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# Geospace Technologies Corporation TEST REPORT

## SCOPE OF WORK

EMC TESTING – AQUALINK

## REPORT NUMBER

106145616LEX-002

## ISSUE DATE

7/16/2025

## PAGES

20

## DOCUMENT CONTROL NUMBER

Non-Specific EMC Report Shell Rev. December 2017

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## EMC TEST REPORT (FULL COMPLIANCE)

**Report Number:** 106145616LEX-002

**Project Number:** G106145616

**Report Issue Date:** 7/16/2025

**Model(s) Tested:** Aqualink

**Standards:** FCC Title 47 CFR Part 15.247  
(Limited to Radiated Spurious Emissions)

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

Client:  
Geospace Technologies Corporation  
7007 Pinemont Dr  
Houston, TX 77040-6601  
USA

Report prepared by



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EMC Engineer

Report reviewed by



Michael Carlson,  
EMC Team Lead

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## 1 Introduction and Conclusion

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

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

## 2 Test Summary

Section	Test full name	Result
6	Radiated Spurious Emissions (Transmitters Active) (ANSI C63.10:2020)	Pass



### 3 Client Information

This product was tested at the request of the following:

Client Information	
<b>Client Name:</b>	Geospace Technologies Corporation
<b>Address:</b>	7007 Pinemont Dr Houston, TX 77040-6601 USA
<b>Contact:</b>	Mark McAllister
<b>Telephone:</b>	2816301341
<b>Email:</b>	mmcallister@geospace.com
Manufacturer Information	
<b>Manufacturer Name:</b>	Geospace Technologies Corporation
<b>Manufacturer Address:</b>	7007 Pinemont Dr Houston, TX 77040-6601 USA



#### 4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Aqualink
Model Number	Aqualink
Serial Number	D0000077
Hardware Version	N/A
Software Version	N/A
Supported Transmit Bands	902.3MHz – 914.9MHz
Embedded Module	LoRa Radio: Murata 1SJ
Embedded Module FCCID	VPYLBAA0QB1SJ
Receive Date	6/20/2025
Test Start Date	7/7/2025
Test End Date	7/8/2025
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	3.6VDC
Description of Equipment Under Test (provided by client)	
The Geospace Technologies Corporation Aqualink is a LoRa endpoint	

##### 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 C63.10:2020.

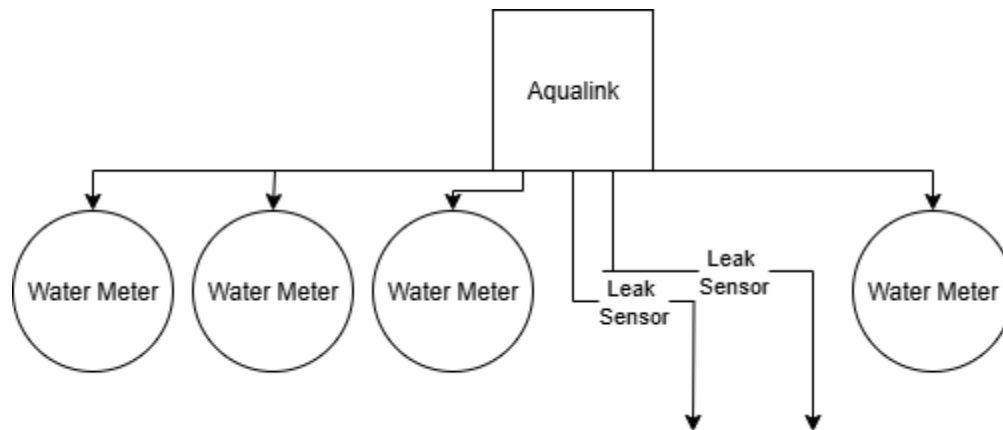
No.	Descriptions of EUT Exercising
1	Device was on and transmitting on low, mid, and high channels while in an orientation that maximized emissions.

Cables					
QTY	Description	Length (m)	Shielding	Ferrites	Termination
1	Kamstrup Cable	1	No	No	flowIQ 2100
1	Kamstrup Cable	2	No	No	flowIQ 2100
1	NMT Cable	1	No	No	VersaMag
1	NMT Cable	.3	No	No	VersaMag
2	Rope Leak Sensor	1.5	No	No	N/A

Support Equipment (Accessories)		
Description	Manufacturer	Model Number
Water Meter	Kamstrup	flowIQ 2100
Water Meter	Kamstrup	flowIQ 2100
Water Meter	NMT	VersaMag
Water Meter	NMT	VersaMag
Rope Leak Sensor	Shenzhen AnYing Technology Co., Ltd	A-LC1B-5CH1
Rope Leak Sensor	Shenzhen AnYing Technology Co., Ltd	A-LC1B-5CH1



## 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 C63.10:2020.

**TEST SITE:** 10m ALSE

**Site Designation:** 10m Chamber

#### Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	U <sub>cispr</sub>
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 $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ 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 $\mu$ 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 $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ 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 $\mu$ V to  $\mu$ V or mV the following was used:

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

### 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 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	8258	Rohde & Schwarz	ESW44	5/5/2025	5/5/2026
Bilog Antenna (30MHz-1GHz)	7085	SunAR	JB6	3/14/2025	3/14/2026
Horn Antenna (1-18GHz)	3780	ETS	3117	7/18/2024	7/18/2025
Horn Antenna (18-40GHz)	3779	ETS	3116c	8/28/2024	8/28/2025
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
30M-1G 3m Signal Path without Preamplifier	8311 2593 8188 8185	-	-	11/26/2024	11/26/2025
Preamplifier	3918	Rohde & Schwarz	TS-PR18	11/26/2024	11/26/2025
1-18GHz Signal Path with Preamplifier	3074 3918 8310 2593 8188 8185	-	-	11/26/2024	11/26/2025

### 6.4 Software Utilized:

Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 10.60.20

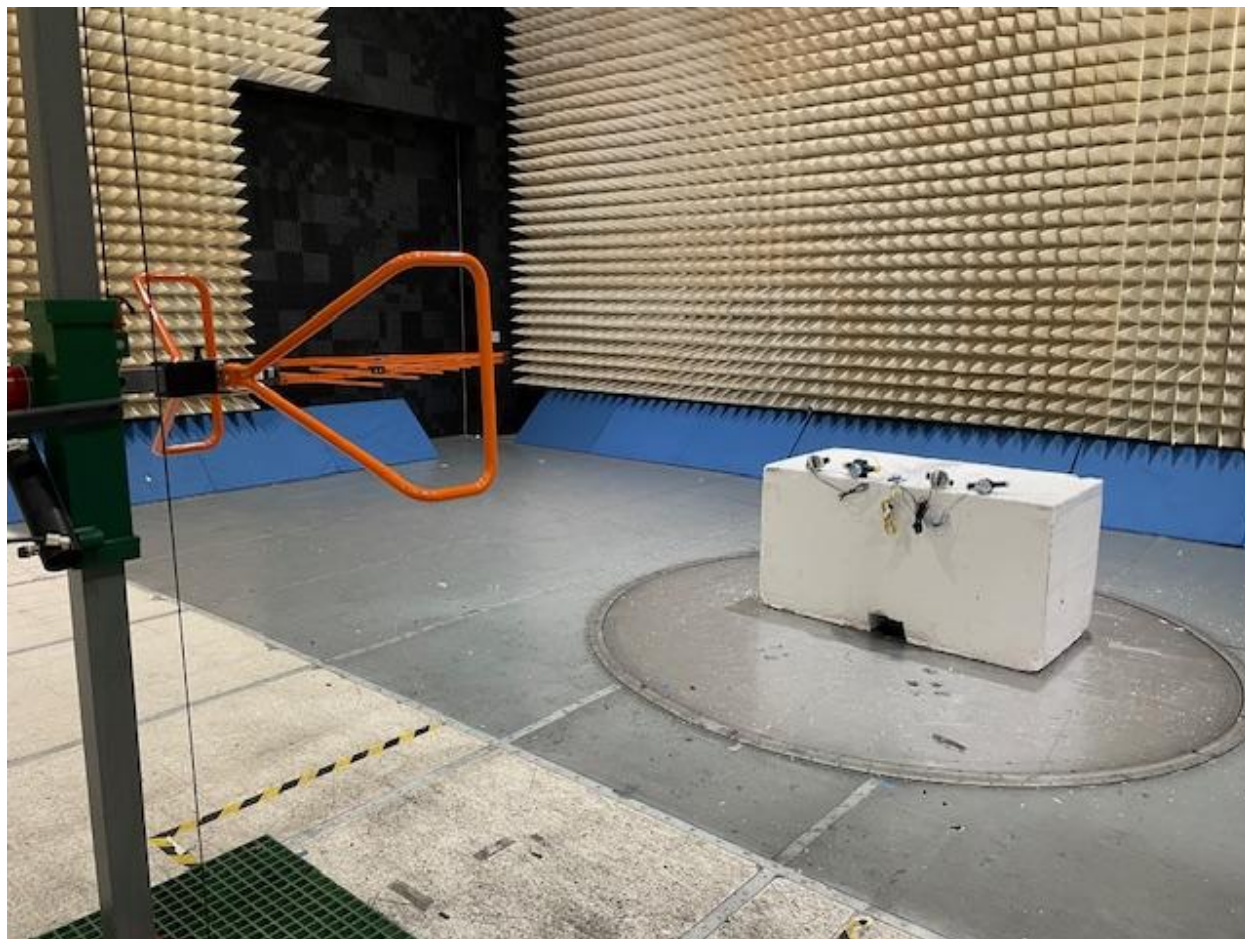
### 6.5 Results:

The sample tested was found to Comply.



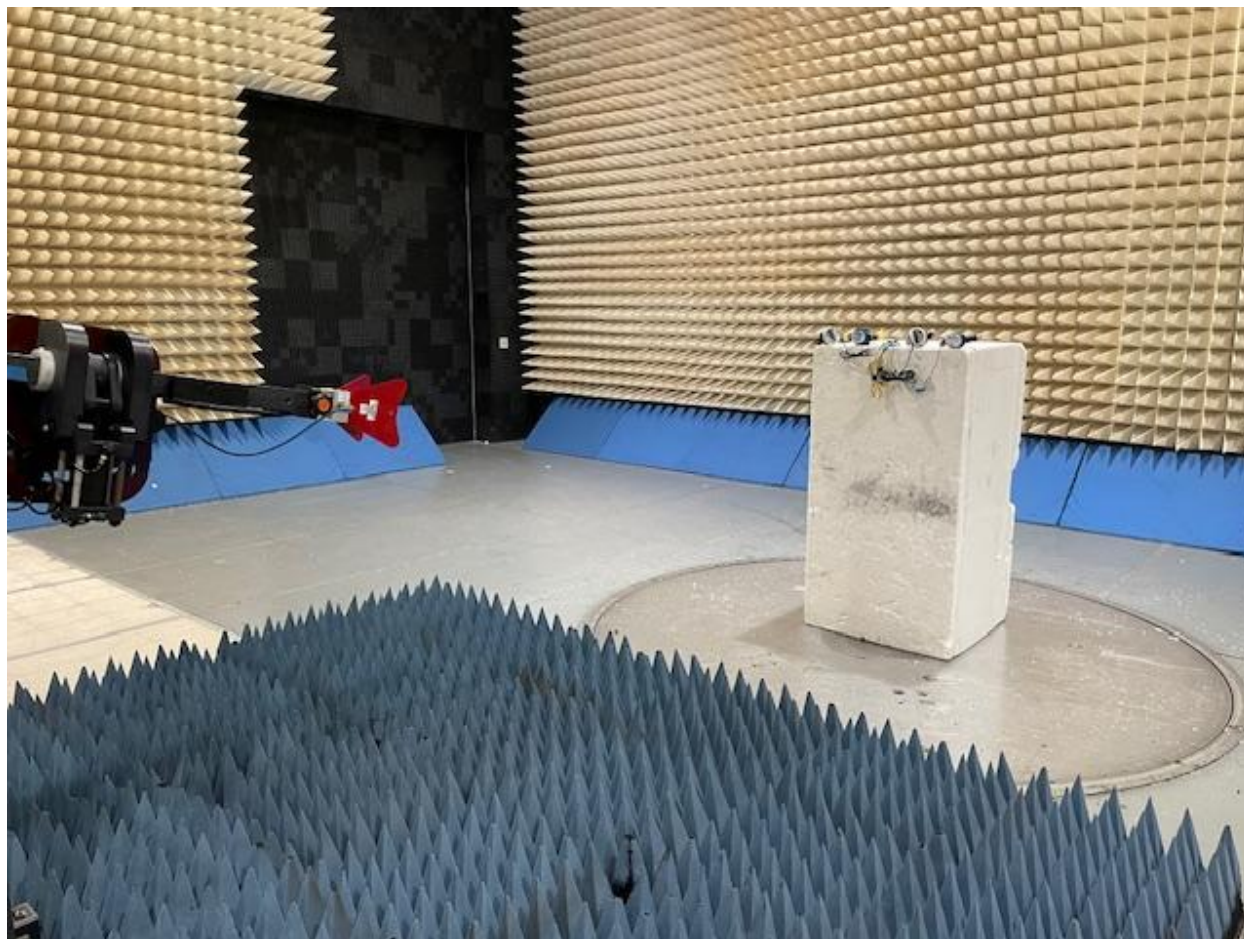


## 6.6 Setup Photographs: Radiated Spurious Emissions (Below 1GHz)





## 6.7 Setup Photographs: Radiated Spurious Emissions (Above 1GHz)

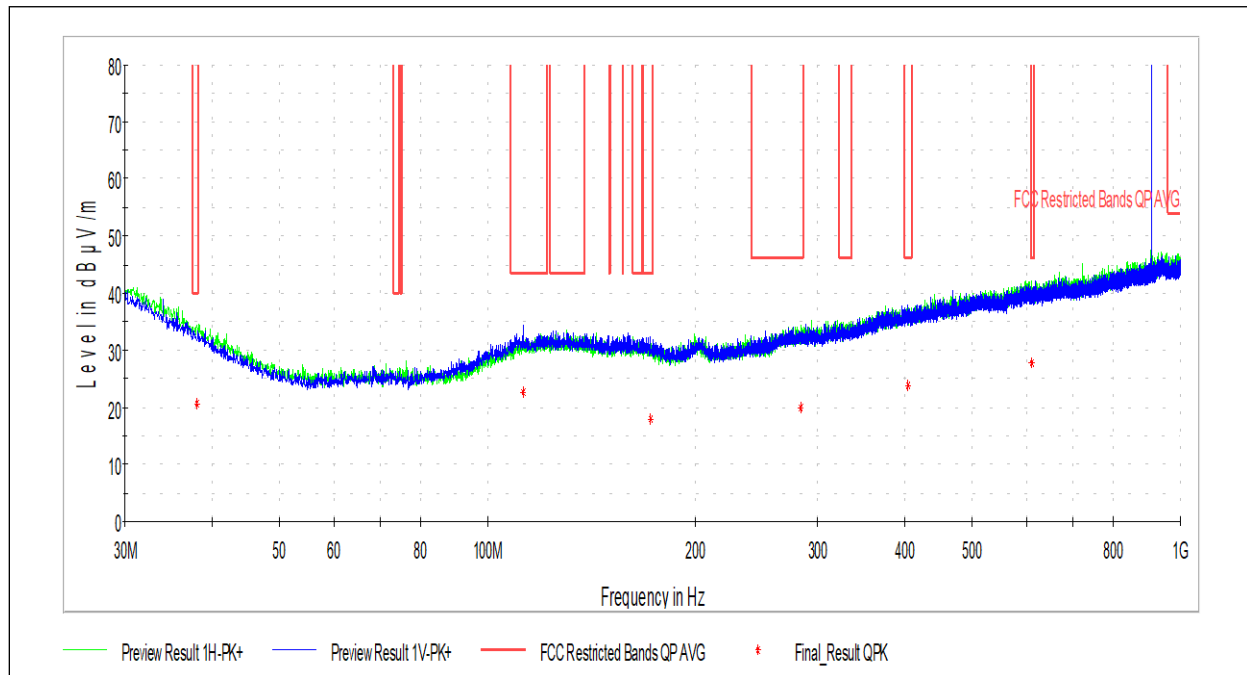




## 6.8 FCC Part 15C Radiated Spurious Emissions

### 6.8.1 Radiated Spurious Emissions, 30 MHz – 1 GHz

#### 6.8.1.1 Low Channel<sup>1</sup>



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
38.083333	20.61	40.00	19.39	250.0	H	188.0	22.5
112.503889	22.57	43.52	20.96	100.0	V	12.0	20.4
171.781667	18.03	43.52	25.49	315.0	V	198.0	19.9
283.062222	19.93	46.02	26.09	374.0	H	232.0	21.8
404.743333	23.69	46.02	22.34	105.0	V	184.0	24.3
610.275556	27.61	46.02	18.41	360.0	H	129.0	28.7

Test Personnel: David Perry  
Supervising/Reviewing Engineer: N/A  
(Where Applicable) FCC Part 15.247  
Product Standard: RSS-247 Issue 2  
Input Voltage: 3.6VDC  
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 7/7/2025  
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205  
Ambient Temperature: 22.8°C  
Relative Humidity: 65.4%  
Atmospheric Pressure: 985.4mbar

Deviations, Additions, or Exclusions: None

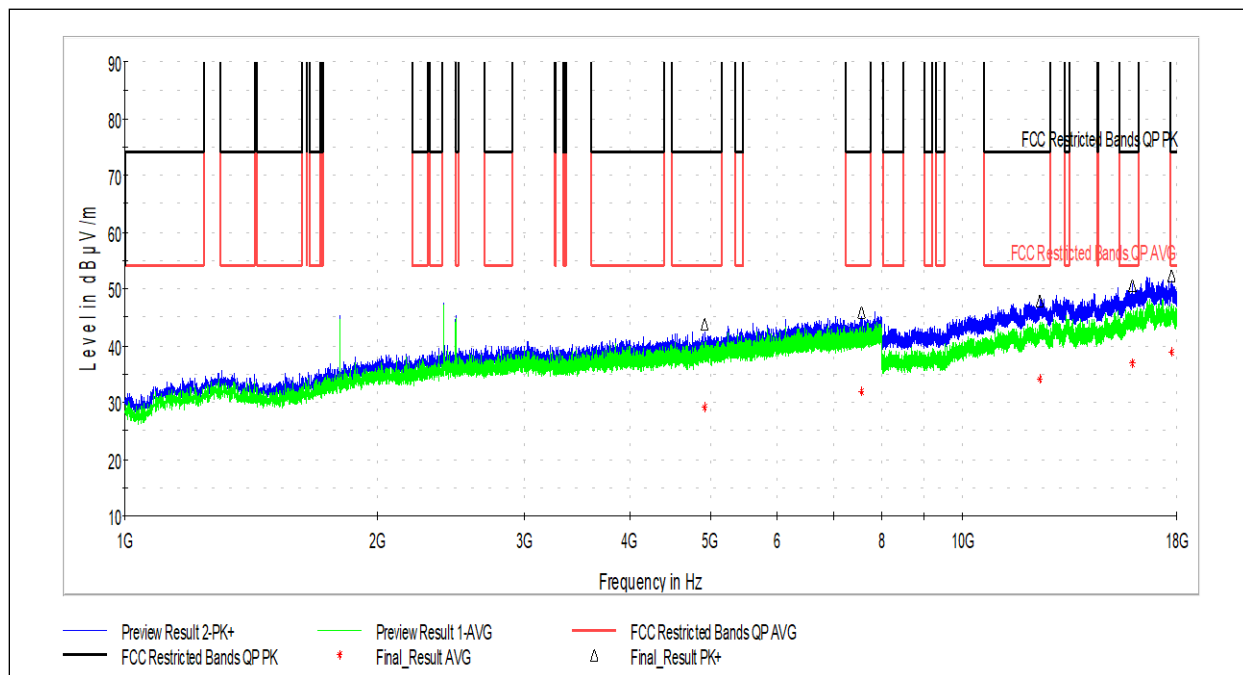
<sup>1</sup> Testing represents the worst case of low, middle, and high channels.





## 6.8.2 Radiated Spurious Emissions, 1 GHz – 18 GHz

### 6.8.2.1 Low Channel



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4919.222222	43.82	73.98	30.16	410.0	H	214.0	9.7
7571.833333	46.00	73.98	27.98	410.0	H	171.0	13.7
12363.125000	47.77	73.98	26.21	410.0	H	0.0	20.7
15937.500000	50.66	73.98	23.32	410.0	V	34.0	24.2
17761.875000	52.41	73.98	21.57	410.0	V	71.0	26.1

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4919.222222	29.20	53.98	24.78	410.0	H	214.0	9.7
7571.833333	31.97	53.98	22.01	410.0	H	171.0	13.7
12363.125000	34.07	53.98	19.91	410.0	H	0.0	20.7
15937.500000	36.91	53.98	17.07	410.0	V	34.0	24.2
17761.875000	38.83	53.98	15.15	410.0	V	71.0	26.1

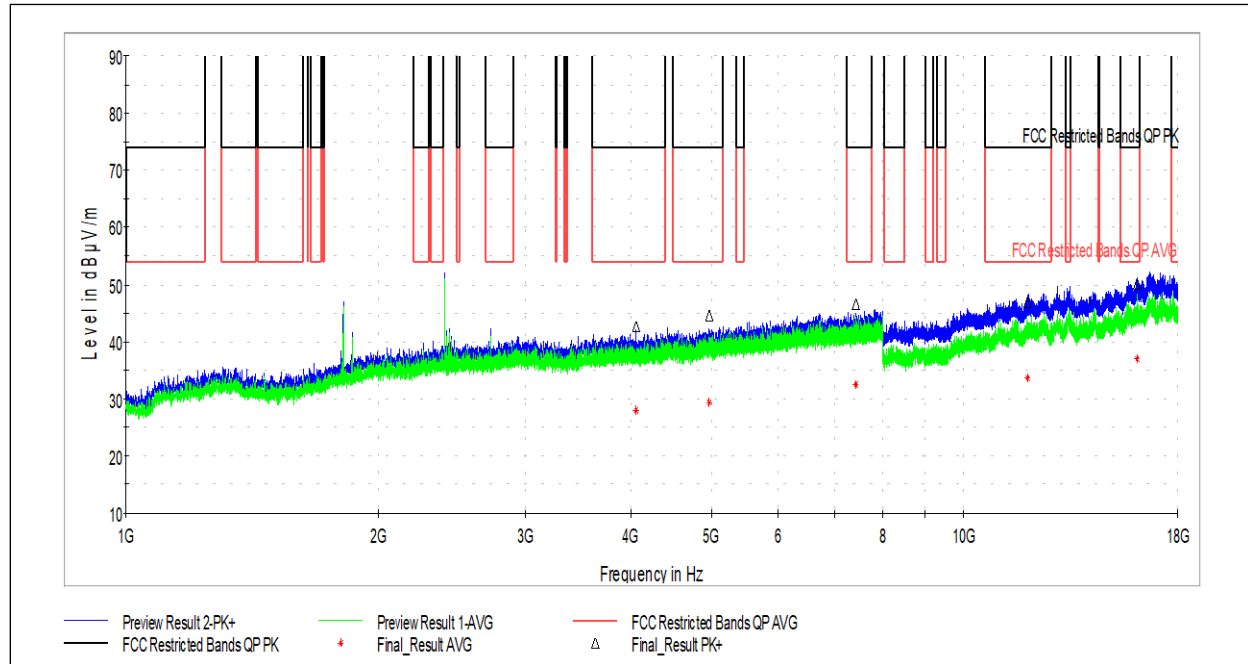
Test Personnel: David Perry  
Supervising/Reviewing Engineer: N/A  
(Where Applicable)  
Product Standard: FCC Part 15.247  
Input Voltage: RSS-247 Issue 2  
3.6VDC  
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 7/7/2025  
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205  
Ambient Temperature: 22.8°C  
Relative Humidity: 65.4%  
Atmospheric Pressure: 985.4mbar

Deviations, Additions, or Exclusions: None



### 6.8.3.1 Mid Channel



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4058.611111	42.69	73.98	31.29	410.0	V	155.0	8.6
4967.055556	44.59	73.98	29.39	410.0	V	97.0	9.8
7431.833333	46.67	73.98	27.31	410.0	H	10.0	13.5
11917.500000	46.95	73.98	27.03	410.0	H	267.0	20.1
16083.125000	50.07	73.98	23.91	410.0	H	1.0	24.5

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4058.611111	27.90	53.98	26.08	410.0	V	155.0	8.6
4967.055556	29.46	53.98	24.52	410.0	V	97.0	9.8
7431.833333	32.40	53.98	21.58	410.0	H	10.0	13.5
11917.500000	33.62	53.98	20.36	410.0	H	267.0	20.1
16083.125000	36.94	53.98	17.04	410.0	H	1.0	24.5

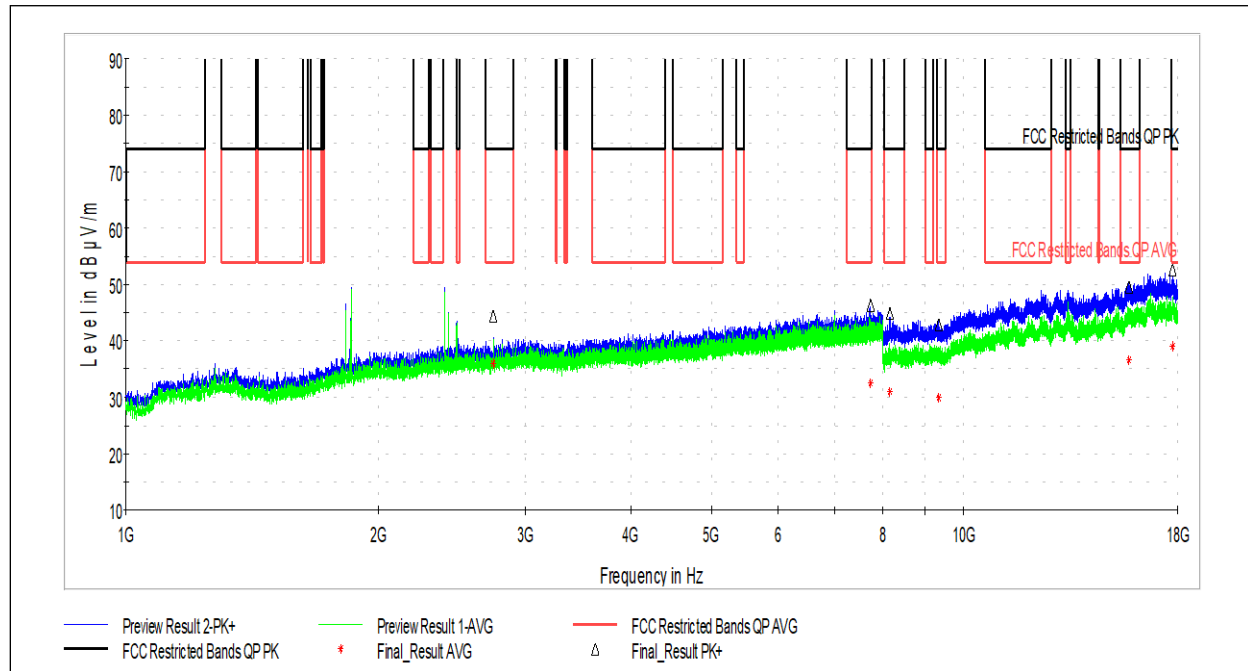
Test Personnel: David Perry  
Supervising/Reviewing Engineer: \_\_\_\_\_  
(Where Applicable) N/A  
FCC Part 15.247  
Product Standard: RSS-247 Issue 2  
Input Voltage: 3.6VDC  
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 7/7/2025  
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205  
Ambient Temperature: 22.8°C  
Relative Humidity: 65.4%  
Atmospheric Pressure: 985.4mbar

Deviations, Additions, or Exclusions: None



## 6.8.3.2 High Channel



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2744.555556	44.38	73.98	29.60	172.0	H	182.0	5.9
7739.055556	46.27	73.98	27.71	410.0	V	84.0	13.8
8166.875000	44.76	73.98	29.22	151.0	H	286.0	14.5
9323.750000	42.94	73.98	31.04	410.0	H	253.0	16.2
15739.375000	49.63	73.98	24.35	410.0	H	0.0	23.6
17762.500000	52.56	73.98	21.42	410.0	H	130.0	26.1

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2744.555556	35.89	53.98	18.09	172.0	H	182.0	5.9
7739.055556	32.49	53.98	21.49	410.0	V	84.0	13.8
8166.875000	30.96	53.98	23.02	151.0	H	286.0	14.5
9323.750000	29.99	53.98	23.99	410.0	H	253.0	16.2
15739.375000	36.53	53.98	17.45	410.0	H	0.0	23.6
17762.500000	38.96	53.98	15.02	410.0	H	130.0	26.1

Test Personnel: David Perry  
Supervising/Reviewing Engineer: N/A  
(Where Applicable)  
FCC Part 15.247  
Product Standard: RSS-247 Issue 2  
Input Voltage: 3.6VDC  
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 7/7/2025  
Limit Applied: FCC Part 15.209 in Restricted Bands from FCC Part 15.205  
Ambient Temperature: 22.8°C  
Relative Humidity: 65.4%  
Atmospheric Pressure: 985.4mbar

Deviations, Additions, or Exclusions: None



#### 6.8.4 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	7/16/2025	106145616LEX-002	JP	MC	Original Issue