अनिवार्य आवश्यकताएँ

संख्या : TEC59432108

Essential Requirements

ER No. : TEC59432108

Equipments Operating in 2.4 GHz and 5 GHz Band

MTCTE के तहत जारी:

Issued under MTCTE by:

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Essential Requirements for:

Equipments Operating in 2.4 GHz and 5 GHz Band

Certification Scheme: **GCS** Product Fee Group: **B**

This ER covers all types of WiFi Access Point, WiFi Controller, WiFi Base Station and Point to Point Systems in 2.4GHz and 5 GHz frequncy band

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. PTP PMP Wireless Access Equipment 2.4 or 5 GHz
2. Wifi Access Points and CPE
3. WLAN Controller Equipment

1. Variant 1 : PTP PMP Wireless Access Equipment 2.4 or 5 GHz

1.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
1.1.1	Conducted And Radiated Emission - Class A	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
1.1.2	EIRP for Wifi PTP PMP Radio Interface	Latest NFAP and GSRs issued by DoT WPC . Annex-G2
1.1.3	Frequency for PTP PMP Radio Interface	DoT WPC GSR No. 45(E) 1048(E). Annex-G1.
1.1.4	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
1.1.5	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B

1.1.6	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
1.1.7	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
1.1.8	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
1.1.9	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
1.1.10	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
1.1.11	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1
1.1.12	WiFi PTP PMP Radio Interface Conformance	Annex-G3

1.2 Interface 1 : 1 G Optical Ethernet

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

1.3 Interface 2 : 10 G Optical Ethernet

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

1.4 Interface 3 : 2 Mbps - E1

S.No.	Parameter Name	Standard Name
1.4.1	Input Jitter Tolerance for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.4.2	Input Return Loss for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I
1.4.3	Nominal Bit Rate with Tolerance for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I

1.4.4	Output Jitter for 2 Mbps Int	ITU-T G.823 / ETSI TBR-4. Annex-I
1.4.5	Pulse Mask for 2 Mbps Int	ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I

1.5 Interface 4 : ADSL

S.No.	Parameter Name	Standard Name
1.5.1	Bit Rate for ADSL Int	ANSI.T1.413-2. Annex-J1
1.5.2	Impulse Noise Protection for ADSL Int	Annex-J1
1.5.3	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
1.5.4	Insulation Test for ADSL Int	Annex-J1
1.5.5	Line Port impedance for ADSLx Int	Annex-J1
1.5.6	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
1.5.7	PSD for ADSL Int	G.992.3 G992.5. Annex-J1
1.5.8	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

1.6 Interface 5 : Fast Ethernet Electrical

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

1.7 Interface 6 : Gigabit Ethernet Electrical

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

1.8 Interface 7 : STM-1 Electrical

S.No.	Parameter Name	Standard Name
1.8.1	Input Jitter Tolerance STM-1 Electrical	ITU-T G.825. Annex-K
1.8.2	Input Return Loss for STM-1 Electrical	ITU-T G.703. Annex-K
1.8.3	Nominal Bit Rate with Tolerance STM-1 Electrical Int	ITU-T G.703. Annex-K
1.8.4	Output Jitter for STM-1 Electrical Int	ITU-T G.825. Annex-K
1.8.5	Pulse Mask for STM-1 Electrical Int	ITU-T G.703. Annex-K

1.9 Interface 8 : STM-1 Optical

S.No.	Parameter Name	Standard Name
1.9.1	Input Jitter Tolerance for STM-1 Opt	ITU-T G.825. Annex-K
1.9.2	Mean Launched Power for STM-1 Opt Int	ITU-T G.957. Annex-K
1.9.3	Nominal Bit Rate with Tolerance STM-1 Opt Int	ITU-T G.957. Annex-K
1.9.4	Operating Wavelength Range for STM-1 Opt Int	ITU-T G.957. Annex-K
1.9.5	Output Jitter for STM-1 Opt Int	ITU-T G.783 G.825 Annex-K
1.9.6	Receiver Overload for STM-1 Opt Int	ITU-T G.957. Annex-K
1.9.7	Receiver Sensitivity for STM-1 Opt Int	ITU-T G.957. Annex-K

1.10 Interface 9 : STM-16 Optical

S.No.	Parameter Name	Standard Name
1.10.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K
1.10.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
1.10.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
1.10.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
1.10.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
1.10.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
1.10.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

1.11 Interface 10 : STM-4 Optical

S.No.	Parameter Name	Standard Name
1.11.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
1.11.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
1.11.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
1.11.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
1.11.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
1.11.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K

1.11.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

1.12 Interface 11 : VDSL

S.No.	Parameter Name	Standard Name
1.12.1	Bit Rate for VDSLx Int	G.993.1 and G993.2. Annex-J1
1.12.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
1.12.3	Line Port impedance for VDSLx Int	Annex-J1
1.12.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
1.12.5	Profiles for VDSLx	G.993.2(cl 7.2). Annex-J1
1.12.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1
1.12.7	Return Loss for VDSLx	G.993.1 Cl. 6.5. Annex-J1
1.12.8	Transmitted Power At ATU-C for VDSLx Int	Annex-J1

1.13 Interface 12 : WiFi

S.No.	Parameter Name	Standard Name
1.13.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
1.13.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3
1.13.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
1.13.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

2. Variant 2 : Wifi Access Points and CPE

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 22/32 EN55022/32. Class A or Class B applicability as defined in Notes to Annex-B.
2.1.2	Dual IP Layer Operation RFC 4213 - Address	RFC 4213 Cl. 2.1. Annex-P6

2.1.3	Dual IP Layer Operation RFC 4213 - Tunnelling	RFC 4213 Cl. 2.1. Annex-P6
2.1.4	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
2.1.5	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
2.1.6	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
2.1.7	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
2.1.8	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
2.1.9	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
2.1.10	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
2.1.11	IPV6 Extn Header Parameters	RFC 2460 or RFC 8200 . Annex-P7
2.1.12	IPV6 Header Parameters	RFC 2460 / RFC 8200 . Annex-P7
2.1.13	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1

2.2 Interface 1 : Fast Ethernet Electrical

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

2.3 Interface 2 : Gigabit Ethernet Electrical

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

2.4 Interface 3 : WiFi

S.No.	Parameter Name	Standard Name
2.4.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
2.4.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407

		or FCC CFR47 pt 15.249. Annex-G3
2.4.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
2.4.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

3. Variant 3 : WLAN Controller Equipment

3.1 Parameters Linked with Product Variant

S.No.	Parameter Name	Standard Name
3.1.1	Conducted And Radiated Emission - Class A	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
3.1.2	Dual IP Layer Operation RFC 4213 - Address	RFC 4213 Cl. 2.1. Annex-P6
3.1.3	Dual IP Layer Operation RFC 4213 - Tunnelling	RFC 4213 Cl. 2.1. Annex-P6
3.1.4	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
3.1.5	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
3.1.6	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
3.1.7	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
3.1.8	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B
3.1.9	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
3.1.10	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
3.1.11	IPV6 Extn Header Parameters	RFC 2460 or RFC 8200 . Annex-P7
3.1.12	IPV6 Header Parameters	RFC 2460 / RFC 8200 . Annex-P7
3.1.13	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1

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
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 : ADSL

S.No.	Parameter Name	Standard Name
3.5.1	Bit Rate for ADSL Int	ANSI.T1.413-2. Annex-J1
3.5.2	Impulse Noise Protection for ADSL Int	Annex-J1
3.5.3	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
3.5.4	Insulation Test for ADSL Int	Annex-J1
3.5.5	Line Port impedance for ADSLx Int	Annex-J1
3.5.6	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
3.5.7	PSD for ADSL Int	G.992.3 G992.5. Annex-J1
3.5.8	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

3.6 Interface 5 : Fast Ethernet Electrical

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

3.7 Interface 6 : Gigabit Ethernet Electrical

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

3.8 Interface 7 : STM-1 Electrical

S.No.	Parameter Name	Standard Name
3.8.1	Input Jitter Tolerance STM-1 Electrical	ITU-T G.825. Annex-K
3.8.2	Input Return Loss for STM-1 Electrical	ITU-T G.703. Annex-K
3.8.3	Nominal Bit Rate with Tolerance STM-1 Electrical Int	ITU-T G.703. Annex-K
3.8.4	Output Jitter for STM-1 Electrical Int	ITU-T G.825. Annex-K
3.8.5	Pulse Mask for STM-1 Electrical Int	ITU-T G.703. Annex-K

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 : STM-16 Optical

S.No.	Parameter Name	Standard Name
3.10.1	Input Jitter Tolerance for STM-16 Opt	G.825. Annex-K

3.10.2	Mean Launched Power for STM-16 Opt Int	ITU-T G.957. Annex-K
3.10.3	Nominal Bit Rate with Tolerance STM-16 Opt Int	ITU-T G.957. Annex-K
3.10.4	Operating Wavelength Range for STM-16 Opt Int	ITU-T G.957. Annex-K
3.10.5	Output Jitter for STM-16 Opt Int	ITU-T G.783. Annex-K
3.10.6	Receiver Overload for STM-16 Opt Int	ITU-T G.957. Annex-K
3.10.7	Receiver Sensitivity for STM-16 Opt Int	ITU-T G.957. Annex-K

3.11 Interface 10 : STM-4 Optical

S.No.	Parameter Name	Standard Name
3.11.1	Input Jitter Tolerance for STM-4 Opt	ITU-T G.825. Annex-K
3.11.2	Mean Launched Power for STM-4 Opt Int	ITU-T G.957. Annex-K
3.11.3	Nominal Bit Rate with Tolerance STM-4 Opt Int	ITU-T G.957 Annex-K
3.11.4	Operating Wavelength Range for STM-4 Opt Int	ITU-T G.957. Annex-K
3.11.5	Output Jitter for STM-4 Opt Int	ITU-T G.783. Annex-K
3.11.6	Receiver Overload for STM-4 Opt Int	ITU-T G.957. Annex-K
3.11.7	Receiver Sensitivity for STM-4 Opt Int	ITU-T G.957. Annex-K

3.12 Interface 11 : VDSL

S.No.	Parameter Name	Standard Name
3.12.1	Bit Rate for VDSLx Int	G.993.1 and G993.2. Annex-J1
3.12.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
3.12.3	Line Port impedance for VDSLx Int	Annex-J1
3.12.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
3.12.5	Profiles for VDSLx	G.993.2(cl 7.2). Annex-J1
3.12.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1
3.12.7	Return Loss for VDSLx	G.993.1 Cl. 6.5. Annex-J1
3.12.8	Transmitted Power At ATU-C for VDSLx Int	Annex-J1

3.13 Interface 12 : WiFi

S.No.	Parameter Name	Standard Name
3.13.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
3.13.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3
3.13.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
3.13.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1