

Leviton Manufacturing Company

Wireless Remote Switch (100-WSS0S-P0W)

Report No. LEVT0011.2

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: October 15, 2008

Leviton Manufacturing Company

Model: Wireless Remote Switch (100-WSS0S-POW)

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.231:2007	ANSI C63.4: 2003	Pass
Spurious Radiated Emissions	FCC 15.205:2007	ANSI C63.4:2003	Pass
Field Strength of Fundamental	FCC 15.231(b):2007	ANSI C63.4: 2003	Pass
Duty Cycle	FCC 15.231:2007	ANSI C63.4: 2003	Pass
Occupied Bandwidth	FCC 15.231:2007	ANSI C63.4: 2003	Pass

Modifications made to the product

See the Modifications section of this report

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 and accepted by the FCC (Federal Communications Commission) and Industry Canada(Site filing #2834D-1).

Approved By:

Ethan Schoonover, Sultan Lab Manager



NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. 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: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, 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. 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.



NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0

Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2*)



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.



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. USA0604C.



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).



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 (NVLAP).



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 Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294.*)



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 (US0017). License No.SL2-IN-E-1017.



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



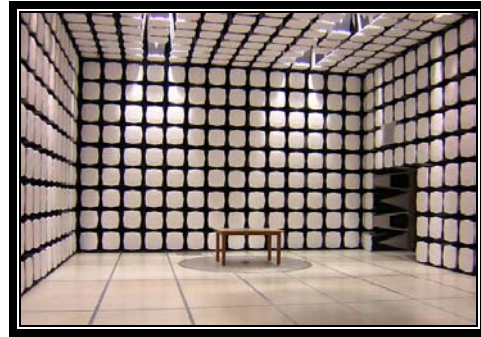
MIC: Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157*)



SCOPE

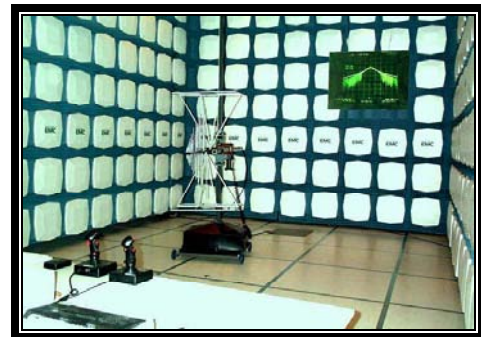
For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



**California – Orange County Facility
Labs OC01 – OC13**

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



**Oregon – Evergreen Facility
Labs EV01 – EV11**

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



**Washington – Sultan Facility
Labs SU01 – SU07**

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

Party Requesting the Test

Company Name:	Leviton Manufacturing Company
Address:	20497 SW Teton Avenue
City, State, Zip:	Tualatin, OR 97062
Test Requested By:	Dan Wright
Model:	Wireless Remote Switch (100-WSS0S-P0W)
First Date of Test:	October 14, 2008
Last Date of Test:	October 15, 2008
Receipt Date of Samples:	October 14, 2008
Equipment Design Stage:	Preproduction
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

Wireless Remote Switch

Testing Objective:

TCB Certification under FCC 15.231

CONFIGURATION 1 LEVT0011

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless PIR Ceiling Sensor (typical)	Leviton Manufacturing Company	000-WSC15-IOW	Unit 05

CONFIGURATION 2 LEVT0011

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Remote Switch (Typical)	Leviton Manufacturing Company	100-WSS0S-P0W	Eng-04

CONFIGURATION 5 LEVT0011

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Remote Switch (CW)	Leviton Manufacturing Company	100-WSS0S-P0W	Eng-05

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AAA Battery pack	unknown	none	none

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	10/14/2008	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	10/14/2008	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	10/15/2008	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	10/15/2008	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was complete.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting CW

POWER SETTINGS INVESTIGATED

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	3200 MHz
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SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2007	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	5/19/2008	13
Antenna, Biconilog	EMCO	3141	AXE	1/15/2008	24
EV01 Cables		Bilog Cables	EVA	5/19/2008	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/19/2008	13
Antenna, Horn	EMCO	3115	AHC	8/12/2008	24
High Pass Filter 1.2 - 18 GHz	Micro-Tronics	HPM50108	HFV	5/21/2008	13
EV01 Cables		Double Ridge Horn Cables	EVB	5/19/2008	13

MEASUREMENT BANDWIDTHS

	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.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The single, integral antenna to be used with the EUT was tested. The EUT was configured for un-modulated, CW operation at its single transmit frequency. The field strength of the transmit frequency was maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT 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.

To derive average emission measurements, a duty cycle correction factor per 15.35(c) was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{ms}$ or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec

Pulsewidth of Pulse = 0.7302 mSec

Number of Pulses = 5

Duty Cycle = $20 \log [(5)(0.7302)/100] = -28.8 \text{ dB}$

The duty cycle correction factor of -28.8 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz for measurements at or below 1GHz. Above 1GHz, a resolution bandwidth of 1MHz and a video bandwidth of 3MHz was used.

The field strength of the spurious emissions meet the limits as defined in 47 CFR 15.231(b). The spurious emissions also meet the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions. Further, spurious emissions meet the provisions of 15.205 using the measurement instrumentation specified in that section.

SPURIOUS RADIATED EMISSIONS

EUT: Wireless Remote Switch (100-WSS0S-P0W)				Work Order: LEVT0011	
Serial Number: Eng-05				Date: 10/15/08	
Customer: Leviton Manufacturing Company				Temperature: 21	
Attendees: None				Humidity: 36%	
Project: None				Barometric Pres.: 29.95 in	
Tested by: Rod Peloquin				Power: Battery	
				Job Site: EV01	

TEST SPECIFICATIONS		Test Method	
FCC 15.231(b):2007		ANSI C63.4:2003	
FCC 15.205:2007		ANSI C63.4:2003	

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS			
Temporary battery pack for continuous transmission			

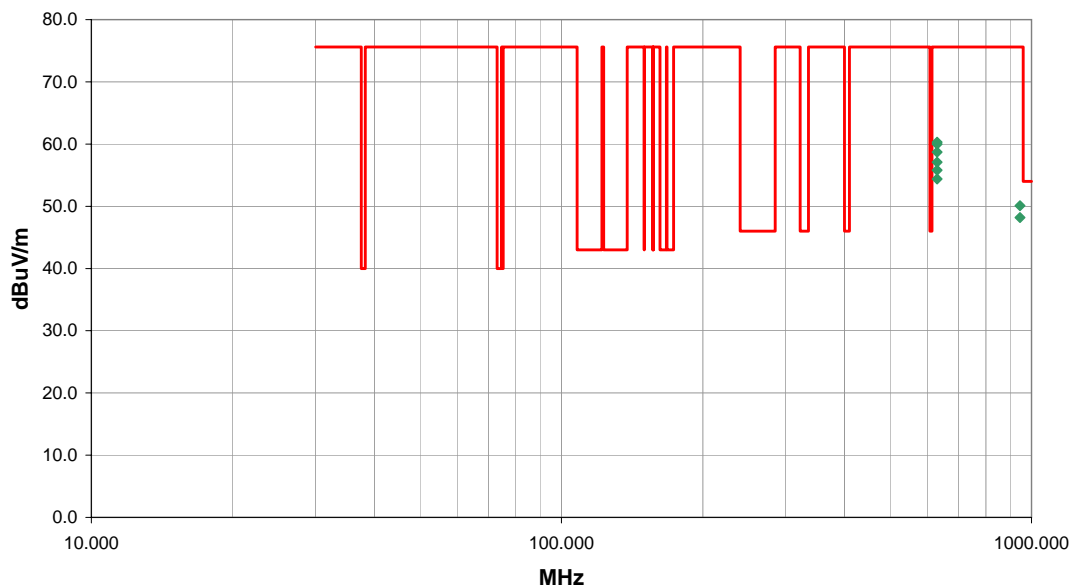
EUT OPERATING MODES

Transmitting CW

DEVIATIONS FROM TEST STANDARD

No deviations.

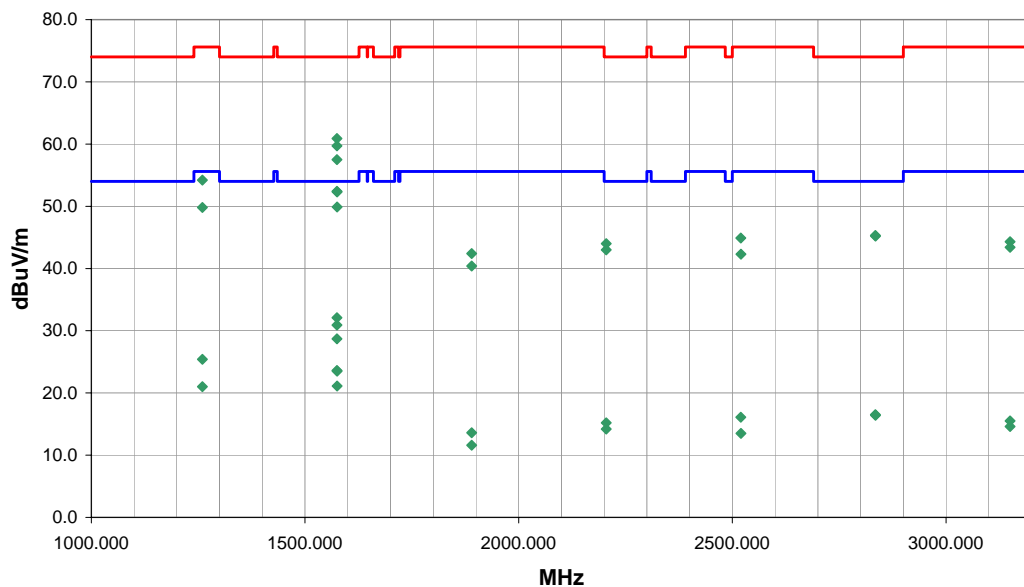
Run #	5	Signature
Configuration #	1	
Results	Pass	



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
629.954	41.5	8.8	70.0	1.4	0.0	10.0	H-Bilog	PK	0.0	60.3	75.6	-15.3	EUT horizontal
629.957	41.2	8.8	138.0	1.4	0.0	10.0	H-Bilog	PK	0.0	60.0	75.6	-15.6	EUT on side
629.953	39.9	8.8	318.0	1.0	0.0	10.0	V-Bilog	PK	0.0	58.7	75.6	-16.9	EUT vertical
629.948	38.3	8.8	219.0	1.4	0.0	10.0	H-Bilog	PK	0.0	57.1	75.6	-18.5	EUT vertical
629.946	37.0	8.8	217.0	1.0	0.0	10.0	V-Bilog	PK	0.0	55.8	75.6	-19.8	EUT on side
629.960	35.6	8.8	120.0	2.7	0.0	10.0	V-Bilog	PK	0.0	54.4	75.6	-21.2	EUT horizontal
944.934	27.9	12.2	197.0	1.2	0.0	10.0	V-Bilog	PK	0.0	50.1	75.6	-25.5	EUT vertical
944.931	26.0	12.2	222.0	1.0	0.0	10.0	H-Bilog	PK	0.0	48.2	75.6	-27.4	EUT horizontal

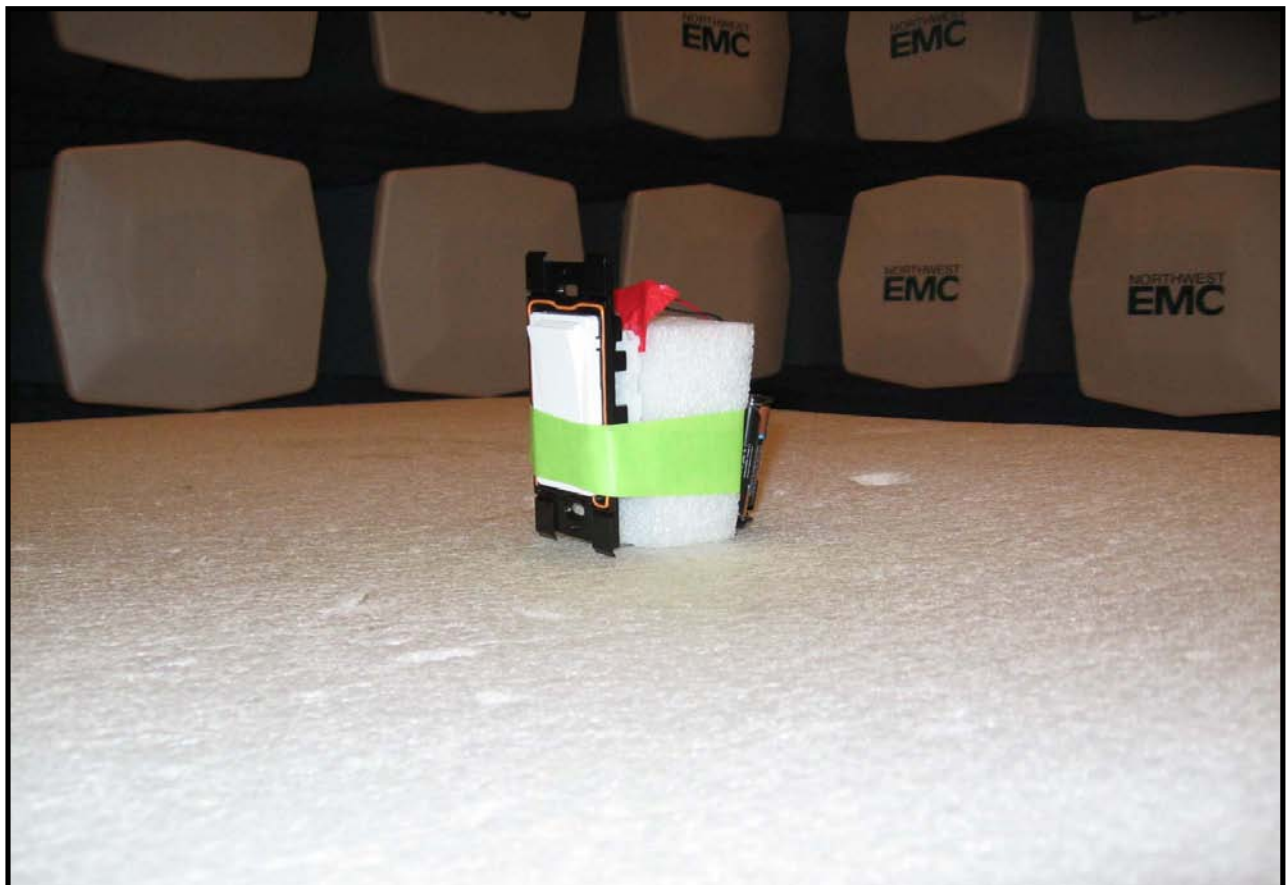
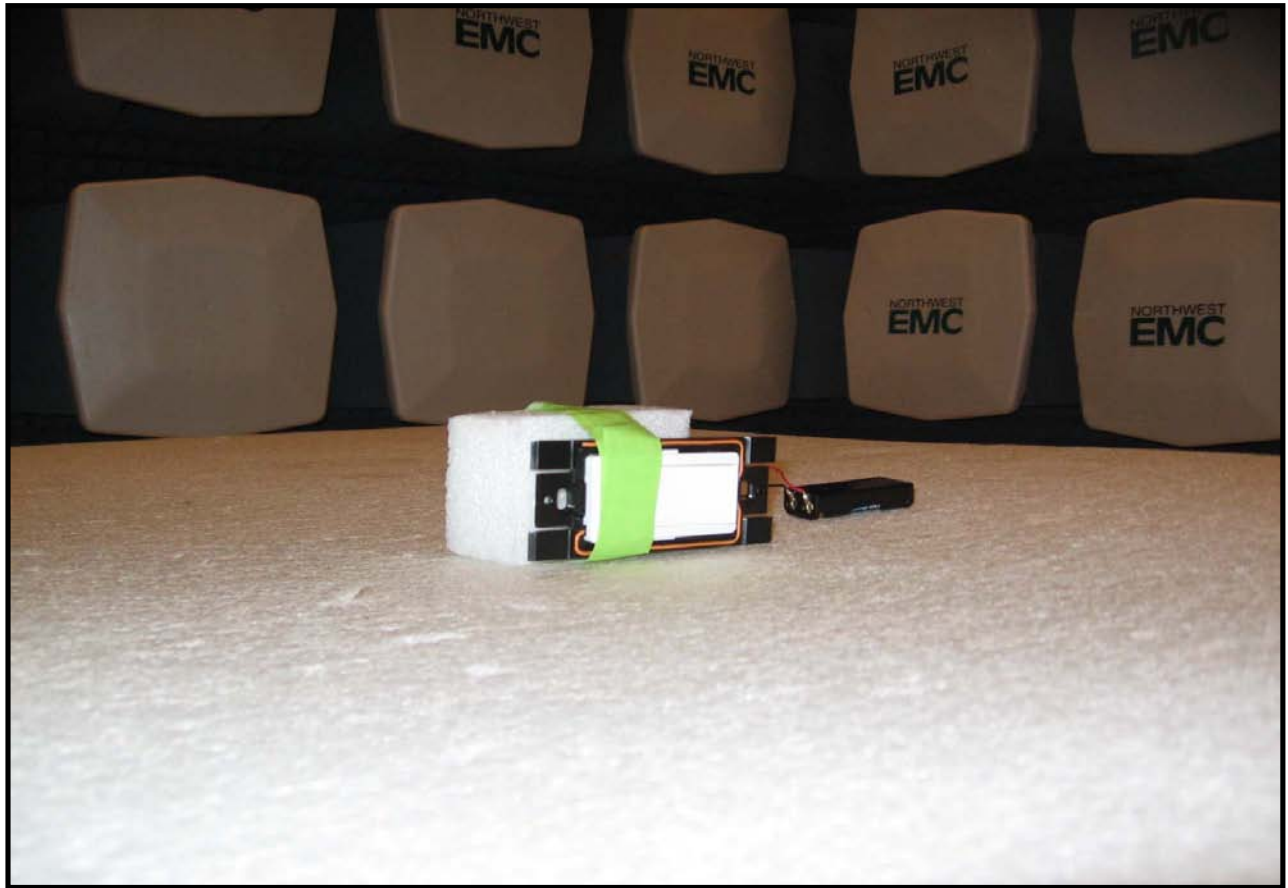
SPURIOUS RADIATED EMISSIONS

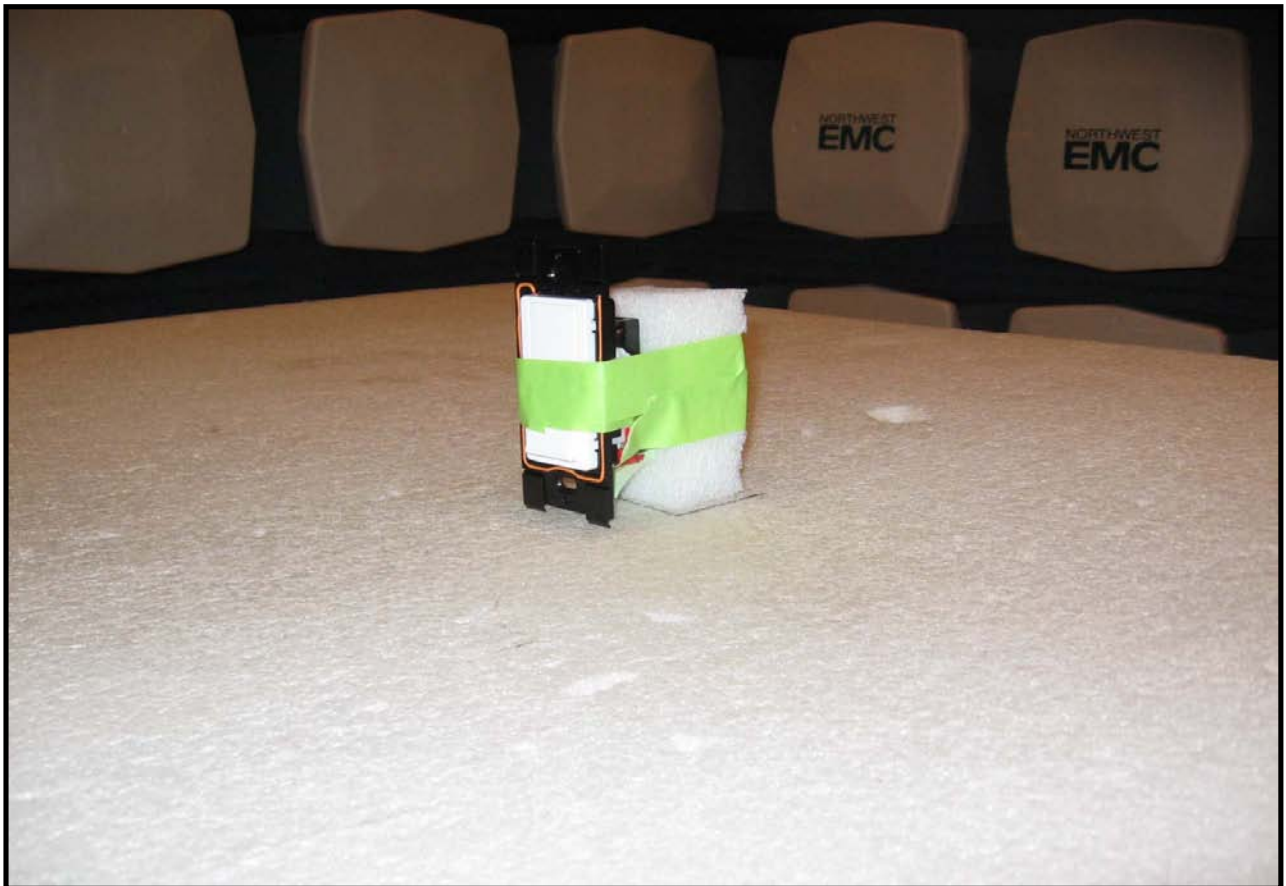
EUT: Wireless Remote Switch (100-WSS0S-P0W)		Work Order: LEVT0011
Serial Number: Eng-05		Date: 10/15/08
Customer: Leviton Manufacturing Company		Temperature: 21
Attendees: None		Humidity: 36%
Project: None		Barometric Pres.: 29.95 in
Tested by: Rod Peloquin		Power: Battery
		Job Site: EV01
TEST SPECIFICATIONS		Test Method
FCC 15.231(b):2007		ANSI C63.4:2003
FCC 15.205:2007		ANSI C63.4:2003
TEST PARAMETERS		
Antenna Height(s) (m)	1 - 4	Test Distance (m)
		3
COMMENTS		
Temporary battery pack for continuous transmission: Shortened temporary battery wires		
EUT OPERATING MODES		
Transmitting CW		
DEVIATIONS FROM TEST STANDARD		
No deviations.		
Run #	6	Signature <i>Rod L. Peloquin</i>
Configuration #	1	
Results	Pass	

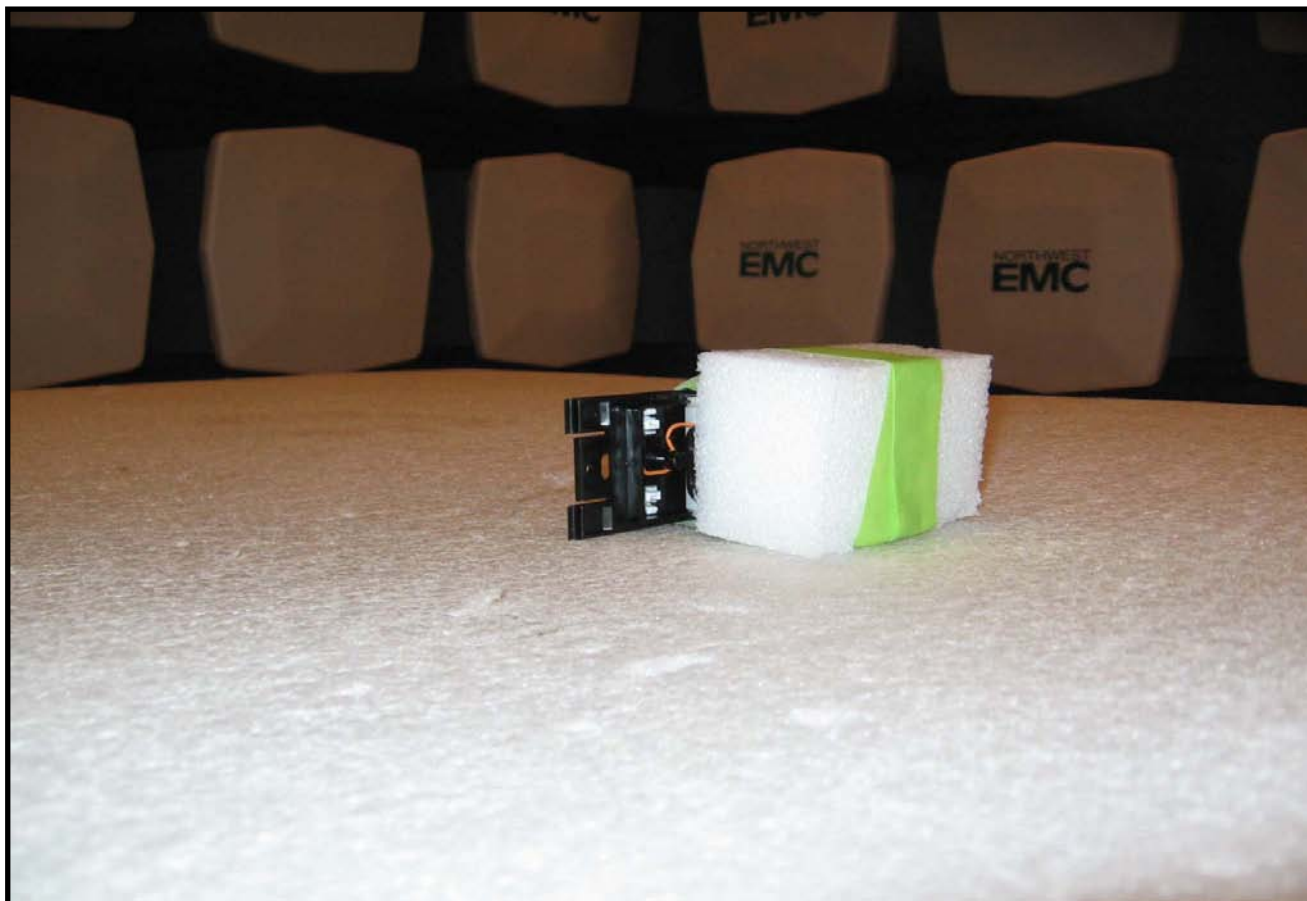


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
1574.892	63.3	-2.4	216.0	1.1	0.0	0.0	V-Horn	PK	0.0	60.9	74.0	-13.1	EUT vertical
1574.762	62.1	-2.4	106.0	1.4	0.0	0.0	H-Horn	PK	0.0	59.7	74.0	-14.3	EUT on side
1574.872	59.9	-2.4	312.0	1.0	0.0	0.0	H-Horn	PK	0.0	57.5	74.0	-16.5	EUT horizontal
1259.928	57.5	-3.3	194.0	1.4	0.0	0.0	V-Horn	PK	0.0	54.2	75.6	-21.4	EUT vertical
1574.872	54.8	-2.4	355.0	1.4	0.0	0.0	H-Horn	PK	0.0	52.4	74.0	-21.6	EUT vertical
1574.947	54.7	-2.4	242.0	1.1	0.0	0.0	V-Horn	PK	0.0	52.3	74.0	-21.7	EUT horizontal
1574.892	63.3	-2.4	216.0	1.1	28.8	0.0	V-Horn	AV	0.0	32.1	54.0	-21.9	EUT vertical
1574.762	62.1	-2.4	106.0	1.4	28.8	0.0	H-Horn	AV	0.0	30.9	54.0	-23.1	EUT on side
1574.952	52.3	-2.4	290.0	1.1	0.0	0.0	V-Horn	PK	0.0	49.9	74.0	-24.1	EUT on side
1574.872	59.9	-2.4	312.0	1.0	28.8	0.0	H-Horn	AV	0.0	28.7	54.0	-25.3	EUT horizontal
1259.813	53.1	-3.3	109.0	1.0	0.0	0.0	H-Horn	PK	0.0	49.8	75.6	-25.8	EUT on side
2834.720	42.0	3.3	161.0	1.0	0.0	0.0	V-Horn	PK	0.0	45.3	74.0	-28.7	EUT vertical
2835.010	41.9	3.3	272.0	1.0	0.0	0.0	H-Horn	PK	0.0	45.2	74.0	-28.8	EUT on side
2204.788	43.1	0.9	103.0	1.0	0.0	0.0	H-Horn	PK	0.0	44.0	74.0	-30.0	EUT on side
1259.928	57.5	-3.3	194.0	1.4	28.8	0.0	V-Horn	AV	0.0	25.4	55.6	-30.2	EUT vertical
1574.872	54.8	-2.4	355.0	1.4	28.8	0.0	H-Horn	AV	0.0	23.6	54.0	-30.4	EUT vertical
1574.947	54.7	-2.4	242.0	1.1	28.8	0.0	V-Horn	AV	0.0	23.5	54.0	-30.5	EUT horizontal
2519.863	42.6	2.3	218.0	1.0	0.0	0.0	V-Horn	PK	0.0	44.9	75.6	-30.7	EUT vertical
2205.007	42.1	0.9	102.0	1.0	0.0	0.0	V-Horn	PK	0.0	43.0	74.0	-31.0	EUT vertical
3149.959	39.0	5.3	143.0	1.0	0.0	0.0	H-Horn	PK	0.0	44.3	75.6	-31.3	EUT on side









Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4407B	AAU	12/7/2007	13
Near Field Probe	EMCO	7405	IPD	NCR	0

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

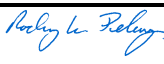
TEST DESCRIPTION

The occupied bandwidth is required to be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

The measurement was made using near field probe near the integral antenna of the EUT to the input of the spectrum analyzer. The EUT was transmitting at its maximum data rate.

EMC

OCCUPIED BANDWIDTH

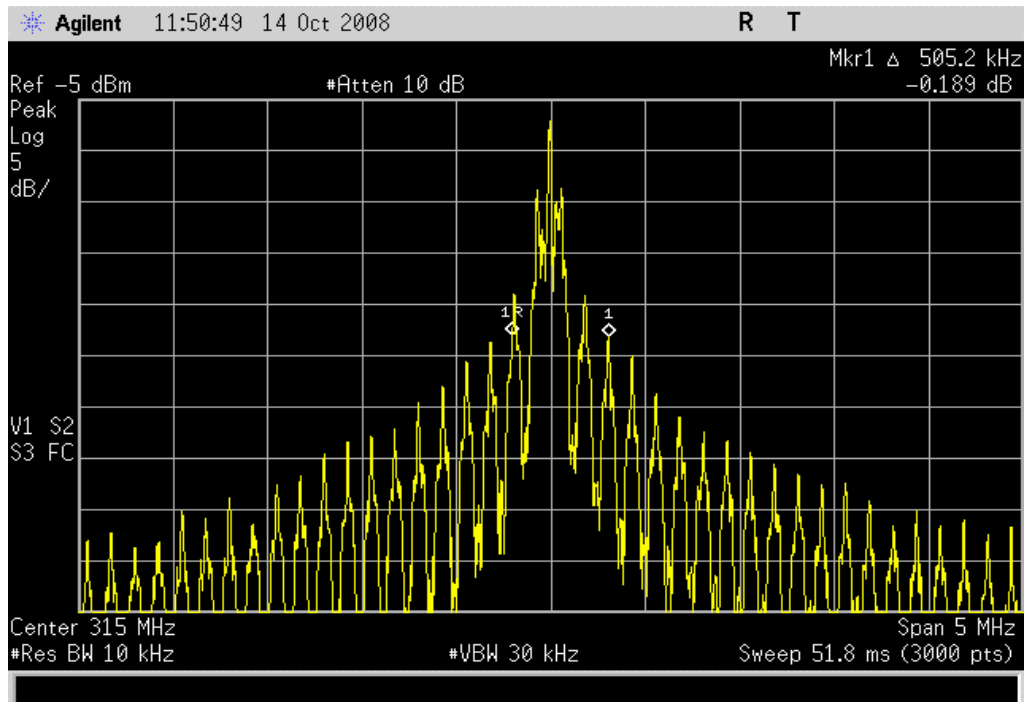
EUT: Wireless Remote Switch (100-WSS0S-P0W)		Work Order: LEVT0011	
Serial Number: ENG-04		Date: 10/14/08	
Customer: Leviton Manufacturing Company		Temperature: 23°C	
Attendees: Dan Wright		Humidity: 28%	
Project: None		Barometric Pres.: 30.46 in	
Tested by: Rod Peloquin		Power: Battery	Job Site: EV06
TEST SPECIFICATIONS		Test Method	
FCC 15.231:2007		ANSI C63.4:2003	
COMMENTS			
Manually operated with typical pulse train			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	2	Signature 	
		Value	Limit
20 dB occupied bandwidth		505.2 kHz	788 kHz
			Results
			Pass

20 dB occupied bandwidth

Result: Pass

Value: 505.2 kHz

Limit: 788 kHz





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting CW

POWER SETTINGS INVESTIGATED

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	314 MHz	Stop Frequency	316 MHz
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SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2007	13
Antenna, Biconilog	EMCO	3141	AXE	1/15/2008	24

MEASUREMENT BANDWIDTHS

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(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.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was configured for continuous modulated operation at its single transmit frequency. The field strength of the transmit frequency was maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.4:1992).

To derive average emission measurements, a duty cycle correction factor per 15.35(c) was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{ms}$ or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec

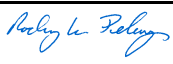
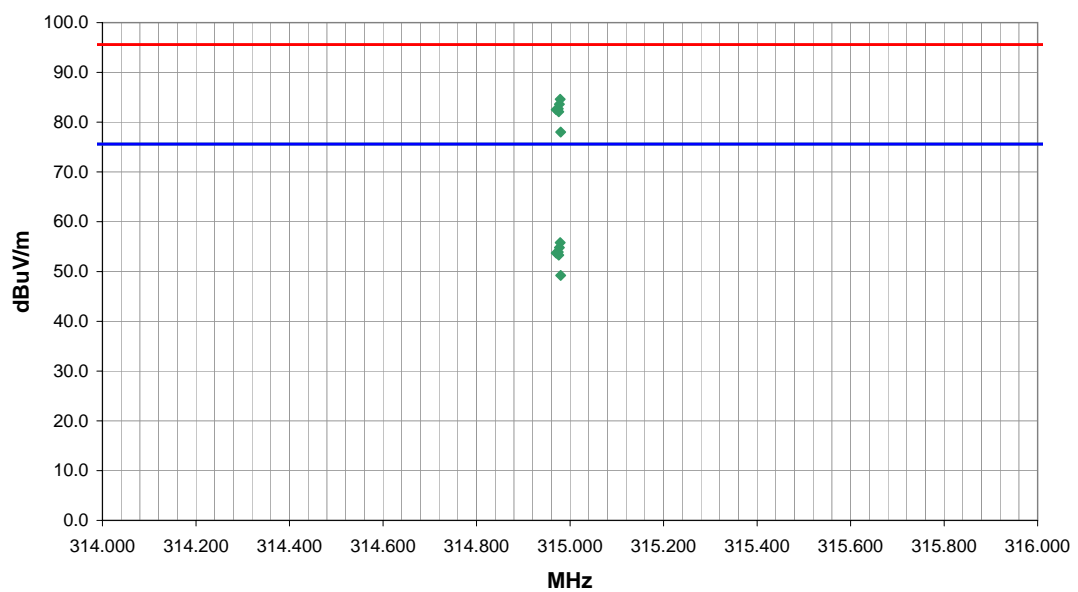
Pulsewidth of Pulse = 0.7302 mSec

Number Pulses = 5

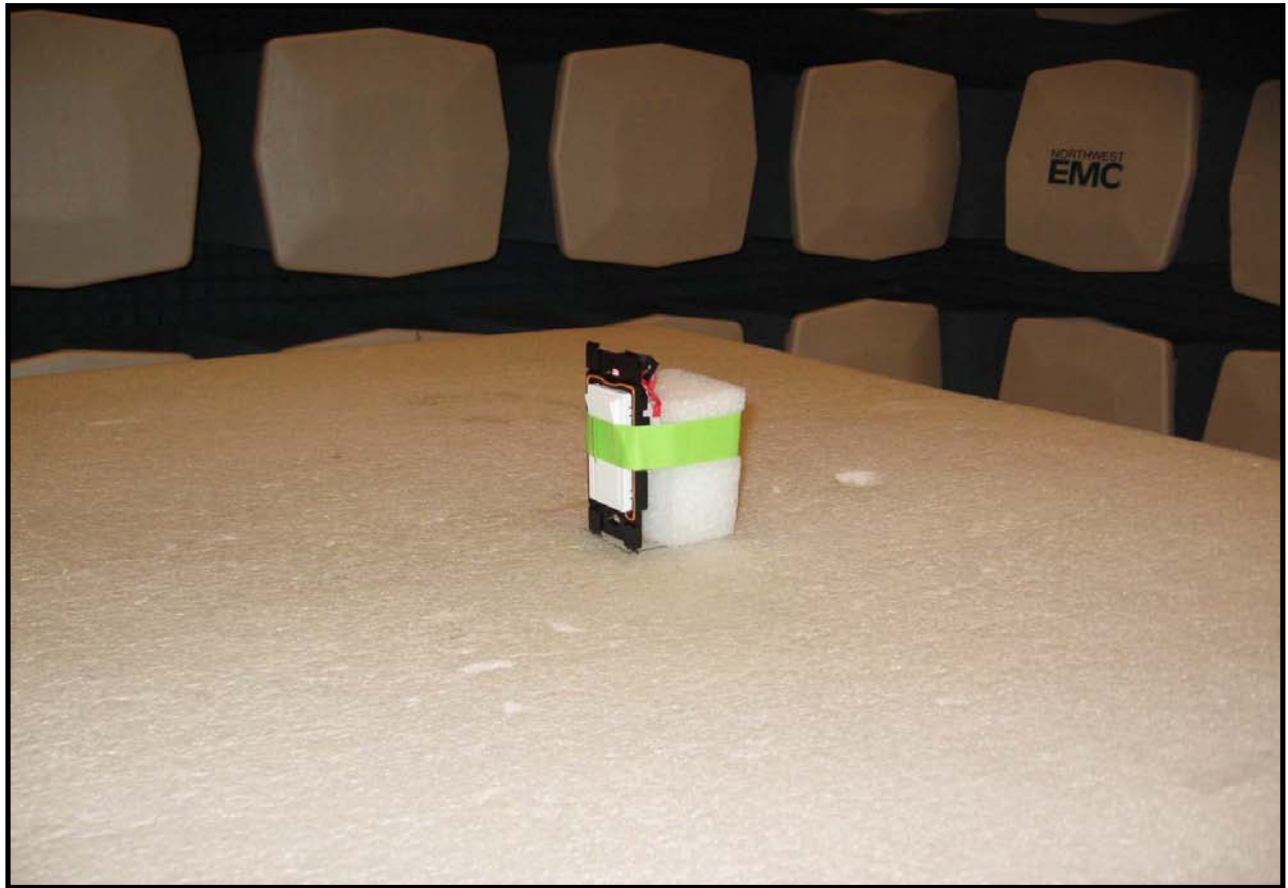
Duty Cycle = $20 \log [(5)(0.7302)/100] = -28.8 \text{ dB}$

The duty cycle correction factor of -28.8 dB was added to the peak readings to mathematically derive the average levels. Peak measurements were made with a resolution bandwidth of 100kHz and a video bandwidth of 300kHz.

The field strength of the fundamental (transmit) frequency meets the limits as defined in 47 CFR 15.231(b). It also meets the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions.

NORTHWEST		FIELD STRENGTH OF FUNDAMENTAL		PSA 2007.07.21																																																																																																																																																																																							
EMC				EMI 2008.7.3																																																																																																																																																																																							
EUT: Wireless Remote Switch (100-WSS0S-P0W)				Work Order: LEVT0011																																																																																																																																																																																							
Serial Number: Eng-05				Date: 10/15/08																																																																																																																																																																																							
Customer: Leviton Manufacturing Company				Temperature: 23°C																																																																																																																																																																																							
Attendees: None				Humidity: 28%																																																																																																																																																																																							
Project: None				Barometric Pres.: 30.46 in																																																																																																																																																																																							
Tested by: Rod Peloquin				Power: Battery																																																																																																																																																																																							
				Job Site: EV01																																																																																																																																																																																							
TEST SPECIFICATIONS				Test Method																																																																																																																																																																																							
FCC 15.231(b):2007				ANSI C63.4:2003																																																																																																																																																																																							
TEST PARAMETERS																																																																																																																																																																																											
Antenna Height(s) (m)		1 - 4		Test Distance (m)																																																																																																																																																																																							
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<table><thead><tr><th>Freq (MHz)</th><th>Amplitude (dBuV)</th><th>Factor (dB)</th><th>Azimuth (degrees)</th><th>Height (meters)</th><th>Duty Cycle Correction Factor</th><th>External Attenuation (dB)</th><th>Polarity</th><th>Detector</th><th>Distance Adjustment (dB)</th><th>Adjusted dBuV/m</th><th>Spec. Limit dBuV/m</th><th>Compared to Spec. (dB)</th><th>Comments</th></tr></thead><tbody><tr><td>314.979</td><td>62.1</td><td>22.5</td><td>212.0</td><td>1.1</td><td>0.0</td><td>0.0</td><td>H-Bilog</td><td>PK</td><td>0.0</td><td>84.6</td><td>95.6</td><td>-11.0</td><td>EUT horizontal</td></tr><tr><td>314.977</td><td>61.1</td><td>22.5</td><td>227.0</td><td>1.1</td><td>0.0</td><td>0.0</td><td>H-Bilog</td><td>PK</td><td>0.0</td><td>83.6</td><td>95.6</td><td>-12.0</td><td>EUT vertical</td></tr><tr><td>314.975</td><td>60.2</td><td>22.5</td><td>64.0</td><td>2.0</td><td>0.0</td><td>0.0</td><td>V-Bilog</td><td>PK</td><td>0.0</td><td>82.7</td><td>95.6</td><td>-12.9</td><td>EUT vertical</td></tr><tr><td>314.970</td><td>60.0</td><td>22.5</td><td>185.0</td><td>1.1</td><td>0.0</td><td>0.0</td><td>H-Bilog</td><td>PK</td><td>0.0</td><td>82.5</td><td>95.6</td><td>-13.1</td><td>EUT on side</td></tr><tr><td>314.976</td><td>59.6</td><td>22.5</td><td>169.0</td><td>2.1</td><td>0.0</td><td>0.0</td><td>V-Bilog</td><td>PK</td><td>0.0</td><td>82.1</td><td>95.6</td><td>-13.5</td><td>EUT on side</td></tr><tr><td>314.980</td><td>55.5</td><td>22.5</td><td>66.0</td><td>2.1</td><td>0.0</td><td>0.0</td><td>V-Bilog</td><td>PK</td><td>0.0</td><td>78.0</td><td>95.6</td><td>-17.6</td><td>EUT horizontal</td></tr><tr><td>314.979</td><td>62.1</td><td>22.5</td><td>212.0</td><td>1.1</td><td>28.8</td><td>0.0</td><td>H-Bilog</td><td>AV</td><td>0.0</td><td>55.8</td><td>75.6</td><td>-19.8</td><td>EUT horizontal</td></tr><tr><td>314.977</td><td>61.1</td><td>22.5</td><td>227.0</td><td>1.1</td><td>28.8</td><td>0.0</td><td>H-Bilog</td><td>AV</td><td>0.0</td><td>54.8</td><td>75.6</td><td>-20.8</td><td>EUT vertical</td></tr><tr><td>314.975</td><td>60.2</td><td>22.5</td><td>64.0</td><td>2.0</td><td>28.8</td><td>0.0</td><td>V-Bilog</td><td>AV</td><td>0.0</td><td>53.9</td><td>75.6</td><td>-21.7</td><td>EUT vertical</td></tr><tr><td>314.970</td><td>60.0</td><td>22.5</td><td>185.0</td><td>1.1</td><td>28.8</td><td>0.0</td><td>H-Bilog</td><td>AV</td><td>0.0</td><td>53.7</td><td>75.6</td><td>-21.9</td><td>EUT on side</td></tr><tr><td>314.976</td><td>59.6</td><td>22.5</td><td>169.0</td><td>2.1</td><td>28.8</td><td>0.0</td><td>V-Bilog</td><td>AV</td><td>0.0</td><td>53.3</td><td>75.6</td><td>-22.3</td><td>EUT on side</td></tr><tr><td>314.980</td><td>55.5</td><td>22.5</td><td>66.0</td><td>2.1</td><td>28.8</td><td>0.0</td><td>V-Bilog</td><td>AV</td><td>0.0</td><td>49.2</td><td>75.6</td><td>-26.4</td><td>EUT horizontal</td></tr></tbody></table>						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	314.979	62.1	22.5	212.0	1.1	0.0	0.0	H-Bilog	PK	0.0	84.6	95.6	-11.0	EUT horizontal	314.977	61.1	22.5	227.0	1.1	0.0	0.0	H-Bilog	PK	0.0	83.6	95.6	-12.0	EUT vertical	314.975	60.2	22.5	64.0	2.0	0.0	0.0	V-Bilog	PK	0.0	82.7	95.6	-12.9	EUT vertical	314.970	60.0	22.5	185.0	1.1	0.0	0.0	H-Bilog	PK	0.0	82.5	95.6	-13.1	EUT on side	314.976	59.6	22.5	169.0	2.1	0.0	0.0	V-Bilog	PK	0.0	82.1	95.6	-13.5	EUT on side	314.980	55.5	22.5	66.0	2.1	0.0	0.0	V-Bilog	PK	0.0	78.0	95.6	-17.6	EUT horizontal	314.979	62.1	22.5	212.0	1.1	28.8	0.0	H-Bilog	AV	0.0	55.8	75.6	-19.8	EUT horizontal	314.977	61.1	22.5	227.0	1.1	28.8	0.0	H-Bilog	AV	0.0	54.8	75.6	-20.8	EUT vertical	314.975	60.2	22.5	64.0	2.0	28.8	0.0	V-Bilog	AV	0.0	53.9	75.6	-21.7	EUT vertical	314.970	60.0	22.5	185.0	1.1	28.8	0.0	H-Bilog	AV	0.0	53.7	75.6	-21.9	EUT on side	314.976	59.6	22.5	169.0	2.1	28.8	0.0	V-Bilog	AV	0.0	53.3	75.6	-22.3	EUT on side	314.980	55.5	22.5	66.0	2.1	28.8	0.0	V-Bilog	AV	0.0	49.2	75.6	-26.4	EUT horizontal
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																																																																																																																																																																														
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Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4407B	AAU	12/7/2007	13
Near Field Probe	EMCO	7405	IPD	NCR	0

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

For software controlled or pre-programmed devices, the manufacturer shall declare the duty cycle class or classes for the equipment under test. For manually operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmission is constant until the trigger is released or manually reset. The manufacturer shall also give a description of the application for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and hence the duty class.

Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

To derive average emission measurements, a duty cycle correction factor per 15.35(c) was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Where "On time" = $N1L1 + N2L2 + \dots$

Where N1 is the number of type 1 pulses, L1 is length of type 1 pulses, N2 is the number of type 2 pulses, L2 is the length of type 2 pulses, etc.

Therefore, Duty Cycle = $(N1L1 + N2L2 + \dots)/100\text{ms}$ or T, whichever is less. Where T is the period of the pulse train.

The measured values for the EUT's pulse train are as follows:

Period = 100 mSec

Pulsewidth of Pulse = 0.703 mSec

Number of Pulses = 5

Duty Cycle = $((5)(.7302 \text{ ms}) / 100 \text{ ms}) = 0.0365$

The duty cycle correction factor will be calculated from this information and added to the peak readings to mathematically derive the average levels.

EMC

DUTY CYCLE

EUT:	Wireless Remote Switch (100-WSS0S-P0W)	Work Order:	LEVT0011
Serial Number:	ENG-04	Date:	10/14/08
Customer:	Leviton Manufacturing Company	Temperature:	23°C
Attendees:	Dan Wright	Humidity:	28%
Project:	none	Barometric Pres.:	30.46 in
Tested by:	Rod Peloquin	Power:	battery
		Job Site:	EV06

TEST SPECIFICATIONS		Test Method	
FCC 15.231:2007		ANSI C63.4:2003	

COMMENTS

Duty cycle = $(0.7302 \text{ ms} \times 5)/100 \text{ ms} = (3.65/100) = .0365$

DEVIATIONS FROM TEST STANDARD

No Deviations

Configuration #	2	Signature 
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	Value	Limit	Results
Pulse Width 1	.7302 ms	N/A	N/A
Pulse Width 2	.7302 ms	N/A	N/A
Pulse Width 3	.7302 ms	N/A	N/A
Pulse Width 4	.7302 ms	N/A	N/A
Pulse Width 5	.7302 ms	N/A	N/A
100 ms sweep	3.65 ms	N/A	N/A
200 ms sweep	3.65 ms	N/A	N/A

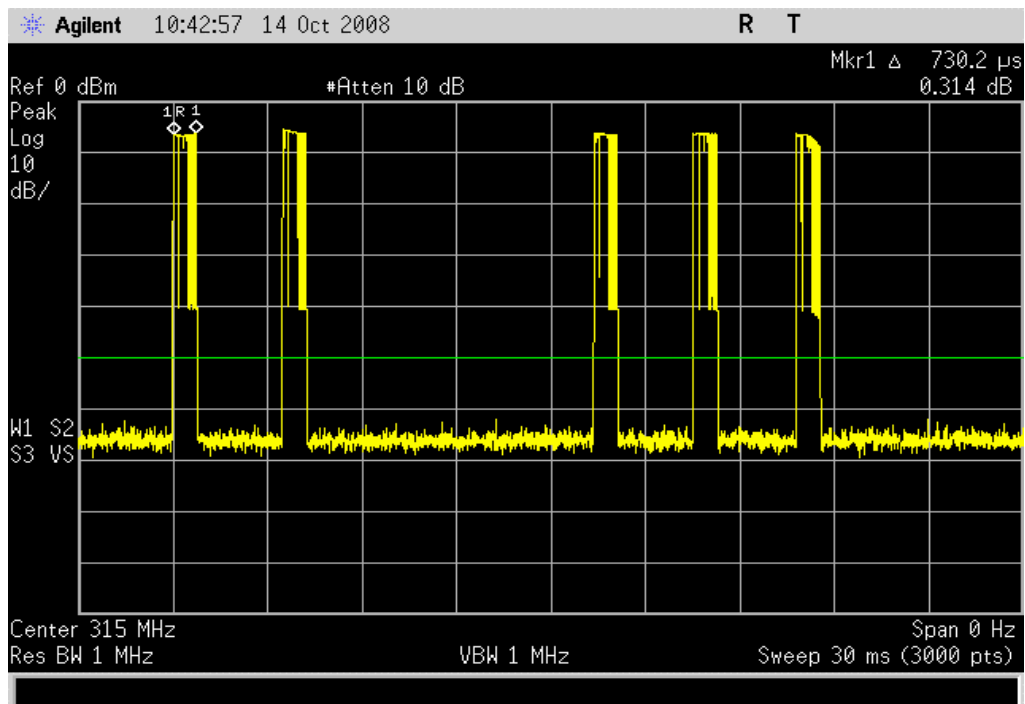
DUTY CYCLE

Pulse Width 1

Result: N/A

Value: .7302 ms

Limit: N/A

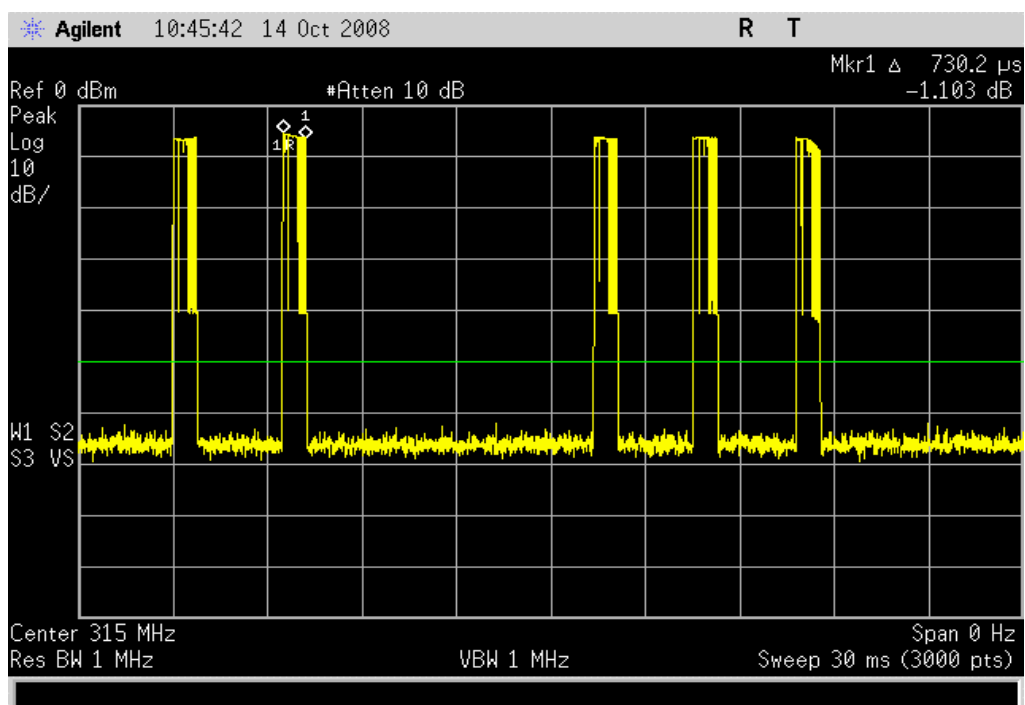


Pulse Width 2

Result: N/A

Value: .7302 ms

Limit: N/A



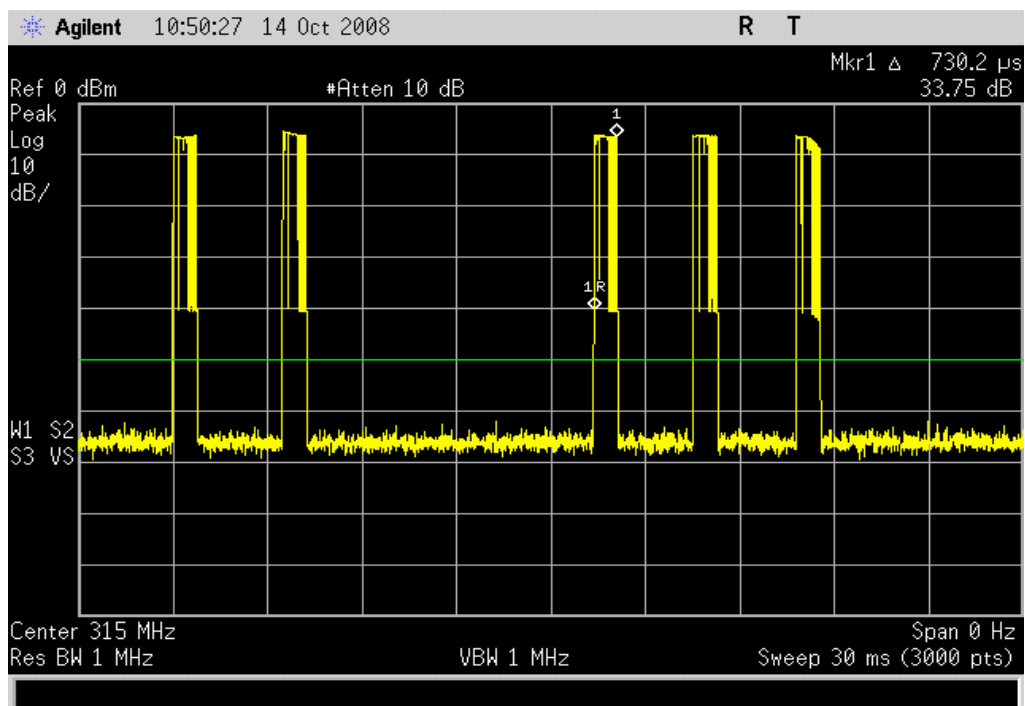
DUTY CYCLE

Pulse Width 3

Result: N/A

Value: .7302 ms

Limit: N/A

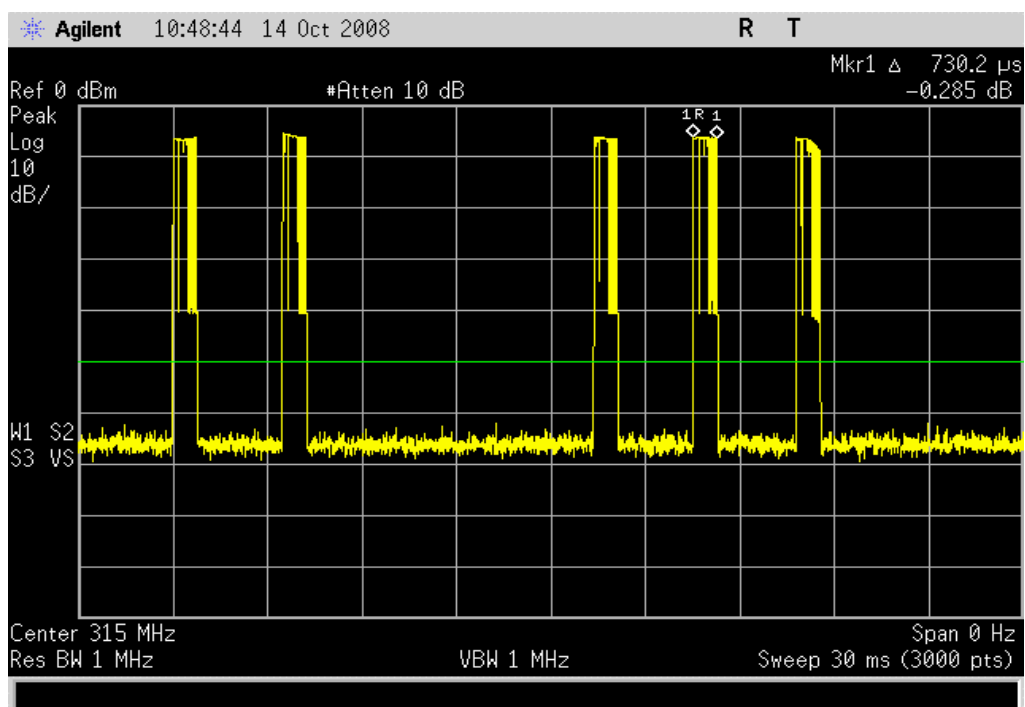


Pulse Width 4

Result: N/A

Value: .7302 ms

Limit: N/A

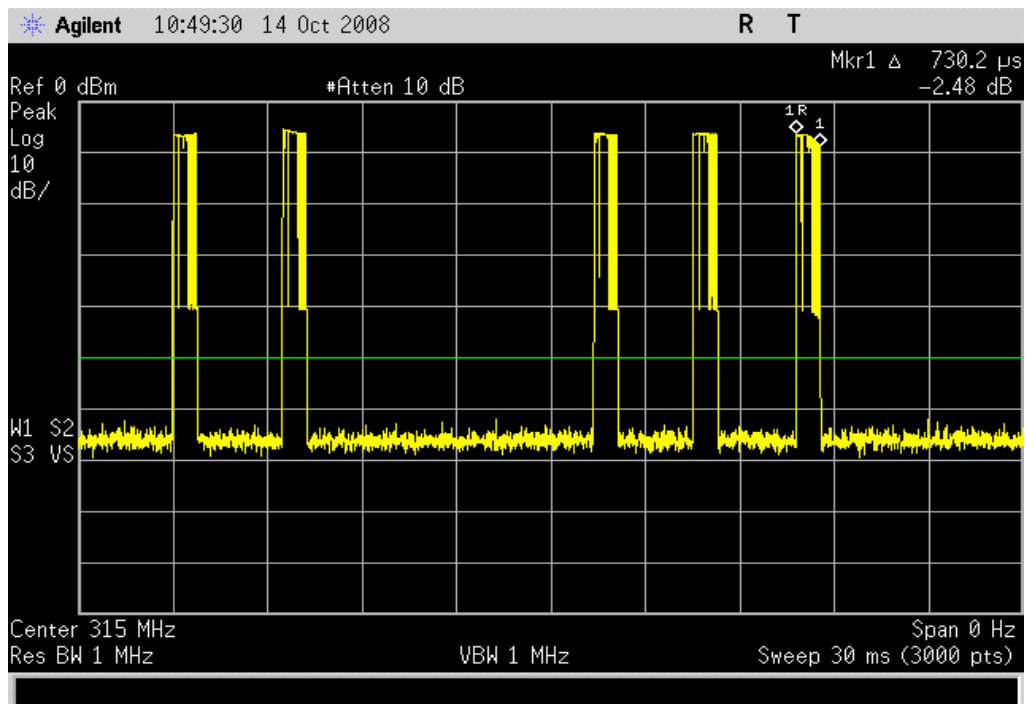


Pulse Width 5

Result: N/A

Value: .7302 ms

Limit: N/A

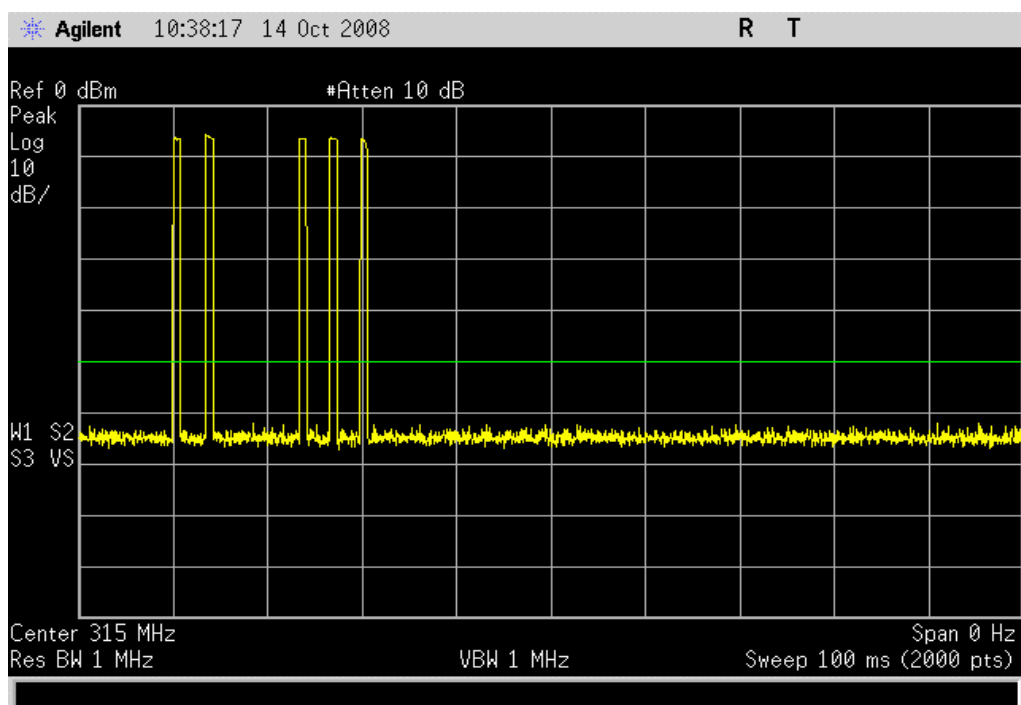


100 ms sweep

Result: N/A

Value: 3.65 ms

Limit: N/A



200 ms sweep

Result: N/A

Value: 3.65 ms

Limit: N/A

