

**FCC PART 15 SUBPART B & SUBPART C SECTION 15.249,
RSS 210, & RSS GEN
TEST REPORT**

for

**VALUE HOME CONNECT, Z-WAVE PLUS
Model: 450248**

Prepared for

SPECTRUM BRANDS
19701 DaVinci
LAKE FOREST, CA 92610

Prepared by: _____

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Reviewed by: _____

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DATE: OCTOBER 21st, 2016

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	2	11	14	48

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1	Plot Map and Layout of Test Site Below 1GHz
2	Plot Map and Layout of Test Site Above 1GHz



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.

Device Tested: Value Home Connect, Z-Wave Plus
Model: 450248
S/N: None

Product Description: The EUT is a Value Home Connect, Z-Wave Plus.

Modifications: The EUT was not modified in order to comply with specifications.

Manufacturer: Spectrum Brands
19701 DaVinci
Lake Forest, CA 92610

Test Date: October 21st, 2016

Test Specifications covered by accreditation:



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

RSS 210 & RSS GEN

Test Procedure: ANSI C63.4 & C63.10



SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	The EUT is battery powered; therefore, this test was not performed.
2	Radiated RF Emissions & Harmonics, 9 kHz – 25,000 MHz Tx and Rx Modes	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Sections 15.205, 15.209, & 15.249, RSS 210 & RSS GEN
3	Fundamental Field Strength	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.249 & RSS 210
4	Emissions Radiated Outside of the Fundamental Frequency Band	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Sections 15.205, 15.209, & 15.249, RSS 210 & RSS GEN
5	Occupied Bandwidth	Complies with the limits of RSS 210 & RSS GEN

**TABLE 1:
SIX HIGHEST RADIATED EMISSIONS READINGS**

	Reading Type (PK / QP / AV)	Polarization (Vert / Horz)	Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Delta (dB)	Test Distance
1	QP	H	908.40	91.42	93.97	-2.55	3-Meter
2	QP	V	908.40	91.15	93.97	-2.82	3-Meter
3	QP	V	916.00	91.00	93.97	-2.97	3-Meter
4	QP	H	916.00	89.58	93.97	-4.39	3-Meter
5	AV	V	8244.00	37.33	53.98	-16.65	3-Meter
6	AV	H	8244.00	37.32	53.98	-16.66	3-Meter



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Value Home Connect, Z-Wave Plus Model: 450248. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 & C63.10. 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 15.109, & Part 15 Subpart C sections 15.205, 15.209, 15.249, RSS GEN, & RSS 210.



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

Spectrum Brands

Chasen Beck Engineer

Compatible Electronics, Inc.

Torey Oliver Test Engineer
Matt Harrison Lab Manager

2.4 Date Test Sample was Received

The test sample was received on October 21st, 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
RSS GEN	General Requirements for Compliance of Radio Apparatus
RSS 210	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration

The Value Home Connect, Z-Wave Plus Model: 450248 (EUT) was setup in a tabletop configuration. The EUT was checked in all 3 axis. The worst case was found to be the X-Axis. The EUT was continuously transmitting a data stream during transmit tests and continuously receiving during receive tests. The spurious emissions were checked with live scans and worst case data was recorded and provided.

The tests were performed using new batteries.

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 (X-Axis)*



4.1.2 Cable Construction and Termination

There were no interconnecting cables.

4.1.3 Axis Determination



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

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER
1	VALUE HOME CONNECT, Z-WAVE PLUS (EUT)	SPECTRUM BRANDS	450248	NONE
2	BATTERIES (4)	RAYOVAC	AA	NONE

5.1.1 Software Used to Exercise the Transmitter:

Version 4.47, Date: 01/04/2017, Storage Location: Spectrum Brands, Inc. located at:
\\ad.spectrumhhi.com\Groups\LKF\Shared\Engineering\Electronics\10. Released Notes, Docs &
Firmware\Firmware Releases For QA\Z-Wave Daughter Card\ValueHomeConnect



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	100172	09/22/2016	09/22/2017
Antenna, Loop	Com Power	AL-130	121049	12/06/2015	12/06/2017
Antenna, CombiLog	Com Power	AC-220	25857	05/19/2016	05/19/2017
Antenna, Horn 1-18GHz	Com Power	AH-118	071250	5/17/2016	5/17/2017
Antenna, Horn 18-26GHz	Com-Power	AH-826	081033	07/06/2015	07/06/2017
Pre-Amp, 1-18GHz	Com Power	PAM-118A	551033	5/17/2016	5/17/2017
Pre-Amp, 18-40GHz	Com-Power	PA-840	181289	6/16/2015	6/16/2017
High Pass Filter	AMTI Microwave Circuits	H3G020G4	481230	8/26/2015	8/26/2017
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



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 EUT was mounted on a 1.0 by 1.5 by 0.8-meter-high non-conductive table, which was placed on the ground plane.

For above 1GHz testing the EUT was placed 1.5 meters above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

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

6.4 Measurement Uncertainty

“Compatible Electronics’ U_{lab} value is less than U_{cisp} , thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 u^2(x_i)}$$

Measurement		U_{cisp}	$U_{lab} = 2 u_c(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3,6 dB	2.88
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	5,2 dB	4.04



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

There are a total of two channels. The low channel is 908.4 MHz and the high channel is at 916 MHz. The EUT uses GFSK and FSK modulation.

7.2 Antenna

The Antenna is made of up a trace on 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

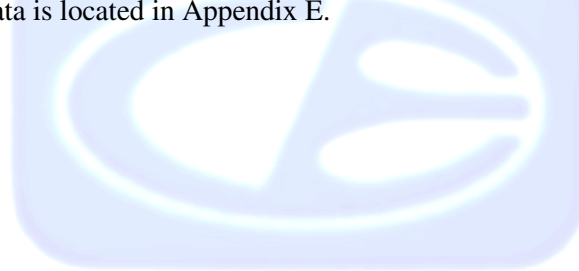
8.1.1 Conducted Emissions Test

Test Results: The EUT is battery powered; therefore, this test was not performed.

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 different configurations were investigated to find the worst case as well the worst case channel. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.



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 Microwave Preamplifier used for frequencies above 1 GHz.

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

For the non-intentional, harmonic, and fundamental emissions a linear average was used.

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

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
.009 to .150	Active Loop Antenna	200 Hz
.150 to 30	Active Loop Antenna	9 kHz
30 to 1000	Combilog Antenna	100 kHz (120 kHz for QP Measurements)
1000 to 25000	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 C63.4 & ANSI C63.10. 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 EUT complies with the limits of CFR Title 47 Part 15 Subpart B section 15.109, & Part 15 Subpart C sections 15.205, 15.209, 15.249, RSS GEN, & RSS 210. The six highest emissions are listed in table 1.



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 EUT complies with Part 15 Subpart C, Section 15.249 & RSS 210.

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 EUT complies with Part 15 Subpart C, Section 15.205, 15.249, RSS GEN, & RSS 210.

9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The Value Home Connect, Z-Wave Plus Model: 450248 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart B section 15.109, & Subpart C sections 15.205, 15.209, 15.249, RSS GEN, & RSS 210.



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

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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."

IC OAT's Test Site Registration Number: 2154C-1



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APPENDIX B***MODIFICATIONS TO THE EUT***

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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

VALUE HOME CONNECT, Z-WAVE PLUS

Model: 450248

S/N: NONE

No additional models were tested.



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

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

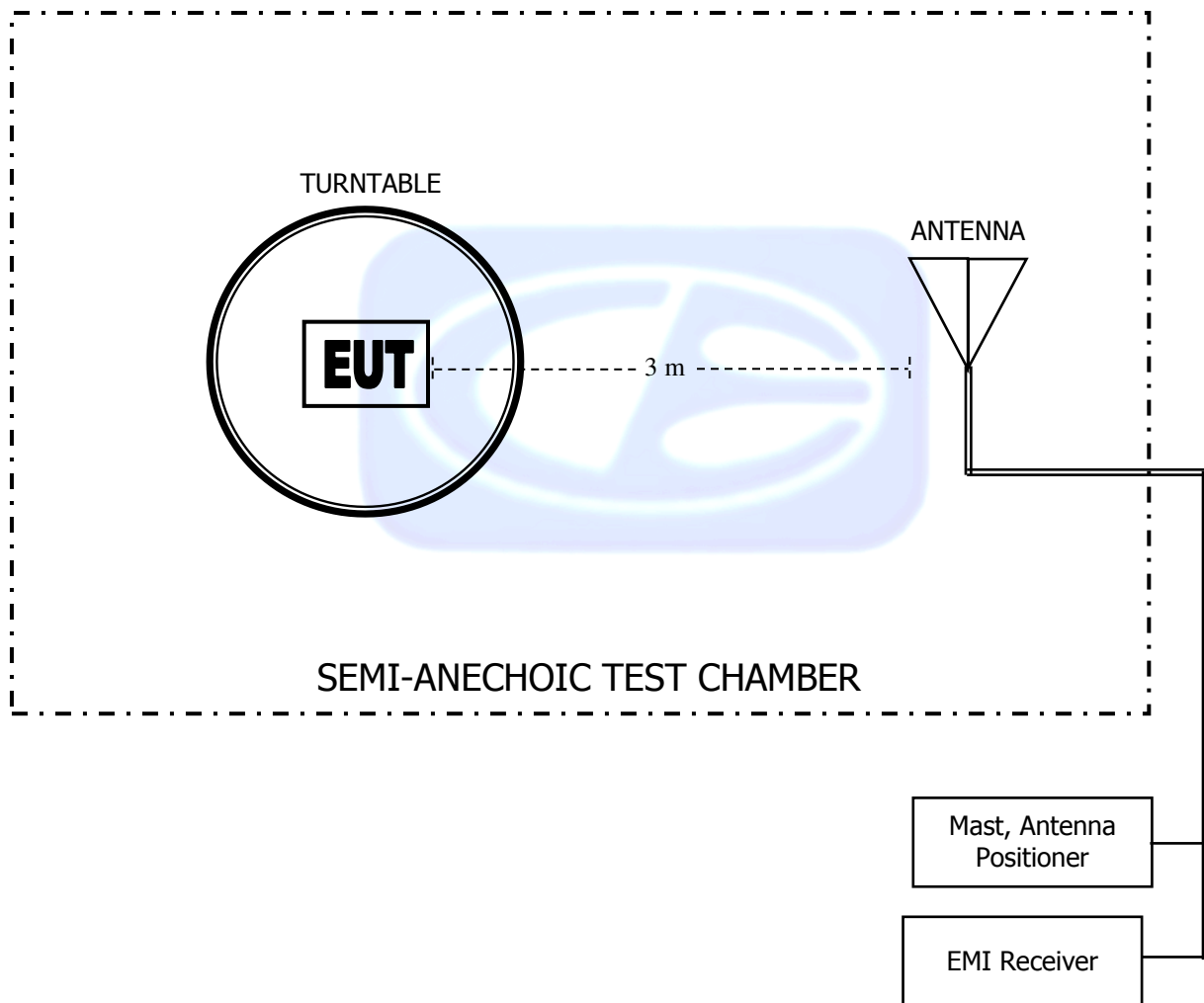
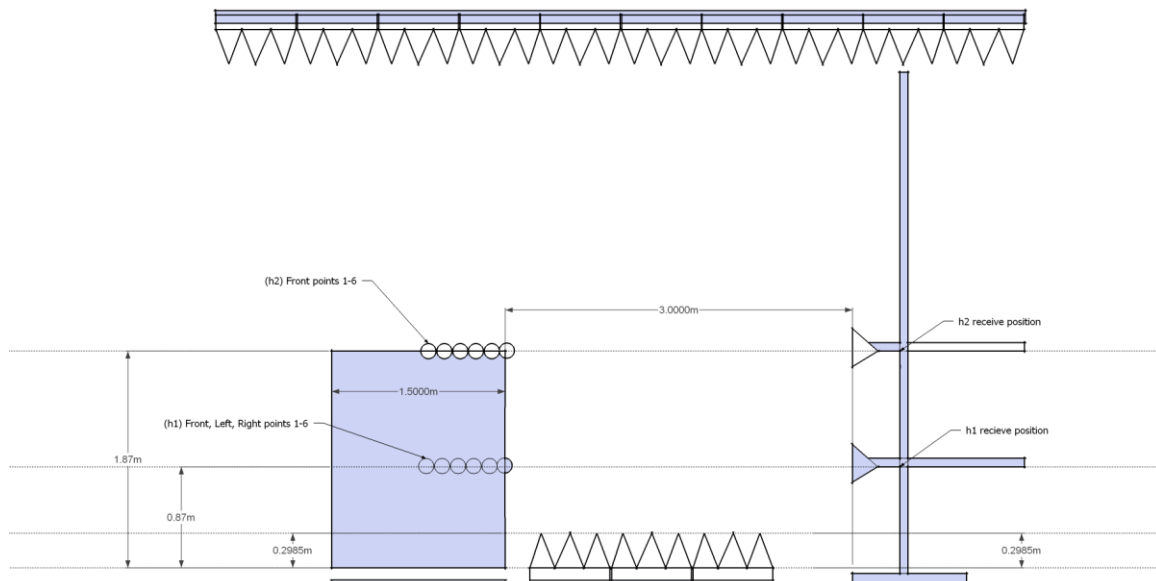


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ



COM-POWER AL-130**LOOP ANTENNA****S/N: 121049****CALIBRATION DUE: DECEMBER 6, 2017**

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	20.6
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	15.2	1000	28.5



COM-POWER AH-118**HORN ANTENNA****S/N: 071250****CALIBRATION DUE: MAY 17, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	24.40	9500	39.11
1500	25.61	10000	39.38
2000	28.71	10500	39.55
2500	29.09	11000	39.66
3000	30.24	11500	40.28
3500	30.94	12000	40.26
4000	31.77	12500	40.64
4500	32.29	13000	41.33
5000	33.70	13500	41.74
5500	34.28	14000	41.52
6000	34.83	14500	41.80
6500	35.07	15000	43.51
7000	36.79	15500	41.03
7500	37.45	16000	40.88
8000	37.67	16500	40.18
8500	37.75	17000	42.59
9000	38.15	17500	44.49
		18000	45.27



COM-POWER PAM-118A**1-18GHz - PREAMPLIFIER****S/N: 551033****CALIBRATION DUE: MAY 17, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	41.06	5500	40.63
1000	41.06	6000	40.18
1100	41.12	6500	40.33
1200	41.09	7000	39.97
1300	41.20	7500	40.45
1400	41.28	8000	39.83
1500	41.34	8500	39.79
1600	41.37	9000	39.71
1700	41.43	9500	39.80
1800	41.47	10000	41.07
1900	41.53	11000	40.05
2000	41.59	12000	40.21
2500	41.87	13000	40.61
3000	42.13	14000	39.09
3500	42.21	15000	39.36
4000	42.22	16000	38.32
4500	41.53	17000	38.32
5000	41.16	18000	36.85



**FRONT VIEW**

SPECTRUM BRANDS

VALUE HOME CONNECT, Z-WAVE PLUS

Model: 450248

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**
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**REAR VIEW**

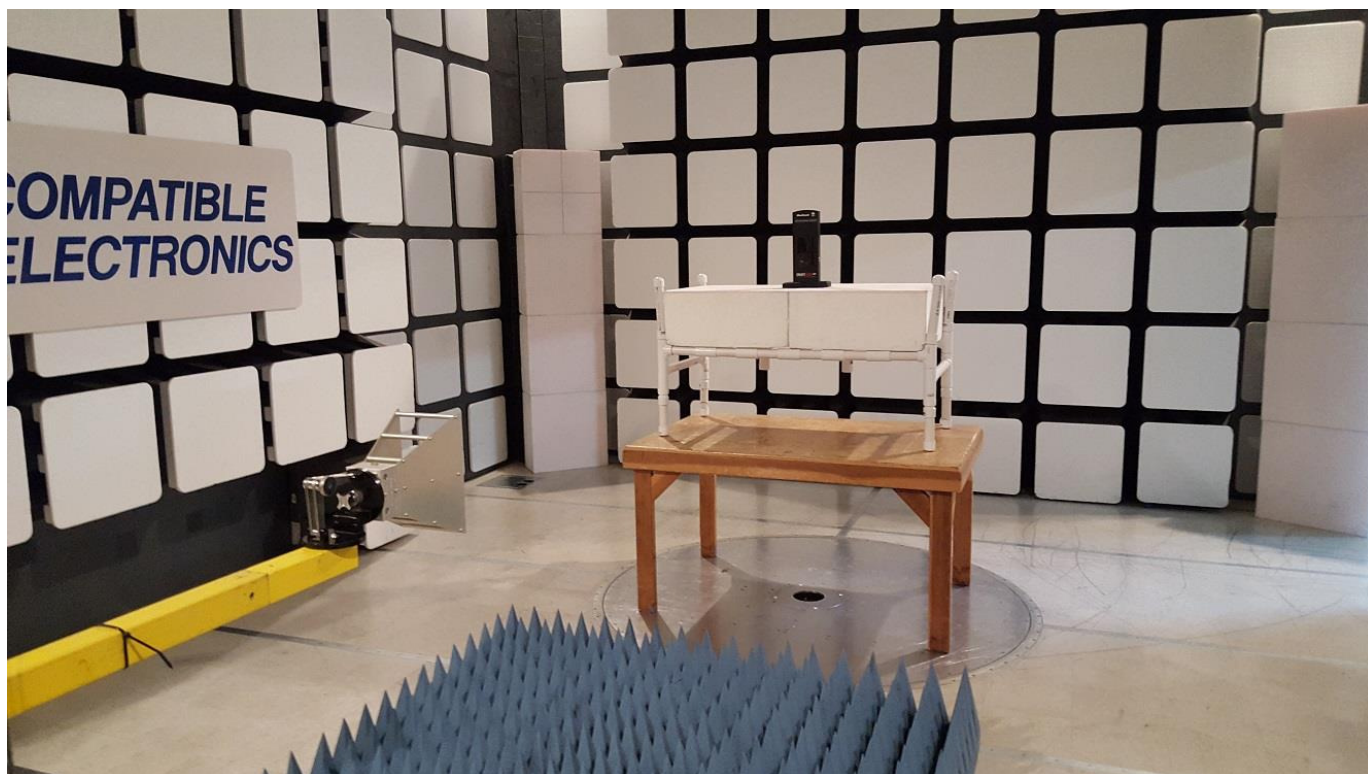
SPECTRUM BRANDS

VALUE HOME CONNECT, Z-WAVE PLUS

Model: 450248

FCC SUBPART B & C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS****Brea Division**
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**FRONT VIEW**

SPECTRUM BRANDS

VALUE HOME CONNECT, Z-WAVE PLUS

Model: 450248

FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS****Brea Division**
114 Olinda Drive
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**REAR VIEW**

SPECTRUM BRANDS
VALUE HOME CONNECT, Z-WAVE PLUS
Model: 450248

FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

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



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(949) 589-0700

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

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

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
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(949) 589-0700

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



Title: FCC 15.209

File: Radiated Pre-Scan 30-1000Mhz 908.42MHz.set

Operator: Torey Oliver

EUT Type: Electronic Lock / VHC

EUT Condition: The EUT is constantly transmitting 908.4 MHz.

Comments: Temp: 71f

Hum: 39%

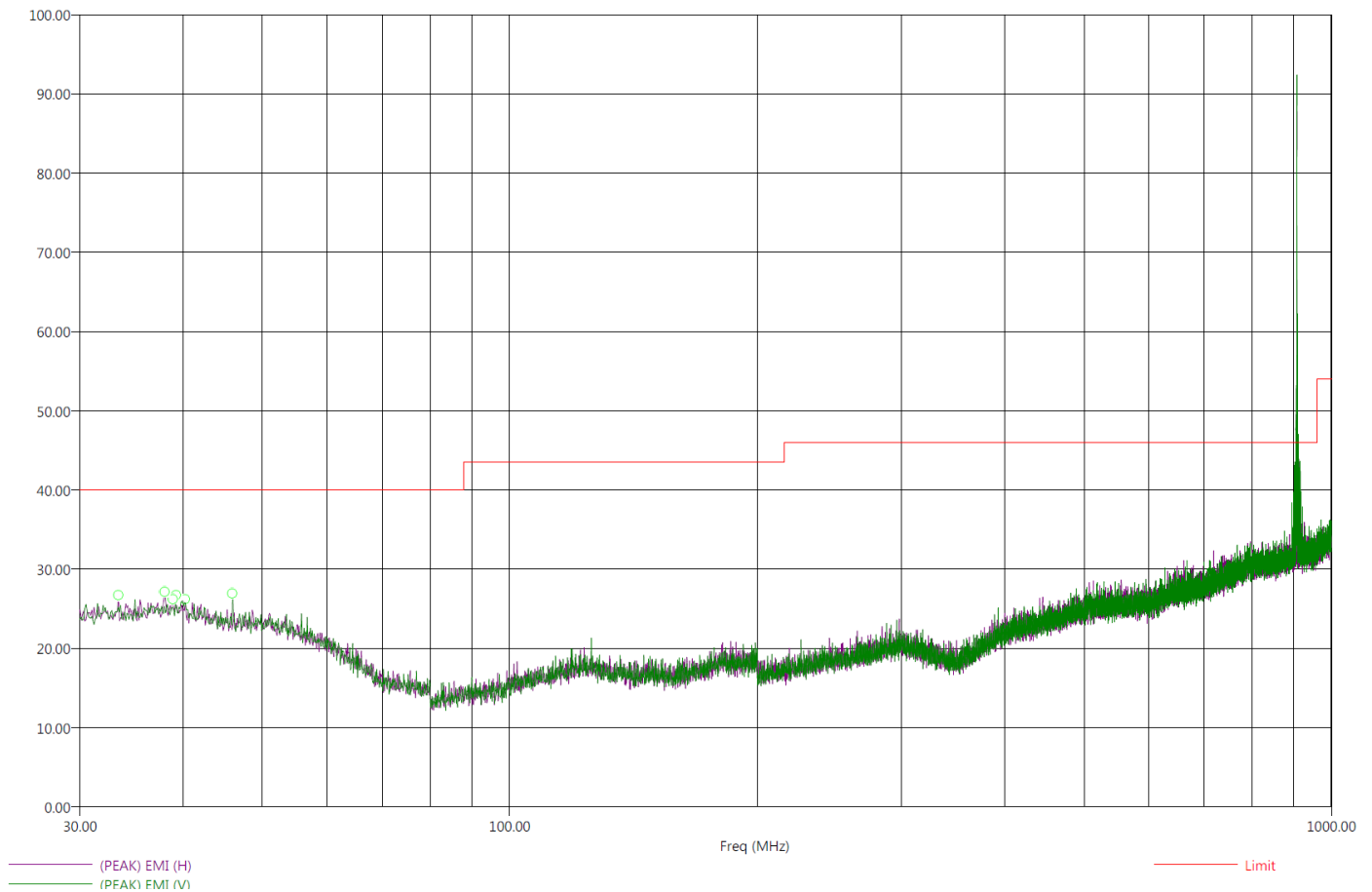
Battery

10/21/2016 10:31:19 AM

Sequence: Preliminary Scan

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

Electric Field Strength (dBμV/m)



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



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(949) 589-0700

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

Title: FCC 15.209

10/21/2016 2:07:08 PM

File: Radiated Final 30-1000Mhz.set

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: Electronic Lock / VHC

EUT Condition: The EUT is constantly transmitting 908.4 MHz.

Comments: Temp: 71f

Hum: 39%

Battery

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)
33.40	-19.45	20.55	25.37	40.00	H	189.50	156.38	22.50	0.33
38.00	-18.94	21.06	25.99	40.00	H	344.00	129.88	22.81	0.40
38.90	-18.80	21.20	25.49	40.00	H	127.50	173.58	22.89	0.41
39.30	-18.69	21.31	26.67	40.00	H	306.50	254.47	22.94	0.42
40.30	-18.66	21.34	27.10	40.00	H	173.25	213.70	22.90	0.43
46.00	-19.96	20.04	25.33	40.00	V	192.50	269.52	21.46	0.45

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



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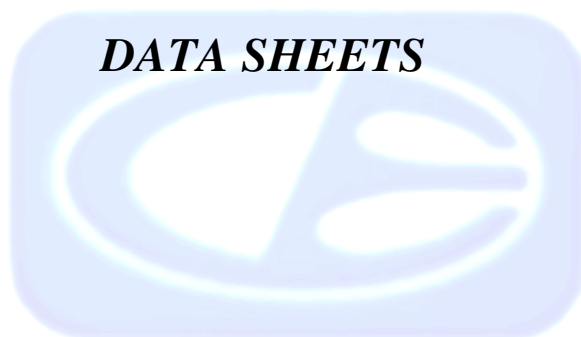
Agoura Division
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Silverado Division
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FUNDAMENTAL & HARMONICS

DATA SHEETS



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Lake Forest, CA 92630
(949) 587-0400

FUNDAMENTAL FIELD STRENGTH

FCC 15.249

Company: Kwikset
EUT: Electronic Lock
Model: VHC

Date: 10/21/2016
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
908.40	91.84	H	93.97	-2.13	Peak	206	1.37	
908.40	91.66	V	93.97	-2.31	Peak	161	1.00	
916.00	86.72	H	93.97	-7.25	Peak	267	2.09	
916.00	91.98	V	93.97	-1.99	Peak	208	1.00	

Test distance
3 meter



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HARMONICS LOW CHANNEL HORIZONTAL

FCC 15.249

Company: Kwikset
EUT: Electronic Lock
Model: VHC

Date: 10/21/2016
Lab: R
Tested by: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1816.8		H	73.98		Peak			No Emissions Found
1816.8		H	53.98		Avg			No Emissions Found
2725.2		H	73.98		Peak			No Emissions Found
2725.2		H	53.98		Avg			No Emissions Found
3633.6		H	73.98		Peak			No Emissions Found
3633.6		H	53.98		Avg			No Emissions Found
4542.0	44.92	H	73.98	-29.06	Peak	1.71	170	
4542.0	30.72	H	53.98	-23.26	Avg	1.71	170	
5450.4		H	73.98		Peak			No Emissions Found
5450.4		H	53.98		Avg			No Emissions Found
6358.8		H	73.98		Peak			No Emissions Found
6358.8		H	53.98		Avg			No Emissions Found
7267.2		H	73.98		Peak			No Emissions Found
7267.2		H	53.98		Avg			No Emissions Found
8175.6	49.54	H	73.98	-24.44	Peak	1.66	206	
8175.6	37.16	H	53.98	-16.82	Avg	1.66	206	
9084.0		H	73.98		Peak			No Emissions Found
9084.0		H	53.98		Avg			No Emissions Found

Test distance
3 meter



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HARMONICS LOW CHANNEL VERTICAL

FCC 15.249

Company: Kwikset
EUT: Electronic Lock
Model: VHC

Date: 10/21/2016
Lab: R
Tested by: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1816.8		V	73.98		Peak			No Emissions Found
1816.8		V	53.98		Avg			No Emissions Found
2725.2		V	73.98		Peak			No Emissions Found
2725.2		V	53.98		Avg			No Emissions Found
3633.6		V	73.98		Peak			No Emissions Found
3633.6		V	53.98		Avg			No Emissions Found
4542.0	41.03	V	73.98	-32.95	Peak			
4542.0	28.36	V	53.98	-25.62	Avg			
5450.4		V	73.98		Peak			No Emissions Found
5450.4		V	53.98		Avg			No Emissions Found
6358.8		V	73.98		Peak			No Emissions Found
6358.8		V	53.98		Avg			No Emissions Found
7267.2		V	73.98		Peak			No Emissions Found
7267.2		V	53.98		Avg			No Emissions Found
8175.6	49.79	V	73.98	-24.19	Peak			
8175.6	37.12	V	53.98	-16.86	Avg			
9084.0		V	73.98		Peak			No Emissions Found
9084.0		V	53.98		Avg			No Emissions Found

Test distance
3 meter



HARMONICS HIGH CHANNEL HORIZONTAL

FCC 15.249

Company: Kwikset
EUT: Electronic Lock
Model: VHC

Date: 10/21/2016
Lab: R
Tested by: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1832.0		H	73.98		Peak			No Emissions Found
1832.0		H	53.98		Avg			No Emissions Found
2748.0		H	73.98		Peak			No Emissions Found
2748.0		H	53.98		Avg			No Emissions Found
3664.0		H	73.98		Peak			No Emissions Found
3664.0		H	53.98		Avg			No Emissions Found
4580.0	49.27	H	73.98	-24.71	Peak	1.68	178	
4580.0	33.30	H	53.98	-20.68	Avg	1.68	178	
5496.0		H	73.98		Peak			No Emissions Found
5496.0		H	53.98		Avg			No Emissions Found
6412.0		H	73.98		Peak			No Emissions Found
6412.0		H	53.98		Avg			No Emissions Found
7328.0		H	73.98		Peak			No Emissions Found
7328.0		H	53.98		Avg			No Emissions Found
8244.0	49.93	H	73.98	-24.05	Peak	1.92	222	
8244.0	37.32	H	53.98	-16.66	Avg	1.92	222	
9160.0		H	73.98		Peak			No Emissions Found
9160.0		H	53.98		Avg			No Emissions Found

Test distance
3 meter



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HARMONICS HIGH CHANNEL VERTICAL

FCC 15.249

Company: Kwikset
EUT: Electronic Lock
Model: VHC

Date: 10/21/2016
Lab: R
Tested by: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1832.0		V	73.98		Peak			No Emissions Found
1832.0		V	53.98		Avg			No Emissions Found
2748.0		V	73.98		Peak			No Emissions Found
2748.0		V	53.98		Avg			No Emissions Found
3664.0		V	73.98		Peak			No Emissions Found
3664.0		V	53.98		Avg			No Emissions Found
4580.0		V	73.98		Peak			No Emissions Found
4580.0		V	53.98		Avg			No Emissions Found
5496.0		V	73.98		Peak			No Emissions Found
5496.0		V	53.98		Avg			No Emissions Found
6412.0		V	73.98		Peak			No Emissions Found
6412.0		V	53.98		Avg			No Emissions Found
7328.0		V	73.98		Peak			No Emissions Found
7328.0		V	53.98		Avg			No Emissions Found
8244.0	49.80	V	73.98	-24.18	Peak	1.84	140	
8244.0	37.33	V	53.98	-16.65	Avg	1.84	140	
9160.0		V	73.98		Peak			No Emissions Found
9160.0		V	53.98		Avg			No Emissions Found

Test distance
3 meter





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

DATA SHEETS



Brea Division
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BAND EDGES HORIZONTAL

FCC 15.249 & RSS 210

Company: Spectrum Brands
EUT: Value Home Connect, Z-Wave Plus
Model: 450248

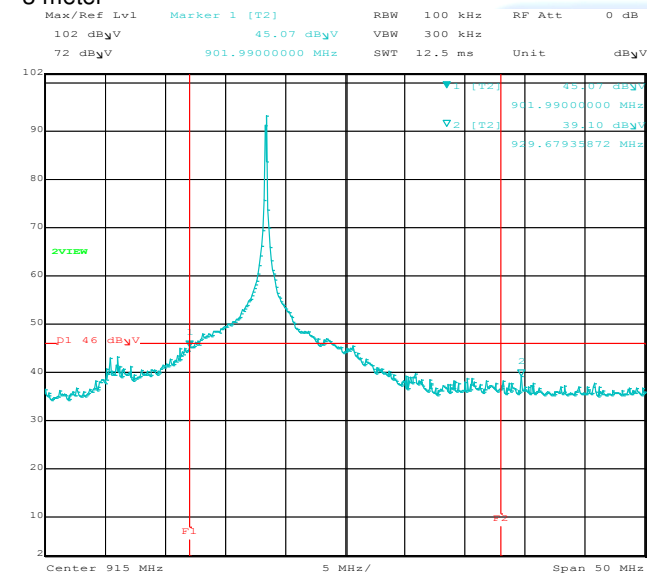
Date: 10/21/2016
Lab: R
Test ENG: Torey Oliver

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

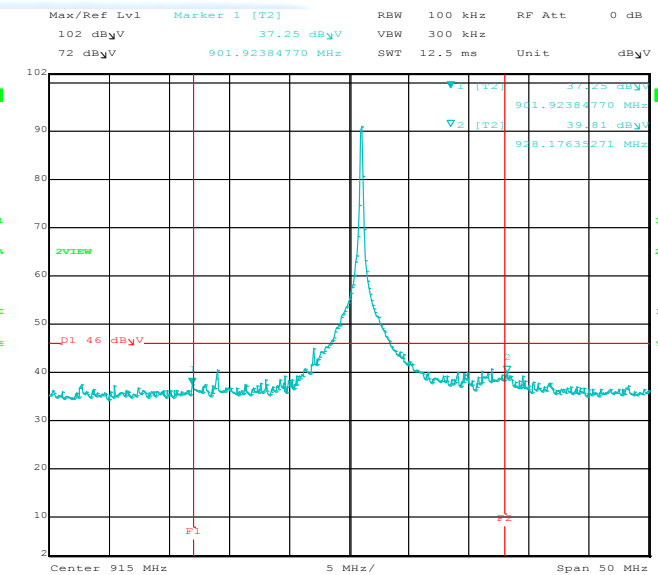
Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
901.99	45.07	H	46.00	-0.93	Peak	1.37	205	No Marker Delta
901.92	37.25	H	46.00	-8.75	Peak	1.38	209	Method Used
929.68	39.10	H	46.00	-6.90	Peak	1.37	205	No Marker Delta
928.18	39.81	H	46.00	-6.19	Peak	1.38	209	Method Used

Test distance

3 meter



Comment A: Band Edge 908.4MHz Horizontal
Date: 1.JAN.1997 06:06:27



Comment A: Band Edge 916MHz Horizontal
Date: 1.JAN.1997 05:47:37



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BAND EDGES VERTICAL

FCC 15.249 & RSS 210

Company: Spectrum Brands
EUT: Value Home Connect, Z-Wave Plus
Model: 450248

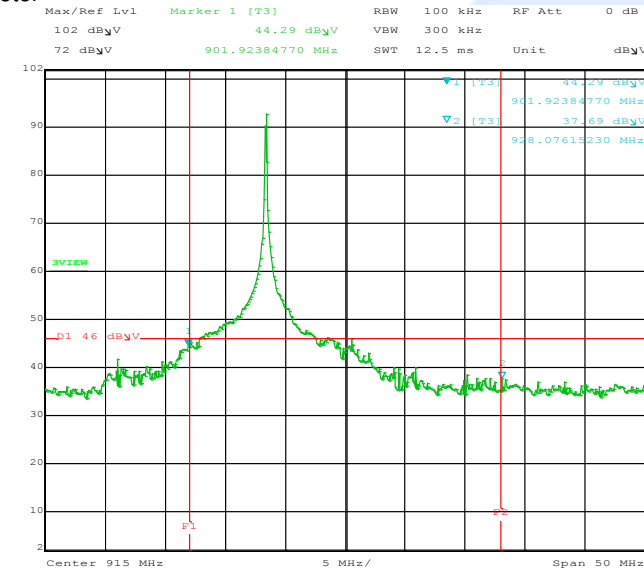
Date: 10/21/2016
Lab: R
Test ENG: Torey Oliver

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

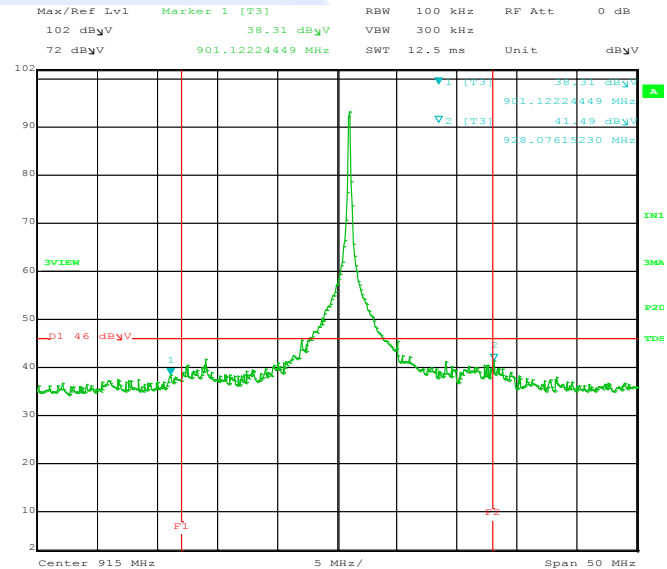
Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
901.92	44.29	V	46.00	-1.71	Peak	1.00	280	No Marker Delta
901.12	38.31	V	46.00	-7.69	Peak	1.00	150	Method Used
928.08	37.69	V	46.00	-8.31	Peak	1.00	280	No Marker Delta
928.08	41.49	V	46.00	-4.51	Peak	1.00	150	Method Used

Test distance

3 meter



Comment A: Band Edge 908.4MHz Vertical
Date: 1.JAN.1997 06:09:19



Comment A: Band Edge 916MHz Vertical
Date: 1.JAN.1997 05:43:51



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***OCCUPIED BANDWIDTH
DATA SHEETS***



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OCCUPIED BANDWIDTH

RSS GEN

Company: Spectrum Brands
EUT: Value Home Connect, Z-Wave Plus
Model: 450248

Date: 10/21/2016
Lab: R
Test ENG: Torey Oliver

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

Occupied Bandwidth

Freq. (MHz)	Measured BW (kHz)	Peak / QP / Avg	Comments
908.42	94.59	Peak	99% Bandwidth
916.00	166.73	Peak	99% Bandwidth

