

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Korg Inc

Headphone

Model Number: WH-L1

FCC ID: KIJ-WHL1

|              |                                                                     |
|--------------|---------------------------------------------------------------------|
| Applicant    | Korg Inc                                                            |
| Address:     | 4015-2 Yanokuchi, Inagi-City, Tokyo, 206-0812 Japan                 |
|              |                                                                     |
| Prepared By: | EST Technology Co., Ltd.                                            |
|              | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
|              | Tel: 86-769-83081888-808                                            |

|                 |                       |
|-----------------|-----------------------|
| Report Number:  | ESTE-R2308295         |
| Date of Test:   | May. 06~Aug. 23, 2023 |
| Date of Report: | Aug. 25, 2023         |

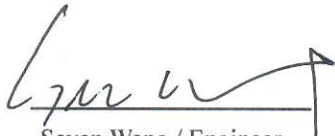
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## EST Technology Co., Ltd.

|                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                              |                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Applicant:</b>                                                                                                                                                                                 | Korg Inc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                              |                       |
| <b>Address:</b>                                                                                                                                                                                   | 4015-2 Yanokuchi, Inagi-City, Tokyo, 206-0812 Japan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                              |                       |
| <b>Manufacturer:</b>                                                                                                                                                                              | Korg Inc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                              |                       |
| <b>Address:</b>                                                                                                                                                                                   | 4015-2 Yanokuchi, Inagi-City, Tokyo, 206-0812 Japan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                              |                       |
| <b>Factory:</b>                                                                                                                                                                                   | DONGGUAN TRISTAR ELECTRONIC CO.,LTD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                              |                       |
| <b>Address:</b>                                                                                                                                                                                   | Building 1 & Building 2, No.196, Tangxia Dongxing Road, Tangxia Town, Dongguan City, Guangdong Province, China                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                              |                       |
| <b>E.U.T:</b>                                                                                                                                                                                     | Headphone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                              |                       |
| <b>Model Number:</b>                                                                                                                                                                              | WH-L1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                              |                       |
| <b>Power Supply:</b>                                                                                                                                                                              | DC 3.7V From Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                              |                       |
| <b>Trade Name:</b>                                                                                                                                                                                | KORG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Serial No.:</b>                                                                                           | -----                 |
| <b>Date of Receipt:</b>                                                                                                                                                                           | Apr. 21, 2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Date of Test:</b>                                                                                         | May. 06~Aug. 23, 2023 |
| <b>Test Specification:</b>                                                                                                                                                                        | FCC Part 15 Subpart C (15.249)<br>ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                              |                       |
| <b>Test Result:</b>                                                                                                                                                                               | <p>The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.</p> <p>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p> |                                                                                                              |                       |
| <b>Prepared by:</b>                                                                                                                                                                               | <b>Reviewed by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Date:</b> Aug. 25, 2023<br><b>Approved by:</b>                                                            |                       |
| <br>Emily Cai / Assistant                                                                                      | <br>Seven Wang / Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                  | <br>Iceman Hu / Manager |                       |
| <b>Other Aspects:</b>                                                                                                                                                                             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                              |                       |
| Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                              |                       |
| This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                              |                       |

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

|                               |   |                      |
|-------------------------------|---|----------------------|
| Product Name                  | : | Headphone            |
| Model Number                  | : | WH-L1                |
| Software Version              | : | N/A                  |
| Hardware Version              | : | N/A                  |
| Operation frequency           | : | 2400MHz-2483.5MHz    |
| Number of channel             | : | 20                   |
| Field Strength of Fundamental | : | 110.55 dB $\mu$ V/m  |
| Modulation Type               | : | GFSK                 |
| Sample Type                   | : | Prototype production |

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

### 1.2. Antenna Information

| Ant No. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---------|-------|------------|--------------|-----------|------------|
| 1       | -     | -          | Internal     | -         | 0          |

Note: This information is provided by the applicant.

### 1.3. Information of RF Cable

| Cable Loss(dB)                                                                                                                                                                               | Provided by |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1.0                                                                                                                                                                                          | Korg Inc    |
| Note: 1.The customer declared the loss value of the RF Cable, and the test results of this report only apply to the sample as received.<br>2. This information is provided by the applicant. |             |

## 2. SUMMARY OF TEST

### 2.1. Summary of test result

| No. | Description of Test Item                  | FCC Standard Section                               | Results |
|-----|-------------------------------------------|----------------------------------------------------|---------|
| 1   | Field Strength of Fundamental             | 15.249(a)                                          | PASS    |
| 2   | Radiated Spurious Emissions and Band Edge | 15.205<br>15.209<br>15.249(a)(c)(d)(e)<br>15.35(b) | PASS    |
| 3   | 20dB Bandwidth                            | 15.215                                             | PASS    |
| 4   | AC Power Line Conducted Emissions         | 15.207                                             | N/A     |
| 5   | Antenna Requirement                       | 15.203                                             | PASS    |

Note: "N/A" denotes test is not applicable in this test report.

## 2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA  
Registration No.: L5288  
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA  
Designation Number: CN1215  
This Certificate is valid until: January 31, 2024

Certificated by A2LA, USA  
Registration No.: 4366.01  
This Certificate is valid until: January 31, 2024

Certificated by Industry Canada  
CAB identifier No.: CN0035  
This Certificate is valid until: January 31, 2024

Certificated by VCCI, Japan  
Registration No.:C-14103; T-20073; R-13663;  
R-20103; G-20097  
Date of registration: Apr. 20, 2020  
This Certificate is valid until: Apr. 19, 2026

Certificated by TUV Rheinland, Germany  
Registration No.: UA 50413872 0001  
Date of registration: July 31, 2018

Certificated by Intertek  
Registration No.: 2011-RTL-L2-64  
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,  
Guangdong, China

### 2.3. Measurement uncertainty

| Test Item                                               | Uncertainty                |
|---------------------------------------------------------|----------------------------|
| Uncertainty for spurious emissions test (Below 30MHz)   | $\pm 1.62$ dB              |
| Uncertainty for spurious emissions test (30MHz-1GHz)    | $\pm 4.60$ dB(Polarize: H) |
|                                                         | $\pm 4.68$ dB(Polarize: V) |
| Uncertainty for spurious emissions test (1GHz to 18GHz) | $\pm 4.96$ dB              |
| Uncertainty for radio frequency                         | $7 \times 10^{-8}$         |
| Uncertainty for conducted RF Power                      | 1.08dB                     |
| Uncertainty for Power density test                      | 0.26dB                     |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

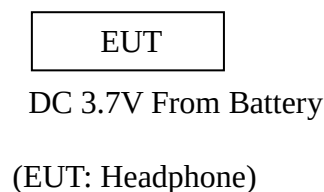
### 2.4. Assistant equipment used for test

| Item | Equipment | Brand | Model Name/Type No. | FCC ID | Series No. |
|------|-----------|-------|---------------------|--------|------------|
| -    | -         | -     | -                   | -      | -          |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| -    | -             | -            | -      | -    |

### 2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into test mode by software before test.





## 2.6. Test Mode

The test mode was selected for the final test as listed below.

| Test Item                             | Test Mode | Test Channel    |
|---------------------------------------|-----------|-----------------|
| Duty Cycle                            | TX        | Low/Middle/High |
| Field Strength of Fundamental         | TX        | Low/Middle/High |
| Radiated Spurious Emissions           | TX        | Low/Middle/High |
| 20dB Bandwidth&99% Occupied Bandwidth | TX        | Low/Middle/High |

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

## 2.7. Power Setting of Test Software

| Software Name  | A8102    |          |          |
|----------------|----------|----------|----------|
| Frequency(MHz) | 2405.889 | 2441.729 | 2473.985 |
| Setting        | Default  | Default  | Default  |

Note: This information is provided by the applicant.

## 2.8. Channel List

| Channel | Frequency<br>(MHz) | Channel | Frequency<br>(MHz) |
|---------|--------------------|---------|--------------------|
| 1       | 2405.889           | 11      | 2441.729           |
| 2       | 2409.473           | 12      | 2445.313           |
| 3       | 2413.057           | 13      | 2448.897           |
| 4       | 2416.641           | 14      | 2452.481           |
| 5       | 2420.225           | 15      | 2456.065           |
| 6       | 2423.809           | 16      | 2459.649           |
| 7       | 2427.393           | 17      | 2463.233           |
| 8       | 2430.977           | 18      | 2466.817           |
| 9       | 2434.561           | 19      | 2470.401           |
| 10      | 2438.145           | 20      | 2473.985           |

## 2.9. Test Equipment List

| For radiated emission test(9kHz-30MHz) |                 |              |            |                  |            |           |
|----------------------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment                              | Manufacturer    | Model No.    | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| EMI Test Receiver                      | Rohde & Schwarz | ESR7         | EST-E047   | LISAI            | June 12,23 | 1 Year    |
| Active Loop Antenna                    | SCHWARZB ECK    | FMZB 1519B   | EST-E054   | LISAI            | June 12,23 | 1 Year    |
| Test Software                          | Audix           | e3-6.111221a | N/A        | N/A              | N/A        | N/A       |
| 9kHz-30MHz Cable                       | N/A             | EST-001      | N/A        | N/A              | N/A        | N/A       |

| For radiated emissions test (30MHz-1000MHz) |                 |              |            |                  |            |           |
|---------------------------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment                                   | Manufacturer    | Model No.    | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| EMI Test Receiver                           | Rohde & Schwarz | ESR7         | EST-E047   | LISAI            | June 12,23 | 1 Year    |
| Bilog Antenna                               | Teseq           | CBL 6111D    | EST-E034   | LISAI            | June 12,23 | 1 Year    |
| Test Software                               | Audix           | e3-6.111221a | N/A        | N/A              | N/A        | N/A       |
| 30-1000MHz Cable                            | N/A             | EST-002      | N/A        | N/A              | N/A        | N/A       |

| For radiated emission test(Above 1000MHz) |                |                  |            |                  |            |           |
|-------------------------------------------|----------------|------------------|------------|------------------|------------|-----------|
| Equipment                                 | Manufacturer   | Model No.        | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| Horn Antenna                              | SCHWARZB ECK   | BBHA9120D        | EST-E144   | LISAI            | June 12,23 | 1 Year    |
| Horn Antenna                              | Com-Power      | AHA-840          | EST-E133   | LISAI            | June 12,23 | 1 Year    |
| Low Noise Amplifier                       | RF             | TRLA-01018 0G45N | EST-E142   | LISAI            | June 12,23 | 1 Year    |
| Spectrum Analyzer                         | Rohde &Schwarz | FSV40            | EST-E069   | LISAI            | June 12,23 | 1 Year    |
| Test Software                             | Audix          | e3-6.111221a     | N/A        | N/A              | N/A        | N/A       |
| Above 1GHz Cable                          | N/A            | EST-003          | N/A        | N/A              | N/A        | N/A       |

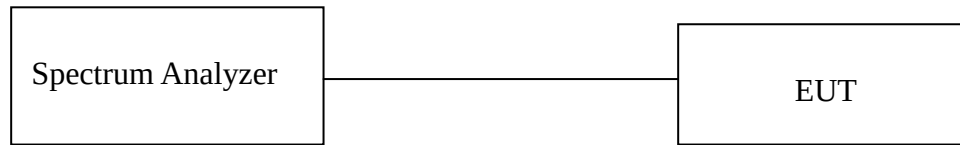
| For connect EUT antenna terminal test |                |           |            |                  |            |           |
|---------------------------------------|----------------|-----------|------------|------------------|------------|-----------|
| Equipment                             | Manufacturer   | Model No. | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| TS 1120                               | Tonscend       | /         | /          | /                | /          | /         |
| Test Software                         | Tonscend       | TS1120-3  | 3.2.11     | /                | /          | /         |
| RF Control Unit                       | Tonscend       | JS0806-2  | EST-E134   | LISAI            | June 12,23 | 1 Year    |
| Signal and Spectrum Analyzer          | Rohde &Schwarz | FSV 40    | EST-E136   | LISAI            | June 12,23 | 1 Year    |

### 3. DUTY CYCLE

#### 3.1. Limit

N/A

#### 3.2. Test Setup



#### 3.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting                                               |
|---------------------|-------------------------------------------------------|
| Center Frequency    | Test Frequency                                        |
| RBW                 | $\geq$ OBW                                            |
| VBW                 | $\geq$ RBW                                            |
| Span                | Zero                                                  |
| Sweep Time          | At least one period of the pulse train or over 100 ms |
| Detector            | PEAK                                                  |

#### 3.4. Test Procedure

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 3.3.
- c. Adjust and configure any EUT switches, controls, or input data streams to ensure that the EUT is transmitting or encoded to obtain the “worst-case” pulse ON time.
- d. If the pulse train is periodic (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms, then:
  - 1) Set the TRIGGER on the spectrum analyzer to capture at least one period of the pulse train, including any blanking intervals.
  - 2) Determine the total maximum pulse “ON time” ( $t_{ON}$ ) over one period of the pulse train. If the pulse train contains pulses of different widths, then  $t_{ON}$  is determined by summing the duration of all of the pulses within the pulse train [i.e.,  $t_{ON} = \Sigma(t_1 + t_2 + \dots t_n)$ ].
  - 3) The duty cycle is then determined by dividing the total maximum “ON time” by the period of the pulse train ( $t_{ON}/T$ ).
- e. If the pulse train is nonperiodic or is periodic with a period that exceeds 100 ms, or as an alternative to step d, then:
  - 1) Set the TRIGGER on the spectrum analyzer to capture the greatest amount of pulse “ON time” over 100 ms.
  - 2) Find the 100 ms period that contains the maximum “on time”; this may require summing the duration of multiple pulses as described in step d 2).
  - 3) Determine the duty cycle by dividing the total maximum “ON time” by 100 ms ( $t_{ON}/100$  ms).
- f. Determine the duty cycle correction factor by below Equation to the duty cycle determined in the preceding steps.

$$\delta(\text{dB}) = 20\log(\Delta)$$

where

$\delta$  is the duty cycle correction factor (dB)

$\Delta$  is the duty cycle (dimensionless)

## 3.5. Test Conditions

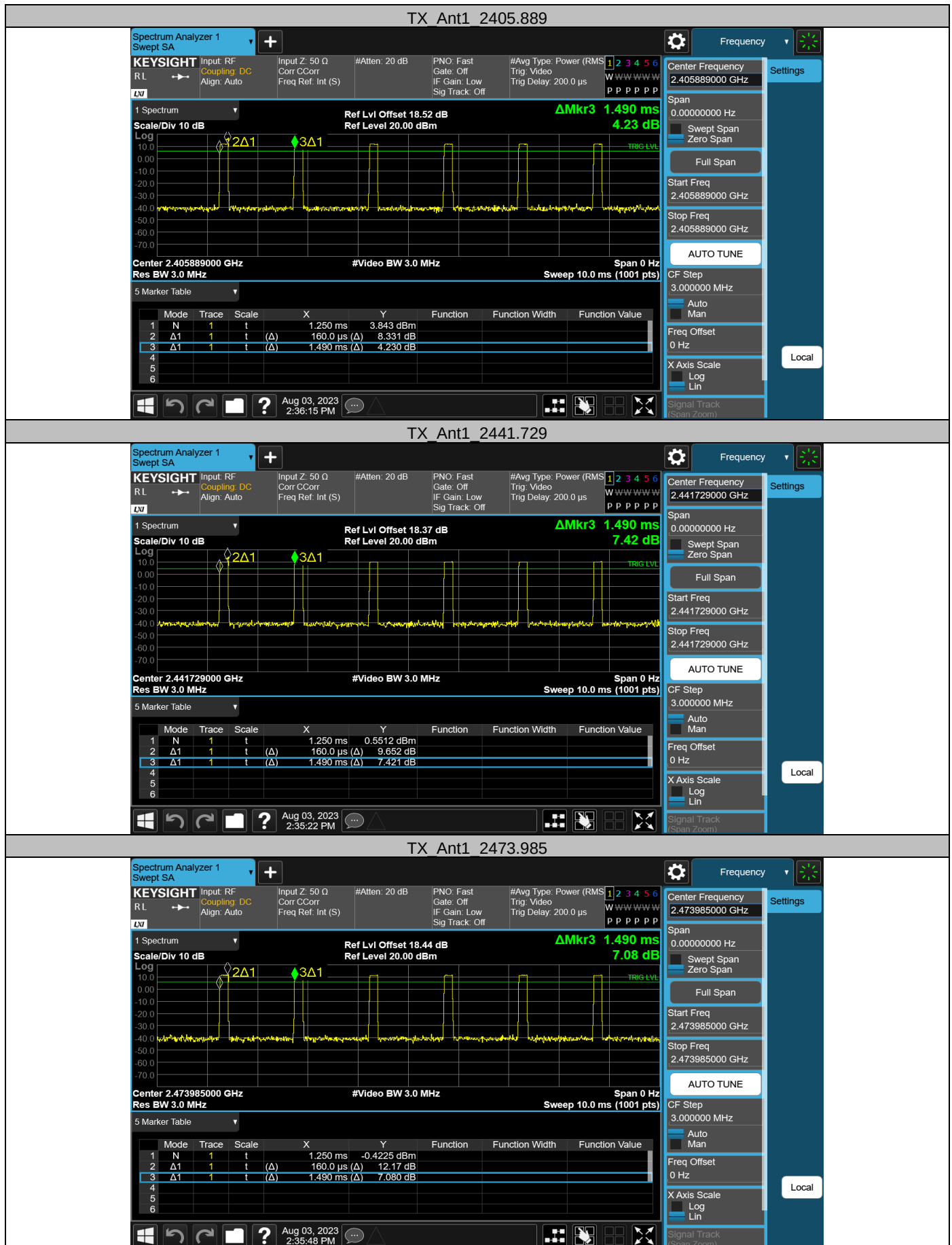
|             |       |                   |     |              |         |
|-------------|-------|-------------------|-----|--------------|---------|
| Temperature | 26.3℃ | Relative Humidity | 56% | Test Voltage | DC 3.7V |
|-------------|-------|-------------------|-----|--------------|---------|

## 3.6. Test Result

| Test Frequency (MHz) | On Time (ms) | Total Time (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|----------------------|--------------|-----------------|----------------|-----------------------------------|
| 2405.889             | 0.16         | 1.49            | 10.74          | -19.38                            |
| 2441.729             | 0.16         | 1.49            | 10.74          | -19.38                            |
| 2473.985             | 0.16         | 1.49            | 10.74          | -19.38                            |

Note:

1.  $T_{ON\ time} = t_{on\ 1} \times N_{Burst\ 1} + t_{on\ 2} \times N_{Burst\ 2} + \dots + t_{on\ n} \times N_{Burst\ n}$   
 $N_{Burst\ n}$  is the number of Burst n in one period or 100ms
2. Duty Cycle=(On Time/ Total Time)\*100%
3. Duty Cycle Correction Factor = $20 \times \text{LOG}(\text{Duty Cycle})$



## 4. FIELD STRENGTH OF FUNDAMENTAL

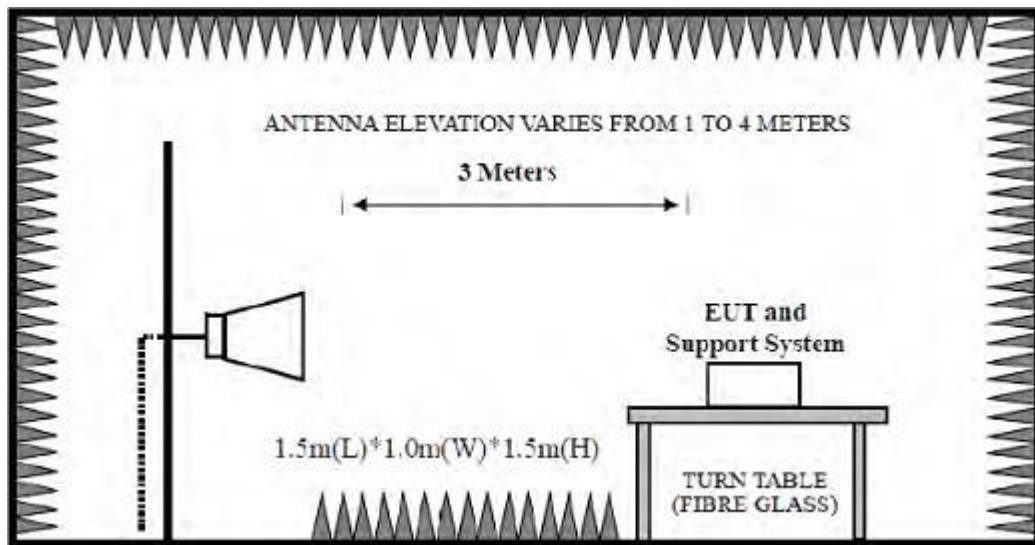
### 4.1. Limit

| Fundamental frequency | Field strength of fundamental@3m (millivolts/meter) | Average Limit@3m dB $\mu$ V/m | Peak Limit@3m dB $\mu$ V/m |
|-----------------------|-----------------------------------------------------|-------------------------------|----------------------------|
| 902-928MHz            | 50                                                  | 94                            | 114                        |
| 2400-2483.5MHz        | 50                                                  | 94                            | 114                        |
| 5725-5875MHz          | 50                                                  | 94                            | 114                        |
| 24.0-24.25            | 250                                                 | 108                           | 128                        |

Note:

1. Average Limit (dB $\mu$ V/m)=20 $\times$ log[1000 $\times$ Field Strength (mV/m)].
2. Peak Limit (dB $\mu$ V/m)= Average Limit (dB $\mu$ V/m)+20dB

### 4.2. Test Setup



### 4.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting        |
|---------------------|----------------|
| RBW                 | $\geq$ OBW     |
| VBW                 | 3 $\times$ RBW |
| Start frequency     | 2400MHz        |
| Stop frequency      | 2483.5MHz      |
| Sweep Time          | Auto           |
| Detector            | PEAK/AVG       |
| Trace Mode          | Max Hold       |

#### 4.4. Test Procedure

- a. EUT was placed on a turn table, which is 1.5 meter high above the ground.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Spectrum analyzer setting parameters in accordance with section 3.3.
- d. Set the EUT transmit continuously with maximum output power.
- e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- f. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test,record the average and peak value.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

## 4.5. Test Result

| Test frequency<br>(MHz) | Fundamental<br>frequency<br>(MHz) | Field strength of<br>fundamental level<br>(dB $\mu$ V/m) |        | Limit<br>(dB $\mu$ V/m) |      | Result | Antenna<br>Pole<br>(H/V) |
|-------------------------|-----------------------------------|----------------------------------------------------------|--------|-------------------------|------|--------|--------------------------|
|                         |                                   | Avg                                                      | Peak   | Avg                     | Peak |        |                          |
| 2405.889                | 2406.93                           | 85.76                                                    | 105.14 | 94                      | 114  | Pass   | V                        |
|                         | 2406.93                           | 82.06                                                    | 101.44 | 94                      | 114  | Pass   | H                        |
| 2441.729                | 2442.59                           | 84.76                                                    | 104.14 | 94                      | 114  | Pass   | V                        |
|                         | 2442.92                           | 75.31                                                    | 94.69  | 94                      | 114  | Pass   | H                        |
| 2473.985                | 2474.90                           | 91.17                                                    | 110.55 | 94                      | 114  | Pass   | V                        |
|                         | 2475.07                           | 88.83                                                    | 108.21 | 94                      | 114  | Pass   | H                        |

Note :

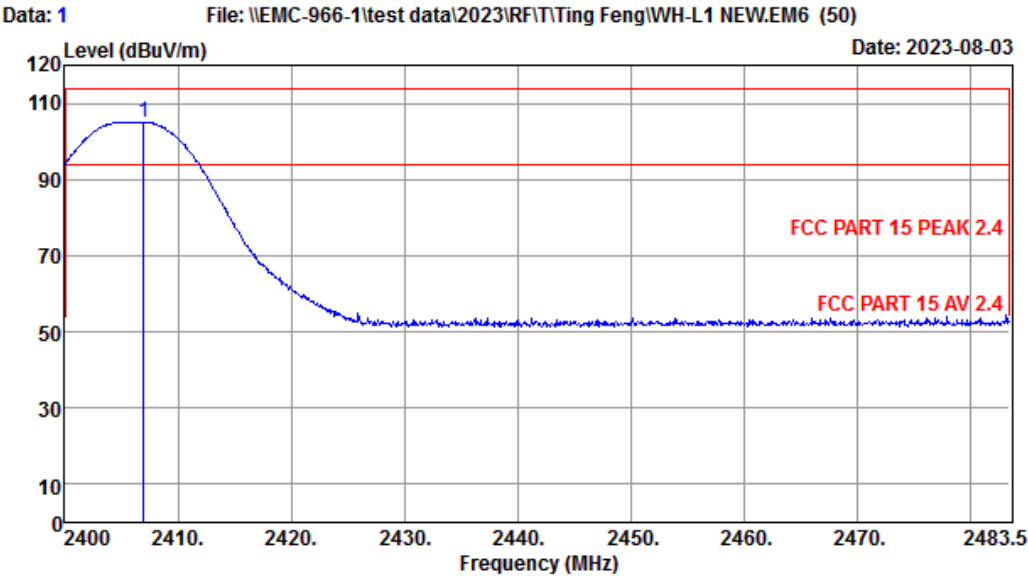
1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor.
2. Duty Cycle Correction Factor=-19.38.(refer to section 3 of this report )



Low Channel(2405.889MHz)

EST Technology

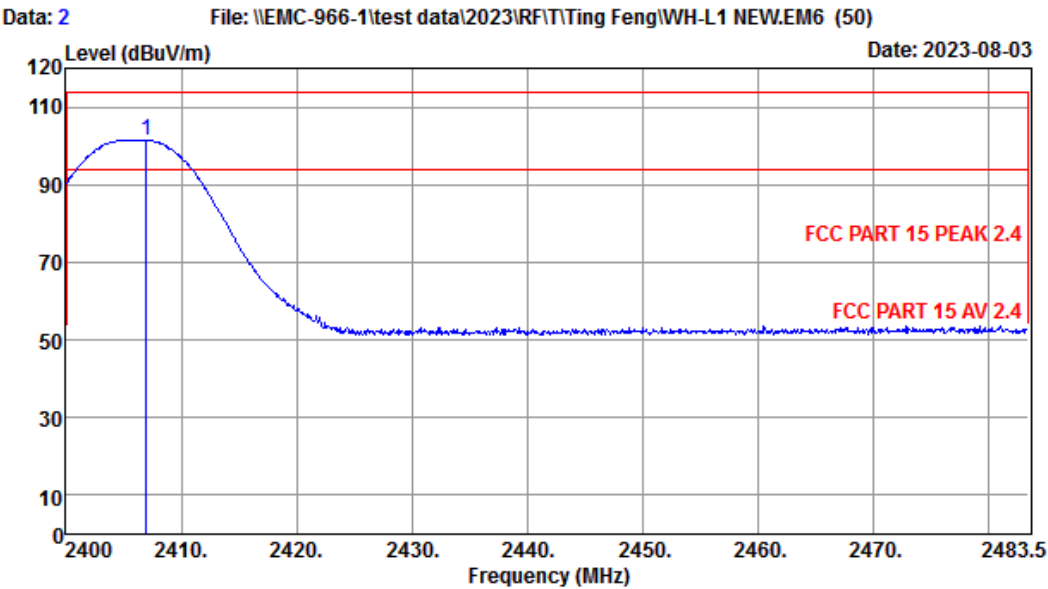
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Houjie, Dongguan,Guangdong,China  
Tel:+86-769-83081888  
Fax:+86-769-83081878



Site no. : site Data no. : 1  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2405.889MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2406.93        | 27.48                    | 3.57                  | 44.99                 | 119.08            | 105.14                        | 114.00             | 8.86           | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 2  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2405.889MHz

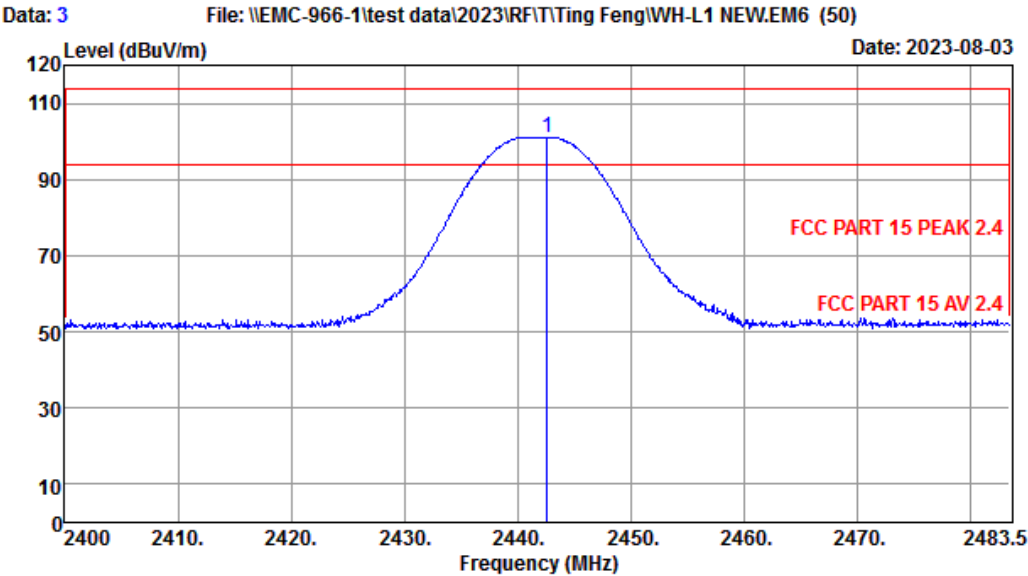
|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2406.93        | 27.48                    | 3.57                  | 44.99                 | 115.38            | 101.44                        | 114.00             | 12.56          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

Middle Channel(2441.729MHz)

EST Technology

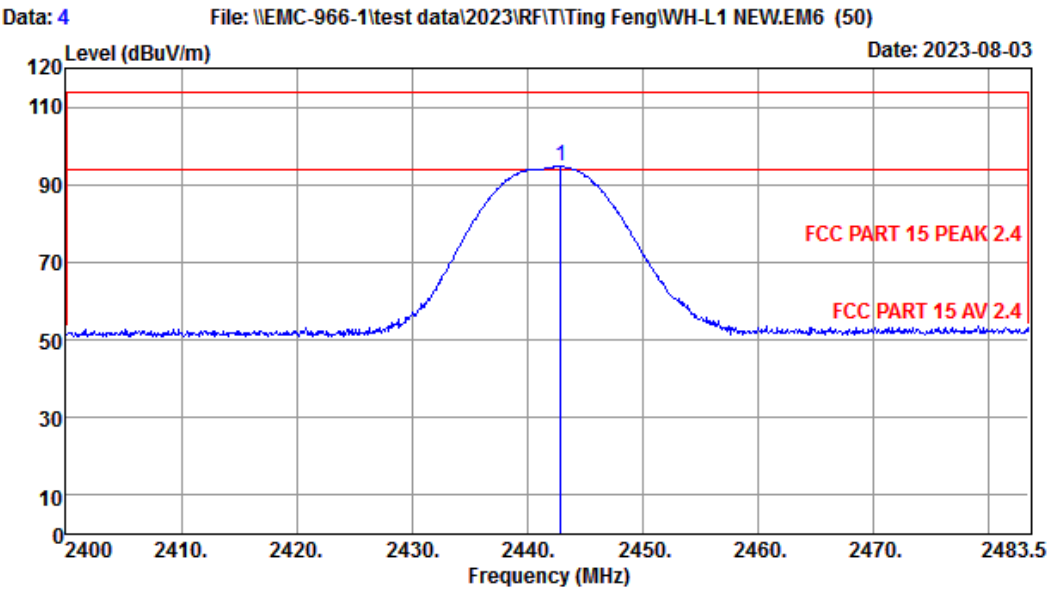
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Fax:+86-769-83081878



Site no. : site Data no. : 3  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2441.729MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2442.59        | 27.58                    | 3.59                  | 44.96                 | 114.93            | 101.14                        | 114.00             | 12.86          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 4  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2441.729MHz

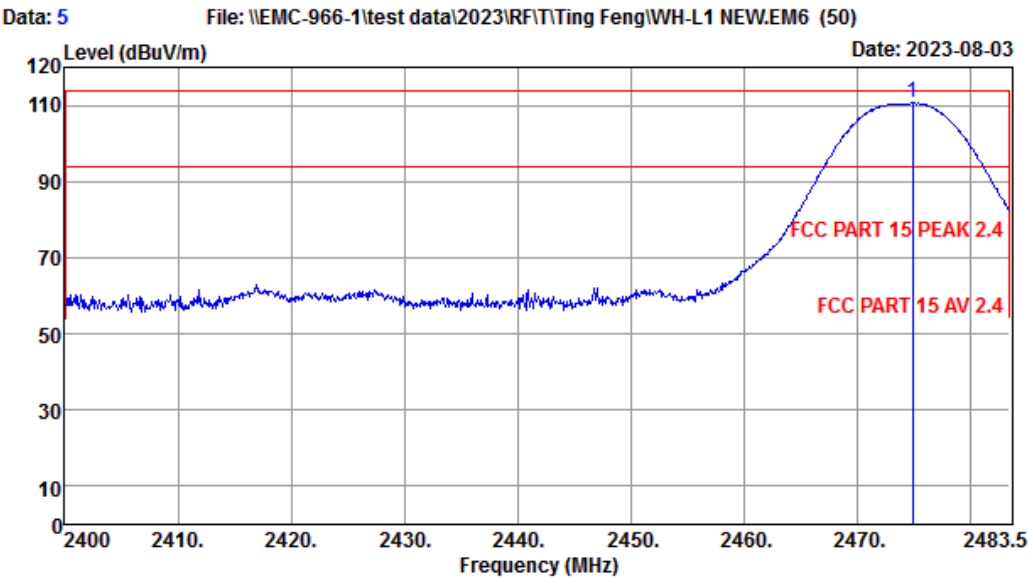
|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2442.92        | 27.58                    | 3.59                  | 44.96                 | 108.48            | 94.69                         | 114.00             | 19.31          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

High Channel(2473.985MHz)

EST Technology

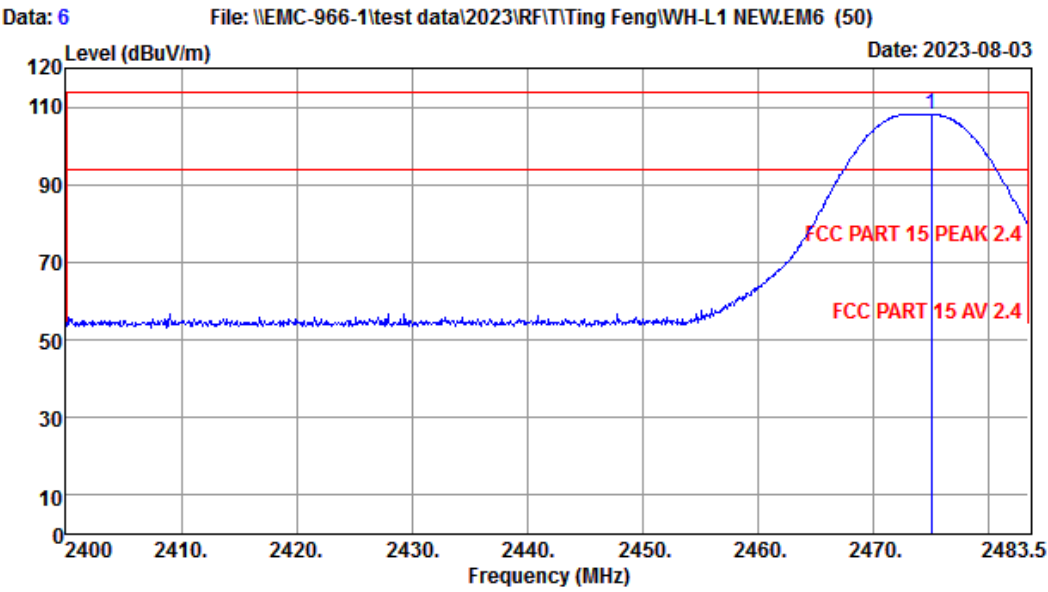
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Tel:+86-769-83081888  
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Site no. : 1# 966 Chamber Data no. : 5  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2474.90        | 27.68                    | 3.62                  | 44.93                 | 124.18            | 110.55                        | 114.00             | 3.45           | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 6  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5℃;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2475.07        | 27.68                    | 3.62                  | 44.93                 | 121.84            | 108.21                        | 114.00             | 5.79           | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

## 5. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

### 5.1. Limit

- (a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of harmonics@3m (microvolts/meter) | Average Limit@3m dBμV/m | Peak Limit@3m dBμV/m |
|-----------------------|---------------------------------------------------|-------------------------|----------------------|
| 902-928MHz            | 500                                               | 54                      | 74                   |
| 2400-2483.5MHz        | 500                                               | 54                      | 74                   |
| 5725-5875MHz          | 500                                               | 54                      | 74                   |
| 24.0-24.25            | 2500                                              | 68                      | 88                   |

- (b) Field strength limits are specified at a distance of 3 meters.

- (c) 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 §15.209, whichever is the lesser attenuation.

#### 15.209 Radiated emission limits

| Frequency (MHz) | Field Strength(μV/m) | Distance(m) |
|-----------------|----------------------|-------------|
| 0.009-0.490     | 2400/F(kHz)          | 300         |
| 0.490-1.705     | 24000/F(kHz)         | 30          |
| 1.705-30        | 30                   | 30          |
| 30-88           | 100                  | 3           |
| 88-216          | 150                  | 3           |
| 216-960         | 200                  | 3           |
| Above 960       | 500                  | 3           |

#### 15.205 Restricted frequency band

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |

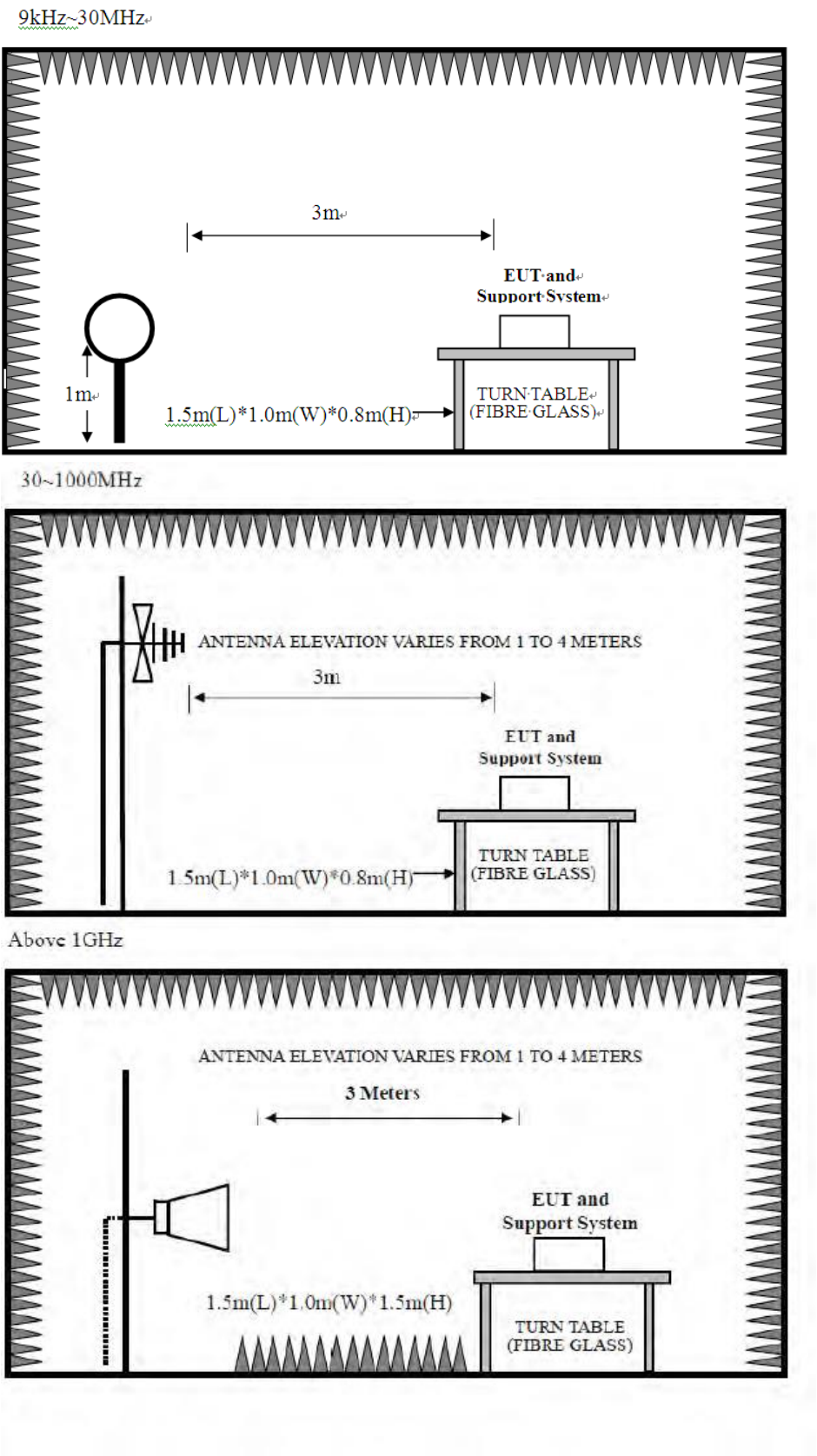
- (d) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation

Note:

- (1) Emission level  $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$ .
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.



5.2. Test Setup



### 5.3. Spectrum Analyzer Setting

For 9KHz-150KHz

| Spectrum Parameters | Setting                                 |
|---------------------|-----------------------------------------|
| RBW                 | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| VBW                 | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| Start frequency     | 9KHz                                    |
| Stop frequency      | 150KHz                                  |
| Sweep Time          | Auto                                    |
| Detector            | PEAK/QP/AVG                             |
| Trace Mode          | Max Hold                                |

For 150KHz-30MHz

| Spectrum Parameters | Setting  |
|---------------------|----------|
| RBW                 | 9KHz     |
| VBW                 | 9KHz     |
| Start frequency     | 150KHz   |
| Stop frequency      | 30MHz    |
| Sweep Time          | Auto     |
| Detector            | QP       |
| Trace Mode          | Max Hold |

For 30MHz-1000MHz

| Spectrum Parameters | Setting  |
|---------------------|----------|
| RBW                 | 120KHz   |
| VBW                 | 300KHz   |
| Start frequency     | 30MHz    |
| Stop frequency      | 1000MHz  |
| Sweep Time          | Auto     |
| Detector            | QP       |
| Trace Mode          | Max Hold |

For Above 1GHz

| Spectrum Parameters | Setting                    |
|---------------------|----------------------------|
| RBW                 | 1MHz                       |
| VBW                 | 3MHz                       |
| Start frequency     | 1GHz                       |
| Stop frequency      | 10 Times Carrier Frequency |
| Sweep Time          | Auto                       |
| Detector            | PEAK                       |
| Trace Mode          | Max Hold                   |

## 5.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 4.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

Note:

1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 2405.889MHz/2441.729MHz/2473.985MHz are fundamental frequency.

## 5.5. Test Result

| Radiated Band Edge (Above 1GHz) |                                   |                                                          |       |                         |      |        |                          |
|---------------------------------|-----------------------------------|----------------------------------------------------------|-------|-------------------------|------|--------|--------------------------|
| Test Frequency<br>(MHz)         | Fundamental<br>Frequency<br>(MHz) | Field Strength of<br>Fundamental Level<br>(dB $\mu$ V/m) |       | Limit<br>(dB $\mu$ V/m) |      | Result | Antenna<br>Pole<br>(H/V) |
|                                 |                                   | Avg                                                      | Peak  | Avg                     | Peak |        |                          |
| 2405.899                        | 2400.00                           | 50.88                                                    | 70.26 | 54                      | 74   | Pass   | V                        |
|                                 | 2400.00                           | 47.15                                                    | 66.53 | 54                      | 74   | Pass   | H                        |
| 2473.985                        | 2483.50                           | 39.87                                                    | 59.25 | 54                      | 74   | Pass   | V                        |
|                                 | 2483.50                           | 53.48                                                    | 72.86 | 54                      | 74   | Pass   | H                        |

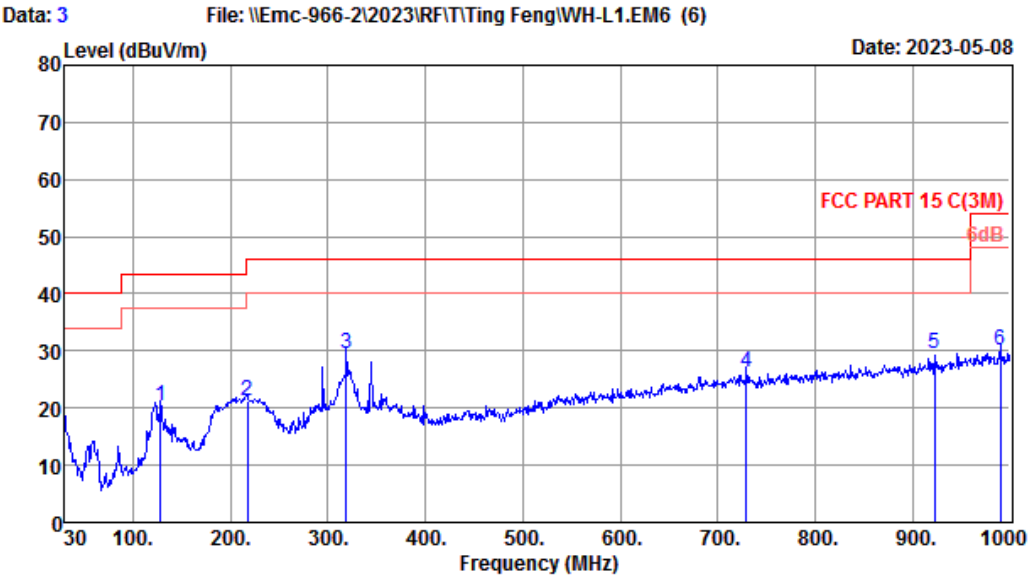
Note :

1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor.
2. Duty Cycle Correction Factor=-19.38.(refer to section 3 of this report )

Radiated Emissions Below 1GHz

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Site no. : 2# 966 chamber Data no. : 3  
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 C(3M)  
Env. / Ins. : Temp:24.6℃;Humi:55%;Press:101.52kPa  
Engineer : GBond  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX Mode

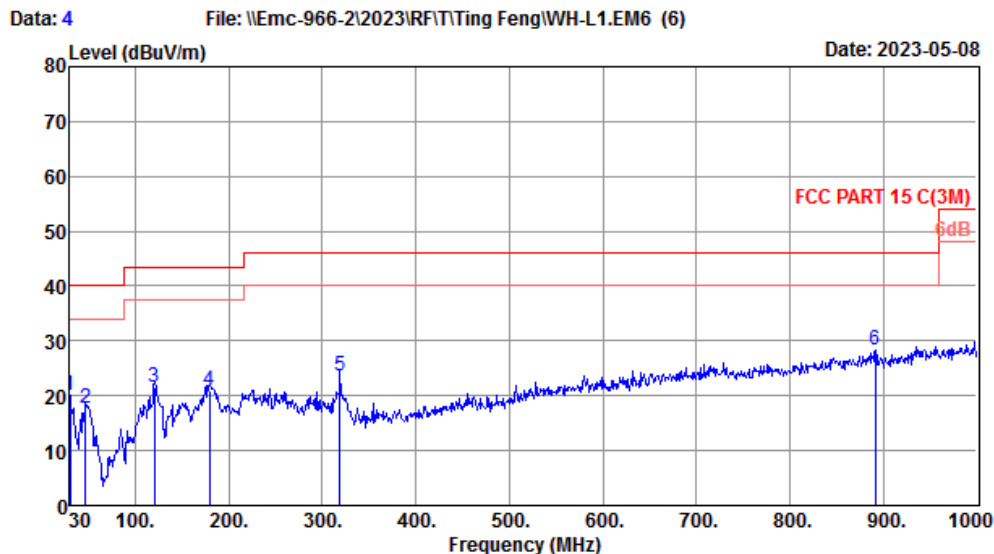
|   | Freq.<br>(MHz) | ANT<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 127.97         | 12.02                   | 1.63                  | 6.69              | 20.34                         | 43.50             | 23.16          | QP     |
| 2 | 217.21         | 9.78                    | 1.81                  | 9.63              | 21.22                         | 46.00             | 24.78          | QP     |
| 3 | 319.06         | 14.64                   | 2.31                  | 12.69             | 29.64                         | 46.00             | 16.36          | QP     |
| 4 | 729.37         | 22.00                   | 3.69                  | 0.48              | 26.17                         | 46.00             | 19.83          | QP     |
| 5 | 922.40         | 24.56                   | 4.29                  | 0.77              | 29.62                         | 46.00             | 16.38          | QP     |
| 6 | 990.30         | 25.50                   | 4.46                  | 0.07              | 30.03                         | 54.00             | 23.97          | QP     |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.



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Site no. : 2# 966 chamber Data no. : 4  
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL  
Limit : FCC PART 15 C(3M)  
Env. / Ins. : Temp:24.6°C;Humi:55%;Press:101.52kPa  
Engineer : GBond  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX Mode

|   | Freq.<br>(MHz) | ANT<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 30.00          | 18.90                   | 0.58                  | 0.66              | 20.14                         | 40.00             | 19.86          | QP     |
| 2 | 46.49          | 9.83                    | 0.73                  | 7.10              | 17.66                         | 40.00             | 22.34          | QP     |
| 3 | 120.21         | 11.60                   | 1.68                  | 8.22              | 21.50                         | 43.50             | 22.00          | QP     |
| 4 | 179.38         | 9.85                    | 1.63                  | 9.43              | 20.91                         | 43.50             | 22.59          | QP     |
| 5 | 319.06         | 14.64                   | 2.31                  | 6.55              | 23.50                         | 46.00             | 22.50          | QP     |
| 6 | 891.36         | 24.02                   | 4.21                  | 0.24              | 28.47                         | 46.00             | 17.53          | QP     |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

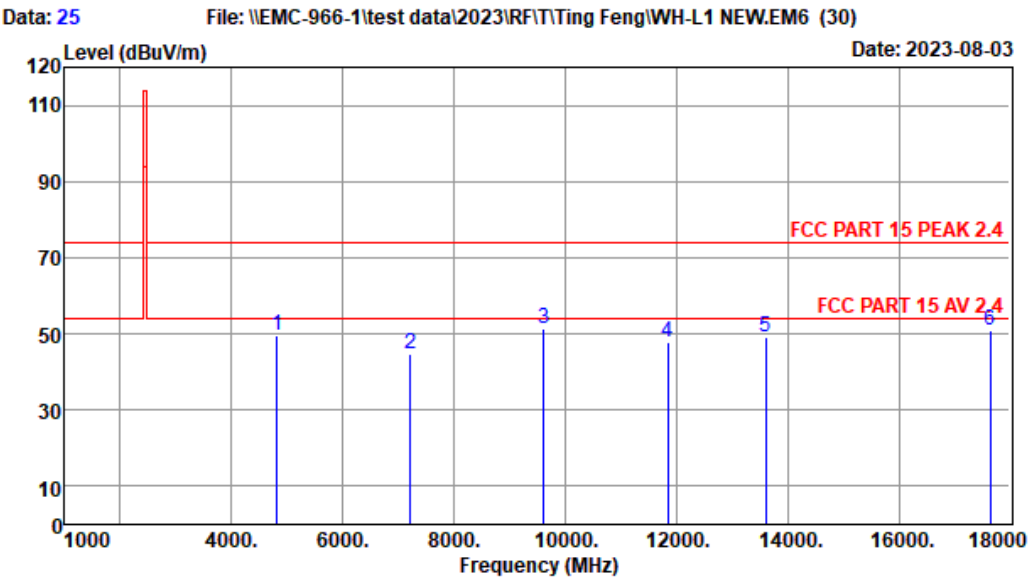
## Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All channels had been pre-test, only the worst case was reported.

Radiated Emissions Above 1G

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Site no. : 1# 966 Chamber Data no. : 25  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2405.889MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBUV) | Emission<br>Level<br>(dBUV/m) | Limits<br>(dBUV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4811.78        | 32.40                    | 5.20                  | 44.49                 | 56.43             | 49.54                         | 74.00              | 24.46          | Peak   |
| 2 | 7217.67        | 36.17                    | 6.67                  | 44.08                 | 45.99             | 44.75                         | 74.00              | 29.25          | Peak   |
| 3 | 9619.00        | 38.12                    | 7.77                  | 43.65                 | 49.15             | 51.39                         | 74.00              | 22.61          | Peak   |
| 4 | 11846.00       | 38.82                    | 8.74                  | 42.32                 | 42.80             | 48.04                         | 74.00              | 25.96          | Peak   |
| 5 | 13614.00       | 39.88                    | 9.57                  | 40.80                 | 40.50             | 49.15                         | 74.00              | 24.85          | Peak   |
| 6 | 17643.00       | 40.42                    | 12.14                 | 43.23                 | 41.46             | 50.79                         | 74.00              | 23.21          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official  
limit are not reported.

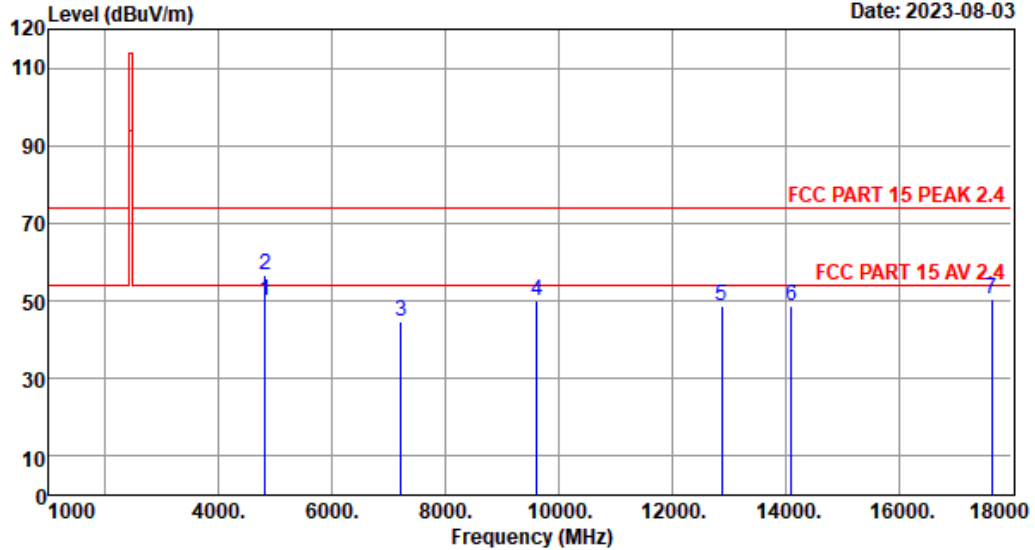
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Data: 26

File: \\EMC-966-1\\test data\\2023\\RF\\Ting Feng\\WH-L1 NEW.EM6 (30)

Date: 2023-08-03



Site no. : 1# 966 Chamber Data no. : 26  
 Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
 Engineer : QQZ  
 EUT : Headphone  
 Power : DC 3.7V From Battery  
 M/N : WH-L1  
 Test Mode : TX 2405.889MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|---------|
| 1 | 4811.78        | 32.40                    | 5.20                  | 44.49                 | 56.94             | 50.05                         | 54.00              | 3.95           | Average |
| 2 | 4811.78        | 32.40                    | 5.20                  | 44.49                 | 63.72             | 56.83                         | 74.00              | 17.17          | Peak    |
| 3 | 7217.67        | 36.17                    | 6.67                  | 44.08                 | 46.08             | 44.84                         | 74.00              | 29.16          | Peak    |
| 4 | 9619.00        | 38.12                    | 7.77                  | 43.65                 | 47.76             | 50.00                         | 74.00              | 24.00          | Peak    |
| 5 | 12883.00       | 39.59                    | 9.21                  | 40.97                 | 40.69             | 48.52                         | 74.00              | 25.48          | Peak    |
| 6 | 14107.00       | 39.95                    | 9.82                  | 41.05                 | 40.13             | 48.85                         | 74.00              | 25.15          | Peak    |
| 7 | 17643.00       | 40.42                    | 12.14                 | 43.23                 | 41.16             | 50.49                         | 74.00              | 23.51          | Peak    |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. Margin= Limit - Emission Level.  
 3. The emission levels that are 20dB below the official limit are not reported.



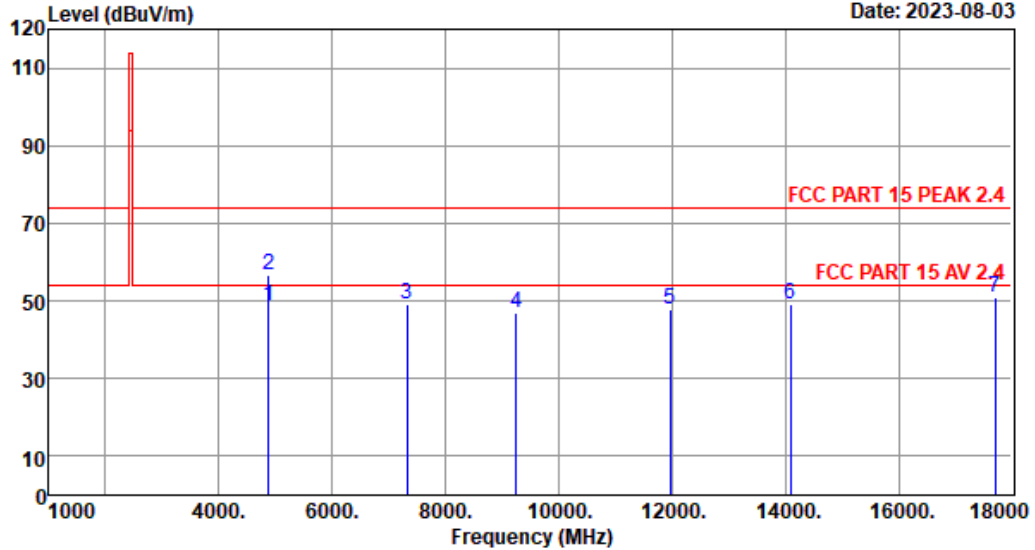
## EST Technology

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Houjie, Dongguan, Guangdong, China  
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Fax: +86-769-83081878

Data: 27

File: \\EMC-966-1\\test data\\2023\\RF\\Ting Feng\\WH-L1 NEW.EM6 (30)

Date: 2023-08-03



Site no. : 1# 966 Chamber Data no. : 27  
 Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
 Engineer : QQZ  
 EUT : Headphone  
 Power : DC 3.7V From Battery  
 M/N : WH-L1  
 Test Mode : TX 2441.729MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|---------|
| 1 | 4883.46        | 32.56                    | 5.28                  | 44.42                 | 55.13             | 48.55                         | 54.00              | 5.45           | Average |
| 2 | 4883.46        | 32.56                    | 5.28                  | 44.42                 | 63.33             | 56.75                         | 74.00              | 17.25          | Peak    |
| 3 | 7325.19        | 36.26                    | 6.70                  | 44.07                 | 50.09             | 48.98                         | 74.00              | 25.02          | Peak    |
| 4 | 9245.00        | 38.05                    | 7.78                  | 43.50                 | 44.62             | 46.95                         | 74.00              | 27.05          | Peak    |
| 5 | 11965.00       | 38.80                    | 8.81                  | 42.23                 | 42.60             | 47.98                         | 74.00              | 26.02          | Peak    |
| 6 | 14090.00       | 39.96                    | 9.81                  | 41.01                 | 40.53             | 49.29                         | 74.00              | 24.71          | Peak    |
| 7 | 17711.00       | 40.65                    | 12.20                 | 43.13                 | 41.37             | 51.09                         | 74.00              | 22.91          | Peak    |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. Margin= Limit - Emission Level.  
 3. The emission levels that are 20dB below the official limit are not reported.

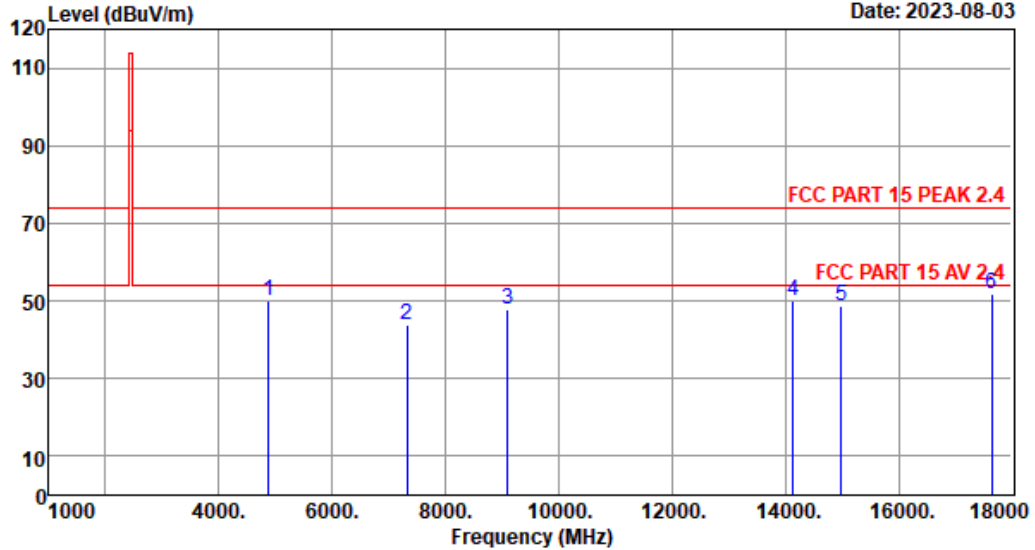
## EST Technology

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Data: 28

File: \\EMC-966-1\\test data\\2023\\RF\\T\\Ting Feng\\WH-L1 NEW.EM6 (30)

Date: 2023-08-03



Site no. : 1# 966 Chamber Data no. : 28  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2441.729MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4883.46        | 32.56                    | 5.28                  | 44.42                 | 56.54             | 49.96                         | 74.00              | 24.04          | Peak   |
| 2 | 7325.19        | 36.26                    | 6.70                  | 44.07                 | 45.08             | 43.97                         | 74.00              | 30.03          | Peak   |
| 3 | 9092.00        | 38.02                    | 7.78                  | 43.43                 | 45.49             | 47.86                         | 74.00              | 26.14          | Peak   |
| 4 | 14141.00       | 39.93                    | 9.84                  | 41.14                 | 41.23             | 49.86                         | 74.00              | 24.14          | Peak   |
| 5 | 14991.00       | 39.50                    | 10.24                 | 43.26                 | 42.37             | 48.85                         | 74.00              | 25.15          | Peak   |
| 6 | 17643.00       | 40.42                    | 12.14                 | 43.23                 | 42.67             | 52.00                         | 74.00              | 22.00          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

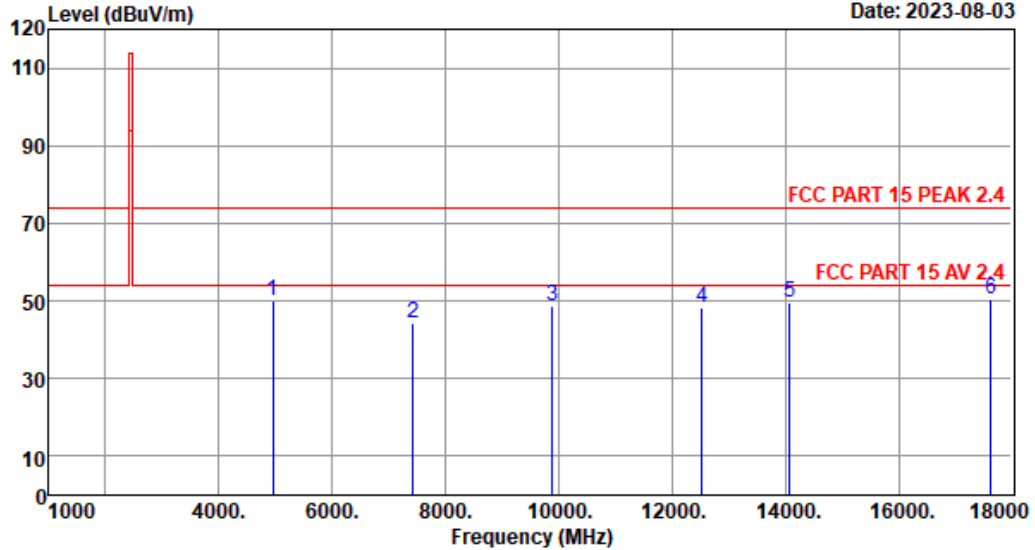
## EST Technology

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Data: 29

File: \\EMC-966-1\\test data\\2023\\RF\\T\\Ting Feng\\WH-L1 NEW.EM6 (30)

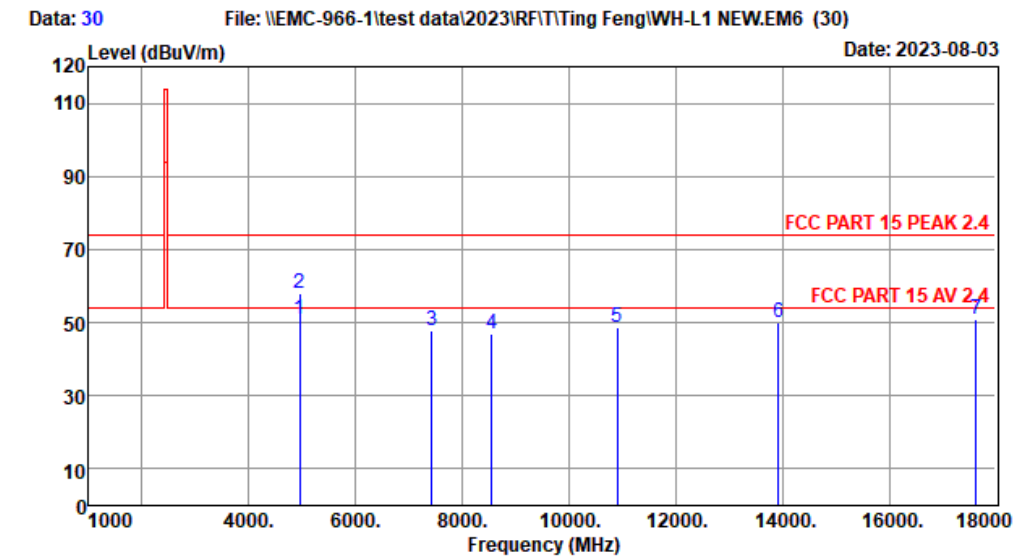
Date: 2023-08-03



Site no. : 1# 966 Chamber Data no. : 29  
 Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
 Engineer : QQZ  
 EUT : Headphone  
 Power : DC 3.7V From Battery  
 M/N : WH-L1  
 Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4947.97        | 32.69                    | 5.35                  | 44.35                 | 56.14             | 49.83                         | 74.00              | 24.17          | Peak   |
| 2 | 7421.96        | 36.34                    | 6.74                  | 44.06                 | 45.30             | 44.32                         | 74.00              | 29.68          | Peak   |
| 3 | 9891.00        | 38.18                    | 7.77                  | 43.76                 | 46.48             | 48.67                         | 74.00              | 25.33          | Peak   |
| 4 | 12526.00       | 39.27                    | 9.06                  | 41.46                 | 41.45             | 48.32                         | 74.00              | 25.68          | Peak   |
| 5 | 14073.00       | 39.96                    | 9.80                  | 40.97                 | 40.69             | 49.48                         | 74.00              | 24.52          | Peak   |
| 6 | 17626.00       | 40.37                    | 12.12                 | 43.26                 | 41.36             | 50.59                         | 74.00              | 23.41          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. Margin= Limit - Emission Level.  
 3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 30  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark  |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|---------|
| 1 | 4947.97        | 32.69                    | 5.35                  | 44.35                 | 57.14             | 50.83                         | 54.00              | 3.17           | Average |
| 2 | 4947.97        | 32.69                    | 5.35                  | 44.35                 | 64.30             | 57.99                         | 74.00              | 16.01          | Peak    |
| 3 | 7421.96        | 36.34                    | 6.74                  | 44.06                 | 48.64             | 47.66                         | 74.00              | 26.34          | Peak    |
| 4 | 8548.00        | 37.46                    | 7.39                  | 43.67                 | 45.77             | 46.95                         | 74.00              | 27.05          | Peak    |
| 5 | 10911.00       | 38.84                    | 8.22                  | 43.07                 | 44.69             | 48.68                         | 74.00              | 25.32          | Peak    |
| 6 | 13920.00       | 39.98                    | 9.73                  | 40.80                 | 40.95             | 49.86                         | 74.00              | 24.14          | Peak    |
| 7 | 17626.00       | 40.37                    | 12.12                 | 43.26                 | 41.61             | 50.84                         | 74.00              | 23.16          | Peak    |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

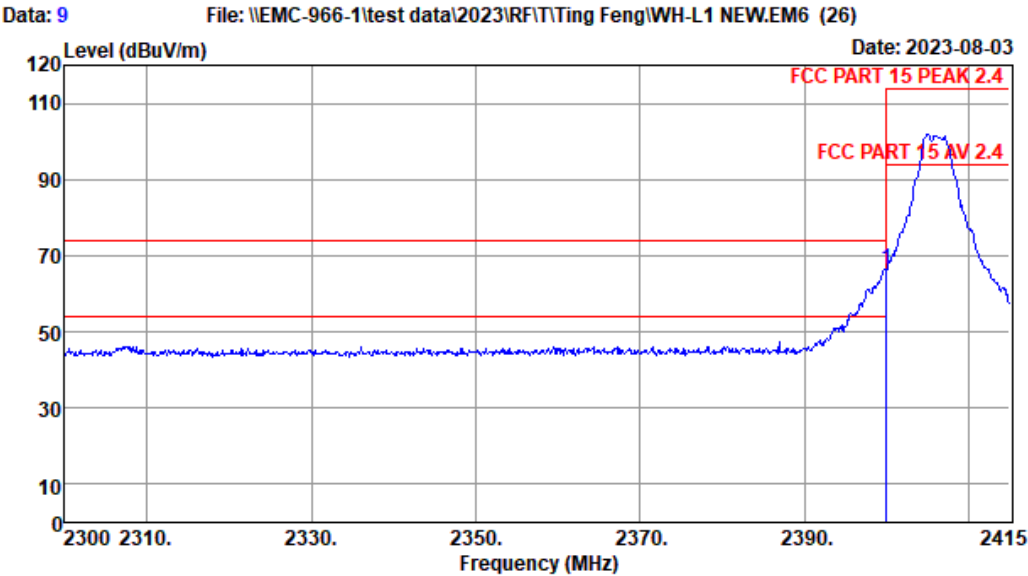
Note:

1. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Radiated Band Edge

EST Technology

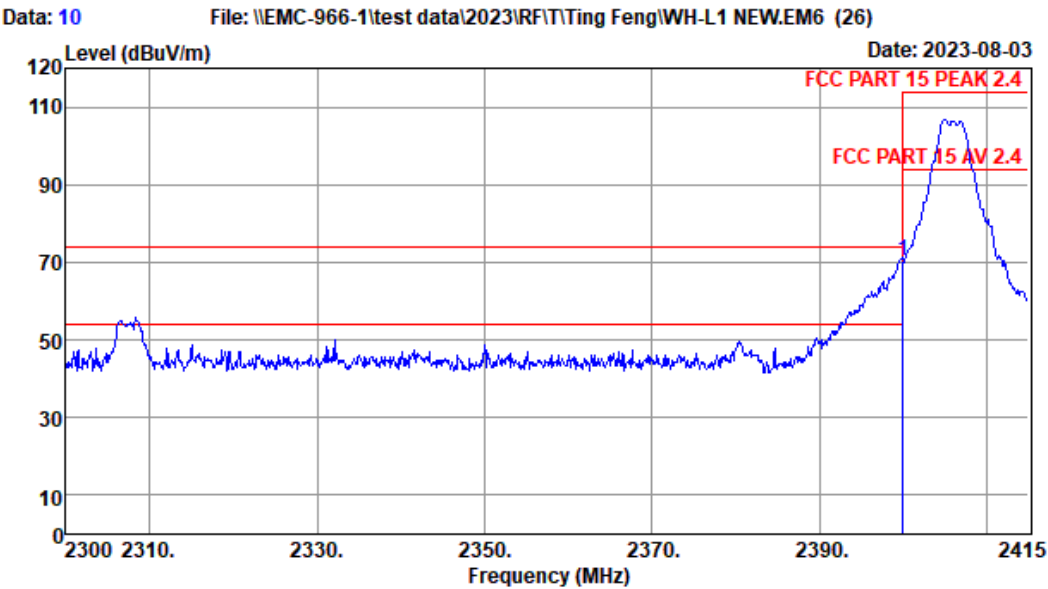
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Fax:+86-769-83081878



Site no. : 1# 966 Chamber Data no. : 9  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2405.889MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2400.00        | 27.46                    | 3.55                  | 45.01                 | 80.53             | 66.53                         | 74.00              | 7.47           | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

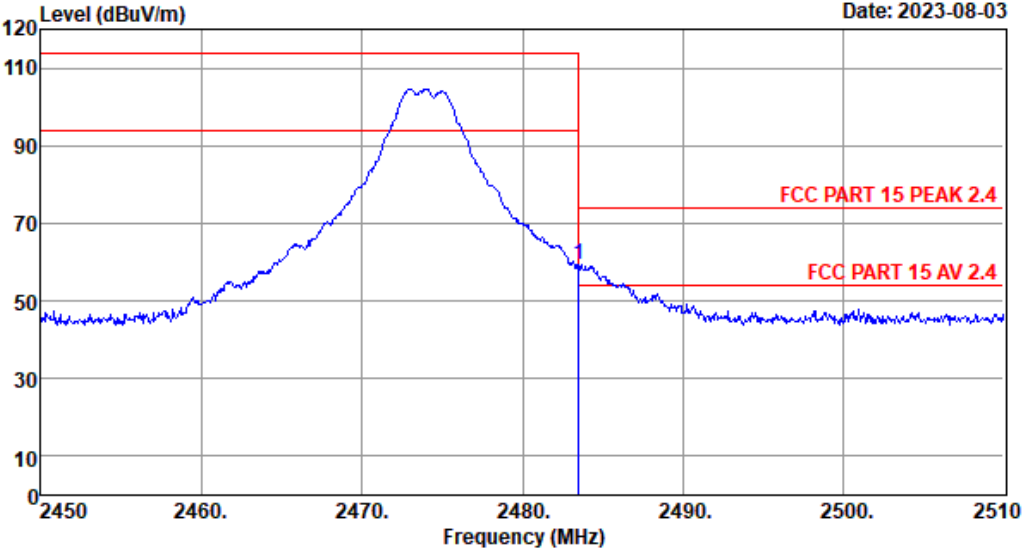


Site no. : 1# 966 Chamber Data no. : 10  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2405.889MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2400.00        | 27.46                    | 3.55                  | 45.01                 | 84.26             | 70.26                         | 74.00              | 3.74           | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

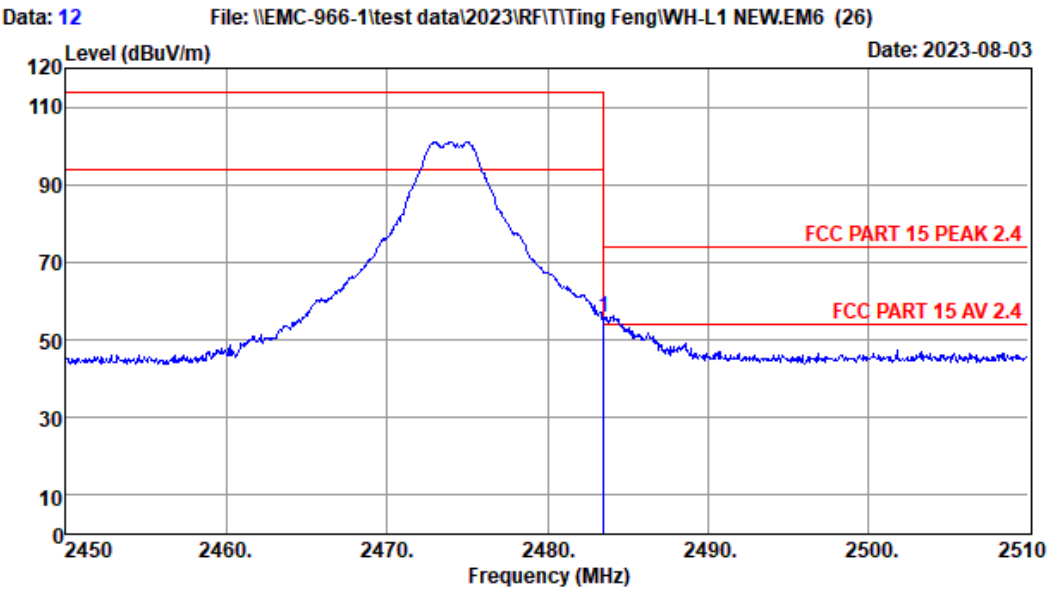
Data: 11                      File: \\EMC-966-1\\test data\\2023\\RF\\T\\Ting Feng\\WH-L1 NEW.EM6 (26)                      Date: 2023-08-03



Site no. : 1# 966 Chamber                      Data no. : 11  
Dis. / Ant. : 3m BBHA9120D-2667                      Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2483.50        | 27.70                    | 3.62                  | 44.93                 | 72.86             | 59.25                         | 74.00              | 14.75          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 12  
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : Temp:19.5°C;Humi:51%;Press:101.52kPa  
Engineer : QQZ  
EUT : Headphone  
Power : DC 3.7V From Battery  
M/N : WH-L1  
Test Mode : TX 2473.985MHz

|   | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Amp<br>Factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2483.50        | 27.70                    | 3.62                  | 44.93                 | 69.19             | 55.58                         | 74.00              | 18.42          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

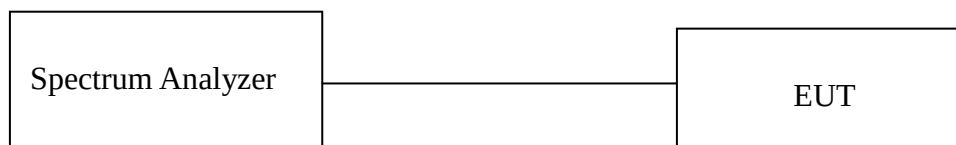


## 6. 20dB BANDWIDTH

### 6.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 6.2. Test Setup



### 6.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting                          |
|---------------------|----------------------------------|
| RBW                 | 1%~5% OBW                        |
| VBW                 | 3×RBW                            |
| Span                | two times and five times the OBW |
| Sweep Time          | Auto                             |
| Detector            | Peak                             |
| Trace Mode          | Max Hold                         |

### 6.4. Test Procedure

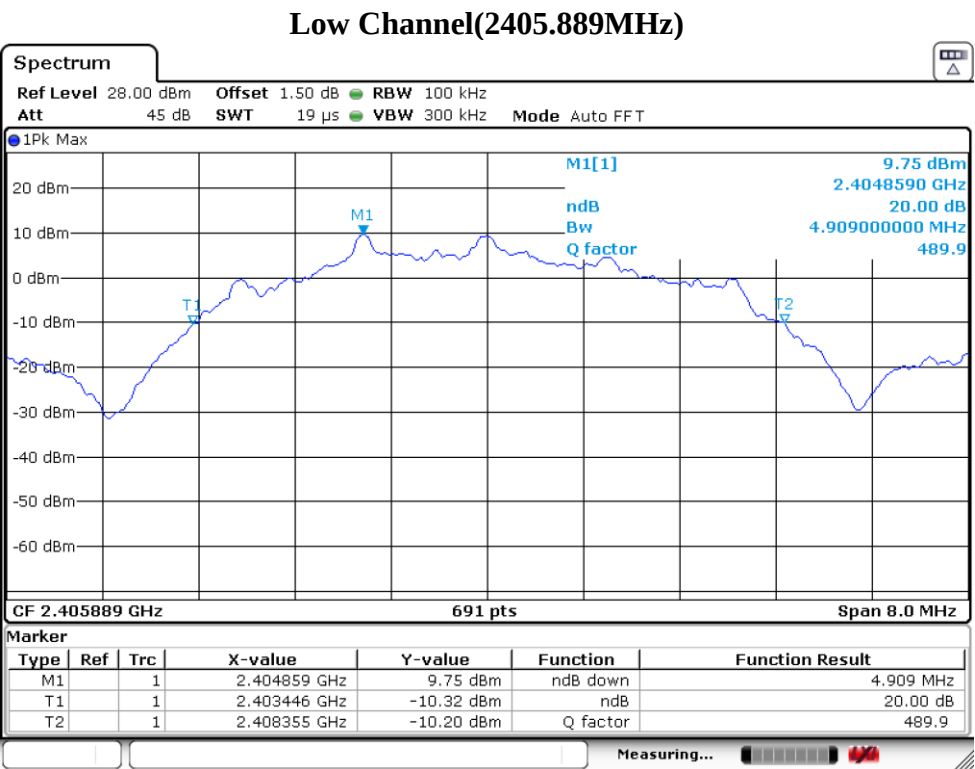
- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 5.3.
- Set the EUT transmit continuously with maximum output power.
- Allow trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.
- Repeat above procedures until all modes and channels were measured.
- Record the results in the test report.

### 6.5. Test Condition

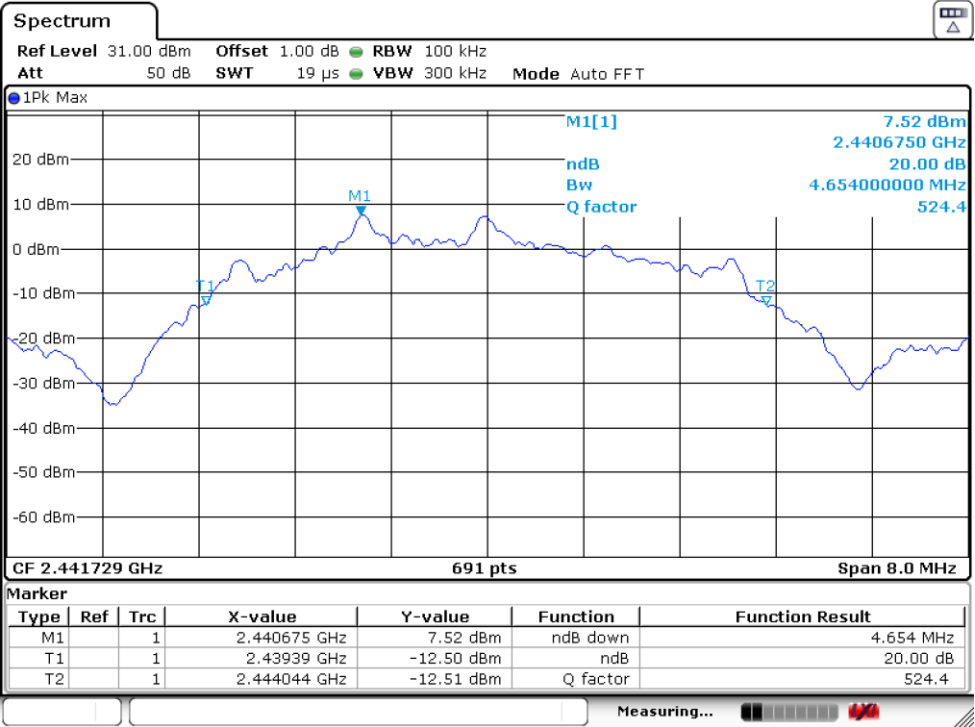
|             |       |                   |     |              |         |
|-------------|-------|-------------------|-----|--------------|---------|
| Temperature | 26.3℃ | Relative Humidity | 56% | Test Voltage | DC 3.7V |
|-------------|-------|-------------------|-----|--------------|---------|

6.6. Test Result

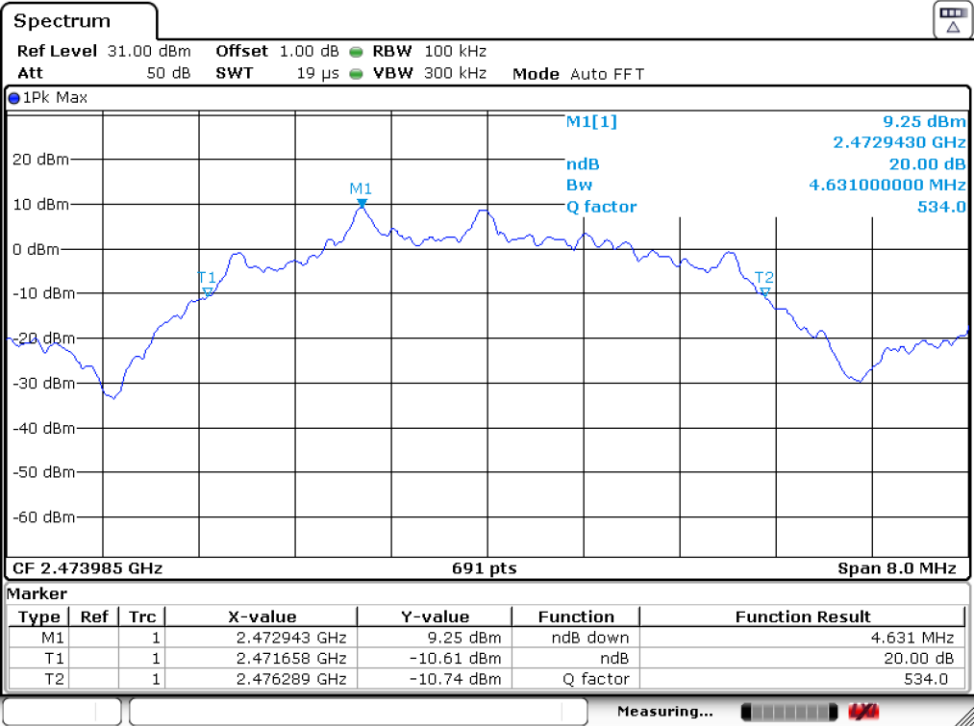
| Test Frequency (MHz) | 20dB Bandwidth (MHz) | Result |
|----------------------|----------------------|--------|
| 2405.889             | 4.909                | Pass   |
| 2441.729             | 4.654                | Pass   |
| 2473.985             | 4.631                | Pass   |



Middle Channel(2441.729MHz)



High Channel(2473.985MHz)



## 7. ANTENNA REQUIREMENTS

### 7.1. Limit

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### 7.2. Test Result

The antennas used for this product is internal antenna, so compliance with antenna requirements.  
( Please refer to the EUT photo for details)

## **8. TEST SETUP PHOTO**

**Refer to report no. ESTE-R2309001 (Appendix A)**

## 9. EUT PHOTO

**Refer to report no. ESTE-R2309002 (Appendix B)**

**End of Test Report**