

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

for

ECHOSTAR SAGE ZHA REMOTE 2014

MODEL: URC-2001BC0-R

Prepared for

UNIVERSAL ELECTRONICS, INC.
201 EAST SANDPOINTE AVE., 8TH FLOOR
SANTA ANA, CA 92707

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BREA, CALIFORNIA 92823
(714) 579-0500

DATE: OCTOBER 15, 2014

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	16	2	2	2	13	28	63

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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: EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R
EchoStar model number: 36.0
EchoStar PN: 205227
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Customer: Universal Electronics, Inc.
201 East Sandpointe Ave., 8TH Floor
Santa Ana California, 92707

Test Dates: October 6 and 15, 2014

Test Specifications: Emissions requirements
CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.249

Test Procedure: ANSI C63.4

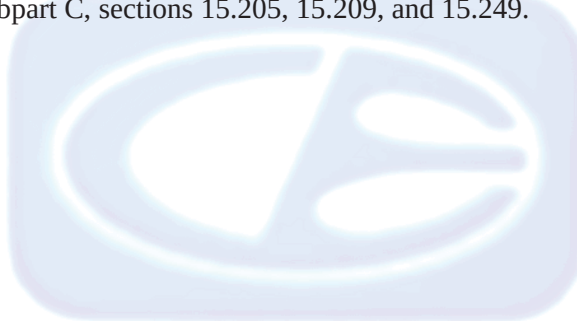
Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 10 kHz – 25,000 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
2	Conducted RF Emissions, 150 kHz to 30 MHz	This test was not performed because the EUT operates on battery power and does not connect to the AC mains.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the EchoStar Sage ZHA Remote 2014, Model: URC-2001BC0-R. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4. 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

Universal Electronics, Inc.

Jesse Mendez

Senior Electrical Core Engineer

Compatible Electronics Inc.

Kyle Fujimoto

Test Engineer

James Ross

Test Engineer

Kenneth Lee

Test Technician

2.4 Date Test Sample was Received

The test sample was received on October 6, 2014.

2.5 Disposition of the Test Sample

The test sample has not been returned to Universal Electronics 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
N/A	Not Applicable

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 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation
CISPR 22: 2008	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

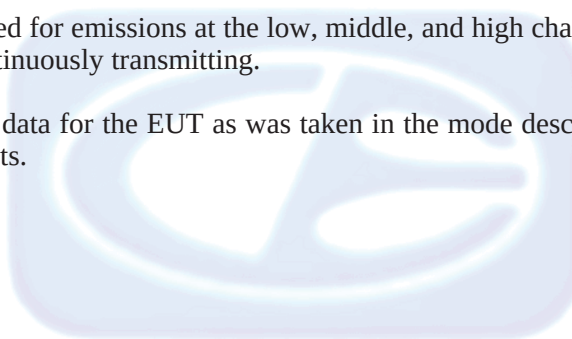
4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - Emissions

The EchoStar Sage ZHA Remote 2014, Model: URC-2001BC0-R (EUT) is a remote control that is powered by two AA 1.5 VDC batteries.

The EUT was tested for emissions at the low, middle, and high channels while in the X, Y and Z axis. The EUT was continuously transmitting.

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



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
ECHOSTAR SAGE ZHA REMOTE 2014	UNIVERSAL ELECTRONICS, INC.	URC-2001BC0-R EchoStar model number 36.0	P/N: 205227	MG3-2001

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED IN LAB B					
Computer	Compaq	CQ5210F	CNX9360CF9	N/A	N/A
Monitor	Hewlett Packard	HPs2031a	3CQ046N3MD	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100194	November 19, 2012	2 Year
GENERAL TEST EQUIPMENT USED IN LAB D					
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	Agilent Technologies	N9038A	MY51100115	March 6, 2014	2 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	May 20, 2014	1 Year
Preamplifier	Com-Power	PA-118	181656	January 13, 2014	1 Year
Preamplifier	Com-Power	PA-840	711013	May 13, 2014	2 Year
Loop Antenna	Com-Power	AL-130	17089	January 29, 2013	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2014	2 Year
Horn Antenna	Com-Power	AH-826	0071957	N/A	N/A
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

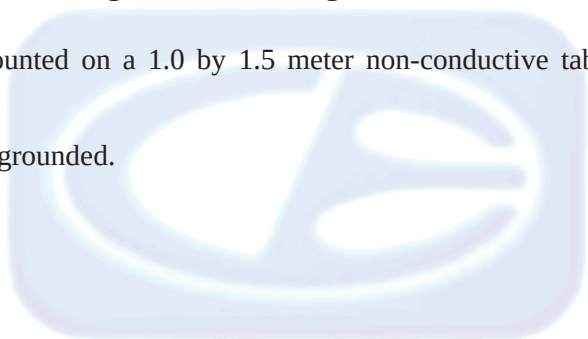
6.1 Test Facility Description

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

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.



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 Radiated Emissions (Spurious and Harmonics) Test – Lab B

The EMI Receiver was used as a measuring meter. A preamplifier was used to increase the sensitivity of the instrument. The Com Power Microwave Preamplifier Model: PA-118 was used for frequencies above 1 GHz and the PA 840 for frequencies above 18 GHz. The EMI Receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI Receiver records the highest measured reading over all the sweeps.

For frequencies above 1 GHz, the readings were averaged by a "duty cycle correction factor", derived from 20 log (dwell time / 100 ms). This duty cycle correction factor was then subtracted from the peak reading.

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
1 GHz to 18 GHz	1 MHz	Horn Antenna
18 GHz to 25 GHz	1 MHz	Horn Antenna

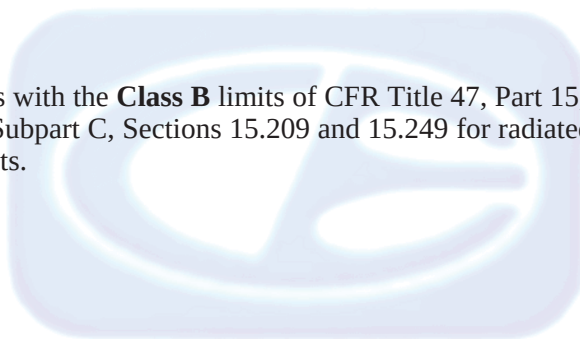
The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2009. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a 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 by the Radiated Emission Manual Test software. 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.

Radiated Emissions (Spurious and Harmonics) Test -- Lab B (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 1 GHz to 25 GHz to obtain the final test data.

Test Results:

The EUT 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, Sections 15.209 and 15.249 for radiated emissions. Please see Appendix E for the data sheets.



7.1.2 Radiated Emissions (Spurious and Harmonics) Test – Lab D

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. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is set up according to ANSI C63.4, EN 50147-2 and CISPR 22. 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 measurement bandwidths and transducers used for the radiated emissions test were:

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

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

Test Results:

The EUT 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, Sections 15.209 and 15.249 (d) for radiated emissions. Please see Appendix E for the data sheets.

7.1.3 RF Emissions Test ResultsTable 1.0 RADIATED EMISSION RESULTS
EchoStar Sage ZHA Remote 2014, Model: URC-2001BC0-R

Frequency MHz	Average Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
4850 (H) (X-Axis) (Low Channel)	51.53	54.00	-2.47
4850 (H) (Z-Axis) (Low Channel)	50.62	54.00	-3.38
7275 (V) (Y-Axis) (Low Channel)	50.49	54.00	-3.51
7275 (H) (X-Axis) (Low Channel)	50.07	54.00	-3.93
7275 (H) (Z-Axis) (Low Channel)	49.70	54.00	-4.30
7350 (V) (Y-Axis) (Middle Channel)	49.68	54.00	-4.32

Notes:

(H) Horizontal

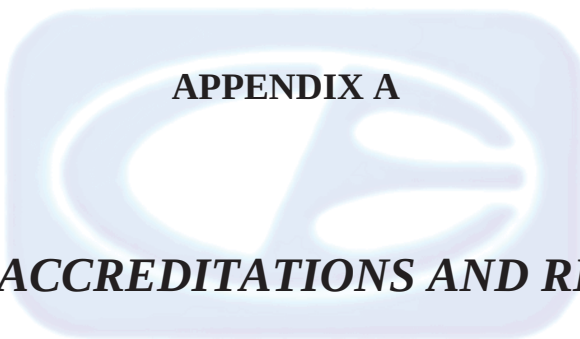
(V) Vertical

* The complete emissions data is given in Appendix E of this report.

8. CONCLUSIONS

The EchoStar Sage ZHA Remote 2014, Model: URC-2001BC0-R, as tested, meets all of the specification limits defined in FCC Title 47, Part 15, 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

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

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

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

NVLAP listing links

[Agoura Division](#) / [Brea Division](#) / [Silverado/Lake Forest Division](#)

.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."



ANSI listing [CETCB](#)



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

US/EU MRA list [NIST MRA site](#)



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).

APEC MRA list [NIST MRA site](#)

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



VCCI Support member: Please visit http://www.vcci.jp/vcci_e/



FCC Listing, from FCC OET site

[FCC test lab search](#) <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>

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

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.

The EUT was not modified during the testing.



APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R
S/N: N/A

There were no additional models covered under this report.

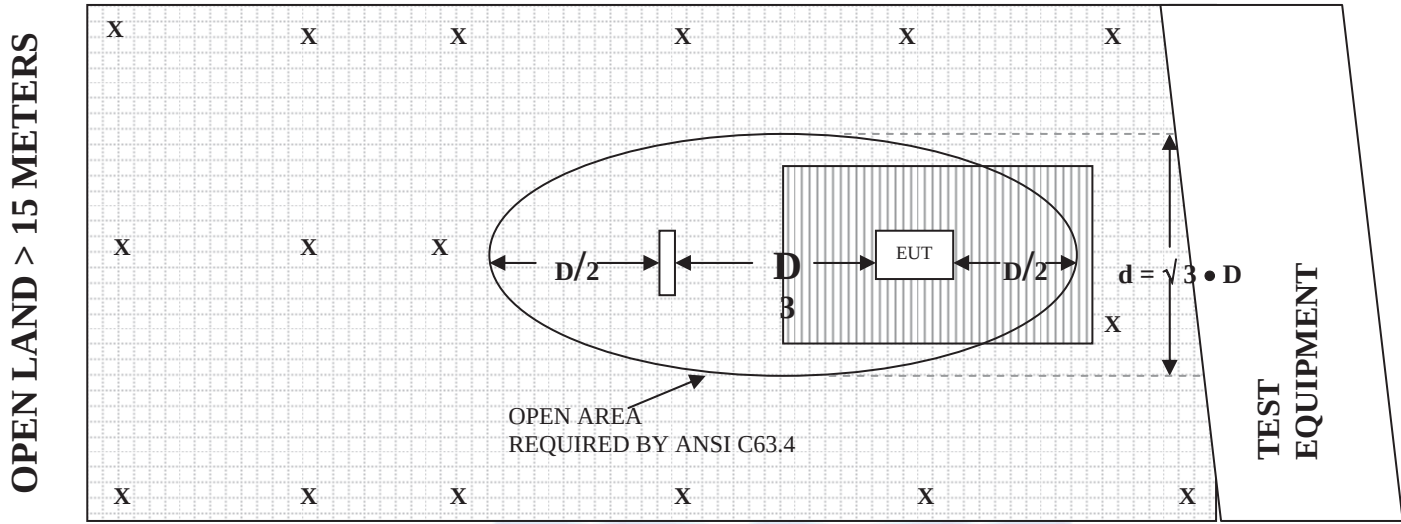


APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

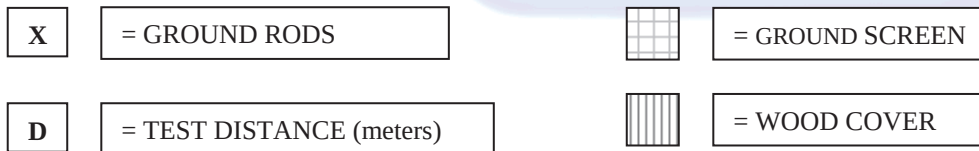
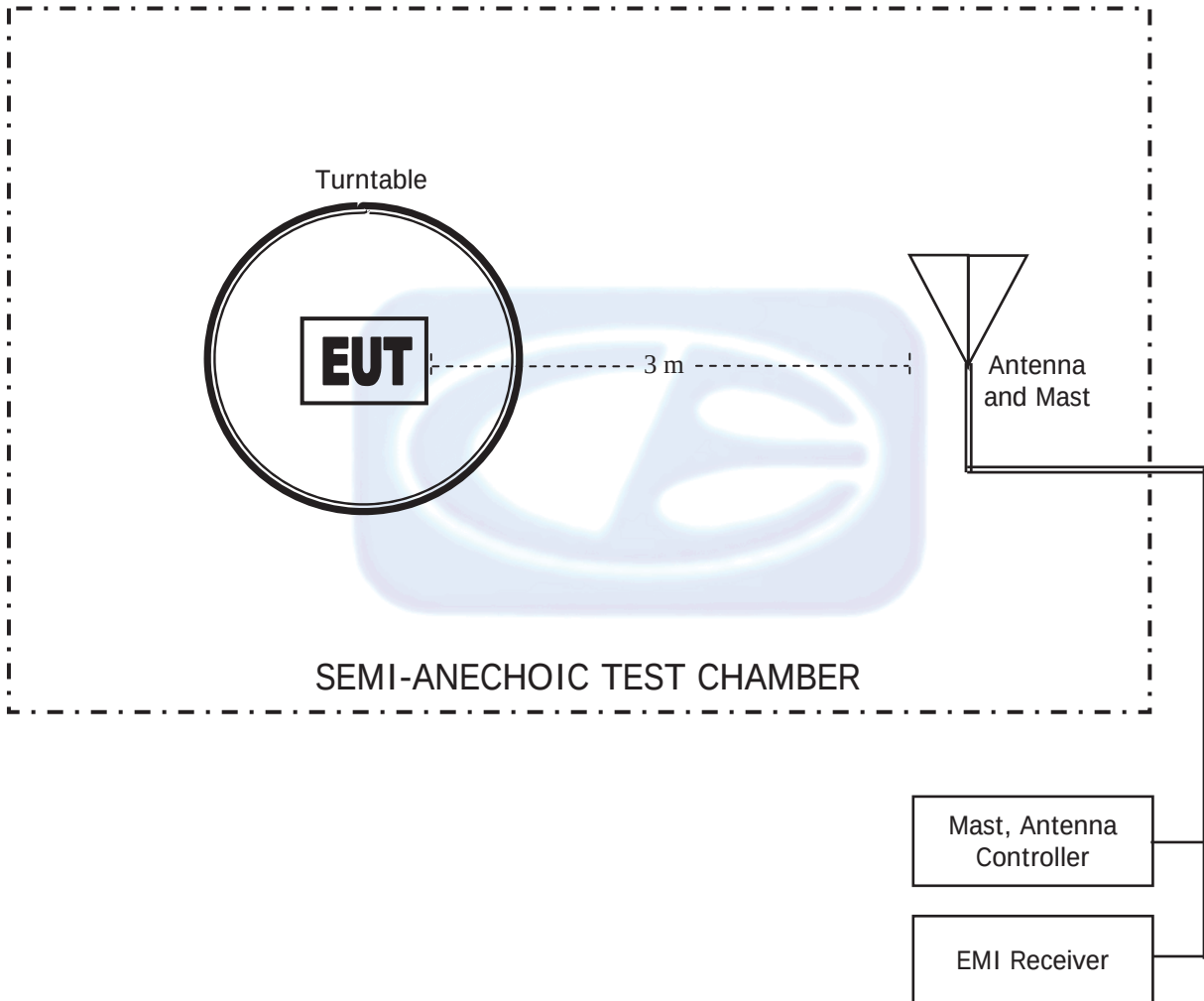


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



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

S/N: 17089

CALIBRATION DATE: JANUARY 29, 2013

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-42.5	9
0.01	-42.3	9.2
0.02	-42.1	9.4
0.03	-41.4	10.1
0.04	-41.8	9.7
0.05	-42.4	9.1
0.06	-42.3	9.2
0.07	-42.5	9
0.08	-42.4	9.1
0.09	-42.5	9
0.1	-42.5	9
0.2	-42.7	8.8
0.3	-42.6	8.9
0.4	-42.5	9
0.5	-42.7	8.8
0.6	-42.7	8.8
0.7	-42.5	9
0.8	-42.3	9.2
0.9	-42.2	9.3
1	-42.2	9.3
2	-41.8	9.7
3	-41.7	9.8
4	-41.7	9.8
5	-41.5	10
6	-41.6	9.9
7	-41.4	10.1
8	-41	10.5
9	-40.8	10.7
10	-41.3	10.2
15	-41.4	10.1
20	-41.2	10.3
25	-42.6	8.9
30	-41.7	9.8

COM-POWER AC-220**COMBILOG ANTENNA****S/N: 61060****CALIBRATION DATE: MAY 20, 2014**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.40	200	14.40
35	23.70	250	16.40
40	24.20	300	17.90
45	22.60	350	15.60
50	22.10	400	19.90
60	17.90	450	20.40
70	12.70	500	21.60
80	11.60	550	21.50
90	12.20	600	22.30
100	13.20	650	23.50
120	15.70	700	23.70
125	15.80	750	25.90
140	13.60	800	25.90
150	16.90	850	26.40
160	14.20	900	27.00
175	14.90	950	27.70
180	15.00	1000	27.50

COM POWER AH-118**HORN ANTENNA**

S/N: 071175

CALIBRATION DATE: FEBRUARY 26, 2014

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.23	10.0	38.43
1.5	25.84	10.5	40.19
2.0	28.14	11.0	40.49
2.5	29.51	11.5	41.39
3.0	31.20	12.0	42.02
3.5	32.17	12.5	43.30
4.0	31.40	13.0	42.77
4.5	31.86	13.5	40.18
5.0	34.82	14.0	42.59
5.5	34.38	14.5	41.74
6.0	36.31	15.0	41.84
6.5	34.81	15.5	38.48
7.0	37.48	16.0	39.52
7.5	36.98	16.5	37.85
8.0	36.66	17.0	41.33
8.5	38.47	17.5	44.96
9.0	37.22	18.0	48.50
9.5	37.86		

COM-POWER PA-118**PREAMPLIFIER**

S/N: 181656

CALIBRATION DATE: JANUARY 13, 2014

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.90	6.0	25.40
1.1	25.30	6.5	25.20
1.2	26.00	7.0	24.40
1.3	26.20	7.5	24.00
1.4	26.30	8.0	23.90
1.5	26.40	8.5	24.50
1.6	26.50	9.0	25.20
1.7	26.60	9.5	24.80
1.8	26.50	10.0	24.90
1.9	26.60	11.0	25.40
2.0	26.70	12.0	24.50
2.5	26.90	13.0	24.30
3.0	27.00	14.0	25.20
3.5	27.10	15.0	25.90
4.0	26.60	16.0	25.60
4.5	26.10	17.0	23.70
5.0	26.40	18.0	25.80
5.5	25.80		

COM-POWER AH-826**HORN ANTENNA**

S/N: 71957

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.5	22.5	35.5
18.5	33.5	23.0	35.9
19.0	34.0	23.5	35.7
19.5	34.0	24.0	35.6
20.0	34.3	24.5	36.0
20.5	34.9	25.0	36.2
21.0	34.7	25.5	36.1
21.5	35.0	26.0	36.2
22.0	35.0	26.5	35.7

COM-POWER PA-840**MICROWAVE PREAMPLIFIER****S/N: 711013****CALIBRATION DATE: MAY 13, 2014**

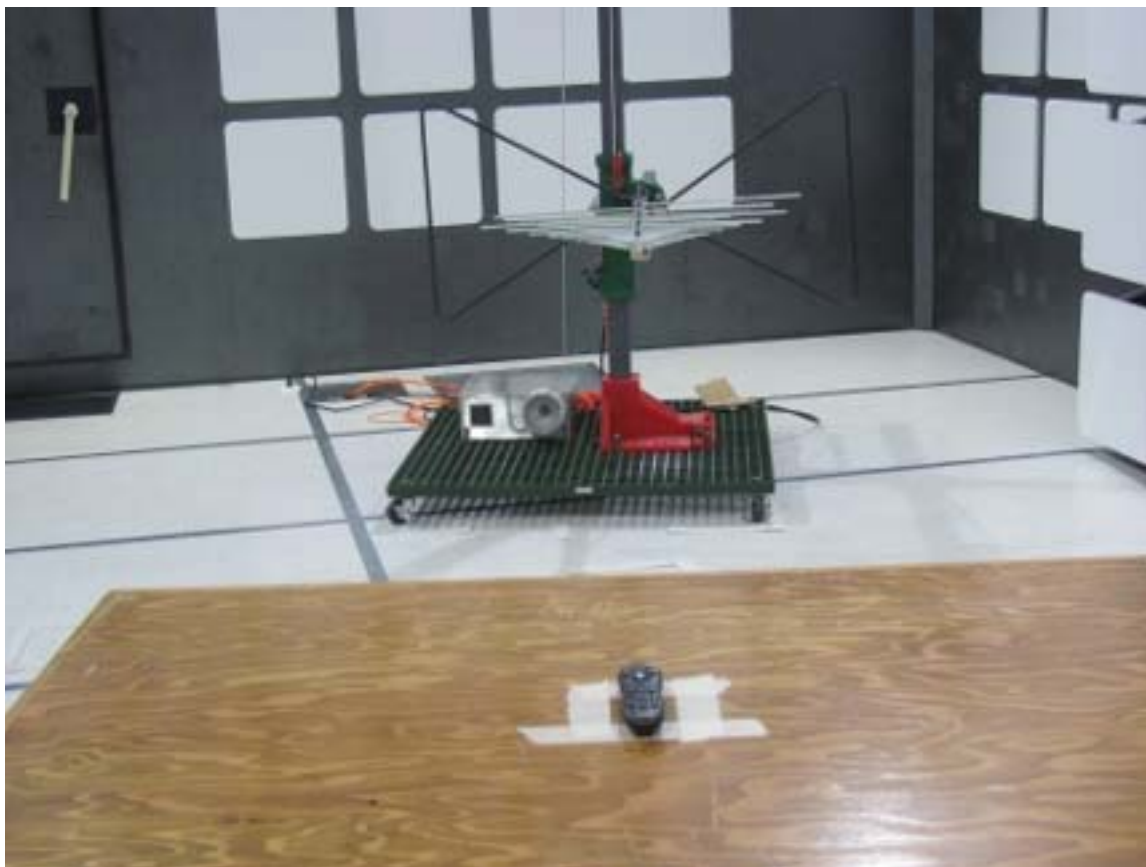
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	25.19	31.0	25.69
19.0	24.48	31.5	25.74
20.0	24.39	32.0	26.35
21.0	24.73	32.5	26.64
22.0	23.49	33.0	25.98
23.0	24.23	33.5	24.68
24.0	24.59	34.0	24.61
25.0	25.32	34.5	23.78
26.0	25.66	35.0	24.74
26.5	25.99	35.5	24.39
27.0	26.26	36.0	23.46
27.5	25.33	36.5	23.71
28.0	24.49	37.0	26.35
28.5	24.74	37.5	23.49
29.0	25.93	38.0	25.42
29.5	26.28	38.5	24.87
30.0	26.17	39.0	22.60
30.5	26.11	39.5	20.57
		40.0	19.15



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
ECHOSTAR SAGE ZHA REMOTE 2014
MODEL: URC-2001BC0-R
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
ECHOSTAR SAGE ZHA REMOTE 2014
MODEL: URC-2001BC0-R

FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
ECHOSTAR SAGE ZHA REMOTE 2014
MODEL: URC-2001BC0-R
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
ECHOSTAR SAGE ZHA REMOTE 2014
MODEL: URC-2001BC0-R
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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

APPENDIX E

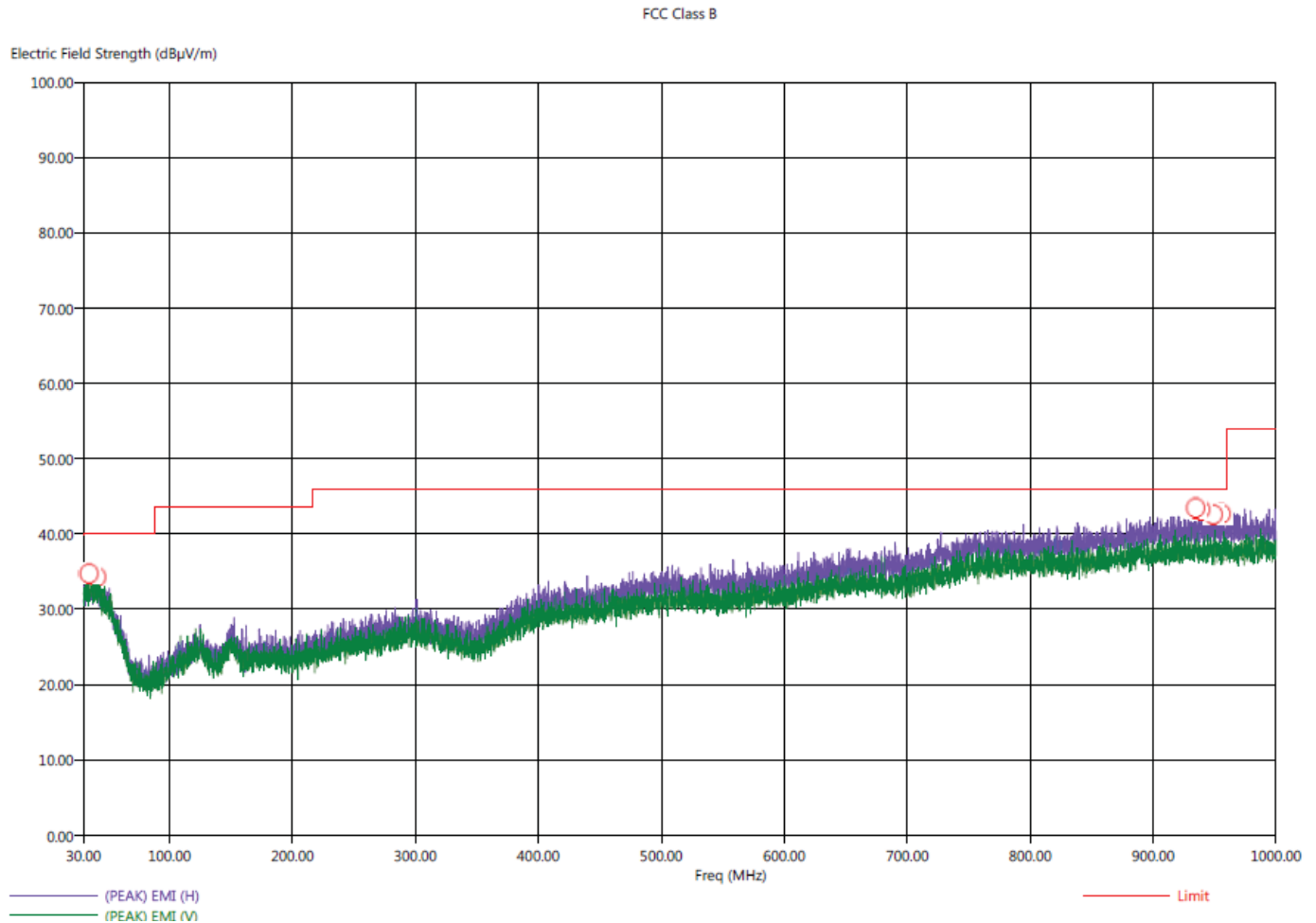
DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

Title: Pre-Scan - FCC Class B
File: Agilent - Radiated Pre-Scan 30-1000Mhz_X-Axis_Worst Case.set
Operator: Kenneth Lee
EUT Type: EchoStar Sage ZHA Remote 2014
EUT Condition: Continuously Transmitting - X-Axis_Low Channel_Worst Case
Comments: Customer: Universal Electronics, Inc.
M/N: URC-2001BC0-R

10/15/2014 9:26:26 AM
Sequence: Preliminary Scan



Title: Radiated Final - 30-1000 MHz - FCC Class B

File: Agilent - Radiated Final Scan 30-1000Mhz_X-Axis_Low Channel_Worst Case - FCC Class B - 10-15-2014.set

Operator: Kenneth Lee

EUT Type: EchoStar Sage ZHA Remote 2014

EUT Condition: Continuously Transmitting - X-Axis_Low Channel_Worst Case

Comments: Customer: Universal Electronics, Inc.

M/N: URC-2001BC0-R

10/15/2014 9:43:59 AM

Sequence: Final Measurements

Final Scan - 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)	Twr Ht (cm)	Ttbl Aql (dec)
34.70	V	34.86	30.83	-5.14	-9.17	40.00	23.68	0.39	383.79	301.25
40.90	H	35.63	31.05	-4.37	-8.95	40.00	23.85	0.44	303.19	93.50
934.80	H	43.19	38.85	-2.81	-7.15	46.00	27.49	2.69	351.91	351.50
939.00	H	43.13	38.96	-2.87	-7.04	46.00	27.55	2.70	207.61	293.50
949.20	H	43.53	39.08	-2.47	-6.92	46.00	27.69	2.71	223.37	211.50
955.70	H	44.00	39.09	-2.00	-6.91	46.00	27.68	2.73	383.85	79.25



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Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Low Channel
X-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	92.91	V	114	-21.09	Peak	2.25	160	
2425	78.49	V	94	-15.51	Avg	2.25	160	
4850	62.82	V	74	-11.18	Peak	2.75	145	
4850	48.4	V	54	-5.6	Avg	2.75	145	
7275	61.86	V	74	-12.14	Peak	1	180	
7275	47.44	V	54	-6.56	Avg	1	180	
9700								NO EMISSIONS
9700								DETECTED
12125								NO EMISSIONS
12125								DETECTED
14550								NO EMISSIONS
14550								DETECTED
16975								NO EMISSIONS
16975								DETECTED
19400								NO EMISSIONS
19400								DETECTED
21825								NO EMISSIONS
21825								DETECTED
24250								NO EMISSIONS
24250								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Low Channel
X-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	99.17	H	114	-14.83	Peak	1.1	100	
2425	84.75	H	94	-9.25	Avg	1.1	100	
4850	65.95	H	74	-8.05	Peak	1	300	
4850	51.53	H	54	-2.47	Avg	1	300	
7275	64.49	H	74	-9.51	Peak	1	290	
7275	50.07	H	54	-3.93	Avg	1	290	
9700								NO EMISSIONS
9700								DETECTED
12125								NO EMISSIONS
12125								DETECTED
14550								NO EMISSIONS
14550								DETECTED
16975								NO EMISSIONS
16975								DETECTED
19400								NO EMISSIONS
19400								DETECTED
21825								NO EMISSIONS
21825								DETECTED
24250								NO EMISSIONS
24250								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Low Channel
Y-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	100.8	V	114	-13.2	Peak	1	290	
2425	86.38	V	94	-7.62	Avg	1	290	
4850	63.33	V	74	-10.67	Peak	1	340	
4850	48.91	V	54	-5.09	Avg	1	340	
7275	64.91	V	74	-9.09	Peak	1.5	290	
7275	50.49	V	54	-3.51	Avg	1.5	290	
9700								NO EMISSIONS
9700								DETECTED
12125								NO EMISSIONS
12125								DETECTED
14550								NO EMISSIONS
14550								DETECTED
16975								NO EMISSIONS
16975								DETECTED
19400								NO EMISSIONS
19400								DETECTED
21825								NO EMISSIONS
21825								DETECTED
24250								NO EMISSIONS
24250								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Low Channel

Y-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	92.97	H	114	-21.03	Peak	2	160	
2425	78.55	H	94	-15.45	Avg	2	160	
4850	62.96	H	74	-11.04	Peak	1	190	
4850	48.54	H	54	-5.46	Avg	1	190	
7275	63.59	H	74	-10.41	Peak	1	0	
7275	49.17	H	54	-4.83	Avg	1	0	
9700								NO EMISSIONS
9700								DETECTED
12125								NO EMISSIONS
12125								DETECTED
14550								NO EMISSIONS
14550								DETECTED
16975								NO EMISSIONS
16975								DETECTED
19400								NO EMISSIONS
19400								DETECTED
21825								NO EMISSIONS
21825								DETECTED
24250								NO EMISSIONS
24250								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Low Channel
Z-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	93.73	V	114	-20.27	Peak	1	0	
2425	79.31	V	94	-14.69	Avg	1	0	
4850	63.63	V	74	-10.37	Peak	1.5	0	
4850	49.21	V	54	-4.79	Avg	1.5	0	
7275	62.21	V	74	-11.79	Peak	1.25	280	
7275	47.79	V	54	-6.21	Avg	1.25	280	
9700								NO EMISSIONS
9700								DETECTED
12125								NO EMISSIONS
12125								DETECTED
14550								NO EMISSIONS
14550								DETECTED
16975								NO EMISSIONS
16975								DETECTED
19400								NO EMISSIONS
19400								DETECTED
21825								NO EMISSIONS
21825								DETECTED
24250								NO EMISSIONS
24250								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Low Channel
Z-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	96.04	H	114	-17.96	Peak	1.25	235	
2425	81.62	H	94	-12.38	Avg	1.25	235	
4850	65.04	H	74	-8.96	Peak	1.1	260	
4850	50.62	H	54	-3.38	Avg	1.1	260	
7275	64.12	H	74	-9.88	Peak	1.1	90	
7275	49.7	H	54	-4.3	Avg	1.1	90	
9700								NO EMISSIONS DETECTED
9700								
12125								NO EMISSIONS DETECTED
12125								
14550								NO EMISSIONS DETECTED
14550								
16975								NO EMISSIONS DETECTED
16975								
19400								NO EMISSIONS DETECTED
19400								
21825								NO EMISSIONS DETECTED
21825								
24250								NO EMISSIONS DETECTED
24250								

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Middle Channel
X-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	95.09	V	114	-18.91	Peak	2	190	
2450	80.67	V	94	-13.33	Avg	2	190	
4900	61.48	V	74	-12.52	Peak	3	180	
4900	47.06	V	54	-6.94	Avg	3	180	
7350	61.57	V	74	-12.43	Peak	1	190	
7350	47.15	V	54	-6.85	Avg	1	190	
9800								NO EMISSIONS DETECTED
9800								
12250								NO EMISSIONS DETECTED
12250								
14700								NO EMISSIONS DETECTED
14700								
17150								NO EMISSIONS DETECTED
17150								
19600								NO EMISSIONS DETECTED
19600								
22050								NO EMISSIONS DETECTED
22050								
24500								NO EMISSIONS DETECTED
24500								

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Middle Channel
X-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	101.52	H	114	-12.48	Peak	1.1	90	
2450	87.1	H	94	-6.9	Avg	1.1	90	
4900	63.61	H	74	-10.39	Peak	1	330	
4900	49.19	H	54	-4.81	Avg	1	330	
7350	62.49	H	74	-11.51	Peak	1.75	335	
7350	48.07	H	54	-5.93	Avg	1.75	335	
9800								NO EMISSIONS
9800								DETECTED
12250								NO EMISSIONS
12250								DETECTED
14700								NO EMISSIONS
14700								DETECTED
17150								NO EMISSIONS
17150								DETECTED
19600								NO EMISSIONS
19600								DETECTED
22050								NO EMISSIONS
22050								DETECTED
24500								NO EMISSIONS
24500								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Middle Channel
Y-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	100.89	V	114	-13.11	Peak	1.25	270	
2450	86.47	V	94	-7.53	Avg	1.25	270	
4900	62.46	V	74	-11.54	Peak	1.25	90	
4900	48.04	V	54	-5.96	Avg	1.25	90	
7350	64.1	V	74	-9.9	Peak	1.25	280	
7350	49.68	V	54	-4.32	Avg	1.25	280	
9800								NO EMISSIONS
9800								DETECTED
12250								NO EMISSIONS
12250								DETECTED
14700								NO EMISSIONS
14700								DETECTED
17150								NO EMISSIONS
17150								DETECTED
19600								NO EMISSIONS
19600								DETECTED
22050								NO EMISSIONS
22050								DETECTED
24500								NO EMISSIONS
24500								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Middle Channel
Y-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	93.99	H	114	-20.01	Peak	1.25	180	
2450	79.57	H	94	-14.43	Avg	1.25	180	
4900	62.18	H	74	-11.82	Peak	1	190	
4900	47.76	H	54	-6.24	Avg	1	190	
7350	62.86	H	74	-11.14	Peak	1.5	135	
7350	48.44	H	54	-5.56	Avg	1.5	135	
9800								NO EMISSIONS
9800								DETECTED
12250								NO EMISSIONS
12250								DETECTED
14700								NO EMISSIONS
14700								DETECTED
17150								NO EMISSIONS
17150								DETECTED
19600								NO EMISSIONS
19600								DETECTED
22050								NO EMISSIONS
22050								DETECTED
24500								NO EMISSIONS
24500								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Middle Channel
Z-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	94.88	V	114	-19.12	Peak	1	290	
2450	80.46	V	94	-13.54	Avg	1	290	
4900	62.98	V	74	-11.02	Peak	1	15	
4900	48.56	V	54	-5.44	Avg	1	15	
7350	61.51	V	74	-12.49	Peak	1	270	
7350	47.09	V	54	-6.91	Avg	1	270	
9800								NO EMISSIONS
9800								DETECTED
12250								NO EMISSIONS
12250								DETECTED
14700								NO EMISSIONS
14700								DETECTED
17150								NO EMISSIONS
17150								DETECTED
19600								NO EMISSIONS
19600								DETECTED
22050								NO EMISSIONS
22050								DETECTED
24500								NO EMISSIONS
24500								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

Middle Channel
Z-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2450	98.07	H	114	-15.93	Peak	1.25	280	
2450	83.65	H	94	-10.35	Avg	1.25	280	
4900	63.53	H	74	-10.47	Peak	1.1	100	
4900	49.11	H	54	-4.89	Avg	1.1	100	
7350	61.88	H	74	-12.12	Peak	1.5	45	
7350	47.46	H	54	-6.54	Avg	1.5	45	
9800								NO EMISSIONS
9800								DETECTED
12250								NO EMISSIONS
12250								DETECTED
14700								NO EMISSIONS
14700								DETECTED
17150								NO EMISSIONS
17150								DETECTED
19600								NO EMISSIONS
19600								DETECTED
22050								NO EMISSIONS
22050								DETECTED
24500								NO EMISSIONS
24500								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel
X-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	95.13	V	114	-18.87	Peak	1.75	180	
2475	80.71	V	94	-13.29	Avg	1.75	180	
4950	61.36	V	74	-12.64	Peak	2.25	290	
4950	46.94	V	54	-7.06	Avg	2.25	290	
7425	60.56	V	74	-13.44	Peak	1.75	340	
7425	46.14	V	54	-7.86	Avg	1.75	340	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel
X-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	101.21	H	114	-12.79	Peak	1	90	
2475	86.79	H	94	-7.21	Avg	1	90	
4950	63.93	H	74	-10.07	Peak	1	350	
4950	49.51	H	54	-4.49	Avg	1	350	
7425	60.93	H	74	-13.07	Peak	1.5	325	
7425	46.51	H	54	-7.49	Avg	1.5	325	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel
Y-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	100.47	V	114	-13.53	Peak	1.25	240	
2475	86.05	V	94	-7.95	Avg	1.25	240	
4950	62.45	V	74	-11.55	Peak	1.25	85	
4950	48.03	V	54	-5.97	Avg	1.25	85	
7425	62.87	V	74	-11.13	Peak	1	325	
7425	48.45	V	54	-5.55	Avg	1	325	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel

Y-Axis - Horizontal

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	93.66	H	114	-20.34	Peak	1.5	160	
2475	79.24	H	94	-14.76	Avg	1.5	160	
4950	62.02	H	74	-11.98	Peak	1.5	180	
4950	47.6	H	54	-6.4	Avg	1.5	180	
7425	62.61	H	74	-11.39	Peak	1.35	45	
7425	48.19	H	54	-5.81	Avg	1.35	45	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED

FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel
Z-Axis - Vertical

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	95.4	V	114	-18.6	Peak	1	0	
2475	80.98	V	94	-13.02	Avg	1	0	
4950	62.74	V	74	-11.26	Peak	1.5	35	
4950	48.32	V	54	-5.68	Avg	1.5	35	
7425	60.54	V	74	-13.46	Peak	1.5	90	
7425	46.12	V	54	-7.88	Avg	1.5	90	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED

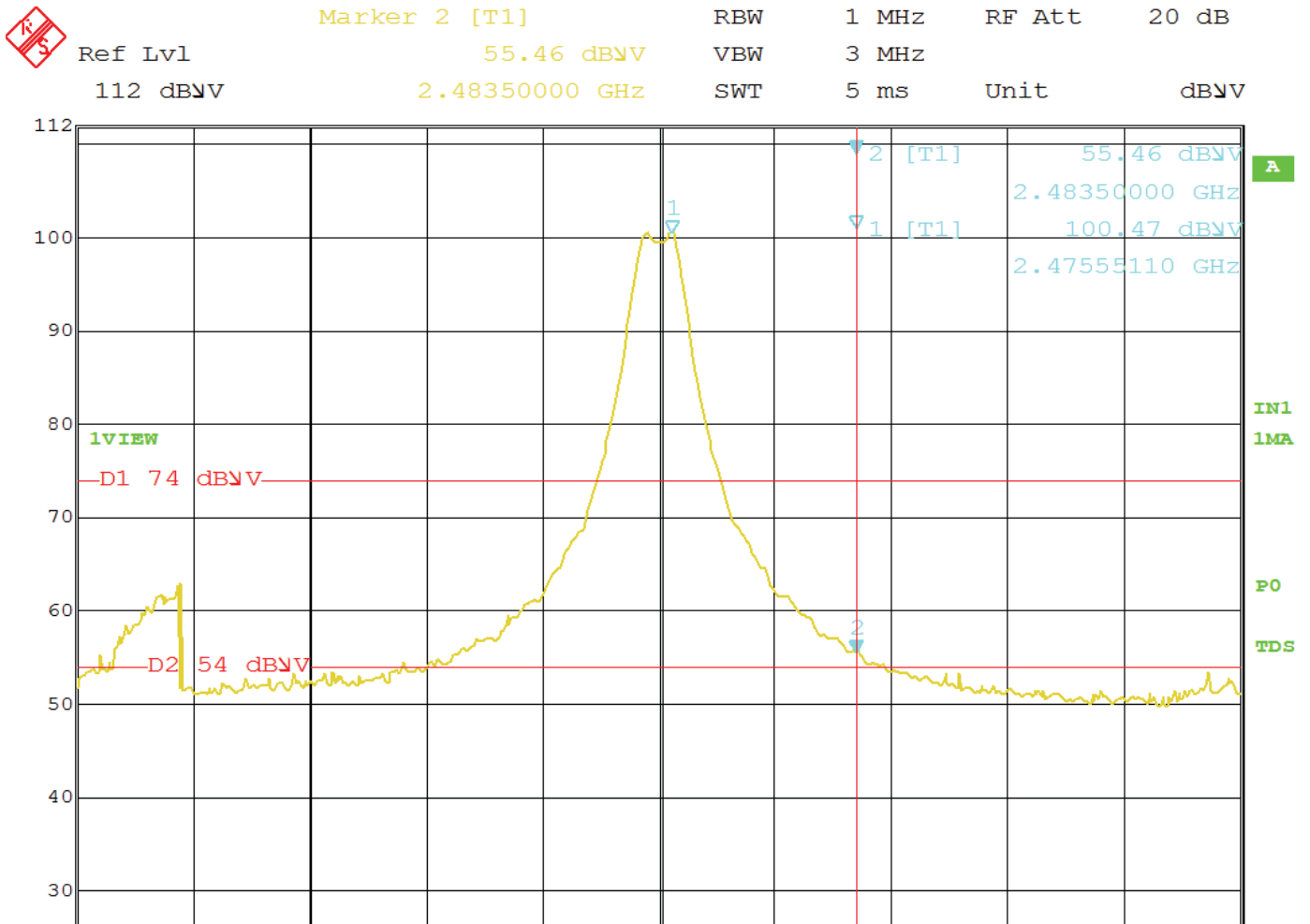
FCC 15.249

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

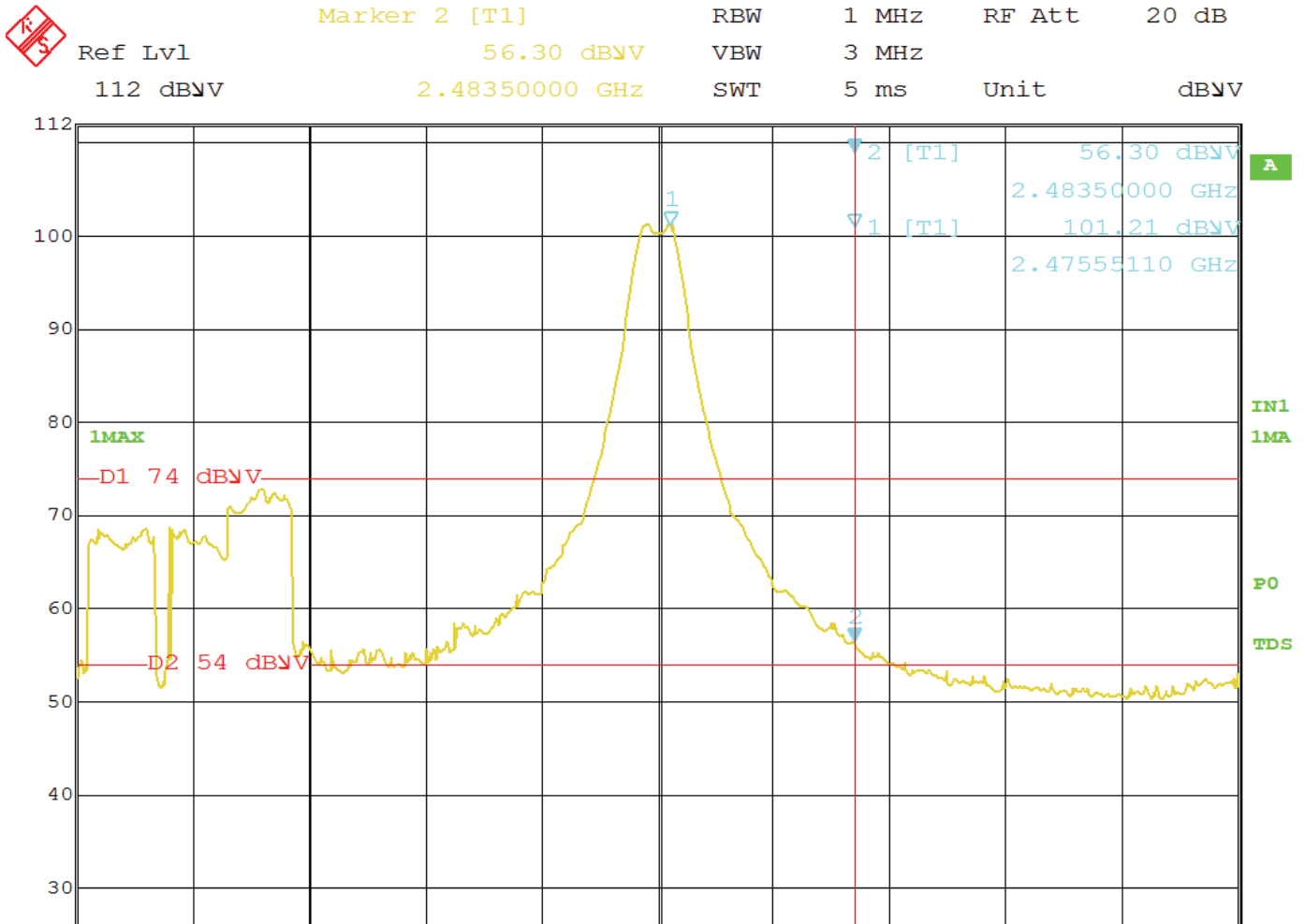
Date: 10/06/2014
Lab: B
Tested By: Kenneth Lee

High Channel Z-Axis - Horizontal

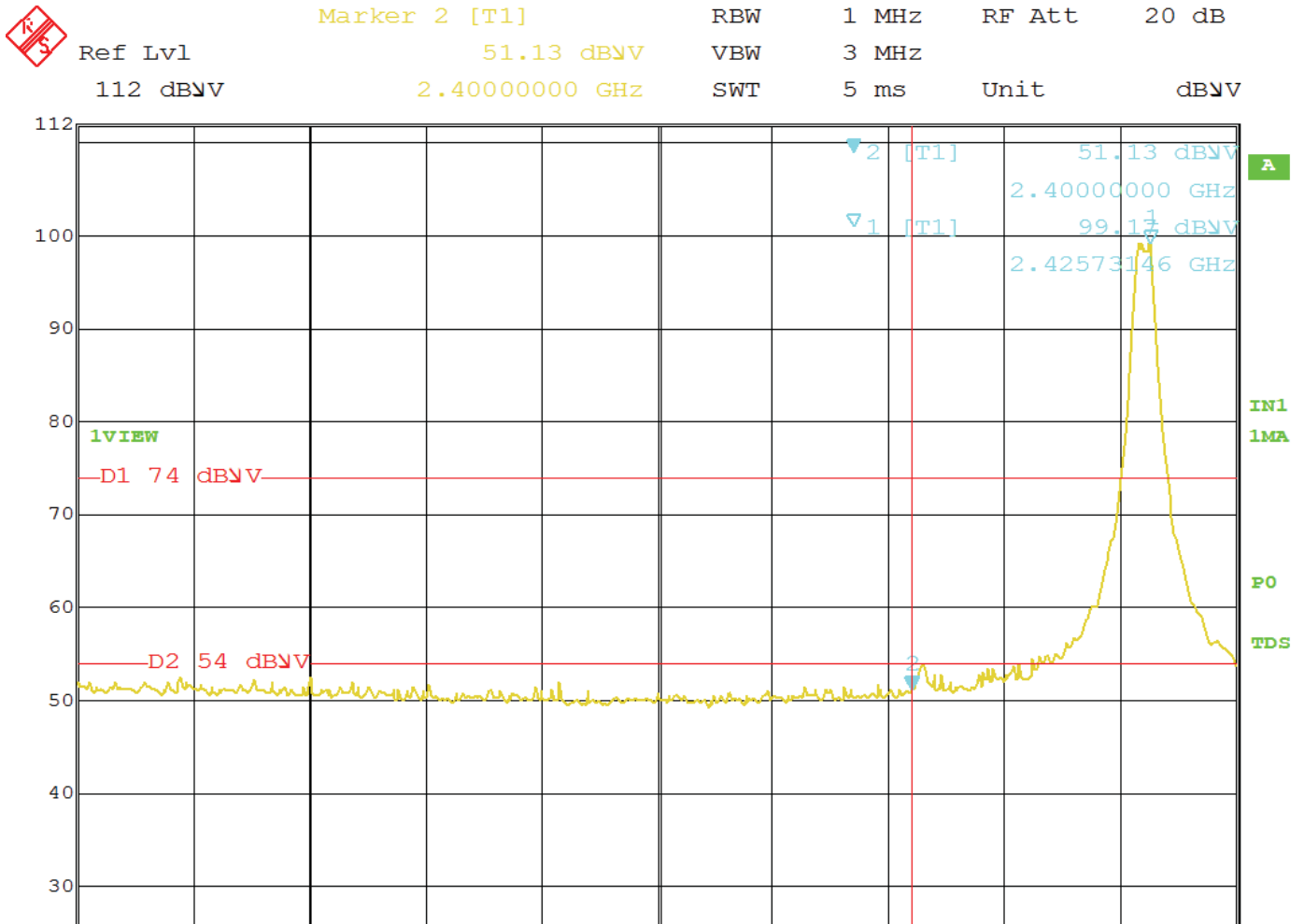
Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2475	98.67	H	114	-15.33	Peak	1.15	280	
2475	84.25	H	94	-9.75	Avg	1.15	280	
4950	63.56	H	74	-10.44	Peak	1.3	115	
4950	49.14	H	54	-4.86	Avg	1.3	115	
7425	60.45	H	74	-13.55	Peak	1.75	180	
7425	46.03	H	54	-7.97	Avg	1.75	180	
9900								NO EMISSIONS
9900								DETECTED
12375								NO EMISSIONS
12375								DETECTED
14850								NO EMISSIONS
14850								DETECTED
17325								NO EMISSIONS
17325								DETECTED
19800								NO EMISSIONS
19800								DETECTED
22275								NO EMISSIONS
22275								DETECTED
24750								NO EMISSIONS
24750								DETECTED



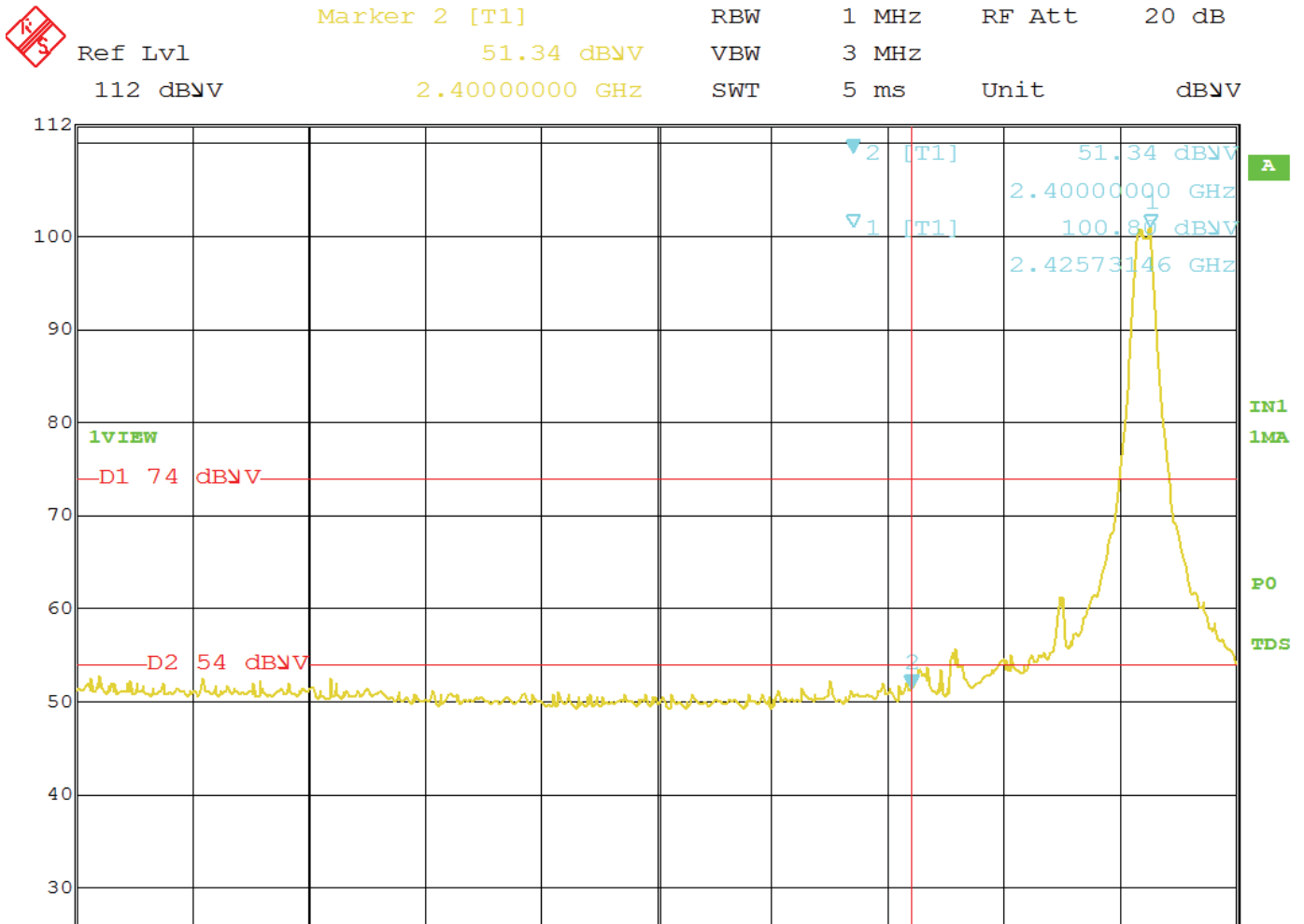
Band Edge – Vertical Polarization – High Ch – Y-Axis – Worst Case



Band Edge – Horizontal Polarization – High Ch – X-Axis – Worst Case



Band Edge – Horizontal Polarization – Low Ch – X-Axis – Worst Case



Band Edge – Vertical Polarization – Low Ch – Y-Axis – Worst Case

FCC 15.249 and FCC Class B

Universal Electronics, Inc.
EchoStar Sage ZHA Remote 2014
Model: URC-2001BC0-R

Date: 10/06/2014

Lab: B

Tested By: Kenneth Lee

Digital Portion and Non-Harmonic Emissions of the Transmitter
Vertical and Horizontal Polarizations

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected
								from 10 kHz to 30 MHz
								for the Digital Portion
								for both the Vertical and
								Horizontal Polarizations.
								No Emissions Detected
								from 10 kHz to 30 MHz
								for the Non-Harmonic
								Emissions from the Tx for the
								EUT for both the Vertical and
								Horizontal Polarizations.
								No Emissions Detected
								from 1 GHz to 25 GHz
								for the Digital Portion
								for both the Vertical and
								Horizontal Polarizations.
								No Emissions Detected
								from 1 GHz to 25 GHz
								for the Non-Harmonic
								Emissions from the Tx for the
								EUT for both the Vertical and
								Horizontal Polarizations.
								Investigated in the
								X, Y, and Z-Axis