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DATE: 28 July 2014

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

Visonic Ltd.

Equipment under test:

PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna

Tower CAM PG2

Written by: _____
R. Pinchuck, Documentation

Approved by: _____
M. Zohar, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Measurement/Technical Report for
Visonic Ltd.

PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna

Tower CAM PG2

FCC ID: WP3TOWERCAMPG2

IC: 1467C-TOWERCAMPG2

This report concerns:	Original Grant:	X
	Class I Change:	
	Class II Change:	

Equipment type: Frequency Hopping Spread Spectrum

Limits used: 47CFR15 Section 15.247

Measurement procedures used are FCC Public Notice DA-00-705 and ANSI C63.4: 2003.

Application for Certification prepared by:

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Applicant for this device: (different from "prepared by")

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1. General Information

1.1 *Administrative Information*

Manufacturer:	Visonic Ltd.
Manufacturer's Address:	Habarzel 24 Tel Aviv Israel 69710 Tel: +972-3-645-6789 Fax: +972-3-645-6788
Manufacturer's Representative:	Arick Elshtein
Equipment Under Test (E.U.T):	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Equipment Model No.:	Tower CAM PG2
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	08.07.14
Start of Test:	08.07.14
End of Test:	09.07.14
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	47CFR15 Section 15.247 RSS-210, Issue 8, 2010

1.2 *List of Accreditations*

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 *Product Description*

The TOWER CAM PG2 is a 2-way, wireless outdoor digital mirror PIR detector with built-in camera. Activated upon PIR detection or upon demand, the TOWER CAM PG2 sends clear images to the Monitoring Station for alarm image verification.

1.4 *Test Methodology*

Radiated testing was performed according to the procedures in FCC Public Notice DA 00-705 and ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 *Test Facility*

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing November 21, 2012).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 *Measurement Uncertainty*

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB

2. System Test Configuration

2.1 *Justification*

Unit was tested in a typical wall mounted orientation, same as installation position, transmitting from internal antenna at the max power at 3 different channels. Modulated GFSK 50Kbps Data Rate.

2.2 *EUT Exercise Software*

The EUT was tested when programmed with the formal, commercially released firmware, configured to transmit periodically at maximum transmission rate.

2.3 *Special Accessories*

No special accessories were needed in order to achieve compliance.

2.4 *Equipment Modifications*

No modifications were needed in order to achieve compliance

2.5 *Configuration of Tested System*

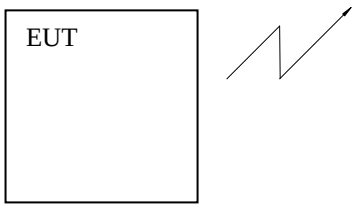

Figure 1. Configuration of Tested System

3. Radiated Measurement Test Set-up Photos

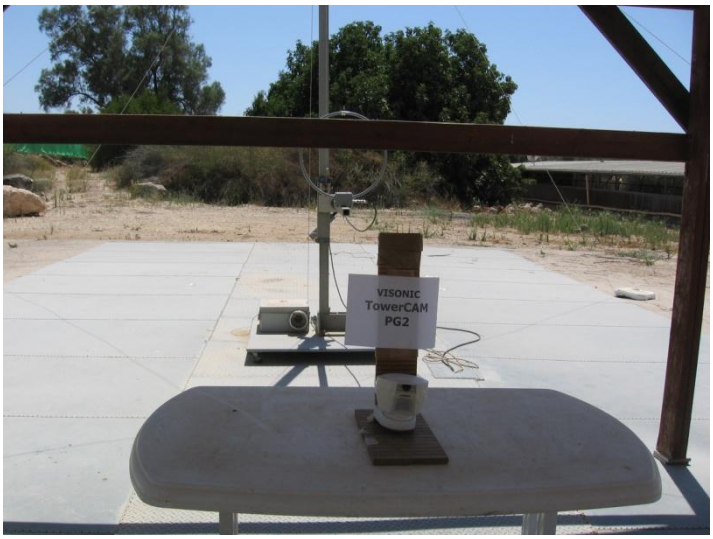

Figure 2. Radiated Emission Test

Figure 3. Radiated Emission Test

Figure 4. Radiated Emission Test

Figure 5. Radiated Emission Test

4. 20dB Minimum Bandwidth

4.1 *Test Specification*

F.C.C. Part 15, Subpart C: 15.247(a)(1)(i)

4.2 *Test procedure*

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.
The transmitter unit operated with normal modulation. The spectrum analyzer was set to 10 kHz resolution BW. The spectrum bandwidth of the transmitter unit was measured and recorded. The test was performed to measure the transmitter occupied bandwidth. The EUT was set up as shown in *Figure* 1, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on modulation envelope.
The E.U.T. was tested at Low (912.750 MHz) and High (919.106 MHz) channels

4.3 *Test Results*

Operation Frequency (MHz)	Bandwidth Reading (kHz)	Specification (kHz)
912.750	106.0	<250
919.106	107.0	<250

Figure 6 — 20 dB Minimum Bandwidth Test Results Table

JUDGEMENT: Passed

For additional information see *Figure 7 to Figure 8.*

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

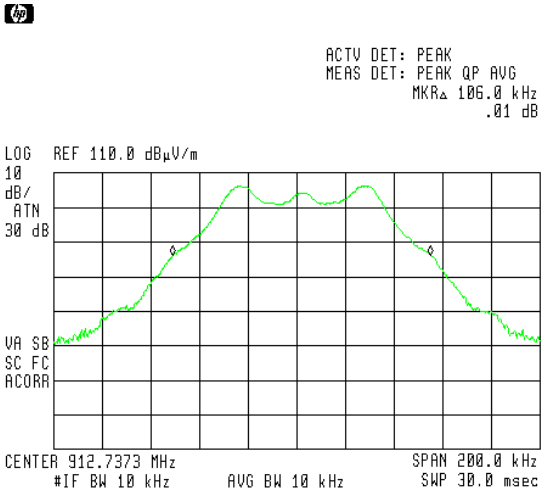

Figure 7. — 912.75 MHz

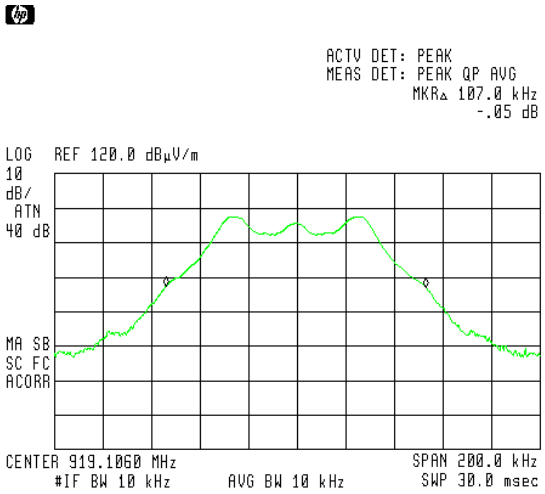

Figure 8. — 919.106 MHz

4.4 *Test Equipment Used, 20 dB Minimum Bandwidth*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 9 Test Equipment Used

5. 26dB Minimum Bandwidth

5.1 *Test Specification*

F.C.C. Part 15, Subpart C: 15.247(a)(1)(i)

5.2 *Test procedure*

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters.
The transmitter unit operated with normal modulation. The spectrum analyzer was set to 10 kHz resolution BW. The spectrum bandwidth of the transmitter unit was measured and recorded. The test was performed to measure the transmitter occupied bandwidth. The EUT was set up as shown in *Figure* 1, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on modulation envelope.
The E.U.T. was tested at Low (912.750 MHz) and High (919.106 MHz) channels

5.3 *Test Results*

Operation Frequency (MHz)	Bandwidth Reading (kHz)
912.750	120.0
919.106	120.5

Figure 10 — 26 dB Minimum Bandwidth Test Results Table

JUDGEMENT: Passed

For additional information see Figure 11 *to* Figure 12.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

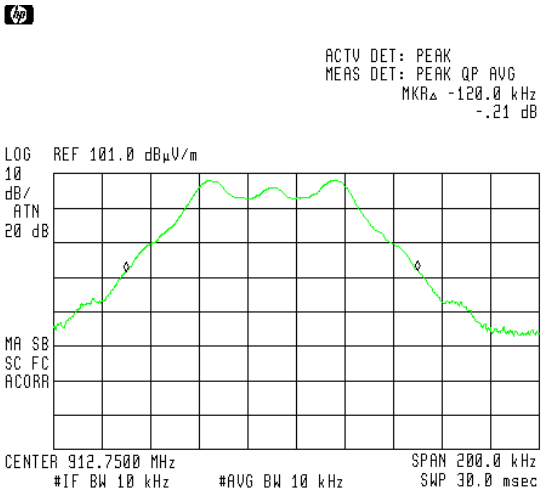

Figure 11. — 912.75 MHz

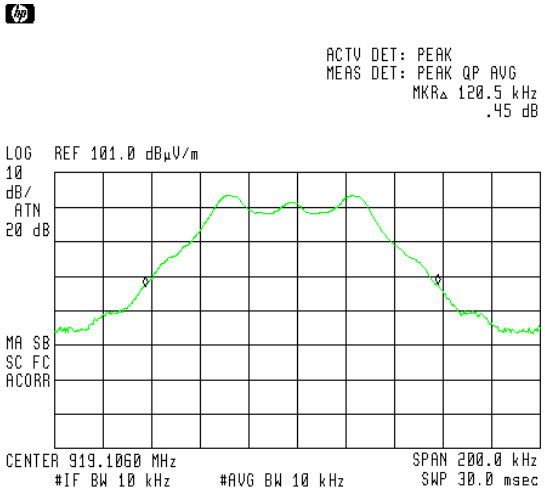

Figure 12. — 919.106 MHz

5.4 *Test Equipment Used, 26 dB Minimum Bandwidth*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 13 Test Equipment Used

6. Number of Hopping Frequencies

6.1 *Test Specification*

F.C.C., Part 15, Subpart C Section 15.247(a)(1)(i)

6.2 *Test Procedure*

The E.U.T. was set to hopping mode.
The spectrum analyzer was set to the following parameters:

Band of Operation: 902-928 MHz
RBW: 30 kHz
VBW: 30 kHz
Detector Function: Peak
Trace: Maximum Hold

6.3 *Test Results*

Number of Hopping Frequencies	Specification
50	>=50

Figure 14 Number of Hopping Frequencies Test Results Table

JUDGEMENT: Passed

For additional information see *Figure 15* to *Figure 21*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

Number of Hopping Frequencies

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

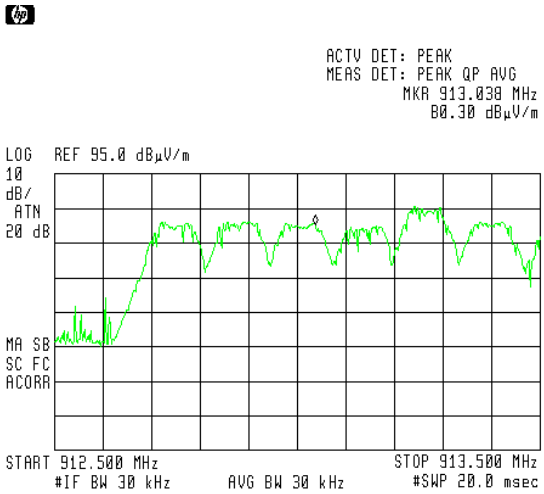

Figure 15. Number of Channels

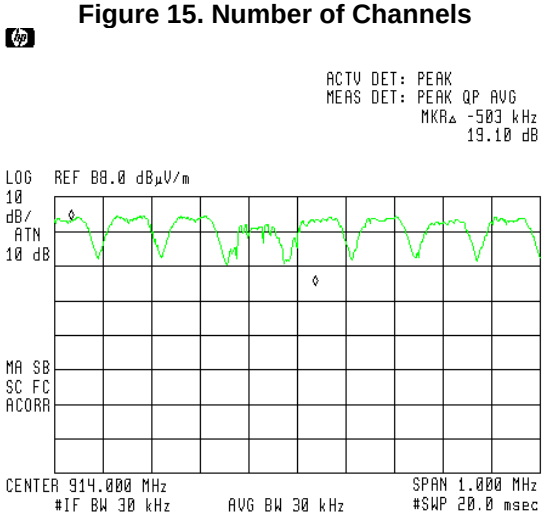

Figure 16. Number Of Channels

Number of Hopping Frequencies

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

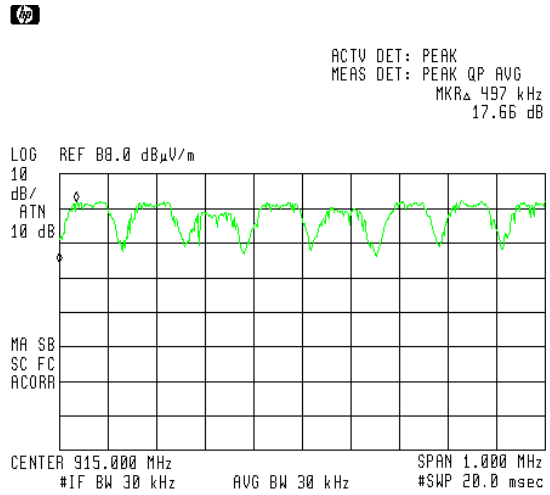

Figure 17. Number Of Channels

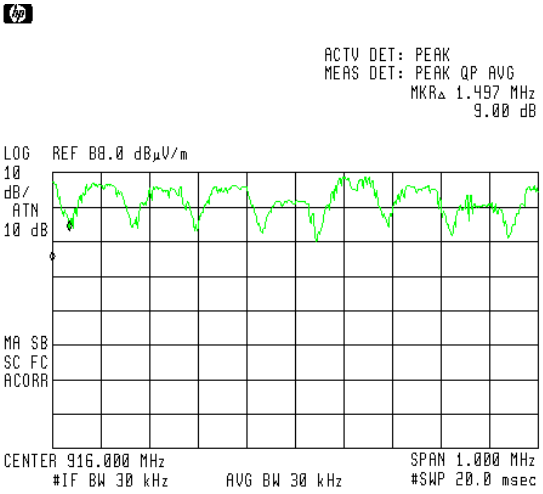

Figure 18. Number Of Channels

Number of Hopping Frequencies

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

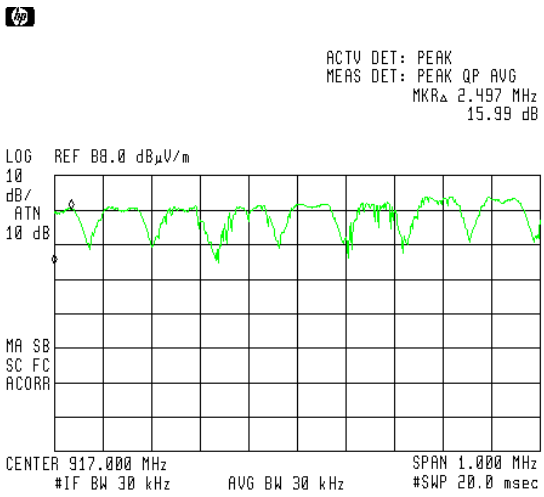

Figure 19. Number Of Channels

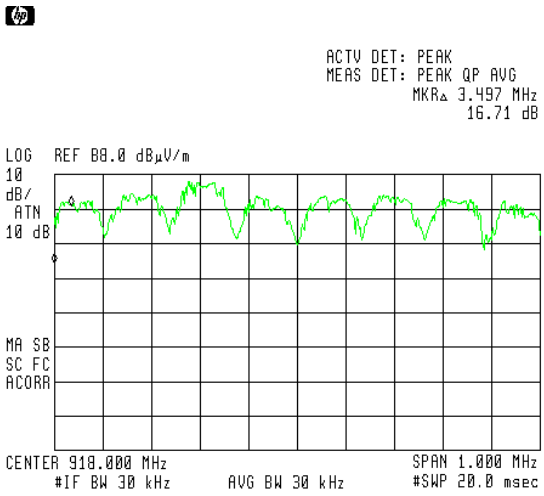

Figure 20. Number Of Channels

Number of Hopping Frequencies

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

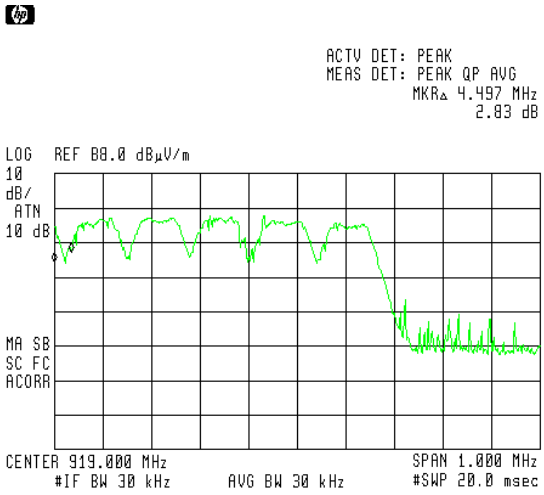

Figure 21. Number Of Channels

6.4 *Test Equipment Used, Number of Hopping Frequencies*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 22 Test Equipment Used

7. Channel Frequency Separation

7.1 *Test Specification*

FCC Part 15, Subpart C, 15.247(a) (1)

7.2 *Test procedure*

The E.U.T. was set to hopping mode.
The spectrum analyzer was set to the following parameters:

RBW: 30 kHz
VBW: 30 kHz
Detector Function: Peak
Trace: Maximum Hold

The marker delta function to determine the separation between the peaks of the adjacent channels was used.

7.3 *Test Results*

Channel Frequency Separation (kHz)	Specification (kHz)	Margin (kHz)
130	>100	30

Figure 23 Channel Frequency Separation Test Results Table

JUDGEMENT: Passed by 30 kHz

For additional information see *Figure 24*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

Channel Frequency Separation

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

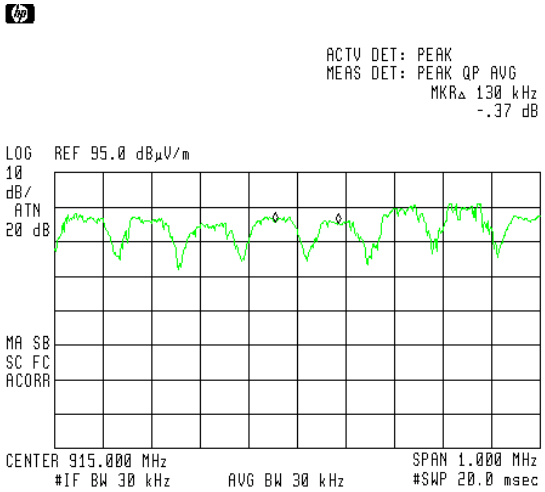

Figure 24. Channel Frequency Separation

7.4 *Test Equipment Used, Channel Frequency Separation Test*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 25 Test Equipment Used

8. Radiated Maximum Power Output

8.1 *Test Specification*

F.C.C. Part 15, Subpart C: 15.247(b)(2)

8.2 *Test procedure*

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters. The transmitter unit operated with normal modulation. The EMI receiver was set to 100 kHz resolution BW. The EUT was set up as shown in *Figure* 1, and its proper operation was checked.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization/

The worst case emission were measured vertically

Radiated output power levels were measured at selected operation frequencies and the results were converted to power level according to the formula as shown below:

$$P = \frac{(E_{V/m} \times d)^2}{(30 \times G)} \text{ [W]}$$

The E.U.T. was tested at the Low (912.750 MHz) and High (919.106 MHz) channels with modulation.

8.3 *Test Results*

Frequency	Pol	E	Results	Limit	Margin
(MHz)		(dbµV/m)	(dBm)	(dBm)	(dB)
912.750	V	105.34	12.89	30	-17.11
912.750	H	107.24	15.02	30	-14.98
919.106	V	101.65	9.39	30	-20.61
919.106	H	107.87	15.74	30	-14.26

Figure 26 Radiated Power Output Test Results Table

JUDGEMENT: Passed by 14.26 dBm

For additional information see *Figure 27* to *Figure* 30.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

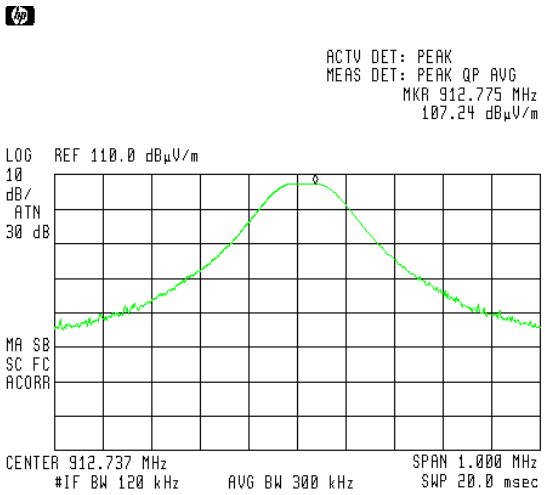

Figure 27 — 912.75 MHz-Horizontal

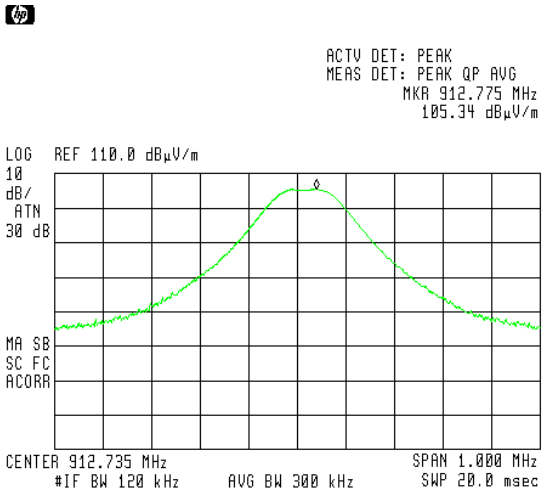

Figure 28 — 912.75 MHz-Vertical

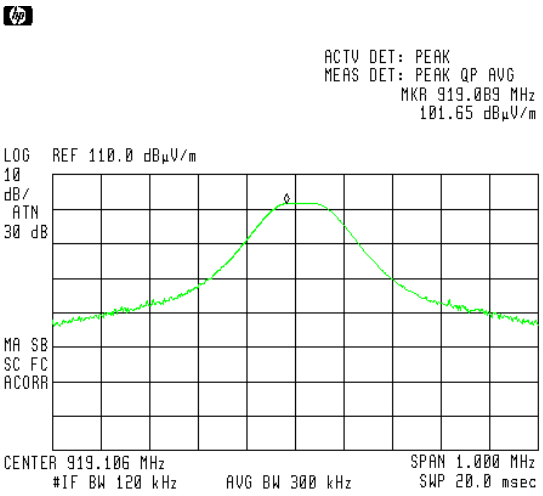

Figure 29 — 919.106 MHz VERTICAL

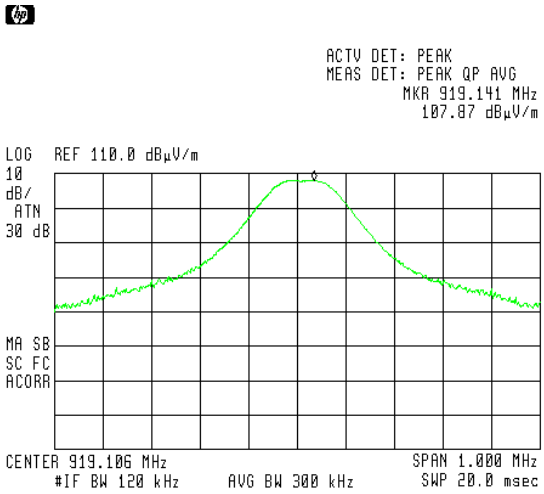

Figure 30 — 919.106 MHz HORIZONTAL

8.4 *Test Equipment Used, Radiated Maximum Power Output*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 31 Test Equipment Used

9. Dwell Time on Each Channel

9.1 *Test Specification*

FCC Part 15, Section 15.247(a)(1)(i)

9.2 *Test Procedure*

The E.U.T. was tested in radiated mode using the substitution antenna. The spectrum analyzer was set to 30 kHz VBW .

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 20 seconds

9.3 *Test Results*

The E.U.T met the requirements of the FCC Part 15, Section 15.247(a)(1)(i).

Additional information of the results is given in *Figure 32 to Figure 33*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

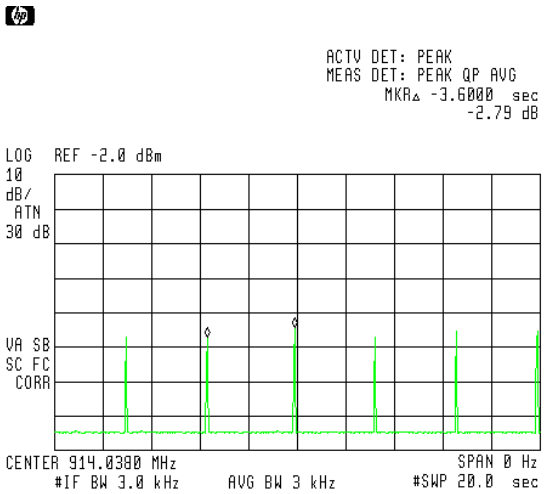

Figure 32 — Transmission Within 20 sec

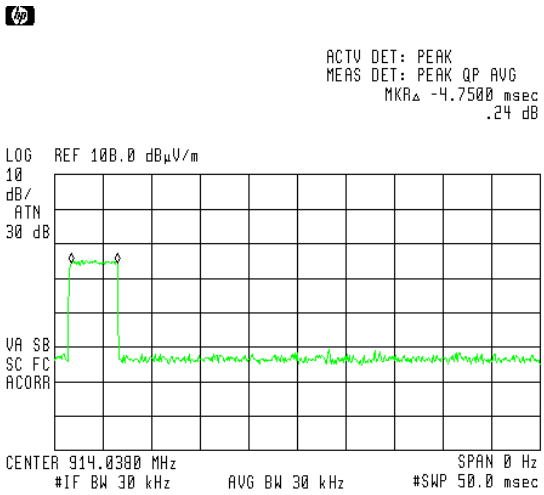

Figure 33 — Burst duration

(burst duration=4.75msec*6=28.5msec<400msec)

9.4 *Test Equipment Used, Dwell Time on Each Channel*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 34 Test Equipment Used

10. Band Edge

10.1 *Test Specification*

FCC Part 15, Section 15.247(d)

10.2 *Test procedure*

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters. The transmitter unit operated with normal modulation. The EMI receiver was set to 120 kHz resolution BW. The EUT was set up as shown in *Figure* 1, and its proper operation was checked.

The EMI receiver was adjusted to the transmission channel at the maximum radiated level. The display line was set to 20 dBc and the EMC analyzer was set to the band edge frequencies.

The E.U.T. was tested at the lower and the upper channels.

10.3 *Test Results*

Operation Frequency (MHz)	**Band Edge Frequency** (MHz)	**Spectrum Level** (dBuV/m)	**Specification** (dBuV/m)
Low	902.0	53.0	87.0
High	928.0	53.3	87.6

Figure 35 Band Edge Test results table

JUDGEMENT: Passed

For additional information see *Figure 36* to *Figure 37*.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

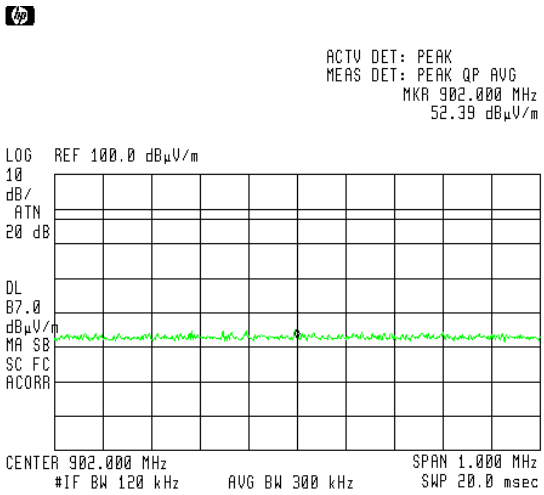

Figure 36 — 912.75 MHz horizontal

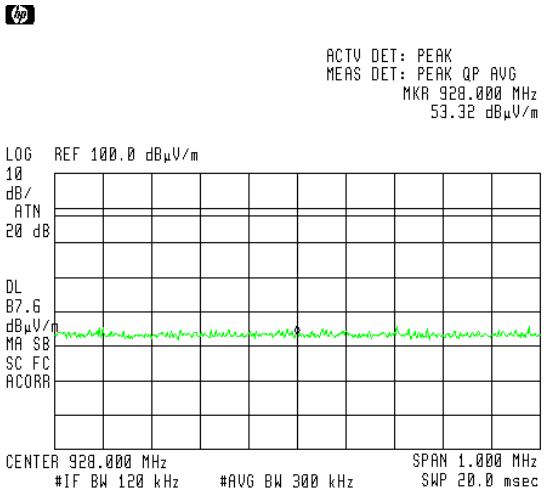

Figure 37 — 919.106 MHz horizontal

10.4 *Test Equipment Used, Band Edge Spectrum.*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 38 Test Equipment Used

11. Spurious Radiated Emission, 9 kHz – 30 MHz

11.1 *Test Specification*

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

11.2 *Test Procedure*

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying with CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequencies of 912.75 and 919.106 MHz. These frequencies were measured using a peak detector.

11.3 *Test Results*

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

The results for operating frequencies were the same.

No signals were detected in the frequency range of 9 kHz – 30 MHz.

TEST PERSONNEL:

Tester Signature:  Date: 28.07.14

Typed/Printed Name: M. Zohar

11.4 *Field Strength Calculation*

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

11.5 *Test Equipment Used, Spurious Radiated Emission 9 kHz – 30 MHz*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Loop Antenna	EMCO	6502	9506-2950	November 4, 2013	1 Year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 39 Test Equipment Used

12. Spurious Radiated Emission 30 MHz – 10 GHz

12.1 *Test Specification*

30 MHz- 10 GHz, F.C.C., Part 15, Subpart C

12.2 *Test Procedure*

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground.

The frequency range 30 MHz-10 GHz was scanned and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

In the frequency range of 30 MHz – 2.9 GHz, the emissions were measured using a computerized EMI receiver complying with CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9-10.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100 Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.
The test distance was 3 meters.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The E.U.T. was tested in 2 operating frequencies:
912.75 MHz; 919.106 MHz.

12.3 *Test Data*

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

For the operation frequency 912.75 MHz, the margin between the emission level and the specification limit is 16.6dB in the worst case at the frequency of 1825.5 MHz, horizontal polarization.

For the operation frequency 919.106 MHz, the margin between the emission level and the specification limit is 17.5dB in the worst case at the frequency of 2757.3 MHz, vertical polarization.

TEST PERSONNEL:

Tester Signature: _____ Date: 28.07.14

Typed/Printed Name: M. Zohar

Radiated Emission

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 10.0 GHz
Test Distance: 3 meters
Detector: Peak

Operation Frequency (MHz)	Freq. (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak Specification (dB µV/m)	Peak Margin (dB)
912.750	1825.5	H	57.4	74.0	-16.6
912.750	1825.5	V	54.7	74.0	-19.3
912.750	2738.2	H	57.3	74.0	-16.7
912.750	2738.2	V	56.8	74.0	-17.2
919.106	1838.2	H	55.8	74.0	-18.2
919.106	1838.2	V	52.5	74.0	-21.5
919.106	2757.3	H	56.5	74.0	-17.5
919.106	2757.3	V	54.6	74.0	-19.4

Figure 40. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission

E.U.T Description	PowerG, Outdoor Mirror PIR Motion Detector with Anti-Masking and Built-In Antenna
Type	Tower CAM PG2
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 30 MHz to 10.0 GHz
Test Distance: 3 meters
Detector: Peak

Operation Frequency	Freq.	Polarity	Peak Reading	Average Factor	Average Result	Average Specification	Average Margin
(MHz)	(MHz)	(H/V)	(dBµV/m)	(dB)	(dBµV/m)	(dB µV/m)	(dB)
912.750	1825.5	H	57.4	26.4	31.0	54.0	-23.0
912.750	1825.5	V	54.7	26.4	28.3	54.0	-25.7
912.750	2738.2	H	57.3	26.4	30.9	54.0	-23.1
912.750	2738.2	V	56.8	26.4	30.4	54.0	-23.6
919.106	1838.2	H	55.8	26.4	29.4	54.0	-24.6
919.106	1838.2	V	52.5	26.4	26.1	54.0	-27.9
919.106	2757.3	H	56.5	26.4	30.1	54.0	-23.9
919.106	2757.3	V	54.6	26.4	28.2	54.0	-25.8

Figure 41. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Average factor=20 LOG(4.75m/100m)=26.4

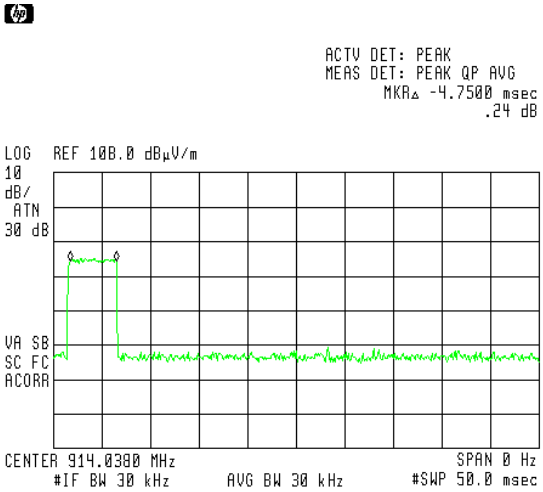

Figure 42 — Burst duration

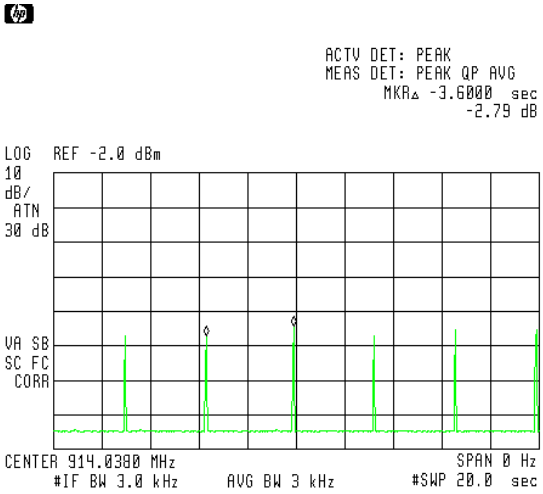

Figure 43 — Time Between Bursts

12.4 *Field Strength Calculation 30 – 1000 MHz*

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

12.5 *Test Equipment Used, Spurious Radiated Emission 30 MHz – 10 GHz*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 Year
RF Filter Section	HP	85420E	3705A00248	January 15, 2014	1 Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 Years
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2013	2 Years
Double Ridged Waveguide Horn Antenna	ETS	3115	29845	March 14, 2012	3 Years
Horn Antenna	ARA	SWH-28	1007	March 30, 2014	3 Years
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 21, 2013	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2013	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2014	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	March 2, 2014	1 Year
Spectrum Analyzer	Rodhe & Schwarz	FSL6	100194	December 1, 2013	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 44 Test Equipment Used

13. Antenna Gain/Information

The antenna gain is -3.0dBi.

14. R.F Exposure/Safety

The typical placement of the E.U.T. is wall or ceiling mounted. The typical distance between the E.U.T. and the user is 1m.

Calculation of Maximum Permissible Exposure (MPE)
Based on 47CFR1 Section1.1310 Requirements

(a) FCC Limit at 919.11 MHz is:

$$\frac{f}{1500} = 0.613 \frac{mW}{cm^2}$$

Using Table 1 of 47CFR1 Section 1.1310 limit for general population/uncontrolled exposures, the above levels are an average over 30 minutes.

(b) The power density produced by the E.U.T. is:

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t = Calculated Transmitted Power (includes G_t)

G_t = Antenna Gain -3.0 dBi= 0.5 dBi

R = Distance From Transmitter

(c) The peak power density produced by the E.U.T. is:

$$S_p = \frac{37.50}{4\pi(100)^2} = 2.984 \times 10^{-4} \frac{mW}{cm^2}$$

(d) This value is below the FCC limit.

15. APPENDIX A - CORRECTION FACTORS

15.1 *Correction factors for CABLE*

from EMI receiver to test antenna at 3 AND 10 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
30	1.96	700	11.25
35	2.08	800	12.53
40	2.26	900	13.86
45	2.43	1000	14.86
50	2.59	1200	15.7
55	2.65	1400	17.05
60	2.86	1600	18.2
65	2.96	1800	19.4
70	3.04	2000	21.3
75	3.27		
80	3.41		
85	3.54		
90	3.68		
95	3.77		
100	3.93		
110	4.19		
120	4.41		
130	4.6		
140	4.83		
150	5.06		
160	5.35		
170	5.57		
180	5.7		
190	5.84		
200	6.02		
250	6.86		
300	7.59		
350	8.09		
400	8.7		
450	9.15		
500	9.53		
550	9.82		
600	10.24		
650	10.74		

NOTES:

1. The cable type is **RG-214/U**

15.2 *Correction factors for Bilog ANTENNA*

Model: 3142
Antenna serial number: 1250
3 meter range

FREQUENCY (MHz)	AFE (dB/m)	FREQUENCY (MHz)	AFE (dB/m)
30	18.4	1100	25
40	13.7	1200	24.9
50	9.9	1300	26
60	8.1	1400	26.1
70	7.4	1500	27.1
80	7.2	1600	27.2
90	7.5	1700	28.3
100	8.5	1800	28.1
120	7.8	1900	28.5
140	8.5	2000	28.9
160	10.8		
180	10.4		
200	10.5		
250	12.7		
300	14.3		
400	17		
500	18.6		
600	19.6		
700	21.1		
800	21.4		
900	23.5		
1000	24.3		

15.3 *Correction factors for Horn ANTENNA*

Model: 3115
Antenna serial number: 6142
3 meter range

FREQUENCY (MHz)	Antenna Factor (dB/m)	FREQUENCY (MHz)	Antenna Factor (dB/m)
1000	23.9	10500	38.4
1500	25.4	11000	38.5
2000	27.3	11500	39.4
2500	28.5	12000	39.2
3000	30.4	12500	39.4
3500	31.6	13000	40.7
4000	33	14000	42.1
4500	32.7	15000	40.1
5000	34.1	16000	38.2
5500	34.5	17000	41.7
6000	34.9	17500	45.7
6500	35.1	18000	47.7
7000	35.9		
7500	37.5		
8000	37.6		
8500	38.3		
9000	38.5		
9500	38.1		
10000	38.6		

15.4 *Correction factors for ACTIVE LOOP ANTENNA*

Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2

16. Comparison Industry Canada Requirements With FCC

IC: 1467C-TOWERCAMPG2 **FCC ID:** WP3TOWERCAMPG2

Test	FCC	IC
20 dB BW	15.247(a)2	RSS 210 Issue 8 A8.1(a)
Number of Hopping Frequencies	15.247(a)(1)(i)	RSS 210 Issue 8 A8.1(c)
Channel Frequency Separation	15.247(a)(1)	RSS 210 Issue 8 A8.1(b)
Max power / Peak power	15.247(b)(2)	RSS 210 Issue 8 A8.4(1)
Dwell Time on Each Channel	15.205(c)	RSS GEN Issue 3, 7.2.5 (Table 5)
Band Edge	15.247(d)	RSS 210 Issue 8 A8.5
Spurious radiated emission in the restricted band	15.205(c)	RSS GEN Issue 3, 7.2.5 (Table 5)
RF Exposure Limits	1.1307(b)(1)	RSS 102 4.4