


FCC PART 15 CLASS B  
EMI MEASUREMENT AND TEST REPORT  
For

Natural Wireless LLC  
23A Poplar Street, East Rutherford, NJ 07073, USA

**FCC ID: OG6S2326-24P**

June 21, 2012

This Report Concerns: Original Report		Equipment Type: 8-24 Ports Managed PoE Switch	
Test Engineer:		Eric Li <i>Eric Li</i>	
Report No.:		BST12060248Y-1ER-3	
Receive EUT Date/Test Date:		June 8, 2012/ June 17-19, 2012	
Reviewed By President:		Christina Deng <i>Christina Deng</i>	
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## **1. GENERAL INFORMATION**

### **1.1. Report information**

1.1.1.This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2.The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BST, unless the applicant has authorized BST in writing to do so.

Test Facility -

The test site used to collect the radiated data is located on the address of

Shenzhen Certification Technology Service Co., Ltd

(FCC Registered Test Site Number: 197647) on

2F, Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road,

Bao'an District, shenzhen 518126, China

The Test Site is constructed and calibrated to meet the FCC requirements.

### **1.2. Measurement Uncertainty**

Available upon request.

## 2. PRODUCT DESCRIPTION

### 2.1. EUT Description

Applicant : Natural Wireless LLC  
 Address : 23A Poplar Street, East Rutherford, NJ 07073, USA  
  
 Manufacturer : Natural Wireless LLC  
 Address : 23A Poplar Street, East Rutherford, NJ 07073, USA  
  
 EUT Description : 8-24 Ports Managed PoE Switch  
  
 Trade Name : NaturalWireless  
  
 Model Number : S2326-24P, S2318-16P, S2310-8P, S2326, S2318, S2310  
  
 Power Supply : AC 110-240V, 50/60Hz

### 2.2. Block Diagram of EUT Configuration

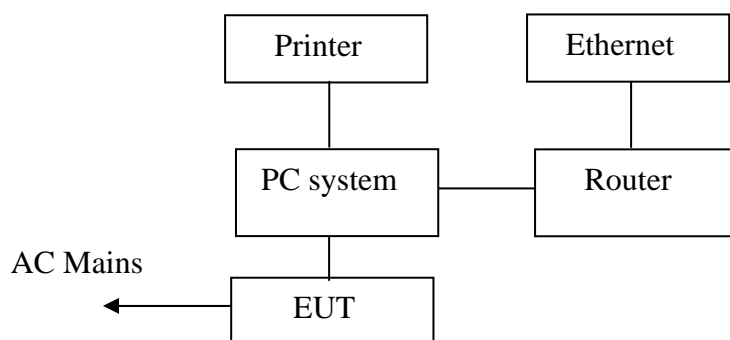


Figure 1 EUT Setup

### 2.3. Support Equipment List

Name	Model No	S/N	Manufacturer	Used “ ”
PC system	AM1830	N/A	Acer	
Printer	HP1020	N/A	HP	
Router	TL-R402M	07115200391	TP-LINK	

### 2.4. Test Conditions

Temperature: 23~25

Relative Humidity: 50~63 %

### 3. FCC ID LABEL

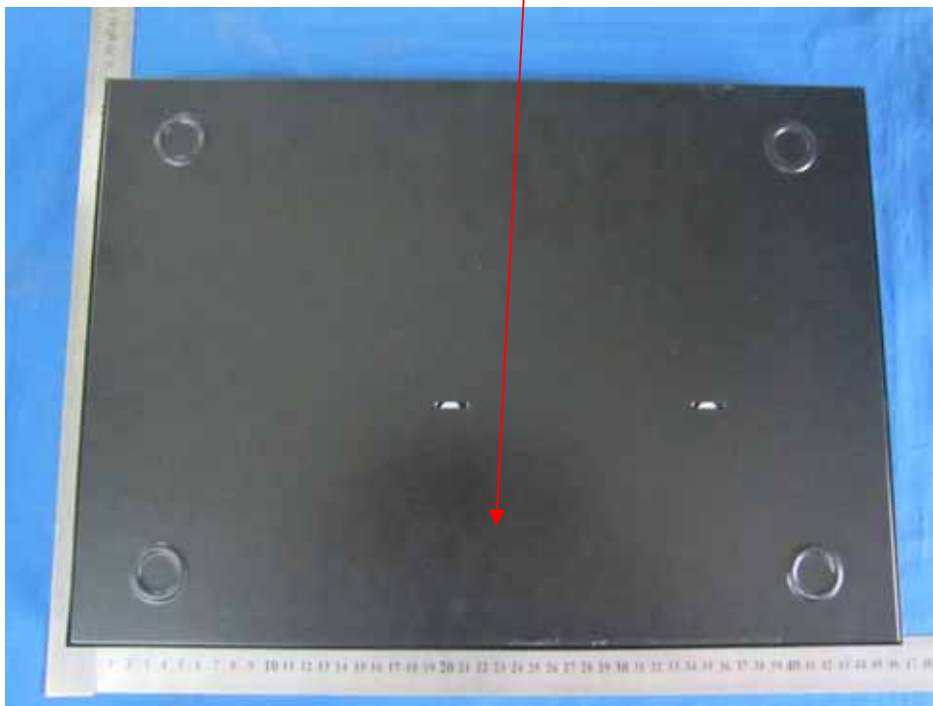
**FCC ID: OG6S2326-24P**

**This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:**

- 1. This device may not cause harmful interference, and**
- 2. This device must accept any interference received, including interference that may cause undesired operation.**

#### **Label Location on EUT**

#### **EUT View/ FCC ID Label Location**



#### 4. TEST RESULTS SUMMARY

**Table 1 Test Results Summary**

Test Items	Test Results
Conducted disturbance	Pass
Radiated disturbance	Pass

Statement: All testing was performed using the test procedures found in ANSI C63.4-20003.

##### **Modifications**

No modification was made.

## 5. TEST EQUIPMENT USED

Equipment/Facilities	Manufacturer	Model #	Serial no.	Date of Cal.	Cal. Interval
Cable	Resenberger	N/A	NO.1	Mar 10 , 2012	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10 , 2012	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10 , 2012	1 Year
LISN	Rohde & Schwarz	ESH3-Z5	100305	Mar 10 , 2012	1 Year
50 Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10 , 2012	1 Year
EMI Test Receiver	Rohde & Schwarz	ESP13	100180	Oct.11,2011	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.10,2011	1 Year
3m Semi-Anechoic Chamber	Albatross Projects	9m x 6m x 6m	N/A	Feb.20,2012	1 Year
Signal Generator	FLUKE	PM5418 + Y/C	LO747012	Feb.20,2012	1 Year
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2012	1 Year
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2012	1 Year
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2011	1 Year
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2011	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	208 279	May 12, 2012	1 Year
Ultra Broadband Antenna	Rohde & Schwarz	HL-562	100110	June.15,2012	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct.11,2011	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct.11,2011	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.20,2012	1 Year
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb.20,2012	1 Year
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2011	1 Year
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.20,2012	1 Year
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2012	1 Year
Absorbing clamp	Rohde & Schwarz	MDS-21	N/A	Oct.11,2011	1 Year

## 6. CONDUCTED EMISSION TEST

### 6.1. Block Diagram of Test Setup

#### 6.1.1. Block Diagram of connection between the EUT and the simulators

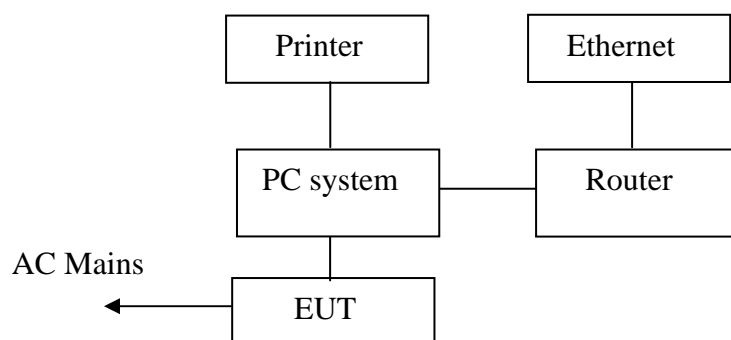
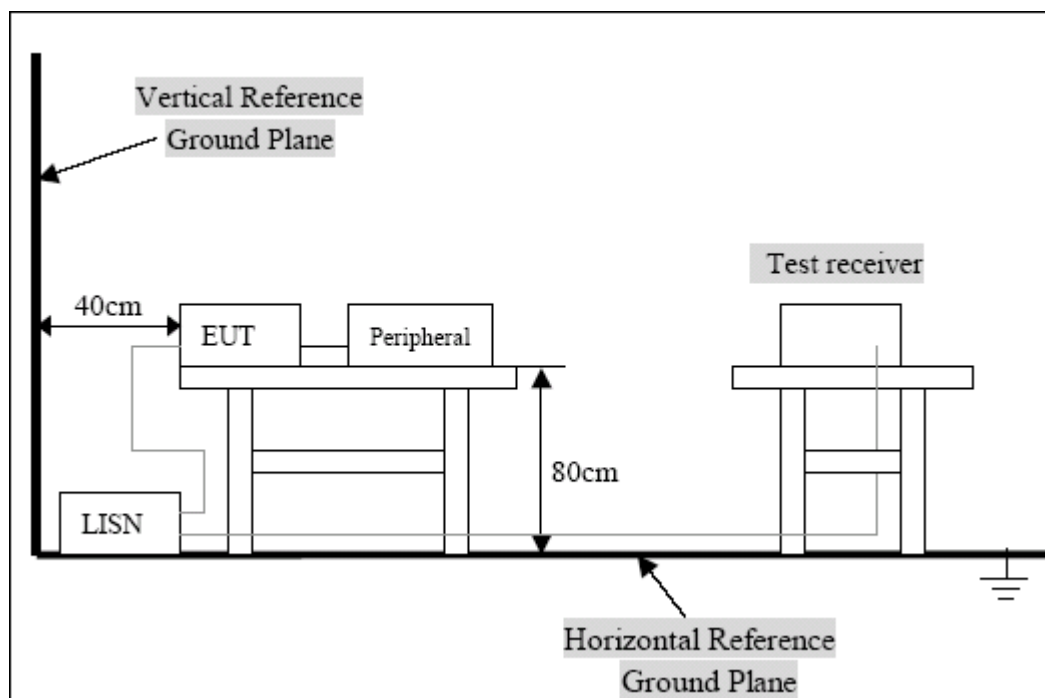


Figure 1 EUT Setup

#### 6.1.2. Test Setup Diagram





## 6.2. Test Standard

FCC Part 15 CLASS B

ANSI C63.4 2003

## 6.3. Conducted Emission Limit(Class B)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.

## 6.4. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet FCC Part 15 requirement and operating in a manner, which tends to maximize its emission characteristics in a normal application.

## 6.5. Operating Condition of EUT

6.5.1. Setup the EUT and simulators as shown in Section 6.1.

6.5.2. Turn on the power of all equipments.

6.5.3. Let the EUT work in test mode and test it.

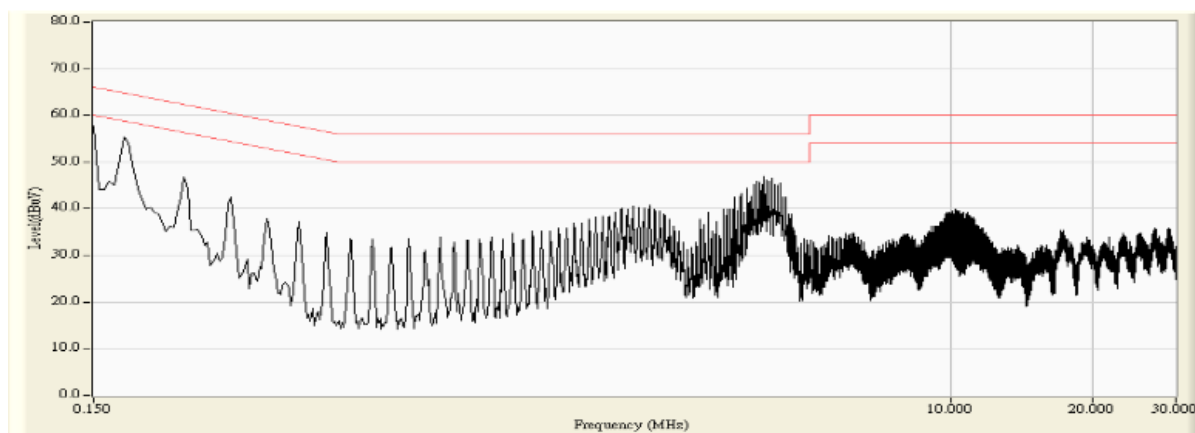
## 6.6. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions form both sides of AC line. The bandwidth of EMI test receiver is set at 9kHz.

## 6.7. Test Result

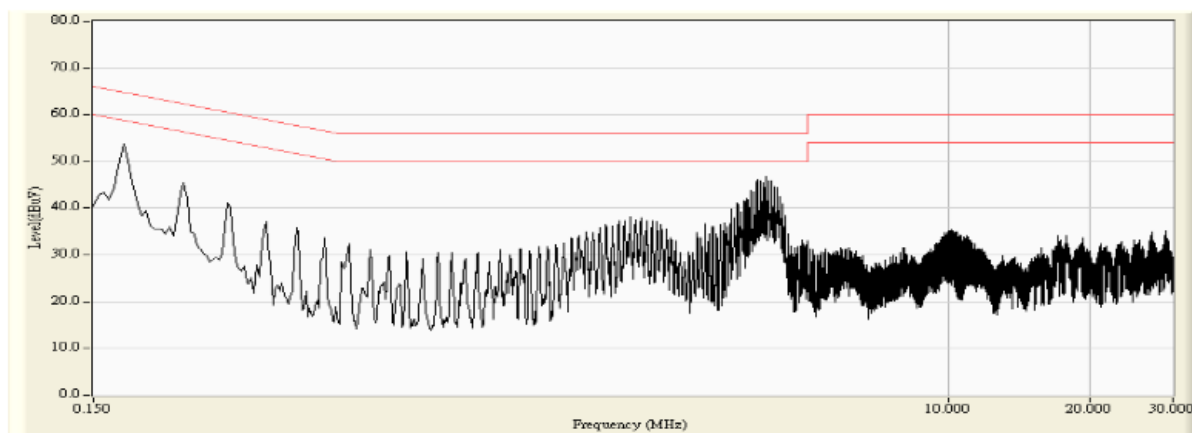
**Pass**

## N Line



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.174	9.929	43.200	53.129	-11.638	64.767	QUASIPeAK
2		0.234	9.450	34.800	44.250	-18.057	62.307	QUASIPeAK
3		0.294	9.498	28.000	37.498	-22.913	60.411	QUASIPeAK
4		2.282	9.708	18.600	28.308	-27.692	56.000	QUASIPeAK
5		3.450	9.780	13.000	22.780	-33.220	56.000	QUASIPeAK
6		3.978	9.813	23.200	33.013	-22.987	56.000	QUASIPeAK
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.174	9.929	33.500	43.429	-11.338	54.767	AVERAGE
2		0.234	9.450	24.100	33.550	-18.757	52.307	AVERAGE
3		0.294	9.498	21.900	31.398	-19.013	50.411	AVERAGE
4		2.282	9.708	16.000	25.708	-20.292	46.000	AVERAGE
5		3.450	9.780	7.700	17.480	-28.520	46.000	AVERAGE
6		3.978	9.813	16.100	25.913	-20.087	46.000	AVERAGE

## L Line



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.174	9.929	41.400	51.329	-13.438	64.767	QUASIPeAK
2		0.234	9.450	33.000	42.450	-19.857	62.307	QUASIPeAK
3		0.290	9.494	30.800	40.294	-20.230	60.524	QUASIPeAK
4		2.090	9.684	24.400	34.084	-21.916	56.000	QUASIPeAK
5		2.210	9.700	16.800	26.500	-29.500	56.000	QUASIPeAK
6	*	4.062	9.820	33.600	43.420	-12.580	56.000	QUASIPeAK

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.174	9.929	33.600	43.529	-11.238	54.767	AVERAGE
2		0.234	9.450	27.300	36.750	-15.557	52.307	AVERAGE
3		0.290	9.494	25.100	34.594	-15.930	50.524	AVERAGE
4		2.090	9.684	22.500	32.184	-13.816	46.000	AVERAGE
5		2.210	9.700	18.900	28.600	-17.400	46.000	AVERAGE
6		4.062	9.820	23.600	33.420	-12.580	46.000	AVERAGE

## 7. RADIATED EMISSION MEASUREMENT

### 7.1. Block Diagram of EUT Configuration

#### 7.1.1. Block Diagram of connection between the EUT and the simulators

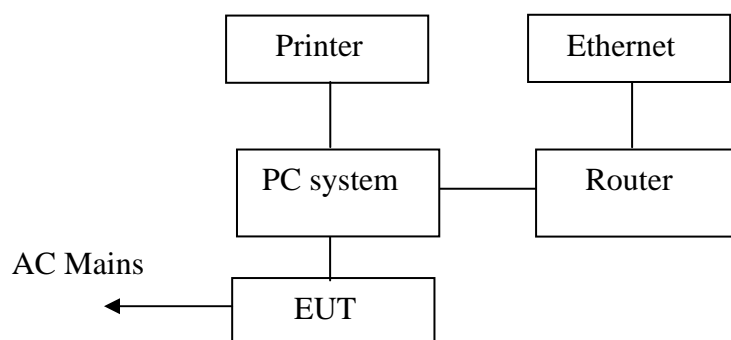
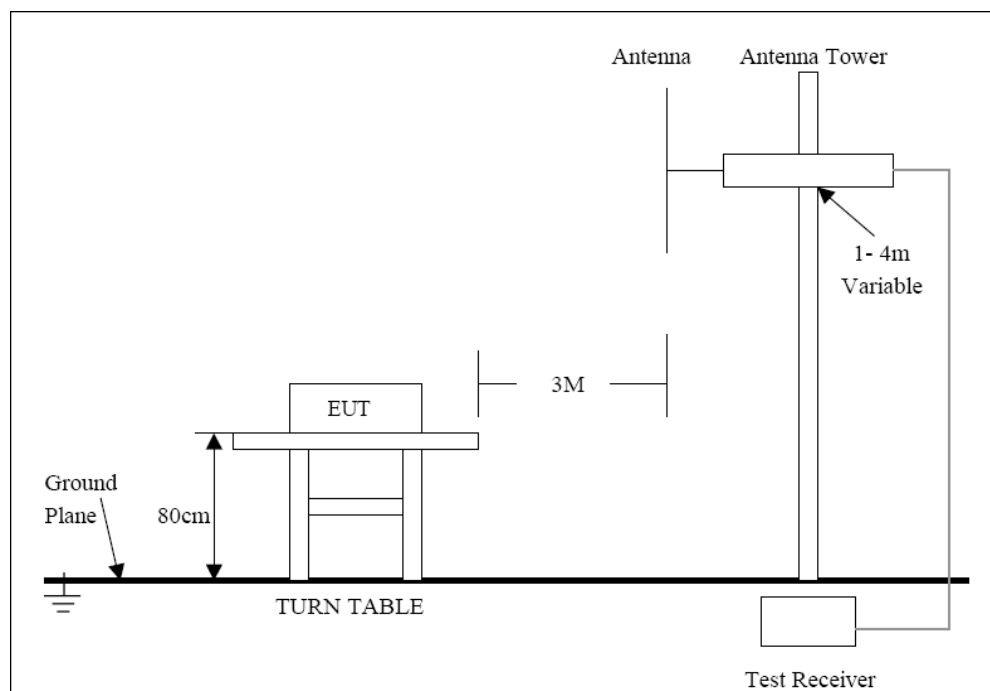


Figure 1 EUT Setup

#### 7.1.2. Semi-anechoic Chamber Test Setup Diagram



## 7.2. Test Standard

FCC Part 15 CLASS B  
ANSI C63.4 2003

## 7.3. Radiated Emission Limit(Class B)

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB $\mu$ V/m)
30 ~ 88	3	40.0
88 ~ 216	3	43.5
216 ~ 960	3	46.0
Above 1000	3	54.0

Note:(1) The smaller limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT or system.

## 7.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Measurement to meet the Commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 7.5. Operating Condition of EUT

7.5.1.Setup the EUT as shown on Section 7.1

7.5.2.Turn on the power of all equipments.

7.5.3.Let the EUT work in test mode and measure it.

## 7.6. Test Procedure

The EUT 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. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Calibrated Loop antenna is used as receiving antenna for frequencies below 30MHz, Calibrated Bilog antenna is used as receiving antenna for frequencies between 30 MHz and 1 GHz, Calibrated Horn antenna is used as receiving antenna for frequencies above 1000MHz. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver is set at 9kHz in below 30MHz and set at 120kHz in 30-1000MHz and 1000kHz in above 1G.

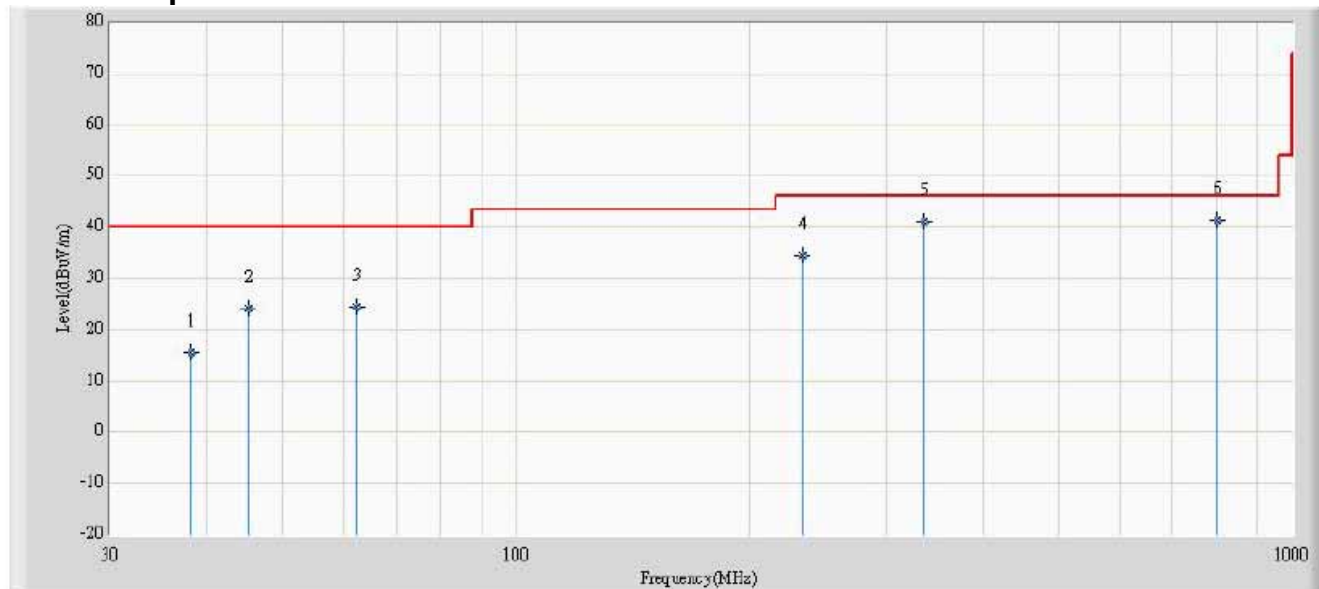
The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Peak detector and Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The measurements greater than 20dB below the limit are not report.

## 7.7. Test Result

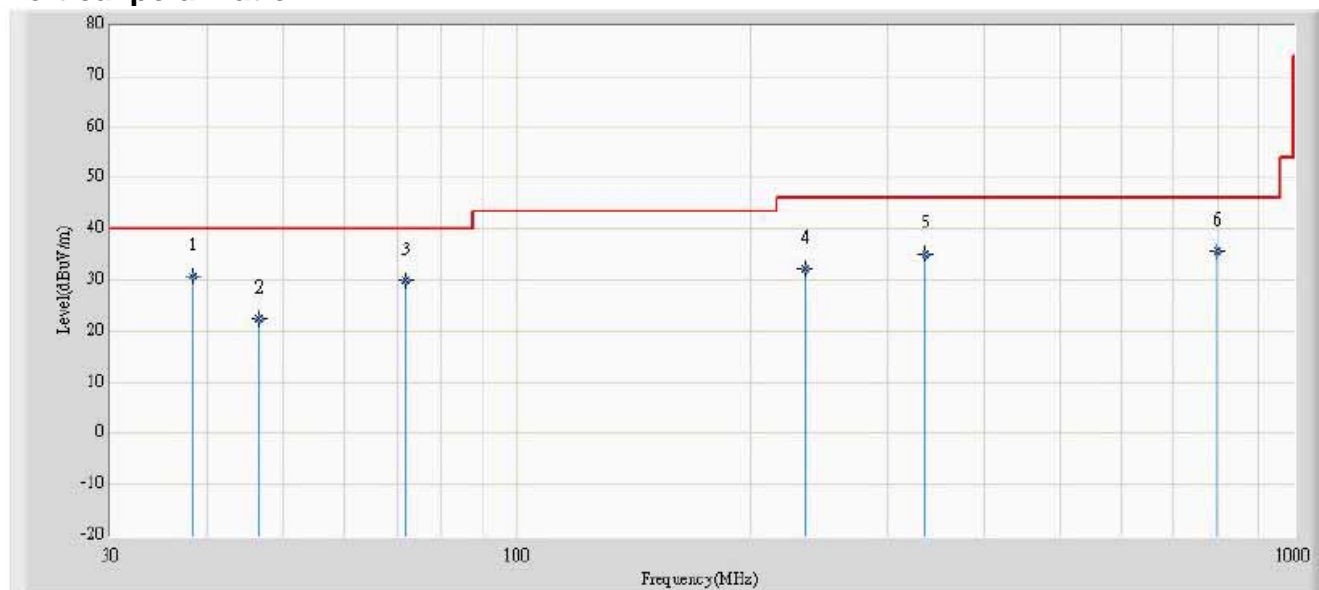
**PASS**

### Horizontal polarization



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			38.168	15.584	1.883	-24.416	40.000	13.701	QP
2			45.102	24.320	14.165	-15.680	40.000	10.155	QP
3			62.379	24.405	18.443	-15.595	40.000	5.962	QP
4			233.977	34.617	23.084	-11.383	46.000	11.533	QP
5			336.045	41.235	25.594	-4.765	46.000	15.640	QP
6		*	800.716	41.601	19.044	-4.399	46.000	22.557	QP

### Vertical polarization



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	38.279	30.728	17.087	-9.272	40.000	13.641	QP
2			46.478	22.669	13.094	-17.331	40.000	9.575	QP
3			71.825	30.042	23.907	-9.958	40.000	6.135	QP
4			234.529	32.352	20.734	-13.648	46.000	11.618	QP
5			335.995	35.092	19.453	-10.908	46.000	15.639	QP
6			798.237	35.606	13.086	-10.394	46.000	22.520	QP