

# EMC TEST REPORT

The device described below is tested by Shenzhen Nore Testing Center Co.,Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Shenzhen Nore Testing Center Co.,Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Applicant : SHENZHEN MUST ENERGY TECHNOLOGY CO., LTD  
Address : A801-803 Common Building, Sogood Science Park, Sanwei Community  
Hangcheng Road, Xixiang Bao'an District, Shenzhen, Guangdong, China

Manufacturer : SHENZHEN MUST ENERGY TECHNOLOGY CO., LTD  
Address : A801-803 Common Building, Sogood Science Park, Sanwei Community  
Hangcheng Road, Xixiang Bao'an District, Shenzhen, Guangdong, China

Factory : MUST ENERGY (GUANGDONG) TECHNOLOGY CO., LTD  
Address : Building 8, No.115, Zhangcha Road 1, Chancheng district, Foshan city,  
Guangdong Province, P.R.China

E.U.T. : LiFePO4 BATTERY PACK

Brand Name : MUST

Model No. : MS-LFP24125

Measurement Standard : EN 61000-6-3: 2007+A1: 2011+AC: 2012  
EN IEC 61000-6-1: 2019

Date of Receiver : January 09, 2021

Date of Test : January 10, 2021 to January 13, 2021

Date of Report : January 14, 2021

This Test Report is Issued Under the Authority of :

Prepared by



Bowen Zhu / Engineer

Approved & Authorized Signer



Evan Yang /Authorized Signatory

This report shows that the E.U.T. is technically compliant with the EN 61000-6-3 and EN IEC 61000-6-1. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Nore Testing Center Co.,Ltd.

## TABLE OF CONTENTS

<b>1. SUMMARY OF TEST RESULTS.....</b>	<b>4</b>
<b>2. GENERAL INFORMATION.....</b>	<b>5</b>
2.1 Details of E.U.T.....	5
2.2 Description of Support Device.....	6
2.3 Block Diagram of Test Setup.....	6
2.4 Test Facility.....	6
2.5 Abnormalities from Standard Conditions.....	6
<b>3. MEASURING DEVICES AND TEST EQUIPMENT.....</b>	<b>7</b>
3.1. For Radiated Emission Measurement.....	7
<b>4. RADIATED EMISSION MEASUREMENT.....</b>	<b>8</b>
4.1 Block Diagram of Test.....	8
4.2 Limit of Radiated Emission Measurement.....	8
4.3 Test Procedure.....	9
4.4 Operating Condition of E.U.T.....	9
4.5 Radiated Emission Measurement Result.....	9
<b>5. PERFORMANCE CRITERIA FOR IMMUNITY.....</b>	<b>14</b>
<b>6. IMMUNITY TEST.....</b>	<b>15</b>
<b>7. PHOTOGRAPH.....</b>	<b>16</b>
7.1 Photo of Radiation Emission Measurement.....	16
<b>APPENDIX I.....</b>	<b>17</b>
<b>(PHOTOS OF E.U.T.).....</b>	<b>17</b>

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## 1. SUMMARY OF TEST RESULTS

The E.U.T. has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 61000-6-3: 2007+A1: 2011+AC: 2012	Radiated Emission Test	PASS	Uncertainty: 3.4dB

IMMUNITY(EN IEC 61000-6-1: 2019)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2: 2008	Electrostatic Discharge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3: 2006+A1:2007+A2:2010	RF Field Strength Susceptibility Test	PASS	Meets the requirements of Performance Criterion A

## 2. GENERAL INFORMATION

### 2.1 Details of E.U.T.

E.U.T. : LiFePO4 BATTERY PACK

Brand Name : MUST

Model No. : MS-LFP24125

Rating :

**MUST<sup>®</sup>** LiFePO4 BATTERY PACK  
25.6V 125Ah (3200wh)  
CE ♻️ ⚡  
Max. Charge voltage: 29.2V Max. Charge Current: 100A  
Max. Discharge Current: 100A Operating Temperature: -20~60°C  
CONSULT THE USER MANUAL PRIOR TO OPERATING THE BATTERY!  
WARNING:  
1. DO NOT short the battery terminals.  
2. DO NOT incinerate, crush, or disassemble.  
3. DO NOT reverse connections (polarity) from charger to battery.  
4. DO NOT over charge or over discharge.  
5. DO NOT operate battery beyond published voltage, current, and temperature limits  
MUST ENERGY (GUANGDONG) TECH CO., LTD

Operation Frequency : Below 108MHz (Declaration by applicant)

Test Voltage : DC 29.2V, DC 25.6V

Cable : None

Description of model difference : None

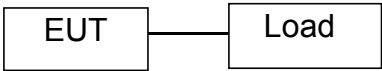
Remark : None

## 2.2 Description of Support Device

None

## 2.3 Block Diagram of Test Setup

Block diagram of connection between the E.U.T. and simulators



## 2.4 Test Facility

Site Description	
EMC Lab	: Listed by CNAS,May 18, 2018 The certificate is valid until May 17, 2024 The Laboratory has been assessed and proved to be in compliance with CNAS/CL01 The Certificate Registration Number is L11038.
Name of Firm	: Shenzhen Nore Testing Center Co.,Ltd.
Site Location	: South, No. 1, Building 10, Maqueling Industrial Zone, Nanshan Shenzhen, Guangdong, 518057, China

## 2.5 Abnormalities from Standard Conditions

None

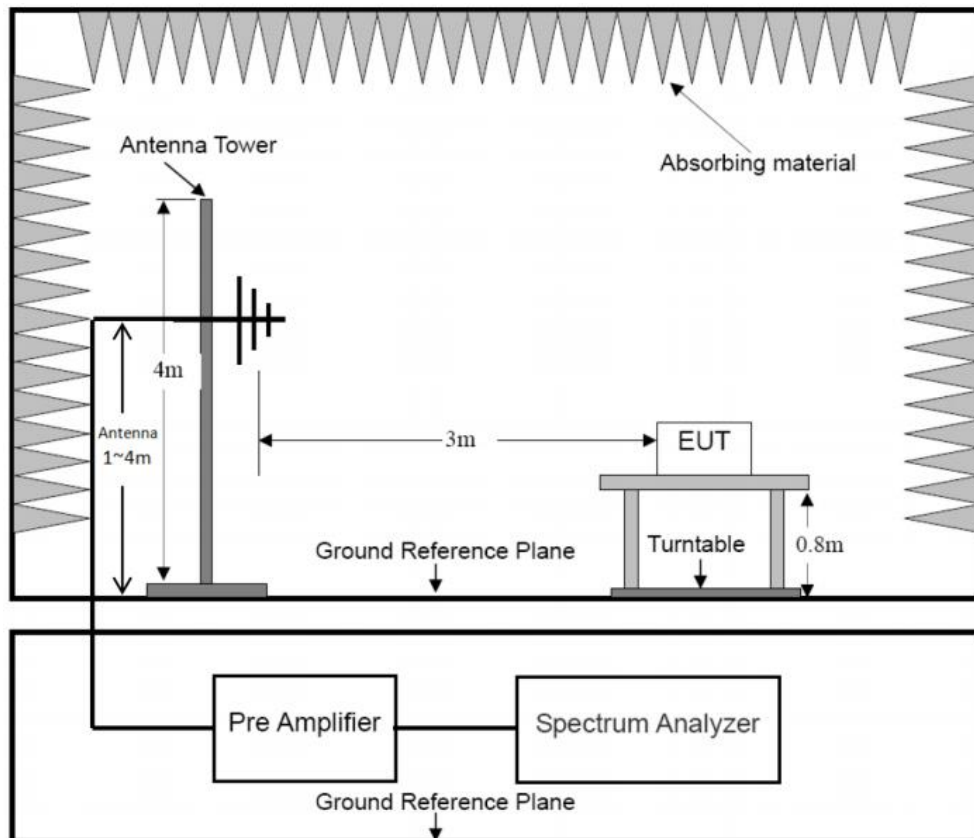
### 3. MEASURING DEVICES AND TEST EQUIPMENT

#### 3.1. For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESPI-7	100006	Mar. 29, 2020	1 Year
2.	Composite logarithmic antenna	SCHAFFNER	CBL6112B	2625	May 17, 2020	2Year
3.	Horn Antenna	SCHWARZBECKI	BBHA 9120 D	01884	Apr. 29, 2020	1 Year
4.	Power Amplifier	HP	HP 8447D	2443A04646	Mar. 29, 2020	1 Year
5.	Power Amplifier	KSYET	PAM-118	443007	Apr. 24, 2020	1 Year
6.	Cable	N/A	1M	N/A	Apr. 24, 2020	1 Year
7.	Cable	N/A	5M	N/A	Apr. 24, 2020	1 Year
8.	Cable	N/A	9M	N/A	Apr. 24, 2020	1 Year
9.	Test Software	EZ	EZ-EMC (Ver.CT3A11)	N/A	N/A	N/A

## 4. RADIATED EMISSION MEASUREMENT

### 4.1 Block Diagram of Test



### 4.2 Limit of Radiated Emission Measurement

Test Standard: EN 61000-6-3

Limits for radiated disturbance at a measuring distance of 3m.

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	40
230 to 1000	47

Note 1 The lower limit shall apply at the transition frequency.  
Note 2 If the internal emission source is operating at a frequency below 9KHz, then measurements need only to be performed up to 230MHz



### 4.3 Test Procedure

E.U.T. and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. E.U.T. is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to EN 61000-6-3 on radiated emission measurement.

The bandwidth of the EMI test receiver (R&S ESPI-7) is set at 120 KHz.

The frequency range from 30 MHz to 1000 MHz is checked.

Sample of data calculate:

Level=Reading + Factor; Margin= Level-Limit

Factor=CF+AF+AG

Where CF=Cable attenuation factor in dB

AF= Antenna factor in dB

AG=Amplifier Gain in dB

### 4.4 Operating Condition of E.U.T.

4.4.1 Setup the E.U.T. and simulators as shown in Section 4.3.

4.4.2 Turn on the power of all equipments.

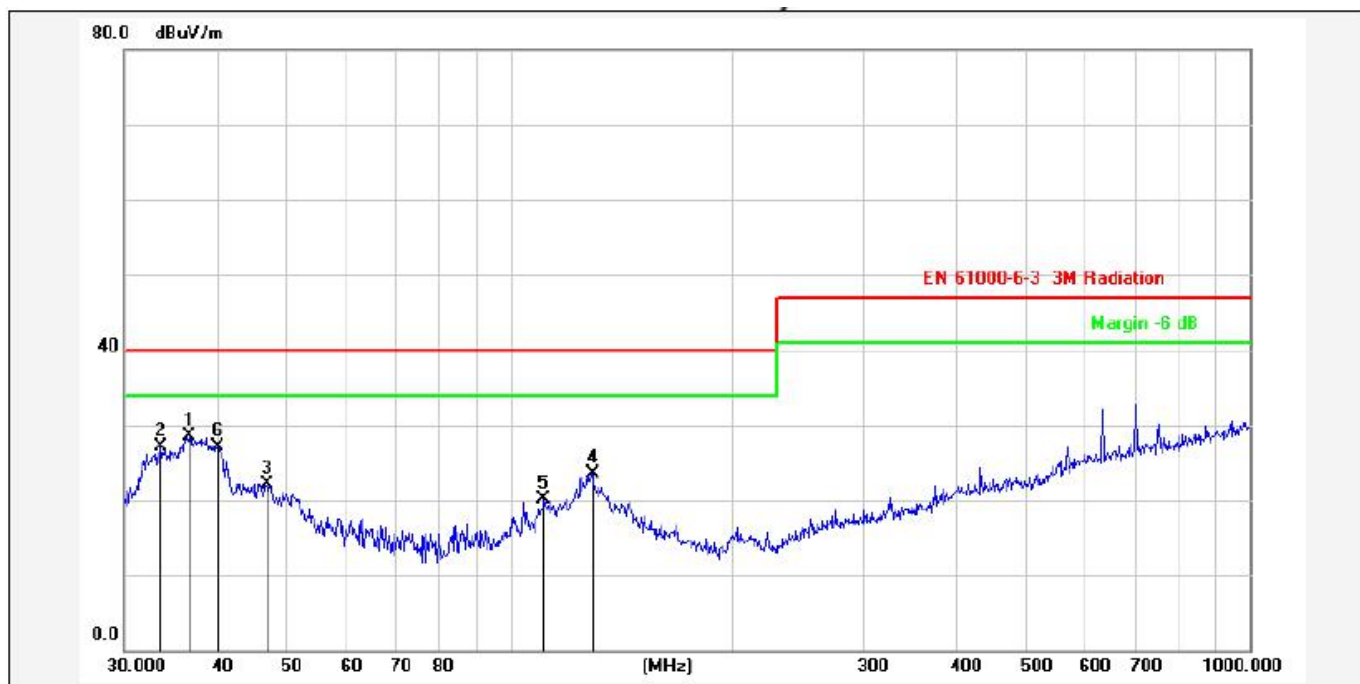
4.4.3 Let the E.U.T. work in test modes and test it.

### 4.5 Radiated Emission Measurement Result

**PASS.**

Please refer to the following pages of the worst case.

E.U.T :	LiFePO4 BATTERY PACK	Model Name :	MS-LFP24125
Temperature :	26.1°C	Relative Humidity :	51 %
Pressure :	1006 hPa	Test Voltage :	DC 29.2V
Test Mode :	Charging mode	Polarization:	Horizontal



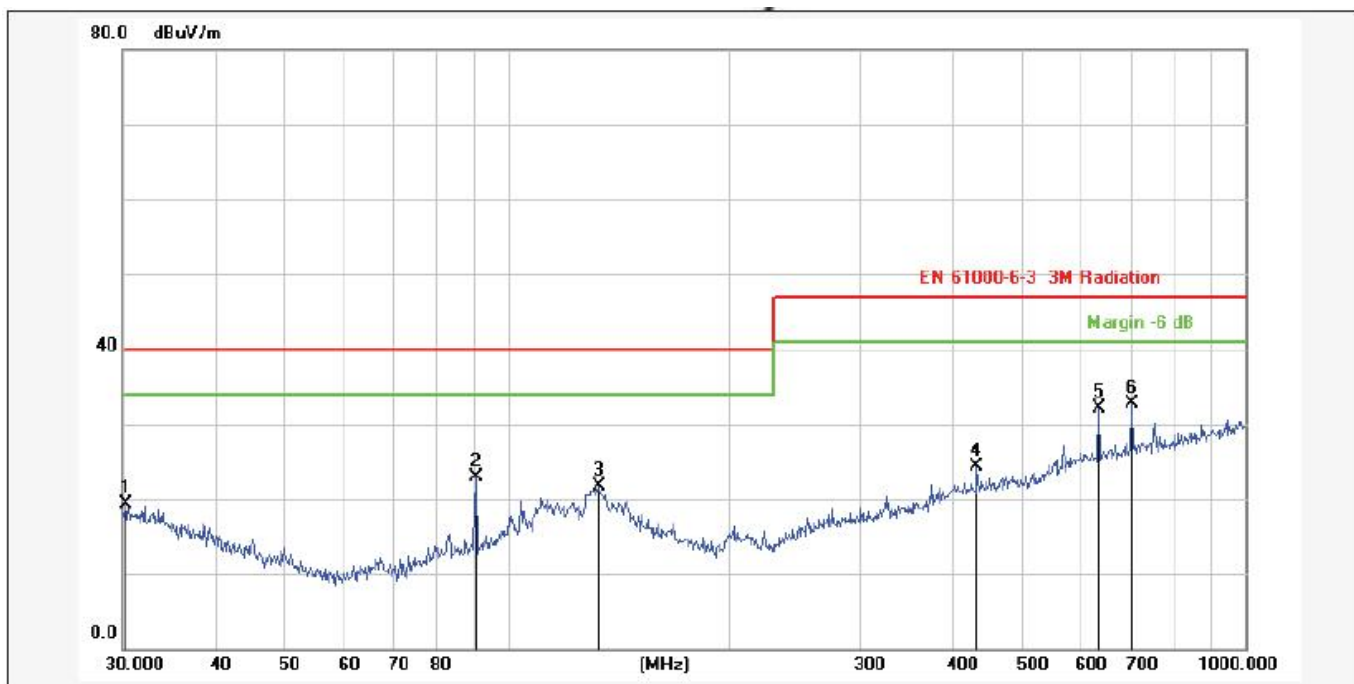
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	36.7661	-11.18	39.64	28.46	40.00	-11.54	QP			P	
2	33.6802	-9.82	36.86	27.04	40.00	-12.96	QP			P	
3	46.8301	-14.74	36.92	22.18	40.00	-17.82	QP			P	
4	129.0141	-10.01	33.56	23.55	40.00	-16.45	QP			P	
5	110.9569	-10.50	30.67	20.17	40.00	-19.83	QP			P	
6	40.1347	-12.65	39.75	27.10	40.00	-12.90	QP			P	

E.U.T :	LiFePO4 BATTERY PACK	Model Name :	MS-LFP24125
Temperature :	26.1°C	Relative Humidity :	51 %
Pressure :	1006 hPa	Test Voltage :	DC 29.2V
Test Mode :	Charging mode	Polarization:	Vertical



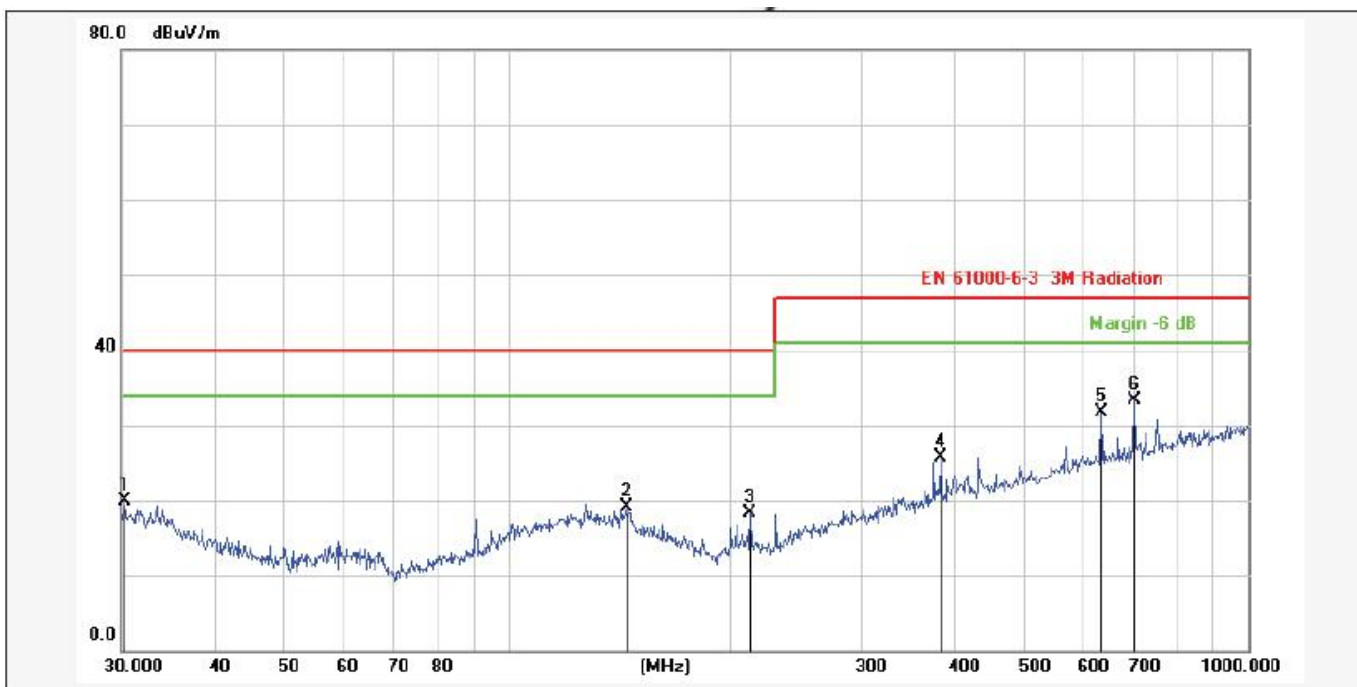
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	34.8821	-10.80	36.26	25.46	40.00	-14.54	QP			P	
2	37.0248	-11.68	33.91	22.23	40.00	-17.77	QP			P	
3	49.8813	-15.81	36.58	20.77	40.00	-19.23	QP			P	
4	108.6470	-10.98	35.21	24.23	40.00	-15.77	QP			P	
5	116.9492	-10.11	35.16	25.05	40.00	-14.95	QP			P	
6	132.2204	-10.40	37.06	26.66	40.00	-13.34	QP			P	

E.U.T :	LiFePO4 BATTERY PACK	Model Name :	MS-LFP24125
Temperature :	26.1°C	Relative Humidity :	51 %
Pressure :	1006 hPa	Test Voltage :	DC 25.6V
Test Mode :	Discharge mode	Polarization:	Horizontal



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.3172	-8.33	27.70	19.37	40.00	-20.63	QP			P	
2	90.5374	-13.86	36.84	22.98	40.00	-17.02	QP			P	
3	132.6850	-10.11	31.85	21.74	40.00	-18.26	QP			P	
4	432.5456	-5.81	30.02	24.21	47.00	-22.79	QP			P	
5	633.9073	-1.24	33.42	32.18	47.00	-14.82	QP			P	
6	701.7610	-0.28	33.05	32.77	47.00	-14.23	QP			P	

E.U.T :	LiFePO4 BATTERY PACK	Model Name :	MS-LFP24125
Temperature :	26.1°C	Relative Humidity :	51 %
Pressure :	1006 hPa	Test Voltage :	DC 25.6V
Test Mode :	Discharge mode	Polarization:	Vertical



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.3171	-8.92	28.77	19.85	40.00	-20.15	QP			P	
2	144.3346	-10.82	30.02	19.20	40.00	-20.80	QP			P	
3	212.2693	-13.44	31.65	18.21	40.00	-21.79	QP			P	
4	383.9318	-7.32	33.01	25.69	47.00	-21.31	QP			P	
5	633.9072	-1.47	33.10	31.63	47.00	-15.37	QP			P	
6	701.7609	-0.58	33.85	33.27	47.00	-13.73	QP			P	

## 5. PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard: EN IEC 61000-6-1

The variety and the diversity of the apparatus within the scope of this standard makes it difficult to define precise criteria for the evaluation of the immunity test results.

If, as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report.

### **Performance Criterion A:**

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

### **Performance Criterion B:**

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operation state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

### **Performance Criteria C**

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

## 6. IMMUNITY TEST

EUT is apparatus containing no electronic control circuitry. Such equipment is considered to meet the relevant immunity requirements without testing.



## 7. PHOTOGRAPH

### 7.1 Photo of Radiation Emission Measurement





# APPENDIX I (Photos of E.U.T.)

## Photos of E.U.T.



---End of the report---