



FCC / ISED Test Report

For:
Garmin International

Brand:
Garmin

Marketing Name:
M/N A04674

Model Number:
A04674

Product Description:
Portable device with BLE, ANT, and LTE

FCC ID: IPH-04674 contains FCC ID: HSW-TY1SC
IC: 1792A-04674 contains IC: 4492A-TY1SC

Applied Rules and Standards:
47 CFR Part 15.249
RSS-210 Issue 10 & RSS-Gen Issue 5

REPORT #: EMC_GARMI_117_24001_15_249_ANT_Rev1

DATE: 2024-05-31



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 15.249 of Title 47 of the Code of Federal Regulations and the relevant ISED Canada standard RSS-210.

No deviations were ascertained.

Company	Description	Model #
Garmin International	Portable device with BLE, ANT, and LTE	A04674

Responsible for the Report:

2024-05-31	Compliance	Art Thammanavarat (Senior EMC Engineer)	
Date	Section	Name	Signature

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
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Issa Ghama
Responsible Project Leader:	Sangeetha Sivaraman

2.2 Identification of the Client

Applicant's Name:	Garmin International Inc
Street Address:	1200 E. 151st. Street
City/Zip Code	Olathe, KS 66062
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Garmin Corporation
Manufacturers Address:	No.68, Zhangshu 2nd Rd., Xizhi Dist.
City/Zip Code	New Taipei City 221
Country	Taiwan, R.O.C.

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Product Description:	Portable device with BLE, ANT, and LTE
Model Name :	A04674
HW Version :	1
SW Version :	2.09
FCC-ID :	IPH-04674 contains FCC ID: HSW-TY1SC
IC:	1792A-04674 contains IC: 4492A-TY1SC
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Center to center: 2402 MHz (ch 2) – 2480 MHz (ch 80), 79 channels
Bands/Modes Supported	<u>ANT+ Transceivers</u> Model Name : Nordic Model Number : nRF52832 <u>Wireless Technologies</u> ANT+
Modulation:	GFSK
Antenna Information as declared:	Antenna type: Planar inverted F (PIFA, chip) Antenna brand: Unictron Technologies Corporation Antenna model: H2U34WGTQW0100 Antenna gain: 2.0 dBi peak @ 2402-2480 MHz Antenna impedance: 50 ohms
Max. Peak Output Power:	Conducted Power 2.8dBm
Other Radios included in the device	LTE, BLE
Power Supply/ Rated Operating Voltage Range	4.5 – 5.5 Vdc Rechargeable Lithium-Ion, Garmin PN: 361-00160-00.0
Operating Temperature Range	From -20° to 60°C (from -4° to 140°F)
Sample Revision	☒ Production ☐ Pre-Production
EUT Diameter	☒ < 60 cm ☐ Other _____
Note: The information of the EUT specifications in the table above is provided by the client.	

3.2 EUT Sample details

EUT #	Model Number	HW Version	SW Version	Notes/Comments
1	A04674	1	2.09	N/A

3.3 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number	Comments
1	Laptop	P135G	Dell	12243628947	Support laptop provided by Cetecom to exercise device.

3.4 Test Sample Configuration

EUT Set-up #	Combination of AE used for test set up	Comments
1	EUT#1 + AE#1	The radio of the EUT was configured using the “Factory Test” software: • Modulation: ANT Modulate Test • Channel (Fixed): ○ Ch. 2 (Low, 2402 MHz) ○ Ch. 39 (Mid, 2439 MHz) ○ Ch. 79 (High, 2479 MHz) The “Factory Test” software will not available to the end user. The power was controlled through software updated by the client. The latest software was used for the measurements. The internal antenna was connected. The EUT was connected to the AC mains through a USB charger.

3.5 Justification for Worst Case Mode of Operation

During the testing process, the EUT was tested with transmitter sets on low, mid and high channels. 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 15.249 of Title 47 of the Code of Federal Regulations and Radio Standard Specification RSS-210 of ISED Canada.

This test report is to support a request for new equipment authorization under the
FCC ID: IPH-04674 contains FCC ID: HSW-TY1SC
IC: 1792A-04674 contains IC: 4492A-TY1SC

Testing procedures are based on ANSI C63.10 (2013) – “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices” – IEEE Standards Association, Accredited by the American National Standards Institute

5 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	NA	NP	Result
§15.215(c) RSS-Gen 6.7	20 dB Bandwidth; 99% Occupied Bandwidth	Nominal	ANT	■	□	□	Complies
§15.249(a)	General Field Strength Limit	Nominal	ANT	■	□	□	Complies
§15.249(a)(c)(d)(e); §15.209; RSS-210 B.10(b) RSS-Gen 6.13; 8.9	Radiated Transmitter Spurious Emissions	Nominal	ANT	■	□	□	Complies

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

6 Measurement Uncertainty

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

Radiated measurement

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

RF conducted measurement ± 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%

6.2 Dates of Testing:

2024-03-14 – 2024-05-31

6.3 Decision Rule:

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

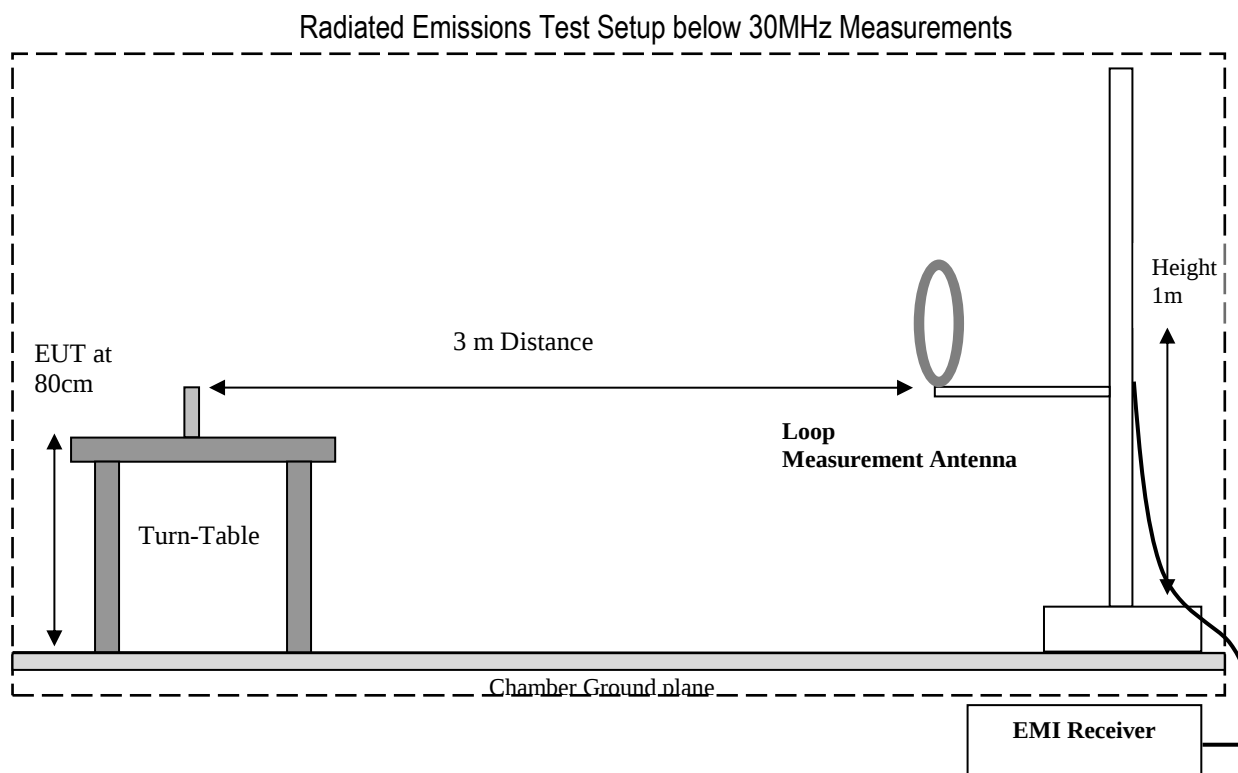
Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3. The measurement uncertainty is mentioned in this test report, See chapter 9, but is not taken into account – neither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

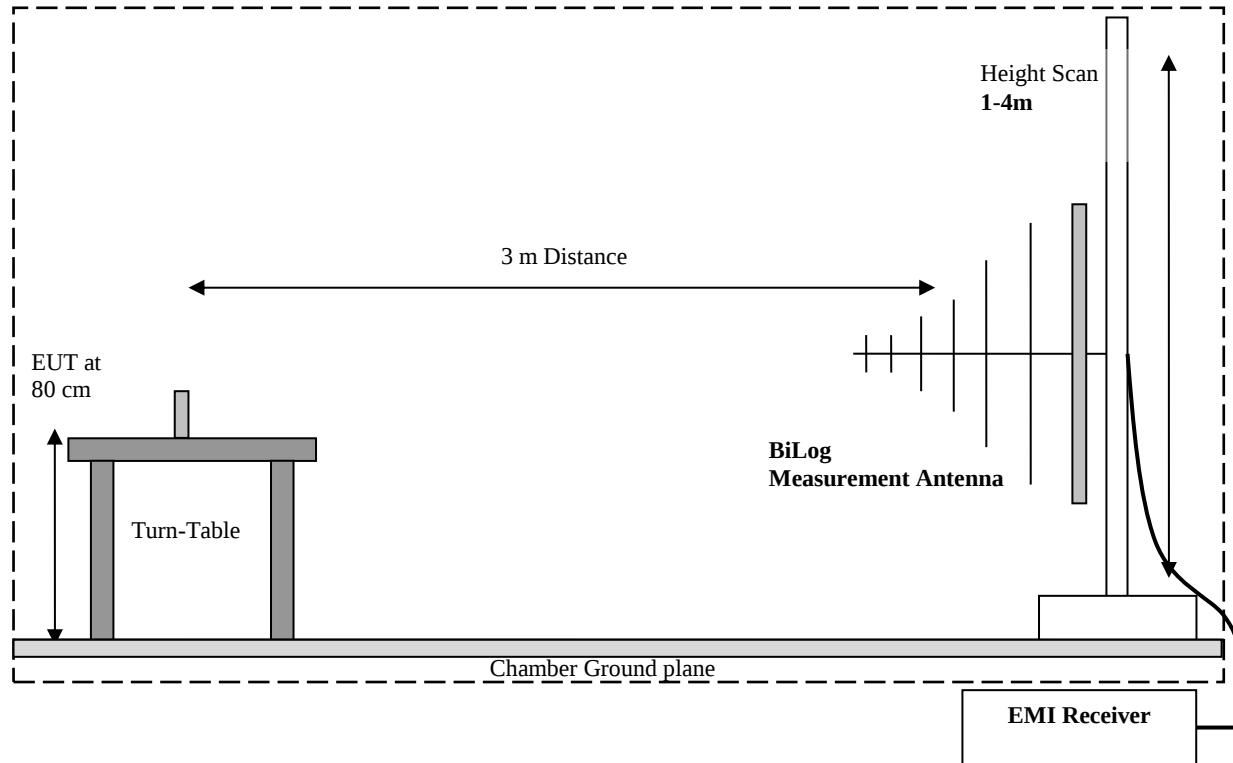
7.1 Radiated Measurement

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

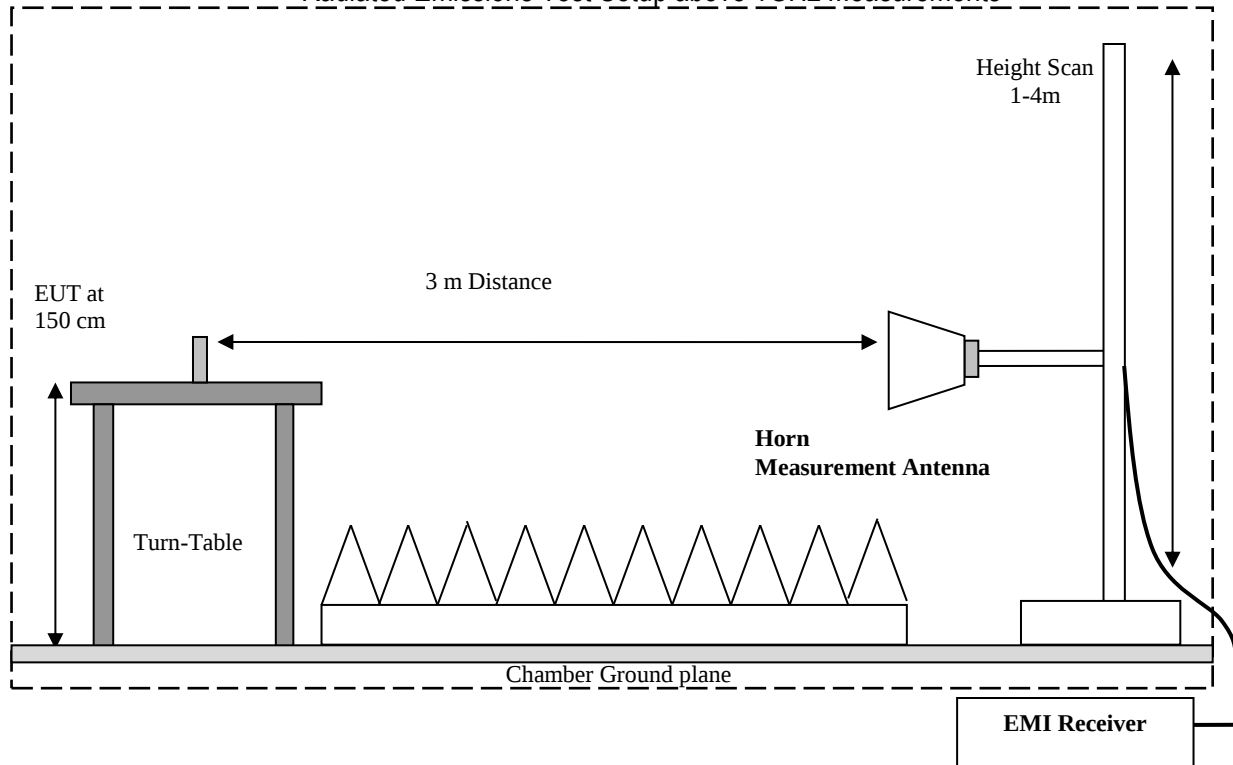
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to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

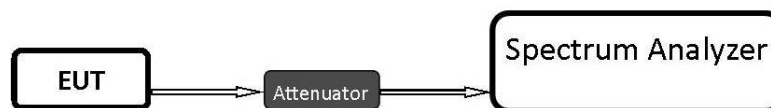
Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

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 ANSI C63.10 (2013) – “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices” – IEEE Standards Association, Accredited by the American National Standards Institute



- 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 General Field Strength Limit

8.1.1 Measurement according to ANSI C63.10 (2020)

Spectrum Analyzer settings:

- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW
- Sweep = Auto couple
- Detector function = Peak
- Trace = Max hold
- Use peak marker function to determine the peak amplitude level

8.1.2 Limits:

FCC §15.249

- (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

- (c) Field strength limits are specified at a distance of 3 meters.

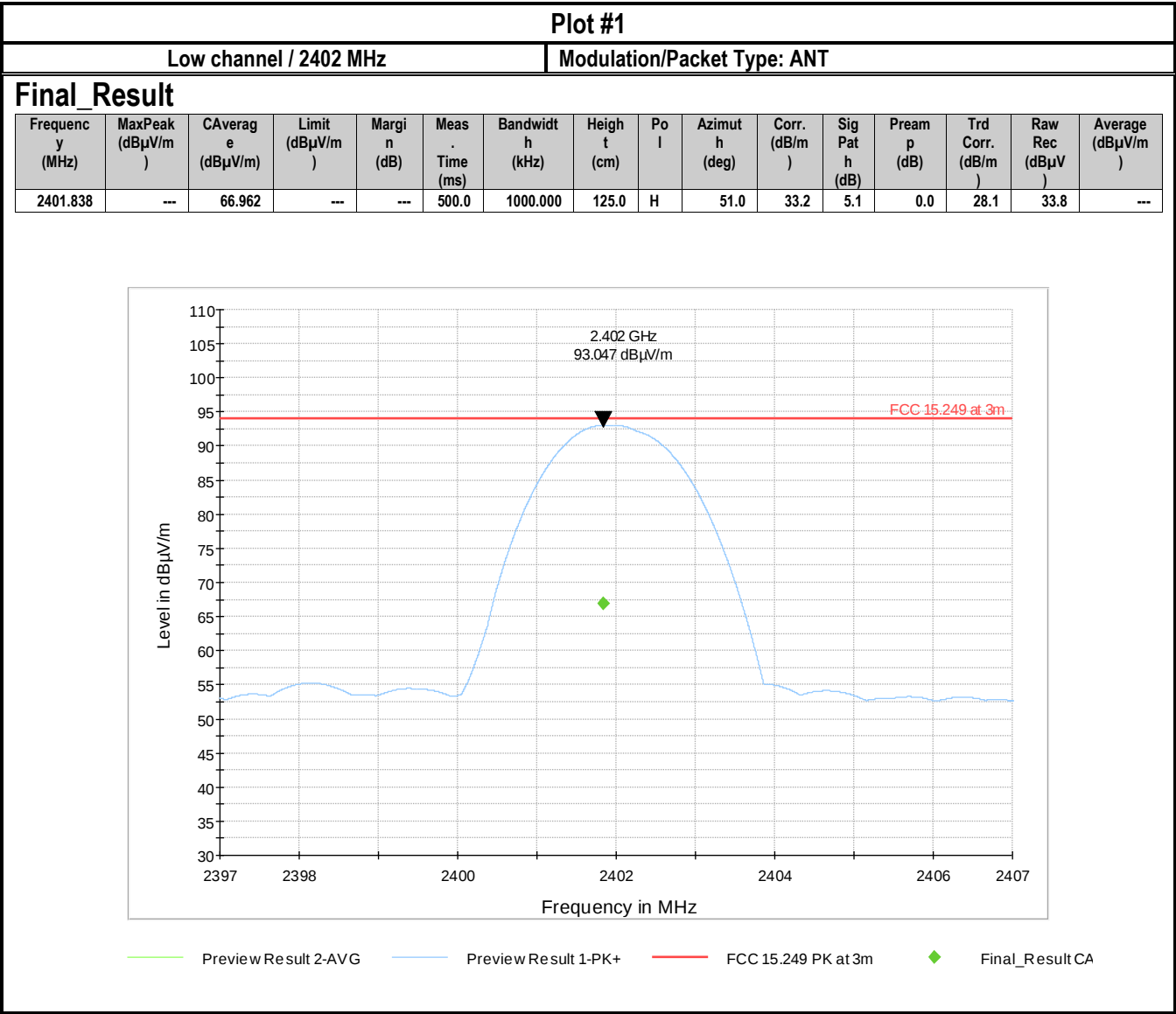
8.1.3 Test conditions and setup:

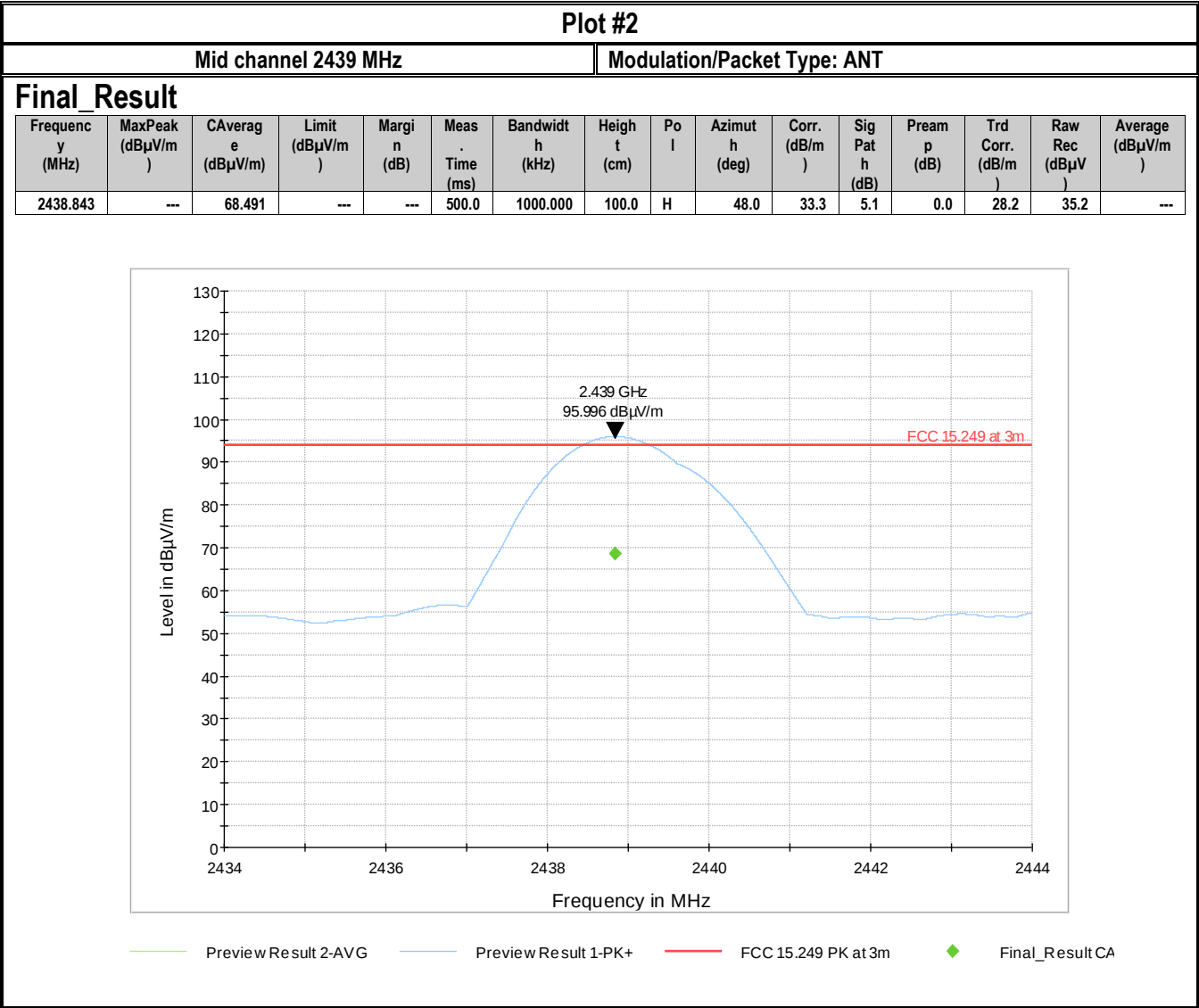
Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input	Antenna Gain
21.9° C	1	GFSK	5 Vdc	2 dBi

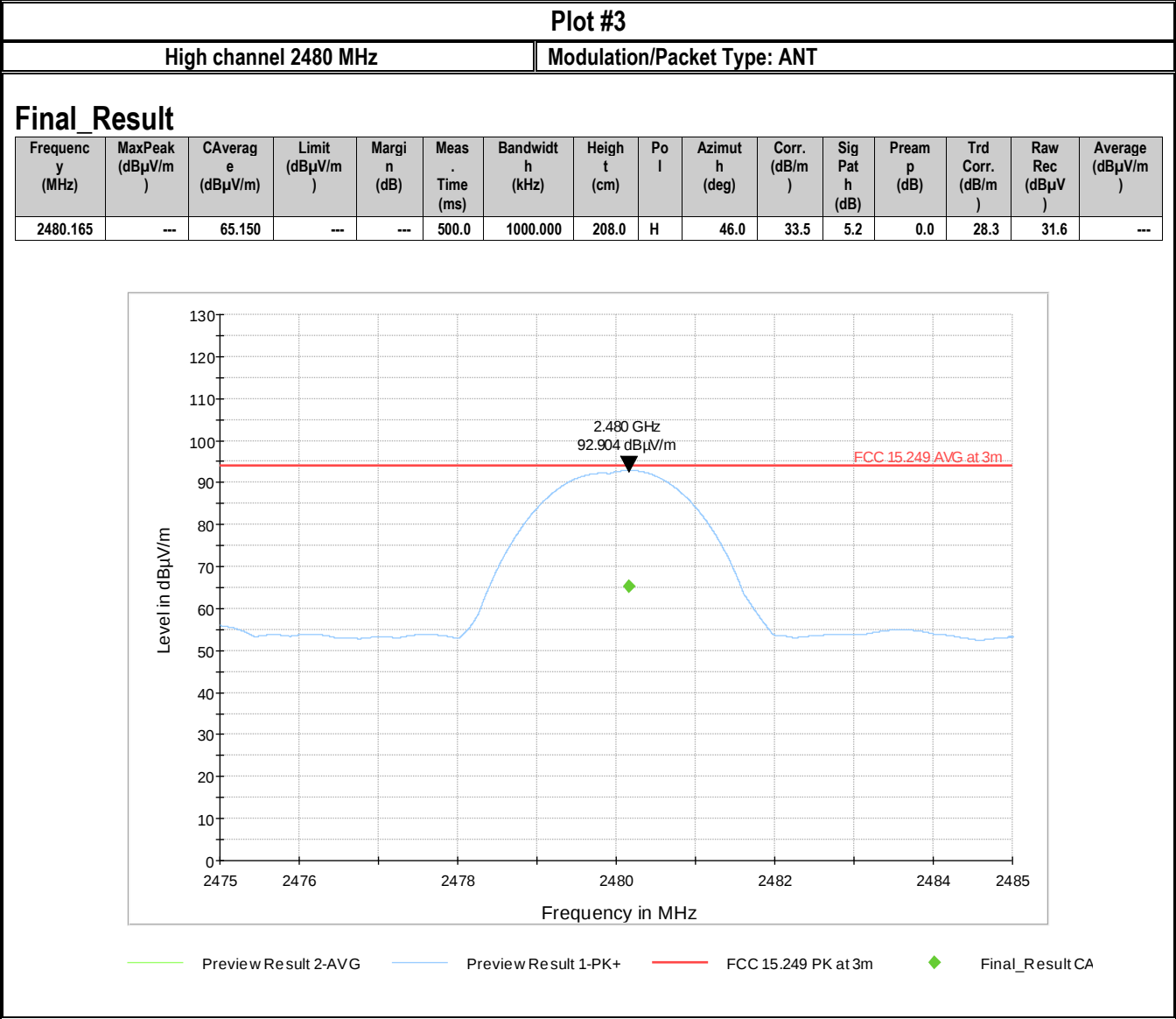
8.1.4 Measurement result:

Plot #	Frequency (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Result
1	2402	66.96	93.98	Pass
2	2439	68.49	93.98	Pass
3	2480	65.15	93.98	Pass

8.1.5 Measurement Plots:







8.2 Emission Bandwidth 20dB and 99% Occupied Bandwidth

8.2.1 Measurement according to ANSI C63.10 (2020)

Spectrum Analyzer settings:

20 dB Bandwidth:

- Set frequency = nominal EUT channel center frequency
- Set Span = 2 x to 5 x OBW
- Set RBW = 1% to 5% of OBW
- Set the video bandwidth (VBW) $\approx 3 \times$ RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep = Auto couple
- Allow the trace to stabilize
- Determine the reference value by setting spectrum analyzer marker to the highest level of the displayed trace
- Determine the “-20 dB down amplitude” using [(reference value) – 20]
- Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-20 dB down amplitude”

99% Occupied Bandwidth:

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

8.2.2 Limits:

FCC §15.215(c)

- Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

8.2.3 Test conditions and setup:

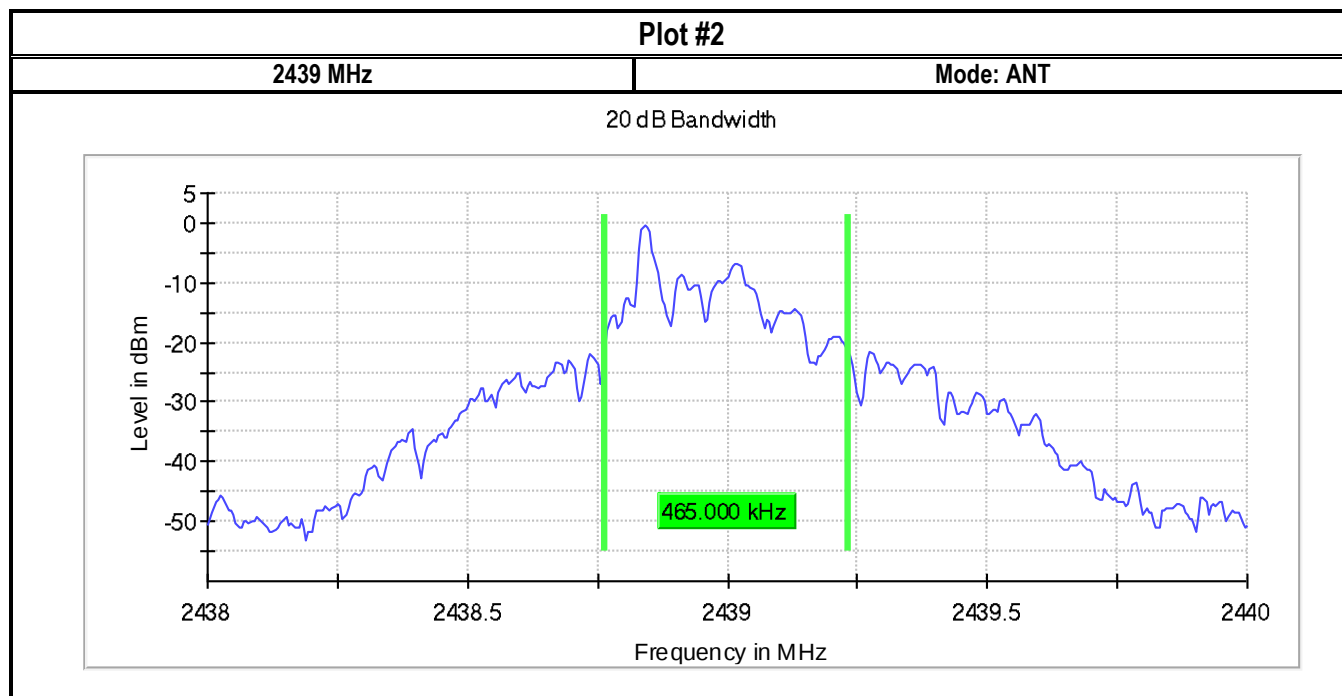
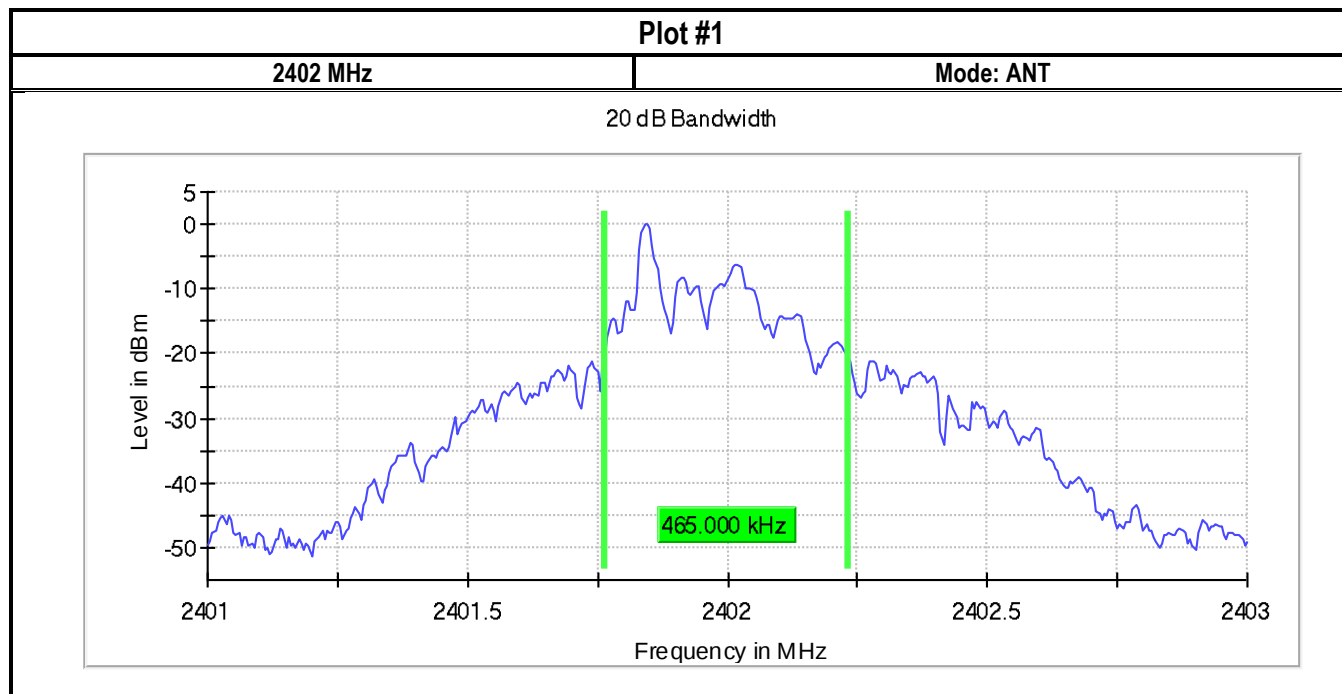
Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
21.9° C	1	GFSK	5 Vdc

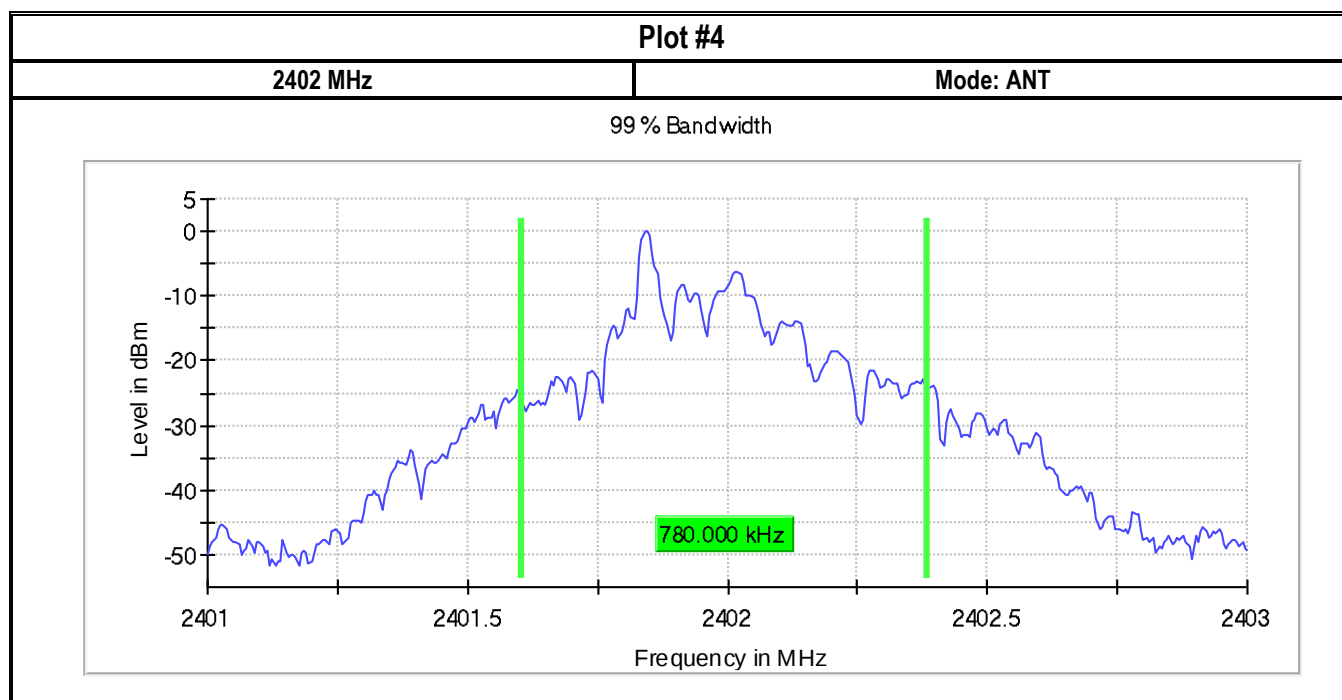
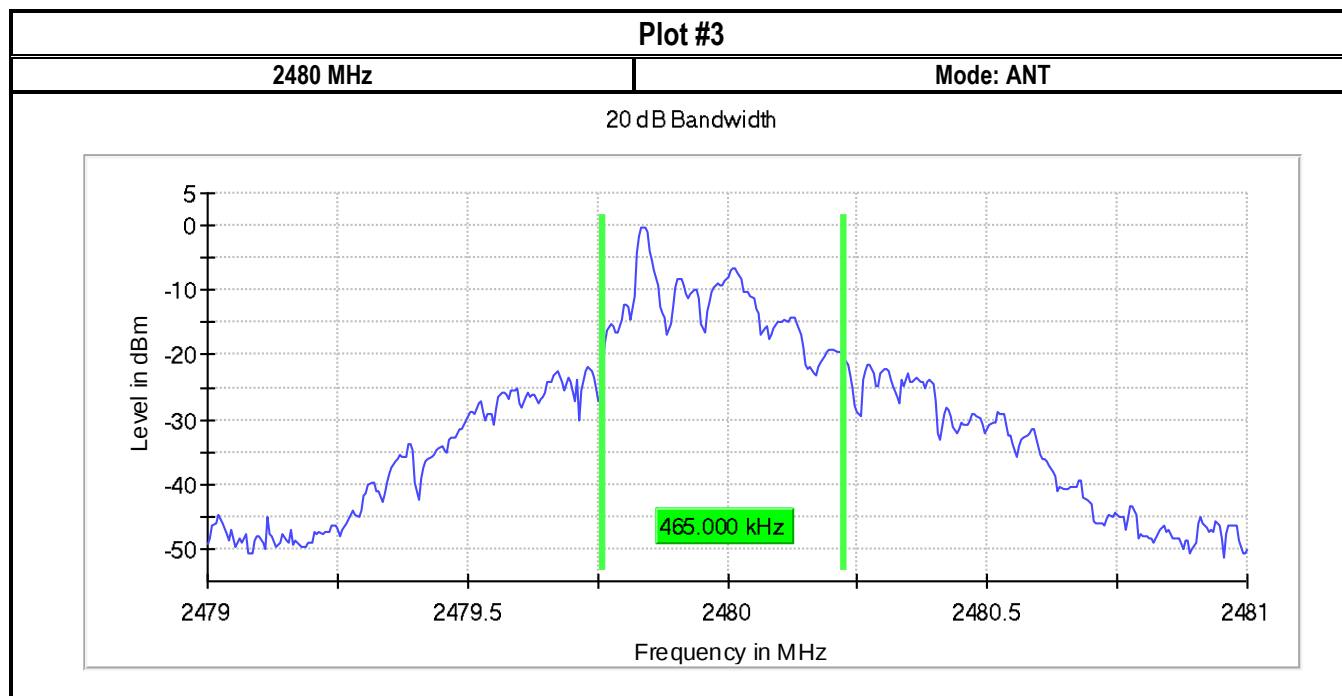
8.2.4 Measurement result:

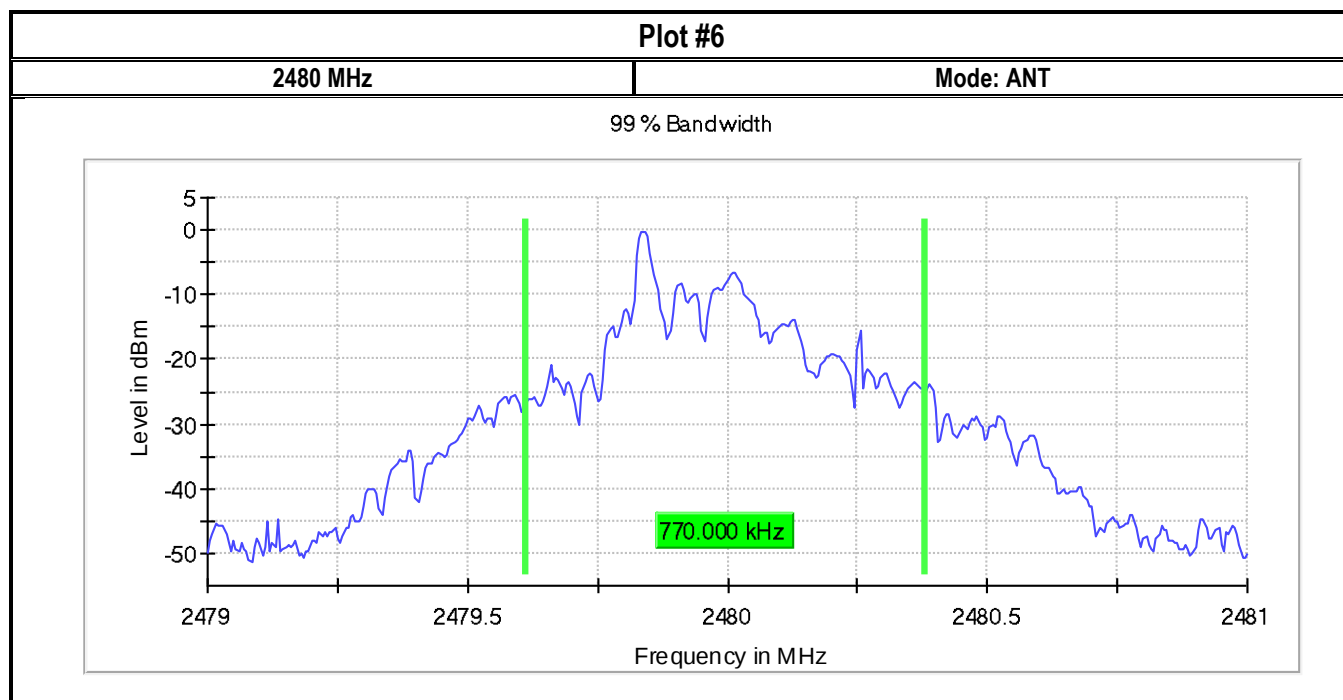
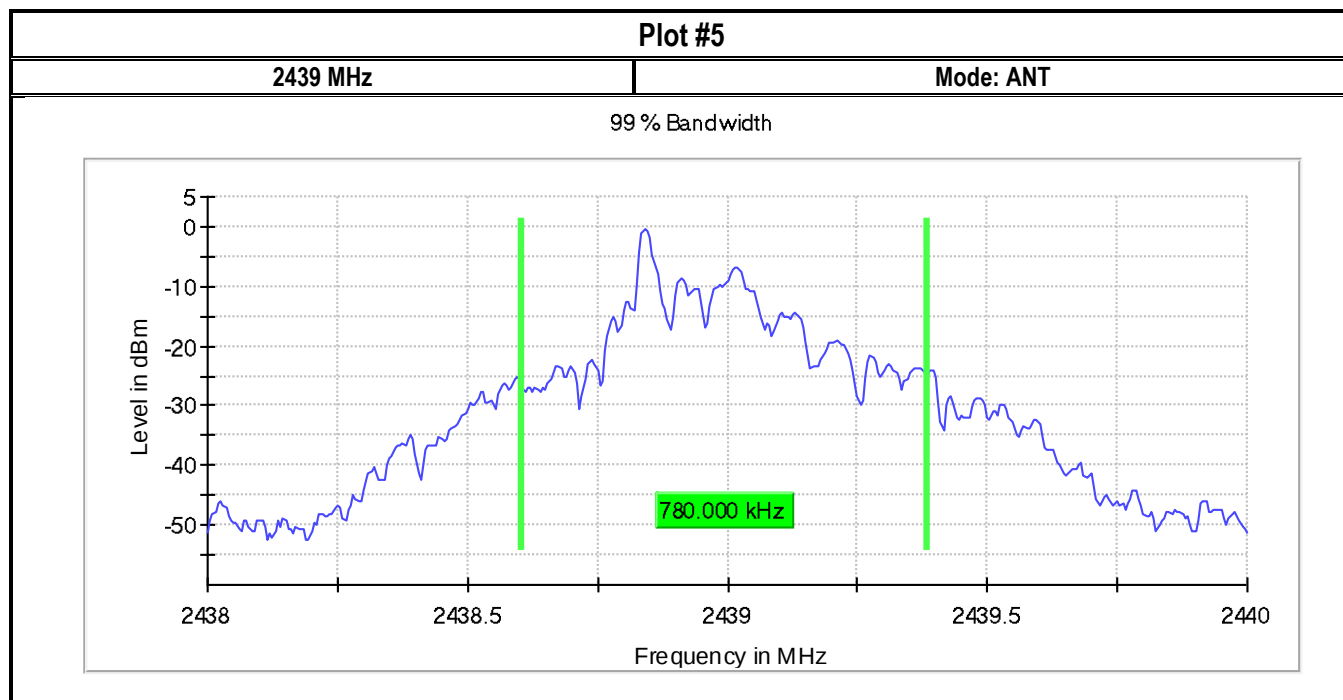
Plot #	Frequency (MHz)	20dB Emissions Bandwidth (MHz)	Result
1	2402	0.465	Pass
2	2439	0.465	Pass
3	2480	0.465	Pass

Plot #	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Result
4	2402	0.780	Pass
5	2439	0.780	Pass
6	2480	0.770	Pass

8.2.5 Measurement Plots:







8.3 Radiated Transmitter Spurious Emissions and Restricted Bands

8.3.1 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.

8.3.2 Limits:

FCC §15.249

- (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

- (c) Field strength limits are specified at a distance of 3 meters.
- (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
- (e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of

modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

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

8.3.3 Test conditions and setup:

Ambient Temperature	EUT Set-Up #	EUT operating mode	Power Input
21.9° C	1	GFSK	5 Vdc

8.3.4 Measurement result:

Plot #	Channel #	Scan Frequency	Lowest Margin Emission (dBm)	Limit	Result
1-3	Low	30 MHz – 18 GHz	64.136	See section 8.3.2	Pass
4-8	Mid	9 kHz – 26 GHz	64.087	See section 8.3.2	Pass
9-11	High	30 MHz – 18 GHz	37.470	See section 8.3.2	Pass

8.3.5 Measurement Plots:

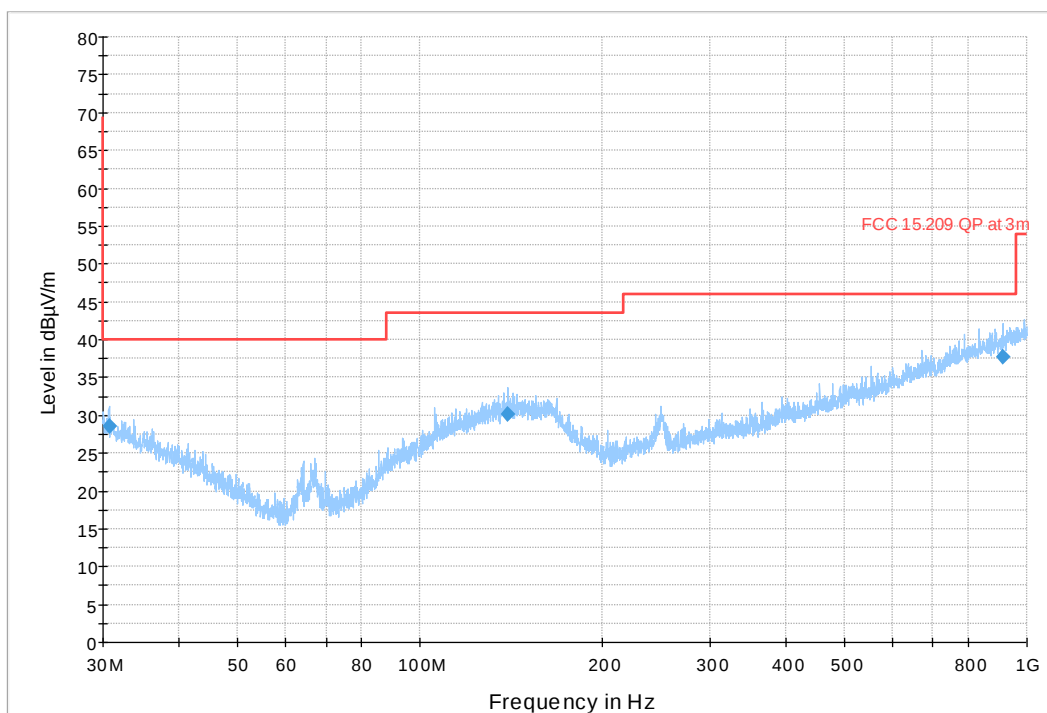
Plot # 1 Radiated Emissions: 30 MHz – 1 GHz

Modulation: ANT

Channel: Low

Final Result

Frequency	QuasiPeak	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin	Measurement	Bandwidth	Height	Polarization	Azimuth	Correction (dB/m)	Signal Path	Preamplifier	Trd Corr.	Raw Rec
30.697	28.606	---	40.00	11.39	500.0	120.000	377.0	H	101.0	-10.7	-	0.0	24.7	39.3
139.186	30.144	---	43.50	13.36	500.0	120.000	357.0	H	2.0	-9.7	-	0.0	25.1	39.8
914.428	37.711	---	46.02	8.31	500.0	120.000	272.0	V	227.0	-3.3	-	0.0	28.9	41.0

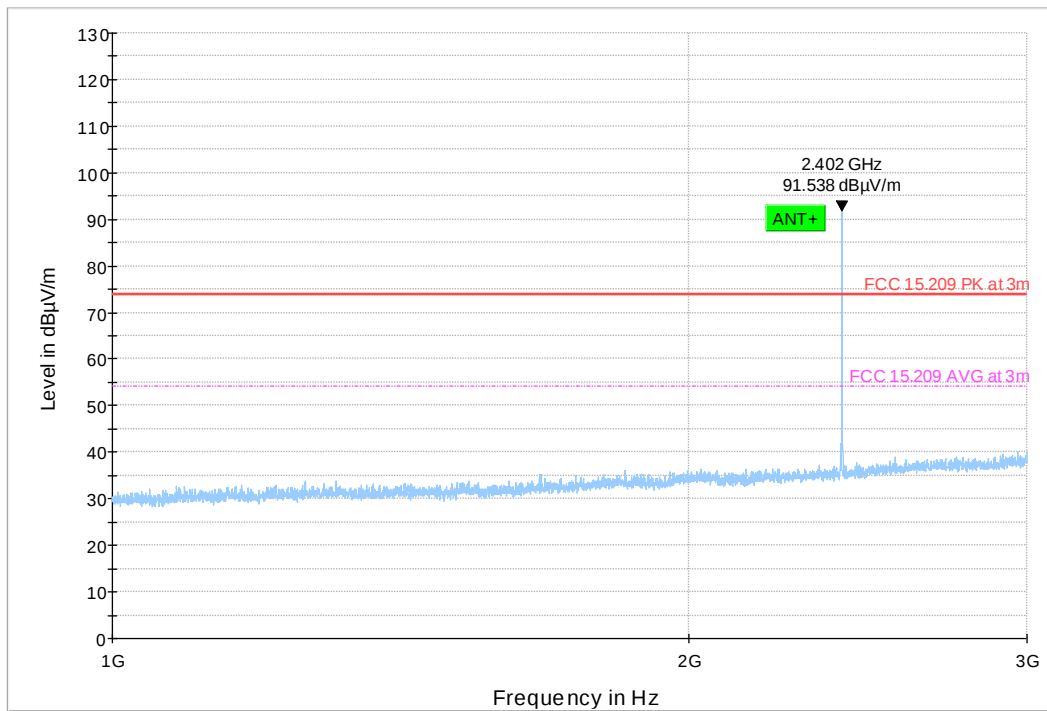


◆ AVG_MAXH Final_Result QPK
 ◆ PK+_MAXH Final_Result PK+
 — FCC 15.209 QP at 3m

Plot # 2 Radiated Emissions: 1 – 3 GHz

Modulation: ANT

Channel: Low



AVG_MAXH
FCC 15.209 AVG at 3m

PK+_MAXH
Final_Result PK+

FCC 15.209 PK at 3m
Final_Result CAV

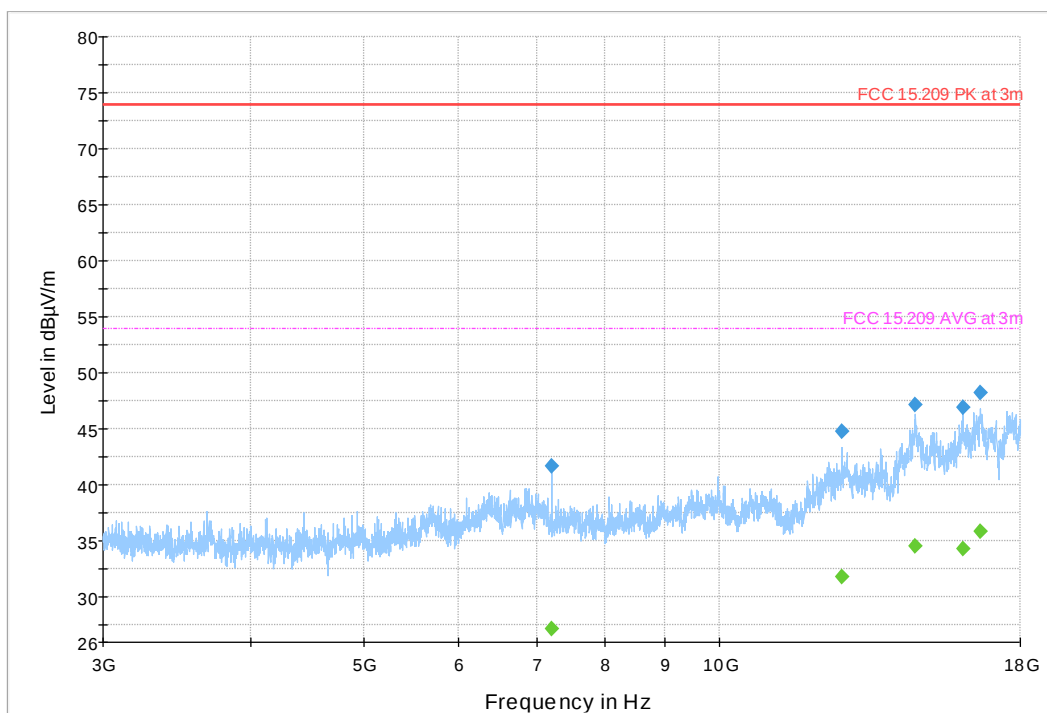
Plot # 3 Radiated Emissions: 3 – 18 GHz

Modulation: ANT

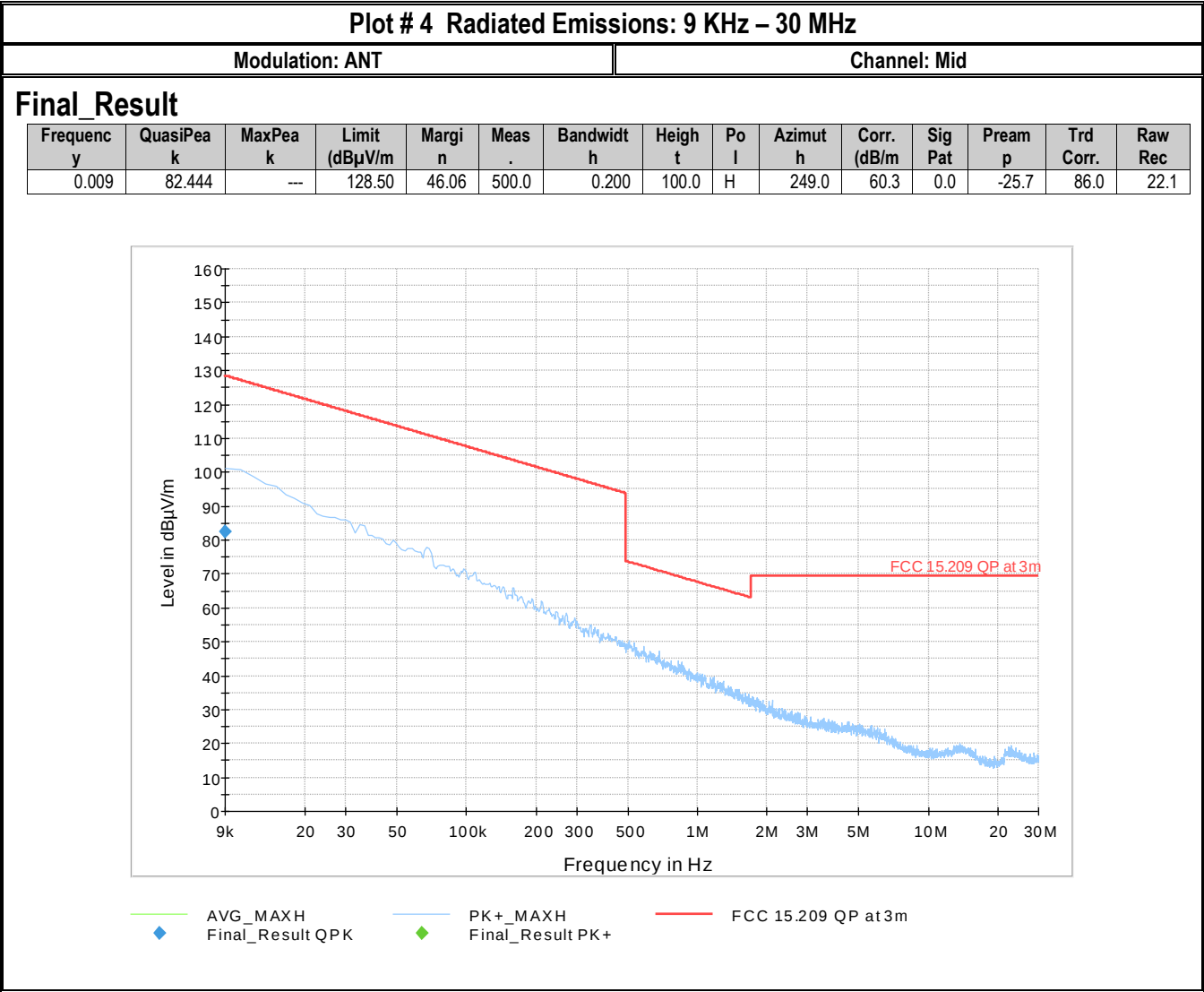
Channel: Low

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)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
7204.820	41.750	---	73.98	32.23	500.0	1000.000	274.0	H	304.0	-1.5	9.3	-46.8	36.0	43.3
7204.820	---	27.144	53.98	26.84	500.0	1000.000	274.0	H	304.0	-1.5	9.3	-46.8	36.0	28.7
12703.156	---	31.795	53.98	22.18	500.0	1000.000	400.0	V	276.0	8.9	13.4	-43.4	38.9	22.9
12703.156	44.790	---	73.98	29.19	500.0	1000.000	400.0	V	276.0	8.9	13.4	-43.4	38.9	35.8
14675.061	---	34.513	53.98	19.47	500.0	1000.000	100.0	H	181.0	10.7	14.5	-45.0	41.2	23.8
14675.061	47.172	---	73.98	26.81	500.0	1000.000	100.0	H	181.0	10.7	14.5	-45.0	41.2	36.4
16100.750	---	34.267	53.98	19.71	500.0	1000.000	117.0	H	28.0	13.9	15.9	-42.9	40.9	20.4
16100.750	46.903	---	73.98	27.08	500.0	1000.000	117.0	H	28.0	13.9	15.9	-42.9	40.9	33.0
16652.205	48.187	---	73.98	25.79	500.0	1000.000	205.0	V	180.0	14.5	15.7	-42.4	41.2	33.6
16652.205	---	35.874	53.98	18.11	500.0	1000.000	205.0	V	180.0	14.5	15.7	-42.4	41.2	21.3



AVG_MAXH PK+ MAXH FCC 15.209 PK at 3m
 FCC 15.209 AVG at 3m Final_Result PK+ Final_Result CAV



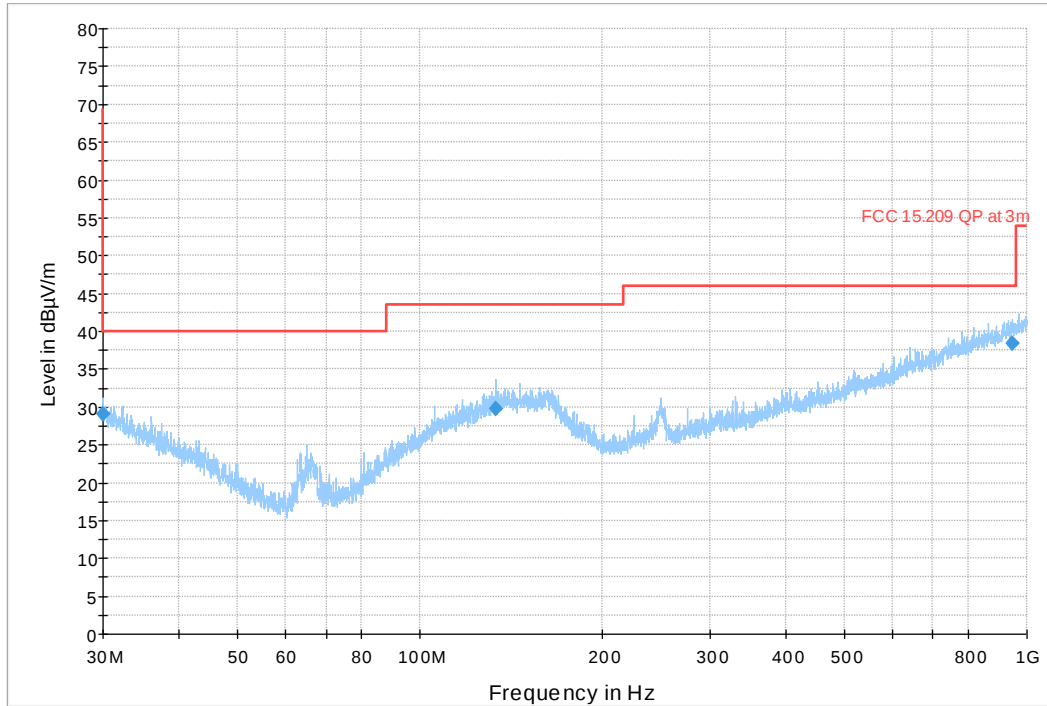
Plot # 5 Radiated Emissions: 30 MHz – 1 GHz

Modulation: ANT

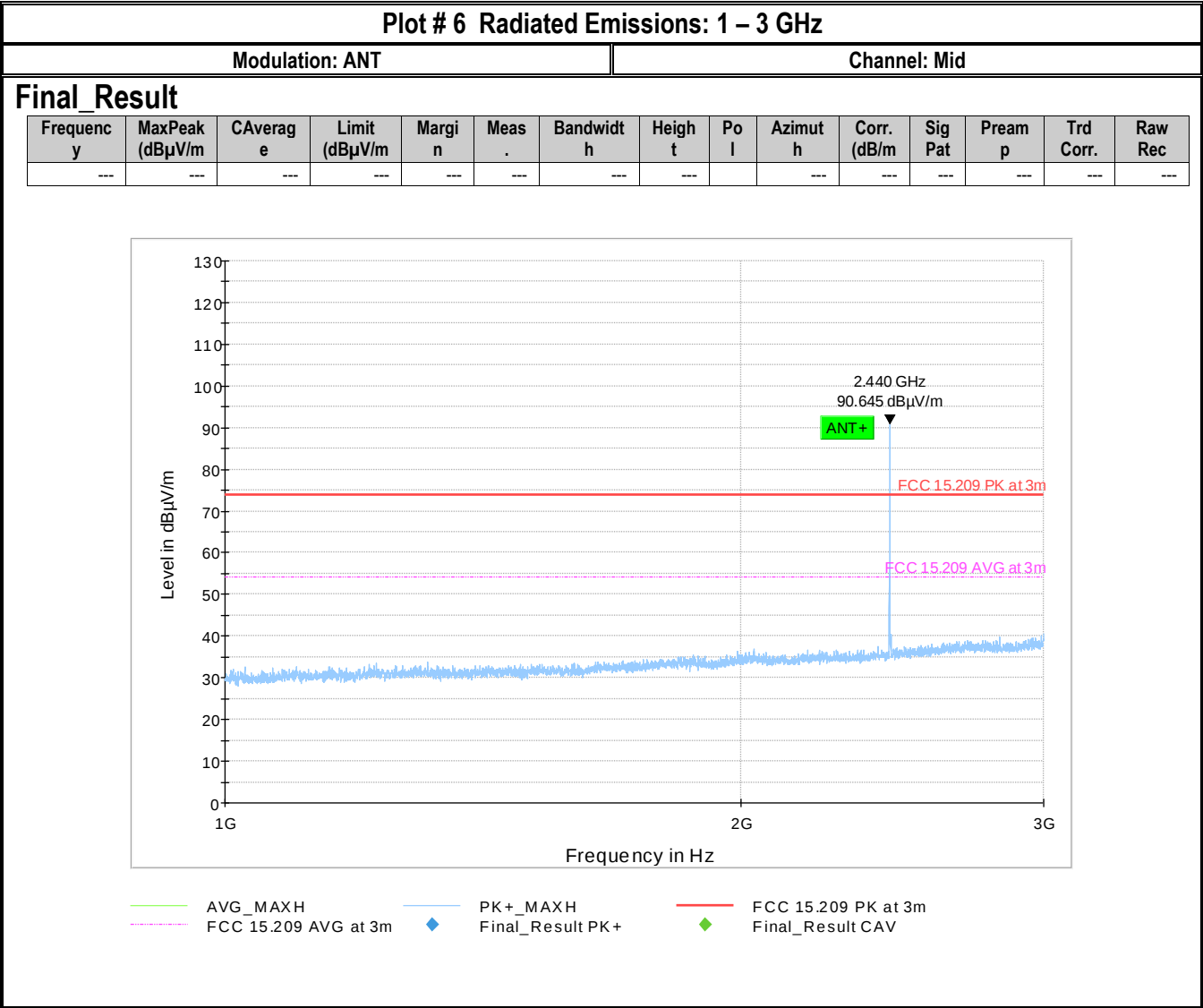
Channel: Mid

Final Result

Frequency	QuasiPeak	MaxPeak	Limit (dBμV/m)	Margin	Measurement	Bandwidth	Height	Polarization	Azimuth	Correction (dB/m)	Signature Pattern	Preamplifier	Trade-off Correction	Raw Rec
30.030	29.055	---	40.00	10.95	500.0	120.000	172.0	H	44.0	-10.3	-	0.0	25.0	39.4
132.972	29.728	---	43.50	13.77	500.0	120.000	162.0	H	166.0	-10.0	-	0.0	24.8	39.7
944.892	38.391	---	46.02	7.63	500.0	120.000	257.0	H	262.0	-2.7	-	0.0	29.4	41.1



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



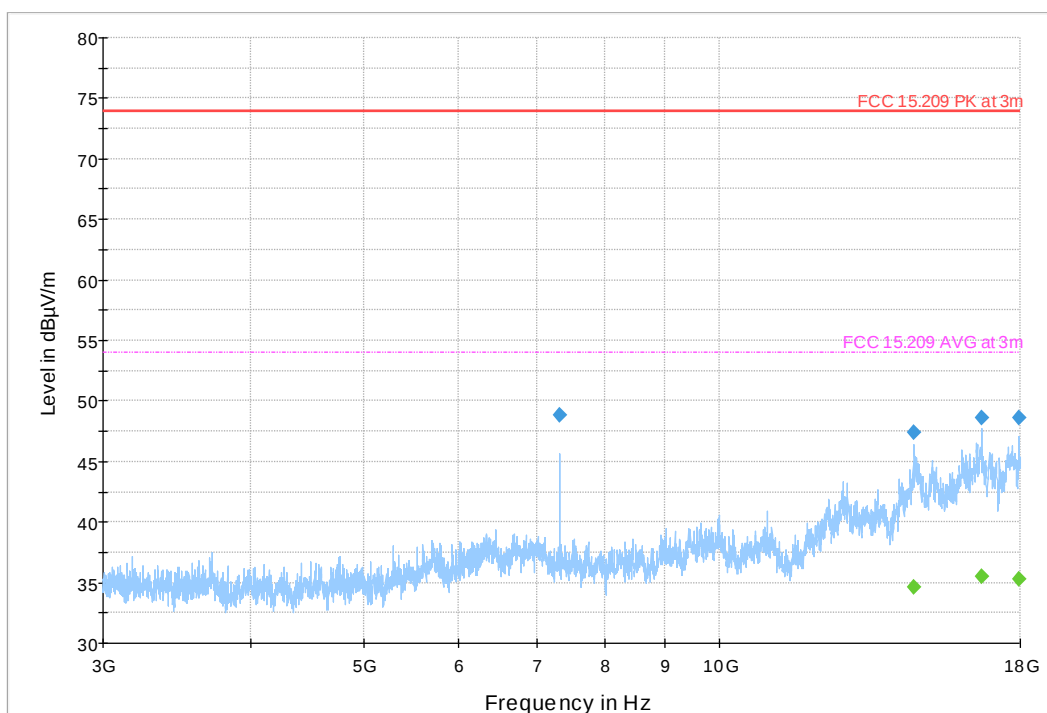
Plot # 7 Radiated Emissions: 3 – 18 GHz

Modulation: ANT

Channel: Mid

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)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
7316.500	48.803	---	73.98	25.18	500.0	1000.000	318.0	V	43.0	-0.8	9.9	-46.6	35.9	49.6
7316.500	---	29.125	53.98	24.85	500.0	1000.000	318.0	V	43.0	-0.8	9.9	-46.6	35.9	29.9
14636.500	47.396	---	73.98	26.58	500.0	1000.000	204.0	V	195.0	10.7	14.6	-44.9	41.1	36.7
14636.500	---	34.655	53.98	19.32	500.0	1000.000	204.0	V	195.0	10.7	14.6	-44.9	41.1	23.9
16690.000	48.569	---	73.98	25.41	500.0	1000.000	283.0	H	213.0	14.8	15.7	-42.1	41.3	33.8
16690.000	---	35.501	53.98	18.48	500.0	1000.000	283.0	H	213.0	14.8	15.7	-42.1	41.3	20.7
17950.000	48.612	---	73.98	25.37	500.0	1000.000	309.0	V	40.0	15.7	16.3	-42.3	41.6	32.9
17950.000	---	35.263	53.98	18.72	500.0	1000.000	309.0	V	40.0	15.7	16.3	-42.3	41.6	19.6



AVG_MAXH PK+_MAXH FCC 15.209 PK at 3m
 FCC 15.209 AVG at 3m Final_Result PK+ Final_Result CAV

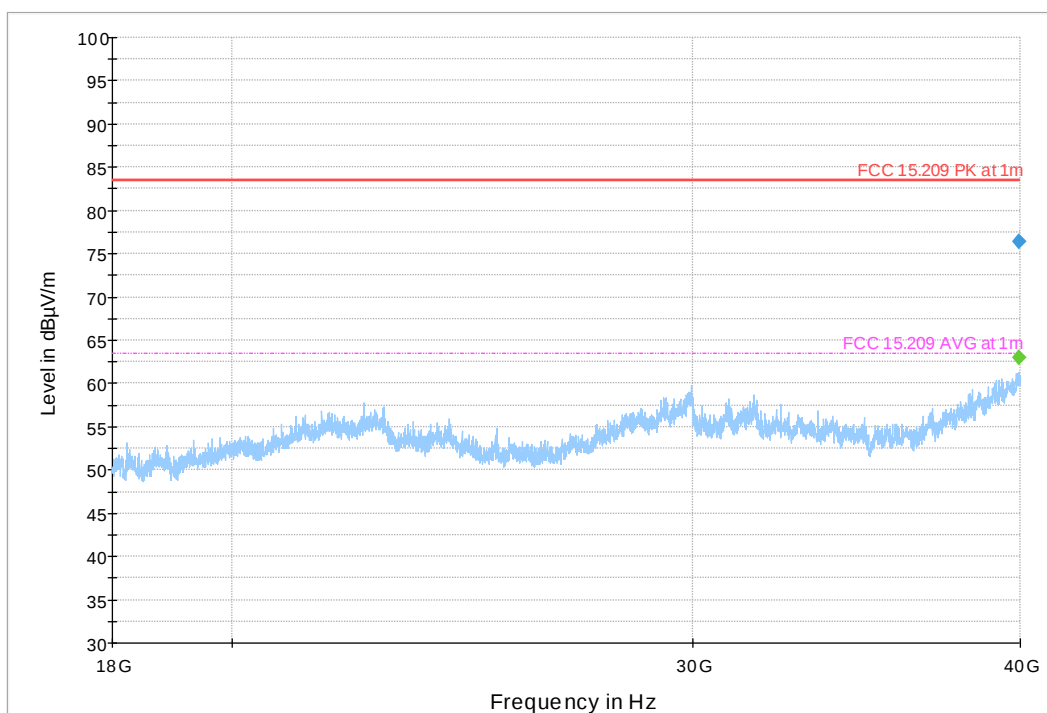
Plot # 8 Radiated Emissions: 18 – 26 GHz

Modulation: ANT

Channel: Mid

Final Result

Frequency	MaxPeak (dBμV/m)	CAverage	Limit (dBμV/m)	Margin	Measure	Bandwidth	Height	Polarization	Azimuth	Corr. (dB/m)	Sig Pat	Preamplifier	Trd Corr.	Raw Rec
39941.563	---	63.067	63.50	0.43	500.0	1000.000	150.0	V	142.0	24.3	12.7	0.0	11.6	38.7
39941.563	76.358	---	83.50	7.14	500.0	1000.000	150.0	V	142.0	24.3	12.7	0.0	11.6	52.0



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

*Note: Final measurement was performed on highest peak emission from noise floor. Therefore, no emission was found on the EUT.

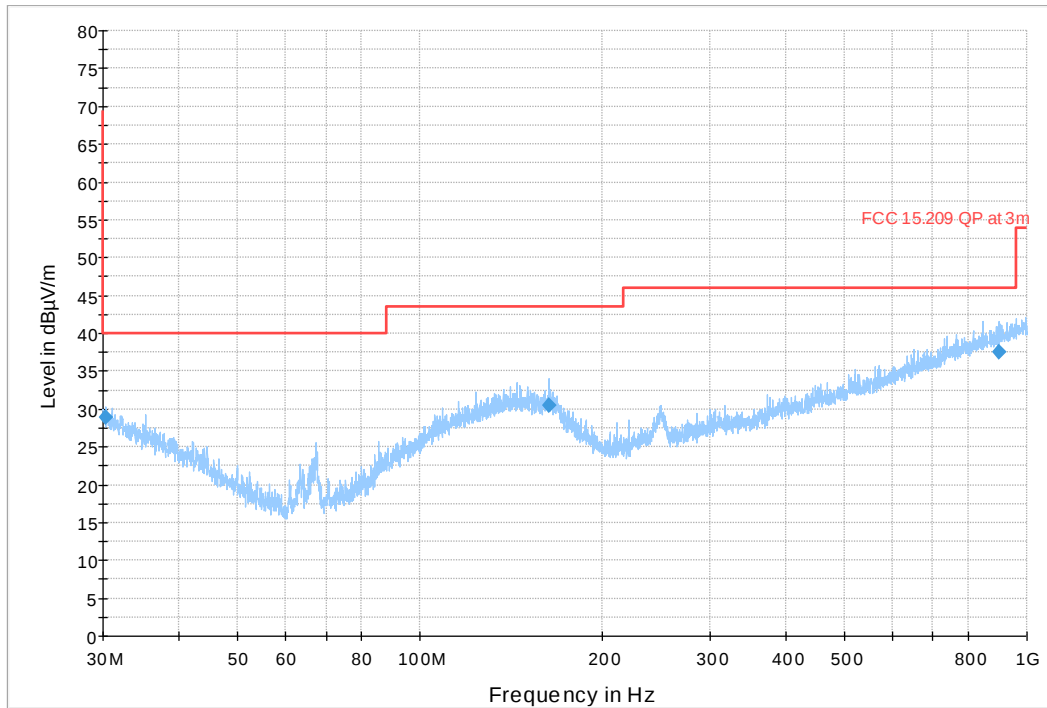
Plot # 9 Radiated Emissions: 30 MHz – 1 GHz

Modulation: ANT

Channel: High

Final Result

Frequency	QuasiPeak	MaxPeak	Limit (dBμV/m)	Margin	Measurement	Bandwidth	Height	Polarization	Azimuth	Correction (dB/m)	Signature Pattern	Preamplifier	Trace Correction	Raw Rec
30.364	28.815	---	40.00	11.19	500.0	120.000	376.0	H	37.0	-10.5	-	0.0	24.8	39.3
163.011	30.401	---	43.50	13.10	500.0	120.000	116.0	V	72.0	-9.6	-	0.0	25.0	40.0
897.332	37.470	---	46.02	8.55	500.0	120.000	270.0	H	236.0	-3.4	-	0.0	28.9	40.9

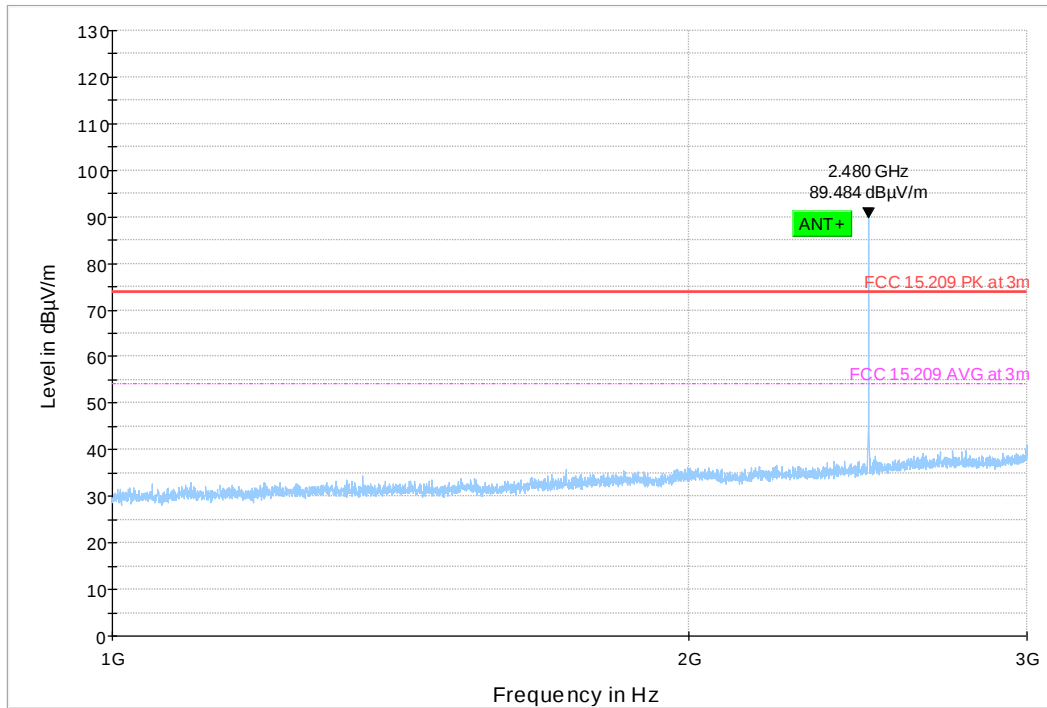


— AVG_MAXH
— PK+_MAXH
— FCC 15.209 QP at 3m
◆ Final_Result QPK
◆ Final_Result PK+

Plot # 10 Radiated Emissions: 1 – 3 GHz

Modulation: ANT

Channel: High



AVG_MAXH PK+_MAXH FCC 15.209 PK at 3m
FCC 15.209 AVG at 3m Final_Result PK+ Final_Result CAV

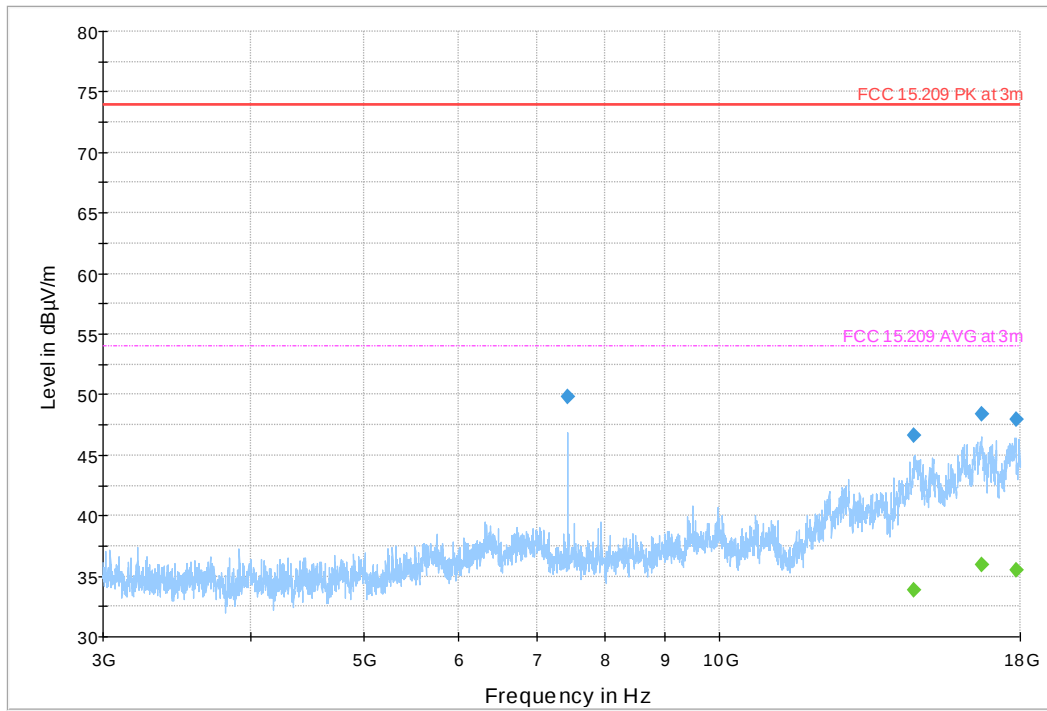
Plot # 11 Radiated Emissions: 3 – 18 GHz

Modulation: ANT

Channel: High

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path	Preamp (dB)	Trd Corr.	Raw Rec
7436.500	49.790	---	73.98	24.19	500.0	1000.000	127.0	V	22.0	-0.4	10.4	-46.6	35.9	50.2
7436.500	---	29.214	53.98	24.77	500.0	1000.000	127.0	V	22.0	-0.4	10.4	-46.6	35.9	29.6
14622.250	46.615	---	73.98	27.36	500.0	1000.000	158.0	V	65.0	10.7	14.6	-44.9	41.1	35.9
14622.250	---	33.823	53.98	20.16	500.0	1000.000	158.0	V	65.0	10.7	14.6	-44.9	41.1	23.1
16672.500	---	35.949	53.98	18.03	500.0	1000.000	228.0	V	186.0	14.7	15.7	-42.3	41.3	21.2
16672.500	48.440	---	73.98	25.54	500.0	1000.000	228.0	V	186.0	14.7	15.7	-42.3	41.3	33.7
17839.250	---	35.454	53.98	18.52	500.0	1000.000	351.0	V	187.0	15.2	16.1	-42.5	41.6	20.3
17839.250	47.948	---	73.98	26.03	500.0	1000.000	351.0	V	187.0	15.2	16.1	-42.5	41.6	32.8



— AVG_MAXH — PK+_MAXH — FCC 15.209 PK at 3m
--- FCC 15.209 AVG at 3m ◆ Final_Result PK+ ◆ Final_Result CAV

9 Test setup photos

Setup photos are included in supporting file name: "EMC_GRMI_117_24001_FCC_Setup_Photos.pdf"

10 Test Equipment And Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
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
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
2024-05-20	EMC_GARMI_117_24001_15_249_ANT	Initial Version	Art Thammanavarat
2024-05-31	EMC_GARMI_117_24001_15_249_ANT_Rev1	Report Revised base on TCB's Review 1. Section 8.1 Added Field Strength tables and removed Output Power. 2. Section 8.2: Removed duty cycle. 3. Section 8.4: Updated plots.	Art Thammanavarat

<<< The End >>>