



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

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Tested by:

Andrew Bluhm, EMC Engineer**Reviewed by:**

Jeremy Pickens, RF Lab Manager

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Occupied Bandwidth 20dB Bandwidth	15.247(a)(1)	RSS-247 5.1(a) RSS-GEN 6.7	NS ¹
Peak Power Output	15.247(a)(1)	RSS-247 5.4(b)	NS ¹
Carrier Frequency Separation	15.247(a)(1)	RSS-247 5.1(b)	NS ¹
Number of Hopping Channels	15.247(a)(1)(i)	RSS-247 5.1(d)	NS ¹
Dwell Time	15.247(a)(1)(i)	RSS-247 5.1(d)	NS ¹
Pseudo-Random Hop Sequence	15.247(a)(1)	RSS-247 5.1(a)	NS ¹
Conducted Spurious Emissions	15.247(d)	RSS-247 5.5	NS ¹
Radiated Spurious Emissions	15.35(b), 15.209	RSS-GEN 8.10	Compliant
Antenna Requirement	15.203	RSS-GEN 6.8	Compliant ²
AC Powerline Conducted Emissions	15.107, 15.207	RSS-GEN 8.8	NA ³

- 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

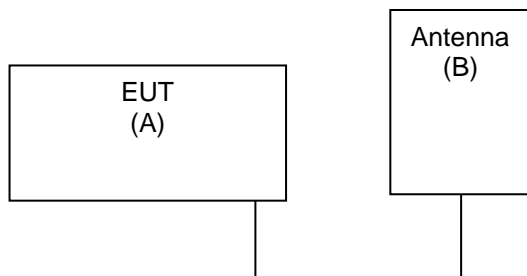
2.4 Channel List

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 / 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	Compliant

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 ⁽¹⁾		Peak Limits dBuV/m
	Microvolts/m	dBuV/m	
30 - 88 MHz	100	40 ⁽²⁾	--
88 - 216 MHz	150	43.5 ⁽²⁾	--
216 - 960 MHz	200	46 ⁽²⁾	--
960 - 1000 MHz	500	54 ⁽²⁾	--
1 - 40 GHz	500	54 ⁽³⁾	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

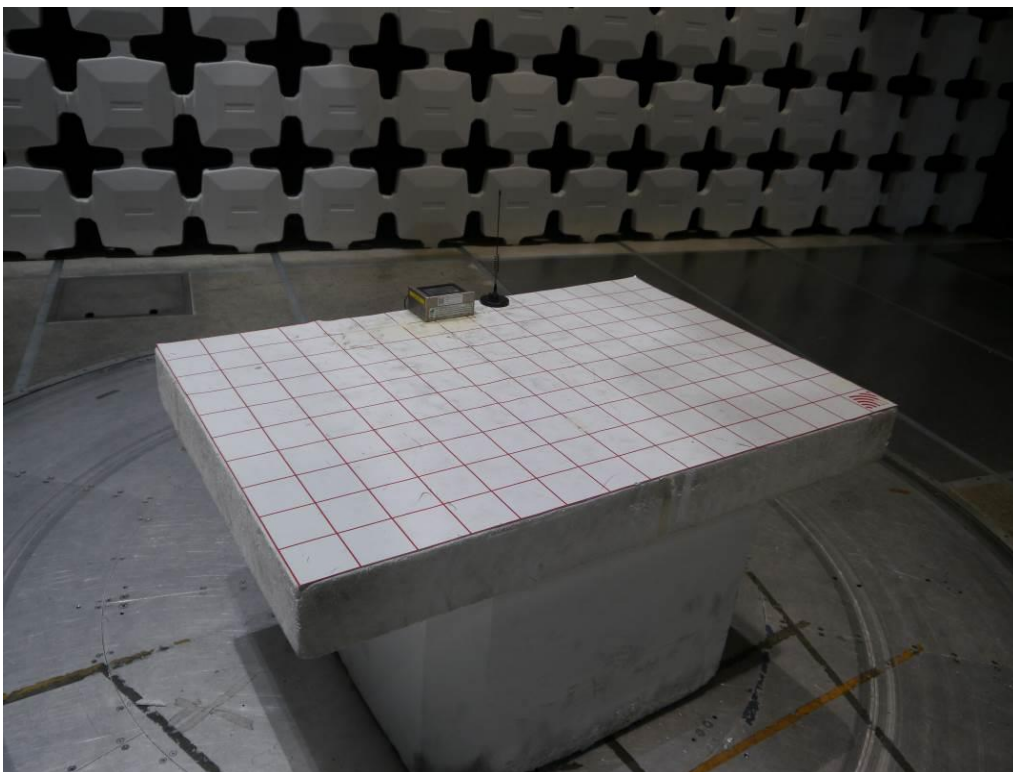
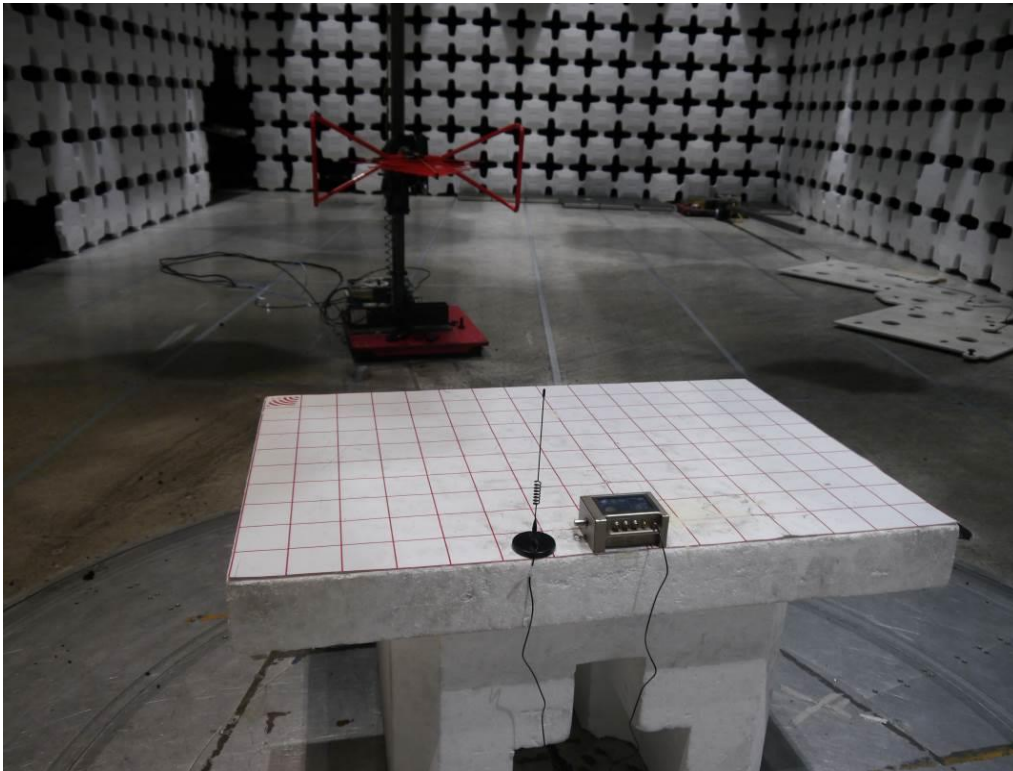
Note: Refer to the table for calibration intervals.

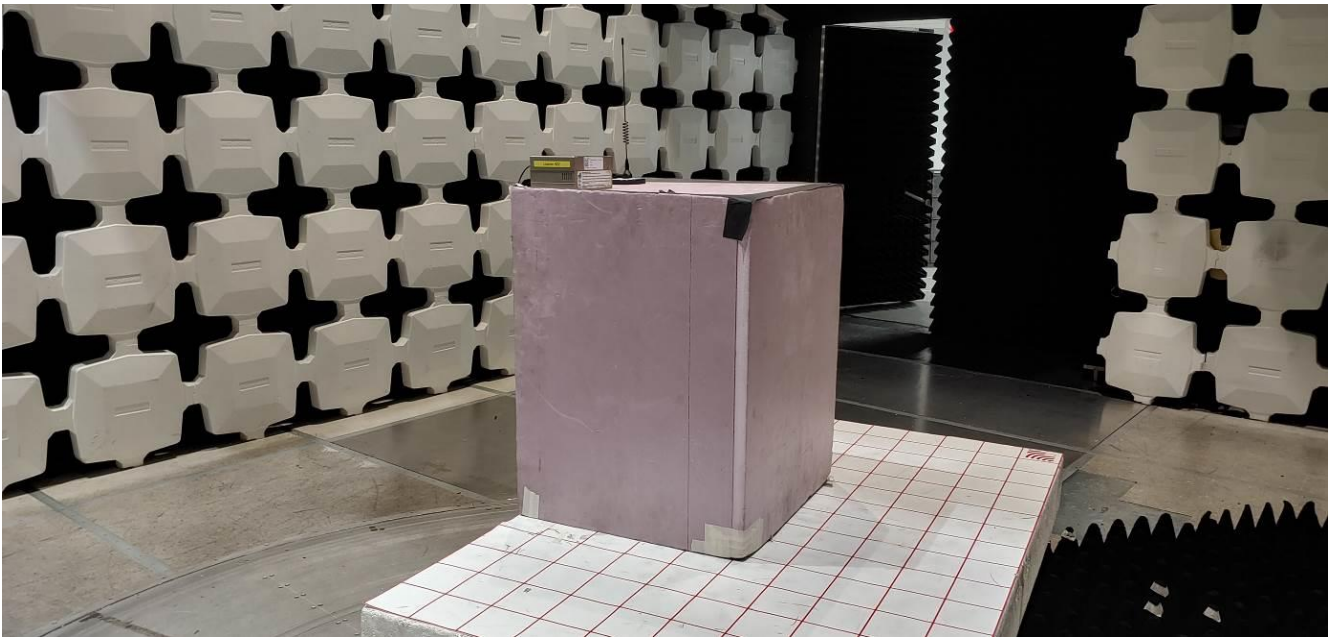
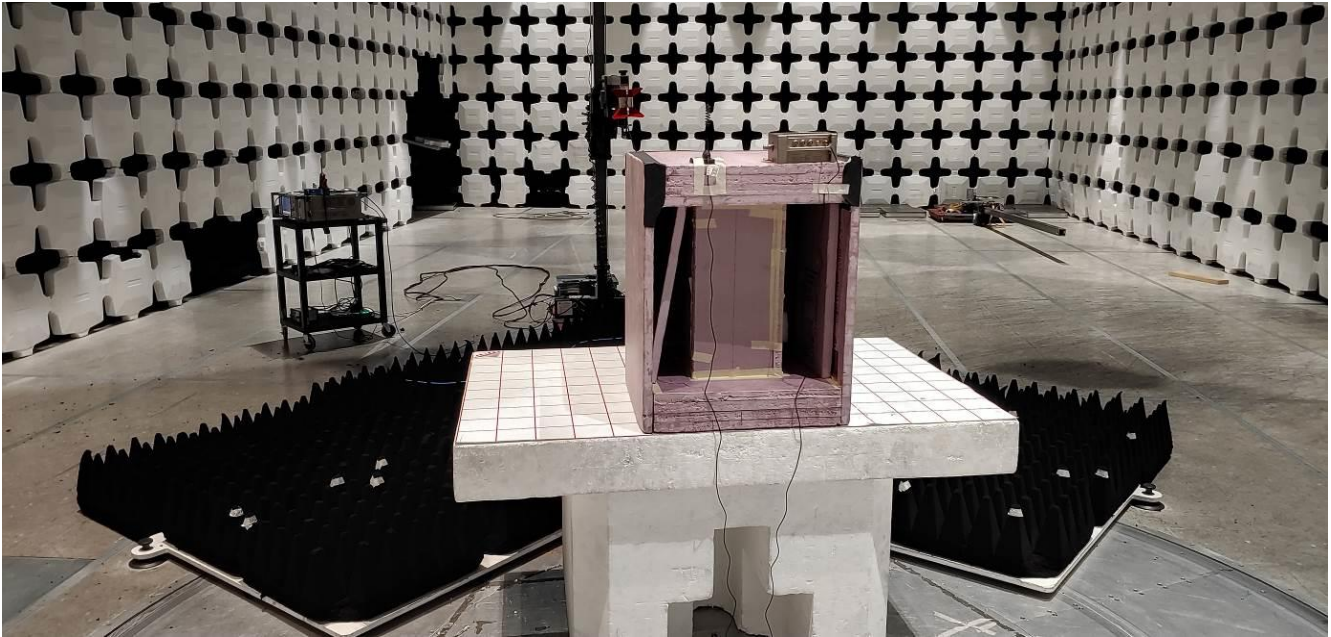
Software:

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

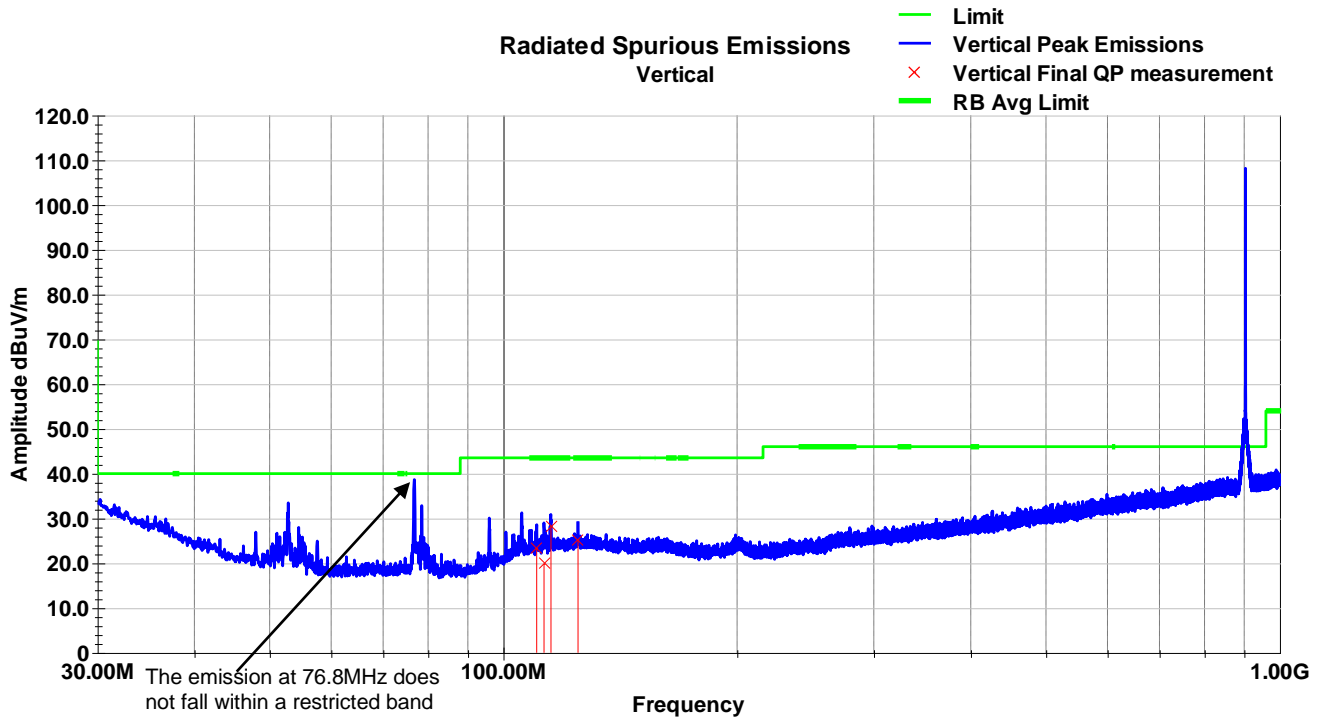
3.5 Test Setup Photographs





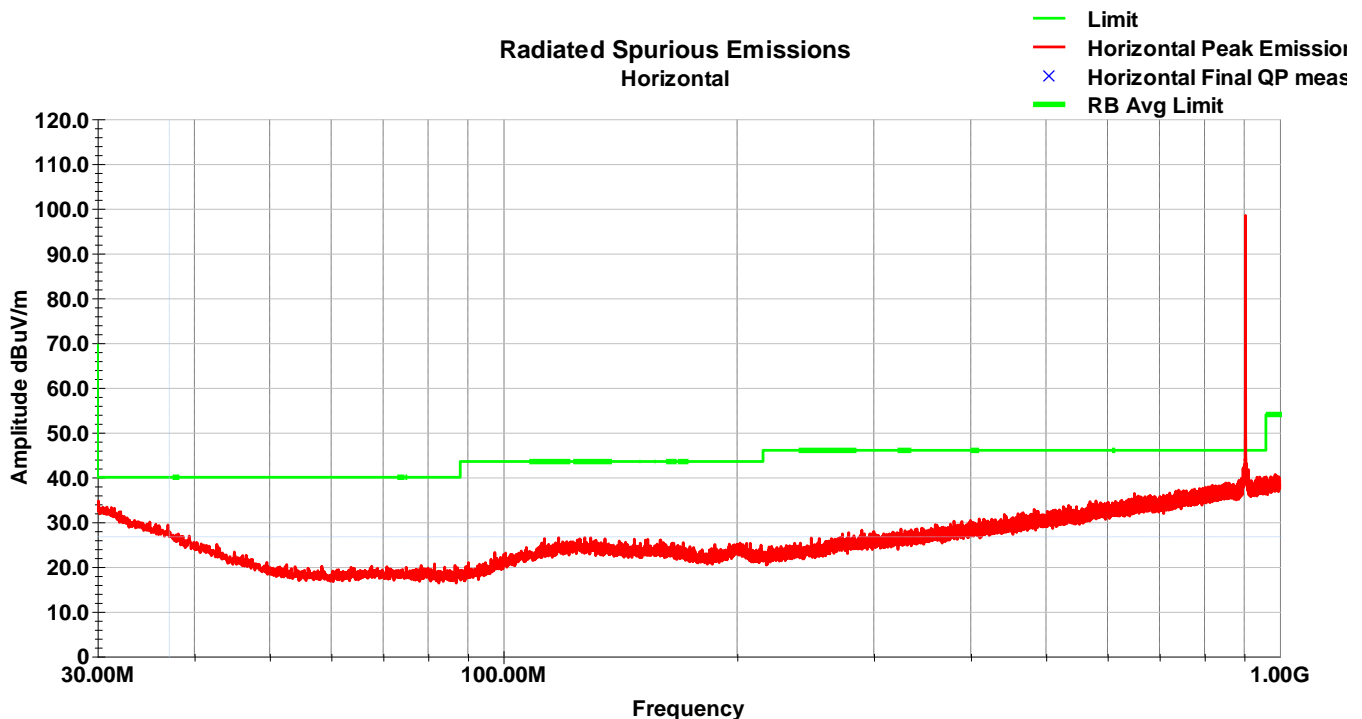
3.6 Test Data

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

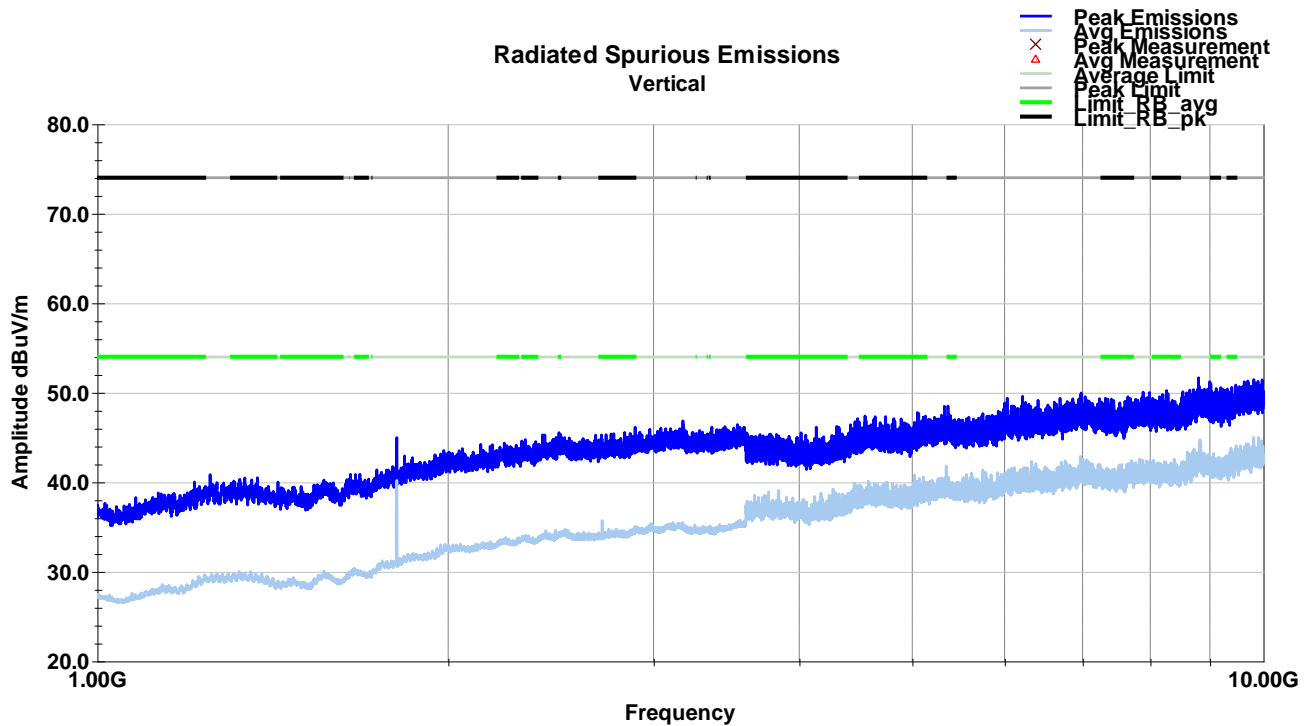


No spurious emissions were detected that were associated with the radio operation.

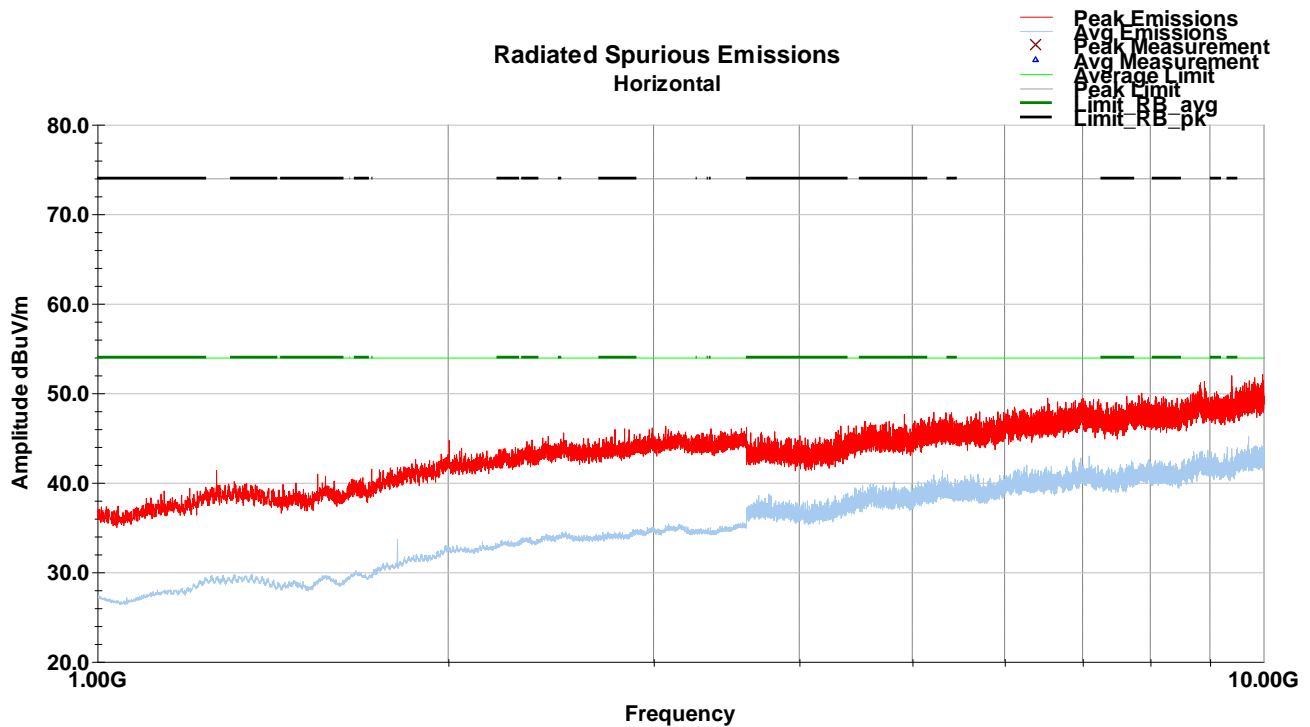
Low Channel (903.45MHz) 30-1000MHz - Horizontal Radiated Emissions – Peak Plot



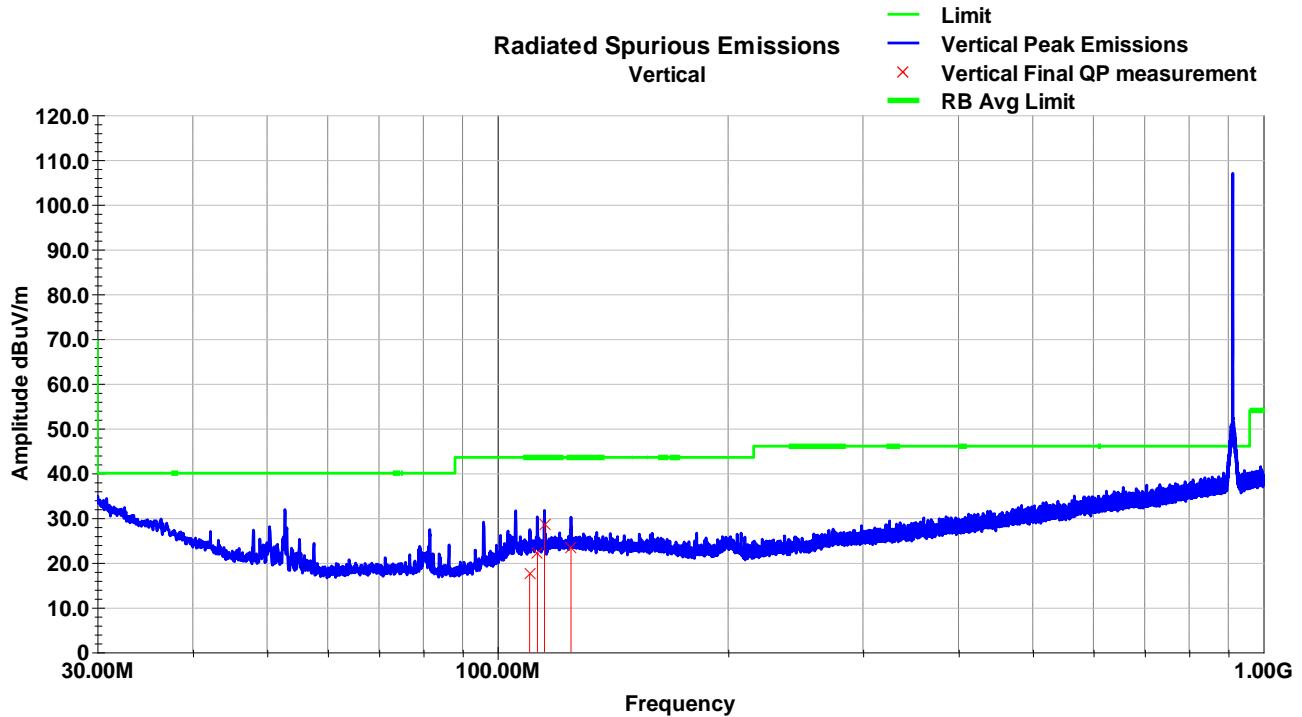
Low Channel (903.45MHz) 1-10GHz – Vertical Radiated Emissions – Peak Plot



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

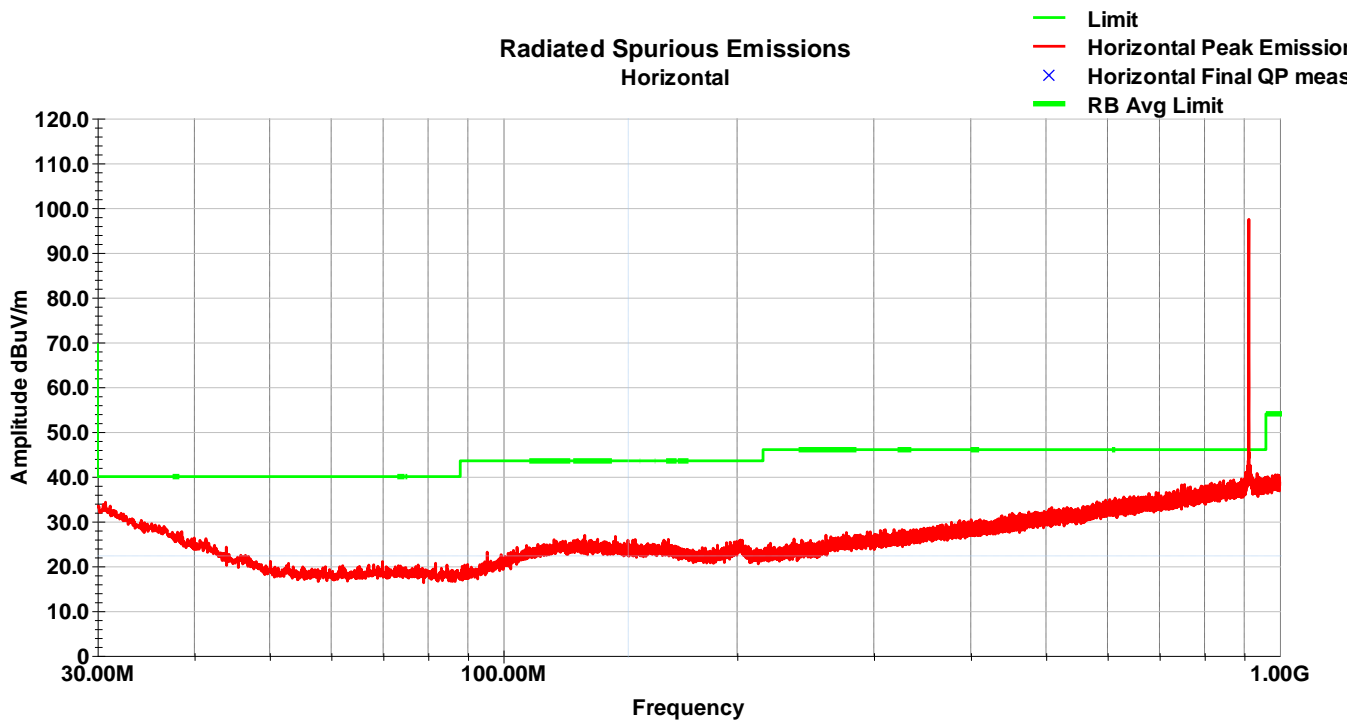


Mid Channel (912.45MHz) 30-1000MHz - Vertical Radiated Emissions – Peak Plot

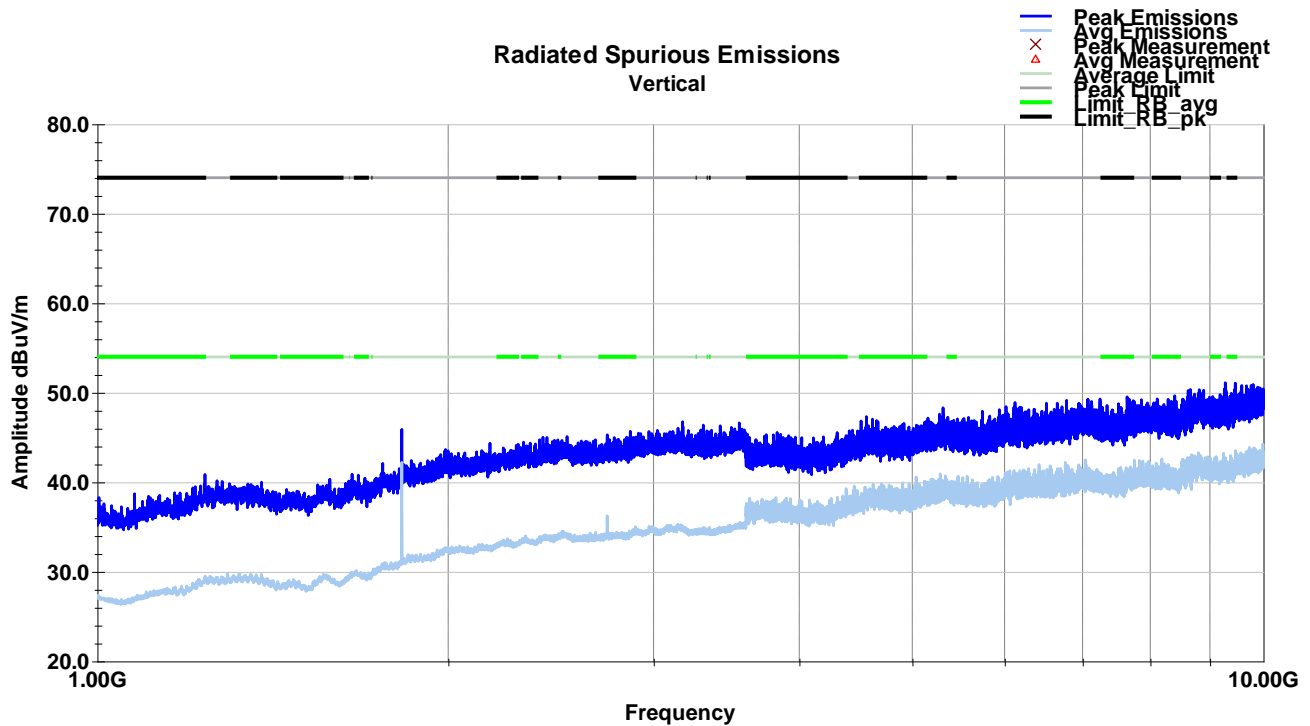


No spurious emissions were detected that were associated with the radio operation.

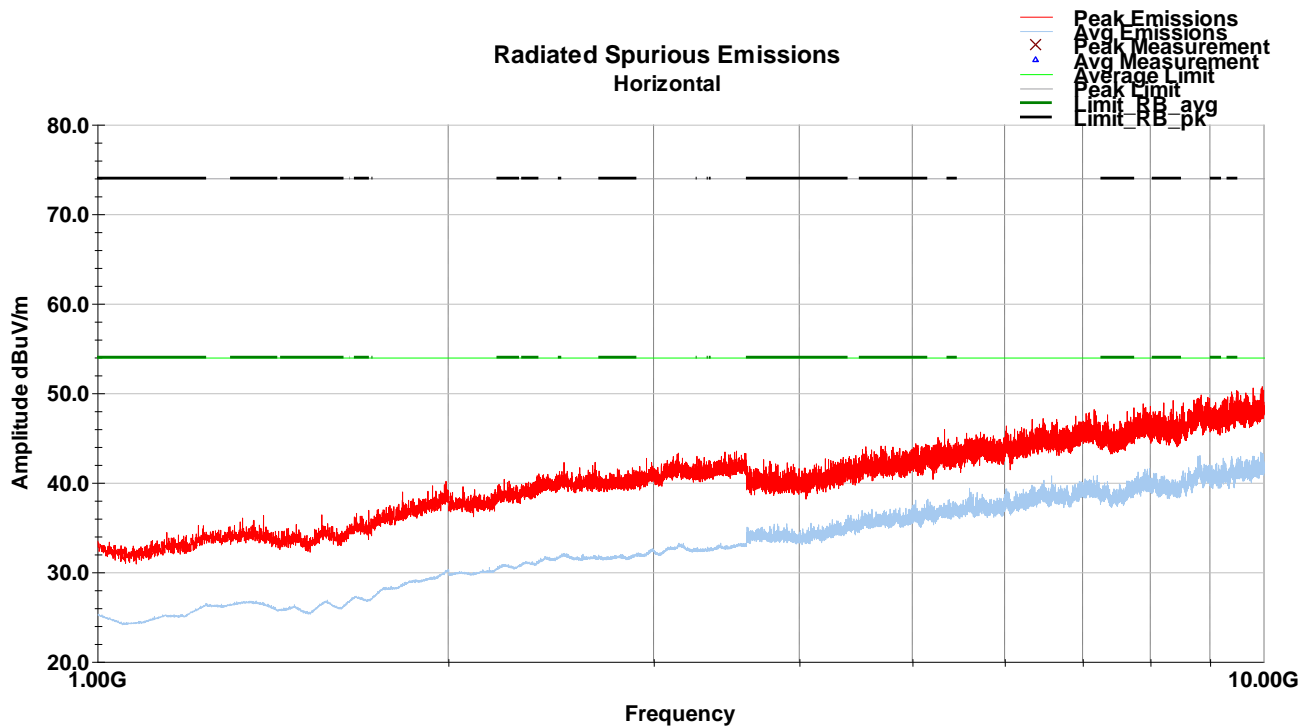
Mid Channel (912.45MHz) 30-1000MHz – Horizontal Radiated Emissions – Peak Plot



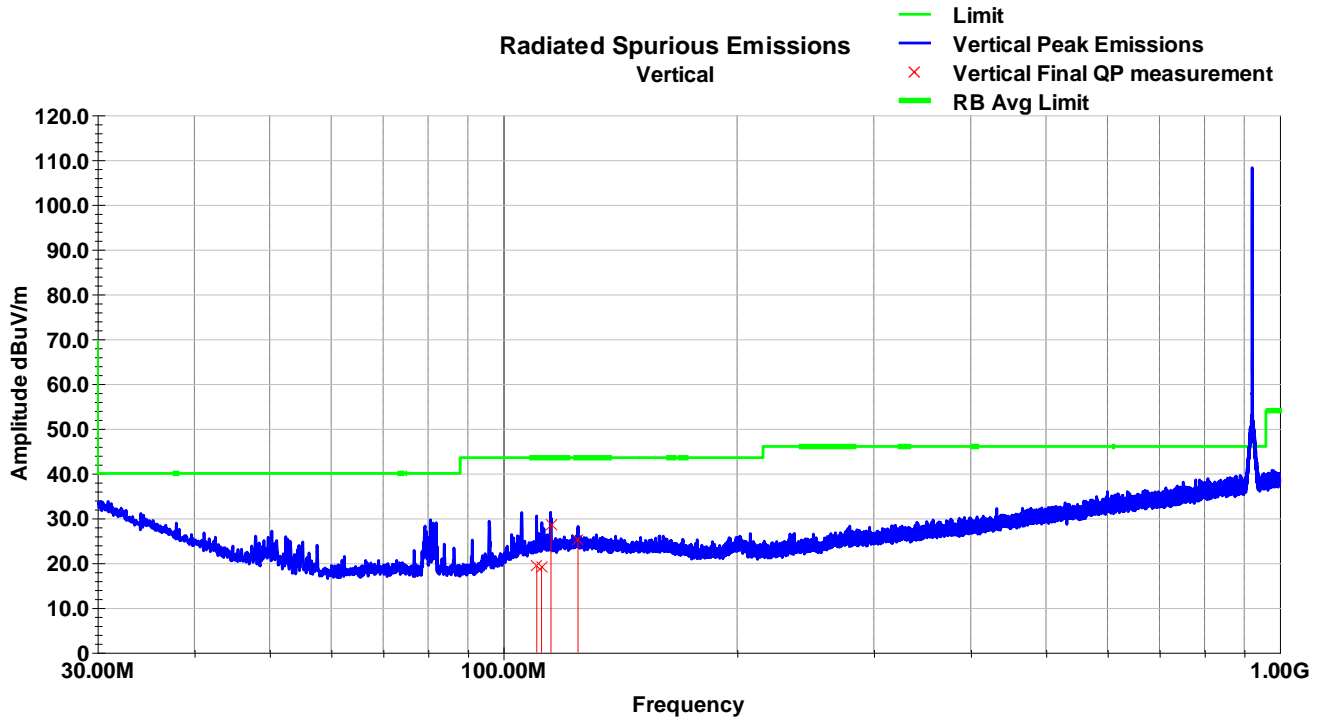
Mid Channel (912.45MHz) 1-10GHz – Vertical Radiated Emissions – Peak Plot



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

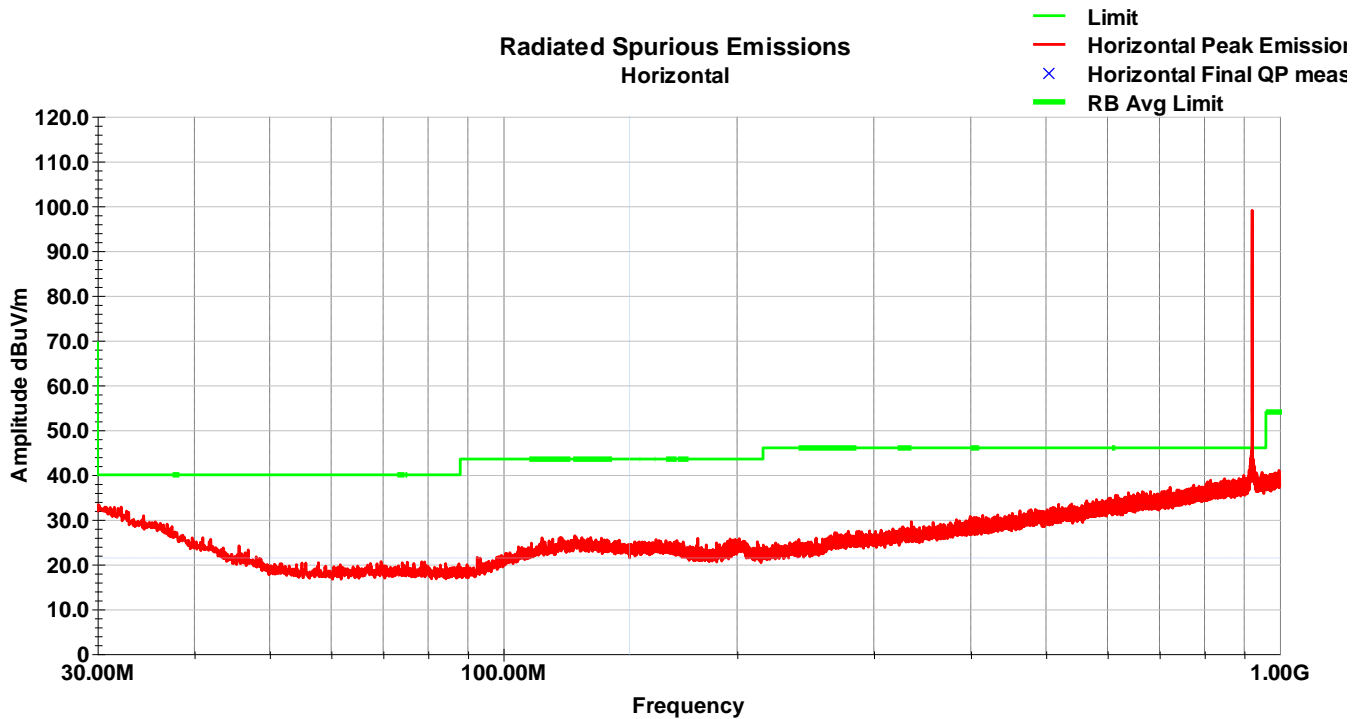


High Channel (921.45MHz) 30-1000MHz - Vertical Radiated Emissions – Peak Plot

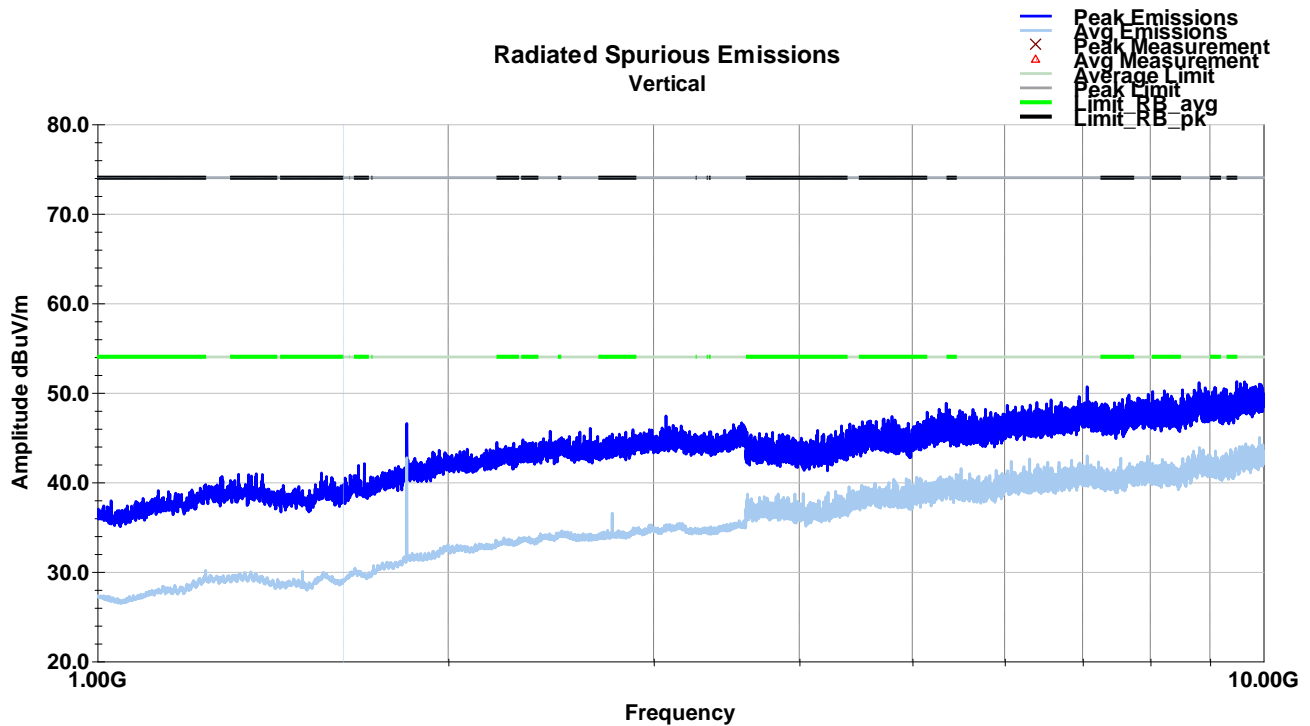


No spurious emissions were detected that were associated with the radio operation.

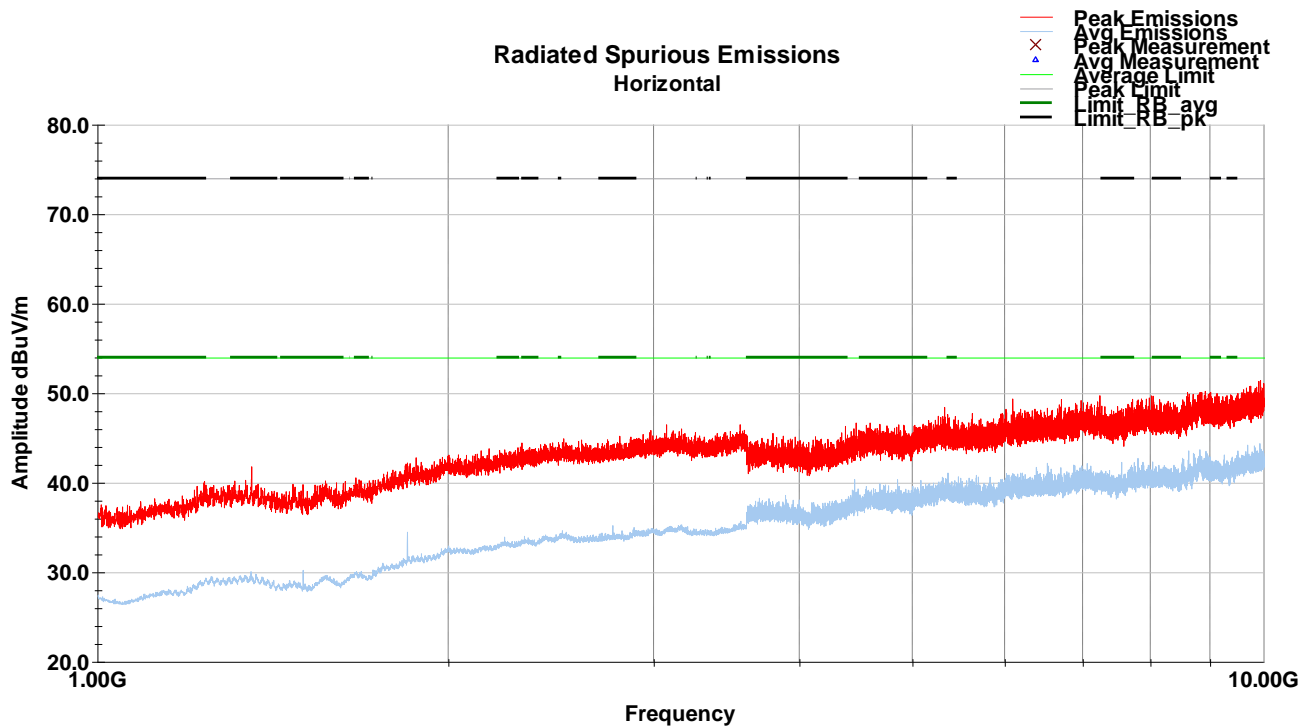
High Channel (921.45MHz) 30-1000MHz - Horizontal Radiated Emissions – Peak Plot



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"> - Clarified antenna information (Section 2.3) - Added Channel List (Section 2.4) 	23 May 2022