

**FCC PART 15, SUBPART B and C
TEST REPORT**

for

DOUBLE DECORA LIGHT SWITCH

Model: DDLS2-ZWAVE5

Prepared for

ECOLINK INTELLIGENT TECHNOLOGY, INC.
2055 CORTE DEL NOGAL
CARLSBAD, CALIFORNIA 92011

Prepared by: _____ 

EDGAR VALENCIA

Approved by: _____ 

KYLE FUJIMOTO

COMPATIBLE ELECTRONICS INC.
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DATE: DECEMBER 5, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	2	11	35	69

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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 without the written permission of Compatible Electronics, unless done so in full.

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

Device Tested: Double Decora Light Switch
Model: DDLS2-ZWAVE5
S/N: N/A

Product Description: The EUT is a battery-powered device for home automation applications.

Modifications: The EUT was not modified in order to meet the specifications.

Customer: Ecolink Intelligent Technology, Inc.
2055 Corte Del Nogal
Carlsbad, California 92011

Test Dates: November 20, 21, 27, and 28, 2017; and December 12, 2017

Test Specifications covered by accreditation:

CFR Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209, and 15.249



Test Procedures: ANSI C63.4: 2014 and ANSI C63.10: 2013

SUMMARY OF TEST RESULTS

<i>TEST</i>	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 9 kHz – 9300 MHz (Transmitter and Digital portion)	Complies with the Class B limits of CFR Title 47, Part 15 Subpart B; and the limits of CFR Title 47, Part 15 Subpart C, section 15.205, 15.209 and 15.249 <small>Highest reading in relation to spec limit 93.48 dBuV/m @ 916.00 MHz (*U = 4.54 dB)</small>
2	Conducted RF Emissions, 150 kHz to 30 MHz	This test was not performed because the EUT does not connect to the AC mains

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Double Decora Light Switch, Model: DDLS2-ZWAVE5. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

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

Ecolink Intelligent Technology, Inc.

Keyoor Gosalia Principal RF Engineer

Compatible Electronics Inc.

Kyle Haag Test Technician
Edgar Valencia Test Technician
Kyle Fujimoto Test Engineer

2.4 Date Test Sample was Received

The test sample was received on prior to the initial date of testing.

2.5 Disposition of the Test Sample

The test sample has not been returned to Ecolink Intelligent Technology, 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
ASK	Amplitude Shift Key
ITE	Information Technology Equipment
LISN	Line Impedance Stabilization Network
N/A	Not Applicable
Tx	Transmit
Rx	Receive
PIR	Pyroelectric ("Passive") Infrared
Inc.	Incorporated

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
ANSI C63.4 2014	American National Standard for 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 of procedure for compliance testing of unlicensed wireless devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The Double Decora Light Switch, Model: DDLS2-ZWAVE5 (EUT) was setup in a stand-alone configuration. The EUT was investigated in all three orthogonal axis. During the testing, the EUT was continuously transmitting or receiving at the low channel of 908.42 MHz and high channel of 916 MHz.

The X orientation is when the EUT is parallel to the ground. The Y orientation is when the EUT is perpendicular to the ground mounted vertically. The Z orientation is when the EUT is perpendicular to the ground mounted horizontally.

The EUT was programmed to be able to continuously transmit or receive at the low and high channels. Fresh batteries were installed inside the EUT prior to the testing. The EUT was preset via internal firmware to continuously transmit or receive at the low or high, respectively.

The firmware is stored in one of the network drives in the company's server.

The final radiated data for the EUT was taken in the mode described above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

The EUT had no external cables.

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

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
DOUBLE DECORA LIGHT SWITCH (EUT)	ECOLINK INTELLIGENT TECHNOLOGY, INC.	DDLS2-ZWAVE5	N/A	XQC-DDLS2ZWAVE5
FIRMWARE FOR EUT*	ECOLINK INTELLIGENT TECHNOLOGY, INC.	1.0	N/A	N/A

*Located inside the EUT to allow the EUT to transmit on a continuous basis.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED IN LAB D					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight	N9038A	MY5120150	December 6, 2017	1 Year
EMI Receiver, 20 Hz – 40 GHz	Rohde & Schwarz	ESIB40	100194	September 26, 2017	1 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	July 27, 2017	1 Year
Preamplifier	Com-Power	PAM-118A	551024	May 12, 2016	2 Year
Loop Antenna	Com-Power	AL-130R	121090	February 9, 2017	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2016	2 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A

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

Please refer to section 2.1 and 7.1 of this report for emissions test location.

6.2 EUT Mounting, Bonding and Grounding

For frequencies 1 GHz and below: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 1.5 meters above the ground plane.

The EUT was not grounded.

6.3 Measurement Uncertainty

The uncertainty values are in the table below.

The uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level, using a coverage factor of $k=2$

MEASUREMENT TYPE	PARTICULAR CONFIGURATION	UNCERTAINTY VALUES
RADIATED EMISSIONS	3-METER CHAMBER, COMBILOG ANTENNA	4.54 dB
RADIATED EMISSIONS	3-METER CHAMBER, HORN ANTENNA	3.70 dB
AC LINE CONDUCTED EMISSIONS	3-METER CHAMBER, COM-POWER LISN	2.88 dB

7. TEST PROCEDURES

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

7.1 RF Emissions

7.1.1 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. A transient limiter was used for the protection of the EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. 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 was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter 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 computer software. The final qualification data is located in Appendix E.

Test Results:

This device is battery powered and does not connect to the AC public mains, thus this test was not performed.

7.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was used to increase the sensitivity of the instrument. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured (200 Hz for 9 kHz to 150 kHz, 9 kHz for 150 kHz to 30 MHz, 120 kHz for 30 MHz to 1 GHz and 1 MHz for 1 GHz to 9.3 GHz).

The frequencies above 1 GHz were averaged using a duty cycle correction factor as explained in section 7.1.4 of this test report.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4. 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 (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

The EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 1.0.

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209 and 15.249 for radiated emissions.

7.1.3 RF Emissions Test ResultsTable 1.0 RADIATED EMISSION RESULTS
Double Decora Light Switch
Model: DDLS2-ZWAVE5

Frequency MHz	Quasi-Peak EMI Reading (dBuV/m)	Quasi-Peak Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) dB
916.00 (H) (X-Axis)	93.48	93.97	-0.49
908.42 (H) (X-Axis)	93.32	93.97	-0.65
916.00 (V) (Z-Axis)	91.15	93.97	-2.82
908.42 (H) (Y-Axis)	91.04	93.97	-2.93
928.00 (V) (Z-Axis)	42.16	46.00	-3.84
908.42 (V) (Y-Axis)	89.79	93.97	-4.18

Notes:

- * The complete emissions data is given in Appendix E of this report.
- (V) Vertical
- (H) Horizontal

7.1.4 Duty Cycle Calculation

The fundamental and harmonics were 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.

Where

$$\delta(\text{dB}) = 20 \log \left[\frac{\sum (nt_1 + mt_2 + \dots + \xi t_x)}{T} \right]$$

n is the number of pulses of duration t_1

m is the number of pulses of duration t_2

ξ is the number of pulses of duration t_x

T is the period of the pulse train or 100 ms if the pulse train length is greater than 100 ms

The worst case was when the EUT was attempting to communicate just after inserting the battery:

Duty Cycle Correction Factor = -10.88 dB

Pulse = 6.8 ms

Worst Case Between Pulses = 23.8 ms

6.8 ms / 23.8 ms = 0.2857

20 log (0.2857) = -10.88 dB correction factor

8. CONCLUSIONS

The Double Decora Light Switch, Model: DDLS2-ZWAVE5, as tested, meets all of the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209 and 15.249.



APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

Newbury Park Division
1050 Lawrence Drive
Newbury Park, CA 91320
(805) 480-4044

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

LABORATORY ACCREDITATIONS AND RECOGNITIONS



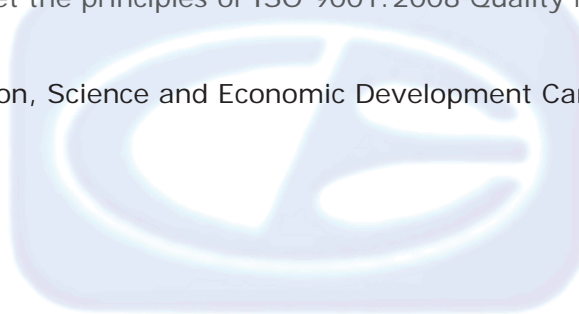
For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.

For the most up-to-date version of our scopes and certificates please visit <http://celectronics.com/quality/scope/>

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

Test Site Number for Innovation, Science and Economic Development Canada: 2154A-3



APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.249 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.



APPENDIX C

***ADDITIONAL MODEL COVERED
UNDER THIS REPORT***

ADDITIONAL MODEL COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Double Decora Light Switch
Model: DDLS2-ZWAVE5
S/N: N/A

There are no additional Models covered under this report.





APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

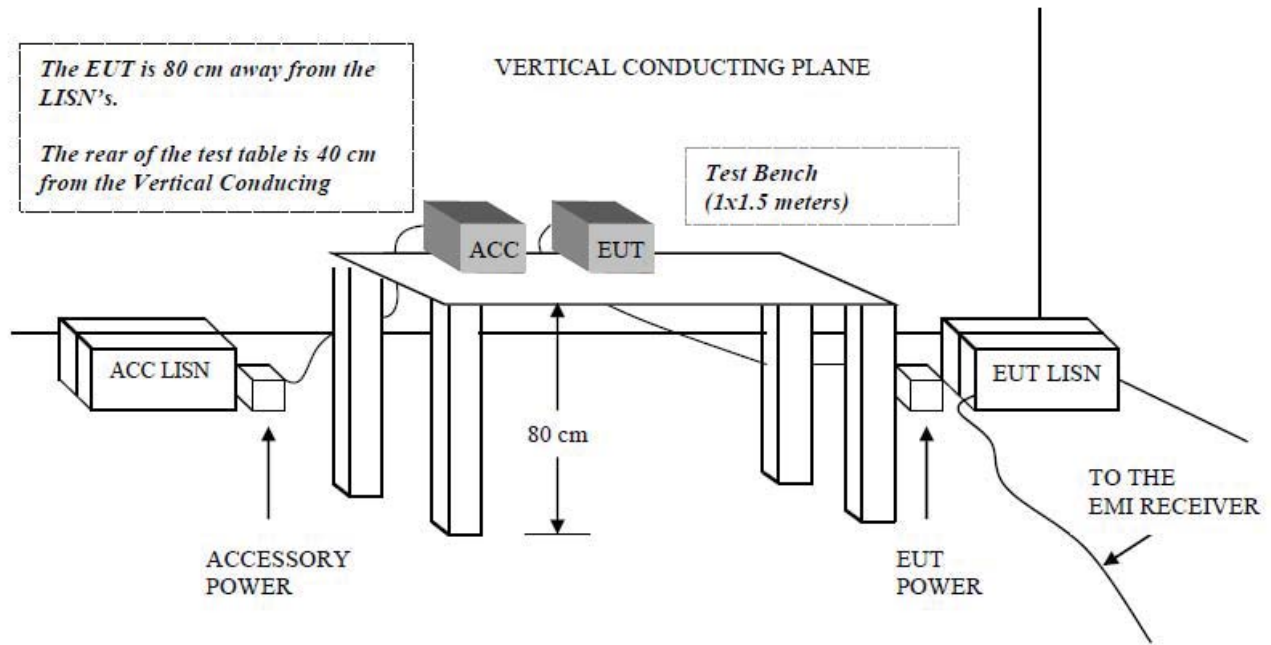
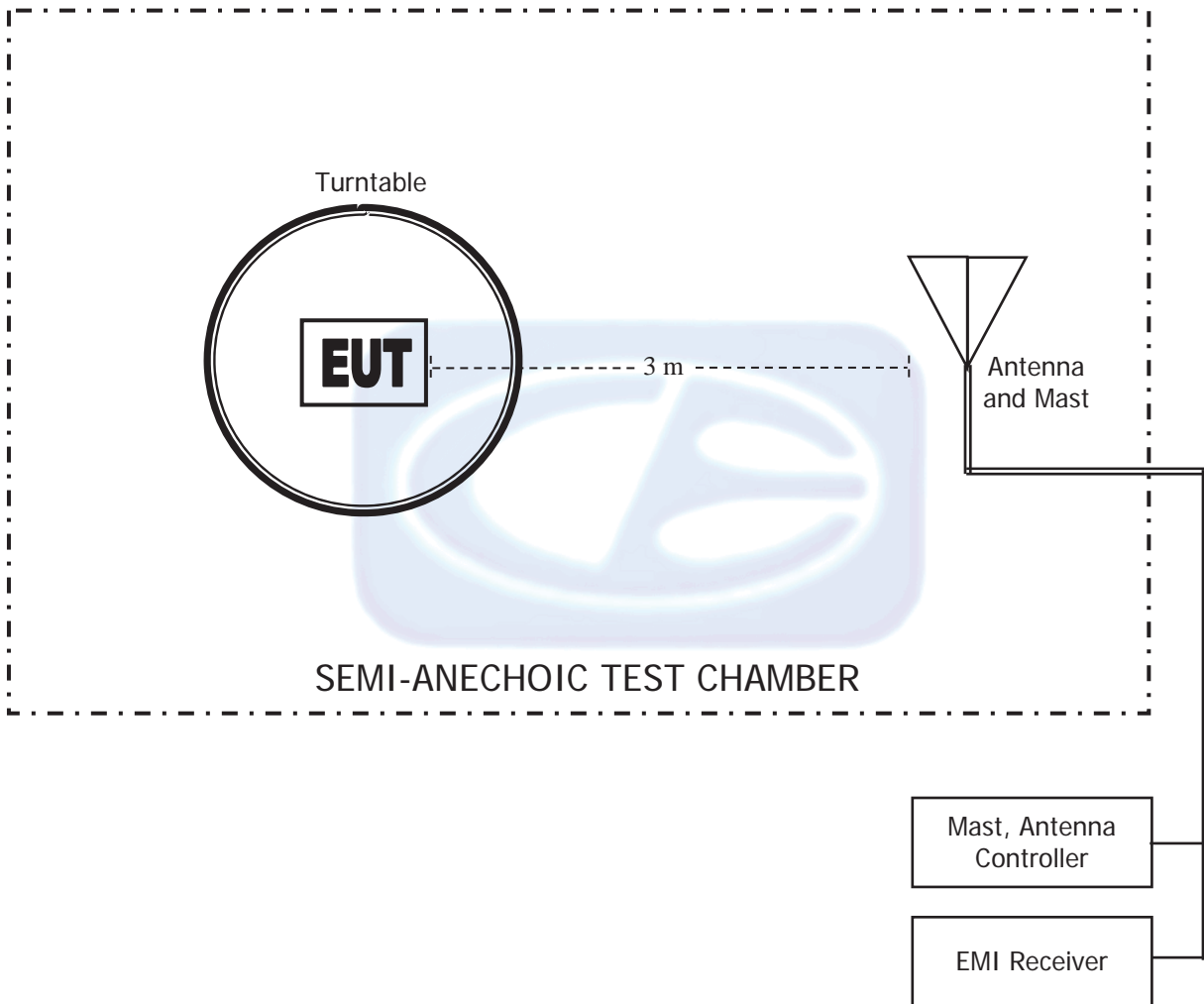


FIGURE 2: LAYOUT OF THE SEMI -ANECHOIC TEST CHAMBER



COM-POWER AL-130**LOOP ANTENNA**

S/N: 121090

CALIBRATION DATE: FEBRUARY 9, 2017

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-36.17	15.33
0.01	-35.86	15.64
0.02	-37.30	14.20
0.03	-36.58	14.92
0.04	-36.99	14.51
0.05	-37.66	13.84
0.06	-37.53	13.97
0.07	-37.64	13.86
0.08	-37.52	13.98
0.09	-37.62	13.88
0.1	-37.59	13.91
0.2	-37.79	13.71
0.3	-37.80	13.70
0.4	-37.70	13.80
0.5	-37.79	13.71
0.6	-37.79	13.71
0.7	-37.69	13.81
0.8	-37.49	14.01
0.9	-37.39	14.11
1	-37.39	14.11
2	-37.09	14.41
3	-37.09	14.41
4	-37.19	14.31
5	-36.98	14.52
6	-37.17	14.33
7	-37.05	14.45
8	-36.85	14.65
9	-36.84	14.66
10	-36.75	14.75
15	-37.16	14.34
20	-36.44	15.06
25	-37.88	13.62
30	-39.14	12.36

COM-POWER AC-220**COMBILOG ANTENNA****S/N: 61060****CALIBRATION DATE: JULY 27, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.80	200	14.10
35	24.00	250	15.30
40	24.70	300	17.70
45	22.90	350	17.70
50	22.10	400	19.00
60	17.60	450	21.30
70	12.70	500	21.00
80	11.20	550	22.30
90	13.10	600	23.40
100	14.40	650	22.90
120	15.30	700	24.60
125	15.00	750	24.50
140	12.80	800	25.40
150	16.50	850	26.40
160	12.90	900	27.20
175	14.30	950	27.80
180	14.50	1000	26.80

COM POWER AH-118**HORN ANTENNA**

S/N: 071175

CALIBRATION DATE: FEBRUARY 26, 2016

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.93	10.0	39.33
1.5	25.54	10.5	39.64
2.0	28.09	11.0	41.04
2.5	30.21	11.5	44.29
3.0	30.15	12.0	41.22
3.5	30.17	12.5	41.50
4.0	31.90	13.0	41.62
4.5	33.51	13.5	40.63
5.0	33.87	14.0	39.94
5.5	35.08	14.5	41.84
6.0	34.81	15.0	42.69
6.5	34.26	15.5	39.03
7.0	36.33	16.0	39.07
7.5	37.03	16.5	41.40
8.0	37.56	17.0	43.18
8.5	40.07	17.5	47.01
9.0	38.92	18.0	46.48
9.5	38.21		

COM-POWER PAM-118A**PREAMPLIFIER**

S/N: 551024

CALIBRATION DATE: MAY 12, 2016

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	39.84	6.0	39.05
1.1	39.40	6.5	38.94
1.2	39.58	7.0	39.25
1.3	39.68	7.5	39.09
1.4	39.91	8.0	39.01
1.5	39.78	8.5	38.60
1.6	39.50	9.0	38.64
1.7	39.81	9.5	39.67
1.8	39.89	10.0	39.30
1.9	39.94	11.0	39.15
2.0	39.57	12.0	39.24
2.5	40.39	13.0	39.49
3.0	40.63	14.0	39.44
3.5	40.80	15.0	39.94
4.0	40.86	16.0	40.09
4.5	39.94	17.0	40.06
5.0	34.47	18.0	39.76
5.5	39.32		



FRONT VIEW

ECOLINK INTELLIGENT TECHNOLOGY, INC.
DOUBLE DECORA LIGHT SWITCH
MODEL: DDLS2-ZWAVE5
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

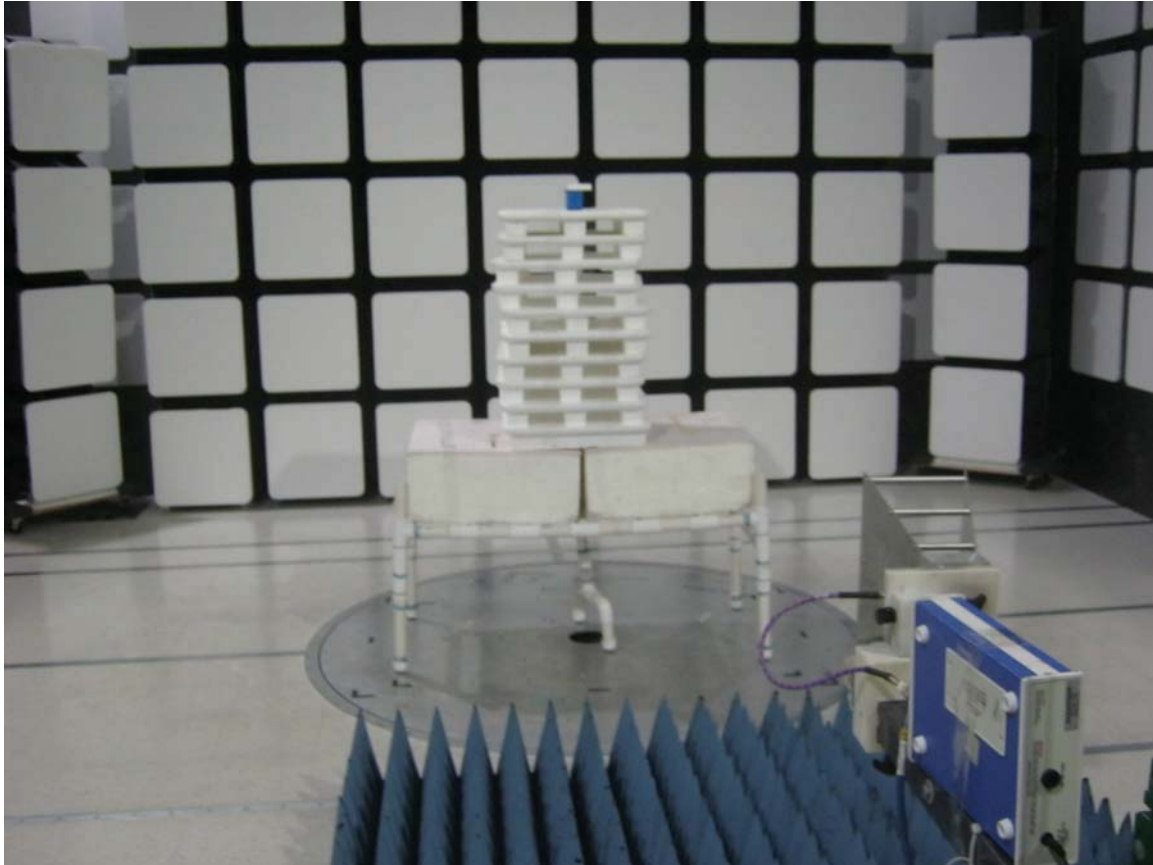
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

ECOLINK INTELLIGENT TECHNOLOGY, INC.
DOUBLE DECORA LIGHT SWITCH
MODEL: DDLS2-ZWAVE5
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

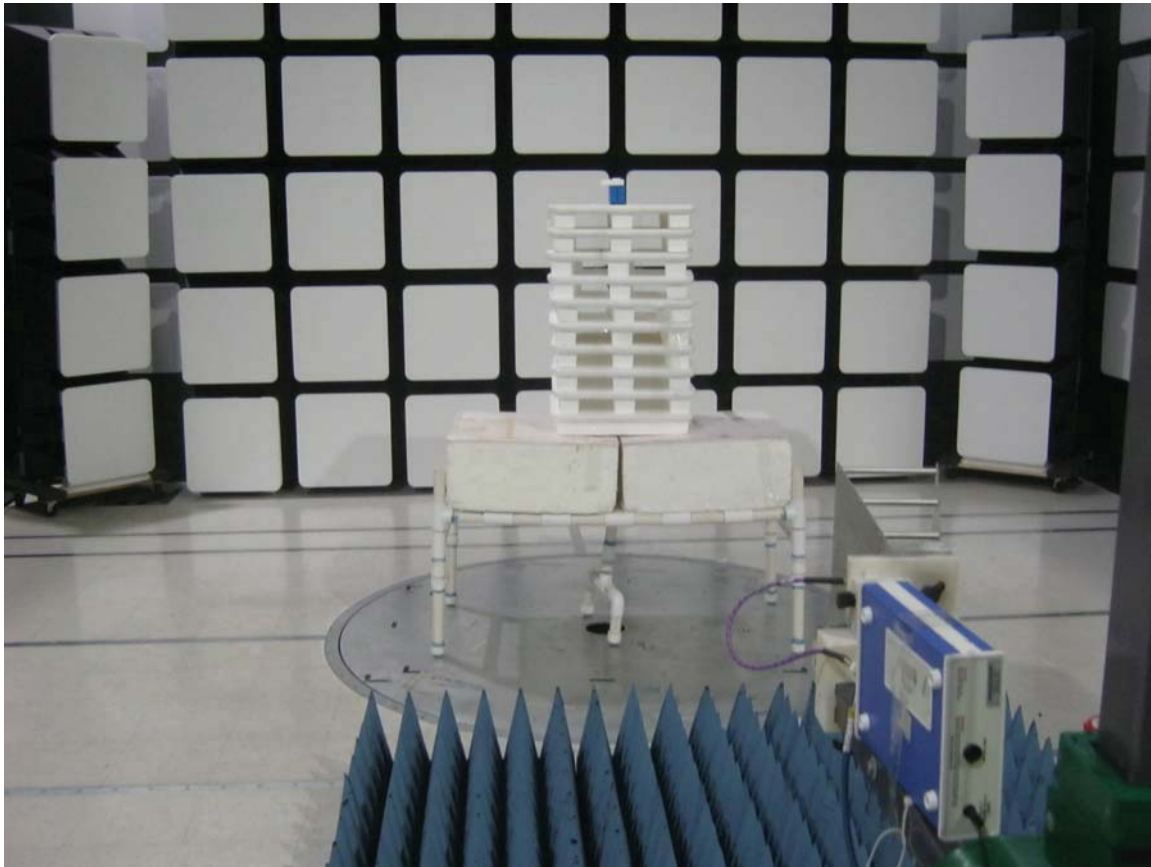
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

ECOLINK INTELLIGENT TECHNOLOGY, INC.
DOUBLE DECORA LIGHT SWITCH
MODEL: DDLS2-ZWAVE5
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

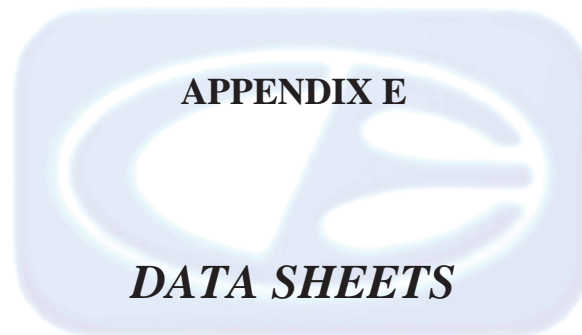
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

ECOLINK INTELLIGENT TECHNOLOGY, INC.
DOUBLE DECORA LIGHT SWITCH
MODEL: DDLS2-ZWAVE5
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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

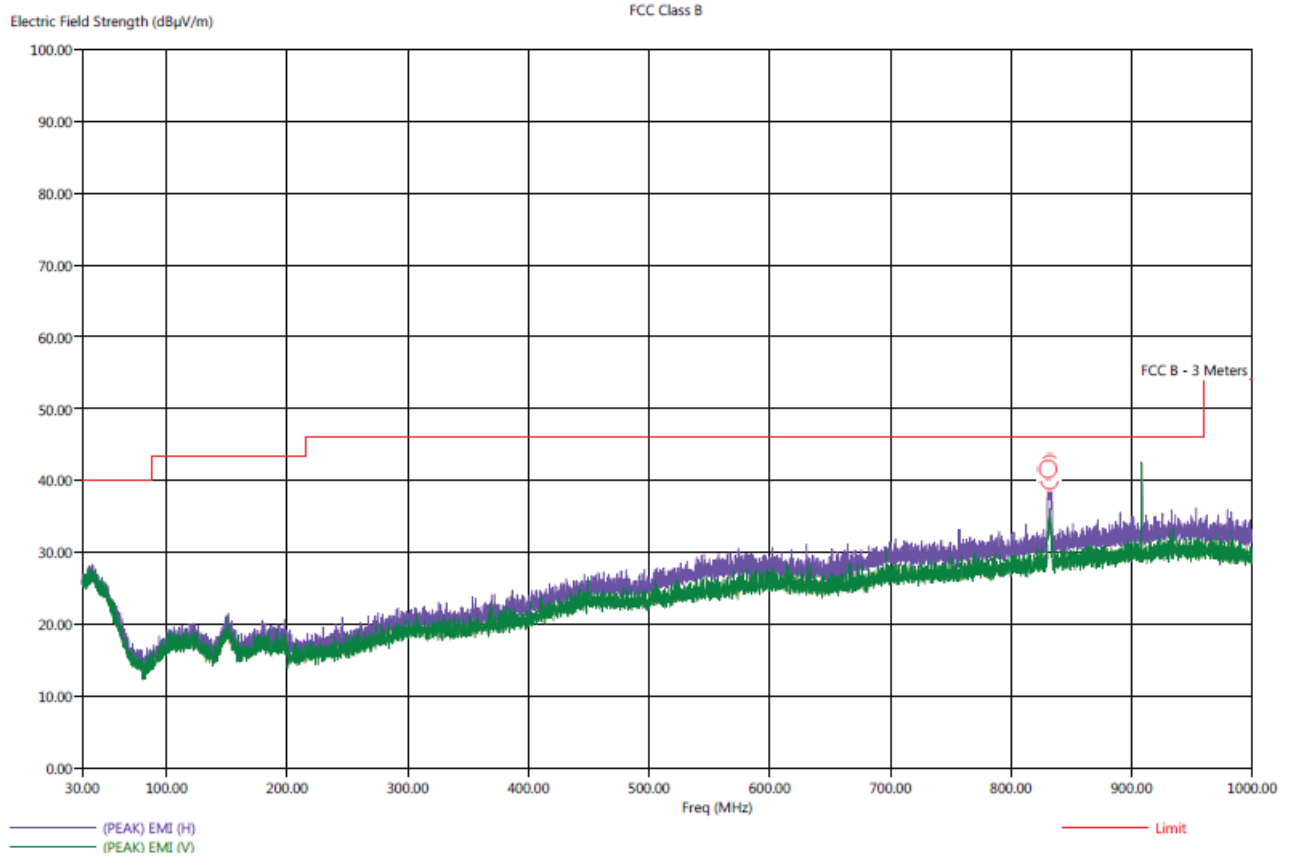




***RADIATED EMISSIONS
DATA SHEETS***

Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz DR4_DR2 Y-Axis.set
Operator: Kyle Haag
EUT Type: Double Decora Light Switch
EUT Condition: The EUT was receiving at 908.42 MHz - Y-Axis Worst Case
Company: Ecolink Intelligent Technology, Inc
Model: DDLS2-ZWAVE5
S/N: N/A
Note: The frequency at 908.42 MHz is from an accessory unit (and not the EUT) that was transmitting at 908.42 MHz inside the chamber so that the EUT could receive at 908.42 MHz.

11/27/2017 1:02:59 PM
Sequence: Preliminary Scan



Note: A manual scan was taken from 1 GHz to 5 GHz. No emissions were detected.

Title: Radiated Final - FCC Class B
 File: Rohde & Schwarz - Final Scan - FCC Class B - 30 MHz to 1000 MHz DR4_DR2 Y-Axis.set
 Operator: Kyle Haag
 EUT Type: Double Decora Light Switch
 EUT Condition: The EUT was receiving at 908.42 MHz - Y-Axis Worst Case
 Company: Ecolink Intelligent Technology, Inc
 Model: DDLS2-ZWAVES
 S/N: N/A

11/27/2017 1:27:11 PM
 Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (dea)	Twr Ht (cm)
830.60	H	33.83	28.04	-12.17	-17.96	46.00	26.02	2.62	268.00	339.64
831.70	H	33.47	28.01	-12.53	-17.99	46.00	26.04	2.62	119.00	144.11
831.90	H	33.28	28.01	-12.72	-17.99	46.00	26.04	2.62	13.00	193.43
832.40	H	33.97	28.07	-12.03	-17.93	46.00	26.06	2.62	17.25	373.91
833.00	H	33.43	28.02	-12.57	-17.98	46.00	26.06	2.62	229.25	127.88
833.30	H	33.53	28.03	-12.47	-17.97	46.00	26.07	2.62	163.25	357.19

Note: A manual scan was taken from 1 GHz to 5 GHz. No emissions were detected.

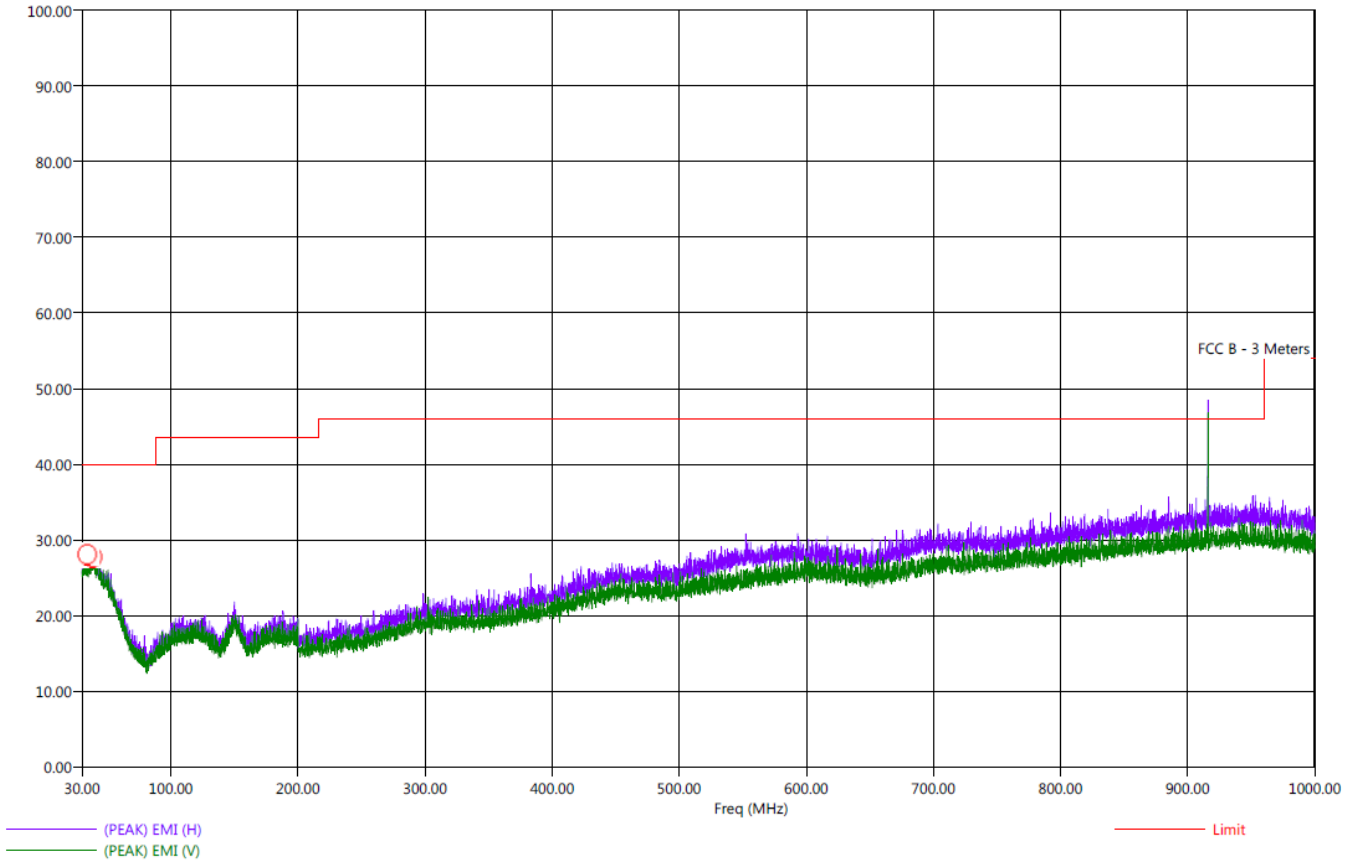


Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz DR4_DR3 Y-Axis.set
Operator: Kyle Haag
EUT Type: Double Decora Light Switch
EUT Condition: The EUT was receiving at 916 MHz - Y-Axis Worst Case
Company: Ecolink Intelligent Technology, Inc
Model: DDL52-ZWAVE5
S/N: N/A
Note: The frequency at 916 MHz is from an accessory unit (and not the EUT) that was transmitting at 916 MHz inside the chamber so that the EUT could receive at 916 MHz.

11/27/2017 11:52:29 AM
Sequence: Preliminary Scan

FCC Class B

Electric Field Strength (dB μ V/m)



Note: A manual scan was taken from 1 GHz to 5 GHz. No emissions were detected.

Title: Radiated Final - FCC Class B
 File: Rohde & Schwarz - Final Scan - FCC Class B - 30 MHz to 1000 MHz DR4_DR3 Y-Axis.set
 Operator: Kyle Haag
 EUT Type: Double Decora Light Switch
 EUT Condition: The EUT was receiving at 916 MHz - Y-Axis Worst Case
 Company: Ecolink Intelligent Technology, Inc
 Model: DDLS2-ZWAVES
 S/N: N/A

11/27/2017 12:15:40 PM
 Sequence: Final Measurements

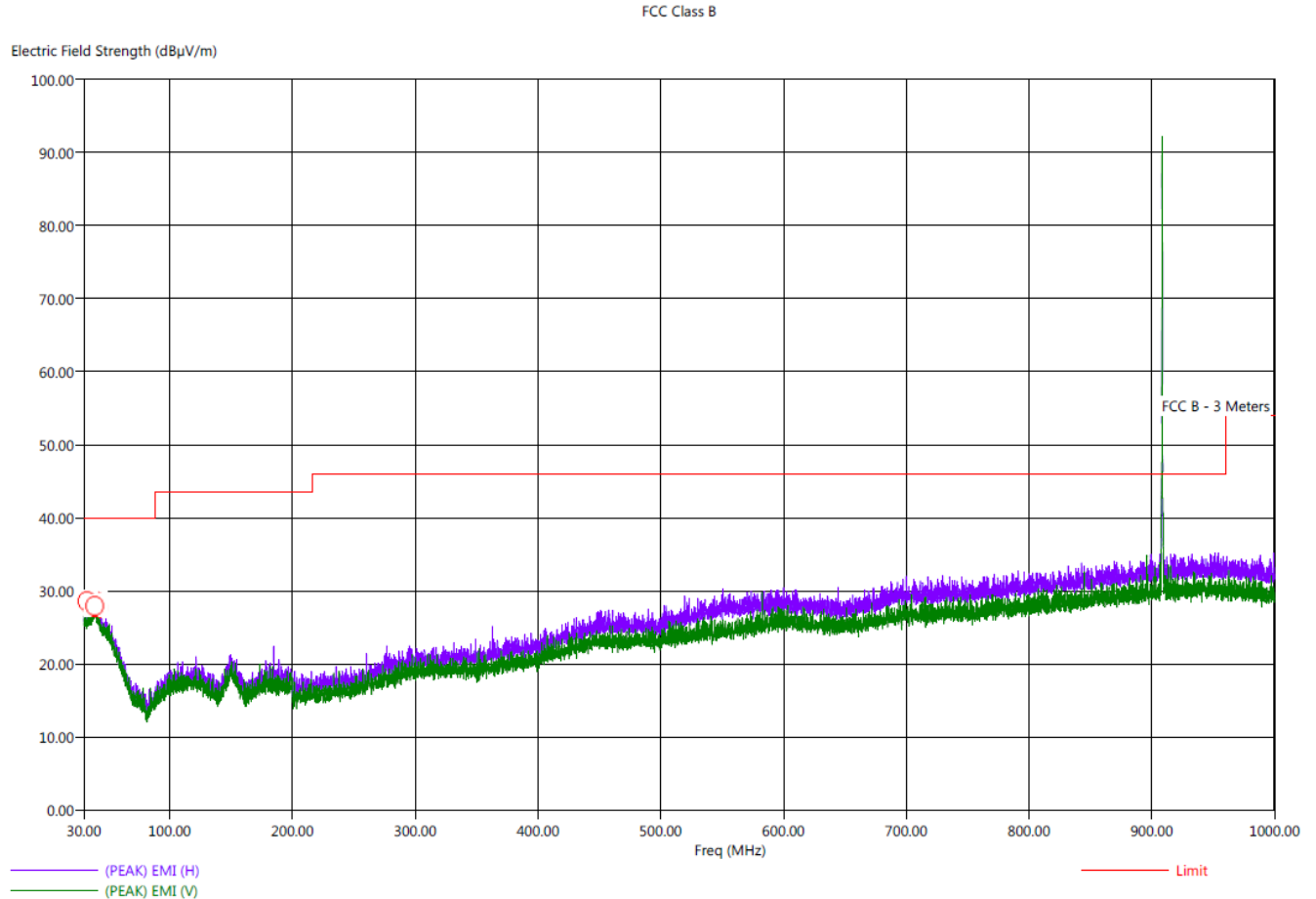
FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (dec)	Twr Ht (cm)
34.20	V	27.60	21.84	-12.40	-18.16	40.00	23.96	0.46	277.75	374.14
36.80	H	28.25	22.35	-11.75	-17.65	40.00	24.27	0.47	47.25	209.85
38.40	V	28.36	22.66	-11.64	-17.34	40.00	24.52	0.48	183.75	144.41
38.70	H	27.25	22.66	-12.75	-17.34	40.00	24.51	0.48	168.25	324.83
38.90	H	27.59	22.70	-12.41	-17.30	40.00	24.56	0.48	66.50	357.61
39.60	H	27.60	22.80	-12.40	-17.20	40.00	24.65	0.49	47.50	127.82

Note: A manual scan was taken from 1 GHz to 5 GHz. No emissions were detected.



Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz DR2 Y-Axis.set
Operator: Kyle Haag
EUT Type: Double Decora Light Switch
EUT Condition: The DR2 is transmitting at 908.42 MHz Y-Axis Worst Case
Comments: Company: Ecolink Intelligent Technology, Inc
Model: DDLS2-ZWAVE5
S/N: N/A

11/27/2017 8:48:30 AM
Sequence: Preliminary Scan



Note: The frequency at 908.42 MHz is from the intentional radiator of the EUT and is subject to the limits of FCC 15.249 instead.

Title: Radiated Final - FCC Class B
 File: Rohde & Schwarz - Final Scan - FCC Class B - 30 MHz to 1000 MHz DR2 Y-Axis.set
 Operator: Kyle Haaq
 EUT Type: Double Decora Light Switch
 EUT Condition: The DR2 is transmitting at 908.42 MHz Y-Axis Worst Case
 Comments: Company: Ecolink Intelligent Technology, Inc
 Model: DDLS2-ZWAVE5
 S/N: N/A

11/27/2017 9:16:35 AM
 Sequence: Final Measurements

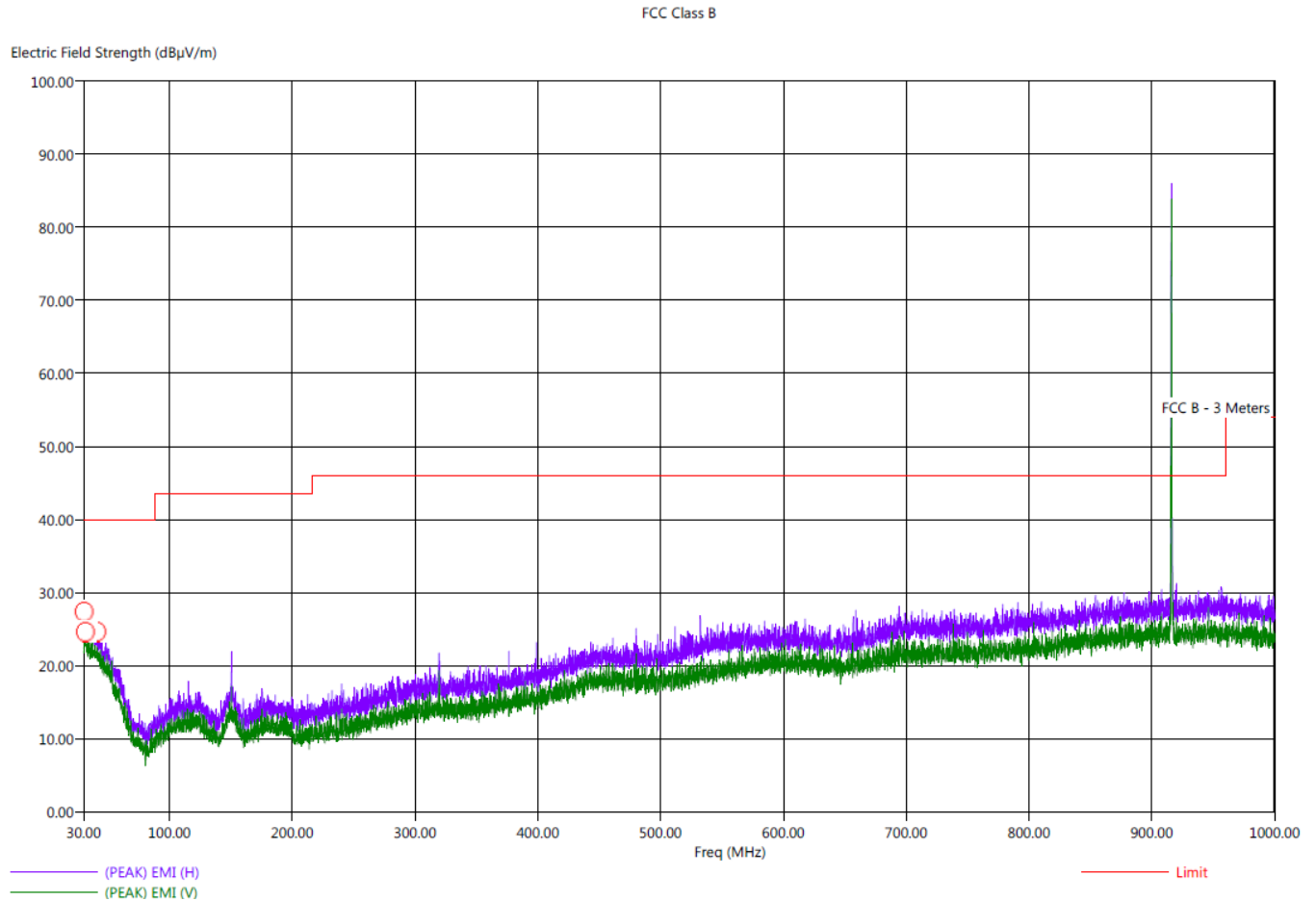
FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dB μ V/m)	(QP) EMI (dB μ V/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dB μ V/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (dea)	Twr Ht (cm)
32.60	H	27.23	21.70	-12.77	-18.30	40.00	23.90	0.45	146.25	144.05
38.70	H	27.80	22.62	-12.20	-17.38	40.00	24.53	0.48	287.25	209.73
38.90	V	27.83	22.75	-12.17	-17.25	40.00	24.55	0.48	14.00	308.23
39.30	H	27.26	22.72	-12.74	-17.28	40.00	24.63	0.49	177.50	275.10
39.90	H	28.09	22.82	-11.91	-17.18	40.00	24.67	0.49	159.50	127.70
41.70	H	27.09	22.17	-12.91	-17.83	40.00	24.07	0.50	241.00	176.71



Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz DR3 Y-Axis.set
Operator: Kyle Haag
EUT Type: Single Decora Light Switch
EUT Condition: The DR3 was transmitting at 916 MHz Y-Axis Worst Case
Comments: Company: Ecolink Intelligent Technology, Inc
Model: SDLS2-ZWAVE5
S/N: N/A

11/27/2017 9:42:15 AM
Sequence: Preliminary Scan



Note: The frequency at 916 MHz is from the intentional radiator of the EUT and is subject to the limits of FCC 15.249 instead.

Title: Radiated Final - FCC Class B
 File: Rohde & Schwarz - Final Scan - FCC Class B - 30 MHz to 1000 MHz DR3 Y-Axis.set
 Operator: Kyle Haag
 EUT Type: Double Decora Light Switch
 EUT Condition: The DR3 was transmitting at 908.42 MHz Y-Axis Worst Case
 Comments: Company: Ecolink Intelligent Technology, Inc
 Model: DDLS2-ZWAVE5
 S/N: N/A

11/27/2017 10:07:09 AM
 Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
31.50	H	30.91	26.46	-9.09	-13.54	40.00	23.86	0.44	178.00	373.61
31.50	V	31.00	27.14	-9.00	-12.86	40.00	23.86	0.44	209.00	127.94
31.80	H	29.31	24.81	-10.69	-15.19	40.00	23.88	0.44	147.50	292.00
32.00	H	27.97	22.85	-12.03	-17.15	40.00	23.88	0.44	22.75	209.97
32.30	H	27.68	22.73	-12.32	-17.27	40.00	23.90	0.44	12.75	324.65
40.80	H	25.03	19.73	-14.97	-20.27	40.00	24.42	0.50	214.75	291.94



FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/21/2017
 Lab: D
 Tested By: Kyle Haag

**Fundamental
 Low Channel**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
908.42	77.43	V	113.97	-36.54	Peak	268.25	171.70	X-Axis
908.42	77.35	V	93.97	-16.62	QP	268.25	171.70	Vertical Polarization
908.42	89.97	V	113.97	-24.00	Peak	264.25	121.25	Y-Axis
908.42	89.79	V	93.97	-4.18	QP	264.25	121.25	Vertical Polarization
908.42	88.23	V	113.97	-25.74	Peak	288.50	114.98	Z-Axis
908.42	88.15	V	93.97	-5.82	QP	288.50	114.98	Vertical Polarization
908.42	93.29	H	113.97	-20.68	Peak	61.75	144.26	X-Axis
908.42	93.09	H	93.97	-0.88	QP	61.75	144.26	Horizontal Polarization
908.42	91.13	H	113.97	-22.84	Peak	9.00	152.29	Y-Axis
908.42	91.04	H	93.97	-2.93	QP	9.00	152.29	Horizontal Polarization
908.42	80.45	H	113.97	-33.52	Peak	137.75	143.10	Z-Axis
908.42	80.36	H	93.97	-13.61	QP	137.75	143.10	Horizontal Polarization

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/21/2017
 Lab: D
 Tested By: Kyle Haag

**Fundamental
 High Channel**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
916.00	81.91	V	113.97	-32.06	Peak	266.50	156.23	X-Axis
916.00	81.82	V	93.97	-12.15	QP	266.50	156.23	Vertical Polarization
916.00	88.30	V	113.97	-25.67	Peak	103.00	104.35	Y-Axis
916.00	88.18	V	93.97	-5.79	QP	103.00	104.35	Vertical Polarization
916.00	91.37	V	113.97	-22.60	Peak	99.25	120.11	Z-Axis
916.00	91.15	V	93.97	-2.82	QP	99.25	120.11	Vertical Polarization
916.00	93.49	H	113.97	-20.48	Peak	344.75	139.82	X-Axis
916.00	93.48	H	93.97	-0.49	QP	344.75	139.82	Horizontal Polarization
916.00	88.89	H	113.97	-25.08	Peak	201.50	161.85	Y-Axis
916.00	88.81	H	93.97	-5.16	QP	201.50	161.85	Horizontal Polarization
916.00	78.08	H	113.97	-35.89	Peak	116.00	164.83	Z-Axis
916.00	77.97	H	93.97	-16.00	QP	116.00	164.83	Horizontal Polarization

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	49.44	V	73.97	-24.53	Peak	111.00	131.82	
1816.84	38.56	V	53.97	-15.41	Avg	111.00	131.82	
2725.26	43.44	V	73.97	-30.53	Peak	111.50	144.35	
2725.26	32.56	V	53.97	-21.41	Avg	111.50	144.35	
3633.68	40.06	V	73.97	-33.91	Peak	210.75	117.25	
3633.68	29.18	V	53.97	-24.79	Avg	210.75	117.25	
4542.10	44.90	V	73.97	-29.07	Peak	65.50	155.82	
4542.10	34.02	V	53.97	-19.95	Avg	65.50	155.82	
5450.52	44.67	V	73.97	-29.30	Peak	175.25	152.25	
5450.52	33.79	V	53.97	-20.18	Avg	175.25	152.25	
6358.94	45.16	V	73.97	-28.81	Peak	267.50	156.58	
6358.94	34.28	V	53.97	-19.69	Avg	267.50	156.58	
7267.36	45.35	V	73.97	-28.62	Peak	183.25	143.82	
7267.36	34.47	V	53.97	-19.50	Avg	183.25	143.82	
8175.78	48.41	V	73.97	-25.56	Peak	154.75	126.86	
8175.78	37.53	V	53.97	-16.44	Avg	154.75	126.86	
9084.20	48.60	V	73.97	-25.37	Peak	107.50	125.25	
9084.20	37.72	V	53.97	-16.25	Avg	107.50	125.25	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	33.99	V	73.97	-39.98	Peak	115.50	189.55	
1816.84	23.11	V	53.97	-30.86	Avg	115.50	189.55	
2725.26	42.77	V	73.97	-31.20	Peak	296.25	155.88	
2725.26	31.89	V	53.97	-22.08	Avg	296.25	155.88	
3633.68	42.65	V	73.97	-31.32	Peak	276.00	159.58	
3633.68	31.77	V	53.97	-22.20	Avg	276.00	159.58	
4542.10	44.34	V	73.97	-29.63	Peak	66.75	155.88	
4542.10	33.46	V	53.97	-20.51	Avg	66.75	155.88	
5450.52	44.88	V	73.97	-29.09	Peak	114.50	165.50	
5450.52	34.00	V	53.97	-19.97	Avg	114.50	165.50	
6358.94	46.20	V	73.97	-27.77	Peak	190.50	156.58	
6358.94	35.32	V	53.97	-18.65	Avg	190.50	156.58	
7267.36	44.47	V	73.97	-29.50	Peak	42.00	156.00	
7267.36	33.59	V	53.97	-20.38	Avg	42.00	156.00	
8175.78	52.38	V	73.97	-21.59	Peak	253.75	140.83	
8175.78	41.50	V	53.97	-12.47	Avg	253.75	140.83	
9084.20	48.56	V	73.97	-25.41	Peak	260.50	132.25	
9084.20	37.68	V	53.97	-16.29	Avg	260.50	132.25	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	33.86	V	73.97	-40.11	Peak	90.00	171.52	
1816.84	22.98	V	53.97	-30.99	Avg	90.00	171.52	
2725.26	48.94	V	73.97	-25.03	Peak	183.25	146.44	
2725.26	38.06	V	53.97	-15.91	Avg	183.25	146.44	
3633.68	41.42	V	73.97	-32.55	Peak	38.75	167.76	
3633.68	30.54	V	53.97	-23.43	Avg	38.75	167.76	
4542.10	47.73	V	73.97	-26.24	Peak	89.75	148.29	
4542.10	36.85	V	53.97	-17.12	Avg	89.75	148.29	
5450.52	43.58	V	73.97	-30.39	Peak	7.50	150.25	
5450.52	32.70	V	53.97	-21.27	Avg	7.50	150.25	
6358.94	47.57	V	73.97	-26.40	Peak	157.50	179.22	
6358.94	36.69	V	53.97	-17.28	Avg	157.50	179.22	
7267.36	45.25	V	73.97	-28.72	Peak	350.00	181.50	
7267.36	34.37	V	53.97	-19.60	Avg	350.00	181.50	
8175.78	50.84	V	73.97	-23.13	Peak	138.00	207.60	
8175.78	39.96	V	53.97	-14.01	Avg	138.00	207.76	
9084.20	49.61	V	73.97	-24.36	Peak	350.00	205.00	
9084.20	38.73	V	53.97	-15.24	Avg	350.00	205.00	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	32.78	H	73.97	-41.19	Peak	246.75	152.77	
1816.84	21.90	H	53.97	-32.07	Avg	246.75	152.77	
2725.26	45.82	H	73.97	-28.15	Peak	350.00	204.59	
2725.26	34.94	H	53.97	-19.03	Avg	350.00	204.59	
3633.68	40.40	H	73.97	-33.57	Peak	200.00	143.82	
3633.68	29.52	H	53.97	-24.45	Avg	200.00	143.82	
4542.10	46.41	H	73.97	-27.56	Peak	325.50	104.83	
4542.10	35.53	H	53.97	-18.44	Avg	325.50	104.83	
5450.52	43.74	H	73.97	-30.23	Peak	159.50	105.58	
5450.52	32.86	H	53.97	-21.11	Avg	159.50	105.58	
6358.94	47.22	H	73.97	-26.75	Peak	175.00	182.20	
6358.94	36.34	H	53.97	-17.63	Avg	175.00	182.20	
7267.36	44.59	H	73.97	-29.38	Peak	20.25	154.02	
7267.36	33.71	H	53.97	-20.26	Avg	20.25	154.02	
8175.78	51.77	H	73.97	-22.20	Peak	211.50	129.67	
8175.78	40.89	H	53.97	-13.08	Avg	211.50	129.67	
9084.20	49.80	H	73.97	-24.17	Peak	250.50	150.25	
9084.20	38.92	H	53.97	-15.05	Avg	250.50	150.26	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	33.44	H	73.97	-40.53	Peak	218.00	125.13	
1816.84	22.56	H	53.97	-31.41	Avg	218.00	125.13	
2725.26	47.64	H	73.97	-26.33	Peak	153.50	174.38	
2725.26	36.76	H	53.97	-17.21	Avg	153.50	174.38	
3633.68	42.84	H	73.97	-31.13	Peak	169.00	212.22	
3633.68	31.96	H	53.97	-22.01	Avg	169.00	212.23	
4542.10	47.13	H	73.97	-26.84	Peak	147.75	148.71	
4542.10	36.25	H	53.97	-17.72	Avg	147.75	148.71	
5450.52	42.45	H	73.97	-31.52	Peak	37.50	137.43	
5450.52	31.57	H	53.97	-22.40	Avg	37.50	137.43	
6358.94	47.74	H	73.97	-26.23	Peak	152.50	115.04	
6358.94	36.86	H	53.97	-17.11	Avg	152.50	115.04	
7267.36	45.93	H	73.97	-28.04	Peak	46.75	115.04	
7267.36	35.05	H	53.97	-18.92	Avg	46.75	115.04	
8175.78	53.37	H	73.97	-20.60	Peak	126.00	128.35	
8175.78	42.49	H	53.97	-11.48	Avg	126.00	128.35	
9084.20	49.01	H	73.97	-24.96	Peak	237.50	131.50	
9084.20	38.13	H	53.97	-15.84	Avg	237.50	131.50	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - Low Channel
 Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1816.84	34.00	H	73.97	-39.97	Peak	124.25	139.58	
1816.84	23.12	H	53.97	-30.85	Avg	124.25	139.58	
2725.26	41.33	H	73.97	-32.64	Peak	231.00	140.83	
2725.26	30.45	H	53.97	-23.52	Avg	231.00	140.83	
3633.68	40.75	H	73.97	-33.22	Peak	143.50	127.70	
3633.68	29.87	H	53.97	-24.10	Avg	143.50	127.70	
4542.10	43.03	H	73.97	-30.94	Peak	216.25	147.58	
4542.10	32.15	H	53.97	-21.82	Avg	216.25	147.58	
5450.52	43.41	H	73.97	-30.56	Peak	106.75	147.58	
5450.52	32.53	H	53.97	-21.44	Avg	106.75	147.58	
6358.94	45.65	H	73.97	-28.32	Peak	116.00	170.98	
6358.94	34.77	H	53.97	-19.20	Avg	116.00	170.98	
7267.36	45.43	H	73.97	-28.54	Peak	25.75	170.98	
7267.36	34.55	H	53.97	-19.42	Avg	25.75	170.98	
8175.78	51.62	H	73.97	-22.35	Peak	347.00	172.50	
8175.78	40.74	H	53.97	-13.23	Avg	347.00	172.50	
9084.20	47.55	H	73.97	-26.42	Peak	162.44	19.25	
9084.20	36.67	H	53.97	-17.30	Avg	162.44	19.25	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	34.39	V	73.97	-39.58	Peak	325.00	119.88	
1832.00	23.51	V	53.97	-30.46	Avg	325.00	119.88	
2748.00	44.94	V	73.97	-29.03	Peak	203.25	193.97	
2748.00	34.06	V	53.97	-19.91	Avg	203.25	193.97	
3664.00	41.99	V	73.97	-31.98	Peak	132.50	171.34	
3664.00	31.11	V	53.97	-22.86	Avg	132.50	171.34	
4580.00	43.23	V	73.97	-30.74	Peak	209.00	199.46	
4580.00	32.35	V	53.97	-21.62	Avg	209.00	199.46	
5496.00	44.67	V	73.97	-29.30	Peak	13.75	199.52	
5496.00	33.79	V	53.97	-20.18	Avg	13.75	199.52	
6412.00	43.89	V	73.97	-30.08	Peak	133.25	199.52	
6412.00	33.01	V	53.97	-20.96	Avg	133.25	199.52	
7328.00	45.53	V	73.97	-28.44	Peak	226.00	199.52	
7328.00	34.65	V	53.97	-19.32	Avg	226.00	199.52	
8244.00	50.78	V	73.97	-23.19	Peak	74.25	102.25	
8244.00	39.90	V	53.97	-14.07	Avg	74.25	102.25	
9160.00	48.58	V	73.97	-25.39	Peak	339.75	199.52	
9160.00	37.70	V	53.97	-16.27	Avg	339.75	199.52	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	30.38	V	73.97	-43.59	Peak	144.75	136.75	
1832.00	19.50	V	53.97	-34.47	Avg	144.75	136.75	
2748.00	43.85	V	73.97	-30.12	Peak	320.50	178.74	
2748.00	32.97	V	53.97	-21.00	Avg	320.50	178.74	
3664.00	46.06	V	73.97	-27.91	Peak	273.50	154.08	
3664.00	35.18	V	53.97	-18.79	Avg	273.50	154.08	
4580.00	42.07	V	73.97	-31.90	Peak	142.00	146.32	
4580.00	31.19	V	53.97	-22.78	Avg	142.00	146.32	
5496.00	44.20	V	73.97	-29.77	Peak	242.25	134.14	
5496.00	33.32	V	53.97	-20.65	Avg	242.25	134.14	
6412.00	44.16	V	73.97	-29.81	Peak	9.75	135.55	
6412.00	33.28	V	53.97	-20.69	Avg	9.75	135.55	
7328.00	46.58	V	73.97	-27.39	Peak	187.75	127.58	
7328.00	35.70	V	53.97	-18.27	Avg	187.75	127.58	
8244.00	49.73	V	73.97	-24.24	Peak	33.00	128.58	
8244.00	38.85	V	53.97	-15.12	Avg	33.00	128.58	
9160.00	49.26	V	73.97	-24.71	Peak	12.00	131.25	
9160.00	38.38	V	53.97	-15.59	Avg	12.00	131.25	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	35.08	V	73.97	-38.89	Peak	72.25	127.58	
1832.00	24.20	V	53.97	-29.77	Avg	72.25	127.58	
2748.00	44.63	V	73.97	-29.34	Peak	248.25	198.32	
2748.00	33.75	V	53.97	-20.22	Avg	248.25	198.32	
3664.00	42.96	V	73.97	-31.01	Peak	61.50	204.83	
3664.00	32.08	V	53.97	-21.89	Avg	61.50	204.83	
4580.00	45.15	V	73.97	-28.82	Peak	335.75	204.83	
4580.00	34.27	V	53.97	-19.70	Avg	335.75	204.83	
5496.00	44.68	V	73.97	-29.29	Peak	62.75	201.25	
5496.00	33.80	V	53.97	-20.17	Avg	62.75	201.25	
6412.00	46.31	V	73.97	-27.66	Peak	358.50	149.97	
6412.00	35.43	V	53.97	-18.54	Avg	358.50	149.97	
7328.00	48.47	V	73.97	-25.50	Peak	0.00	153.49	
7328.00	37.59	V	53.97	-16.38	Avg	0.00	153.49	
8244.00	52.30	V	73.97	-21.67	Peak	345.25	120.29	
8244.00	41.42	V	53.97	-12.55	Avg	345.25	120.29	
9160.00	49.11	V	73.97	-24.86	Peak	130.50	115.25	
9160.00	38.23	V	53.97	-15.74	Avg	130.50	115.25	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - X-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	35.15	H	73.97	-38.82	Peak	249.50	135.10	
1832.00	24.27	H	53.97	-29.70	Avg	249.50	135.10	
2748.00	44.56	H	73.97	-29.41	Peak	338.25	181.25	
2748.00	33.68	H	53.97	-20.29	Avg	338.25	181.25	
3664.00	45.30	H	73.97	-28.67	Peak	50.00	177.31	
3664.00	34.42	H	53.97	-19.55	Avg	50.00	177.31	
4580.00	44.27	H	73.97	-29.70	Peak	313.00	145.85	
4580.00	33.39	H	53.97	-20.58	Avg	313.00	145.85	
5496.00	44.00	H	73.97	-29.97	Peak	217.00	135.64	
5496.00	33.12	H	53.97	-20.85	Avg	217.00	135.64	
6412.00	44.39	H	73.97	-29.58	Peak	273.50	158.58	
6412.00	33.51	H	53.97	-20.46	Avg	273.50	158.58	
7328.00	47.56	H	73.97	-26.41	Peak	64.00	135.64	
7328.00	36.68	H	53.97	-17.29	Avg	64.00	135.64	
8244.00	51.00	H	73.97	-22.97	Peak	276.50	131.82	
8244.00	40.12	H	53.97	-13.85	Avg	276.50	131.82	
9160.00	48.14	H	73.97	-25.83	Peak	141.50	130.58	
9160.00	37.26	H	53.97	-16.71	Avg	141.50	130.58	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	35.68	H	73.97	-38.29	Peak	282.75	150.25	
1832.00	24.80	H	53.97	-29.17	Avg	282.75	150.25	
2748.00	45.06	H	73.97	-28.91	Peak	129.50	144.29	
2748.00	34.18	H	53.97	-19.79	Avg	129.50	144.29	
3664.00	47.51	H	73.97	-26.46	Peak	331.50	159.28	
3664.00	36.63	H	53.97	-17.34	Avg	331.50	159.28	
4580.00	45.69	H	73.97	-28.28	Peak	75.50	159.34	
4580.00	34.81	H	53.97	-19.16	Avg	75.50	159.34	
5496.00	41.57	H	73.97	-32.40	Peak	337.75	158.58	
5496.00	30.69	H	53.97	-23.28	Avg	337.75	158.58	
6412.00	47.22	H	73.97	-26.75	Peak	351.75	182.32	
6412.00	36.34	H	53.97	-17.63	Avg	351.75	182.32	
7328.00	46.82	H	73.97	-27.15	Peak	350.00	185.35	
7328.00	35.94	H	53.97	-18.03	Avg	350.00	185.35	
8244.00	51.24	H	73.97	-22.73	Peak	285.00	136.77	
8244.00	40.36	H	53.97	-13.61	Avg	285.00	136.77	
9160.00	50.12	H	73.97	-23.85	Peak	164.50	158.58	
9160.00	39.24	H	53.97	-14.73	Avg	164.50	158.58	

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

**Harmonics - High Channel
 Transmit Mode - Z-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1832.00	34.15	H	73.97	-39.82	Peak	0.00	120.29	
1832.00	23.27	H	53.97	-30.70	Avg	0.00	120.29	
2748.00	44.12	H	73.97	-29.85	Peak	220.25	190.62	
2748.00	33.24	H	53.97	-20.73	Avg	220.25	190.62	
3664.00	42.83	H	73.97	-31.14	Peak	29.50	120.41	
3664.00	31.95	H	53.97	-22.02	Avg	29.50	120.41	
4580.00	42.40	H	73.97	-31.57	Peak	266.50	108.17	
4580.00	31.52	H	53.97	-22.45	Avg	266.50	108.17	
5496.00	44.33	H	73.97	-29.64	Peak	50.75	158.58	
5496.00	33.45	H	53.97	-20.52	Avg	50.75	158.58	
6412.00	45.18	H	73.97	-28.79	Peak	223.75	140.53	
6412.00	34.30	H	53.97	-19.67	Avg	223.75	140.53	
7328.00	45.14	H	73.97	-28.83	Peak	193.50	141.52	
7328.00	34.26	H	53.97	-19.71	Avg	193.50	141.52	
8244.00	49.36	H	73.97	-24.61	Peak	30.50	141.52	
8244.00	38.48	H	53.97	-15.49	Avg	30.50	141.52	
9160.00	49.40	H	73.97	-24.57	Peak	10.50	145.25	
9160.00	38.52	H	53.97	-15.45	Avg	10.50	145.25	

FCC Class B and FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/20/2017
 Lab: D
 Tested By: Kyle Haag

Non Harmonic Emissions from the Tx and Digital Portion - 9 kHz to 30 MHz
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the digital portion
								of the EUT
								from 9 kHz to 30 MHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								Investigated in the X-Axis,
								Y-Axis, and Z-Axis



***BAND EDGES
DATA SHEETS***

FCC 15.249

 Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

 Date: 11/21/2017
 Lab: D
 Tested By: Kyle Haag

Band Edges

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
908.42	93.29	H	113.97	-20.68	Peak	61.75	144.26	Fundamental - Low Ch.
908.42	93.09	H	93.97	-0.88	QP	61.75	144.26	X-Axis - Worst Case
901.28	42.27	H	66.00	-23.73	Peak	61.75	144.26	Band Edge
901.28	37.76	H	46.00	-8.24	QP	61.75	144.26	X-Axis - Worst Case
908.42	89.97	V	113.97	-24.00	Peak	264.25	121.25	Fundamental - Low Ch.
908.42	89.79	V	93.97	-4.18	QP	264.25	121.25	Y-Axis - Worst Case
902.00	37.51	V	66.00	-28.49	Peak	264.25	121.25	Band Edge
902.00	32.04	V	46.00	-13.96	QP	264.25	121.25	Y-Axis - Worst Case

FCC 15.249

Ecolink Intelligent Technology, Inc.
 Double Decora Light Switch
 Model: DDLS2-ZWAVE5

Date: 11/21/2017
 Lab: D
 Tested By: Kyle Haag

Band Edges

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
916.00	93.49	H	113.97	-20.48	Peak	344.75	139.82	Fundamental - High Ch.
916.00	93.48	H	93.97	-0.49	QP	344.75	139.82	X-Axis - Worst Case
928.00	40.58	H	66.00	-25.42	Peak	197.75	142.86	Band Edge
928.00	34.38	H	46.00	-11.62	QP	197.75	142.86	X-Axis - Worst Case
916.00	91.37	V	113.97	-22.60	Peak	99.25	120.11	Fundamental - High Ch.
916.00	91.15	V	93.97	-2.82	QP	99.25	120.11	Z-Axis - Worst Case
928.00	47.44	V	66.00	-18.56	Peak	99.25	120.11	Band Edge
928.00	42.16	V	46.00	-3.84	QP	99.25	120.11	Z-Axis - Worst Case

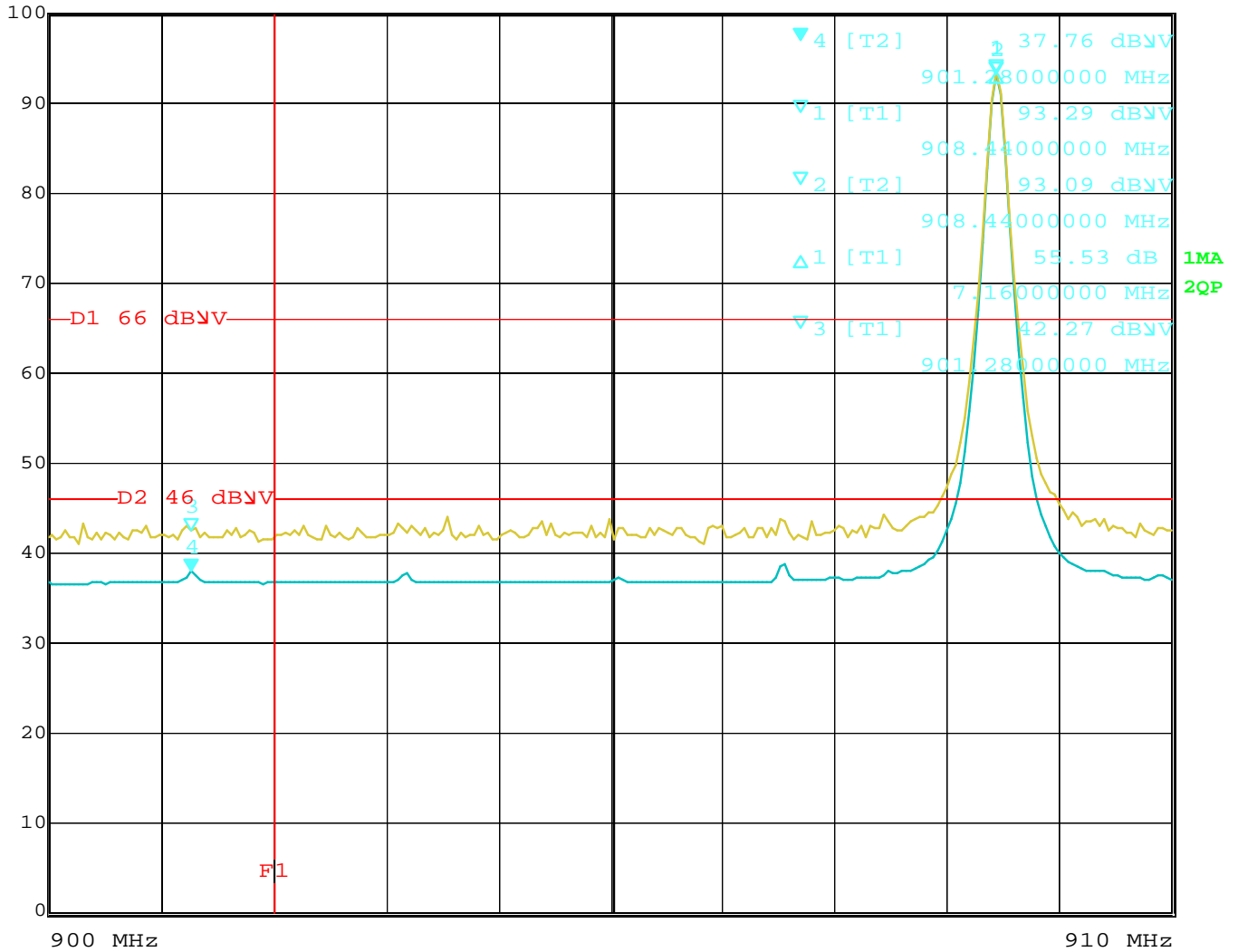
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

Newbury Park Division
 1050 Lawrence Drive
 Newbury Park, CA 91320
 (805) 480-4044

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

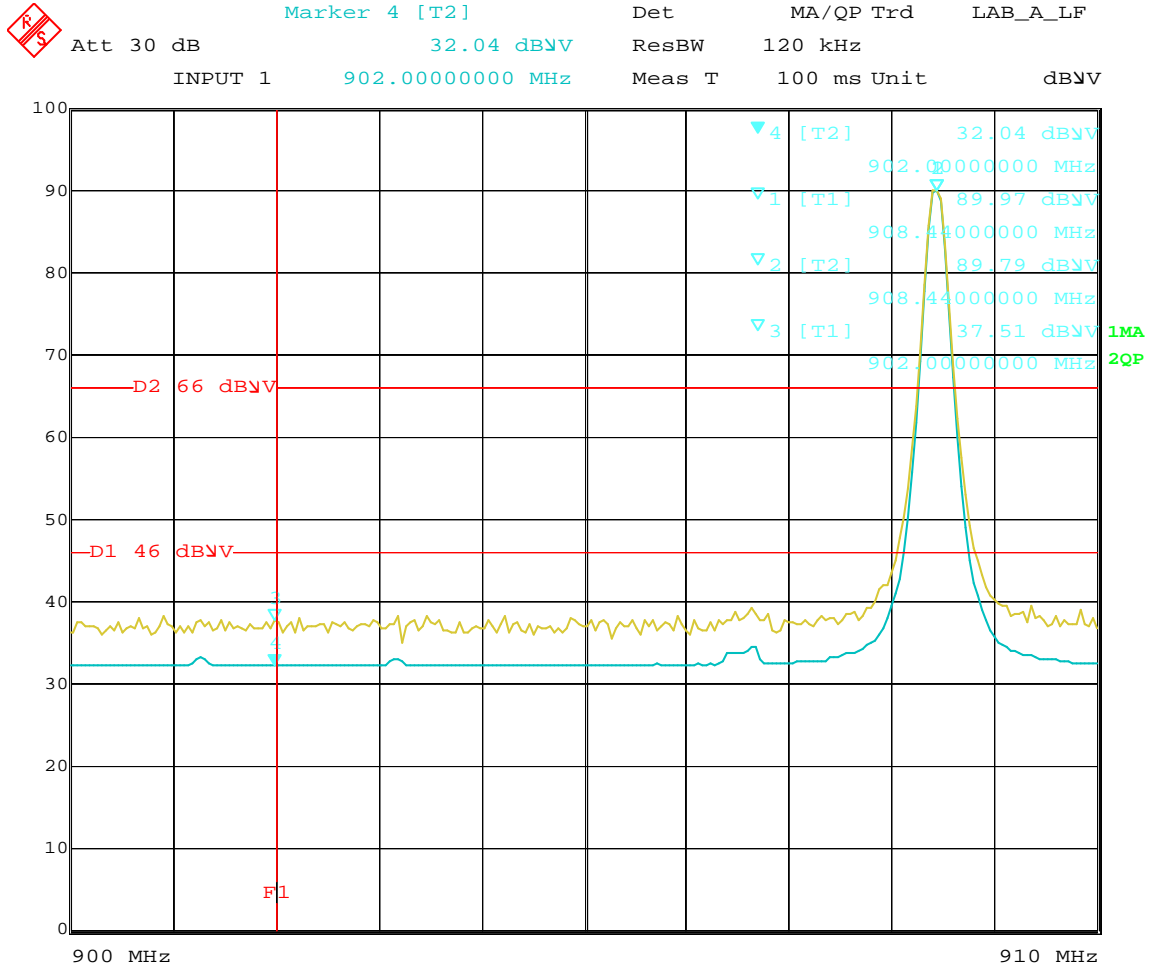


Att 30 dB Marker 4 [T2] Det MA/QP Trd LAB_A_LF
 INPUT 1 37.76 dBV ResBW 120 kHz
 Meas T 100 ms Unit dBV



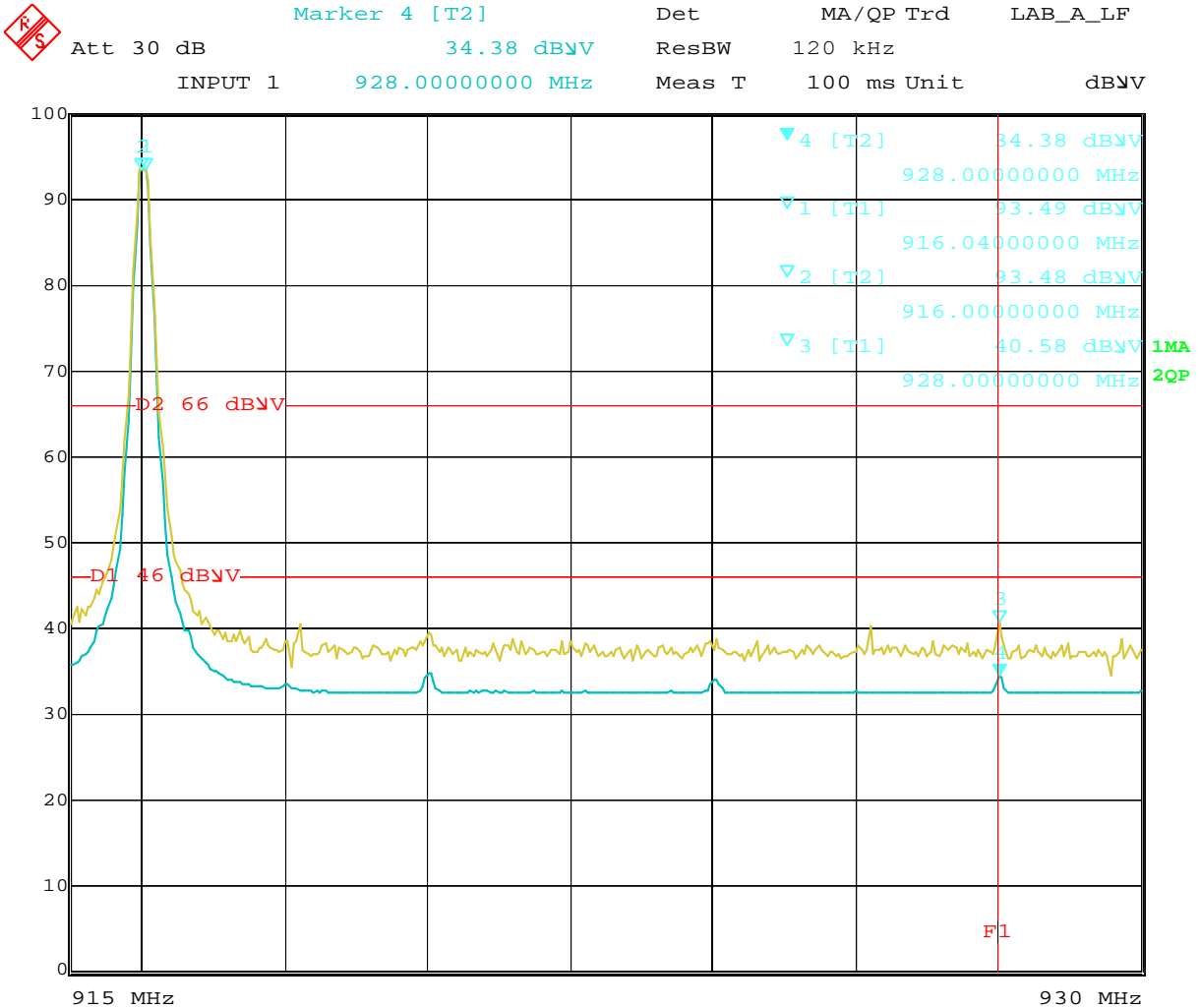
Date: 21.NOV.2017 11:08:50

Band Edge - 908.42 MHz - Horizontal - X-Axis - Worst Case



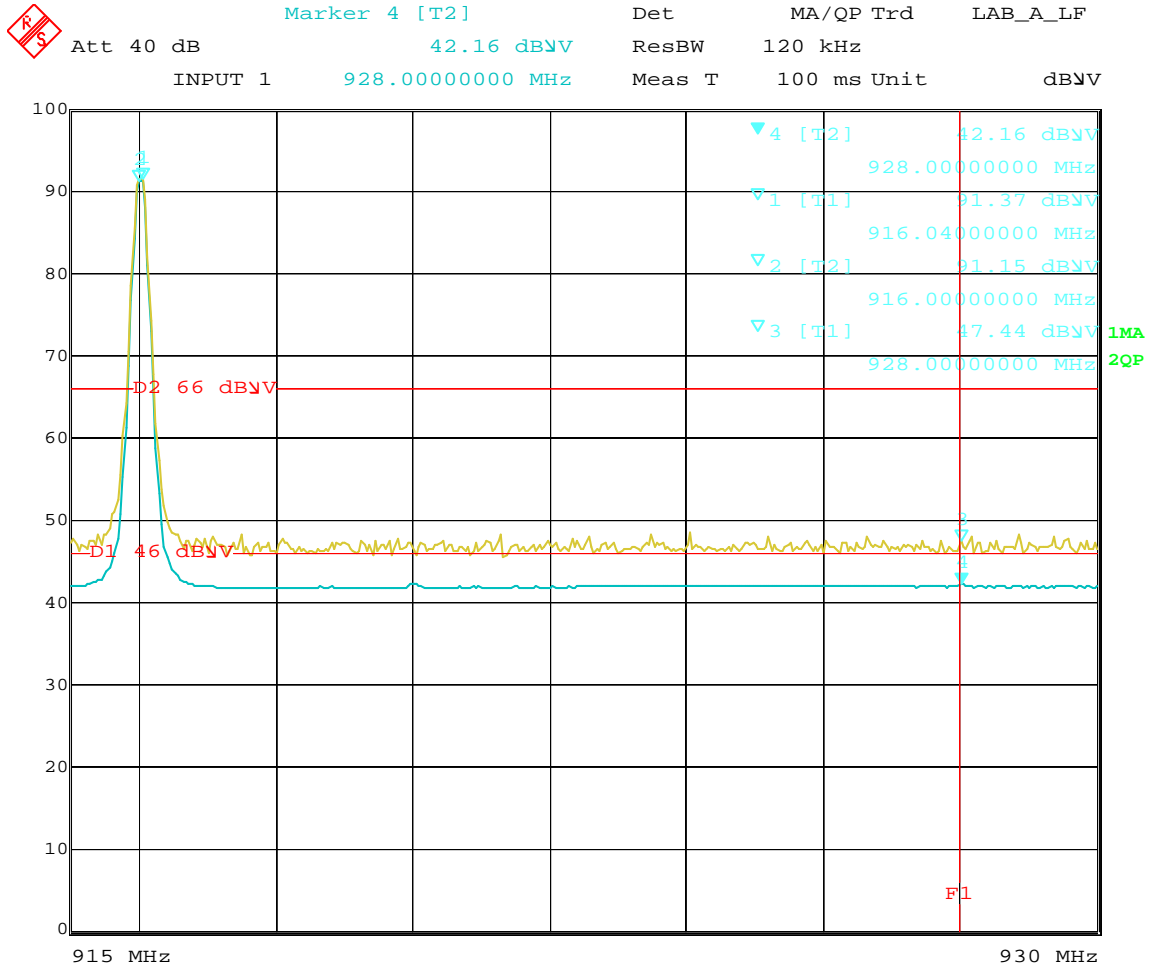
Date: 21.NOV.2017 12:00:00

Band Edge - 908.42 MHz - Vertical - Y-Axis - Worst Case



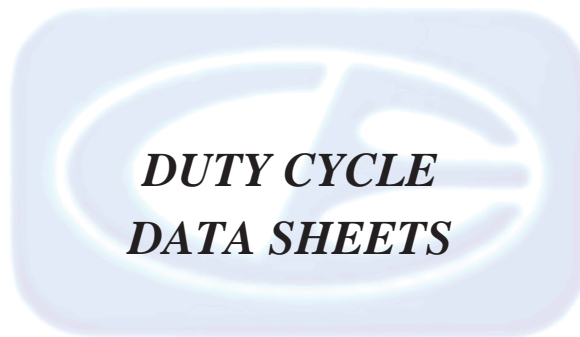
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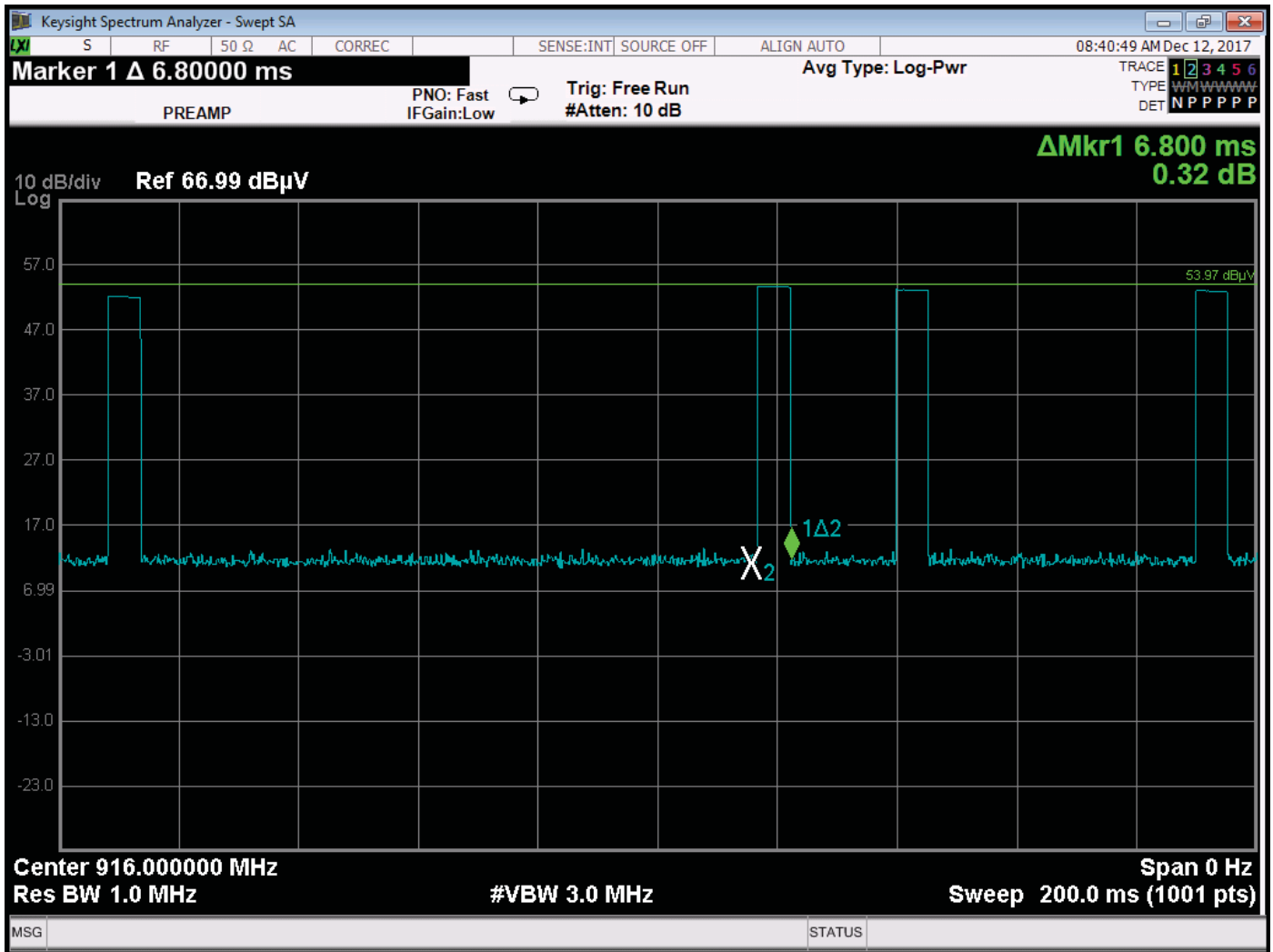
Band Edge - 916 MHz - Horizontal - X-Axis - Worst Case



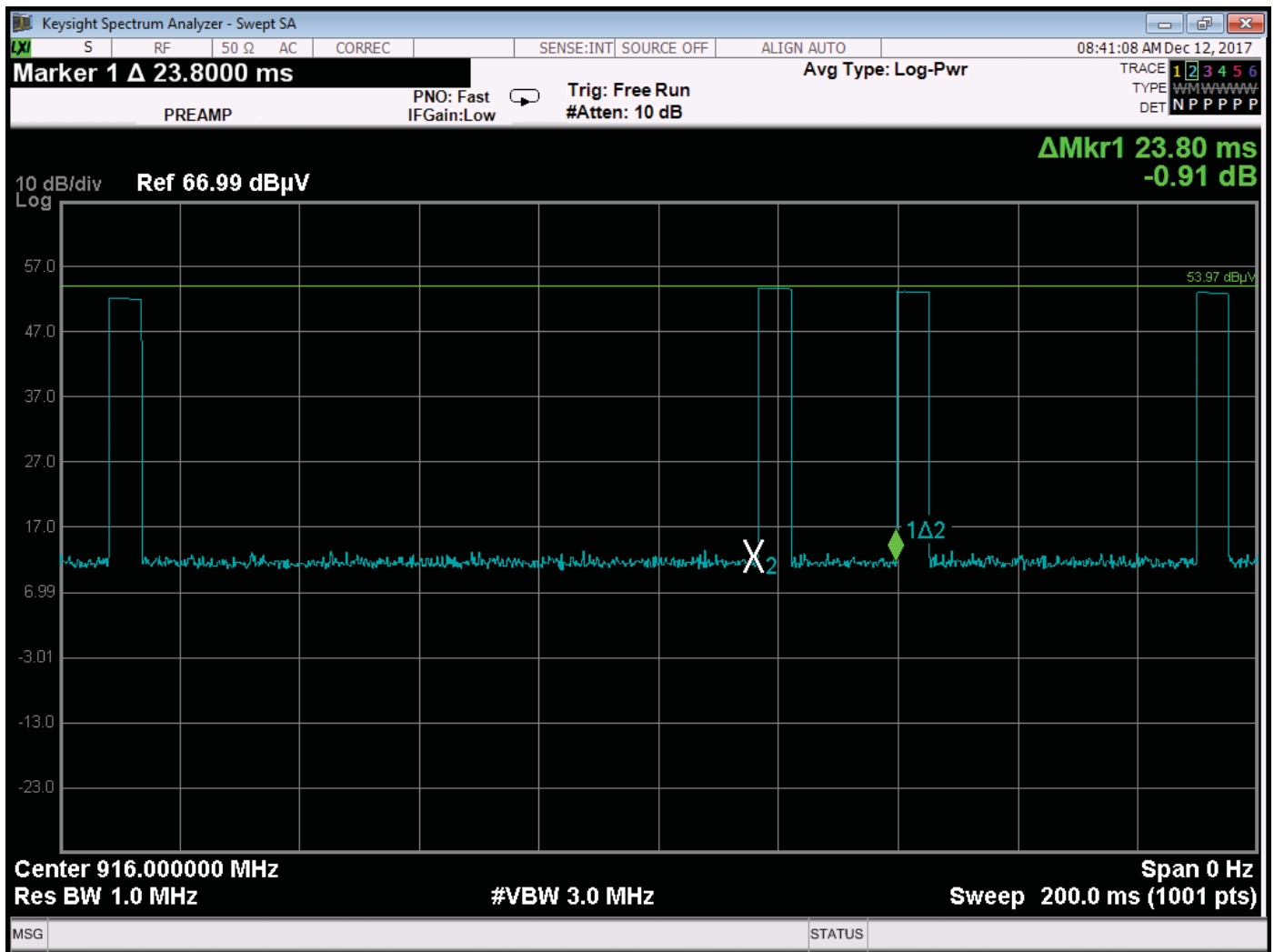
Date: 21.NOV.2017 15:27:48

Band Edge - 916 MHz - Vertical - Z-Axis - Worst Case





Pulse = 6.8 ms



Plot Showing that the pulses repeats at a worst case of 23.80 ms

Total Duty Cycle = 6.8 ms / 23.80 ms = 28.57% Duty Cycle

The Peak to Average Ratio is -10.88 dB