

अनिवार्य आवश्यकताएँ

संख्या : TEC14762108

Essential Requirements

ER No. : TEC14762108

PON Family of Broadband Equipment

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Government of India

Khurshid Lal Bhawan, Janpath, New Delhi-110001, INDIA

Essential Requirements for:

PON Family of Broadband Equipment

Certification Scheme: **GCS**

Product Fee Group: **B**

This ER covers equipment used in all types of PON Systems

Note: Annexures referred to in this ER are Annexures as mentioned in "Annexures to ERs" No. TEC/SD/DD/TCP-222/02/June19 as updated from time to time and available on MTCTE portal.

This product has the following variants:

1. PON ONT
2. PON ONU
3. PON OLT

1. Variant 1 : PON ONT

1.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
1.1.1	Conducted And Radiated Emission - Class B	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
1.1.2	Dual IP Layer Operation RFC 4213 - Decapsulation	RFC 4213 Clause No. 3.6 Annexure-P6
1.1.3	Dual IP Layer Operation RFC 4213 - DNS	RFC 4213 Cl. 2.1. Annex-P6
1.1.4	Dual IP Layer Operation RFC 4213 - Link-Local Addresses	RFC 4213 Clause No. 3.7 Annexure-P6
1.1.5	Dual IP Layer Operation RFC 4213 - Neighbor Discovery over Tunnels	RFC 4213 Clause No. 3.8 Annexure-P6
1.1.6	Dual IP Layer Operation RFC 4213 -	RFC 4213 Clause No. 5 Annexure-P6

	Security Considerations	
1.1.7	Dual IP Layer Operation RFC 4213 - Static Tunnel MTU	RFC 4213 Clause No. 3.2.1 Annexure-P6
1.1.8	Frame loss of PON	RFC 2544. Annex-J3
1.1.9	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
1.1.10	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
1.1.11	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
1.1.12	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
1.1.13	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
1.1.14	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
1.1.15	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
1.1.16	IPV6 Destination Options Header	RFC 2460 or RFC 8200 Clause No. 4.6 Annexure-P7
1.1.17	IPV6 Extension Header Order	RFC 2460 or RFC 8200 Clause No. 4.1 RFC 4213 Clause No. 5 Annexure-P7
1.1.18	IPV6 Extn Header Parameters	RFC 2460 or RFC 8200 . Annex-P7
1.1.19	IPV6 Fragment Header	RFC 2460 or RFC 8200 Clause No. 4.5 Annexure-P7
1.1.20	IPV6 No Next Header	RFC 2460 or RFC 8200 Clause No. 4.7 Annexure-P7
1.1.21	IPV6 Options	RFC 2460 or RFC 8200 Clause No. 4.2 Annexure-P7
1.1.22	IPV6 Packet Size Issues	RFC 2460 or RFC 8200 Clause No. 5 Annexure-P7
1.1.23	IPV6 Responding to Packets Carrying Routing Headers	RFC 2460 or RFC 8200 Clause No. 8.4 Annexure-P7
1.1.24	IPV6 Routing Header	RFC 2460 or RFC 8200 Clause No. 4.4 Annexure-P7

1.1.25	IPV6 Upper-Layer Checksums	RFC 2460 or RFC 8200 Clause No. 8.1 Annexure-P7
1.1.26	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
1.1.27	Latency of PON	RFC 2544. Annex-J3
1.1.28	MAC Address Limitation in PON	IEEE 802.3. Annex-J3
1.1.29	Over Voltage and over Current Protection on 2W	K.21. Annex-D
1.1.30	Password Based Authentication in PON	ITU-T G.984.3 section 9.2.2 12. Annex-J3

1.2 Interface 1 : 10 100 1000 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.2.1	Link Speed and Autonegotiation Test GE	IEEE 802.3. Annex-H

1.3 Interface 2 : 10 100 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.3.1	Link Speed and Autonegotiation Test FE	IEEE 802.3 Annex-H

1.4 Interface 3 : 10 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.4.1	Link Speed	IEEE 802.3 Annex-H

1.5 Interface 4 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
1.5.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.5.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
1.5.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
1.5.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.5.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

1.6 Interface 5 : 2 Wire

S.No.	Parameter Name	Standard Name
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1.6.1	Idle State Current for 2 wire Int	ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1. Annex-D
1.6.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
1.6.3	Longitudinal Conversion Loss for 2W Int	Q.552 Cl. 2.2.2. Annex-D
1.6.4	Maximum Loop Current for 2W Int	ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3. Annex-D
1.6.5	Return Loss for 2W Int	Q.552 Cl. 2.2.1.2. Annex-D

1.7 Interface 6 : EPON

S.No.	Parameter Name	Standard Name
1.7.1	Operating Wavelength Recv for EPON Int	IEEE 802.3ah. Annex-J2
1.7.2	Operating Wavelength Trans for EPON Int	IEEE 802.3ah. Annex-J2
1.7.3	Opt Output Power for EPON Int at OLT	IEEE 802.3ah. Annex-J2
1.7.4	Opt Output Power for EPON Int at ONT	IEEE 802.3ah. Annex-J2
1.7.5	Receiver Sensitivity for EPON Int at OLT	IEEE 802.3ah. Annex-J2
1.7.6	Receiver Sensitivity for EPON Int at ONT	IEEE 802.3ah. Annex-J2

1.8 Interface 7 : GPON

S.No.	Parameter Name	Standard Name
1.8.1	Operating Wavelength Recv for GPON Int	G.984.2. Annex-J2
1.8.2	Operating Wavelength Trans for GPON Int	G.984.2. Annex-J2
1.8.3	Opt Output Power for GPON Int at OLT	G.984.2. Annex-J2
1.8.4	Opt Output Power for GPON Int at ONT	G.984.2. Annex-J2
1.8.5	Protocol Test for GPON Int	Ethernet over GEM G.984.2. Annex-J3
1.8.6	Receiver Sensitivity for GPON Int at OLT	G.984.2. Annex-J2
1.8.7	Receiver Sensitivity for GPON Int at ONT	G.984.2. Annex-J2

1.9 Interface 8 : NGPON2

S.No.	Parameter Name	Standard Name
1.9.1	Operating Wavelength Recv NGPON2 Int	G.989.2. Annex-J2
1.9.2	Operating Wavelength Trans NGPON2 Int	G.989.2. Annex-J2
1.9.3	Opt Output Power NGPON2 Int at OLT	G.989.2. Annex-J2

1.9.4	Opt Output Power NGPON2 Int at ONT	G.989.2. Annex-J2
1.9.5	Protocol Test for NGPON2 Int	G.989.2 RFC 2544. Annex-J3
1.9.6	Receiver Sensitivity NGPON2 Int at OLT	G.989.2. Annex-J2
1.9.7	Receiver Sensitivity NGPON2 Int at ONT	G.989.2. Annex-J2

1.10 Interface 9 : WDMPON

S.No.	Parameter Name	Standard Name
1.10.1	Operating Wavelength Recv WDMPON Int	G.694.1. Annex-J2
1.10.2	Operating Wavelength Trans WDMPON Int	G.694.1. Annex-J2
1.10.3	Opt Output Power WDMPON Int at OLT	G.694.1. Annex-J2
1.10.4	Opt Output Power WDMPON Int at ONT	G.694.1. Annex-J2
1.10.5	Protocol test for WDMPON Int	G.698.3. Annex-J3
1.10.6	Receiver Sensitivity WDMPON Int at OLT	G.694.1. Annex-J2
1.10.7	Receiver Sensitivity WDMPON Int at ONT	G.694.1. Annex-J2

1.11 Interface 10 : WiFi

S.No.	Parameter Name	Standard Name
1.11.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
1.11.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3
1.11.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
1.11.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

1.12 Interface 11 : XGPON

S.No.	Parameter Name	Standard Name
1.12.1	Operating Wavelength Recv for XGPON Int	G.987.2. Annex-J2
1.12.2	Operating Wavelength Trans for XGPON Int	G.987.2. Annex-J2
1.12.3	Opt Output Power XGPON Int at OLT	G.987.2. Annex-J2
1.12.4	Opt Output Power XGPON Int at ONT	G.987.2. Annex-J2
1.12.5	Protocol test for XGPON Int	G.987.2 XGEM. Annex-J3

1.12.6	Receiver Sensitivity XGPON Int at OLT	G.987.2. Annex-J2
1.12.7	Receiver Sensitivity XGPON Int at ONT	G.987.2. Annex-J2

1.13 Interface 12 : XGSPON

S.No.	Parameter Name	Standard Name
1.13.1	Operating Wavelength Recv XGSPON Int	G.9807.1. Annex-J2
1.13.2	Operating Wavelength Trans XGSPON Int	G.9807.1. Annex-J2
1.13.3	Opt Output Power XGSPON Int at OLT	G.9807.1. Annex-J2
1.13.4	Opt Output Power XGSPON Int at ONT	G.9807.1. Annex-J2
1.13.5	Protocol Test for XGSPON Int	G.9807.1 XGEM. Annex-J3
1.13.6	Receiver Sensitivity XGSPON Int at OLT	G.9807.1. Annex-J2
1.13.7	Receiver Sensitivity XGSPON Int at ONT	G.9807.1. Annex-J2

2. Variant 2 : PON ONU

2.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
2.1.1	Conducted And Radiated Emission - Class B	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
2.1.2	DOS Prevention SSH v1-2 for CLI in PON	ITU-T G.984.3 section V.2 SSH v2 RFC 4251. Annex-J3
2.1.3	Dual IP Layer Operation RFC 4213 - Address	RFC 4213 Cl. 2.1. Annex-P6
2.1.4	Dual IP Layer Operation RFC 4213 - Decapsulation	RFC 4213 Clause No. 3.6 Annexure-P6
2.1.5	Dual IP Layer Operation RFC 4213 - Link-Local Addresses	RFC 4213 Clause No. 3.7 Annexure-P6
2.1.6	Dual IP Layer Operation RFC 4213 - Neighbor Discovery over Tunnels	RFC 4213 Clause No. 3.8 Annexure-P6
2.1.7	Dual IP Layer Operation RFC 4213 - Security Considerations	RFC 4213 Clause No. 5 Annexure-P6
2.1.8	Dual IP Layer Operation RFC 4213 - Static Tunnel MTU	RFC 4213 Clause No. 3.2.1 Annexure-P6
2.1.9	Frameloss of PON	RFC 2544. Annex-J3

2.1.10	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
2.1.11	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
2.1.12	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
2.1.13	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
2.1.14	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
2.1.15	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
2.1.16	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
2.1.17	IPV6 Destination Options Header	RFC 2460 or RFC 8200 Clause No. 4.6 Annexure-P7
2.1.18	IPV6 Extension Header Order	RFC 2460 or RFC 8200 Clause No. 4.1 RFC 4213 Clause No. 5 Annexure-P7
2.1.19	IPV6 Extn Header Parameters	RFC 2460 or RFC 8200 . Annex-P7
2.1.20	IPV6 Fragment Header	RFC 2460 or RFC 8200 Clause No. 4.5 Annexure-P7
2.1.21	IPV6 No Next Header	RFC 2460 or RFC 8200 Clause No. 4.7 Annexure-P7
2.1.22	IPV6 Options	RFC 2460 or RFC 8200 Clause No. 4.2 Annexure-P7
2.1.23	IPV6 Packet Size Issues	RFC 2460 or RFC 8200 Clause No. 5 Annexure-P7
2.1.24	IPV6 Responding to Packets Carrying Routing Headers	RFC 2460 or RFC 8200 Clause No. 8.4 Annexure-P7
2.1.25	IPV6 Routing Header	RFC 2460 or RFC 8200 Clause No. 4.4 Annexure-P7
2.1.26	IPV6 Upper-Layer Checksums	RFC 2460 or RFC 8200 Clause No. 8.1 Annexure-P7
2.1.27	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1

2.1.28	Latency of PON	RFC 2544. Annex-J3
2.1.29	MAC Address Limitation in PON	IEEE 802.3. Annex-J3
2.1.30	MAC Based 802.1x Authentication in PON	IEEE 802.1x. Annex-J3
2.1.31	Over Voltage and over Current Protection on 2W	K.21. Annex-D
2.1.32	Password Based Authentication in PON	ITU-T G.984.3 section 9.2.2 12. Annex-J3

2.2 Interface 1 : 10 100 1000 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.2.1	Link Speed and Autonegotiation Test GE	IEEE 802.3. Annex-H

2.3 Interface 2 : 10 100 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.3.1	Link Speed and Autonegotiation Test FE	IEEE 802.3 Annex-H

2.4 Interface 3 : 10 BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.4.1	Link Speed	IEEE 802.3 Annex-H

2.5 Interface 4 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
2.5.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
2.5.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
2.5.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
2.5.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
2.5.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

2.6 Interface 5 : 2 Wire

S.No.	Parameter Name	Standard Name
2.6.1	Idle State Current for 2 wire Int	ETSI EN 300 001 ETSI TBR-21 Cl. 4.4.1. Annex-D
2.6.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D

2.6.3	Longitudinal Conversion Loss for 2W Int	Q.552 Cl. 2.2.2. Annex-D
2.6.4	Maximum Loop Current for 2W Int	ETSI EN 300 001 ETSI TBR-21 Cl.4.4.3. Annex-D
2.6.5	Return Loss for 2W Int	Q.552 Cl. 2.2.1.2. Annex-D

2.7 Interface 6 : ADSL

S.No.	Parameter Name	Standard Name
2.7.1	Bit Rate for ADSL Int	ANSI.T1.413-2. Annex-J1
2.7.2	Impulse Noise Protection for ADSL Int	Annex-J1
2.7.3	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
2.7.4	Insulation Test for ADSL Int	Annex-J1
2.7.5	Line Port impedance for ADSLx Int	Annex-J1
2.7.6	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
2.7.7	PSD for ADSL Int	G.992.3 G992.5. Annex-J1
2.7.8	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

2.8 Interface 7 : EPON

S.No.	Parameter Name	Standard Name
2.8.1	Operating Wavelength Recv for EPON Int	IEEE 802.3ah. Annex-J2
2.8.2	Operating Wavelength Trans for EPON Int	IEEE 802.3ah. Annex-J2
2.8.3	Opt Output Power for EPON Int at OLT	IEEE 802.3ah. Annex-J2
2.8.4	Opt Output Power for EPON Int at ONT	IEEE 802.3ah. Annex-J2
2.8.5	Receiver Sensitivity for EPON Int at OLT	IEEE 802.3ah. Annex-J2
2.8.6	Receiver Sensitivity for EPON Int at ONT	IEEE 802.3ah. Annex-J2

2.9 Interface 8 : G.FAST

S.No.	Parameter Name	Standard Name
2.9.1	Impulse Noise Protection for G.FAST Int	Annex-J1
2.9.2	Insulation Test for G.FAST Int	Annex-J1
2.9.3	Loop Resistance for G.FAST IntSLx	EN 300 001. Annex-J1
2.9.4	PPPoE for G.FAST Int	RFC 2516. Annex-J1
2.9.5	Profiles for G.FAST Int	G.9700. Annex-J1

2.9.6	PVC Support for G.FAST Int	Annex-J1
2.9.7	Throughput Test for G.FAST Int	Annex-J1
2.9.8	VPI-VCI Support for G.FAST Int	Annex-J1

2.10 Interface 9 : G.HN

S.No.	Parameter Name	Standard Name
2.10.1	Profiles for G.HN Int	G.9960 Cl. 6. Annex-J1
2.10.2	PSD for G.HN	G.9964. Annex-J1

2.11 Interface 10 : GPON

S.No.	Parameter Name	Standard Name
2.11.1	Operating Wavelength Recv for GPON Int	G.984.2. Annex-J2
2.11.2	Operating Wavelength Trans for GPON Int	G.984.2. Annex-J2
2.11.3	Opt Output Power for GPON Int at OLT	G.984.2. Annex-J2
2.11.4	Opt Output Power for GPON Int at ONT	G.984.2. Annex-J2
2.11.5	Protocol Test for GPON Int	Ethernet over GEM G.984.2. Annex-J3
2.11.6	Receiver Sensitivity for GPON Int at OLT	G.984.2. Annex-J2
2.11.7	Receiver Sensitivity for GPON Int at ONT	G.984.2. Annex-J2

2.12 Interface 11 : NGPON2

S.No.	Parameter Name	Standard Name
2.12.1	Operating Wavelength Recv NGPON2 Int	G.989.2. Annex-J2
2.12.2	Operating Wavelength Trans NGPON2 Int	G.989.2. Annex-J2
2.12.3	Opt Output Power NGPON2 Int at OLT	G.989.2. Annex-J2
2.12.4	Opt Output Power NGPON2 Int at ONT	G.989.2. Annex-J2
2.12.5	Protocol Test for NGPON2 Int	G.989.2 RFC 2544. Annex-J3
2.12.6	Receiver Sensitivity NGPON2 Int at OLT	G.989.2. Annex-J2
2.12.7	Receiver Sensitivity NGPON2 Int at ONT	G.989.2. Annex-J2

2.13 Interface 12 : VDSL

S.No.	Parameter Name	Standard Name
2.13.1	Bit Rate for VDSLx Int	G.993.1 and G993.2. Annex-J1

2.13.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
2.13.3	Line Port impedance for VDSLx Int	Annex-J1
2.13.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
2.13.5	Profiles for VDSLx	G.993.2(cl 7.2). Annex-J1
2.13.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1
2.13.7	Return Loss for VDSLx	G.993.1 Cl. 6.5. Annex-J1
2.13.8	Transmitted Power At ATU-C for VDSLx Int	Annex-J1

2.14 Interface 13 : WDMPON

S.No.	Parameter Name	Standard Name
2.14.1	Operating Wavelength Recv WDMPON Int	G.694.1. Annex-J2
2.14.2	Operating Wavelength Trans WDMPON Int	G.694.1. Annex-J2
2.14.3	Opt Output Power WDMPON Int at OLT	G.694.1. Annex-J2
2.14.4	Opt Output Power WDMPON Int at ONT	G.694.1. Annex-J2
2.14.5	Protocol test for WDMPON Int	G.698.3. Annex-J3
2.14.6	Receiver Sensitivity WDMPON Int at OLT	G.694.1. Annex-J2
2.14.7	Receiver Sensitivity WDMPON Int at ONT	G.694.1. Annex-J2

2.15 Interface 14 : WiFi

S.No.	Parameter Name	Standard Name
2.15.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
2.15.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3
2.15.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
2.15.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

2.16 Interface 15 : XGPON

S.No.	Parameter Name	Standard Name
2.16.1	Operating Wavelength Recv for XGPON Int	G.987.2. Annex-J2

2.16.2	Operating Wavelength Trans for XGPON Int	G.987.2. Annex-J2
2.16.3	Opt Output Power XGPON Int at OLT	G.987.2. Annex-J2
2.16.4	Opt Output Power XGPON Int at ONT	G.987.2. Annex-J2
2.16.5	Protocol test for XGPON Int	G.987.2 XGEM. Annex-J3
2.16.6	Receiver Sensitivity XGPON Int at OLT	G.987.2. Annex-J2
2.16.7	Receiver Sensitivity XGPON Int at ONT	G.987.2. Annex-J2

2.17 Interface 16 : XGSPON

S.No.	Parameter Name	Standard Name
2.17.1	Operating Wavelength Recv XGSPON Int	G.9807.1. Annex-J2
2.17.2	Operating Wavelength Trans XGSPON Int	G.9807.1. Annex-J2
2.17.3	Opt Output Power XGSPON Int at OLT	G.9807.1. Annex-J2
2.17.4	Opt Output Power XGSPON Int at ONT	G.9807.1. Annex-J2
2.17.5	Protocol Test for XGSPON Int	G.9807.1 XGEM. Annex-J3
2.17.6	Receiver Sensitivity XGSPON Int at OLT	G.9807.1. Annex-J2
2.17.7	Receiver Sensitivity XGSPON Int at ONT	G.9807.1. Annex-J2

3. Variant 3 : PON OLT

3.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
3.1.1	Conducted And Radiated Emission - Class A or Class B	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Class A or Class B applicability as defined in Notes to Annex-B.
3.1.2	Dual IP Layer Operation RFC 4213 - Decapsulation	RFC 4213 Clause No. 3.6 Annexure-P6
3.1.3	Dual IP Layer Operation RFC 4213 - DNS	RFC 4213 Cl. 2.1. Annex-P6
3.1.4	Dual IP Layer Operation RFC 4213 - Link-Local Addresses	RFC 4213 Clause No. 3.7 Annexure-P6
3.1.5	Dual IP Layer Operation RFC 4213 - Neighbor Discovery over Tunnels	RFC 4213 Clause No. 3.8 Annexure-P6
3.1.6	Dual IP Layer Operation RFC 4213 - Security Considerations	RFC 4213 Clause No. 5 Annexure-P6

3.1.7	Dual IP Layer Operation RFC 4213 - Static Tunnel MTU	RFC 4213 Clause No. 3.2.1 Annexure-P6
3.1.8	Frameloss of PON	RFC 2544. Annex-J3
3.1.9	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
3.1.10	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
3.1.11	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
3.1.12	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
3.1.13	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
3.1.14	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
3.1.15	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
3.1.16	IPV6 Destination Options Header	RFC 2460 or RFC 8200 Clause No. 4.6 Annexure-P7
3.1.17	IPV6 Extension Header Order	RFC 2460 or RFC 8200 Clause No. 4.1 RFC 4213 Clause No. 5 Annexure-P7
3.1.18	IPV6 Extension headers	RFC 2460 or RFC 8200 Clause No 4
3.1.19	IPV6 Fragment Header	RFC 2460 or RFC 8200 Clause No. 4.5 Annexure-P7
3.1.20	IPV6 No Next Header	RFC 2460 or RFC 8200 Clause No. 4.7 Annexure-P7
3.1.21	IPV6 Options	RFC 2460 or RFC 8200 Clause No. 4.2 Annexure-P7
3.1.22	IPV6 Packet Size Issues	RFC 2460 or RFC 8200 Clause No. 5 Annexure-P7
3.1.23	IPV6 Responding to Packets Carrying Routing Headers	RFC 2460 or RFC 8200 Clause No. 8.4 Annexure-P7
3.1.24	IPV6 Routing Header	RFC 2460 or RFC 8200 Clause No. 4.4 Annexure-P7
3.1.25	IPV6 Upper-Layer Checksums	RFC 2460 or RFC 8200 Clause No. 8.1

		Annexure-P7
3.1.26	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
3.1.27	Latency of PON	RFC 2544. Annex-J3
3.1.28	MAC Address Learning and Aging Control	G.984.1. Annex-J3
3.1.29	MAC Learning Support at OLT	G.984.1. Annex-J3
3.1.30	Max Throughput of PON	RFC 2544. Annex-J3
3.1.31	Maximum Bandwidth Limiting in PON	ITU-T-REC-G.984.3-200803 Section 7.5. Annex-J3
3.1.32	Minimum Guaranteed Bandwidth in PON	ITU-T-REC-G.984.3-200803 Section 7.5. Annex-J3
3.1.33	Minimum Two Classification in PON	ITU-T-REC-G.984.3-200803 Section 7.5. Annex-J3
3.1.34	Port-id Based VLAN Support at OLT	G.984.1 IEEE 802.1Q(testing procedure). Annex-J3
3.1.35	Switch Fabric Throughput Capability OLT	G.984.1. Annex-J3
3.1.36	VLAN Stacking to Network Support at OLT	G.984.1 IEEE 802.1Q(testing procedure). Annex-J3

3.2 Interface 1 : 1 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.2.1	Average Launch power for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H
3.2.2	Receiver Sensitivity 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H
3.2.3	Wavelength for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H

3.3 Interface 2 : 10 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.3.1	Average Launch power for 10 GE Opt	IEEE 802.3ae Cl. 52. Annex-H
3.3.2	Receiver Sensitivity 10 GE Opt	IEEE 802.3ae Cl. 52. Annex-H
3.3.3	Wavelength for 10 GE Opt	IEEE 802.3ae Cl. 52. Annex-H

3.4 Interface 3 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
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3.4.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
3.4.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
3.4.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
3.4.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
3.4.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

3.5 Interface 4 : EPON

S.No.	Parameter Name	Standard Name
3.5.1	Operating Wavelength Recv for EPON Int	IEEE 802.3ah. Annex-J2
3.5.2	Operating Wavelength Trans for EPON Int	IEEE 802.3ah. Annex-J2
3.5.3	Opt Output Power for EPON Int at OLT	IEEE 802.3ah. Annex-J2
3.5.4	Opt Output Power for EPON Int at ONT	IEEE 802.3ah. Annex-J2
3.5.5	Receiver Sensitivity for EPON Int at OLT	IEEE 802.3ah. Annex-J2
3.5.6	Receiver Sensitivity for EPON Int at ONT	IEEE 802.3ah. Annex-J2

3.6 Interface 5 : GPON

S.No.	Parameter Name	Standard Name
3.6.1	Operating Wavelength Recv for GPON Int	G.984.2. Annex-J2
3.6.2	Operating Wavelength Trans for GPON Int	G.984.2. Annex-J2
3.6.3	Opt Output Power for GPON Int at OLT	G.984.2. Annex-J2
3.6.4	Opt Output Power for GPON Int at ONT	G.984.2. Annex-J2
3.6.5	Protocol Test for GPON Int	Ethernet over GEM G.984.2. Annex-J3
3.6.6	Receiver Sensitivity for GPON Int at OLT	G.984.2. Annex-J2
3.6.7	Receiver Sensitivity for GPON Int at ONT	G.984.2. Annex-J2

3.7 Interface 6 : NGPON2

S.No.	Parameter Name	Standard Name
3.7.1	Operating Wavelength Recv NGPON2 Int	G.989.2. Annex-J2
3.7.2	Operating Wavelength Trans NGPON2 Int	G.989.2. Annex-J2
3.7.3	Opt Output Power NGPON2 Int at OLT	G.989.2. Annex-J2
3.7.4	Opt Output Power NGPON2 Int at ONT	G.989.2. Annex-J2

3.7.5	Protocol Test for NGPON2 Int	G.989.2 RFC 2544. Annex-J3
3.7.6	Receiver Sensitivity NGPON2 Int at OLT	G.989.2. Annex-J2
3.7.7	Receiver Sensitivity NGPON2 Int at ONT	G.989.2. Annex-J2

3.8 Interface 7 : RF Video

S.No.	Parameter Name	Standard Name
3.8.1	RF Video Output Bandwidth	52 + 870 MHz. - 870 MHz. Annex-J2
3.8.2	RF Video Output Level	14 dBmV. Annex-J2
3.8.3	RF Video Output Tilt	0 dB. Annex-J2

3.9 Interface 8 : STM-1 Optical

S.No.	Parameter Name	Standard Name
3.9.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
3.9.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
3.9.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
3.9.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
3.9.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 G.825 Annex-K
3.9.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
3.9.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

3.10 Interface 9 : WDMPON

S.No.	Parameter Name	Standard Name
3.10.1	Operating Wavelength Recv WDMPON Int	G.694.1. Annex-J2
3.10.2	Operating Wavelength Trans WDMPON Int	G.694.1. Annex-J2
3.10.3	Opt Output Power WDMPON Int at OLT	G.694.1. Annex-J2
3.10.4	Opt Output Power WDMPON Int at ONT	G.694.1. Annex-J2
3.10.5	Protocol test for WDMPON Int	G.698.3. Annex-J3
3.10.6	Receiver Sensitivity WDMPON Int at OLT	G.694.1. Annex-J2
3.10.7	Receiver Sensitivity WDMPON Int at ONT	G.694.1. Annex-J2

3.11 Interface 10 : XGPON

S.No.	Parameter Name	Standard Name
3.11.1	Operating Wavelength Recv for XGPON Int	G.987.2. Annex-J2
3.11.2	Operating Wavelength Trans for XGPON Int	G.987.2. Annex-J2
3.11.3	Opt Output Power XGPON Int at OLT	G.987.2. Annex-J2
3.11.4	Opt Output Power XGPON Int at ONT	G.987.2. Annex-J2
3.11.5	Protocol test for XGPON Int	G.987.2 XGEM. Annex-J3
3.11.6	Receiver Sensitivity XGPON Int at OLT	G.987.2. Annex-J2
3.11.7	Receiver Sensitivity XGPON Int at ONT	G.987.2. Annex-J2

3.12 Interface 11 : XGSPON

S.No.	Parameter Name	Standard Name
3.12.1	Operating Wavelength Recv XGSPON Int	G.9807.1. Annex-J2
3.12.2	Operating Wavelength Trans XGSPON Int	G.9807.1. Annex-J2
3.12.3	Opt Output Power XGSPON Int at OLT	G.9807.1. Annex-J2
3.12.4	Opt Output Power XGSPON Int at ONT	G.9807.1. Annex-J2
3.12.5	Protocol Test for XGSPON Int	G.9807.1 XGEM. Annex-J3
3.12.6	Receiver Sensitivity XGSPON Int at OLT	G.9807.1. Annex-J2
3.12.7	Receiver Sensitivity XGSPON Int at ONT	G.9807.1. Annex-J2