TEST REPORT

FROM

SIEMIC

For

MRDS10

To

47 CFR 15.247(f)

Test Report Serial No.:
SL05080202T-WSI-002

This report supersedes None

Remarks:

Equipment complied with the specification	[X]
Equipment did not comply with the specification	[ ]

This Test Report is Issued Under the Authority of:

.....
Tested by: Kerwinn Corpuz, Test Enginner

.....
Reviewed by: Alvin Ilarina, Lab Manager

Issue date: 12 October 2005

Equipment Details:
Manufacturer: The Wattstopper, Inc.

Registration No. 783147	Registration No. 4842	Lab Code: KR0032	RTA No. D23/16V	Registration No. 2195

This page has been left blank intentionally.

CONTENTS

This page has been left blank intentionally.

Executive Summary

The purpose of this test programme was to demonstrate compliance of the The Wattstopper, Inc., MRDS10 against the current 47 CFR 15.247(f). The MRDS10 demonstrated compliance with the 47 CFR 15.247(f).

The Wattstopper, Inc. is the applicant and claimed manufacturer of this tested product. For the detailed description of this product, please refer to the MRDS10 User Manual.

The equipment under test is a hybrid system operating in the 902-928MHz band.

The Equipment may be used with the MRDC10 desktop cradle charger or the MRDP10 wall mount cradle charger.

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

1 Technical Details

Purpose	Compliance testing of MRDS10 with 47 CFR 15.247(f)
Applicant / Client	The Wattstopper, Inc. 6212 Corte Del Abeto, Suite 200 Carlsbad, CA 92009
Manufacturer	The 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	SL05080202T-WSI-002
Date EUT received	28 September 2005
Standard applied	47 CFR 15.247(f)
Dates of test (from – to)	28 September 2005 to 03 October 2005
No of Units:	1
Equipment Category:	DTS
Trade/Product Name:	MRDS10
Type/Model Name/No:	MRDS10
Technical Variants:	MRDS10 w/MRDC10, MRDS10 w/MRDP10
FCC ID No.	Q4B-MRDS10

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).

Test Standard	Description	Pass / Fail
47 CFR 15.247(f)		
15.207	Conducted Emissions Voltage	Pass
15.207(a)	Occupied Bandwidth	Pass
15.247(a)(1)	Channel Separation	Pass
15.247(a)(1)	Number of Hopping Channels	Pass
15.247(f)	Time of Occupancy	Pass
15.247(b)(3)	Output Power	Pass
15.247(d)	Power Spectral Density	Pass
15.247(c)	Spurious Emissions	Pass
15.209; 15.247(c)	Spurious Radiated	Pass
ANSI C63.4: 2003		

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.

3 Measurements, Examinations and Derived Results

3.1 General observations

Equipment serial number(s)		
Module:	Part number:	Serial number:
MRDS10	MRDS10	none

3.2 Test Results

3.2.1 Conducted Emissions Voltage

Requirement(s): 47 CFR §15.207

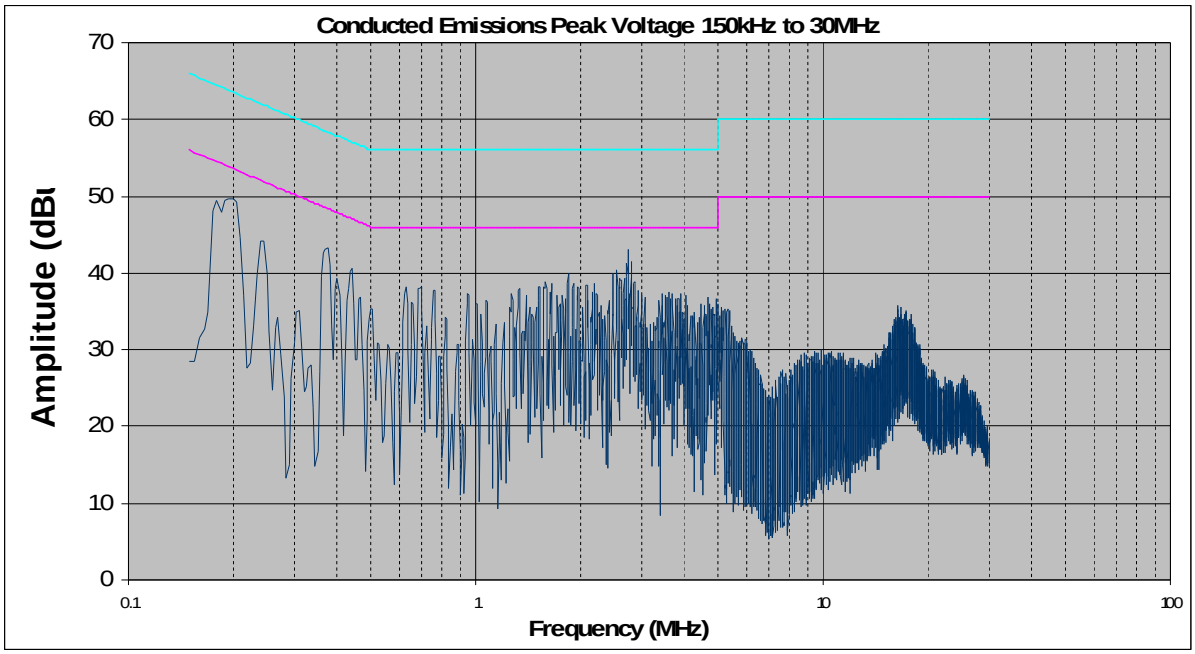
Procedures:

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 50Ω/50µH 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.

The EUT was testing in the two configurations that it can be installed in. The EUT was tested in the MRDC10 desktop cradle charger and the MRDP10 wall mount cradle charger.

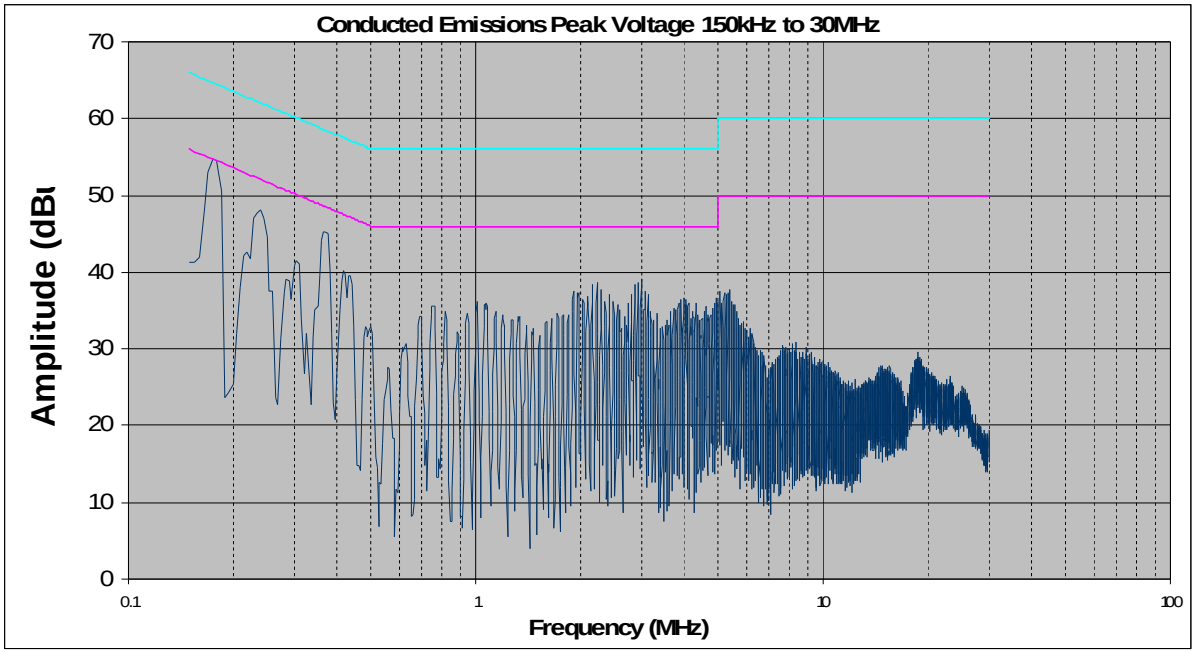
Results:



Neutral Plot: Desktop Cradle Charger

FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Corrected Amplitude (dBuV) QP	Limit (dBuV) AVG	Margin (dB) AVG
0.192	42.8	73	-30.2	42.8	60	-17.2
0.383	40.5	73	-32.5	40.5	60	-19.5
2.745	37.8	73	-35.2	37.8	60	-22.2

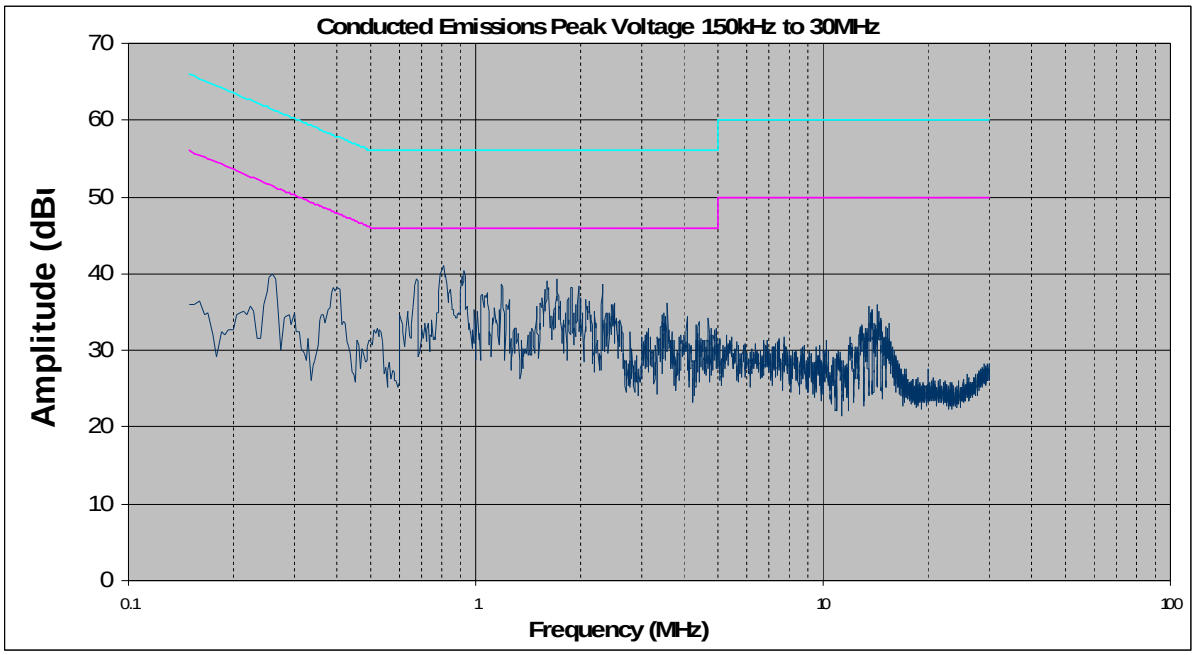
Neutral Table: Desktop Cradle Charger



Phase Plot: Desktop Cradle Charger

FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Corrected Amplitude (dBuV) QP	Limit (dBuV) AVG	Margin (dB) AVG
0.193	47.1	73	-25.9	47.1	60	-12.9
0.257	40.6	73	-32.4	40.6	60	-19.4
0.384	41.1	73	-31.9	41.1	60	-18.9

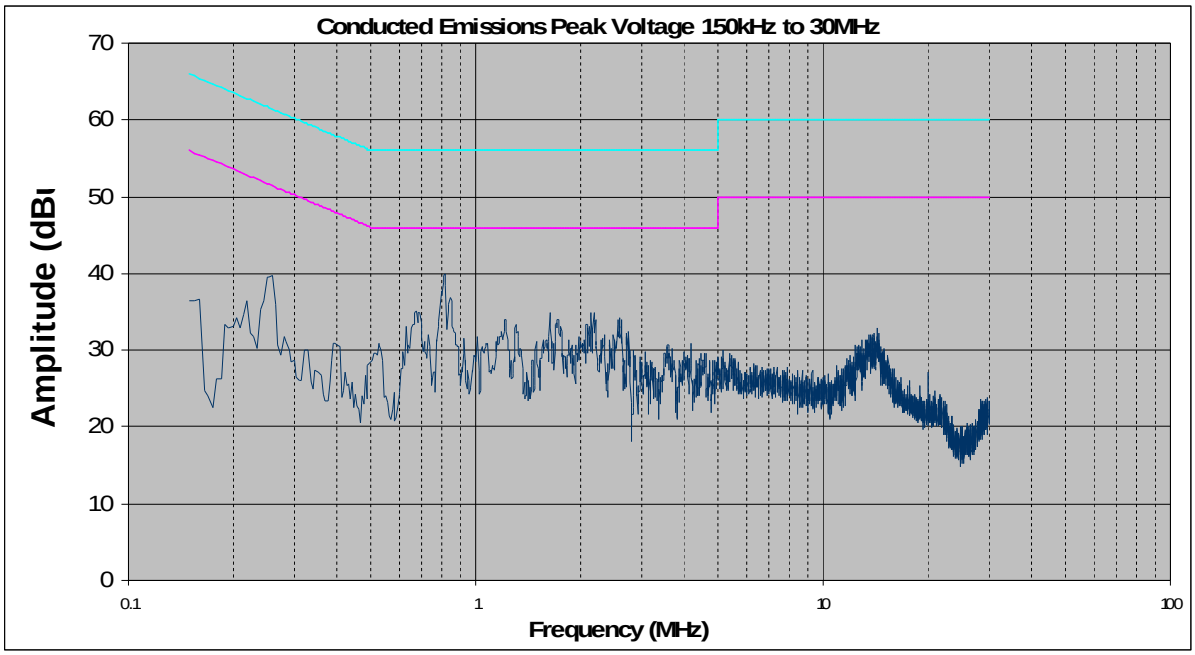
Phase Table: Desktop Cradle Charger



Neutral Plot: Wall Mount Cradle Charger

FREQ. (MHz)	Corrected Amplitude (dBuV) PK	Limit (dBuV) QP	Margin (dB) QP	Corrected Amplitude (dBuV) PK	Limit (dBuV) AVG	Margin (dB) AVG
0.81	41	73	-32	41	60	-19
0.925	40.3	73	-32.7	40.3	60	-19.7
1.715	39.2	73	-33.8	39.2	60	-20.8

Neutral Table: Wall Mount Cradle Charger



Phase Plot: Wall Mount Cradle Charger

FREQ. (MHz)	Corrected Amplitude (dBuV) PK	Limit (dBuV) QP	Margin (dB) QP	Corrected Amplitude (dBuV) PK	Limit (dBuV) AVG	Margin (dB) AVG
0.675	35.1	73	-37.9	35.1	60	-24.9
0.815	37.8	73	-35.2	37.8	60	-22.2
1.64	34.9	73	-38.1	34.9	60	-25.1

Phase Table: Wall Mount Cradle Charger

Tested By: Kerwinn Corpuz

Date Tested: 3 October 2005

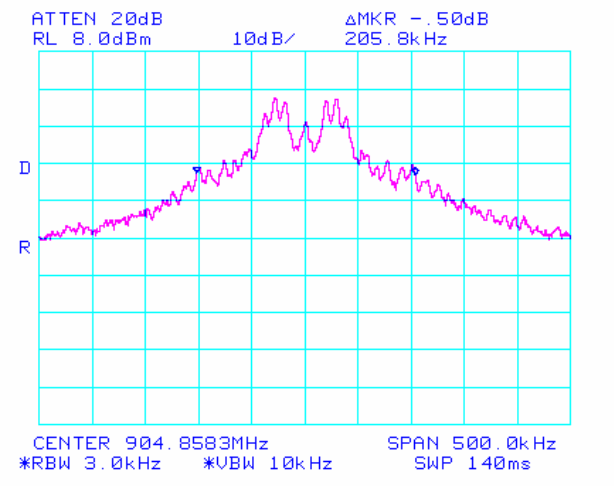
3.2.2 Occupied Bandwidth

Requirement(s): 47 CFR §15.247(a)(1)

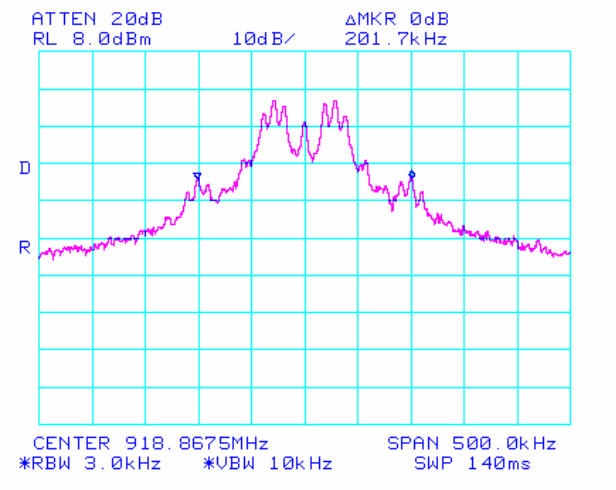
Procedures: The 20dB bandwidths were measured conducted using a spectrum analyzer for the low, mid, and hi channels.

Results:

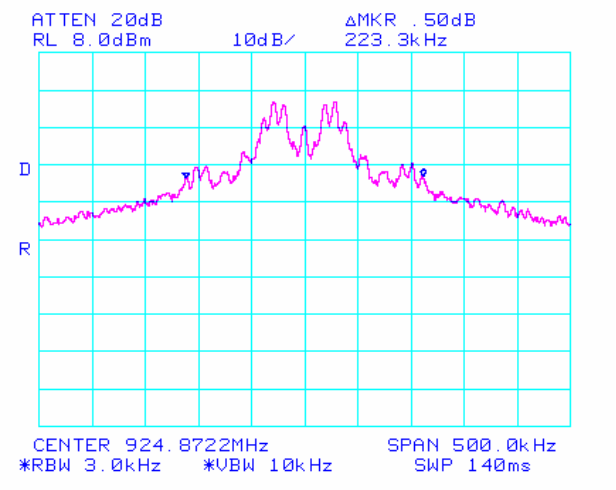
Plot #	Channel	Channel Bandwidth (kHz)
1	Low	205.8
2	Mid	201.7
3	Hi	223.3



Plot 1: 20dB Bandwidth Low



Plot 2: 20dB Bandwidth Mid



Plot 3: 20dB Bandwidth Hi

Tested By: Kerwinn Corpuz

Date Tested: 29 September 2005

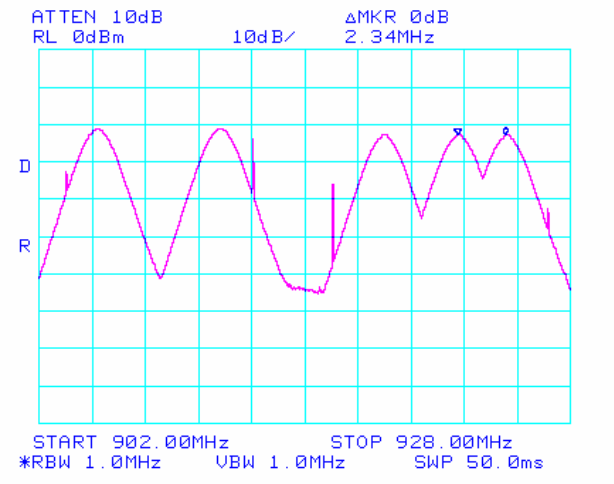
3.2.3 Carrier Frequency Separation

Requirement(s): 47 CFR §15.247(a)(1)

Procedures: The carrier frequency separation measurement was taken conducted using a spectrum analyzer.

Results:

Plot #	Carrier Frequency Separation (MHz)
4	2.34



Plot 4: Carrier Frequency Separation

Tested By: Kerwinn Corpuz

Date Tested: 3 October 2005

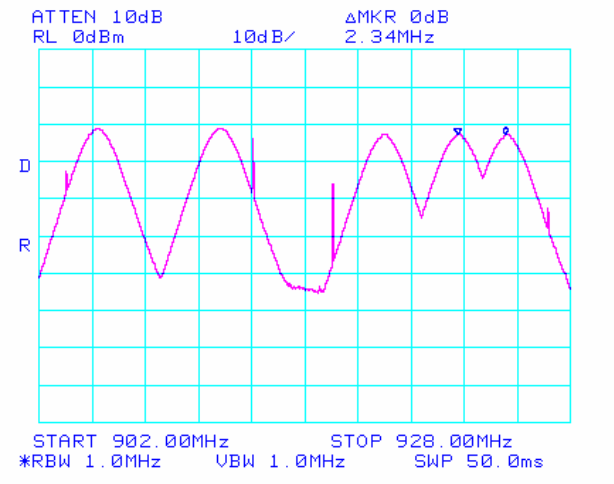
3.2.4 Number of Hopping Channels

Requirement(s): 47 CFR §15.247(a)(1)

Procedures: The number of hopping channels was measured conducted with a spectrum analyzer.

Results:

Plot #	Number of Hopping Channels
5	5



Plot 5: Number of Hopping Channels

Tested By: Kerwinn Corpuz

Date Tested: 3 October 2005

3.2.5 Time of Occupancy

Requirement(s): 47 CFR §15.247(f)

Time of occupancy shall not be greater than 0.4 seconds within a period of 0.4 second multiplied by the number of hopping channels (5) = 2.0 seconds

Procedures: The time of occupancy was measured conducted with a spectrum analyzer.

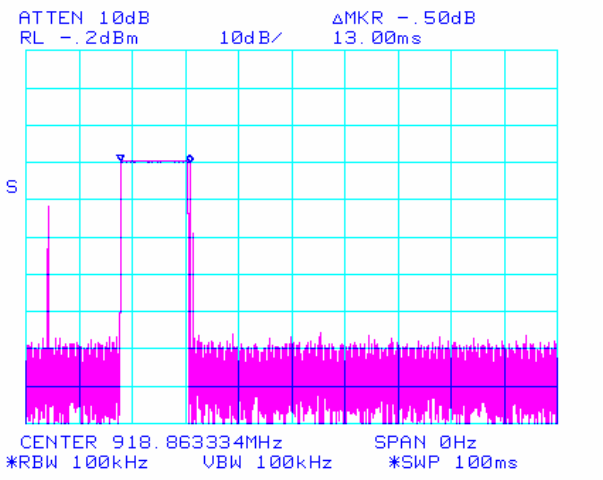
Results:

Plot #	Time of Occupancy (ms)
6 to 7	78

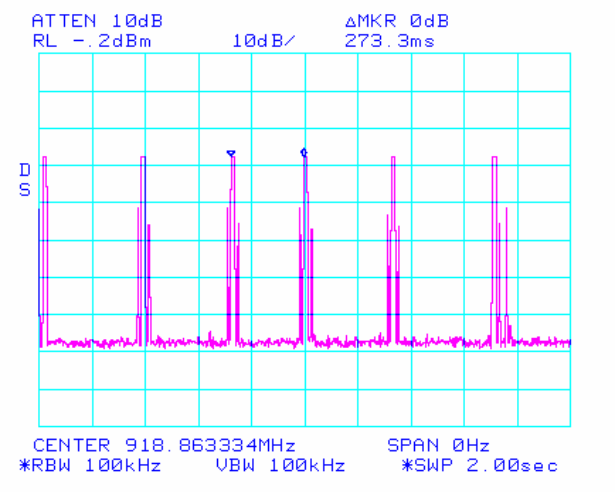
Time of occupancy per period = 13.0ms

Number of periods per 2 seconds = 6 periods

Time of occupancy = 13.0ms * 6 = 78 ms



Plot 6: Time of occupancy (1 of 2)



Plot 7: Time of occupancy (2 of 2)

Tested By: Kerwinn Corpuz

Date Tested: 3 October 2005

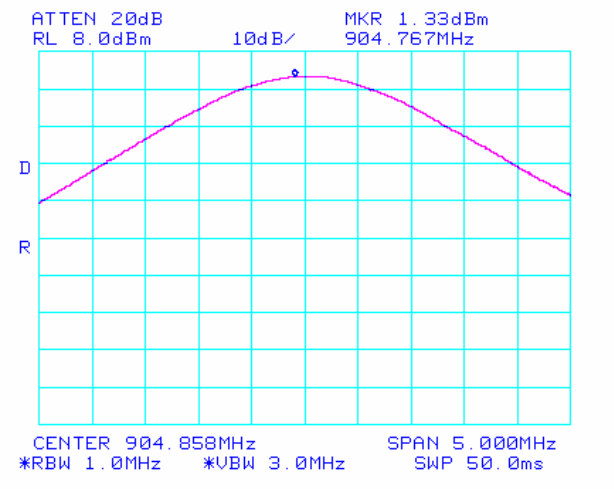
3.2.6 Peak Output Power

Requirement(s): 47 CFR §15.247(b)(3)

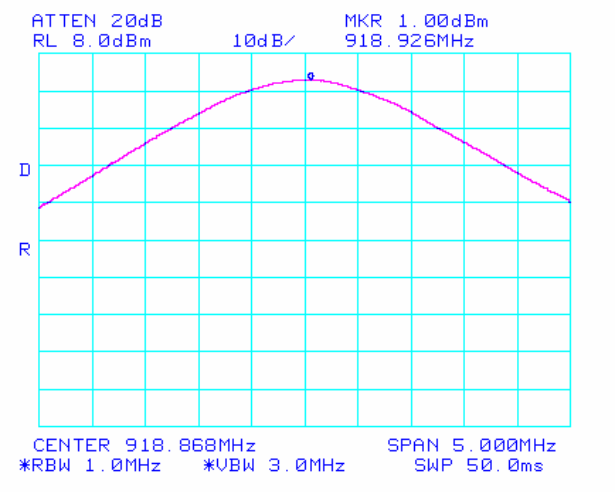
Procedures: The peak output power was measured conducted using a spectrum analyzer for the low, mid, and hi channels.

Results:

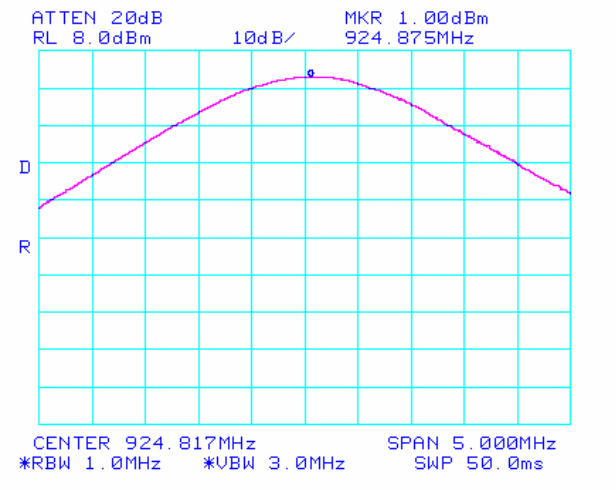
Plot #	Channel	Peak Power (dBm)
8	Low	1.33
9	Mid	1.0
10	Hi	1.0



Plot 8: Peak Power Low



Plot 9: Peak Power Mid



Plot 10: Peak Power Hi

Tested By: Kerwinn Corpuz

Date Tested: 30 September 2005

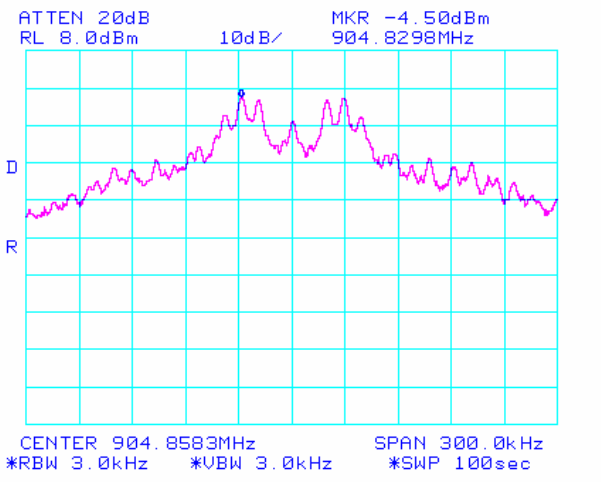
3.2.7 Peak Power Spectral Density

Requirement(s): 47 CFR §15.247(d)

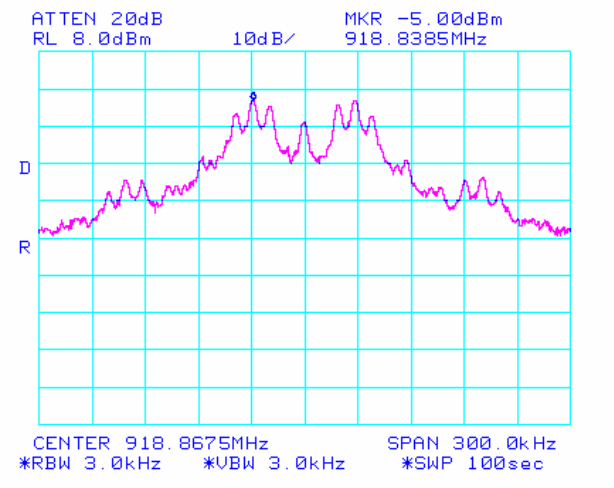
Procedures: The peak power spectral density measured at the antenna terminal using a spectrum analyzer for the low, mid, and hi channels.

Results:

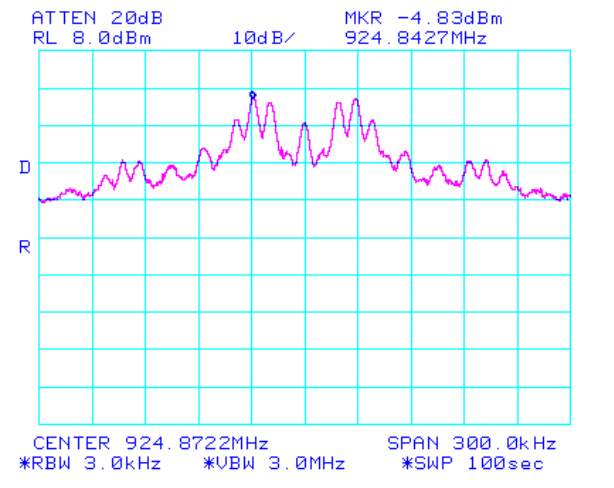
Plot #	Channel	PPSD (dBm/3 kHz)	Limit (dBm/ 3kHz)
11	Low	-4.5	8
12	Mid	-5.0	8
13	Hi	-4.8	8



Plot 11: Peak Power Spectral Density Low



Plot 12: Peak Power Spectral Density Mid



Plot 13: Peak Power Spectral Density Hi

Tested By: Kerwinn Corpuz

Date Tested: 30 September 2005

3.2.8 Spurious Emissions at Antenna Terminals

Requirement(s): 47 CFR §15.247(c)

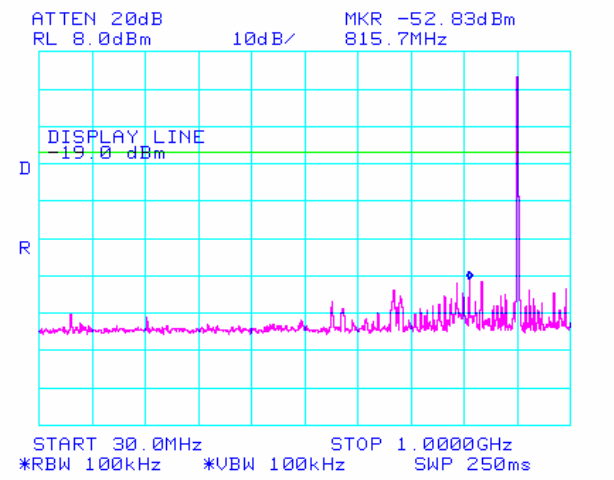
Procedures: The conducted spurious emissions were measured conducted using a spectrum analyzer for the low, mid, and hi channels.

The spurious limit: – 19.0 dBm

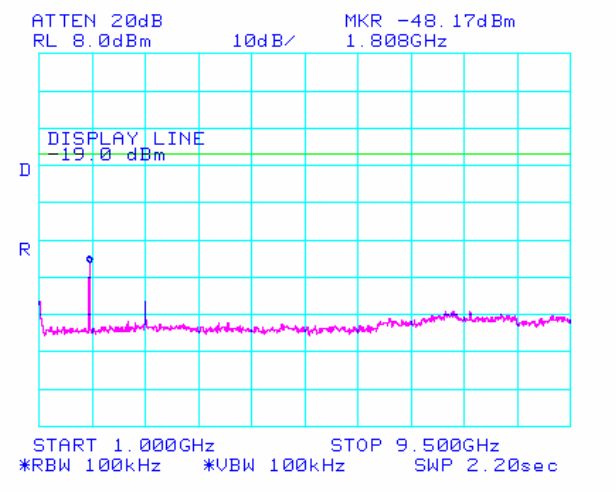
Results:

Plots #	Channel	Pass/Fail
14 to 15	Low	Pass
15 to 16	Mid	Pass
17 to 18	Hi	Pass

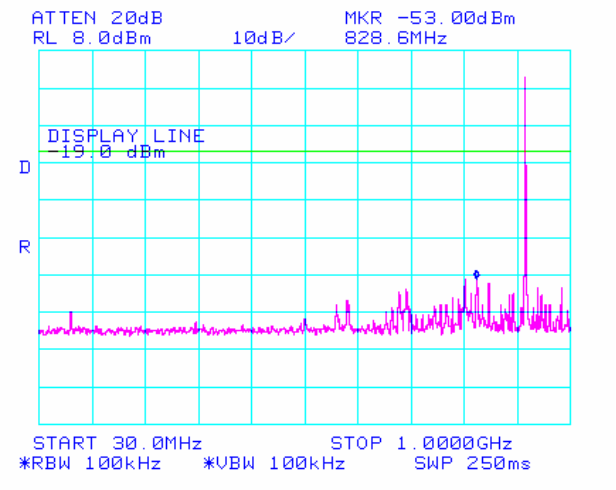
Note: Emissions over the limit lines in the following plots are the fundamentals.



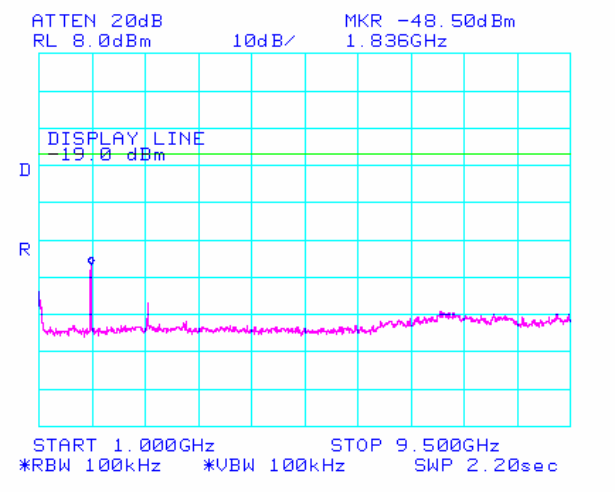
Plot 14: Conducted Spurious Emissions Low 1/2



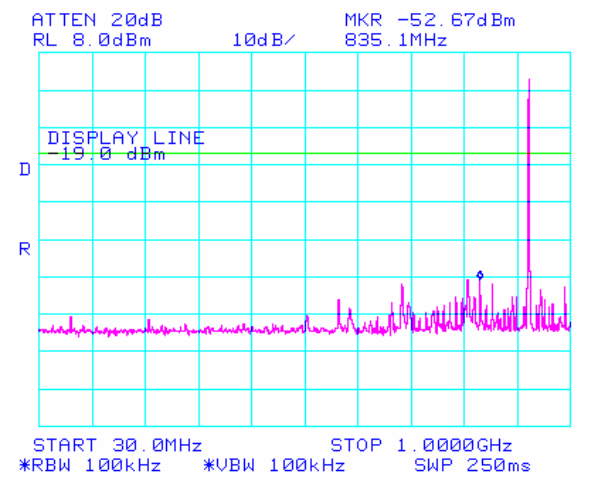
Plot 15: Conducted Spurious Emissions Low 2/2



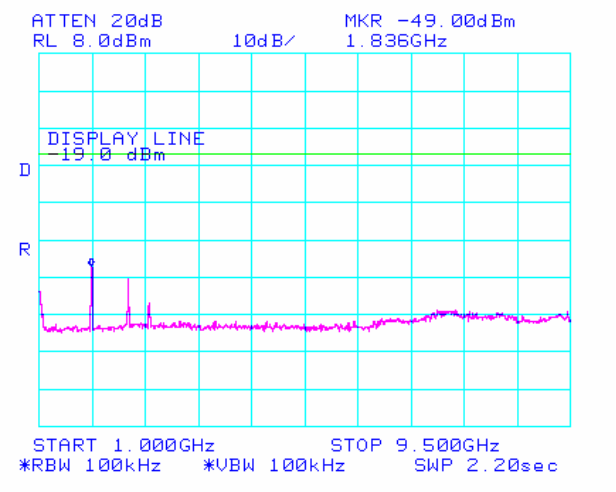
Plot 16: Conducted Spurious Emissions Mid 1/2



Plot 17: Conducted Spurious Emissions Mid 2/2



Plot 18: Conducted Spurious Emissions Hi 1/2



Plot 19: Conducted Spurious Emissions Hi 2/2

Tested By: Kerwinn Corpuz

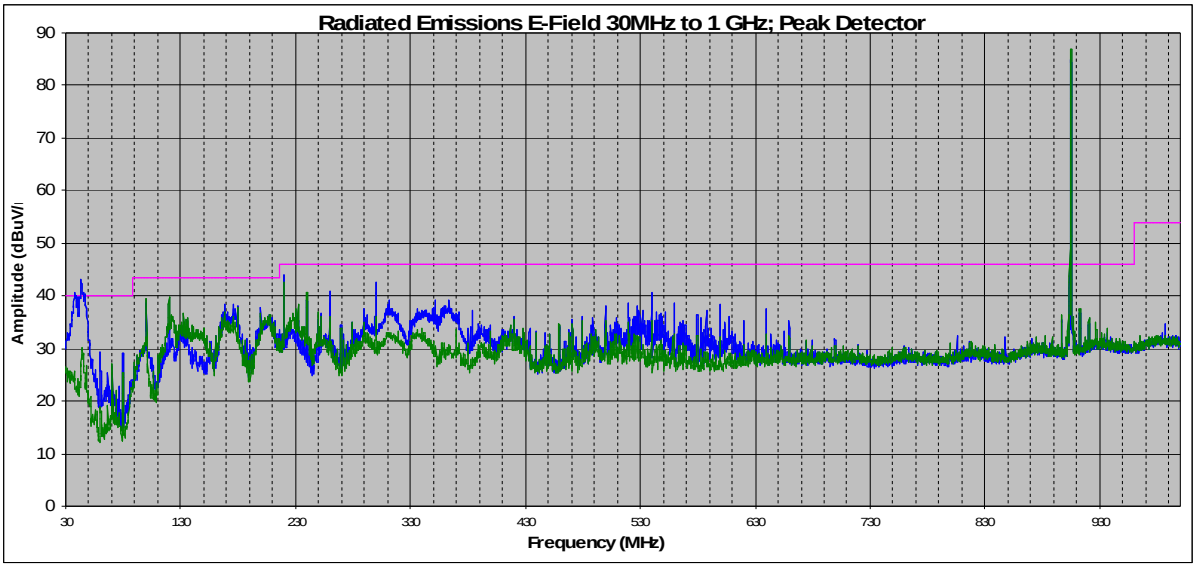
Date Tested: 30 September 2005

3.2.9 Radiated Spurious Emissions < 1 GHz

Requirement(s): 47 CFR §15.209

Procedures: Radiated emissions were measured according to ANSI C63.4. Equipment was tested in three orthogonal axis at hi mid and low with the worse case reported

Results:



Radiated Emissions Plot

Frequency	Azimuth	Measure	Antenna Polarity	Antenna Height	Raw Amplitude @ 3m	ACF	CBL loss	Corrected Amplitude @ 3m	Limit @3m	Delta
(MHz)	(degrees)	(Avg/QP)	(H/V)	(m)	(dBuV/m)	(dBm)	(dBm)	(dBuV/m)	(dBuV/m)	(dBuV/m)
44.19	350	qp	v	1	26	9.148	0.741	35.88854	40	-4.111457
220	0	qp	v	1	29.3	11.6	1.1	42	46	-4
260	10	qp	v	1	18.7	13.4	1.3	33.4	46	-12.6
300	45	qp	v	1	16.1	13.5	1.5	31.1	46	-14.9
100	120	qp	h	1.7	27.4	10.4	0.9	38.7	43.5	-4.8
120	120	qp	h	2.4	24.6	14.1	0.92	39.62	43.5	-3.88

Sample Calculation: Corrected Amplitude = Raw + ACF + Cable Loss

Tested By: Kerwinn Corpuz

Date Tested: 28 September 2005

3.2.10 Radiated Spurious Emissions > 1 GHz

Requirement(s): 47 CFR §15.247(c)

Procedures: Equipment was setup in a semi-anechoic chamber. For measurements above 1 GHz an average measurement was taken with a 1MHz resolution bandwidth was used.

Results:

Frequency (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 1m (dBuV)	Pre Amp. (dB)	Ant.Corr. Factor (dB)	Cable Loss (dB)	Dist.Corr. Factor (dB)	Duty Cycle (dB)	Final Field Strength (dBuV/m)	Limit @ 3m (dBuV/m)	Delta (dBuV/m)	Detector (pk/avg)
1.85	250	H	1.15	66.80	32.22	27.30	1.88	9.54	0.0	54.22	74	-19.78	pk
1.85	250	H	1.15	66.50	32.22	27.30	1.88	9.54	17.7	36.22	54	-17.78	avg
2.775	70	H	1.30	64.00	32.70	30.13	2.37	9.54	0.0	54.26	74	-19.74	pk
2.775	70	H	1.30	63.20	32.70	30.13	2.37	9.54	17.7	35.76	54	-18.24	avg
1.81	225	H	1.10	66.20	32.20	27.11	1.85	9.54	0.0	53.41	74	-20.59	pk
1.81	225	H	1.10	65.00	32.20	27.11	1.85	9.54	17.7	34.51	54	-19.49	avg
2.715	80	H	1.20	67.30	32.68	29.78	2.36	9.54	0.0	57.21	74	-16.79	pk
2.715	80	H	1.20	66.80	32.68	29.78	2.36	9.54	17.7	39.01	54	-14.99	avg
1.837	260	H	1.20	66.00	32.22	27.24	1.87	9.54	0.0	53.35	74	-20.65	pk
1.837	260	H	1.20	65.20	32.22	27.24	1.87	9.54	17.7	34.85	54	-19.15	avg
2.756	80	H	1.20	64.70	32.70	30.02	2.36	9.54	0.0	54.85	74	-19.15	pk
2.756	80	H	1.20	64.00	32.70	30.02	2.36	9.54	17.7	36.45	54	-17.55	avg
1.85	200	V	1.10	70.80	32.22	27.43	1.88	9.54	0.0	58.35	74	-15.65	pk
1.85	200	V	1.10	70.80	32.22	27.43	1.88	9.54	17.7	40.65	54	-13.35	avg
2.775	255	V	1.20	61.20	32.70	29.93	2.37	9.54	0.0	51.26	74	-22.74	pk
2.775	255	V	1.20	59.50	32.70	29.93	2.37	9.54	17.7	31.86	54	-22.14	avg
1.81	200	V	1.20	69.30	32.20	27.25	1.85	9.54	0.0	56.65	74	-17.35	pk
1.81	200	V	1.20	69.00	32.20	27.25	1.85	9.54	17.7	38.65	54	-15.35	avg
2.715	170	V	1.20	65.00	32.68	29.65	2.36	9.54	0.0	54.78	74	-19.22	pk
2.715	170	V	1.20	62.80	32.68	29.65	2.36	9.54	17.7	34.88	54	-19.12	avg
1.837	225	V	1.10	69.80	32.22	27.37	1.87	9.54	0.0	57.29	74	-16.71	pk
1.837	225	V	1.10	69.80	32.22	27.37	1.87	9.54	17.7	39.59	54	-14.41	avg
2.756	235	V	1.10	62.50	32.70	29.84	2.36	9.54	0.0	52.47	74	-21.53	pk
2.756	235	V	1.10	61.30	32.70	29.84	2.36	9.54	17.7	33.57	54	-20.43	avg

Sample Calculation:

EUT Field Strength = Antenna Factor(dB) + Cable Loss(dB) – Amplifier Gain(dB) + Filter Attenuation(dB, if used) – Distance Correction Factor – Duty Cycle Factor

Note 1: Duty cycle calcuation: 20 log(dwell time / 100ms) = 20 log(13ms / 100ms) = 17.7 dB. Duty Cycle was applied to average measurements.

Note 2: Emissions after 3rd harmonic are noise floor.

Tested By: Kerwinn Corpuz

Date Tested: 28 September 2005

4 TEST INSTRUMENTATION

4.1 TEST INSTRUMENTATION

Instrument	Manufacturer	Model
Spectrum Analyzer	HP	8564E
Power Meter	HP	437B
Power Sensor	HP	8485A
Antenna	Emco	3115
Antenna	Emco	3115
Signal Generator	Wiltron	68169B
Chamber	Lingren	3m
Pre-Amplifier	HP	8449
DMM	Fluke	73III
Variac	KRM	AEEC-2090
Chamber	Tenney	TTRS
DMM	Fluke	51II

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
Wattstopper MRDC10 Wattstopper MRDP10	1. Power cord

EUT Description	:	Wireless Touchscreen Controller
Model No	:	MRDS10
Serial No	:	none

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

Test	Description Of Operation
	The EUT was controlled via the touch screen to enter test modes necessary to complete the testing.

APPENDIX B: External Photos

See Attachment

APPENDIX C: CIRCUIT/BLOCK DIAGRAMS

See Attachment

APPENDIX D: Internal Photos

See Attachment

APPENDIX F: PRODUCT DESCRIPTION

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

APPENDIX H: FCC LABEL LOCATION

See Attachment

APPENDIX I: USER MANUAL

See Attachment