Essential Requirements (ER)

For

Point of Sale (POS) Devices

(With three variants)

Index:

1. Scope:

This document lays down the Essential Requirements **(ER)** under the Mandatory Testing Framework in accordance with Government of India Gazette Notification No. G.S.R. 1131 (E), dated 5th September 2017, for **"Point of Sale (POS) Devices"** used in Indian Telecom Networks.

1.1 Variants:

This document covers the following three variants of the product "Point of Sale (POS) Devices" (refer Table-I below):-

Table I: List of product variants

Variants→ **Products↓**	Variant 1	Variant 2	Variant 3
Point of Sale (POS) Devices	POS terminal with PSTN/CDMA/ GSM/ GPRS/ 3G/4G interface (without biometric)	POS terminal with PSTN/CDMA/ GSM/ GPRS/3G/4G interface (with biometric)	e-POS: PoS terminal with PSTN/CDMA/ GSM/ GPRS/ 3G/4G interface (with Integrated biometric)

1.2 Brief Description

This Document covers the following aspects of the Essential Requirements, namely-EMI/EMC Requirements, Safety Requirements, Security Requirements, Technical Requirements and Other Requirements.

2. Essential Requirements

Essential Requirements, namely-EMI/EMC Requirements, Safety Requirements, Security Requirements, Technical Requirements and Other Requirements are as follows:

2.1 EMI/EMC Requirement:

The equipment shall conform to the EMC requirements as per the TEC Standard No. TEC/SD/DD/EMC-221/05.OCT 2016 and limits indicated therein.

S.N.	Parameter	Results
i)	**Conducted and radiated emission:** **Name of EMC Standard:** "CISPR 22 (2008)/CISPR 32 - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment". **Limits:-** i. To comply with Class B of CISPR 22 (2008)/CISPR 32. ii. The values of limits shall be as per TEC Standard No. TEC/SD/DD/EMC-221/05.OCT 2016. iii. For Radiated Emission tests, limits below 1 GHz shall be as per Table 4 (a1) or 5 (a1) of TEC Standard No. TEC/SD/DD/EMC-221/05.OCT 2016 for measuring distance of 3m.	Test results from Designated CAB of TEC to be submitted for compliance.
ii)	**Immunity to Electrostatic discharge:** **Name of EMC Standard:** IEC 61000-4-2 {2008) "Testing and measurement techniques of Electrostatic discharge immunity test". **Limits: -** i. Contact discharge level 2 {± 4 kV} or higher voltage; ii. Air discharge level 3 {± 8 kV} or higher voltage;	Test results from Designated CAB of TEC to be submitted for compliance

iii)	**Immunity to radiated RF:** **Name of EMC Standard:** IEC 61000-4-3 (2010) "Testing and measurement techniques- Radiated RF Electromagnetic Field Immunity test" **Limits:-** **For Telecom Terminal Equipment without Voice interface (s)** Under test level 2 {test field strength of 3 V/m} for general purpose 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	Test results from Designated CAB of TEC to be submitted for compliance
iv)	**Immunity to fast transients (burst):** **Name of EMC Standard**: IEC 61000- 4- 4 {2012) "Testing and measurement techniques of electrical fast transients/burst immunity test" **Limits:-** Test Level 2 i.e. a) 1 kV for AC/DC power lines; b) 0. 5 kV for signal / control / data / telecom lines;	Test results from Designated CAB of TEC to be submitted for compliance
v)	**Immunity to surges:** **Name of EMC Standard:** IEC 61000-4-5 (2014) “Testing & Measurement techniques for Surge immunity test" **Limits:-** i. For mains power input ports: (a) 2 kV peak open circuit voltage for line to ground coupling (b) 1 kV peak open circuit voltage for line to line coupling ii. For telecom ports: (a) 2 kV peak open circuit voltage for line to ground	Test results from Designated CAB of TEC to be submitted for compliance

	(b) 2 kV peak open circuit voltage for line to line coupling.	
vi)	**Immunity to conducted disturbance induced by Radio frequency fields:** **Name of EMC Standard:** IEC 61000-4-6 (2013) "Testing & measurement techniques-Immunity to conducted disturbances induced by radio- frequency fields" **Limits:-** Under the test level 2 {3 V r.m.s.}in the frequency range 150 kHz-80 MHz for AC / DC lines and Signal /Control/telecom lines.	Test results from Designated CAB of TEC to be submitted for compliance
vii)	**Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any):** **Name of EMC Standard:** IEC 61000-4-11 (2004) "Testing & measurement techniques- voltage dips, short interruptions and voltage variations immunity tests" **Limits:-** i. a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500ms) ii. a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e. 40% supply voltage for 200ms) iii. a voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s. iv. a voltage interruption corresponding to a reduction of supply voltage of >95% for 10ms.	Test results from Designated CAB of TEC to be submitted for compliance
viii)	**Immunity to voltage dips & short interruptions (applicable to only DC power input ports, if any):** **Name of EMC Standard**: IEC 61000-4-29:2000: Electromagnetic compatibility (EMC) Part 4-29: Testing and measurement techniques- voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	Test results from Designated CAB of TEC

	Limits: i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B. ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C. iii. Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B. iv. Voltage dip corresponding to 40% & 70% of supply for 100ms, 300 ms and 1000 ms. Applicable Performance Criteria shall be C. v. Voltage variations corresponding to 80% and 120% of supply for 100 ms to 10s as per Table 1c of IEC 61000-4-29. Applicable Performance Criteria shall be B.	to be submitted for compliance

Note: For checking compliance with the above EMC requirements, the method of measurements shall be in accordance with TEC Standard No. TEC/SD/RD/EMC-002/02.OCT.2016 and the references mentioned therein.

2.2 Safety Requirements:

S.N.	Parameter	Results/remarks
i)	The device shall conform to IS 13252 (2003) “Safety of information technology device including electrical business device” {equivalent to IEC Publication 60950 (2001)} and IS 10437 {1986} “Safety requirements of radio transmitting devices” equivalent to IEC 60215 {for Radio Devices only}.	Compliance
ii)	**Safety Requirement for Batteries:** IS 16046: 2012 (equivalent to IEC 62133:2002) (latest version, if any)	Compliance

2.3 Security Requirements:

As and when prescribed by DoT HQ.

2.4 Technical Requirements:

For technical requirements, refer Table-II for interfaces used for product variants, Table-III A for Interface parameters and Table III B for additional test parameters for product variants.

Table II: List of Interfaces for products and their variants

Applicable to→ **Interface↓**	**Product Variants**		
	POS terminal with PSTN/CDMA/GSM/GPRS/3G/4G interface (without biometric)	POS terminal with PSTN/ CDMA/GSM/GPRS/3G/4G interface (with biometric)	e-POS: PoS terminal with PSTN/CDMA/GSM/GPRS/3G/4G interface (with Integrated biometric)
2 Wire/PSTN	y	y	y
CDMA	y	y	y
GSM/GPRS	y	y	y
3G	y	y	y
4G	y	y	y

Table III-A-: List of test parameters for interfaces/product and their international standards							
Applicable to→ **Test Parameter↓**	*(Standards)*	2W/ PSTN	CDMA	GPRS	GSM	3G	4G
Longitudinal/Transverse Conversion Loss/ (Impedance Unbalance about earth)	Q.552 (clause 2.1.2)	y					
Return Loss	Q.552(clause 2.1.1.2)	y					
Over Voltage/ Over Current Protection	K.21	y					
Max. Loop Current	ETSI EN 300 001(<60 mA)	y					
Idle State Current	ETSI EN 300 001 (< 30 µA)	y					
Insulation Test	ETSI EN 300 001(>5 MΩ)	y					
CDMA parameters	Refer Annexure-I		y				
GSM/GPRS parameters	Refer Annexure-I			y	y		
3G parameters	Refer Annexure-I					y	
4G parameters	Refer Annexure-I						y

Note: The above interfaces and their parameters shall be tested as applicable to EUT. If EUT has some other communication technologies/interfaces in the WAN (network side) in addition to the technology mentioned in this ER, then the corresponding technical requirements in the respective ER of TEC will be applicable.

Table-III B - List of additional test parameters applicable to product variants				
Applicable to→ **Test Parameter↓**	**Product Variants**			
	(Standard)	POS terminal with PSTN/ CDMA/ GSM/ GPRS interface	(POS) terminal with PSTN/CDMA/ GSM/GPRS interface (with biometric)	e-POS: PoS terminal with PSTN/CDMA/ GSM/GPRS interface (with Integrated biometric)
RFID parameters	Refer Annexure-II	y	y	y
NFC parameters	Refer Annexure-II	y	y	y
BLE parameters	Refer Annexure-II	y	y	y
Wi-Fi parameters	Refer Annexure-II	y	y	y

2.5 Other Requirements (if any): ----------

Annexure-I

S.N.	Parameter	Standard
1. Technical Requirements for CDMA 2000		
i	**Operating Frequency:** EUT shall be capable of at least operating in the following frequency bands. **CDMA:** 824-844 MHz (U/L) and 869889 MHz (D/L)	Current National Frequency Allocation Plan
ii	Transmitter Maximum output power	1x: S0011 4.4.5 0R EN 301 908-04 (CDMA) 4.2.3
iii	Transmitter Spectrum emissions mask	1x: S0011 4.5.1 0R EN 301 908-04 (CDMA) 4.2.2
iv	Transmitter spurious emissions in active mode (Conducted)	1x: S0011 4.5.1 0R EN 301 908-04 (CDMA) 4.2.2
v	Receiver spurious emission in idle mode (Conducted)	1x: S0011 3.6 0R EN 301 908-04 (CDMA) 4.2.5
vi	Frequency Stability	1x: S0011 4.1 0R EN 301 908-04 (CDMA)
vii	Receiver Reference sensitivity level	EN 301 908-04 (CDMA)
viii	Receiver Adjacent Channel Selectivity (ACS)	EN 301 908-04 (CDMA) 4.2.8
ix	Receiver In-band blocking	EN 301 908-04 (CDMA) 4.2.6
2. Technical Requirements for GSM:		
i	**Operating Frequency:** EUT 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)	Current National Frequency Allocation Plan

ii	Transmitter Maximum output power	For GSM: TS 51 010-1 13.3 For GPRS:TS 51 010-1 13.16.2 OR EN 301 511 (GSM) 4.2.10
iii	Output RF Spectrum	3GPP TS 51 010-1 13.4 OR EN 301 511 (GSM) 4.2.6
iv	Transmitter spurious emissions in active mode (Conducted)	3GPP TS 51 010-1 12.1.1 0R EN 301 511 (GSM) 4.2.12
v	Receiver spurious emission in idle mode (Conducted)	3GPP TS 51 010-1 12.1.2 0R EN 301 511 (GSM) 4.2.13
vi	Frequency Stability	3GPP TS 51 010-1 13.1 0R EN 301 511 (GSM) 4.2.1
vi	Receiver Reference sensitivity level	3GPP TS 51 010-1 14.2.1 0R EN 301 511 (GSM)
vii	Adjacent Channel Rejection	3GPP TS 51 010-1 14.5.1 0R EN 301 511 (GSM)
ix	Receiver blocking	3GPP TS 51 010-1 14.7.1 0R EN 301 511 (GSM) 4.2.20
3. Technical Requirements for WCDMA/HSPA:		
i	Operating Frequency EUT 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 935960 MHz (D/L)	Current National Frequency Allocation Plan
ii	Transmitter Maximum output power	3GPP TS 34.121-1 5.2 0R EN 301 908-2 (UMTS) 4.2.2
iii	Transmitter Spectrum emissions mask	3GPP TS 34.121-1 5.9 0R EN 301 908-2 (UMTS) 4.2.3
iv	Transmitter spurious emissions in active mode (Conducted)	3GPP TS 34.121-1 5.11 0R EN 301 908-2 (UMTS) 4.2.4
v	Receiver spurious emission in idle mode (Conducted)	3GPP TS 34.121-1 6.8 0R EN 301 908-2 (UMTS) 4.2.10
vi	Frequency Stability	3GPP TS 34.121-1 5.3 0R EN 301 908-2 (UMTS)

vii	Transmitter Minimum Output Power	3GPP TS 34.121-1 5.4.3 0R EN 301 908-2 (UMTS) 4.2.5
viii	Receiver Reference sensitivity level	3GPP TS 34.121-1 6.2 0R EN 301 908-2 (UMTS) 4.2.13
ix	Receiver Adjacent Channel Selectivity (ACS)	3GPP TS 34.121-1 6.4 0R EN 301 908-2 (UMTS) 4.2.6
x	Receiver In-band blocking	3GPP TS 34.121-1 6.5.2.1 0R EN 301 908-2 (UMTS) 4.2.7
4. Technical Requirements for LTE/ LTE-A:		
i	**Operating Frequency** EUT shall be capable of operating in one or more of the following frequency bands. **LTE(FDD):** 824 – 849 MHz (U/L) and 869 – 894 MHz (D/L) **LTE(FDD):**890-915 MHz (U/L) and 935-960 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	Current National Frequency Allocation Plan
ii	Transmitter Maximum output power	3GPP TS 36.521-1 6.2.2 OR EN 301 908-13 (LTE) 4.2.2
iii	Transmitter Spectrum emissions mask	3GPP TS 36.521-1 6.6.2.1 OR EN 301 908-13 (LTE) 4.2.3
iv	Transmitter spurious emissions in active mode (Conducted)	3GPP TS 36.521-1 6.6.3.1, 6.6.3.2, 6.6.3.3 OR EN 301 908-13 (LTE) 4.2.4
v	Receiver spurious emission in idle mode (Conducted)	3GPP TS 36.521-1 7.9 OR EN 301 908-13 (LTE) 4.2.10
vi	Frequency Stability	3GPP TS 36.521-1 6.5 OR EN 301 908-13 (LTE)
vii	Power Control Absolute power tolerance	3GPP TS 36.521-1 6.3.5.1 OR EN 301 908-13 (LTE)
viii	Receiver Reference sensitivity level	3GPP TS 36.521-1 7.3 OR EN 301 908-13 (LTE) 4.2.12
ix	Receiver Adjacent Channel Selectivity (ACS)	3GPP TS 36.521-1 7.5 OR EN 301 908-13 (LTE) 4.2.6
x	Receiver In-band blocking	3GPP TS 36.521-1 7.6.1 OR EN 301 908-13 (LTE) 4.2.7

ANNEXURE-II

Technical requirements for Wi-Fi, RFID or any other low power wireless interfaces, when used in LAN (customer end)

<table>
<tr><td>1.</td><td colspan="2">RFID/ NFC/ BLE</td></tr>
<tr><td></td><td>Parameter</td><td>Standard</td></tr>
<tr><td>i</td><td>Frequency of operation:
For RFID: UHF-865-867 MHz
For NFC: 13.56 MHz band
For LAN/HAN Interface-Bluetooth Low Energy (BLE): 2.4 GHz band as per latest NFAP provisions.
Note: Frequency of operation requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</td><td>As per the provisions of latest NFAP and GSRs issued by WPC</td></tr>
<tr><td>ii</td><td>EIRP:
A. Maximum Transmitted Power: 1W
B. Maximum effective radiated power: 4W.
C. Carrier Bandwidth: 200 KHz.
Note: EIRP requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</td><td>As per the provisions of latest NFAP and GSRs issued by WPC</td></tr>
<tr><td>iii</td><td>Spurious Emissions:
1. Transmitter Spurious Emission:
(a) In-Band spurious emission:
<table>
<tr><td>Frequency Offset</td><td>Transmit Power</td></tr>
<tr><td>550 kHz</td><td>-20 dBc</td></tr>
<tr><td>|M*-N*| =2</td><td>-20 dBm</td></tr>
</table></td><td>As per the provisions of latest NFAP and GSRs issued by WPC</td></tr>
</table>

|M*-N*| =3	-40 dBm

*The transmitter is transmitting on channel M and the adjacent channel power is measured on channel number N

(b) Out-of-band Spurious Emission:

Frequency range	Limit when operating	Limit when in standby
30 MHz to 1 GHz	- 36 dBm	- 57 dBm
Above 1 GHz to 12.75 GHz	- 30 dBm	- 47 dBm
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	- 47 dBm	- 47 dBm

2. **Receiver spurious emissions** (measured in a 100 KHz bandwidth):

Frequency range	Limit
30 MHz to 1 GHz	- 57 dBm
Above 1 GHz to 12.75 GHz	- 47 dBm .

<table>
<tr><td colspan="3">2. Wi-Fi</td></tr>
<tr><td>S.N.</td><td>Parameter</td><td>Standard</td></tr>
<tr><td>i</td><td>Frequency of operation:
a) 2.4 GHz band: 2.4- 2.4835 GHz as per latest NFAP provisions.
b) 5 GHz: 5.150- 5.350 GHz, 5.725-5.875 GHz band as per latest NFAP provisions.
Note: Frequency of operation requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</td><td>As per latest NFAP provisions and GSRs issued by WPC</td></tr>
<tr><td>ii</td><td>EIRP:
a) Maximum of 4 Watts for outdoor usage.
b) Maximum of 200 mW for indoor usage.
Note: EIRP requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</td><td>As per latest NFAP provisions and GSRs issued by WPC</td></tr>
<tr><td>iii</td><td>Spurious emissions:
1. Transmitter spurious emissions:
(a) Transmitter limits for narrowband spurious emission
<table>
<tr><td>Frequency range</td><td>Limit when operating</td><td>Limit when in standby</td></tr>
<tr><td>30 MHz to 1 GHz</td><td>- 36 dBm</td><td>- 57 dBm</td></tr>
<tr><td>Above 1 GHz to 12.75 GHz</td><td>- 30 dBm</td><td>- 47 dBm</td></tr>
<tr><td>1.8 GHz to 1.9 GHz
5.15 GHz to 5.3 GHz</td><td>- 47 dBm</td><td>- 47 dBm</td></tr>
</table></td><td>As per latest NFAP provisions and GSRs issued by WPC</td></tr>
</table>

(b) Transmitter limits for wideband spurious emission

Frequency range	Limit when operating	Limit when in standby
30 MHz to 1 GHz	- 86 dBm/Hz	- 107 dBm/Hz
Above 1 GHz to 12.75 GHz	- 80 dBm/Hz	- 97 dBm/Hz
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	- 97 dBm/Hz	- 97 dBm/Hz

2. Receiver spurious emissions:

(a) Narrowband spurious emission limits for receivers

Frequency range	Limit
30 MHz to 1 GHz	- 57 dBm
Above 1 GHz to 12.75 GHz	- 47 dBm .

(b) Wideband spurious emission limits for receivers

Frequency range	Limit
30 MHz to 1 GHz	- 107 dBm/ Hz
Above 1 GHz to 12.75 GHz	- 97 dBm / Hz

****