# TEST REPORT

| | |
|---|---|
| Applicant: | NEW BRIGHT INDUSTRIAL CO., LTD. |
| Address: | 9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG |

| | |
|---|---|
| Manufacturer or Supplier | NEW BRIGHT INDUSTRIAL CO., LTD. |
| Address | 9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG |
| Product: | TOY Receiver |
| Brand Name: | N/A |
| Model: | GF64MB |
| Additional Model & Model Difference | N/A |
| Date of tests: | Mar. 30, 2018 ~ Apr. 12, 2018 |

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 Breeze Jiang<br>Project Engineer / EMC Department | Approved by Glyn He<br>Supervisor / EMC Department |
|---|---|
| | <br>Date: Apr. 17, 2018 |

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| RF180330N045 | Original release | Apr. 17, 2018 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249) | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE AND LIMIT** | **RESULT** | **REMARK** |
| §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:

| MEASUREMENT | FREQUENCY | UNCERTAINTY |
|---|---|---|
| Radiated emissions | 9KHz ~ 30MHz | 2.90dB |
| | 30MHz ~ 1GMHz | 3.83dB |
| | 1GHz ~ 18GHz | 4.93dB |
| | 18GHz ~ 40GHz | 4.80dB |

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

| | |
|---|---|
| **PRODUCT** | TOY Receiver |
| **MODEL NO.** | GF64MB |
| **ADDITIONAL MODEL** | N/A |
| **FCC ID** | G6DGF64MB |
| **NOMINAL VOLTAGE** | DC 7.5V (1.5V*AA*5) from Battery |
| **MODULATION TECHNOLOGY** | GFSK |
| **OPERATING FREQUENCY** | 2410-2473MHz |
| **ANTENNA TYPE** | Wire Antenna, with 0dBi gain |
| **I/O PORTS** | Refer to user's manual |
| **CABLE SUPPLIED** | N/A |

**NOTE:**

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.: 180330N045) for detailed product photo.

## 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 X axis for radiated emission. The EUT was tested under the following mode.

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|---|---|---|---|---|---|
| | RE<1G | RE≥1G | PLC | BW | |
| A | √ | √ | - | √ | DC 7.5V from New Battery |

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
**PLC:** Power Line Conducted Emission **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 | 2410 MHz |
| Middle | 2445 MHz |
| High | 2473 MHz |

Channel List

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|---|---|
| **1** | **2410** | 17 | 2426 | 33 | 2442 | 49 | 2458 |
| 2 | 2411 | 18 | 2427 | 34 | 2443 | 50 | 2459 |
| 3 | 2412 | 19 | 2428 | 35 | 2444 | 51 | 2460 |
| 4 | 2413 | 20 | 2429 | **36** | **2445** | 52 | 2461 |
| 5 | 2414 | 21 | 2430 | 37 | 2446 | 53 | 2462 |
| 6 | 2415 | 22 | 2431 | 38 | 2447 | 54 | 2463 |
| 7 | 2416 | 23 | 2432 | 39 | 2448 | 55 | 2464 |
| 8 | 2417 | 24 | 2433 | 40 | 2449 | 56 | 2465 |
| 9 | 2418 | 25 | 2434 | 41 | 2450 | 57 | 2466 |
| 10 | 2419 | 26 | 2435 | 42 | 2451 | 58 | 2467 |
| 11 | 2420 | 27 | 2436 | 43 | 2452 | 59 | 2468 |
| 12 | 2421 | 28 | 2437 | 44 | 2453 | 60 | 2469 |
| 13 | 2422 | 29 | 2438 | 45 | 2454 | 61 | 2470 |
| 14 | 2423 | 30 | 2439 | 46 | 2455 | 62 | 2471 |
| 15 | 2424 | 31 | 2440 | 47 | 2456 | 63 | 2472 |
| 16 | 2425 | 32 | 2441 | 48 | 2457 | **64** | **2473** |

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 7.5V from New Battery | Hardy |
| BW | 25deg. C, 55%RH | DC 7.5V from New Battery | Hardy |
| 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

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

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

| Fundamental Frequency | Field strength of fundamental (milli-volts/meter) | Field strength of harmonics (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.

**NOTE**:

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. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESU40 | 100449 | Mar. 11,18 | Mar. 10,19 |
| Signal and Spectrum Analyzer | Rohde&Schwarz | FSV7 | 102331 | Nov. 04,17 | Nov. 03,18 |
| Active Loop Antenna (9KHz -30MHz) | SCHWARZBECK | FMZB 1519B | 1519B-045 | May 31,17 | May 30,18 |
| Amplifier (9KHz -1GHz) | Burgeon | BPA-530 | 100210 | Apr. 05,18 | Apr. 04,19 |
| Bilog Antenna (20MHz -2GHz) | Teseq | CBL 6111D | 30643 | Jul. 28, 17 | Jul. 27, 18 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062558 | May 19,17 | May 18,18 |
| Horn Antenna (18GHz -40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170242 | Mar. 15,18 | Mar. 14,19 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Mar. 06,18 | Mar. 05,19 |
| Test Software | ADT | ADT_Radiated _V7.6.15.9.2 | N/A | N/A | N/A |
| Broadband Preamplifier (1GHz~18GHz) | SCHWARZBECK | BBV9718 | 305 | Mar. 06,18 | Mar. 05,19 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 08,17 | Nov. 07,18 |
| Test Software | ADT | ADT_Radiated _V7.6.15.9.2 | N/A | N/A | N/A |

**NOTE:**

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above1GHz if tested.
4. The FCC Site Registration No. is 749762.

### 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 1m 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.

**NOTE:**

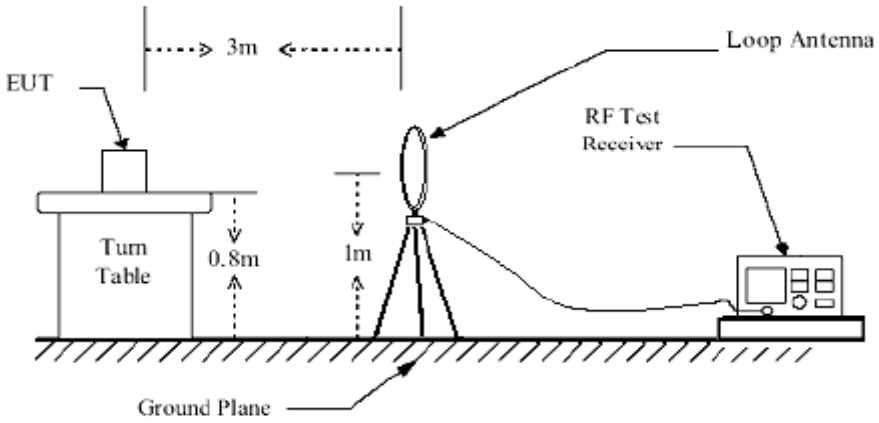
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
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

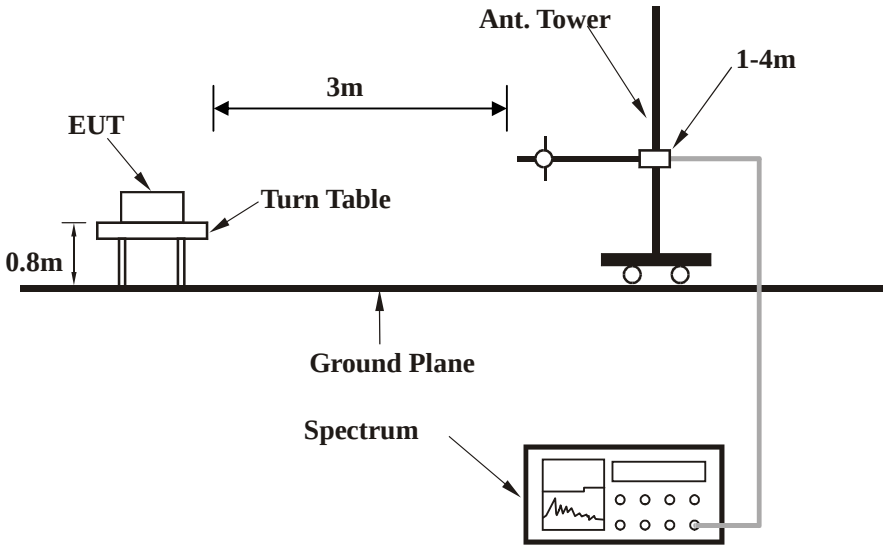
No deviation.

## 4.1.5 TEST SETUP

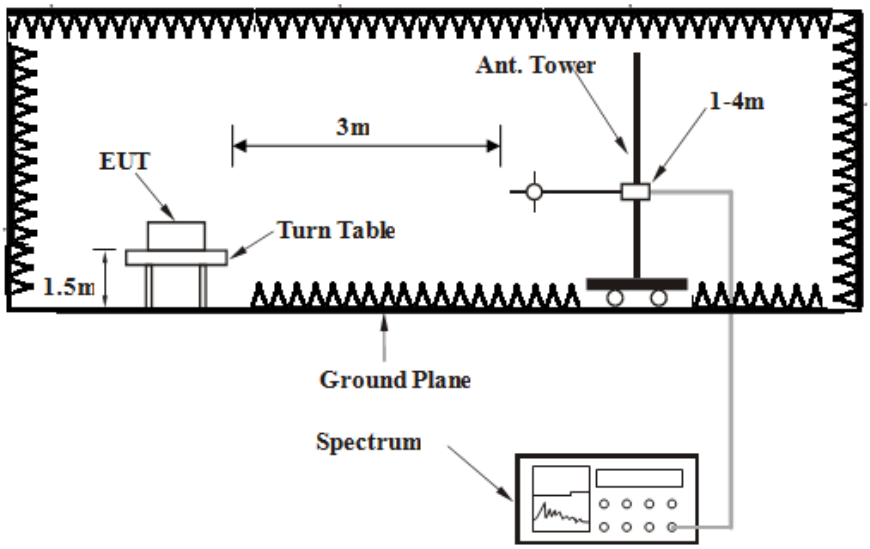
### Below 30MHz test setup




### 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

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.

## 4.1.7 TEST RESULTS

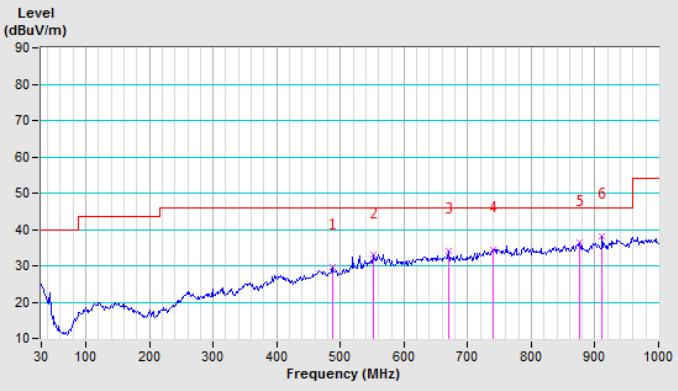
**BELOW 1GHz WORST-CASE DATA**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Middle Channel | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 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 | 487.02 | 29.69 QP | 46.00 | -16.31 | 1.00 H | 158 | 30.66 | -0.97 |
| 2 | 552.31 | 32.92 QP | 46.00 | -13.08 | 1.00 H | 103 | 30.85 | 2.07 |
| 3 | 670.45 | 34.01 QP | 46.00 | -11.99 | 1.00 H | 185 | 30.63 | 3.38 |
| 4 | 740.40 | 34.52 QP | 46.00 | -11.48 | 1.00 H | 65 | 29.31 | 5.21 |
| 5 | 875.64 | 36.31 QP | 46.00 | -9.69 | 1.00 H | 144 | 30.60 | 5.71 |
| **6** | **911.39** | **38.10 QP** | **46.00** | **-7.90** | **1.00 H** | 175 | **32.47** | **5.63** |

**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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

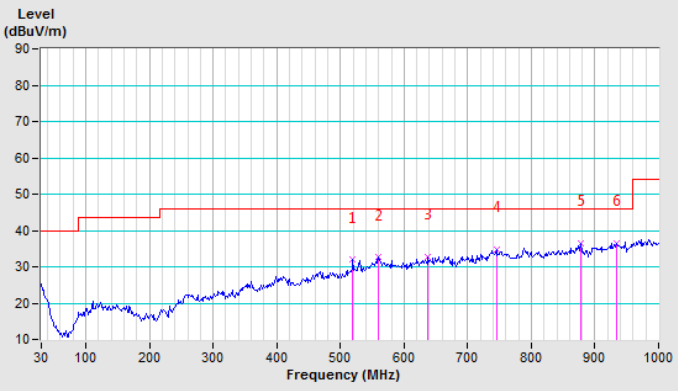


| CHANNEL | TX Middle Channel | DETECTOR FUNCTION | Quasi-Peak (QP) |
|---|---|---|---|
| FREQUENCY RANGE | 9KHz ~ 1GHz | | |

| 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 | 519.66 | 31.94 QP | 46.00 | -14.06 | 2.00 V | 16 | 31.52 | 0.42 |
| 2 | 560.08 | 32.55 QP | 46.00 | -13.45 | 2.00 V | 129 | 29.83 | 2.72 |
| 3 | 637.80 | 32.81 QP | 46.00 | -13.19 | 2.00 V | 55 | 29.65 | 3.16 |
| 4 | 745.06 | 34.73 QP | 46.00 | -11.27 | 2.00 V | 142 | 29.63 | 5.10 |
| 5 | 877.20 | 36.56 QP | 46.00 | -9.44 | 2.00 V | 114 | 30.94 | 5.62 |
| 6 | 933.16 | 36.42 QP | 46.00 | -9.58 | 2.00 V | 100 | 29.27 | 7.15 |

**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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



## ABOVE 1GHz WORST-CASE DATA:

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

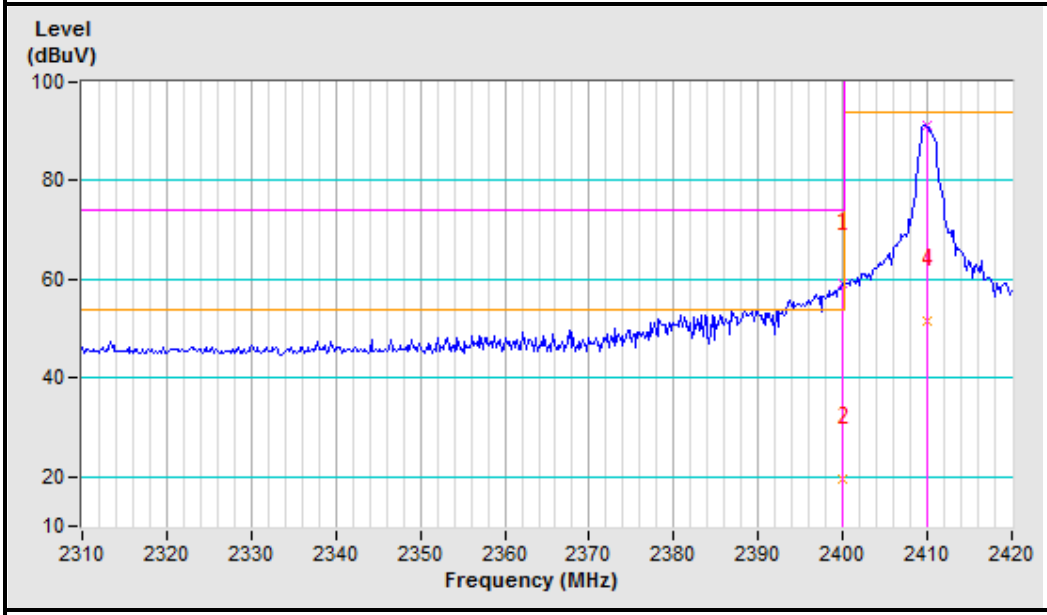
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2400.00 | 59.09 PK | 74.00 | -14.91 | 1.00 H | 34 | 55.96 | 3.13 |
| 2 | *2400.00 | 19.69 AV | 54.00 | -34.31 | 1.00 H | 34 | 16.56 | 3.13 |
| 3 | 2410.00 | 91.14 PK | 114.00 | -22.86 | 1.00 H | 32 | 87.97 | 3.17 |
| 4 | 2410.00 | 51.74 AV | 94.00 | -42.26 | 1.00 H | 32 | 48.57 | 3.17 |
| 5 | 4820.00 | 58.39 PK | 74.00 | -15.61 | 1.00 H | 261 | 52.30 | 6.09 |
| 6 | 4820.00 | 18.99 AV | 54.00 | -35.01 | 1.00 H | 261 | 12.90 | 6.09 |
| 7 | 7230.00 | 60.04 PK | 74.00 | -13.96 | 1.00 H | 278 | 48.55 | 11.49 |
| 8 | 7230.00 | 20.64 AV | 54.00 | -33.36 | 1.00 H | 278 | 9.15 | 11.49 |
| 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** | ***2400.00** | **62.22 PK** | **74.00** | **-11.78** | **1.89 V** | **0** | **59.09** | **3.13** |
| 2 | *2400.00 | 22.82 AV | 54.00 | -31.18 | 1.89 V | 0 | 19.69 | 3.13 |
| 3 | 2410.00 | 95.52 PK | 114.00 | -18.48 | 2.13 V | 0 | 92.35 | 3.17 |
| 4 | 2410.00 | 56.12 AV | 94.00 | -37.88 | 2.13 V | 0 | 52.95 | 3.17 |
| 5 | 4820.00 | 57.14 PK | 74.00 | -16.86 | 1.37 V | 189 | 51.05 | 6.09 |
| 6 | 4820.00 | 17.74 AV | 54.00 | -36.26 | 1.37 V | 189 | 11.65 | 6.09 |
| 7 | 7230.00 | 62.48 PK | 74.00 | -11.52 | 1.00 V | 19 | 50.99 | 11.49 |
| 8 | 7230.00 | 23.08 AV | 54.00 | -30.92 | 1.00 V | 19 | 11.59 | 11.49 |

**REMARKS:**

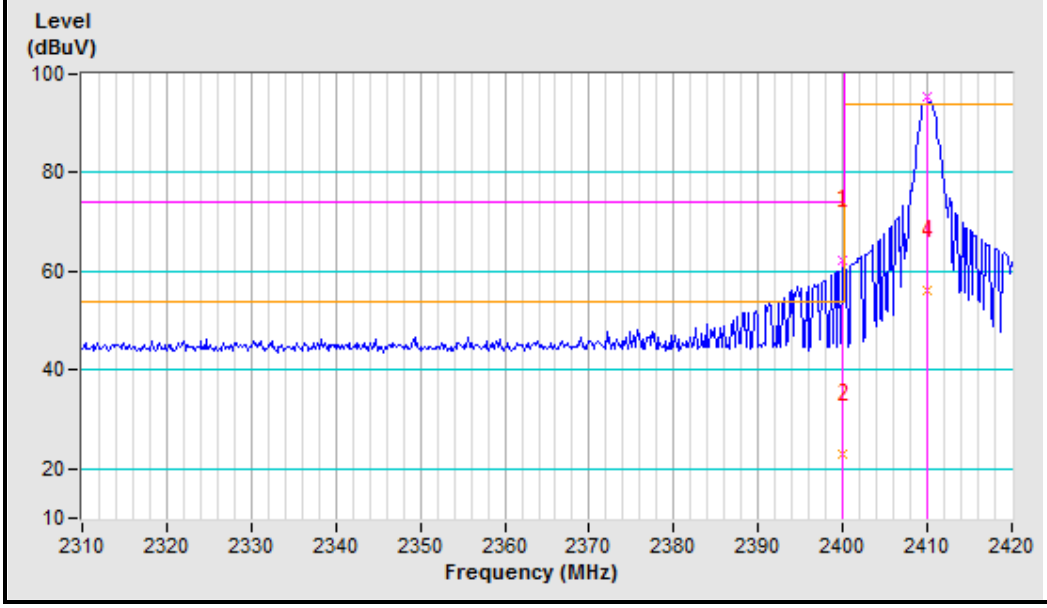
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

**Band edge Plot**

**2400MHz Horizontal**




**2400MHz Vertical**



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

| 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 | *2445.00 | 90.83 PK | 114.00 | -23.17 | 1.00 H | 304 | 87.53 | 3.30 |
| 2 | *2445.00 | 51.43 AV | 94.00 | -42.57 | 1.00 H | 304 | 48.13 | 3.30 |
| 3 | 4890.00 | 57.92 PK | 74.00 | -16.08 | 1.00 H | 263 | 51.69 | 6.23 |
| 4 | 4890.00 | 18.52 AV | 54.00 | -35.48 | 1.00 H | 263 | 12.29 | 6.23 |
| **5** | **7335.00** | **63.02 PK** | **74.00** | **-10.98** | **1.00 H** | **257** | **51.23** | **11.79** |
| 6 | 7335.00 | 23.62 AV | 54.00 | -30.38 | 1.00 H | 257 | 11.83 | 11.79 |
| **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 | *2445.00 | 94.74 PK | 114.00 | -19.26 | 2.34 V | 360 | 91.44 | 3.30 |
| 2 | *2445.00 | 55.34 AV | 94.00 | -38.66 | 2.34 V | 360 | 52.04 | 3.30 |
| 3 | 4890.00 | 56.82 PK | 74.00 | -17.18 | 1.00 V | 179 | 50.59 | 6.23 |
| 4 | 4890.00 | 17.42 AV | 54.00 | -36.58 | 1.00 V | 179 | 11.19 | 6.23 |
| 5 | 7335.00 | 61.99 PK | 74.00 | -12.01 | 1.00 V | 9 | 50.20 | 11.79 |
| 6 | 7335.00 | 22.59 AV | 54.00 | -31.41 | 1.00 V | 9 | 10.80 | 11.79 |

**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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

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

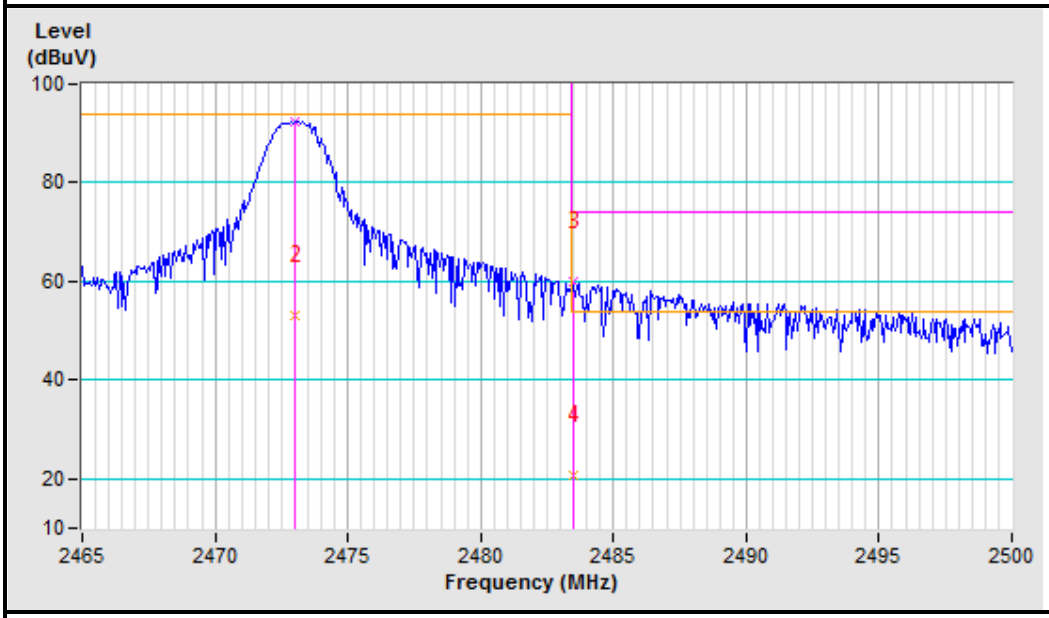
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2473.00 | 92.56 PK | 114.00 | -21.44 | 3.84 H | 127 | 89.16 | 3.40 |
| 2 | *2473.00 | 53.16 AV | 94.00 | -40.84 | 3.84 H | 127 | 49.76 | 3.40 |
| 3 | 2483.50 | 59.93 PK | 74.00 | -14.07 | 3.84 H | 127 | 56.49 | 3.44 |
| 4 | 2483.50 | 20.53 AV | 54.00 | -33.47 | 3.84 H | 127 | 17.09 | 3.44 |
| 5 | 4946.00 | 55.89 PK | 74.00 | -18.11 | 1.00 H | 271 | 49.54 | 6.35 |
| 6 | 4946.00 | 16.49 AV | 54.00 | -37.51 | 1.00 H | 271 | 10.14 | 6.35 |
| 7 | 7419.00 | 62.60 PK | 74.00 | -11.40 | 1.00 H | 241 | 50.58 | 12.02 |
| 8 | 7419.00 | 23.20 AV | 54.00 | -30.80 | 1.00 H | 241 | 11.18 | 12.02 |
| **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 | *2473.00 | 95.15 PK | 114.00 | -18.85 | 1.83 V | 2 | 91.75 | 3.40 |
| 2 | *2473.00 | 55.75 AV | 94.00 | -38.25 | 1.83 V | 2 | 52.35 | 3.40 |
| 3 | 2483.50 | 62.06 PK | 74.00 | -11.94 | 1.83 V | 2 | 58.62 | 3.44 |
| 4 | 2483.50 | 22.66 AV | 54.00 | -31.34 | 1.83 V | 2 | 19.22 | 3.44 |
| 5 | 4946.00 | 58.45 PK | 74.00 | -15.55 | 1.00 V | 147 | 52.10 | 6.35 |
| 6 | 4946.00 | 19.05 AV | 54.00 | -34.95 | 1.00 V | 147 | 12.70 | 6.35 |
| 7 | 7419.00 | 62.21 PK | 74.00 | -11.79 | 1.34 V | 13 | 50.19 | 12.02 |
| 8 | 7419.00 | 22.81 AV | 54.00 | -31.19 | 1.34 V | 13 | 10.79 | 12.02 |

**REMARKS:**

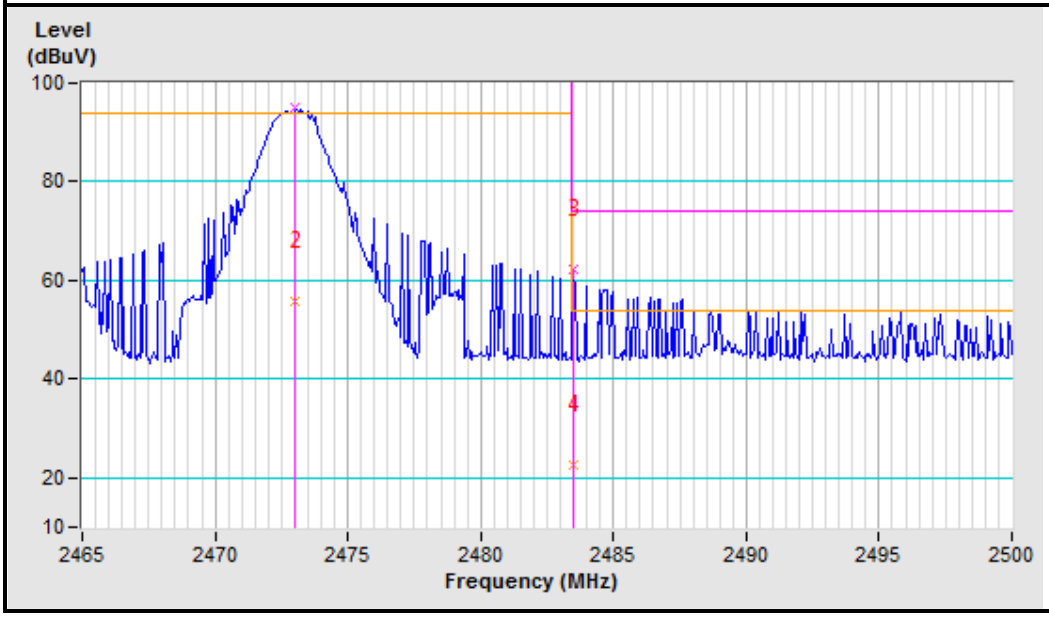
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

**Band edge Plot**

**2483.5MHz Horizontal**




**2483.5MHz 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. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Power Sensor | Keysight | U2021XA | MY55060016 | May 19,17 | May 18,18 |
| Power Sensor | Keysight | U2021XA | MY55060018 | May 19,17 | May 18,18 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 21, 17 | Oct.20, 18 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,17 | Sep. 04,18 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 08,17 | Nov. 07,18 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 04,17 | Nov. 03,18 |
| Signal Generator | Agilent | N5183A | MY50140980 | Jan. 02,18 | Jan. 01,19 |
| Agile Signal Generator | Agilent | 8645A | Agilent | Sep.01, 17 | Aug.31, 18 |
| Spectrum Analyzer | Keysight | N9020A | MY55400499 | Apr. 10,18 | Apr. 09,19 |
| MXG-B RF Vector Signal Generator | Keysight | N5182B | MY56200288 | Jan. 02,18 | Jan. 01,19 |
| Attenuator | MINI | BW-S10W2+ | S130129FGE2 | N/A | N/A |
| DC Source | Keysight | E3642A | MY56146098 | N/A | N/A |

**NOTE:**

1. The test was performed in RF Oven 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.

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.

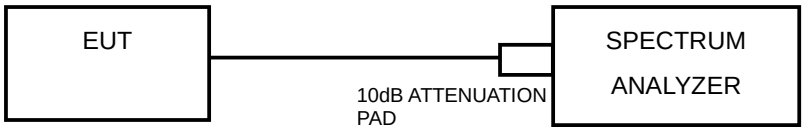
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

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

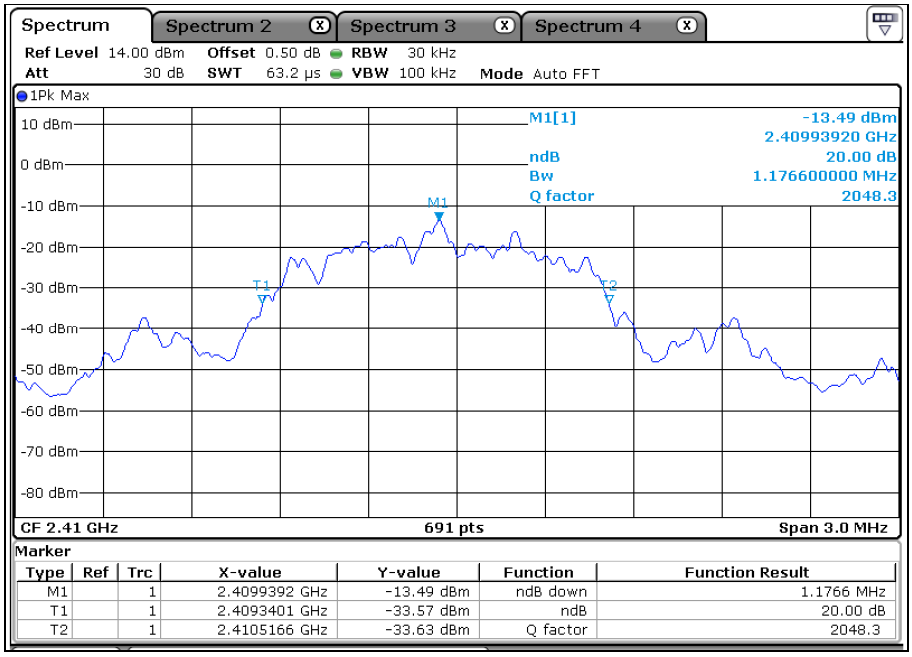
a) Turned on the power of all equipment.

b) EUT was operated according to the type used was description in manufacturer’s specifications or the User's Manual.

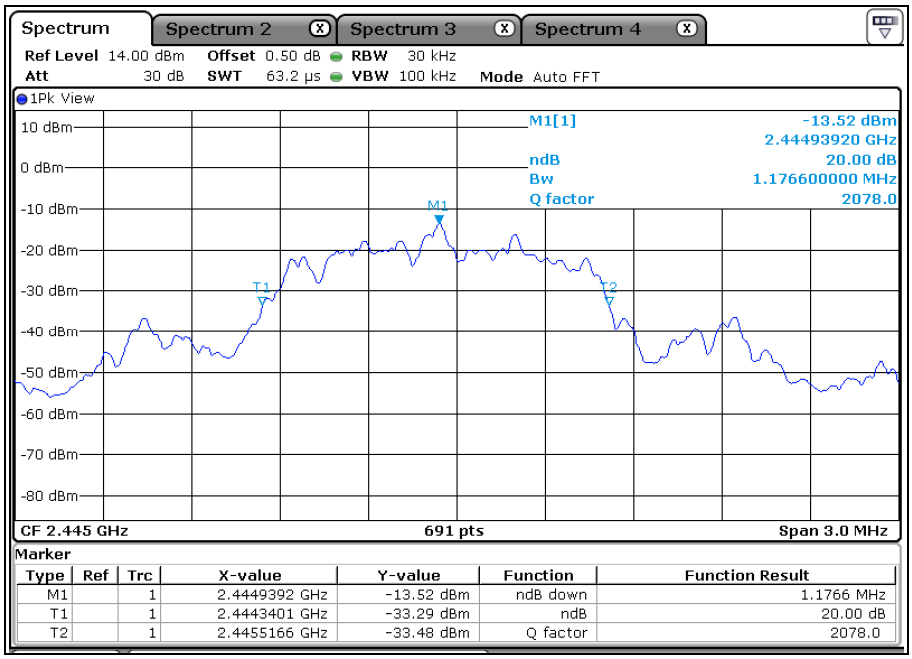
## 4.2.7 TEST RESULTS

| CHANNEL | CHANNEL FREQUENCY (MHz) | 20dB BANDWIDTH (MHz) |
|---|---|---|
| Low | 2410 | 1.1766 |
| Middle | 2445 | 1.1766 |
| High | 2473 | 1.1809 |

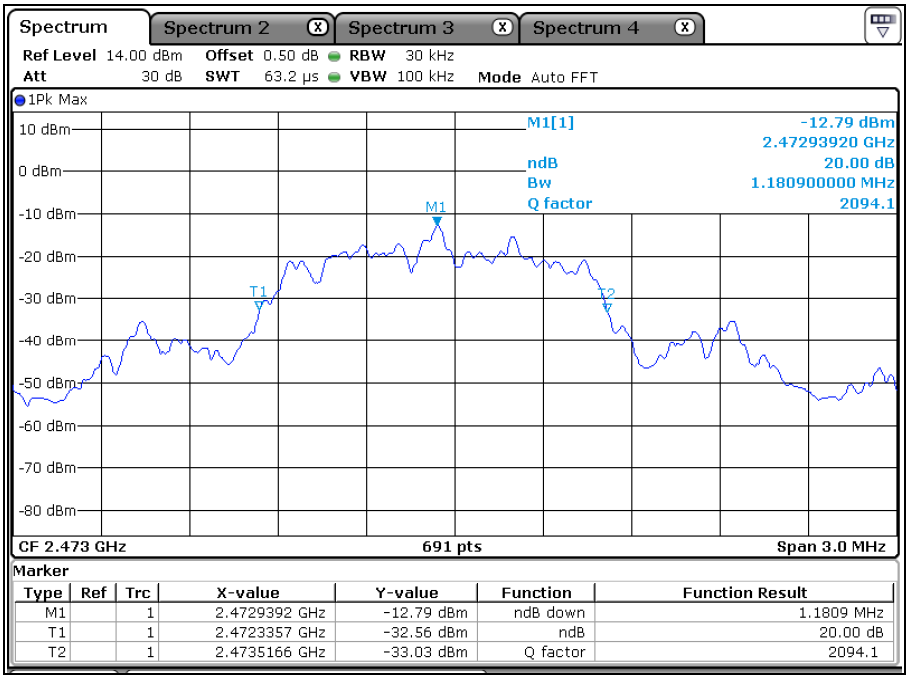
**Test Data:** Low channel



**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---**