

अनिवार्य आवश्यकताएं

ESSENTIAL REQUIREMENTS

सं.: टी.ई.सी./ई.आर./एम.टी./ आर.पी.टी.-००१/०१/अप्रैल २०१८

No. : TEC/ER/MT/RPT-001/01/APRIL 2018

Repeater(s) for Cellular Network

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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 Repeaters for Cellular Network to be used in Indian Telecom Network using 2G/3G/4G technology.

The document defines the mandatory testing requirements for certification under the MT&CTE framework.

This ER covers following variants of the product:

Name of Product	Variant(s)
Repeater(s) for Cellular Network	<ol style="list-style-type: none"><li data-bbox="580 837 847 871">1. GSM Repeater<li data-bbox="580 904 900 938">2. WCDMA Repeater<li data-bbox="580 972 831 1005">3. LTE Repeater

History

S. No.	Name of the Product	ER Number	Remarks
1.	Repeater(s) for Cellular Network	TEC/ER/MT/RPT-001/ 01/APRIL 2018	New ER Release Date - __/04/2018

1 EMI/ EMC Requirements

(These requirements shall be as per TEC Standard No. TEC/SD/DD/EMC-221/05.OCT-16 as modified/ amended from time to time)

Clause	Parameter	Standard	Limits/ Results expected
1.1.	Conducted and Radiated Emission	CISPR 22 (2008) OR CISPR 32 Class-A	Compliance
1.2.	Immunity to Electrostatic discharge: Contact discharge level 2 { ± 4 kV}	IEC-61000-4-2 Performance Criteria-B, Clause 9	Compliance
1.3.	Immunity to Electrostatic discharge: Air discharge level 3 { ± 8 kV}	IEC-61000-4-2 Performance Criteria-B, Clause 9	Compliance
1.4.	Immunity to radiated RF: (a) Radio Frequency: 80 MHz to 1 GHz, Electromagnetic field: 3V/m (b) Radio Frequency: 800 MHz to 960 MHz, Electromagnetic field: 10V/m (c) Radio Frequency: 1.4 GHz to 6 GHz, Electromagnetic field: 10V/m	IEC 61000-4-3 (2010); Performance Criteria-A, Clause 9	Compliance
1.5.	Immunity to fast transients (burst): Test Level 2: (a) 1 kV for AC/DC power port (b) 0.5 kV for signal / control / data / telecom lines.	IEC 61000-4-4 {2012}; Performance Criteria-B, Clause 9	Compliance
1.6.	Immunity to surges: AC/DC ports (a) 2 kV peak open circuit voltage for line to ground (b) 1kV peak open circuit voltage for line to line	IEC 61000-4-5 (2014) Performance Criteria-B, Clause 9	Compliance
1.7.	Immunity to surges: Telecom ports (c) 2 kV peak open circuit voltage for line to ground coupling. (d) 2 kV peak open circuit voltage for line to line coupling.	IEC 61000-4-5 (2014) Performance Criteria-C, Clause 9	Compliance

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 for AC / DC lines and Signal /Control/telecom lines.	IEC 61000-4-6 (2013) Performance Criteria-A, Clause 9	Compliance
1.9.	Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any): Limits: - (a) a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70% supply voltage for 500ms) (b) a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e.40% supply voltage for 200ms) (c) a voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s. (d) a voltage interruption corresponding to a reduction of supply voltage of >95% for 10ms.	IEC 61000-4-11 (2004): a. Performance Criteria B for Reduction of Supply 30% for 500ms or Dip to reduction of 60% for 100ms b. Performance Criteria C for Reduction of 60% for 200ms c. Performance criteria C for Voltage Interruption>95% for 5 s (Note: In case of Battery back-up performance criteria A is applicable). d. Performance Criteria B for Voltage Interruption >95% duration :10ms (Note: In case of Battery back-up Performance Criteria A is applicable for above conditions.)	Compliance

1.10.	<p>Immunity to voltage dips & short interruptions (applicable to only DC power input ports, if any):</p> <ul style="list-style-type: none"> a. Voltage Interruption with 0% of supply for 10ms. b. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. c. Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. d. Voltage dip corresponding to 40% & 70% of supply for 100ms, 300 ms and 1000 ms. e. Voltage variations corresponding to 80% and 120%of supply for 100 ms to 10s as per Table 1c of IEC 61000-4-29. 	<p>IEC 61000-4-29(2000)</p> <ul style="list-style-type: none"> a. Applicable Performance Criteria shall be B. b. Applicable Performance Criteria shall be C. c. Applicable Performance Criteria shall be B. d. Applicable Performance Criteria shall be C. e. Applicable Performance Criteria shall be B. 	Compliance
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2 Safety Requirements

Clause	Parameter	Standard	Limits/ Results expected
2.1	The equipment shall conform to IS 13252 part 1:2010- "Information Technology Equipment – Safety- Part 1: General Requirements" [equivalent to IEC 60950-1 {2005} "Information Technology Equipment –Safety- Part 1: General Requirements"] Or IEC 62368-I:2014	IS 13252 part 1:2010 / IEC 60950-1 {2005} part 1; or IEC 62368-I:2014	Compliance

3 Security Requirements

Clause	Parameter	Standard	Limits/ Results expected
Under finalisation by DOT Security Wing			

4 Technical Requirements

4.1 Technical Requirements for RF Repeaters – GSM

Clause	Parameter	Standard	Limits/ Results expected
4.1.1.	Operating Frequency The Repeater shall be capable of operating in at least one of the frequency bands as per the National Frequency Allocation Plan.	Applicable National Frequency Allocation Plan	Compliance
4.1.2.	Output Power	3GPP TS 45.005 Clause 4.1.2	Compliance
4.1.3.	Spurious emissions	3GPP TS 51.026 Clause 5	Compliance
4.1.4.	Frequency Error	3GPP TS 51.026 Clause 8	Compliance
4.1.5.	Intermodulation Attenuation	3GPP TS 51.026 Clause 6	Compliance
4.1.6.	Out of Band Gain	3GPP TS 51.026 Clause 7	Compliance

4.2 Technical Requirements for W-CDMA (UTRA FDD) Repeaters

Clause	Parameter	Standard	Limits/ Results expected
4.2.1.	<p>Operating Frequency</p> <p>The Repeater shall be capable of operating in at least one of the frequency bands as per the National Frequency Allocation Plan.</p>	Applicable National Frequency Allocation Plan	Compliance
4.2.2.	Output Power	3GPP TS 25.143 Clause 6	Compliance
4.2.3.	Out of band emission	3GPP TS 25.143 Clause 9.1	Compliance
4.2.4.	Spurious emissions	3GPP TS 25.143 Clause 9.2	Compliance
4.2.5.	Input intermodulation	3GPP TS 25.143 Clause 11	Compliance
4.2.6.	Out of band gain	3GPP TS 25.143 Clause 8	Compliance
4.2.7.	Adjacent Channel Rejection Ratio	3GPP TS 25.143 Clause 13	Compliance
4.2.8.	Output intermodulation	3GPP TS 25.143 Clause 12	Compliance

4.3 Technical Requirements for LTE (FDD) Repeaters

Clause	Parameter	Standard	Limits/ Results expected
4.3.1.	Operating Frequency The Repeater shall be capable of operating in at least one of the frequency bands as per the National Frequency Allocation Plan.	Applicable National Frequency Allocation Plan	Compliance
4.3.2.	Output Power	3GPP TS 36.143 Clause 6	Compliance
4.3.3.	Operating band unwanted emissions	3GPP TS 36.143 Clause 9.1	Compliance
4.3.4.	Spurious emissions	3GPP TS 36.143 Clause 9.2	Compliance
4.3.5.	Input intermodulation	3GPP TS 36.143 Clause 11	Compliance
4.3.6.	Out of band gain	3GPP TS 36.143 Clause 8	Compliance
4.3.7.	Adjacent Channel Rejection Ratio	3GPP TS 36.143 Clause 13	Compliance
4.3.8.	Output intermodulation	3GPP TS 36.143 Clause 12	Compliance

5 Other Requirements

Clause	Parameter	Standard	Limits/ Results expected

References

S.No.	Document No.	Document Title
1.	TEC/SD/DD/EMC-221/05/ OCT-16	Electromagnetic compatibility standard for Telecommunication Equipment
2.	CISPR 22 (2008)	Limits and methods of measurement of radio disturbance characteristics of Information Technology equipment
3.	CISPR 32 (2015)	Electromagnetic compatibility of multimedia equipment - Emission requirements
4.	IEC 61000-4-2 (2008)	Testing and measurement techniques of Electrostatic discharge immunity test
5.	IEC 61000-4-3 (2010)	Radiated RF Electromagnetic Field Immunity test
6.	IEC 61000-4-4 (2012)	Testing and measurement techniques of electrical fast transients/burst immunity test
7.	IEC 61000-4-5(2014)	Test & Measurement techniques for Surge immunity tests
8.	IEC 61000-4-6(2013)	Immunity to conducted disturbances, induced by radio frequency fields
9.	IEC 61000-4-11(2004)	Voltage dips, shot interruptions and voltage variations immunity tests
10.	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
11.	IS 13252 part 1: 2010 And 2013 & And 2015	Information Technology Equipment –Safety- Part 1: General Requirements
12.	IEC 60950-1:2005+ A1:2009 + A2:2013	Information Technology Equipment –Safety- Part 1: General Requirements
13.	IEC 62368: 2014	Audio/video, information and communication technology equipment - Part 1: Safety requirements
14.	3GPP TS 45.005	Digital cellular telecommunications system (Phase 2+); Radio transmission and reception

15.	3GPP TS 51.026	Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Part 4: Repeaters
16.	3GPP TS 25.143	Universal Mobile Telecommunications System (UMTS);UTRA repeater conformance testing
17.	3GPP TS 36.143	Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing

Glossary

CAB	Conformance Assessment Body
CDMA	Code Division Multiple Access
CISPR	Comité International Spécial des Perturbations Radioélectriques
EMC	Electromagnetic Compatibility
ER	Essential Requirements
ETSI	European Telecommunications Standards Institute
EUT	Equipment Under Test
FDD	Frequency Division Duplex
GSR	General Statutory Rules
IEC	International Electrotechnical Commission
LTE	Long Term Evolution
MTCTE	Mandatory Testing and Certification of Telecom Equipment
TEC	Telecommunication Engineering Center
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network

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