



FCC / ISED & Test Report

FOR:

Garmin International, Inc.

Model Name:

GMN-02245

Product Description:

LTE/Wi-Fi Datalink and Data Storage System

FCC ID: IPH-03788

IC: 1792A-03788

Applied Rules and Standards:

47 CFR Parts 27

RSS-139 Issue 4, RSS-199 Issue 4.

REPORT #: EMC_GARMI_116_23001_FCC_27_Rev1

DATE: 2023-09-19



A2LA Accredited

**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: info@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 SAMPLE DETAILS	6
3.3	ACCESSORY EQUIPMENT (AE) DETAILS.....	6
3.4	TEST SAMPLE CONFIGURATION	6
3.1	JUSTIFICATION FOR WORST CASE MODE OF OPERATION.....	6
4	SUBJECT OF INVESTIGATION	7
4.1	MEASUREMENT UNCERTAINTY	7
4.2	ENVIRONMENTAL CONDITIONS DURING TESTING:.....	7
4.3	DATES OF TESTING:	7
4.4	DECISION RULE:.....	7
5	MEASUREMENT PROCEDURES.....	8
5.1	RADIATED MEASUREMENT.....	8
5.2	SAMPLE CALCULATIONS FOR FIELD STRENGTH MEASUREMENTS	10
6	MEASUREMENT RESULTS SUMMARY	11
6.1	FCC 27 / RSS-139, RSS-199	11
7	TEST RESULT DATA	12
7.1	OUTPUT POWER VERIFICATION	12
7.2	RADIATED SPURIOUS EMISSIONS.....	15
8	TEST SETUP PHOTOS.....	37
9	TEST EQUIPMENT AND ANCILLARIES USED FOR TESTING	37
10	REVISION HISTORY	38

1 Assessment

The following device as further described in section 3 of this report was evaluated against the applicable criteria specified in the Code of Federal Regulations Title 47 parts 27 and Industry Canada Standards RSS-139 issue 4 and RSS-199 issue 4.

No deficiencies were ascertained.

Company	Description	Model #
Garmin International, Inc.	LTE/Wi-Fi Datalink and Data Storage System	GMN-02245

Responsible for Testing Laboratory:

Arndt Stoecker

2023-09-19

Compliance

(Director of Regulatory Services)

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

Responsible for the Report:

Art Thammanavarat

2023-09-19

Compliance

(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:	Arndt Stoecker
Responsible Project Leader:	Sangeetha Sivaraman

2.2 Identification of the Client

Client Firm/Name:	Garmin International
Street Address:	1200 East 151 Street
City/Zip Code	Olathe, KS 66062
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	GMN-02245
Marketing Name	GDL 60
HW Version	Ver B
SW Version	2.30
FCC-ID	IPH-03788
IC:	1792A-03788
FVIN:	08
HVIN:	GMN-02245
PMN:	GDL 60
Product Description	LTE/Wi-Fi Datalink and Data Storage System
Transceiver Technology / Type(s) of Modulation	Cellular Modules Model Name : Quectel Model Number : EG25-G FCC : XMR201903EG25G ISED : 10224A-201903EG25G Wireless Technologies W-CDMA (UMTS) FDD : 4 LTE FDD Band : 4,7 LTE TDD Band : 41
Frequency Range	UMTS Band IV: 1712.4 – 1752.6 MHz LTE Band 4: 1710 – 1755 MHz LTE Band 7: 2500 – 2570 MHz LTE Band 41: 2496 – 2690 MHz
Max. declared antenna gain	Name: Garmin Model: GA-61A P/N : 011-06391-00 Type: LTE/Wi-Fi Antenna Location: External Maximum Peak Gain in band: • LTE Band 4 / UMTS Band IV: 1.67 dBi • LTE Band 7: 5.47 dBi • LTE Band 41: 5.47 dBi
Other Radios included in the device:	Wi-Fi
Power Supply/ Rated Operating Voltage Range	Vmin: 9 VDC/ Vnom: 24 VDC / Vmax: 32 VDC

Operating Temperature Range	-40°C to 70 °C
Sample Revision	☐ Production ☒ Pre-Production
EUT Dimensions (cm)	22.15cm x 10.16cm x 2.83cm
Weight (g)	680g
EUT Diameter	☒ < 60 cm ☐ Other _____

3.2 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	67H001401	Ver B	2.30	Radiated Emissions

3.3 Accessory Equipment (AE) details

EUT #	Model Number	Type	Manufacturer	Serial Number
1	GA-61A	LTE/Wi-Fi Antenna	Garmin International	8AP000104

3.4 Test Sample Configuration

Set-up #	EUT / AE used for set-up	Comments
1	EUT#1+AE#1	Cellular was tested on Mid Channels at maximum power in a co-transmission mode WiFi radio was configured to 802.11g Mid channel using special commands through command window provided by the client that will not be available to the end user

3.1 Justification for Worst Case Mode of Operation

Mode of Operation	Description of Operating modes	Additional Information
Op. 1	Cellular and WiFi 802.11g Co-Transmission	During the testing process, the EUT was tested with transmitter sets on WiFi WLAN 802.11g mid channels with antenna GA 61A, and co-transmitting with LTE radio Mid Channel. The EUT was configured to the highest duty cycle and maximum output power. 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 evaluate the compliance of the EUT against the relevant requirements specified in the Code of Federal Regulations Title 47 parts 27 and ISSED Standards and RSS-139 issue 4 and RSS-199 Issue 4.

4.1 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 $k=2$.

Radiated measurement

Measurement System	EMC 1	EMC 2
Conducted emissions (mains port)	1.12 dB	0.46 dB
Radiated emissions		
(< 30 MHz)	3.66 dB	3.88 dB
(30 MHz – 1GHz)	3.17 dB	3.34 dB
(1 GHz – 3 GHz)	5.01 dB	4.45 dB
(>3 GHz)	4.0 dB	4.79 dB

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.

4.2 Environmental Conditions During Testing:

The following environmental conditions were maintained during the course of testing:

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

4.3 Dates of Testing:

2023-03-24 – 2023-05-30

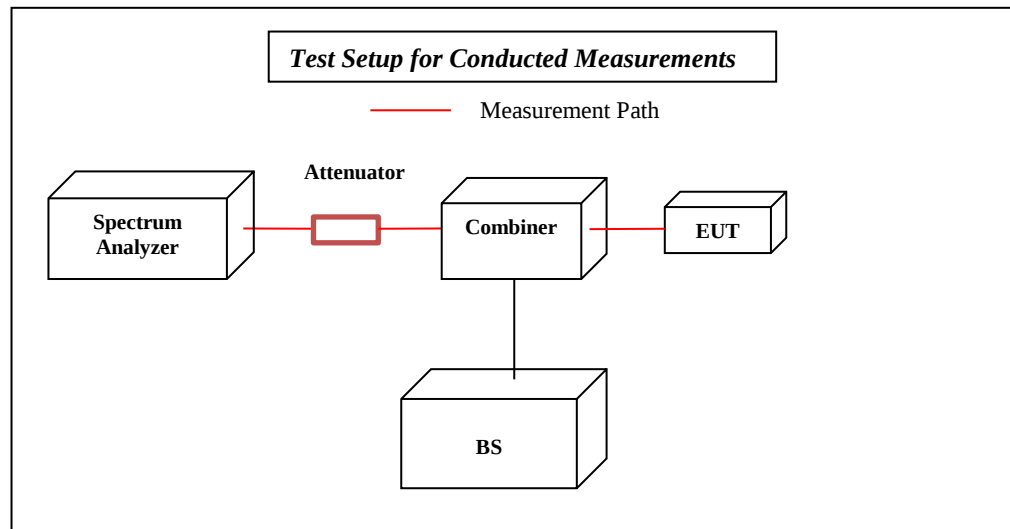
4.4 Decision Rule:

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.

5 Measurement Procedures

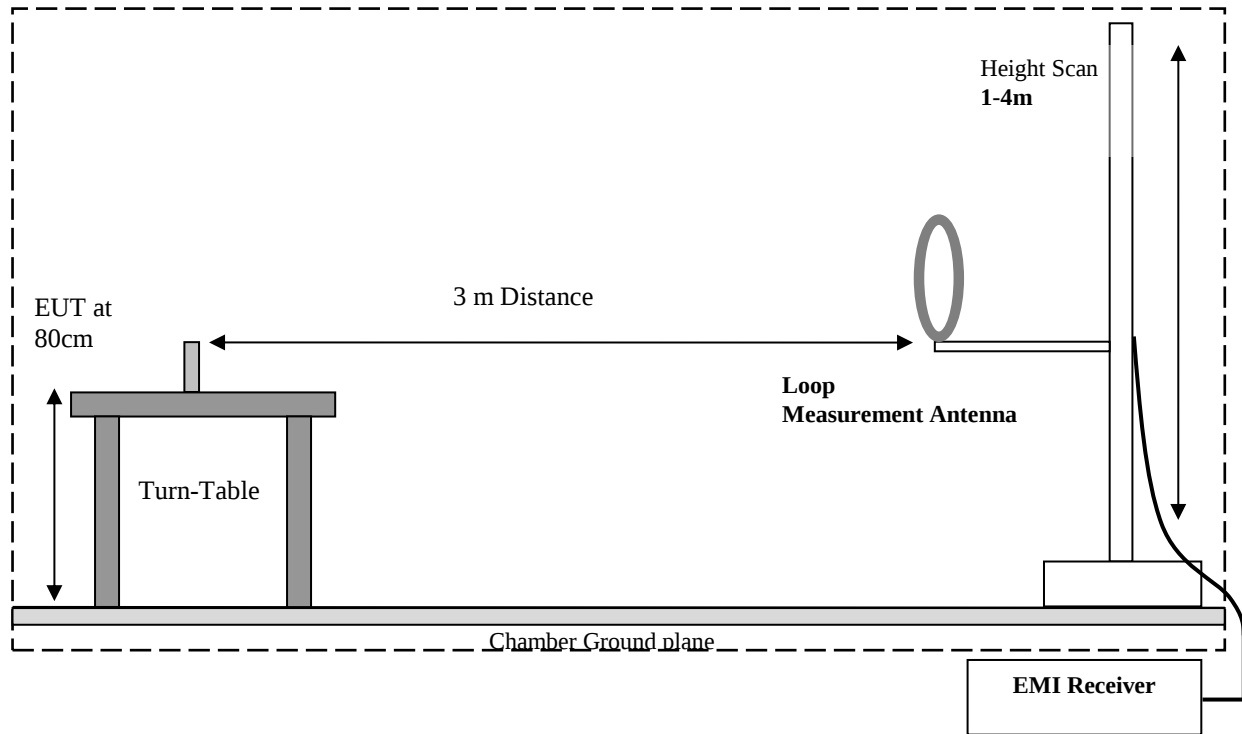
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v03r01 – “Measurement Guidance for Certification of Licensed Digital Transmitters” and according to relevant parts of ANSI/TIA-603-D-2010 as detailed below.



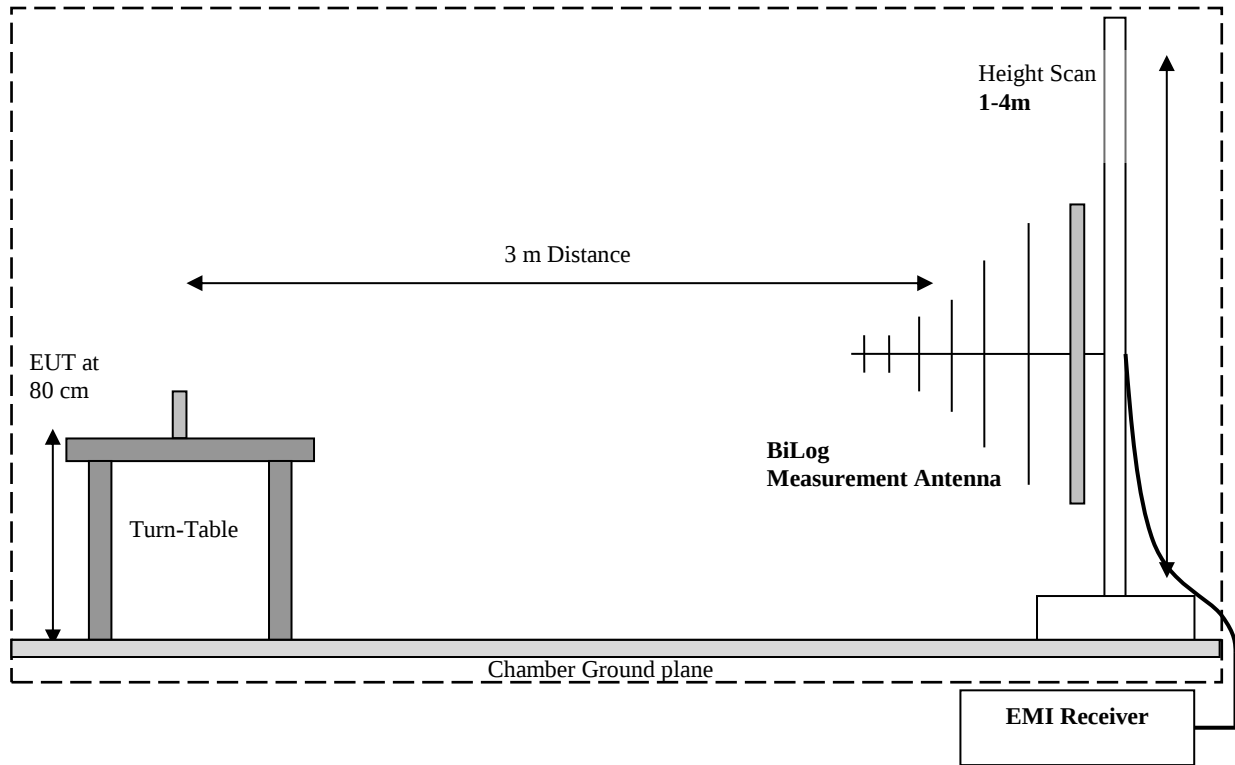
5.1 Radiated Measurement

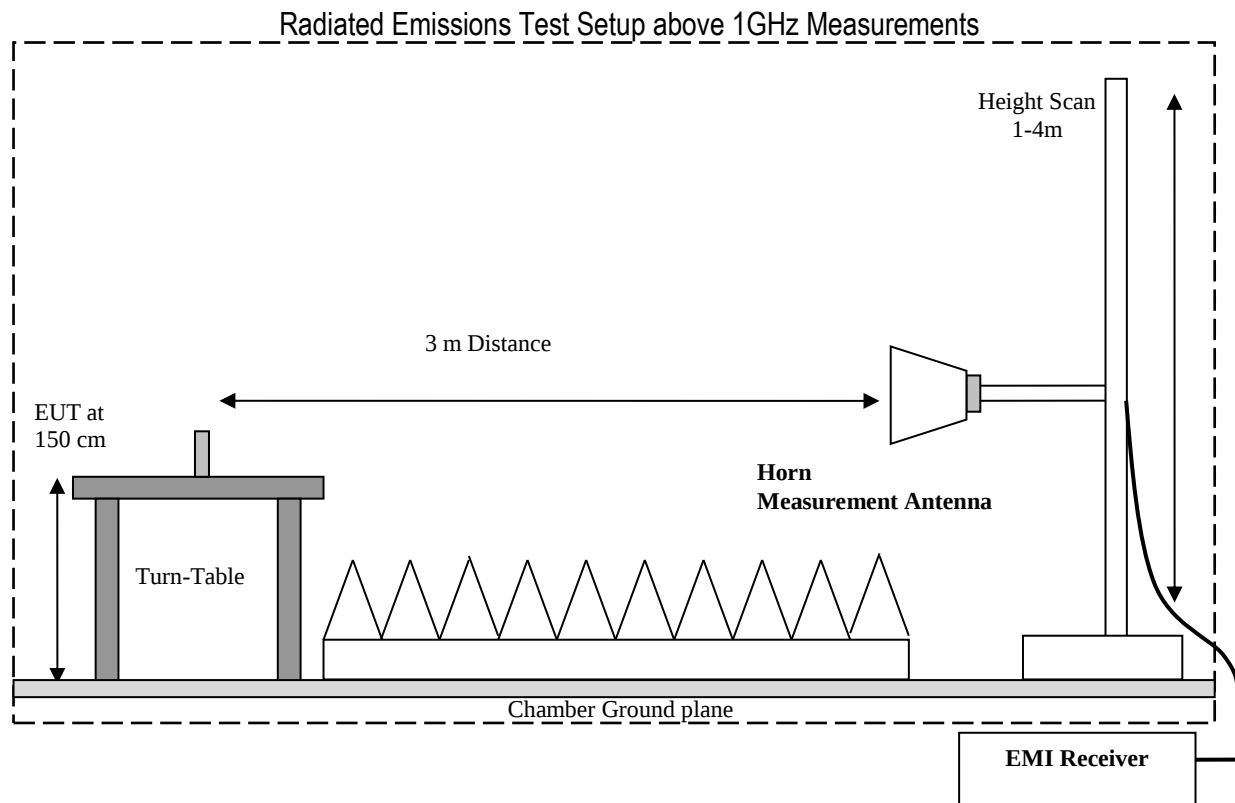
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to 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 below 30MHz Measurements



Radiated Emissions Test Setup 30MHz-1GHz Measurements





5.2 Sample Calculations for Field Strength Measurements

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

- Measured reading in dB μ V
- Cable Loss between the receiving antenna and SA in dB and
- 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

6 Measurement Results Summary

6.1 FCC 27 / RSS-139, RSS-199

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046; §27.50	RF Output Power	Nominal	-	☐	☐	☐	■	See Note 3
§2.1055; §27.54	Frequency Stability	Extreme Temperature and Voltage	-	☐	☐	☐	■	See Note 4
§2.1049; §27.53	Occupied Bandwidth	Nominal	-	☐	☐	☐	■	See Note 5
§2.1051; §27.53	Band Edge Compliance	Nominal	-	☐	☐	☐	■	See Note 6
§2.1051; §27.53	Conducted Spurious Emissions	Nominal	-	☐	☐	☐	■	Note 2
§2.1053; §27.53	Radiated Spurious Emissions	Nominal	Op. 1	■	☐	☐	☐	Complies

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

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

Note 3: Leveraged from report # HR/2019/1001601, Section 4.1 (FCC ID: XMR201903EG25G, IC ID: 10224A-201903EG25G)

Note 4: Leveraged from report # HR/2019/1001601, Section 4.8 (FCC ID: XMR201903EG25G, IC ID: 10224A-201903EG25G)

Note 5: Leveraged from report # HR/2019/1001601, Section 4.3 (FCC ID: XMR201903EG25G, IC ID: 10224A-201903EG25G)

Note 6: Leveraged from report # HR/2019/1001601, Section 4.4 (FCC ID: XMR201903EG25G, IC ID: 10224A-201903EG25G)

7 Test Result Data

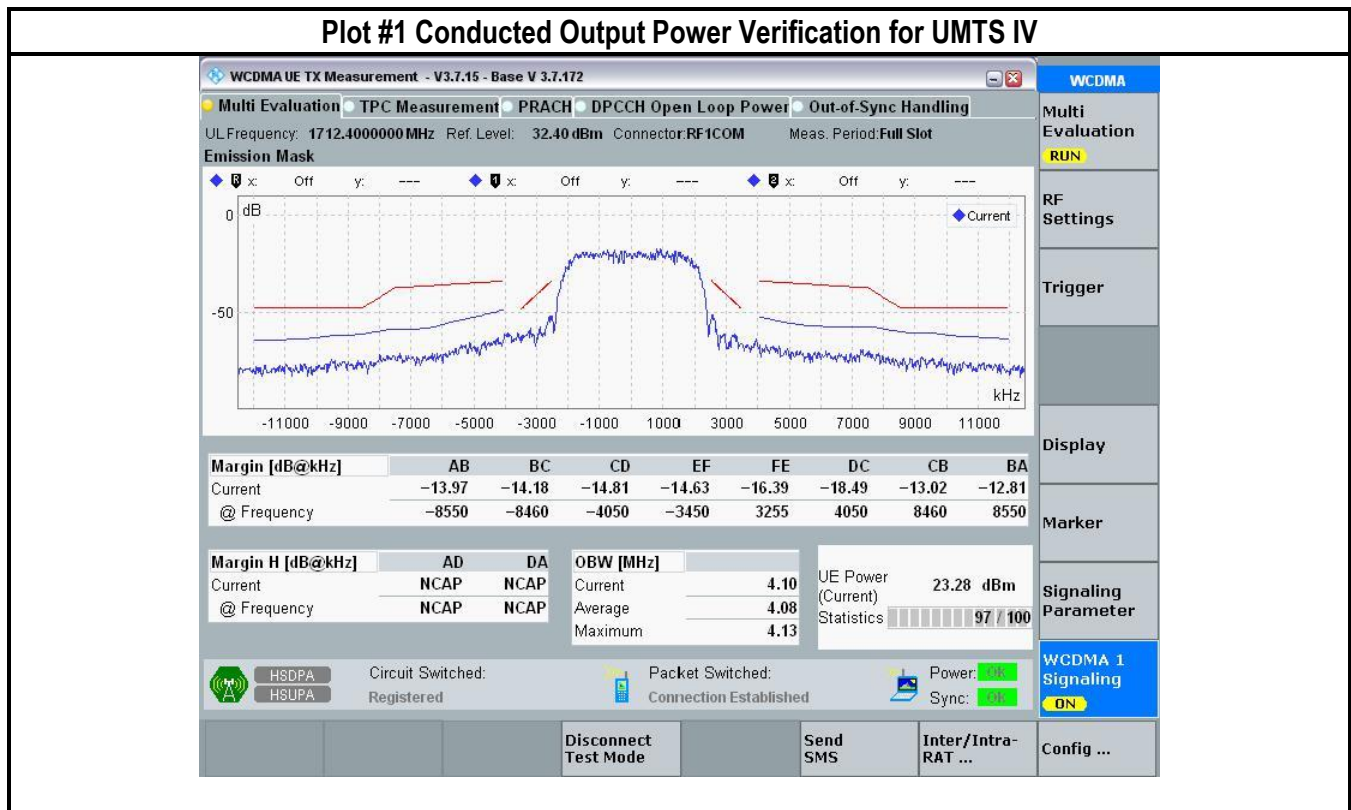
7.1 Output Power Verification

7.1.1 Conducted Output Power Measurement results.

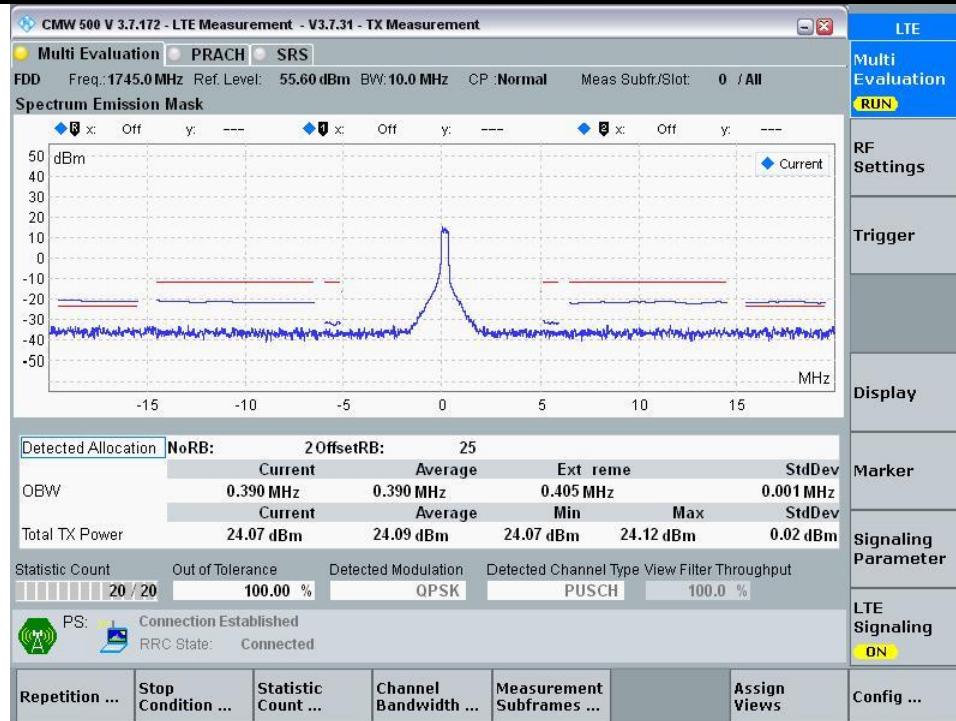
Plot #	FCC Rule Parts	Band	Frequency Range (MHz)	Measure Output Power (dBm)	Measure Output Power (W)	Gain (dBi)	EIRP (W) ^{Note 2}	Limit EIRP (W)
1	27	UMTS IV	1712.4 – 1752.6	23.28	0.213	1.67	0.313	1
2	27	LTE 4	1710 – 1755	24.07	0.255	1.67	0.375	1
3	27	LTE 7	2500 – 2570	23.28	0.213	5.47	0.750	1
4	27	LTE 41	2496 – 2690	23.35	0.216	5.47	0.762	1

Note: ERP/EIRP are based on calculations from Power Conducted by adding the declared maximum gain of the utilized cellular antenna per operational description.

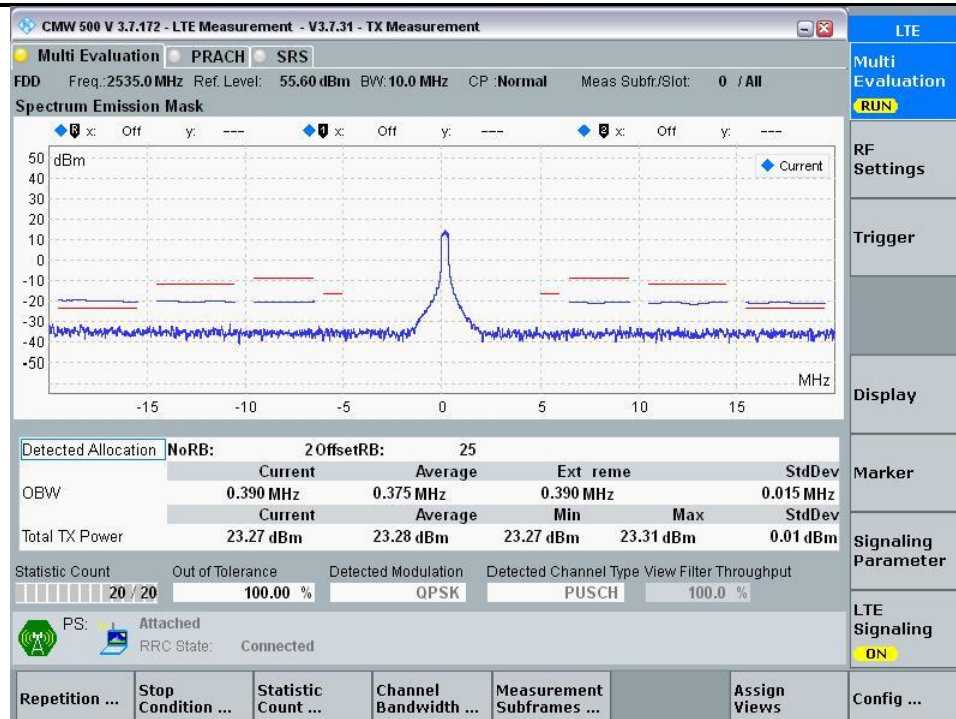
7.1.2 Measurement Plots:



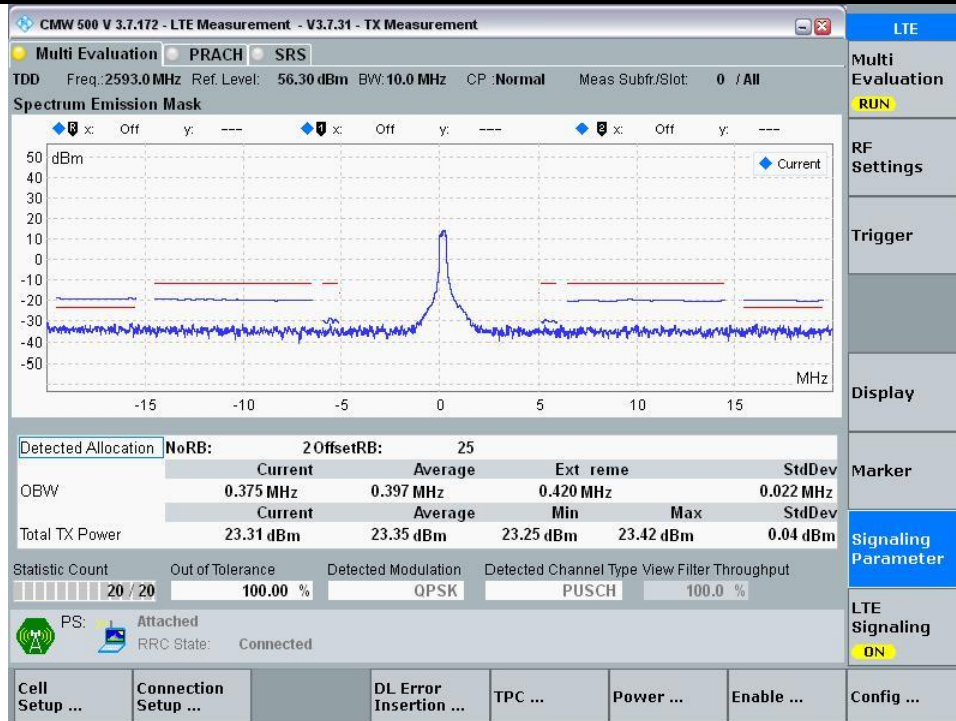
Plot #2 Conducted Output Power Verification for LTE Band 4



Plot #3 Conducted Output Power Verification for LTE Band 7



Plot #4 Conducted Output Power Verification for LTE Band 41



7.2 Radiated Spurious Emissions

7.2.1 Measurement utilizing KDB 971168 D01 Power Meas License Digital Systems v03r01, and according to ANSI/TIA-603-D-2010

Spectrum Analyzer Settings for FCC 22

Frequency Range	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

Spectrum Analyzer Settings for FCC 24 and 27

Frequency Range	30MHz – 1 GHz	1 – 2.7 GHz	2.7 – 18 GHz	18 – 19.1 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto	Auto

7.2.2 Limits:

7.2.2.1 FCC Part 22.917 (a); FCC Part 24.238 (a); FCC Part 27.53 (h)(m)

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

For Band 7 & 41, the minimum permissible attenuation level of any spurious emission is at least $55 + \log_{10}(P)$ [Watts]) on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

7.2.2.2 RSS-132 Part 5.5; RSS-133 Part 6.5; RSS-139 Part 5.6; RSS-199 Part 5.6 Transmitter Unwanted Emissions

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

i. In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

Note: The limit calculation result is a constant of -13 dBm.

Note: For LTE Band 7 and 41, the limit calculation result is a constant of -25 dBm.

7.2.3 Test conditions and setup:

Ambient Temperature (°C)	EUT Set-Up #	EUT operating mode	Power Input
23.8	1	Op. 1	12 VDC

7.2.4 Measurement result:

Plot #	Channel	EUT operating mode	Scan Frequency	Limit (dBm)	Result
1-5	Mid*	UMTS Band IV + Wi-Fi	9 kHz – 22 GHz	-13	Pass
6-10	Mid*	LTE Band 4+ Wi-Fi	9 kHz – 22 GHz	-13	Pass
11-15	Mid*	LTE Band 7+ Wi-Fi	9 kHz – 22 GHz	-25	Pass
16-20	Mid*	LTE Band 41+ Wi-Fi	9 kHz – 22 GHz	-25	Pass

*Note: Co-Transmission was performed with Wi-Fi 802.11g mode.

7.2.5 Measurement Plots:

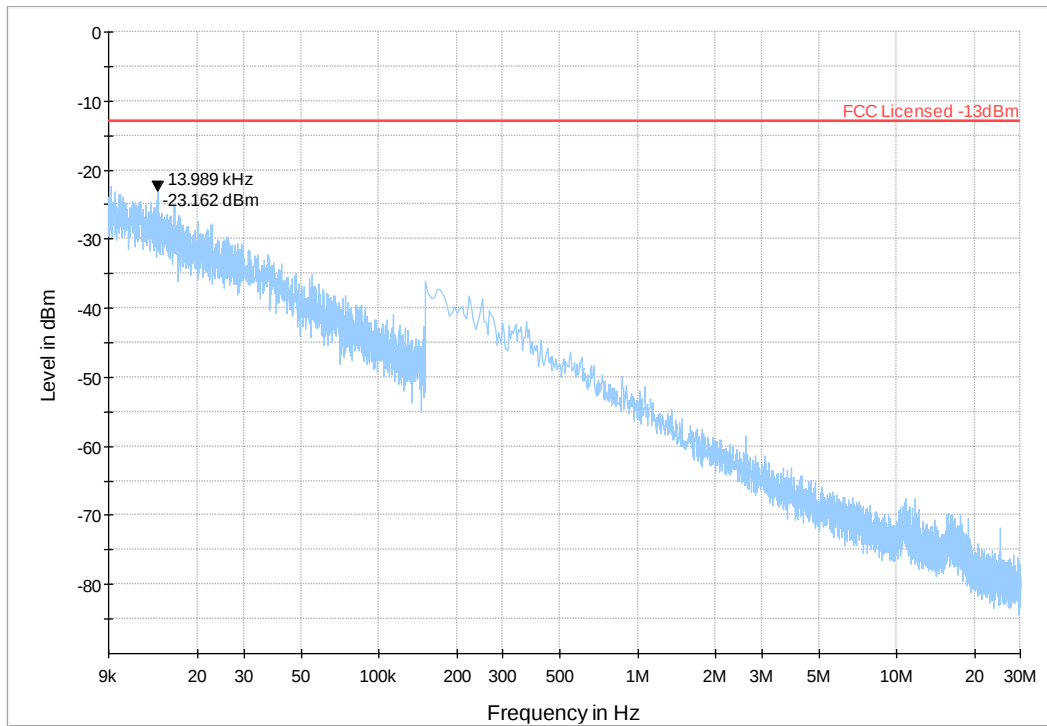
UMTS Band IV

Plot # 1 Radiated Emissions: 9 kHz - 30 MHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---		---	---	



Preview Result 1-PK+

FCC Licensed -13dBm

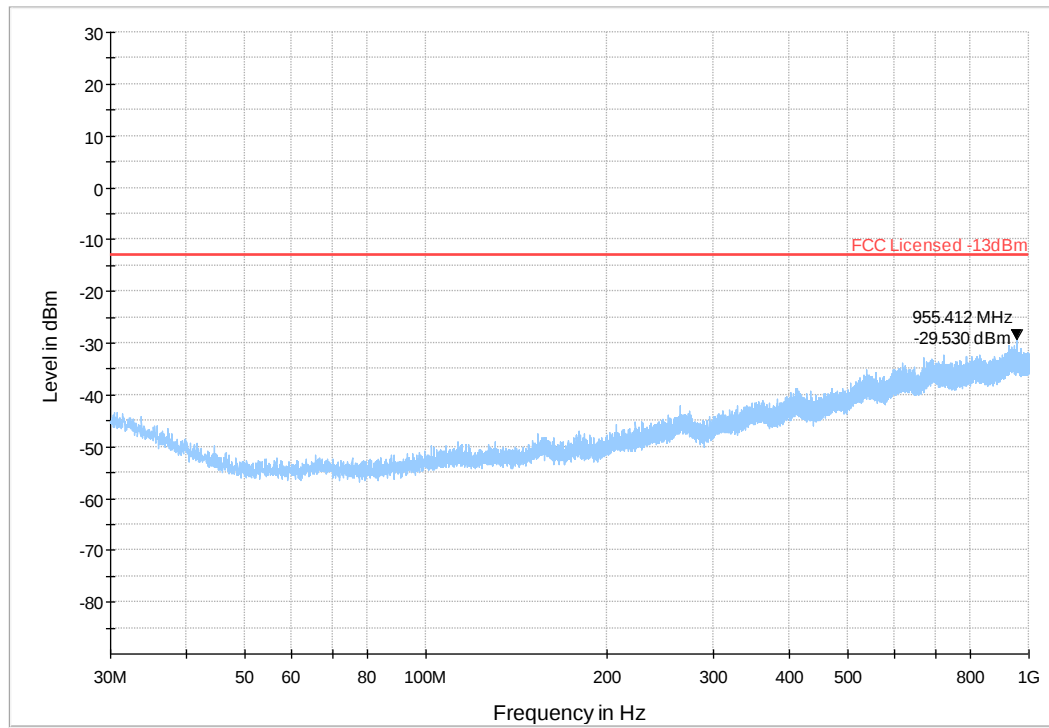
Final_Result RMS

Plot # 2 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment



Preview Result 1-PK+

FCC Licensed -13dBm

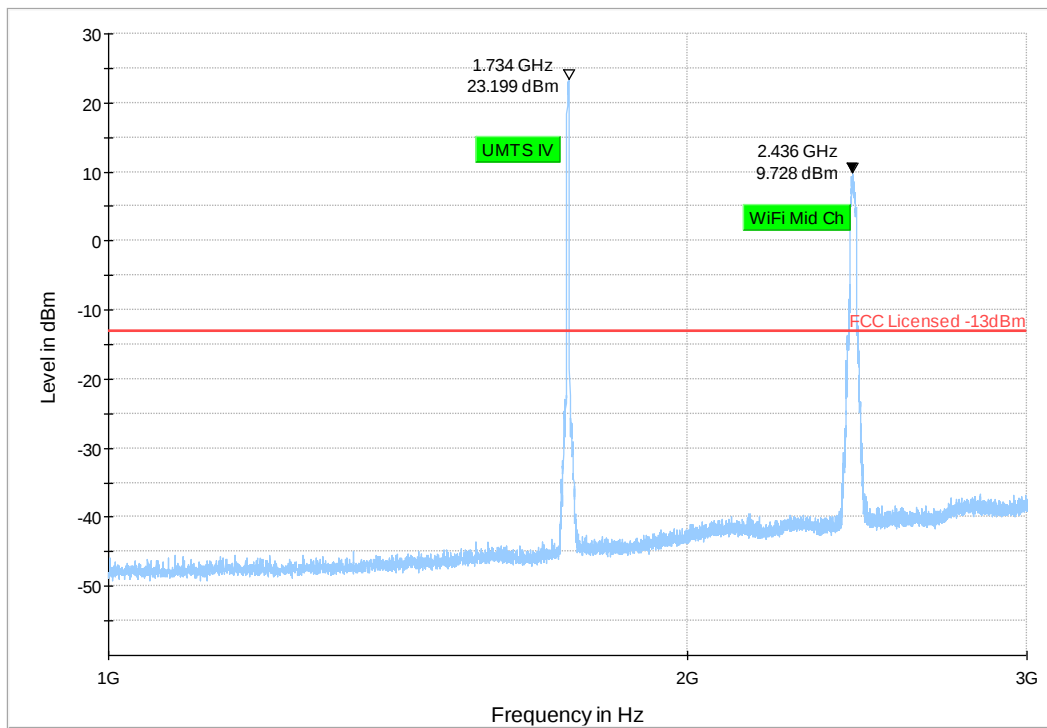
◆ Final_Result RMS

Plot # 3 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+

FCC Licensed -13dBm

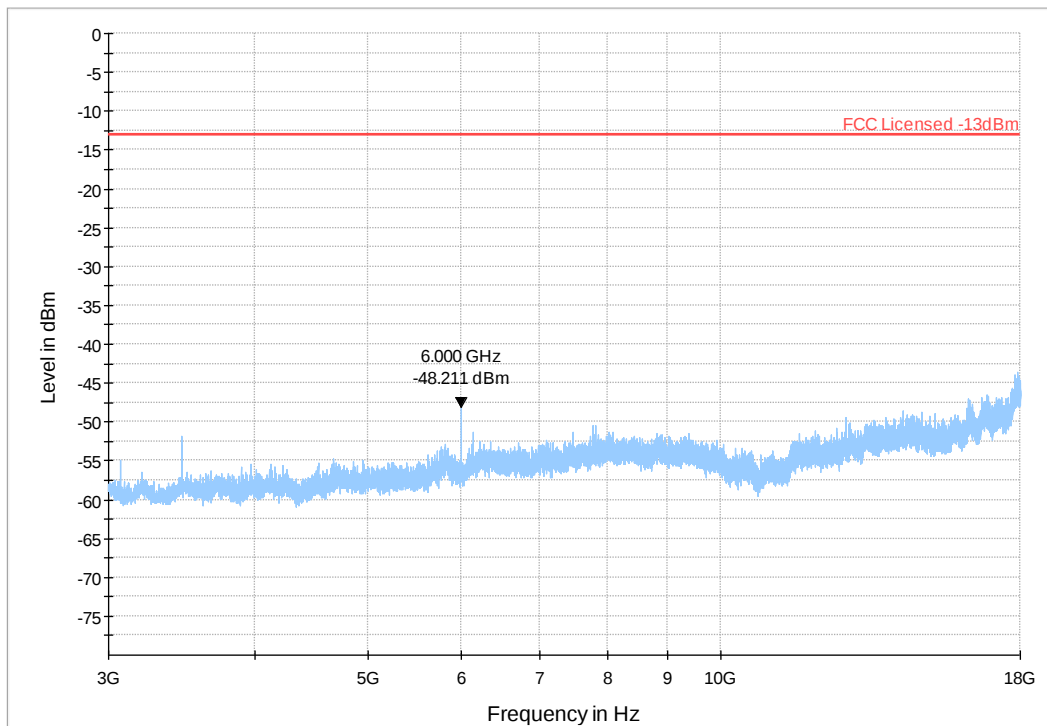
◆ Final_Result RMS

Plot # 4 Radiated Emissions: 3 GHz – 18 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



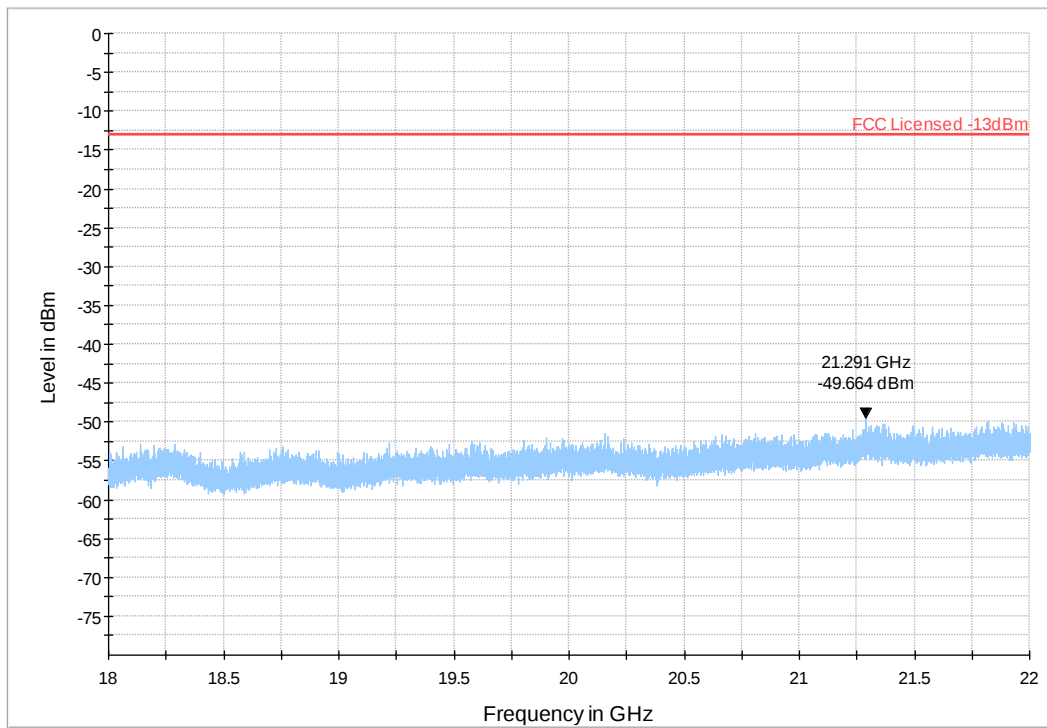
Preview Result 1-PK+ FCC Licensed -13dBm Final_Result RMS

Plot # 5 Radiated Emissions: 18 GHz – 22 GHz

Channel: Mid

Final Result

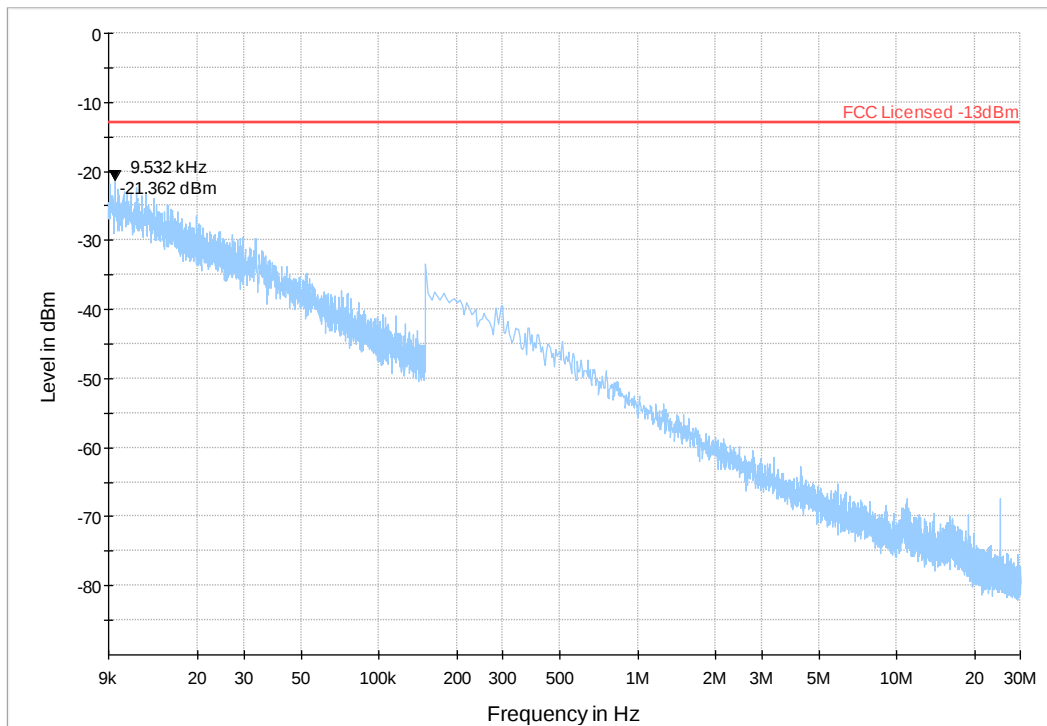
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+ FCC Licensed -13dBm Final_Result RMS

LTE Band 4**Plot # 6 Radiated Emissions: 9 kHz - 30 MHz****Channel: Mid****Final_Result**

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---		---	---	



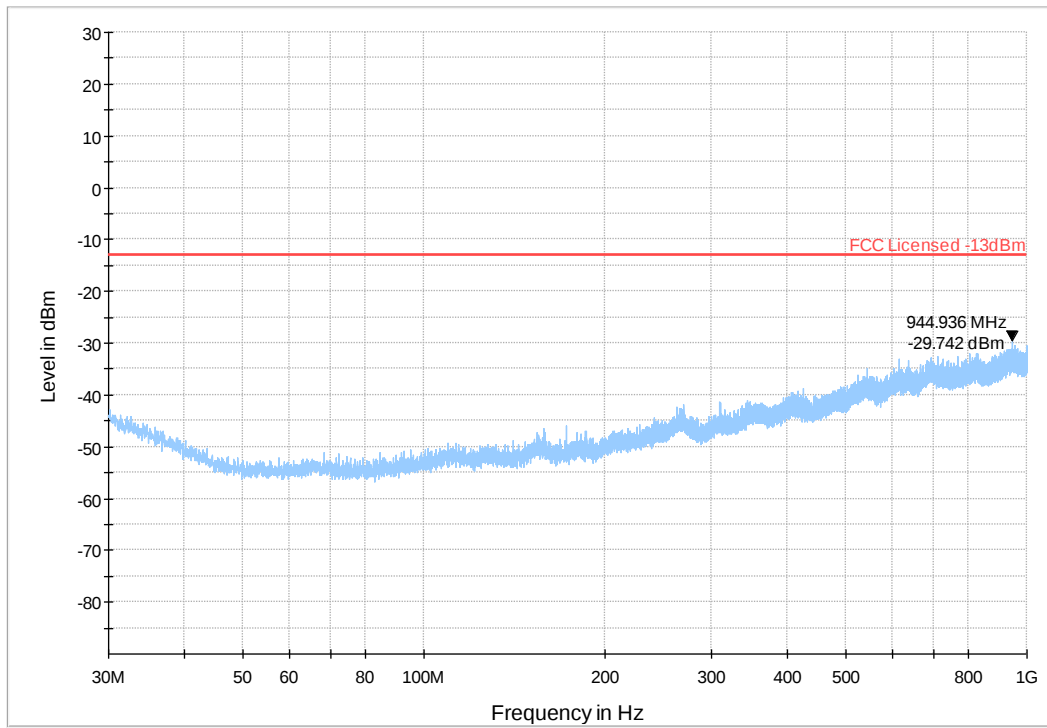
— Preview Result 1-PK+ — FCC Licensed -13dBm ◆ Final_Result RMS

Plot # 7 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment



Preview Result 1-PK+

FCC Licensed -13dBm



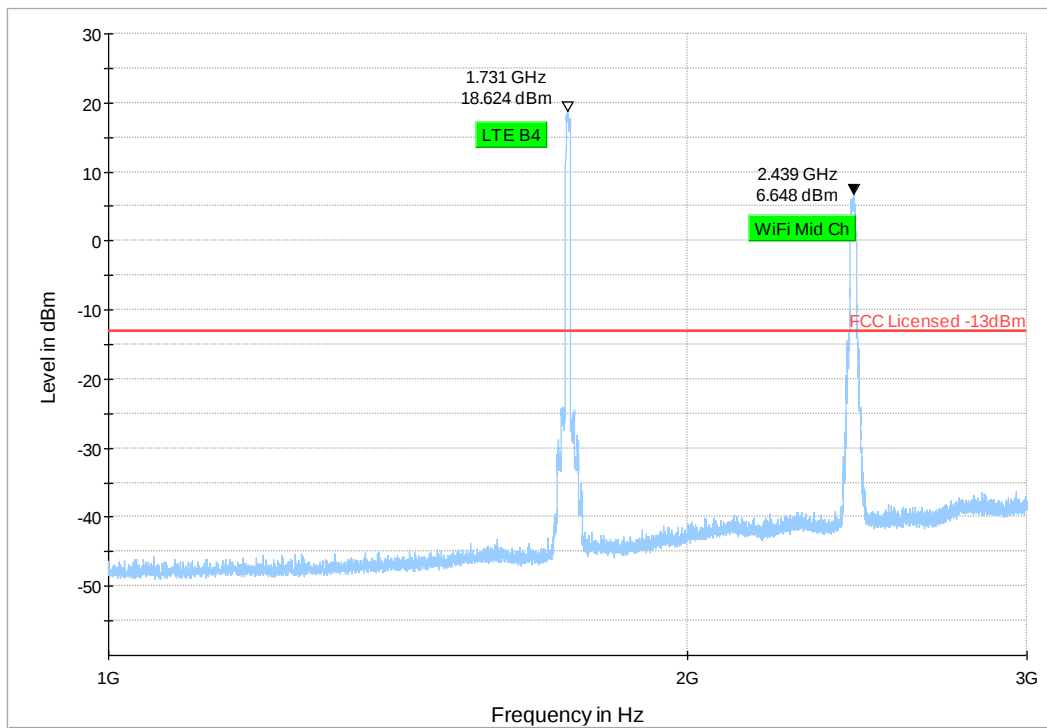
Final_Result RMS

Plot # 8 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+

FCC Licensed -13dBm

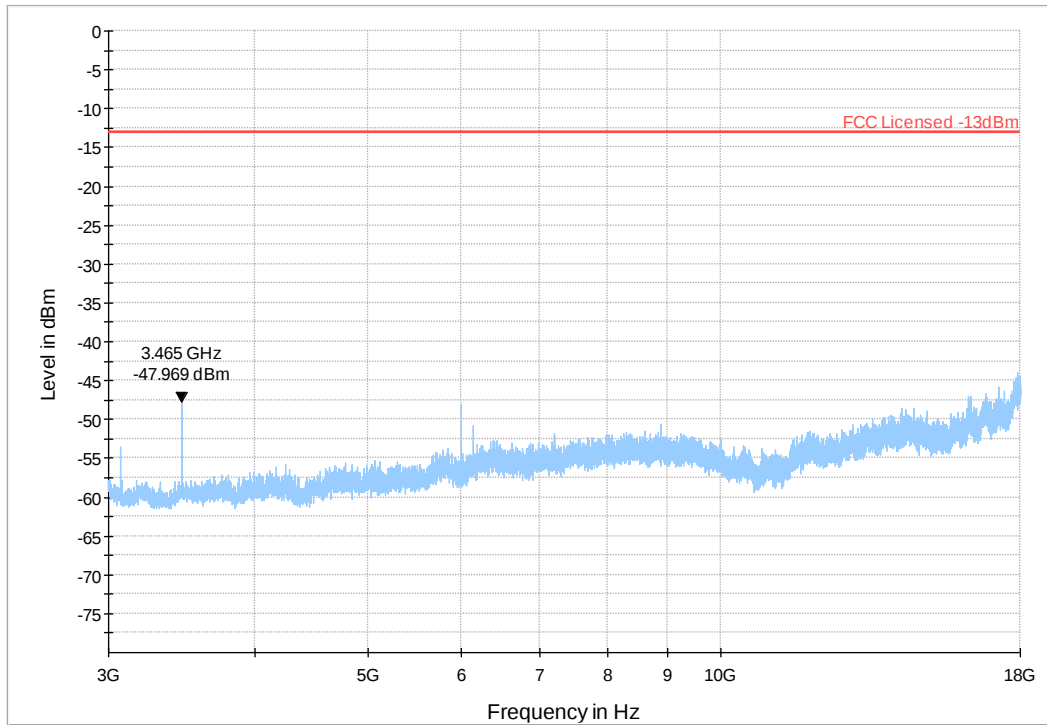
◆ Final_Result RMS

Plot # 9 Radiated Emissions: 3 GHz – 18 GHz

Channel: Mid

Final_Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



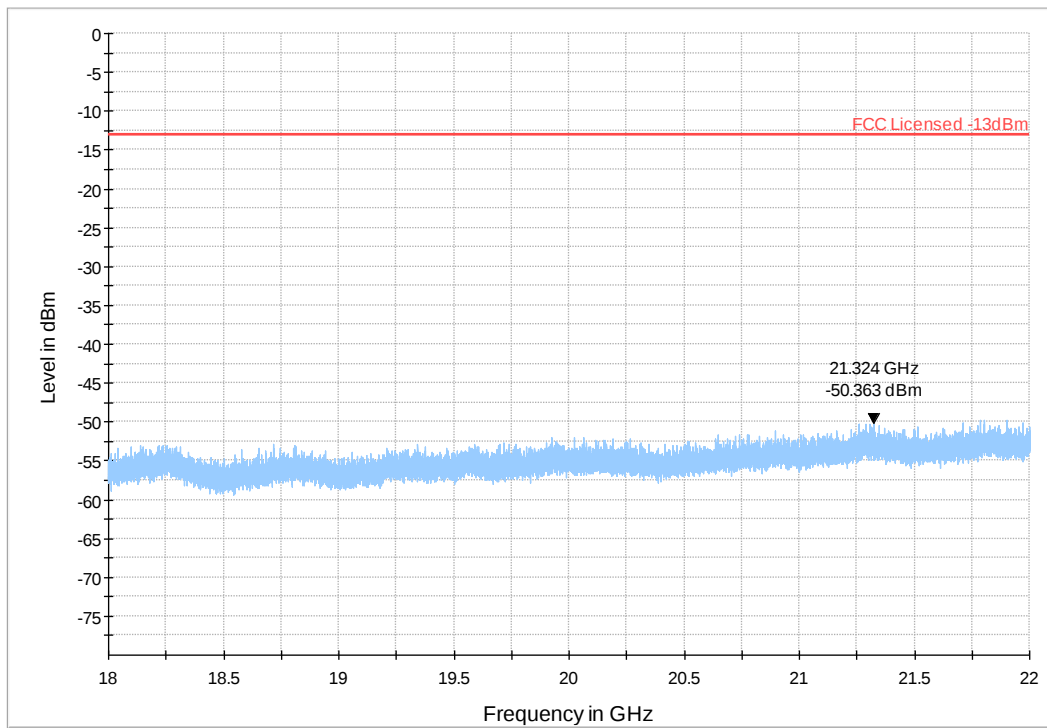
Preview Result 1-PK+ FCC Licensed -13dBm Final_Result RMS

Plot # 10 Radiated Emissions: 18 GHz – 22 GHz

Channel: Mid

Final Result

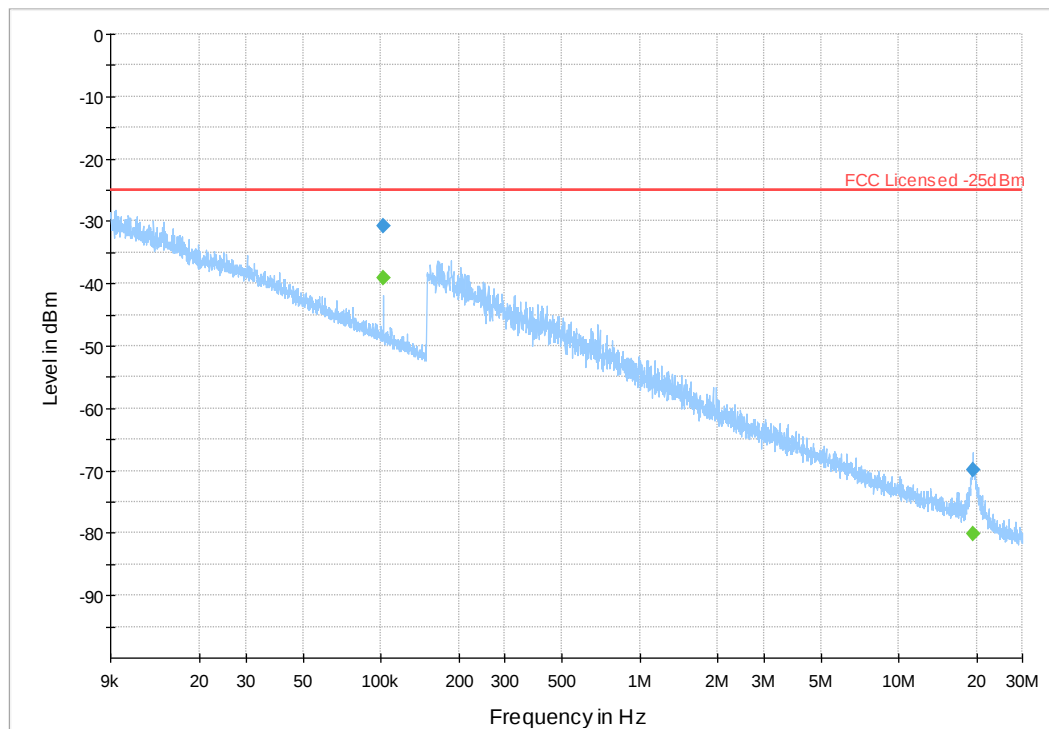
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+ FCC Licensed -13dBm Final_Result RMS

LTE Band 7**Plot # 11 Radiated Emissions: 9 kHz - 30 MHz****Channel: Mid****Final Result**

Frequency (MHz)	MaxPeak (dBm)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.102	-30.80	---	-25.00	5.80	500.0	1.000	100.0	H	111.0	-76.9
0.102	---	-39.16	---	---	500.0	1.000	100.0	H	111.0	-76.9
19.414	-69.94	---	-25.00	44.94	500.0	1.000	100.0	H	45.0	-78.7
19.414	---	-80.09	---	---	500.0	1.000	100.0	H	45.0	-78.7



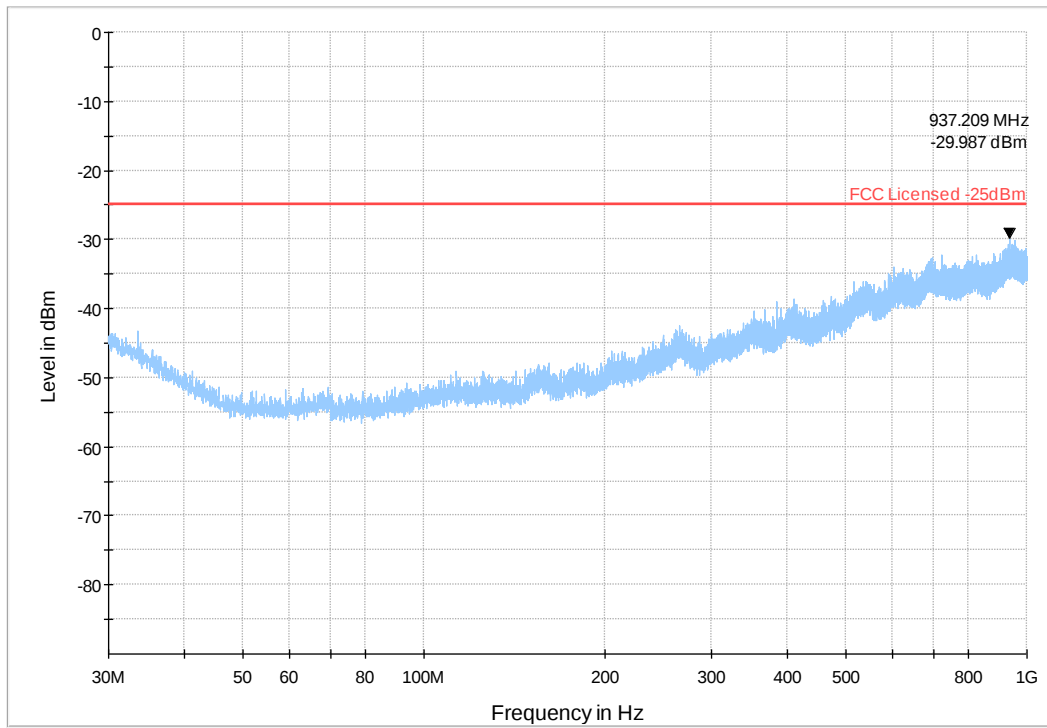
— Preview Result 1-RMS — FCC Licensed -25dBm ◆ Final_Result PK+ ◆ Final_Result RMS

Plot # 12 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment



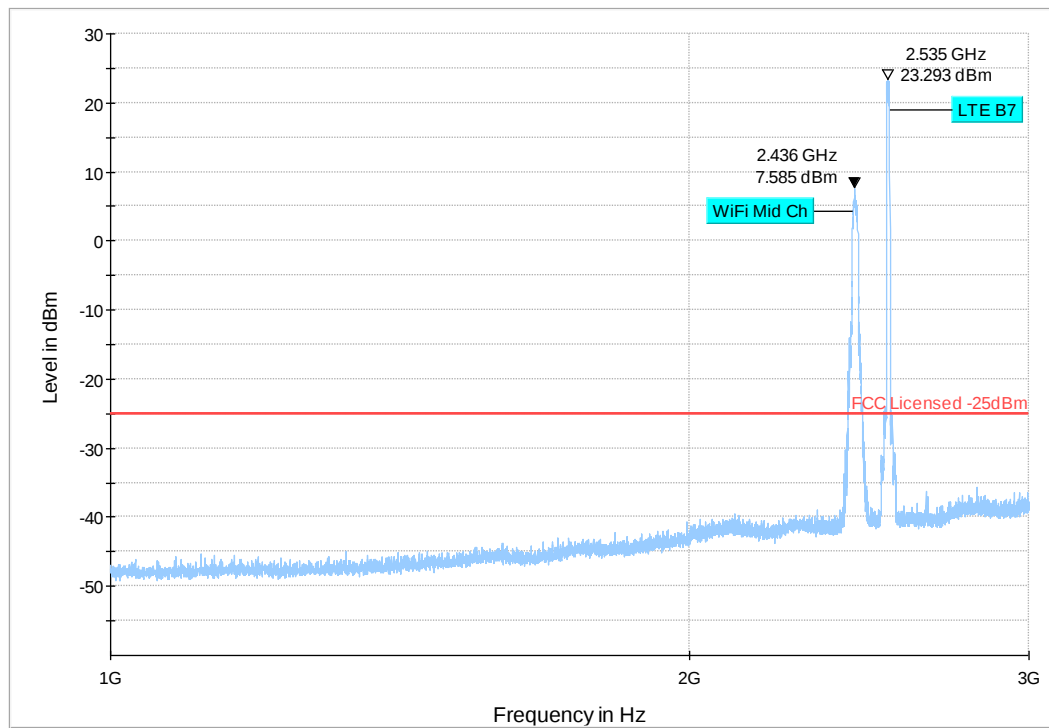
— Preview Result 1-PK+ — FCC Licensed -25dBm ◆ Final_Result RMS

Plot # 13 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+

FCC Licensed -25dBm

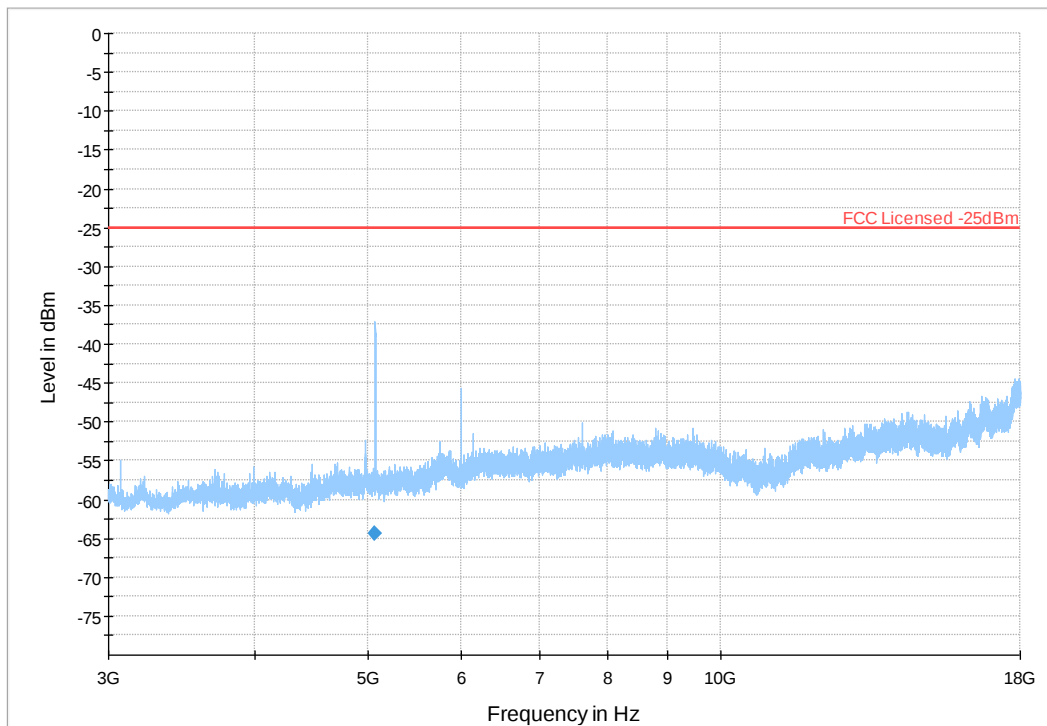
◆ Final_Result RMS

Plot # 14 Radiated Emissions: 3 GHz – 18 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
5068.500	-64.417	-25.00	39.417	500.0	1000.000	241.0	H	241.0	-99.5	



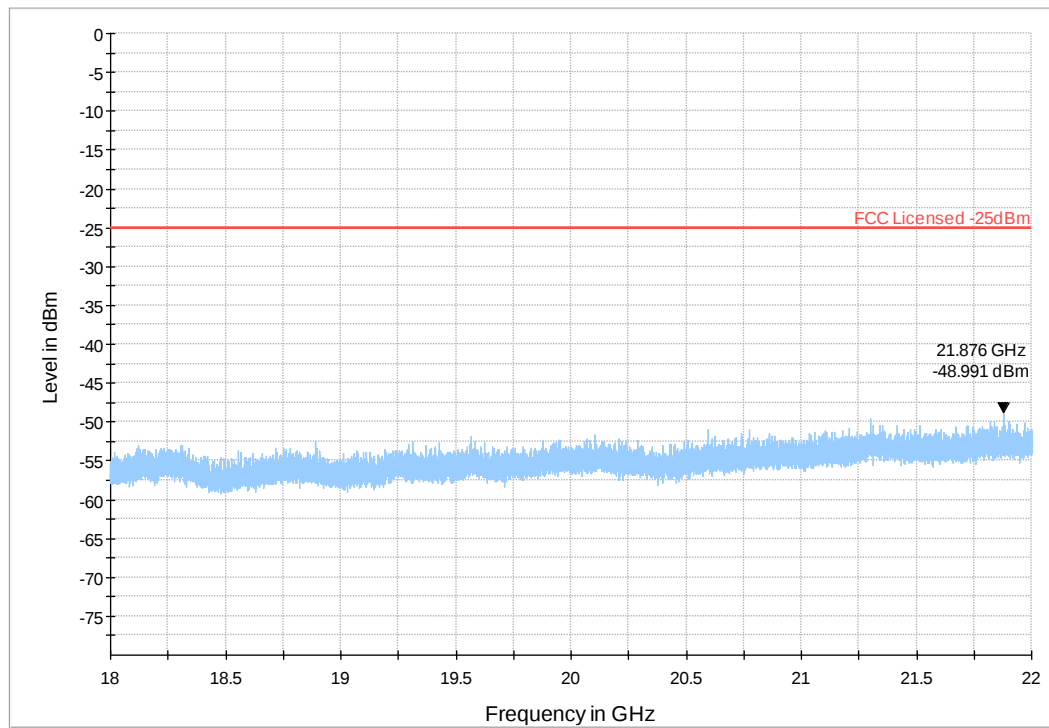
Preview Result 1-PK+ FCC Licensed -25dBm Final_Result RMS

Plot # 15 Radiated Emissions: 18 GHz – 22 GHz

Channel: Mid

Final Result

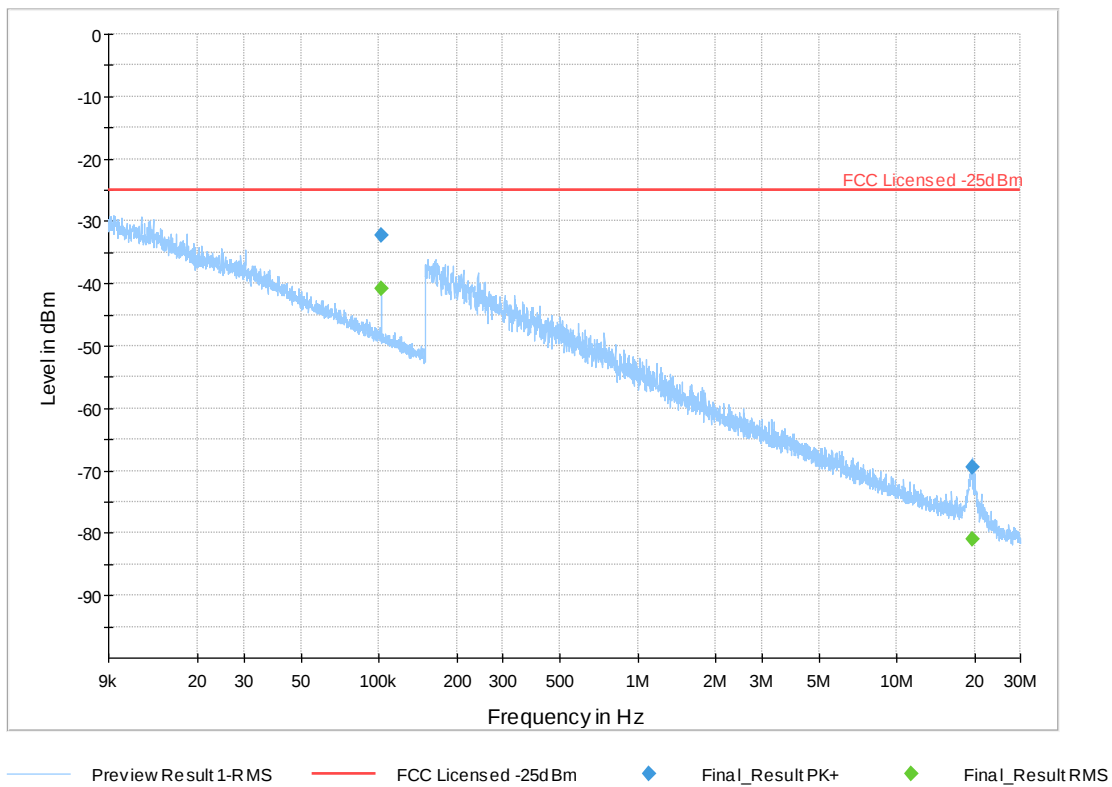
Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+ FCC Licensed -25dBm Final_Result RMS

LTE Band 41**Plot # 16 Radiated Emissions: 9 kHz - 30 MHz****Channel: Mid****Final Result**

Frequency (MHz)	MaxPeak (dBm)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
0.102	---	-40.87	---	---	500.0	1.000	275.0	H	122.0	-76.9
0.102	-32.37	---	-25.00	7.37	500.0	1.000	275.0	H	122.0	-76.9
19.638	---	-80.95	---	---	500.0	1.000	100.0	H	335.0	-78.7
19.638	-69.43	---	-25.00	44.43	500.0	1.000	100.0	H	335.0	-78.7

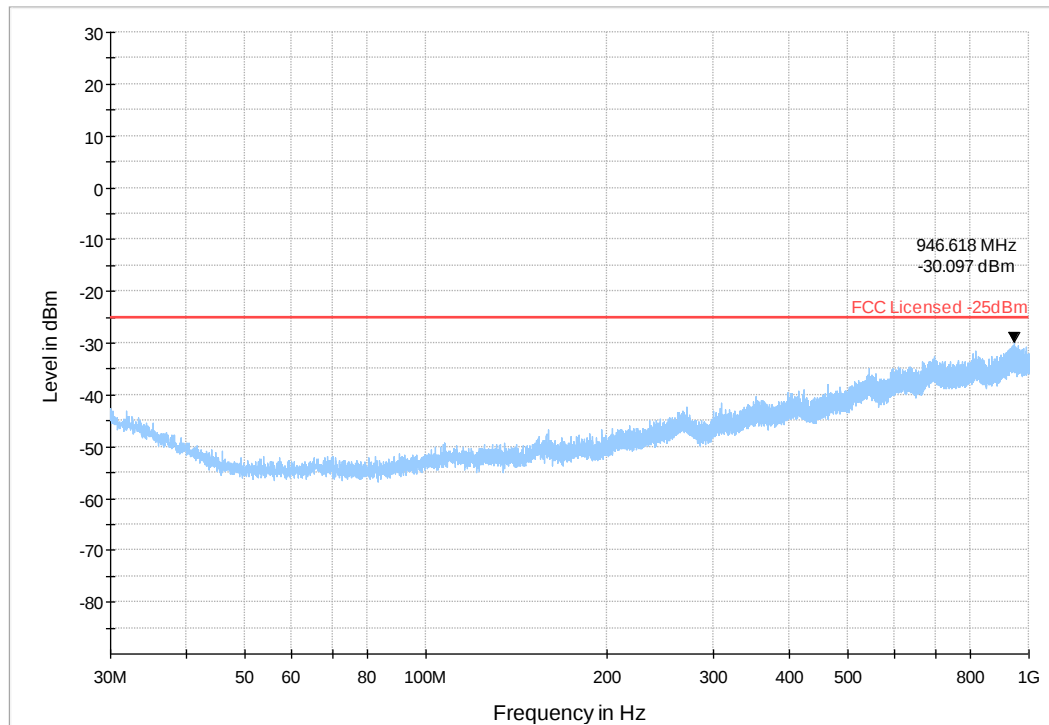


Plot # 17 Radiated Emissions: 30 MHz – 1GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment



Preview Result 1-PK+

FCC Licensed -25dBm



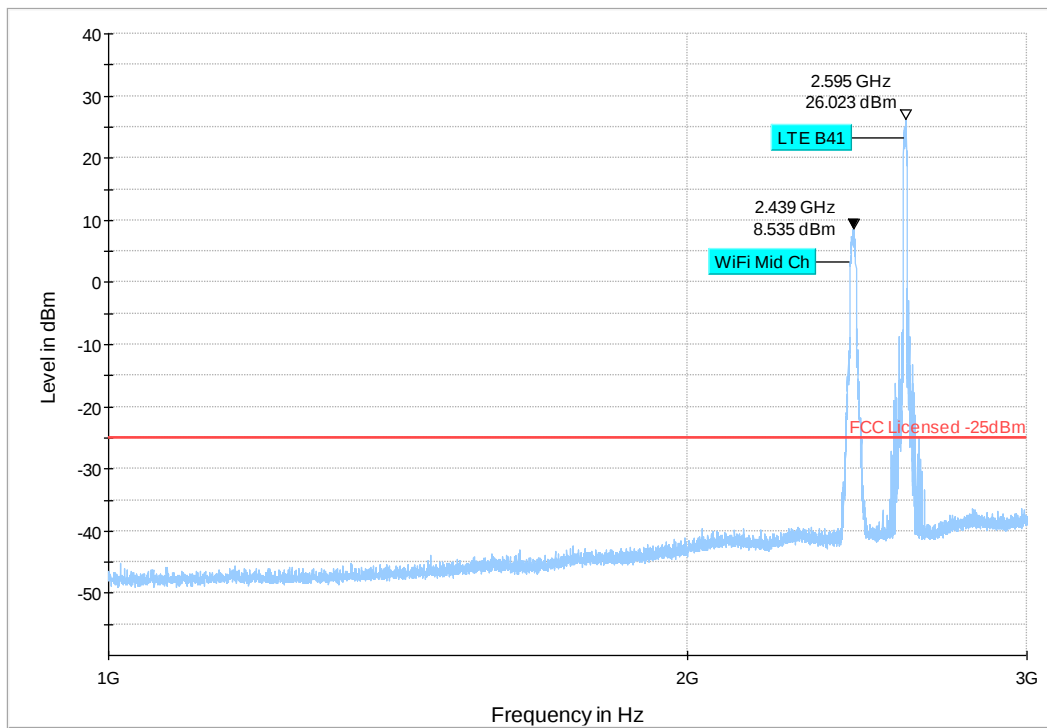
Final_Result RMS

Plot # 18 Radiated Emissions: 1 GHz - 3 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+

FCC Licensed -25dBm

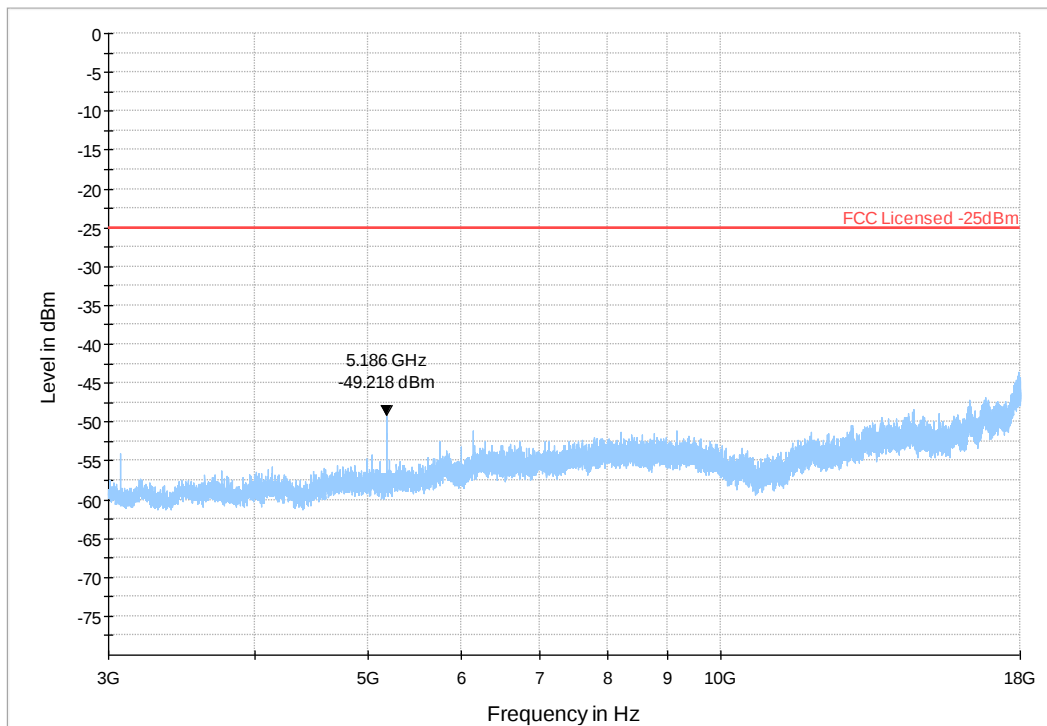
◆ Final_Result RMS

Plot # 19 Radiated Emissions: 3 GHz – 18 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+

FCC Licensed -25dBm

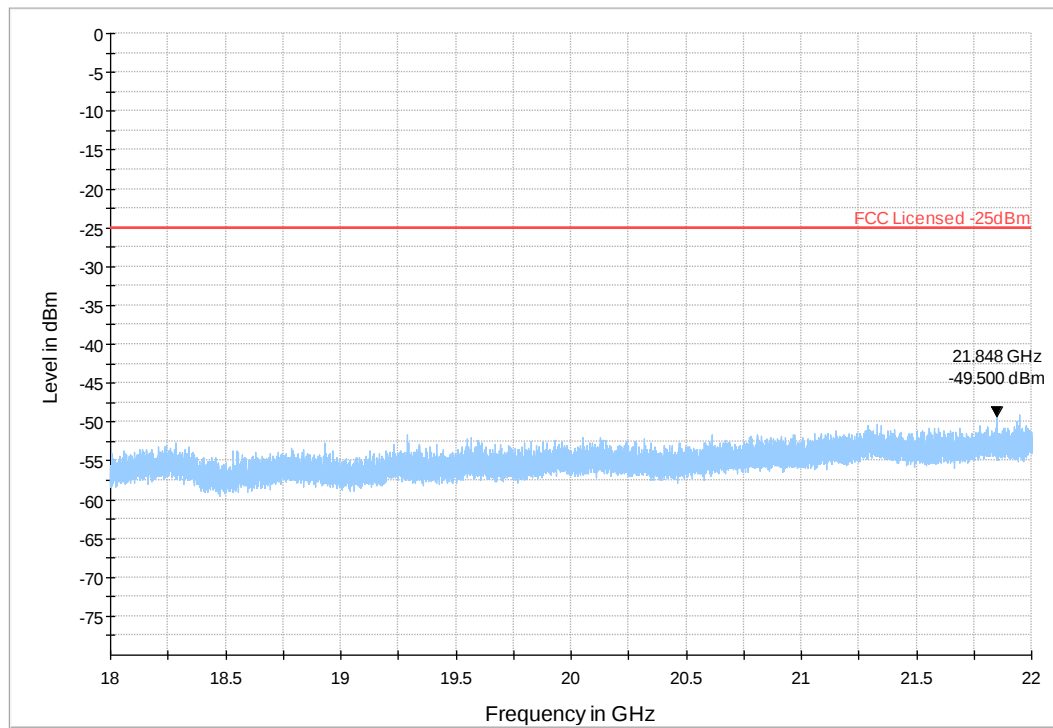
Final_Result RMS

Plot # 20 Radiated Emissions: 18 GHz – 22 GHz

Channel: Mid

Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
---	---	---	---	---	---	---	---	---	---	---



Preview Result 1-PK+ FCC Licensed -25dBm Final_Result RMS

8 Test setup photos

Setup photos are included in supporting file name: "EMC_GARMI_116_23001_FCC_27_Setup_photos.pdf"

9 Test Equipment and Ancillaries Used For Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
ACTIVE LOOP ANTENNA	ETS LINDGREN	6507	00161344	3 YEARS	10/30/2020
BILOG ANTENNA	ETS.LINDGREN	3142E	00166067	3 YEARS	10/21/2021
HORN ANTENNA	EMCO	3115	00035111	3 YEARS	09/30/2021
HORN ANTENNA	ETS.LINDGREN	3117	00215984	3 YEARS	01/31/2021
HORN ANTENNA	ETS.LINDGREN	3116	00070497	3 YEARS	11/23/2020
TEST RECEIVER	R&S	ESU40	100251	3 YEARS	09/13/2021
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	1201.002K50-127068-mX	3 Years	5/22/2022
DIGITAL THERMOMETER	CONTROL COMPANY	36934-164	181230565	3 YEARS	10/20/2021

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.

10 Revision History

Date	Template Revision	Changes to report	Prepared by
2023-09-13	EMC_GARMI_116_23001_FCC_27	Initial Version	Art Thammanavarat
2023-09-19	EMC_GARMI_116_23001_FCC_27_Rev.1	<u>Report Revised based on Reviewer's comments</u> 1. Secs 1, 4, 6 and 7.2.2: Added RSS-199 Issue 4 2. Sec 4: Corrected Typo 3. Secs 7.2.2.2: Corrected Typo	Art Thammanavarat

<<< The End >>>