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Report No.: SZEM160500358401  
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## **TEST REPORT**

**Application No.:** SZEM1605003584HS  
**Applicant:** Minwa Electronics Co., Ltd.  
**Address of Applicant:** 22/F, Far East Finance Center, 16 Harcourt Road, Admiralty, Hong Kong  
**Manufacturer:** Minwa Electronics Co., Ltd.  
**Address of Manufacturer:** 22 Floor, Far East Finance Center, 16 Harcourt Road, Admiralty, Hong Kong  
**Factory:** Minwa China (Huizhou) Electronics Co., Ltd.  
**Address of Factory:** Huizhou Industrial Park, Minwa (Dalian) Industrial Park, Ruhu Town, Huicheng District, Huizhou, 516169 Guangdong, China

**Equipment Under Test (EUT):**

**EUT Name:** Battery tester  
**Model No.:** MW336  
**Trade mark:** MW  
**Standards:** EN 61326-1:2013  
EN 61326-2-2:2013  
**Date of Receipt:** 2016-05-19  
**Date of Test:** 2016-05-20 to 2016-05-24  
**Date of Issue:** 2016-05-31

<b>Test Result :</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.



Jack Zhang  
EMC Laboratory Manager



The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

Item	Standard	Method	Class	Result
Radiated Disturbance (30MHz-1GHz)	EN 61326-1:2013	EN 55011:2009 +A1:2010	N/A	Pass
Electrostatic Discharge	EN 61326-1:2013	EN 61000-4-2:2009	4kV Contact Discharge 4kV Air Discharge	Pass
Radiated Immunity (80MHz-2.7GHz)	EN 61326-1:2013	EN 61000-4-3:2006 +A1:2008+A2:2010	3V/m, 80%, 1kHz Amp. Mod. 3V/m, 80%, 1kHz Amp. Mod. 1V/m, 80%, 1kHz Amp. Mod.	Pass

N/A: Not applicable

Remark: as per the applicant request , no test was performed to assess the mode which powered via car charger .



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## 4 General Information

### 4.1 Details of E.U.T.

Power Supply: Supply by DC12V or DC24V battery  
Cable: DC cable: 40cm unshielded  
Car charge cable: 40cm unshielded

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Rechargeable Battery	Ocean	NP7-12	REF. No.SEA2800
Rechargeable Battery	Gadlee	DP00027	REF. No.SEA2800

### 4.3 Standards Applicable for Testing

**Table 1 : Tests Carried Out Under EN 61326-1:2013**

Method	Item	Status
EN 55011:2009+A1:2010	Conducted Disturbance at Mains Terminals (150kHz-30MHz)	×
EN 55011:2009+A1:2010	Radiated Disturbance(30MHz-1GHz)	√
EN 61000-3-2:2014	Harmonic Current Emission	×
EN 61000-3-3:2013	Voltage Fluctuations and Flicker	×
EN 61000-4-2:2009	Electrostatic Discharge	√
EN 61000-4-4:2012	Electrical Fast Transients/Burst at Power Port	×
EN 61000-4-4:2012	Electrical Fast Transients/Burst at Signal Port	×
EN 61000-4-5:2014	Surge at Power Port	×
EN 61000-4-5:2014	Surge at Signal Port	×
EN 61000-4-6:2014	Conducted Immunity at Power Port(150kHz-80MHz)	×
EN 61000-4-6:2014	Conducted Immunity at Signal Port(150kHz-80MHz)	×
EN 61000-4-11:2004	Voltage Dips and Interruptions	×
EN 61000-4-3:2006 +A1:2008+A2:2010	Radiated Immunity(80MHz-2.7GHz)	√

× Indicates that the test is not applicable  
 √ Indicates that the test is applicable



#### **4.4 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.5 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None

#### **4.8 Monitoring of EUT for All Immunity Test**

Visual: Monitored the light and display of the EUT

Audio: None



## 5 Equipment List

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2015-08-01	2016-08-01
2	EMI Test Receiver (9k-3GHz)	Rohde & Schwarz	ESCI	SEM004-01	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-17	2016-01-26	2017-01-26
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-04-25	2017-04-25
5	Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2016-08-14

ESD						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	ESD Simulator	SCHAFFNER	NSG 438	SEM019-01	2016-03-16	2017-03-16
2	ESD Ground Plane	SGS(3m*3m)	N/A	SEN006-01	N/A	N/A



Radiated Immunity						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	N/A	SEM001-05	2014-06-10	2017-06-10
2	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-08	2016-04-25	2017-04-25
3	Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2016-04-25	2017-04-25
4	Log-periodic Antenna (0.07-3GMHz)	Schwarzbeck	VUSLP9111E	SEM003-17	N/A	N/A
5	Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2016-04-25	2017-04-25
6	Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	2015-10-31	2016-10-31
7	Broadband Amplifier (800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	2015-10-31	2016-10-31
8	Open Switch and Control Unit	Rohde & Schwarz	OSP130	SEN007-01	2015-10-31	2016-10-31
9	Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	SEM005-13	2015-10-23	2016-10-23
10	Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2016-04-25	2017-04-25
11	Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03	2015-10-09	2016-10-09
12	Conditioning Amplifier	Brüel & Kjaer	2690-OS2	SEM005-10	2016-04-25	2017-04-25





General used equipment						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2015-10-12	2016-10-12
2	Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2015-10-12	2016-10-12
3	Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2015-10-12	2016-10-12
4	Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2016-04-25	2017-04-25



## 6 Emission Test Results

### 6.1 Radiated Disturbance(30MHz-1GHz)

Test Requirement: EN 61326-1:2013  
Test Method: EN 55011:2009+A1:2010  
Frequency Range: 30MHz to 1GHz

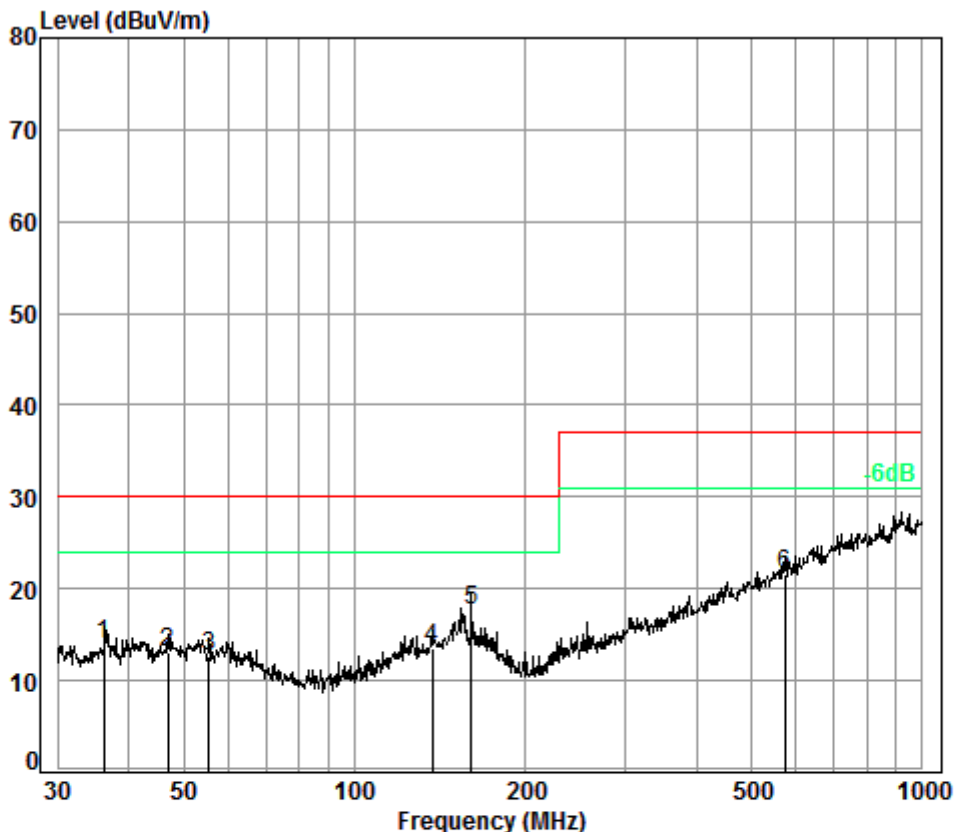
#### 6.1.1 E.U.T. Operation

Operating Environment:					
Temperature:	25.0 °C	Humidity:	50 % RH	Atmospheric Pressure:	1015 mbar
Test mode:	a: On mode, keep EUT measuring the situation of the rechargeable battery.				
The worst case for final test:	a: On mode, keep EUT measuring the situation of the rechargeable battery.				

#### 6.1.2 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:a;Polarization:Horizontal



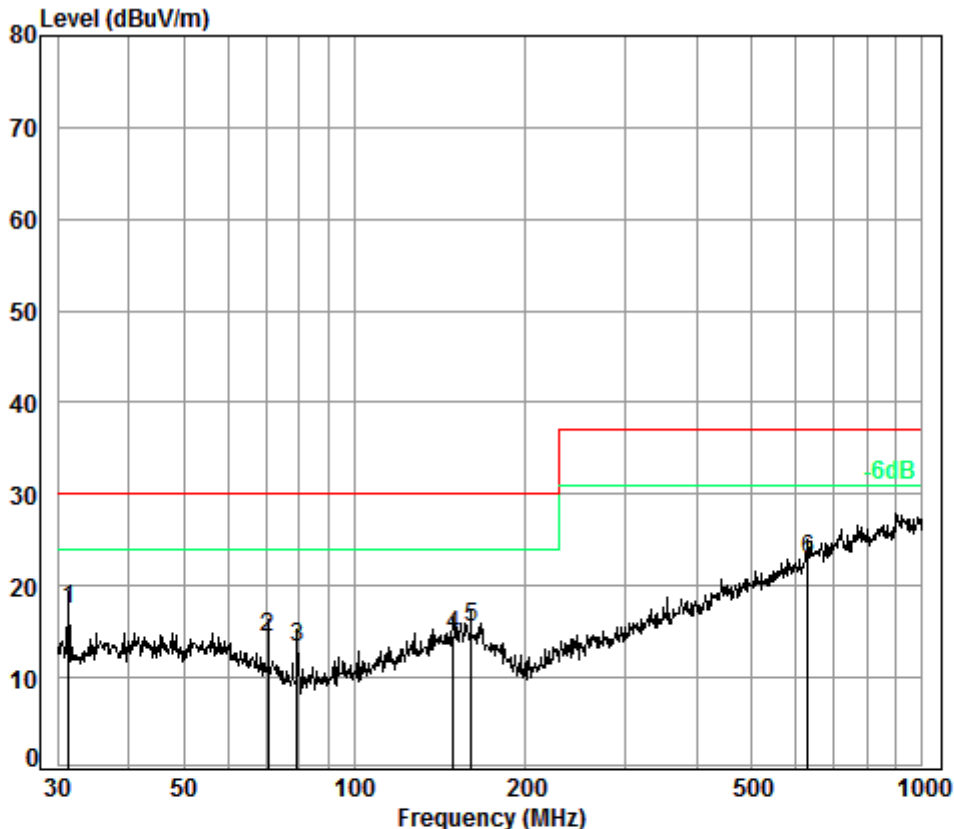
Condition: 10m Horizontal

Job No. : 3584HS

Test Mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	36.25	6.73	12.82	32.98	27.30	13.87	30.00	-16.13
2	46.99	6.84	12.85	33.00	26.43	13.12	30.00	-16.88
3	55.41	7.00	12.34	32.97	26.33	12.70	30.00	-17.30
4	136.94	7.39	12.54	32.75	26.40	13.58	30.00	-16.42
5 pp	160.35	7.50	13.36	32.73	29.53	17.66	30.00	-12.34
6	572.61	8.83	18.14	32.60	27.10	21.47	37.00	-15.53

Mode:a;Polarization:Vertical



Condition: 10m Vertical  
 Job No. : 3584HS  
 Test Mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	31.40	6.70	12.52	32.97	31.23	17.48	30.00	-12.52
2	70.58	6.91	9.97	32.90	30.37	14.35	30.00	-15.65
3	79.24	7.09	8.65	32.87	30.32	13.19	30.00	-16.81
4	149.49	7.45	13.38	32.74	26.41	14.50	30.00	-15.50
5	160.35	7.50	13.36	32.73	27.32	15.45	30.00	-14.55
6	629.48	8.97	19.28	32.60	27.31	22.96	37.00	-14.04



## **7 Immunity Test Results**

### **7.1 Performance Criteria Description in EN 61326-1:2013**

<b>Criterion A</b>	During testing, normal performance within the specification limits.
<b>Criterion B</b>	During testing, temporary degradation, or loss of function or performance which is selfrecovering.
<b>Criterion C</b>	During testing, temporary degradation, or loss of function or performance which requires operator intervention or system reset occurs.



## 7.2 Electrostatic Discharge

Test Requirement: EN 61326-1:2013

Test Method: EN 61000-4-2:2009

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.0 °C Humidity: 54 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: On mode, keep EUT measuring the situation of the rechargeable battery.

### 7.2.2 Test Results:

Observations: Test Point:

1. All insulated enclosure and seams.
2. All accessible metal parts of the enclosure.
3. All side

Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	2,4,8	+	1	A
Air Discharge	2,4,8	-	1	A
Contact Discharge	4	+	2	A
Contact Discharge	4	-	2	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A

### Results:

A: No degradation in the performance of the EUT was observed.



### 7.3 Radiated Immunity(80MHz-2.7GHz)

Test Requirement: EN 61326-1:2013  
Test Method: EN 61000-4-3:2006+A1:2008+A2:2010

#### 7.3.1 E.U.T. Operation

Operating Environment:  
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar  
Test mode: a: On mode, keep EUT measuring the situation of the rechargeable battery.

#### 7.3.2 Test Results:

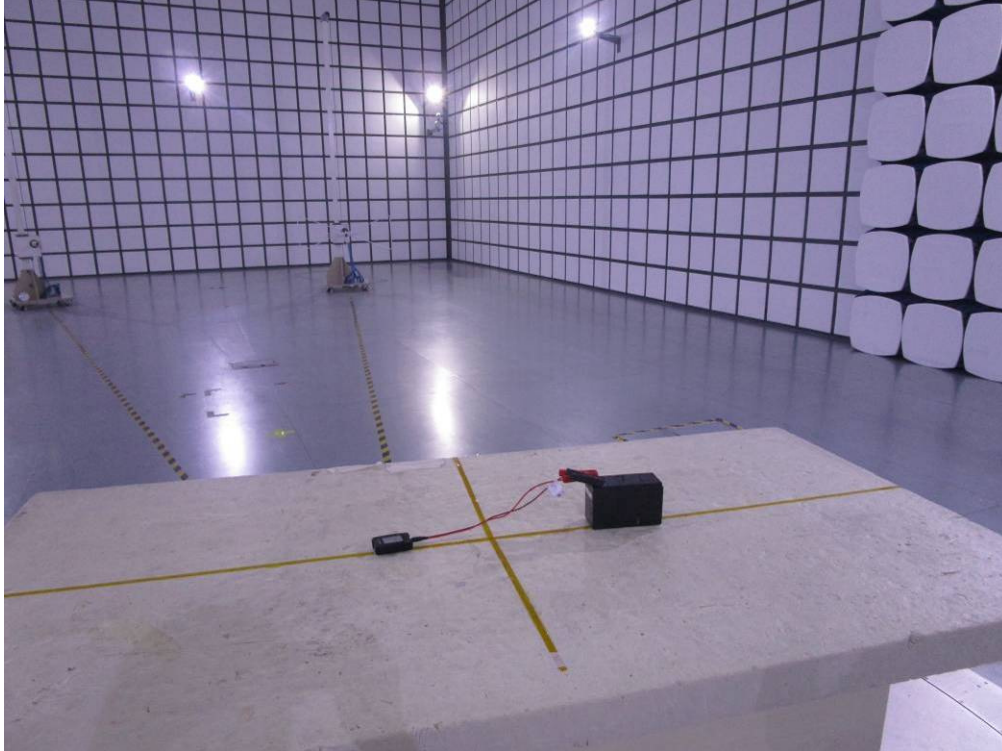
Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	3	Front	2s	A
80MHz-1GHz	3	Back	2s	A
80MHz-1GHz	3	Left	2s	A
80MHz-1GHz	3	Right	2s	A
80MHz-1GHz	3	Top	2s	A
80MHz-1GHz	3	Underside	2s	A
1.4GHz-2GHz	3	Front	2s	A
1.4GHz-2GHz	3	Back	2s	A
1.4GHz-2GHz	3	Left	2s	A
1.4GHz-2GHz	3	Right	2s	A
1.4GHz-2GHz	3	Top	2s	A
1.4GHz-2GHz	3	Underside	2s	A
2GHz-2.7GHz	1	Front	2s	A
2GHz-2.7GHz	1	Back	2s	A
2GHz-2.7GHz	1	Left	2s	A
2GHz-2.7GHz	1	Right	2s	A
2GHz-2.7GHz	1	Top	2s	A
2GHz-2.7GHz	1	Underside	2s	A

#### Results:

A: No degradation in the performance of the EUT was observed.

## 8 Photographs

### 8.1 Radiated Disturbance(30MHz-1GHz) Test Setup

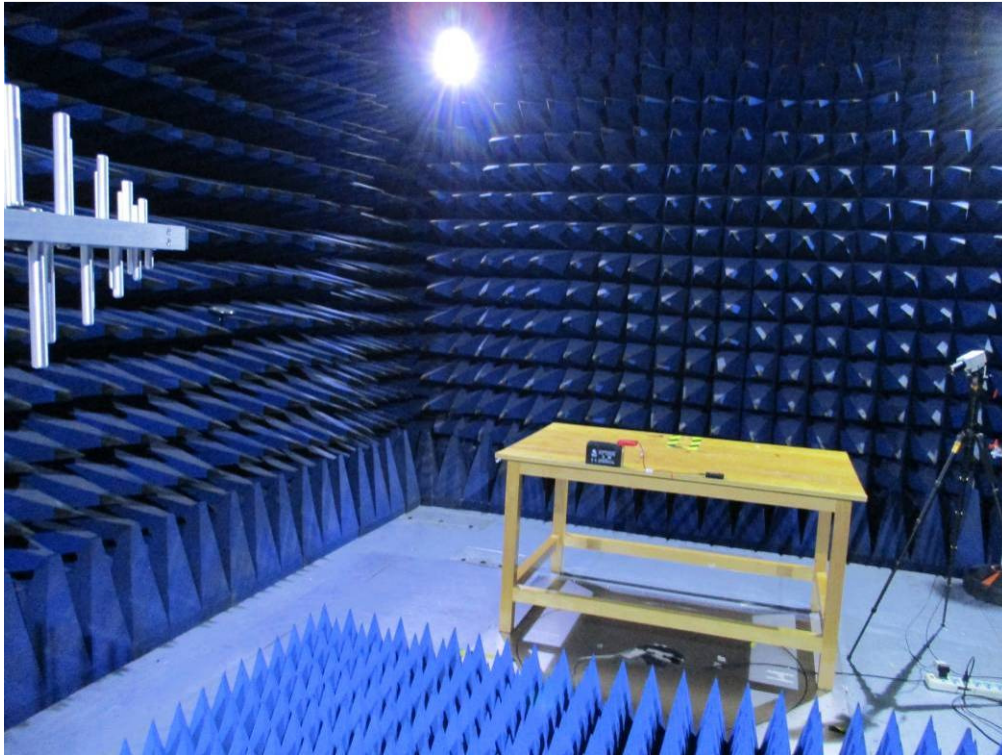


### 8.2 Electrostatic Discharge Test Setup





### 8.3 Radiated Immunity(80MHz-2.7GHz) Test Setup



### 8.4 EUT Constructional Details



