



Test Report

For:

Astronautics Corporation of America

Brand:

Astronautics Corporation of America

Marketing Name:

ACA-WPEQ-256ACNRBI

Model Name:

ACA-WPEQ-256ACNRBI

Product Description:

AGCS structure included ACS, GCS and ACCT; Connectivity Module (CM)

FCC ID: 2AVRR-WPEQ256ACN

ISED: 25923-WPEQ256ACN

Applied Rules and Standards:

47 CFR Part 15.247 (DTS)

RSS-247 Issue 4 (DTS) & RSS-Gen Issue 5

KDB996369 D04 Module Integration Guide V02

REPORT #: EMC_ASTRO_072_25001_FCC15.247_DTS_Rev2

DATE: 2026-01-26



IC recognized #
3462B

CETECOM Inc.

411 Dixon Landing Road ♦ Milpitas, CA 95035 ♦ U.S.A.

Phone: + 1 (408) 586 6200 ♦ Fax: + 1 (408) 586 6299 ♦ E-mail: contact@cetecom.com ♦ <http://www.cetecom.com>

CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

TABLE OF CONTENTS

1	ASSESSMENT.....	3
2	ADMINISTRATIVE DATA	4
2.1	IDENTIFICATION OF THE TESTING LABORATORY ISSUING THE EMC TEST REPORT	4
2.2	IDENTIFICATION OF THE CLIENT	4
2.3	IDENTIFICATION OF THE MANUFACTURER.....	4
3	EQUIPMENT UNDER TEST (EUT).....	5
3.1	EUT SPECIFICATIONS	5
3.2	EUT POWER SETTING	6
3.3	EUT SAMPLE DETAILS	6
3.4	ACCESSORY EQUIPMENT (AE) DETAILS.....	6
3.5	MODE OF OPERATION.....	6
3.6	TEST SETUP.....	7
3.7	JUSTIFICATION FOR WORST CASE MODE OF OPERATION.....	7
4	SUBJECT OF INVESTIGATION	8
5	MEASUREMENT RESULTS SUMMARY	8
6	MEASUREMENT UNCERTAINTY.....	9
6.1	MEASUREMENT UNCERTAINTY	9
6.2	ENVIRONMENTAL CONDITIONS DURING TESTING:	9
6.3	DATE OF TESTING:.....	9
6.4	DECISION RULE:.....	9
7	MEASUREMENT PROCEDURES	10
7.1	RADIATED MEASUREMENT.....	10
7.2	POWER LINE CONDUCTED MEASUREMENT PROCEDURE	12
7.3	RF CONDUCTED MEASUREMENT PROCEDURE	12
8	TEST RESULT DATA	13
8.1	POWER VERIFICATION	13
8.2	RADIATED TRANSMITTER SPURIOUS EMISSIONS AND RESTRICTED BANDS	15
9	TEST SETUP PHOTOS.....	48
10	TEST EQUIPMENT AND ANCILLARIES USED FOR TESTING	48
11	REVISION HISTORY	49

1 **Assessment**

The following device was evaluated against the applicable criteria specified in

- 47 CFR Part 15.247 (DTS)
- RSS-247 Issue 4 (DTS) & RSS-Gen Issue 5
- KDB 996369 D04 Module Integration Guide V02

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

Company	Description	Model #
Astronautics Corporation of America	AGCS structure included ACS, GCS and ACCT; Connectivity Module (CM)	ACA-WPEQ-256ACNRBI

Report Authorized by:

Responsible for testing Laboratory:

2026-01-26	Compliance	Alvin, Ilarina (Director of EMC Services)	
Date	Section	Name	Signature

Responsible for the Report:

2026-01-26	Compliance	Guangcheng Huang (Senior EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

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

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

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

2.2 Identification of the Client

Client's Name:	Astronautics Corporation of America
Street Address:	135 W Forest Hill Ave
City/Zip Code	Oak Creek, WI 53154-2901
Country	USA

2.3 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 No	ACA-WPEQ-256ACNRBI	
HW Version	ACA-WPEQ-256ACNRBI	
SW Version	N/A	
FCC-ID	2AVRR-WPEQ256ACN	
ISED:	25923-WPEQ256ACN	
HVIN:	ACA-WPEQ-256ACNRBI	
PMN:	ACA-WPEQ-256ACNRBI	
Product Description	AGCS structure included ACS, GCS and ACCT; Connectivity Module (CM)	
Frequency Range / number of channels:	Frequency Range (MHz)	Channel Number
	2412-2462	1-11
Modes of Operation / Channel Bandwidths:	IEEE Std. 802.11	Data Rate / MCS
	b	1-11 Mbps
	g	6-54 Mbps
	n: HT20 & HT40	MCS 0-15
Transceiver Technology / Type(s) of Modulation	<u>Wi-Fi Modules</u> Company Name: SparkLAN Model Number: WPEQ-256ACNRBI, WPEQ-256ACN FCC: 2AVRR-WPEQ256ACN <u>Wireless Technologies</u> Wi-Fi 2.4GHz Wi-Fi 5GHz	
Max. declared antenna gain	Company Name: TAOGLAS Type: FXP.830 Freedom Dual Band Wi-Fi 2.4/5.8GHz Dipole Antenna Part No: FXP.830.09.0100C Peak Gain: 2.4GHz: 2.55 dBi 5.2GHz: 5.90 dBi 5.8GHz: 5.00 dBi	
Other Radios included in the device:	Cellular	
Power Supply/ Rated Operating Voltage Range	3.135V (Low) / 3.3V (Nominal) / 3.465V (Max)	
Operating Temperature Range	-40°C to +85°C	
Sample Revision	☒ Production ☐ Pre-Production	
Note: The information of the EUT specifications in the table above is provided by the client		

3.2 EUT Power setting

Channel Number	2400 – 2483.5 MHz			
	802.11b	802.11g	802.11n (HT20)	802.11n (HT40)
Low	23	-	-	-
Mid	23	-	-	-
High	23	-	-	-

Note: according to module report with report number FR8D0605AC by SPORTON INTERNATIONAL INC., 802.11b is the worst-case mode, which is applied throughout all tests within this test report.

3.3 EUT Sample details

EUT #	IMEI	HW Version	SW Version	Notes/Comments
1	359073069901902	ACA-WPEQ-256ACNRBI	N/A	Radiated and AC Conducted Emissions

3.4 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number	Comments
1	Laptop	P135G	Dell	12243628947	Support laptop provided by Cetecom to exercise device.
2	Host Device – AFS6460 Connectivity Module	278830-21	Astronautics Corporation of America		
3	Certification Tester	284438-1	Astronautics Corporation of America		
4	Certification Tester to CM Cable	283699	Astronautics Corporation of America		

3.5 Mode of Operation

Mode of Operation	Description of Operating modes	Comments
Op. 1	802.11b (20 MHz, 1 Mbit/s)	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.

Note: according to module report with report number FR8D0605AC by SPORTON INTERNATIONAL INC., 802.11b is the worst-case mode, which is applied throughout all tests within this test report.

3.6 Test Setup

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#1	The radio of the EUT was configured to a fixed channel transmission with highest possible duty cycle using software that is not available to the end user.

3.7 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels, and highest possible duty cycle. For radiated measurements, all data in this report show 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 section 1 of this test report.

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.247(a)(1) RSS-247 5.2(a)	Emission Bandwidth	Nominal	-	☐	☐	☒	Note 1
§15.247(e) RSS-247 5.2(b)	Power Spectral Density	Nominal	-	☐	☐	☒	Note 1
§15.247(b)(1) RSS-247 5.4(d)	Maximum Conducted Output Power and EIRP	Nominal	-	☒	☐	☐	Complies Note 1
§15.247(d) RSS-247 5.5	Band edge compliance Non-restricted Band Edges	Nominal	-	☐	☐	☒	Note 1
§15.247; 15.209; 15.205 RSS-Gen 8.9; 8.10	Band edge compliance Restricted Band Edges	Nominal	-	☐	☐	☒	Note 1
§15.247(d); §15.209 RSS-Gen 6.13	TX Spurious emissions- Radiated	Nominal	802.11b	☒	☐	☐	Complies
§15.207(a) RSS Gen 8.8	AC Conducted Emissions	Nominal	802.11b	☐	☒	☐	Note 2

Note 1: Test methodologies and engineering judgement have been applied according to KDB 996369 D04 Module Integration Guide V02. For other test cases subject to the integrated module, refer test report with report number FR8D0605AC by SPORTON INTERNATIONAL INC.

Note 2: This device does not connect to AC mains network

6 **Measurement Uncertainty**

6.1 **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

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.

6.2 **Environmental Conditions during Testing:**

The following environmental conditions were maintained during testing:

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

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

6.3 **Date of Testing:**

2025-09-02 – 2025-09-30

6.4 **Decision Rule:**

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

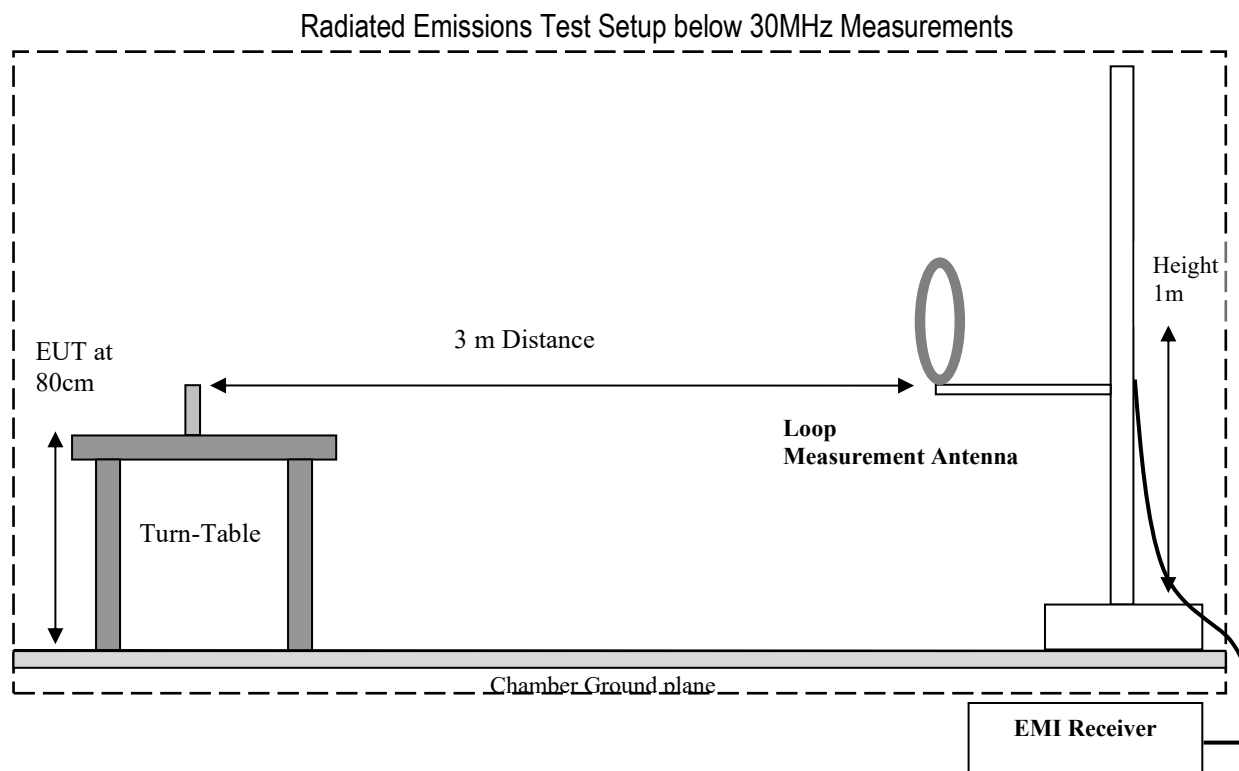
Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither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

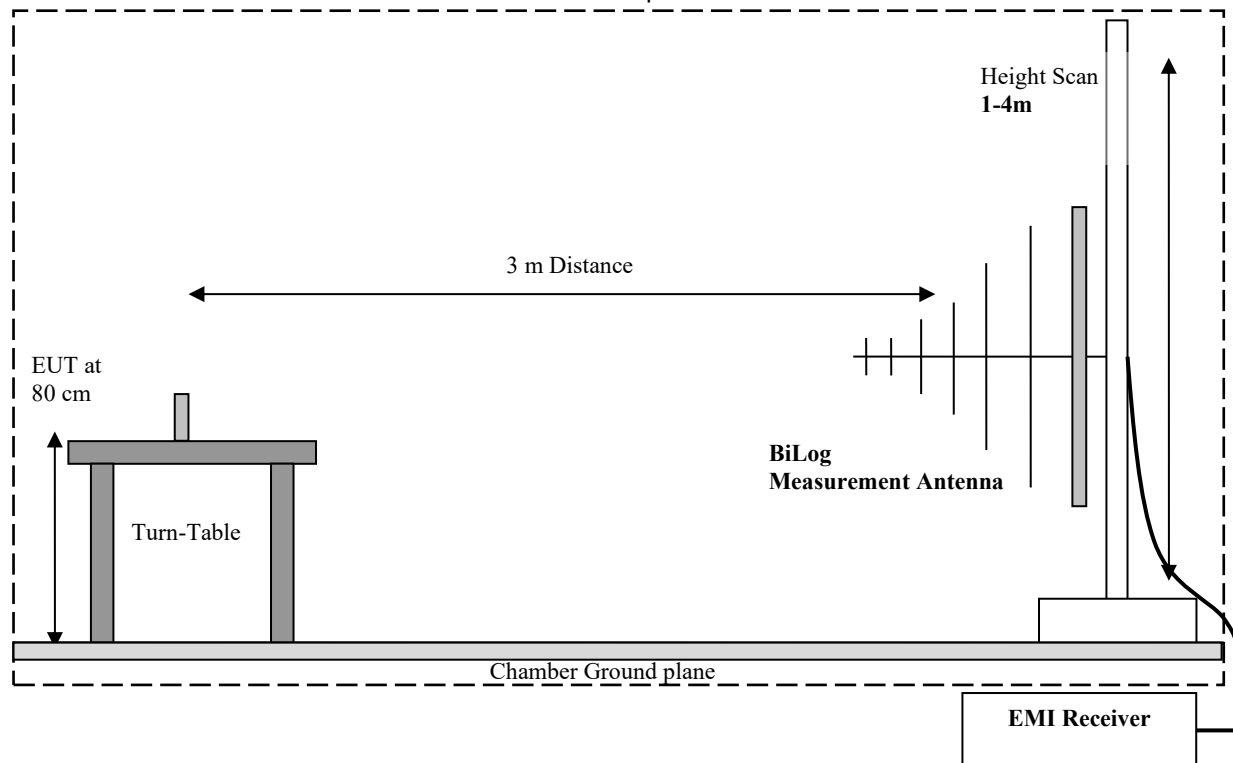
7.1 Radiated Measurement

The radiated measurement is performed according to ANSI C63.10 (2020)

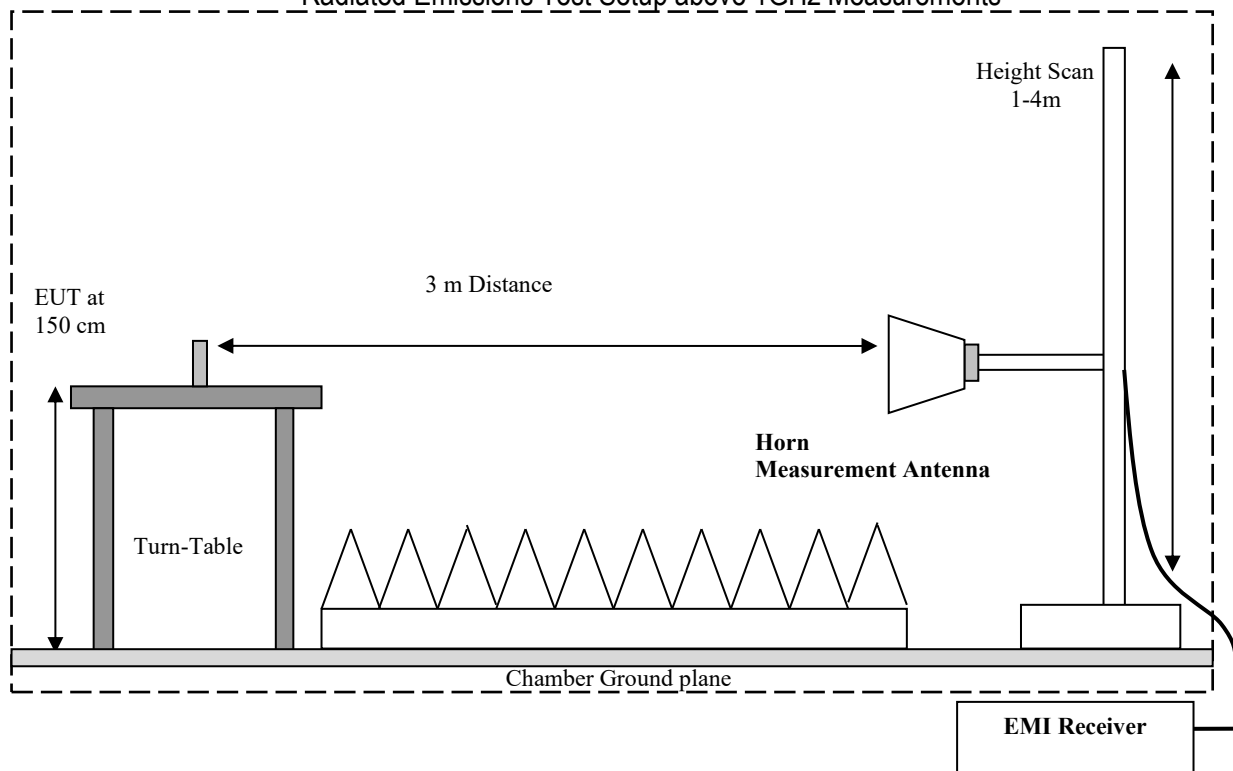
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to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

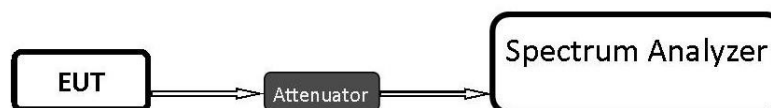
Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

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 Power Verification

8.1.1 Measurement according to FCC 558074 D01 15.247 Meas Guidance v05r02

Spectrum Analyzer settings:

- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW
- Span = at least 1.5 times the OBW
- Sweep = Auto couple
- Detector function = PK
- Trace = Maxhold

8.1.2 Limits:

- FCC §15.247 (b)(1): 1 W / 30 dBm
- RSS-247: 1 W / 30 dBm

8.1.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
23.8°C	1	1	nominal

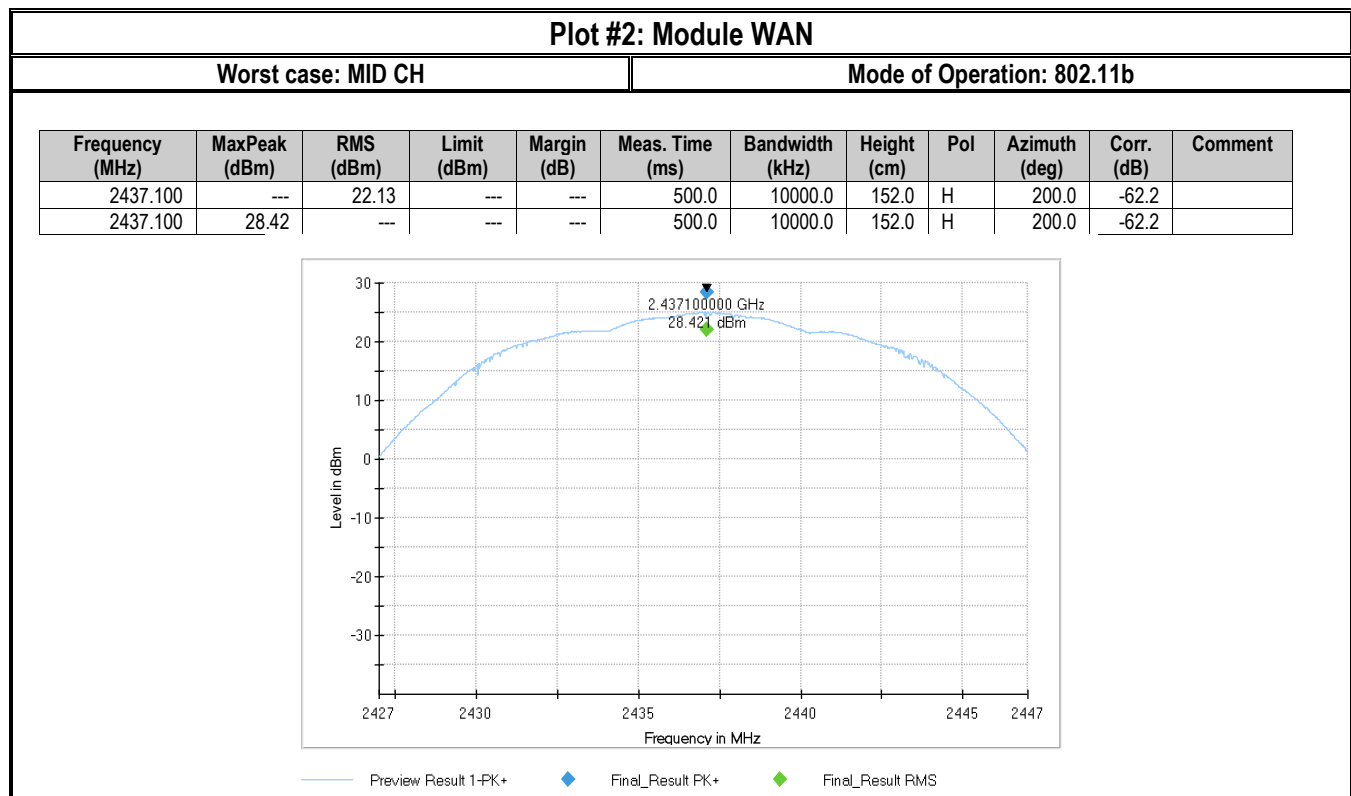
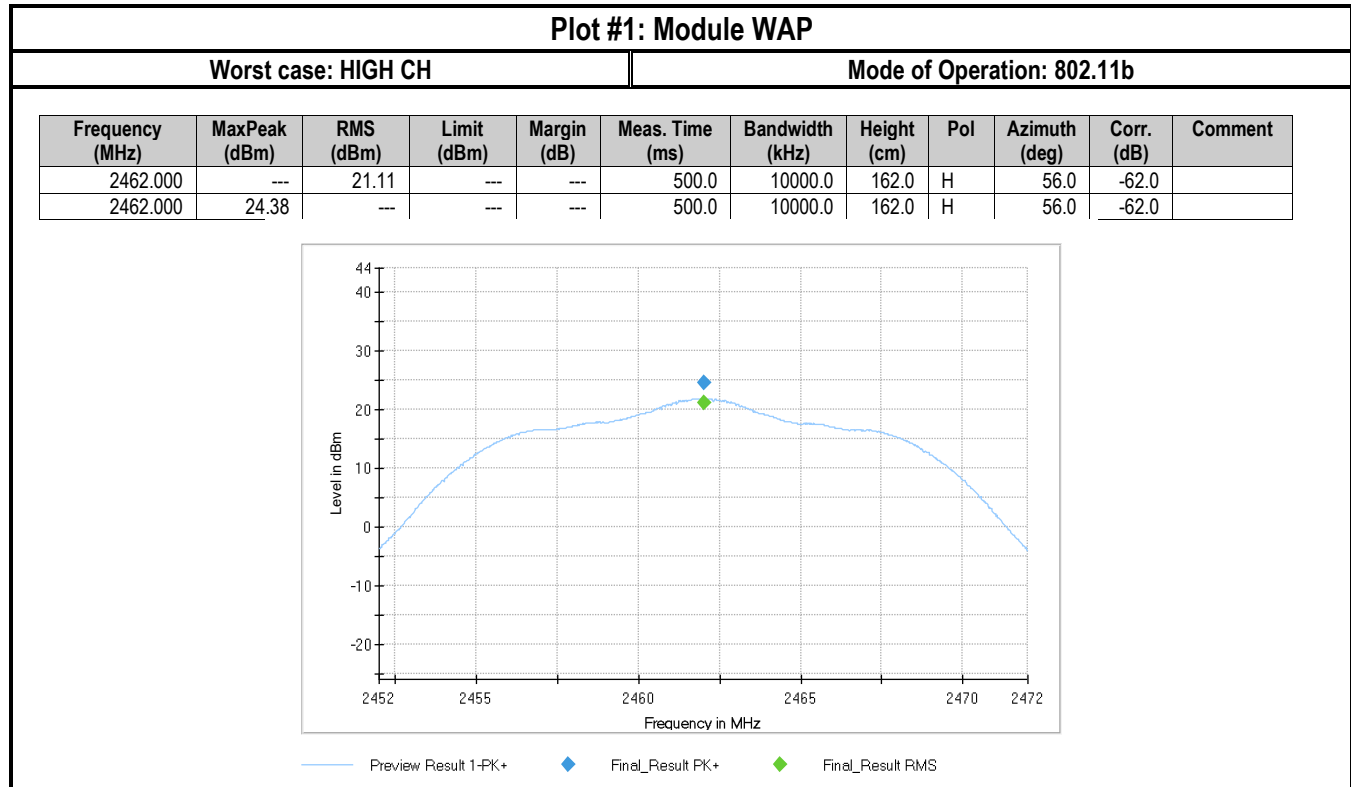
8.1.4 Measurement result:

Plot #	Module	WLAN Mode	Channel	EIRP PK (dBm)	Conducted Power PK * (dBm)	Result
-	WAP	802.11b	Low	23.81	21.26	Pass
-	WAP	802.11b	Mid	24.26	21.71	Pass
1	WAP	802.11b	High	24.38	21.83	Pass
-	WAN	802.11g	Low	27.72	25.17	Pass
2	WAN	802.11g	Mid	28.42	25.87	Pass
-	WAN	802.11g	High	27.54	24.99	Pass

Note: following section of measurement plots includes only the worst-case channel of each module.

Note *: results are calculated with given antenna gain provided by applicant, which is lower than 6 dBi.

8.1.5 Measurement Plots:



8.2 Radiated Transmitter Spurious Emissions and Restricted Bands

8.2.1 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.

8.2.2 Limits:

FCC §15.247

- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §15.209 & RSS-Gen 8.9

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

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

FCC §15.205 & RSS-Gen 8.10

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

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

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

*PEAK LIMIT= 74 dBμV/m

*AVG. LIMIT= 54 dBμV/m

8.2.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
22.0 °C	1	1	nominal

8.2.4 Measurement result:

Plot #	Module	Scan Frequency	Limit	Result
1-15	WAP	9 kHz – 26 GHz	See section 8.2.2	Pass
16-30	WAN	9 kHz – 26 GHz	See section 8.2.2	Pass

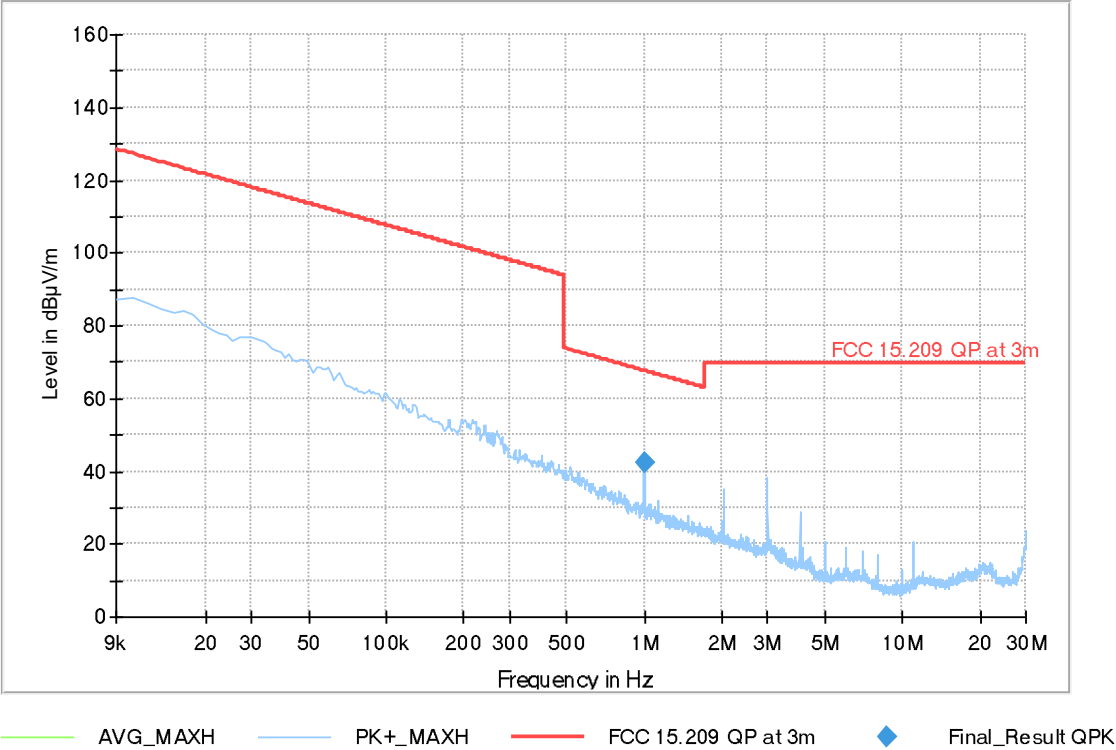
8.2.5 Measurement Plots:

8.2.5.1 Module WAP

Plot 1 LOW CH

Final Result

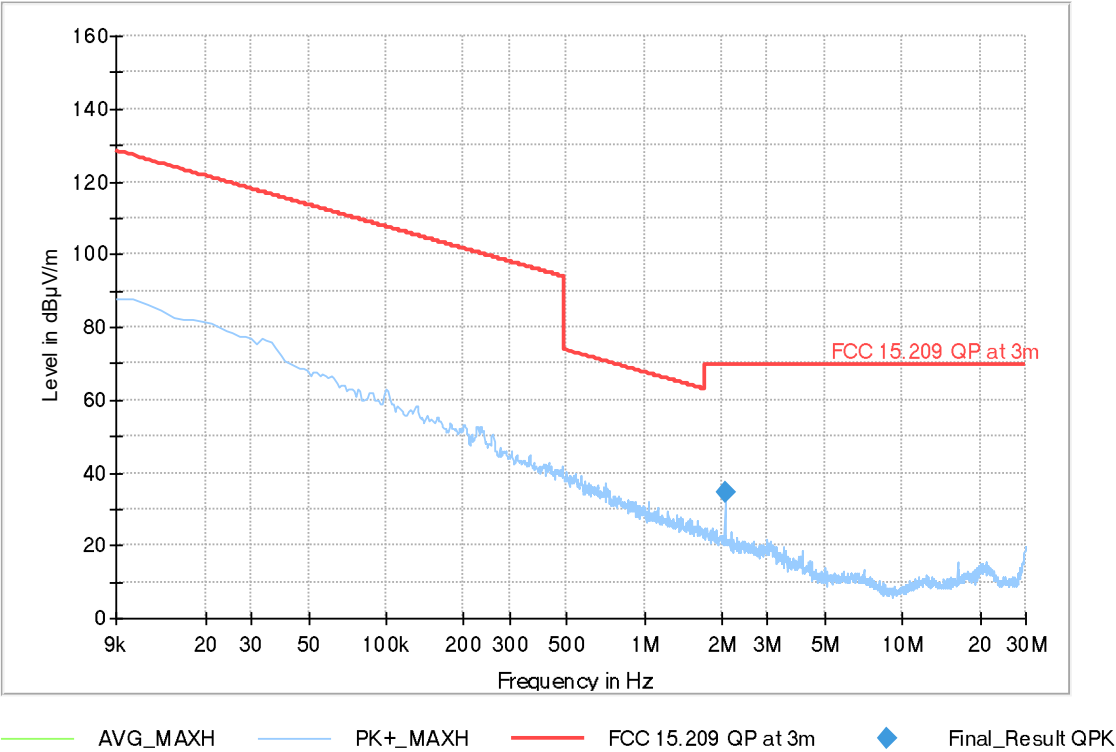
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
1.000	42.319	67.62	25.30	500.0	9.0	100.0	H	164.0	17.9	0.2	-28.7	46.4	24.4



Plot 2 MID CH

Final Result

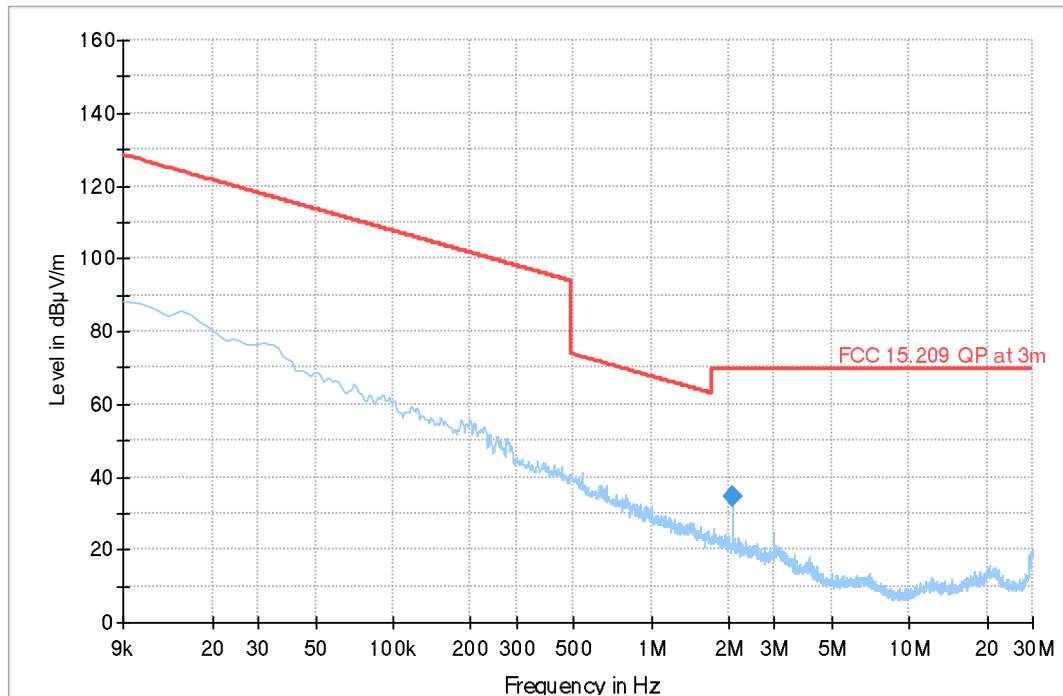
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
2.058	34.488	69.50	35.01	500.0	9.0	100.0	V	13.0	12.6	0.3	-28.7	41.0	21.9



Plot 3 HIGH CH

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
2.065	34.415	69.50	35.09	500.0	9.0	100.0	H	6.0	12.5	0.3	-28.7	41.0	21.9

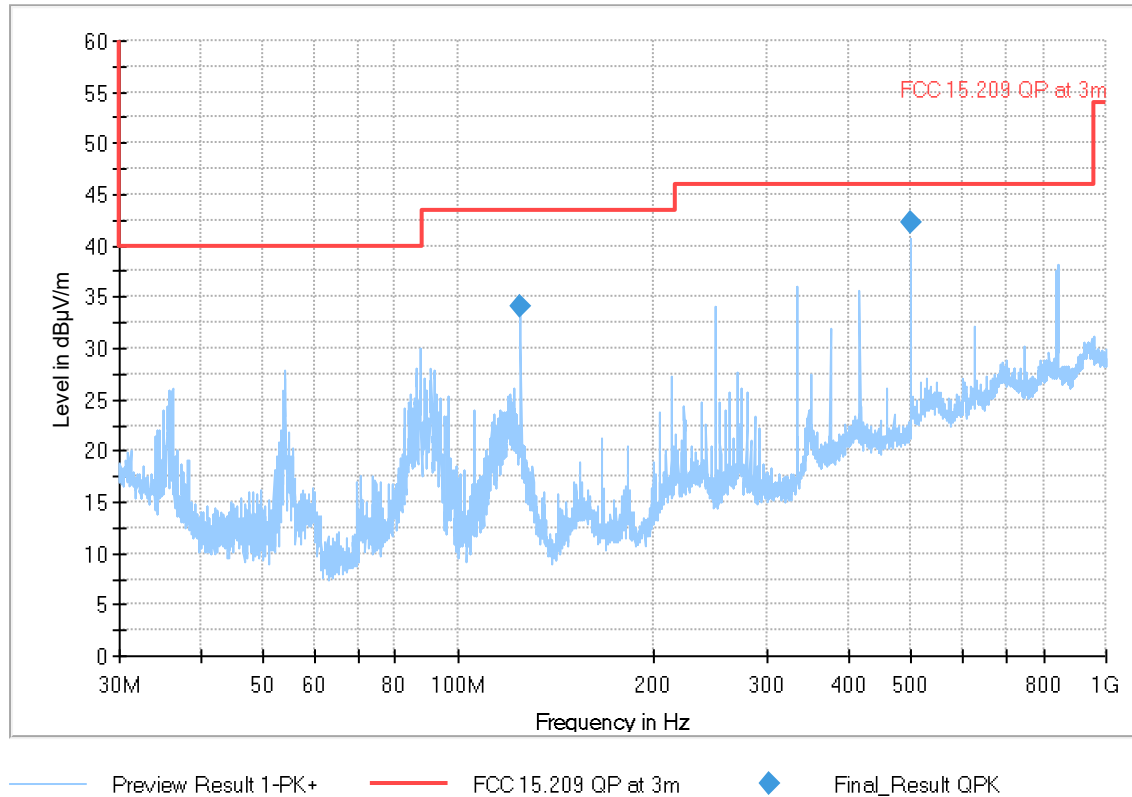


— AVG_MAXH — PK+_MAXH — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot 4 LOW CH

Final_Result

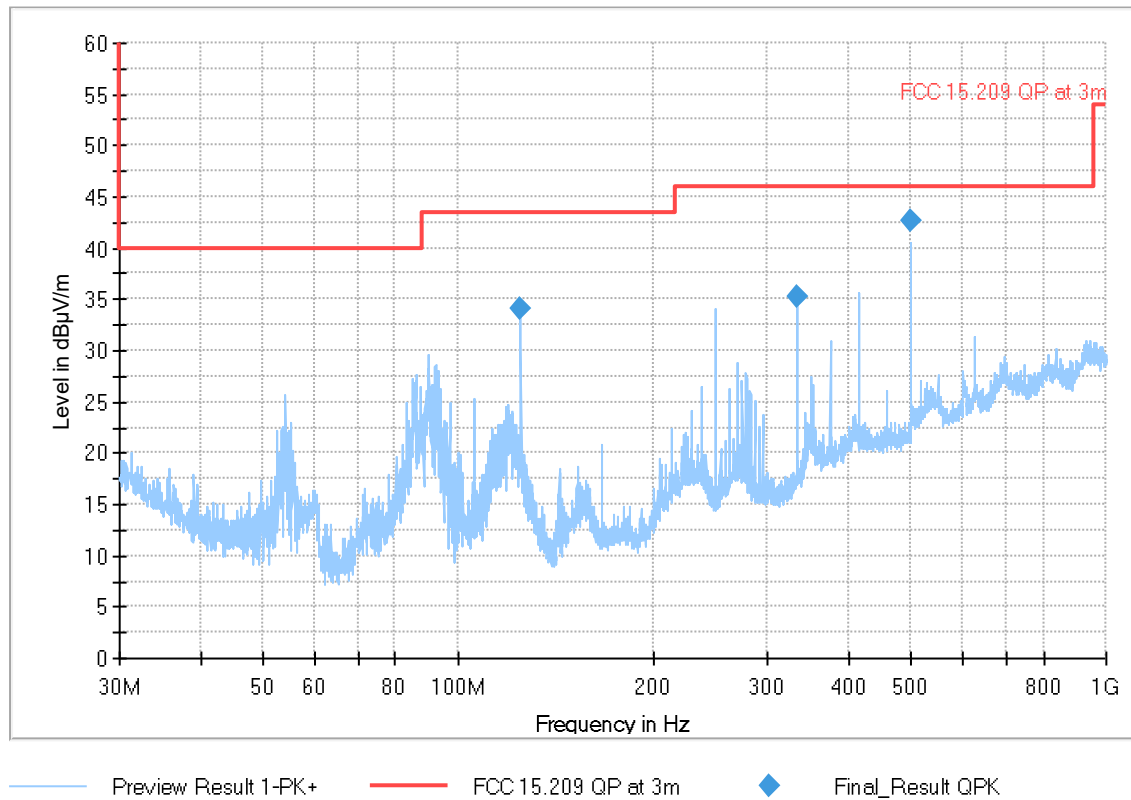
Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
124.995	34.06	---	43.50	9.44	500.0	120.0	100.0	V	329.0	-20.4	
499.997	42.33	---	46.02	3.69	500.0	120.0	155.0	V	89.0	-7.8	



Plot 5 MID CH

Final_Result

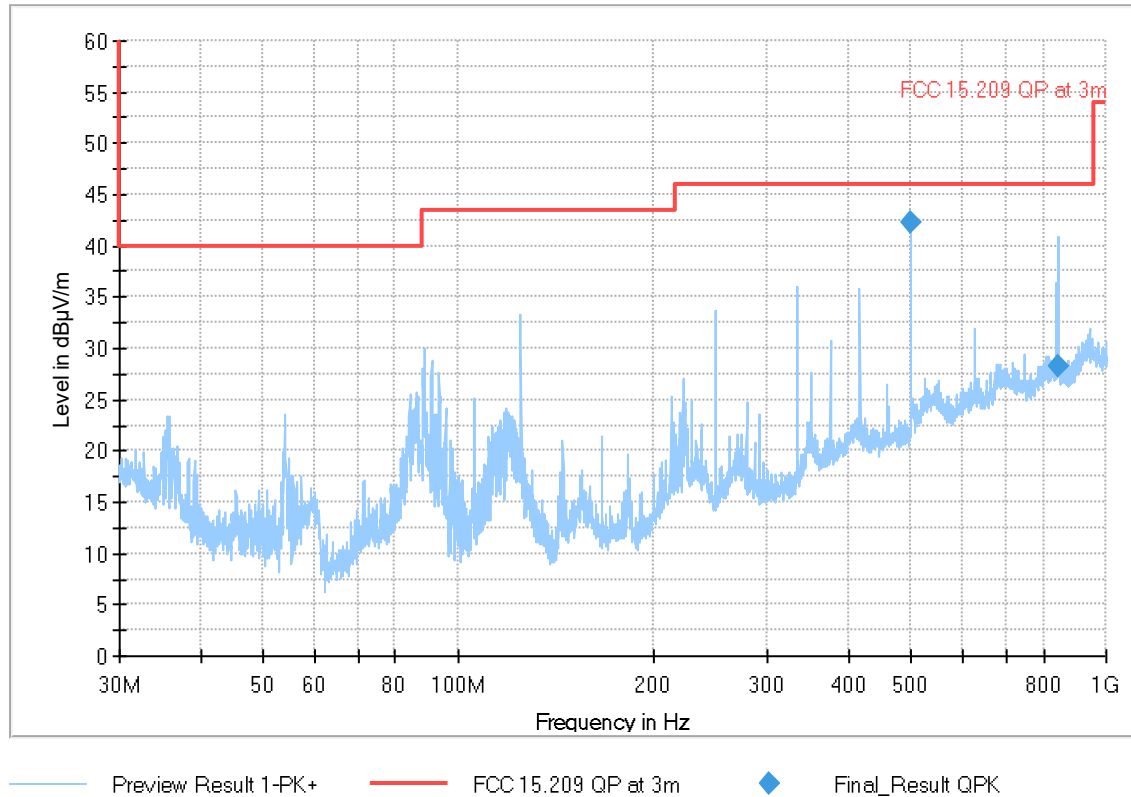
Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
124.995	34.02	---	43.50	9.48	500.0	120.0	107.0	V	131.0	-20.4	
333.319	35.23	---	46.02	10.79	500.0	120.0	100.0	V	119.0	-13.2	
500.030	42.74	---	46.02	3.28	500.0	120.0	155.0	V	89.0	-7.8	



Plot 6 HIGH CH

Final_Result

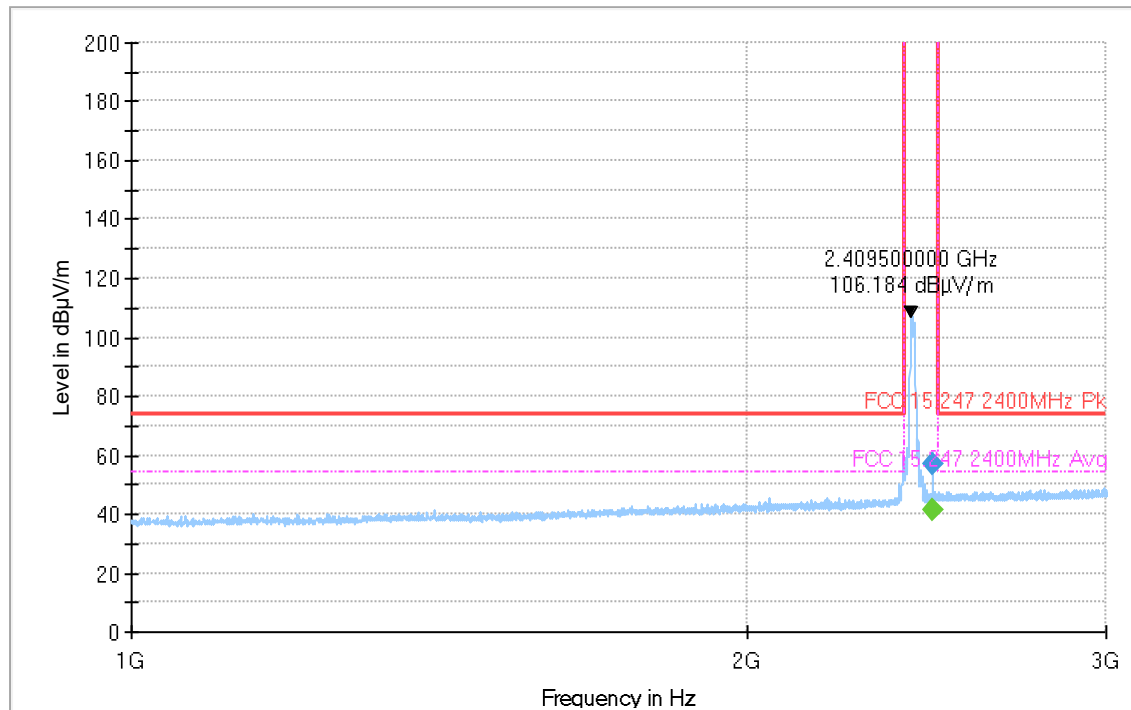
Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
499.997	42.36	---	46.02	3.66	500.0	120.0	152.0	V	91.0	-7.8	
842.213	28.19	---	46.02	17.83	500.0	120.0	109.0	H	307.0	-2.8	



Plot 7 LOW CH

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
2466.000	---	41.14	500.00	458.86	500.0	1000.0	188.0	V	27.0	34.2	
2466.000	57.14	---	500.00	442.86	500.0	1000.0	188.0	V	27.0	34.2	

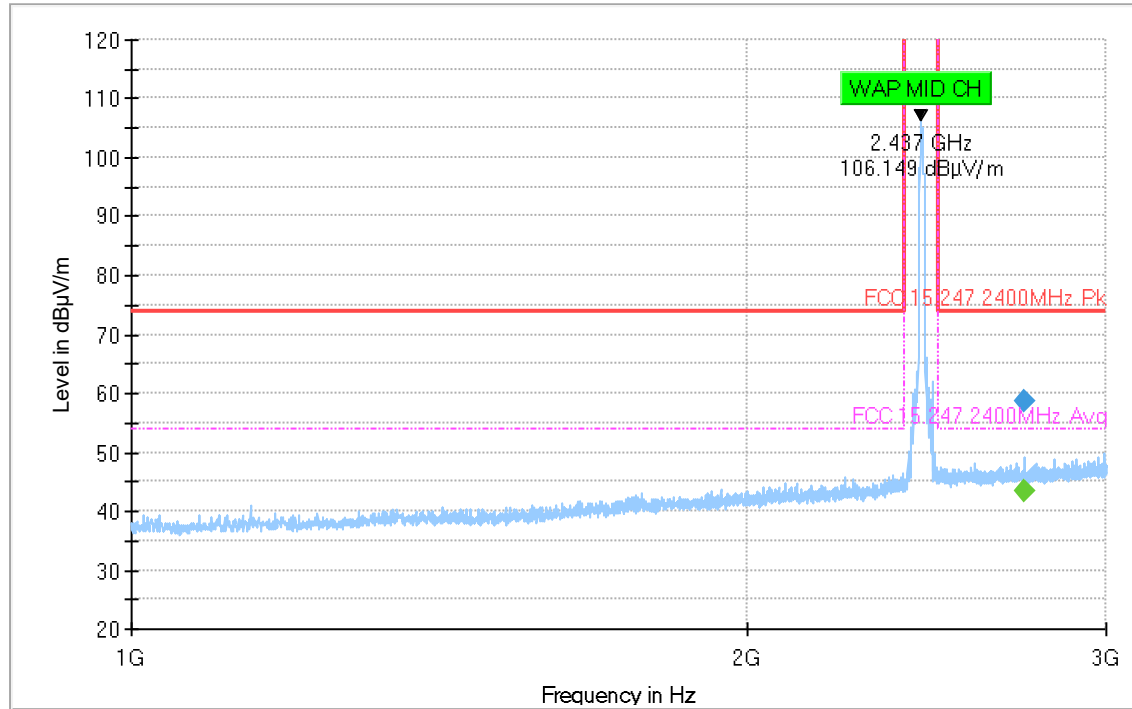


◆ Preview Result 1-PK+ Final_Result PK+
 ◆ FCC 15.247 2400MHz Pk Final_Result CAV
 ◆ FCC 15.247 2400MHz Avg

Plot 8 MID CH

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
2738.000	---	43.55	54.00	10.45	500.0	1000.0	308.0	V	69.0	35.5	
2738.000	58.54	---	74.00	15.46	500.0	1000.0	308.0	V	69.0	35.5	

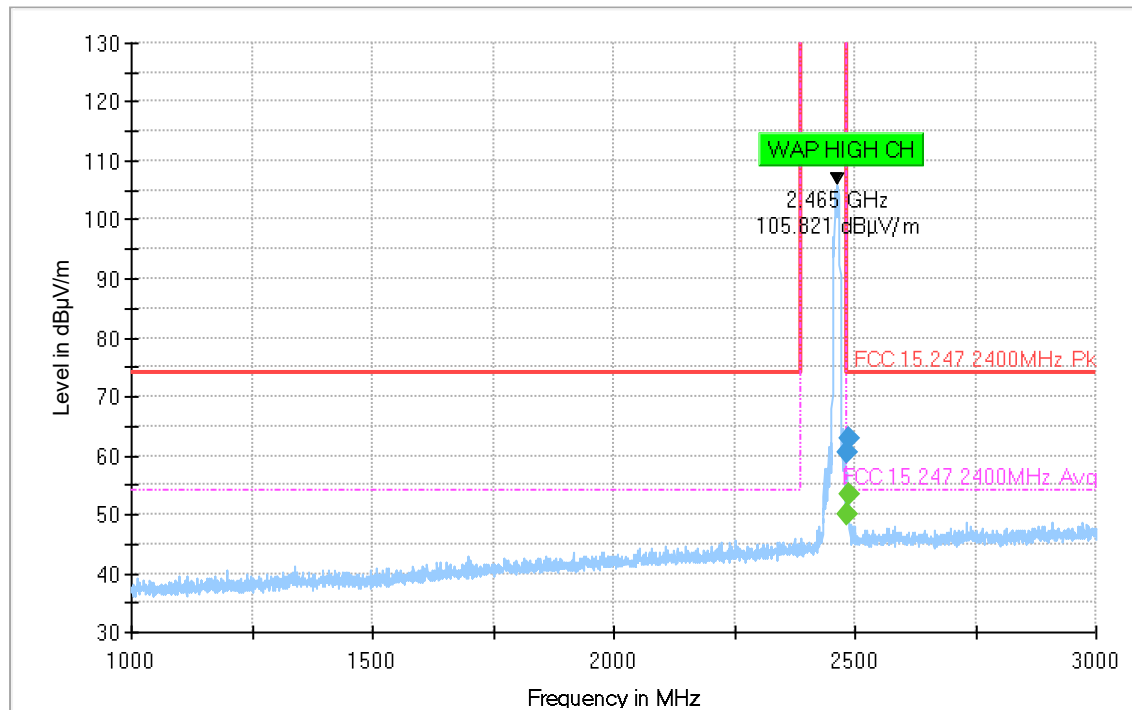


 Preview Result 1-PK+
 Final_Result PK+
  FCC 15.247.2400MHz Pk
 Final_Result CAV
  FCC 15.247.2400MHz Avg

Plot 9 HIGH CH

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
2483.500	---	49.96	54.00	4.04	500.0	1000.0	276.0	H	112.0	33.9	
2483.500	60.65	---	74.00	13.35	500.0	1000.0	276.0	H	112.0	33.9	
2488.000	62.85	---	74.00	11.15	500.0	1000.0	230.0	H	230.0	33.9	
2488.000	---	53.38	54.00	0.62	500.0	1000.0	230.0	H	230.0	33.9	

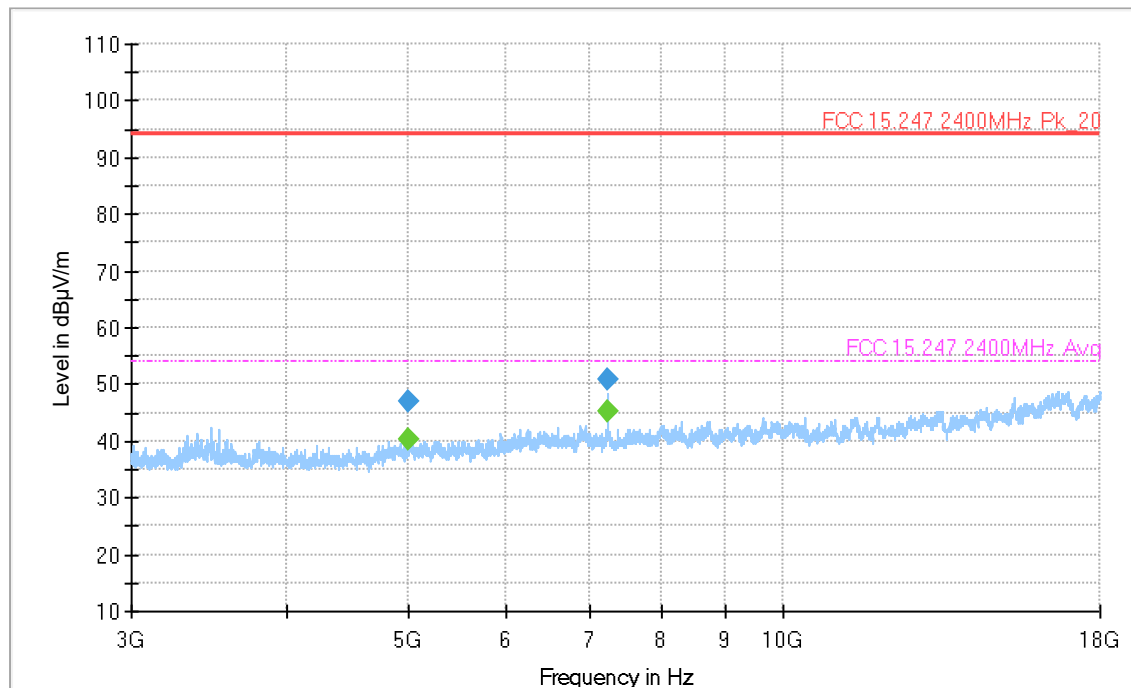


◆ Preview Result 1-PK+ Final_Result PK+
 ◆ FCC 15.247 2400MHz Pk Final_Result CAV
 --- FCC 15.247 2400MHz Avg

Plot 10 LOW CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
5000.000	47.13	---	94.00	46.87	500.0	1000.0	178.0	H	73.0	-2.2	
5000.000	---	40.11	54.00	13.89	500.0	1000.0	178.0	H	73.0	-2.2	
7236.750	50.92	---	94.00	43.08	500.0	1000.0	117.0	V	274.0	2.3	
7236.750	---	45.06	54.00	8.94	500.0	1000.0	117.0	V	274.0	2.3	

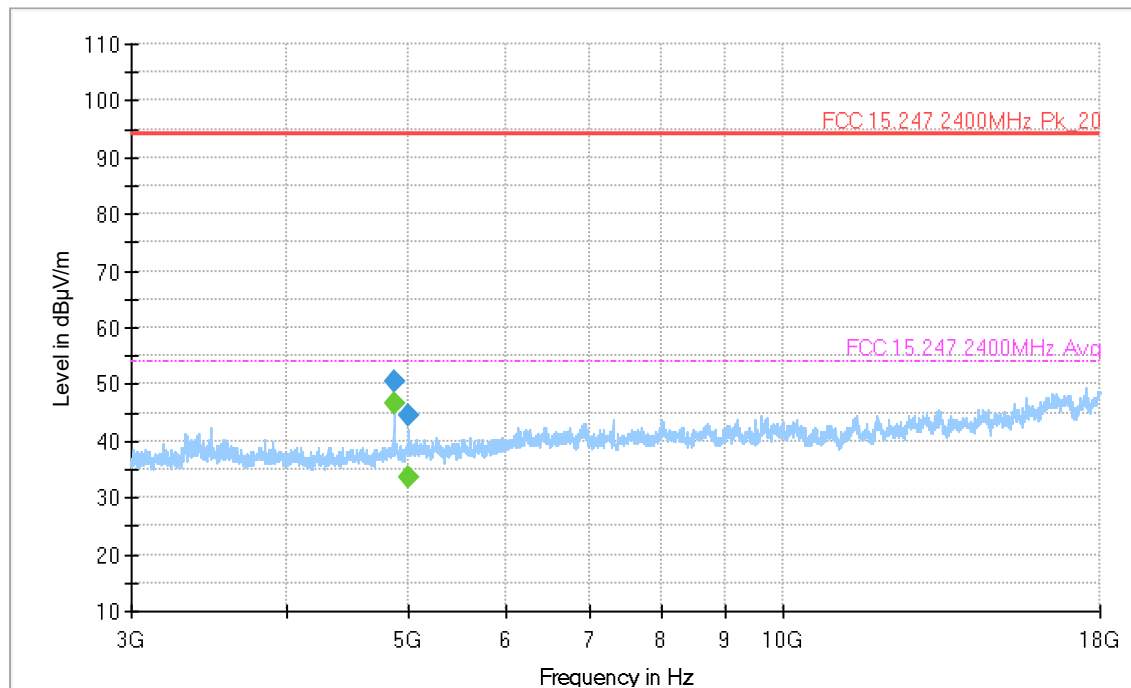


— Preview Result 1-PK+
--- FCC 15.247 2400MHz Avg
◆ Final_Result CAV
— FCC 15.247 2400MHz Pk_20
◆ Final_Result PK+

Plot 11 MID CH

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
4874.000	50.49	---	94.00	43.51	500.0	1000.0	191.0	V	264.0	-2.1	
4874.000	---	46.76	54.00	7.24	500.0	1000.0	191.0	V	264.0	-2.1	
4999.750	44.33	---	94.00	49.67	500.0	1000.0	103.0	H	74.0	-2.2	
4999.750	---	33.61	54.00	20.39	500.0	1000.0	103.0	H	74.0	-2.2	

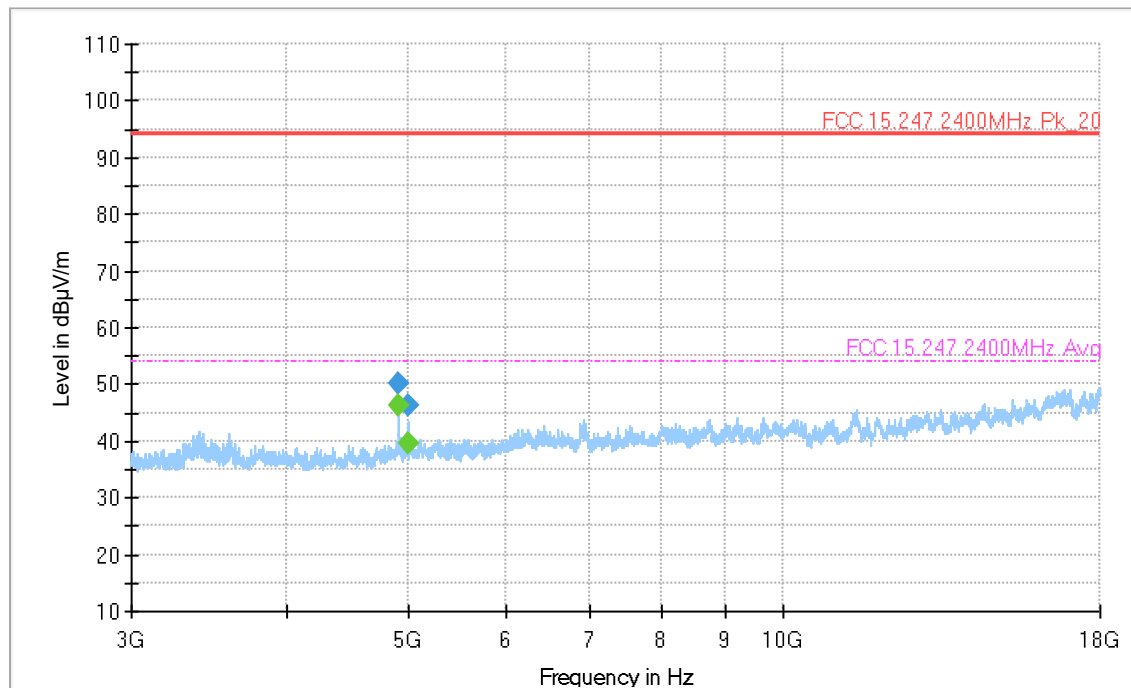


— Preview Result 1-PK+
--- FCC 15.247 2400MHz Avg
◆ Final Result CAV
— FCC 15.247 2400MHz Pk_20
◆ Final Result PK+

Plot 12 HIGH CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
4924.000	50.05	---	94.00	43.95	500.0	1000.0	102.0	H	96.0	-1.8	
4924.000	---	46.26	54.00	7.74	500.0	1000.0	102.0	H	96.0	-1.8	
5000.000	46.43	---	94.00	47.57	500.0	1000.0	155.0	H	87.0	-2.2	
5000.000	---	39.63	54.00	14.37	500.0	1000.0	155.0	H	87.0	-2.2	

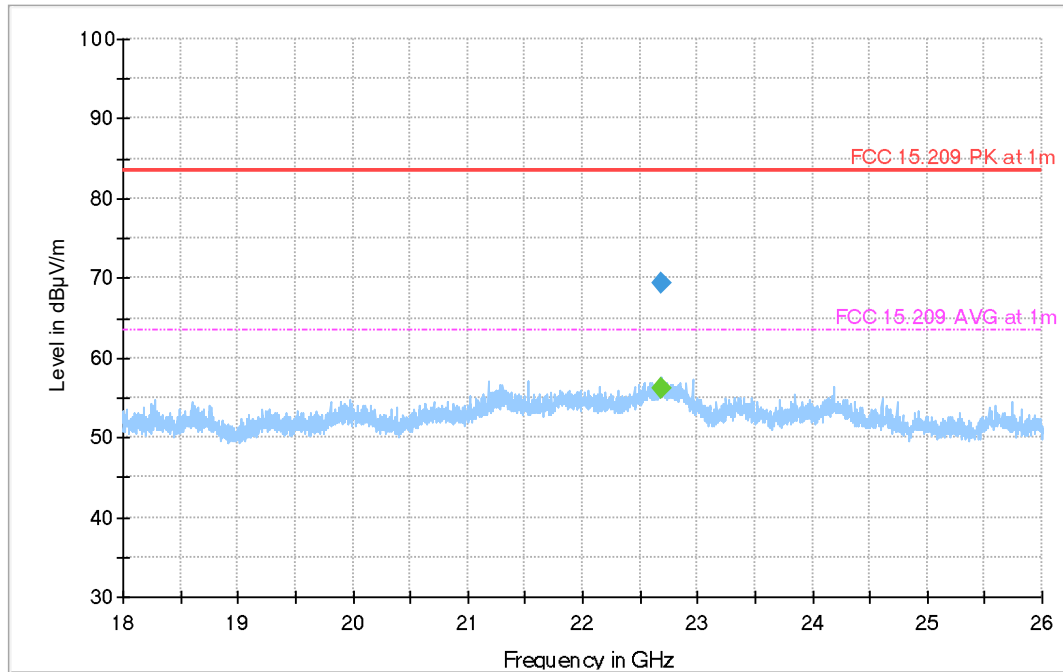


— Preview Result 1-PK+
--- FCC 15.247 2400MHz Avg
◆ Final_Result CAV
— FCC 15.247 2400MHz Pk_20
◆ Final_Result PK+

Plot 13 LOW CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
22690.000	---	56.173	63.50	7.33	500.0	1000.0	100.0	H	145.0	21.1	9.8	0.0	11.4	35.0
22690.000	69.250	---	83.50	14.25	500.0	1000.0	100.0	H	145.0	21.1	9.8	0.0	11.4	48.1

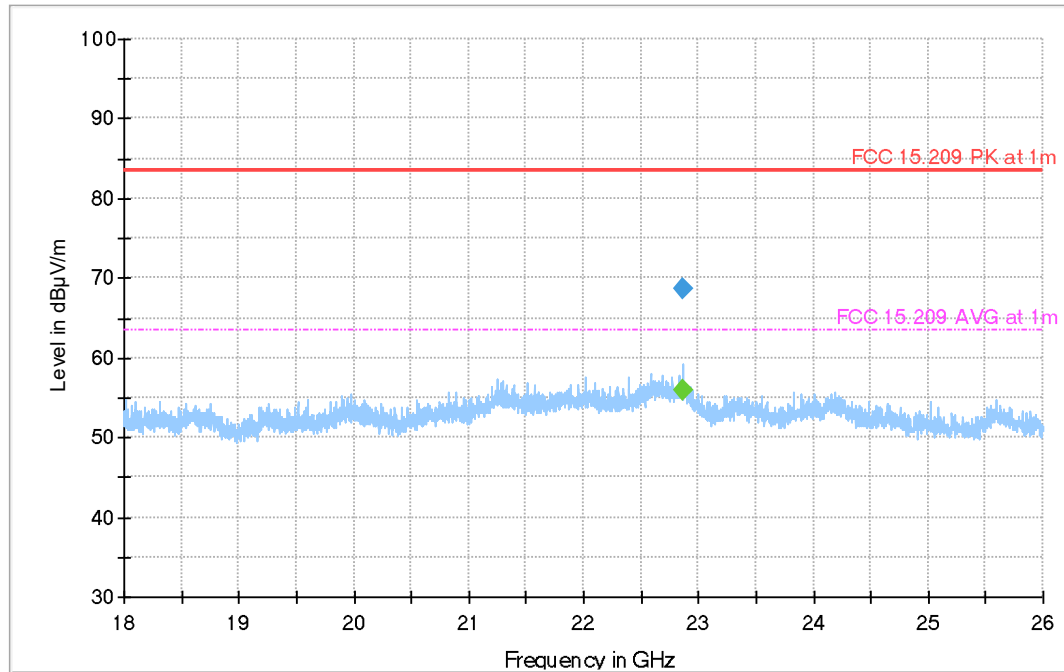


— AVG_MAXH
--- FCC 15.209 AVG at 1m
 ◆ PK+_MAXH
◆ Final_Result PK+
 — FCC 15.209 PK at 1m
◆ Final_Result CAV

Plot 14 MID CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
22861.500	---	55.895	63.50	7.61	500.0	1000.0	132.0	H	43.0	20.7	9.7	0.0	10.9	35.2
22861.500	68.669	---	83.50	14.83	500.0	1000.0	132.0	H	43.0	20.7	9.7	0.0	10.9	48.0

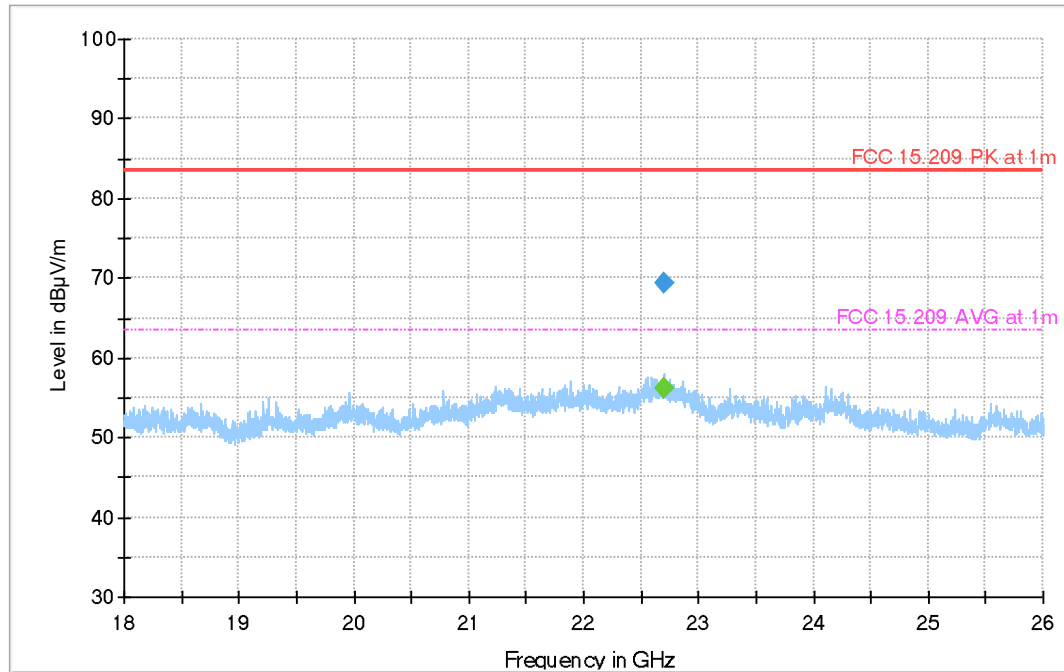


— AVG_MAXH
--- FCC 15.209 AVG at 1m
 ◆ PK+_MAXH
 Final_Result PK+
 — FCC 15.209 PK at 1m
◆ Final_Result CAV

Plot 15 HIGH CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
22695.250	---	56.182	63.50	7.32	500.0	1000.0	100.0	H	67.0	21.1	9.8	0.0	11.4	35.1
22695.250	69.246	---	83.50	14.25	500.0	1000.0	100.0	H	67.0	21.1	9.8	0.0	11.4	48.1



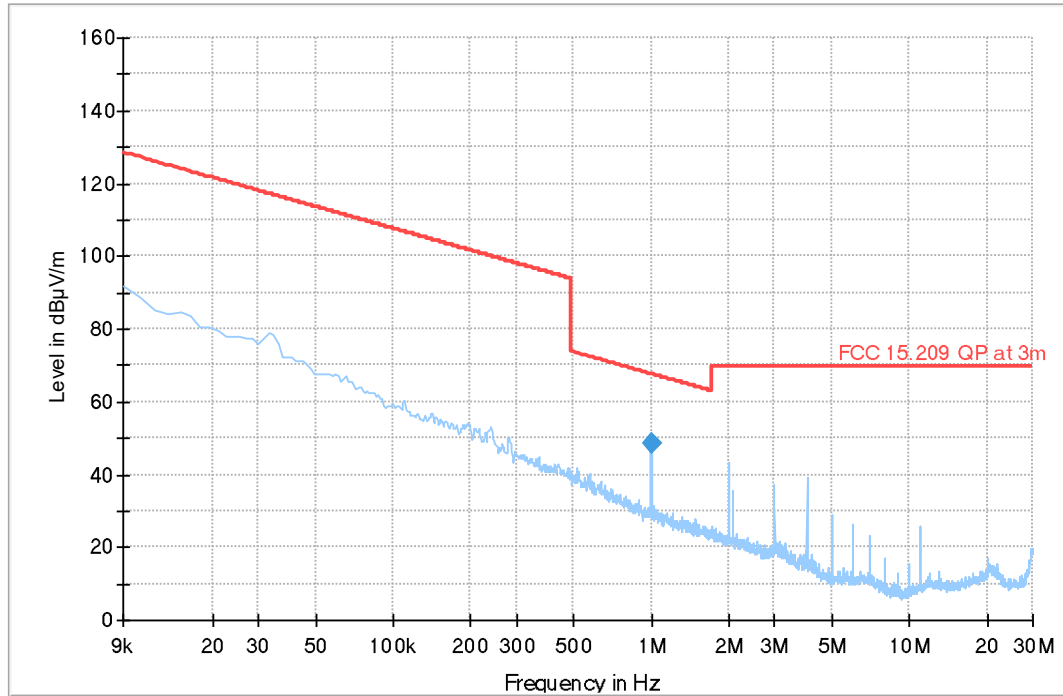
— AVG_MAXH
--- FCC 15.209 AVG at 1m
 ◆ PK+_MAXH
 Final_Result PK+
 — FCC 15.209 PK at 1m
◆ Final_Result CAV

8.2.5.2 Module WAN

Plot 16 LOW CH

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
1.000	48.453	67.62	19.17	500.0	9.0	100.0	V	57.0	17.9	0.2	-28.7	46.4	30.5

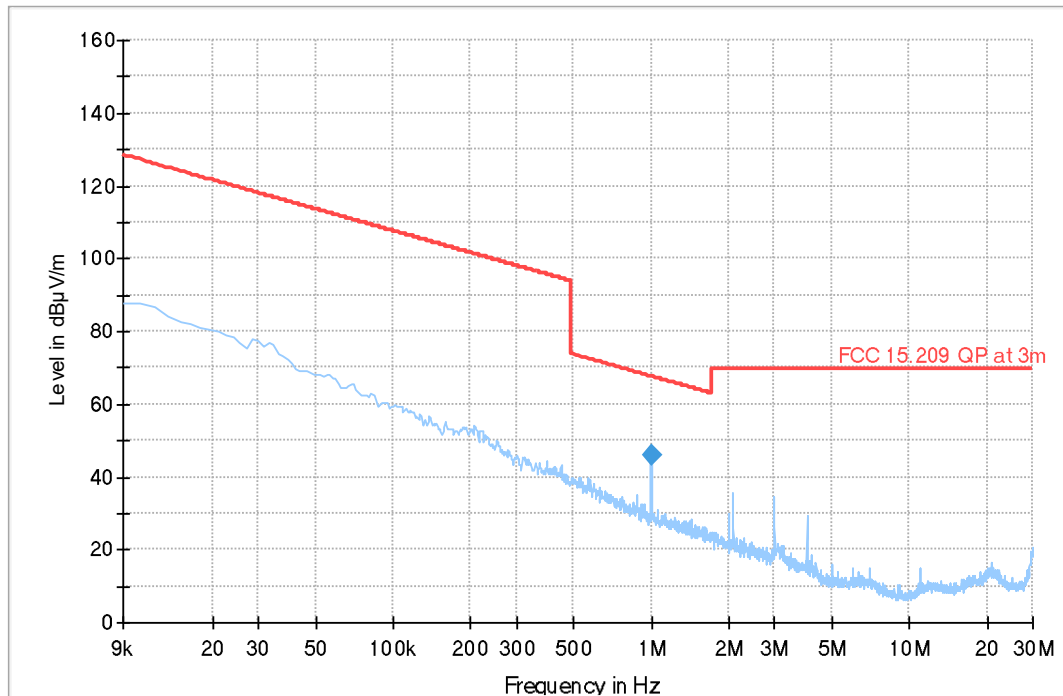


— AVG_MAXH — PK+_MAXH — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot 17 MID CH

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
1.000	46.131	67.62	21.49	500.0	9.0	100.0	H	347.0	17.9	0.2	-28.7	46.4	28.2

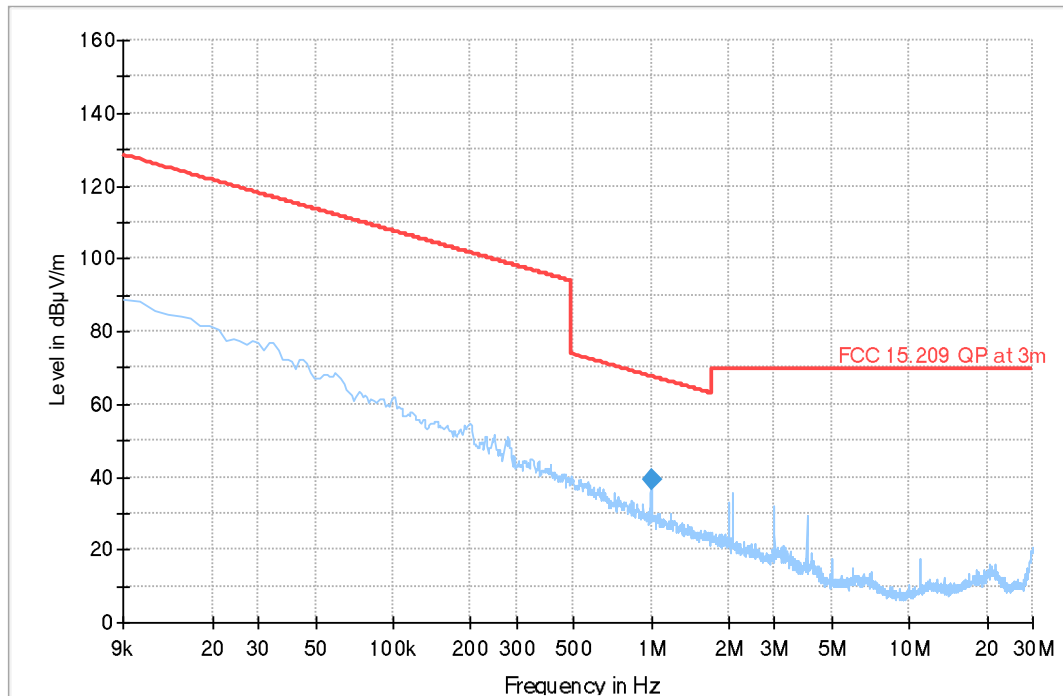


— AVG_MAXH — PK+_MAXH — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot 18 HIGH CH

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
1.000	39.116	67.62	28.51	500.0	9.0	100.0	H	46.0	17.9	0.2	-28.7	46.4	21.2

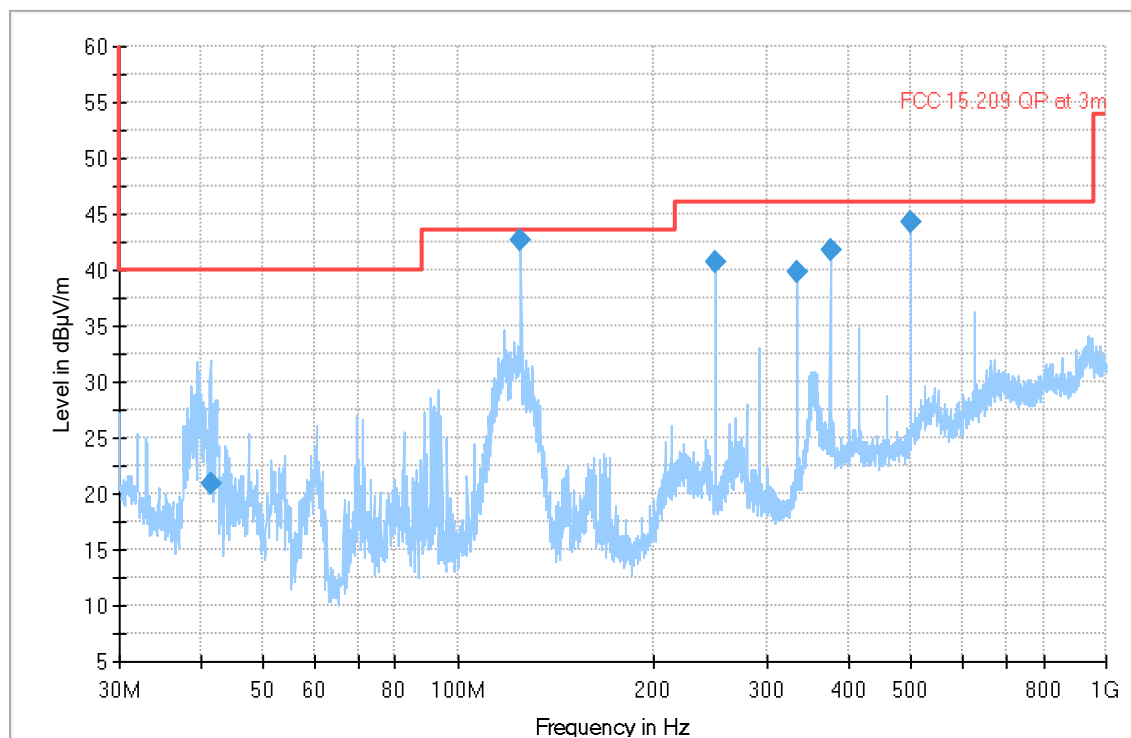


— AVG_MAXH — PK+_MAXH — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot 19 LOW CH

Final_Result

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
41.446	20.96	---	40.00	19.04	500.0	120.0	115.0	V	174.0	-18.7	
124.987	42.66	---	43.50	0.84	500.0	120.0	152.0	H	57.0	-20.4	
249.996	40.69	---	46.02	5.33	500.0	120.0	100.0	H	100.0	-15.2	
333.343	39.79	---	46.02	6.23	500.0	120.0	111.0	H	218.0	-13.2	
375.005	41.75	---	46.02	4.27	500.0	120.0	143.0	H	276.0	-10.9	
500.038	44.26	---	46.02	1.76	500.0	120.0	135.0	H	148.0	-7.8	

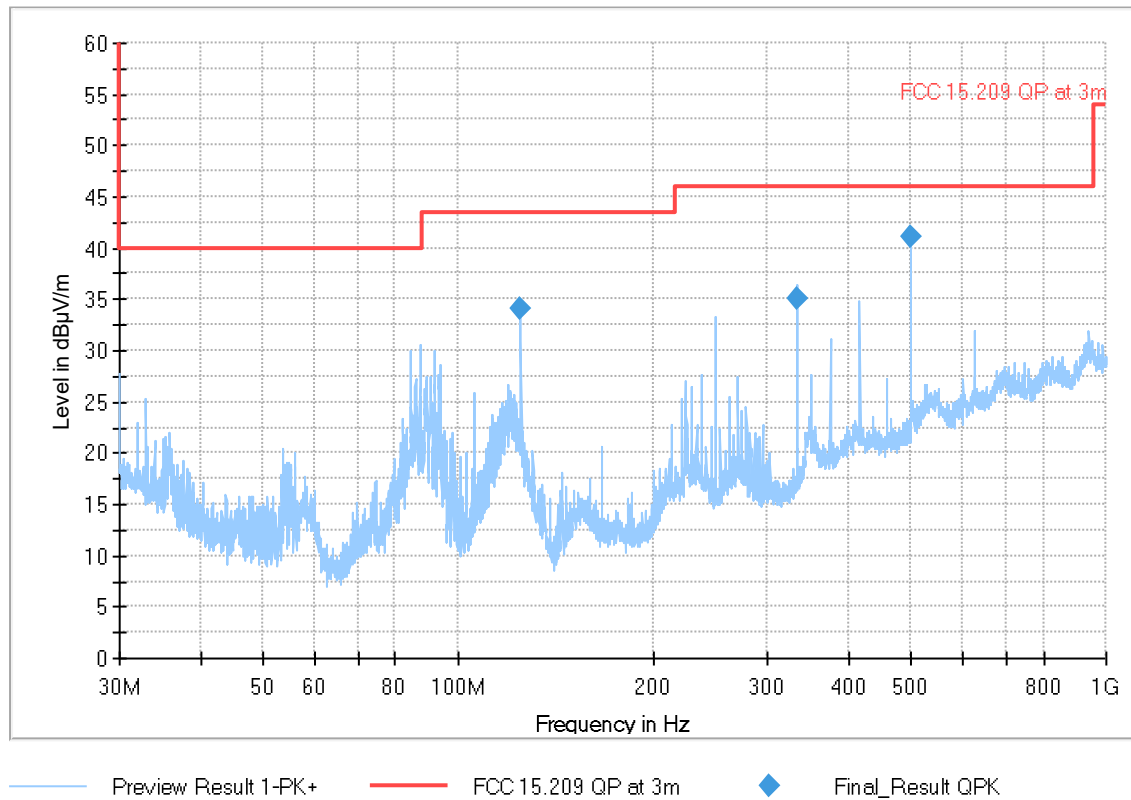


— Preview Result 1-PK+ — FCC 15.209 QP at 3m ◆ Final_Result QPK

Plot 20 MID CH

Final_Result

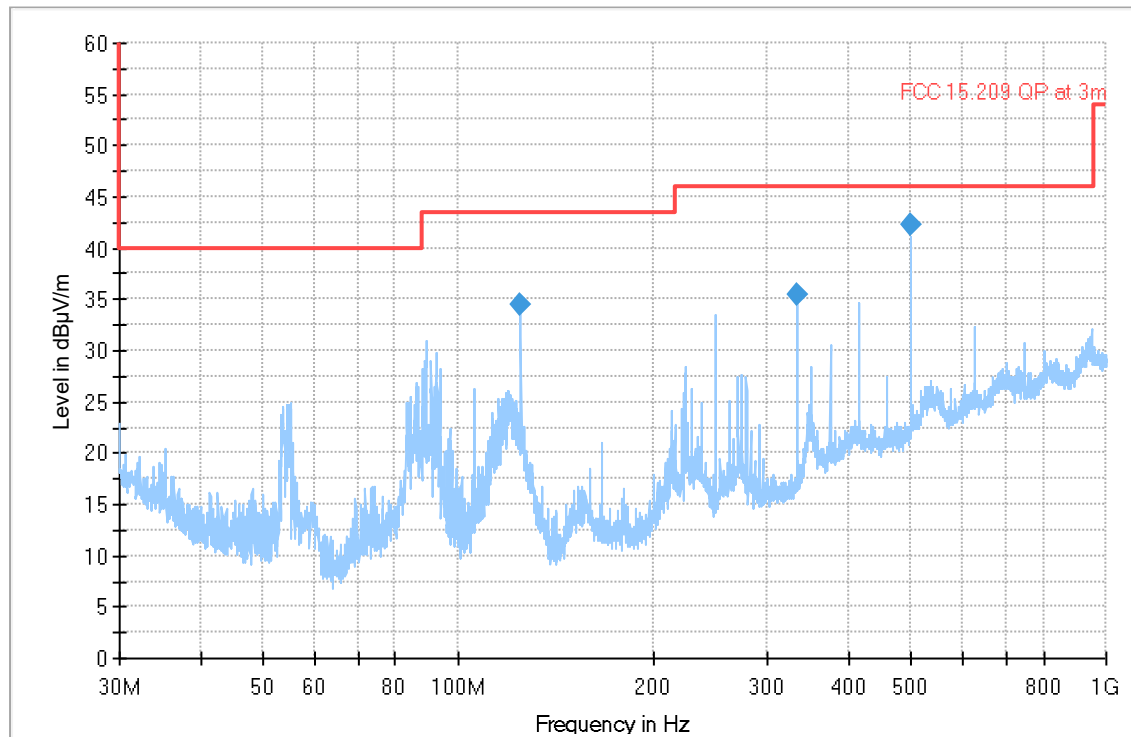
Frequency (MHz)	QuasiPeak (dBμV/m)	DET 2 (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
124.995	34.04	---	43.50	9.46	500.0	120.0	100.0	V	-12.0	-20.4	
333.319	35.04	---	46.02	10.98	500.0	120.0	100.0	V	118.0	-13.2	
499.997	41.03	---	46.02	4.99	500.0	120.0	100.0	V	113.0	-7.8	



Plot 21 HIGH CH

Final_Result

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
124.995	34.55	---	43.50	8.95	500.0	120.0	107.0	V	358.0	-20.4	
333.319	35.50	---	46.02	10.52	500.0	120.0	100.0	V	116.0	-13.2	
500.030	42.33	---	46.02	3.69	500.0	120.0	155.0	V	87.0	-7.8	

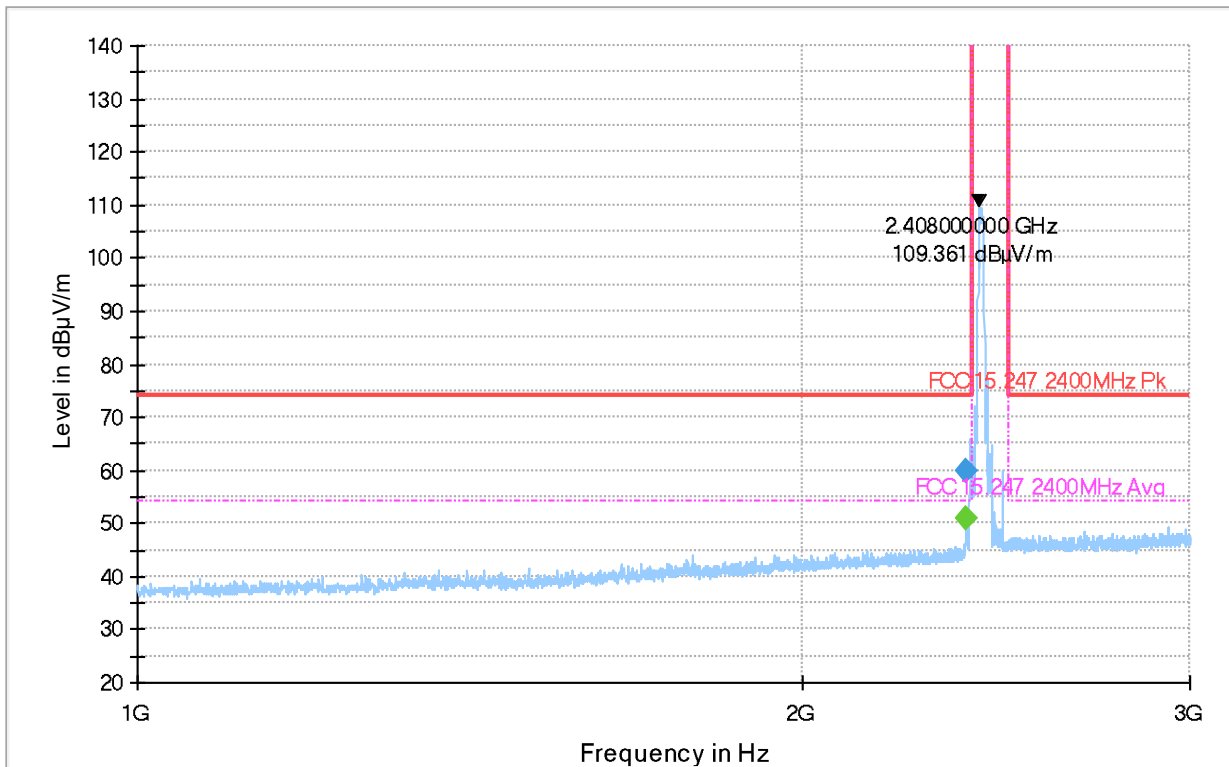


— Preview Result 1-PK+
 — FCC 15.209 QP at 3m
 ◆ Final_Result QPK

Plot 22 LOW CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
2376.500	---	50.85	54.00	3.15	500.0	1000.0	238.0	H	335.0	33.0	
2376.500	60.00	---	74.00	14.00	500.0	1000.0	238.0	H	335.0	33.0	

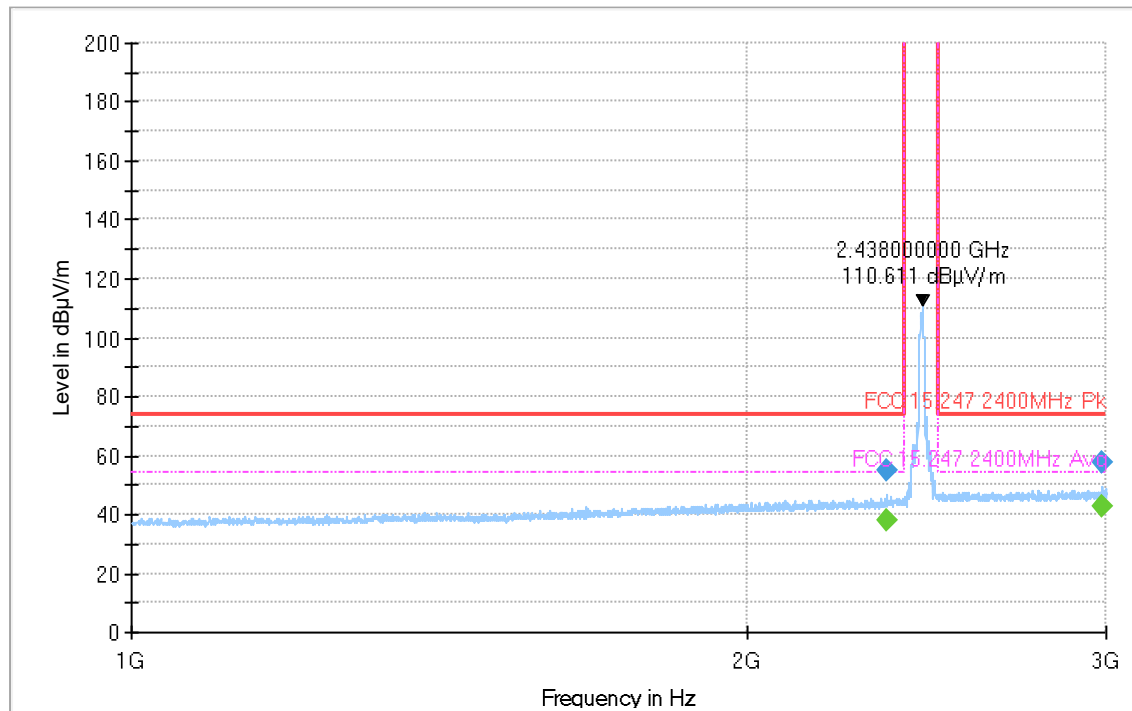


◆ Preview Result 1-PK+ Final_Result PK+
 ◆ FCC 15.247 2400MHz Pk Final_Result CAV
 --- FCC 15.247 2400MHz Avg

Plot 23 MID CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
2344.500	54.89	---	74.00	19.11	500.0	1000.0	141.0	V	221.0	33.5	
2344.500	---	37.78	54.00	16.22	500.0	1000.0	141.0	V	221.0	33.5	
2988.500	57.77	---	74.00	16.23	500.0	1000.0	325.0	V	97.0	36.1	
2988.500	---	42.82	54.00	11.18	500.0	1000.0	325.0	V	97.0	36.1	

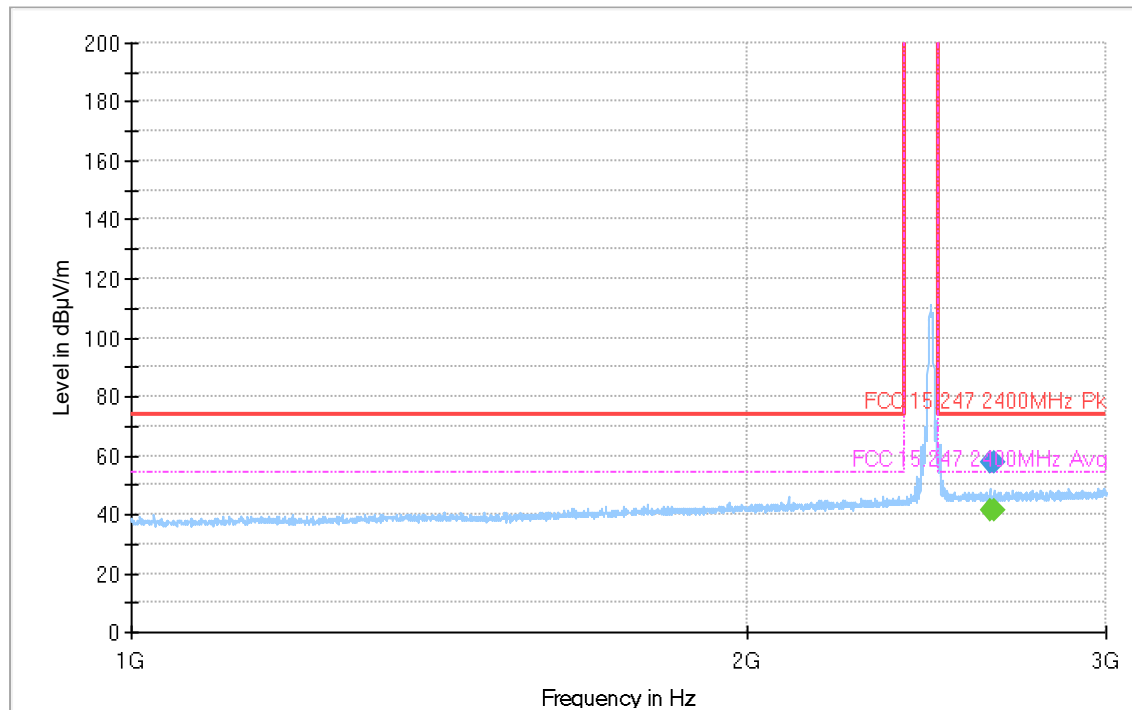


 Preview Result 1-PK+
 Final_Result PK+
  FCC 15.247 2400MHz Pk
 Final_Result CAV
  FCC 15.247 2400MHz Avg

Plot 24 HIGH CH

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth (Hz)	Height	Pol	Azimuth	Corr. (dB/m)	Comment
2631.000	---	41.33	54.00	12.67	500.0	1000.0	201.0	V	91.0	35.0	
2631.000	57.31	---	74.00	16.69	500.0	1000.0	201.0	V	91.0	35.0	
2647.500	---	41.54	54.00	12.46	500.0	1000.0	320.0	V	261.0	35.2	
2647.500	57.43	---	74.00	16.57	500.0	1000.0	320.0	V	261.0	35.2	

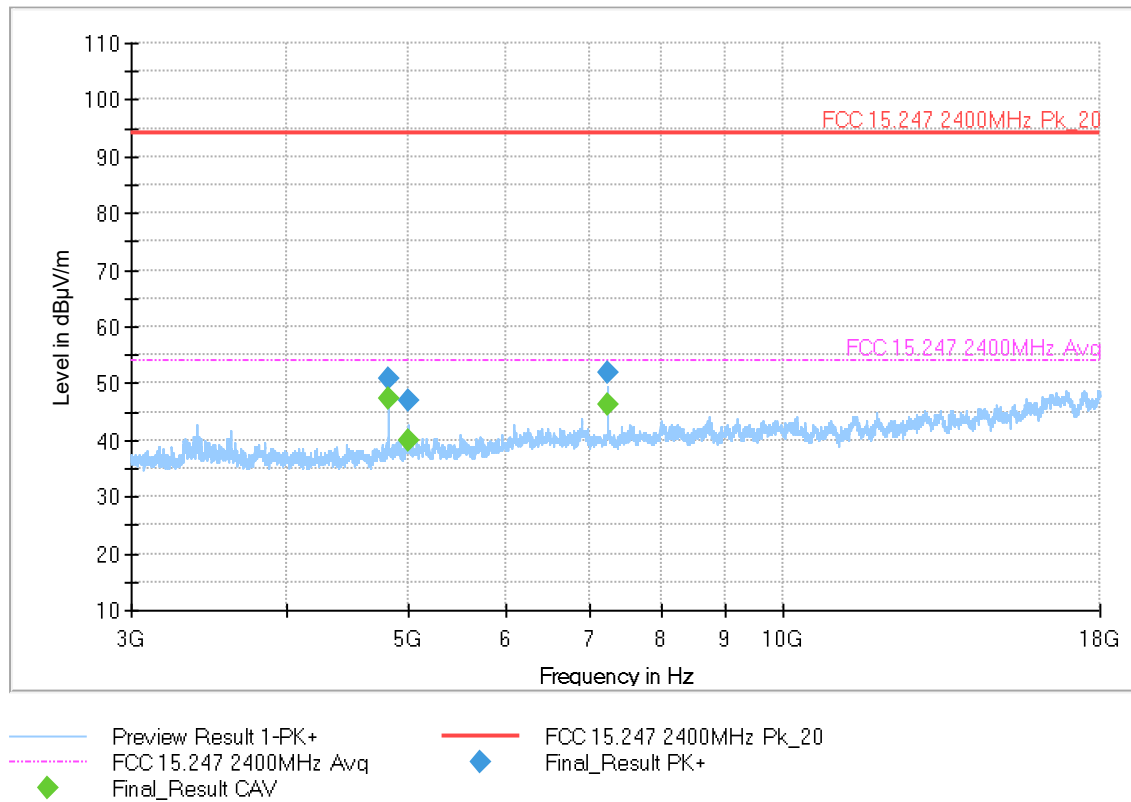


◆ Preview Result 1-PK+ Final_Result PK+
 ◆ FCC 15.247 2400MHz Pk Final_Result CAV
 ◆ FCC 15.247 2400MHz Avg

Plot 25_LOW CH

Final Result

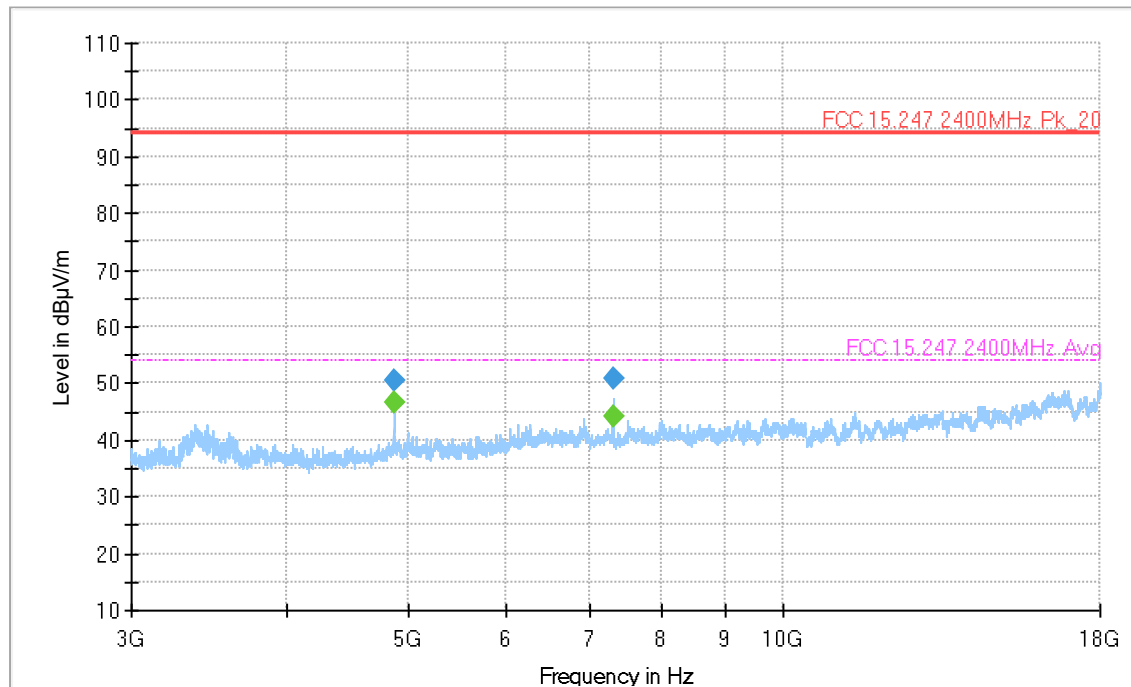
Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
4824.000	50.79	---	94.00	43.21	500.0	1000.0	204.0	H	180.0	-1.9	
4824.000	---	47.29	54.00	6.71	500.0	1000.0	204.0	H	180.0	-1.9	
4999.750	---	40.00	54.00	14.00	500.0	1000.0	172.0	H	77.0	-2.2	
4999.750	47.15	---	94.00	46.85	500.0	1000.0	172.0	H	77.0	-2.2	
7234.000	51.89	---	94.00	42.11	500.0	1000.0	153.0	H	180.0	2.4	
7234.000	---	46.13	54.00	7.87	500.0	1000.0	153.0	H	180.0	2.4	



Plot 26_MID CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
4874.000	50.42	---	94.00	43.58	500.0	1000.0	147.0	H	12.0	-2.1	
4874.000	---	46.74	54.00	7.26	500.0	1000.0	147.0	H	12.0	-2.1	
7310.000	50.71	---	94.00	43.29	500.0	1000.0	159.0	H	350.0	1.3	
7310.000	---	44.29	54.00	9.71	500.0	1000.0	159.0	H	350.0	1.3	



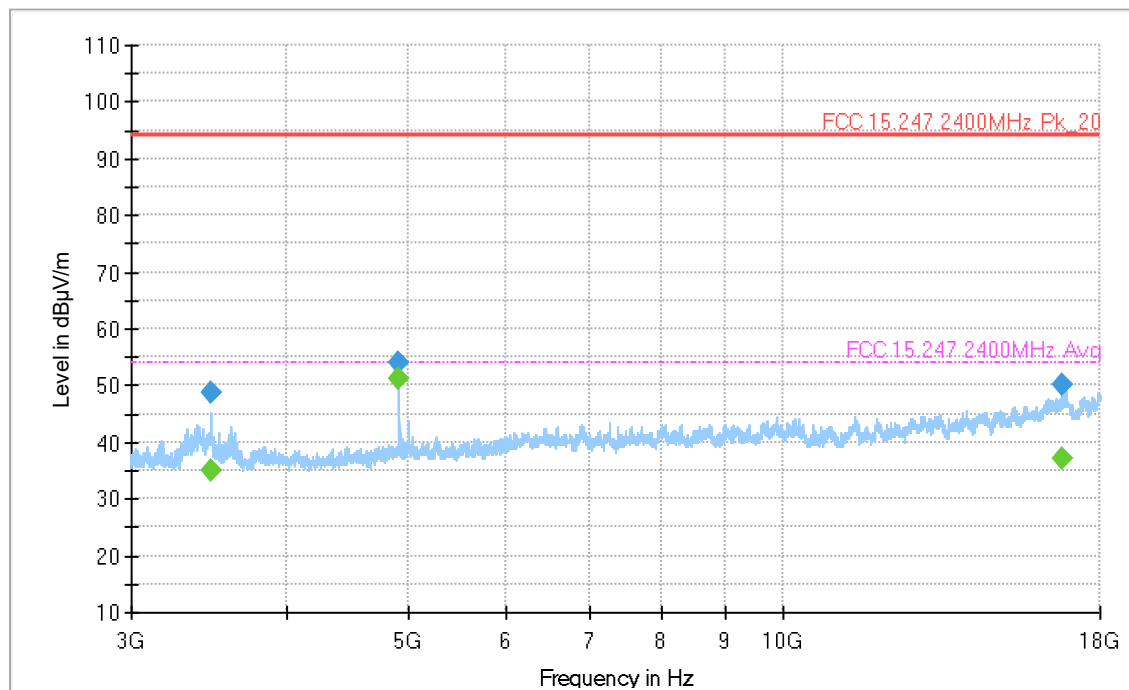
— Preview Result 1-PK+
--- FCC 15.247 2400MHz Avg
◆ Final_Result CAV

— FCC 15.247 2400MHz Pk_20
◆ Final_Result PK+

Plot 27_HIGH CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Meas. Time (ms)	Bandwidth	Height	Pol	Azimuth	Corr. (dB/m)	Comment
3476.000	---	34.95	54.00	19.05	500.0	1000.0	106.0	V	192.0	-5.8	
3476.000	48.59	---	94.00	45.41	500.0	1000.0	106.0	V	192.0	-5.8	
4924.000	53.85	---	94.00	40.15	500.0	1000.0	167.0	H	355.0	-1.8	
4924.000	---	51.26	54.00	2.74	500.0	1000.0	167.0	H	355.0	-1.8	
16804.750	50.32	---	94.00	43.68	500.0	1000.0	212.0	V	180.0	14.0	
16804.750	---	37.21	54.00	16.79	500.0	1000.0	212.0	V	180.0	14.0	



— Preview Result 1-PK+
— FCC 15.247 2400MHz Avg
— FCC 15.247 2400MHz Pk_20
◆ Final_Result PK+
◆ Final_Result CAV

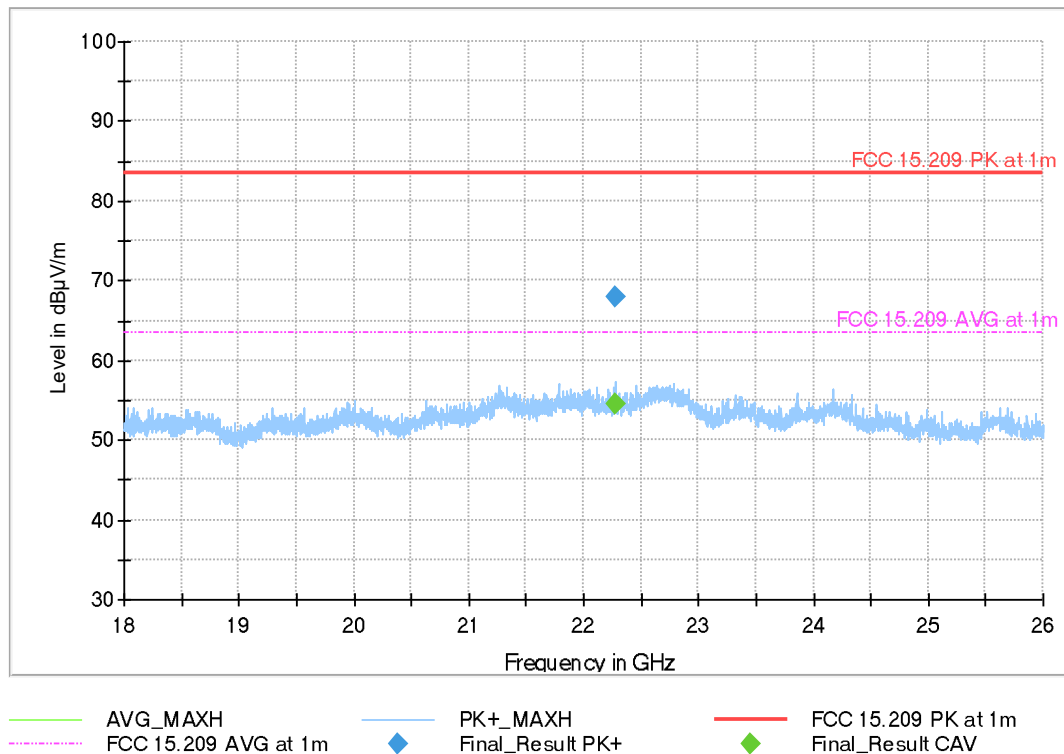
Plot 28 LOW CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
22275.750	---	54.398	63.50	9.10	500.0	1000.0	306.0	V	9.0	19.2	9.9	0.0	9.4
22275.750	67.845	---	83.50	15.65	500.0	1000.0	306.0	V	9.0	19.2	9.9	0.0	9.4

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
22275.750	35.2
22275.750	48.6



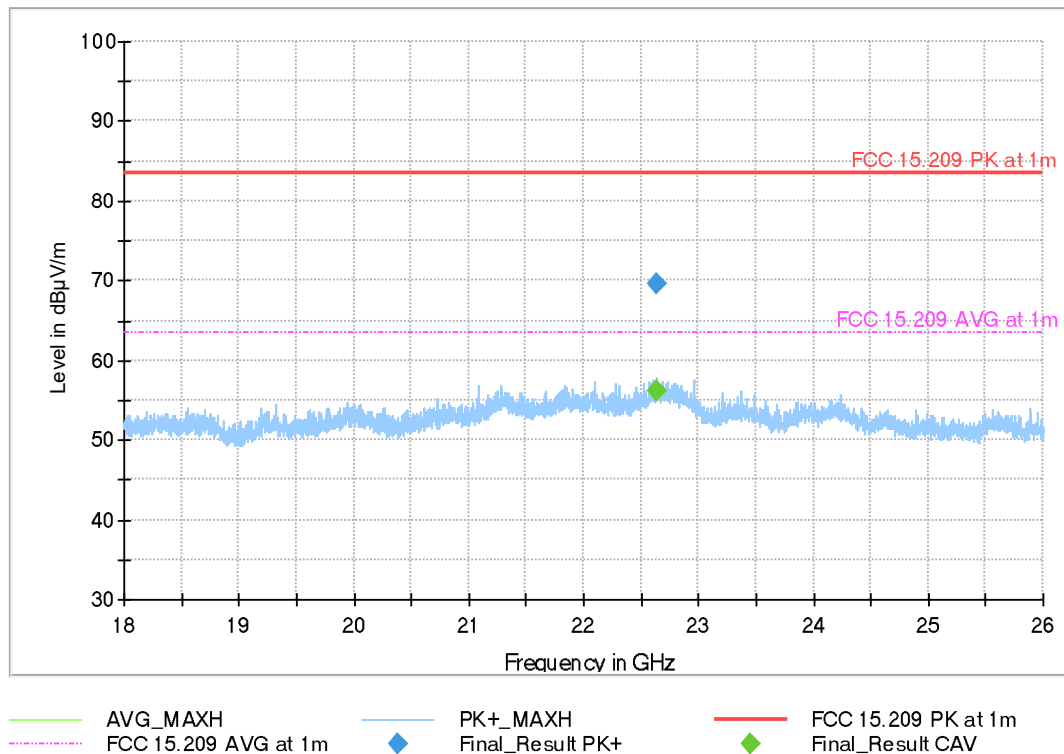
Plot 29 MID CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
22643.500	---	56.124	63.50	7.38	500.0	1000.0	190.0	V	235.0	21.0	9.8	0.0	11.2
22643.500	69.650	---	83.50	13.85	500.0	1000.0	190.0	V	235.0	21.0	9.8	0.0	11.2

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
22643.500	35.1
22643.500	48.6



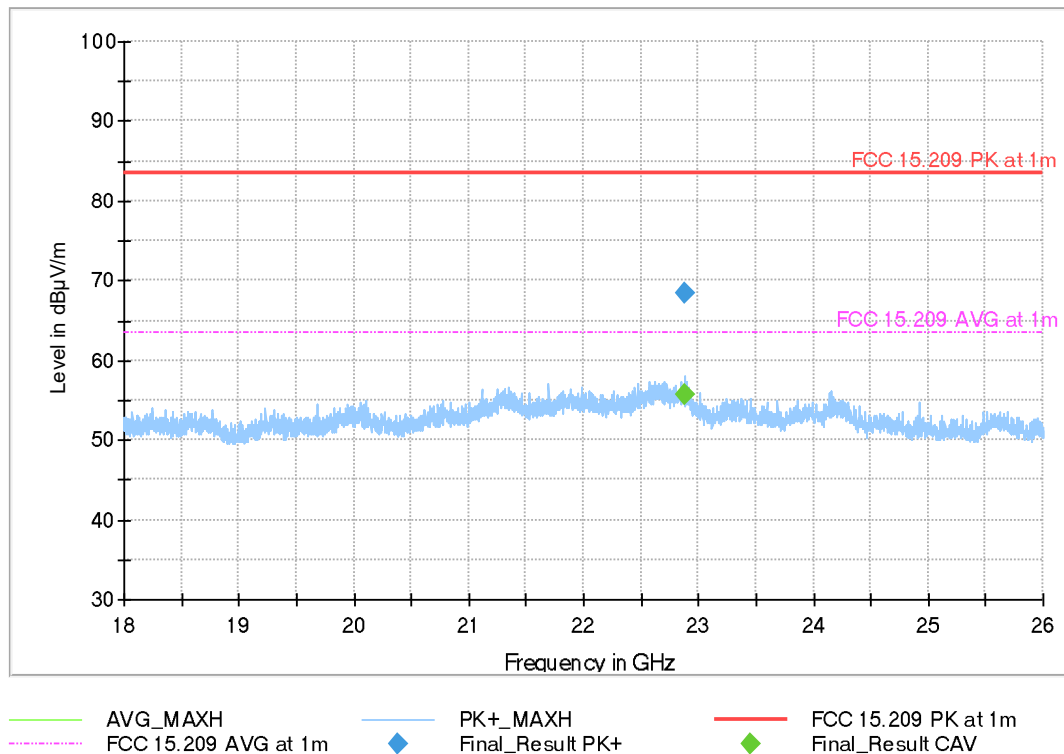
Plot 30 HIGH CH

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
22877.500	---	55.804	63.50	7.70	500.0	1000.0	100.0	V	168.0	20.6	9.7	0.0	10.9
22877.500	68.345	---	83.50	15.16	500.0	1000.0	100.0	V	168.0	20.6	9.7	0.0	10.9

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)
22877.500	35.2
22877.500	47.7



9 Test setup photos

Setup photos are included in supporting file name: "EMC_ASTRO_072_25001_FCC15.247_DTS_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

EMC Lab 1

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
PASSIVE LOOP ANTENNA	ETS LINDGREN	6512	00049838	3 Years	09/18/2025
BILOG ANTENNA	ETS.LINDGREN	3142E	00166067	3 Years	08/01/2024
HORN ANTENNA	EMCO	3115	00035114	3 Years	09/17/2025
HORN ANTENNA	ETS.LINDGREN	3117	00215984	3 Years	09/22/2025
HORN ANTENNA	ETS LINDGREN	3116C-PA	00166821	3 Years	09/04/2025
TEST RECEIVER	R&S	ESW44	103143	2 Years	09/12/2024
Signal Analyzer	R&S	FSV40	101022	3 Years	09/30/2025
DIGITAL THERMOMETER	CONTROL COMPANY	4410,90080-03	230713059	3 Years	10/18/2023
PULSE LIMITER	R&S	ESH3-Z2	102473	3 Years	09/08/2025
LISN	FCC	FCC-LISN-50-25-2-08	08014	2 Years	09/08/2025
Multimeter	Fluke	115	56090717MV	3 Years	09/25/2025
Software	EMC32	Version 11.40.00	-	-	-

EMC Lab 2

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.

11 Revision History

Date	Report name	Changes to report	Prepared by
2025-10-30	EMC_ASTRO_072_25001_FCC15.247_DTS	Initial version	Guangcheng Huang
2025-12-03	EMC_ASTRO_072_25001_FCC15.247_DTS_Rev1	Section 3.1: Updated Table. Section 8.1.4: Updated calculation of conducted power.	Guangcheng Huang
2026-01-26	EMC_ASTRO_072_25001_FCC15.247_DTS_Rev2	Section 3.1: Updated Table.	Guangcheng Huang

<<< The End >>>