

# AS/NZS CISPR 32:2015

## TEST REPORT

For

**Pycom Ltd**

High Point 9 Sydenham Road, Guildford Surrey GU1 3RX, Surrey, United Kingdom

**Tested Model: Fipy 1.0**

<b>Report Type:</b> Original Report	<b>Product Name:</b> Fipy
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<b>Report Number:</b> RSHA180108015-00A	
<b>Report Date:</b> 2018-06-14	
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	Pycom Ltd
Test Model	Fipy 1.0
Product	Fipy
Rate Voltage	DC 3.4-5.5V
Dimension	55 mm (L)*20 mm (W)*10mm(H)

*\*All measurement and test data in this report was gathered from production sample serial number: 20180108012. (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2018-01-08.*

### Objective

This test report is prepared on behalf of Pycom Ltd in accordance with AS/NZS CISPR 32:2015 Class B rules.

The objective of the manufacturer is to determine compliance with AS/NZS CISPR 32:2015 Class B.

### Related Submittal(s)/Grant(s)

No related submittal(s).

### Test Methodology

CISPR 16-1-1: 2015, Specification for radio disturbance and immunity measuring apparatus and methods Part 1-1: Radio disturbance and immunity measuring apparatus- Measuring apparatus.

CISPR 16-1-4:2010+A2:2017, Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements.

CISPR 16-2-1: 2014, Specification for radio disturbance and immunity measuring apparatus and methods- Part2-1: Methods of measurement of disturbance and immunity- Conducted disturbance measurements.

CISPR 16-2-3: 2016, Specification for radio disturbance and immunity measuring apparatus and methods - Part2-3: Methods of measurement of disturbances and immunity- Radiated disturbance measurements.

CISPR 16-4-2: 2011+A1:2014, Specification for radio disturbance and immunity measuring apparatus and methods-Part 4-2: Uncertainties, statistics and limit modeling-Measurement instrumentation uncertainty.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 Meters.

## Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

FINAL

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in normal condition.

*Test Mode: Communication*

### EUT exercise software

No exercise software to test.

### Equipment Modifications

No modification was made to the EUT tested.

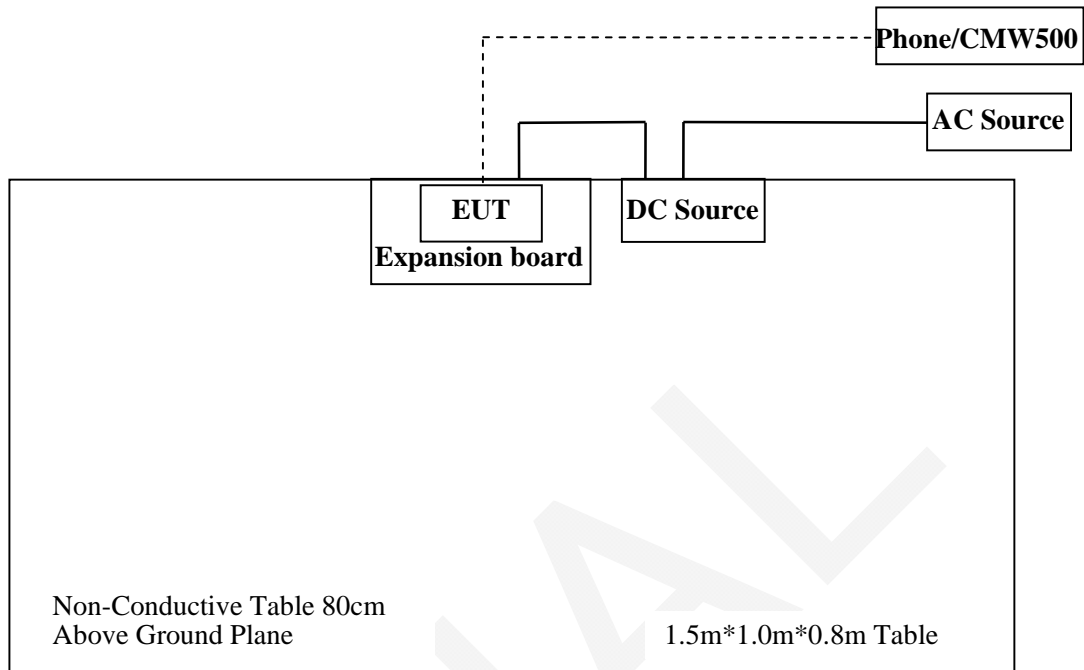
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HUAWEI	Phone	EVA-TL00	N/A
Pycom Ltd	Expansion board	V2.1A	1630001506
MCH	DC Source	MCH-303D-II	14070562
R&S	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	116218

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Power cable	1.2	Expansion board	DC Source

### Block Diagram of Radiated Emissions Test Setup



**SUMMARY OF TEST REPORT****AS/NZS CISPR 32:2015**

<b>RULE</b>	<b>DESCRIPTION</b>	<b>RESULTS</b>
§A2	Conducted Emissions	Not Applicable
§ A3	Radiated Emissions	Compliance

Note: Not applicable: The EUT is powered by DC Source, and there's no special AC to DC power supply.

## AS/NZS CISPR 32:2015 §A2-Radiated Emissions

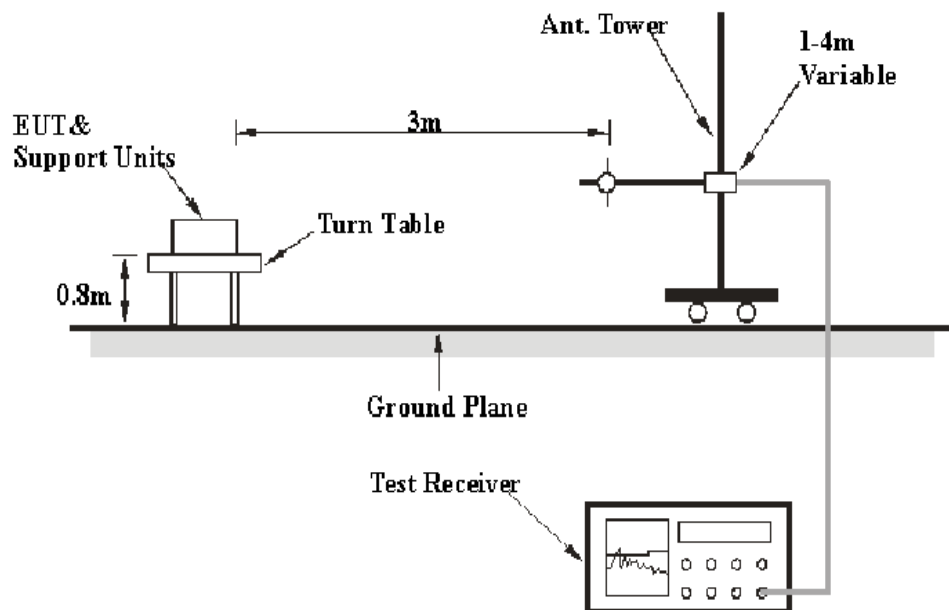
### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

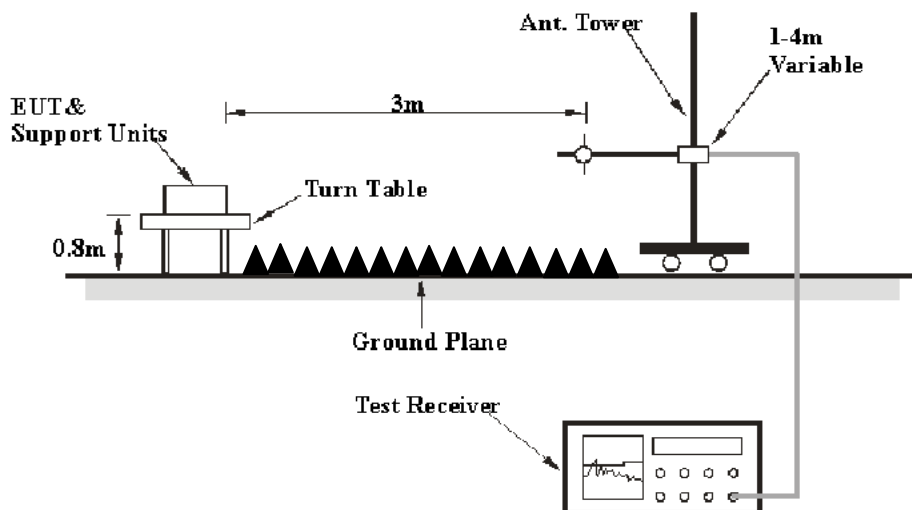
Item		Measurement Uncertainty	$U_{\text{cispr}}$
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB
	1GHz~6GHz	4.45dB	5.2 dB

### Test System Setup

Below 1GHz:





**Above 1GHz:**

The radiated emission tests were performed in the 3 meters test site, the setup of EUT is according with CISPR 16-1-4:2010+A2:2017, CISPR16-2-3:2016 measurement procedure, the related limit was specified in the AS/NZS CISPR 32: 2015 Class B.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

**EMI Test Receiver Setup**

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	1MHz	AVG

**Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in Quasi-peak detection mode for frequency below 1 GHz, Peak and average detection mode above 1 GHz.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	171205	2017-08-14	2018-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	Signal Analyzer	ESU40	100207	2017-08-27	2018-08-26
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
Champrotek	Chamber	Chamber B	T-KSEMC080	-	-
R&S	Auto test Software	EMC32	100361	-	-
Narda	Pre-amplifier	AFS42-00101800	2001270	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-8	008	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-4	004	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2017-12-12	2018-12-11

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

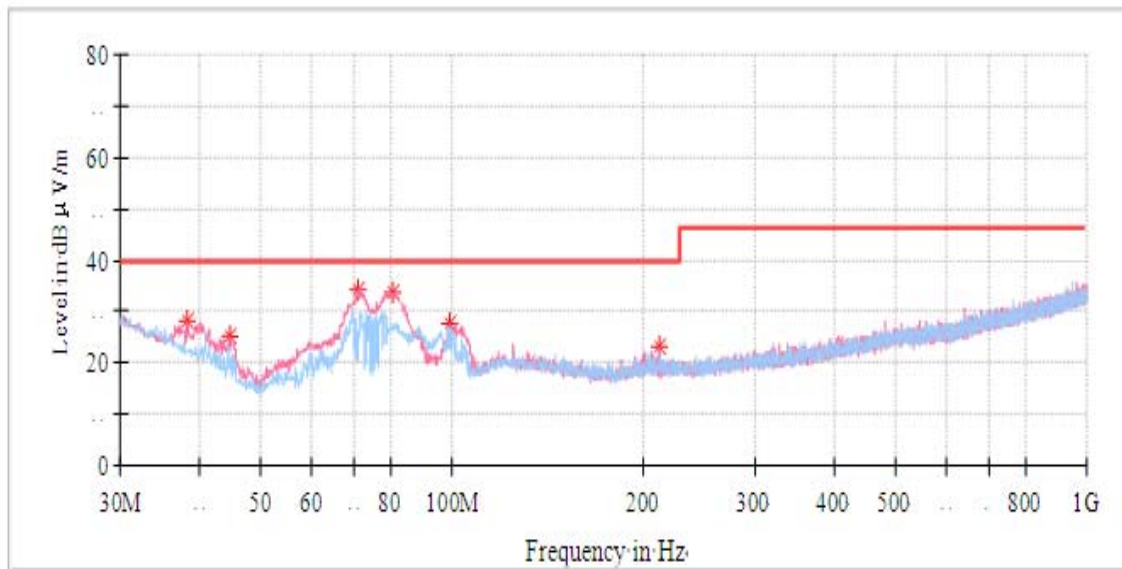
$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

**Test Data****Environmental Conditions**

<b>Temperature:</b>	27 °C
<b>Relative Humidity:</b>	48 %
<b>ATM Pressure:</b>	101.0 kPa

\* The testing was performed by Annie Xuan on 2018-02-02.

Test Mode: Communication

**Below 1GHz**

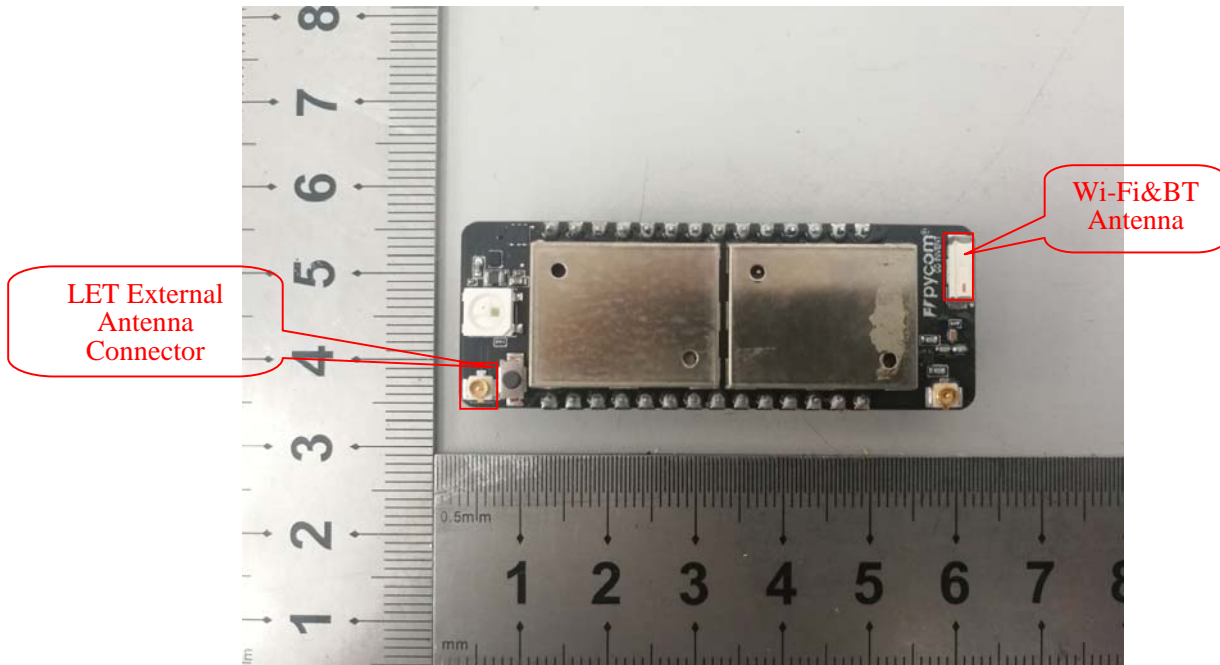
Frequency (MHz)	Max Peak (dB μV/m)	Limit (dB μV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.366250	28.41	40.00	11.59	200.0	V	294.0	-10.1
44.550000	25.13	40.00	14.87	100.0	V	278.0	-14.3
71.346250	34.00	40.00	6.00	100.0	V	152.0	-17.8
80.925000	33.59	40.00	6.41	200.0	V	179.0	-18.2
99.476250	27.58	40.00	12.42	100.0	V	75.0	-15.5
212.360000	23.03	40.00	16.97	100.0	V	251.0	-12.7

**Above 1 GHz:**

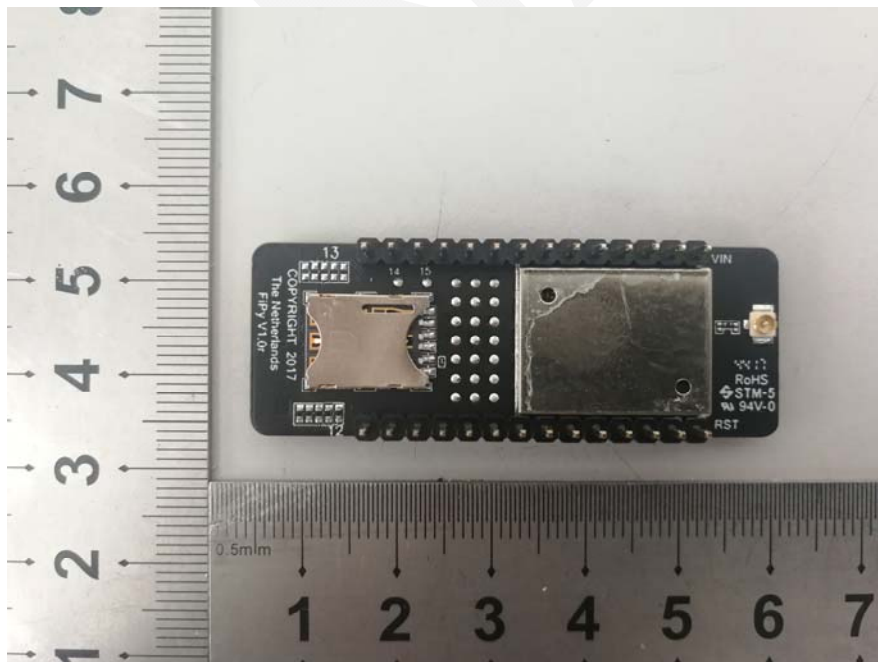
Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1097.402597	---	18.34	50.00	31.66	100.0	V	241.0	-11.3
1097.402597	31.29	---	70.00	38.71	100.0	V	241.0	-11.3
1681.818182	---	21.80	50.00	28.20	200.0	V	124.0	-7.2
1681.818182	35.24	---	70.00	34.76	100.0	V	156.0	-7.2
2396.103896	---	24.94	50.00	25.06	200.0	V	0.0	-4.9
2396.103896	40.66	---	70.00	29.34	200.0	V	0.0	-4.9
3240.259740	---	28.45	54.00	25.55	200.0	H	297.0	-1.5
3240.259740	44.74	---	74.00	29.26	200.0	H	297.0	-1.5
4506.493506	---	31.74	54.00	22.26	100.0	V	30.0	1.8
4506.493506	45.15	---	74.00	28.85	100.0	H	307.0	1.8
5545.454545	---	32.54	54.00	21.46	200.0	V	222.0	4.2
5545.454545	45.31	---	74.00	28.69	200.0	V	222.0	4.2

## EXHIBIT A - EUT PHOTOGRAPHS

**EUT- Top View**



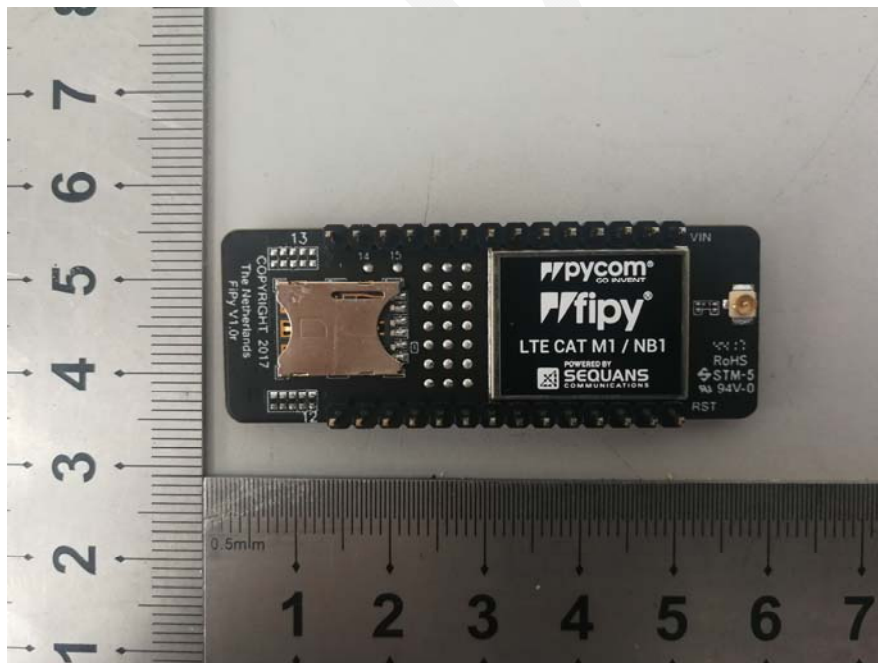
**EUT- Bottom View**



**EUT – PCB Top View**



**EUT – PCB Bottom View**



## **EXHIBIT B – TEST SETUP PHOTOGRAPHS**

**Radiated Emissions- Front Side (Below 1GHz)**

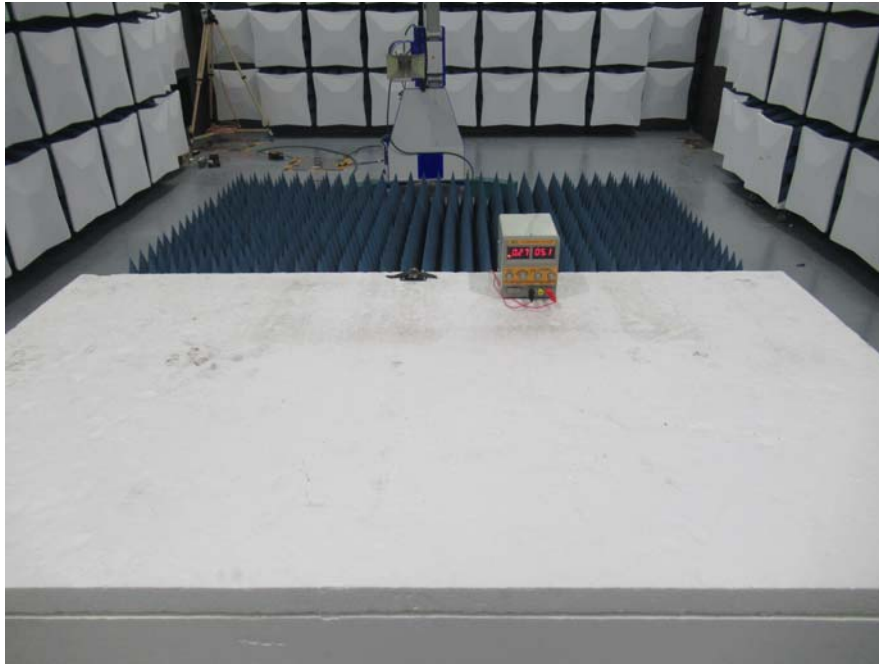


**Radiated Emissions- Rear Side (Below 1GHz)**

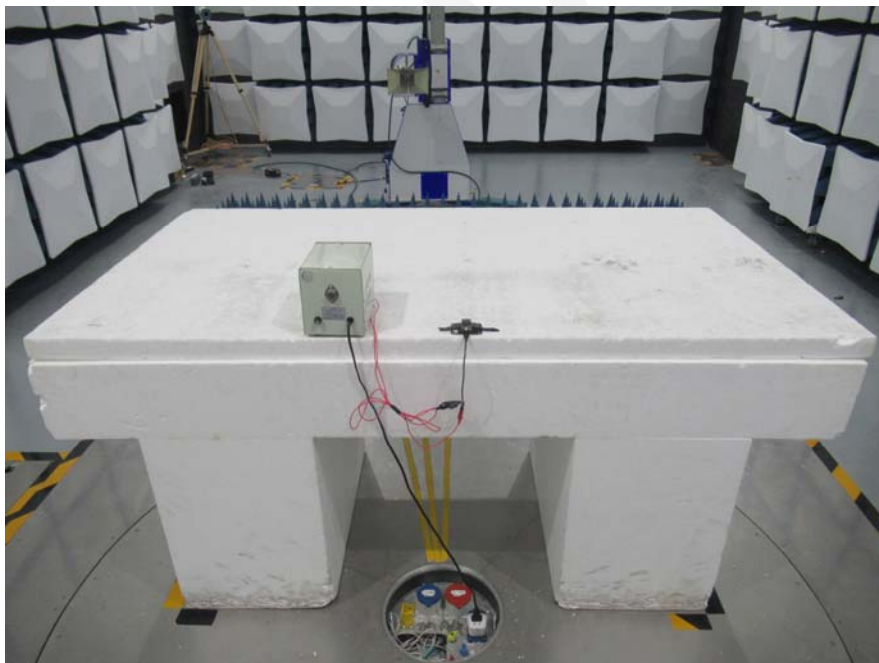




**Radiated Emissions- Front Side (Above 1GHz)**



**Radiated Emissions- Rear Side (Above 1GHz)**



**\*\*\*\*END OF REPORT\*\*\*\***