.2 | MGW, SGW, PABX, ONU, ONT |
| IPV4 Parameters Set-A | Internet Header Format | RFC 791 | Clause 3.1 | MGW, SGW, PABX, ONU, ONT |
| IPV4 Parameters Set-A | Addressing | RFC 791 | Clause 3.2 | MGW, SGW, PABX, ONU, ONT |
| IPV4 Parameters Set-C | Function Description | RFC 791 | Clause 2.3 | SOFT SWITCH |
| IPV4 Parameters Set-C | Gateways | RFC 791 | Clause 2.4 | SOFT SWITCH |
| IPV4 Parameters Set-C | Interfaces | RFC 791 | Clause 3.3 | SOFT SWITCH |
| Dual IP layer operation: Address | Dual IP layer operation: Address Configuration | RFC 4213 | Clause 2.1 | WiFi Access Point, WiFi CPE, DSL NT Modem, ONU, ONT, OLT |
| Dual IP layer operation: DNS | Dual IP layer operation: DNS | RFC 4213 | Clause 2.2 | |
| Dual IP layer operation: Tunnelling | Dual IP layer operation: Tunnelling | RFC 4213 | Clause 3 | WiFi Access Point, WiFi CPE, DSL NT Modem, ONU, ONT, OLT, MGW, LMGW, PABX, SBC, Mobile Device, ONU, ONT, CCN |

| Annexure-P7: IP Conformance Parameters – IPv6 – RFC 2460 | | | | |
|---|--|----------|-----------------|---|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| IPv6 Header Parameters | Header: Version Field | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: Traffic Class | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: Flow Label | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: Payload Length | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: No next header after IPv6 Header | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: Hop Limit | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Header Parameters | Header: Source and Destination Address | RFC 2460 | Clause 3 | SIP Terminal, SBC, Mobile Device, ONU, ONT, CCN |
| IPv6 Extn. Header Parameters | IPv6 Extension Header Order | RFC 2460 | Clause 4.1 | Mobile Device, ONU, ONT, CCN |
| IPv6 Extn. Header Parameters | IPv6 Extension Header Options | RFC 2460 | Clause 4.2 | Mobile Device, ONU, ONT, CCN |
| IPv6 Extn. Header Parameters | IPv6 Extension Header Hop By Hop Options | RFC 2460 | Clause 4.3 | Mobile Device, ONU, ONT, CCN |
| IPv6 Extn. Header Parameters | IPv6 Extension Header Routing | RFC 2460 | Clause 4.4 | Mobile Device, ONU, ONT, CCN |

| Annexure-P8: IP Conformance Parameters – DTMF – RFC 4733 | | | | |
|---|--|----------|-----------------|------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| DTMF Parameters Set-A | RTP payload format for named telephones events | RFC 4733 | Clause 2 | MGW,LMGW |
| DTMF Parameters Set-A | Use of RTP header fields | RFC 4733 | Clause 2.2 | MGW,LMGW |
| DTMF Parameters Set-A | Payload Format | RFC 4733 | Clause 2.3 | MGW,LMGW |
| DTMF Parameters Set-B | DTMF: Applications | RFC 4733 | Clause 3.1 | Soft Switch |
| DTMF Parameters Set-B | DTMF: Congestion Consideration | RFC 4733 | Clause 3.3 | Soft Switch |
| DTMF Parameters Set-B | DTMF: Events | RFC 4733 | Clause 3.2 | Soft Switch |
| DTMF Parameters Set-B | DTMF: Payload Format | RFC 4733 | Clause 2.3 | Soft Switch |
| DTMF Parameters Set-B | DTMF: RTP payload format for named telephones events | RFC 4733 | Clause 2 | Soft Switch |
| DTMF Parameters Set-B | DTMF: Specification of Events codes for DTMF events | RFC 4733 | Clause 3 | Soft Switch |
| DTMF Parameters Set-B | DTMF: Use of RTP header fields | RFC 4733 | Clause 2.2 | Soft Switch |
| DTMF Parameters Set-C | DTMF: Duration negotiation | RFC 4733 | Clause 2.3.5 | PABX |
| DTMF Parameters Set-C | DTMF: Negotiation of Payload | RFC 4733 | Clause 2.5.1.1 | PABX |
| DTMF Parameters Set-C | DTMF: Transmission of Event Packet | RFC 4733 | Clause 2.5.1.2 | PABX |
| DTMF Parameters Set-C | DTMF: Verification of sequence no. and time stamp | RFC 4733 | Clause 2.2.1 | PABX |

| Annexure-P9: IP Conformance Parameters – SCTP – RFC 4960 | | | | |
|---|--|----------|-----------------|------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| SCTP Parameters Set-A | SCTP packet Format | RFC 4960 | Clause 3 | MGW, LMGW, SGW |
| SCTP Parameters Set-A | SCTP common header field descriptions | RFC 4960 | Clause 3.1 | MGW, LMGW, SGW |
| SCTP Parameters Set-A | Chunk field descriptions | RFC 4960 | Clause 3.2 | MGW, LMGW, SGW |
| SCTP Parameters Set-A | Optional/variable-length parameters format | RFC 4960 | Clause 3.2.1 | MGW, LMGW, SGW |
| SCTP Parameters Set-A | Reporting of unrecognized parameters | RFC 4960 | Clause 3.2.2 | MGW, LMGW, SGW |
| SCTP Parameters Set-A | SCTP association state diagram | RFC 4960 | Clause 4 | MGW, LMGW, SGW |
| SCTP Parameters Set-B | User Data Fragmentation | RFC 4960 | Clause 1.5.3 | SBC, Soft Switch |
| SCTP Parameters Set-B | Path Management | RFC 4960 | Clause 1.5.7 | SBC, Soft Switch |
| SCTP Parameters Set-B | Transmission of DATA Chunks | RFC 4960 | Clause 6.1 | SBC, Soft Switch |
| SCTP Parameters Set-B | Path Failure Detection | RFC 4960 | Clause 8.2 | SBC, Soft Switch |

| Annexure-P10: IP Conformance Parameters – M3UA – RFC 4960 and Signalling over IP – RFC 2719 | | | | |
|--|---|----------|-----------------|------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| M3UA Parameters | Procedures to Support the M3UA-User | RFC 3332 | Clause 4.1 | Soft Switch, SGW |
| M3UA Parameters | Establishment of Association and Traffic Between SGs and ASPs | RFC 3332 | Clause 5.1 | Soft Switch, SGW |
| M3UA Parameters | M3UA Port Number | RFC 3332 | Clause 7.2 | Soft Switch, SGW |
| M3UA Protocol Extensions Parameter | M3UA Protocol Extensions | RFC 3332 | Clause 7.3 | Soft Switch, SGW |
| Signalling Protocol Over IP | Gateway Component Functions | RFC2719 | Clause 2.1 | SGW |
| Signalling Protocol Over IP | SS7 Interworking for Connection Control | RFC2719 | Clause 2.2 | SGW |
| Signalling Protocol Over IP | ISDN Interworking for Connection Control | RFC2719 | Clause 2.3 | SGW |
| Signalling Protocol Over IP | Architecture for Database Access | RFC2719 | Clause 2.4 | SGW |
| Signalling Protocol Over IP | SG to SG | RFC2719 | Clause 3.5 | SGW |

| Annexure-P11: IP Conformance Parameters – Functional Tests for IP | | | | |
|--|---|-----------------|------------------------|-------------------------------|
| Parameter Group: IP Conformance (CONFIP) | | | | |
| Parameter Name | Individual Parameter Name | IETF RFC | Clause/ Section | Applicability/ Remarks |
| IPV4 Parameters Set-D | IPV4 Functional Tests | RFC 791 | Appendix-II, Test-5 | LAN Switch, Router |
| SNMPv2 Parameters | SNMPv2 Functional Tests | RFC 3410 | Appendix-II, Test-6 | LAN Switch, Router |
| SNMPv3 Parameters | SNMPv3 Functional Tests | RFC 3416 | Appendix-II, Test-7 | LAN Switch, Router |
| Dynamic Routing | Dynamic Routing Functional Tests | | Appendix-II, Test-8 | Router |
| Static Routing | Static Routing Functional Tests | | Appendix-II, Test-9 | Router |
| TCP Parameters | TCP Functional Tests | RFC 793 | Appendix-II, Test-10 | Router |
| Mac Learning & Pkt Fwdg | Mac Learning and Packet Forwarding | | Appendix-II, Test-11 | LAN Switch |
| Spanning Tree Protocol Test | Spanning Tree Protocol Root Bridge Election Functional Test | IEEE 802.1d | Appendix-II, Test-12 | LAN Switch |
| Spanning Tree Protocol Test | Spanning Tree Protocol Port Blocking Functional Test | IEEE 802.1d | Appendix-II, Test-13 | LAN Switch |
| OSPFv2 | OSPFv2 | RFC2328 | Appendix-I, Table-1 | LAN Switch |
| OSPFv3 for IPv6 | OSPFV3 | RFC2740 | Appendix-I, Table-2 | |
| IPV6 Complete Suite | RFC 2460 or 8200 | RFC2460/8200 | Appendix-I, Table-3 | LAN Switch |
| IPV6 Complete Suite | RFC 4861 | RFC4862 | Appendix-I, Table-4 | LAN Switch |
| IPV6 Complete Suite | RFC 4862 | RFC4862 | Appendix-I, Table-5 | LAN Switch |
| IPV6 Complete Suite | RFC 1981 | RFC1981 | Appendix-I, Table-6 | LAN Switch |
| IPV6 Complete Suite | RFC 4443 | RFC4443 | Appendix-I, Table-7 | LAN Switch |
| BGP4 for IPv6 | BGP4 for IPV6 | RFC2545 | Appendix-I, Table-8 | LAN Switch |
| BGP4 | | RFC4271 | Appendix-I, Table-9 | LAN Switch |
| MBGP | | RFC4760 | Appendix-I, Table-10 | LAN Switch |
| LDP | | RFC5036 | Appendix-I, Table-11 | LAN Switch |
| IPSec Functional Test | IPSec Functional Test | | Appendix-II, Test-19 | IP Security System |

| | | | | |
|--|--|--------------------|------------------------------|--------------------|
| NAT Functional Test | NAT Functional Test | | Appendix-II, Test-20, 21 | IP Security System |
| Policy Functional Test | Policy Functional Test | | Appendix-II, Test-22 | IP Security System |
| IDS Functional Test | IDS Functional Test | | Appendix-II, Test-23, 24 | IP Security System |
| IPS Functional Test | IPS Functional Test | | Appendix-II, Test-25, 26 | IP Security System |
| UTM URL, Content & Anti-Virus Filtering Functional Test | UTM URL, Content & Anti-Virus Filtering Functional Test | | Appendix-II, Test-27, 28, 29 | IP Security System |
| Profile for frequency synchronisation | Profile for frequency synchronisation | | Appendix-II, Test-30 | PTP GM |
| Profile for time and phase synchronisation with full timing support | Profile for time and phase synchronisation with full timing support | | Appendix-II, Test-31 | PTP GM |
| Profile for time and phase synchronisation with partial timing support | Profile for time and phase synchronisation with partial timing support | | Appendix-II, Test-32 | PTP GM |
| PPPoE | PPPoE Functional Test | RFC2516 | Appendix-II, Test-17 | PON, Router |
| Radius | Radius Functional Test | RFC2865 | Appendix-II, Test-18 | Router |
| Support for Bi-directional LSP | Support for Bi-directional LSP | G.8110 and RFC5654 | Appendix-II, Test-14 | MPLS TP CEN Switch |
| Ethernet PWE and Service Identification | Ethernet PWE and Service Identification | | Appendix-II, Test-15 | MPLS TP CEN Switch |
| TDM PWE and Service Identification | TDM PWE and Service Identification | | Appendix-II, Test-16 | MPLS TP CEN Switch |

| Appendix-I: IP Conformance Test Cases for RFCs | | |
|--|--|----------------|
| Parameter Group: IP Conformance (CONFIP) | | |
| Note: Wherever a particular IP test is implemented in a product through a RFC different from what is mentioned in ER, please obtain confirmation from Helpdesk before submitting application. | | |
| Table-1: OSPFv2 as per RFC 2328 | | |
| RFC Section | RFC Clause | Remarks |
| 9.2 | First, a Hello Packet may be received from a neighbour claiming to be itself the Backup Designated Router. Alternatively, a Hello packet may be received from a neighbour claiming to be itself the Designated Router, and indicating that there is no Backup Designated Router. In either case there must be bidirectional communication with the neighbour, i.e., the router must also appear in the neighbour's Hello Packet. This event signals an end to the Waiting state. | |
| 13(5b) | In some cases (e.g., the state of the receiving interface is DR and the LSA was received from a router other than the Backup DR) the LSA will be flooded back out the receiving interface | |
| 13.5 | Circumstances:- LSA is more recent than database copy, but was not flooded back out receiving interface. Backup:- Delayed acknowledgment sent if advertisement received from Designated Router, otherwise do nothing. All other States:- Delayed acknowledgment sent. | |
| 13(5a) | If there is already a database copy, and if the database copy was received via flooding and installed less than MinLSArrival seconds ago, discard the new LSA (without acknowledging it) and examine the next LSA (if any) listed in the Link State Update packet. | |
| 8.1 & 8.2 | The OSPF packet header is verified. The fields specified in the header must match those configured for the receiving interface. If they do not, the packet should be discarded | |

| Table-2: OSPFv3 as per RFC 2740 | | |
|--|---|----------------|
| RFC Section | RFC Clause | Remarks |
| 3.1.3 | The Interface ID that the neighbour advertises in its Hello Packets must be recorded in the neighbour structure. The router will include the neighbour's Interface ID in the router's router-LSA when either a) advertising a point-to-point link to the neighbour or b) advertising a link to a network where the neighbour has become Designated Router. | |
| A.3.2 | All routers connected to a common link must agree on certain parameters (HelloInterval and RouterDeadInterval). These parameters are included in Hello packets, so that differences can inhibit the forming of neighbour relationships. The Hello packet also contains fields used in Designated Router election (Designated Router ID and Backup Designated Router ID), and fields used to detect bi-directionality (the Router IDs of all neighbours whose Hellos have been recently received). | |
| 3.2.2 | The receiving router must be an area border router, and the Router ID specified in the packet (the source router) must be the other end of a configured virtual link. The receiving interface must also attach to the virtual link's configured Transit area. If all of these checks succeed, the packet is accepted and is from now on associated with the virtual link (and the backbone area). | |
| 3.2.2 | The fields specified in the header must match those configured for the receiving interface. If they do not, the packet should be discarded | |
| 3.4.3.1 | Consider the router-LSA that router RT3 would originate for Area 1 in Figure 1. Only a single interface must be described, namely that which connects to the transit network N3. It assumes that RT4 has been elected Designated Router of Network N3 | |

| Table-3: IPV6 as per RFC 2460 | | |
|--------------------------------------|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 4.1 | IPv6 nodes must accept and attempt to process extension headers in any order and occurring any number of times in the same packet, | |
| 4.2 | The Option Type identifiers are internally encoded such that their highest-order two bits specify the action that must be taken if the processing IPv6 node does not recognize the Option Type: 11 - discard the packet and, only if the packet's Destination Address was not a multicast address, send an ICMP Parameter Problem, Code 2, message to the packet's Source Address, pointing to the unrecognized Option Type. | |
| 4.2 | The Option Type identifiers are internally encoded such that their highest-order two bits specify the action that must be taken if the processing IPv6 node does not recognize the Option Type: 01 - discard the packet. | |
| 4.2 | The Option Type identifiers are internally encoded such that their highest-order two bits specify the action that must be taken if the processing IPv6 node does not recognize the Option Type: 10 - discard the packet and, regardless of whether or not the packet's Destination Address was a multicast address, send an ICMP Parameter Problem, Code 2, message to the packet's Source Address, pointing to the unrecognized Option Type. | |
| 4.4 | If Segments Left is zero, the node must ignore the Routing header and proceed to process the next header in the packet, whose type is identified by the Next Header field in the Routing header. | |

| Table-4: IPV6 as per RFC 4861 | | |
|--------------------------------------|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 6.1.1 | A router MUST silently discard any received Router Solicitation messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |
| 6.1.2 | A node MUST silently discard any received Router Advertisement messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |
| 6.2.2 | A router MUST NOT send Router Advertisements out any interface that is not an advertising interface. | |
| 7.1.1 | A node MUST silently discard any received Neighbour Solicitation messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |
| 7.1.2 | node MUST silently discard any received Neighbour Advertisement messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |

| Table-5: IPV6 as per RFC 4862 | | |
|--------------------------------------|---|----------------|
| RFC Section | RFC Clause | Remarks |
| 5.4.2 | In order to improve the robustness of the Duplicate Address Detection algorithm, an interface MUST receive and process datagrams sent to the all-nodes multicast address or solicited-node multicast address of the tentative address during the delay period. This does not necessarily conflict with the requirement that joining the multicast group be delayed. | |
| 5.4 | Duplicate Address Detection MUST NOT be performed on anycast addresses (note that anycast addresses cannot syntactically be distinguished from unicast addresses). | |
| 7.1.1 | A node MUST silently discard any received Neighbour Solicitation messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |
| 7.1.1 | The contents of the Reserved field, and of any unrecognized options, MUST be ignored. Future, backward-compatible changes to the protocol may specify the contents of the Reserved field or add new options; backward-incompatible changes may use different Code values. | |
| 7.1.2 | A node MUST silently discard any received Neighbour Advertisement messages that do not satisfy all of the following validity checks: <ul style="list-style-type: none"> - The IP Hop Limit field has a value of 255, i.e., the packet could not possibly have been forwarded by a router. | |

| Table-6: IPV6 as per RFC 1981 | | |
|--------------------------------------|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 4 | A node may receive a Packet Too Big message reporting a next-hop MTU that is less than the IPv6 minimum link MTU. In that case, the node is not required to reduce the size of subsequent packets sent on the path to less than the IPv6 minimum link MTU, | |

| Table-7: IPV6 as per RFC 4443 | | |
|--------------------------------------|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 2.2 | (a) If the message is a response to a message sent to one of the node's unicast addresses, the Source Address of the reply MUST be that same address. | |
| | If the message is a response to a message sent to any other address, such as <ul style="list-style-type: none"> - a multicast group address, - an anycast address implemented by the node, or - a unicast address that does not belong to the node; the Source Address of the ICMPv6 packet MUST be a unicast address belonging to the node | |
| 2.4 | If an ICMPv6 informational message of unknown type is received, it MUST be silently discarded. | |
| 2.4 | An ICMPv6 error message MUST NOT be originated as a result of receiving the following: (e.3) A packet destined to an IPv6 multicast address. | |
| 2.4 | An ICMPv6 error message MUST NOT be originated as a result of receiving the following: (e.6) A packet whose source address does not uniquely identify a single node -- e.g., the IPv6 Unspecified Address, an IPv6 multicast address, or an address known by the ICMP message originator to be an IPv6 anycast address. | |

| Table-8: BGP4 for IPV6 as per RFC 2545 | | |
|---|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 3 | The link-local address shall be included in the Next Hop field if and only if the BGP speaker shares a common subnet with the entity identified by the global IPv6 address carried in the Network Address of Next Hop field and the peer the route is being advertised to In all other cases a BGP speaker shall advertise to its peer in the Network Address field only the global IPv6 address of the next hop (the value of the Length of Network Address of Next Hop field shall be set to 16) | |
| 3 | The link-local address shall be included in the Next Hop field if and only if the BGP speaker shares a common subnet with the entity identified by the global IPv6 address carried in the Network Address of Next Hop field and the peer the route is being advertised to In all other cases a BGP speaker shall advertise to its peer in the Network Address field only the global IPv6 address of the next hop (the value of the Length of Network Address of Next Hop field shall be set to 16) | |

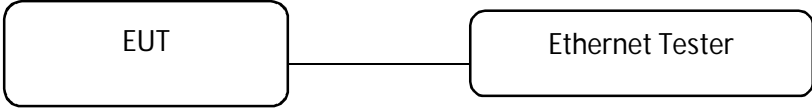
| Table-9: BGP4 for IPV6 as per RFC 4271 | | |
|---|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 9.2 | When a BGP speaker receives an UPDATE message from an internal peer, the receiving BGP speaker SHALL NOT re-distribute the routing information contained in that UPDATE message to other internal peers | |
| 6.1 | if the Length field of the message header is less than 19 or greater than 4096, then the Error Subcode MUST be set to Bad Message Length. The Data field MUST contain the erroneous Length field. | |
| 6.3 | If an optional attribute is recognized, then the value of this attribute MUST be checked. If an error is detected, the attribute MUST be discarded, and the Error Subcode MUST be set to Optional Attribute Error. The Data field MUST contain the attribute (type, length, and value) | |
| 6.1 | If the Marker field of the message header is not as expected, then a synchronization error has occurred and the Error Subcode MUST be set to Connection Not Synchronized, if the Length field of an OPEN message is less than the minimum length of the OPEN message | |
| 6.8 | Upon receipt of an OPEN message, the local system MUST examine all of its connections that are in the OpenConfirm state | |

| Table-10: MBGP as per RFC 4760 | | |
|---------------------------------------|--|----------------|
| RFC Section | RFC Clause | Remarks |
| 7 | If a BGP speaker receives from a neighbor an Update message that contains the MP_REACH_NLRI or MP_UNREACH_NLRI attribute, and the speaker determines that the attribute is incorrect, the speaker MUST delete all the BGP routes received from that neighbor whose AFI/SAFI is the same as the one carried in the incorrect MP_REACH_NLRI or MP_UNREACH_NLRI attribute | |
| 7 | If a BGP speaker receives from a neighbor an Update message that contains the MP_REACH_NLRI or MP_UNREACH_NLRI attribute, and the speaker determines that the attribute is incorrect, the speaker MUST delete all the BGP routes received from that neighbor whose AFI/SAFI is the same as the one carried in the incorrect MP_REACH_NLRI or MP_UNREACH_NLRI attribute | |
| 7 | If a BGP speaker receives from a neighbor an Update message that contains the MP_REACH_NLRI or MP_UNREACH_NLRI attribute, and the speaker determines that the attribute is incorrect, the speaker MUST delete all the BGP routes received from that neighbor whose AFI/SAFI is the same as the one carried in the incorrect MP_REACH_NLRI or MP_UNREACH_NLRI attribute | |
| Table-11: LDP4 as per RFC 5036 | | |
| RFC Section | RFC Clause | Remarks |
| 2.2.2 | An LDP Identifier is a six octet quantity used to identify an LSR label space. The first four octets identify the LSR and must be a globally unique value, such as a 32-bit router Id assigned to the LSR. | |
| 2.5.2 | An LSR MUST advertise the same transport address in all Hellos that advertise the same label space | |
| 2.5.6 | After an LDP session has been established, an LSR must arrange that its peer receive an LDP PDU from it at least every KeepAlive timeperiod to ensure the peer restarts the session KeepAlive Timer | |
| 2.7 | When the next hop for a prefix changes, the LSR must retrieve the label advertised by the new next hop from the LIB for use in forwarding. | |
| 2.8.1 | The Label Request message MUST include a Hop Count TLV. | |
| 2.2.2 | An LDP Identifier is a six octet quantity used to identify an LSR label space. The first four octets identify the LSR and must be a globally unique value, such as a 32-bit router Id assigned to the LSR. | |


| Appendix-II: Test Setup and Test Procedures | |
|--|---|
| Test No. | 1 |
| Parameter Name | Frequency for WiFi and Point To Point/ Point To Multipoint Radio Interface |
| Test Details | Frequency of Operation and Peak Power Measurement Test Setup |
| Test instruments required | Spectrum Analyser |
| Test Setup | <p>The diagram illustrates the test setup. A box labeled 'EUT' (Under Test Equipment) is connected via a blue arrow to a 'Spectrum Analyser' (a Rohde & Schwarz FSWP100). A '19 V Power Adapter' is connected to a 'PoE' (Power over Ethernet) box. The 'PoE' box is connected to the 'EUT' and also to a laptop computer.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. Make the setup as shown above. 2. Configure the Spectrum Analyser for <ol style="list-style-type: none"> a) Center Frequency as required. b) SPAN of 20MHz c) RBW of 3KHz 3. Configure EUT in different modes of operation. 4. Measure peak power shown in Spectrum analyser. |
| Expected Results | <ol style="list-style-type: none"> 1. Record peak power and attach trace |


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|----------------------------------|--|
| Test No. | 2 |
| Parameter Name | Frequency of Operation and Transmit Power for Satellite Equipment |
| Test Details | Typical setup of Frequency of Operation & Transmit Power measurement for Satellite System Equipment |
| Test instruments required | Signal Generator Spectrum Analyser Attenuator Power Meter Power Supply |
| Test Setup | <p>The diagram illustrates the test setup. A Signal Generator is connected to the Equipment Under Test (EUT). A Power Supply is connected to the EUT. An Attenuator is connected between the EUT and the Spectrum Analyser. A Power Meter is connected between the Attenuator and the Spectrum Analyser.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. For measurement of Transmit Power, Power Meter is to be connected to the Equipment Under Test (EUT). 2. For measurement of Frequency of Operation, Spectrum Analyser (with DC block if required) is to be connected to the EUT. |
| Expected Results | <ol style="list-style-type: none"> 3. Record peak power and attach trace |

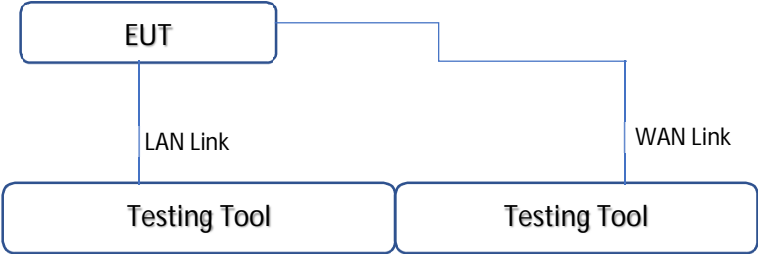
| | |
|---------------------------|--|
| Test No. | 3 |
| Parameter Name | Transmit power for PTP/ PMP Radio Interface |
| Test Details | Typical setup of Transmit power Measurement |
| Test instruments required | Power Meter Power Supply Attenuator |
| Test Setup | <p>The diagram illustrates the test setup for measuring transmit power. It features a central Equipment Under Test (EUT) with three main ports: Control Port(s), Power Ports, and Antenna Port(s). A Control Computer is connected to the Control Port(s). A Power Supply is connected to the Power Ports. The Antenna Port(s) is connected to an Attenuator, which is then connected to a Power Meter. The Power Meter display shows a reading of 120.17.</p> |
| Test Procedure | 1. For measurement of Transmit Power, Power Meter is to be connected to the Equipment Under Test (EUT). |
| Expected Results | 2. Record peak power and attach trace |

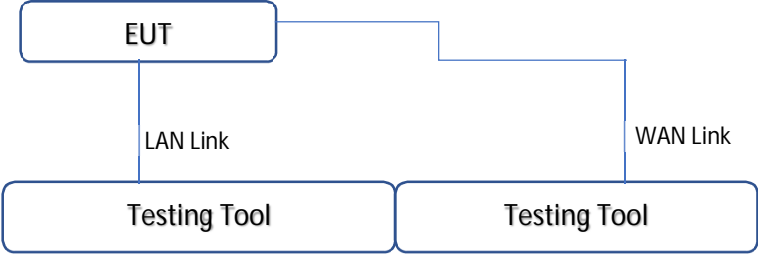
| | |
|---------------------------|--|
| Test No. | 4 |
| Parameter Name | Link Speed and Auto-negotiation FE, Link Speed and Auto-negotiation GE |
| Test Details | Test for Ethernet Link Speed (100/1000) and Auto-negotiation |
| Test instruments required | Ethernet Tester supporting 100/1000 mbps link |
| Test Setup |  <pre> graph LR EUT[EUT] --- ET[Ethernet Tester] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect the Ethernet Tester to the applicable/ supported Ethernet interface of the Router/LAN Switch as shown above. 2. Configure the EUT to use auto-negotiation on its selected Ethernet port. 3. Configure the Ethernet Tester to run at 100 mbps speed and see if it is able to connect to the EUT. The Ethernet link between the Ethernet Tester and EUT should be active and report 100mbps link speed (if link speed 100 mbps is supported by the EUT). 4. Configure the Ethernet Tester to run at 1000 mbps speed and see if it is able to connect to the EUT. The Ethernet link between the Ethernet Tester and EUT should be active and report 1000mbps link speed. (if link speed 1000 mbps is supported by the EUT). |
| Expected Results | <ol style="list-style-type: none"> 1. The Ethernet link between the Ethernet Tester and EUT should be active and report 100 or 1000 mbps link speed as per the link speed supported by the EUT |

| | |
|---------------------------|---|
| Test No. | 5 |
| Parameter Name | IPV4 Functional Tests |
| Test instruments required | IP Testing Tool |
| Test Setup | <pre> graph TD EUT[EUT] --- S1[Subnet] S1 --- H1[] H1 --- S2[Subnet] H1 --- S3[Subnet] S2 --- ITT1[IP Testing Tool] S3 --- ITT2[IP Testing Tool] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect the IP Testing Tool to the Ethernet interface of the router as shown above. 2. Configure the IP interfaces of the EUT and IP Testing Tool for back-to-back communication from/ to IP Testing Tool. 3. Configure static/ dynamic routing on the EUT to reach local LAN subnets from the IP Testing Tool. 4. Perform IPv4 ping test from IP Testing Tool to IP Testing Tool and verify that it is successful and that there is no packet drop. 5. Perform file transfer test from IP Testing Tool to IP Testing Tool and verify that it is successful. |
| Expected Results | <ol style="list-style-type: none"> 1. IPv4 Ping test should be successful with zero packet loss. 2. File transfer test should be successful. 3. Enclose screenshots and IP Testing Tool traces of the IPV4 communication. |

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|---------------------------|--|
| Test No. | 6 |
| Parameter Name | SNMPv2 Functional Tests |
| Test Details | Test for management: SNMPv2 AND SNMPv3 (check TRAP, GET and SET operations) |
| Test instruments required | SNMP Test Tool (SNMP Manager) |
| Test Setup |  <p>The diagram illustrates the test setup. On the left, a blue circular icon representing a network device is labeled "EUT Configured as Agent" with the IP address "1.1.1.124" below it. On the right, a blue laptop icon is labeled "SNMP Test Tool" with the IP address "1.1.1.224" below it. A horizontal line connects the two devices, representing a network connection.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. Configure the EUT to run SNMP agent and SNMP Test Tool (NMS) to run SNMP manager application by using correct parameters. 2. Testing of TRAP message: The NMS uses SNMPv2 to manage the SNMP agent, and the agent automatically sends notifications to report events to the NMS. 3. Configure the SNMP agent to send traps to the manager. 4. Use a wrong community name to get the value of a MIB node on the agent. You can see an authentication failure trap on the SNMP manager. 5. Test "SetRequest" operation: SNMP Testing node (SNMP manager) sends SNMPv2c "SetRequest" to set SysName to "EUT1". Verify the SysName value on the EUT. It should match the value "EUT1" set using 'SetRequest' function from the SNMP manger. 6. Test SNMP GET Operation (single Object): Testing node (SNMP Manager) sends SNMPv2c "GetRequest" scalar object to get sysName.0 1.3.6.1.2.1.1.5.0 in system group in MIB II, to Agent. The agent should respond with "SysName value as "EUT1" as set in the previous step, verifying that the EUT support SNMP GET function. |
| Expected Results | <ol style="list-style-type: none"> 1. TRAP should be sent by EUT (Agent) to Testing Node (SNMP Manager). 2. SetRequest operation should be able to set SysName object in agent (EUT) 3. GetRequest operation should be able to get SysName Object from agent(EUT) 4. Attach screenshots for above successful operations. |

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|---------------------------|--|
| Test No. | 7 |
| Parameter Name | SNMPv3 Functional Tests |
| Test Details | Test for SNMPv3 management |
| Test instruments required | SNMP Test Tool (SNMP Manager) |
| Test Setup |  <p>The diagram illustrates a network connection between two devices. On the left is a blue circular icon representing a network device, labeled "EUT Configured as Agent" with the IP address "1.1.1.124" below it. On the right is a blue laptop icon representing the "SNMP Test Tool" with the IP address "1.1.1.224" below it. A horizontal line connects the two devices, indicating a network link.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. Configure the agent on EUT and SNMP manager on SBNMP Test Tool to use SNMPv3 with security level setting to AuthPriv. Set Authentication to SHA and Privacy (encryption) to DES. 2. The NMS uses SNMPv3 to monitor and manage the agent 3. The agent automatically sends notifications to report events to the NMS. 4. The NMS and the agent perform authentication when they establish an SNMP session. The authentication algorithm is SHA and the authentication key is xxxxxx. The NMS and the agent also encrypt the SNMP packets between them by using the DES algorithm and encryption key yyyyyy |
| Expected Results | <ol style="list-style-type: none"> 1. Use correct authentication credentials to access the agent. 2. Attach traces for successful encrypted authentication with correct credentials 3. Use incorrect authentication credentials to access the agent 4. Attach traces for failed authentication with incorrect credentials |

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|---------------------------|---|
| Test No. | 8 |
| Parameter Name | Dynamic Routing Functional Tests |
| Test Details | Test for Dynamic Routing Table entry |
| Test instruments required | IP Testing Tool |
| Test Setup |  <pre> graph TD EUT[EUT] --- LAN[LAN Link] --- TT1[Testing Tool] TT1 --- WAN[WAN Link] --- TT2[Testing Tool] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect the interface as the case may be, as shown in the setup diagram 2. Connect the Testing Tool to the Ethernet interface of the EUT as shown above. 3. Configure the IP interfaces of the EUT and Testing Tool for back-to-back communication between two ports of Testing Tool. 4. Verify that no static or dynamic routing table entry exists on the EUT and that ping to the WAN port of Testing Tool is not working through LAN Port of Testing Tool. 5. Configure Dynamic Routing (OSPFv2) on the EUT to reach each subnet from other subnet using dynamic routing. Static routing should NOT be used in this case. 6. Perform back-to-back ping test from Testing Tool through EUT and verify that it is successful and that there is no packet drop. 7. Verify the existence of dynamic routing table entry of remote LAN subnet on the EUT using dynamic routing. |
| Expected Results | <ol style="list-style-type: none"> 1. There should be routing table entry of the remote LAN subnet on the EUT using dynamic routing protocol (OSPF). 2. The ping test should be successful to the remote LAN subnet IP address. |

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|---------------------------|---|
| Test No. | 9 |
| Parameter Name | Static Routing Functional Tests |
| Test Details | Test for Static Routing Table entry |
| Test instruments required | Testing Tool |
| Test Setup |  <p>The diagram illustrates the test setup. At the top is a box labeled 'EUT'. Below it are two boxes labeled 'Testing Tool'. A vertical line labeled 'LAN Link' connects the EUT to the left Testing Tool. A line labeled 'WAN Link' connects the EUT to the right Testing Tool. The two Testing Tools are connected to each other via a horizontal line at the bottom.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect the interface as the case may be, as shown in the setup diagram 2. Connect the Testing Tool to the Ethernet interface of the EUT as shown above. 3. Configure the IP interfaces of the EUT and Testing Tool for back-to-back communication between two ports of Testing Tool. 4. Verify that no static or dynamic routing table entry exists on the EUT and that ping to the WAN port of Testing Tool is not working through LAN Port of Testing Tool. 5. Configure static routing on the EUT to reach each subnet from other subnet. 6. Perform ping test from back-to-back ping test from Testing Tool through EUT and verify that it is successful and that there is no packet drop. 7. Verify the existence of routing table entry of remote LAN subnet on the EUT using static routing. |
| Expected Results | <ol style="list-style-type: none"> 1. There should be routing table entry of the remote LAN subnet on the EUT using static route. 2. The ping test should be successful to the remote LAN subnet IP address. |

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|---------------------------|---|
| Test No. | 10 |
| Parameter Name | TCP Functional Tests |
| Test Details | Test for TCP protocol |
| Test instruments required | IP Testing Tool |
| Test Setup | <pre> graph TD EUT[EUT] --- LAN[LAN Link] --- TT1[Testing Tool] TT1 --- WAN[WAN Link] --- TT2[Testing Tool] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect the Testing Tool to the Ethernet interface of the router as shown above. 2. Configure the Testing Tool and the EUT for back-to-back communication between two ports of Testing Tool. 3. Configure static/ dynamic routing on the EUT to reach each subnet from other subnet. 4. Install/ ensure availability of FTP server and FTP client on Testing Tool for performing file transfer test. 5. Perform file transfer test between the two ports of Testing Tool and verify that it is successful through EUT as per the above-mentioned setup. 6. The EUT must also support TELNET functionality. Configure the EUT to support telnet on its local IP address. 7. Connect to the EUT using telnet from Testing Tool to verify that telnet connection is established and EUT can be configured remotely using telnet sessions. 8. Capture packets at various stages to verify functionality of Sequence Numbers and TCP Header Formats. |
| Expected Results | <ol style="list-style-type: none"> 1. File transfer test should be successful. 2. Telnet connection to EUT from Testing Tool should be successful. 3. Enclose screenshots and Testing Tool traces of the communication, and indicate various Headers and Sequence Numbers. |

| | |
|---------------------------|---|
| Test No. | 11 |
| Parameter Name | Mac Learning and Packet Forwarding Tests |
| Test Details | Mac Learning and Packet Forwarding |
| Test instruments required | IP Testing Tool |
| Test Setup | <p>The diagram illustrates the test setup. At the top, a box labeled 'EUT' is connected to two boxes labeled 'Testing Tool' at the bottom. A vertical line labeled 'LAN Link' connects EUT to the left Testing Tool. A line labeled 'WAN Link' connects EUT to the right Testing Tool. The WAN link is shown as a stepped line, indicating a network path.</p> |
| Test Procedure | <ol style="list-style-type: none"> 1. Connect Interface-A of Testing Tool with EUT and ping EUT. 2. Ensure MAC address of Interface-A of Testing Tool is visible in EUT's MAC address table and Interface-B MAC address is not visible. (e.g. show mac-add). 3. Connect Interface-B of Testing Tool to EUT and ping Testing Tool through Interface-A. Ping should be successful. 4. Check EUT's MAC address table. MAC address of Interface-B of Testing Tool should be visible in table. |
| Expected Results | <ol style="list-style-type: none"> 1. Ping from Interface-B to Interface-A should be successful, showing successful packet forwarding. 2. MAC address should be visible on EUT's MAC table. 3. Enclose screenshot for successful test. |

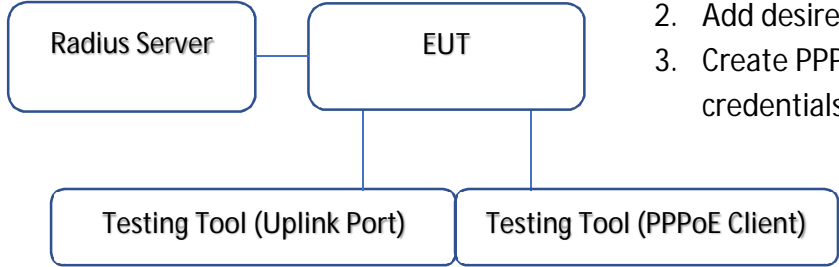
| | |
|---------------------------|--|
| Test No. | 12 |
| Parameter Name | Spanning Tree Protocol Root Bridge Election Functional Test |
| Test Details | Test for Spanning tree protocol (STP) – Root Bridge Election |
| Test instruments required | IP Testing Tool Another Switch |
| Test Setup | <pre> graph TD EUT[EUT] --- AnotherSwitchB[Another Switch-B] EUT --- TT1[Testing Tool] AnotherSwitchB --- TT2[Testing Tool] TT1 --- IP1[192.168.1.1] TT2 --- IP2[192.168.1.1] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Enable STP (802.1d) at both EUT and other switch, keeping priority value the same. 2. Verify from C-BPDU from Testing Tool that it contains information about bridge id (Priority/ MAC Address). 3. Depending on computed bridge id, Verify from C-BPDU messages that EUT either becomes the Root Bridge, or allows the other switch to become Root Bridge. |
| Expected Results | <ol style="list-style-type: none"> 1. The switch, which has the lowest root bridge ID, will be elected as the root bridge. 2. Attach screenshot and Testing Tool traces as artefacts. |

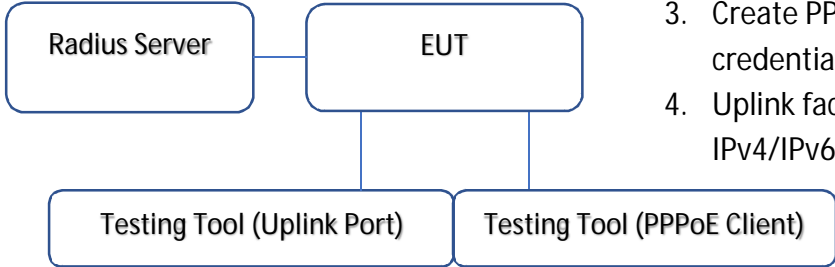
| | |
|---------------------------|--|
| Test No. | 13 |
| Parameter Name | Spanning Tree Protocol Port Blocking Functional Test |
| Test Details | Test for Spanning tree protocol(STP) – Port Blocking |
| Test instruments required | Testing Tool Another Switch |
| Test Setup | <pre> graph TD EUT[EUT] --- Port 3 SwitchB[Another Switch-B] EUT --- Port 5 SwitchB EUT --- 192.168.1.1 TT1[Testing Tool] SwitchB --- 192.168.1.1 TT2[Testing Tool] </pre> |
| Test Procedure | <ol style="list-style-type: none"> 1. Create setup as in test STP-1 2. Create Switch-B as root bridge 3. Connect additional ports of EUT and switch-B to create one more link |
| Expected Results | <ol style="list-style-type: none"> 3. STP should automatically block port 5 4. Evidence: Print status of port 3 and 5 from EUT |


| | |
|---------------------------|---|
| Test No. | 14 |
| Parameter Name | |
| Test Details | To verify whether bidirectional LSPs can be created in the operator determined route via the RMS |
| Test instruments required | EMS Server and client Two similar CEN Switches |
| Test Setup | <p>The diagram illustrates the test setup. At the top, an EMS Server is connected to EUT (CEN Switch-1) through a Management Port. A dashed line represents the connection between the EMS Server and an EMS Client (represented by a computer icon). EUT (CEN Switch-1) is connected to CEN Switch-2 and CEN Switch-3 via GE Port/NNI interfaces. CEN Switch-2 and CEN Switch-3 are interconnected through an MPLS-TP (LSP/ PW) Infrastructure. Both CEN Switch-2 and CEN Switch-3 have GE Port/UNI interfaces at the bottom.</p> |
| Test Pre-condition | 5. |
| Test Steps | 6. |
| Expected Results | 7. |


| | |
|---------------------------|---|
| Test No. | 15 |
| Parameter Name | |
| Test Details | Ethernet E-line Service via Pseudo-Wire Emulation (PWE3) Test |
| Test instruments required | EMS Server and client Two similar CEN Switches Two Laptops |
| Test Setup | <p>The diagram illustrates the test setup for Ethernet E-line Service via PWE3. It features an EMS Server at the top, connected to an EUT (CEN Switch-1) through a Management Port. The EUT is connected to two central CEN Switches, CEN Switch-2 and CEN Switch-3, via GE Port/NNI interfaces. These two switches are interconnected through an MPLS-TP (LSP/ PW) Infrastructure. Laptop-1 is connected to CEN Switch-2 via a GE Port/UNI interface, and Laptop-2 is connected to CEN Switch-3 via a GE Port/UNI interface. An EMS Client is shown connected to the EMS Server via a dashed line.</p> |
| Test Steps | 8. For measurement of Transmit Power, Power Meter is to be connected to the Equipment Under Test (EUT). |
| Expected Results | 9. Record peak power and attach trace |


| | |
|---------------------------|---|
| Test No. | 16 |
| Parameter Name | |
| Test Details | TDM E1 Service Pseudo-Wire Emulation (PWE3) Test |
| Test instruments required | EMS Server and client Two similar CEN Switches SDH/ E1 Tester |
| Test Setup | <p>The diagram illustrates the test setup for TDM E1 Service Pseudo-Wire Emulation (PWE3) Test. It shows the following components and connections:</p> <ul style="list-style-type: none"> EMS Server: Connected to EMS Client (represented by a computer icon) via a dashed line. EMS Server: Connected to EUT (CEN Switch-1) via a Management Port. EUT (CEN Switch-1): Connected to CEN Switch-2 and CEN Switch-3 via GE Port/ NNI. CEN Switch-2 and CEN Switch-3: Connected via MPLS-TP (LSP/ PW) Infrastructure. CEN Switch-2: Connected to SDH/ E1 Tester via an E1 Port. CEN Switch-3: Connected to an E1/STM-1 Port/ UNI. |
| Test Steps | 10. |
| Expected Results | 11. |


| | |
|-------------------------------|--|
| Test No. | 17 |
| Parameter Name | PPPoE as per RFC 2516 |
| Test Details | |
| Test instruments required | Test tool for emulating PPPoE Client and uplink port Linux Server with Radius Tool |
| Pre-Test Setup And Test Setup | <div style="display: flex; align-items: center;"> <div style="flex: 1;">  <pre> graph TD RS[Radius Server] --- EUT[EUT] EUT --- T1[Testing Tool (Uplink Port)] EUT --- T2[Testing Tool (PPPoE Client)] </pre> </div> <div style="flex: 1;"> <ol style="list-style-type: none"> 1. Setup free radius server on the linux machine 2. Add desired user credentials in user file on the radius server. 3. Create PPPoE emulation on the test tool with the same user credentials. </div> </div> |
| Test Steps | <ol style="list-style-type: none"> 1. Start the PPPoE client emulation from test tool. 2. Verify that PADI was received on the box by using CLI 3. Check that authentication was successful by using CLI 4. Issue show PPPoE statistics again to see that DUT has sent PADO, received PADR and send PADS packet by using CLI. (Note : since subscriber bring up happens very fast you might be able to see all the packet count in step 2 itself.) 5. Check on DUT to see that subscriber has come up by executing CLIs 6. Stop the PPPoE client emulation from test tool. 7. Check that PADT message was received on the DUT using CLI 8. Check that subscriber entry has been cleared from the DUT using CLI |
| Expected Results | <ol style="list-style-type: none"> 1. For Step 2 , CLI output contains correct PADI packet count. 2. For Step 3 , Authentication is granted. 3. For Step 4 , CLI output contains correct PADO,PADR and PADS packet count. 4. For Step 5 , CLI contains correct subscriber count and state. 5. For Step 6 , PADT is received on the DUT after PPPoE client emulation is stopped in the test tool. 6. For Step 8 , CLI output returns subscriber count as 0 |


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| Test No. | 18 | |
| Parameter Name | Radius | |
| Test instruments required | Test tool for emulating PPPoE Client and uplink port Linux Server with Radius Tool | |
| Pre-Test Setup And Test Setup |  <pre> graph TD RS[Radius Server] --- EUT[EUT] EUT --- T1[Testing Tool (Uplink Port)] EUT --- T2[Testing Tool (PPPoE Client)] </pre> | <ol style="list-style-type: none"> 1. Setup free radius server on the linux machine 2. Add desired user credentials in user file on the radius server. 3. Create PPPoE emulation on the test tool with the same user credentials. 4. Uplink facing port on the DUT configured with appropriate IPv4/IPv6 addressed and ARP/NDP resolved on the test tool. |
| Test Steps | <ol style="list-style-type: none"> 1. Start the PPPoE client emulation from test tool. 2. Verify that PADI was received on the box by using CLI 3. Check that authentication request was received on the DUT by using CLI 4. Check that Access-Accept was received on the DUT by using CLI 5. Stop the PPPoE client emulation from test tool. 6. Check that PADT message was received on the DUT using CLI 7. Check that subscriber entry has been cleared from the DUT using CLI 8. Create a mismatch between user credentials in PPPoE client emulation and free radius user file. 9. Start the PPPoE client emulation from test tool. 10. Verify that access-reject has been received on the DUT using CLI 11. Check that no subscriber comes up if Access-reject has been received from the radius server using CLI | Expected Results <ul style="list-style-type: none"> • • CLI output contains correct PADI packet count. • Authentication is granted. • Accept counter increments correctly in the CLI output. • • PADT is received on the DUT after PPPoE client emulation is stopped in the test tool. • CLI output contains Active subscriber count as 0 • • • Reject counter increments correctly in the CLI output • CLI output contains Active subscriber count as 0 |


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| Test No. | 19 |
| Parameter Name | Ping traffic through Policy based IPsec Tunnel |
| Test instruments required | Peer Device Two linux machines |
| Pre-Test Setup And Test Setup |  <pre> graph LR L1[Linux 1] --- EUT[EUT] EUT --- Peer[Peer] Peer --- L2[Linux 2] </pre> <ol style="list-style-type: none"> 1. Configure IKE and IPsec under Security configuration options on both DUT and PEER devices. 2. To route the required traffic through the tunnel, add the configured VPN under the required policy on both DUT and PEER devices 3. If DUT needs to be act as Initiator, then configure establish tunnel immediately only at the DUT side 4. If DUT needs to be act as responder, then configure establish tunnel immediately only at the PEER side |
| Test Case Steps | <ol style="list-style-type: none"> 1. Send ping traffic from Linux1 to Linux2 or Linux2 to Linux1 2. Verify fields under security IPsec /IKE CLI |
| Expected Results | <ol style="list-style-type: none"> 1. If Establish tunnel immediately is configured: <ol style="list-style-type: none"> a. As soon as configuration gets committed verify P1 and P2 SA is up on both the devices. b. role (initiator or responder) should be proper under ike cli based on the configuration on both the devices c. There should not be any ping packet drop d. packet statistics under ipsec cli should match with actual sent traffic. e. configured Policy through which tunnel is formed should be visible in ipsec sa cli 2. If Establish tunnel on-traffic is configured (default configuration if nothing is configured) <ol style="list-style-type: none"> a. There will be one ping packet drop and packet statistics should match accordingly under ipsec cli b. P1 and P2 SA should be up on both the devices c. role (initiator or responder) should be proper under ike cli based on traffic d. configured Policy through which tunnel is formed should be visible in ipsec sa cli |


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| Test No. | 20 |
| Parameter Name | Test Source NAT with PAT with multiple source ip addresses. |
| Test instruments required | One Linux client with hping2 tool installed One linux machines |
| Pre-Test Setup And Test Setup |  <pre> graph LR A[Linux Client] --- B[EUT] B --- C[Linux Server] </pre> <ol style="list-style-type: none"> 1. Install hping2 on Linux Client to initiate traffic from multiple source addresses 2. On Linux server, add route for nat-pool address used in nat configuration on DUT 3. Configure source nat pool on DUT with single IP address 4. Configure source nat rule-set on DUT with 'from' and 'to' and also match condition like 'source-address' and 'destination-address' <p>Note: PAT is enabled by default</p> |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start sending traffic with hping2 tool from Linux client with first IP to Linux server IP address 2. Again Initiate hping2 by incrementing the source IP in 'source-ip' field |
| Expected Results | <ol style="list-style-type: none"> 1. For Step 1, verify that cli output of flow session shows nat-translation. Test considered pass if the source address is natted with the address from the pool specified. 2. Also, check source nat-translation hit count is incrementing in cli output 3. For step 2, Verify that port address translation is seen in cli output of security flow session |


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| Test No. | 21 |
| Parameter Name | Test Source NAT NAT64 related feature |
| Test instruments required | One Linux client One linux server |
| Pre-Test Setup And Test Setup |  <pre> graph LR A[Linux Client (IPv6 Host)] --- B[EUT] B --- C[Linux Server (IPv4 Host)] </pre> <p>1. To configure NAT64, you need to have a pool of single IPs which will be the IPv4 address of the server. 2. We need a destination NAT configuration to translate the IPv6 address into IPv4 address in the destination field of the incoming packet. 3. The destination address is IPv4, but the source address is IPv6. Thus, we must apply the source NAT in order to change the IPv6 address to IPv4 in the source field of the packet.</p> |
| Test Case Steps | <ol style="list-style-type: none"> 1. Initiate traffic from Linux client 2. Verify nat translation has worked by checking flow session on DUT |
| Expected Results | <ol style="list-style-type: none"> 1. Check how the sessions are being established: |


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| Test No. | 22 |
| Parameter Name | Verify Source Address any, destination specific, application any action = deny |
| Test instruments required | One Linux client One linux server |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0[H0 (Linux)] --- EUT[EUT] EUT --- H1[H1 (Linux)] </pre> <p>1. Configure IPs on the eth interfaces of both the linux machines. To configure NAT64, you need to have a pool of single IPs which will be the IPv4 address of the server.</p> |
| Test Case Steps | <ol style="list-style-type: none"> 1. Configure security zones and add interfaces to it. 2. (Ex: Configure a security zone "trust" and add the interface connected to one of the linux machines to it. Configure another security zone "untrust" and add router's other interface to it .) 3. Create address book entries to specify the source and destination address. 4. Create a policy (say p1) from zone trust to zone untrust and vice-versa , with source address any name , destination address as address book name , application any . 5. Set a deny condition for the policy. 6. (For ex: set security policies from-zone trust to-zone untrust policy p1 then deny) 7. Commit the configuration. 8. Send traffic from H0 to H1. |
| Expected Results | 1. Traffic should not be allowed due to the deny policy. |


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| Test No. | 23 |
| Parameter Name | Verify the packet capture of the attack logs |
| Test instruments required | 2 Linux server, syslog, ftp client and server |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0[H0 (Linux)] --- EUT[EUT] EUT --- H1[H1 (Linux)] </pre> <ol style="list-style-type: none"> 1. IDP license is installed 2. IDP security package is installed 3. Configure IDP with FTP:USER:ROOT attack and attack to fw policy 4. Configure the packet-log server and the port details 5. Enable 5 packets to capture pre and post the attack. |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the packet-log server to capture the packets 2. Start the FTP server 3. Start FTP traffic with user as root |
| Expected Results | <ol style="list-style-type: none"> 1. IDP attack table should not have the attack detected 2. The packet log tool should have the attack details and the pre and post attack packet captured 3. IDP attack log should be generated and the packet log id should be matching with the packet log attack details |

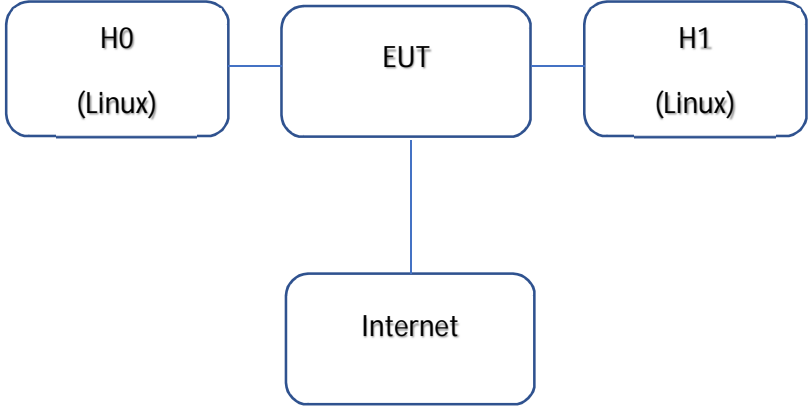
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| Test No. | 24 |
| Parameter Name | Check the attack detection over https session |
| Test instruments required | 2 Linux server, syslog, ftp client and server |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0["H0 (Linux)"] --- EUT["EUT"] EUT --- H1["H1 (Linux)"] </pre> <ol style="list-style-type: none"> 1. IDP license is installed 2. IDP security package is installed 3. Configure a ssl proxy profile and attach to the fw policy 4. Configure an IDP with custom http attack and attach to the same IDP policy |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the openssl server. 2. Send the https traffic using curl from client |
| Expected Results | <ol style="list-style-type: none"> 1. IDP attack table should have the custom http attack detected |

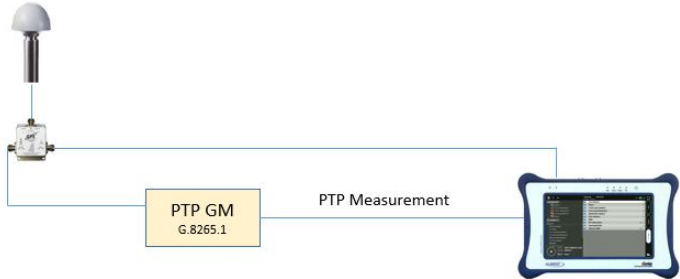
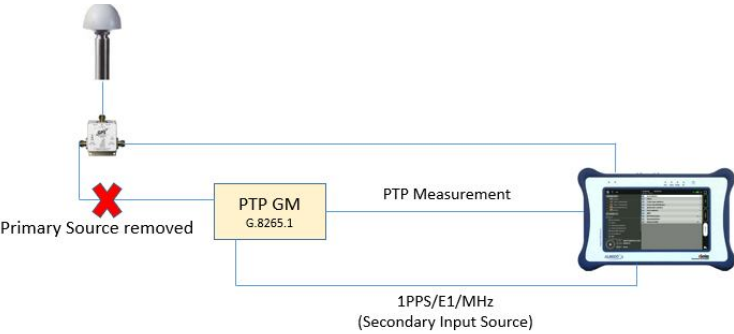
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| Test No. | 25 |
| Parameter Name | Close Client and Server Action for TCP in IPS Rule Base |
| Test instruments required | 2 Linux servers |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0[H0 (Linux)] --- EUT[EUT] EUT --- H1[H1 (Linux)] </pre> <ol style="list-style-type: none"> 1. IDP license is installed 2. IDP security package is installed 3. Configure an http attack with close client and server as action |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the tcp dump on both client and server. 2. Send the http attack traffic. |
| Expected Results | <ol style="list-style-type: none"> 1. http attack should be detected 2. client and server should have received RST packet to close the tcp connection 3. IDP attack log should have the action as close-client-and-server as action |

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| Test No. | 26 |
| Parameter Name | Close Client Action for UDP in IPS Rule Base |
| Test instruments required | 2 Linux servers |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0["H0 (Linux)"] --- EUT["EUT"] EUT --- H1["H1 (Linux)"] </pre> <ol style="list-style-type: none"> 1. IDP license is installed 2. IDP security package is installed 3. Configure a dns attack with close client as action |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the tcp dump on client. 2. Send the dns attack traffic from client. |
| Expected Results | <ol style="list-style-type: none"> 1. DNS attack should be detected. 2. Server should not receive the packet. 3. IDP attack log should have the action as DROP as action. |

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| Test No. | 27 |
| Parameter Name | http with block-extension-list |
| Test instruments required | 2 Linux servers |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0["H0 (Linux)"] --- EUT["EUT"] EUT --- H1["H1 (Linux)"] </pre> <ol style="list-style-type: none"> 1. Configure UTM custom objects for file extension list such as vbs, pl, tst 2. Configure the UTM content filtering feature profile with the block-extension for those file extension list 3. Configure notifications options as message and content for the message 4. Attach the profile to the fw policy. 5. Configure the security logging |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the HTTP server and have the files with different extension 2. From client get vbs, pl, txt and html files using curl |
| Expected Results | <ol style="list-style-type: none"> 1. Other than html file all are blocked 2. In the utm content filtering statistics, the extension blocked counter should increment accordingly 3. Verify the content filtering blocked message in the syslog |

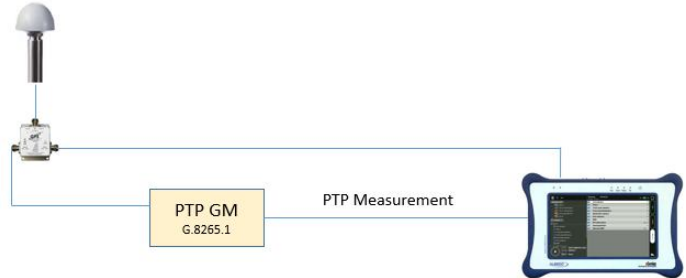
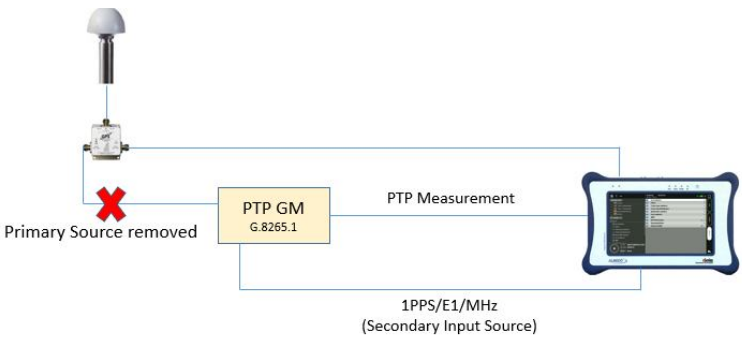
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| Test No. | 28 |
| Parameter Name | File extension blocking |
| Test instruments required | 2 Linux servers |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0["H0 (Linux)"] --- EUT["EUT"] EUT --- H1["H1 (Linux)"] </pre> <ol style="list-style-type: none"> 1. Configure UTM custom objects for filename extension list for com and exe 2. Configure the UTM content filtering feature profile with the block-extension for those filename extension list 3. Configure content filtering UTM policy for ftp upload and download 4. Configure notifications options as message and content for the message 5. Attach the profile to the fw policy. 6. Configure the security logging |
| Test Case Steps | <ol style="list-style-type: none"> 1. Start the FTP server and have the files with different extension 2. From client, do ftp and get exe and com extension files 3. From client do ftp and put exe and com extension files |
| Expected Results | <ol style="list-style-type: none"> 1. GET and PUT of exe and com files are blocked with proper error message 2. In the utm content filtering statistics, the Base on extension list counter should increment accordingly 3. Verify the content filtering blocked message in the syslog |

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| Test No. | 29 |
| Parameter Name | Test with Infected file for ALL Protocol |
| Test instruments required | 2 Linux servers |
| Pre-Test Setup And Test Setup |  <pre> graph LR H0[H0 (Linux)] --- EUT[EUT] EUT --- H1[H1 (Linux)] EUT --- Internet[Internet] </pre> <ol style="list-style-type: none"> 1. DUT should have internet access through one of the revenue interface 2. Sophos license should be installed 3. Sophos av is configured and the pattern is up to date 4. Configure Sophos anti-virus profile for http, ftp up/down, smtp, pop and imap 5. Attach the profile to the utm policy 6. Attach the utm policy to the fw policy |
| Test Case Steps | 1. Send the following traffic with the virus file attached (HTTP GET/POST, FTP GET/PUT, SMTP, IMAP and POP3) |
| Expected Results | <ol style="list-style-type: none"> 1. The virus file should be blocked with the proper error message 2. The virus file should be detected and the threat-found incremented in the anti-virus statistics 3. Verify the av virus detected message in the syslog |

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| Test No. | 30 |
| Parameter Name | Profile for frequency synchronisation |
| Test Details | Support for PTP frequency profile: G.8265.1 & monitor 1) PTP messages exchanged between Master & Slave 2) Protocol statistics of GM for e.g. GM IP, GM Identity, GM clock class & value etc. 3) GM locking with auxiliary interfaces and observe relevant protocol statistics. |
| Test instruments required | Synch tester Splitter GPS Antenna Connecting Cables Laptop |
| Test Setup 1 | Setup 1: Follow Test procedure instructions 4 to 7  |
| Test Setup 2 | Setup 2: Follow Test procedure instruction 8  |

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| Test Procedure | <ol style="list-style-type: none"> 1. Connect GNSS signal to PTP GM and Tester. Wait for sufficient (approx. 1-2 hours) time so that GM and Tester are locked to UTC. 2. Now, configure PTP GM as per the settings mentioned below: <ul style="list-style-type: none"> <li style="text-align: center;">ITU-T G.8265.1 ----- <pre style="margin-left: 20px;"> frame {udp} addressing-mode {unicast} one-step {enable disable} path-delay-mechanism {e2e disable} domain <4..23> priority1 - priority2 - localpriority <1..255> class <80..110> BMCA "Static BMCA" sync-interval <0.125 msg/s..128 msg/s> delay-request-interval <0.125 msg/s..128 msg/s> announce-tx-interval <0.125 msg/s..8 msg/s> </pre> 3. After configuring PTP GM with correct Frequency profile setting (through CLI & GUI). Configure the Sync Tester with same parameters & connect the Tester to the configured PTP port on GM. 4. Verify: if PTP GM has ping option & able to ping Tester's IP. Also verify if VLAN tagging is possible on PTP messages. 5. Verify: If GM is sharing all the relevant protocol information to the Tester for e.g. <ol style="list-style-type: none"> i) GM IP ii) GM Identity iii) GM Priority iv) GM Clock class & value v) GM Clock Source 6. Verify: Message Exchange between Master & Slave i.e. <ol style="list-style-type: none"> i) Sync ii) Follow-up iii) Delay Request iv) Delay Response etc. 7. Now, remove the GPS antenna cable from the PTP GM and see if the Clock class in the tester changes to a different value (Locked mode clock class to Holdover clock class). |
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| | <p>8. Configure Primary input clock in PTP GM as GNSS and set a secondary input clock as well (for e.g. 1PPS, E1, MHz). Sync Tester can be used to give secondary input to the GM. Now remove the primary input clock from the GM and verify that GM automatically switches to secondary input source.</p> |
| Expected Results | <ol style="list-style-type: none">1. Verify GM configuration through GUI & CLI.2. Verify Test procedure - Steps 4 to 8. Results should match the configured value as per ITU-T Standard.3. Attach screenshots. |

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| Test No. | 31 |
| Parameter Name | Profile for time and phase synchronisation with full timing support |
| Test Details | Support for PTP frequency profile: G.8265.1 & monitor 1) PTP messages exchanged between Master & Slave 2) Protocol statistics of GM for e.g. GM MAC, GM Identity, GM clock class & value etc. 3) GM locking with auxiliary interfaces and observe relevant protocol statistics. |
| Test instruments required | Synch tester (e.g. xGenius) Splitter GPS Antenna Connecting Cables Laptop |
| Test Setup 1 | Setup 1: Follow Test procedure instructions 4 to 7  |
| Test Setup 2 | Setup 2: Follow Test procedure instruction 8  |

Test Procedure

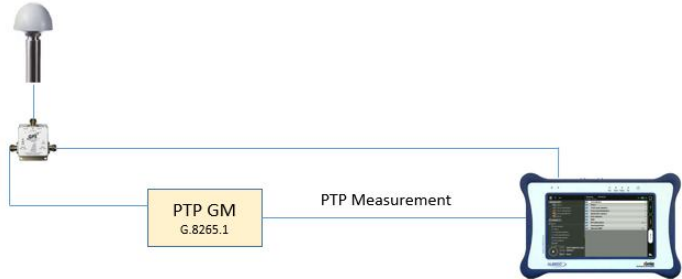
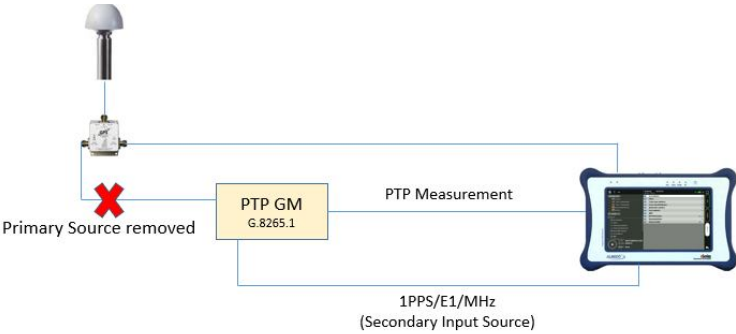
1. Connect GNSS signal to PTP GM and Tester. Wait for sufficient (approx. 1-2 hours) time so that GM and Tester are locked to UTC.
2. Now, configure PTP GM as per the settings mentioned below:

ITU-T G.8275.1

```
-----  
frame {ethernet}  
addressing-mode {multicast}  
one-step {enable|disable}  
path-delay-mechanism {e2e}  
domain <24..43>  
priority1 <128>  
priority2 <0..255>  
localpriority <1..255>  
class {6|7|140|150|160|248|255}  
BMCA "Alternate BMCA"  
sync-interval <16 msg/s>  
delay-request-interval <16 msg/s>  
announce-tx-interval <8 msg/s>
```

3. After configuring PTP GM with correct Phase profile (full on-path) setting **(through CLI & GUI)**. Configure the Sync Tester with same parameters & connect the Tester to the configured PTP port on GM.
4. **Verify:** if VLAN tagging is possible on the PTP messages.
5. **Verify:** If GM is sharing all the relevant protocol information to the Tester for e.g.
 - i) GM MAC
 - ii) GM Identity
 - iii) GM Priority
 - iv) GM Clock class & value
 - v) GM Clock Source
6. **Verify:** Message Exchange between Master & Slave i.e.
 - i) Sync
 - ii) Follow-up
 - iii) Delay Request
 - iv) Delay Response etc.
7. Now, remove the GPS antenna cable from the PTP GM and see if the Clock class in the tester changes to a different value (Locked mode clock class to Holdover clock class).

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| | 8. Configure Primary input clock in PTP GM as GNSS and set a secondary input clock as well (for e.g. 1PPS, E1, MHz). Sync Tester can be used to give secondary input to the GM. Now remove the primary input clock from the GM and verify that GM automatically switches to secondary input source. |
| Expected Results | <ol style="list-style-type: none">1. Verify GM configuration through GUI(Graphic User Interface) & CLI(Command Line Interface).2. Verify Test procedure - Steps 4 to 8. Results should match the configured value as per ITU-T Standard.3. Attach Screenshot. |

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| Test No. | 32 |
| Parameter Name | Profile for time and phase synchronisation with partial timing support |
| Test Details | Support for PTP frequency profile: G.8265.1 & monitor 1) PTP messages exchanged between Master & Slave 2) Protocol statistics of GM for e.g. GM IP, GM Identity, GM clock class & value etc. 3) GM locking with auxiliary interfaces and observe relevant protocol statistics. |
| Test instruments required | Synch tester (e.g. xGenius) Splitter GPS Antenna Connecting Cables Laptop |
| Test Setup 1 | Setup 1: Follow Test procedure instructions 4 to 7  |
| Test Setup 2 | Setup 2: Follow Test procedure instruction 8  |

Test Procedure

1. Connect GNSS signal to PTP GM and Tester. Wait for sufficient (approx. 1-2 hours) time so that GM and Tester are locked to UTC.
2. Now, configure PTP GM as per the settings mentioned below:

ITU-T G.8275.2

```
-----  
frame {udp}  
addressing-mode {unicast}  
one-step {enable|disable}  
path-delay-mechanism {e2e|disable}  
domain <44..63>  
priority1 <128>  
priority2 <0..255>  
localpriority <1..255>  
class {6|7|140|150|160|248|255}  
BMCA "Alternate BMCA"  
sync-interval <1 msg/s..128 msg/s>  
delay-request-interval <1 msg/s..128 msg/s>  
announce-tx-interval <1 msg/s..8 msg/s>
```

3. After configuring PTP GM with correct Phase profile (partial on-path) setting (**through CLI & GUI**). Configure the Sync Tester with same parameters & connect the Tester to the configured PTP port on GM.
4. **Verify:** if PTP GM has ping option & able to ping Tester's IP. Also verify if VLAN tagging is possible on the PTP messages.
5. **Verify:** If GM is sharing all the relevant protocol information to the Tester for e.g.
 - i) GM IP
 - ii) GM Identity
 - iii) GM Priority
 - iv) GM Clock class & value
 - v) GM Clock Source
6. **Verify:** Message Exchange between Master & Slave i.e.
 - i) Sync
 - ii) Follow-up
 - iii) Delay Request
 - iv) Delay Response etc.
7. Now, remove the GPS antenna cable from the PTP GM and verify if the **Clock class** in the tester changes to a different value (Locked mode clock class to Holdover clock class).

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| | 8. Configure Primary input clock in PTP GM as GNSS and set a secondary input clock as well (for e.g. 1PPS, E1, MHz). Sync Tester can be used to give secondary input to the GM. Now remove the primary input clock from the GM and verify that GM automatically switches to secondary input source. |
| Expected Results | <ol style="list-style-type: none">1. Verify GM configuration through GUI & CLI.2. Verify Test procedure - Steps 4 to 8. Results should match the configured value as per ITU-T Standard.3. Attach screenshots. |

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|---------------------------|---|
| Test No. | 33 |
| Parameter Name | Mobile device - Non Zero IMEI/MEID/ESN |
| Test Details | Test for Identification of Equipment Identity for mobile device for GSM/ UMTS/ LTE/ CDMA |
| Test instruments required | None |
| Test Setup | Powered on EUT |
| Test Procedure | <ol style="list-style-type: none"> 1. Press *#06# to display IMEI. 2. Copy down the displayed IMEI. |
| Expected Results | <ol style="list-style-type: none"> 1. Check that the displayed IMEI is not all zeroes/ null. |

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| Test No. | 34 |
| Parameter Name | Mobile Emergency Support - Panic button |
| Test Details | Test for functioning of Panic button in Feature phone |
| Test instruments required | None |
| Test Setup | <ol style="list-style-type: none"> 1. Power on EUT. 2. If the device has a keypad lock, invoke it to lock the key pad. |
| Test Procedure | <ol style="list-style-type: none"> 1. Press Numeric Key "5" on the feature phone keypad for more than 10 seconds. 2. If a call is not invoked, repeat step 1 with numeric key "9". 3. Disconnect the call if invoked. 4. Remove keypad lock. 5. Repeat step 1, 2 and 3. |
| Expected Results | <ol style="list-style-type: none"> 1. Check that emergency call is invoked in both cases by actions in step 2 and 5. |

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|---------------------------|---|
| Test No. | 35 |
| Parameter Name | Mobile Emergency Support - Panic button |
| Test Details | Test for functioning of Panic button in Smart phone |
| Test instruments required | None |
| Test Setup | Powered on EUT. |
| Test Procedure 1 | <ol style="list-style-type: none"> 1. Switch on the mobile so that the screen is lit. If there is a screen protector (wallpaper), invoke it. If there is a screen lock, invoke it to lock the screen. 2. Switch off screen display. 3. Short Press power-on button thrice in quick succession. 4. Disconnect the call if invoked. 5. With screen protector and screen lock invoked and screen display switched on, repeat step 3 and 4. |
| Test Procedure 2 | <ol style="list-style-type: none"> 1. Switch on the mobile screen. If there is a screen protector (wallpaper), remove it. If there is a screen lock, invoke it to lock the screen. 2. Check if a Soft emergency call button is visible even in screen lock mode. 3. Invoke emergency call by touching it. 4. Disconnect the call if invoked. |
| Test Procedure 3 | <ol style="list-style-type: none"> 1. Switch on the mobile screen. If there is a screen protector (wallpaper), invoke it. If there is a screen lock, invoke it to lock the screen. 2. Switch off screen display. 3. Press power-on button for more than 3 seconds 4. Disconnect the call if invoked. |
| Expected Results | <ol style="list-style-type: none"> 1. Wallpaper ON + Screen Lock ON + Screen Off + Short press power on button thrice => Emergency call 2. Wallpaper ON + Screen Lock ON + Screen Lit + Short press power on button thrice => Emergency call 3. Wallpaper Off + Screen Lock ON + Screen Lit + Visible emergency call button touch => Emergency call 4. Wallpaper ON + Screen Lock ON + Screen Off + Long press power on button once => Emergency call |

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|---------------------------|--|
| Test No. | 36 |
| Parameter Name | Mobile Emergency Support - GPS Location |
| Test Details | Test for facility of identifying the location through satellite based GPS in smart phone handsets. |
| Test instruments required | None |
| Test Setup | Powered on EUT. |
| Test Procedure | <ol style="list-style-type: none"> 1. Switch on the mobile and deactivate SIM(s). 2. Go to settings through appropriate menu. 3. Locate settings for "Location" and turn the "Location" Off and On. 4. Use any suitable App to display current location of mobile. |
| Expected Results | 1. Verify that Mobile phone is able to display location using satellite based GPS, when SIM(s) are deactivated. |

| | |
|---------------------------|--|
| Test No. | 37 |
| Parameter Name | Mobile Emergency Support – Call on 112 |
| Test Details | Test for facility to dial 112 with Keypad lock, without SIM or without registration on PLMN. |
| Test instruments required | None |
| Test Setup | Powered on EUT. Test SIM without subscription. |
| Test Procedure 1 | <ol style="list-style-type: none"> 1. Switch on the mobile screen. If there is a screen protector (wallpaper), remove it. If there is a screen lock, invoke it to lock the screen. 2. Check if either keypad, or an icon/ link to display the keypad is visible. In case of later, click icon/ link to display keyboard. 3. Invoke emergency call by dialing 112. 4. Disconnect the call if invoked. |
| Test Procedure 2 | <ol style="list-style-type: none"> 1. Remove SIM from mobile. Switch on the mobile. If there is a screen protector (wallpaper), remove it. If there is a screen lock, invoke it to lock the screen. 2. Repeat steps 2, 3 and 4 of Procedure 1. |
| Test Procedure 3 | <ol style="list-style-type: none"> 1. Insert test SIM and switch ON mobile. 2. Verify that mobile is trying to be registered to some available PLMN. 3. Repeat procedure 2 with test SIM. |
| Expected Results | <ol style="list-style-type: none"> 1. It is possible to dial the emergency number 112 even if the key pad is locked, as verified through Procedure 1. 2. It is possible to dial the emergency number 112 without SIM, as verified through Procedure 2. 3. The mobile phone, which has not successfully registered shall nevertheless be able to make emergency call attempts on an available PLMN, as verified through Procedure 3. |