



FCC / ISED Test Report

For:

Astronautics Corporation of America

Marketing Name:

Astronautics M2-JODY-W3 WIFI Radio

Model Number:

ACA-M2-JODY-W377-00B

Product Description:

Astronautics M2-JODY-W3 WIFI Radio

FCC ID: 2AVRR-JODYW377

IC: 25923-JODYW377

Applied Rules and Standards:

47 CFR Part 15.407 (NII) & 5 GHz (UNII)
RSS-247 Issue 4 (DTSS) & (LE-LAN), and RSS-Gen Issue 5

REPORT #: EMC_ASTRO_069_25001_FCC_15_407_Rev1

DATE: 2025-09-26



A2LA Accredited

IC recognized #
3462B

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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.

No deviations were ascertained.

Company	Description	Model #
Astronautics Corporation of America	Astronautics M2-JODY-W3 WIFI Radio	ACA-M2-JODY-W377-00B

Responsible for Testing Laboratory:

Alvin Ilarina
(Senior Manager Regulatory
Services)

2025-09-26

Compliance

Date	Section	Name	Signature
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Responsible for the Report:

Cheng Song
(EMC Engineer)

2025-09-26

Compliance

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Section 3.
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
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EMC Lab Manager:	Alvin, Ilarina
Responsible Project Leader:	Jayalakshmi, Sekar

2.1 Identification of the Client

Client Firm/Name:	Astronautics Corporation of America
Street Address:	135 W Forest Hill Ave.
City/Zip Code	Oak Creek WI 53154
Country	USA

2.2 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model Number(s):	ACA-M2-JODY-W377-00B
Marketing Name	Astronautics M2-JODY-W3 WIFI Radio
HW Version	ACA-JODY-W377-00B
SW Version	N/A
FCC ID	2AVRR-JODYW377
IC	25923-JODYW377
Product Description:	Astronautics M2-JODY-W3 WIFI Radio
Radio Information as declared:	Cellular Model Name: Telit Cinterion Model Number: FN990A40 Wireless Technologies: • 5G NR FR1 NSA • 5G NR FR1 SA • LTE • UMTS
	WLAN Model Name: u-blox AG Model Number : M2-JODY-W377-00C Wireless Technologies: • Wi-Fi 2.4GHz • Wi-Fi 5GHz
Antenna information as declared:	2G/3G/4G/5G Terminal Antenna Manufacturer: Panorama Antennas Part No. PWB-6-60-RSMAP Peak Gain: • 698 – 960 MHz : 2dBi • 1710 – 3800 MHz : 4dBi • 4400 – 6000 MHz : 6dBi
	WLAN Antenna Monopole Whip Antenna Peak Gain: • 2.4 GHz: 7.7dBi • 5.15 GHz: 5.4dBi • 5.9 GHz: 6dBi
Power Supply / Rated Operating Voltage Range (min/nom/max):	Vmin: 18.5 VDC / Vnom: 28 VDC / Vmax: 36 VDC
Rated Operating Temperature Range:	Tmin: -40 °C / Tmax: +70 °C

Test Sample Status:

Production

Note: The information of the EUT specifications in the table above is provided by the client.

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes
1	53098030625	ACA-JODY-W377-00B	N/A	N/A

3.3 Accessory Equipment (AE) details

AE #	Type	PN	Manufacturer	Serial Number
1	Communication Unit	284438 REV1	Astronautics Corporation of America	019

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#1 + AE#1	

3.5 Mode of Operation

Mode of Operation	Description of Operating modes	Comments
Op. 1	802.11n (20 MHz, MCS8)	The EUT radio was configured for fixed-channel transmission at the highest possible duty cycle using software not available to the end user. An external antenna was connected.

3.6 Justification for Mode of Operation

During testing, the EUT was operated on low, mid, and high channels at the highest possible duty cycle. For radiated measurements, the data in this report reflects the worst case between horizontal and vertical antenna polarizations and across all EUT orientations.

4 Subject of Investigation

This report supports a Class II Permissive Change to FCC ID: 2AVRR-JODYW377 to:

- add a new external WLAN antenna.
- evaluate co-transmission with the integrated cellular (WWAN) radio in the host.

No hardware changes have been made to the module or host electronics.

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.407(e) RSS-247 6.2.4.1	Emission Bandwidth	Nominal	-	☐	☐	☒	Note 1 Note 2
§15.407(a) RSS-247 6	Power Spectral Density	Nominal	-	☐	☐	☒	Note 1 Note 2
§15.407(a) RSS-247 6	Maximum Output Power	Nominal	-	☐	☐	☒	Note 1 Note 2
§15.407; 15.205 RSS-247 6; RSS-Gen 8.10	Band Edge Compliance	Nominal	-	☐	☐	☒	Note 1 Note 2
§15.407(b); §15.209; 15.205 RSS-247 6; RSS-Gen 8.9; 8.10	Radiated TX Spurious Emissions	Nominal	Op. 1	☒	☐	☐	Complies
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	Nominal	Op. 1	☒	☐	☐	Complies

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

Note 2: The changes addressed in this filing do not impact the original test results; the original test results remain valid. Conducted characteristics are unchanged from the original certification of this device and are not repeated here.

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 Lab 1	EMC Lab 2
Conducted emissions (mains port)	150 kHz – 30 MHz	2.47 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

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:

2025-06-16 – 2025-07-02

6.3 Decision Rule:

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

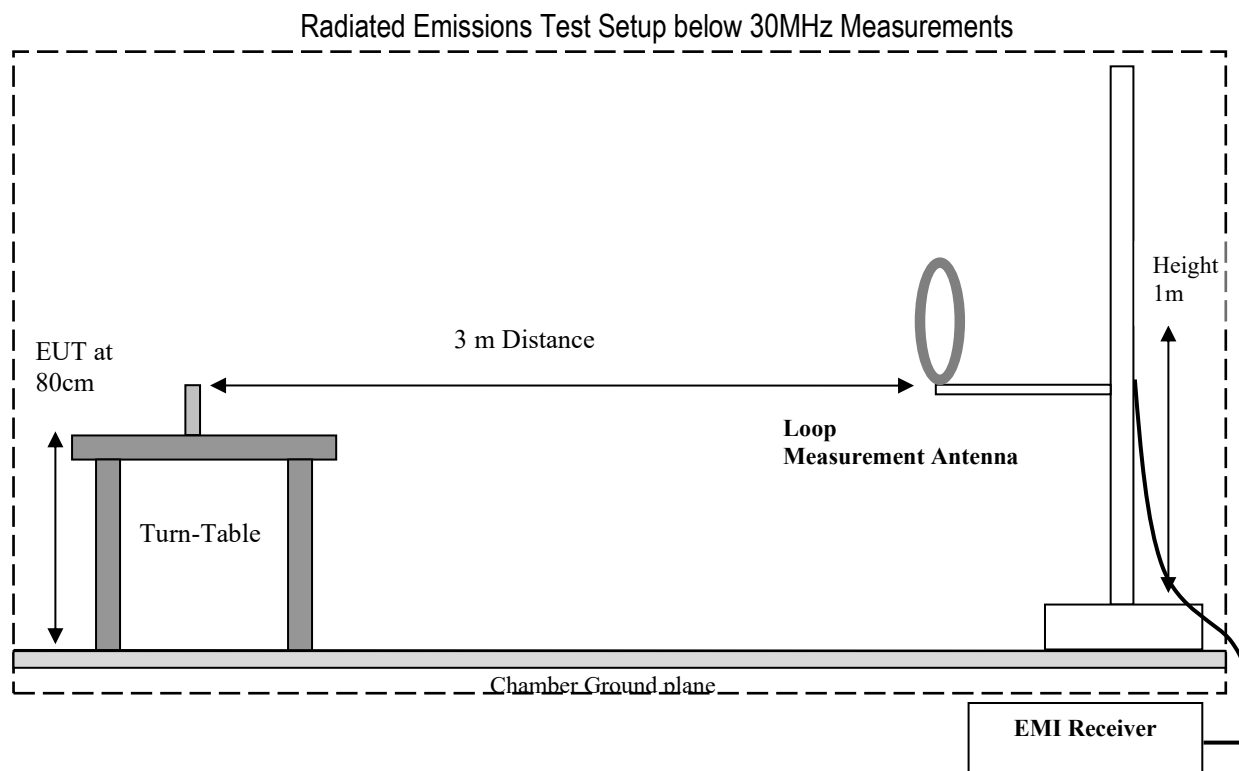
Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither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

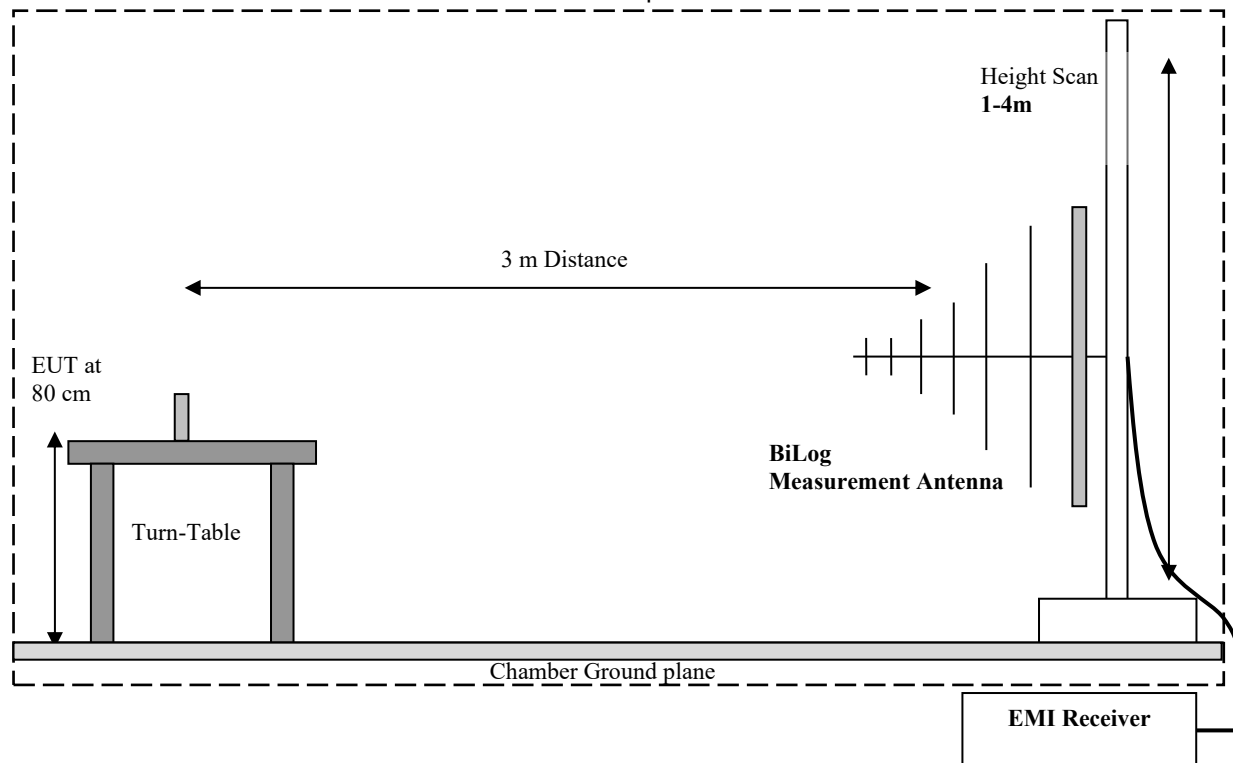
7.1 Radiated Measurement

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

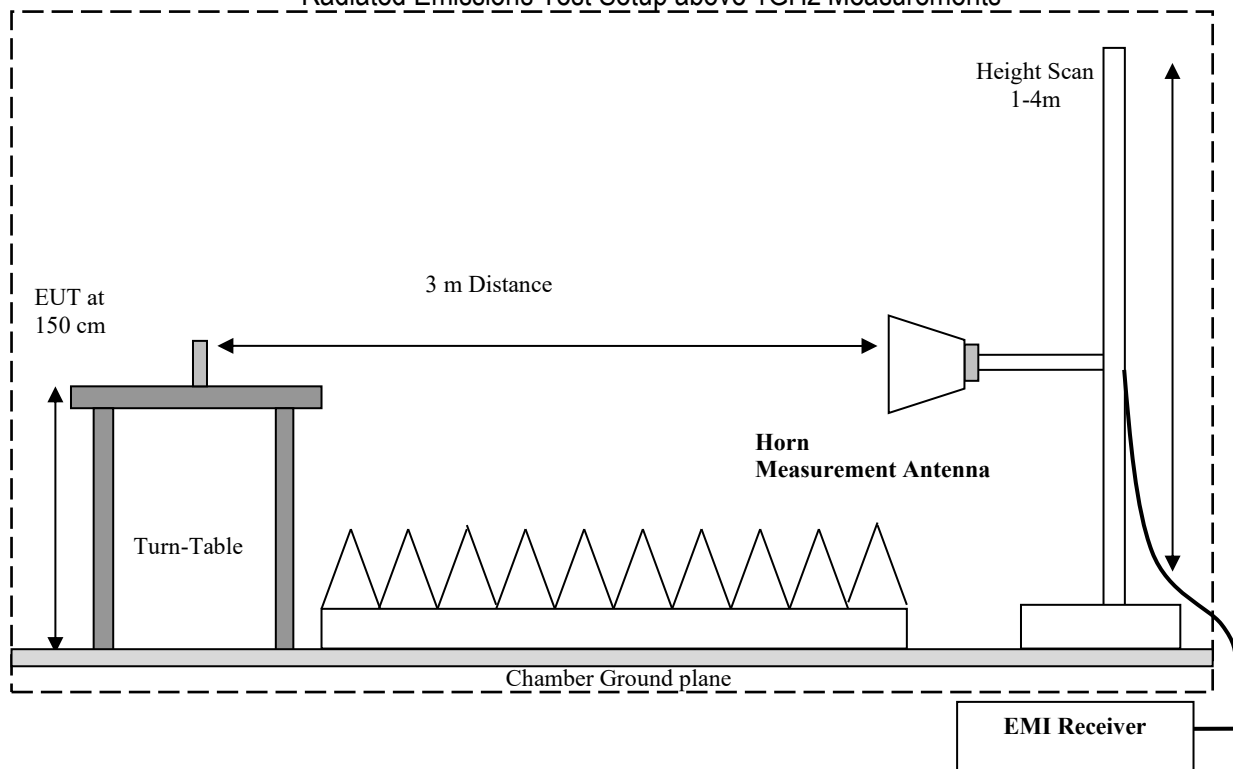
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to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



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 μ 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:

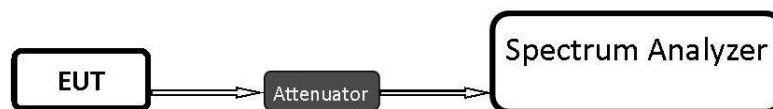
Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

7.2 Power Line Conducted Measurement Procedure

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

7.3 RF Conducted Measurement Procedure

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



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

8 Test Result Data

8.1 Radiated Transmitter Spurious Emissions

8.1.1 Measurement according to ANSI C63.10 (2013)

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.

8.1.2 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 & RSS-Gen 8.9

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

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

FCC §15.205 & RSS-Gen 8.10

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

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

- Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

*PEAK LIMIT= 74 dBμV/m

*AVG. LIMIT= 54 dBμV/m

8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
22° C	1	Op. 1	120 V AC

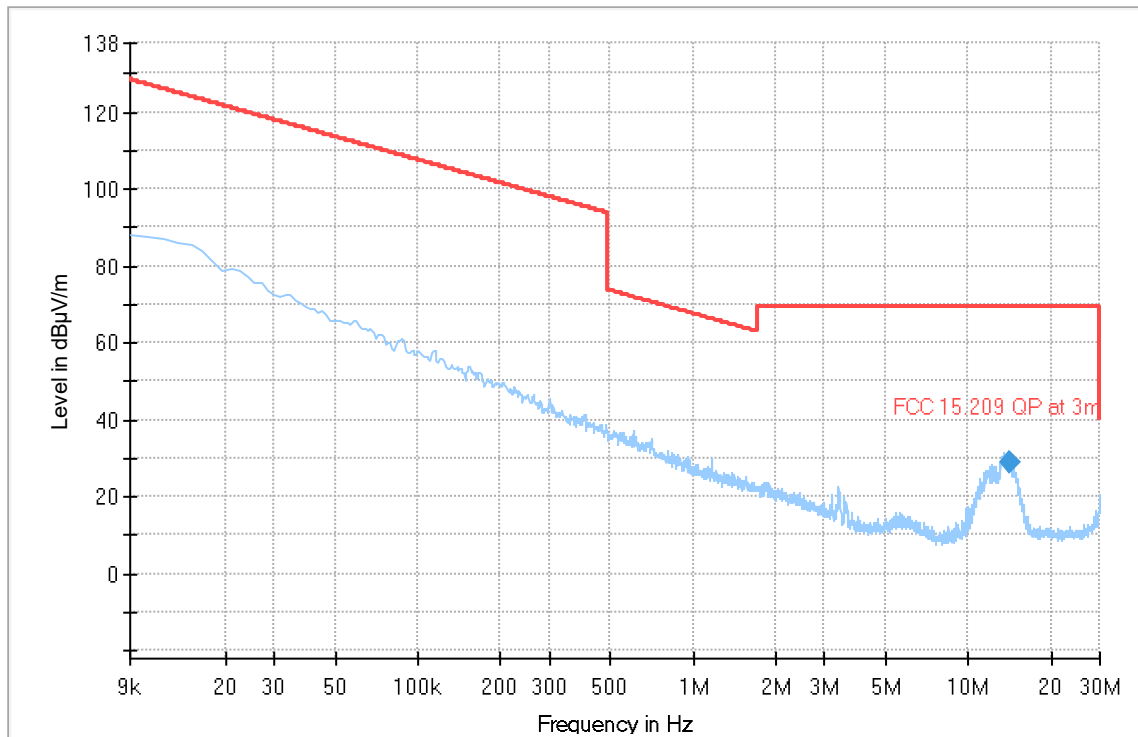
8.1.4 Measurement result:

Plot #	Channel #	Scan Frequency	Limit	Result
1-5	UNII-1 Low (36)	9 kHz – 40 GHz	See section 8.1.2	Pass
6-10	UNII-1 Mid (40)	9 kHz – 40 GHz	See section 8.1.2	Pass
11-15	UNII-1 High (48)	9 kHz – 40 GHz	See section 8.1.2	Pass
16-20	UNII-3 Low (149)	9 kHz – 40 GHz	See section 8.1.2	Pass
21-25	UNII-3 Mid (157)	9 kHz – 40 GHz	See section 8.1.2	Pass
26-30	UNII-3 High (165)	9 kHz – 40 GHz	See section 8.1.2	Pass

8.1.5 Measurement Plots:

Plot # 1

Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
14.103	29.05	---	69.50	40.45	500.0	9.0	120.0	H	154.0	5.4	



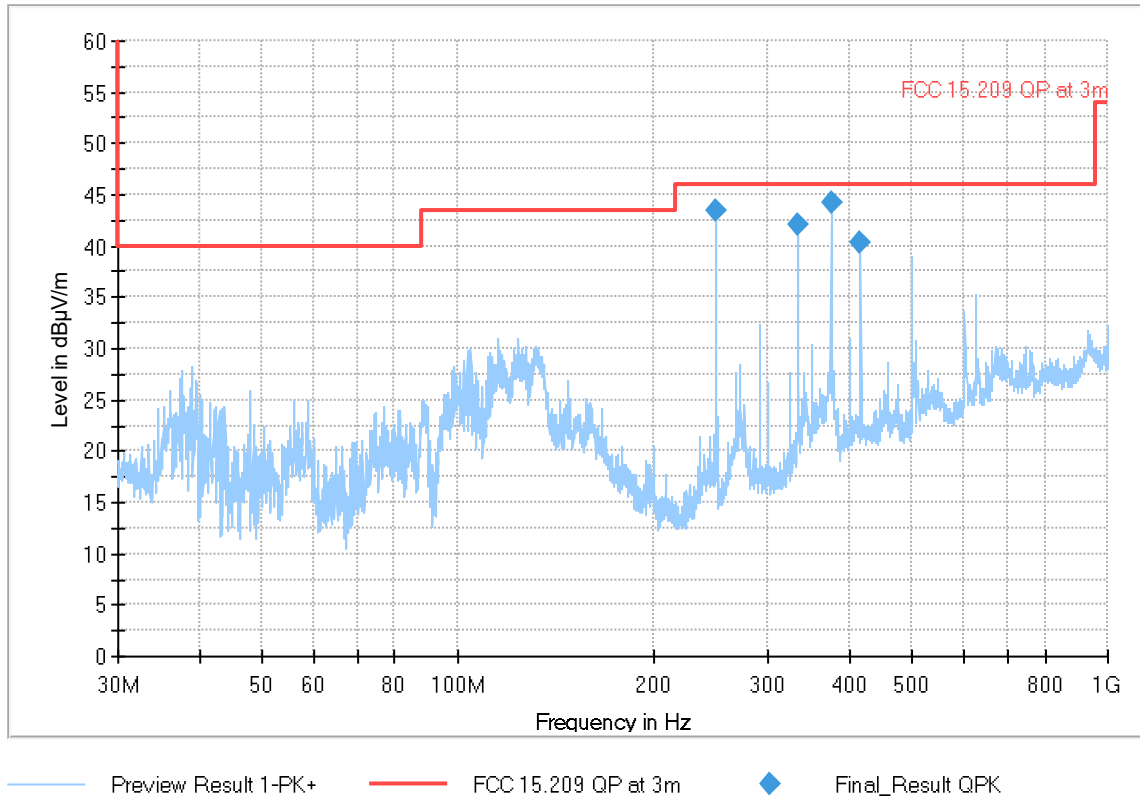
— Preview Result 1-PK+

— FCC 15.209 QP at 3m

◆ Final_Result QPK

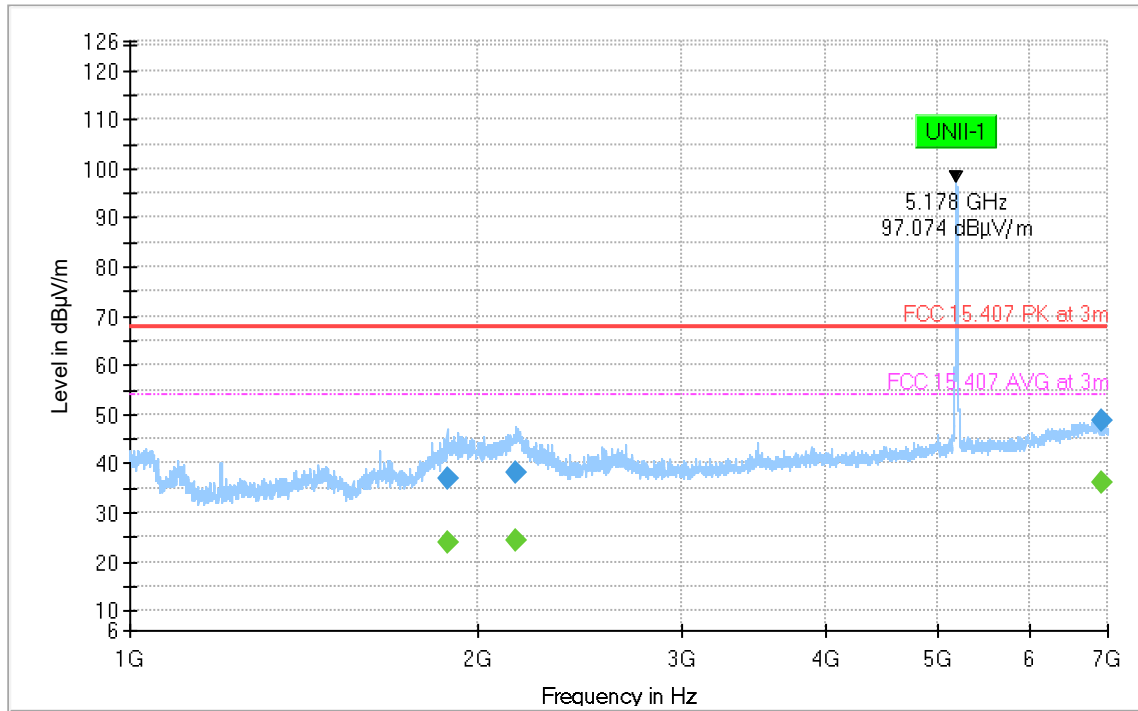
Plot # 2

Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	43.36	---	46.02	2.66	500.0	120.0	255.0	H	23.0	-15.2	
333.319	42.02	---	46.02	4.00	500.0	120.0	107.0	H	332.0	-13.2	
374.997	44.13	---	46.02	1.89	500.0	120.0	100.0	H	339.0	-10.9	
416.674	40.28	---	46.02	5.74	500.0	120.0	100.0	H	83.0	-9.0	



Plot # 3

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1880.250	37.07	---	68.00	30.93	500.0	1000.0	192.0	V	306.0	4.5	
1880.250	---	24.10	53.98	29.88	500.0	1000.0	192.0	V	306.0	4.5	
2157.050	---	24.22	53.98	29.76	500.0	1000.0	315.0	V	-1.0	5.9	
2157.050	37.94	---	68.00	30.06	500.0	1000.0	315.0	V	-1.0	5.9	
6922.500	48.63	---	68.00	19.37	500.0	1000.0	285.0	H	60.0	19.0	
6922.500	---	36.00	53.98	17.98	500.0	1000.0	285.0	H	60.0	19.0	



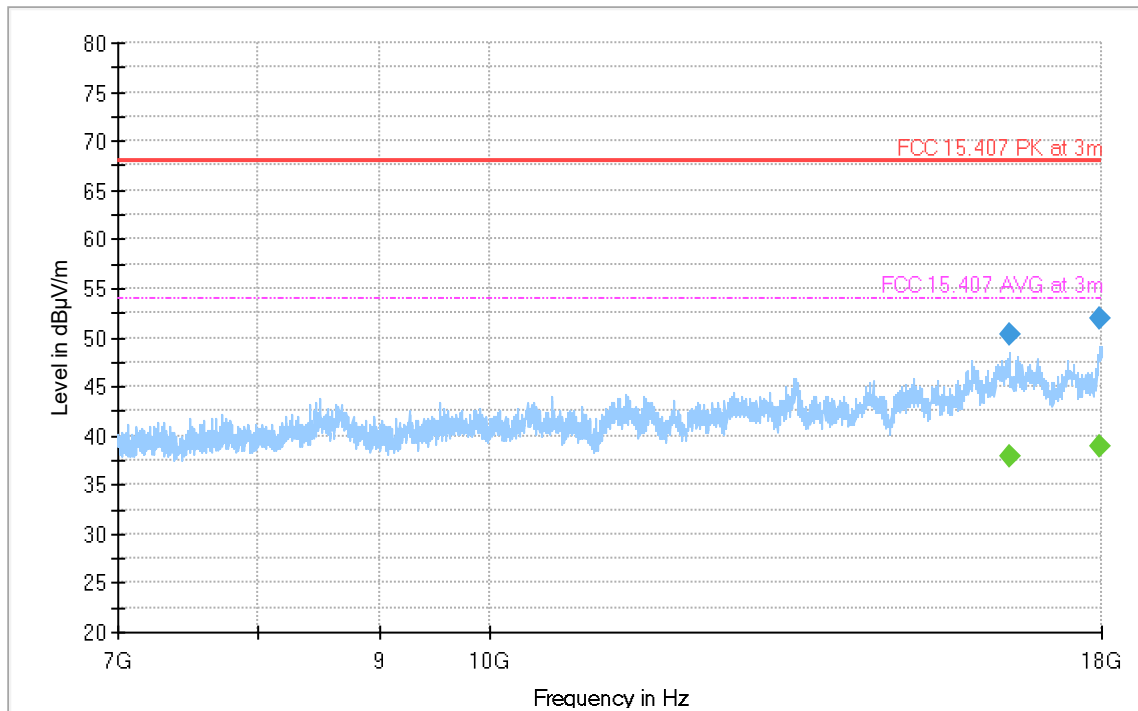
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 4

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
16468.800	---	37.87	53.98	16.11	500.0	1000.0	210.0	H	42.0	14.1	
16468.800	50.31	---	68.00	17.69	500.0	1000.0	210.0	H	42.0	14.1	
17966.267	---	38.94	53.98	15.04	500.0	1000.0	264.0	V	19.0	18.2	
17966.267	51.89	---	68.00	16.11	500.0	1000.0	264.0	V	19.0	18.2	



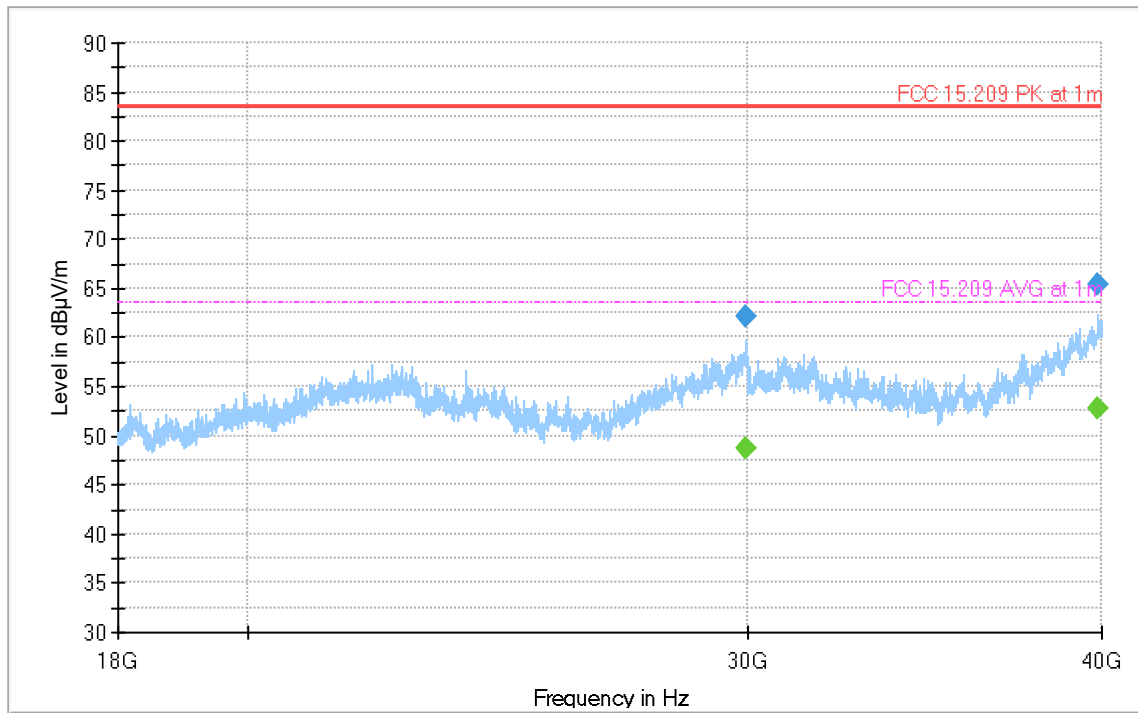
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 5

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
29953.500	---	48.72	63.50	14.78	500.0	1000.0	150.0	H	101.0	22.9	
29953.500	62.07	---	83.50	21.43	500.0	1000.0	150.0	H	101.0	22.9	
39850.938	---	52.74	63.50	10.76	500.0	1000.0	150.0	V	86.0	24.4	
39850.938	65.43	---	83.50	18.07	500.0	1000.0	150.0	V	86.0	24.4	

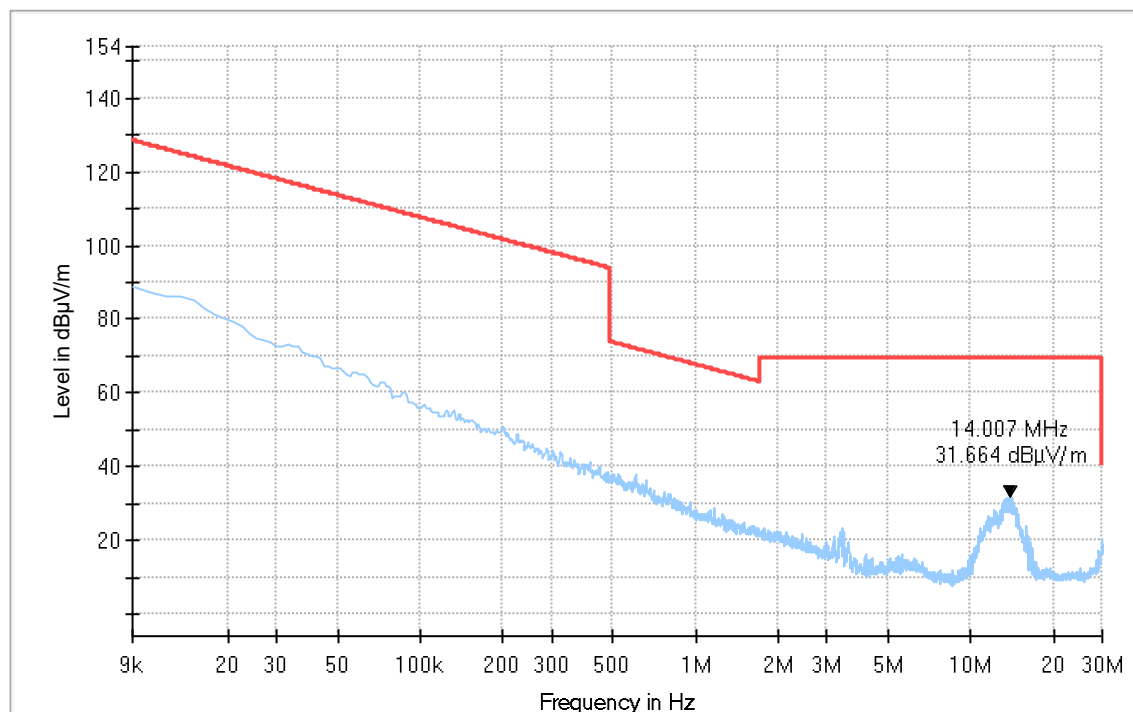


Preview Result 1-PK+
Final_Result PK+

FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m

Plot # 6

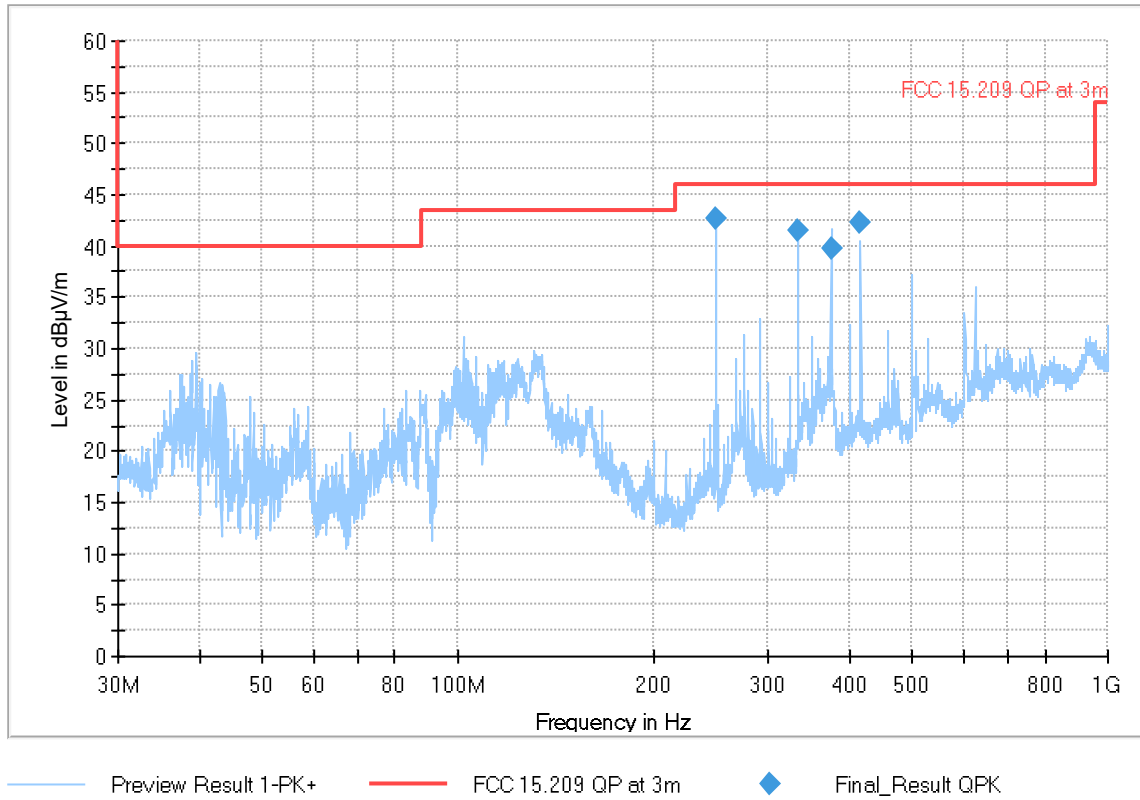


— Preview Result 1-PK+
— FCC 15.209 QP at 3m

* Critical_Freqs PK+
◆ Final_Result QPK

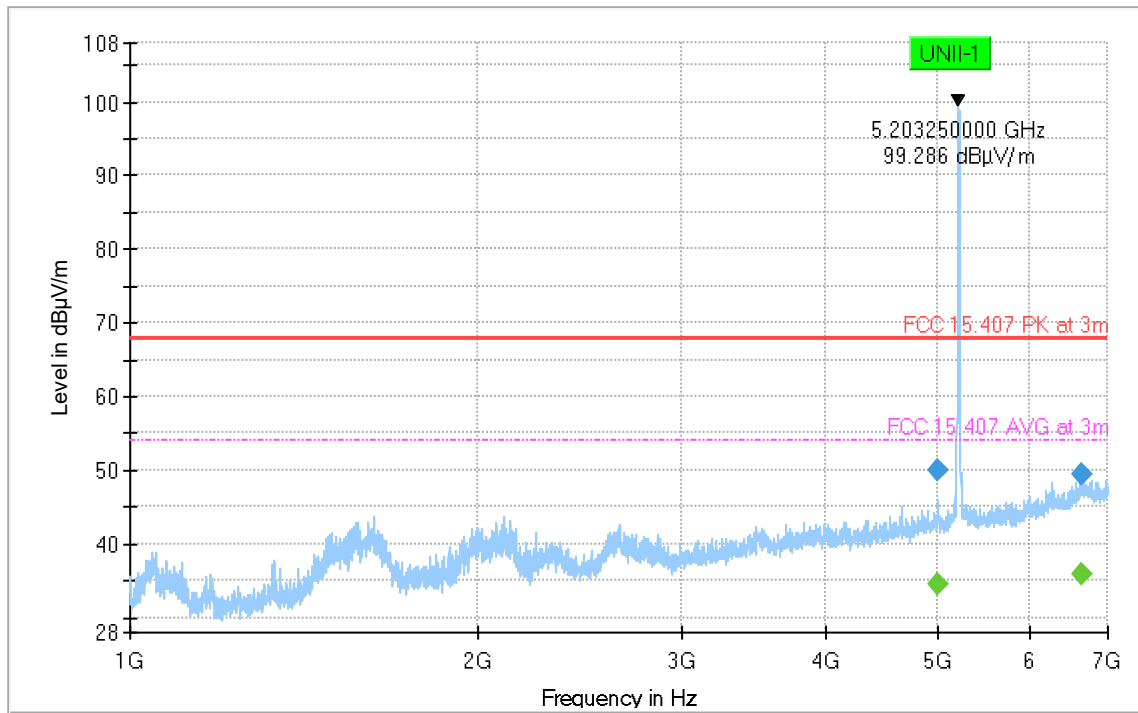
Plot # 7

Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	42.75	---	46.02	3.28	500.0	120.0	117.0	H	82.0	-15.2	
333.319	41.40	---	46.02	4.62	500.0	120.0	106.0	H	306.0	-13.2	
374.997	39.81	---	46.02	6.21	500.0	120.0	107.0	H	330.0	-10.9	
416.674	42.21	---	46.02	3.81	500.0	120.0	100.0	H	93.0	-9.0	



Plot # 8

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
4995.100	49.93	---	68.00	18.07	500.0	1000.0	132.0	V	274.0	14.4	
4995.100	---	34.52	53.98	19.46	500.0	1000.0	132.0	V	274.0	14.4	
6640.150	49.39	---	68.00	18.61	500.0	1000.0	315.0	H	40.0	18.8	
6640.150	---	35.96	53.98	18.01	500.0	1000.0	315.0	H	40.0	18.8	



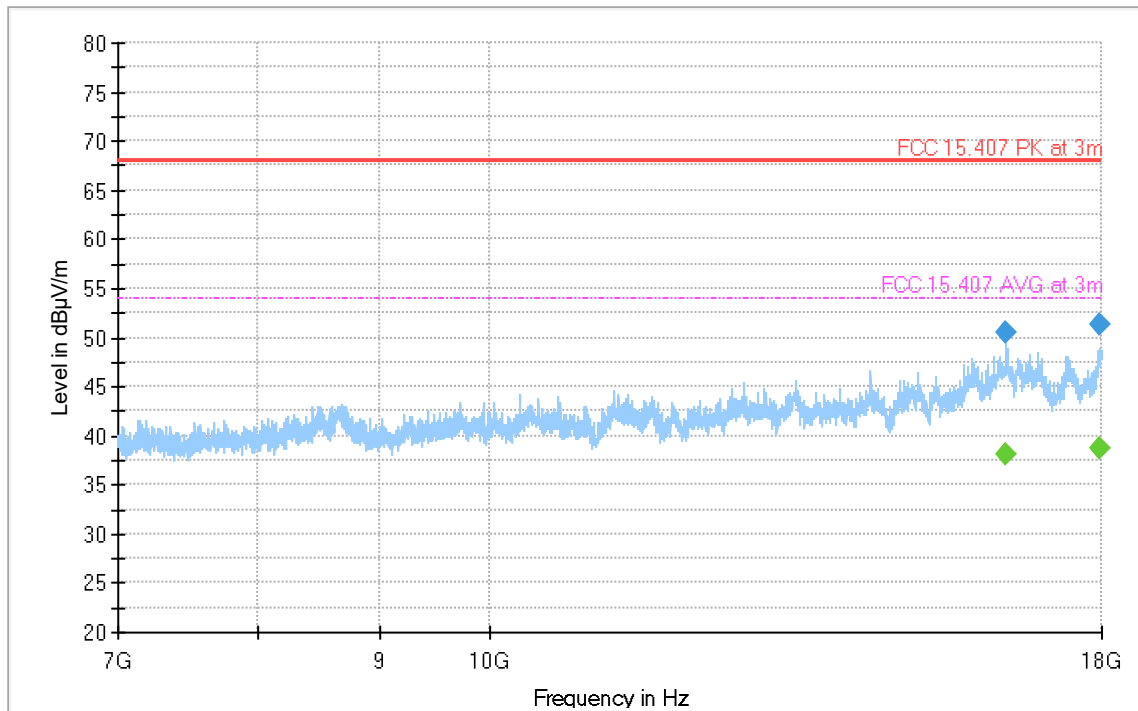
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 9

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
16413.433	---	38.04	53.98	15.93	500.0	1000.0	265.0	H	7.0	14.0	
16413.433	50.44	---	68.00	17.56	500.0	1000.0	265.0	H	7.0	14.0	
17962.600	---	38.80	53.98	15.18	500.0	1000.0	118.0	H	163.0	18.1	
17962.600	51.28	---	68.00	16.72	500.0	1000.0	118.0	H	163.0	18.1	



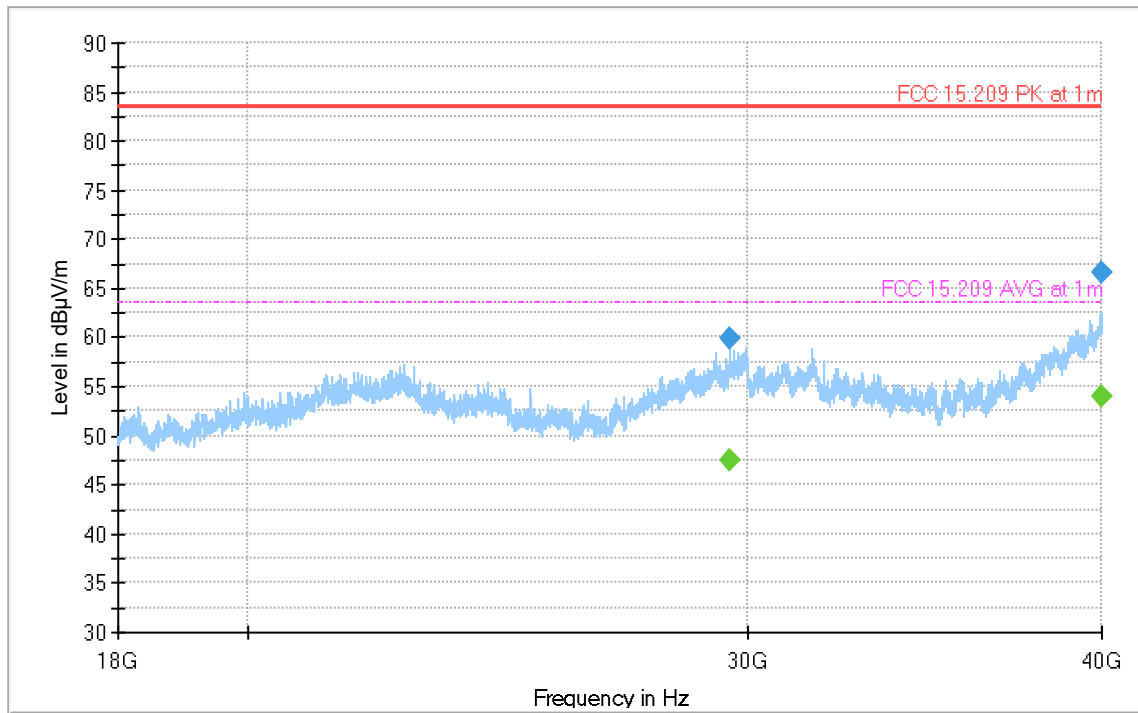
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 10

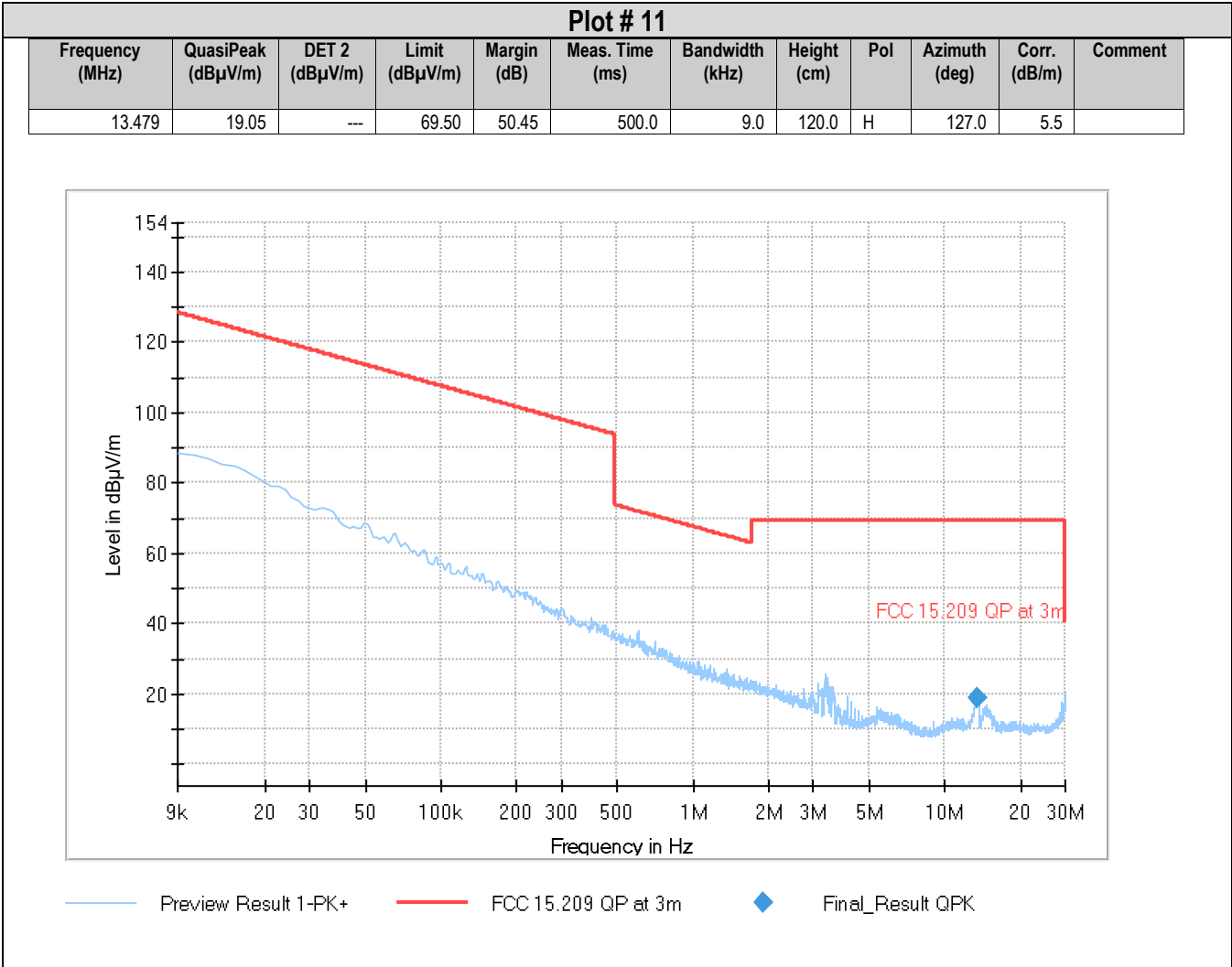
Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
29573.625	59.93	---	83.50	23.57	500.0	1000.0	150.0	V	68.0	21.5	
29573.625	---	47.49	63.50	16.01	500.0	1000.0	150.0	V	68.0	21.5	
39983.750	66.56	---	83.50	16.94	500.0	1000.0	150.0	H	149.0	24.9	
39983.750	---	53.92	63.50	9.58	500.0	1000.0	150.0	H	149.0	24.9	



Preview Result 1-PK+
Final_Result PK+

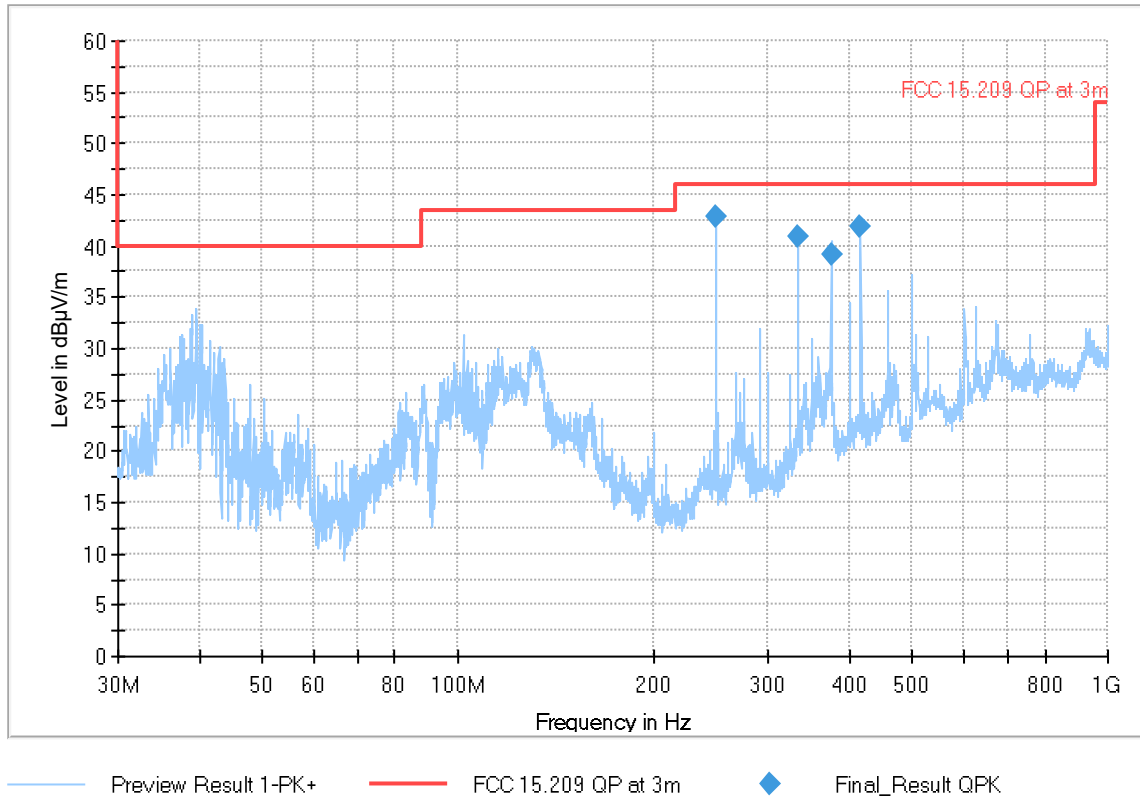
FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m



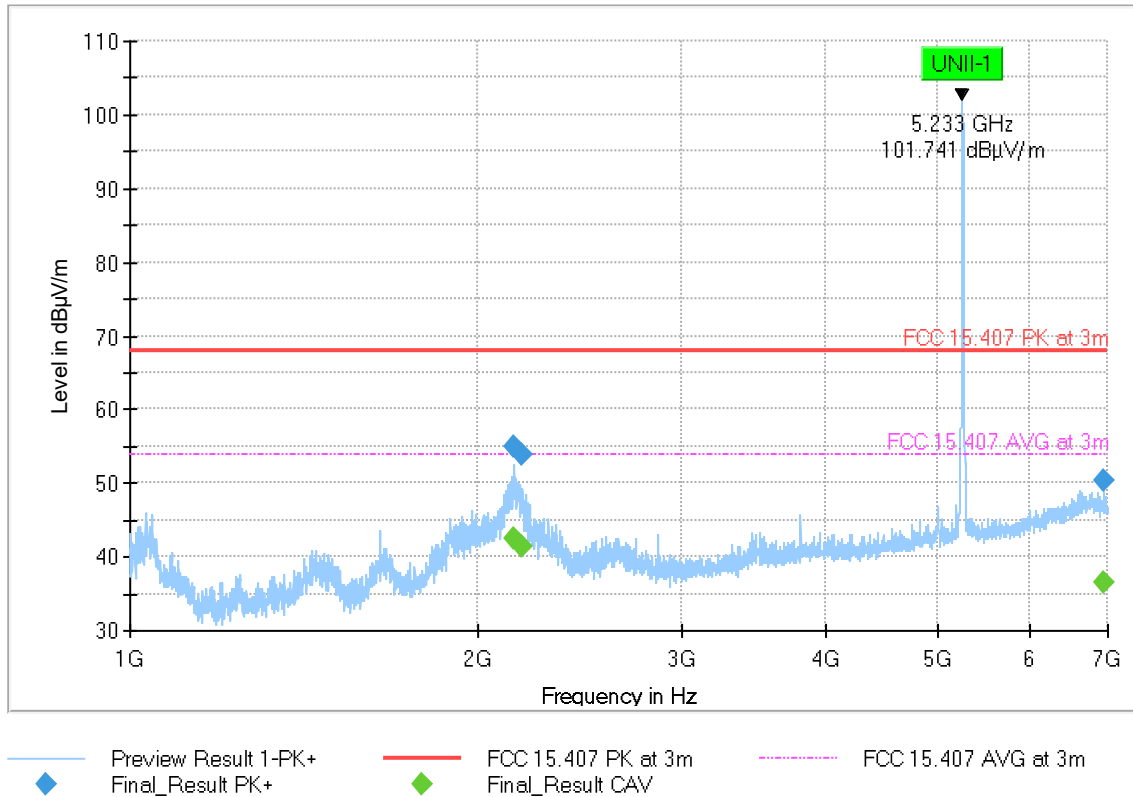
Plot # 12

Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	42.90	---	46.02	3.12	500.0	120.0	179.0	H	69.0	-15.2	
333.319	40.92	---	46.02	5.10	500.0	120.0	100.0	H	59.0	-13.2	
374.997	39.20	---	46.02	6.82	500.0	120.0	192.0	H	72.0	-10.9	
416.674	41.95	---	46.02	4.07	500.0	120.0	100.0	H	83.0	-9.0	



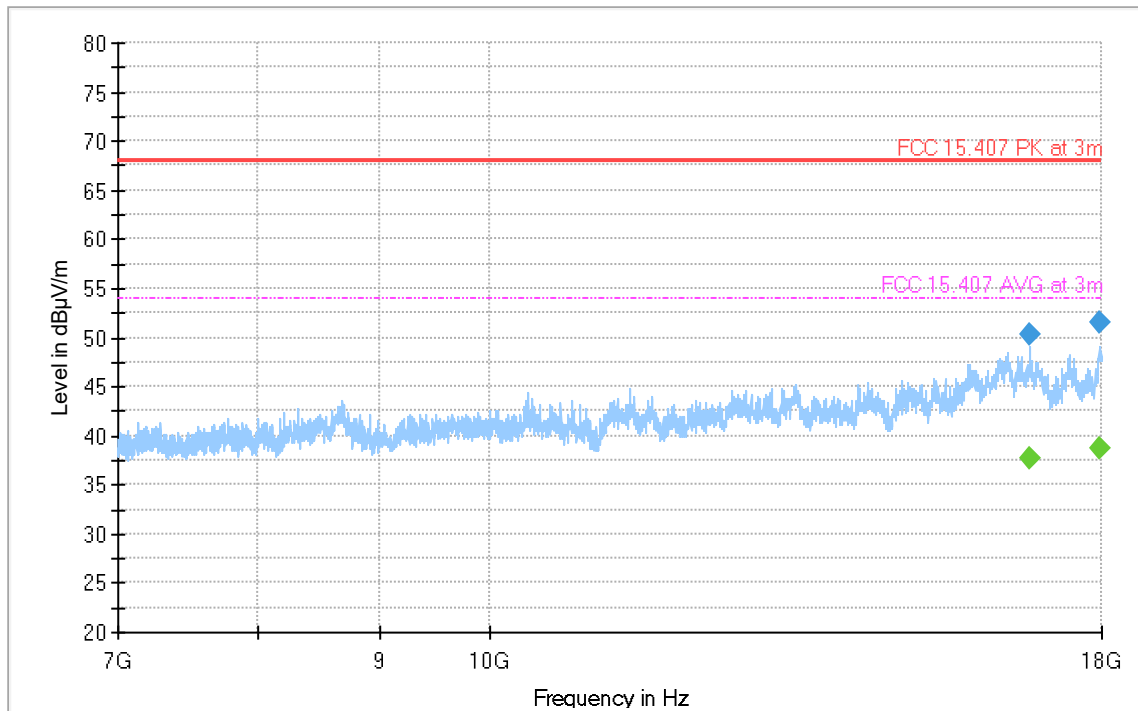
Plot # 13

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2142.800	55.06	---	68.00	12.94	500.0	1000.0	132.0	V	258.0	5.9	
2142.800	---	42.47	53.98	11.51	500.0	1000.0	132.0	V	258.0	5.9	
2181.150	---	41.31	53.98	12.67	500.0	1000.0	131.0	V	252.0	6.0	
2181.150	53.96	---	68.00	14.04	500.0	1000.0	131.0	V	252.0	6.0	
6950.400	50.45	---	68.00	17.55	500.0	1000.0	100.0	H	198.0	19.1	
6950.400	---	36.55	53.98	17.43	500.0	1000.0	100.0	H	198.0	19.1	



Plot # 14

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
16795.867	50.36	---	68.00	17.64	500.0	1000.0	303.0	V	307.0	13.9	
16795.867	---	37.72	53.98	16.26	500.0	1000.0	303.0	V	307.0	13.9	
17959.300	51.62	---	68.00	16.38	500.0	1000.0	107.0	V	300.0	18.0	
17959.300	---	38.78	53.98	15.20	500.0	1000.0	107.0	V	300.0	18.0	



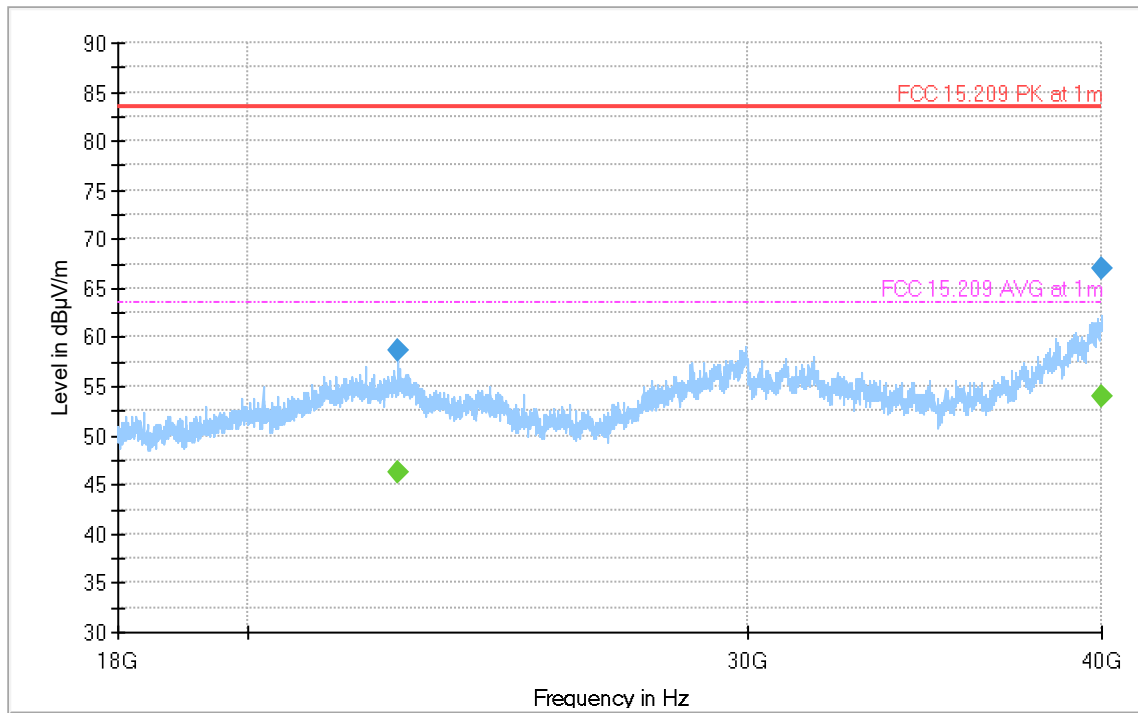
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 15

Frequency (MHz)	MaxPeak (dB μ V/m)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
22594.875	---	46.29	63.50	17.21	500.0	1000.0	150.0	H	273.0	19.7	
22594.875	58.63	---	83.50	24.87	500.0	1000.0	150.0	H	273.0	19.7	
40000.000	---	54.06	63.50	9.44	500.0	1000.0	150.0	V	77.0	25.0	
40000.000	66.92	---	83.50	16.58	500.0	1000.0	150.0	V	77.0	25.0	



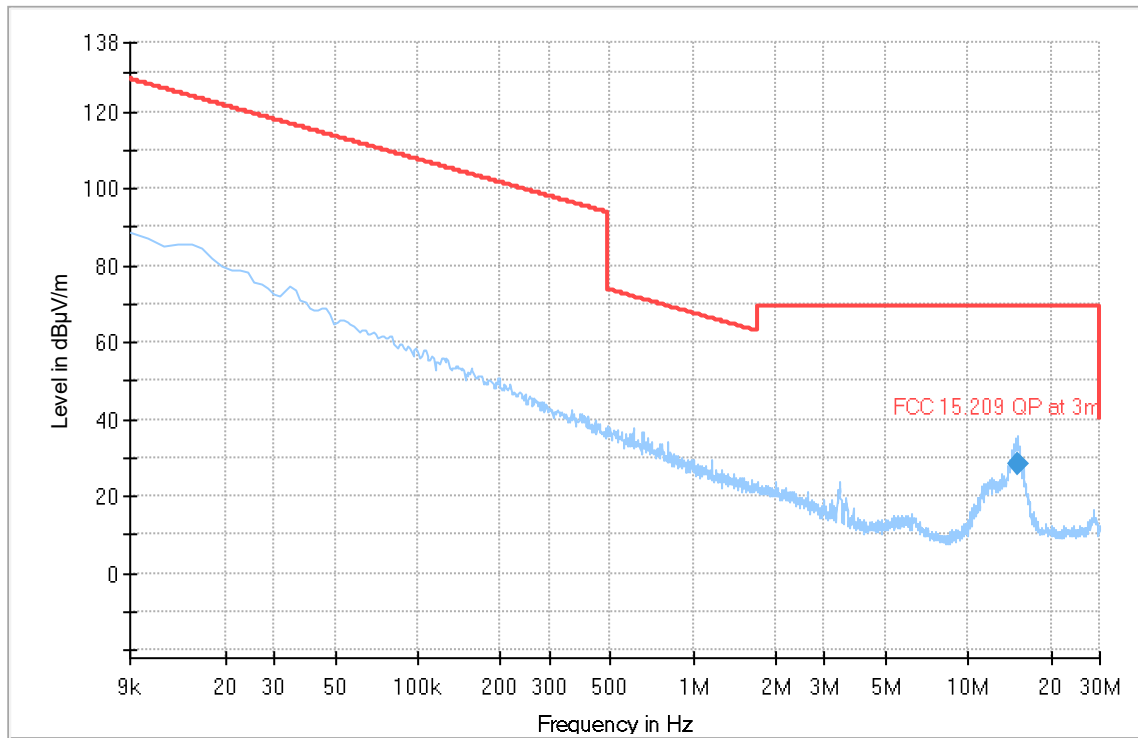
Preview Result 1-PK+
Final_Result PK+

FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m

Plot # 16

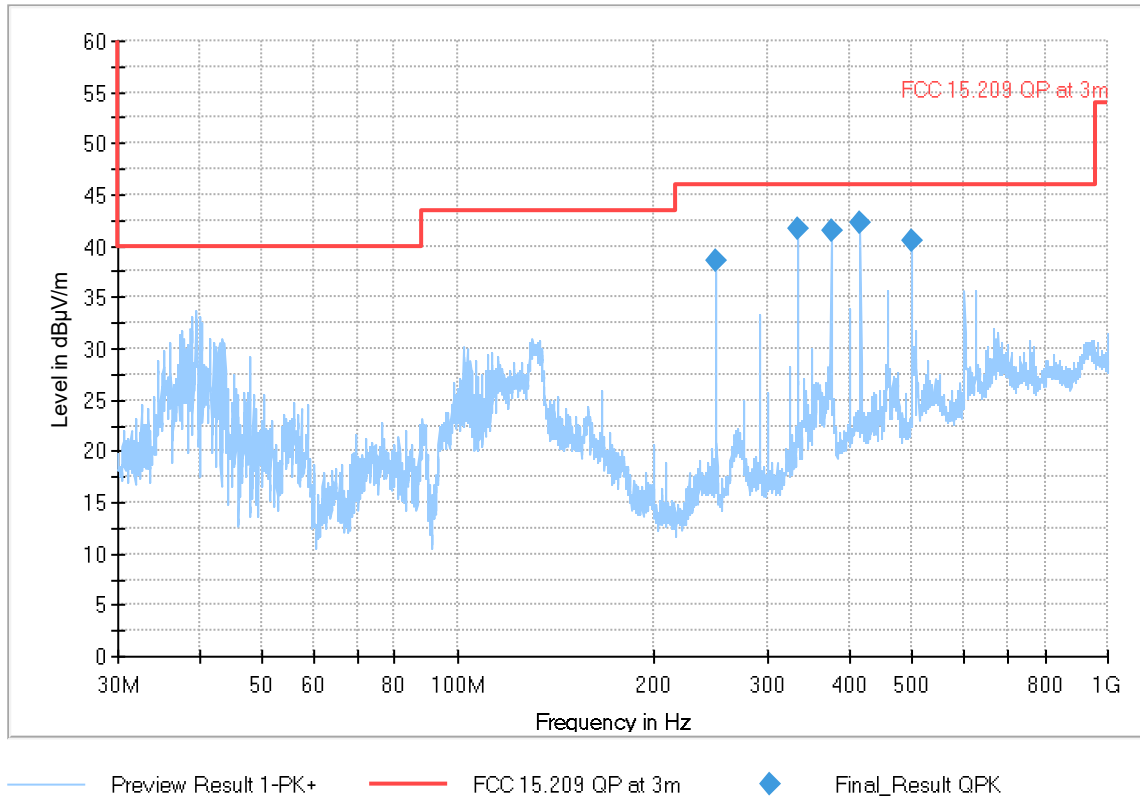
Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
15.094	28.19	---	69.50	41.31	500.0	9.0	120.0	H	143.0	5.3	



— Preview Result 1-PK+ — FCC 15.209 QP at 3m ◆ Final_Result QPK

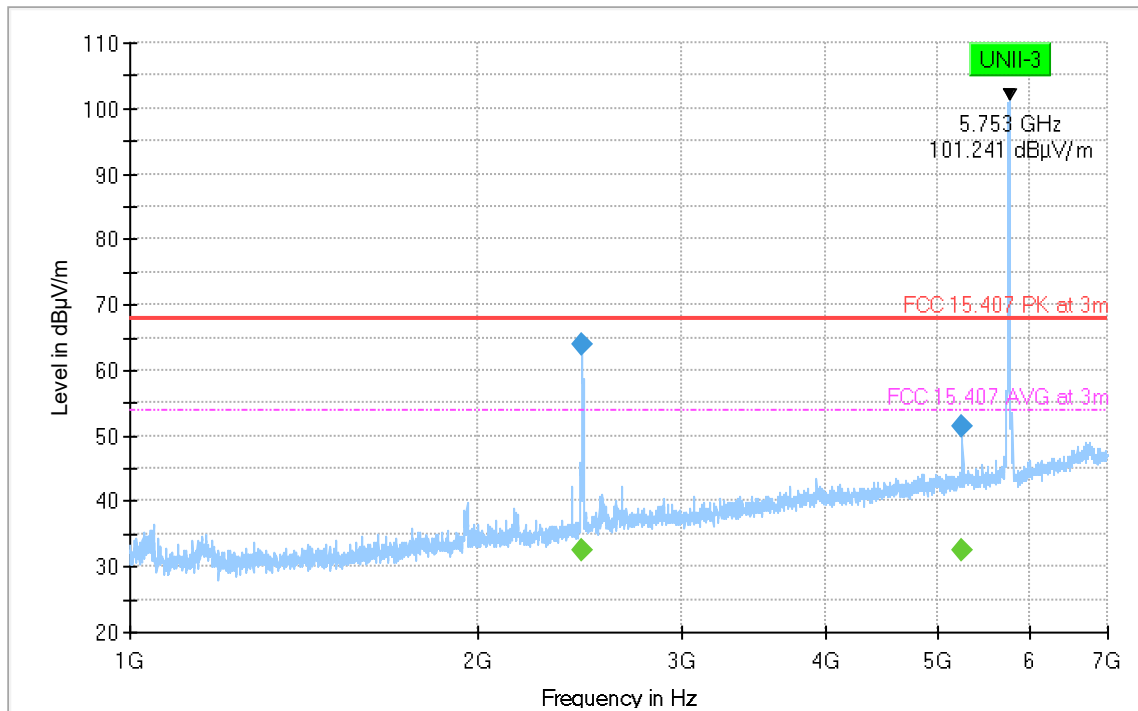
Plot # 17

Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	38.61	---	46.02	7.41	500.0	120.0	169.0	H	197.0	-15.2	
333.319	41.75	---	46.02	4.27	500.0	120.0	107.0	H	264.0	-13.2	
374.997	41.48	---	46.02	4.54	500.0	120.0	100.0	H	125.0	-10.9	
416.674	42.37	---	46.02	3.65	500.0	120.0	100.0	H	88.0	-9.0	
499.997	40.55	---	46.02	5.47	500.0	120.0	100.0	H	335.0	-7.8	



Plot # 18

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2460.500	63.96	---	68.00	4.04	500.0	1000.0	232.0	V	47.0	6.9	
2460.500	---	32.63	53.98	21.35	500.0	1000.0	232.0	V	47.0	6.9	
5243.050	51.34	---	68.00	16.66	500.0	1000.0	281.0	H	32.0	15.3	
5243.050	---	32.54	53.98	21.44	500.0	1000.0	281.0	H	32.0	15.3	



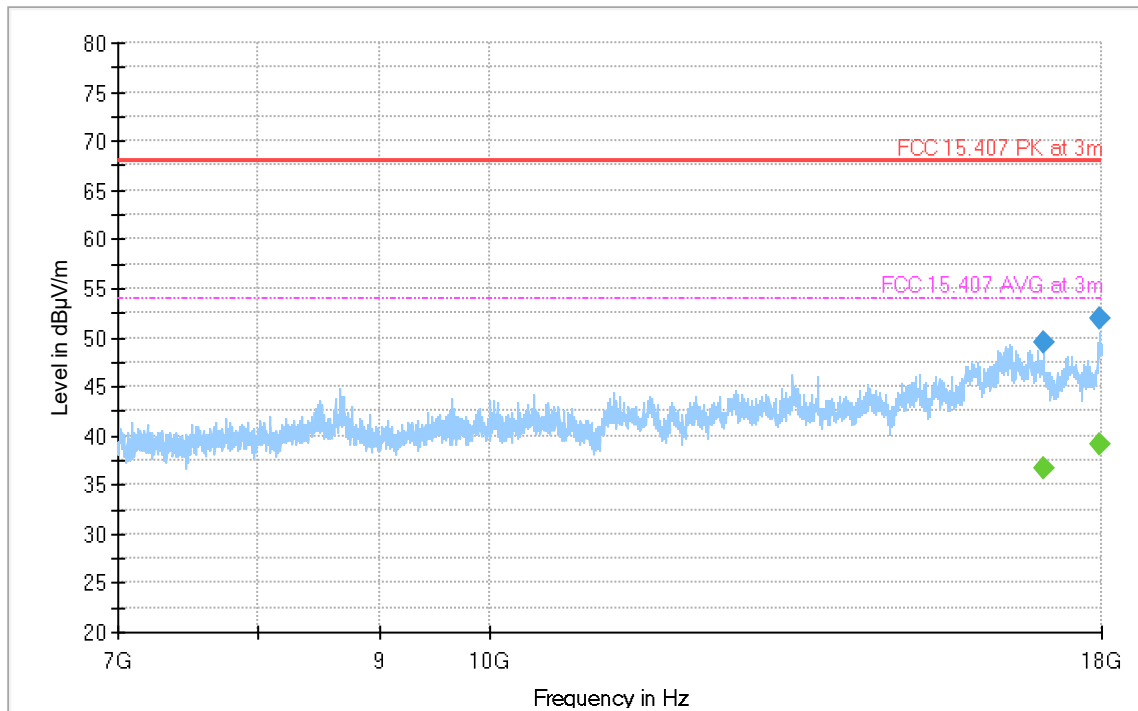
Preview Result 1-PK+
Final_Result PK+

Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 19

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
17014.767	49.55	---	68.00	18.45	500.0	1000.0	315.0	V	300.0	13.7	
17014.767	---	36.76	53.98	17.22	500.0	1000.0	315.0	V	300.0	13.7	
17965.900	51.87	---	68.00	16.13	500.0	1000.0	159.0	H	104.0	18.2	
17965.900	---	39.03	53.98	14.95	500.0	1000.0	159.0	H	104.0	18.2	



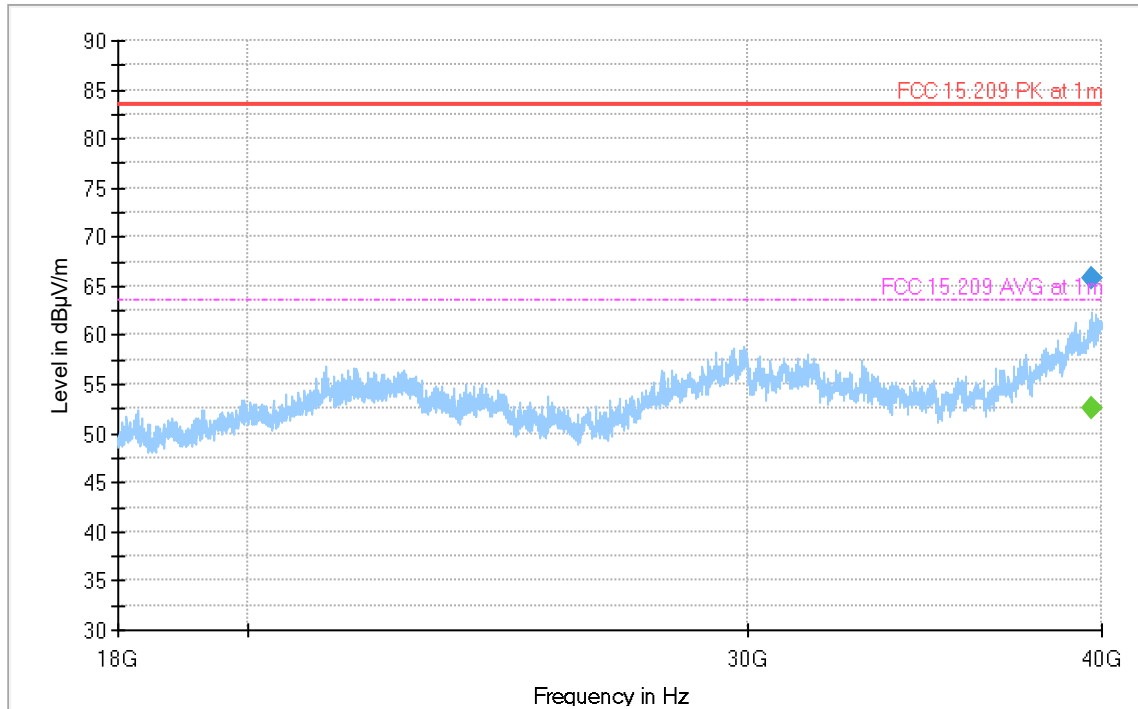
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 20

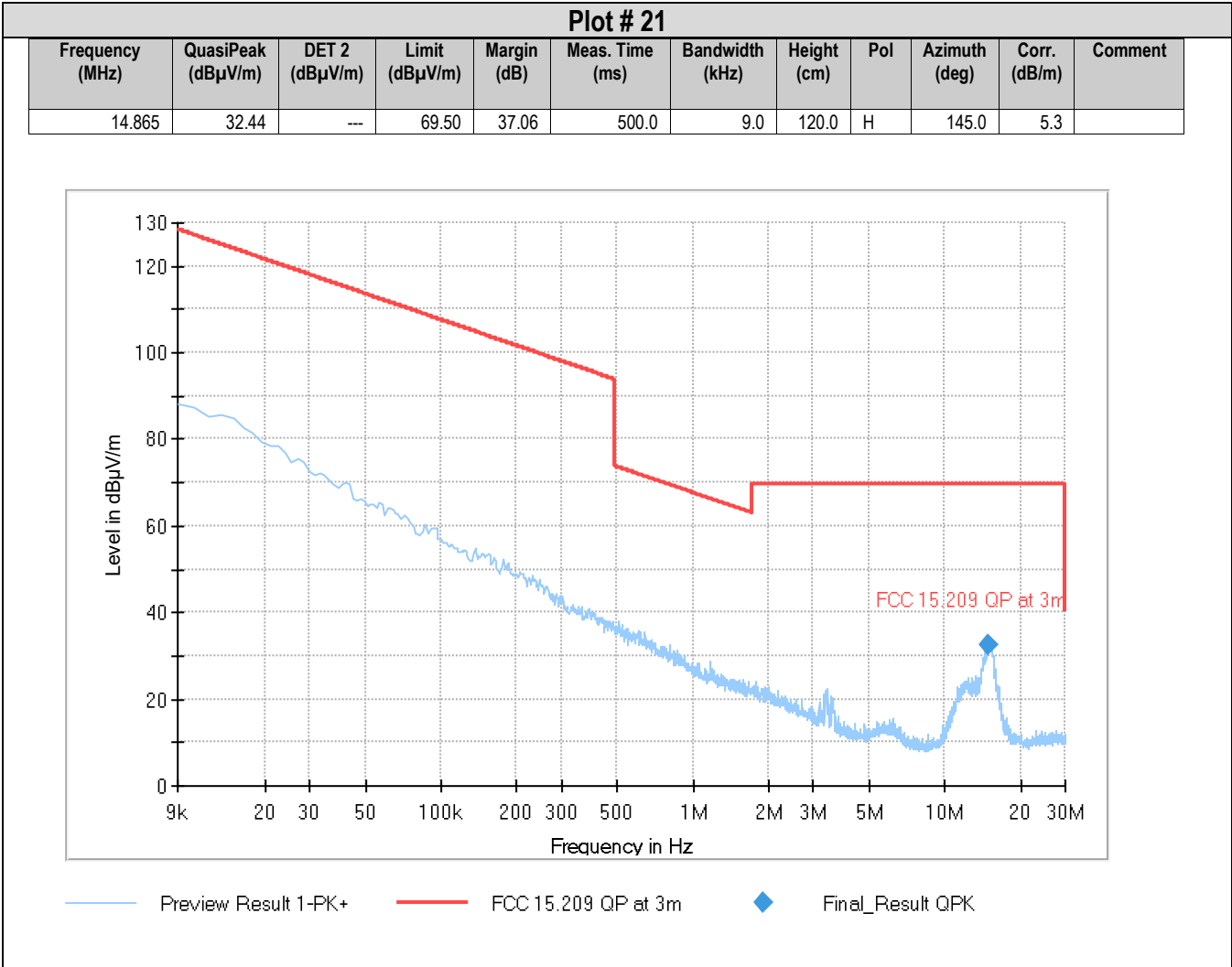
Frequency (MHz)	MaxPeak (dB μ V/m)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
39692.813	---	52.64	63.50	10.86	500.0	1000.0	150.0	H	226.0	23.8	
39692.813	65.84	---	83.50	17.66	500.0	1000.0	150.0	H	226.0	23.8	



Preview Result 1-PK+
Final_Result PK+

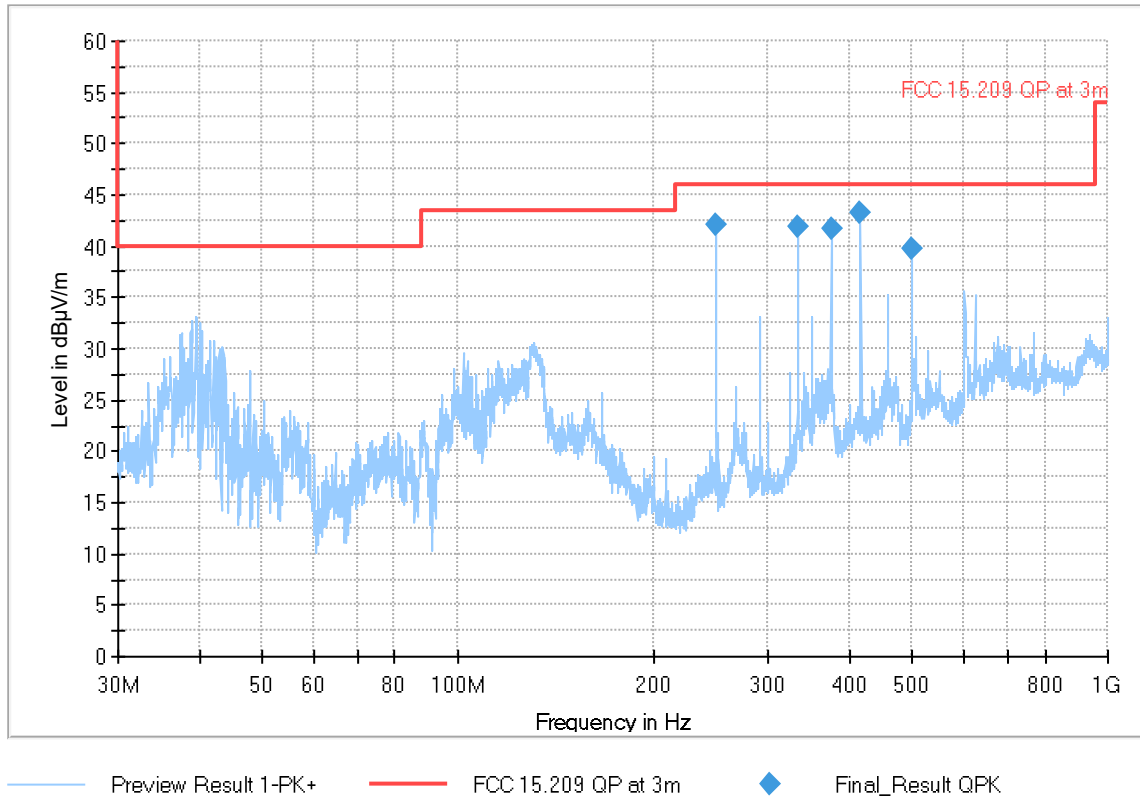
FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m



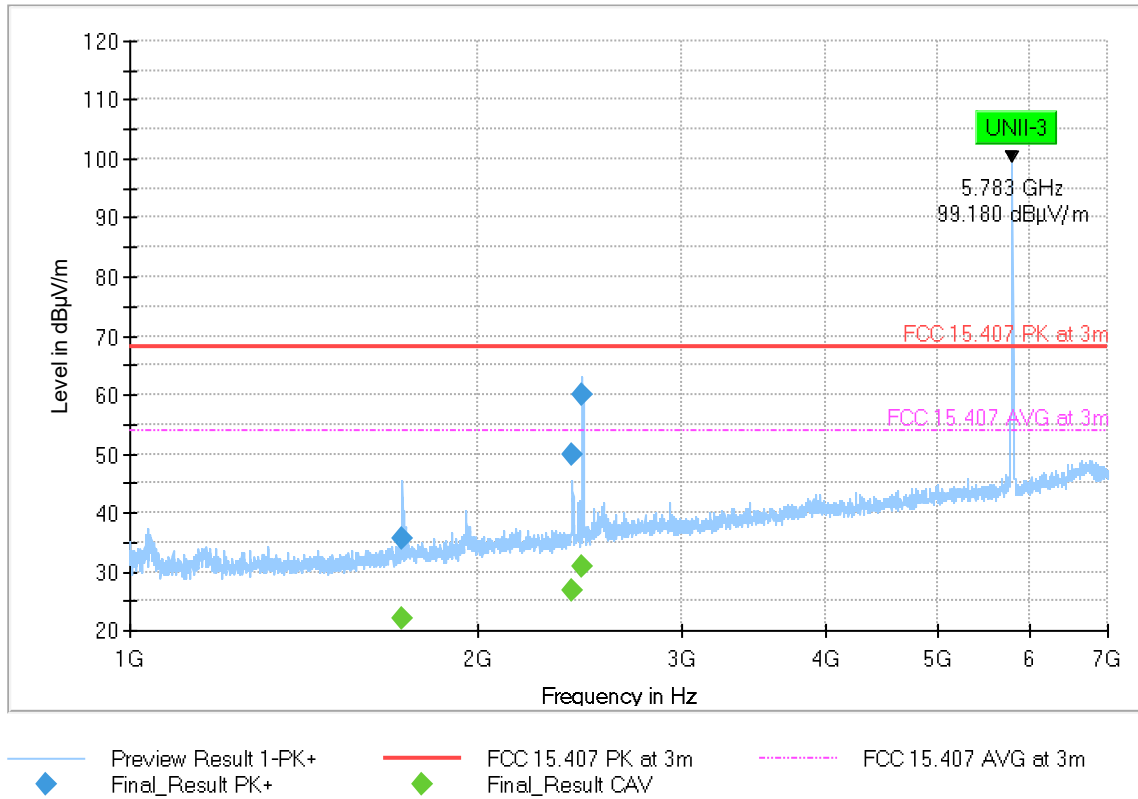
Plot # 22

Frequency (MHz)	QuasiPeak (dB μ V/m)	DET 2 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	42.03	---	46.02	3.99	500.0	120.0	119.0	H	89.0	-15.2	
333.319	41.90	---	46.02	4.12	500.0	120.0	107.0	H	263.0	-13.2	
374.997	41.61	---	46.02	4.41	500.0	120.0	107.0	H	269.0	-10.9	
416.674	43.28	---	46.02	2.74	500.0	120.0	100.0	H	84.0	-9.0	
499.997	39.67	---	46.02	6.35	500.0	120.0	100.0	H	331.0	-7.8	



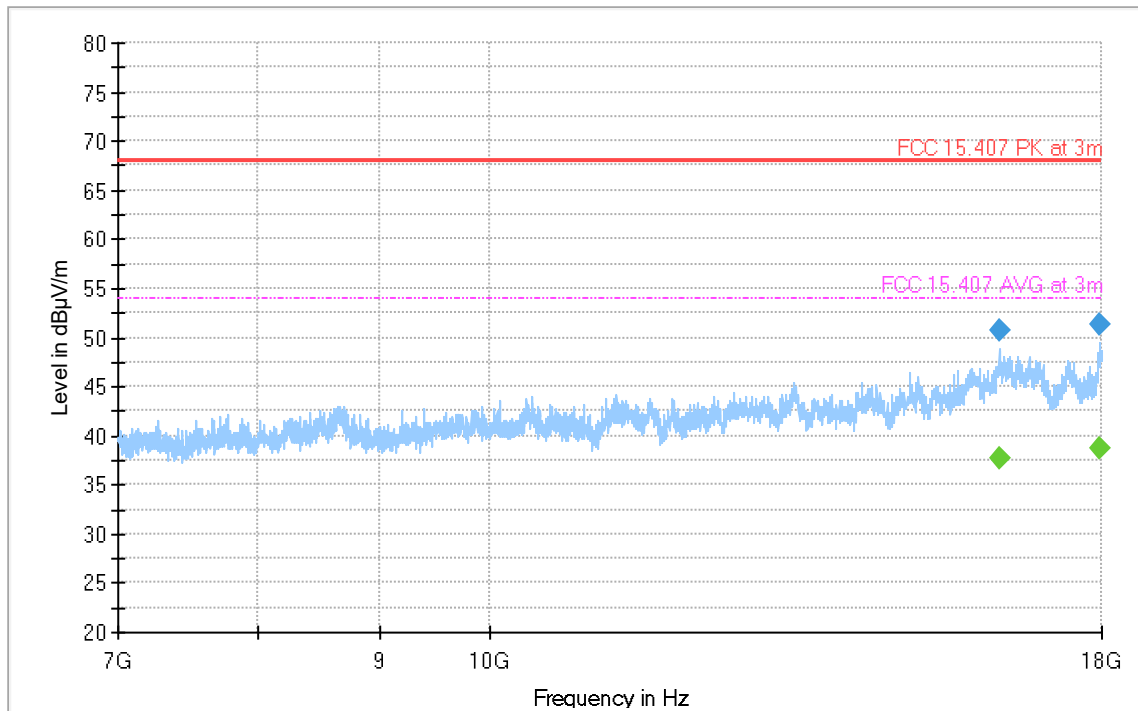
Plot # 23

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
1720.700	---	22.18	53.98	31.80	500.0	1000.0	315.0	H	248.0	3.5	
1720.700	35.50	---	68.00	32.50	500.0	1000.0	315.0	H	248.0	3.5	
2410.400	---	26.67	53.98	27.31	500.0	1000.0	309.0	V	310.0	6.7	
2410.400	49.93	---	68.00	18.07	500.0	1000.0	309.0	V	310.0	6.7	
2461.000	---	30.71	53.98	23.27	500.0	1000.0	107.0	V	261.0	6.9	
2461.000	59.98	---	68.00	8.02	500.0	1000.0	107.0	V	261.0	6.9	



Plot # 24

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
16306.733	50.70	---	68.00	17.30	500.0	1000.0	315.0	V	271.0	13.4	
16306.733	---	37.73	53.98	16.25	500.0	1000.0	315.0	V	271.0	13.4	
17973.600	51.26	---	68.00	16.74	500.0	1000.0	141.0	V	15.0	18.4	
17973.600	---	38.72	53.98	15.26	500.0	1000.0	141.0	V	15.0	18.4	



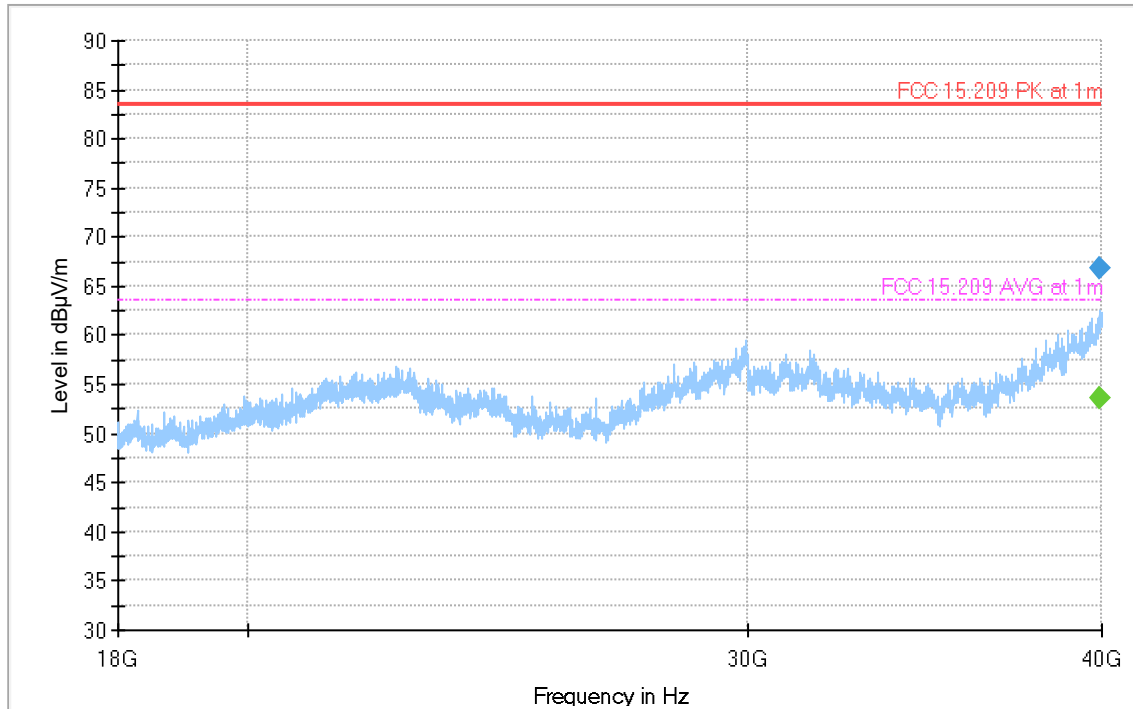
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 25

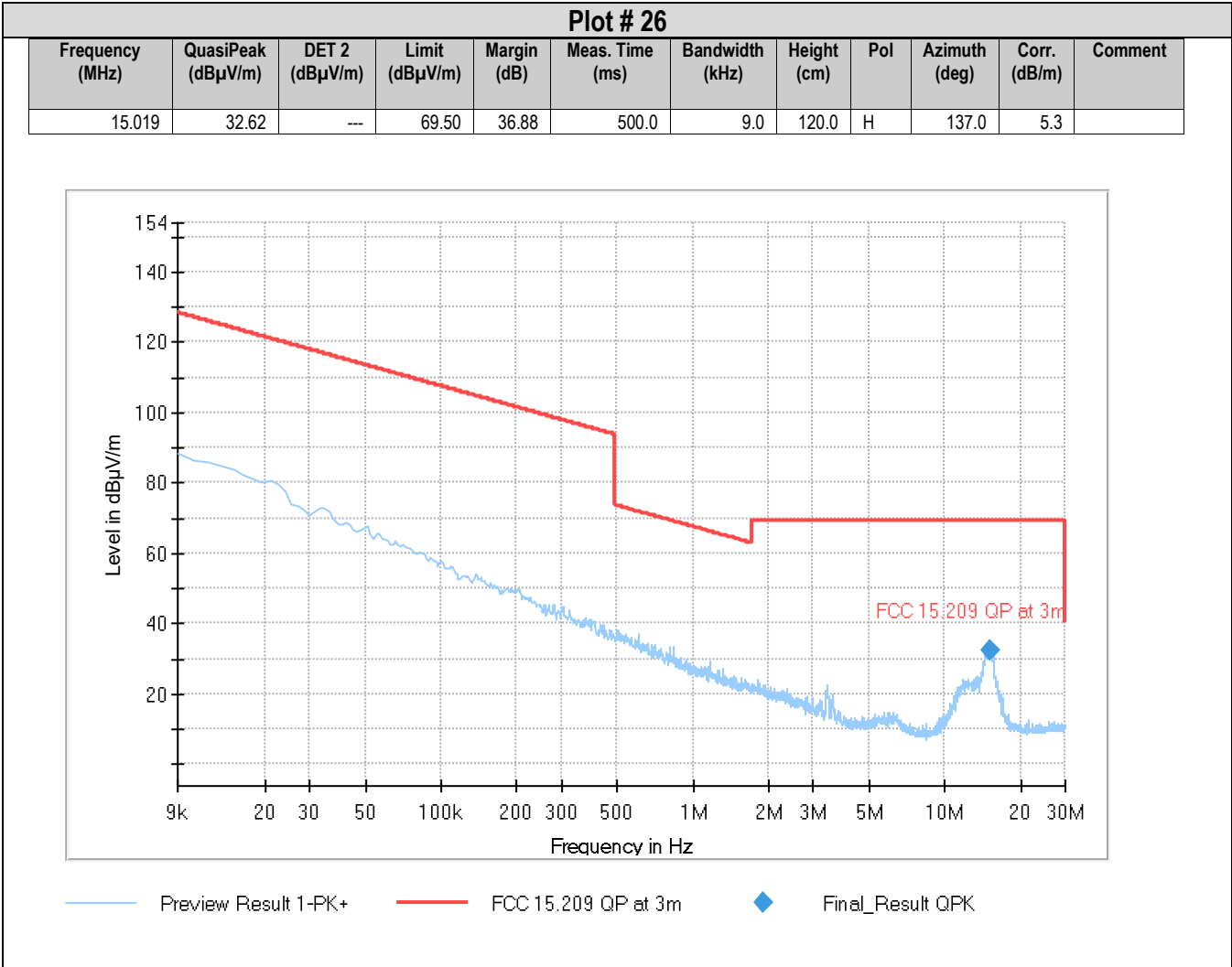
Frequency (MHz)	MaxPeak (dB μ V/m)	CAverage (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
39957.500	---	53.67	63.50	9.83	500.0	1000.0	150.0	V	244.0	24.8	
39957.500	66.76	---	83.50	16.74	500.0	1000.0	150.0	V	244.0	24.8	



Preview Result 1-PK+
Final_Result PK+

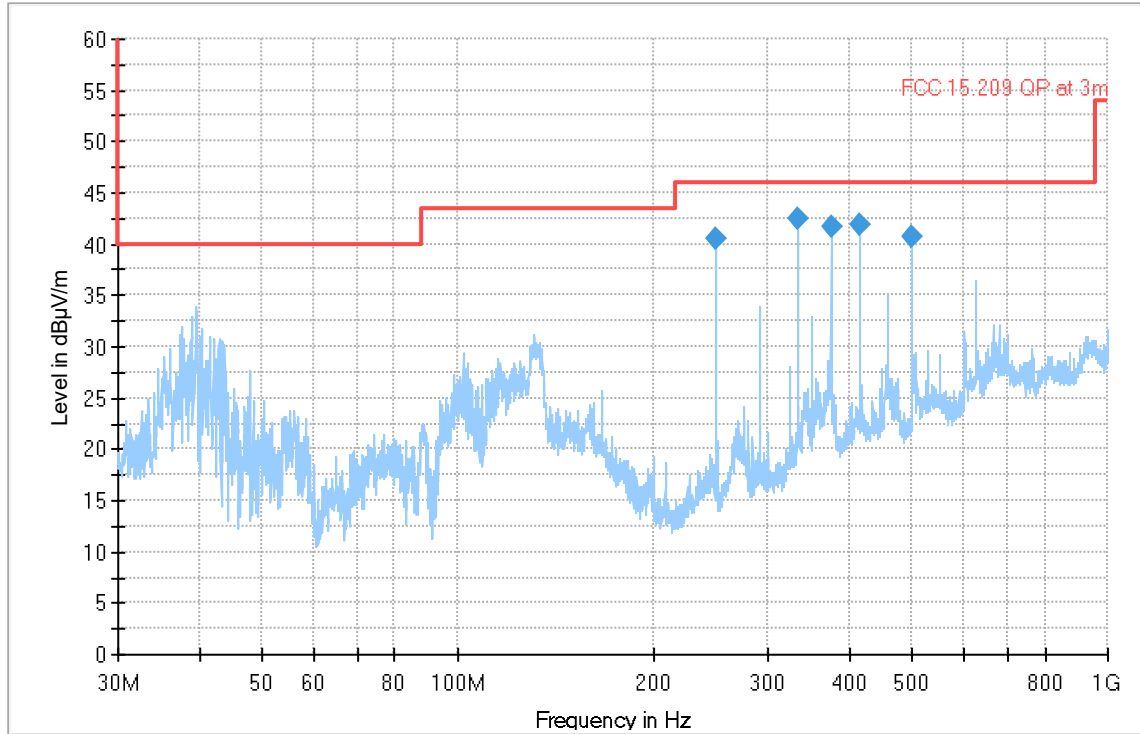
FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m



Plot # 27

Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
249.996	40.60	---	46.02	5.42	500.0	120.0	119.0	H	96.0	-15.2	
333.319	42.45	---	46.02	3.58	500.0	120.0	107.0	H	265.0	-13.2	
374.997	41.69	---	46.02	4.34	500.0	120.0	107.0	H	271.0	-10.9	
416.674	41.88	---	46.02	4.14	500.0	120.0	100.0	H	85.0	-9.0	
499.997	40.64	---	46.02	5.38	500.0	120.0	100.0	H	339.0	-7.8	



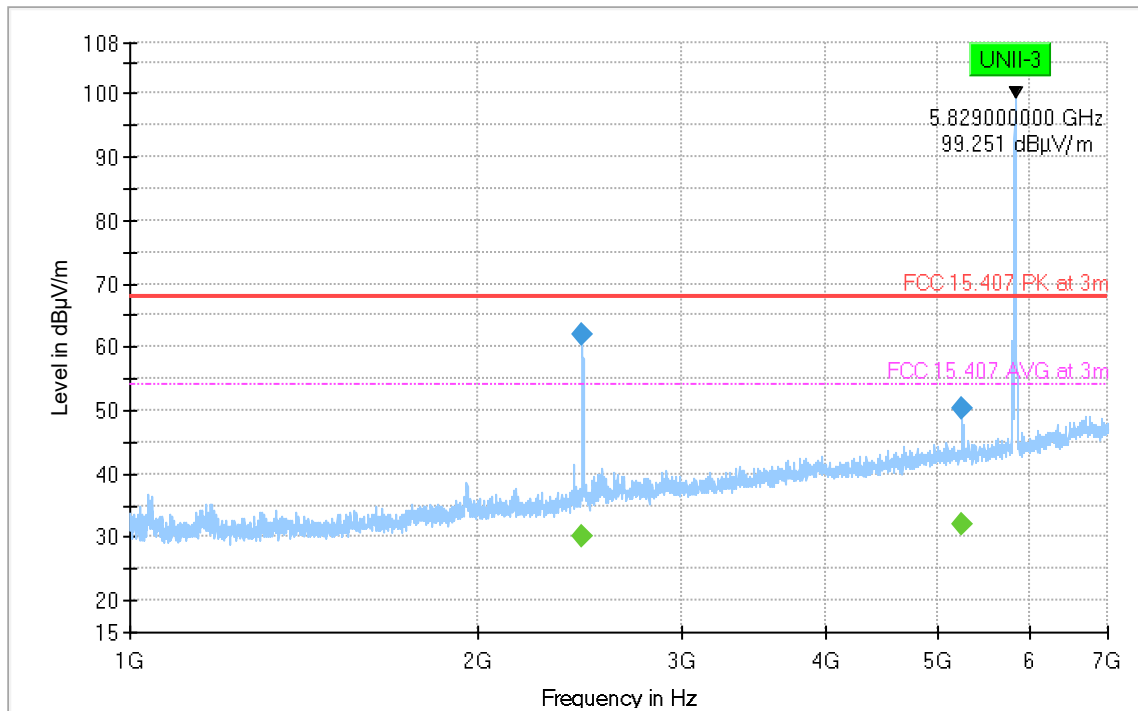
— Preview Result 1-PK+

— FCC 15.209 QP at 3m

◆ Final_Result QPK

Plot # 28

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2460.150	---	30.25	53.98	23.73	500.0	1000.0	130.0	H	150.0	6.5	
2460.150	61.94	---	68.00	6.06	500.0	1000.0	130.0	H	150.0	6.5	
5233.050	---	32.14	53.98	21.84	500.0	1000.0	254.0	V	296.0	14.7	
5233.050	50.29	---	68.00	17.71	500.0	1000.0	254.0	V	296.0	14.7	



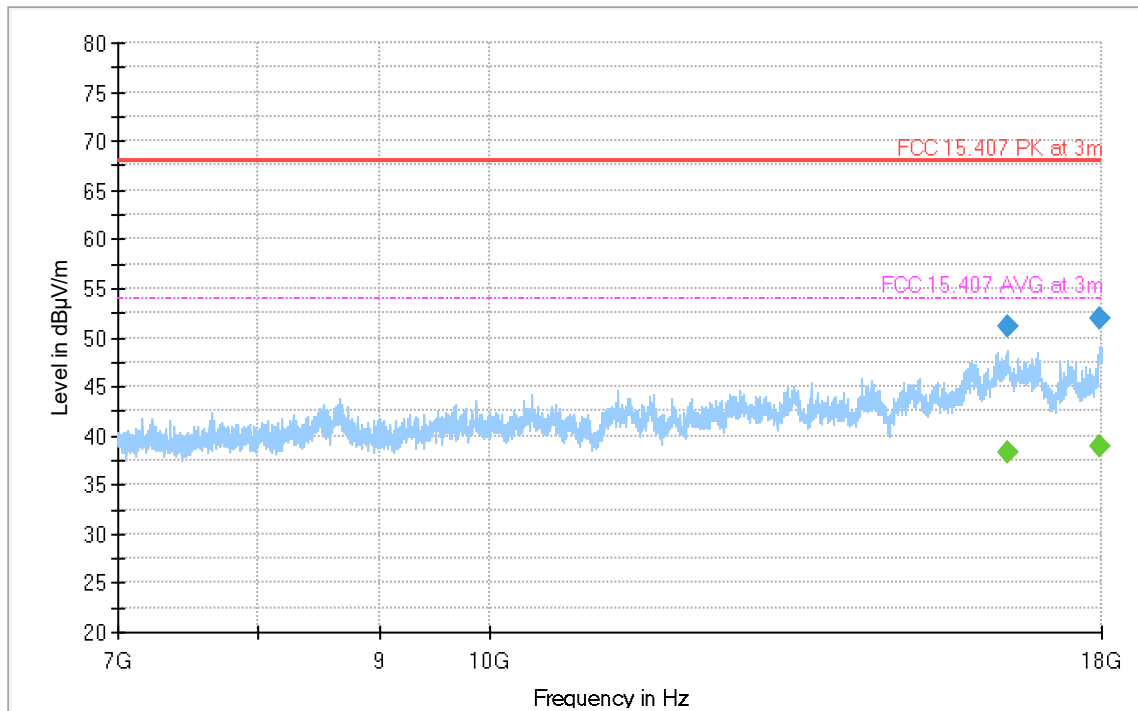
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 29

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
16432.867	51.03	---	68.00	16.97	500.0	1000.0	315.0	V	193.0	14.1	
16432.867	---	38.28	53.98	15.69	500.0	1000.0	315.0	V	193.0	14.1	
17973.600	52.00	---	68.00	16.00	500.0	1000.0	107.0	V	36.0	18.4	
17973.600	---	39.00	53.98	14.98	500.0	1000.0	107.0	V	36.0	18.4	



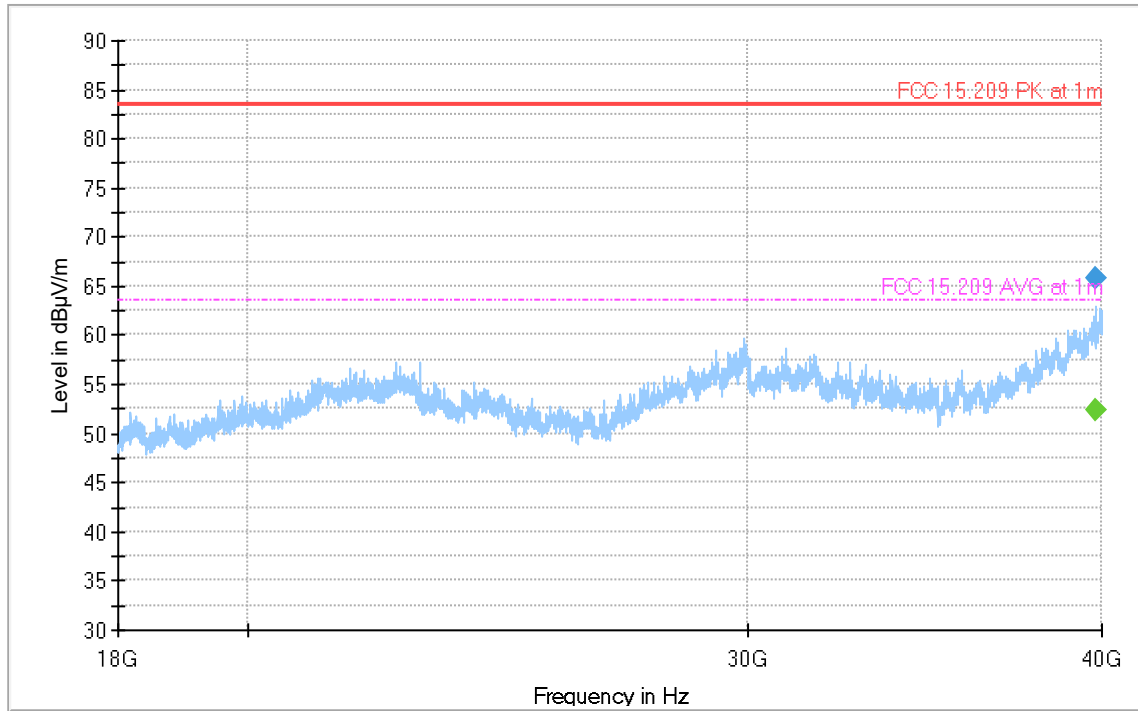
Preview Result 1-PK+
Final_Result PK+

FCC 15.407 PK at 3m
Final_Result CAV

FCC 15.407 AVG at 3m

Plot # 30

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
39783.750	---	52.47	63.50	11.03	500.0	1000.0	150.0	H	308.0	24.2	
39783.750	65.82	---	83.50	17.68	500.0	1000.0	150.0	H	308.0	24.2	



Preview Result 1-PK+
Final_Result PK+

FCC 15.209 PK at 1m
Final_Result CAV

FCC 15.209 AVG at 1m

8.2 AC Power Line Conducted Emissions

8.2.1 Measurement according to ANSI C63.4

Analyzer Settings:

- RBW = 9 KHz (CISPR Bandwidth)
- Detector: Peak / Average for Pre-scan
- Quasi-Peak/Average for Final Measurements

8.2.2 Limits: §15.207 & RSS-Gen 8.8

FCC §15.207(a) & RSS-Gen 8.8

- Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

8.2.3 Test conditions and setup:

Ambient Temperature ©	EUT Set-Up #	EUT operating mode	Power line (L1, L2, L3, N)	Power Input
22° C	1	Op. 1	Line & Neutral	120 V AC

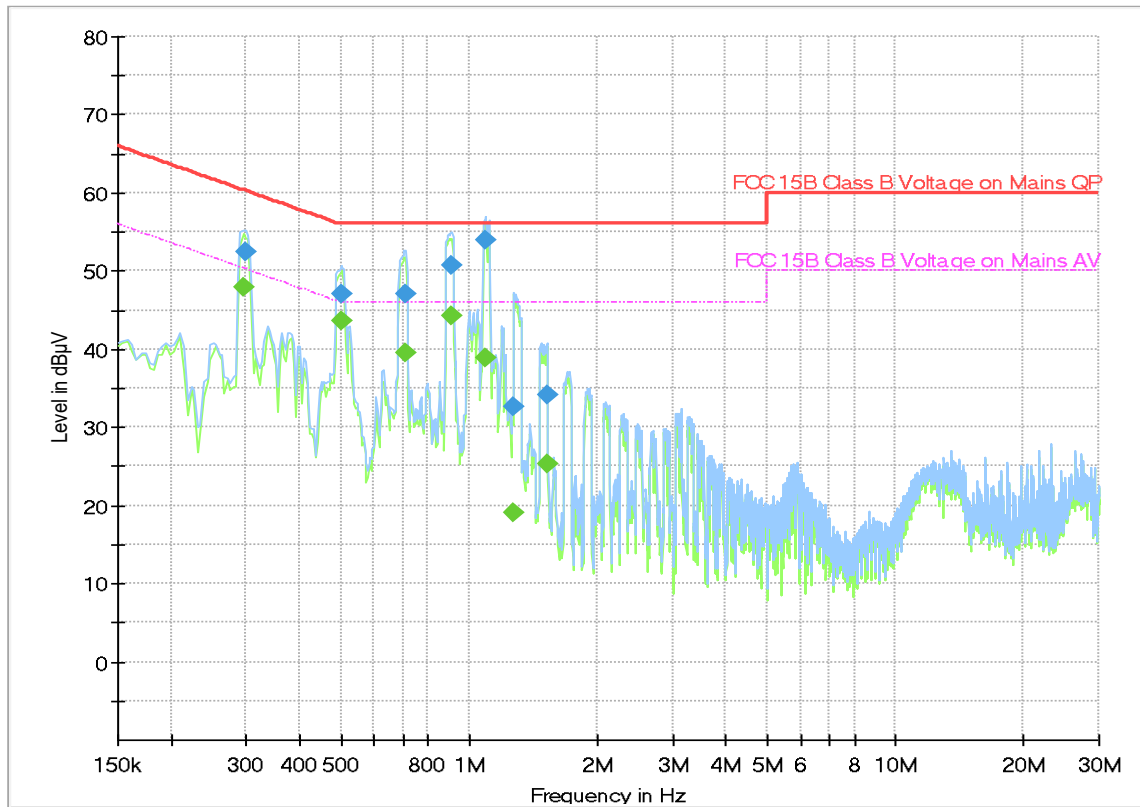
8.2.4 Measurement Result:

Plot #	Port	EUT Set-Up #:	EUT operating mode	Scan Frequency	Limit	Result
1	AC Mains	1	Op. 1	150 kHz – 30 MHz	See section 8.2.2	Pass

8.2.5 Measurement Plots:

Plot # 1

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.295	---	47.85	50.38	2.52	1000.0	9.0	N	GND	10.0
0.299	52.41	---	60.26	7.86	1000.0	9.0	N	GND	10.0
0.501	47.14	---	56.00	8.86	1000.0	9.0	N	GND	9.9
0.505	---	43.58	46.00	2.42	1000.0	9.0	N	GND	9.9
0.711	---	39.48	46.00	6.52	1000.0	9.0	N	GND	9.9
0.711	47.06	---	56.00	8.94	1000.0	9.0	N	GND	9.9
0.908	50.67	---	56.00	5.33	1000.0	9.0	N	GND	9.9
0.908	---	44.29	46.00	1.71	1000.0	9.0	N	GND	9.9
1.090	---	38.97	46.00	7.03	1000.0	9.0	N	GND	9.9
1.094	53.85	---	56.00	2.15	1000.0	9.0	N	GND	9.9
1.275	32.64	---	56.00	23.36	1000.0	9.0	N	GND	9.9
1.275	---	19.08	46.00	26.92	1000.0	9.0	N	GND	9.9
1.521	---	25.34	46.00	20.66	1000.0	9.0	N	GND	9.9
1.521	34.21	---	56.00	21.79	1000.0	9.0	N	GND	9.9



AVG_MAXH
FCC 15B Class B Voltage on Mains QP
Final_Result QPK

PK+_MAXH
FCC 15B Class B Voltage on Mains AV
Final_Result CAV

9 Test setup photos

Setup photos are included in supporting file name: "EMC_ASTRO_069_25001_FCC_15_407_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	09/06/2023
BILOG ANTENNA	A.H. SYSTEMS	BiLA2G	569	3 Years	10/30/2023
HORN ANTENNA	EMCO	3115	00035111	3 Years	10/26/2023
HORN ANTENNA	ETS LINDGREN	3117-PA	00167061	3 Years	9/25/2023
HORN ANTENNA	ETS LINDGREN	3116C-PA	00166821	3 Years	10/26/2023
ESW.EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	101715	3 Years	10/24/2023
DIGITAL THERMOMETER	Control Company	4410,90080-03	230712972	3 Years	10/18/2023
Signal Analyzer	R&S	FSV40	101022	3 Years	09/25/2023
Multimeter	Fluke	115	56090717MV	3 Years	09/26/2023
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.

11 History

Date	Report Name	Changes to report	Prepared by
9/18/2025	EMC_ASTRO_069_25001_FCC_15_407	Initial Version	Cheng Song
9/26/2025	EMC_ASTRO_069_25001_FCC_15_407_Rev1	Updated Sections 4 and 5 in the report.	Cheng Song

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