SimpliSafe, Inc.

Application
For
Certification

433MHz Transmitter (Keychain Remote)

(FCC ID: U9KR2)

HK09091131-1
MN/cl
October 29, 2009

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

MEASUREMENT/TECHNICAL REPORT

SimpliSafe, Inc. - Model: SSKR2
FCC ID: U9KR2

This report concerns (check one:) Original Grant __X__ Class II Change ___

Equipment Type : DSC – Pt Security/Remote Control TX

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ____ No __X__

If yes, defer until : _____ date

Company Name agrees to notify the Commission by: _____ date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37 ? Yes ____ No __X__

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-08 Edition] Provision.

Report reviewed by:

Nip Ming Fung, Melvin
Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre,
576 Castle Peak Road,
Kowloon, Hong Kong.
Phone : 852-2173-8535
Fax: 852-2741-1693

Table of Contents

EXHIBIT 1
GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The Keychain Remote allows wireless control of the SimpliSafe alarm system. The Keychain Remote can be used to “arm” and “disarm” the system by pressing the “away” or “off” buttons, as explained in the owner’s manual, or to initiate a panic alarm when the user presses the panic button. The Keychain Remote sends these control messages through 433.920MHz, ASK modulated transmitter. It is powered by 3V lithium battery. The signal is repeated two times, with the last transmission completed within 5 seconds of the initial event.

Antenna Type: Integral, Internal

The circuit description is saved with filename: descri.pdf

1.2 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Preliminary radiated scans were performed in the Open Area Test Site only to determine worst case modes. 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.

1.3 Test Facility

The open area test site used to collect the radiated data 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 2
SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

For 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 new CR1632 size 3VDC Lithium Battery.

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable.

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

For EUT 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.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz.

Radiated emission measurement were performed 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.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (τ_{eff}) was 1ms. With the resolution bandwidth 100kHz and spectrum analyzer IF bandwidth 3 dB, the pulse desensitization factor was 0 dB.

The EUT does not have provision connected to the AC power line.

2.2 EUT Exercising Software

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

2.3 Details of EUT and Description of Peripherals

Details of EUT:

A battery (provided with the unit) was used to power the device. Their description are listed below.

(1) Operated Battery: 1 x CR1632 size 3VDC Lithium Battery. (Supplied by Client)

Description of Peripherals:

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

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

2.5 Equipment Modification

Any modifications installed previous to testing by SimpliSafe, Inc. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Commercial & Electrical Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

Nip Ming Fung, Melvin
Supervisor
Intertek Testing Services
Agent for SimpliSafe, Inc.

Signature

October 29, 2009 Date

EXHIBIT 3
EMISSION RESULTS

3.0 **Emission 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.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

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

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

FS = RR + LF

where FS = Field Strength in dBμV/m
RR = RA - AG in dBμV
LF = CF + AF in dB

Assume a receiver reading of 52.0 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, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBμV/m

RR = 23.0 dBμV
LF = 9.0 dB

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

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

at 1301.760 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 10.0 dB margin compared with average limit

****

TEST PERSONNEL:

Tester Signature

Koo Wai Ip, Engineer
Typed/Printed Name

October 29, 2009
Date

Company: SimpliSafe, Inc. Date of Test: October 02, 2009
Model: SSKR2
Mode : TX

Table 1

Radiated Emissions
Pursuant to FCC Part 15 Section 15.231(b) Requirements

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp (dB)	Antenna factor (dB)	Average Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	433.920	53.8	16	25.0	3.6	59.2	80.8	-21.6
V	867.840	22.6	16	31.0	3.6	34.0	60.8	-26.8
V	***1301.760***	***54.5***	***33***	***26.1***	***3.6***	***44.0***	***54.0***	***-10.0***
V	1735.680	54.0	33	27.2	3.6	44.6	60.8	-16.2
V	2169.600	54.0	33	29.4	3.6	46.8	60.8	-14.0
V	2603.520	51.1	33	30.4	3.6	44.9	60.8	-15.9
V	3037.440	48.0	33	31.9	3.6	43.3	60.8	-17.5
V	3471.360	47.3	33	31.9	3.6	42.6	60.8	-18.2
V	***3905.280***	***44.6***	***33***	***33.3***	***3.6***	***41.3***	***54.0***	***-12.7***

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp (dB)	Antenna factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	433.920	53.8	16	25.0	62.8	100.8	-38.0
V	867.840	22.6	16	31.0	37.6	80.8	-43.2
V	***1301.760***	***54.5***	***33***	***26.1***	***47.6***	***74.0***	***-26.4***
V	1735.680	54.0	33	27.2	48.2	80.8	-32.6
V	2169.600	54.0	33	29.4	50.4	80.8	-30.4
V	2603.520	51.1	33	30.4	48.5	80.8	-32.3
V	3037.440	48.0	33	31.9	46.9	80.8	-33.9
V	3471.360	47.3	33	31.9	46.2	80.8	-34.6
V	***3905.280***	***44.6***	***33***	***33.3***	***44.9***	***74.0***	***-29.1***

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 part 15.205.

Test Engineer: Koo Wai Ip

3.4 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Averaging factor in dB = 20 log (duty cycle)

The specification for output field strengths in accordance with the FCC rules specify measurements with an average detector. During testing, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

One cycle consists of one complete code word that includes synchronous bits, preamble bits and packet bits. Synchronous bits and preamble bits are fixed as shown in technical description. The packet, the signal transitions are always changed on every bits. For the worst case, there is 66ms "ON" time in 100ms, hence, the duty cycle is 66%.

Therefore, the averaging factor is found by $20 \log_{10} [(44 + 2 + 20)\text{ms}/100\text{ms}] = -3.6\text{dB}$

For electronic filing, the sample plot shows the bit timing is saved with filename: timing.pdf

EXHIBIT 4
MISCELLANEOUS INFORMATION

4.0 **Miscellaneous Information**

This miscellaneous information includes details of the measured bandwidth plot and 5-second transmission plot

4.1 Measured Bandwidth

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: bw.pdf. From the plot, the bandwidth is observed to be 764.4kHz, at 20dBc where the bandwidth limit is 1084kHz.

Therefore, the EUT meets the requirement of section 15.231(c).

For electronic filing, 20dB bandwidth plot is saved with filename : bw.pdf

4.2 5-Second Transmission Requirement

[×] Pursuant to 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. For electronic filing, a preliminary copy of the 5-second transmission requirement is saved with filename: 5s.pdf.

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

EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	
Registration No.	EW-0014	EW-2188	EW-2253
Manufacturer	R&S	AGILENTTECH	R&S
Model No.	ESVS30	E4407B	FSP40
Calibration Date	Jun. 01, 2009	Dec. 18, 2008	Aug. 12, 2008
Calibration Due Date	Jun. 01, 2010	Dec. 18, 2009	Nov. 12, 2009

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	Biconical Antenna
Registration No.	EW-0446	EW-1015	EW-0954
Manufacturer	EMCO	EMCO	EMCO
Model No.	3146	3115	3104C
Calibration Date	Oct. 02, 2008	Jul. 28, 2008	Sep. 30, 2008
Calibration Due Date	Apr. 02, 2010	Jan. 28, 2010	Mar. 30, 2010

APPENDIX
EXHIBITS FOR APPLICATION OF CERTIFICATION