**Matrix**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product Variants/Interfaces** | **GSM** | **GPRS** | **EDGE** | **WCDMA** | **LTE** | **WiFi** | **Bluetooth** | **NFC** |
| Feature Phone |  |  |  |  |  |  |  |  |
| Smart Phone |  |  |  |  |  |  |  |  |
| Data Card/Dongle |  |  |  |  |  |  |  |  |

**Scope**

This document lays down the Essential Requirements under the mandatory testing Framework in accordance with Government of India Gazette Notification No. G.S.R. 1131(E), dated 05th September 2017, for Mobile user equipment (including data card/dongle) to be used in Indian Telecom Network using 2G/3G/4G technology. The handsets may also support WiFi, Infrared, Bluetooth, NFC which will need to be certified using the appropriate ER.

# EMI/ EMC Requirements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
| **1.0** | **EMI/ EMC** |  |  |  |
| 1.1 | Conducted and Radiated Emission (Class A or B)? | “CISPR 22 (2008) Class B, CISPR 32 | Compliance Certificate from Accredited Lab |  |
| 1.2 | Immunity to Electrostatic discharge: Contact discharge level 2 {± 4 kV} or higher voltage; | IEC-61000-4-2 | Compliance Certificate from Accredited Lab |  |
| 1.3 | Immunity to Electrostatic discharge: Air discharge level 3 {± 8 kV} or higher voltage. | IEC-61000-4-2 | Compliance Certificate from Accredited Lab |  |
| 1.4 | Immunity to radiated RF: Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency range 80 MHz to 1000 MHz and for protection against digital radio telephones and other RF devices in frequency ranges 800 MHz to 960 MHz and 1.4 GHz to 6.0 GHz. | IEC 61000-4-3 (2010) | Compliance Certificate from Accredited Lab |  |
| 1.5 | Immunity to fast transients (burst): Test Level 2: b) 0. 5 kV for signal / control / data / telecom lines. | IEC 61000- 4- 4 {2012) | Compliance Certificate from Accredited Lab |  |
| 1.6 | Immunity to surges: (a) 2 kV peak open circuit voltage for line to ground | IEC 61000-4-5 (2014) | Compliance Certificate from Accredited Lab |  |
| 1.7 | Immunity to surges: (b) 2 kV peak open circuit voltage for line to line coupling. | IEC 61000-4-5 (2014) | Compliance Certificate from Accredited Lab |  |
| 1.8 | Immunity to conducted disturbance induced by Radio frequency fields: Under the test level 2 {3 V r.m.s.} in the frequency range 150 kHz-80 MHz | IEC 61000-4-6 (2013) | Compliance Certificate from Accredited Lab |  |
| 1.9 | Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any): | IEC 61000-4-11 (2004): | Compliance Certificate from Accredited Lab |  |

# Safety Requirements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
| **2.0** | **Safety Requirements** |  |  |  |
| 2.1 | **Radiation Safety (SAR) Requirements** |  |  |  |
| 2.1.1 | SAR value: 1.6 W/Kg averaged over 1 gm tissue. | SAR measurement Standards  TEC/GR/SAR/001/01.MAR.09 OR IEC Standard 62209-1:2005 | Compliance Certificate from Accredited Lab |  |
| 2.1.2 | Display the single worst case value of SAR | request using MMI string code \*#07#. | Value to be < 1.6 W/Kg averaged over 1 gm tissue.  Compliance Certificate from Accredited Lab |  |
| 2.2 | Safety Requirement for Batteries | IS 16046: 2012 (equivalent to IEC 62133:2002) | Compliance Certificate from Accredited Lab |  |
| 2.3 | General Safety Requirement | IS 13252 | Compliance Certificate from Accredited Lab |  |

# Security Requirements: **As per Security Requirements finalised by Security wing of DoT**

# Technical Requirements

## Technical Requirements for GSM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Operating Frequency**  Mobile Handsets shall be capable of at least operating in the following frequency bands.  **GSM**: 1710-1785 MHz (U/L) and 1805-1880 MHz (D/L)  **GSM**: 890-915 MHz (U/L) and 935-960 MHz (D/L)  New bands adopted by DoT shall be automatically applicable to this ER. | Current National Frequency Allocation Plan | Compliance |  |
|  | **Requirement (test case)** |  | Compliance |  |
|  | Transmitter Maximum output power | TS 51 010-1 13.16.2  EN 301 511 (GSM) 4.2.10 | Compliance |  |
|  | Transmitter Spectrum emissions mask | TS 51 010-1 13.4  EN 301 511 (GSM) 4.2.6 | Compliance |  |
|  | Transmitter spurious emissions in active mode (Conducted) | TS 51 010-1 12.1.1  EN 301 511 (GSM) 4.2.12 | Compliance |  |
|  | Receiver spurious emission in idle mode (Conducted) | TS 51 010-1 12.1.2  EN 301 511 (GSM) 4.2.13 | Compliance |  |
|  | Frequency Stability | TS 51 010-1 13.1  EN 301 511 (GSM) 4.2.1 | Compliance |  |
|  | Radiated spurious emissions | TS 51 010-1 12.2.1 NA  EN 301 511 (GSM) 4.2.16 | Compliance |  |
|  | General ON/OFF time mask | TS 51 010-1 (NA)  EN 301 511 (GSM) | Compliance |  |
|  | Power Control Absolute power tolerance | TS 151 010-1 22.1  EN 301 511 (GSM) | Compliance |  |
|  | Receiver Reference sensitivity level | TS 51 010-1 14.2.1  EN 301 511 (GSM) | Compliance |  |
|  | Receiver Adjacent  Channel Selectivity  (ACS) | TS 51 010-1 14.5.1  EN 301 511 (GSM) | Compliance |  |
|  | Receiver In-band blocking | TS 51 010-1 14.7.1  EN 301 511 (GSM) 4.2.20 | Compliance |  |

## Technical Requirements for WCDMA/HSPA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Operating Frequency**  Mobile Handsets shall be capable of at least operating in the following frequency bands.  **WCDMA**: 1920-1980 MHz (U/L) and 2110-2170 MHz (D/L)  **WCDMA**: 890-915 MHz (U/L) and 935-960 MHz (D/L)  New bands adopted by DoT shall be automatically applicable to this ER. | Current National Frequency Allocation Plan | Compliance |  |
|  | **Requirements- Test Cases** |  | Compliance |  |
|  | Transmitter Maximum output power | TS 34.121-1 5.2  EN 301 908-2 (UMTS) 4.2.2 | Compliance |  |
|  | Transmitter Spectrum emissions mask | TS 34.121-1 5.9  EN 301 908-2 (UMTS) 4.2.3 | Compliance |  |
|  | Transmitter spurious emissions in active mode (Conducted) | TS 34.121-1 5.11  EN 301 908-2 (UMTS) 4.2.4 | Compliance |  |
|  | Receiver spurious emission in idle mode (Conducted) | TS 34.121-1 6.8  EN 301 908-2 (UMTS) 4.2.10 | Compliance |  |
|  | Frequency Stability | TS 34.121-1 5.3  EN 301 908-2 (UMTS) | Compliance |  |
|  | Radiated spurious emissions | N/A  EN 301 908-1 (UMTS/LTE) | Compliance |  |
|  | General ON/OFF time mask | TS 34.121-1 5.5.2  EN 301 908-2 (UMTS) | Compliance |  |
|  | Power Control Absolute power tolerance | TS 34.121-1 5.4.3  EN 301 908-2 (UMTS) 4.2.5 | Compliance |  |
|  | Receiver Reference sensitivity level | TS 34.121-1 6.2  EN 301 908-2 (UMTS) 4.2.13 | Compliance |  |
|  | Receiver Adjacent  Channel Selectivity  (ACS) | TS 34.121-1 6.4  EN 301 908-2 (UMTS) 4.2.6 | Compliance |  |
|  | Receiver In-band blocking | TS 34.121-1 6.5.2.1  EN 301 908-2 (UMTS) 4.2.7 | Compliance |  |

## Technical Requirements for LTE/LTE-A

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Operating Frequency**  Mobile Handsets shall be capable of at least operating in the following frequency bands.  **LTE(FDD):** 824 – 849 MHz (U/L) and 869 – 894 MHz (D/L)  **LTE(FDD):** 1710-1785 MHz (U/L) and 1805-1880 MHz (D/L)  **LTE** **(FDD):** 1920-1980 MHz (U/L) and 2110-2170 MHz (D/L)  **LTE (TDD):** 2300 – 2400 MHz  **LTE (TDD):** 2496 – 2690 MHz  New bands adopted by DoT shall be automatically applicable to this ER. | Current National Frequency Allocation Plan | Compliance |  |
|  | **Requirements- Test Cases** |  | Compliance |  |
|  | Transmitter Maximum output power | TS 36.521-1 6.2.2  EN 301 908-13 (LTE) 4.2.2 | Compliance |  |
|  | Transmitter Spectrum emissions mask | TS 36.521-1 6.6.2.1  EN 301 908-13 (LTE) 4.2.3 | Compliance |  |
|  | Transmitter spurious emissions in active mode (Conducted) | TS 36.521-1 6.6.3.1, 6.6.3.2, 6.6.3.3  EN 301 908-13 (LTE) 4.2.4 | Compliance |  |
|  | Receiver spurious emission in idle mode (Conducted) | TS 36.521-1 7.9  EN 301 908-13 (LTE) 4.2.10 | Compliance |  |
|  | Frequency Stability | TS 36.521-1 6.5  EN 301 908-13 (LTE) | Compliance |  |
|  | Radiated spurious emissions | N/A  EN 301 908-1 (UMTS/LTE) 4.2.2 | Compliance |  |
|  | General ON/OFF time mask | TS 36.521-1 6.3.4.1  EN 301 908-13 (LTE) | Compliance |  |
|  | Power Control Absolute power tolerance | TS 36.521-1 6.3.5.1  EN 301 908-13 (LTE) | Compliance |  |
|  | Receiver Reference sensitivity level | TS 36.521-1 7.3  EN 301 908-13 (LTE) 4.2.12 | Compliance |  |
|  | Receiver Adjacent  Channel Selectivity  (ACS) | TS 36.521-1 7.5  EN 301 908-13 (LTE) 4.2.6 | Compliance |  |
|  | Receiver In-band blocking | TS 36.521-1 7.6.1  EN 301 908-13 (LTE) 4.2.7 | Compliance |  |

## Technical Requirements for CDMA 2000

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Operating Frequency**  Mobile Handsets shall be capable of at least operating in the following frequency bands.  **CDMA:** 824-844 MHz (U/L) and 869-889 MHz (D/L)  New bands adopted by DoT shall be automatically applicable to this ER. | Current National Frequency Allocation Plan | Compliance |  |
|  | **Requirements- Test Cases** |  | Compliance |  |
|  | Transmitter Maximum output power | 1x: S0011 4.4.5  EN 301 908-04 (CDMA) 4.2.3 | Compliance |  |
|  | Transmitter Spectrum emissions mask | 1x: S0011 4.5.1  EN 301 908-04 (CDMA) 4.2.2 | Compliance |  |
|  | Transmitter spurious emissions in active mode (Conducted) | 1x: S0011 4.5.1  EN 301 908-04 (CDMA) 4.2.2 | Compliance |  |
|  | Receiver spurious emission in idle mode (Conducted) | 1x: S0011 3.6  EN 301 908-04 (CDMA) 4.2.5 | Compliance |  |
|  | Frequency Stability | 1x: S0011 4.1  EN 301 908-04 (CDMA) | Compliance |  |
|  | Radiated spurious emissions | N/A  EN 301 908-04 (CDMA) | Compliance |  |
|  | General ON/OFF time mask | EN 301 908-04 (CDMA) | Compliance |  |
|  | Power Control Absolute power tolerance |  | Compliance |  |
|  | Receiver Reference sensitivity level | EN 301 908-04 (CDMA) | Compliance |  |
|  | Receiver Adjacent  Channel Selectivity  (ACS) | EN 301 908-04 (CDMA) 4.2.8 | Compliance |  |
|  | Receiver In-band blocking | EN 301 908-04 (CDMA) 4.2.6 | Compliance |  |

## Technical Requirements for WiFi, Bluetooth, NFC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Support for WiFi** (with/without Hotspot facility) | ER for WiFi | Compliance |  |
|  | **Support for Bluetooth** | ER for Bluetooth | Compliance |  |
|  | **Support for NFC** | ER for NFC | Compliance |  |

# Other Requirements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clause** | **Parameter** | **Standard** | **Limits/ Results expected** | **Results** |
|  | **Identification of Equipment for GSM/UMTS/LTE** |  |  |  |
|  | The Mobile Terminal shall be marked with the manufacturer’s brand identification mark, and the manufacturer’s model or type reference. The markings required shall be legible, indelible and readily visible. | GSMA Official Document TS.06 - IMEI Allocation and Approval Process | Compliance |  |
|  | Each individual Mobile Terminal shall be allocated a unique ‘International Mobile Station Equipment Identity (IMEI)’. Manufacturer shall ensure that adequate security measures have been taken to protect the IMEI against duplication, unauthorized removal or change. | GSMA Official Document TS.06 - IMEI Allocation and Approval Process | Compliance |  |
|  | The IMEI number of the device shall be available in the latest updated IMEI database of the GSMA. | Department of Telecommunication No. 20-40/2006-BS-III(Pt.)(Vol.I)201 dated 3rd September 2009 | Compliance |  |
|  | The Handset shall not be with all zeroes IMEI. | Department of Telecommunication No. 20-40/2006-BS-III(Pt.)(Vol.I)201 dated 3rd September 2009 | Compliance |  |
|  | In case of Mobile handset having more than one SIM if each SIM is associated with its own transceiver, then each transceiver/SIM should have its own associated IMEI number. Therefore, a dual SIM phone should have 2 IMEI numbers; a three SIM phone should have 3 IMEI numbers etc. | GSMA Official Document TS.06 - IMEI Allocation and Approval Process | Compliance |  |
|  | **Identification of Equipment for CDMA 2000** |  |  |  |
|  | The Mobile Terminal shall be marked with the manufacturer’s brand or identification mark, and the manufacturer’s model or type reference. The markings required shall be legible, indelible and readily visible. |  | Compliance |  |
|  | Each individual Mobile Terminal shall be allocated a unique ‘Mobile Equipment Identifier (MEID/ESN)’. Manufacturer shall ensure that adequate security measures have been taken to protect the MEID/ESN against duplication, unauthorized removal or change. |  | Compliance |  |
|  | The Handset shall not be with all zeroes MEID/ESN. | Department of Telecommunication No. 20-40/2006-BS-III(Pt.)(Vol.I)201 dated 3rd September 2009 | Compliance |  |
|  | **Support for Emergency Services** |  |  |  |
|  | Panic button in all mobile handsets | Government of India Gazette Notification No. G.S.R. No. 1441 (E) dated 23-11-2017 | Compliance |  |
|  | GPS in new smart mobile handsets | Government of India Gazette Notification No. G.S.R. No. 1441 (E) dated 23-11-2017 | Compliance |  |
| **5.1.1** | Single Emergency number 112 | Department of Telecom No. 16-04/2015-AS-III/NP/67/120 dated 04th May 2016 |  |  |
|  | Support of the handset for Single Emergency number 112 | **For GSM/UMTS/LTE**  3GPP TS 22.101 and TS 24.008  **For CDMA 2000**,  3GPP2 C.S0023 | Compliance |  |
|  | **Support for Indian Language** | Government of India Gazette Notification No. G.S.R. No. 2357 (E) along with subsequent notifications. | Compliance |  |
|  | **IPv6 Compliance**  All data (Packet) enabled handsets shall be capable of carrying IPv6 traffic either on dual stack (IPv4v6) or on native IPv6 compliant | Department of Telecom F. No. 1-15/RFD/2012-NT dated 10-01-2013 (National IPv6 Deployment Roadmap Version-II)  Department of Telecom 2-8/IPv6-Review/2015-NT Dated: 25-05-2016 (Revision of the IPv6 Transition Timelines) | Compliance Certificate from Accredited Lab against RFC 2460, 2461. |  |
|  | **Restriction on use of Hazardous Material**  Every producer of electrical and electronic equipment and their components or consumables or parts or spares listed in Schedule I shall ensure that, new Electrical and Electronic Equipment and their components or consumables or parts or spares do not contain Lead, Mercury, Cadmium, Hexavalent Chromium, polybrominated biphenyls and polybrominated diphenyl ethers beyond a maximum concentration value of 0.1% by weight in homogenous materials for lead, mercury, hexavalent chromium, polybrominated biphenyls and polybrominated diphenyl ethers and of 0.01% by weight in homogenous materials for cadmium. | E-Waste (Management) Rules, 2016 dated 23rd March 2016 notified vide notification G.S.R. 338 (E), by Ministry of Environment, Forests and Climate Change. | Compliance |  |