

**FCC PART 15 SUBPART B & SUBPART C SECTION 15.249
TEST REPORT**

for

**PHASE CONTROLLED LIGHT DIMMER
Models: WD500EMZ5-1**

Prepared for

**NORTEK SECURITY & CONTROL LLC
1950 CAMINO VIDA ROBLE SUITE 150
CARLSBAD, CA 92008**

Prepared by: _____

TOREY OLIVER

Approved by: _____

MATT HARRISON

**COMPATIBLE ELECTRONICS INC.
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DATE: JUNE 3rd, 2016

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	18	2	2	2	14	18	56

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1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site Below 1GHz
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

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

Devices Tested: Phase Controlled Light Dimmer
Model: WD500EMZ5-1
S/N: None

Product Description: The WD500Z5-1 Phase Controlled Light Dimmers allow remote ON/OFF control and dimming of connected lights. The Z-Wave Wall Mount Dimmer is easily wired in place of a standard wall dimmer.

Modifications: The EUTS were not modified in order to comply with specifications.

Manufacturer: Nortek Security & Control LLC
1950 Camino Vida Roble Suite 150
Carlsbad, CA 92008

Test Date: May 18th, 19th, 20th, & 27th, 2016
June 3rd, 2016

Test Specifications: EMI requirements

CFR Title 47, Part 15 Subpart B Sections 15.107, 15.109, Subpart C Sections 15.205, 15.207, 15.209 and 15.249

Test Procedure: ANSI C63.4 & C63.10



SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.107 & Subpart C Section 15.207, & 15.249
2	Radiated RF Emissions & Harmonics, 9 kHz – 10,000 MHz.	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Section 15.205, 15.209, & 15.249
3	Fundamental Field Strength	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.249
4	Emissions Radiated Outside of the Fundamental Frequency Band	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.249



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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Phase Controlled Light Dimmer Models: WD500EMZ5-1. The EMI measurements were performed according to the measurement procedure described in ANSI. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart B sections 15.107, 15.109, & Part 15 Subpart C sections 15.205, 15.207, 15.209 and 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Nortek Security & Control LLC

Josh Hansen Regulatory Engineer

Compatible Electronics, Inc.

Torey Oliver Test Technician
Matt Harrison Lab Manager

2.4 Date Test Sample was Received

The test sample was received on May 17th, 2016.

2.5 Disposition of the Test Sample

The test sample remains at Compatible Electronics, Inc. as of the date of this test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
PCB	Printed Circuit Board
TX	Transmit
RX	Receive



3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2014	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10: 2013	American National Standard for Testing Unlicensed Wireless Devices



4. DESCRIPTION OF TEST CONFIGURATION

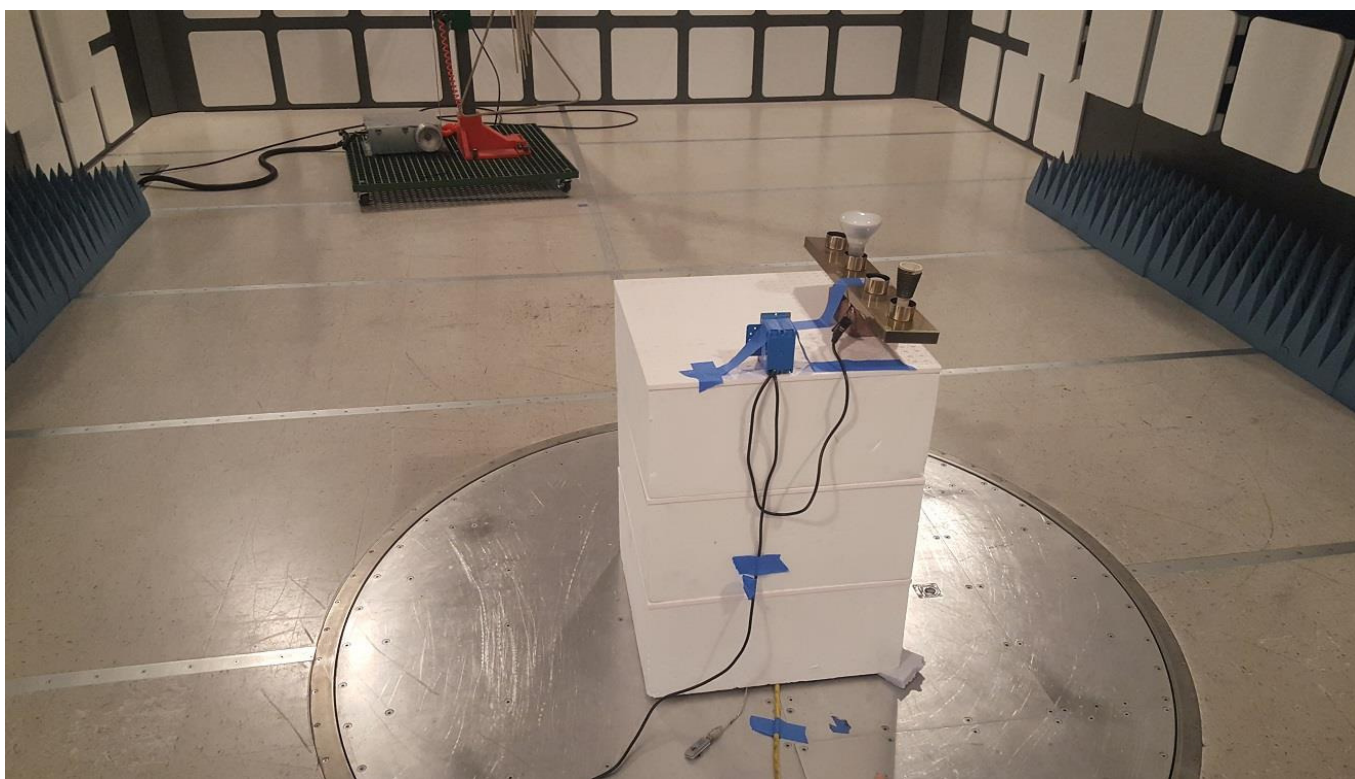
4.1 Description of Test Configuration

The Phase Controlled Light Dimmer Model: WD500EMZ5-1 (EUT) was setup in a test fixture to simulate a real life scenario use. The EUT was connected to a 500W resistive load. The EUT was checked in all three axis (X, Y, & Z) for the worst case. The worst case was found to be the Y-Axis. The EUT was continuously transmitting a data stream during transmit tests. The EUT was set to constantly receive commands for the receive tests.

The EUTs power was varied +/- 15% and no changes in amplitude or frequency were found.

It was determined that the emissions were at their highest level when the EUT was transmitting in the configuration described above for Radiated Emissions. The final radiated data was taken in the above configuration. Please see Appendix E for the test data.

4.1.1 Photograph Test Configuration (Y Axis)



4.1.2 Cable Construction and Termination

Cable 1

This is a 1 meter, unshielded, IEC cable that connects the EUT to the resistive load fixture. The cable was hardwired at the EUT end and had a female IEC connector at the fixture end of the cable. The cable was not bundled.

Cable 2

This is a 1 meter, unshielded, IEC cable that connects the EUT to the AC mains. The cable was hardwired at the EUT end and had a male US plug connected to AC mains under the turntable via wall port. The cable was not bundled.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUTs and Accessory List**

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER
1	PHASE CONTROLLED LIGHT DIMMER (EUT)	NORTEK SECURITY & CONTROL LLC	WD500EMZ5-1	NONE
2	LAPTOP	LENOVO	W530	R9-WRFYR 13/01
3	LAPTOP POWER SUPPLY	LENOVO	45N0113	11S45M0113Z1ZHX82CB1M9
4	LIGHT FIXTURE	GENERIC	GENERIC	NONE
5	RESISTIVE LOAD	GENERIC	500W	NONE



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Computer	Compatible Electronics	NONE	NONE	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100219	09/03/2015	09/03/2016
Antenna, Loop	Com Power	AL-130	121049	12/06/2013	12/06/2016
Antenna, CombiLog	Com Power	AC-220	25857	05/19/2015	05/19/2017
Antenna, Horn 1-18GHz	Com Power	AH-118	071250	07/01/2014	07/01/2016
Pre-Amp, 1-18GHz	Com Power	PAM-118	551034	08/25/2015	08/25/2016
Notch Filter	AMTI Microwave Circuits	N03019-01	3709-01 DC0415	01/06/2015	01/06/2017
Mast, Antenna Positioner	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Turntable	Sunol Science Corporation	FM 2001	N/A	N/A	N/A
Mast and Turntable Controller	Sunol Science Corporation	SC104V	020808-1	N/A	N/A
LISN	Com-Power	LI-150	191935	5/19/2016	5/19/2017



6. TEST SITE DESCRIPTION**6.1 Test Facility Description**

Please refer to section 2.1 and the figures in Appendix D of this report for test location.

6.2 EUT Mounting, Bonding and Grounding

The EUTs were mounted on a on a table, which was placed on the ground plane. The height of the table was 0.8 meters below 1 GHz and 1.5 meter for testing done above 1 GHz.

The EUT was grounded through the AC power cable.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

There 2 operating channels and the EUT uses 2-key FSK/GFSK modulation schemes. The 908.4MHz channel uses the FSK modulation with a 40kbps or a 9kbps data rate. The 40kbps data rate was used for all testing since it was found to be the worst case. The 916MHz channel uses GFSK at a data rate of 100kbps. The gain settings were preset for all units.

1 == 908.4 MHz

2 == 916.0 MHz

7.2 Antenna

The antenna is made up of a wire connected to the PCB.



8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.

Test Results:

The EUTs complies with the limits of CFR Title 47 Part 15 Subpart B section 15.107, & Part 15 Subpart C sections 15.207.



8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. There was one Preamplifier used for frequencies above 1 GHz.

For the fundamental and spurious emissions the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
0.009 to .150	Active Loop Antenna	200 Hz
0.150 to 30	Active Loop Antenna	9 kHz
30 to 1000	Combilog Antenna	100 kHz (120kHz for Quasi-Peak Measurements)
1000 to 10000	Horn Antenna	1 MHz

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUTs complies with the limits of CFR Title 47 Part 15 Subpart B section 15.109, & Part 15 Subpart C sections 15.205, 15.209 and 15.249.



8.1.3 Fundamental Field Strength

The Peak Transmit Radiated Field Strength was measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Test Results:

The EUTs complies with Part 15 Subpart C, Section 15.249.

8.1.4 Emissions Radiated Outside of the Fundamental Frequency Band

The Band Edge measurement was measured using the EMI Receiver at a 3-meter test distance to obtain the final test data. The lower and upper channels were tuned during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

Test Results:

The EUTs complies with Part 15 Subpart C, Section 15.205 & 15.249.



9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The Phase Controlled Light Dimmer Models: WD500EMZ5-1 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart B section 15.107, 15.109, & Subpart C sections 15.205, 15.207, 15.209 and 15.249.



APPENDIX A***LABORATORY ACCREDITATIONS AND
RECOGNITIONS***

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LABORATORY ACCREDITATIONS AND RECOGNITIONS



NVLAP LAB CODES 200063-0,
200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

NVLAP listing links

Agoura Division - <http://ts.nist.gov/Standards/scopes/2000630.htm>

Brea Division - <http://ts.nist.gov/Standards/scopes/2005280.htm>

Silverado/Lake Forest Division - <http://ts.nist.gov/Standards/scopes/2005270.htm>



ANSI listing

[CETCB](http://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4)

<https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4>



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:



VCCI Listing, from VCCI site

[Enter "Compatible" in search form](http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html) http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html



FCC Listing, from FCC OET site

[FCC test lab search](https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>



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APPENDIX B***MODIFICATIONS TO THE EUTS***

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MODIFICATIONS TO THE EUT

There were no modifications were made during testing.



APPENDIX C***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

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ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

PHASE CONTROLLED LIGHT DIMMER

Models: WD500EMZ5-1

S/N: None

No additional models were tested.



APPENDIX D***DIAGRAMS, CHARTS, AND PHOTOS***

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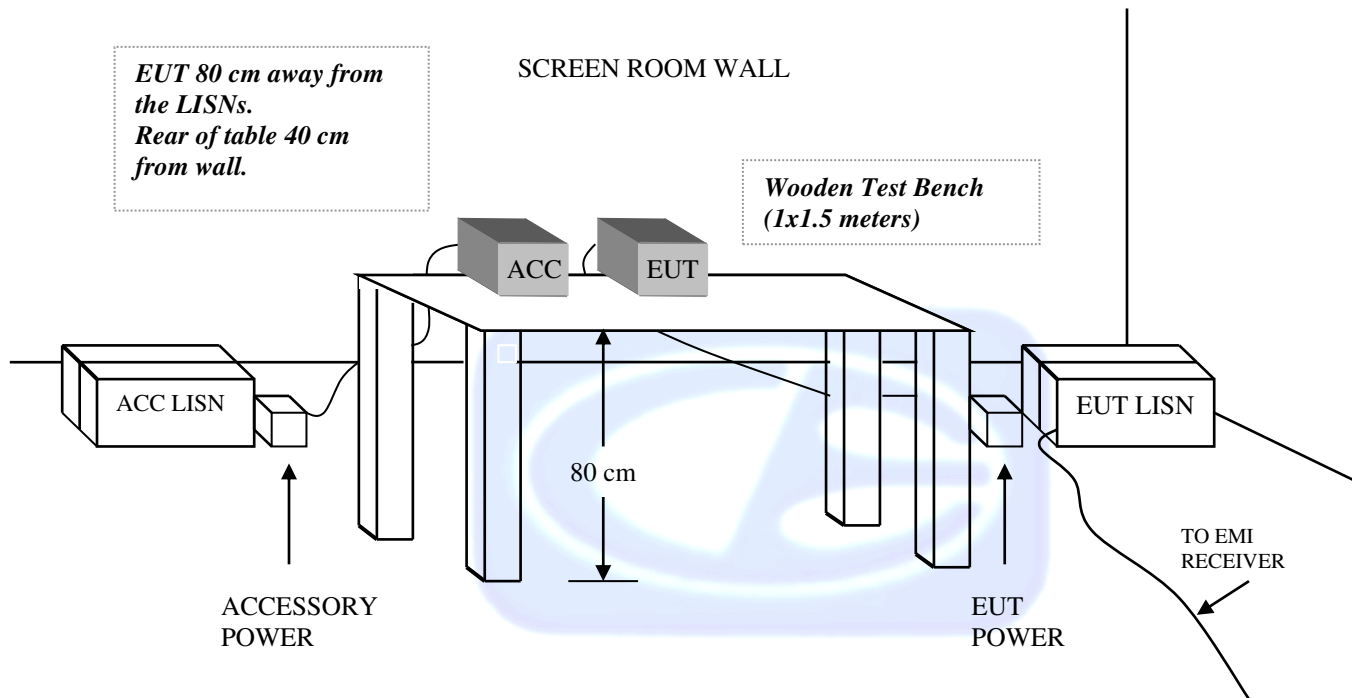
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE BELOW 1GHZ

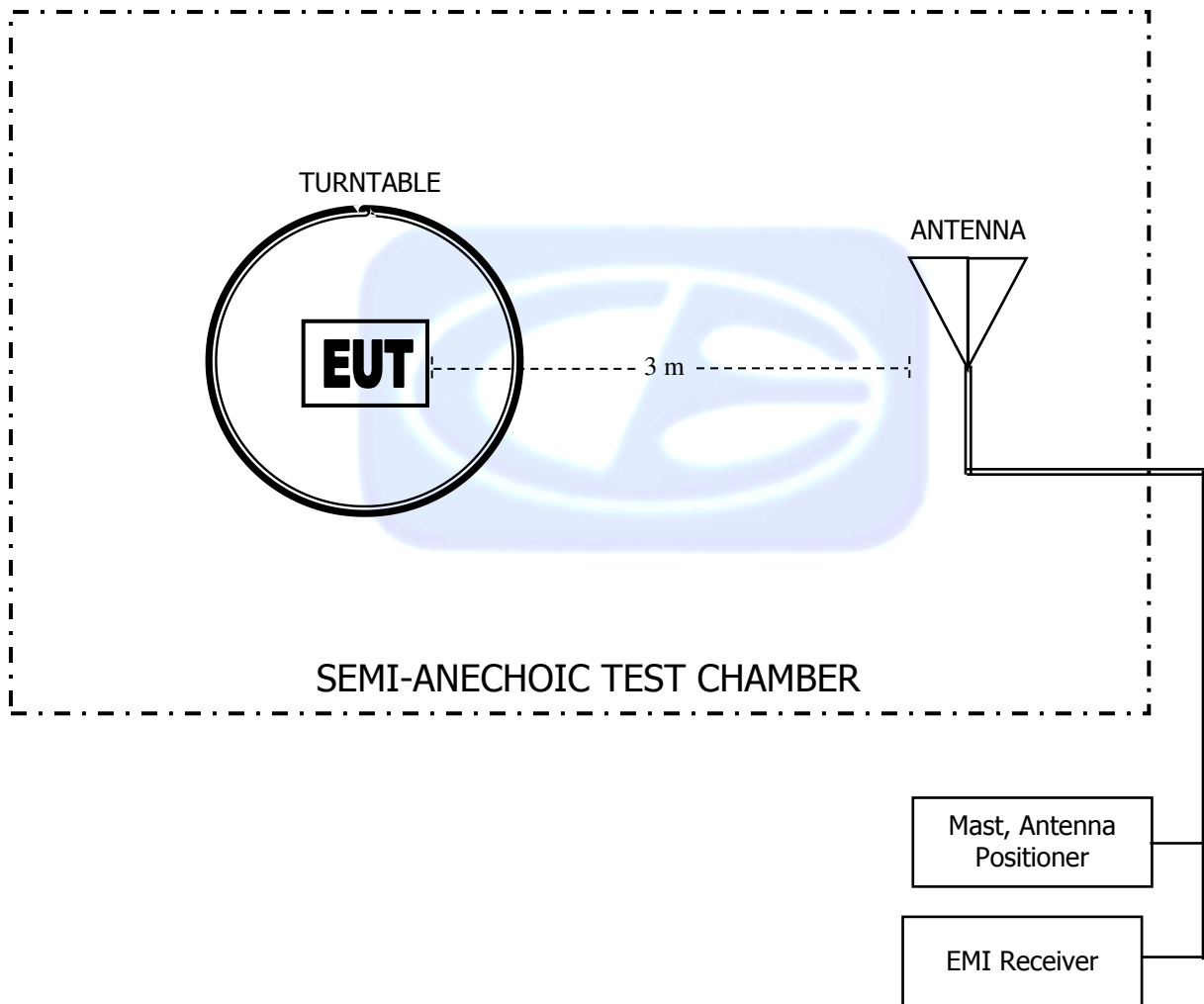
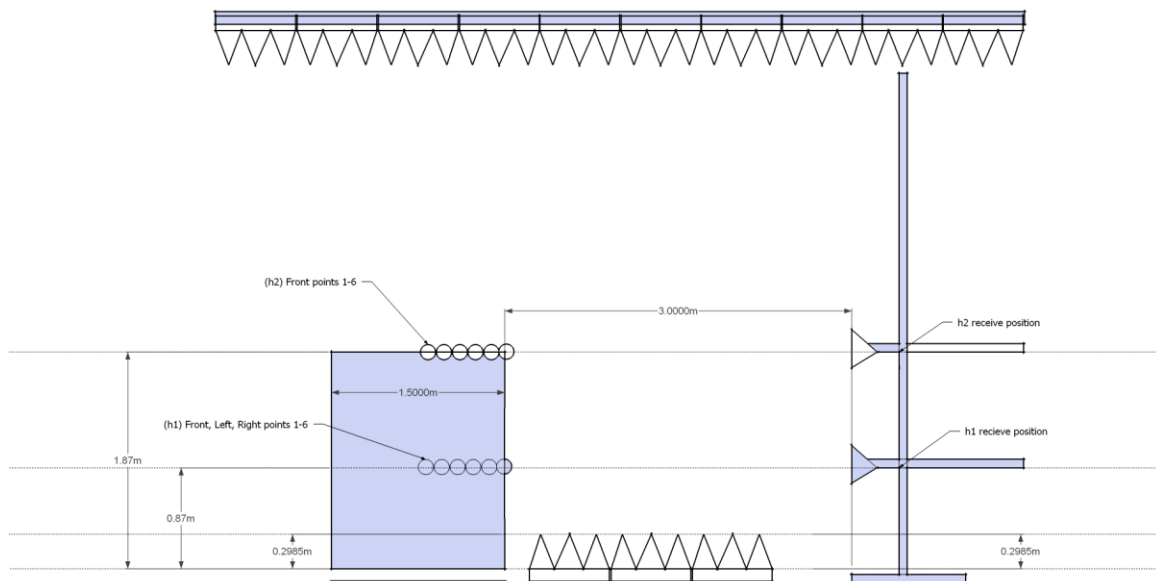


FIGURE 3: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ



COM-POWER AL-130**LOOP ANTENNA****S/N: 121049****CALIBRATION DUE: DECEMBER 6, 2016**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)	FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-34.64	16.86	0.8	-36.32	15.18
0.01	-34.78	16.72	0.9	-36.22	15.28
0.02	-35.91	15.59	1.0	-36.22	15.28
0.03	-35.48	16.02	2.0	-35.91	15.59
0.04	-35.82	15.68	3.0	-35.91	15.59
0.05	-36.49	15.01	4.0	-36.01	15.49
0.06	-36.30	15.20	5.0	-35.80	15.70
0.07	-36.43	15.07	6.0	-36.00	15.50
0.08	-36.30	15.20	7.0	-35.90	15.60
0.09	-36.39	15.11	8.0	-35.70	15.80
0.1	-36.41	15.09	9.0	-35.70	15.80
0.2	-36.61	14.89	10.0	-35.60	15.90
0.3	-36.63	14.87	15.0	-36.52	14.98
0.4	-36.52	14.99	20.0	-35.75	15.75
0.5	-36.63	14.87	25.0	-37.78	13.72
0.6	-36.62	14.88	30.0	-38.62	12.88
0.7	-36.53	14.97			



COM-POWER AC-220**LAB R - COMBILOG ANTENNA****S/N: 25857****CALIBRATION DUE: MAY 19, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.5	160	13.3
35	22.5	180	15.0
40	23.0	200	14.6
45	21.5	250	16.5
50	21.3	300	18.1
60	18.2	400	19.4
70	13.2	500	21.4
80	11.6	600	21.6
90	11.9	700	23.7
100	12.6	800	26.0
120	15.1	900	26.6
140	13.6	1000	28.5



COM-POWER AH-118**HORN ANTENNA****S/N: 071250****CALIBRATION DUE: JULY 1, 2016**

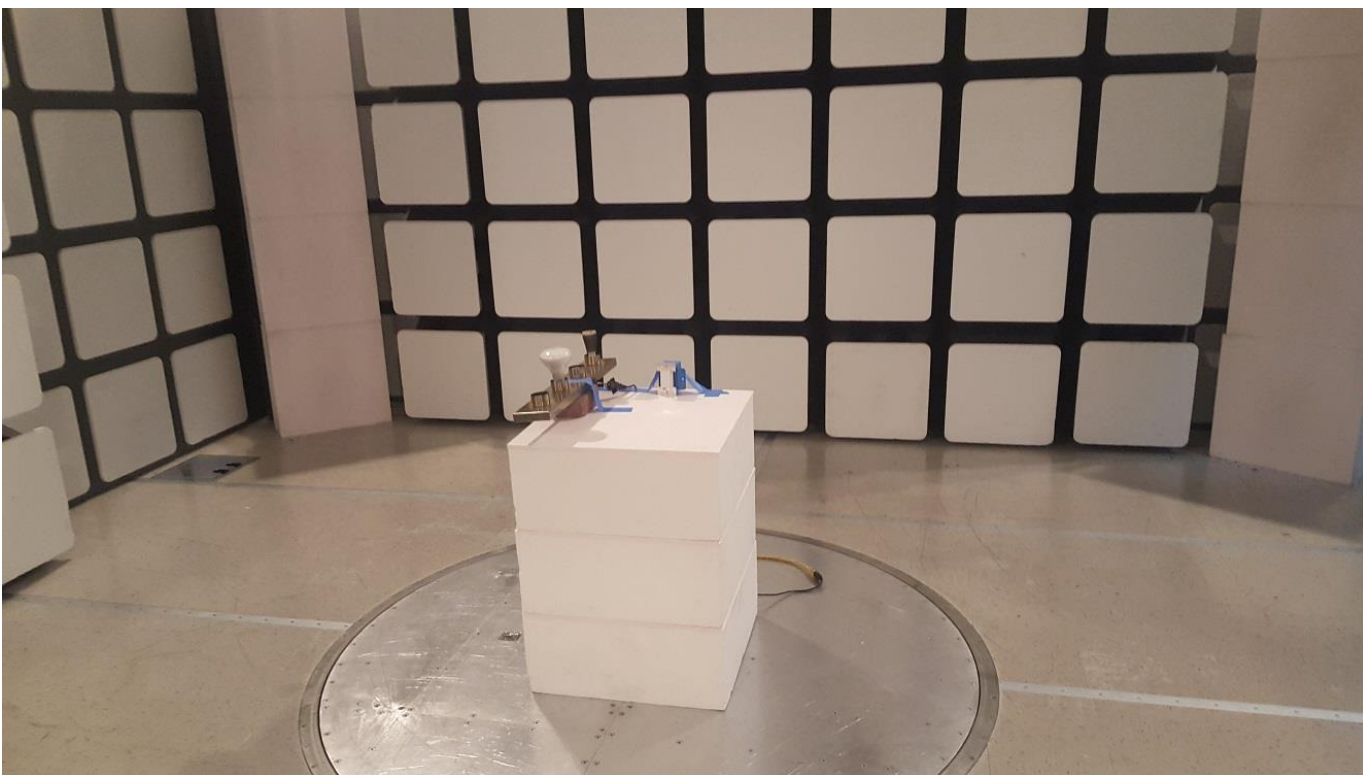
FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	30.1	9500	44.2
1500	29.2	10000	43.4
2000	31.6	10500	44.6
2500	35.5	11000	45.1
3000	33.7	11500	45.7
3500	36.0	12000	46.2
4000	35.4	12500	45.4
4500	35.5	13000	44.8
5000	40.1	13500	46.7
5500	37.8	14000	47.8
6000	39.0	14500	46.4
6500	39.9	15000	47.2
7000	40.4	15500	45.5
7500	44.4	16000	45.0
8000	44.1	16500	44.5
8500	43.1	17000	47.0
9000	43.0	17500	47.8
		18000	44.2



COM-POWER PAM-118**1-18GHz - PREAMPLIFIER****S/N: 551034****CALIBRATION DUE: August 25, 2016**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	26.2	5500	25.3
1000	25.6	6000	25.0
1100	25.9	6500	24.7
1200	25.9	7000	23.6
1300	26.3	7500	23.3
1400	26.5	8000	23.7
1500	26.3	8500	24.0
1600	26.1	9000	24.3
1700	26.2	9500	24.1
1800	26.3	10000	23.7
1900	25.8	11000	24.2
2000	26.0	12000	23.2
2500	26.0	13000	22.8
3000	25.8	14000	22.6
3500	25.9	15000	22.9
4000	26.4	16000	22.3
4500	26.0	17000	22.6
5000	25.6	18000	23.9





FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1
FCC SUBPART B & C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

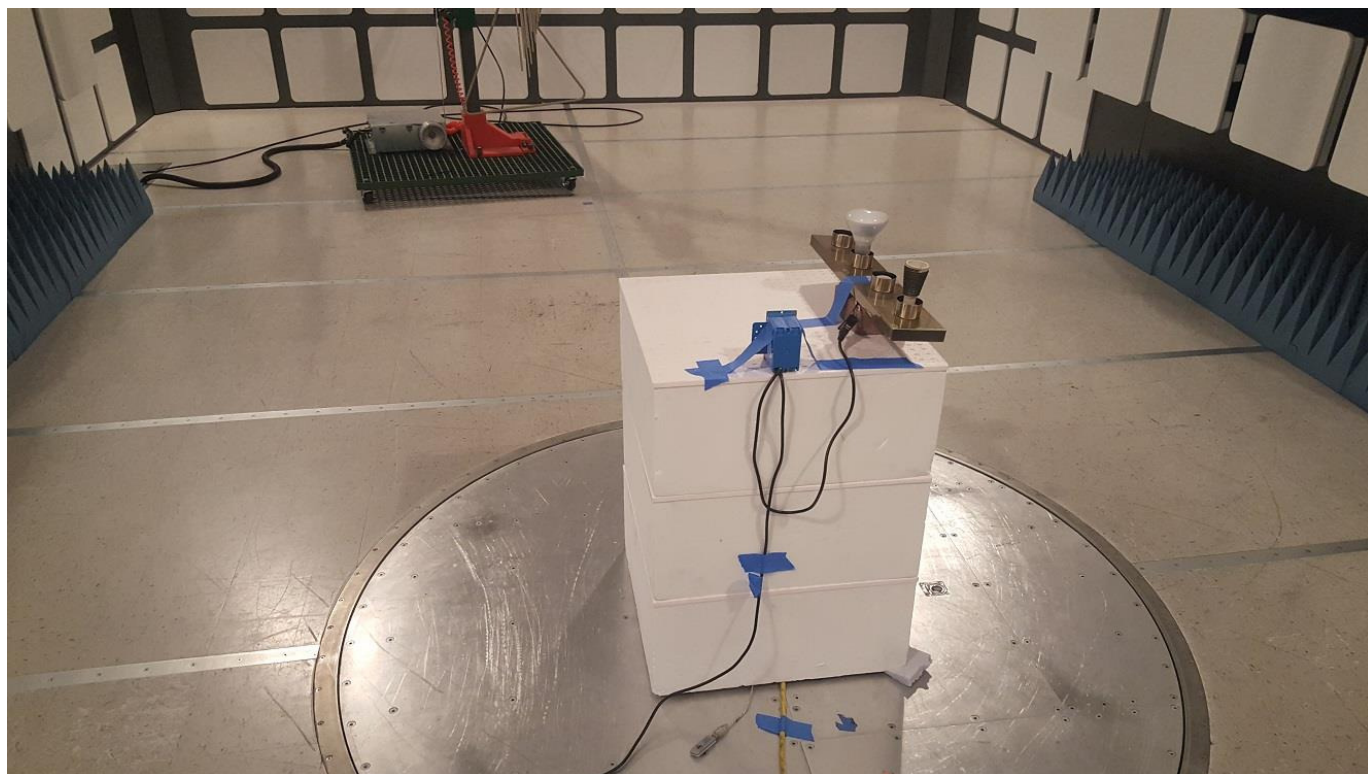


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Lake Forest, CA 92630
(949) 587-0400

**REAR VIEW**

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1

FCC SUBPART B & C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1
FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
114 Olinda Drive
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Agoura Division
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(949) 587-0400

**REAR VIEW**

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1
FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

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Agoura Division
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(949) 587-0400



FRONT VIEW

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1
FCC SUBPART B & C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



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**REAR VIEW**

NORTEK SECURITY & CONTROL LLC
PHASE CONTROLLED LIGHT DIMMER
MODELS: WD500EMZ5-1
FCC SUBPART B & C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

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APPENDIX E***RADIATED EMISSIONS DATA SHEETS***

Brea Division
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(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

5/18/2016 8:38:36 AM

File: Radiated Pre-Scan 30-1000Mhz Rx Set.set

Sequence: Preliminary Scan

Operator: Torey Oliver

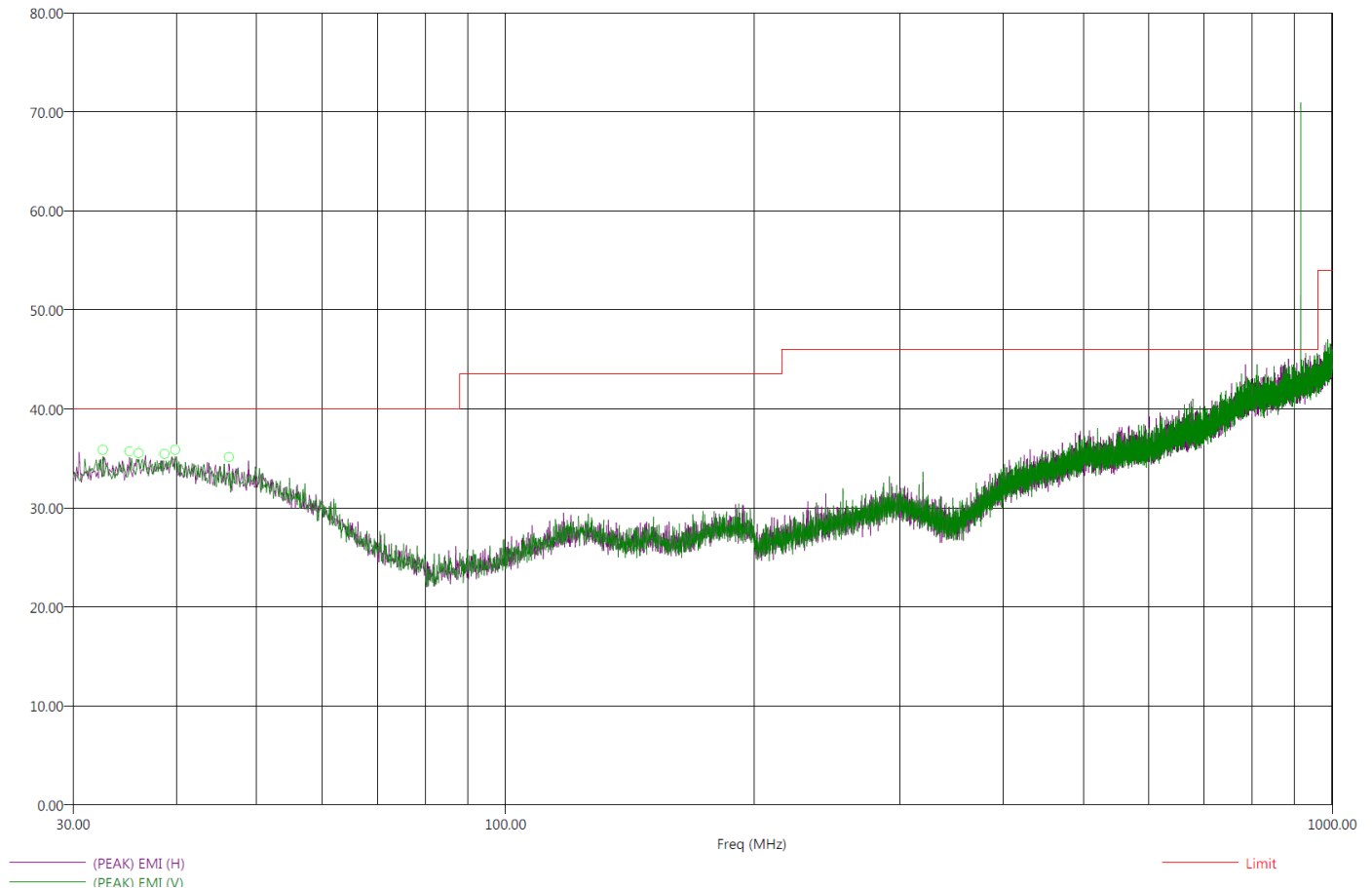
EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1

EUT Condition: The EUT is constantly receiving and executing commands.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)Electric Field Strength (dB μ V/m)

***There were no radiated spurious emissions other than harmonics found below 30 MHz or above 1GHz.
This is the worst case operating mode.***



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Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

5/18/2016 9:06:44 AM

File: Radiated Final 30-1000Mhz Rx Set.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1

EUT Condition: The EUT is constantly receiving and executing commands.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dB μ V/m)	(PEAK) EMI (dB μ V/m)	Limit (dB μ V/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer(dB)	Cable(dB)
32.60	-10.60	29.40	35.71	40.00	V	248.75	137.37	22.50	0.53
35.10	-10.49	29.51	34.96	40.00	H	360.00	108.00	22.51	0.55
36.00	-9.28	30.72	36.02	40.00	V	16.50	236.65	22.61	0.56
38.70	-10.02	29.98	35.13	40.00	V	228.25	400.53	22.88	0.59
39.90	-9.89	30.11	35.33	40.00	H	110.25	241.73	23.00	0.60
46.30	-11.05	28.95	34.08	40.00	H	122.50	254.86	21.44	0.67

*There were no radiated spurious emissions other than harmonics found below 30 MHz or above 1GHz.**This is the worst case operating mode.*

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CONDUCTED EMISSIONS DATA SHEETS

Brea Division
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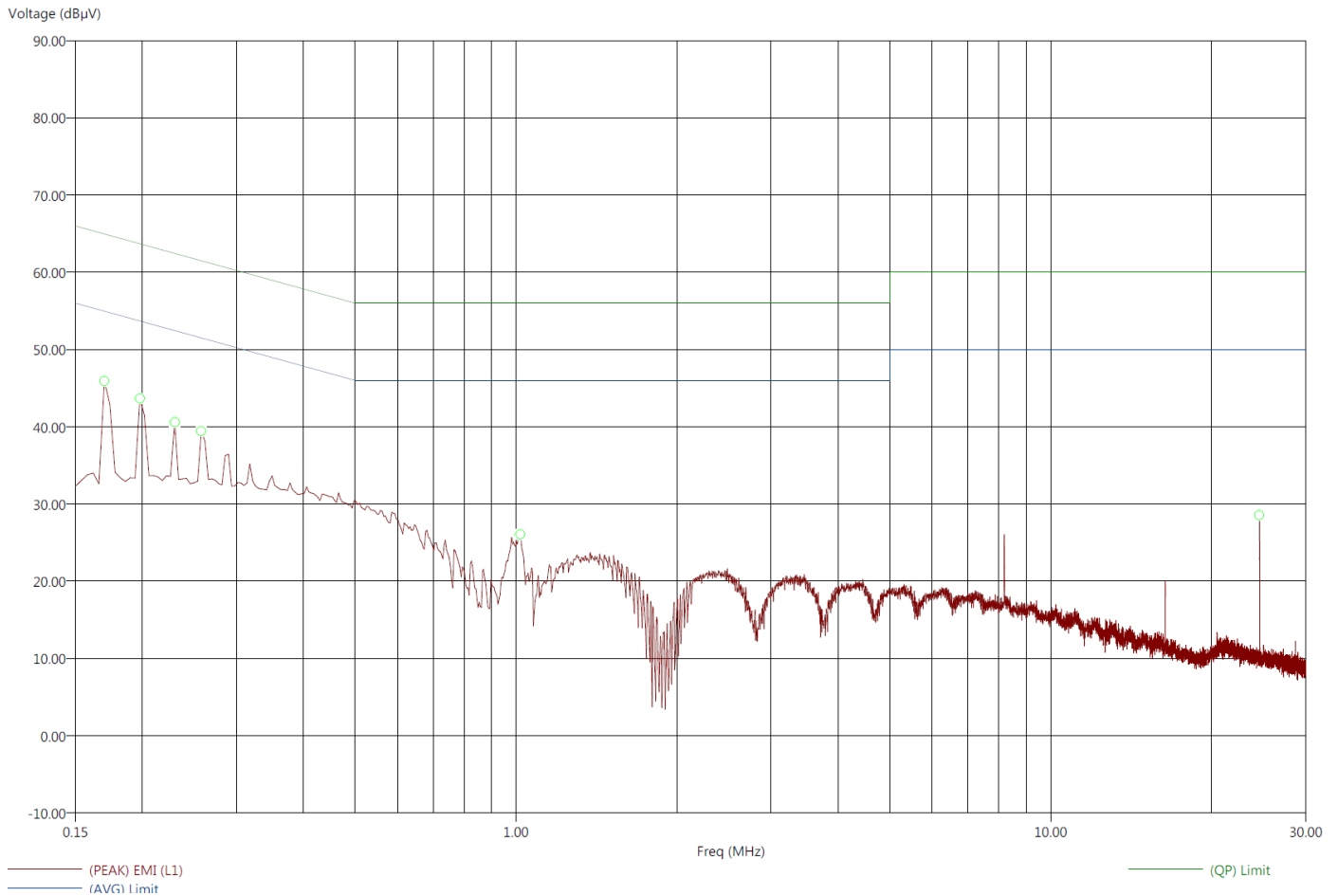
Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.207
File: Conducted Pre-Line 120V.set
Operator: Torey Oliver
EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1
EUT Condition: The EUT is constantly transmitting 908.42MHz
Comments: Temp: 74f
Hum: 33%
120V 60Hz

5/27/2016 11:32:34 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (Lab R)

This is the worst case operating mode.



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Title: FCC 15.207

5/27/2016 11:36:22 AM

File: Conducted Final-Line 120V.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1

EUT Condition: The EUT is constantly transmitting 908.42MHz.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

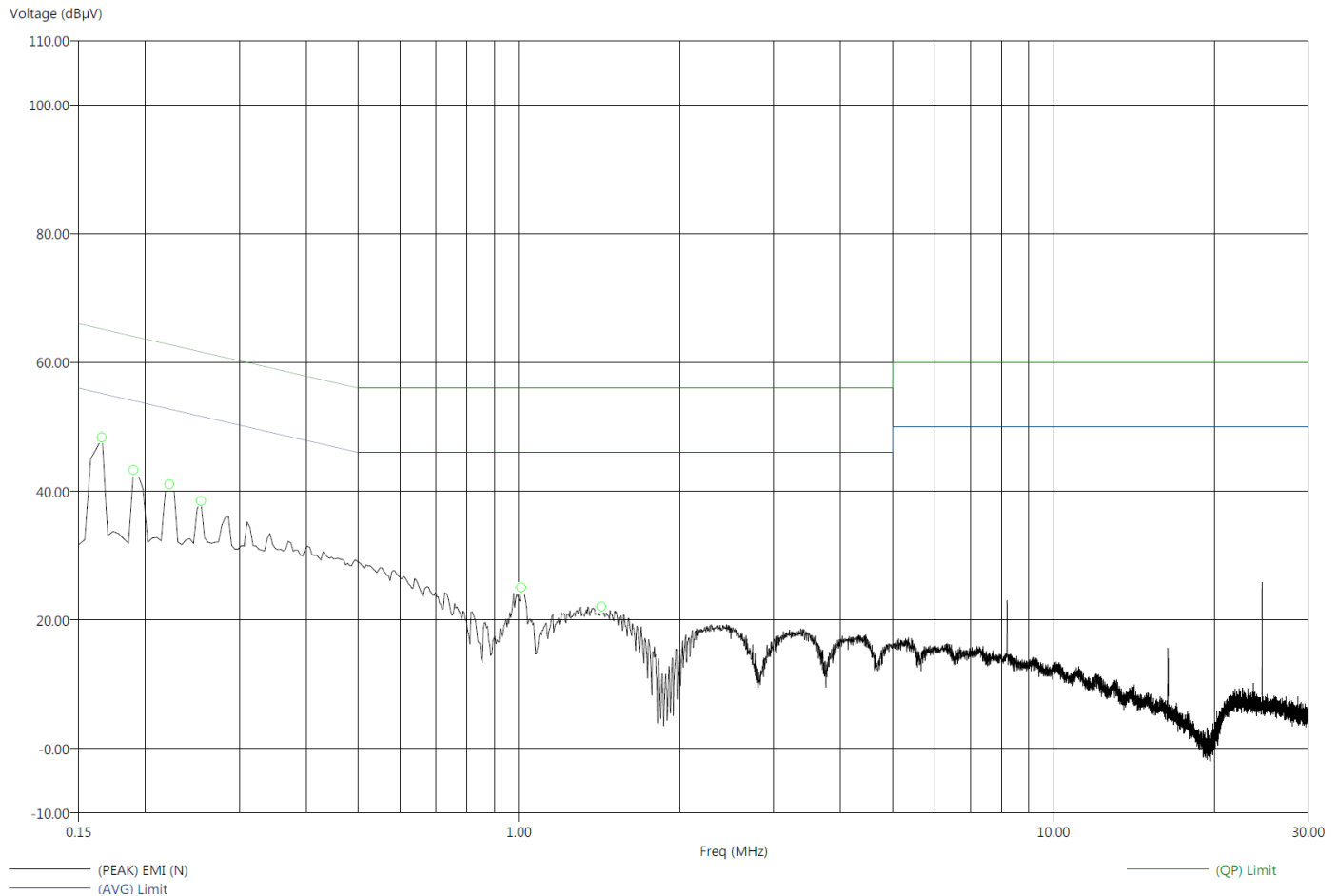
Compatible Electronics, Inc. FAC-3 (Lab R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBμV/m)	(QP) EMI (dBμV/m)	(Peak) EMI (dBμV/m)	(AVG) Limit (dBμV/m)	(QP) Limit (dBμV/m)	Transducer(dB)	Cable(dB)
0.17	-13.18	-18.32	41.78	46.64	53.03	54.96	64.96	0.38	0.00
0.20	-11.77	-16.69	41.93	47.00	53.40	53.69	63.69	0.31	0.00
0.23	-10.87	-15.95	41.58	46.50	52.52	52.45	62.45	0.24	0.00
0.26	-11.12	-15.99	40.38	45.50	51.94	51.50	61.50	0.19	0.00
1.02	-13.93	-20.70	32.07	35.30	43.55	46.00	56.00	0.04	0.00
24.58	-14.66	-20.37	35.34	39.63	48.53	50.00	60.00	0.28	0.30

This is the worst case operating mode.

Title: FCC 15.207
File: Conducted Pre-Neutral 120V.set
Operator: Torey Oliver
EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1
EUT Condition: The EUT is constantly transmitting 908.42MHz.
Comments: Temp: 74f
Hum: 33%
120V 60Hz

5/27/2016 11:15:04 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (Lab R)

This is the worst case operating mode.



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Title: FCC 15.207

5/27/2016 11:20:12 AM

File: Conducted Final-Neutral 120V.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: Phase Controlled Light Dimmer / WD500EMZ5-1

EUT Condition: The EUT is constantly transmitting 908.42MHz.

Comments: Temp: 74f

Hum: 33%

120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(Peak) EMI (dBµV/m)	(AVG) Limit (dBµV/m)	(QP) Limit (dBµV/m)	Transducer(dB)	Cable(dB)
0.17	-13.31	-18.06	41.85	47.09	53.34	55.16	65.16	0.40	0.00
0.19	-12.01	-16.80	42.03	47.24	53.43	54.04	64.04	0.34	0.00
0.22	-10.94	-15.59	41.81	47.16	53.17	52.74	62.74	0.26	0.00
0.25	-10.70	-15.64	40.93	45.99	51.93	51.63	61.63	0.19	0.00
1.01	-13.62	-19.94	32.38	36.06	43.55	46.00	56.00	0.04	0.00
1.43	-13.23	-19.95	32.77	36.05	43.93	46.00	56.00	0.03	0.00

This is the worst case operating mode.

***FUNDAMENTAL
DATA SHEETS***



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Lake Forest Division
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FUNDAMENTAL FIELD STRENGTH

FCC 15.249

Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Tested By: Torey Oliver

Compatible Electronics, Inc. FAC-3

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table	Tower	Comments
908.42	87.53	H	113.97	-26.44	Peak	356	1.00	
908.42	85.53	H	93.97	-8.44	QP	356	1.00	
908.42	95.29	V	113.97	-18.68	Peak	169	1.09	
908.42	92.60	V	93.97	-1.37	QP	169	1.09	
916.00	87.72	H	113.97	-26.25	Peak	0	1.00	
916.00	85.42	H	93.97	-8.55	QP	0	1.00	
916.00	95.15	V	113.97	-18.82	Peak	173	1.00	
916.00	92.11	V	93.97	-1.86	QP	173	1.00	

Test
distance
3 meter



***HARMONIC
DATA SHEETS***

1



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HARMONIC EMISSIONS LOW CHANNEL HORIZONTAL

FCC 15.249

Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1816.8	40.36	H	73.98	-33.62	Peak	1.98	183	
1816.8	26.67	H	53.98	-27.31	Avg	1.98	183	
2725.3	53.55	H	73.98	-20.43	Peak	1.92	16	
2725.3	38.31	H	53.98	-15.67	Avg	1.92	16	
3633.7		H	73.98		Peak			
3633.7		H	53.98		Avg			No emissions found
4542.1	55.74	H	73.98	-18.24	Peak	1.15	12	
4542.1	39.96	H	53.98	-14.02	Avg	1.15	12	
5450.5		H	73.98		Peak			
5450.5		H	53.98		Avg			No emissions found
6358.9	58.93	H	73.98	-15.05	Peak	1.12	51	
6358.9	44.04	H	53.98	-9.94	Avg	1.12	51	
7267.4		H	73.98		Peak			
7267.4		H	53.98		Avg			
8175.8	58.88	H	73.98	-15.10	Peak	1.88	33	
8175.8	45.39	H	53.98	-8.59	Avg	1.88	33	
9084.2		H	73.98		Peak			
9084.2		H	53.98		Avg			No emissions found

Test distance
3 meter



HARMONIC EMISSIONS LOW CHANNEL VERTICAL

FCC 15.249

Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1816.8	44.06	V	73.98	-29.92	Peak	1.51	13	
1816.8	29.70	V	53.98	-24.28	Avg	1.51	13	
2725.3	42.12	V	73.98	-31.86	Peak	1.78	27	
2725.3	29.55	V	53.98	-24.43	Avg	1.78	27	
3633.7		V	73.98		Peak			
3633.7		V	53.98		Avg			No emissions found
4542.1	45.21	V	73.98	-28.77	Peak	1.56	72	
4542.1	32.72	V	53.98	-21.26	Avg	1.56	72	
5450.5		V	73.98		Peak			
5450.5		V	53.98		Avg			No emissions found
6358.9	51.91	V	73.98	-22.07	Peak	2.53	212	
6358.9	39.46	V	53.98	-14.52	Avg	2.53	212	
7267.4		V	73.98		Peak			
7267.4		V	53.98		Avg			No emissions found
8175.8		V	73.98		Peak			
8175.8		V	53.98		Avg			No emissions found
9084.2		V	73.98		Peak			
9084.2		V	53.98		Avg			No emissions found

Test
distance
3 meter



HARMONIC EMISSIONS HIGH CHANNEL HORIZONTAL

FCC 15.249

Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1832.0	39.25	H	73.98	-34.73	Peak	1.67	209	
1832.0	25.74	H	53.98	-28.24	Avg	1.67	209	
2748.0	48.40	H	73.98	-25.58	Peak	1.32	21	
2748.0	30.76	H	53.98	-23.22	Avg	1.32	21	
3664.0		H	73.98		Peak			
3664.0		H	53.98		Avg			No emissions found
4580.0	57.24	H	73.98	-16.74	Peak	2.53	9	
4580.0	37.36	H	53.98	-16.62	Avg	2.53	9	
5496.0		H	73.98		Peak			
5496.0		H	53.98		Avg			No emissions found
6412.0	56.86	H	73.98	-17.12	Peak	1.27	200	
6412.0	39.76	H	53.98	-14.22	Avg	1.27	200	
7328.0		H	73.98		Peak			
7328.0		H	53.98		Avg			No emissions found
8244.0		H	73.98		Peak			
8244.0		H	53.98		Avg			No emissions found
9160.0		H	73.98		Peak			
9160.0		H	53.98		Avg			No emissions found

Test distance
3 meter



HARMONIC EMISSIONS HIGH CHANNEL VERTICAL

FCC 15.249

Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1832.0	44.06	V	73.98	-29.92	Peak	1.51	13	
1832.0	29.70	V	53.98	-24.28	Avg	1.51	13	
2748.0	41.66	V	73.98	-32.32	Peak	1.22	6	
2748.0	28.87	V	53.98	-25.11	Avg	1.22	6	
3664.0		V	73.98		Peak			
3664.0		V	53.98		Avg			No emissions found
4580.0	45.85	V	73.98	-28.13	Peak	3.58	347	
4580.0	33.57	V	53.98	-20.41	Avg	3.58	347	
5496.0		V	73.98		Peak			
5496.0		V	53.98		Avg			No emissions found
6412.0	53.92	V	73.98	-20.06	Peak	3.90	4	
6412.0	39.33	V	53.98	-14.65	Avg	3.90	4	
7328.0		V	73.98		Peak			
7328.0		V	53.98		Avg			No emissions found
8244.0		V	73.98		Peak			
8244.0		V	53.98		Avg			No emissions found
9160.0		V	73.98		Peak			
9160.0		V	53.98		Avg			No emissions found

Test
distance
3 meter



***EMISSIONS RADIATED OUTSIDE OF THE FUNDAMENTAL
FREQUENCY BAND
DATA SHEETS***



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BAND EDGES LOW CHANNEL

FCC 15.249

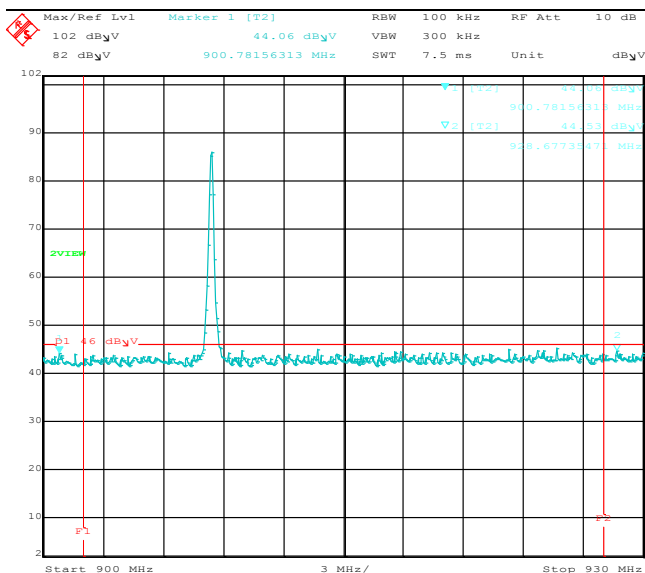
Company: Nortek
EUT: Phase Controlled Light Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Test ENG: Torey Oliver

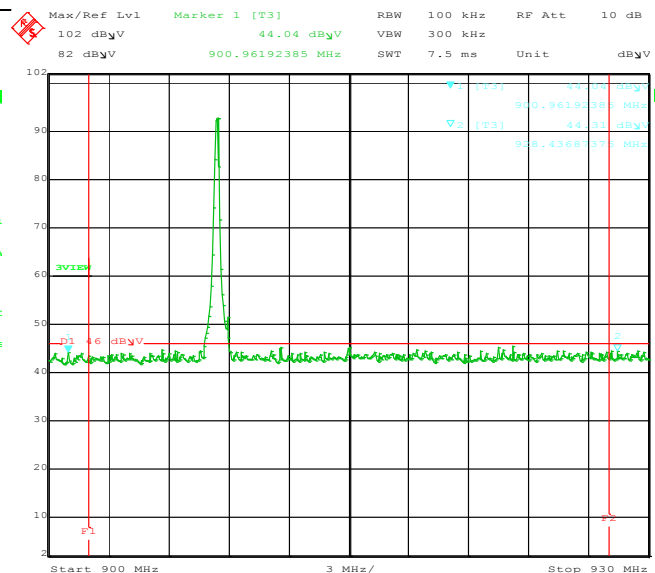
Compatible Electronics, Inc. FAC-3 (Lab R)

Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Table Angle (Deg)	Tower Height (m)	Comments
900.78	44.06	H	46.00	-1.94	Peak	356	1.00	No Marker Delta
928.68	44.53	H	46.00	-1.47	Peak	356	1.00	Method Used
900.96	44.04	V	46.00	-1.96	Peak	169	1.09	No Marker Delta
928.44	44.31	V	46.00	-1.69	Peak	169	1.09	Method Used

Test distance
3 meter



Comment A: Band Edge 908.42MHz Horizontal
Date: 17.MAY.2016 13:39:22



Comment A: Band Edge 908.42MHz Vertical
Date: 17.MAY.2016 13:45:58



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BAND EDGES HIGH CHANNEL

FCC 15.249

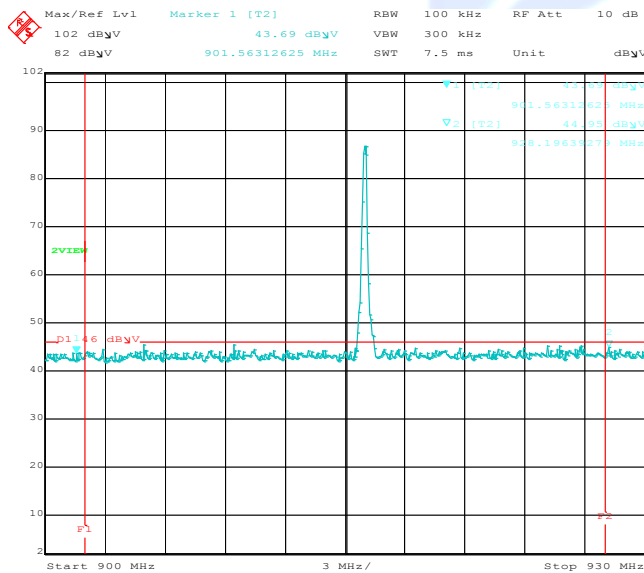
Company: Nortek
Phase Controlled Light
EUT: Dimmer
Model: WD500EMZ5-1

Date: 5/17/2016
Lab: R
Test ENG: Torey Oliver

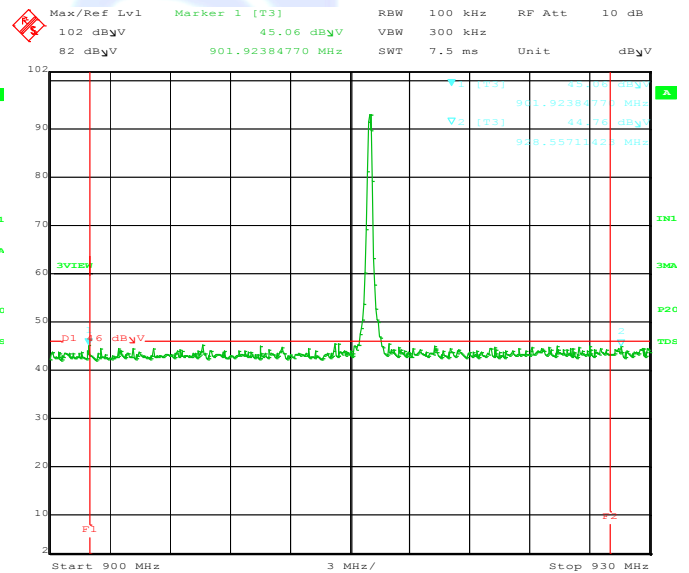
Compatible Electronics, Inc. FAC-3 (Lab R)

Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Table Angle (Deg)	Tower Height (m)	Comments
901.56	43.69	H	46.00	-2.31	Peak	0	1.00	No Marker Delta
928.20	44.95	H	46.00	-1.05	Peak	0	1.00	Method Used
901.92	45.06	V	46.00	-0.94	Peak	173	1.00	No Marker Delta
928.56	44.76	V	46.00	-1.24	Peak	173	1.00	Method Used

Test distance
3 meter



Comment A: Band Edge 916MHz Horizontal
Date: 17.MAY.2016 13:03:06



Comment A: Band Edge 916MHz Vertical
Date: 17.MAY.2016 13:10:43



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