

EMC Test Report

Project Number: 4202701

Report Number: 4202701EMC01

Revision Level: 0

Client: 3Si Security Systems Inc.

Equipment Under Test: Wireless Tracking Device

Model Number: AT170503US

FCC ID: Q6KAT170503A

IC ID: 5043A-AT170503A

FCC Rule Parts: FCC 47 CFR Part 95

RSS-210, Issue 9

RSS-GEN, Issue 4

ANSI C63.26-2015

Report issued on: 20 November 2017

Test Result: Compliant

Tested by:



Jeremy Pickens, Senior EMC Engineer

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
ERP	§95.2167(a)	RSS-210 Annex C.2(a)	Compliant
Bandwidth	§2.1049 §95.2173	RSS-GEN 6.6	Compliant
Transmit Spectrum Mask	§95.2179(a)	RSS-210 Annex C.2(d)	Compliant
Frequency Accuracy	§95.2165	RSS-210 Annex C.2(b)	Compliant
Radiated Spurious Emissions	§95.2179	RSS-210 Annex C.2(d)	Compliant

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

Environmental Conditions over duration of testing

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

2.3 General Information of EUT

Type of Product: Wireless Tracking Device
 Model Number: AT170503US
 Prototype ID: P1-18

Transmit Frequency: 216.475 MHz
 Antenna: Discrete component resonant circuit

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

Sample Received Date: 12 September 2017
 Dates of testing: 12 - 20 September 2017

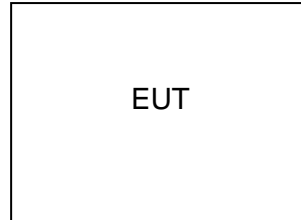
2.4 Operating Modes and Conditions

During testing, the device was configured in software to transmit continuously at 100% duty cycle.

2.5 Modifications Required to Compliance

None

2.6 EUT Connection Block Diagram



2.7 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
A	3Si Security	Wireless Tracking Device	AT170503US	P1-18

2.8 Cable List

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

2.9 Test Equipment

Test End Date: 20-Sep-2017

Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	25-Jul-2018
ANTENNA, BILOG	JB6	SUNOL	B079690	10-Nov-2017
RF CABLE	SF106	HUBER & SUHNER	B079712	24-Jul-2018
RF CABLE	NFS-290-78.7-NFS	FLORIDA RF LABS	B095019	24-Jul-2018
RF CABLE	SF106	HUBER & SUHNER	B079661	25-Jul-2018
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	24-Jul-2018
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	27-Jul-2018
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	22-Feb-2018

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.

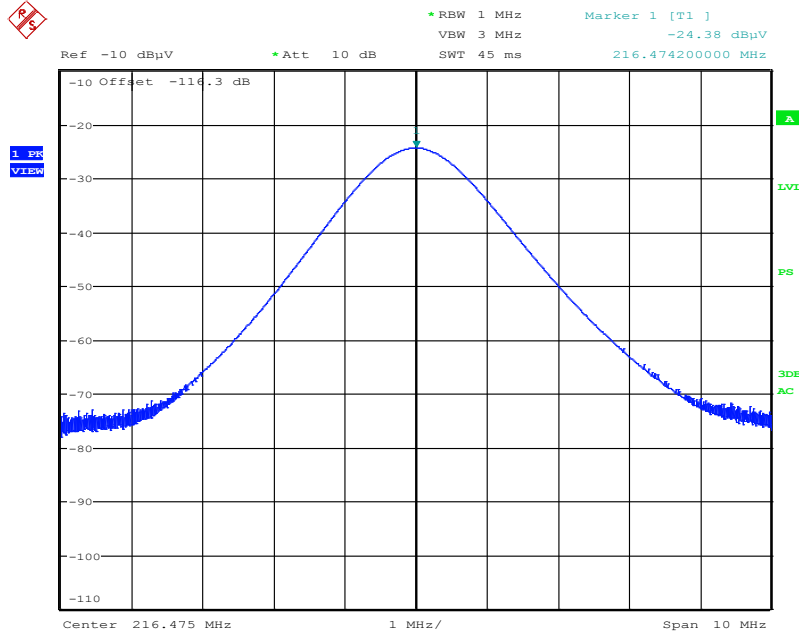
Limit:

For compliance with the FCC rules, the ERP of an LPRS transmitter, other than an LPRS transmitter used with an AMTS station, must not exceed 100 mW.

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

3.3 Test Data

Beacon Signal Frequency, (MHz)	Measured ERP (dBm)	Limit (mW) FCC / ISED	Limit (dBm) FCC / ISED	Margin (dB) FCC / ISED
216.475	-24.4	100 / 160	20 / 22	-44.4 / -46.4



Date: 20.SEP.2017 09:20:15

In addition to the amplifier, cables, and antenna factors, the offset includes a -95.2dB adjustment to convert dBμV/m field strength at 3 meters to an ERP measurement in dBm.

4 Bandwidth

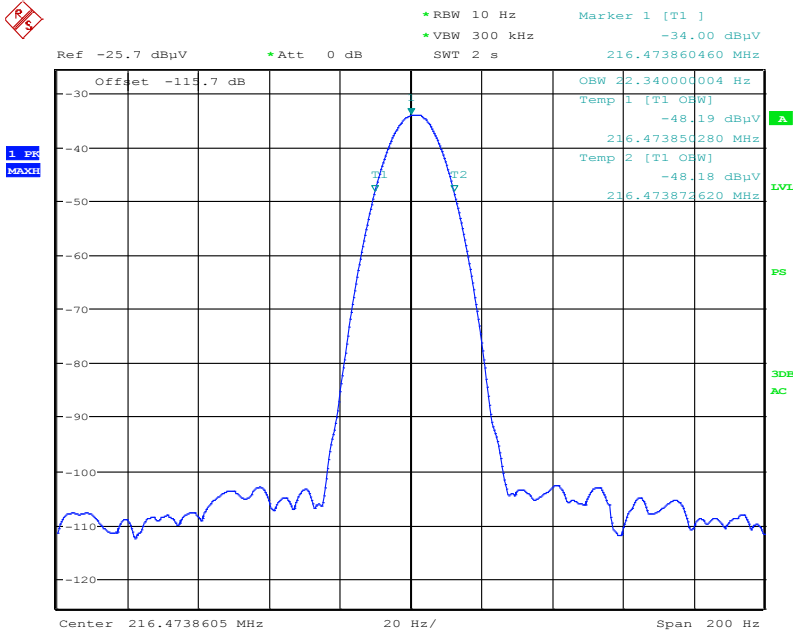
4.1 Test Result

Test Description	Test Specifications	Test Result
Bandwidth	≤ 2.1049 ≤ 95.2173 RSS-GEN 6.6	Reported

4.2 Test Method

Occupied bandwidth measurements were performed according to ANSI C63.26-2015, Section 5.4.

4.3 Test Data



Date: 12.SEP.2017 12:12:20

99% OBW = 22.3Hz

5 Transmit Spectrum Mask

5.1 Test Result

Test Description	Test Specification	Test Result
Transmit Spectrum Mask	§95.2179(a) RSS-210 Annex C.2(d)	Compliant

5.2 Test Method

Spectrum mask measurements were performed according to ANSI C63.26-2015, Section 5.7.3.

Limit:

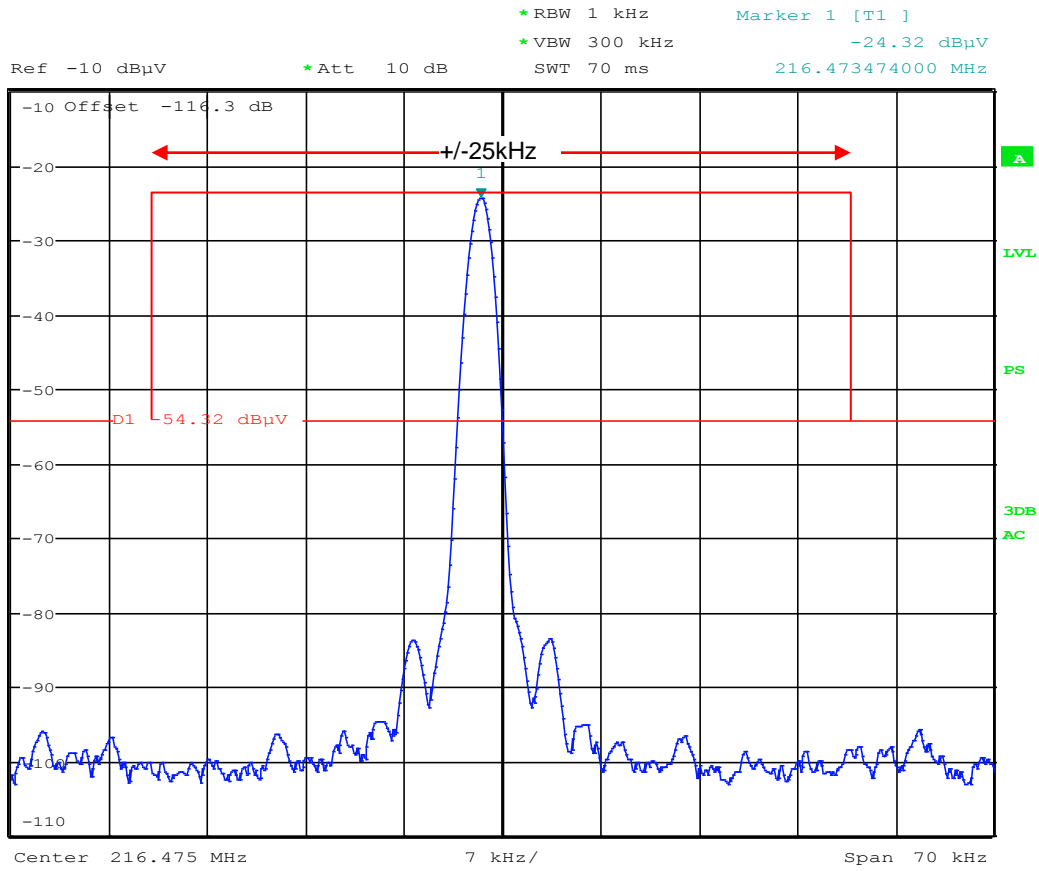
Per FCC Section 95.2179(b)(5), the attenuation requirements are:

- (5) 30 dB on any frequency removed from the channel center frequency by 25 kHz to 35 kHz.

Per RSS-210, Mask D as defined in Annex C.2, the attenuation requirements are:

- 30 dB for emissions at 25 kHz to 35 kHz away from the channel centre frequency

5.3 Test Data



Date: 20.SEP.2017 09:22:58

6 Frequency stability measurements

6.1 Test Result

Test Description	Test Specifications	Test Result
Frequency stability measurements	§95.2165 RSS-210 Annex C.2(b)	Compliant

6.2 Test Method

Frequency stability measurements were performed according to ANSI C63.26-2015, Section 5.6.

Limit:

LPRS transmitters operating on standard band (25 kHz) or extra band (50 kHz) channels must be designed such that the carrier frequencies remain within ± 50 ppm of the channel center frequencies specified in §95.2163(a) and (b), respectively, during normal operating conditions. These requirements are the same as those defined in Table C1 of RSS-210.

6.3 Test Data

operating Frequency (MHz): 216.475

216,475,000

Reference Voltage V_{AC} : 3.7

Deviation Limit (ppm): 50

Deviation Limit \pm (%): 0.00015

Voltage %	Voltage V	Temp °C	Frequency MHz	Freq Dev Hz	Freq Dev ppm
100%	3.70	+20 (Ref)	216.4738708	+1129	+5.22
100%	3.70	-30	216.4724502	+2550	+11.78
100%	3.70	-20	216.4735176	+1482	+6.85
100%	3.70	-10	216.4740719	+928	+4.29
100%	3.70	0	216.4744267	+573	+2.65
100%	3.70	+10	216.4744263	+574	+2.65
100%	3.70	+20	216.4738708	+1129	+5.22
100%	3.70	+30	216.4737698	+1230	+5.68
100%	3.70	+40	216.4733755	+1625	+7.50
100%	3.70	+50	216.4731955	+1804	+8.34
100%	3.70	+55	216.4732201	+1780	+8.22
115%	4.26	+20	216.4738815	+1118	+5.17
85%	3.15	+20	216.4738708	+1129	+5.22

7 Radiated Spurious Emissions

7.1 Test Result

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

7.2 Test Method

Radiated spurious emissions measurements were performed according to ANSI C63.26-2015, Section 5.5.

Limit:

The attenuation requirements are:

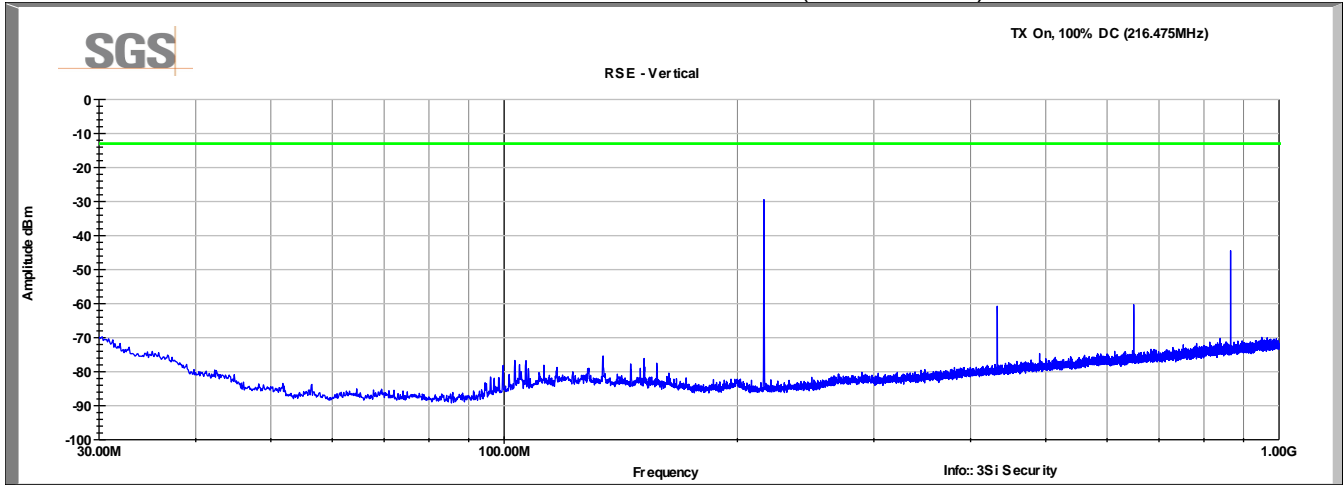
- 1) $43 + 10 \log (P)$ dB on any frequency removed from the channel center frequency by more than 35 kHz (Per Section 95.2179 of the FCC rules)
- 2) $55 + 10 \log_{10} p$ dB or to the general field strength limits specified in RSS-Gen, whichever is less stringent, for emissions at frequencies more than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

7.3 Test Site

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

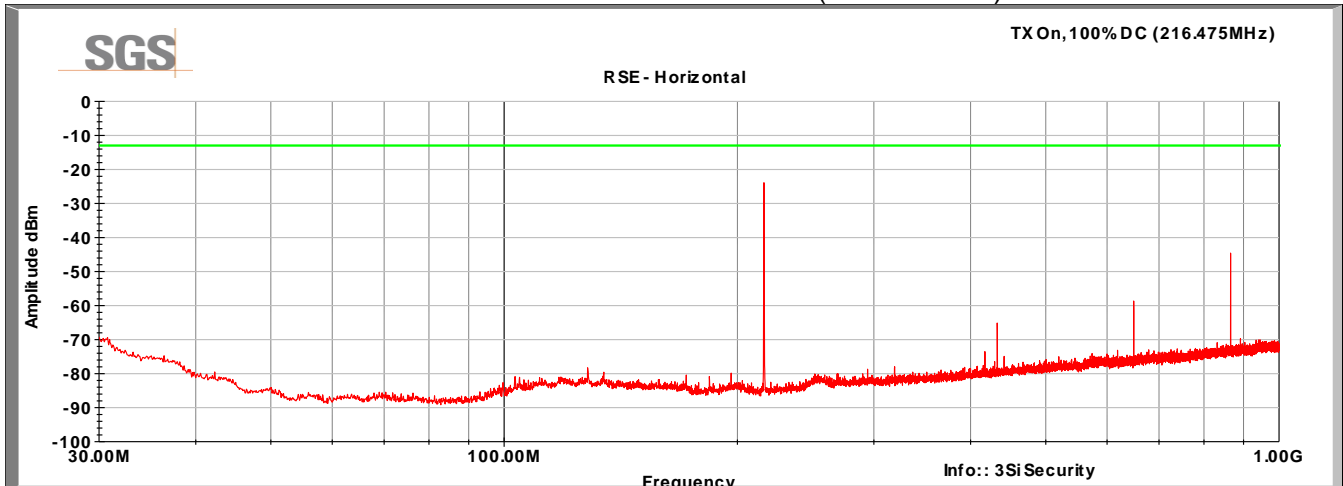
7.4 Test Data

Vertical Radiated Emissions Plot (30-1000MHz)



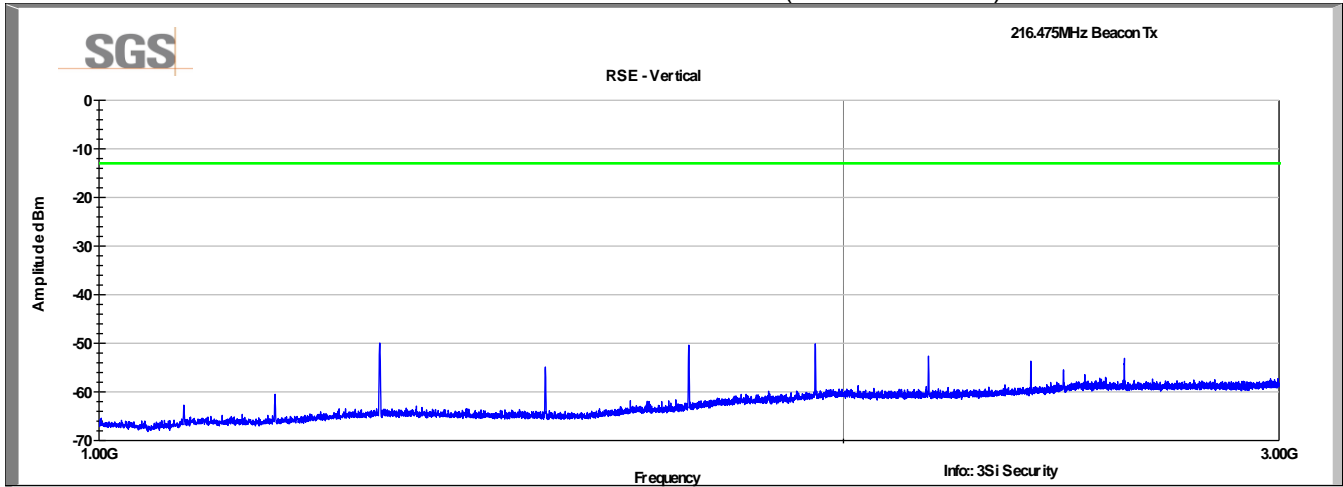
No spurious emissions within 20dB of the limit
 Worst-case spurious emission was -44.5dBm @ 865.9MHz

Horizontal Radiated Emissions Plot (30-1000MHz)



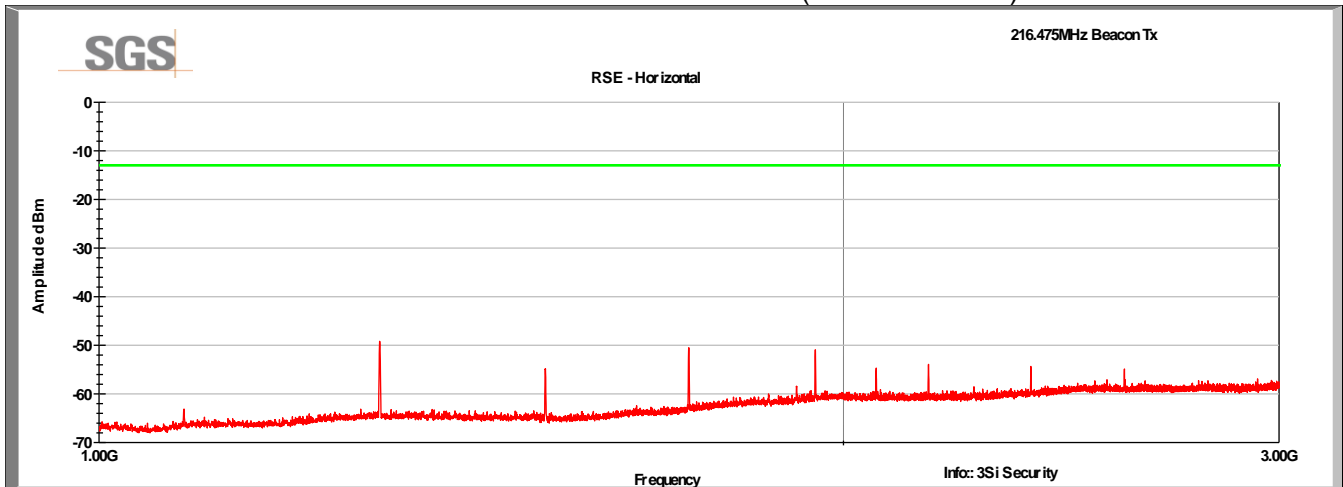
No spurious emissions within 20dB of the limit
 Worst-case spurious emission was -44.6dBm @ 865.9MHz

Vertical Radiated Emissions Plot (1000-3000MHz)



No spurious emissions within 20dB of the limit

Horizontal Radiated Emissions Plot (1000-3000MHz)



No spurious emissions within 20dB of the limit

8 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	20 November 2017