

**Department of Telecommunications  
Telecommunications Engineering Centre  
(IoT division)**

File No: 2-20/2023-IoT/TEC(Pt.I)

Dated: 12.12.2023

**SUB : Minutes of MATCOF meeting held on 20.11.2023 for review of Essential Requirements (ER) of IoT Gateway TEC 24492301 -reg.**

A MATCOF meeting was held on 20.11.2022, in virtual mode, for review of Essential Requirements (ER) of IoT Gateway TEC 24492301. List of participants is available at Annexure-A.

2. Sh. R.S. Singh, DDG(IoT), welcomed all the participants and briefed about the need for reviewing ER of IoT Gateway. He gave a brief presentation about Telecommunication Engineering Centre(TEC) and Mandatory Testing & Certification of Telecommunication Equipment (MTCTE) regime. He also apprised participants that World Telecommunication Standardization Assembly (WTSA)-2024 would be hosted by India in October 2024 in Delhi for which contribution may be submitted. Two resolutions have been identified pertaining to ITU-T SG-20 on "IoT and Smart Cities & Communities" :

**RESOLUTION 98** (Rev. Geneva, 2022): Enhancing the standardization of Internet of Things and smart cities and communities for global development.

**RESOLUTION 78** (Rev. Geneva, 2022): Information and communication technology applications and standards for improved access to e-health services.

3. Mr. Shekhar Singh, AD(IoT) presented the proposed additions and comments/inputs received from stakeholders. The comments / inputs received are given below :

S.No.	Name of Organisation	Inputs / Comments
1.	John Deere (Mr. Parag Kulkarni)	Aligned to the parameters added for testing of 5G interfaces in the ER. We support the addition of international Standard added for these interfaces.
2.	Compliance International Pvt. Ltd., New Delhi (Mr. Parandeep Singh)	The interfaces like 1G Optical and 10G optical are also missing in ER. You are requested to please add these interfaces as we are getting IoT gateways having 1G and 10G Optical interfaces for TEC MTCTE testing purpose.
3.	AA Electro Magnetic Test Laboratory Private Limited (Dr. Lenin Raja )	According to 3GPP FR1 & FR2 for IoT are not covered under Release 17. It may come in Release 18.  We may in discussion with OEM if their Product can Support both FR1 & FR2 at this moment?  Added 200G and 400 G interface with test parameters

Interface : 200G		
S.No.	Parameter Name	Standard Name
1.25.1	Average Launch power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.25.2	Receiver Sensitivity 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.25.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
Interface : 400G		
S.No.	Parameter Name	Standard Name
1.25.1	Average Launch power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.25.2	Receiver Sensitivity 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.25.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

4. The **proposed modification /deletion in the ER / Annexure-to-ER** that emerged, after detailed deliberations, during the discussion in MATCOF meeting are given below :

S.No	Parameter / detail proposed for modification in ER	Existing	Proposed modified	Reason / Remark
1.	Definition	This ER covers all types of IoT Gateways with Cellular Connectivity, Fixed line connectivity, LPWAN(LoRa and Sigfox) and Short range technologies(NFC, RFID etc.)	This ER covers all types of IoT Gateways with Cellular Connectivity, Fixed line connectivity, LPWAN(LoRa and Sigfox) and Short range technologies(NFC, RFID etc.) <b>including 5G and NB-IoT.</b>	<b>5G and NB-IoT</b> added
2.	Parameter Name 1.1.1	Conducted And Radiated Emission - Class A	--	As the device may be either class A or B so to avoid confusion following text may be added in the Annexure-B(Note for IoT) of annexure to ER :
3.	Parameter 1.1.2	Conducted And Radiated Emission - Class B	--	<b>“Conducted and Radiated emission shall be applicable as per the classification of the IoT devices i.e. either class A or B (As applicable)”</b> .
4.	Parameter 1.1.4 (To be deleted)	GPS Compliance	--	To be made as separate interface as table 1.1 pertains to mandatory parameters.
5.	Standard Name 1.1.5 (To be modified)	TEC EMI EMC Standard EN/IEC:61000-4-34 for input current above 16 Ampere. Annex-B	TEC EMI EMC Standard <b>EN/IEC:61000-4-11.</b>	As per TEC EMI/EMC standard. For input current is less than 16 A than EN/IEC:61000-4-11 is applicable
6.	Standard Name 1.1.9 (To be modified)	TEC EMI EMC Standard EN/IEC:61000-4-3 . Annex-B	TEC EMI EMC Standard EN/IEC:61000-4-3 . Annex-B	<b>“ Test Level -2”</b> is removed as the device may be tested for level 2 & 3 both.

5. The proposed **addition of interfaces** in the ER / Annexure-to-ER that emerged during the discussion in MATCOF meeting after detailed deliberations are given below :

**I. Interface : 5G NR- FR1 and FR2 interworking with other Radios**

S.No.	Parameter Name	Standard Name
1.21.1	Additional Spectrum emissions mask for inter-band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.5B.2.3.2
1.21.2	Additional Spurious emissions for inter-band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.5B.4.3
1.21.3	Adjacent channel leakage ratio for Inter- band EN-DC including FR2 2CCs	3GPP TS 38.521-3 Clause 6.5B.2.4.3
1.21.4	Adjacent channel leakage ratio for inter- band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.5B.2.3.3
1.21.5	Adjacent channel selectivity for inter-band EN-DC within FR1 2CCs	3GPP TS 38.521-3 3GPP TS 38.521-3 Clause 7.5B.3
1.21.6	Adjacent channel selectivity for intra-band contiguous EN-DC 2CCs	3GPP TS 38.521-3 Clause 7.5B.1
1.21.7	General spurious emissions for inter-band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.5B.3.3.1
1.21.8	General spurious emissions for intra-band contiguous EN-DC	3GPP TS 38.521-3 Clause 6.5B.3.1.1
1.21.9	Inband blocking for inter-band EN-DC within FR1-2CCs	3GPP TS 38.521-3 Clause 7.6B.2.3
1.21.10	Inband blocking for intra-band contiguous EN-DC in FR1-2CCs	3GPP TS 38.521-3 Clause 7.6B.2.1
1.21.11	Minimum output power for EN-DC Inter- band including FR2	3GPP TS 38.521-3 Clause 6.3B.1.4
1.21.12	Minimum Output Power for intra-band contiguous EN-DC	3GPP TS 38.521-3 Clause 6.3B.1.1
1.21.13	Minimum output power for intra-band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.3B.1.3
1.21.14	Narrow band blocking for inter band EN DC within FR1 2CCs	3GPP TS 38.521-3 Clause 7.6B.4.3

S.No.	Parameter Name	Standard Name
1.21.15	Narrow band blocking for intra band contiguous EN DC in FR1 2CCs	3GPP TS 38.521-3 Clause 7.6B.4.1
1.21.16	Out-of-band blocking for inter-band EN-DC within FR1-2CCs	3GPP TS 38.521-3 Clause 7.6B.3.3
1.21.17	Out-of-band blocking for intra-band contiguous EN-DC in FR1-2CCs	3GPP TS 38.521-3 Clause 7.6B.3.1
1.21.18	Reference sensitivity for EN-DC within FR1 3CCs	3GPP TS 38.521-3 Clause 7.3B.2.3_1.1
1.21.19	Reference sensitivity for inter-band EN-DC including FR2	3GPP TS 38.521-3 Clause 7.3B.2.4
1.21.20	Reference sensitivity for inter-band EN-DC within FR1 2CCs	3GPP TS 38.521-3 Clause 7.3B.2.3
1.21.21	Reference sensitivity for intra-band contiguous EN-DC 2CCs	3GPP TS 38.521-3 Clause 7.3B.2.1
1.21.22	Spectrum emissions mask for inter- band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.5B.2.3.1
1.21.23	Spectrum emissions mask for inter-band EN-DC including FR2 (2 CCs)	3GPP TS 38.521-3 Clause 6.5B.2.4.1
1.21.24	Spurious emission band UE co-existence for intra-band contiguous EN-DC	3GPP TS 38.521-3 Clause 6.5B.3.1.2
1.21.25	Spurious emissions band UE co-existence for inter-band within FR1	3GPP TS 38.521-3 Clause 6.5B.3.3.2
1.21.26	Spurious Emissions for EN DC within FR1 3CCs	3GPP TS 38.521-3 Clause 7.9B.3 1.1
1.21.27	Spurious Emissions for inter band EN DC within FR1 2CCs	3GPP TS 38.521-3 Clause 7.9B.3
1.21.28	Spurious emissions for intra band contiguous EN DC in FR1 2CCs	3GPP TS 38.521-3 Clause 7.9B.1
1.21.29	Spurious Response for inter band EN DC within FR1 2CCs	3GPP TS 38.521-3 Clause 7.7B.3
1.21.30	Spurious Response for intra band contiguous EN DC in FR1 2CCs	3GPP TS 38.521-3 Clause 7.7B.1

S.No.	Parameter Name	Standard Name
1.21.31	UE Maximum Output Power for Inter-Band EN-DC including FR2 - EIRP and TR	3GPP TS 38.521-3 Clause 6.2B.1.4.1
1.21.32	UE Maximum Output Power for Inter-Band EN-DC including FR2 - Spherical Coverage	3GPP TS 38.521-3 Clause 6.2B.1.4.2
1.21.33	UE Maximum Output Power for Inter-Band EN-DC within FR1	3GPP TS 38.521-3 Clause 6.2B.1.3
1.21.34	UE Maximum Output Power for Intra-Band Contiguous EN-DC	3GPP TS 38.521-3 Clause 6.2B.1.1
1.21.35	Wideband Intermodulation for inter band EN DC in FR1 2CCs	3GPP TS 38.521-3 Clause 7.8B.2.3
1.21.36	Wideband Intermodulation for intra band contiguous EN DC in FR1	3GPP TS 38.521-3 Clause 7.8B.2.1

## II. Interface : 5G NR (FR1)

S.No.	Parameter Name	Standard Name
1.22.1	Additional spectrum emission mask-Transmitter	3GPP TS 38.521-1 Clause 6.5.2.3
1.22.2	Additional spectrum emission mask for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.2.3
1.22.3	Additional spurious emissions	3GPP TS 38.521-1 Clause 6.5.3.3
1.22.4	Additional spurious emissions for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.3.3
1.22.5	Adjacent channel selectivity	3GPP TS 38.521-1 Clause 7.5
1.22.6	Adjacent channel selectivity for 2DL CA	3GPP TS 38.521-1 Clause 7.5A.1
1.22.7	Adjacent channel selectivity for UL-MIMO	3GPP TS 38.521-1 Clause 7.5D
1.22.8	General spurious emissions-Transmitter	3GPP TS 38.521-1 Clause 6.5.3.1
1.22.9	General spurious emissions for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.3.1
1.22.10	In-band Blocking for CA-2DL CA	3GPP TS 38.521-1 Clause 7.6A.2.1
1.22.11	Inband Blocking	3GPP TS 38.521-1 Clause 7.6.2
1.22.12	Inband blocking for UL-MIMO	3GPP TS 38.521-1 Clause 7.6D.2

S.No.	Parameter Name	Standard Name
1.22.13	Minimum output power	3GPP TS 38.521-2 Clause 6.3.1
1.22.14	Narrow band blocking	3GPP TS 38.521-1 Clause 7.6.4
1.22.15	Narrow band blocking for CA-2DL CA	3GPP TS 38.521-1 Clause 7.6A.4.1
1.22.16	Narrow band blocking for UL-MIMO	3GPP TS 38.521-1 Clause 7.6D.4
1.22.17	NR ACLR	3GPP TS 38.521-1 Clause 6.5.2.4.1
1.22.18	NR ACLR for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.2.4.1
1.22.19	Out-of-band blocking	3GPP TS 38.521-1 Clause 7.6.3
1.22.20	Out-of-band blocking for UL-MIMO	3GPP TS 38.521-1 Clause 7.6D.3
1.22.21	Reference sensitivity power level	3GPP TS 38.521-1 Clause 7.3.2
1.22.22	Reference sensitivity power level for 2DL CA without exception	3GPP TS 38.521-1 Clause 7.3A.1
1.22.23	Reference sensitivity power level for UL-MIMO	3GPP TS 38.521-1 Clause 7.3D.2
1.22.24	Spectrum Emission Mask-5G NR FR1	3GPP TS 38.521-1 Clause 6.5.2.2
1.22.25	Spectrum emission Mask for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.2.2
1.22.26	Spurious emission for 2DL CA	3GPP TS 38.521-1 Clause 7.9A.1
1.22.27	Spurious emission for UE co-existence	3GPP TS 38.521-1 Clause 6.5.3.2
1.22.28	Spurious emission for UE co-existence for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.3.2
1.22.29	Spurious emissions-5G NR FR1	3GPP TS 38.521-1 Clause 7.9
1.22.30	Spurious response	3GPP TS 38.521-1 Clause 7.7
1.22.31	Spurious response for 2DL CA	3GPP TS 38.521-1 Clause 7.7A.1
1.22.32	Spurious response for UL-MIMO	3GPP TS 38.521-1 Clause 7.7D
1.22.33	UE Maximum Output Power	3GPP TS 38.521-1 Clause 6.2.1
1.22.34	UE maximum output power for UL-MIMO	3GPP TS 38.521-1 Clause 6.2D.1
1.22.35	UE maximum output power reduction for UL- MIMO	3GPP TS 38.521-1 Clause 6.2D.2
1.22.36	UTRA ACLR	3GPP TS 38.521-1 Clause 6.5.2.4.2
1.22.37	UTRA ACLR for UL MIMO	3GPP TS 38.521-1 Clause 6.5D.2.4.2
1.22.38	Wide band Intermodulation	3GPP TS 38.521-1 Clause 7.8.2
1.22.39	Wide band Intermodulation for CA-2DL	3GPP TS 38.521-1 Clause 7.8A.2.1

S.No.	Parameter Name	Standard Name
	CA	
1.22.40	Wide band Intermodulation for UL-MIMO	3GPP TS 38.521-1 Clause 7.8D.2

### III. Interface : 5G NR (FR2)

S.No.	Parameter Name	Standard Name
1.23.1	Adjacent channel leakage ratio	3GPP TS 38.521-2 Clause 6.5.2.3
1.23.2	Minimum Output power-Transmitter	3GPP TS 38.521-1 Clause 6.3.1
1.23.3	Reference sensitivity power level	3GPP TS 38.521-1 Clause 7.3.2
1.23.4	Spectrum Emission Mask-5G NR FR2	3GPP TS 38.521-2 Clause 6.5.2.1
1.23.5	UE maximum output power-EIRP and TRP	3GPP TS 38.521-2 Clause 6.2.1.1
1.23.6	UE maximum output power-Spherical coverage	3GPP TS 38.521-2 Clause 6.2.1.2
1.23.7	UE maximum output power reduction	3GPP TS 38.521-2 Clause 6.2.2
1.23.8	UE maximum output power with additional requirements	3GPP TS 38.521-2 Clause 6.2.3

### IV. Interface : NB-IoT

S.No.	Parameter Name	Standard Name
1.24.1	Frequency Stability-NB-IOT	3GPP TS 36.521-1 Clause 6.5.1F
1.24.2	Maximum output power-NB-IOT	3GPP TS 36.521-1 Clause 6.2.2F
1.24.3	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)
1.24.4	Power Control Absolute Power Tolerance-NB-IOT	3GPP TS 36.521-1 Clause 6.3.5F.1
1.24.5	Receiver Adjacent Channel Selectivity (ACS) - NB-IOT	3GPP TS 36.521-1 Clause 7.5F



S.No.	Parameter Name	Standard Name
1.24.6	Receiver In-band blocking-NB-IOT	3GPP TS 36.521-1 Clause 7.6.1F
1.24.7	Receiver Reference Sensitivity level-NB-IOT	3GPP TS 36.521-1 Clause 7.3F
1.24.8	Receiver spurious emission-NB-IOT	3GPP TS 36.521-1 Clause 7.9F
1.24.9	Spectrum emissions mask-NB-IOT	3GPP TS 36.521-1 Clause 6.6.2.1F
1.24.10	Spurious emissions-NB-IOT	3GPP TS 36.521-1 Clause 6.6.3F.1-6.6.3F.2

#### V. Interface : 200G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.25.1	Average Launch power for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.25.2	Receiver Sensitivity 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122
1.25.3	Wavelength for 200 GE Opt	IEEE 802.3cn Cl 121 Cl 122

#### VI. Interface : 400G Optical Ethernet

S.No.	Parameter Name	Standard Name
1.26.1	Average Launch power for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.26.2	Receiver Sensitivity 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124
1.26.3	Wavelength for 400 GE Opt	IEEE 802.3cn Cl 122 Cl 124

#### VII. Interface : Geolocation Navigation Interface

S.No.	Parameter Name	Standard Name
1.27.1	GPS	As per Annexure to ER for Tracking Device
1.27.2	NavIC	As per Annexure to ER for Tracking Device

Proposal to **add LTE-M interface** was also received during the meeting. The test parameters for the same are being discussed with MT division and shall be accommodated accordingly.

Meeting ended with vote of thanks from DDG(IoT).

Any suggestion / comment may be sent on [ad.iot-tec@gov.in](mailto:ad.iot-tec@gov.in) by 15.12.2023.

This is issued with the approval of DDG(IoT).

Shekhar Singh  
AD(IoT)

**To :**

All the officers of TEC, Stakeholders and participants

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