



Shenzhen Certification Technology Service Co., Ltd  
2F, Building B, East Area of Nanchang Second Industrial  
Zone, Gushu 2nd Road, Bao'an District, Shenzhen  
518126, P.R. China

# TEST REPORT

**FCC ID: JNK-HR-700**

**Applicant** : VOXCOOPER TECHNOLOGY COMPANY LIMITED  
**Address** : 4F, Bldg 18, Paibang Ind., park, 228 Ind., zone, Henggang Town,  
Shenzhen, China

**Equipment under Test (EUT):**

**Name** : twist speaker  
**Model** : HR-700, ISOUND-1690 Twist black, ISOUND-1691 Twist white,  
ISOUND-1692 Twist graphite, ISOUND-1693 Twist red

**Standards** : FCC PART 15, SUBPART C : 2011 (Section 15.249)

**Report No.** : STE120321287

**Date of Test** : April 2-4, 2012

**Date of Issue** : April 5, 2012

|                      |               |
|----------------------|---------------|
| <b>Test Result :</b> | <b>PASS *</b> |
|----------------------|---------------|

\* In the configuration tested, the EUT complied with the standards specified above

Authorized Signature

(Mark Zhu)  
General Manager

The manufacture should ensure that all the 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 Shenzhen Certification Technology Service Co., Ltd. Or test done by Shenzhen Certification Technology Service Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Certification Technology Service Co., Ltd. Approvals in writing.

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## 1 General Information

### 1.1 Description of Device (EUT)

|                       |                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| Trade Name            | : Brunton                                                                                                           |
| EUT                   | : twist speaker                                                                                                     |
| Model No.             | : HR-700, ISOUND-1690 Twist black,<br>ISOUND-1691 Twist white, ISOUND-1692 Twist graphite,<br>ISOUND-1693 Twist red |
| DIFF                  | : Just look and model names are not the same, the other is<br>exactly the same.                                     |
| Type of Antenna       | : Integral Antenna                                                                                                  |
| Antenna Specification | : 0 dBi                                                                                                             |
| Operation Frequency   | : 2402-2480MHz                                                                                                      |
| Channel number        | : 79                                                                                                                |
| Modulation type       | : GFSK                                                                                                              |
| Power Supply          | : DC 4.2V form battery or DC 5V from PC                                                                             |
| Applicant             | : VOXCOOPER TECHNOLOGY COMPANY LIMITED                                                                              |
| Address               | : 4F, Bldg 18, Paibang Ind., park, 228 Ind., zone,<br>Henggang Town, Shenzhen, China                                |
| Manufacturer          | : VOXCOOPER TECHNOLOGY COMPANY LIMITED                                                                              |
| Address               | : 4F, Bldg 18, Paibang Ind., park, 228 Ind., zone,<br>Henggang Town, Shenzhen, China                                |

## 1.2 Description of Test Facility

Shenzhen Certification Technology Service Co., Ltd.  
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 Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China  
 FCC Registered No.:197647

## 2 EMC Equipment List

| Equipment           | Manufacture  | Model No.                   | Serial No.   | Last cal.  | Cal Interval |
|---------------------|--------------|-----------------------------|--------------|------------|--------------|
| 3m Semi-Anechoic    | ETS-LINDGREN | N/A                         | SEL0017      | 06/16/2011 | 1Year        |
| Spectrum analyzer   | Agilent      | E4443A                      | MY46185649   | 06/06/2011 | 1Year        |
| Receiver            | R&S          | ESCI                        | 100492       | 06/06/2011 | 1Year        |
| Receiver            | R&S          | ESCI                        | 101202       | 01/07/2012 | 1Year        |
| Bilog Antenna       | Sunol        | JB3                         | A121206      | 06/04/2011 | 1Year        |
| L.I.S.N.            | R&S          | ESH3-Z5                     | 100305       | 06/16/2011 | 1Year        |
| Horn Antenna        | EMCO         | 3115                        | 640201028-06 | 06/04/2011 | 1Year        |
| Power Meter         | Anritsu      | ML2487A                     | 6K00001491   | 02/23/2012 | 1Year        |
| ETS Horn Antenna    | ETS          | 3160                        | SEL0076      | 06/18/2011 | 1Year        |
| Active Loop Antenna | Beijing Daze | ZN30900A                    | SEL0097      | 06/15/2011 | 1Year        |
| Cable               | Resenberger  | N/A                         | No.1         | 06/04/2011 | 1Year        |
| Cable               | SCHWARZBECK  | N/A                         | No.2         | 06/04/2011 | 1Year        |
| Cable               | SCHWARZBECK  | N/A                         | No.3         | 06/04/2011 | 1Year        |
| Pre-amplifier       | R&S          | AFS42-00101<br>800-25-S-42  | SEL0081      | 06/18/2011 | 1Year        |
| Pre-amplifier       | R&S          | AFS33-18002650<br>-30-8P-44 | SEL0080      | 06/18/2011 | 1Year        |

### 3 Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2003 using a 50  $\mu$  H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**RADIATION INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2003 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3MHz above 1 GHz. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF + CABLE = FS

33.20 dBuV + 10.36 dB + 0.9 dB = 44.46 dBuV/m @ 3m

**ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard C63.4-2003 10.1.7 with the EUT 40 cm from the vertical ground wall.

## 4 Summary of Measurement

| Test Item             | Test Requirement  | Stanadard Paragraph   | Result         |
|-----------------------|-------------------|-----------------------|----------------|
| Spurious Emission     | FCC PART 15: 2011 | Section 15.249&15.209 | Compliance     |
| Conduction Emission   | FCC PART 15: 2011 | Section 15.207        | Compliance     |
| Occupied bandwidth    | FCC PART 15: 2011 | Section 15.249        | Not applicable |
| Band edge Requirement | FCC PART 15: 2011 | Section 15.249        | Compliance     |
| Antenna Requirement   | FCC PART 15: 2011 | Section 15.203        | Compliance     |

Note: EUT can by powered with inside battery or PC from AC mains, according to exploratory test, when powered by PC from AC mains have worse emissions, and also can make sure EUT have enough power for wireless work, so all the final test were performed with PC.

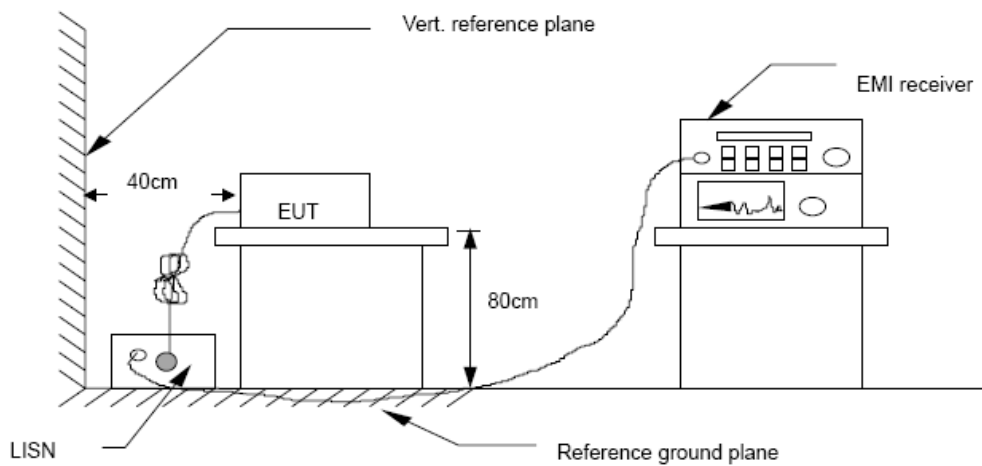
## 5 POWER LINE CONDUCTED EMISSION

### 5.1 Conducted Emission Limits(15.209&249)

| Frequency<br>MHz | Limits dB( $\mu$ V) |               |
|------------------|---------------------|---------------|
|                  | 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.  
 2. The lower limit shall apply at the transition frequencies.  
 3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

### 5.2 Test Setup



### 5.3 Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

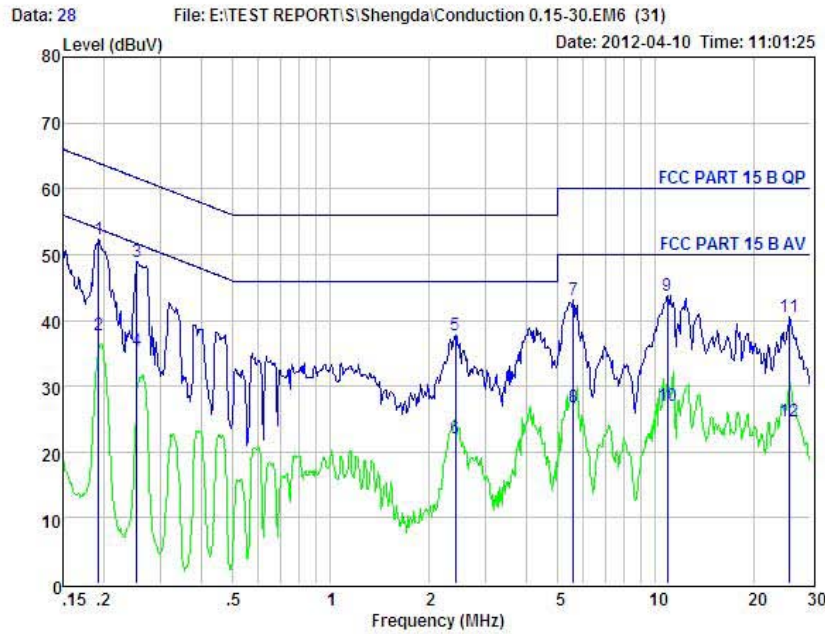
### 5.4 Test Results

**PASS**

Detailed information please see the following page.



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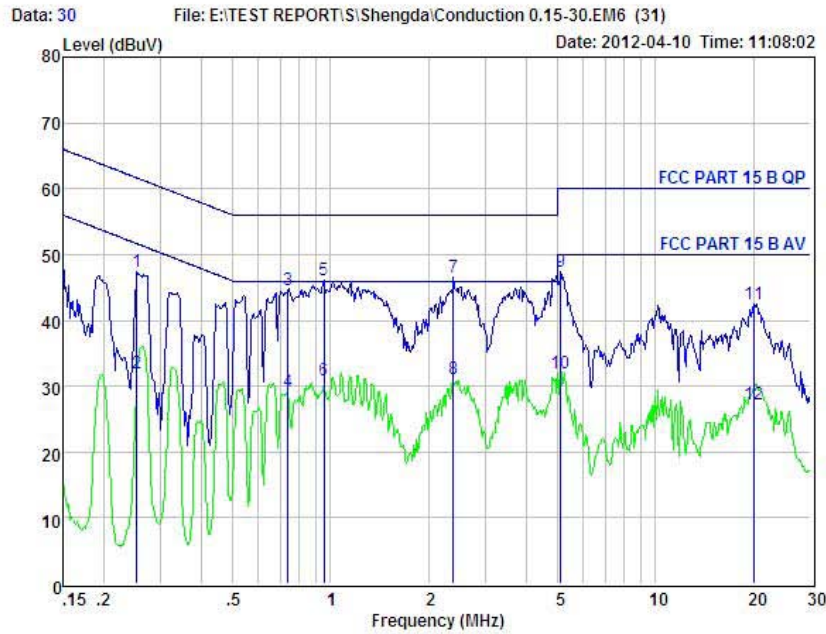


Condition : FCC PART 15 B QP POL: NEUTRAL  
EUT : twist speaker  
Model No. : HR-700  
Test Mode : ON  
Power : AC 120V/60Hz  
Test Engineer: Store  
Remark :

| Item | Freq<br>MHz | Read<br>dBuV | LISN<br>Factor<br>dB | Preamplifier<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|--------------|----------------------|------------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 0.19        | 42.53        | 0.03                 | -9.72                        | 0.10                | 52.38         | 63.89         | -11.51         | QP      |
| 2    | 0.19        | 27.83        | 0.03                 | -9.72                        | 0.10                | 37.68         | 53.89         | -16.21         | Average |
| 3    | 0.25        | 39.01        | 0.03                 | -9.72                        | 0.10                | 48.86         | 61.64         | -12.78         | QP      |
| 4    | 0.25        | 28.61        | 0.03                 | -9.72                        | 0.10                | 38.46         | 51.64         | -13.18         | Average |
| 5    | 2.42        | 27.85        | 0.06                 | -9.70                        | 0.11                | 37.72         | 56.00         | -18.28         | QP      |
| 6    | 2.42        | 12.15        | 0.06                 | -9.70                        | 0.11                | 22.02         | 46.00         | -23.98         | Average |
| 7    | 5.59        | 33.32        | 0.10                 | -9.64                        | 0.13                | 43.19         | 60.00         | -16.81         | QP      |
| 8    | 5.59        | 17.02        | 0.10                 | -9.64                        | 0.13                | 26.89         | 50.00         | -23.11         | Average |
| 9    | 10.90       | 33.78        | 0.23                 | -9.49                        | 0.22                | 43.72         | 60.00         | -16.28         | QP      |
| 10   | 10.90       | 17.18        | 0.23                 | -9.49                        | 0.22                | 27.12         | 50.00         | -22.88         | Average |
| 11   | 25.86       | 29.83        | 0.46                 | -9.63                        | 0.51                | 40.43         | 60.00         | -19.57         | QP      |
| 12   | 25.86       | 14.03        | 0.46                 | -9.63                        | 0.51                | 24.63         | 50.00         | -25.37         | Average |



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Condition : FCC PART 15 B QP POL: LINE  
EUT : twist speaker  
Model No. : HR-700  
Test Mode : ON  
Power : AC 120V/60Hz  
Test Engineer: Store  
Remark :

| Item | Freq<br>MHz | Read<br>dBuV | LISN<br>Factor<br>dB | Preamplifier<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark  |
|------|-------------|--------------|----------------------|------------------------------|---------------------|---------------|---------------|----------------|---------|
| 1    | 0.25        | 37.61        | 0.03                 | -9.72                        | 0.10                | 47.46         | 61.64         | -14.18         | QP      |
| 2    | 0.25        | 22.11        | 0.03                 | -9.72                        | 0.10                | 31.96         | 51.64         | -19.68         | Average |
| 3    | 0.74        | 34.72        | 0.04                 | -9.72                        | 0.10                | 44.58         | 56.00         | -11.42         | QP      |
| 4    | 0.74        | 19.22        | 0.04                 | -9.72                        | 0.10                | 29.08         | 46.00         | -16.92         | Average |
| 5    | 0.95        | 36.27        | 0.04                 | -9.71                        | 0.10                | 46.12         | 56.00         | -9.88          | QP      |
| 6    | 0.95        | 21.07        | 0.04                 | -9.71                        | 0.10                | 30.92         | 46.00         | -15.08         | Average |
| 7    | 2.38        | 36.58        | 0.06                 | -9.70                        | 0.11                | 46.45         | 56.00         | -9.55          | QP      |
| 8    | 2.38        | 21.18        | 0.06                 | -9.70                        | 0.11                | 31.05         | 46.00         | -14.95         | Average |
| 9    | 5.11        | 37.56        | 0.10                 | -9.67                        | 0.12                | 47.45         | 60.00         | -12.55         | QP      |
| 10   | 5.11        | 22.06        | 0.10                 | -9.67                        | 0.12                | 31.95         | 50.00         | -18.05         | Average |
| 11   | 20.16       | 32.23        | 0.33                 | -9.49                        | 0.35                | 42.40         | 60.00         | -17.60         | QP      |
| 12   | 20.16       | 17.03        | 0.33                 | -9.49                        | 0.35                | 27.20         | 50.00         | -22.80         | Average |

## 6 Radiation Emission

### 6.1 Radiation Emission Limits(15.209&249 (a))

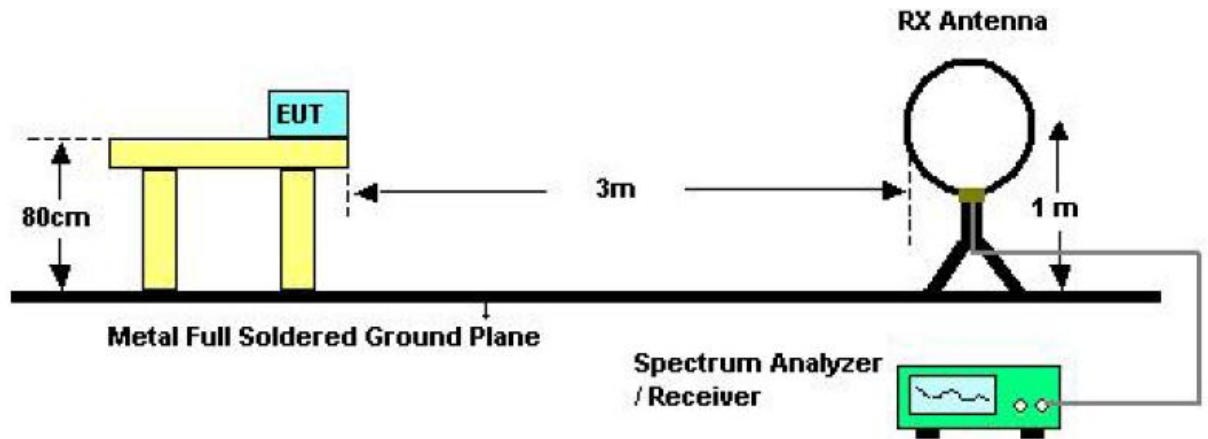
| Frequency<br>(MHZ)   | Field Strength<br>Limits at 3 metres (watts,e.i.r.p.) |            |                            |
|----------------------|-------------------------------------------------------|------------|----------------------------|
|                      | uV/m                                                  | dB uV/m    | Measurement<br>distance(m) |
| 0.009-0.490          | 2400/F(kHz)                                           | XX         | 300                        |
| 0.490-1.705          | 24000/F(kHz)                                          | XX         | 30                         |
| 1.705-30             | 30                                                    | 29.5       | 30                         |
| 30~88                | 100(3nW)                                              | 40         | 3                          |
| 88~216               | 150(6.8nW)                                            | 43.5       | 3                          |
| 216~960              | 200(12nW)                                             | 46         | 3                          |
| Above960             | 500(75nW)                                             | 54         | 3                          |
| Carrier<br>frequency |                                                       | 93.97(AV)  | 3                          |
| Carrier<br>frequency |                                                       | 113.97(PK) | 3                          |

**NOTE:**

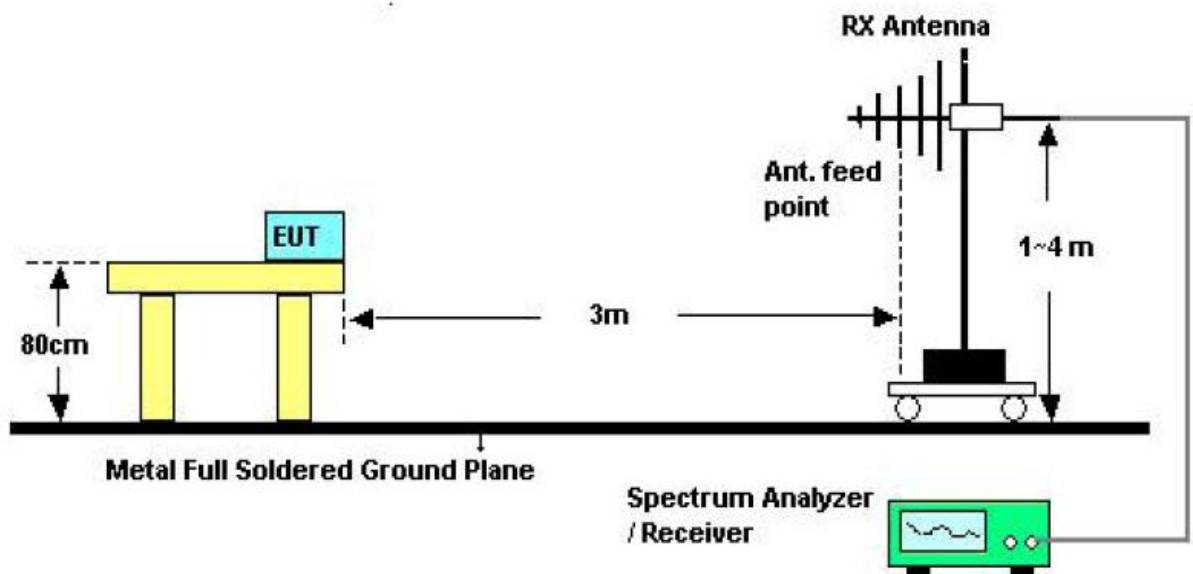
- a) The tighter limit applies at the band edges.
- b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

## 6.2 Test Setup

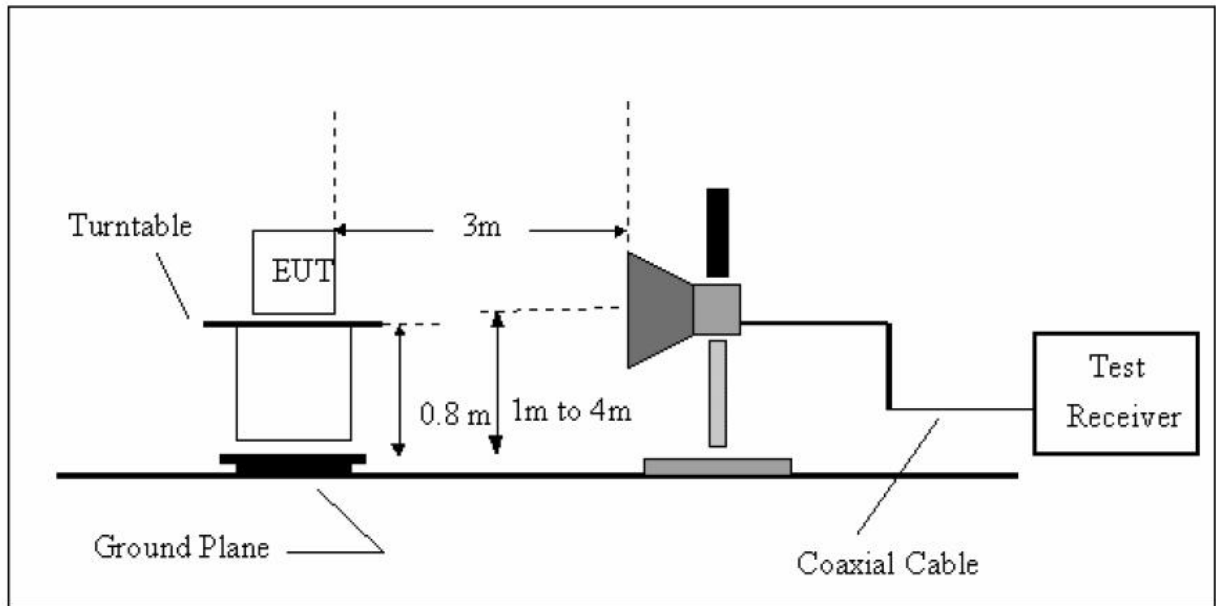
See the next page



Below 30MHZ Test Setup



Above 30MHZ Test Setup



Above 1GHZ Test Setup

### 6.3 Test Procedure

- a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground, The table was rotated 360 degrees to determine the position of the highest radiation
- b) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- c) 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
- d) If Peak value complies with QP limit Below 1GHz. The EUT is deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.
- e) For the actual test configuration, please see the test setup photo.

#### 6.4 Test Equipment Setting For emission test.

|              |            |            |
|--------------|------------|------------|
| 9KHZ~150KHZ  | RBW 200HZ  | VBW1KHZ    |
| 150KHZ~30MHZ | RBW 9KHZ   | VBW 30KHZ  |
| 30MHZ~1GHZ   | RBW 120KHZ | VBW 300KHZ |
| Above 1GHZ   | RBW 1MHZ   | VBW 3MHZ   |

#### 6.5 Test Condition

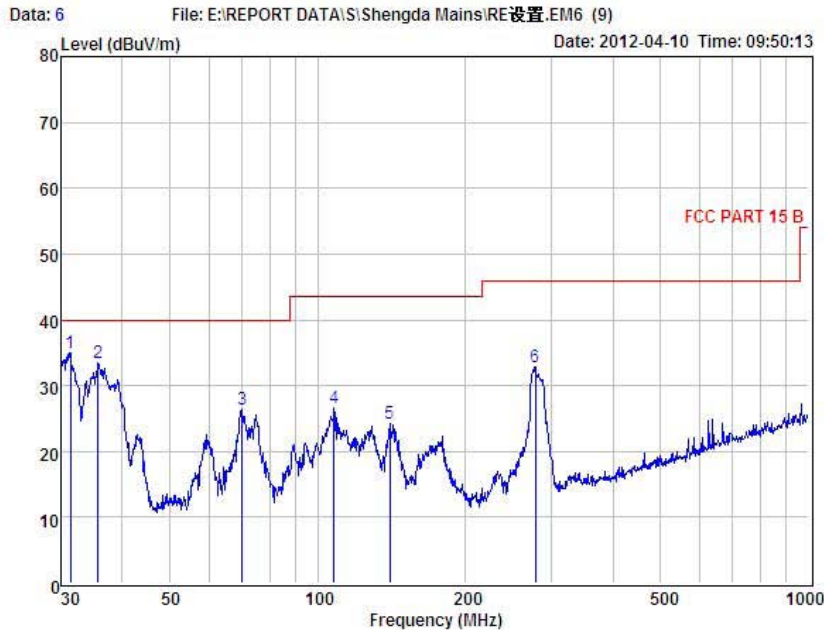
Continual Transmitting in maximum power.

#### 6.6 Test Result

Detailed information please see the following page.



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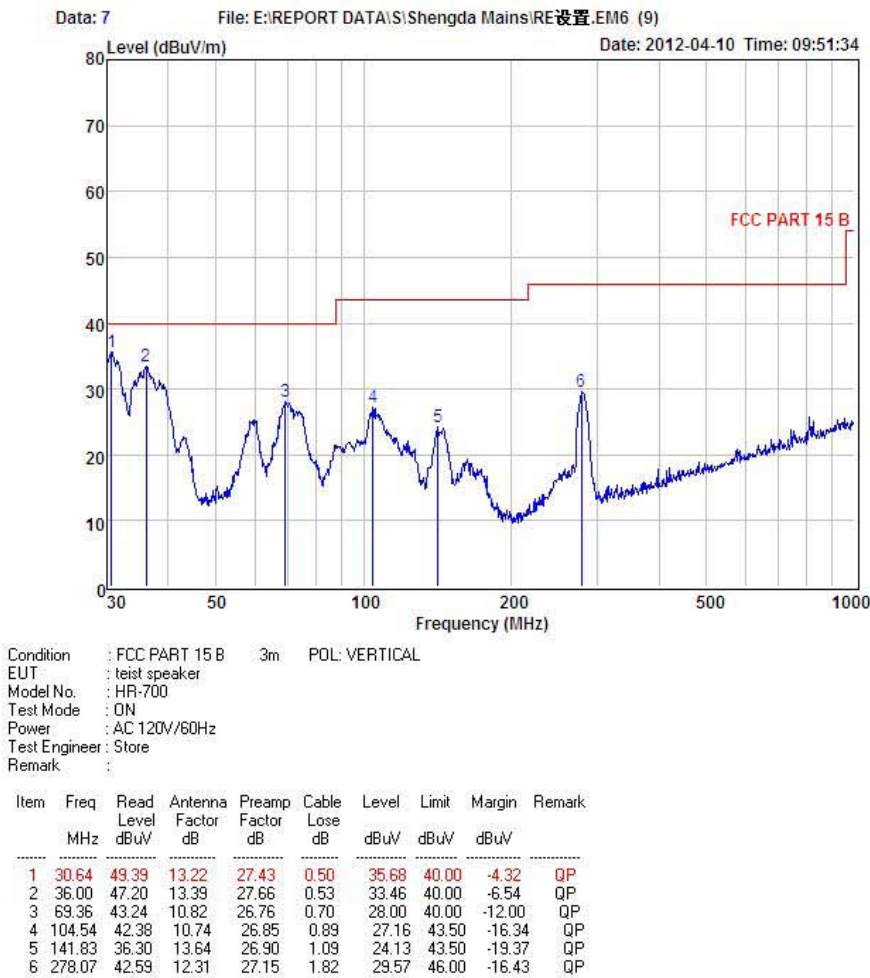


Condition : FCC PART 15 B 3m POL: HORIZONTAL  
EUT : twist soaker  
Model No. : HR-700  
Test Mode : ON  
Power : AC 120V/60Hz  
Test Engineer : Store  
Remark :

| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 31.40       | 48.76                 | 13.28                   | 27.51                  | 0.50                | 35.03         | 40.00         | -4.97          | QP     |
| 2    | 35.75       | 47.27                 | 13.39                   | 27.66                  | 0.53                | 33.53         | 40.00         | -6.47          | QP     |
| 3    | 70.09       | 41.59                 | 10.82                   | 26.76                  | 0.70                | 26.35         | 40.00         | -13.65         | QP     |
| 4    | 107.89      | 41.72                 | 10.93                   | 26.86                  | 0.91                | 26.70         | 43.50         | -16.80         | QP     |
| 5    | 140.34      | 36.63                 | 13.51                   | 26.90                  | 1.08                | 24.32         | 43.50         | -19.18         | QP     |
| 6    | 278.07      | 45.85                 | 12.31                   | 27.15                  | 1.82                | 32.83         | 46.00         | -13.17         | QP     |



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Notes: Above is Below 1GHz test data

## Radiated Emissions Result of Inside band (2402MHz)

|                    |               |                             |                     |
|--------------------|---------------|-----------------------------|---------------------|
| <b>EUT</b>         | twist speaker | <b>Model Name</b>           | HR-700              |
| <b>Temperature</b> | 25°C          | <b>Relative Humidity</b>    | 56%                 |
| <b>Pressure</b>    | 960hPa        | <b>Test voltage</b>         | DC 5V supply by PC  |
| <b>Test Mode</b>   | TX Low        | <b>Antenna polarization</b> | Horizontal/Vertical |

| Channel Low(2402MHz) |             |              |                   |               |                   |                   |                       |              |           |
|----------------------|-------------|--------------|-------------------|---------------|-------------------|-------------------|-----------------------|--------------|-----------|
| Fre. MHz             | Plority H/V | Reading dBuV | Antenna Factor dB | Cable Loss dB | Amplifier Gain dB | Correct Factor dB | Measure Result dBuV/m | Limit dBuV/m | Margin dB |
| 2402                 | H           | 97.43 (PK)   | 12.3              | 1.98          | 19.36             | -5.08             | 92.35                 | 113.97       | -21.62    |
| 2402                 | H           | 88.24 (AV)   | 12.3              | 1.98          | 19.36             | -5.08             | 83.16                 | 93.97        | -10.81    |
| --                   | H           | --           | --                | --            | --                | --                | --                    | --           | --        |
| 2402                 | V           | 102.57 (PK)  | 12.3              | 1.98          | 19.36             | -5.08             | 97.49                 | 113.97       | -16.48    |
| 2402                 | V           | 89.61 (AV)   | 12.3              | 1.98          | 19.36             | -5.08             | 84.53                 | 93.97        | -9.44     |
| --                   | V           | --           | --                | --            | --                | --                | --                    | --           | --        |

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 1318.44     | H            | 51.28               | ---               | -10.84            | 40.44         | ---         | 74.00               | 54.00             | -13.56      | Peak   |
| 1657.22     | H            | 50.84               | ---               | -9.65             | 41.19         | ---         | 74.00               | 54.00             | -12.81      | Peak   |
| 2139.66     | H            | 48.62               | ---               | -8.36             | 40.26         | ---         | 74.00               | 54.00             | -13.74      | Peak   |
| 4803.77     | H            | 42.01               | ---               | 0.64              | 42.65         | ---         | 74.00               | 54.00             | -11.35      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 1486.55     | V            | 49.63               | ---               | -10.27            | 39.36         | ---         | 74.00               | 54.00             | -14.64      | Peak   |
| 2073.22     | V            | 48.96               | ---               | -8.49             | 40.47         | ---         | 74.00               | 54.00             | -13.53      | Peak   |
| 3462.55     | V            | 46.01               | ---               | -4.95             | 41.06         | ---         | 74.00               | 54.00             | -12.94      | Peak   |
| 4803.77     | V            | 41.68               |                   | 0.64              | 42.32         | ---         | 74.00               | 54.00             | -11.68      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes: 1** --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

**2** –Spectrum setting:

a. Peak setting 30MHz-1GHz, RBW=120KHz, VBW=300KHz.

b. AV setting 30MHz-1GHz, RBW=1MHz, VBW=10Hz.

## Radiated Emissions Result of Inside band (2441MHz)

|                    |               |                             |                     |
|--------------------|---------------|-----------------------------|---------------------|
| <b>EUT</b>         | twist speaker | <b>Model Name</b>           | HR-700              |
| <b>Temperature</b> | 25°C          | <b>Relative Humidity</b>    | 56%                 |
| <b>Pressure</b>    | 960hPa        | <b>Test voltage</b>         | DC 5V supply by PC  |
| <b>Test Mode</b>   | TX Mid        | <b>Antenna polarization</b> | Horizontal/Vertical |

| Channel Low(2441MHz) |             |              |                   |               |                   |                   |                       |              |           |
|----------------------|-------------|--------------|-------------------|---------------|-------------------|-------------------|-----------------------|--------------|-----------|
| Fre. MHz             | Plority H/V | Reading dBuV | Antenna Factor dB | Cable Loss dB | Amplifier Gain dB | Correct Factor dB | Measure Result dBuV/m | Limit dBuV/m | Margin dB |
| 2441                 | H           | 99.38 (PK)   | 12.5              | 2.01          | 19.37             | -4.86             | 94.52                 | 113.97       | -19.45    |
| 2441                 | H           | 86.17 (AV)   | 12.5              | 2.01          | 19.37             | -4.86             | 81.31                 | 93.97        | -12.66    |
| --                   | H           | --           | --                | --            | --                | --                | --                    | --           | --        |
| 2441                 | V           | 103.25 (PK)  | 12.5              | 2.01          | 19.37             | -4.86             | 98.39                 | 113.97       | -15.58    |
| 2441                 | V           | 89.73 (AV)   | 12.5              | 2.01          | 19.37             | -4.86             | 84.87                 | 93.97        | -9.10     |
| --                   | V           | --           | --                | --            | --                | --                | --                    | --           | --        |

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 1416.44     | H            | 50.75               | ---               | -10.29            | 40.46         | ---         | 74.00               | 54.00             | -13.54      | Peak   |
| 1832.54     | H            | 50.23               | ---               | -9.16             | 41.07         | ---         | 74.00               | 54.00             | -12.93      | Peak   |
| 2753.33     | H            | 47.24               | ---               | -6.38             | 40.86         | ---         | 74.00               | 54.00             | -13.14      | Peak   |
| 4880.77     | H            | 43.42               | ---               | 0.76              | 44.18         | ---         | 74.00               | 54.00             | -9.82       | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 1273.55     | V            | 51.68               | ---               | -10.96            | 40.72         | ---         | 74.00               | 54.00             | -13.28      | Peak   |
| 1678.44     | V            | 49.89               | ---               | -9.65             | 40.24         | ---         | 74.00               | 54.00             | -13.76      | Peak   |
| 2136.55     | V            | 50.42               | ---               | -8.36             | 42.06         | ---         | 74.00               | 54.00             | -11.94      | Peak   |
| 4880.77     | V            | 42.67               |                   | 0.76              | 43.43         | ---         | 74.00               | 54.00             | -10.57      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes: 1** --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

**2** –Spectrum setting:

a. Peak setting 30MHz-1GHz, RBW=120KHz, VBW=300KHz.

b. AV setting 30MHz-1GHz, RBW=1MHz, VBW=10Hz.

## Radiated Emissions Result of Inside band (2480MHz)

|                    |               |                             |                     |
|--------------------|---------------|-----------------------------|---------------------|
| <b>EUT</b>         | twist speaker | <b>Model Name</b>           | HR-700              |
| <b>Temperature</b> | 25°C          | <b>Relative Humidity</b>    | 56%                 |
| <b>Pressure</b>    | 960hPa        | <b>Test voltage</b>         | DC 5V supply by PC  |
| <b>Test Mode</b>   | TX High       | <b>Antenna polarization</b> | Horizontal/Vertical |

| Channel Low(2480MHz) |             |              |                   |               |                   |                   |                       |              |           |
|----------------------|-------------|--------------|-------------------|---------------|-------------------|-------------------|-----------------------|--------------|-----------|
| Fre. MHz             | Plority H/V | Reading dBuV | Antenna Factor dB | Cable Loss dB | Amplifier Gain dB | Correct Factor dB | Measure Result dBuV/m | Limit dBuV/m | Margin dB |
| 2480                 | H           | 96.24 (PK)   | 12.6              | 2.03          | 19.41             | -4.78             | 91.46                 | 113.97       | -22.51    |
| 2480                 | H           | 85.38 (AV)   | 12.6              | 2.03          | 19.41             | -4.78             | 80.60                 | 93.97        | -13.37    |
| --                   | H           | --           | --                | --            | --                | --                | --                    | --           | --        |
| 2480                 | V           | 99.84 (PK)   | 12.6              | 2.03          | 19.41             | -4.78             | 95.06                 | 113.97       | -18.91    |
| 2480                 | V           | 88.76 (AV)   | 12.6              | 2.03          | 19.41             | -4.78             | 83.98                 | 93.97        | -9.99     |
| --                   | V           | --           | --                | --            | --                | --                | --                    | --           | --        |

| Freq. (MHz) | Ant. Pol H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Ant. / CL CF (dB) | Actual Fs     |             | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin (dB) | Remark |
|-------------|--------------|---------------------|-------------------|-------------------|---------------|-------------|---------------------|-------------------|-------------|--------|
|             |              |                     |                   |                   | Peak (dBuV/m) | AV (dBuV/m) |                     |                   |             |        |
| 1566.77     | H            | 51.26               | ---               | -10.07            | 41.19         | ---         | 74.00               | 54.00             | -12.81      | Peak   |
| 2354.33     | H            | 47.85               | ---               | -7.59             | 40.26         | ---         | 74.00               | 54.00             | -13.74      | Peak   |
| 3658.22     | H            | 44.07               | ---               | -4.38             | 39.69         | ---         | 74.00               | 54.00             | -14.31      | Peak   |
| 4958.44     | H            | 42.49               | ---               | 0.98              | 43.47         | ---         | 74.00               | 54.00             | -10.53      | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |
| 1289.22     | V            | 52.79               | ---               | -10.96            | 41.83         | ---         | 74.00               | 54.00             | -12.17      | Peak   |
| 1963.55     | V            | 48.1                | ---               | -8.64             | 39.46         | ---         | 74.00               | 54.00             | -14.54      | Peak   |
| 2675.33     | V            | 48.11               | ---               | -6.94             | 41.17         | ---         | 74.00               | 54.00             | -12.83      | Peak   |
| 4959.44     | V            | 43.53               |                   | 0.98              | 44.51         | ---         | 74.00               | 54.00             | -9.49       | Peak   |
| N/A         |              |                     |                   |                   |               |             |                     |                   |             |        |

**Notes: 1** --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

**2** –Spectrum setting:

a. Peak setting 30MHz-1GHz, RBW=120KHz, VBW=300KHz.

b. AV setting 30MHz-1GHz, RBW=1MHz, VBW=10Hz.

## 7 Occupied bandwidth

### 7.1 Test limit

Please refer section 15.249

### 7.2 Method of measurement

- a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver RBW set 30KHZ, VBW set 30KHZ, Sweep time set auto.

### 7.3 Test Setup



### 7.4 Test Results

The test not applicable

## 8 Band Edge Check

### 8.1 Test limit

Please refer section 15.249 and section 15.205.

249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

249(e) As shown in section 15.35(b), for frequencies above 1000MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

### 8.2 Test Procedure

8.2.1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

8.2.2. Set spectrum analyzer please see the following test plot.

8.2.3. Set the spectrum analyzer as RBW, VBW=1000 KHz,

8.2.4. Max hold, view and count how many channels in the band.

### 8.3 Test Setup

Please see the section 6.2 Above 1GHz Test Setup.

### 8.4 Test Result

PASS.

Detailed information please see the following page.

Report No.: STE120321287

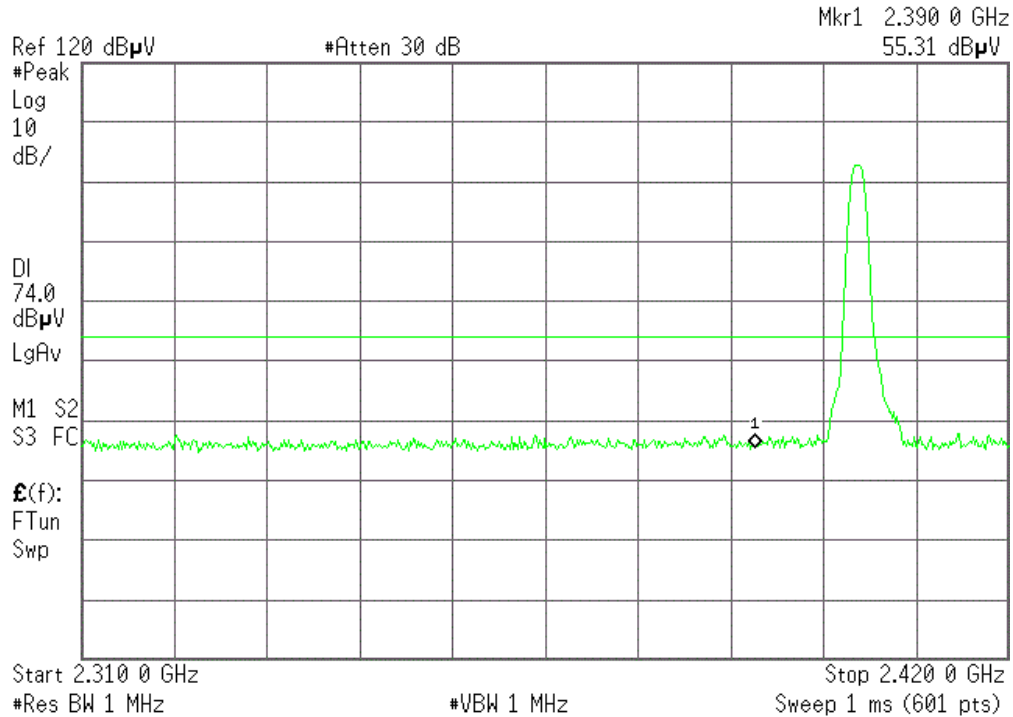
CH Low :

Detector mode: Peak

Agilent

Polarity: Horizontal

R T

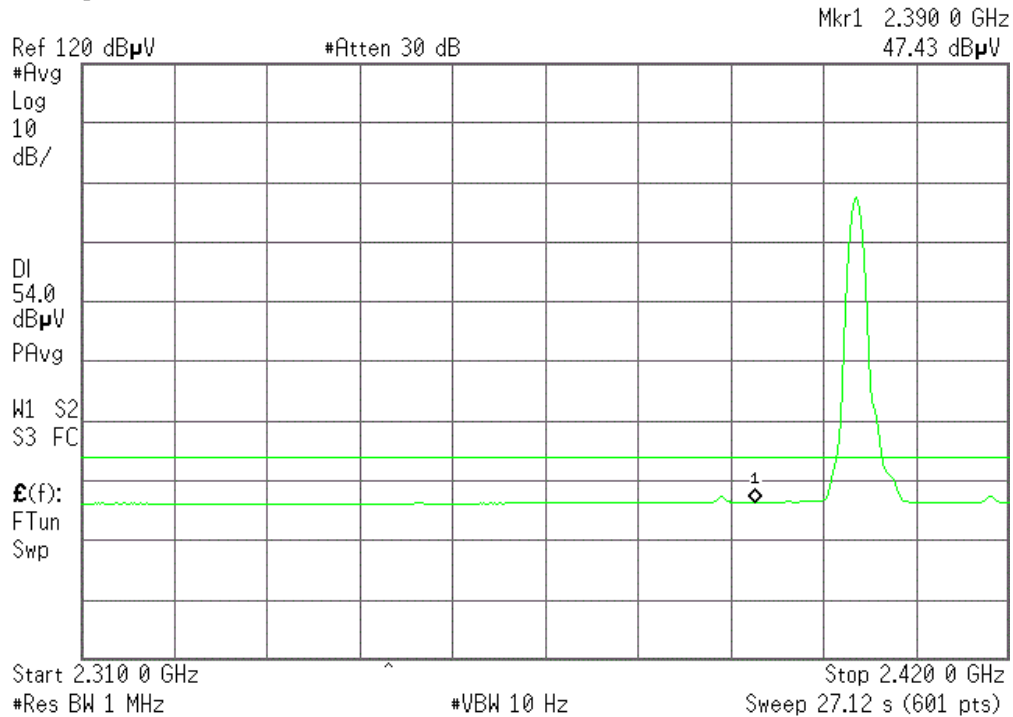


Detector mode: Average

Agilent

Polarity: Horizontal

R T



Report No.: STE120321287

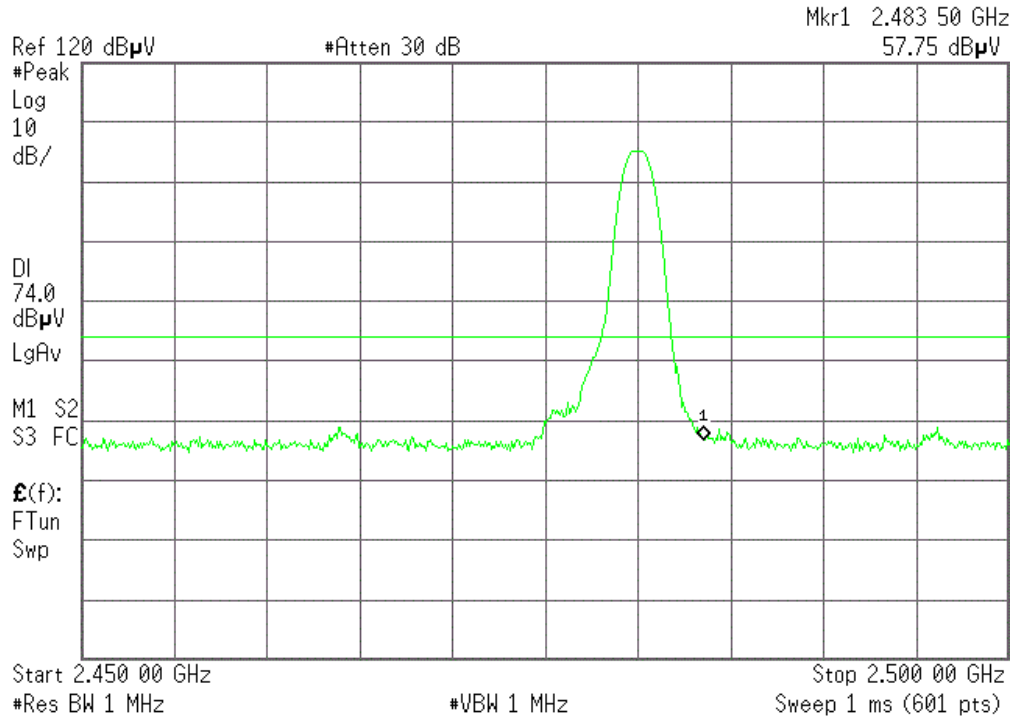
CH High :

Detector mode: Peak

Agilent

Polarity: Horizontal

R T

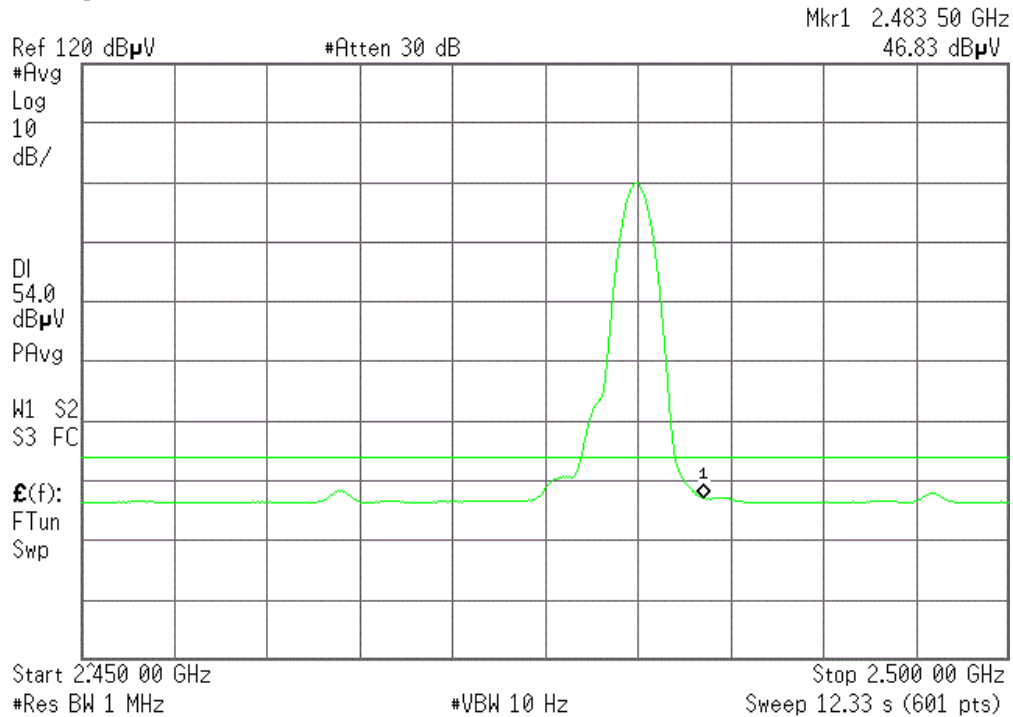


Detector mode: Average

Agilent

Polarity: Horizontal

R T



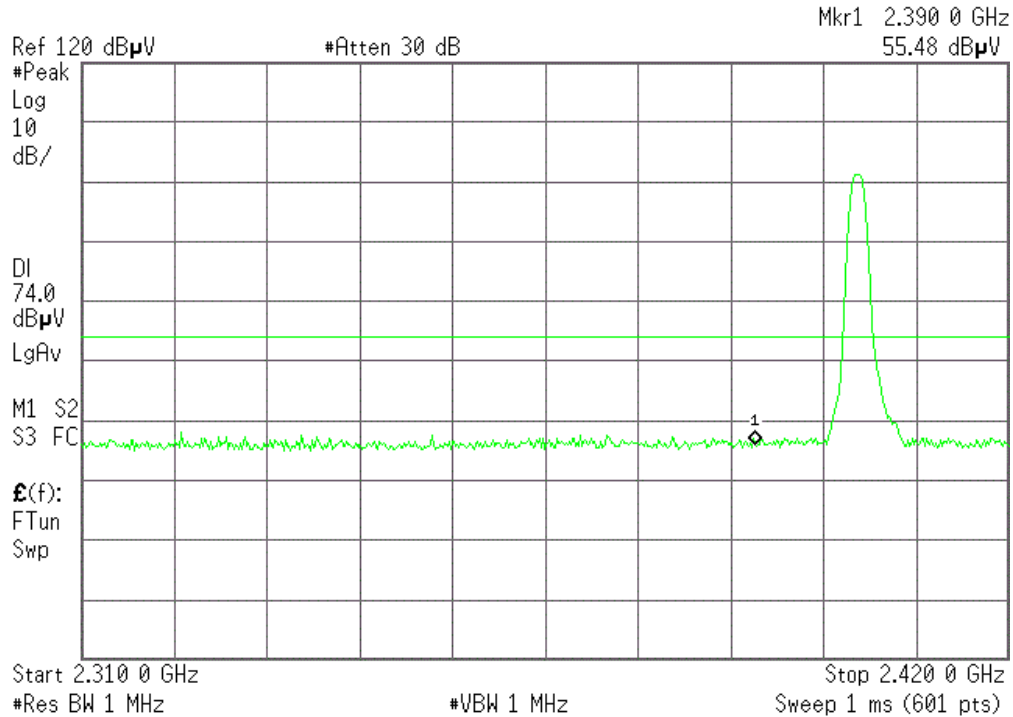
CH Low :

Detector mode: Peak

Agilent

Polarity: Vertical

R T

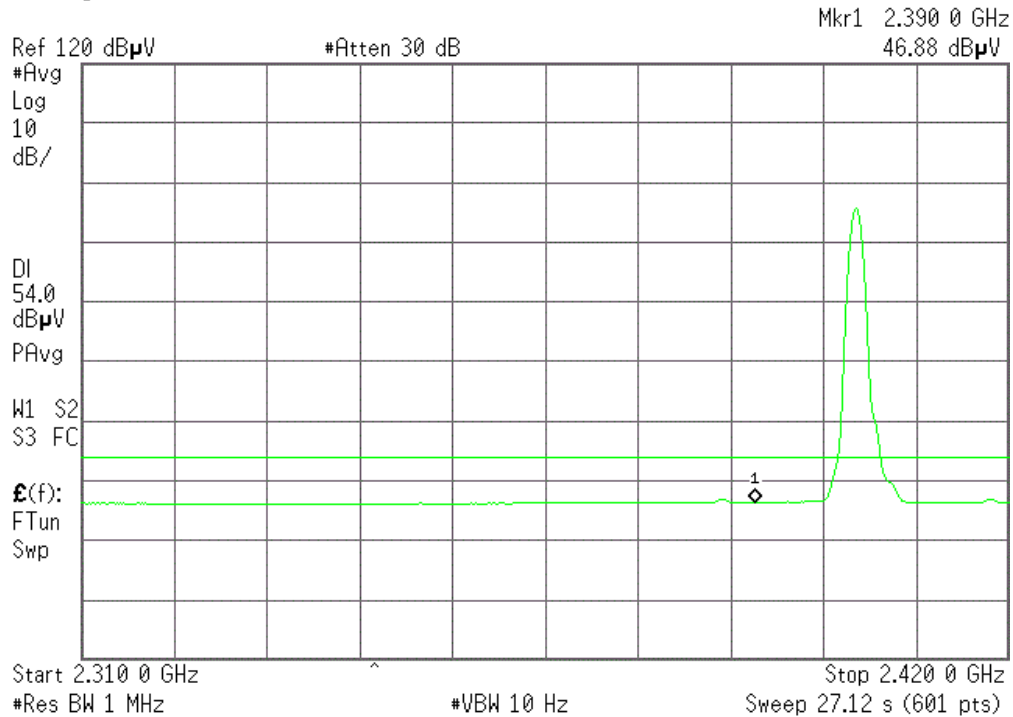


Detector mode: Average

Agilent

Polarity: Vertical

R T



Report No.: STE120321287

CH High :

Detector mode: Peak

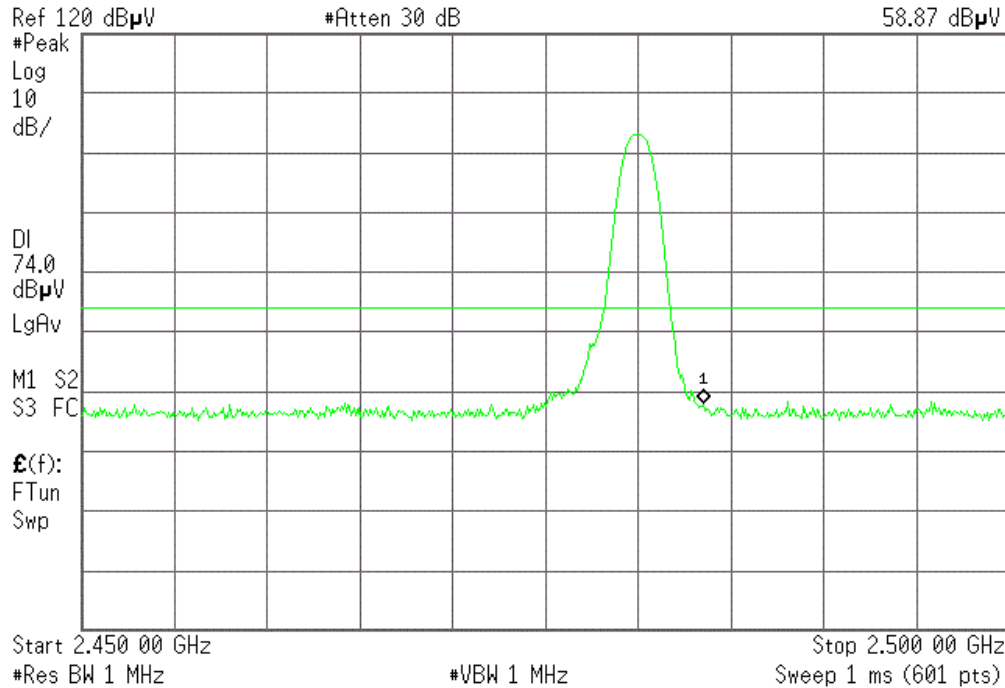
Agilent

Polarity: Vertical

R L

Mkr1 2.483 50 GHz

58.87 dB $\mu$ V



Detector mode: Average

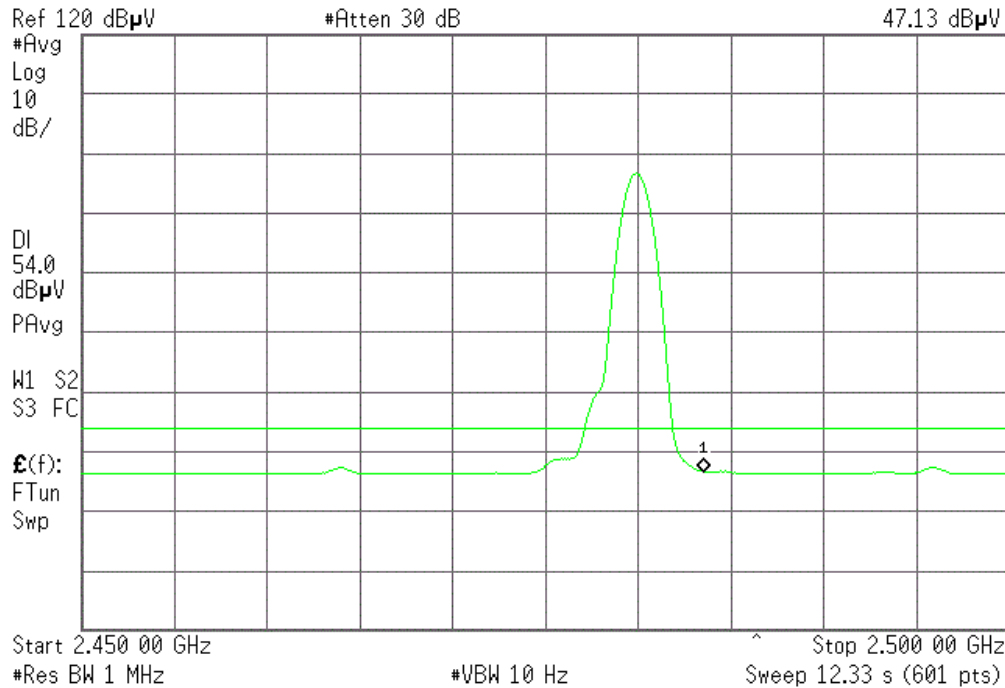
Agilent

Polarity: Vertical

R T

Mkr1 2.483 50 GHz

47.13 dB $\mu$ V



## 9 Antenna Requirement

### 9.1 Standard Requirement

Standard: FCC PART 15, SUBPART C : 2011 (Section 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 9.2 Antenna Connected Construction

The directional gains of antenna used for transmitting is 0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

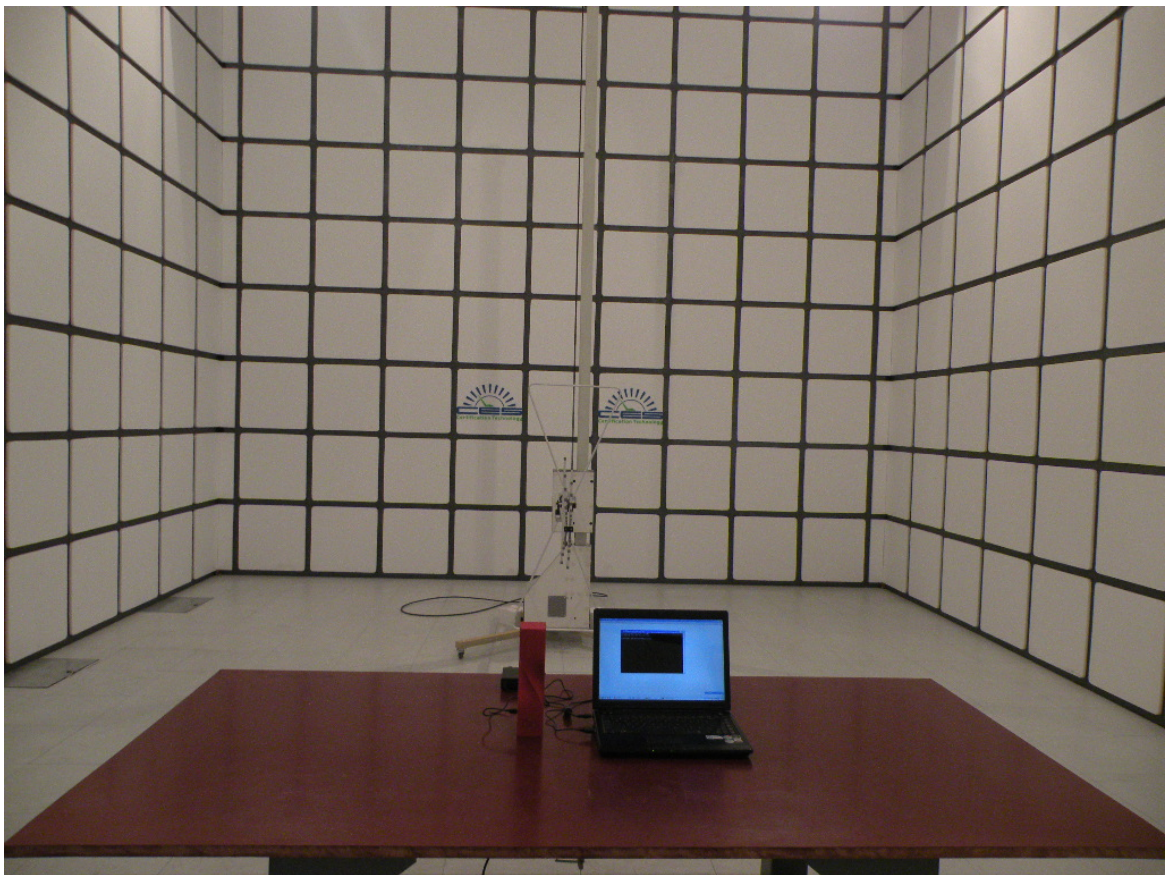
### 9.3 Result

The EUT antenna is integral Antenna. It comply with the standard requirement.

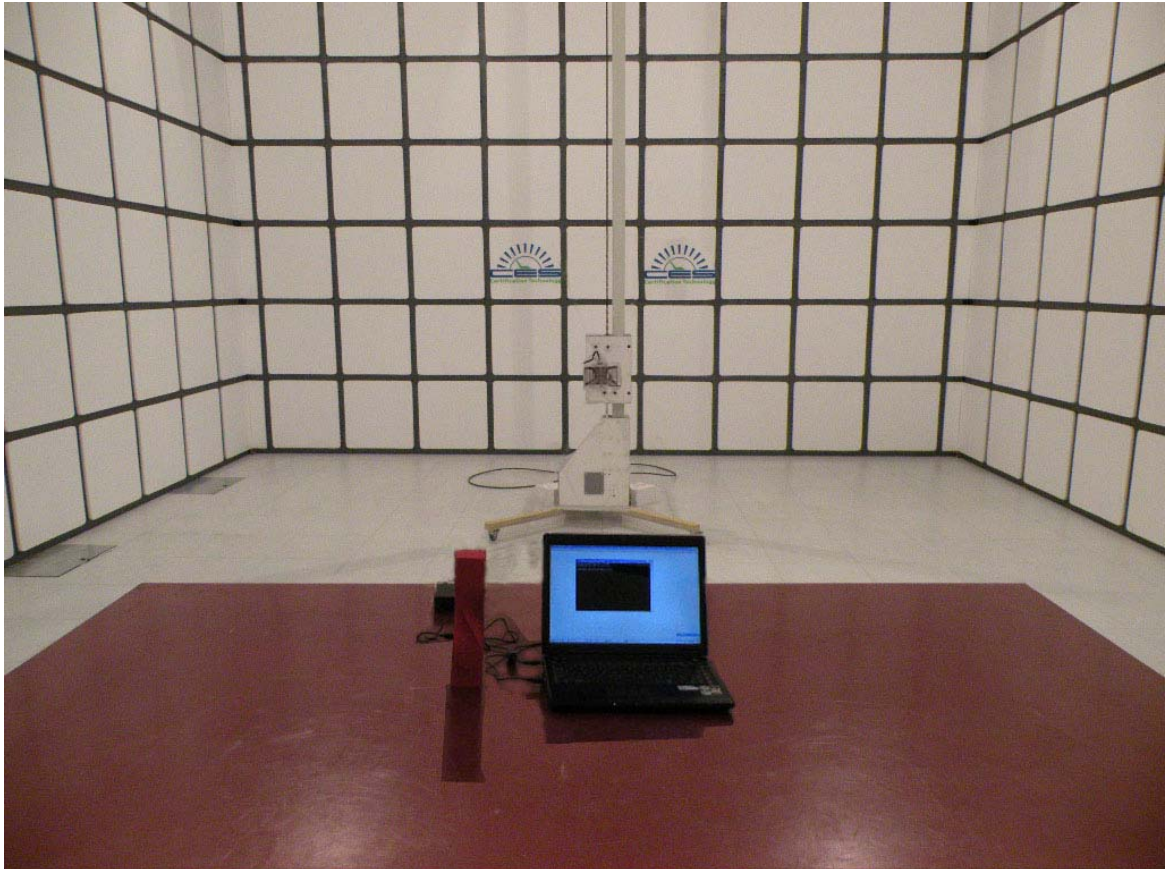
## 10 Photographs of Test Setup

### Photographs-Radiated Emission Test Setup in Chamber

Below 1G



Above 1G



## Photographs-Conducted Emission Test Setup



## 11 Photographs of EUT

**Figure 1**

Photo of EUT

Front View [ ]

Rear View [ ]

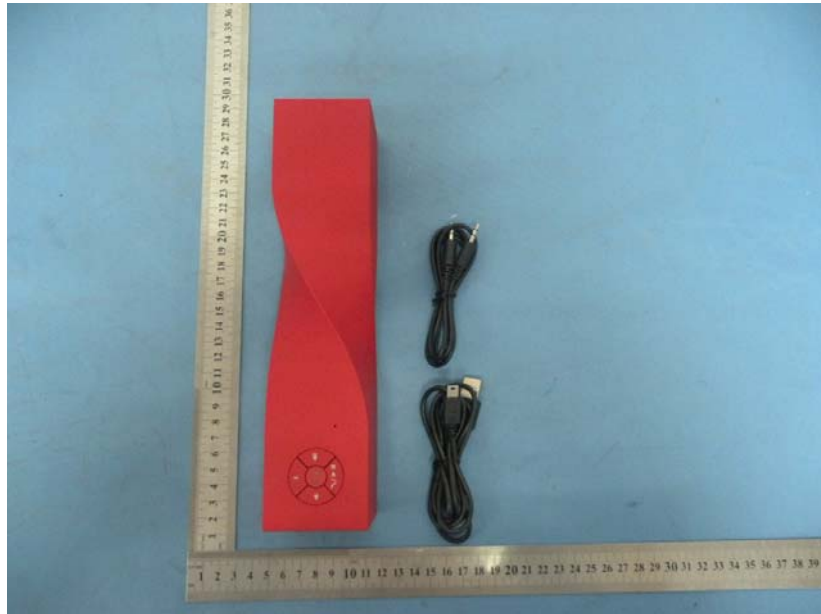
Full View [ ✓ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Full View [ ]



**Figure 2**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ✓ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Full View [ ]



**Figure 3**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ✓ ]

Left View [ ]

Right View [ ]

Full View [ ]



**Figure 4**

Photo of EUT

Front View [ ✓ ]

Rear View [ ]

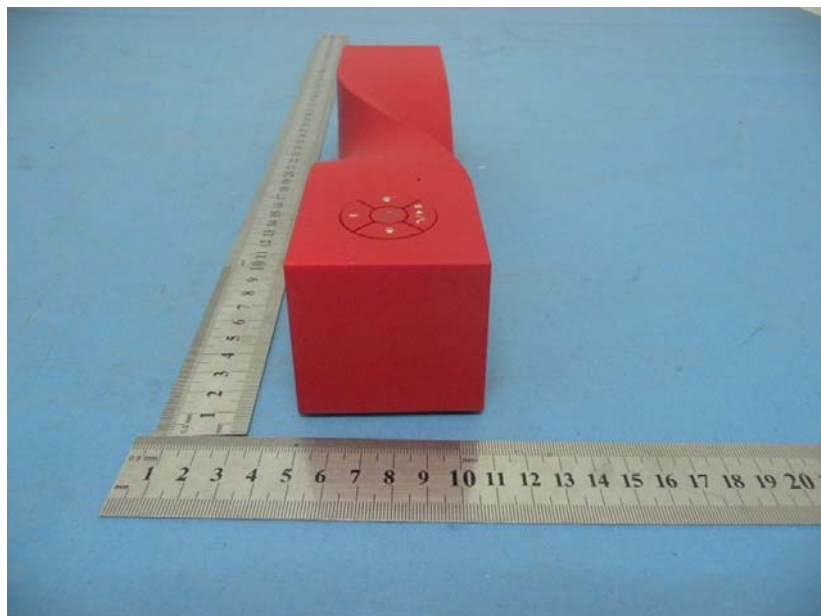
Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [ ]



**Figure 5**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View [ ]

Left View [✓]

Right View [ ]

Internal View [ ]



**Figure 6**

Photo of EUT

Front View [ ]

Rear View [✓]

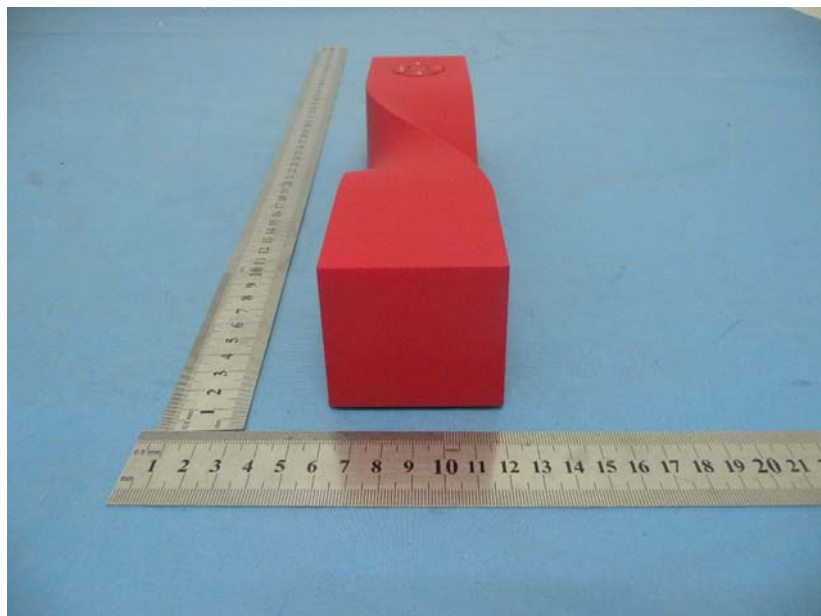
Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Internal View [ ]



**Figure 7**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [✓]

Internal View [ ]



**Figure 8**

Photo of EUT

Front View [ ]

Rear View [ ]

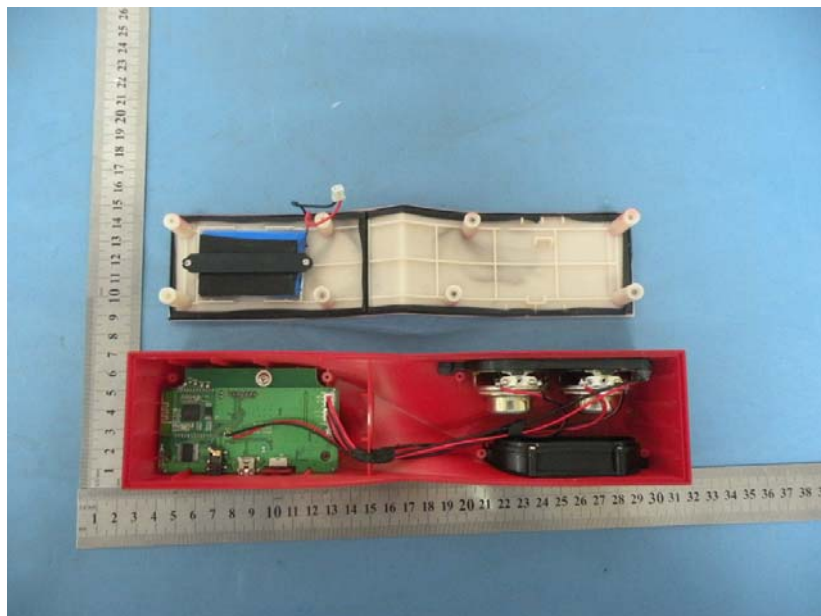
Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Internal View [✓]



**Figure 9**

Photo of EUT

Front View [ ☐ ]

Rear View [ ☐ ]

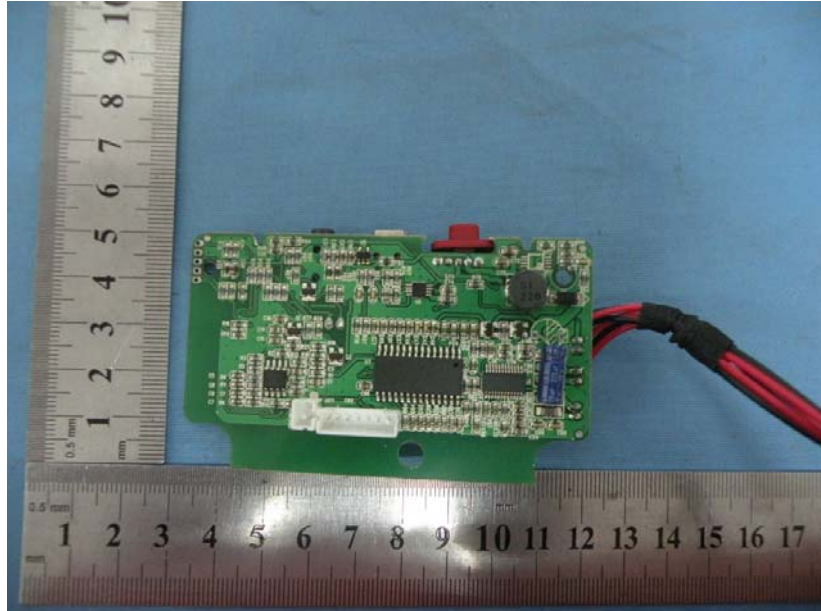
Top View [ ☐ ]

Bottom View [ ☐ ]

Left View [ ☐ ]

Right View [ ☐ ]

Internal View [ ☒ ]



**Figure 10**

Photo of EUT

Front View [ ☐ ]

Rear View [ ☐ ]

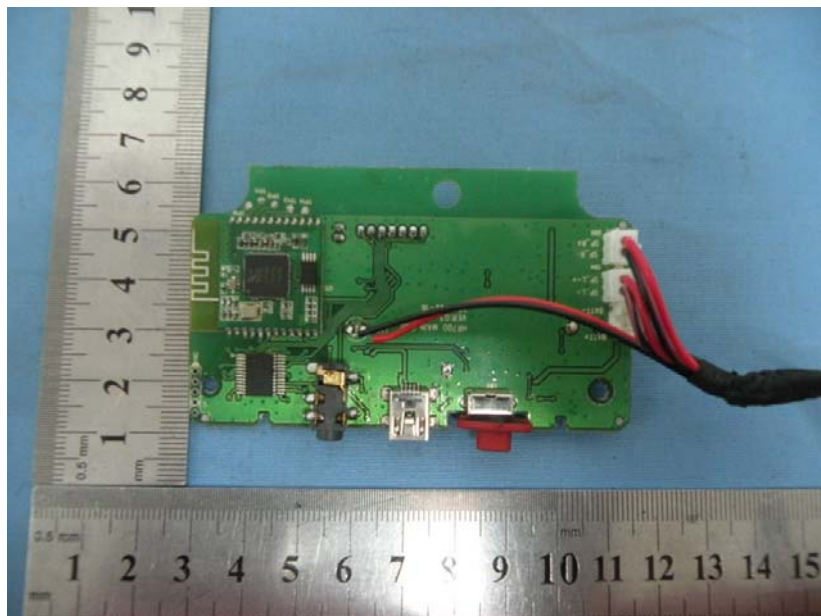
Top View [ ☐ ]

Bottom View [ ☐ ]

Left View [ ☐ ]

Right View [ ☐ ]

Internal View [ ☒ ]



**Figure 11**

Photo of EUT

Front View [ ]

Rear View [ ]

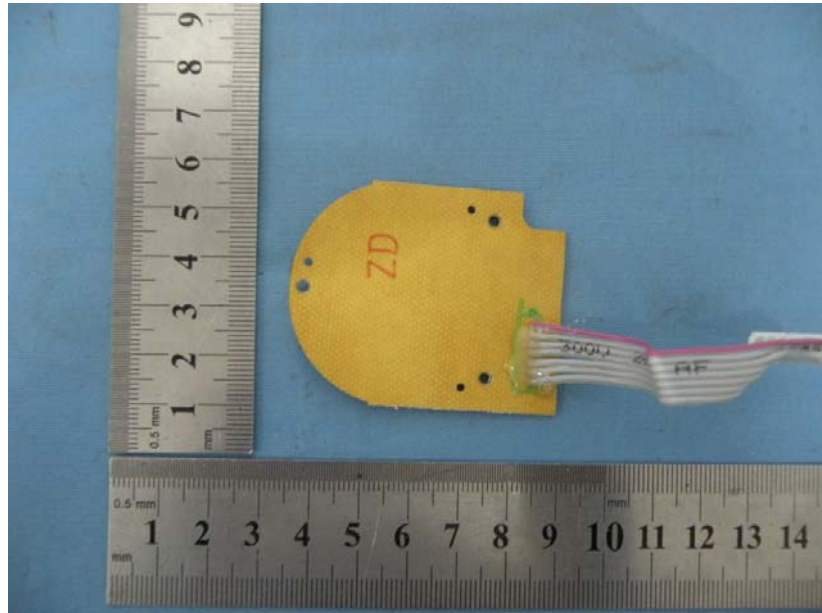
Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Internal View [ ☒ ]



**Figure 12**

Photo of EUT

Front View [ ]

Rear View [ ]

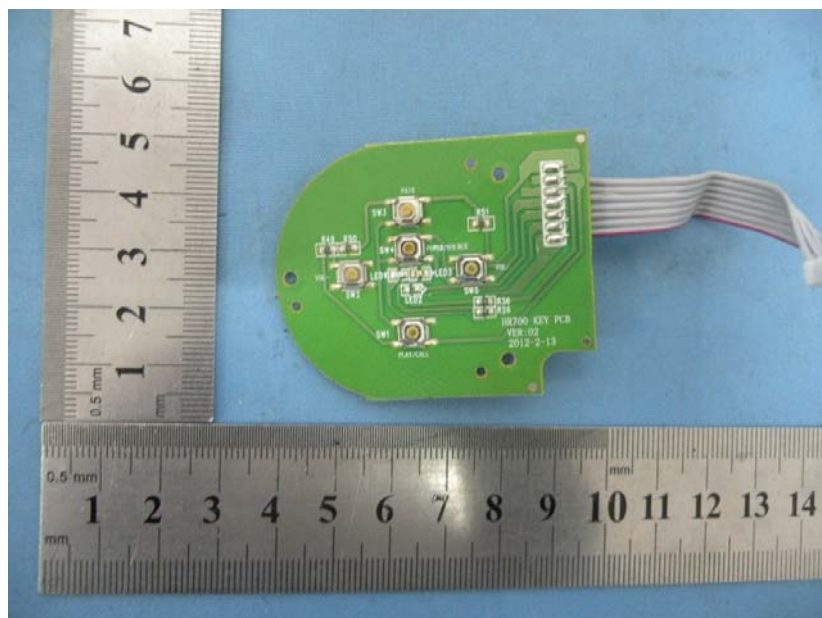
Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Internal View [ ☒ ]



-----END OF THE REPORT-----