

# TEST REPORT

FROM



FOR

WattStopper. Inc

Microwave Sensor

Model: FM-105

TO

47 CFR 15.245 :2007

Test Report Serial No.:  
SL07050101-WAT-004(FCC 15.245)

This report supersedes None

**Remarks:**      Equipment complied with the specification            Equipment did not comply with the specification     

**This Test Report is Issued Under the Authority of:**

*Kevin Leong*

.....  
Tested by: Snell Leong, Test Engineer

*Snell Leong*

.....  
Reviewed by: Leslie Bai, Reviewer

Issue date: 28 May 2007  
Manufacturer: WattStopper. Inc



Registration No. 783147



Registration No. 4842

Industry Canada  
Industrie Canada



Lab Code: KR0032



RTA No. D23/16V



Registration No. 2195



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## **Executive Summary**

The purpose of this test programme was to demonstrate compliance of the WattStopper. Inc, Microwave Sensor, model FM-105 against the current 47 CFR 15.245 :2007. The Microwave Sensor demonstrated compliance with the 47 CFR 15.245 :2007.

WattStopper. Inc is the applicant and claimed manufacturer of this tested product. For the detailed description of this product, please refer to the Microwave Sensor User Manual.

The equipment under test operating frequency is 5800MHz.

The test has demonstrated that this unit complies with stipulated standards.



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## **1 Technical Details**

Purpose	Compliance testing of Microwave Sensor with 47 CFR 15.245 :2007
Applicant / Client	WattStopper. Inc 2800 De La Cruz Blvd Santa Clara, CA 95050
Manufacturer	WattStopper. Inc
Laboratory performing the tests	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test location(s)	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test report reference number	SL07050101-WAT-004(FCC 15.245)
Date EUT received	25 April 2007
Standard applied	47 CFR 15.245 :2007
Dates of test (from – to)	25 April 2007 to 30 April 2007
No of Units:	1
Equipment Category:	FDS
Trade/Product Name:	N/A
Type/Model Name/No:	FM-105
Technical Variants:	N/A
FCC ID No.	Q4BFM105
IC ID No.	N/A

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## **2 Tests Required**

The product was tested in accordance with the following specifications.

The test results recorded in this Test Report are exclusively referred to the tested sample(s).

<b>Test Standard</b>	<b>Description</b>	<b>Pass / Fail</b>
47 CFR 15.245 :2007	RSS 210 Issue 6: 2005	
15.203	Antenna Requirement	Pass
15.207(a)	Conducted Emissions Voltage	Pass
15.245 (a)	Fundamental & Radiated Spurious Emission Limits	Pass
ANSI C63.4: 2003 / RSS-Gen Issue 2: 2007		

*Notes: Deviations to above standards are outlined in specific test sections if applicable.*

*Cable loss and external attenuation are compensated for in the measurement system when applicable.*



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### **3 Antenna Requirement**

**Requirement(s):** 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

1) The EUT antenna is attached permanently to the device which meets the requirement.



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## **4 Measurements, Examinations and Derived Results**

### **4.1 General observations**

Equipment serial number(s)		
EUT:	Model number:	Serial number:
Microwave Sensor	FM-105	none



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## 4.2 Test Results

### 4.2.1 Conducted Emissions Voltage

**Requirement(s):** 47 CFR §15.207

**Procedures:**

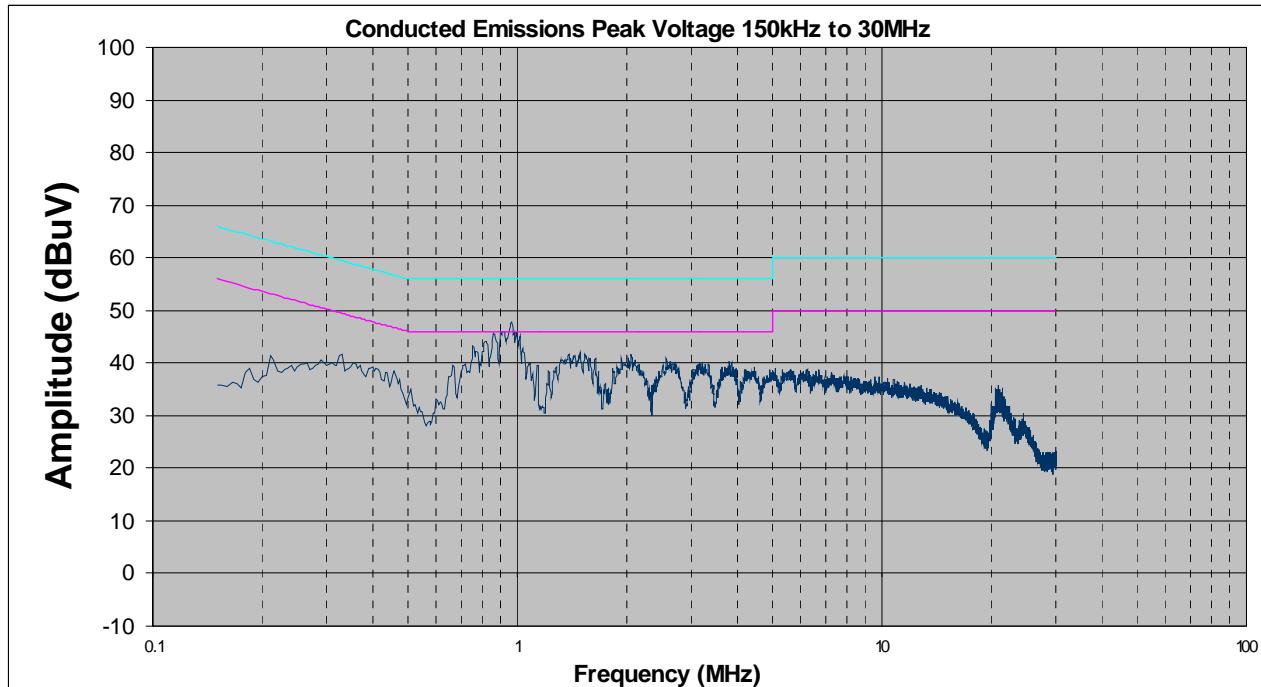
The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table. The power supply for the EUT was fed through a  $50\Omega/50\mu\text{H}$  EUT LISN, connected to filtered mains. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. All other supporting equipment were powered separately from another mains.

The EUT was switched on and allowed to warm up to its normal operating condition. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver. High peaks, relative to the limit line, were then selected. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz. Quasi-peak and Average measurements were made. The procedure was then repeated for the PHASE line.

**Results:**

Quasi-Peak Limit

Average Limit

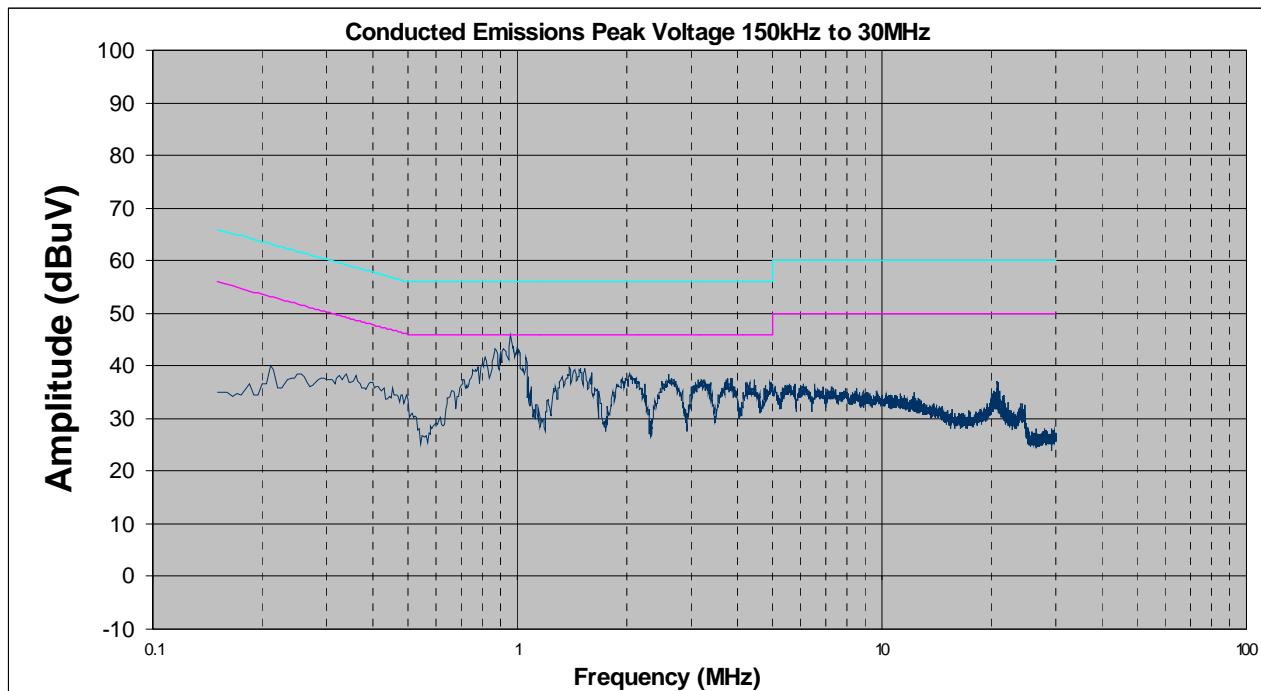


Neutral Line Plot at 120Vac, 60Hz

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[www.siemic.com](http://www.siemic.com)**Phase Line Plot at 120Vac, 60Hz**

LINE	FREQ (MHz)	Corrected Amplitude (dB $\mu$ V) PK	Limit (dB $\mu$ V) QP	Margin (dB) QP	Corrected Amplitude (dB $\mu$ V) PK	Limit (dB $\mu$ V) AVG	Margin (dB) AVG
Neutral	0.33	41.70	59.45	-17.75	35.60	49.45	-13.85
Neutral	1.49	40.10	56.00	-15.90	34.20	46.00	-11.80
Neutral	0.97	40.90	56.00	-15.10	34.80	46.00	-11.20
Phase	2.16	37.60	56.00	-18.40	33.10	46.00	-12.90
Phase	0.97	39.50	56.00	-16.50	35.50	46.00	-10.50
Phase	1.49	39.80	56.00	-16.20	36.60	46.00	-9.40

**Conducted Emission Table**

**Note:** PK = peak; QP = quasi-peak; AVG = average detector.

**Tested By: Snell Leong**  
**Date Tested: 08 May 2007**



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#### 4.2.2 Radiated Fundamental & Spurious Emissions

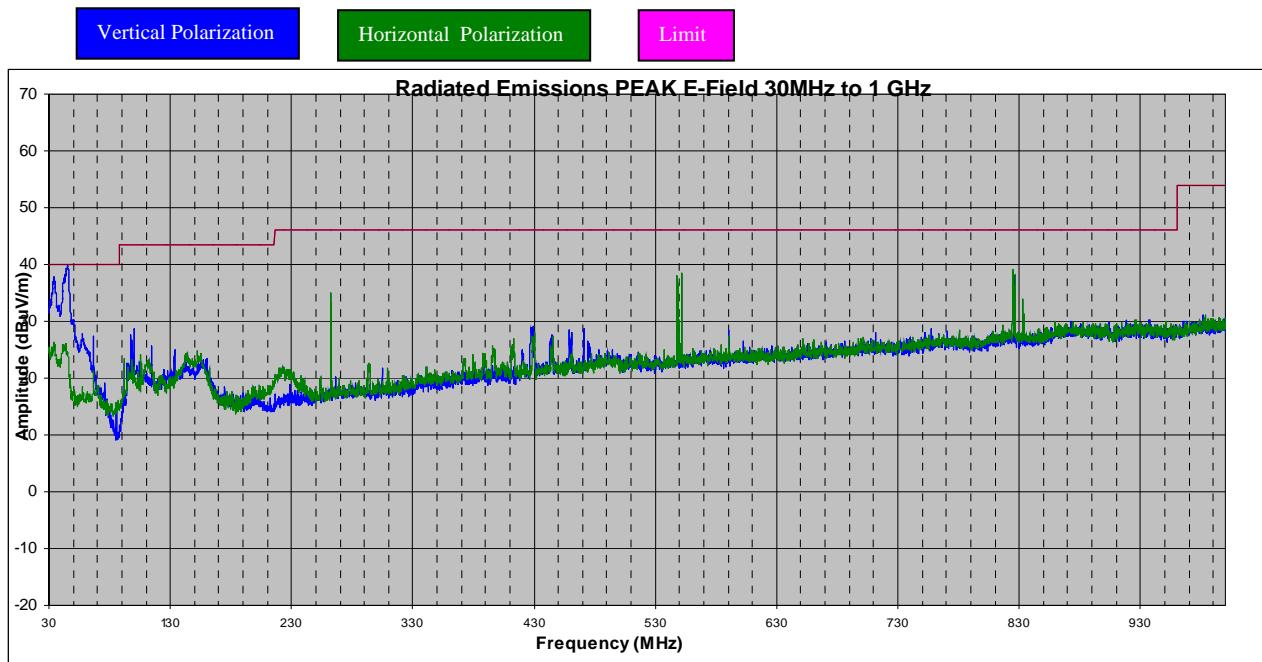
**Requirement(s):** 47 CFR §15.209; 47 CFR §15.245(B)

**Procedures:** Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz.

The limit is converted from microvolts/meter to decibel microvolts/meter.

Sample Calculation: Corrected Amplitude = Raw Amplitude(dB $\mu$ V/m) + ACF(dB) + Cable Loss(dB) – Distance Correction Factor

**Results: 30MHz ~ 1000MHz @ 3 Meter**



Frequency (MHz)	Azimuth (degrees)	Measure (Avg/QP)	Antenna Polarity (H/V)	Antenna Height (m)	Raw Amplitude @ 3m (dB $\mu$ V/m)	ACF (dBm)	CBL loss (dBm)	Corrected Amplitude @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)
34.85	180	QP	V	1	16.20	17.9	0.7	34.8	40	-5.20
45.20	200	QP	V	1	20.10	8.5	0.7	29.3	40	-10.70
100.50	0	QP	V	1	12.90	11.3	0.9	25.1	43.5	-18.40
262.00	0	QP	H	2.1	19.40	12.7	1	33.1	46	-12.90
548.00	180	QP	H	2.1	11.20	18.3	1.8	31.3	46	-14.70
826.00	0	QP	H	2.1	8.30	21.8	2.2	32.3	46	-13.70

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[www.siemic.com](http://www.siemic.com)**Results: 1GHz ~ 40GHz @ 1 Meter**

Frequency (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (dBuV)	Pre Amp. (dB)	Ant.Corr. Factor (dB)	Cable Loss (dB)	Distance	Corrected Field	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)	Remark
									Factor				
									dB				
5.800	0	H	1	83.3	32.41	34.47	3.89	10.00	79.24	134	-54.76	PK	Fund
5.800	0	H	1	83.5	32.41	34.47	3.89	10.00	79.44	114	-34.56	AVG	Fund
5.800	90	V	1.5	74.2	32.41	34.27	3.89	10.00	69.94	134	-64.06	PK	Fund
5.800	90	V	1.5	73.2	32.41	34.27	3.89	10.00	68.94	114	-55.06	AVG	Fund
11.600	0	H	1.4	49.4	32.50	43.17	5.98	10.00	56.05	74	-17.95	PK	2nd
11.600	0	H	1.4	43.8	32.50	43.17	5.98	10.00	50.45	54	-3.55	AVG	2 <sup>nd</sup>
11.600	0	V	1	46.9	32.50	41.79	5.98	10.00	52.17	74	-21.83	PK	2 <sup>nd</sup>
11.600	0	V	1	36.33	32.50	41.79	5.98	10.00	41.60	54	-12.40	AVG	2 <sup>nd</sup>
17.400	90	H	1	45.1	31.56	44.91	7.86	10.00	56.31	74	-17.69	PK	Noise Floor
17.400	312	H	1	32.2	31.56	44.91	7.86	10.00	43.41	54	-10.59	AVG	Noise Floor
17.400	0	V	1	45.5	31.56	44.99	7.86	10.00	56.79	74	-17.21	PK	Noise Floor
17.400	0	V	1	32.6	31.56	44.99	7.86	10.00	43.89	54	-10.11	AVG	Noise Floor
5.725	0	V	1	32.6	32.42	34.44	3.87	10.00	28.49	54	-25.51	AVG	Bandedge
5.725	0	H	1	32.5	32.42	34.44	3.87	10.00	28.39	54	-25.61	AVG	Bandedge
5.875	0	V	1	33.2	32.40	34.32	3.90	10.00	29.02	54	-24.98	AVG	Bandedge
5.875	0	H	1	32.1	32.40	34.32	3.90	10.00	27.92	54	-26.08	AVG	Bandedge

**Tested By: Snell Leong****Date Tested: 08 May 2007**

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## 5 **TEST INSTRUMENTATION**

### 5.1 **TEST INSTRUMENTATION**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>CAL Due Date</b>
Spectrum Analyzer	HP	8568B	04/26/2008
Quasi-Peak Adapter	HP	85650A	04/26/2008
RF Pre-Selector	HP	85685A	04/26/2008
Spectrum Analyzer	HP	8564E	05/01/2008
Power Meter	HP	437B	04/26/2008
Power Sensor	HP	8485A	04/26/2008
Antenna	EMCO	JB1	09/11/2007
Pre-Amplifier	HP(1G~26.5G)	8449	05/01/2008
Horn Antenna	COM Power(18G~40G)	AH-840	03/19/2010
Horn Antenna	EMCO(1G~18G)	3115	08/17/2007
DMM	Fluke	73III	05/01/2008
Variac	KRM	AEEC-2090	See Note
DMM	Fluke	51II	See Note
LISN (9k-30MHz)	Chase	MN2050B	4/26/2008

Note: Functional Verification

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## **APPENDIX A: EUT TEST CONDITIONS**

The following is the description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Cable Description
Microwave Sensor	1. AC Cord

EUT Description : Microwave Sensor
Model No : N/A
Serial No : none

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
All testing	The EUT was set to enter CW mode automatically when powered.



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## **APPENDIX B: EXTERNAL PHOTOS**

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## **APPENDIX C: CIRCUIT/BLOCK DIAGRAMS**

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## **APPENDIX D: INTERNAL PHOTOS**

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## **APPENDIX E: PRODUCT DESCRIPTION**

Detail description of this product is shown in the User's Guide.



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## **APPENDIX F: FCC LABEL LOCATION**

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## **APPENDIX G: USER MANUAL**

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