



FCC ID: QYLAP6255BC03  
Report No.: T181222W01-RP2

ISED: 10301A-AP6255BC03

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# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C

### INDUSTRY CANADA RSS-247

|               |                                                              |
|---------------|--------------------------------------------------------------|
| Test Standard | FCC Part 15.247<br>IC RSS-247 issue 2 and IC RSS-GEN issue 5 |
| Product name  | Body Worn Camera                                             |
| Brand Name    | Getac                                                        |
| Model No.     | BC-03                                                        |
| Test Result   | Pass                                                         |

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.( Wugu Laboratory)

Approved by:

Tested by:

Kevin Tsai  
Deputy Manager

Jerry Chuang  
Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
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## **Revision History**

| Rev. | Issue Date     | Revisions     | Effect Page | Revised By |
|------|----------------|---------------|-------------|------------|
| 00   | April 18, 2019 | Initial Issue | ALL         | May Lin    |

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## 1. GENERAL INFORMATION

### 1.1 EUT INFORMATION

|                   |                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------|
| Applicant         | Getac Technology Corp.<br>5F, Building A2, No.209, Sec.1, Nangang Rd., Nangang Dist.,<br>Taipei City 11568, Taiwan. |
| Manufacturer      | Getac Technology Corp.<br>4F., NO.1, R&D ROAD 2, SCIENCE PARK, HSINCHU, TAIWAN,<br>R.O.C.                           |
| Equipment         | Body Worn Camera                                                                                                    |
| Model No.         | BC-03                                                                                                               |
| Model Discrepancy | N/A                                                                                                                 |
| Trade Name        | Getac                                                                                                               |
| Received Date     | December 22, 2018                                                                                                   |
| Date of Test      | January 18 ~ February 20, 2019                                                                                      |
| Output Power (W)  | BLE: 0.0039 (EIRP: 0.0042)                                                                                          |
| Power Supply      | 1. Powered from battery: DC 5V<br>2. Powered from docking                                                           |
| H/W Version       | PWA-BWC-BC-03                                                                                                       |
| F/W Version       | 4.0.                                                                                                                |

## 1.2 EUT CHANNEL INFORMATION

|                   |                    |
|-------------------|--------------------|
| Frequency Range   | 2402MHz-2480MHz    |
| Modulation Type   | GFSK for BLE-1Mbps |
| Number of channel | 40 Channels        |

### Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 and RSS-GEN Table 1 for test channels

| Number of frequencies to be tested                   |                       |                                              |
|------------------------------------------------------|-----------------------|----------------------------------------------|
| Frequency range in which device operates             | Number of frequencies | Location in frequency range of operation     |
| <input type="checkbox"/> 1 MHz or less               | 1                     | Middle                                       |
| <input type="checkbox"/> 1 MHz to 10 MHz             | 2                     | 1 near top and 1 near bottom                 |
| <input checked="" type="checkbox"/> More than 10 MHz | 3                     | 1 near top, 1 near middle, and 1 near bottom |

## 1.3 ANTENNA INFORMATION

|                   |                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type      | <input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils |
| Antenna Gain      | Gain: 0.36 dBi                                                                                                                       |
| Antenna Connector | NA                                                                                                                                   |

## 1.4 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| AC Powerline Conducted Emission       | +/- 2.96    |
| Emission bandwidth, 20dB bandwidth    | +/- 1.4003  |
| RF output power, conducted            | +/- 1.1372  |
| Power density, conducted              | +/- 1.4003  |
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.0138  |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483  |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 2.5975  |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 2.6112  |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 2.7389  |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 2.9683  |

**Remark:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

## 1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

| Test site          | Test Engineer | Remark |
|--------------------|---------------|--------|
| AC Conduction Room | Dally Hong    |        |
| Radiation          | Jerry Chuang  |        |
| RF Conducted       | Jerry Chuang  |        |

**Remark:** The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.6 INSTRUMENT CALIBRATION

| RF Conducted Test Site |              |         |         |            |            |
|------------------------|--------------|---------|---------|------------|------------|
| Equipment              | Manufacturer | Model   | S/N     | Cal Date   | Cal Due    |
| Coaxial Cable          | Woken        | WC12    | CC002   | 06/29/2018 | 06/28/2019 |
| Power Meter            | Anritsu      | ML2495A | 1149001 | 02/06/2018 | 02/05/2019 |
| Power Seneor           | Anritsu      | MA2491A | 030982  | 02/07/2018 | 02/06/2019 |
| Signal Analyzer        | R&S          | FSV 40  | 101073  | 09/27/2018 | 09/26/2019 |

| 3M 966 Chamber Test Site         |                |                 |             |            |            |
|----------------------------------|----------------|-----------------|-------------|------------|------------|
| Equipment                        | Manufacturer   | Model           | S/N         | Cal Date   | Cal Due    |
| Band Reject Filters              | MICRO TRONICS  | BRM 50702       | 120         | 05/14/2018 | 05/13/2019 |
| Bilog Antenna                    | Sunol Sciences | JB3             | A030105     | 07/13/2018 | 07/12/2019 |
| Cable                            | HUBER SUHNER   | SUCOFLEX 104PEA | 25157       | 06/29/2018 | 06/28/2019 |
| Cable                            | HUBER SUHNER   | SUCOFLEX 104PEA | 20995       | 06/29/2018 | 06/28/2019 |
| Digital Thermo-Hygro Meter       | WISEWIND       | 1206            | D07         | 02/08/2018 | 02/07/2019 |
| double Ridged Guide Horn Antenna | ETC            | MCTD 1209       | DRH13M02003 | 08/20/2018 | 08/19/2019 |
| Loop Ant                         | COM-POWER      | AL-130          | 121051      | 03/21/2018 | 03/20/2019 |
| Pre-Amplifier                    | EMEC           | EM330           | 060609      | 06/29/2018 | 06/28/2019 |
| Pre-Amplifier                    | HP             | 8449B           | 3008A00965  | 06/29/2018 | 06/28/2019 |
| PSA Series Spectrum Analyzer     | Agilent        | E4446A          | MY46180323  | 05/31/2018 | 05/30/2019 |
| Antenna Tower                    | CCS            | CC-A-1F         | N/A         | N.C.R      | N.C.R      |
| Controller                       | CCS            | CC-C-1F         | N/A         | N.C.R      | N.C.R      |
| Turn Table                       | CCS            | CC-T-1F         | N/A         | N.C.R      | N.C.R      |

**Remark:** Each piece of equipment is scheduled for calibration once a year.



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| AC Conducted Emissions Test Site |              |           |          |            |            |
|----------------------------------|--------------|-----------|----------|------------|------------|
| Equipment                        | Manufacturer | Model     | S/N      | Cal Date   | Cal Due    |
| CABLE                            | EMCI         | CFD300-NL | CERF     | 06/29/2018 | 06/28/2019 |
| EMI Test Receiver                | R&S          | ESCI      | 100064   | 07/24/2018 | 07/23/2019 |
| LISN                             | SCHWARZBECK  | NSLK 8127 | 8127-541 | 01/31/2019 | 01/30/2020 |
| LISN                             | SCHAFFNER    | NNB 41    | 03/10013 | 02/13/2019 | 02/12/2020 |

**Remark:** Each piece of equipment is scheduled for calibration once a year.



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## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

| EUT Accessories Equipment |           |       |       |            |        |
|---------------------------|-----------|-------|-------|------------|--------|
| No.                       | Equipment | Brand | Model | Series No. | FCC ID |
|                           | N/A       |       |       |            |        |

| Support Equipment |           |         |               |            |          |
|-------------------|-----------|---------|---------------|------------|----------|
| No.               | Equipment | Brand   | Model         | Series No. | FCC ID   |
| 1                 | NB(B)     | Toshiba | PORTEGE R30-A | N/A        | PD97260H |

## 1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074 D01, RSS-247 Issue 2 and RSS-GEN Issue 5

.

## 2. TEST SUMMERY

| FCC Standard Section | IC Standard Section | Report Section | Test Item                   | Result |
|----------------------|---------------------|----------------|-----------------------------|--------|
| 15.203               | -                   | 1.3            | Antenna Requirement         | Pass   |
| 15.207(a)            | RSS-GEN 8.8         | 4.1            | AC Conducted Emission       | Pass   |
| 15.247(a)(2)         | RSS-247(5.2)(a)     | 4.2            | 6 dB Bandwidth              | Pass   |
| -                    | RSS-GEN 6.7         | 4.2            | Occupied Bandwidth (99%)    | Pass   |
| 15.247(b)(3)         | RSS-247(5.4)(d)     | 4.3            | Output Power Measurement    | Pass   |
| 15.247(e)            | RSS-247(5.2)(b)     | 4.4            | Power Spectral Density      | Pass   |
| 15.247(d)            | RSS-247(5.5)        | 4.5            | Conducted Band Edge         | Pass   |
| 15.247(d)            | RSS-247(5.5)        | 4.5            | Conducted Spurious Emission | Pass   |
| 15.247(d)            | RSS-GEN 8.9, 8.10   | 4.6            | Radiation Band Edge         | Pass   |
| 15.247(d)            | RSS-GEN 8.9, 8.10   | 4.6            | Radiation Spurious Emission | Pass   |

### 3. DESCRIPTION OF TEST MODES

#### 3.1 THE WORST MODE OF OPERATING CONDITION

|                          |                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------|
| Operation mode           | BT4.0 Mode (1Mbps)                                                                      |
| Test Channel Frequencies | 1. Lowest Channel: 2402MHz<br>2. Middle Channel: 2440MHz<br>3. Highest Channel: 2480MHz |

*Remark:*

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

.

### 3.2 THE WORST MODE OF MEASUREMENT

| AC Power Line Conducted Emission |                                                                                                                                            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                   | AC Power line conducted emission for line and neutral                                                                                      |
| Power supply Mode                | Mode 1: EUT power by Docking (MD-03_8 Port)<br>Mode 2: EUT power by Docking (VD-03_1 Port)                                                 |
| Worst Mode                       | <input type="checkbox"/> Mode 1 <input checked="" type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

| Radiated Emission Measurement Above 1G |                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Band edge, Emission for Unwanted and Fundamental                                                                                                                                                                                                                                              |
| Power supply Mode                      | Mode 1: EUT power by Battery<br>Mode 2: EUT power by Docking (MD-03_8 Port)<br>Mode 3: EUT power by Docking (VD-03_1 Port)                                                                                                                                                                    |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4                                                                                                                                                    |
| Worst Position                         | <input type="checkbox"/> Placed in fixed position.<br><input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane)<br><input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane)<br><input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane) |
| Worst Polarity                         | <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical                                                                                                                                                                                                              |

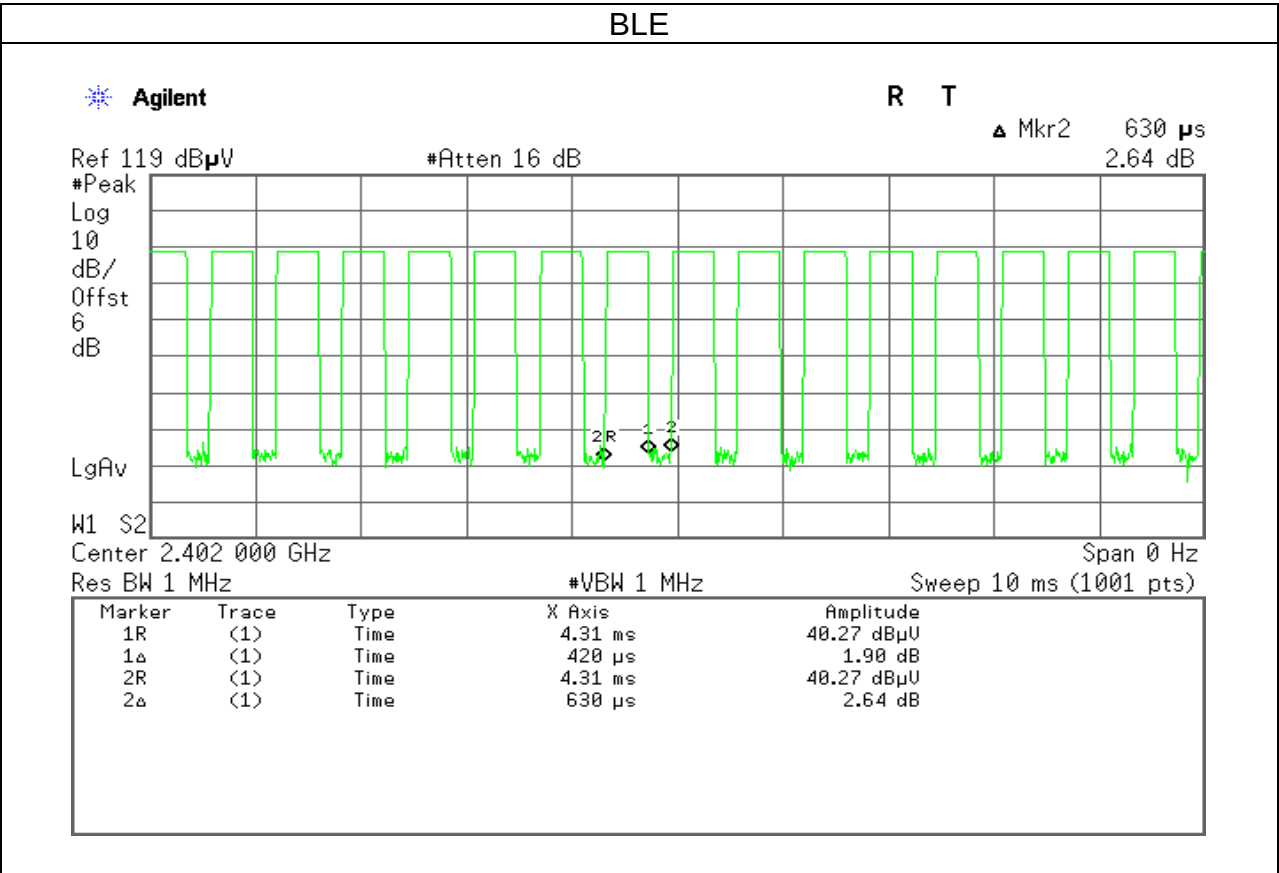
| Radiated Emission Measurement Below 1G |                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Test Condition                         | Radiated Emission Below 1G                                                                                                                 |
| Power supply Mode                      | Mode 1: EUT power by Battery<br>Mode 2: EUT power by Docking (MD-03_8 Port)<br>Mode 3: EUT power by Docking (VD-03_1 Port)                 |
| Worst Mode                             | <input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4 |

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis, X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (X-Plane and Horizontal) were recorded in this report

3.3 EUT DUTY CYCLE

| Duty Cycle    |            |             |                |
|---------------|------------|-------------|----------------|
| Configuration | TX ON (ms) | TX ALL (ms) | Duty Cycle (%) |
| BLE           | 420.0000   | 630.0000    | 66.67%         |



## 4. TEST RESULT

### 4.1 AC POWER LINE CONDUCTED EMISSION

#### 4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

| Frequency Range<br>(MHz) | Limits(dB $\mu$ V) |           |
|--------------------------|--------------------|-----------|
|                          | Quasi-peak         | Average   |
| 0.15 to 0.50             | 66 to 56*          | 56 to 46* |
| 0.50 to 5                | 56                 | 46        |
| 5 to 30                  | 60                 | 50        |

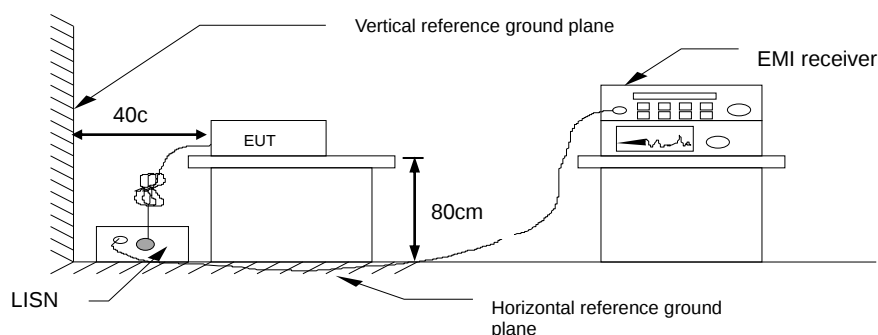
\* Decreases with the logarithm of the frequency.

#### 4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

#### 4.1.3 Test Setup

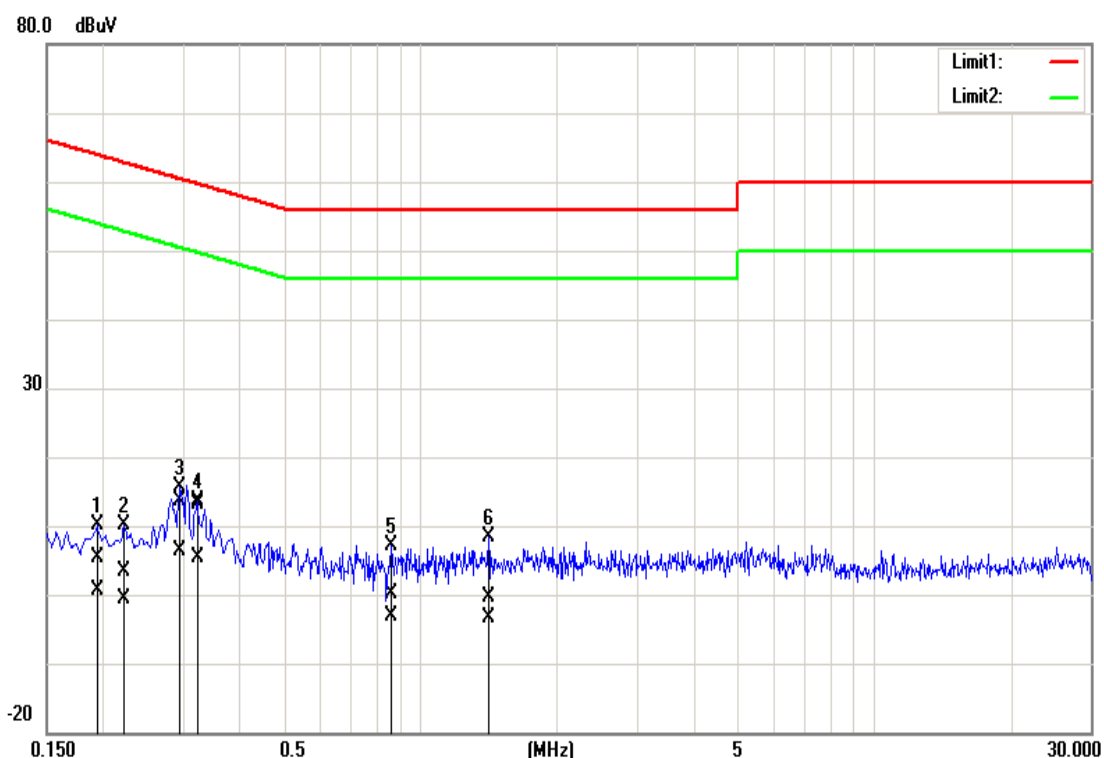


#### 4.1.4 Test Result

**Pass**

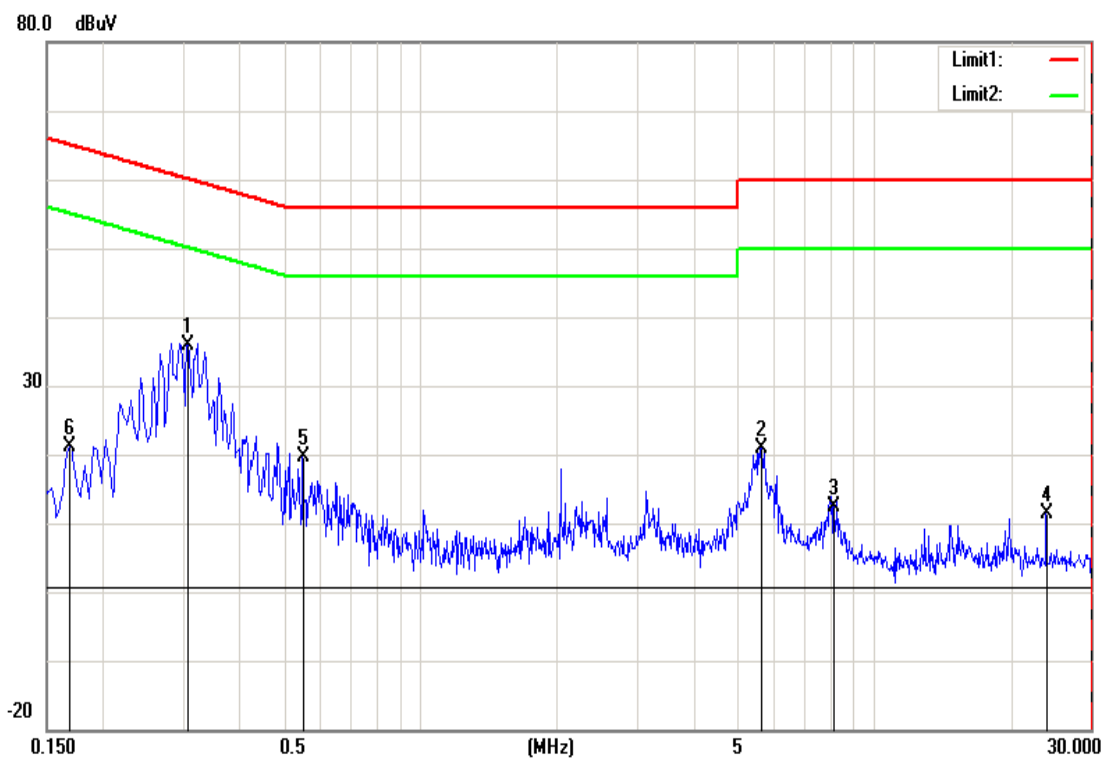
## Test Data

|            |        |               |                   |
|------------|--------|---------------|-------------------|
| Test Mode: | Mode 2 | Temp/Hum      | 24(°C)/ 50%RH     |
| Phase:     | Line   | Test Date     | February 20, 2019 |
|            |        | Test Engineer | Dally Hong        |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.1924          | 5.16                      | 0.51                   | 0.16                   | 5.32                     | 0.67                  | 63.93                   | 53.93                | -58.61                 | -53.26              | Pass   |
| 0.2220          | 3.20                      | -0.87                  | 0.16                   | 3.36                     | -0.71                 | 62.74                   | 52.74                | -59.38                 | -53.45              | Pass   |
| 0.2940          | 13.43                     | 6.26                   | 0.16                   | 13.59                    | 6.42                  | 60.41                   | 50.41                | -46.82                 | -43.99              | Pass   |
| 0.3200          | 12.83                     | 5.24                   | 0.18                   | 13.01                    | 5.42                  | 59.71                   | 49.71                | -46.70                 | -44.29              | Pass   |
| 0.8660          | -0.12                     | -3.44                  | 0.20                   | 0.08                     | -3.24                 | 56.00                   | 46.00                | -55.92                 | -49.24              | Pass   |
| 1.4180          | -0.50                     | -3.68                  | 0.21                   | -0.29                    | -3.47                 | 56.00                   | 46.00                | -56.29                 | -49.47              | Pass   |

|            |         |               |                   |
|------------|---------|---------------|-------------------|
| Test Mode: | Mode 2  | Temp/Hum      | 24(°C)/ 50%RH     |
| Phase:     | Neutral | Test Date     | February 20, 2019 |
|            |         | Test Engineer | Dally Hong        |



| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (dBu ) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|-----------------|---------------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|----------------------|------------------------|---------------------|--------|
| 0.1685          | 19.86                     | 13.99                  | 0.19                   | 20.05                    | 14.18                 | 65.03                   | 55.03                | -44.98                 | -40.85              | Pass   |
| 0.3067          | 35.65                     | 27.76                  | 0.19                   | 35.84                    | 27.95                 | 60.06                   | 50.06                | -24.22                 | -22.11              | Pass   |
| 0.5500          | 13.26                     | 6.62                   | 0.19                   | 13.45                    | 6.81                  | 56.00                   | 46.00                | -42.55                 | -39.19              | Pass   |
| 5.6060          | 12.81                     | 4.92                   | 0.35                   | 13.16                    | 5.27                  | 60.00                   | 50.00                | -46.84                 | -44.73              | Pass   |
| 8.1340          | 5.35                      | -2.92                  | 0.41                   | 5.76                     | -2.51                 | 60.00                   | 50.00                | -54.24                 | -52.51              | Pass   |
| 23.9180         | 6.74                      | 3.67                   | 0.74                   | 7.48                     | 4.41                  | 60.00                   | 50.00                | -52.52                 | -45.59              | Pass   |

## 4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

### 4.2.1 Test Limit

According to §15.247(a)(2) and RSS-247 section 5.2(a)

#### 6 dB Bandwidth :

|       |                          |
|-------|--------------------------|
| Limit | Shall be at least 500kHz |
|-------|--------------------------|

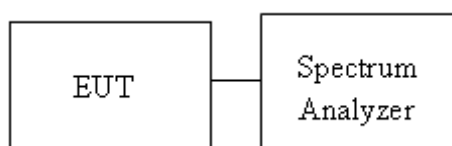
Occupied Bandwidth(99%) : For reporting purposes only.

### 4.2.2 Test Procedure

Test method Refer as KDB 558074 D01 and ANSI C63.10: 2013 clause 6.9.2.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

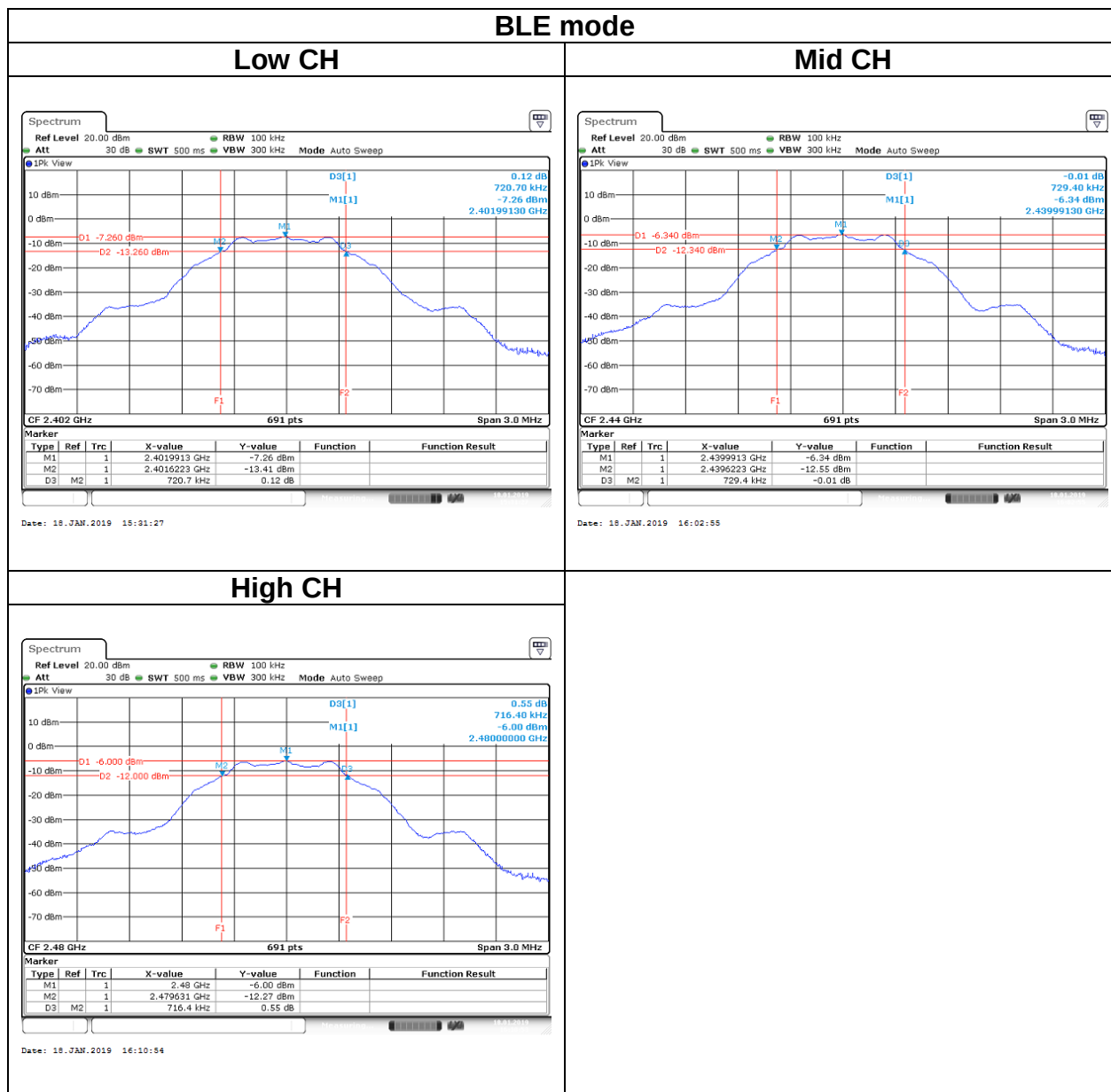
### 4.2.3 Test Setup



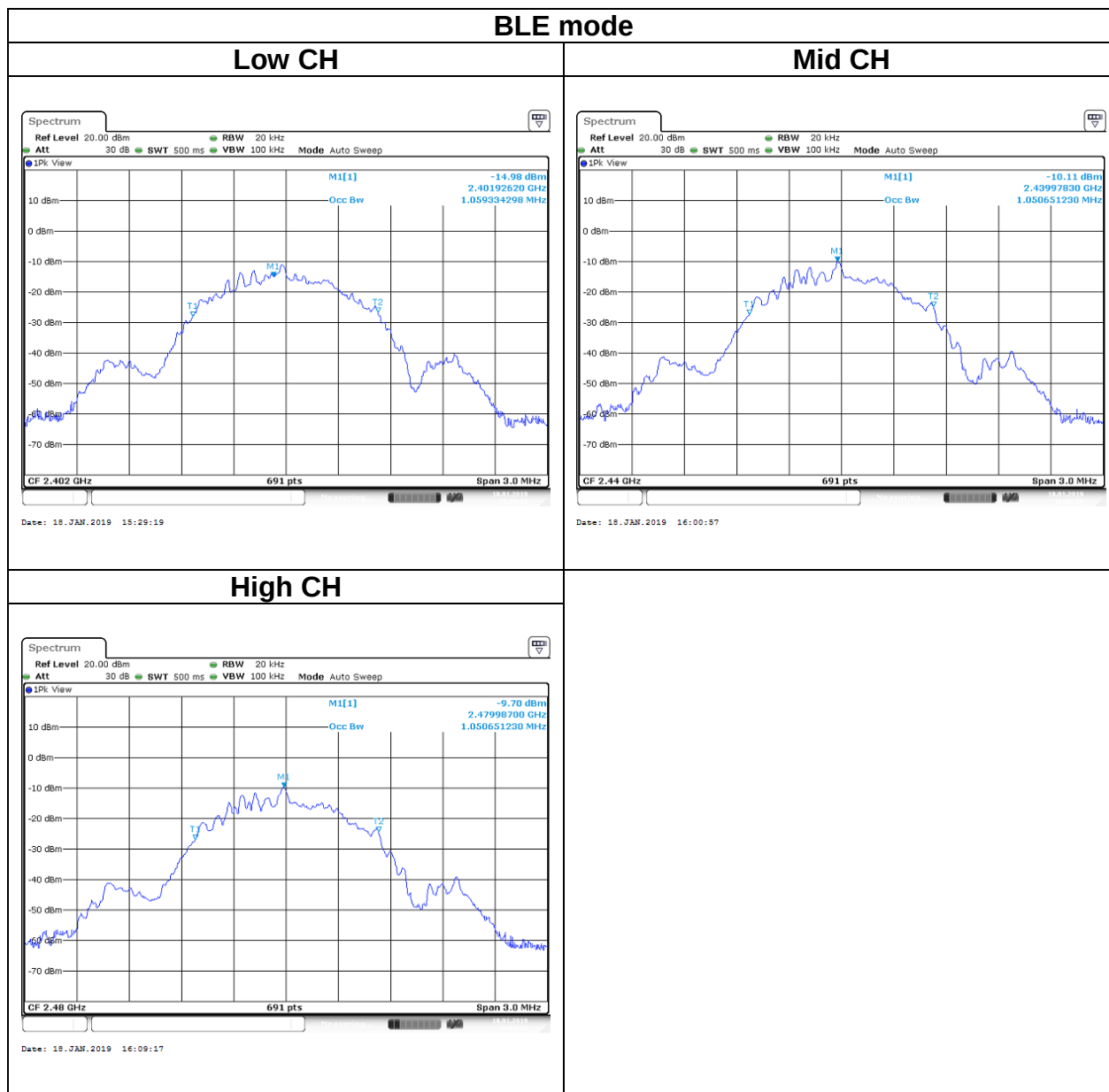
### 4.2.4 Test Result

| Test mode: BLE mode / 2402-2480 MHz |                 |                 |              |                 |
|-------------------------------------|-----------------|-----------------|--------------|-----------------|
| Channel                             | Frequency (MHz) | OBW (99%) (MHz) | 6dB BW (kHz) | 6dB limit (kHz) |
| Low                                 | 2402            | 1.0593          | 720.7        | >500            |
| Mid                                 | 2440            | 1.0506          | 729.4        |                 |
| High                                | 2480            | 1.0506          | 716.4        |                 |

## Test Data (6dB BANDWIDTH)



## Test Data (BANDWIDTH 99%)



## 4.3 OUTPUT POWER MEASUREMENT

### 4.3.1 Test Limit

According to §15.247(b)(3) and RSS-247 section 5.4(d)

**Peak output power** :

#### FCC

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

#### IC

For DTSSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

|       |                                                                                                                                                                                                                       |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi<br>[ Limit = 30 – (DG – 6) ]<br><input type="checkbox"/> Point-to-point operation |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

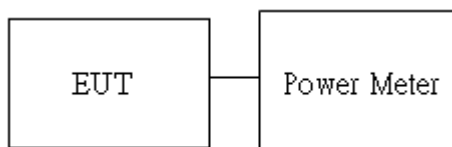
**Average output power** : For reporting purposes only.

### 4.3.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

### 4.3.3 Test Setup



### 4.3.4 Test Result

#### Peak output power :

| BLE Mode                   |    |             |                |                     |              |                   |                    |                    |
|----------------------------|----|-------------|----------------|---------------------|--------------|-------------------|--------------------|--------------------|
| Config.                    | CH | Freq. (MHz) | PK Power (dBm) | EIRP PK Power (dBm) | PK Power (W) | EIRP PK Power (W) | FCC/IC Limit (dBm) | FCC/IC Limit (dBm) |
| BLE<br>Data rate:<br>1Mbps | 0  | 2402        | 4.48           | 4.84                | 0.0028       | 0.0030            | 30                 | 36                 |
|                            | 19 | 2440        | 5.54           | 5.90                | 0.0036       | 0.0039            |                    |                    |
|                            | 39 | 2480        | 5.86           | 6.22                | 0.0039       | 0.0042            |                    |                    |

#### Average output power :

| BLE Mode                   |    |             |                |
|----------------------------|----|-------------|----------------|
| Config.                    | CH | Freq. (MHz) | AV Power (dBm) |
| BLE<br>Data rate:<br>1Mbps | 0  | 2402        | 4.38           |
|                            | 19 | 2440        | 5.41           |
|                            | 39 | 2480        | 5.73           |

## 4.4 POWER SPECTRAL DENSITY

### 4.4.1 Test Limit

According to §15.247(e) and RSS-247 section 5.2(b)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

|       |                                                                                                                                                                                                                       |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Limit | <input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 8dBm<br><input type="checkbox"/> Antenna with DG greater than 6 dBi<br>[ Limit = 8 – (DG – 6) ]<br><input type="checkbox"/> Point-to-point operation : |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 4.4.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss was compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

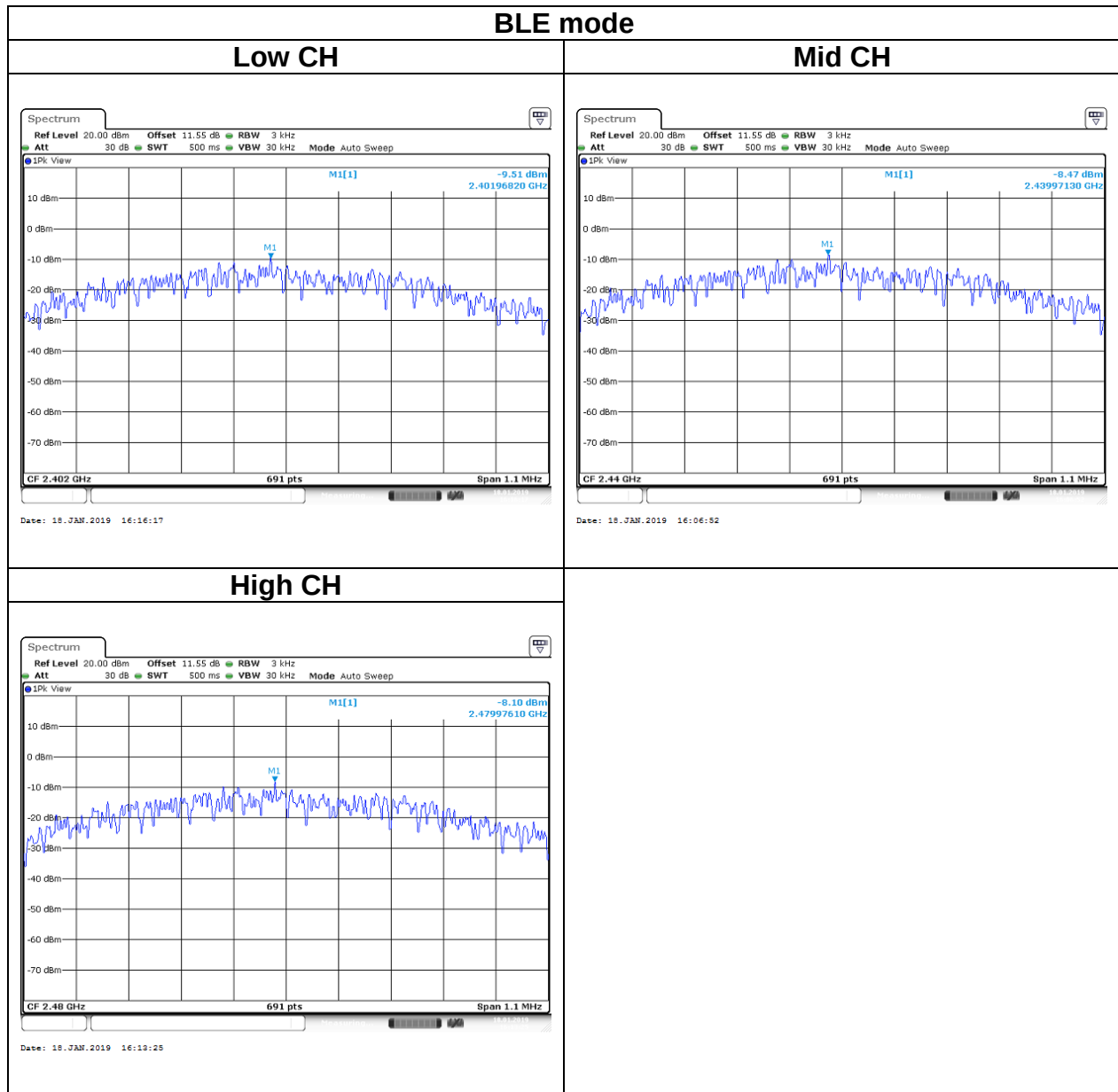
### 4.4.3 Test Setup



### 4.4.4 Test Result

| Test mode: BLE mode / 2402-2480 MHz |                 |           |                    |
|-------------------------------------|-----------------|-----------|--------------------|
| Channel                             | Frequency (MHz) | PSD (dBm) | IC/FCC limit (dBm) |
| Low                                 | 2402            | -9.51     | 8                  |
| Mid                                 | 2440            | -8.47     |                    |
| High                                | 2480            | -8.10     |                    |

## Test Data



## 4.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

### 4.5.1 Test Limit

According to §15.247(d) and RSS-247 section 5.5

**FCC:** In any 100 kHz bandwidth outside the authorized frequency band,

Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

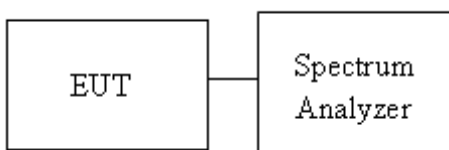
**IC:** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### 4.5.2 Test Procedure

Test method Refer as KDB 558074 D01

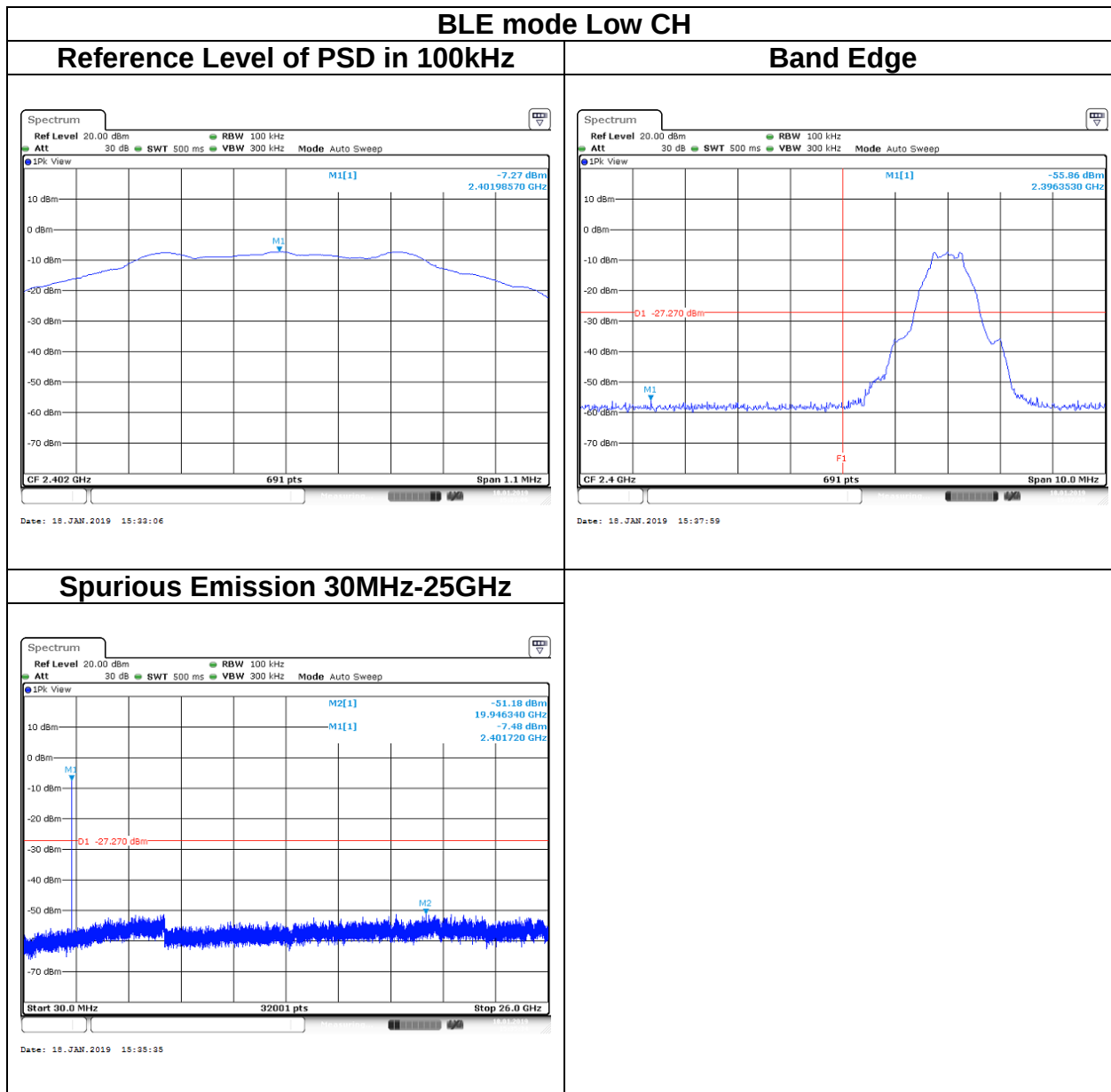
1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

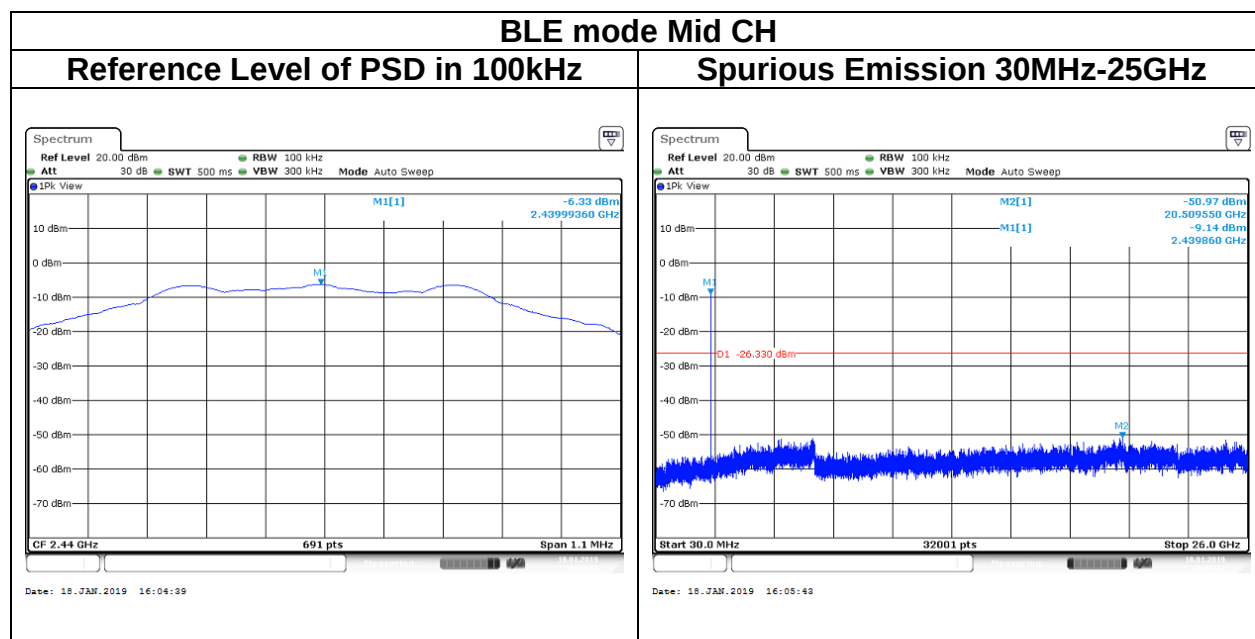
### 4.5.3 Test Setup

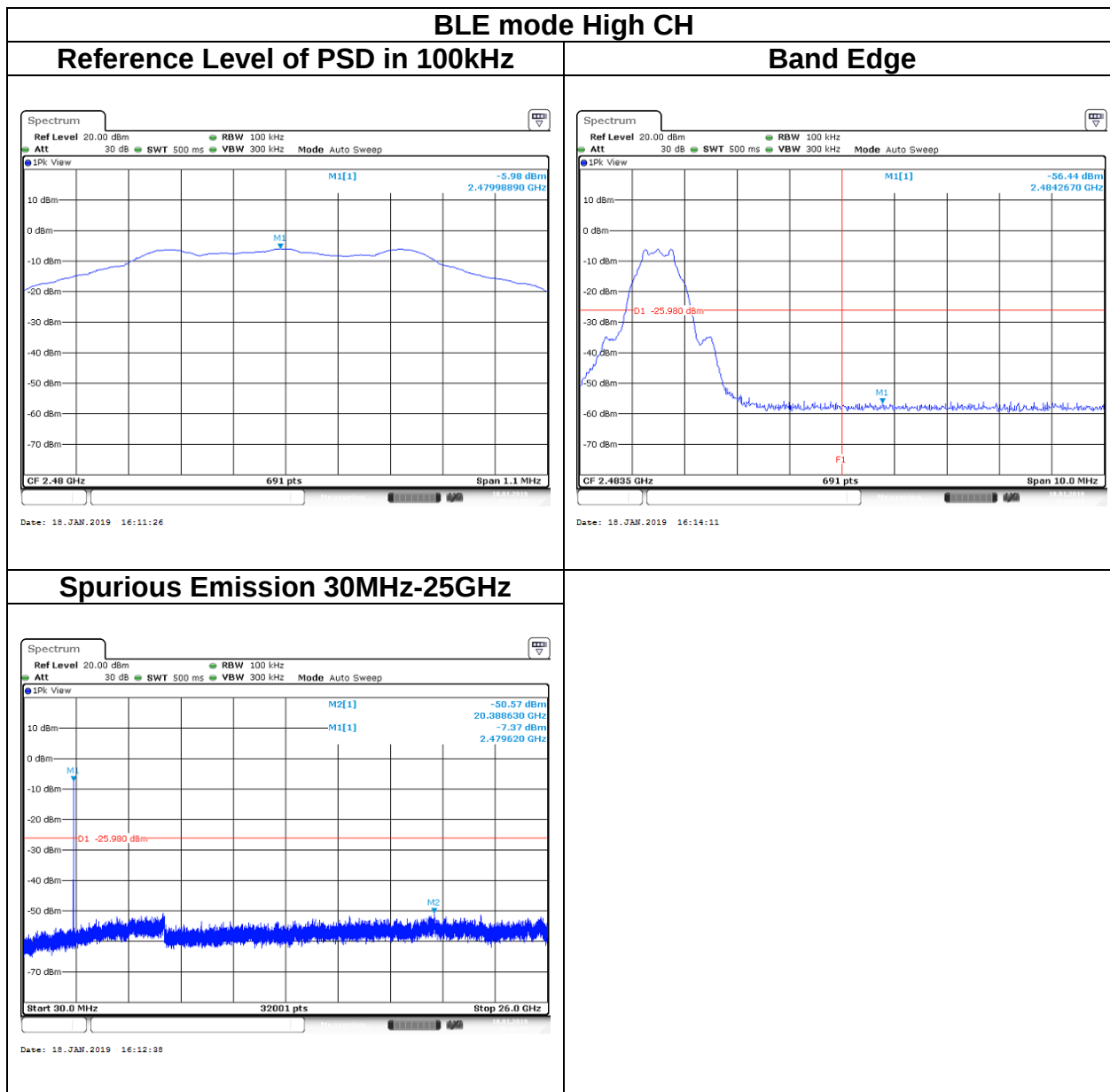


## 4.5.4 Test Result

### Test Data







## 4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

### 4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

IC according to RSS-247 section 5.5, RSS-Gen, Section 8.9 and 8.10

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

#### Below 30 MHz

| Frequency     | Field Strength<br>(microvolts/m) | Magnetic<br>H-Field<br>(microamperes/m) | Measurement<br>Distance<br>(metres) |
|---------------|----------------------------------|-----------------------------------------|-------------------------------------|
| 9-490 kHz     | 2,400/F (F in kHz)               | 2,400/F (F in kHz)                      | 300                                 |
| 490-1,705 kHz | 24,000/F (F in kHz)              | 24,000/F (F in kHz)                     | 30                                  |
| 1.705-30 MHz  | 30                               | N/A                                     | 30                                  |

#### Above 30 MHz

| Frequency<br>(MHz) | Field Strength<br>microvolts/m at 3 metres (watts, e.i.r.p.) |              |
|--------------------|--------------------------------------------------------------|--------------|
|                    | Transmitters                                                 | Receivers    |
| 30-88              | 100 (3 nW)                                                   | 100 (3 nW)   |
| 88-216             | 150 (6.8 nW)                                                 | 150 (6.8 nW) |
| 216-960            | 200 (12 nW)                                                  | 200 (12 nW)  |
| Above 960          | 500 (75 nW)                                                  | 500 (75 nW)  |

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

## 4.6.2 Test Procedure

Test method Refer as KDB 558074 D01

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9KHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

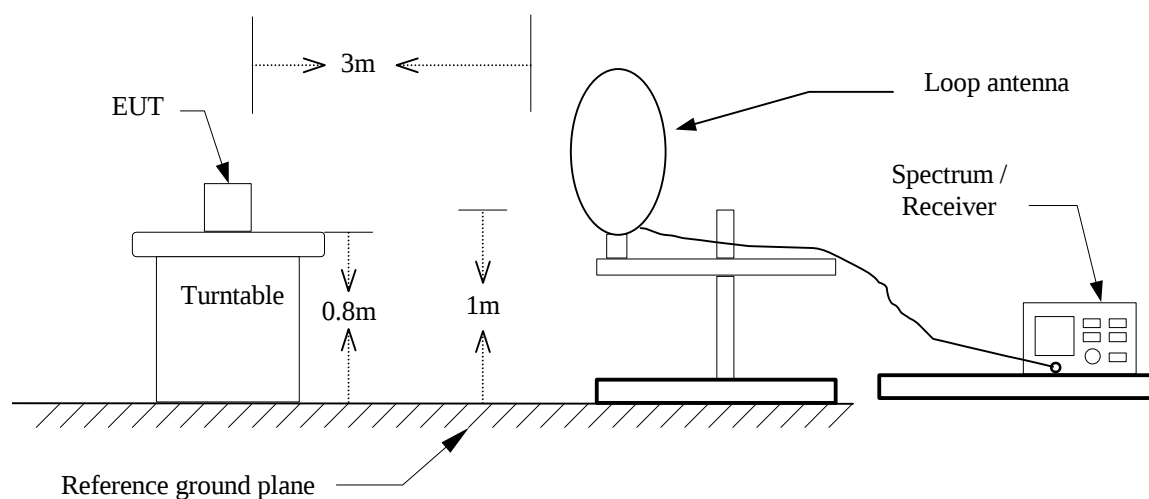
5. The SA setting following :

- (1) Below 1G : RBW = 100kHz, VBW  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
- (2) Above 1G :
  - (2.1) For Peak measurement : RBW = 1MHz, VBW  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
  - (2.2) For Average measurement : RBW = 1MHz, VBW
    - \*If Duty Cycle  $\geq$  98%, VBW=10Hz.
    - \*If Duty Cycle < 98%, VBW=1/T.

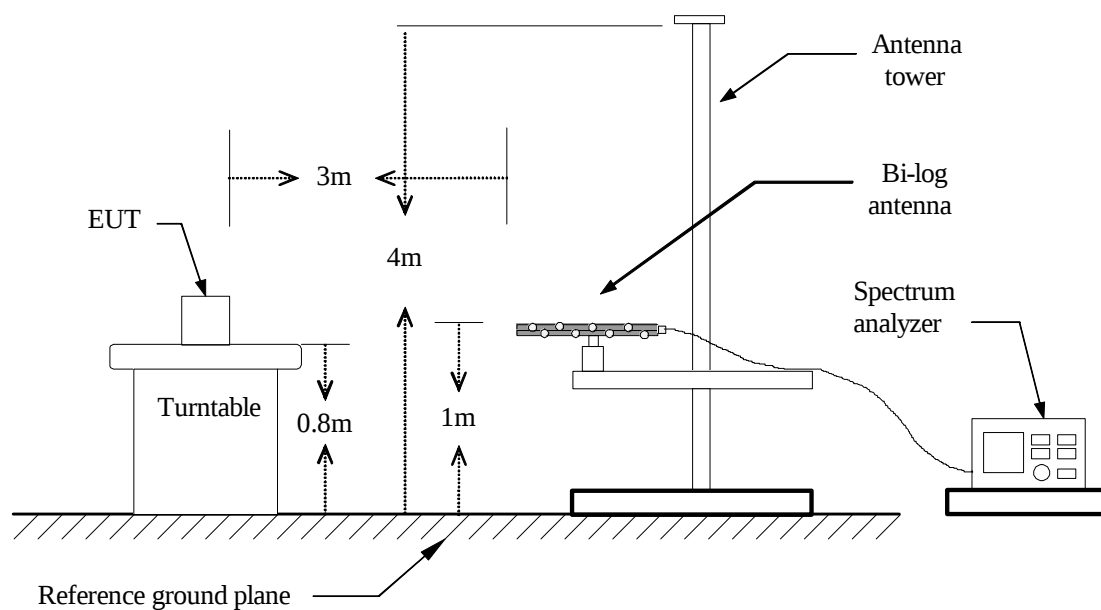
| Configuration | Duty Cycle (%) | T(ms)    | 1/T (kHz) | VBW Setting |
|---------------|----------------|----------|-----------|-------------|
| BLE           | 66.67%         | 420.0000 | 0.002     | 300Hz       |

### 4.6.3 Test Setup

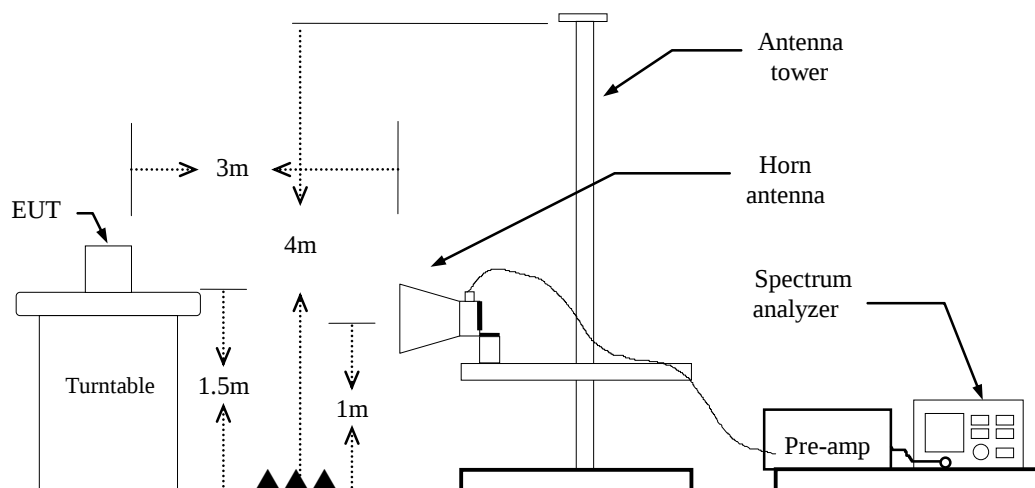
#### 9kHz ~ 30MHz



#### 30MHz ~ 1GHz

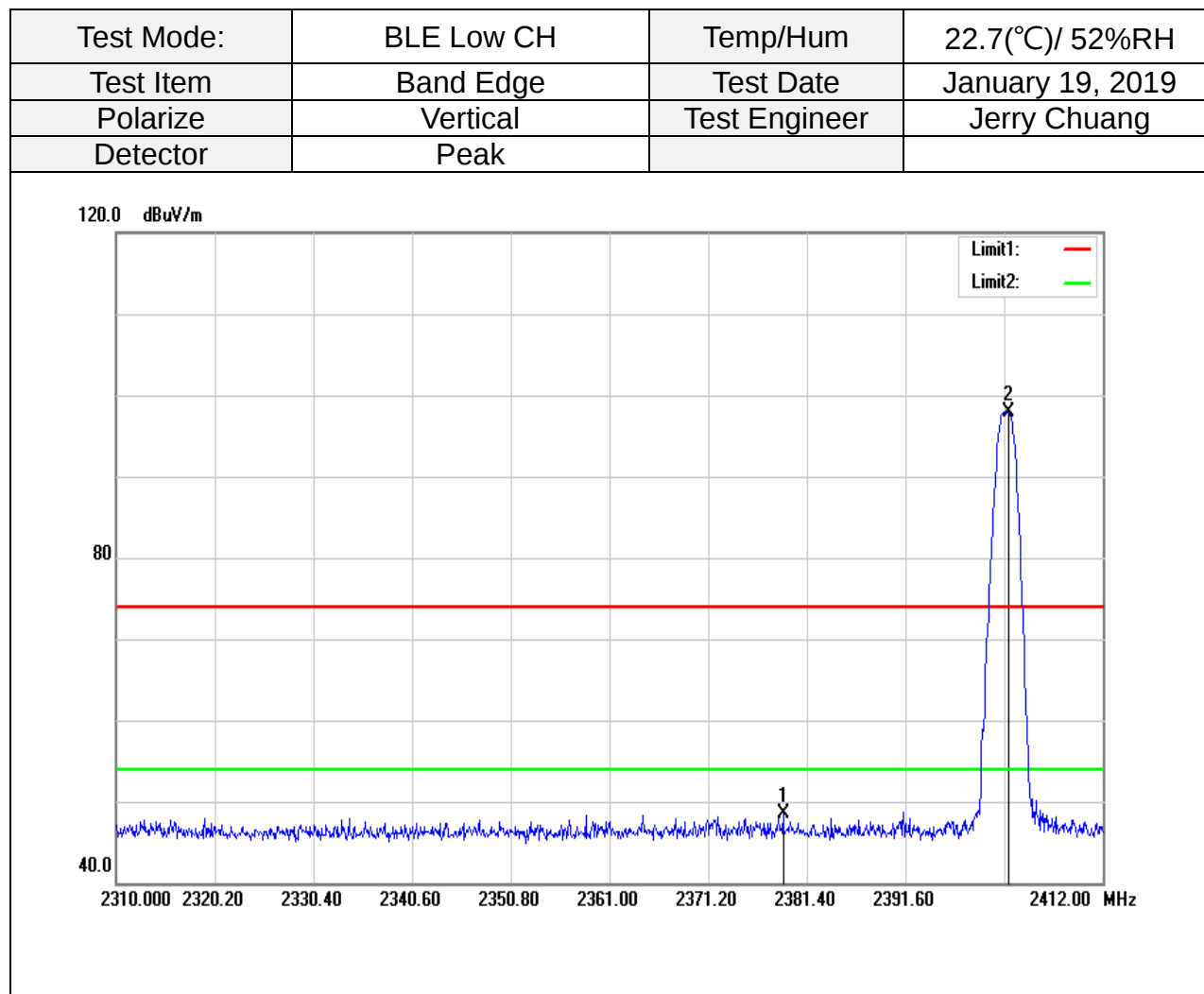


**Above 1 GHz**



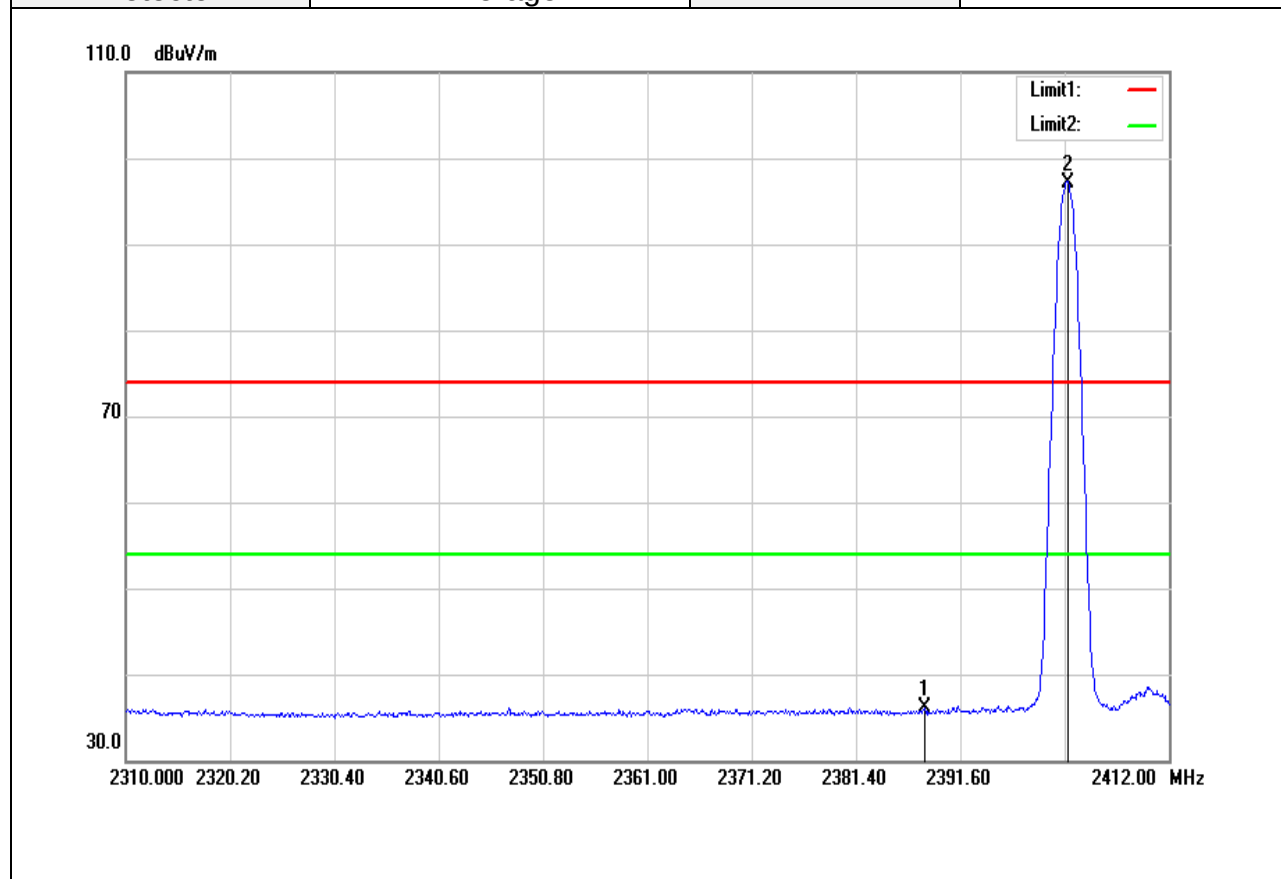
## 4.6.4 Test Result

### Band Edge Test Data



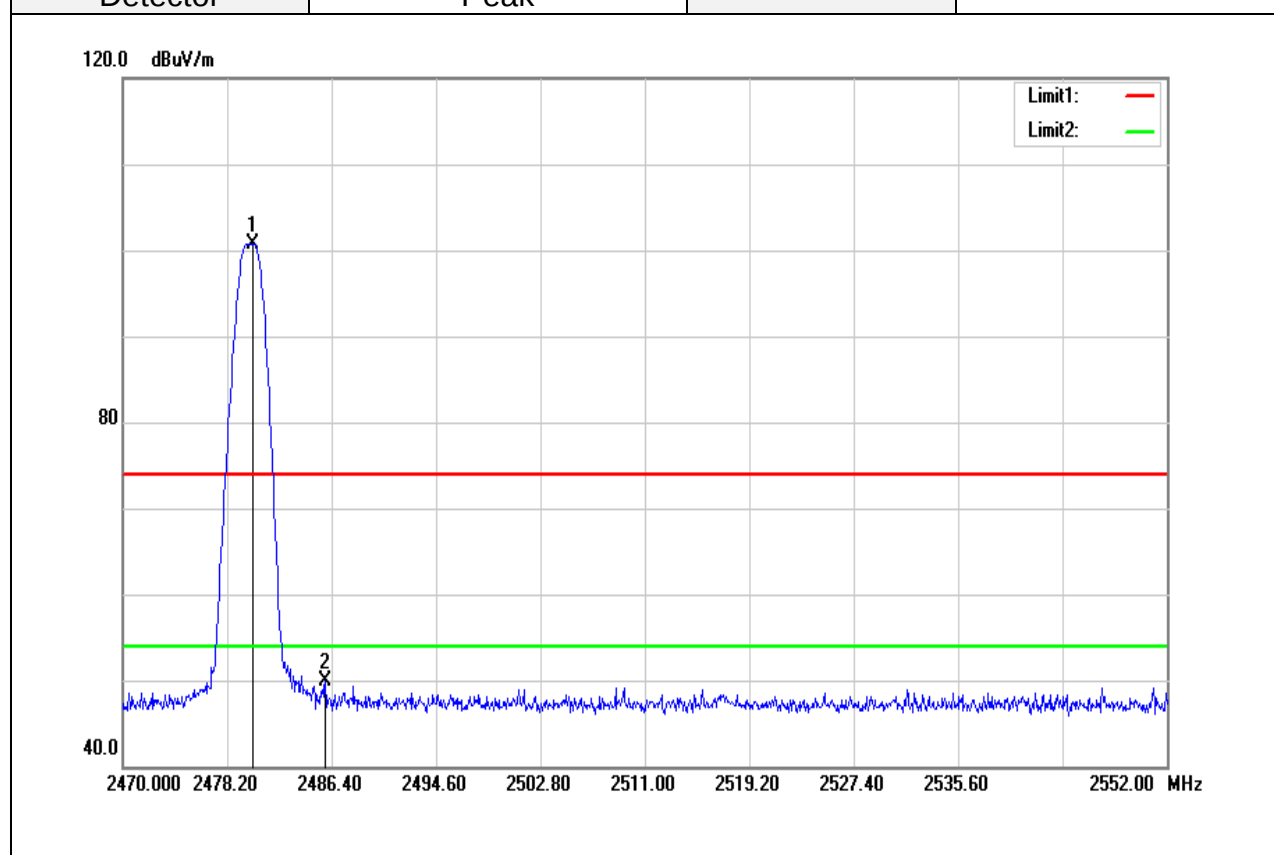
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 2378.952           | 51.68             | -3.11                   | 48.57              | 74.00             | -25.43         | peak   |
| 2   | 2402.208           | 101.06            | -3.13                   | 97.93              | -                 | -              | peak   |

|            |            |               |                  |
|------------|------------|---------------|------------------|
| Test Mode: | BLE Low CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Band Edge  | Test Date     | January 19, 2019 |
| Polarize   | Vertical   | Test Engineer | Jerry Chuang     |
| Detector   | Average    |               |                  |



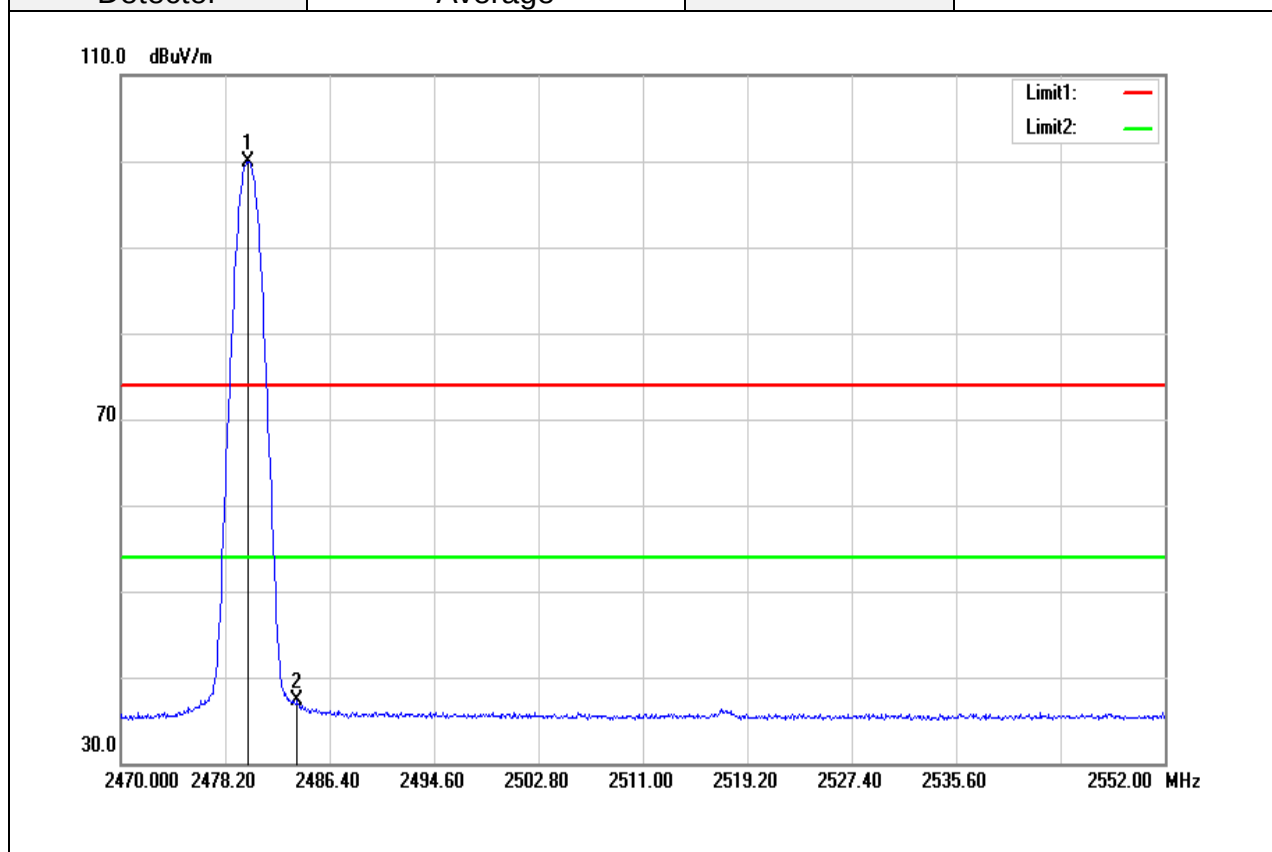
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 2388.132           | 39.23             | -3.12                   | 36.11              | 54.00             | -17.89         | AVG    |
| 2   | 2402.106           | 100.33            | -3.13                   | 97.20              | -                 | -              | AVG    |

|            |             |               |                  |
|------------|-------------|---------------|------------------|
| Test Mode: | BLE High CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Band Edge   | Test Date     | January 19, 2019 |
| Polarize   | Vertical    | Test Engineer | Jerry Chuang     |
| Detector   | Peak        |               |                  |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 2480.250           | 103.50            | -2.73                   | 100.77             | -                 | -              | peak   |
| 2   | 2485.908           | 52.60             | -2.70                   | 49.90              | 74.00             | -24.10         | peak   |

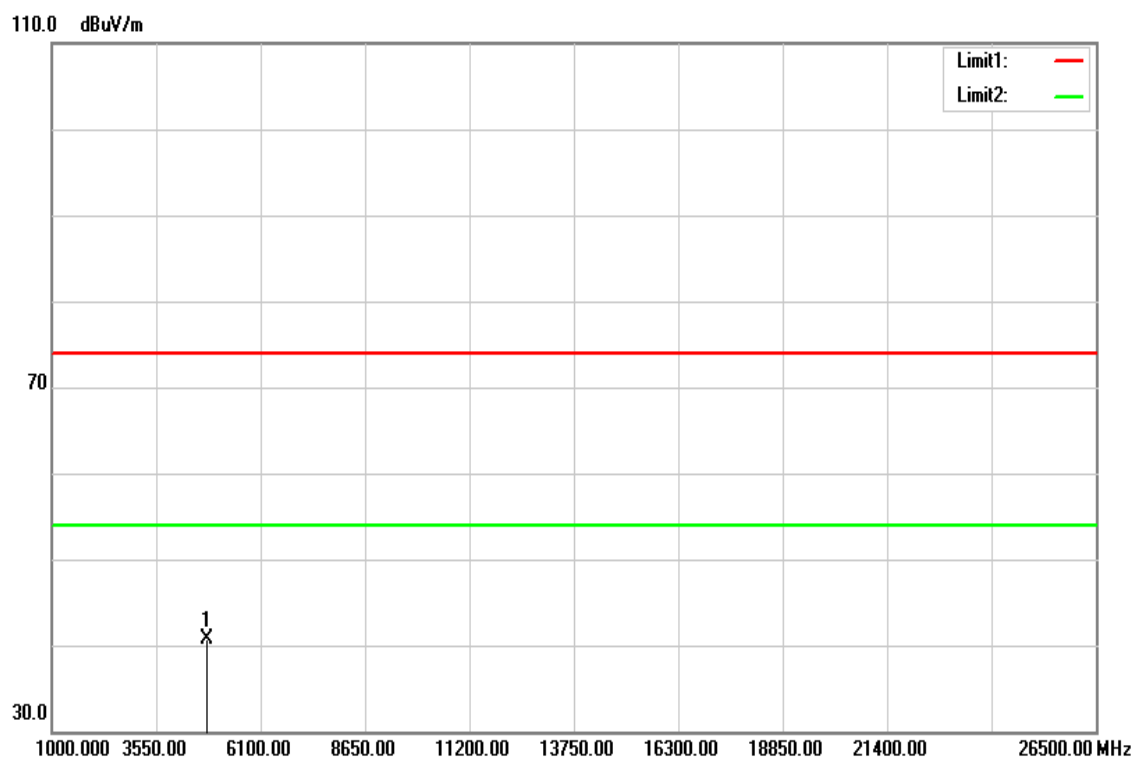
|            |             |               |                  |
|------------|-------------|---------------|------------------|
| Test Mode: | BLE High CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Band Edge   | Test Date     | January 19, 2019 |
| Polarize   | Vertical    | Test Engineer | Jerry Chuang     |
| Detector   | Average     |               |                  |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 2480.004           | 102.71            | -2.73                   | 99.98              | -                 | -              | AVG    |
| 2   | 2483.858           | 40.09             | -2.71                   | 37.38              | 54.00             | -16.62         | AVG    |

### Above 1G Test Data

|            |            |               |                  |
|------------|------------|---------------|------------------|
| Test Mode: | BLE Low CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic   | Test Date     | January 19, 2019 |
| Polarize   | Vertical   | Test Engineer | Jerry Chuang     |
| Detector   | Peak       |               |                  |

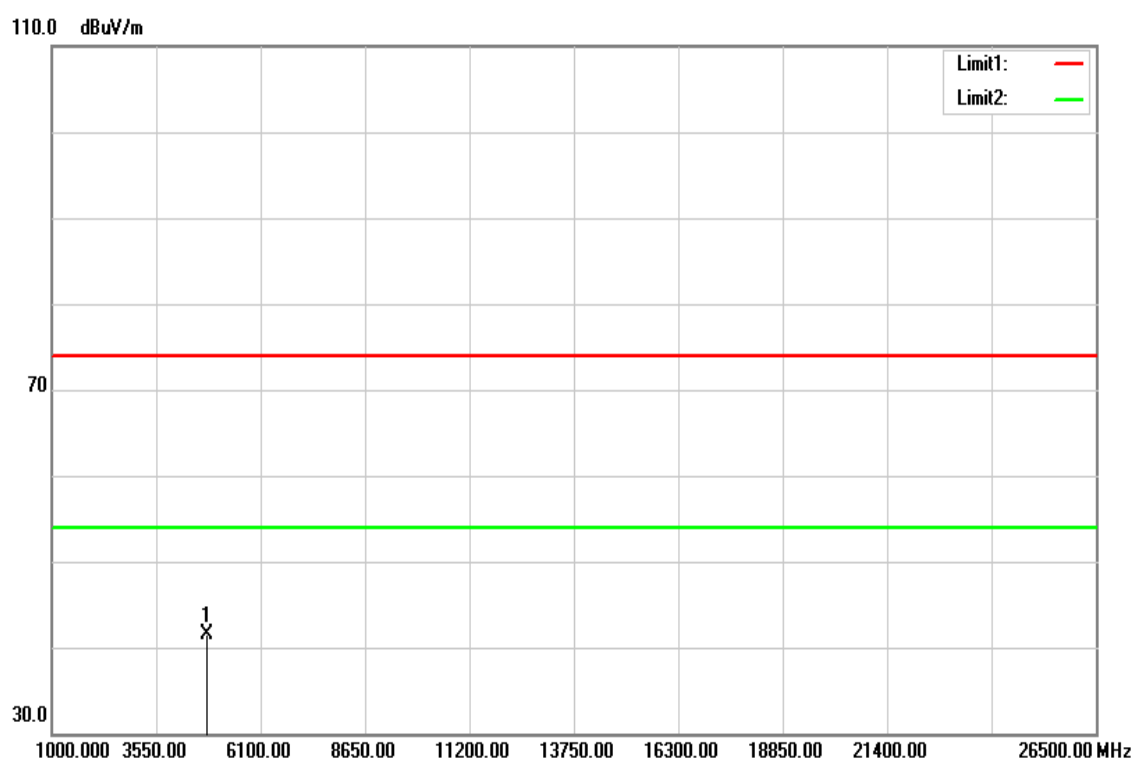


| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 4804.000        | 37.62          | 3.09                  | 40.71           | 74.00          | -33.29      | peak   |
| N/A             |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |

#### Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

|            |            |               |                  |
|------------|------------|---------------|------------------|
| Test Mode: | BLE Low CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic   | Test Date     | January 19, 2019 |
| Polarize   | Horizontal | Test Engineer | Jerry Chuang     |
| Detector   | Peak       |               |                  |

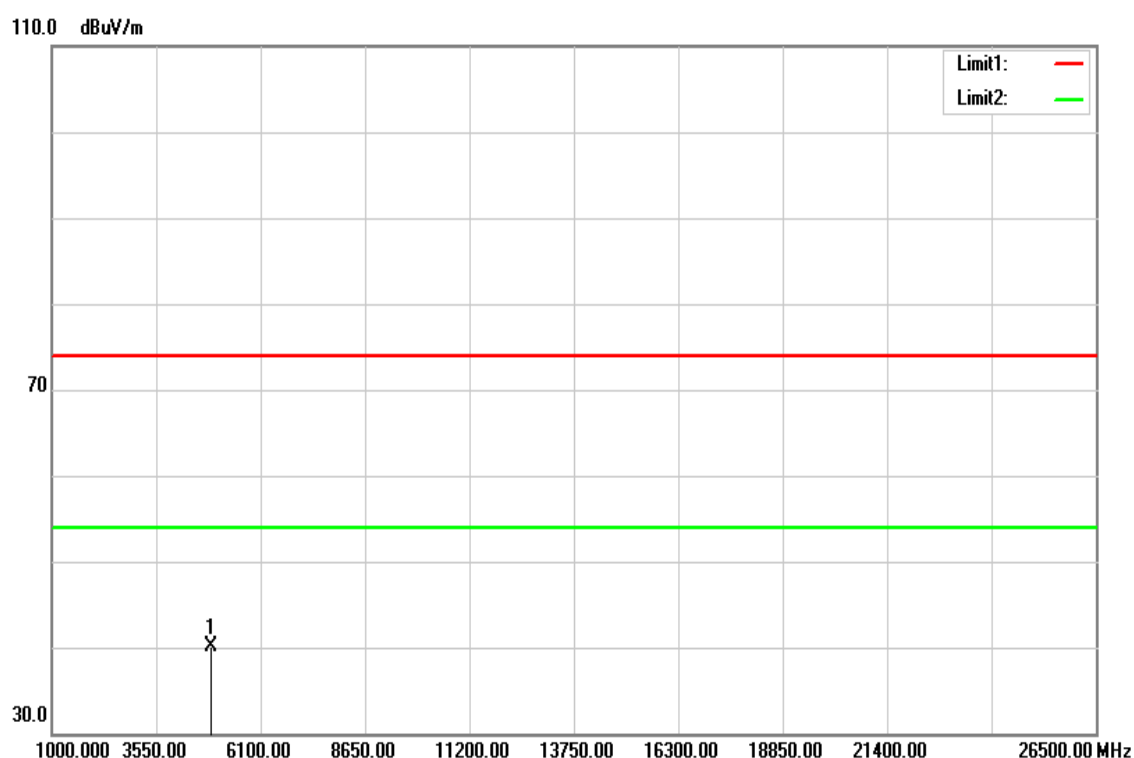


| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 4804.000        | 38.39          | 3.09                  | 41.48           | 74.00          | -32.52      | peak   |
| N/A             |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |

**Remark:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

|            |            |               |                  |
|------------|------------|---------------|------------------|
| Test Mode: | BLE Mid CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic   | Test Date     | January 19, 2019 |
| Polarize   | Vertical   | Test Engineer | Jerry Chuang     |
| Detector   | Peak       |               |                  |

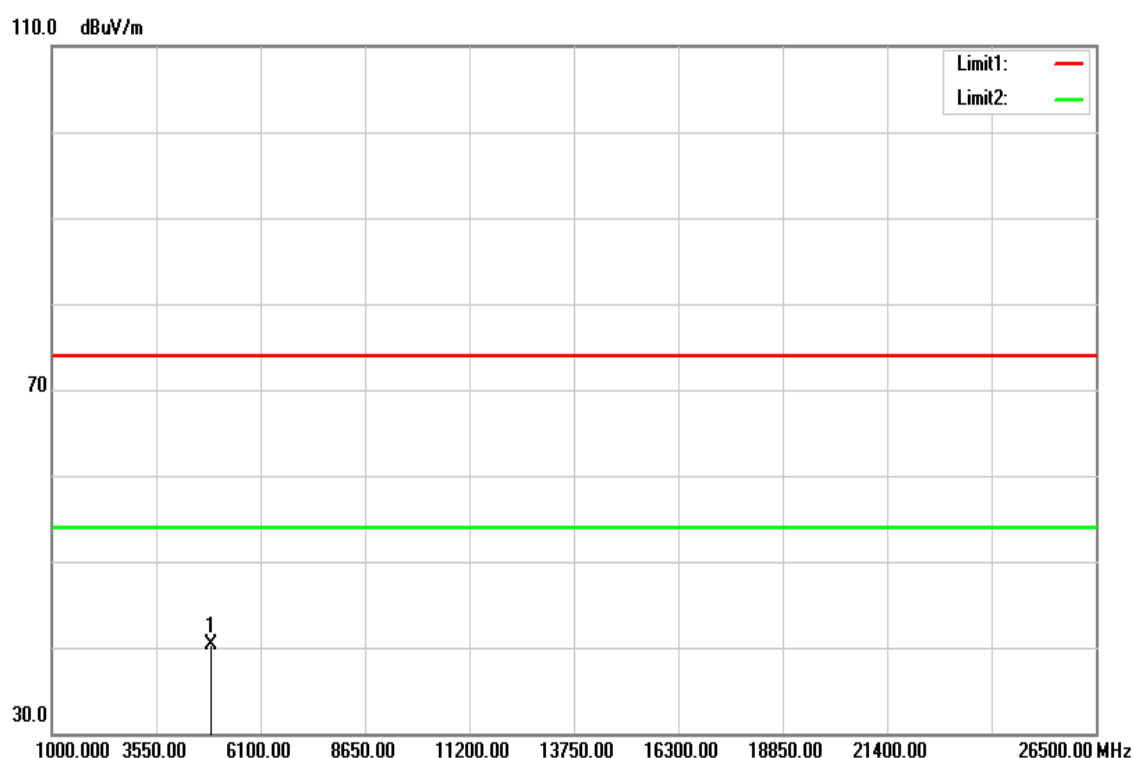


| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 4880.000        | 36.42          | 3.60                  | 40.02           | 74.00          | -33.98      | peak   |
| N/A             |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |

**Remark:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

|            |            |               |                  |
|------------|------------|---------------|------------------|
| Test Mode: | BLE Mid CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic   | Test Date     | January 19, 2019 |
| Polarize   | Horizontal | Test Engineer | Jerry Chuang     |
| Detector   | Peak       |               |                  |

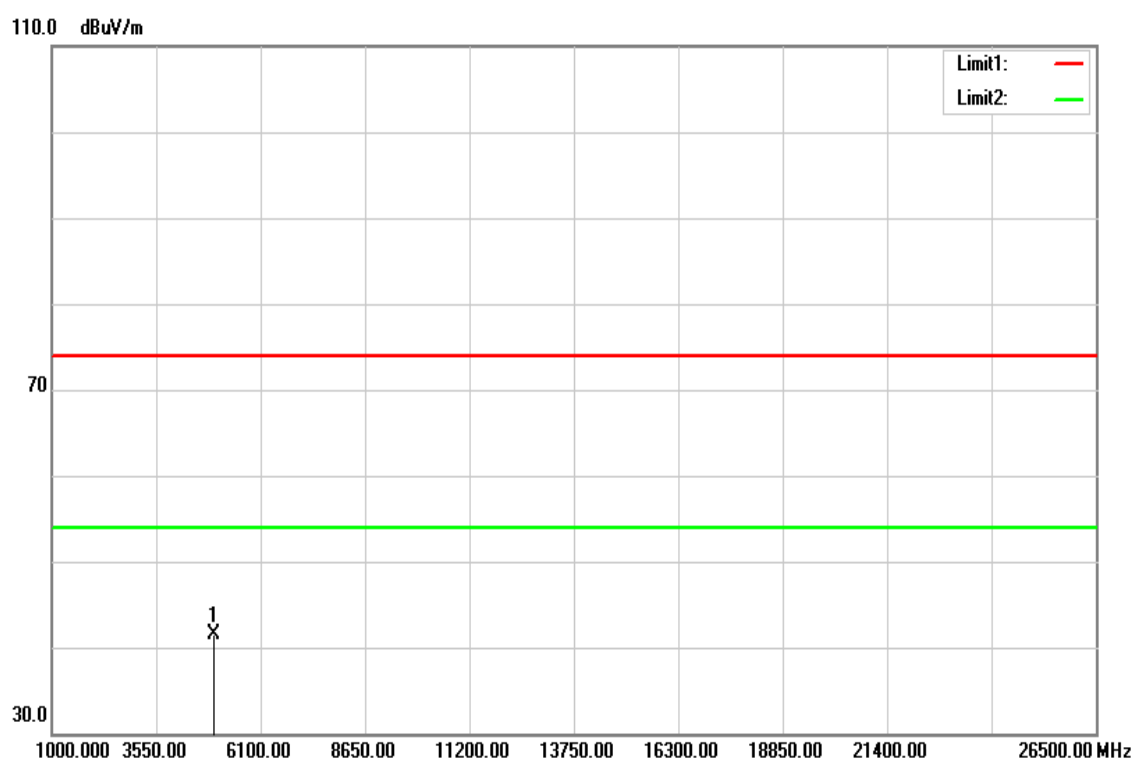


| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 4880.000        | 36.80          | 3.60                  | 40.40           | 74.00          | -33.60      | peak   |
| N/A             |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |

#### Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

|            |             |               |                  |
|------------|-------------|---------------|------------------|
| Test Mode: | BLE High CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic    | Test Date     | January 19, 2019 |
| Polarize   | Vertical    | Test Engineer | Jerry Chuang     |
| Detector   | Peak        |               |                  |

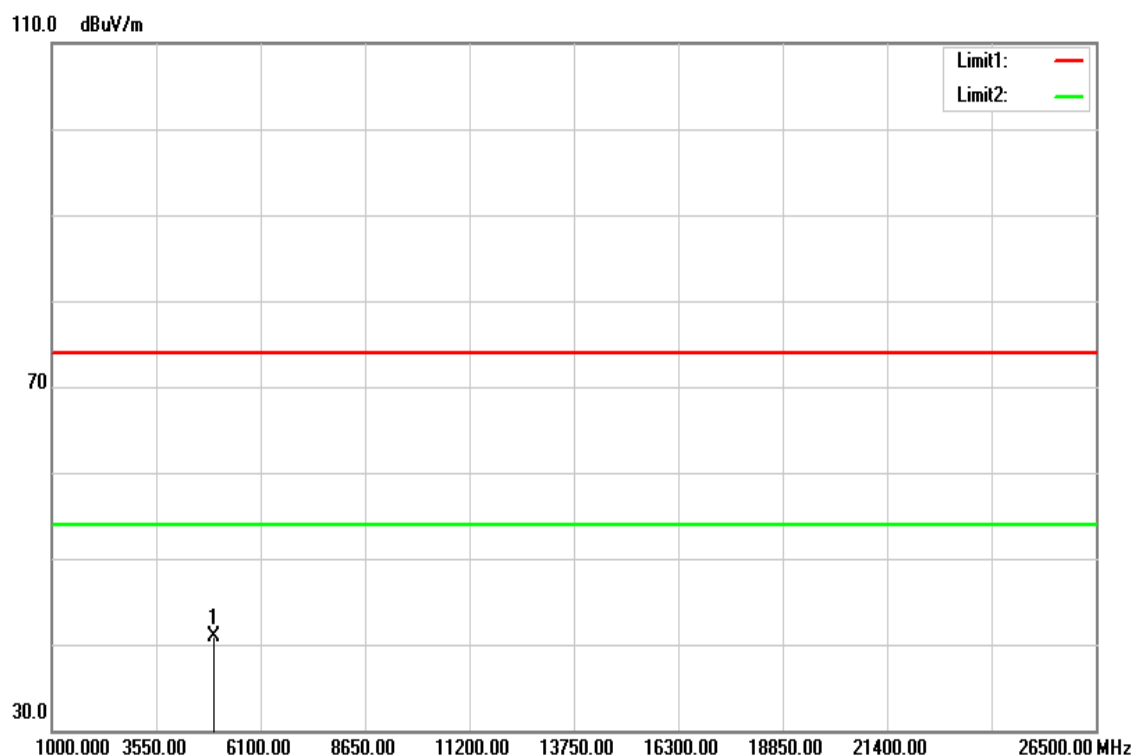


| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 4960.000        | 37.34          | 4.14                  | 41.48           | 74.00          | -32.52      | peak   |
| N/A             |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |
|                 |                |                       |                 |                |             |        |

**Remark:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

|            |             |               |                  |
|------------|-------------|---------------|------------------|
| Test Mode: | BLE High CH | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | Harmonic    | Test Date     | January 19, 2019 |
| Polarize   | Horizontal  | Test Engineer | Jerry Chuang     |
| Detector   | Peak        |               |                  |

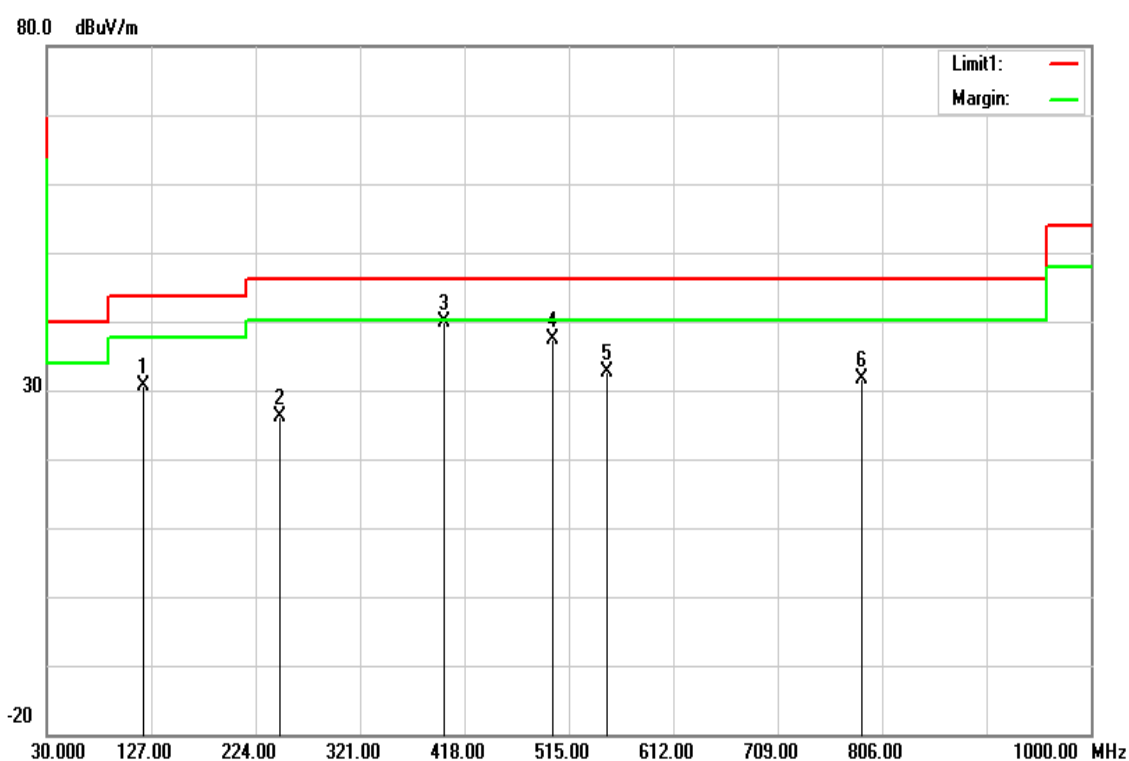


### Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

### Below 1G Test Data

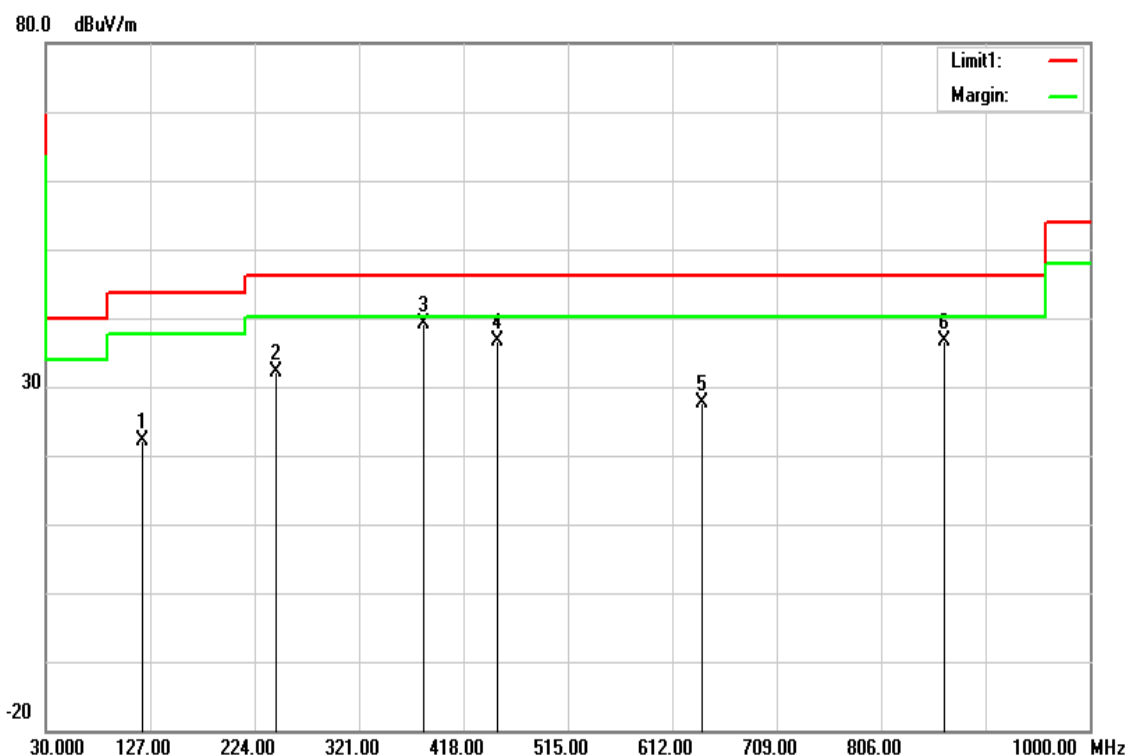
|            |                     |               |                  |
|------------|---------------------|---------------|------------------|
| Test Mode: | BT Mode             | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | 30MHz-1GHz          | Test Date     | January 19, 2019 |
| Polarize   | Vertical            | Test Engineer | Jerry Chuang     |
| Detector   | Peak and Quasi-peak |               |                  |



| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 119.2400        | 39.30          | -8.55                 | 30.75           | 43.52          | -12.77      | peak   |
| 246.3100        | 35.69          | -9.44                 | 26.25           | 46.02          | -19.77      | peak   |
| 399.5700        | 44.77          | -4.81                 | 39.96           | 46.02          | -6.06       | peak   |
| 500.4500        | 39.66          | -2.28                 | 37.38           | 46.02          | -8.64       | peak   |
| 549.9200        | 34.03          | -1.41                 | 32.62           | 46.02          | -13.40      | peak   |
| 786.6000        | 28.86          | 2.77                  | 31.63           | 46.02          | -14.39      | peak   |

**Note:** No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

|            |                     |               |                  |
|------------|---------------------|---------------|------------------|
| Test Mode: | BT Mode             | Temp/Hum      | 22.7(°C)/ 52%RH  |
| Test Item  | 30MHz-1GHz          | Test Date     | January 19, 2019 |
| Polarize   | Horizontal          | Test Engineer | Jerry Chuang     |
| Detector   | Peak and Quasi-peak |               |                  |



| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----------------|----------------|-----------------------|-----------------|----------------|-------------|--------|
| 120.2100        | 30.53          | -8.41                 | 22.12           | 43.52          | -21.40      | peak   |
| 244.3700        | 41.75          | -9.51                 | 32.24           | 46.02          | -13.78      | peak   |
| 381.1400        | 44.60          | -5.50                 | 39.10           | 46.02          | -6.92       | peak   |
| 450.0100        | 39.92          | -3.25                 | 36.67           | 46.02          | -9.35       | peak   |
| 640.1300        | 27.09          | 0.60                  | 27.69           | 46.02          | -18.33      | peak   |
| 864.2000        | 32.66          | 3.96                  | 36.62           | 46.02          | -9.40       | peak   |

**Note:** No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

--End Report--