सत्यमेव जयते

TEST / CALIBRATION REPORT

EMC / EMI Test Report
for
MECO Voltage Transducer With
85V To 265V AC Aux. Supply

Testing as per BS EN 61326 (Edition 1999)

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) 2832 5134, 2830 1468, 2830 1138 Fax : (022) 2822 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.

This Report, if reproduced for any purpose-commercial or otherwise should be reproduced in full. Reproduction of a part of the report or an abstract thereof must be specifically approved from the ERTL (W).

LIABILITY CLAUSE

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 reprot shall not be regarded in any way diminishing the normal contractual responsibilites / obligations between the customer and ERTL (W).

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

1. **SCOPE**

1.1 Service Request No : ERTL (W)/20031936

1.1.1 Service Request finalised on : 1ST – OCT - 2003

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

1.3

Item No.	Description	Qty	Manufacturer and Type No.*	Serial No*
1.	ELECTRICAL TRANSDUCER	01	MECO INSTRUMENTS PVT. LTD / VMT	010

1.4 Test specifications : BS EN 61326 : 1999

1.5 Lab Ambient : Temperature : (25 +_2) deg.C
Humidity : (55 +_5) % RH

1.6 Test Equipment used :
1. EMI/034 : RS Chamber (Keytek, G-Strip)
2. EMI/036 : RF Signal Generator (HP, 8648 A) for C.S and R.S. tests
3. EMI/037 : RF Amplifier (AR, 25A100) for R.S test
4. EMI/044 : Three Phase Immunity Test System
5. CPU/064 : Spectrum Analyser (HP8568B) for CE
6. EMI/048 : ESD Gun for ESD test

ELECTRONICS REGIONAL TEST LABORATORY (W) ★ GOVT. OF INDIA ★ MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY ★ DEPTT. OF INFORMATION TECHNOLOGY ★ STQC DIE ★ ANDHERI (E), MUMBAI-400 093.

Authorised Signatory

* As declared by Manufacturer

2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Description

EUT is a Electrical Transducer CMT , which operates on auxiliary supply between 85 V AC to 265 V AC, 50Hz, single phase. EUT was made operational.

2.2 Operating modes during normal testing.

EUT is supplied with an auxiliary supply between 85 V AC to 265 V AC, 50Hz, single phase. An Input supply of 110 V AC , 50Hz, Single phase is given at input terminals 12 and 13. The output of EUT shall be loaded with rated resistive load for normal operations & all applicable tests. The output current shall remain in the range of 4 to20 mA DC at output 1 & 2 before and after all tests. EUT was made operational with rated input voltage & output was loaded with resistive load during immunity tests.

2.3 Functional check for all immunity tests.

Performance Criterion - 'A'

During testing, normal performance within specification limits.

Performance Criterion - 'B'

During testing temporary degradation or loss of function is allowed which is self recovering e. g. during testing output observed current may deviate by allowed margin ± 0.5 %. However after the test EUT shall function normal within specified limits.

Performance Criterion - 'C'

During testing, temporary degradation or loss of function or performance which requires operator intervention or system reset occurs.

Released By

ELECTRONICS REGIONAL TEST LABORATORY (W) * GOVT. OF INDIA * MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY * DEPTT OF INFORMATION TECHNOLOGY * ANDHERI (E), MUMBAI-400 093.

3.0 Test Results

3.1 CONDUCTED EMISSION

Test Rationale: To measure emissions of the EUT* (referenced to Earth) on Power Mains and to compare them with specified limits to ascertain that the EUT will not disturb other equipment by generating such emissions above a certain limit

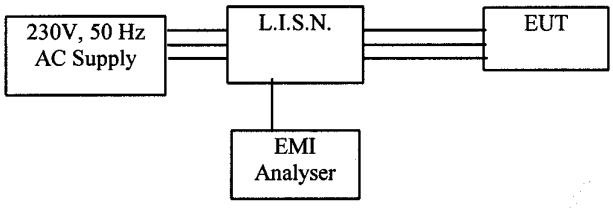
a) Test Condition

Set-up	As per BS EN 55022 : 1995
Measurement Range	150 kHz – 30 MHz
Measurement On	Spectrum Analyser
Line Voltage	230 V AC single phase, 50 Hz supply
Line Frequency	50 Hz

b) Receiver

Bandwidth	9 KHz
Detectors	Quasi – peak and Average
Configuration	Conforming to CISPR 16 - 1

c) Test procedure



EUT supplied with 230V 3 phase, 50 Hz AC supply through an LISN. Emission of the EUT were measured with a Spectrum Analyser .

d Requirements

EUT emissions shall be below following Class 'B' limits

Freq. (MHz)	Limits (dBuV)	
	Quasi-Peak	**Average**
0.15-0.5	79	66
0.5-5	73	60
5-30	73	60

e Observations

Measurements with peak detector were carried.
Pl. see Graph at page 10 of 10

f Results

Complied

ELECTRONICS REGIONAL TEST LABORATORY (W) * GOVT. OF INDIA * MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY * DEPTT OF STQC DTE * ANDHERI (E), MUMBAI-400 093.

3.2 RADIATED EMISSION

Test Rationale :

To measure emissions of the EUT radiated into space and to compare them with specified limits to ascertain that the EUT will not disturb other equipment by generating such emissions above a certain limit.

a) Test Condition :

Set-up As per BS EN 55022 : 1995

Frequency Range 30 MHz – 1000MHz

EUT in normal operating condition with output loaded with full resistive load.

b) Receiver:

Bandwidth	120 KHz
Detectors	QP
Antenna	Bi-Conical (For 30 – 200 MHz) Log-Periodic (For 200 – 1000 MHz)
Configuration	Conforming to CISPR 16-1.

c) Test procedure

- Ambient measurements carried out first with EUT "off" and peaks noted
- EUT was switched "ON" and Emission peaks noted.
- Antenna height and position were changed to maximize Emissions.
- A table of Emission and corresponding Ambient was then drawn up.
- "Ambient" and "Emission" peaks were compared. Peaks with a difference of less than 5 dB were discarded.

d) Requirements

EUT emissions shall be below following limits

Freq. (MHz)	Limits (dBuV/m) QP
30-230	50
230-1000	57

e) Observations

Emission peaks found below required limits.

f) Results

Complied.

ELECTRONICS REGIONAL TEST LABORATORY (W) * GOVT. OF INDIA * MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY DEPTT. OF INFORMATION TECHNOLOGY ANDHERI (E), MUMBAI-400 093.

3.3 Conducted susceptibility

Test Rationale:

To check immunity characteristics of the EUT against Conducted RF Susceptibility levels.

a) Test Condition:

Set-up As per BS EN 61000 – 4 –6 : 1996

Mode of simulation: Injected on power mains

Test Voltage: 3 V r.m.s

Simulation Using coupling/ decoupling Network

EUT in normal operating condition as per Sr. No. 2.2

c Test procedure:

- Conducted RF level was injected to power mains by coupling/ decoupling network along the subject frequency range & EUT performance was monitored before and after the test as per Sr. No. 2.2.

d Requirement:

Performance Criterion 'A', Normal Operation of the EUT with specified performance as per Sr. No. 2.2

e Observations

Operation of the EUT was found normal before and after the test as per Sr. No. 2.2.

f Results

Complied

ELECTRONICS REGIONAL TEST LABORATORY (W) ★ DEPTT. OF INFORMATION TECHNOLOGY ★ MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY ★ GOVT. OF INDIA ★ ANDHERI (E), MUMBAI-400 093.

Reviewed By

3.4 RADIATED SUSCEPTIBILITY (RS)

Test Rationale

To check immunity characteristics of the EUT in the presence of radiated fields generated by intentional emitters like Radio /TV transmitters, wireless equipment and the like by illuminating the EUT by such frequency

a) **Test Condition :**

Set-up As per BS EN 61000-4-3 : 1995

Frequency Range 80 MHz – 1000 MHz

Field Strength 10 V/m

EUT in normal operating condition as per Sr. NO. 2.2

b) **Test procedure**

Electronic control panel of the EUT including housing was subjected to field strength of 10 V/m in G-Strip chamber & functional performance was observed over the subject frequency range after the test.

c) **Requirements**

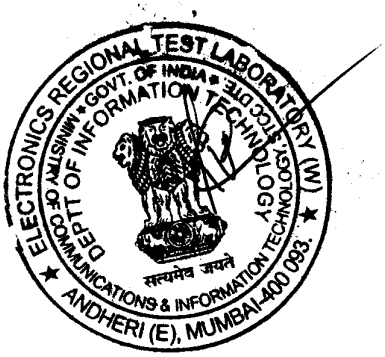
Performance Criterion A ,Operation of the EUT shall be normal before & after the test as per Sr. No. 2.2.

d) **Observations**

Operation was found normal before and after the test as per Sr. No. 2.2. No deviation from actual operating condition could be observed.

e) **Results**

Complied



3.5 ELECTROSTATIC DISCHARGE (ESD)

Test Rationale :

To check immunity characteristics of the EUT against Discharge of Static Electricity that may occur when a charged operator touches the EUT.

a) Test Condition :

Set-up	As per BS EN 61000-4-2 : 1995
Mode of simulation:	Contact Discharge on conductive surfaces & Air Discharge on non- conductive surfaces
Test level	2
Test Voltage:	**Contact Discharge:** 4kV **Air Discharge:** 8kV
No. of Discharges	10
Polarity	Positive and Negative
Points of Discharge	**Contact Discharge** Maintenance screws, conducting metal surfaces **Air Discharge :** ➢ Insulating surfaces
Simulation	Using ESD Gun

EUT in normal operating condition as per Sr. No. 2.2

c Test procedure :

- ➢ EUT initially subjected to indirect discharge on VCP and HCP.
- ➢ EUT was then screened in continuous discharge mode.
- ➢ At susceptible points, ten single discharges were applied.

d Requirement :

Performance Criterion B ,temporary degradation or loss of function is allowed during the test. After the test EUT shall function normal as per Sr. No. 2.2.

e Observations

Operation of the EUT was found to be normal during and after the test as per Sr. No. 2.2.

f Results

Complied

ELECTRONICS REGIONAL TEST LABORATORY (W) DEPTT OF INFORMATION TECHNOLOGY MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY GOVT. OF INDIA ANDHERI (E), MUMBAI-400 093.

3.6 ELECTRICAL FAST TRANSIENTS (EFT)

Test Rationale :

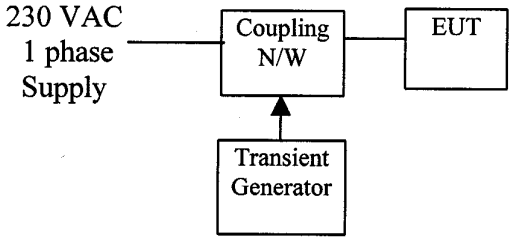
To check immunity characteristics of the EUT against transients generated by inductive load switching, Relay contact bouncing, switching of high voltage switchgear and the like

a Test Condition :

Set-up	As per BS EN 61000-4-4 : 1995
Pulse	5/50 ns
Modes	Common and Differential
Test Level	3
Pulse Amplitude	2kV
Pulse Rep. Rate	5 kHz
Polarity	Positive and Negative
Duration of test in each mode	60 s
Simulation	On 230 V single phase AC supply by Direct Injection

EUT in normal operating condition as per Sr. No. 2.2.

c Test procedure :



➢ Transients generated by the generator were coupled to the 110 VAC Supply through a coupling N/W .

d Requirements :

Performance Criterion B ,temporary degradation or loss of function is allowed during the test. After the test EUT shall function normal as per Sr. No. 2.2.

e Observations

Operation of the EUT was found to be normal during and after the test as per Sr. No. 2.2.

f Results

Complied

Witnessed By

4.0 **General Remarks: Nil**

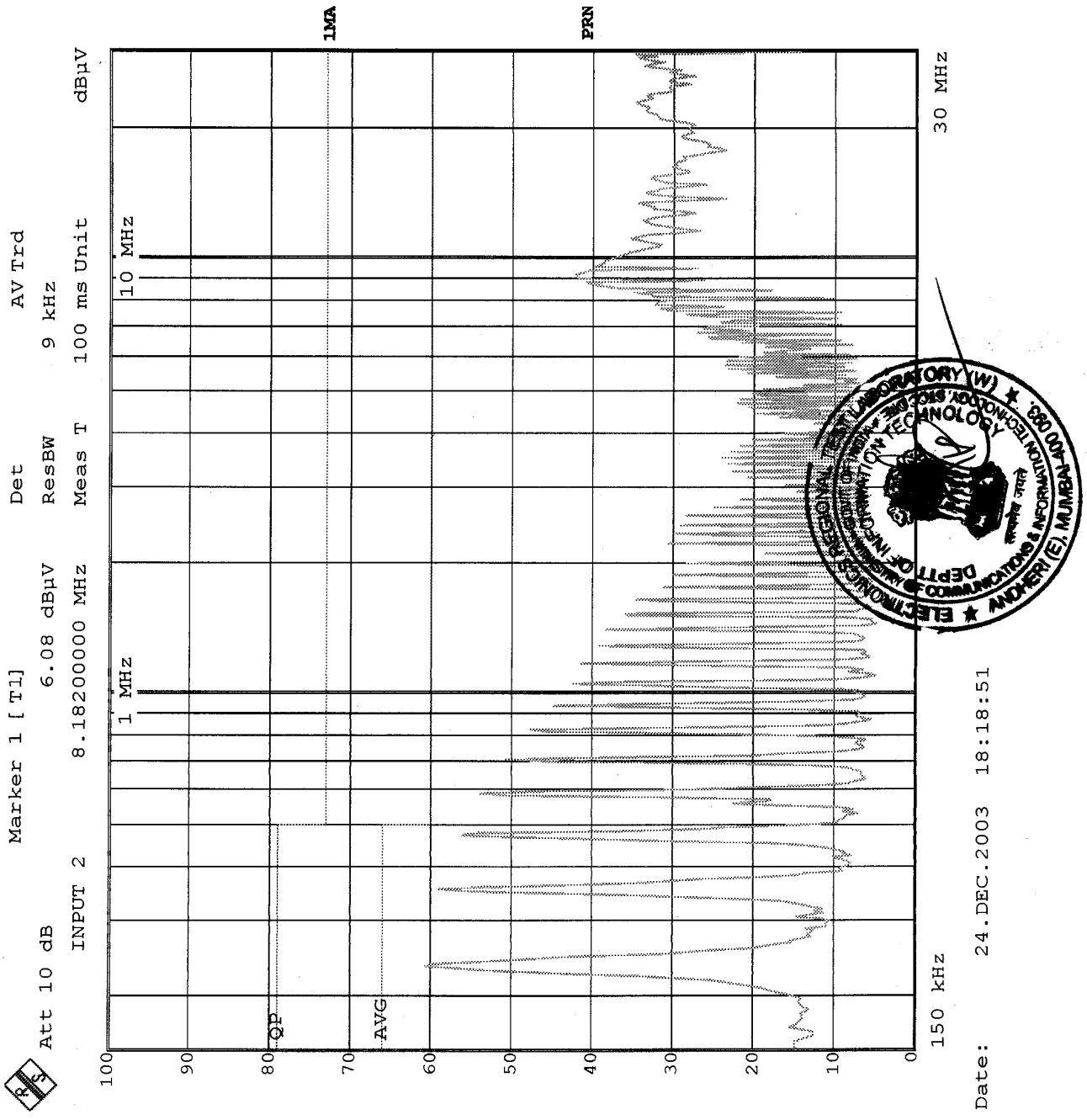
REPORT APPROVED BY

HEAD (EMI/PCT)

REPORT PREPARED BY

ELECTRONICS REGIONAL TEST LABORATORY (W) ★ DEPTT OF INFORMATION TECHNOLOGY ★ MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY ★ ANDHERI (E), MUMBAI-400 093.

6 JAN 2004


Marker 1 [T1]
6.08 dBµV
8.18200000 MHz
Att 10 dB
INPUT 2
Det
AV Trd
ResBW
9 kHz
Meas T
100 ms Unit
dBµV
1MA
PRN
1 MHz
10 MHz
QP
AVG
100
90
80
70
60
50
40
30
20
10
0
150 kHz
30 MHz
Date: 24.DEC.2003 18:18:51

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.