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Alcohol Monitoring Systems, Inc. TEST REPORT

SCOPE OF WORK
EMC TESTING – GPS BRACELET 900/910

REPORT NUMBER
105373087LEX-021

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Non-Specific EMC Report Shell Rev. December 2017

EMC TEST REPORT

(FULL COMPLIANCE)

Report Number: 105373087LEX-021
Project Number: G105373087

Report Issue Date: 9/3/2024

Model(s) Tested: GPS Bracelet 900/910

Standards: FCC Title 47 CFR Part 15.247
RSS-247 Issue 3
RSS-GEN Issue 5

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

Client:
Alcohol Monitoring Systems, Inc.
6251 Greenwood Plaza Blvd
Suite 300
Greenwood Village, CO 80111
USA

Report prepared by

Brian Lackey, Staff Engineer

Report reviewed by

Michael Carlson,
EMC Team Lead

Table of Contents

1 Introduction and Conclusion 4
2 Test Summary 4
3 Client Information 5
4 Description of Equipment under Test and Variant Models 6
5 System Setup and Method 8
6 Occupied Bandwidth 10
7 Carrier Frequency Separation 18
8 Number of Hopping Frequencies 20
9 Time of Occupancy (Dwell Time) 22
10 Output Power 27
11 Conducted Spurious Emissions 34
12 Radiated Spurious Emissions 44
13 Antenna Requirement 61
14 Conducted Emissions 62
15 Revision History 66

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	Occupied Bandwidth (ANSI C63.10 (2020) §6.9.2 and §6.9.3)	Pass
7	Carrier Frequency Separation (ANSI C63.10 (2020) §7.8.2)	Pass
8	Number of Hopping Frequencies (ANSI C63.10 (2020) §7.8.3)	Pass
9	Time of Occupancy (Dwell Time) (ANSI C63.10 (2020) §7.8.4)	Pass
10	Output Power (ANSI C63.10 (2020) §7.8.5)	Pass
11	Conducted Spurious Emissions (ANSI C63.10 (2020) §7.8.7.1 and §7.8.7.2)	Pass
12	Radiated Spurious Emissions (ANSI C63.10 (2020) §§6.3-6.6)	Pass
13	Antenna Requirement (FCC Part 15.203, RSS-Gen Issue 5 § 6.8)	Pass
14	Conducted Emissions (ANSI C63.4:2014)	Pass

3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Alcohol Monitoring Systems, Inc.
Address:	6251 Greenwood Plaza Blvd Suite 300 Greenwood Village, CO 80111 USA
Contact:	Don Pruitt
Telephone:	+1 (706) 265-5180
Email:	dpruitt@scramsystems.com
Manufacturer Information	
Manufacturer Name:	Alcohol Monitoring Systems, Inc.
Manufacturer Address:	6251 Greenwood Plaza Blvd Suite 300 Greenwood Village, CO 80111 USA

4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	GPS Bracelet 900/910
Model Number	GPS Bracelet 900/910
Serial Number	GM10001G9 (radiated) and GM10001G6 (conducted)
Receive Date	6/2/2024
Test Start Date	8/26/2024
Test End Date	8/28/2024
Device Received Condition	Good
Test Sample Type	Production
Transmit Band	902MHz – 928MHz
# of Hopping Channels	50
Nominal Channel Bandwidth	300 kHz
Antenna Type	Integral Antenna
Antenna Gain[1]	-3dBi
Rated Voltage	3.6V Battery
Description of Equipment Under Test (provided by client)	
Ankle worn tracking device	

Test Channels

Channel	Frequency (MHz)	Power Setting
7	903.4	9[2]
8	903.6	10
59	913.8	10
120	926.0	10
121	926.2	9[2]

[1] This information was provided by the client and may affect compliance. Intertek does not make any claim of compliance for values other than those shown.
[2] Reduced output power was used on outermost channels for compliance with emissions limits.

4.1 Channel Plan

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	902.0	26	907.2	52	912.4	78	917.6	104	922.8
1	902.2	27	907.4	53	912.6	79	917.8	105	923.0
2	902.4	28	907.6	54	912.8	80	918.0	106	923.2
3	902.6	29	907.8	55	913.0	81	918.2	107	923.4
4	902.8	30	908.0	56	913.2	82	918.4	108	923.6
5	903.0	31	908.2	57	913.4	83	918.6	109	923.8
6	903.2	32	908.4	58	913.6	84	918.8	110	924.0
7	903.4	33	908.6	59	913.8	85	919.0	111	924.2
8	903.6	34	908.8	60	914.0	86	919.2	112	924.4
9	903.8	35	909.0	61	914.2	87	919.4	113	924.6
10	904.0	36	909.2	62	914.4	88	919.6	114	924.8
11	904.2	37	909.4	63	914.6	89	919.8	115	925.0
12	904.4	38	909.6	64	914.8	90	920.0	116	925.2
13	904.6	39	909.8	65	915.0	91	920.2	117	925.4
14	904.8	40	910.0	66	915.2	92	920.4	118	925.6
15	905.0	41	910.2	67	915.4	93	920.6	119	925.8
16	905.2	42	910.4	68	915.6	94	920.8	120	926.0
17	905.4	43	910.6	69	915.8	95	921.0	121	926.2
18	905.6	44	910.8	70	916.0	96	921.2	122	926.4
19	905.8	45	911.0	71	916.2	97	921.4	123	926.6
20	906.0	46	911.2	72	916.4	98	921.6	124	926.8
21	906.2	47	911.4	73	916.6	99	921.8	125	927.0
22	906.4	48	911.6	74	916.8	100	922.0	126	927.2
23	906.6	49	911.8	75	917.0	101	922.2	127	927.4
24	906.8	50	912.0	76	917.2	102	922.4	128	927.6
25	907.0	51	912.2	77	917.4	103	922.6	129	927.8

Not Supported
Supported, Not Included in Hopping Channel Plan
Supported, Hopping Channel Plan

4.2 Variant Models:

There were no variant models covered under this evaluation.

5 System Setup and Method

5.1 Method:

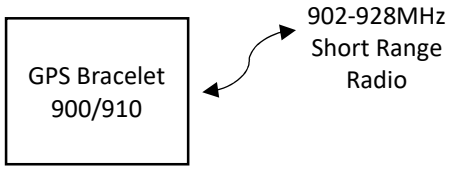
Configuration as required by ANSI C63.10 (2020)

No.	Descriptions of EUT Exercising
1	Powered by internal battery, transmitting on a low, middle, or high channel

Cables					
QTY	Description	Length (m)	Shielding	Ferrites	Termination
-	None	-	-	-	-

Support Equipment (Accessories)		
Description	Manufacturer	Model Number
None	-	-

5.2 EUT Block Diagram:



6 Occupied Bandwidth

6.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §6.9.3

6.2 Test Limits:

Title 47 CFR 15.247(a)(1)

(i) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(ii) Frequency hopping systems operating in the 5725–5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

RSS-247 §5.1

c. For FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

e. FHSs operating in the band 5725-5850 MHz shall use at least 75 hopping channels. The maximum 20 dB bandwidth of the hopping channel shall be 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30-second period.

RSS-GEN §6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

6.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

6.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

6.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/26/2024	19.7°C	52.2%	988.8mbar
Brian Lackey	8/27/2024	19.7°C	52.0%	985.4mbar

6.6 Test Results:

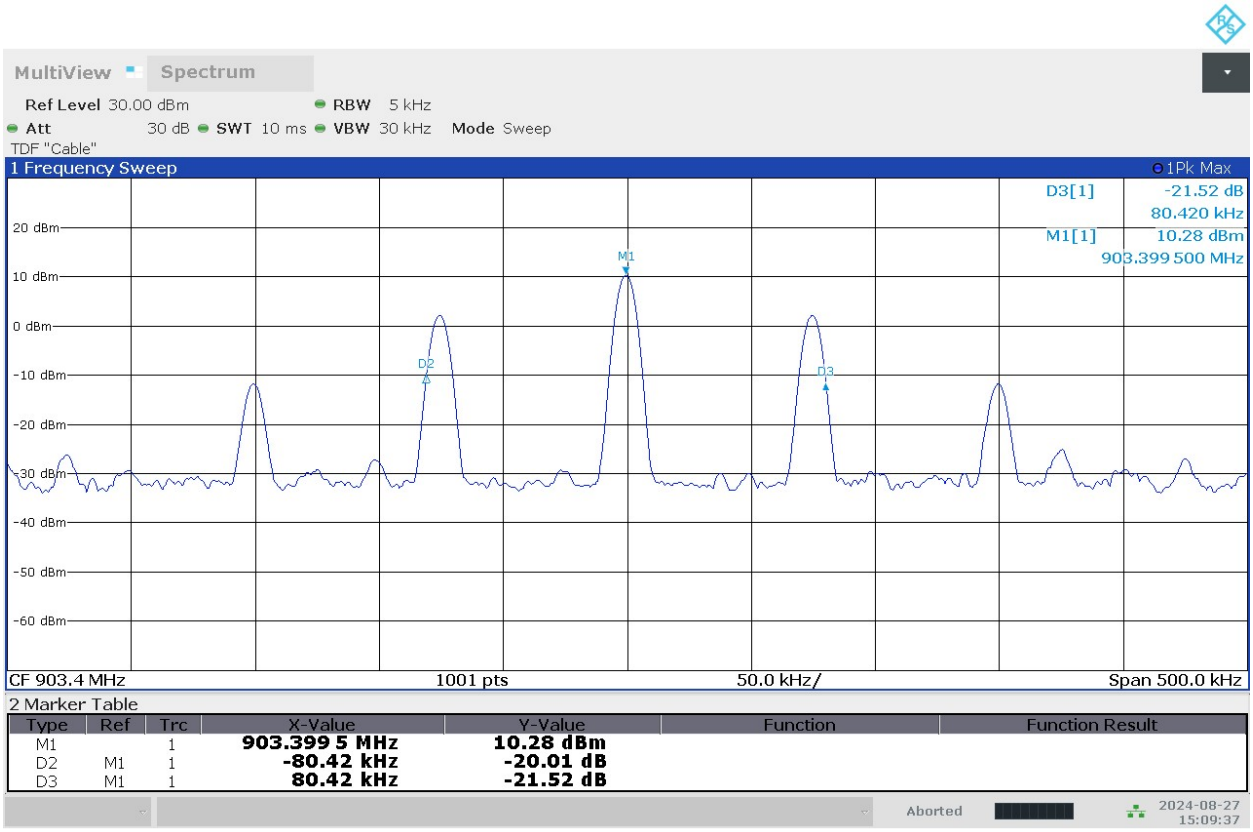
The sample tested was found to Comply.

6.7 Test Data:

Channel	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)
7	903.4	160.8	301.1	500
59	913.8	160.3	295.2	500
121	926.2	160.3	294.6	500

6.8 Test Plots: Occupied Channel Bandwidth (20dB Bandwidth)

6.8.1 Low Channel



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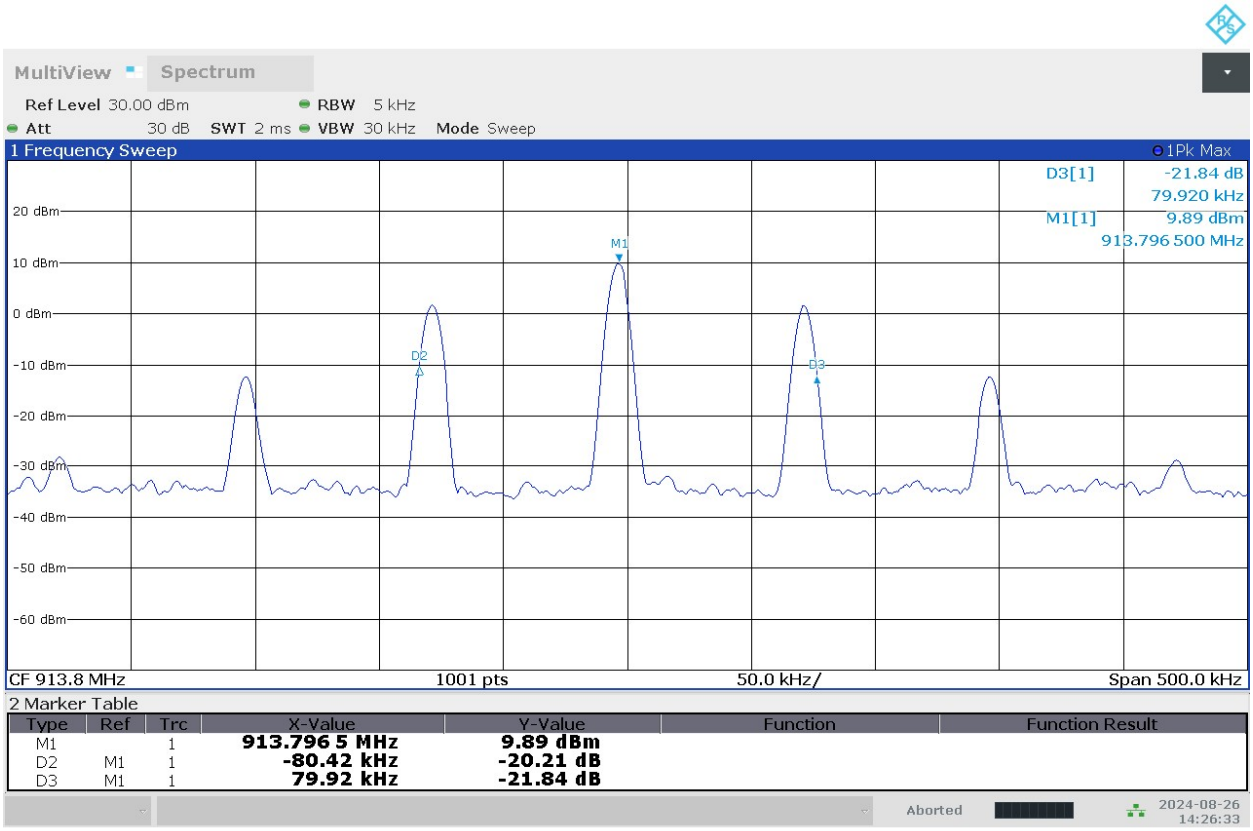
6.8.2 Mid Channel



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6.8.3 High Channel

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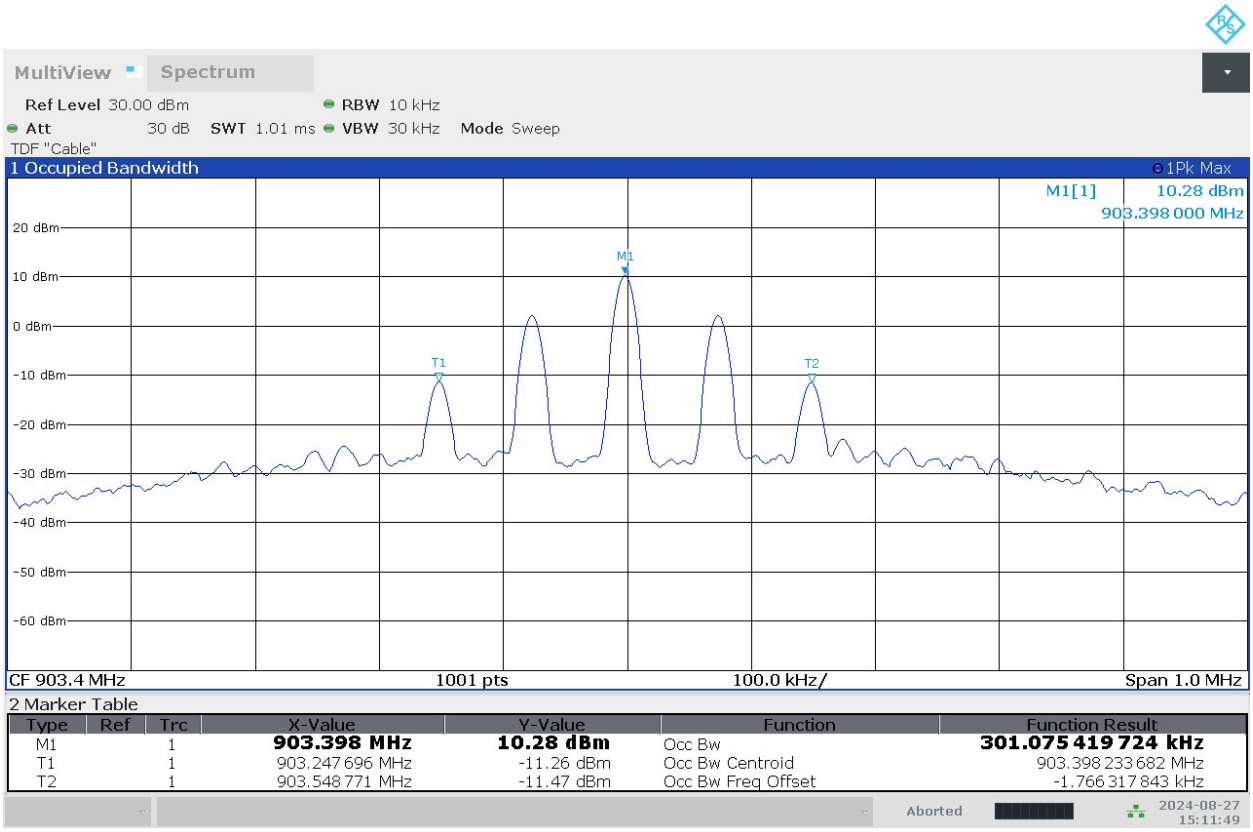
6.9 Test Plots: Occupied Channel Bandwidth (99% Bandwidth)

6.9.1 Low Channel



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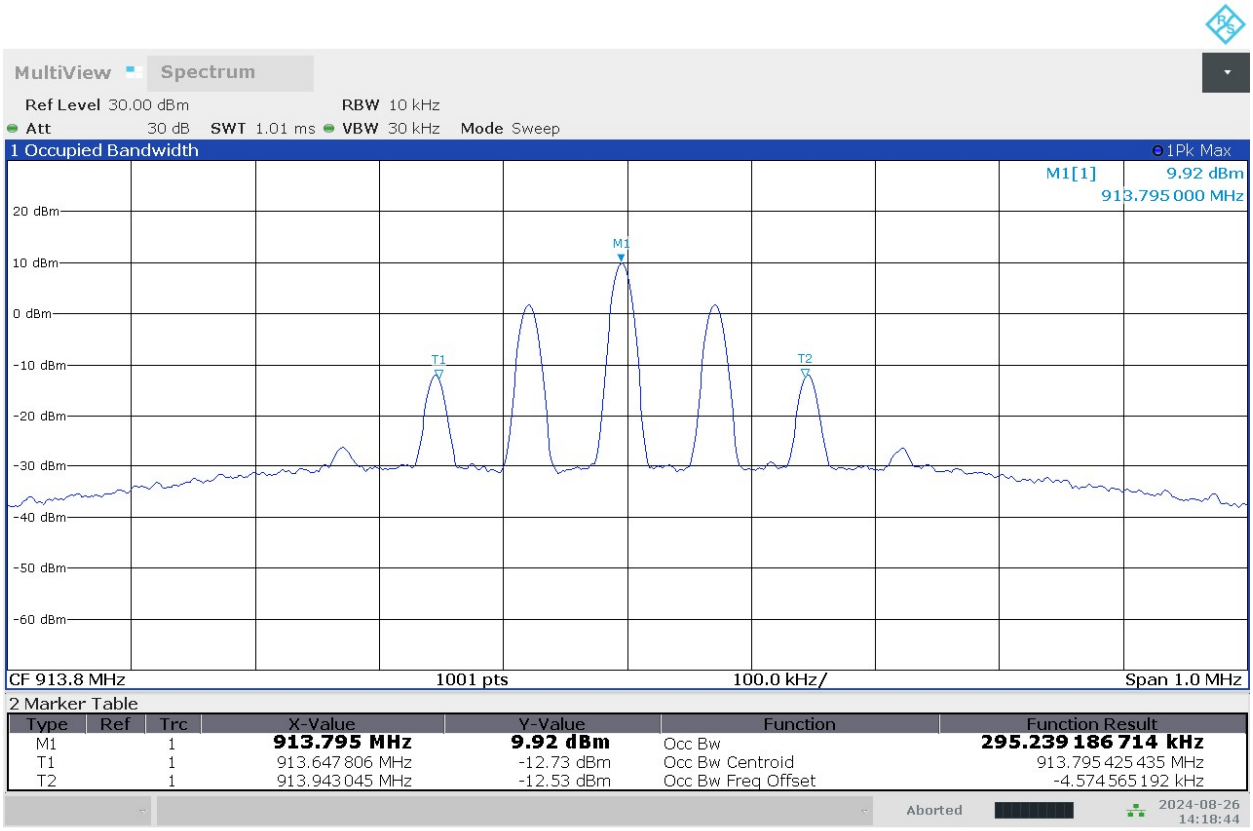
6.9.2 Mid Channel



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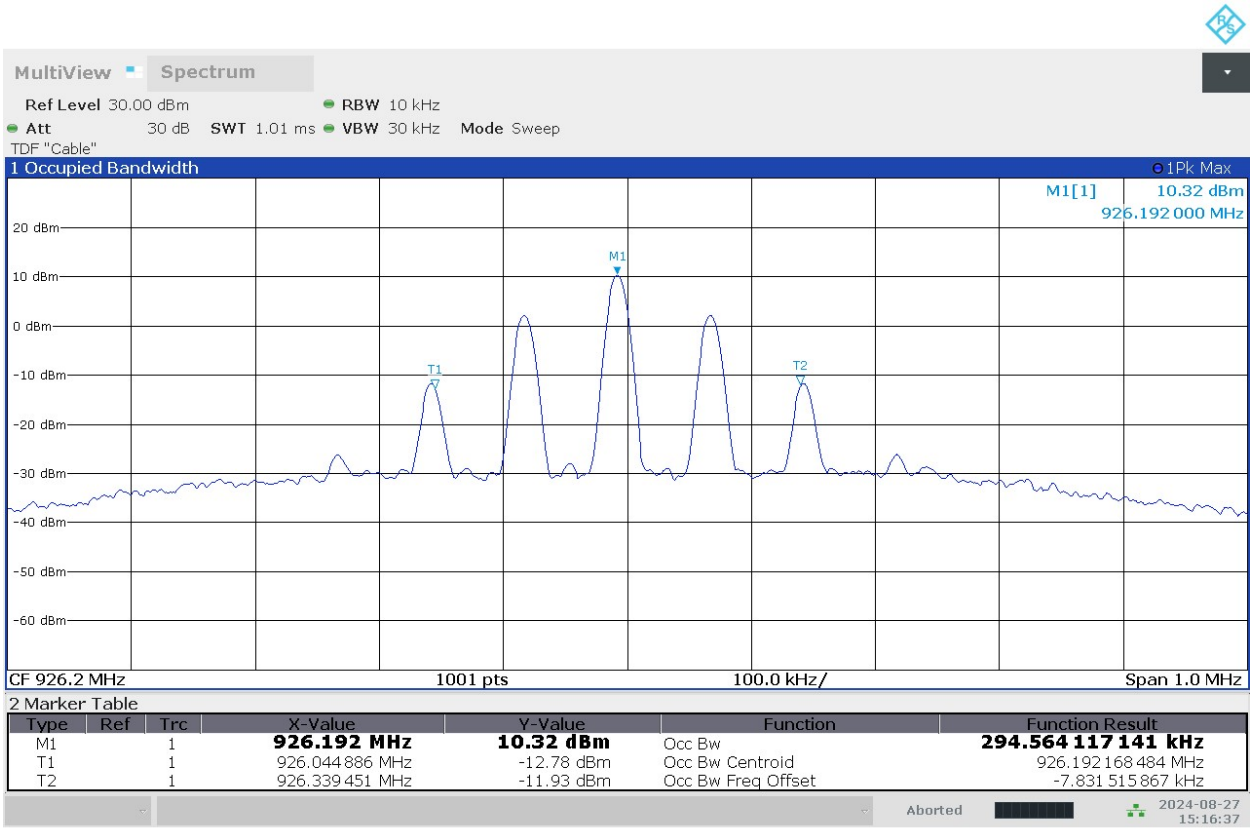
6.9.3 High Channel



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7 Carrier Frequency Separation

7.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §7.8.2

7.2 Test Limits:

Title 47 CFR 15.247(a)

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

RSS-247 §5.1

b. FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

7.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

7.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

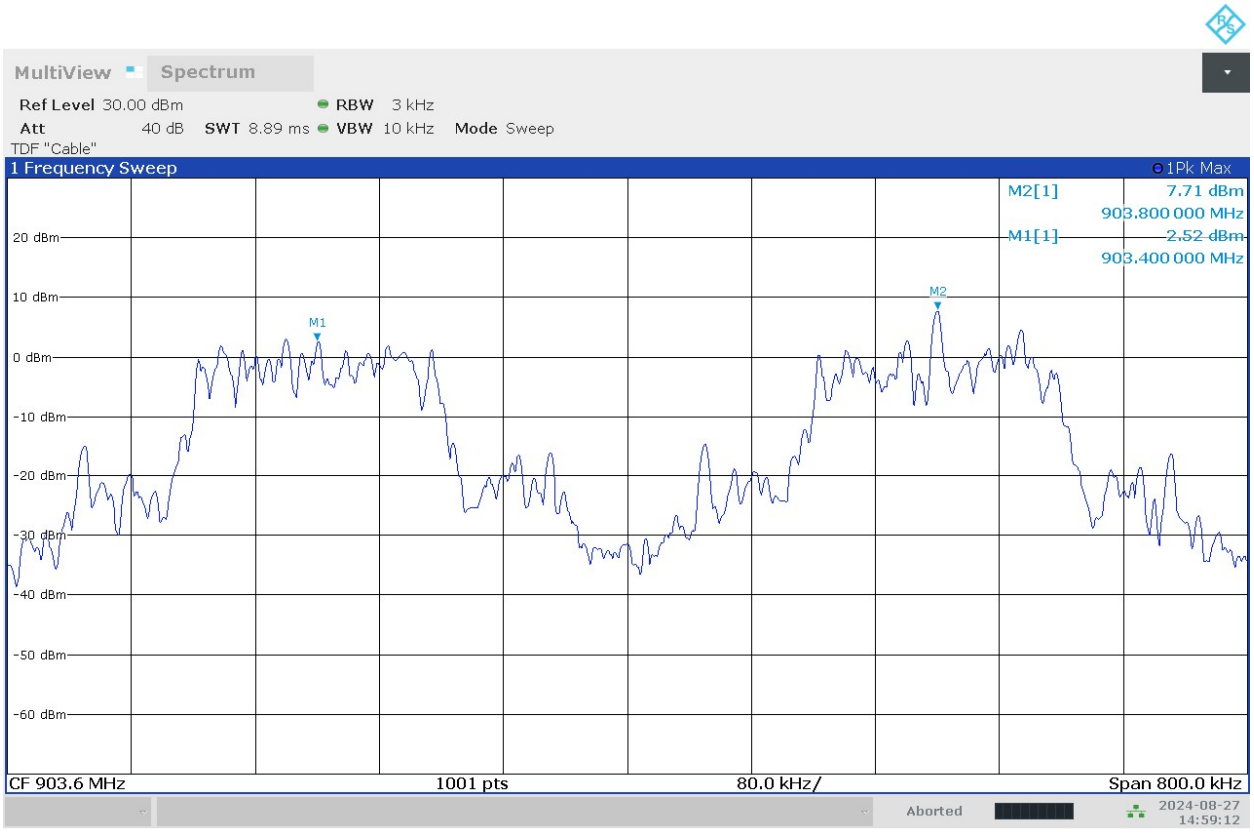
7.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/27/2024	19.7°C	52.0%	985.4mbar

7.6 Test Results:

The sample tested was found to Comply. The nominal channel separation was 200 kHz, and the hopping channel separation was 400 kHz. .

7.7 Plots/Data:



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8 Number of Hopping Frequencies

8.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §7.8.3

8.2 Test Limits:

Title 47 CFR 15.247(a)(1)

(i) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(ii) Frequency hopping systems operating in the 5725–5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

RSS-247 §5.1

c. For FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

d. FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

e. FHSs operating in the band 5725-5850 MHz shall use at least 75 hopping channels. The maximum 20 dB bandwidth of the hopping channel shall be 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30-second period.

8.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

8.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

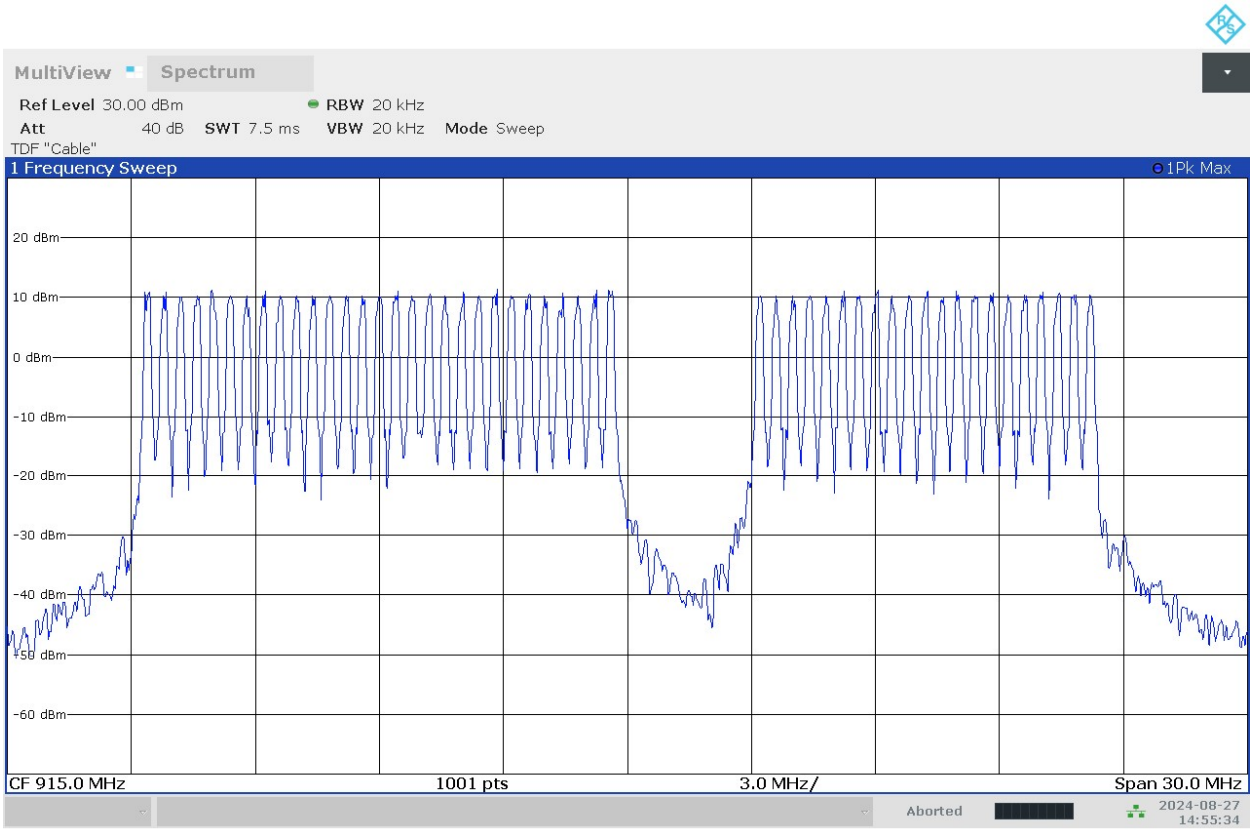
8.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/27/2024	19.7°C	52.0%	985.4mbar

8.6 Test Results:

The sample tested was found to Comply. The device used 50 hopping frequencies.

8.7 Plots/Data:



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9 Time of Occupancy (Dwell Time)

9.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §7.8.4

9.2 Test Limits:

Title 47 CFR 15.247(a)(1)

(iv) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(v) Frequency hopping systems operating in the 5725–5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

(vi) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

RSS-247 §5.1

f. For FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

g. FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

h. FHSs operating in the band 5725-5850 MHz shall use at least 75 hopping channels. The maximum 20 dB bandwidth of the hopping channel shall be 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30-second period.

9.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

9.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

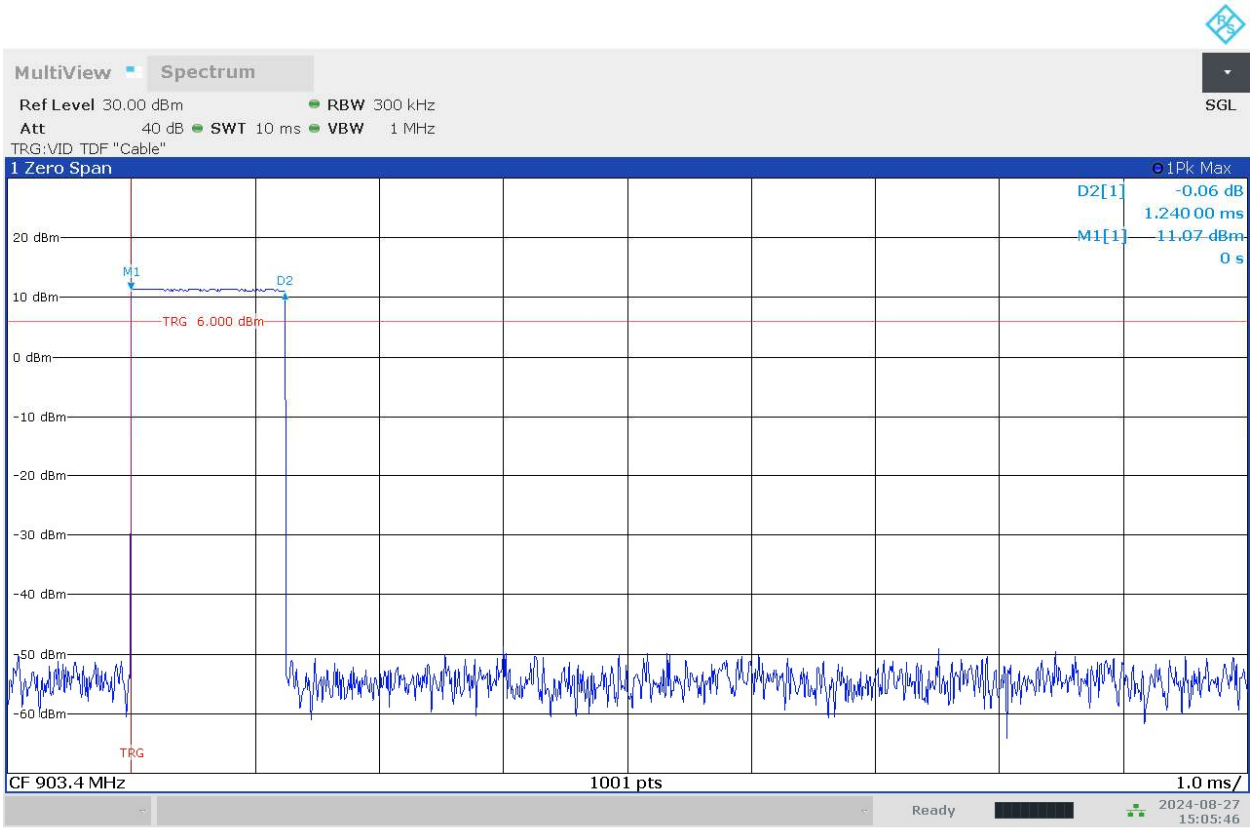
9.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/27/2024	19.7°C	52.0%	985.4mbar

9.6 Test Results:

The sample tested was found to Comply. The total accumulated time of occupancy was 37.2ms in 20 seconds.

9.7 Plots/Data:



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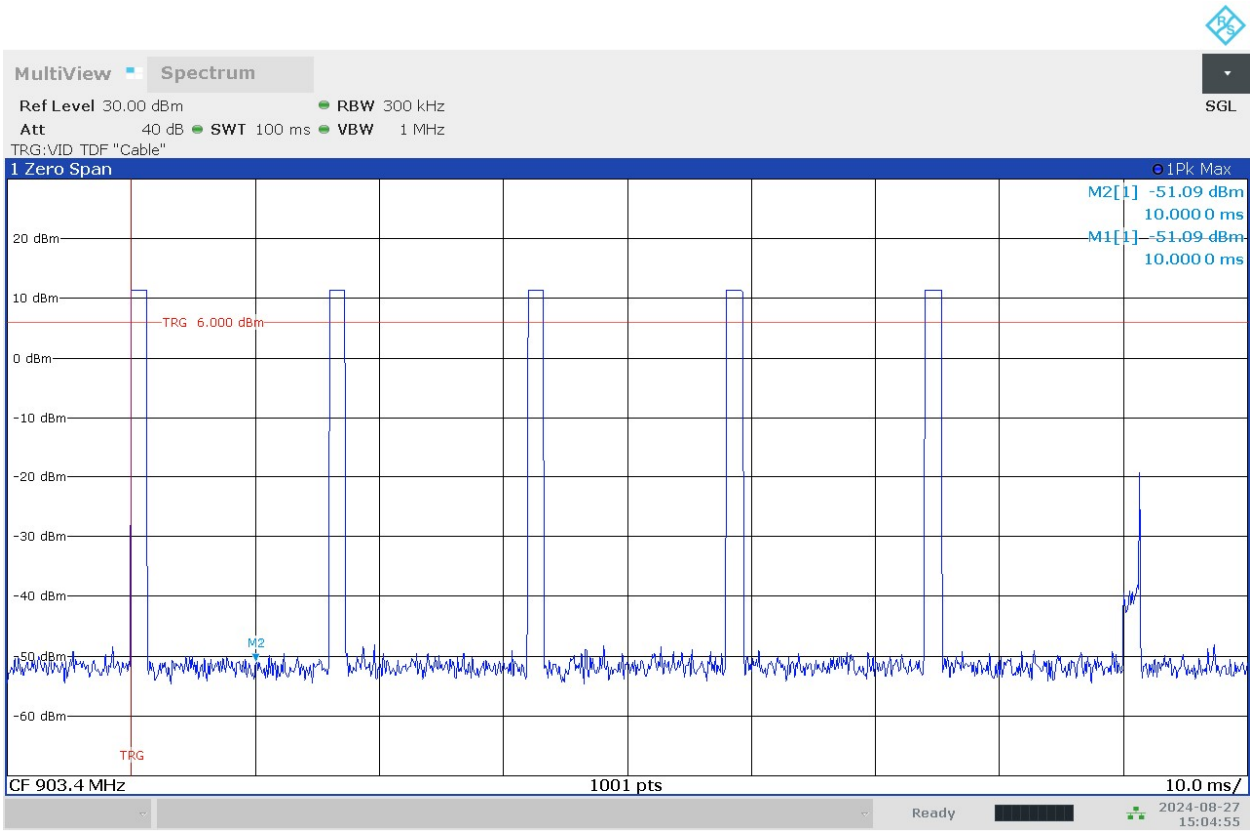
Pulse duration = 1.24ms/pulse



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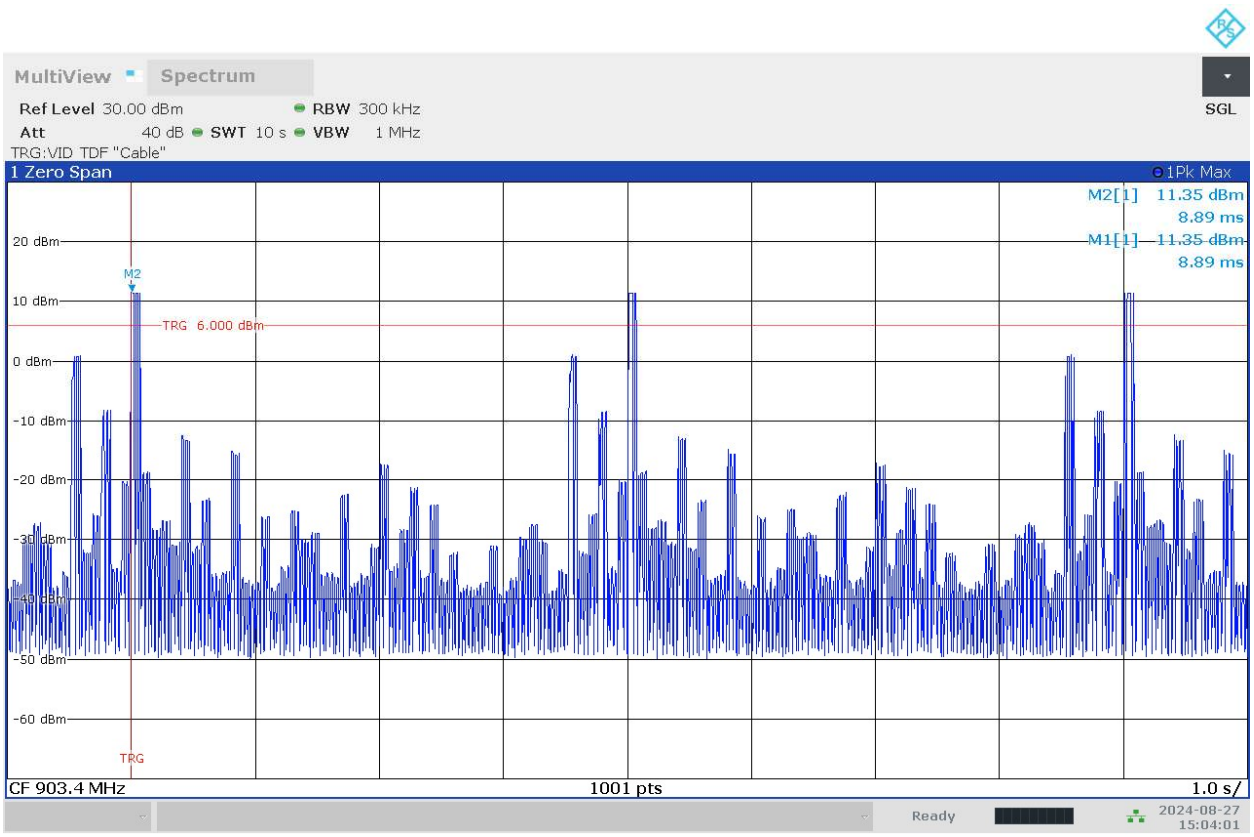
5 pulses/burst



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3 bursts / 10 seconds

Time of occupancy = (1.24 ms/pulse) x (5 pulses/burst) x (3 bursts / 10 seconds) x 2 = 37.2 ms / 20 seconds

10 Output Power

10.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §7.8.5

10.2 Test Limits:

FCC 47 CFR 15.247(b)

1. For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

2. For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

RSS-247 §5.4

a. For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.
b. For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).
c. For FHSs operating in the band 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W, and the e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

10.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

10.4 Test Software Used:

Description	Manufacturer	Version
RSCommander	Rohde & Schwarz	2.4.2 64 bit (2023)

10.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/28/2024	XX.x°C	XX.x%	XXX.xmbar

10.6 Test Results:

The sample tested was found to Comply.

10.7 Test Data:

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
7	903.4	10.58	0.01143	1
8	903.6	11.34	0.01361	1
59	913.8	11.39	0.01377	1
120	926.0	11.48	0.01406	1
121	926.2	10.72	0.01180	1

Channel	Frequency (MHz)	Output Power (dBm)	Antenna Gain (dB)	EIRP (dBm)	EIRP (W)	Limit (W)
7	903.4	10.58	-3	7.58	0.005728	4
8	903.6	11.34	-3	8.34	0.006823	4
59	913.8	11.39	-3	8.39	0.006902	4
120	926.0	11.48	-3	8.48	0.007047	4
121	926.2	10.72	-3	7.72	0.005916	4

10.8 Test Plots: Output Power

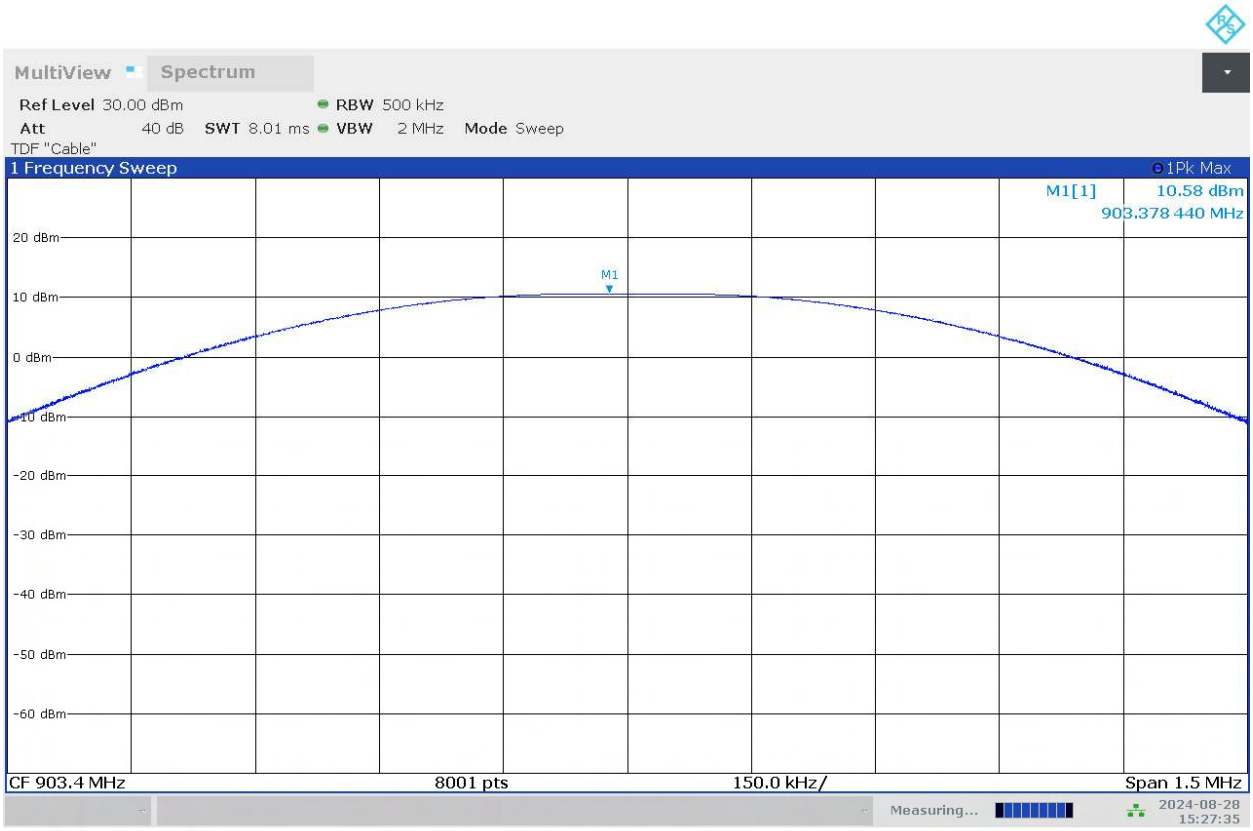

Figure 1 – Channel 7 (903.4 MHz), Power Setting 9

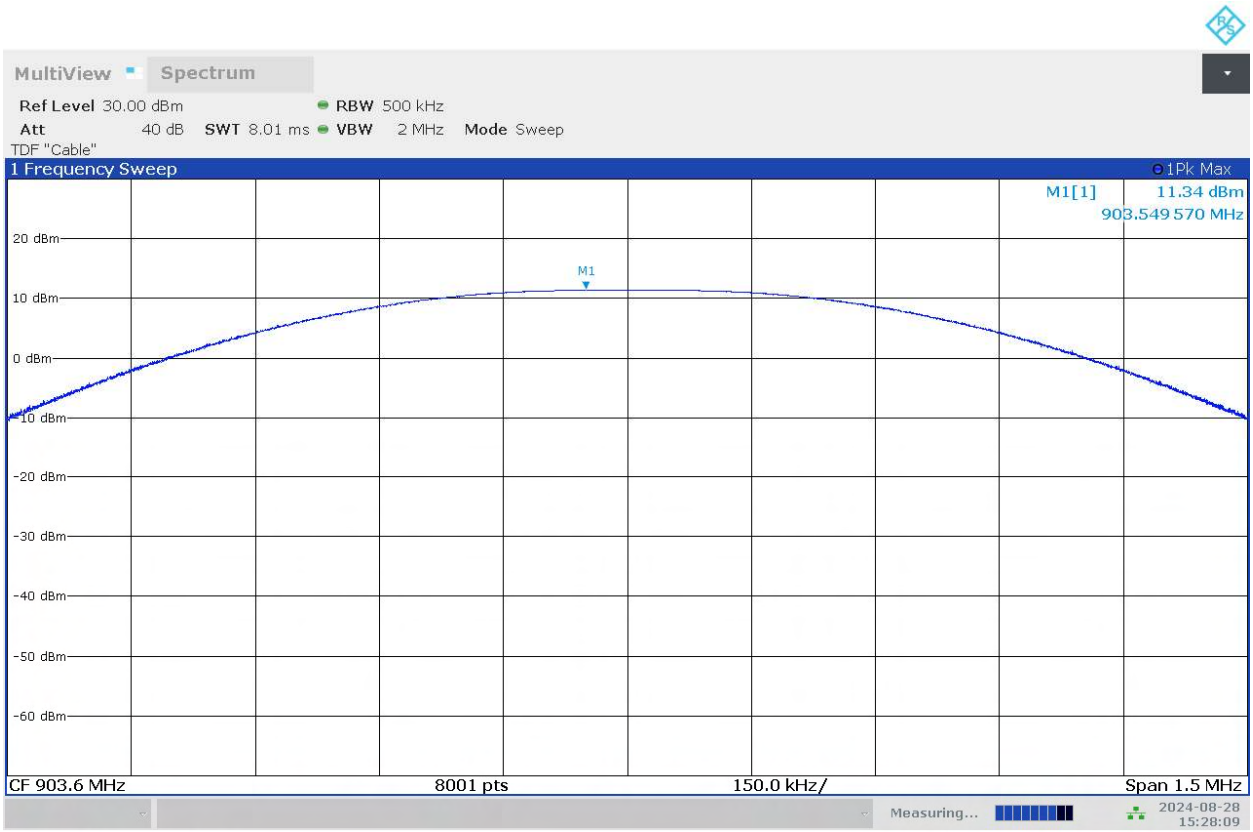

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Figure 2 – Channel 8 (903.6 MHz), Power Setting 10

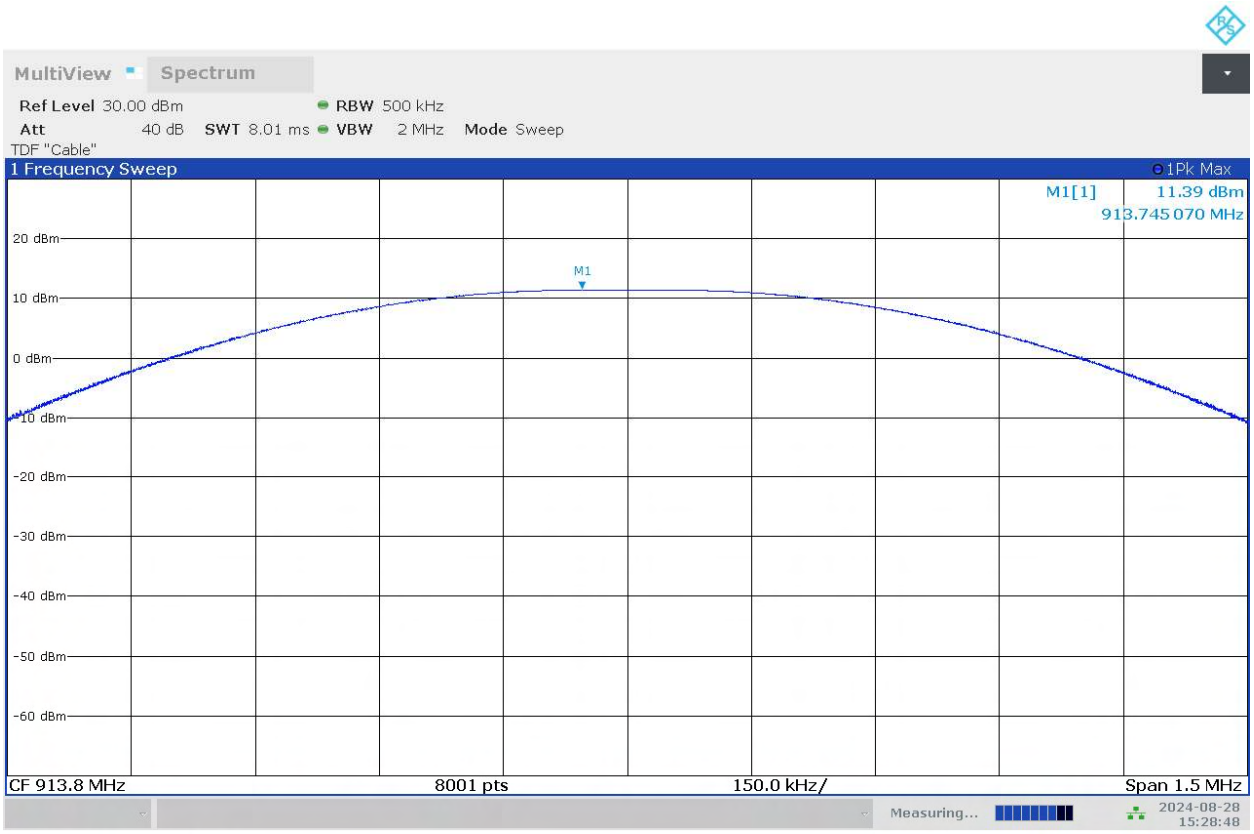

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Figure 3 – Channel 59 (913.8 MHz), Power Setting 10

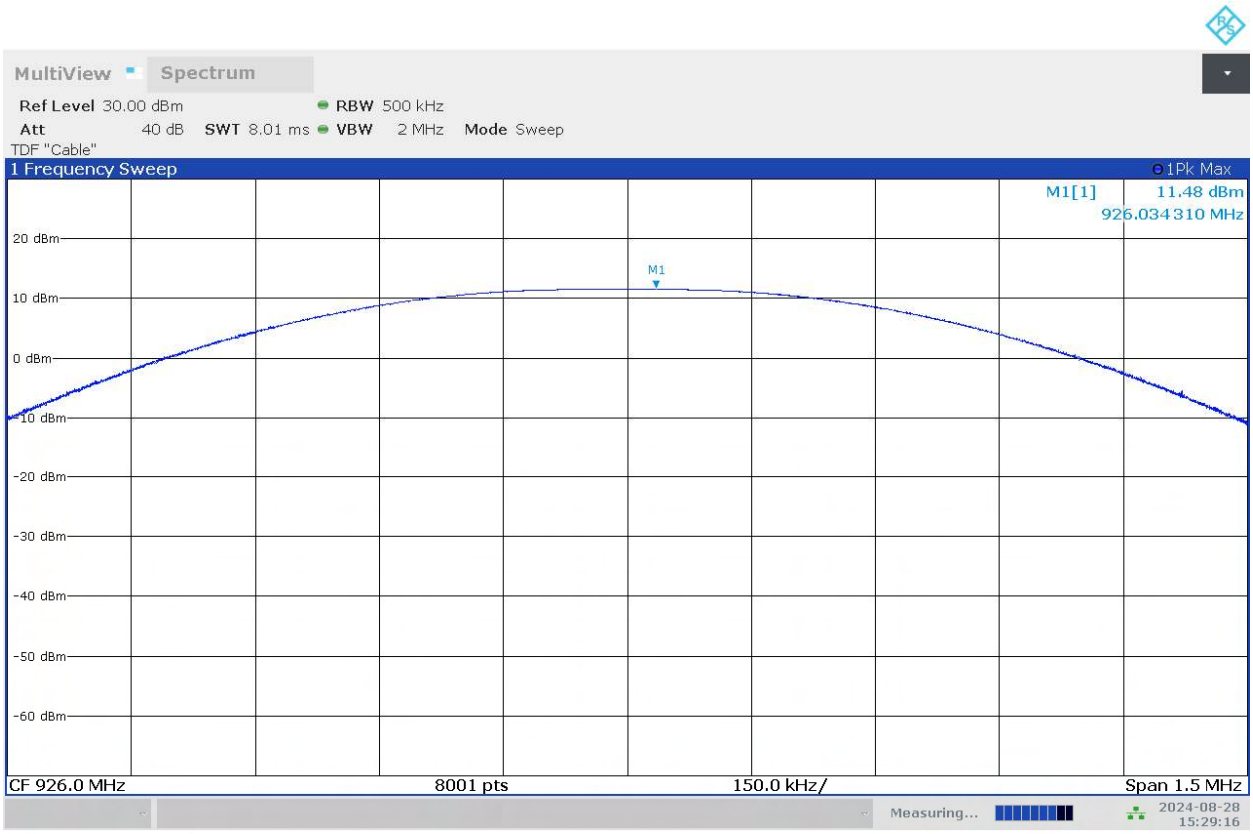

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Figure 4 – Channel 120 (926.0 MHz), Power Setting 10

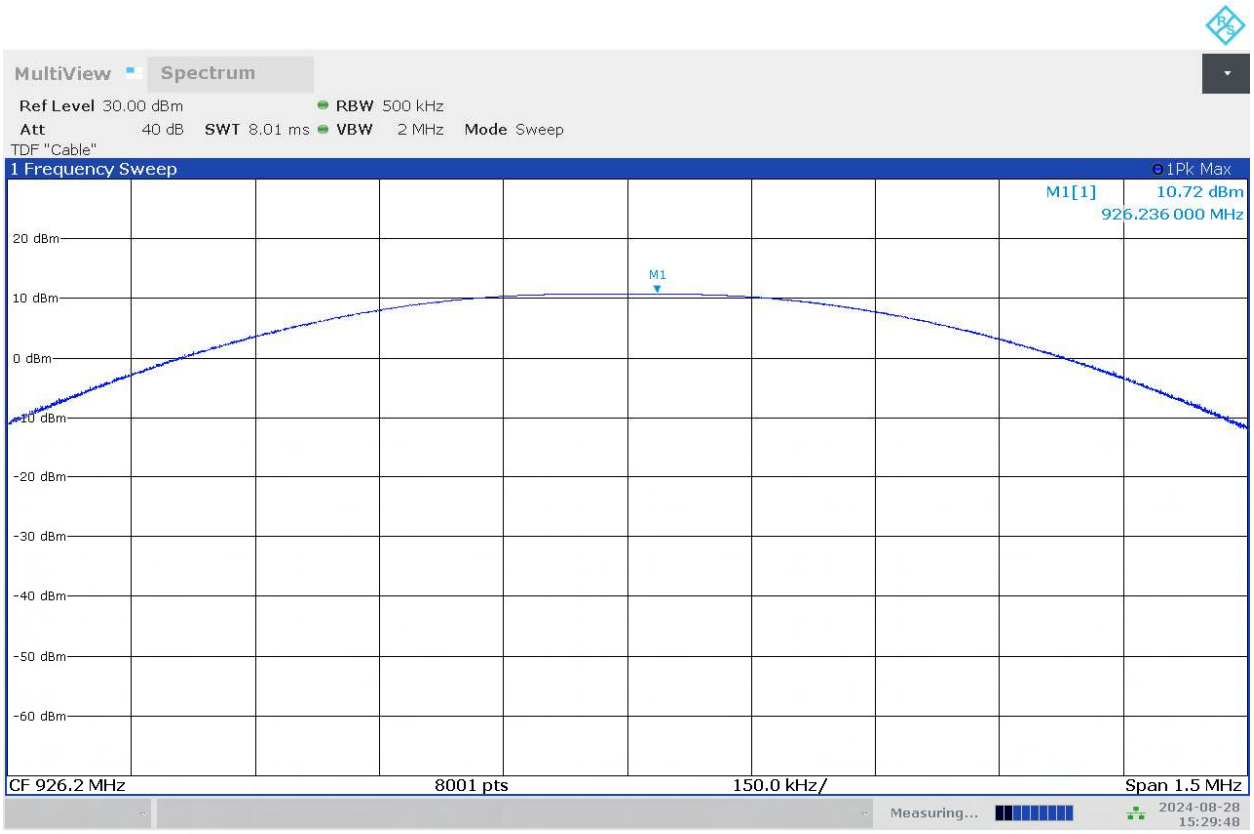

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Figure 5 – Channel 121 (926.2 MHz), Power Setting 10

11 Conducted Spurious Emissions

11.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §7.8.7.1 and §7.8.7.2

11.2 Test Limits:

Title 47 CFR 15.247(d)

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

RSS-247 §5.5

> In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

11.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
Spectrum Analyzer	8305	Rohde & Schwarz	FSW26	12/19/2023	12/19/2024

11.4 Test Software Used:

Name	Manufacturer	Version
TILE	ETS Lindgren	V7.0.6.545

11.5 Test Conditions:

Test Personnel:	Test Date:	Temperature:	Humidity:	Pressure:
Brian Lackey	8/28/2024	19.7°C	54.8%	985.4mbar

11.6 Test Results:

The sample tested was found to Comply.

11.7 Test Data: Conducted Spurious Emissions, General

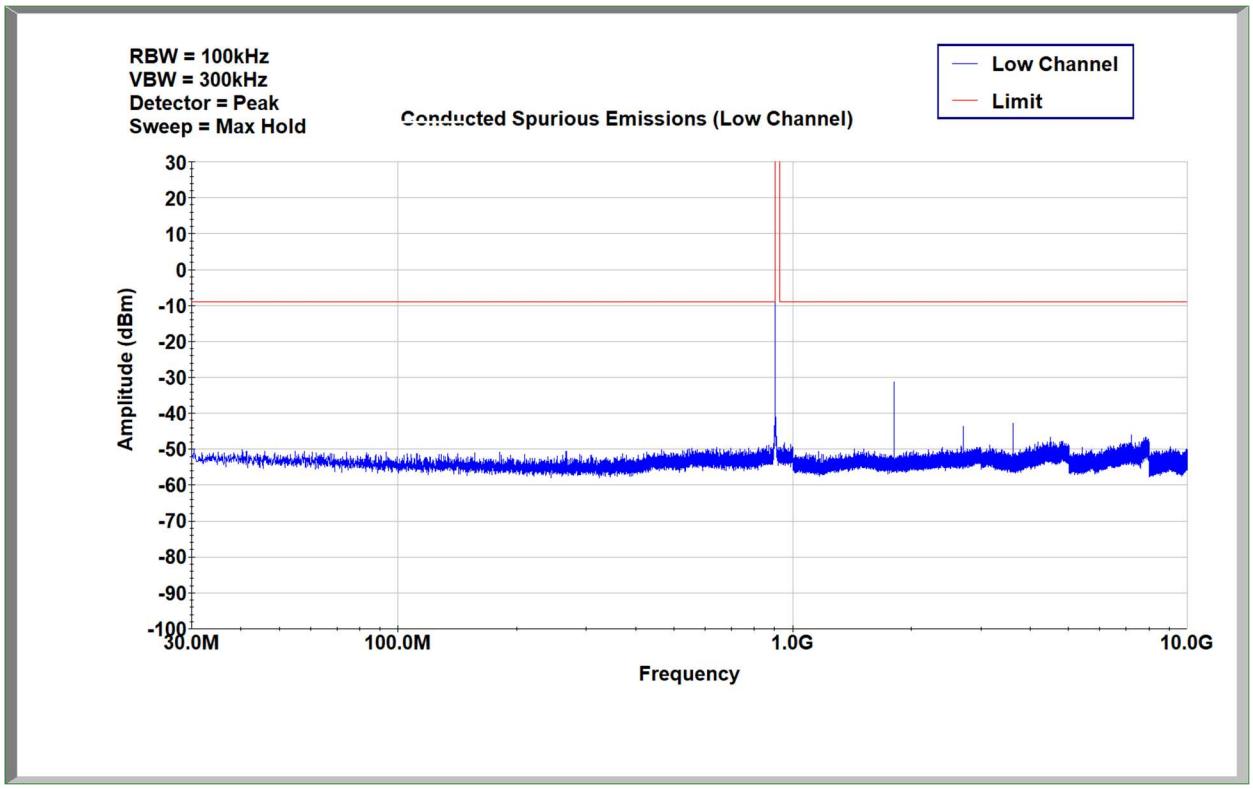


Figure 6 – Conducted Spurious Emissions, Channel 7 (903.2 MHz), Power Setting 9

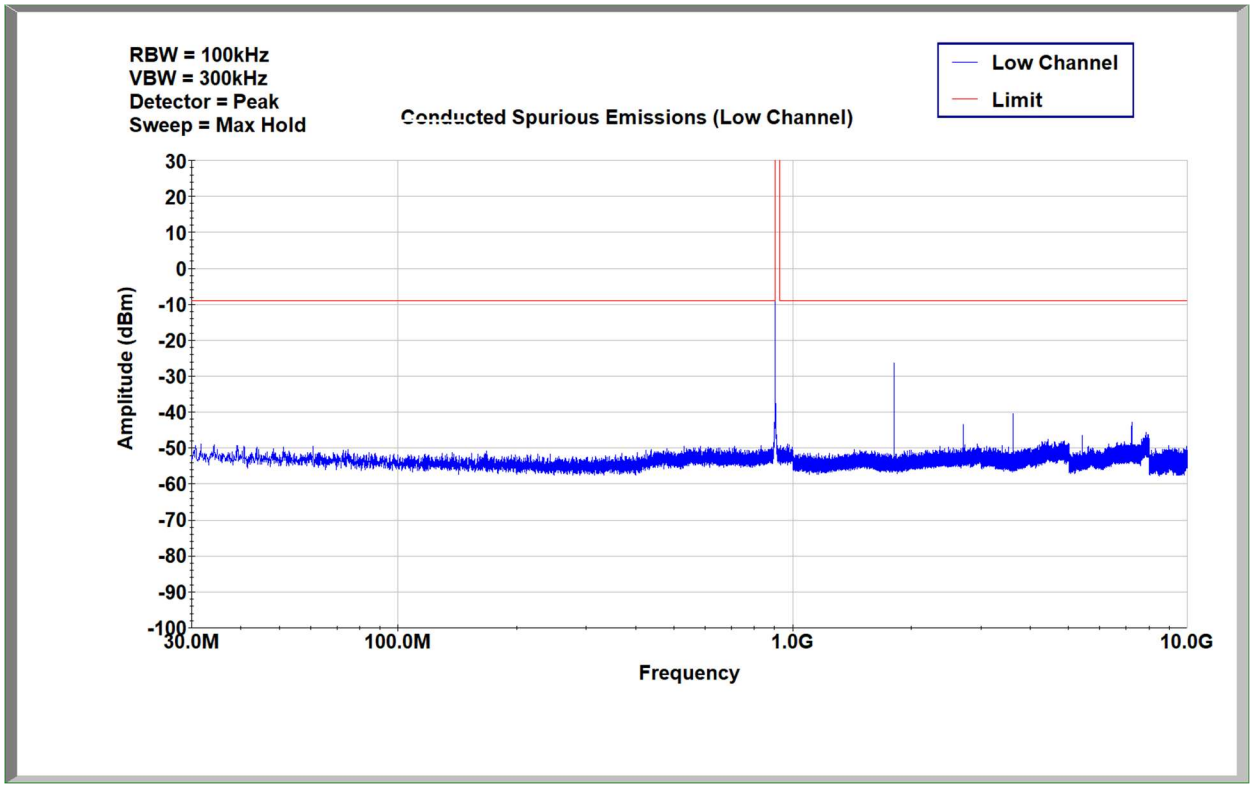


Figure 7 – Conducted Spurious Emissions, Channel 8 (903.6 MHz), Power Setting 10

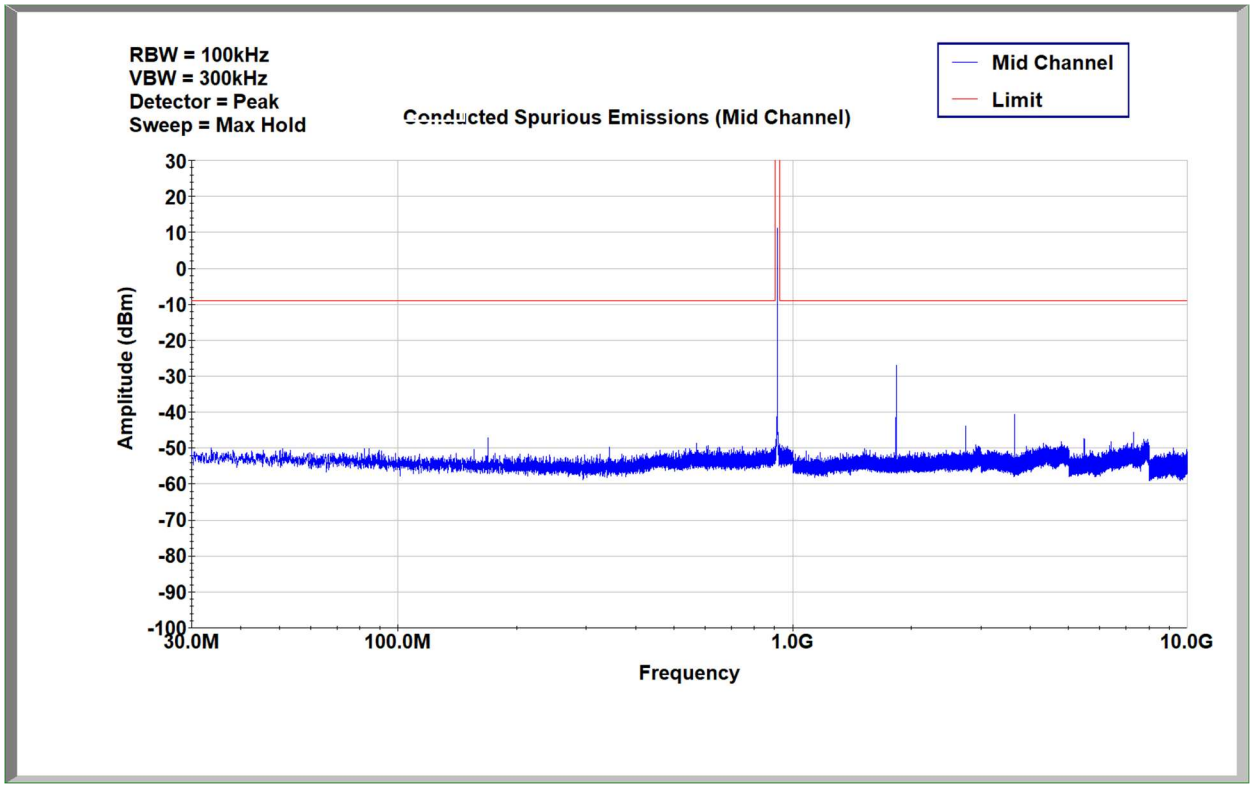


Figure 8 – Conducted Spurious Emissions, Channel 59 (913.8 MHz), Power Setting 10

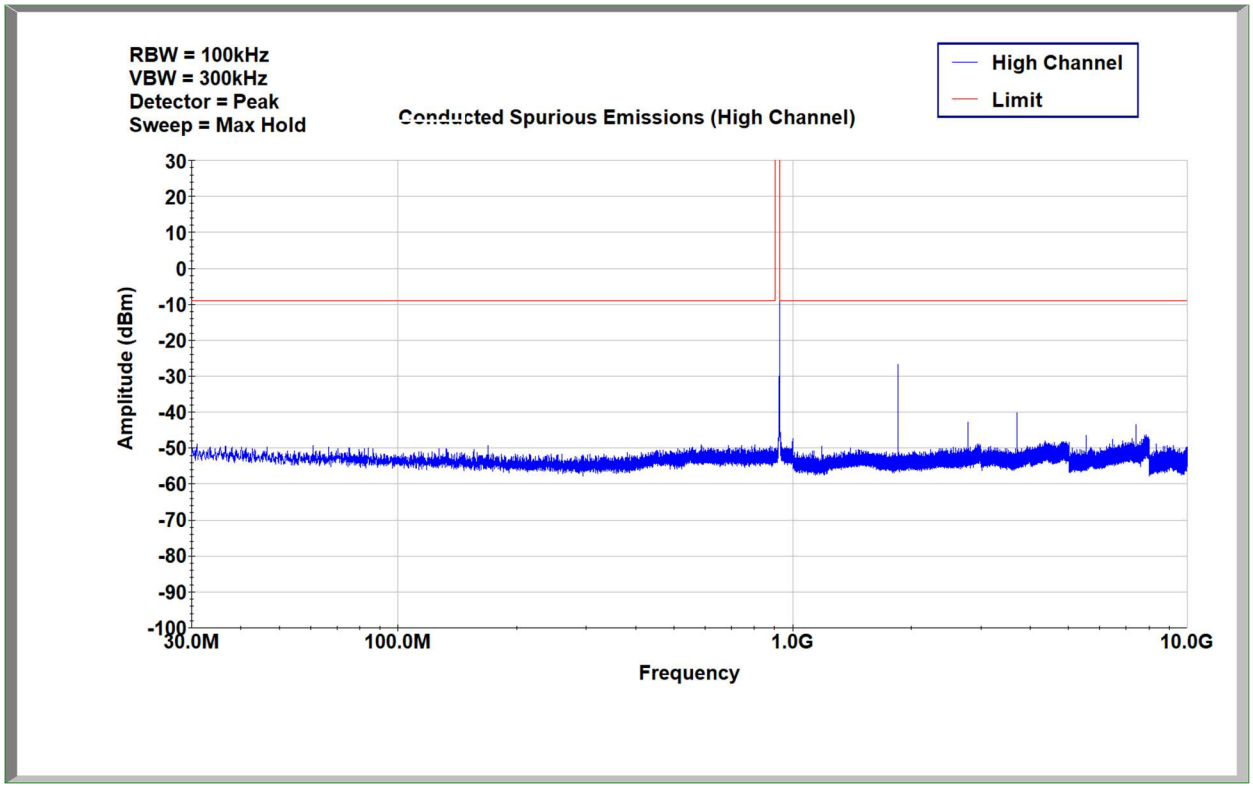


Figure 9 – Conducted Spurious Emissions, Channel 120 (926.0 MHz), Power Setting 10

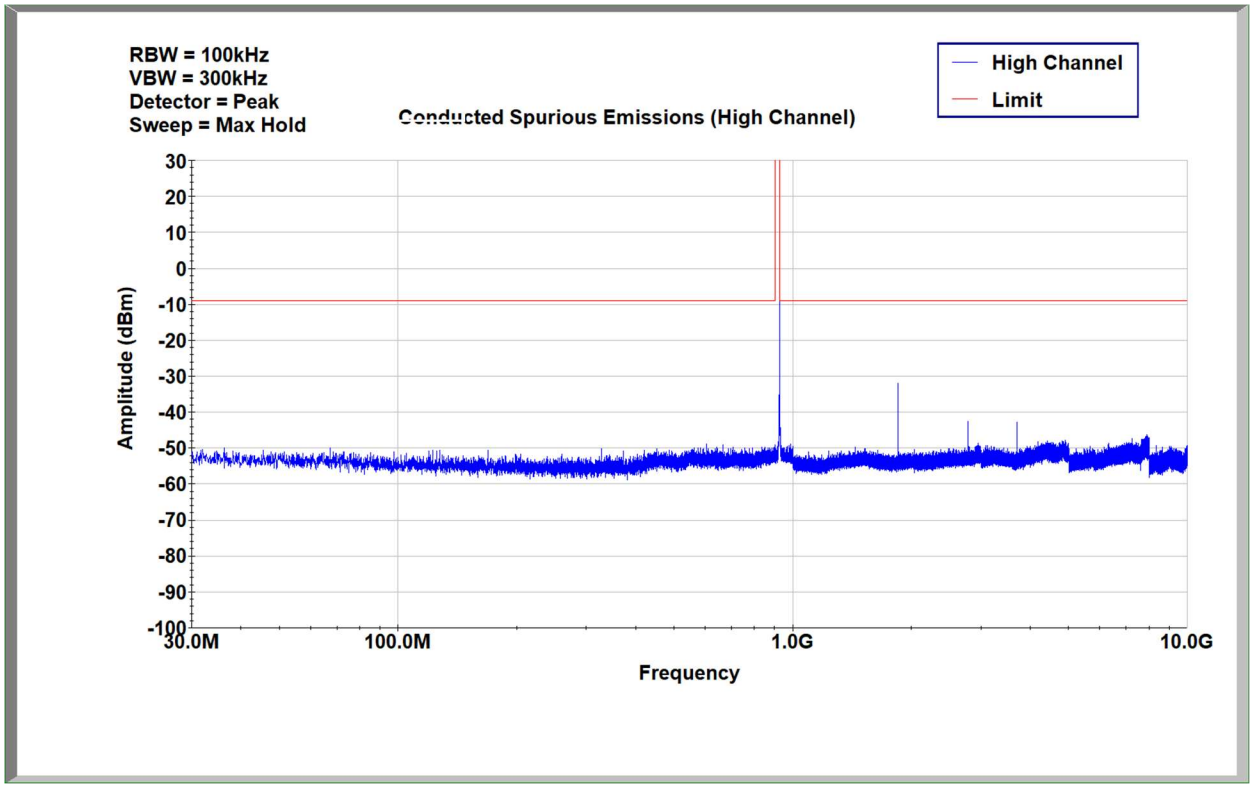


Figure 10 – Conducted Spurious Emissions, Channel 121 (926.2 MHz), Power Setting 10

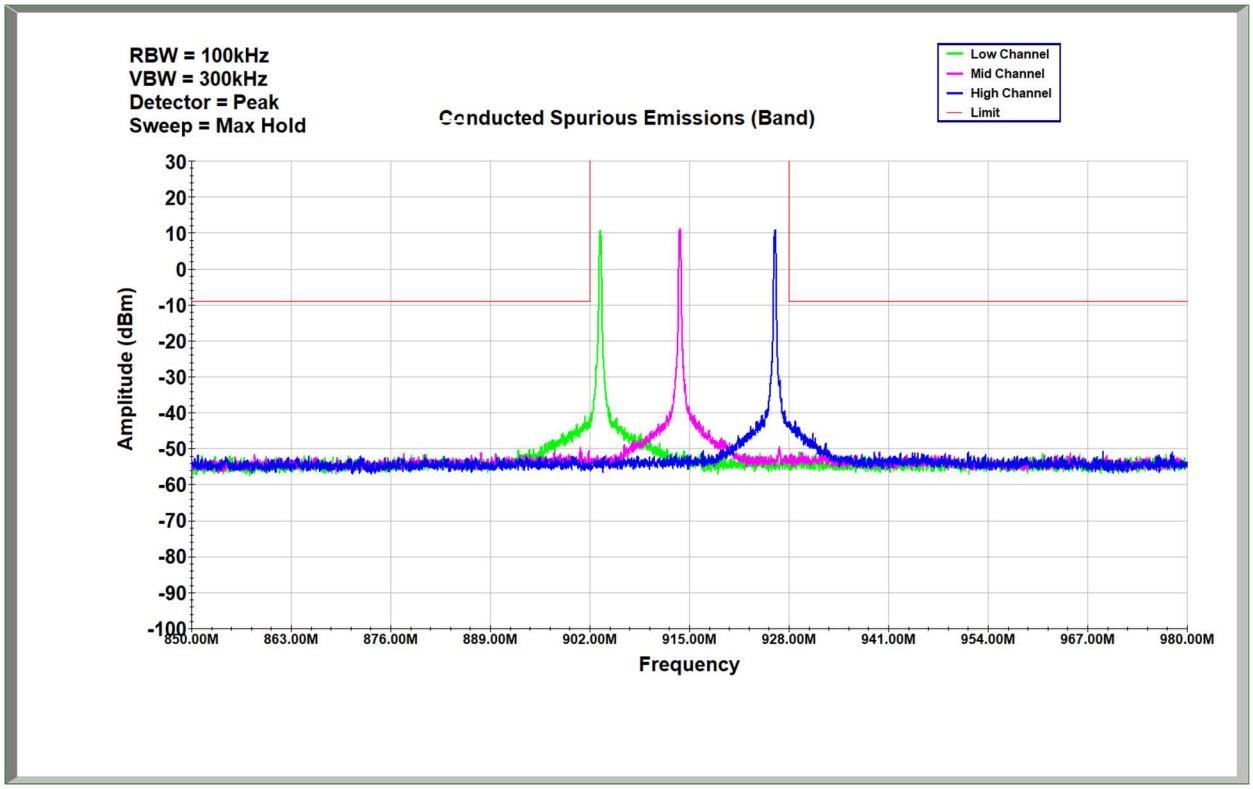


Figure 11 – Emissions at the Band Edge, Channels 7 (903.2 MHz), 59 (913.8 MHz), and 121 (926.2 MHz)

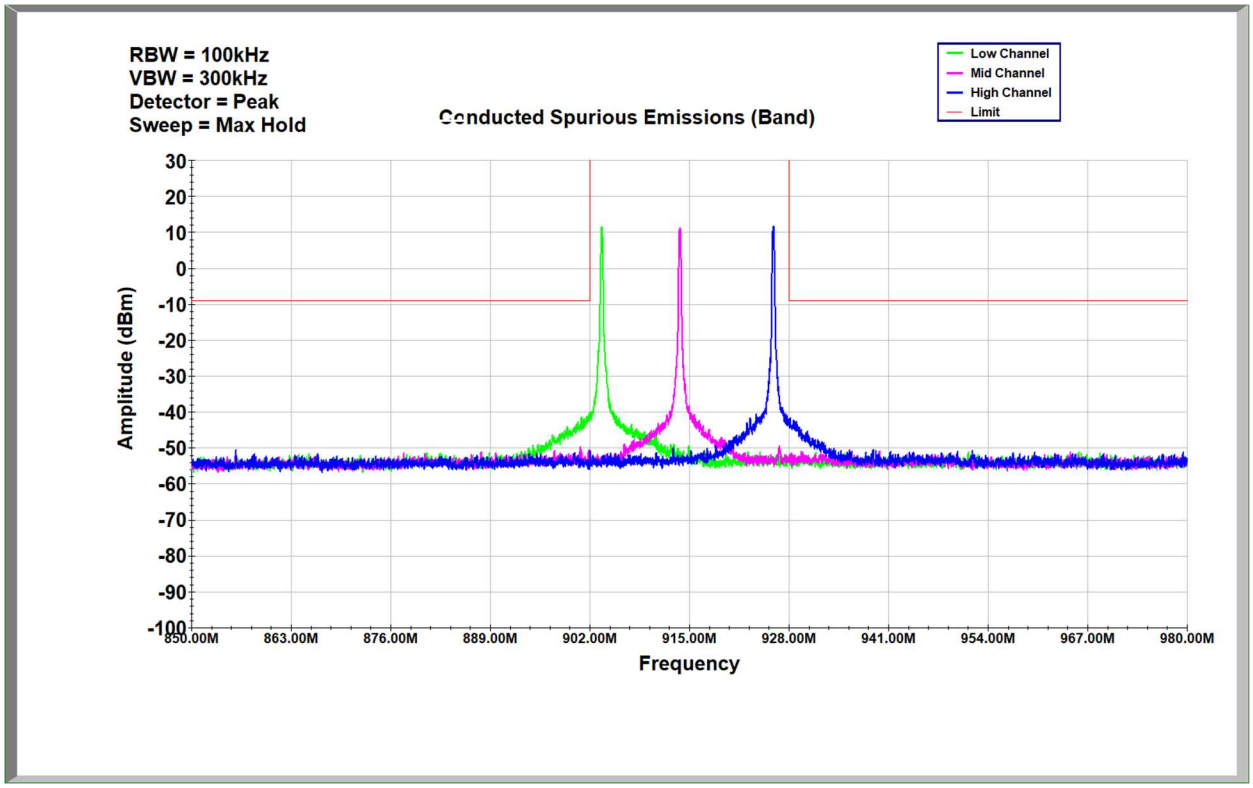


Figure 12 – Emissions at the Band Edge, Channels 8 (903.6 MHz), 59 (913.8 MHz), and 120 (926.0 MHz)

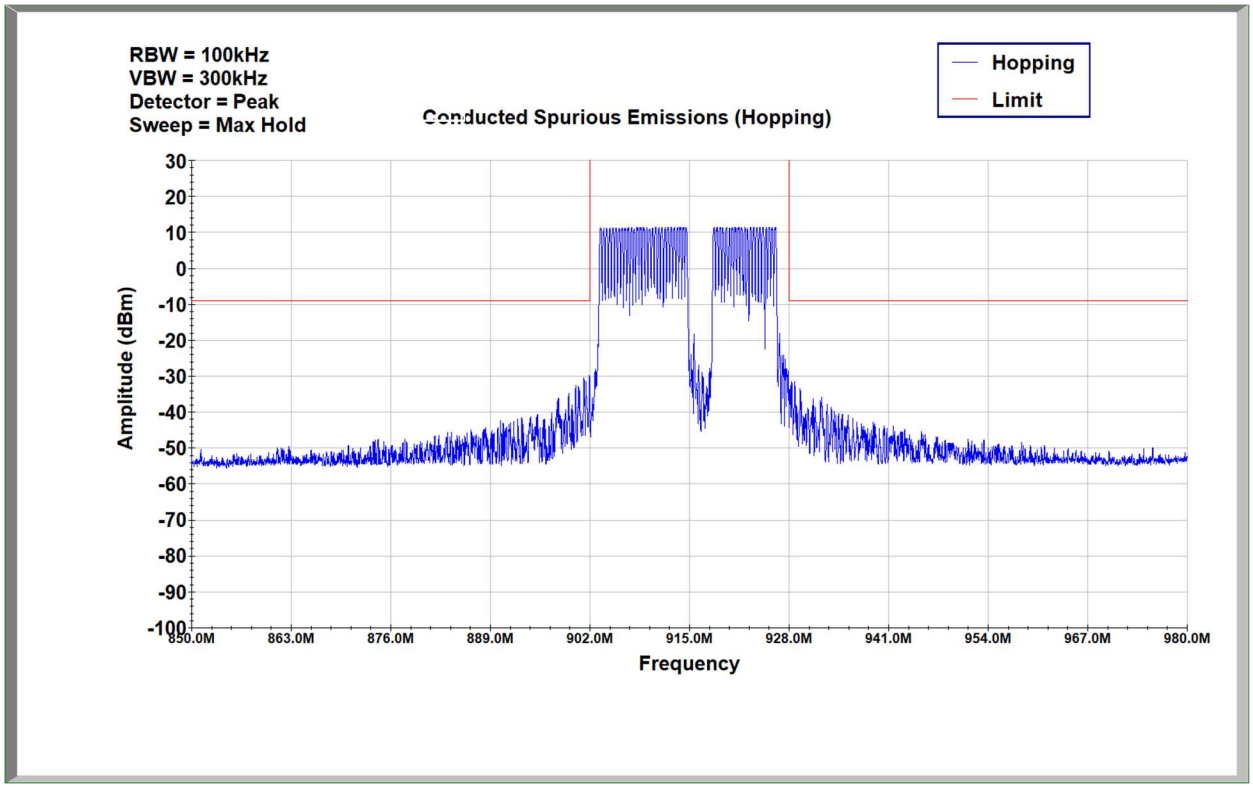


Figure 13 – Emissions at the Band Edge, Frequency Hopping Enabled

12 Radiated Spurious Emissions

12.1 Test Method:

Tests are performed in accordance with ANSI C63.10 §§6.3-6.6

12.2 Test Limits:

Title 47 CFR 15.247(d)

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

RSS-247 §5.5

> In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

12.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	9/19/2023	9/19/2024
Horn Antenna (1-18GHz)	3780	ETS	3117	7/18/2024	7/18/2025
Bilog Antenna	7085	SunAR	JB6	3/18/2024	3/18/2025
Magnetic Loop Antenna	2366	ETS	6502	8/28/2023	8/28/2024
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
Preamplifier (1-18GHz)	3918	Rohde & Schwarz	TS-PR18	1/12/2024	1/12/2025
3m Signal Path with Preamplifier	3074, 3918, 2588, 2593, 8188, 8185			1/12/2024	1/12/2025
30M-1G 3m Signal Path without Preamplifier	3339, 2592, 8188, 8185			1/12/2024	1/12/2025
3m Signal Path without Preamplifier	3074, 2588, 2593, 8188, 8185			1/12/2024	1/12/2025

12.4 Test Software Used:

Description	Manufacturer	Version
EMC32	Rohde & Schwarz	10.60.20

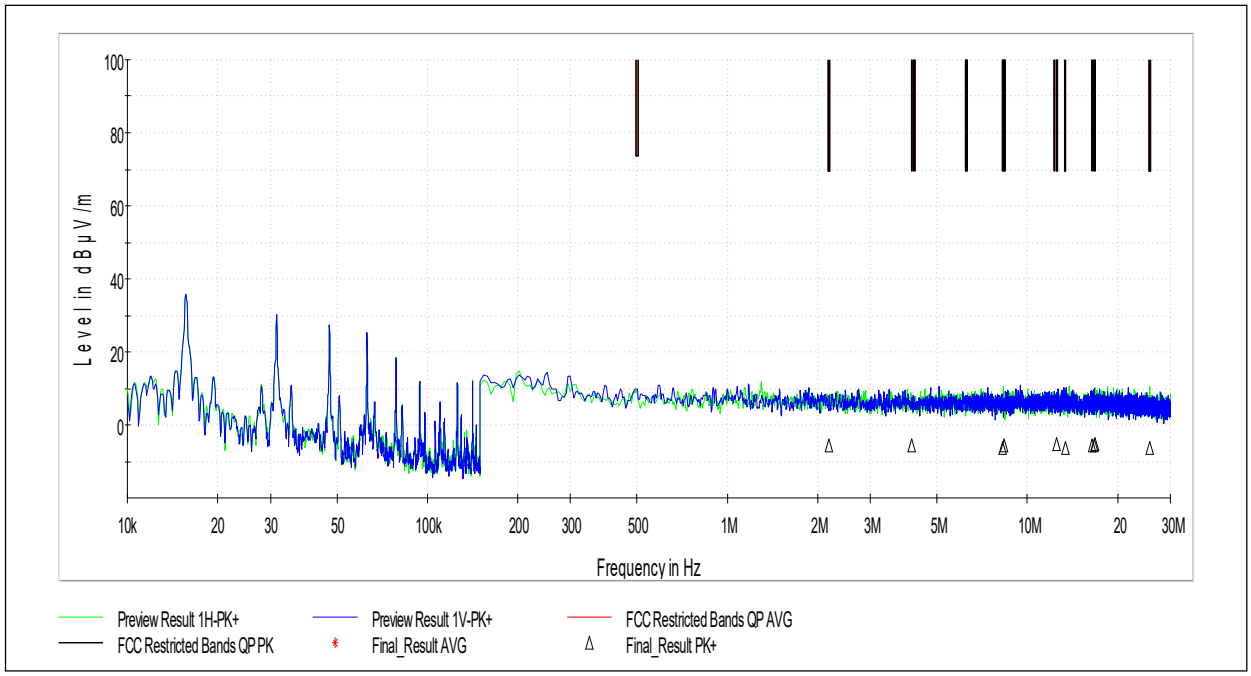
12.5 Test Results:

The sample tested was found to Comply.

12.6 Test Data: Radiated Spurious Emissions, General

12.6.1 Frequency Range 9kHz – 30MHz

Middle Channel[1]



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2.186824	-5.45	69.54	74.99	100.0	V	0.0	11.7
4.127074	-5.76	69.54	75.30	100.0	V	208.0	11.5
8.292905	-6.46	69.54	76.00	100.0	H	102.0	11.1
8.376309	-5.75	69.54	75.30	100.0	H	247.0	11.1
12.520191	-5.42	69.54	74.96	100.0	H	322.0	11.1
13.398132	-6.21	69.54	75.76	100.0	V	76.0	11.1
16.422640	-5.70	69.54	75.24	100.0	H	171.0	10.9
16.694802	-5.59	69.54	75.13	100.0	V	180.0	10.9
16.804544	-5.39	69.54	74.93	100.0	H	16.0	10.9
25.535669	-6.37	69.54	75.91	100.0	H	136.0	9.7

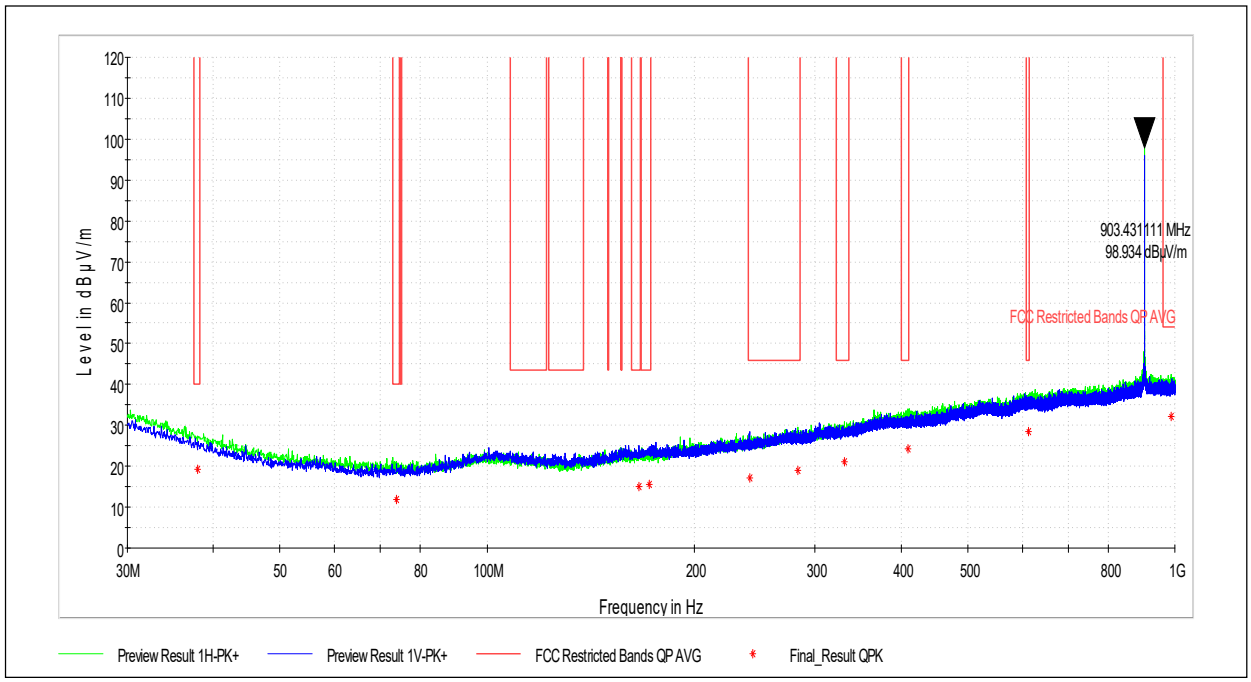
Test Personnel:	Brian Lackey	Test Date:	8/28/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	54.8%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

[1] Testing represents the worst case scenario between the low, middle, and high channels

12.6.2 Frequency Range 30MHz – 1GHz

12.6.2.1 Channel 7 (903.2 MHz), Power Setting 9

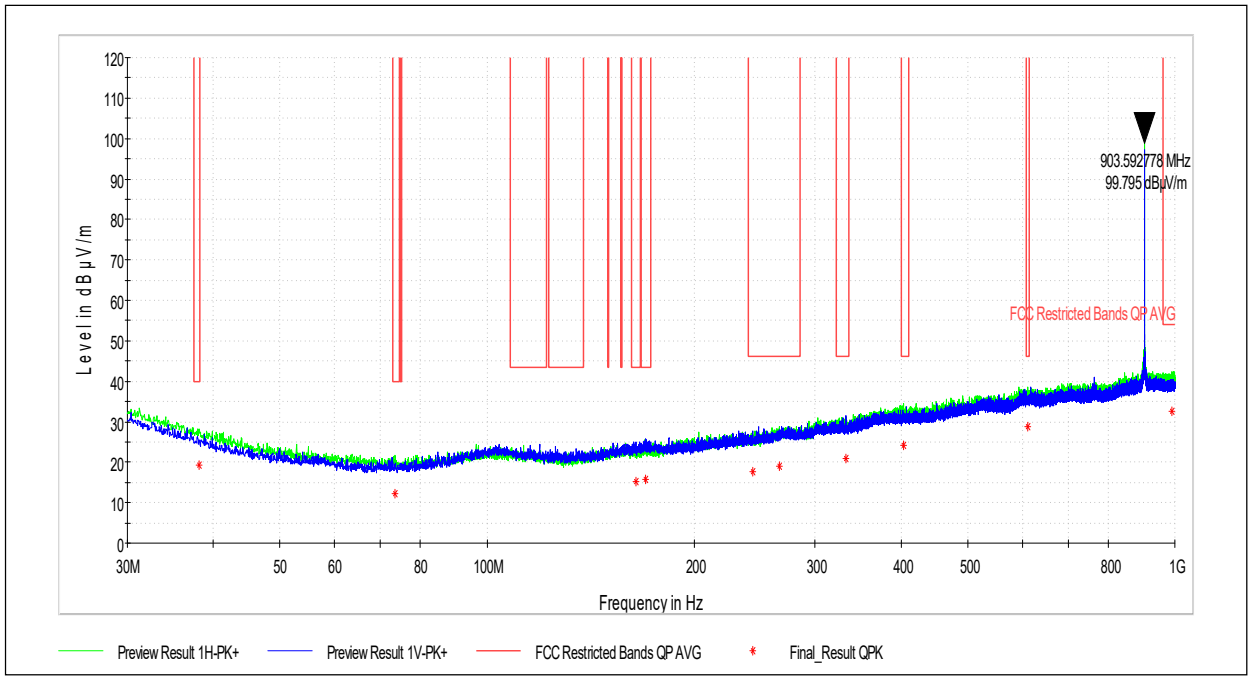


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.975556	19.21	40.00	20.79	261.0	H	218.0	20.5
73.865556	11.83	40.00	28.17	119.0	H	0.0	13.4
166.231111	15.00	43.52	28.52	272.0	V	104.0	17.3
171.943333	15.47	43.52	28.05	120.0	V	86.0	17.5
240.759444	17.20	46.02	28.82	400.0	V	0.0	19.6
283.170000	19.04	46.02	26.98	242.0	H	90.0	21.0
330.592222	21.15	46.02	24.87	347.0	H	263.0	22.7
409.431667	24.29	46.02	21.73	311.0	H	194.0	24.9
612.808333	28.53	46.02	17.49	301.0	H	100.0	29.8
988.036667	32.09	53.98	21.89	150.0	H	119.0	33.3

Test Personnel:	Brian Lackey	Test Date:	8/28/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	54.8%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.6.2.2 Channel 8 (903.6 MHz), Power Setting 10

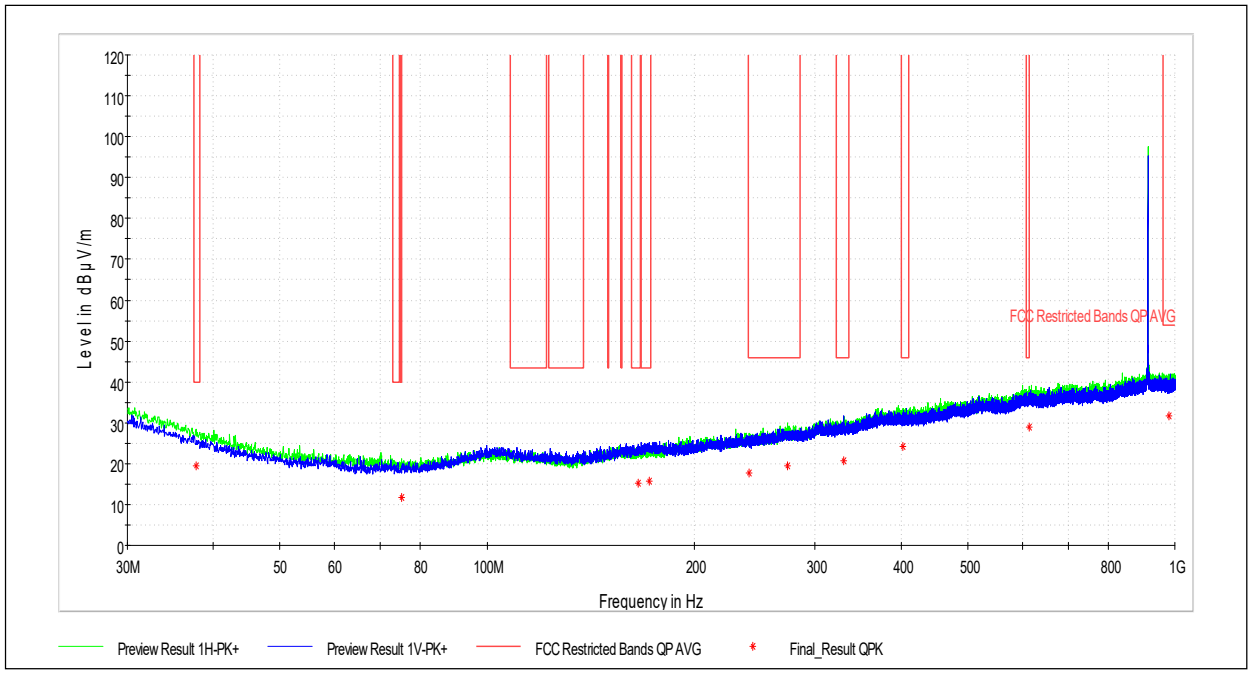


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
38.137222	19.25	40.00	20.75	250.0	H	207.0	20.4
73.542222	12.23	40.00	27.77	363.0	H	236.0	13.5
164.722222	15.22	43.52	28.30	320.0	V	278.0	17.3
169.841667	15.64	43.52	27.88	250.0	V	236.0	17.5
243.561667	17.58	46.02	28.44	363.0	V	77.0	19.7
266.356667	18.97	46.02	27.05	145.0	H	235.0	20.7
332.208889	20.77	46.02	25.25	210.0	V	264.0	22.2
403.450000	24.30	46.02	21.72	230.0	H	311.0	24.9
611.030000	28.64	46.02	17.38	169.0	H	195.0	29.7
991.108333	32.48	53.98	21.50	256.0	H	306.0	33.4

Test Personnel:	Brian Lackey	Test Date:	8/28/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	54.8%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.6.2.3 Channel 59 (913.8 MHz), Power Setting 10

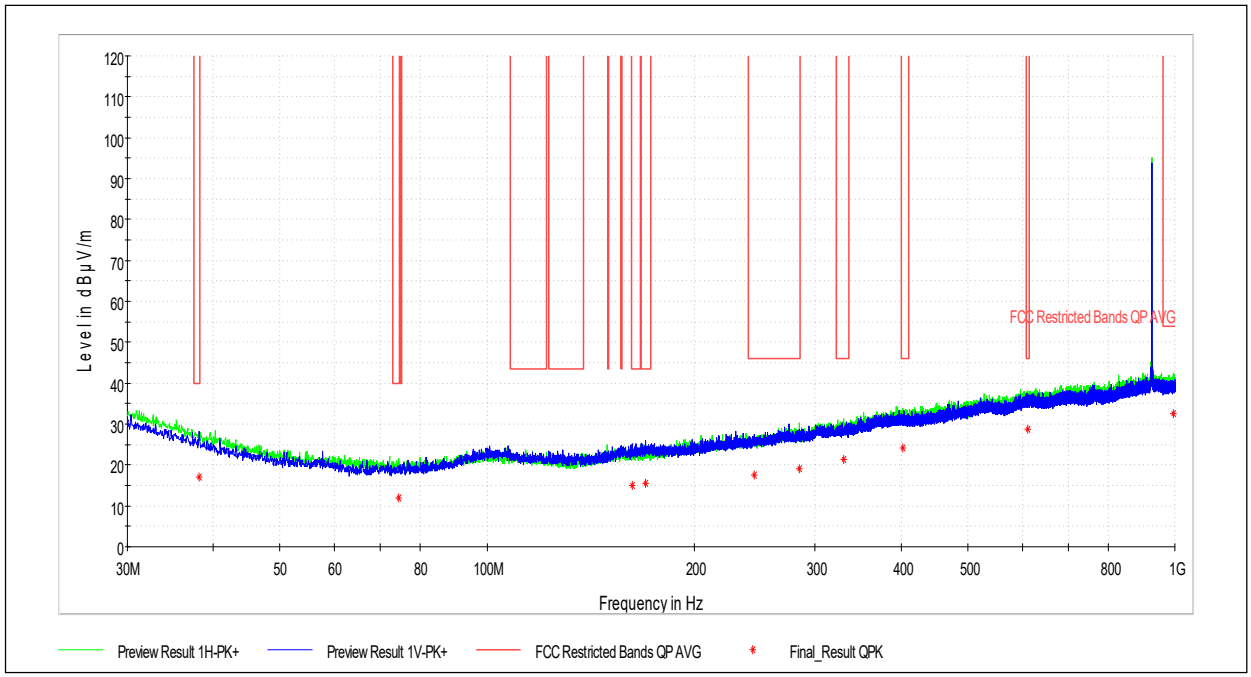


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.760000	19.38	40.00	20.62	250.0	H	302.0	20.6
75.051111	11.85	40.00	28.15	400.0	H	114.0	13.4
165.800000	15.29	43.52	28.23	179.0	V	26.0	17.3
172.320556	15.66	43.52	27.86	283.0	V	16.0	17.5
240.705556	17.69	46.02	28.34	191.0	H	0.0	19.8
273.254444	19.34	46.02	26.68	266.0	H	81.0	21.0
330.322778	20.69	46.02	25.33	155.0	V	100.0	22.2
401.833333	24.21	46.02	21.81	357.0	H	173.0	24.9
613.832222	28.89	46.02	17.13	365.0	H	123.0	29.8
981.408333	31.79	53.98	22.19	326.0	H	178.0	33.1

Test Personnel:	Brian Lackey	Test Date:	8/26/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	57.2%
		Atmospheric Pressure:	988.8mbar

Deviations, Additions, or Exclusions: None

12.6.2.4 Channel 120 (926.0 MHz), Power Setting 10

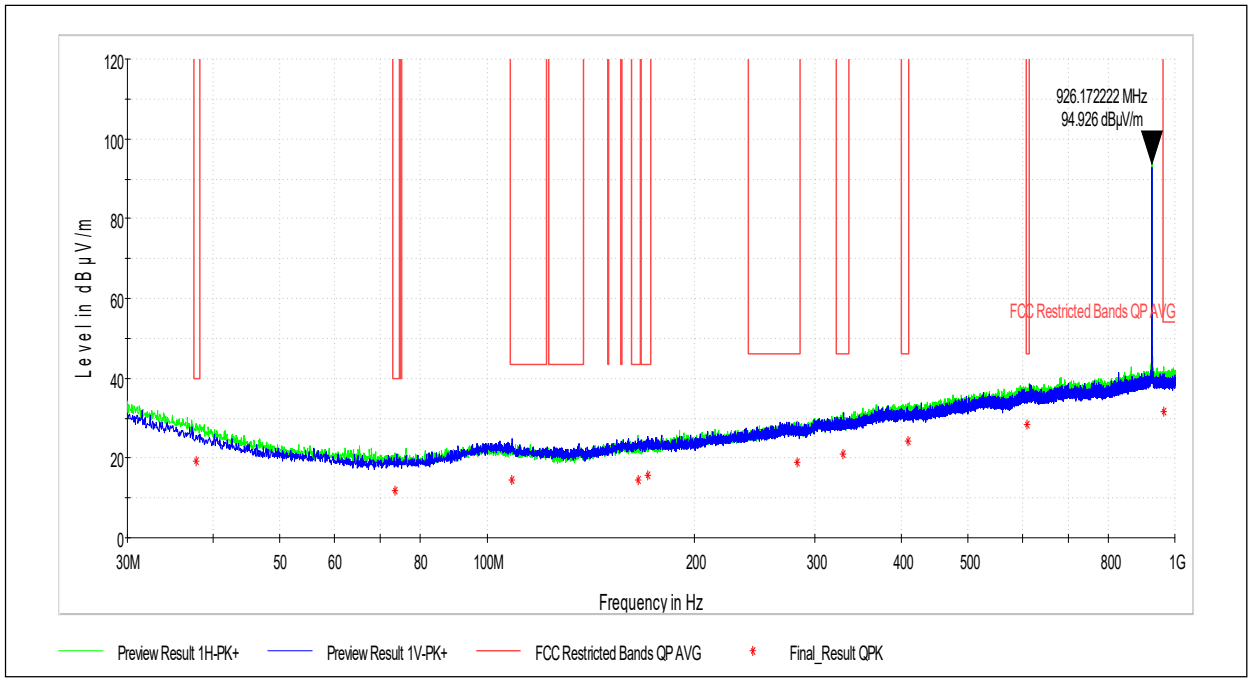


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
38.137222	17.16	40.00	22.84	106.0	V	194.0	18.4
74.458333	11.98	40.00	28.02	101.0	H	52.0	13.4
162.566667	15.03	43.52	28.49	327.0	V	120.0	17.2
170.057222	15.58	43.52	27.95	400.0	V	80.0	17.5
244.423889	17.55	46.02	28.47	148.0	V	276.0	19.8
284.301667	19.11	46.02	26.91	216.0	H	226.0	21.0
329.999444	21.30	46.02	24.72	282.0	H	48.0	22.7
401.941111	24.21	46.02	21.81	285.0	H	152.0	24.9
611.515000	28.78	46.02	17.24	225.0	H	202.0	29.7
993.910556	32.51	53.98	21.47	365.0	H	239.0	33.4

Test Personnel:	Brian Lackey	Test Date:	8/26/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	57.2%
		Atmospheric Pressure:	988.8mbar

Deviations, Additions, or Exclusions: None

12.6.2.5 Channel 121 (926.2 MHz), Power Setting 9



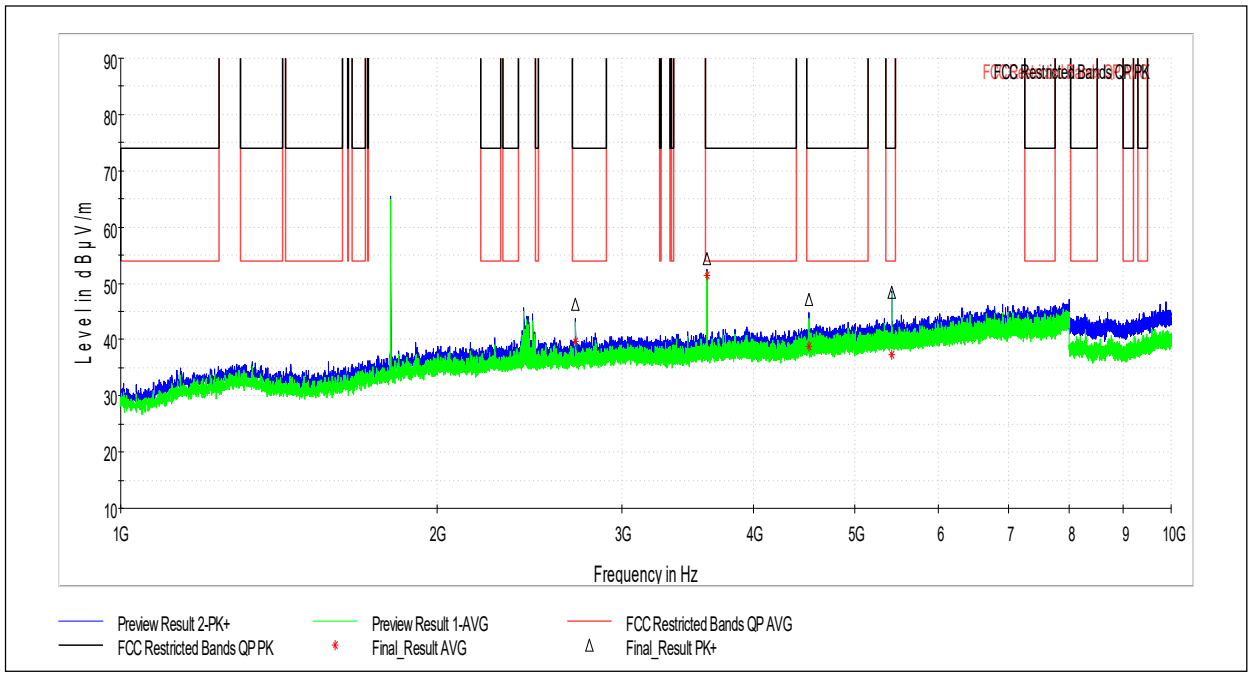
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.760000	19.27	40.00	20.73	250.0	H	28.0	20.6
73.542222	11.88	40.00	28.12	345.0	H	4.0	13.5
108.731667	14.43	43.52	29.09	350.0	V	204.0	16.3
165.692222	14.40	43.52	29.12	370.0	H	87.0	16.6
171.350556	15.58	43.52	27.94	105.0	V	132.0	17.5
282.685000	19.01	46.02	27.01	385.0	H	228.0	21.0
329.514444	21.06	46.02	24.96	264.0	H	73.0	22.7
408.838889	24.17	46.02	21.85	200.0	H	163.0	25.0
609.628889	28.51	46.02	17.51	313.0	H	114.0	29.6
964.541111	31.56	53.98	22.42	189.0	H	90.0	33.2

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
	FCC 15.247		
Product Standard:	RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.6.3 Frequency Range 1GHz – 10GHz

12.6.3.1 Channel 7 (903.2 MHz), Power Setting 9



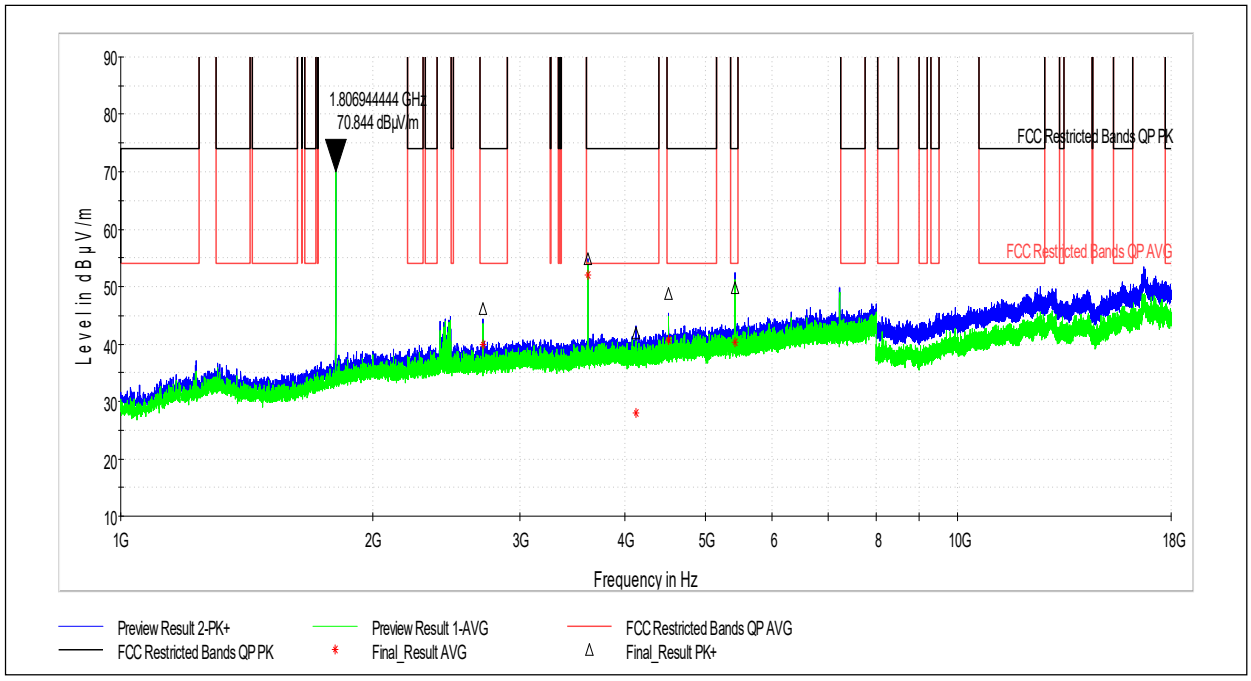
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2710.333333	46.21	73.98	27.77	222.0	H	43.0	5.8
3613.722222	54.35	73.98	19.63	324.0	V	298.0	7.7
4517.111111	47.05	73.98	26.93	117.0	V	342.0	9.4
5420.888889	48.41	73.98	25.57	341.0	V	186.0	10.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2710.333333	39.67	53.98	14.31	222.0	H	43.0	5.8
3613.722222	51.39	53.98	2.59	324.0	V	298.0	7.7
4517.111111	38.78	53.98	15.20	117.0	V	342.0	9.4
5420.888889	37.37	53.98	16.61	341.0	V	186.0	10.7

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
	FCC 15.247		
Product Standard:	RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.6.3.2 Channel 8 (903.6 MHz), Power Setting 10



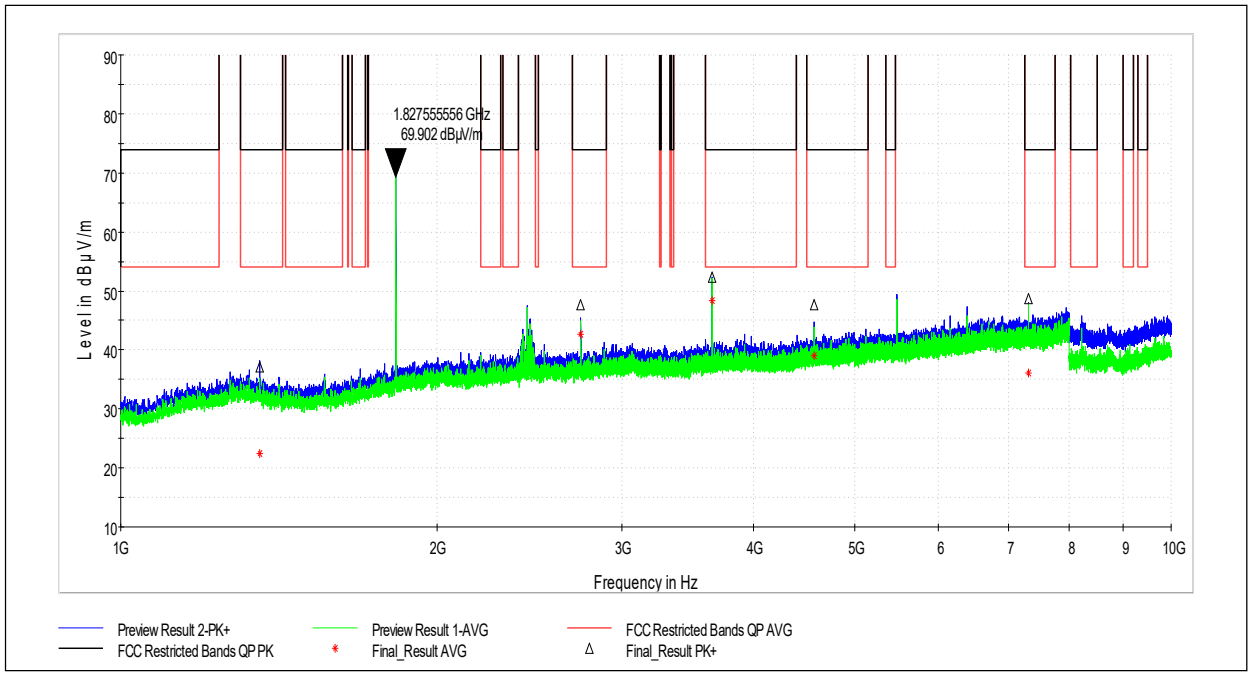
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2710.722222	46.12	73.98	27.86	361.0	H	318.0	5.8
3614.500000	54.80	73.98	19.18	151.0	V	346.0	7.7
4126.277778	41.96	73.98	32.02	410.0	H	142.0	8.6
4517.888889	48.70	73.98	25.28	117.0	V	0.0	9.4
5422.055556	49.79	73.98	24.19	310.0	V	303.0	10.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2710.722222	39.87	53.98	14.11	361.0	H	318.0	5.8
3614.500000	52.09	53.98	1.89	151.0	V	346.0	7.7
4126.277778	27.95	53.98	26.03	410.0	H	142.0	8.6
4517.888889	40.66	53.98	13.32	117.0	V	0.0	9.4
5422.055556	40.23	53.98	13.75	310.0	V	303.0	10.7

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.6.3.3 Channel 59 (913.8 MHz), Power Setting 10



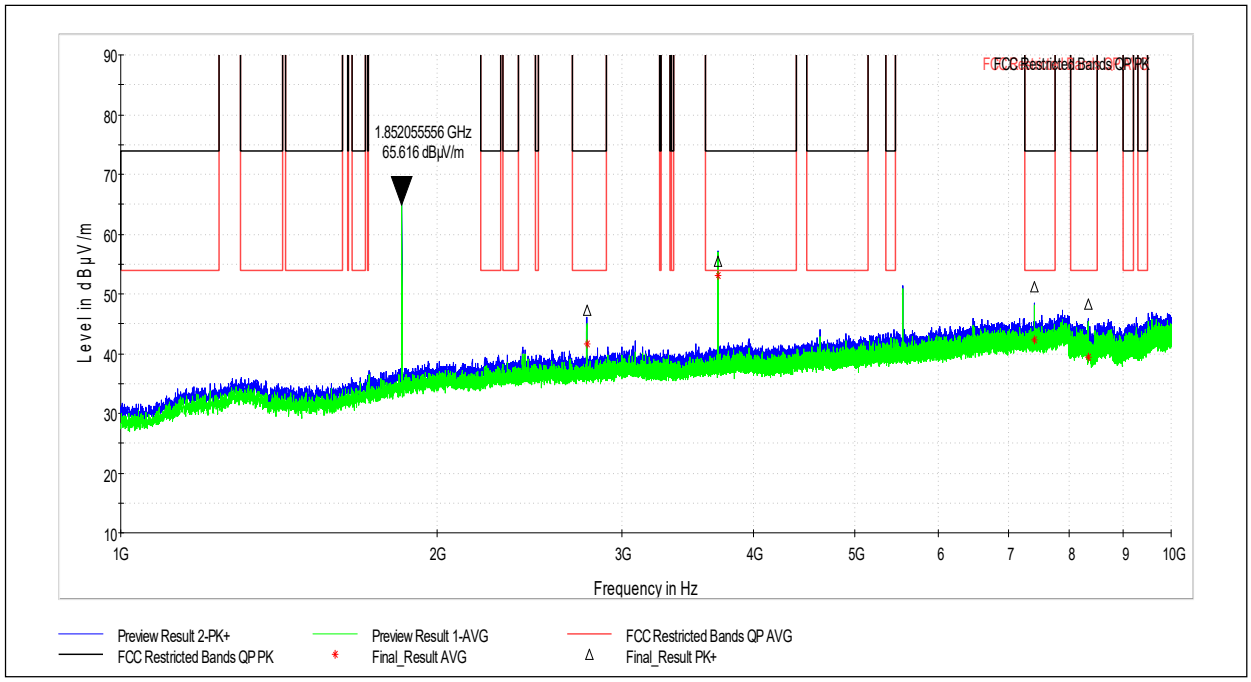
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1355.444444	37.14	73.98	36.84	410.0	H	296.0	0.5
2741.444444	47.69	73.98	26.29	280.0	V	0.0	5.8
3655.333333	52.35	73.98	21.63	261.0	V	308.0	7.7
4569.222222	47.59	73.98	26.39	117.0	V	0.0	9.5
7310.888889	48.64	73.98	25.34	392.0	V	326.0	13.4

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1355.444444	22.46	53.98	31.52	410.0	H	296.0	0.5
2741.444444	42.59	53.98	11.39	280.0	V	0.0	5.8
3655.333333	48.42	53.98	5.56	261.0	V	308.0	7.7
4569.222222	38.98	53.98	15.00	117.0	V	0.0	9.5
7310.888889	36.05	53.98	17.93	392.0	V	326.0	13.4

Test Personnel:	Brian Lackey	Test Date:	8/26/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	57.2%
		Atmospheric Pressure:	988.8mbar

Deviations, Additions, or Exclusions: None

12.6.3.4 Channel 120 (926.0 MHz), Power Setting 10



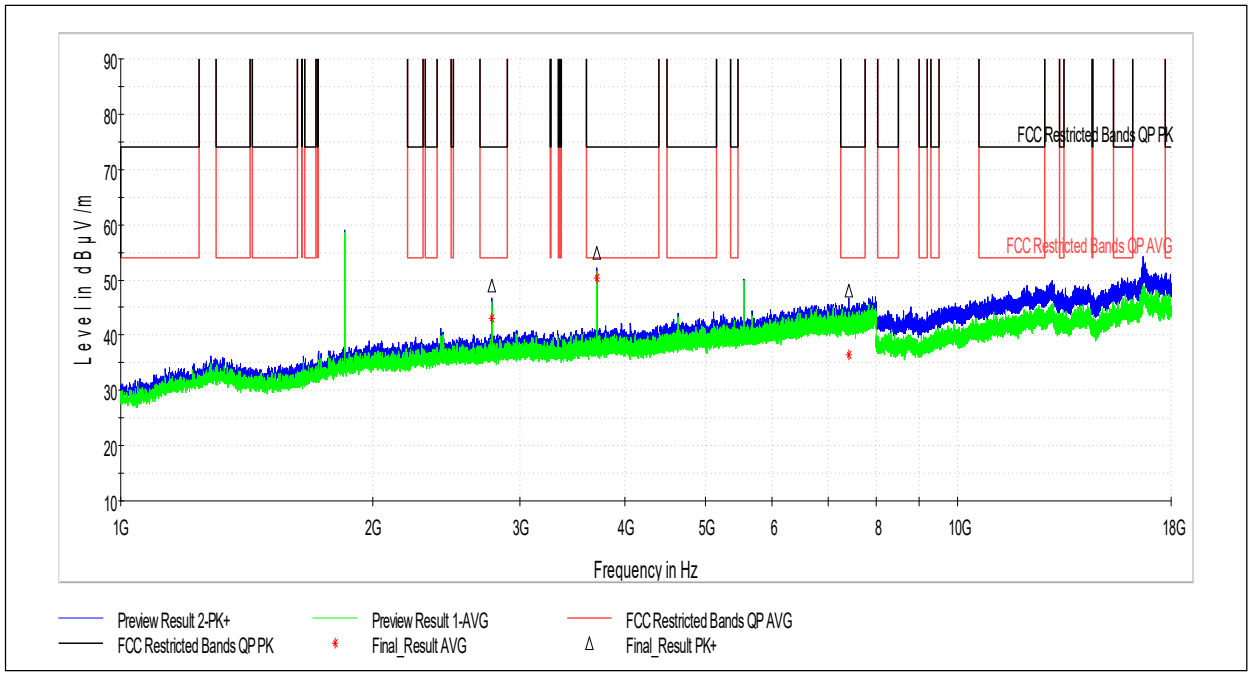
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2778.000000	47.31	73.98	26.67	299.0	V	0.0	5.9
3703.944444	55.53	73.98	18.45	316.0	V	294.0	7.8
7408.111111	51.16	73.98	22.82	208.0	V	316.0	13.4
8334.000000	48.28	73.98	25.70	100.0	V	306.0	14.5

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2778.000000	41.61	53.98	12.37	299.0	V	0.0	5.9
3703.944444	53.01	53.98	0.97	316.0	V	294.0	7.8
7408.111111	42.28	53.98	11.70	208.0	V	316.0	13.4
8334.000000	39.42	53.98	14.56	100.0	V	306.0	14.5

Test Personnel:	Brian Lackey	Test Date:	8/26/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
	FCC 15.247		
Product Standard:	RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	57.2%
		Atmospheric Pressure:	988.8mbar

Deviations, Additions, or Exclusions: None

12.6.3.5 Channel 121 (926.2 MHz), Power Setting 9



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2778.388889	48.95	73.98	25.03	295.0	V	322.0	5.9
3705.111111	54.89	73.98	19.09	289.0	V	300.0	7.8
7409.666667	48.04	73.98	25.94	187.0	H	292.0	13.5

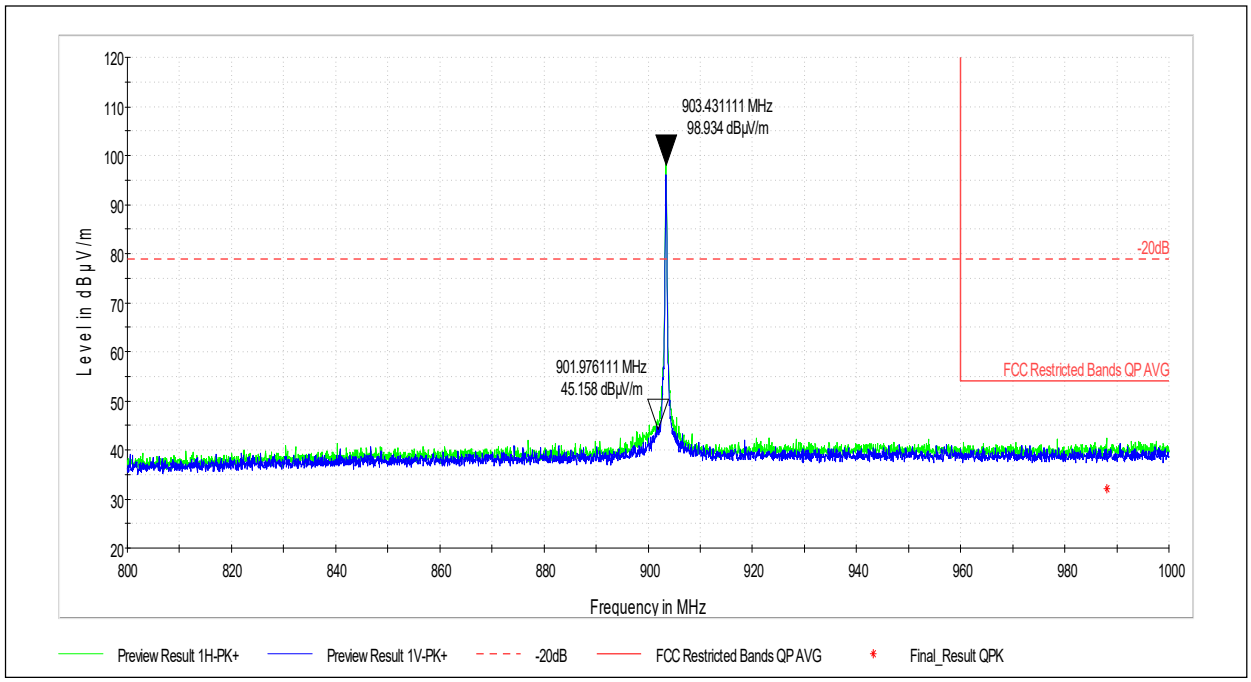
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2778.388889	43.01	53.98	10.97	295.0	V	322.0	5.9
3705.111111	50.29	53.98	3.69	289.0	V	300.0	7.8
7409.666667	36.37	53.98	17.61	187.0	H	292.0	13.5

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.7 Test Data: Radiated Emissions, Band Edge

12.7.1 Low Channel Band Edge, Channel 7 (903.2 MHz), Power Setting 9

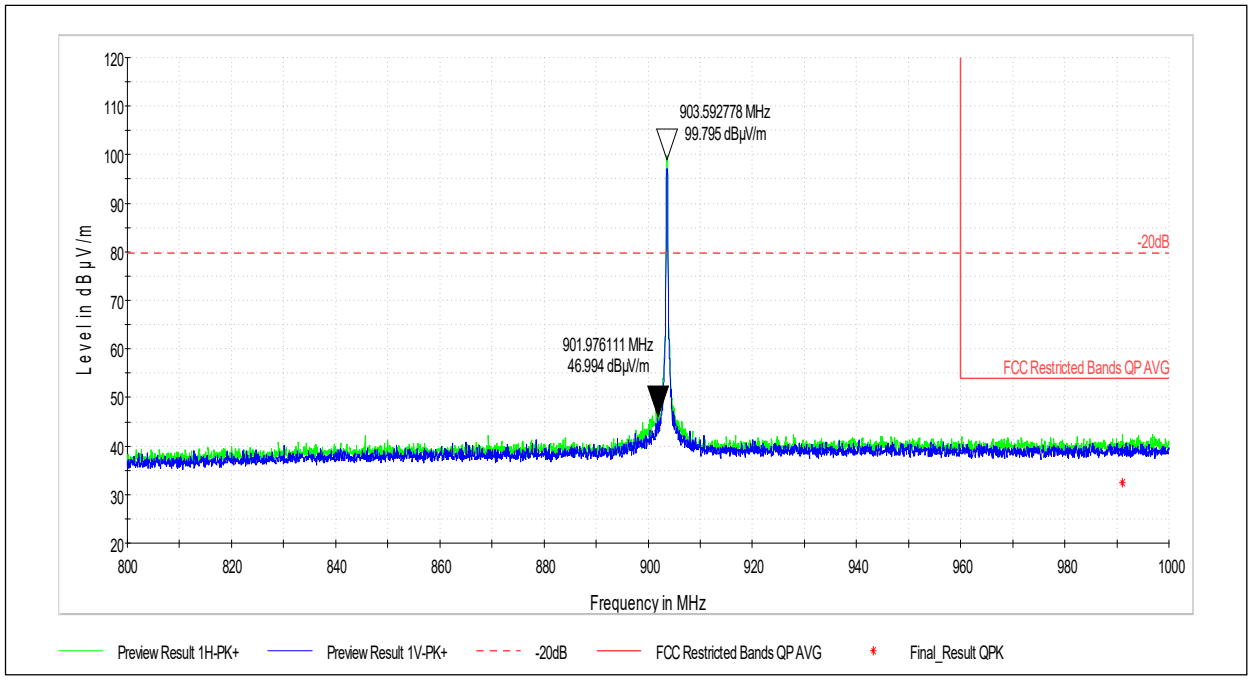


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
988.036667	32.09	53.98	21.89	150.0	H	119.0	33.3

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.7.2 Low Channel Band Edge, Channel 8 (903.6 MHz), Power Setting 10

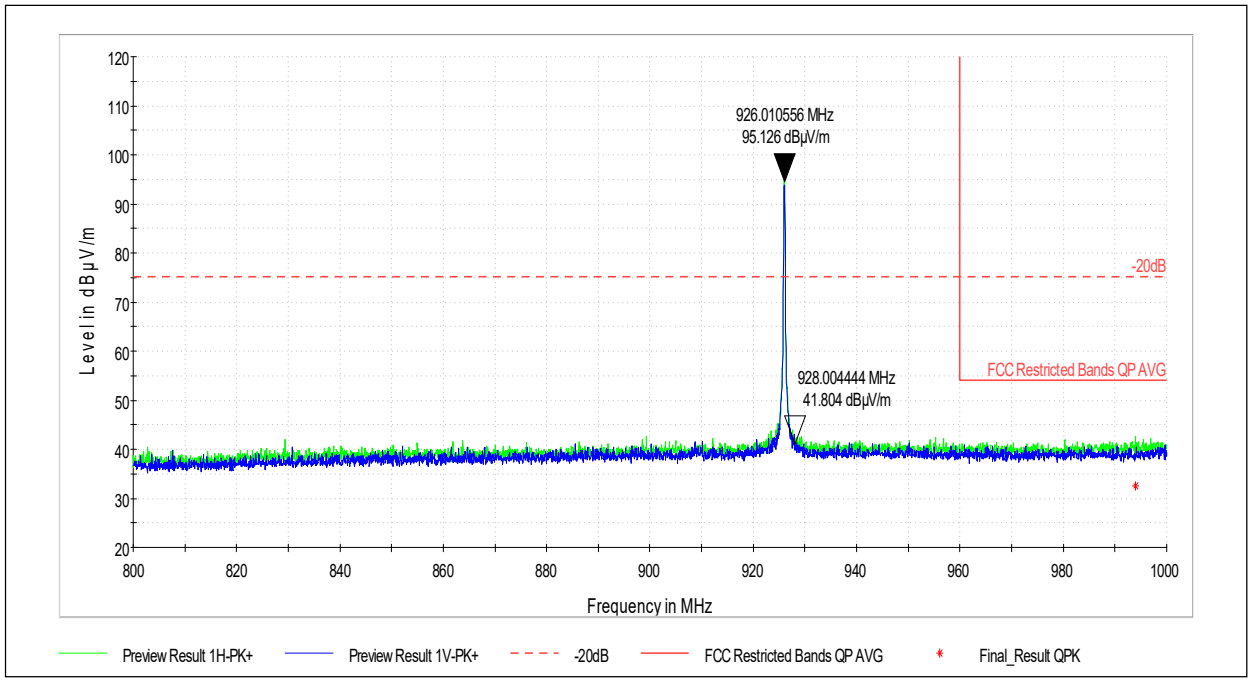


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
991.108333	32.48	53.98	21.50	256.0	H	306.0	33.4

Test Personnel:	Brian Lackey	Test Date:	8/28/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	54.8%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

12.7.3 High Channel Band Edge, Channel 120 (926.0 MHz), Power Setting 10

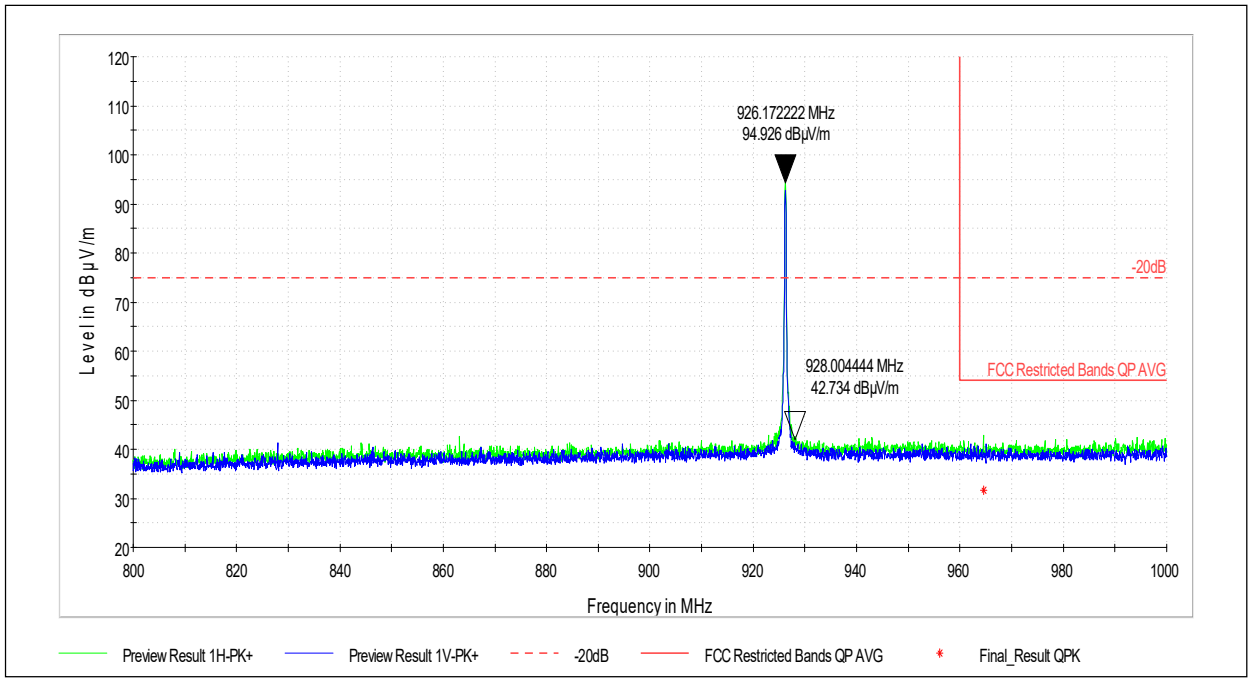


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
993.910556	32.51	53.98	21.47	365.0	H	239.0	33.4

Test Personnel:	Brian Lackey	Test Date:	8/26/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	19.7°C
Input Voltage:	Battery	Relative Humidity:	57.2%
		Atmospheric Pressure:	988.8mbar

Deviations, Additions, or Exclusions: None

12.7.4 High Channel Band Edge, Channel 121 (926.2 MHz), Power Setting 9



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
964.541111	31.56	53.98	22.42	189.0	H	90.0	33.2

Test Personnel:	Brian Lackey	Test Date:	8/27/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Section 12.2
Product Standard:	FCC 15.247 RSS-247	Ambient Temperature:	20.4°C
Input Voltage:	Battery	Relative Humidity:	53.4%
		Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

13 Antenna Requirement

13.1 Test Limits

FCC Part 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

RSS-Gen Issue 5 § 6.8:

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

13.2 Test Results

The device was found to be **compliant**. The device has an internal, permanently affixed antenna.

14 Conducted Emissions

14.1 Method

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

TEST SITE: Ground Plane

Site Designation: Ground Plane

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Power Line Conducted Emissions	150 kHz - 30 MHz	3.1dB	3.4dB

As shown in the table above our conducted 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.

14.2 Sample Calculations

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where NF = Net Reading in dBμV
RF = Reading from receiver in dBμV
LF = LISN or ISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(49.1\ dB\mu V / 20)}$ = 285.1 μV/m

14.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8296	Rohde & Schwarz	EPL1000	1/1/2024	1/1/2025
LISN	8221	Schwarzbeck	NSLK 8163	7/4/2024	7/4/2025
Coaxial Cable	8307			1/22/2024	1/22/2025

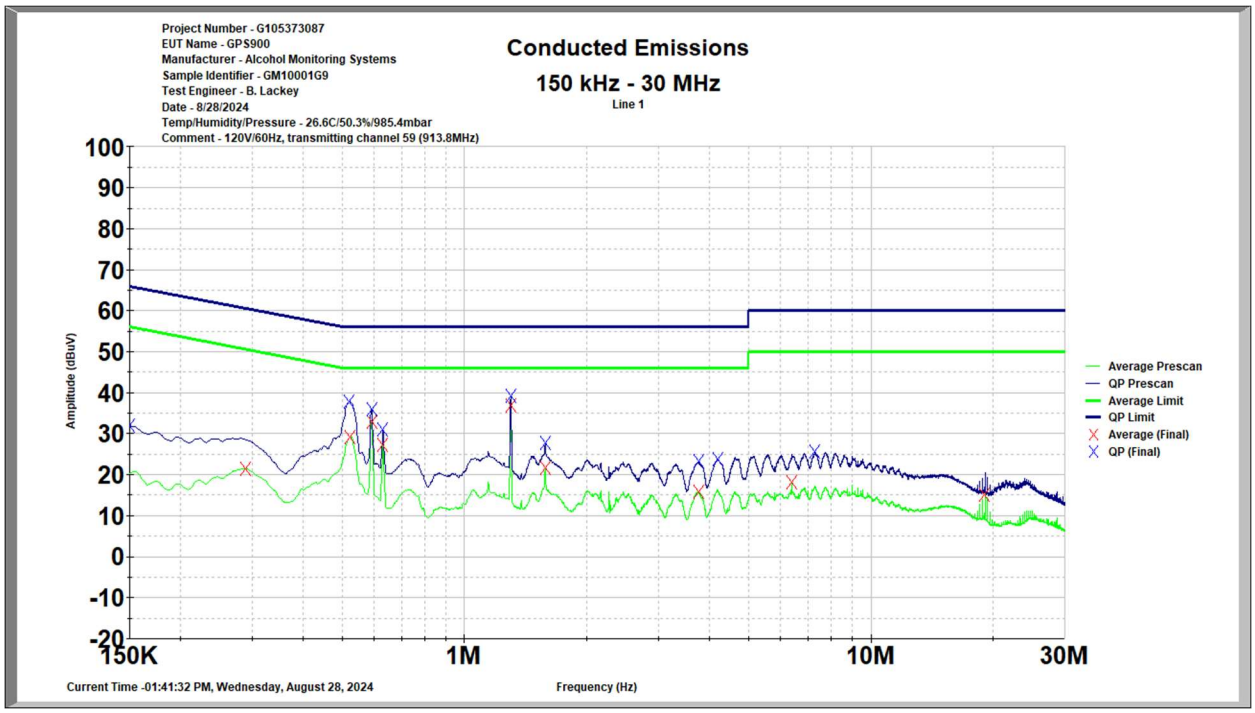
14.4 Software Utilized:

Name	Manufacturer	Version
TILE	ETS Lindgren	V7.0.6.545

14.5 Results:

The sample tested was found to Comply.

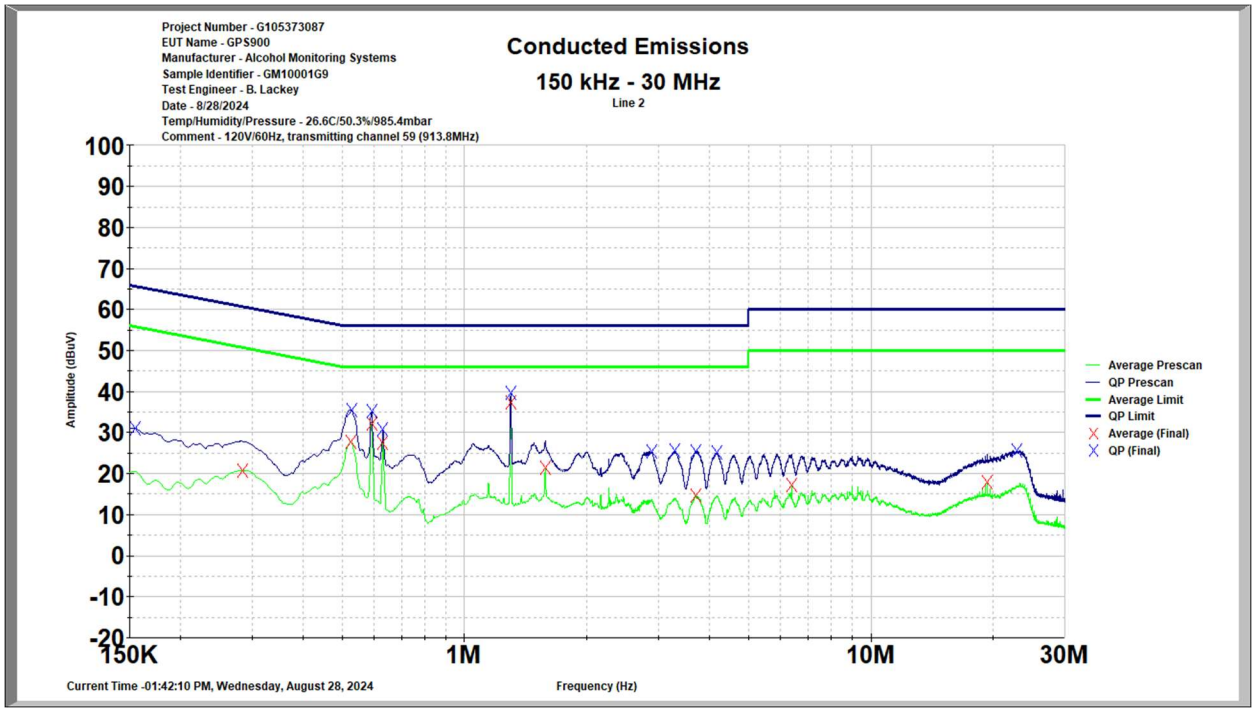
14.6 Plots/Data: Conducted Emissions (Line)



Line

Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Margin (dB)
0.150	31.852	66.000	34.148
0.521	37.830	56.000	18.170
0.591	36.000	56.000	20.000
0.629	30.943	56.000	25.057
1.300	39.187	56.000	16.813
1.581	27.791	56.000	28.209
3.764	23.172	56.000	32.828
4.200	23.841	56.000	32.159
7.292	25.496	60.000	34.504

Frequency (MHz)	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)
0.289	21.377	52.014	30.637
0.523	29.238	46.000	16.762
0.591	32.835	46.000	13.165
0.629	27.331	46.000	18.669
1.300	36.942	46.000	9.058
1.581	21.737	46.000	24.263
3.764	15.689	46.000	30.311
6.396	18.141	50.000	31.859
19.084	15.087	50.000	34.913



Neutral

Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Margin (dB)
0.155	30.954	65.871	34.917
0.528	35.457	56.000	20.543
0.591	35.107	56.000	20.893
0.629	30.714	56.000	25.286
1.300	39.615	56.000	16.385
2.886	25.455	56.000	30.545
3.287	25.504	56.000	30.496
3.714	25.394	56.000	30.606
4.182	25.040	56.000	30.960
22.913	25.632	60.000	34.368

Frequency (MHz)	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)
0.285	20.809	52.143	31.334
0.526	27.706	46.000	18.294
0.591	32.087	46.000	13.913
0.629	27.463	46.000	18.537
1.300	37.242	46.000	8.758
1.581	21.433	46.000	24.567
3.709	14.537	46.000	31.463
6.396	17.192	50.000	32.808
19.349	17.757	50.000	32.243

Test Personnel:	Brian Lackey	Test Date:	8/28/2024
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	FCC Part 15.207
Product Standard:	FCC Part 15.207	Ambient Temperature:	26.6°C
Input Voltage:	120V/60Hz	Relative Humidity:	50.3%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	985.4mbar

Deviations, Additions, or Exclusions: None

15 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	9/3/2024	105373087LEX-021	BL	MC	Original Issue