

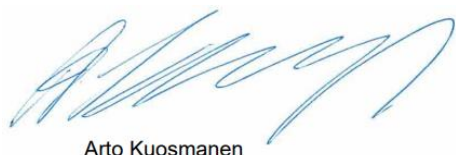
# Radio Test Report

According to

**FCC part 15C,  
RSS-247, RSS-Gen**

**DUT Name:** KALLOS  
**Model No. :** KALLOS  
**Customer:** Intrex Inc  
**Address:** 1896 Preston White Drive, 20191, Reston, VA, United States  
**Summary** IN COMPLIANCE  
**Date of Reception:** 28.3.2024  
**Date(s) of Test(s):** 8.4.2024 – 29.4.2024

Tested by Test Engineer

  
Arto Kuosmanen

Approved by Technical Manager

  
Jukka Rauma

The test report shall not be reproduced except in full, without the written approval of the laboratory. This report is only for the equipment which is described in page 4.

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| Document Version History | Date of issue | Comments         | Approved by |
|--------------------------|---------------|------------------|-------------|
| v0.1                     | 7.6.2024      | Initial version  |             |
| v1.0                     | 14.6.2024     | Approved version | Jukka Rauma |

## 1. General Information

Test Engineers: Arto Kuosmanen, Pekka Pulkkinen

Location:

|                              |                                                   |
|------------------------------|---------------------------------------------------|
| Test Firm Name               | Eurofins Electric & Electronics Finland Oy (EEEF) |
| Test Site                    | Yrttipellontie, Peltola                           |
| Address of Test Site         | Yrttipellontie 6, 90230 Oulu, Finland             |
| FCC Designation number       | FI0008                                            |
| FCC site registration number | 771880                                            |
| ISED number                  | 29576                                             |
| CAB Identifier               | T290                                              |

Customer: Intrex Inc  
Ted Tzirimis  
1896 Preston White Drive, 20191, Reston, VA, United States  
tel: +17034833255  
e-mail: ted@intrex.com

Climate Conditions: Temperature: 15 - 35 °C  
Air pressure: 860 - 1060 hPa  
Humidity: 30-60 rH%  
These limits were not exceeded during testing.

## 2. Test Samples

### General description:

Product is one device in Rythmos+ community system. Safety and wellness solution for senior communities.

### Test sample (Conducted RF):

| Sample number | Serial number | Manufacturer | DUT Type                            | Model  | HW version | SW version   |
|---------------|---------------|--------------|-------------------------------------|--------|------------|--------------|
| 3941ER001     | MRD_04_01_24  | Intrex Inc   | Wearable safety and wellness device | KALLOS | MRD_04     | 2024.03.1x.1 |

### Test sample (Radiated and conducted emissions):

| Sample number | Serial number | Manufacturer | DUT Type                            | Model  | HW version  | SW version   |
|---------------|---------------|--------------|-------------------------------------|--------|-------------|--------------|
| 3941ER004     | MRD_04_01_1   | Intrex Inc   | Wearable safety and wellness device | KALLOS | MRD_04      | 2024.03.1x.1 |
| 3941ER008     | MRDCHG_02_0   | Intrex Inc   | Charging adapter                    | CHRG_1 | MRD_CH G_02 | NA           |

### Accessories / Monitoring devices:

| Sample number | Serial number | Manufacturer | DUT Type                   | Model | HW version | SW version | Comments |
|---------------|---------------|--------------|----------------------------|-------|------------|------------|----------|
| 3941ER009     | NA            | Apple        | Power adapter              | A2118 | NA         | NA         |          |
| 3941ER010     | NA            | NA           | USB-A to UAB-C cable, 0.5m | NA    | NA         | NA         |          |

| Description                          | Information                                                              |            |
|--------------------------------------|--------------------------------------------------------------------------|------------|
| Additional model                     | KALLOS                                                                   |            |
| Brand Names(s)                       | Rythmos                                                                  |            |
| PMN                                  | KALLOS                                                                   |            |
| HVIN                                 | KALLOS                                                                   |            |
| FVIN                                 | 2024.03.1x.1                                                             |            |
| HMN                                  | Rythmos                                                                  |            |
| FCC ID                               | 2AWYMKALLOS                                                              |            |
| IC ID                                | 31261-KALLOSNA01                                                         |            |
| Equipment type                       | End product                                                              |            |
| Radio type                           | Transceiver                                                              |            |
| - operating frequency range:         | 2400.0 MHz – 2483.5 MHz                                                  |            |
| - Nominal Channel Bandwidth:         | 1 MHz                                                                    |            |
| Radio technology / type of equipment | Bluetooth                                                                |            |
| Modulation:                          | GFSK                                                                     |            |
| Number of antennas                   | 1                                                                        |            |
| Radio chip                           | Nordic Semiconductor nRF52832                                            |            |
| Bluetooth Specification              | LE 1Mbps PHY                                                             | Yes        |
|                                      | LE 2Mbps PHY                                                             | No         |
|                                      | LE Coded PHY S=2 (500 kbit)                                              | No         |
|                                      | LE Coded PHY S=8 (125 kbit)                                              | No         |
|                                      | Stable Modulation Index - Transmitter                                    | No         |
|                                      | Stable Modulation Index - Reer                                           | No         |
| Antenna                              | Type                                                                     | Integrated |
|                                      | Model                                                                    | LDS        |
|                                      | Manufacturer                                                             | Amphenol   |
|                                      | Gain                                                                     | -8.95 dBi  |
| Supply voltage                       | 3.7VDC                                                                   |            |
| Type of Power source                 | Battery operated                                                         |            |
| Manufacturer                         | Intrex Inc<br>1896 Preston White Drive, 20191, Reston, VA, United States |            |

### 3. Configuration and Operation Modes

Conducted RF test:

| Test modes / description                                                                   |
|--------------------------------------------------------------------------------------------|
| GFSK modulation, data rate 1 Mbps, duty cycle 63%                                          |
| Continuous modulated carrier at 2402 MHz, 2442 MHz and 2480 MHz, power level setting 8 dBm |

Conducted and radiated emission test:

| Test modes / description                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT battery powered, continuous modulated carrier at 2402 MHz, 2442 MHz and 2480 MHz, power level setting max, data rate 1 Mbps, PBR59. nRF52832 radio commands are given over nRF5340 (nRF5340 continues to broadcast advertising messages) |
| EUT battery powered, continuous reception at 2442 MHz. nRF52832 radio commands are given over nRF5340 (nRF5340 continues to broadcast advertising messages)                                                                                  |

## 4. Test equipment

### Conducted RF tests

R&S TS8997 Test System equipment list:

| Equipment             | Certification-No.                 | Calibration Date | Next calibration |
|-----------------------|-----------------------------------|------------------|------------------|
| SMW200A               | 1035089-D-K-15195-01-00-2022-03   | 26.06.2023       | 25.06.2026       |
| SMB100A               | 1041326-D-K-15195-01-00-2022-03   | 26.06.2023       | 25.06.2026       |
| OSP-B157WX+OSP220     | 300642762-D-K-15195-01-00-2022-03 | 26.06.2023       | 25.06.2024       |
| OSP-B157W8plus+OSP150 | 300639878-D-K-15195-01-00-2022-03 | 26.06.2023       | 25.06.2024       |
| ESW                   | 1039208-D-K-15195-01-00-2022-03   | 05.07.2023       | 04.07.2024       |
| CMW500                | 300693633-D-K-15195-01-00-2023-04 | 25.04.2023       | 24.04.2024       |

### Emission tests

| New ID | Manufacturer    | Equipment type | Description                                               | Serial     | Calibration information | Next calibration |
|--------|-----------------|----------------|-----------------------------------------------------------|------------|-------------------------|------------------|
| G4C265 | Rohde & Schwarz | ESW26          | EMI test receiver                                         | 101324     | 6.7.2023                | 6.7.2024         |
| G4C273 | Frankonia       | ALX-4000E      | Broadband Antenna, 25MHz-4GHz with 6dB (50-A-MFN-06) att. | 00816+1531 | 22.1.2024               | 22.1.2027        |
| G4C292 | Rohde & Schwarz | TS-LNA 1840    | RF Preampifier 18 to 40 GHz                               | 100841     | 9.6.2022                | 9.6.2024         |
| G4C298 | Rohde & Schwarz | CMW500         | Wideband radio communication tester                       | 170980     | 29.6.2023               | 29.6.2024        |
| G4C469 | Rohde & Schwarz | TS_PRE2        | RF Preampifier                                            | 101541     | 9.6.2022                | 9.6.2024         |
| G4C294 | Rohde & Schwarz | Antenna        | Horn Antenna -> 40GHz                                     | 101067     | 4.11.2022               | 4.11.2025        |
| G4C576 | Rohde & Schwarz | HF907          | Double-Ridged Waveguide Horn Antenna 800MHz-18GHz         | 100163     | 9.8.2022                | 9.8.2025         |

| New ID | Manufacturer    | Equipment type | Description             | Serial | Calibration information | Next calibration |
|--------|-----------------|----------------|-------------------------|--------|-------------------------|------------------|
| G4C265 | Rohde & Schwarz | ESW26          | EMI test receiver       | 101324 | 6.7.2023                | 6.7.2024         |
| G4C515 | Rohde & Schwarz | ENV216         | Two-line V-Network LISN | 101472 | 14.5.2023               | 14.5.2024        |

### Test software

| Description  | Manufacturer    | Name  | Version  |
|--------------|-----------------|-------|----------|
| EMC Software | Rohde & Schwarz | EMC32 | 10.60.20 |
| RF Software  | Rohde & Schwarz | WMS32 | 11.60.00 |

## 5. Uncertainties

| Description                                           | Expanded<br>Uncertainty<br>(k=2) |
|-------------------------------------------------------|----------------------------------|
| RF Output Power                                       | 0,99                             |
| Peak Power                                            | 0,80                             |
| Power Spectral Density                                | 0,99                             |
| Accumulated Transmit Time                             | 0,01%                            |
| Minimum Frequency Occupation Time                     | 0,01%                            |
| Hopping Frequency Separation                          | 0,60%                            |
| Occupied Channel Bandwidth                            | 2,08 %                           |
| Out-of-band emissions                                 | 0,89                             |
| Transmitter unwanted emissions in the spurious domain | 1,76                             |
| AC conducted emission                                 | 2,24                             |
| Radiated emission $\leq 1$ GHz                        | 4,62                             |
| Radiated emission $> 1$ GHz                           | 5,72                             |

## 6. Sample emission level calculation

The following is a description of term and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBuV.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strength to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. RF path losses, including RF cables and preamplifiers, have been included with the A.F to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dBuV)} + \text{A.F. (dB/m)} = \text{Net field strength (dBuV/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBuV/m). The FCC limits are given in units of uV/m. The following formula is used to convert the units of uV/m to dbuV/m:

$$\text{Limit (dBuV/m)} = 20 * \log(\text{uV/m})$$

Margin :

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

|                       |                 |                           |           |
|-----------------------|-----------------|---------------------------|-----------|
| Reading + AF          | = Net Reading : | Net reading – FCC limit   | = Margin  |
| + 21.5 dBuV + 26 dB/m | = 47.5 dBuV/m : | 47.5 dBuV/m – 57.0 dBuV/m | = -9.5 dB |

## 7. Test conditions

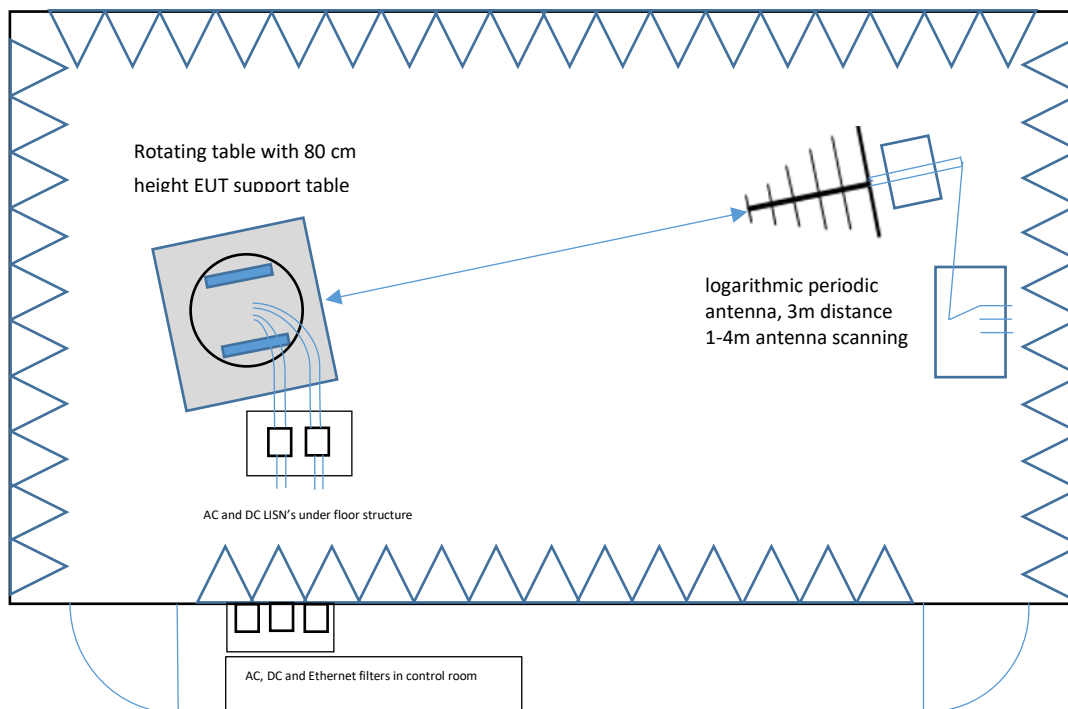
All radiated tests were performed in a semi-anechoic chamber, where the measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz, 1 GHz-18 GHz Double-ridged horn antenna and 18 GHz-40 GHz horn antenna) is located at a distance of 3 m.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (all antennas) was varied from 1 to 4 meters to find the maximum radiated emission.

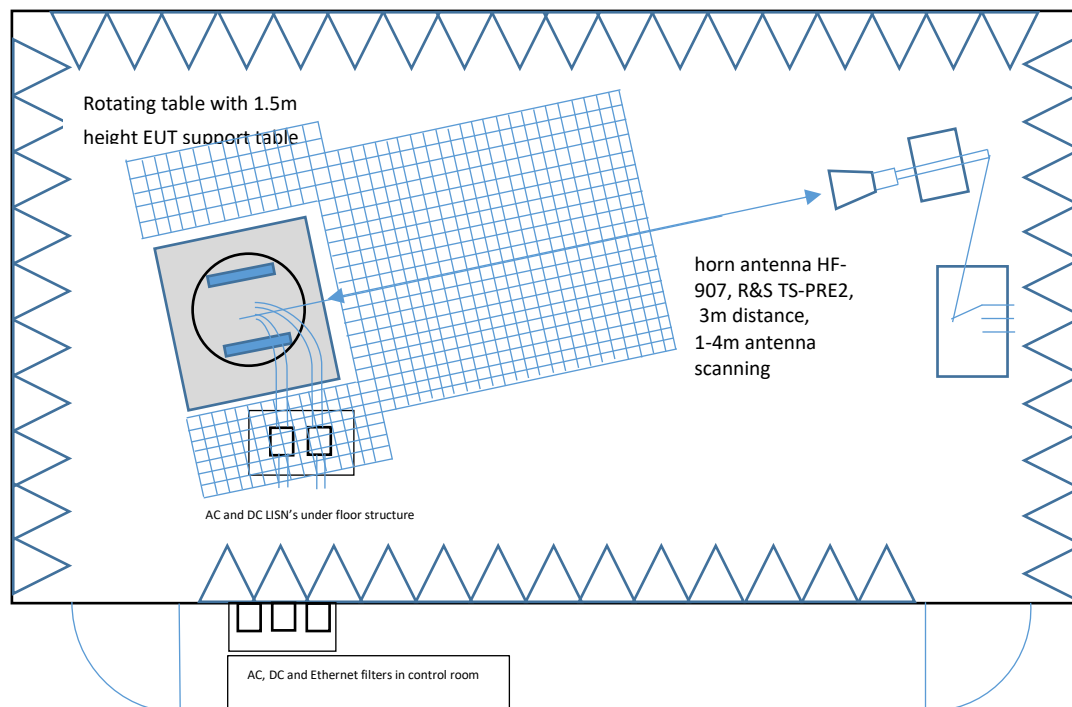
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth / video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

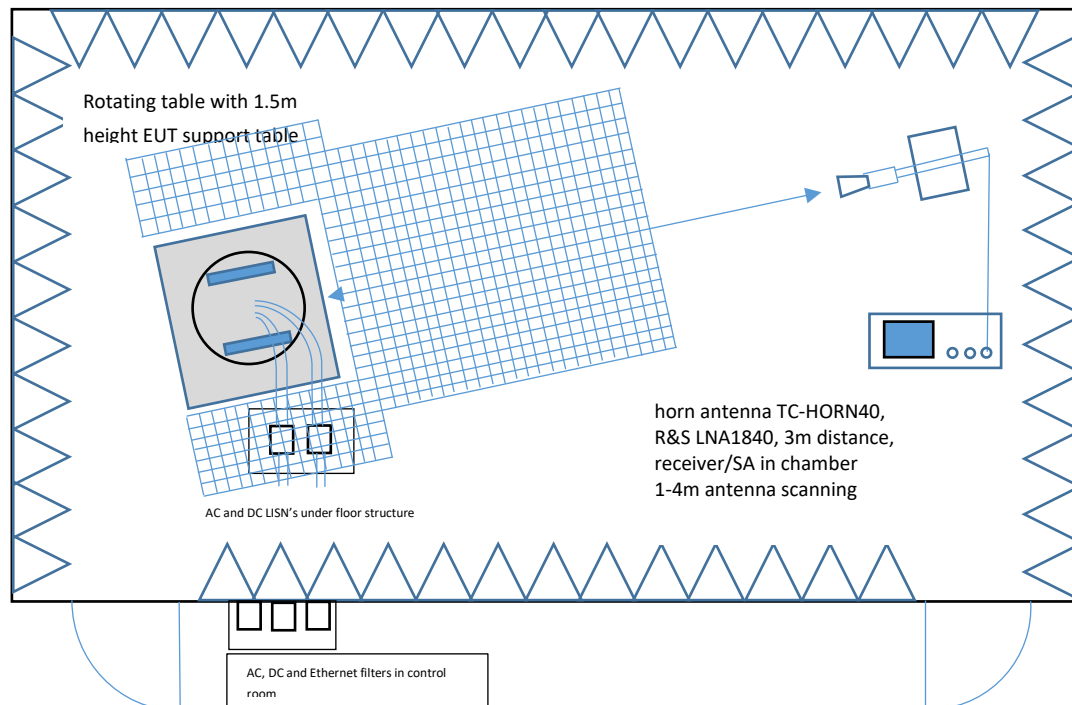
### Radiated measurements setup from 30 MHz to 1 GHz:



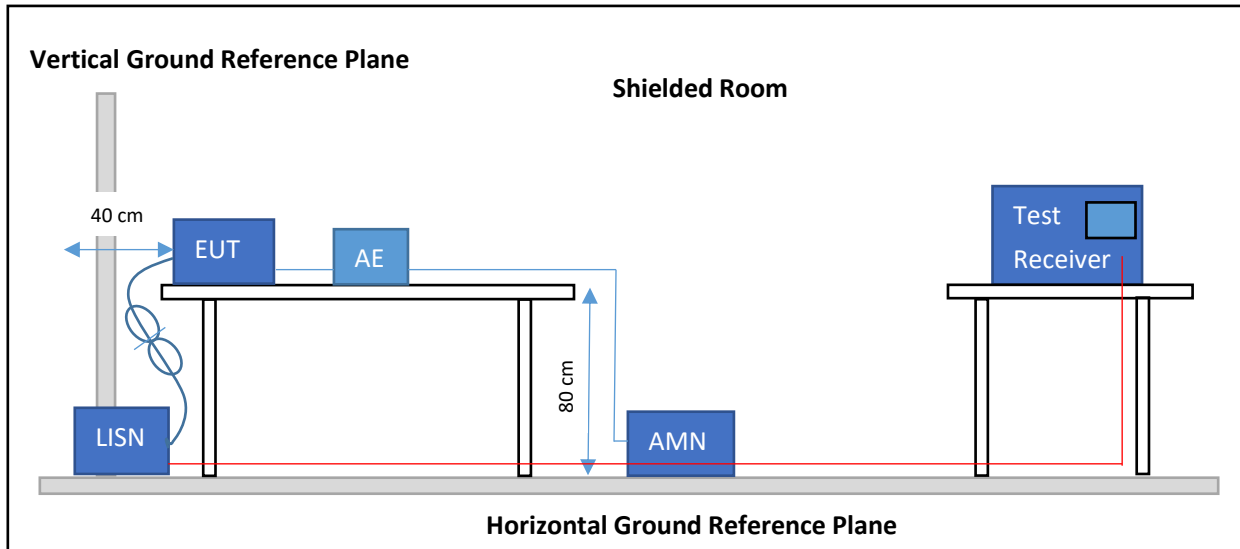
## Radiated measurements setup from 1 GHz to 18 GHz:



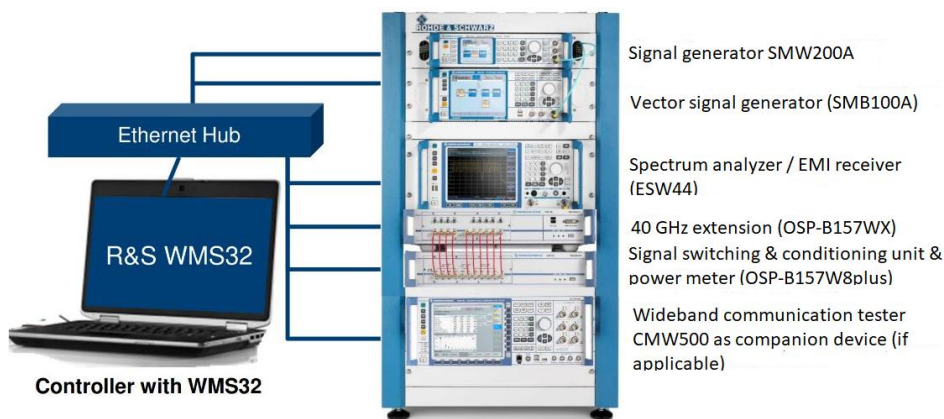
## Radiated measurements setup from 18 GHz to 26 / 40 GHz:



## Conducted emission setup



## Conducted RF measurement system:



## 8. Summary

### Bluetooth LE

| FCC/ISED Requirement (15.247 / RSS-247)                                                                                                                                                                                                                              |                                                                    | Reference method | Result | Remark             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------|--------|--------------------|
| Occupied Bandwidth                                                                                                                                                                                                                                                   | ISED RSS-Gen, Issue 5 A2 (section 6.7)                             | ANSI C63.10-2013 | N/R    | Informational only |
| 6 dB Bandwidth                                                                                                                                                                                                                                                       | FCC § 15.247(a)(2) / RSS-247, Issue 3 (section 5.2 (a))            | ANSI C63.10-2013 | PASS   |                    |
| Maximum peak conducted power                                                                                                                                                                                                                                         | FCC § 15.247(b) / RSS-247, Issue 3 (section 5.4 (d))               | ANSI C63.10-2013 | PASS   |                    |
| Power spectral density                                                                                                                                                                                                                                               | FCC § 15.247(e) / RSS-247, Issue 3 (section 5.2)                   | ANSI C63.10-2013 | PASS   |                    |
| AC power line conducted emissions                                                                                                                                                                                                                                    | FCC § 15.207 / RSS-247, Issue 3 (section 3.1)                      | ANSI C63.10-2013 | PASS   |                    |
| Band edge compliance                                                                                                                                                                                                                                                 | FCC § 15.247(d) / RSS-247, Issue 3 (section 5.5)                   | ANSI C63.10-2013 | PASS   |                    |
| Conducted spurious emissions                                                                                                                                                                                                                                         | FCC § 15.247(d) / RSS-247, Issue 3 (section 5.5)                   | ANSI C63.10-2013 | PASS   |                    |
| Transmitter radiated spurious emissions                                                                                                                                                                                                                              | FCC § 15.247(d), FCC § 15.209 / RSS-Gen, Issue 5 A2 (section 6.13) | ANSI C63.10-2013 | PASS   |                    |
| Receiver radiated spurious emissions                                                                                                                                                                                                                                 | ISED RSS-247, Issue 3 (section 3.1)                                | ANSI C63.4-2014  | PASS   |                    |
| Possible test case verdicts:<br>PASS = Tested device meets the requirements<br>FAIL = Tested device does not meet the requirements<br>N/A = Test requirement not applicable for tested device<br>N/T = Test requirement applicable for tested device, but not tested |                                                                    |                  |        |                    |
| Applicable FCC KDB(s):<br>KDB 558074 DO1: DTS measurement guidance v 0502 (Apr 2, 2019)                                                                                                                                                                              |                                                                    |                  |        |                    |

## 9. Occupied bandwidth

Reference: ISED RSS-Gen, Issue 5 A2 (section 6.7)

Test method: ANSI C63.10 (6.9.3)

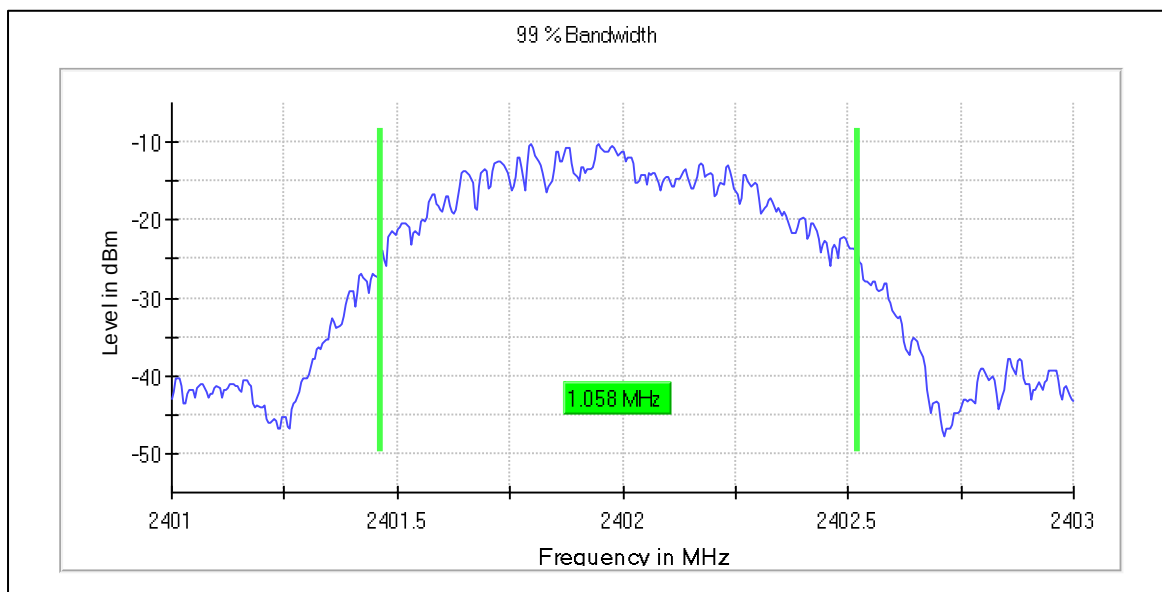
| Limits                    |
|---------------------------|
| None (Informational only) |

| Procedure                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT transmitter is activated in test mode under normal conditions</li> <li>2. Spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum</li> <li>3. The resolution bandwidth is set to the range of 1% to 5% of the occupied bandwidth</li> <li>4. The occupied bandwidth is measured with the build-in analyzer function</li> </ol> |

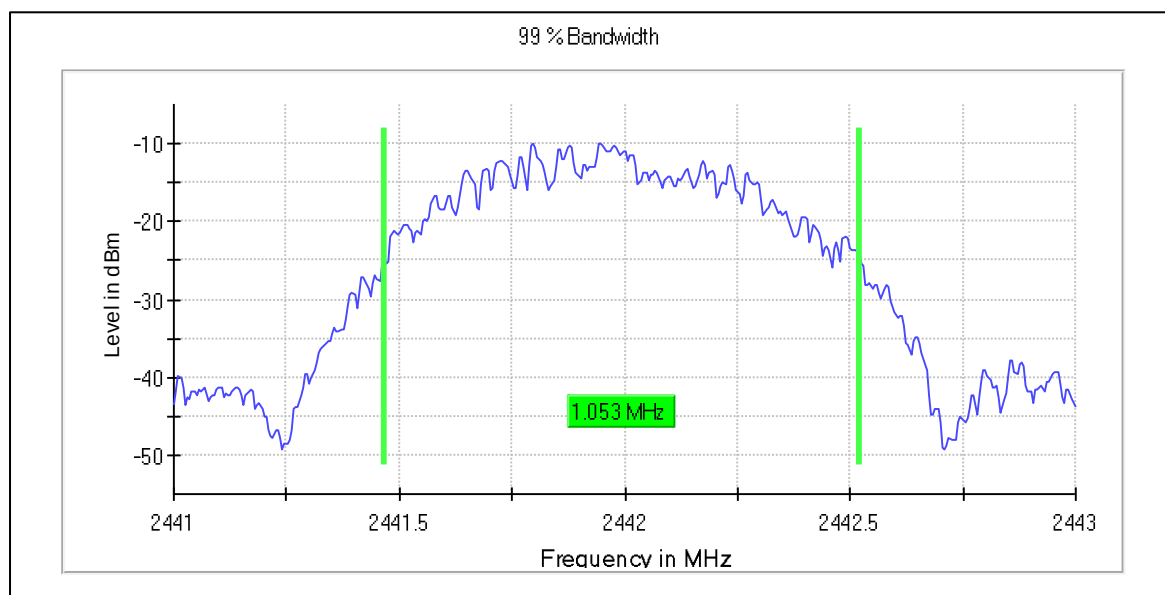
Summary:

| Summary              |                 |                 |
|----------------------|-----------------|-----------------|
| Mode / modulation    | Frequency (MHz) | Bandwidth (MHz) |
| Bluetooth LE, 1 Mbps | 2402            | 1.057644        |
| Bluetooth LE, 1 Mbps | 2442            | 1.052632        |
| Bluetooth LE, 1 Mbps | 2480            | 1.062657        |

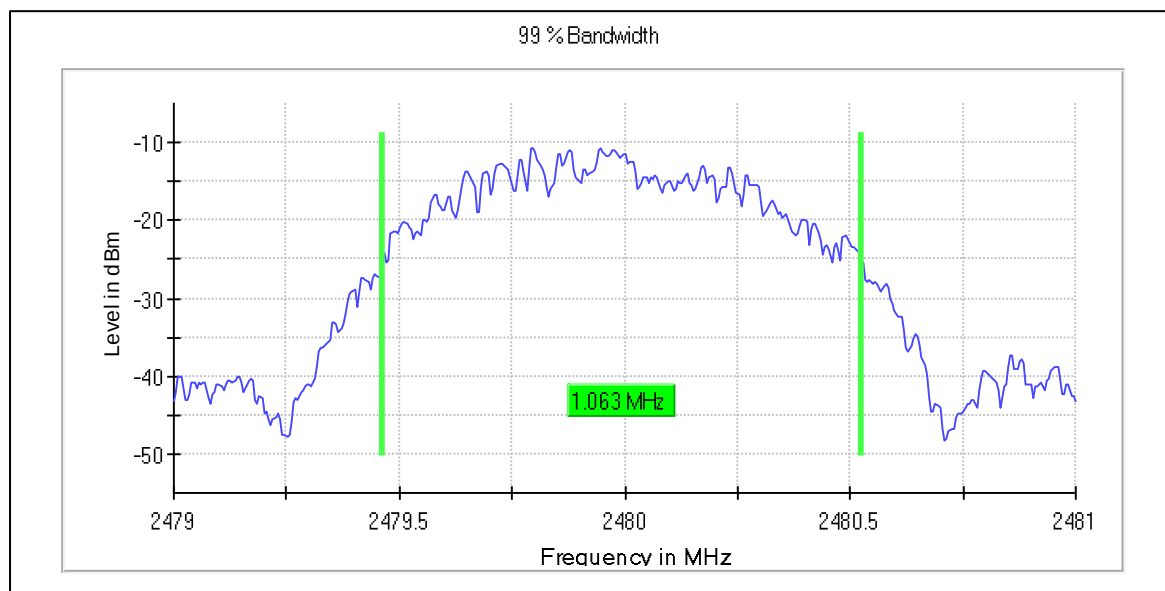
Occupied bandwidth, low channel



## Occupied bandwidth, middle channel



## Occupied bandwidth, high channel



## 10. 6 dB bandwidth

Reference: FCC title 47 part 15 §15.247(a), ISSED RSS-247, Issue 3 (section 5.2)

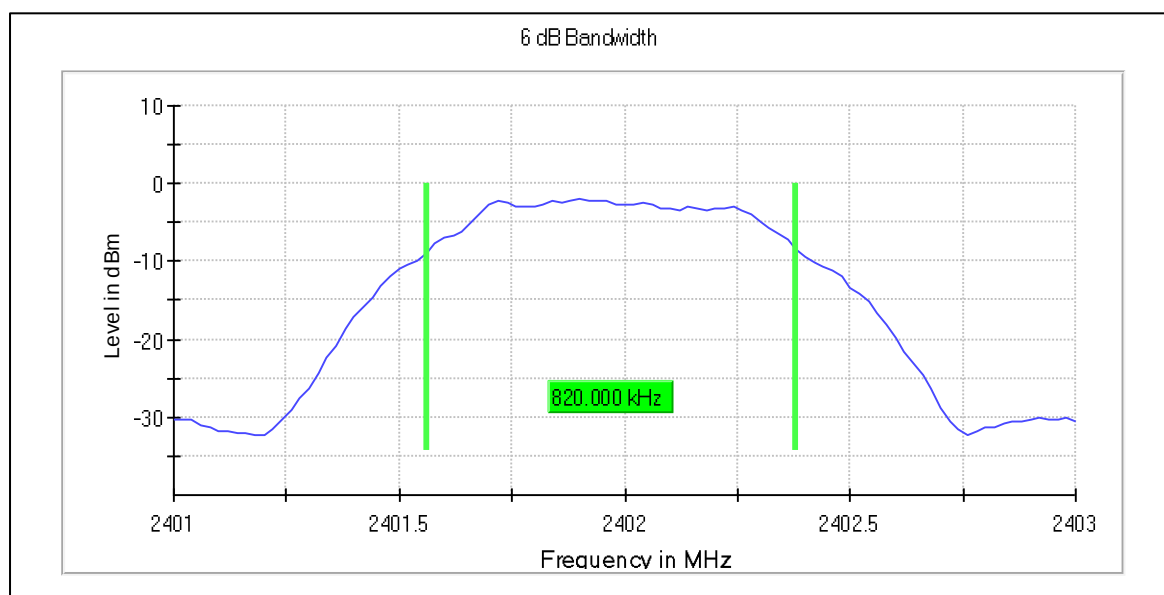
Test method: KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 (11.8.1)

| Limits                                                |
|-------------------------------------------------------|
| The minimum 6 dB bandwidth shall be at least 500 kHz. |

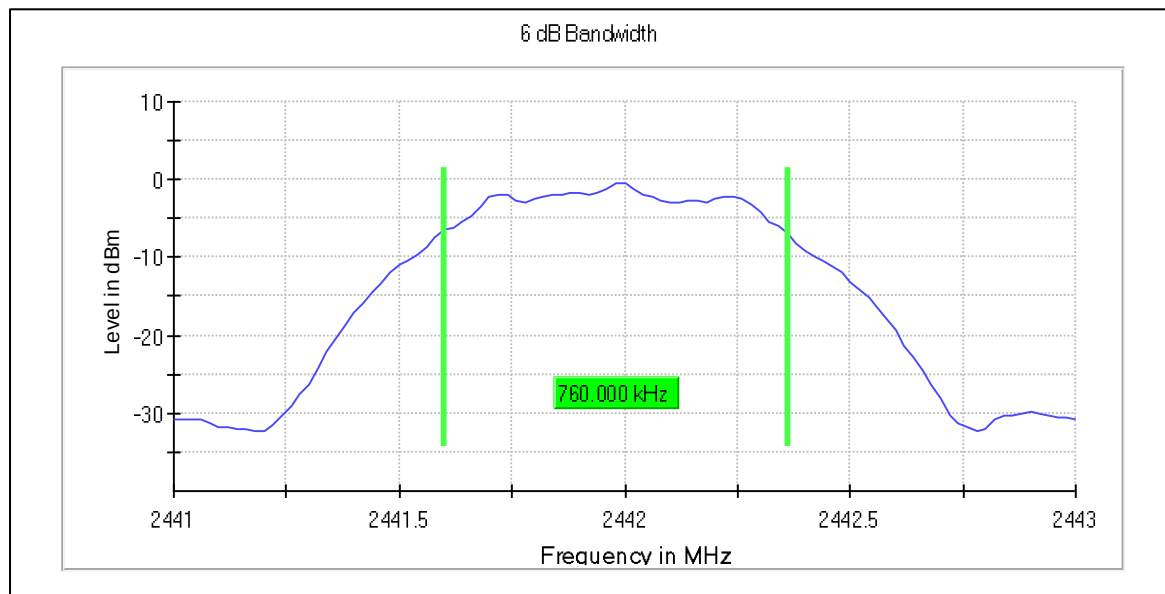
| Test procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. Span set to at least twice the emission spectrum</li> <li>3. Detector set to peak and max hold and BW is set to 100 kHz</li> <li>4. Envelope peak value of emission spectrum is selected</li> <li>5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak</li> <li>6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak</li> <li>7. 6 dB bandwidth is determined by marker frequency separation</li> </ol> |

| Mode / modulation    | DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Max Level (dBm) | Result |
|----------------------|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------|--------|
| Bluetooth LE, 1 Mbps | 2402.000000         | 0.820000        | 0.500000        | ---             | 2401.560000          | 2402.380000           | -1.9            | PASS   |
| Bluetooth LE, 1 Mbps | 2442.000000         | 0.760000        | 0.500000        | ---             | 2441.600000          | 2442.360000           | -0.4            | PASS   |
| Bluetooth LE, 1 Mbps | 2480.000000         | 0.780000        | 0.500000        | ---             | 2479.580000          | 2480.360000           | -1.2            | PASS   |

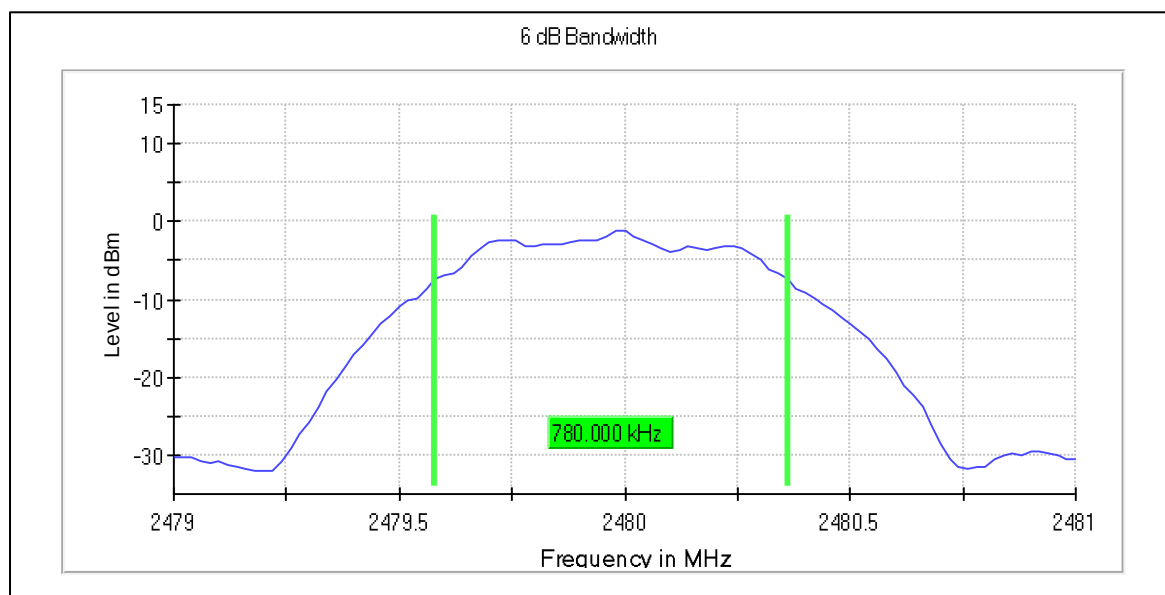
6 dB Bandwidth, low channel:



6 dB Bandwidth, middle channel:



6 dB Bandwidth, high channel:



## 11. Peak conducted output power

Reference: FCC part 15 §15.247(b), ISD RSS-247, Issue 3 (section 5.4)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 (11.9.1.1)

| Limits                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm). The e.i.r.p. shall not exceed 4 W (36 dBm) (Canada).                                                                                                                                                                                                                                                                                 |
| The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. |

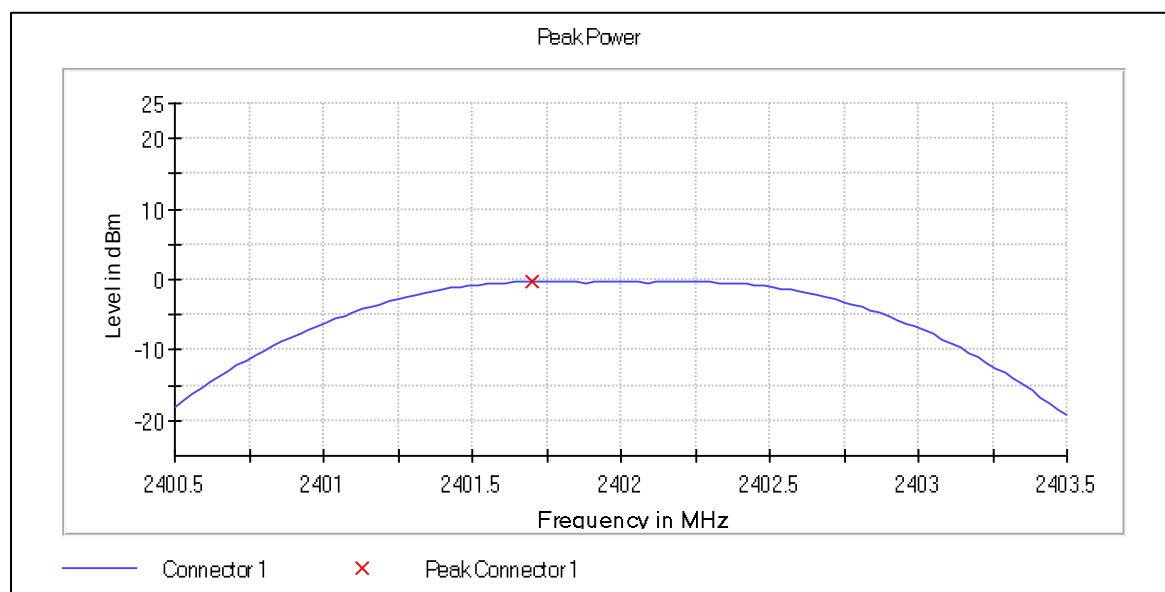
| Test procedure                                                   |
|------------------------------------------------------------------|
| 1. EUT set to test mode (communication tested is used if needed) |
| 2. Analyzer resolution bandwidth is set $\geq$ DTS bandwidth     |
| 3. Detector set to peak and max hold                             |
| 4. Sweep time is set to auto                                     |
| 5. After trace has stabilized a marker is set to peak envelope   |

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

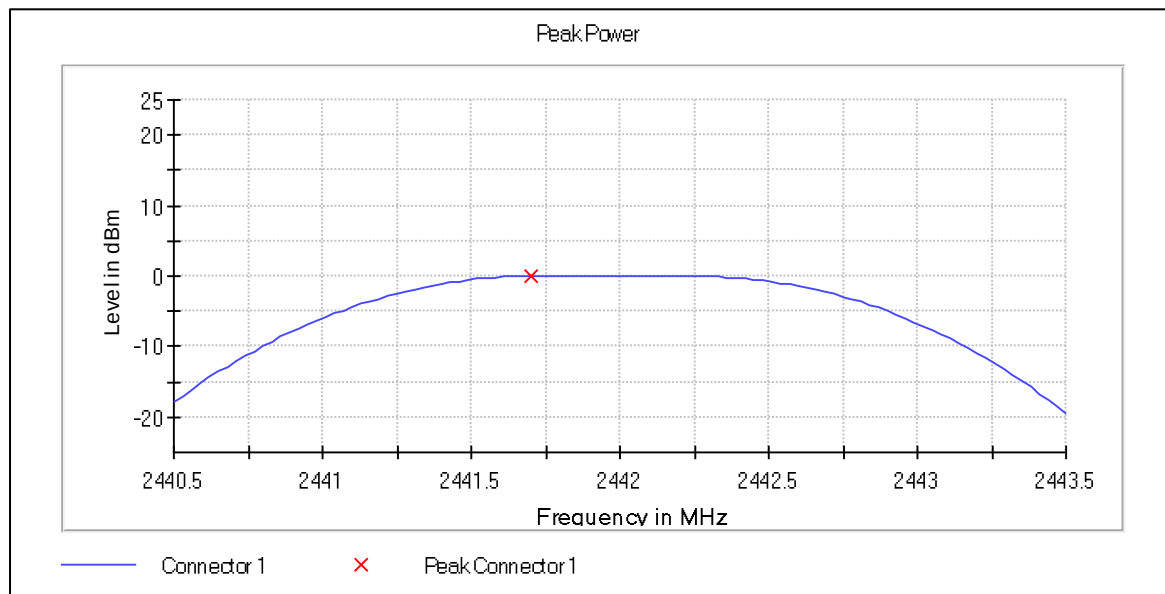
Maximum Declared Antenna Gain: -8.5 dBi

| Mode / modulation    | DUT Frequency (MHz) | Peak Power (dBm) | EIRP Power (dBm) | Result |
|----------------------|---------------------|------------------|------------------|--------|
| Bluetooth LE, 1 Mbps | 2402.000000         | -0.3             | -8.8             | PASS   |
| Bluetooth LE, 1 Mbps | 2442.000000         | 0.0              | -8.5             | PASS   |
| Bluetooth LE, 1 Mbps | 2480.000000         | -0.6             | -9.1             | PASS   |

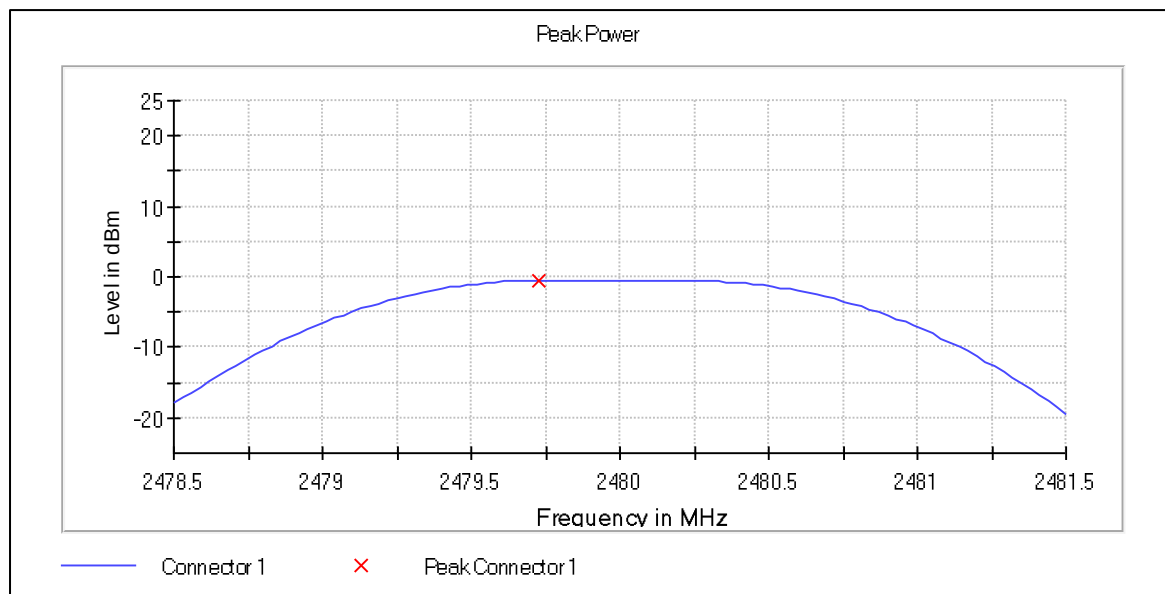
Peak power, low channel



## Peak power, middle channel



## Peak power, high channel



## 12. Peak Power Spectral Density

Reference: FCC §15.247(a),(e), ISED RSS-247, Issue 3 (section 5.2)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10-2013 (11.10.2, 14.3.2)

Specification: 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.

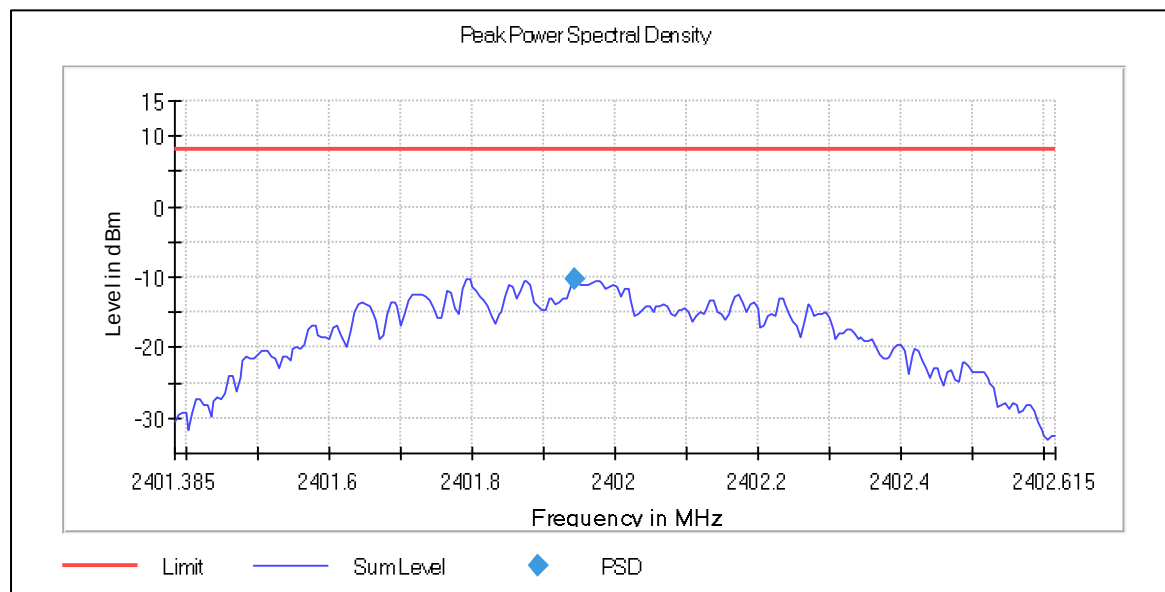
| Limits          |
|-----------------|
| ≤ 8 dBm / 3 kHz |

| Test procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode</li> <li>2. The analyser is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth</li> <li>3. The analyzer is set to 100 kHz with VBW ≥ RBW and the detector is set to peak with max hold</li> <li>4. After trace has stabilized a marker is set to the envelope maximum</li> <li>5. If the power spectral density is above the limit the RBW is reduces (not lower than 3 kHz) and the measurement is repeated</li> <li>6. If the EUT has more than one transmit chain the procedure is repeated for each chain</li> </ol> |

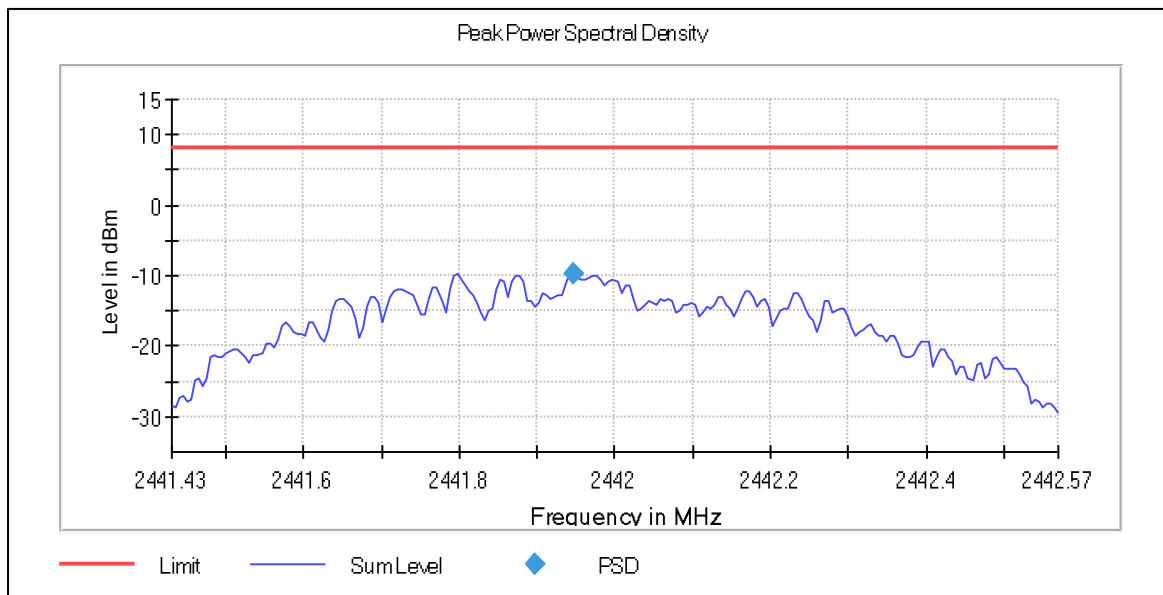
### Summary

| Mode / modulation    | DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|----------------------|---------------------|-----------------|-----------|-----------------|--------|
| Bluetooth LE, 1 Mbps | 2402.000000         | 2401.942265     | -10.153   | 8.0             | PASS   |
| Bluetooth LE, 1 Mbps | 2442.000000         | 2441.947269     | -9.605    | 8.0             | PASS   |
| Bluetooth LE, 1 Mbps | 2480.000000         | 2479.947275     | -10.555   | 8.0             | PASS   |

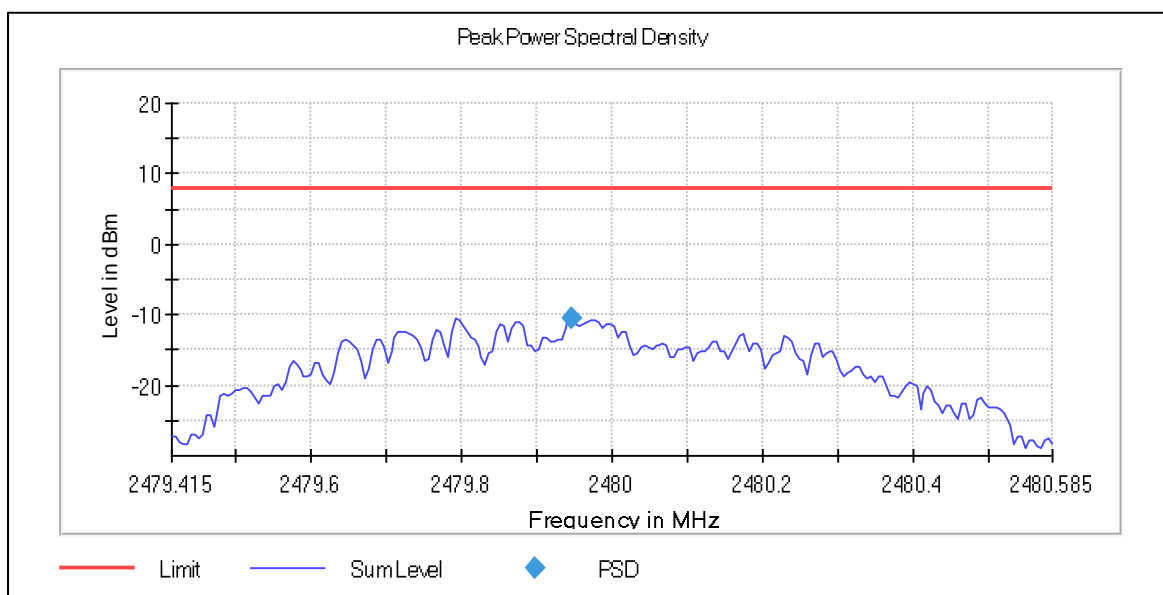
### Peak power spectral density, low channel



## Peak power spectral density, middle channel



## Peak power spectral density, high channel:



### 13. AC power line conducted emissions

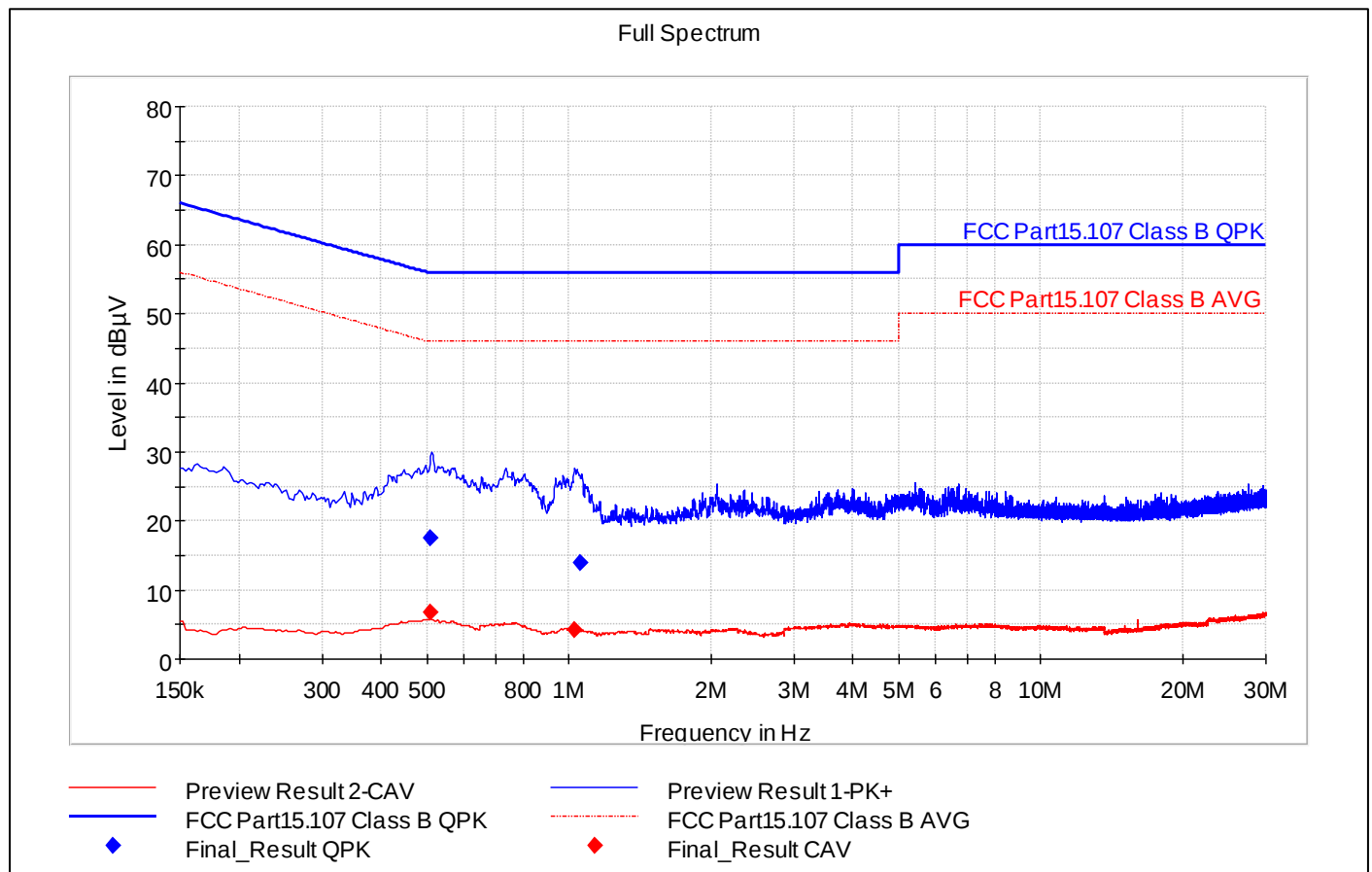
Reference: FCC §15.207, ISED RSS-247, Issue 3 (section 3.1)

Test method: ANSI C63.10-2013 (6.2)

| Limits                                                        |                   |                |
|---------------------------------------------------------------|-------------------|----------------|
| Frequency (MHz)                                               | Quasi-Peak (dBuV) | Average (dBuV) |
| 0.15 – 0.5                                                    | 66 -56*           | 56 – 46*       |
| 0.5 – 5                                                       | 56                | 46             |
| 5 - 30                                                        | 60                | 50             |
| *Limit decreases linearly with the logarithm of the frequency |                   |                |

| Operation mode(s)       | Configuration         | Test Verdict |
|-------------------------|-----------------------|--------------|
| Bluetooth LE RX, 1 Mbps | Mid channel, 2442 MHz | PASS         |

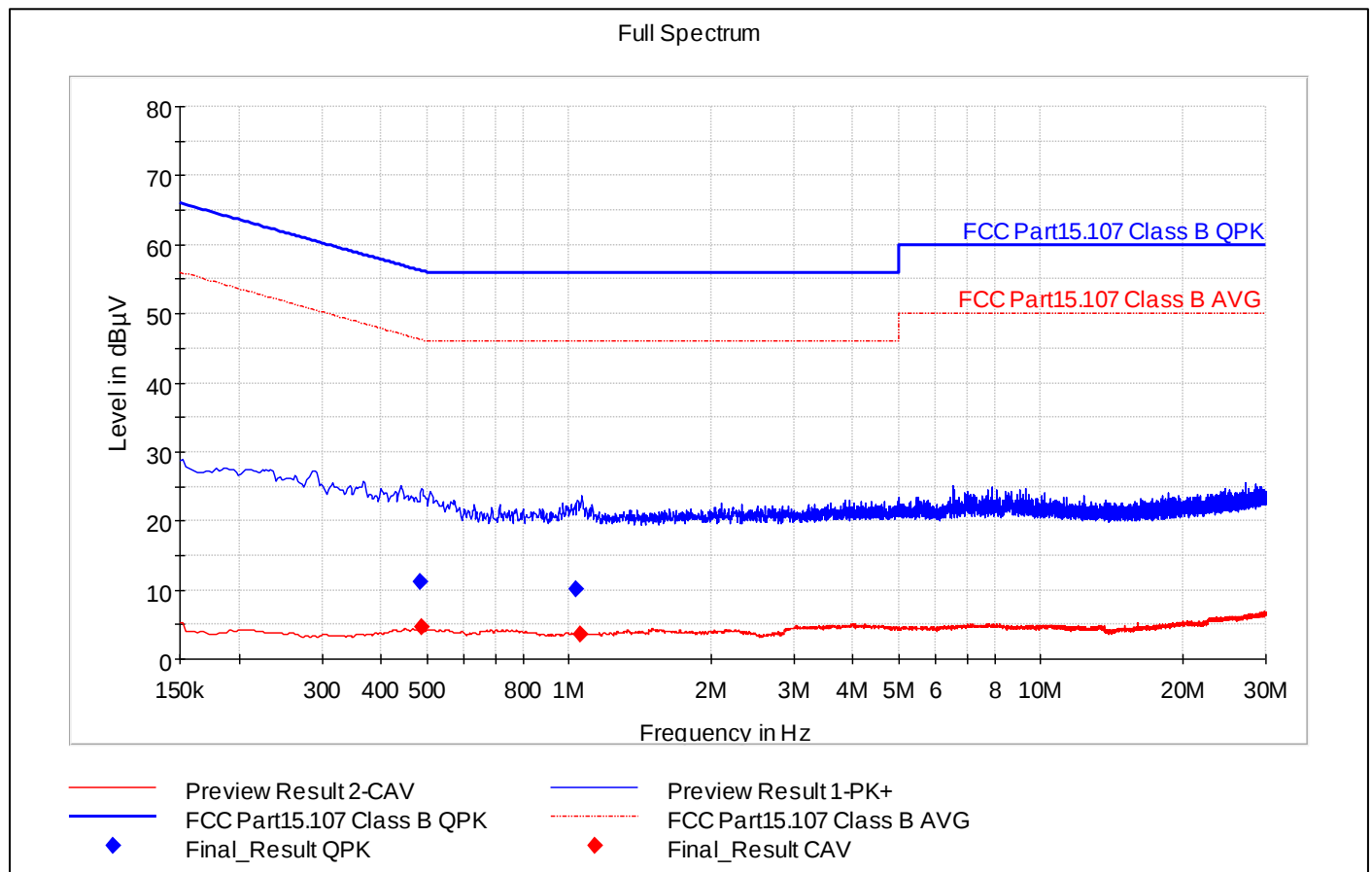
## Conducted emission at the mains power port according to 47 CFR Part 15.207, Phase



## Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) | Comment |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|--------|------------|---------|
| 0.510000        | ---              | 6.84            | 46.00        | 39.16       | 15000.0         | 9.000           | L1   | ON     | 10.0       | PASS    |
| 0.510000        | 17.52            | ---             | 56.00        | 38.48       | 15000.0         | 9.000           | L1   | ON     | 10.0       | PASS    |
| 1.029750        | ---              | 4.23            | 46.00        | 41.77       | 15000.0         | 9.000           | L1   | ON     | 9.8        | PASS    |
| 1.054500        | 14.00            | ---             | 56.00        | 42.00       | 15000.0         | 9.000           | L1   | ON     | 9.8        | PASS    |

## Conducted emission at the mains power port according to 47 CFR Part 15.207, Neutral



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) | Comment |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|--------|------------|---------|
| 0.483000        | 11.25            | ---             | 56.29        | 45.03       | 15000.0         | 9.000           | N    | ON     | 9.9        | PASS    |
| 0.487500        | ---              | 4.60            | 46.21        | 41.61       | 15000.0         | 9.000           | N    | ON     | 9.9        | PASS    |
| 1.034250        | 10.20            | ---             | 56.00        | 45.80       | 15000.0         | 9.000           | N    | ON     | 9.8        | PASS    |
| 1.054500        | ---              | 3.52            | 46.00        | 42.48       | 15000.0         | 9.000           | N    | ON     | 9.8        | PASS    |

## 14. Band edge emissions compliance (transmitter)

Reference: FCC §15.247(d), ISED RSS-247, Issue 3 (section 5.5)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 8.7 and ANSI C63.10-2013 (11.13)

Specification: In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. 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.

| Limits            |                              |
|-------------------|------------------------------|
| Power measurement | Out-of-band attenuation (dB) |
| Peak              | 20                           |
| RMS               | 30                           |

| Limits                                                                                 |
|----------------------------------------------------------------------------------------|
| 1. EUT set to test mode (communication tester is used if needed)                       |
| 2. Span set around lower band edge and detector is set to peak and max hold            |
| 3. Resolution bandwidth is set to 100 kHz                                              |
| 4. Peak emission level(s) within frequency band and outside frequency band is measured |
| 5. Band edge attenuation is determined from level difference                           |

### Summary

| Mode / modulation    | DUT Frequency (MHz) | Result |
|----------------------|---------------------|--------|
| Bluetooth LE, 1 Mbps | 2402.000000         | PASS   |
| Bluetooth LE, 1 Mbps | 2480.000000         | PASS   |

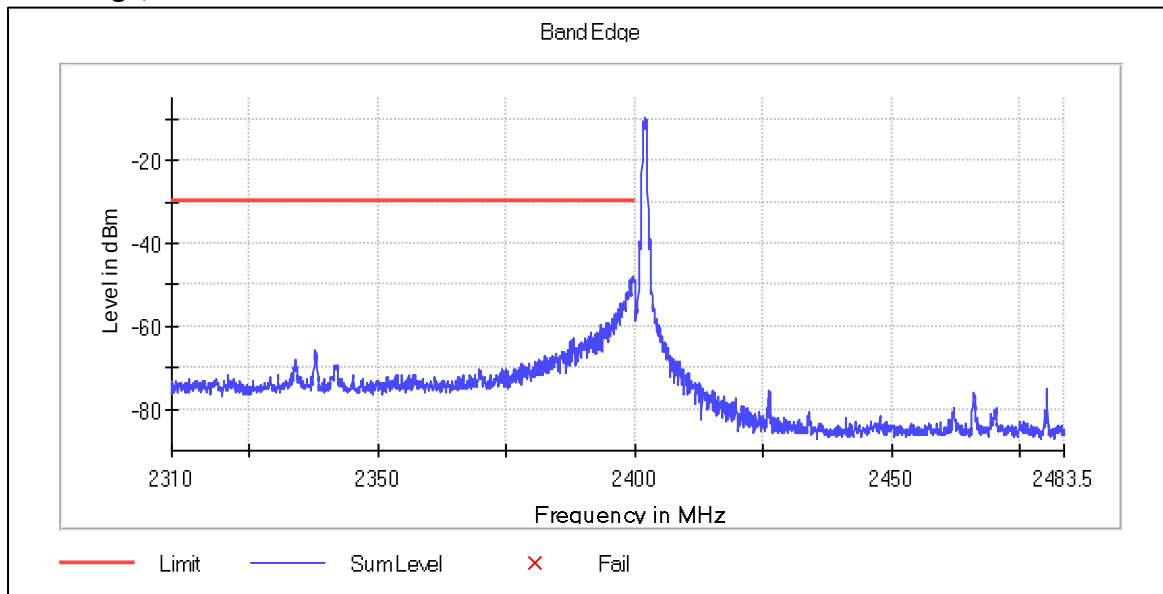
### Measurements, band edge low

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2399.599778     | -47.9       | 18.4        | -29.5       | PASS   |
| 2399.649805     | -48.0       | 18.5        | -29.5       | PASS   |
| 2399.699833     | -48.4       | 18.9        | -29.5       | PASS   |
| 2399.549750     | -48.6       | 19.1        | -29.5       | PASS   |
| 2399.499722     | -48.8       | 19.3        | -29.5       | PASS   |
| 2399.949972     | -48.8       | 19.3        | -29.5       | PASS   |
| 2399.899944     | -48.9       | 19.4        | -29.5       | PASS   |
| 2399.749861     | -48.9       | 19.4        | -29.5       | PASS   |
| 2399.849917     | -49.1       | 19.5        | -29.5       | PASS   |
| 2398.999444     | -49.1       | 19.6        | -29.5       | PASS   |
| 2399.449694     | -49.1       | 19.6        | -29.5       | PASS   |
| 2399.049472     | -49.2       | 19.7        | -29.5       | PASS   |
| 2399.799889     | -49.3       | 19.8        | -29.5       | PASS   |
| 2399.399666     | -49.8       | 20.3        | -29.5       | PASS   |
| 2399.099500     | -49.8       | 20.3        | -29.5       | PASS   |

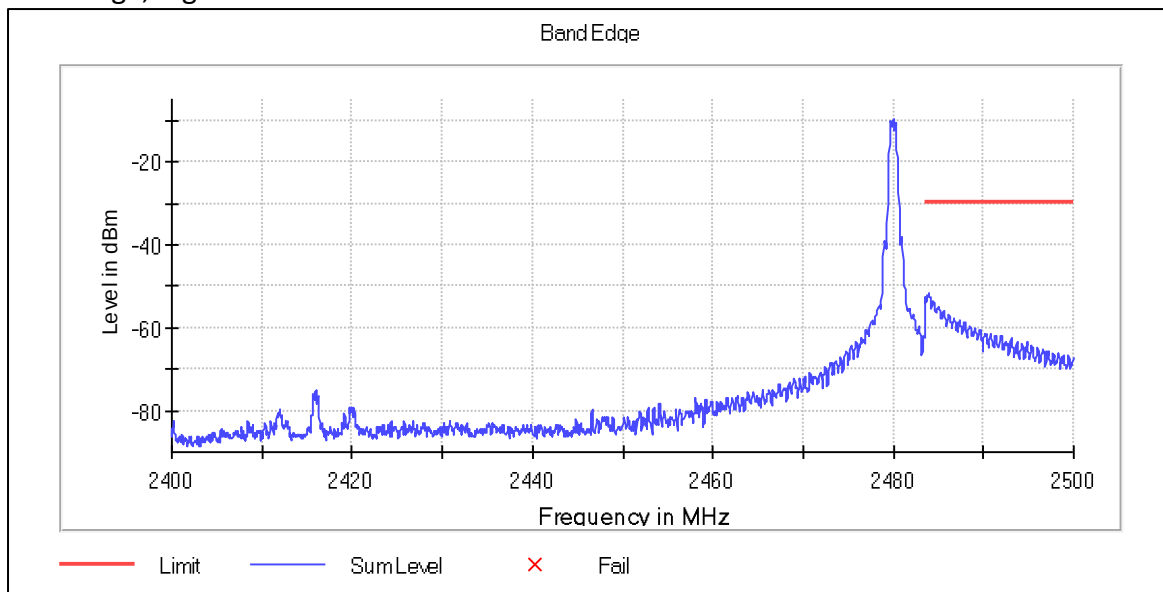
### Measurements, band edge high

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 2483.901216     | -51.8       | 22.2        | -29.6       | PASS   |
| 2483.851064     | -52.1       | 22.5        | -29.6       | PASS   |
| 2483.800912     | -52.2       | 22.6        | -29.6       | PASS   |
| 2483.951368     | -52.3       | 22.7        | -29.6       | PASS   |
| 2484.001520     | -52.4       | 22.8        | -29.6       | PASS   |
| 2484.051672     | -52.7       | 23.1        | -29.6       | PASS   |
| 2483.550152     | -52.8       | 23.2        | -29.6       | PASS   |
| 2484.402736     | -53.4       | 23.8        | -29.6       | PASS   |
| 2483.700608     | -53.4       | 23.8        | -29.6       | PASS   |
| 2483.650456     | -53.6       | 24.0        | -29.6       | PASS   |
| 2483.750760     | -53.7       | 24.0        | -29.6       | PASS   |
| 2484.452888     | -53.7       | 24.1        | -29.6       | PASS   |
| 2483.600304     | -53.8       | 24.2        | -29.6       | PASS   |
| 2484.503040     | -53.9       | 24.2        | -29.6       | PASS   |
| 2484.101824     | -54.1       | 24.5        | -29.6       | PASS   |

## Band edge, low channel



## Band edge, high channel



## 15. Tx spurious emissions, conducted

Reference: FCC §15.247(d), ISSED RSS-247, Issue 3 (section 5.5)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 8.5 and ANSI C63.10-2013 (11.11.2 & 11.11.3)

| Limits            |                              |
|-------------------|------------------------------|
| Power measurement | Out-of-band attenuation (dB) |
| Peak              | 20                           |
| RMS               | 30                           |

| Test procedure                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT set to test mode (communication tester is used if needed)</li> <li>2. Span set around lower band edge and detector is set to peak and max hold</li> <li>3. Resolution bandwidth is set to 100 kHz</li> <li>4. Markers are set to peak emission levels outside frequency band</li> </ol> |

| Mode / modulation    | DUT Frequency (MHz) | Result |
|----------------------|---------------------|--------|
| Bluetooth LE, 1 Mbps | 2402.000000         | PASS   |
| Bluetooth LE, 1 Mbps | 2440.000000         | PASS   |
| Bluetooth LE, 1 Mbps | 2480.000000         | PASS   |

### Pre Measurements, low channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 4803.154762     | -47.6       | 16.0        | -31.6       |
| 7202.797619     | -54.9       | 23.3        | -31.6       |
| 2523.494048     | -64.7       | 33.1        | -31.6       |
| 2390.000000     | -65.9       | 34.3        | -31.6       |
| 2340.000000     | -66.2       | 34.6        | -31.6       |
| 2280.000000     | -67.0       | 35.4        | -31.6       |
| 2513.495536     | -68.5       | 36.9        | -31.6       |
| 2250.000000     | -69.0       | 37.4        | -31.6       |
| 12012.081845    | -69.1       | 37.5        | -31.6       |
| 9602.440476     | -70.0       | 38.3        | -31.6       |
| 2380.000000     | -71.7       | 40.1        | -31.6       |
| 2553.489583     | -72.2       | 40.6        | -31.6       |
| 2350.000000     | -72.4       | 40.7        | -31.6       |
| 2270.000000     | -72.8       | 41.1        | -31.6       |
| 25860.020833    | -73.3       | 41.7        | -31.6       |

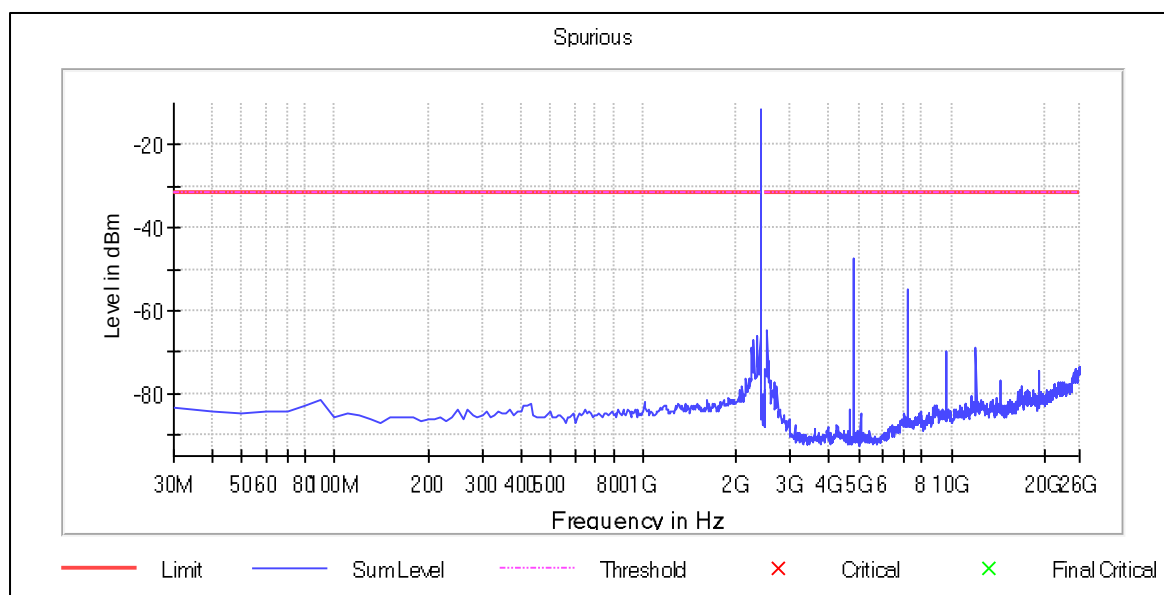
## Pre Measurements, middle channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 4883.142857     | -48.3       | 18.1        | -30.2       |
| 7322.779762     | -53.4       | 23.2        | -30.2       |
| 2320.000000     | -64.9       | 34.7        | -30.2       |
| 2563.488095     | -65.3       | 35.1        | -30.2       |
| 2503.497024     | -65.8       | 35.6        | -30.2       |
| 2380.000000     | -66.0       | 35.8        | -30.2       |
| 9762.416667     | -68.1       | 37.9        | -30.2       |
| 12212.052083    | -69.2       | 39.0        | -30.2       |
| 2290.000000     | -69.9       | 39.7        | -30.2       |
| 2593.483631     | -70.6       | 40.4        | -30.2       |
| 2390.000000     | -71.5       | 41.3        | -30.2       |
| 2493.498512     | -72.1       | 41.9        | -30.2       |
| 2310.000000     | -72.2       | 42.0        | -30.2       |
| 730.000000      | -72.4       | 42.2        | -30.2       |
| 25420.086310    | -73.0       | 42.7        | -30.2       |

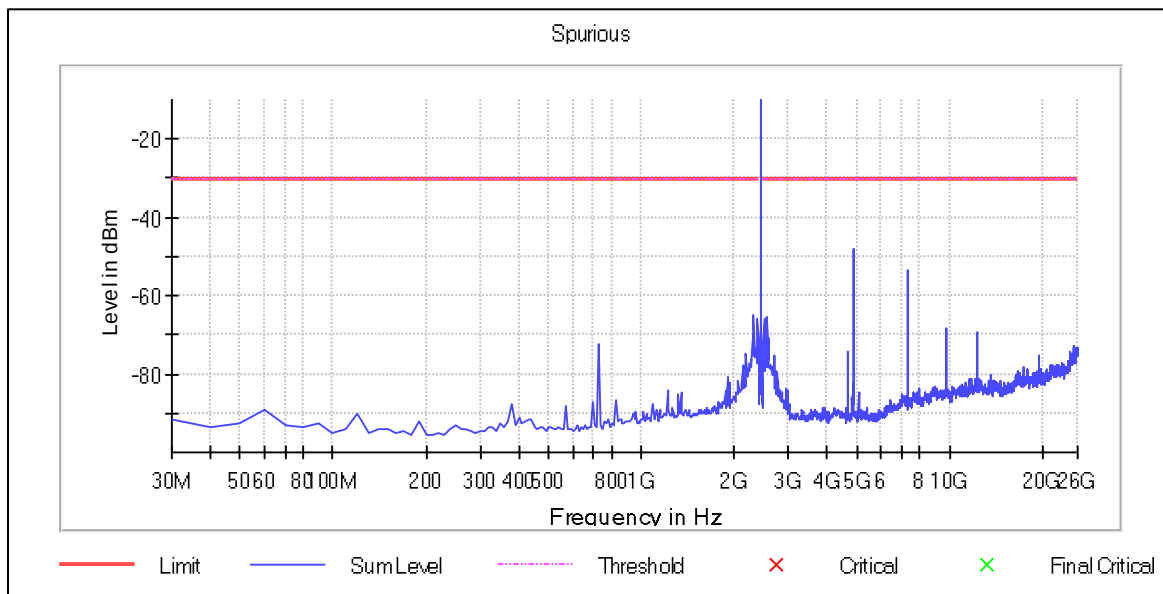
## Pre Measurements, top channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 4953.132440     | -46.3       | 16.1        | -30.2       |
| 7442.761905     | -52.7       | 22.4        | -30.2       |
| 7432.763393     | -53.5       | 23.3        | -30.2       |
| 25400.089286    | -61.0       | 30.7        | -30.2       |
| 25820.026786    | -62.9       | 32.7        | -30.2       |
| 25350.096726    | -63.2       | 33.0        | -30.2       |
| 25880.017857    | -63.4       | 33.2        | -30.2       |
| 25410.087798    | -63.5       | 33.2        | -30.2       |
| 25950.007440    | -63.6       | 33.4        | -30.2       |
| 25920.011905    | -63.7       | 33.5        | -30.2       |
| 25450.081845    | -64.0       | 33.7        | -30.2       |
| 25850.022321    | -64.0       | 33.8        | -30.2       |
| 25800.029762    | -64.1       | 33.9        | -30.2       |
| 25560.065476    | -64.1       | 33.9        | -30.2       |
| 25830.025298    | -64.2       | 33.9        | -30.2       |

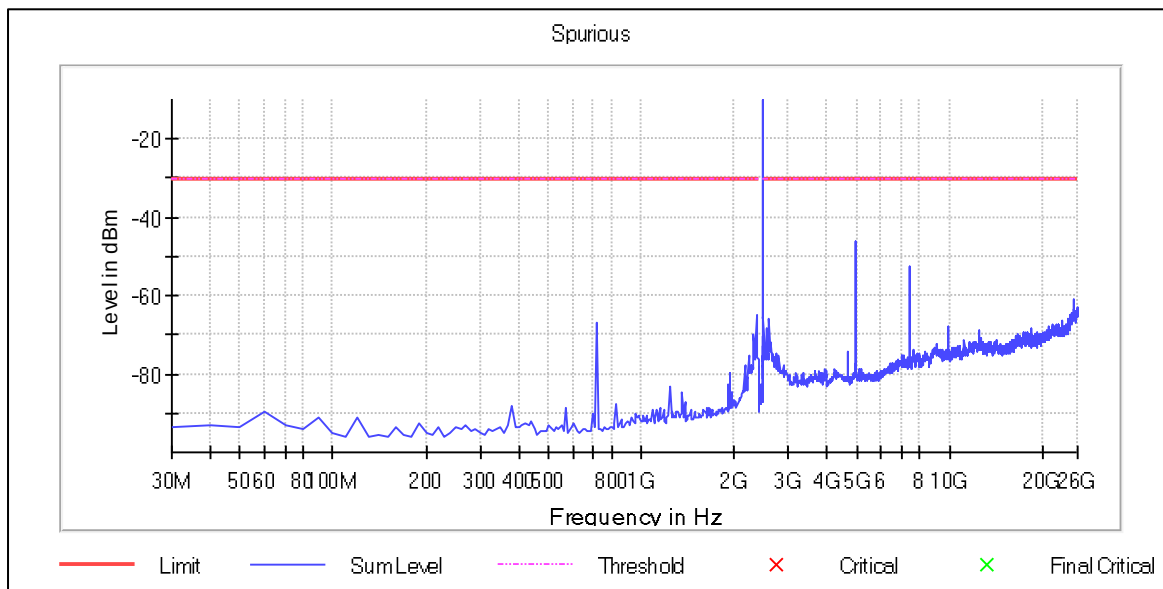
## Low channel



## Middle channel



## High channel



## 16. Emissions in restricted frequency bands

Reference: FCC §15.247(d), ISSED RSS-247, Issue 3 (section 6.2)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 8.6 and ANSI C63.10-2013 (11.12)

| Limits            |                                          |
|-------------------|------------------------------------------|
| Power measurement | Out-of-band attenuation (dB)             |
| Peak              | according to FCC §15.209 and FCC §15.205 |

| Test procedure                                                              |
|-----------------------------------------------------------------------------|
| 1. EUT set to test mode (communication tester is used if needed)            |
| 2. Span set around lower band edge and detector is set to peak and max hold |
| 3. Resolution bandwidth is set to 300 Hz                                    |
| 4. Markers are set to peak emission levels outside frequency band           |

| Summary              |                 |                 |
|----------------------|-----------------|-----------------|
| Mode / modulation    | Frequency (MHz) | Bandwidth (MHz) |
| Bluetooth LE, 1 Mbps | 2402.000000     | PASS            |
| Bluetooth LE, 1 Mbps | 2440.000000     | PASS            |
| Bluetooth LE, 1 Mbps | 2480.000000     | PASS            |

Pre Measurements, low channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 4803.585824     | -44.9       | 23.7        | -21.2       |
| 4803.085806     | -45.0       | 23.8        | -21.2       |
| 4804.585861     | -45.1       | 23.9        | -21.2       |
| 4804.085843     | -45.1       | 23.9        | -21.2       |
| 4805.085880     | -47.8       | 26.6        | -21.2       |
| 4802.585787     | -48.0       | 26.8        | -21.2       |
| 4802.085769     | -56.3       | 35.1        | -21.2       |
| 4805.585898     | -56.6       | 35.4        | -21.2       |
| 2389.996427     | -57.6       | 36.4        | -21.2       |
| 4670.080886     | -58.1       | 36.9        | -21.2       |
| 2369.989282     | -58.5       | 37.3        | -21.2       |
| 2274.455163     | -58.8       | 37.6        | -21.2       |
| 2274.955341     | -59.5       | 38.3        | -21.2       |
| 2242.443730     | -59.7       | 38.5        | -21.2       |
| 2365.487674     | -59.8       | 38.6        | -21.2       |

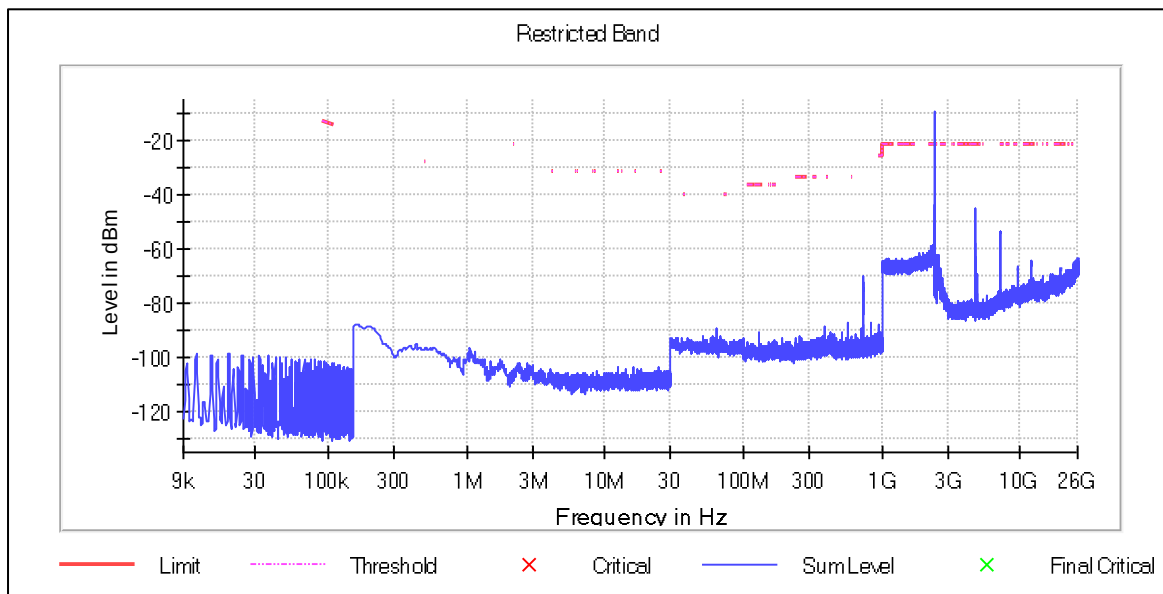
## Pre Measurements, middle channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 4883.588784     | -47.5       | 26.3        | -21.2       |
| 4883.088765     | -47.6       | 26.4        | -21.2       |
| 4884.088802     | -47.9       | 26.7        | -21.2       |
| 4884.588821     | -48.1       | 26.9        | -21.2       |
| 4885.088839     | -50.9       | 29.7        | -21.2       |
| 4882.588747     | -51.2       | 30.0        | -21.2       |
| 7326.679158     | -51.6       | 30.4        | -21.2       |
| 7325.679121     | -51.8       | 30.6        | -21.2       |
| 7325.179103     | -51.8       | 30.6        | -21.2       |
| 7326.179140     | -51.9       | 30.7        | -21.2       |
| 7327.179177     | -52.2       | 31.0        | -21.2       |
| 7324.679084     | -52.5       | 31.3        | -21.2       |
| 4885.588858     | -57.3       | 36.1        | -21.2       |
| 7327.679195     | -57.8       | 36.6        | -21.2       |
| 7324.179066     | -58.5       | 37.3        | -21.2       |

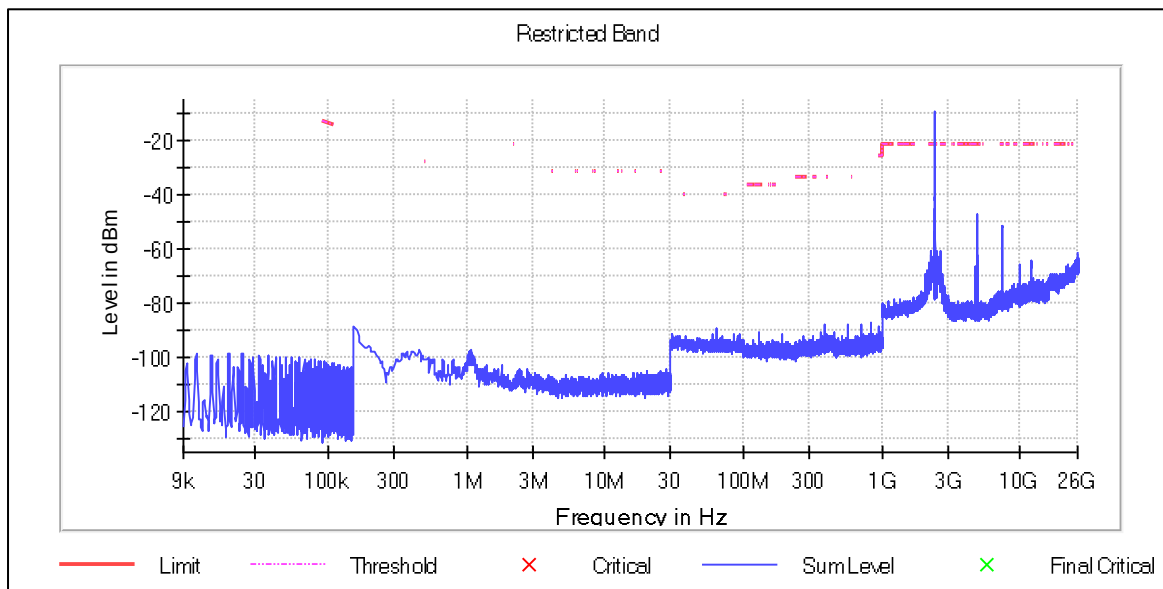
## Pre Measurements, top channel

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|-----------------|-------------|-------------|-------------|
| 2488.000166     | -41.3       | 20.1        | -21.2       |
| 2484.000018     | -43.2       | 22.0        | -21.2       |
| 2484.500037     | -44.6       | 23.4        | -21.2       |
| 4960.591632     | -45.3       | 24.1        | -21.2       |
| 4960.091614     | -45.4       | 24.2        | -21.2       |
| 4959.591595     | -45.6       | 24.4        | -21.2       |
| 4959.091577     | -45.7       | 24.5        | -21.2       |
| 4961.091651     | -48.1       | 26.9        | -21.2       |
| 4958.591558     | -48.5       | 27.3        | -21.2       |
| 2485.000055     | -50.7       | 29.5        | -21.2       |
| 7440.683375     | -50.7       | 29.5        | -21.2       |
| 7439.683338     | -50.8       | 29.6        | -21.2       |
| 7439.183320     | -51.1       | 29.9        | -21.2       |
| 7440.183357     | -51.1       | 29.9        | -21.2       |
| 2489.000203     | -51.4       | 30.2        | -21.2       |

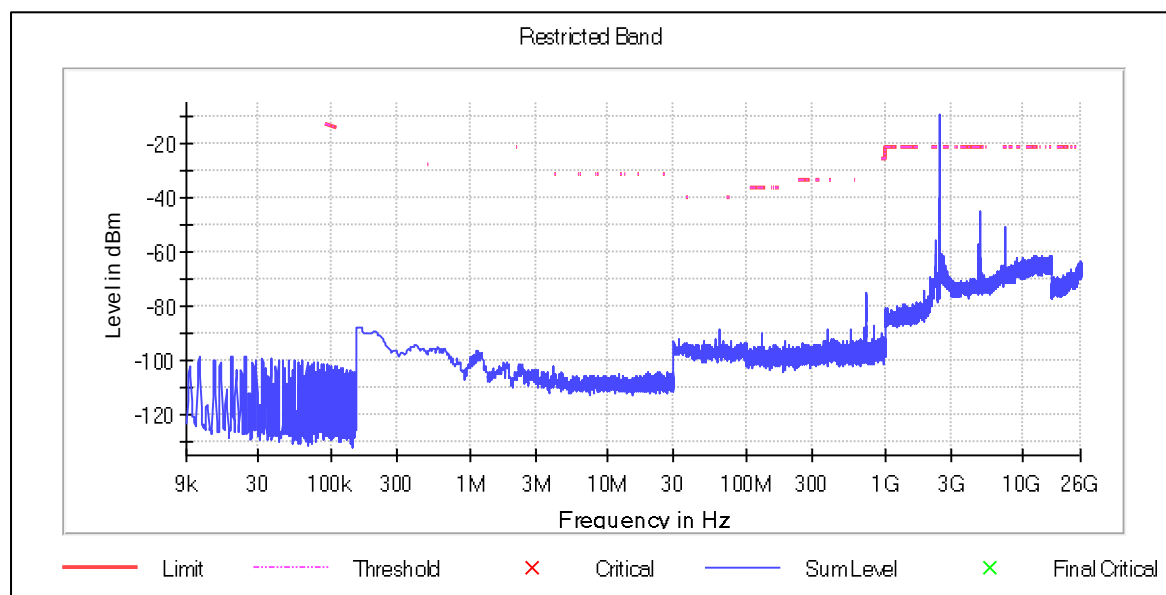
## Low channel



## Middle channel



## High channel



## 17. Tx spurious emissions, radiated

Reference: FCC §15.247(d), FCC §15.209, ISSED RSS-Gen Issue 5 A2 (section 6.13)

Test method: KDB 558074 D01 DTS Meas Guidance v05r02 8.5 and ANSI C63.10-2013 (6.4, 6.5, 6.6 & 11.12)

Specification: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)/RSS-Gen):

| Limits                |            |                       |                         |                          |
|-----------------------|------------|-----------------------|-------------------------|--------------------------|
| Frequency range (MHz) | Detector   | Field strength (uV/m) | Field strength (dBuV/m) | Measurement distance (m) |
| 0.009 – 0.09          | Average    | 2400/F(kHz)           | -                       | 300                      |
| 0.09 – 0.110          | Quasi-Peak | 2400/F(kHz)           | -                       | 300                      |
| 0.110 – 0.490         | Average    | 2400/F(kHz)           | -                       | 300                      |
| 0.490 – 1.705         | Quasi-Peak | 24000/F(kHz)          | -                       | 30                       |
| 1.705 – 30.0          | Quasi-Peak | 30                    | -                       | 30                       |
| 30 - 88               | Quasi-Peak | 100                   | 40                      | 3                        |
| 88 – 216              | Quasi-Peak | 150                   | 43.5                    | 3                        |
| 216 – 960             | Quasi-Peak | 200                   | 46                      | 3                        |
| 960 - 1000            | Quasi-Peak | 500                   | 54                      | 3                        |
| >1000                 | Average    | 500                   | 54                      | 3                        |

| Test procedure 30 MHz -1 GHz |                                                                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                           | EUT is placed on a non conducting support at the center of a turn table 0.8m above the ground                                                             |
| 2.                           | EUT set to test mode                                                                                                                                      |
| 3.                           | The receiver is set to peak detection with max hold                                                                                                       |
| 4.                           | The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization                |
| 5.                           | Found peak values were further maximized by adjusting turntable position $\pm 22,5$ degrees around detected value and scanning the antenna height 1 to 4m |
| 6.                           | For maximized values, final measurement was done with the corresponding final detector.                                                                   |

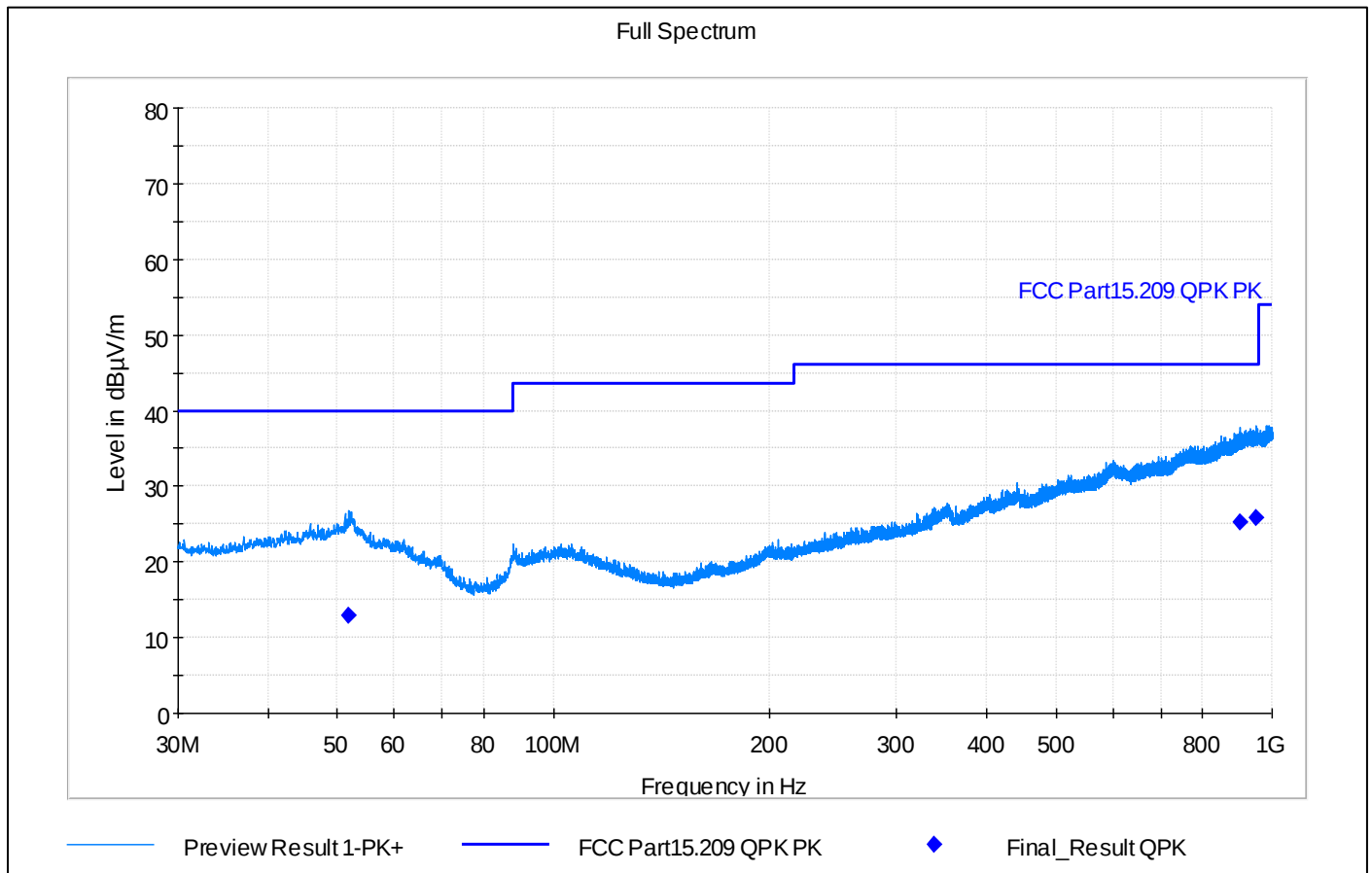
| Test procedure > 1 GHz |                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                     | EUT is placed on a non conducting support at the center of a turn table 1.5m above the ground                                                             |
| 2.                     | EUT set to test mode                                                                                                                                      |
| 3.                     | The receiver is set to peak detection with max hold                                                                                                       |
| 4.                     | The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization.               |
| 5.                     | Found peak values were further maximized by adjusting turntable position $\pm 22,5$ degrees around detected value and scanning the antenna height 1 to 4m |
| 6.                     | For maximized values, final measurement was done with the corresponding final detector.                                                                   |

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function. RSS-247: Attenuation below the general field strength limits specified in RSS-Gen is not required.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

| Operation mode(s)       | Configuration          | Test Verdict |
|-------------------------|------------------------|--------------|
| Bluetooth LE TX, 1 Mbps | Low channel, 2402 MHz  | PASS         |
| Bluetooth LE TX, 1 Mbps | Mid channel, 2442 MHz  | PASS         |
| Bluetooth LE TX, 1 Mbps | High channel, 2480 MHz | PASS         |

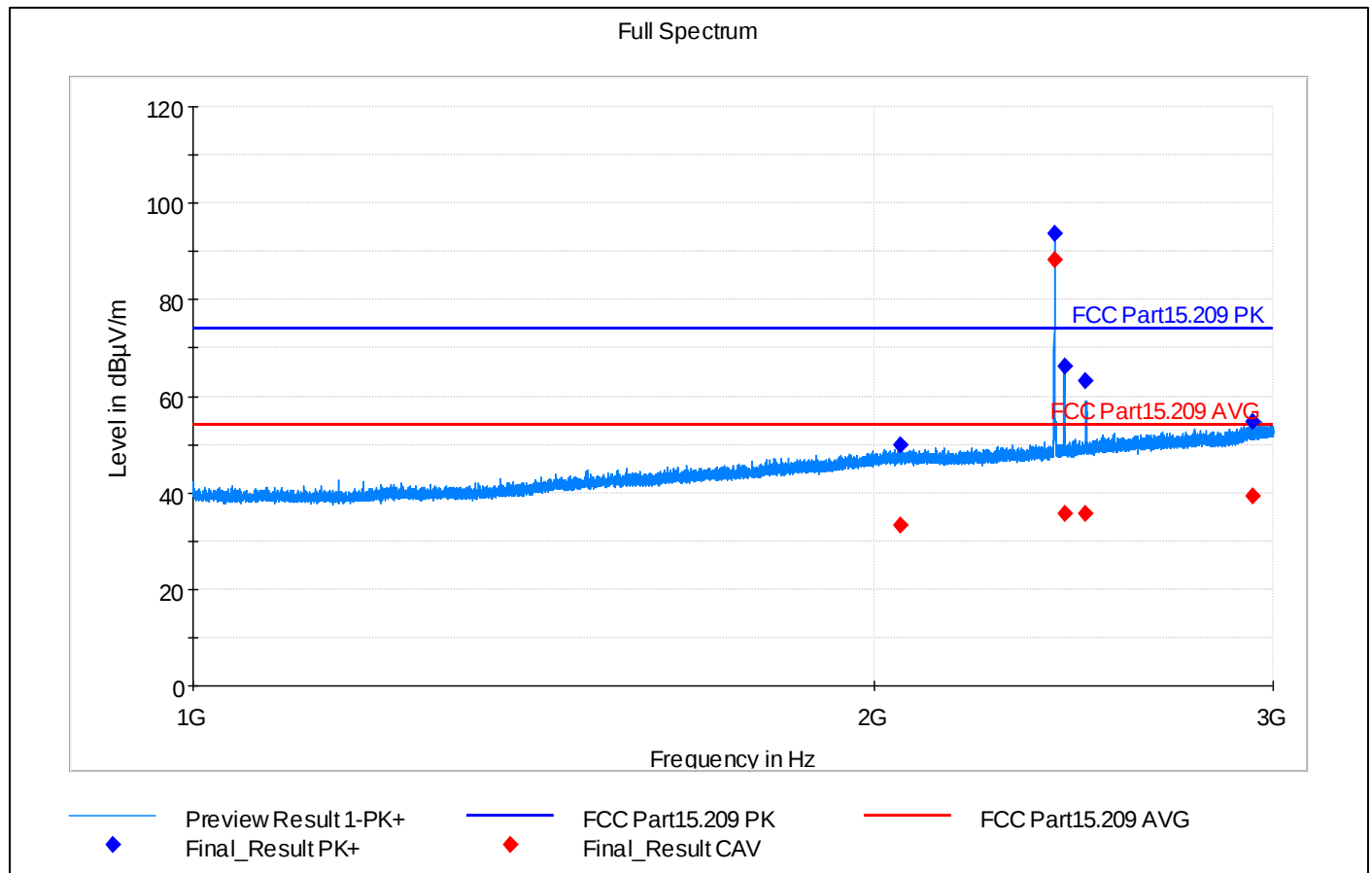
## Low channel, 30 MHz – 1 GHz



## Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 51.900000       | 12.86              | 40.00          | 27.14       | 15000.0         | 120.000         | 100.0       | V   | 77.0          | 0.0             | 21.0         | PASS    |
| 903.210000      | 25.25              | 46.00          | 20.75       | 15000.0         | 120.000         | 98.0        | V   | 326.0         | 0.0             | 33.8         | PASS    |
| 950.460000      | 25.89              | 46.00          | 20.11       | 15000.0         | 120.000         | 259.0       | V   | 87.0          | 0.0             | 34.1         | PASS    |

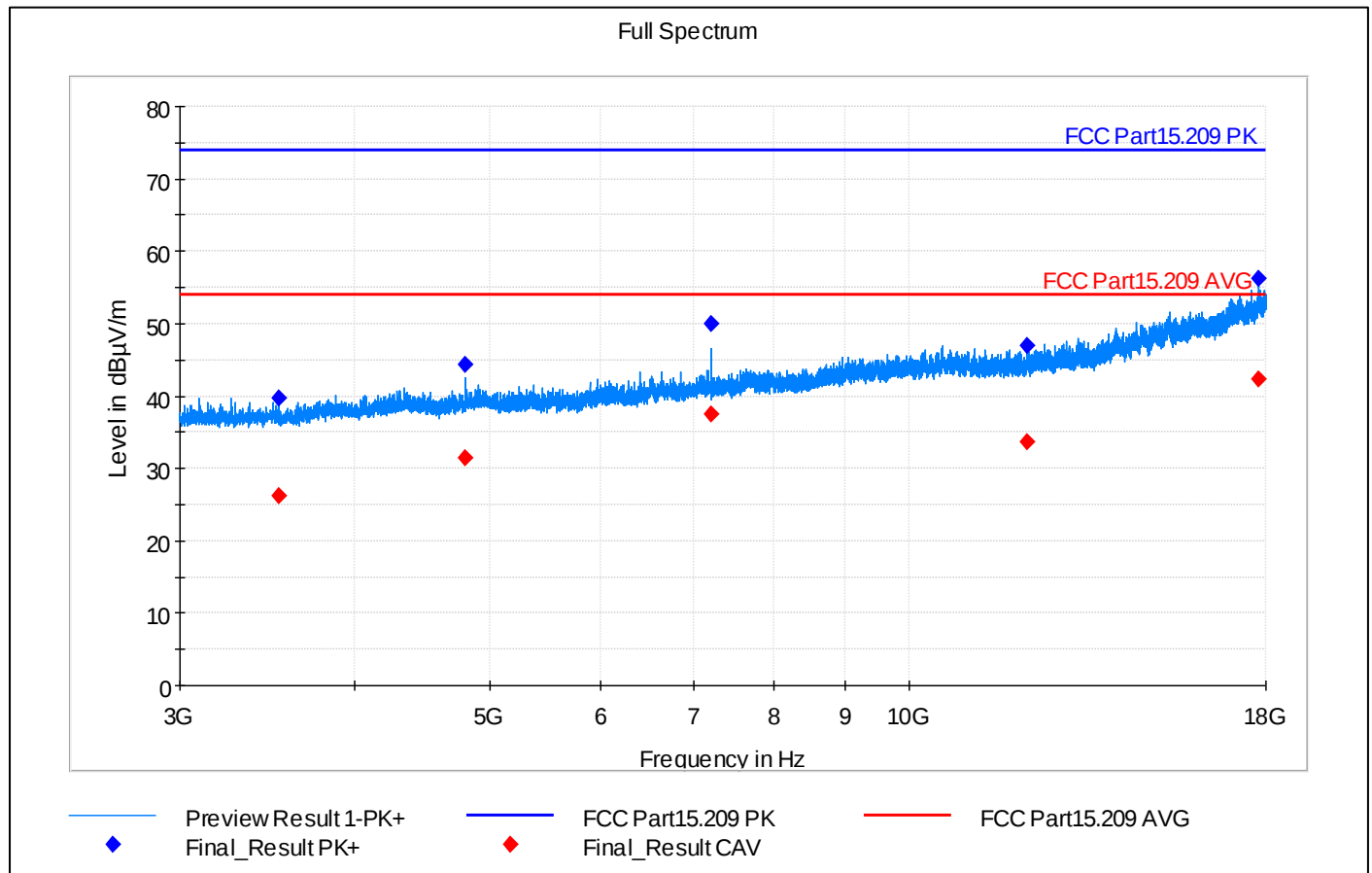
## Low channel, 1 – 3 GHz



**Note:** Frequencies 2401.950, 2426.200 and 2479.850 MHz are excluded from spurious domain measurements and ignored. See table below.

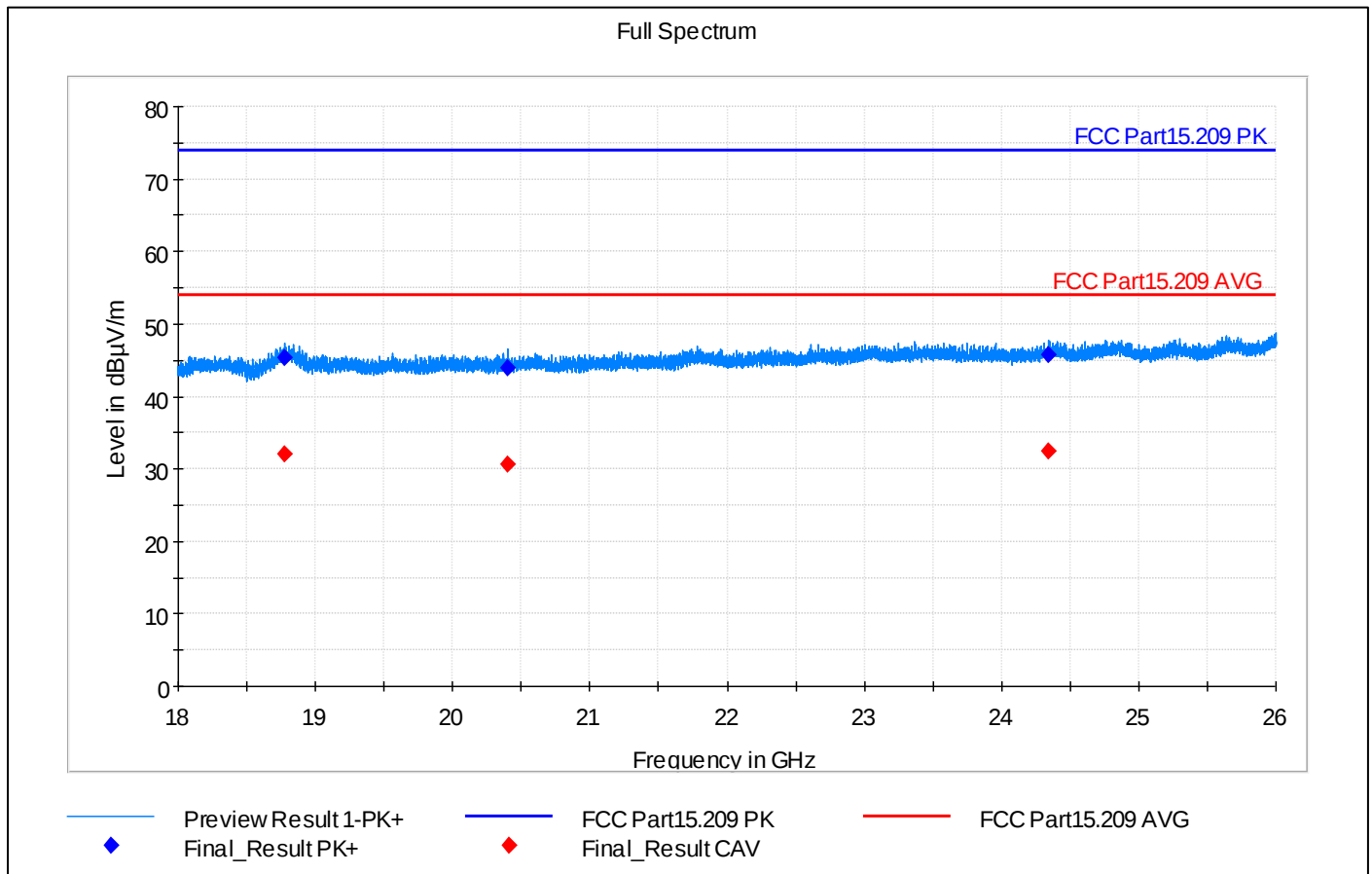
## Final\_Result

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment                        |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|--------------------------------|
| 2053.750000     | 49.94            | ---               | 74.00          | 24.06       | 15000.0         | 1000.000        | 331.0       | V   | 210.0         | 0.0             | 37.6         | PASS                           |
| 2053.750000     | ---              | 33.35             | 54.00          | 20.65       | 15000.0         | 1000.000        | 331.0       | V   | 210.0         | 0.0             | 37.6         | PASS                           |
| 2401.950000     | ---              | 88.15             | 54.00          | -34.15      | 15000.0         | 1000.000        | 134.0       | H   | 174.0         | 90.0            | 38.6         | TX signal                      |
| 2401.950000     | 93.74            | ---               | 74.00          | -19.74      | 15000.0         | 1000.000        | 134.0       | H   | 174.0         | 90.0            | 38.6         | TX signal                      |
| 2426.200000     | 66.15            | ---               | 74.00          | 7.85        | 15000.0         | 1000.000        | 157.0       | H   | -5.0          | 90.0            | 38.8         | nRF5340 BLE advertising signal |
| 2426.200000     | ---              | 35.53             | 54.00          | 18.47       | 15000.0         | 1000.000        | 157.0       | H   | -5.0          | 90.0            | 38.8         | nRF5340 BLE advertising signal |
| 2479.850000     | 63.13            | ---               | 74.00          | 10.87       | 15000.0         | 1000.000        | 291.0       | V   | 266.0         | 0.0             | 39.2         | nRF5340 BLE advertising signal |
| 2479.850000     | ---              | 35.80             | 54.00          | 18.20       | 15000.0         | 1000.000        | 291.0       | V   | 266.0         | 0.0             | 39.2         | nRF5340 BLE advertising signal |
| 2939.200000     | 54.68            | ---               | 74.00          | 19.32       | 15000.0         | 1000.000        | 383.0       | H   | 93.0          | 0.0             | 40.9         | PASS                           |
| 2939.200000     | ---              | 39.44             | 54.00          | 14.56       | 15000.0         | 1000.000        | 383.0       | H   | 93.0          | 0.0             | 40.9         | PASS                           |

**Low channel, 3 – 18 GHz**

**Final Result**

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 3528.500000     | 39.70            | ---               | 74.00          | 34.30       | 15000.0         | 1000.000        | 206.0       | V   | 29.0          | 90.0            | 6.0          | PASS    |
| 3528.500000     | ---              | 26.13             | 54.00          | 27.87       | 15000.0         | 1000.000        | 206.0       | V   | 29.0          | 90.0            | 6.0          | PASS    |
| 4804.250000     | 44.29            | ---               | 74.00          | 29.71       | 15000.0         | 1000.000        | 257.0       | H   | 229.0         | 90.0            | 10.0         | PASS    |
| 4804.250000     | ---              | 31.54             | 54.00          | 22.46       | 15000.0         | 1000.000        | 257.0       | H   | 229.0         | 90.0            | 10.0         | PASS    |
| 7205.250000     | 50.07            | ---               | 74.00          | 23.93       | 15000.0         | 1000.000        | 135.0       | H   | 317.0         | 90.0            | 14.9         | PASS    |
| 7205.250000     | ---              | 37.41             | 54.00          | 16.59       | 15000.0         | 1000.000        | 135.0       | H   | 317.0         | 90.0            | 14.9         | PASS    |
| 12132.500000    | ---              | 33.68             | 54.00          | 20.32       | 15000.0         | 1000.000        | 282.0       | H   | 109.0         | 0.0             | 22.9         | PASS    |
| 12132.500000    | 46.92            | ---               | 74.00          | 27.08       | 15000.0         | 1000.000        | 282.0       | H   | 109.0         | 0.0             | 22.9         | PASS    |
| 17779.250000    | 56.15            | ---               | 74.00          | 17.85       | 15000.0         | 1000.000        | 407.0       | V   | 129.0         | 0.0             | 38.1         | PASS    |
| 17779.250000    | ---              | 42.25             | 54.00          | 11.75       | 15000.0         | 1000.000        | 407.0       | V   | 129.0         | 0.0             | 38.1         | PASS    |

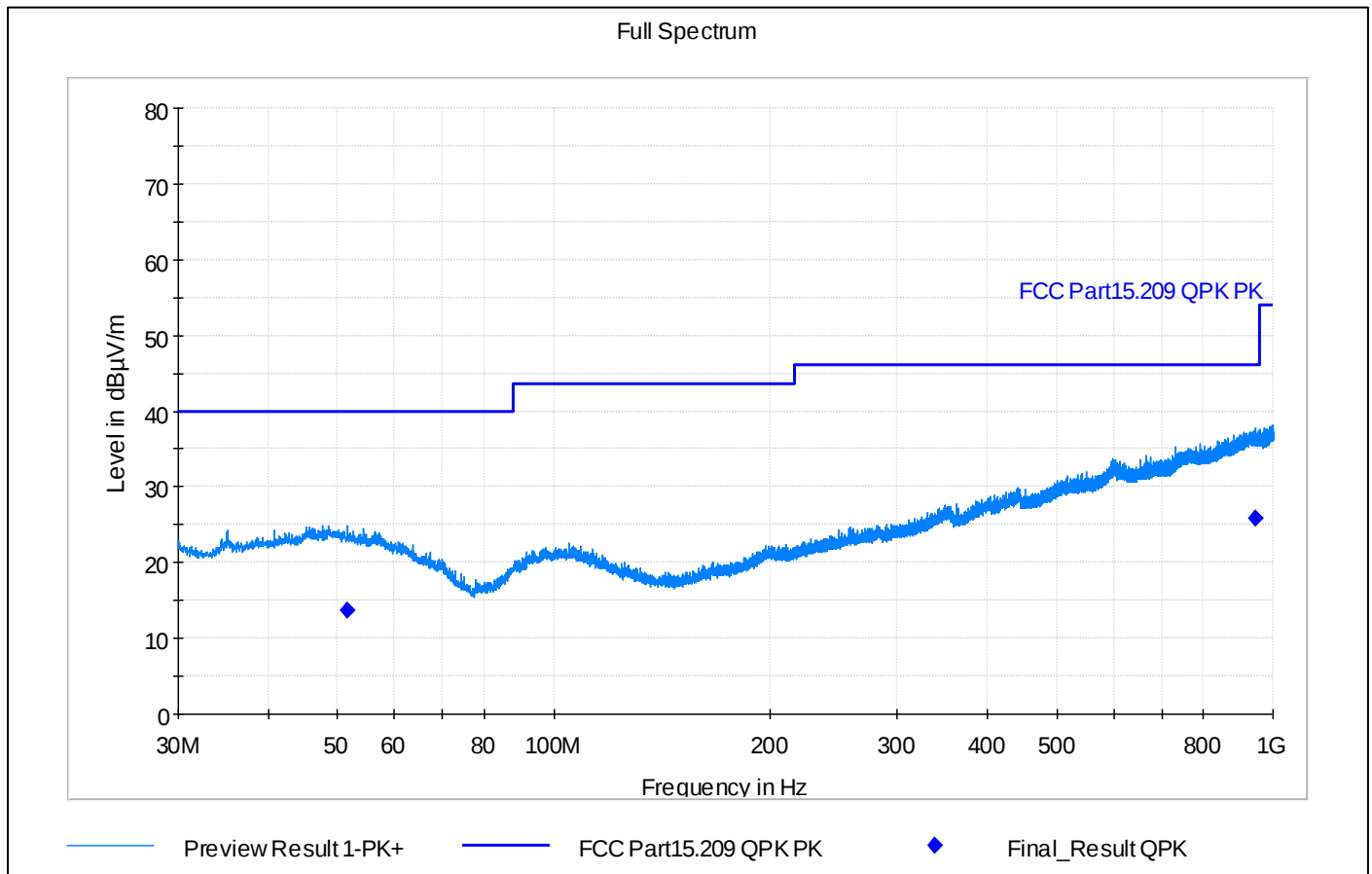
## Low channel, 18 – 26 GHz



## Final\_Result

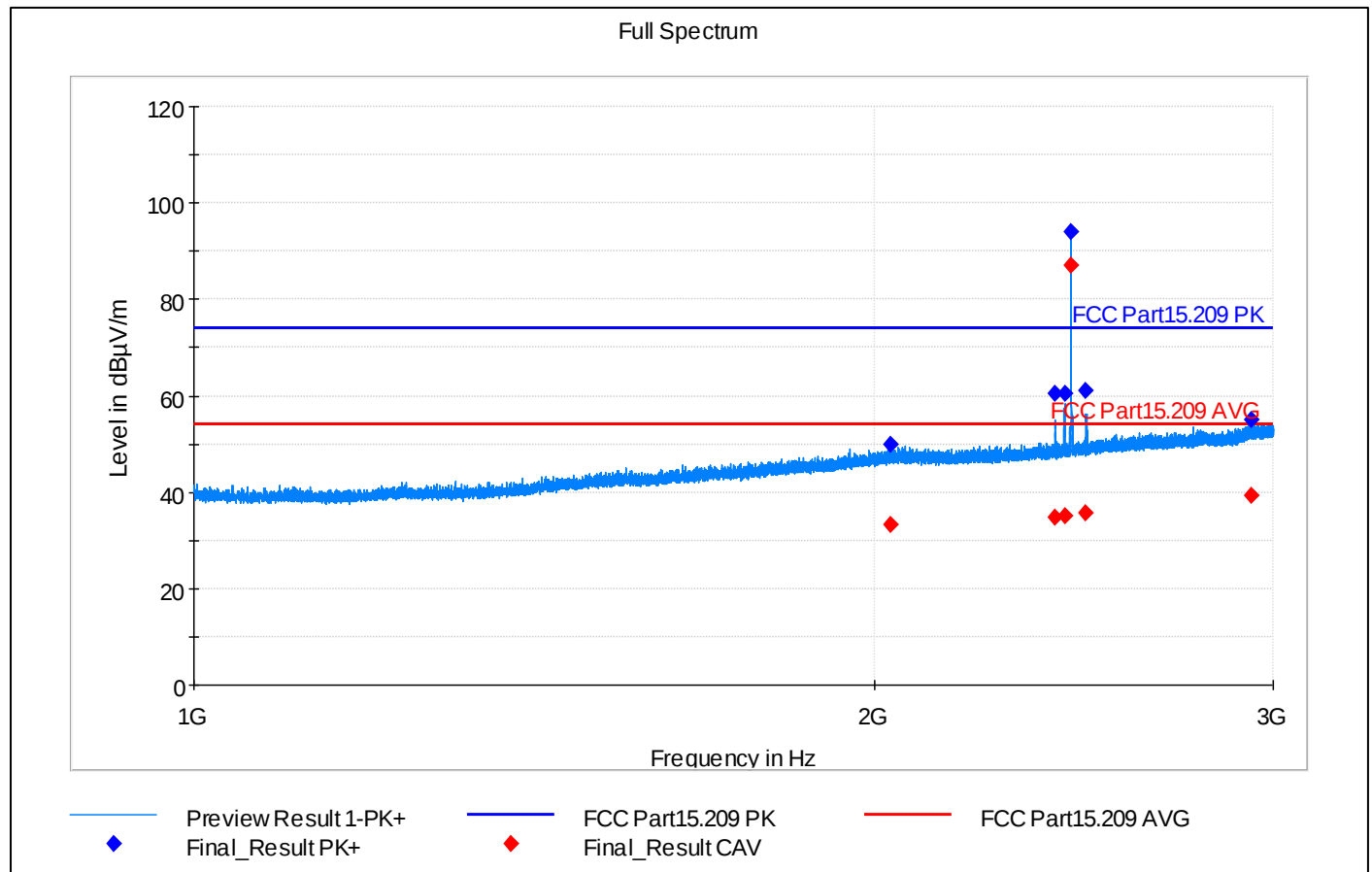
| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 18773.000000    | ---              | 32.10             | 54.00          | 21.90       | 3000.0          | 1000.000        | 182.0       | V   | 164.0         | 0.0             | 23.5         | PASS    |
| 18773.000000    | 45.34            | ---               | 74.00          | 28.66       | 3000.0          | 1000.000        | 182.0       | V   | 164.0         | 0.0             | 23.5         | PASS    |
| 20396.750000    | 43.86            | ---               | 74.00          | 30.14       | 3000.0          | 1000.000        | 407.0       | H   | 152.0         | 0.0             | 24.3         | PASS    |
| 20396.750000    | ---              | 30.64             | 54.00          | 23.36       | 3000.0          | 1000.000        | 407.0       | H   | 152.0         | 0.0             | 24.3         | PASS    |
| 24345.000000    | 45.81            | ---               | 74.00          | 28.19       | 3000.0          | 1000.000        | 186.0       | V   | 67.0          | 0.0             | 26.0         | PASS    |
| 24345.000000    | ---              | 32.52             | 54.00          | 21.48       | 3000.0          | 1000.000        | 186.0       | V   | 67.0          | 0.0             | 26.0         | PASS    |

## Mid channel, 30 MHz – 1 GHz



## Final\_Result

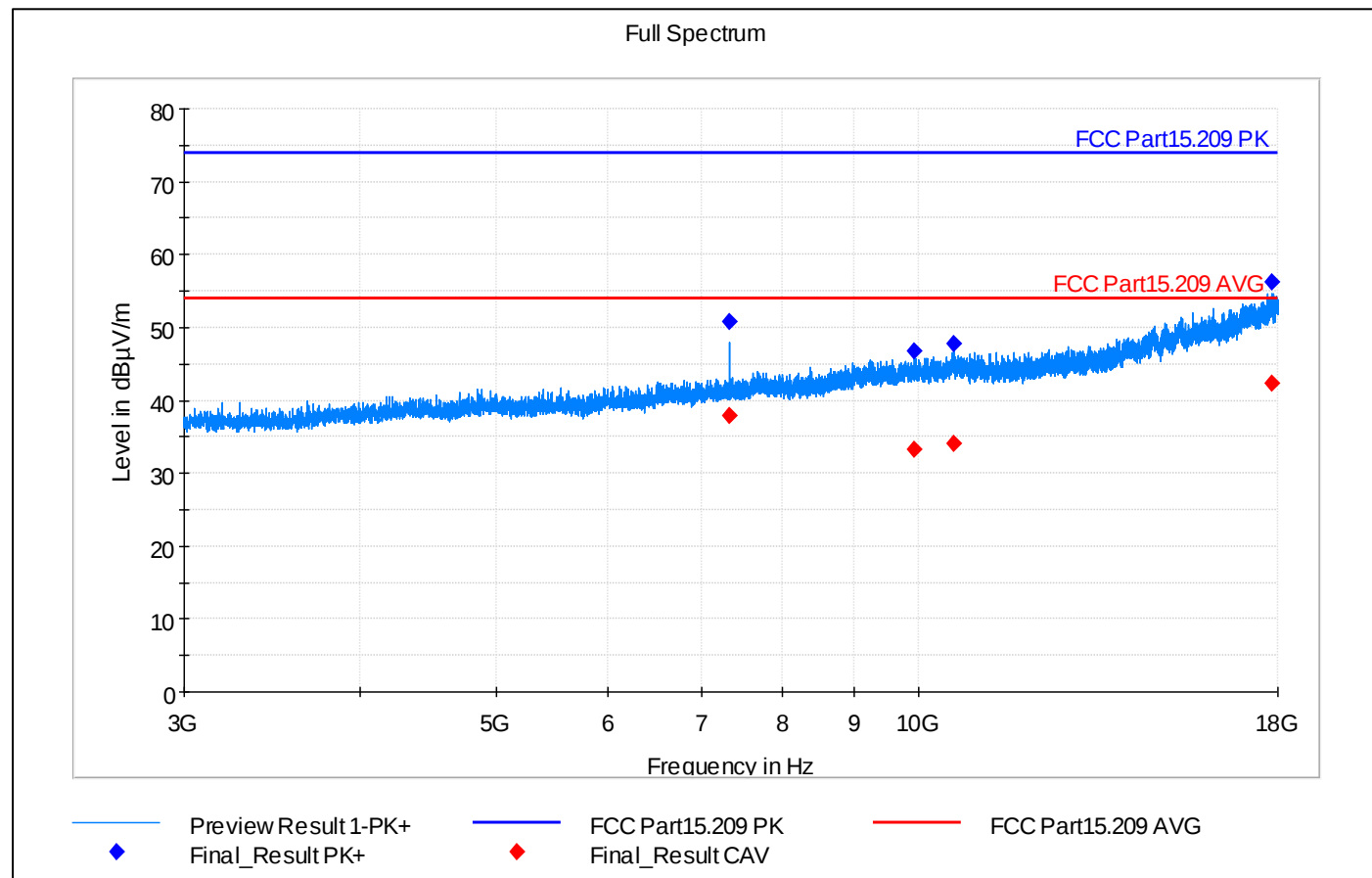
| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 51.570000       | 13.72              | 40.00          | 26.28       | 15000.0         | 120.000         | 337.0       | V   | -16.0         | 90.0            | 21.0         | PASS    |
| 946.560000      | 25.78              | 46.00          | 20.22       | 15000.0         | 120.000         | 190.0       | H   | 39.0          | 90.0            | 34.1         | PASS    |

**Mid channel, 1-3 GHz**


**Note:** Frequencies 2402.250, 2425.900, 2442.300 and 2479.800 MHz are excluded from spurious domain measurements and ignored. See table below.

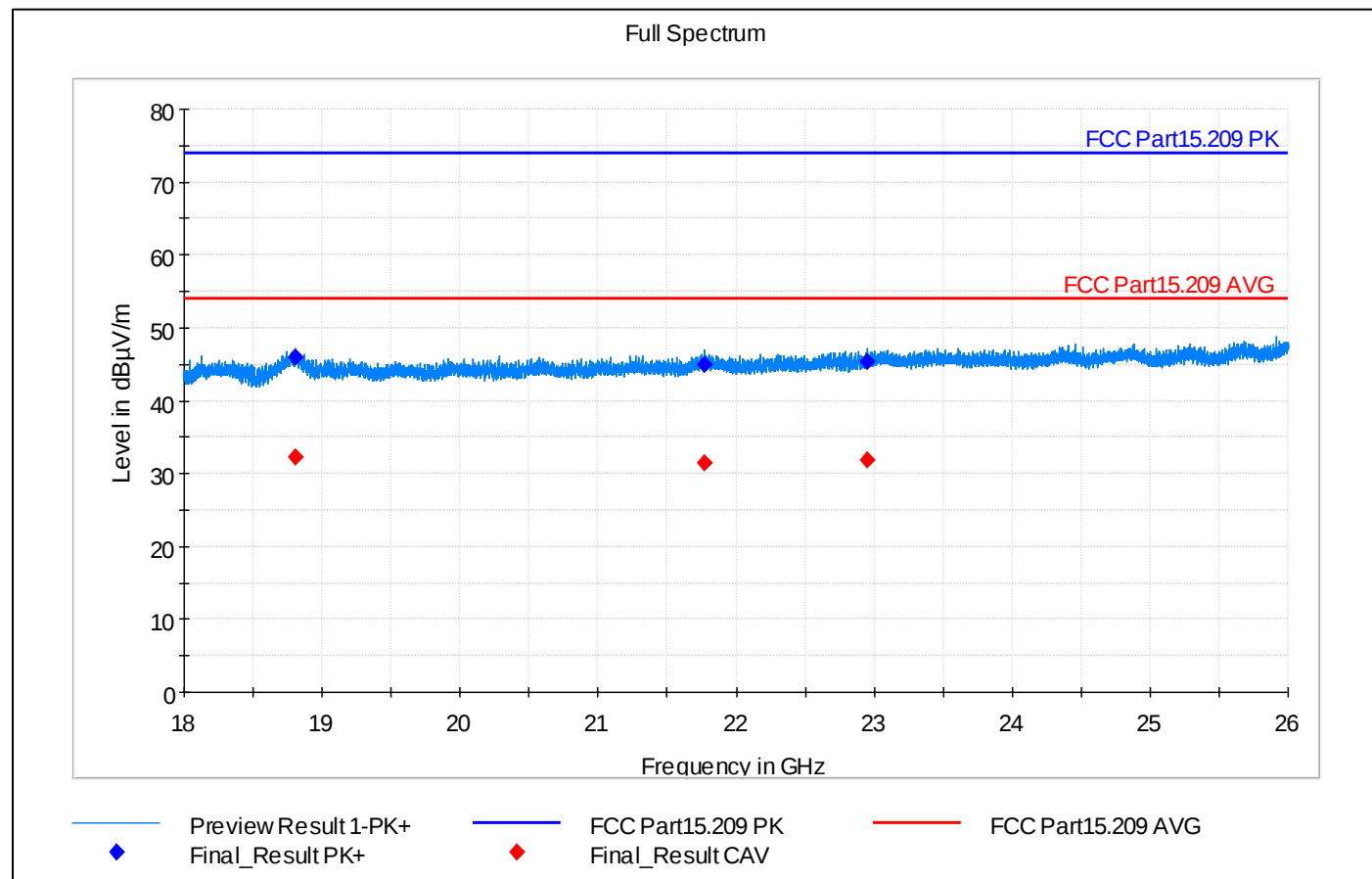
**Final\_Result**

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment                        |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|--------------------------------|
| 2032.800000     | 49.82            | ---               | 74.00          | 24.18       | 15000.0         | 1000.000        | 253.0       | H   | 193.0         | 90.0            | 37.6         | PASS                           |
| 2032.800000     | ---              | 33.17             | 54.00          | 20.83       | 15000.0         | 1000.000        | 253.0       | H   | 193.0         | 90.0            | 37.6         | PASS                           |
| 2402.250000     | 60.46            | ---               | 74.00          | 13.54       | 15000.0         | 1000.000        | 150.0       | H   | 326.0         | 0.0             | 38.6         | nRF5340 BLE advertising signal |
| 2402.250000     | ---              | 34.84             | 54.00          | 19.16       | 15000.0         | 1000.000        | 150.0       | H   | 326.0         | 0.0             | 38.6         | nRF5340 BLE advertising signal |
| 2425.900000     | 60.60            | ---               | 74.00          | 13.40       | 15000.0         | 1000.000        | 219.0       | V   | 208.0         | 0.0             | 38.8         | nRF5340 BLE advertising signal |
| 2425.900000     | ---              | 35.16             | 54.00          | 18.84       | 15000.0         | 1000.000        | 219.0       | V   | 208.0         | 0.0             | 38.8         | nRF5340 BLE advertising signal |
| 2442.300000     | 93.99            | ---               | 74.00          | -19.99      | 15000.0         | 1000.000        | 155.0       | H   | 183.0         | 90.0            | 38.9         | TX signal                      |
| 2442.300000     | ---              | 86.96             | 54.00          | -32.96      | 15000.0         | 1000.000        | 155.0       | H   | 183.0         | 90.0            | 38.9         | TX signal                      |
| 2479.800000     | ---              | 35.67             | 54.00          | 18.33       | 15000.0         | 1000.000        | 218.0       | V   | 323.0         | 0.0             | 39.2         | nRF5340 BLE advertising signal |
| 2479.800000     | 61.14            | ---               | 74.00          | 12.86       | 15000.0         | 1000.000        | 218.0       | V   | 323.0         | 0.0             | 39.2         | nRF5340 BLE advertising signal |
| 2935.750000     | ---              | 39.38             | 54.00          | 14.62       | 15000.0         | 1000.000        | 353.0       | H   | 36.0          | 90.0            | 40.9         | PASS                           |
| 2935.750000     | 55.05            | ---               | 74.00          | 18.95       | 15000.0         | 1000.000        | 353.0       | H   | 36.0          | 90.0            | 40.9         | PASS                           |

**Mid channel, 3–18 GHz**

**Final\_Result**

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 7326.750000     | 50.74            | ---               | 74.00          | 23.26       | 15000.0         | 1000.000        | 150.0       | H   | 313.0         | 90.0            | 15.2         | PASS    |
| 7326.750000     | ---              | 37.84             | 54.00          | 16.16       | 15000.0         | 1000.000        | 150.0       | H   | 313.0         | 90.0            | 15.2         | PASS    |
| 9931.750000     | ---              | 33.19             | 54.00          | 20.81       | 15000.0         | 1000.000        | 111.0       | H   | 46.0          | 90.0            | 20.0         | PASS    |
| 9931.750000     | 46.76            | ---               | 74.00          | 27.24       | 15000.0         | 1000.000        | 111.0       | H   | 46.0          | 90.0            | 20.0         | PASS    |
| 10578.750000    | 47.68            | ---               | 74.00          | 26.32       | 15000.0         | 1000.000        | 194.0       | V   | 62.0          | 0.0             | 21.6         | PASS    |
| 10578.750000    | ---              | 34.06             | 54.00          | 19.94       | 15000.0         | 1000.000        | 194.0       | V   | 62.0          | 0.0             | 21.6         | PASS    |
| 17839.000000    | ---              | 42.39             | 54.00          | 11.61       | 15000.0         | 1000.000        | 212.0       | V   | 22.0          | 90.0            | 38.5         | PASS    |
| 17839.000000    | 56.21            | ---               | 74.00          | 17.79       | 15000.0         | 1000.000        | 212.0       | V   | 22.0          | 90.0            | 38.5         | PASS    |

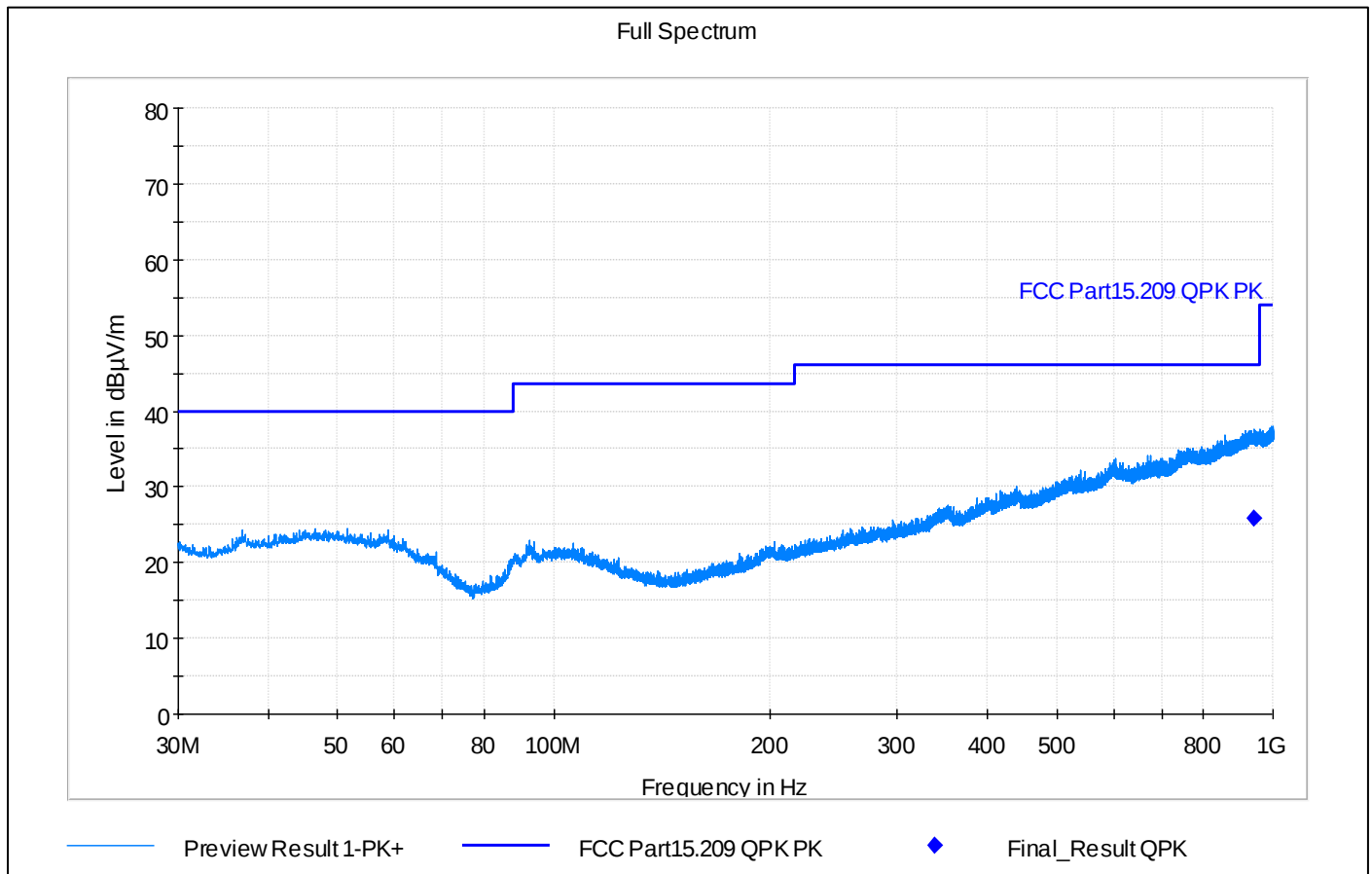
## Mid channel, 18–26 GHz



## Final\_Result

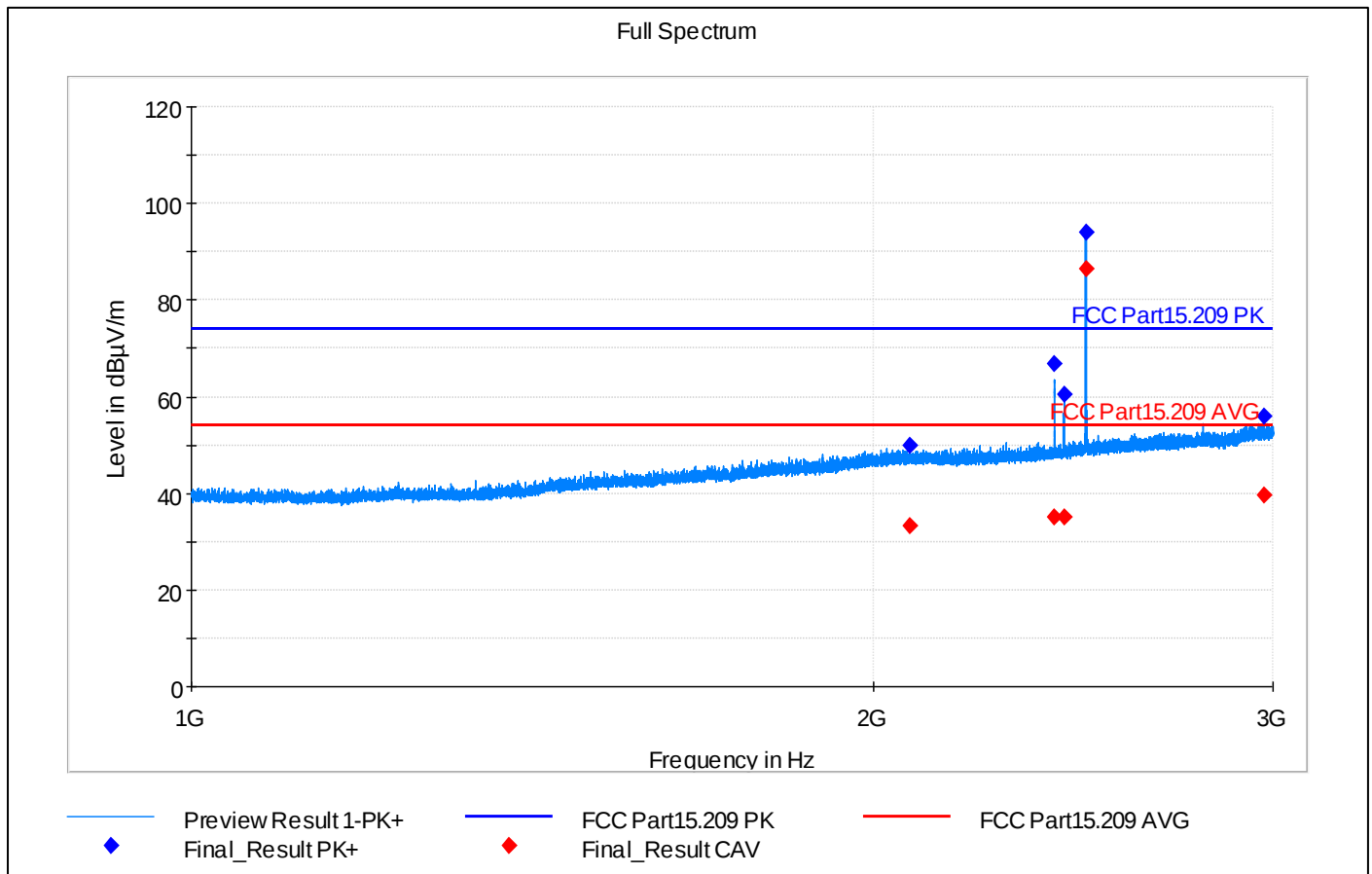
| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 18809.250000    | 45.91            | ---               | 74.00          | 28.09       | 3000.0          | 1000.000        | 381.0       | V   | 102.0         | 90.0            | 23.5         | PASS    |
| 18809.250000    | ---              | 32.18             | 54.00          | 21.82       | 3000.0          | 1000.000        | 381.0       | V   | 102.0         | 90.0            | 23.5         | PASS    |
| 21774.500000    | 45.02            | ---               | 74.00          | 28.98       | 3000.0          | 1000.000        | 182.0       | H   | 89.0          | 90.0            | 24.8         | PASS    |
| 21774.500000    | ---              | 31.45             | 54.00          | 22.55       | 3000.0          | 1000.000        | 182.0       | H   | 89.0          | 90.0            | 24.8         | PASS    |
| 22947.000000    | ---              | 31.81             | 54.00          | 22.19       | 3000.0          | 1000.000        | 111.0       | V   | 189.0         | 90.0            | 25.4         | PASS    |
| 22947.000000    | 45.37            | ---               | 74.00          | 28.63       | 3000.0          | 1000.000        | 111.0       | V   | 189.0         | 90.0            | 25.4         | PASS    |

## High channel, 30 MHz – 1 GHz



## Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 940.620000      | 25.91              | 46.00          | 20.09       | 15000.0         | 120.000         | 129.0       | H   | 63.0          | 90.0            | 34.1         | PASS    |

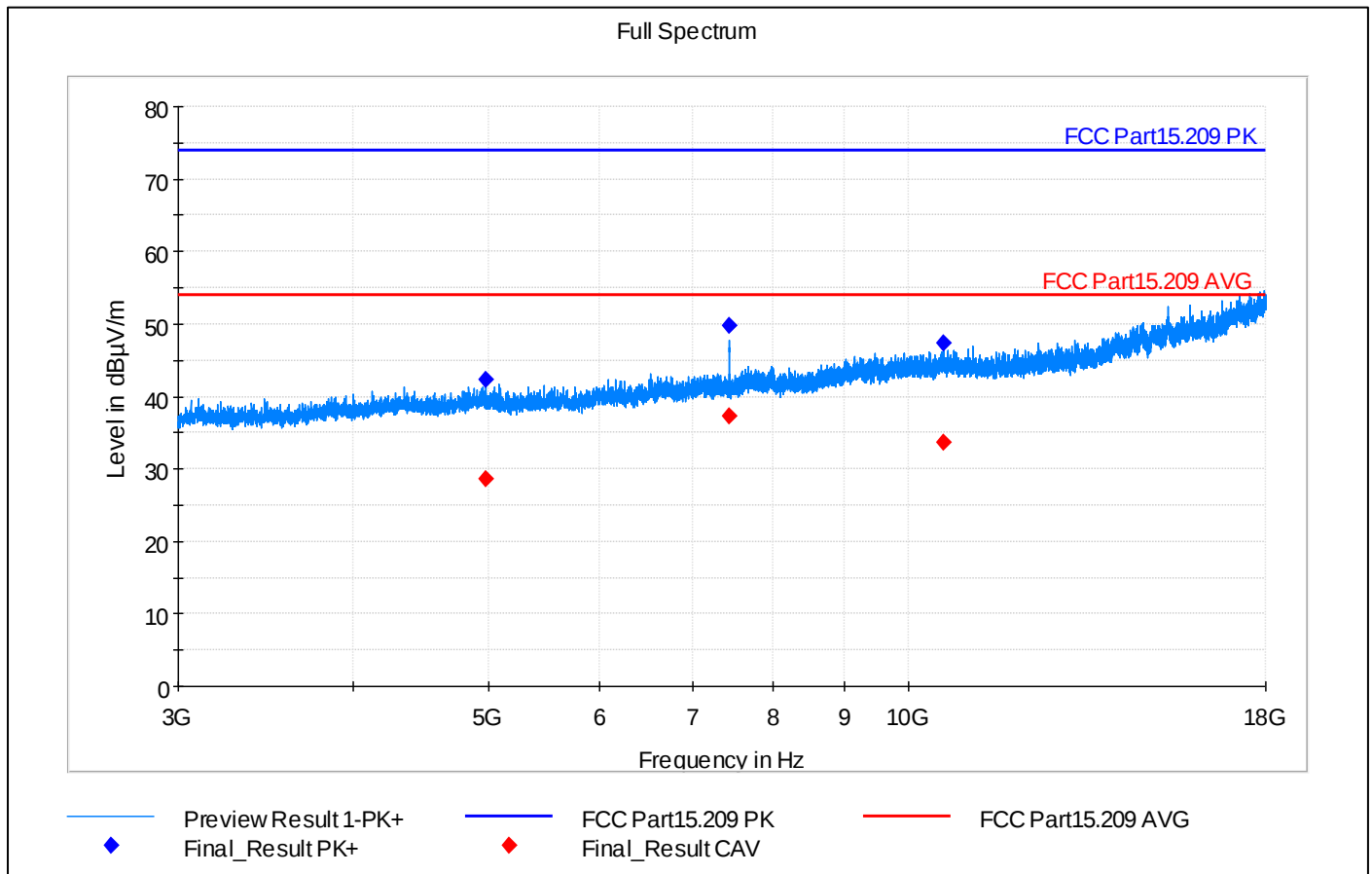
**High channel, 1 – 3 GHz**


**Note:** Frequencies 2402.300, 2425.950, 2480.300 MHz are excluded from spurious domain measurements and ignored. See table below.

**Final\_Result**

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment                        |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|--------------------------------|
| 2073.850000     | ---              | 33.35             | 54.00          | 20.65       | 15000.0         | 1000.000        | 113.0       | H   | 271.0         | 0.0             | 37.6         | PASS                           |
| 2073.850000     | 49.81            | ---               | 74.00          | 24.19       | 15000.0         | 1000.000        | 113.0       | H   | 271.0         | 0.0             | 37.6         | PASS                           |
| 2402.300000     | 66.82            | ---               | 74.00          | 7.18        | 15000.0         | 1000.000        | 137.0       | H   | 141.0         | 90.0            | 38.6         | nRF5340 BLE advertising signal |
| 2402.300000     | ---              | 35.18             | 54.00          | 18.82       | 15000.0         | 1000.000        | 137.0       | H   | 141.0         | 90.0            | 38.6         | nRF5340 BLE advertising signal |
| 2425.950000     | 60.39            | ---               | 74.00          | 13.61       | 15000.0         | 1000.000        | 187.0       | V   | 207.0         | 0.0             | 38.8         | nRF5340 BLE advertising signal |
| 2425.950000     | ---              | 35.19             | 54.00          | 18.81       | 15000.0         | 1000.000        | 187.0       | V   | 207.0         | 0.0             | 38.8         | nRF5340 BLE advertising signal |
| 2480.300000     | ---              | 86.60             | 54.00          | -32.60      | 15000.0         | 1000.000        | 152.0       | H   | 177.0         | 90.0            | 39.2         | TX signal                      |
| 2480.300000     | 94.06            | ---               | 74.00          | -20.06      | 15000.0         | 1000.000        | 152.0       | H   | 177.0         | 90.0            | 39.2         | TX signal                      |
| 2972.400000     | ---              | 39.52             | 54.00          | 14.48       | 15000.0         | 1000.000        | 272.0       | H   | 260.0         | 90.0            | 41.3         | PASS                           |
| 2972.400000     | 55.87            | ---               | 74.00          | 18.13       | 15000.0         | 1000.000        | 272.0       | H   | 260.0         | 90.0            | 41.3         | PASS                           |

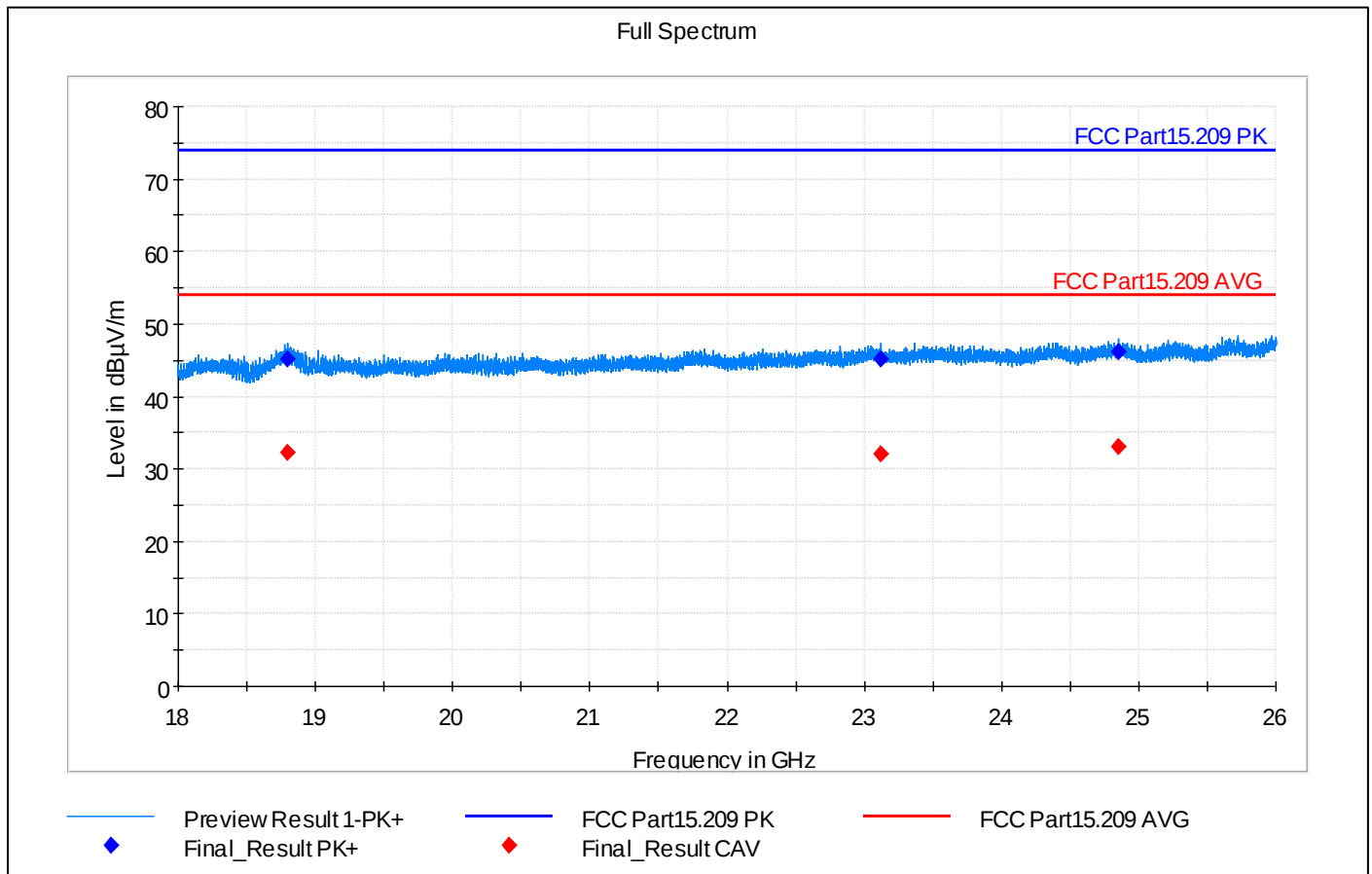
## High channel, 3 – 18 GHz



## Final\_Result

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 4982.000000     | 42.25            | ---               | 74.00          | 31.75       | 15000.0         | 1000.000        | 309.0       | V   | 340.0         | 0.0             | 10.1         | PASS    |
| 4982.000000     | ---              | 28.51             | 54.00          | 25.49       | 15000.0         | 1000.000        | 309.0       | V   | 340.0         | 0.0             | 10.1         | PASS    |
| 7439.250000     | 49.78            | ---               | 74.00          | 24.22       | 15000.0         | 1000.000        | 234.0       | H   | 321.0         | 90.0            | 15.1         | PASS    |
| 7439.250000     | ---              | 37.24             | 54.00          | 16.76       | 15000.0         | 1000.000        | 234.0       | H   | 321.0         | 90.0            | 15.1         | PASS    |
| 10597.000000    | ---              | 33.65             | 54.00          | 20.35       | 15000.0         | 1000.000        | 112.0       | H   | 180.0         | 0.0             | 21.7         | PASS    |
| 10597.000000    | 47.31            | ---               | 74.00          | 26.69       | 15000.0         | 1000.000        | 112.0       | H   | 180.0         | 0.0             | 21.7         | PASS    |

## High channel, 18 – 26 GHz



## Final\_Result

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 18799.000000    | 45.23            | ---               | 74.00          | 28.77       | 3000.0          | 1000.000        | 339.0       | V   | 303.0         | 90.0            | 23.5         | PASS    |
| 18799.000000    | ---              | 32.15             | 54.00          | 21.85       | 3000.0          | 1000.000        | 339.0       | V   | 303.0         | 90.0            | 23.5         | PASS    |
| 23119.750000    | ---              | 31.96             | 54.00          | 22.04       | 3000.0          | 1000.000        | 270.0       | V   | 22.0          | 90.0            | 25.6         | PASS    |
| 23119.750000    | 45.13            | ---               | 74.00          | 28.87       | 3000.0          | 1000.000        | 270.0       | V   | 22.0          | 90.0            | 25.6         | PASS    |
| 24848.000000    | 46.11            | ---               | 74.00          | 27.89       | 3000.0          | 1000.000        | 224.0       | H   | -9.0          | 90.0            | 26.6         | PASS    |
| 24848.000000    | ---              | 33.00             | 54.00          | 21.00       | 3000.0          | 1000.000        | 224.0       | H   | -9.0          | 90.0            | 26.6         | PASS    |

## 18. Receiver spurious emissions, radiated

Reference: ISED RSS-247, Issue 3 (section 3.1)

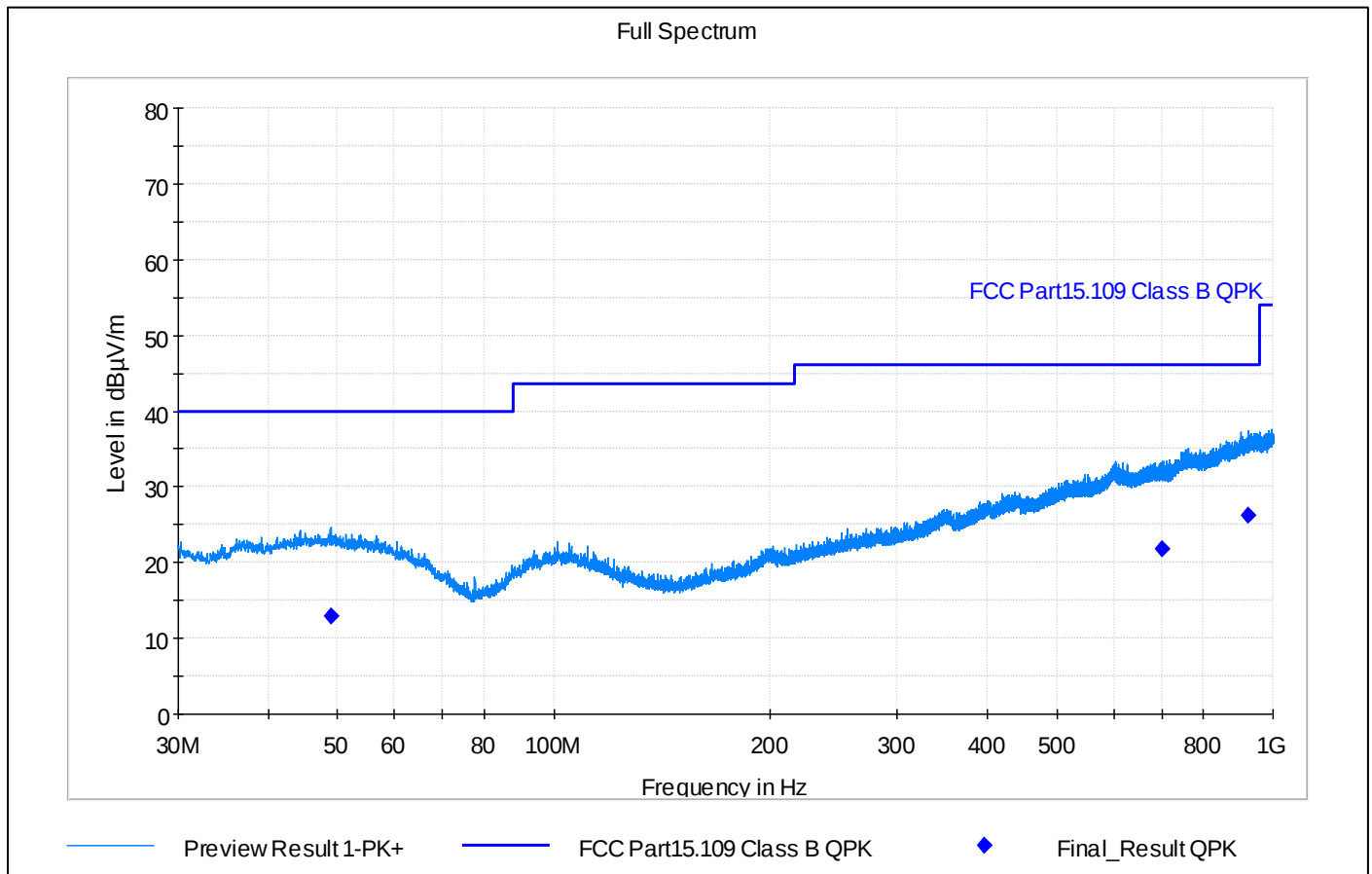
Test method: ANSI C63.4-2014 (8.1 – 8.3)

| Limits          |            |                       |                          |
|-----------------|------------|-----------------------|--------------------------|
| Frequency (MHz) | Detector   | Field strength (uV/m) | Measurement distance (m) |
| 30 – 88         | Quasi-Peak | 100                   | 3                        |
| 88 - 216        | Quasi-Peak | 150                   | 3                        |
| 216 - 960       | Quasi-Peak | 200                   | 3                        |
| 960 - 1000      | Quasi-Peak | 500                   | 3                        |
| > 1000          | Average    | 500                   | 3                        |

| Test procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. EUT is placed on a non conducting support at the center of a turn table 0.8m above the ground</li> <li>2. EUT set to test mode</li> <li>3. The receiver is set to peak detection with max hold</li> <li>4. The EUT is rotated through 360 degrees (orientation varied), measurements were made in both horizontal and vertical planes of polarization</li> <li>5. Found peak values were further maximized by adjusting turntable position <math>\pm 22,5</math> degrees around detected value and scanning the antenna height 1 to 4m</li> <li>6. For maximized values, final measurement was done with the corresponding final detector.</li> </ol> |

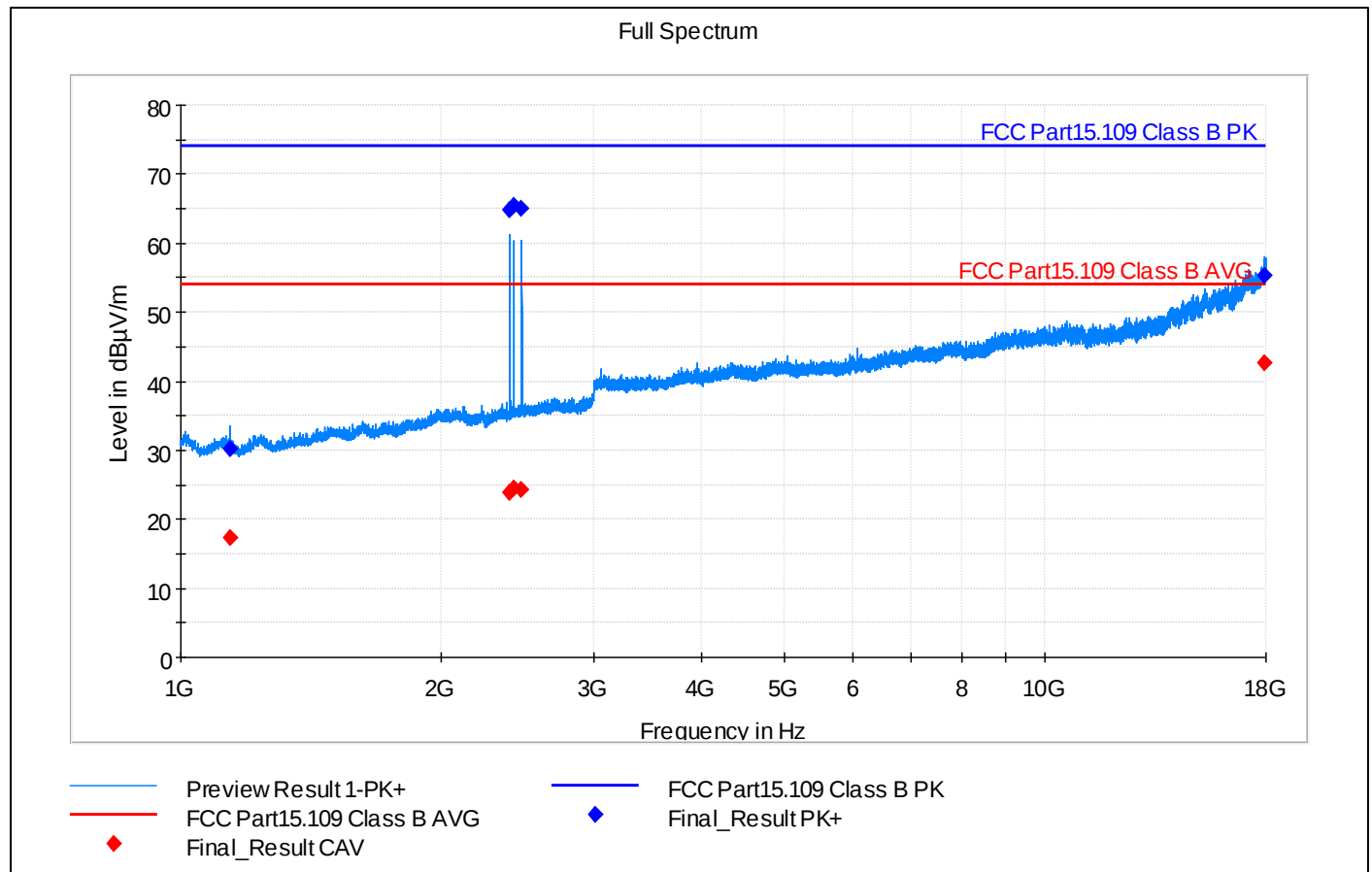
| Operation mode(s) | Configuration         | Test Verdict |
|-------------------|-----------------------|--------------|
| Bluetooth LE RX   | Mid channel, 2442 MHz | PASS         |

## Mid channel, 30 MHz – 1 GHz



## Final\_Result

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|--------------|---------|
| 48.870000       | 12.84              | 40.00          | 27.16       | 15000.0         | 120.000         | 364.0       | V   | 282.0         | 0.0             | 21.1         | PASS    |
| 700.470000      | 21.77              | 46.00          | 24.23       | 15000.0         | 120.000         | 178.0       | V   | 71.0          | 0.0             | 30.6         | PASS    |
| 925.380000      | 26.14              | 46.00          | 19.86       | 15000.0         | 120.000         | 301.0       | V   | 90.0          | 0.0             | 34.0         | PASS    |

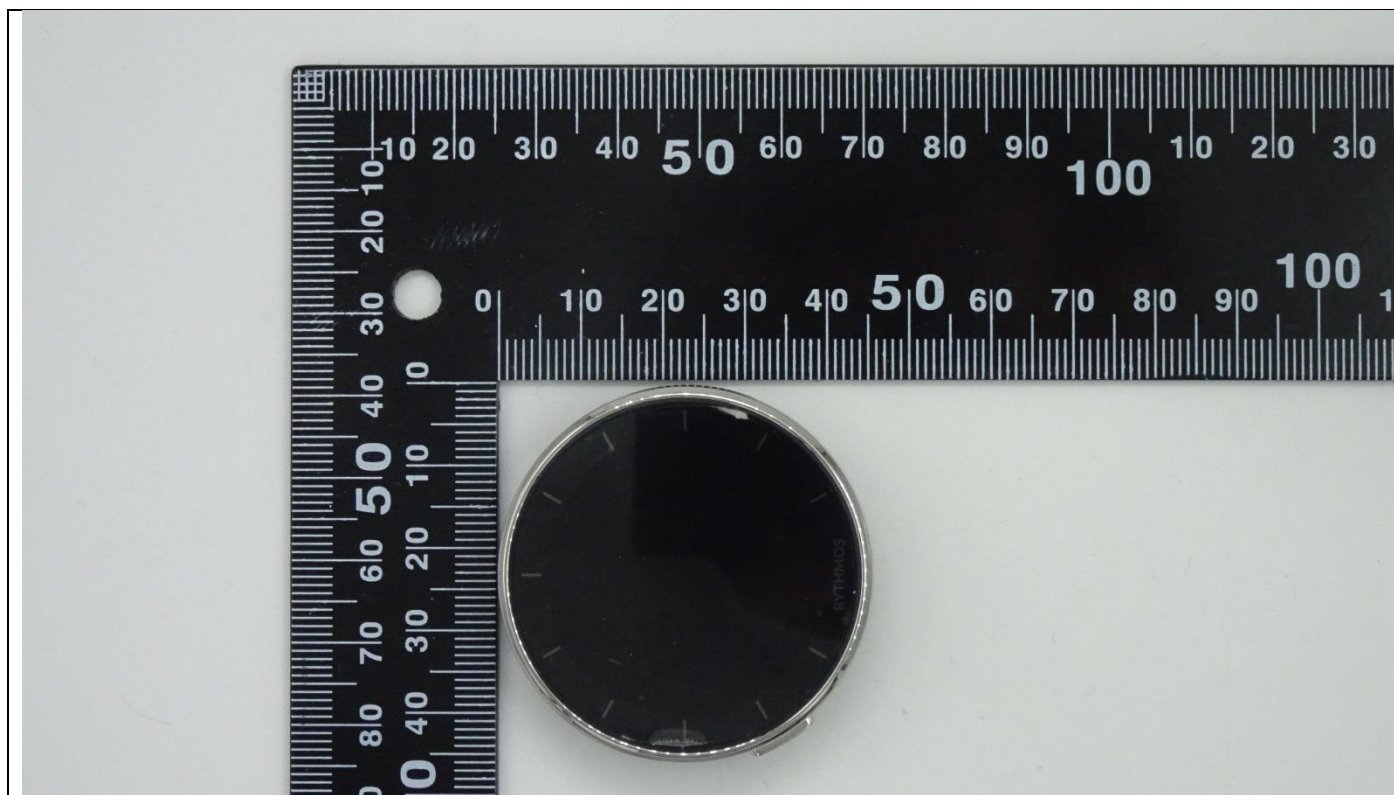
**Mid channel, 1 – 18 GHz**


**Note:** Frequencies 2401.750, 2426.250, 2479.750 MHz are excluded from spurious domain measurements and ignored. See table below.

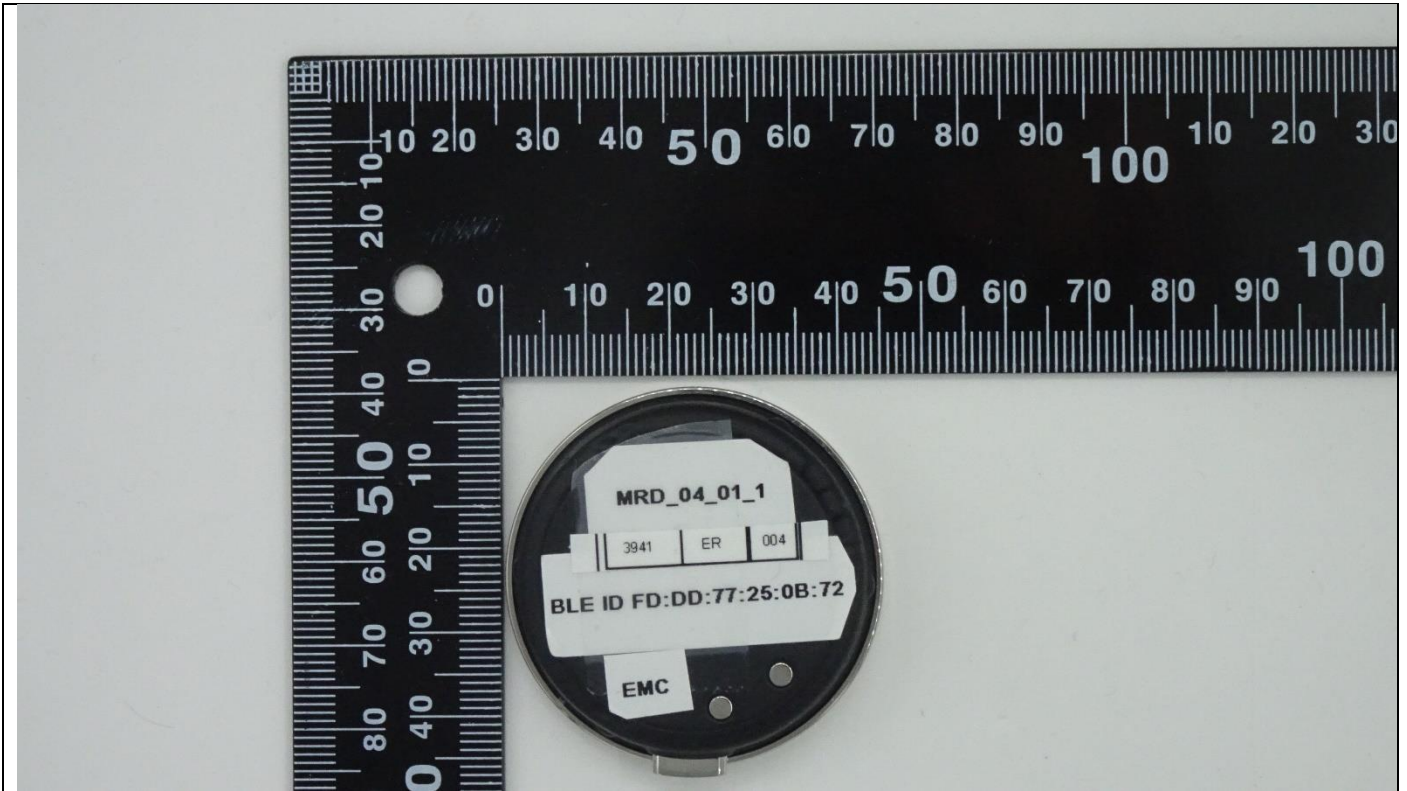
**Final\_Result**

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment                    |
|-----------------|------------------|-------------------|----------------|-------------|------------|-----------------|-------------|-----|---------------|--------------|----------------------------|
| 1141.250000     | ---              | 17.37             | 54.00          | 36.63       | 500.0      | 1000.000        | 172.0       | H   | 247.0         | -7.9         | PASS                       |
| 1141.250000     | 30.18            | ---               | 74.00          | 43.82       | 500.0      | 1000.000        | 172.0       | H   | 247.0         | -7.9         | PASS                       |
| 2401.750000     | 64.79            | ---               | 74.00          | 9.21        | 500.0      | 1000.000        | 340.0       | H   | 46.0          | 0.1          | Wirepas advertising signal |
| 2401.750000     | ---              | 23.94             | 54.00          | 30.06       | 500.0      | 1000.000        | 340.0       | H   | 46.0          | 0.1          | Wirepas advertising signal |
| 2426.250000     | ---              | 24.50             | 54.00          | 29.50       | 500.0      | 1000.000        | 328.0       | H   | 33.0          | 0.2          | Wirepas advertising signal |
| 2426.250000     | 65.41            | ---               | 74.00          | 8.59        | 500.0      | 1000.000        | 328.0       | H   | 33.0          | 0.2          | Wirepas advertising signal |
| 2479.750000     | ---              | 24.30             | 54.00          | 29.70       | 500.0      | 1000.000        | 316.0       | H   | 225.0         | 0.4          | Wirepas advertising signal |
| 2479.750000     | 65.01            | ---               | 74.00          | 8.99        | 500.0      | 1000.000        | 316.0       | H   | 225.0         | 0.4          | Wirepas advertising signal |
| 17964.000000    | 55.33            | ---               | 74.00          | 18.67       | 500.0      | 1000.000        | 370.0       | H   | 105.0         | 39.1         | PASS                       |
| 17964.000000    | ---              | 42.67             | 54.00          | 11.33       | 500.0      | 1000.000        | 370.0       | H   | 105.0         | 39.1         | PASS                       |

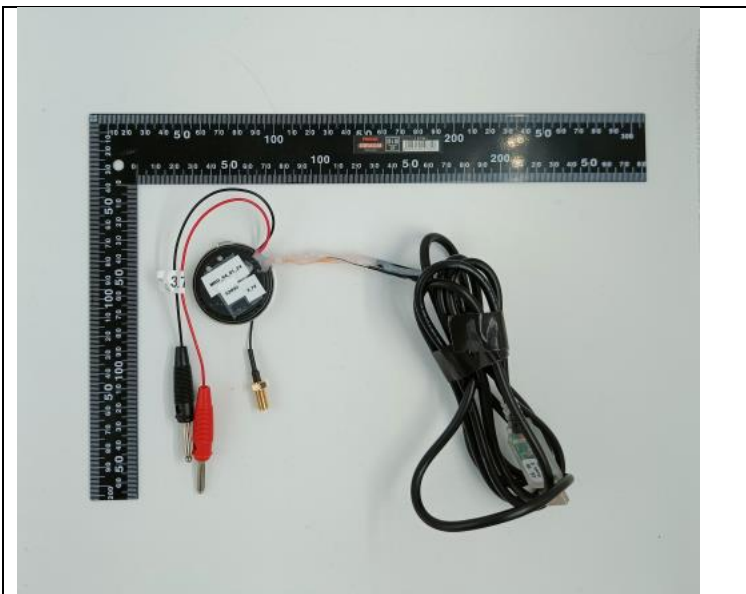
## 19. Photographs – Equipment External



*Picture 1, EUT Top view*

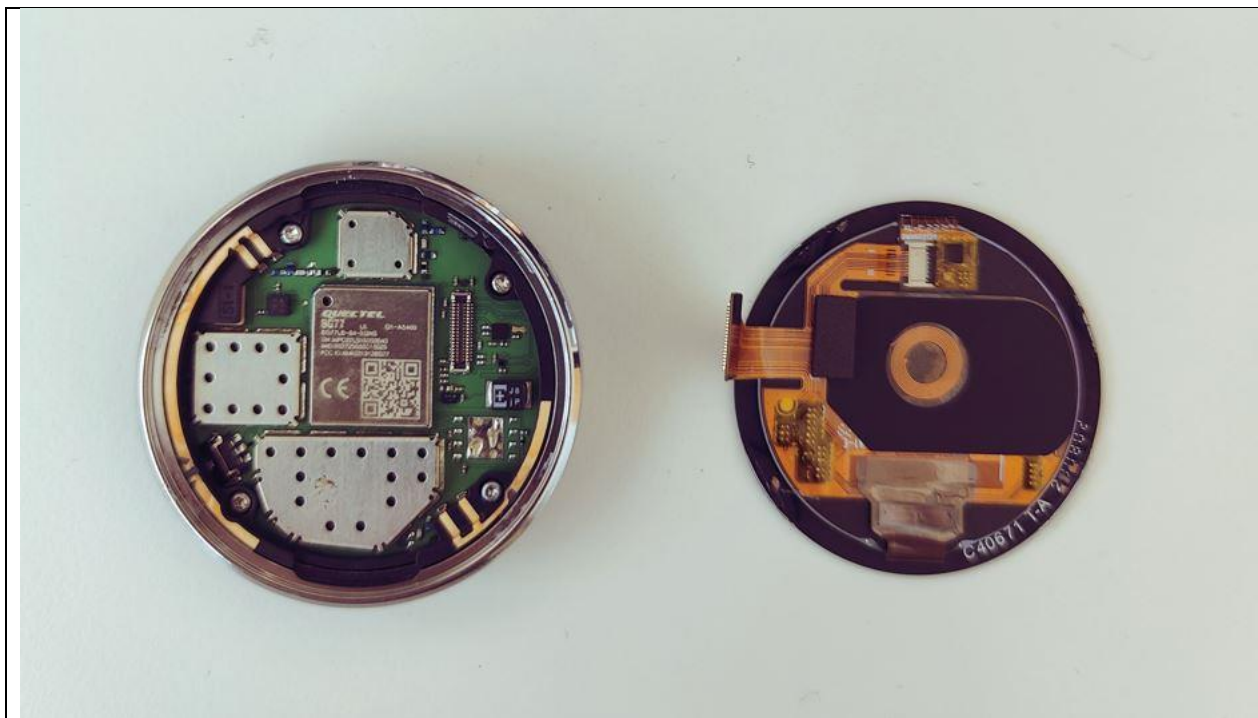


*Picture 2, EUT Bottom view*

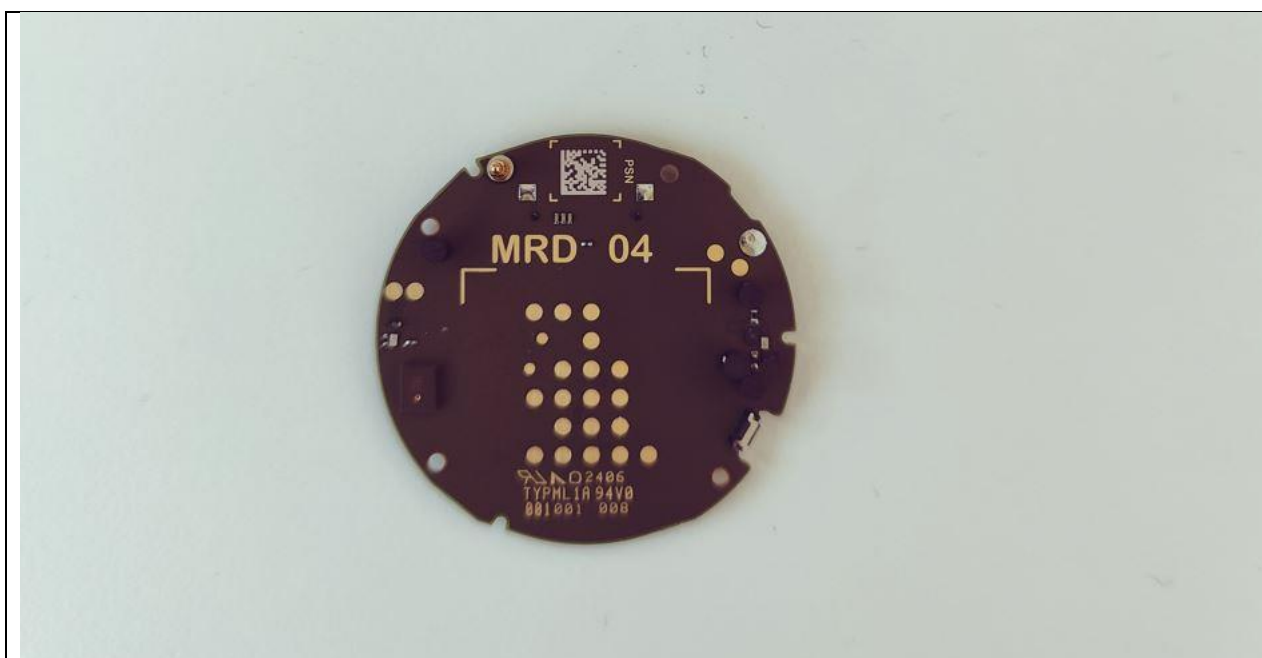


*Picture 3, Conducted RF EUT with auxiliary equipment*

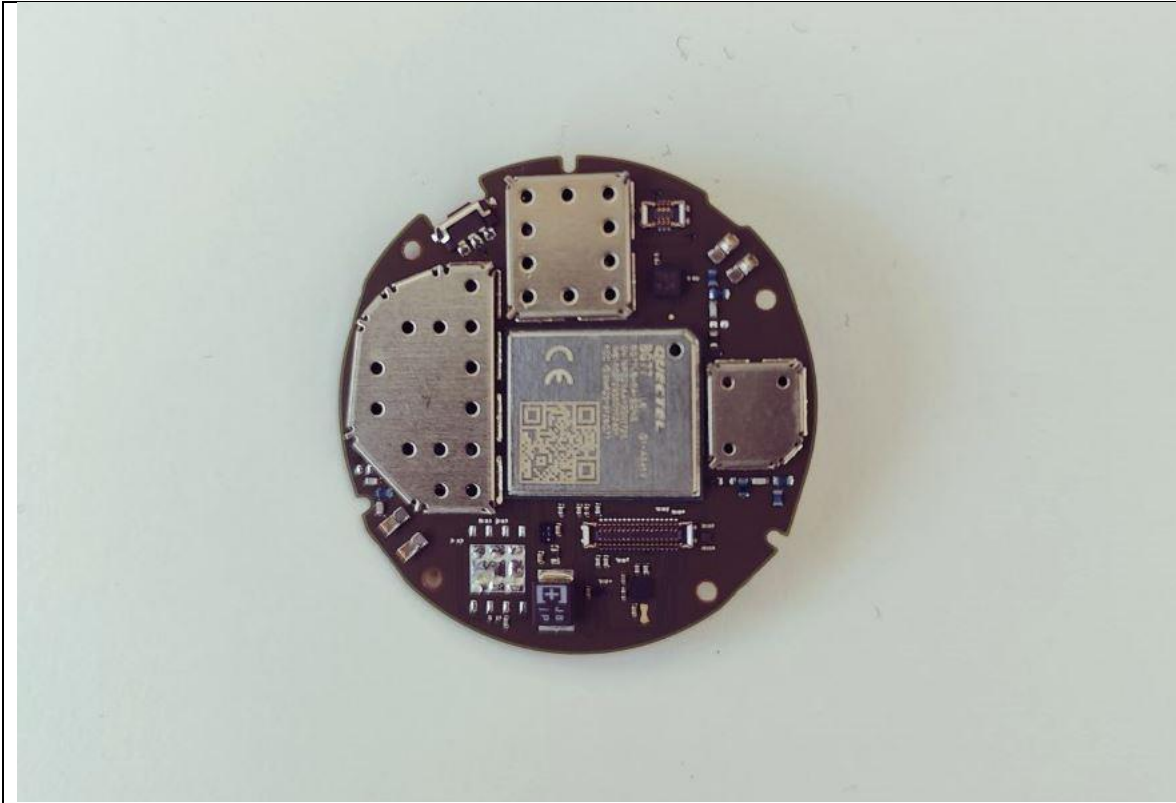
## 20. Photographs – Equipment Internal



Picture 4, EUT with open cover



Picture 5, EUT MRD\_04U bottom



*Picture 6, EUT MRD\_04U top*

## 21. Photographs – Test Setups



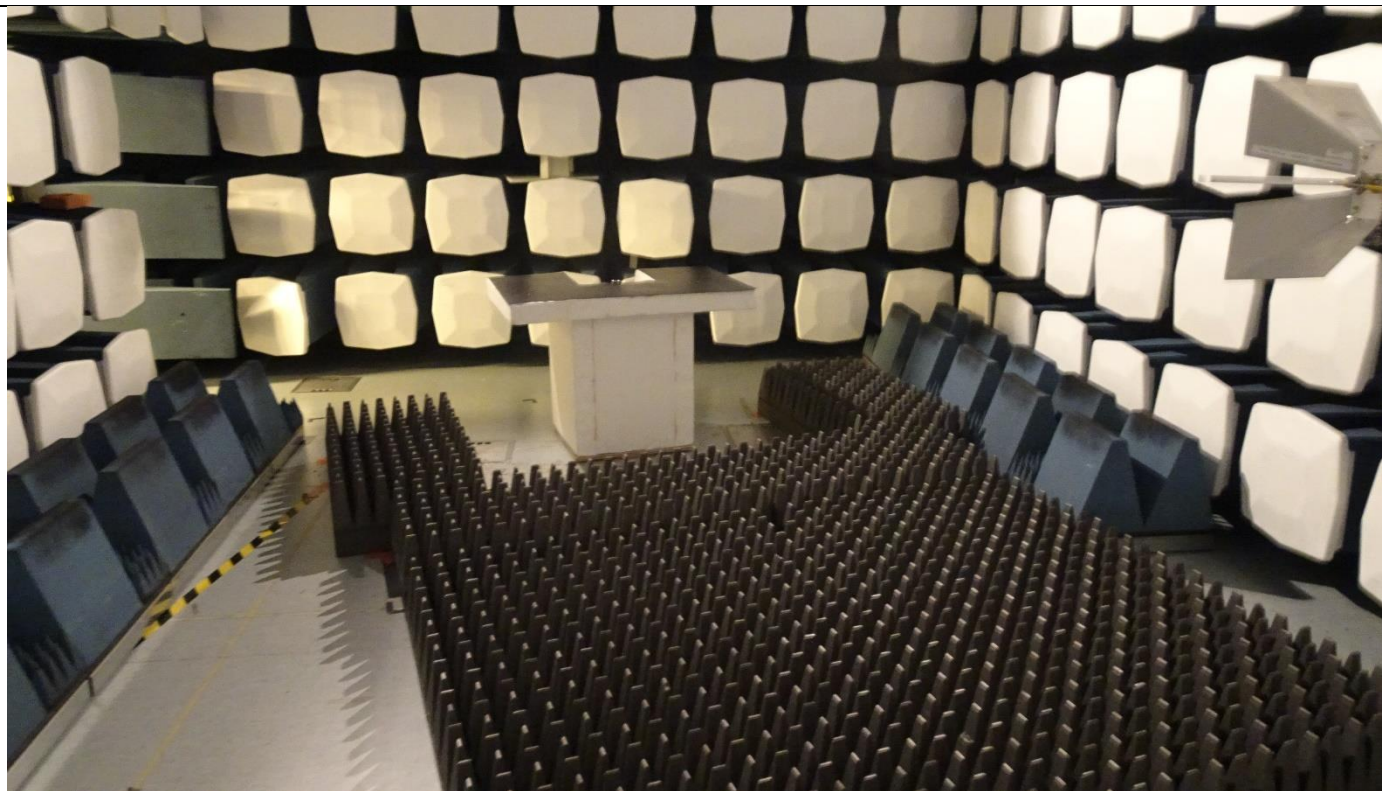
*Picture 7, AC Power Line Conducted Emissions*



*Picture 8, Radiated Spurious Emissions, common setup, TX and RX 30 - 1000 MHz*



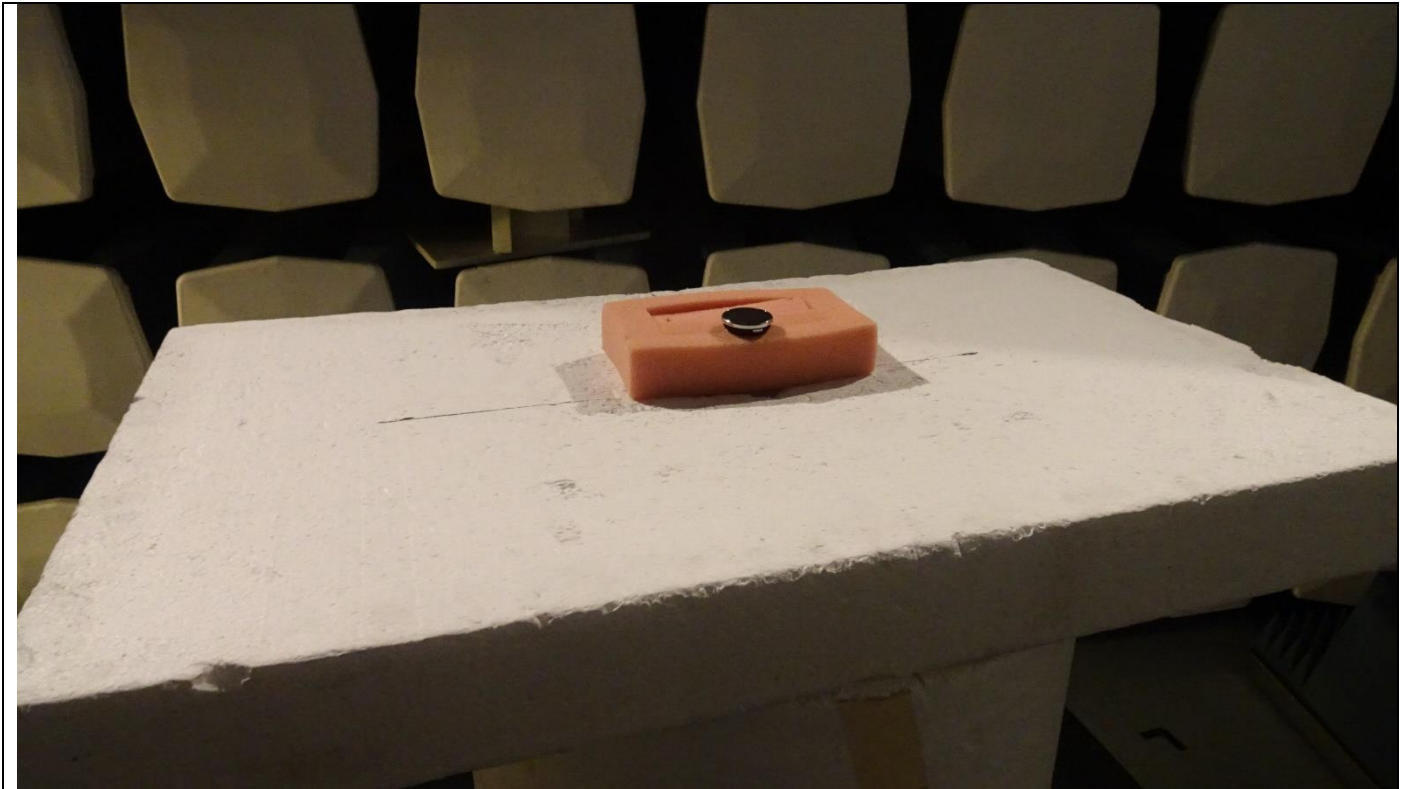
*Picture 9, Radiated Spurious Emissions, common setup, TX, 1 - 26 GHz*



*Picture 10, Radiated Spurious Emissions, common setup, RX, 1 – 18 MHz*



*Picture 11, Radiated Spurious Emissions, EUT setup, TX and RX 30 – 1000 MHz*



*Picture 12, Radiated Spurious Emissions, EUT setup, TX 1 – 26 GHz*



*Picture 13, Radiated Spurious Emissions, EUT setup, RX 1 – 12,75 GHz*