

EMC Test Report

Class II Permissive Change

Project Number: 4627265

Report Number: 4627265EMC01

Revision Level: 0

Client: 3SI Security Systems Inc.

Equipment Under Test: Wireless Tracking Device

Model Number: AT170503A

FCC ID: Q6KAT170503A

IC ID: 5043A-AT170503A

FCC Rule Parts: FCC 47 CFR Part 95

RSS-210, Issue 10

RSS-GEN, Issue 4

ANSI C63.26-2015

Report issued on: 1 June 2020

Test Result: Compliant

Tested by:


Shawn McGuinness EMC Engineering Leader

Reviewed by:


David Schramm, Operations Manager

Remarks: This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Output Power	FCC 47 CFR §95.2167(a)	RSS-210 Annex C.2(a)	Compliant
Channel Plan	FCC 47 CFR §95.2163	RSS-210, Annex C2(b)	Compliant
Frequency Stability	FCC 47 CFR §95.2165	RSS-210, Annex C2(b)	Not in scope ¹
Unwanted Emissions	FCC 47 CFR §95.2179	RSS-210 Annex C.2(d) RSS-210, 8.9	Compliant
Unwanted emissions in restricted frequency bands	--	RSS-210, Annex C.2(c) RSS-GEN, 8.10	Not applicable
Occupied Bandwidth	FCC 47 CFR §2.1049	RSS-GEN, 6.7	Not in scope ¹
AC power-line conducted emissions	--	RSS-GEN, 8.8	Not applicable

Note 1: Measurement not needed for this application for Class II Permissive Change.

1.1 *Modifications Required for Compliance*

None

2 General Information

2.1 Client Information

Name: 3SI Security Systems Inc.
 Address: 2055 N Brown Rd, Ste 225
 City, State, Zip, Country: Lawrenceville, GA 30043, USA

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
 FCC Designation number: US1126
 ISED CAB identifier: US0186
 ISED site number: 9984A

2.2.1 Environmental Conditions over duration of testing

	Min	Max
Temperature:	24.5 °C	25.6 °C
Relative Humidity:	46.8 %	53.9%

2.2.2 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	Conduction emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
5	RF conducted power	$\pm 0.75\text{dB}$
6	RF power density	$\pm 2.84\text{dB}$
7	Conducted Spurious emissions	$\pm 0.75\text{dB}$
8	RF Radiated power	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
9	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
10	Temperature test	$\pm 1^\circ\text{C}$
11	Humidity test	$\pm 3\%$
12	Supply voltages	$\pm 1.5\%$
13	Time	$\pm 3\%$

2.3 **General Information of EUT**

Type of Product: Wireless Tracking Device
Product Marketing Name (PMN): ATM Tracker/Cell Battery Tracker
Model Number (HVIN): AT170503A
Firmware Version ID: 13.2.41741
IMEI: 352753092914363

Transmit Frequency: 216.025 to 216.975MHz
Antenna: PCB Trace
Power Setting: 0.5 dBm (conducted)
Number of Channels: 20 Channels §95.2163 LPRS channels. Section B
Modulation type: Pulsed CW

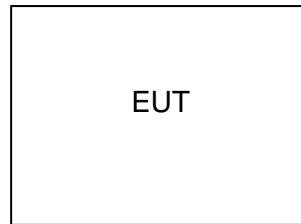
Rated Voltage: 3.7Vdc Battery
Tested Voltage: 3.7Vdc Battery

Sample Received Date: 21 May2020
Dates of testing: 21 May 2020

2.4 **Operating Modes and Conditions**

During testing, the device was placed in test mode to transmit continuously at 100% duty cycle. The device output power in test mode is equivalent to normal operation. Normal operation uses a 20% duty cycle, (200ms on 800ms off).

2.5 EUT Connection Block Diagram



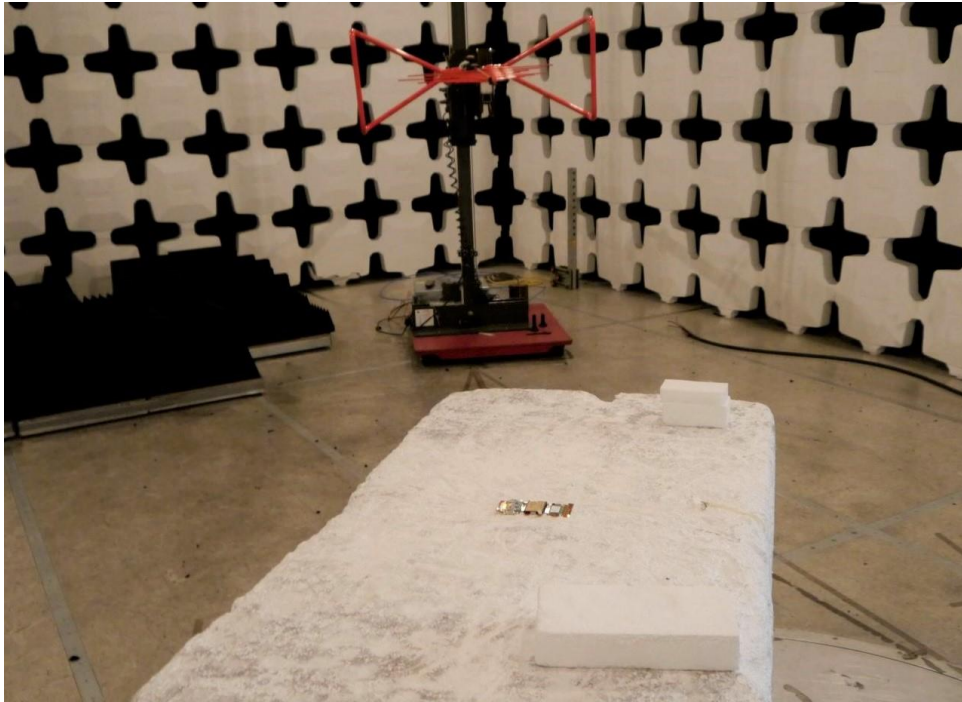
2.6 System Configurations

Device reference	Manufacturer	Description	Model Number	IMEI
A	3SI Security	Wireless Tracking Device	AT170503A	352753092914363

2.7 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
None						

2.8 Test Photograph



2.9 EUT Photograph



2.10 Test Equipment

Test End Date: 21-May-2020

Tester: SKM

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	7-May-2021
RF Cable Nm to Nm, 0.01-18GHz	90-195-354	TELEDYNE STORM MICROWAVE	20120	2-Mar-2021
RF Cable Nm to Nf, 0.01-18GHz	90-213-118	TELEDYNE STORM MICROWAVE	20117	2-Mar-2021
RF Cable Nm to Nm, 0.01-18GHz	90-195-118	TELEDYNE STORM MICROWAVE	20126	2-Mar-2021
RF CABLE	104PE	HUBER & SUHNER	B079793	5-Sep-2020
LOW NOISE AMPLIFIER	ZKL-2+	Mini-Circuits	B079800	16-Sep-2020

Note: The equipment calibration period is 1 year.

3 Effective Radiated Power

3.1 Test Result

Test Description	Test Specification	Test Result
Effective Radiated Power	§95.2167(a) RSS-210 Annex C.2(a)	Compliant

3.2 Test Method

Radiated ERP measurements were performed according to ANSI C63.26-2015, Section 5.2. 7.

For compliance with the FCC rules, the ERP of an LPRS transmitter must not exceed 100 mW.
 Example calculations: $ERP \text{ (dBm)} = L + AF + CL - PA - 95.2 - 2.14$

For compliance with RSS-210, the peak output power and e.i.r.p. shall not exceed 100 mW and 160 mW, respectively.

Example calculations: $EIRP \text{ (dBm)} = L + AF + CL - PA - 95.2$

L: Level taken from spectrum analyzer in dBuV

AF: Antenna Factor in dB/m

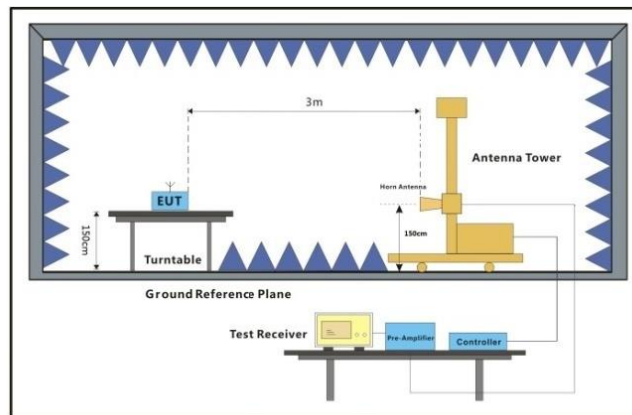
CL: Cable loss in dB

PA: Preamplifier in dB

The factor for converting from field strength at 3m to EIRP is 95.2.

The factor for converting from EIRP to ERP is -2.14.

3.3 Test Setup Diagram



Above 1GHz

3.4 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

3.5 Test Data

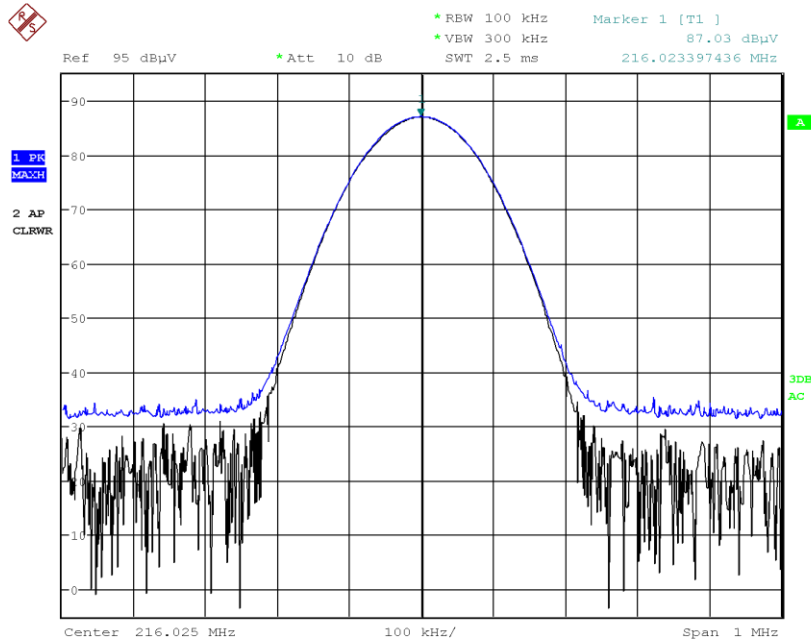
Data recorded for Conducted Power

Frequency (MHz)	Measured Power ERP (dBm)	Measured Power ERP (mW)	ERP Limit (mW)	Result
216.475	-24.13	0.00386	100	Pass
216.025	-24.37	0.00366	100	Pass
216.975	-23.81	0.00416	100	Pass

Data recorded for EIRP

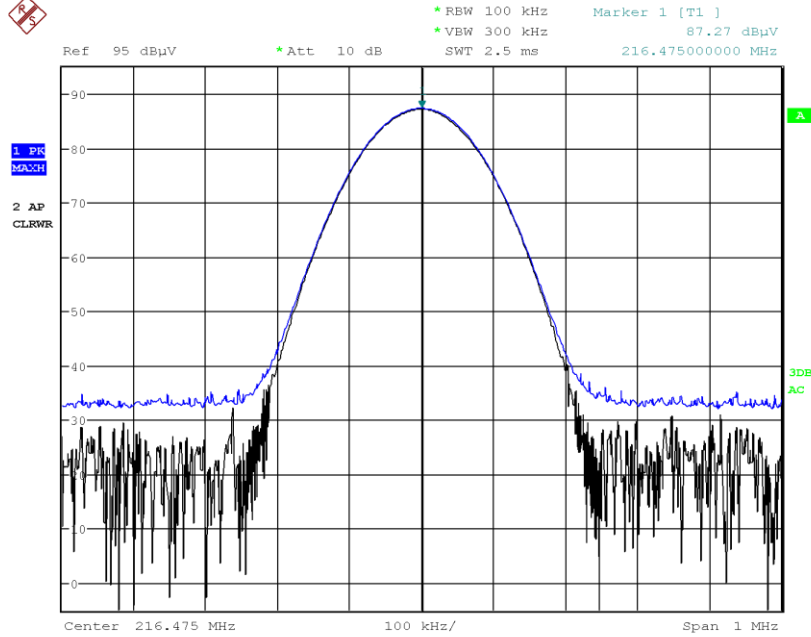
Frequency (MHz)	Measured Power EIRP (dBm)	Measured Power EIRP (mW)	EIRP Limit (mW)	Result
216.475	-21.99	0.00632	160	Pass
216.025	-22.23	0.00598	160	Pass
216.975	-21.67	0.00681	160	Pass

Low Channel – 216.025 MHz



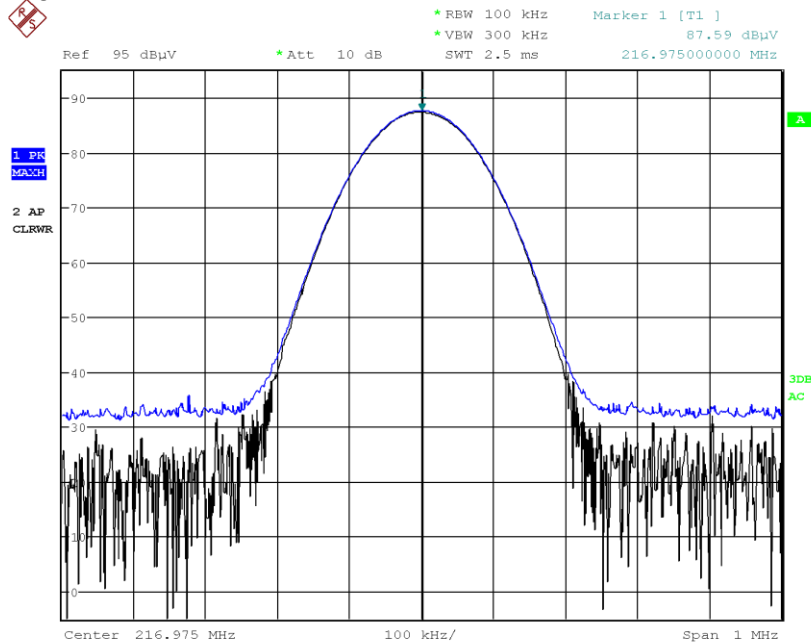
Date: 21.MAY.2020 11:32:43

Mid Channel – 216.475 MHz



Date: 21.MAY.2020 11:01:58

High Channel – 216.975 MHz



Date: 21.MAY.2020 11:41:25

4 Radiated Spurious Emissions

4.1 Test Result

Test Description	Test Specifications	Test Result
Radiated spurious emissions	§95.2179 RSS-210 Annex C.2(d)	Compliant

4.2 Test Method

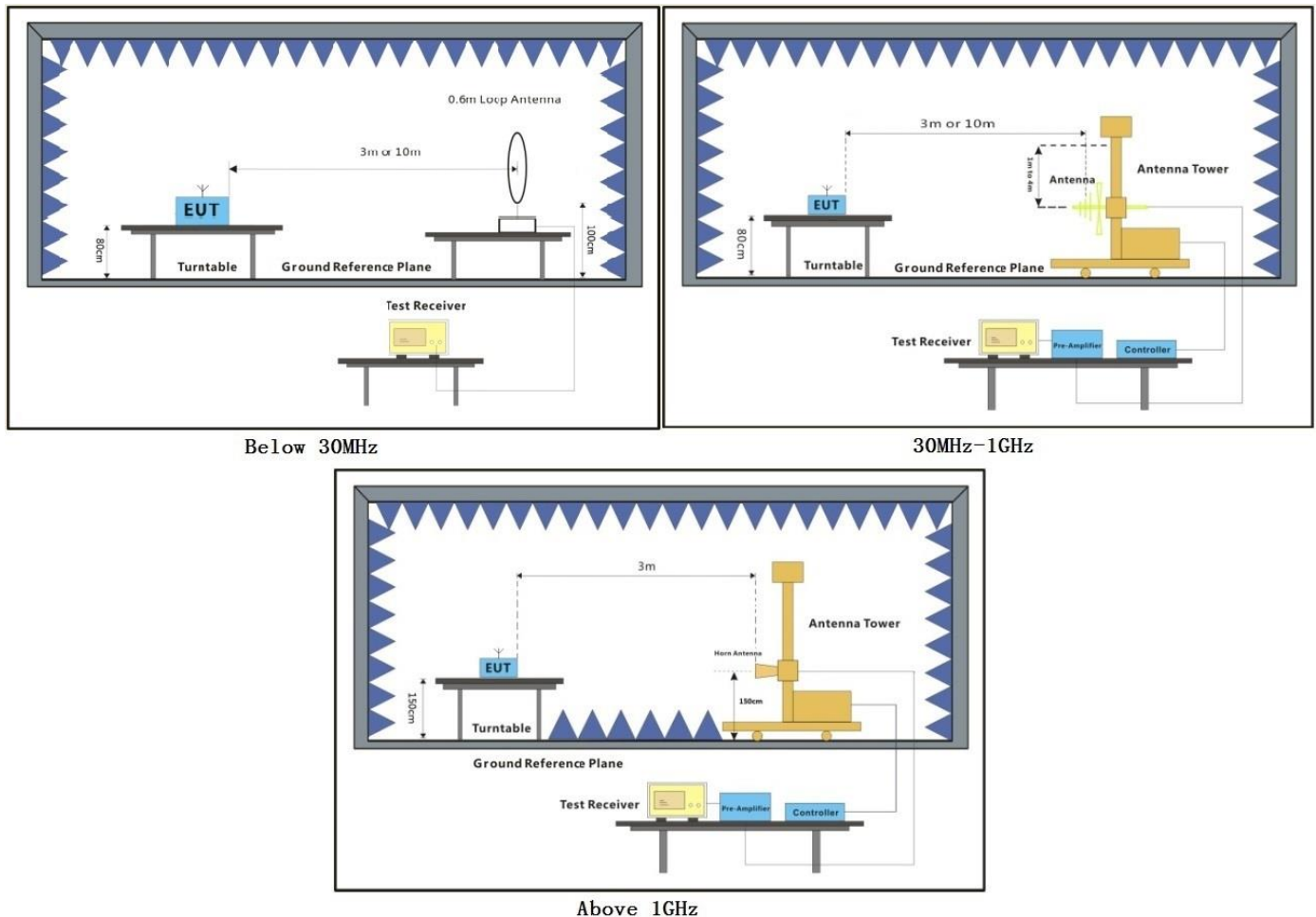
Radiated spurious emissions measurements were performed according to ANSI C63.26-2015, Section 5.5. EUT was tested at 3 meters distance.

Limit:

The attenuation requirements are:

- 1) $43 + 10 \log(P)$ dB on any frequency removed from the channel center frequency by more than 35 kHz (Per Section 95.2179 of the FCC rules)
- 2) $55 + 10 \log_{10} p$ dB or to the general field strength limits specified in RSS-Gen, whichever is less stringent, for emissions at frequencies more than 35 kHz away from the channel center frequency. (Per RSS-210, Annex C.2)

4.3 Test Setup Diagram

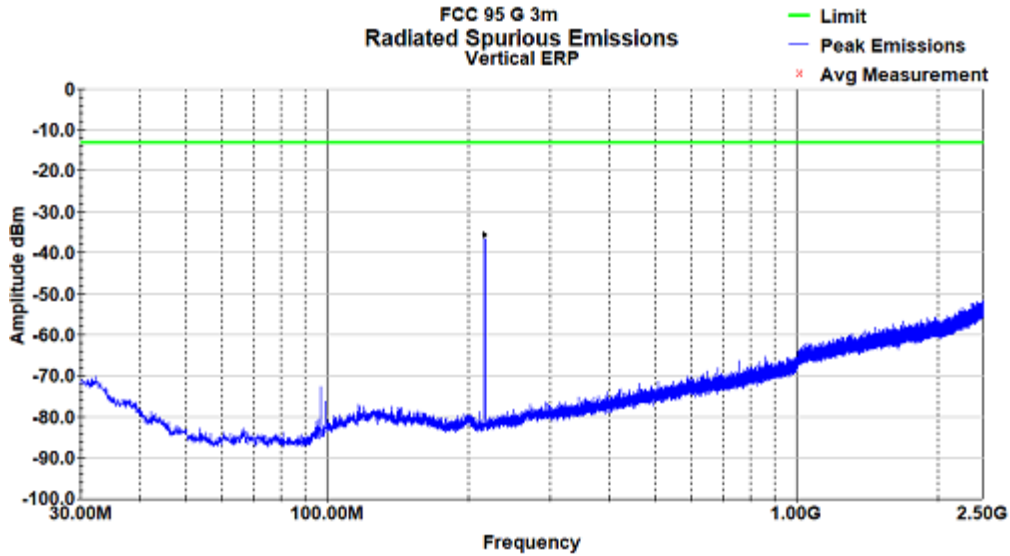


4.4 **Test Site**

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

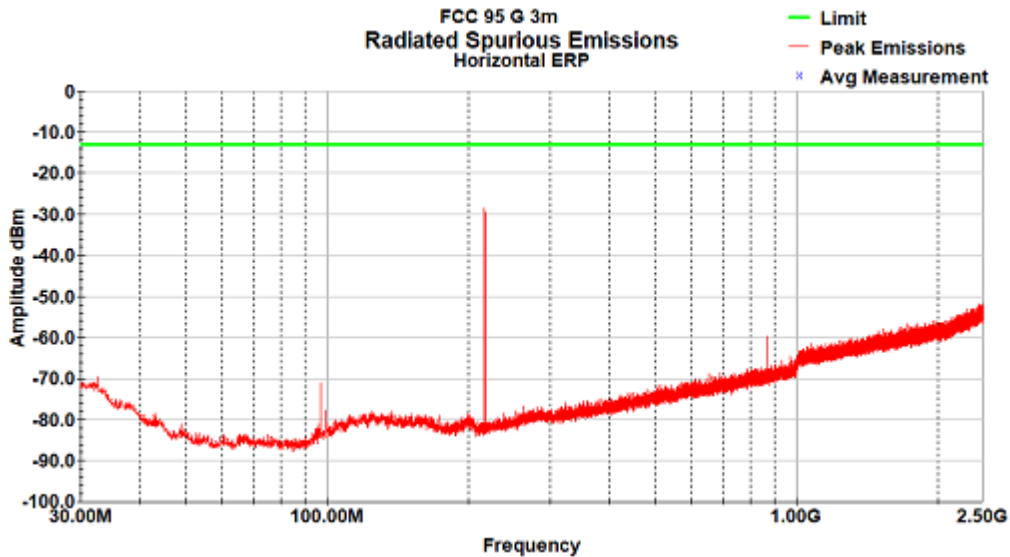
4.5 Test Data

Vertical Radiated Emissions 216.975MHzPlot (30-2500MHz)



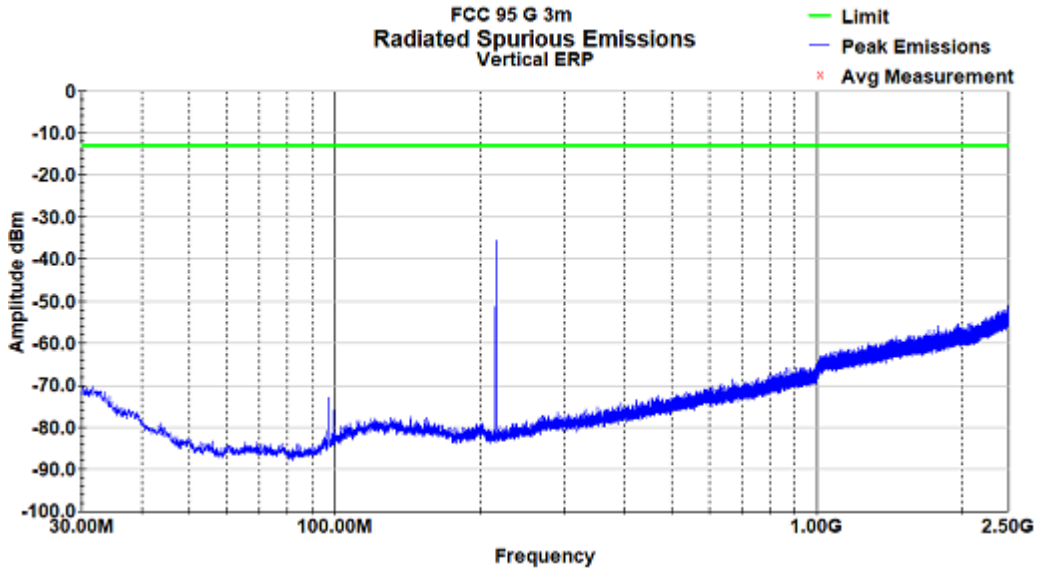
The limit line for RSS-210 Annex C, Mask D, is -25 dBm for $f_d > 3.75$ kHz

Horizontal Radiated Emissions Plot (30-2200MHz)



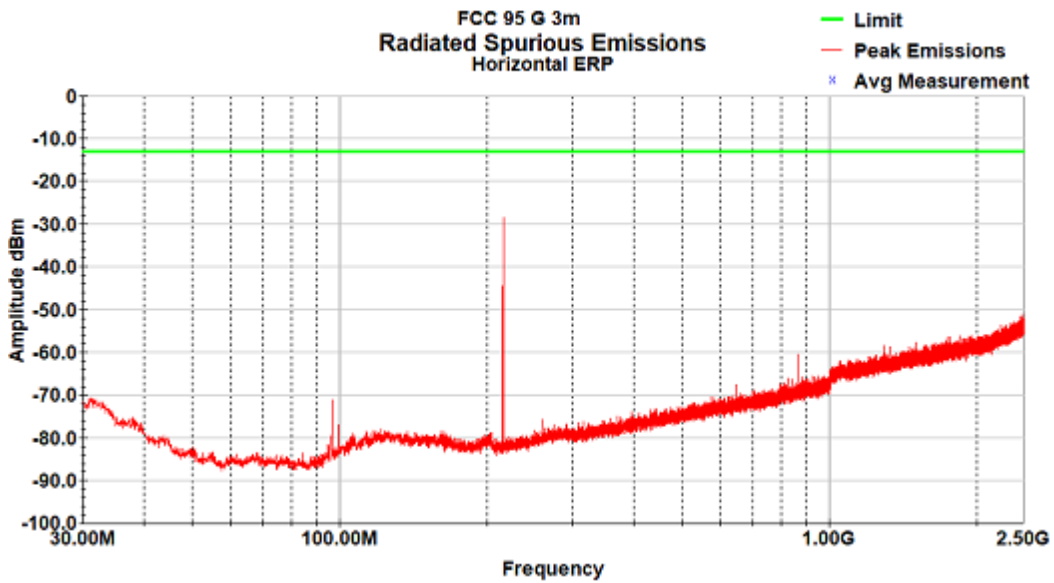
The limit line for RSS-210 Annex C, Mask D, is -25 dBm for $f_d > 3.75$ kHz

Vertical Radiated Emissions Plot 216.025 (30-2500MHz)



The limit line for RSS-210 Annex C, Mask D, is -25 dBm for $f_d > 3.75$ kHz

Horizontal Radiated Emissions Plot (30-2200MHz)



The limit line for RSS-210 Annex C, Mask D, is -25 dBm for $f_d > 3.75$ kHz

5 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	1 June 2020