

**अनिवार्य आवश्यकताएँ**

**संख्या : TEC24492408**

**Essential Requirements**

**ER No. : TEC24492408**

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## **IoT Gateway**

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## Essential Requirements for:

### IoT Gateway

Certification Scheme: **SCS**

Product Fee Group: **B**

This ER covers all types of IoT Gateways working on wired or wireless (cellular/ non cellular) communication technologies.

*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. IoT Gateway

#### 1. Variant 1 : IoT Gateway

##### 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	Dual IP Parameters	RFC 4213. Annex-P6
1.1.3	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B
1.1.4	Immunity to DC Voltage Dips and Short Interruptions	EN/IEC:61000-4-29. Annex-B
1.1.5	Immunity to Electrostatic Discharge	TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B
1.1.6	Immunity to Fast Transients (Burst)	TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B
1.1.7	Immunity to Radiated RF	TEC EMI EMC Standard EN/IEC:61000-4-3.

		Annex-B
1.1.8	Immunity to RF Field Induced Conducted Disturbance	TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B
1.1.9	Immunity to Surges	TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B
1.1.10	IoT Dev - Non-0 IMEI or MEID or Unique MAC	Annex-M
1.1.11	IPV4 Parameters	RFC 791. Annex-P6
1.1.12	IPV6 Parameters	RFC 2460 / 8200. Annex-P7
1.1.13	IT Equipment Safety	IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1

### 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 : 200 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.3.1	Average Launch Power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.3.2	Receiver Sensitivity for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.3.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

### 1.4 Interface 3 : 400 G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.4.1	Average Launch Power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.4.2	Receiver Sensitivity for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.4.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

### 1.5 Interface 4 : 40 G Optical Ethernet

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

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

### 1.6 Interface 5 : 5G NR (FR1)

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

### 1.7 Interface 6 : 5G NR- FR1 and FR2 interworking with other Radios

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

### 1.8 Interface 7 : 5G NR (FR2)

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

### 1.9 Interface 8 : 6LoWPAN (2.4 MHz)

S.No.	Parameter Name	Standard Name
1.9.1	Basic RF Requirements for 6LoWPAN Interface	Annex G4 (4.4 to 4.15). ETSI EN 300 328 V2.2.2.
1.9.2	EIRP for 6LoWPAN Interface	WPC GSR 45(E). Annex-G4(4.2)
1.9.3	Frequency of operation for 6LoWPAN Interface	Latest NFAP Annex-G4(4.1)
1.9.4	Maximum Transmitted Power for 6LoWPAN Int	WPC GSR 45(E). Annex-G4 (4.3)

### 1.10 Interface 9 : 6LoWPAN (865 to 867 MHz)

S.No.	Parameter Name	Standard Name
1.10.1	Basic RF Requirements for 6LoWPAN	Annex- G5(5.4 to 5.18). ETSI EN 300 220-2

	Interface (865 to 867 MHz)	V3.2.1
1.10.2	EIRP for 6LoWPAN Interface (865 to 867 MHz)	WPC GSR 564(E). Annex- G5(5.2)
1.10.3	Frequency of Operation for 6LoWPAN Interface( 865 to 867 MHz)	Latest NFAP. Annex- G5(5.1)
1.10.4	Maximum Transmitted Power for 6LoWPAN Interface (865 to 867 MHz)	WPC GSR 564(E). Annex- G5(5.3)

### 1.11 Interface 10 : ADSLx

S.No.	Parameter Name	Standard Name
1.11.1	Bit Rate for ADSLx Int	Annex-J1
1.11.2	Impulse Noise Protection for ADSL Int	Annex-J1
1.11.3	Insulation Test for ADSL Int	Annex-J1
1.11.4	Line Port impedance for ADSLx Int	Annex-J1
1.11.5	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
1.11.6	PSD for ADSLx Int	Annex-J1
1.11.7	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

### 1.12 Interface 11 : BLE for IoT

S.No.	Parameter Name	Standard Name
1.12.1	Basic RF Requirements for BLE Interface	Annex G4 (4.4 to 4.15). ETSI EN 300 328 V2.2.2.
1.12.2	EIRP for BLE Interface	WPC GSR 45(E). Annex-G4 (4.2)
1.12.3	Frequency of Operation for BLE Interface	Latest NFAP. Annex-G4(4.1)
1.12.4	Maximum Transmitted Power for BLE Int	WPC GSR 45(E). Annex-G4 (4.3)

### 1.13 Interface 12 : CDMA

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

### 1.14 Interface 13 : Fast Ethernet Electrical

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

#### 1.15 Interface 14 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
1.15.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
1.15.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
1.15.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

#### 1.16 Interface 15 : Geolocation Navigation Interface for IoT

S.No.	Parameter Name	Standard Name
1.16.1	GPS for IoT	Annexure to ER for Tracking Device
1.16.2	NavIC for IoT	Annexure to ER for Tracking Device

#### 1.17 Interface 16 : Gigabit Ethernet Electrical

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

#### 1.18 Interface 17 : GSM or GPRS or EDGE

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

#### 1.19 Interface 18 : LPWAN - LoRa

S.No.	Parameter Name	Standard Name
1.19.1	Basic RF Requirements for LPWAN-LoRa	Annex- G5(5.4 to 5.18). ETSI EN 300 220-2 V3.2.1
1.19.2	EIRP LoRa	WPC GSR 564(E). Annex- G5(5.2).
1.19.3	Frequency of Operation for LoRa Int	Latest NFAP. Annex- G5(5.1)
1.19.4	Maximum Transmit Power LoRa	WPC GSR 564(E). Annex- G5(5.3).

### 1.20 Interface 19 : LPWAN - SigFox

S.No.	Parameter Name	Standard Name
1.20.1	Basic RF Requirements for LPWAN - SigFox	Annex- G5(5.4 to 5.18). ETSI EN 300 220-2 V3.2.1.
1.20.2	EIRP SigFox	WPC GSR 564(E). Annex- G5(5.2).
1.20.3	Frequency of Operation for SigFox Int	Latest NFAP. Annex- G5(5.1)
1.20.4	Maximum Transmit Power SigFox	WPC GSR 564(E). Annex- G5(5.3).

### 1.21 Interface 20 : LTE or LTE-A

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

### 1.22 Interface 21 : NB-IOT

S.No.	Parameter Name	Standard Name
1.22.1	Frequency Stability-NB-IOT	3GPP TS 36.521-1 Clause 6.5.1F
1.22.2	Maximum output power-NB-IOT	3GPP TS 36.521-1 Clause 6.2.2F
1.22.3	Operating Frequency-NB-IOT-Device Equip. shall be capable of operating in at least one of the frequency bands as per the National Freq. Allocation plan	National Frequency Allocation Plan- 2018 Frequency Allocation Table (IND 16)
1.22.4	Power Control Absolute Power Tolerance-NB-IOT	3GPP TS 36.521-1 Clause 6.3.5F.1
1.22.5	Receiver Adjacent Channel Selectivity (ACS) -NB-IOT	3GPP TS 36.521-1 Clause 7.5F
1.22.6	Receiver In-band blocking-NB-IOT	3GPP TS 36.521-1 Clause 7.6.1F
1.22.7	Receiver Reference Sensitivity level-NB-IOT	3GPP TS 36.521-1 Clause 7.3F
1.22.8	Receiver spurious emission-NB-IOT	3GPP TS 36.521-1 Clause 7.9F
1.22.9	Spectrum emissions mask-NB-IOT	3GPP TS 36.521-1 Clause 6.6.2.1F
1.22.10	Spurious emissions-NB-IOT	3GPP TS 36.521-1 Clause 6.6.3F.1-6.6.3F.2

### 1.23 Interface 22 : NFC for IoT

S.No.	Parameter Name	Standard Name
1.23.1	Basic RF Requirements for NFC - Int	Annex- G6 (6.2 to 6.13). ETSI EN 300 330 V2.1.1
1.23.2	Frequency of Operation for NFC Int	Latest NFAP. Annex-G6(6.1)

### 1.24 Interface 23 : SHDSL

S.No.	Parameter Name	Standard Name
1.24.1	Insulation Resistance for SHDSL int	G.991.2. Annex-J1
1.24.2	LCL for SHDSL Interface	G.991.2. Annex-J1
1.24.3	PSD for SHDSL Int	G.991.2. Annex-J1
1.24.4	Return Loss for SHDSL	G.991.2. Annex-J1
1.24.5	Throughput for SHDSL Interface	G.991.2. Annex-J1
1.24.6	Transmitted Power for SHDSL Int	G.991.2. Annex-J1

### 1.25 Interface 24 : VDSLx

S.No.	Parameter Name	Standard Name
1.25.1	Bit Rate for VDSLx Int	G.993.1 or G993.2. Annex-J1
1.25.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
1.25.3	Line Port impedance for VDSLx Int	G.993.1 or G.993.2 Annex-J1
1.25.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
1.25.5	Profiles for VDSLx	G.993.1 or G.993.2 Annex-J1
1.25.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1
1.25.7	Return Loss for VDSLx	G.993.1 or G.993.2 Annex-J1
1.25.8	Transmitted Power At ATU-C for VDSLx Int	G.993.1 or G.993.2 Annex-J1

### 1.26 Interface 25 : WCDMA or HSPA

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



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### 1.27 Interface 26 : WiFi

S.No.	Parameter Name	Standard Name
1.27.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
1.27.2	5 GHz WiFi Radio Conformance	ETSI EN 301 893 and or ETSI EN 302 502 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3
1.27.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
1.27.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

### 1.28 Interface 27 : ZigBee

S.No.	Parameter Name	Standard Name
1.28.1	Basic RF Requirements for ZigBee Interface	Annex G4 (4.4 to 4.15). ETSI EN 300 328 V2.2.2.
1.28.2	EIRP for ZigBee Interface	WPC GSR 45(E). Annex-G4 (4.2)
1.28.3	Frequency of Operation for ZigBee Interface	Latest NFAP. Annex-G4(4.1)
1.28.4	Maximum Transmitted Power for ZigBee Int	WPC GSR 45(E). Annex-G4 (4.3)