



# FCC Part 15C Test Report

**FCC ID:A7GAMAS-2816**

Product Name:	<b>Mattress Inflation Air Pump</b>
Trademark:	N/A
Model Name :	<b>AMAS-2816</b> <b>AMAS-2816A, AMAS-2816B, AMAS-2812,</b> <b>AMAS-2818, AMAS-2820, AMAS-2822.</b>
Prepared For :	<b>NINGBO FOREVER ELECTRONIC APPLIANCE CO., LTD.</b>
Address :	NO.375, NINGCHUAN ROAD, NINGBO, ZHEJIANG, CHINA
Prepared By :	<b>Shenzhen BCTC Technology Co., Ltd.</b>
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	<b>Jun. 22 – Jun. 29, 2016</b>
Date of Report :	<b>Jun. 29, 2016</b>
Report No.:	<b>BCTC-160607428E</b>



## VERIFICATION OF COMPLIANCE

**Applicant's name**.....: NINGBO FOREVER ELECTRONIC APPLIANCE CO., LTD.

Address .....: NO.375, NINGCHUAN ROAD, NINGBO, ZHEJIANG, CHINA

**Manufacture's Name**.....: NINGBO FOREVER ELECTRONIC APPLIANCE CO., LTD.

Address .....: NO.375, NINGCHUAN ROAD, NINGBO, ZHEJIANG, CHINA

### Product description

Product name.....: Mattress Inflation Air Pump

Trademark: N/A

Model Name: AMAS-2816

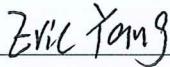
FCC Part15.249

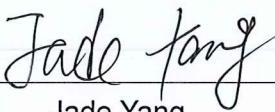
Standards: ANSI C63.10-2013

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Result.....: **Pass**

Testing Engineer :   
Eric Yang

Reviewer  
(Supervisor) :   
Jade Yang

Approved &  
Authorized  
Signer(Manager) :   
Carson Zhang



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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.249	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.249	Bandwidth	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

### 1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.  
Add.:No.101, Yousong Road, Longhua New District, Shenzhen, China  
FCC Registration No.:187086

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mattress Inflation Air Pump											
Trade Name	N/A											
Model Name	AMAS-2816											
Serial Model	AMAS-2816A, AMAS-2816B, AMAS-2812, AMAS-2818, AMAS-2820, AMAS-2822.											
Model Difference	All the model are the same circuit and RF module,except model names.											
Product Description	<table border="1"><tr><td>Operation Frequency:</td><td>2432MHz</td></tr><tr><td>Modulation Type:</td><td>FSK</td></tr><tr><td>Number Of Channel</td><td>1 CH</td></tr><tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr></table> <p>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</p>				Operation Frequency:	2432MHz	Modulation Type:	FSK	Number Of Channel	1 CH	Antenna Designation:	Please see Note 3.
Operation Frequency:	2432MHz											
Modulation Type:	FSK											
Number Of Channel	1 CH											
Antenna Designation:	Please see Note 3.											
Channel List	Please refer to the Note 2.											
Rating	DC 12V From Adapter											
Connecting I/O Port(s)	Please refer to the User's Manual											
hardware version	--											
Software version	--											
Serial number	--											

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2432	/	/	/	/

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	PCB Antenna	N/A	0	



## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

For All Mode	Description	Modulation Type
Mode 1	CH01	FSK
Mode 2	Link mode(conducted emission and Radiated emission)	

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

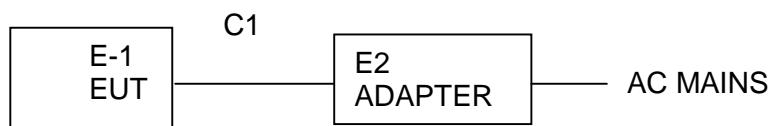
## 2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Frequency	2432 MHz
Channel	1

## 2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission/Conducted Emission Test





## 2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Mattress Inflation Air Pump	N/A	AMAS-2816	N/A	EUT
E-2	Adapter	N/A	GM26-120200-2A	N/A	Input:100-240V~ 50/60Hz 1A Output: 12V---2A

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.0M	DC cable unshielded

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



## 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	1166.5950K 03-101165- ha	2016.06.06	2017.06.05	1 year
2	LISN	R&S	NSLK81 26	812646 6	2015.08.24	2016.08.23	1 year
3	LISN	R&S	NSLK81 26	812648 7	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	620026441 7	2016.06.07	2017.06.06	1 year
5	RF cables	R&S	R204	R20X	2015.07.06	2016.07.05	1 year

### Radiation test, Band-edge test and 20db bandwidth test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY4510804 0	2015.07.06	2016.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2016.06.07	2017.06.06	1 year
3	Bilog Antenna	R&S	VULB 9168	VULB91 68-438	2015.07.06	2016.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	620026441 6	2016.06.07	2017.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2016.06.07	2017.06.06	1 year
6	Horn Antenna	R&S	HF906	10027	2015.07.06	2016.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	R&S	BBV9743	9743-01 9	2015.08.25	2016.08.24	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2016.06.08	2017.06.07	1 year
10	RF cables	R&S	R203	R20X	2015.07.06	2016.07.05	1 year
11	Antenna connector	Florida RFLabs	Lab-Fle	RF 01#	2015.07.06	2016.07.05	1 year



### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

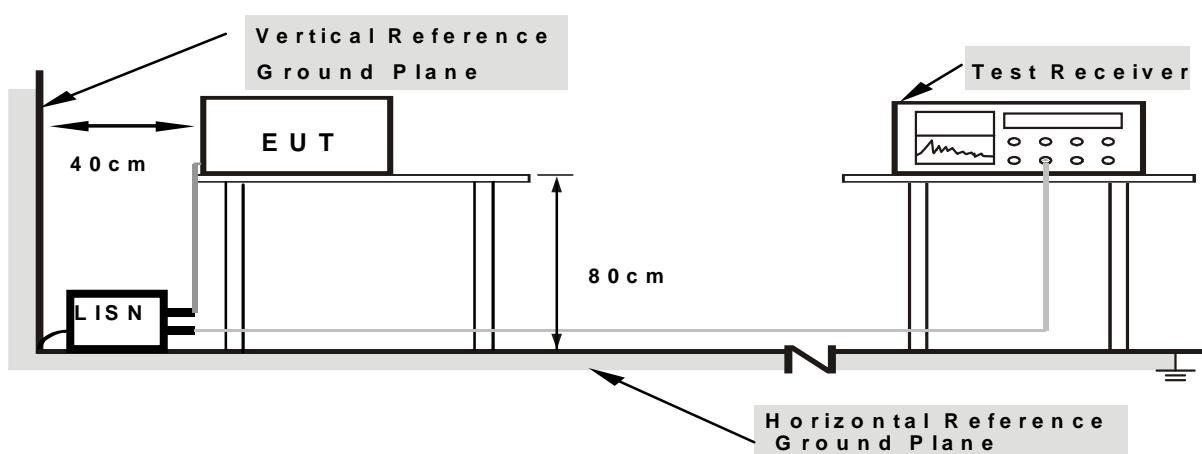
### 3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP



### 3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.



### 3.1.6 TEST RESULTS

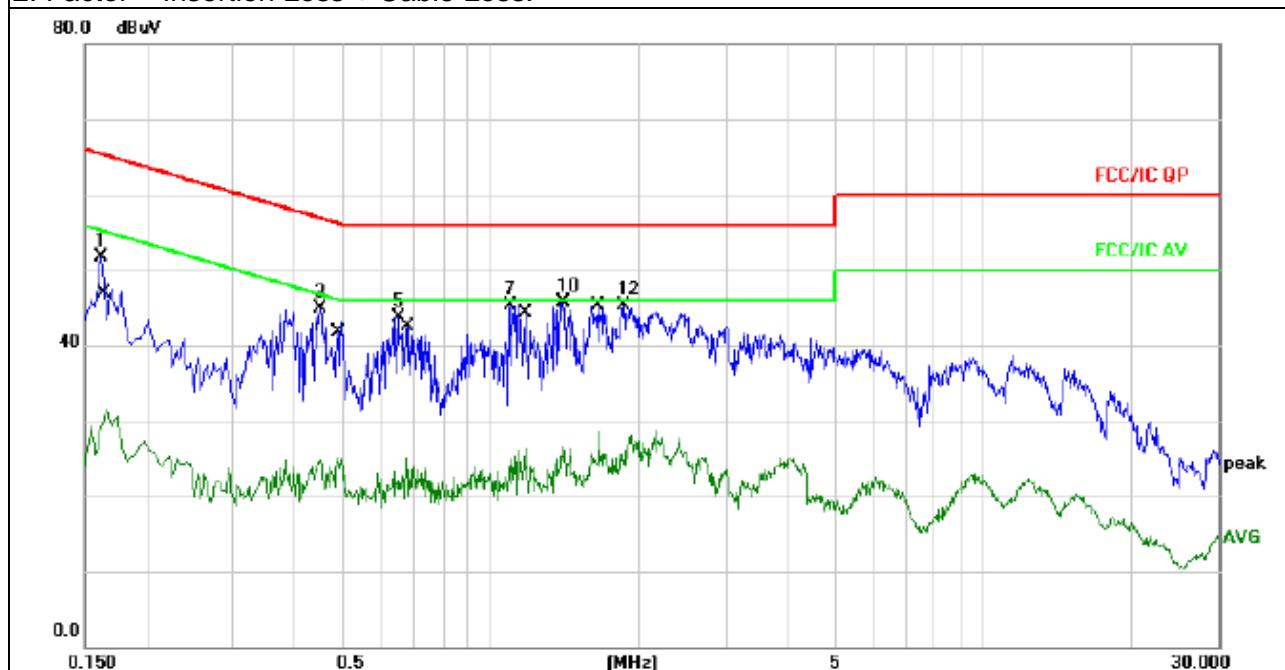
Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 2

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Margin (dB)	Detector Type
0.1660	41.65	10.06	51.71	65.15	-13.44	QP
0.1660	21.35	10.06	31.41	55.15	-23.74	AVG
0.4500	34.75	10.11	44.86	56.87	-12.01	QP
0.4500	14.98	10.11	25.09	46.87	-21.78	AVG
0.6500	33.54	10.13	43.67	56.00	-12.33	QP
0.6500	14.95	10.13	25.08	46.00	-20.92	AVG
1.0980	35.20	10.17	45.37	56.00	-10.63	QP
1.0980	16.10	10.17	26.27	46.00	-19.73	AVG
1.4100	35.62	10.17	45.79	56.00	-10.21	QP
1.4100	16.35	10.17	26.52	46.00	-19.48	AVG
1.8660	35.15	10.18	45.33	56.00	-10.67	QP
1.8660	18.36	10.18	28.54	46.00	-17.46	AVG

**Remark:**

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.



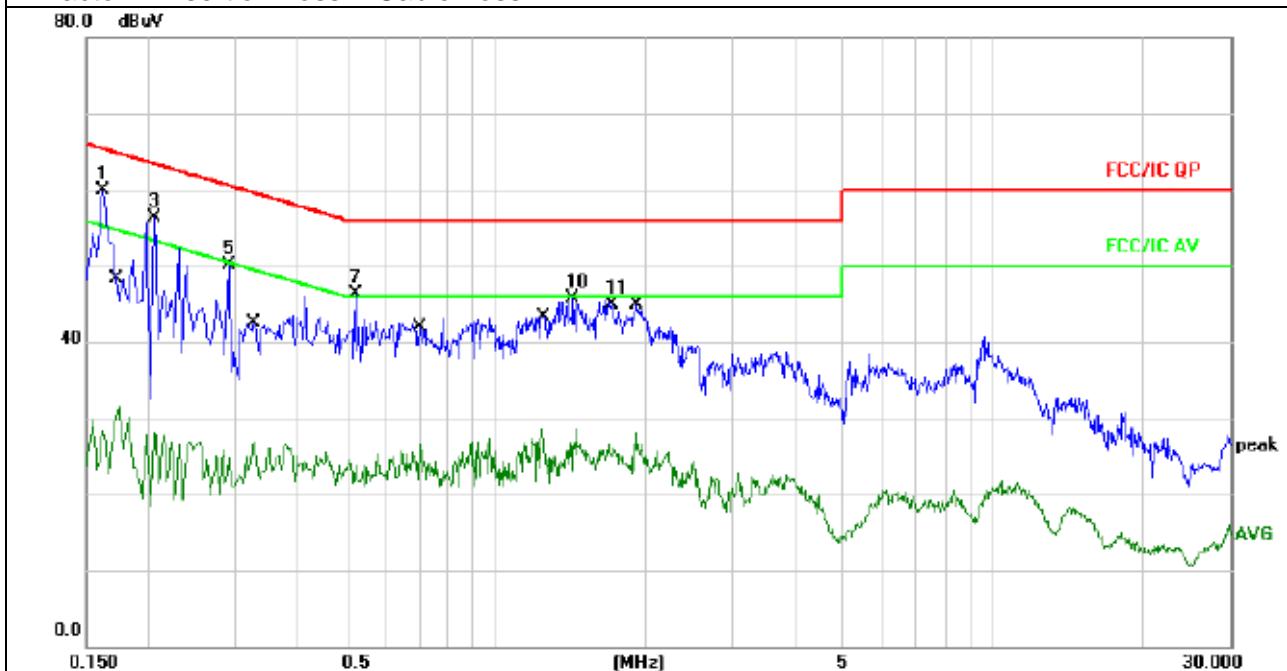


Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V/60Hz	Test Mode :	Mode 2

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V)	(dB $\mu$ V)	(dB)	
0.1620	49.78	10.05	59.83	65.36	-5.53	QP
0.1620	21.39	10.05	31.44	55.36	-23.92	AVG
0.2060	46.14	10.07	56.21	63.36	-7.15	QP
0.2060	18.02	10.07	28.09	53.36	-25.27	AVG
0.2900	39.92	10.09	50.01	60.52	-10.51	QP
0.2900	16.82	10.09	26.91	50.52	-23.61	AVG
0.5220	36.15	10.12	46.27	56.00	-9.73	QP
0.5220	16.40	10.12	26.52	46.00	-19.48	AVG
1.4260	35.54	10.17	45.71	56.00	-10.29	QP
1.4260	18.37	10.17	28.54	46.00	-17.46	AVG
1.7100	34.76	10.18	44.94	56.00	-11.06	QP
1.7100	17.92	10.18	28.10	46.00	-17.90	AVG

**Remark:**

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.





### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

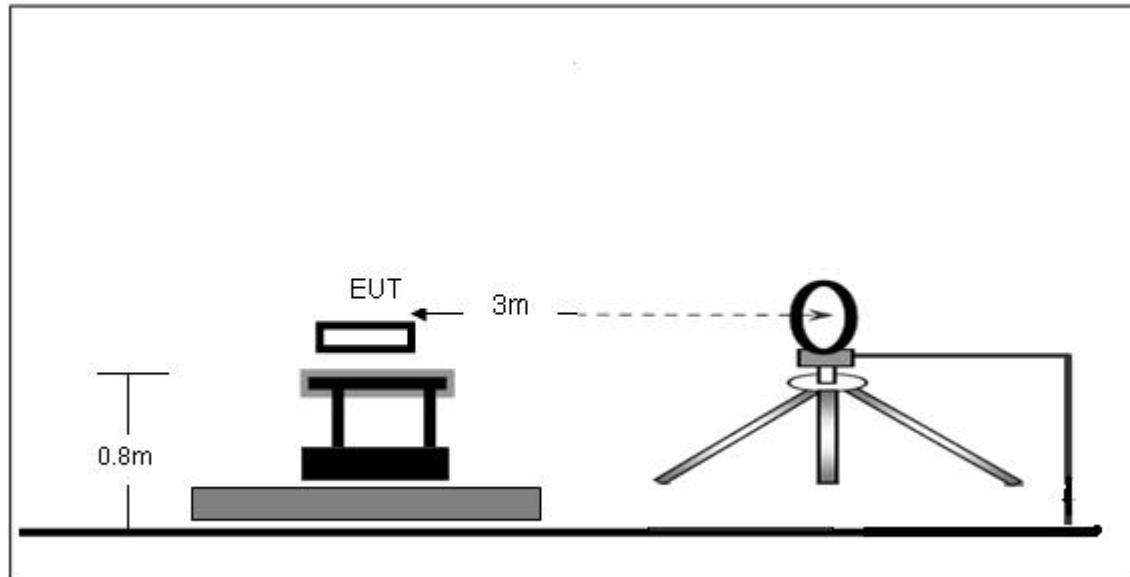
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

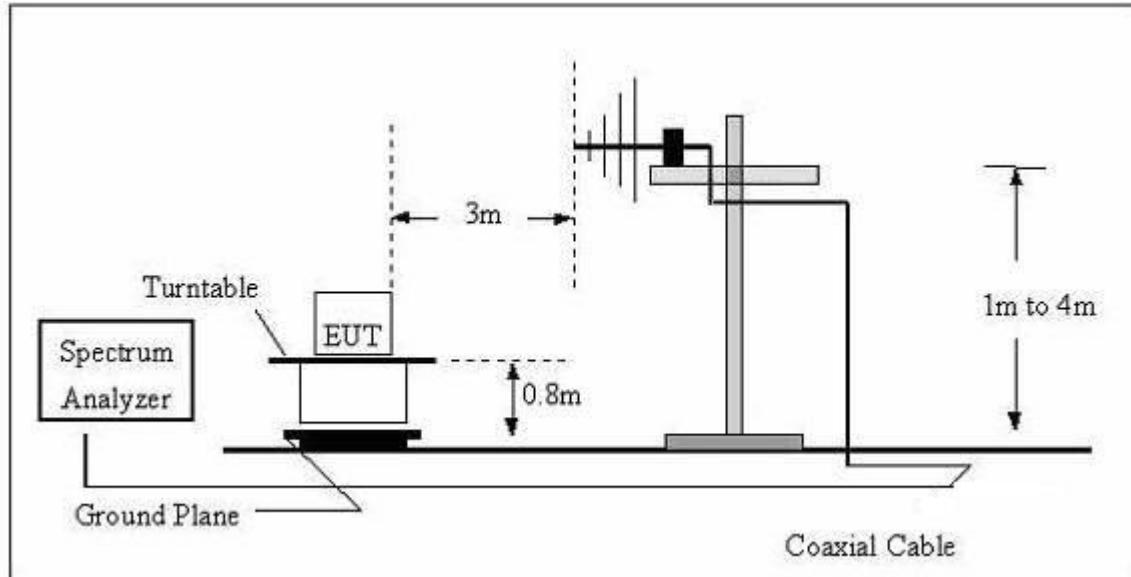
No deviation

### 3.2.4 TEST SETUP

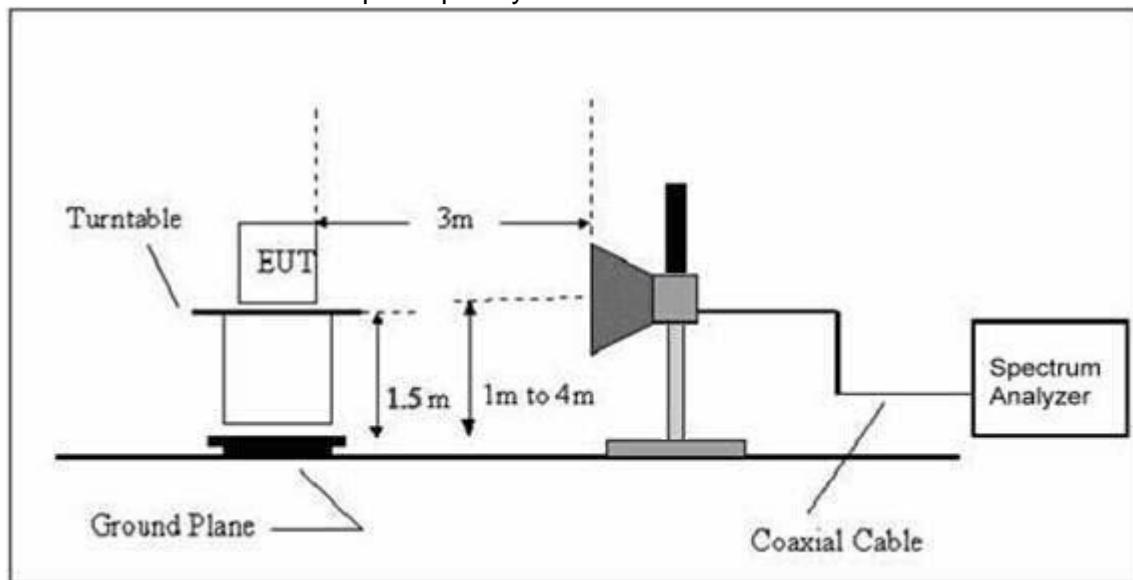
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz

**3.2.5 EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



### 3.2.6 TEST RESULTS

#### Radiated Spurious Emission (Below 30MHz )

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 12V From Adapter		
Test Mode :	Mode 2		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

**NOTE:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.



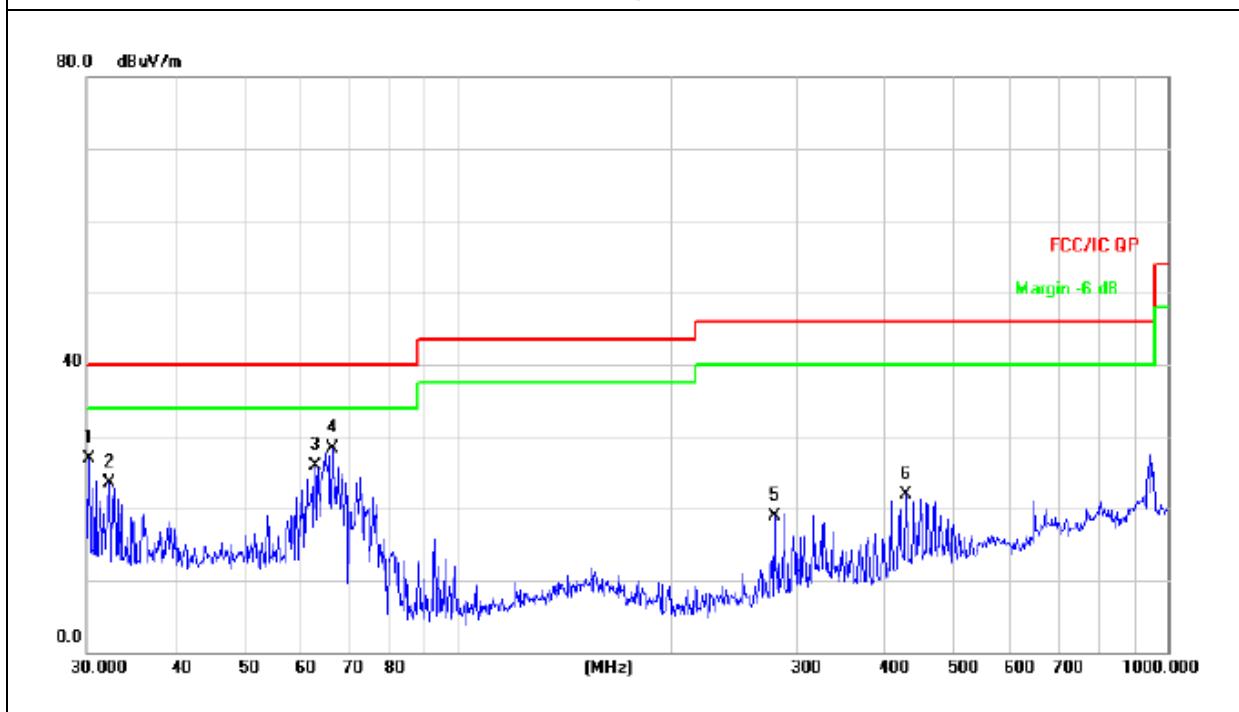
## Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 12V From Adapter		
Test Mode : (Worst)	Mode 2		

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
30.2111	34.95	-8.05	26.90	40.00	-13.10	QP
32.2925	31.90	-8.34	23.56	40.00	-16.44	QP
62.8708	38.08	-12.09	25.99	40.00	-14.01	QP
66.4989	41.51	-13.12	28.39	40.00	-11.61	QP
279.0436	31.97	-13.13	18.84	46.00	-27.16	QP
428.0193	31.39	-9.53	21.86	46.00	-24.14	QP

## Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.





Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 12V From Adapter		
Test Mode :	(Worst) Mode 2		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
30.1053	44.76	-8.03	36.73	40.00	-3.27	QP
31.3992	44.10	-8.22	35.88	40.00	-4.12	QP
33.5623	42.66	-8.42	34.24	40.00	-5.76	QP
39.0245	38.43	-8.80	29.63	40.00	-10.37	QP
66.0341	46.18	-12.93	33.25	40.00	-6.75	QP
279.0436	27.67	-13.13	14.54	46.00	-31.46	QP

**Remark:**

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Radiated Spurious Emission ( 1GHz to 10<sup>th</sup> harmonics)

FSK

2432MHz	Freq.	Receiver Reading	Detector	Polar	Corrected Factor	Emission Level	Limit	Result
	(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	
	2432	90.52	PK	H	13.94	104.46	114	Pass
	2432	70.74	Ave	H	13.94	84.68	94	Pass
	4864	46.83	PK	H	19.43	66.26	74	Pass
	4864	28.57	Ave	H	19.43	48.00	54	Pass
	12355	25.48	PK	H	17.81	43.29	74	Pass
	17850	18.69	PK	H	25.39	44.08	74	Pass
	2432	89.58	PK	V	13.94	103.52	114	Pass
	2432	71.46	Ave	V	13.94	85.40	94	Pass
	4864	47.62	PK	V	19.43	67.05	74	Pass
	4864	29.84	Ave	V	19.43	49.27	54	Pass
	12355	25.78	PK	V	17.81	43.59	74	Pass
	17850	18.53	PK	V	25.39	43.92	74	Pass

## Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



## 4. BANDWIDTH TEST

### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.249	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30KHz
VB	$\geq$ RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

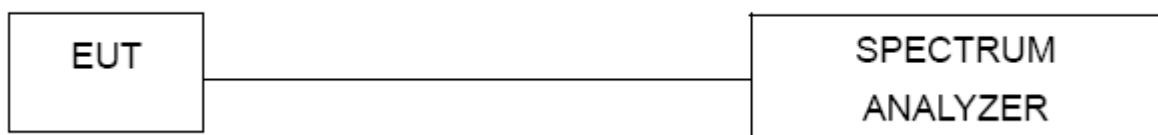
#### 4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 30KHz, VBW $\geq$  RBW, Sweep time = Auto.

#### 4.1.2 DEVIATION FROM STANDARD

No deviation.

#### 4.1.3 TEST SETUP



#### 4.1.4 EUT OPERATION CONDITIONS

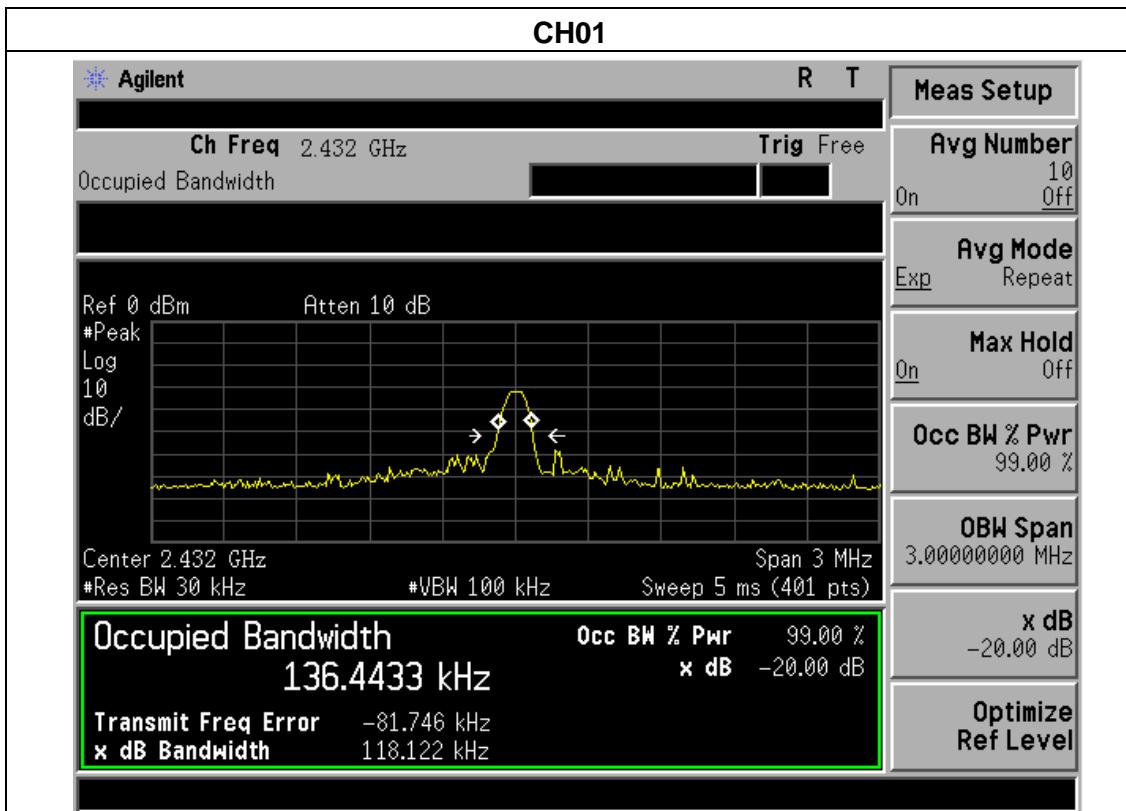
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



#### 4.1.5 TEST RESULTS

EUT :	Mattress Inflation Air Pump	Model Name :	AMAS-2816
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 12V From Adapter
Test Mode :	CH01		

	Frequency	20dB Bandwidth (kHz)	Result
FSK	2432 MHz	118.122	PASS





## 5. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

#### Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported



## 5.1 DEVIATION FROM STANDARD

No deviation.

## 5.2 TEST SETUP

### 5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 5.4 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 12V From Adapter
Test Mode :	CH01		

	Frequency (MHz)	Antenna polarization (H/V)	Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission (dB $\mu$ V/m)	Band edge Limit (dB $\mu$ V/m)		Result
						(dB $\mu$ V/m)	PK	PK	
FSK	<2400	H	2390.00	33.55	13.83	47.38	74.00	54.00	Pass
	<2400	V	2390.00	33.76	13.83	47.59	74.00	54.00	Pass
	<2400	H	2400.00	33.65	13.85	47.50	74.00	54.00	Pass
	<2400	V	2400.00	33.43	13.85	47.28	74.00	54.00	Pass
	>2483.5	H	2483.50	33.37	14.02	47.39	74.00	54.00	Pass
	>2483.5	V	2483.50	33.11	14.02	47.13	74.00	54.00	Pass
	>2483.5	H	2485.50	33.98	14.04	48.02	74.00	54.00	Pass
	>2483.5	V	2485.50	33.27	14.04	47.31	74.00	54.00	Pass

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



## 6. ANTENNA REQUIREMENT

### 6.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 6.2 EUT ANTENNA

The EUT antenna is Integrated (PCB) antenna. It complies with the standard requirement.



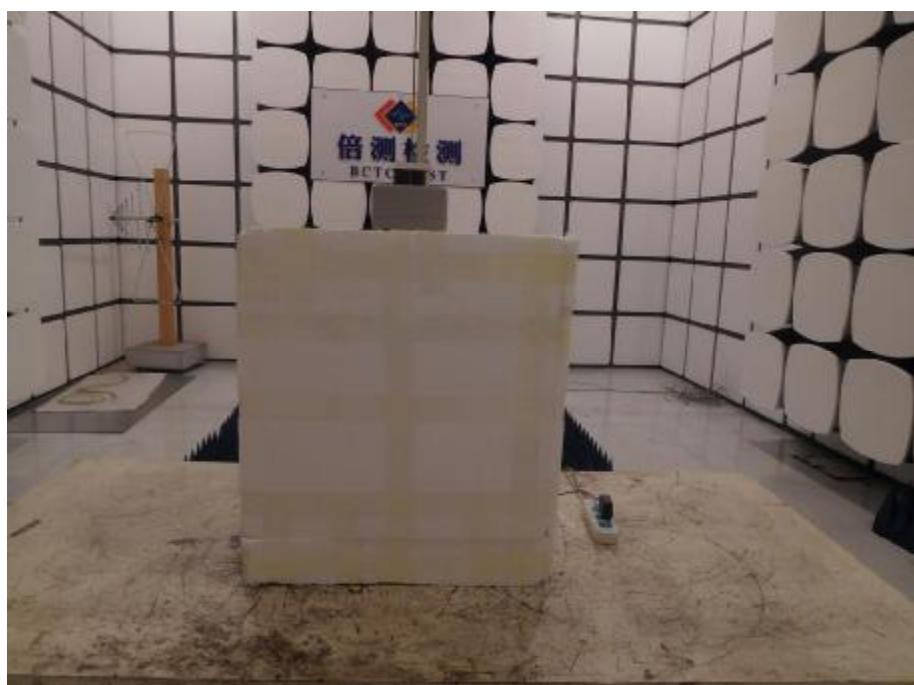
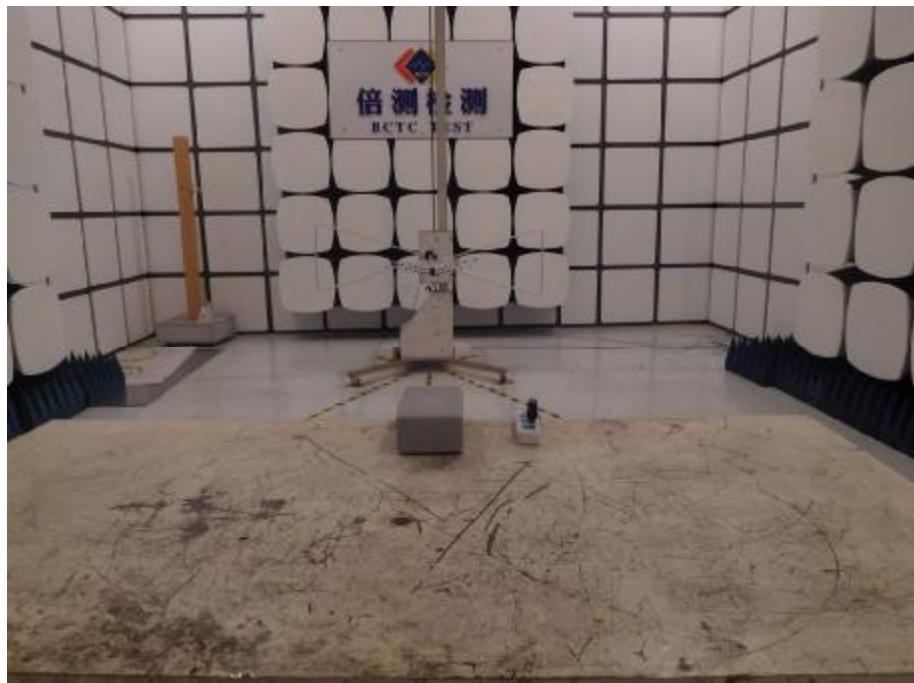
## 7. EUT TEST PHOTO

### conducted Emission



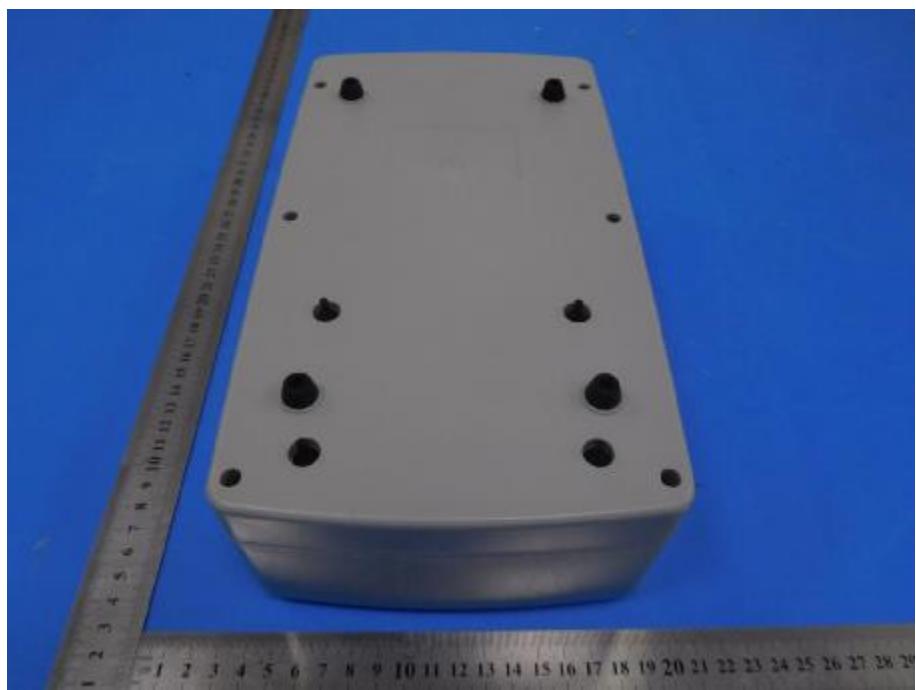


### Radiated Measurement Photos





## 8. EUT PHOTO



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