SimpliSafe, Inc.

Application
For
Certification
(FCC ID: U9K-ES1000)

433MHz Transmitter (Entry Sensor)

HK08110911-1
KS/ ac
November 24, 2008

Intertek Testing Services Hong Kong Ltd.
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LIST OF EXHIBITS

INTERTEK TESTING SERVICES

MEASUREMENT/TECHNICAL REPORT

SimpliSafe, Inc. - MODEL: ES1000
FCC ID: U9K-ES1000

November 24, 2008

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

Equipment Type: DSC – Pt 15 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 [10-01-07 Edition] provision.

Report prepared by: Sit Kim Wai, Ken
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Test Report	Test Report	report.pdf
Operational Description	Technical Description	descri.pdf
Test Setup Photos	Radiated Emission	config photos.pdf
External Photos	External Photo	external photos.pdf
Internal Photos	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
Users Manual	User Manual	manual.pdf
Test Report	Bandwidth Plot	bw.pdf
Test Report	Transmission Period	5s.pdf
Test Report	Bit Timing Diagram	timing.pdf
Cover Letter	Letter of Agency	letter of agency.pdf
Cover Letter	Confidentiality Request	request.pdf

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Magnetic Reed Switch Sensor with a Wireless Transmitter, which indicates window or door opening and closing events to the SimpliSafe alarm system. The transmitter is a 433.92MHz, ASK modulated transmitter. It is powered by 3V lithium battery. After detecting an opening door or window, the Entry Sensor activates the transmitter, which sends a signal to the Base station. This signal is repeated two times, with the last transmission completed within 5 seconds of the initial event. An LED on the front indicates an opening door/ window with a single flash and a closing door/ window with a double flash.

Antenna Type : Integral, Internal

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of a transmitter. The transmitters, associated have FCC ID: U9K-BS1000, U9K-KR1, U9K-KP1000, U9K-MS1000 and U9K-PB1000 and have been filed at the same time.

1.3 Test Methodology

The radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.4 Test Facility

The open area test site used to collect the emission 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

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The EUT was powered from 1 x CR123A Size 3VDC Lithium Battery.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The EUT was mounted to a plastic stand, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes. For simplicity of testing, the unit was wired to transmit continuously.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

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.

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

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the button is depressed, the unit transmits the typical signal. For simplicity of testing, the unit was wired to transmit continuously.

2.3 Special Accessories

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

2.4 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 Intertek Testing Services Hong Kong Ltd.

2.5 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.

2.6 Support Equipment List and Description

This product was tested in a standalone configuration.

All the items listed under section 2.0 of this report are

Confirmed by:

Sit Kim Wai, Ken
Assistant Manager
Intertek Testing Services Hong Kong Ltd.
Agent for SimpliSafe, Inc.

Signature

November 24, 2008 Date

EXHIBIT 3

EMISSION RESULTS

3.0 **Emission Results**

Data is included 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 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 reflect 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

3.1 Field Strength Calculation (cont'd)

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 = 29.0 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

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
433.920 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: config photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 2.8 dB margin compare with the average limit

TEST PERSONNEL:

Signature

Melvin Nip, Senior Lead Engineer
Typed/Printed Name

November 24, 2008
Date

Company: SimpliSafe, Inc. Date of Test: November 21, 2008
Model: ES1000

Table 1

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

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	433.920	72.6	16	25.0	3.6	78.0	80.8	-2.8
V	867.840	30.6	16	31.0	3.6	42.0	60.8	-18.8
H	*1301.760	50.3	33	26.1	3.6	39.8	54.0	-14.2
H	1735.680	53.2	33	27.2	3.6	43.8	60.8	-17.0
H	2169.600	49.4	33	29.4	3.6	42.2	60.8	-18.6
H	2603.520	47.2	33	30.4	3.6	41.0	60.8	-19.8
H	3037.440	45.3	33	31.9	3.6	40.6	60.8	-20.2
H	3471.360	44.1	33	31.9	3.6	39.4	60.8	-21.4

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	433.920	72.6	16	25.0	81.6	100.8	-19.2
V	867.840	30.6	16	31.0	45.6	80.8	-35.2
H	*1301.760	50.3	33	26.1	43.4	74.0	-30.6
H	1735.680	53.2	33	27.2	47.4	80.8	-33.4
H	2169.600	49.4	33	29.4	45.8	80.8	-35.0
H	2603.520	47.2	33	30.4	44.6	80.8	-36.2
H	3037.440	45.3	33	31.9	44.2	80.8	-36.6
H	3471.360	44.1	33	31.9	43.0	80.8	-37.8

Notes: 1. Peak detector data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic 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 harmonic 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.

* Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Melvin Nip

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

4.0 **Equipment Photographs**

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

EXHIBIT 5

PRODUCT LABELLING

5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

EXHIBIT 6

TECHNICAL SPECIFICATIONS

6.0 Technical Specifications

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 7

INSTRUCTION MANUAL

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 **Miscellaneous Information**

This miscellaneous information includes details of the measured bandwidth plot, 5-second transmission plot, the test procedure and calculation of factors such as pulse desensitization and averaging factor.

8.1 **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 430kHz, at 20dBc where the bandwidth limit is 1084kHz.

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

Refer to the following plot for 20dB bandwidth: Plot E1: 20dB Bandwidth.

8.2 **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.

8.3 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

The effective period (T_{eff}) was 1ms. With a resolution bandwidth (3dB) of 100kHz, the pulse desensitivity factor was 0dB.

8.4 Calculation of Average Factor

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 $20 \log_{10} [(44 + 2 + 20)\text{ms}/100] = -3.6\text{dB}$

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

8.5 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

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 Exhibit 8.3.

The frequency range scanned is 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 40 GHz, whichever is lower. For line conducted emissions (if any), the range scanned is 150 kHz to 30 MHz.

8.5 **Emissions Test Procedures (cont'd)**

The EUT is warmed up for 15 minutes prior to the test.

AC power (if any) to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2003. There is no AC power line connected to the EUT and the test is not applicable.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

EXHIBIT 9

LETTER OF AGENCY

9.0 Letter of Agency

For electronic filing, a copy of the Letter of Agency is saved with filename: letter of agency.pdf.

EXHIBIT 10

CONFIDENITIALITY REQUEST

10.0 **Confidentiality Request**

For electronic filing, a preliminary copy of the Confidentiality Request is saved with filename: request.pdf