# 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 | 0.688 | 2401.652 | 2402.34 | ≥0.5 | PASS |
| | | 2440 | 0.684 | 2439.656 | 2440.34 | ≥0.5 | PASS |
| | | 2480 | 0.676 | 2479.66 | 2480.336 | ≥0.5 | PASS |
| BLE_TM2 | Ant1 | 2402 | 1.156 | 2401.424 | 2402.58 | ≥0.5 | PASS |
| | | 2440 | 1.156 | 2439.424 | 2440.58 | ≥0.5 | PASS |
| | | 2480 | 1.156 | 2479.424 | 2480.58 | ≥0.5 | PASS |

### 1.2 Test Graphs

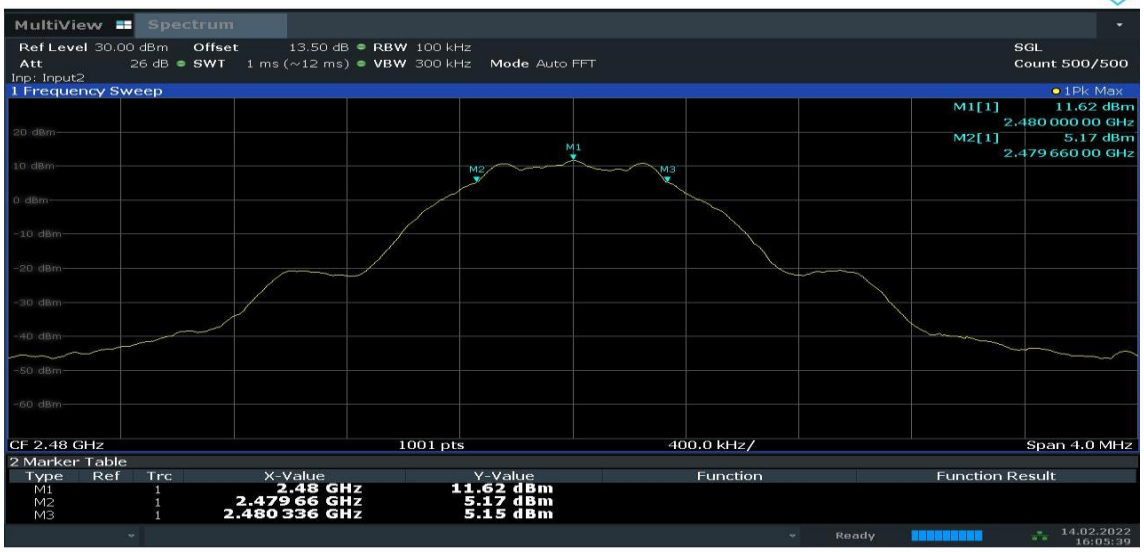
BLE_TM1_Ant1_2402


15:44:58 14.02.2022

BLE_TM1_Ant1_2440


15:58:27 14.02.2022

BLE_TM1_Ant1_2480




16:05:40 14.02.2022

BLE_TM2_Ant1_2402


16:11:49 14.02.2022

BLE_TM2_Ant1_2440


16:17:18 14.02.2022

BLE_TM2_Ant1_2480


16:22:32 14.02.2022

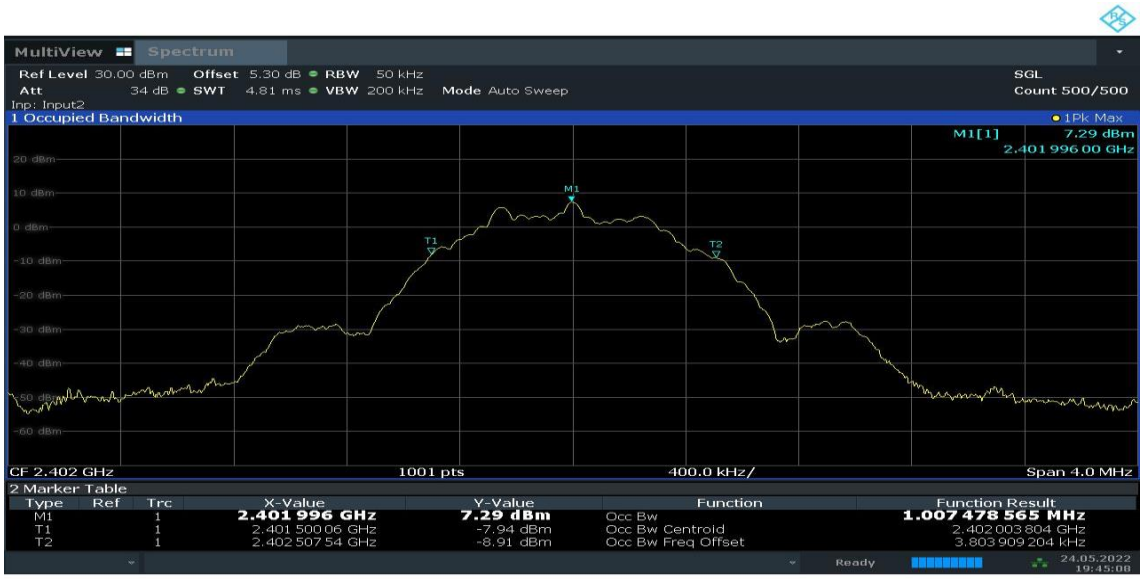
## 2. Appendix B: Occupied Channel Bandwidth

### 2.1 Test Result

| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | 2402 | 1.007 | 2401.5 | 2402.51 | --- | PASS |
| | | 2440 | 1.008 | 2439.5 | 2440.51 | --- | PASS |
| | | 2480 | 1.008 | 2479.5 | 2480.51 | --- | PASS |
| BLE_TM2 | Ant1 | 2402 | 1.9987 | 2401.02 | 2403.01 | --- | PASS |
| | | 2440 | 1.9974 | 2439.02 | 2441.01 | --- | PASS |
| | | 2480 | 1.9972 | 2479.02 | 2481.01 | --- | PASS |

## 2.2 Test Graphs

BLE_TM1_Ant1_2402




19:45:08 24.05.2022

BLE_TM1_Ant1_2440


19:46:19 24.05.2022

BLE_TM1_Ant1_2480


19:47:26 24.05.2022

BLE_TM2_Ant1_2402


19:50:06 24.05.2022

BLE_TM2_Ant1_2440


19:49:21 24.05.2022

BLE_TM2_Ant1_2480


19:48:12 24.05.2022

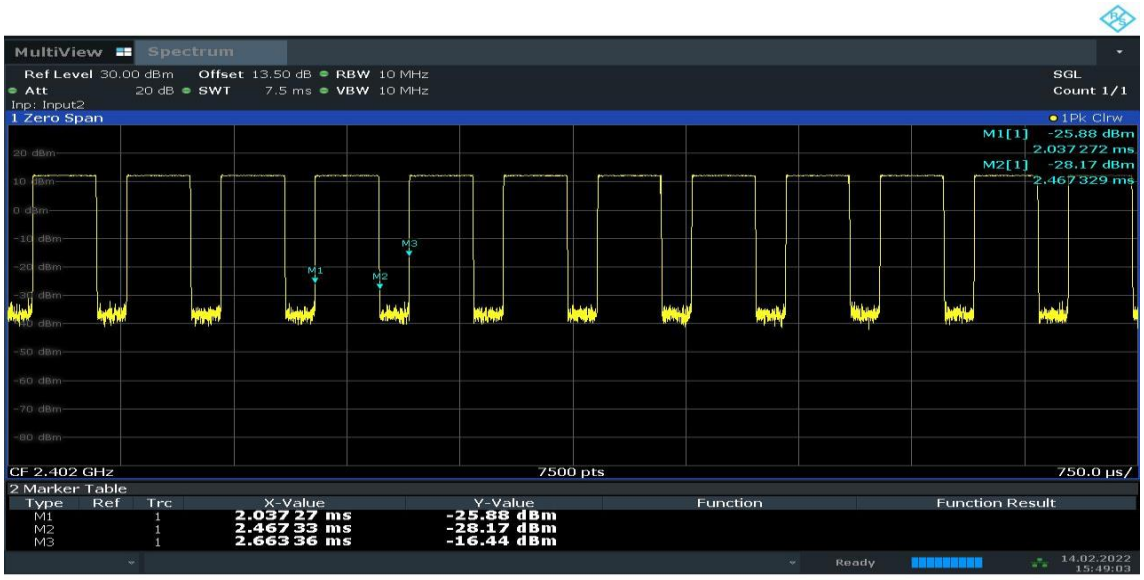
## 3.Appendix C: Duty Cycle

### 3.1 Test Result

| TestMode | Antenna | Channel | Transmission Duration [ms] | Transmission Period [ms] | Duty Cycle [%] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | 2402 | 0.43 | 0.63 | 68.254 | --- | PASS |
| | | 2440 | 0.43 | 0.63 | 68.254 | --- | PASS |
| | | 2480 | 0.43 | 0.63 | 68.254 | --- | PASS |
| BLE_TM2 | Ant1 | 2402 | 1.12 | 1.88 | 59.574 | --- | PASS |
| | | 2440 | 1.12 | 1.88 | 59.574 | --- | PASS |
| | | 2480 | 1.12 | 1.88 | 59.574 | --- | PASS |

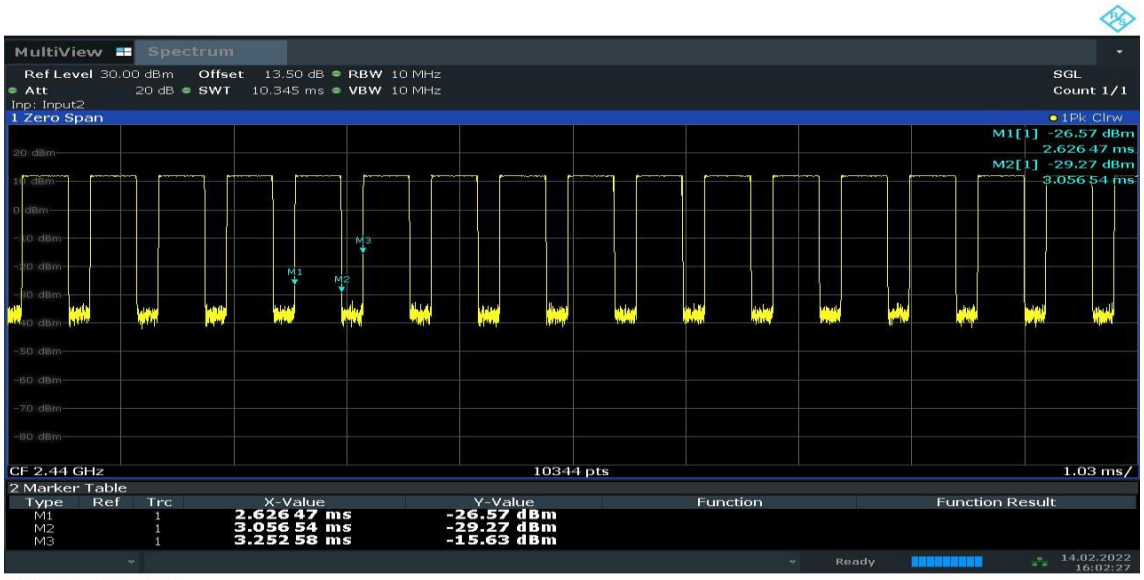
### 3.2 Test Graphs

BLE_TM1_Ant1_2402



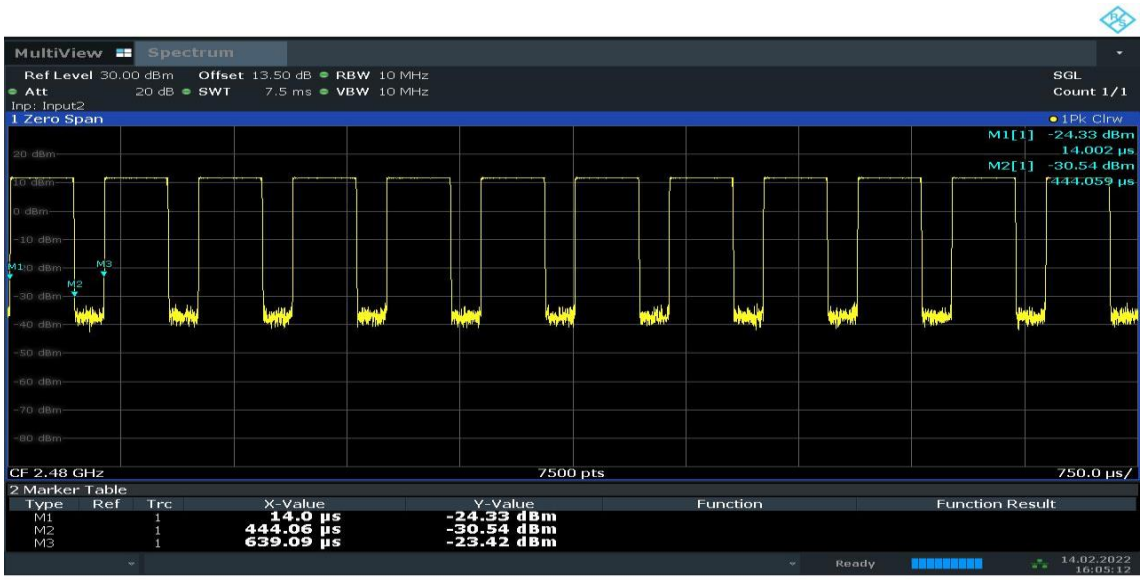

15:49:04 14.02.2022

BLE_TM1_Ant1_2440



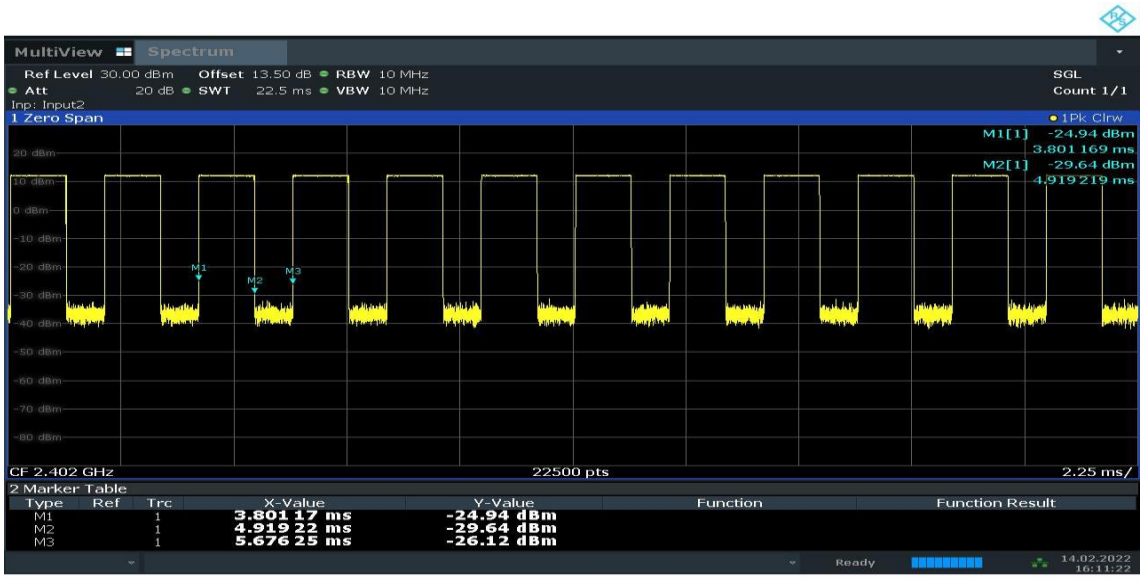

16:02:28 14.02.2022

BLE_TM1_Ant1_2480



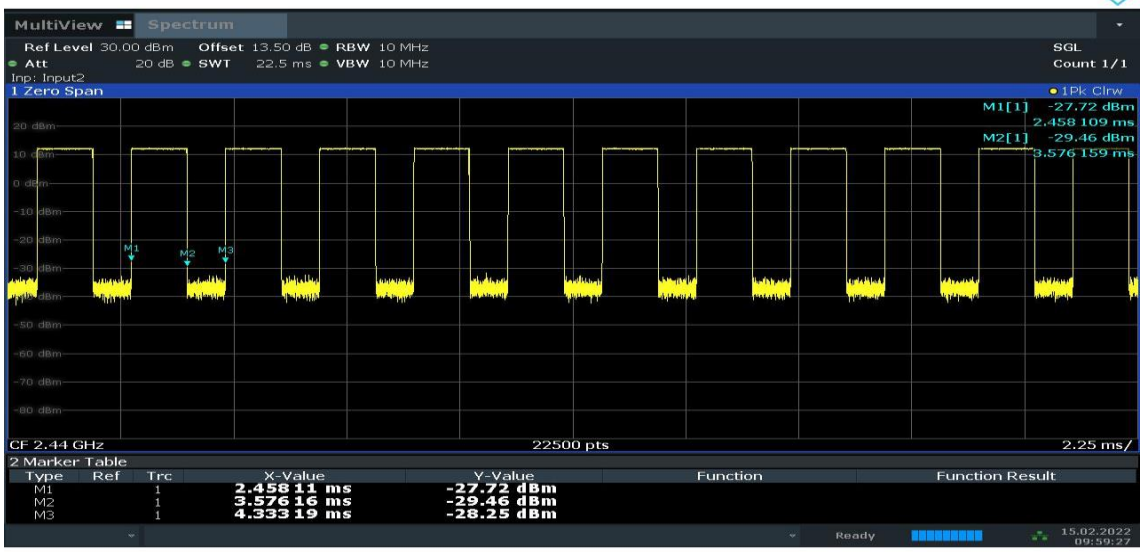

16:05:13 14.02.2022

BLE_TM2_Ant1_2402

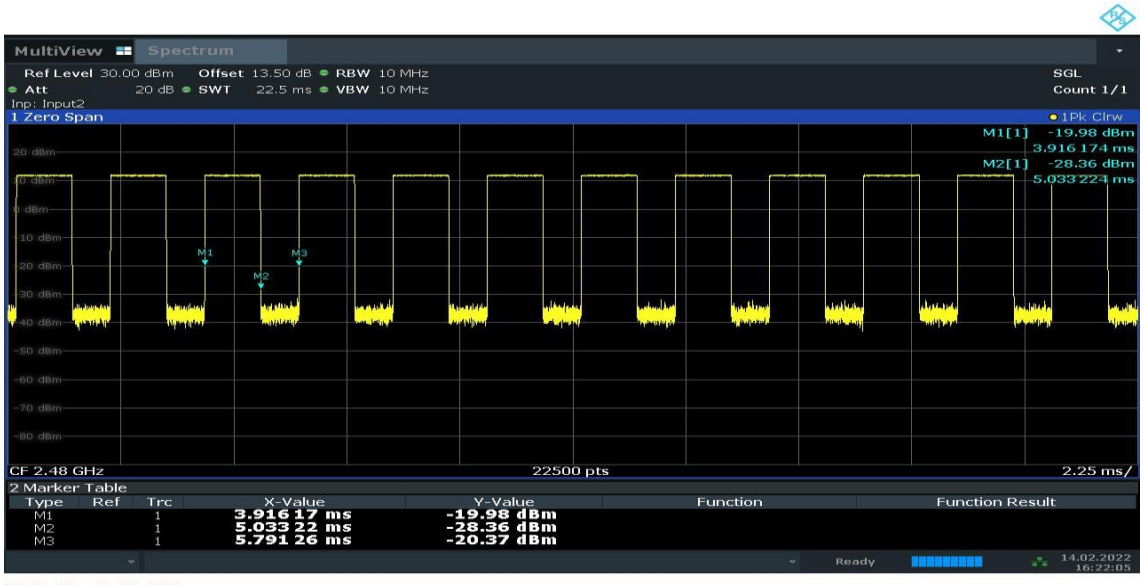



16:11:22 14.02.2022

BLE_TM2_Ant1_2440




BLE_TM2_Ant1_2480



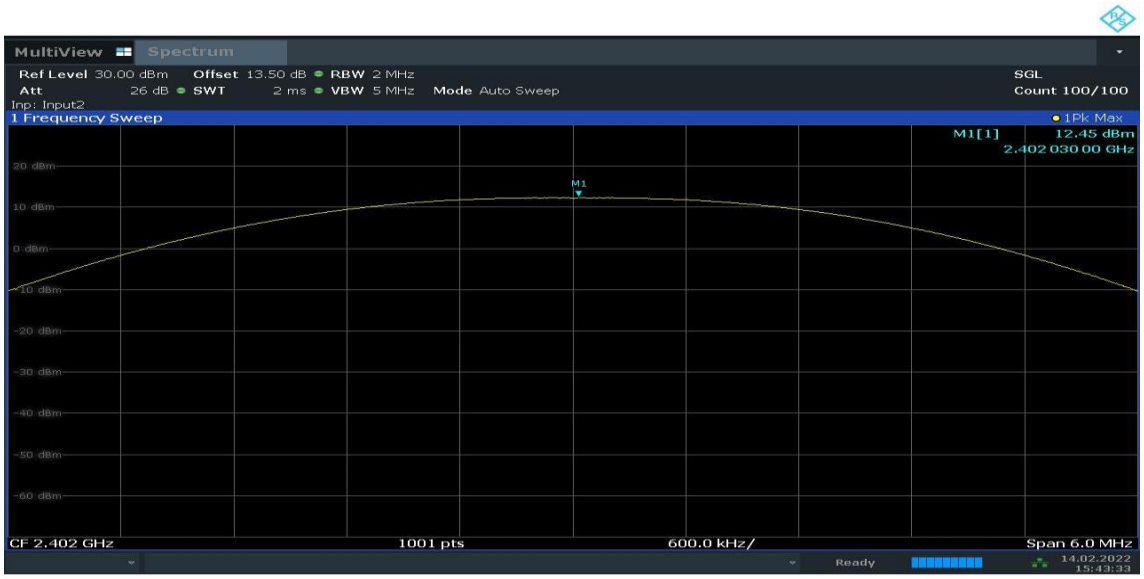
# 4.Appendix D: Maximum Peak output power

## 4.1 Test Result

| TestMode | Antenna | Channel | Conducted Result[dBm] | Conducted Limit[dBm] | EIRP Result[dBm] | EIRP Result[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | 2402 | 12.45 | 30 | 5.45 | 36 | PASS |
| | | 2440 | 12.47 | 30 | 5.47 | 36 | PASS |
| | | 2480 | 12.34 | 30 | 5.34 | 36 | PASS |
| BLE_TM2 | Ant1 | 2402 | 12.43 | 30 | 5.43 | 36 | PASS |
| | | 2440 | 12.5 | 30 | 5.5 | 36 | PASS |
| | | 2480 | 12.37 | 30 | 5.37 | 36 | PASS |

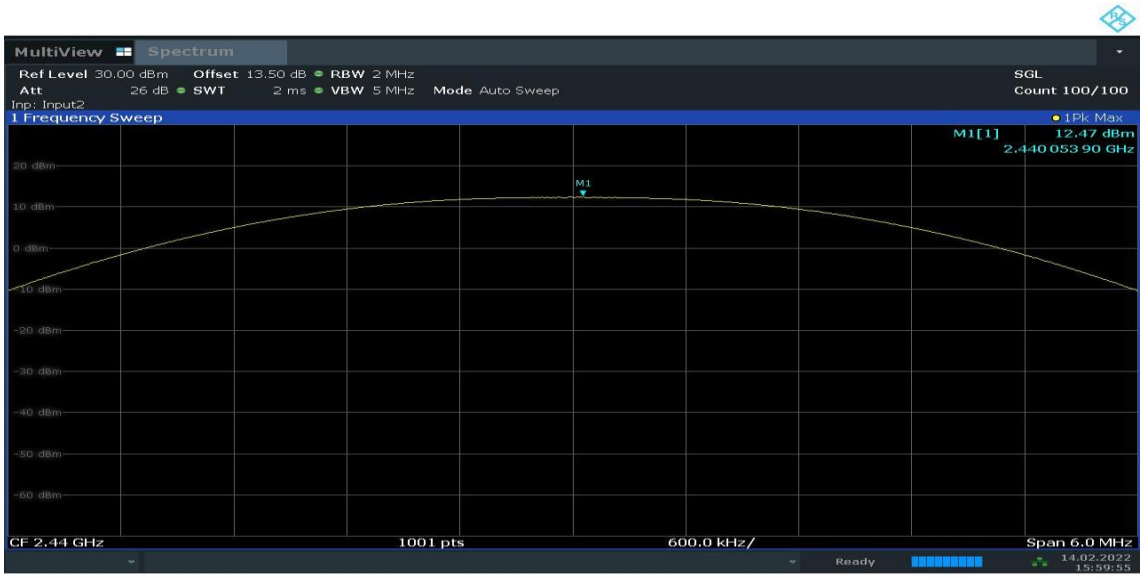
### 4.2 Test Graphs

BLE_TM1_Ant1_2402



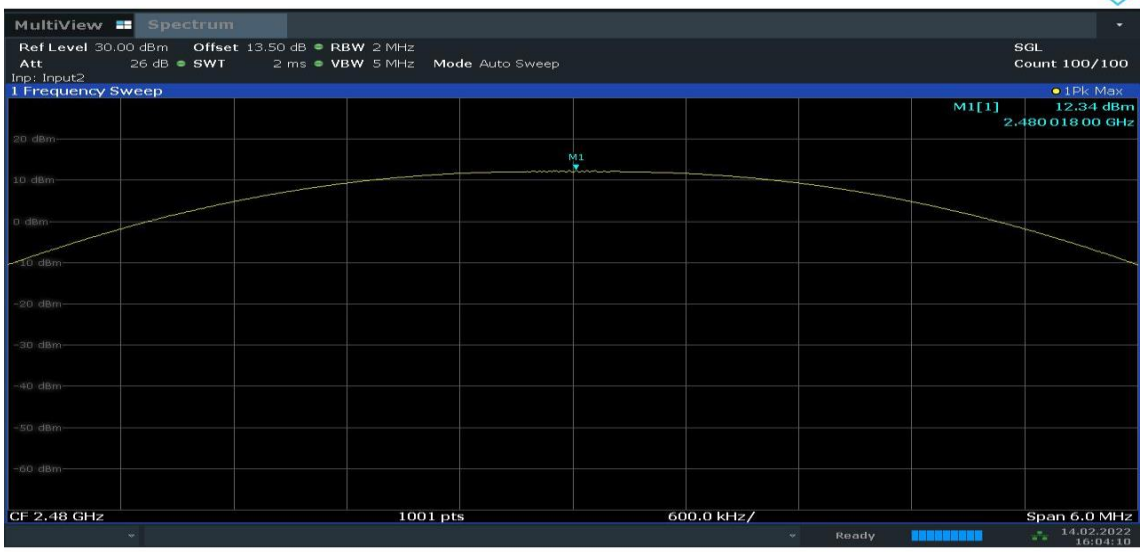

15:43:34 14.02.2022

BLE_TM1_Ant1_2440



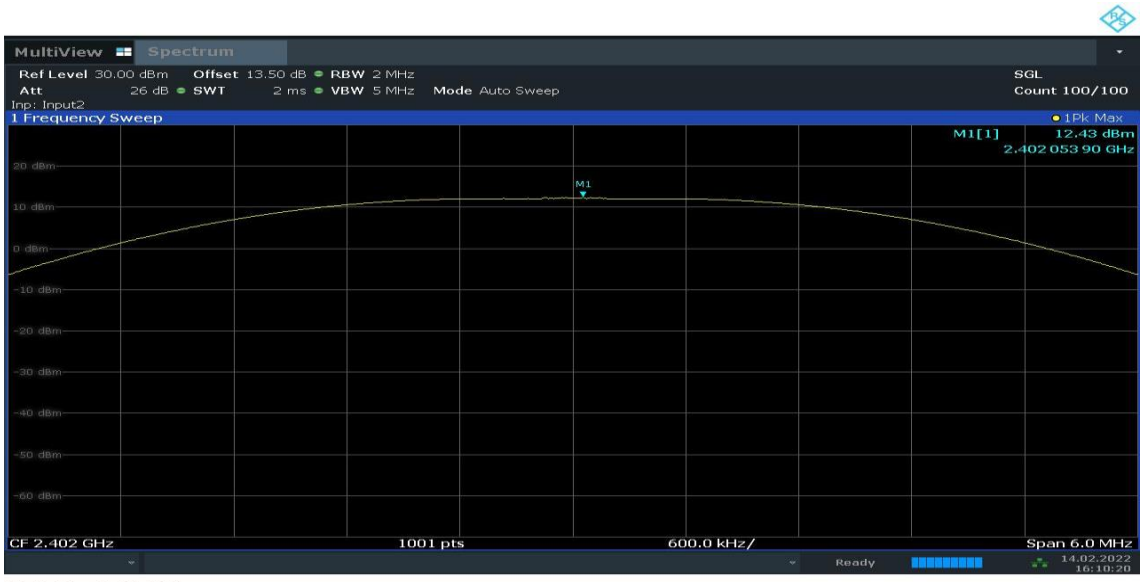

15:59:56 14.02.2022

BLE_TM1_Ant1_2480

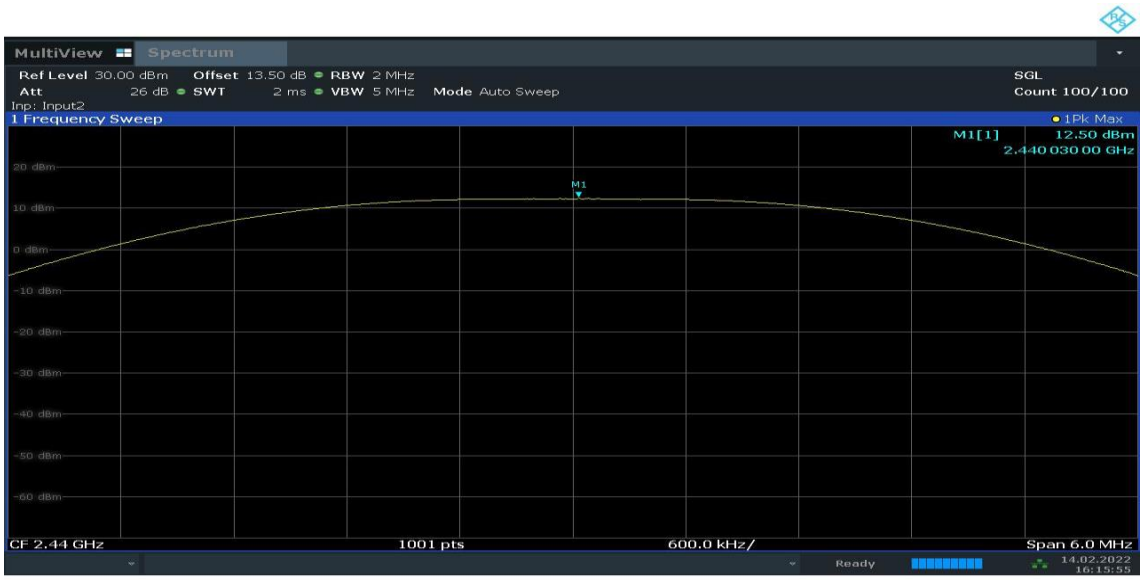


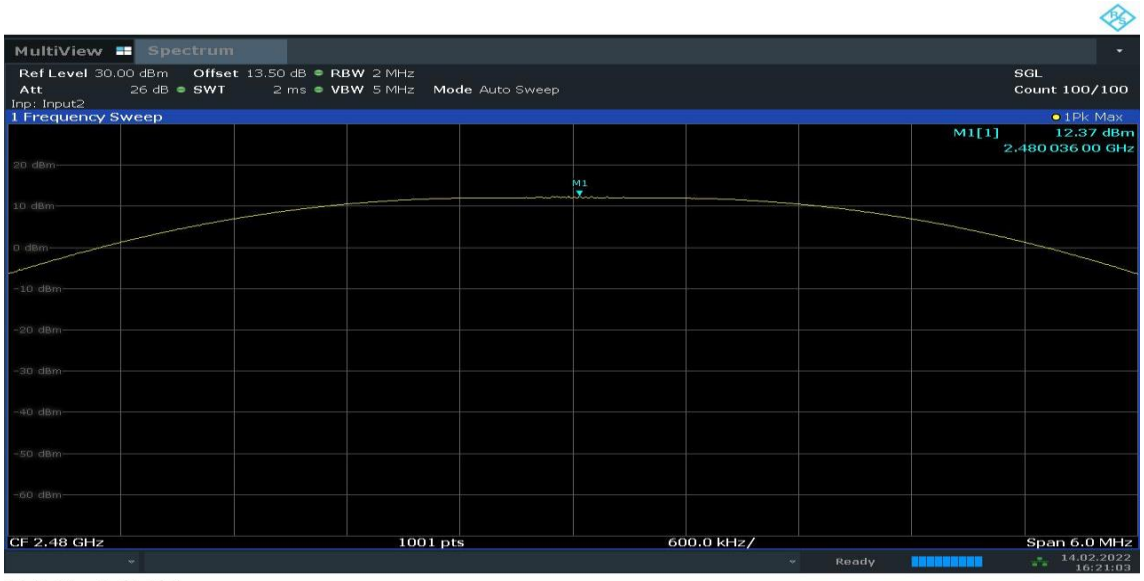

16:04:11 14.02.2022

BLE_TM2_Ant1_2402




16:10:20 14.02.2022

| BLE_TM2_Ant1_2440 |
| --- |
|  <br>16:15:55 14.02.2022 |

| BLE_TM2_Ant1_2480 |
| --- |
|  <br>16:21:03 14.02.2022 |

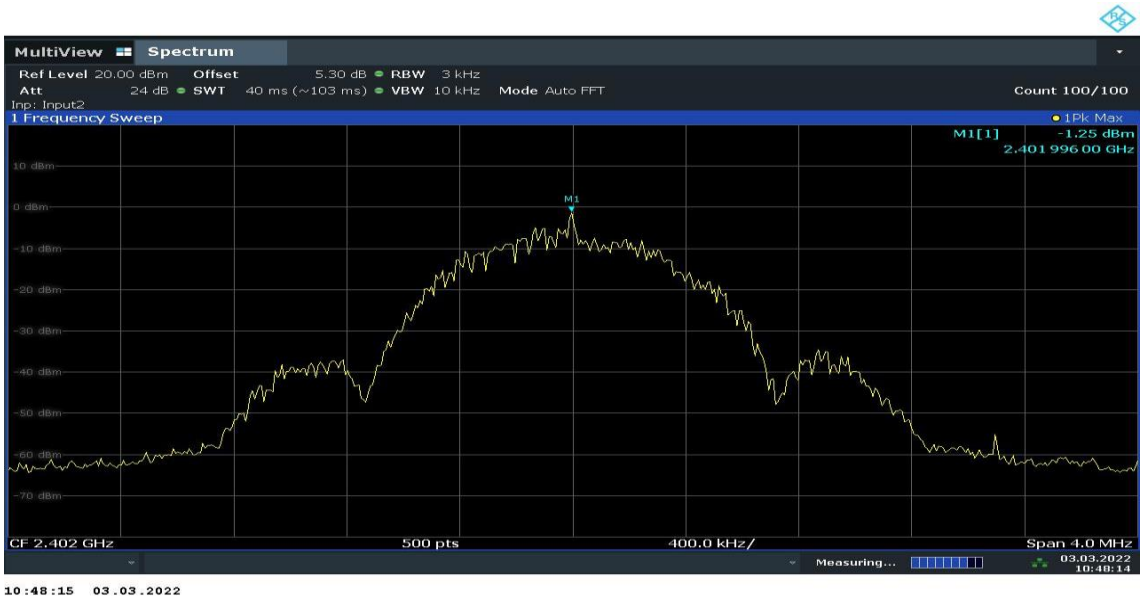
## 5.Appendix E: Maximum power spectral density

### 5.1 Test Result

| TestMode | Antenna | Channel | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | 2402 | -1.25 | <=8 | PASS |
| | | 2440 | 0.13 | <=8 | PASS |
| | | 2480 | -1.08 | <=8 | PASS |
| BLE_TM2 | Ant1 | 2402 | -1.96 | <=8 | PASS |
| | | 2440 | -0.64 | <=8 | PASS |
| | | 2480 | -1.08 | <=8 | PASS |

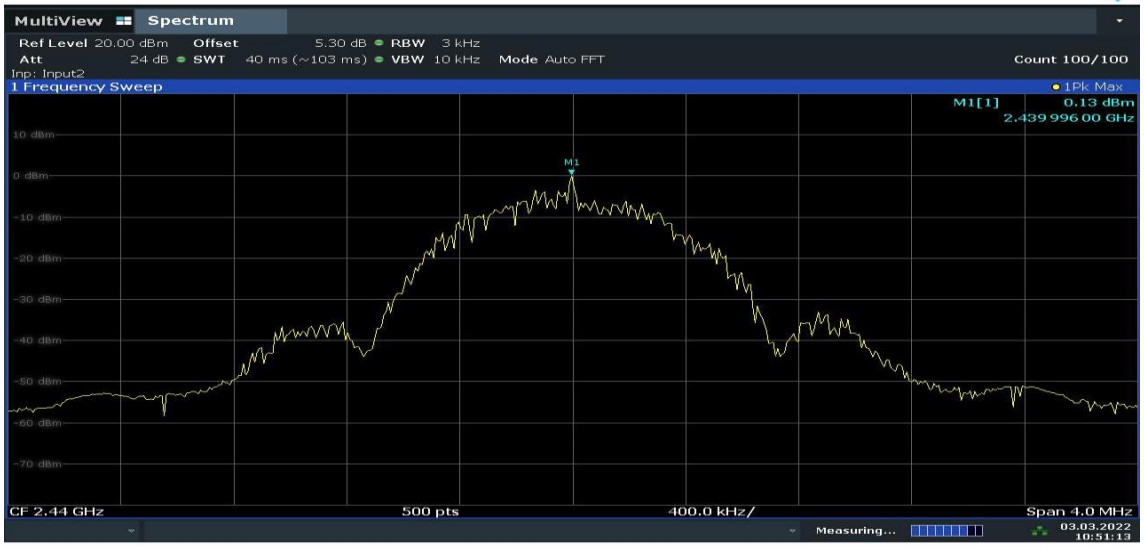
## 5.2 Test Graphs

BLE_TM1_Ant1_2402



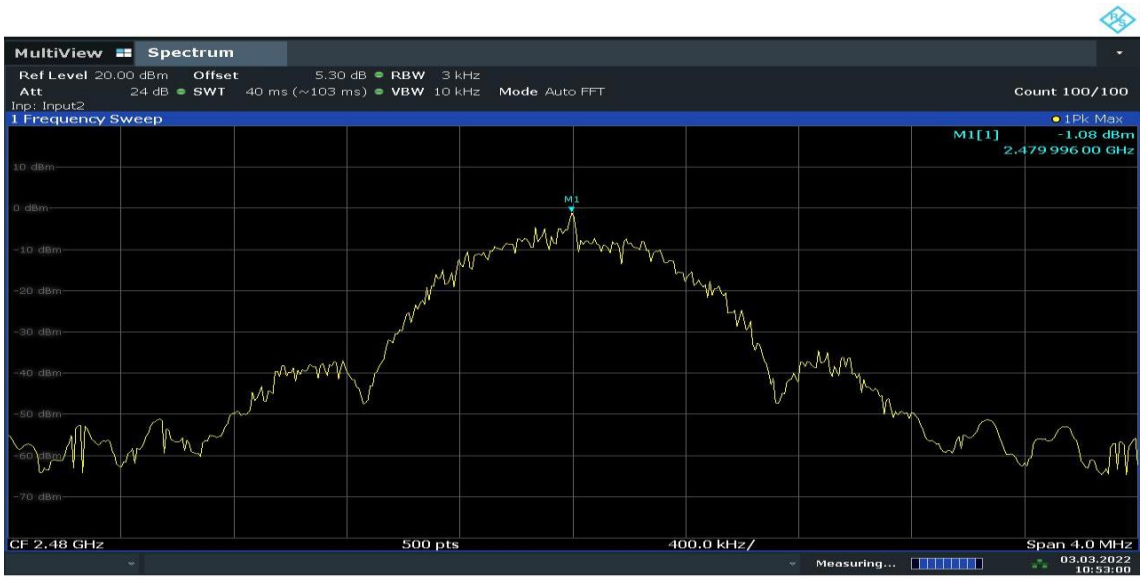

10:48:15 03.03.2022

BLE_TM1_Ant1_2440



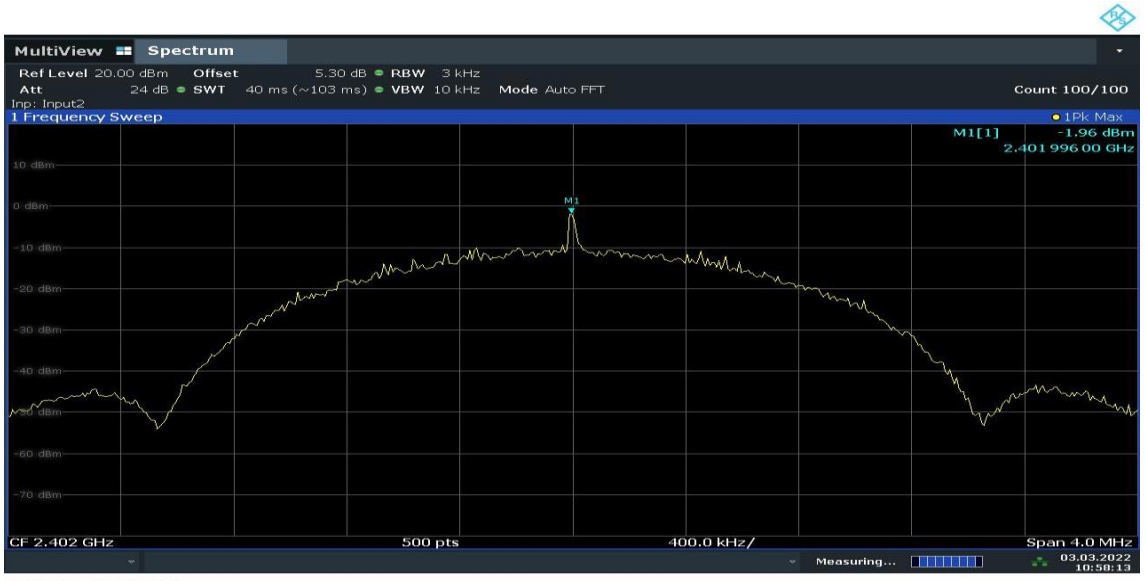

10:51:14 03.03.2022

BLE_TM1_Ant1_2480

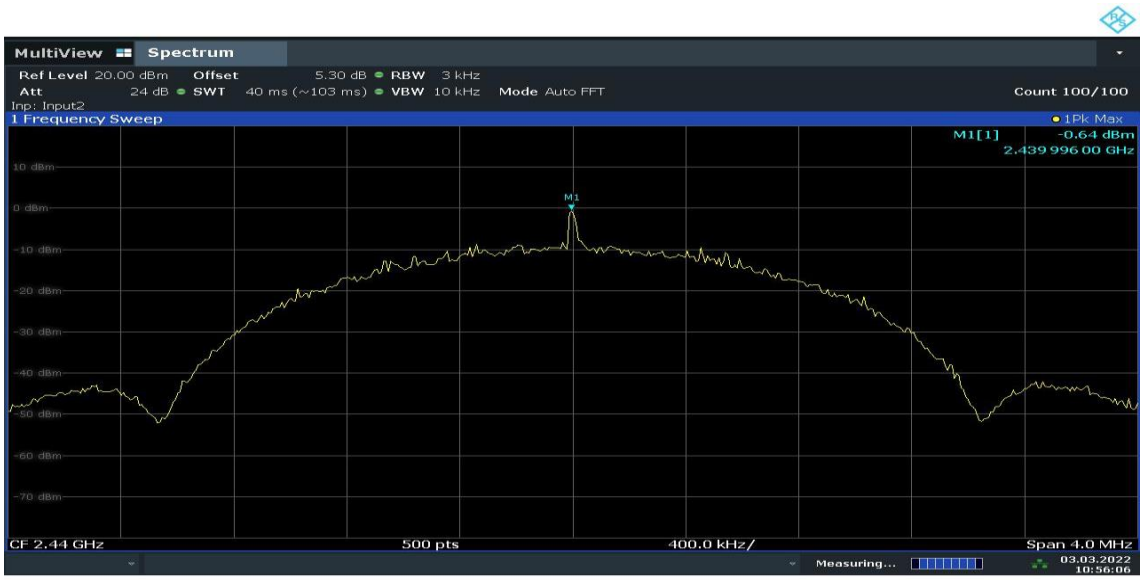
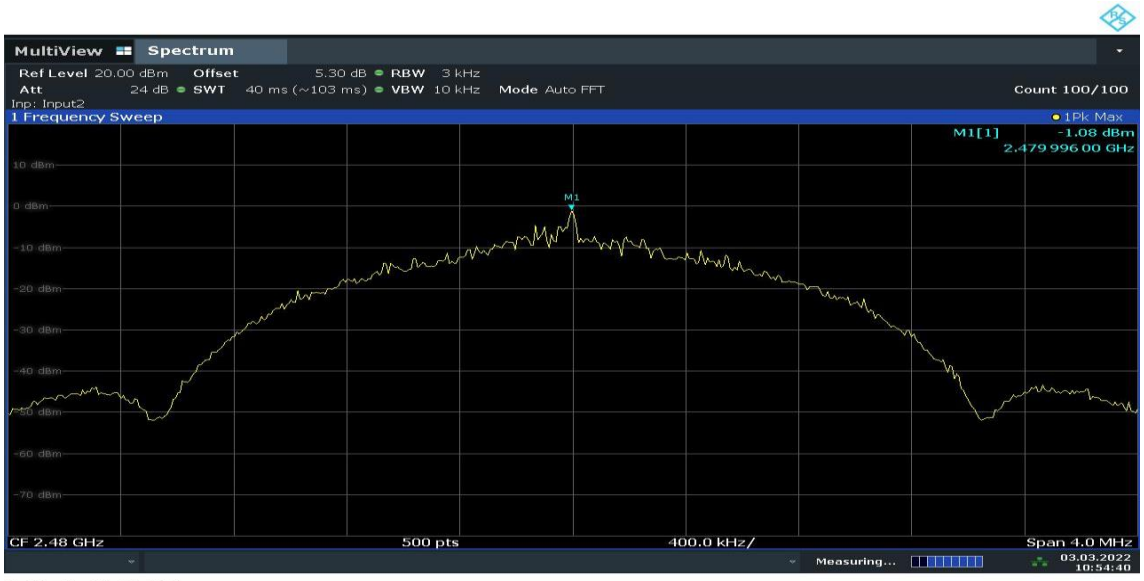



10:53:01 03.03.2022

BLE_TM2_Ant1_2402




10:58:14 03.03.2022

| BLE_TM2_Ant1_2440 |
| --- |
|  |
| BLE_TM2_Ant1_2480 |
|  |

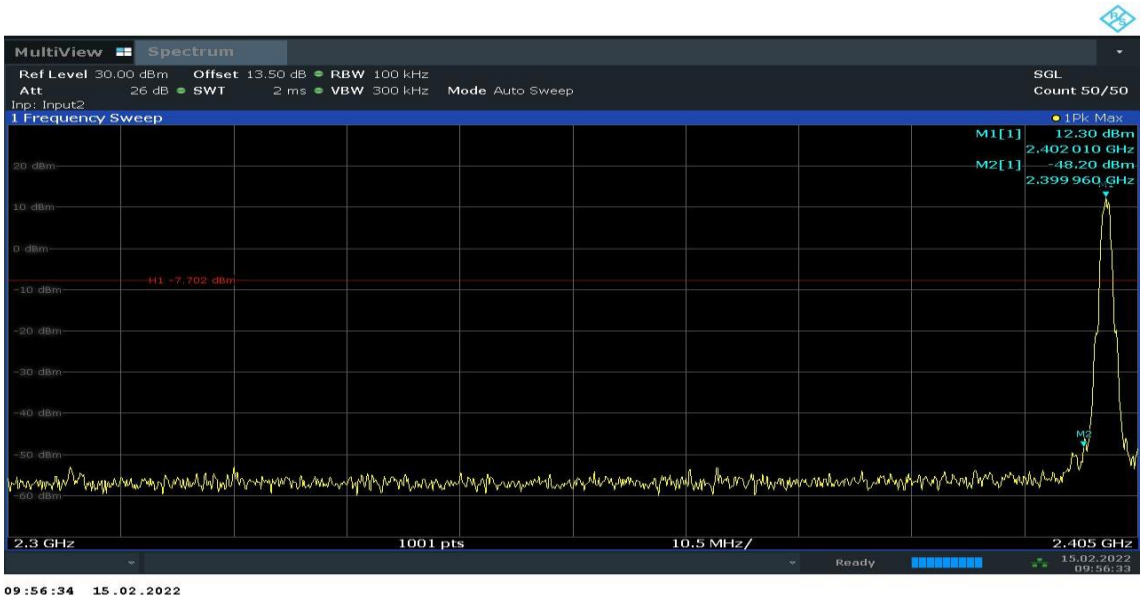
# 6.Appendix F: Band edge measurements

## 6.1 Test Result

| TestMode | Antenna | ChName | Channel | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | Low | 2402 | 12.298 | -48.203 | -7.702 | PASS |
| | | High | 2480 | 11.556 | -53.53 | -8.444 | PASS |
| BLE_TM2 | Ant1 | Low | 2402 | 12.185 | -30.706 | -7.815 | PASS |
| | | High | 2480 | 11.693 | -53.835 | -8.307 | PASS |

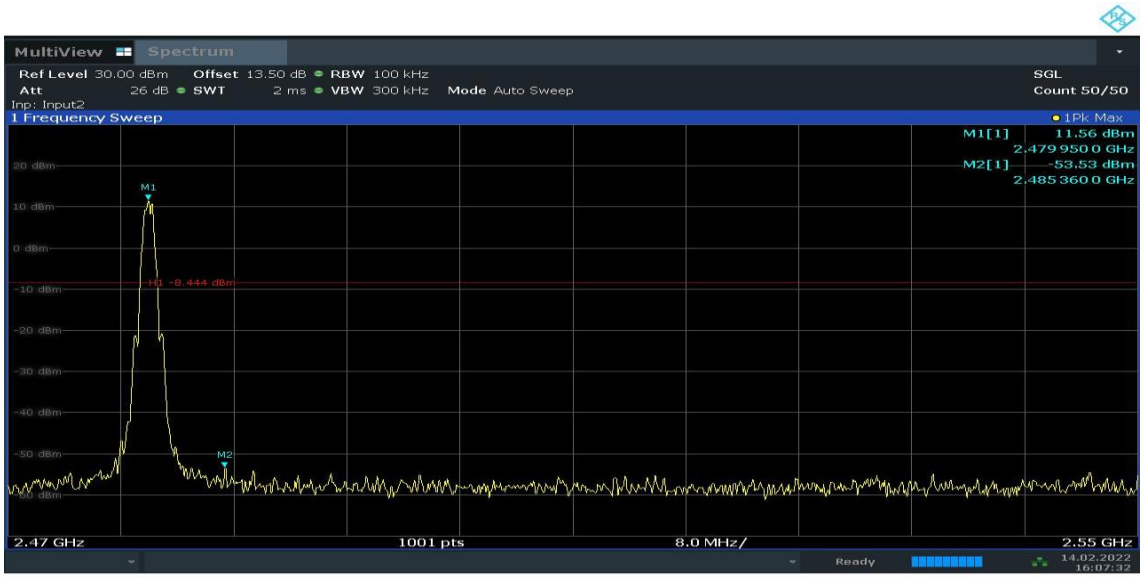
### 6.2 Test Graphs

BLE_TM1_Ant1_Low_2402




09:56:34 15.02.2022

BLE_TM1_Ant1_High_2480

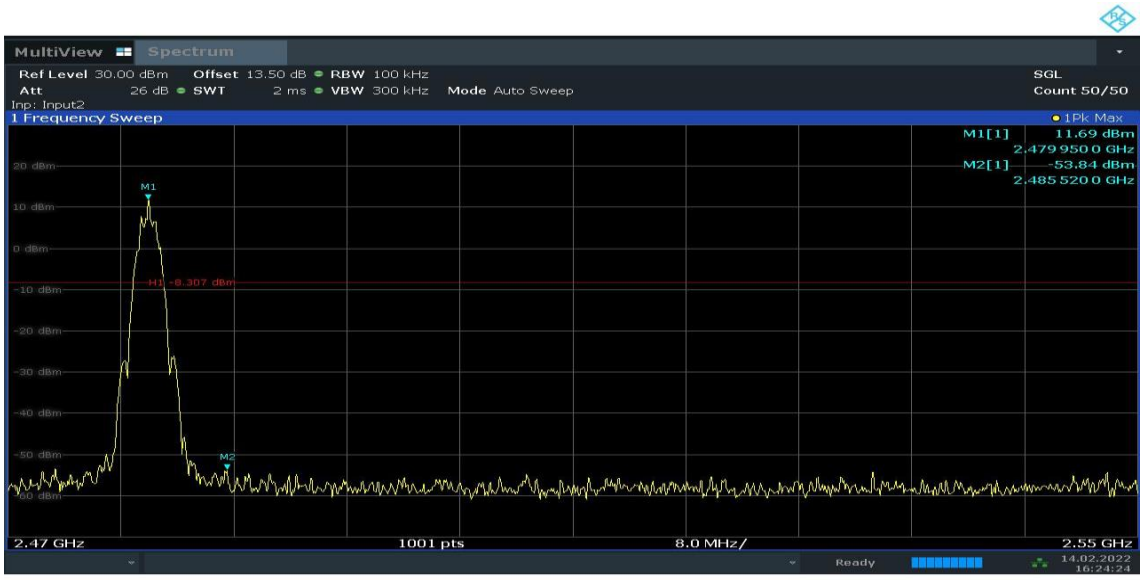



16:07:32 14.02.2022

BLE_TM2_Ant1_Low_2402


16:13:40 14.02.2022

BLE_TM2_Ant1_High_2480




16:24:24 14.02.2022

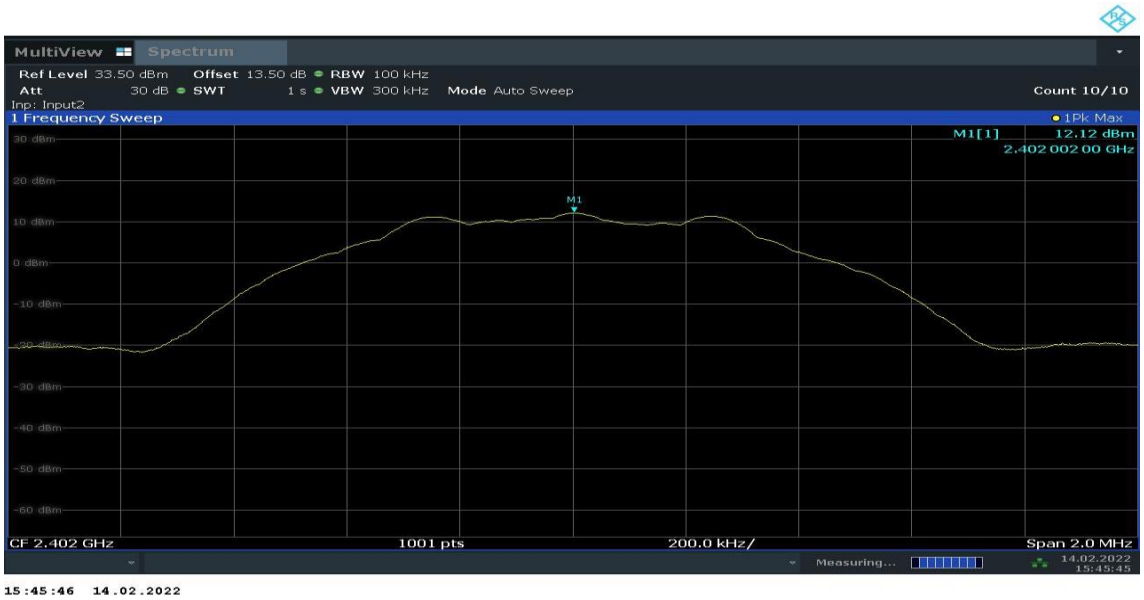
# 7.Appendix G: Conducted Spurious Emission

## 7.1 Test Result

| TestMode | Antenna | Channel | RefLevel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|
| BLE_TM1 | Ant1 | 2402 | 12.12 | ＜Limit | -17.88 | PASS |
| | | 2440 | 11.85 | ＜Limit | -18.15 | PASS |
| | | 2480 | 11.67 | ＜Limit | -18.33 | PASS |
| BLE_TM2 | Ant1 | 2402 | 12.18 | ＜Limit | -17.82 | PASS |
| | | 2440 | 11.89 | ＜Limit | -18.11 | PASS |
| | | 2480 | 11.73 | ＜Limit | -18.27 | PASS |

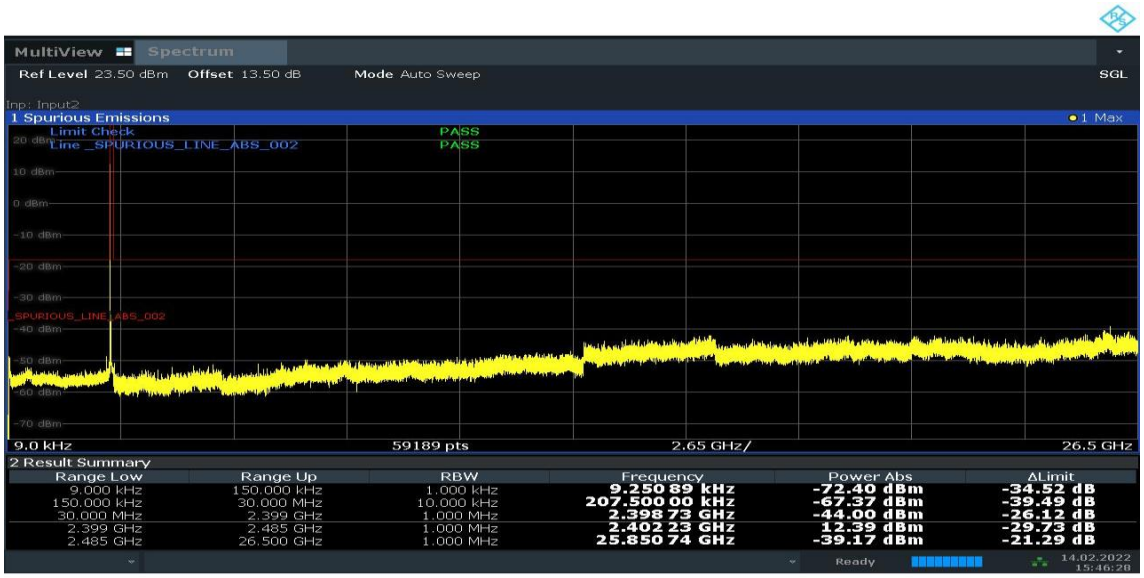
### 7.2 Test Graphs

BLE_TM1_Ant1_2402_0~Reference



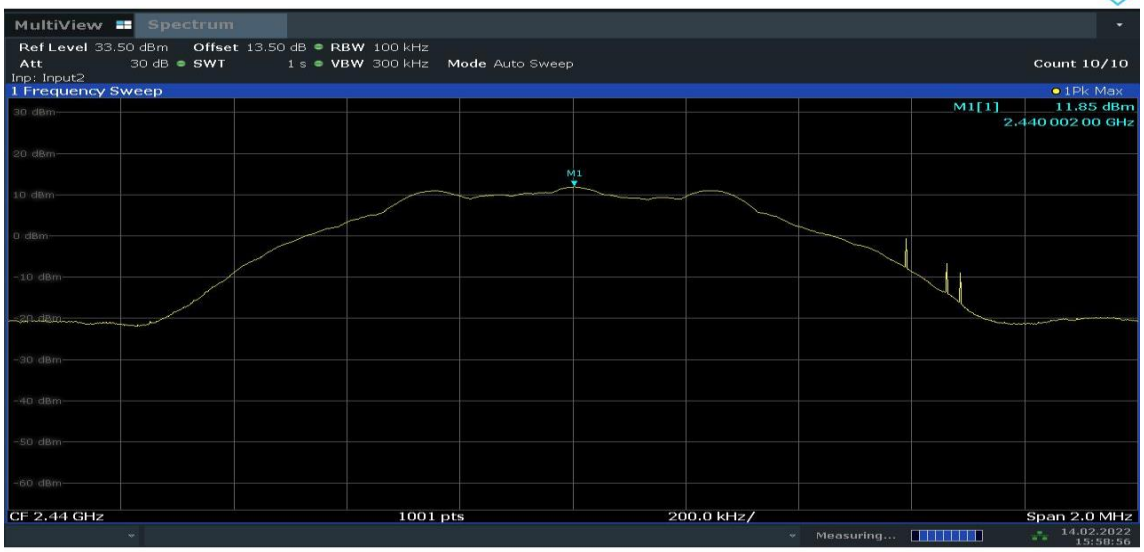

15:45:46 14.02.2022

BLE_TM1_Ant1_2402_9KHz~26.5GHz

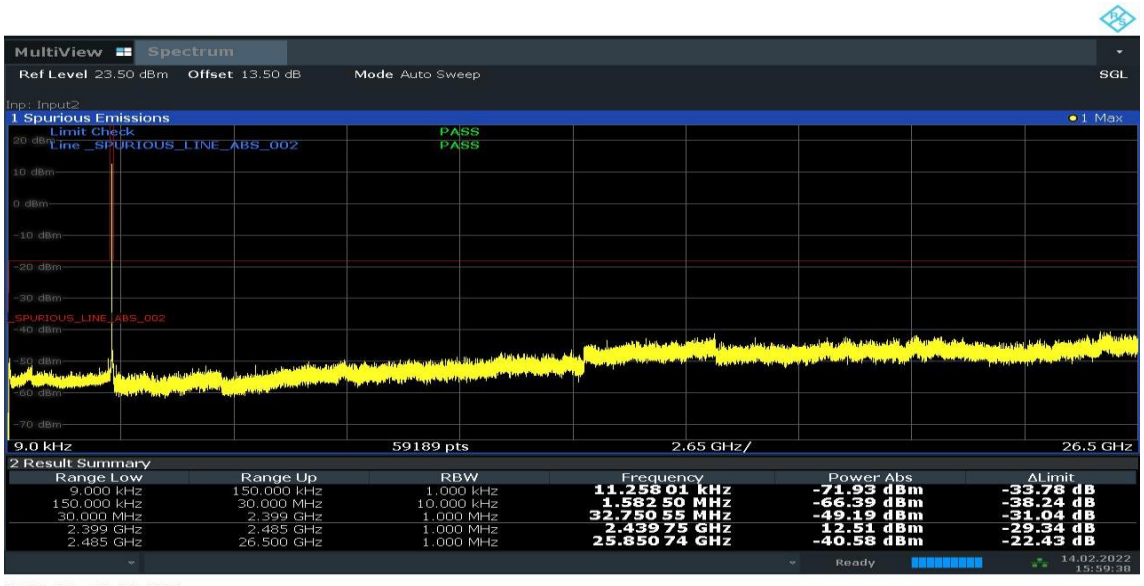



15:46:29 14.02.2022

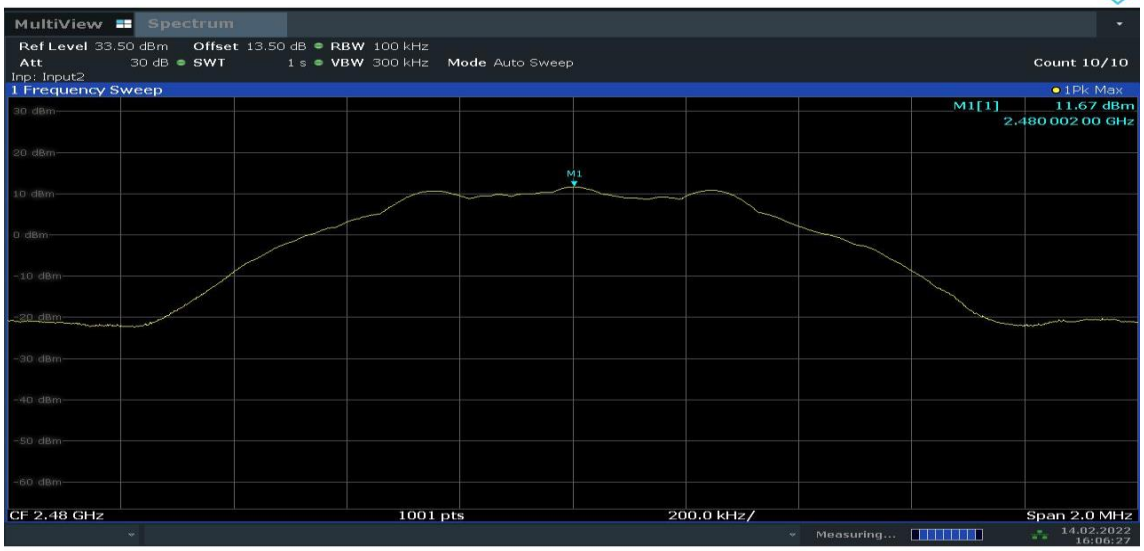
| BLE_TM1_Ant1_2440_0~Reference |
|---|




| BLE_TM1_Ant1_2440_9KHz~26.5GHz |
|---|

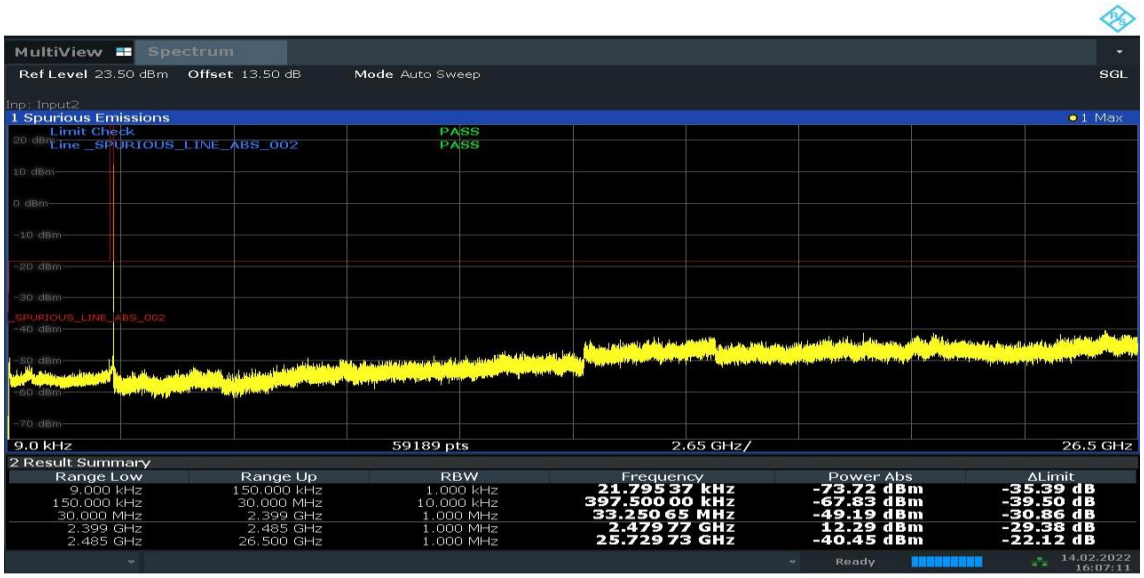


BLE_TM1_Ant1_2480_0~Reference



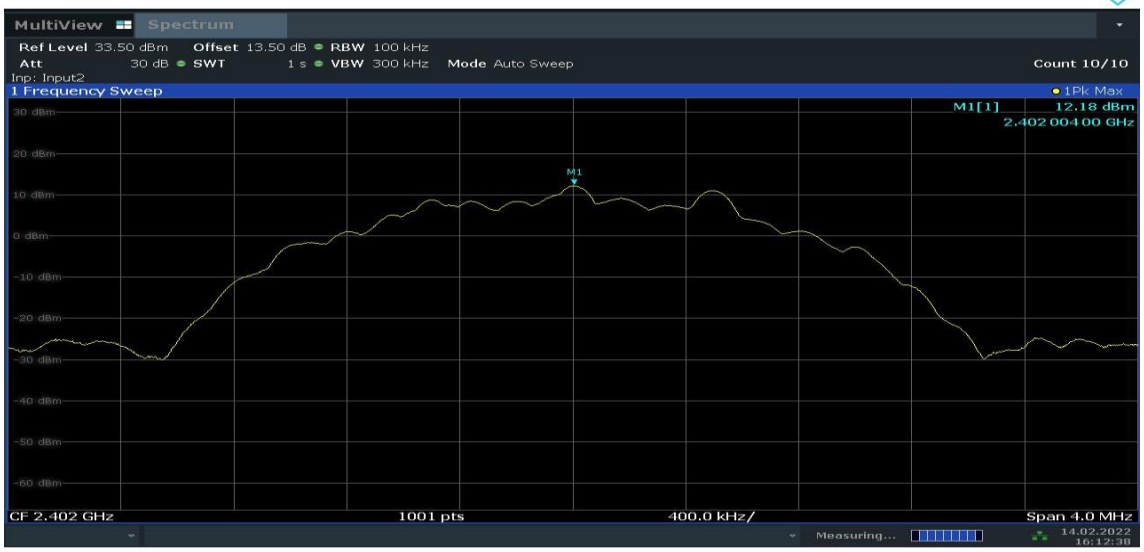

16:06:28 14.02.2022

BLE_TM1_Ant1_2480_9KHz~26.5GHz




16:07:11 14.02.2022

BLE_TM2_Ant1_2402_0~Reference

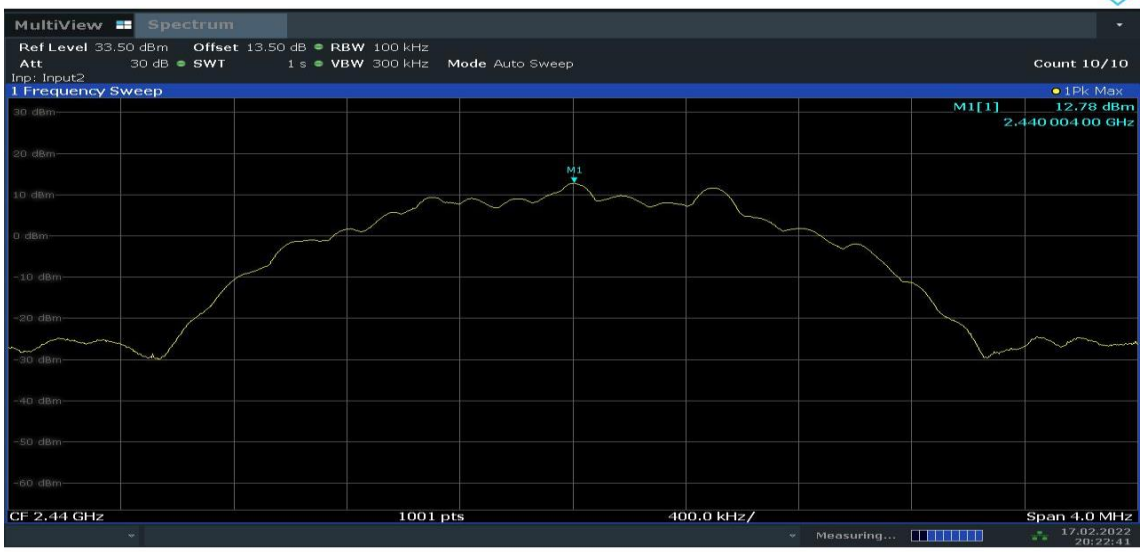



16:12:38 14.02.2022

BLE_TM2_Ant1_2402_9KHz~26.5GHz

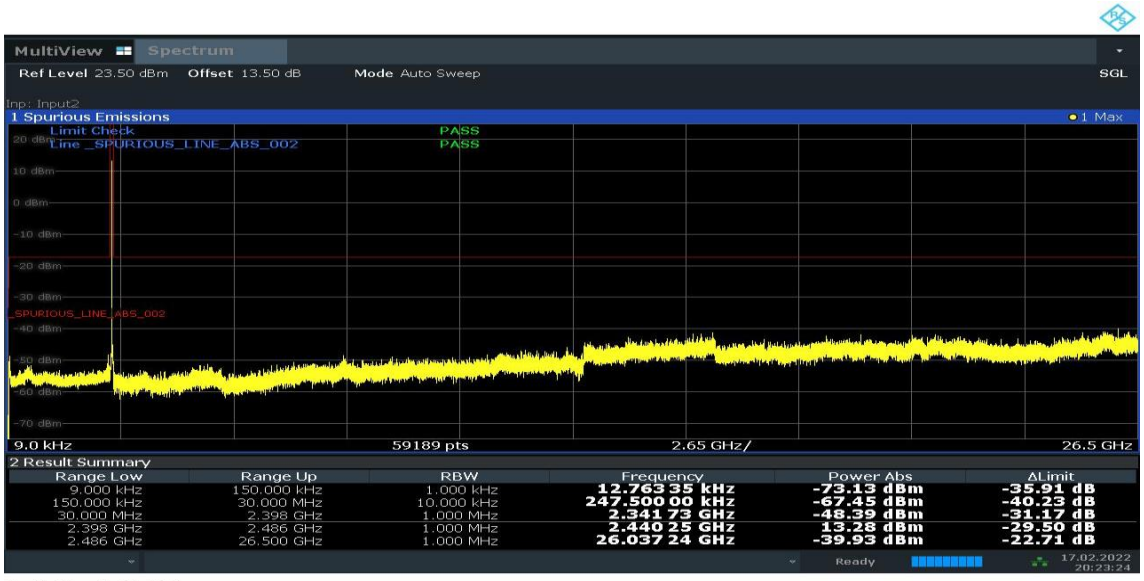

16:13:20 14.02.2022

BLE_TM2_Ant1_2440_0~Reference



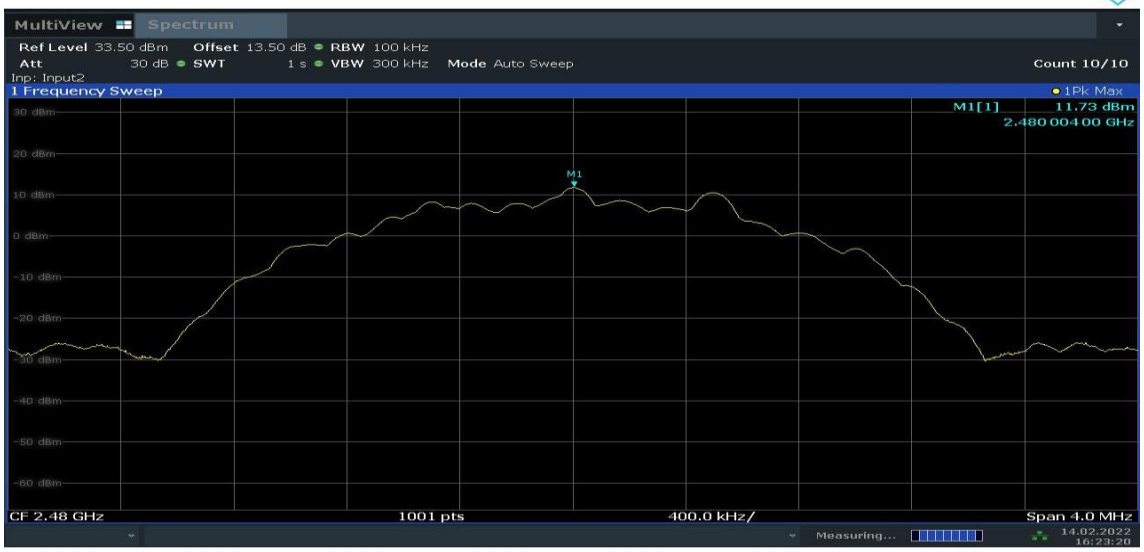

20:22:41 17.02.2022

BLE_TM2_Ant1_2440_9KHz~26.5GHz



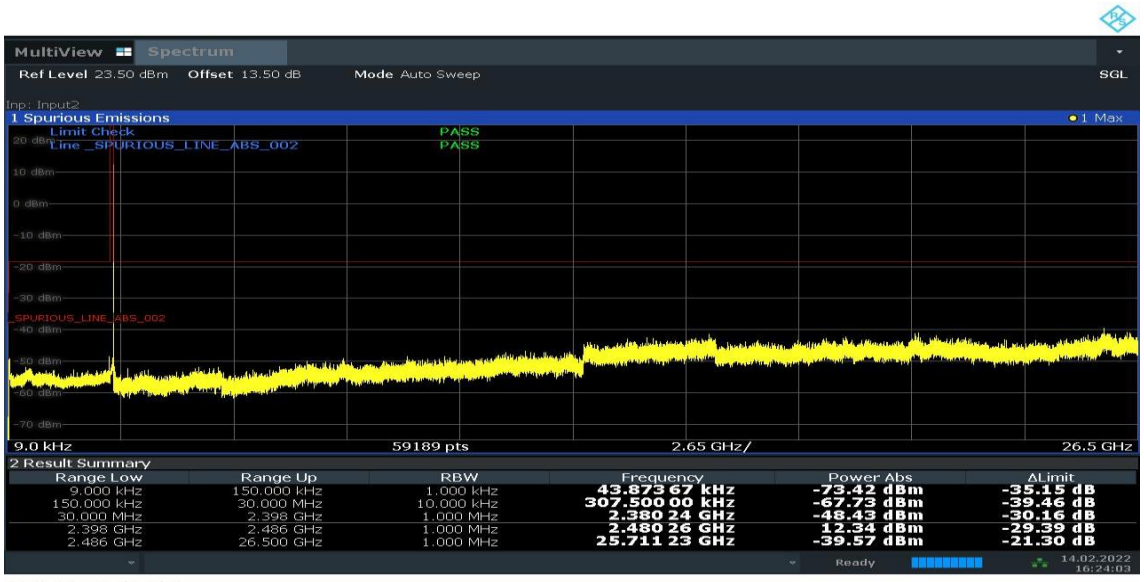

20:23:24 17.02.2022

BLE_TM2_Ant1_2480_0~Reference




16:23:20 14.02.2022

BLE_TM2_Ant1_2480_9KHz~26.5GHz




16:24:03 14.02.2022

## 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 GHz 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.

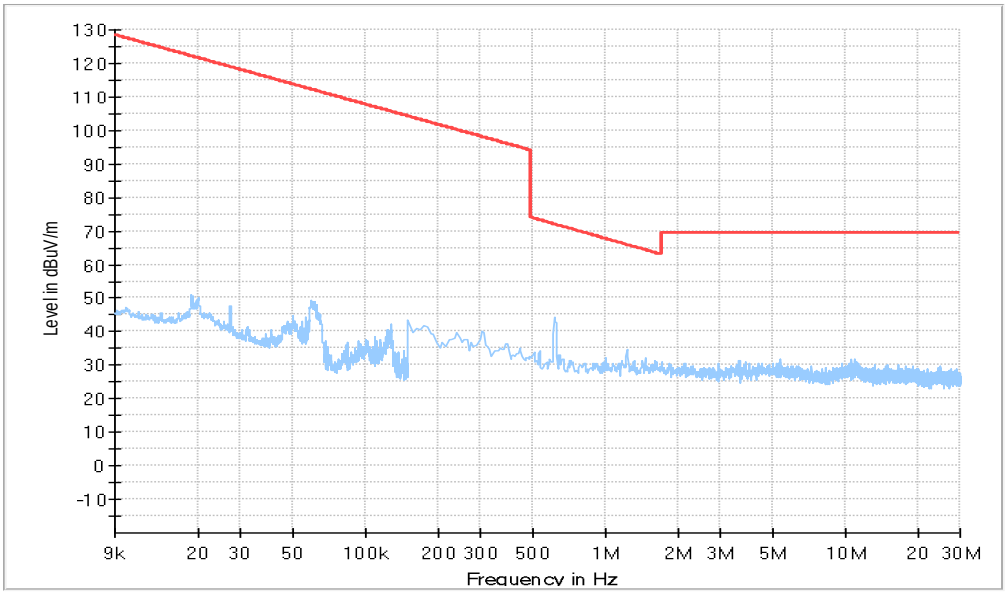
### 8.1. Test Results

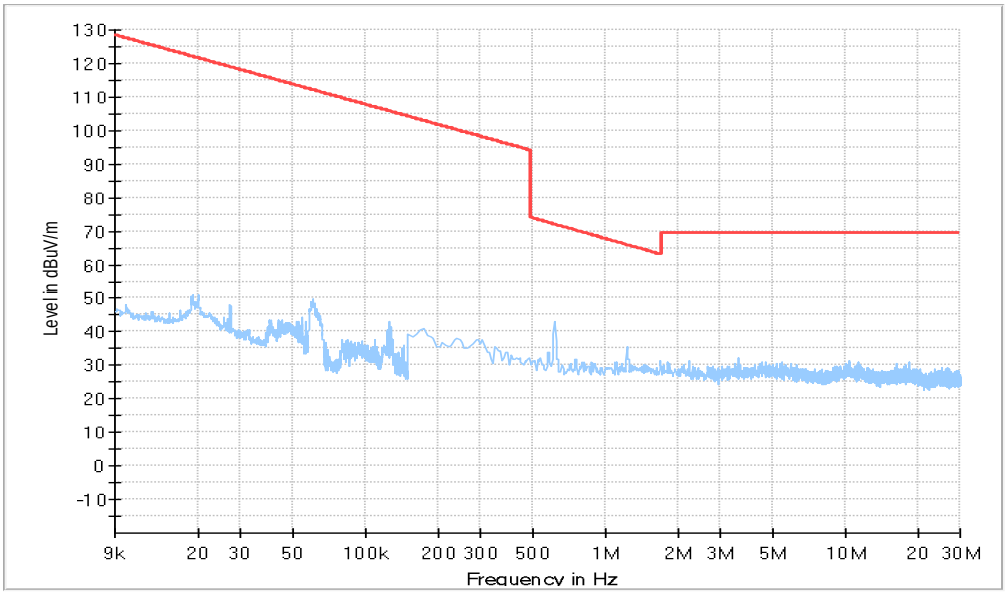
| Test Mode | Antenna | Test Channel | Spurious Emissions Result | Spurious Emissions Limit | Verdict |
|---|---|---|---|---|---|
| TM1_BLE_1M | Ant1 | 2402 | (see Test Graphs) | (see Test Graphs) | PASS |
| | Ant1 | 2480 | (see Test Graphs) | (see Test Graphs) | PASS |
| TM2_BLE_2M | Ant1 | 2402 | (see 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_ Ant1-BLE_1M |
|---|
|  |

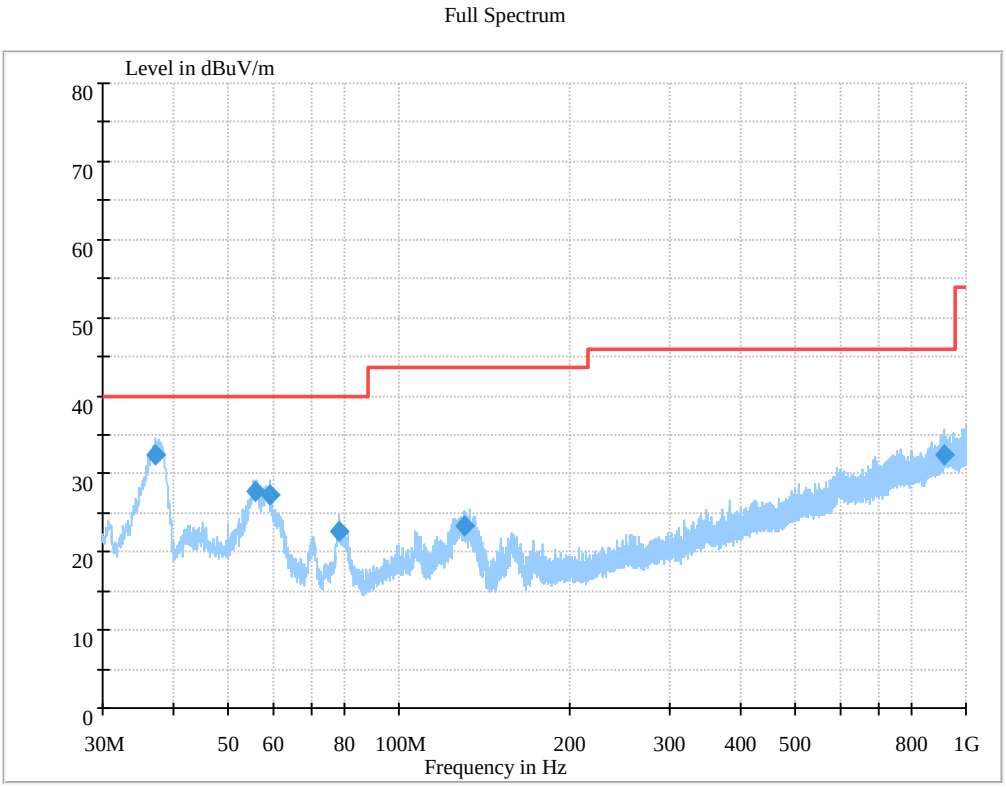
| Worst case CH_2402_ Ant1-BLE_2M |
|---|
|  |

### 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).

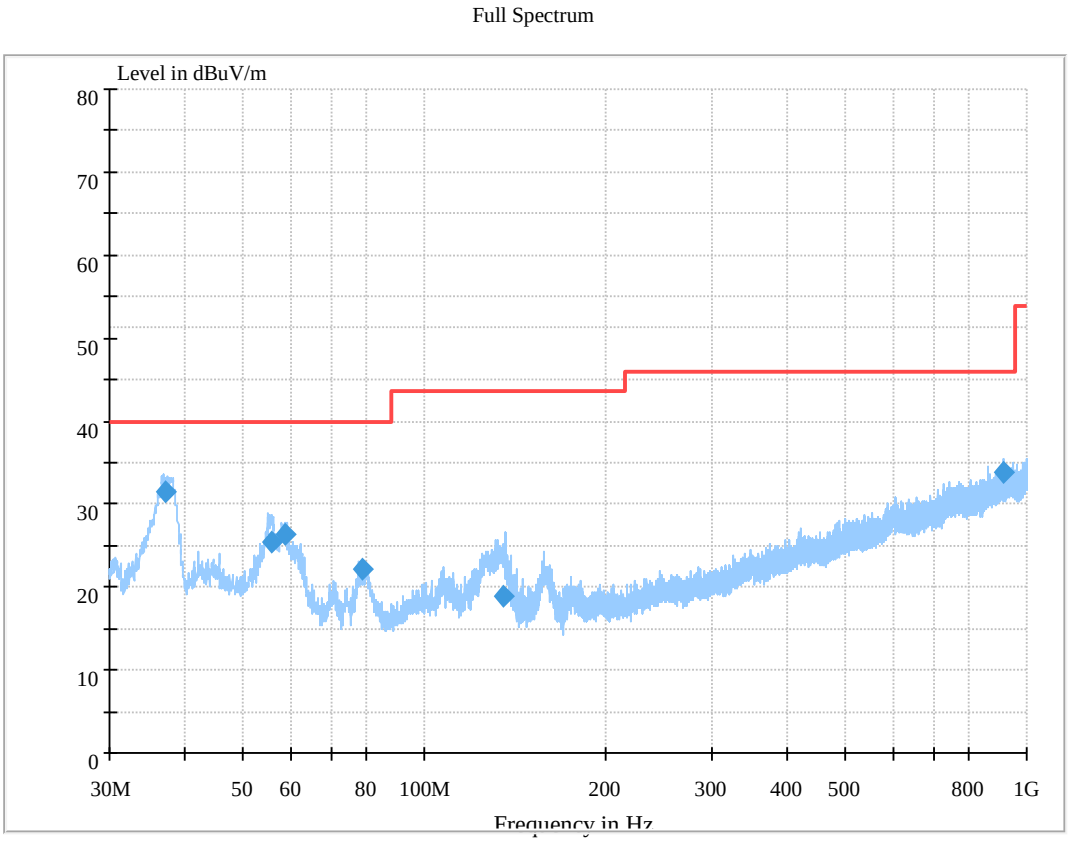
Worst case CH_2402_ Ant1- BLE_1M




MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 37.081000 | 32.51 | 13.4 | 40.00 | 7.49 | 100.0 | 233.0 | V |
| 55.765340 | 27.66 | 18.2 | 40.00 | 12.34 | 112.0 | -45.0 | V |
| 59.100000 | 27.18 | 15.2 | 40.00 | 12.82 | 100.0 | 246.0 | V |
| 78.451500 | 22.66 | 19.5 | 40.00 | 17.34 | 100.0 | 140.0 | V |
| 130.589000 | 23.29 | 20.2 | 43.50 | 20.21 | 100.0 | 233.0 | V |
| 914.674480 | 32.50 | 13.4 | 46.00 | 13.50 | 113.0 | -15.0 | V |

Worst case CH_2402_ Ant1- BLE_2M




MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 37.043120 | 36.47 | 18.2 | 40.00 | 3.53 | 100.0 | 292.0 | V |
| 55.885840 | 31.98 | 20.2 | 40.00 | 8.02 | 193.0 | -37.0 | V |
| 58.560720 | 33.61 | 19.7 | 40.00 | 6.39 | 100.0 | 206.0 | V |
| 78.820200 | 30.19 | 13.4 | 40.00 | 9.81 | 112.0 | 119.0 | V |
| 135.511260 | 29.45 | 15.1 | 43.50 | 14.05 | 100.0 | 218.0 | V |
| 913.289140 | 42.06 | 30.9 | 46.00 | 3.94 | 133.0 | 186.0 | V |

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

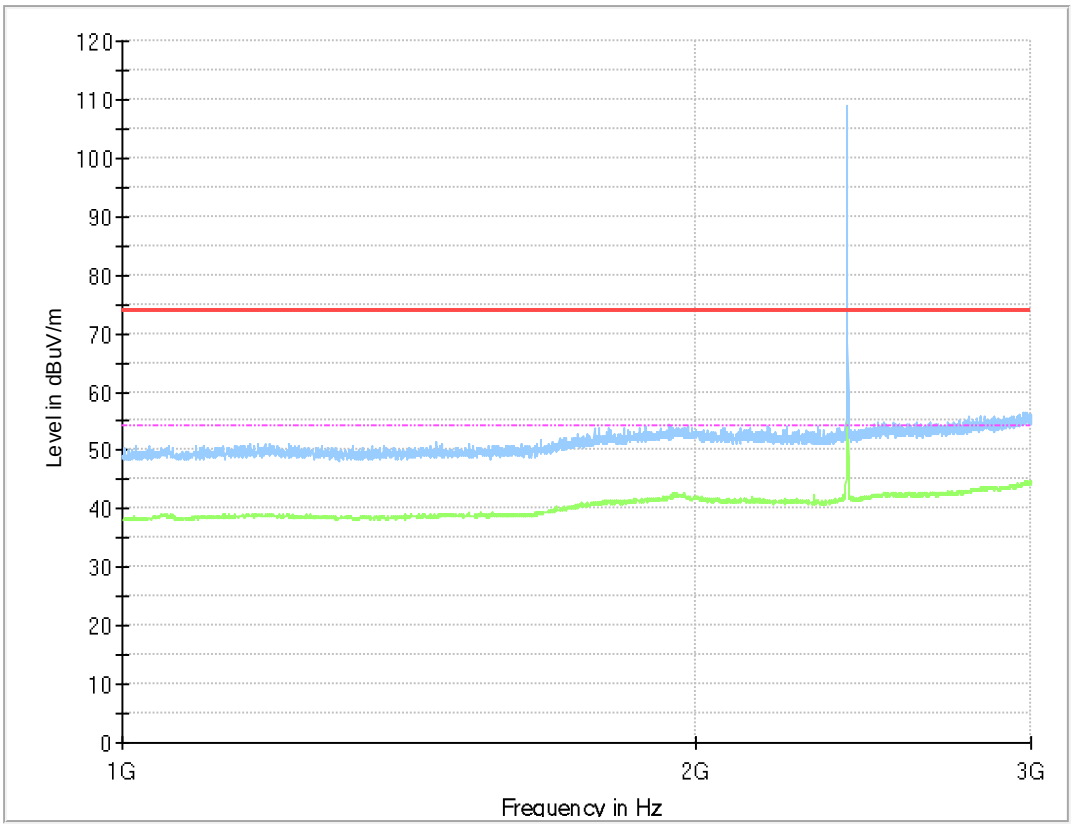
Note 1: The testing range of “1 GHz to 3 GHz” is for checking radiated emissions near the EUT operating bands. The test results and plot for testing range of “1 GHz to 3 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each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

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

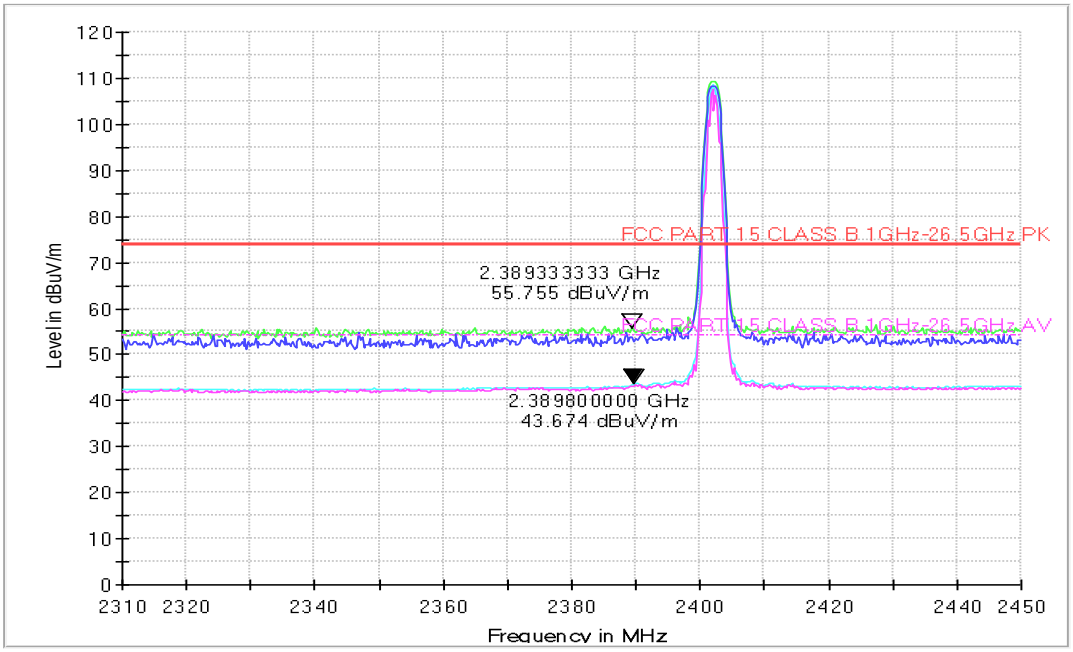
Note 3: The peak spike exceeds the limit line is EUT’s operating frequency.

#### 8.2.3.1. BLE_1M

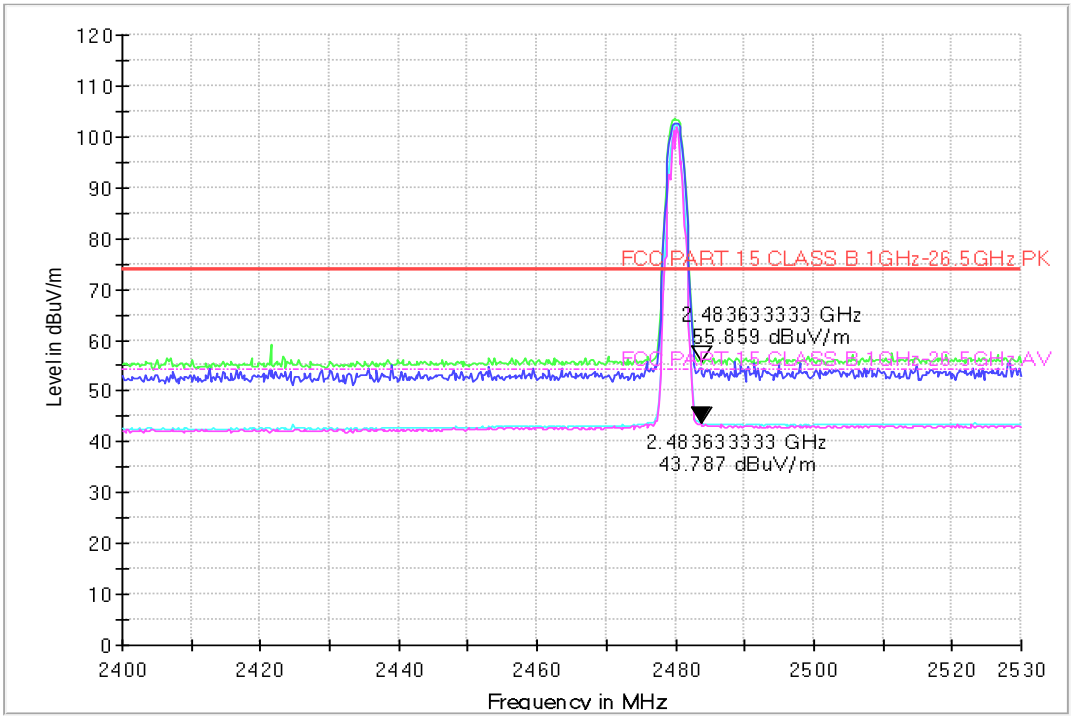
Worst case CH_2480_ Ant1 (1 GHz to 3 GHz)



CH_2402_ Ant1（Band Edge）

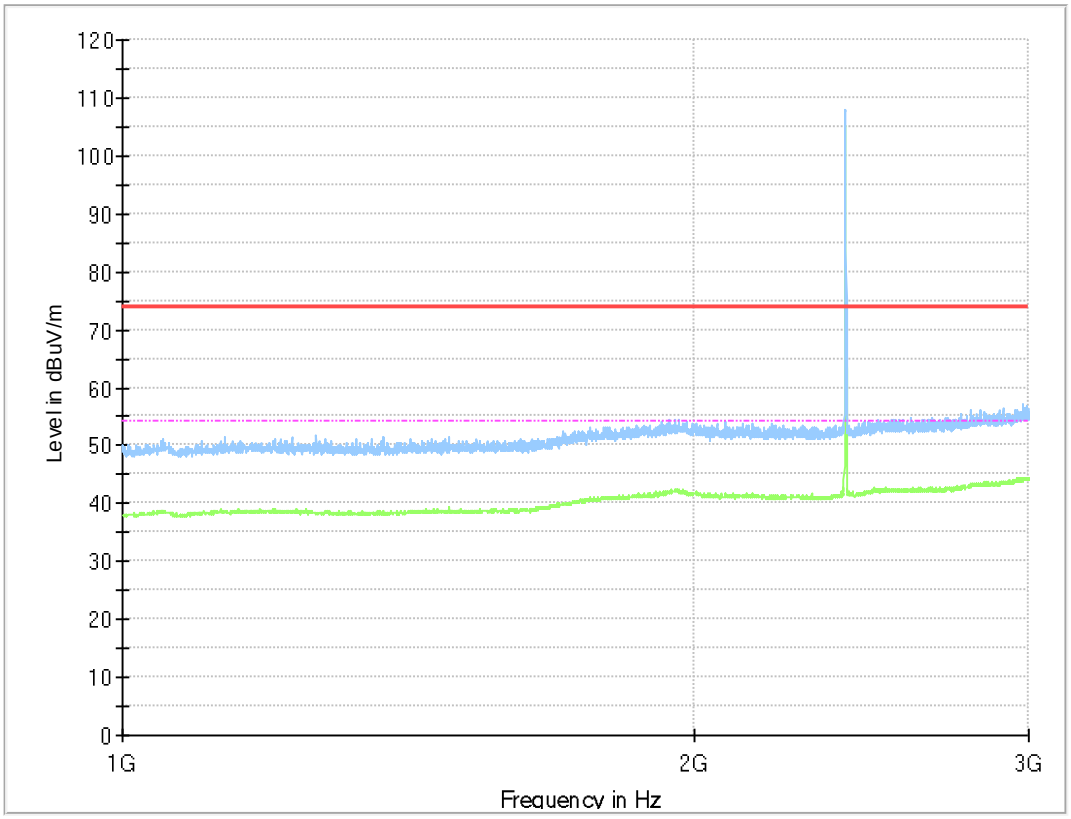



CH_2480_ Ant1（Band Edge）

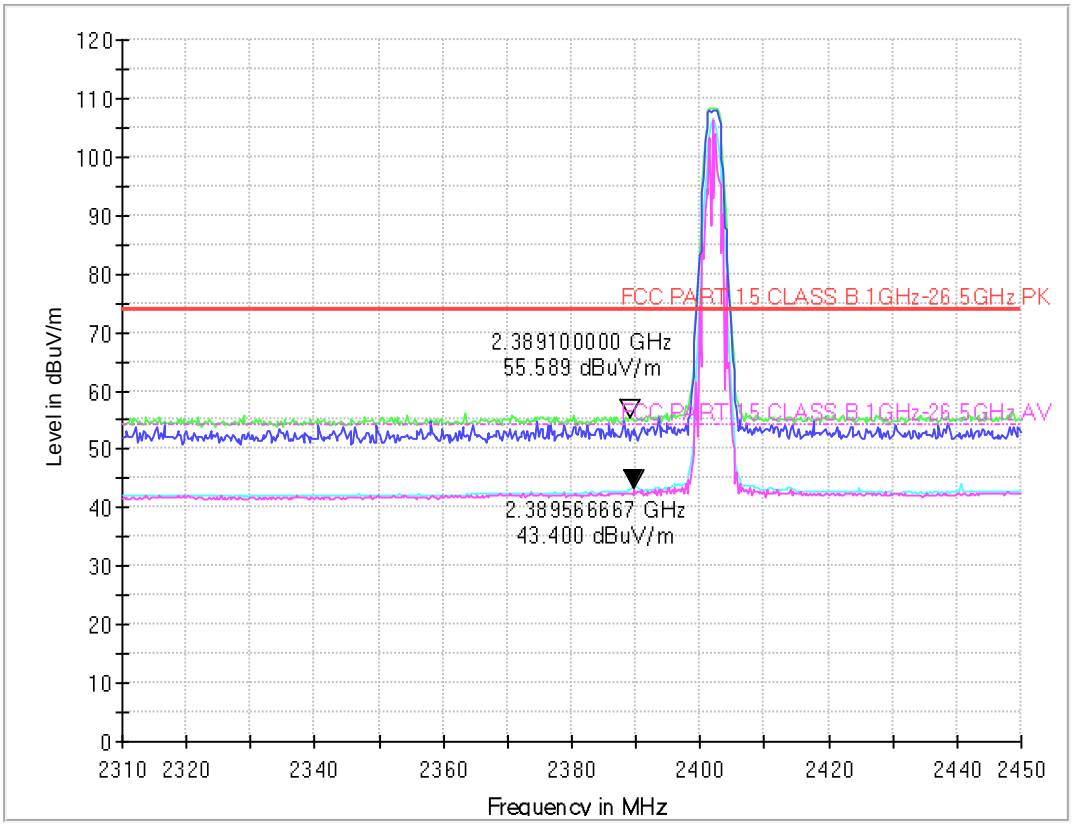


### 8.2.3.2. BLE_2M

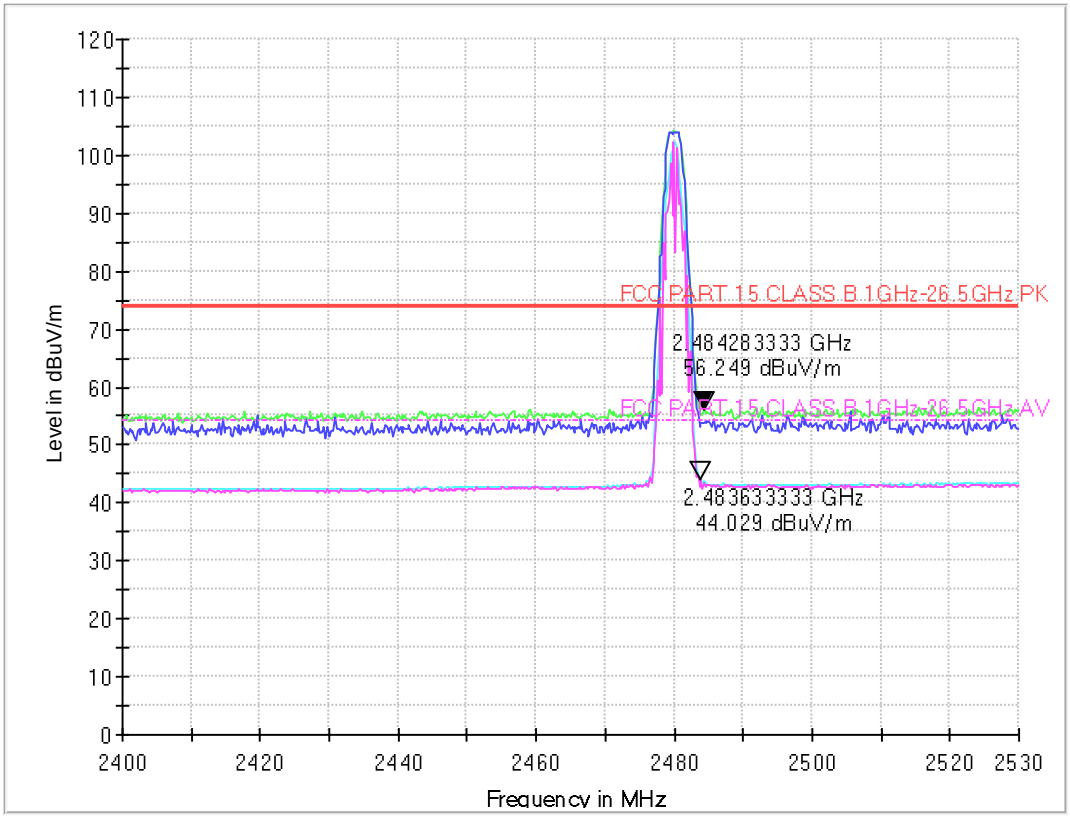
| Worst case CH_2480_ Ant1 (1 GHz to 3 GHz) |
|---|



CH_2402_ Ant1（Band Edge）



CH_2480_ Ant1（Band Edge）

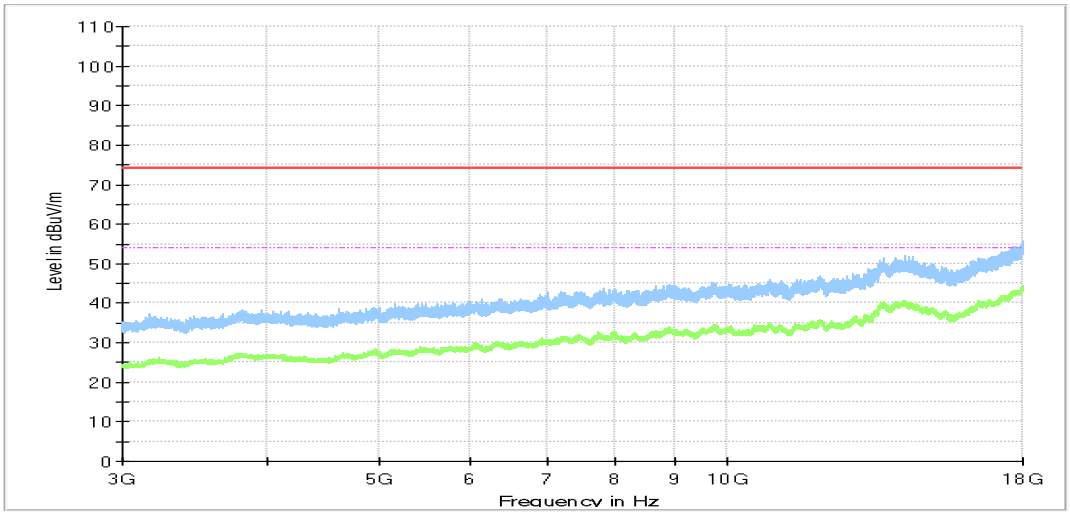
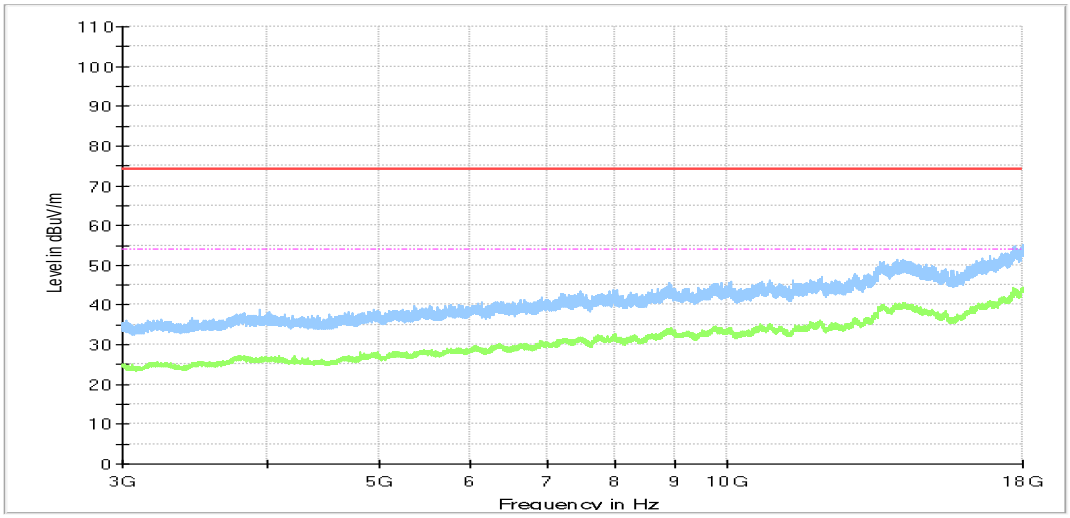


### 8.2.4. Part 4: Testing Range of “3 GHz to 18 GHz”

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 faraway from the EUT operating bands.

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

| Worst case CH_2402_ Ant1- BLE_1M |
|---|
|  |
| Worst case CH_2480_ Ant1- BLE_2M |
|  |

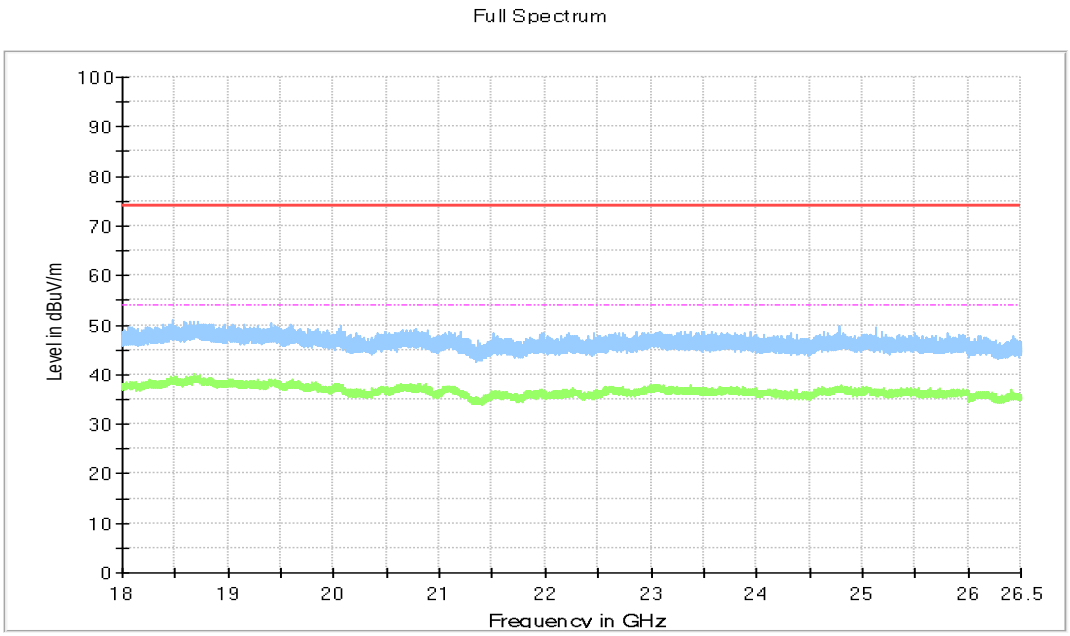
### 8.2.5. Part 5: Testing Range of “18 GHz to 26.5 GHz”

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.

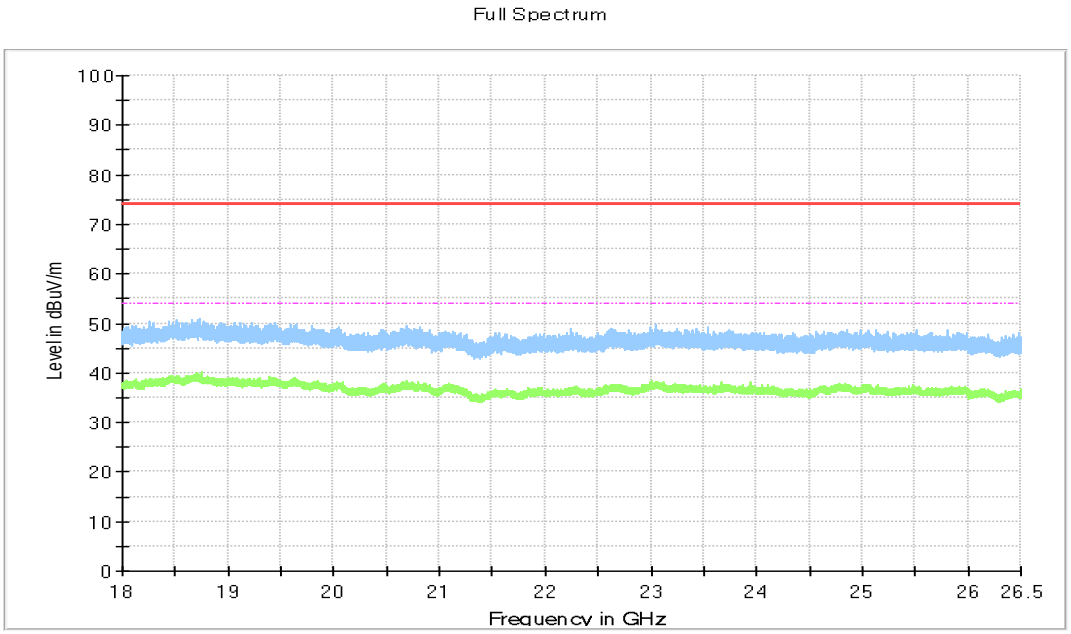
Note 2: The testing range of “18 GHz to 26.5 GHz” is for checking radiated emissions faraway from the EUT operating bands.

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

| Worst case CH_2480_ Ant1- BLE_1M |
| --- |



Worst case CH_2480_ Ant1- BLE_2M



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

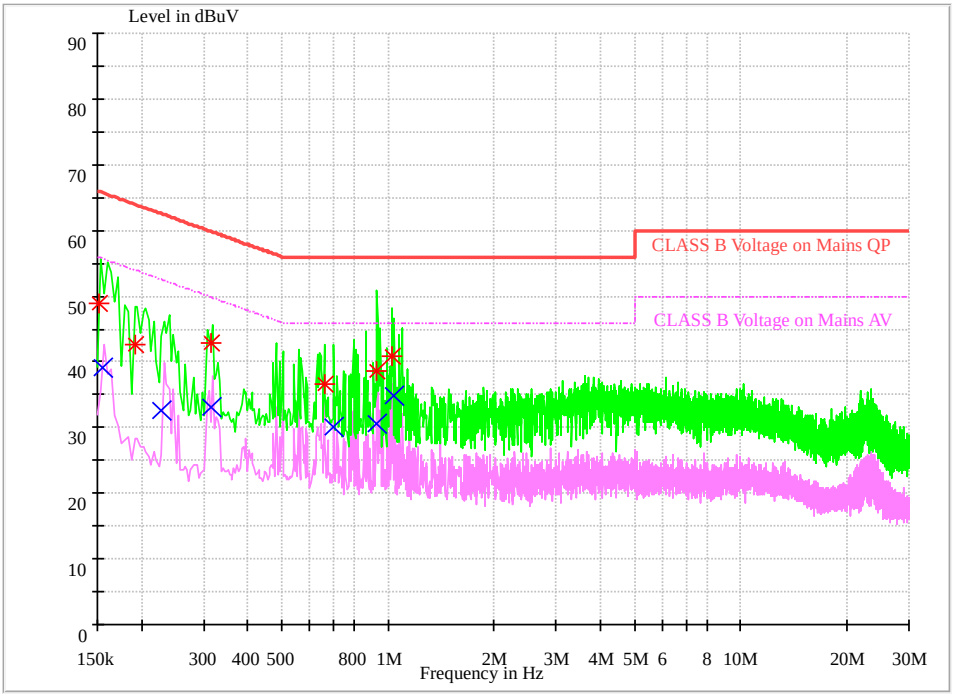
Note 1: The test results and plot for testing range of “150 kHz to 30 MHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.
Note 2： RBW =9 kHz; VBW = 30 kHz

### 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 | 2402 | (see Test Graphs) | (see Test Graphs) | PASS |

## 9.2. Test Graphs

Worst case CH_2402_ Ant1- BLE_1M



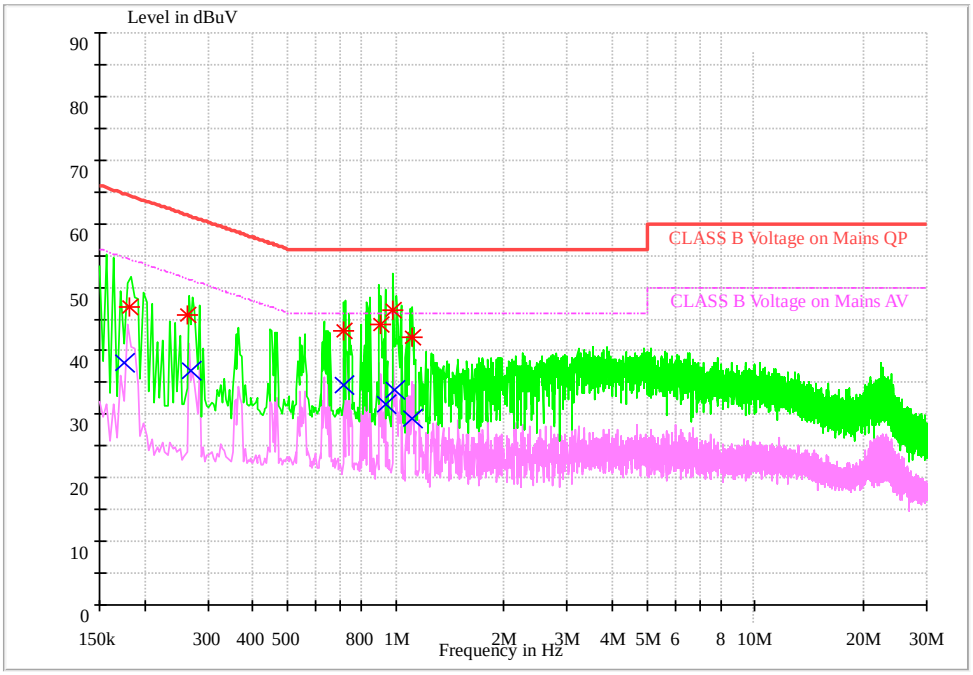

**MEASUREMENT RESULT: QP Detector**

| Frequency (MHz) | Level (dBµV) | Limit (dBµV) | Transd. (dB) | Margin (dB) | Line | PE |
|---|---|---|---|---|---|---|
| 0.151306 | 48.76 | 65.93 | 9.7 | 17.17 | N | FLO |
| 0.192681 | 42.55 | 63.92 | 9.7 | 21.37 | N | FLO |
| 0.314318 | 42.77 | 59.86 | 9.7 | 17.08 | L1 | FLO |
| 0.662737 | 36.63 | 56 | 9.7 | 19.37 | N | FLO |
| 0.930937 | 38.53 | 56 | 9.7 | 17.47 | N | FLO |
| 1.030793 | 40.94 | 56 | 9.7 | 15.06 | L1 | FLO |

**MEASUREMENT RESULT: AV Detector**

| Frequency (MHz) | Level (dBµV) | Limit (dBµV) | Transd. (dB) | Margin (dB) | Line | PE |
|---|---|---|---|---|---|---|
| 0.154292 | 39.09 | 55.77 | 9.7 | 16.68 | L1 | FLO |
| 0.228124 | 32.64 | 52.52 | 9.7 | 19.88 | L1 | FLO |
| 0.315887 | 33.18 | 49.81 | 9.7 | 16.63 | L1 | FLO |
| 0.703359 | 29.98 | 46 | 9.7 | 16.02 | L1 | FLO |
| 0.931428 | 30.48 | 46 | 9.7 | 15.52 | N | FLO |
| 1.040904 | 34.81 | 46 | 9.7 | 11.19 | L1 | FLO |

Worst case CH_2480_ Ant1- BLE_2M




**MEASUREMENT RESULT: QP Detector**

| Frequency (MHz) | Level (dBµV) | Limit (dBµV) | Transd. (dB) | Margin (dB) | Line | PE |
|---|---|---|---|---|---|---|
| 0.181753 | 46.79 | 64.41 | 9.7 | 17.61 | N | FLO |
| 0.264529 | 45.68 | 61.29 | 9.7 | 15.61 | L1 | FLO |
| 0.715526 | 43.16 | 56 | 9.7 | 12.84 | L1 | FLO |
| 0.902689 | 44.21 | 56 | 9.7 | 11.79 | N | FLO |
| 0.98344 | 46.37 | 56 | 9.7 | 9.63 | L1 | FLO |
| 1.113656 | 42.14 | 56 | 9.7 | 13.86 | N | FLO |

**MEASUREMENT RESULT: AV Detector**

| Frequency (MHz) | Level (dBµV) | Limit (dBµV) | Transd. (dB) | Margin (dB) | Line | PE |
|---|---|---|---|---|---|---|
| 0.17655 | 38.11 | 54.65 | 9.7 | 16.54 | L1 | FLO |
| 0.270107 | 36.73 | 51.12 | 9.7 | 14.39 | L1 | FLO |
| 0.720246 | 34.48 | 46 | 9.7 | 11.52 | L1 | FLO |
| 0.937976 | 31.6 | 46 | 9.7 | 14.4 | L1 | FLO |
| 0.987566 | 33.9 | 46 | 9.7 | 12.1 | L1 | FLO |
| 1.114454 | 29.24 | 46 | 9.7 | 16.76 | L1 | FLO |

Note:
1.Level = Reading level+ Transd (cable loss + correction factor)
The reading level is calculated by software which is not shown in the sheet.
2. Margin=Limit – Level.

END