सत्यमेव जयते

TEST / CALIBRATION REPORT

EMC / EMI Test Report
for
MECO Universal Electrical Analyser

Testing as per BS EN 61326 (Edition 1998)

ELECTRONICS REGIONAL TEST LABORATORY (WEST)

MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY, (STQC Dte.)

Government of India

Plot No. F 7 & 8, MIDC Area, Opp.SEEPZ,
Andheri (E), Mumbai-400 093.
Phone : (022) 832 5134, 830 1468, 830 1138 Fax : (022) 822 5713
E-mail : ertlbom@bom4.vsnl.net.in

MEMORANDUM

The Test/Calibration Report issued by **ERTL (W)** is a record of the measurements conducted on the products submitted to it for testing / calibration and the results thereof. Unless otherwise specified in the report, the results are applicable only to those products which have been tested / calibrated and do not apply to other products even though declared to be identical.

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1. **ERTL (W)** shall not be liable for any change in test / calibration data and performance specification on account of malfunctioning of the standard / instrument /equipment due to any damage caused to it after the report, in respect of it has been issued.

2. The report shall not be regarded in any way diminishing the normal contractual responsibilities / obligations between the customer and **ERTL (W).**

3. The result reported in this report are valid only at the time of and under the stated conditions of the measurements.

ELECTRONICS REGIONAL TEST LABORATORY (WEST) MINISTRY OF I.T. AND COMMUNICATIONS (STQC DTE)	REPORT NO. ERTL(W)/2002 EMI 147		
SUBJECT: EMC TESTING OF UNIVERSAL ELECTRICAL ANALYSER	DATE 30 JUL 2002	PAGE 1	OF 9

1. **SCOPE**

1.1 Service Request No :ERTL(W)/2002 0993

1.1.1 Service Request finalised on : 23 MAY 2002

1.2 Requested by
(Name and address of organisation) :MECO INSTRUMENTS PVT. LTD,
301, BHARAT INDUSTRIAL ESTATE,
T.T. ROAD, SEWREE
MUMBAI 400 015

1.3

Item No.	Description	Qty	Manufacturer and Type No.	Serial No.
1.	UNIVERSAL ELECTRICAL ANALYSER	01	MECO INSTRUMENTS SPVR - 96	------

1.4 Test specifications BS EN 61326 (Edition 1998)

1.5 Lab Ambient Temperature : (25 ±2) deg.C
Humidity : (55 ±5) % RH

1.6 Test Equipment used :

1. EMI/003 : ESD Simulator (Schaffner, NSG 432)
2. EMI/033 : EFT Simulator (EM-Test, EFT-800)
3. EMI/034 : RS Chamber (Keytek, G-Strip)
4. EMI/036 : RF Signal Generator (HP, 8648 A)
5. CPU/064 : EMI System (HP, 8568 B)
6. EMI/038 : C D N (Keytek)
7. EMI/044 : Immunity Test System(EM-Test, UCS 500 M6)

30 JUL 2002

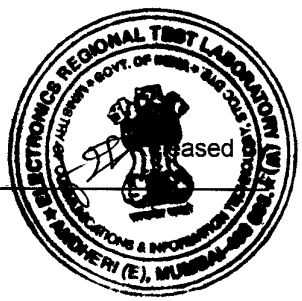
2.0 Test Results

Sr. No	Test /Parameter	Test Condition	Requirement	Observation	Remarks
2.1	Conducted Emission	AS per BSEN 61326,1998, Table 4 (Class B) EUT* in normal operating condition as per Annexure 'A' **Test set-up :** As per CISPR 22 for table top EUT* **Line Voltage** : 230 VAC **Frequency** : 50 Hz **Length of Auxiliary Power mains:** 1m (Three core unshielded) **Reciever** **EMI Bandwidth :** 9 kHz **Detectors :** Quasi-Peak & Average **Configuration :** Conforming to CISPR 16	The emissions of the EUT shall not exceed the following limits. **Freq. (MHz) / Limits (dBuV) QP / Avg** 0.15-0.5 : 66-56 / 56-46 0.5-5 : 56 / 46 5-30 : 60 / 50	For results/ graph please refer page 9 of 9	Complied
2.2	Radiated Emission	AS per BSEN 61326,1998, Table 4(Class B) EUT supply **Line Voltage** : 230V **Line Frequency:** 50Hz **Test Setup:** Open Area Test Site as per CISPR 22 **Antenna :** Biconical and Log periodic **Polarisation**: Horizontal & Vertical **Reciever** Bandwidth : 120 kHz Detector : Quasi - Peak **Measurement distance:** 3m	The emissions of the EUT* shall not exceed the following limits (@ 3 meter test distance). **Freq. (MHz) / Limits (dBuV/m)** 30 – 230 : 40.45 230-1000 : 47.45	For results/ graph please refer page 8 of 9	Complied

Released By

* EUT : Equipment Under Test (See Annexure 'B' for description)

Sr. No	Test /Parameter	Test Condition	Requirement	Observation	Remarks
2.3	Electrostatic Discharge	AS per BSEN 61326,1998 Table A.1 EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per IEC 61000-4-2 **Mode of simulation:** Contact & Air Discharge **Test Voltage**: Contact Discharge : 4kV Air Discharge : 8kV **No. of Discharges :** 10 **Polarity :** ±ve **Air Discharge points:** Front panel Display **Contact Discharge points:** Maintenance screws	The EUT shall continue to perform satisfactorily after the test as per Annexure 'A'. **Performance Criterion :** ' B' (During testing, temporary degradation, or loss of function or performance which is self recoverable)	**Air discharge :** During the test, blackening of display could be seen. However there was no change in indicated parameters The EUT was found to perform satisfactorily after the test as per Annexure 'A'. **Contact Discharge:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	**Complies with Criterion 'A'** (During testing Normal performance within specification limits) **Complies with Criterion 'A'** (During testing Normal performance within specification limits)
2.3	Radiated Susceptibility	AS per BSEN 61326,1998, Table A.1 EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per IEC 61000-4-3 **Frequency Range** : 80 MHz to 1000MHz **Modulation :** 80 % AM @ 1 kHz **Field Strength** : 10 V/m. **Simulation :** Using Gstrip™ RF Immunity Test Chamber	The EUT shall continue to perform satisfactorily during and after the test as per Annexure 'A'. **Performance Criterion :** 'A' (During testing Normal performance within specification limits)	The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	Complies with Criterion 'A'



Sr. No	Test /Parameter	Test Condition	Requirement	Observation	Remarks
2.4	Electrical Fast Transients	AS per BSEN 61326, 1998, Table A.1 EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per IEC 61000-4-4 **Pulse :** 5/50 nSec **Pulse Rep. Rate :** 5kHz **Pulse Amplitude : 2** kV **Polarity :** ± ve **Mode :** Common and Differential **Duration of test in each mode :** 60 s **Simulation on :** 1. 230 V Auxiliary supply 2. 3 Phase I/P **Simulation Method:** Direct injection	The EUT shall continue to perform satisfactorily after the test as per Annexure 'A'. **Performance Criterion :** 'B' (During testing, temporary degradation, or loss of function or performance which is self recoverable)	**Test on Auxiliary supply:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'. **Test on 3 Phase I/P:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	**Complies with Criterion 'A'** (During testing Normal performance within specification limits) **Complies with Criterion 'A'** (During testing Normal performance within specification limits)
2.5	Surge	AS per BSEN 61326,1998, Table A.1 EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per IEC 61000-4-5 **Pulse :** 1.2/50 uSec **Mode :** Common & Differential **Pulse Amplitude** **Common mode : 2** kV **Differential mode : 1** kV **Polarity :** ± ve **Simulation on :** 1. 230 V Auxiliary supply 2. 3 Phase I/P **Simulation Method:** Direct injection	The EUT shall continue to perform satisfactorily after the test as per Annexure 'A'. **Performance Criterion :** B (During testing, temporary degradation, or loss of function or performance which is self recoverable)	**Test on Auxiliary supply:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'. **Test on 3 Phase I/P:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	**Complies with Criterion 'A'** (During testing Normal performance within specification limits) **Complies with Criterion 'A'** (During testing Normal performance within specification limits)

Sr. No	Test /Parameter	Test Condition	Requirement	Observation	Remarks
2. 8	Conducted RF Susceptibility	As per EN 61326 Table A.1 EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per EN 61000-4-6 **Simulation** **Frequency Range:** 150 KHz to 100 MHz **Amplitude :** 3V **Modulation :** 80% AM at 1kHz **Mode :** Common **Simulation on :** 1. 230 V Auxiliary supply 2. 3 Phase I/P **Simulation Method :** On mains using CDN	Operation of the EUT shall be as per Annexure 'A' during and after the test **Performance Criterion : 'A'**	**Test on Auxiliary supply:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'. **Test on 3 Phase I/P:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	Complied Complied
2.7	Voltage Dips / Short interruption	AS per EN 61326,1998, Table A.1 of Annexure A EUT in normal operating condition as per Annexure 'A' **Test Setup:** As per EN 61000-4-11 **Line Voltage** : 230V **Line Frequency:** 50Hz **Simulation on :** 230 V Auxiliary supply **Reduction % 100** **Duration mSec 10**	The EUT shall continue to perform satisfactorily after the test as per Annexure 'A'. **Performance Criterion : 'C'**	**Test on Auxiliary supply:** The EUT was found to perform satisfactorily during and after the test and all parameters were within limits as per Annexure 'A'.	**Complies with Criterion 'A'** (During testing Normal performance within specification limits)

3.0 **General Remarks : Nil**

REPORT APPROVED BY

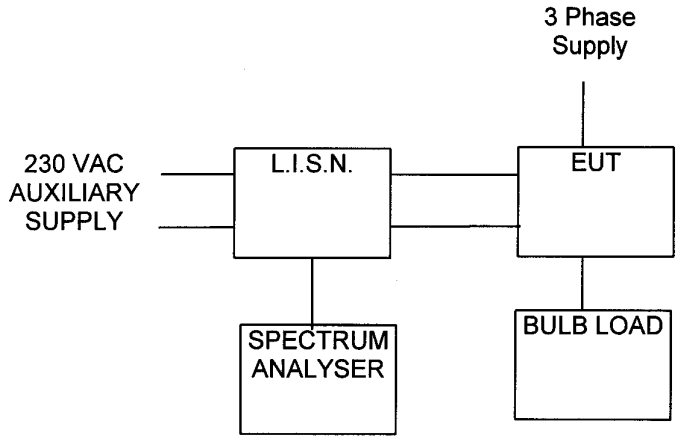
HEAD (EMI/PCT)

REPORT RELEASED BY

OFFICER

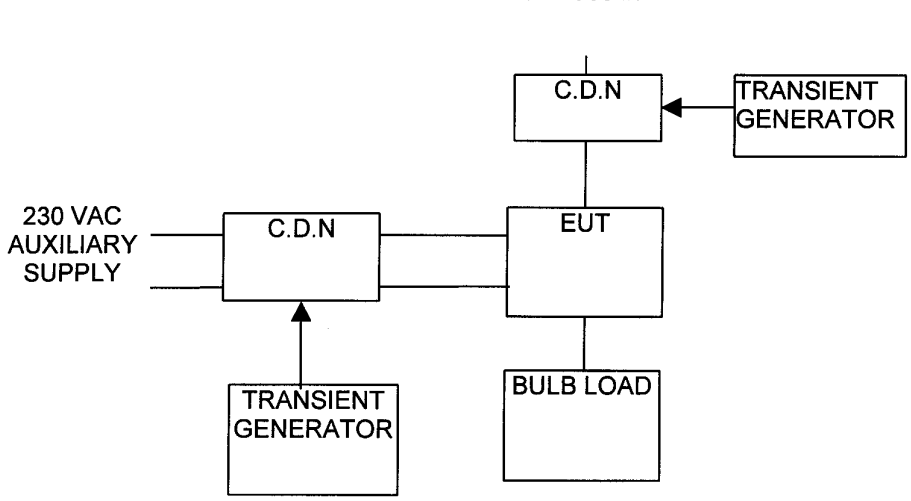
ANNEXURE 'A'

EUT SET-UP FOR CONDUCTED EMISSIONS TESTING



Measurements carried out on Auxiliary Mains while the measurement circuit energised by 415 V 3 ϕ supply and carrying 5 A current

EUT SET-UP FOR CONDUCTED IMMUNITY TESTING

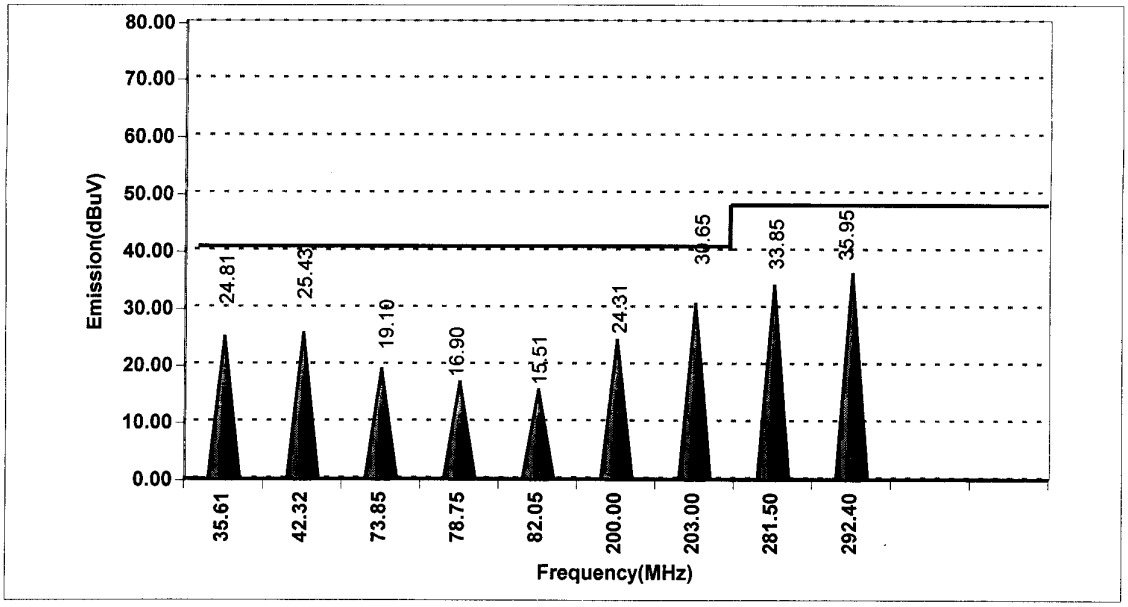


Conducted Immunity tests were carried out by coupling transients generated by generator, separately on 230 VAC Auxiliary supply and 3 Phase I/P through a CDN. The test set-up is as shown in the figure above. EUT performance was evaluated as per the following:-

Functional Check
Allowable variation in reading shall be :
±1% for Voltage , Current, Active power Reactive power, Apparent Power.
+/- 2 Hz for Frequency.

RADIATED EMISSION TEST RESULTS

Sr.	Frequency(MHz)	Emissions (dBμV/m)	Limit (dBμV/m)	Results
1.	35.61	24.81	40.45	PASS
2.	42.32	25.43	40.45	PASS
3.	73.85	19.10	40.45	PASS
4.	78.75	16.90	40.45	PASS
5.	82.05	15.51	40.45	PASS
6.	200.00	24.31	40.45	PASS
7.	203.00	30.65	40.45	PASS
8.	281.50	33.85	47.45	PASS
9.	292.40	35.95	47.45	PASS
10.	35.61	24.81	47.45	PASS



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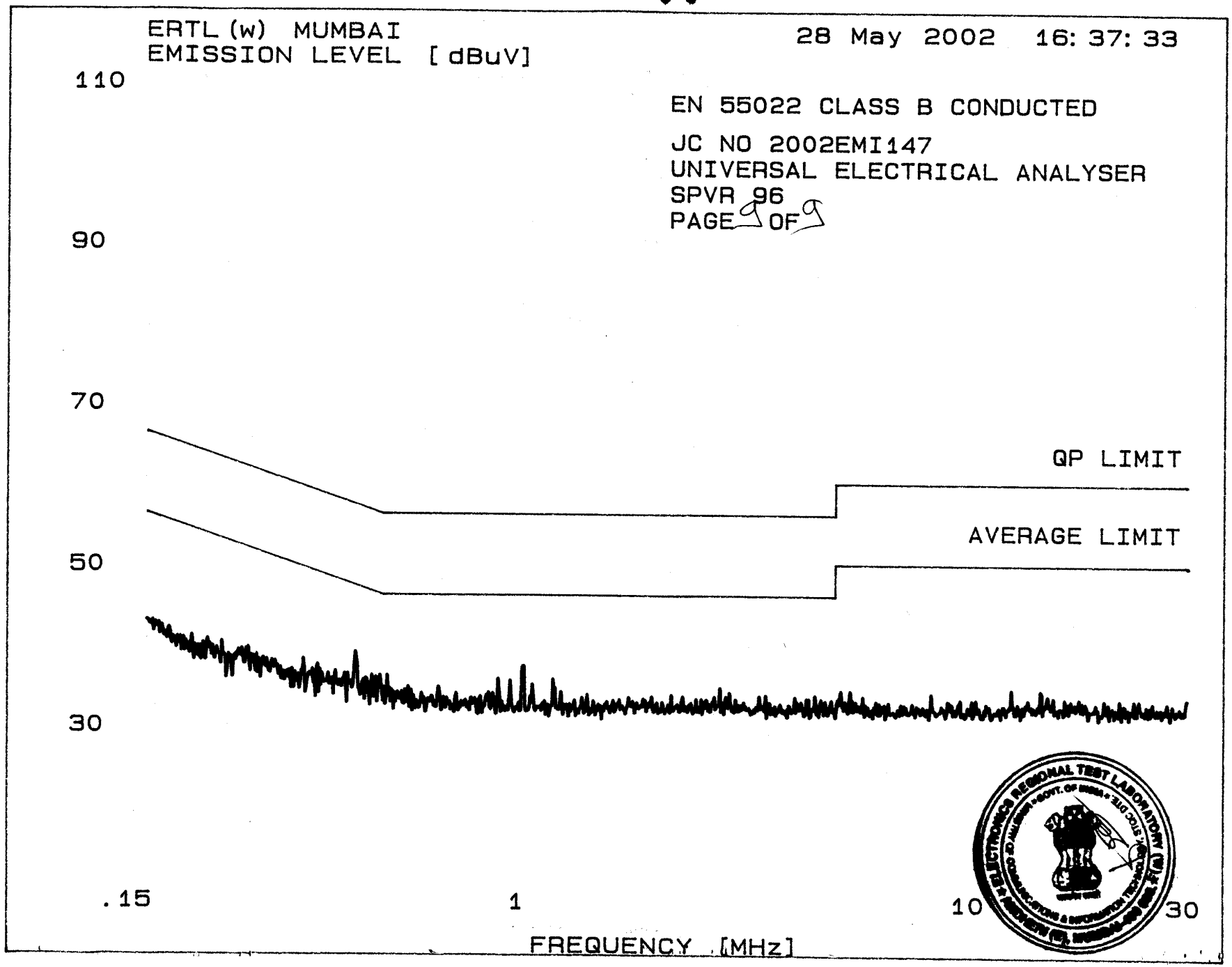
ERTL (w) MUMBAI
EMISSION LEVEL [dBuV]
28 May 2002 16: 37: 33
EN 55022 CLASS B CONDUCTED
JC NO 2002EMI147
UNIVERSAL ELECTRICAL ANALYSER
SPVR 96
PAGE 9 OF 9
110
90
70
50
30
QP LIMIT
AVERAGE LIMIT
.15
1
10
30
FREQUENCY [MHz]

OUR ACCREDITATION STATUS

ERTL (W) set up under the STQC Directorate, Ministry of Communications & Information Technology, Govt. of India has been accreditated under number of national / international systems as follows :

SYSTEM	AREA	STATUS
IECQ (International Electro-technical Commission on Quality Assessment System for Electronic Components)	**Component Testing** • Resistors (Fixed) • Capacitors (Fixed)	Accreditated as ITL (Independent Test Laboratory)
NABL (C), India National Accreditational Board for Test & Calibration laboratories (Calibration System)	**Calibration** • Electro-technical discipline • Thermal discipline • Mechanical discipline	Accreditated Calibration Laboratory
NABL(T), India National Accreditational Board for Test & Calibration laboratories (Testing System)	Electronic & Electrical Testing	Accreditated Test Laboratory
IECEE-CE-Scheme	• Mains Operated Electronic Consumer Products	Approved as a CB test Laboratory
Other recognisation		Recognised by CSPO of State Govt., DOT, Naval Docyard, LCSO etc.