

Resolution Products, Inc.

**Home Automation Device
FCC ID: U5X-RE920A**

Certification Test Report

April 12, 2012

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1. Introduction

This device is a transceiver for use in home automation applications. It controls other devices such as lights, thermostats, sirens, etc. The device is powered by a GE SimonXT security system through its rear connector. The SimonXT supplies 10VDC.

The device has two transmitters. One transmitter is controlled by a Zensys ZM3102N Zwave module centered at 908.415MHz. The other transmitter is implemented with an Infineon TDK5101F transmitter chip and is centered at 319.5MHz. The transmitters do not transmit at the same time. The device measures 4.1 x 1.9”.

Certification is requested under FCC Rules, Part 15, Subpart C, Paragraphs 15.249 and 15.231.

2. Statement of Compliance

Specific sections of FCC Rules Part 2 that require information or listing are given below.

2.1. FCC Part 2 §2.907

This is an application for certification of original equipment.

2.2. FCC Part 2 §2.911

- a) This application has been filed electronically using form 731.
- b) All required information has been supplied in this application and its attachments.
- c) This application has been electronically signed by an officer of Resolution Products, Inc.
- d) The technical test data has been signed by the agency performing the testing.
- e) Signature supplied in appropriate block on form 731.
- f) Processing fee has been paid.
- g) Signatures have been supplied electronically.

2.3. FCC Part 2 §2.913

- a) This application has been filed electronically.
- b) Appropriate fees have been filed electronically.
- c) Equipment samples shall be supplied as requested.

2.4. FCC Part 2 §2.915

We are requesting a grant of certification. This application shows compliance with the technical standards.

2.5. FCC Part 2 §2.925

A label shall be affixed to each piece of equipment, showing the FCC identifier. The label shall read “FCC ID: U5X-RE920A”. See Exhibit A for a photograph showing the label and location on the device.

2.6. FCC Part 2 §2.943, 2.945

Sample production equipment shall be submitted to the FCC upon request.

2.7. FCC Part 2 §2.947

- a) Measurement procedure follows ANSI C63.4: 2009.
- b) A description of utilized test equipment is contained in the report.

2.8. FCC Part 2 §2.948

Radiated measurements were taken at the following FCC-approved facility:

Rhein Tech Laboratories, Inc.

360 Herndon Parkway, Suite 1400

Herndon, VA 20170 USA

Contact: Rick McMurray

703-689-0368

2.9. FCC Part 2 §2.1033

- a) Form 731 has been filed electronically.
- b) The technical report, along with its exhibits, contains the information as follows:
 - (1) full name and mailing address of the manufacturer of the device and the applicant for certification:
Resolution Products, Inc.
226 Locust Street, Suite 4
Hudson, WI 54016
 - (2) FCC Identifier is U5X-RE920A
 - (3) Copy of the installation/user instructions is furnished as Exhibit E.
 - (4) A brief description of the device and operation is furnished in Exhibit F. Schematic is furnished in Exhibit G.
 - (5) Block diagram furnished in Exhibit H.
 - (6) This document constitutes a technical test report.
 - (7) Internal and external photographs have been furnished in Exhibits A and C.
 - (8) Not applicable. There are no peripheral or accessory devices used with this device. It is a standalone device.
 - (9) This application not pursuant to the transition rules of section 15.37
 - (10) Not applicable. This device does not include a scanning receiver.
 - (11) Not applicable.
 - (12) Not applicable.
- c) Not applicable. This device shall operate under Part 15 of the rules.
- d) Not applicable.
- e) Not applicable. This is not a composite system.

3. Discussion of Laboratory Measurements and Rules Compliance

3.1. FCC Part 15 §15.249

The 908.415MHz transmitter is tested and certified under section 15.249.

3.1.1. FCC Part 15 §15.249(a)

3.1.1.1. Raw Field Strength Limits

The following field strength limits are specified in §15.249(a):

Fundamental: 94dBuV/m

Harmonics: 74dBuV/m

3.1.1.2. Measured Radiated Field Strength Data

Measured radiated field strength data is shown in Exhibit L. Emissions data was taken at 3 meters in all three orthogonal planes in order to measure the highest peak emissions. Emissions from 0.009 MHz to the tenth harmonic were measured as per §15.33(a). Appropriate correction factors were applied to account for cable and other site-specific losses. This is referred to in the table as the Site Correction Factor. The highest measurements are shown in the table for each frequency showing measurable signal.

The fundamental signal, at 87.9dBuV/m, passed by 6.1dB.

The highest spurious signal was the second harmonic, which passed by 22.2dB.

Photographs of the test site are shown in Exhibit M.

3.1.2. FCC Part 15 §15.249(d)

§15.249(d) states that all emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuate by at least 50dB below the level of the fundamental or to the general radiated emissions limits in 15.209, which ever is the lesser attenuation. 15.209 is the lesser attenuation in this case. 15.209 states a limit of 200uV/m, or 46dBuV/m.

The measured radiated field strength data is shown in Exhibit L. This data shows that all emissions except for harmonics fall below the required limit.

3.2. FCC Part 15 §15.231

The 319.5MHz transmitter is tested and certified under section 15.231.

3.2.1. FCC Part 15 §15.231(a)(3)

This device does not send supervisory transmissions.

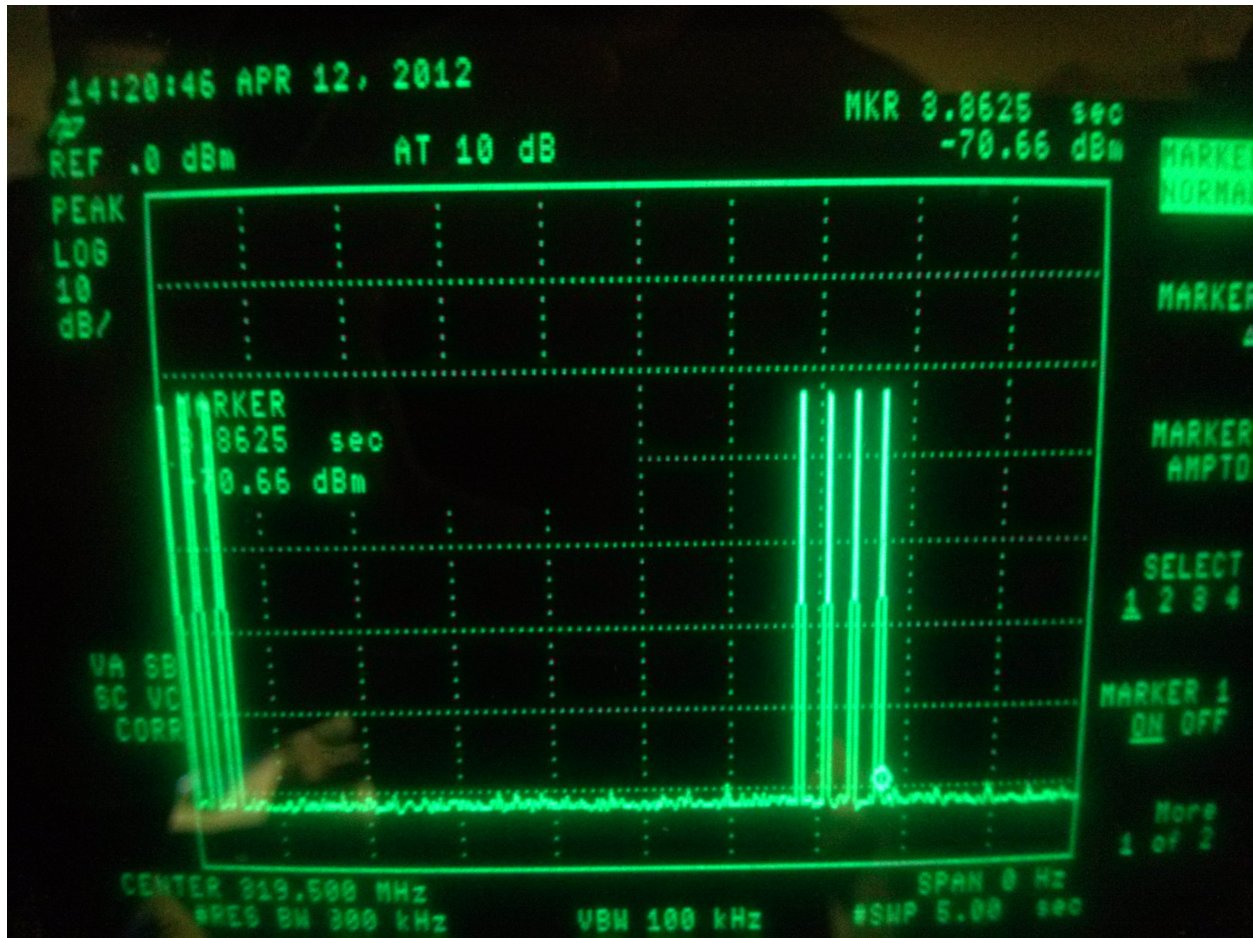
3.2.2. FCC Part 15 §15.231(a)(4)

This 319.5MHz transmitter is activated by the siren output signal on the Simon security system. This siren output signal activates in the case of an alarm or arming situation. Two transmission packets are sent by the device upon valid activation. These packets are approximately 17ms in length and are sent with a spacing of approximately 150ms. As allowed by this rules section, packets are sent during the pendency of the alarm condition, at a rate of two packets every 4.5 seconds.

At the end of the activation, three turn-off packets are sent. Then, 3 seconds later, 4 final turn-off packets are sent.

The device does not continue transmitting beyond the packets resulting from each activation. In the absence of activations from the security system, the transmitter does not transmit at all.

A plot of the transmissions is shown below. This plot shows the transmissions occurring in a 5 second window as a result of one activation ending. The packets are shown to conclude within the 5-second window of the end of the activation. This plot made using Hewlett Packard Model 8594E Spectrum Analyzer.



3.2.3. FCC Part 15 §15.231(a)(5)

There is no setup information transmitted with this device.

3.2.4. FCC Part 15 §15.231(b)

3.2.4.1. Raw Field Strength Limits

Interpolation performed on the data in the §15.231(b) table yields raw field strength limits as follows:

Fundamental: 75.9dBuV/m
Spurious: : 55.9dBuV/m

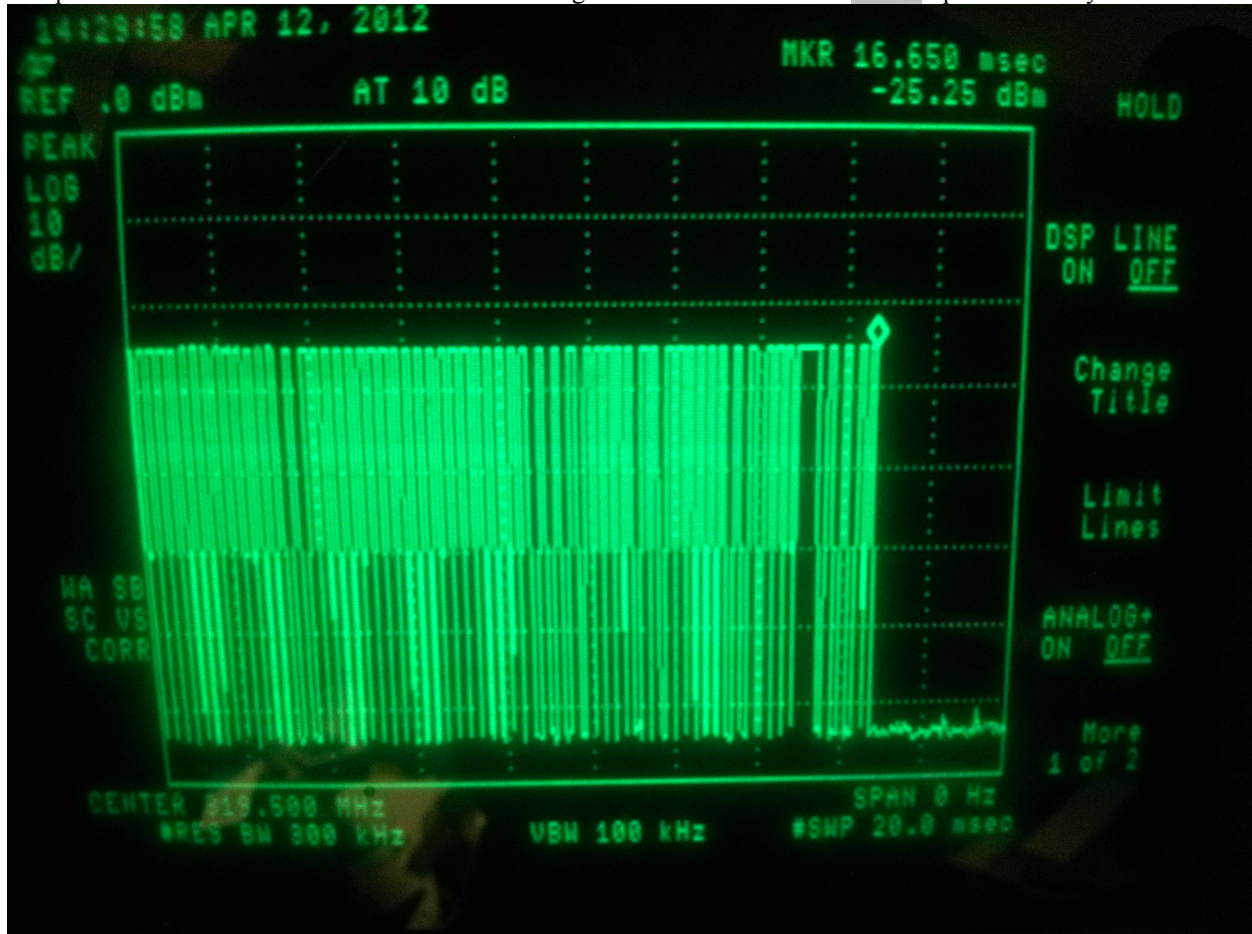
Certain harmonics of the transmitted signal fall in the restricted bands of §15.205. These harmonics are all above 960MHz and have the following limit as given in §15.209:

Restricted band limit = 500uV/m = 54dBuV/m.

3.2.4.2. Duty Cycle Correction Factor and Resulting Limits

This transmitter uses ASK modulation. 63 bits are transmitted in each packet, and the “on” time for each bit is 122usec, except for one bit which has an "on" time of 366usec. The resulting “on” time per packet is 7.93ms. The transmitted packets are limited to one packet in a 125ms period. The transmitter duty cycle over a 100ms time period is therefore $7.93/100 = 7.93\%$.

The packet width measurement below was made using Hewlett Packard Model 8594E Spectrum Analyzer.



Calculating the allowed duty cycle correction factor as given in §15.35(c):

$$20\log(7.93/100) = -22.01\text{dB}$$

This transmitter therefore qualifies for the maximum duty cycle correction factor allowed in §15.35(c). The maximum duty cycle correction factor allowed is 20dB. Resulting radiated field strength limits are as follows:

Fundamental:	95.9dBuV/m
Spurious: :	75.9dBuV/m
Restricted Band:	74dBuV/m

3.2.4.3. Measured Radiated Field Strength Data

Radiated emissions of the harmonics were tested at three meters. The EUT was tested in the three orthogonal planes with the receive antenna in both polarities. The emissions were maximized per ANSI C63.4:2003 8.3.1.2; that is, the measurement antenna height was varied between 1 and 3m, and the EUT was rotated through 360 degrees on a rotating turntable until the maximum emissions were found. Both horizontal and vertical measurement antenna polarizations were used. A resolution bandwidth of 100kHz was used for frequencies less than 1000MHz, and a resolution bandwidth of 1MHz was used for frequencies greater than or equal to 1000MHz. The video bandwidth was set to a value at least three times greater than the resolution bandwidth.

The EUT was adapted to continuously transmit for testing purposes.

Measured radiated field strength data is shown in Exhibit I.

The fundamental signal, at 90.9dBuV/m, passed by 0.8dB
The highest spurious signal was the 7th harmonic, which passed by 13.6dB.

Photographs of the test site are shown in Exhibit J.

3.2.5. FCC Part 15 §15.231(c)

Allowed 20dB bandwidth of the transmitted signal is 0.25% of the carrier frequency.

BW Limit = $0.0025 \times 319.5\text{MHz}$

BW Limit = 0.799MHz

Bandwidth measurements were made using Hewlett Packard Model 8594E Spectrum Analyzer. The plot below shows the modulated signal. Bandwidth of the modulated signal is 27.3kHz or 0.0273MHz. These measurements show compliance with the bandwidth requirements.

