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KCF Technologies, Inc. TEST REPORT

SCOPE OF WORK

EMC TESTING – SD-BASE-4

REPORT NUMBER

104699147LEX-002.3

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1/26/2023

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EMC TEST REPORT

(FULL COMPLIANCE)

Report Number: 104699147LEX-002.3

Project Number: G104699147

Report Issue Date: 9/3/2021

Report Revised Date: 1/26/2023

Model(s) Tested: SD-BASE-4

Standards: FCC Part 15C, 15E 22, 24, 27, 90
RSS-130 Issue 2, RSS-132 Issue 3,
RSS-133 Issue 6, Amendment 1,
RSS-139 Issue 3, RSS-199 Issue 3,
RSS-247 Issue 2
(Limited to Verification of
Radiated Spurious Emissions)

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

Client:
KCF Technologies, Inc.
336 S Fraser St
State College, PA 16801-4830
USA

Report prepared by



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Report reviewed by



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Table of Contents

1	<i>Introduction and Conclusion.....</i>	4
2	<i>Test Summary</i>	4
3	<i>Client Information</i>	5
4	<i>Description of Equipment under Test and Variant Models.....</i>	6
5	<i>System Setup and Method</i>	7
6	<i>Radiated Emissions</i>	10
7	<i>Revision History</i>	58



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
6.9 – 6.19	Radiated Spurious Emissions (Transmitters Active) (ANSI C63.10:2013)	Pass
6.20 – 6.23	Radiated Spurious Emissions (Transmitters Active) (ANSI C63.26:2015)	Pass



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	KCF Technologies, Inc.
Address:	336 S Fraser St State College, PA 16801-4830 USA
Contact:	Micah Gregory
Telephone:	+1 (814) 867-4097 x175
Email:	mgregory@kcftech.com
Manufacturer Information	
Manufacturer Name:	KCF Technologies, Inc.
Manufacturer Address:	336 S Fraser St State College, PA 16801-4830 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	SD-BASE-4
Model Number	SD-BASE-4
Supported Transmit Bands	LTE Bands: 2, 4, 5, 7, 12, 13, 26, 41, 66 Wi-Fi: 2.4GHz, 5GHz U-NII-1, U-NII-3 PRN: 2.4GHz
Embedded Modules	Sierra Wireless EM7565 (FCCID: N7NEM75, ICID: 2417C-EM75) Wi-Fi: SparkLAN WPEQ-262ACNI (FCCID: RYK-WPEQ262ACNIBT, ICID: 6158A-EQ262ACNIBT) PRN: U-blox BMD-345 (FCCID: XPYBMD345, ICID: 8595A-BMD345)
Antenna Information (provided by client):	Cell: - Pulse W5067, 700/1710/2400MHz, 2dBi gain - Laird EFF6989A2S-19MHF1 (receive only) Wi-Fi: - Pulse W5030, 2.4-2.5GHz / 5.15-5.875GHz, 4/6dBi gain - Molex 1461530300, peak gain 2.2dBi @ 2.4GHz, 2.8 @ 5GHz PRN: ANT-2.4-CPA, 2.4GHz, 5.5dBi gain
Receive Date	6/4/2021
Test Start Date	6/6/2021
Test End Date	8/29/2021
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	120VAC
Description of Equipment Under Test (provided by client)	
The SD-BASE-4 is an IoT Gateway device. It serves as a gateway for wireless industrial sensors, collecting, buffering and forwarding the sensor data to the cloud.	

4.1 Variant Models:

There were no variant models covered by this evaluation.



5 System Setup and Method

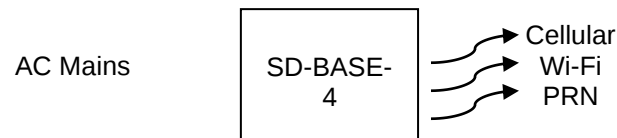
5.1 Method:

Configuration as required by ANSI C63.10:2013 and ANSI C63.26:2015.

No.	Descriptions of EUT Exercising
1	The EUT was powered by 120V/60Hz. The Wi-Fi radio was configured to transmit continuously on the 2.4GHz band or a 5GHz U-NII band. The other radios were idle.
2	The EUT was powered by 120V/60Hz. The EUT was connected to a cellular base station simulator. The other radios were idle.
3	The EUT was powered by 120V/60Hz. The EUT was configured to transmit continuously using its 2.4GHz PRN radio. the other radios were idle.

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	AC Mains	2	No	No	Plug
2	Ethernet	2	No	No	RJ45

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 C63.10:2013 and ANSI C63.26:2015.

TEST SITE: 10m ALSE

Site Designation: 10m Chamber

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
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.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

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

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

$$NF = \text{Net Reading in dB}\mu\text{V}$$

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	3900	Rohde & Schwarz	ESU40	10/5/2020	10/5/2021
Bilog Antenna (30MHz-1GHz)	7085	SunAR	JB6	9/4/2020	9/4/2021
Horn Antenna	4001	ETS	3117	1/26/2021	1/26/2022
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
Coaxial Cable	3074			12/21/2020	12/21/2021
Preamplifier	3918	Rohde & Schwarz	TS-PR18	12/21/2020	12/21/2021
Coaxial Cable	2588			12/21/2020	12/21/2021
Coaxial Cable	2593			12/21/2020	12/21/2021
Coaxial Cable	2592			12/21/2020	12/21/2021
Coaxial Cable	3339			12/21/2020	12/21/2021
Preamplifier	7019	Rohde & Schwarz	TS-PR3	12/21/2020	12/21/2021
Coaxial Cable	3172			12/21/2020	12/21/2021
Coaxial Cable	2590			12/21/2020	12/21/2021
Coaxial Cable	2589			12/21/2020	12/21/2021

6.5 Software Utilized:

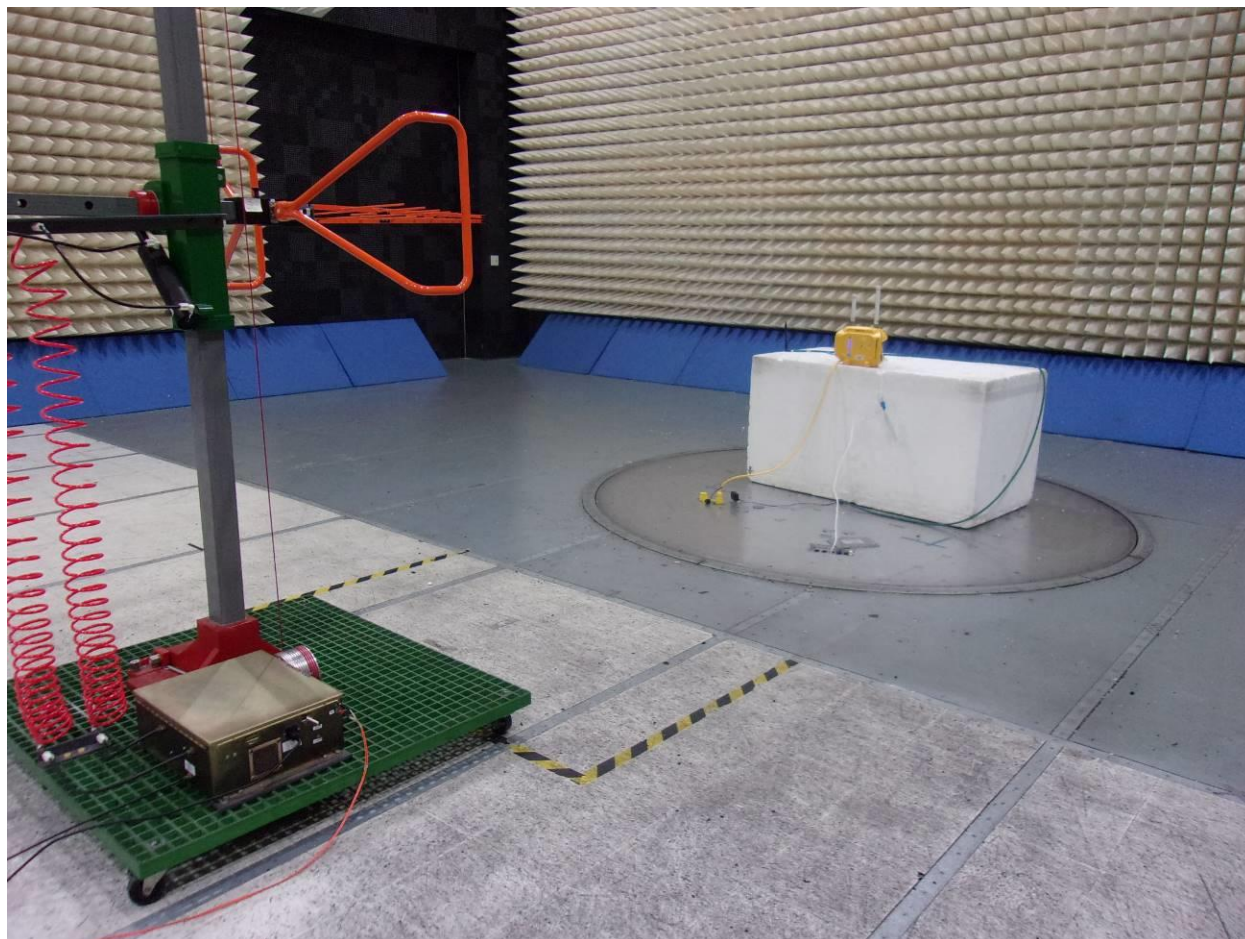
Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 9.15.02

6.6 Results:

The sample tested was found to Comply.

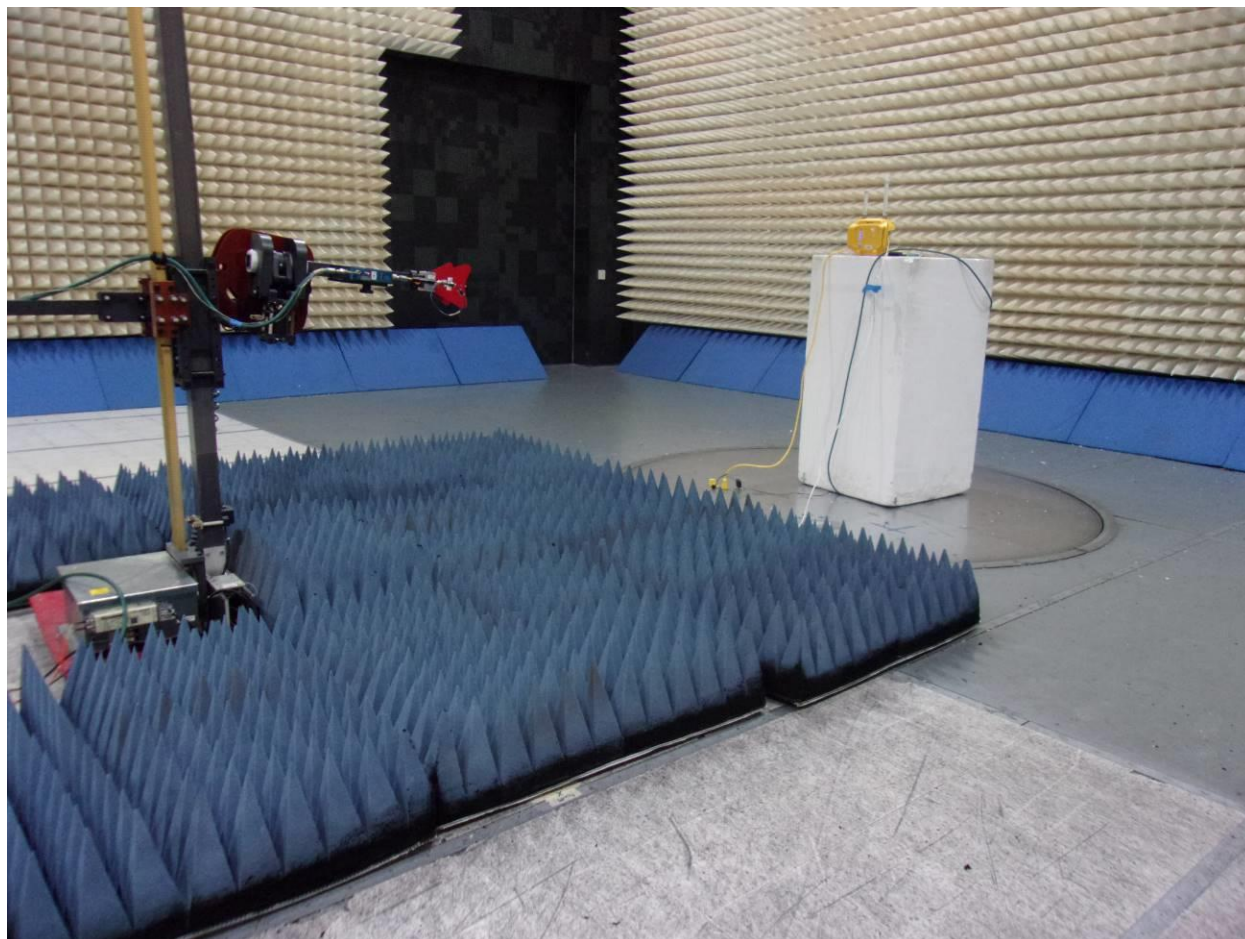


6.7 Setup Photographs: Radiated Emissions (FCC Part 15C/15E/22/24/27/90 Below 1GHz)





6.8 Setup Photographs: Radiated Emissions (FCC Part 15C/15E/22/24/27/90 Above 1GHz)



**6.9 FCC Part 15.247 Radiated Spurious Emissions (PRN Radio)****6.9.1 Radiated Spurious Emissions (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1374.500000	39.89	73.98	34.09	1000.000	127.0	H	201.0	1
1400.000000	48.21	73.98	25.77	1000.000	100.0	H	0.0	1
1439.500000	43.90	73.98	30.08	1000.000	391.0	V	34.0	0
1500.000000	43.90	73.98	30.08	1000.000	237.0	V	320.0	0
1600.000000	45.25	73.98	28.73	1000.000	263.0	V	318.0	0
3999.500000	55.22	73.98	18.76	1000.000	208.0	H	260.0	8
4803.500000	46.62	73.98	27.36	1000.000	374.0	V	0.0	9
12008.500000	56.20	73.98	17.78	1000.000	323.0	V	-1.0	19

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1374.500000	29.02	53.98	24.96	1000.000	127.0	H	201.0	1
1400.000000	37.06	53.98	16.92	1000.000	100.0	H	0.0	1
1439.500000	23.07	53.98	30.91	1000.000	391.0	V	34.0	0
1500.000000	34.51	53.98	19.47	1000.000	237.0	V	320.0	0
1600.000000	33.00	53.98	20.98	1000.000	263.0	V	318.0	0
3999.500000	28.89	53.98	25.09	1000.000	208.0	H	260.0	8
4803.500000	36.26	53.98	17.72	1000.000	374.0	V	0.0	9
12008.500000	44.85	53.98	9.13	1000.000	323.0	V	-1.0	19

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 6/6/2021
FCC Part 15.209 in Restricted
Limit Applied: Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 55.8%
Atmospheric Pressure: 990.0mbar

Deviations, Additions, or Exclusions: None

**6.9.2 Radiated Spurious Emissions (High Channel)**

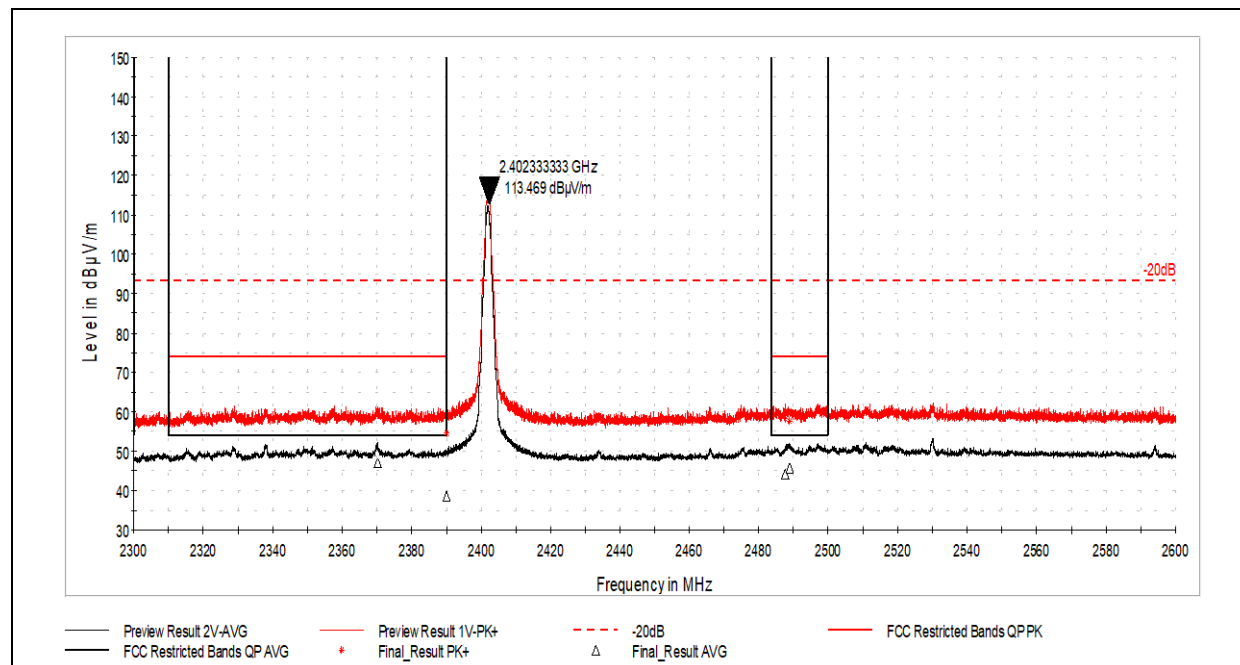
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1375.000000	41.28	73.98	32.70	1000.000	188.0	H	214.0	1
1400.000000	45.46	73.98	28.52	1000.000	100.0	H	346.0	1
1439.000000	47.70	73.98	26.28	1000.000	410.0	V	168.0	0
1500.000000	46.03	73.98	27.95	1000.000	294.0	V	315.0	0
1600.000000	48.65	73.98	25.33	1000.000	392.0	H	212.0	1
2878.500000	43.80	73.98	30.18	1000.000	109.0	H	252.0	7
4944.000000	48.71	73.98	25.27	1000.000	311.0	V	0.0	10
7415.500000	44.66	73.98	29.32	1000.000	127.0	V	298.0	13
12361.500000	52.81	73.98	21.17	1000.000	238.0	V	0.0	21

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1375.000000	34.33	53.98	19.65	1000.000	188.0	H	214.0	1
1400.000000	34.53	53.98	19.45	1000.000	100.0	H	346.0	1
1439.000000	23.45	53.98	30.53	1000.000	410.0	V	168.0	0
1500.000000	35.09	53.98	18.89	1000.000	294.0	V	315.0	0
1600.000000	29.98	53.98	24.00	1000.000	392.0	H	212.0	1
2878.500000	26.65	53.98	27.33	1000.000	109.0	H	252.0	7
4944.000000	40.71	53.98	13.27	1000.000	311.0	V	0.0	10
7415.500000	31.14	53.98	22.84	1000.000	127.0	V	298.0	13
12361.500000	38.98	53.98	15.00	1000.000	238.0	V	0.0	21

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 6/6/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 55.8%
Atmospheric Pressure: 990.0mbar

Deviations, Additions, or Exclusions: None

**6.9.3 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2370.183333	59.62	73.98	14.36	1000.000	209.0	V	0.0	39
2390.000000	54.47	73.98	19.51	1000.000	410.0	V	89.0	39
2487.483333	58.12	73.98	15.86	1000.000	250.0	V	0.0	39
2488.883333	57.74	73.98	16.24	1000.000	250.0	V	8.0	39

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2370.183333	46.94	53.98	7.04	1000.000	209.0	V	0.0	39
2390.000000	38.63	53.98	15.35	1000.000	410.0	V	89.0	39
2487.483333	44.12	53.98	9.86	1000.000	250.0	V	0.0	39
2488.883333	45.70	53.98	8.28	1000.000	250.0	V	8.0	39

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer: NA
(Where Applicable)

Product Standard: FCC Part 15.247
Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 6/6/2021

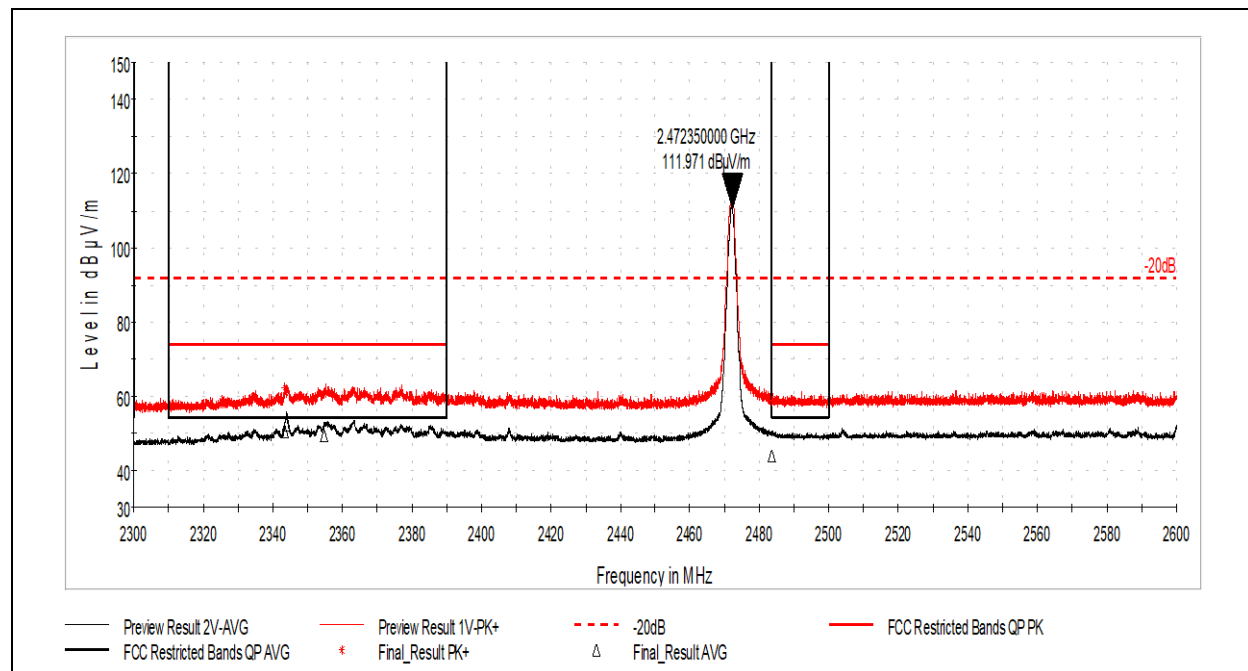
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205

Ambient Temperature: 23.7C

Relative Humidity: 55.8%

Atmospheric Pressure: 990.0mbar

Deviations, Additions, or Exclusions: None

**6.9.4 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2343.483333	62.33	73.98	11.65	1000.000	207.0	V	0.0	39
2343.883333	60.95	73.98	13.03	1000.000	153.0	V	0.0	39
2354.750000	60.71	73.98	13.27	1000.000	156.0	V	0.0	39
2483.550000	58.63	73.98	15.35	1000.000	226.0	V	0.0	39

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2343.483333	50.44	53.98	3.54	1000.000	207.0	V	0.0	39
2343.883333	52.54	53.98	1.44	1000.000	153.0	V	0.0	39
2354.750000	49.24	53.98	4.74	1000.000	156.0	V	0.0	39
2483.550000	43.82	53.98	10.16	1000.000	226.0	V	0.0	39

Test Personnel: Brian Lackey
 Supervising/Reviewing Engineer: NA
 (Where Applicable) FCC Part 15.247
 Product Standard: RSS-247 Issue 2
 Input Voltage: 120V/60Hz
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 6/6/2021
 Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
 Ambient Temperature: 23.7C
 Relative Humidity: 55.8%
 Atmospheric Pressure: 990.0mbar

Deviations, Additions, or Exclusions: None

**6.10 FCC Part 15.247 Radiated Spurious Emissions (2.4GHz Wi-Fi Radio, 802.11b)****6.10.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2246.000000	70.86	73.98	3.12	1000.000	251.0	V	153.0	4
2815.000000	53.89	73.98	20.09	1000.000	153.0	V	162.0	7
3999.500000	51.83	73.98	22.15	1000.000	100.0	V	95.0	9
4874.000000	50.73	73.98	23.25	1000.000	187.0	V	104.0	10
5000.000000	43.87	73.98	30.11	1000.000	295.0	H	233.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2246.000000	34.38	53.98	19.60	1000.000	251.0	V	153.0	4
2815.000000	28.18	53.98	25.80	1000.000	153.0	V	162.0	7
3999.500000	30.35	53.98	23.63	1000.000	100.0	V	95.0	9
4874.000000	37.69	53.98	16.29	1000.000	187.0	V	104.0	10
5000.000000	31.11	53.98	22.87	1000.000	295.0	H	233.0	9

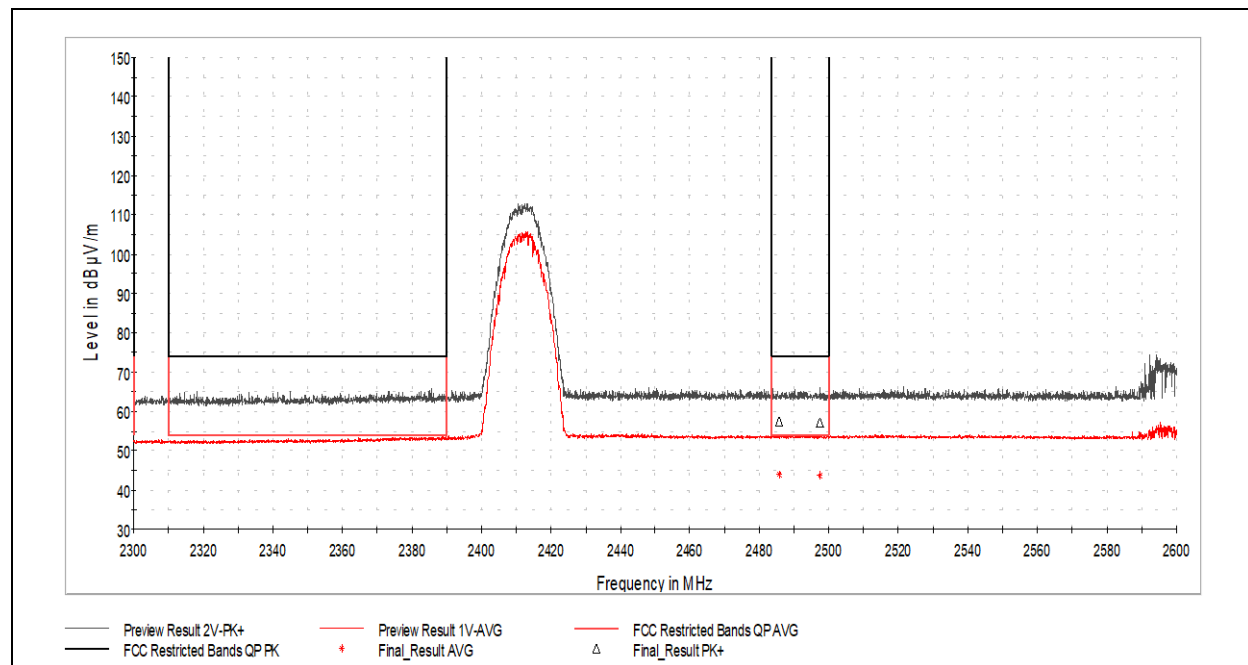
Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 69.4%
Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None



6.10.2 Emissions at the Band Edge (Low Channel)



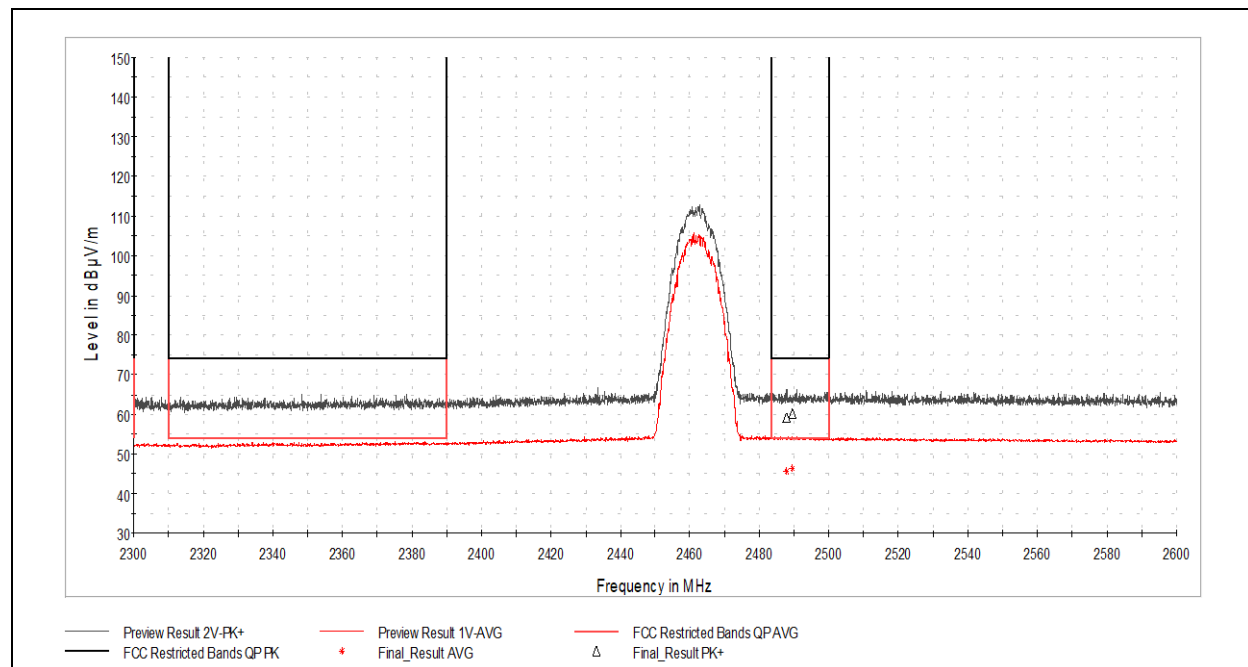
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2485.711539	57.45	73.98	16.53	1000.000	234.0	V	203.0	39
2497.365385	57.08	73.98	16.90	1000.000	167.0	V	201.0	39

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2485.711539	43.97	53.98	10.01	1000.000	234.0	V	203.0	39
2497.365385	43.69	53.98	10.29	1000.000	167.0	V	201.0	39

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/27/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 14.7C
Relative Humidity: 64.6%
Atmospheric Pressure: 893.5mbar

Deviations, Additions, or Exclusions: None

**6.10.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.788462	59.24	73.98	14.74	1000.000	236.0	V	304.0	39
2489.519231	60.12	73.98	13.86	1000.000	191.0	V	76.0	39

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.788462	45.48	53.98	8.50	1000.000	236.0	V	304.0	39
2489.519231	46.39	53.98	7.59	1000.000	191.0	V	76.0	39

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/27/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 14.7C
Relative Humidity: 64.6%
Atmospheric Pressure: 893.5mbar

Deviations, Additions, or Exclusions: None

**6.11 FCC Part 15.247 Radiated Spurious Emissions (2.4GHz Wi-Fi Radio, 802.11g)****6.11.1 Radiated Spurious Emissions (Mid Channel)**

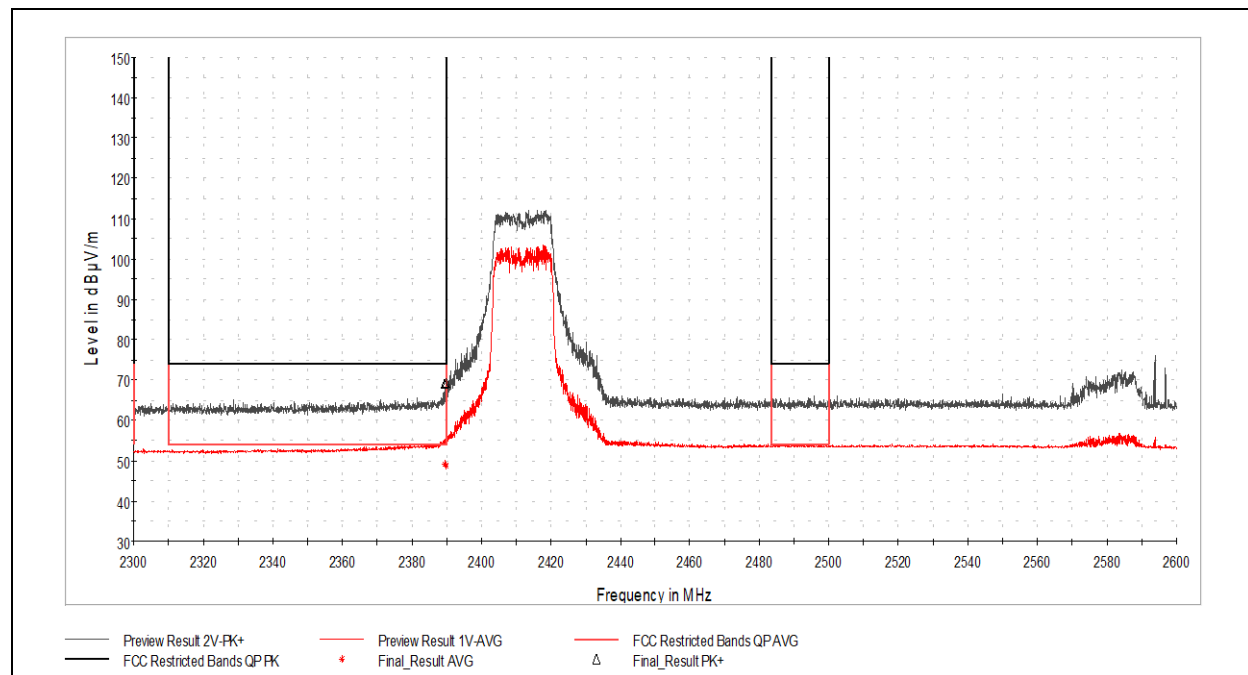
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1600.000000	48.42	73.98	25.56	1000.000	360.0	V	154.0	0
2250.500000	71.39	73.98	2.59	1000.000	124.0	H	240.0	5
2817.000000	51.48	73.98	22.50	1000.000	100.0	H	202.0	6
3994.000000	42.66	73.98	31.32	1000.000	100.0	V	228.0	9
4873.500000	46.12	73.98	27.86	1000.000	100.0	V	0.0	10
5000.000000	44.86	73.98	29.12	1000.000	188.0	V	225.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1600.000000	36.24	53.98	17.74	1000.000	360.0	V	154.0	0
2250.500000	29.76	53.98	24.22	1000.000	124.0	H	240.0	5
2817.000000	27.85	53.98	26.13	1000.000	100.0	H	202.0	6
3994.000000	29.59	53.98	24.39	1000.000	100.0	V	228.0	9
4873.500000	29.66	53.98	24.32	1000.000	100.0	V	0.0	10
5000.000000	34.09	53.98	19.89	1000.000	188.0	V	225.0	9

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable)
FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 69.4%
Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.11.2 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.480769	69.14	73.98	4.84	1000.000	203.0	V	198.0	39
2389.769231	69.43	73.98	4.55	1000.000	204.0	V	193.0	39

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.480769	49.18	53.98	4.80	1000.000	203.0	V	198.0	39
2389.769231	48.82	53.98	5.16	1000.000	204.0	V	193.0	39

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer: NA
(Where Applicable)

Product Standard: FCC Part 15.247

Input Voltage: 120V/60Hz

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/27/2021

Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205

Ambient Temperature: 14.7C

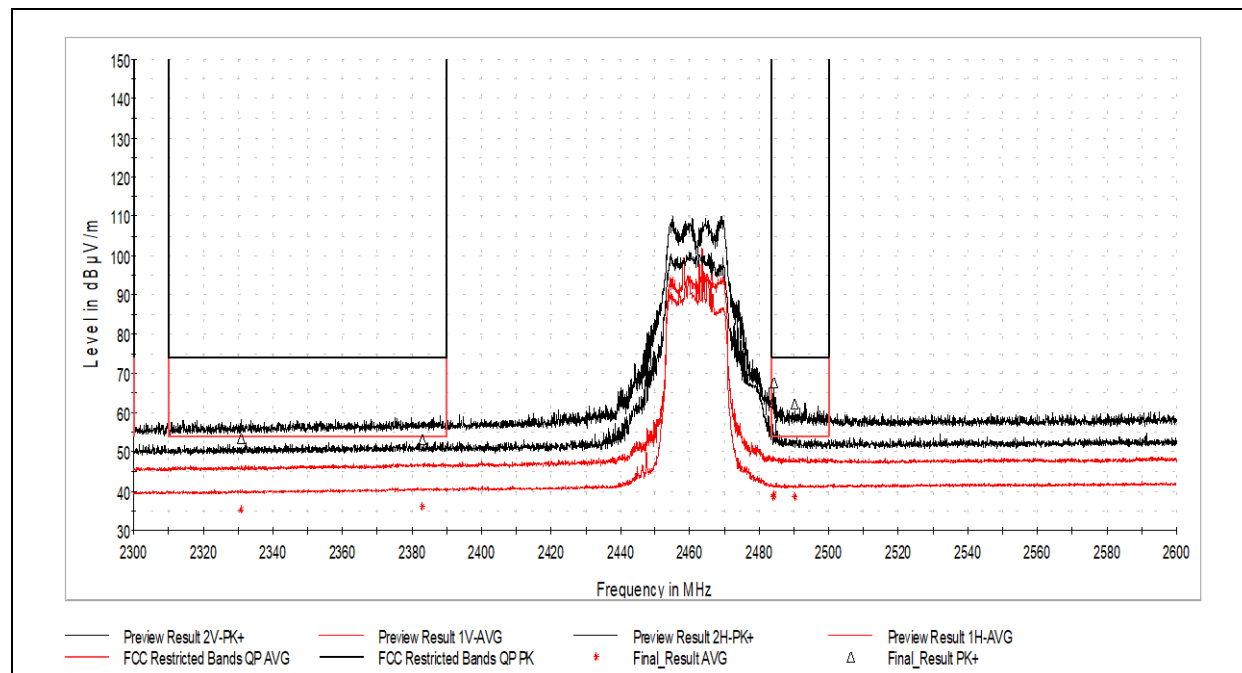
Relative Humidity: 64.6%

Atmospheric Pressure: 893.5mbar

Deviations, Additions, or Exclusions: None



6.11.3 Emissions at the Band Edge (High Channel)



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2330.865385	53.48	73.979	20.50	1000.000	239.0	V	0.0	37.62
2382.961539	53.16	73.979	20.82	1000.000	221.0	V	108.0	38.19
2483.865385	62.86	73.979	11.12	1000.000	169.0	V	259.0	38.45
2484.211539	67.82	73.979	6.16	1000.000	168.0	V	318.0	38.46
2490.153846	62.13	73.979	11.85	1000.000	167.0	V	322.0	38.52

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2330.865385	35.22	53.979	18.76	1000.000	239.0	V	0.0	37.62
2382.961539	36.05	53.979	17.93	1000.000	221.0	V	108.0	38.19
2483.865385	38.60	53.979	15.38	1000.000	169.0	V	259.0	38.45
2484.211539	39.06	53.979	14.92	1000.000	168.0	V	318.0	38.46
2490.153846	38.46	53.979	15.52	1000.000	167.0	V	322.0	38.52

Test Personnel: Seth Parker
Supervising/Reviewing Engineer: Brian Lackey
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/2/2022
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.3C
Relative Humidity: 70.1%
Atmospheric Pressure: 985.7mbar

Deviations, Additions, or Exclusions: None

**6.12 FCC Part 15.247 Radiated Spurious Emissions (2.4GHz Wi-Fi Radio, 802.11nHT20)****6.12.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.544444	28.24	40.00	11.76	120.000	100.0	V	-1.0	22
110.348333	29.96	43.52	13.56	120.000	265.0	H	159.0	21
168.278889	25.90	43.52	17.62	120.000	100.0	V	82.0	21
241.406111	28.37	46.02	17.65	120.000	100.0	V	141.0	22
332.855556	29.47	46.02	16.55	120.000	165.0	V	90.0	24
399.947222	36.03	46.02	9.99	120.000	191.0	H	167.0	27
404.366111	31.84	46.02	14.18	120.000	194.0	H	168.0	27
405.282222	31.81	46.02	14.21	120.000	192.0	H	166.0	27
613.508889	31.28	46.02	14.74	120.000	127.0	H	132.0	32
961.092222	37.58	53.98	16.40	120.000	121.0	H	320.0	38

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2250.000000	74.20	73.98	-0.22	1000.000	256.0	V	166.0	4
2803.000000	55.28	73.98	18.70	1000.000	410.0	V	143.0	6
4000.000000	46.57	73.98	27.41	1000.000	316.0	H	131.0	8
4874.000000	49.07	73.98	24.91	1000.000	236.0	V	239.0	10
5000.000000	43.86	73.98	30.12	1000.000	190.0	V	222.0	9
16094.500000	55.61	73.98	18.37	1000.000	119.0	H	72.0	25
19875.500000	55.94	73.98	18.04	1000.000	100.0	V	328.0	16
22750.500000	56.26	73.98	17.72	1000.000	100.0	H	46.0	10
23753.500000	58.21	73.98	15.77	1000.000	394.0	H	23.0	11

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2250.000000	31.53	53.98	22.45	1000.000	256.0	V	166.0	4
2803.000000	28.40	53.98	25.58	1000.000	410.0	V	143.0	6
4000.000000	30.96	53.98	23.02	1000.000	316.0	H	131.0	8
4874.000000	33.63	53.98	20.35	1000.000	236.0	V	239.0	10
5000.000000	31.03	53.98	22.95	1000.000	190.0	V	222.0	9
16094.500000	42.35	53.98	11.63	1000.000	119.0	H	72.0	25
19875.500000	42.45	53.98	11.53	1000.000	100.0	V	328.0	16
22750.500000	43.08	53.98	10.90	1000.000	100.0	H	46.0	10
23753.500000	44.89	53.98	9.09	1000.000	394.0	H	23.0	11

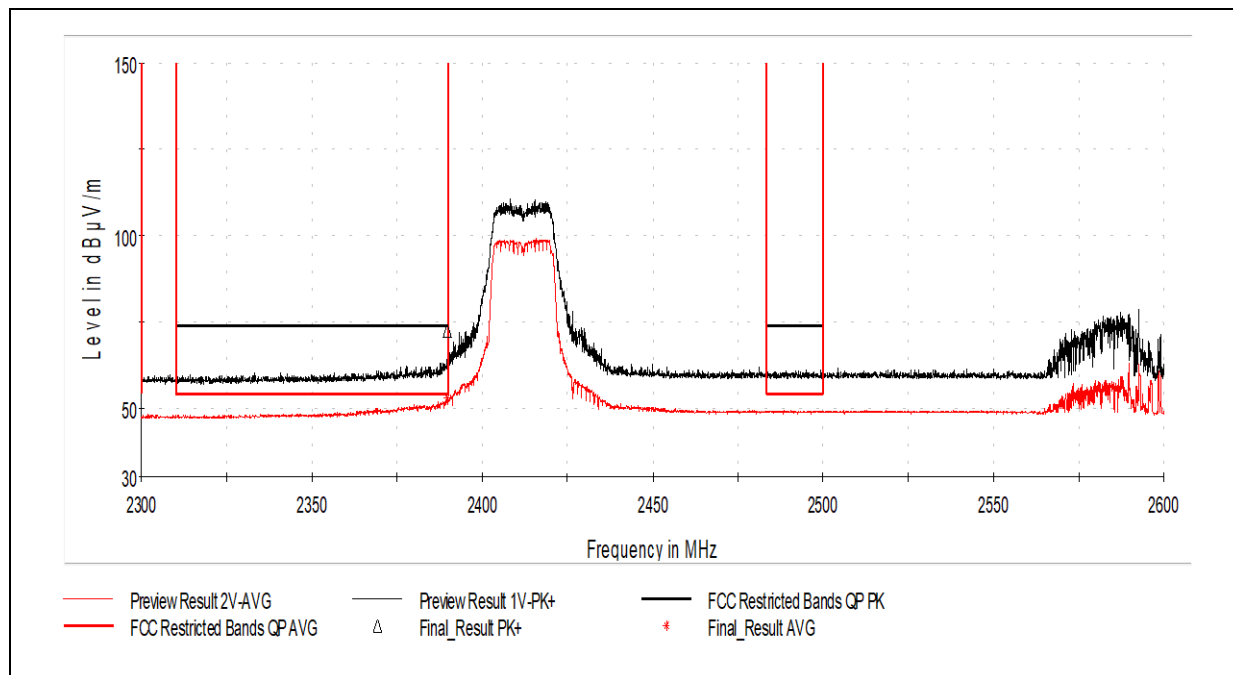
Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021, 8/29/2021
FCC Part 15.209 in Restricted
Limit Applied: Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 69.4%
Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None



6.12.2 Emissions at the Band Edge (Low Channel)



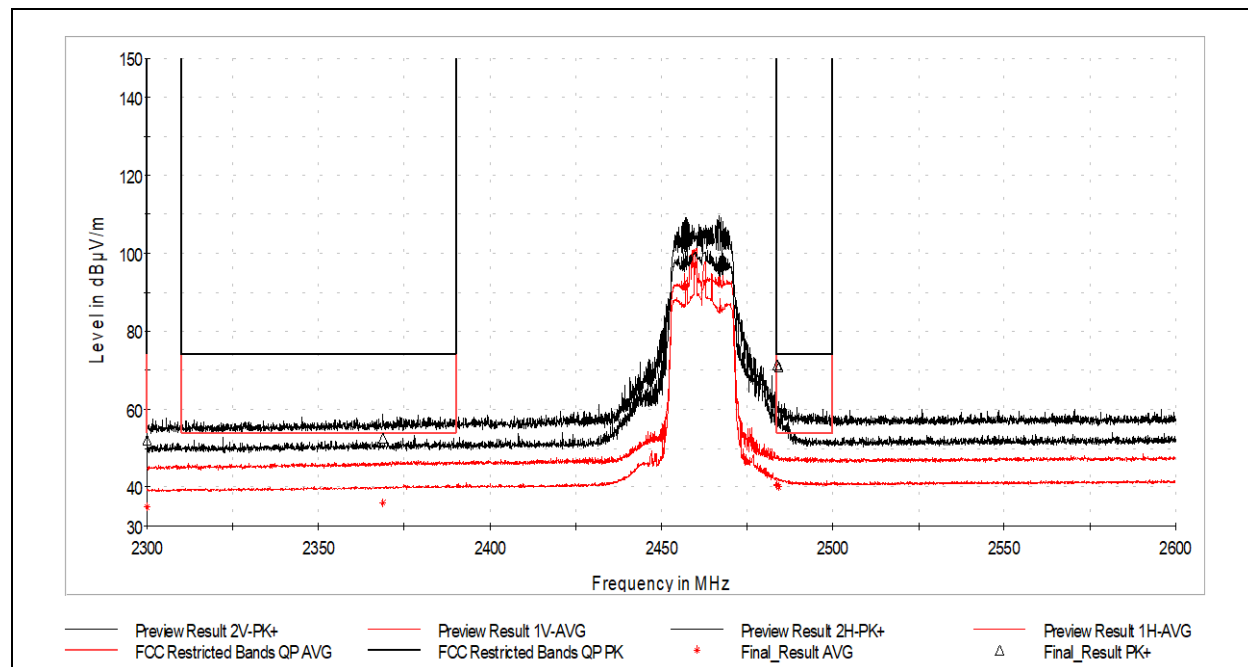
Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.826923	72.52	73.98	1.46	1000.000	224.0	V	328.0	39

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.826923	53.03	53.98	0.95	1000.000	224.0	V	328.0	39

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: (Where Applicable) NA
Product Standard: FCC Part 15.247
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/27/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 14.7C
Relative Humidity: 64.6%
Atmospheric Pressure: 893.5mbar

Deviations, Additions, or Exclusions: None

**6.12.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2300.000000	52.07	73.979	21.91	1000.000	285.0	V	0.0	37.40
2368.769231	52.65	73.979	21.33	1000.000	130.0	V	273.0	37.98
2483.692308	71.30	73.979	2.68	1000.000	167.0	V	11.0	38.45
2483.750000	71.46	73.979	2.52	1000.000	175.0	V	326.0	38.45
2484.153846	70.80	73.979	3.18	1000.000	164.0	V	334.0	38.46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2300.000000	34.77	53.979	19.21	1000.000	285.0	V	0.0	37.40
2368.769231	35.88	53.979	18.10	1000.000	130.0	V	273.0	37.98
2483.692308	40.24	53.979	13.74	1000.000	167.0	V	11.0	38.45
2483.750000	40.59	53.979	13.39	1000.000	175.0	V	326.0	38.45
2484.153846	40.14	53.979	13.84	1000.000	164.0	V	334.0	38.46

Test Personnel: Seth Parker
Supervising/Reviewing Engineer: Brian Lackey
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/2/2022
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.3C
Relative Humidity: 70.1%
Atmospheric Pressure: 985.7mbar

Deviations, Additions, or Exclusions: None

**6.13 FCC Part 15.247 Radiated Spurious Emissions (2.4GHz Wi-Fi Radio, 802.11nHT40)****6.13.1 Radiated Spurious Emissions (Mid Channel)**

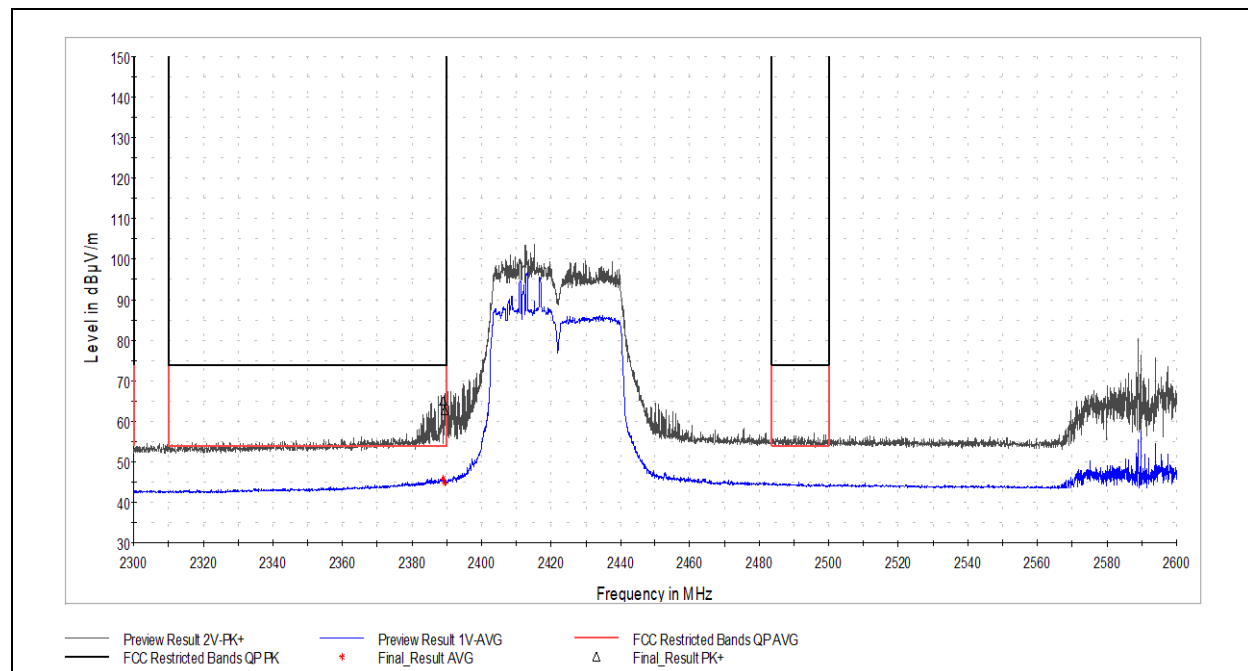
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2250.500000	73.53	73.98	0.45	1000.000	211.0	V	180.0	4
2791.500000	48.10	73.98	25.88	1000.000	158.0	V	175.0	6
3992.500000	42.89	73.98	31.09	1000.000	168.0	V	174.0	9
4874.000000	43.64	73.98	30.34	1000.000	367.0	H	115.0	10
5000.000000	44.52	73.98	29.46	1000.000	212.0	V	134.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2250.500000	30.62	53.98	23.36	1000.000	211.0	V	180.0	4
2791.500000	27.89	53.98	26.09	1000.000	158.0	V	175.0	6
3992.500000	29.40	53.98	24.58	1000.000	168.0	V	174.0	9
4874.000000	30.39	53.98	23.59	1000.000	367.0	H	115.0	10
5000.000000	32.45	53.98	21.53	1000.000	212.0	V	134.0	9

Test Personnel: Brian Lackey
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 15.247
Product Standard: RSS-247 Issue 2
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
Ambient Temperature: 23.7C
Relative Humidity: 69.4%
Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

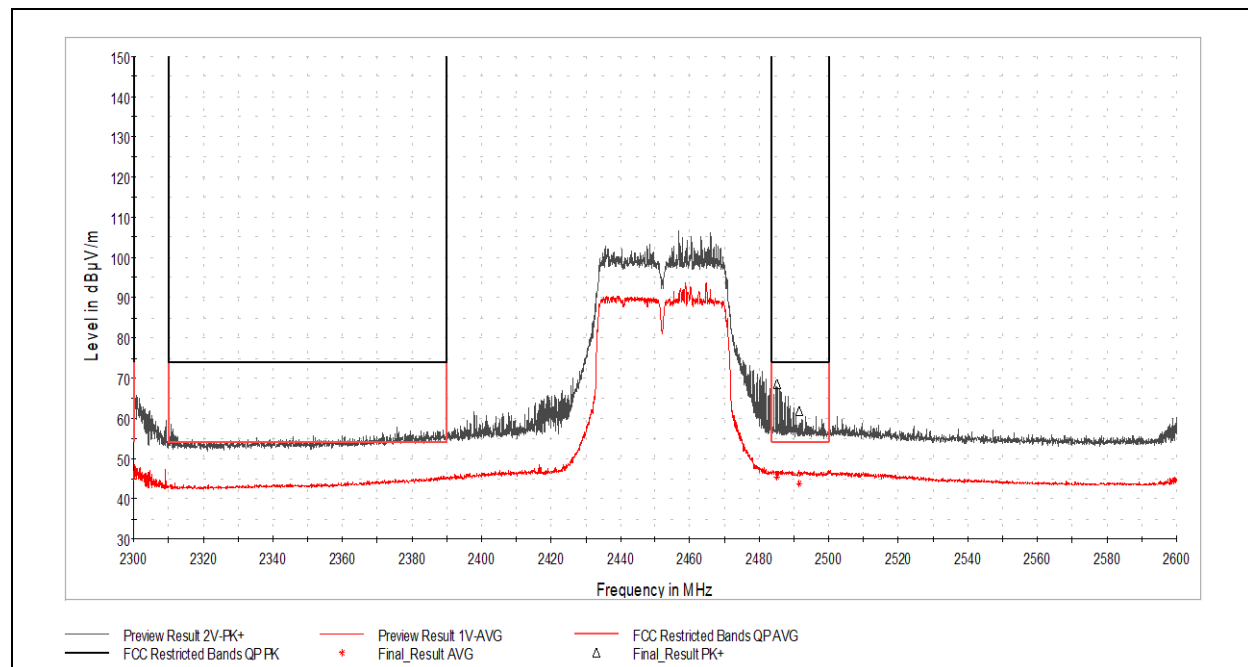
**6.13.2 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.961539	65.15	73.98	8.83	1000.000	121.0	V	80.0	39
2389.365385	62.72	73.98	11.26	1000.000	265.0	V	316.0	39

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.961539	45.81	53.98	8.17	1000.000	121.0	V	80.0	39
2389.365385	44.94	53.98	9.04	1000.000	265.0	V	316.0	39

Test Personnel:	Brian Lackey	Test Date:	8/27/2021
Supervising/Reviewing Engineer:		FCC Part 15.209 in Restricted	
(Where Applicable)	NA	Limit Applied:	Bands from FCC Part 15.205
Product Standard:	FCC Part 15.247	Ambient Temperature:	14.7C
Input Voltage:	RSS-247 Issue 2	Relative Humidity:	64.6%
Pretest Verification w / Ambient	120V/60Hz	Atmospheric Pressure:	893.5mbar
Signals or BB Source:	Yes		

Deviations, Additions, or Exclusions: the output power was reduced to setting 100 (1dBm)

**6.13.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.961539	68.60	73.98	5.38	1000.000	167.0	V	201.0	39
2491.480769	61.74	73.98	12.24	1000.000	192.0	V	170.0	39

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.961539	45.39	53.98	8.59	1000.000	167.0	V	201.0	39
2491.480769	43.89	53.98	10.09	1000.000	192.0	V	170.0	39

Test Personnel: Brian Lackey
 Supervising/Reviewing Engineer: NA
 (Where Applicable) FCC Part 15.247
 Product Standard: RSS-247 Issue 2
 Input Voltage: 120V/60Hz
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/27/2021
 Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205
 Ambient Temperature: 14.7C
 Relative Humidity: 64.6%
 Atmospheric Pressure: 893.5mbar

Deviations, Additions, or Exclusions: the output power was reduced to setting 500 (5dBm)

**6.14 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11a U-NII-1)****6.14.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	51.51	88.23	36.72	1000.000	205.0	V	82.0	13
11037.500000	50.53	73.98	23.45	1000.000	170.0	H	252.0	19
16760.000000	56.33	88.23	31.90	1000.000	410.0	V	10.0	25

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	42.64	68.23	25.59	1000.000	205.0	V	82.0	13
11037.500000	37.44	53.98	16.54	1000.000	170.0	H	252.0	19
16760.000000	42.90	68.23	25.33	1000.000	410.0	V	10.0	25

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021

FCC Part 15.401(b)(1)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Limit Applied:

Ambient Temperature: 23.7C

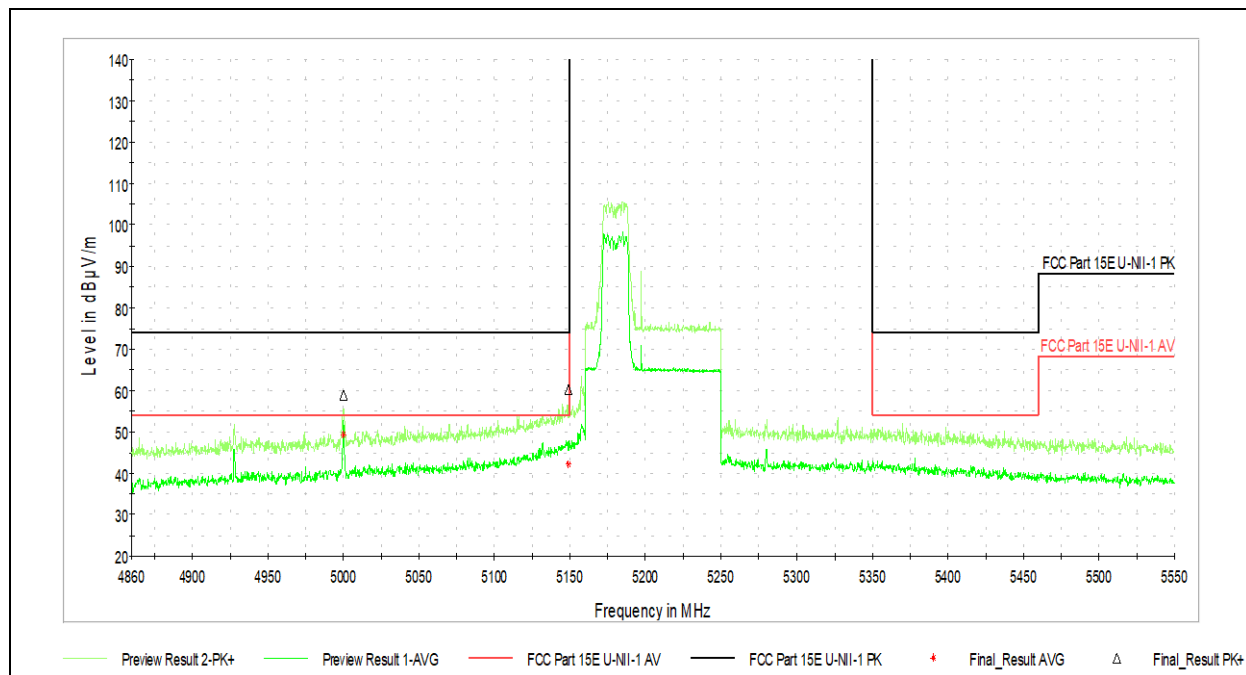
Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None



6.14.2 Emissions at the Band Edge (Low Channel)



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	58.96	73.98	15.02	1000.000	135.0	V	111.0	9
5148.750000	60.13	73.98	13.85	1000.000	167.0	V	109.0	10

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	49.36	53.98	4.62	1000.000	135.0	V	111.0	9
5148.750000	42.07	53.98	11.91	1000.000	167.0	V	109.0	10

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient
Signals or BB Source: 120V/60Hz

Yes

Test Date: 8/25/2021

FCC Part 15.401(b)(1)

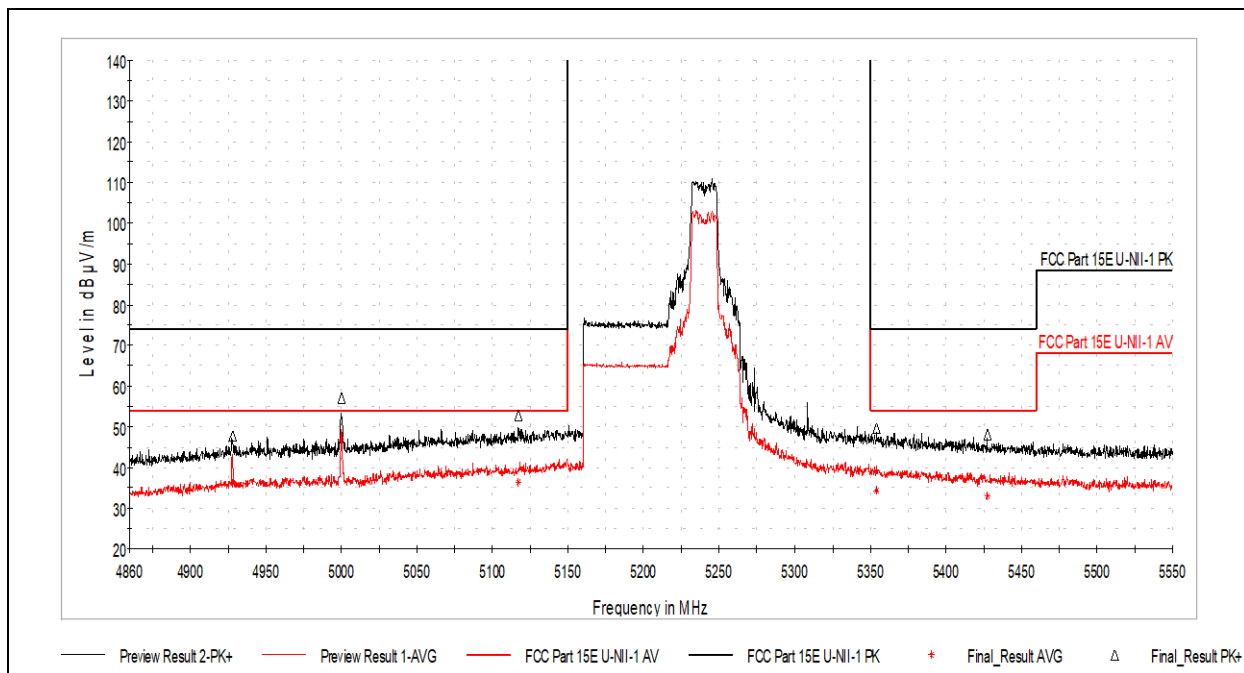
Limit Applied: FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Ambient Temperature: 23.7C

Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: the output power was reduced to setting 100 (1dBm)

**6.14.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4928.000000	47.80	73.98	26.18	1000.000	198.0	V	338.0	10
5000.000000	57.12	73.98	16.86	1000.000	133.0	V	112.0	9
5117.250000	52.78	73.98	21.20	1000.000	149.0	V	110.0	10
5354.250000	49.63	73.98	24.35	1000.000	117.0	V	101.0	11
5427.500000	48.21	73.98	25.77	1000.000	210.0	V	90.0	11

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4928.000000	36.05	53.98	17.93	1000.000	198.0	V	338.0	10
5000.000000	46.76	53.98	7.22	1000.000	133.0	V	112.0	9
5117.250000	36.34	53.98	17.64	1000.000	149.0	V	110.0	10
5354.250000	34.24	53.98	19.74	1000.000	117.0	V	101.0	11
5427.500000	33.11	53.98	20.87	1000.000	210.0	V	90.0	11

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer: NA
(Where Applicable)

Product Standard: FCC Part 15E
Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 8/25/2021
FCC Part 15.401(b)(1)
FCC Part 15.209 in Restricted Bands from FCC Part 15.205

Limit Applied:

Ambient Temperature: 23.7C
Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.15 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11nHT20 U-NII-1)****6.15.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	47.49	88.23	40.74	1000.000	178.0	V	102.0	13
12095.000000	52.61	73.98	21.37	1000.000	410.0	V	345.0	20
16031.500000	54.97	73.98	19.01	1000.000	357.0	V	0.0	24
19362.000000	56.88	73.98	17.10	1000.000	410.0	V	0.0	17
20879.500000	55.84	73.98	18.14	1000.000	192.0	V	133.0	13
22669.500000	56.87	73.98	17.11	1000.000	100.0	V	0.0	10
31515.000000	62.92	73.98	11.06	1000.000	100.0	V	12.0	17
36460.000000	64.51	73.98	9.47	1000.000	410.0	V	0.0	19

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	36.20	68.23	32.03	1000.000	178.0	V	102.0	13
12095.000000	38.56	53.98	15.42	1000.000	410.0	V	345.0	20
16031.500000	41.55	53.98	12.43	1000.000	357.0	V	0.0	24
19362.000000	42.62	53.98	11.36	1000.000	410.0	V	0.0	17
20879.500000	42.81	53.98	11.17	1000.000	192.0	V	133.0	13
22669.500000	43.61	53.98	10.37	1000.000	100.0	V	0.0	10
31515.000000	49.32	53.98	4.66	1000.000	100.0	V	12.0	17
36460.000000	51.26	53.98	2.72	1000.000	410.0	V	0.0	19

Test Personnel: Brian LackeyTest Date: 7/26/2021, 8/29/2021Supervising/Reviewing Engineer:
(Where Applicable)NA

FCC Part 15.401(b)(1)

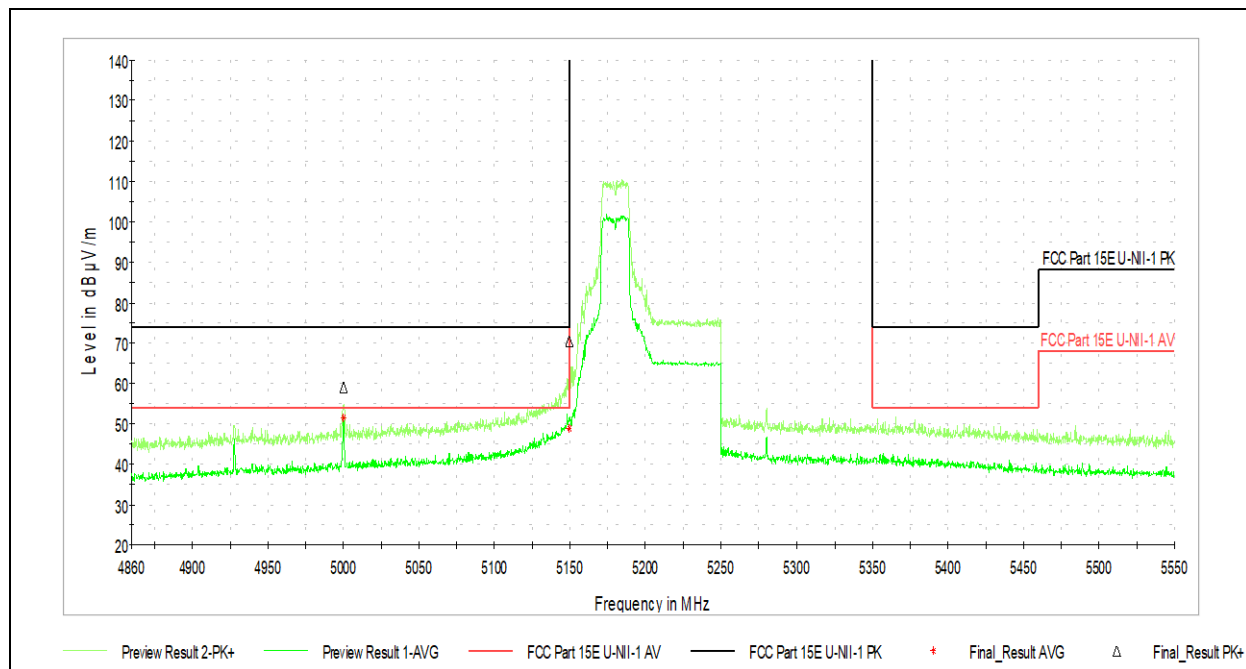
FCC Part 15.209 in Restricted

Limit Applied: Bands from FCC Part 15.205Product Standard: RSS-247 Issue 2Input Voltage: 120V/60HzAmbient Temperature: 23.7CRelative Humidity: 69.4%

Pretest Verification w / Ambient

Signals or BB Source: YesAtmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

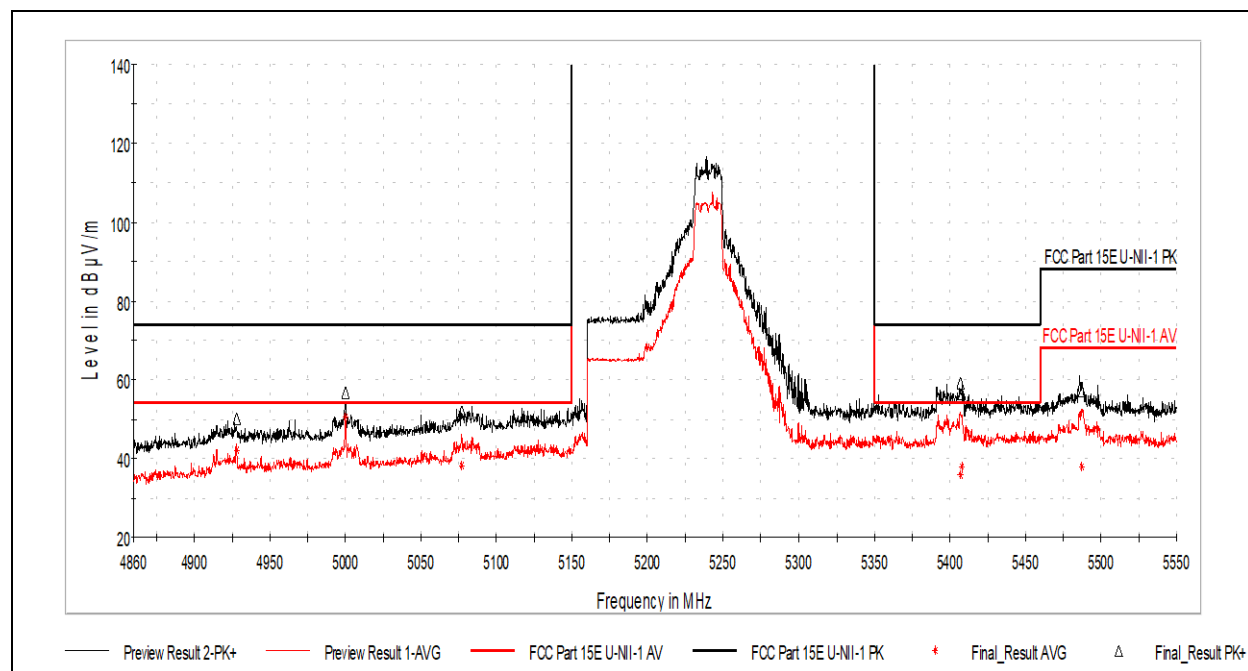
**6.15.2 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	59.02	73.98	14.96	1000.000	141.0	V	108.0	9
5149.500000	70.56	73.98	3.42	1000.000	168.0	V	112.0	10

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	51.58	53.98	2.40	1000.000	141.0	V	108.0	9
5149.500000	48.78	53.98	5.20	1000.000	168.0	V	112.0	10

Test Personnel:	Brian Lackey	Test Date:	8/25/2021
Supervising/Reviewing Engineer:			FCC Part 15.401(b)(1)
(Where Applicable)	NA		FCC Part 15.209 in Restricted
	FCC Part 15E	Limit Applied:	Bands from FCC Part 15.205
Product Standard:	RSS-247 Issue 2	Ambient Temperature:	23.7C
Input Voltage:	120V/60Hz	Relative Humidity:	69.4%
Pretest Verification w / Ambient		Atmospheric Pressure:	986.5mbar
Signals or BB Source:	Yes		

Deviations, Additions, or Exclusions: the output power was reduced to setting 800 (8dBm)

**6.15.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4928.000000	50.29	73.98	23.69	1000.000	167.0	V	102.0	10
5000.000000	56.81	73.98	17.17	1000.000	151.0	V	111.0	9
5077.000000	52.15	73.98	21.83	1000.000	167.0	V	113.0	10
5407.000000	59.34	73.98	14.64	1000.000	100.0	V	11.0	11
5408.000000	56.54	73.98	17.44	1000.000	166.0	V	226.0	11
5487.500000	57.01	88.23	31.22	1000.000	208.0	V	134.0	10

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4928.000000	42.07	53.98	11.91	1000.000	167.0	V	102.0	10
5000.000000	50.62	53.98	3.36	1000.000	151.0	V	111.0	9
5077.000000	38.36	53.98	15.62	1000.000	167.0	V	113.0	10
5407.000000	35.86	53.98	18.12	1000.000	100.0	V	11.0	11
5408.000000	38.08	53.98	15.90	1000.000	166.0	V	226.0	11
5487.500000	38.03	68.23	30.20	1000.000	208.0	V	134.0	10

Test Personnel: Brian Lackey

Test Date: 7/30/2021

Supervising/Reviewing Engineer:
(Where Applicable)

NA

Limit Applied:

FCC Part 15.401(b)(1)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Ambient Temperature: 23.4C

Relative Humidity: 65.2%

Pretest Verification w / Ambient

Signals or BB Source: Yes

Atmospheric Pressure: 987.0mbar

Deviations, Additions, or Exclusions: None

**6.16 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11acVHT20 U-NII-1)****6.16.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	48.51	88.23	39.72	1000.000	177.0	V	105.0	13
12332.500000	51.99	73.98	21.99	1000.000	410.0	V	0.0	20
16077.000000	55.74	73.98	18.24	1000.000	125.0	H	180.0	25

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6960.000000	39.34	68.23	28.89	1000.000	177.0	V	105.0	13
12332.500000	38.61	53.98	15.37	1000.000	410.0	V	0.0	20
16077.000000	42.33	53.98	11.65	1000.000	125.0	H	180.0	25

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: 120V/60Hz

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021

FCC Part 15.401(b)(1)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Limit Applied:

Ambient Temperature: 23.7C

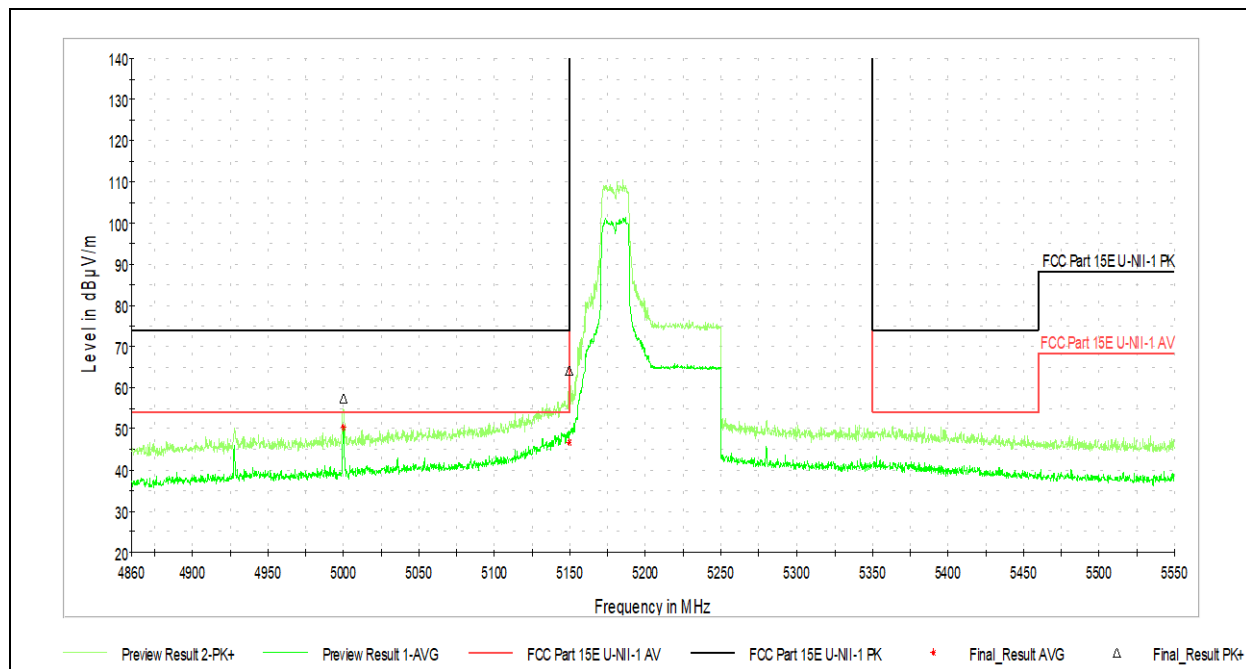
Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None



6.16.2 Emissions at the Band Edge (Low Channel)

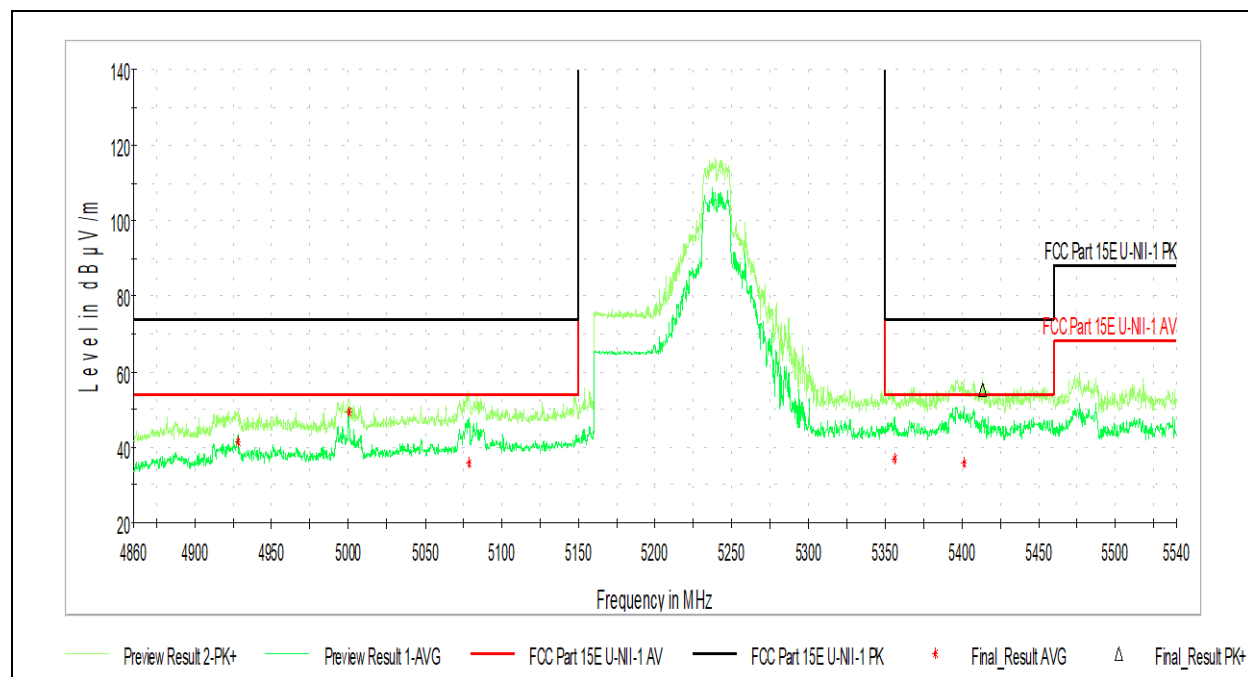


Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	57.46	73.98	16.52	1000.000	218.0	V	100.0	9
5149.500000	64.19	73.98	9.79	1000.000	149.0	V	133.0	10

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5000.000000	50.33	53.98	3.65	1000.000	218.0	V	100.0	9
5149.500000	46.81	53.98	7.17	1000.000	149.0	V	133.0	10

Test Personnel:	Brian Lackey	Test Date:	8/25/2021
Supervising/Reviewing Engineer:			FCC Part 15.401(b)(1)
(Where Applicable)	NA		FCC Part 15.209 in Restricted
	FCC Part 15E	Limit Applied:	Bands from FCC Part 15.205
Product Standard:	RSS-247 Issue 2	Ambient Temperature:	23.7C
Input Voltage:	120V/60Hz	Relative Humidity:	69.4%
Pretest Verification w / Ambient		Atmospheric Pressure:	986.5mbar
Signals or BB Source:	Yes		

Deviations, Additions, or Exclusions: the output power was reduced to setting 700 (7dBm)

**6.16.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5413.366667	55.24	73.98	18.74	1000.000	292.0	V	241.0	11

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4928.000000	41.48	53.98	12.50	1000.000	215.0	V	304.0	10
5000.250000	49.24	53.98	4.74	1000.000	133.0	V	114.0	9
5078.750000	35.65	53.98	18.33	1000.000	292.0	V	241.0	10
5356.091667	37.11	53.98	16.87	1000.000	115.0	V	109.0	11
5401.283333	35.73	53.98	18.25	1000.000	211.0	V	90.0	11

Test Personnel: Brian Lackey

Test Date: 7/30/2021

Supervising/Reviewing Engineer:
(Where Applicable)

NA

Limit Applied: FCC Part 15.401(b)(1)
FCC Part 15.209 in Restricted

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Ambient Temperature: 23.4C

Relative Humidity: 65.2%

Pretest Verification w / Ambient

Signals or BB Source: Yes

Atmospheric Pressure: 987.0mbar

Deviations, Additions, or Exclusions: None

**6.17 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11a U-NII-3)****6.17.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
12097.000000	51.74	73.98	22.24	1000.000	410.0	V	318.0	20
13085.000000	52.22	88.23	36.01	1000.000	410.0	V	219.0	21
16079.500000	55.65	73.98	18.33	1000.000	410.0	H	12.0	25
17171.500000	57.11	88.23	31.12	1000.000	348.0	V	0.0	26

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
12097.000000	38.57	53.98	15.41	1000.000	410.0	V	318.0	20
13085.000000	39.17	68.23	29.06	1000.000	410.0	V	219.0	21
16079.500000	42.33	53.98	11.65	1000.000	410.0	H	12.0	25
17171.500000	43.50	68.23	24.73	1000.000	348.0	V	0.0	26

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E
RSS-247 Issue 2

Input Voltage: 120V/60Hz

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/28/2021

FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

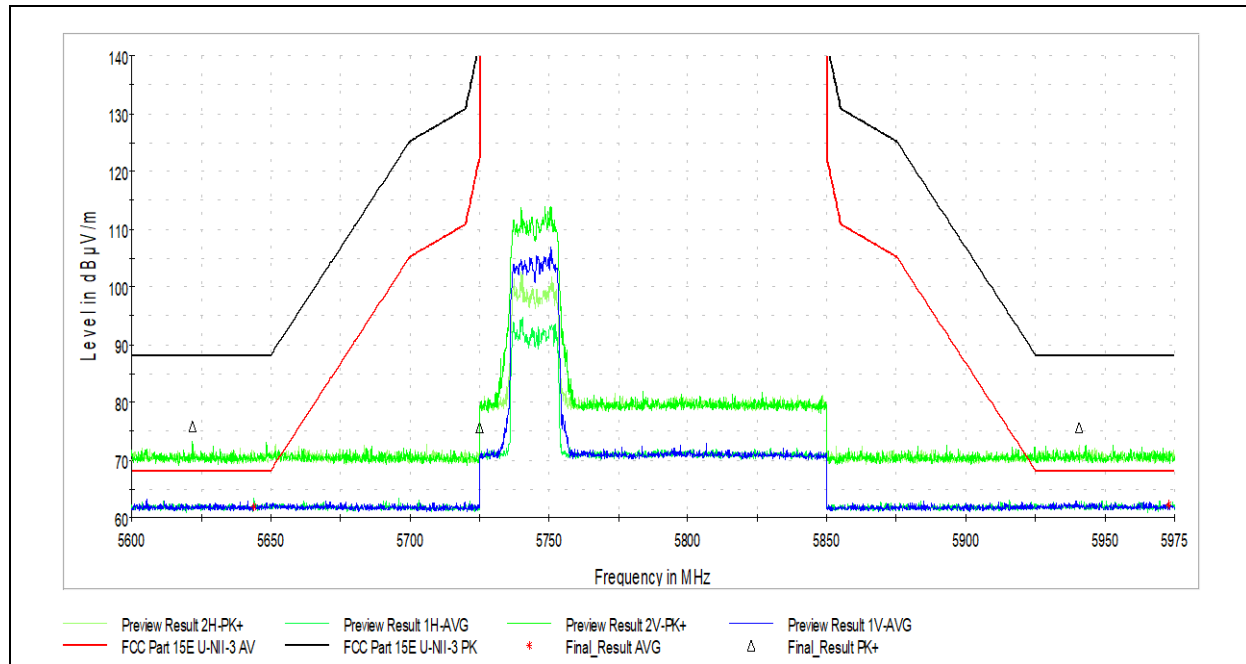
Limit Applied:

Ambient Temperature: 23.7C

Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.17.2 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5621.875000	75.85	88.23	12.38	1000.000	240.0	V	79.0	45
5725.000000	75.70	142.23	66.53	1000.000	240.0	V	79.0	46
5940.625000	75.56	88.23	12.67	1000.000	240.0	V	79.0	46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5644.000000	61.90	68.23	6.33	1000.000	190.0	H	198.0	45
5972.750000	62.26	68.23	5.97	1000.000	240.0	V	79.0	46

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: RSS-247 Issue 2

Input Voltage: 120V/60Hz

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/28/2021

FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

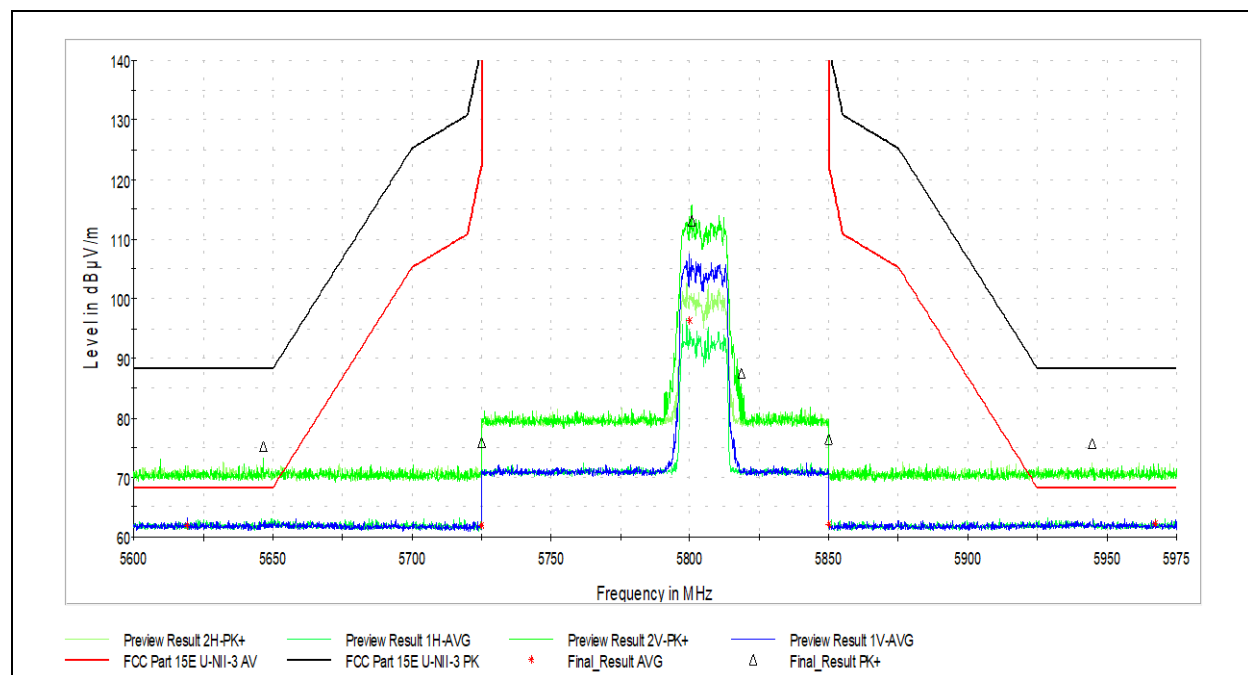
Limit Applied:

Ambient Temperature: 23.7C

Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.17.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5646.625000	75.16	88.23	13.07	1000.000	252.0	V	269.0	46
5725.000000	75.83	142.23	66.40	1000.000	252.0	V	269.0	46
5800.625000	113.18	-	-	1000.000	252.0	V	269.0	46
5818.500000	87.40	-	-	1000.000	252.0	V	269.0	46
5850.000000	76.36	142.23	65.87	1000.000	252.0	V	269.0	46
5944.625000	75.75	88.23	12.48	1000.000	252.0	V	269.0	46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5619.250000	61.86	68.23	6.37	1000.000	252.0	V	269.0	45
5725.000000	61.92	-	-	1000.000	167.0	H	22.0	46
5799.875000	96.38	-	-	1000.000	183.0	V	102.0	46
5850.000000	62.02	122.23	60.21	1000.000	218.0	H	213.0	46
5967.375000	62.21	68.23	6.02	1000.000	158.0	H	237.0	46

Test Personnel: Brian Lackey

Test Date: 7/28/2021

Supervising/Reviewing Engineer:

(Where Applicable)

NA

Limit Applied:

FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Product Standard:

FCC Part 15E

Ambient Temperature: 23.7C

Input Voltage:

RSS-247 Issue 2

Relative Humidity: 69.4%

Pretest Verification w / Ambient

Signals or BB Source:

Yes

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.18 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11nHT20 U-NII-3)****6.18.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.131667	28.52	40.00	11.48	120.000	100.0	V	244.0	27
45.627778	18.07	40.00	21.93	120.000	105.0	V	170.0	17
83.942778	32.52	40.00	7.48	120.000	105.0	V	10.0	16
400.001111	40.18	46.00	5.82	120.000	192.0	H	162.0	27
700.054444	41.48	46.00	4.52	120.000	105.0	H	178.0	33
750.009444	40.89	46.00	5.11	120.000	105.0	H	171.0	34
796.138333	41.56	46.00	4.44	120.000	105.0	H	192.0	35

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
11190.000000	49.91	73.98	24.07	1000.000	390.0	V	79.0	19
12364.000000	52.11	73.98	21.87	1000.000	100.0	H	64.0	21
16764.000000	56.04	88.23	32.19	1000.000	117.0	V	-1.0	25
21284.500000	55.82	73.98	18.16	1000.000	100.0	H	0.0	12
23554.000000	59.09	88.23	29.14	1000.000	410.0	V	220.0	11
25697.500000	59.98	88.23	28.25	1000.000	410.0	V	0.0	12
36448.000000	64.35	73.98	9.63	1000.000	410.0	H	0.0	19
36914.000000	62.00	88.23	26.23	1000.000	377.0	H	339.0	18

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
11190.000000	36.77	53.98	17.21	1000.000	390.0	V	79.0	19
12364.000000	38.87	53.98	15.11	1000.000	100.0	H	64.0	21
16764.000000	42.94	68.23	25.29	1000.000	117.0	V	-1.0	25
21284.500000	42.25	53.98	11.73	1000.000	100.0	H	0.0	12
23554.000000	45.94	68.23	22.29	1000.000	410.0	V	220.0	11
25697.500000	46.70	68.23	21.53	1000.000	410.0	V	0.0	12
36448.000000	50.96	53.98	3.02	1000.000	410.0	H	0.0	19
36914.000000	49.01	68.23	19.22	1000.000	377.0	H	339.0	18

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: RSS-247 Issue 2

Input Voltage: 120V/60Hz

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/26/2021, 8/29/2021
FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted

Limit Applied: Bands from FCC Part 15.205

Ambient Temperature: 23.7C

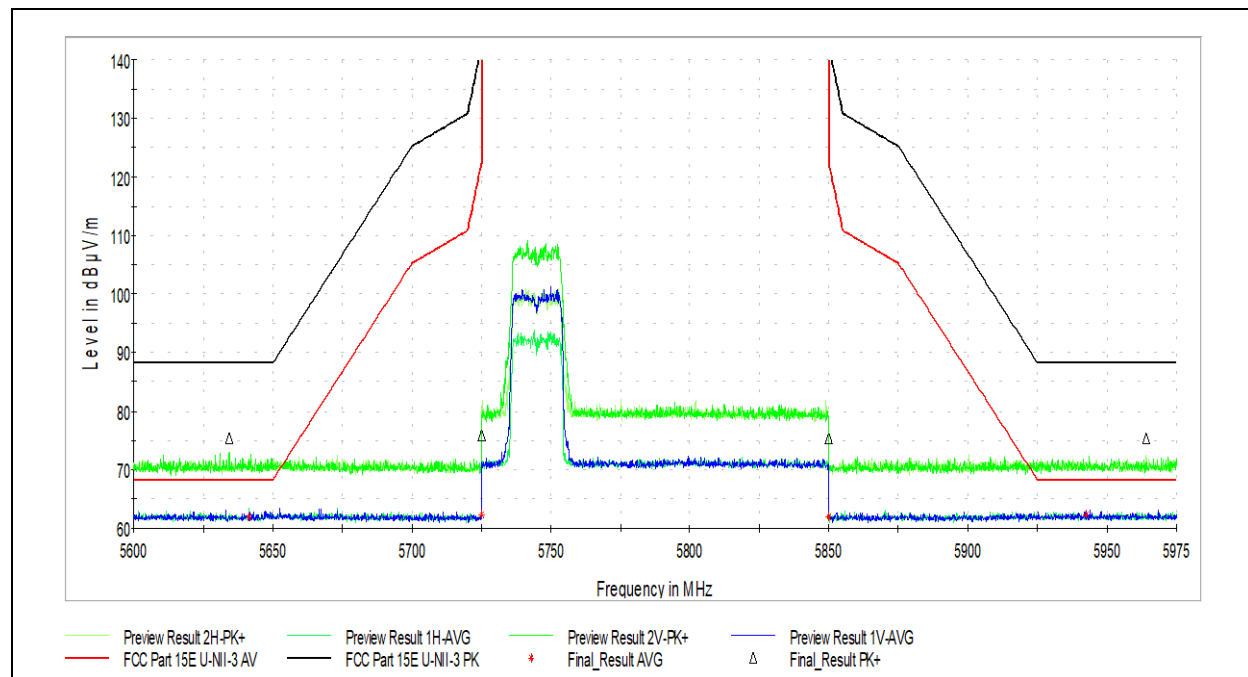
Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None



6.18.2 Emissions at the Band Edge (Low Channel)



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5634.250000	75.24	88.23	12.99	1000.000	209.0	V	213.0	45
5725.000000	75.81	-	-	1000.000	209.0	V	213.0	46
5850.000000	75.27	-	-	1000.000	209.0	V	213.0	46
5964.125000	75.29	88.23	12.94	1000.000	209.0	V	213.0	46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5641.500000	61.88	68.23	6.35	1000.000	100.0	H	158.0	45
5725.000000	62.21	-	-	1000.000	209.0	V	213.0	46
5850.000000	61.98	-	-	1000.000	206.0	V	180.0	46
5942.625000	62.36	68.23	5.87	1000.000	100.0	H	0.0	46

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/28/2021

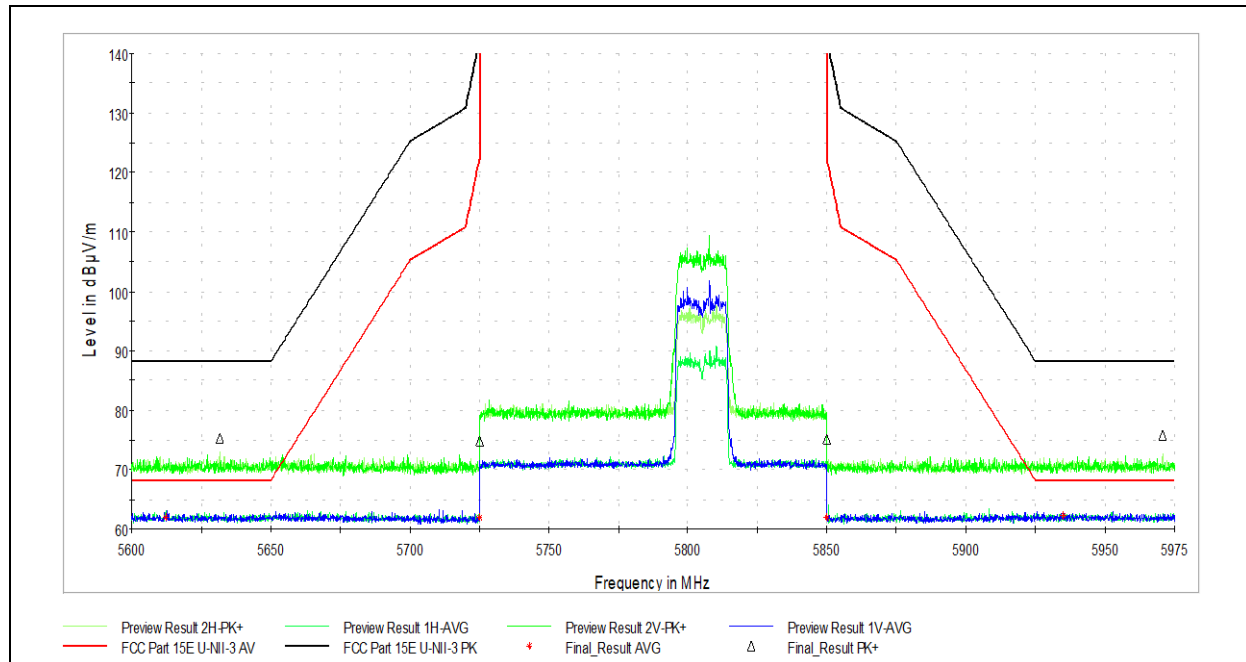
Limit Applied: FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Ambient Temperature: 23.7C

Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.18.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5631.625000	75.31	88.23	12.92	1000.000	230.0	V	243.0	45
5725.000000	74.77	-	-	1000.000	230.0	V	243.0	46
5850.000000	75.25	-	-	1000.000	230.0	V	243.0	46
5970.625000	75.91	88.23	12.32	1000.000	230.0	V	243.0	46

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5612.125000	61.92	68.23	6.31	1000.000	255.0	H	198.0	45
5725.000000	61.91	-	-	1000.000	230.0	V	243.0	46
5850.000000	62.04	-	-	1000.000	199.0	V	110.0	46
5935.000000	62.30	68.23	5.93	1000.000	325.0	V	253.0	46

Test Personnel: Brian Lackey

Test Date: 7/28/2021

Supervising/Reviewing Engineer:

FCC Part 15.401(b)(4)

(Where Applicable)

NA

FCC Part 15.209 in Restricted

Limit Applied:

Bands from FCC Part 15.205

Product Standard:

FCC Part 15E

Ambient Temperature:

23.4C

Input Voltage:

RSS-247 Issue 2

Relative Humidity:

65.2%

Pretest Verification w / Ambient

Signals or BB Source:

Yes

Atmospheric Pressure:

987.0mbar

Deviations, Additions, or Exclusions: None

**6.19 FCC Part 15E Radiated Spurious Emissions (5GHz Wi-Fi 802.11acVHT20 U-NII-3)****6.19.1 Radiated Spurious Emissions (Mid Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
11205.000000	50.18	73.98	23.80	1000.000	349.0	V	300.0	19
13179.500000	52.56	88.23	35.67	1000.000	364.0	V	0.0	21
14298.500000	52.66	88.23	35.57	1000.000	100.0	H	108.0	21
16086.500000	55.61	73.98	18.37	1000.000	379.0	H	0.0	25

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
11205.000000	36.78	53.98	17.20	1000.000	349.0	V	300.0	19
13179.500000	39.16	68.23	29.07	1000.000	364.0	V	0.0	21
14298.500000	39.60	68.23	28.63	1000.000	100.0	H	108.0	21
16086.500000	42.36	53.98	11.62	1000.000	379.0	H	0.0	25

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient
Signals or BB Source: 120V/60Hz

Yes

Test Date: 7/28/2021

FCC Part 15.401(b)(4)

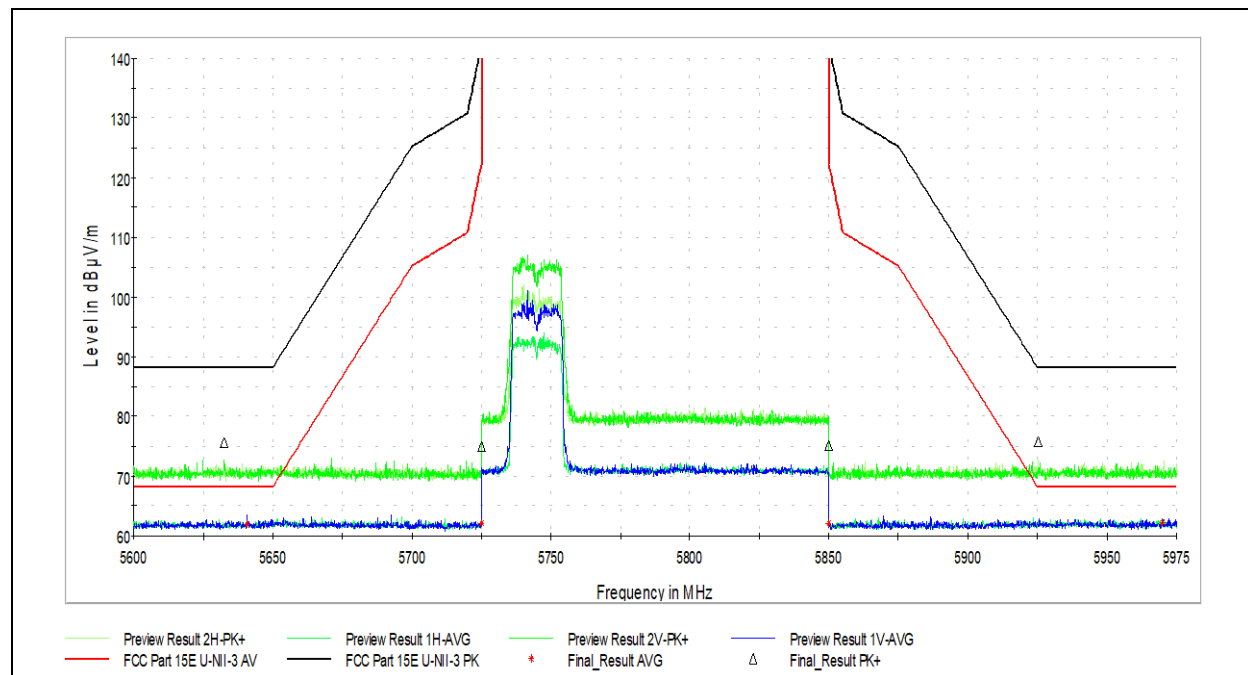
Limit Applied: FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Ambient Temperature: 23.7C

Relative Humidity: 69.4%

Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.19.2 Emissions at the Band Edge (Low Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5632.500000	75.71	88.23	12.52	1000.000	116.0	V	305.0	45
5725.000000	74.98	-	-	1000.000	116.0	V	305.0	46
5850.000000	75.22	-	-	1000.000	116.0	V	305.0	46
5925.125000	75.93	88.23	12.30	1000.000	116.0	V	305.0	46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5640.750000	61.86	68.23	6.37	1000.000	226.0	V	102.0	45
5725.000000	62.08	-	-	1000.000	305.0	V	99.0	46
5850.000000	62.02	-	-	1000.000	410.0	H	231.0	46
5970.000000	62.24	68.23	5.99	1000.000	116.0	V	305.0	46

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer: NA
 (Where Applicable)

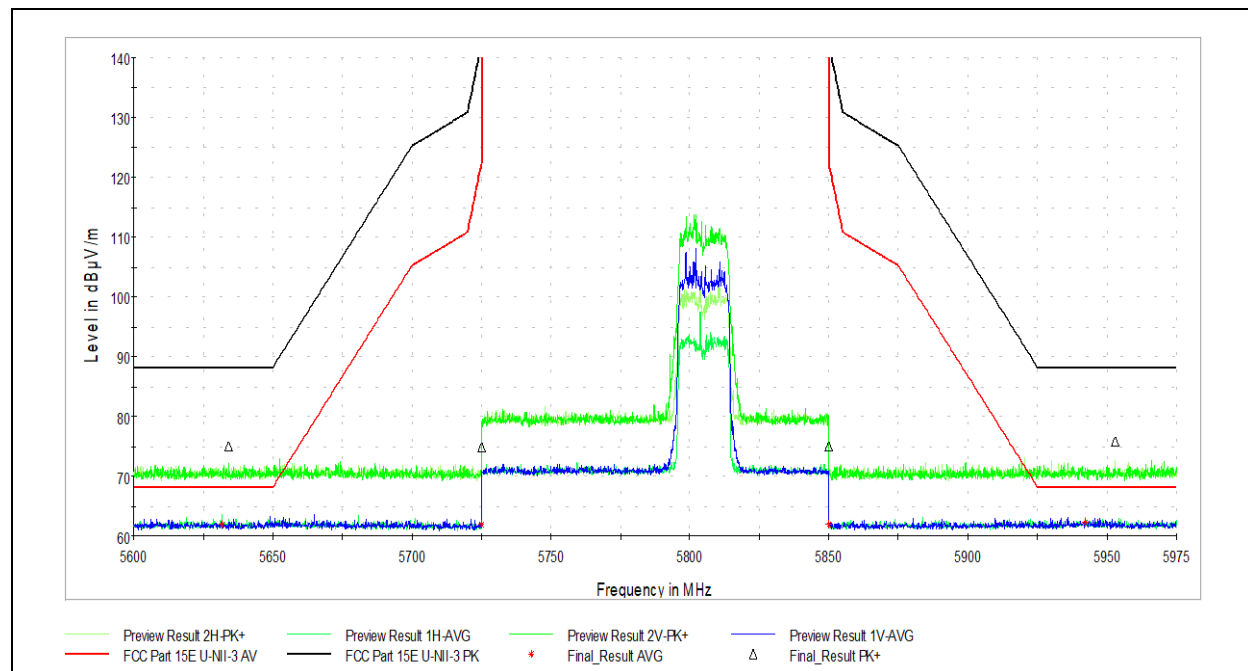
Product Standard: FCC Part 15E
 Input Voltage: RSS-247 Issue 2
 Pretest Verification w / Ambient Signals or BB Source: 120V/60Hz
Yes

Test Date: 7/28/2021
FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted Bands from FCC Part 15.205

Limit Applied:

Ambient Temperature: 23.7C
 Relative Humidity: 69.4%
 Atmospheric Pressure: 986.5mbar

Deviations, Additions, or Exclusions: None

**6.19.3 Emissions at the Band Edge (High Channel)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5634.125000	75.16	88.23	13.07	1000.000	243.0	H	102.0	45
5725.000000	74.90	-	-	1000.000	243.0	H	102.0	46
5850.000000	75.10	-	-	1000.000	243.0	H	102.0	46
5952.875000	75.95	88.23	12.28	1000.000	243.0	H	102.0	46

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
5631.625000	61.94	68.23	6.29	1000.000	342.0	H	328.0	45
5725.000000	61.92	-	-	1000.000	243.0	H	102.0	46
5850.000000	62.02	-	-	1000.000	117.0	H	212.0	46
5942.375000	62.36	68.23	5.87	1000.000	100.0	H	262.0	46

Test Personnel: Brian Lackey

Supervising/Reviewing Engineer:
(Where Applicable) NA

Product Standard: FCC Part 15E

Input Voltage: RSS-247 Issue 2

Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/28/2021

FCC Part 15.401(b)(4)
FCC Part 15.209 in Restricted
Bands from FCC Part 15.205

Limit Applied:

Ambient Temperature: 23.4C

Relative Humidity: 65.2%

Atmospheric Pressure: 987.0mbar

Deviations, Additions, or Exclusions: None

**6.20 FCC Part 22 Radiated Spurious Emissions****6.20.1 LTE B5**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.376667	37.00	82.25	45.25	120.000	101.0	V	7.0	21
67.830000	31.67	82.25	50.58	120.000	101.0	V	0.0	15
125.006111	50.47	82.25	31.78	120.000	101.0	V	206.0	22
349.776667	36.14	82.25	46.11	120.000	101.0	H	27.0	25
877.833889	54.51	82.25	27.74	120.000	101.0	V	201.0	35

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	41.46	82.25	40.79	1000.000	169.0	H	56.0	1
1800.000000	44.99	82.25	37.26	1000.000	134.0	V	338.0	3
2060.000000	60.87	82.25	21.38	1000.000	169.0	V	332.0	4
2245.500000	63.55	82.25	18.70	1000.000	330.0	H	176.0	5
2438.000000	51.61	82.25	30.64	1000.000	134.0	V	41.0	5
5000.000000	44.30	82.25	37.95	1000.000	160.0	V	271.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	34.15	82.25	48.10	1000.000	169.0	H	56.0	1
1800.000000	39.92	82.25	42.33	1000.000	134.0	V	338.0	3
2060.000000	26.06	82.25	56.19	1000.000	169.0	V	332.0	4
2245.500000	26.90	82.25	55.35	1000.000	330.0	H	176.0	5
2438.000000	29.69	82.25	52.56	1000.000	134.0	V	41.0	5
5000.000000	32.20	82.25	50.05	1000.000	160.0	V	271.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer:
(Where Applicable) NA
Product Standard: FCC Part 22
Input Voltage: RSS-132
120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None

**6.21 FCC Part 24 Radiated Spurious Emissions****6.21.1 LTE B2**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
40.077222	37.52	82.25	44.73	120.000	136.0	V	-1.0	20
67.291111	33.93	82.25	48.32	120.000	100.0	V	0.0	15
125.006111	50.44	82.25	31.81	120.000	100.0	V	203.0	22
144.352222	42.64	82.25	39.61	120.000	100.0	V	18.0	22
345.088333	35.21	82.25	47.04	120.000	100.0	H	8.0	25

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2436.000000	45.49	82.25	36.76	1000.000	254.0	V	254.0	5
2810.000000	48.42	82.25	33.83	1000.000	100.0	V	0.0	7
3754.500000	42.75	82.25	39.50	1000.000	100.0	H	93.0	8
5000.000000	44.91	82.25	37.34	1000.000	321.0	V	305.0	9
9403.000000	49.24	82.25	33.01	1000.000	346.0	H	37.0	17

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2436.000000	27.09	82.25	55.16	1000.000	254.0	V	254.0	5
2810.000000	27.30	82.25	54.95	1000.000	100.0	V	0.0	7
3754.500000	29.22	82.25	53.03	1000.000	100.0	H	93.0	8
5000.000000	34.16	82.25	48.09	1000.000	321.0	V	305.0	9
9403.000000	35.80	82.25	46.45	1000.000	346.0	H	37.0	17

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
FCC Part 24
Product Standard: RSS-133
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None

**6.22 FCC Part 27 Radiated Spurious Emissions****6.22.1 LTE B4**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.167222	37.63	82.25	44.62	120.000	100.0	V	-1.0	22
67.291111	33.76	82.25	48.49	120.000	100.0	V	0.0	15
125.006111	49.69	82.25	32.56	120.000	99.0	V	203.0	22
346.220000	37.00	82.25	45.25	120.000	100.0	H	26.0	25
750.009444	41.92	82.25	40.33	120.000	100.0	H	172.0	34

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	45.72	82.25	36.53	1000.000	260.0	V	136.0	5
2812.500000	51.28	82.25	30.97	1000.000	100.0	H	276.0	7
3463.000000	45.06	82.25	37.19	1000.000	117.0	V	334.0	7
4000.000000	47.82	82.25	34.43	1000.000	211.0	V	287.0	9
5000.000000	45.30	82.25	36.95	1000.000	118.0	V	-1.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	26.78	82.25	55.47	1000.000	260.0	V	136.0	5
2812.500000	27.08	82.25	55.17	1000.000	100.0	H	276.0	7
3463.000000	32.88	82.25	49.37	1000.000	117.0	V	334.0	7
4000.000000	30.68	82.25	51.57	1000.000	211.0	V	287.0	9
5000.000000	35.14	82.25	47.11	1000.000	118.0	V	-1.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer:
(Where Applicable) NA
FCC Part 27
Product Standard: RSS-139
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



6.22.2 LTE B7

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.500000	46.58	82.25	35.67	1000.000	281.0	V	342.0	5
2536.000000	57.83	82.25	24.42	1000.000	270.0	V	122.0	6
2873.000000	40.99	82.25	41.26	1000.000	109.0	V	318.0	7
4000.000000	48.94	82.25	33.31	1000.000	109.0	V	286.0	9
5000.000000	44.56	82.25	37.69	1000.000	109.0	V	66.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.500000	27.10	82.25	55.15	1000.000	281.0	V	342.0	5
2536.000000	47.39	82.25	34.86	1000.000	270.0	V	122.0	6
2873.000000	27.33	82.25	54.92	1000.000	109.0	V	318.0	7
4000.000000	30.07	82.25	52.18	1000.000	109.0	V	286.0	9
5000.000000	33.50	82.25	48.75	1000.000	109.0	V	66.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer:
(Where Applicable) NA
FCC Part 27
Product Standard: RSS-199
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



6.22.3 LTE B12

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
40.562222	36.89	82.25	45.36	120.000	100.0	V	-2.0	20
67.291111	33.59	82.25	48.66	120.000	105.0	V	5.0	15
125.006111	50.57	82.25	31.68	120.000	99.0	V	206.0	22
344.010556	37.26	82.25	44.99	120.000	100.0	H	26.0	25
735.998333	59.74	82.25	22.51	120.000	165.0	H	286.0	34

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	40.15	82.25	42.10	1000.000	100.0	V	320.0	0
1800.000000	45.30	82.25	36.95	1000.000	134.0	V	335.0	3
2062.500000	57.10	82.25	25.15	1000.000	297.0	V	302.0	4
2252.000000	71.58	82.25	10.67	1000.000	410.0	H	228.0	5
2435.000000	54.76	82.25	27.49	1000.000	343.0	V	345.0	5
2809.000000	57.82	82.25	24.43	1000.000	349.0	H	0.0	7
5000.000000	43.58	82.25	38.67	1000.000	100.0	H	22.0	9
16683.000000	56.63	82.25	25.62	1000.000	410.0	V	34.0	25

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	32.96	82.25	49.29	1000.000	100.0	V	320.0	0
1800.000000	39.93	82.25	42.32	1000.000	134.0	V	335.0	3
2062.500000	27.72	82.25	54.53	1000.000	297.0	V	302.0	4
2252.000000	30.36	82.25	51.89	1000.000	410.0	H	228.0	5
2435.000000	28.30	82.25	53.95	1000.000	343.0	V	345.0	5
2809.000000	27.69	82.25	54.56	1000.000	349.0	H	0.0	7
5000.000000	30.36	82.25	51.89	1000.000	100.0	H	22.0	9
16683.000000	43.47	82.25	38.78	1000.000	410.0	V	34.0	25

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
Product Standard: FCC Part 27
Input Voltage: RSS-130
Pretest Verification w / Ambient: 120V/60Hz
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



6.22.4 LTE B13

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1800.000000	44.85	82.25	37.40	1000.000	189.0	V	336.0	3
2067.000000	60.57	82.25	21.68	1000.000	362.0	H	98.0	4
2255.500000	69.26	82.25	12.99	1000.000	344.0	H	148.0	5
2435.000000	49.63	82.25	32.62	1000.000	270.0	V	0.0	5
5000.000000	43.90	82.25	38.35	1000.000	158.0	V	320.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1800.000000	39.35	82.25	42.90	1000.000	189.0	V	336.0	3
2067.000000	26.00	82.25	56.25	1000.000	362.0	H	98.0	4
2255.500000	29.26	82.25	52.99	1000.000	344.0	H	148.0	5
2435.000000	27.03	82.25	55.22	1000.000	270.0	V	0.0	5
5000.000000	32.11	82.25	50.14	1000.000	158.0	V	320.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
FCC Part 27
Product Standard: RSS-130
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



6.22.5 LTE B41

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
40.023333	37.67	82.25	44.58	120.000	100.0	V	6.0	20
67.830000	32.04	82.25	50.21	120.000	100.0	V	0.0	15
124.952222	47.30	82.25	34.95	120.000	100.0	V	203.0	22
346.273889	36.36	82.25	45.89	120.000	100.0	H	28.0	25
750.009444	41.21	82.25	41.04	120.000	100.0	H	170.0	34

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	45.25	82.25	37.00	1000.000	268.0	V	35.0	5
2595.000000	66.30	82.25	15.95	1000.000	266.0	V	338.0	6
2813.500000	53.79	82.25	28.46	1000.000	109.0	V	277.0	7
5000.000000	44.83	82.25	37.42	1000.000	109.0	V	66.0	9
7772.500000	45.63	82.25	36.62	1000.000	134.0	V	103.0	14

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	26.54	82.25	55.71	1000.000	268.0	V	35.0	5
2595.000000	48.33	82.25	33.92	1000.000	266.0	V	338.0	6
2813.500000	27.10	82.25	55.15	1000.000	109.0	V	277.0	7
5000.000000	33.58	82.25	48.67	1000.000	109.0	V	66.0	9
7772.500000	32.10	82.25	50.15	1000.000	134.0	V	103.0	14

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 27
Product Standard: RSS-199
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



6.22.6 LTE B66

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	46.28	82.25	35.97	1000.000	247.0	H	0.0	6
2809.500000	63.93	82.25	18.32	1000.000	410.0	V	334.0	7
3495.500000	46.88	82.25	35.37	1000.000	395.0	V	338.0	7
5000.000000	45.90	82.25	36.35	1000.000	117.0	V	-1.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2438.000000	26.99	82.25	55.26	1000.000	247.0	H	0.0	6
2809.500000	27.82	82.25	54.43	1000.000	410.0	V	334.0	7
3495.500000	34.37	82.25	47.88	1000.000	395.0	V	338.0	7
5000.000000	34.87	82.25	47.38	1000.000	117.0	V	-1.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: _____
(Where Applicable) NA
FCC Part 27
Product Standard: RSS-139
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None

**6.23 FCC Part 90 Radiated Spurious Emissions****6.23.1 LTE B26**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	40.42	82.25	41.83	1000.000	100.0	V	327.0	0
1800.000000	45.34	82.25	36.91	1000.000	159.0	V	342.0	3
2057.000000	53.89	82.25	28.36	1000.000	100.0	H	228.0	4
2247.500000	65.30	82.25	16.95	1000.000	125.0	H	313.0	5
2438.500000	50.96	82.25	31.29	1000.000	100.0	V	316.0	5
5000.000000	45.15	82.25	37.10	1000.000	116.0	V	67.0	9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1400.000000	33.21	82.25	49.04	1000.000	100.0	V	327.0	0
1800.000000	40.04	82.25	42.21	1000.000	159.0	V	342.0	3
2057.000000	25.53	82.25	56.72	1000.000	100.0	H	228.0	4
2247.500000	26.93	82.25	55.32	1000.000	125.0	H	313.0	5
2438.500000	28.56	82.25	53.69	1000.000	100.0	V	316.0	5
5000.000000	34.49	82.25	47.76	1000.000	116.0	V	67.0	9

Test Personnel: Michael Carlson
Supervising/Reviewing Engineer: NA
(Where Applicable) FCC Part 90
Product Standard: RSS-132
Input Voltage: 120V/60Hz
Pretest Verification w / Ambient
Signals or BB Source: Yes

Test Date: 7/24/2021
Limit Applied: -13dBm converted to field strength
Ambient Temperature: 23.2C
Relative Humidity: 61.6%
Atmospheric Pressure: 989.9mbar

Deviations, Additions, or Exclusions: None



7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	9/3/2021	104699147LEX-002	BZ	BCT	Original Issue
1	9/10/2021	104699147LEX-002.1	BZ	BCT	Updated module and antenna information
2	9/8/2022	104699147LEX-002.2	BZ	JTS	Updated band edge results for 802.11g and 802.11n.
3	1/26/2023	104699147LEX-002.3	BZ	JTS	