



# Test Report

**For:**  
Visteon Corporation

**Brand:**  
Visteon

**Marketing Name:**  
Battery Pack Control Module

**Model Name:**  
BPCMSW

**Product Description:**  
Battery Pack Control Module

**FCC ID:** NT8-BPCMSW  
**IC:** 3043A-BPCMSW

**Applied Rules and Standards:**  
47 CFR Part 15.247 (DTS)  
RSS-247 Issue 3 (DTS) & RSS-Gen Issue 5

**REPORT #:** EMC\_VISTE\_002\_23001\_BPCMSW\_FCC15247\_DTS\_Rev1

**DATE:** 2024-11-22



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3462B  
CABID: US0187

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## 1 **Assessment**

The following device was evaluated against the applicable criteria specified in

- FCC rules Parts 15.247 of Title 47 of the Code of Federal Regulations and
- ISED Canada standard RSS-247 Issue 3.

No deviations were ascertained.

| Company             | Description                 | Model # |
|---------------------|-----------------------------|---------|
| Visteon Corporation | Battery Pack Control Module | BPCMSW  |

### Responsible for the Report:

| 2024-11-22 | Compliance | Guangcheng Huang<br>(Senior EMC Test Engineer) |           |
|------------|------------|--|-----------|
| Date       | Section    | Name   | Signature |

The test results of this test report relate exclusively to the test item specified in Section3.  
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

## 2 Administrative Data

### 2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

|                         |                        |
|-------------------------|------------------------|
| <b>Company Name:</b>    | CETECOM Inc.           |
| <b>Department:</b>      | Compliance             |
| <b>Street Address:</b>  | 411 Dixon Landing Road |
| <b>City/Zip Code</b>    | Milpitas, CA 95035     |
| <b>Country</b>          | USA                    |
| <b>Telephone:</b>       | +1 (408) 586 6200      |
| <b>Fax:</b>             | +1 (408) 586 6299      |
| <b>EMC Lab Manager:</b> | Alvin Ilarina          |
| <b>Project Manager:</b> | Akanksha Baskaran      |

### 2.2 Identification of the Client

|                        |                              |
|------------------------|------------------------------|
| <b>Client's Name:</b>  | Visteon Corporation          |
| <b>Street Address:</b> | One Village Center Drive     |
| <b>City/Zip Code</b>   | Van Buren Township, MI/48111 |
| <b>Country</b>         | USA                          |

### 2.3 Identification of the Manufacturer

|                               |                |
|-------------------------------|----------------|
| <b>Manufacturer's Name:</b>   | Same as Client |
| <b>Manufacturers Address:</b> | Same as Client |
| <b>City/Zip Code</b>          | Same as Client |
| <b>Country</b>                | Same as Client |

### 3 **Equipment Under Test (EUT)**

#### 3.1 EUT Specifications

|  |   |
|--|---|
| <b>Model No:</b>                                     | BPCMSW  |
| <b>Marketing Name:</b>                               | Battery Pack Control Module   |
| <b>HW Version:</b>                                   | VPSE1F-12A652-GB  |
| <b>SW Version:</b>                                   | SWE201-30775-001F01   |
| <b>FCC ID:</b>                                       | NT8-BPCMSW  |
| <b>IC:</b>   | 3043A-BPCMSW  |
| <b>FVIN:</b>   | N/A   |
| <b>HVIN:</b>   | BPCMSW  |
| <b>PMN:</b>  | BPCMSW  |
| <b>Product Description:</b>                          | Battery Pack Control Module   |
| <b>Power Supply / Rated operating Voltage Range:</b> | Min. 8 V, Nom 13.5 V, Max. 16 V powered by the vehicle battery power system |
| <b>Operating Temperature Range</b>                   | -40 °C to +85 °C  |
| <b>Sample Revision</b>                               | Production  |
| <b>EUT Dimensions</b>                                | 12.4 cm X 40.86 cm X 0+ 3.47 cm   |
| Note: All information provided by the client.        |   |

### 3.2 Radio Specifications

|   |  |
|---|--|
| <b>Embedded Radio Technologies</b>            | Integrating 2 ADI Proprietary Protocol:<br>1.- ADRF8951 chipset<br>2.- ADRF8951 chipset  |
| <b>Frequency Range / number of channels:</b>  | 1.- ADRF8951 chipset:<br>Low Power 2.4 GHz wBMS radio<br>Frequency Range: 2405 - 2480 MHz<br>Channels: 0-15<br><br>2.- ADRF8951 chipset:<br>Low Power 2.4 GHz wBMS radio<br>Frequency Range: 2405 - 2480 MHz<br>Channels: 0-15   |
| <b>Rated max. EIRP</b>                        | 1.- ADRF8951 chipset: 8 dBm<br>2.- ADRF8951 chipset: 8 dBm   |
| <b>Tested radio technology</b>                | Integrating 2 ADI Proprietary Protocol:<br>1.- ADRF8951 chipset<br>2.- ADRF8951 chipset  |
| <b>Antenna Type / Gain</b>                    | 1. Part No. 1001013<br>Product: 2.4 GHz<br>FR4 Antenna<br>2. Part No. 1001013<br>Product: 2.4 GHz<br>FR4 Antenna   |
| <b>Modes of Operation</b>                     | 1.- ADRF8951 chipset:<br>Proprietary Protocol: 802.15.4<br>2400 MHz - 2483.5 MHz ISM Band<br>Modulation: GFSK<br>Nominal Channel Bandwidth: 5 MHz<br>Duty Cycle: 27%<br>2.- ADRF8951 chipset:<br>Proprietary Protocol: 802.15.4<br>2400 MHz - 2483.5 MHz ISM Band<br>Modulation: GFSK<br>Nominal Channel Bandwidth: 5 MHz<br>Duty Cycle: 27% |
| Note: All information provided by the client. |  |

### 3.3 EUT Sample details

| EUT # | Serial Number | HW Version       | SW Version          | Notes/Comments |
|-------|---------------|------------------|---------------------|----------------|
| 1     | N/A           | VPSE1F-12A652-GB | SWE201-30775-001F01 | Conducted EUT  |
| 2     | N/A           | VPSE1F-12A652-GB | SWE201-30775-001F01 | Radiated EUT   |

### 3.4 Accessory Equipment (AE) details

| AE # | Type           | Model           | Manufacturer | Serial Number |
|------|----------------|-----------------|--------------|---------------|
| 1    | USB-Dongle     | PL2303TA        | HiLetgo      | NA            |
| 2    | Harness cables | Power ON cables | NA           | NA            |

Note: all AEs are only used for setting up the test mode. They are disconnected before the test.

### 3.5 Test Sample Configuration

| EUT Set-up # | Combination of AE used for test set up | Comments   |
|--------------|--|--|
| 1            | EUT#1                                  | The radio of the EUT is configured according to requirement of each test case for the conducted test |
| 2            | EUT#2                                  | The radio of the EUT is configured according to requirement of each test case for the radiated test  |

### 3.6 Mode of Operation

| Mode # | Mode of Operation | Comments   |
|--------|-------------------|--|
| 1      | TX                | Continuously transmission modulated signal<br>Duty cycle >98% (for testing purpose only) |

### 3.7 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty cycle is higher than 98%. For radiated measurements, all data in this report shows the worst case between horizontal and vertical antenna polarizations and for all orientations of the EUT.

## 4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to assess the performance of the EUT according to the relevant requirements specified in chapter 1.

### 4.1 Test procedures and standards applied

- FCC part 15, Subpart C §15.247
- KDB 558074 D01 15.247 Meas Guidance v05r02
- RSS-247 issue 3
- RSS-Gen issue 5 April 2018
- ANSI C63.10:2013

## 5 Measurement Results Summary

| Test Specification                                 | Test Case                                    | Temperature and Voltage Conditions | Mode | Pass                                | NA                                  | NP                       | Result   |
|--|--|------------------------------------|------|-------------------------------------|-------------------------------------|--------------------------|----------|
| FCC §15.247(a)(2)<br>RSS-247 5.2(a)<br>RSS-Gen 6.7 | Emission Bandwidth                           | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| FCC §15.247(e)<br>RSS-247 5.2(b)                   | Power Spectral Density                       | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| FCC §15.247(b)(3)<br>RSS-247 5.4(d)                | Maximum Conducted Output Power and EIRP      | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| FCC §15.247(d)<br>RSS-247 5.5                      | Band Edge Compliance Unrestricted Band Edges | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| FCC §15.247; 15.209; 15.205<br>RSS-Gen 8.9; 8.10   | Band Edge Compliance Restricted Band Edges   | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| §15.247(d); §15.209<br>RSS-Gen 6.13                | TX Radiated Spurious Emissions               | Nominal                            | TX   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies |
| §15.207(a)<br>RSS Gen 8.8                          | AC Conducted Emissions                       | Nominal                            | TX   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Note 1   |

**Note:** NA= Not Applicable; NP= Not Performed.

**Note 1:** The EUT is powered by battery pack. Thus, the test case is not applicable.



## 6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

### Radiated measurement

| Measurement System               |                  | EMC 1   | EMC 2   |
|----------------------------------|------------------|---------|---------|
| Conducted emissions (mains port) | 150 kHz – 30 MHz | 1.12 dB | N/A     |
| Radiated emissions               | (< 30 MHz)       | 3.28 dB | 2.98 dB |
|                                  | (30 MHz – 1 GHz) | 3.16 dB | 2.81 dB |
|                                  | (1 – 3 GHz)      | 4.71 dB | 4.51 dB |
|                                  | (3 – 18 GHz)     | 4.23 dB | 4.16 dB |
|                                  | (18 – 40 GHz)    | 2.42 dB | 2.42 dB |

RF conducted measurement                       $\pm 0.5$  dB

According to TR 102 273 a multiplicative propagation of error is assumed for RF measurement systems. For this reason, the RMS method is applied to dB values and not to linear values as appropriate for additive propagation of error. Also used: <http://physics.nist.gov/cuu/Uncertainty/typeb.html>. The above calculated uncertainties apply to direct application of the Substitution method. The Substitution method is always used when the EUT comes closer than 3dB to the limit.

### 6.1 Environmental Conditions During Testing:

The following environmental conditions were maintained during testing:

- Ambient Temperature: 20-25 °C
- Relative humidity: 40-60%

### 6.2 Dates of Testing:

2024-10-07 – 2024-10-18

### 6.3 Decision Rule:

Cetecom advanced follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, see chapter 9, but is not considered – neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong.

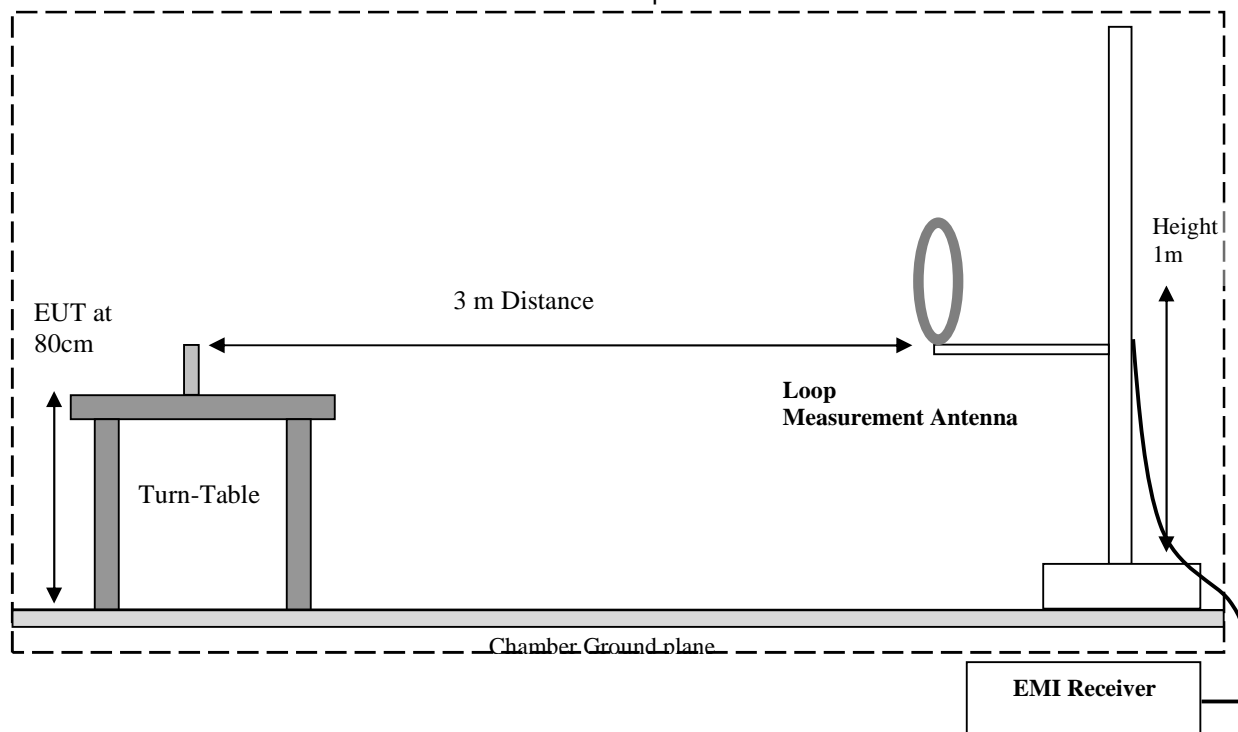
## 7 Measurement Procedures

### 7.1 Radiated Measurement

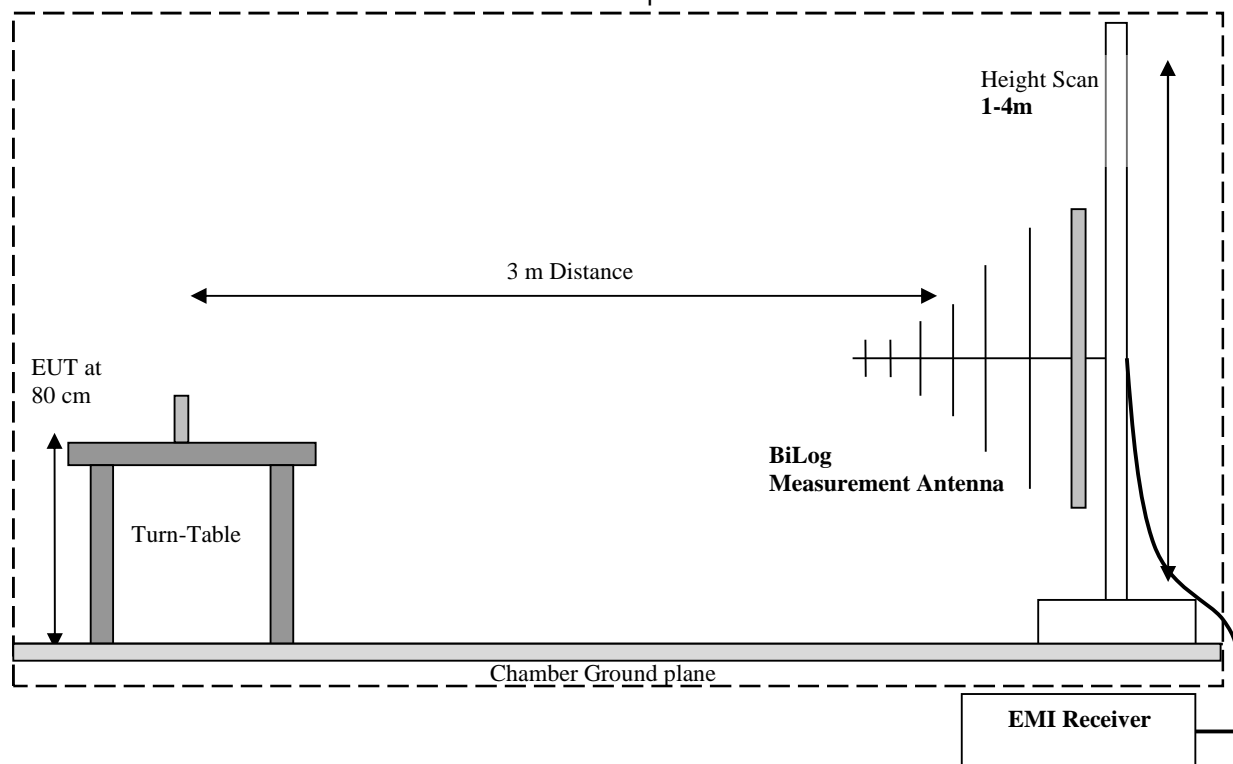
The radiated measurement is performed according to ANSI C63.10 (2013)

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 360° continuous measurement of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axes of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The highest six emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

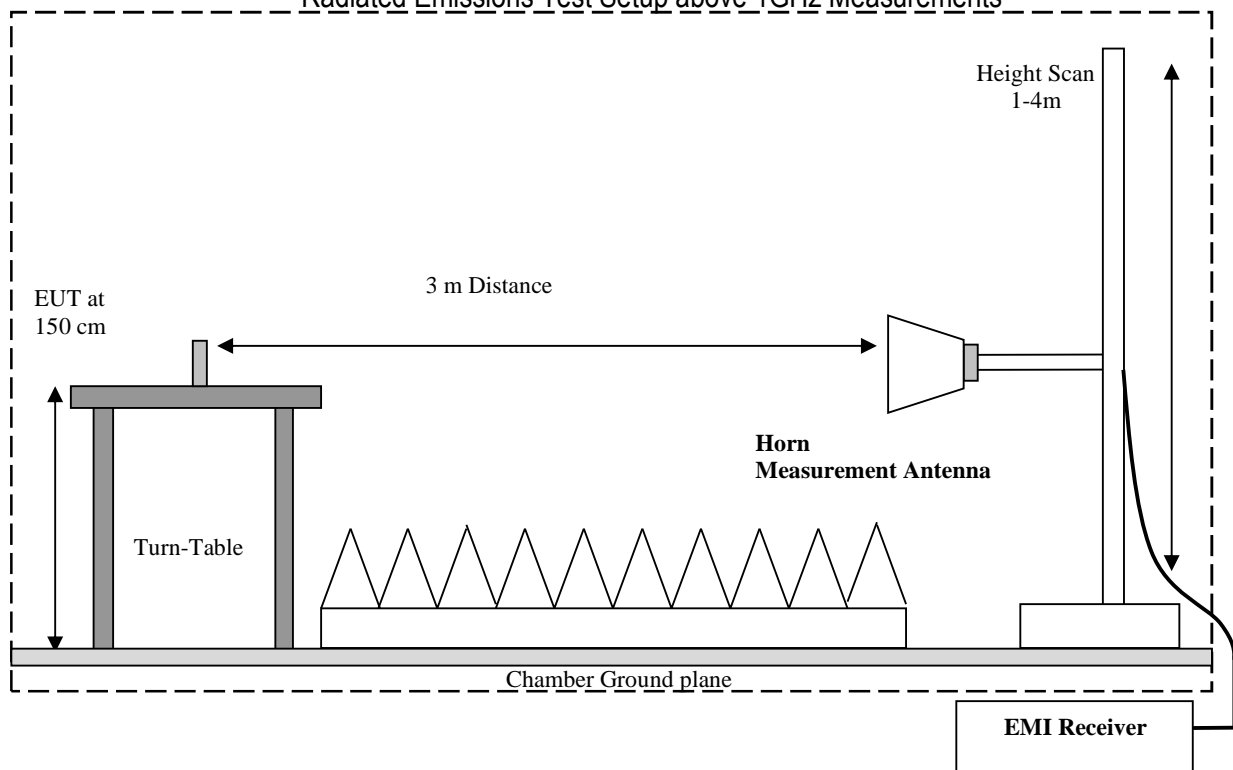
Radiated Emissions Test Setup below 30MHz Measurements



## Radiated Emissions Test Setup 30MHz-1GHz Measurements



## Radiated Emissions Test Setup above 1GHz Measurements



### 7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, taking into account the following parameters:

1. Measured reading in dB $\mu$ V
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

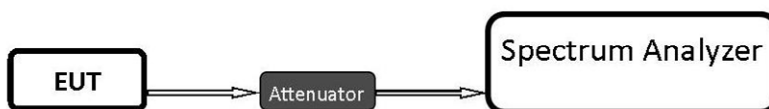
| Frequency (MHz) | Measured SA (dB $\mu$ V) | Cable Loss (dB) | Antenna Factor Correction (dB) | Field Strength Result (dB $\mu$ V/m) |
|-----------------|--------------------------|-----------------|--------------------------------|--------------------------------------|
| 1000            | 80.5                     | 3.5             | 14                             | 98.0                                 |

### 7.2 Power Line Conducted Measurement Procedure

AC Power Line conducted emissions measurements performed according to: ANSI C63.4 (2014)

### 7.3 RF Conducted Measurement Procedure

Testing procedures are based on 558074 D01 15.247 Meas Guidance v05r02 – “GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES” - April 2, 2019, by the Federal Communications Commission, Office of Engineering and Technology, Laboratory Division.



- Connect the equipment as shown in the above diagram.
- Adjust the settings of the SA (Rohde-Schwarz Spectrum Analyzer) to connect the EUT at the required mode of test.
- Measurements are to be performed with the EUT set to the low, middle and high channels and for worst case modulation schemes.

## 8 Test Result

### 8.1 Emission Bandwidth 6dB and 99% Occupied Bandwidth

#### 8.1.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.

##### **Spectrum Analyzer settings:**

##### 99% Occupied Bandwidth:

- Set frequency = nominal EUT channel center frequency
- Set Span = 1.5 x to 5.0 x OBW
- Set RBW = 1% to 5% of OBW
- Set the video bandwidth (VBW)  $\approx 3 \times$  RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep = Auto couple
- Allow the trace to stabilize
- Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth
- If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

##### 6dB (DTS) Bandwidth:

- Set RBW = 100 kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep = Auto couple
- Allow the trace to stabilize
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 8.1.2 Limits:

##### FCC §15.247(a)(2) and RSS-247 5.2(a)

- Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 8.1.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22 °C               | 1            | TX                 | nominal     |

### 8.1.4 Measurement result:

| Test # | Channel | 99% Occupied Bandwidth (MHz) | Limit (MHz) | Result        |
|--------|---------|------------------------------|-------------|---------------|
| 1      | 0       | 2.0280                       | -           | For info only |
| 2      | 8       | 2.0367                       | -           | For info only |
| 3      | 15      | 2.0193                       | -           | For info only |

**Note 1:** The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

**Note 2:** The plots presented below represent the worst-case test results measured.

| Test # | Channel | 6dB Emissions Bandwidth (MHz) | Limit (MHz) | Result |
|--------|---------|-------------------------------|-------------|--------|
| 4      | 0       | 1.3675                        | > 0.5       | Pass   |
| 5      | 8       | 1.3506                        | > 0.5       | Pass   |
| 6      | 15      | 1.3844                        | > 0.5       | Pass   |

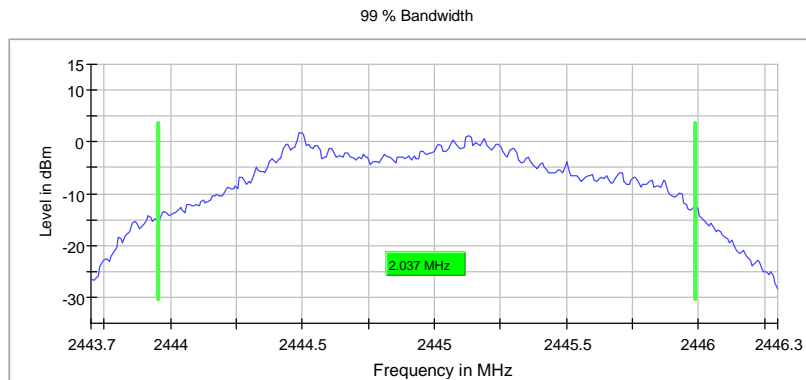
**Note 1:** The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

**Note 2:** The plots presented below represent the worst-case test results measured.

## 8.1.5 Measurement Plots: 99% OBW

### Occupied Channel Bandwidth 99% (2405 MHz)

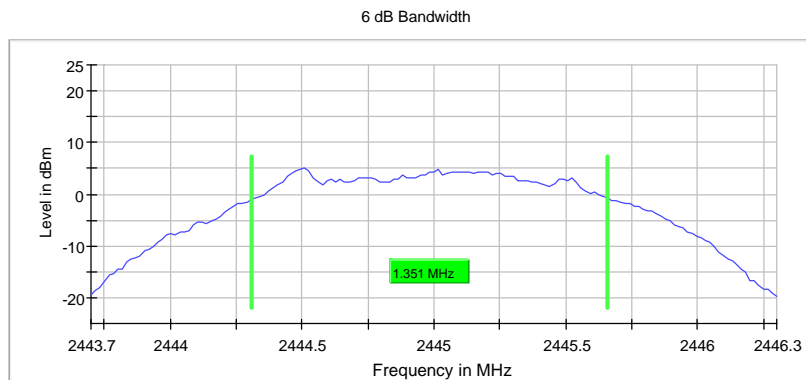
| DUT Frequency (MHz) | Bandwidth (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | Result |
|---------------------|-----------------|----------------------|-----------------------|--------|
| 2445.000000         | 2.036667        | 2443.951333          | 2445.988000           | PASS   |



## 8.1.6 Measurement Plots: 6dB BW

### Minimum Emission Bandwidth 6 dB (2445 MHz)

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) | DUT Frequency (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|-----------------|----------------------|-----------------------|---------------------|-----------------|--------|
| 2445.000000         | 1.350650        | 0.500000        | 2444.307792          | 2445.658442           | 2445.000000         | 5.2             | PASS   |



## 8.2 Maximum Peak Conducted Output Power

### 8.2.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.

Spectrum Analyzer settings according to mentioned ANSI, sec.11.9.2.2.2 Method AVGSA-1:

#### 8.2.2 Limits:

##### Maximum Peak Output Power:

- FCC §15.247 (b)(3): 1 W (30 dBm)
- IC RSS-247 5.4(d): 1 W (30 dBm)

#### 8.2.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input | Antenna Gain |
|---------------------|--------------|--------------------|-------------|--------------|
| 22 °C               | 1            | TX                 | nominal     | 2.6 dBi *    |

**Note \***: Details regarding the antenna gain are provided by the applicant.

#### 8.2.4 Measurement result:

| Test # | Channel | Maximum Peak Conducted Output Power (dBm) | EIRP (dBm) | Limit (dBm)         | Result |
|--------|---------|---|------------|---------------------|--------|
| 1      | 0       | 7   | 9.6 *      | 30 (PK) / 36 (EIRP) | Pass   |
| 2      | 8       | 6.5                                       | 9.1 *      | 30 (PK) / 36 (EIRP) | Pass   |
| 3      | 15      | 7   | 9.6 *      | 30 (PK) / 36 (EIRP) | Pass   |

**Note \***: Results based on calculation utilizing antenna gain information provided by applicant.

**Note 2**: The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

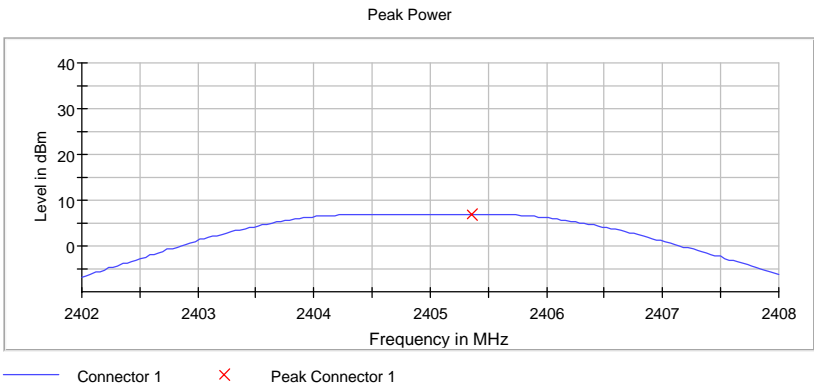
**Note 3**: The plots presented below represent the worst-case test results measured.



8.2.5 Measurement Plots:

Peak output power (Sweep) (2405 MHz)

| DUT Frequency (MHz) | Peak Power (dBm) | Limit Max (dBm) | Result |
|---------------------|------------------|-----------------|--------|
| 2405.000000         | 7.0              | 30.0            | PASS   |



### 8.3 Power Spectral Density

#### 8.3.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.

##### Spectrum Analyzer settings for Peak PSD method:

- Set analyzer center frequency to DTS channel center frequency
- Set the span to 1.5 x DTS bandwidth
- Set RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- Set the VBW  $\geq 3 \times \text{RBW}$
- Detector = Peak
- Sweep time = Auto couple
- Trace mode = Max hold
- Allow trace to fully stabilize
- Use the peak marker function to determine the maximum amplitude level within the RBW
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

#### 8.3.2 Limits:

##### FCC§15.247(e) & RSS-247 5.2(b)

- For digitally modulated systems, the peak 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.

#### 8.3.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22 °C               | 1            | TX                 | nominal     |

#### 8.3.4 Measurement result:

| Test # | Channel | Maximum Power Spectral Density (dBm/3 kHz) | Limit (dBm / 3 kHz) | Result |
|--------|---------|--|---------------------|--------|
| 1      | 0       | -0.351                                     | 8                   | Pass   |
| 2      | 8       | -0.883                                     | 8                   | Pass   |
| 3      | 15      | -0.326                                     | 8                   | Pass   |

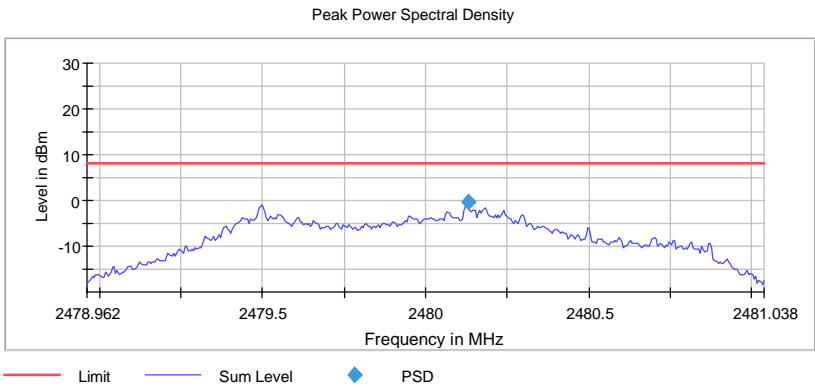
**Note 1:** The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

**Note 2:** The plots presented below represent the worst-case test results measured.

8.3.5 Measurement Plots:

Peak Power Spectral Density (2405 MHz)

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2480.000000         | 2480.129789     | -0.326    | 8.0             | PASS   |



## **8.4 Non-restricted Band Edge Compliance and Conducted Spurious Emissions**

### **8.4.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.**

#### **Spectrum Analyzer settings for band edge:**

- Set the center frequency and span to encompass frequency range to be measured
- RBW = 100 kHz
- VBW  $\geq 3 \times$  RBW
- Sweep Time: Auto couple
- Detector = Peak
- Trace = Max hold
- Allow trace to fully stabilize
- Use the peak marker function to determine the maximum amplitude level
- Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge

### **8.4.2 Limits non restricted band:**

#### **FCC§15.247 (d)**

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### **RSS-247 5.5**

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB.

#### **Spectrum Analyzer settings for restricted band:**

- Peak measurements are made using a peak detector and RBW=100 kHz

### 8.4.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up #                            | EUT operating mode | Power Input |
|---------------------|---|--------------------|-------------|
| 22 °C               | 1 (low band edge)<br>2 (high band edge) | TX                 | nominal     |

### 8.4.4 Measurement result: band edge (conducted)

| Test # | EUT operating mode | Band Edge                         | Band Edge Delta (dBc) | Detector | Limit (dBc) | Result |
|--------|--------------------|-----------------------------------|-----------------------|----------|-------------|--------|
| 1      | TX                 | Lower, Non-restricted (conducted) | 32.1                  | PK       | min. 20     | Pass   |
| 2      | TX                 | Upper, Non-restricted (conducted) | 31.5                  | PK       | min. 20     | Pass   |

**Note 1:** The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

**Note 2:** The plots presented below represent the worst-case test results measured.

### 8.4.5 Measurement result: conducted spurious emission

| Test # | EUT operating mode | Frequency range | Measured lowest margin (dBc) | Limit (dBm) | Result |
|--------|--------------------|-----------------|------------------------------|-------------|--------|
| 3      | TX, channel 0      | 30 MHz – 26 GHz | 26.9                         | -26.7       | Pass   |
| 4      | TX, channel 8      | 30 MHz – 26 GHz | 28                           | -27.5       | Pass   |
| 5      | TX, channel 15     | 30 MHz – 26 GHz | 29.3                         | -25.6       | Pass   |

**Note 1:** The limits are based on the emission levels of the intentional radiator, adjusted with a 30 dB attenuation, as the measurements are performed using an RMS detector averaging over a time interval.

**Note 2:** The test results and plots are generated by the R&S EMC32 software, which automatically performs the measurements.

**Note 3:** The plots presented below represent the worst-case test results measured.

## 8.4.6 Measurement Plots (Non-restricted Band Edge)

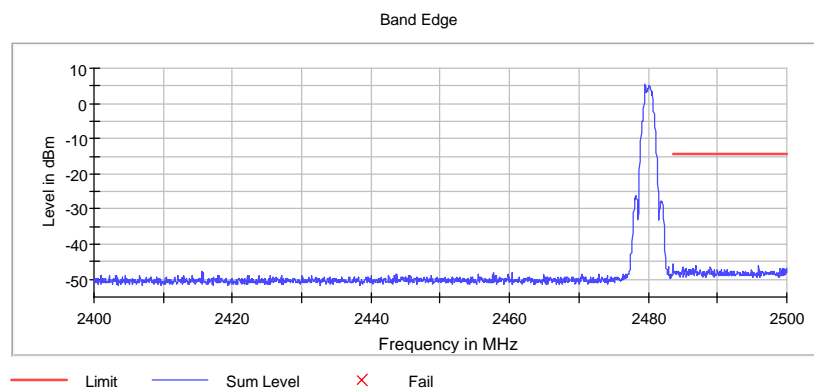
### Band Edge high (2480 MHz)

#### Result

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 2480.000000         | PASS   |

#### Inband Peak

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2479.521471     | 5.7         |



## 8.4.7 Measurement Plots (Conducted Spurious Emissions)

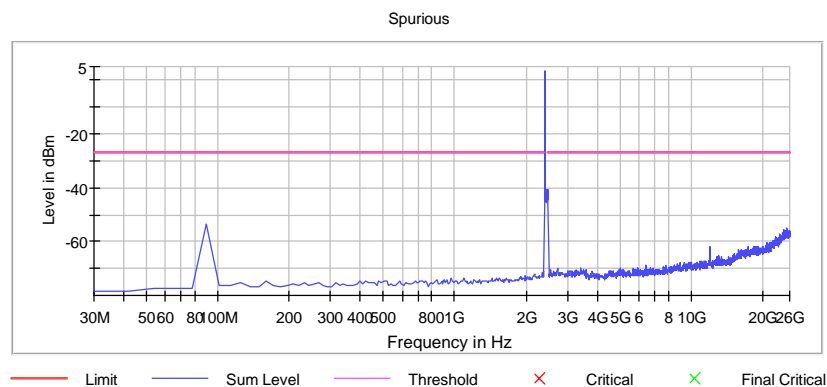
### Tx Spurious Emission (2405 MHz)

#### Result

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 2405.000000         | PASS   |

#### Inband Peak

| Frequency (MHz) | Level (dBm) |
|-----------------|-------------|
| 2404.879870     | 3.3         |



## **8.5 Radiated Transmitter Spurious Emissions and Restricted Band Edge**

### **8.5.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02, and ANSI C63.10 Clause 11.**

#### **Spectrum Analyzer Settings:**

- Frequency = 9 KHz – 30 MHz
- RBW = 9 KHz
- Detector: Peak
  
- Frequency = 30 MHz – 1 GHz
- Detector = Peak / Quasi-Peak
- RBW= 120 KHz (<1GHz)
  
- Frequency > 1 GHz
- Detector = Peak / Average
- RBW = 1 MHz
  
- Radiated spurious emissions shall be measured for the transmit frequencies, transmit power, and data rate for the lowest, middle and highest channel in each frequency band of operation and for the highest gain antenna for each antenna type, and using the appropriate parameters and test requirements.
- The highest (or worst-case) data rate shall be recorded for each measurement.
- For testing frequencies below 30 MHz at distance other than the specified in the standard, the limit conversion is calculated by using the FCC materials for the ANSI 63 committee issued on January, 27 1991.

### **8.5.2 Limits:**

#### **FCC §15.247**

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

# FCC §15.209 & RSS-Gen 8.9

- Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency of emission (MHz) | Field strength (μV/m) | Measurement Distance (m) | Field strength @ 3m (dBμV/m) |
|-----------------------------|-----------------------|--------------------------|------------------------------|
| 0.009–0.490                 | 2400/F(kHz) / -----   | 300                      | -                            |
| 0.490–1.705                 | 24000/F(kHz) / -----  | 30                       | -                            |
| 1.705–30.0                  | 30 / (29.5)           | 30                       | -                            |
| 30–88                       | 100                   | 3                        | 40 dBμV/m                    |
| 88–216                      | 150                   | 3                        | 43.5 dBμV/m                  |
| 216–960                     | 200                   | 3                        | 46 dBμV/m                    |
| Above 960                   | 500                   | 3                        | 54 dBμV/m                    |

# FCC §15.205 & RSS-Gen 8.10

- Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz               | MHz                 | MHz           | GHz         |
|-------------------|---------------------|---------------|-------------|
| 0.090-0.110       | 16.42-16.423        | 399.9-410     | 4.5-5.15    |
| 10.495-0.505      | 16.69475-16.69525   | 608-614       | 5.35-5.46   |
| 2.1735-2.1905     | 16.80425-16.80475   | 960-1240      | 7.25-7.75   |
| 4.125-4.128       | 25.5-25.67          | 1300-1427     | 8.025-8.5   |
| 4.17725-4.17775   | 37.5-38.25          | 1435-1626.5   | 9.0-9.2     |
| 4.20725-4.20775   | 73-74.6             | 1645.5-1646.5 | 9.3-9.5     |
| 6.215-6.218       | 74.8-75.2           | 1660-1710     | 10.6-12.7   |
| 6.26775-6.26825   | 108-121.94          | 1718.8-1722.2 | 13.25-13.4  |
| 6.31175-6.31225   | 123-138             | 2200-2300     | 14.47-14.5  |
| 8.291-8.294       | 149.9-150.05        | 2310-2390     | 15.35-16.2  |
| 8.362-8.366       | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4   |
| 8.37625-8.38675   | 156.7-156.9         | 2690-2900     | 22.01-23.12 |
| 8.41425-8.41475   | 162.0125-167.17     | 3260-3267     | 23.6-24.0   |
| 12.29-12.293      | 167.72-173.2        | 3332-3339     | 31.2-31.8   |
| 12.51975-12.52025 | 240-285             | 3345.8-3358   | 36.43-36.5  |
| 12.57675-12.57725 | 322-335.4           | 3600-4400     | Above 38.6  |
| 13.36-13.41       |                     |               |             |

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).  
 \*PEAK LIMIT= 74 dBμV/m  
 \*AVG. LIMIT= 54 dBμV/m



### 8.5.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22 °C               | 2            | TX                 | nominal     |

### 8.5.4 Measurement result:

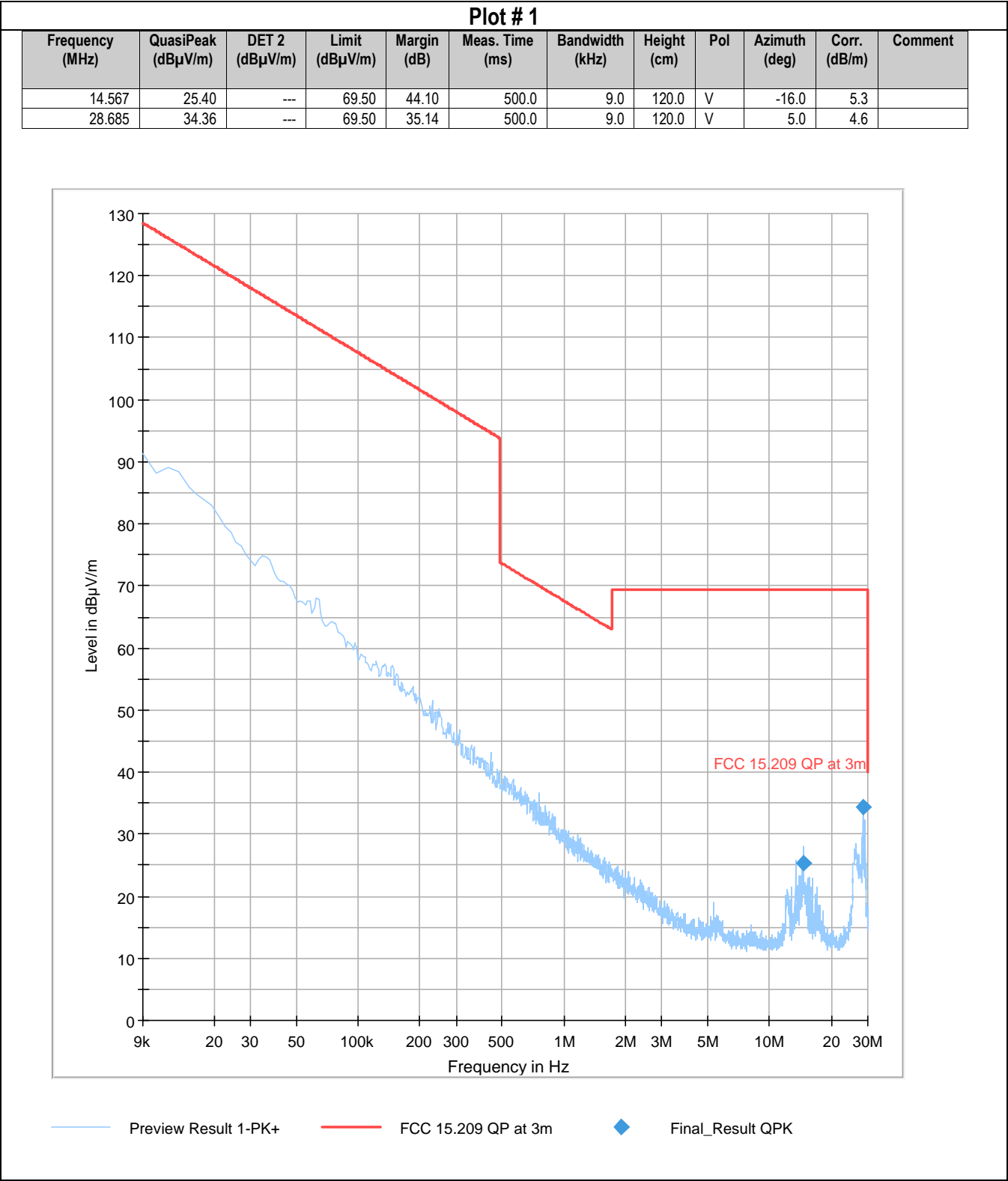
| Plot # | Channel # | Scan Frequency | Emission level with lowest margin to limit | Limit             | Result |
|--------|-----------|----------------|--|-------------------|--------|
| 1-5    | Low       | 9 kHz – 26 GHz | 42.26 dB $\mu$ V/m (AV)                    | See section 8.6.2 | Pass   |
| 6-10   | Mid       | 9 kHz – 26 GHz | 43.80 dB $\mu$ V/m (AV)                    | See section 8.6.2 | Pass   |
| 11-15  | High      | 9 kHz – 26 GHz | 44.24 dB $\mu$ V/m (AV)                    | See section 8.6.2 | Pass   |

**Note 1:** Two identical antenna ports on the EUT are tested individually, with only one antenna transmitting at a time.

**Note 2:** During normal operation of the EUT, the two antennas do not transmit simultaneously.

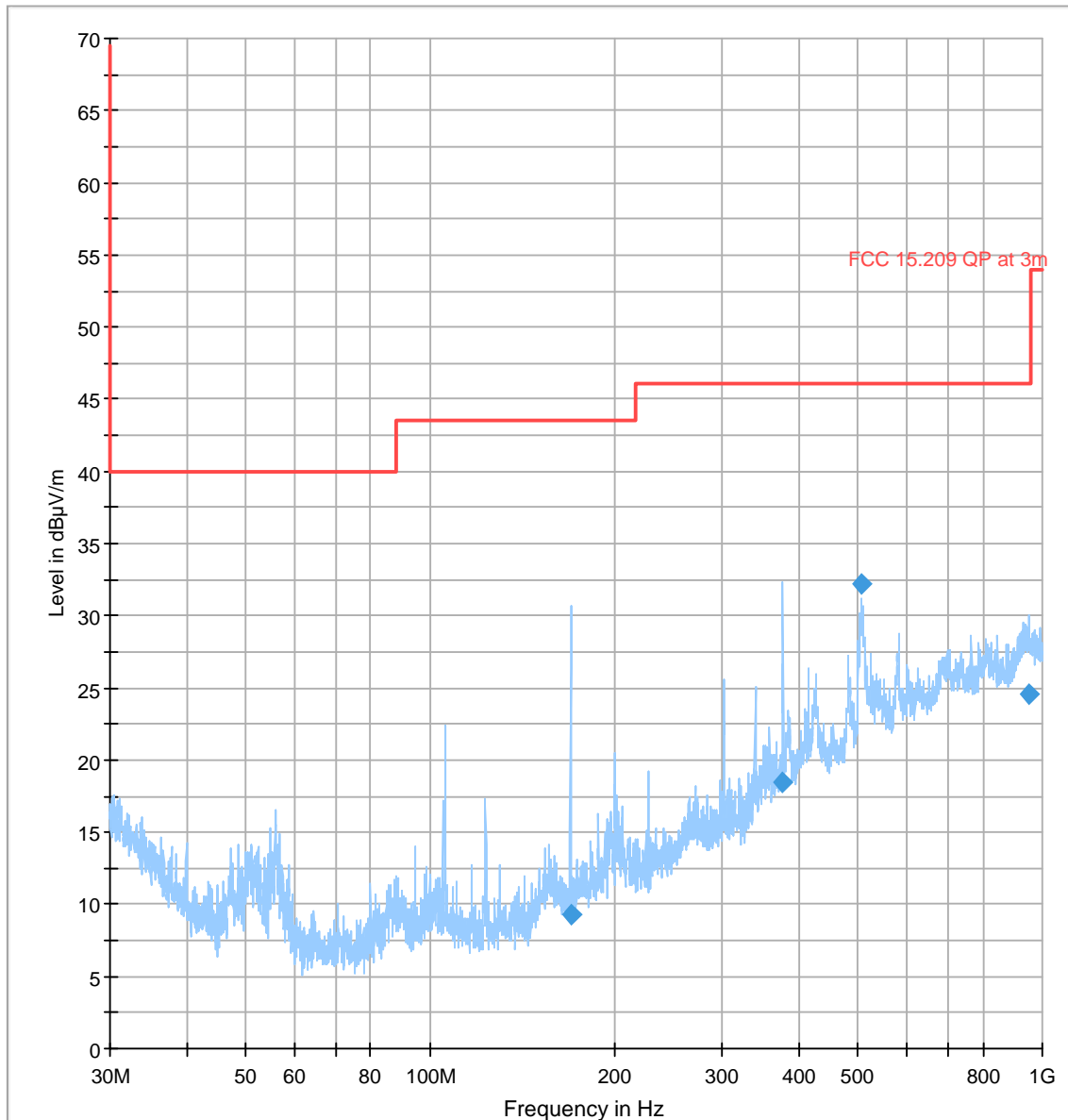
**Note 3:** Limited tests on the left antenna port are conducted to verify if the two identical ports exhibit similar performance.

8.5.5 Measurement Plots:



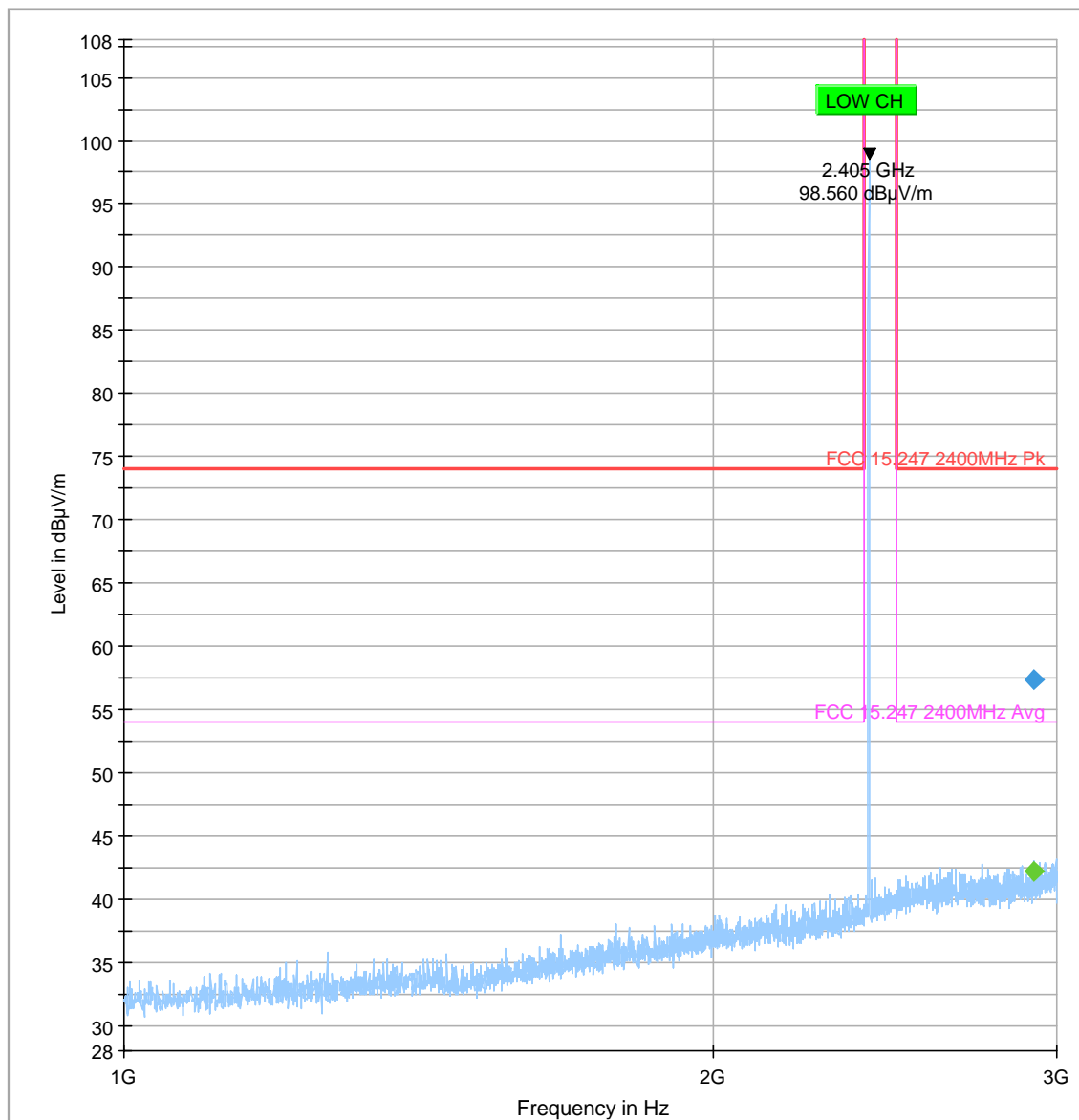
Plot # 2

| Frequency (MHz) | QuasiPeak (dBμV/m) | DET 2 (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 169.629         | 9.26               | ---            | 43.50          | 34.24       | 500.0           | 120.0           | 162.0       | H   | 85.0          | -18.3        |         |
| 377.337         | 18.48              | ---            | 46.02          | 27.55       | 500.0           | 120.0           | 100.0       | H   | 22.0          | -10.8        |         |
| 506.193         | 32.18              | ---            | 46.02          | 13.84       | 500.0           | 120.0           | 128.0       | V   | 297.0         | -7.4         |         |
| 950.173         | 24.58              | ---            | 46.02          | 21.44       | 500.0           | 120.0           | 316.0       | H   | 80.0          | -0.5         |         |



Plot # 3

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 2920.500        | ---              | 42.26             | 54.00          | 11.74       | 500.0           | 1000.0          | 152.0       | H   | 323.0         | 35.2         |         |
| 2920.500        | 57.30            | ---               | 74.00          | 16.70       | 500.0           | 1000.0          | 152.0       | H   | 323.0         | 35.2         |         |



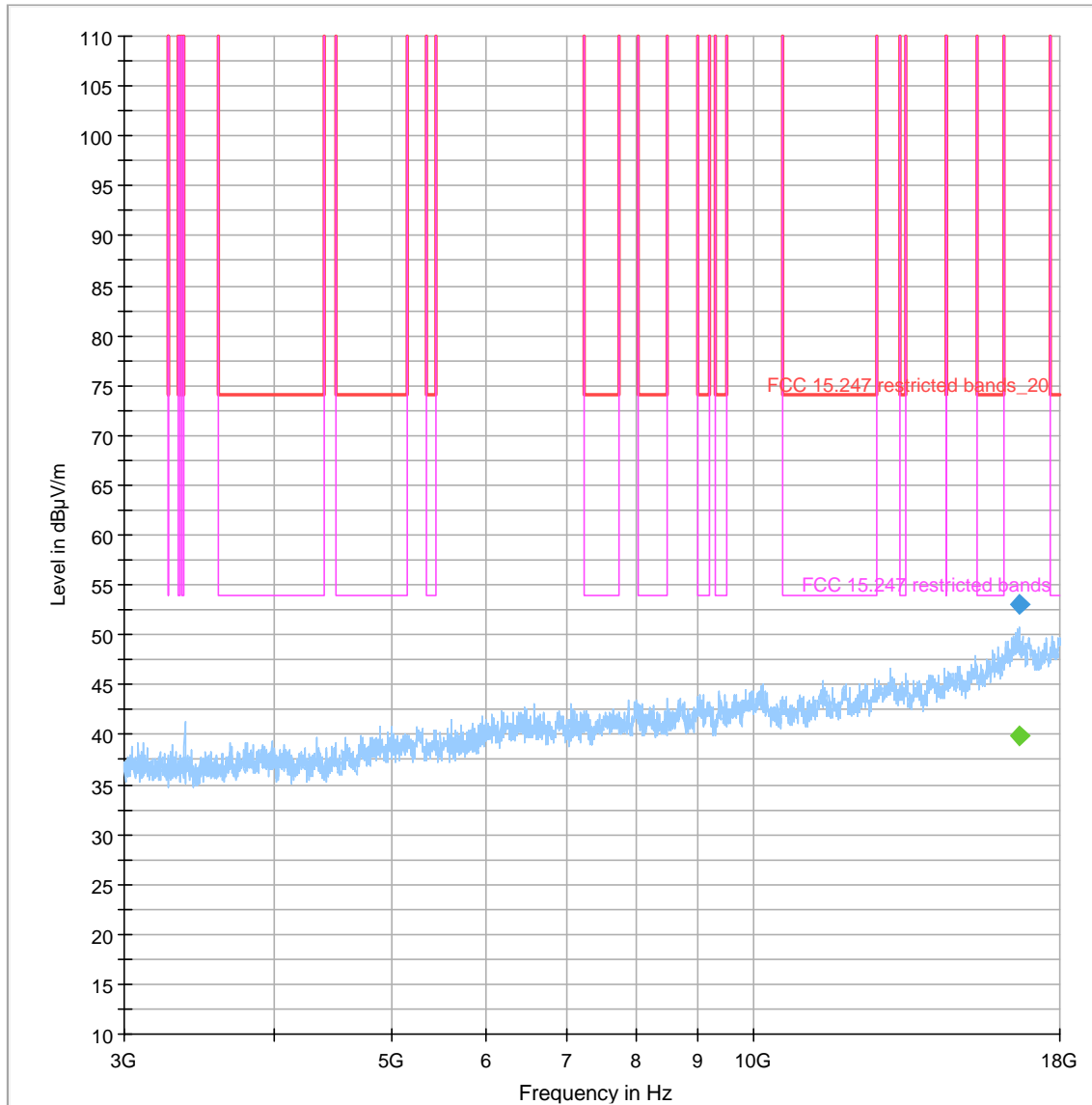
Preview Result 1-PK+  
Final\_Result PK+

FCC 15.247 2400MHz Pk  
Final\_Result CAV

FCC 15.247 2400MHz Avg

Plot # 4

| Frequency (MHz) | MaxPeak (dB $\mu$ V/m) | CAverage (dB $\mu$ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment                    |
|-----------------|------------------------|-------------------------|-----------------|-----------------|-------------|-----|---------------|--------------|----------------------------|
| 16644.750       | ---                    | 39.98                   | 500.0           | 1000.0          | 258.0       | H   | 42.0          | 14.6         | Not in the restricted band |
| 16644.750       | 53.06                  | ---                     | 500.0           | 1000.0          | 258.0       | H   | 42.0          | 14.6         | Not in the restricted band |

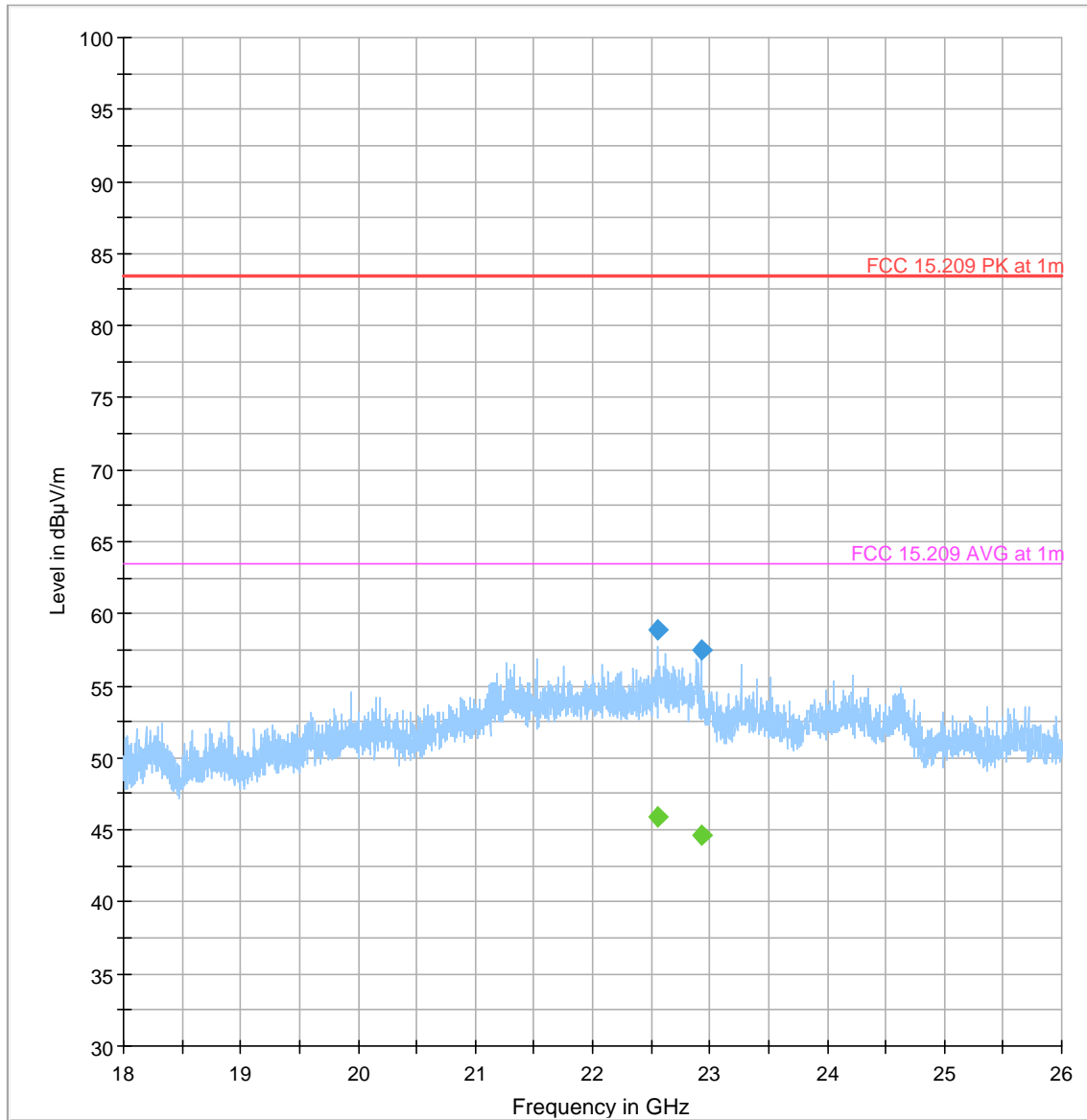


Preview Result 1-PK+  
FCC 15.247 restricted bands  
Final\_Result CAV

FCC 15.247 restricted bands\_20  
Final\_Result PK+

**Plot # 5**

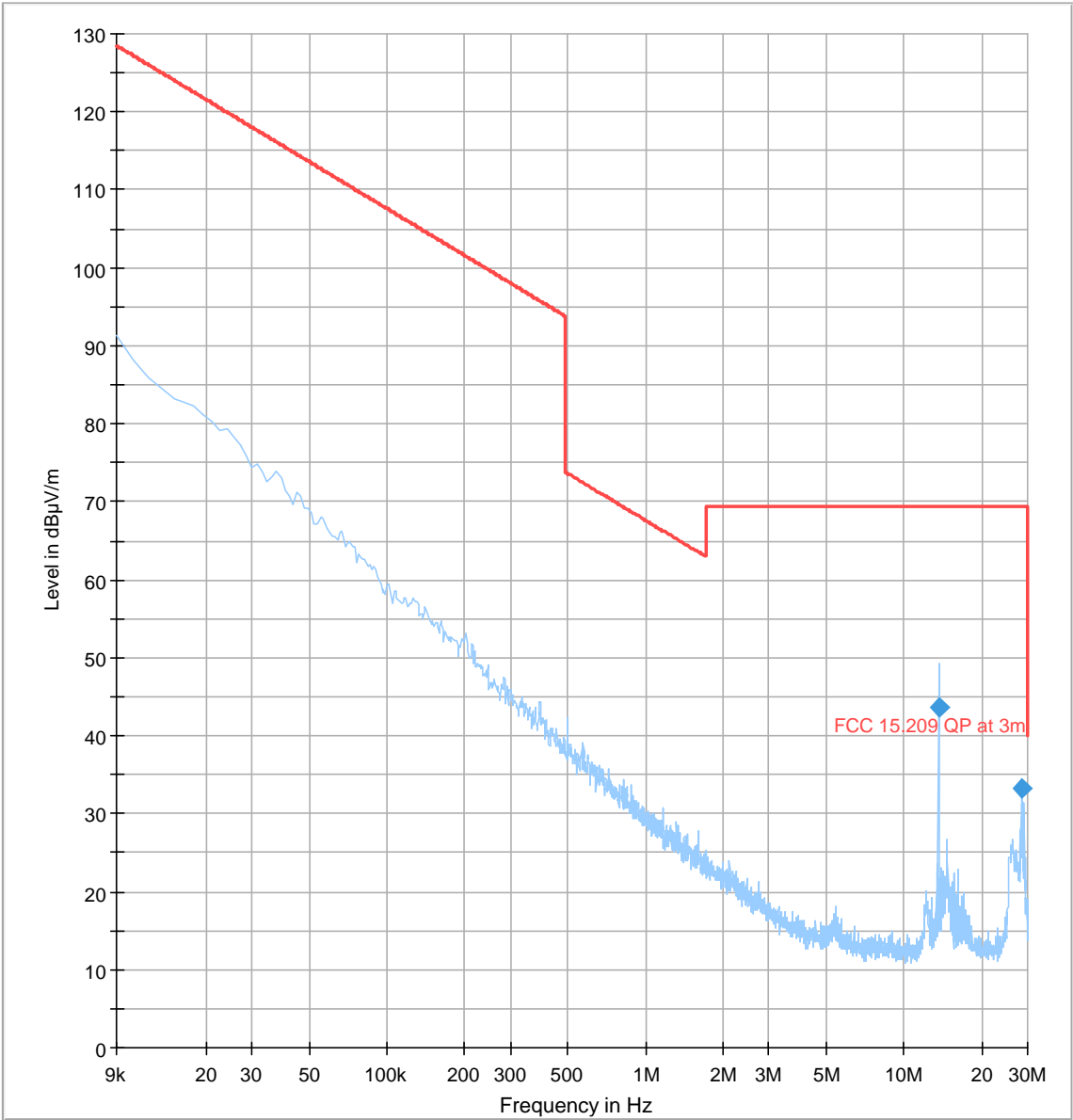
| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 22557.500       | 58.86            | ---               | 83.50          | 24.64       | 500.0           | 1000.0          | 140.0       | V   | 263.0         | 19.6         |         |
| 22557.500       | ---              | 45.91             | 63.50          | 17.59       | 500.0           | 1000.0          | 140.0       | V   | 263.0         | 19.6         |         |
| 22932.000       | 57.44            | ---               | 83.50          | 26.06       | 500.0           | 1000.0          | 140.0       | H   | 48.0          | 19.4         |         |
| 22932.000       | ---              | 44.70             | 63.50          | 18.80       | 500.0           | 1000.0          | 140.0       | H   | 48.0          | 19.4         |         |



◆ Preview Result 1-PK+ Final\_Result PK+
 ◆ FCC 15.209 PK at 1m Final\_Result CAV
 — FCC 15.209 AVG at 1m

Plot # 6

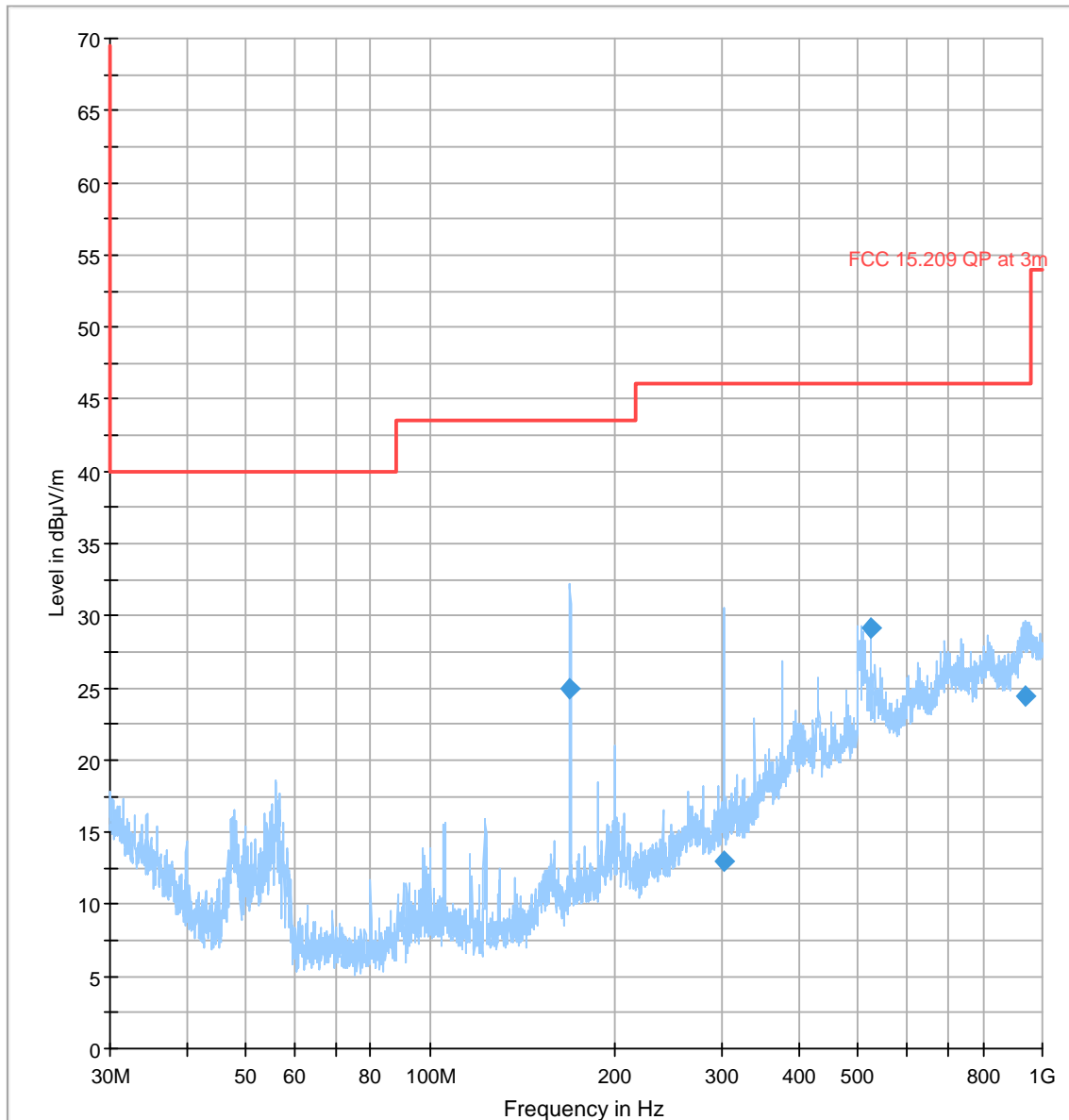
| Frequency (MHz) | QuasiPeak (dBμV/m) | DET 2 (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 13.559          | 43.67              | ---            | 69.50          | 25.83       | 500.0           | 9.0             | 120.0       | H   | -44.0         | 5.5          |         |
| 28.686          | 33.24              | ---            | 69.50          | 36.26       | 500.0           | 9.0             | 120.0       | V   | 11.0          | 4.6          |         |



Preview Result 1-PK+      FCC 15.209 QP at 3m      Final\_Result QPK

Plot # 7

| Frequency (MHz) | QuasiPeak (dB $\mu$ V/m) | DET 2 (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------------|----------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 169.476         | 24.94                    | ---                  | 43.50                | 18.56       | 500.0           | 120.0           | 205.0       | H   | 90.0          | -18.3        |         |
| 301.677         | 13.02                    | ---                  | 46.02                | 33.00       | 500.0           | 120.0           | 100.0       | H   | 256.0         | -13.9        |         |
| 524.317         | 29.16                    | ---                  | 46.02                | 16.86       | 500.0           | 120.0           | 222.0       | H   | 315.0         | -5.9         |         |
| 935.061         | 24.47                    | ---                  | 46.02                | 21.55       | 500.0           | 120.0           | 290.0       | V   | 168.0         | -0.6         |         |

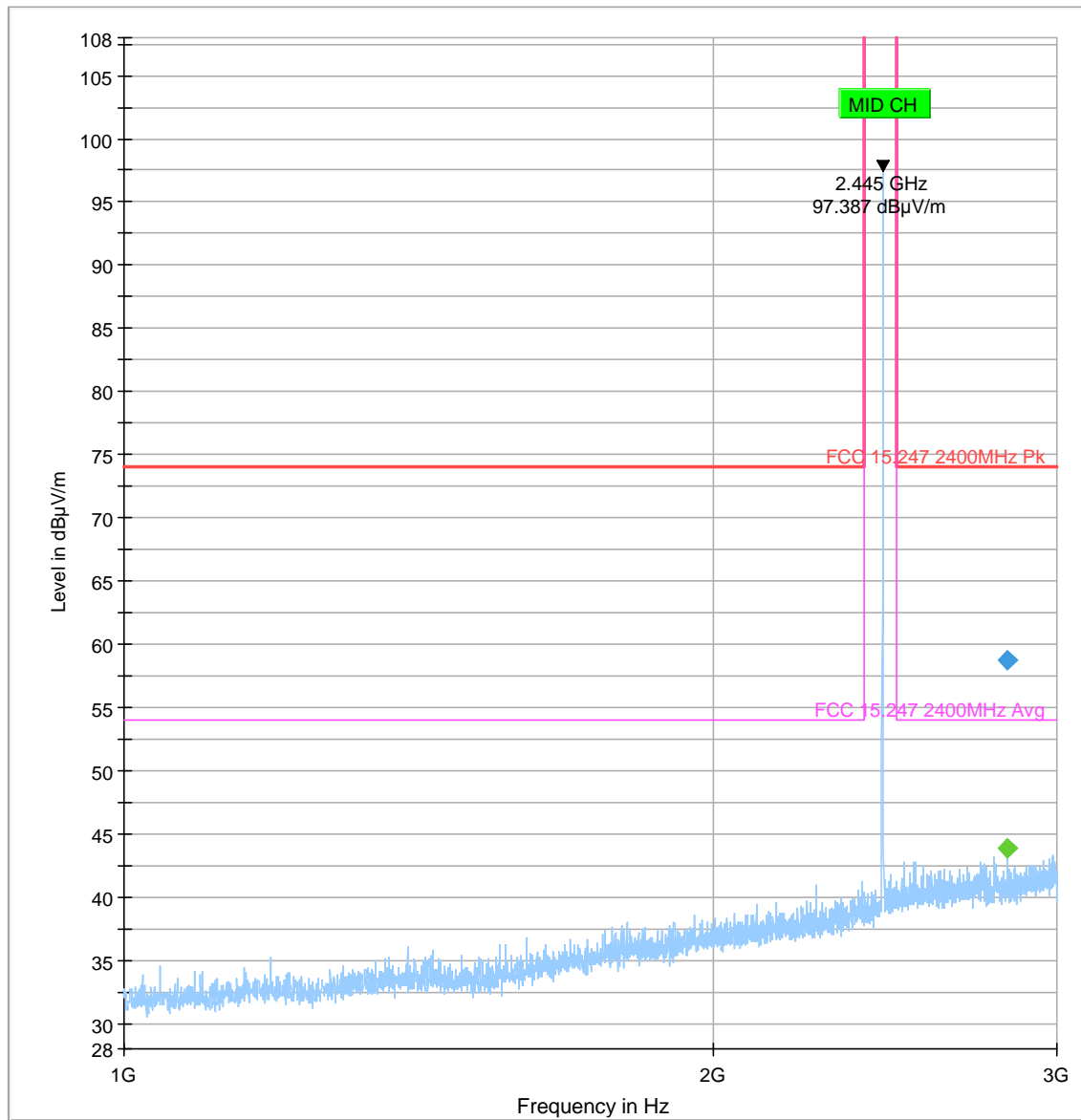


Preview Result 1-PK+      FCC 15.209 QP at 3m      Final\_Result QPK



Plot # 8

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 2830.500        | ---              | 43.80             | 54.00          | 10.20       | 500.0           | 1000.0          | 195.0       | V   | 144.0         | 35.5         |         |
| 2830.500        | 58.72            | ---               | 74.00          | 15.28       | 500.0           | 1000.0          | 195.0       | V   | 144.0         | 35.5         |         |



Preview Result 1-PK+  
Final\_Result PK+

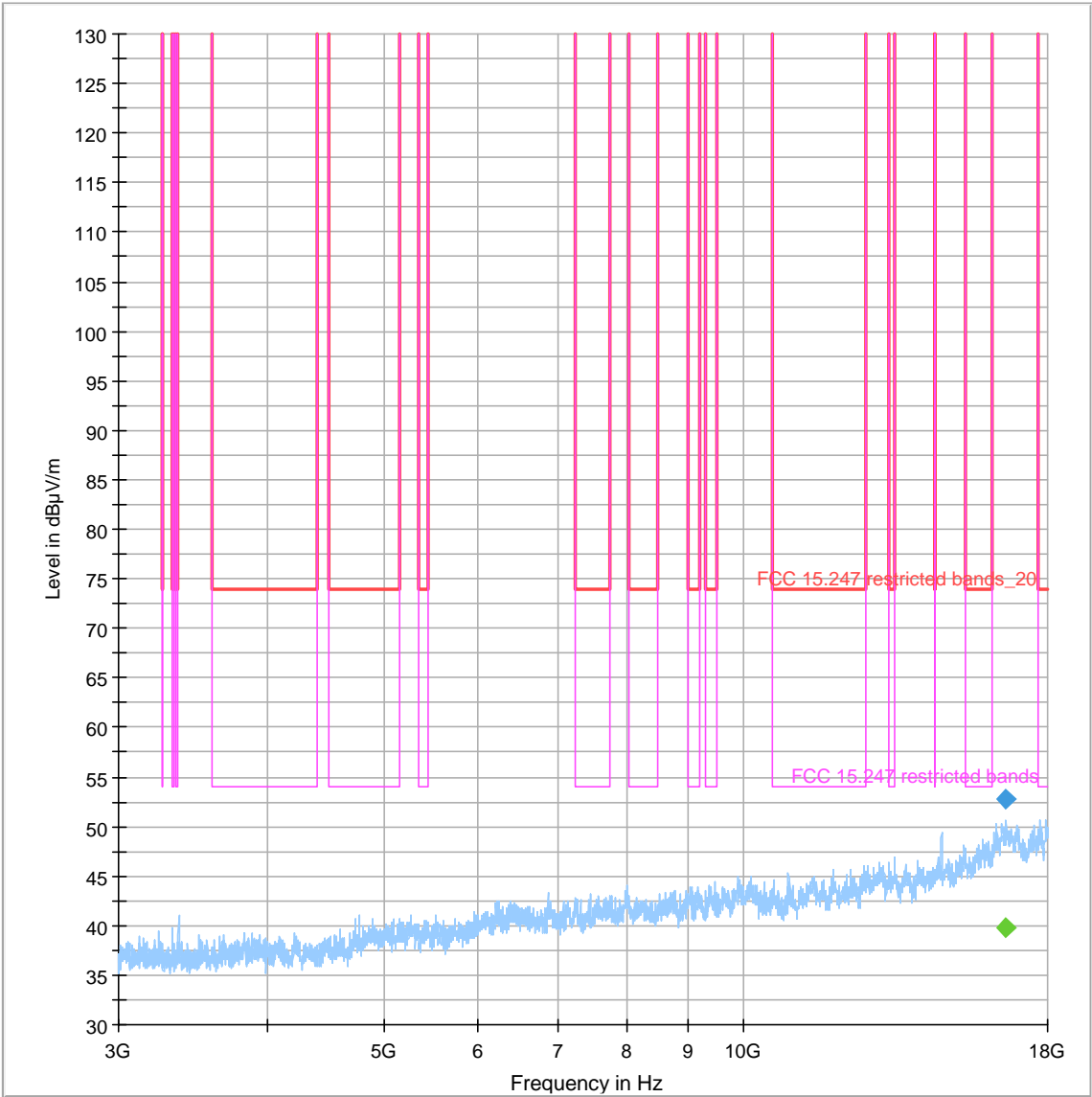
FCC 15.247 2400MHz Pk  
Final\_Result CAV

FCC 15.247 2400MHz Avg



Plot # 9

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment                    |
|-----------------|------------------|-------------------|-----------------|-----------------|-------------|-----|---------------|--------------|----------------------------|
| 16624.000       | ---              | 39.87             | 500.0           | 1000.0          | 312.0       | H   | 283.0         | 14.6         | Not in the restricted band |
| 16624.000       | 52.83            | ---               | 500.0           | 1000.0          | 312.0       | H   | 283.0         | 14.6         | Not in the restricted band |



- Preview Result 1-PK+

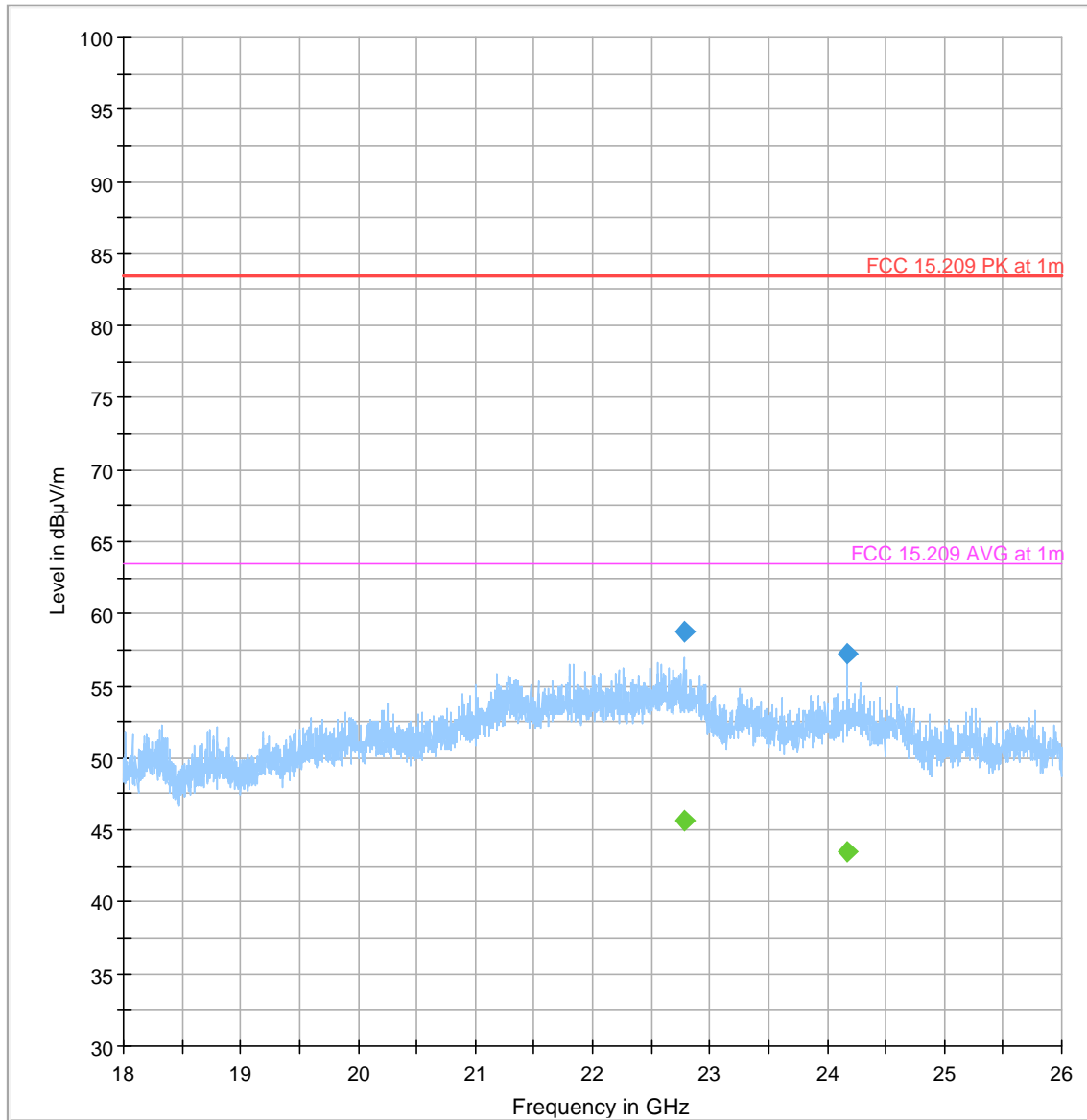
FCC 15.247 restricted bands

Final\_Result CAV
- FCC 15.247 restricted bands\_20

Final\_Result PK+

**Plot # 10**

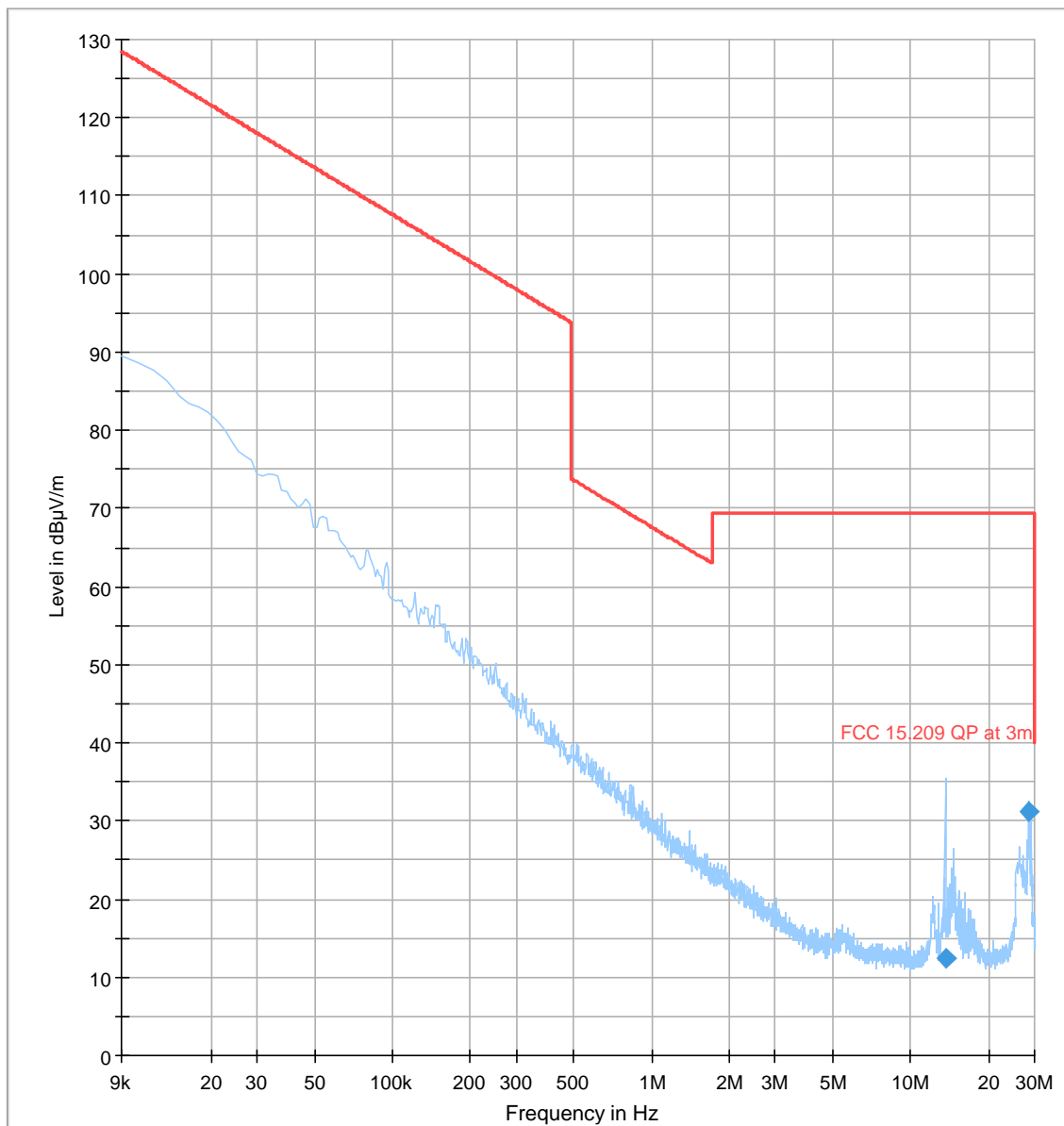
| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 22776.750       | 58.74            | ---               | 83.50          | 24.76       | 500.0           | 1000.0          | 140.0       | V   | 139.0         | 20.0         |         |
| 22776.750       | ---              | 45.68             | 63.50          | 17.82       | 500.0           | 1000.0          | 140.0       | V   | 139.0         | 20.0         |         |
| 24169.250       | 57.27            | ---               | 83.50          | 26.23       | 500.0           | 1000.0          | 140.0       | H   | -5.0          | 18.3         |         |
| 24169.250       | ---              | 43.51             | 63.50          | 19.99       | 500.0           | 1000.0          | 140.0       | H   | -5.0          | 18.3         |         |



◆ Preview Result 1-PK+ Final\_Result PK+
 ◆ FCC 15.209 PK at 1m Final\_Result CAV
 — FCC 15.209 AVG at 1m

Plot # 11

| Frequency (MHz) | QuasiPeak (dB $\mu$ V/m) | DET 2 (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------------|----------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 13.562          | 12.35                    | ---                  | 69.50                | 57.15       | 500.0           | 9.0             | 120.0       | V   | 81.0          | 5.5          |         |
| 28.685          | 31.18                    | ---                  | 69.50                | 38.32       | 500.0           | 9.0             | 120.0       | H   | 308.0         | 4.6          |         |



Preview Result 1-PK+

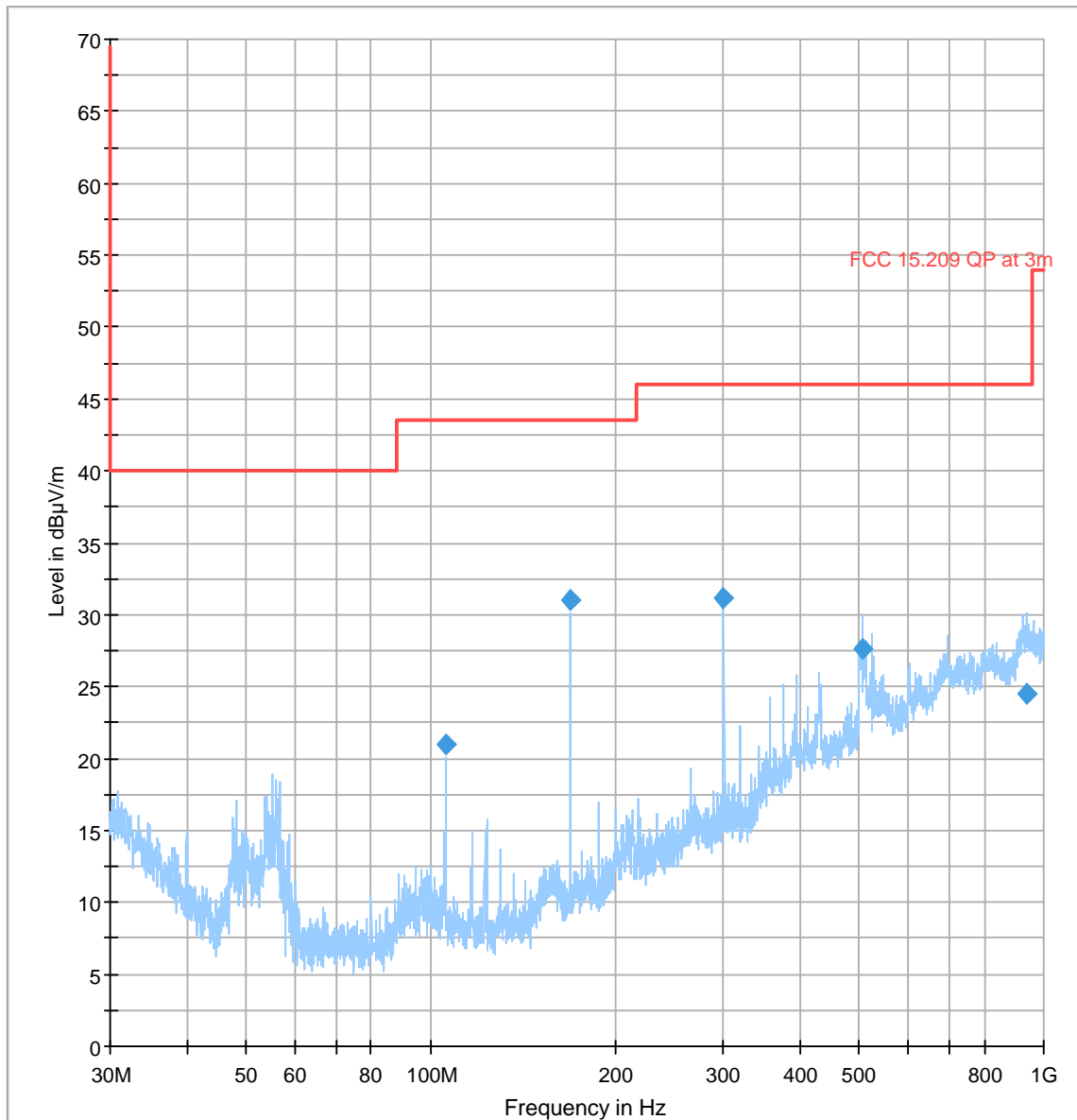
FCC 15.209 QP at 3m



Final\_Result QPK

Plot # 12

| Frequency (MHz) | QuasiPeak (dBμV/m) | DET 2 (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|--------------------|----------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 105.686         | 20.98              | ---            | 43.50          | 22.52       | 500.0           | 120.0           | 118.0       | V   | 250.0         | -19.6        |         |
| 169.169         | 31.00              | ---            | 43.50          | 12.50       | 500.0           | 120.0           | 205.0       | H   | 101.0         | -18.3        |         |
| 300.885         | 31.16              | ---            | 46.02          | 14.86       | 500.0           | 120.0           | 117.0       | H   | 68.0          | -13.9        |         |
| 506.296         | 27.66              | ---            | 46.02          | 18.36       | 500.0           | 120.0           | 202.0       | H   | 107.0         | -7.4         |         |
| 940.447         | 24.51              | ---            | 46.02          | 21.51       | 500.0           | 120.0           | 157.0       | V   | -17.0         | -0.5         |         |



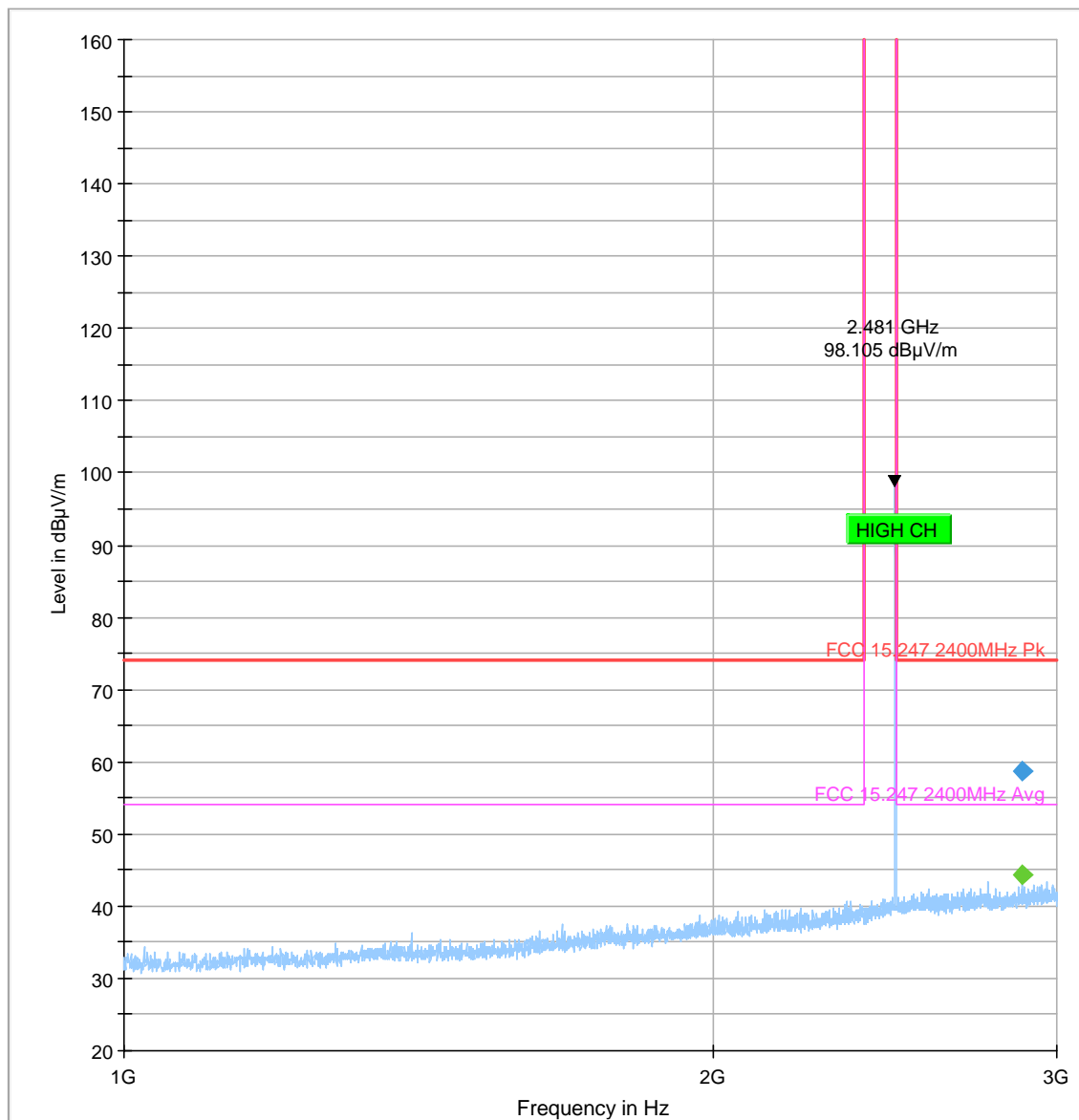
— Preview Result 1-PK+

— FCC 15.209 QP at 3m

◆ Final\_Result QPK

Plot # 13

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 2881.000        | ---              | 44.24             | 54.00          | 9.76        | 500.0           | 1000.0          | 100.0       | V   | 89.0          | 35.7         |         |
| 2881.000        | 58.78            | ---               | 74.00          | 15.22       | 500.0           | 1000.0          | 100.0       | V   | 89.0          | 35.7         |         |



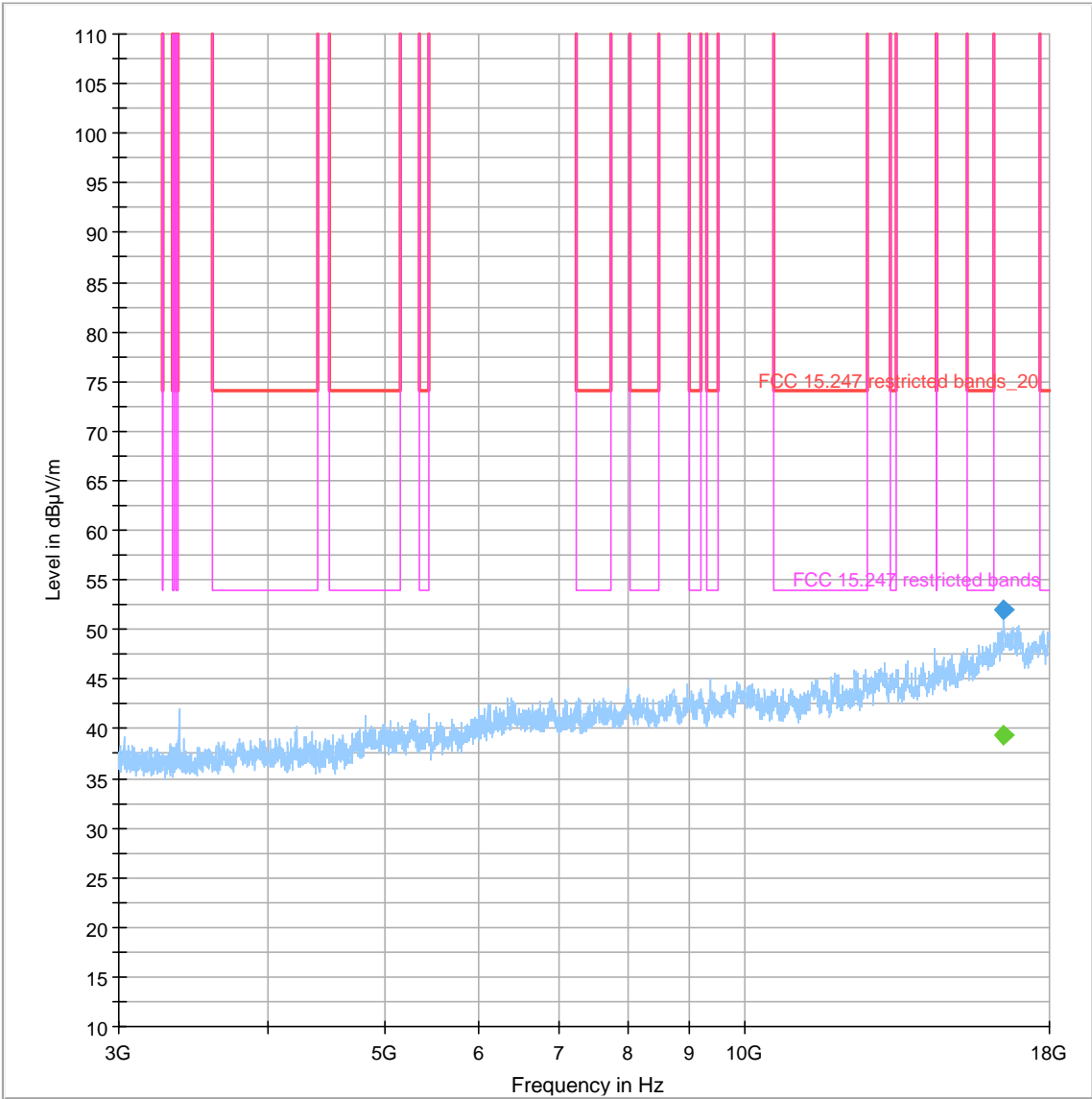
◆ Preview Result 1-PK+  
Final\_Result PK+

◆ FCC 15.247 2400MHz Pk  
Final\_Result CAV

— FCC 15.247 2400MHz Avg

Plot # 14

| Frequency (MHz) | MaxPeak (dBµV/m) | CAverage (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment                    |
|-----------------|------------------|-------------------|-----------------|-----------------|-------------|-----|---------------|--------------|----------------------------|
| 16505.000       | ---              | 39.44             | 500.0           | 1000.0          | 385.0       | H   | 120.0         | 14.4         | Not in the restricted band |
| 16505.000       | 51.99            | ---               | 500.0           | 1000.0          | 385.0       | H   | 120.0         | 14.4         | Not in the restricted band |



Preview Result 1-PK+

FCC 15.247 restricted bands

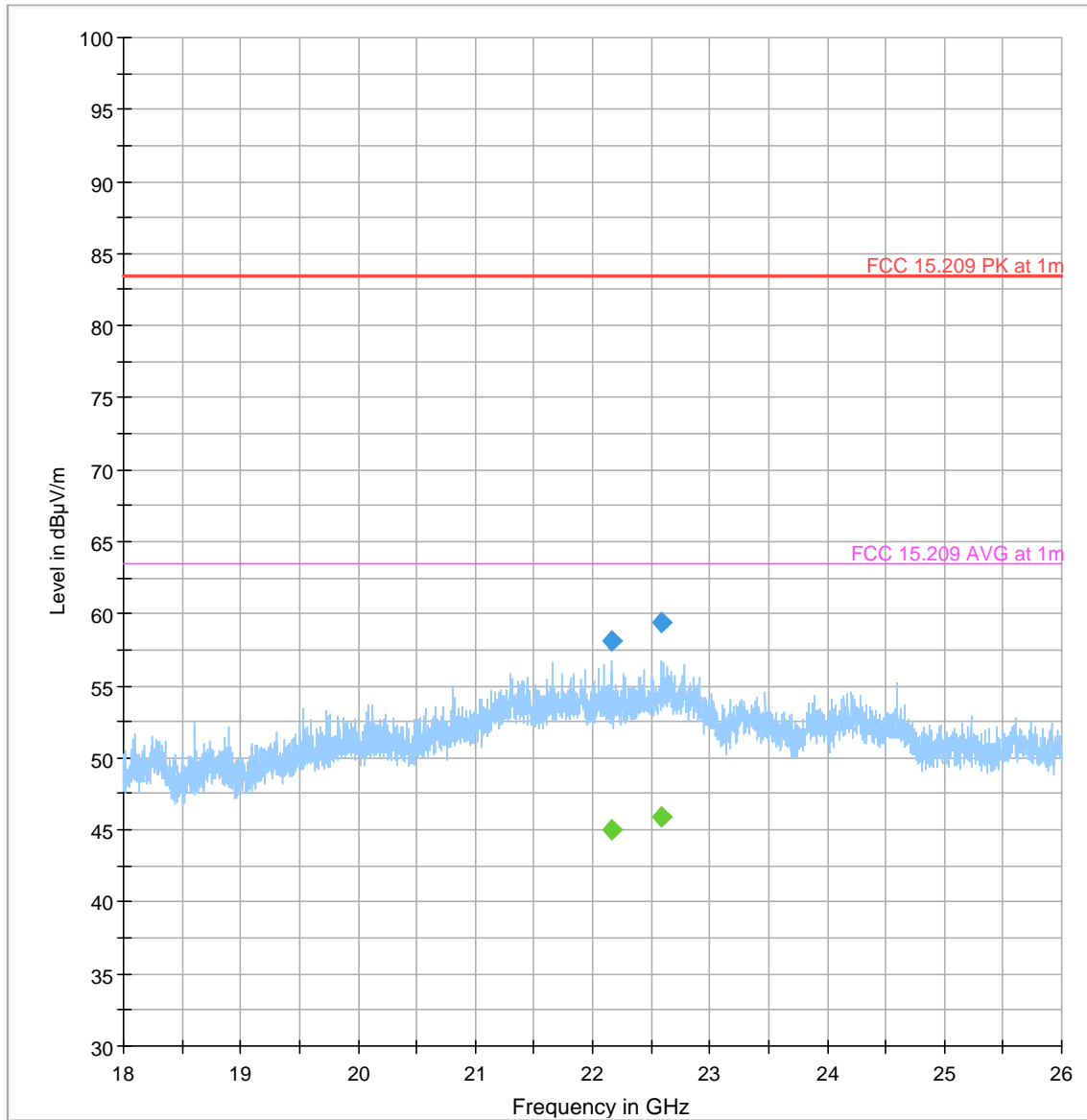
Final\_Result CAV

FCC 15.247 restricted bands\_20

Final\_Result PK+

**Plot # 15**

| Frequency (MHz) | MaxPeak (dBμV/m) | CAverage (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Comment |
|-----------------|------------------|-------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------|
| 22161.250       | ---              | 45.06             | 63.50          | 18.44       | 500.0           | 1000.0          | 140.0       | H   | 190.0         | 18.8         |         |
| 22161.250       | 58.14            | ---               | 83.50          | 25.36       | 500.0           | 1000.0          | 140.0       | H   | 190.0         | 18.8         |         |
| 22582.000       | ---              | 45.94             | 63.50          | 17.56       | 500.0           | 1000.0          | 140.0       | V   | 68.0          | 19.7         |         |
| 22582.000       | 59.36            | ---               | 83.50          | 24.14       | 500.0           | 1000.0          | 140.0       | V   | 68.0          | 19.7         |         |



◆ Preview Result 1-PK+ Final\_Result PK+
 ◆ FCC 15.209 PK at 1m Final\_Result CAV
 — FCC 15.209 AVG at 1m



## 9 Test setup photos

Setup photos are included in supporting file name:  
“EMC\_VISTE\_002\_23001\_BPCMSW\_FCC15247\_DTS\_Photos\_Rev1”

## 10 Test Equipment and Ancillaries Used for Testing

| Equipment Type          | Manufacturer    | Model               | Serial #   | Calibration Cycle | Last Calibration Date |
|-------------------------|-----------------|---------------------|------------|-------------------|-----------------------|
| Active Monopole ANTENNA | Com-Power Corp. | AM-741R             | 10200112   | 3 Years           | 11/09/2023            |
| ACTIVE LOOP ANTENNA     | ETS LINDGREN    | 6512                | 00049838   | 3 Years           | 09/06/2023            |
| BILOG ANTENNA           | ETS.LINDGREN    | 3142E               | 00166067   | 3 Years           | 08/01/2024            |
| HORN ANTENNA            | EMCO            | 3115                | 00035114   | 3 Years           | 09/13/2023            |
| HORN ANTENNA            | ETS.LINDGREN    | 3117                | 00215984   | 3 Years           | 10/26/2023            |
| HORN ANTENNA            | ETS LINDGREN    | 3116C-PA            | 00166821   | 3 Years           | 10/26/2023            |
| TEST RECEIVER           | R&S             | ESW44               | 103143     | 2 Years           | 09/12/2024            |
| DIGITAL THERMOMETER     | CONTROL COMPANY | 4410,90080-03       | 230713059  | 3 Years           | 10/18/2023            |
| PULSE LIMITER           | R&S             | ESH3-Z2             | 102473     | 3 Years           | 11/02/2023            |
| LISN                    | FCC             | FCC-LISN-50-25-2-08 | 08014      | 2 Years           | 10/06/2023            |
| V-Network LISN          | R&S             | ESH3-Z6             | 836154/011 | 3 Years           | 10/06/2023            |
| Multimeter              | Fluke           | 115                 | 56090717MV | 3 Years           | 09/26/2023            |
| Software                | EMC32           | Version 11.40.00    | -          | -                 | -                     |

**Note:** Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.  
Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated “NA” for cal status either do not specifically require calibration or is internally characterized before use.

## 11 Revision History

| Date       | Report name                                  | Changes to report  | Prepared by      |
|------------|--|--|------------------|
| 2024-11-14 | EMC_VISTE_002_23001_BPCMSW_FCC15247_DTS      | Initial version  | Guangcheng Huang |
| 2024-11-22 | EMC_VISTE_002_23001_BPCMSW_FCC15247_DTS_Rev1 | Update OBW plot,<br>remove duty cycle measurement,<br>remove margin to the emission limit<br>for frequency not in the restricted<br>band | Guangcheng Huang |

<<< The End >>>