

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

for

ECHOSTAR 52.0 MELBOURNE 2014

MODEL: URC-2024BC0-R

Prepared for

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

Prepared by: _____

KENNETH LEE

Approved by: _____

KYLE FUJIMOTO

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: APRIL 23, 2015

	REPORT	APPENDICES					TOTAL
	BODY	A	B	C	D	E	
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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 52.0 Melbourne 2014
Model: URC-2024BC0-R
EchoStar model number: 52.0
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: February 23, 2015 and April 23, 2015

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 52.0 Melbourne 2014, Model: URC-2024BC0-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.

James Ross

Test Engineer

Kenneth Lee

Test Technician

2.4 Date Test Sample was Received

The test sample was received on February 23, 2015.

2.5 Disposition of the Test Sample

The test sample has not been returned to Universal 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
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

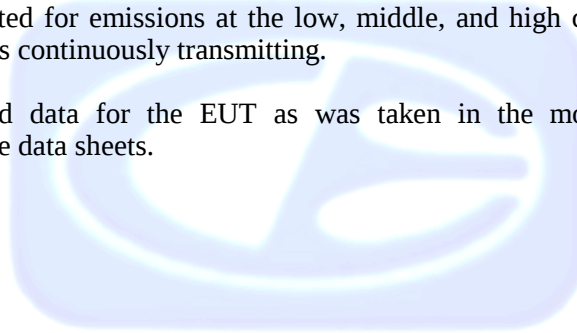
4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - Emissions

The EchoStar 52.0 Melbourne 2014, Model: URC-2024BC0-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 52.0 MELBOURNE 2014	UNIVERSAL ELECTRONICS, INC.	URC-2024BC0-R ECHOSTAR MODEL NUMBER 52.0	N/A	MG3-2024

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	December 4, 2014	1 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	April 3, 2015	1 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	May 20, 2014	1 Year
Preamplifier	Com-Power	PA-118	551024	March 6, 2015	1 Year
Preamplifier	Com-Power	PA-840	711013	May 13, 2014	2 Year
Loop Antenna	Com-Power	AL-130	17089	February 6, 2015	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

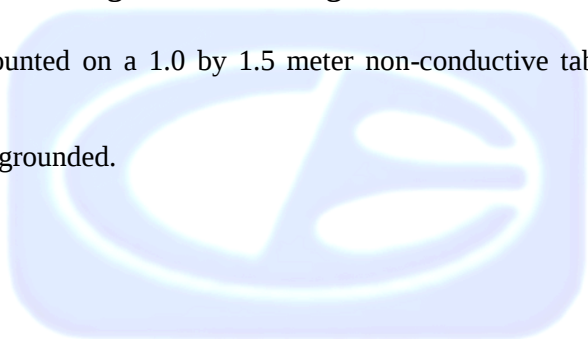
6.1 Test Facility Description

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 $20 \log(\text{dwell time} / 100 \text{ ms})$. 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.

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 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

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 52.0 Melbourne 2014, Model: URC-2024BC0-R

Frequency MHz	Average Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
7425 (H) (Y-Axis) (High Channel)	47.74	54	-6.26
7350 (H) (Y-Axis) (Mid Channel)	47.15	54	-6.85
7275 (H) (Y-Axis) (Low Channel)	46.59	54	-7.41
7425 (H) (Z-Axis) (High Channel)	45.38	54	-8.62
7275 (V) (Z-Axis) (Low Channel)	45.04	54	-8.96
7350 (H) (X-Axis) (Mid Channel)	44.63	54	-9.37

Notes:

(H) Horizontal

(V) Vertical

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

8. CONCLUSIONS

The EchoStar 52.0 Melbourne 2014, Model: URC-2024BC0-R, as tested, meets all of the specification limits defined in CFR Title 47, Part 15, Subpart B, and the limits of CFR 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



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](http://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

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

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 52.0 Melbourne 2014
Model: URC-2024BC0-R
EchoStar model number: 52.0
S/N: N/A

There were no additional models covered under this report.

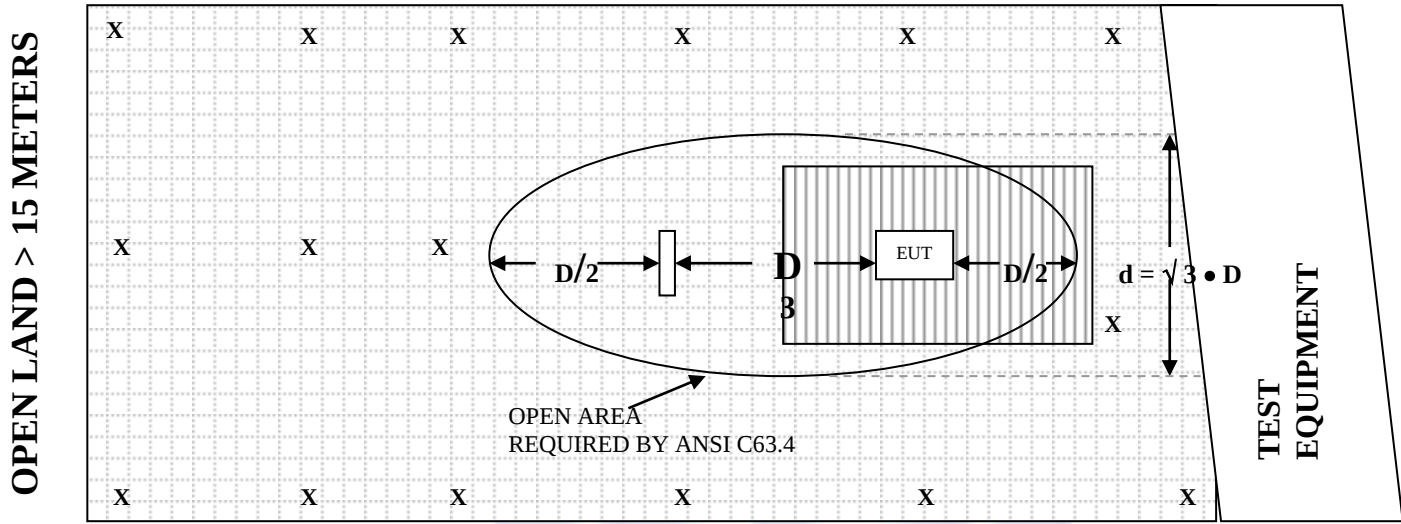


APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE

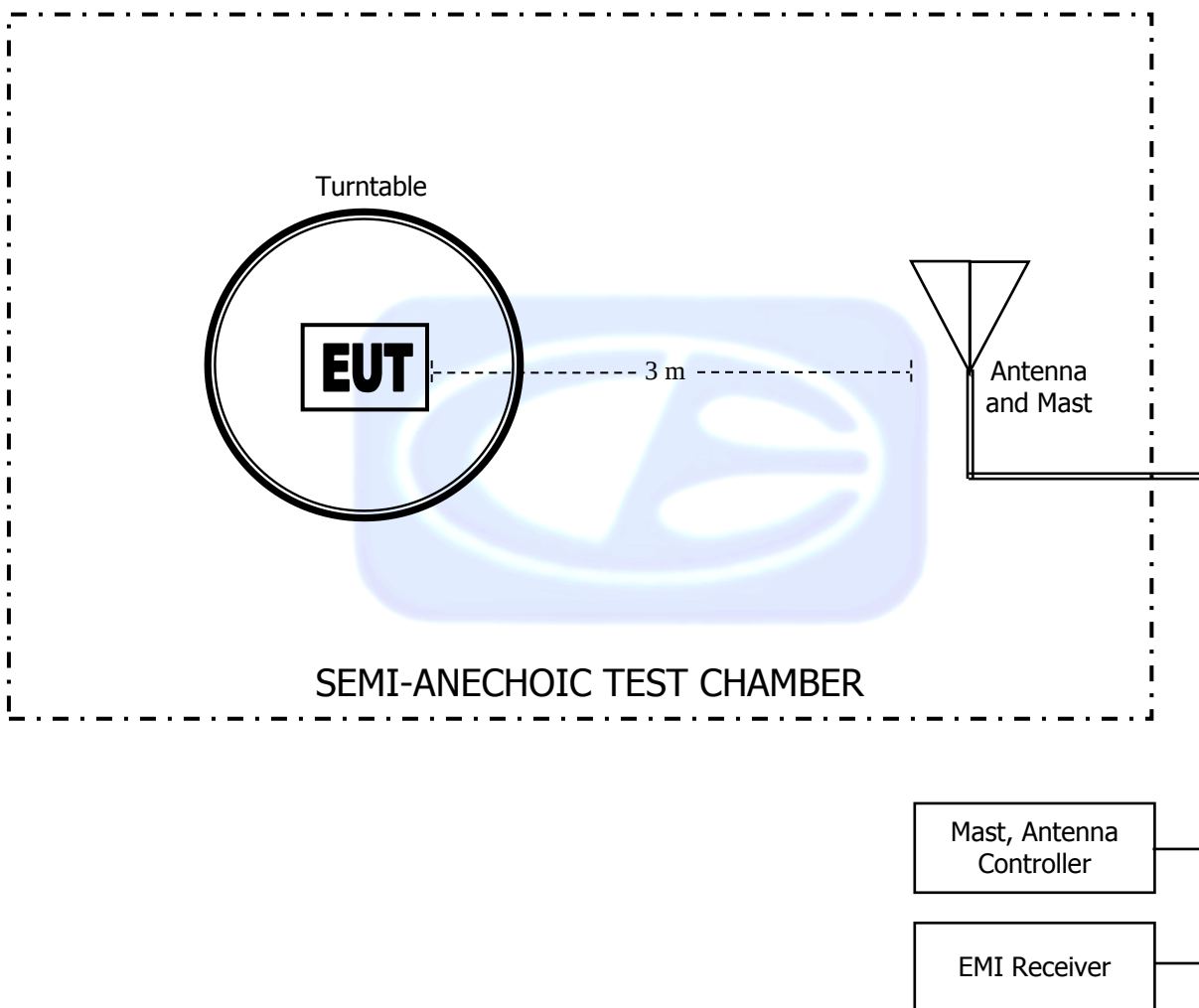
OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

X	= GROUND RODS		= GROUND SCREEN
D	= TEST DISTANCE (meters)		= WOOD COVER

FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



COM-POWER AL-130**LOOP ANTENNA****S/N: 17089****CALIBRATION DATE: FEBRUARY 6, 2015**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-33.18	18.32
0.01	-34.10	17.40
0.02	-38.65	12.85
0.03	-39.28	12.22
0.04	-40.09	11.41
0.05	-40.85	10.65
0.06	-40.88	10.62
0.07	-41.07	10.43
0.08	-41.04	10.46
0.09	-41.19	10.31
0.1	-41.20	10.30
0.2	-41.52	9.98
0.3	-41.53	9.97
0.4	-41.42	10.08
0.5	-41.53	9.97
0.6	-41.53	9.97
0.7	-41.43	10.07
0.8	-41.23	10.27
0.9	-41.13	10.37
1	-41.14	10.36
2	-40.80	10.70
3	-40.66	10.84
4	-40.61	10.89
5	-40.33	11.17
6	-40.53	10.97
7	-40.47	11.03
8	-40.48	11.02
9	-39.93	11.57
10	-39.81	11.69
15	-43.35	8.15
20	-39.16	12.34
25	-40.24	11.26
30	-43.18	8.32

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: 551024****CALIBRATION DATE: MARCH 6, 2015**

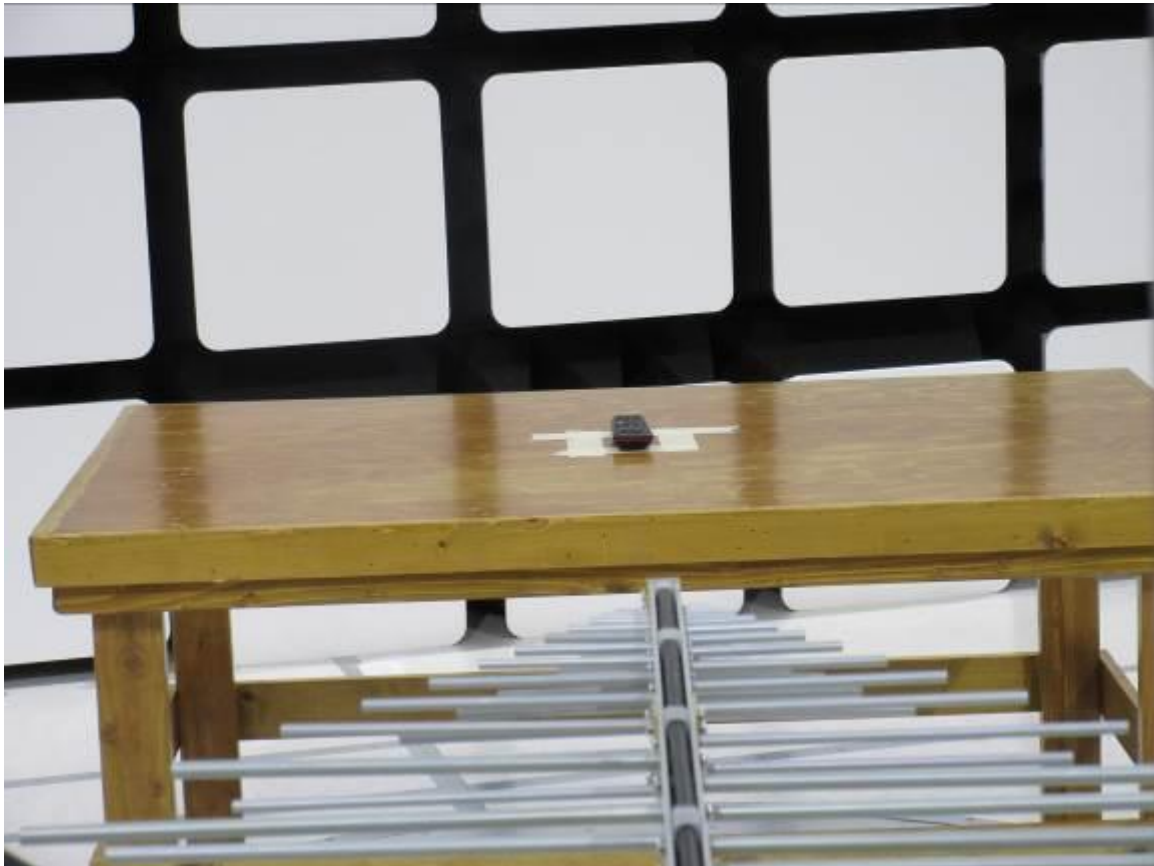
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	39.76	6.0	38.77
1.1	40.46	6.5	38.46
1.2	40.05	7.0	38.27
1.3	40.58	7.5	38.77
1.4	39.50	8.0	39.25
1.5	39.92	8.5	38.63
1.6	40.40	9.0	39.58
1.7	40.10	9.5	42.12
1.8	40.49	10.0	38.53
1.9	38.86	11.0	40.21
2.0	41.53	12.0	41.15
2.5	41.05	13.0	40.51
3.0	40.29	14.0	40.32
3.5	40.82	15.0	39.47
4.0	40.88	16.0	39.88
4.5	41.37	17.0	39.79
5.0	40.73	18.0	40.61
5.5	39.05		

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**

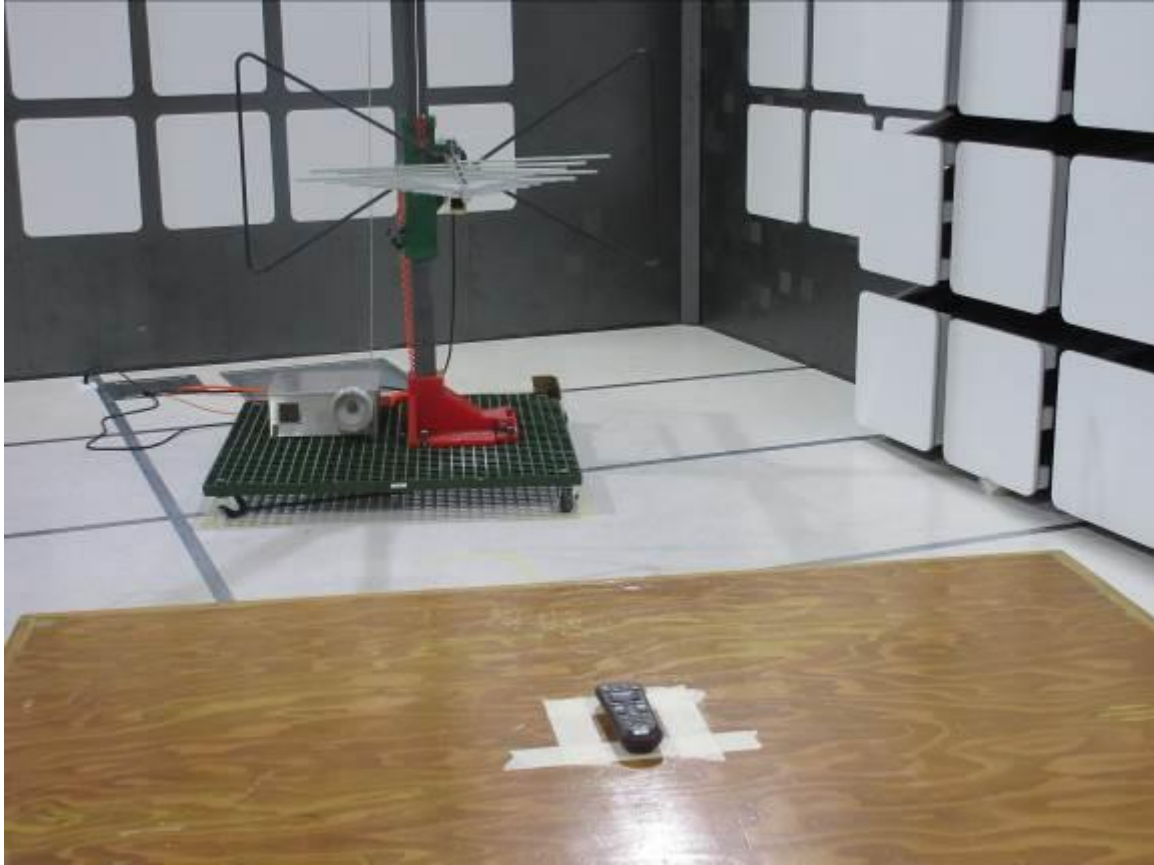
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	25.19	31.0	25.69
19.0	24.48	31.5	25.74
20.0	24.39	32.0	26.35
21.0	24.73	32.5	26.64
22.0	23.49	33.0	25.98
23.0	24.23	33.5	24.68
24.0	24.59	34.0	24.61
25.0	25.32	34.5	23.78
26.0	25.66	35.0	24.74
26.5	25.99	35.5	24.39
27.0	26.26	36.0	23.46
27.5	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 52.0 MELBOURNE 2014
MODEL: URC-2024BC0-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 52.0 MELBOURNE 2014
MODEL: URC-2024BC0-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 52.0 MELBOURNE 2014
MODEL: URC-2024BC0-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 52.0 MELBOURNE 2014
MODEL: URC-2024BC0-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

FCC 15.249

Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	88.85	V	114	-25.15	Peak	2	135	
2425	68.85	V	94	-25.15	Avg	2	135	
4850	52.95	V	74	-21.05	Peak	1.1	95	
4850	32.95	V	54	-21.05	Avg	1.1	95	
7275	63.48	V	74	-10.52	Peak	1.1	170	
7275	43.48	V	54	-10.52	Avg	1.1	170	
9700	53.04	V	74	-20.96	Peak	1	135	
9700	33.04	V	54	-20.96	Avg	1	135	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	99.88	H	114	-14.12	Peak	1	355	
2425	79.88	H	94	-14.12	Avg	1	355	
4850	58.81	H	74	-15.19	Peak	1.5	180	
4850	38.81	H	54	-15.19	Avg	1.5	180	
7275	64.5	H	74	-9.5	Peak	1	45	
7275	44.5	H	54	-9.5	Avg	1	45	
9700	54.46	H	74	-19.54	Peak	1	165	
9700	34.46	H	54	-19.54	Avg	1	165	
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 15.249Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-RDate: 04/23/2015
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	96.54	V	114	-17.46	Peak	1	270	
2425	76.54	V	94	-17.46	Avg	1	270	
4850	57.51	V	74	-16.49	Peak	1.25	95	
4850	37.51	V	54	-16.49	Avg	1.25	95	
7275	63.4	V	74	-10.6	Peak	1.25	335	
7275	43.4	V	54	-10.6	Avg	1.25	335	
9700	53.51	V	74	-20.49	Peak	1.1	45	
9700	33.51	V	54	-20.49	Avg	1.1	45	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	99.99	H	114	-14.01	Peak	1.5	0	
2425	79.99	H	94	-14.01	Avg	1.5	0	
4850	60.06	H	74	-13.94	Peak	1.35	5	
4850	40.06	H	54	-13.94	Avg	1.35	5	
7275	66.59	H	74	-7.41	Peak	1.15	335	
7275	46.59	H	54	-7.41	Avg	1.15	335	
9700	56.08	H	74	-17.92	Peak	1	0	
9700	36.08	H	54	-17.92	Avg	1	0	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	100.1	V	114	-13.9	Peak	1	90	
2425	80.1	V	94	-13.9	Avg	1	90	
4850	60.6	V	74	-13.4	Peak	1	90	
4850	40.6	V	54	-13.4	Avg	1	90	
7275	65.04	V	74	-8.96	Peak	1	235	
7275	45.04	V	54	-8.96	Avg	1	235	
9700	54.37	V	74	-19.63	Peak	1.5	95	
9700	34.37	V	54	-19.63	Avg	1.5	95	
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

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Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	91.41	H	114	-22.59	Peak	1.65	235	
2425	71.41	H	94	-22.59	Avg	1.65	235	
4850	51.76	H	74	-22.24	Peak	1.5	135	
4850	31.76	H	54	-22.24	Avg	1.5	135	
7275	63.97	H	74	-10.03	Peak	1	180	
7275	43.97	H	54	-10.03	Avg	1	180	
9700	53.51	H	74	-20.49	Peak	1	65	
9700	33.51	H	54	-20.49	Avg	1	65	
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

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Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	90.8	V	114	-23.2	Peak	1	85	
2450	70.8	V	94	-23.2	Avg	1	85	
4900	51.98	V	74	-22.02	Peak	1	95	
4900	31.98	V	54	-22.02	Avg	1	95	
7350	64.42	V	74	-9.58	Peak	1	170	
7350	44.42	V	54	-9.58	Avg	1	170	
9800	54.41	V	74	-19.59	Peak	1	335	
9800	34.41	V	54	-19.59	Avg	1	335	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	100.25	H	114	-13.75	Peak	1	35	
2450	80.25	H	94	-13.75	Avg	1	35	
4900	57.95	H	74	-16.05	Peak	1	180	
4900	37.95	H	54	-16.05	Avg	1	180	
7350	64.63	H	74	-9.37	Peak	1	45	
7350	44.63	H	54	-9.37	Avg	1	45	
9800	54.09	H	74	-19.91	Peak	1.35	90	
9800	34.09	H	54	-19.91	Avg	1.35	90	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	95.85	V	114	-18.15	Peak	1.5	235	
2450	75.85	V	94	-18.15	Avg	1.5	235	
4900	56.68	V	74	-17.32	Peak	1.25	95	
4900	36.68	V	54	-17.32	Avg	1.25	95	
7350	64.5	V	74	-9.5	Peak	1	335	
7350	44.5	V	54	-9.5	Avg	1	335	
9800	56.18	V	74	-17.82	Peak	1.35	335	
9800	36.18	V	54	-17.82	Avg	1.35	335	
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 15.249Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-RDate: 04/23/2015
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	100.23	H	114	-13.77	Peak	1.5	0	
2450	80.23	H	94	-13.77	Avg	1.5	0	
4900	60.26	H	74	-13.74	Peak	1.65	0	
4900	40.26	H	54	-13.74	Avg	1.65	0	
7350	67.15	H	74	-6.85	Peak	1.15	345	
7350	47.15	H	54	-6.85	Avg	1.15	345	
9800	56.19	H	74	-17.81	Peak	1.1	45	
9800	36.19	H	54	-17.81	Avg	1.1	45	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	99.2	V	114	-14.8	Peak	1.1	0	
2450	79.2	V	94	-14.8	Avg	1.1	0	
4900	59.26	V	74	-14.74	Peak	1	90	
4900	39.26	V	54	-14.74	Avg	1	90	
7350	63.28	V	74	-10.72	Peak	1	135	
7350	43.28	V	54	-10.72	Avg	1	135	
9800	55.8	V	74	-18.2	Peak	1.15	190	
9800	35.8	V	54	-18.2	Avg	1.15	190	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	91.89	H	114	-22.11	Peak	1.85	135	
2450	71.89	H	94	-22.11	Avg	1.85	135	
4900	52.24	H	74	-21.76	Peak	1.35	135	
4900	32.24	H	54	-21.76	Avg	1.35	135	
7350	64.57	H	74	-9.43	Peak	1	45	
7350	44.57	H	54	-9.43	Avg	1	45	
9800	57.54	H	74	-16.46	Peak	2	280	
9800	37.54	H	54	-16.46	Avg	2	280	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	92.39	V	114	-21.61	Peak	2	135	
2475	72.39	V	94	-21.61	Avg	2	135	
4950	53.19	V	74	-20.81	Peak	2.1	135	
4950	33.19	V	54	-20.81	Avg	2.1	135	
7425	64.29	V	74	-9.71	Peak	1	160	
7425	44.29	V	54	-9.71	Avg	1	160	
9900	53.1	V	74	-20.9	Peak	1	345	
9900	33.1	V	54	-20.9	Avg	1	345	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	99.58	H	114	-14.42	Peak	1	10	
2475	79.58	H	94	-14.42	Avg	1	10	
4950	58.36	H	74	-15.64	Peak	1.5	190	
4950	38.36	H	54	-15.64	Avg	1.5	190	
7425	62.71	H	74	-11.29	Peak	1	45	
7425	42.71	H	54	-11.29	Avg	1	45	
9900	53.86	H	74	-20.14	Peak	1	90	
9900	33.86	H	54	-20.14	Avg	1	90	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	95.23	V	114	-18.77	Peak	1.5	65	
2475	75.23	V	94	-18.77	Avg	1.5	65	
4950	57.44	V	74	-16.56	Peak	1.25	110	
4950	37.44	V	54	-16.56	Avg	1.25	110	
7425	64.62	V	74	-9.38	Peak	1.15	355	
7425	44.62	V	54	-9.38	Avg	1.15	355	
9900	57.05	V	74	-16.95	Peak	1	45	
9900	37.05	V	54	-16.95	Avg	1	45	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	100.09	H	114	-13.91	Peak	1.1	0	
2475	80.09	H	94	-13.91	Avg	1.1	0	
4950	63.32	H	74	-10.68	Peak	1.15	0	
4950	43.32	H	54	-10.68	Avg	1.15	0	
7425	67.74	H	74	-6.26	Peak	1.5	345	
7425	47.74	H	54	-6.26	Avg	1.5	345	
9900	56.04	H	74	-17.96	Peak	1.5	160	
9900	36.04	H	54	-17.96	Avg	1.5	160	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	99.32	V	114	-14.68	Peak	1	15	
2475	79.32	V	94	-14.68	Avg	1	15	
4950	62.12	V	74	-11.88	Peak	1	90	
4950	42.12	V	54	-11.88	Avg	1	90	
7425	64.04	V	74	-9.96	Peak	1.75	80	
7425	44.04	V	54	-9.96	Avg	1.75	80	
9900	54.56	V	74	-19.44	Peak	1.1	45	
9900	34.56	V	54	-19.44	Avg	1.1	45	
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 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
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	91.1	H	114	-22.9	Peak	1.75	235	
2475	71.1	H	94	-22.9	Avg	1.75	235	
4950	53.18	H	74	-20.82	Peak	1	45	
4950	33.18	H	54	-20.82	Avg	1	45	
7425	65.38	H	74	-8.62	Peak	1.1	60	
7425	45.38	H	54	-8.62	Avg	1.1	60	
9900	55.3	H	74	-18.7	Peak	1	0	
9900	35.3	H	54	-18.7	Avg	1	0	
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



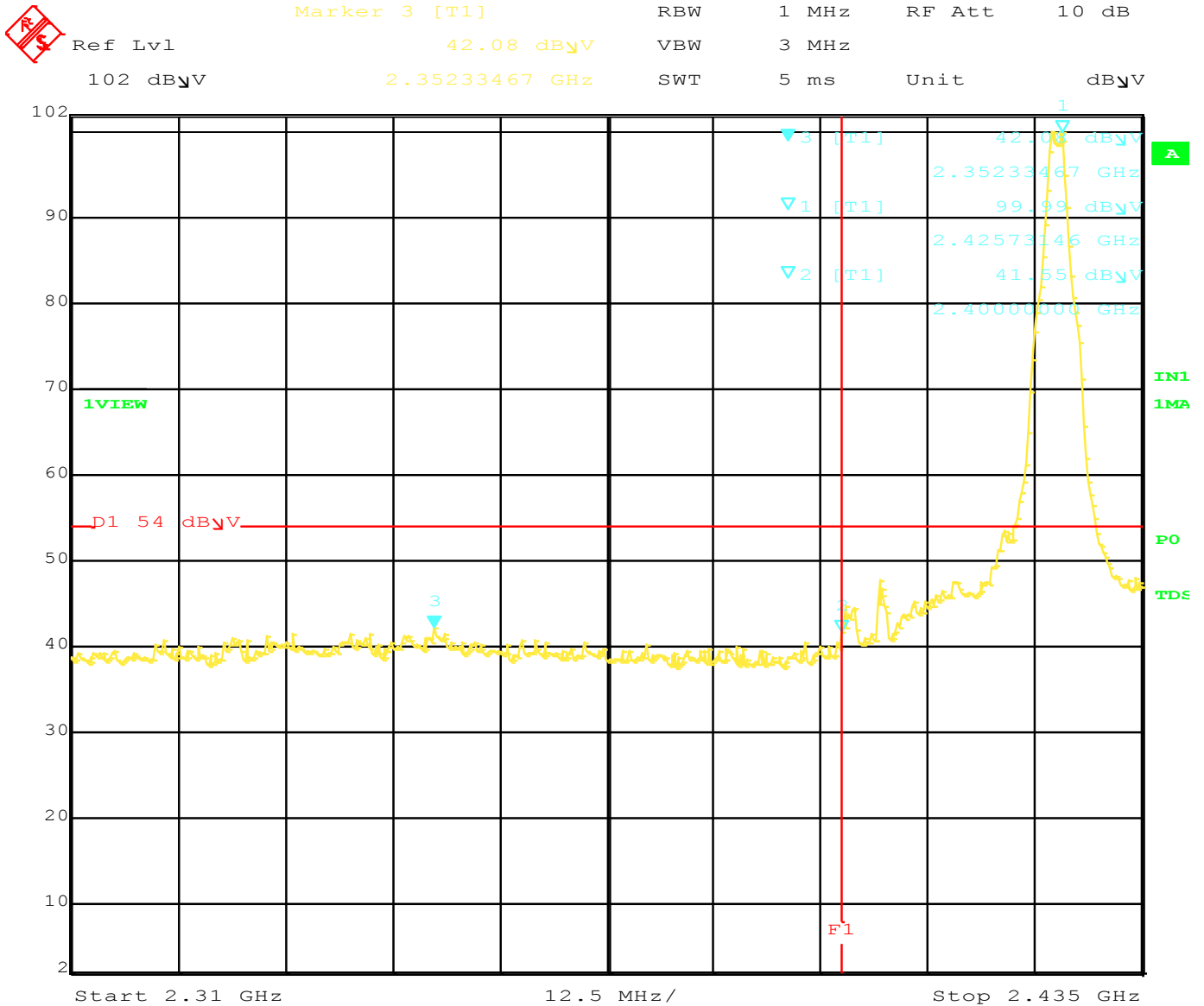
FCC 15.249

Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-R

Date: 04/23/2015
Lab: B
Tested By: Kenneth Lee

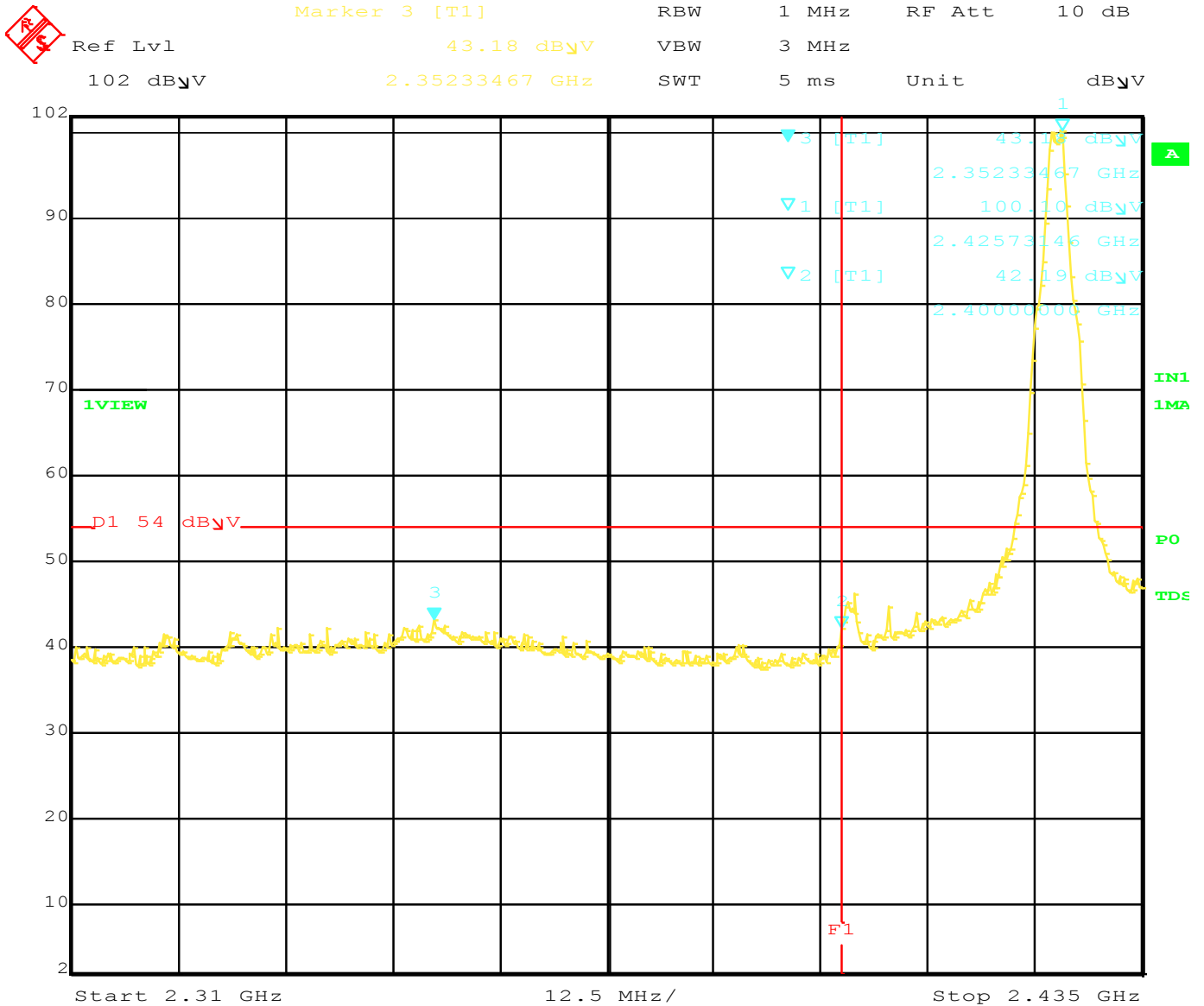
Band Edges

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2425	100.1	V	114	-13.9	Peak	1	90	Fundamental
2425	80.1	V	94	-13.9	Avg	1	90	of Low Channel
2352	43.18	V	74	-30.82	Peak	1	90	Band Edge of Low Channel
2352	23.18	V	54	-30.82	Avg	1	90	Z-Axis Worst Case
2425	99.99	H	114	-14.01	Peak	1.5	0	Fundamental of
2425	79.99	H	94	-14.01	Avg	1.5	0	Low Channel
2352	42.08	H	74	-31.92	Peak	1.5	0	Band Edge of Low Channel
2352	22.08	H	54	-31.92	Avg	1.5	0	Y-Axis Worst Case
2475	100.09	H	114	-13.91	Peak	1.1	0	Fundamental of
2475	80.09	H	94	-13.91	Avg	1.1	0	High Channel
2498	50.86	H	74	-23.14	Peak	1.1	0	Band Edge of High Channel
2498	30.86	H	54	-23.14	Avg	1.1	0	Y-Axis Worst Case
2475	99.32	V	114	-14.68	Peak	1	15	Fundamental of
2475	79.32	V	94	-14.68	Avg	1	15	High Channel
2498	50.39	V	74	-23.61	Peak	1	15	Band Edge of High Channel
2498	30.39	V	54	-23.61	Avg	1	15	Z-Axis Worst Case



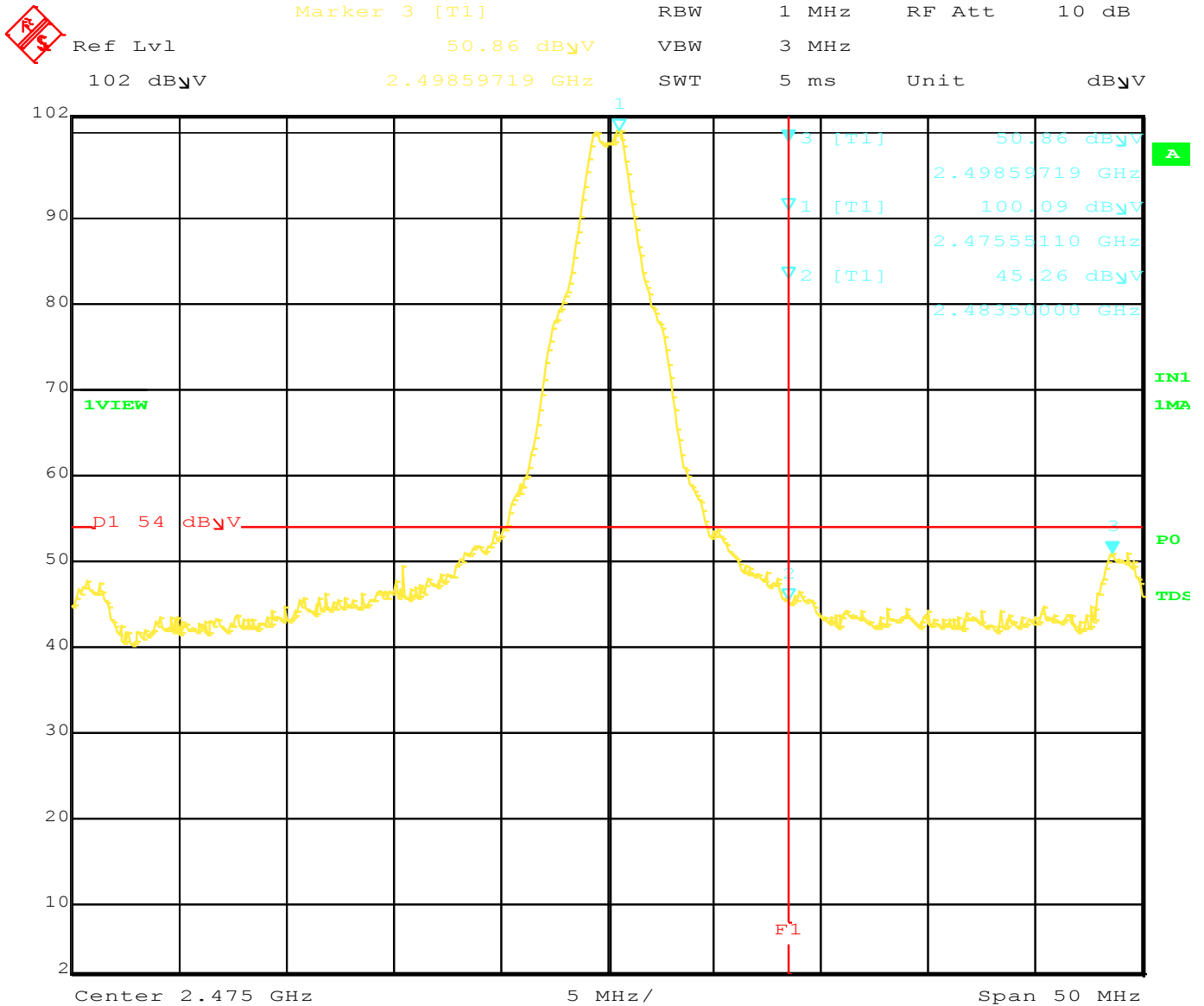
Date: 23.APR.2015 09:22:19

Band Edge – Low Channel – Horizontal Polarization – Y-Axis – Worst Case



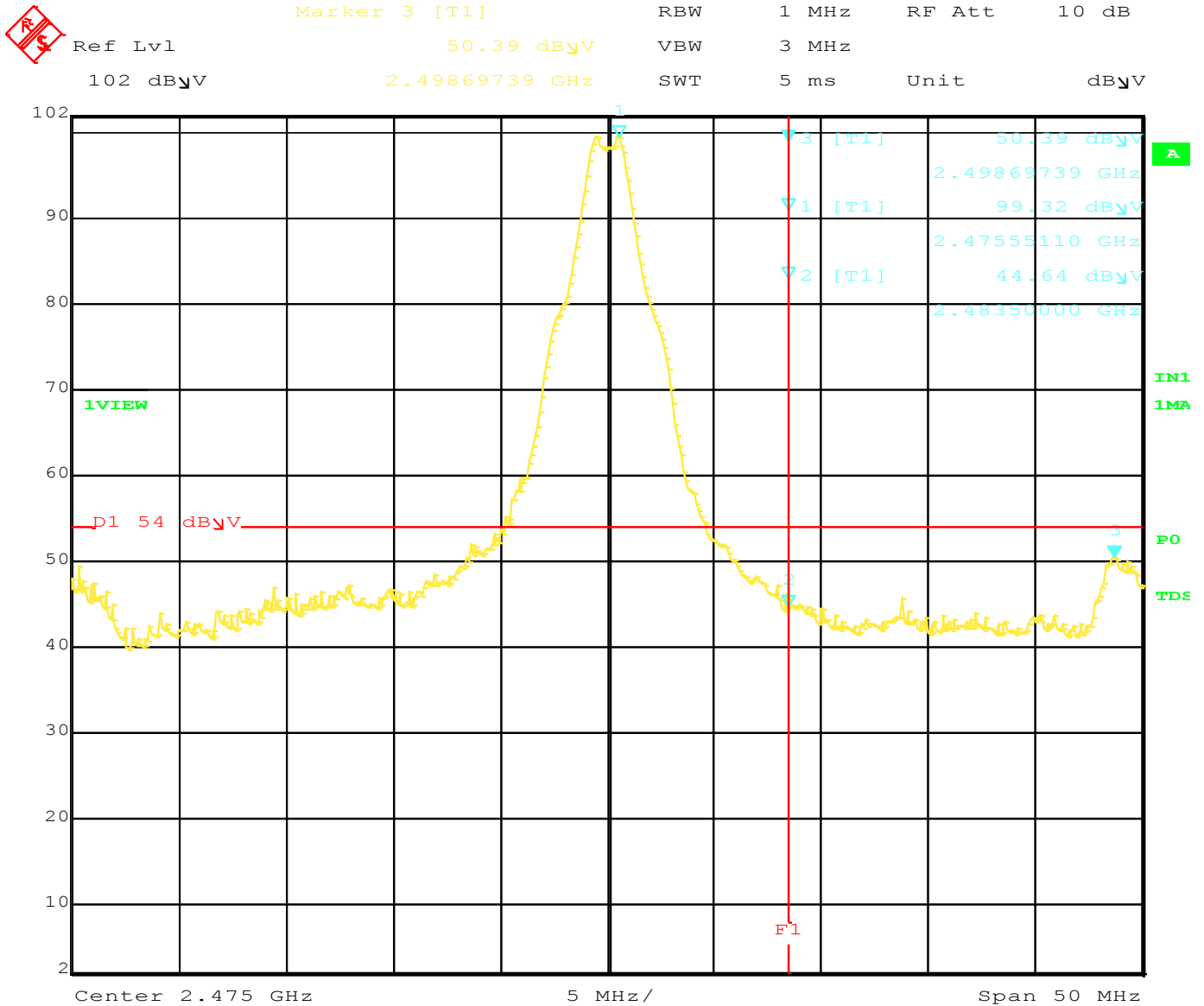
Date: 23.APR.2015 09:15:19

Band Edge – Low Channel – Vertical Polarization – Z-Axis – Worst Case



Date: 23.APR.2015 10:44:05

Band Edge – High Channel – Horizontal Polarization – Y-Axis – Worst Case



Date: 23.APR.2015 10:37:03

Band Edge – High Channel – Vertical Polarization – Z-Axis – Worst Case

FCC 15.249Universal Electronics, Inc.
EchoStar 52.0 Melbourne 2014
Model: URC-2024BC0-RDate: 04/23/2015
Lab: B
Tested By: Kenneth Lee**Digital Portion and Non-Harmonic Emissions from the Transmitter**
10 kHz to 30 MHz and 1 GHz to 25 GHz

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.
								Investigated in the X, Y, and Z-Axis
								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