

# RF Test Report

**Project Number:** 4897775**Proposal:** SUW-202108001494**Report Number:** 4897775EMC01**Revision Level:** 1**Client:** Windrock, Inc.**Equipment Under Test:** Wireless Encoder**Models:** A6420**FCC ID:** VYK-A6420**IC ID:** 7549A-A6420**Applicable Standards:** ANSI C63.10: 2013 (FCC Part 15 Subpart C, § 15.247)

RSS-247, Issue 2

RSS-GEN Issue 5

**Report issued on:** 23 May 2022**Test Result:** Compliant

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

**Tested by:**

Andrew Bluhm, EMC Engineer

**Reviewed by:**

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## 1 Summary of Test Results

| Test Description                     | Test Specification | Test Result                   |
|--------------------------------------|--------------------|-------------------------------|
| Occupied Bandwidth<br>20dB Bandwidth | 15.247(a)(1)       | RSS-247 5.1(a)<br>RSS-GEN 6.7 |
| Peak Power Output                    | 15.247(a)(1)       | RSS-247 5.4(b)                |
| Carrier Frequency Separation         | 15.247(a)(1)       | RSS-247 5.1(b)                |
| Number of Hopping Channels           | 15.247(a)(1)(i)    | RSS-247 5.1(d)                |
| Dwell Time                           | 15.247(a)(1)(i)    | RSS-247 5.1(d)                |
| Pseudo-Random Hop Sequence           | 15.247(a)(1)       | RSS-247 5.1(a)                |
| Conducted Spurious Emissions         | 15.247(d)          | RSS-247 5.5                   |
| Radiated Spurious Emissions          | 15.35(b),15.209    | RSS-GEN 8.10                  |
| Antenna Requirement                  | 15.203             | RSS-GEN 6.8                   |
| AC Powerline Conducted Emissions     | 15.107, 15.207     | RSS-GEN 8.8                   |
|                                      |                    | NA <sup>3</sup>               |

- 1) Not under the scope of this evaluation – for the Class II Permissive Change to add an alternate antenna, only radiated spurious emissions was required.
- 2) The external antenna port is a reverse SMA connector.
- 3) The encoder is battery-powered with no facility for connection to the AC mains.

### 1.1 ***Modifications Required for Compliance***

None

## 2 General Information

### 2.1 Applicant Information

Name: Windrock, Inc

Address: 1832 Midpark Rd, Suite 102

City, State, Zip, Country: Knoxville, TN 37921

Manufacturer: Same

### 2.2 Test Laboratory

Name: SGS North America, Inc.

Address: 620 Old Peachtree Road NW, Suite 100

City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA

Type of lab: Testing Laboratory

Certificate Number: 3212.01

Designation Number: US1126

CAB Identifier: US0186

### 2.3 General Information of EUT

EUT: Wireless Encoder

Model Number: A6420-00-00

Serial Number: 1808642281

Frequency Range: 903.45 to 921.45 MHz

Channels: 8

Modulation type: GFSK

Antenna: 3.8dBi Whip Element w/Base & Cable  
Linx Technologies, ANT-ELE-S01-005 (Antenna) / ANT-MAG-B85-RPS (Base & Cable)

Rated Voltage: 7.2 Vdc Li Ion Battery

Sample Received Date: 18 March 2022

Dates of testing: 13 – 15 April 2016

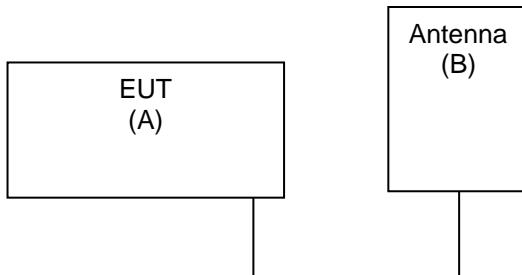
## 2.4 Channel List

Channel 0 903.37 MHz  
Channel 1 906.37 MHz  
Channel 2 907.87 MHz  
Channel 3 909.37 MHz  
Channel 4 912.37 MHz  
Channel 5 915.37 MHz  
Channel 6 919.87 MHz  
Channel 7 921.37 MHz

## 2.5 Operating Modes and Conditions

During testing, the device was placed into continuous transmit mode using client-provided firmware configurations in the radio. Low, middle, and high channels were evaluated.

## 2.6 EUT Connection Block Diagram



## 2.7 System Configuration

| Device reference | Manufacturer      | Description      | Model Number                         | Serial Number |
|------------------|-------------------|------------------|--------------------------------------|---------------|
| A                | Windrock          | Wireless Encoder | A6420-00-00                          | 1808642281    |
| B                | Linx Technologies | Antenna          | ANT-ELE-S01-005 /<br>ANT-MAG-B85-RPS | N/A           |

## 2.8 Cable List

| Cable reference | Port Name    | Start | End     | Cable Length (m) | Ferrite installed? | Shielded? |
|-----------------|--------------|-------|---------|------------------|--------------------|-----------|
| 1               | Antenna Coax | EUT   | Antenna | 4                | None               | Coax      |

## 3 Field Strength of Spurious Radiation

### 3.1 Test Result

| Test Description            | Test Specification | Test Result  |
|-----------------------------|--------------------|--------------|
| Radiated Spurious Emissions | 15.35(b), 15.209   | RSS-GEN 8.10 |

### 3.2 Test Method

The measurement methods defined in ANSI C63.10: 2013 were used.

Lowest, middle, and highest channels were investigated – the device was commanded to continuously transmit on low, middle, and high channels. 9.6kbps and 50kbps were the worst-case operating conditions.

Test distance:

9k to 30 MHz – The EUT to measurement antenna distance was 3 meters  
30 to 1000 MHz - The EUT to measurement antenna distance was 3 meters  
1 to 18 GHz - The EUT to measurement antenna distance was 3 meters  
18 to 26 GHz - The EUT to measurement antenna distance was 3 meters

Limits within restricted bands of operation:

| Frequency      | Limits <sup>(1)</sup> |                     | Peak Limits<br>dBuV/m |
|----------------|-----------------------|---------------------|-----------------------|
|                | Microvolts/m          | dBuV/m              |                       |
| 30 - 88 MHz    | 100                   | 40 <sup>(2)</sup>   | --                    |
| 88 - 216 MHz   | 150                   | 43.5 <sup>(2)</sup> | --                    |
| 216 - 960 MHz  | 200                   | 46 <sup>(2)</sup>   | --                    |
| 960 - 1000 MHz | 500                   | 54 <sup>(2)</sup>   | --                    |
| 1 - 40 GHz     | 500                   | 54 <sup>(3)</sup>   | 74                    |

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

### 3.3 Test Site

10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

#### Environmental Conditions

Temperature: 24.2 °C

Relative Humidity: 46.7 %

Atmospheric Pressure: 97.7 kPa

### 3.4 Test Equipment

Test End Date: 1/31/2022

Tester: AB/ZH

| Equipment                     | Model         | Manufacturer    | Asset Number | Cal Date    | Cal Due Date |
|-------------------------------|---------------|-----------------|--------------|-------------|--------------|
| RF CABLE NM TO NM, 0.01-18GHZ | 90-195-079    | TELEDYNE STORM  | 20123        | 14-Feb-2022 | 14-Feb-2023  |
| RF CABLE, NM TO NM.           | 90-195-276    | TELEDYNE STORM  | 21020        | 16-Mar-2022 | 16-Mar-2023  |
| N TO N RF CABLE               | NC12-N1N1-276 | MEGAPHASE       | 22000        | 10-Jan-2022 | 10-Jan-2023  |
| EMI TEST RECEIVER             | ESU40         | ROHDE & SCHWARZ | B079629      | 21-Jun-2021 | 21-Jun-2022  |
| ANTENNA, BILOG                | JB6           | SUNOL           | B079689      | 5-Nov-2020  | 5-Nov-2022   |
| ANTENNA, DRG HORN (MEDIUM)    | 3117          | ETS LINDGREN    | B079699      | 15-Jul-2020 | 15-Jul-2022  |
| RF CABLE                      | SF106         | HUBER & SUHNER  | B079713      | 26-Aug-2021 | 26-Aug-2022  |
| RF CABLE                      | 104PE         | HUBER & SUHNER  | B079793      | 24-Aug-2021 | 24-Aug-2022  |
| FILTER, HIGH PASS, >1000MHZ   | HPM50108      | MICRO-TRONICS   | B079802      | 6-Jul-2021  | 6-Jul-2022   |
| LOW NOISE AMPLIFIER           | ZKL-2+        | MINI-CIRCUITS   | B079817      | 26-Aug-2021 | 26-Aug-2022  |
| LOW NOISE AMPLIFIER           | TS-PR18       | ROHDE & SCHWARZ | B094463      | 7-Jul-2021  | 7-Jul-2022   |

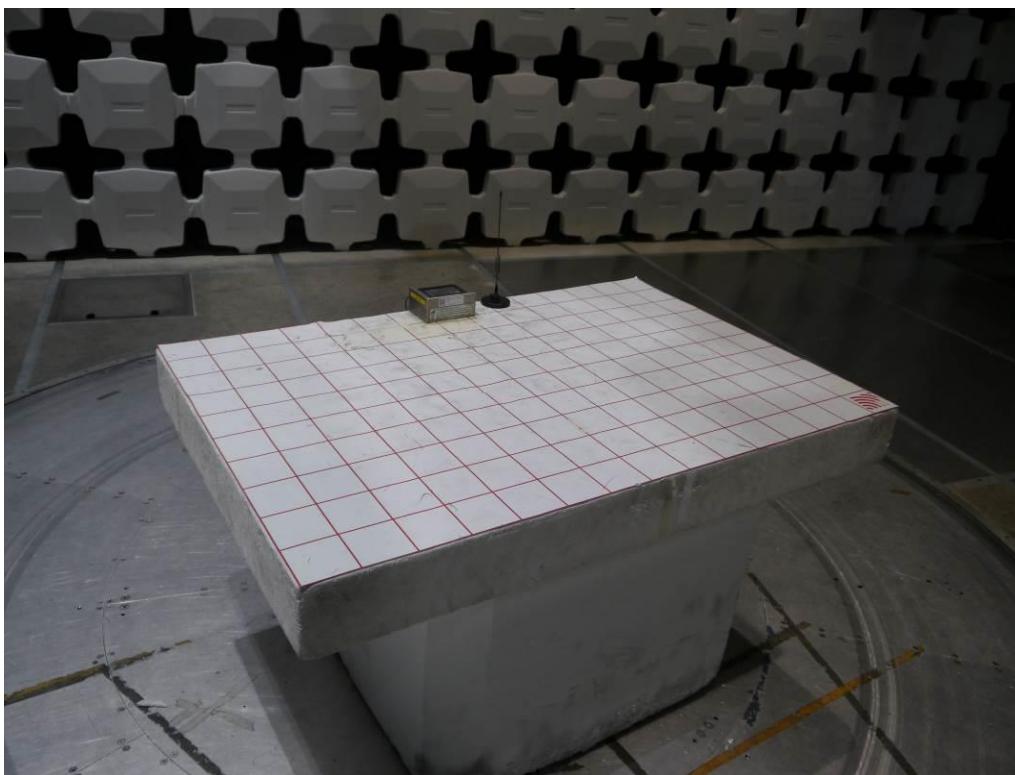
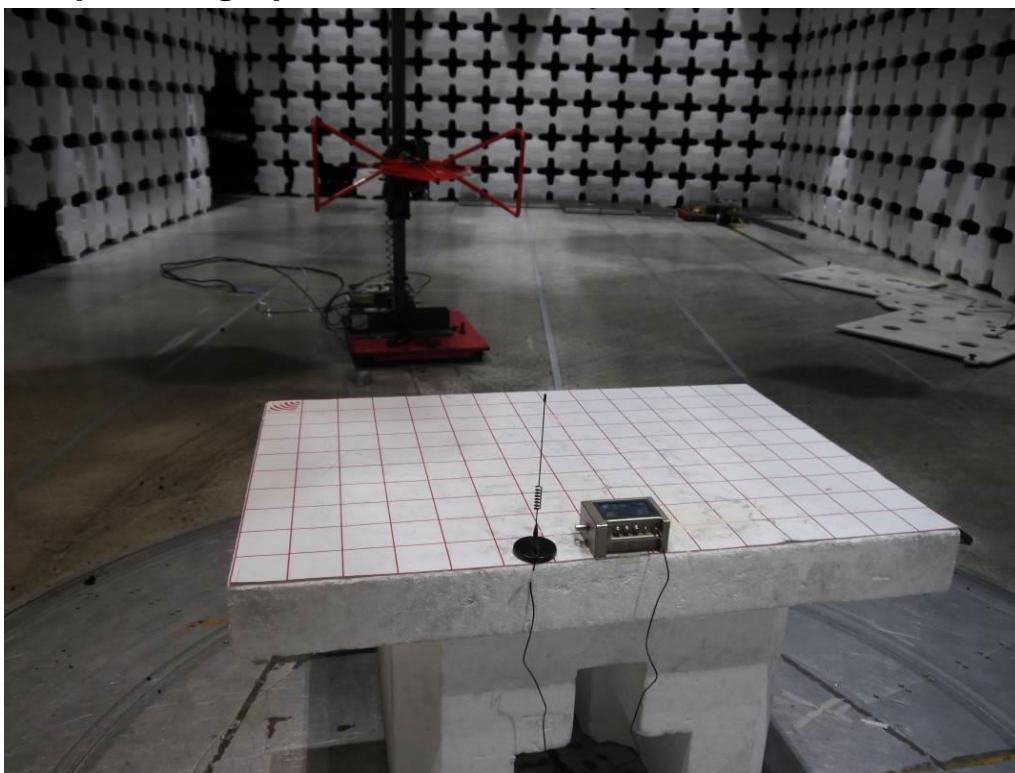
Note: Refer to the table for calibration intervals.

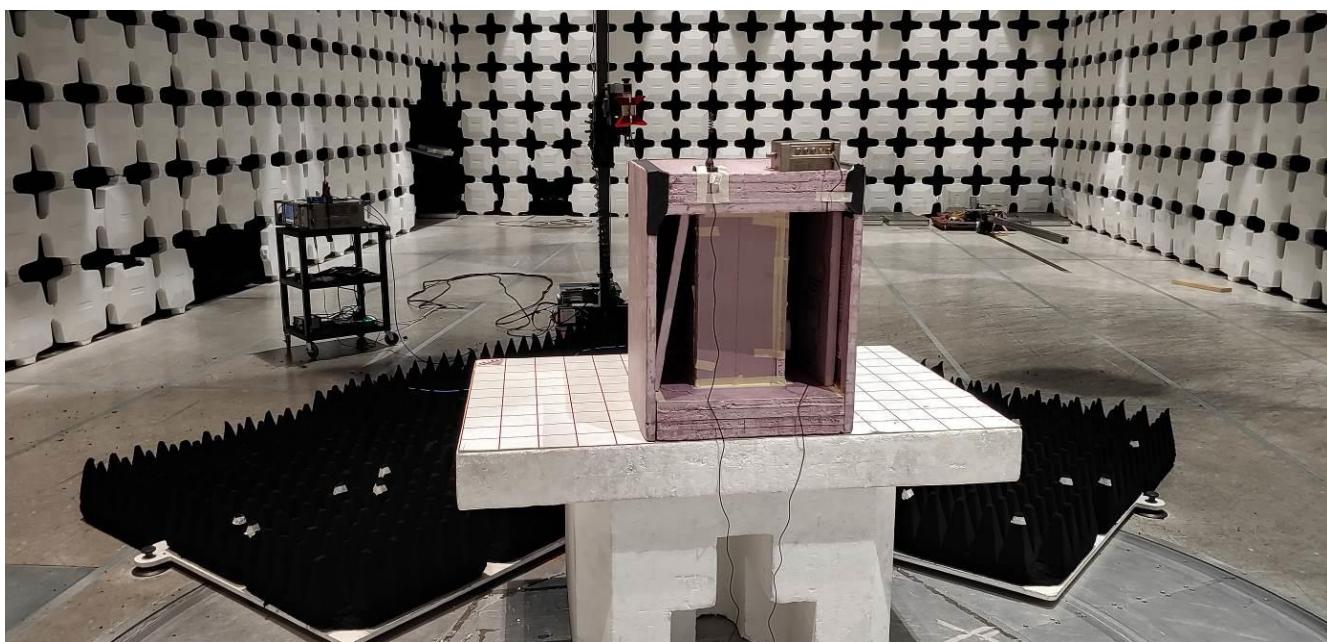
#### Software:

TILE! software profile "RSE 30-1000 MHz T7 220318" dated 01 04 2022

TILE! software profile "RSE 1-18 GHz T7 210212" dated 19 07 2022

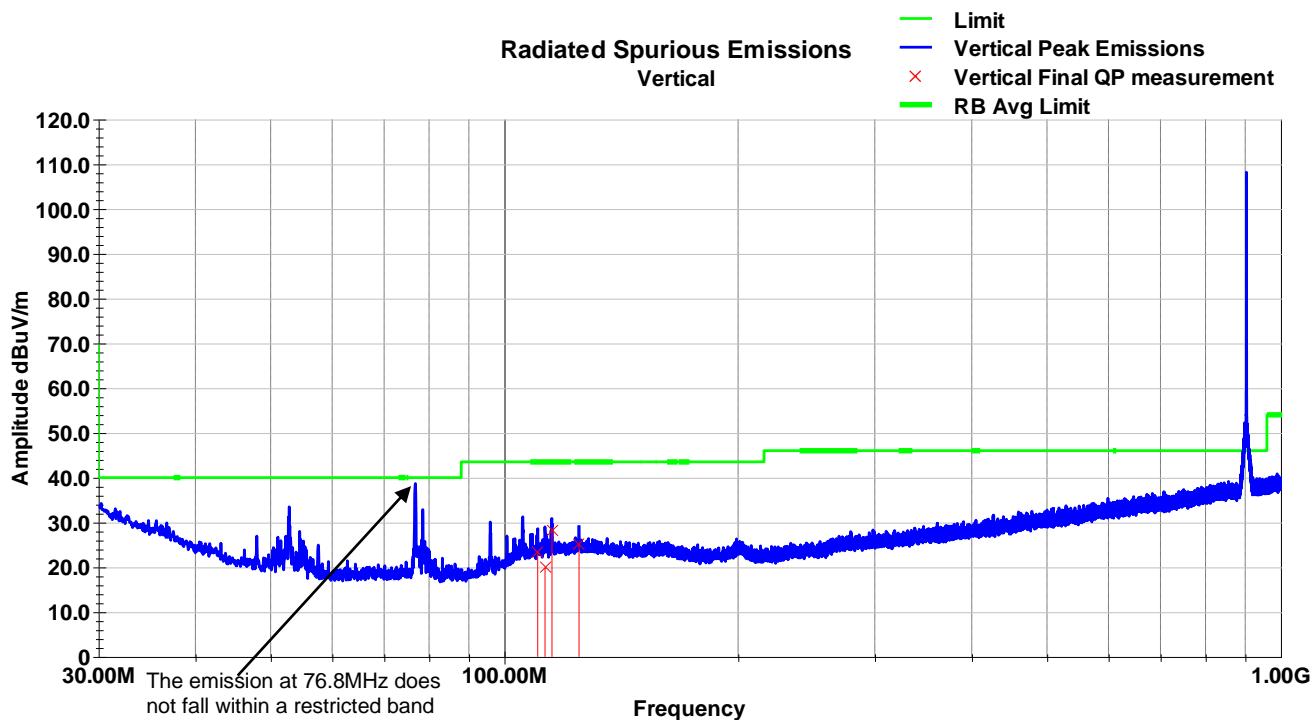
### 3.5 Test Setup Photographs





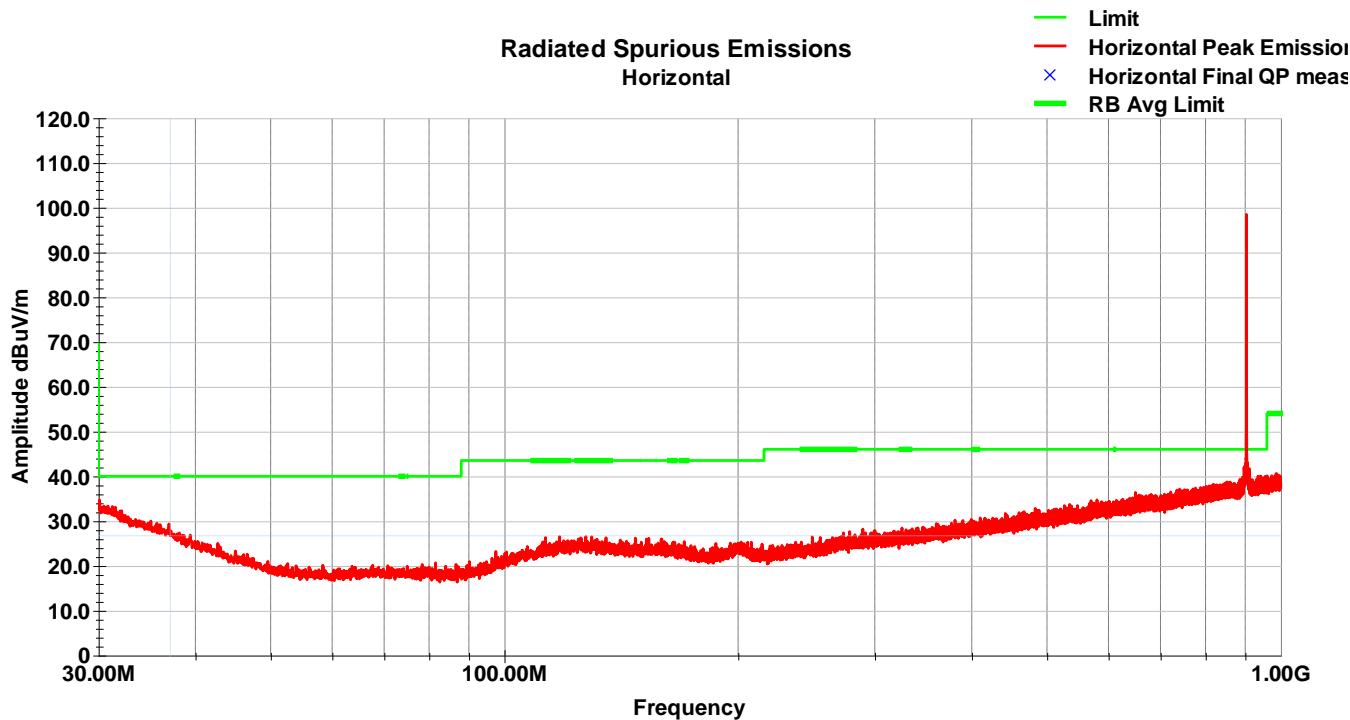
### 3.6 Test Data

Low Channel (903.45MHz) 30-1000MHz - Vertical Radiated Emissions – Peak Plot

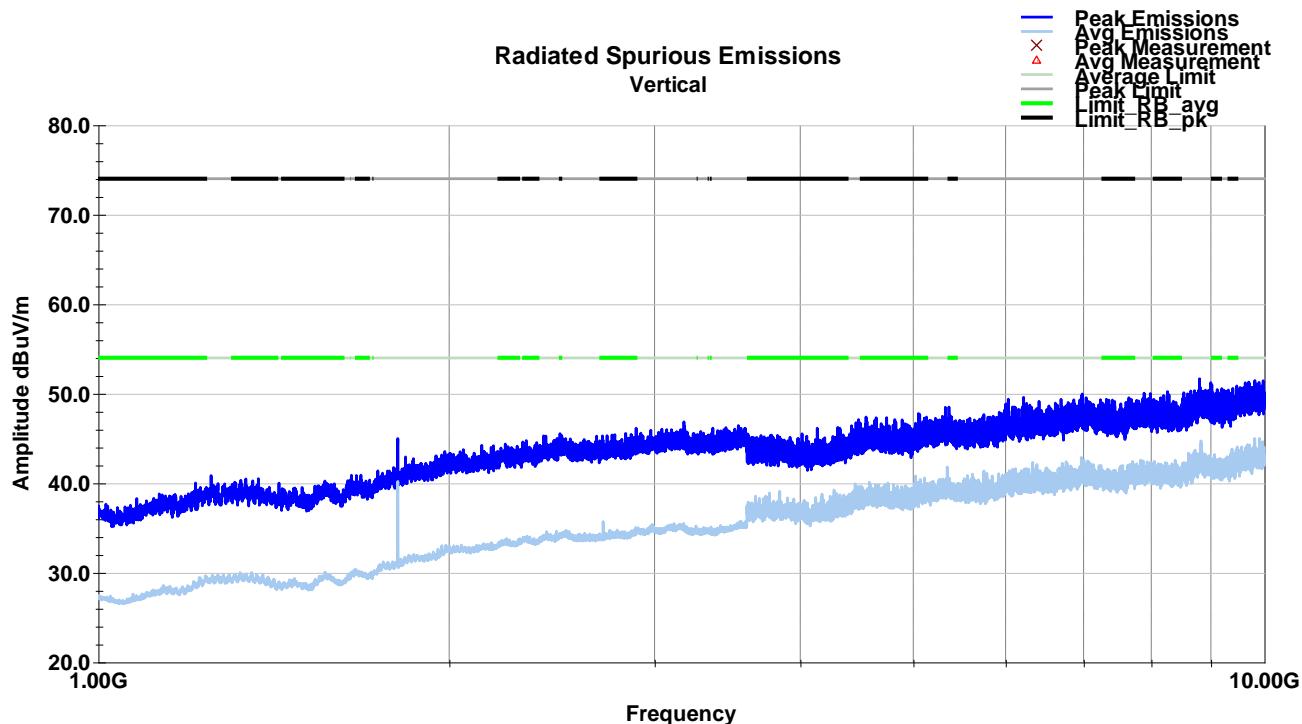


No spurious emissions were detected that were associated with the radio operation.

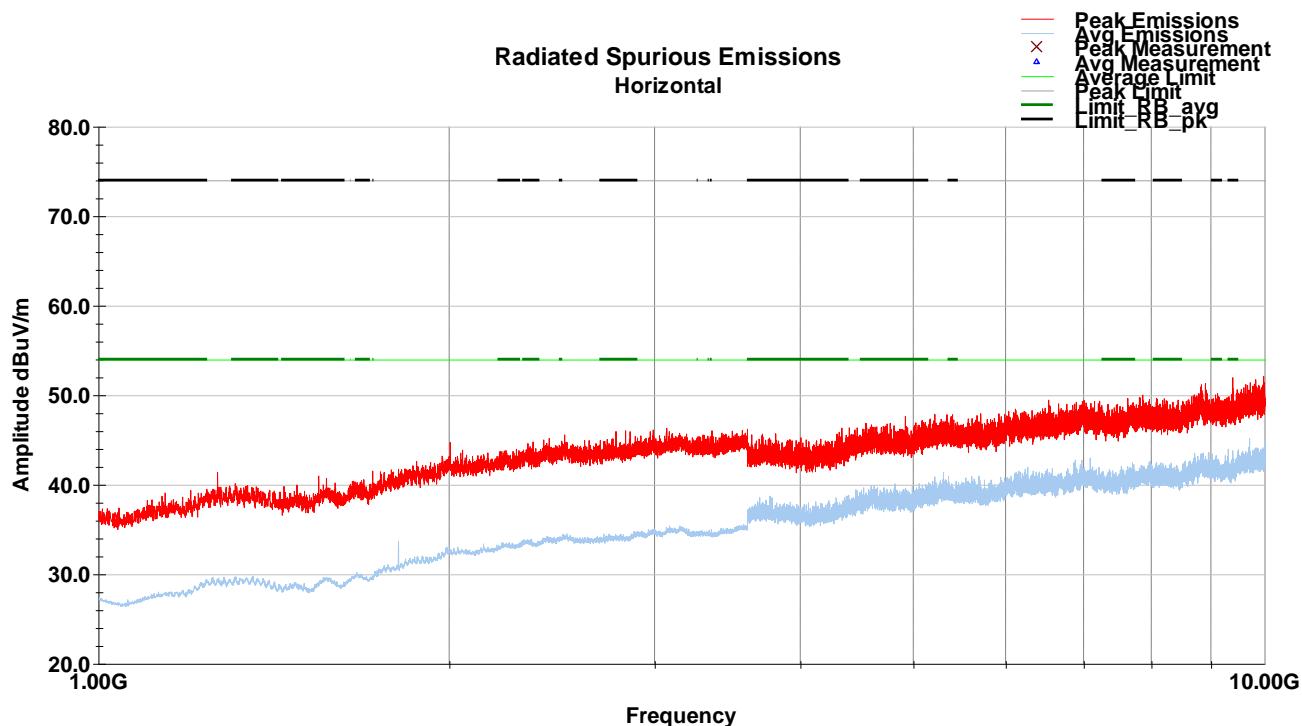
Low Channel (903.45MHz) 30-1000MHz - Horizontal Radiated Emissions – Peak Plot



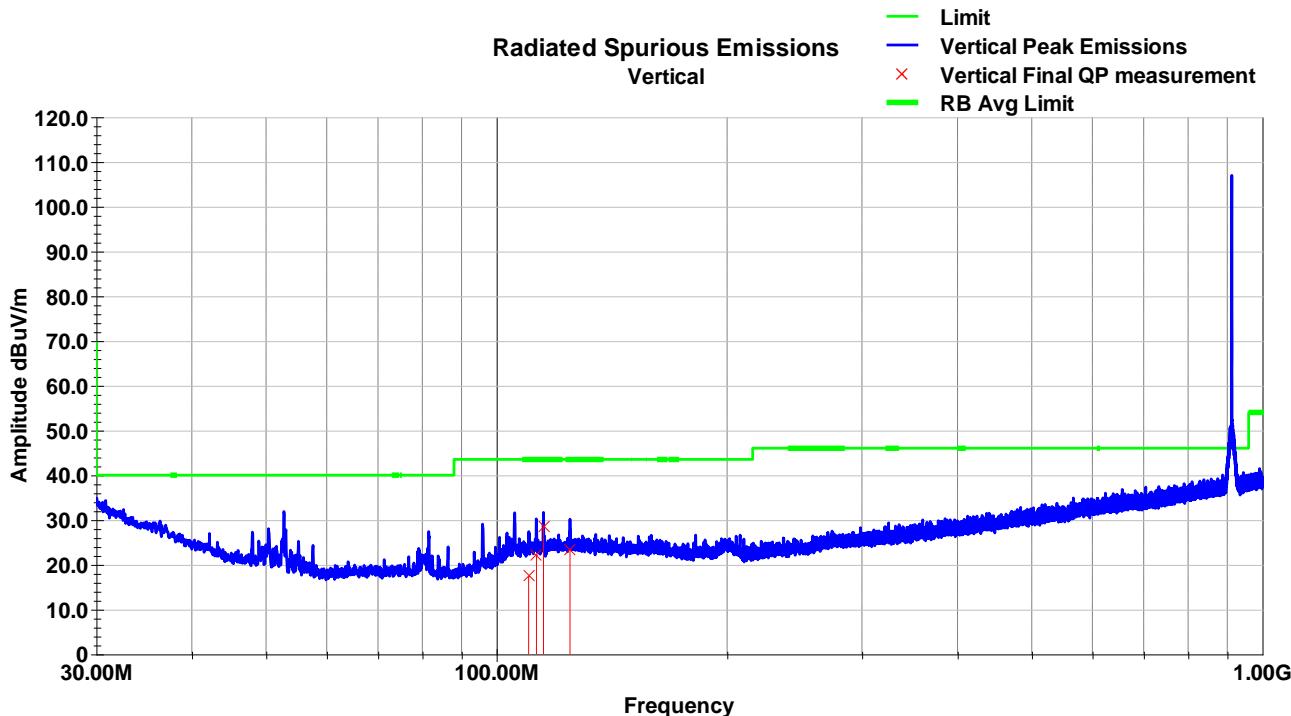
## Low Channel (903.45MHz) 1-10GHz – Vertical Radiated Emissions – Peak Plot



## Low Channel (903.45MHz) 1-10GHz – Horizontal Radiated Emissions – Peak Plot

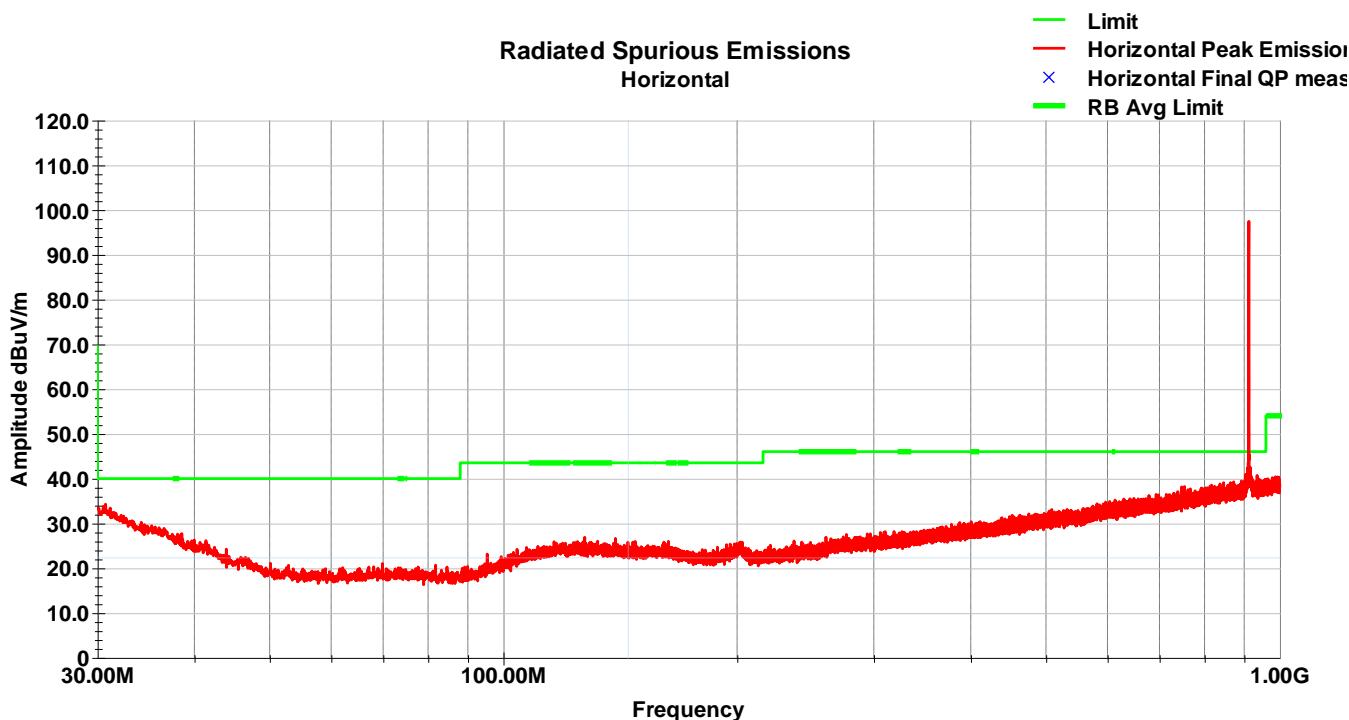


## Mid Channel (912.45MHz) 30-1000MHz - Vertical Radiated Emissions – Peak Plot

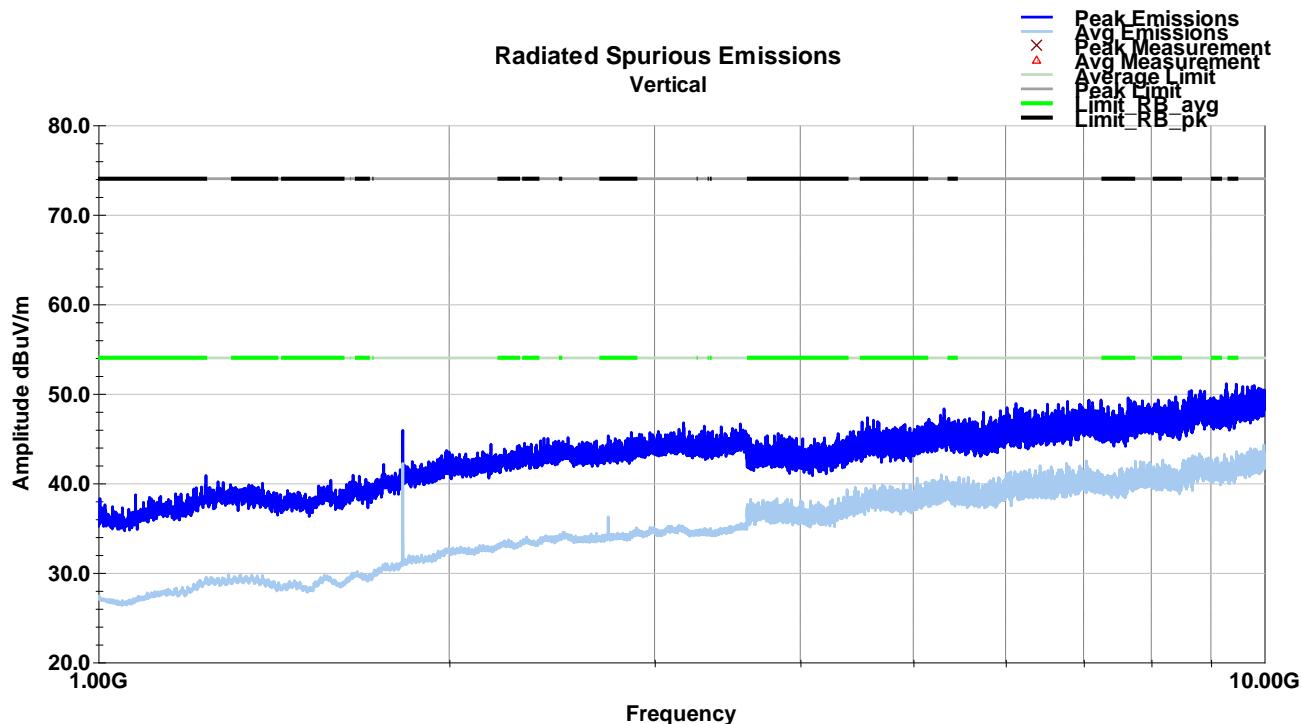


No spurious emissions were detected that were associated with the radio operation.

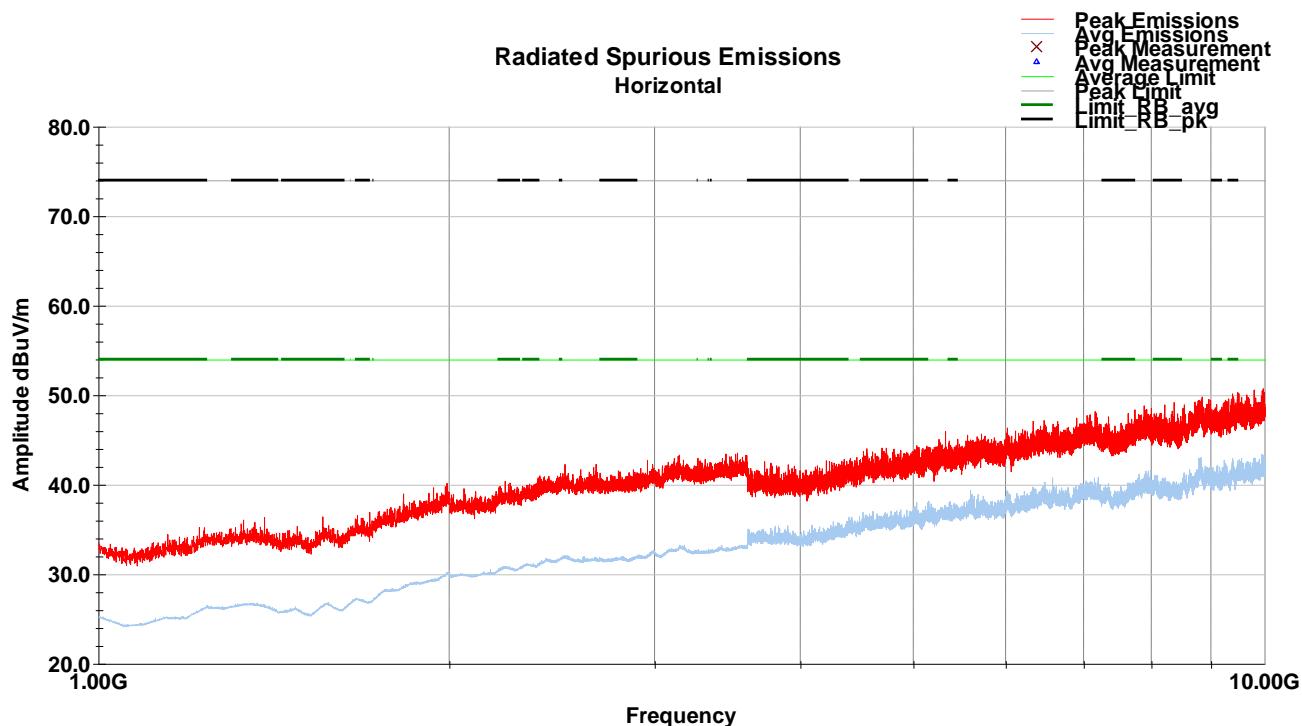
## Mid Channel (912.45MHz) 30-1000MHz – Horizontal Radiated Emissions – Peak Plot



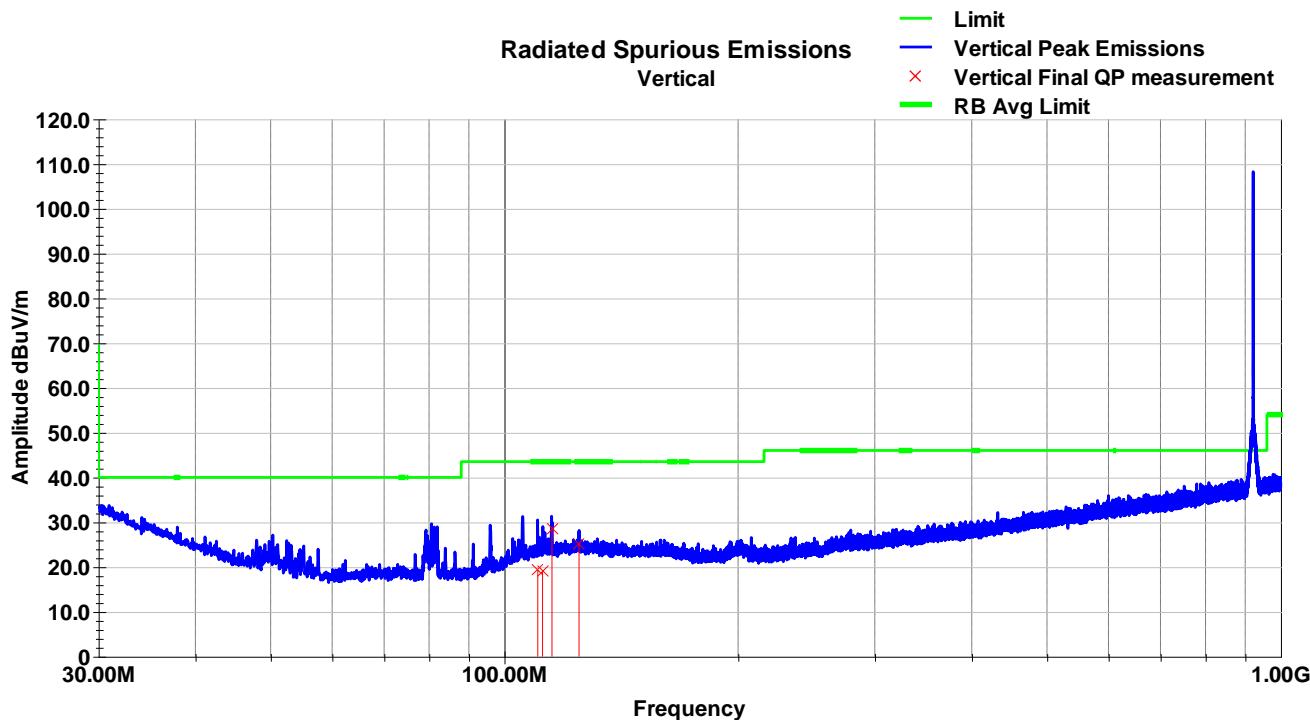
## Mid Channel (912.45MHz) 1-10GHz – Vertical Radiated Emissions – Peak Plot



## Mid Channel (912.45MHz) 1-10GHz – Horizontal Radiated Emissions – Peak Plot

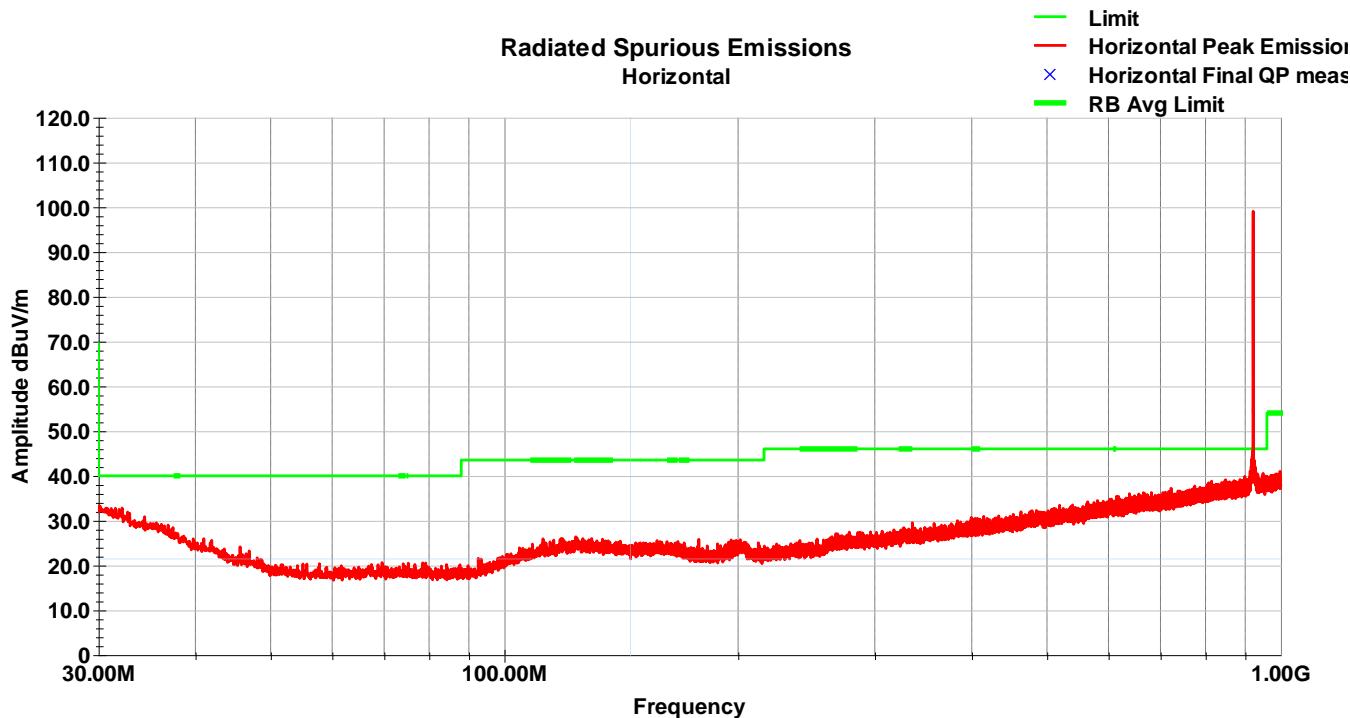


## High Channel (921.45MHz) 30-1000MHz - Vertical Radiated Emissions – Peak Plot

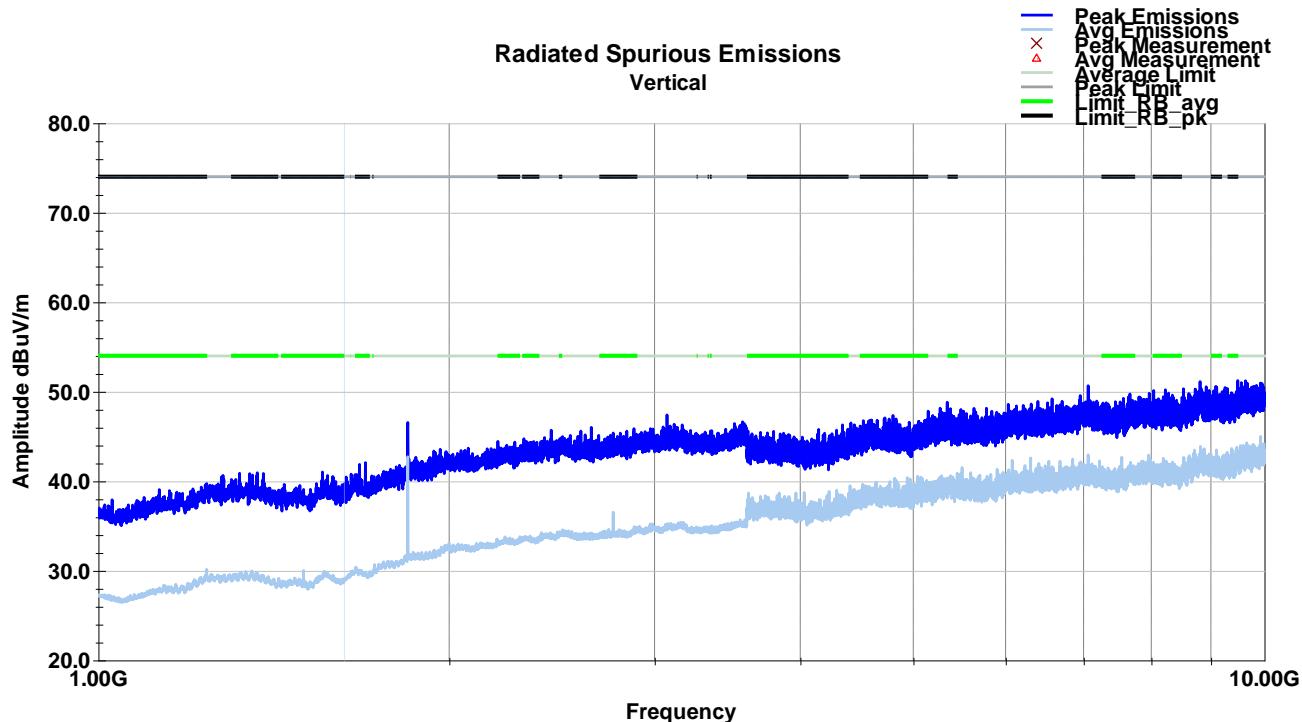


No spurious emissions were detected that were associated with the radio operation.

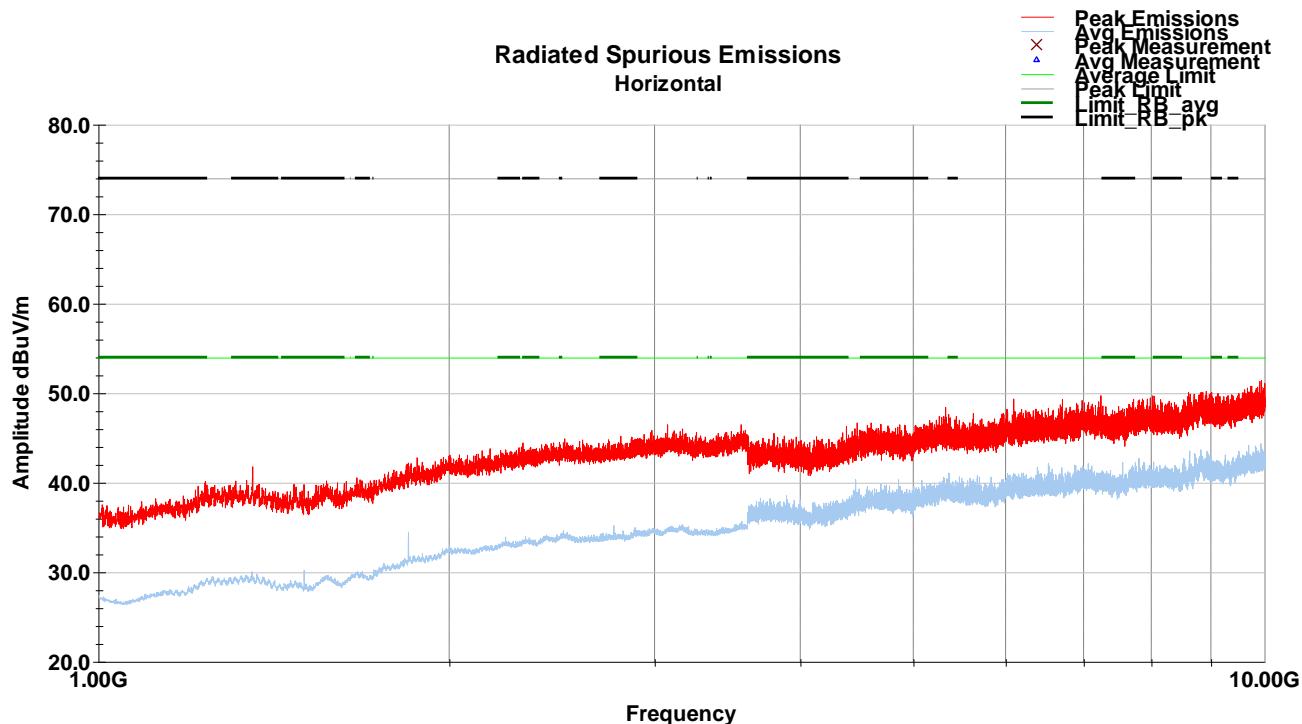
## High Channel (921.45MHz) 30-1000MHz - Horizontal Radiated Emissions – Peak Plot



## High Channel (921.45MHz) 1-10GHz - Vertical Radiated Emissions – Peak Plot



## High Channel (921.45MHz) 1-10GHz - Horizontal Radiated Emissions – Peak Plot



## 4 Revision History

| Revision Level | Description of changes   | Revision Date |
|----------------|--|---------------|
| 0              | Initial release  | 26 April 2022 |
| 1              | <ul style="list-style-type: none"><li>- Clarified antenna information (Section 2.3)</li><li>- Added Channel List (Section 2.4)</li></ul> | 23 May 2022   |
|                |  |               |
|                |  |               |
|                |  |               |
|                |  |               |
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|                |  |               |
|                |  |               |