

# Test Report

**FOR:**

Continental Automotive Technologies GmbH

**Brand:**

AUMOVIO

**Marketing Name:**

PACCAR Connect Platform

**Model Name:**

SILVERBOX

**Product Description:**

Infotainment controller for truck

**FCC ID:** 2AJW5PCNPSLV

**IC:** 21979-PCNPSLV

**Applied Rules and Standards:**

47 CFR Part 15.407 (NII) & 5 GHz (UNII)

RSS-247 Issue 4 (DTS) & (LE-LAN), and RSS-Gen Issue 5

**REPORT #:** EMC\_CONTM\_003\_25001\_FCC15407\_WLAN\_Rev4

**DATE:** 2026-04-13



**IC recognized #**  
**3462B**

**CETECOM Inc.**

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## 1 Assessment

The following device was evaluated against the applicable criteria specified in FCC rules Parts 15.407 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-247.

There were no additions, deviations, or exclusions made from the test method.

| Company Name                             | Product Description               | Model No. |
|------------------------------------------|-----------------------------------|-----------|
| Continental Automotive Technologies GmbH | Infotainment controller for truck | SILVERBOX |

Report Authorized by:

Responsible for testing Laboratory:

Alvin Ilarina  
(Director of EMC Services)

Alvin  
ILARINA  
Digitally signed by  
Alvin ILARINA  
Date: 2026.04.13  
16:37:41 -07'00'

2026-04-13 Compliance

| Date | Section | Name | Signature |
|------|---------|------|-----------|
|------|---------|------|-----------|

Responsible for the Report:

Guangcheng Huang  
(Senior EMC Test Engineer)

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07'00'

2026-04-13 Compliance

| 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

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

### 2.1 Identification of the Client

|                   |                                          |
|-------------------|------------------------------------------|
| Client Firm/Name: | Continental Automotive Technologies GmbH |
| Street Address:   | Heinrich-Hertz-Straße 45                 |
| City/Zip Code     | 78052                                    |
| Country           | Germany                                  |

### 2.2 Identification of the Manufacturer

|                        |                                           |
|------------------------|-------------------------------------------|
| Manufacturer's Name:   | Continental Automotive Guadalajara Mexico |
| Manufacturers Address: | Camino a la Tijera 3                      |
| City/Zip Code          | 45647                                     |
| Country                | Mexico                                    |

### 3 Equipment Under Test (EUT)

#### 3.1 EUT Specifications

|                                                      |                                   |
|------------------------------------------------------|-----------------------------------|
| <b>Model No:</b>                                     | SILVERBOX                         |
| <b>Marketing Name:</b>                               | PACCAR Connect Platform           |
| <b>HW Version:</b>                                   | AAA2425110200                     |
| <b>SW Version:</b>                                   | EBS.A.C.2025-03-07                |
| <b>FCC ID:</b>                                       | 2AJW5PCNPSLV                      |
| <b>ISED:</b>                                         | 21979-PCNPSLV                     |
| <b>FWIN:</b>                                         | -                                 |
| <b>HVIN:</b>                                         | AAA26838                          |
| <b>PMN:</b>                                          | -                                 |
| <b>Product Description:</b>                          | Infotainment controller for truck |
| <b>Power Supply / Rated operating Voltage Range:</b> | 9 V to 16 V                       |
| <b>Operating Temperature Range</b>                   | -40°C to 85°C                     |
| <b>Sample Revision</b>                               | production                        |
| <b>EUT Dimensions</b>                                | 194 mm X 140 mm X 87.15 mm        |
| Note: All information provided by the client.        |                                   |

### 3.2 Radio Specifications

|                                               |                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Embedded Radio Technologies</b>            | AM/FM, SDARS, WLAN, BT, GNSS                                                                                                                                                                                                                                                                                                   |
| <b>Frequency Range / number of channels:</b>  | WLAN 5GHz, UNII-1 (5150 - 5250 MHz), UNII-3 (5725 - 5850 MHz) / 36, 38, 40, 44, 46, 48, 149, 151, 153 155, 157, 159, 161<br>BT CLASS 2 (2400-2483.5 MHz)<br>BLE (2400-2483.5 MHz)<br><br>WLAN 5 GHz <ul style="list-style-type: none"> <li>• U-NII 1&amp;3</li> <li>• BW 20/40 MHz</li> <li>• mode 802.11 a/ac/ax/n</li> </ul> |
| <b>Antenna Type / Gain</b>                    | See following table of antenna gain                                                                                                                                                                                                                                                                                            |
| Note: All information provided by the client. |                                                                                                                                                                                                                                                                                                                                |

| 2.4 GHz band (dBi) (only use AT400/chain2) |       |       |                       |
|--------------------------------------------|-------|-------|-----------------------|
| RF chain                                   | AT400 | AT401 |                       |
| In-band Max.                               | 2.8   | 1.9   |                       |
| 5 GHz band, U-NII-1 subband (dBi)          |       |       |                       |
| RF chain                                   | AT400 | AT401 | MIMO directional gain |
| In-band Max.                               | 2.3   | 2.4   | 5.36                  |
| 5 GHz band, U-NII-3 subband (dBi)          |       |       |                       |
| RF chain                                   | AT400 | AT401 | MIMO directional gain |
| In-band Max.                               | 5.5   | 4.7   | 8.12                  |

Note: MIMO directional gain calculated per formula (40) from ANSI C63.10-2020.

### 3.3 EUT Power setting

Test software QRCT (snapshot down below) provided by applicant. TX setup parameters are loaded with xml files prepared by applicant.

| TX SETUP           |                   | TX REPORT         |       |
|--------------------|-------------------|-------------------|-------|
|                    | Properties        | Property          | PHY   |
| RF Mode/Instance   | PhyA_only         | Good Packets      | 31104 |
| Phy ID             | PHY_A0            | ThermCal 1        | 0     |
| Tx Mode            | ContTx99          | ThermCal 2        | 0     |
| Channel (Mhz)      | 5200              | RSSI              | 0     |
| Channel2 (Mhz)     |                   | Throughput        | 0     |
| TX Power Control   | TxPowerAuto       | Gain Index        | 0     |
| TX Power(dBm)      | 10                | DAC GAIN          | 0     |
| cbState            | none              | PACFG             | 0     |
| Rate               | RATE_MCS_8        | PDADC1            | 0     |
| Rate BW            | RateBW_11AC_VHT20 | PDADC2            | 0     |
| NSS                | _2Streams         | PDADC3            | 0     |
| Short Guard        | OFF               | PDADC4            | 0     |
| Duty Cycle(0-100%) | 100               | LatestMeasPwrOut1 | 0     |

|                  | SISO        |             | MIMO              |             |
|------------------|-------------|-------------|-------------------|-------------|
|                  | U-NII-1     | U-NII-3     | U-NII-1           | U-NII-3     |
| TX Power Control | TxPowerAuto | TxPowerAuto | TxPowerForce_CLPC | TxPowerAuto |
| TX Power (dBm)   | 12          | 14          | 9                 | 14          |

About guardrails that limit power output on device and final SW:

#### A. Power Summation Logic

- SISO Mode: Only one chain is active. The firmware allows it to hit the 12 dBm ceiling because the total output is just that one chain.
- MIMO Mode: Both chains are active. To keep the total power within regulatory limits or thermal envelopes, the firmware applies a MIMO Backoff. If the limit is 12 dBm total, it must restrict each chain to roughly 9 dBm.

#### B. Firmware Guardrails (The "Chainmask")

When the QCA6696 driver negotiates a connection, it sets a Chainmask.

- If the Chainmask is 0x3 (both antennas), the firmware automatically switches to the MIMO Power Table.
- The hardware registers for the Power Amplifiers (PAs) are locked to these table values. Even if a user-space tool sends a command to "Set Tx Power to 12 dBm," the firmware intercepts this and caps it at the value defined in the BDF for the current mode (MIMO).

### 3.4 EUT Sample details

| EUT # | Serial Number | HW Version    | SW Version         | Notes/Comments |
|-------|---------------|---------------|--------------------|----------------|
| 1     | -             | AAA2425110200 | EBS.A.C.2025-03-07 | Radiated DUT   |
| 2     | 25268017      | AAA2425110200 | EBS.A.C.2025-03-07 | Conducted DUT  |

### 3.5 Accessory Equipment (AE) details

| AE # | Type          | Model | Manufacturer | Serial Number |
|------|---------------|-------|--------------|---------------|
| 1    | cable harness | -     | -            | -             |
| 2    | Test laptop   | -     | -            | -             |

### 3.6 Test Sample Configuration

| EUT Set-up # | Combination of AE used for test set up | Comments                                                                    |
|--------------|----------------------------------------|-----------------------------------------------------------------------------|
| 1            | EUT#1 + AE#1                           | For conducted testing (test laptop used before testing to set up test mode) |
| 2            | EUT#2 + AE#1                           | For radiated testing (test laptop used before testing to set up test mode)  |

### 3.7 Justification for Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty. 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 FCC rules Part 15.407 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-247 of ISED Canada.

#### 5 Measurement Results Summary

| Test Specification                                          | Test Case                      | Temperature and Voltage Conditions | Mode                | Pass                                | NA                                  | NP                       | Result           |
|-------------------------------------------------------------|--------------------------------|------------------------------------|---------------------|-------------------------------------|-------------------------------------|--------------------------|------------------|
| §15.407(e)<br>RSS-247 6.2.4.1                               | Emission Bandwidth             | Nominal                            | 802.11<br>a/ac/ax/n | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies         |
| §15.407(a)<br>RSS-247 6                                     | Power Spectral Density         | Nominal                            | 802.11<br>a/ac/ax/n | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies         |
| §15.407(a)<br>RSS-247 6                                     | Maximum Output Power           | Nominal                            | 802.11<br>a/ac/ax/n | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies         |
| §15.407; 15.205<br>RSS-247 6; RSS-Gen 8.10                  | Band Edge Compliance           | Nominal                            | 802.11<br>a/ac/ax/n | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies         |
| §15.407(b); §15.209; 15.205<br>RSS-247 6; RSS-Gen 8.9; 8.10 | Radiated TX Spurious Emissions | Nominal                            | 802.11 ac           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Complies         |
| §15.207(a)<br>RSS Gen 8.8                                   | AC Conducted Emissions         | Nominal                            | -                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Note 1<br>Note 2 |

**Note 1:** NA= Not Applicable; NP= Not Performed.

**Note 2:** The EUT is not powered by the AC public mains; therefore, AC conducted emissions testing 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.

| Measurement System               |                  | EMC-1   | EMC-2   |
|----------------------------------|------------------|---------|---------|
| Conducted emissions (mains port) | 150 kHz – 30 MHz | 2.45 dB | N/A     |
| Radiated emissions               | 9 kHz – 30 MHz   | 2.68 dB | 2.53 dB |
|                                  | 30 – 100 MHz     | 4.39 dB | 3.85 dB |
|                                  | 100 MHz – 1 GHz  | 5.65 dB | 5.24 dB |
|                                  | 1 – 6 GHz        | 5.0 dB  | 4.88 dB |
|                                  | 6 – 18 GHz       | 4.76 dB | 4.58 dB |
|                                  | 18 – 40 GHz      | 4.65 dB | 4.61 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 the course of testing:

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

Deviating test conditions are indicated at individual test description where applicable.

### 6.2 Date of Testing:

2025-11-06 – 2026-03-11

### 6.3 Decision Rule:

Cetecom Inc follows ILAC G8:09/2019 chapter 4.2.1 (Simple Acceptance Rule).

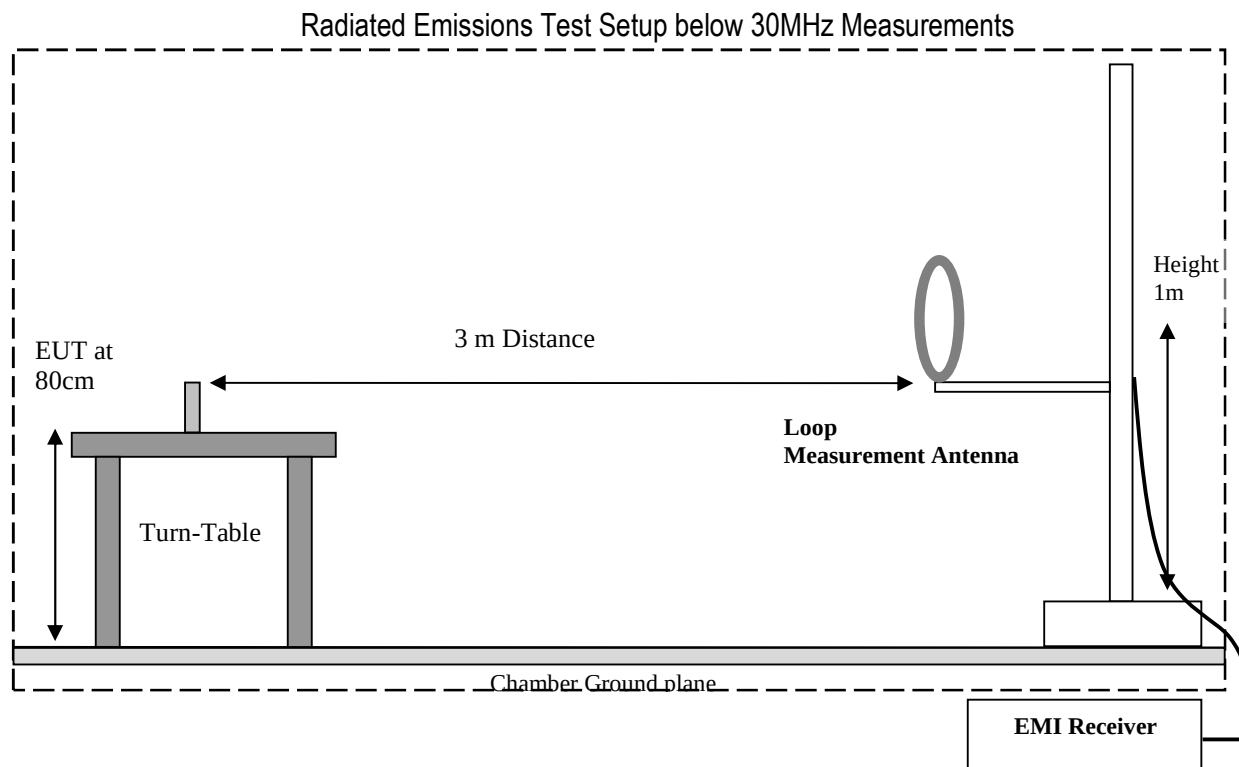
Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither 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

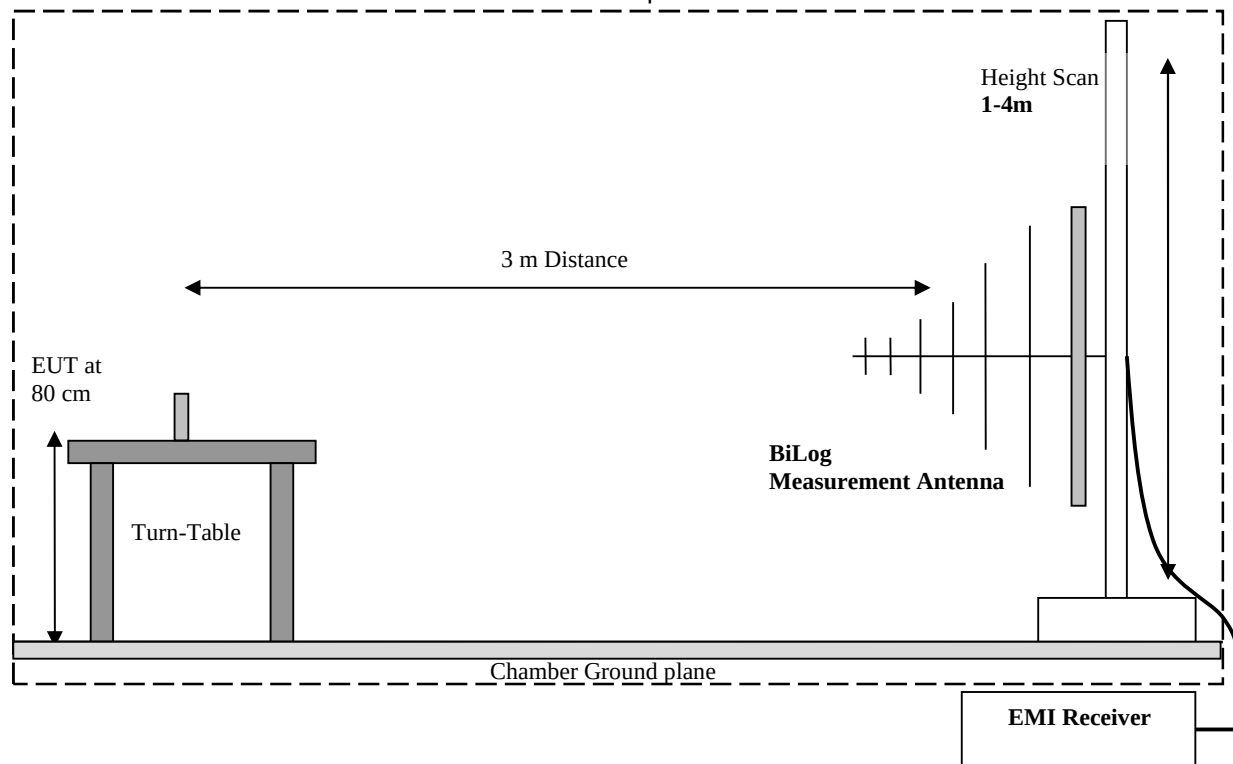
### 7.1 Radiated Measurement

The radiated measurement is performed according to ANSI C63.10 (2020) + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024

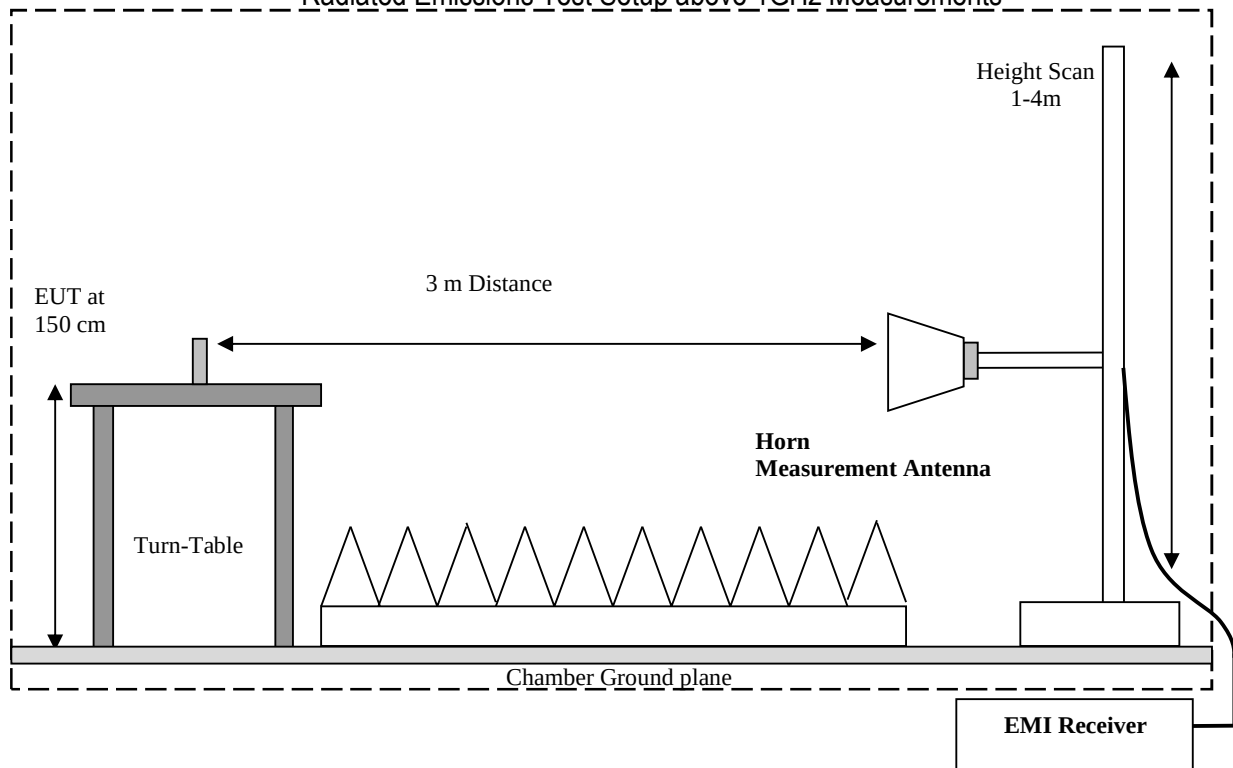
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis 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 10 highest 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 up 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.



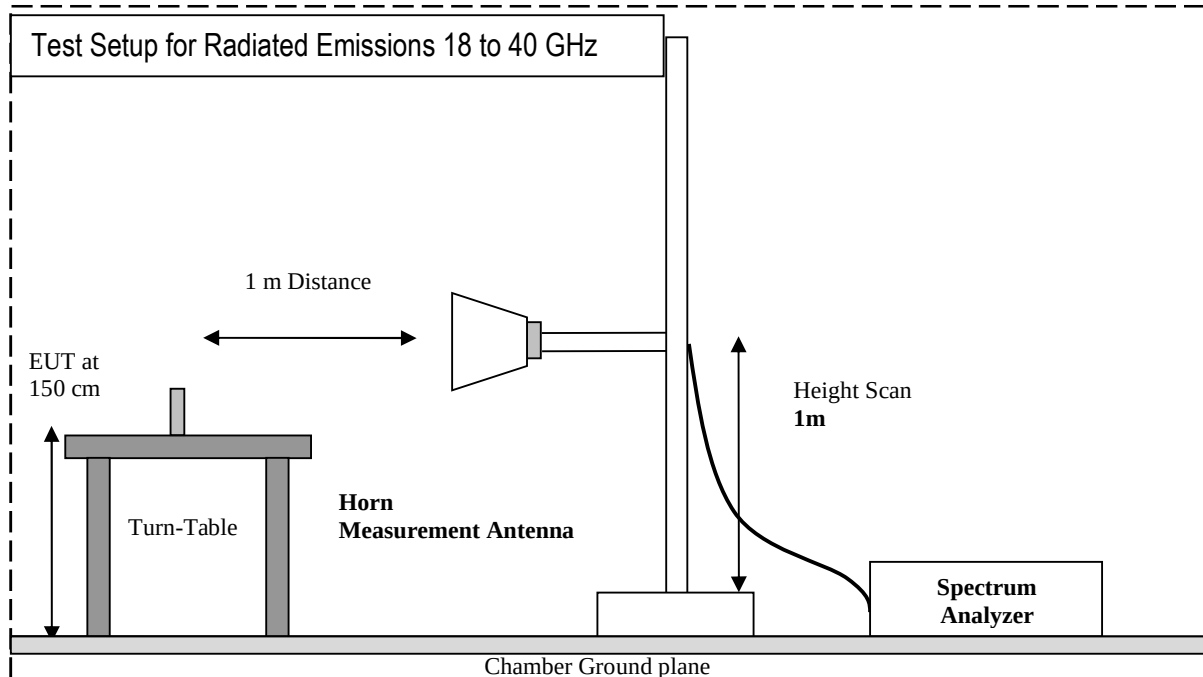
### Radiated Emissions Test Setup 30MHz-1GHz Measurements



### Radiated Emissions Test Setup above 1GHz Measurements



- The 18-40 GHz test hardware is shared between both chambers. Below is a representative photo from the setup in EMC-2. For this setup the Spectrum Analyzer is used, connected directly to the 3116-PA antenna via the green high frequency cable.



### 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                                 |

To correct for distance when measuring at a distance other than the specification distance;

- For measurements below 30 MHz:  $FS_{\text{limit}} = FS_{\text{max}} - 40\log(d_{\text{limit}}/d_{\text{measure}})$
- For measurements above 30 MHz:  $FS_{\text{limit}} = FS_{\text{max}} - 20\log(d_{\text{limit}}/d_{\text{measure}})$

where

$FS_{\text{limit}}$  is the calculation of field strength at the limit distance, expressed in dB $\mu$ V/m

$FS_{\text{max}}$  is the measured field strength, expressed in dB $\mu$ V/m

$d_{\text{measure}}$  is the distance of the measurement point from the EUT

$d_{\text{limit}}$  is the reference limit distance –  $40\log(\text{SpecDistance}/\text{TestDistance}) = \text{Distance Factor}$

Example:

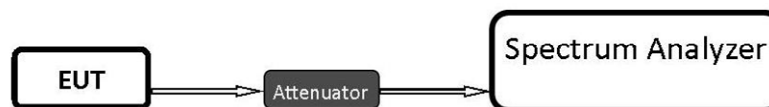
| Frequency (MHz) | Field Strength Limit @30m ( $\mu$ V/m) | Field Strength Limit @30m (dB $\mu$ V/m) | Field Strength limit @3m (dB $\mu$ V/m) |
|-----------------|----------------------------------------|------------------------------------------|-----------------------------------------|
| 10              | 30                                     | 29.54                                    | 69.54                                   |
| 100             | 30                                     | 29.54                                    | 49.54                                   |

## 7.2 Power Line Conducted Measurement Procedure

AC Power Line conducted emissions measurements performed according to: ANSI C63.10 (2020) + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024

## 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 Data

### 8.1 Maximum Output Power

#### 8.1.1 Measurement according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

**Method PM-G** (Measurement using a gated RF average power meter):

- Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### 8.1.2 Limits:

FCC§15.407

##### Sub-band 5150-5250 MHz

- For AP the maximum conducted output power over the frequency band of operation shall not exceed 1 W
- For Client Devices the maximum conducted output power over the frequency band of operation shall not exceed 250 mW

##### Sub-band 5250-5350 MHz and 5470-5725 MHz and

- The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz

##### Sub-band 5725-5850 MHz

- The maximum conducted output power over the frequency band of operation shall not exceed 1 W

RSS-247

##### Sub-band 5150-5250 MHz

- For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.
- For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz.

##### Sub-band 5250-5350 MHz

- For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.
- Devices, other than devices installed in vehicles, shall comply with the following:
  - a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less.
  - b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

- Additional requirements

In addition to the above requirements, devices shall comply with the following, where applicable:

- a) Outdoor fixed devices with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where  $\theta$  is the angle above the local horizontal plane (of the Earth) as shown below:

|                                           |                                          |
|-------------------------------------------|------------------------------------------|
| i. -13 dBW/MHz                            | for $0^\circ \leq \theta < 8^\circ$      |
| ii. $-13 - 0.716 (\theta - 8)$ dBW/MHz    | for $8^\circ \leq \theta < 40^\circ$     |
| iii. $-35.9 - 1.22 (\theta - 40)$ dBW/MHz | for $40^\circ \leq \theta \leq 45^\circ$ |
| iv. -42 dBW/MHz                           | for $\theta > 45^\circ$                  |

The measurement procedure defined in Annex A of this document shall be used to verify the compliance to the e.i.r.p. at different elevations.

- b) Devices, other than outdoor fixed devices, having an e.i.r.p. greater than 200 mW shall comply with either i. or ii. below:

i. devices shall comply with the e.i.r.p. elevation mask in 6.2.2.3(a); or

ii. devices shall implement a method to permanently reduce their e.i.r.p. via a firmware feature in the event that the Department requires it. The test report must demonstrate how the device's power table can be updated to meet this firmware requirement. The manufacturer shall provide this firmware to update all systems automatically in compliance with the directions received from the Department.

#### Sub-band 5470-5600 MHz and 5650-5725 MHz

- The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less.
- The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

#### Sub-band 5725-5850 MHz

- The maximum conducted output power shall not exceed 1 W.

Note: All limits are conducted. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 8.1.3 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input | Antenna Gain |
|---------------------|--------------|--------------------|-------------|--------------|
| 22 °C               | 1            | 802.11 a/ac/ax/n   | 12 VDC      | Note 1       |

Note: Power setting see sec.3.3.

**8.1.4 Measurement result:**

U-NII-1 Band Operation (20 MHz Bandwidth)

SISO Chain 1/AT401

| Mode    | Channel | Frequency (MHz) | Maximum Output Power (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED EIRP Limit (dBm) | Result |
|---------|---------|-----------------|----------------------------|------------|------------------------------|-----------------------|--------|
| 802.11a | 36      | 5180            | 9.8                        | 12.2       | 30                           | 13.99                 | Pass   |
| 802.11a | 40      | 5200            | 9.7                        | 12.1       | 30                           | 13.99                 | Pass   |
| 802.11a | 48      | 5240            | 9.5                        | 11.9       | 30                           | 13.99                 | Pass   |

U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 1/AT401

| Mode    | Channel | Frequency (MHz) | Maximum Output Power (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED Output Power Limit (dBm) | Result |
|---------|---------|-----------------|----------------------------|------------|------------------------------|-------------------------------|--------|
| 802.11a | 149     | 5745            | 9.3                        | 14         | 30                           | 30                            | Pass   |
| 802.11a | 157     | 5785            | 9.5                        | 14.2       | 30                           | 30                            | Pass   |
| 802.11a | 165     | 5825            | 8.8                        | 13.5       | 30                           | 30                            | Pass   |

U-NII-1 Band Operation (20 MHz Bandwidth)

SISO Chain 2/AT400

| Mode    | Channel | Frequency (MHz) | Maximum Output Power (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED EIRP Limit (dBm) | Result |
|---------|---------|-----------------|----------------------------|------------|------------------------------|-----------------------|--------|
| 802.11a | 36      | 5180            | 8.8                        | 11.2       | 30                           | 13.99                 | Pass   |
| 802.11a | 40      | 5200            | 8.8                        | 11.2       | 30                           | 13.99                 | Pass   |
| 802.11a | 48      | 5240            | 9.3                        | 11.7       | 30                           | 13.99                 | Pass   |

U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 2/AT400

| Mode    | Channel | Frequency (MHz) | Maximum Output Power (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED Output Power Limit (dBm) | Result |
|---------|---------|-----------------|----------------------------|------------|------------------------------|-------------------------------|--------|
| 802.11a | 149     | 5745            | 8.5                        | 14         | 30                           | 30                            | Pass   |
| 802.11a | 157     | 5785            | 9.1                        | 14.6       | 30                           | 30                            | Pass   |
| 802.11a | 165     | 5825            | 8.5                        | 14         | 30                           | 30                            | Pass   |

## U-NII-1 Band Operation (20 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Output Power Chain 1 /AT401 (dBm) | Output Power Chain 2 /AT400 (dBm) | Output Power total (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED EIRP Limit (dBm) | Result |
|----------|---------|-----------------|-----------------------------------|-----------------------------------|--------------------------|------------|------------------------------|-----------------------|--------|
| 802.11ac | 36      | 5180            | 2.8                               | 6.1                               | 7.8                      | 13.2       | 30                           | 13.99                 | Pass   |
| 802.11ac | 40      | 5200            | 2.7                               | 5.9                               | 7.6                      | 13.0       | 30                           | 13.99                 | Pass   |
| 802.11ac | 48      | 5240            | 2.5                               | 6.0                               | 7.6                      | 13.0       | 30                           | 13.99                 | Pass   |
| 802.11ax | 36      | 5180            | 2.8                               | 6.2                               | 7.8                      | 13.2       | 30                           | 13.99                 | Pass   |
| 802.11ax | 40      | 5200            | 2.8                               | 5.9                               | 7.7                      | 13.1       | 30                           | 13.99                 | Pass   |
| 802.11ax | 48      | 5240            | 2.6                               | 6.1                               | 7.7                      | 13.1       | 30                           | 13.99                 | Pass   |
| 802.11n  | 36      | 5180            | 2.4                               | 5.6                               | 7.3                      | 12.7       | 30                           | 13.99                 | Pass   |
| 802.11n  | 40      | 5200            | 2.3                               | 5.3                               | 7.1                      | 12.5       | 30                           | 13.99                 | Pass   |
| 802.11n  | 48      | 5240            | 2.0                               | 5.5                               | 7.1                      | 12.5       | 30                           | 13.99                 | Pass   |

## U-NII-3 Band Operation (20 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Output Power Chain 1 /AT401 (dBm) | Output Power Chain 2 /AT400 (dBm) | Output Power total (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED Output Power Limit (dBm) | Result |
|----------|---------|-----------------|-----------------------------------|-----------------------------------|--------------------------|------------|------------------------------|-------------------------------|--------|
| 802.11ac | 149     | 5745            | 12.7                              | 9.5                               | 14.4                     | 22.5       | 27.88                        | 27.88                         | Pass   |
| 802.11ac | 157     | 5785            | 12.8                              | 9.6                               | 14.5                     | 22.6       | 27.88                        | 27.88                         | Pass   |
| 802.11ac | 165     | 5825            | 12.0                              | 9.0                               | 13.8                     | 21.9       | 27.88                        | 27.88                         | Pass   |
| 802.11ax | 149     | 5745            | 12.7                              | 9.0                               | 14.2                     | 22.3       | 27.88                        | 27.88                         | Pass   |
| 802.11ax | 157     | 5785            | 12.8                              | 9.0                               | 14.3                     | 22.4       | 27.88                        | 27.88                         | Pass   |
| 802.11ax | 165     | 5825            | 12.3                              | 8.6                               | 13.8                     | 21.9       | 27.88                        | 27.88                         | Pass   |
| 802.11n  | 149     | 5745            | 12.6                              | 9.2                               | 14.2                     | 22.3       | 27.88                        | 27.88                         | Pass   |
| 802.11n  | 157     | 5785            | 12.8                              | 9.3                               | 14.4                     | 22.5       | 27.88                        | 27.88                         | Pass   |
| 802.11n  | 165     | 5825            | 12.1                              | 8.5                               | 13.7                     | 21.8       | 27.88                        | 27.88                         | Pass   |

## U-NII-1 Band Operation (40 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Output Power Chain 1 /AT401 (dBm) | Output Power Chain 2 /AT400 (dBm) | Output Power total (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED EIRP Limit (dBm) | Result |
|----------|---------|-----------------|-----------------------------------|-----------------------------------|--------------------------|------------|------------------------------|-----------------------|--------|
| 802.11ac | 38      | 5190            | 2.8                               | 6.0                               | 7.7                      | 13.1       | 30                           | 14.77                 | Pass   |
| 802.11ac | 46      | 5230            | 3.1                               | 6.1                               | 7.8                      | 13.2       | 30                           | 14.77                 | Pass   |
| 802.11ax | 38      | 5190            | 2.8                               | 6.1                               | 7.8                      | 13.2       | 30                           | 14.77                 | Pass   |
| 802.11ax | 46      | 5230            | 3.2                               | 6.1                               | 7.9                      | 13.3       | 30                           | 14.77                 | Pass   |
| 802.11n  | 38      | 5190            | 2.7                               | 5.9                               | 7.6                      | 13.0       | 30                           | 14.77                 | Pass   |
| 802.11n  | 46      | 5230            | 3.0                               | 5.9                               | 7.7                      | 13.1       | 30                           | 14.77                 | Pass   |

## U-NII-3 Band Operation (40 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Output Power Chain 1 /AT401 (dBm) | Output Power Chain 2 /AT400 (dBm) | Output Power total (dBm) | EIRP (dBm) | FCC Output Power Limit (dBm) | ISED Output Power Limit (dBm) | Result |
|----------|---------|-----------------|-----------------------------------|-----------------------------------|--------------------------|------------|------------------------------|-------------------------------|--------|
| 802.11ac | 151     | 5755            | 12.6                              | 9.5                               | 14.3                     | 22.4       | 27.88                        | 27.88                         | Pass   |
| 802.11ac | 159     | 5795            | 12.8                              | 9.5                               | 14.5                     | 22.6       | 27.88                        | 27.88                         | Pass   |
| 802.11ax | 151     | 5755            | 12.6                              | 9.1                               | 14.2                     | 22.3       | 27.88                        | 27.88                         | Pass   |
| 802.11ax | 159     | 5795            | 12.7                              | 8.9                               | 14.3                     | 22.4       | 27.88                        | 27.88                         | Pass   |
| 802.11n  | 151     | 5755            | 11.8                              | 9.5                               | 13.8                     | 21.9       | 27.88                        | 27.88                         | Pass   |
| 802.11n  | 159     | 5795            | 12.2                              | 9.5                               | 14                       | 22.1       | 27.88                        | 27.88                         | Pass   |

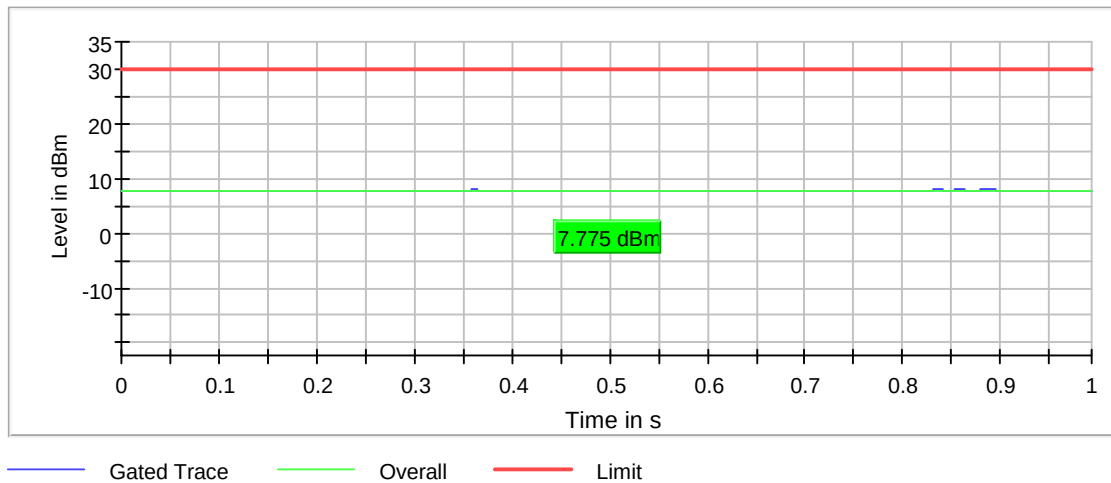
### 8.1.5 Highest Power Measurement Plot:

For test cases where the measurement plots were determined to be similar, only the plot corresponding to the worst-case configuration of each sub-band is presented in this section.

#### U-NII-1 sub-band RF output power (802.11ac, MIMO, 5180 MHz; 20 MHz)

| DUT Frequency (MHz) | Gated RMS (dBm) | Limit Max (dBm) | Gated EIRP (dBm) | DutyCycle (%) | Result |
|---------------------|-----------------|-----------------|------------------|---------------|--------|
| 5180.000000         | 7.8             | 30.0            | 13.2             | 99.720        | PASS   |

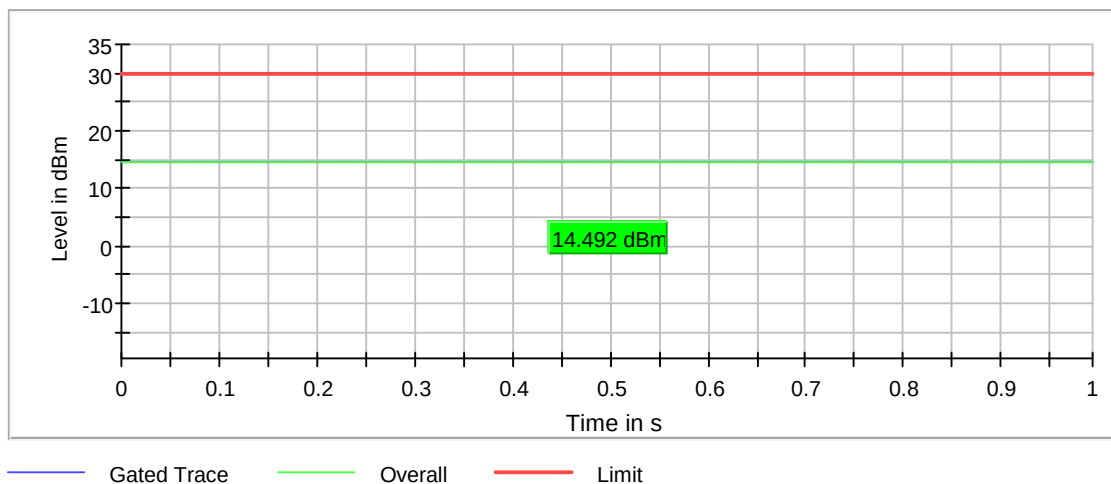
Gated Trace



#### U-NII-3 sub-band RF output power (802.11ac, MIMO, 5785 MHz; 20 MHz)

| DUT Frequency (MHz) | Gated RMS (dBm) | Limit Max (dBm) | Gated EIRP (dBm) | DutyCycle (%) | Result |
|---------------------|-----------------|-----------------|------------------|---------------|--------|
| 5785.000000         | 14.5            | 27.88           | 226              | 99.719        | PASS   |

Gated Trace



## 8.2 Power Spectral Density

### 8.2.1 Measurement according to FCC 789033 D02 General UNII Test Procedures New Rules v02r01

#### Spectrum Analyzer Settings for Peak PSD in 1 MHz Band with Method SA-1:

- Use the settings in section 8.1.1
- Use the peak marker function to determine the maximum amplitude level within the RBW. The result is the Maximum PSD over 1 MHz reference bandwidth

#### Spectrum Analyzer Settings for Peak PSD in 500 kHz Band with Method SA-1:

- Set RBW 500 kHz
- Set VBW  $\geq 3$  RBW.
- Measure the Maximum PSD in 500 kHz reference bandwidth for sub-band 5725-5850 MHz

### 8.2.2 Limits:

#### FCC§15.407

##### Sub-band 5150-5250 MHz

- For AP the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band
- For Client Devices the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band

##### Sub-band 5250-5350 MHz and 5470-5725 MHz and

- The maximum power spectral density shall not exceed 11 dBm in any 1 MHz band

##### Sub-band 5725-5850 MHz

- The maximum power spectral density shall not exceed 30 dBm in any 500 kHz band

#### RSS-247

##### Sub-band 5150-5250 MHz

- For all other devices than OEM devices installed in vehicles, EIRP PSD shall not exceed 10 dBm/MHz

##### Sub-band 5250-5350 MHz

- PSD shall be less than 11 dBm in any 1 MHz band

##### Sub-band 5470-5600 MHz and 5650-5725 MHz

- PSD shall be less than 11 dBm in any 1 MHz band

##### Sub-band 5725-5850 MHz

- PSD shall be less than 30 dBm in any 500 kHz band

Note: All limits are conducted. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**8.2.3 Test conditions and setup:**

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22° C               | 1            | 802.11 a/ac/ax/n   | 12 VDC      |

**8.2.4 Measurement result:**

Remark: EUT is an OEM device installed in vehicle. Thus, it can be categorized as outdoor access point, which is subject to the FCC rule part 15.407(a)(1)(i).

U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 1

| Mode    | Channel | Frequency (MHz) | Maximum PSD (dBm) | FCC PSD Limit (dBm) | ISED PSD Limit (dBm) | Result |
|---------|---------|-----------------|-------------------|---------------------|----------------------|--------|
| 802.11a | 36      | 5180            | 1.921             | 17                  | -                    | Pass   |
| 802.11a | 40      | 5200            | 1.710             | 17                  | -                    | Pass   |
| 802.11a | 48      | 5240            | 1.631             | 17                  | -                    | Pass   |
| 802.11a | 149     | 5745            | -2.149            | 30                  | 30                   | Pass   |
| 802.11a | 157     | 5785            | -2.219            | 30                  | 30                   | Pass   |
| 802.11a | 165     | 5825            | -2.658            | 30                  | 30                   | Pass   |

U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 2

| Mode    | Channel | Frequency (MHz) | Maximum PSD (dBm) | FCC PSD Limit (dBm) | ISED PSD Limit (dBm) | Result |
|---------|---------|-----------------|-------------------|---------------------|----------------------|--------|
| 802.11a | 36      | 5180            | -1.356            | 17                  | -                    | Pass   |
| 802.11a | 40      | 5200            | -1.283            | 17                  | -                    | Pass   |
| 802.11a | 48      | 5240            | -0.859            | 17                  | -                    | Pass   |
| 802.11a | 149     | 5745            | -5.236            | 30                  | 30                   | Pass   |
| 802.11a | 157     | 5785            | -4.492            | 30                  | 30                   | Pass   |
| 802.11a | 165     | 5825            | -5.444            | 30                  | 30                   | Pass   |

## U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Maximum PSD (dBm) | FCC PSD Limit (dBm) | ISED PSD Limit (dBm) | Result |
|----------|---------|-----------------|-------------------|---------------------|----------------------|--------|
| 802.11ac | 36      | 5180            | 1.503             | 17                  | -                    | Pass   |
| 802.11ac | 40      | 5200            | 1.466             | 17                  | -                    | Pass   |
| 802.11ac | 48      | 5240            | 1.509             | 17                  | -                    | Pass   |
| 802.11ac | 149     | 5745            | -0.359            | 27.88               | 27.88                | Pass   |
| 802.11ac | 157     | 5785            | -0.361            | 27.88               | 27.88                | Pass   |
| 802.11ac | 165     | 5825            | -0.757            | 27.88               | 27.88                | Pass   |
| 802.11ax | 36      | 5180            | 1.296             | 17                  | -                    | Pass   |
| 802.11ax | 40      | 5200            | 1.280             | 17                  | -                    | Pass   |
| 802.11ax | 48      | 5240            | 1.285             | 17                  | -                    | Pass   |
| 802.11ax | 149     | 5745            | -0.624            | 27.88               | 27.88                | Pass   |
| 802.11ax | 157     | 5785            | -0.827            | 27.88               | 27.88                | Pass   |
| 802.11ax | 165     | 5825            | -1.242            | 27.88               | 27.88                | Pass   |
| 802.11n  | 36      | 5180            | 1.219             | 17                  | -                    | Pass   |
| 802.11n  | 40      | 5200            | 1.291             | 17                  | -                    | Pass   |
| 802.11n  | 48      | 5240            | 1.310             | 17                  | -                    | Pass   |
| 802.11n  | 149     | 5745            | -0.547            | 27.88               | 27.88                | Pass   |
| 802.11n  | 157     | 5785            | 0.000             | 27.88               | 27.88                | Pass   |
| 802.11n  | 165     | 5825            | -0.864            | 27.88               | 27.88                | Pass   |

## U-NII-1 and U-NII-3 Band Operation (40 MHz Bandwidth)

## MIMO

| Mode     | Channel | Frequency (MHz) | Maximum PSD (dBm) | FCC PSD Limit (dBm) | ISED PSD Limit (dBm) | Result |
|----------|---------|-----------------|-------------------|---------------------|----------------------|--------|
| 802.11ac | 38      | 5190            | -1.397            | 17                  | -                    | Pass   |
| 802.11ac | 46      | 5230            | -1.504            | 17                  | -                    | Pass   |
| 802.11ac | 151     | 5755            | -3.331            | 27.88               | 27.88                | Pass   |
| 802.11ac | 159     | 5795            | -3.341            | 27.88               | 27.88                | Pass   |
| 802.11ax | 38      | 5190            | -1.545            | 17                  | -                    | Pass   |
| 802.11ax | 46      | 5230            | -1.636            | 17                  | -                    | Pass   |
| 802.11ax | 151     | 5755            | -3.507            | 27.88               | 27.88                | Pass   |
| 802.11ax | 159     | 5795            | -3.587            | 27.88               | 27.88                | Pass   |
| 802.11n  | 38      | 5190            | -1.078            | 17                  | -                    | Pass   |
| 802.11n  | 46      | 5230            | -1.384            | 17                  | -                    | Pass   |
| 802.11n  | 151     | 5755            | -3.783            | 27.88               | 27.88                | Pass   |
| 802.11n  | 159     | 5795            | -3.306            | 27.88               | 27.88                | Pass   |

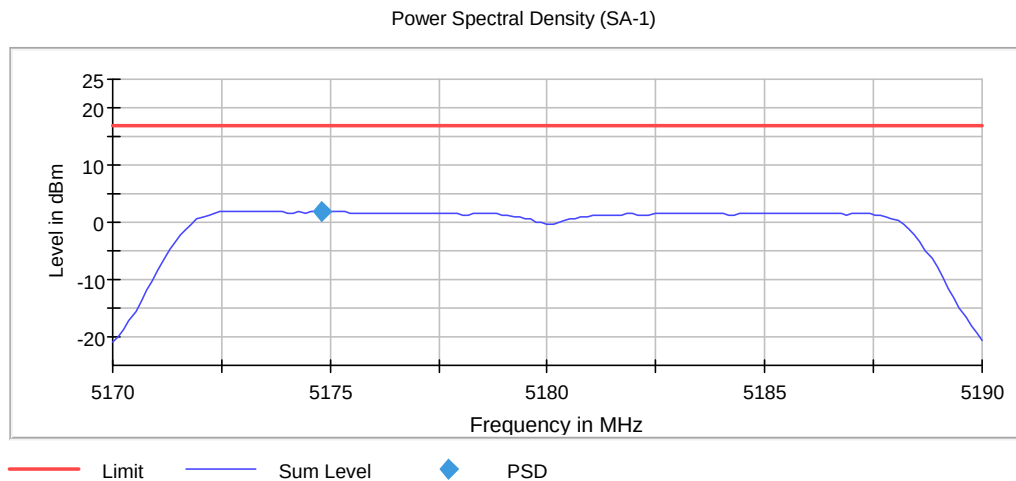
## 8.2.5 Highest PSD Measurement Plots:

For test cases where the measurement plots were determined to be similar, only the plot corresponding to the worst-case configuration is presented in this section.

### U-NII-1: SISO 5180 MHz; 30.000 dBm; 20 MHz

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 5180.000000         | 5174.805195     | 1.921     | 17.0            | PASS   |

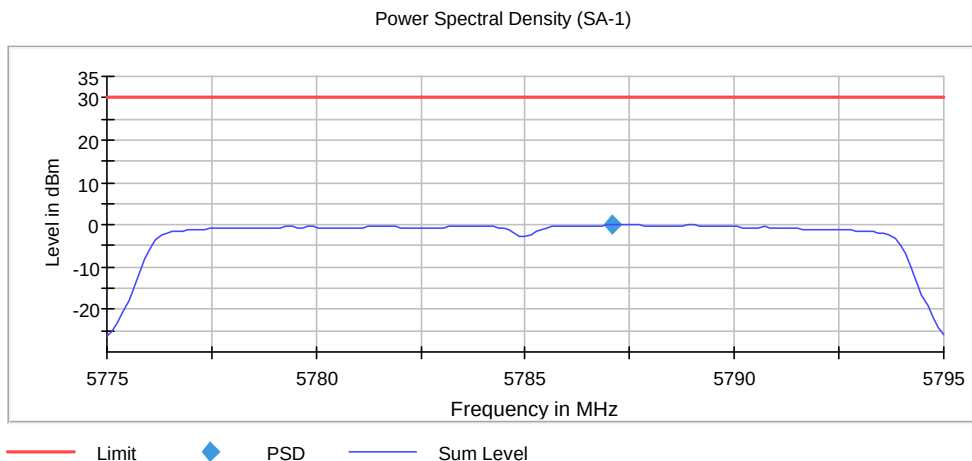
| Port | State |
|------|-------|
| 1    | used  |



### U-NII-3: MIMO 5785 MHz; 30.000 dBm; 20 MHz

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 5785.000000         | 5787.077922     | 0.000     | 27.88           | PASS   |

| Port | State |
|------|-------|
| 1    | used  |
| 2    | used  |



### 8.3 Band Edge Compliance

#### 8.3.1 Measurement according to FCC 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10 (2020)

##### Non-Restricted Band Edge and Restricted Band Edge Peak Measurement Spectrum Analyzer Settings:

- 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

##### Restricted Band Edge Average Measurement Spectrum Analyzer Settings:

- 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 = RMS (Power Averaging)
- Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of  $1 / D$ , where  $D$  is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
- Perform band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured

##### Restricted Band Edge – Radiated measurement method - ANSI C63.10; 6.10.6.2 Marker-delta procedure:

1. Perform Peak and Average in-band field strength measurements with the following SA settings
  - RBW = 100 kHz
  - VBW  $\geq 3 \times$  RBW
2. Perform relative measurements of the fundamental and the band-edge levels using the following SA settings
  - RBW = 1% of the total span (but never less than 30 kHz),
  - VBW  $\geq 3 \times$  RBW
  - Record the delta of the peak levels of the fundamental emission and the relevant band-edge emission
3. Subtract the delta measured in step b) from the field strengths measured in step a). The resulting field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band-edge emissions compliance, where required.

**8.3.2 Limits non restricted band:**

FCC§15.407 (b); RSS-247 6

- For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

**8.3.3 Limits for restricted band §15.407/15.209/15.205 and RSS-Gen 8.9/8.10**

- \*PEAK LIMIT= 74 dBμV/m @3m =-21.23 dBm
- \*AVG. LIMIT= 54 dBμV/m @3m =-41.23 dBm
- Start frequency & stop frequency according to frequency range specified in the restricted band table in FCC section 15.205 & RSS-Gen 8.10

| 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                                                                      |                     |               |             |

### 8.3.4 Test conditions and setup:

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input | Antenna Gain |
|---------------------|--------------|--------------------|-------------|--------------|
| 22 °C               | 1 & 2        | 802.11 a/ac/ax/n   | 12 VDC      | Note 1       |

### 8.3.5 Measurement result:

| Plot # | EUT operating mode     | Band Edge      | Lowest Band-Edge Margin (dB) | Limit             | Result |
|--------|------------------------|----------------|------------------------------|-------------------|--------|
| 1, 2   | 802.11a SISO chain 1   | Non-restricted | 6                            | See section 8.3.2 | Pass   |
| -      | 802.11a SISO chain 2   | Non-restricted | 15.1                         | See section 8.3.2 | Pass   |
| -      | 802.11ac MIMO 20MHz BW | Non-restricted | 8.2                          | See section 8.3.2 | Pass   |
| -      | 802.11ac MIMO 40MHz BW | Non-restricted | 11                           | See section 8.3.2 | Pass   |
| -      | 802.11ax MIMO 20MHz BW | Non-restricted | 8.2                          | See section 8.3.2 | Pass   |
| -      | 802.11ax MIMO 40MHz BW | Non-restricted | 10.8                         | See section 8.3.2 | Pass   |
| 3, 4   | 802.11n MIMO 40MHz BW  | Non-restricted | 9.1                          | See section 8.3.2 | Pass   |
| -      | 802.11ax MIMO 20MHz BW | Restricted     | 3.31                         | See section 8.3.2 | Pass   |
| 5      | 802.11ax MIMO 40MHz BW | Restricted     | 2.54                         | See section 8.3.2 | Pass   |

Note: For test cases where the measurement plots were determined to be similar, only the plot corresponding to the worst-case configuration is presented in this section.

### 8.3.6 Measurement Plots:

#### Plot 1: 802.11a, U-NII-1, SISO chain 1, 5180 MHz; 20 MHz

##### Band Edge low

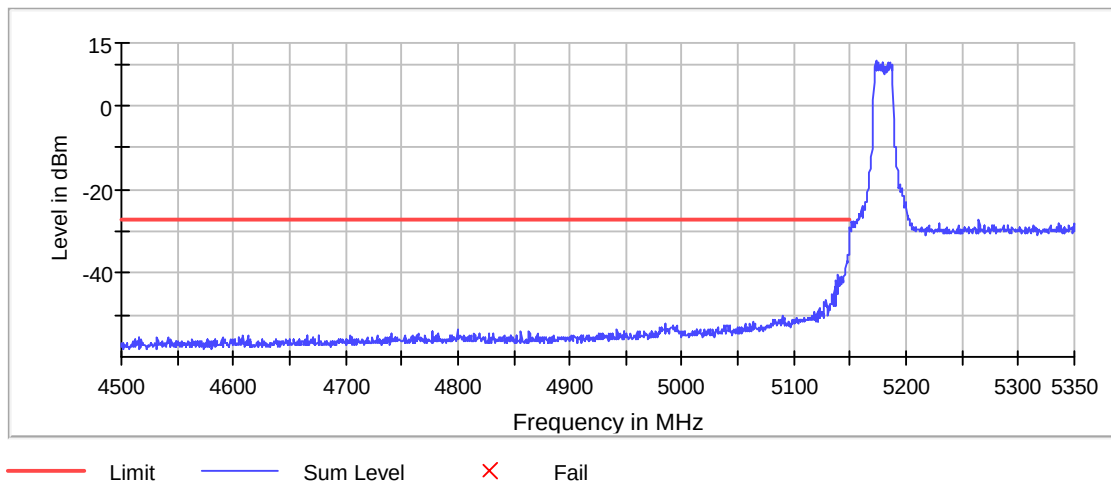
### Result

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 5180.000000         | PASS   |

### Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5149.500000     | -32.5       | 5.5         | -27.0       | PASS   |
| 5149.000000     | -34.7       | 7.7         | -27.0       | PASS   |
| 5148.500000     | -35.4       | 8.4         | -27.0       | PASS   |
| 5148.000000     | -35.8       | 8.8         | -27.0       | PASS   |
| 5147.000000     | -37.2       | 10.2        | -27.0       | PASS   |
| 5147.500000     | -37.6       | 10.6        | -27.0       | PASS   |
| 5146.500000     | -39.1       | 12.1        | -27.0       | PASS   |
| 5146.000000     | -39.9       | 12.9        | -27.0       | PASS   |
| 5145.500000     | -40.0       | 13.0        | -27.0       | PASS   |
| 5139.500000     | -40.1       | 13.1        | -27.0       | PASS   |
| 5145.000000     | -40.4       | 13.4        | -27.0       | PASS   |
| 5141.500000     | -40.6       | 13.6        | -27.0       | PASS   |
| 5144.500000     | -40.9       | 13.9        | -27.0       | PASS   |
| 5140.000000     | -41.1       | 14.1        | -27.0       | PASS   |
| 5142.000000     | -41.2       | 14.2        | -27.0       | PASS   |

Band Edge



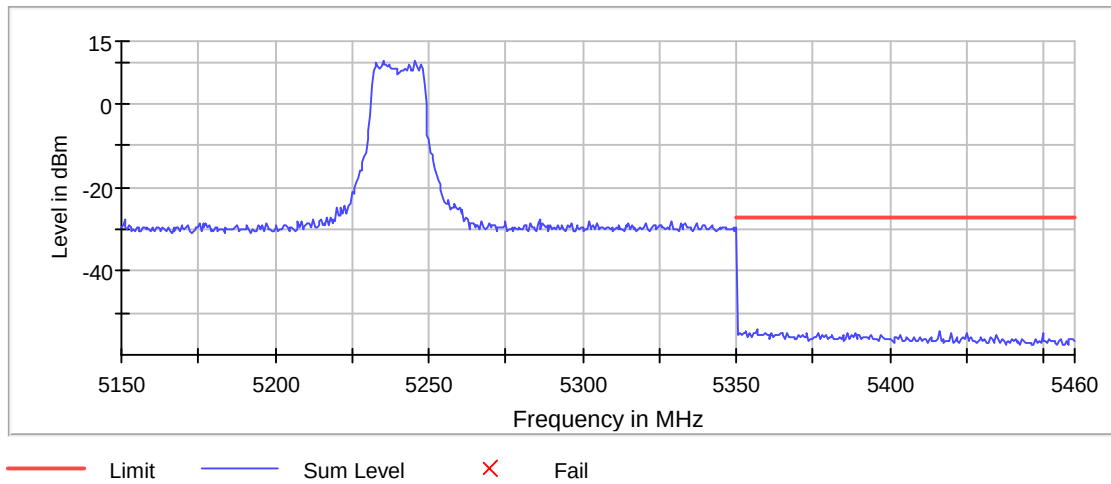
**Plot 2: 802.11a, U-NII-1, SISO chain 1, 5240 MHz; 20 MHz****Band Edge high****Result**

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 5240.000000         | PASS   |

**Measurements**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5356.600000     | -54.1       | 27.1        | -27.0       | PASS   |
| 5353.300000     | -54.2       | 27.2        | -27.0       | PASS   |
| 5416.000000     | -54.4       | 27.4        | -27.0       | PASS   |
| 5359.350000     | -54.7       | 27.7        | -27.0       | PASS   |
| 5361.550000     | -54.8       | 27.8        | -27.0       | PASS   |
| 5388.500000     | -54.9       | 27.9        | -27.0       | PASS   |
| 5355.500000     | -54.9       | 27.9        | -27.0       | PASS   |
| 5424.800000     | -54.9       | 27.9        | -27.0       | PASS   |
| 5351.100000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5356.050000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5354.400000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5373.100000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5449.550000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5386.300000     | -55.0       | 28.0        | -27.0       | PASS   |
| 5376.400000     | -55.0       | 28.0        | -27.0       | PASS   |

Band Edge



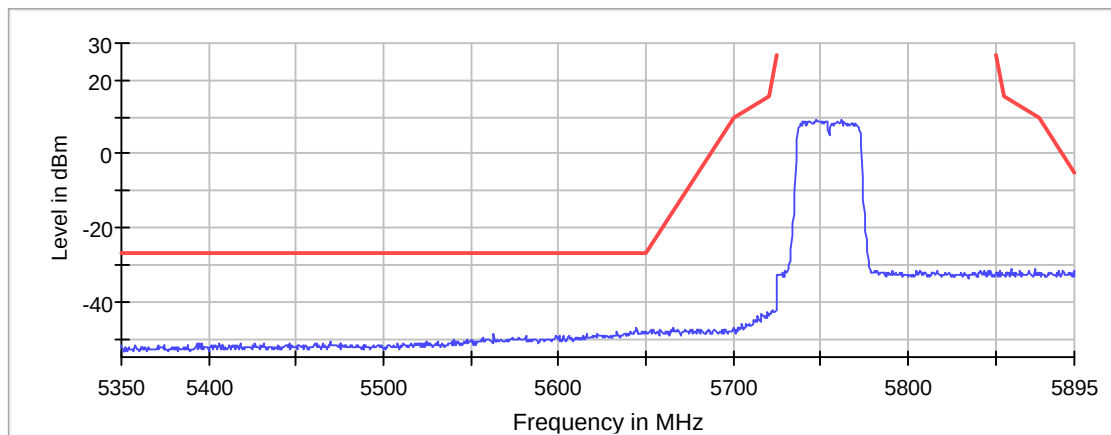
**Plot 3: 802.11n, U-NII-3, MIMO 40MHz BW, 5755 MHz****Band Edge low****Result**

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 5755.000000         | PASS   |

**Measurements**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5747.339744     | 9.4         | 17.6        | 27.0        | PASS   |
| 5762.051282     | 9.1         | 17.9        | 27.0        | PASS   |
| 5750.064103     | 8.9         | 18.1        | 27.0        | PASS   |
| 5746.250000     | 8.9         | 18.1        | 27.0        | PASS   |
| 5748.974359     | 8.9         | 18.1        | 27.0        | PASS   |
| 5761.506410     | 8.9         | 18.1        | 27.0        | PASS   |
| 5742.980769     | 8.9         | 18.1        | 27.0        | PASS   |
| 5763.141026     | 8.8         | 18.2        | 27.0        | PASS   |
| 5753.878205     | 8.8         | 18.2        | 27.0        | PASS   |
| 5752.788462     | 8.8         | 18.2        | 27.0        | PASS   |
| 5751.698718     | 8.8         | 18.2        | 27.0        | PASS   |
| 5748.429487     | 8.8         | 18.2        | 27.0        | PASS   |
| 5743.525641     | 8.8         | 18.2        | 27.0        | PASS   |
| 5742.435897     | 8.7         | 18.3        | 27.0        | PASS   |
| 5746.794872     | 8.7         | 18.3        | 27.0        | PASS   |

Band Edge



— Limit    × Fail    — Sum Level

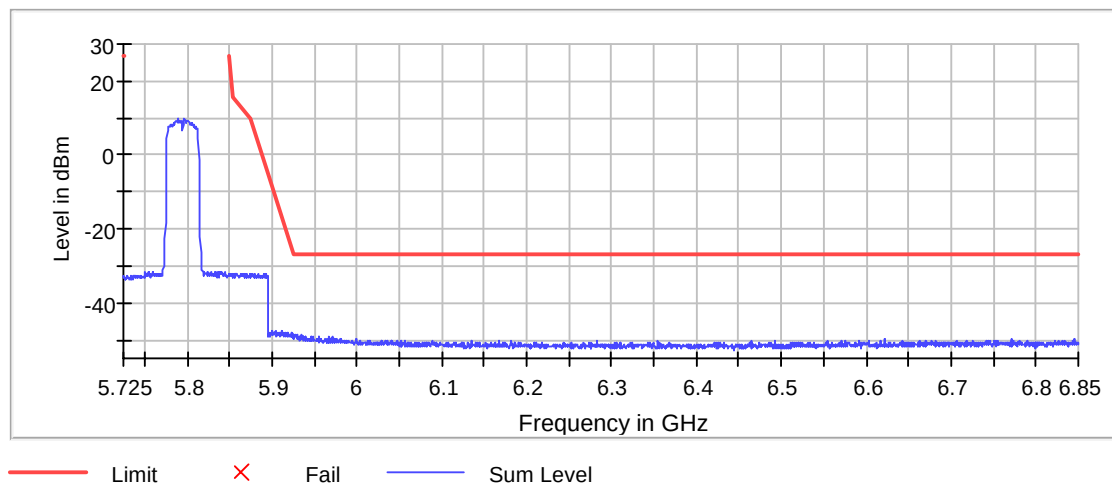
**Plot 4: 802.11n, U-NII-3, MIMO 40MHz BW, 5795 MHz****Band Edge high****Result**

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 5795.000000         | PASS   |

**Measurements**

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5797.467949     | 9.6         | 17.4        | 27.0        | PASS   |
| 5789.839744     | 9.6         | 17.4        | 27.0        | PASS   |
| 5793.108974     | 9.5         | 17.5        | 27.0        | PASS   |
| 5800.737179     | 9.5         | 17.5        | 27.0        | PASS   |
| 5799.647436     | 9.4         | 17.6        | 27.0        | PASS   |
| 5798.012821     | 9.4         | 17.6        | 27.0        | PASS   |
| 5792.019231     | 9.4         | 17.6        | 27.0        | PASS   |
| 5801.282051     | 9.3         | 17.7        | 27.0        | PASS   |
| 5789.294872     | 9.3         | 17.7        | 27.0        | PASS   |
| 5801.826923     | 9.3         | 17.7        | 27.0        | PASS   |
| 5790.384615     | 9.3         | 17.7        | 27.0        | PASS   |
| 5800.192308     | 9.2         | 17.8        | 27.0        | PASS   |
| 5790.929487     | 9.2         | 17.8        | 27.0        | PASS   |
| 5791.474359     | 9.2         | 17.8        | 27.0        | PASS   |
| 5787.115385     | 9.2         | 17.8        | 27.0        | PASS   |

Band Edge

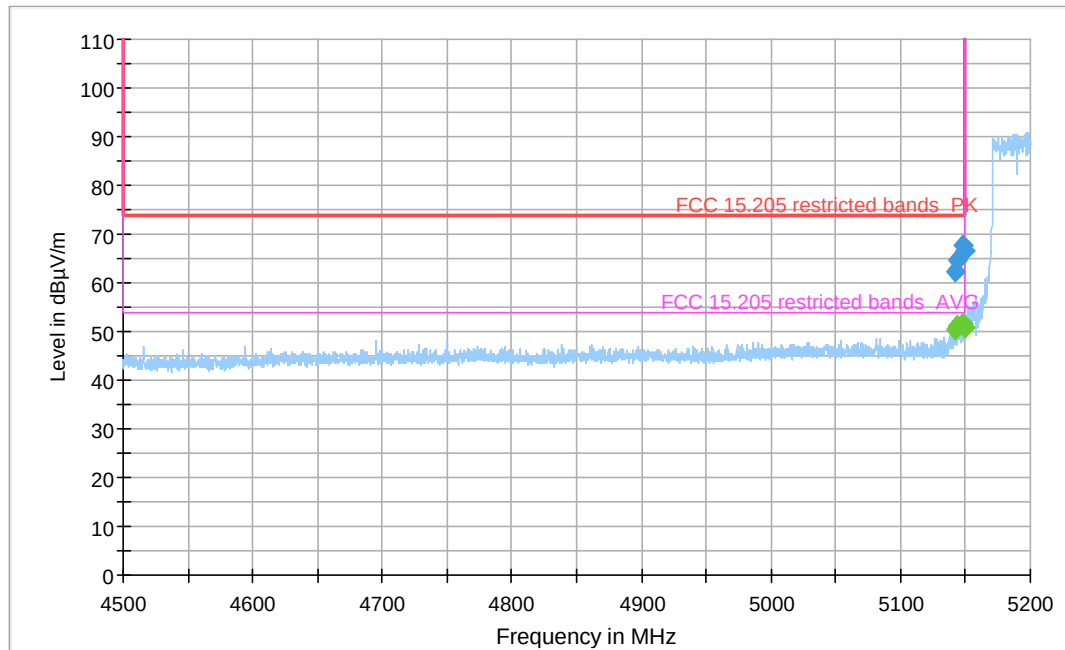


**Plot 5: Restricted Band Edge****802.11ax, U-NII-1, MIMO HE40 5190 MHz****Final\_Result**

| Frequency (MHz) | MaxPeak (dBμV/m) | RMS (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|--------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 5141.813        | ---              | 50.544       | 53.98          | 3.44        | 100.0           | 1000.0          | 272.0       | H   | -2.0          | 13.8         | -19.8         | 0.0         | 33.6             |
| 5141.813        | 62.187           | ---          | 74.00          | 11.81       | 100.0           | 1000.0          | 272.0       | H   | -2.0          | 13.8         | -19.8         | 0.0         | 33.6             |
| 5144.292        | 64.761           | ---          | 74.00          | 9.24        | 100.0           | 1000.0          | 191.0       | V   | 316.0         | 13.8         | -19.8         | 0.0         | 33.6             |
| 5144.292        | ---              | 51.100       | 53.98          | 2.88        | 100.0           | 1000.0          | 191.0       | V   | 316.0         | 13.8         | -19.8         | 0.0         | 33.6             |
| 5147.354        | ---              | 51.441       | 53.98          | 2.54        | 100.0           | 1000.0          | 202.0       | V   | 315.0         | 13.8         | -19.8         | 0.0         | 33.6             |
| 5147.354        | 67.868           | ---          | 74.00          | 6.13        | 100.0           | 1000.0          | 202.0       | V   | 315.0         | 13.8         | -19.8         | 0.0         | 33.6             |
| 5149.250        | 66.557           | ---          | 74.00          | 7.44        | 100.0           | 1000.0          | 132.0       | V   | 29.0          | 13.8         | -19.8         | 0.0         | 33.6             |
| 5149.250        | ---              | 50.948       | 53.98          | 3.03        | 100.0           | 1000.0          | 132.0       | V   | 29.0          | 13.8         | -19.8         | 0.0         | 33.6             |

(continuation of the "Final\_Result" table from column 19 ...)

| Frequency (MHz) | Raw Rec (dBμV) |
|-----------------|----------------|
| 5141.813        | 36.7           |
| 5141.813        | 48.4           |
| 5144.292        | 50.9           |
| 5144.292        | 37.3           |
| 5147.354        | 37.6           |
| 5147.354        | 54.0           |
| 5149.250        | 52.7           |
| 5149.250        | 37.1           |



Preview Result 1-PK+      FCC 15.205 restricted bands\_PK  
FCC 15.205 restricted bands\_AVG      Final\_Result PK+  
Final\_Result RMS

## 8.4 Emission Bandwidth 6 dB, 26 dB, and 99%

### 8.4.1 Measurement according to FCC 789033 D02 General UNII Test Procedures New Rules v02r01

- For the band 5.150-5.250 GHz the 99% EBW is measured
- For the bands 5.250-5.350 GHz and 5.470-5.725 GHz the 26 dB and 99% EBW is measured
- For the band 5.725-5.850 GHz the 6 dB EBW is measured

#### Spectrum Analyzer Settings for 26 dB EBW:

- Set RBW = approximately 1% of the emission bandwidth
- Set the VBW > RBW
- Detector = Peak
- Trace mode = Max Hold
- Sweep = Auto Couple
- Allow the trace to stabilize
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%

#### Spectrum Analyzer Settings for 6 dB EBW in band 5.725 – 5.850 GHz:

- 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

#### Spectrum Analyzer Settings for 99% Occupied Bandwidth

- Set center frequency to the nominal EUT channel center frequency
- Set span = 1.5 times to 5.0 times the OBW
- Set RBW = 1% to 5% of the OBW
- Set VBW  $\geq 3 \times$  RBW
- Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used
- Use the 99% power bandwidth function of the instrument (if available)
- If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. 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% occupied bandwidth is the difference between these two frequencies

**8.4.2 Limits:**

FCC §15.247(e) and RSS-407 6.2.4.1

- For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

**8.4.3 Test conditions and setup:**

| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22° C               | 1            | 802.11 a/ac/ax/n   | 12 VDC      |

**8.4.4 Measurement result:**

U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 1

| Mode    | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 26 dB Emissions Bandwidth (MHz) | Limit             | Result |
|---------|---------|-----------------|-------------------------------|---------------------------------|-------------------|--------|
| 802.11a | 36      | 5180            | 16.700000                     | 26.200000                       | See Section 8.4.2 | Pass   |
| 802.11a | 40      | 5200            | 16.700000                     | 22.400000                       | See Section 8.4.2 | Pass   |
| 802.11a | 48      | 5240            | 16.700000                     | 22.200000                       | See Section 8.4.2 | Pass   |
| Mode    | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 6 dB Emissions Bandwidth (MHz)  | Limit             | Result |
| 802.11a | 149     | 5745            | 16.700000                     | 16.550000                       | See Section 8.4.2 | Pass   |
| 802.11a | 157     | 5785            | 16.700000                     | 16.600000                       | See Section 8.4.2 | Pass   |
| 802.11a | 165     | 5825            | 16.800000                     | 16.550000                       | See Section 8.4.2 | Pass   |

U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)

SISO Chain 2

| Mode    | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 26 dB Emissions Bandwidth (MHz) | Limit             | Result |
|---------|---------|-----------------|-------------------------------|---------------------------------|-------------------|--------|
| 802.11a | 36      | 5180            | 16.800000                     | 22.800000                       | See Section 8.4.2 | Pass   |
| 802.11a | 40      | 5200            | 16.700000                     | 22.800000                       | See Section 8.4.2 | Pass   |
| 802.11a | 48      | 5240            | 16.700000                     | 22.800000                       | See Section 8.4.2 | Pass   |
| Mode    | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 6 dB Emissions Bandwidth (MHz)  | Limit             | Result |
| 802.11a | 149     | 5745            | 16.700000                     | 16.550000                       | See Section 8.4.2 | Pass   |
| 802.11a | 157     | 5785            | 16.700000                     | 16.550000                       | See Section 8.4.2 | Pass   |
| 802.11a | 165     | 5825            | 16.700000                     | 16.550000                       | See Section 8.4.2 | Pass   |

U-NII-1 and U-NII-3 Band Operation (20 MHz Bandwidth)  
MIMO

| Mode     | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 26 dB Emissions Bandwidth (MHz) | Limit             | Result |
|----------|---------|-----------------|-------------------------------|---------------------------------|-------------------|--------|
| 802.11ac | 36      | 5180            | 17.900000                     | 27.800000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 40      | 5200            | 17.800000                     | 22.400000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 48      | 5240            | 17.900000                     | 23.000000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 36      | 5180            | 17.900000                     | 27.800000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 40      | 5200            | 18.000000                     | 23.000000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 48      | 5240            | 17.900000                     | 23.000000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 36      | 5180            | 17.600000                     | 21.300000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 40      | 5200            | 17.600000                     | 20.400000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 48      | 5240            | 17.600000                     | 20.200000                       | See Section 8.4.2 | Pass   |
| Mode     | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 6 dB Emissions Bandwidth (MHz)  | Limit             | Result |
| 802.11ac | 149     | 5745            | 17.900000                     | 17.900000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 157     | 5785            | 17.800000                     | 17.850000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 165     | 5825            | 17.900000                     | 17.900000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 149     | 5745            | 17.900000                     | 17.850000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 157     | 5785            | 17.900000                     | 17.900000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 165     | 5825            | 17.900000                     | 17.900000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 149     | 5745            | 17.600000                     | 17.300000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 157     | 5785            | 17.600000                     | 17.400000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 165     | 5825            | 17.600000                     | 17.250000                       | See Section 8.4.2 | Pass   |

U-NII-1 and U-NII-3 Band Operation (40 MHz Bandwidth)  
MIMO

| Mode     | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 26 dB Emissions Bandwidth (MHz) | Limit             | Result |
|----------|---------|-----------------|-------------------------------|---------------------------------|-------------------|--------|
| 802.11ac | 38      | 5190            | 37.179487                     | 43.360000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 46      | 5230            | 37.179487                     | 43.360000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 38      | 5190            | 37.179487                     | 43.360000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 46      | 5230            | 36.923076                     | 43.360000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 38      | 5190            | 36.410256                     | 39.680000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 46      | 5230            | 36.410256                     | 39.680000                       | See Section 8.4.2 | Pass   |
| Mode     | Channel | Frequency (MHz) | 99% Emissions Bandwidth (MHz) | 6 dB Emissions Bandwidth (MHz)  | Limit             | Result |
| 802.11ac | 151     | 5755            | 37.179487                     | 36.600000                       | See Section 8.4.2 | Pass   |
| 802.11ac | 159     | 5795            | 36.923076                     | 36.550000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 151     | 5755            | 36.923076                     | 36.650000                       | See Section 8.4.2 | Pass   |
| 802.11ax | 159     | 5795            | 36.923076                     | 36.600000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 151     | 5755            | 36.410256                     | 35.750000                       | See Section 8.4.2 | Pass   |
| 802.11n  | 159     | 5795            | 36.410256                     | 35.800000                       | See Section 8.4.2 | Pass   |

8.4.5 Measurement Plots:

For test cases where the measurement plots were determined to be similar, only a single representative plot is presented in this section for all corresponding configurations.

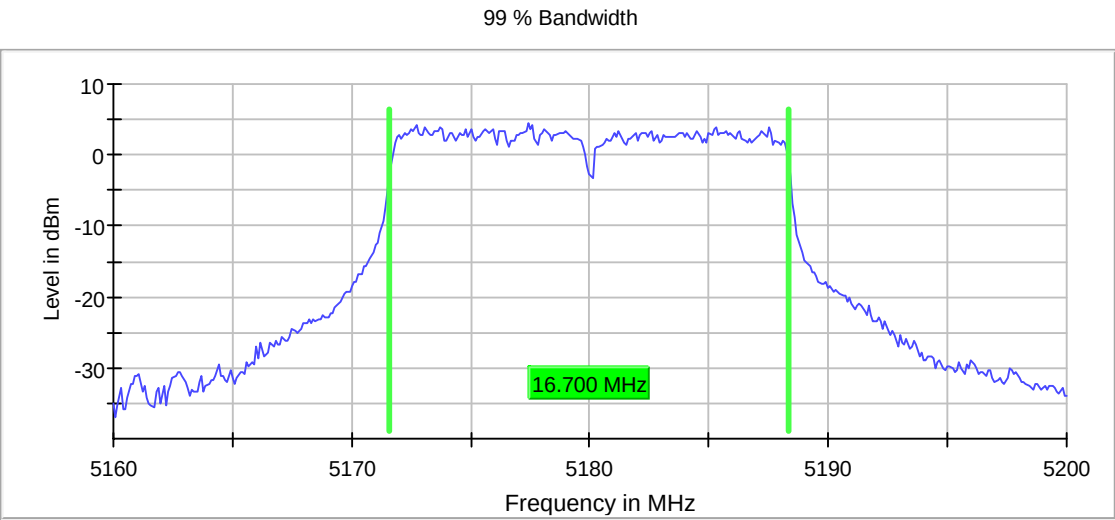
Occupied Channel Bandwidth 99% (5180 MHz; 30.000 dBm; 20 MHz)

99 % Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 5180.000000         | 16.700000       | ---             | ---             | 5171.600000          | 5188.300000           |

(continuation of the "99 % Bandwidth" table from column 6 ...)

| DUT Frequency (MHz) | Result |
|---------------------|--------|
| 5180.000000         | PASS   |



Emission Bandwidth 26 dB (5240 MHz; 30.000 dBm; 20 MHz)

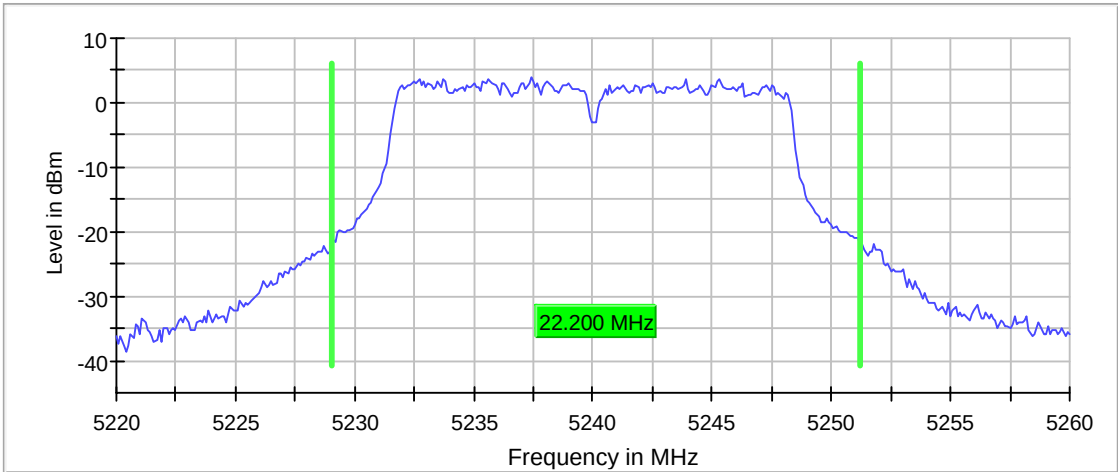
26 dB Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 5240.000000         | 22.200000       | ---             | ---             | 5229.000000          | 5251.200000           |

(continuation of the "26 dB Bandwidth" table from column 6 ...)

| DUT Frequency (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|--------|
| 5240.000000         | 4.0             | PASS   |

26 dB Bandwidth



Minimum Emission Bandwidth 6 dB (5745 MHz; 30.000 dBm; 20 MHz)

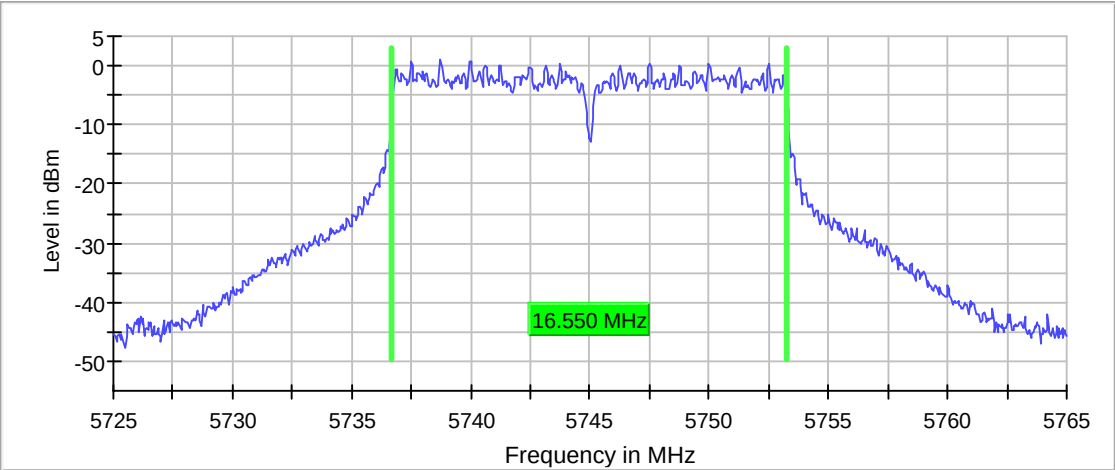
6 dB Bandwidth

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 5745.000000         | 16.550000       | 0.500000        | ---             | 5736.700000          | 5753.250000           |

(continuation of the "6 dB Bandwidth" table from column 6 ...)

| DUT Frequency (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|--------|
| 5745.000000         | 1.0             | PASS   |

6 dB Bandwidth



## 8.5 Radiated Transmitter Spurious Emissions

### 8.5.1 Measurement according to ANSI C63.10 (2020)

#### 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 §15.407

- Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.
- The provisions of §15.205 apply to intentional radiators operating under this section.

## FCC §15.209 &amp; 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 &amp; 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:**

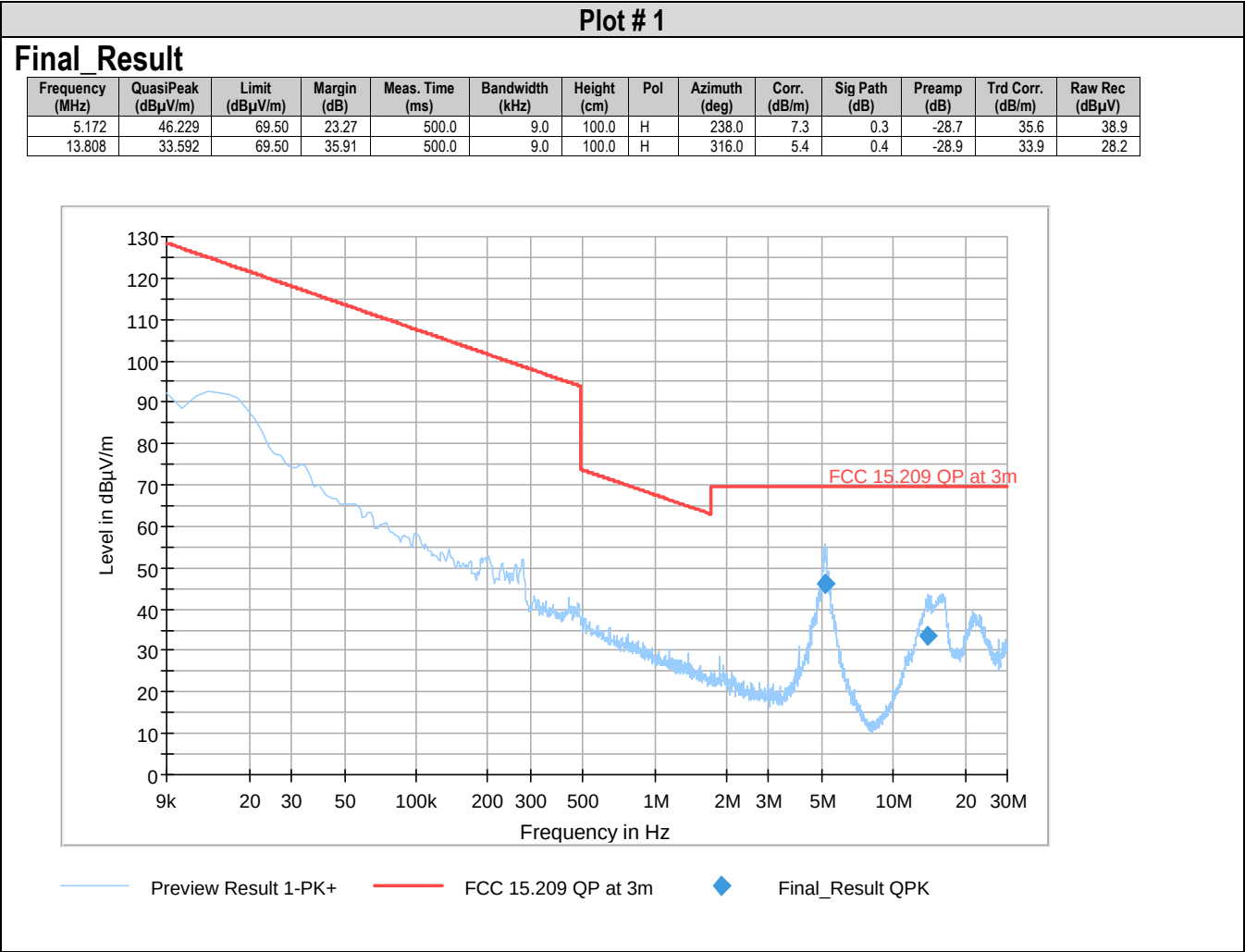
| Ambient Temperature | EUT Set-Up # | EUT operating mode | Power Input |
|---------------------|--------------|--------------------|-------------|
| 22 °C               | 2            | 802.11ac VHT20     | 12 VDC      |

Note: 802.11ac, MIMO, 5785 MHz; 20 MHz BW shows highest EIRP, thus the worst case scenario for radiated spurious emissions testing.

**8.5.4 Measurement result:**

| Plot # | Channel # | Scan Frequency | Emission level with lowest margin | Limit             | Result |
|--------|-----------|----------------|-----------------------------------|-------------------|--------|
| 1-6    | 36        | 9 kHz – 40 GHz | 33.683 dB $\mu$ V/m QPK           | See section 8.5.2 | Pass   |
| 7-12   | 40        | 9 kHz – 40 GHz | 45.868 dB $\mu$ V/m AVG           | See section 8.5.2 | Pass   |
| 13-18  | 48        | 9 kHz – 40 GHz | 46.291 dB $\mu$ V/m AVG           | See section 8.5.2 | Pass   |
| 19-24  | 149       | 9 kHz – 40 GHz | 33.281 dB $\mu$ V/m QPK           | See section 8.5.2 | Pass   |
| 25-30  | 157       | 9 kHz – 40 GHz | 33.235 dB $\mu$ V/m QPK           | See section 8.5.2 | Pass   |
| 31-36  | 165       | 9 kHz – 40 GHz | 34.029 dB $\mu$ V/m QPK           | See section 8.5.2 | Pass   |

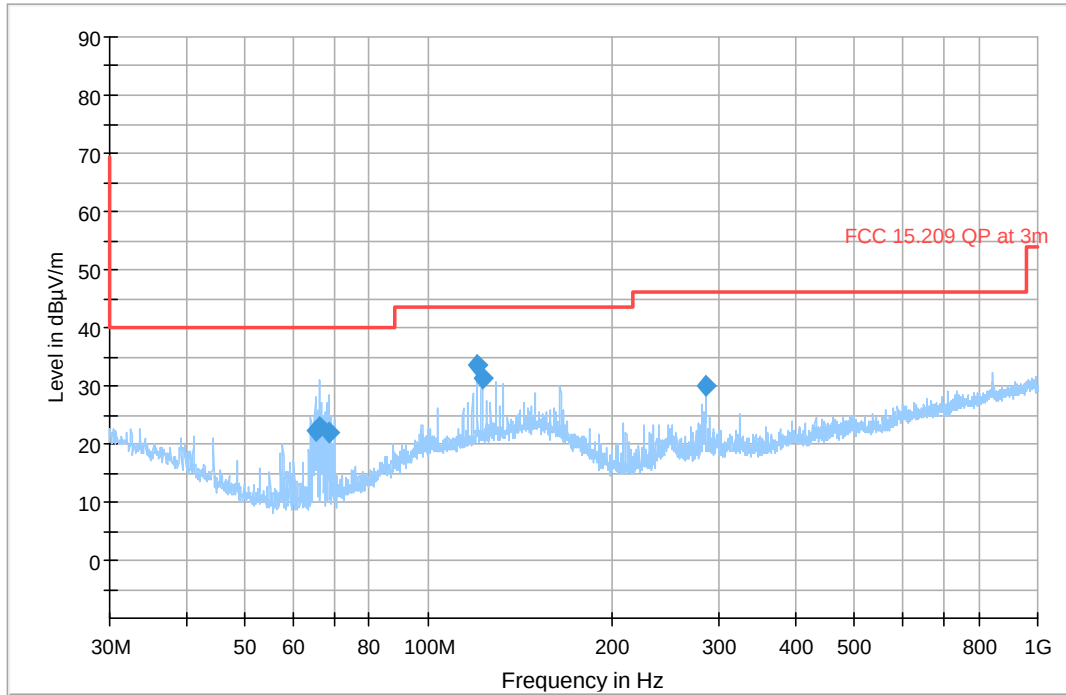
8.5.5 Measurement Plots:



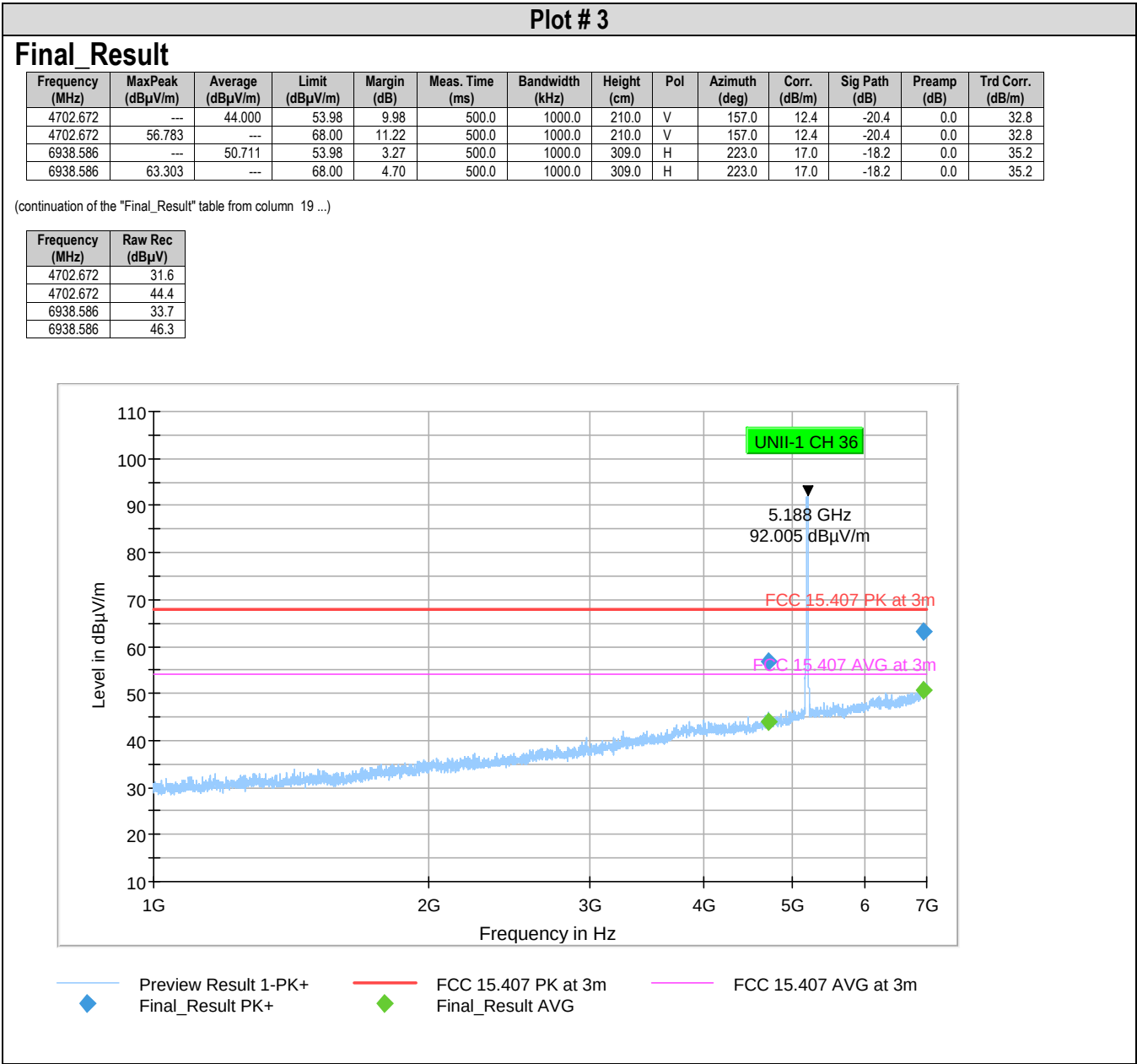
## Plot # 2

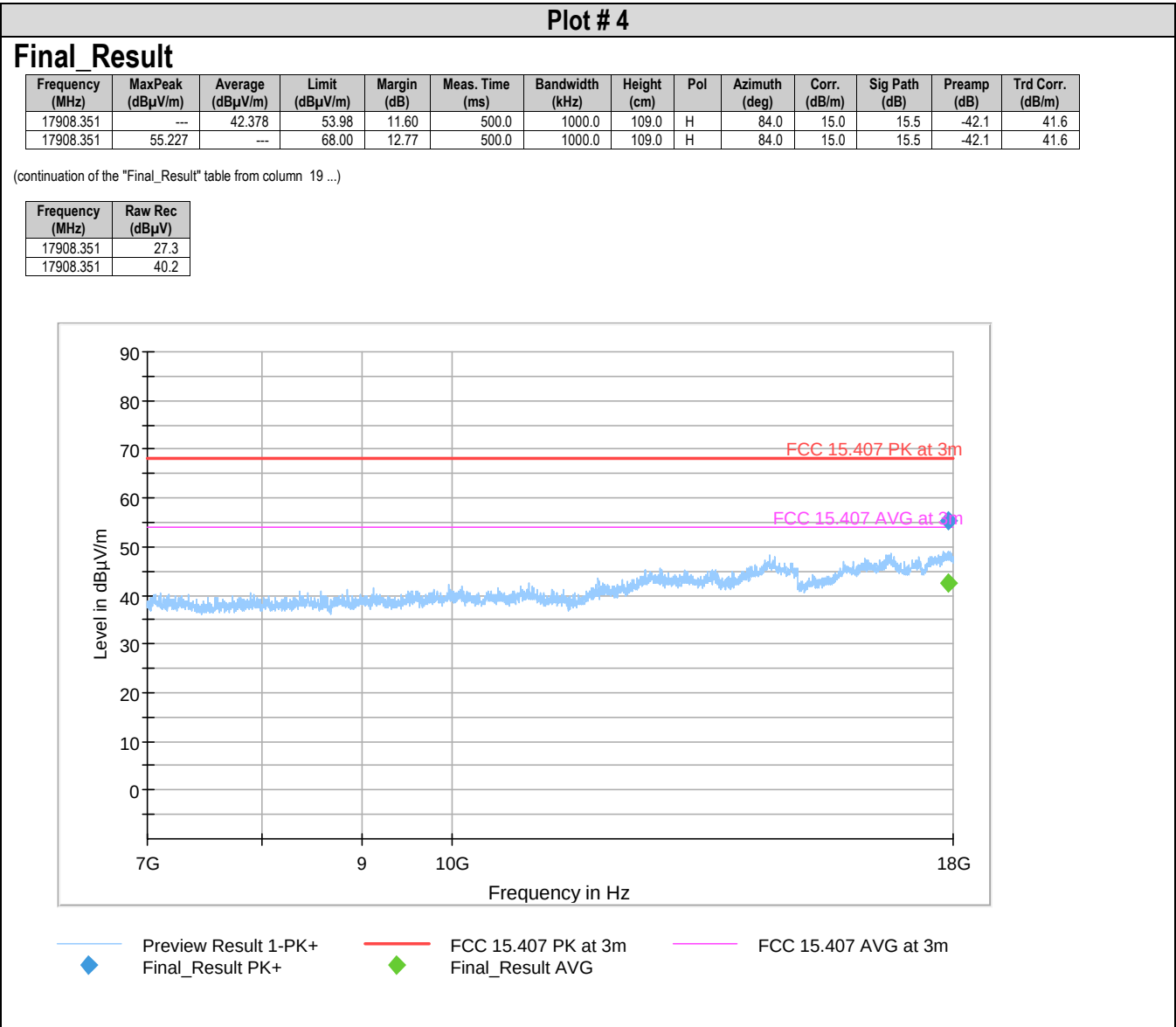
## Final\_Result

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) | Raw Rec (dBμV) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|----------------|
| 65.302          | 22.158             | 40.00          | 17.84       | 500.0           | 120.0           | 171.0       | V   | 77.0          | -22.4        | -34.8         | 0.0         | 12.4             | 44.5           |
| 66.202          | 23.008             | 40.00          | 16.99       | 500.0           | 120.0           | 141.0       | V   | 76.0          | -22.2        | -34.8         | 0.0         | 12.6             | 45.2           |
| 68.732          | 21.797             | 40.00          | 18.20       | 500.0           | 120.0           | 220.0       | V   | 81.0          | -22.0        | -34.8         | 0.0         | 12.9             | 43.7           |
| 120.374         | 33.683             | 43.50          | 9.82        | 500.0           | 120.0           | 100.0       | V   | 124.0         | -10.9        | -34.6         | 0.0         | 23.7             | 44.6           |
| 122.523         | 31.211             | 43.50          | 12.29       | 500.0           | 120.0           | 100.0       | V   | 176.0         | -10.9        | -34.6         | 0.0         | 23.7             | 42.1           |
| 285.142         | 30.144             | 46.02          | 15.88       | 500.0           | 120.0           | 125.0       | H   | 43.0          | -13.6        | -33.9         | 0.0         | 20.3             | 43.7           |

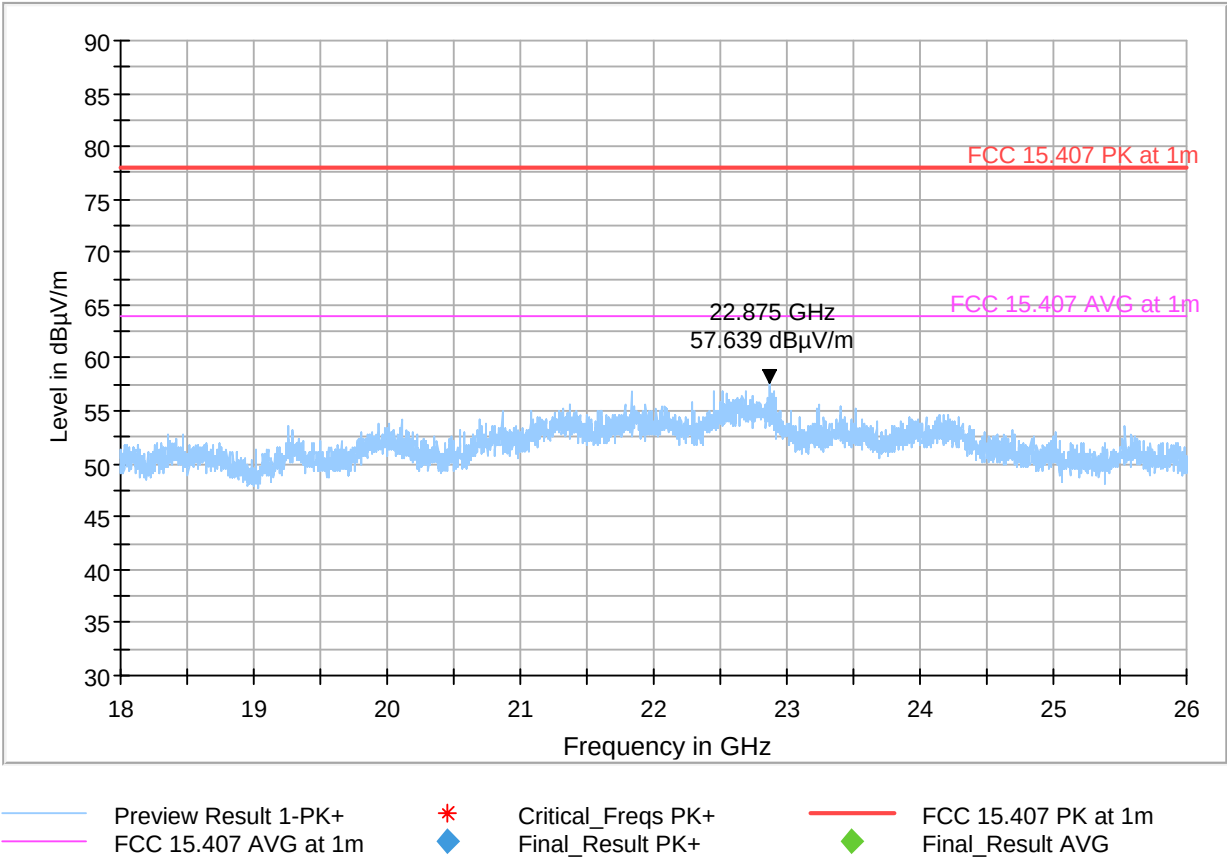


Preview Result 1-PK+    FCC 15.209 QP at 3m    Final\_Result QPK





Plot # 5



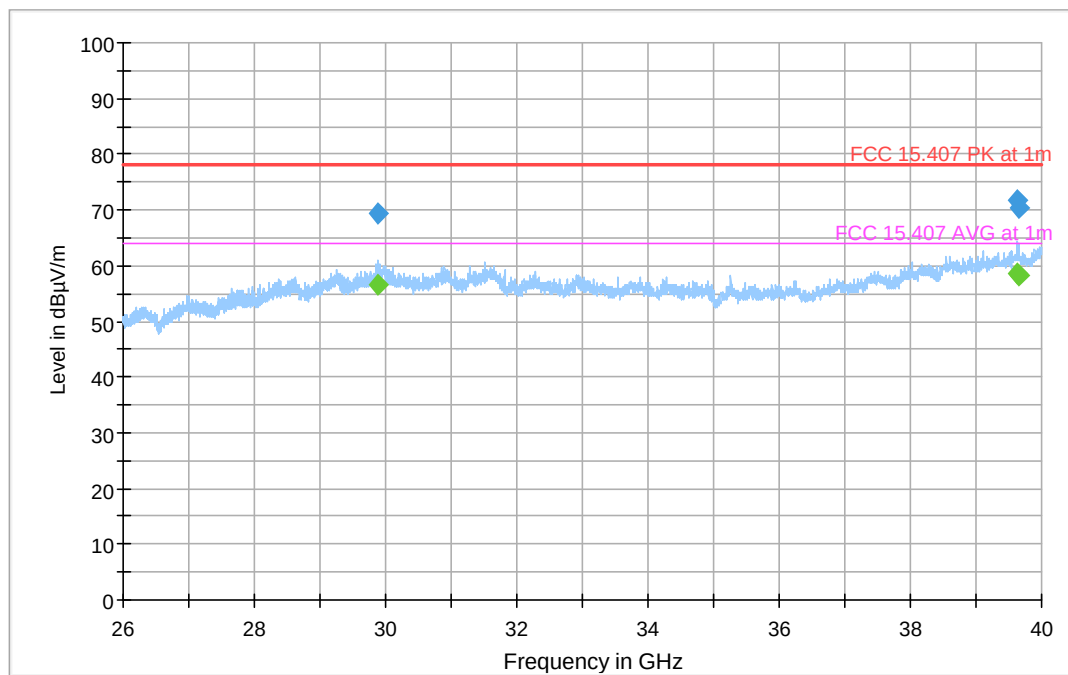
## Plot # 6

## Final\_Result

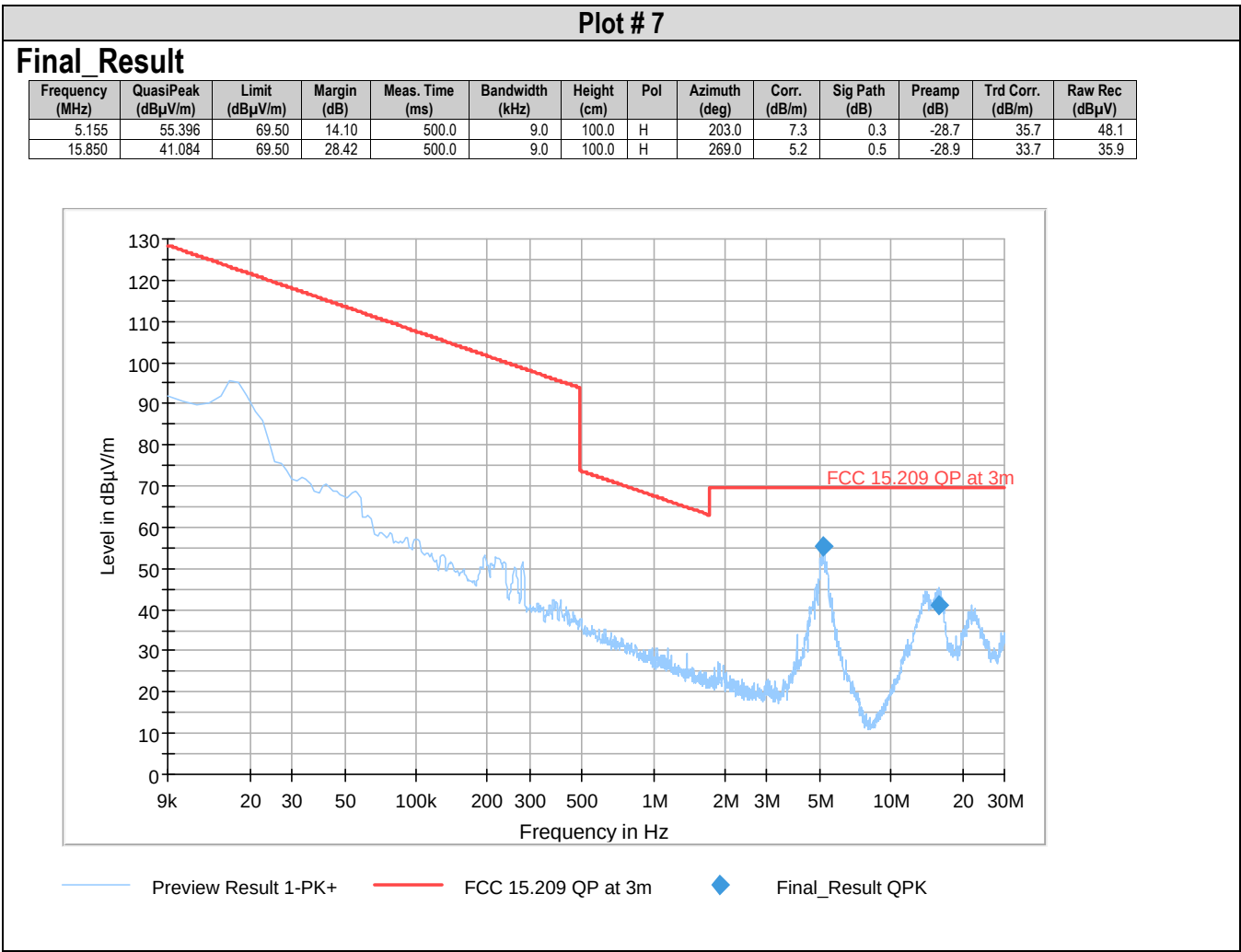
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 29889.614       | ---              | 56.426           | 63.98          | 7.55        | 500.0           | 1000.0          | 150.0       | V   | 209.0         | 24.9         | 10.4          | 0.0         | 14.5             |
| 29889.614       | 69.278           | ---              | 78.00          | 8.72        | 500.0           | 1000.0          | 150.0       | V   | 209.0         | 24.9         | 10.4          | 0.0         | 14.5             |
| 39619.788       | 71.616           | ---              | 78.00          | 6.38        | 500.0           | 1000.0          | 150.0       | H   | 88.0          | 24.2         | 12.6          | 0.0         | 11.5             |
| 39619.788       | ---              | 58.606           | 63.98          | 5.37        | 500.0           | 1000.0          | 150.0       | H   | 88.0          | 24.2         | 12.6          | 0.0         | 11.5             |
| 39659.875       | 70.308           | ---              | 78.00          | 7.69        | 500.0           | 1000.0          | 150.0       | V   | 182.0         | 24.1         | 12.6          | 0.0         | 11.4             |
| 39659.875       | ---              | 58.081           | 63.98          | 5.90        | 500.0           | 1000.0          | 150.0       | V   | 182.0         | 24.1         | 12.6          | 0.0         | 11.4             |

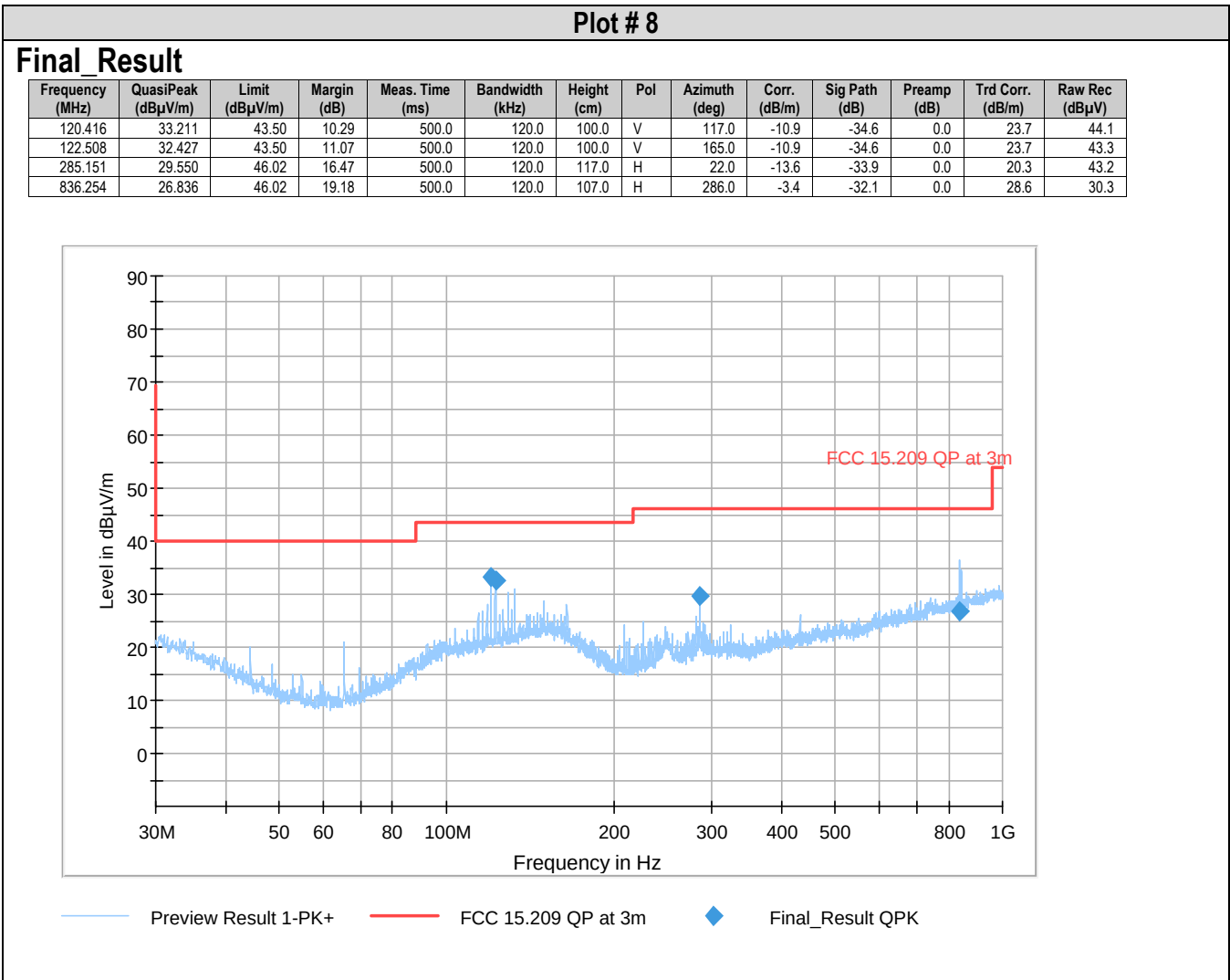
(continuation of the "Final\_Result" table from column 19 ...)

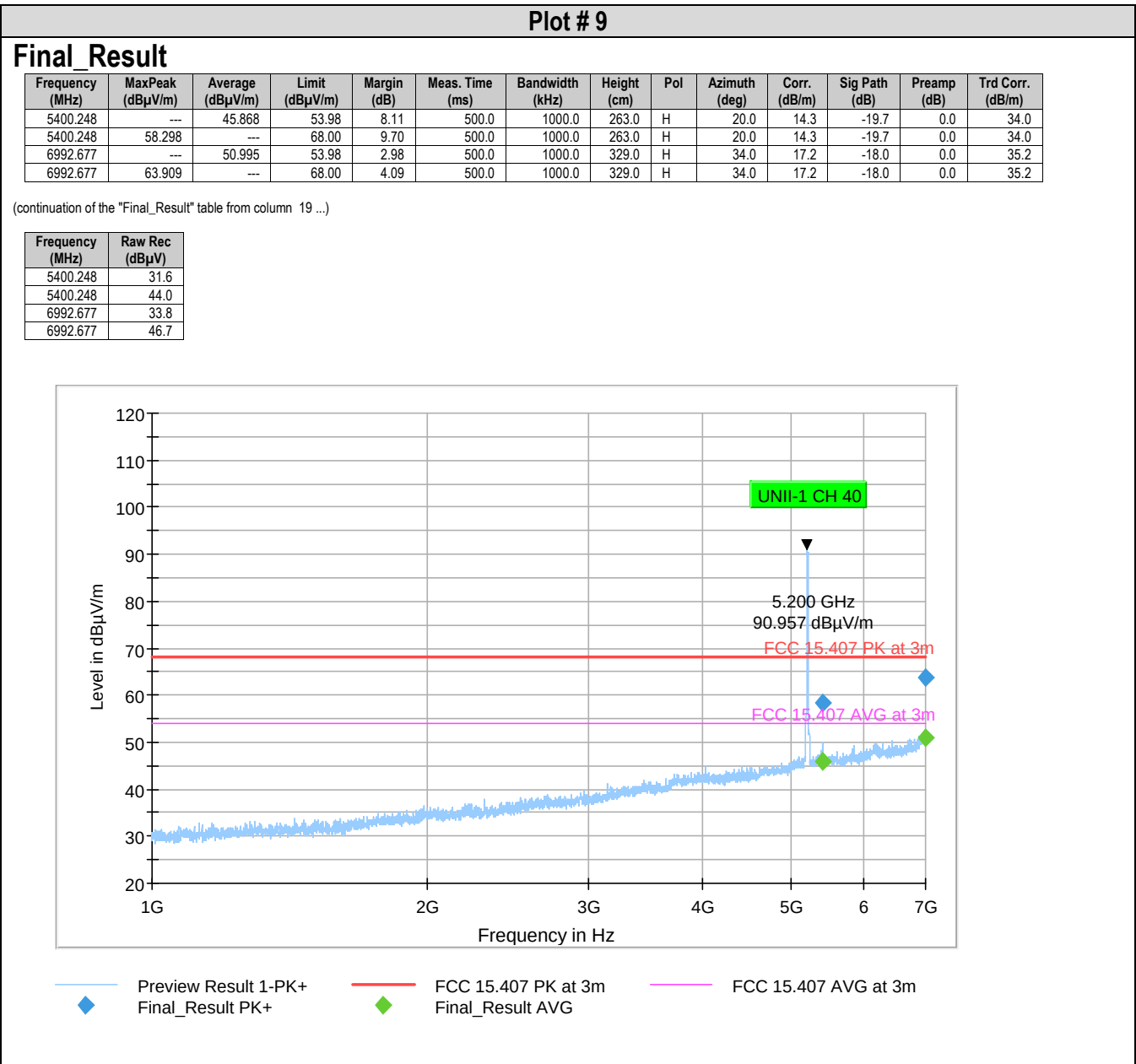
| Frequency (MHz) | Raw Rec (dBμV) |
|-----------------|----------------|
| 29889.614       | 31.5           |
| 29889.614       | 44.4           |
| 39619.788       | 47.5           |
| 39619.788       | 34.5           |
| 39659.875       | 46.2           |
| 39659.875       | 34.0           |

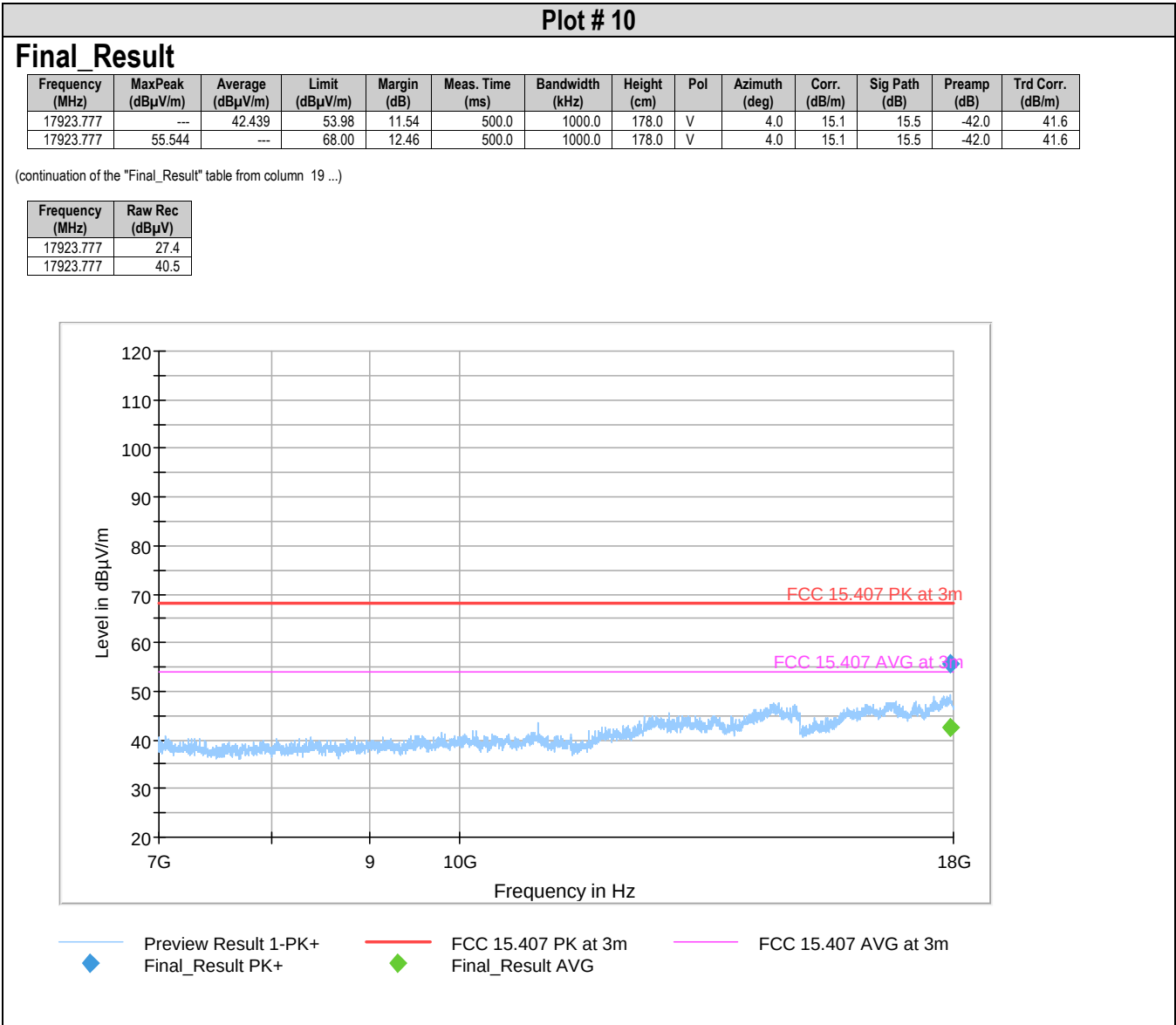


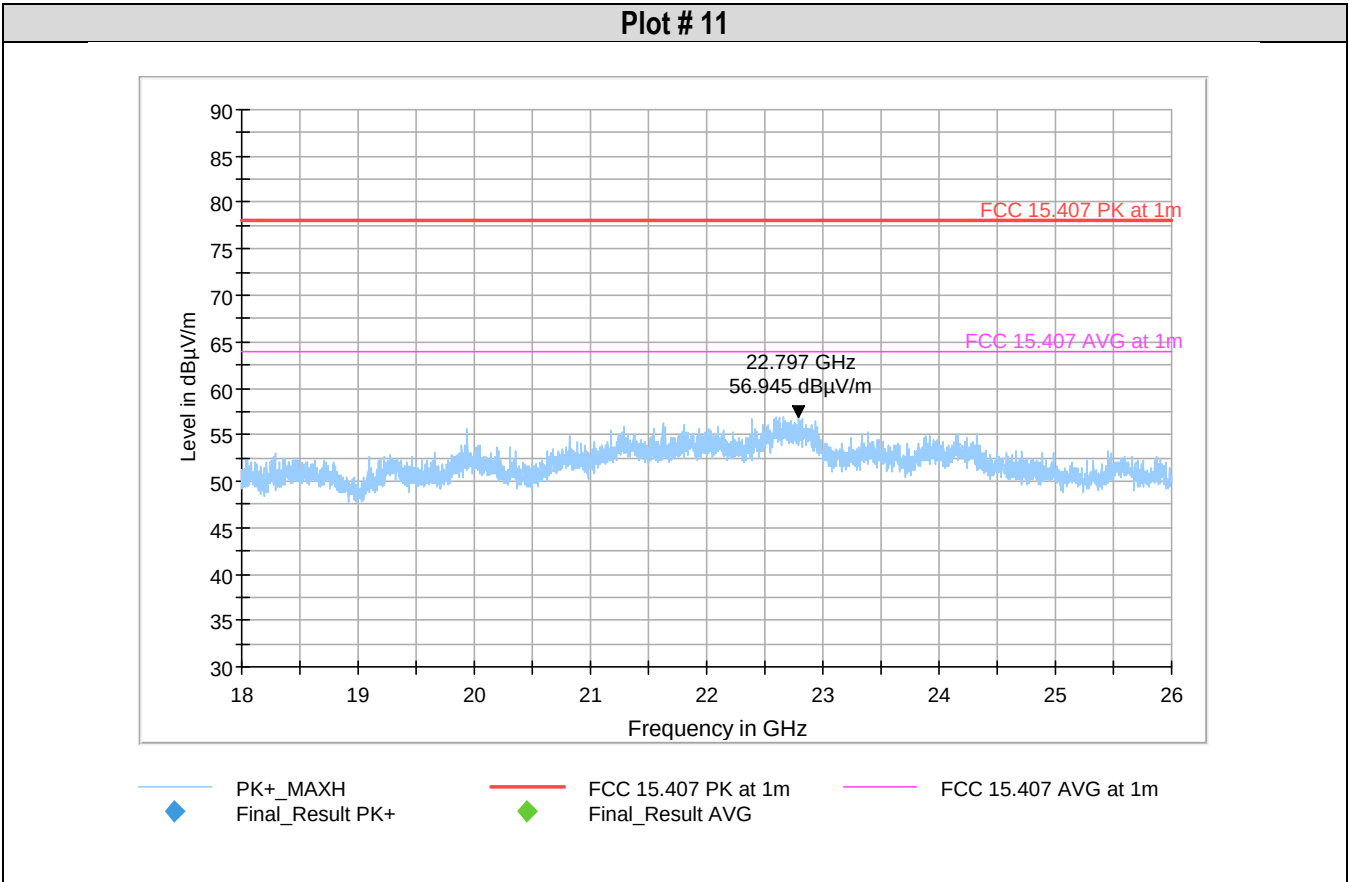
Preview Result 1-PK+ Final\_Result PK+      FCC 15.407 PK at 1m Final\_Result AVG      FCC 15.407 AVG at 1m











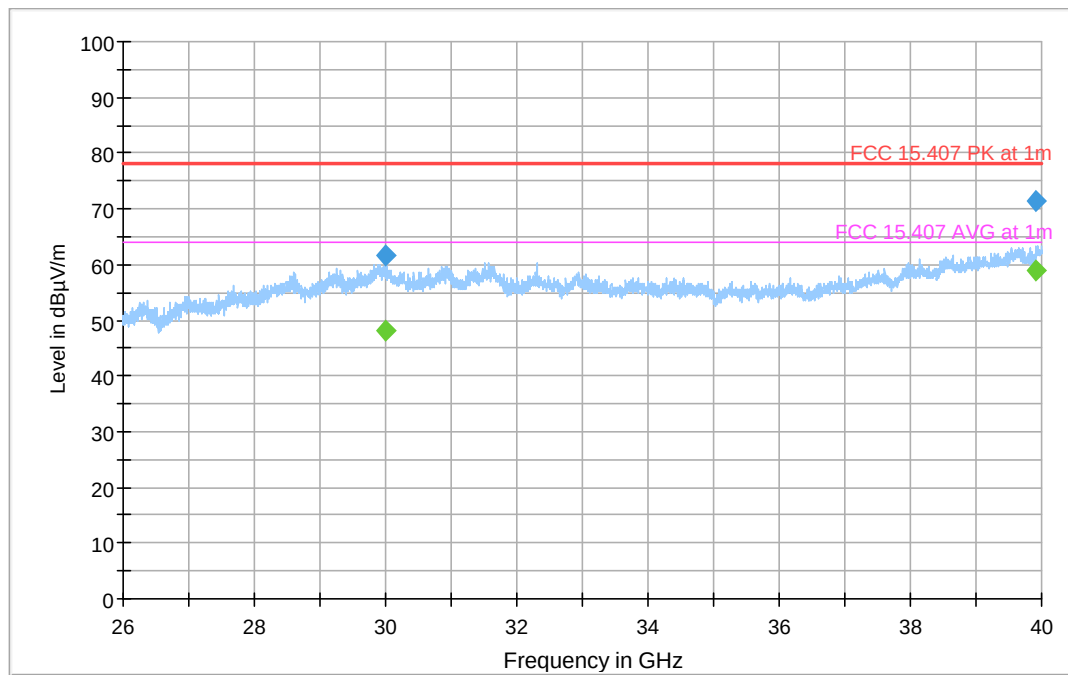
## Plot # 12

## Final\_Result

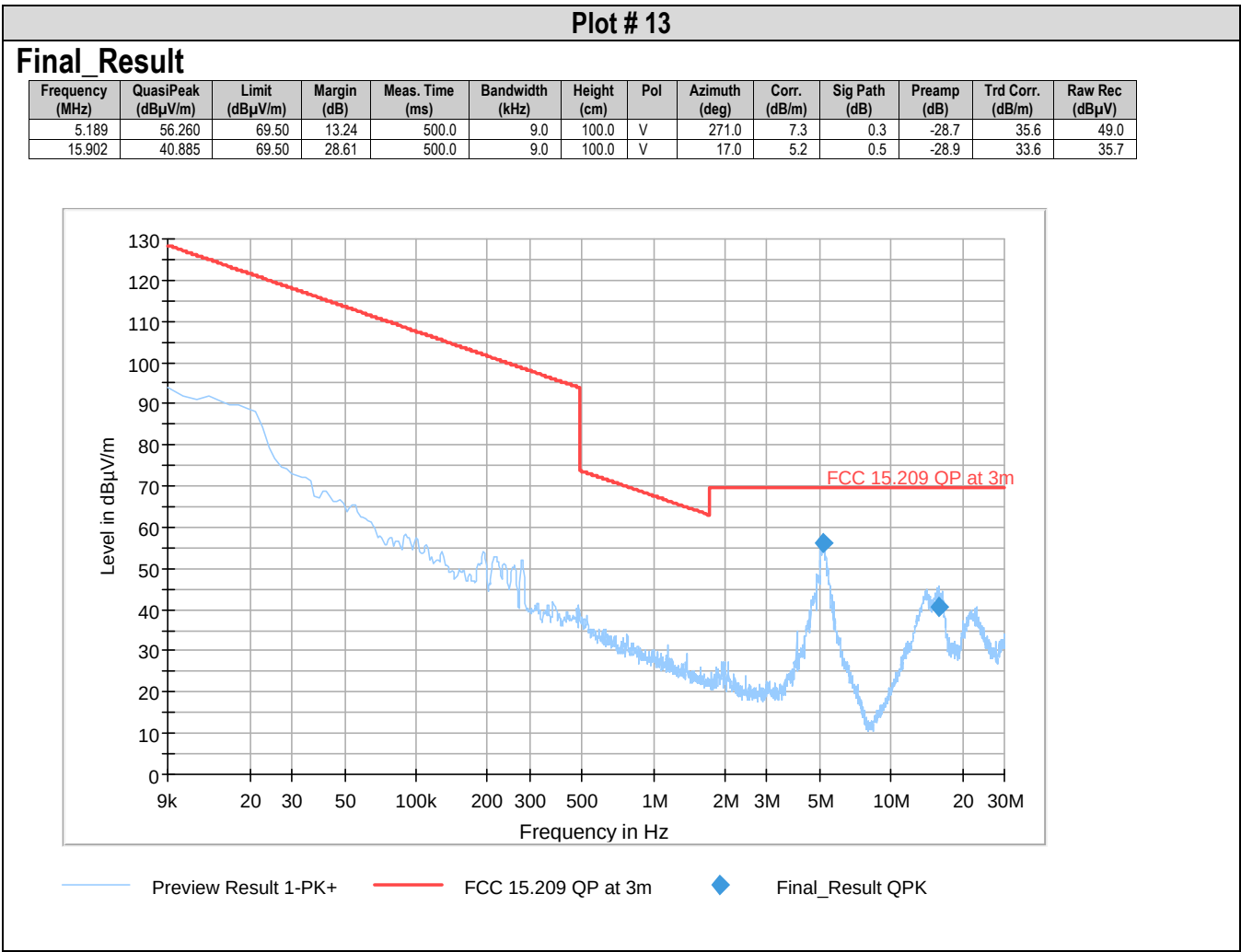
| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 29994.877       | ---              | 48.015           | 63.98          | 15.96       | 500.0           | 1000.0          | 150.0       | H   | 46.0          | 25.2         | 10.4          | 0.0         | 14.7             |
| 29994.877       | 61.541           | ---              | 78.00          | 16.46       | 500.0           | 1000.0          | 150.0       | H   | 46.0          | 25.2         | 10.4          | 0.0         | 14.7             |
| 39927.803       | ---              | 58.965           | 63.98          | 5.01        | 500.0           | 1000.0          | 150.0       | V   | 1.0           | 24.8         | 12.7          | 0.0         | 12.1             |
| 39927.803       | 71.217           | ---              | 78.00          | 6.78        | 500.0           | 1000.0          | 150.0       | V   | 1.0           | 24.8         | 12.7          | 0.0         | 12.1             |

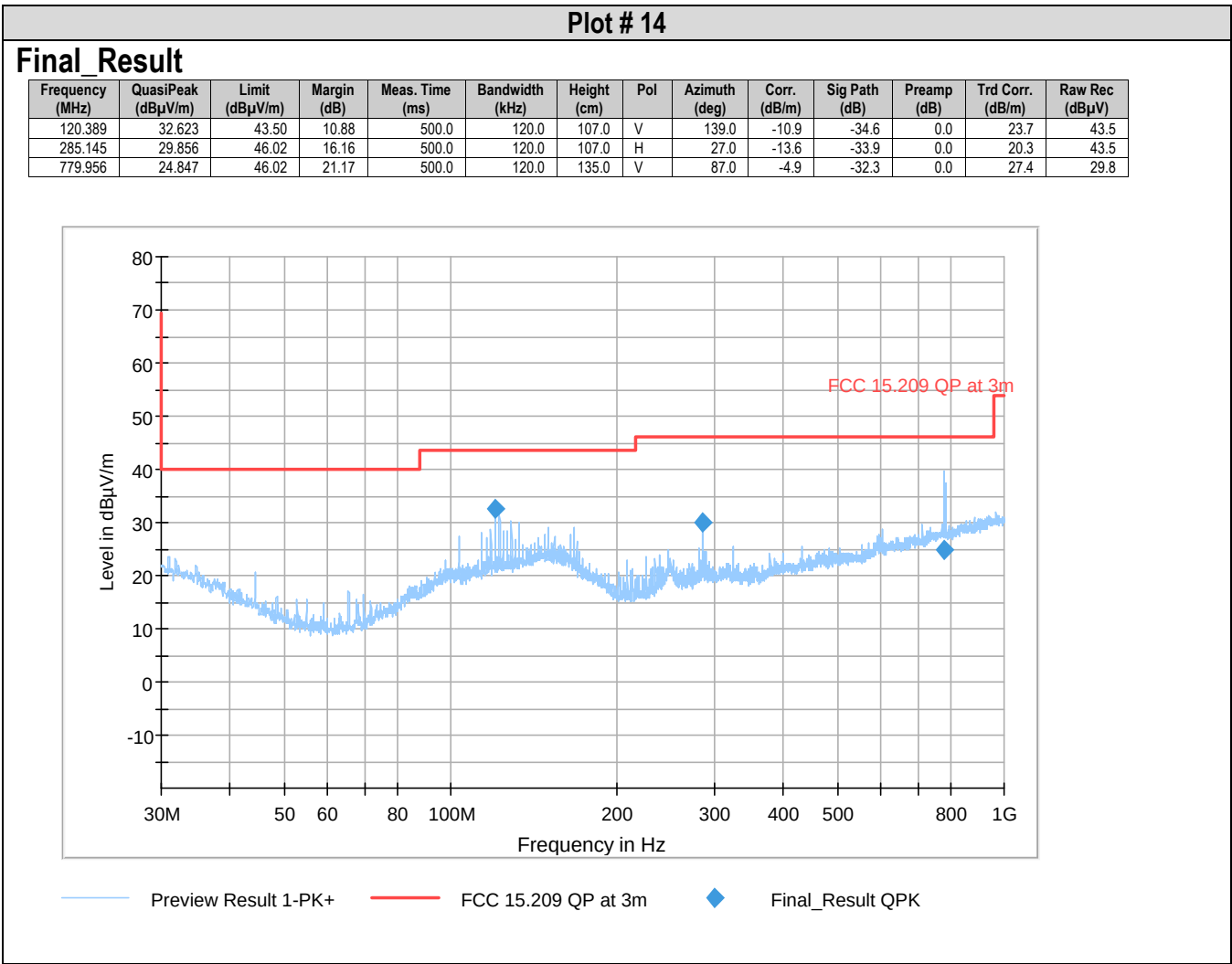
(continuation of the "Final\_Result" table from column 19 ...)

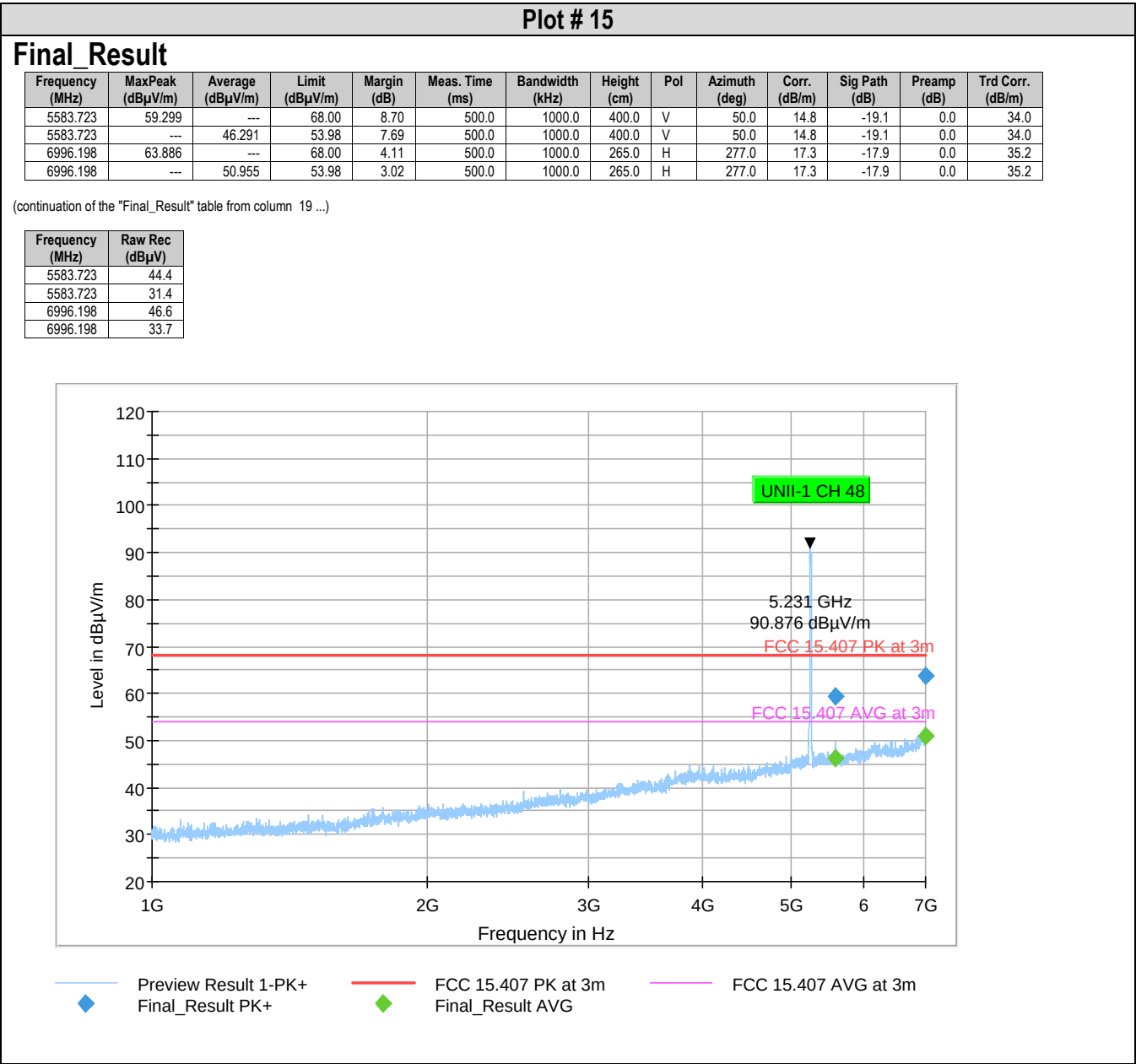
| Frequency (MHz) | Raw Rec (dBµV) |
|-----------------|----------------|
| 29994.877       | 22.8           |
| 29994.877       | 36.4           |
| 39927.803       | 34.1           |
| 39927.803       | 46.4           |

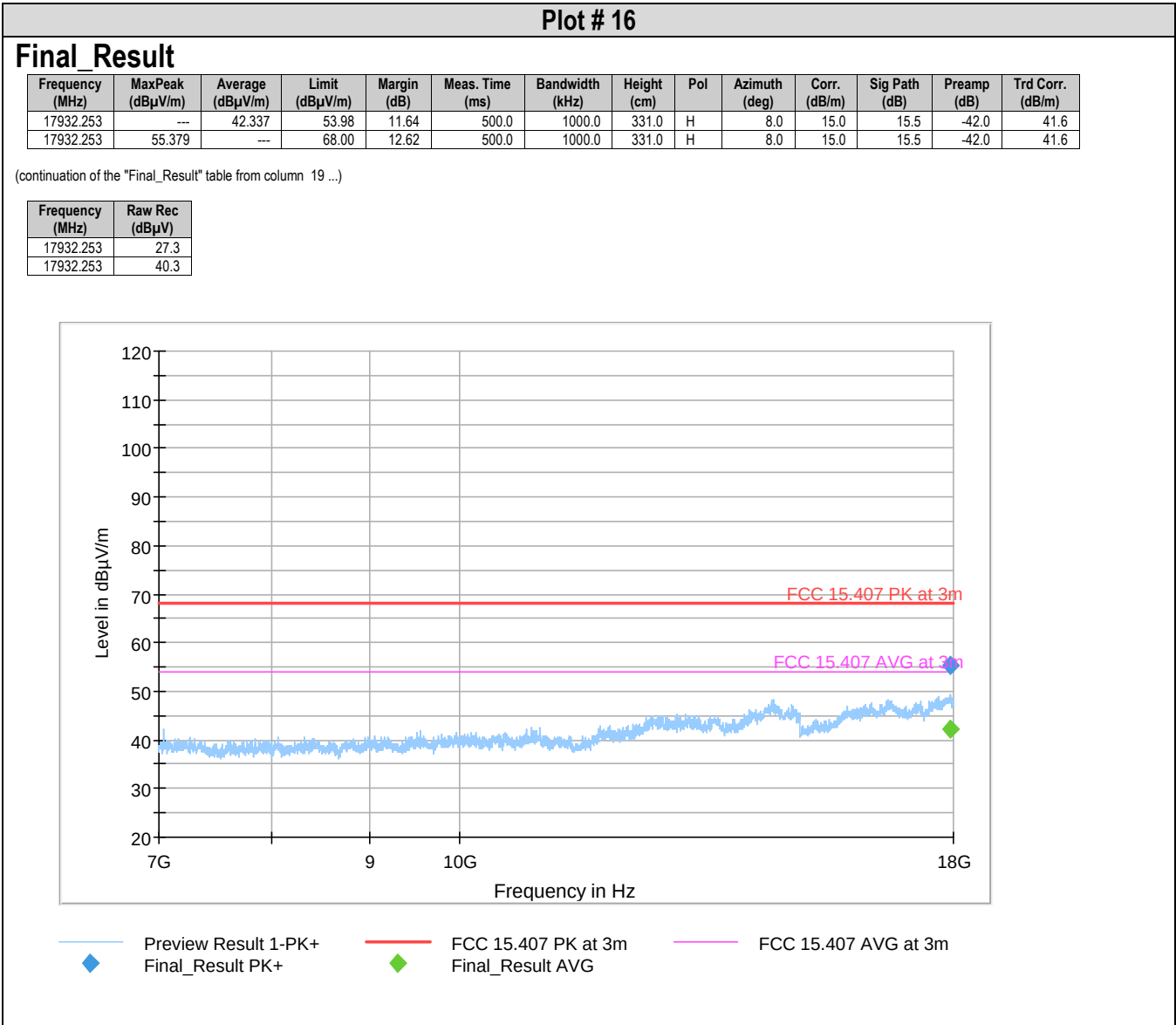


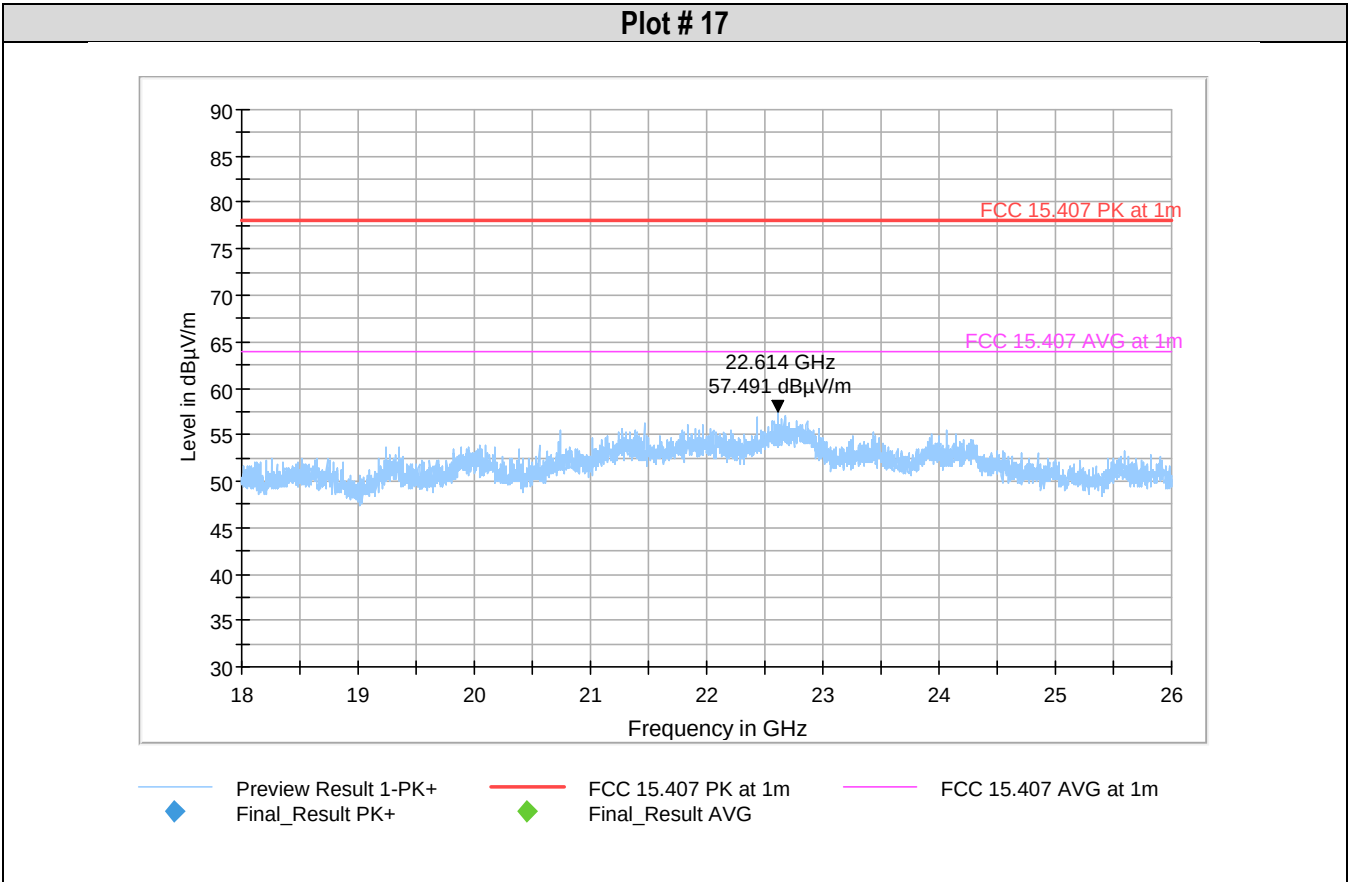
Preview Result 1-PK+      FCC 15.407 PK at 1m      FCC 15.407 AVG at 1m  
Final\_Result PK+      Final\_Result AVG











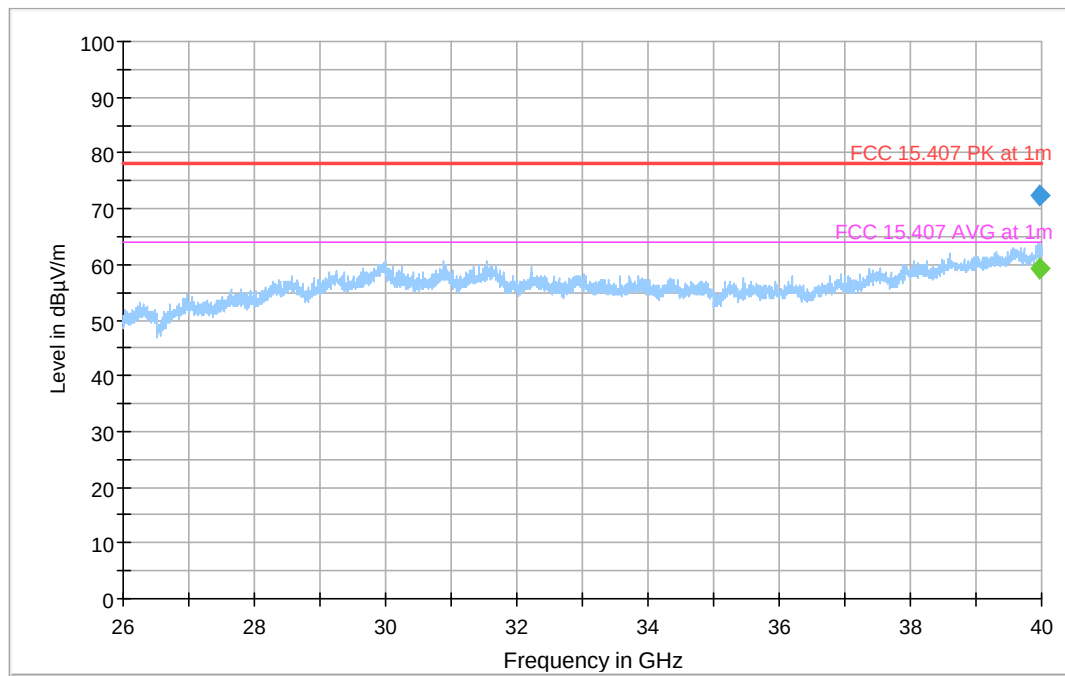
## Plot # 18

## Final\_Result

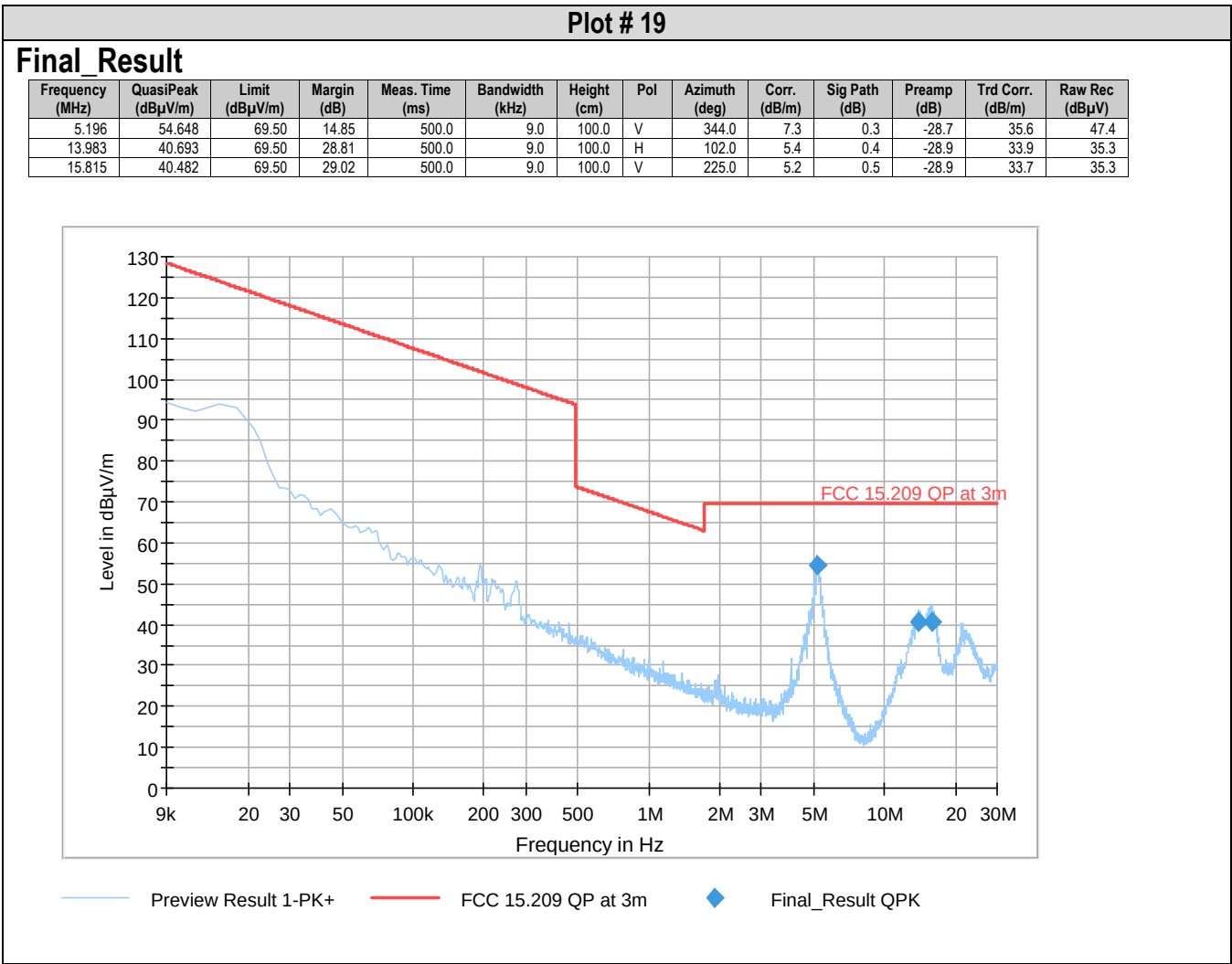
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 39981.897       | ---              | 59.241           | 63.98          | 4.74        | 500.0           | 1000.0          | 150.0       | V   | 40.0          | 25.0         | 12.7          | 0.0         | 12.3             |
| 39981.897       | 72.323           | ---              | 78.00          | 5.68        | 500.0           | 1000.0          | 150.0       | V   | 40.0          | 25.0         | 12.7          | 0.0         | 12.3             |

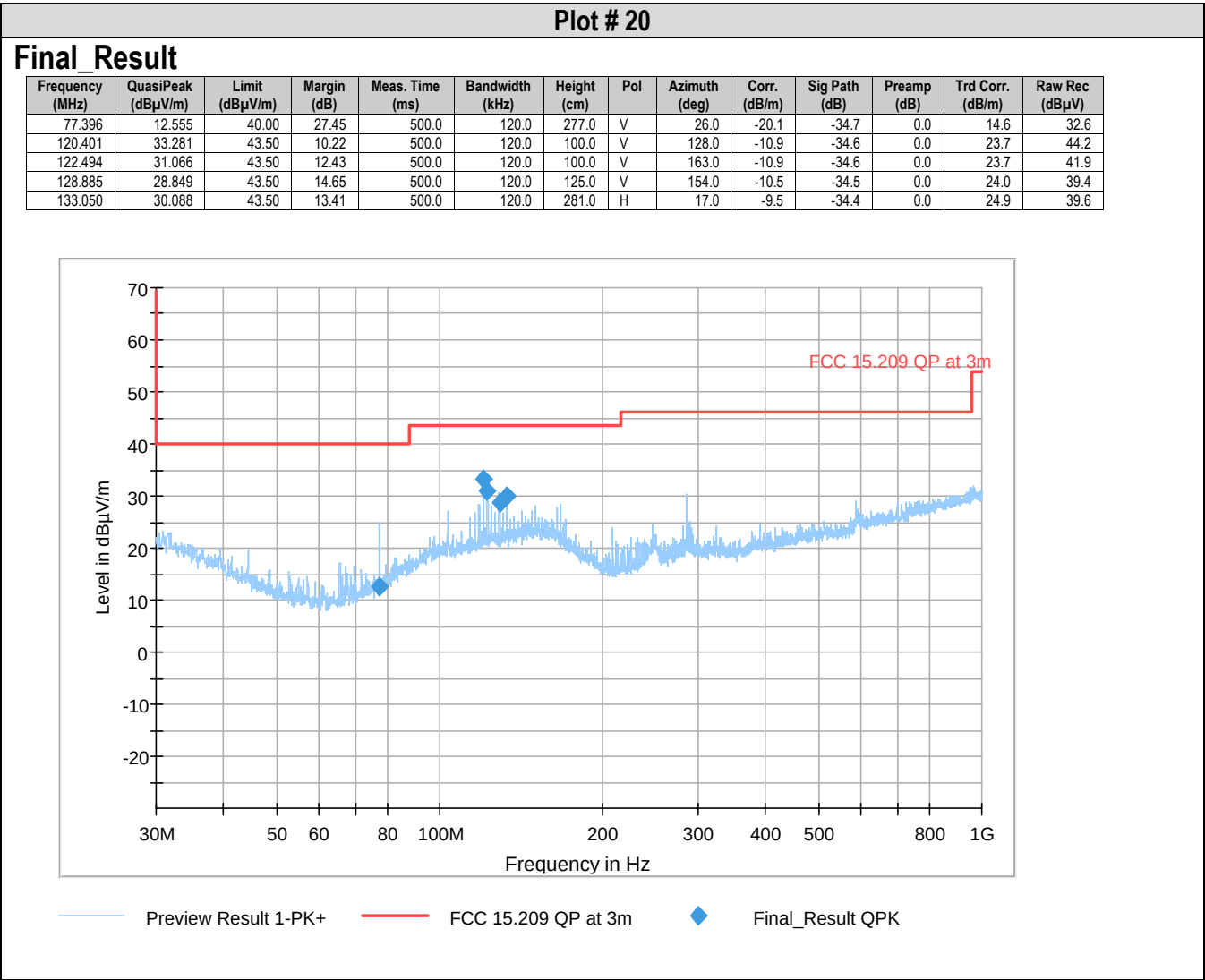
(continuation of the "Final\_Result" table from column 19 ...)

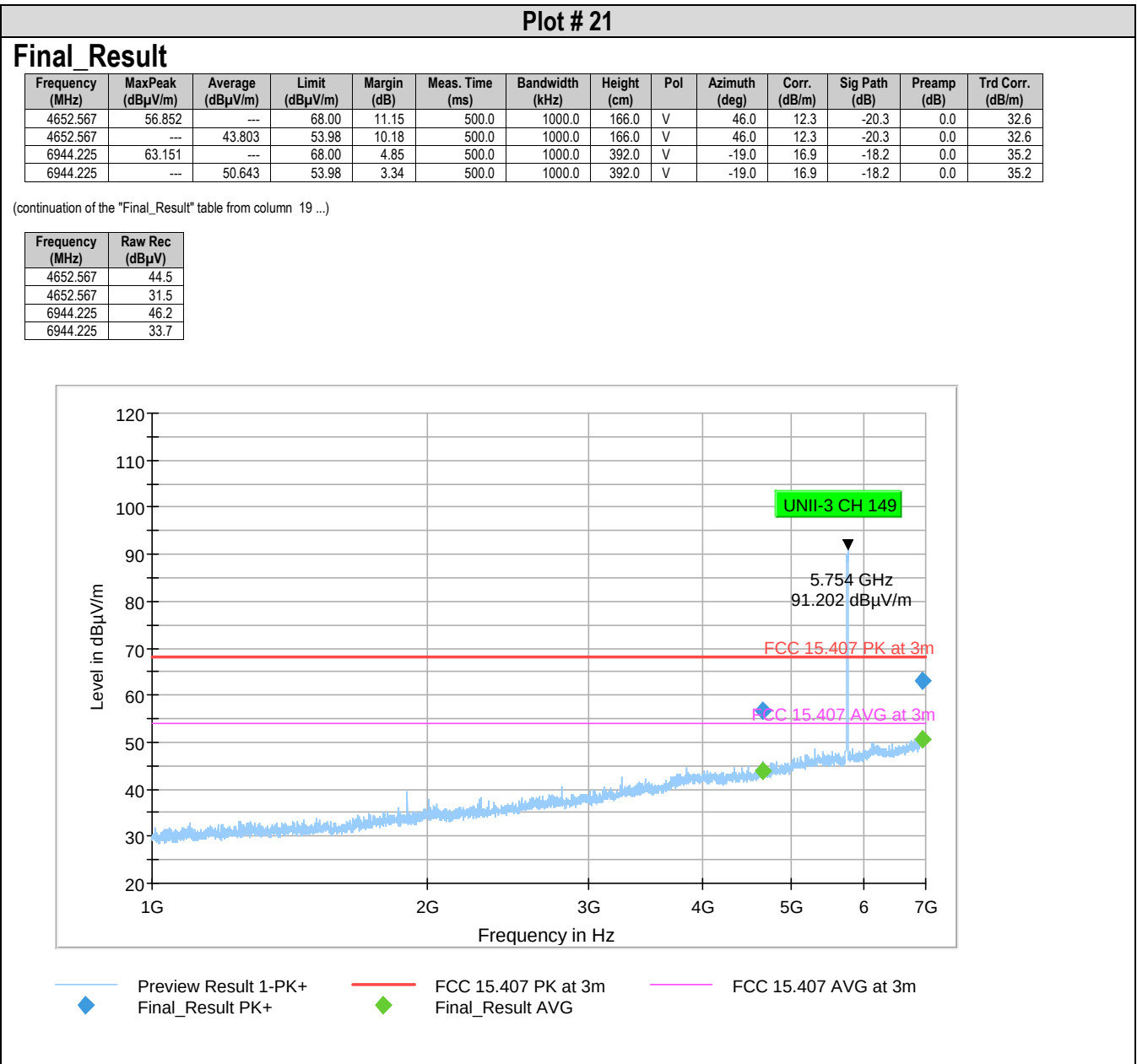
| Frequency (MHz) | Raw Rec (dBμV) |
|-----------------|----------------|
| 39981.897       | 34.2           |
| 39981.897       | 47.3           |

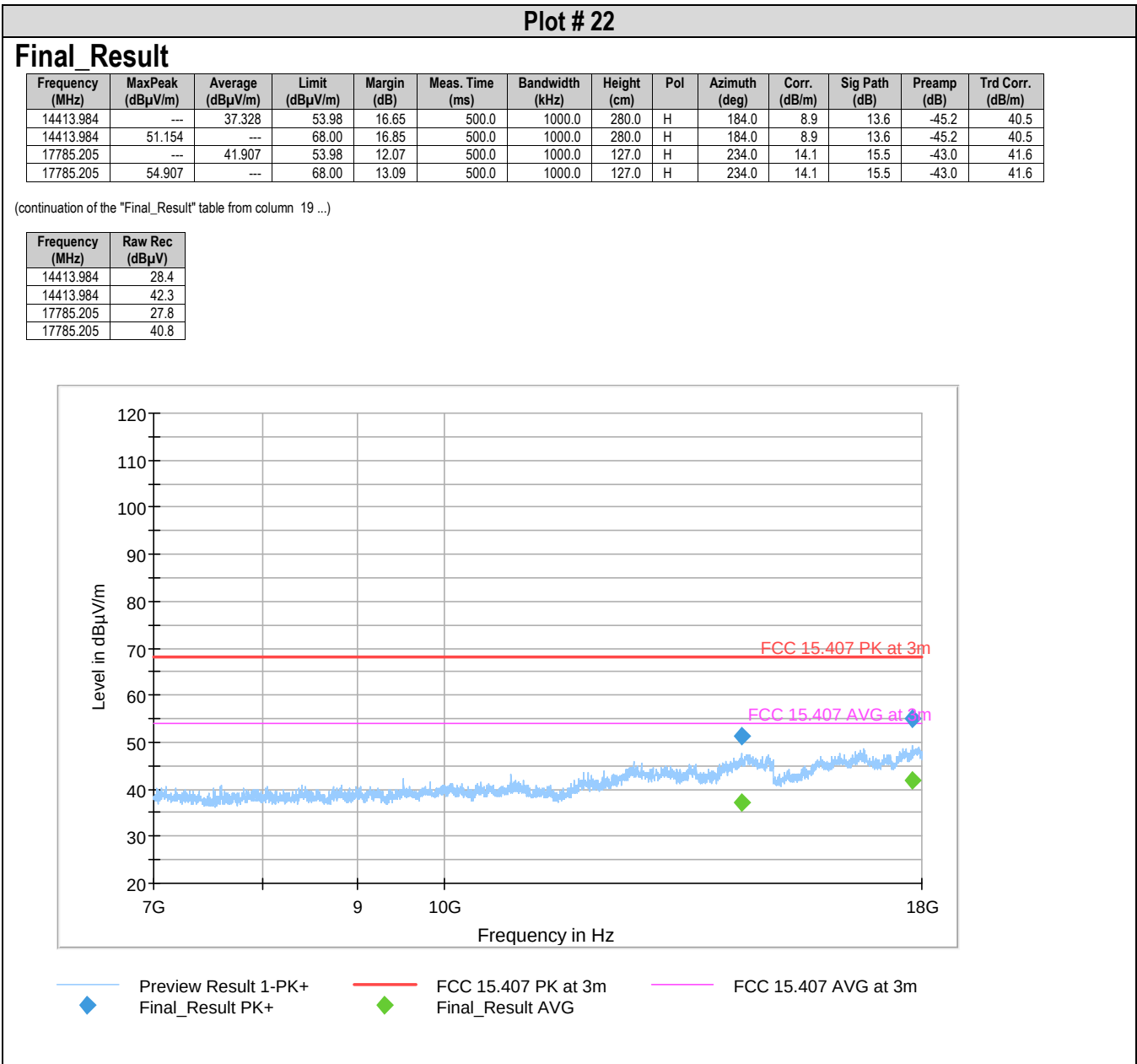


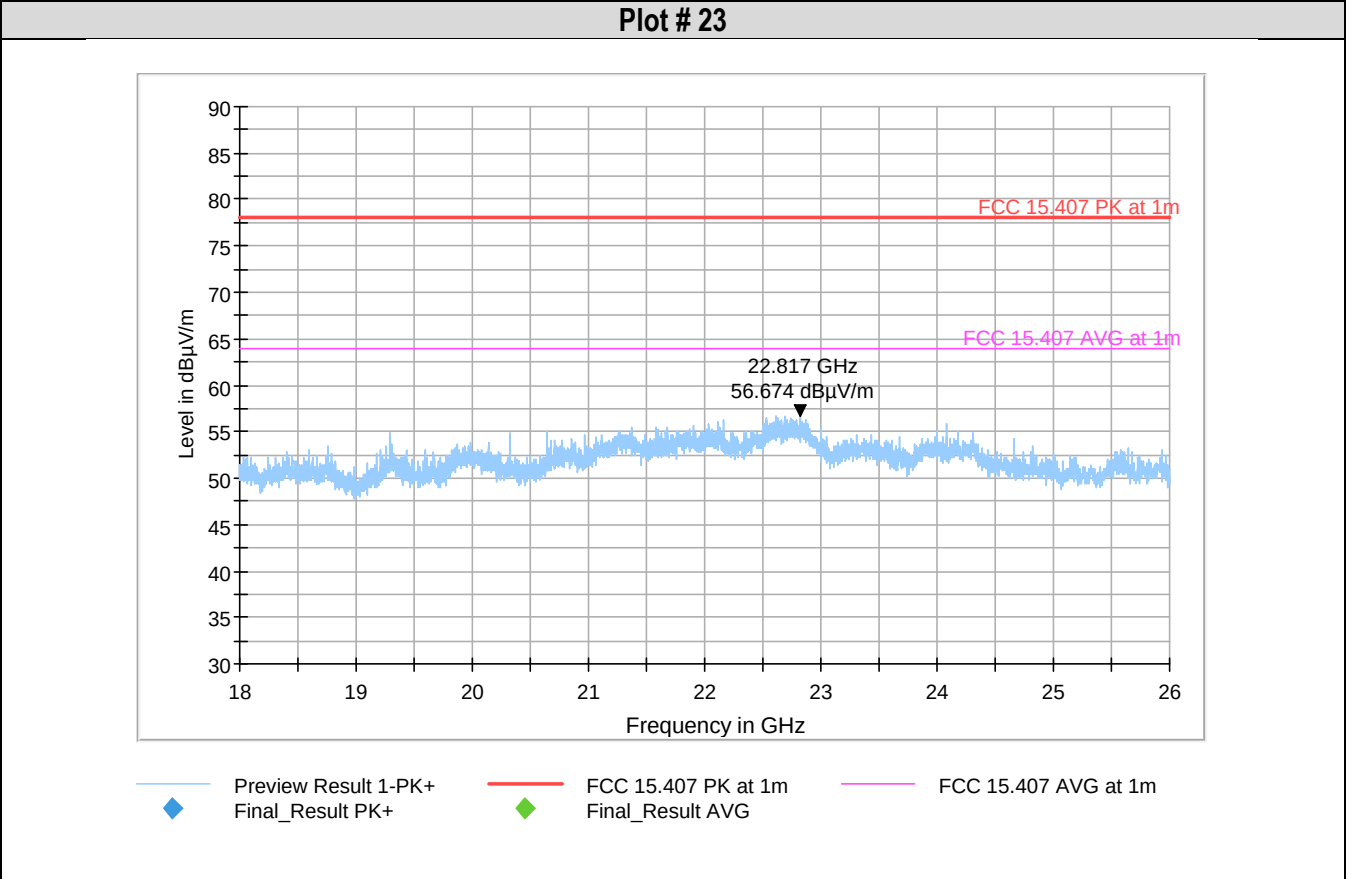
◆ Preview Result 1-PK+ Final\_Result PK+    ◆ FCC 15.407 PK at 1m Final\_Result AVG    — FCC 15.407 AVG at 1m

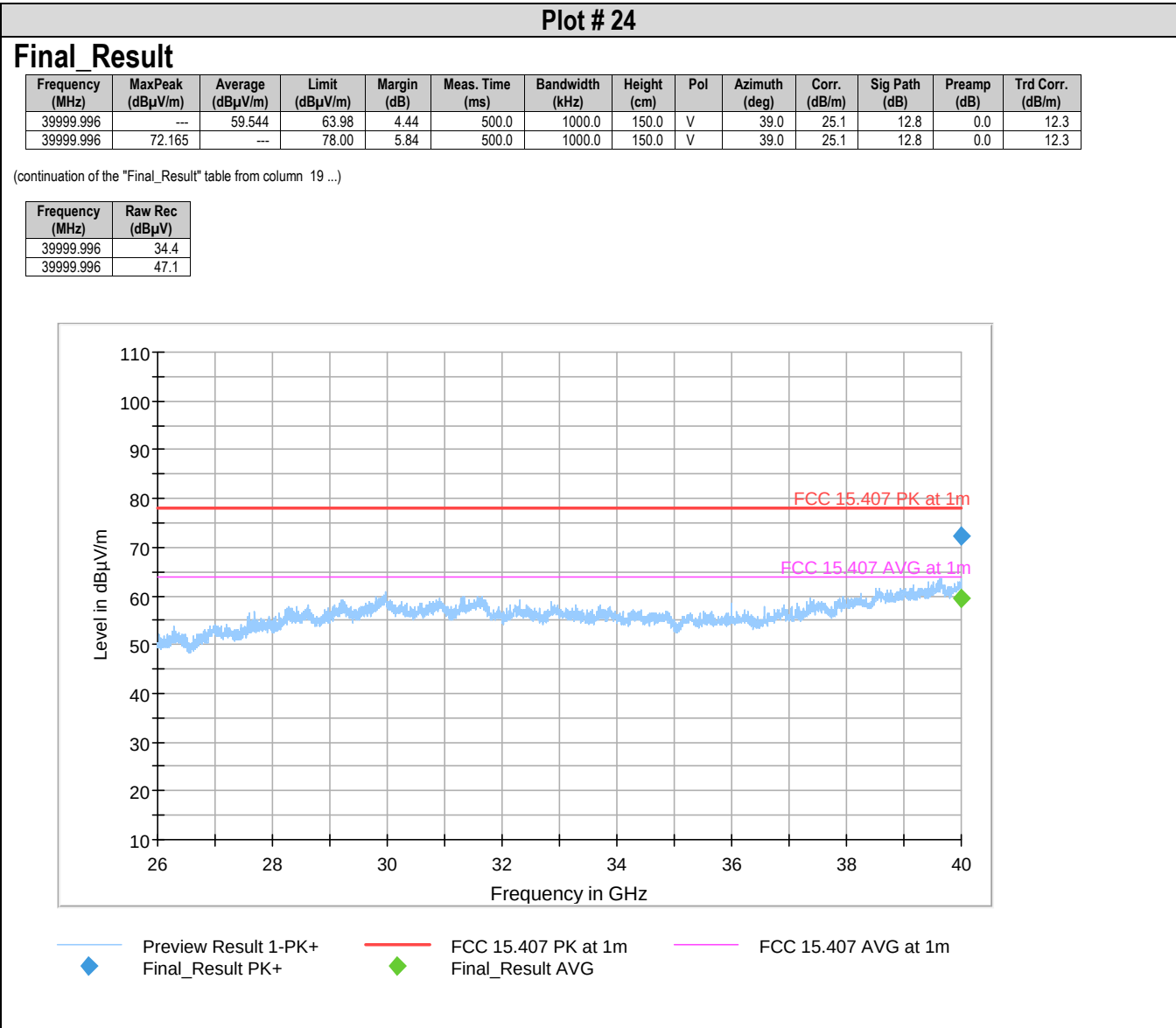


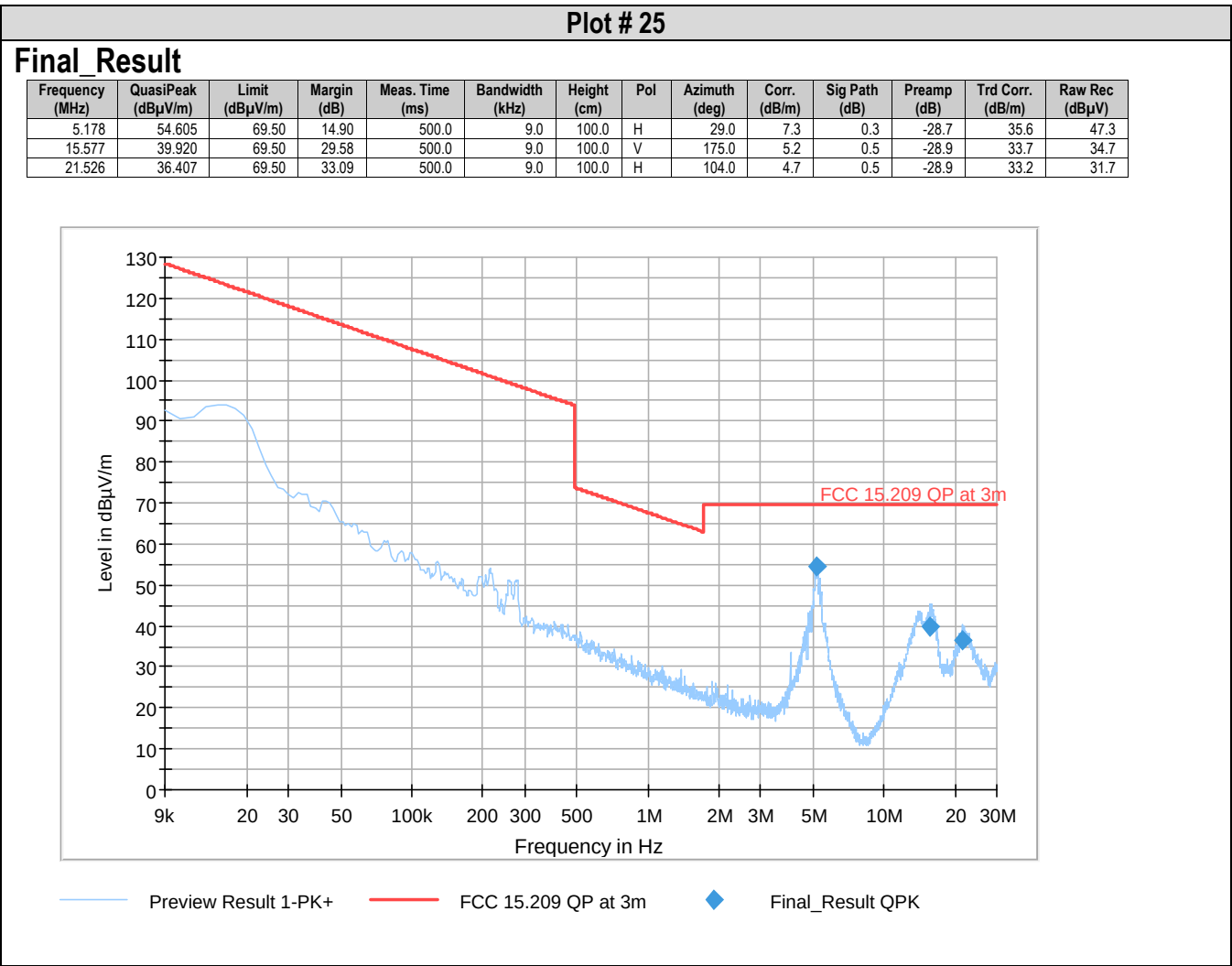


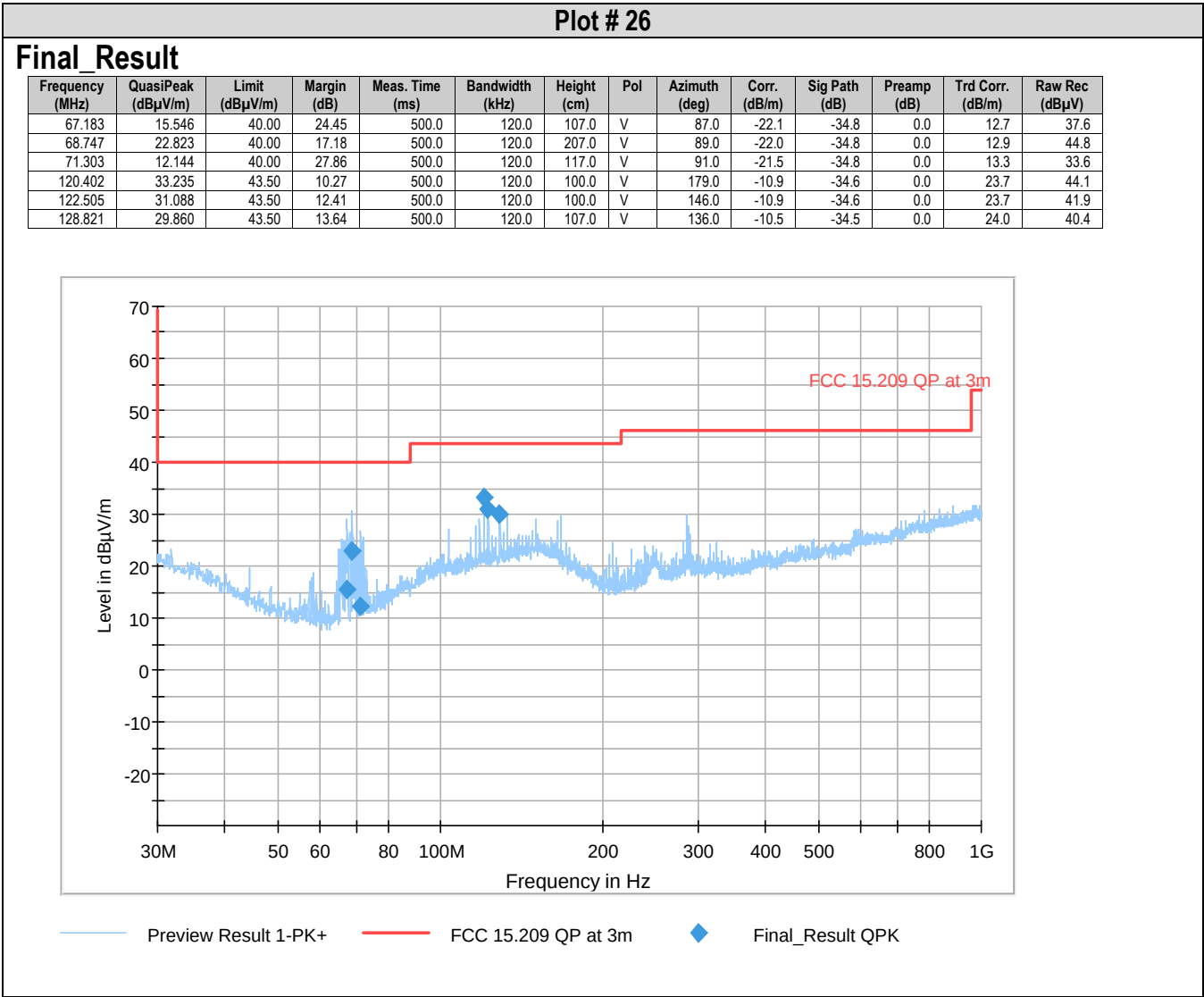












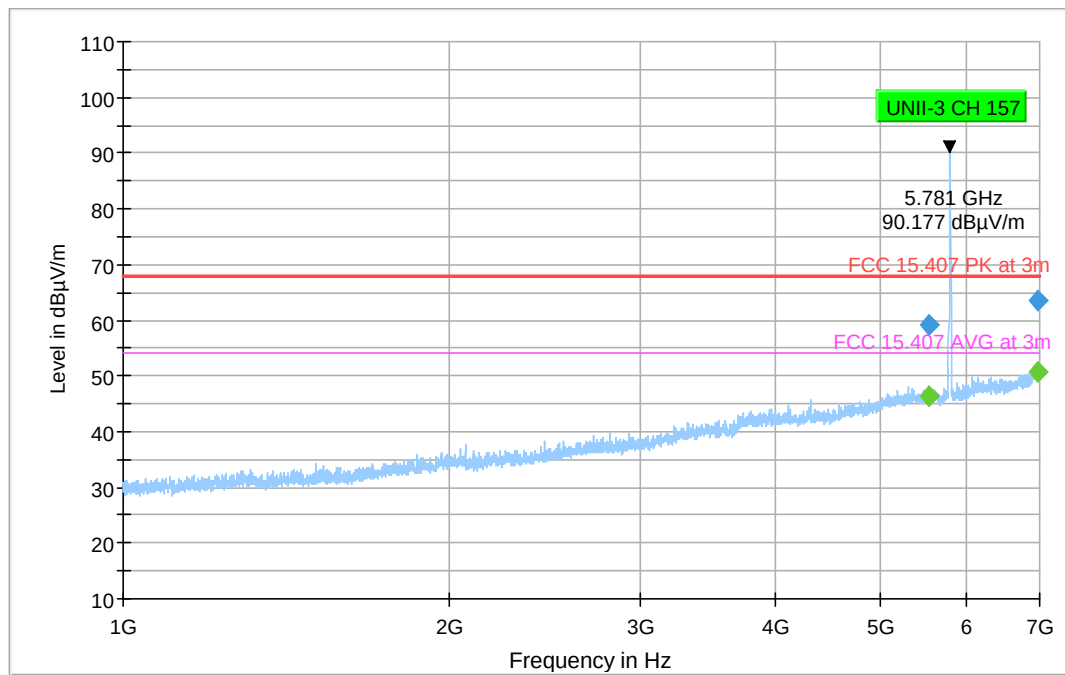
## Plot # 27

## Final\_Result

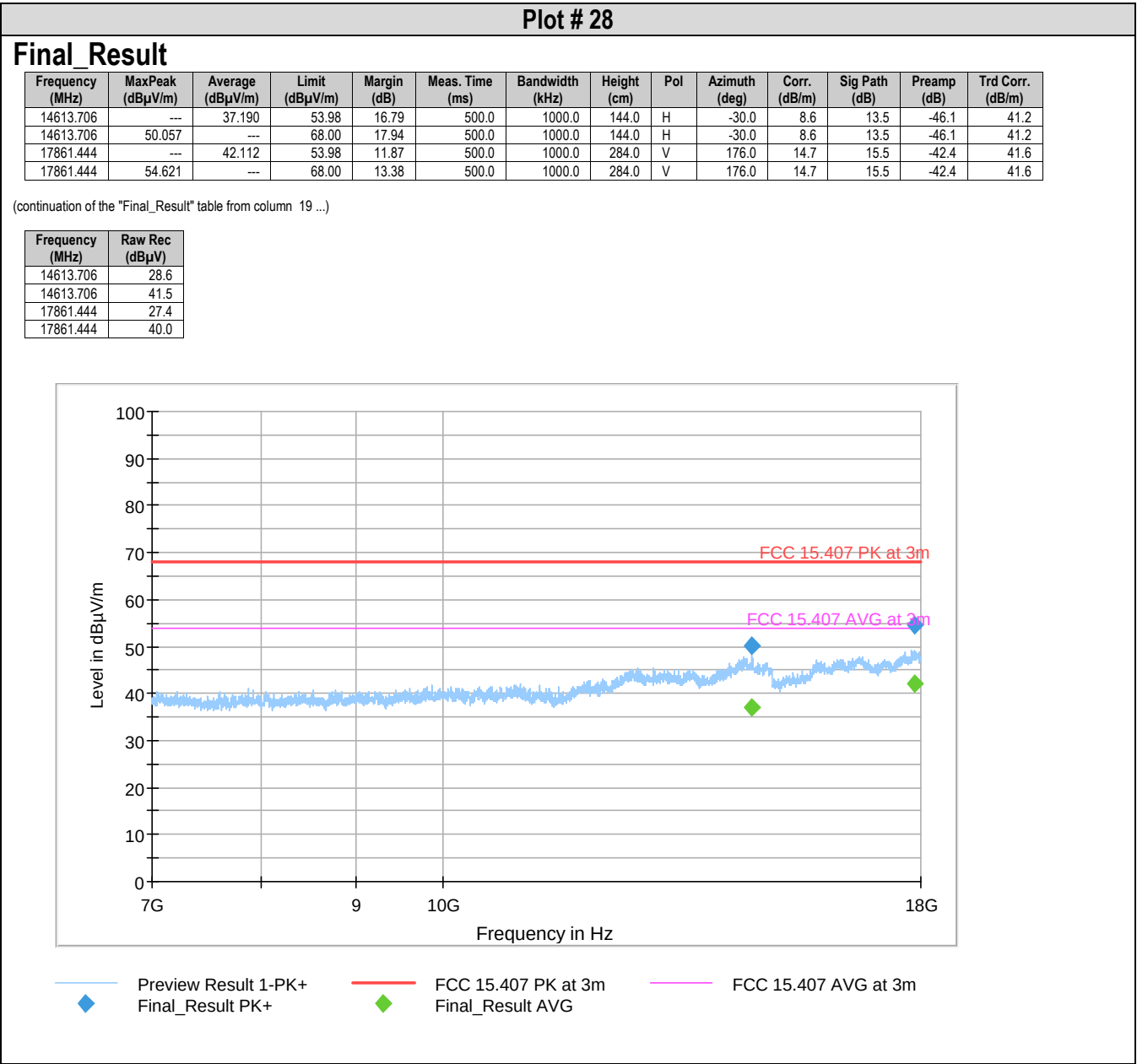
| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 5543.957        | ---              | 46.204           | 53.98          | 7.77        | 500.0           | 1000.0          | 195.0       | H   | 78.0          | 14.6         | -19.4         | 0.0         | 34.0             |
| 5543.957        | 59.063           | ---              | 68.00          | 8.94        | 500.0           | 1000.0          | 195.0       | H   | 78.0          | 14.6         | -19.4         | 0.0         | 34.0             |
| 6958.543        | ---              | 50.669           | 53.98          | 3.31        | 500.0           | 1000.0          | 400.0       | H   | 47.0          | 17.0         | -18.2         | 0.0         | 35.2             |
| 6958.543        | 63.472           | ---              | 68.00          | 4.53        | 500.0           | 1000.0          | 400.0       | H   | 47.0          | 17.0         | -18.2         | 0.0         | 35.2             |

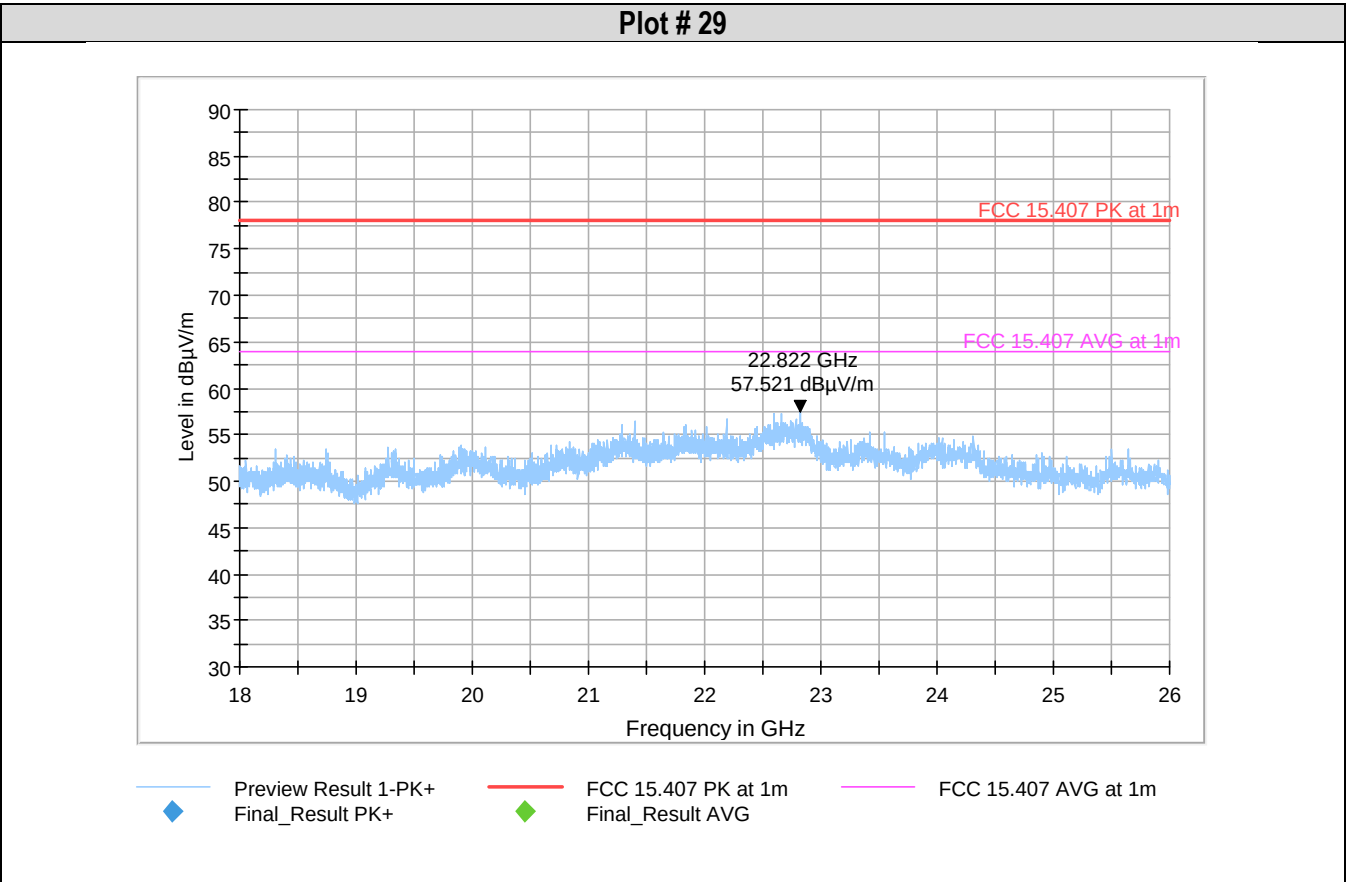
(continuation of the "Final\_Result" table from column 19 ...)

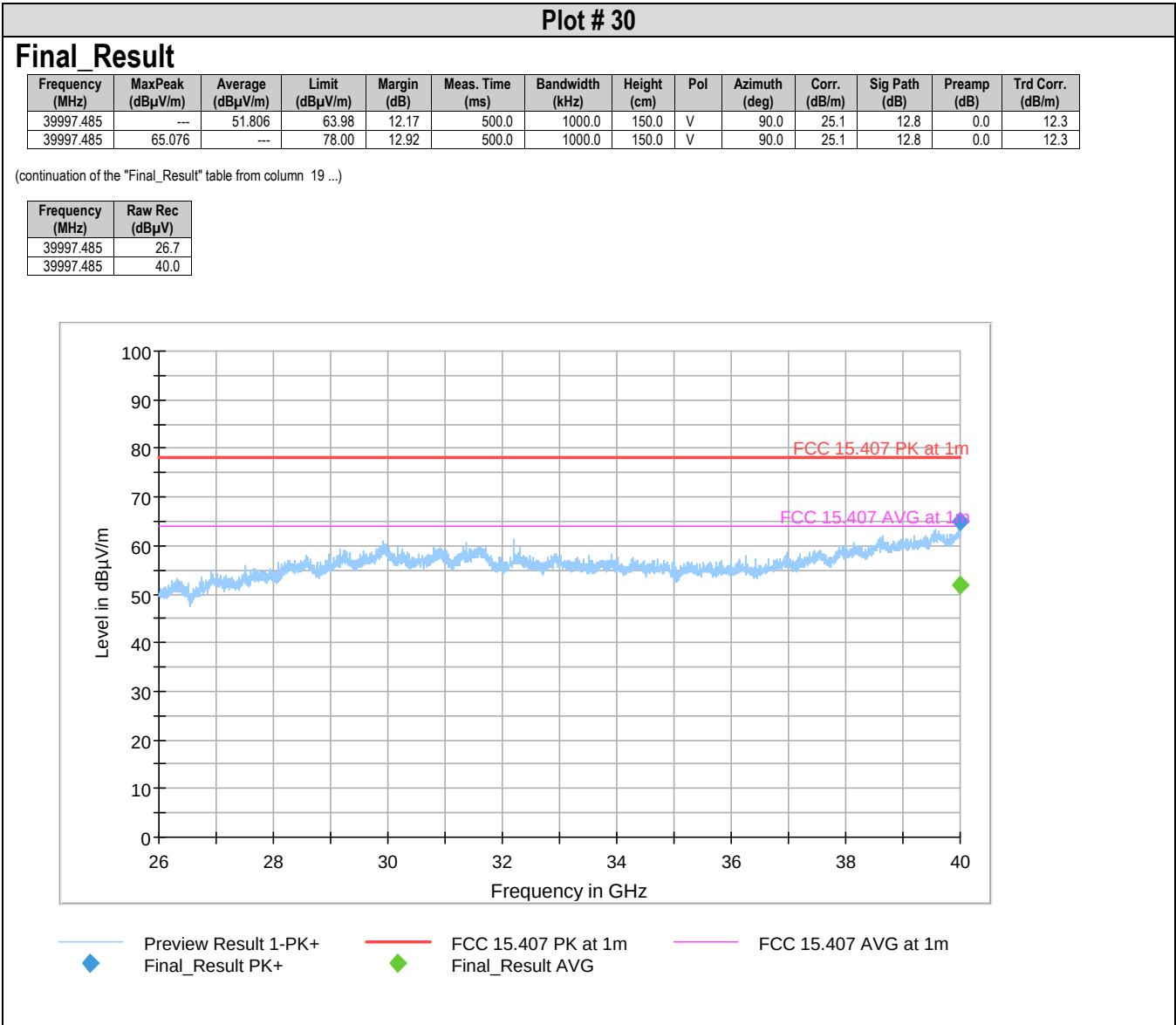
| Frequency (MHz) | Raw Rec (dBμV) |
|-----------------|----------------|
| 5543.957        | 31.6           |
| 5543.957        | 44.5           |
| 6958.543        | 33.6           |
| 6958.543        | 46.4           |

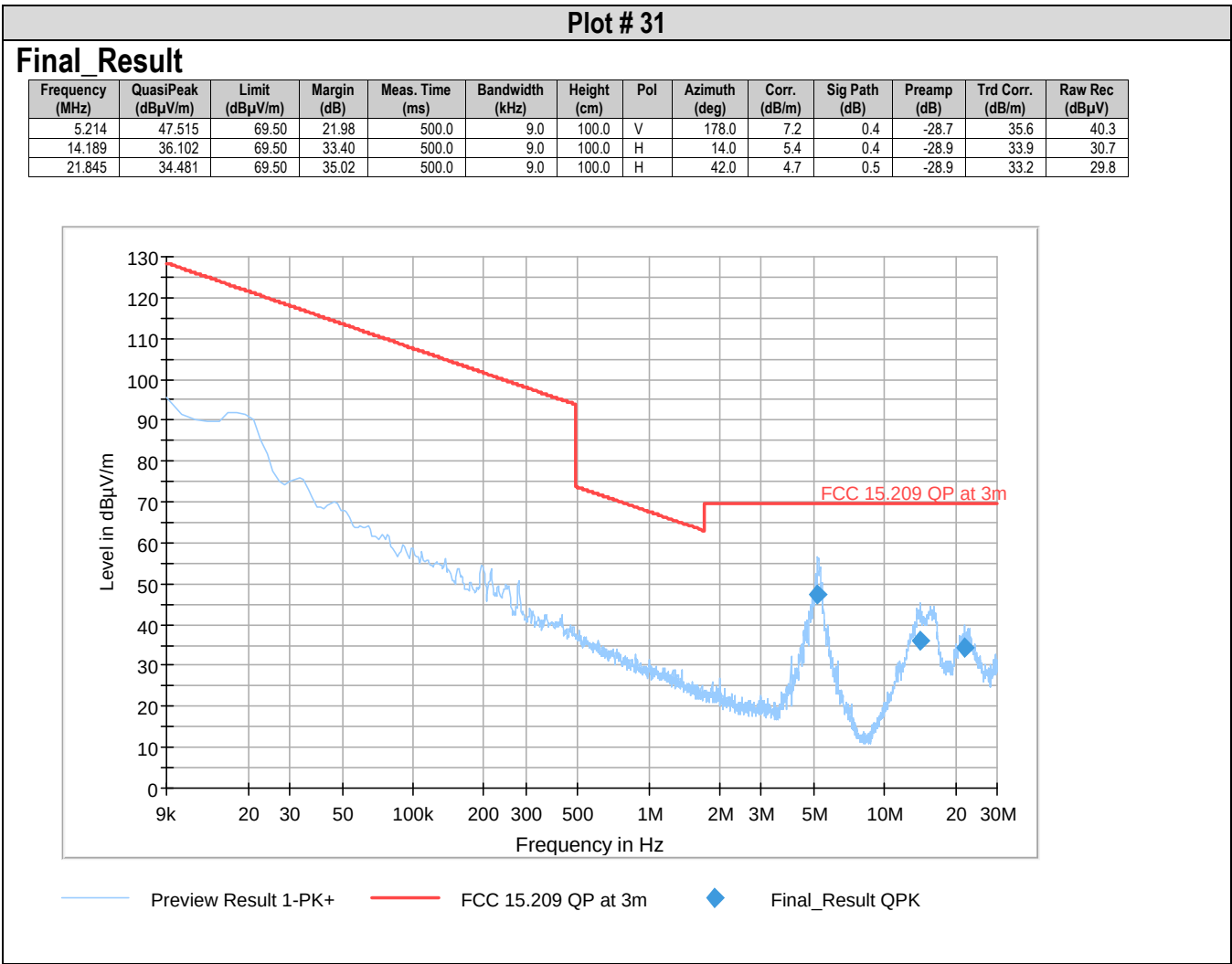


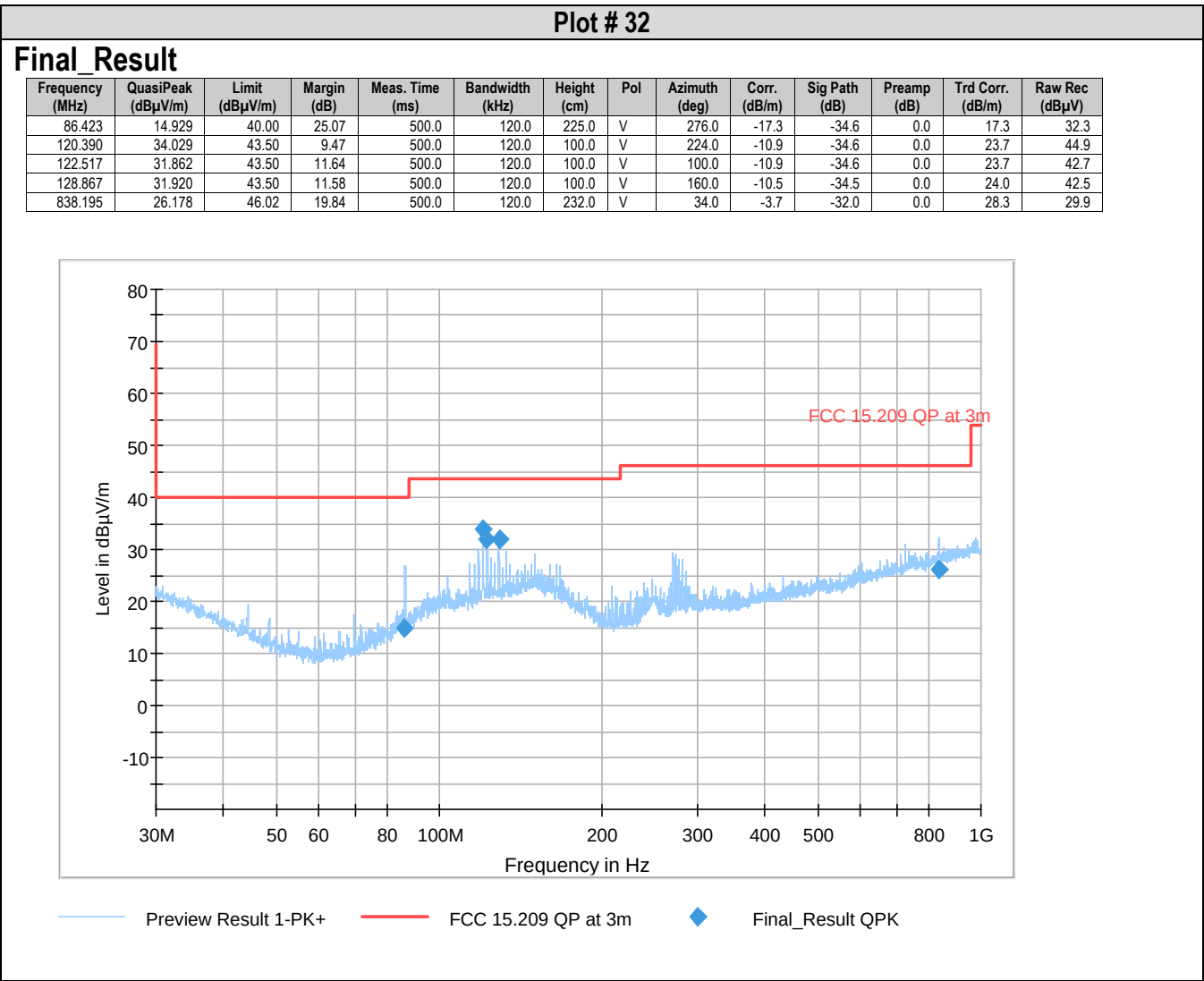
Preview Result 1-PK+ Final\_Result PK+ FCC 15.407 PK at 3m FCC 15.407 AVG at 3m

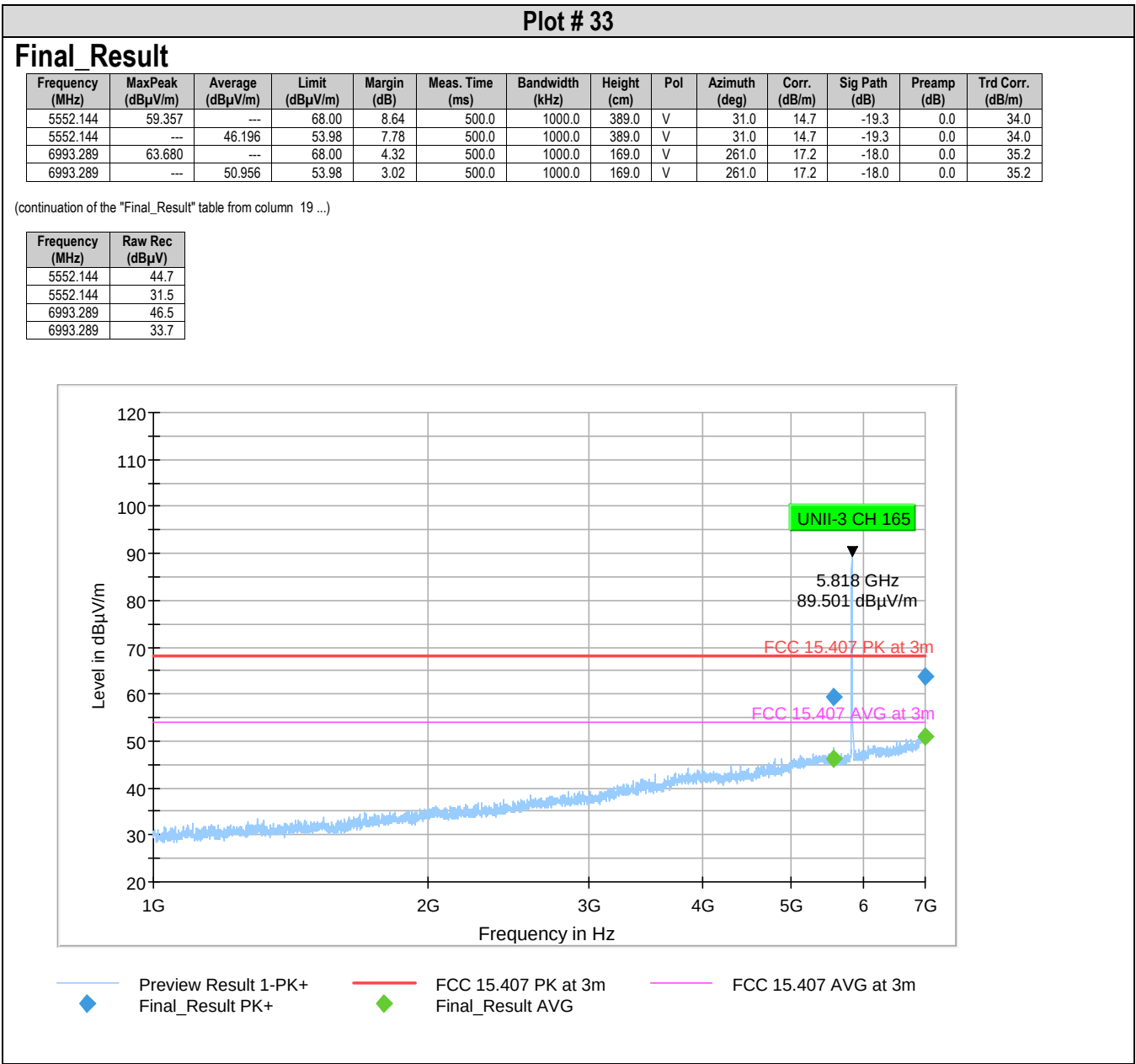












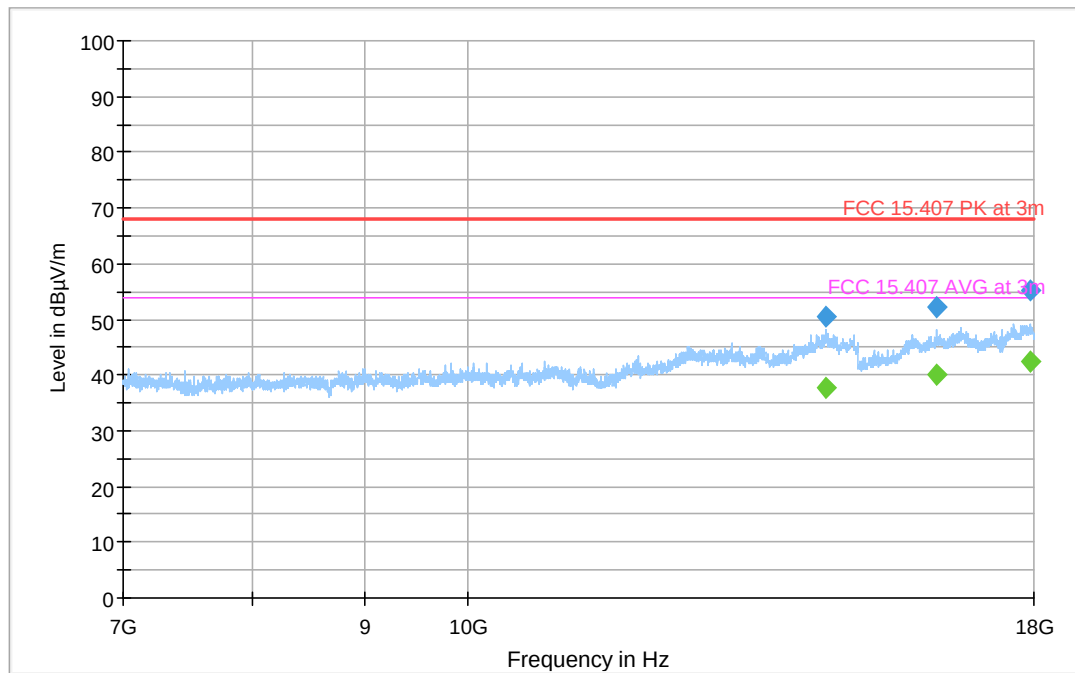
## Plot # 34

## Final\_Result

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 14500.991       | ---              | 37.771           | 53.98          | 16.21       | 500.0           | 1000.0          | 194.0       | H   | 10.0          | 8.6          | 13.4          | -45.6       | 40.8             |
| 14500.991       | 50.548           | ---              | 68.00          | 17.45       | 500.0           | 1000.0          | 194.0       | H   | 10.0          | 8.6          | 13.4          | -45.6       | 40.8             |
| 16267.623       | 52.257           | ---              | 68.00          | 15.74       | 500.0           | 1000.0          | 177.0       | H   | 216.0         | 11.8         | 14.8          | -43.8       | 40.8             |
| 16267.623       | ---              | 40.167           | 53.98          | 13.81       | 500.0           | 1000.0          | 177.0       | H   | 216.0         | 11.8         | 14.8          | -43.8       | 40.8             |
| 17913.029       | 55.231           | ---              | 68.00          | 12.77       | 500.0           | 1000.0          | 360.0       | H   | 165.0         | 15.1         | 15.5          | -42.0       | 41.6             |
| 17913.029       | ---              | 42.445           | 53.98          | 11.53       | 500.0           | 1000.0          | 360.0       | H   | 165.0         | 15.1         | 15.5          | -42.0       | 41.6             |

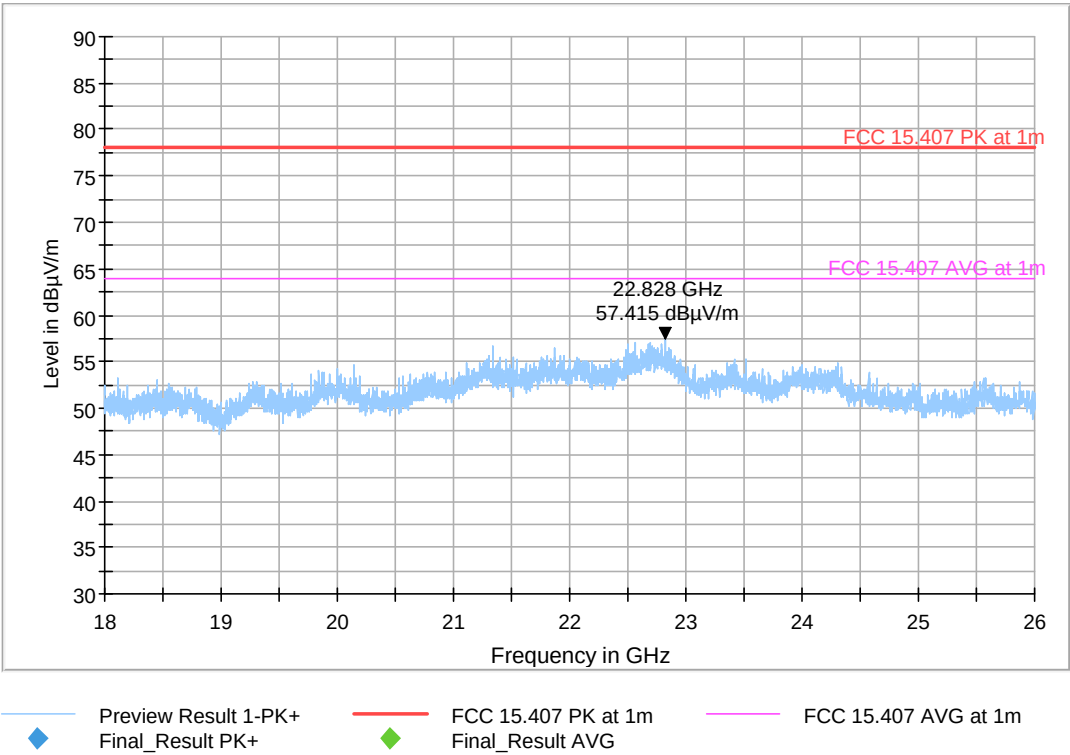
(continuation of the "Final\_Result" table from column 19 ...)

| Frequency (MHz) | Raw Rec (dBµV) |
|-----------------|----------------|
| 14500.991       | 29.2           |
| 14500.991       | 42.0           |
| 16267.623       | 40.4           |
| 16267.623       | 28.4           |
| 17913.029       | 40.2           |
| 17913.029       | 27.4           |



Preview Result 1-PK+ Final\_Result PK+ FCC 15.407 PK at 3m Final\_Result AVG FCC 15.407 AVG at 3m

Plot # 35



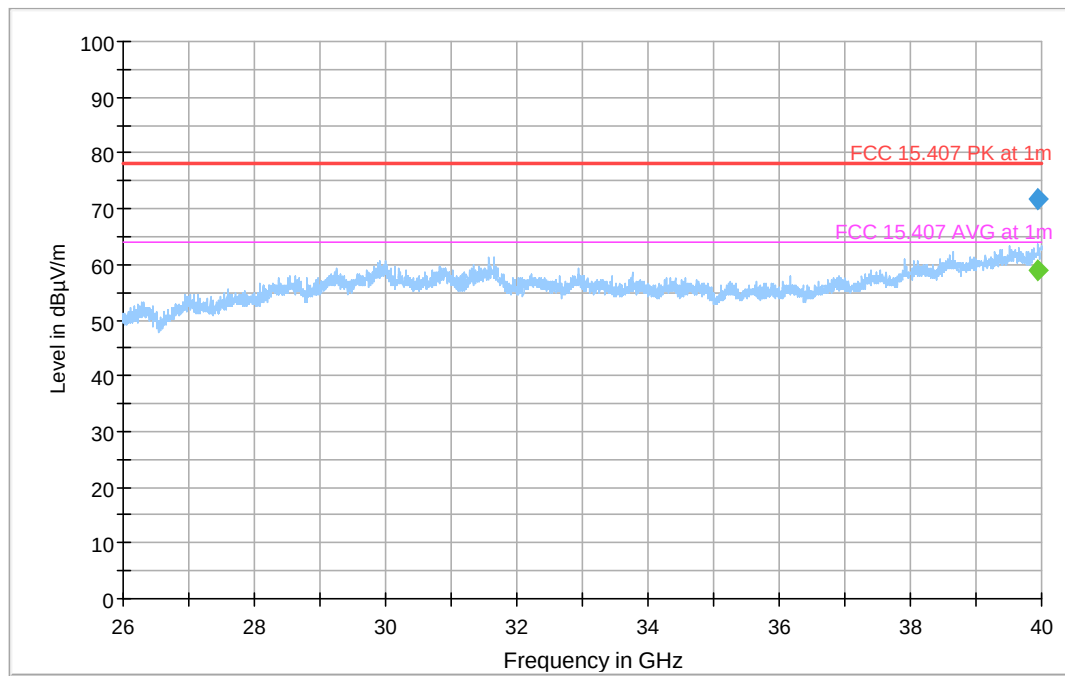
## Plot # 36

## Final\_Result

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) | Sig Path (dB) | Preamp (dB) | Trd Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|---------------|-------------|------------------|
| 39949.584       | ---              | 59.069           | 63.98          | 4.91        | 500.0           | 1000.0          | 150.0       | V   | 272.0         | 24.9         | 12.7          | 0.0         | 12.2             |
| 39949.584       | 71.631           | ---              | 78.00          | 6.37        | 500.0           | 1000.0          | 150.0       | V   | 272.0         | 24.9         | 12.7          | 0.0         | 12.2             |

(continuation of the "Final\_Result" table from column 19 ...)

| Frequency (MHz) | Raw Rec (dBμV) |
|-----------------|----------------|
| 39949.584       | 34.1           |
| 39949.584       | 46.7           |



◆ Preview Result 1-PK+ Final\_Result PK+    ◆ FCC 15.407 PK at 1m Final\_Result AVG    — FCC 15.407 AVG at 1m

## 9 Test setup photos

Setup photos are included in supporting file name: "EMC\_CONTM\_003\_25001\_FCC15407\_WLAN\_Setup\_Photos"

## 10 Test Equipment And Ancillaries Used For Testing

| Equipment Type        | Manufacturer    | Model            | Serial #   | Calibration Cycle | Last Calibration Date |
|-----------------------|-----------------|------------------|------------|-------------------|-----------------------|
| PASSIVE LOOP ANTENNA  | ETS LINDGREN    | 6512             | 000164698  | 3 Years           | 09/05/2025            |
| BILOG ANTENNA         | A.H. SYSTEMS    | BiLA2G           | 569        | 3 Years           | 09/08/2025            |
| HORN ANTENNA          | EMCO            | 3115             | 00035111   | 3 Years           | 09/04/2025            |
| HORN ANTENNA          | ETS LINDGREN    | 3117-PA          | 00167061   | 3 Years           | 09/04/2025            |
| HORN ANTENNA          | ETS LINDGREN    | 3116C-PA         | 00166821   | 3 Years           | 09/04/2025            |
| ESW.EMI TEST RECEIVER | ROHDE & SCHWARZ | ESW44            | 101715     | 3 Years           | 04/17/2024            |
| DIGITAL THERMOMETER   | Control Company | 4410,90080-03    | 230712972  | 3 Years           | 10/18/2023            |
| Signal Analyzer       | R&S             | FSV40            | 101022     | 3 Years           | 09/30/2025            |
| Multimeter            | Fluke           | 115              | 56090717MV | 3 Years           | 09/25/2025            |
| Software              | EMC32           | Version 10.50.40 | -          | -                 | -                     |

**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 "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

| Equipment Type          | Manufacturer    | Model    | Serial #               | Calibration Cycle | Last Calibration Date |
|-------------------------|-----------------|----------|------------------------|-------------------|-----------------------|
| Vector Signal Generator | ROHDE & SCHWARZ | SMW 200A | 14120000K02-111326-gW  | -                 | N/A                   |
| Signal Generator        | ROHDE & SCHWARZ | SMF 100A | 1167.0000K02-101833-NX | 3 Years           | 09/27/2023            |
| Spectrum Analyzer       | ROHDE & SCHWARZ | FSU      | 200302                 | 3 Years           | 01/25/2024            |
| Switch                  | ROHDE & SCHWARZ | OSP 120  | 100083                 | 3 Years           | 12/14/2023            |
| Vector Signal Generator | ROHDE & SCHWARZ | SMJ 100A | 101173                 | -                 | N/A                   |
| Spectrum Analyzer       | ROHDE & SCHWARZ | FSU      | 100189                 | 3 Years           | 10/21/2024            |
| RF Step Attenuator      | ROHDE & SCHWARZ | RSP      | 100062                 | -                 | N/A                   |
| Temperature Chamber     | TESTEQUITY      | 123H     | 230159                 | -                 | N/A                   |
| Digital Thermometer     | Traceable       | -        | 230713047              | 3 Years           | 10/18/2023            |
| Software                | WMS32           | 12.00.01 | -                      | -                 | N/A                   |

**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 "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

**11 History**

| Date       | Report Name                            | Changes to report                                                                                                                                                                                                                                                                | Prepared by      |
|------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 2026-01-02 | EMC_CONTM_003_25001_FCC15407_WLAN      | Initial Version                                                                                                                                                                                                                                                                  | Guangcheng Huang |
| 2026-02-19 | EMC_CONTM_003_25001_FCC15407_WLAN_Rev1 | Update EUT antenna gain<br>Specify limit for each U-NII sub-bands                                                                                                                                                                                                                | Guangcheng Huang |
| 2026-03-24 | EMC_CONTM_003_25001_FCC15407_WLAN_Rev2 | Update EUT trace loss and antenna gain,<br>Compensating test results accordingly<br>Update sample calculation and test setup scheme above 18 GHz                                                                                                                                 | Guangcheng Huang |
| 2026-04-08 | EMC_CONTM_003_25001_FCC15407_WLAN_Rev3 | Sec.3.2, update antenna gain.<br>Sec.3.3, add description on output power setting.<br>Sec.8.2, update output power and PSD limit for U-NII-3 due to directional antenna gain greater than 6 dBi.<br>Sec.8.1, add single port output power info to MIMO output power measurement. | Guangcheng Huang |
| 2026-04-13 | EMC_CONTM_003_25001_FCC15407_WLAN_Rev4 | Sec.3.2, remove ch42 with 80 MHz BW from U-NII-1,<br>Sec.5, update mode tested for test case RSE,<br>Sec.8.5.4, update emission level with lowest margin                                                                                                                         | Guangcheng Huang |

&lt;&lt;&lt; The End &gt;&gt;&gt;