

अनिवार्य आवश्यकतायें

संख्या: TEMP1621338196382

Essential Requirements

ER No.: TEMP1621338196382

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**Router**

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**Telecommunication Engineering Centre**

**Government of India**

**Khurshidlal Bhawan, Janpath, New Delhi-110001, INDIA**

Essential Requirements for:

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# Router

Certification Scheme: GCS

Product Fee Group: C

This ER covers all types of Routers

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. IPv4 Router
2. MPLS Router
3. IPv6 Router
4. BNG/BRAS Router

## 5. Cloud Control Capable Router

### 1. Variant 1 : IPv4 Router

1.101 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
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### 2. Variant 2 : MPLS Router

2.101 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
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### 3. Variant 3 : Ipv6 Router

3.101 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
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4. Variant 4 : BNG/BRAS Router  
 4.101 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
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**5. Variant 5 : Cloud Control Capable Router**

5.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
5.1.1	Dynamic Routing OSPF or BGP or ISIS	RFC2328 (OSPFv2), RFC2740 (OSPFv3), RFC2545 (BGP for IPV6), RFC4271 (BGP4), RFC1142, 1195 (IS-IS) Annex-P11
5.1.2	Static Routing	Annex-P11
5.1.3	Conducted And Radiated Emission – Class A	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
5.1.4	Conducted And Radiated Emission – Class B	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
5.1.5	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2.
5.1.6	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
5.1.7	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
5.1.8	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
5.1.9	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
5.1.10	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B

5.1.11	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
5.1.12	IPV6 Complete Suite	RFC 2460 or 8200 4861 4862 1981 4443 Annex-P11
5.1.13	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
5.1.14	Manageability SNMP V2 or V3 or Netconf/YANG	RFC 3410 3416 Annex-P11or RFC 6241, RFC 6020
5.1.15	TCP Parameters	RFC 793. Annex-P11
5.1.16	Ipv6 Dual Stack as per RFC 4213	RFC 4213 clause 2.1 and 2.2. Annex-P6
5.1.17	Energy Consumption Rating (ECR)	TEC ECR Standard No. 74046:2020 Table 7
5.1.18	Energy Passport (EP)	TEC ECR Standard No 74046:2020 Clause 4.8

### 5.2 Interface 1 : ISDN BRI

S.No.	Parameter Name	Standard Name
5.2.1	Layer-III BRI Specification - Call Clearing	Q.931. Annex-D1
5.2.2	Layer-III BRI Specification - Call Setup	Q.931. Annex-D1

### 5.3 Interface 2 : LTE or LTE-A

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

### 5.4 Interface 3 : WiFi

S.No.	Parameter Name	Standard Name
5.4.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
5.4.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3

5.4.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
5.4.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

#### 5.5 Interface 4 : ISDN PRI

S.No.	Parameter Name	Standard Name
5.5.1	Bit Rate Tolerance for PRI	G.703 Cl. 11.1 ETSI TBR-4 Cl. 9.2.3. Annex-I
5.5.2	Input Jitter Tolerance for PRI	G.823 I.431 ETSI TBR-4. Annex-I
5.5.3	Input Return Loss for PRI	G.703 Cl. 11.3 ETSI TBR-4 Cl. 9.3.1. Annex-I
5.5.4	Layer-III PRI Specification - Call Clearing	Q.931. Annex-D1
5.5.5	Layer-III PRI Specification - Call Setup	Q.931. Annex-D1
5.5.6	Output Jitter for PRI	G.823 I.431 ETSI TBR-4. Annex-I
5.5.7	Pulse Mask for PRI	G.703 Cl. 11.2 ETSI TBR-4 Cl. 9.2.1. Annex-I

#### 5.6 Interface 5 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
5.6.1	Nominal Bit Rate with Tolerance for 2 Mbps	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I
	Int	
5.6.2	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
5.6.3	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
5.6.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
5.6.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

#### 5.7 Interface 6 : STM-1 Optical

S.No.	Parameter Name	Standard Name
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5.7.1	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
5.7.2	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
5.7.3	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
5.7.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
5.7.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 G.825 Annex-K
5.7.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
5.7.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

### 5.8 Interface 7 : ADSL

S.No.	Parameter Name	Standard Name
5.8.1	Bit Rate for ADSL Int	ANSI.T1.413-2. Annex-J1
5.8.2	Insulation Test for ADSL Int	Annex-J1
5.8.3	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
5.8.4	Impulse Noise Protection for ADSL Int	Annex-J1
5.8.5	Line Port impedance for ADSLx Int	Annex-J1
5.8.6	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
5.8.7	PSD for ADSL Int	G.992.3 G992.5. Annex-J1
5.8.8	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

### 5.9 Interface 8 : VDSL

S.No.	Parameter Name	Standard Name
5.9.1	Bit Rate for VDSLx Int	G.993.1 and G993.2. Annex-J1
5.9.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
5.9.3	Line Port impedance for VDSLx Int	Annex-J1
5.9.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
5.9.5	Profiles for VDSLx	G.993.2(cl 7.2). Annex-J1
5.9.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1

5.9.7	Return Loss for VDSLx	G.993.1 Cl. 6.5. Annex-J1
5.9.8	Transmitted Power At ATU-C for VDSLx Int	Annex-J1

#### 5.10 Interface 9 : 34 Mbps - E3

S.No.	Parameter Name	Standard Name
5.10.1	Nominal Bit Rate with Tolerance for 34 Mbps Int	ITU-T G.703 Annex-I
5.10.2	Input Jitter Tolerance for 34 Mbps Int	ITU-T G.823. Annex-I
5.10.3	Input Return Loss for 34 Mbps Int	ITU-T G.703. Annex-I
5.10.4	Output Jitter for 34 Mbps Int	ITU-T G.823. Annex-I
5.10.5	Pulse Mask for 34 Mbps Int	ITU-T G.703. Annex-I

#### 5.11 Interface 10 : 45 Mbps

S.No.	Parameter Name	Standard Name
5.11.1	Nominal Bit Rate with Tolerance for 45 Mbps Int	ITU-T G.703 Annex-I
5.11.2	Input Jitter Tolerance for 45 Mbps Int	ITU-T G.824. Annex-I
5.11.3	DC power	ITU-T G.703. Annex-I
5.11.4	Output Jitter for 45 Mbps Int	ITU-T G.824 Annex-I
5.11.5	Pulse Mask for 45 Mbps Int	ITU-T G.703. Annex-I

#### 5.12 Interface 11 : STM-1 Electrical

S.No.	Parameter Name	Standard Name
5.12.1	Nominal Bit Rate with Tolerance STM-1 Electrical Int	ITU-T G.703. Annex-K
5.12.2	Input Jitter Tolerance STM-1 Electrical	ITU-T G.825. Annex-K
5.12.3	Input Return Loss for STM-1 Electrical	ITU-T G.703. Annex-K
5.12.4	Output Jitter for STM-1 Electrical Int	ITU-T G.825. Annex-K
5.12.5	Pulse Mask for STM-1 Electrical Int	ITU-T G.703. Annex-K

### 5.13 Interface 12 : STM-4 Optical

S.No.	Parameter Name	Standard Name
5.13.1	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
5.13.2	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
5.13.3	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
5.13.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
5.13.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
5.13.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
5.13.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

### 5.14 Interface 13 : STM-16 Optical

S.No.	Parameter Name	Standard Name
5.14.1	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
5.14.2	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
5.14.3	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
5.14.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
5.14.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
5.14.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
5.14.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

### 5.15 Interface 14 : STM-64 Optical

S.No.	Parameter Name	Standard Name
5.15.1	Nominal Bit Rate with Tolerance STM-64 Opt Int	ITU-T G.957 Annex-K



5.15.2	Input Jitter Tolerance for STM-64 Opt	ITU-T G.825. Annex-K
5.15.3	Mean Launched Power for STM-64 Opt Int	ITU-T G.691. Annex-K
5.15.4	Operating Wavelength Range for STM-64 Opt Int	ITU-T G.691. Annex-K
5.15.5	Output Jitter for STM-64 Opt Int	ITU-T G.783. Annex-K
5.15.6	Receiver Overload for STM-64 Opt Int	ITU-T G.691. Annex-K
5.15.7	Receiver Sensitivity for STM-64 Opt Int	ITU-T G.691. Annex-K

#### 5.16 Interface 15 : NX64 kbps

S.No.	Parameter Name	Standard Name
5.16.1	Nominal Bit Rate with Tolerance for NX64 kbps Int	ITU-T G.703. Annex-I
5.16.2	Input Jitter Tolerance for NX64 kbps Int	ITU-T G.823. Annex-I
5.16.3	Input Return Loss for NX64 kbps Int	ITU-T G.703. Annex-I
5.16.4	Output Jitter for NX64 kbps Int	ITU-T G.823. Annex-I
5.16.5	Pulse Mask for NX64 kbps Int	ITU-T G.703. Annex-I

#### 5.17 Interface 16 : 1 G Optical Ethernet

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

#### 5.18 Interface 17 : 10 G Optical Ethernet

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

#### 5.19 Interface 18 : SHDSL

S.No.	Parameter Name	Standard Name
5.19.1	Impedance Unbalance About Earth for SHDSL Int	G.991.2. Annex-J1
5.19.2	Insulation Resistance for SHDSL int	G.991.2. Annex-J1
5.19.3	LCL for SHDSL Interface	G.991.2. Annex-J1
5.19.4	PSD for SHDSL Int	G.991.2. Annex-J1
5.19.5	Return Loss for SHDSL	G.991.2. Annex-J1
5.19.6	Throughput for SHDSL Interface	G.991.2. Annex-J1
5.19.7	Transmitted Power for SHDSL Int	G.991.2. Annex-J1

#### 5.20 Interface 19 : 40 G Optical Ethernet

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

#### 5.21 Interface 20 : 100 G Optical Ethernet

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

#### 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 : 10 100 1000 BASE-T Ethernet

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

#### 5.24 Interface 23 : 10 100 BASE-T Ethernet

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

#### 5.25 Interface 24 : 400GBASE-X Ethernet

S.No.	Parameter Name	Standard Name
5.25.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 124
5.25.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 124
5.25.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 124
5.25.4	Link Speed for 400 GE Opt	IEEE 802.3cn Annex-H
5.25.5	PCS Layer Testing for 400 GE Opt	IEEE 802.3cn Table 122-1
5.25.6	Optical Transceiver Testing	IEEE 802.3cn Cl 122 124

#### 5.26 Interface 25 : 200 G BASE-X Ethernet

S.No.	Parameter Name	Standard Name
5.26.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 121 122
5.26.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 121 122
5.26.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 121 122
5.26.4	Link Speed for 400 GE Opt	IEEE 802.3cn Annex-H
5.26.5	PCS Layer Testing for 400 GE Opt	IEEE 802.3cn Table 122-1
5.26.6	Optical Transceiver Testing	IEEE 802.3cn Cl 121 122

#### 5.27 Interface 26 : 25 G Optical Ethernet

S.No.	Parameter Name	Standard Name
5.27.1	Average Launch Power for 25 GE Opt	IEEE 802.3 ed 2018 Cl. 114
5.27.2	Receiver Sensitivity for 25 GE Opt	IEEE 802.3 ed 2018 Cl. 114

5.27.3	Wavelength for 25 GE Opt	IEEE 802.3 ed 2018 Cl. 114
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