Certificate # 2951.01

# TEST REPORT

| | |
|---|---|
| Applicant | Particle Industries,Inc |
| Address | 126 Post St, 4th floor, San Francisco, CA 94108 USA |

| | |
|---|---|
| Manufacturer or Supplier | Particle Industries,Inc |
| Address | 126 Post St, 4th floor, San Francisco, CA 94108 USA |
| Product | Boron 2G/3G |
| Brand Name | Particle Industries, Inc |
| Model | BRN310 |
| Additional Model & Model Difference | N/A |
| Date of tests | Sep. 03, 2018 ~ Nov. 08, 2018 |

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

☒ **Canada RSS-247 Issue 2 (2017-02)**
☒ **Canada RSS-Gen Issue 5 (2018-04)**

**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 |
|---|---|
| Breeze | Date: Dec. 10, 2018 |

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| IC180831N010-1 | Original release | Dec. 10, 2018 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: RSS-247; RSS-Gen | | | |
|---|---|---|---|
| **Standard RSS-Gen** | **Test Type and Limit** | **Result** | **Remark** |
| RSS-Gen 8.8 | AC Power Conducted Emission | PASS | Meet the requirement of limit |
| RSS-Gen 6.7 | Occupied Bandwidth Measurement | PASS | Meet the requirement of limit |
| 8.10 Table 7 | Restricted Band of Operation | PASS | Meet the requirement of limit |
| 8.9 Table 5 | Transmitter Radiated Emissions | PASS | Meet the requirement of limit. |
| **Standard RSS-247** | **Test Type and Limit** | **Result** | **Remark** |
| 5.2(a) | 6db Bandwidth Measurement | PASS | Meet the requirement of limit |
| 5.2(b) | Power Spectral Density Measurement | PASS | Meet the requirement of limit. |
| 5.4(d) | Maximum Output Power | PASS | Meet the requirement of limit. |
| 5.5 | Out of band Emission Measurement | PASS | Meet the requirement of limit. |

# 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 |
|---|---|---|
| Conducted emissions | 9kHz~30MHz | 2.70dB |
| Radiated emissions | 9KHz ~ 30MHz | 2.16dB |
| | 30MHz ~ 1GMHz | 3.76dB |
| | 1GHz ~ 18GHz | 4.84dB |
| | 18GHz ~ 40GHz | 4.96dB |

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** | Boron 2G/3G |
| **MODEL NO.** | BRN310 |
| **ADDITIONAL MODEL** | N/A |
| **IC** | 20127-BRN310 |
| **NOMINAL VOLTAGE** | Li+ PIN /Battery connector: DC 3.7V from Li-ion Battery or VUSB PIN /USB connector :DC 5V from USB Host Unit |
| **MODULATION TECHNOLOGY** | DSSS(IEEE 802.15.4) |
| **MODULATION TYPE** | OQPSK |
| **OPERATING FREQUENCY** | 2405-2480MHz |
| **PEAK OUTPUT POWER** | 0.61dBm(Maximum) |
| **ANTENNA TYPE** | PCB Antenna, with 0dBi gain |
| **I/O PORTS** | Refer to user's manual |
| **CABLE SUPPLIED** | N/A |
| **PRODUCT SW/HW** | V1.00/V1.00 |
| **RADIO SW/HW** | V1.00/V1.00 |
| **TEST SW VERSION** | arduino-1.8.6 |
| **RF POWER SETTING IN TEST SW** | N/A |

**NOTE:**

1. The EUT provides completed transmitters and receivers:

| MODULATION MODE | FUNCTION |
|---|---|
| **DSSS** | 1TX/1RX |

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Please refer to the EUT photo document (Reference No.: 180831N010) for detailed product photo.
5. The EUT is wireless module, it no any accessories.

## 3.2 DESCRIPTION OF TEST MODES

16 channels are provided:

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---|---|---|---|
| **11** | **2405 MHz** | 19 | 2445 MHz |
| 12 | 2410 MHz | 20 | 2450 MHz |
| 13 | 2415 MHz | 21 | 2455 MHz |
| 14 | 2420 MHz | 22 | 2460 MHz |
| 15 | 2425 MHz | 23 | 2465 MHz |
| 16 | 2430 MHz | 24 | 2470 MHz |
| 17 | 2435 MHz | 25 | 2475 MHz |
| **18** | **2440 MHz** | **26** | **2480 MHz** |

### 3.2.1. CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

### 3.2.2 Test Mode Applicability and tested channel detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports

The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

| EUT CONFIGURE MODE | APPLICABLE TO | | | | MODE |
|---|---|---|---|---|---|
| | RE<1G | RE≥1G | PLC | APCM | |
| **A** | √ | √ | **-** | √ | Powered by Fully Battery |
| **B** | **-** | **-** | √ | - | Powered by Adapter |

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
**PLC:** Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

**POWER LINE CONDUCTED EMISSION TEST:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

| EUT CONFIGURE MODE | TESTED CONDITION |
|---|---|
| B | (2.4G) Link |

**RADIATED EMISSION TEST (BELOW 1GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

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

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Kbps) |
|---|---|---|---|---|---|
| A | 11 to 26 | 11 | DSSS | OQPSK | 250 |

For the test results, only the worst case was shown in test report.

**RADIATED EMISSION TEST (ABOVE 1GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

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

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Kbps) |
|---|---|---|---|---|---|
| A | 11 to 26 | 11,18, 26 | DSSS | OQPSK | 250 |

**BANDEDGE MEASUREMENT:**

☒Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Kbps) |
|---|---|---|---|---|---|
| A | 11 to 26 | 11,18, 26 | DSSS | OQPSK | 250 |

**ANTENNA PORT CONDUCTED MEASUREMENT:**

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Kbps) |
|---|---|---|---|---|---|
| A | 11 to 26 | 11,18, 26 | DSSS | OQPSK | 250 |

**TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | TEST VOLTAGE | TESTED BY |
|---|---|---|---|
| RE<1G | 25deg. C, 53%RH | DC3.7V from Fully Battery | Xue Wang |
| RE≥1G | 25deg. C, 53%RH | DC3.7V from Fully Battery | Xue Wang |
| PLC | 20deg. C, 56%RH | DC 5V from Adapter | Sen He |
| APCM | 25deg. C, 60%RH | DC3.7V from Fully Battery | Robert Cheng |

## 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:

**Canada RSS-247 Issue 2 (2017-02)**

**Canada RSS-Gen Issue 5 (2018-04)**

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 with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | DC source | LONG WEI | PS-6403D | 010934269 | N/A |
| 2 | Li-ion Battery | N/A | DC3.7V | N/A | N/A |
| 3 | Adapter | N/A | DC5V 1.5A | N/A | N/A |
| 4 | Mobile phone | Apple | ML7F2CH/A | C6KQKXLAGRY8 | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | DC Line: Unshielded, Detachable 1.0m |
| 2 | N/A |
| 3 | USB Line: Unshielded, Detachable 0.6m |
| 4 | N/A |

**NOTE:** All power cords of the above support units are non-shielded (1.8m).

# 4 TEST TYPES AND RESULTS

## 4.1 CONDUCTED EMISSION MEASUREMENT

### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 ~ 0.5 | 66 to 56 | 56 to 46 |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

**NOTE**: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.1.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESR7 | 101494 | Mar. 21,18 | Mar. 20,19 |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 101173 | Mar. 03,18 | Mar. 02,19 |
| Artificial Mains Network | Rohde&Schwarz | ESH3-Z5 | 100317 | Apr. 11,18 | Apr. 10,19 |
| Voltage probe | SCHWARZBECK | TK 9421 | TK 9421-176 | Jan. 17,18 | Jan. 16,19 |
| Test software | ADT | ADT_Cond_V7.3.7 | N/A | N/A | N/A |

**NOTE:**

1. The test was performed in shielded room 553.
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.

### 4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

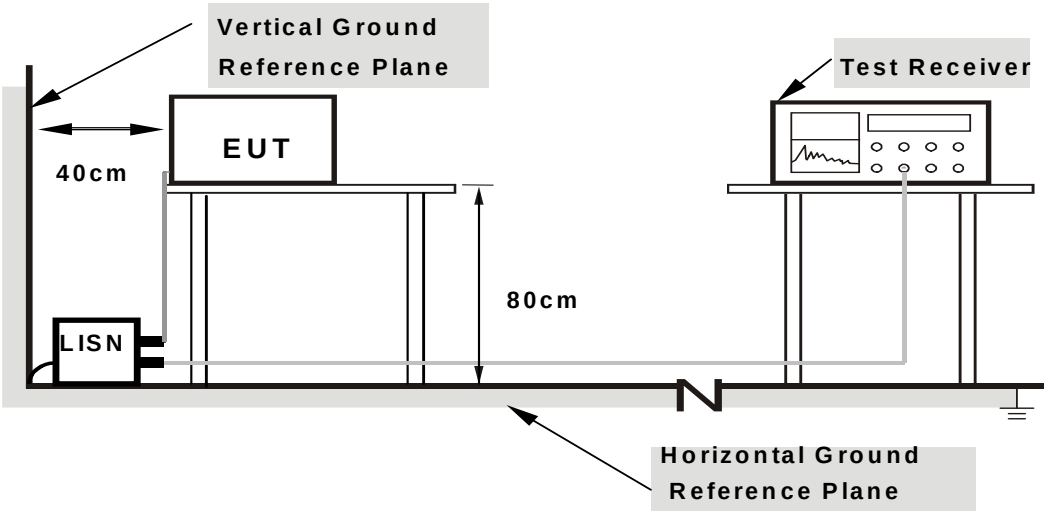
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.1.5 TEST SETUP




**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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 and connected of all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

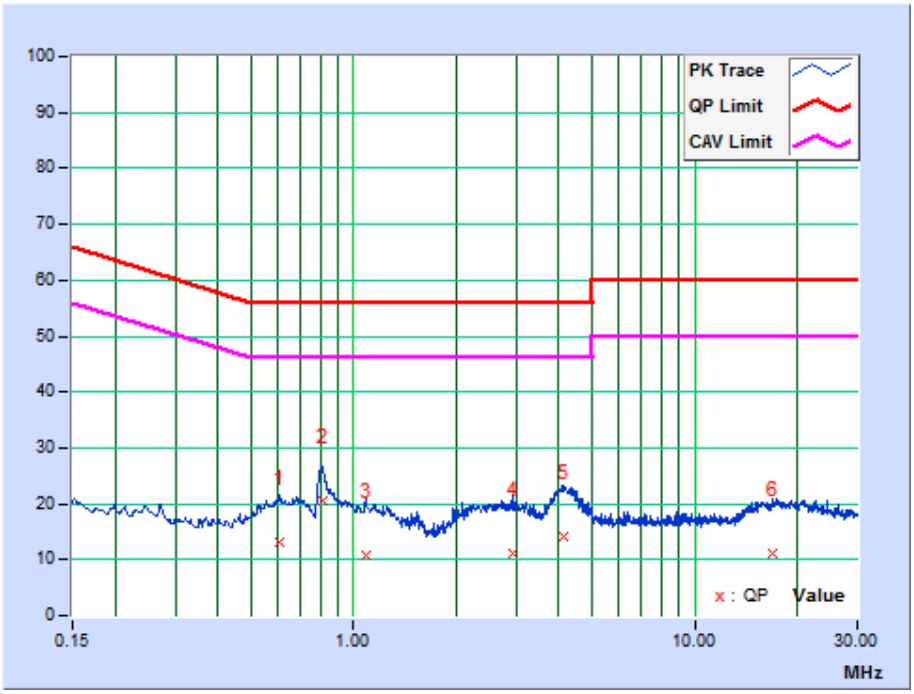
## 4.1.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA:**

| PHASE | Line | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.60893 | 10.36 | 2.61 | -4.95 | 12.97 | 5.41 | 56.00 | 46.00 | -43.03 | -40.59 |
| **2** | **0.80772** | **10.45** | **10.10** | **-1.93** | **20.55** | **8.52** | **56.00** | **46.00** | **-35.45** | **-37.48** |
| 3 | 1.09139 | 10.23 | 0.54 | -5.48 | 10.77 | 4.75 | 56.00 | 46.00 | -45.23 | -41.25 |
| 4 | 2.91750 | 9.69 | 1.34 | -4.87 | 11.03 | 4.82 | 56.00 | 46.00 | -44.97 | -41.18 |
| 5 | 4.15950 | 9.90 | 4.31 | -3.96 | 14.21 | 5.94 | 56.00 | 46.00 | -41.79 | -40.06 |
| 6 | 16.95975 | 9.94 | 1.28 | -3.91 | 11.22 | 6.03 | 60.00 | 50.00 | -48.78 | -43.97 |

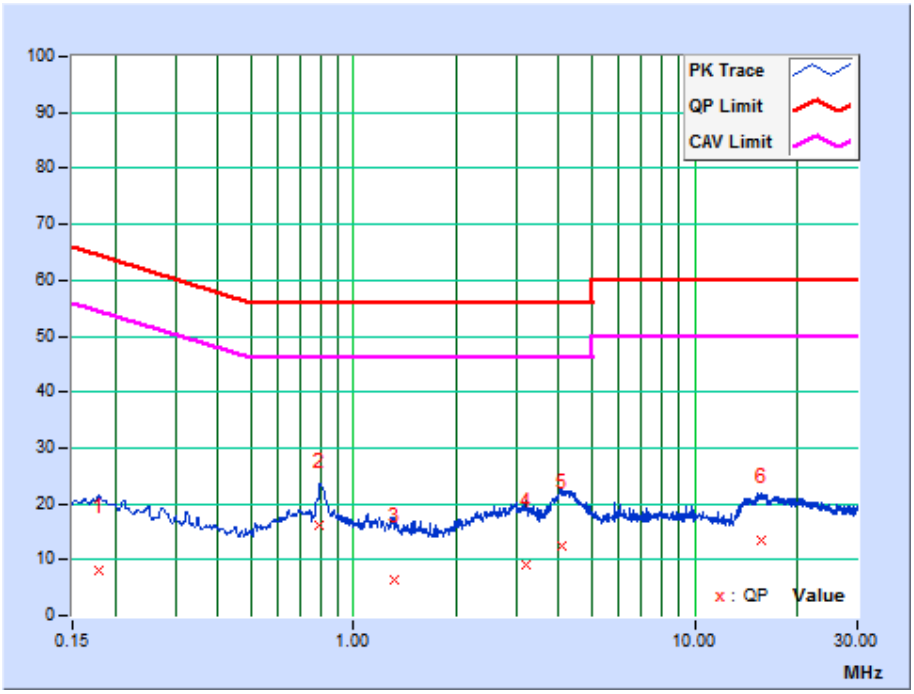
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



| PHASE | Neutral | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|

| No | Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.17933 | 10.16 | -1.92 | -4.63 | 8.24 | 5.53 | 64.52 | 54.52 | -56.28 | -48.99 |
| 2 | 0.79713 | 9.95 | 6.18 | -3.52 | 16.13 | 6.43 | 56.00 | 46.00 | -39.87 | -39.57 |
| 3 | 1.31100 | 9.75 | -3.52 | -6.54 | 6.23 | 3.21 | 56.00 | 46.00 | -49.77 | -42.79 |
| 4 | 3.19650 | 10.11 | -1.04 | -5.17 | 9.07 | 4.94 | 56.00 | 46.00 | -46.93 | -41.06 |
| 5 | 4.06500 | 9.69 | 2.75 | -4.14 | 12.44 | 5.55 | 56.00 | 46.00 | -43.56 | -40.45 |
| 6 | 15.76950 | 9.81 | 3.63 | -2.59 | 13.44 | 7.22 | 60.00 | 50.00 | -46.56 | -42.78 |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in RSS-Gen Section 8.10, must also comply with the radiated emission limits specified in RSS-Gen Section 8.9. 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 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

## 4.2.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESU40 | 100449 | Mar. 21,18 | Mar. 20,19 |
| Signal and Spectrum Analyzer | Rohde&Schwarz | FSV7 | 102331 | Nov. 04,18 | Nov. 03,19 |
| Active Loop Antenna (9KHz -30MHz) | SCHWARZBECK | FMZB 1519B | 1519B-045 | May 04,18 | May 03,19 |
| Amplifier (9KHz -1GHz) | Burgeon | BPA-530 | 100210 | Apr. 18,18 | Apr. 18,19 |
| Bilog Antenna (20MHz -2GHz) | Teseq | CBL 6111D | 30643 | Aug. 11, 18 | Aug. 10, 19 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062558 | Jul. 21, 18 | Jul. 20, 19 |
| Horn Antenna (18GHz -40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170242 | May 05,18 | May 04,19 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Feb. 10,18 | Feb. 09,19 |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |
| Broadband Preamplifier (1GHz~18GHz) | SCHWARZBECK | BBV9718 | 305 | Apr. 18,18 | Apr. 18,19 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 08,18 | Nov. 07,19 |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Jul. 06, 18 | Jul. 05, 19 |

**NOTE:**

1. The test was performed in 966 Chamber.
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. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The IC test Site Registration No. is 5936A-1.

### 4.2.3 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. For below 1GHz was used bilog antenna, and above 1GHz was used horn 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. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**NOTE:**

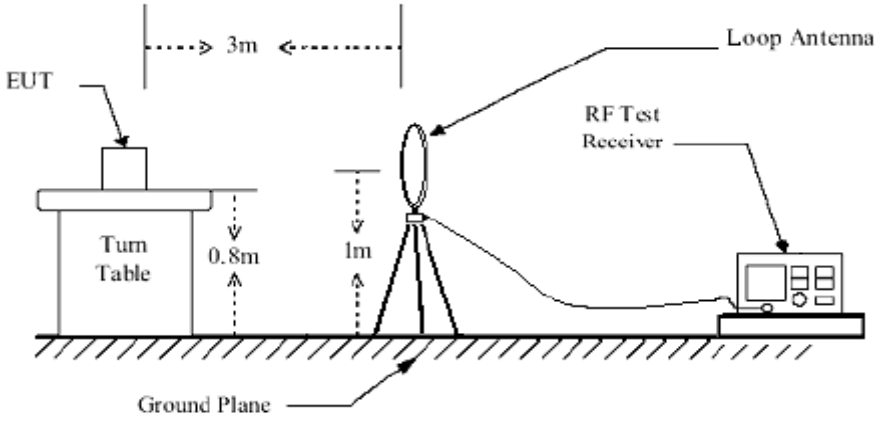
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

### 4.2.4 DEVIATION FROM TEST STANDARD

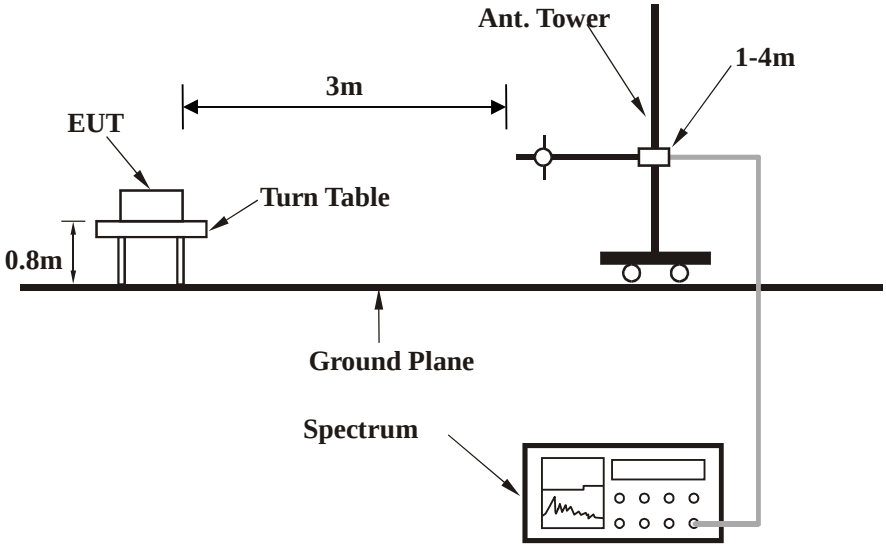
No deviation.

## 4.2.5 TEST SETUP

### Below 30MHz

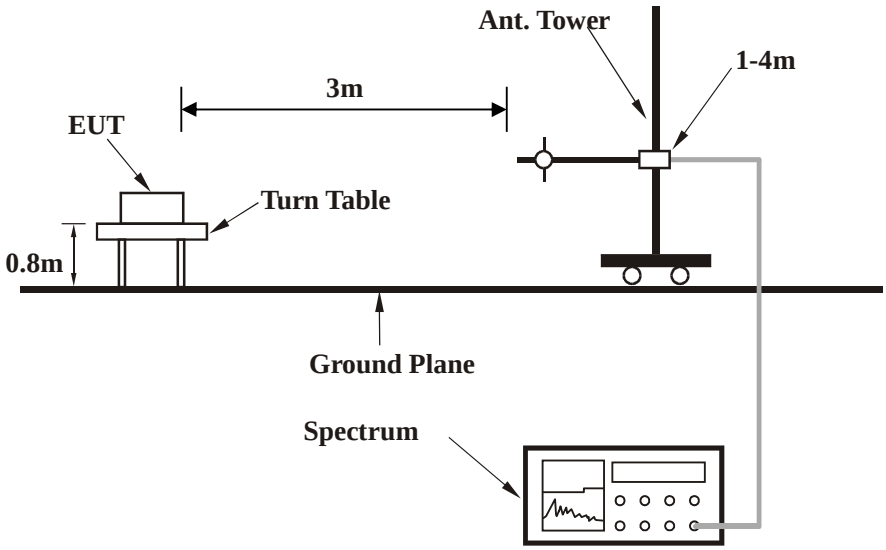



### Below 1GHz test setup




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

## Above 1GHz test setup




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

### 4.2.6 EUT OPERATING CONDITIONS

a. Set the EUT placed them on a testing table.
b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the EUT in full functions.

## 4.2.7 TEST RESULTS

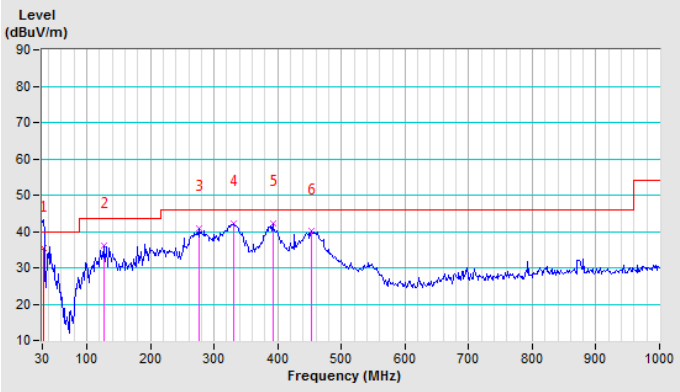
**BELOW 1GHz WORST-CASE DATA:**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 11 | **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 | 31.55 | 35.26 QP | 40.00 | -4.74 | 1.25 H | 360 | 46.30 | -11.04 |
| 2 | 126.38 | 36.12 QP | 43.50 | -7.38 | 2.00 H | 0 | 52.45 | -16.33 |
| 3 | 277.16 | 40.94 QP | 46.00 | -5.06 | 2.00 H | 359 | 54.77 | -13.83 |
| **4** | **330.02** | **42.31 QP** | **46.00** | **-3.69** | **2.00 H** | **310** | **53.75** | **-11.44** |
| 5 | 392.20 | 42.31 QP | 46.00 | -3.69 | 2.00 H | 296 | 51.81 | -9.50 |
| 6 | 452.82 | 40.03 QP | 46.00 | -5.97 | 2.00 H | 156 | 48.51 | -8.48 |

**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.

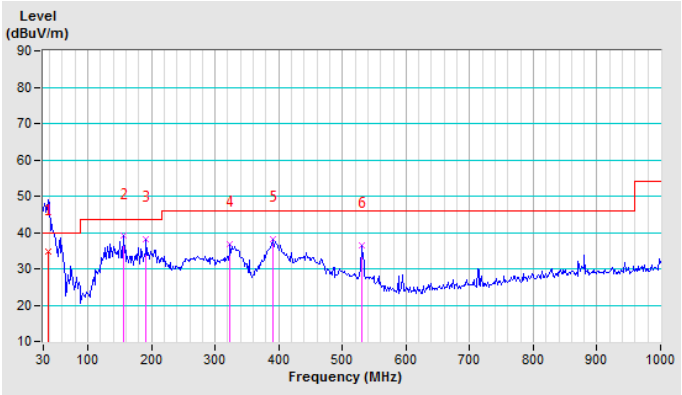


| CHANNEL | TX Channel 11 | DETECTOR FUNCTION | Quasi-Peak (QP) |
|---|---|---|---|
| FREQUENCY RANGE | 9KHz ~ 1GHz | | |

| 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 | 37.77 | 34.58 QP | 40.00 | -5.42 | 1.00 V | 125 | 49.25 | -14.67 |
| 2 | 155.91 | 39.02 QP | 43.50 | -4.48 | 1.00 V | 230 | 55.39 | -16.37 |
| 3 | 191.67 | 38.12 QP | 43.50 | -5.38 | 1.00 V | 201 | 56.02 | -17.91 |
| 4 | 323.80 | 36.70 QP | 46.00 | -9.30 | 1.00 V | 85 | 48.37 | -11.67 |
| 5 | 390.64 | 38.10 QP | 46.00 | -7.90 | 1.00 V | 144 | 47.65 | -9.55 |
| 6 | 530.54 | 36.45 QP | 46.00 | -9.55 | 1.00 V | 167 | 43.04 | -6.59 |

**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 DATA

| CHANNEL | TX Channel 11 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| 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 | 2390.00 | 43.16 PK | 74.00 | -30.84 | 1.17 H | 131 | 41.11 | 2.05 |
| 2 | 2390.00 | 20.66 AV | 54.00 | -33.34 | 1.17 H | 131 | 18.61 | 2.05 |
| 3 | *2405.00 | 84.10 PK | | | 1.17 H | 131 | 81.94 | 2.16 |
| 4 | *2405.00 | 61.60 AV | | | 1.17 H | 131 | 59.44 | 2.16 |
| 5 | 4810.00 | 44.56 PK | 74.00 | -29.44 | 1.53 H | 67 | 39.73 | 4.83 |
| 6 | 4810.00 | 22.06 AV | 54.00 | -31.94 | 1.53 H | 67 | 17.23 | 4.83 |
| 7 | #7215.00 | 49.19 PK | 74.00 | -24.81 | 1.53 H | 67 | 40.55 | 8.64 |
| 8 | #7215.00 | 26.69 AV | 54.00 | -27.31 | 1.53 H | 67 | 18.05 | 8.64 |
| 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 | 2390.00 | 42.80 PK | 74.00 | -31.20 | 1.79 V | 196 | 40.75 | 2.05 |
| 2 | 2390.00 | 20.30 AV | 54.00 | -33.70 | 1.79 V | 196 | 18.25 | 2.05 |
| 3 | *2405.00 | 85.38 PK | | | 1.33 V | 196 | 83.22 | 2.16 |
| 4 | *2405.00 | 62.88 AV | | | 1.33 V | 196 | 60.72 | 2.16 |
| 5 | 4810.00 | 46.01 PK | 74.00 | -27.99 | 1.24 V | 95 | 41.18 | 4.83 |
| 6 | 4810.00 | 23.51 AV | 54.00 | -30.49 | 1.24 V | 95 | 18.68 | 4.83 |
| 7 | #7215.00 | 50.12 PK | 74.00 | -23.88 | 1.47 V | 69 | 41.48 | 8.64 |
| 8 | #7215.00 | 27.62 AV | 54.00 | -26.38 | 1.47 V | 69 | 18.98 | 8.64 |

**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.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 18 | 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 | *2450.00 | 82.07 PK | | | 1.15 H | 66 | 79.59 | 2.48 |
| 2 | *2450.00 | 59.57 AV | | | 1.15 H | 66 | 57.09 | 2.48 |
| 3 | 4900.00 | 45.32 PK | 74.00 | -28.68 | 1.51 H | 24 | 40.29 | 5.03 |
| 4 | 4900.00 | 22.82 AV | 54.00 | -31.18 | 1.51 H | 24 | 17.79 | 5.03 |
| 5 | 7350.00 | 50.11 PK | 74.00 | -23.89 | 1.17 H | 97 | 41.31 | 8.80 |
| 6 | 7350.00 | 27.61 AV | 54.00 | -26.39 | 1.17 H | 97 | 18.81 | 8.80 |
| **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 | *2450.00 | 83.32 PK | | | 1.15 V | 197 | 80.84 | 2.48 |
| 2 | *2450.00 | 60.82 AV | | | 1.15 V | 197 | 58.34 | 2.48 |
| 3 | 4900.00 | 47.53 PK | 74.00 | -26.47 | 1.47 V | 69 | 42.50 | 5.03 |
| 4 | 4900.00 | 25.03 AV | 54.00 | -28.97 | 1.47 V | 69 | 20.00 | 5.03 |
| **5** | **7350.00** | **51.33 PK** | **74.00** | **-22.67** | **1.66 V** | **100** | **42.53** | **8.80** |
| 6 | 7350.00 | 28.83 AV | 54.00 | -25.17 | 1.66 V | 100 | 20.03 | 8.80 |

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

| CHANNEL | TX Channel 26 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| 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 | *2480.00 | 82.37 PK | | | 1.00 H | 127 | 79.69 | 2.68 |
| 2 | *2480.00 | 59.87 AV | | | 1.00 H | 127 | 57.19 | 2.68 |
| 3 | 2483.50 | 42.74 PK | 74.00 | -31.26 | 1.00 H | 127 | 40.04 | 2.70 |
| 4 | 2483.50 | 20.24 AV | 54.00 | -33.76 | 1.00 H | 127 | 17.54 | 2.70 |
| 5 | 4960.00 | 45.79 PK | 74.00 | -28.21 | 1.15 H | 64 | 40.62 | 5.17 |
| 6 | 4960.00 | 23.29 AV | 54.00 | -30.71 | 1.15 H | 64 | 18.12 | 5.17 |
| 7 | 7440.00 | 49.92 PK | 74.00 | -24.08 | 1.79 H | 68 | 41.02 | 8.90 |
| 8 | 7440.00 | 27.42 AV | 54.00 | -26.58 | 1.79 H | 68 | 18.52 | 8.90 |
| 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 | *2480.00 | 80.29 PK | | | 1.00 V | 69 | 77.61 | 2.68 |
| 2 | *2480.00 | 57.79 AV | | | 1.00 V | 69 | 55.11 | 2.68 |
| 3 | 2483.50 | 42.90 PK | 74.00 | -31.10 | 1.17 V | 69 | 40.20 | 2.70 |
| 4 | 2483.50 | 20.40 AV | 54.00 | -33.60 | 1.17 V | 69 | 17.70 | 2.70 |
| 5 | 4960.00 | 45.47 PK | 74.00 | -28.53 | 1.31 V | 167 | 40.30 | 5.17 |
| 6 | 4960.00 | 22.97 AV | 54.00 | -31.03 | 1.31 V | 167 | 17.80 | 5.17 |
| 7 | 7440.00 | 50.05 PK | 74.00 | -23.95 | 1.10 V | 0 | 41.15 | 8.90 |
| 8 | 7440.00 | 27.55 AV | 54.00 | -26.45 | 1.10 V | 0 | 18.65 | 8.90 |

**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.

## 4.3 6dB BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz

### 4.3.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Power Sensor | Keysight | U2021XA | MY55060016 | Jun. 13,18 | Jun. 12,19 |
| Power Sensor | Keysight | U2021XA | MY55060018 | Jun. 13,18 | Jun. 12,19 |
| Power Meter | Anritsu | ML2495A | 1139001 | Apr. 13,18 | Apr. 13,19 |
| Power Sensor | Anritsu | MA2411B | 1531155 | Apr. 13,18 | Apr. 13,19 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 21, 18 | Oct.20, 19 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,18 | Sep. 04,19 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 08,18 | Nov. 07,19 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 08,18 | Nov. 07,19 |
| Signal Generator | Agilent | N5183A | MY50140980 | Jan. 02,18 | Jan. 01,19 |
| Agile Signal Generator | Agilent | 8645A | Agilent | Sep.01, 18 | Aug.31, 19 |
| Spectrum Analyzer | Keysight | N9020A | MY55400499 | Mar. 21,18 | Mar. 20,19 |
| MXG-B RF Vector Signal Generator | Keysight | N5182B | MY56200288 | Jan. 02,18 | Jan. 01,19 |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Jul.06, 18 | Jul. 05, 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.

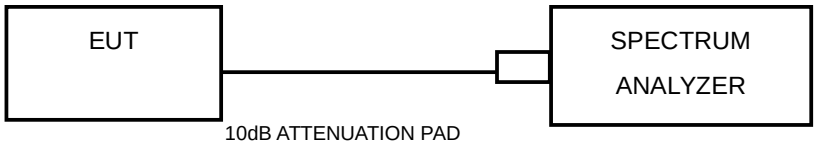
### 4.3.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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 6 dB relative to the maximum level measured in the fundamental emission.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

### 4.3.5 TEST SETUP



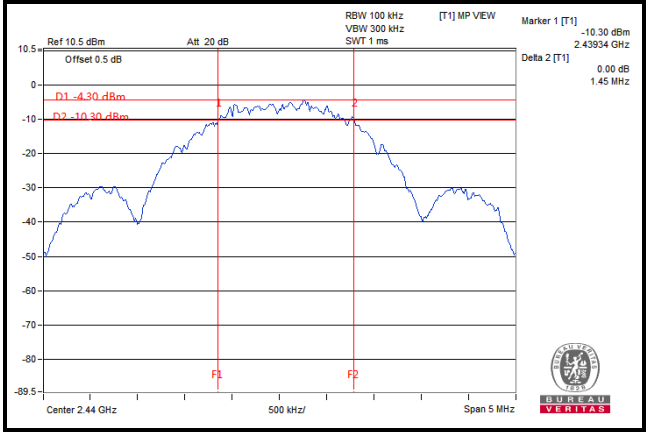

### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.3.7 TEST RESULTS

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 11 | 2405 | 1.05 | 0.5 | PASS |
| 18 | 2440 | 1.45 | 0.5 | PASS |
| 26 | 2480 | 1.19 | 0.5 | PASS |

**SPECTRUM PLOT OF WORST VALUE**

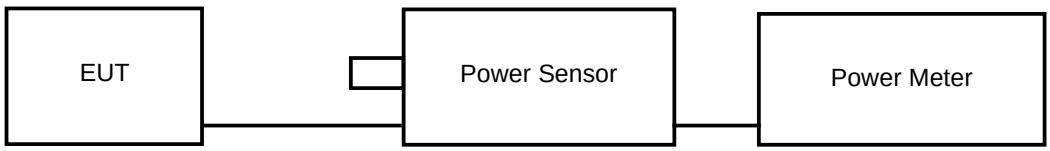


## 4.4 MAXIMUM OUTPUT POWER

### 4.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

For DTSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W(30dBm). The e.i.r.p. shall not exceed 4 W(36dBm)

### 4.4.2 TEST SETUP




10dB ATTENUATION PAD

### 4.4.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Power Sensor | Keysight | U2021XA | MY55060016 | Jun. 13,18 | Jun. 12,19 |
| Power Sensor | Keysight | U2021XA | MY55060018 | Jun. 13,18 | Jun. 12,19 |
| Power Meter | Anritsu | ML2495A | 1139001 | Apr. 13,18 | Apr. 13,19 |
| Power Sensor | Anritsu | MA2411B | 1531155 | Apr. 13,18 | Apr. 13,19 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 21, 18 | Oct.20, 19 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,18 | Sep. 04,19 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 08,18 | Nov. 07,19 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 08,18 | Nov. 07,19 |
| Signal Generator | Agilent | N5183A | MY50140980 | Jan. 02,18 | Jan. 01,19 |
| Agile Signal Generator | Agilent | 8645A | Agilent | Sep.01, 18 | Aug.31, 19 |
| Spectrum Analyzer | Keysight | N9020A | MY55400499 | Mar. 21,18 | Mar. 20,19 |
| MXG-B RF Vector Signal Generator | Keysight | N5182B | MY56200288 | Jan. 02,18 | Jan. 01,19 |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Jul.06, 18 | Jul. 05, 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.

### 4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A peak power meter was used to read the response of the peak power sensor. Record the peak power level.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.4.7 TEST RESULTS

### MAXIMUM OUTPUT POWER

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER (dBm) | PEAK POWER (mW) | EIRP (mW) | PEAK POWER LIMIT (W) | EIRP LIMIT (W) | PASS/FAIL |
|---|---|---|---|---|---|---|---|
| 11 | 2405 | **0.61** | **1.1510** | **1.1510** | 1 | 4 | PASS |
| 18 | 2440 | 0.32 | 1.0760 | 1.0760 | 1 | 4 | PASS |
| 26 | 2480 | -0.17 | 0.9616 | 0.9616 | 1 | 4 | PASS |

### AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

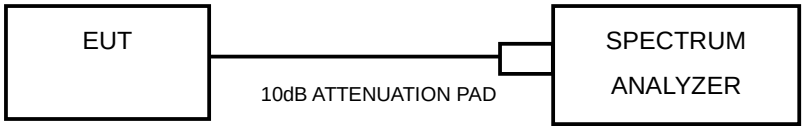
| CHANNEL | CHANNEL FREQUENCY(MHz) | AVERAGE POWER (dBm) | AVG. POWER (mW) |
|---|---|---|---|
| 11 | 2405 | **-1.10** | **0.7762** |
| 18 | 2440 | -1.41 | 0.7228 |
| 26 | 2480 | -1.80 | 0.6607 |

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

### 4.5.2 TEST SETUP




### 4.5.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Power Sensor | Keysight | U2021XA | MY55060016 | Jun. 13,18 | Jun. 12,19 |
| Power Sensor | Keysight | U2021XA | MY55060018 | Jun. 13,18 | Jun. 12,19 |
| Power Meter | Anritsu | ML2495A | 1139001 | Apr. 13,18 | Apr. 13,19 |
| Power Sensor | Anritsu | MA2411B | 1531155 | Apr. 13,18 | Apr. 13,19 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 21, 18 | Oct.20, 19 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,18 | Sep. 04,19 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 08,18 | Nov. 07,19 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 08,18 | Nov. 07,19 |
| Signal Generator | Agilent | N5183A | MY50140980 | Jan. 02,18 | Jan. 01,19 |
| Agile Signal Generator | Agilent | 8645A | Agilent | Sep.01, 18 | Aug.31, 19 |
| Spectrum Analyzer | Keysight | N9020A | MY55400499 | Mar. 21,18 | Mar. 20,19 |
| MXG-B RF Vector Signal Generator | Keysight | N5182B | MY56200288 | Jan. 02,18 | Jan. 01,19 |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Jul.06, 18 | Jul. 05, 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.

### 4.5.4 TEST PROCEDURE

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to 1.5 times the DTS Bandwidth.
c) Set RBW to: 3KHz
d) Set VBW ≥3 x RBW.
e) Detector = peak
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Use the peak marker function to determine the maximum amplitude level.

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

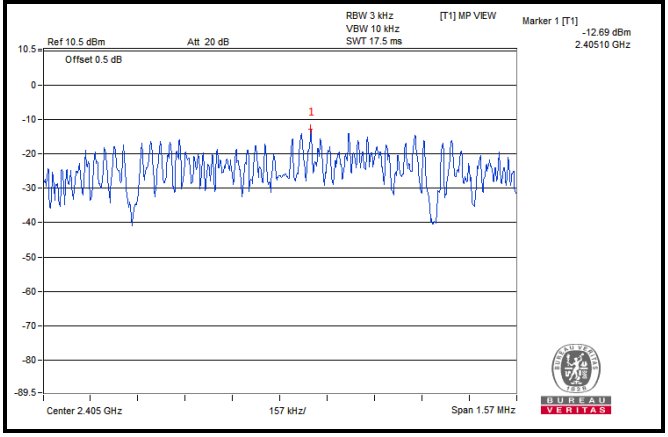
### 4.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.5.7 TEST RESULTS

| Channel | FREQ. (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---|---|---|---|---|
| 11 | 2405 | -12.69 | 8.00 | PASS |
| 18 | 2440 | -13.15 | 8.00 | PASS |
| 26 | 2480 | -13.58 | 8.00 | PASS |

**SPECTRUM PLOT OF WORST VALUE**

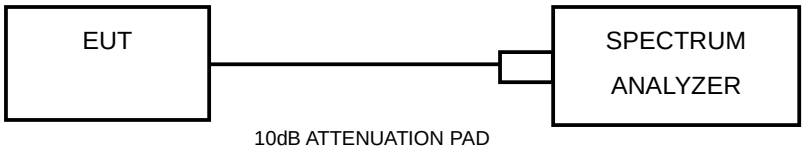


## 4.6 OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP




### 4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

**MEASUREMENT PROCEDURE REF**

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

**MEASUREMENT PROCEDURE OOBE**

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

## 4.6.5 DEVIATION FROM TEST STANDARD

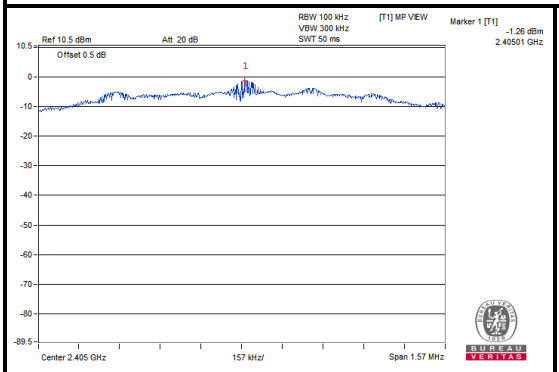
No deviation.

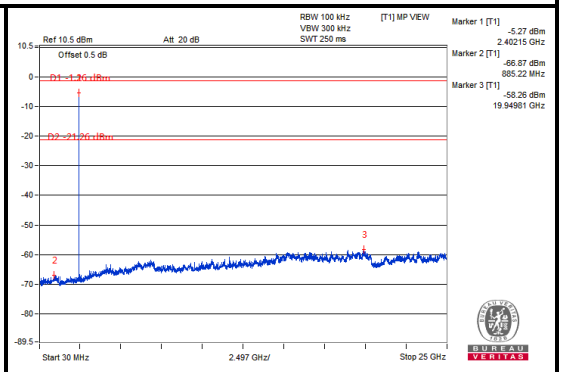
## 4.6.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

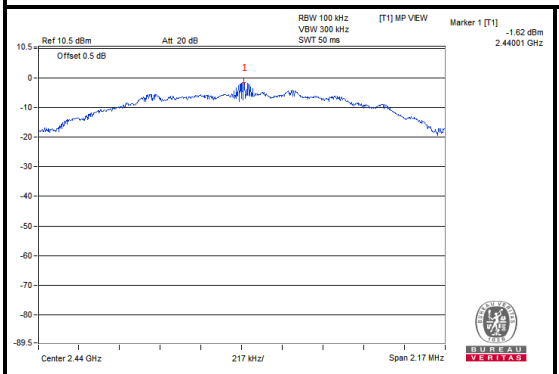
## 4.6.7 TEST RESULTS

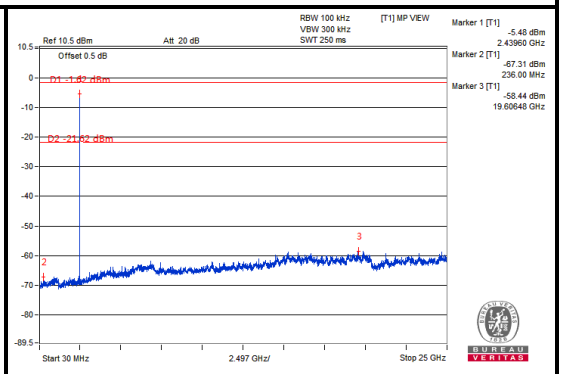
**CH 11**



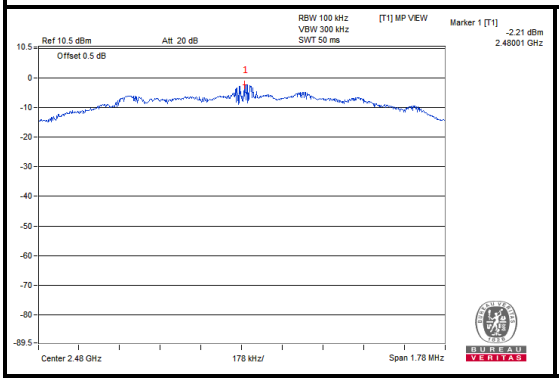



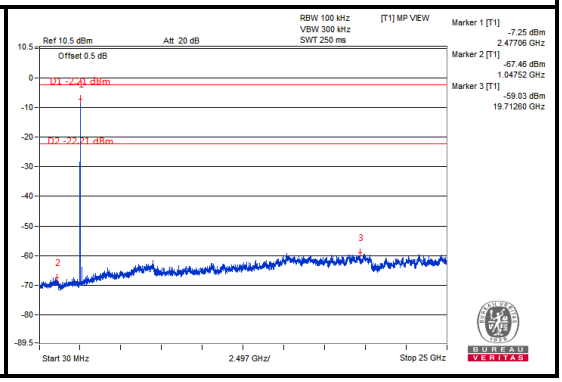

**CH 18**

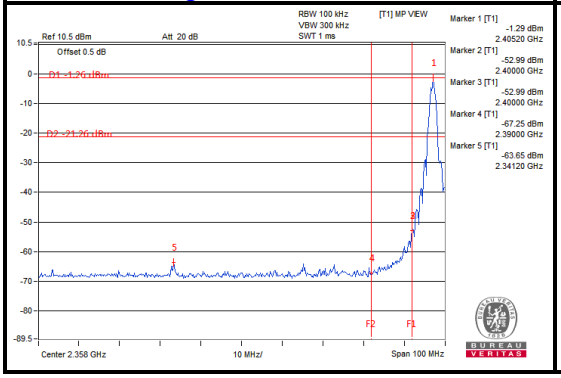
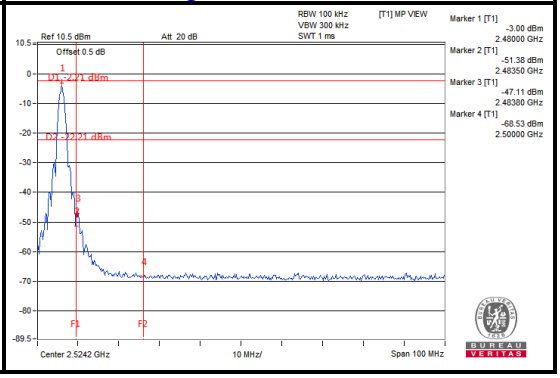



**CH 26**



| CH 11 Band edge | CH 26 Band edge |
| --- | --- |
|  |  |

## 4.7 OCCUPIED BANDWIDTH MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Power Sensor | Keysight | U2021XA | MY55060016 | Jun. 13,18 | Jun. 12,19 |
| Power Sensor | Keysight | U2021XA | MY55060018 | Jun. 13,18 | Jun. 12,19 |
| Power Meter | Anritsu | ML2495A | 1139001 | Apr. 13,18 | Apr. 13,19 |
| Power Sensor | Anritsu | MA2411B | 1531155 | Apr. 13,18 | Apr. 13,19 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 21, 18 | Oct.20, 19 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,18 | Sep. 04,19 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Nov. 08,18 | Nov. 07,19 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 08,18 | Nov. 07,19 |
| Signal Generator | Agilent | N5183A | MY50140980 | Jan. 02,18 | Jan. 01,19 |
| Agile Signal Generator | Agilent | 8645A | Agilent | Sep.01, 18 | Aug.31, 19 |
| Spectrum Analyzer | Keysight | N9020A | MY55400499 | Mar. 21,18 | Mar. 20,19 |
| MXG-B RF Vector Signal Generator | Keysight | N5182B | MY56200288 | Jan. 02,18 | Jan. 01,19 |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Jul.06, 18 | Jul. 05, 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.

### 4.7.2 TEST PROCEDURE

The transmitter antenna output was connected to the spectrum analyzer through an attenuator. The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

Below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.7.3 DEVIATION FROM TEST STANDARD

No deviation.

### 4.7.4 TEST SETUP

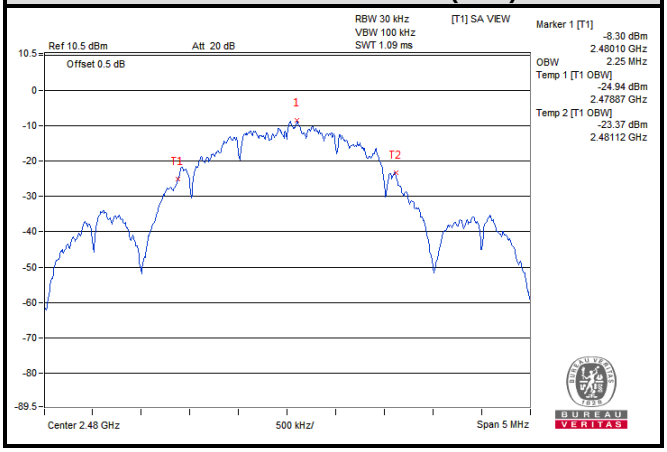

### 4.7.5 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.7.6 TEST RESULTS

| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---|---|---|
| 11 | 2405 | 2.23 |
| 18 | 2440 | 2.23 |
| 26 | 2480 | 2.25 |

**OCCUPIED BANDWIDTH (MHz)**



# 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---**