

## FCC&IC RF TEST REPORT

**No. 170500327SHA-003**

Applicant : The Ketchum Group, Inc. dba Outdoor Technology  
25201 Paseo De Alicia, Ste. 105, Laguna Hills, CA  
92653, USA

Manufacturer : XIA MEN JOYATECH CO., LTD.  
304# 28TH BUILDING, GUANRI ROAD, XIAMEN  
SOFTWARE PARK, XIAMEN, FUJIAN PROVINCE

Product Name : Bluetooth headphone

Type/Model : Rhinos

**TEST RESULT : PASS**

### SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

**47CFR Part 15 (2016):** Radio Frequency Devices (Subpart C)

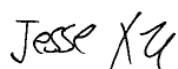
**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

**RSS-210 Issue 8 (December 2010):** Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

**RSS-Gen Issue 4 (December 2014):** General Requirements for Compliance of Radio Apparatus

Date of issue: June 15, 2017

Prepared by:



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## Description of Test Facility

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## **1 GENERAL INFORMATION**

### **1.1 Description of Client**

Applicant : The Ketchum Group, Inc. dba Outdoor Technology  
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Manufacturer : XIA MEN JOYATECH CO., LTD.

304# 28TH BUILDING, GUANRI ROAD, XIAMEN  
SOFTWARE PARK, XIAMEN, FUJIAN PROVINCE

### **1.2 Identification of the EUT**

Product Name : Bluetooth headphone

Type/model : Rhinos

FCC ID : PGW- OT3300

IC : 21672-OT3300

### 1.3 Technical Specification

Operation Frequency : 2402-2480MHz  
Band

Type of Modulation : GFSK

Description of EUT : Here is one model.  
We tested the 2402CH , 2442CH and 2480CH and listed  
the worst data in this report.

Antenna Designation : PCB antenna, 3.0 dBi peak gain

Rating : Battery 3.7V

Category of EUT : Class B

EUT type : ☒ Table top  
☐ Floor standing

Software applied : Bluetest3

Sample received date : Mar 15, 2017

Date of test : Mar 16, 2017 –May 20, 2017

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

47CFR Part 15 (2016)  
ANSI C63.10 (2013)  
RSS-210 Issue 8 (December 2010)  
RSS-Gen Issue 4 (December 2014)

### 2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

Three axes (X, Y, Z) were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded. Compare with the test results that Z axis is the worst case.

### 2.3 Test software list

| Test Items         | Software | Manufacturer | Version |
|--------------------|----------|--------------|---------|
| Conducted emission | ESxS-K1  | R&S          | V2.1.0  |
| Radiated emission  | ES-K1    | R&S          | V1.71   |

### 2.4 Test peripherals list

| Item No. | Name            | Band and Model   | Description          |
|----------|-----------------|------------------|----------------------|
| 1        | Laptop computer | HP ProBook 6470b | 100-240V AC, 50/60Hz |
| 2        | AC Adapter      | HUAWEI           |                      |

## 2.5 Instrument list

| Equipment                  | Type              | Manu.             | Internal no. | Cal. Date  | Due date   |
|----------------------------|-------------------|-------------------|--------------|------------|------------|
| Test Receiver              | ESCS 30           | R&S               | EC 2107      | 2016-10-21 | 2017-10-20 |
| Test Receiver              | ESIB 26           | R&S               | EC 3045      | 2016-10-20 | 2017-10-19 |
| A.M.N.                     | ESH2-Z5           | R&S               | EC 3119      | 2017-1-9   | 2018-1-8   |
| A.M.N.                     | ENV 216           | R&S               | EC 3393      | 2016-8-9   | 2017-8-8   |
| A.M.N.                     | ENV 216           | R&S               | EC 3394      | 2016-8-9   | 2017-8-8   |
| A.M.N.                     | ENV4200           | R&S               | EC3558       | 2016-8-9   | 2017-8-8   |
| Ultra-broadband antenna    | HL 562            | R&S               | EC 3046-1    | 2017-5-16  | 2018-5-14  |
| Bilog Antenna              | CBL 6112D         | TESEQ             | EC 4206      | 2017-4-28  | 2018-4-27  |
| Horn antenna               | HF 906            | R&S               | EC 3049      | 2017-4-28  | 2018-4-27  |
| Pre-amplifier              | Pre-amp 18        | R&S               | EC 3222      | 2017-4-12  | 2018-4-11  |
| Semi-anechoic chamber      | -                 | Albatross project | EC 3048      | 2017-5-12  | 2018-5-11  |
| High Pass Filter           | WHKX 1.0/15G-10SS | Wainwright        | EC4297-1     | 2017-1-8   | 2018-1-7   |
| Power sensor / Power meter | N1911A/N1921A     | Agilent           | EC4318       | 2017-04-12 | 2018-04-11 |

## 2.6 Test Summary

**This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

| TEST ITEM                              | FCC REFERANCE   | IC REFERANCE                                 | RESULT |
|----------------------------------------|-----------------|----------------------------------------------|--------|
| Radiated emission                      | 15.249 & 15.205 | RSS-210 Issue 8<br>Annex A2.9<br>&Clause 2.2 | Pass   |
| Assigned bandwidth<br>(20dB bandwidth) | 15.215(c)       | -                                            | Pass   |
| Occupied bandwidth                     | -               | RSS-Gen Issue 4<br>Clause 6.6                | Tested |
| Power line conducted emission          | 15.207          | RSS-Gen Issue 4<br>Clause 8.8                | Pass   |

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

### 3 Radiated emission

**Test result:** Pass

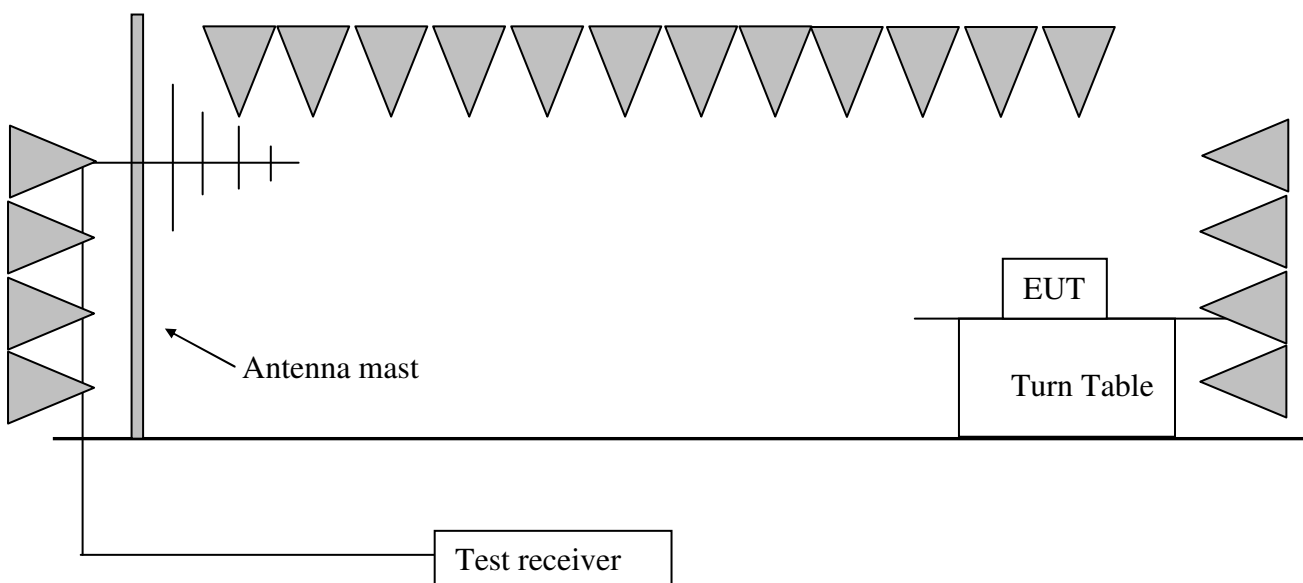
#### 3.1 Test limit

| Fundamental Frequency<br>(MHz)                    | Fundamental limit<br>(dBuV/m) | Harmonic limit<br>(dBuV/m) |
|---------------------------------------------------|-------------------------------|----------------------------|
| <input type="checkbox"/> 902 - 928                | 94                            | 54                         |
| <input checked="" type="checkbox"/> 2400 - 2483.5 | 94                            | 54                         |
| <input type="checkbox"/> 5725 - 5875              | 94                            | 54                         |
| <input type="checkbox"/> 24000 - 24250            | 108                           | 68                         |

The radiated emissions which fall outside allocated band (2400-2483.5MHz), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

| Frequency<br>(MHz) | Field Strength<br>(dBuV/m) | Measurement Distance<br>(m) |
|--------------------|----------------------------|-----------------------------|
| 30 - 88            | 40.0                       | 3                           |
| 88 - 216           | 43.5                       | 3                           |
| 216 - 960          | 46.0                       | 3                           |
| Above 960          | 54.0                       | 3                           |

#### 3.2 Test Configuration



### 3.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

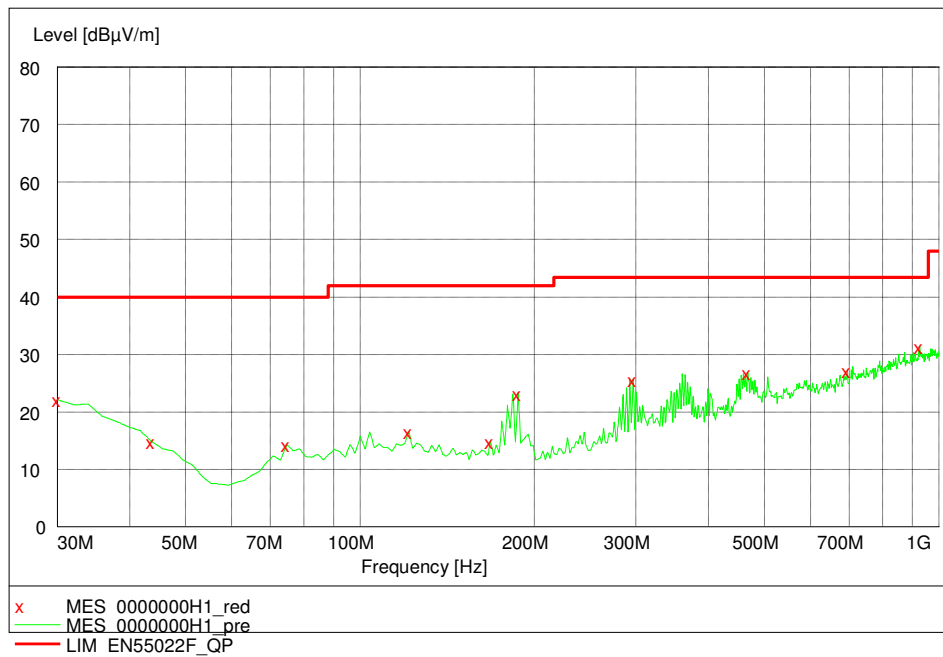
RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);  
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);  
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)  
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);  
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

### 3.4 Test protocol

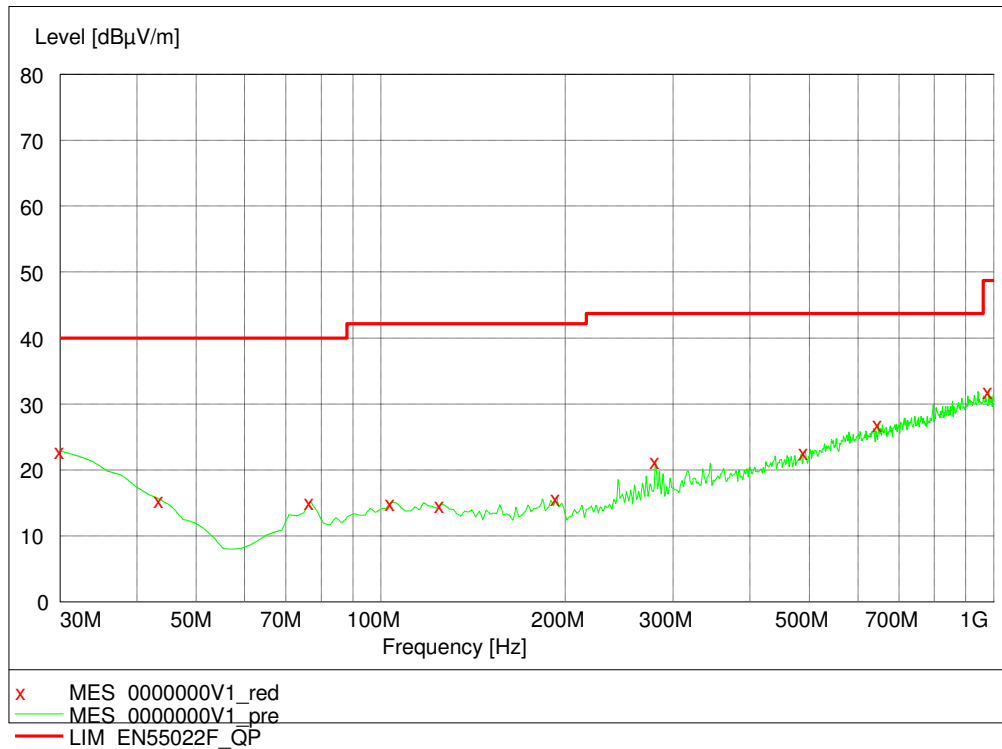
Temperature : 23 °C  
Relative Humidity : 56 %

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

#### Horizontal



Vertical



**Test result below 1GHz:**

| Channel                                                          | Antenna | Frequency (MHz) | Corrected Reading (dBμV/m) | Correct Factor (dB/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|------------------------------------------------------------------|---------|-----------------|----------------------------|-----------------------|----------------|-------------|----------|
| H                                                                | H       | 197.00          | *                          | 13.18                 | 43.00          | *           | QP       |
|                                                                  | H       | 307.48          | *                          | 24.79                 | 46.00          | *           | QP       |
|                                                                  | H       | 960.00          | *                          | 19.86                 | 46.00          | *           | QP       |
|                                                                  | V       | 30.00           | *                          | 21.40                 | 40.00          | *           | QP       |
|                                                                  | V       | 55.15           | *                          | 12.70                 | 40.00          | *           | QP       |
|                                                                  | V       | 68.95           | *                          | 10.22                 | 40.00          | *           | QP       |
|                                                                  | V       | 197.76          | *                          | 9.30                  | 43.50          | *           | QP       |
|                                                                  | V       | 480.00          | *                          | 20.10                 | 46.00          | *           | QP       |
|                                                                  | V       | 960.00          | *                          | 20.70                 | 46.00          | *           | QP       |
| Remark: If the margin higher than 20dB, it would be marked as *. |         |                 |                            |                       |                |             |          |

Note: The worst test result (30MHz to 1GHz) of channel L (2402MHz) chosen to list in the report as representative.

**Test result above 1GHz:**

| CH | Antenna | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | H       | 2402.20         | 30.70                 | 88.00                      | 94.00          | 6.00        | PK       |
|    | H       | 2389.00         | 30.30                 | 36.50                      | 54.00          | 17.50       | PK       |
|    | H       | 2400.00         | 30.30                 | 58.45                      | 74.00          | 15.55       | PK       |
|    | H       | 2400.00         | 30.30                 | 52.22                      | 54.00          | 1.78        | AV       |
|    | H       | 4804.00         | -1.50                 | 44.30                      | 54.00          | 9.70        | PK       |
|    | V       | 2402.20         | 30.70                 | 82.30                      | 94.00          | 11.70       | PK       |
|    | V       | 4804.00         | -1.50                 | 40.02                      | 54.00          | 13.98       | PK       |
| M  | H       | 2442.00         | 30.70                 | 89.50                      | 94.00          | 4.50        | PK       |
|    | H       | 4880.00         | -1.10                 | 43.37                      | 54.00          | 10.63       | PK       |
|    | V       | 2442.00         | 30.70                 | 86.00                      | 94.00          | 8.00        | PK       |
|    | V       | 4880.00         | -1.10                 | 41.05                      | 54.00          | 12.95       | PK       |
| H  | H       | 2480.00         | 30.70                 | 88.45                      | 94.00          | 5.55        | PK       |
|    | H       | 2483.50         | 30.80                 | 42.20                      | 54.00          | 11.80       | PK       |
|    | H       | 4960.00         | -0.80                 | 40.60                      | 54.00          | 15.40       | PK       |
|    | V       | 2480.00         | 30.70                 | 87.45                      | 94.00          | 6.55        | PK       |
|    | V       | 2485.05         | 29.45                 | 38.19                      | 54.00          | 15.81       | PK       |
|    | V       | 4960.00         | -0.80                 | 40.38                      | 54.00          | 13.62       | PK       |

**Test mode: with BT connected (worst case list as below)**

| Channel | Antenna | Frequency (MHz) | Corrected Reading (dBuV/m) | Correct Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---------|---------|-----------------|----------------------------|-----------------------|----------------|-------------|----------|
| L       | H       | 2402.20         | 90.40                      | 34.34                 | Fundamental    | /           | PK       |
|         | H       | 2389.27         | 54.50                      | 34.30                 | 74.00          | 19.50       | PK       |
|         | H       | 4803.61         | 48.80                      | -3.55                 | 74.00          | 25.20       | PK       |
| M       | H       | 2441.20         | 90.84                      | 34.60                 | Fundamental    | /           | PK       |
|         | H       | 4883.77         | 49.50                      | -3.35                 | 74.00          | 24.50       | PK       |
| H       | H       | 2480.20         | 90.14                      | 34.62                 | Fundamental    | /           | PK       |
|         | H       | 2483.72         | 52.47                      | 34.65                 | 74.00          | 21.53       | PK       |
|         | H       | 4963.93         | 51.70                      | -3.16                 | 74.00          | 22.30       | PK       |

Remark:

1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed);
2. Corrected Reading = Original Receiver Reading + Correct Factor;
3. Margin = Limit – Corrected Reading;
4. If the PK Corrected reading is lower than AV limit, the AV test can be elided;

Example:

Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV,  
Then Correct Factor =  $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$ ,  
Corrected Reading =  $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$ ,  
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m,  
Then Margin =  $54 - 10.20 = 43.80\text{dBuV/m}$ .

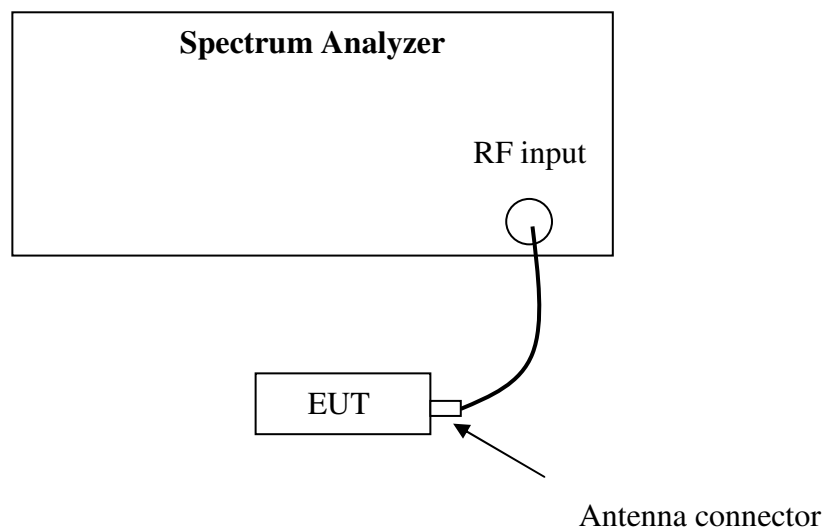
## 4 Assigned bandwidth (20dB bandwidth)&OCW

Test result: Pass

### 4.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band.

### 4.2 Test Configuration



### 4.3 Test procedure and test setup

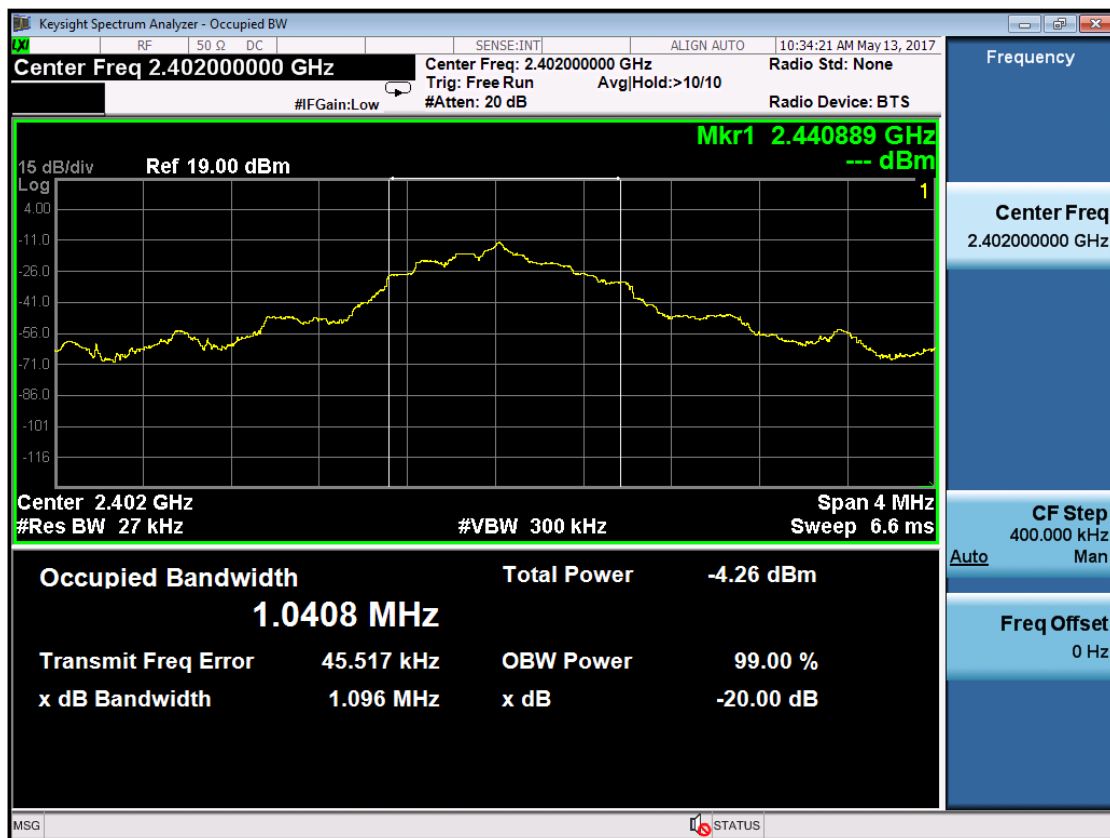
The 20dB Bandwidth per FCC § 15.215(c) is measured using the Spectrum Analyzer. Set Span = 2 to 3 times the 20 dB bandwidth, RBW = approximately 1% of the 20 dB bandwidth, VBW > RBW, Sweep = auto, Detector = peak, Trace = max hold. The test was performed at 3 channels (lowest, middle and highest channel).

#### 4.4 Test protocol

Temperature : 24 °C  
Relative Humidity : 56 %

| 20dB bandwidth<br>(MHz) | permitted band<br>(MHz) | Result |
|-------------------------|-------------------------|--------|
|                         | 2400 ~ 2483.5           | Pass   |
| <b>OCW<br/>(KHz)</b>    |                         |        |
| L                       | 1040.8                  | Tested |
| M                       | 1039.0                  | Tested |
| H                       | 1023.3                  | Tested |

L



M



H



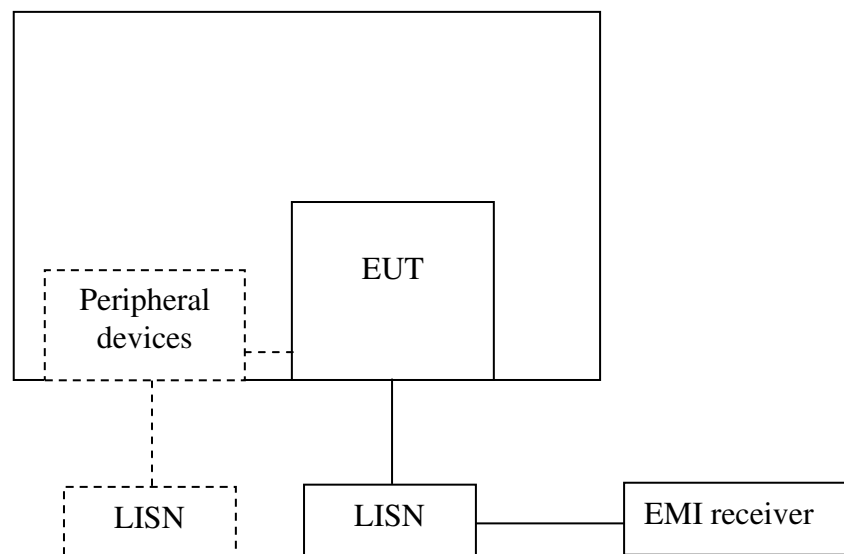
## 5 Power line conducted emission

**Test result:** Pass

### 5.1 Limit

| Frequency of Emission (MHz)                      | Conducted Limit (dBuV) |            |
|--------------------------------------------------|------------------------|------------|
|                                                  | QP                     | AV         |
| 0.15-0.5                                         | 66 to 56*              | 56 to 46 * |
| 0.5-5                                            | 56                     | 46         |
| 5-30                                             | 60                     | 50         |
| * Decreases with the logarithm of the frequency. |                        |            |

### 5.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

### 5.3 Test procedure and test set up

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50  $\Omega$  LISN port (to which the EUT is connected), where permitted, terminated into a 50  $\Omega$  measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50  $\Omega$  measuring port is terminated by a measuring instrument having 50  $\Omega$  input impedance. All other ports are terminated in 50  $\Omega$  loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

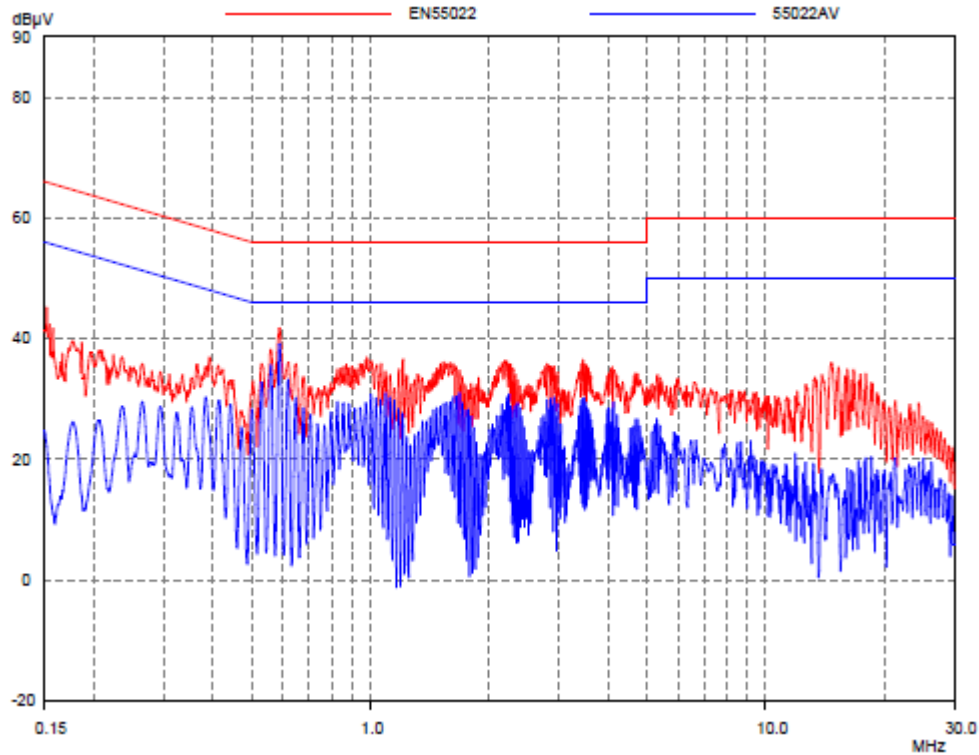
## 5.4 Test protocol

Temperature : 23 °C

Relative Humidity : 56 %

All the three models of product were tested and the worst data (GFSK, 2402MHz) was listed in the report.

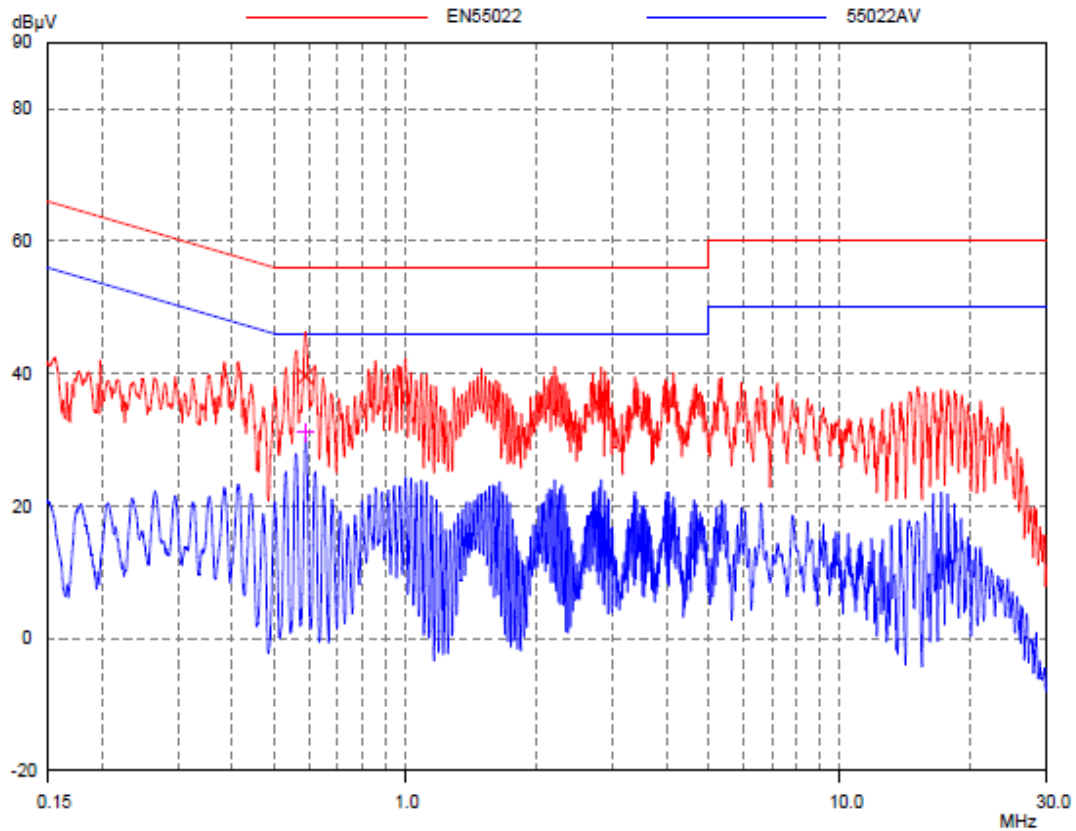
L-line



Test Data:

| Frequency<br>(MHz)                                               | Quasi-peak      |                 |                | Average         |                 |                |
|------------------------------------------------------------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
|                                                                  | level<br>dB(μV) | Limit<br>dB(μV) | Margin<br>(dB) | level<br>dB(μV) | limit<br>dB(μV) | Margin<br>(dB) |
| 0.15                                                             | *               | *               | *              | *               | *               | *              |
| 0.663                                                            | *               | *               | *              | *               | *               | *              |
| 1.167                                                            | *               | *               | *              | *               | *               | *              |
| 1.719                                                            | *               | *               | *              | *               | *               | *              |
| 2.229                                                            | *               | *               | *              | *               | *               | *              |
| 25.863                                                           | *               | *               | *              | *               | *               | *              |
| Remark: If the margin higher than 10dB, it would be marked as *. |                 |                 |                |                 |                 |                |

N-line



| Frequency<br>(MHz)                                               | Quasi-peak      |                 |                | Average         |                 |                |
|------------------------------------------------------------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
|                                                                  | level<br>dB(μV) | Limit<br>dB(μV) | Margin<br>(dB) | level<br>dB(μV) | limit<br>dB(μV) | Margin<br>(dB) |
| 0.15                                                             | *               | *               | *              | *               | *               | *              |
| 0.663                                                            | *               | *               | *              | *               | *               | *              |
| 1.167                                                            | *               | *               | *              | *               | *               | *              |
| 1.719                                                            | *               | *               | *              | *               | *               | *              |
| 2.229                                                            | *               | *               | *              | *               | *               | *              |
| 25.863                                                           | *               | *               | *              | *               | *               | *              |
| Remark: If the margin higher than 10dB, it would be marked as *. |                 |                 |                |                 |                 |                |