TEST REPORT

Report Number: HK12031517-1

Application
for
Original Grant of 47 CFR Part 15 Certification

315MHz Transmitter (Base Station)

FCC ID: U9K-BS2000

Prepared and Checked by:

Signed on File
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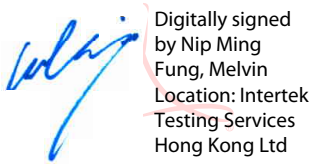
Approved by:



Nip Ming Fung, Melvin
Senior Supervisor
April 17, 2012

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GENERAL INFORMATION

Applicant Name:	SimpliSafe, Inc.
Applicant Address:	1035 Cambridge Street, Suite 18A Cambridge, MA 02141 USA
FCC Specification Standard:	FCC Part 15, October 1, 2010 Edition
FCC ID:	U9K-BS2000
FCC Model(s):	BS2000
Type of EUT:	Security/Remote Control Transmitter
Description of EUT:	315MHz Transmitter (Base Station)
Serial Number:	N/A
Sample Receipt Date:	March 27, 2012
Date of Test:	April 5 - 11, 2012
Report Date:	April 17, 2012
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Table of Contents

EXHIBIT 1
TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.0 Test Results Summary & Statement of Compliance

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	Results	Details see section
Antenna Requirement	15.203	Pass	2.1
Radiated Emission 5-Second Transmission Requirement Bandwidth	15.231(b) 15.231(a2) 15.231(c)	Pass Pass Pass	4.2 4.3.2 4.3.1
Radiated Emission in Restricted Bands	15.205	Pass	4.2
AC Power Line Conducted Emission	15.207	Pass	4.4

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2010 Edition

EXHIBIT 2
GENERAL DESCRIPTION

2.0 **General Description**

2.1 Product Description

The BS2000 is a 315MHz Transmitter (Base Station). It operates at 315MHz. The Base Station is powered by an adaptor 100-240VAC to 7.5VDC 1.6A and/or "Ni-MH" type rechargeable battery (4 x “AA” size 1.2VDC 2500mAh). There is no simultaneous transmission for the 315MHz transmitter and the modular transmitter.

The 315MHz antenna used in base station is integral, and the test sample is a prototype.

The circuit description is saved with filename: descri.pdf.

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

2.2 Related Submittal Grants

This is an application of certification of the transmitter. The associated 433MHz superheterodyne receiver housed in the base station was tested and approved following DoC procedure. Separate DoC test report was prepared.

2.3 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Preliminary radiated scans and all radiated measurements were performed in Open Area Test Sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data and conducted data are at Roof Top and 2nd Floor respectively of Intertek Testing Services Hong Kong Ltd., which is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 3
SYSTEM TEST CONFIGURATION

3.0 **System Test Configuration**

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by a 100-240VAC to 7.5VDC 1.6A adaptor and/or a fully charged batteries.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT attached to peripherals, they were connected and operational to simulate typical use.

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

For transmitter radiated measurement, the spectrum analyzer resolution bandwidth was 100 kHz for frequencies below 1000 MHz. The resolution bandwidth was 1 MHz for frequencies above 1000 MHz.

Radiated emission measurement for transmitter was performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.1 Justification - Cont'd

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.2.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (Teff) was referred to Exhibit 4.2.3. With the resolution bandwidth 100kHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data is included in this report.

3.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

3.3 Details of EUT and Description of Accessories

Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their description are listed below.

(1) Base Station: An AC adaptor (100-240VAC to 7.5VDC 1.6A, Model: HKP12-0751600dU) (Supplied by Client)
(2) Backup Battery: A "Ni-MH" type rechargeable battery (4 x “AA” size 1.2VDC 2500mAh) (Supplied by Intertek)

Description of Peripherals:

(1) Telephone Line Simulator, Model: TLS-5D-01, S/N: 151101 (Supplied by Intertek)
(2) Keychain Remote, Model: KR1, FCC ID: U9K-KR1 (Supplied by Client)
(3) Uniden Corded Phone, Model: AS7402 (Supplied by Intertek)
(4) 2 x 3m Telephone Line (Supplied by Intertek)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

EXHIBIT 4
TEST RESULTS

4.0 **Test Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

4.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflects the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD +AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 +1.6 -29 +0 + (-10) = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

4.2 Radiated Emissions

4.2.1 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

315.000 MHz

The worst case radiated emission configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.2.2 Radiated Emission Data

The data in tables 1-2 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 1.0 dB margin compare with average limit

4.2.3 Transmitter Duty Cycle Calculation

Duty Cycle (DC)
= Maximum On time in 100ms [Preamble (2ms) & Packet (98ms)] / 100ms
= (2ms + 52ms) / 100ms

Average Factor (AF) = 20 log(DC)
= 20* log (0.54)
= -5.3dB

The sample plot shows the bit timing is saved with filename: timing.pdf

Mode: TX

Table 1

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBuV)	Pre-Amp (dB)	Antenna factor (dB)	Average Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	315.000	72.9	16	23.0	5.3	74.6	75.6	-1.0
V	630.000	32.0	16	29.0	5.3	39.7	55.6	-15.9
V	945.000	26.2	16	33.0	5.3	37.9	55.6	-17.7
V	1260.000	59.5	33	26.1	5.3	47.3	55.6	-8.3
V	***1575.000***	***59.6***	***33***	***27.2***	***5.3***	***48.5***	***54.0***	***-5.5***
V	1890.000	58.0	33	27.2	5.3	46.9	55.6	-8.7
V	***2205.000***	***54.2***	***33***	***29.4***	***5.3***	***45.3***	***54.0***	***-8.7***
V	2520.000	52.8	33	30.4	5.3	44.9	55.6	-10.7
V	***2835.000***	***52.2***	***33***	***30.4***	***5.3***	***44.3***	***54.0***	***-9.7***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

Mode: TX

Table 2

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBuV)	Pre-Amp (dB)	Antenna factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	315.000	72.9	16	23.0	79.9	95.6	-15.7
V	630.000	32.0	16	29.0	45.0	75.6	-30.6
V	945.000	26.2	16	33.0	43.2	75.6	-32.4
V	1260.000	59.5	33	26.1	52.6	75.6	-23.0
V	***1575.000***	***59.6***	***33***	***27.2***	***53.8***	***74.0***	***-20.2***
V	1890.000	58.0	33	27.2	52.2	75.6	-23.4
V	***2205.000***	***54.2***	***33***	***29.4***	***50.6***	***74.0***	***-23.4***
V	2520.000	52.8	33	30.4	50.2	75.6	-25.4
V	***2835.000***	***52.2***	***33***	***30.4***	***49.6***	***74.0***	***-24.4***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

4.3 Transmitter Bandwidth and 5-Second Transmission

4.3.1 Measured Bandwidth

The plot shows the fundamental emission when modulated is saved with filename: bw.pdf. From the plot, the bandwidth is observed to be 726kHz, at 20dBc where the bandwidth limit is 787.5kHz.

Therefore, the EUT meets the requirement of FCC Part 15 Section 15.231(c).

4.3.2 5-Second Transmission Requirement

[ ] Pursuant to FCC Part 15 Section 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. The EUT meets the requirement. A preliminary copy of the 5-second transmission requirement is saved with filename: 5s.pdf.

[×] Pursuant to FCC Part 15 Section 15.231(a)(2), a transmitter activated automatically shall cease transmitter within 5 seconds after activation. The EUT meets the requirement. A preliminary copy of the 5-seconds transmission requirement is saved with filename: 5s.pdf.

4.4 AC Power Line Conducted Emission

[ ] Not applicable – EUT is only powered by battery for operation.

[×] EUT connects to AC power line. Emission Data is listed in following pages.

[ ] Base unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.4.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.204 MHz

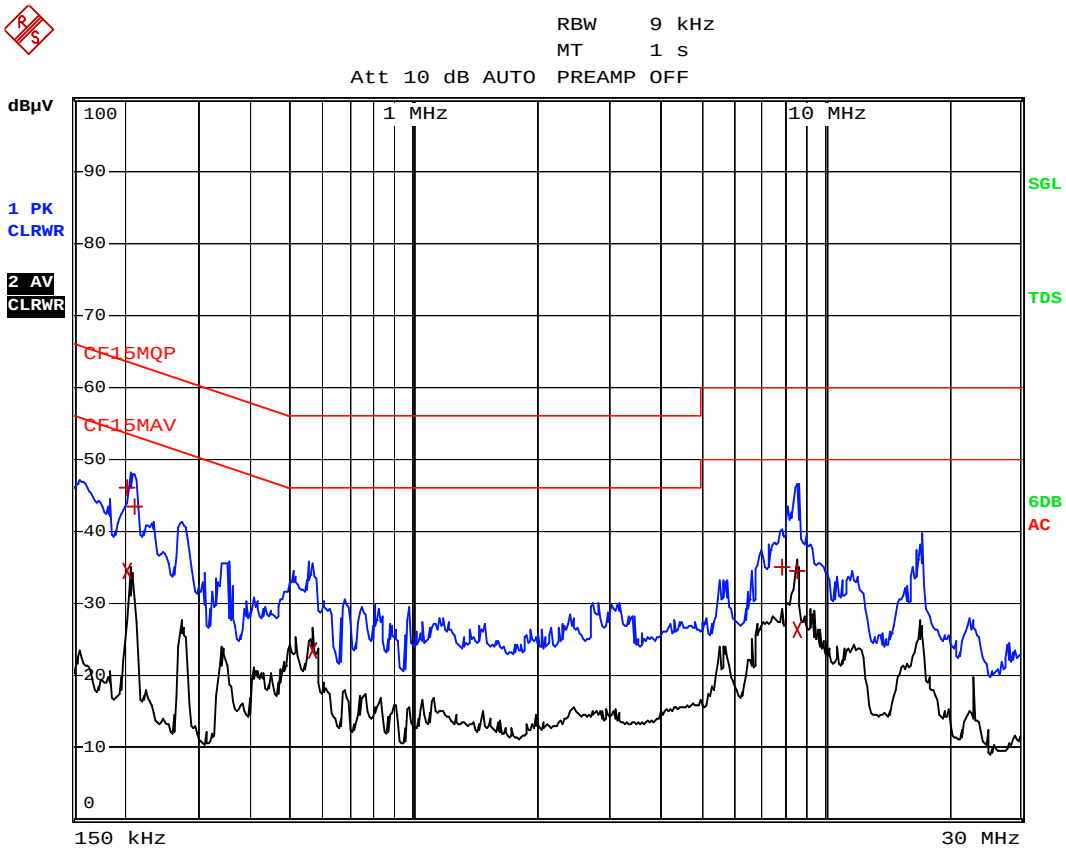
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.4.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance

Passed by 17.34 dB margin compare with quasi-peak limit

Model No.: BS2000
Worst Case: TX



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Model No.: BS2000
Worst Case: TX

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	204 kHz	46.10	L1	-17.34
2	CISPR Average	204 kHz	34.52	L1	-18.92
1	Quasi Peak	213 kHz	43.53	N	-19.55
2	CISPR Average	564 kHz	23.52	L1	-22.47
1	Quasi Peak	7.9395 MHz	35.13	N	-24.86
1	Quasi Peak	8.583 MHz	34.60	N	-25.39
2	CISPR Average	8.583 MHz	26.28	L1	-23.71

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EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	Biconical Antenna 20MHz to 200MHz	Log Periodic Antenna	Spectrum Analyzer
Registration No.	EW-2512	EW-0446	EW-2188
Manufacturer	EMCO	EMCO	AGILENTTECH
Model No.	3104C	3146	E4407B
Calibration Date	Nov. 15. 2011	Oct. 31. 2011	Sep. 26. 2011
Calibration Due Date	May. 15. 2013	Apr. 30. 2013	Sep. 26. 2012

Equipment	Double Ridged Guide Antenna (1GHz - 18GHz)	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-1133	EW-2500	EW-2466
Manufacturer	EMCO	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	3115	ESCI	FSP30
Calibration Date	Mar. 02. 2011	Feb. 24. 2012	Apr. 11. 2011
Calibration Due Date	Sep. 02. 2012	Feb. 24. 2013	Apr. 11. 2012

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Artificial Mains Network
Registration No.	EW-2500	EW-2501
Manufacturer	ROHDESCHWARZ	R&S
Model No.	ESCI	ENV-216
Calibration Date	Feb. 24. 2012	Mar. 30. 2011
Calibration Due Date	Feb. 24. 2013	Jun. 29. 2012

END OF TEST REPORT