



## Appendix for Test report

## 1. Appendix A: DTS Bandwidth

### 1.1 Test Result

| TestMode | Antenna | Channel | DTS BW [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|---------|---------|--------------|----------|----------|------------|---------|
| BLE_TM1  | Ant1    | 2402    | 0.7313       | 2401.62  | 2402.352 | $\geq 0.5$ | PASS    |
|          |         | 2440    | 0.7353       | 2439.616 | 2440.352 | $\geq 0.5$ | PASS    |
|          |         | 2480    | 0.7353       | 2479.616 | 2480.352 | $\geq 0.5$ | PASS    |
| BLE_TM2  | Ant1    | 2402    | 1.1588       | 2401.413 | 2402.571 | $\geq 0.5$ | PASS    |
|          |         | 2440    | 1.1588       | 2439.413 | 2440.571 | $\geq 0.5$ | PASS    |
|          |         | 2480    | 1.1588       | 2479.413 | 2480.571 | $\geq 0.5$ | PASS    |

## 1.2 Test Graphs

BLE\_TM1\_Ant1\_2402



BLE\_TM1\_Ant1\_2440



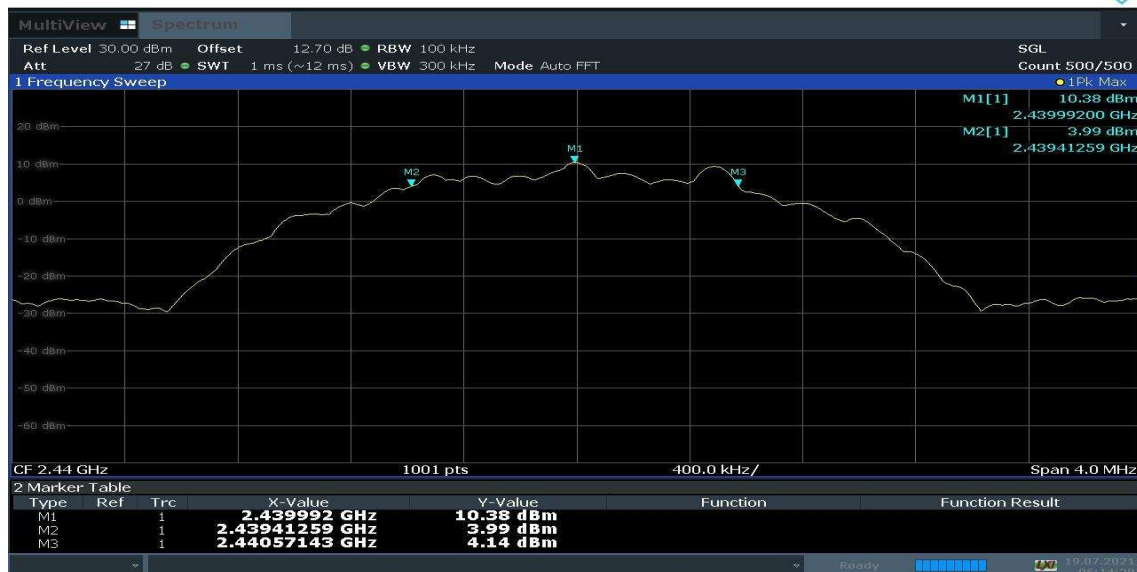
## BLE\_TM1\_Ant1\_2480



## BLE\_TM2\_Ant1\_2402



## BLE\_TM2\_Ant1\_2440



## BLE\_TM2\_Ant1\_2480



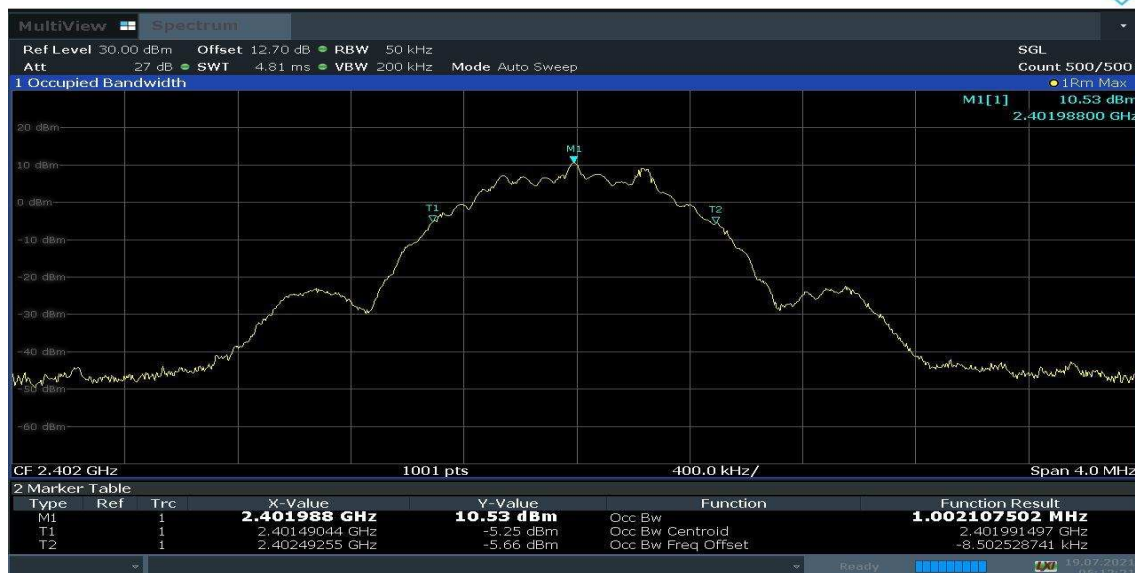
## 2. Appendix B: Occupied Channel Bandwidth

### 2.1 Test Result

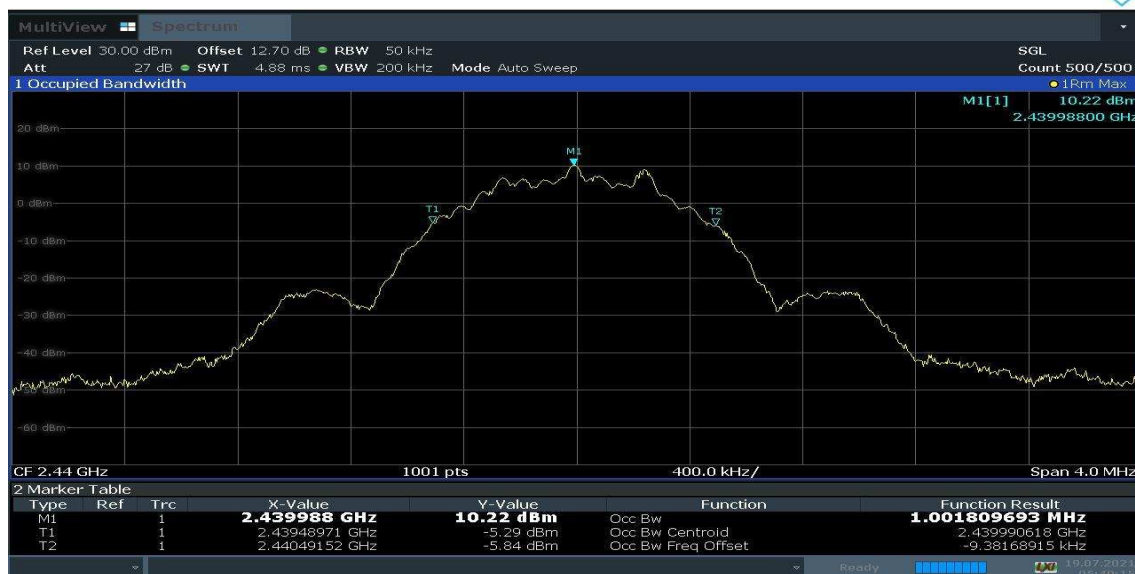
| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|----------|---------|---------|-----------|---------|---------|------------|---------|
| BLE_TM1  | Ant1    | 2402    | 1.0021    | 2401.49 | 2402.49 | ---        | PASS    |
|          |         | 2440    | 1.0018    | 2439.49 | 2440.49 | ---        | PASS    |
|          |         | 2480    | 1.0031    | 2479.49 | 2480.49 | ---        | PASS    |
| BLE_TM2  | Ant1    | 2402    | 1.9887    | 2401.01 | 2403.0  | ---        | PASS    |
|          |         | 2440    | 1.9845    | 2439.01 | 2440.99 | ---        | PASS    |
|          |         | 2480    | 1.9895    | 2479.01 | 2481.0  | ---        | PASS    |

## 2.2 Test Graphs

BLE\_TM1\_Ant1\_2402



BLE\_TM1\_Ant1\_2440



### BLE\_TM1\_Ant1\_2480



### BLE\_TM2\_Ant1\_2402



## BLE\_TM2\_Ant1\_2440



## BLE\_TM2\_Ant1\_2480



### 3. Appendix C: Duty Cycle

#### 3.1 Test Result

| TestMode | Antenna | Channel | Transmission Duration [ms] | Transmission Period [ms] | Duty Cycle [%] | Limit[MHz] | Verdict |
|----------|---------|---------|----------------------------|--------------------------|----------------|------------|---------|
| BLE_TM1  | Ant1    | 2402    | 2.18                       | 2.5                      | 87.2           | ---        | PASS    |
|          |         | 2440    | 2.17                       | 2.5                      | 86.8           | ---        | PASS    |
|          |         | 2480    | 2.18                       | 2.5                      | 87.2           | ---        | PASS    |
| BLE_TM2  | Ant1    | 2402    | 1.11                       | 1.87                     | 59.358         | ---        | PASS    |
|          |         | 2440    | 1.12                       | 1.88                     | 59.574         | ---        | PASS    |
|          |         | 2480    | 1.11                       | 1.87                     | 59.358         | ---        | PASS    |

### 3.2 Test Graphs

BLE\_TM1\_Ant1\_2402



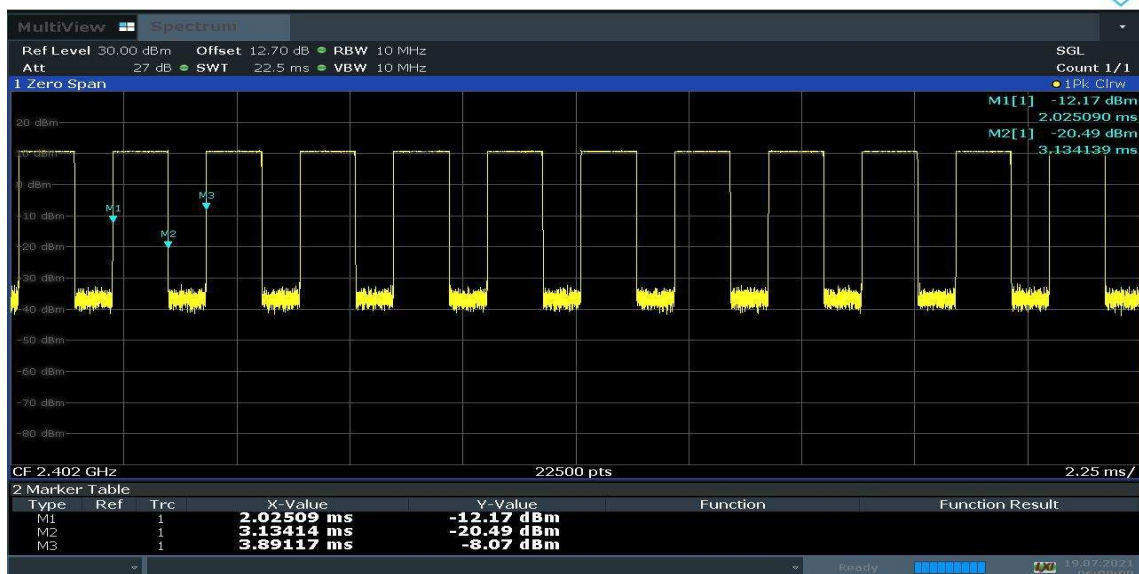
BLE\_TM1\_Ant1\_2440



## BLE\_TM1\_Ant1\_2480



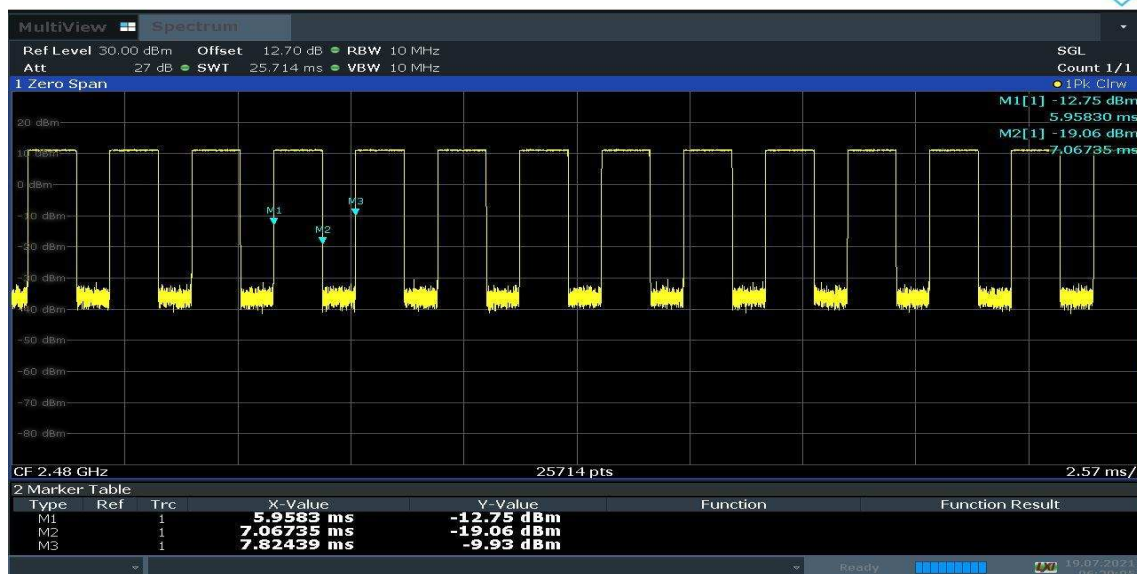
## BLE\_TM2\_Ant1\_2402



## BLE\_TM2\_Ant1\_2440



## BLE\_TM2\_Ant1\_2480



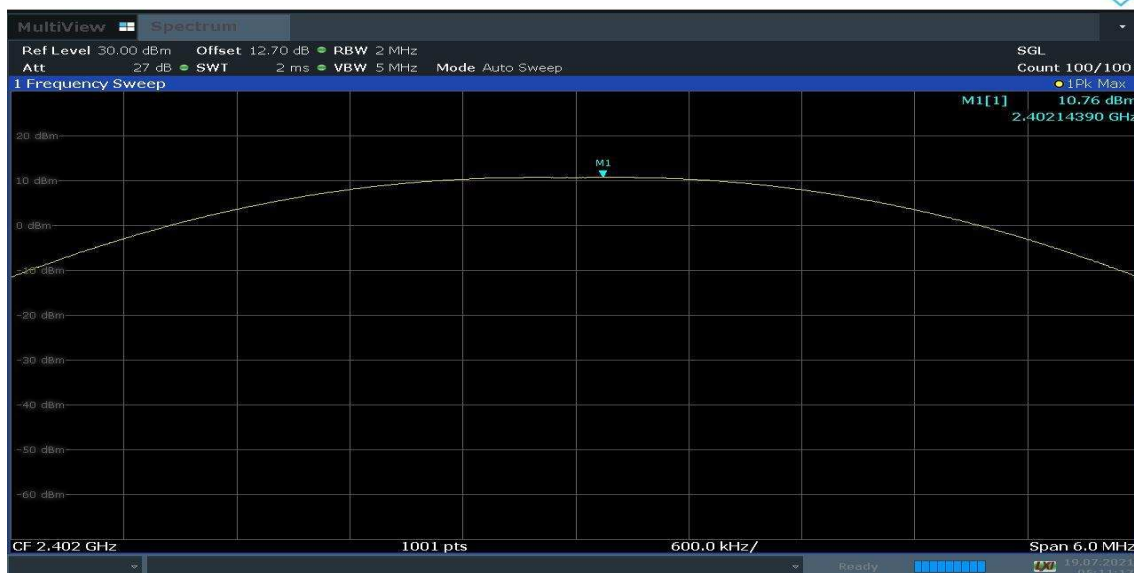
## 4. Appendix D: Maximum Peak output power

### 4.1 Test Result

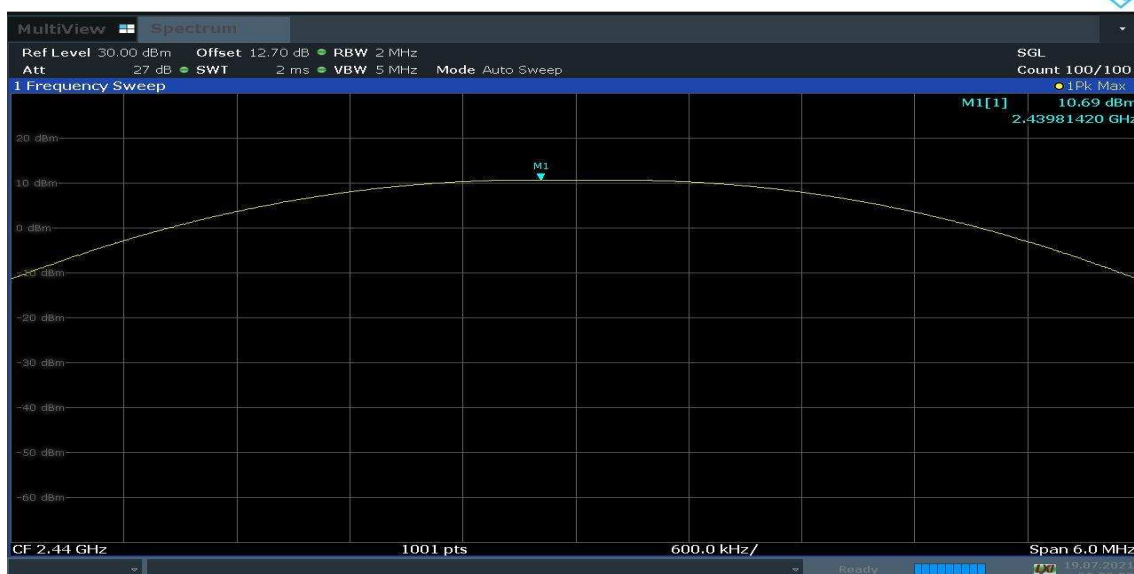
| TestMode | Antenna | Channel | Conducted Result[dBm] | Conducted Limit[dBm] | EIRP Result[dBm] | EIRP Result[dBm] | Verdict |
|----------|---------|---------|-----------------------|----------------------|------------------|------------------|---------|
| BLE_TM1  | Ant1    | 2402    | 10.76                 | 30                   | 4.16             | 36               | PASS    |
|          |         | 2440    | 10.69                 | 30                   | 4.09             | 36               | PASS    |
|          |         | 2480    | 11.11                 | 30                   | 4.51             | 36               | PASS    |
| BLE_TM2  | Ant1    | 2402    | 10.72                 | 30                   | 4.12             | 36               | PASS    |
|          |         | 2440    | 10.71                 | 30                   | 4.11             | 36               | PASS    |
|          |         | 2480    | 11.14                 | 30                   | 4.54             | 36               | PASS    |

## 4.2 Test Graphs

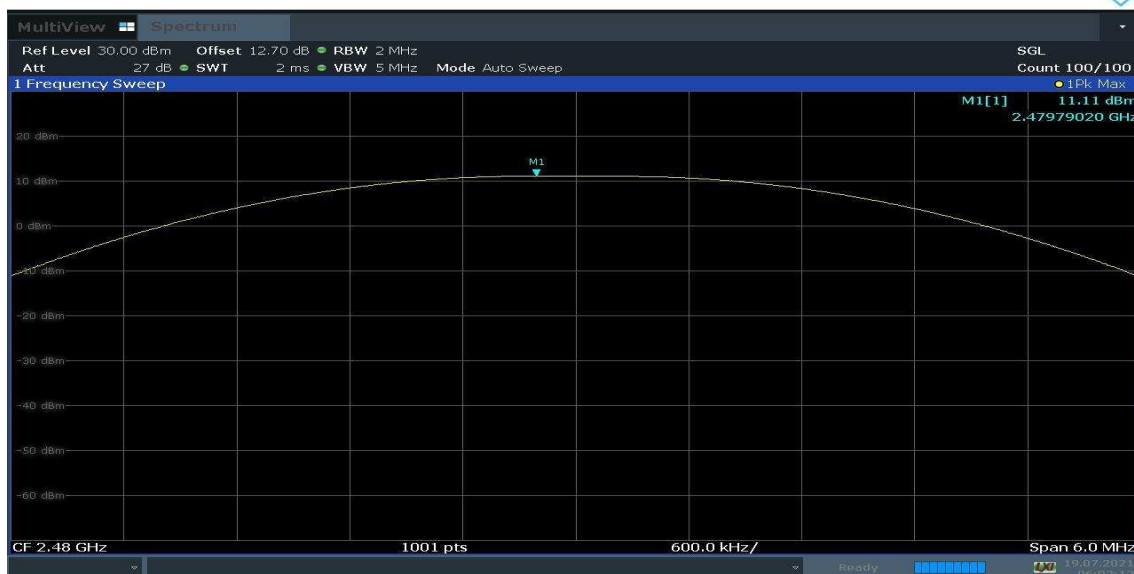
BLE\_TM1\_Ant1\_2402



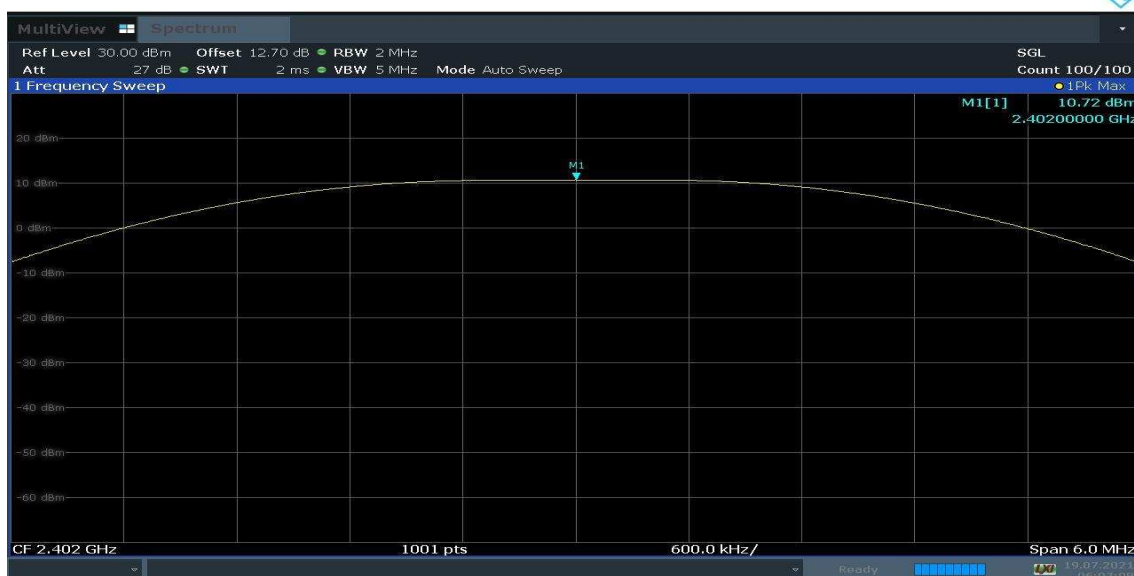
BLE\_TM1\_Ant1\_2440



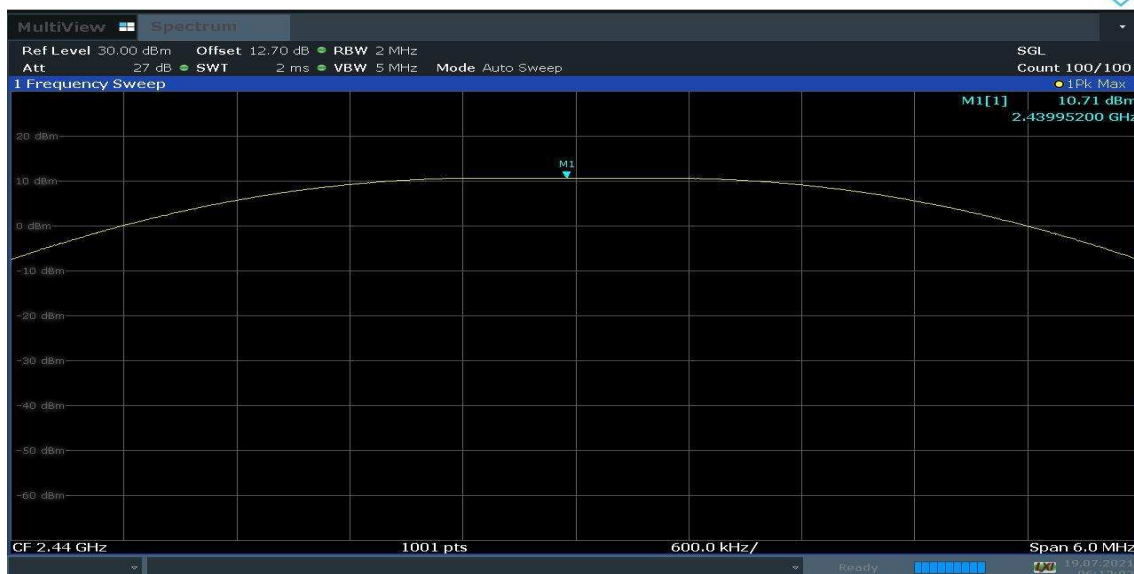
## BLE\_TM1\_Ant1\_2480



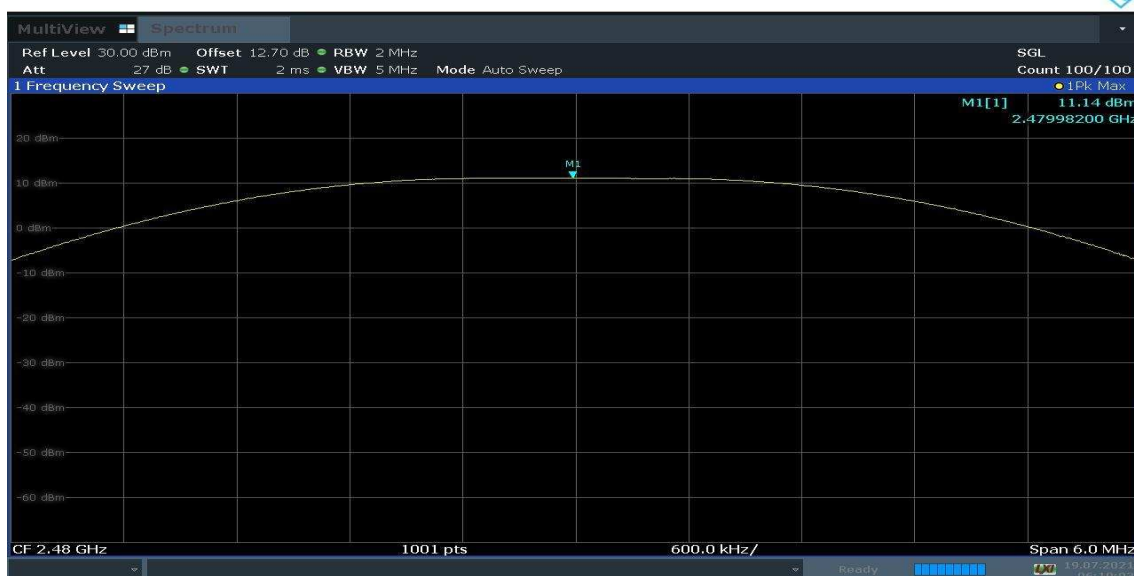
## BLE\_TM2\_Ant1\_2402



### BLE\_TM2\_Ant1\_2440



### BLE\_TM2\_Ant1\_2480



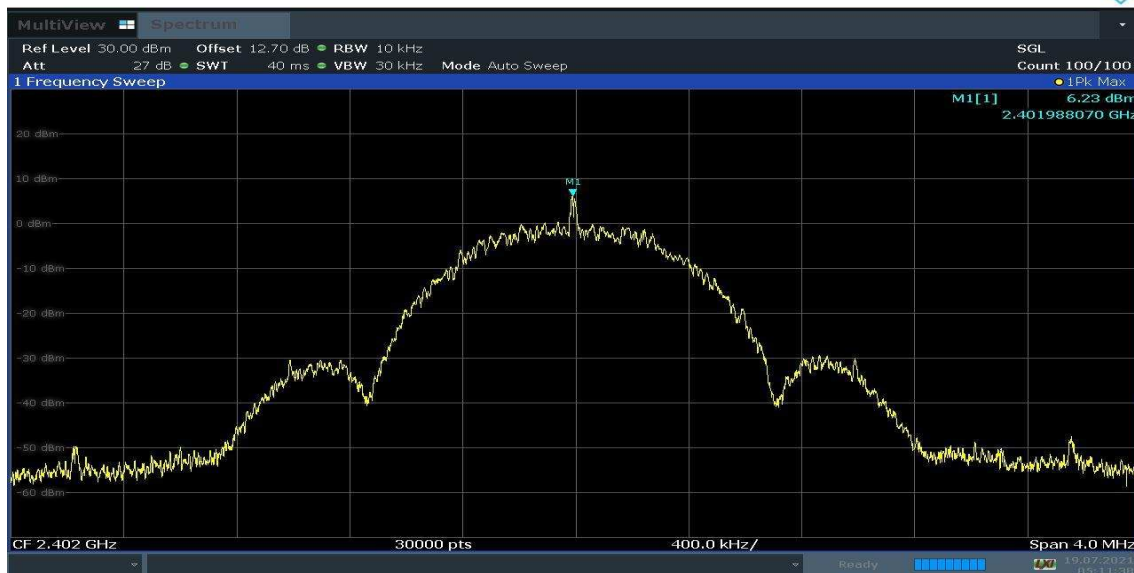
## 5. Appendix E: Maximum power spectral density

### 5.1 Test Result

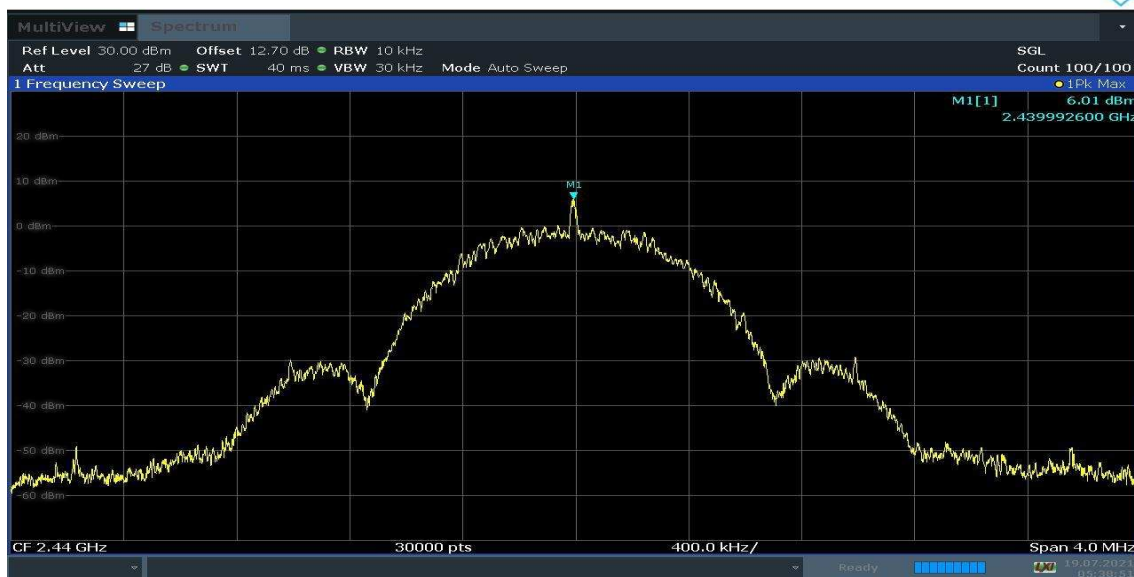
| TestMode | Antenna | Channel | Result[dBm/10kHz] | Limit[dBm/3kHz] | Verdict |
|----------|---------|---------|-------------------|-----------------|---------|
| BLE_TM1  | Ant1    | 2402    | 6.23              | $\leq 8$        | PASS    |
|          |         | 2440    | 6.01              | $\leq 8$        | PASS    |
|          |         | 2480    | 6.66              | $\leq 8$        | PASS    |
| BLE_TM2  | Ant1    | 2402    | 6.19              | $\leq 8$        | PASS    |
|          |         | 2440    | 6.1               | $\leq 8$        | PASS    |
|          |         | 2480    | 6.59              | $\leq 8$        | PASS    |

## 5.2 Test Graphs

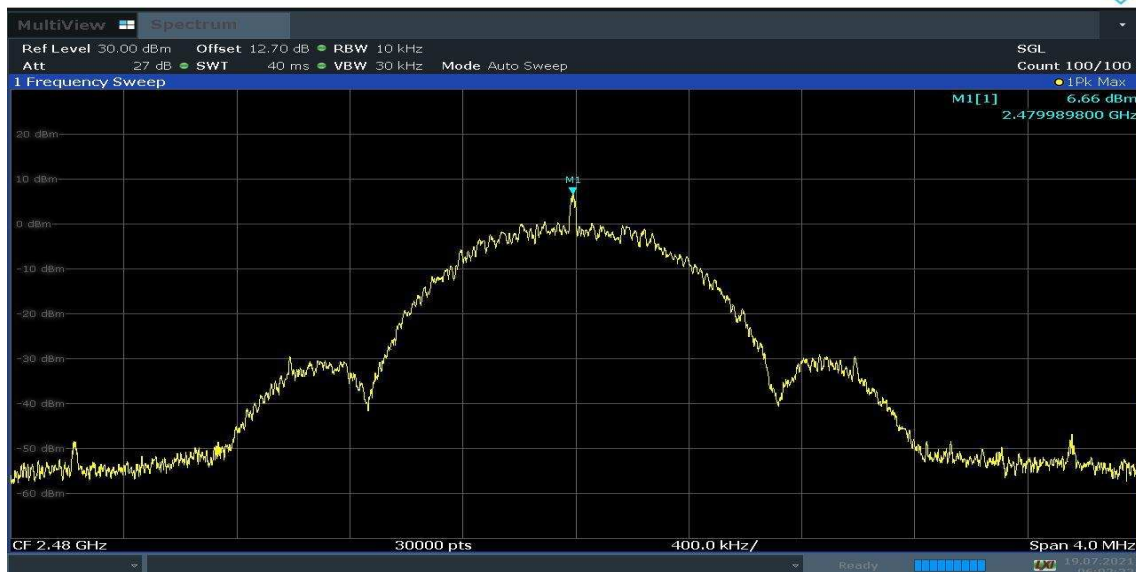
BLE\_TM1\_Ant1\_2402



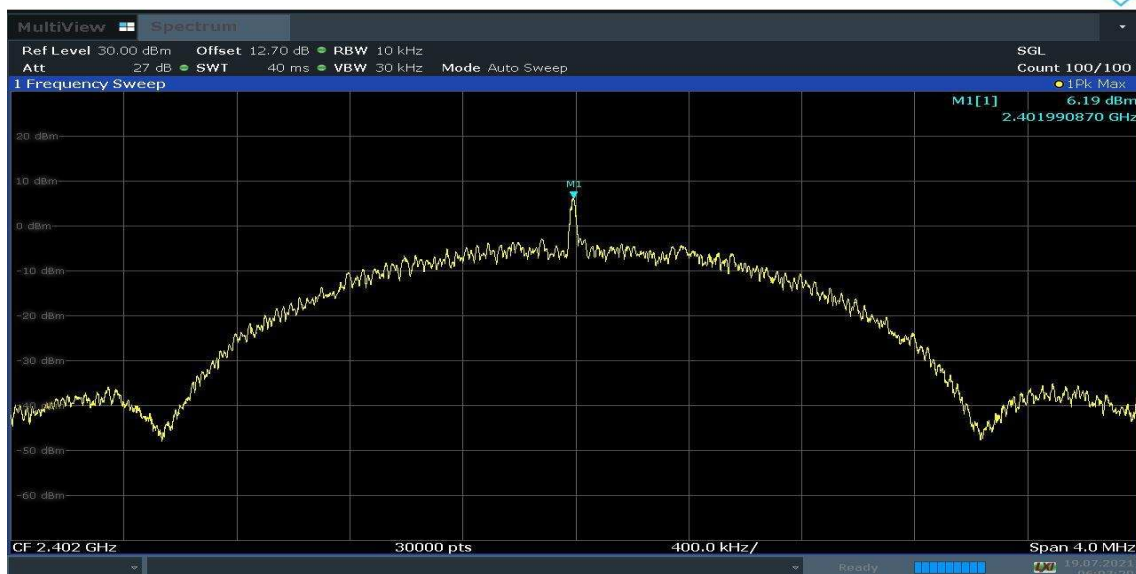
BLE\_TM1\_Ant1\_2440



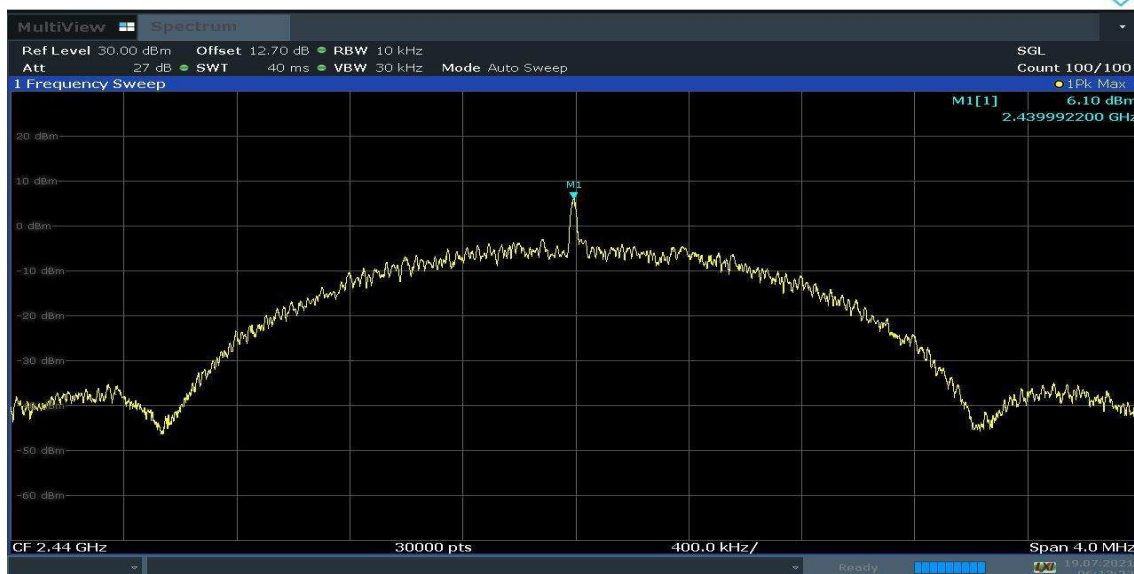
### BLE\_TM1\_Ant1\_2480



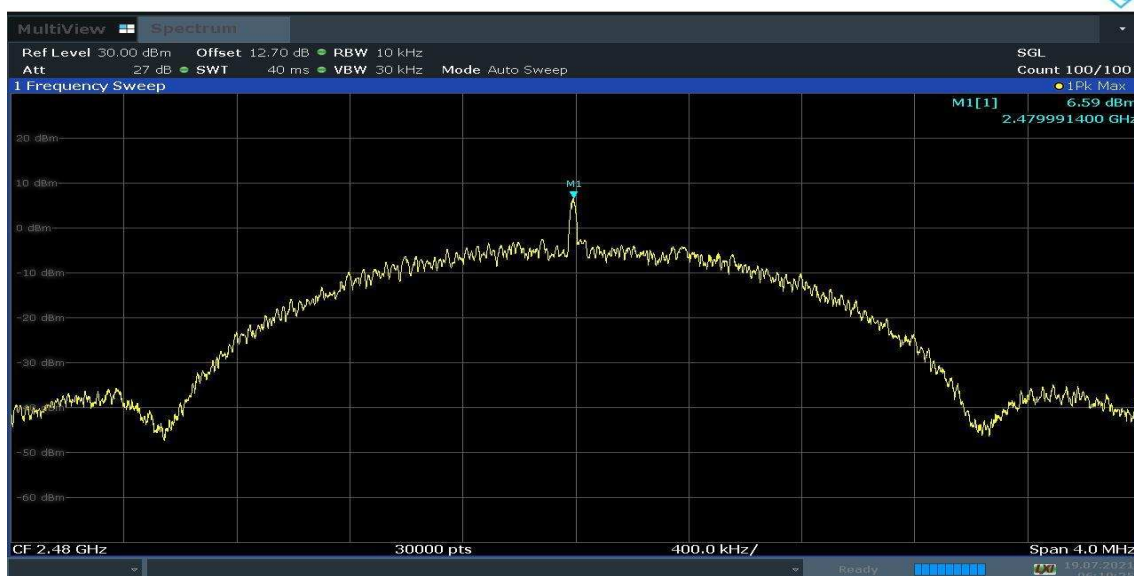
### BLE\_TM2\_Ant1\_2402



BLE\_TM2\_Ant1\_2440



BLE\_TM2\_Ant1\_2480



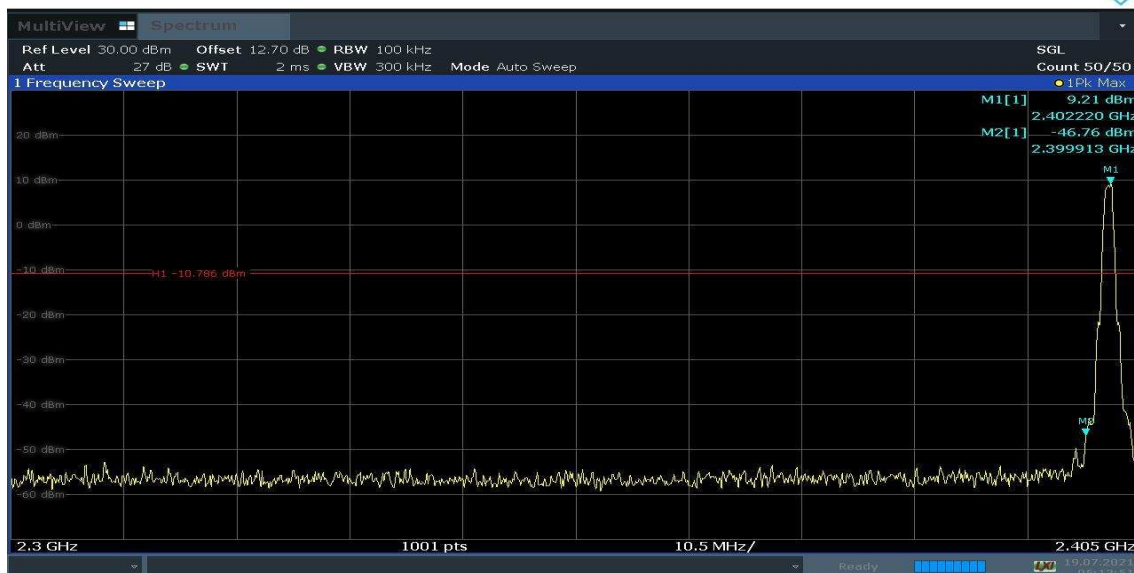
## 6. Appendix F: Band edge measurements

### 6.1 Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|---------|--------|---------|---------------|-------------|------------|---------|
| BLE_TM1  | Ant1    | Low    | 2402    | 9.214         | -46.761     | -10.786    | PASS    |
|          |         | High   | 2480    | 9.33          | -54.062     | -10.670    | PASS    |
| BLE_TM2  | Ant1    | Low    | 2402    | 7.641         | -34.781     | -12.359    | PASS    |
|          |         | High   | 2480    | 7.76          | -53.194     | -10.240    | PASS    |

## 6.2 Test Graphs

BLE\_TM1\_Ant1\_Low\_2402



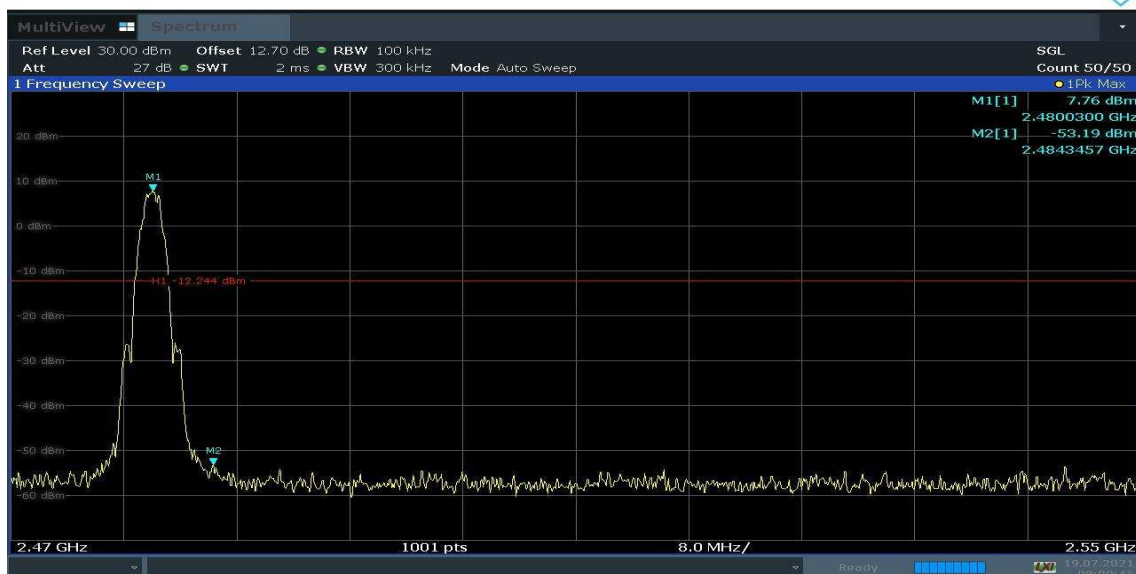
BLE\_TM1\_Ant1\_High\_2480



### BLE\_TM2\_Ant1\_Low\_2402



### BLE\_TM2\_Ant1\_High\_2480



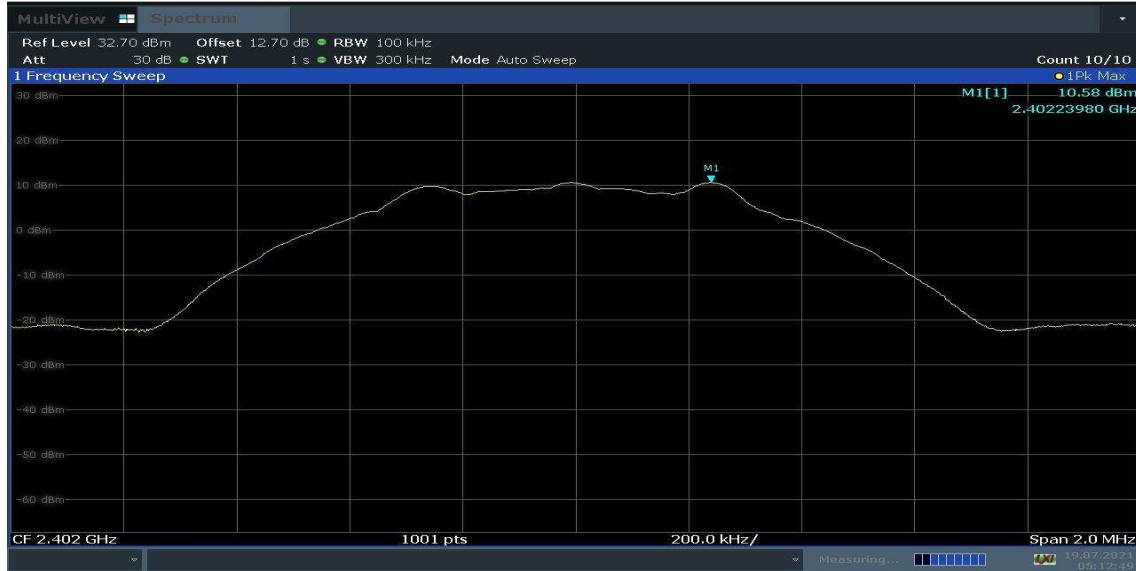
## 7. Appendix G: Conducted Spurious Emission

### 7.1 Test Result

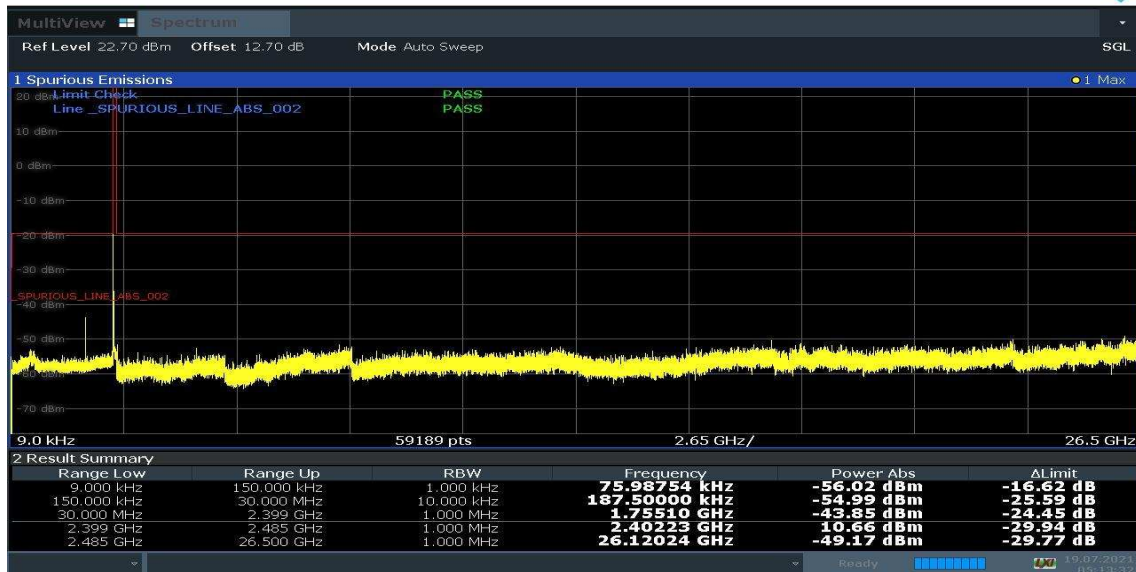
| TestMode | Antenna | Channel | RefLevel[dBm /100kHz] | Result[dBm] | Limit[dBm /100kHz] | Verdict |
|----------|---------|---------|-----------------------|-------------|--------------------|---------|
| BLE_TM1  | Ant1    | 2402    | 10.58                 | <Limit      | -19.42             | PASS    |
|          |         | 2440    | 10.24                 | <Limit      | -19.76             | PASS    |
|          |         | 2480    | 10.69                 | <Limit      | -19.31             | PASS    |
| BLE_TM2  | Ant1    | 2402    | 10.6                  | <Limit      | -19.4              | PASS    |
|          |         | 2440    | 10.39                 | <Limit      | -19.61             | PASS    |
|          |         | 2480    | 10.78                 | <Limit      | -19.22             | PASS    |

## 7.2 Test Graphs

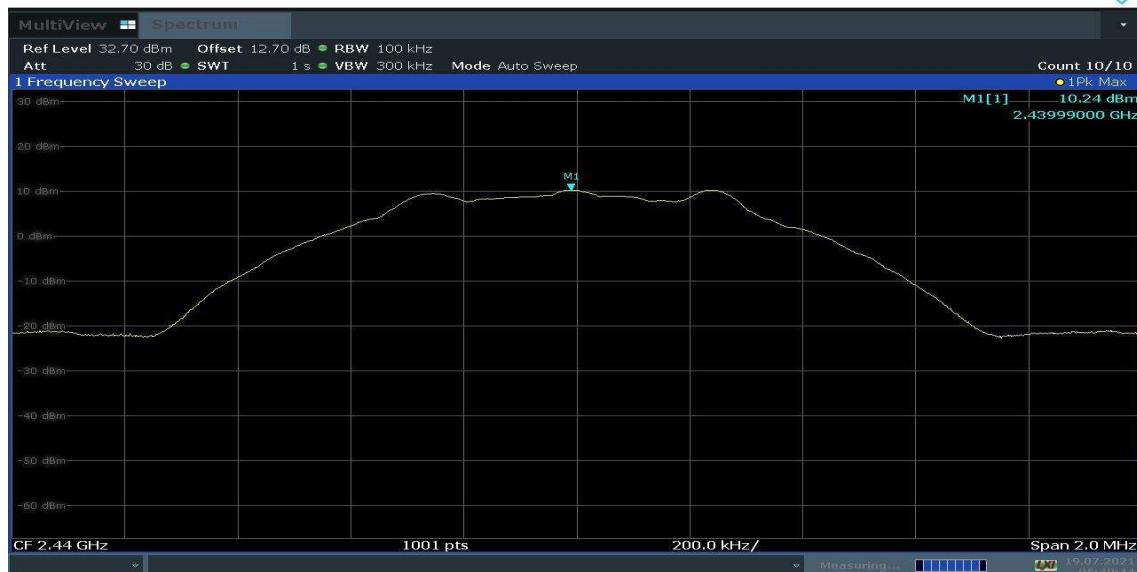
BLE\_TM1\_Ant1\_2402\_0-Reference



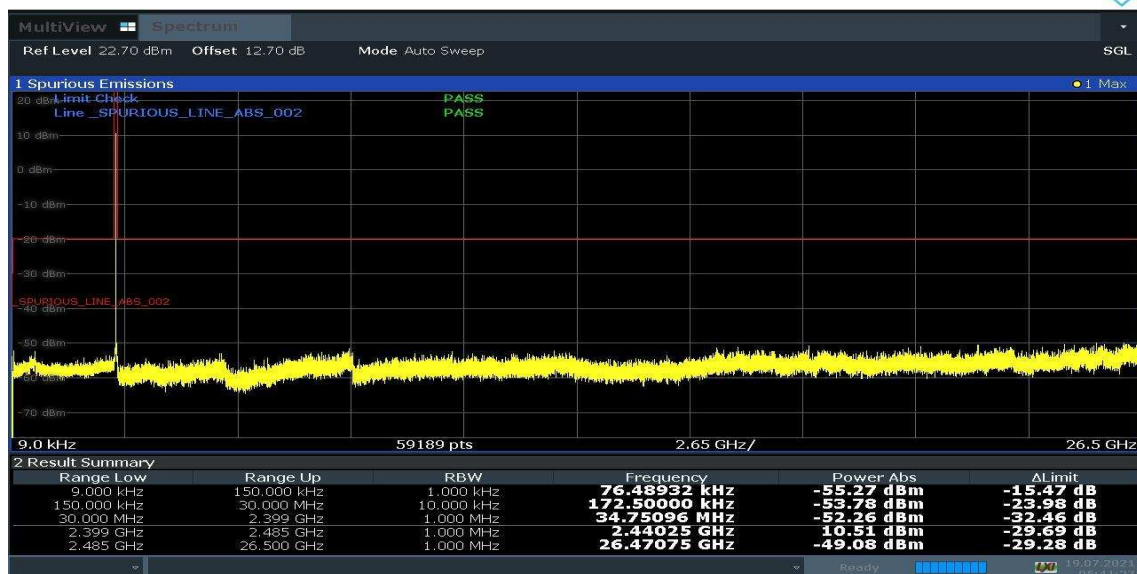
BLE\_TM1\_Ant1\_2402\_0.009~30



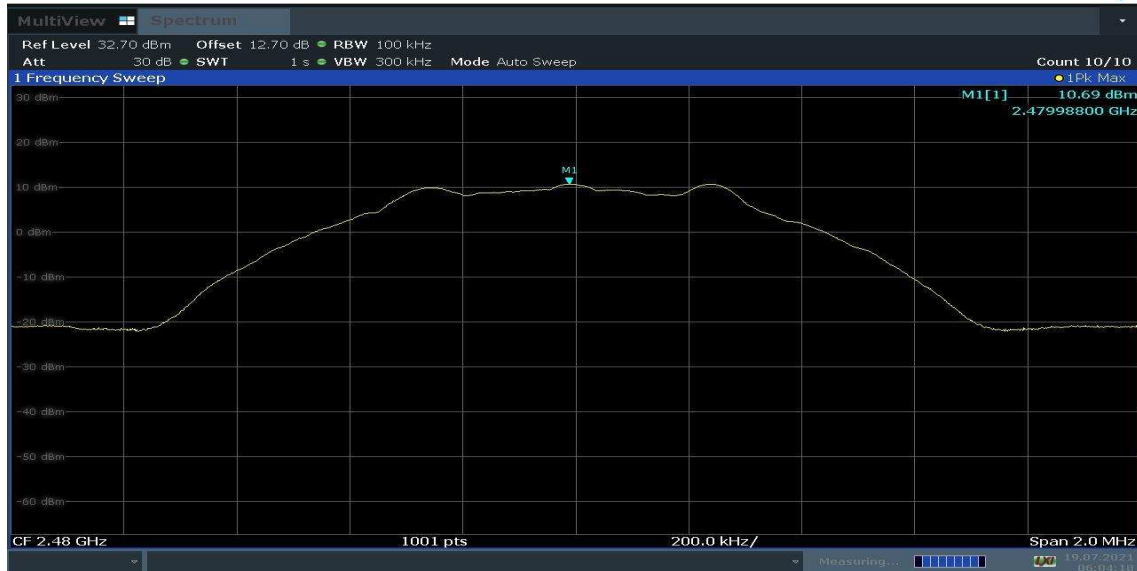
## BLE\_TM1\_Ant1\_2440\_0~Reference



## BLE\_TM1\_Ant1\_2440\_0.009~30



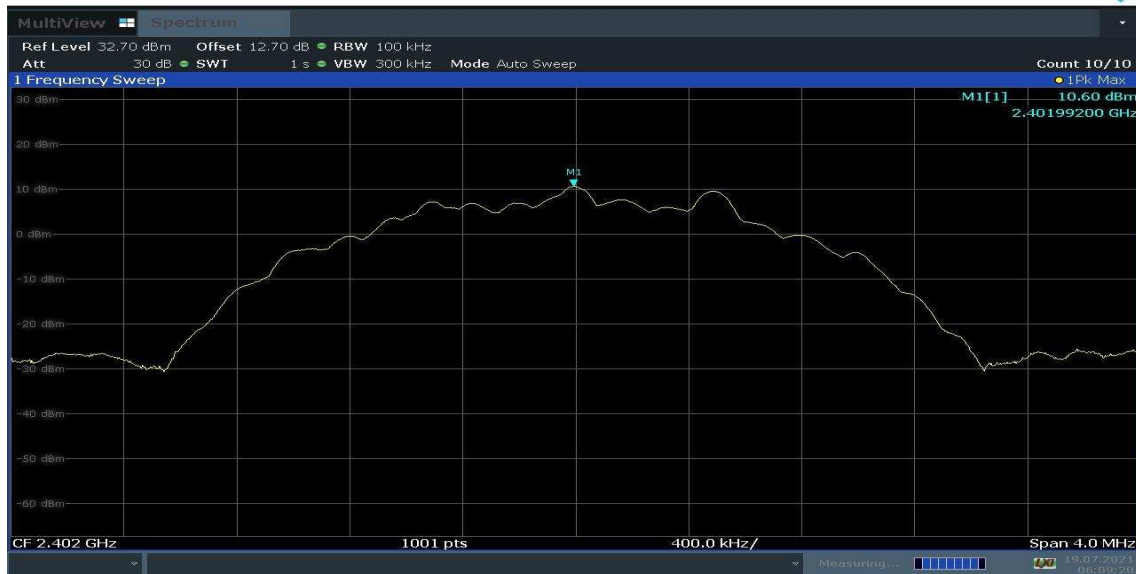
## BLE\_TM1\_Ant1\_2480\_0-Reference



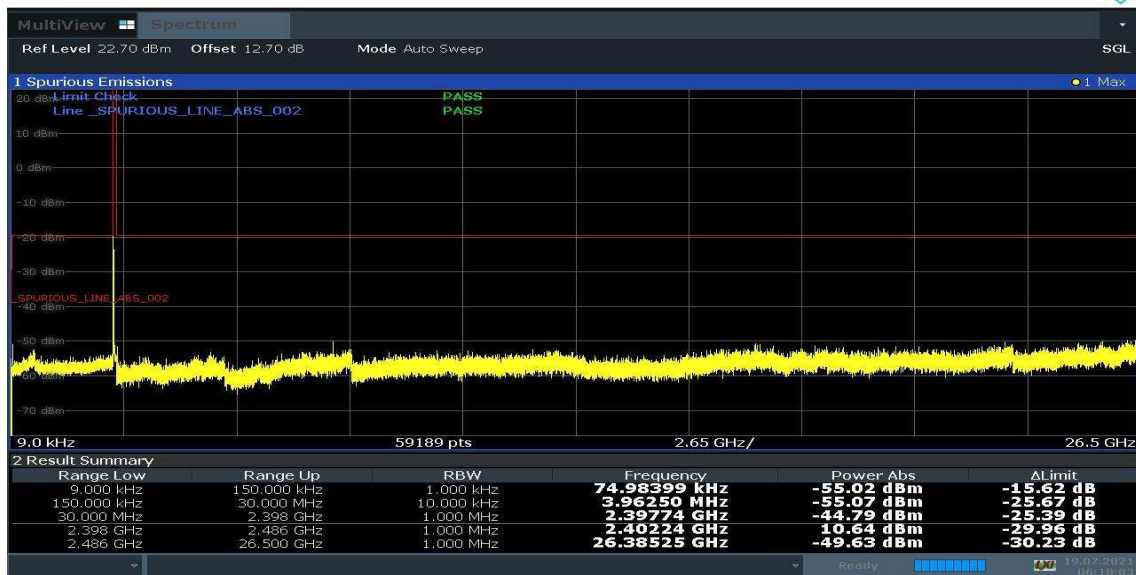
## BLE\_TM1\_Ant1\_2480\_0.009~30



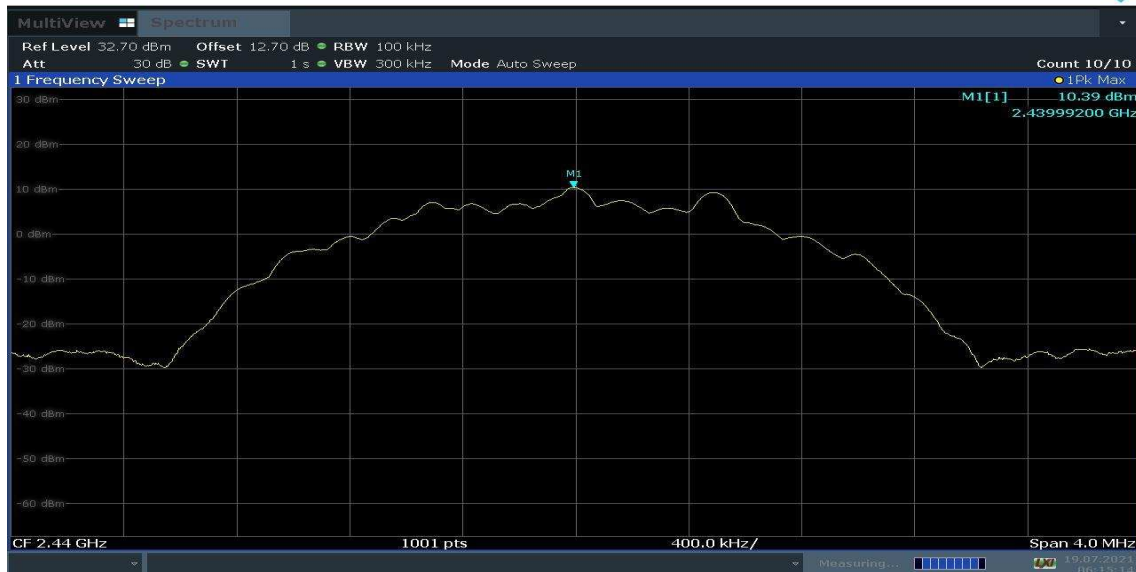
## BLE\_TM2\_Ant1\_2402\_0~Reference



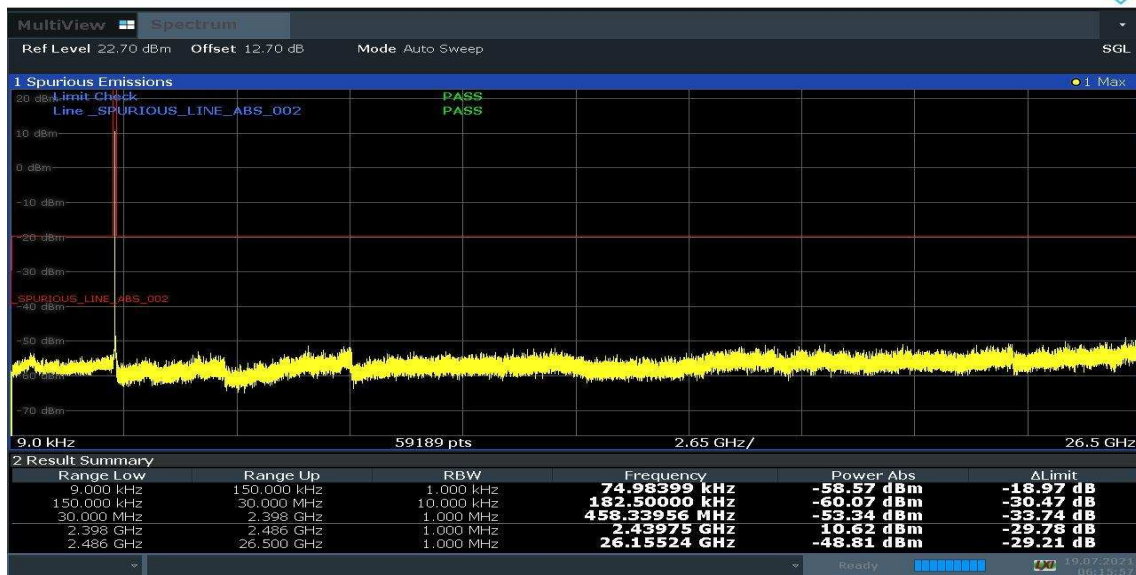
## BLE\_TM2\_Ant1\_2402\_0.009~30



## BLE\_TM2\_Ant1\_2440\_0~Reference



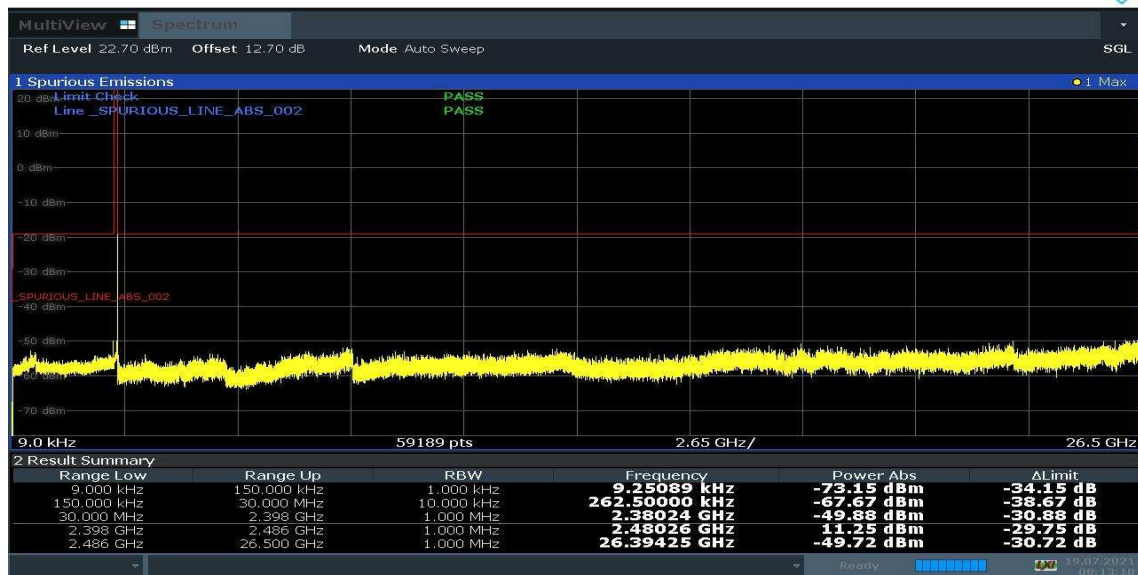
## BLE\_TM2\_Ant1\_2440\_0.009~30



## BLE\_TM2\_Ant1\_2480\_0~Reference



## BLE\_TM2\_Ant1\_2480\_0.009~30



## 8. Appendix H: Radiated Spurious Emission & Spurious in Restricted Band

Note:

1. We tested all modes & antennas, the data presented below is the worst case.
2. The simultaneous transmission has been considered
3. The whole testing range is from “9 KHz to 26.5 GHz (10th harmonics)” is divided into 5 parts according to the test site settings, which are:
  - (Part 1): Test range of “9 KHz to 30 MHz”, RBW = 9 kHz, VBW = 30 kHz
  - (Part 2): Test range of “30 MHz to 1 GHz”, RBW = 100 kHz, VBW = 300 kHz.
  - (Part 3): Test range of “1 GHz to 3 GHz”. RBW = 1 MHz, VBW = 3 MHz.
  - (Part 4): Test range of “3 GHz to 18 GHz”, RBW = 1 MHz, VBW = 3 MHz.
  - (Part 5): Test range of “18 GHz to 26.5 GHz”. RBW = 1 MHz, VBW = 3 MHz.

### 8.1 Test Results

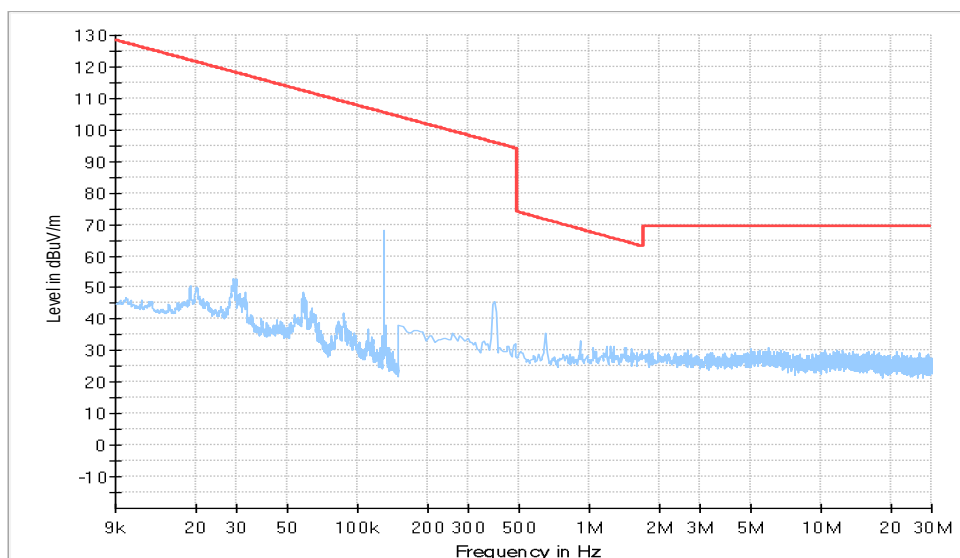
| Test Mode  | Antenna | Test Channel | Spurious Emissions Result | Spurious Emissions Limit | Verdict |
|------------|---------|--------------|---------------------------|--------------------------|---------|
| TM1_BLE_1M | Ant1    | 2402         | (see Test Graphs)         | (see Test Graphs)        | PASS    |
|            | Ant1    | 2480         | (see Test Graphs)         | (see Test Graphs)        | PASS    |
| TM2_BLE_2M | Ant1    | 2402         | (see Test Graphs)         | (see Test Graphs)        | PASS    |
|            | Ant1    | 2480         | (see Test Graphs)         | (see Test Graphs)        | PASS    |

## 8.2 Test Graphs

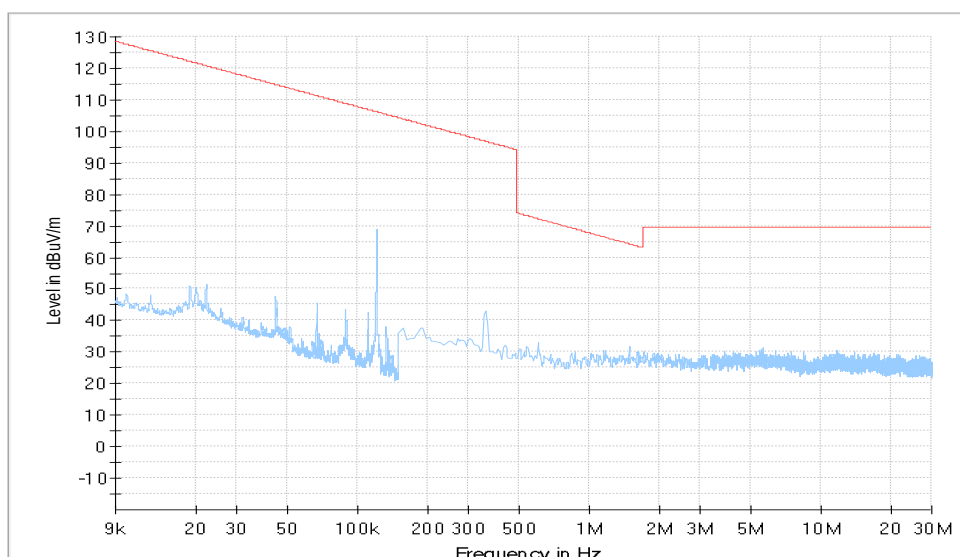
### 8.2.1 Part 1: Testing Range of “9 kHz to 30MHz”

Note 1: The test results and plot for testing range of “9 kHz to 30MHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Worst case CH\_2402-BLE\_1M



Worst case CH\_2402-BLE\_2M

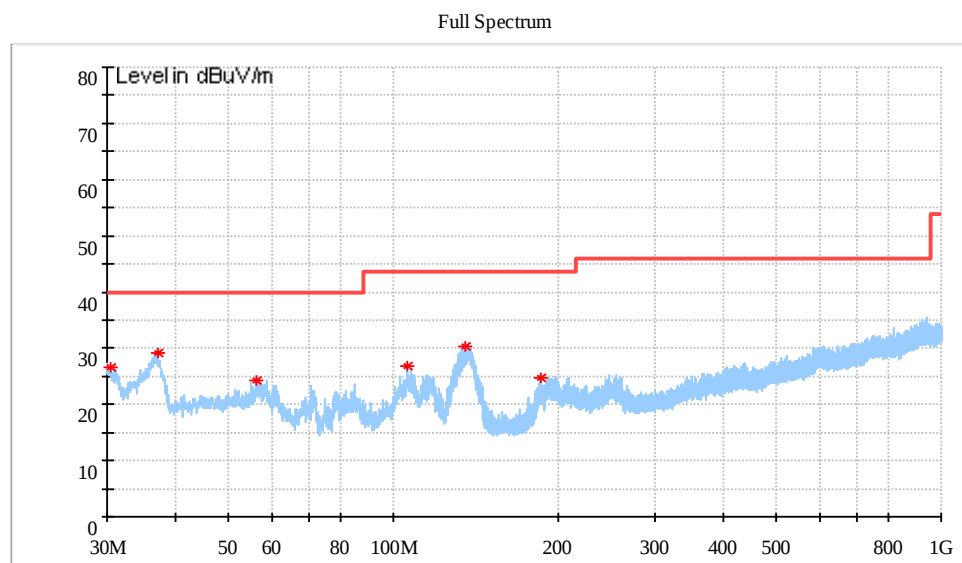


## 8.2.2 Part 2: Testing Range of “30 MHz to 1 GHz”

Note 1: The test results and plot for testing range of “30 MHz to 1 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Note 2: The emissions in this range are mainly from the Platform Device (Notepad PC and its ancillary components).

Worst case CH\_2402- BLE\_1M

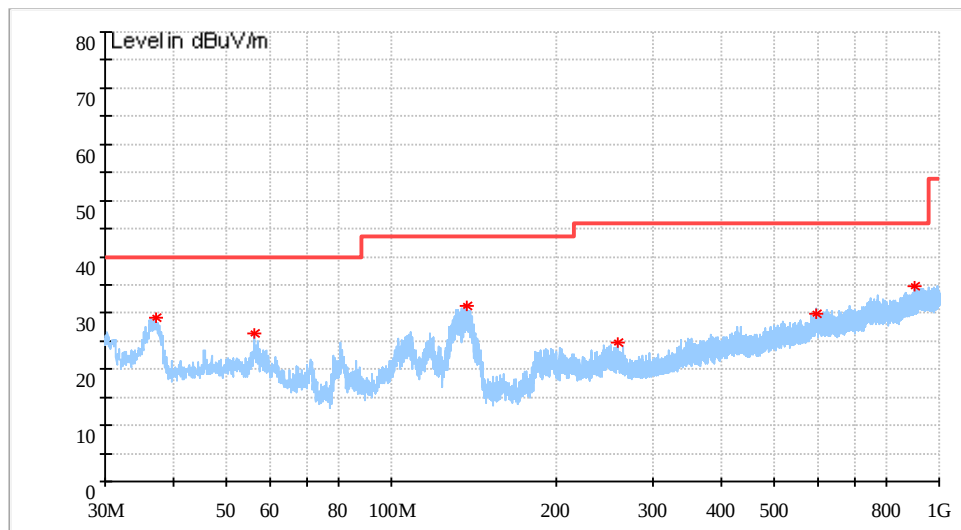


MEASUREMENT RESULT: QP Detector

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarisation |
|------------------|-----------------|--------------|-----------------|--------------|--------------|----------------|--------------|
| 30.485000        | 26.56           | 16.5         | 40.00           | 13.44        | 100.0        | 317.0          | V            |
| 37.032500        | 29.23           | 18.2         | 40.00           | 10.77        | 100.0        | 347.0          | V            |
| 56.190000        | 24.32           | 20.2         | 40.00           | 15.68        | 100.0        | 2.0            | V            |
| 106.290500       | 26.85           | 18.4         | 43.50           | 16.65        | 100.0        | 298.0          | V            |
| 135.633000       | 30.33           | 15.1         | 43.50           | 13.17        | 100.0        | 338.0          | V            |
| 185.830500       | 24.72           | 17.0         | 43.50           | 18.78        | 100.0        | 104.0          | V            |

## Worst case CH\_2402- BLE\_2M

Full Spectrum



## MEASUREMENT RESULT: QP Detector

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarisation |
|------------------|-----------------|--------------|-----------------|--------------|--------------|----------------|--------------|
| 37.032500        | 29.10           | 18.2         | 40.00           | 10.90        | 100.0        | 294.0          | V            |
| 56.093000        | 26.26           | 20.2         | 40.00           | 13.74        | 100.0        | 60.0           | V            |
| 137.621500       | 31.19           | 15.0         | 43.50           | 12.31        | 100.0        | 294.0          | V            |
| 259.259500       | 24.80           | 19.9         | 46.00           | 21.20        | 100.0        | 189.0          | H            |
| 598.468500       | 29.93           | 27.4         | 46.00           | 16.07        | 100.0        | 144.0          | H            |
| 898.877500       | 34.66           | 30.6         | 46.00           | 11.34        | 100.0        | 163.0          | V            |

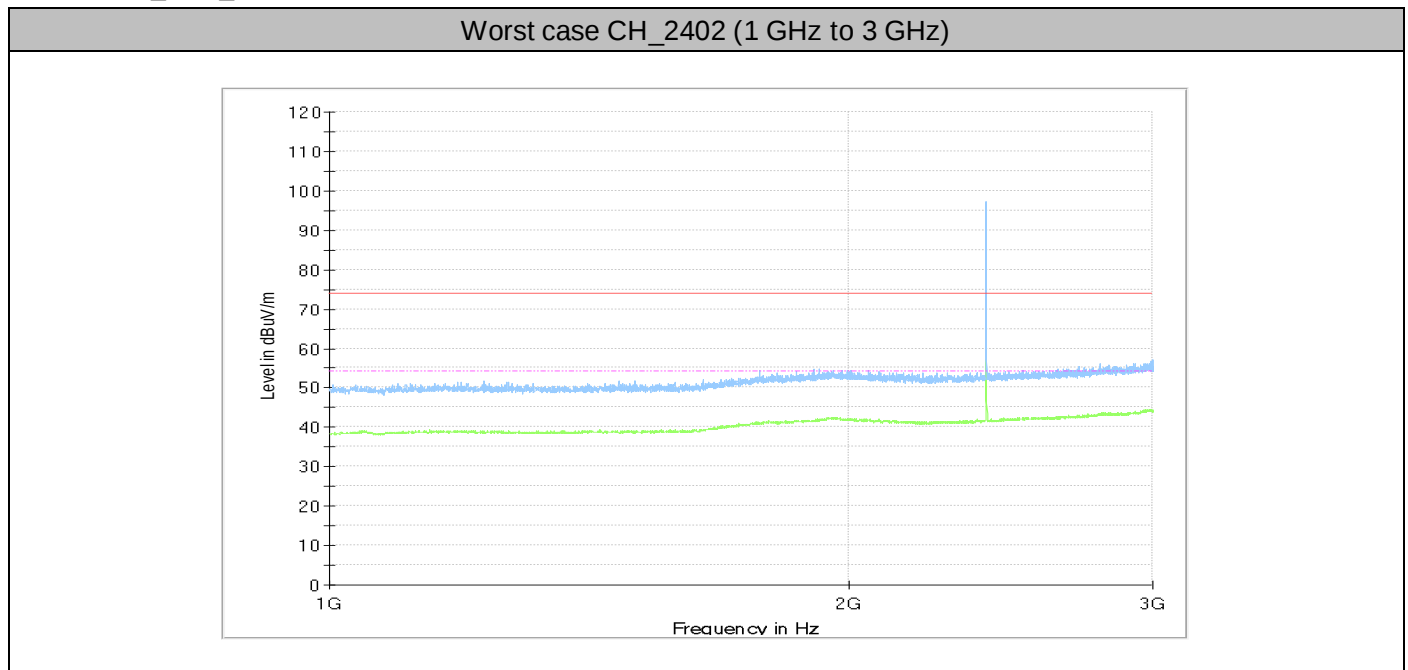
### 8.2.3 Part 3: Testing Range of “1 GHz to 3 GHz”

Note 1: The testing range of “1 GHz to 3 GHz” is for checking radiated emissions located in restricted bands near the EUT operating bands. The test results and plot for testing range of “1 GHz to 3 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

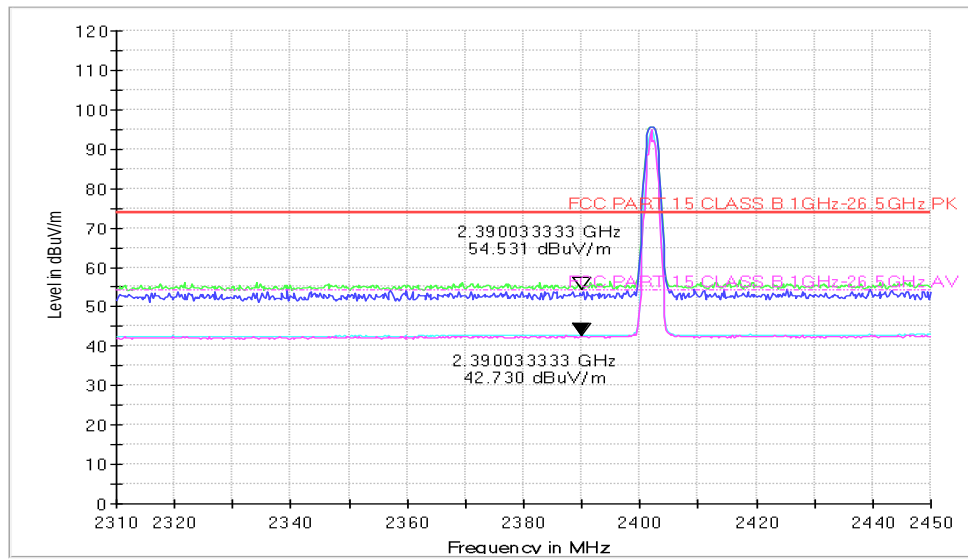
Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).

Note 3: The peak spike exceeds the limit line is EUT's operating frequency.

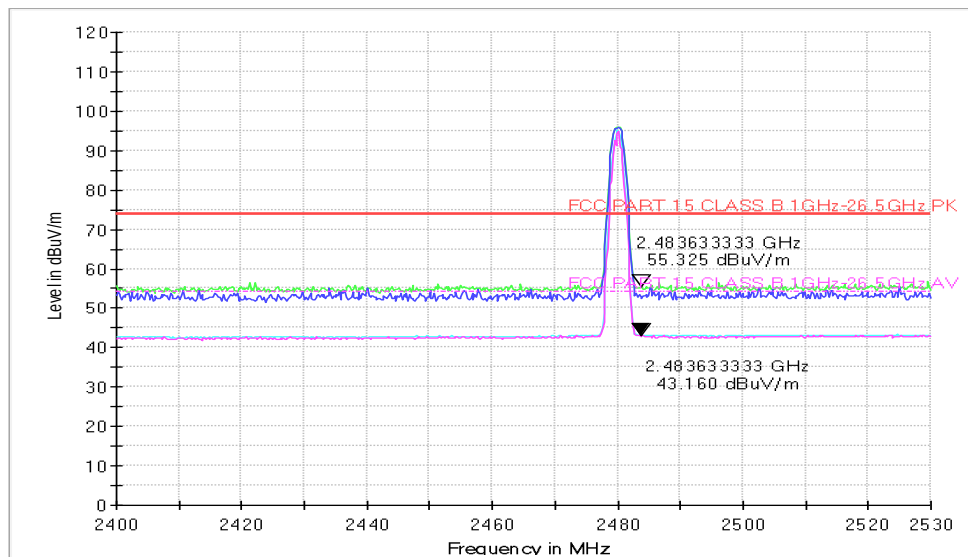
#### 8.2.3.1 TM1\_BLE\_1M



### CH\_2402(Band Edge)

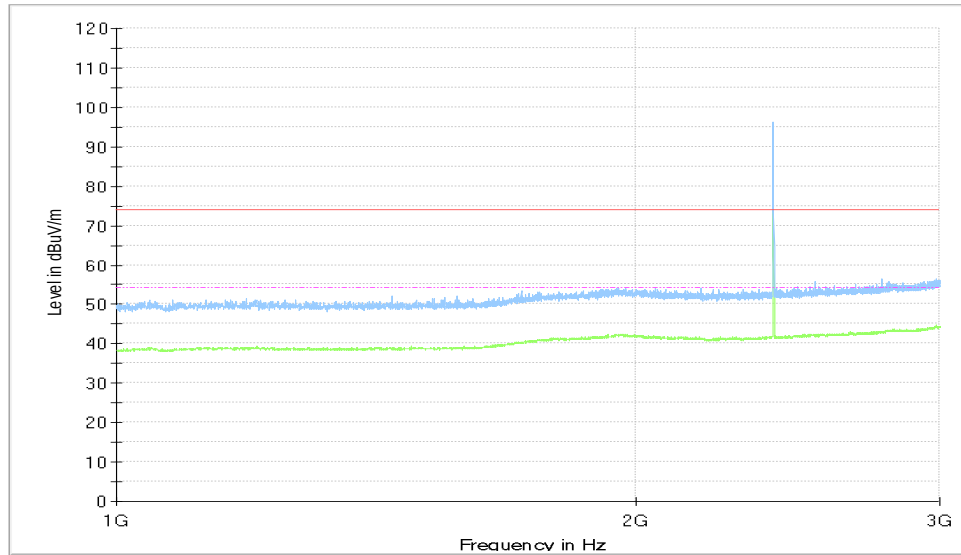


### CH\_2480(Band Edge)

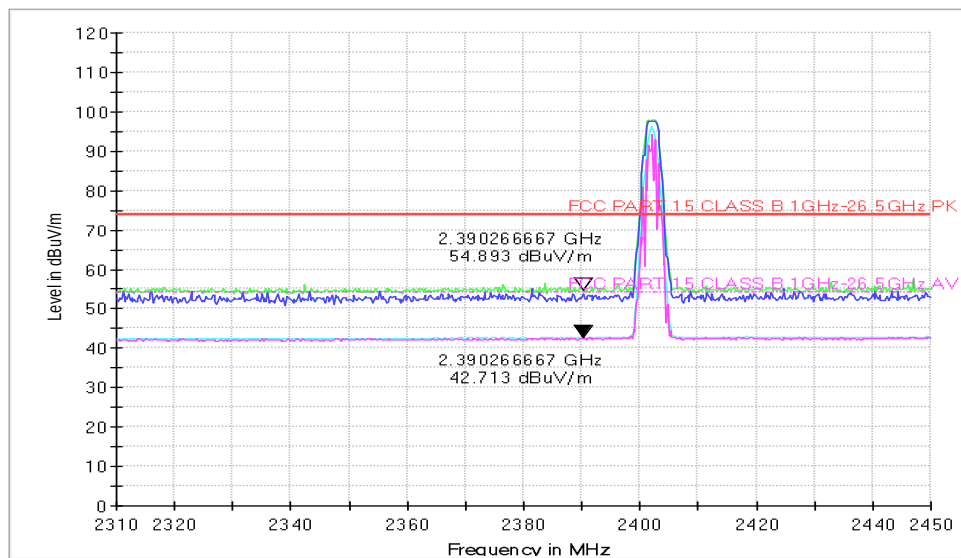


### 8.2.3.2 TM2\_BLE\_2M

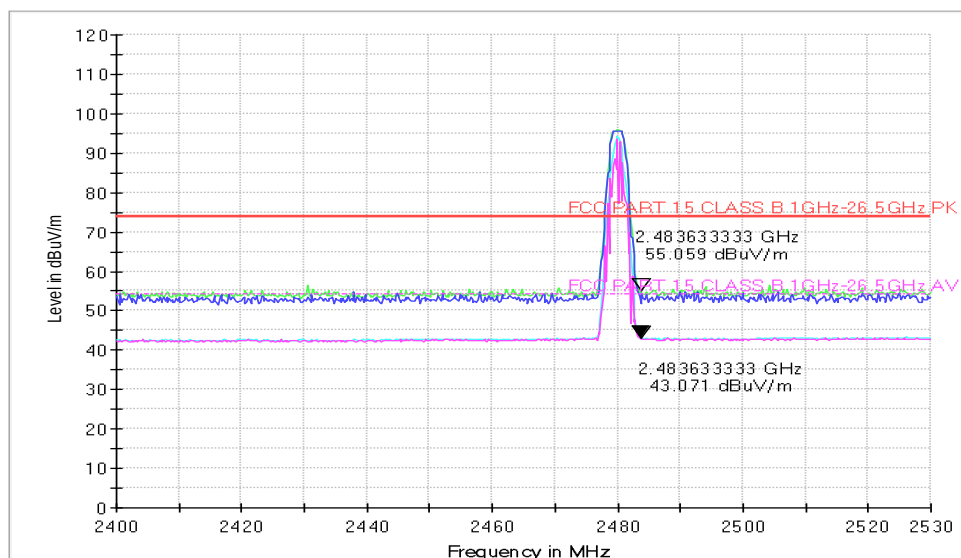
Worst case CH\_2480 (1 GHz to 3 GHz)



CH\_2402(Band Edge)



### CH\_2480(Band Edge)

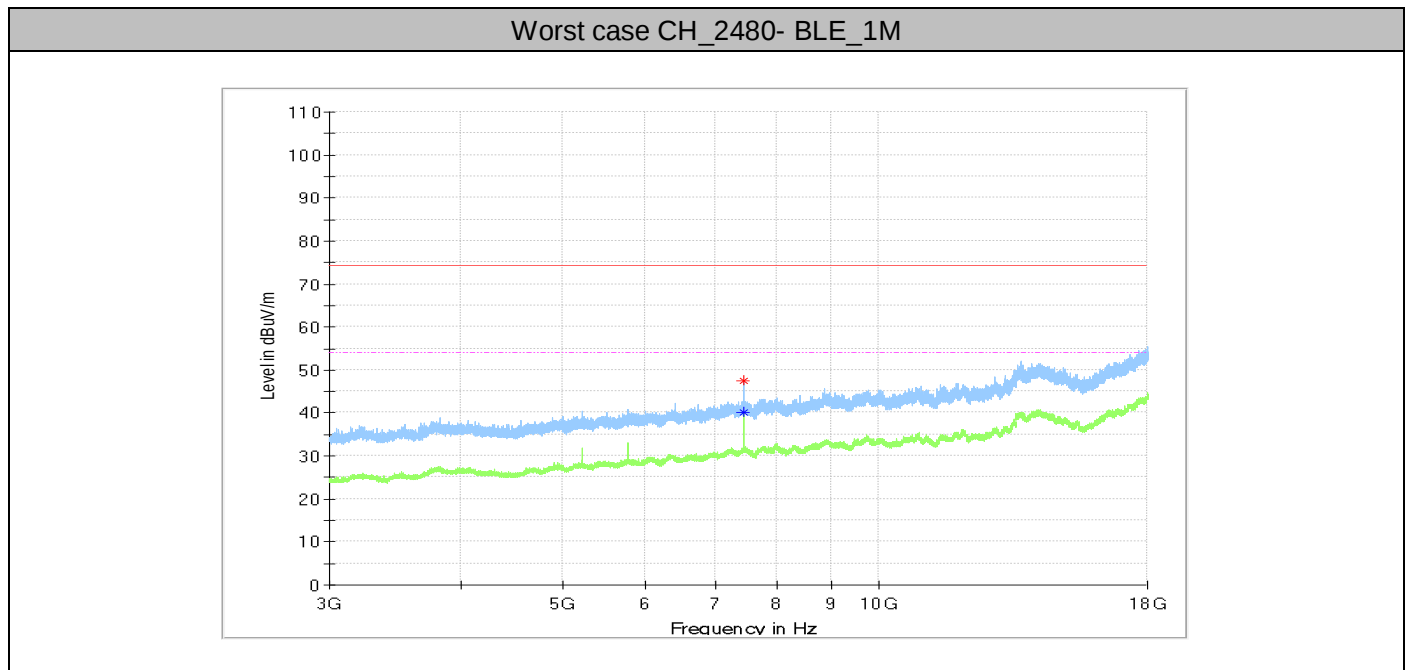


## 8.2.4 Part 4: Testing Range of “3 GHz to 18 GHz”

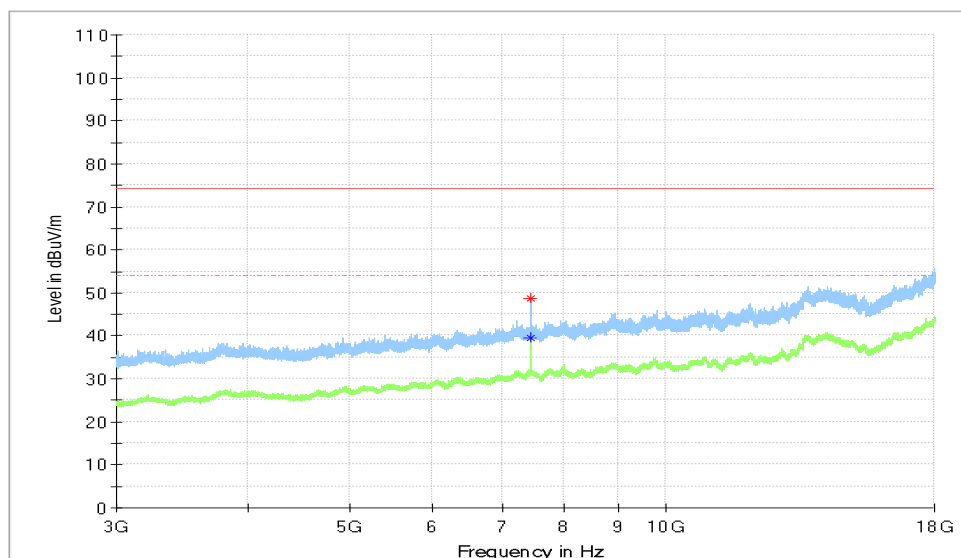
Note 1: The test results and plot for testing range of “3 GHz to 18 GHz” showed as below is the worst case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Note 2: The testing range of “3 GHz to 18 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.

Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).



Worst case CH\_2480- BLE\_2M



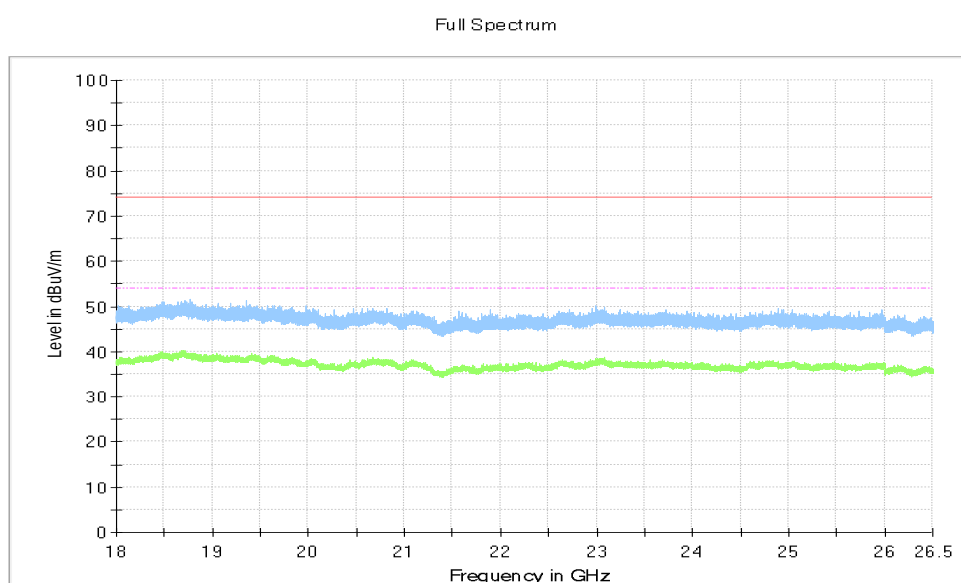
### 8.2.5 Part 5: Testing Range of “18 GHz to 26.5 GHz”

Note 1: The test results and plot for testing range of “18 GHz to 26.5 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

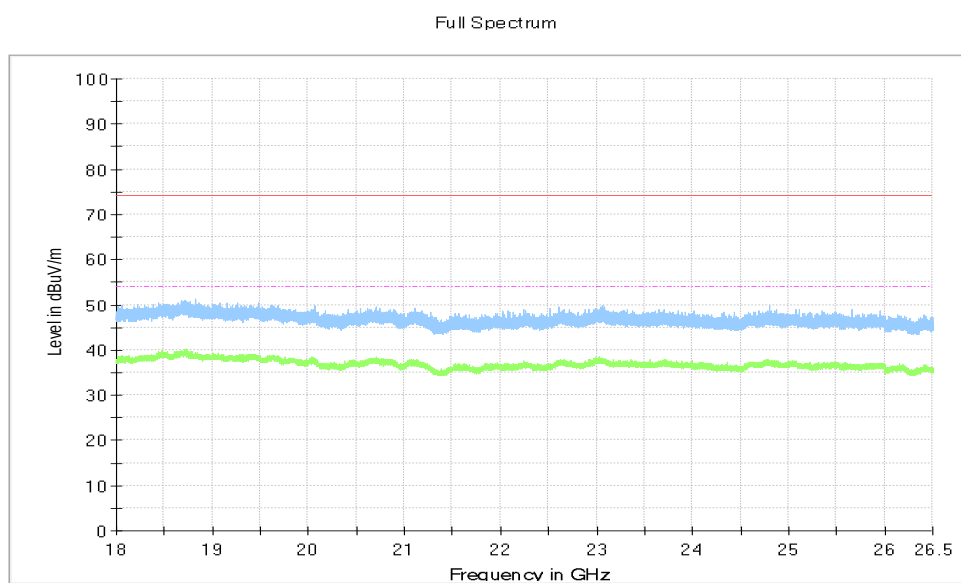
Note 2: The testing range of “18 GHz to 26.5 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.

Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).

Worst case CH\_2480- BLE\_1M



Worst case CH\_2480- BLE\_2M



## 9. Appendix I: Conducted Emission at Power Port

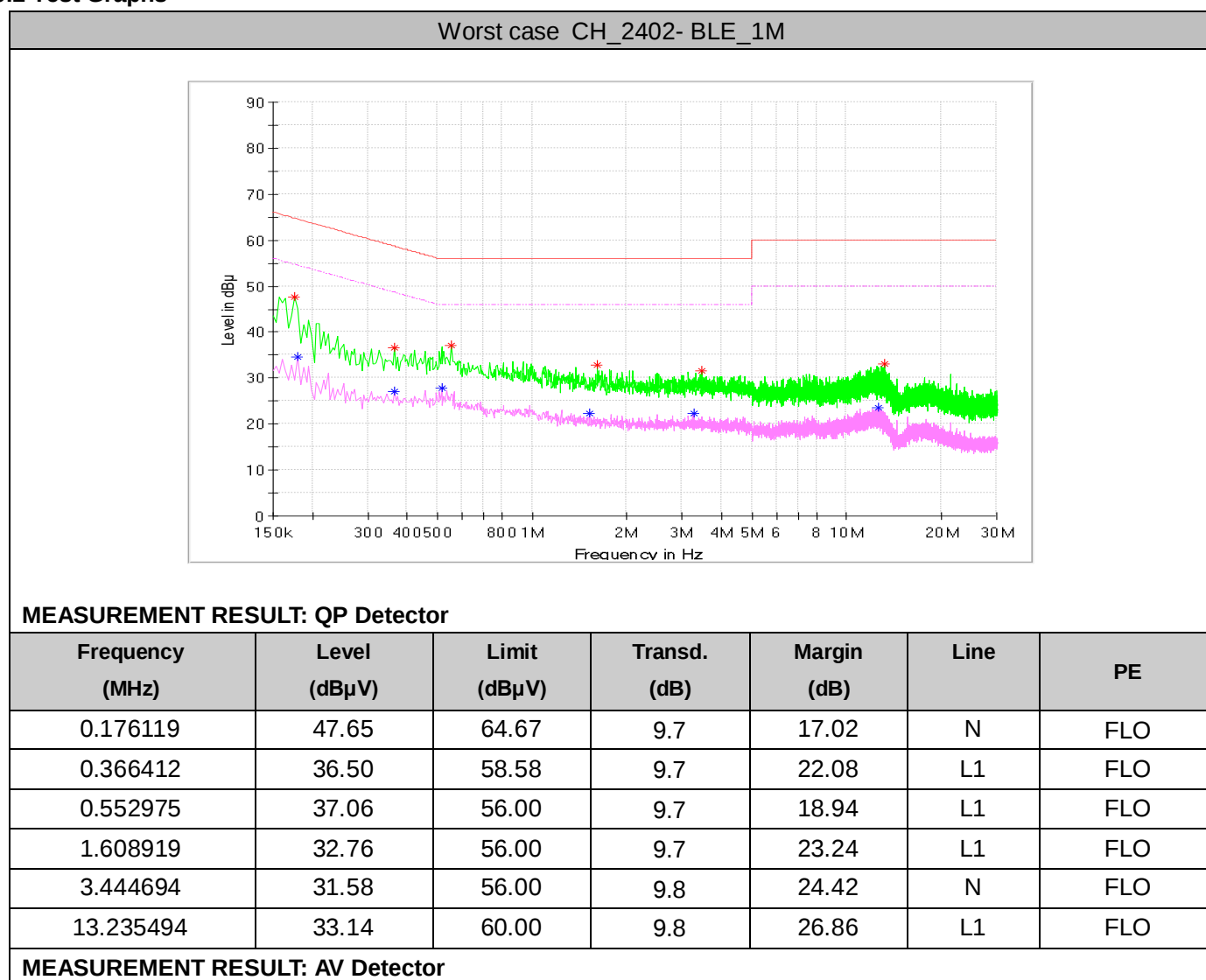
Note 1: The test results and plot for testing range of “150 kHz to 30 MHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.

Note 2: RBW =9 kHz; VBW = 30 kHz

### 9.1 Test Results

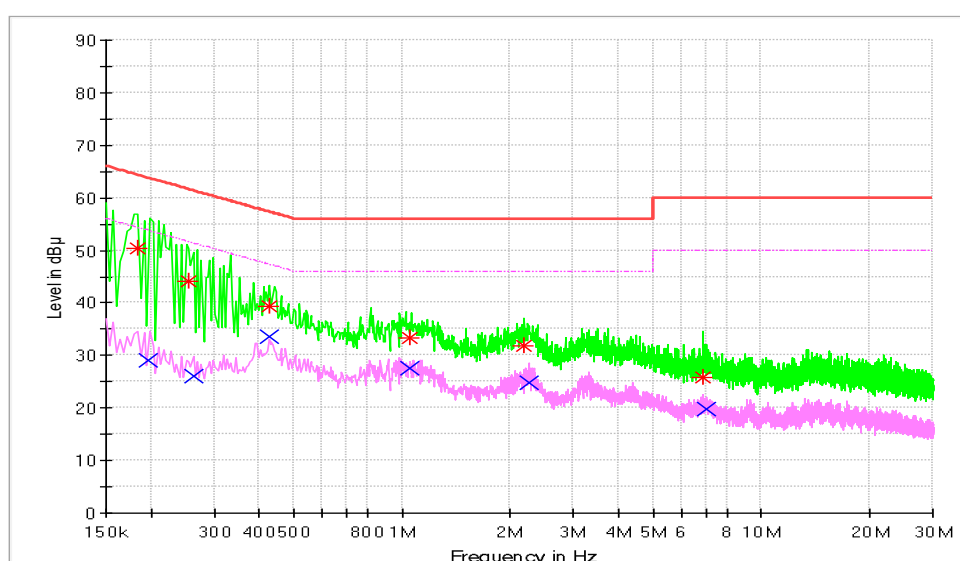
| Test Mode  | Antenna Port | Test Channel | Maximum Emissions | Limit             | Verdict |
|------------|--------------|--------------|-------------------|-------------------|---------|
| TM1_BLE_1M | Ant1         | 2402         | (see Test Graphs) | (see Test Graphs) | PASS    |
| TM1_BLE_2M | Ant1         | 2480         | (see Test Graphs) | (see Test Graphs) | PASS    |

### 9.2 Test Graphs



| Frequency (MHz) | Level (dBμV) | Limit (dBμV) | Transd. (dB) | Margin (dB) | Line | PE  |
|-----------------|--------------|--------------|--------------|-------------|------|-----|
| 0.179850        | 34.60        | 54.49        | 9.7          | 19.89       | L1   | FLO |
| 0.366412        | 27.07        | 48.58        | 9.7          | 21.51       | L1   | FLO |
| 0.515662        | 27.88        | 46.00        | 9.7          | 18.12       | N    | FLO |
| 1.526831        | 22.31        | 46.00        | 9.7          | 23.69       | L1   | FLO |
| 3.276788        | 22.39        | 46.00        | 9.8          | 23.61       | N    | FLO |
| 12.571331       | 23.56        | 50.00        | 10.3         | 26.44       | L1   | FLO |

### Worst case CH\_2480- BLE\_2M



### MEASUREMENT RESULT: QP Detector

| Frequency (MHz) | Level (dBμV) | Limit (dBμV) | Transd. (dB) | Margin (dB) | Line | PE  |
|-----------------|--------------|--------------|--------------|-------------|------|-----|
| 0.176119        | 47.42        | 64.67        | 9.7          | 17.25       | N    | FLO |
| 0.220894        | 40.99        | 62.79        | 9.7          | 21.80       | L1   | FLO |
| 0.511931        | 40.59        | 56.00        | 9.7          | 15.41       | N    | FLO |
| 0.888788        | 34.97        | 56.00        | 9.7          | 21.03       | N    | FLO |
| 3.911100        | 33.61        | 56.00        | 9.8          | 22.39       | N    | FLO |
| 12.198206       | 35.24        | 60.00        | 10.3         | 24.76       | N    | FLO |

### MEASUREMENT RESULT: AV Detector

| Frequency (MHz) | Level (dBμV) | Limit (dBμV) | Transd. (dB) | Margin (dB) | Line | PE  |
|-----------------|--------------|--------------|--------------|-------------|------|-----|
| 0.176119        | 35.81        | 54.67        | 9.7          | 18.86       | L1   | FLO |
| 0.220894        | 30.96        | 52.79        | 9.7          | 21.83       | L1   | FLO |



|           |       |       |      |       |   |     |
|-----------|-------|-------|------|-------|---|-----|
| 0.511931  | 31.22 | 46.00 | 9.7  | 14.78 | N | FLO |
| 0.922369  | 24.34 | 46.00 | 9.7  | 21.66 | N | FLO |
| 3.996919  | 21.38 | 46.00 | 9.8  | 24.62 | N | FLO |
| 12.339994 | 24.38 | 50.00 | 10.3 | 25.62 | N | FLO |

Note:

1, Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

2, Margin=Limit - Level

END