

अनिवार्य आवश्यकताएँ

संख्या: TEC37942606

Essential Requirements

ER No. : TEC37942606

LAN Switch

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दूरसंचार अभियांत्रिकी केंद्र

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Telecommunication Engineering Centre

Government of India

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

Essential Requirements for:

LAN Switch

Certification Scheme: **SCS**

Product Fee Group: **C**

This ER covers all types of LAN Switches.

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. Fabric Interconnect Switch
2. L2 LAN Switch
3. L2 Unmanaged Switch
4. L3 LAN Switch
5. MPLS TP Switch

6. Storage Area Network (SAN) Switch

1. Variant 1 : Fabric Interconnect Switch

1.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
1.1.1	Conducted And Radiated Emission - Class A or Class B	TEC EMI EMC Standard CISPR 32 EN55032. Class A or Class B applicability as defined in Notes to Annex-B.
1.1.2	Fibre Channel Dynamic Routing	RFC 4626 Annex-P11
1.1.3	Fibre Channel Name Server	RFC 4438 Annex-P11
1.1.4	Fibre Channel Registered State Change Notification	RFC 4983 Annex-P11
1.1.5	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
1.1.6	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
1.1.7	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
1.1.8	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
1.1.9	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
1.1.10	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
1.1.11	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
1.1.12	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
1.1.13	Manageability SNMP V2 or V3/Netconf/Yang	RFC 3410 or RFC 3416 or RFC 6241 or RFC 6020 Test No. 38 or 39 or 68 Annex-P11

1.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
1.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
1.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

1.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

1.4 Interface 3 : 10 100 BASE-T Ethernet

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

1.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

1.6 Interface 5 : 10G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.6.1	Average Launch Power for 10GFC	IEEE Std 802.3-2022, Cl. 52
1.6.2	Data Rate for 10GFC	IEEE Std 802.3-2022, Cl. 52
1.6.3	Receiver Sensitivity for 10GFC	IEEE Std 802.3-2022, Cl. 52
1.6.4	Wavelength for 10GFC	IEEE Std 802.3-2022, Cl. 52

1.7 Interface 6 : 10 G Optical Ethernet

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

1.8 Interface 7 : 128G FC Fibre Channel

S.No.	Parameter Name	Standard Name
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1.8.1	Average Launch Power for 128GFC	FC-PI-8, INCITS 560-2023
1.8.2	Data Rate for 128GFC	FC-PI-8, INCITS 560-2023
1.8.3	Receiver Sensitivity for 128GFC	FC-PI-8, INCITS 560-2023
1.8.4	Wavelength for 128GFC	FC-PI-8, INCITS 560-2023

1.9 Interface 8 : 16G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.9.1	Average Launch Power for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
1.9.2	Data Rate for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
1.9.3	Receiver Sensitivity for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
1.9.4	Wavelength for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)

1.10 Interface 9 : 1G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.10.1	Average Launch Power for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
1.10.2	Data Rate for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
1.10.3	Receiver Sensitivity for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
1.10.4	Wavelength for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)

1.11 Interface 10 : 1 G Optical Ethernet

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

1.12 Interface 11 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.12.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.12.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

1.12.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
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1.13 Interface 12 : 256G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.13.1	Average Launch Power for 256GFC	FC-PI-9, INCITS 581-202x
1.13.2	Data Rate for 256GFC	FC-PI-9, INCITS 581-202x
1.13.3	Receiver Sensitivity for 256GFC	FC-PI-9, INCITS 581-202x
1.13.4	Wavelength for 256GFC	FC-PI-9, INCITS 581-202x

1.14 Interface 13 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.14.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

1.15 Interface 14 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.15.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
1.15.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
1.15.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

1.16 Interface 15 : 2G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.16.1	Average Launch Power for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
1.16.2	Data Rate for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
1.16.3	Receiver Sensitivity for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
1.16.4	Wavelength for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)

1.17 Interface 16 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
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1.17.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.17.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
1.17.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
1.17.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.17.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

1.18 Interface 17 : 32G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.18.1	Average Launch Power for 32GFC	FC-PI-6 (INCITS 512-2015)
1.18.2	Data Rate for 32GFC	FC-PI-6 (INCITS 512-2015)
1.18.3	Receiver Sensitivity for 32GFC	FC-PI-6 (INCITS 512-2015)
1.18.4	Wavelength for 32GFC	FC-PI-6 (INCITS 512-2015)

1.19 Interface 18 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
1.19.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I
1.19.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
1.19.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
1.19.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
1.19.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

1.20 Interface 19 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.20.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.20.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.20.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

1.21 Interface 20 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.21.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

1.21.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
1.21.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

1.22 Interface 21 : 4G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.22.1	Average Launch Power for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
1.22.2	Data Rate for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
1.22.3	Receiver Sensitivity for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
1.22.4	Wavelength for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)

1.23 Interface 22 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
1.23.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
1.23.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
1.23.3	Wavelength for 50 GE Opt	IEEE 802.3cn

1.24 Interface 23 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
1.24.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

1.25 Interface 24 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
1.25.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
1.25.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

1.26 Interface 25 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
1.26.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13

1.26.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F
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1.27 Interface 26 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
1.27.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
1.27.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

1.28 Interface 27 : 64G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.28.1	Average Launch Power for 64GFC	FC-PI-7 (INCITS 543-2019)
1.28.2	Data Rate for 64GFC	FC-PI-7 (INCITS 543-2019)
1.28.3	Receiver Sensitivity for 64GFC	FC-PI-7 (INCITS 543-2019)
1.28.4	Wavelength for 64GFC	FC-PI-7 (INCITS 543-2019)

1.29 Interface 28 : 8G FC Fibre Channel

S.No.	Parameter Name	Standard Name
1.29.1	Average Launch Power for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
1.29.2	Data Rate for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
1.29.3	Receiver Sensitivity for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
1.29.4	Wavelength for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)

1.30 Interface 29 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
1.30.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
1.30.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
1.30.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
1.30.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I

1.30.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I
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1.31 Interface 30 : CDMA

S.No.	Parameter Name	Standard Name
1.31.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
1.31.2	Operating Frequency for CDMA Int	NFAP. Annex-F

1.32 Interface 31 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
1.32.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
1.32.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
1.32.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

1.33 Interface 32 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
1.33.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
1.33.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

1.34 Interface 33 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
1.34.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
1.34.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

1.35 Interface 34 : STM-16 Optical

S.No.	Parameter Name	Standard Name
1.35.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
1.35.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
1.35.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K

1.35.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
1.35.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
1.35.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
1.35.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

1.36 Interface 35 : STM-1 Optical

S.No.	Parameter Name	Standard Name
1.36.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
1.36.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
1.36.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
1.36.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
1.36.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K
1.36.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
1.36.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

1.37 Interface 36 : STM-4 Optical

S.No.	Parameter Name	Standard Name
1.37.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
1.37.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
1.37.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
1.37.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
1.37.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
1.37.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
1.37.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

1.38 Interface 37 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
1.38.1	Operating Frequency for WCDMA or HSPA	NFAP. Annex-F

	Int	
1.38.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

1.39 Interface 38: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
1.39.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
1.39.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
1.39.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet Optical	Average Launch Power for each lane	IEEE P802.3dj, Clause 180.7, DR8	max = 4 dBm min = -3.1 dBm	
H.57	1.6Tbps Ethernet Optical	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, DR8	-0.9 dBm	
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	

2. Variant 2 : L2 LAN Switch

2.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
2.1.1	Conducted And Radiated Emission - Class A or Class B	TEC EMI EMC Standard CISPR 32 EN55032. Class A or Class B applicability as defined in Notes to Annex-B.
2.1.2	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
2.1.3	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
2.1.4	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B

2.1.5	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
2.1.6	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
2.1.7	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
2.1.8	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
2.1.9	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
2.1.10	Mac Learning and Packet Forwarding	Annex-P11
2.1.11	Manageability SNMP V2 or V3/Netconf/Yang	RFC 3410 or RFC 3416 or RFC 6241 or RFC 6020 Test No. 38 or 39 or 68 Annex-P11
2.1.12	Spanning Tree Protocol	IEEE 802.1d. Annex-P11

2.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
2.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
2.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
2.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

2.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

2.4 Interface 3 : 10 100 BASE-T Ethernet

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

2.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

2.6 Interface 5 : 10 G Optical Ethernet

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

2.7 Interface 6 : 1 G Optical Ethernet

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

2.8 Interface 7 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
2.8.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
2.8.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
2.8.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

2.9 Interface 8 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.9.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

2.10 Interface 9 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
2.10.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
2.10.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
2.10.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

2.11 Interface 10 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
2.11.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I

2.11.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
2.11.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
2.11.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
2.11.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

2.12 Interface 11 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
2.12.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I
2.12.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
2.12.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
2.12.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
2.12.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

2.13 Interface 12 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
2.13.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
2.13.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
2.13.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

2.14 Interface 13 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
2.14.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
2.14.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
2.14.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

2.15 Interface 14 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
2.15.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
2.15.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
2.15.3	Wavelength for 50 GE Opt	IEEE 802.3cn

2.16 Interface 15 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
2.16.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

2.17 Interface 16 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
2.17.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
2.17.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

2.18 Interface 17 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
2.18.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13
2.18.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F

2.19 Interface 18 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
2.19.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
2.19.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

2.20 Interface 19 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
2.20.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
2.20.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
2.20.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
2.20.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I
2.20.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I

2.21 Interface 20 : CDMA

S.No.	Parameter Name	Standard Name
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2.21.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
2.21.2	Operating Frequency for CDMA Int	NFAP. Annex-F

2.22 Interface 21 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
2.22.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
2.22.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
2.22.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

2.23 Interface 22 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
2.23.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
2.23.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

2.24 Interface 23 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
2.24.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
2.24.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

2.25 Interface 24 : STM-16 Optical

S.No.	Parameter Name	Standard Name
2.25.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
2.25.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
2.25.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
2.25.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
2.25.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
2.25.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
2.25.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

2.26 Interface 25 : STM-1 Optical

S.No.	Parameter Name	Standard Name
2.26.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
2.26.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
2.26.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
2.26.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
2.26.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K
2.26.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
2.26.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

2.27 Interface 26 : STM-4 Optical

S.No.	Parameter Name	Standard Name
2.27.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
2.27.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
2.27.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
2.27.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
2.27.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
2.27.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
2.27.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

2.28 Interface 27 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
2.28.1	Operating Frequency for WCDMA or HSPA Int	NFAP. Annex-F
2.28.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

2.29 Interface 28: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
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2.29.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
2.29.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
2.29.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet Optical	Average Launch Power for each lane	IEEE P802.3dj, Clause 180.7, DR8	max = 4 dBm min = -3.1 dBm	
H.57	1.6Tbps Ethernet Optical	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, DR8	-0.9 dBm	
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	

3. Variant 3 : L2 Unmanaged Switch

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 32 EN55032. Class A or Class B applicability as defined in Notes to Annex-B.
3.1.2	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
3.1.3	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
3.1.4	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
3.1.5	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
3.1.6	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
3.1.7	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
3.1.8	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5.

		Annex-B
3.1.9	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
3.1.10	Mac Learning and Packet Forwarding	Annex-P11

3.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
3.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
3.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

3.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

3.4 Interface 3 : 10 100 BASE-T Ethernet

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

3.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
3.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

3.6 Interface 5 : 10 G Optical Ethernet

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

3.7 Interface 6 : 1 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.7.1	Average Launch power for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H

3.7.2	Receiver Sensitivity 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H
3.7.3	Wavelength for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H

3.8 Interface 7 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.8.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
3.8.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
3.8.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

3.9 Interface 8 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
3.9.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

3.10 Interface 9 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.10.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
3.10.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
3.10.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

3.11 Interface 10 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
3.11.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
3.11.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
3.11.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
3.11.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
3.11.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

3.12 Interface 11 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
3.12.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I

3.12.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
3.12.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
3.12.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
3.12.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

3.13 Interface 12 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.13.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
3.13.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
3.13.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

3.14 Interface 13 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
3.14.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
3.14.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
3.14.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

3.15 Interface 14 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
3.15.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
3.15.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
3.15.3	Wavelength for 50 GE Opt	IEEE 802.3cn

3.16 Interface 15 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
3.16.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

3.17 Interface 16 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
3.17.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
3.17.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

3.18 Interface 17 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
3.18.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13
3.18.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F

3.19 Interface 18 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
3.19.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
3.19.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

3.20 Interface 19 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
3.20.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
3.20.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
3.20.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
3.20.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I
3.20.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I

3.21 Interface 20 : CDMA

S.No.	Parameter Name	Standard Name
3.21.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
3.21.2	Operating Frequency for CDMA Int	NFAP. Annex-F

3.22 Interface 21 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
3.22.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
3.22.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
3.22.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

3.23 Interface 22 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
3.23.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
3.23.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

3.24 Interface 23 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
3.24.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
3.24.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

3.25 Interface 24 : STM-16 Optical

S.No.	Parameter Name	Standard Name
3.25.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
3.25.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
3.25.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
3.25.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
3.25.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
3.25.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
3.25.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

3.26 Interface 25 : STM-1 Optical

S.No.	Parameter Name	Standard Name
3.26.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
3.26.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
3.26.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
3.26.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
3.26.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K

3.26.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
3.26.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

3.27 Interface 26 : STM-4 Optical

S.No.	Parameter Name	Standard Name
3.27.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
3.27.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
3.27.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
3.27.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
3.27.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
3.27.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
3.27.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

3.28 Interface 27 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
3.28.1	Operating Frequency for WCDMA or HSPA Int	NFAP. Annex-F
3.28.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

3.29 Interface 28: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
3.29.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
3.29.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
3.29.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet	Average Launch Power	IEEE P802.3dj, Clause 180.7,	max = 4 dBm min = -3.1 dBm	

	Optical	for each lane	DR8		
H.57	1.6Tbps Ethernet Optical	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, DR8	-0.9 dBm	
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	

4. Variant 4 : L3 LAN Switch

4.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
4.1.1	Conducted And Radiated Emission - Class A or Class B	TEC EMI EMC Standard CISPR 32 EN55032. Class A or Class B applicability as defined in Notes to Annex-B.
4.1.2	Dynamic Routing	Annex-P11
4.1.3	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
4.1.4	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
4.1.5	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
4.1.6	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
4.1.7	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
4.1.8	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
4.1.9	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
4.1.10	IPV4 Parameters Set-D	RFC 791. Annex-P11
4.1.11	IPV6 as per RFC 8200	RFC 8200. Annex-P11
4.1.12	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
4.1.13	Mac Learning and Packet Forwarding	Annex-P11

4.1.14	Manageability SNMP V2 or V3/Netconf/Yang	RFC 3410 or RFC 3416 or RFC 6241 or RFC 6020 Test No. 38 or 39 or 68 Annex-P11
4.1.15	Spanning Tree Protocol	IEEE 802.1d. Annex-P11
4.1.16	Static Routing	Annex-P11

4.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
4.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
4.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

4.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

4.4 Interface 3 : 10 100 BASE-T Ethernet

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

4.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
4.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

4.6 Interface 5 : 10 G Optical Ethernet

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

4.7 Interface 6 : 1 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.7.1	Average Launch power for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H

4.7.2	Receiver Sensitivity 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H
4.7.3	Wavelength for 1 GE Opt	IEEE 802.3z Cl. 38. Annex-H

4.8 Interface 7 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.8.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
4.8.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
4.8.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

4.9 Interface 8 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
4.9.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

4.10 Interface 9 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.10.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
4.10.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
4.10.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

4.11 Interface 10 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
4.11.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
4.11.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
4.11.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
4.11.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
4.11.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

4.12 Interface 11 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
4.12.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I

4.12.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
4.12.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
4.12.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
4.12.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

4.13 Interface 12 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.13.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
4.13.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
4.13.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

4.14 Interface 13 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
4.14.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
4.14.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
4.14.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

4.15 Interface 14 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
4.15.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
4.15.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
4.15.3	Wavelength for 50 GE Opt	IEEE 802.3cn

4.16 Interface 15 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
4.16.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

4.17 Interface 16 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
4.17.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
4.17.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

4.18 Interface 17 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
4.18.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13
4.18.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F

4.19 Interface 18 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
4.19.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
4.19.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

4.20 Interface 19 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
4.20.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
4.20.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
4.20.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
4.20.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I
4.20.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I

4.21 Interface 20 : CDMA

S.No.	Parameter Name	Standard Name
4.21.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
4.21.2	Operating Frequency for CDMA Int	NFAP. Annex-F

4.22 Interface 21 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
4.22.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
4.22.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
4.22.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

4.23 Interface 22 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
4.23.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
4.23.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

4.24 Interface 23 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
4.24.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
4.24.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

4.25 Interface 24 : STM-16 Optical

S.No.	Parameter Name	Standard Name
4.25.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
4.25.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
4.25.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
4.25.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
4.25.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
4.25.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
4.25.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

4.26 Interface 25 : STM-1 Optical

S.No.	Parameter Name	Standard Name
4.26.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
4.26.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
4.26.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
4.26.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K

4.26.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K
4.26.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
4.26.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

4.27 Interface 26 : STM-4 Optical

S.No.	Parameter Name	Standard Name
4.27.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
4.27.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
4.27.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
4.27.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
4.27.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
4.27.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
4.27.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

4.28 Interface 27 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
4.28.1	Operating Frequency for WCDMA or HSPA Int	NFAP. Annex-F
4.28.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

4.29 Interface 28: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
4.29.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
4.29.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
4.29.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet Optical	Average Launch Power for each lane	IEEE P802.3dj, Clause 180.7, DR8	max = 4 dBm min = -3.1 dBm	
H.57	1.6Tbps	Receiver	IEEE P802.3dj,	-0.9 dBm	

	Ethernet Optical	Sensitivity	Clause 180.7, DR8		
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	

5. Variant 5 : MPLS TP Switch

5.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
5.1.1	Conducted And Radiated Emission - Class A	TEC EMI EMC Standard CISPR 32 EN550 32. Annex-B
5.1.2	Ethernet PWE and Service Identification	RFC 4448 Clause 4. Annex-P11
5.1.3	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
5.1.4	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
5.1.5	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
5.1.6	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
5.1.7	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
5.1.8	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
5.1.9	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
5.1.10	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
5.1.11	Mac Learning and Packet Forwarding	Annex-P11
5.1.12	Manageability SNMP V2 or V3 or Qx Management Protocol	RFC 3410 3416 Annex-P11
5.1.13	MPLS TP Requirement	RFC 5654 Clause 2. Annex-P11
5.1.14	TDM PWE and Service Identification	RFC 3916 Clause 4 & Clause 7.1 Annex-P11

5.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
5.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
5.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
5.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

5.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

5.4 Interface 3 : 10 100 BASE-T Ethernet

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

5.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
5.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

5.6 Interface 5 : 10 G Optical Ethernet

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

5.7 Interface 6 : 1 G Optical Ethernet

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

5.8 Interface 7 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
5.8.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
5.8.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

5.8.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
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5.9 Interface 8 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
5.9.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

5.10 Interface 9 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
5.10.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
5.10.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
5.10.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

5.11 Interface 10 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
5.11.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
5.11.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
5.11.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
5.11.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
5.11.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

5.12 Interface 11 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
5.12.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I
5.12.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
5.12.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
5.12.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
5.12.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

5.13 Interface 12 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
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5.13.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
5.13.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
5.13.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

5.14 Interface 13 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
5.14.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
5.14.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
5.14.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

5.15 Interface 14 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
5.15.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
5.15.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
5.15.3	Wavelength for 50 GE Opt	IEEE 802.3cn

5.16 Interface 15 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
5.16.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

5.17 Interface 16 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
5.17.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
5.17.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

5.18 Interface 17 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
5.18.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13
5.18.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F

5.19 Interface 18 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
5.19.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
5.19.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

5.20 Interface 19 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
5.20.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
5.20.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
5.20.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
5.20.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I
5.20.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I

5.21 Interface 20 : CDMA

S.No.	Parameter Name	Standard Name
5.21.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
5.21.2	Operating Frequency for CDMA Int	NFAP. Annex-F

5.22 Interface 21 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
5.22.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
5.22.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
5.22.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

5.23 Interface 22 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
5.23.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
5.23.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

5.24 Interface 23 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
5.24.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
5.24.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

5.25 Interface 24 : STM-16 Optical

S.No.	Parameter Name	Standard Name
5.25.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
5.25.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
5.25.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
5.25.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
5.25.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
5.25.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
5.25.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

5.26 Interface 25 : STM-1 Optical

S.No.	Parameter Name	Standard Name
5.26.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
5.26.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
5.26.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
5.26.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
5.26.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K
5.26.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
5.26.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

5.27 Interface 26 : STM-4 Optical

S.No.	Parameter Name	Standard Name
5.27.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
5.27.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K

5.27.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
5.27.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
5.27.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
5.27.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
5.27.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

5.28 Interface 27 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
5.28.1	Operating Frequency for WCDMA or HSPA Int	NFAP. Annex-F
5.28.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

5.29 Interface 28: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
5.29.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
5.29.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
5.29.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet Optical	Average Launch Power for each lane	IEEE P802.3dj, Clause 180.7, DR8	max = 4 dBm min = -3.1 dBm	
H.57	1.6Tbps Ethernet Optical	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, DR8	-0.9 dBm	
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	

6. Variant 6 : Storage Area Network (SAN) Switch

6.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
6.1.1	Conducted And Radiated Emission - Class A or Class B	TEC EMI EMC Standard CISPR 32 EN55032. Class A or Class B applicability as defined in Notes to Annex-B.
6.1.2	Fibre Channel Dynamic Routing	RFC 4626 Annex-P11
6.1.3	Fibre Channel Frame Encapsulation	RFC 3643 Annex-P11
6.1.4	Fibre Channel Logins	RFC 4172 Annex-P11
6.1.5	Fibre Channell Zone Server	RFC 4936 Annex-P11
6.1.6	Fibre Channel Name Server	RFC 4438 Annex-P11
6.1.7	Fibre Channel Packet Forwarding	RFC 2625 Annex-P11
6.1.8	Fibre Channel Registered State Change Notification	RFC 4983 Annex-P11
6.1.9	Fibre Channel Security Protocols (FC-SP)	Functional Test/ RFC 5324 Annex-P11
6.1.10	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
6.1.11	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
6.1.12	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
6.1.13	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
6.1.14	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
6.1.15	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
6.1.16	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
6.1.17	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
6.1.18	Manageability SNMP V2 or V3/Netconf/Yang	RFC 3410 or RFC 3416 or RFC 6241 or RFC 6020 Test No. 38 or 39 or 68 Annex-P11

6.2 Interface 1 : 100 G Optical Ethernet

S.No.	Parameter Name	Standard Name
6.2.1	Average Launch power for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
6.2.2	Receiver Sensitivity 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H
6.2.3	Wavelength for 100 GE Opt	IEEE 802.3ba Cl. 86 88. Annex-H

6.3 Interface 2 : 10 100 1000 BASE-T Ethernet

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

6.4 Interface 3 : 10 100 BASE-T Ethernet

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

6.5 Interface 4 : 10 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
6.5.1	Link Speed and Auto negotiation Test 10 GE	IEEE 802.3an. Annex-H

6.6 Interface 5 : 10G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.6.1	Average Launch Power for 10GFC	IEEE Std 802.3-2022, Cl. 52
6.6.2	Data Rate for 10GFC	IEEE Std 802.3-2022, Cl. 52
6.6.3	Receiver Sensitivity for 10GFC	IEEE Std 802.3-2022, Cl. 52
6.6.4	Wavelength for 10GFC	IEEE Std 802.3-2022, Cl. 52

6.7 Interface 6 : 10 G Optical Ethernet

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

6.8 Interface 7 : 128G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.8.1	Average Launch Power for 128GFC	FC-PI-8, INCITS 560-2023

6.8.2	Data Rate for 128GFC	FC-PI-8, INCITS 560-2023
6.8.3	Receiver Sensitivity for 128GFC	FC-PI-8, INCITS 560-2023
6.8.4	Wavelength for 128GFC	FC-PI-8, INCITS 560-2023

6.9 Interface 8 : 16G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.9.1	Average Launch Power for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
6.9.2	Data Rate for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
6.9.3	Receiver Sensitivity for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
6.9.4	Wavelength for 16GFC	FC-PI-5, Revision 6 (ANSI INCITS 479-2011)

6.10 Interface 9 : 1G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.10.1	Average Launch Power for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
6.10.2	Data Rate for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
6.10.3	Receiver Sensitivity for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)
6.10.4	Wavelength for 1GFC	FC-PI, Revision 13 (ANSI INCITS 352-2002)

6.11 Interface 10 : 1 G Optical Ethernet

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

6.12 Interface 11 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
6.12.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
6.12.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
6.12.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

6.13 Interface 12 : 256G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.13.1	Average Launch Power for 256GFC	FC-PI-9, INCITS 581-202x
6.13.2	Data Rate for 256GFC	FC-PI-9, INCITS 581-202x
6.13.3	Receiver Sensitivity for 256GFC	FC-PI-9, INCITS 581-202x
6.13.4	Wavelength for 256GFC	FC-PI-9, INCITS 581-202x

6.14 Interface 13 : 2.5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
6.14.1	Link Speed and Auto negotiation Test 2.5 GE	IEEE 802.3bz. Annex-H

6.15 Interface 14 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
6.15.1	Average Launch Power for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
6.15.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114
6.15.3	Wavelength for 25 GE Opt	IEEE 802.3 - 2018 Cl. 114

6.16 Interface 15 : 2G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.16.1	Average Launch Power for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
6.16.2	Data Rate for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
6.16.3	Receiver Sensitivity for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
6.16.4	Wavelength for 2GFC	FC-PI-2, Revision 10 (ANSI INCITS 404-2006)

6.17 Interface 16 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
6.17.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
6.17.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I

6.17.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
6.17.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
6.17.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

6.18 Interface 17 : 32G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.18.1	Average Launch Power for 32GFC	FC-PI-6 (INCITS 512-2015)
6.18.2	Data Rate for 32GFC	FC-PI-6 (INCITS 512-2015)
6.18.3	Receiver Sensitivity for 32GFC	FC-PI-6 (INCITS 512-2015)
6.18.4	Wavelength for 32GFC	FC-PI-6 (INCITS 512-2015)

6.19 Interface 18 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
6.19.1	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I
6.19.2	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
6.19.3	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
6.19.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
6.19.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

6.20 Interface 19 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
6.20.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
6.20.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
6.20.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

6.21 Interface 20 : 40 G Optical Ethernet

S.No.	Parameter Name	Standard Name
6.21.1	Average Launch power for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
6.21.2	Receiver Sensitivity 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H
6.21.3	Wavelength for 40 GE Opt	IEEE 802.3ba Cl. 86 87. Annex-H

6.22 Interface 21 : 4G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.22.1	Average Launch Power for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
6.22.2	Data Rate for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
6.22.3	Receiver Sensitivity for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)
6.22.4	Wavelength for 4GFC	FC-PI-3, Revision 4 (ANSI INCITS 460-2011)

6.23 Interface 22 : 50G Ethernet Optical

S.No.	Parameter Name	Standard Name
6.23.1	Average Launch Power for 50 GE Opt	IEEE 802.3cn
6.23.2	Receiver Sensitivity for 50 GE Opt	IEEE 802.3cn
6.23.3	Wavelength for 50 GE Opt	IEEE 802.3cn

6.24 Interface 23 : 5 G BASE-T Ethernet

S.No.	Parameter Name	Standard Name
6.24.1	Link Speed and Auto negotiation Test 5 GE	IEEE 802.3bz. Annex-H

6.25 Interface 24 : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
6.25.1	Int Parameters for 5G NR (FR1)	3GPP TS 38.521-1. Annex-F14
6.25.2	Operating frequency for 5G NR (FR1)	NFAP. Annex-F

6.26 Interface 25 : 5G NR- FR1 and FR2 interworking with other Radios

S.No.	Parameter Name	Standard Name
6.26.1	Int Parameters for 5G NR-FR1 and FR2 interworking with other Radios	3GPP TS 38.521-3. Annex-F13
6.26.2	Operating frequency for 5G NR- FR1 and FR2 interworking with other Radios	NFAP. Annex-F

6.27 Interface 26 : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
6.27.1	Int Parameters for 5G NR (FR2)	3GPP TS 38.521-2. Annex-F15
6.27.2	Operating frequency for 5G NR (FR2)	NFAP. Annex-F

6.28 Interface 27 : 64G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.28.1	Average Launch Power for 64GFC	FC-PI-7 (INCITS 543-2019)
6.28.2	Data Rate for 64GFC	FC-PI-7 (INCITS 543-2019)
6.28.3	Receiver Sensitivity for 64GFC	FC-PI-7 (INCITS 543-2019)
6.28.4	Wavelength for 64GFC	FC-PI-7 (INCITS 543-2019)

6.29 Interface 28 : 8G FC Fibre Channel

S.No.	Parameter Name	Standard Name
6.29.1	Average Launch Power for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
6.29.2	Data Rate for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
6.29.3	Receiver Sensitivity for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
6.29.4	Wavelength for 8GFC	FC-PI-4, Revision 8 (ANSI INCITS 450-2008)

6.30 Interface 29 : 8 Mbps - E2

S.No.	Parameter Name	Standard Name
6.30.1	Input Jitter Tolerance for 8 Mbps Int	ITU-T G.823. Annex-I
6.30.2	Input Return Loss for 8 Mbps Int	ITU-T G.703. Annex-I
6.30.3	Nominal Bit Rate with Tolerance for 8 Mbps Int	ITU-T G.703 Annex-I
6.30.4	Output Jitter for 8 Mbps Int	ITU-T G.823. Annex-I
6.30.5	Pulse Mask for 8 Mbps Int	ITU-T G.703. Annex-I

6.31 Interface 30 : CDMA

S.No.	Parameter Name	Standard Name
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6.31.1	CDMA Int Parameters	1xS0011 or EN 301 908-04 CDMA. Annex-F9
6.31.2	Operating Frequency for CDMA Int	NFAP. Annex-F

6.32 Interface 31 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
6.32.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
6.32.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
6.32.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

6.33 Interface 32 : GSM or GPRS or EDGE

S.No.	Parameter Name	Standard Name
6.33.1	Int Parameters for GSM or GPRS or EDGE	3GPP TS 51 010-1 or EN 301 511. Annex-F10
6.33.2	Operating Frequency for GSM or GPRS or EDGE Int	NFAP. Annex-F

6.34 Interface 33 : LTE or LTE-A

S.No.	Parameter Name	Standard Name
6.34.1	Int Parameters for LTE or LTE-A	3GPP TS 36.521-1 or EN 301 908-13. Annex-F12
6.34.2	Operating Frequency for LTE or LTE-A Int	NFAP. Annex-F

6.35 Interface 34 : STM-16 Optical

S.No.	Parameter Name	Standard Name
6.35.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
6.35.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
6.35.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
6.35.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
6.35.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
6.35.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
6.35.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

6.36 Interface 35 : STM-1 Optical

S.No.	Parameter Name	Standard Name
6.36.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
6.36.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
6.36.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
6.36.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
6.36.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 Annex-K
6.36.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
6.36.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

6.37 Interface 36 : STM-4 Optical

S.No.	Parameter Name	Standard Name
6.37.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
6.37.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
6.37.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
6.37.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
6.37.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
6.37.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
6.37.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

6.38 Interface 37 : WCDMA or HSPA

S.No.	Parameter Name	Standard Name
6.38.1	Operating Frequency for WCDMA or HSPA Int	NFAP. Annex-F
6.38.2	WCDMA or HSPA Int Parameters	3GPP TS 34.121-1 or EN 301 908-2. Annex-F11

6.39 Interface 38: 1.6Tbps Ethernet Optical

S.No.	Parameter Name	Standard Name
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6.39.1	Average Launch Power	IEEE P802.3dj, Clause 180.7, Annex-H
6.39.2	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, Annex-H
6.39.3	Wavelength	IEEE P802.3dj, Clause 180.7, Annex-H

Addendum to Annexure to ERs (Annex-H)

S. No.	Interface Name	Parameter Name	Standard	Limits / Values	Applicability
H.56	1.6Tbps Ethernet Optical	Average Launch Power for each lane	IEEE P802.3dj, Clause 180.7, DR8	max = 4 dBm min = -3.1 dBm	
H.57	1.6Tbps Ethernet Optical	Receiver Sensitivity	IEEE P802.3dj, Clause 180.7, DR8	-0.9 dBm	
H.58	1.6Tbps Ethernet Optical	Wavelength	IEEE P802.3dj, Clause 180.7, DR8	1304.5 nm to 1317.5 nm	