



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

WIRELESS GARAGE DOOR SENSOR/ TILT

MODEL NUMBER*: SW-ATT-TILT, 4676A-433TILT

**FCC ID: QNP-433TILT
IC ID: 4676A-433TILT**

REPORT NUMBER: 12U14298-1, Revision A

ISSUE DATE: APRIL 17, 2012

Prepared for
**SECURE WIRELESS
5817 Dryden Place, Suite D
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model

*SW-ATT-TILT is the USA model; 4676A-433TILT is the Canadian



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	04/09/12	Initial Issue	F. Ibrahim
A	04/17/12	Revised sections 7.2 and 8.1	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SECURE WIRELESS
5817 Dryden Place, Suite D
Carlsbad, CA 92008, U.S.A.

EUT DESCRIPTION: WIRELESS GARAGE DOOR SENSOR/ TILT

MODEL*: SW-ATT-TILT, 4676A-433TLIT
*SW-ATT-TILT is the USA model; 4676A-433TILT is the Canadian

SERIAL NUMBER: 00015A (Continuous TX) and 000121 (Test Firmware)

DATE TESTED: APRIL 02, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 1	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

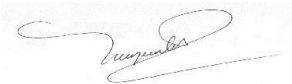
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Wireless Garage Door Sensor.

Equipment Type	433.92 MHz Transmitter
Fundamental Frequency	433.92 MHz
Power Source	3V Type CR2032 Battery
Transmitting Time	Periodic < 5 seconds
Manufacturer	Secure Wireless

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The SW-ATT-TILT and 4676A-433TILT transmitters use an internal -15 dBi wire loop antenna which is not replaceable by the user.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was SWS5014-U2-02-X01

The test utility software used during testing was 635_RA2_2080.hx

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y, and Z to find worst-case orientation. It was determined that X orientation is the worst-case orientation; therefore, all final radiated testing was conducted with EUT in X orientation.

The EUT operates at a single frequency, which is 433.92 MHz.

EUT in continuous transmission mode was used for the following test items:

- Peak Fundamental, Harmonics and Spurious radiated emission.
- RX Spurious emission.
- 99% BW.
- 20 dB BW.

EUT (factory default) in normal operation was triggered to transmit and the following was measured:

- Duty Cycle
- Transmission Time

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

None

I/O CABLES

None, the EUT is battery operated.

TEST SETUP

The EUT is a stand-alone unit that is powered by battery.

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent/HP	8449B	C01052	06/13/12
Preamplifier, 1300 MHz	Agilent/HP	8447D	C01048	07/16/12
Bilog Antenna	ETS	3117	C01005	07/25/12
Antenna, Horn, 18 GHz	EMCO	31158	C00945	06/26/12
PSA	Agilent	E4440A	T129	04/28/12
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	C02688	CNR

7. ANTENNA PORT TEST RESULTS

7.1. 20 dB AND 99% BW

LIMITS

FCC §15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC A1.1.3

For the purpose of Section A1.1, the 99% Bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

TEST PROCEDURE

ANSI C63.4

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 100 KHz. The VBW is set to 300 KHz. The sweep time is coupled. Bandwidth is determined at the points 20 dB down from the modulated carrier.

99% Bandwidth: The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

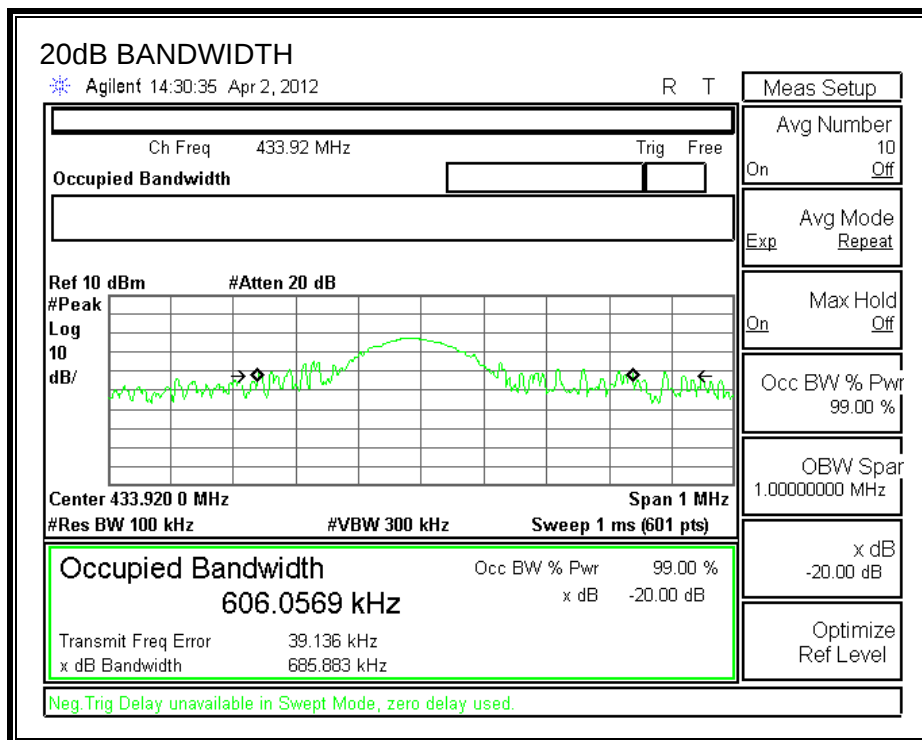
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	685.883	1084.8	-398.917

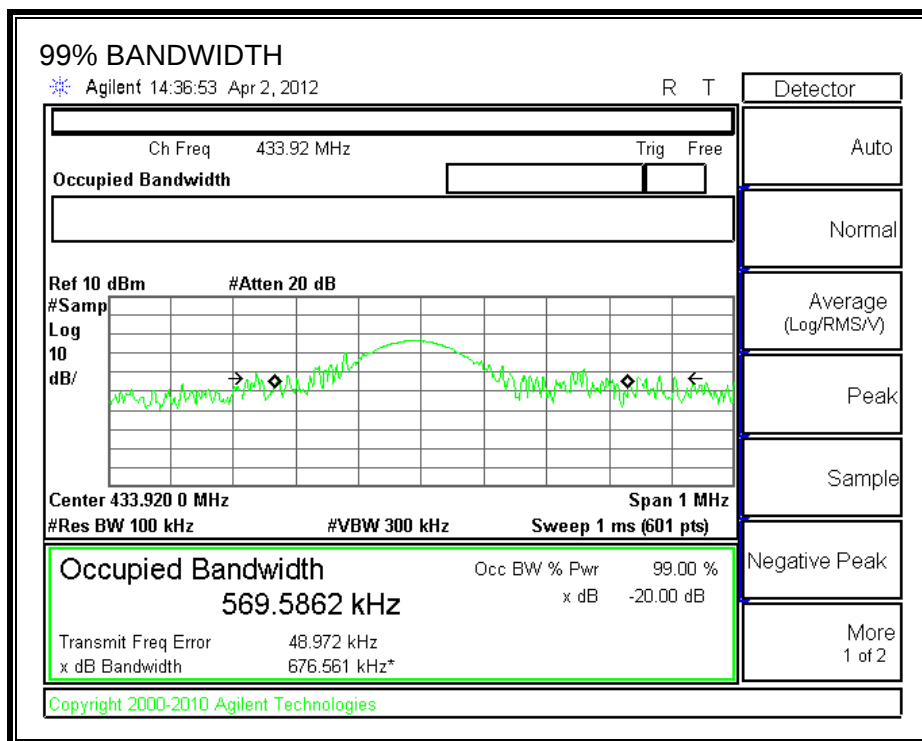
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	569.5862	1084.8	-515.2

20dB BANDWIDTH



99% BANDWIDTH



7.2. DUTY CYCLE

LIMITS

FCC §15.35 (c)

The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

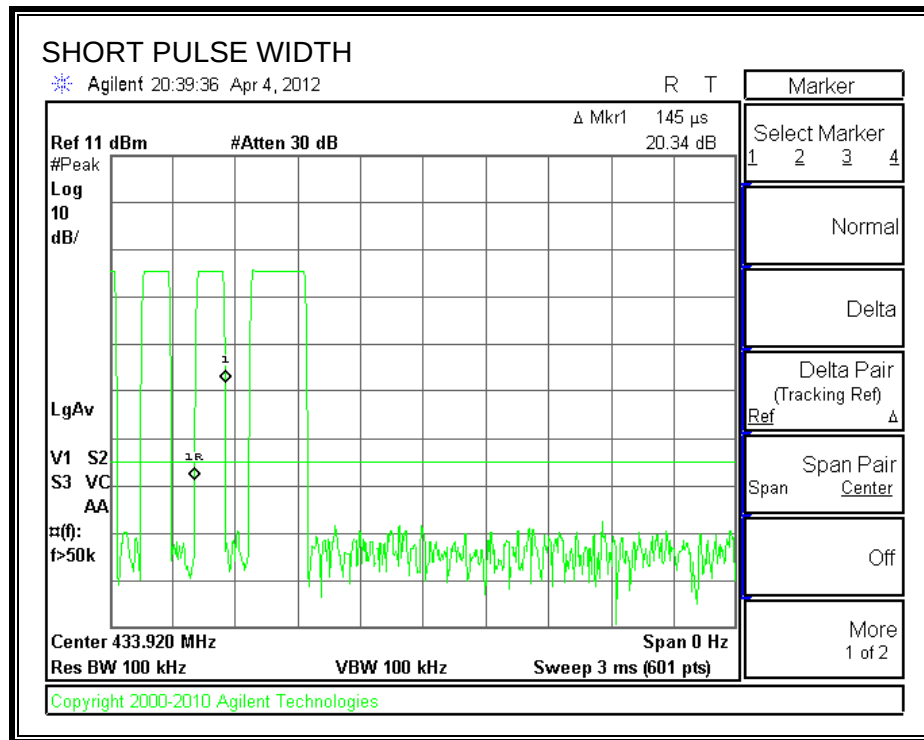
The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

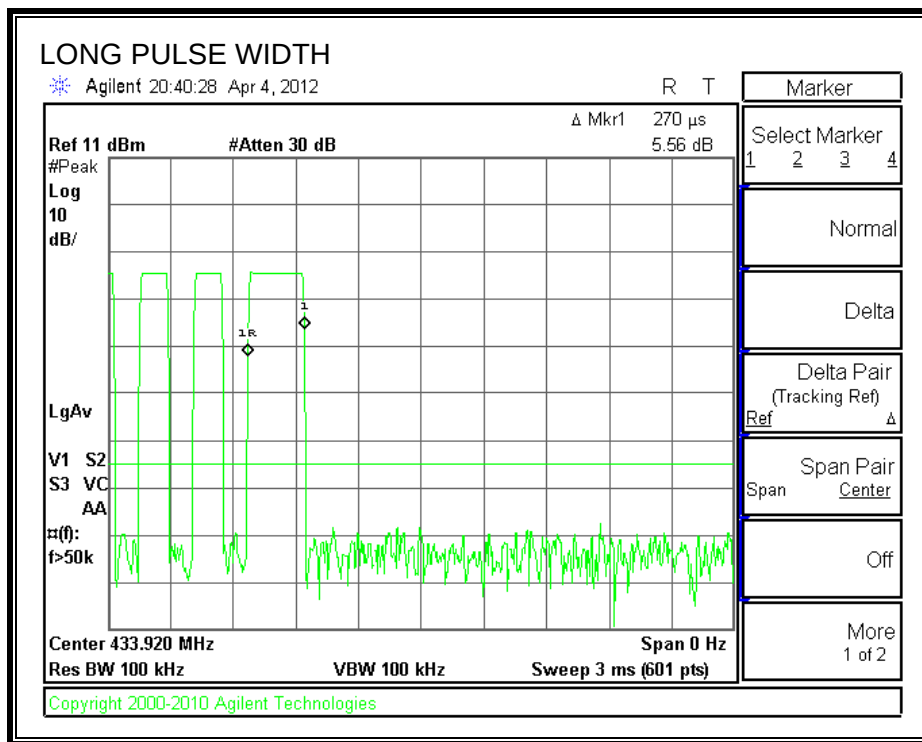
CALCULATION

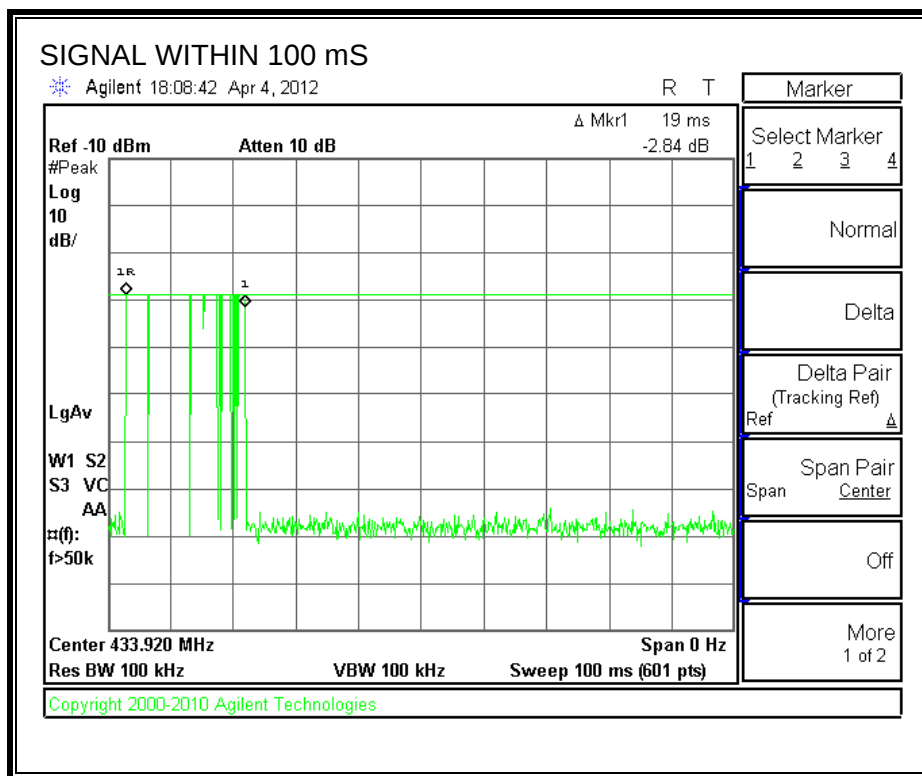
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is $(\# \text{ of long pulses} * \text{long pulse width}) + (\# \text{ of short pulses} * \text{short pulse width}) / 100$ or T

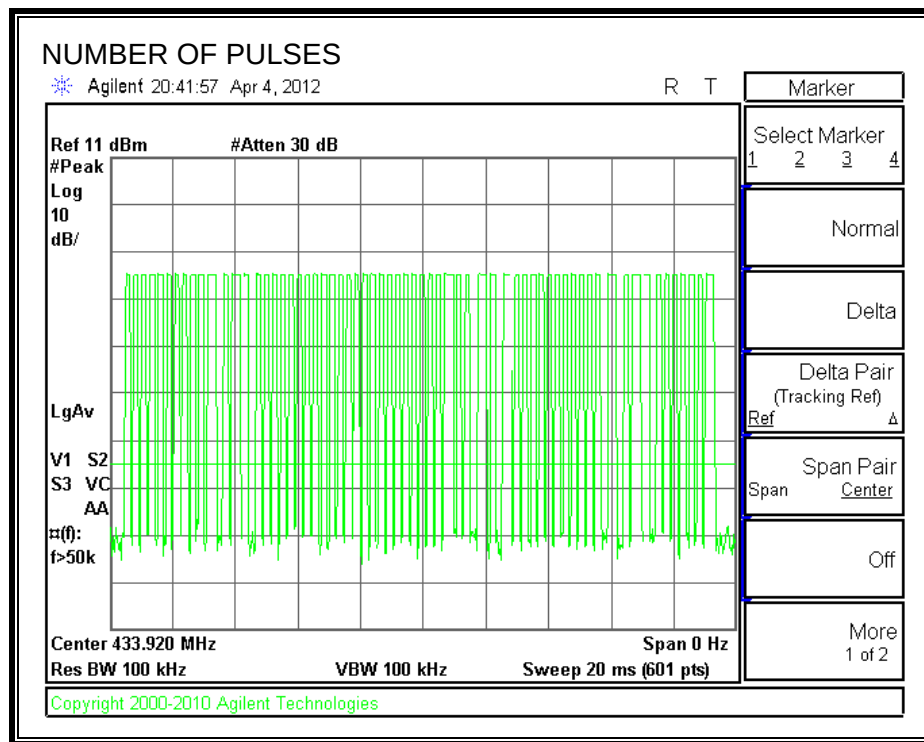
RESULTS

One Period (ms)	Long Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	0.27	10	0.145	55	10.68%	-19.43









7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

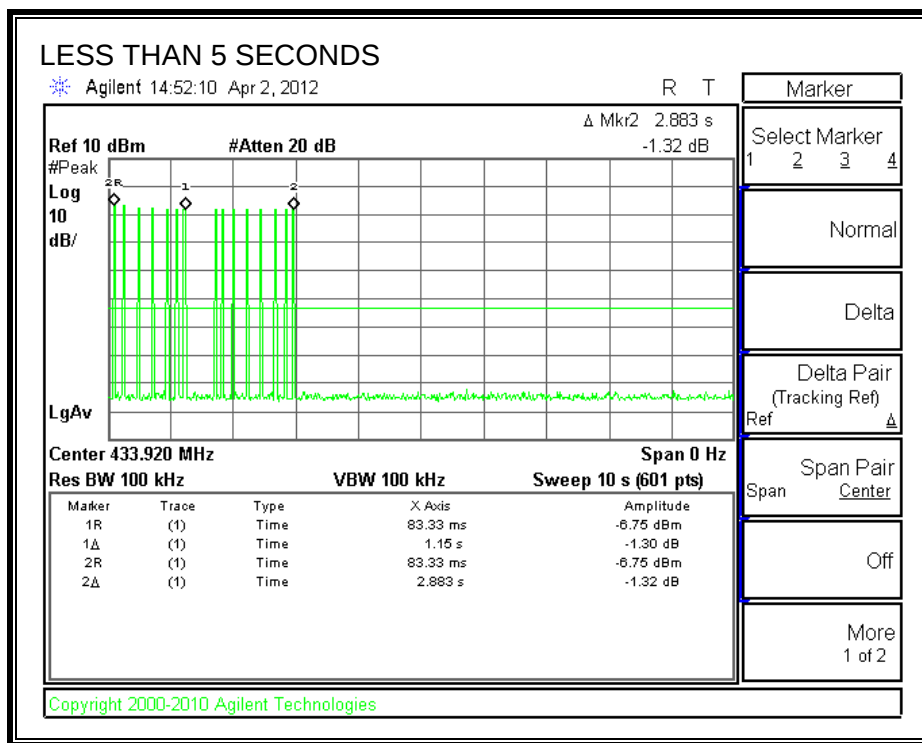
IC A1.1.1 (b)

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz.

RESULTS



8. RADIATED EMISSION TEST RESULTS

8.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (b)

IC A1.1.2

In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (Microvolts/meter)	Field Strength of Spurious Emissions (Microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,7501	125 to 3751
174 - 260	3,750	375
260 - 470	3,750 to 12,5001	375 to 1,2501
Above 470	12,500	1,250

1 Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 88	100 **	3
88 216	150 **	3
216 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 72 MHz, 76 88 MHz, 174 216 MHz or 470 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

										Project #: 12U14298 Report #: 12U14298-1 Date & Time: 04/02/12 Test Engr: Vien Tran	
FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP 561F MONTEREY ROAD, SAN JOSE, CA 95037-9001 PHONE: (408) 463-0885 FAX: (408) 463-0888											
Company: Secure Wireless EUT Description: Wireless Garage Door Sensor, 433.92 MHz Test Configuration: EUT Stand-Alone Type of Test: FCC 15.231b Mode of Operation: Transmitting											

$M\% = ((t1+t2+t3+...)/T) * 66.83\% = 10.68\%$

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -19.43

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
X-Position (EUT Lay down)														
433.92	76.20	56.77	17.00	1.82	0.00	95.02	75.59	100.83	80.83	-5.81	-5.23	3mV	0.00	1.00
433.92	77.26	57.83	17.00	1.82	0.00	96.08	76.65	100.83	80.83	-4.75	-4.17	3mH	0.00	2.00
Y-Position (EUT Standup)														
433.92	75.25	55.82	17.00	1.82	0.00	94.07	74.64	100.83	80.83	-6.76	-6.18	3mV	0.00	1.00
433.92	70.34	50.91	17.00	1.82	0.00	89.16	69.73	100.83	80.83	-11.67	-11.09	3mH	0.00	2.00
Z-Position (EUT Standup)														
433.92	76.87	57.44	17.00	1.82	0.00	95.69	76.26	100.83	80.83	-5.14	-4.56	3mV	0.00	1.00
433.92	68.80	49.37	17.00	1.82	0.00	87.62	68.19	100.83	80.83	-13.21	-12.63	3mH	0.00	2.00
Worst Position: X-Position (EUT Lay down)														
867.84	51.86	32.43	22.65	2.83	29.40	47.94	28.51	80.83	60.83	-32.89	-32.31	3mV	0.00	1.00
867.84	54.85	35.42	22.65	2.83	29.40	50.93	31.50	80.83	60.83	-29.90	-29.32	3mH	0.00	2.00

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz

High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Secure Wirelless															
Project #:		12U14298															
Date:		4/2/2012															
Test Engineer:		Vien Tran															
Configuration:		EUT Stand Alone															
Mode:		Continuos TX															
$M\% = ((t1+t2+t3+...)/T) * 66.83\% = 10.68\%$																	
Av Reading = Pk Reading + 20*log(M%) 20 * log (M%) = -19.43																	
Test Equipment:																	
Horn 1-18GHz				Pre-amplifer 1-26GHz				Pre-amplifer 26-40GHz				Horn > 18GHz				Limit	
T60; S/N: 2238 @3m				T34 HP 8449B												FCC 15.205	
Hi Frequency Cables																	
3' cable 22807700				12' cable 22807600				20' cable 22807500				HPF				Reject Filter	
3' cable 22807700				12' cable 22807600				20' cable 22807500				HPF_1.5GHz					
Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz																	
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fldr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
1.736	3.0	70.1	50.7	27.2	3.7	-36.7	0.0	0.3	64.6	45.2	80.8	60.8	-16.2	-15.7	H		
2.170	3.0	67.5	48.1	28.3	4.2	-36.1	0.0	0.5	64.4	45.0	80.8	60.8	-16.4	-15.9	H		
2.604	3.0	64.3	44.9	29.1	4.7	-35.6	0.0	0.6	63.2	43.7	80.8	60.8	-17.7	-17.1	H		
3.037	3.0	71.1	51.7	30.3	5.2	-35.3	0.0	0.6	71.9	52.5	80.8	60.8	-8.9	-8.3	H		
3.417	3.0	63.7	44.3	31.2	5.6	-34.9	0.0	0.6	66.2	46.7	80.8	60.8	-14.7	-14.1	H		
3.905	3.0	53.6	34.2	32.4	6.1	-34.4	0.0	0.6	58.2	38.8	74.0	54.0	-15.8	-15.2	H		
4.339	3.0	48.8	29.4	32.8	6.4	-34.2	0.0	0.6	54.4	35.0	74.0	54.0	-19.6	-19.0	H		
1.736	3.0	59.9	40.5	27.2	3.7	-36.7	0.0	0.3	54.4	35.0	80.8	60.8	-26.4	-25.9	V		
2.170	3.0	74.8	55.4	28.3	4.2	-36.1	0.0	0.5	71.7	52.3	80.8	60.8	-9.1	-8.6	V		
2.604	3.0	67.6	48.2	29.1	4.7	-35.6	0.0	0.6	66.5	47.0	80.8	60.8	-14.4	-13.8	V		
3.037	3.0	66.8	47.4	30.3	5.2	-35.3	0.0	0.6	67.6	48.2	80.8	60.8	-13.2	-12.7	V		
3.417	3.0	60.8	41.4	31.2	5.6	-34.9	0.0	0.6	63.3	43.8	80.8	60.8	-17.6	-17.0	V		
3.905	3.0	59.4	40.0	32.4	6.1	-34.4	0.0	0.6	64.0	44.6	74.0	54.0	-10.0	-9.4	V		
4.339	3.0	48.9	29.5	32.8	6.4	-34.2	0.0	0.6	54.5	35.1	74.0	54.0	-19.5	-18.9	V		
Rev. 11.10.11																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

8.2. RX RADIATED SPURIOUS EMISSION

LIMITS

IC RSS-Gen Issue 2, section 7.2.3.2

All spurious emissions shall comply with the limits shown below:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to receive in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 5th harmonic is investigated with the transmitter set to the middle channel.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

Not applicable, this EUT is transmitter only.