

## TEST REPORT

|            |                                                                                                            |
|------------|------------------------------------------------------------------------------------------------------------|
| Applicant: | Shantou Chenghai Huabo Smart Living Technology Co., Ltd                                                    |
| Address:   | Next to Chengjiang Road, Dutou Village, Shanghua County, Chenghai District, Shantou City, Guangdong, China |

|                                      |                                                                                                                  |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Manufacturer or Supplier             | Shantou Chenghai Huabo Smart Living Technology Co., Ltd                                                          |
| Address                              | Next to Chengjiang Road, Dutou Village, Shanghua County, Chenghai District, Shantou City, Guangdong, China       |
| Product:                             | Toy RC Pixie Cruiser Doodle                                                                                      |
| Brand Name:                          | Sharper Image                                                                                                    |
| Model:                               | 1017621                                                                                                          |
| Additional Models & Model Difference | 1017330, HB2023T, 101XXXX (where XXX can be digits 0000-9999 which represent different customers)., see item 3.1 |
| Date of tests:                       | Oct. 09, 2023 ~ Oct. 23, 2023                                                                                    |

the tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.249**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Tested by Loren Luo<br>Project Engineer / EMC Department                            | Approved by Glyn He<br>Assistant Manager / EMC Department                            |
|  |  |
|                                                                                     | Date: Dec. 26, 2023                                                                  |

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## RELEASE CONTROL RECORD

| ISSUE NO.       | REASON FOR CHANGE | DATE ISSUED   |
|-----------------|-------------------|---------------|
| RF2309WDG0191-1 | Original release  | Dec. 26, 2023 |

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| <b>APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249)</b> |                              |               |                              |
|------------------------------------------------------------------|------------------------------|---------------|------------------------------|
| <b>STANDARD SECTION</b>                                          | <b>TEST TYPE AND LIMIT</b>   | <b>RESULT</b> | <b>REMARK</b>                |
| §15.203                                                          | Antenna Requirement          | PASS          | No antenna connector is used |
| §15.207 (a)                                                      | Conducted Emission           | N/A           | Powered from battery         |
| §15.205                                                          | Restricted Band of Operation | PASS          | Compliant                    |
| §15.209<br>§15.249(a)                                            | Radiated Emission            | PASS          | Compliant                    |
| §15.215(c)                                                       | 20dB Bandwidth Test          | PASS          | Compliant                    |

## 2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| <b>MEASUREMENT</b> | <b>FREQUENCY</b> | <b>UNCERTAINTY</b> |
|--------------------|------------------|--------------------|
| Radiated emissions | 9KHz ~ 30MHz     | 2.72dB             |
|                    | 30MHz ~ 1GMHz    | 4.24dB             |
|                    | 1GHz ~ 18GHz     | 4.78dB             |
|                    | 18GHz ~ 40GHz    | 4.50dB             |

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

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                   |
|------------------------------|---------------------------------------------------------------------------------------------------|
| <b>PRODUCT</b>               | Toy RC Pixie Cruiser Doodle                                                                       |
| <b>MODEL NO.</b>             | 1017621                                                                                           |
| <b>ADDITIONAL MODELS</b>     | 1017330, HB2023T, 101XXXX (where XXX can be digits 0000-9999 which represent different customers) |
| <b>FCC ID</b>                | 2A4XIHB2023T24GT                                                                                  |
| <b>NOMINAL VOLTAGE</b>       | DC 4.5V (1.5V*AAA*3) from battery                                                                 |
| <b>MODULATION TECHNOLOGY</b> | GFSK                                                                                              |
| <b>OPERATING FREQUENCY</b>   | 2405MHz -2475MHz                                                                                  |
| <b>ANTENNA TYPE</b>          | Wire Antenna, with 0dBi gain                                                                      |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                            |
| <b>CABLE SUPPLIED</b>        | N/A                                                                                               |

**NOTES:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2309WDG0191) for detailed product photo.
4. Additional models (see above table) are identical with the test model 1017621 except the color of the appearance and model number for trading purpose.

### 3.2 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and packet type. The worst case was found when the EUT was positioned on Y axis for radiated emission. The EUT was tested under the following mode.

| EUT CONFIGURE<br>MODE | APPLICABLE TO |       |     |    | DESCRIPTION          |
|-----------------------|---------------|-------|-----|----|----------------------|
|                       | RE<1G         | RE≥1G | PLC | BW |                      |
| A                     | √             | √     | -   | √  | DC 4.5V from Battery |

Where **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission

**RE≥1G**: Radiated Emission above 1GHz  
**BW**: 20db bandwidth

**NOTE**: No need to concern of Conducted Emission due to the EUT is powered by battery.

Following channel(s) was (were) selected for the test as listed below.

| TESTED CHANNEL | TESTED FREQUENCY |
|----------------|------------------|
| Low            | 2405 MHz         |
| Middle         | 2445 MHz         |
| High           | 2475 MHz         |

## Channel List

| Channel | Freq. (MHz) |
|---------|-------------|
| 1       | 2405        |
| 2       | 2445        |
| 3       | 2475        |

Note: The more detailed channel, please refer to the product specifications

## TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER          | TESTED BY |
|---------------|--------------------------|----------------------|-----------|
| RE            | 25deg. C, 55%RH          | DC 4.5V from Battery | Ryker     |
| BW            | 25deg. C, 56%RH          | DC 4.5V from Battery | Ryker     |
| PLC           | -                        | -                    | -         |

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C, Section 15.249**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without any other necessary accessories or support units

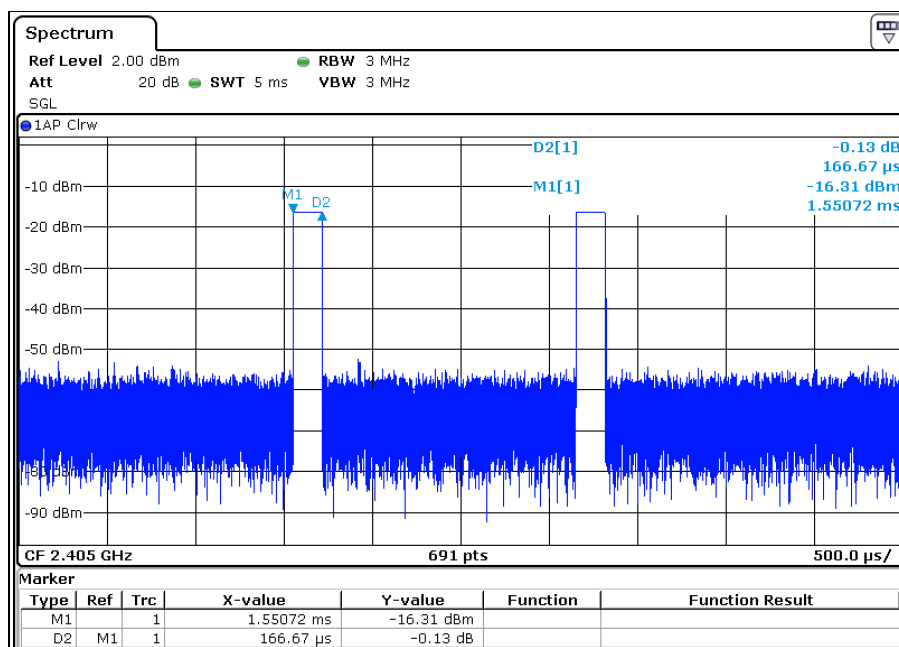
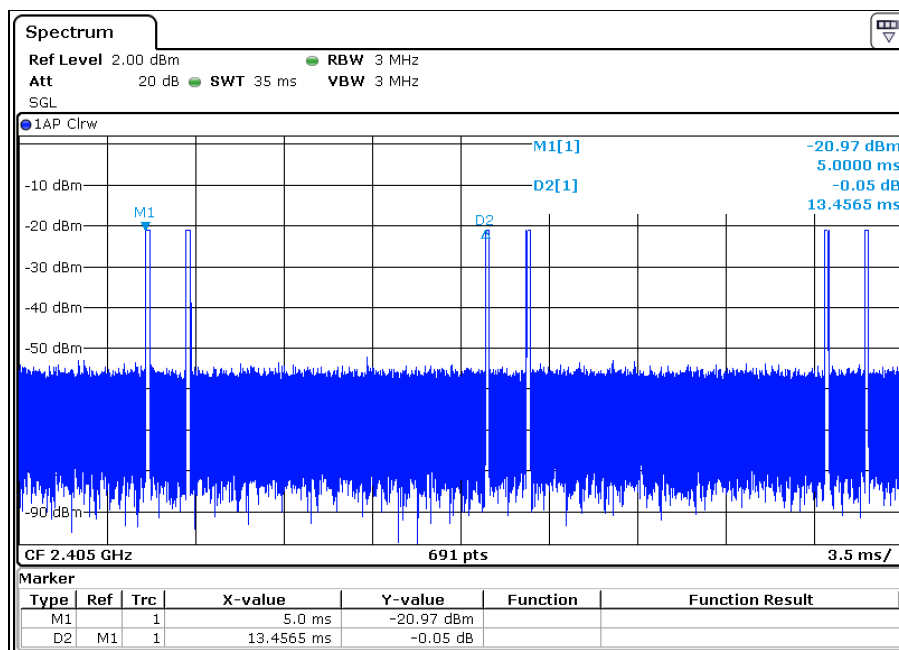
### 3.5 DUTY CYCLE OF TESET SIGNAL

$T_p = 13.4565 \text{ ms}$

$T_{on} = (166.67 \times 2) / 1000 \approx 0.33334 \text{ ms}$

Duty Cycle =  $T_{on} / T_p \times 100\% = 0.33334 / 13.4565 \approx 2.477\%$

AV factor =  $20 \log (\text{Duty cycle}) = 20 \log (2.477\%) \approx -32.12 \text{ dB}$



## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| FREQUENCIES<br>(MHz) | FIELD STRENGTH<br>(microvolts/meter) | MEASUREMENT DISTANCE<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490        | 2400/F(kHz)                          | 300                              |
| 0.490 ~ 1.705        | 24000/F(kHz)                         | 30                               |
| 1.705 ~ 30.0         | 30                                   | 30                               |
| 30 ~ 88              | 100                                  | 3                                |
| 88 ~ 216             | 150                                  | 3                                |
| 216 ~ 960            | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental<br>Frequency | Field strength of<br>fundamental<br>(milli-volts/meter) | Field strength of<br>harmonics<br>(micro-volts/meter) |
|--------------------------|---------------------------------------------------------|-------------------------------------------------------|
| 902-928 MHz              | 50                                                      | 500                                                   |
| 2400-2483.5 MHz          | 50                                                      | 500                                                   |
| 5725-5875 MHz            | 50                                                      | 500                                                   |
| 24.0-24.25 GHz           | 250                                                     | 2500                                                  |

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

#### NOTES:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.1.2 TEST INSTRUMENTS

| Equipment                   | Manufacturer  | Model No.                | Serial No.   | Next Cal.    |
|-----------------------------|---------------|--------------------------|--------------|--------------|
| Spectrum Analyzer           | Rohde&Schwarz | FSV3044                  | 101326       | July 13, 24  |
| EMI Test Receiver           | Rohde&Schwarz | ESU8                     | 100372       | Apr. 06, 24  |
| Bilog Antenna               | SCHWARZBECK   | VULB 9168                | 9168-555     | Jan. 08, 24  |
| Pre-Amplifier               | Agilent       | 8447D                    | 2944A10488   | July. 26, 24 |
| 3m Semi-anechoic Chamber    | ETS-Lindgren  | 9m*6m*6m                 | D3040003DG-1 | July 30, 24  |
| Coaxial RF Cable            | Joinfront     | JFAA6-NMNM-8000          | 2100033742   | July 10, 24  |
| Coaxial RF Cable            | Joinfront     | JFAR-NMBNCM-2000         | 2100033742   | July 10, 24  |
| Coaxial RF Cable            | Joinfront     | JFAR-BNCM5MM-500         | 2100033742   | July 10, 24  |
| Test software               | ADT           | ADT_Radiated_V7.6.15.9.2 | N/A          | N/A          |
| Horn Antenna                | ETS-Lindgren  | 3117                     | 00240041     | May 06, 24   |
| Horn Antenna                | SCHWARZBECK   | BBHA 9170                | 01024        | Apr. 01, 24  |
| Pre-Amplifier (1GHz-18GHz)  | Rohde&Schwarz | SCU18                    | 102265       | Apr. 01, 24  |
| Pre-Amplifier (18GHz-40GHz) | Rohde&Schwarz | SCU40                    | 100437       | Oct. 10, 24  |
| Coaxial RF Cable            | Joinfront     | JFAA6-NMNM-8000          | 2100033742   | July 10, 24  |
| Coaxial RF Cable            | Joinfront     | JFAA6-NMSMM-2000         | 2100033742   | July 10, 24  |
| Coaxial RF Cable            | Joinfront     | JFAA6-NMSMM-800          | 2100033742   | July 10, 24  |

**NOTES:**

1. The test was performed in 966 Chamber-3.
2. The calibration interval of the above test instruments are 12/24\* months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.
5. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1.3m above the ground.
- g. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### NOTES:

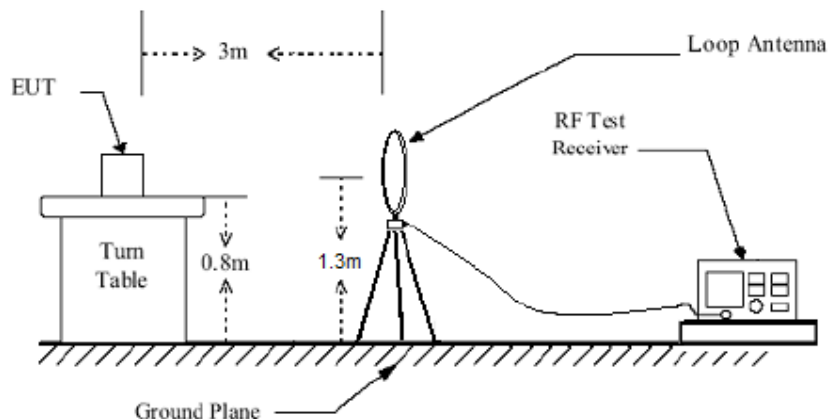
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. Average value =PK Emission +AV Factor.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

#### 4.1.4 DEVIATION FROM TEST STANDARD

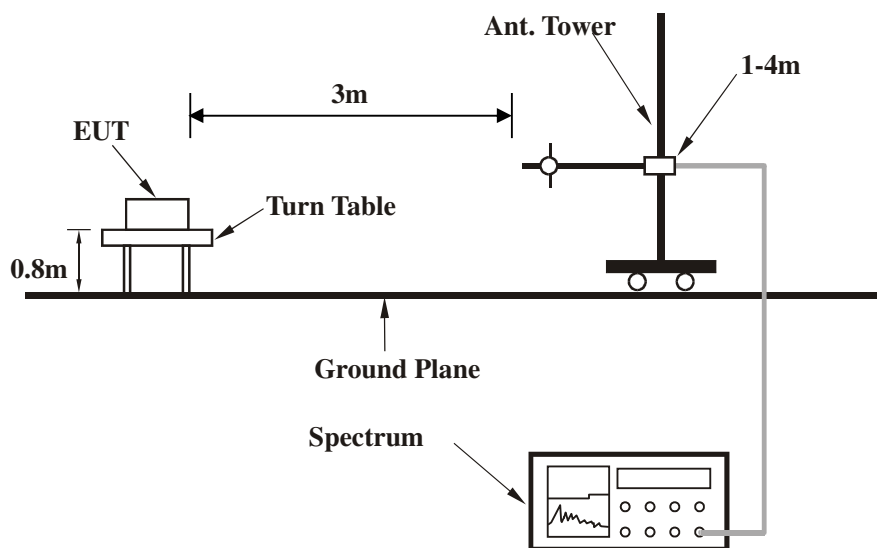
No deviation.

#### 4.1.5 TEST SETUP

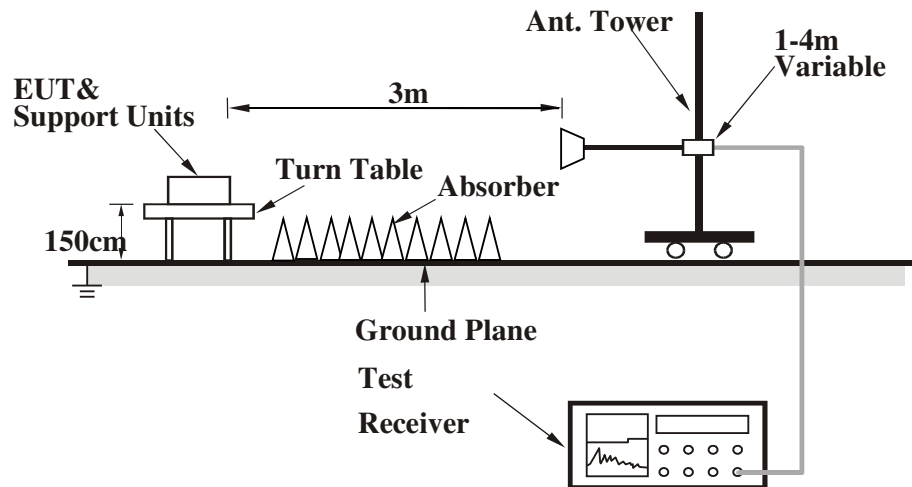
##### Below 30MHz test setup



##### Below 1GHz test setup



### Above 1GHz test setup



**Note:** For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- Turned on the power of all equipment.
- EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

#### 4.1.7 TEST RESULTS

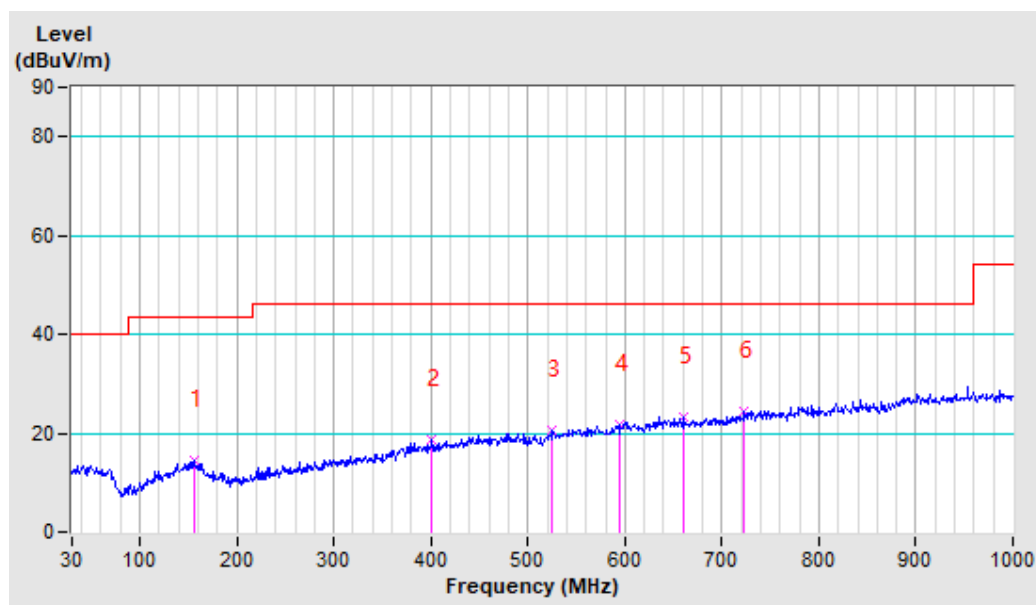
##### BELOW 1GHz WORST-CASE DATA

|                        |                   |                          |                 |
|------------------------|-------------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | TX Middle Channel | <b>DETECTOR FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 9KHz ~ 1GHz       |                          |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|-----------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.                                                 | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                   | 156.10      | 14.36 QP                | 43.50          | -29.14      | 1.00 H             | 306                  | 27.19            | -12.83                   |
| 2                                                   | 400.54      | 18.62 QP                | 46.00          | -27.38      | 1.00 H             | 174                  | 27.92            | -9.30                    |
| 3                                                   | 524.70      | 20.64 QP                | 46.00          | -25.36      | 1.10 H             | 58                   | 28.09            | -7.45                    |
| 4                                                   | 593.57      | 21.80 QP                | 46.00          | -24.20      | 1.10 H             | 183                  | 27.79            | -5.99                    |
| 5                                                   | 659.53      | 23.19 QP                | 46.00          | -22.81      | 1.00 H             | 177                  | 27.85            | -4.66                    |
| 6                                                   | 723.55      | 24.47 QP                | 46.00          | -21.53      | 1.00 H             | 285                  | 27.83            | -3.36                    |

##### REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.

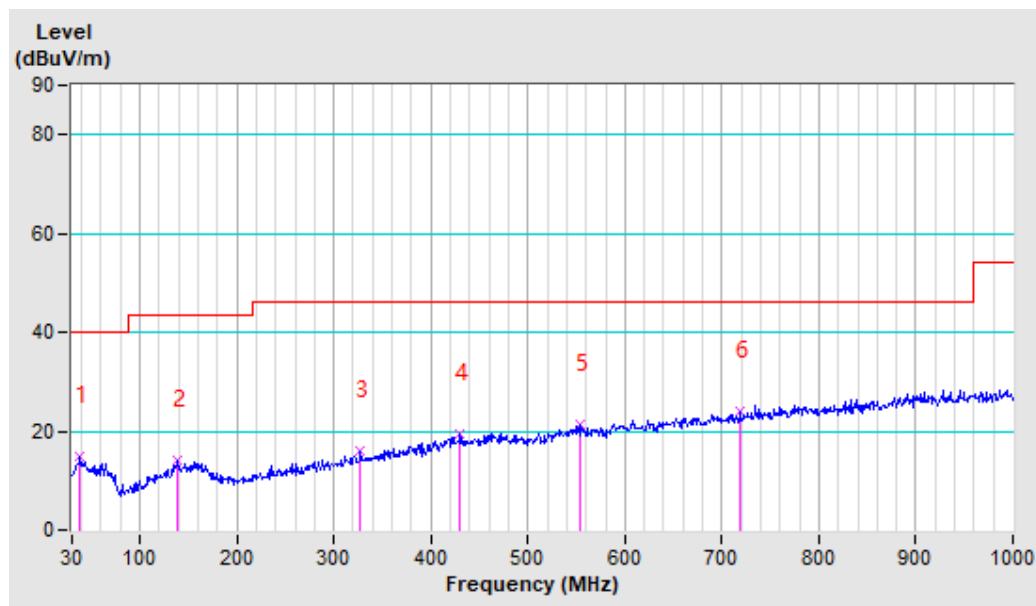


|                        |                   |                          |                 |
|------------------------|-------------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | TX Middle Channel | <b>DETECTOR FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 9KHz ~ 1GHz       |                          |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|---------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.                                               | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                 | 37.76       | 14.93 QP                | 40.00          | -25.07      | 1.30 V             | 158                  | 28.85            | -13.92                   |
| 2                                                 | 138.64      | 14.14 QP                | 43.50          | -29.36      | 1.30 V             | 122                  | 27.63            | -13.49                   |
| 3                                                 | 326.82      | 15.83 QP                | 46.00          | -30.17      | 1.00 V             | 212                  | 26.75            | -10.92                   |
| 4                                                 | 429.64      | 19.26 QP                | 46.00          | -26.74      | 1.00 V             | 134                  | 28.21            | -8.95                    |
| 5                                                 | 554.77      | 21.32 QP                | 46.00          | -24.68      | 1.00 V             | 182                  | 27.98            | -6.66                    |
| 6                                                 | 718.70      | 24.13 QP                | 46.00          | -21.87      | 1.00 V             | 262                  | 27.63            | -3.50                    |

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



**ABOVE 1GHz WORST-CASE DATA:**

|                        |                |                 |              |
|------------------------|----------------|-----------------|--------------|
| <b>CHANNEL</b>         | TX Low Channel | <b>DETECTOR</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   | <b>FUNCTION</b> | Average (AV) |

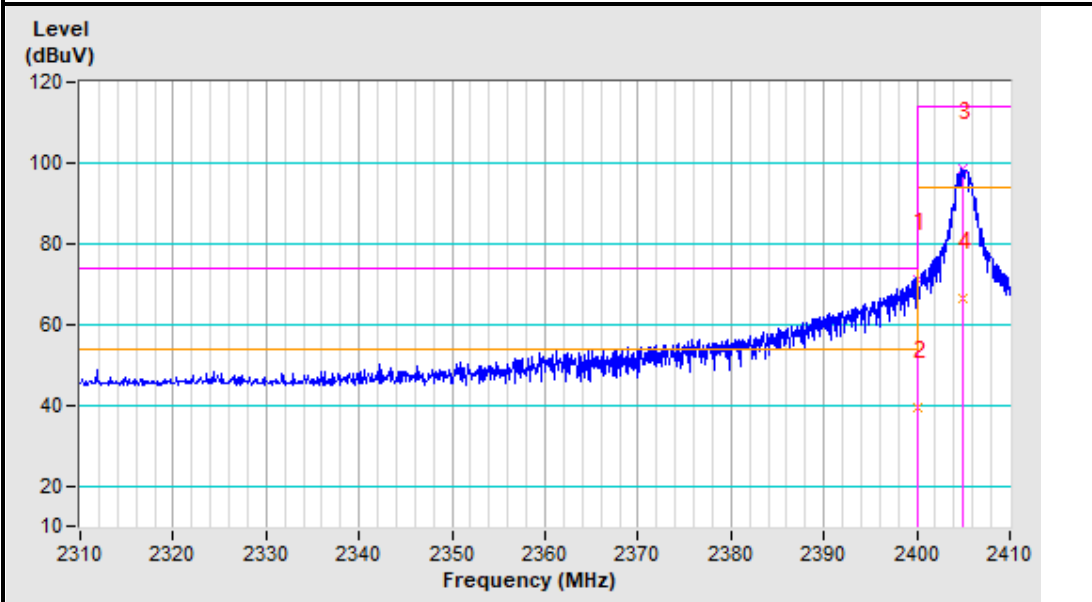
| ANTENNA POLARITY & TEST DISTANCE : HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | 2400.00        | 71.00 PK                      | 74.00             | -3.00          | 1.20 H                   | 130                        | 74.22                  | -3.22                          |
| 2                                                    | 2400.00        | 38.88 AV                      | 54.00             | -15.12         | 1.20 H                   | 130                        | 42.10                  | -3.22                          |
| 3                                                    | *2405.00       | 98.48 PK                      | 114.00            | -15.52         | 1.20 H                   | 130                        | 101.69                 | -3.21                          |
| 4                                                    | *2405.00       | 66.36 AV                      | 94.00             | -27.64         | 1.20 H                   | 130                        | 69.57                  | -3.21                          |
| 5                                                    | 4810.00        | 60.12 PK                      | 74.00             | -13.88         | 1.00 H                   | 248                        | 62.34                  | -2.22                          |
| 6                                                    | 4810.00        | 28.00 AV                      | 54.00             | -26.00         | 1.00 H                   | 248                        | 30.22                  | -2.22                          |
| 7                                                    | 7215.00        | 55.73 PK                      | 74.00             | -18.27         | 1.10 H                   | 148                        | 54.39                  | 1.34                           |
| 8                                                    | 7215.00        | 23.61 AV                      | 54.00             | -30.39         | 1.10 H                   | 148                        | 22.27                  | 1.34                           |
| ANTENNA POLARITY & TEST DISTANCE : VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | 2400.00        | 64.59 PK                      | 74.00             | -9.41          | 1.50 V                   | 160                        | 67.81                  | -3.22                          |
| 2                                                    | 2400.00        | 32.47 AV                      | 54.00             | -21.53         | 1.50 V                   | 160                        | 35.69                  | -3.22                          |
| 3                                                    | *2405.00       | 92.52 PK                      | 114.00            | -21.48         | 1.50 V                   | 160                        | 95.73                  | -3.21                          |
| 4                                                    | *2405.00       | 60.40 AV                      | 94.00             | -33.60         | 1.50 V                   | 160                        | 63.61                  | -3.21                          |
| 5                                                    | 4810.00        | 55.72 PK                      | 74.00             | -18.28         | 1.52 V                   | 156                        | 57.94                  | -2.22                          |
| 6                                                    | 4810.00        | 23.60 AV                      | 54.00             | -30.40         | 1.52 V                   | 156                        | 25.82                  | -2.22                          |
| 7                                                    | 7215.00        | 55.45 PK                      | 74.00             | -18.55         | 1.20 V                   | 310                        | 54.11                  | 1.34                           |
| 8                                                    | 7215.00        | 23.33 AV                      | 54.00             | -30.67         | 1.20 V                   | 310                        | 21.99                  | 1.34                           |

**REMARK:**

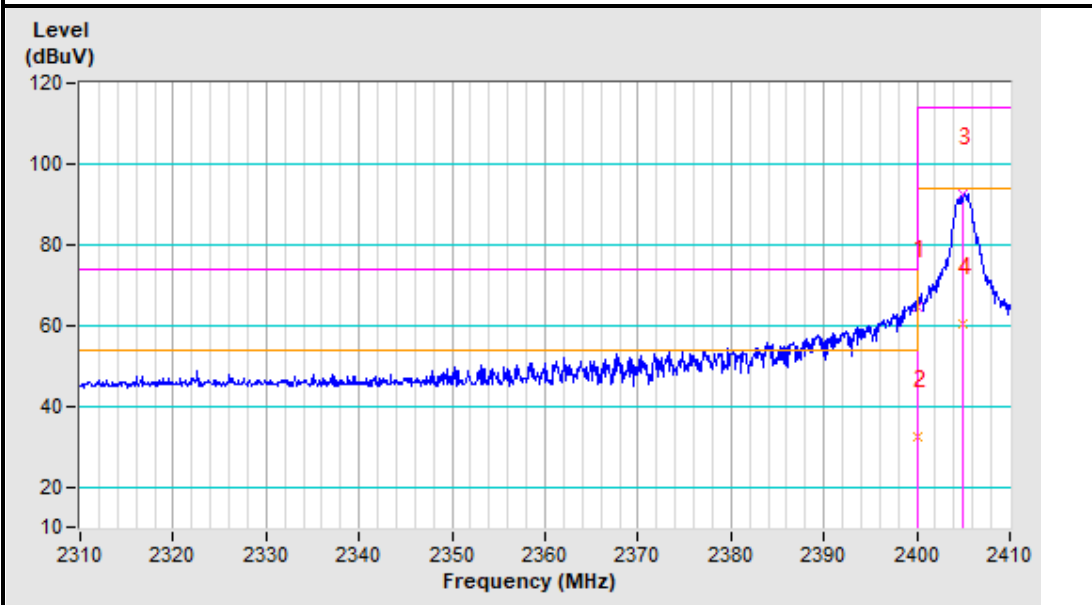
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. Average value = PK Emission + 20\*log(duty cycle) Where the duty factor is calculated from following formula:  $20 \log (\text{Duty cycle}) = 20 \log (2.477\%) = -32.12 \text{dB}$ , Please see page 9 for plotted duty.

### Band edge Plot

#### 2405MHz Horizontal



#### 2405MHz Vertical



|                        |                   |                              |              |
|------------------------|-------------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Middle Channel | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz      |                              | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE : HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | *2445.00       | 96.36 PK                      | 114.00            | -17.64         | 1.44 H                   | 263                        | 99.47                  | -3.11                          |
| 2                                                    | *2445.00       | 64.24 AV                      | 94.00             | -29.76         | 1.44 H                   | 263                        | 67.35                  | -3.11                          |
| 3                                                    | 4890.00        | 59.45 PK                      | 74.00             | -14.55         | 1.00 H                   | 240                        | 61.63                  | -2.18                          |
| 4                                                    | 4890.00        | 27.33 AV                      | 54.00             | -26.67         | 1.00 H                   | 240                        | 29.51                  | -2.18                          |
| 5                                                    | 7335.00        | 53.18 PK                      | 74.00             | -20.82         | 1.00 H                   | 247                        | 52.38                  | 0.80                           |
| 6                                                    | 7335.00        | 21.06 AV                      | 54.00             | -32.94         | 1.00 H                   | 247                        | 20.26                  | 0.80                           |
| ANTENNA POLARITY & TEST DISTANCE : VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | *2445.00       | 91.08 PK                      | 114.00            | -22.92         | 1.00 V                   | 236                        | 94.19                  | -3.11                          |
| 2                                                    | *2445.00       | 58.96 AV                      | 94.00             | -35.04         | 1.00 V                   | 236                        | 62.07                  | -3.11                          |
| 3                                                    | 4890.00        | 53.96 PK                      | 74.00             | -20.04         | 1.00 V                   | 236                        | 56.14                  | -2.18                          |
| 4                                                    | 4890.00        | 21.84 AV                      | 54.00             | -32.16         | 1.00 V                   | 236                        | 24.02                  | -2.18                          |
| 5                                                    | 7335.00        | 54.45 PK                      | 74.00             | -19.55         | 1.00 V                   | 185                        | 53.65                  | 0.80                           |
| 6                                                    | 7335.00        | 22.33 AV                      | 54.00             | -31.67         | 1.00 V                   | 185                        | 21.53                  | 0.80                           |

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. Average value = PK Emission + 20\*log(duty cycle) Where the duty factor is calculated from following formula:  $20 \log (\text{Duty cycle}) = 20 \log (2.477\%) = -32.12 \text{ dB}$ , Please see page 9 for plotted duty.

|                        |                 |                              |              |
|------------------------|-----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX High Channel | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz    |                              | Average (AV) |

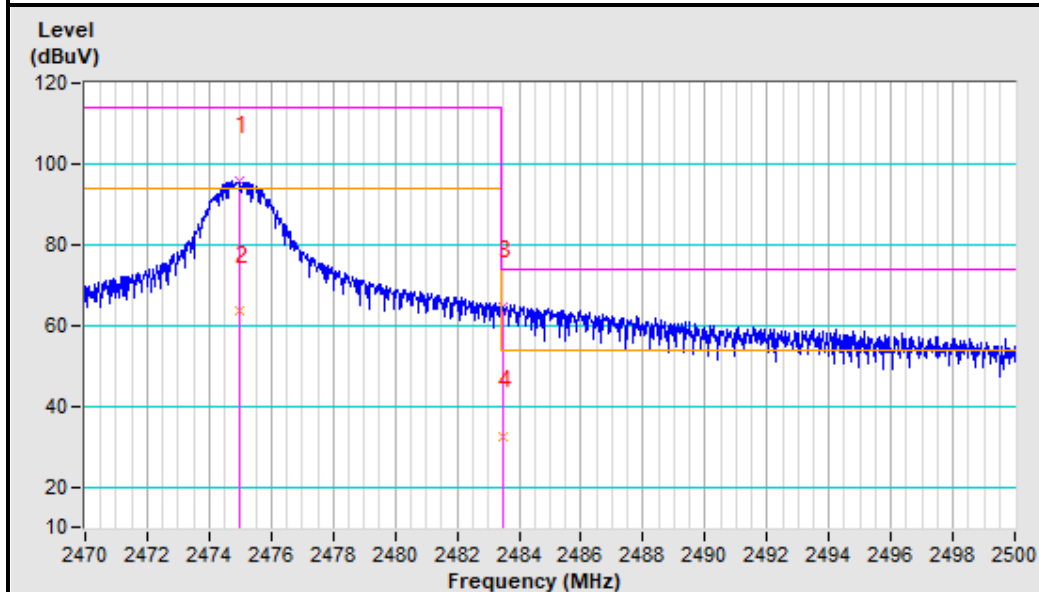
| ANTENNA POLARITY & TEST DISTANCE : HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|------------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | *2475.00       | 95.54 PK                      | 114.00            | -18.46         | 1.20 H                   | 130                        | 98.57                  | -3.03                          |
| 2                                                    | *2475.00       | 63.42 AV                      | 94.00             | -30.58         | 1.20 H                   | 130                        | 66.45                  | -3.03                          |
| 3                                                    | 2483.50        | 64.51 PK                      | 74.00             | -9.49          | 1.20 H                   | 130                        | 67.51                  | -3.00                          |
| 4                                                    | 2483.50        | 32.39 AV                      | 54.00             | -21.61         | 1.20 H                   | 130                        | 35.39                  | -3.00                          |
| 5                                                    | 4950.00        | 58.19 PK                      | 74.00             | -15.81         | 1.00 H                   | 158                        | 60.34                  | -2.16                          |
| 6                                                    | 4950.00        | 26.07 AV                      | 54.00             | -27.93         | 1.00 H                   | 158                        | 28.23                  | -2.16                          |
| 7                                                    | 7425.00        | 59.36 PK                      | 74.00             | -14.64         | 1.00 H                   | 233                        | 58.97                  | 0.39                           |
| 8                                                    | 7425.00        | 27.24 AV                      | 54.00             | -26.76         | 1.00 H                   | 233                        | 26.85                  | 0.39                           |
| ANTENNA POLARITY & TEST DISTANCE : VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                  | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                    | *2475.00       | 91.76 PK                      | 114.00            | -22.24         | 1.20 V                   | 150                        | 94.79                  | -3.03                          |
| 2                                                    | *2475.00       | 59.64 AV                      | 94.00             | -34.36         | 1.20 V                   | 150                        | 62.67                  | -3.03                          |
| 3                                                    | 2483.50        | 58.31 PK                      | 74.00             | -15.69         | 1.20 V                   | 150                        | 61.31                  | -3.00                          |
| 4                                                    | 2483.50        | 26.19 AV                      | 54.00             | -27.81         | 1.20 V                   | 150                        | 29.19                  | -3.00                          |
| 5                                                    | 4950.00        | 58.14 PK                      | 74.00             | -15.86         | 1.00 V                   | 230                        | 60.30                  | -2.16                          |
| 6                                                    | 4950.00        | 26.02 AV                      | 54.00             | -27.98         | 1.00 V                   | 230                        | 28.18                  | -2.16                          |
| 7                                                    | 7425.00        | 57.11 PK                      | 74.00             | -16.89         | 1.00 V                   | 237                        | 56.72                  | 0.39                           |
| 8                                                    | 7425.00        | 24.99 AV                      | 54.00             | -29.01         | 1.00 V                   | 237                        | 24.60                  | 0.39                           |

**REMARK:**

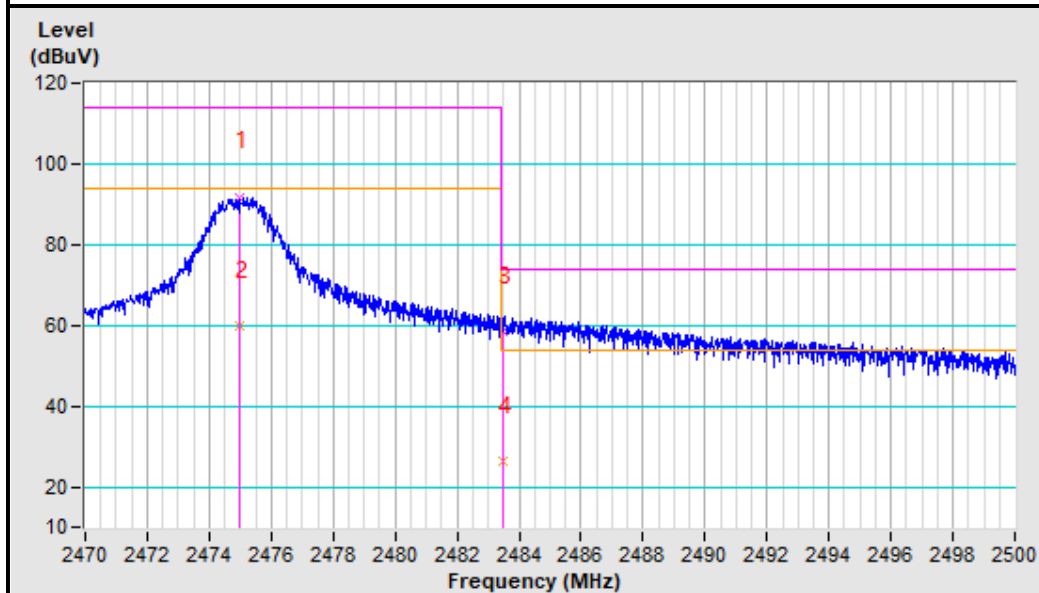
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. Average value = PK Emission + 20\*log(duty cycle) Where the duty factor is calculated from following formula:  $20 \log (\text{Duty cycle}) = 20 \log (2.477\%) = -32.12 \text{ dB}$ , Please see page 9 for plotted duty.

## Band edge Plot

### 2475MHz Horizontal



### 2475MHz Vertical



## 4.2 20dB BANDWIDTH MEASUREMENT

### 4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), 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.

### 4.2.2 TEST INSTRUMENTS

| Equipment                                 | Manufacturer  | Model No.                     | Serial No.  | Next Cal.   |
|-------------------------------------------|---------------|-------------------------------|-------------|-------------|
| Wireless Connectivity Tester              | Rohde&Schwarz | CMW270                        | 101601      | Oct. 15, 24 |
| Spectrum Analyzer                         | Rohde&Schwarz | FSV40                         | 101003      | Jan. 15, 24 |
| Spectrum Analyzer                         | Rohde&Schwarz | FSV40                         | 101094      | Jan. 11, 24 |
| Frequency Analyzer                        | Keysight      | N9010B                        | MY60240432  | Oct. 10, 24 |
| Programmable Temperature&Humidity Chamber | Hongjin       | HYC-TH-225DH                  | DG-180746   | Jan. 11, 24 |
| Attenuator                                | MINI          | BW-S10W2+                     | S130129FGE2 | N/A         |
| DC Source                                 | Agilent       | E3640A                        | MY40004013  | Feb. 08, 24 |
| Test software                             | ADT           | ADT_RF Test Software V6.6.5.3 | N/A         | N/A         |
| Test software                             | ADT           | ADT_RF Test Software V6.6.5.4 | N/A         | N/A         |

#### NOTES:

1. The test was performed in RF Test Shielded Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

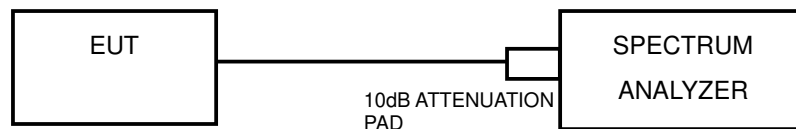
#### 4.2.3 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



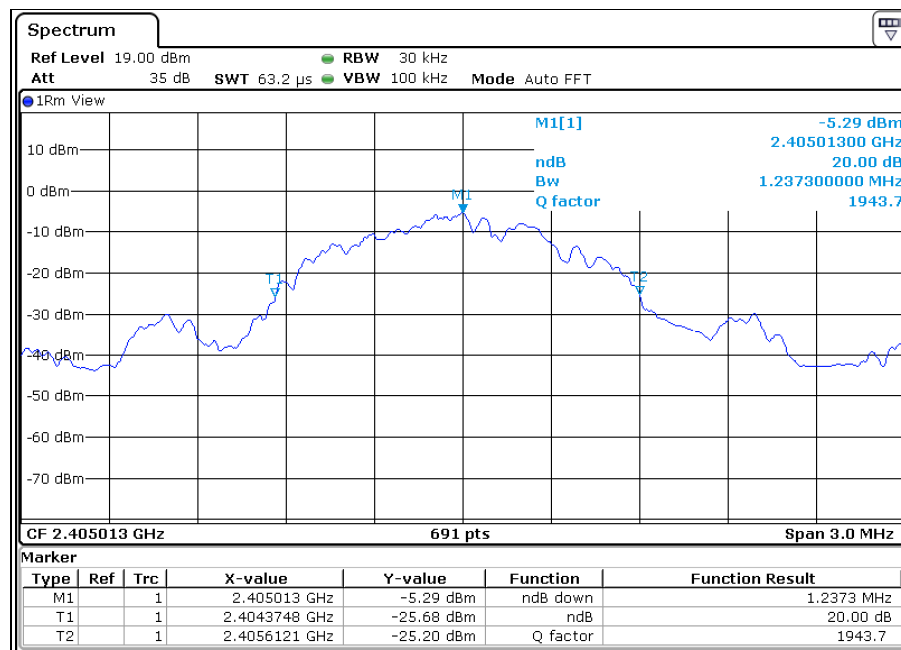
#### 4.2.6 EUT OPERATING CONDITIONS

- a) Turned on the power of all equipment.
- b) EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

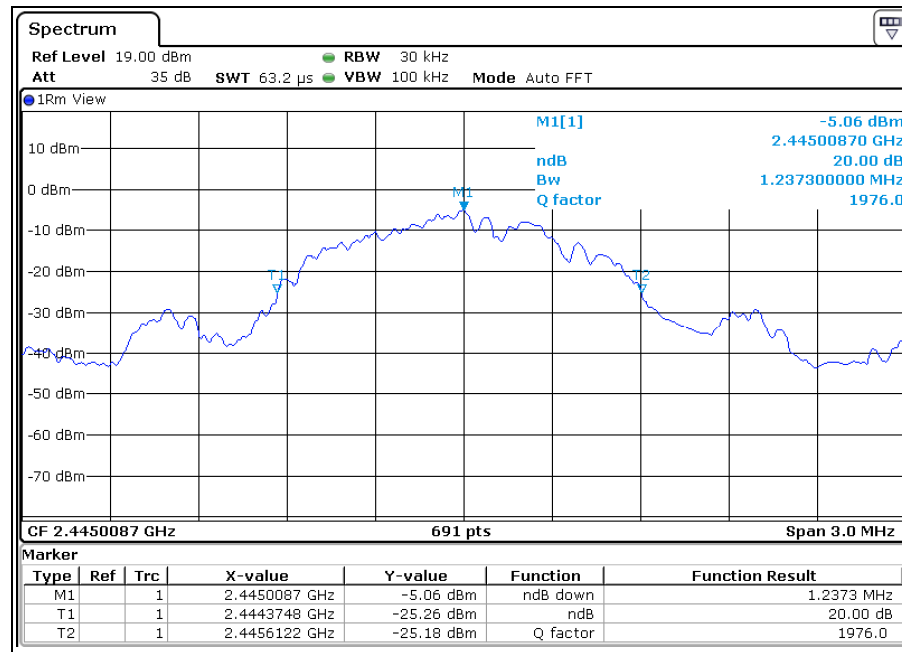
## 4.2.7 TEST RESULTS

| CHANNEL | CHANNEL FREQUENCY (MHz) | 20dB BANDWIDTH (MHz) |
|---------|-------------------------|----------------------|
| Low     | 2405                    | 1.2373               |
| Middle  | 2445                    | 1.2373               |
| High    | 2475                    | 1.2417               |

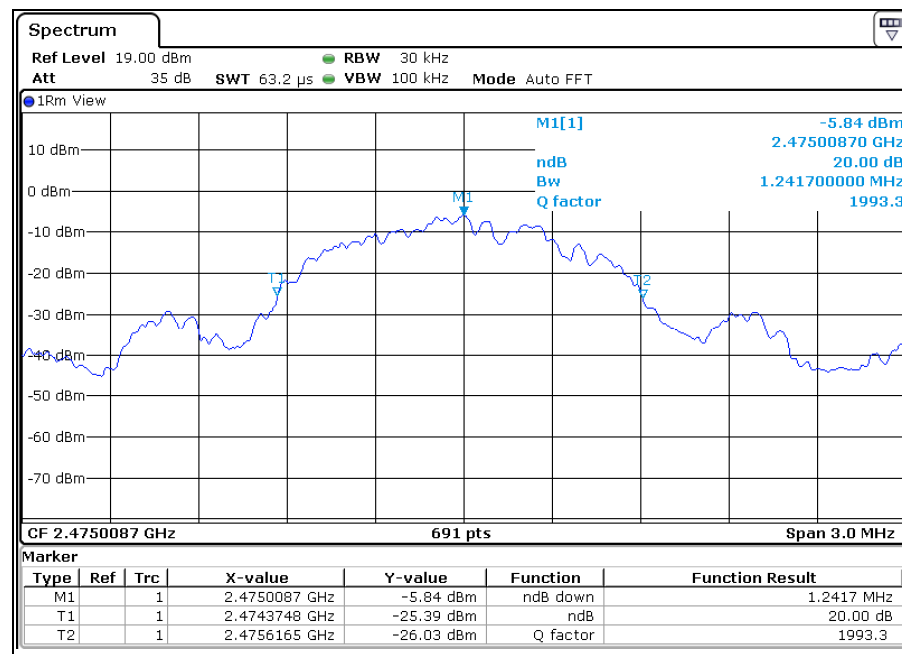
### Test Data: Low channel



Test Data: Middle channel



Test Data: High channel



## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

## 6. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---