

The Watt Stopper, Inc.

MRR2

June 16, 2003

Report No. WATT0013

Report Prepared By:



1-888-EMI-CERT

Test Report

Certificate of Test

Issue Date: June 16, 2003

The Wattstopper, Inc.
Model : MRR2
Report No: WATT0013

Emissions

Description	Pass	Fail
FCC 15.247, Spurious Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Output Power	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Band Edge Compliance	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Spurious Conducted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Power Spectral Density	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Occupied Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Dwell Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Number of Hopping Frequencies	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.247, Channel Spacing	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.207, Powerline Conducted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The equipment was tested in the configuration and mode(s) of operation provided by the client. The specific tests and test levels were specified by the client. Any additional tests, or product configurations that should be tested are the responsibility of the client. Product compliance is the responsibility of the client.

List of Modifications to equipment under test required to meet the requirements:

- See the modifications page of the report.

Deviations to the test standard

- No deviations were made to the test standard

Test Facility

- The measurement facility used to collect the data is located at:
 Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
 Phone: (503) 844-4066 Fax: 844-3826
 This site has been fully described in a report filed with the FCC (Federal Communications Commission), and accepted by the FCC in a letter maintained in our files.

Approved By:



Greg Kiemel, Director of Engineering

This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: The Open Area Test Sites, and conducted measurement facilities, have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files.

TCB: Northwest EMC has been accredited by ANSI to ISO/IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



A2LA: Accreditation has been granted to Northwest EMC, Inc. to perform the Electromagnetic Compatibility (EMC) tests described in the Scope of Accreditation. Assessment performed to ISO/IEC 17025. Certificate Number: 1936-01, Certificate Number: 1936-02, Certificate Number 1936-03



Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body. (A2LA)



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0302C



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



Industry Canada: Accredited by Industry Canada for performance of radiated measurements. Our open area test sites comply with RSP 100, Issue 7, section 3.3.



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Nos. - Evergreen: C-1071 and R-1025, Trails End: C-694 and R-677, Sultan: C-905, R-871 and R-1172, North Sioux City C-1246, R-1185 and R-1217)



BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No. SL2-IN-E-1017.



CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement



GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

NORTHWEST EMC
Evergreen Facility
22975 NW Evergreen Pkwy #400
Hillsboro, OR 97124
David Tolman Phone: 503 844 4066

ELECTRICAL (EMC)

Valid until: July 31, 2004

Certificate Number: 1936-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC) tests:

<u>EMC Standards</u>	<u>Title</u>
<i>Radiated & Conducted Emissions</i>	
CFR 47, FCC Part 15 using ANSI C63.4	American National Standard for methods of measurement of radio-noise emissions for low-voltage electrical and electronic equipment in the range of 9 kHz to 40GHz.
CISPR 22	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
CNS 13438	Limits and methods of measurement of radio interference characteristics of information technology equipment.
EN 55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
Canada ICES-003	Digital apparatus
AS/NZS 3548	Australian/New Zealand Standard Limits and methods of measurement of radio disturbance characteristics of information technology equipment
Canada ICES-001	Industrial, scientific and medical radio frequency generators
CNS 13803	Industrial, Scientific and Medical Instrument

AS/NZS 2064	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 61000-6-3	Electromagnetic capability – Generic emission standard. Part 1: Residential, commercial and light industry. (I.S.)
EN 61000-6-4	Electromagnetic compatibility – Generic emission standard. Part 2: Industrial environment
VCCI V-3/99.05	Technical Requirements
VCCI V-4/99.05	Instruction for Test Conditions for Requirement under Test
CISPR 11	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 55011	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
EN 55103-1	Electromagnetic Compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1: Emission
EN 61000-3-2	Electromagnetic compatibility (EMC). Part 3: Limits Section 2: Limits for harmonic current emissions
EN 61000-3-3	Electromagnetic compatibility (EMC). Part 3: Limits Section 2: Limitation of voltage fluctuations and flicker in low-voltage supply systems.
GR-1089 Section 3 (excluding analog voice band)	Bellcore electromagnetic compatibility and electrical safety – Generic criteria for network telecommunications equipment.

Immunity

EN 61000-4-2 AS/NZS 61000-4-2	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test – Basic EMC Publication
EN 61000-4-3 AS/NZS 61000-4-3	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 3: Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4 AS/NZS 61000-4-4	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 4: Electrical fast transient/burst immunity test – Basic EMC publication

EN 61000-4-5 AS/NZS 61000-4-5	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques. Section 5: Surge immunity test.
EN 61000-4-6 AS/NZS 61000-4-6	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 6: Immunity to conducted disturbances, induce by radio-frequency fields.
EN 61000-4-8	Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 8: Power frequency magnetic field immunity test.
EN 61000-4-11	Electromagnetic Compatibility (EMC) Part 4: Testing and measurement techniques. Section 11: Voltage dips, short interruptions and voltage. Variations immunity tests.
EN 61000-6-1	Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Section 1: Immunity for residential, commercial and light-industrial environments
EN 61000-6-2	Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Section 2: Immunity for industrial environments
IEEE/ANSI C62.41	IEEE recommended practice on surge voltages in low-voltage AC power circuits

Product Standards

GR-1089 Section 3 (excluding voice band)	Bellcore electromagnetic compatibility and electrical safety – Generic criteria for network telecommunications equipment.
EN 61326	Electrical equipment for measurement, control and laboratory use – EMC requirements
EN 60601-1-2	Medical electrical equipment Part 1: general requirements for safety Section 2: Collateral standard: Electromagnetic compatibility – requirements and tests
EN 50130-4	Alarm Systems. Part 4: Electromagnetic compatibility. Product family standard: Immunity requirements for components of fire, intruder and social alarm systems.
EN 55103-2	Electromagnetic Compatibility – Product family standard for audio, video, audio-visual and entertainment lighting control professional use. Part 2: Immunity
EN 55024	Immunity Requirements for Information Technology Equipment – ITE Immunity

Other Standards

ETS 300 220	Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 25 MHZ to 1000 MHZ frequency range with power levels ranging up to 500 mW; Part 1: Parameters intended for regulatory purposes; Part 2: Supplementary parameters not intended for regulatory Purposes
ETS 300 224	Electro Magnetic Compatability and Radio Spectrum Matters; Paging Services; Technical characteristics and test methods for on site paging service devices.
ETS 300 328	Radio Equipment and Systems (RES); Wideband transmission systems; Technical characteristics and test conditions for data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques
ETS 300 489-1	Electro Magnetic Compatability and Radio Spectrum Matters; Common Technical Requirements
ETS 300 489-2	Specific conditions for radio paging equipment
ETS 300 489-3	Specific conditions for Short Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz
Canadian RSS-102	Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields
Canadian RSS-119	Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz
Canadian RSS-123	Low Power Licensed Radiocommunication Devices
Canadian RSS-139	Licensed Radiocommunications Devices in the Band 2400- 2483.5 MHz
Canadian RSS-210	Industry Canada – Low power license-exempt radio communication devices
SAE J1113-41	Radiated and conducted emissions.
SAE J1113-21	Radiated immunity absorber lined chamber (200 MHz – 1 GHz)
SAE J1113-23	Radiated immunity stripline method (only 10 kHz – 200 MHz @ 80 V/m)

SAE J1113-4 (only substitution method)	Conducted immunity Bulk Current Injection
SAE J1113-13	ESD
FCC 47 Parts 22 (Cellular), 24, 25, 26 & 27	TCB Scope B1 (Excluding SAR testing)
FCC 47 Parts 22 (Non-Cellular), 73,74,90,95 & 97	TCB Scope B2 (Excluding SAR testing)
FCC 47 Parts 80 & 87	TCB Scope B3 (Excluding SAR testing)
FCC 47 Parts 21, 74, 101	TCB Scope B4 (Excluding SAR testing)
<i>Onsite Testing</i>	
EN61000-6-2	Generic Immunity Standard for Industrial Applications
EN61000-6-4	Generic Emissions Standard for Industrial Applications

What is measurement uncertainty?

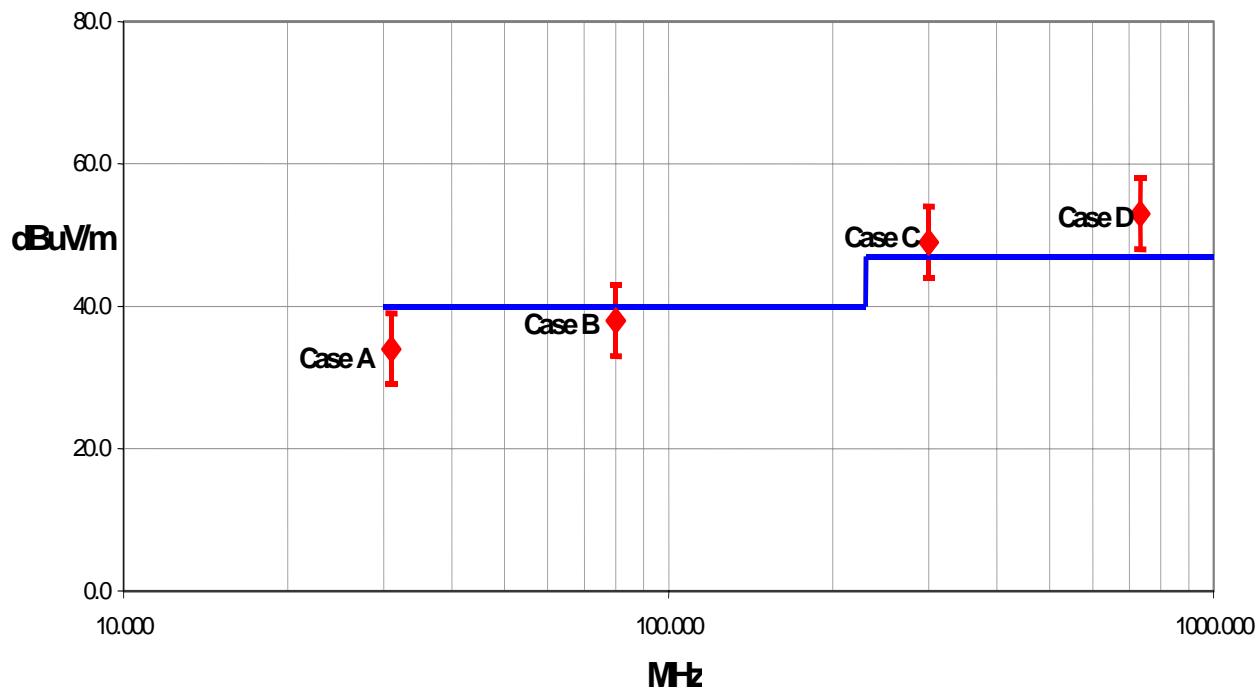
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz		Value (dB)							
Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna		3m	10m
		3m	10m	3m	10m	3m	10m		
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25		
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49		

Radiated Emissions > 1 GHz		Value (dB)			
	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25		+ 1.38 - 1.35	
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)		+ 2.57 - 2.51	+ 2.76 - 2.70	

Conducted Emissions		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.48
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.97

Radiated Immunity		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.11

Conducted Immunity		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.10

Legend		
$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties		
U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $uc(y)$ yields a confidence level of only 68%.		

**California****Orange County Facility**

41 Tesla Ave.
Irvine, CA 92618
(888) 364-2378
FAX (503) 844-3826

**Oregon****Evergreen Facility**

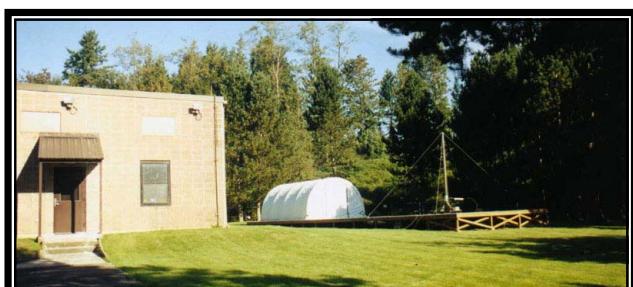
22975 NW Evergreen Pkwy.,
Suite 400
Hillsboro, OR 97124
(503) 844-4066
FAX (503) 844-3826

**Oregon****Trails End Facility**

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735

**South Dakota****North Sioux City Facility**

745 N. Derby Lane
P.O. Box 217
North Sioux City, SD 57049
(605) 232-5267
FAX (605) 232-3873

**Washington****Sultan Facility**

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

Company Name:	The Watt Stopper Inc.
Address:	6120 Paseo Del Norte, Suite 1-2
City, State, Zip:	Carlsbad, CA 92009
Test Requested By:	Bertrand Debever
Model:	MRR2
First Date of Test:	5-29-03
Last Date of Test:	6-16-03
Receipt Date of Samples:	5-29-03
Equipment Design Stage:	Pre-Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided at time of test
Ports:	DC

Functional Description of the EUT (Equipment Under Test):

Repeater operating in the 902-928MHz band as a 15.247(f) hybrid system.

Client Justification for EUT Selection:

The product is an engineering sample, representative of the final product.

Client Justification for Test Selection

These tests satisfy the requirements for FCC Certification of the radio transmitter.

Equipment modifications				
Item #	Test	Date	Modification	Note
1	Spurious Radiated Emissions	05-29-2003, 05-30-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
2	AC Powerline Conducted Emissions	06-02-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
3	Output Power	06-06-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
4	Occupied Bandwidth	06-09-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
5	Band Edge Compliance	06-09-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
6	Spurious Conducted Emissions	06-09-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
7	Channel Spacing	06-12-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
8	Number of Hopping Frequencies	06-12-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
9	Power Spectral Density	06-12-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.
10	Dwell Time	06-13-2003	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

All

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at all channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel. The measurement is made with the spectrum analyzer's resolution bandwidth set to greater than or equal to 1% of the span, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The carrier frequency separation was measured between each of 5 hopping channels in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

Completed by:

A handwritten signature in blue ink that reads "Rocky L. Reling". The signature is fluid and cursive, with "Rocky" on the top line and "L. Reling" on the bottom line.

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	MRR2	Work Order:	WATT0014
Serial Number:	N/A	Date:	06/12/03
Customer:	The Watt Stopper, Inc.	Temperature:	23 degrees C
Attendees:	N/A	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	120VAC/60Hz
TEST SPECIFICATIONS		Job Site: EV06	

Specification: CFR 47 Part 15.247(a)(1)

Year: 2003

Method: DA 00-705, ANSI C63.4

Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The hopping channel carrier frequencies shall be separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

RESULTS

Pass CHANNEL SPACING

2.31MHz

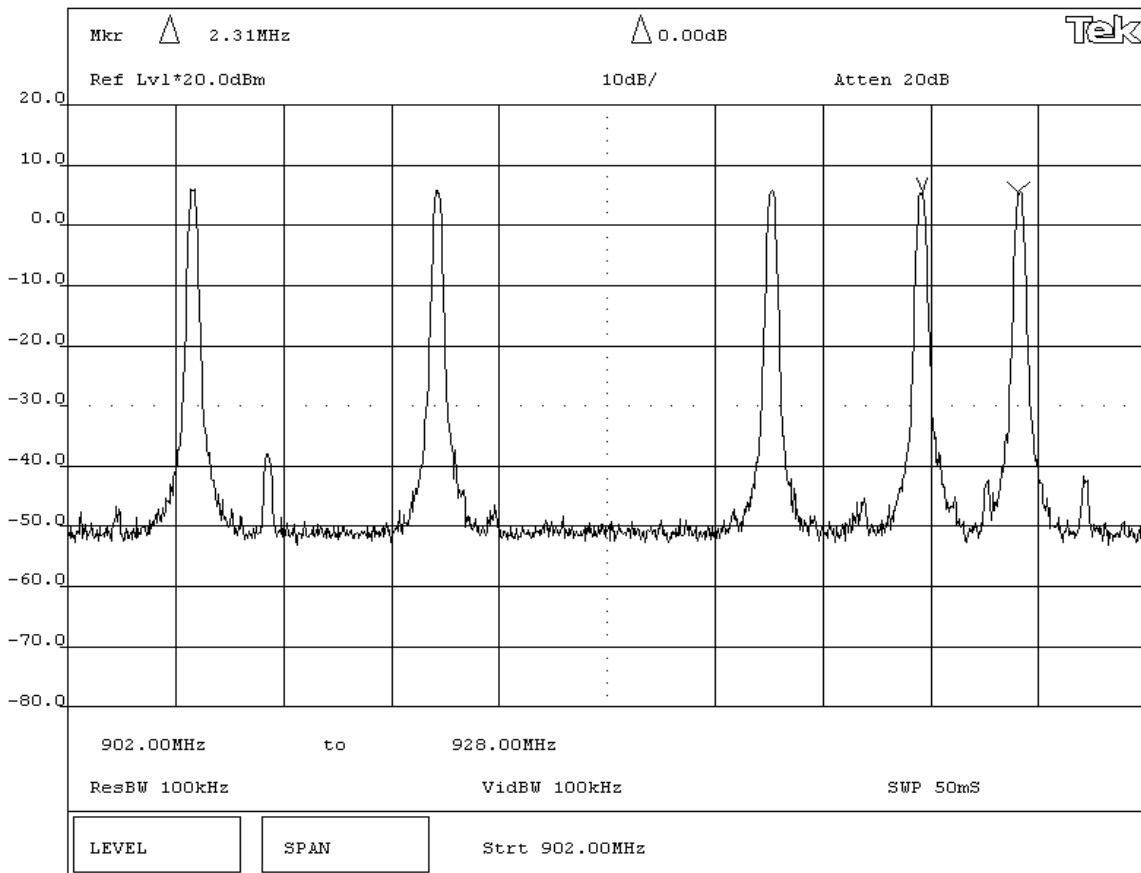
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Carrier Frequency Separation



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Mid

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits all channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(f), The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period in seconds equal to the number of hopping channels employed multiplied by 0.4. The measurement is made with the spectrum analyzer's span set to zero, the resolution bandwidth set to 1 MHz, and the video bandwidth set to 7 MHz. The measurement is made in two steps. First, the sweep speed is adjusted to capture the pulse width or dwell time of a single transmission. Then, the sweep speed is set to 2 seconds to count the number of transmissions during that period. The dwell time of a single transmission multiplied by the number of transmissions during a 2 second period equals the average time of occupancy during a 2 second period.

Configuration: The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

Completed by:

A handwritten signature in blue ink that reads "Rocky L. Reling". The signature is fluid and cursive, with "Rocky" on the top line and "L. Reling" on the bottom line.

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: MRR2	Work Order: WATT0013
Serial Number: N/A	Date: 06/16/03
Customer: The Watt Stopper, Inc.	Temperature: 25 °C
Attendees: None	Humidity: 34%
Customer Ref. No.: N/A	Bar. Pressure: 30.15
Tested by: Rod Peloquin	Job Site: EV06
Specification: 47 CFR 15.247(f)	Year: 2003
	Method: DA 00-705, ANSI C63.4
	Year: 1992

SAMPLE CALCULATIONS

Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 2 second period)

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period in seconds equal to the number of hopping channels employed multiplied by 0.4.

RESULTS	TOTAL DWELL TIME IN 2 SECOND PERIOD	DWELL TIME DURING A SINGLE TRANSMISSION
Pass	168mS	16.8mS

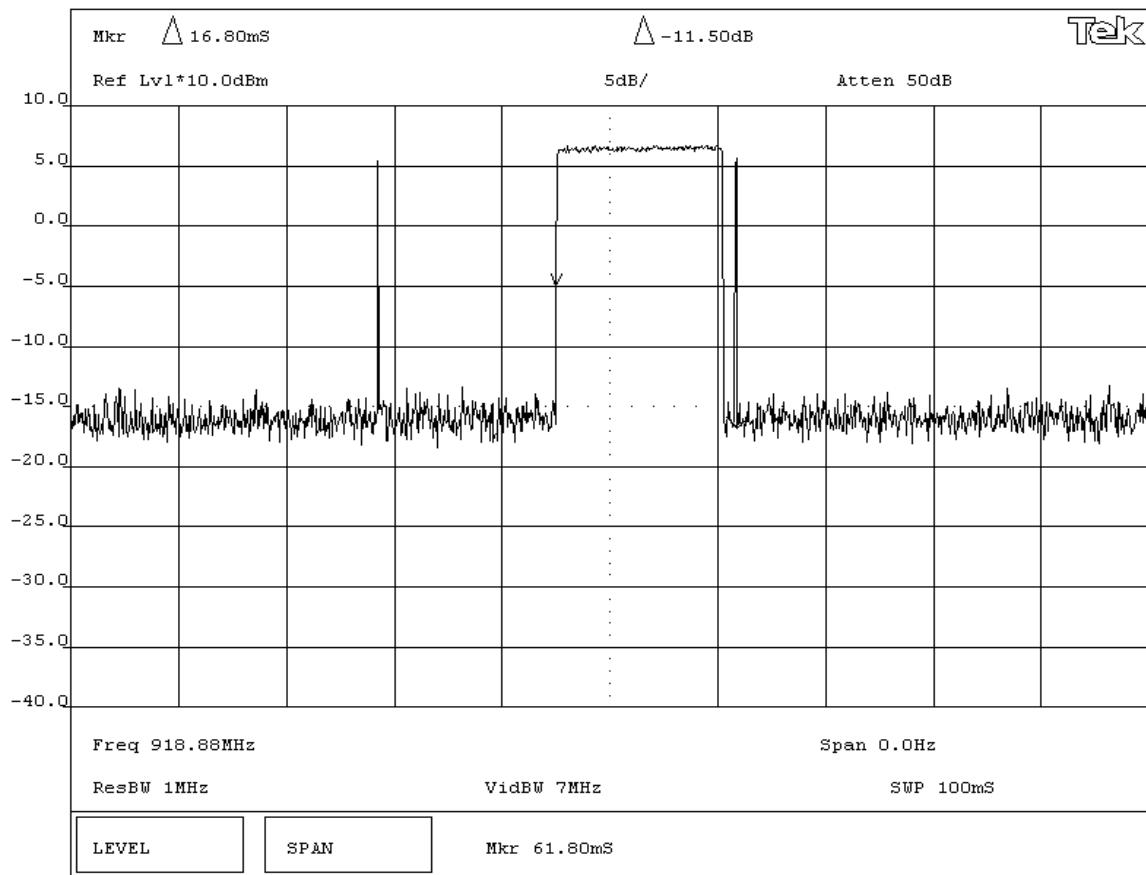
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Time of Occupancy (Dwell Time) - Single Transmission



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

BETA
01/30

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/16/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	30.15
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
Specification:	47 CFR 15.247(f)	Method:	DA 00-705, ANSI C63.4
Year:	2003	Year:	1992

SAMPLE CALCULATIONS

Total Dwell time = (Dwell Time during a single transmission) X (Number of transmissions during a 2 second period)

COMMENTS

5 hopping channels

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period in seconds equal to the number of hopping channels employed multiplied by 0.4.

RESULTS

TOTAL DWELL TIME IN 2 SECOND PERIOD

NUMBER OF TRANSMISSIONS DURING A 2 SECOND PERIOD

Pass 168mS 10

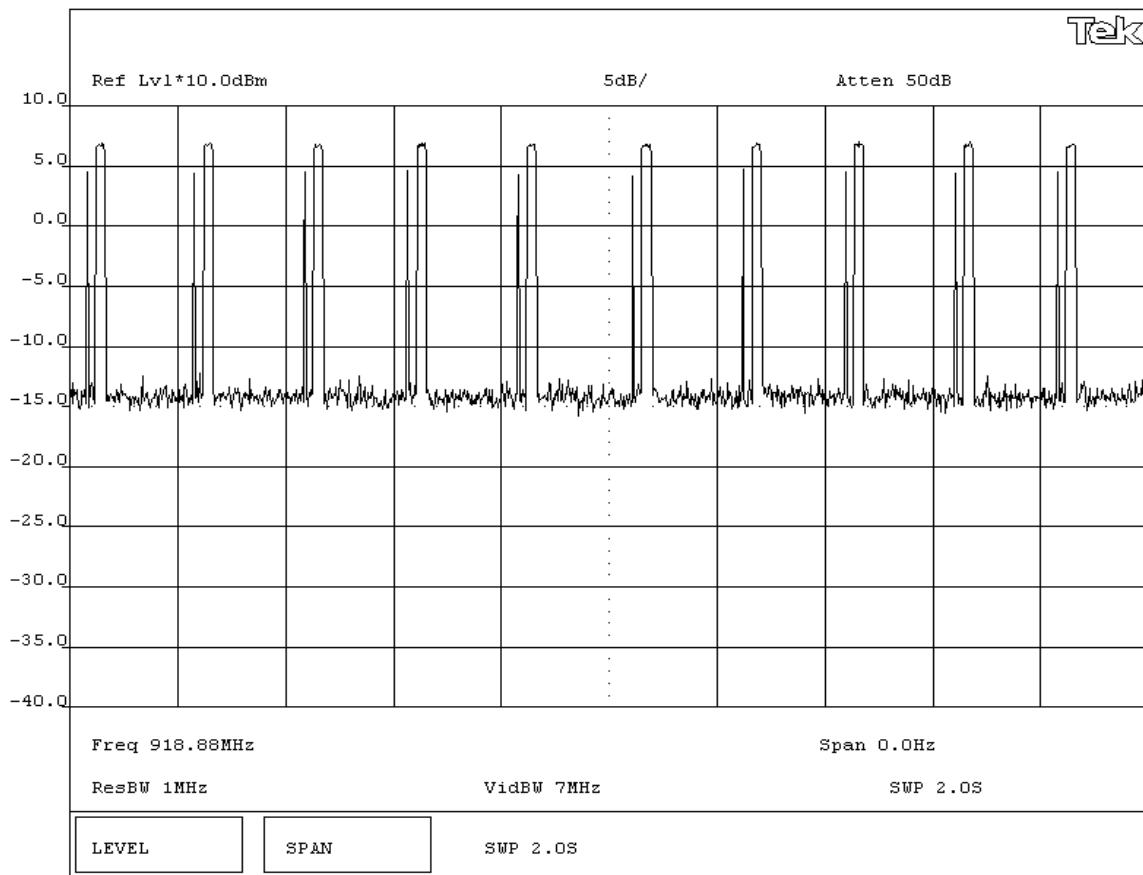
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Time of Occupancy (Dwell Time) - Number of transmissions during a 2 second period



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

All

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at all channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: The number of hopping channels is required to be measured to allow calculation of total dwell time per 47 CFR 15.247(f). The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer.

Completed by:



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	MRR2	Work Order:	WATT0014
Serial Number:	N/A	Date:	06/12/03
Customer:	The Watt Stopper, Inc.	Temperature:	23 degrees C
Attendees:	N/A	Humidity:	38% RH
Customer Ref. No.:	N/A	Power:	120VAC/60Hz

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247(f) Year: 2003 Method: DA 00-705, ANSI C63.4 Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

To determine dwell time per 15.247(f) the total number of hopping frequencies must be determined

RESULTS	NUMBER OF HOPPING FREQUENCIES
Pass	5

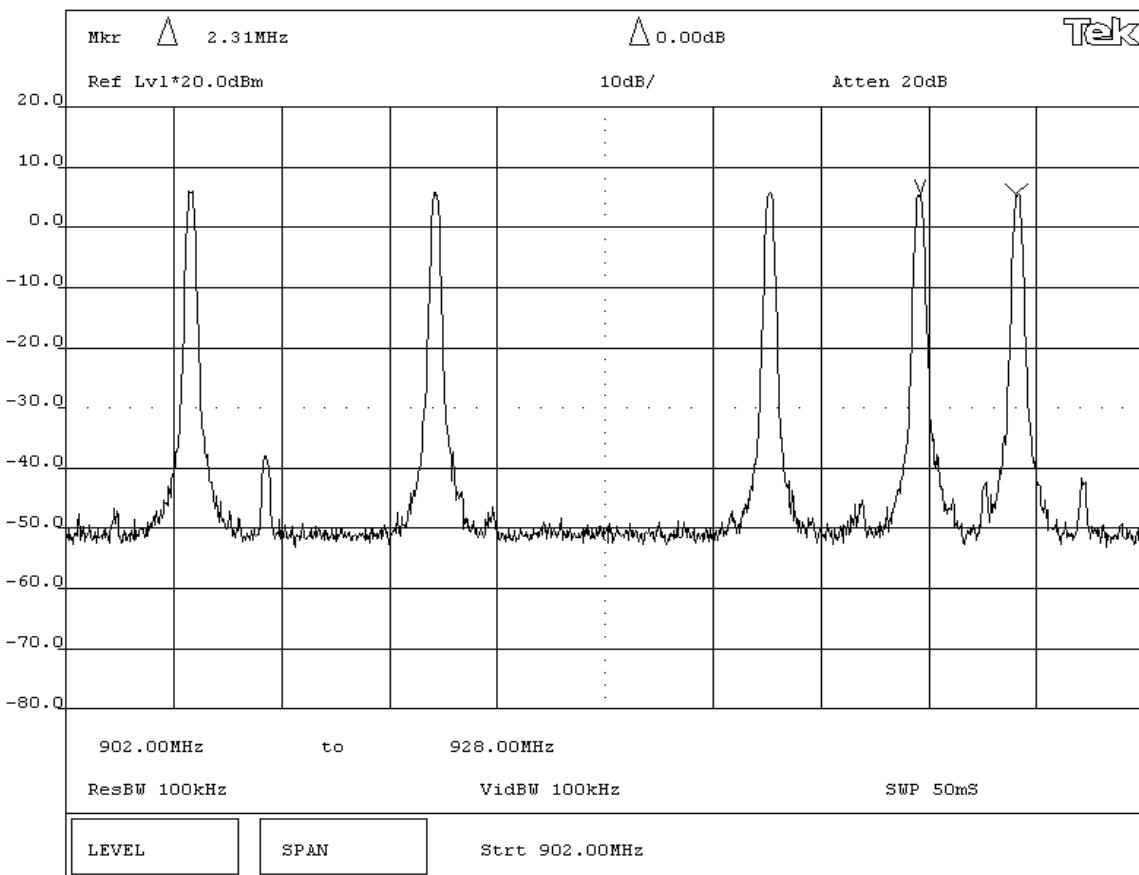
SIGNATURE

Rodney L. Peloquin

Tested By: _____

DESCRIPTION OF TEST

HOPPING CHANNELS



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Typical

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120VAC/60Hz

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(a)(1)(i), the 20 dB bandwidth of a hopping channel must be less than 500 kHz. The measurement is made with the spectrum analyzer's resolution bandwidth set to $\geq 1\%$ of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Completed by:

A handwritten signature in blue ink that reads "Rocky L. Reling". The signature is fluid and cursive, with "Rocky" on the top line and "L. Reling" on the bottom line.

NORTHWEST
EMC

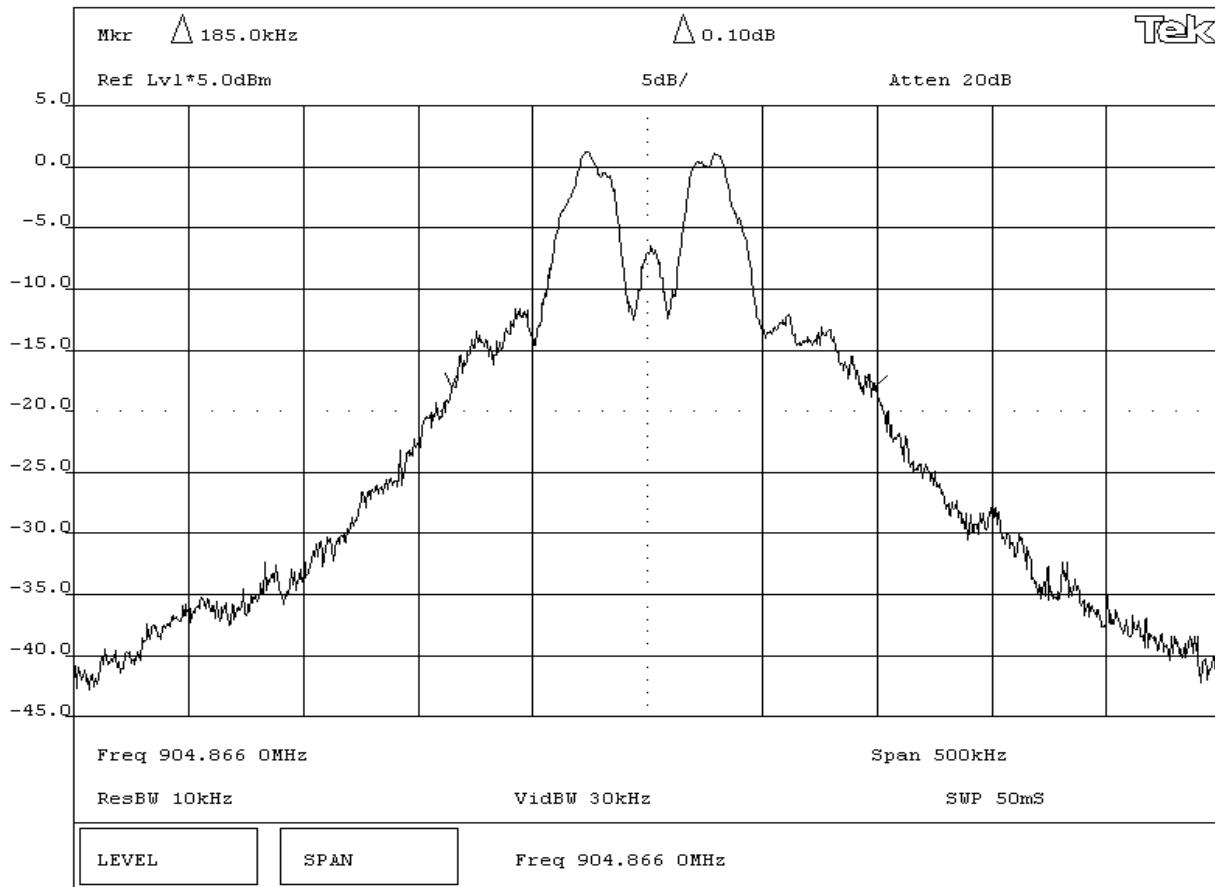
EMISSIONS DATA SHEET

Occupied Bandwidth

Transmitters

Rev d11/15/02

EUT:	MRR2			Work Order:	WATT0013			
Serial Number:	N/A			Date:	06/09/03			
Customer:	The Watt Stopper, Inc.			Temperature:	25 °C			
Attendees:	None			Humidity:	34%			
Customer Ref. No.:	N/A			Bar. Pressure:	29.89			
Tested by:	Rod Peloquin		Power:	120VAC/60Hz		Job Site:	EV06	
TEST SPECIFICATIONS								
Specification:		CFR 47 Part 15.247(a)(1)	Year:	2003	Method:	DA 00-705, ANSI C63.4	Year:	1992
SAMPLE CALCULATIONS								
COMMENTS								
None								
EUT OPERATING MODES								
No hop mode								
DEVIATIONS FROM TEST STANDARD								
REQUIREMENTS								
RESULTS		BANDWIDTH						
Pass		185KHz						
SIGNATURE								
<i>Roddy L. Peloquin</i>								
Tested By: _____								
DESCRIPTION OF TEST								
Low Channel								



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

EMISSIONS DATA SHEET

Occupied Bandwidth

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/09/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	29.89
Tested by:	Bob Peloquin	Power:	120VAC/60Hz
		Job Site:	EV06

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247(a)(1) Year: 2003 Method: DA 00-705, ANSI C63.4 Year: 1992

SAMPLE CALCULATIONS

COMMENTS

None

EUT OPERATING MODES

No hop mode

DEVIATIONS FROM TEST STANDARD

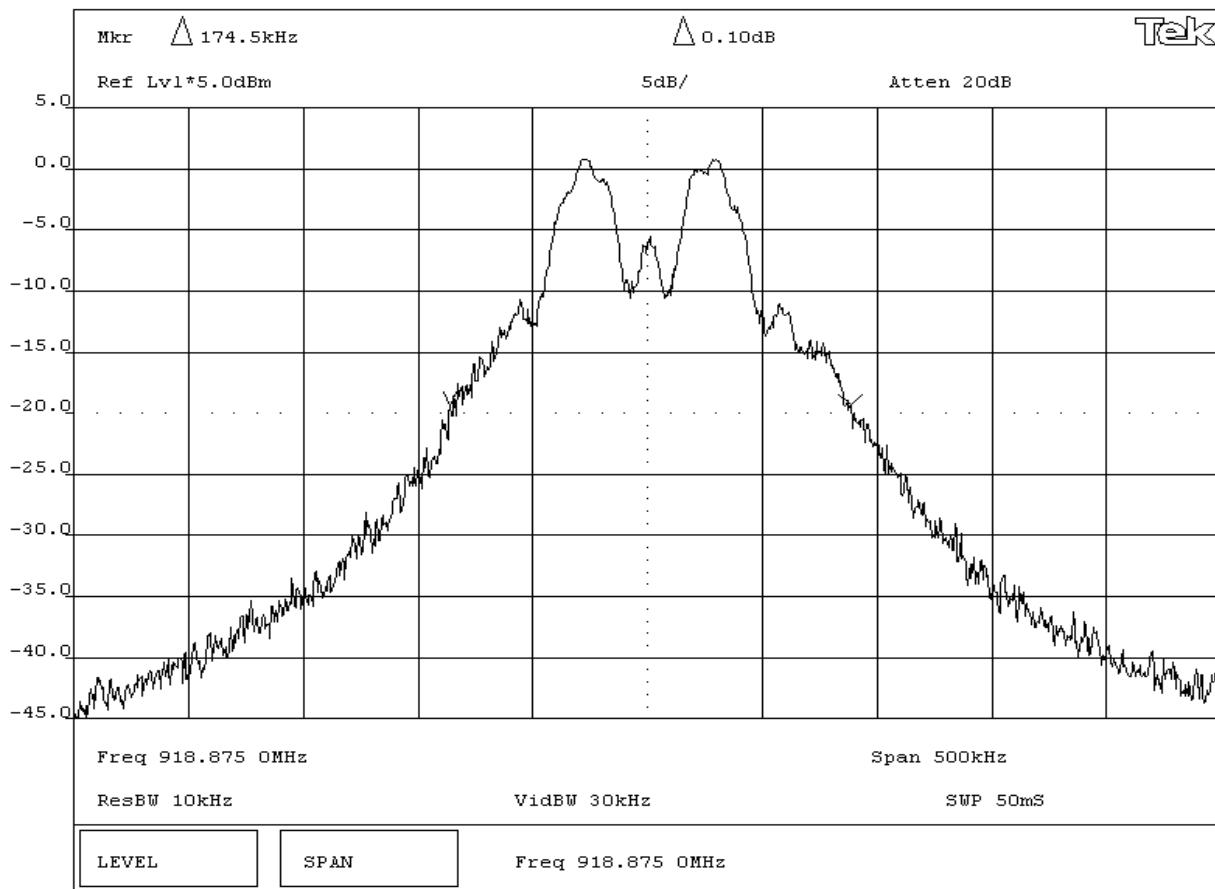
REQUIREMENTS

RESULTS

Tested By -

DESCRIPTION OF TEST

Mid Channel



NORTHWEST
EMC

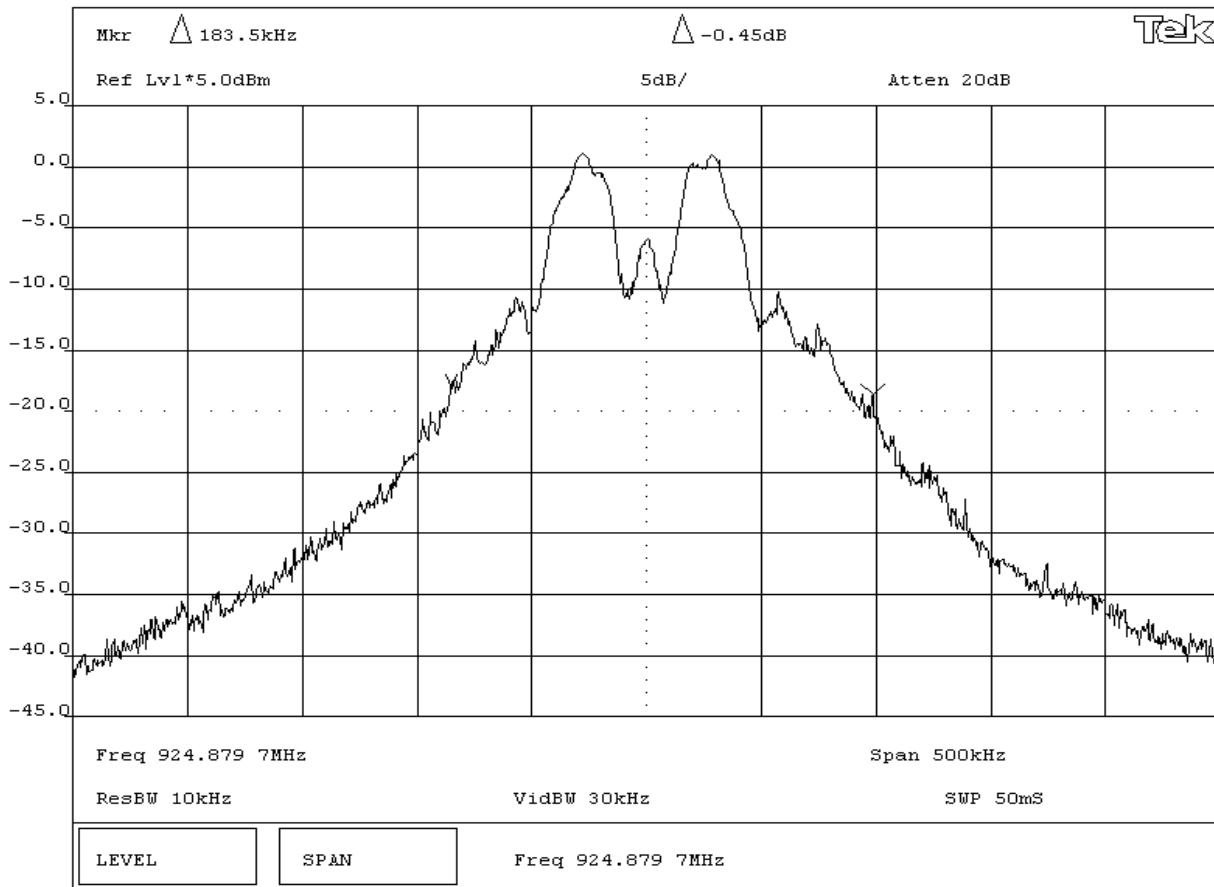
EMISSIONS DATA SHEET

Occupied Bandwidth

Transmitters

Rev d11/15/02

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/09/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	29.89
Tested by:	Rod Peloquin	Job Site:	EV06
TEST SPECIFICATIONS			
Specification: CFR 47 Part 15.247(a)(1)		Year: 2003	Method: DA 00-705, ANSI C63.4
SAMPLE CALCULATIONS			
COMMENTS			
None			
EUT OPERATING MODES			
No hop mode			
DEVIATIONS FROM TEST STANDARD			
REQUIREMENTS			
RESULTS		BANDWIDTH	
Pass		183.5KHz	
SIGNATURE			
			
Tested By: _____			
DESCRIPTION OF TEST			
High Channel			



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(b)(3), the maximum peak output power must not exceed 1 Watt. The measurement is made using either a peak power meter, or a spectrum analyzer using the following settings:

- Resolution bandwidth set to greater than the 6 dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(4), the EUT meets the de facto EIRP limit of +36dBm.

Completed by:



NORTHWEST
EMC

EMISSIONS DATA SHEET

Output Power

Transmitters

Rev df11/15/02

EUT: MRR2

Work Order: WATT0013

Serial Number: N/A

Date: 06/06/03

Customer: The Watt Stopper, Inc.

Temperature: 25 °C

Attendees: None

Humidity: 34%

Customer Ref. No.: N/A

Bar. Pressure: 29.89

Tested by: Rod Peloquin

Power: 120VAC/60Hz

Job Site: EV06

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247(b)(3)

Year: 2003

Method: DA 00-705, ANSI C63.4

Year: 1992

SAMPLE CALCULATIONS

COMMENTS

None

EUT OPERATING MODES

No hop mode

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Peak Output Power cannot exceed .25 Watt

RESULTS

AMPLITUDE

Pass

4.576mW

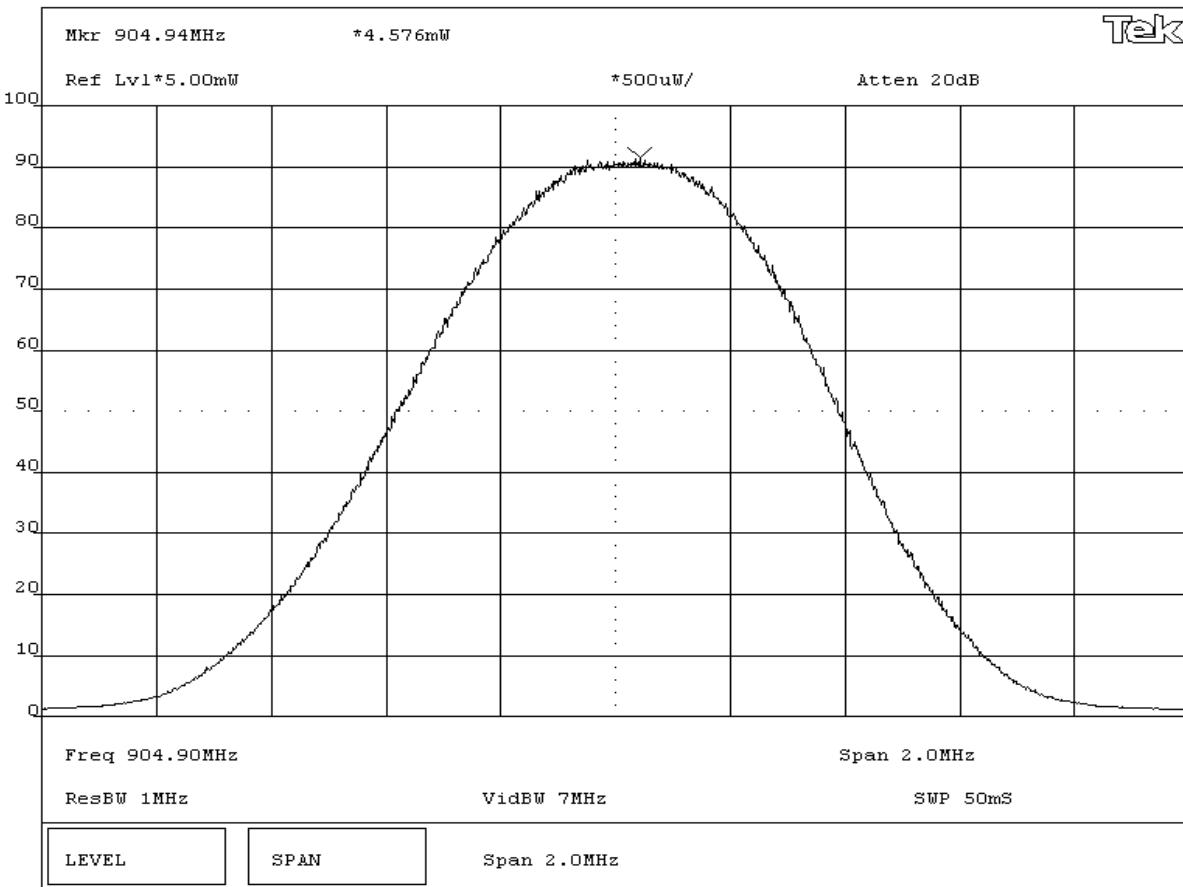
SIGNATURE

Roddy L. Peloquin

Tested By: _____

DESCRIPTION OF TEST

Low Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Output Power

Transmitters

Rev df11/15/02

EUT: MRR2

Work Order: WATT0013

Serial Number: N/A

Date: 06/06/03

Customer: The Watt Stopper, Inc.

Temperature: 25 °C

Attendees: None

Humidity: 34%

Customer Ref. No.: N/A

Bar. Pressure: 29.89

Tested by: Rod Peloquin

Power: 120VAC/60Hz

Job Site: EV06

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247(b)(3)

Year: 2003

Method: DA 00-705, ANSI C63.4

Year: 1992

SAMPLE CALCULATIONS

COMMENTS

None

EUT OPERATING MODES

No hop mode

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Peak Output Power cannot exceed .25 Watt

RESULTS

AMPLITUDE

Pass

4.346mW

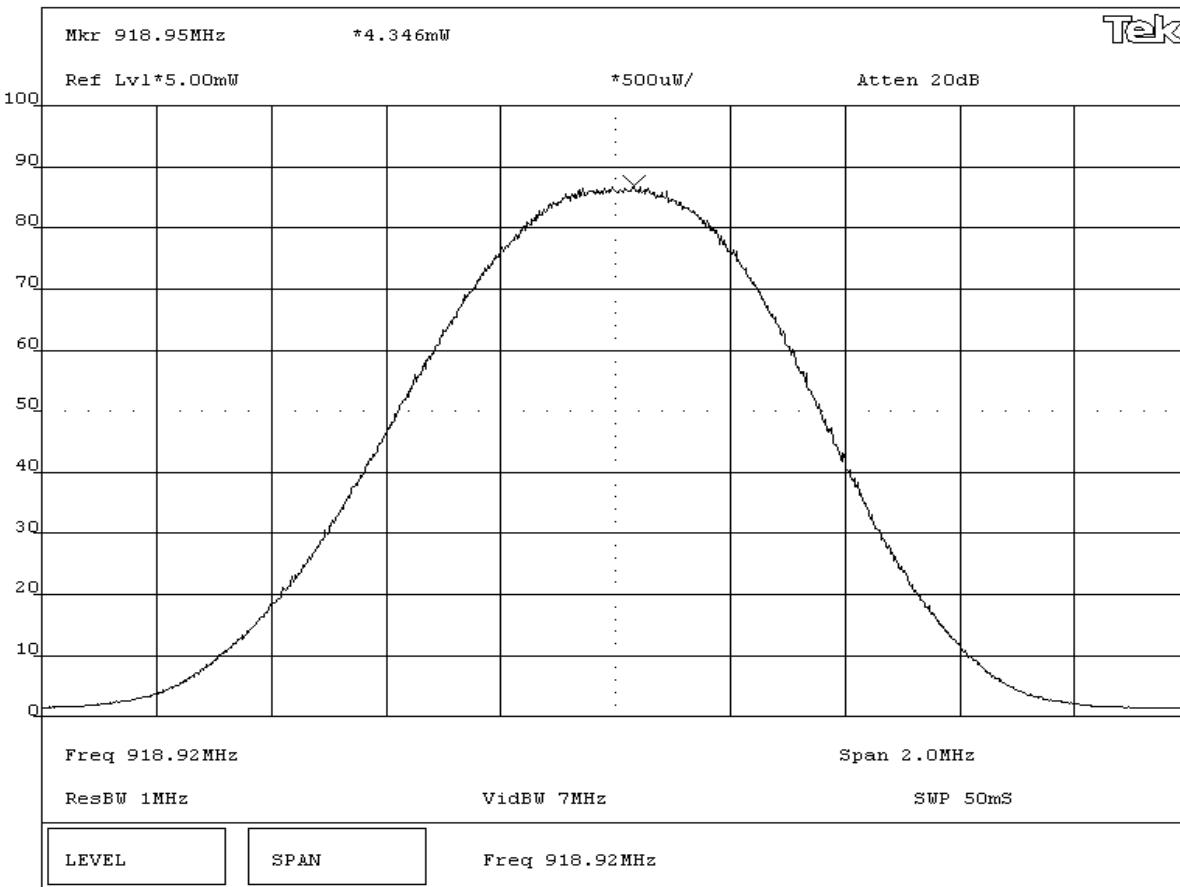
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Mid Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Output Power

Transmitters

Rev df11/15/02

EUT: MRR2

Work Order: WATT0013

Serial Number: N/A

Date: 06/06/03

Customer: The Watt Stopper, Inc.

Temperature: 25 °C

Attendees: None

Humidity: 34%

Customer Ref. No.: N/A

Bar. Pressure: 29.89

Tested by: Rod Peloquin

Power: 120VAC/60Hz

Job Site: EV06

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247(b)(3)

Year: 2003

Method: DA 00-705, ANSI C63.4

Year: 1992

SAMPLE CALCULATIONS

COMMENTS

None

EUT OPERATING MODES

No hop mode

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Peak Output Power cannot exceed .25 Watt

RESULTS

AMPLITUDE

Pass

4.331mW

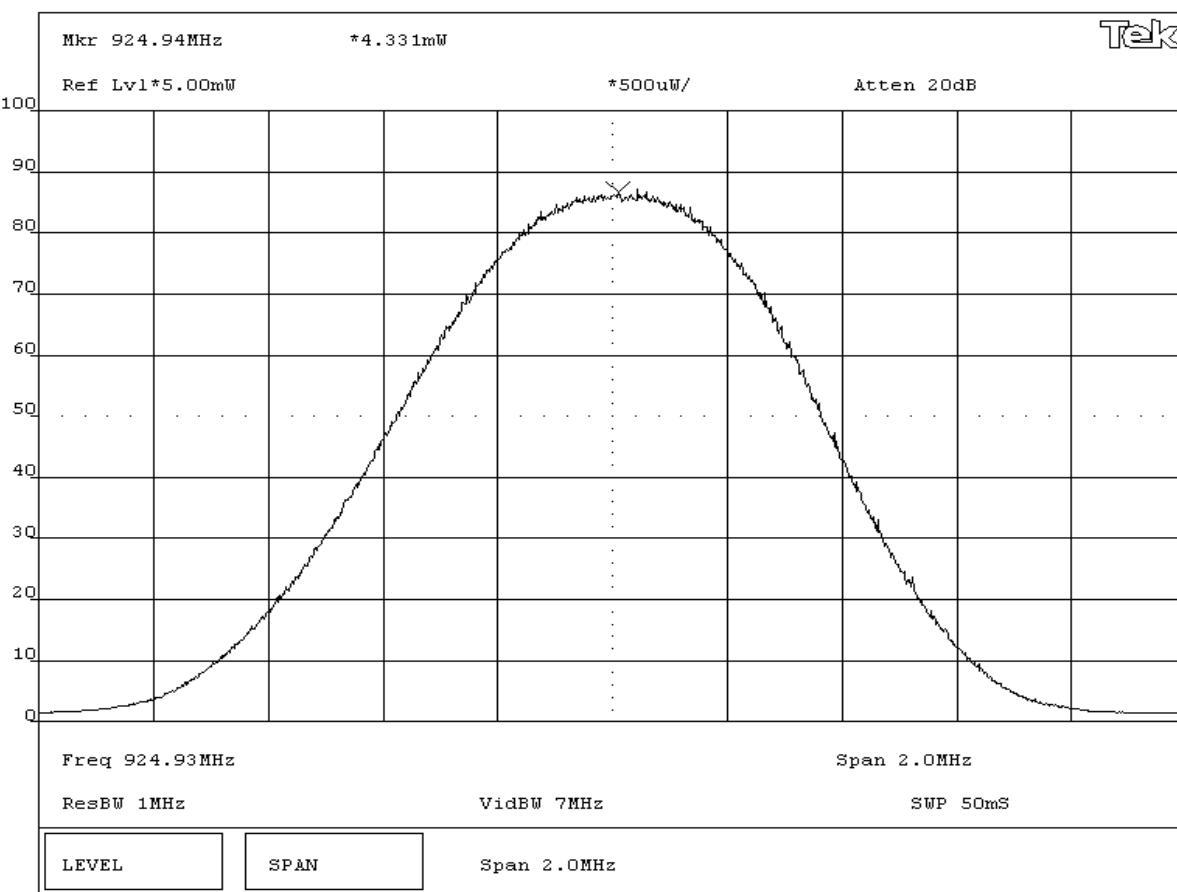
SIGNATURE



Tested By: _____

DESCRIPTION OF TEST

High Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Typical

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

Completed by:

A handwritten signature in blue ink that reads "Rocky L. Reling". The signature is fluid and cursive, with "Rocky" on the top line and "L. Reling" on the bottom line.

NORTHWEST
EMC

EMISSIONS DATA SHEET

Band Edge Compliance

Transmitters

Rev df11/15/02

EUT: MRR2

Work Order: WATT0013

Serial Number: N/A

Date: 06/09/03

Customer: The Watt Stopper, Inc.

Temperature: 25 °C

Attendees: None

Humidity: 34%

Customer Ref. No.: N/A

Bar. Pressure: 30.15

Tested by: Rod Peloquin

Power: 120VAC/60Hz

Job Site: EV06

TEST SPECIFICATIONS

Specification: CFR 47 Part 15.247 (c)

Year: 2003

Method: DA 00-705, ANSI C63.4

Year: 1992

SAMPLE CALCULATIONS

COMMENTS

None

EUT OPERATING MODES

No hop mode

DEVIATIONS FROM TEST STANDARD

REQUIREMENTS

RESULTS

Pass

AMPLITUDE

-60.0db

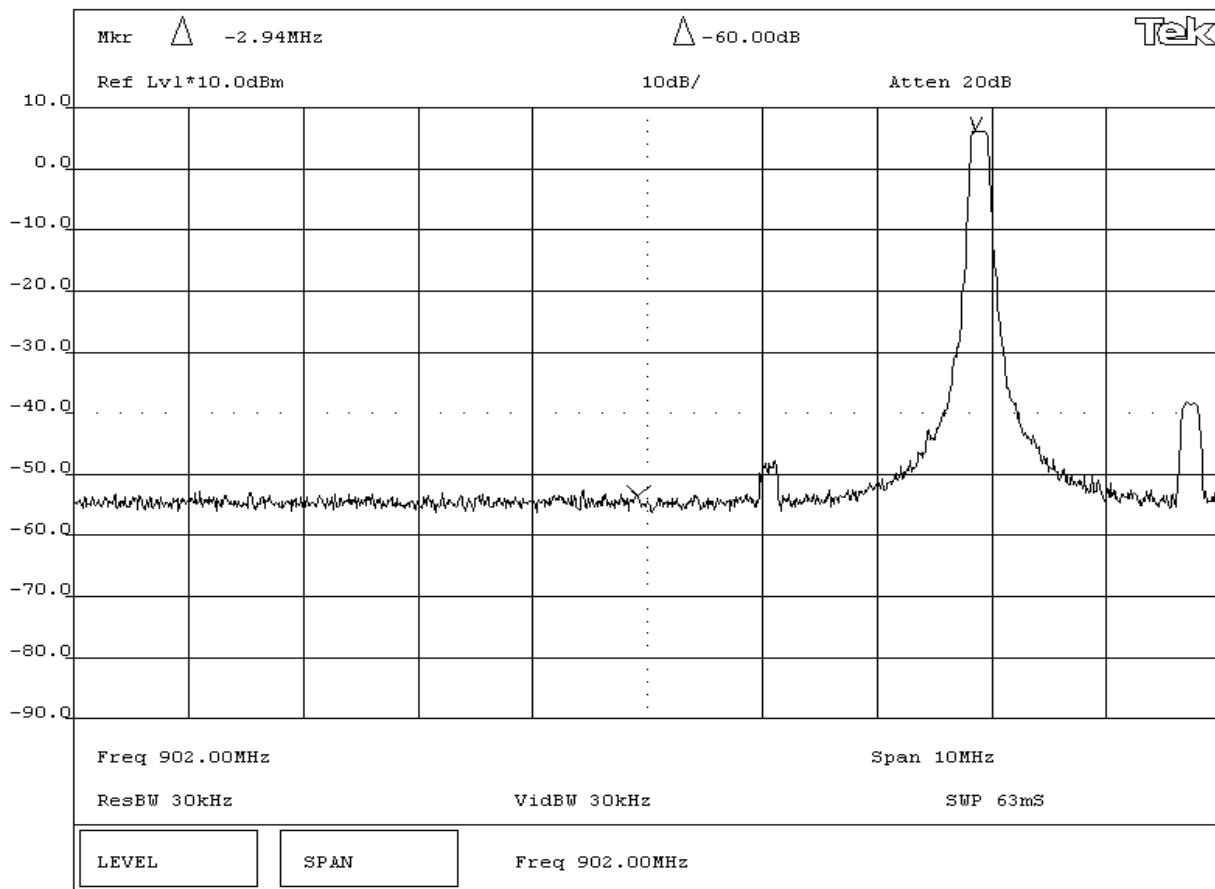
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Low Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

NORTHWEST
EMC

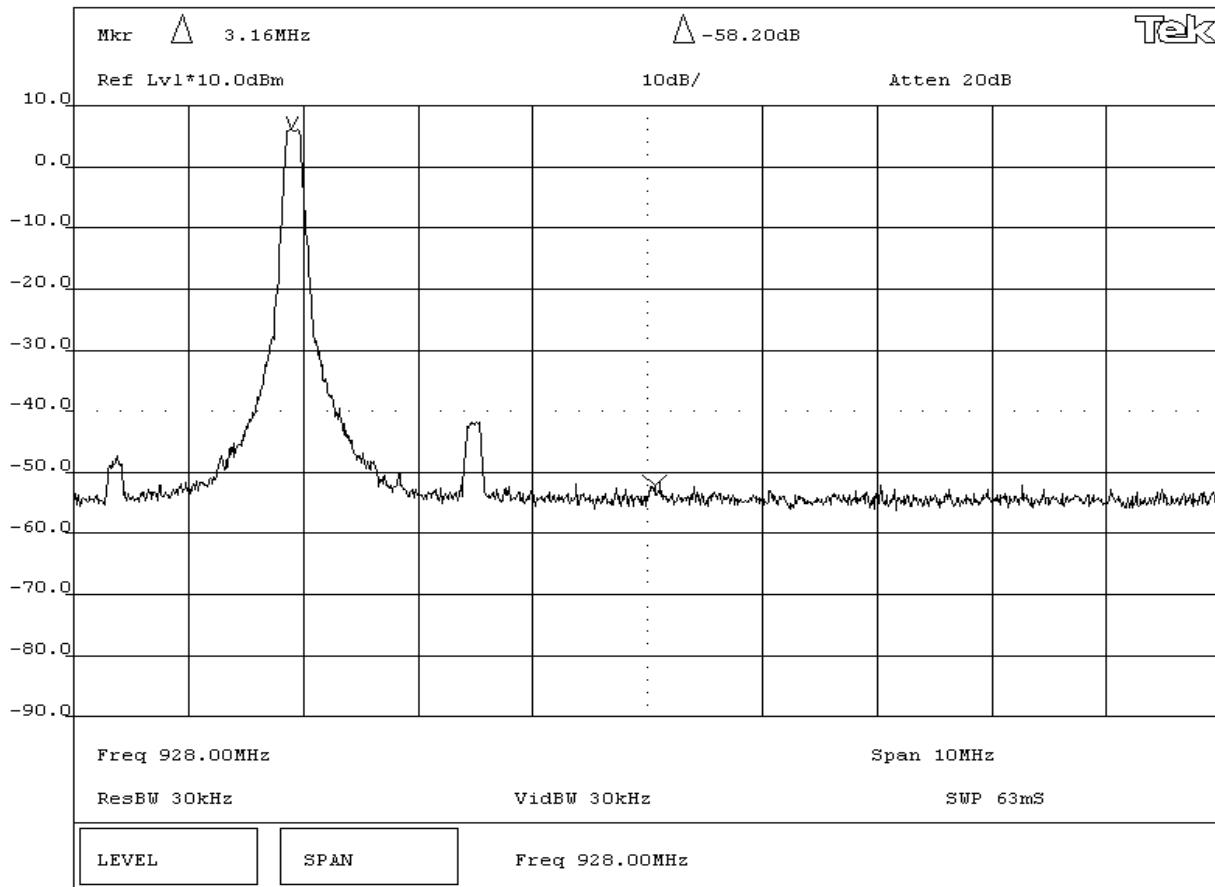
EMISSIONS DATA SHEET

Band Edge Compliance

Transmitters

Rev d11/15/02

EUT:	MRR2			Work Order:	WATT0013			
Serial Number:	N/A			Date:	06/09/03			
Customer:	The Watt Stopper, Inc.			Temperature:	25 °C			
Attendees:	None			Humidity:	34%			
Customer Ref. No.:	N/A			Bar. Pressure:	30.15			
Tested by:	Rod Peloquin		Power:	120VAC/60Hz		Job Site:	EV06	
TEST SPECIFICATIONS								
Specification:		CFR 47 Part 15.247(c)	Year:	2003	Method:	DA 00-705, ANSI C63.4	Year:	1992
SAMPLE CALCULATIONS								
COMMENTS								
None								
EUT OPERATING MODES								
No hop mode								
DEVIATIONS FROM TEST STANDARD								
REQUIREMENTS								
RESULTS AMPLITUDE								
Pass -58.2dB								
SIGNATURE								
								
Tested By: _____								
DESCRIPTION OF TEST								
High Channel								



KNOB 2

KNOB 1

KEYPAD

Tektronix

2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	10 GHz
-----------------	--------	----------------	--------

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
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Description

Transmits at low, mid, and high channels.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	01/07/2003	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	01/06/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/06/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Antenna, Horn	EMCO	3115	AHC	08/12/2002	12 mo
High pass filter	RLC Electronics	F-100-4000-5-R	HFF	01/05/2003	12 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. Compliance is demonstrated with either a RF conducted or radiated measurement. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF emissions were measured with the EUT set to low, medium, and high transmit frequencies. The EUT was transmitting at its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

Radiated measurements were made using the alternative procedure described in FCC Public Notice DA-00705. A pre-amp and high pass filter were used with the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

The field strength of both the fundamental emission and all spurious emissions was measured with these settings. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992). The measured field strength of all spurious emissions is below the measured field strength of the fundamental emission by more than 20 dB.

Completed by:



EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

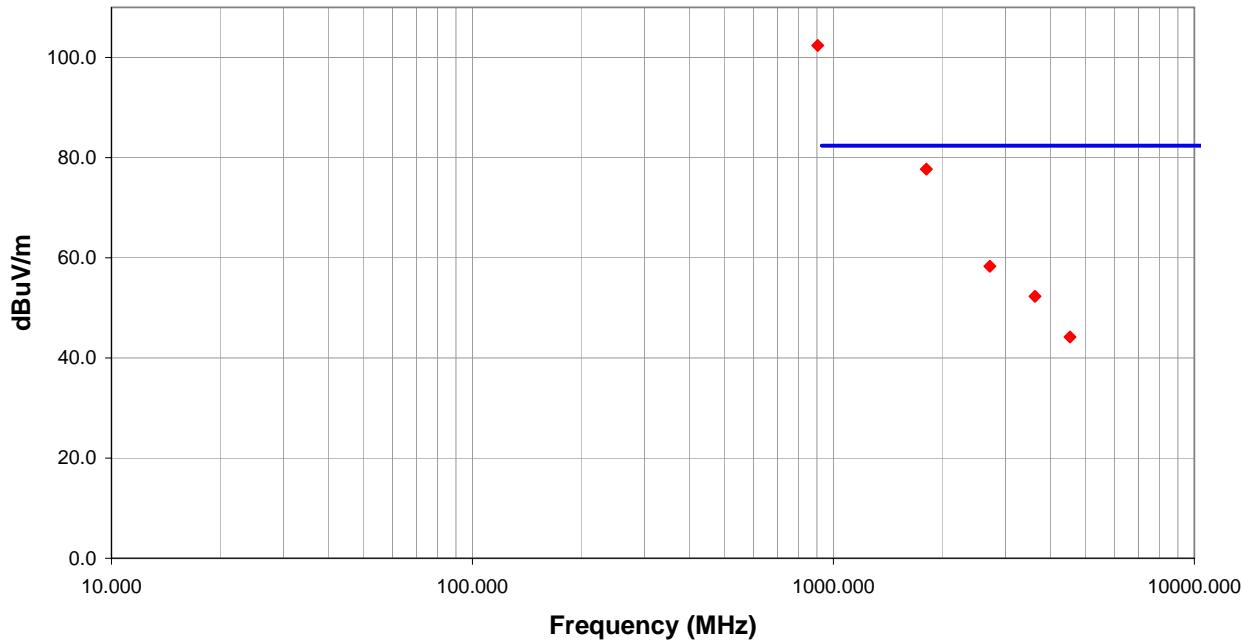
RESULTS

Pass	Run #
	13

Other

Roddy L. Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Maximum allowed level dBuV/m	dBc	Comments
904.865	76.0	26.4	242.0	1.2	3.0	0.0	V-Bilog	PK	0.0	102.4	Fund.	N/A	Low channel
1809.750	46.2	31.5	232.0	1.0	3.0	0.0	V-Horn	PK	0.0	77.7	82.4	-24.7	Low channel
2714.671	56.5	1.8	205.0	1.4	0.0	0.0	V-Horn	PK	0.0	58.3	82.4	-44.1	Low channel
3619.354	48.7	3.6	91.0	1.4	0.0	0.0	V-Horn	PK	0.0	52.3	82.4	-50.1	Low channel
4524.325	39.1	5.1	120.0	1.0	3.0	0.0	V-Horn	PK	0.0	44.2	82.4	-58.2	Low channel

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

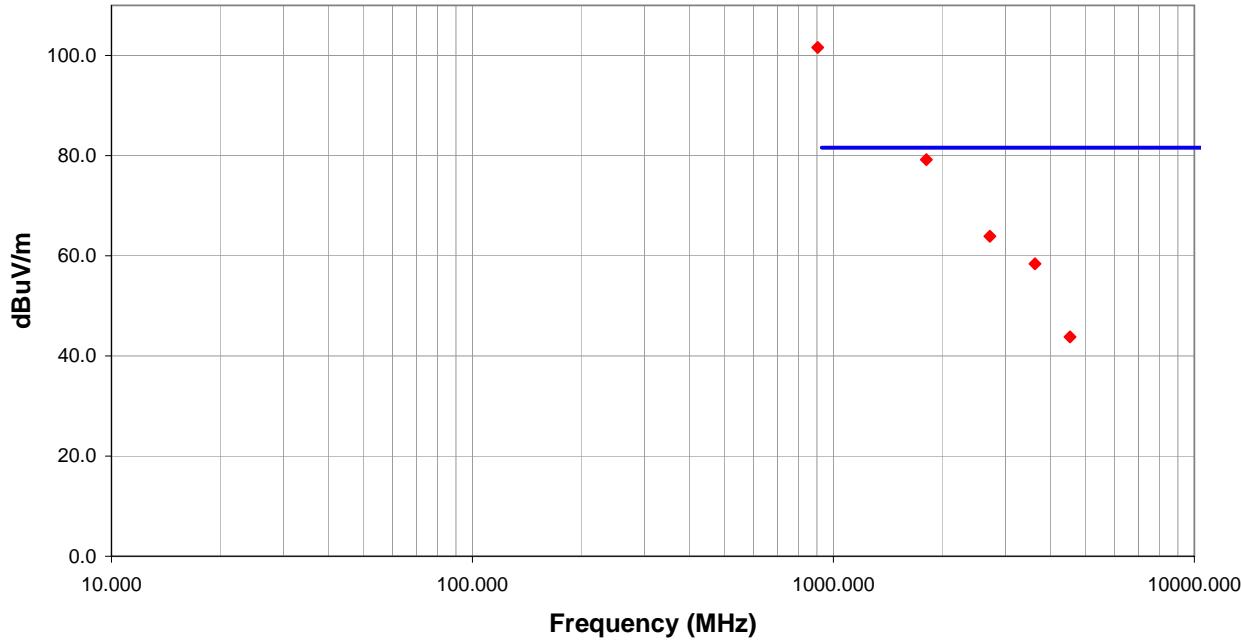
RESULTS

Pass	Run #
	13

Other

Rod Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Maximum allowed level dBuV/m	dBc	Comments
904.864	75.2	26.4	150.0	1.0	3.0	0.0	H-Bilog	PK	0.0	101.6	Fund.	N/A	Low channel
1809.750	47.7	31.5	110.0	1.0	3.0	0.0	H-Horn	PK	0.0	79.2	81.6	-22.4	Low channel
2714.671	62.1	1.8	76.0	1.3	0.0	0.0	H-Horn	PK	0.0	63.9	81.6	-37.7	Low channel
3619.354	54.8	3.6	84.0	1.2	0.0	0.0	H-Horn	PK	0.0	58.4	81.6	-43.2	Low channel
4524.325	38.7	5.1	129.0	1.3	3.0	0.0	H-Horn	PK	0.0	43.8	81.6	-57.8	Low channel

OATS DATA SHEET

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

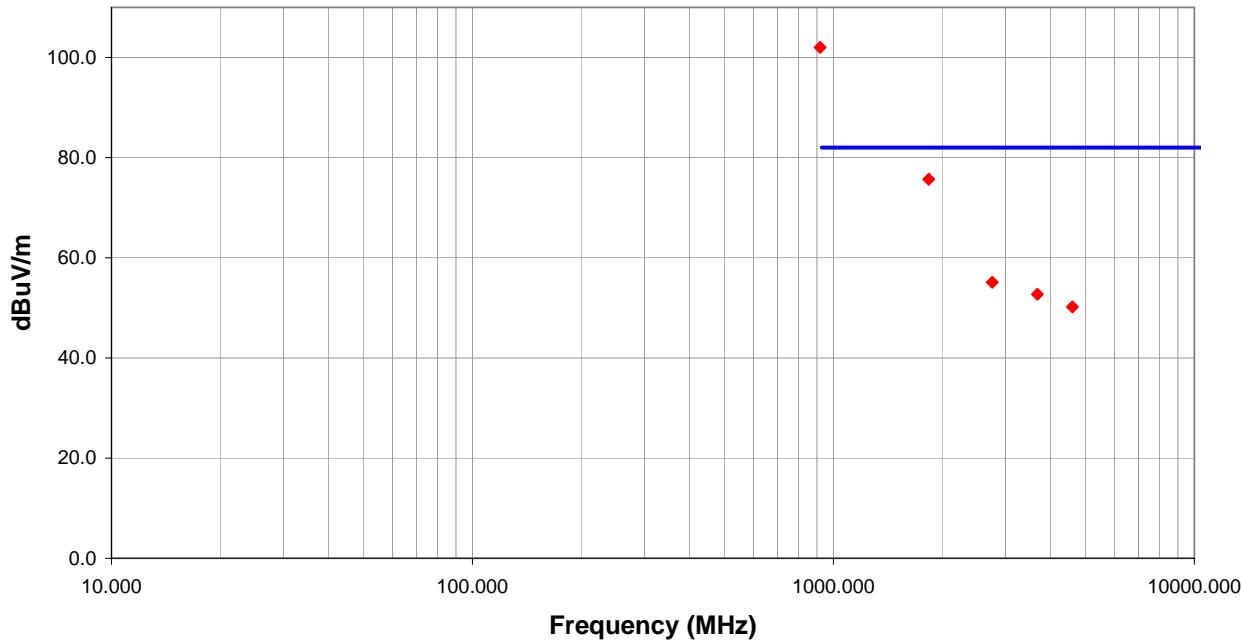
RESULTS

Pass	Run #
	13

Other

Roddy L. Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Maximum allowed level dBuV/m	dBc	Comments
918.875	75.4	26.6	177.0	1.6	3.0	0.0	V-Bilog	PK	0.0	102.0	Fund.	N/A	Mid channel
1837.750	44.0	31.7	231.0	1.0	3.0	0.0	V-Horn	PK	0.0	75.7	82.0	-26.3	Mid channel
2756.533	53.2	1.9	279.0	1.5	0.0	0.0	V-Horn	PK	0.0	55.1	82.0	-46.9	Mid channel
3675.381	48.9	3.8	256.0	1.2	0.0	0.0	V-Horn	PK	0.0	52.7	82.0	-49.3	Mid channel
4594.528	44.9	5.3	0.0	1.2	0.0	0.0	V-Horn	PK	0.0	50.2	82.0	-51.8	Mid channel

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

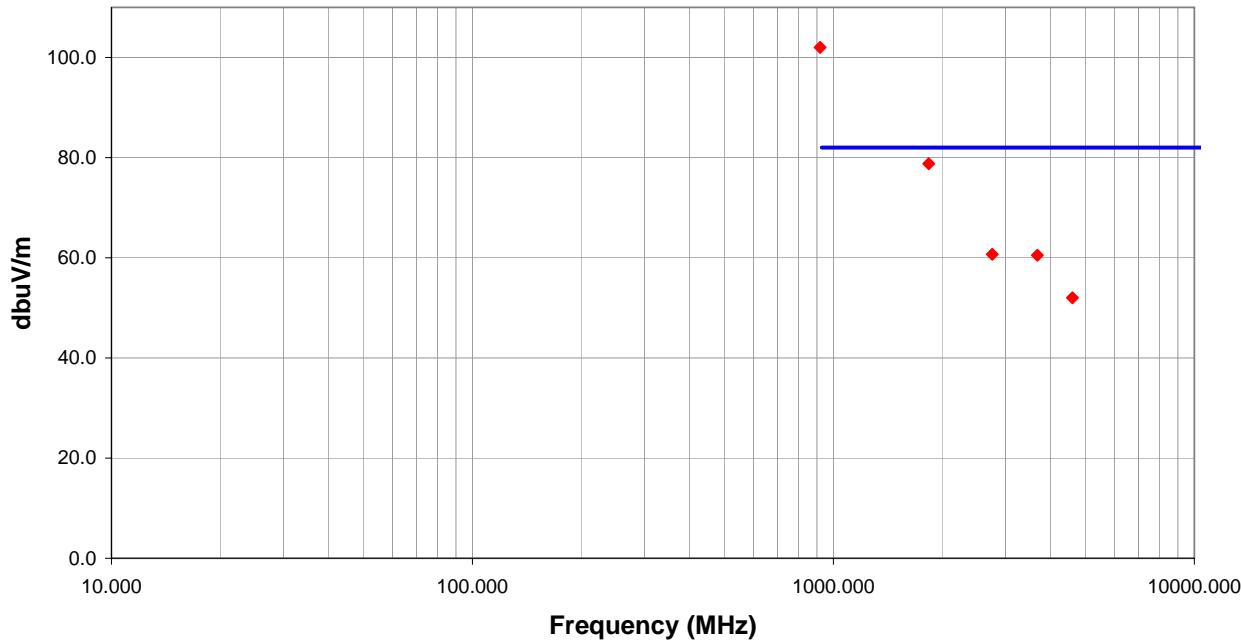
RESULTS

Pass	Run #
	13

Other

Roddy L. Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dbuV/m	Maximum allowed level dbuV/m	dBc	Comments
918.875	75.4	26.6	151.0	1.0	3.0	0.0	H-Bilog	PK	0.0	102.0	Fund.	N/A	Mid channel
1837.750	47.1	31.7	135.0	1.1	3.0	0.0	H-Horn	PK	0.0	78.8	82.0	-23.2	Mid channel
2756.533	58.8	1.9	72.0	1.3	0.0	0.0	H-Horn	PK	0.0	60.7	82.0	-41.3	Mid channel
3675.381	56.7	3.8	81.0	1.1	0.0	0.0	H-Horn	PK	0.0	60.5	82.0	-41.5	Mid channel
4594.528	46.7	5.3	79.0	1.1	0.0	0.0	H-Horn	PK	0.0	52.0	82.0	-50.0	Mid channel

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting channel

DEVIATIONS FROM TEST STANDARD

No deviations.

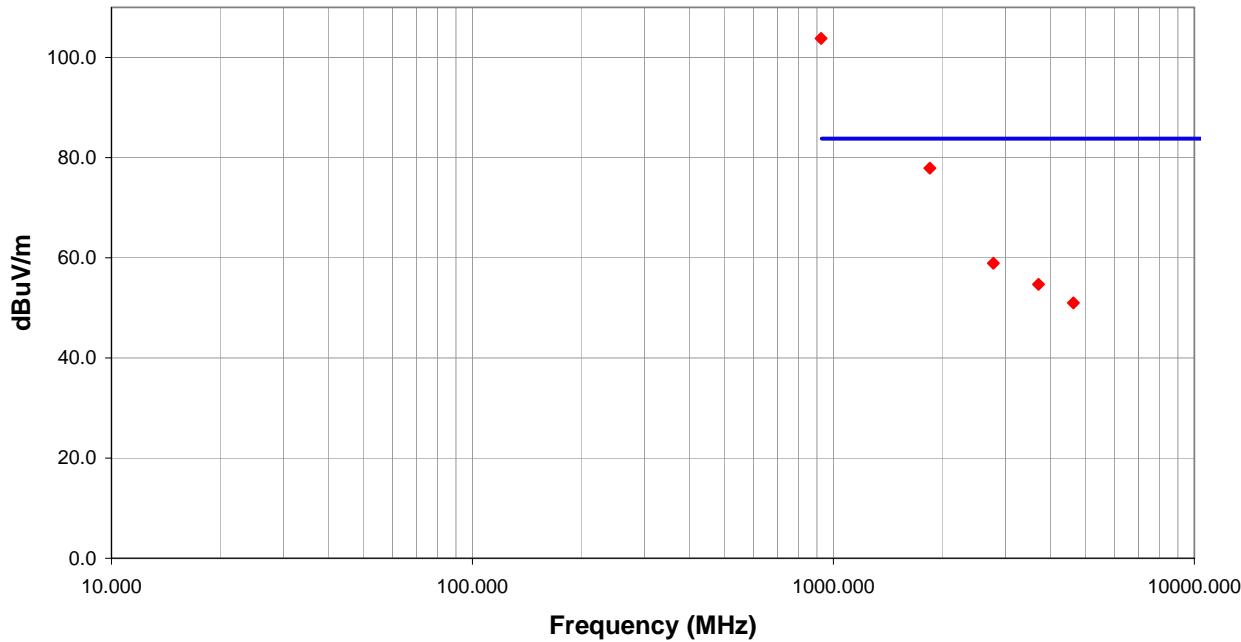
RESULTS

Pass	Run #
	13

Other



Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Maximum allowed level dBuV/m	dBc	Comments
924.876	77.2	26.6	58.0	1.3	3.0	0.0	V-Bilog	PK	0.0	103.8	Fund.	N/A	High channel
1849.752	46.2	31.7	224.0	1.0	3.0	0.0	V-Horn	PK	0.0	77.9	83.8	-25.9	High channel
2774.561	57.0	1.9	165.0	1.5	0.0	0.0	V-Horn	PK	0.0	58.9	83.8	-44.9	High channel
3699.606	50.8	3.9	143.0	1.1	0.0	0.0	V-Horn	PK	0.0	54.7	83.8	-49.1	High channel
4624.245	45.6	5.4	17.0	1.3	0.0	0.0	V-Horn	PK	0.0	51.0	83.8	-52.8	High channel

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 06/12/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC Part 15.247(c)	Year: 2000
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation
 Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting high channel

DEVIATIONS FROM TEST STANDARD

No deviations.

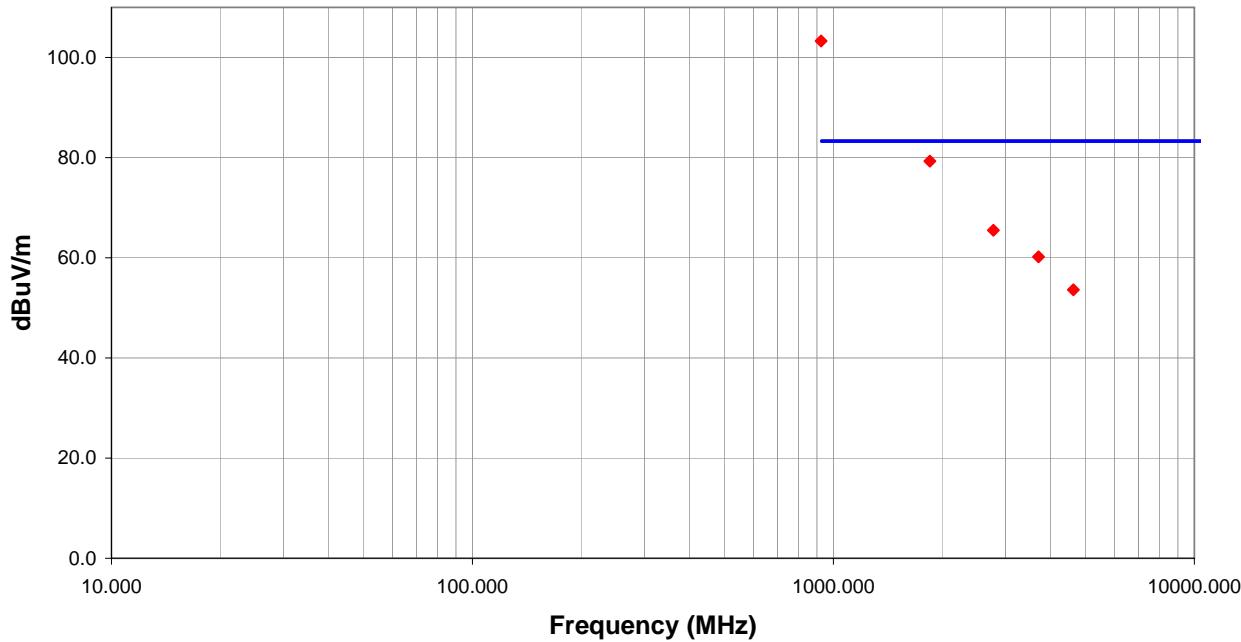
RESULTS

Pass	Run #
	13

Other



Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Maximum allowed level dBuV/m	dBc	Comments
924.876	76.7	26.6	151.0	1.0	3.0	0.0	H-Bilog	PK	0.0	103.3	Fund.	N/A	High channel
1849.752	47.6	31.7	117.0	1.0	3.0	0.0	H-Horn	PK	0.0	79.3	83.3	-24.0	High channel
2774.561	63.6	1.9	72.0	1.2	0.0	0.0	H-Horn	PK	0.0	65.5	83.3	-37.8	High channel
3699.606	56.3	3.9	81.0	1.1	0.0	0.0	H-Horn	PK	0.0	60.2	83.3	-43.1	High channel
4624.245	48.2	5.4	77.0	1.3	0.0	0.0	H-Horn	PK	0.0	53.6	83.3	-49.7	High channel

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Typical

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120VAC, 60Hz

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	The Watt Stopper, Inc.	MRR2	N/A
AC Adapter	N/A	A35-U0900	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.2	PA	EUT	AC Mains

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(d), the peak power spectral density conducted from the antenna port of a direct sequence transmitter must not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

Configuration: The peak power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

Completed by:

A handwritten signature in blue ink that reads "Rocky L. Reling".

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/12/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	29.89
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
Specification:	CFR 47 Part 15.247(d)	Method:	FCC 97-114, ANSI C63.4
	Year: 2003		Year: 1992

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = $10^4 \log(3\text{kHz}/1\text{Hz})$

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS

Pass

Power Spectral Density = 4.3 dBm / 3kHz

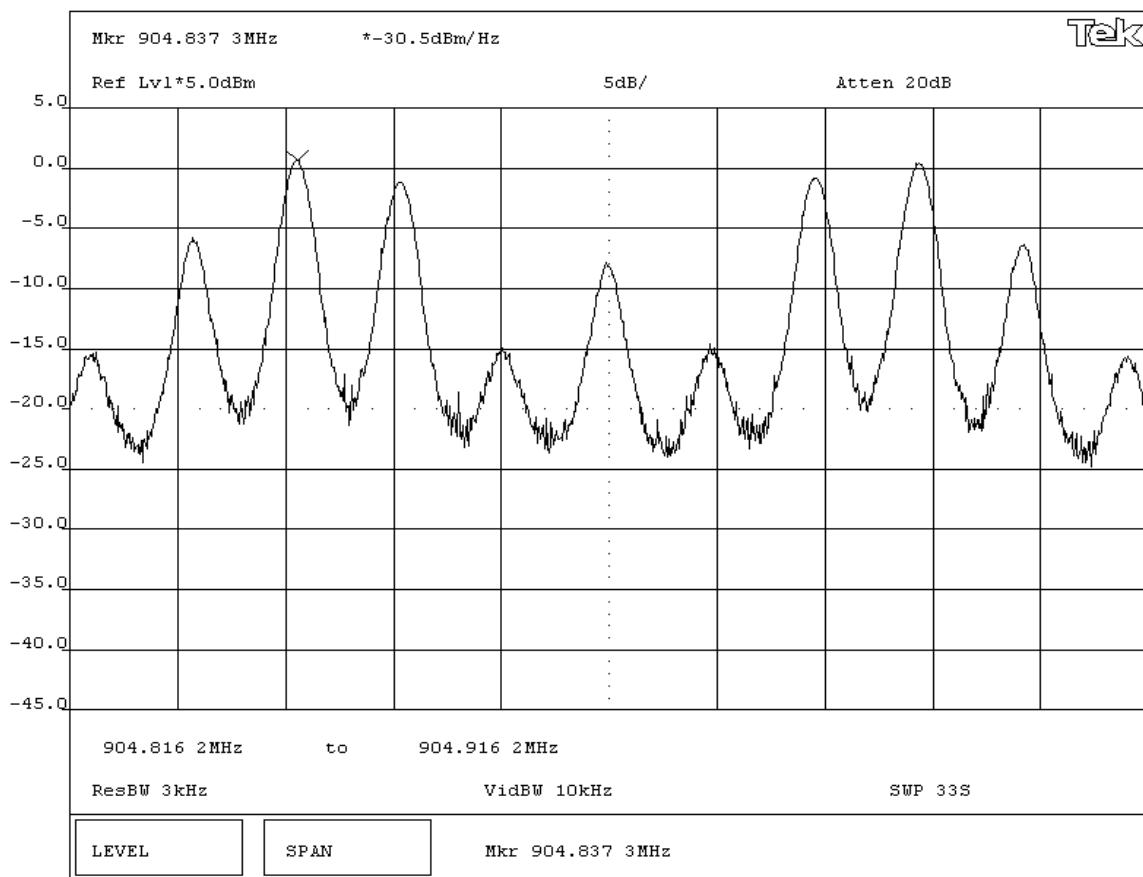
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Low Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/12/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	29.89
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
Specification:	CFR 47 Part 15.247(d)	Method:	FCC 97-114, ANSI C63.4
	Year: 2003		Year: 1992

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = $10^{\log(3\text{kHz}/1\text{Hz})}$

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS

Pass Power Spectral Density = 3.9 dBm / 3kHz

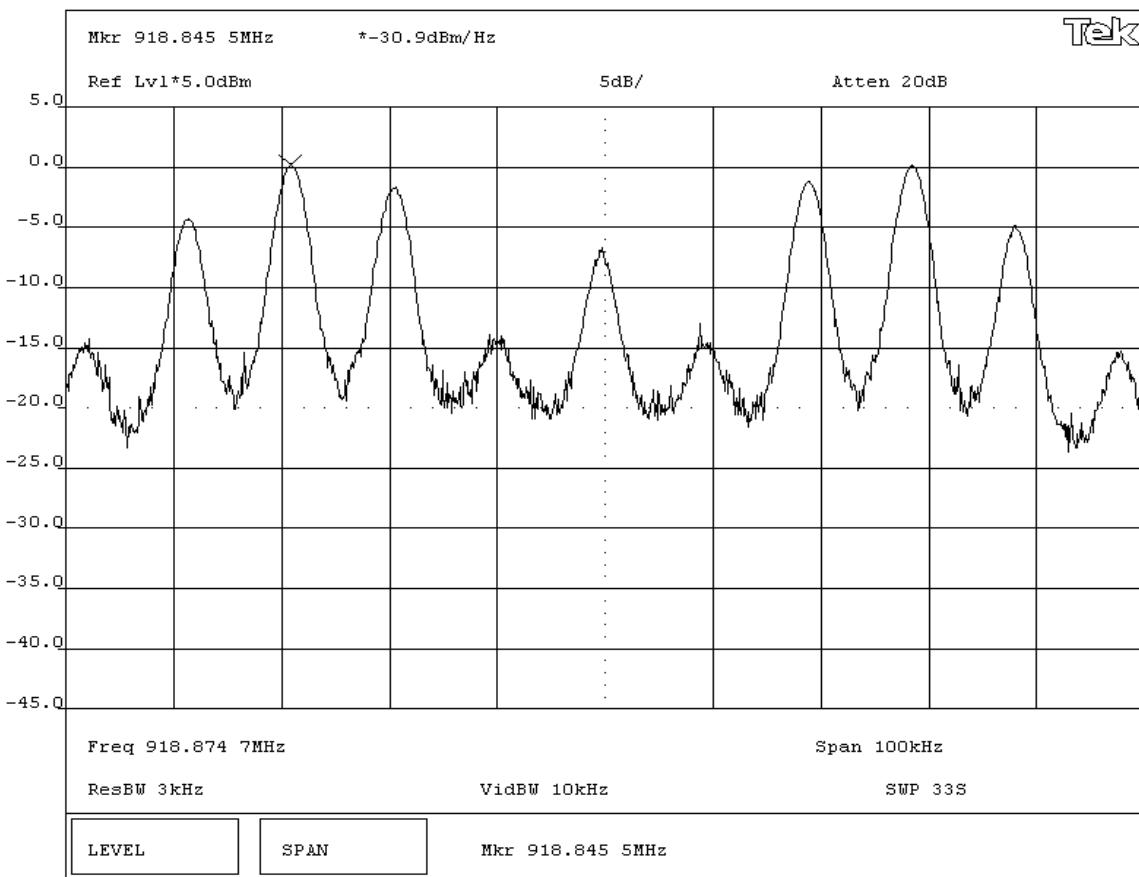
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Mid Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	MRR2	Work Order:	WATT0013
Serial Number:	N/A	Date:	06/12/03
Customer:	The Watt Stopper, Inc.	Temperature:	25 °C
Attendees:	None	Humidity:	34%
Customer Ref. No.:	N/A	Bar. Pressure:	29.89
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
Specification:	CFR 47 Part 15.247(d)	Method:	FCC 97-114, ANSI C63.4
	Year:	2003	Year:

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = $10^4 \log(3\text{kHz}/1\text{Hz})$

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS

Pass Power Spectral Density = 4.1 dBm / 3kHz

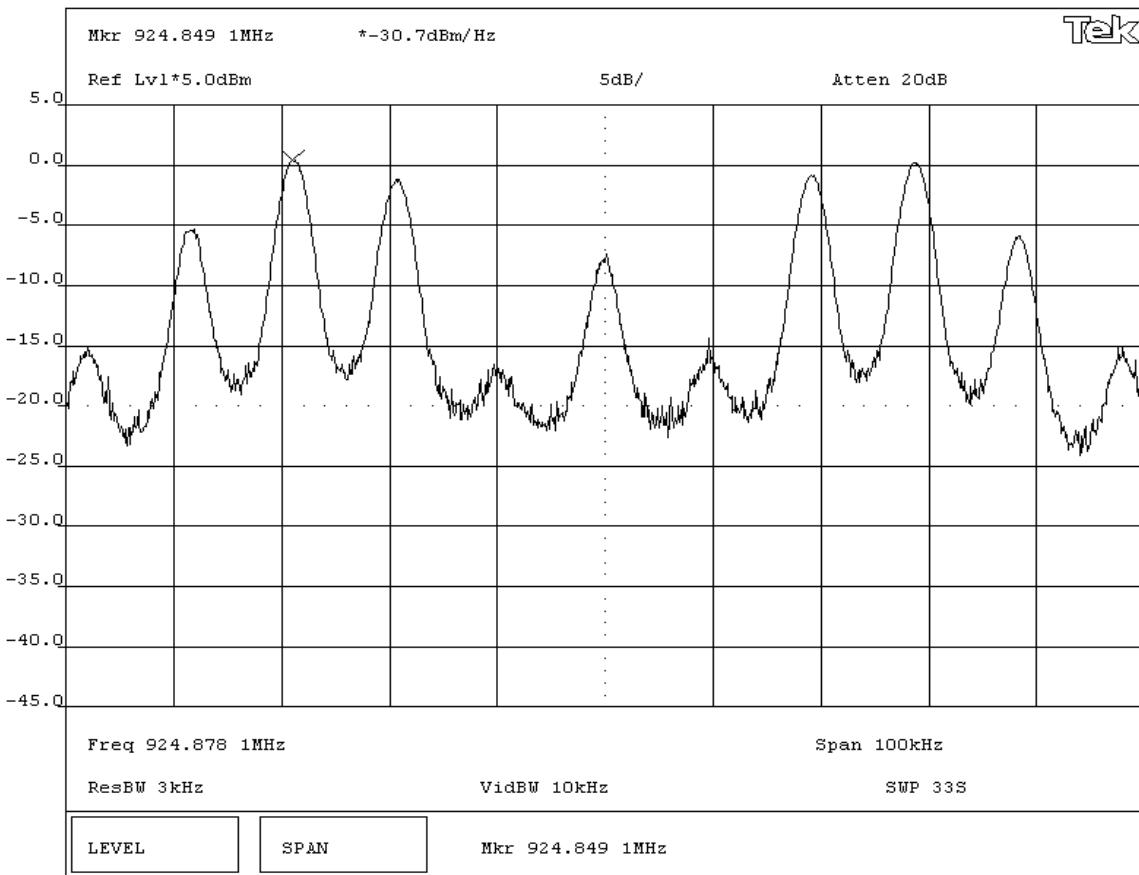
SIGNATURE

Rod Peloquin

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - High Channel



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Typical

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	10 GHz
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Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
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Description

Transmits low, mid, and high channels.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	01/07/2003	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	01/06/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/06/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Antenna, Horn	EMCO	3115	AHC	08/12/2002	12 mo
High Pass Filter	Hewlett Packard	84300-80037	HFE	05/01/2003	12 mo

Test Description

Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

Configuration: The only type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. The EUT was transmitting at its maximum data rate in a no hop mode. For each configuration, the spectrum was scanned from 30 MHz to 10 GHz. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity. Since the dwell time per channel of the hopping signal was less than 100 ms, the readings obtained with the 10 Hz VBW were further reduced by a "duty cycle correction factor" of 15.5 dB, derived from $20\log(\text{dwell time}/100\text{ms})$, where the EUT's maximum dwell time in any 100mS period was measured to be 16.8 mS.

Bandwidths Used for Measurements

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

Completed by:

Holly Antognoli

NORTHWEST
EMC

OATS DATA SHEET

REV
df3.10
03/10/2003

EUT: MRR2	Work Order: WATT0013
Serial Number:	Date: 05/29/03
Customer: The Watt Stopper Inc.	Temperature: 75
Attendees:	Humidity: 42%
Cust. Ref. No.:	Barometric Pressure: 29.82
Tested by: Holly Ashkannejhad	Job Site: EV01
TEST SPECIFICATIONS	
Specification: FCC Part 15.247(c)	Year: 2001
Method: ANSI C63.4	Year: 1992
SAMPLE CALCULATIONS	
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation	
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator	
COMMENTS	

EUT OPERATING MODES

Transmitting low, mid, high channels

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

Pass

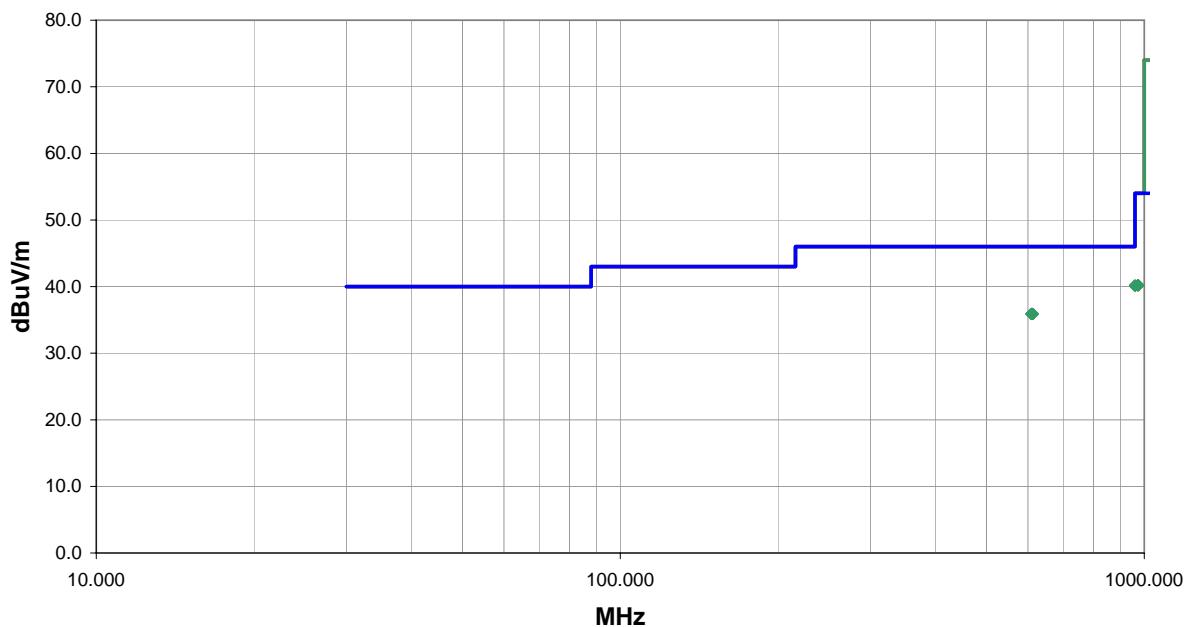
Run #

2

Other

Holly Ashkannejhad

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
609.149	23.0	-7.1	2.0	1.7	3.0	20.0	V-Bilog	QP	0.0	35.9	46.0	-10.1
609.327	23.0	-7.1	146.0	1.2	3.0	20.0	H-Bilog	QP	0.0	35.9	46.0	-10.1
609.714	23.0	-7.1	104.0	1.7	3.0	20.0	V-Bilog	QP	0.0	35.9	46.0	-10.1
610.511	23.0	-7.1	164.0	1.2	3.0	20.0	H-Bilog	QP	0.0	35.9	46.0	-10.1
612.621	22.9	-7.0	165.0	3.2	3.0	20.0	V-Bilog	QP	0.0	35.9	46.0	-10.1
612.763	22.9	-7.0	108.0	1.2	3.0	20.0	H-Bilog	QP	0.0	35.9	46.0	-10.1
972.530	23.2	-3.0	133.0	3.2	3.0	20.0	H-Bilog	QP	0.0	40.2	54.0	-13.8
972.738	23.2	-3.0	16.0	2.1	3.0	20.0	V-Bilog	QP	0.0	40.2	54.0	-13.8
973.555	23.2	-3.0	64.0	3.1	3.0	20.0	V-Bilog	QP	0.0	40.2	54.0	-13.8
973.967	23.2	-3.0	95.0	1.0	3.0	20.0	H-Bilog	QP	0.0	40.2	54.0	-13.8
960.093	23.4	-3.2	293.0	1.1	3.0	20.0	V-Bilog	QP	0.0	40.2	54.0	-13.8
960.076	23.3	-3.2	321.0	1.0	3.0	20.0	H-Bilog	QP	0.0	40.1	54.0	-13.9

OATS DATA SHEET

EUT:	MRR2	Work Order:	WATT0013
Serial Number:		Date:	05/30/03
Customer:	The Watt Stopper Inc.	Temperature:	75
Attendees:		Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	29.82
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz
			Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2001
Method:	ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Transmitting low, mid, high channels

DEVIATIONS FROM TEST STANDARD

No deviations.

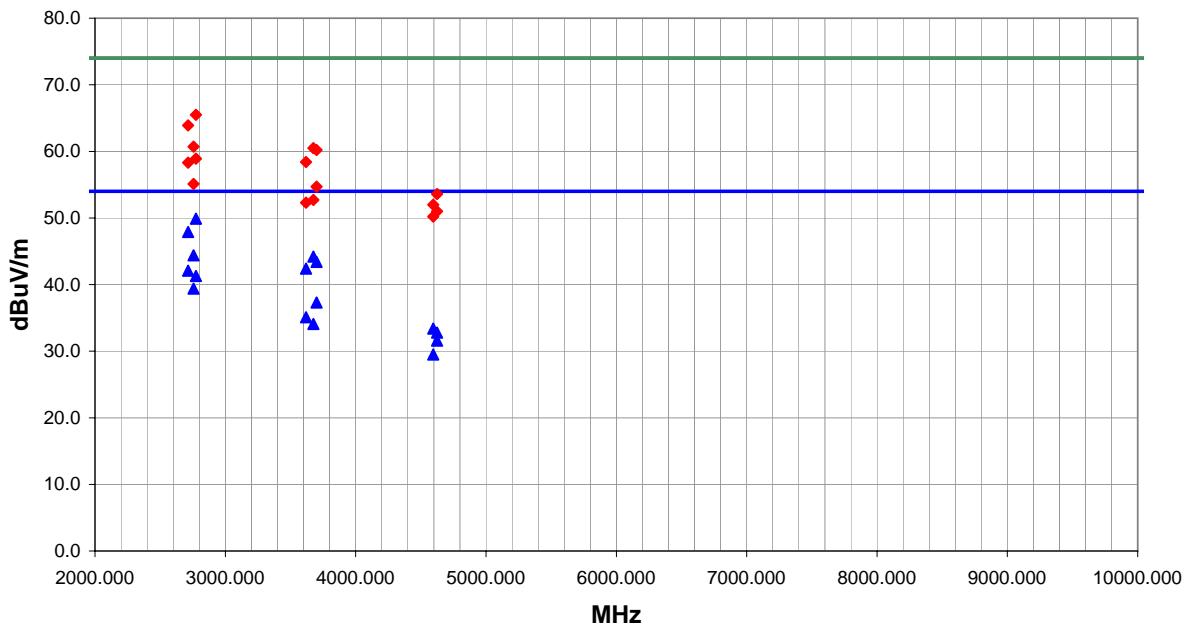
RESULTS

Pass	Run #
	6

Other

Holly Ashkannejhad

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
2774.561	63.5	1.9	72.0	1.2	15.5	0.0	H-Horn	AV	0.0	49.9	54.0	-4.1	High channel
2714.671	61.6	1.8	76.0	1.3	15.5	0.0	H-Horn	AV	0.0	47.9	54.0	-6.1	Low channel
2756.533	58.0	1.9	72.0	1.3	15.5	0.0	H-Horn	AV	0.0	44.4	54.0	-9.6	Mid channel
3675.381	55.9	3.8	81.0	1.1	15.5	0.0	H-Horn	AV	0.0	44.2	54.0	-9.8	Mid channel
3699.606	55.0	3.9	81.0	1.1	15.5	0.0	H-Horn	AV	0.0	43.4	54.0	-10.6	High channel
3619.354	54.3	3.6	84.0	1.2	15.5	0.0	H-Horn	AV	0.0	42.4	54.0	-11.6	Low channel
2714.671	55.8	1.8	205.0	1.4	15.5	0.0	V-Horn	AV	0.0	42.1	54.0	-11.9	Low channel
2774.561	54.9	1.9	165.0	1.5	15.5	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7	High channel
2756.533	53.0	1.9	279.0	1.5	15.5	0.0	V-Horn	AV	0.0	39.4	54.0	-14.6	Mid channel
3699.606	48.9	3.9	143.0	1.1	15.5	0.0	V-Horn	AV	0.0	37.3	54.0	-16.7	High channel
3619.354	47.0	3.6	91.0	1.4	15.5	0.0	V-Horn	AV	0.0	35.1	54.0	-18.9	Low channel
3675.381	45.8	3.8	256.0	1.2	15.5	0.0	V-Horn	AV	0.0	34.1	54.0	-19.9	Mid channel
4594.528	43.6	5.3	79.0	1.1	15.5	0.0	H-Horn	AV	0.0	33.4	54.0	-20.6	Mid channel
4624.245	42.9	5.4	17.0	1.3	15.5	0.0	V-Horn	AV	0.0	32.8	54.0	-21.2	High channel
4624.245	41.7	5.4	77.0	1.3	15.5	0.0	H-Horn	AV	0.0	31.6	54.0	-22.4	High channel
4594.528	39.7	5.3	0.0	1.2	15.5	0.0	V-Horn	AV	0.0	29.5	54.0	-24.5	Mid channel
2774.561	63.6	1.9	72.0	1.2	0.0	0.0	H-Horn	PK	0.0	65.5	74.0	-8.5	High channel
2714.671	62.1	1.8	76.0	1.3	0.0	0.0	H-Horn	PK	0.0	63.9	74.0	-10.1	Low channel
2756.533	58.8	1.9	72.0	1.3	0.0	0.0	H-Horn	PK	0.0	60.7	74.0	-13.3	Mid channel
3675.381	56.7	3.8	81.0	1.1	0.0	0.0	H-Horn	PK	0.0	60.5	74.0	-13.5	Mid channel

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: MRR2	Work Order: WATT0013
Serial Number: N/A	Date: 06/16/03
Customer: The Watt Stopper, Inc.	Temperature: 25 °C
Attendees: None	Humidity: 34%
Customer Ref. No.: N/A	Bar. Pressure: 30.15
Tested by: Rod Peloquin	Job Site: EV06
Specification: 47 CFR 15.235(c)	Year: 2003
	Method: DA 00-705, ANSI C63.4
	Year: 1992

SAMPLE CALCULATIONS

Duty cycle correction factor (dB) = $20 \log_{10} (\text{worst case high time} / \text{any 100mS period})$

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The average value of radiated emissions can be reduced by a duty cycle correction factor for comparison to the limit. The duty cycle correction factor is calculated as shown above:

RESULTS

Pass

DWELL TIME DURING A SINGLE TRANSMISSION

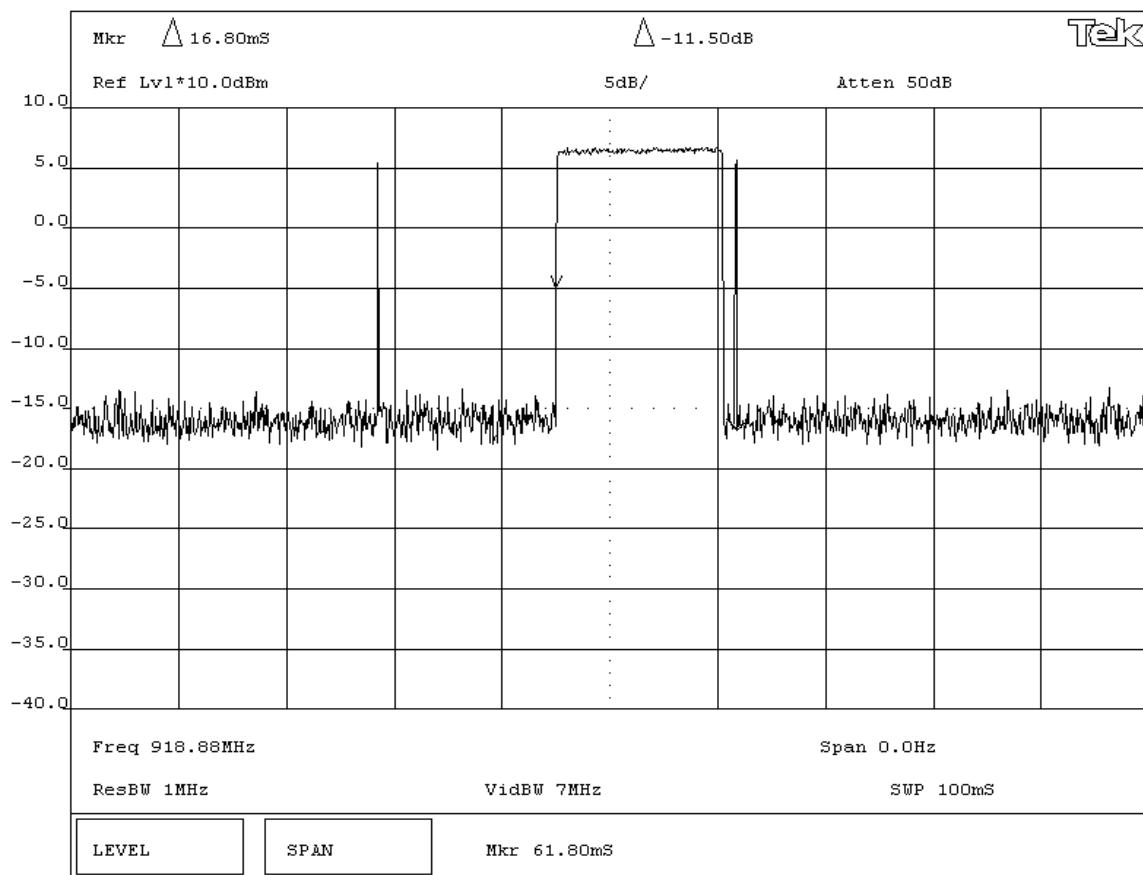
16.8mS

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Time of Occupancy (Dwell Time) - Single Transmission



KNOB 2

KNOB 1

KEYPAD

Tektronix 2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

....
BETA
01/30/0

EUT: MRR2	Work Order: WATT0013
Serial Number: N/A	Date: 06/16/03
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Attendees: None	Humidity: 34%
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SAMPLE CALCULATIONS

Duty cycle correction factor (dB) = $20 \log_{10} (\text{worst case high time} / \text{any 100mS period})$

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate. Hopping carrier.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The average value of radiated emissions can be reduced by a duty cycle correction factor for comparison to the limit. The duty cycle correction factor is calculated as shown above:

RESULTS

NUMBER OF TRANSMISSIONS DURING A 100mS PERIOD

Pass

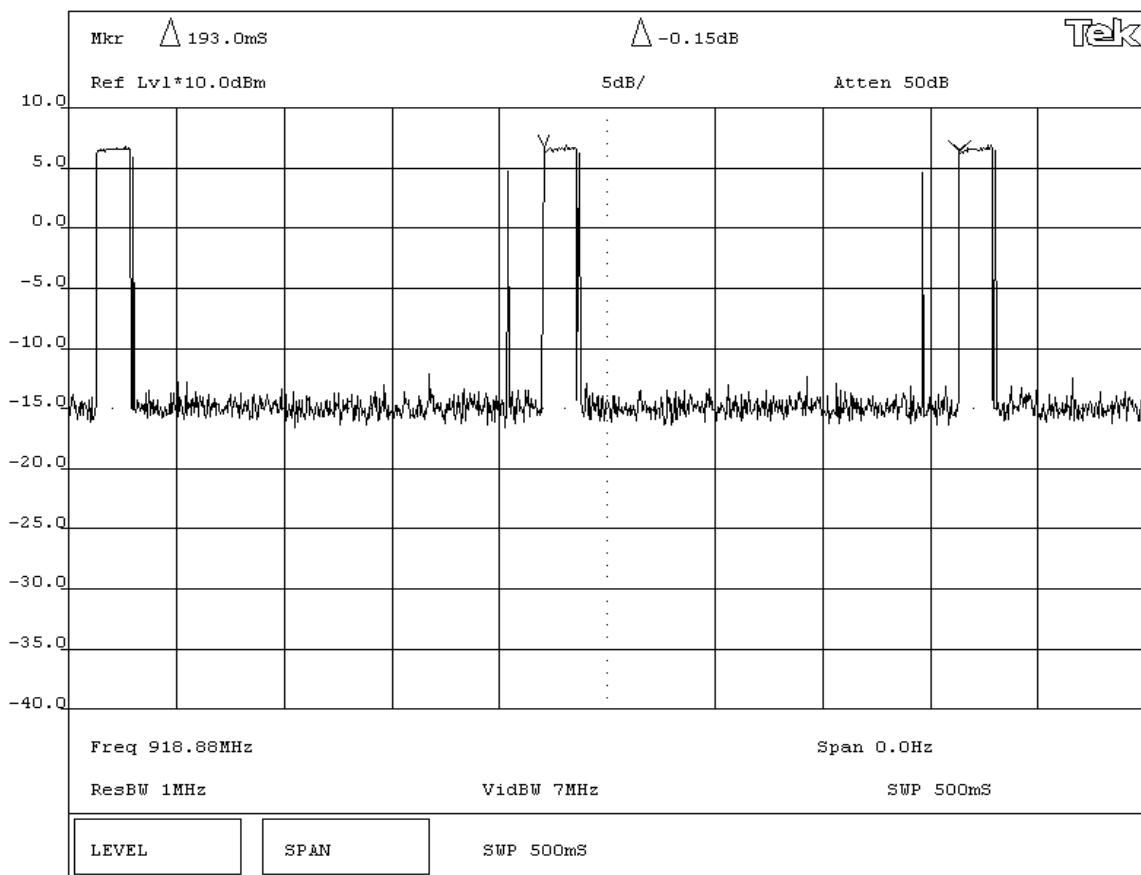
1

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Maximum high time during a 100mS period



Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High

Mid

Low

Operating Modes Investigated:

Typical

Data Rates Investigated:

Typical

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120VAC, 60Hz

Software\Firmware Applied During Test

Exercise software	Standard Production Software	Version	Unknown
Description			
Transmits at low, mid, and high channels.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	N/A	A35-U0900	N/A
EUT	The Watt Stopper, Inc.	MRR2	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	2.2	PA	EUT	AC Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	01/07/2003	12 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	01/02/2003	12 mo
LISN	Solar	9252-50-R-24-BNC	LIN	12/12/2002	12 mo

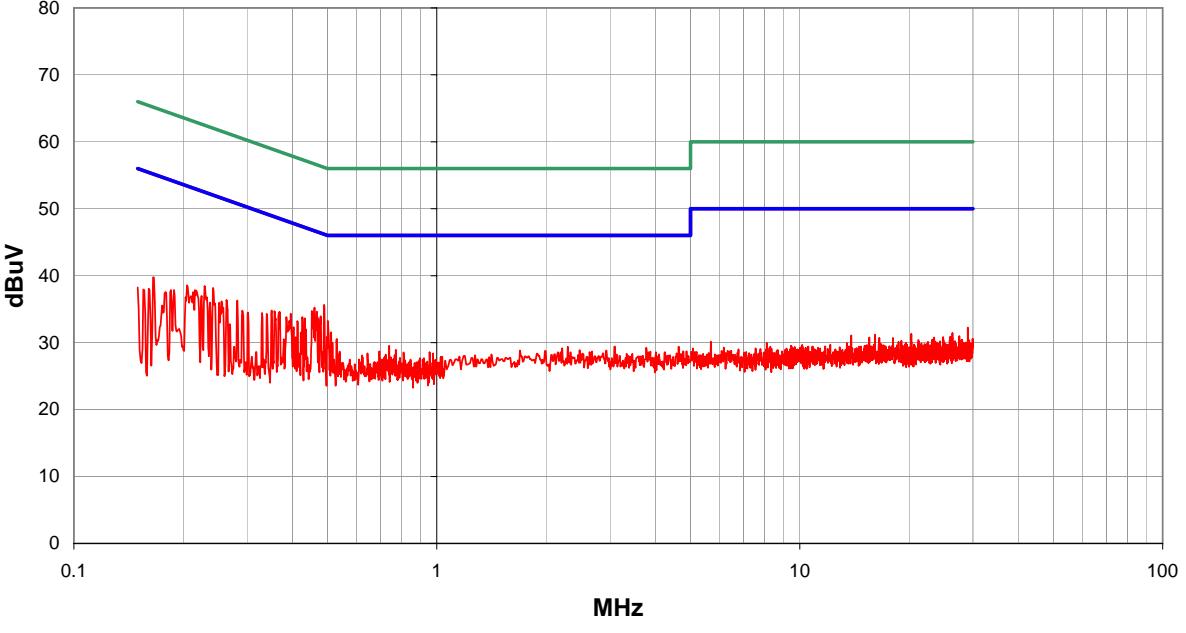
Test Description

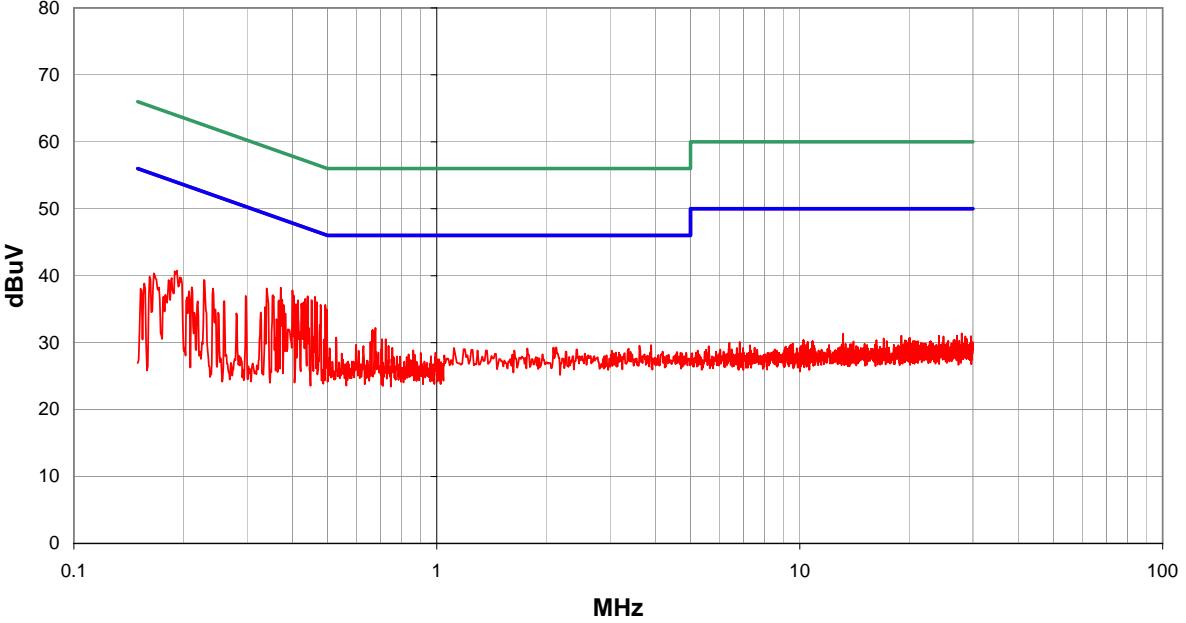
Requirement: Per 47 15.207(d), if the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits of 15.207.

Configuration: The EUT will be powered from a host device that is connected to the AC power line. Therefore, the measurements were made using a wall-bug transformer to power the EUT. The transformer contained no EMC suppression devices. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

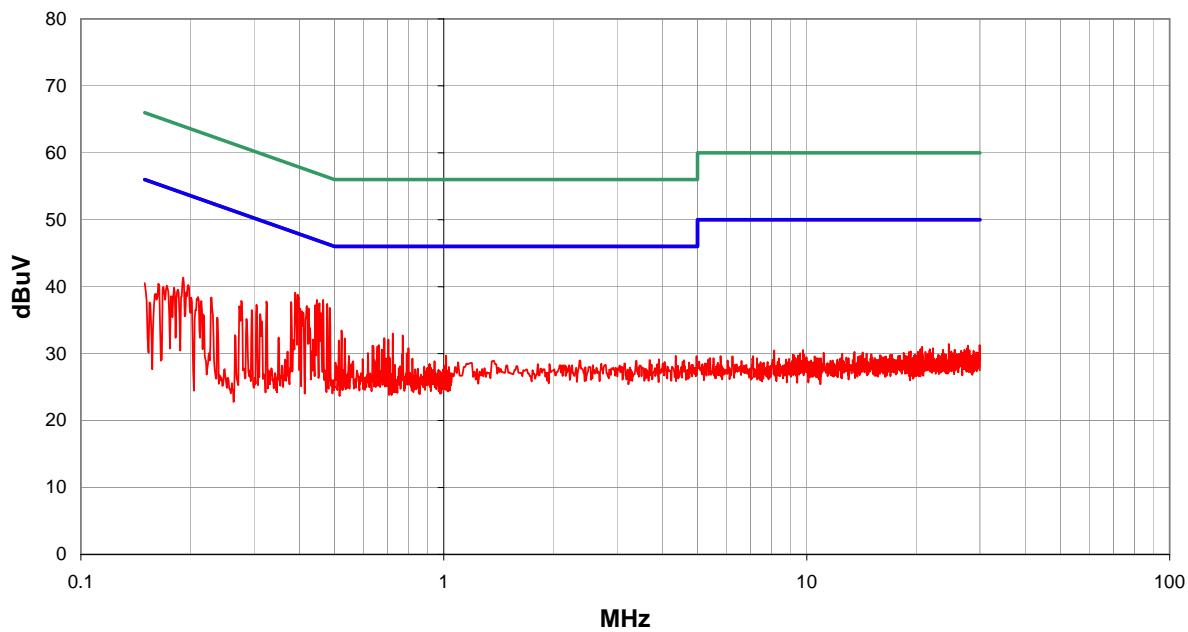
Completed by:



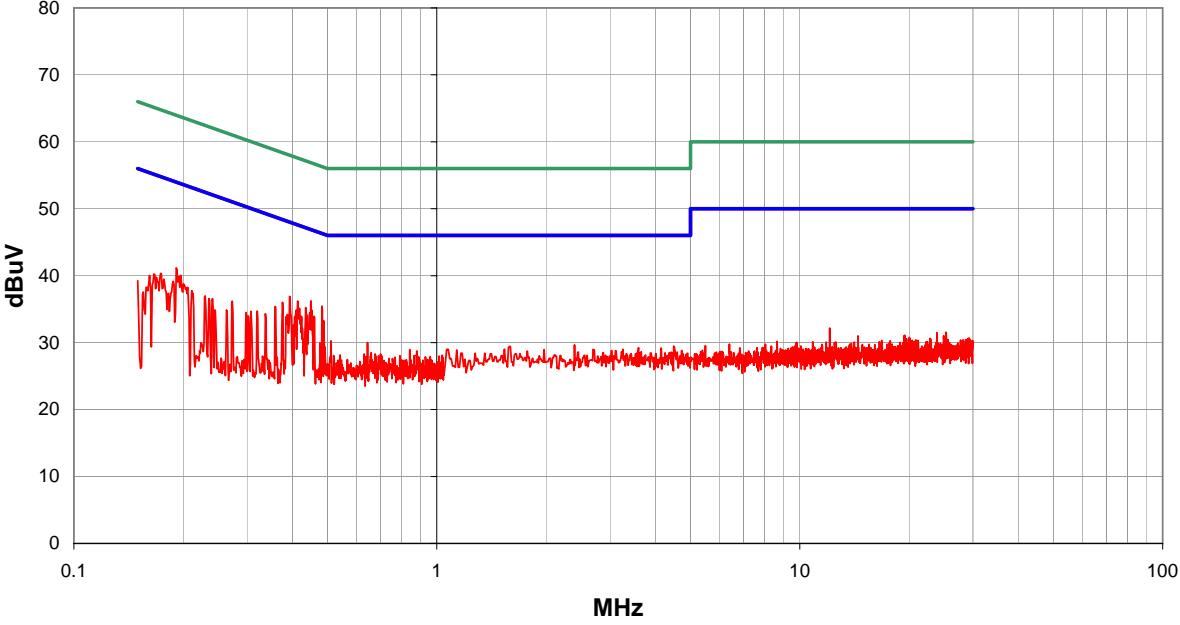
NORTHWEST	CONDUCTED EMISSIONS DATA SHEET										REV df3.10 03/10/2003																																																																																																																																																																																																																																																																																
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Limit dBuV	Compared to Spec. (dB)	0.489	15.4			0.0	0.2	20.0				35.6	46.2	-10.5	0.461	15.0			0.0	0.2	20.0				35.2	46.7	-11.4	0.467	14.4			0.0	0.2	20.0				34.6	46.6	-11.9	0.452	14.5			0.0	0.2	20.0				34.7	46.8	-12.1	0.456	14.2			0.0	0.2	20.0				34.4	46.8	-12.3	0.479	13.7			0.0	0.2	20.0				33.9	46.4	-12.4	0.501	13.0			0.0	0.2	20.0				33.2	46.0	-12.8	0.471	13.4			0.0	0.2	20.0				33.6	46.5	-12.9	0.426	13.6			0.0	0.2	20.0				33.8	47.3	-13.5	0.433	13.4			0.0	0.2	20.0				33.6	47.2	-13.6	0.396	14.1			0.0	0.2	20.0				34.3	47.9	-13.6	0.242	18.0			0.0	0.2	20.0				38.2	52.0	-13.9	0.369	14.4			0.0	0.2	20.0				34.6	48.5	-13.9	0.229	18.3			0.0	0.2	20.0				38.5	52.5	-14.0	0.357	14.5			0.0	0.2	20.0				34.7	48.8	-14.1	0.351	14.6			0.0	0.2	20.0				34.8	48.9	-14.1	0.367	14.2			0.0	0.2	20.0				34.4	48.6	-14.2	0.385	13.6			0.0	0.2	20.0				33.8	48.2	-14.4	0.413	13.0			0.0	0.2	20.0				33.2	47.6	-14.4	0.512	11.3			0.0	0.3	20.0				31.6	46.0	-14.4
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0.385	13.6			0.0	0.2	20.0				33.8	48.2	-14.4																																																																																																																																																																																																																																																																															
0.413	13.0			0.0	0.2	20.0				33.2	47.6	-14.4																																																																																																																																																																																																																																																																															
0.512	11.3			0.0	0.3	20.0				31.6	46.0	-14.4																																																																																																																																																																																																																																																																															

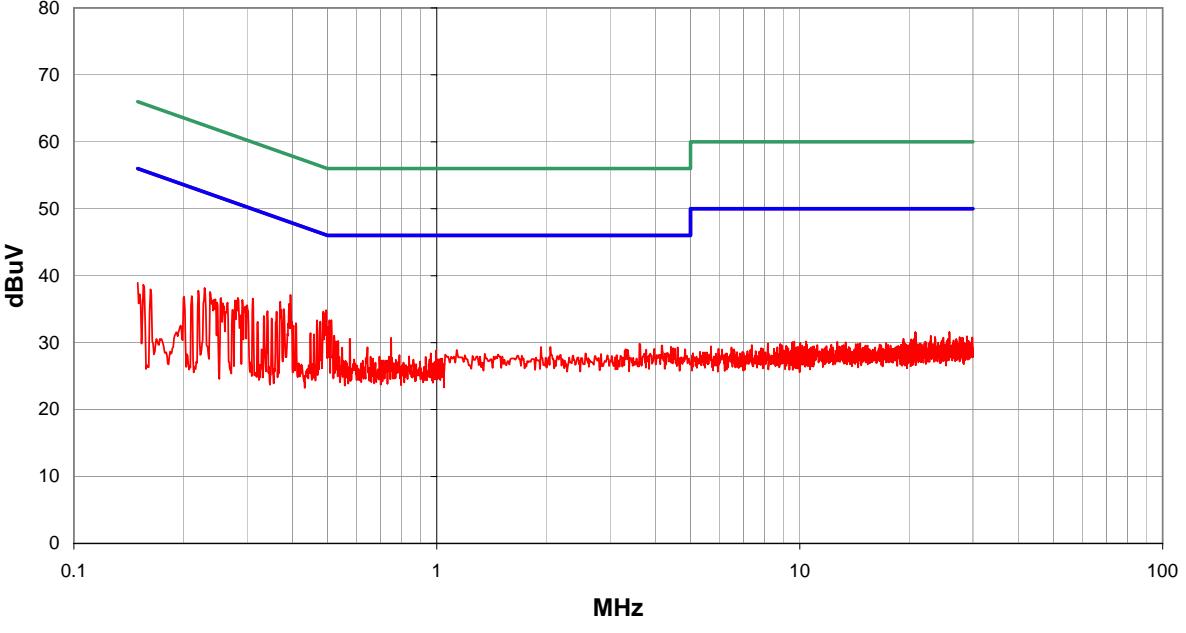
NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET								REV df3.10 03/10/2003		
EUT: MRR2				Work Order: WATT0013								
Serial Number: N/A				Date: 06/02/03								
Customer: The Watt Stopper Inc.				Temperature: 75								
Attendees:				Humidity: 42%								
Cust. Ref. No.:				Barometric Pressure 29.82								
Tested by: Holly Ashkannejhad				Power: 120VAC, 60Hz				Job Site: EV01				
TEST SPECIFICATIONS												
Specification: FCC Part 15.207				Year: 2003								
Method: ANSI C63.4				Year: 1992								
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
EUT OPERATING MODES												
Transmitting low channels												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS				Line				Run #				
Pass				L1				2				
Other								Tested By:				
												
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [Pm] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.462	16.6			0.0	0.2	20.0				36.8	46.7	-9.8
0.400	17.6			0.0	0.2	20.0				37.8	47.8	-10.0
0.441	16.7			0.0	0.2	20.0				36.9	47.0	-10.1
0.371	18.0			0.0	0.2	20.0				38.2	48.5	-10.3
0.493	15.4			0.0	0.2	20.0				35.6	46.1	-10.5
0.452	16.1			0.0	0.2	20.0				36.3	46.8	-10.5
0.467	15.8			0.0	0.2	20.0				36.0	46.6	-10.5
0.434	16.3			0.0	0.2	20.0				36.5	47.2	-10.6
0.479	15.4			0.0	0.2	20.0				35.6	46.4	-10.7
0.404	16.8			0.0	0.2	20.0				37.0	47.8	-10.8
0.497	14.7			0.0	0.2	20.0				34.9	46.0	-11.1
0.340	17.9			0.0	0.2	20.0				38.1	49.2	-11.1
0.415	16.1			0.0	0.2	20.0				36.3	47.6	-11.2
0.429	15.8			0.0	0.2	20.0				36.0	47.3	-11.2
0.424	15.6			0.0	0.2	20.0				35.8	47.4	-11.6
0.353	16.9			0.0	0.2	20.0				37.1	48.9	-11.8
0.409	15.5			0.0	0.2	20.0				35.7	47.7	-11.9
0.375	16.2			0.0	0.2	20.0				36.4	48.4	-12.0
0.367	16.1			0.0	0.2	20.0				36.3	48.6	-12.3
0.379	15.4			0.0	0.2	20.0				35.6	48.3	-12.7

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		REV df3.10 03/10/2003
EUT: MRR2 Serial Number: N/A Customer: The Watt Stopper Inc. Attendees: Cust. Ref. No.: Tested by: Holly Ashkannejhad		Work Order: WATT0013 Date: 06/02/03 Temperature: 75 Humidity: 42% Barometric Pressure 29.82 Job Site: EV01		
TEST SPECIFICATIONS Specification: FCC Part 15.207 Method: ANSI C63.4		Year: 2003 Year: 1992		
SAMPLE CALCULATIONS Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator				
COMMENTS				
EUT OPERATING MODES Transmitting mid channels				
DEVIATIONS FROM TEST STANDARD No deviations.				
RESULTS Pass		Line	Run #	
Other		 Tested By:		

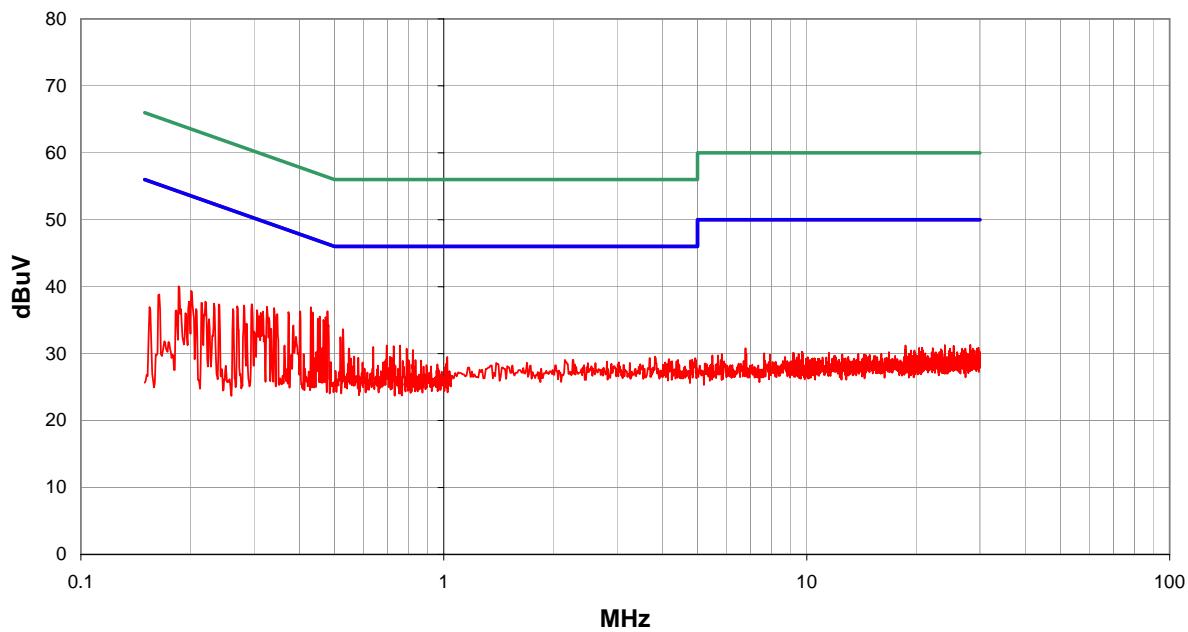


Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.465	17.8			0.0	0.2	20.0				38.0	46.6	-8.6
0.447	17.8			0.0	0.2	20.0				38.0	46.9	-8.9
0.478	17.2			0.0	0.2	20.0				37.4	46.4	-8.9
0.389	18.9			0.0	0.2	20.0				39.1	48.1	-9.0
0.396	18.6			0.0	0.2	20.0				38.8	47.9	-9.1
0.454	17.3			0.0	0.2	20.0				37.5	46.8	-9.3
0.485	16.6			0.0	0.2	20.0				36.8	46.3	-9.4
0.443	17.0			0.0	0.2	20.0				37.2	47.0	-9.8
0.419	16.9			0.0	0.2	20.0				37.1	47.5	-10.3
0.380	17.5			0.0	0.2	20.0				37.7	48.3	-10.6
0.425	16.5			0.0	0.2	20.0				36.7	47.4	-10.6
0.460	15.8			0.0	0.2	20.0				36.0	46.7	-10.7
0.402	16.5			0.0	0.2	20.0				36.7	47.8	-11.1
0.407	16.1			0.0	0.2	20.0				36.3	47.7	-11.4
0.410	15.9			0.0	0.2	20.0				36.1	47.6	-11.5
0.325	17.6			0.0	0.2	20.0				37.8	49.6	-11.8
0.523	13.2			0.0	0.3	20.0				33.5	46.0	-12.5
0.191	21.2			0.0	0.2	20.0				41.4	54.0	-12.6
0.305	17.1			0.0	0.2	20.0				37.3	50.1	-12.8
0.723	12.7			0.0	0.3	20.0				33.0	46.0	-13.0

NORTHWEST	CONDUCTED EMISSIONS DATA SHEET										REV df3.10 03/10/2003																																																																																																																																																																																																																																																																																
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Freq (MHz)</th> <th style="width: 10%;">Amplitude (dBuV)</th> <th style="width: 10%;"></th> <th style="width: 10%;"></th> <th style="width: 10%;">Transducer (dB)</th> <th style="width: 10%;">Cable (dB)</th> <th style="width: 10%;">External Attenuation (dB)</th> <th style="width: 10%;"></th> <th style="width: 10%;">Detector (blank equal peaks [PK] from scan)</th> <th style="width: 10%;"></th> <th style="width: 10%;">Adjusted dBuV</th> <th style="width: 10%;">Spec. Limit dBuV</th> <th style="width: 10%;">Compared to Spec. (dB)</th> </tr> </thead> <tbody> <tr> <td>0.450</td> <td>16.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>36.2</td> <td>46.9</td> <td>-10.6</td> </tr> <tr> <td>0.483</td> <td>15.2</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>35.4</td> <td>46.3</td> <td>-10.8</td> </tr> <tr> <td>0.393</td> <td>16.7</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>36.9</td> <td>48.0</td> <td>-11.1</td> </tr> <tr> <td>0.414</td> <td>16.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>36.2</td> <td>47.6</td> <td>-11.4</td> </tr> <tr> <td>0.435</td> <td>15.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>35.2</td> <td>47.2</td> <td>-11.9</td> </tr> <tr> <td>0.452</td> <td>14.6</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>34.8</td> <td>46.8</td> <td>-12.0</td> </tr> <tr> <td>0.376</td> <td>15.8</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>36.0</td> <td>48.4</td> <td>-12.4</td> </tr> <tr> <td>0.447</td> <td>14.2</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>34.4</td> <td>46.9</td> <td>-12.5</td> </tr> <tr> <td>0.460</td> <td>13.7</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>33.9</td> <td>46.7</td> <td>-12.8</td> </tr> <tr> <td>0.191</td> <td>21.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>41.2</td> <td>54.0</td> <td>-12.8</td> </tr> <tr> <td>0.409</td> <td>14.6</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>34.8</td> <td>47.7</td> <td>-12.8</td> </tr> <tr> <td>0.488</td> <td>13.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>33.2</td> <td>46.2</td> <td>-12.9</td> </tr> <tr> <td>0.439</td> <td>13.9</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>34.1</td> <td>47.1</td> <td>-13.0</td> </tr> <tr> <td>0.359</td> <td>15.2</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>35.4</td> <td>48.8</td> <td>-13.4</td> </tr> <tr> <td>0.424</td> <td>13.7</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>33.9</td> <td>47.4</td> <td>-13.5</td> </tr> <tr> <td>0.407</td> <td>13.7</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>33.9</td> <td>47.7</td> <td>-13.8</td> </tr> <tr> <td>0.388</td> <td>14.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>34.2</td> <td>48.1</td> <td>-13.9</td> </tr> <tr> <td>0.173</td> <td>20.2</td> <td></td> <td></td> <td>0.0</td> <td>0.1</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>40.3</td> <td>54.8</td> <td>-14.4</td> </tr> <tr> <td>0.273</td> <td>16.0</td> <td></td> <td></td> <td>0.0</td> <td>0.2</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>36.2</td> <td>51.0</td> <td>-14.8</td> </tr> <tr> <td>0.166</td> <td>20.1</td> <td></td> <td></td> <td>0.0</td> <td>0.1</td> <td>20.0</td> <td></td> <td></td> <td></td> <td>40.2</td> <td>55.1</td> <td>-14.9</td> </tr> </tbody> </table>											Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)	0.450	16.0			0.0	0.2	20.0				36.2	46.9	-10.6	0.483	15.2			0.0	0.2	20.0				35.4	46.3	-10.8	0.393	16.7			0.0	0.2	20.0				36.9	48.0	-11.1	0.414	16.0			0.0	0.2	20.0				36.2	47.6	-11.4	0.435	15.0			0.0	0.2	20.0				35.2	47.2	-11.9	0.452	14.6			0.0	0.2	20.0				34.8	46.8	-12.0	0.376	15.8			0.0	0.2	20.0				36.0	48.4	-12.4	0.447	14.2			0.0	0.2	20.0				34.4	46.9	-12.5	0.460	13.7			0.0	0.2	20.0				33.9	46.7	-12.8	0.191	21.0			0.0	0.2	20.0				41.2	54.0	-12.8	0.409	14.6			0.0	0.2	20.0				34.8	47.7	-12.8	0.488	13.0			0.0	0.2	20.0				33.2	46.2	-12.9	0.439	13.9			0.0	0.2	20.0				34.1	47.1	-13.0	0.359	15.2			0.0	0.2	20.0				35.4	48.8	-13.4	0.424	13.7			0.0	0.2	20.0				33.9	47.4	-13.5	0.407	13.7			0.0	0.2	20.0				33.9	47.7	-13.8	0.388	14.0			0.0	0.2	20.0				34.2	48.1	-13.9	0.173	20.2			0.0	0.1	20.0				40.3	54.8	-14.4	0.273	16.0			0.0	0.2	20.0				36.2	51.0	-14.8	0.166	20.1			0.0	0.1	20.0				40.2	55.1	-14.9
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)																																																																																																																																																																																																																																																																															
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0.388	14.0			0.0	0.2	20.0				34.2	48.1	-13.9																																																																																																																																																																																																																																																																															
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0.273	16.0			0.0	0.2	20.0				36.2	51.0	-14.8																																																																																																																																																																																																																																																																															
0.166	20.1			0.0	0.1	20.0				40.2	55.1	-14.9																																																																																																																																																																																																																																																																															

NORTHWEST	CONDUCTED EMISSIONS DATA SHEET										REV df3.10 03/10/2003																																																																																																																																																																																																																																																																																
EUT: MRR2 Serial Number: N/A Customer: The Watt Stopper Inc. Attendees: Cust. Ref. No.: Tested by: Holly Ashkannejhad					Work Order: WATT0013 Date: 06/02/03 Temperature: 75 Humidity: 42% Barometric Pressure: 29.82 Job Site: EV01																																																																																																																																																																																																																																																																																						
TEST SPECIFICATIONS																																																																																																																																																																																																																																																																																											
Specification: FCC Part 15.207 Method: ANSI C63.4					Year: 2003 Year: 1992																																																																																																																																																																																																																																																																																						
SAMPLE CALCULATIONS																																																																																																																																																																																																																																																																																											
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator																																																																																																																																																																																																																																																																																											
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Freq (MHz)</th> <th style="width: 10%;">Amplitude (dBuV)</th> <th style="width: 10%;"></th> <th style="width: 10%;"></th> <th style="width: 10%;">Transducer (dB)</th> <th style="width: 10%;">Cable (dB)</th> <th style="width: 10%;">External Attenuation (dB)</th> <th style="width: 10%;"></th> <th style="width: 10%;">Detector (blank equal peaks [PK] from scan)</th> <th style="width: 10%;"></th> <th style="width: 10%;">Adjusted dBuV</th> <th style="width: 10%;">Spec. Limit dBuV</th> <th style="width: 10%;">Compared to Spec. (dB)</th> </tr> </thead> <tbody> <tr> <td>0.396</td><td>16.9</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>37.1</td><td>47.9</td><td>-10.8</td></tr> <tr> <td>0.496</td><td>14.6</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>34.8</td><td>46.1</td><td>-11.2</td></tr> <tr> <td>0.487</td><td>14.4</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>34.6</td><td>46.2</td><td>-11.6</td></tr> <tr> <td>0.490</td><td>14.1</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>34.3</td><td>46.2</td><td>-11.8</td></tr> <tr> <td>0.392</td><td>15.6</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>35.8</td><td>48.0</td><td>-12.2</td></tr> <tr> <td>0.371</td><td>15.9</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>36.1</td><td>48.5</td><td>-12.4</td></tr> <tr> <td>0.513</td><td>13.1</td><td></td><td></td><td>0.0</td><td>0.3</td><td>20.0</td><td></td><td></td><td></td><td>33.4</td><td>46.0</td><td>-12.6</td></tr> <tr> <td>0.506</td><td>13.1</td><td></td><td></td><td>0.0</td><td>0.3</td><td>20.0</td><td></td><td></td><td></td><td>33.4</td><td>46.0</td><td>-12.6</td></tr> <tr> <td>0.468</td><td>13.1</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>33.3</td><td>46.6</td><td>-13.2</td></tr> <tr> <td>0.478</td><td>12.9</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>33.1</td><td>46.4</td><td>-13.2</td></tr> <tr> <td>0.379</td><td>14.8</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>35.0</td><td>48.3</td><td>-13.3</td></tr> <tr> <td>0.311</td><td>16.4</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>36.6</td><td>49.9</td><td>-13.3</td></tr> <tr> <td>0.501</td><td>12.1</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>32.3</td><td>46.0</td><td>-13.7</td></tr> <tr> <td>0.283</td><td>16.5</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>36.7</td><td>50.7</td><td>-14.0</td></tr> <tr> <td>0.362</td><td>14.4</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>34.6</td><td>48.7</td><td>-14.1</td></tr> <tr> <td>0.291</td><td>16.2</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>36.4</td><td>50.5</td><td>-14.1</td></tr> <tr> <td>0.229</td><td>18.0</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>38.2</td><td>52.5</td><td>-14.3</td></tr> <tr> <td>0.342</td><td>14.5</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>34.7</td><td>49.2</td><td>-14.5</td></tr> <tr> <td>0.278</td><td>16.1</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>36.3</td><td>50.9</td><td>-14.6</td></tr> <tr> <td>0.237</td><td>17.4</td><td></td><td></td><td>0.0</td><td>0.2</td><td>20.0</td><td></td><td></td><td></td><td>37.6</td><td>52.2</td><td>-14.6</td></tr> </tbody> </table>											Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)	0.396	16.9			0.0	0.2	20.0				37.1	47.9	-10.8	0.496	14.6			0.0	0.2	20.0				34.8	46.1	-11.2	0.487	14.4			0.0	0.2	20.0				34.6	46.2	-11.6	0.490	14.1			0.0	0.2	20.0				34.3	46.2	-11.8	0.392	15.6			0.0	0.2	20.0				35.8	48.0	-12.2	0.371	15.9			0.0	0.2	20.0				36.1	48.5	-12.4	0.513	13.1			0.0	0.3	20.0				33.4	46.0	-12.6	0.506	13.1			0.0	0.3	20.0				33.4	46.0	-12.6	0.468	13.1			0.0	0.2	20.0				33.3	46.6	-13.2	0.478	12.9			0.0	0.2	20.0				33.1	46.4	-13.2	0.379	14.8			0.0	0.2	20.0				35.0	48.3	-13.3	0.311	16.4			0.0	0.2	20.0				36.6	49.9	-13.3	0.501	12.1			0.0	0.2	20.0				32.3	46.0	-13.7	0.283	16.5			0.0	0.2	20.0				36.7	50.7	-14.0	0.362	14.4			0.0	0.2	20.0				34.6	48.7	-14.1	0.291	16.2			0.0	0.2	20.0				36.4	50.5	-14.1	0.229	18.0			0.0	0.2	20.0				38.2	52.5	-14.3	0.342	14.5			0.0	0.2	20.0				34.7	49.2	-14.5	0.278	16.1			0.0	0.2	20.0				36.3	50.9	-14.6	0.237	17.4			0.0	0.2	20.0				37.6	52.2	-14.6
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)																																																																																																																																																																																																																																																																															
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0.490	14.1			0.0	0.2	20.0				34.3	46.2	-11.8																																																																																																																																																																																																																																																																															
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0.371	15.9			0.0	0.2	20.0				36.1	48.5	-12.4																																																																																																																																																																																																																																																																															
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0.283	16.5			0.0	0.2	20.0				36.7	50.7	-14.0																																																																																																																																																																																																																																																																															
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0.291	16.2			0.0	0.2	20.0				36.4	50.5	-14.1																																																																																																																																																																																																																																																																															
0.229	18.0			0.0	0.2	20.0				38.2	52.5	-14.3																																																																																																																																																																																																																																																																															
0.342	14.5			0.0	0.2	20.0				34.7	49.2	-14.5																																																																																																																																																																																																																																																																															
0.278	16.1			0.0	0.2	20.0				36.3	50.9	-14.6																																																																																																																																																																																																																																																																															
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NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		REV df3.10 03/10/2003
EUT: MRR2 Serial Number: N/A Customer: The Watt Stopper Inc. Attendees: Cust. Ref. No.: Tested by: Holly Ashkannejhad		Work Order: WATT0013 Date: 06/02/03 Temperature: 75 Humidity: 42% Barometric Pressure 29.82 Job Site: EV01		
TEST SPECIFICATIONS Specification: FCC Part 15.207 Method: ANSI C63.4		Year: 2003 Year: 1992		
SAMPLE CALCULATIONS Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator				
COMMENTS				
EUT OPERATING MODES Transmitting high channels				
DEVIATIONS FROM TEST STANDARD No deviations.				
RESULTS Pass		Line	Run #	
Other		 Tested By:		



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [Pm] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.479	16.1			0.0	0.2	20.0				36.3	46.4	-10.0
0.430	16.7			0.0	0.2	20.0				36.9	47.3	-10.3
0.435	15.9			0.0	0.2	20.0				36.1	47.2	-11.0
0.472	15.2			0.0	0.2	20.0				35.4	46.5	-11.0
0.455	15.3			0.0	0.2	20.0				35.5	46.8	-11.2
0.402	16.1			0.0	0.2	20.0				36.3	47.8	-11.5
0.466	14.8			0.0	0.2	20.0				35.0	46.6	-11.5
0.451	15.0			0.0	0.2	20.0				35.2	46.9	-11.6
0.373	16.0			0.0	0.2	20.0				36.2	48.4	-12.2
0.528	13.4			0.0	0.3	20.0				33.7	46.0	-12.3
0.341	16.6			0.0	0.2	20.0				36.8	49.2	-12.4
0.326	16.8			0.0	0.2	20.0				37.0	49.6	-12.6
0.296	17.2			0.0	0.2	20.0				37.4	50.4	-13.0
0.348	15.7			0.0	0.2	20.0				35.9	49.0	-13.1
0.317	16.1			0.0	0.2	20.0				36.3	49.8	-13.5
0.519	12.2			0.0	0.3	20.0				32.5	46.0	-13.5
0.281	17.0			0.0	0.2	20.0				37.2	50.8	-13.6
0.306	16.3			0.0	0.2	20.0				36.5	50.1	-13.6
0.313	15.9			0.0	0.2	20.0				36.1	49.9	-13.8
0.385	14.0			0.0	0.2	20.0				34.2	48.2	-14.0