

ER for Smart Electricity Meter

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 Smart Electricity Meter/ Smart Circuit Breaker Panel to be used in Indian Telecom Network using

(a) Cellular/ Broadband connectivity for transmitting data directly to the HES

Product Matrix: -

Product/ Variant	BLE	GSM 2G	WCDMA 3G	LTE/ LTE- A	CDMA 2000	Ethernet	USB	6LoW PAN	RF Mesh	ZigBee	NB PLC	BB PLC	G3 PLC	Prime Netw orks	IPv6
Smart Electricity Meter working on Cellular/ broadband	NA					NA	NA	NA	NA	NA	NA	NA	NA	NA	

1 EMI/ EMC Requirements

Clause	Parameter	Standard	Limits/ Results expected	Remarks
1.0	EMI/ EMC			
1.1	<p>Conducted and Radiated Emission (Class A or B)?</p> <p>The values of limits shall be as per TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p> <p>For Radiated Emission tests, limits below 1 GHz shall be as per Table 4 (a1) (for Class B) or 5 (a1) (for Class A) for measuring distance of 3m</p>	<p>CISPR 22 (2008) Class B / CISPR 32 Class B (2015)</p> <p>Note: If meter is to be tested along with communication module then CISPR 14-1 is applicable</p>	Compliance	<i>As CISPR 32: 2015 has replaced CISPR 22: 2008 and the overlap period of 3 years between the two standards as provided by IEC is over in 2018</i>
1.2	<p>Immunity to Electrostatic discharge: Contact discharge level 2 {± 4 kV} or higher voltage;</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of</p>	<p>For communication module: Level 2 as per standard IEC-61000-4-2</p> <p>Note: If meter is to be tested along with communication module, then severity level should be 4 (As per Standard of Smart Meter IS 16444 which refers to IS 15884.)</p>	Compliance	

	TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16			
1.3	<p>Immunity to Electrostatic discharge: Air discharge level 3 {± 8 kV} or higher voltage.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	<p>For communication module: Level 3 as per standard IEC-61000-4-2</p> <p>Note: If meter is to be tested along with communication module then severity level should be 4 (As per Standard of Smart Meter IS 16444 which refers to IS 13779 & IS 15884.)</p>	Compliance	
1.4	<p>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.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p>	<p>For communication module: Level 2 as per standard IEC 61000-4-3 (2010)</p> <p>Note: If meter is to be tested along with communication module, then severity level should be 4 and Field Strength is 10 V/m (As per Standard of Smart Meter IS 16444 which refers to IS 13779 & IS 15884.)</p>	Compliance	

	Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16			
1.5	<p>Immunity to fast transients (burst): Test Level 2: b) 0.5 kV for signal / control / data / telecom lines.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	<p>For communication module: Level 2 as per standard IEC 61000-4-4 {2012}</p> <p>Note: If meter is to be tested along with communication module then severity level should be 3, ±4KV (As per Standard of Smart Meter IS 16444 which refers to IS 13779 & IS 15884.)</p>	Compliance	
1.6	<p>Immunity to surges: (a) 2 kV peak open circuit voltage for line to ground</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	<p>For communication module: 2 kV as per standard IEC 61000-4-5 (2014) in both the polarities and all the angles (As per Standard of Smart Meter IS 16444 which refers to IS 13779 & IS 15884.)</p> <p>Note: If meter is to be tested along with communication module then ± 5 KV and 5 Pulses</p>	Compliance	

		each polarity at 60° ,240° only in Differential Mode		
1.7	<p>Immunity to surges: (b) 2 kV peak open circuit voltage for line to line coupling.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	<p>For communication module: 2 kV as per standard IEC 61000-4-5 (2014) in both the polarities and all the angles</p> <p>Note: If meter is to be tested along with communication module then ± 5 KV and 5 Pulses each polarity at 60° ,240° only in Differential Mode</p>	Compliance	
1.8	<p>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</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	IEC 61000-4-6 (2013)	Compliance	

1.9	<p>Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any):</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	IEC 61000-4-11 (2004)	Compliance	
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2 Safety Requirements

Clause	Parameter	Standard	Limits/ Results expected	Remarks
2.0	General Safety Requirement	For communication module: IEC 60950 / IS 13252 Note: If meter is to be tested along with communication module then Safety must as per prevailing IS 16444	Compliance	

3 Security Requirements

As and when prescribed by DoT

Clause	Parameter	Standard	Limits/ Results expected	Remarks
3.0				

4 Technical Requirements

4.1 Technical Requirements for GSM

Clause	Parameter	Standard	Limits/ Results expected	Remarks
4.1.1.	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	Compliance	
4.1.2.	Transmitter Maximum output power	3GPP TS 51 010-1 13.16.2 (GPRS) and 3GPP TS 51 010-1 13.3 (GSM) or EN 301 511 (GSM) 4.2.10	Compliance	
4.1.3.	Output RF Spectrum	3GPP TS 51 010-1 13.4 or EN 301 511 (GSM) 4.2.6	Compliance	
4.1.4.	Transmitter spurious emissions in active mode (Conducted)	3GPP TS 51 010-1 12.1.1 or EN 301 511 (GSM) 4.2.12	Compliance	
4.1.5.	Receiver spurious emission in idle mode (Conducted)	3GPP TS 51 010-1 12.1.2 or EN 301 511 (GSM) 4.2.13	Compliance	

4.1.6.	Frequency Stability	3GPP TS 51 010-1 13.1 or EN 301 511 (GSM) 4.2.1	Compliance	
4.1.7.	Receiver Reference sensitivity level	3GPP TS 51 010-1 14.2.1 or EN 301 511 (GSM)	Compliance	
4.1.8.	Adjacent Channel Rejection	3GPP TS 51 010-1 14.5.1 or EN 301 511 (GSM)	Compliance	
4.1.9.	Receiver blocking	3GPP TS 51 010-1 14.7.1 or EN 301 511 (GSM) 4.2.20	Compliance	

4.2 Technical Requirements for WCDMA/HSPA

Clause	Parameter	Standard	Limits/ Results expected	Remarks
4.2.1.	<p>Operating Frequency</p> <p>EUT shall be capable of at least operating in the following frequency bands.</p> <p>WCDMA: 1920-1980 MHz (U/L) and 2110-2170 MHz (D/L)</p> <p>WCDMA: 890-915 MHz (U/L) and 935-960 MHz (D/L)</p>	Current National Frequency Allocation Plan	Compliance	
4.2.2.	Transmitter Maximum output power	3GPP TS 34.121-1 5.2 or EN 301 908-2 (UMTS) 4.2.2	Compliance	
4.2.3.	Transmitter Spectrum emissions mask	3GPP TS 34.121-1 5.9 or EN 301 908-2 (UMTS) 4.2.3	Compliance	
4.2.4.	Transmitter spurious emissions in active mode (Conducted)	3GPP TS 34.121-1 5.11 or EN 301 908-2 (UMTS) 4.2.4	Compliance	
4.2.5.	Receiver spurious emission in idle mode (Conducted)	3GPP TS 34.121-1 6.8 or EN 301 908-2 (UMTS) 4.2.10	Compliance	
4.2.6.	Frequency Stability	3GPP TS 34.121-1 5.3 or EN 301 908-2 (UMTS)	Compliance	

4.2.7.	Transmitter Minimum Output Power	3GPP TS 34.121-1 5.4.3 or EN 301 908-2 (UMTS) 4.2.5	Compliance	
4.2.8.	Receiver Reference sensitivity level	3GPP TS 34.121-1 6.2 or EN 301 908-2 (UMTS) 4.2.13	Compliance	
4.2.9.	Receiver Adjacent Channel Selectivity (ACS)	3GPP TS 34.121-1 6.4 or EN 301 908-2 (UMTS) 4.2.6	Compliance	
4.2.10.	Receiver In-band blocking	3GPP TS 34.121-1 6.5.2.1 or EN 301 908-2 (UMTS) 4.2.7	Compliance	

4.3 Technical Requirements for LTE/LTE-A

Clause	Parameter	Standard	Limits/ Results expected	Remarks
4.3.1.	<p>Operating Frequency</p> <p>EUT shall be capable of operating in FDD bands or TDD bands or both FDD and TDD bands as mentioned below as per the band allocation to different operators.</p> <p>LTE(FDD):824 - 849 MHz (U/L) and 869 - 894 MHz (D/L)</p> <p>LTE(FDD):1710-1785 MHz (U/L) and 1805-1880 MHz (D/L)</p> <p>LTE(FDD): 1920-1980 MHz (U/L) and 2110-2170 MHz (D/L)</p> <p>LTE (TDD): 2300 - 2400 MHz</p> <p>LTE (TDD): 2496 - 2690 MHz</p>	Current National Frequency Allocation Plan	Compliance	

4.3.2.	Transmitter Maximum output power	3GPP TS 36.521-1 6.2.2 or EN 301 908-13 (LTE) 4.2.2	Compliance	
4.3.3.	Transmitter Spectrum emissions mask	3GPP TS 36.521-1 6.6.2.1 or EN 301 908-13 (LTE) 4.2.3	Compliance	
4.3.4.	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	Compliance	
4.3.5.	Receiver spurious emission in idle mode (Conducted)	3GPP TS 36.521-1 7.9 or EN 301 908-13 (LTE) 4.2.10	Compliance	
4.3.6.	Frequency Stability	3GPP TS 36.521-1 6.5 or EN 301 908-13 (LTE)	Compliance	
4.3.7.	Power Control Absolute power tolerance	3GPP TS 36.521-1 6.3.5.1 or EN 301 908-13 (LTE)	Compliance	
4.3.8.	Receiver Reference sensitivity level	3GPP TS 36.521-1 7.3 or EN 301 908-13 (LTE) 4.2.12	Compliance	
4.3.9.	Receiver Adjacent Channel Selectivity (ACS)	3GPP TS 36.521-1 7.5 or EN 301 908-13 (LTE) 4.2.6	Compliance	
4.3.10.	Receiver In-band blocking	3GPP TS 36.521-1 7.6.1 or EN 301 908-13 (LTE) 4.2.7	Compliance	

4.4 Technical Requirements for CDMA 2000

Clause	Parameter	Standard	Limits/ Results expected	Remarks
4.4.1.	Operating Frequency EUT shall be capable of at least operating in the following frequency bands. CDMA: 824-844 MHz (U/L) and 869-889 MHz (D/L)	Current National Frequency Allocation Plan	Compliance	
4.4.2.	Transmitter Maximum output power	1x: S0011 4.4.5 or EN 301 908-04 (CDMA) 4.2.3	Compliance	
4.4.3.	Transmitter Spectrum emissions mask	1x: S0011 4.5.1 or EN 301 908-04 (CDMA) 4.2.2	Compliance	
4.4.4.	Transmitter spurious emissions in active mode (Conducted)	1x: S0011 4.5.1 or EN 301 908-04 (CDMA) 4.2.2	Compliance	
4.4.5.	Receiver spurious emission in idle mode (Conducted)	1x: S0011 3.6 or EN 301 908-04 (CDMA) 4.2.5	Compliance	
4.4.6.	Frequency Stability	1x: S0011 4.1 or EN 301 908-04 (CDMA)	Compliance	
4.4.7.	Receiver Reference sensitivity level	EN 301 908-04 (CDMA)	Compliance	

4.4.8.	Receiver Adjacent Channel Selectivity (ACS)	EN 301 908-04 (CDMA) 4.2.8	Compliance	
4.4.9.	Receiver In-band blocking	EN 301 908-04 (CDMA) 4.2.6	Compliance	

5 Other Requirements

Clause	Parameter	Standard	Limits/ Results expected	Remarks
5.1.	Identification of Equipment for GSM/UMTS/LTE			
a)	Each device shall have a unique 'International Mobile Station Equipment Identity' (IMEI) which shall not be with all zeros/ null/ invalid IMEI.	GSMA Official Document TS.06, 2017 - IMEI Allocation and Approval Process Test Procedure: Manufacturer shall mention the suitable procedure for testing IMEI by connecting device to smart phone/ tablet/ PC and without using any specialised test equipment	Compliance	
5.2.	Identification of Equipment for CDMA 2000		Compliance	
a)	Each device shall be allocated a unique 'Mobile Equipment Identifier (MEID/ESN)' which shall not be with all zeroes/ null/ invalid MEID/ESN.	Similar Procedure as in Clause 5.1. above	Compliance	

<p>5.3.</p>	<p>IPv6 Compliance All data (Packet) enabled devices shall be capable of carrying IPv6 traffic either on dual stack (IPv4v6) or on native IPv6 compliant</p>	<p>For IPv6: RFC 2460: Clause no. 3, 4.1, 4.2, 4.3, 4.4 For Dual stack: RFC 4213: Clause 2.1 & Clause 2.2 (Note: Date of implementation will be as per DoT policy)</p>	<p>Compliance</p>	
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