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Calian Advanced Technologies TEST REPORT

SCOPE OF WORK

EMC TESTING – RUKKUS LTEM

REPORT NUMBER

105007035LEX-003

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EMC TEST REPORT (FULL COMPLIANCE)

Report Number: 105007035LEX-003

Project Number: G105007035

Report Issue Date: 3/31/2022

Model(s) Tested: Rukkus LTEM

Standards: FCC Part 15B
ICES-003 Issue 7
FCC Part 22, 24, 27, 90
(Radiated Spurious Emissions)

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Dr.
Lexington, KY 40510
USA

Client:
Calian Advanced Technologies
18 Innovation Boulevard
Saskatoon, Saskatchewan, S7N 3R1
Canada

Report prepared by



Michael Carlson,
EMC Engineer

Report reviewed by



Brian Lackey,
Team Leader

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
6	Radiated Emissions (Transmitters Idle) (ANSI C63.4:2014)	Pass
6	Radiated Spurious Emissions (Transmitters Active) (ANSI C63.26:2015)	Pass
-	Conducted Emissions (ANSI C63.4:2014)	Pass ¹

¹ The EUT is battery powered and does not connect to AC mains.



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Calian Advanced Technologies
Address:	18 Innovation Boulevard Saskatoon, Saskatchewan, S7N 3R1 Canada
Contact:	Scott Jasken
Telephone:	13069331608
Email:	Scott.jasken@calian.com
Manufacturer Information	
Manufacturer Name:	Calian Advanced Technologies
Manufacturer Address:	18 Innovation Boulevard Saskatoon, Saskatchewan, S7N 3R1 Canada



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Rukkus LTEM
Model Number	Rukkus LTEM
Hardware Version	3
Software Version	7
Supported Transmit Bands	LTE Bands: 2, 4, 5, 12, 13, 25, 26
Embedded Module	uBlox SARA-R510S
Embedded Module hardware Version	SARA-R510S-00B-01
Embedded Module Software Version	02.06,A00.01
Embedded Module FCCID	XPYUBX19KM01
Receive Date	3/20/2022
Test Start Date	3/27/2022
Test End Date	3/28/2022
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	7VDC
Low Voltage	3VDC
High Voltage	10VDC
Description of Equipment Under Test (provided by client)	
The Rukkus LTEM is a remote sensing agricultural device.	

4.1 Variant Models:

There were no variant models covered by this evaluation.



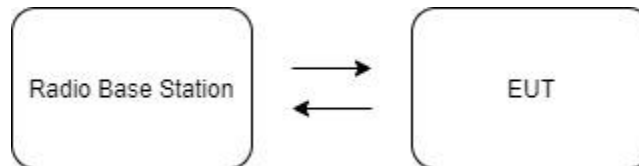
5 System Setup and Method

5.1 Method:

Configuration as required by ANSI C63.4:2014 and ANSI C63.26:2015.

No.	Descriptions of EUT Exercising
1	Battery Power: ON, Cell Radio: ON connected to a CMW 500 Base Station Simulator
2	Battery Power: ON, Cell Radio: OFF

5.2 EUT Block Diagram:





5.3 EUT Photo (Front):





5.4 EUT Photo (Back):





6 Radiated Emissions

6.1 Method

Tests are performed in accordance with ANSI C63.4:2014 and ANSI C63.26:2015.

TEST SITE: 10m ALSE

Site Designation: 10m Chamber

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	U _{CISPR}
Radiated Emissions, 10m	30-1000 MHz	3.9dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.0dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.7dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required.



6.2 Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$
$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

6.3 Field Strength to Power Calculation

As allowable by ANSI C63.26: 2015 section 5.2.7, the output power of unwanted emissions can be calculated from a field strength measurement. The transmitter measurements that follow in this report have applied the following calculation to the -13dBm limit to arrive an equivalent field strength limit at 3 meters as follows:

$E \text{ (dB}\mu\text{V/m)} = \text{EIRP (dBm)} - 20\log(D) + 104.8$; where D is the measurement distance (in the far field region) in m.

Example:

$$\text{Limit (dB}\mu\text{V/m)} = -13 - 20\log(3) + 104.8 = 82.25 \text{ dB}\mu\text{V/m}$$

**6.4 Test Equipment Used:**

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8181	Rohde & Schwarz	ESW44	11/16/2021	11/16/2022
Bilog Antenna	3133	ETS	3142C	8/26/2021	8/26/2022
Horn Antenna	3780	ETS	3117	6/28/2021	6/28/2022
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
Preamplifier	3918	Rohde&Schwarz	TS-PR18	1/13/2022	1/13/2023
Preamplifier	3920	Rohde & Schwarz	TS-PR26	1/13/2022	1/13/2023
Coaxial Cable	3074			1/13/2022	1/13/2023
Coaxial Cable	2588			1/13/2022	1/13/2023
Coaxial Cable	2593			1/13/2022	1/13/2023
Coaxial Cable	2592			1/13/2022	1/13/2023
Coaxial Cable	3339			1/13/2022	1/13/2023

6.5 Software Utilized:

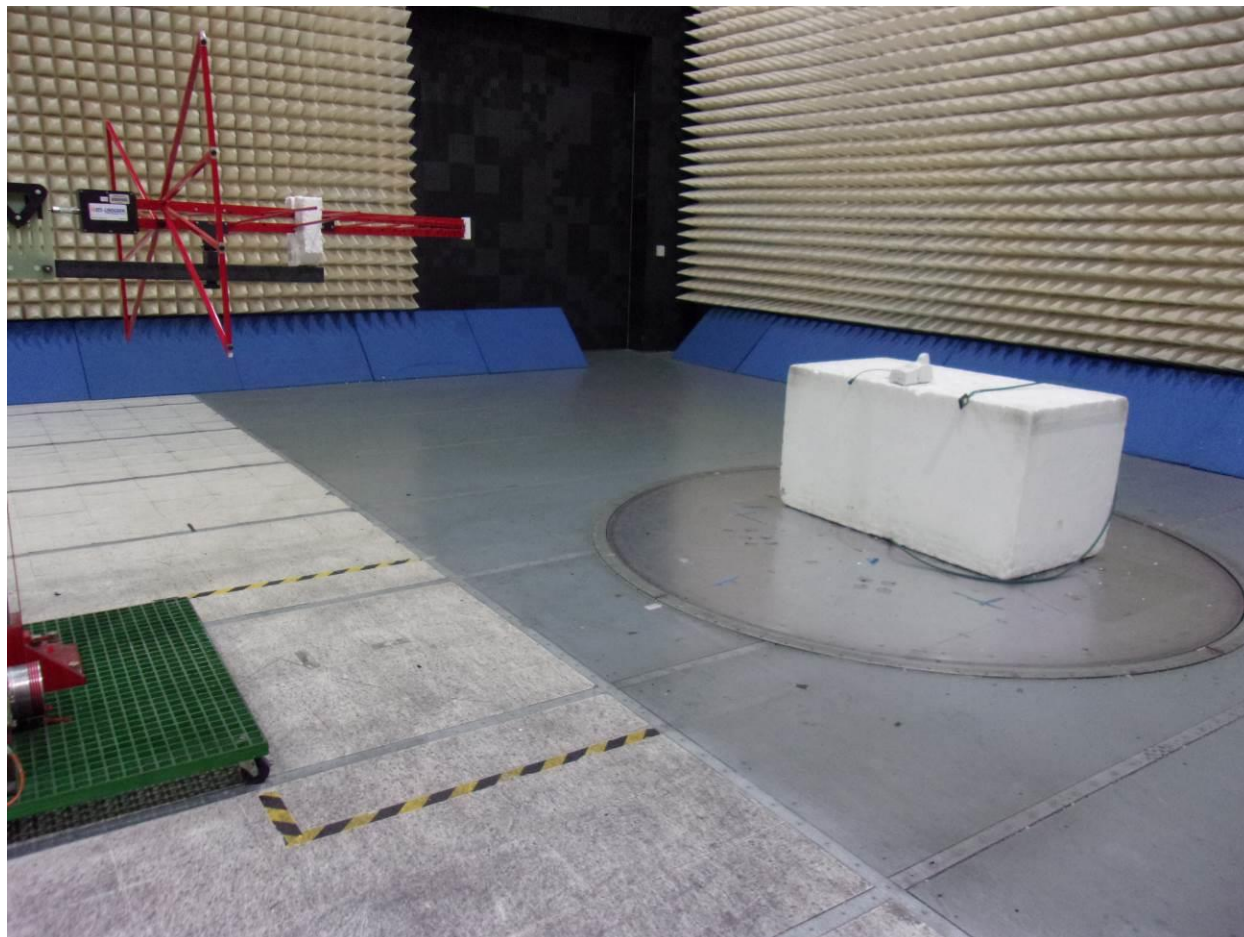
Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 10.60.20

6.6 Results:

The sample tested was found to Comply.

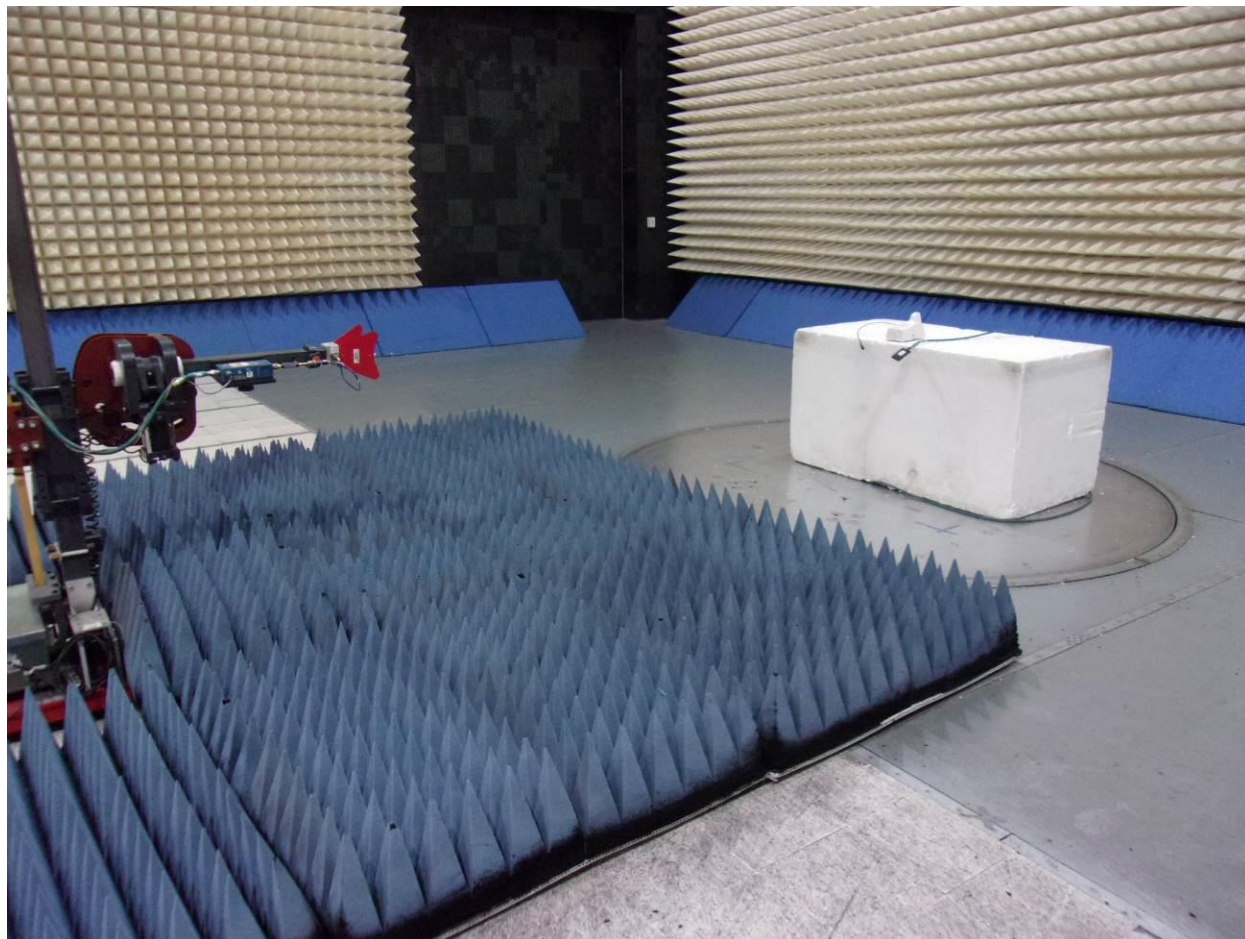


6.7 Setup Photographs: Radiated Emissions (FCC Part 15B/22/24/27/90 Below 1GHz)



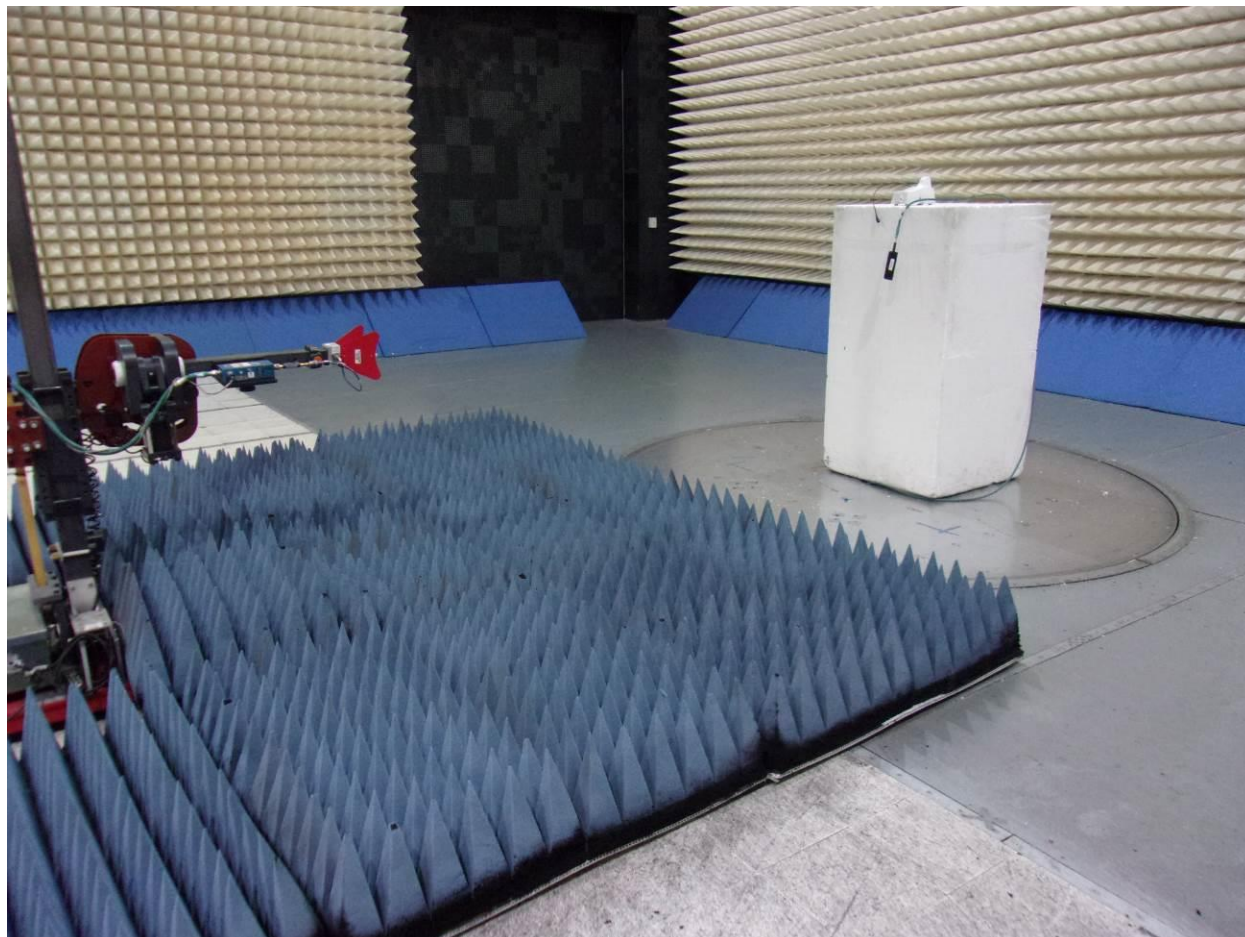


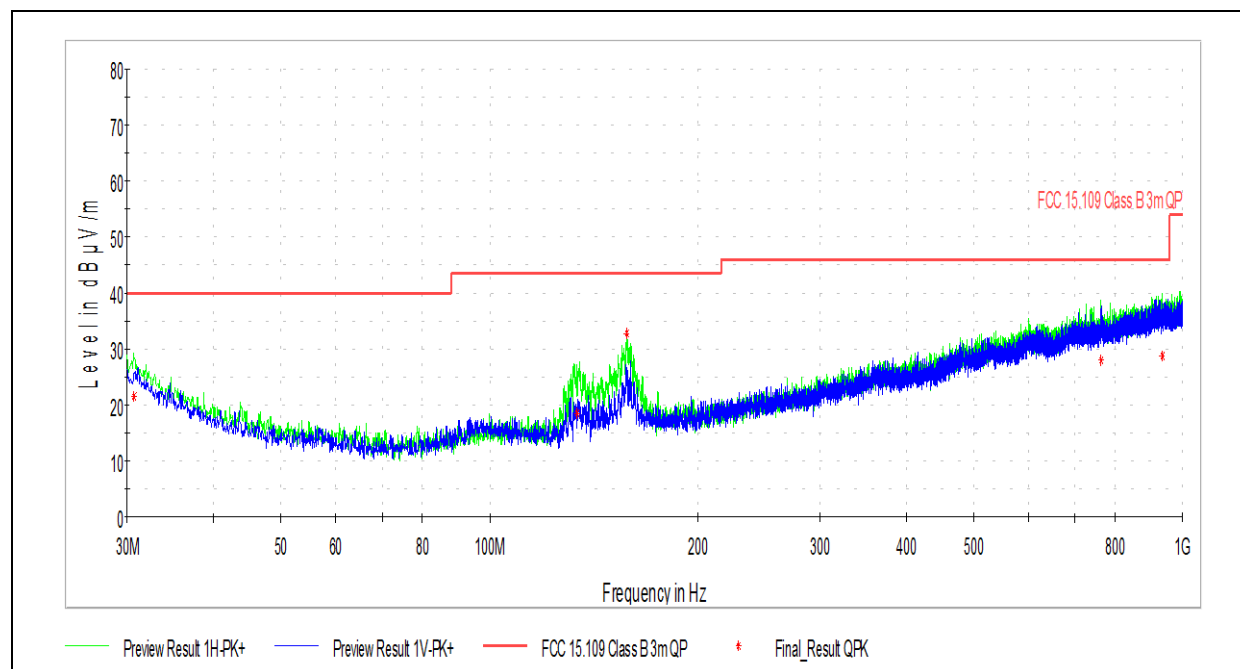
6.8 Setup Photographs: Radiated Emissions (FCC Part 15B Above 1GHz)





6.9 Setup Photographs: Radiated Emissions (FCC Part 22/24/27/90 Above 1GHz)



**6.10 Plots/Data: Radiated Emissions, 30MHz – 1GHz (Transmitters Idle)**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.646667	21.60	40.000	18.40	120.000	100.0	H	164.0	24.80
133.897778	18.56	43.522	24.97	120.000	261.0	H	7.0	15.70
157.716667	32.79	43.522	10.73	120.000	120.0	H	206.0	18.14
763.320000	27.96	46.021	18.07	120.000	131.0	H	60.0	34.18
935.548889	28.78	46.021	17.25	120.000	383.0	H	220.0	37.02

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: (Where Applicable) N/A

Product Standard: FCC Part 15B

Input Voltage: ICES-003 Issue 7

Pretest Verification w / Ambient Signals or BB Source: 7VDC Battery

Yes

Test Date: 3/28/2022

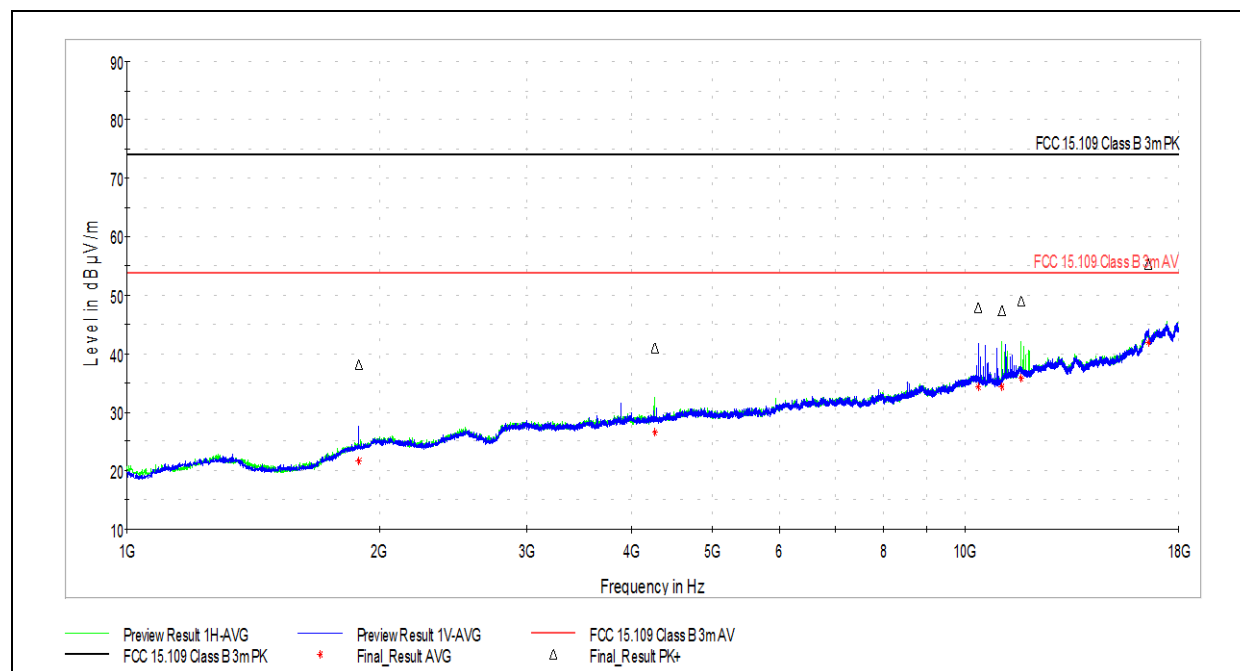
Limit Applied: Class B

Ambient Temperature: 21.4°C

Relative Humidity: 19.5%

Atmospheric Pressure: 987.1 mbar

Deviations, Additions, or Exclusions: The FCC Part 15.109 limits are more stringent than the corresponding limits from ICES-003 Issue 7.

**6.11 Plots/Data: Radiated Emissions, 1GHz – 18GHz (Transmitters Idle)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1891.500000	38.10	73.979	35.88	1000.000	100.0	V	278.0	2.71
4262.500000	40.94	73.979	33.04	1000.000	100.0	H	258.0	8.29
10363.000000	47.84	73.979	26.14	1000.000	410.0	V	0.0	17.72
11076.000000	47.43	73.979	26.55	1000.000	294.0	H	0.0	18.61
11663.500000	48.95	73.979	25.03	1000.000	410.0	H	21.0	19.38
16548.000000	55.29	73.979	18.69	1000.000	356.0	V	0.0	25.93

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1891.500000	21.62	53.979	32.36	1000.000	100.0	V	278.0	2.71
4262.500000	26.59	53.979	27.39	1000.000	100.0	H	258.0	8.29
10363.000000	34.26	53.979	19.72	1000.000	410.0	V	0.0	17.72
11076.000000	34.27	53.979	19.71	1000.000	294.0	H	0.0	18.61
11663.500000	35.81	53.979	18.17	1000.000	410.0	H	21.0	19.38
16548.000000	41.92	53.979	12.06	1000.000	356.0	V	0.0	25.93

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: (Where Applicable) N/A

FCC Part 15B

Product Standard: ICES-003 Issue 7

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022

Limit Applied: Class B

Ambient Temperature: 20.9°C

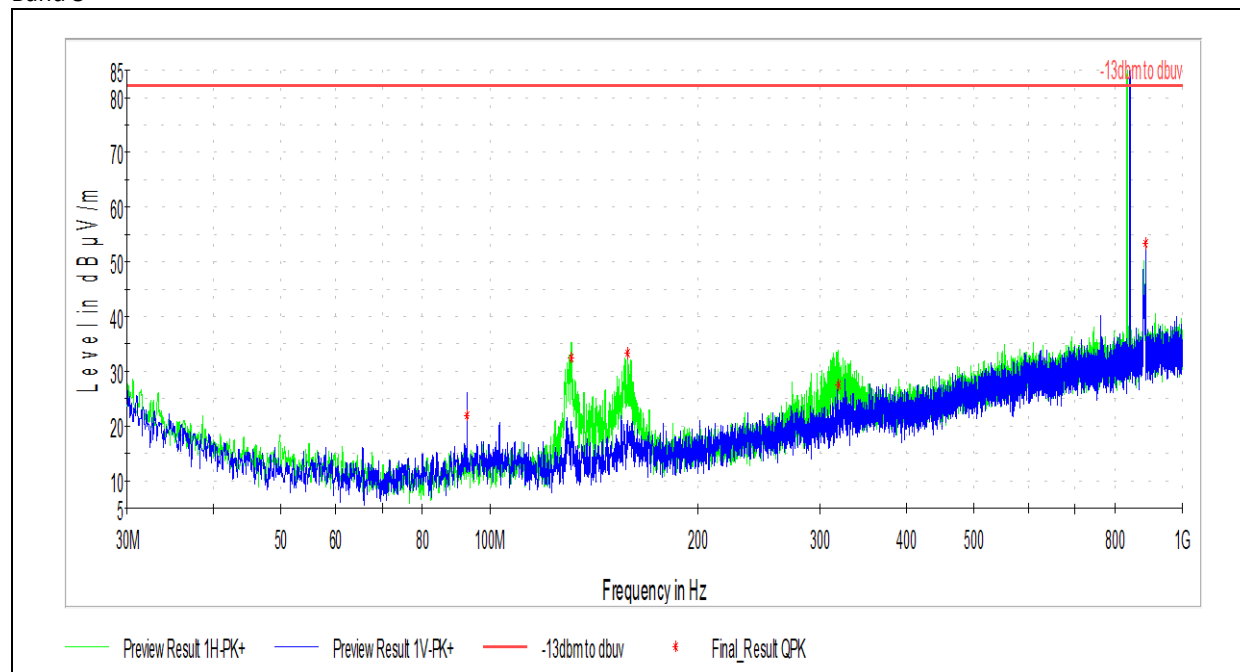
Relative Humidity: 22.2%

Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None

**6.12 FCC Part 22 Radiated Spurious Emissions (LTE B5)****6.12.1 Radiated Spurious Emissions, 30 MHz – 1 GHz**

Band 5



*The large peak shown is the fundamental frequency of the operating band.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
92.834444	21.88	82.250	60.37	120.000	100.0	V	179.0	16.50
131.311111	32.59	82.250	49.66	120.000	140.0	H	188.0	15.57
158.309444	33.37	82.250	48.88	120.000	116.0	H	218.0	18.12
318.844444	27.46	82.250	54.79	120.000	95.0	H	336.0	24.47
883.923333	53.28	82.250	28.97	120.000	151.0	V	208.0	35.17

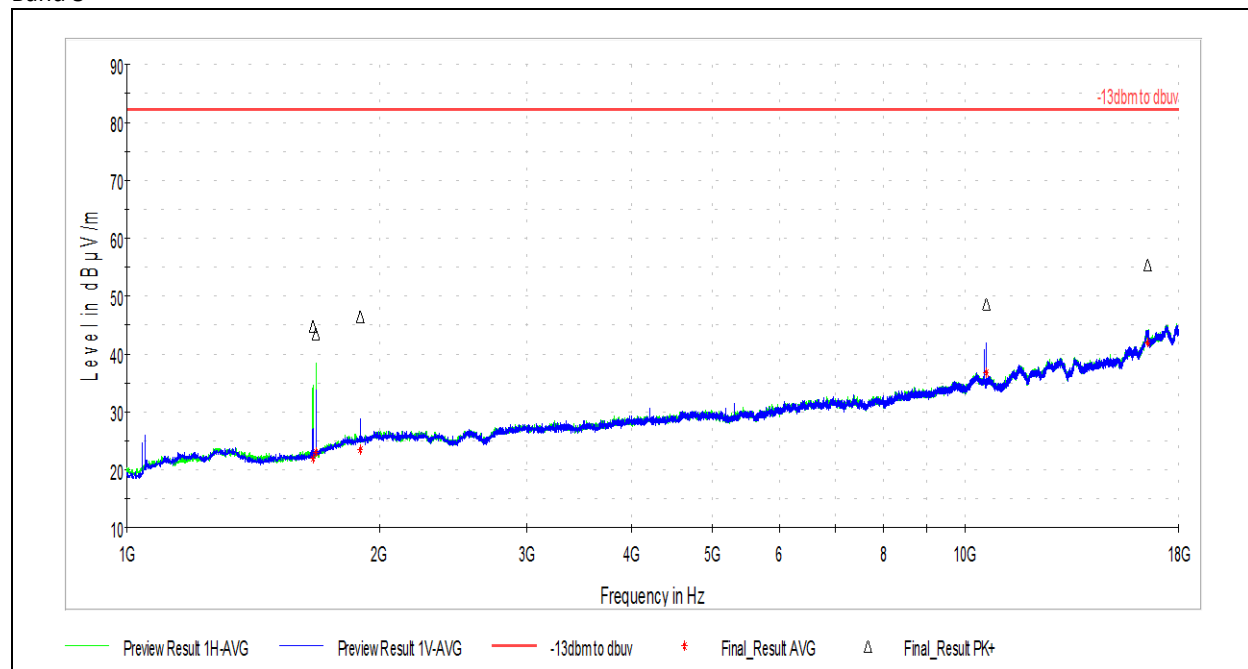
Test Personnel: Michael Carlson
 Supervising/Reviewing Engineer: _____
 (Where Applicable) N/A
 Product Standard: FCC Part 22
 Input Voltage: 7VDC Battery
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/28/2022
 Limit Applied: -13dBm converted to field strength
 Ambient Temperature: 21.4°C
 Relative Humidity: 19.5%
 Atmospheric Pressure: 987.1 mbar

Deviations, Additions, or Exclusions: None

**6.12.2 Radiated Spurious Emissions, 1 GHz – 18 GHz**

Band 5



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1665.500000	44.88	82.250	37.37	1000.000	248.0	H	194.0	-0.27
1681.500000	43.42	82.250	38.83	1000.000	109.0	H	194.0	-0.18
1898.000000	46.59	82.250	35.66	1000.000	109.0	V	320.0	2.69
10602.500000	48.60	82.250	33.65	1000.000	109.0	V	173.0	18.10
16523.500000	55.54	82.250	26.71	1000.000	100.0	V	205.0	25.83

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1665.500000	21.96	82.250	60.29	1000.000	248.0	H	194.0	-0.27
1681.500000	23.05	82.250	59.20	1000.000	109.0	H	194.0	-0.18
1898.000000	23.54	82.250	58.71	1000.000	109.0	V	320.0	2.69
10602.500000	36.66	82.250	45.59	1000.000	109.0	V	173.0	18.10
16523.500000	42.01	82.250	40.24	1000.000	100.0	V	205.0	25.83

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: N/A

(Where Applicable) Product Standard: FCC Part 22

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 20.9°C

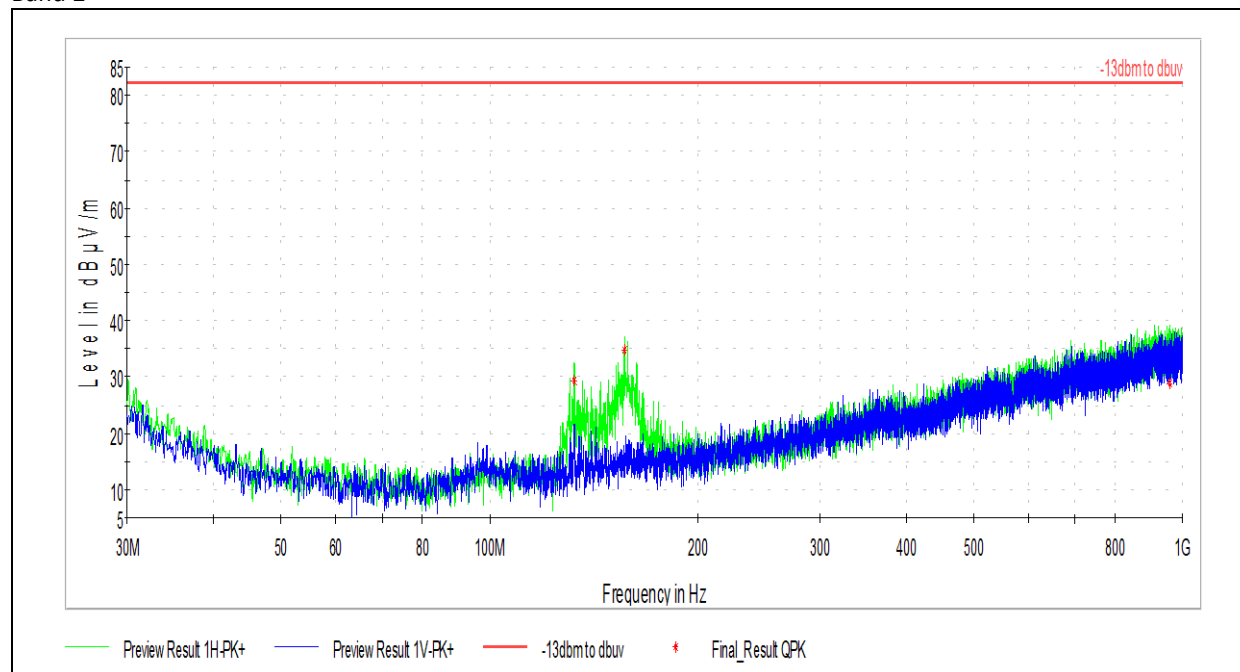
Relative Humidity: 22.2%

Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None

**6.13 FCC Part 24 Radiated Spurious Emissions (LTE B2/B25)****6.13.1 Radiated Spurious Emissions, 30 MHz – 1 GHz**

Band 2



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
132.604444	29.31	82.250	52.94	120.000	147.0	H	190.0	15.65
156.746667	34.71	82.250	47.54	120.000	115.0	H	204.0	18.13
958.128333	28.74	82.250	53.51	120.000	304.0	H	101.0	37.23

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: _____

(Where Applicable) N/A

Product Standard: FCC Part 24

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/28/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 21.4°C

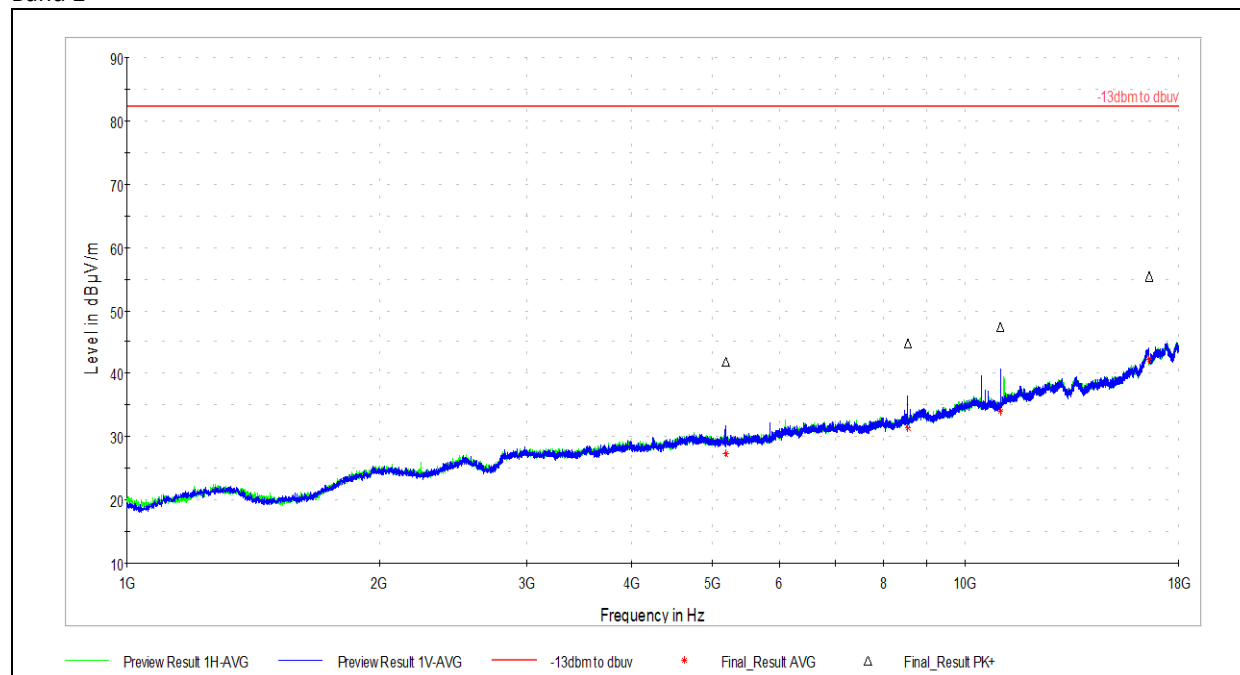
Relative Humidity: 19.5%

Atmospheric Pressure: 987.1 mbar

Deviations, Additions, or Exclusions: None

**6.13.2 Radiated Spurious Emissions, 1 GHz – 18 GHz**

Band 2



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5182.500000	41.82	82.250	40.43	1000.000	100.0	V	304.0	9.59
8542.500000	44.76	82.250	37.49	1000.000	290.0	V	316.0	14.21
11026.500000	47.29	82.250	34.96	1000.000	282.0	V	0.0	18.56
16596.500000	55.38	82.250	26.87	1000.000	100.0	V	61.0	26.16

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5182.500000	27.36	82.250	54.89	1000.000	100.0	V	304.0	9.59
8542.500000	31.43	82.250	50.82	1000.000	290.0	V	316.0	14.21
11026.500000	33.96	82.250	48.29	1000.000	282.0	V	0.0	18.56
16596.500000	42.21	82.250	40.04	1000.000	100.0	V	61.0	26.16

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: N/A

(Where Applicable)

Product Standard: FCC Part 24

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 20.9°C

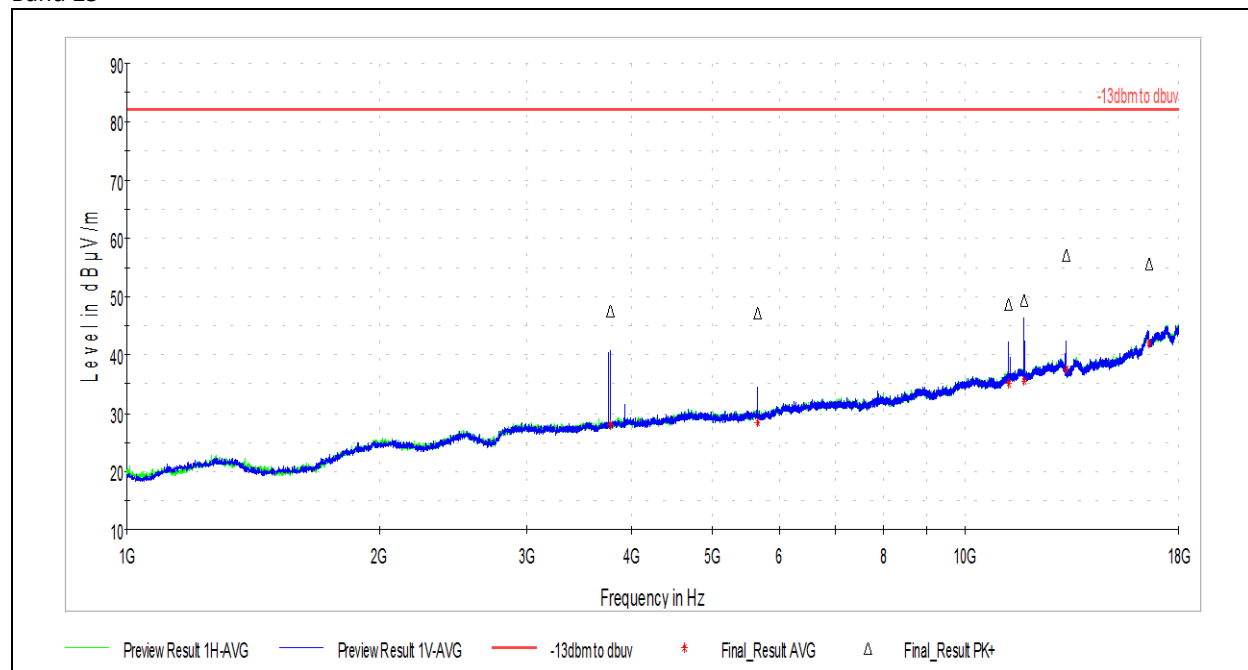
Relative Humidity: 22.2%

Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None



Band 25



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3773.500000	47.67	82.250	34.58	1000.000	118.0	V	21.0	7.28
5660.500000	47.15	82.250	35.10	1000.000	162.0	V	178.0	10.27
11272.000000	48.67	82.250	33.58	1000.000	100.0	V	168.0	18.69
11756.000000	49.29	82.250	32.96	1000.000	100.0	V	171.0	19.41
13208.500000	57.03	82.250	25.22	1000.000	153.0	V	203.0	21.10
16598.500000	55.60	82.250	26.65	1000.000	100.0	H	254.0	26.09

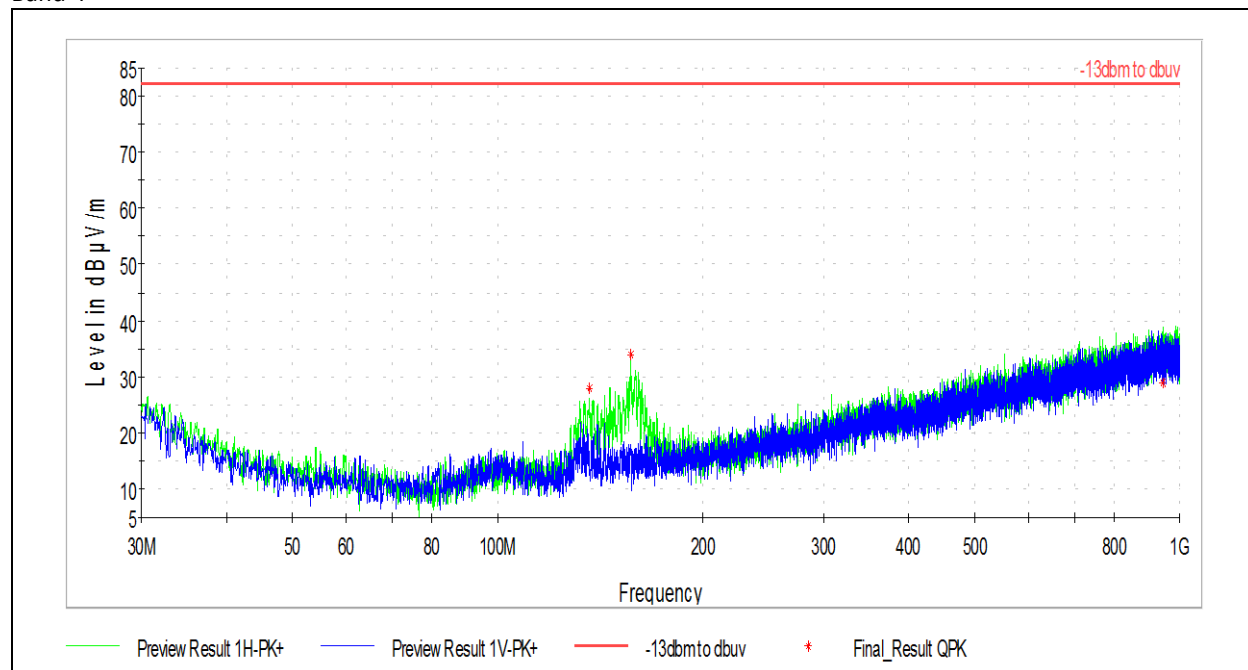
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3773.500000	27.94	82.250	54.31	1000.000	118.0	V	21.0	7.28
5660.500000	28.28	82.250	53.97	1000.000	162.0	V	178.0	10.27
11272.000000	35.16	82.250	47.09	1000.000	100.0	V	168.0	18.69
11756.000000	35.60	82.250	46.65	1000.000	100.0	V	171.0	19.41
13208.500000	37.51	82.250	44.74	1000.000	153.0	V	203.0	21.10
16598.500000	42.10	82.250	40.15	1000.000	100.0	H	254.0	26.09

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) N/A
Product Standard: FCC Part 24
Input Voltage: 7VDC Battery
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 20.9°C
Relative Humidity: 22.2%
Atmospheric Pressure: 982.3 mbar

**6.14 FCC Part 27 Radiated Spurious Emissions (LTE B4/B12/B13)****6.14.1 Radiated Spurious Emissions, 30 MHz – 1 GHz**

Band 4



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
136.161111	27.82	82.250	54.43	120.000	143.0	H	187.0	15.94
156.746667	33.91	82.250	48.34	120.000	115.0	H	207.0	18.13
944.171111	28.94	82.250	53.31	120.000	400.0	H	90.0	37.15

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: _____

(Where Applicable) N/A

Product Standard: FCC Part 27

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/28/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 21.4°C

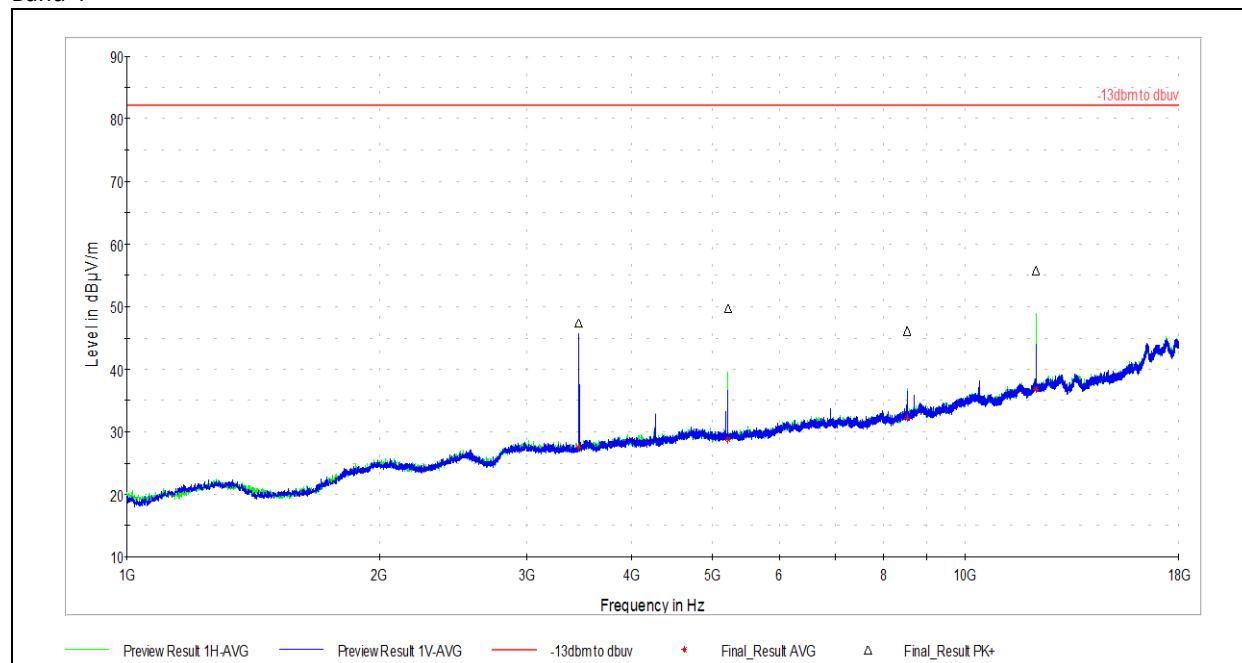
Relative Humidity: 19.5%

Atmospheric Pressure: 987.1 mbar

Deviations, Additions, or Exclusions: None

**6.14.2 Radiated Spurious Emissions, 1 GHz – 18 GHz**

Band 4



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3457.500000	47.40	82.250	34.85	1000.000	100.0	V	172.0	6.05
5210.500000	49.65	82.250	32.60	1000.000	100.0	H	254.0	9.67
8538.500000	46.14	82.250	36.11	1000.000	100.0	H	230.0	14.30
12158.000000	55.74	82.250	26.51	1000.000	100.0	H	268.0	20.13

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3457.500000	27.55	82.250	54.70	1000.000	100.0	V	172.0	6.05
5210.500000	28.70	82.250	53.55	1000.000	100.0	H	254.0	9.67
8538.500000	32.13	82.250	50.12	1000.000	100.0	H	230.0	14.30
12158.000000	36.80	82.250	45.45	1000.000	100.0	H	268.0	20.13

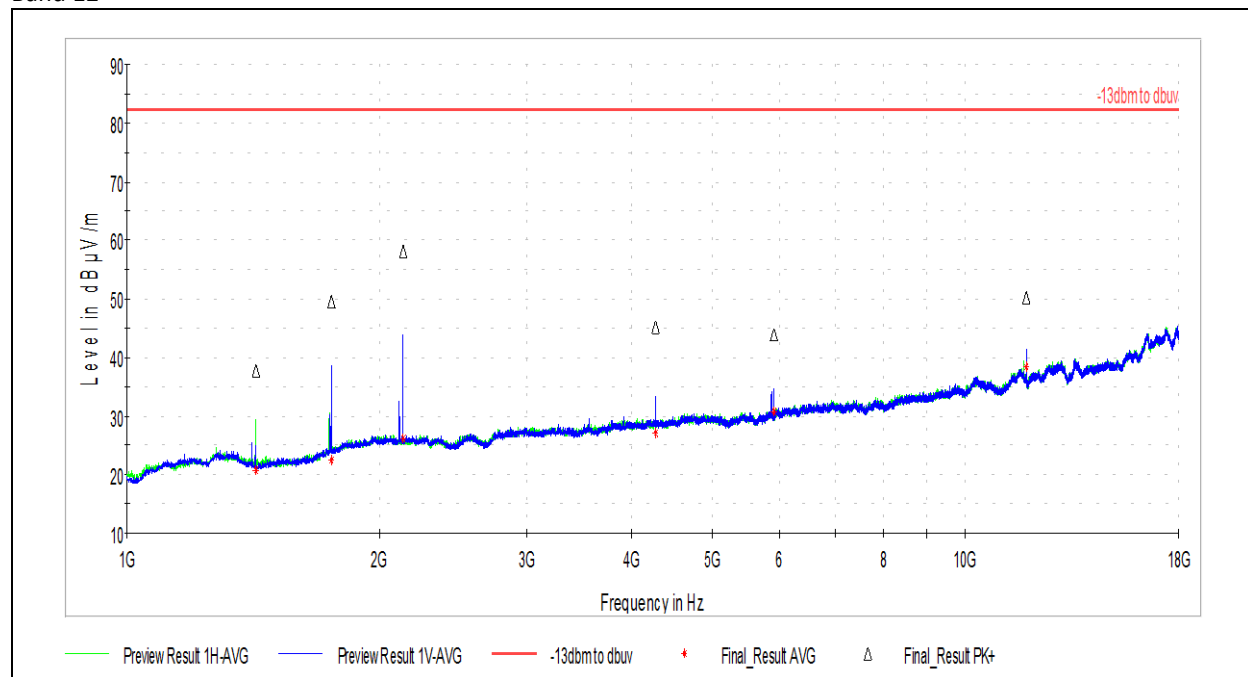
Test Personnel: Michael Carlson
 Supervising/Reviewing Engineer: _____
 (Where Applicable) N/A
 Product Standard: FCC Part 27
 Input Voltage: 7VDC Battery
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022
 Limit Applied: -13dBm converted to field strength
 Ambient Temperature: 20.9°C
 Relative Humidity: 22.2%
 Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None



Band 12



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1423.500000	37.68	82.250	44.57	1000.000	109.0	H	105.0	-0.91
1752.000000	49.53	82.250	32.72	1000.000	118.0	V	108.0	1.09
2135.500000	58.05	82.250	24.20	1000.000	218.0	V	72.0	3.31
4271.500000	45.23	82.250	37.02	1000.000	163.0	V	246.0	8.30
5916.500000	43.78	82.250	38.47	1000.000	109.0	V	214.0	10.87
11833.000000	50.19	82.250	32.06	1000.000	109.0	V	180.0	19.60

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1423.500000	20.63	82.250	61.62	1000.000	109.0	H	105.0	-0.91
1752.000000	22.54	82.250	59.71	1000.000	118.0	V	108.0	1.09
2135.500000	26.26	82.250	55.99	1000.000	218.0	V	72.0	3.31
4271.500000	26.99	82.250	55.26	1000.000	163.0	V	246.0	8.30
5916.500000	30.81	82.250	51.44	1000.000	109.0	V	214.0	10.87
11833.000000	38.46	82.250	43.79	1000.000	109.0	V	180.0	19.60

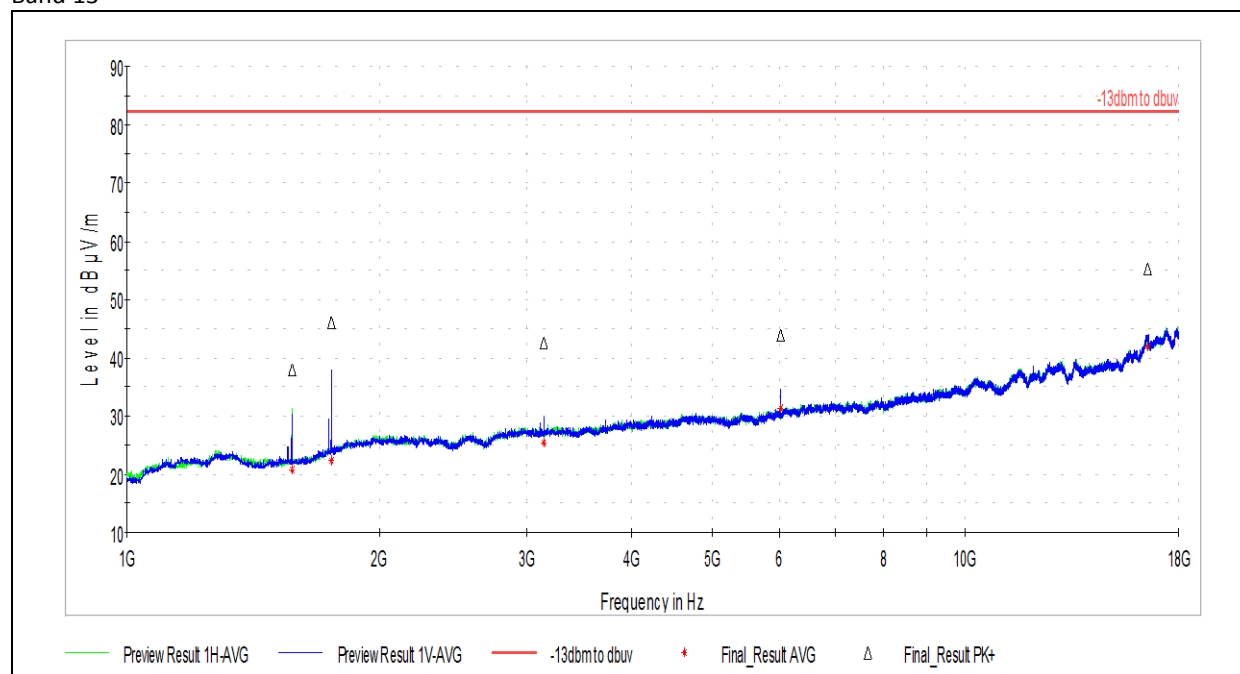
Test Personnel: Michael Carlson
 Supervising/Reviewing Engineer: _____
 (Where Applicable) N/A
 Product Standard: FCC Part 27
 Input Voltage: 7VDC Battery
 Pretest Verification w / Ambient
 Signals or BB Source: Yes

Test Date: 3/27/2022
 Limit Applied: -13dBm converted to field strength
 Ambient Temperature: 20.9°C
 Relative Humidity: 22.2%
 Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None



Band 13



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1572.500000	37.88	82.250	44.37	1000.000	228.0	H	192.0	-0.96
1752.500000	46.13	82.250	36.12	1000.000	136.0	V	99.0	1.09
3145.500000	42.60	82.250	39.65	1000.000	100.0	V	274.0	5.94
6024.500000	43.79	82.250	38.46	1000.000	228.0	V	70.0	11.13
16522.000000	55.20	82.250	27.05	1000.000	100.0	H	202.0	25.74

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1572.500000	20.71	82.250	61.54	1000.000	228.0	H	192.0	-0.96
1752.500000	22.32	82.250	59.93	1000.000	136.0	V	99.0	1.09
3145.500000	25.41	82.250	56.84	1000.000	100.0	V	274.0	5.94
6024.500000	31.21	82.250	51.04	1000.000	228.0	V	70.0	11.13
16522.000000	41.86	82.250	40.39	1000.000	100.0	H	202.0	25.74

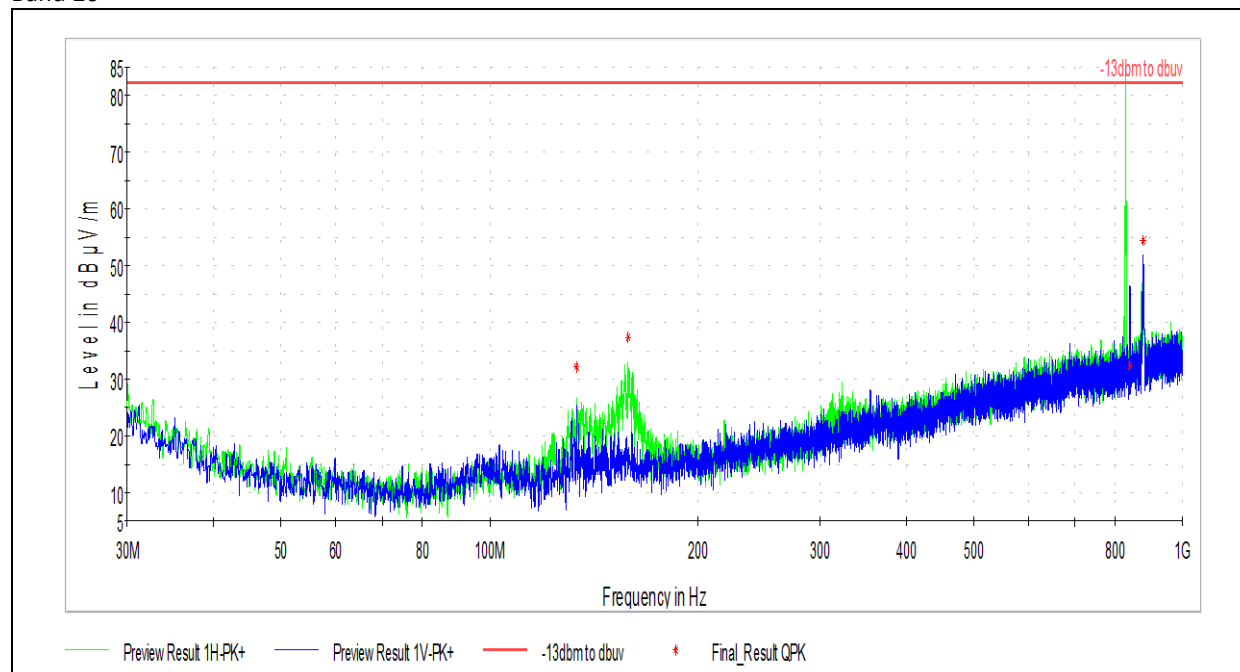
Test Personnel: Michael Carlson
 Supervising/Reviewing Engineer: _____
 (Where Applicable) N/A
 Product Standard: FCC Part 27
 Input Voltage: 7VDC Battery
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022
 Limit Applied: -13dBm converted to field strength
 Ambient Temperature: 20.9°C
 Relative Humidity: 22.2%
 Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None

**6.15 FCC Part 90 Radiated Spurious Emissions (LTE B26)****6.15.1 Radiated Spurious Emissions, 30 MHz – 1 GHz**

Band 26



*The large peak shown is the fundamental frequency of the operating band.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
133.412778	32.17	82.250	50.08	120.000	141.0	H	199.0	15.70
158.632778	37.37	82.250	44.88	120.000	115.0	H	207.0	18.09
840.758333	32.35	82.250	49.90	120.000	100.0	V	119.0	34.81
878.803889	54.48	82.250	27.77	120.000	179.0	V	164.0	35.05

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: _____

(Where Applicable) N/A

Product Standard: FCC Part 90

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/28/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 21.4°C

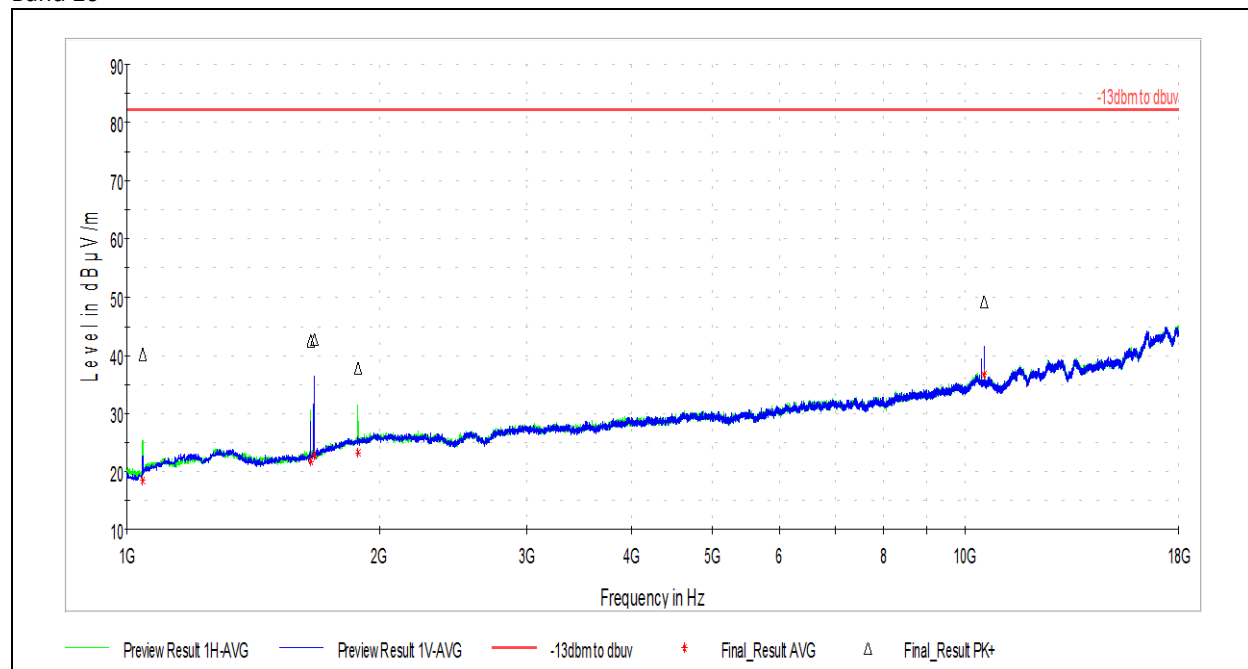
Relative Humidity: 19.5%

Atmospheric Pressure: 987.1 mbar

Deviations, Additions, or Exclusions: None

**6.15.2 Radiated Spurious Emissions, 1 GHz – 18 GHz**

Band 26



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1044.500000	40.18	82.250	42.07	1000.000	159.0	H	334.0	-2.96
1655.000000	42.52	82.250	39.73	1000.000	109.0	H	192.0	-0.22
1671.500000	42.69	82.250	39.56	1000.000	117.0	V	340.0	-0.20
1887.500000	37.78	82.250	44.47	1000.000	277.0	H	208.0	2.83
10542.500000	49.20	82.250	33.05	1000.000	118.0	V	171.0	18.03

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1044.500000	18.45	82.250	63.80	1000.000	159.0	H	334.0	-2.96
1655.000000	21.77	82.250	60.48	1000.000	109.0	H	192.0	-0.22
1671.500000	22.78	82.250	59.47	1000.000	117.0	V	340.0	-0.20
1887.500000	23.19	82.250	59.06	1000.000	277.0	H	208.0	2.83
10542.500000	36.66	82.250	45.59	1000.000	118.0	V	171.0	18.03

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: N/A

(Where Applicable)

Product Standard: FCC Part 90

Input Voltage: 7VDC Battery

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 3/27/2022

Limit Applied: -13dBm converted to field strength

Ambient Temperature: 20.9°C

Relative Humidity: 22.2%

Atmospheric Pressure: 982.3 mbar

Deviations, Additions, or Exclusions: None



7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	3/31/2022	105007035LEX-003	MC	BZ	Original Issue