

**Department of Telecommunications**  
**Telecommunication Engineering Centre**  
**(IoT Division)**

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

Dated: 05.10.2023

To,

**All stakeholders/ MATCOF members related to IoT Division**

**Subject: Invitation for MATCOF meeting of IoT Division, TEC**

1. The Department of Telecommunications, Ministry of Communications, Government of India vide Gazette Notification No. G.S.R. 1131(E) dated 5<sup>th</sup> September, 2017 has amended the Indian Telegraph Rules, 1951 (Amendment 2017) to introduce Mandatory Testing & Certification of Telecom Equipment ( <http://tec.gov.in/pdf/Whatsnew/eGazetteNotif.pdf> ). Telecommunication Engineering Centre (TEC) is implementing Mandatory Testing & Certification of Telecommunication Equipment in India in phases.
2. In MTCTE, every telecom equipment needs to undergo mandatory testing and certification prior to sale, import for use in India. Details are available on TEC website <http://www.tec.gov.in/mandatory-testing-and-certification-of-telecom-equipments-mtcte/>
3. The testing is to be carried out for conformance to Essential Requirements for the equipment. Essential Requirements (ERs) of few IoT devices have already been prepared by TEC with the consultation of related stakeholders (MATCOF meetings). These ERs are available at MTCTE portal at [https://www.mtcte.tec.gov.in/er\\_list](https://www.mtcte.tec.gov.in/er_list)
4. To review / refine the ERs of the **IoT Gateway (TEC 24492301)** mainly for incorporating the 5G and NB-IoT interfaces, a MATCOF(Mandatory Testing Consultative Forum) meeting has been planned as per following schedule :

Essential Requirement of device	Date and Time of Meeting	Online Meeting Link
IoT Gateway (TEC 24492301)	06.11.2023 (11: 30 AM)	<a href="https://cdotmeet.cdotech.in/vmeet/ass-fia-xt7-4yb">https://cdotmeet.cdotech.in/vmeet/ass-fia-xt7-4yb</a>

5. You are requested to give your inputs / comments on the above ERs by 01.11.2023 (05:30 PM) through email to Mr. Shekhar Singh ([ad.iot-tec@gov.in](mailto:ad.iot-tec@gov.in)), Mr. Rajneesh Kumar ([rajneesh.kr@gov.in](mailto:rajneesh.kr@gov.in)) and cc to [ddgsd.tec@gov.in](mailto:ddgsd.tec@gov.in) so that the same may be discussed in the scheduled MATCOF meetings.
  
6. Concerned stakeholders are requested to make it convenient to attend the meeting.

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

(Shekhar Singh)  
AD (IoT), TEC

Encl : Draft updated ER of IoT Gateway

Copy to:

- 1) Sr. DDG TEC- for kind information
- 2) All the officers of TEC/RTEC
- 3) AD(IT) for uploading this notice on TEC website.

अनिवार्य आवश्यकताएं

संख्या : TEC24492301

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Essential Requirements

ER No. : TEC24492301

IoT Gateway

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MTCTE के तहत जारी:

Issued under MTCTE by:

दूरसंचार अभियांत्रिकी केंद्र

भारत सरकार

खुशीद लाल भवन, जनपथ, नई दिल्ली - 110001, भारत

Telecommunication Engineering Centre

Government of India

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

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Essential Requirements for:

## IoT Gateway

Certification Scheme: **GCS**

Product Fee Group: **B**

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.) 5G and NB-IoT added

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	TEC EMI EMC Standard CISPR 32 EN55032. Annex-B
1.1.2	Conducted And Radiated Emission - Class B	TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B
1.1.3	Dual IP Parameters	RFC 4213. Annex-P6
1.1.4	GPS Compliance	Compliance to Gol notification GSR no. 436(E).
1.1.5	Immunity to AC Voltage Dips and Short Interruptions	TEC EMI EMC Standard EN/IEC:61000-4-34 for input current above 16 Ampere. 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 Test Level -2. 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	IoT Dev - Non-0 IMEI or MEID or Unique MAC	Annex-M
1.1.13	IPV4 Parameters	RFC 791. Annex-P6
1.1.14	IPV6 Parameters	RFC 2460 / 8200. Annex-P7
1.1.15	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 : 40 G Optical Ethernet

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

#### 1.4 Interface 3 : 6LoWPAN

S.No.	Parameter Name	Standard Name
1.4.1	Basic RF Requirements for 6LoWPAN Interface	Annex G4 (4.4 to 4.15). ETSI EN 300 328 V2.2.2.
1.4.2	EIRP for 6LoWPAN Interface	WPC GSR 45(E). Annex-G4(4.2)
1.4.3	Frequency of operation for 6LoWPAN	Latest NFAP Annex-G4(4.1)

	Interface	
1.4.4	Maximum Transmitted Power for 6LowPAN Int	WPC GSR 45(E). Annex-G4 (4.3)

#### 1.5 Interface 4 : ADSLx

S.No.	Parameter Name	Standard Name
1.5.1	Bit Rate for ADSLx Int	Annex-J1
1.5.2	Impulse Noise Protection for ADSL Int	Annex-J1
1.5.3	Insulation Test for ADSL Int	Annex-J1
1.5.4	Line Port impedance for ADSLx Int	Annex-J1
1.5.5	Loop resistance for ADSLx	ETSI EN 300 001. Annex-J1
1.5.6	PSD for ADSLx Int	Annex-J1
1.5.7	Transmitted Power At ATU-C for ADSLx Int	Annex-J1

#### 1.6 Interface 5 : BLE for IoT

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

#### 1.7 Interface 6 : CDMA

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

#### 1.8 Interface 7 : Fast Ethernet Electrical

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

#### 1.9 Interface 8 : Fast Ethernet Optical

S.No.	Parameter Name	Standard Name
1.9.1	Average Launch power for FE Opt	IEEE 802.3u. Annex-H
1.9.2	Receiver Sensitivity for FE Opt	IEEE 802.3u. Annex-H
1.9.3	Wavelength for FE Opt	IEEE 802.3u. Annex-H

#### 1.10 Interface 9 : Gigabit Ethernet Electrical

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

#### 1.11 Interface 10 : GSM or GPRS or EDGE

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

#### 1.12 Interface 11 : LPWAN - LoRa

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

#### 1.13 Interface 12 : LPWAN - SigFox

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

#### 1.14 Interface 13 : LTE or LTE-A



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

#### 1.15 Interface 14 : NFC for IoT

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

#### 1.16 Interface 15 : SHDSL

S.No.	Parameter Name	Standard Name
1.16.1	Insulation Resistance for SHDSL int	G.991.2. Annex-J1
1.16.2	LCL for SHDSL Interface	G.991.2. Annex-J1
1.16.3	PSD for SHDSL Int	G.991.2. Annex-J1
1.16.4	Return Loss for SHDSL	G.991.2. Annex-J1
1.16.5	Throughput for SHDSL Interface	G.991.2. Annex-J1
1.16.6	Transmitted Power for SHDSL Int	G.991.2. Annex-J1

#### 1.17 Interface 16 : VDSLx

S.No.	Parameter Name	Standard Name
1.17.1	Bit Rate for VDSLx Int	G.993.1 or G993.2. Annex-J1
1.17.2	Insulation Test for 2 wire Int	ETSI EN 300 001. Annex-D
1.17.3	Line Port impedance for VDSLx Int	G.993.1 or G.993.2 Annex-J1
1.17.4	Loop resistance for VDSLx	ETSI EN 300 001. Annex-J1
1.17.5	Profiles for VDSLx	G.993.1 or G.993.2 Annex-J1
1.17.6	PSD for VDSLx Int	G.993.1(cl 6.2). G.993.2(cl 7.2) Ann-A B C. Annex-J1
1.17.7	Return Loss for VDSLx	G.993.1 or G.993.2 Annex-J1
1.17.8	Transmitted Power At ATU-C for VDSLx Int	G.993.1 or G.993.2 Annex-J1

#### 1.18 Interface 17 : WCDMA or HSPA

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

#### 1.19 Interface 18 : WiFi

S.No.	Parameter Name	Standard Name
1.19.1	2.4 GHz WiFi Radio Conformance	ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3
1.19.2	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
1.19.3	EIRP for Wifi Interface	Latest NFAP and GSRs issued by DoT WPC. Annex-G2
1.19.4	Frequency for WiFi equipments	DoT WPC GSR No. 45(E) 1048(E). Annex-G1

#### 1.20 Interface 19 : ZigBee

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

**1.21 Interface 13 : 5G NR- FR1 and FR2 interworking with other Radios**

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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
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

<a href="#">1.21.17</a>	<a href="#">Out-of-band blocking for intra-band contiguous EN-DC in FR1-2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.6B.3.1</a>
<a href="#">1.21.18</a>	<a href="#">Reference sensitivity for EN-DC within FR1 3CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.3B.2.3 1.1</a>
<a href="#">1.21.19</a>	<a href="#">Reference sensitivity for inter-band EN-DC including FR2</a>	<a href="#">3GPP TS 38.521-3 Clause 7.3B.2.4</a>
<a href="#">1.21.20</a>	<a href="#">Reference sensitivity for inter-band EN-DC within FR1 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.3B.2.3</a>
<a href="#">1.21.21</a>	<a href="#">Reference sensitivity for intra-band contiguous EN-DC 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.3B.2.1</a>
<a href="#">1.21.22</a>	<a href="#">Spectrum emissions mask for inter-band EN-DC within FR1</a>	<a href="#">3GPP TS 38.521-3 Clause 6.5B.2.3.1</a>
<a href="#">1.21.23</a>	<a href="#">Spectrum emissions mask for inter-band EN-DC including FR2 (2 CCs)</a>	<a href="#">3GPP TS 38.521-3 Clause 6.5B.2.4.1</a>
<a href="#">1.21.24</a>	<a href="#">Spurious emission band UE co-existence for intra-band contiguous EN-DC</a>	<a href="#">3GPP TS 38.521-3 Clause 6.5B.3.1.2</a>
<a href="#">1.21.25</a>	<a href="#">Spurious emissions band UE co-existence for inter-band within FR1</a>	<a href="#">3GPP TS 38.521-3 Clause 6.5B.3.3.2</a>
<a href="#">1.21.26</a>	<a href="#">Spurious Emissions for EN DC within FR1 3CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.9B.3 1.1</a>
<a href="#">1.21.27</a>	<a href="#">Spurious Emissions for inter band EN DC within FR1 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.9B.3</a>
<a href="#">1.21.28</a>	<a href="#">Spurious emissions for intra band contiguous EN DC in FR1 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.9B.1</a>
<a href="#">1.21.29</a>	<a href="#">Spurious Response for inter band EN DC within FR1 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.7B.3</a>
<a href="#">1.21.30</a>	<a href="#">Spurious Response for intra band contiguous EN DC in FR1 2CCs</a>	<a href="#">3GPP TS 38.521-3 Clause 7.7B.1</a>
<a href="#">1.21.31</a>	<a href="#">UE Maximum Output Power for Inter-Band EN-DC including FR2 - EIRP and TR</a>	<a href="#">3GPP TS 38.521-3 Clause 6.2B.1.4.1</a>
<a href="#">1.21.32</a>	<a href="#">UE Maximum Output Power for Inter-Band EN-DC including FR2 - Spherical Coverage</a>	<a href="#">3GPP TS 38.521-3 Clause 6.2B.1.4.2</a>
<a href="#">1.21.33</a>	<a href="#">UE Maximum Output Power for Inter-Band EN-DC within FR1</a>	<a href="#">3GPP TS 38.521-3 Clause 6.2B.1.3</a>
<a href="#">1.21.34</a>	<a href="#">UE Maximum Output Power for Intra-Band</a>	<a href="#">3GPP TS 38.521-3 Clause 6.2B.1.1</a>

	<u>Contiguous EN-DC</u>	
<u>1.21.35</u>	<u>Wideband Intermodulation for inter band EN DC in FR1 2CCs</u>	<u>3GPP TS 38.521-3 Clause 7.8B.2.3</u>
<u>1.21.36</u>	<u>Wideband Intermodulation for intra band contiguous EN DC in FR1</u>	<u>3GPP TS 38.521-3 Clause 7.8B.2.1</u>

## **1.22 Interface 14 : 5G NR (FR1)**

<u>S.No.</u>	<u>Parameter Name</u>	<u>Standard Name</u>
<u>1.22.1</u>	<u>Additional spectrum emission mask- Transmitter</u>	<u>3GPP TS 38.521-1 Clause 6.5.2.3</u>
<u>1.22.2</u>	<u>Additional spectrum emission mask for UL MIMO</u>	<u>3GPP TS 38.521-1 Clause 6.5D.2.3</u>
<u>1.22.3</u>	<u>Additional spurious emissions</u>	<u>3GPP TS 38.521-1 Clause 6.5.3.3</u>
<u>1.22.4</u>	<u>Additional spurious emissions for UL MIMO</u>	<u>3GPP TS 38.521-1 Clause 6.5D.3.3</u>
<u>1.22.5</u>	<u>Adjacent channel selectivity</u>	<u>3GPP TS 38.521-1 Clause 7.5</u>
<u>1.22.6</u>	<u>Adjacent channel selectivity for 2DL CA</u>	<u>3GPP TS 38.521-1 Clause 7.5A.1</u>
<u>1.22.7</u>	<u>Adjacent channel selectivity for UL-MIMO</u>	<u>3GPP TS 38.521-1 Clause 7.5D</u>
<u>1.22.8</u>	<u>General spurious emissions-Transmitter</u>	<u>3GPP TS 38.521-1 Clause 6.5.3.1</u>
<u>1.22.9</u>	<u>General spurious emissions for UL MIMO</u>	<u>3GPP TS 38.521-1 Clause 6.5D.3.1</u>
<u>1.22.10</u>	<u>In-band Blocking for CA-2DL CA</u>	<u>3GPP TS 38.521-1 Clause 7.6A.2.1</u>
<u>1.22.11</u>	<u>Inband Blocking</u>	<u>3GPP TS 38.521-1 Clause 7.6.2</u>
<u>1.22.12</u>	<u>Inband blocking for UL-MIMO</u>	<u>3GPP TS 38.521-1 Clause 7.6D.2</u>
<u>1.22.13</u>	<u>Minimum output power</u>	<u>3GPP TS 38.521-2 Clause 6.3.1</u>
<u>1.22.14</u>	<u>Narrow band blocking</u>	<u>3GPP TS 38.521-1 Clause 7.6.4</u>
<u>1.22.15</u>	<u>Narrow band blocking for CA-2DL CA</u>	<u>3GPP TS 38.521-1 Clause 7.6A.4.1</u>
<u>1.22.16</u>	<u>Narrow band blocking for UL-MIMO</u>	<u>3GPP TS 38.521-1 Clause 7.6D.4</u>
<u>1.22.17</u>	<u>NR ACLR</u>	<u>3GPP TS 38.521-1 Clause 6.5.2.4.1</u>
<u>1.22.18</u>	<u>NR ACLR for UL MIMO</u>	<u>3GPP TS 38.521-1 Clause 6.5D.2.4.1</u>
<u>1.22.19</u>	<u>Out-of-band blocking</u>	<u>3GPP TS 38.521-1 Clause 7.6.3</u>
<u>1.22.20</u>	<u>Out-of-band blocking for UL-MIMO</u>	<u>3GPP TS 38.521-1 Clause 7.6D.3</u>
<u>1.22.21</u>	<u>Reference sensitivity power level</u>	<u>3GPP TS 38.521-1 Clause 7.3.2</u>
<u>1.22.22</u>	<u>Reference sensitivity power level for 2DL CA without exception</u>	<u>3GPP TS 38.521-1 Clause 7.3A.1</u>

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<a href="#">1.22.23</a>	<a href="#">Reference sensitivity power level for UL- MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 7.3D.2</a>
<a href="#">1.22.24</a>	<a href="#">Spectrum Emission Mask-5G NR FR1</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5.2.2</a>
<a href="#">1.22.25</a>	<a href="#">Spectrum emission Mask for UL MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5D.2.2</a>
<a href="#">1.22.26</a>	<a href="#">Spurious emission for 2DL CA</a>	<a href="#">3GPP TS 38.521-1 Clause 7.9A.1</a>
<a href="#">1.22.27</a>	<a href="#">Spurious emission for UE co-existence</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5.3.2</a>
<a href="#">1.22.28</a>	<a href="#">Spurious emission for UE co-existence for UL- MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5D.3.2</a>
<a href="#">1.22.29</a>	<a href="#">Spurious emissions-5G NR FR1</a>	<a href="#">3GPP TS 38.521-1 Clause 7.9</a>
<a href="#">1.22.30</a>	<a href="#">Spurious response</a>	<a href="#">3GPP TS 38.521-1 Clause 7.7</a>
<a href="#">1.22.31</a>	<a href="#">Spurious response for 2DL CA</a>	<a href="#">3GPP TS 38.521-1 Clause 7.7A.1</a>
<a href="#">1.22.32</a>	<a href="#">Spurious response for UL-MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 7.7D</a>
<a href="#">1.22.33</a>	<a href="#">UE Maximum Output Power</a>	<a href="#">3GPP TS 38.521-1 Clause 6.2.1</a>
<a href="#">1.22.34</a>	<a href="#">UE maximum output power for UL-MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 6.2D.1</a>
<a href="#">1.22.35</a>	<a href="#">UE maximum output power reduction for UL- MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 6.2D.2</a>
<a href="#">1.22.36</a>	<a href="#">UTRA ACLR</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5.2.4.2</a>
<a href="#">1.22.37</a>	<a href="#">UTRA ACLR for UL MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 6.5D.2.4.2</a>
<a href="#">1.22.38</a>	<a href="#">Wide band Intermodulation</a>	<a href="#">3GPP TS 38.521-1 Clause 7.8.2</a>
<a href="#">1.22.39</a>	<a href="#">Wide band Intermodulation for CA-2DL CA</a>	<a href="#">3GPP TS 38.521-1 Clause 7.8A.2.1</a>
<a href="#">1.22.40</a>	<a href="#">Wide band Intermodulation for UL-MIMO</a>	<a href="#">3GPP TS 38.521-1 Clause 7.8D.2</a>

### **1.23 Interface 15 : 5G NR (FR2)**

<u>S.No.</u>	<u>Parameter Name</u>	<u>Standard Name</u>
<a href="#">1.23.1</a>	<a href="#">Adjacent channel leakage ratio</a>	<a href="#">3GPP TS 38.521-2 Clause 6.5.2.3</a>
<a href="#">1.23.2</a>	<a href="#">Minimum Output power-Transmitter</a>	<a href="#">3GPP TS 38.521-1 Clause 6.3.1</a>
<a href="#">1.23.3</a>	<a href="#">Reference sensitivity power level</a>	<a href="#">3GPP TS 38.521-1 Clause 7.3.2</a>
<a href="#">1.23.4</a>	<a href="#">Spectrum Emission Mask-5G NR FR2</a>	<a href="#">3GPP TS 38.521-2 Clause 6.5.2.1</a>
<a href="#">1.23.5</a>	<a href="#">UE maximum output power-EIRP and TRP</a>	<a href="#">3GPP TS 38.521-2 Clause 6.2.1.1</a>
<a href="#">1.23.6</a>	<a href="#">UE maximum output power-Spherical coverage</a>	<a href="#">3GPP TS 38.521-2 Clause 6.2.1.2</a>
<a href="#">1.23.7</a>	<a href="#">UE maximum output power reduction</a>	<a href="#">3GPP TS 38.521-2 Clause 6.2.2</a>

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1.23.8	<u>UE maximum output power with additional requirements</u>	<u>3GPP TS 38.521-2 Clause 6.2.3</u>
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**1.24. Interface 15 : NB-IoT**

<u>S.No.</u>	<u>Parameter Name</u>	<u>Standard Name</u>
<u>1.24.1</u>	<u>Frequency Stability-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 6.5.1F</u>
<u>1.24.2</u>	<u>Maximum output power-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 6.2.2F</u>
<u>1.24.3</u>	<u>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</u>	<u>National Frequency Allocation Plan- 2018 Frequency Allocation Table (IND 16)</u>
<u>1.24.4</u>	<u>Power Control Absolute Power Tolerance-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 6.3.5F.1</u>
<u>1.24.5</u>	<u>Receiver Adjacent Channel Selectivity (ACS)-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 7.5F</u>
<u>1.24.6</u>	<u>Receiver In-band blocking-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 7.6.1F</u>
<u>1.24.7</u>	<u>Receiver Reference Sensitivity level-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 7.3F</u>
<u>1.24.8</u>	<u>Receiver spurious emission-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 7.9F</u>
<u>1.24.9</u>	<u>Spectrum emissions mask-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 6.6.2.1F</u>
<u>1.24.10</u>	<u>Spurious emissions-NB-IOT</u>	<u>3GPP TS 36.521-1 Clause 6.6.3F.1-6.6.3F.2</u>

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