

**FCC CLASS II PERMISSIVE CHANGE
TEST REPORT***for***DISH 54.0 BRISBANE CR 2018****Model: R32027BA00-00006**

Prepared for

UNIVERSAL ELECTRONICS, INC.
201 EAST SANDPOINTE AVENUE, 8TH FLOOR
SANTA ANA, CALIFORNIA 92707

Prepared by: _____

HARVEY SAMACO

Approved by: _____

KYLE FUJIMOTO

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

DATE: DECEMBER 16, 2019

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	21	2	2	2	13	36	76



This report shall not be reproduced except in full, without the written approval of Compatible Electronics.

TABLE OF CONTENTS

Section / Title	PAGE
GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS	5
1. PURPOSE	6
2. ADMINISTRATIVE DATA	7
2.1 Location of Testing	7
2.2 Traceability Statement	7
2.3 Cognizant Personnel	7
2.4 Date Test Sample was Received	7
2.5 Disposition of the Test Sample	7
2.6 Abbreviations and Acronyms	7
3. APPLICABLE DOCUMENTS	8
4. DESCRIPTION OF TEST CONFIGURATION	9
4.1.1 Cable Construction and Termination	9
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	10
5.1 EUT and Accessory List	10
6. TEST SITE DESCRIPTION	12
6.1 Test Facility Description	12
6.2 EUT Mounting, Bonding and Grounding	12
6.3 Measurement Uncertainty	12
7. CHARACTERISTICS OF THE TRANSMITTER	13
7.1 Channel Number and Frequencies	13
7.2 Antenna	13
8. TEST PROCEDURES	14
8.1 RF Emissions	14
8.1.1 Conducted Emissions Test	14
8.1.2 Radiated Emissions Test	15
8.1.3 RF Emissions Test Results	16
8.1.4 Sample calculations	17
8.2 DTS Bandwidth	18
8.3 Peak Output Power	18
8.4 RF Antenna Conducted Test	19
8.5 RF Band Edges	19
8.6 Spectral Density Test	20
9. CONCLUSIONS	21

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams and Charts • Test Setup Diagrams • Antenna and Effective Gain Factors
E	• Data Sheets
F	Class II Permissive Change Information

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Layout of the Semi-Anechoic Test Chamber

LIST OF TABLES

TABLE	TITLE
1.0	Radiated Emission Results

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: Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006
S/N: N/A

Product Description: The EUT is a universal remote control that allows users to operate devices using radio frequency (RF) signals and/or infrared (IR) signals.

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

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

Test Dates: December 13 and December 16-17, 2019

Test Specification covered by accreditation:



Test Specifications: Emissions requirements
CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209,
and 15.247

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

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

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	This test was not performed because the EUT is battery powered only.
2	Radiated RF Emissions, 9 kHz – 25000 MHz	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, 15.205, 15.209 and 15.247 (d) Highest reading in relation to spec limit 48.57 (Avg) dBuV/m @ 4950.00 MHz (*U = 3.61 dB)
3	DTS Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(2)
4	Peak Output Power	This test was not performed since it was unlikely to change due to the modification.
5	RF Band Edges	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d)
6	Spectral Density	This test was not performed since it was unlikely to change due to the modification

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Dish 54.0 Brisbane CR 2018, Model: R32027BA00-00006. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

The EUT was originally granted under the FCC ID: MG3-R32027B6. The EUT is a Class II Permissive Change because a change was made to the non-radio portion of the EUT and it is no longer electrically identical to the original. However, no RF parameters such as power output and frequency has been changed

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 Staff Engineer, Electrical

Compatible Electronics Inc.

Harvey Samaco Test Technician

Kyle Fujimoto Test Engineer

2.4 Date Test Sample was Received

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

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.

EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
DoC	Declaration of Conformity
N/A	Not Applicable
Tx	Transmit
Rx	Receive
Inc.	Incorporated
RF	Radio Frequency
IR	Infrared

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
558074 D01 DTS Meas Guidance v05r02	Guidance for Performing Compliance Measurements on Digital Transmissions Systems (DTS) Operating Under Section 15.247
ANSI C63.4 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION

The Dish 54.0 Brisbane CR 2018, Model: R32027BA00-00006 (EUT) was setup in a stand-alone configuration. The EUT was investigated in all three orthogonal axis (X, Y, & Z) at its low, middle, and high channels (2425 MHz, 2450 MHz, and 2475 MHz), respectively. During the testing, the EUT was continuously transmitting in its RF mode, as well as in its IR mode.

Fresh batteries were installed inside the EUT prior to the testing. The EUT was programmed via the Radio Control Console v4.0.3 firmware.

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

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

4.1.1 Cable Construction and Termination

The EUT had no external cables.

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

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
DISH 54.0 BRISBANE CR 2018 (EUT)	UNIVERSAL ELECTRONICS, INC.	R32027BA00-00006	N/A	MG3-R32027B6
LAPTOP*	HEWLETT PACKARD	HSTNN-C82C	N/A	N/A
AC ADAPTER FOR LAPTOP*	HEWLETT PACKARD	HSTNN-DA40	N/A	DoC
PROGRAM BOARD*	UNIVERSAL ELECTRONICS, INC.	RMF-TX300C	N/A	N/A
FIRMWARE*	UNIVERSAL ELECTRONICS, INC.	RADIO CONTROL CONSOLE	v4.0.3	N/A

*Used to program the EUT only and was removed prior to the testing

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
RADIATED AND CONDUCTED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies	N9038A	MY5120150	August 23, 2019	1 Year
CombiLog Antenna	Com-Power	AC-220	061093	June 5, 2019	2 Year
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
Turntable	Com-Power	TT-100	N/A	N/A	N/A
Antenna-Mast	Com-Power	AM-100	N/A	N/A	N/A
Horn Antenna	Com-Power	AH-118	071175	February 22, 2018	2 Year
Preamplifier	Com-Power	PA-118	181653	January 25, 2019	1 Year
Preamplifier	Com-Power	PA-840	711013	May 10, 2018	2 Year
Horn Antenna	Com-Power	AH-826	71957	N/A	N/A
Loop Antenna	Com-Power	AL-130R	121090	February 5, 2019	2 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

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

6.2 EUT Mounting, Bonding and Grounding

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

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

The EUT was not grounded.

6.3 Measurement Uncertainty

The uncertainty values are in the table below.

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

MEASUREMENT TYPE	PARTICULAR CONFIGURATION	UNCERTAINTY VALUES
RADIATED EMISSIONS	3-METER CHAMBER, COMBILOG ANTENNA	3.26 dB (Vertical) 3.19 dB (Horizontal)
RADIATED EMISSIONS	3-METER CHAMBER, HORN ANTENNA	3.61 dB

7. CHARACTERISTICS OF THE TRANSMITTER

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

7.1 Channel Number and Frequencies

The EUT uses a total of 3 channels which are spaced 25 MHz apart.

The low channel is 2425 MHz
The high channel is 2475 MHz

7.2 Antenna

The EUT has a 2 dBi gain inverted F trace antenna.

8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. A transient limiter was used for the protection of the EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the EMI Receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63:4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

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

The EUT was tested at 120 VAC. The six highest emissions are listed in Table 1.0.

Test Results:

This test was not performed because the EUT operates on battery power only and cannot be connected to the AC public mains.

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. Preamplifiers were used to increase the sensitivity of the instrument. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured.

The frequencies below 1 GHz were quasi-peaked using the quasi-peak detector of the EMI Receiver.

The frequencies above 1 GHz were averaged using the RMS detector average function on the EMI Receiver.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

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

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna
1 GHz to 25 GHz	1 MHz	Horn Antenna

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209, and 15.247 (d) for radiated emissions.

8.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Frequency (MHz)	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) (dB)
4950.00 (V) (Y-Axis)	48.57 (Avg)	53.97	-5.40
2483.50 (H) (X-axis)	47.98 (Avg)	53.97	-5.99
4900.00 (H) (Z-Axis)	47.89 (Avg)	53.97	-6.08
4900.00 (V) (Y-Axis)	47.88 (Avg)	53.97	-6.09
4950.00 (H) (Z-Axis)	47.66 (Avg)	53.97	-6.31
4950.00 (H) (Y-Axis)	47.26 (Avg)	53.97	-6.71

Notes:

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

8.1.4 Sample Calculations

A correction factor for the antenna, cable and a distance factor (if any) must be applied to the meter reading before a true field strength reading can be obtained. This Corrected Meter Reading is then compared to the specification limit in order to determine compliance with the limits.

The equation can be derived in the following manner:

Specification limit ($\mu\text{V/m}$) $\log \times 20$ = Specification Limit in dBuV

(Specification distance / test distance) $\log \times 40$ = distance factor

Note: When using an Active Antenna, the Antenna factor shall be subtracted due to the combination of the internal amplification and antenna loss. At lower frequencies the cable loss is negligible.

OR

Corrected Meter Reading = meter reading + F – A + C

where: F = antenna factor
A = amplifier gain
C = cable loss

The correction factors for the antenna and the amplifier gain are attached in Appendix D of this report. The data sheets are attached in Appendix E.

The distance factor D is 0 when the test is performed at the required specification distance.

8.2 DTS Bandwidth

The DTS Bandwidth was measured using the EMI Receiver. The following steps were performed for measuring the DTS Bandwidth.

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW) to equal or greater than 3 times the RBW
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep = Auto Couple
6. Allow the trace to stabilize
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(2).

8.3 Peak Output Power

The Peak Output Power was measured using radiated emissions method described in section 8.1.2 of this test report. The peak power was calculated by the following equation:

$$P = [(E \cdot D)^2] / (30 G)$$

P = Power in Watts for which you are solving

E = the measured maximum field strength in V/m utilizing the widest available RBW.

G = the numeric gain of the transmitting antenna over an isotropic radiator.

Test Results:

This test was not performed since it was unlikely to change due to the modification.

8.4 Emissions in Non-restricted Frequency Bands

The procedure described in section 8.1.2 of this test report was used to maximize the emissions. The procedure of section 11.11.2 of ANSI C63.10 was then used to determine that the highest reference level was the high channel, which was 101.40 dBuV/m

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The emissions in the non-restricted frequency bands are at least attenuated by 20 dB below the highest reference level established by section 11.11.2 of ANSI C63.10. Please see the data sheets located in Appendix E.

8.5 RF Band Edges

The RF band edges were taken at 2390 MHz when the EUT was on the low channel and 2483.5 MHz when the EUT was on the high channel using the EMI Receiver. A preamplifier was used to boost the signal level, with the plots being taken at a 3 meter test distance. The radiated emissions test procedure as describe in section 8.1.2 of this test report was used to maximize the emission.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power at the restricted bands closest to the band edges at 2390 MHz and 2483.5 MHz also meet the limits of section 15.209. Please see the data sheets located in Appendix E.

8.6 Spectral Density Test

The spectrum density output was measured using radiated emissions method described in section 8.1.2 of this test report. The spectral density was calculated by the following equation.

$$P = [(E \cdot D)^2] / (30 G)$$

P = Power in Watts for which you are solving

E = the measured maximum field strength in V/m utilizing the an RBW of 3 kHz.

G = the numeric gain of the transmitting antenna over an isotropic radiator.

The EMI Receiver was setup as follows:

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span to at least 1.5 times the OBW.
3. Set the RBW to 3 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = Peak
6. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW
7. Sweep time = auto couple
8. Use the peak marker function to determine the maximum amplitude level

Test Results:

This test was not performed since it was unlikely to change due to the modification.

9. CONCLUSIONS

The Dish 54.0 Brisbane CR 2018, Model: R32027BA00-00006 (EUT), as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.



APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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."



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 15.247 specifications.

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

No modifications were made to the EUT during the testing.



APPENDIX C

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

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Dish 54.0 Brisbane CR 2018
Models: R32027BA00-00006
S/N: N/A

There are no additional models covered under this report.



APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

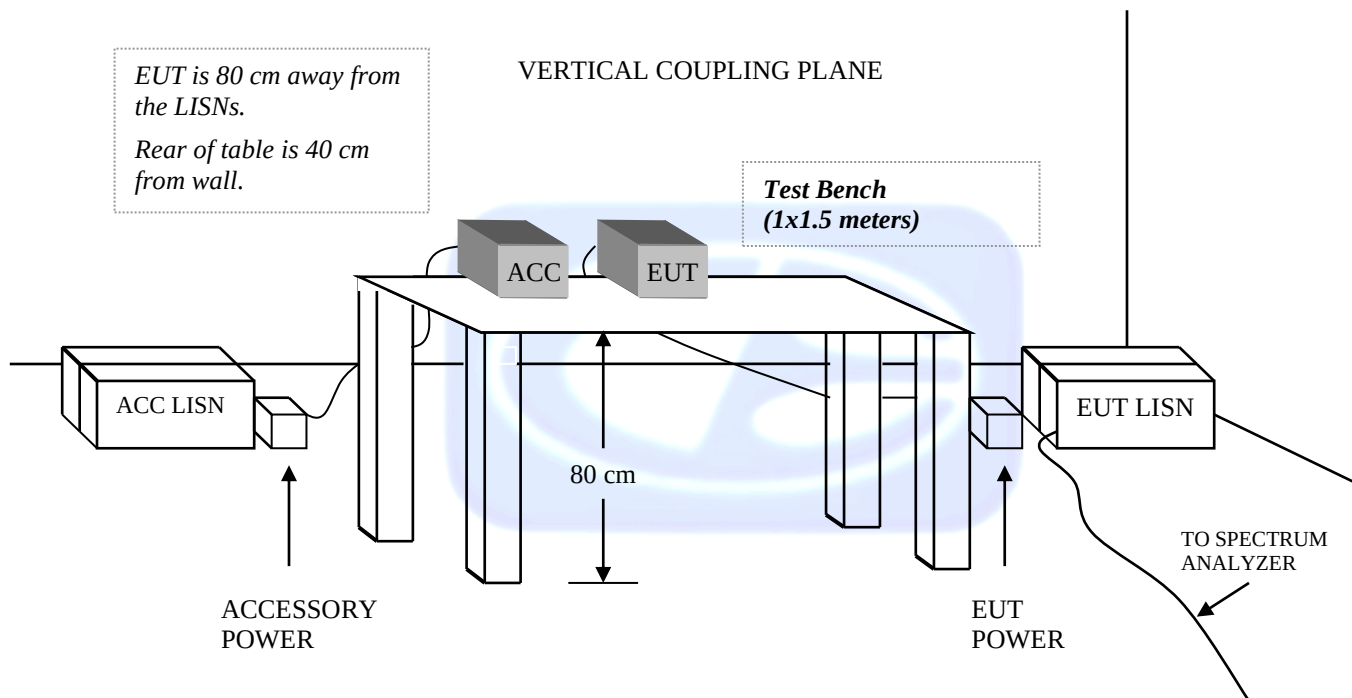
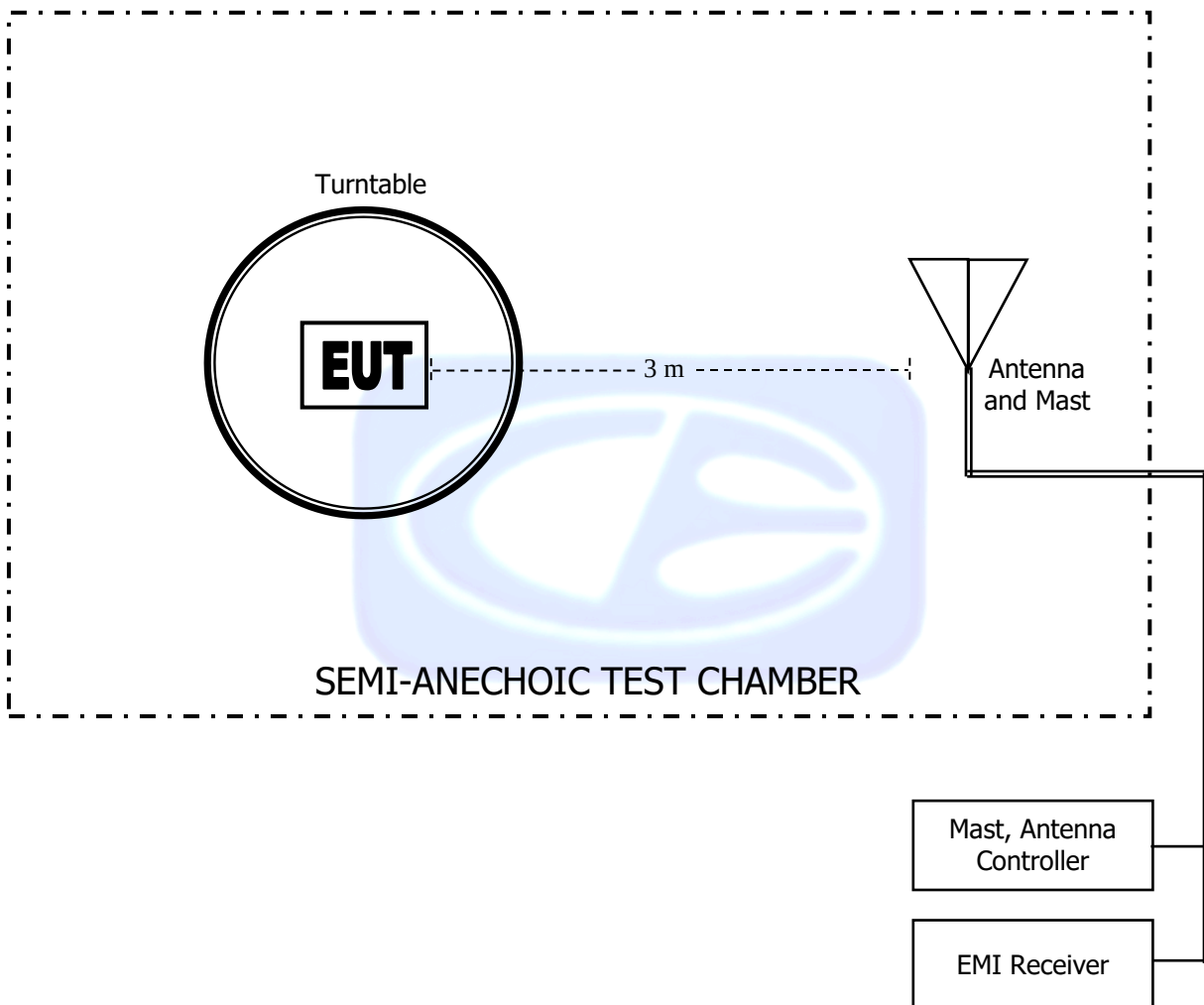


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



COM-POWER AL-130R**LOOP ANTENNA****S/N: 121090****CALIBRATION DATE: FEBRUARY 5, 2019**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.01	15.6	-35.9
0.02	14.8	-36.7
0.03	15.6	-35.9
0.04	15.1	-36.4
0.05	14.4	-37.0
0.10	14.1	-37.3
0.20	14.1	-37.3
0.30	14.0	-37.4
0.40	14.0	-37.4
0.50	14.2	-37.2
1.00	14.5	-37.0
2.00	14.5	-36.9
3.00	14.5	-36.9
4.00	14.7	-36.8
5.00	14.6	-36.9
6.00	14.6	-36.9
7.00	14.6	-36.9
8.00	14.6	-36.9
9.00	14.6	-36.9
10.00	14.8	-36.6
11.00	14.9	-36.6
12.00	14.8	-36.6
13.00	14.8	-36.7
14.00	14.6	-36.8
15.00	14.5	-36.9
16.00	14.5	-37.0
17.00	14.6	-36.9
18.00	14.7	-36.7
19.00	14.8	-36.6
20.00	14.9	-36.6
21.00	14.6	-36.8
22.00	14.2	-37.2
23.00	13.7	-37.7
24.00	13.3	-38.2
25.00	13.0	-38.5
26.00	12.9	-38.6
27.00	13.0	-38.5
28.00	13.1	-38.4
29.00	13.1	-38.4
30.00	12.9	-38.5

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61093

CALIBRATION DATE: JUNE 5, 2019

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.10	200	15.30
35	20.90	250	16.80
40	20.10	300	19.00
45	19.40	350	19.60
50	18.40	400	21.70
60	15.10	450	21.60
70	12.00	500	22.20
80	11.60	550	22.70
90	13.50	600	24.20
100	14.70	650	24.40
120	15.90	700	24.50
125	15.90	750	25.40
140	14.80	800	26.30
150	15.50	850	26.70
160	19.80	900	27.50
175	15.20	950	27.80
180	14.90	1000	27.90

COM POWER AH-118**HORN ANTENNA****S/N: 071175****CALIBRATION DATE: FEBRUARY 22, 2018**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.71	10.0	40.08
1.5	25.46	10.5	40.75
2.0	29.26	11.0	41.78
2.5	27.95	11.5	41.02
3.0	29.03	12.0	40.32
3.5	29.70	12.5	40.96
4.0	30.71	13.0	40.29
4.5	31.62	13.5	39.48
5.0	33.23	14.0	39.89
5.5	35.07	14.5	42.75
6.0	34.43	15.0	40.98
6.5	34.98	15.5	38.54
7.0	36.75	16.0	39.40
7.5	37.10	16.5	39.40
8.0	37.66	17.0	41.74
8.5	39.29	17.5	42.58
9.0	37.75	18.0	44.68
9.5	38.23		

COM-POWER PA-118**PREAMPLIFIER****S/N: 181653****CALIBRATION DATE: JANUARY 25, 2019**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.10	6.0	40.60
1.1	40.10	6.5	39.50
1.2	40.00	7.0	39.40
1.3	39.70	7.5	39.30
1.4	39.60	8.0	39.20
1.5	39.90	8.5	40.50
1.6	40.00	9.0	39.60
1.7	39.70	9.5	39.50
1.8	39.50	10.0	38.80
1.9	39.60	11.0	38.70
2.0	39.90	12.0	42.20
2.5	40.10	13.0	40.00
3.0	40.80	14.0	40.30
3.5	40.60	15.0	40.20
4.0	40.50	16.0	41.00
4.5	41.60	17.0	39.70
5.0	39.20	18.0	40.90
5.5	40.00		

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

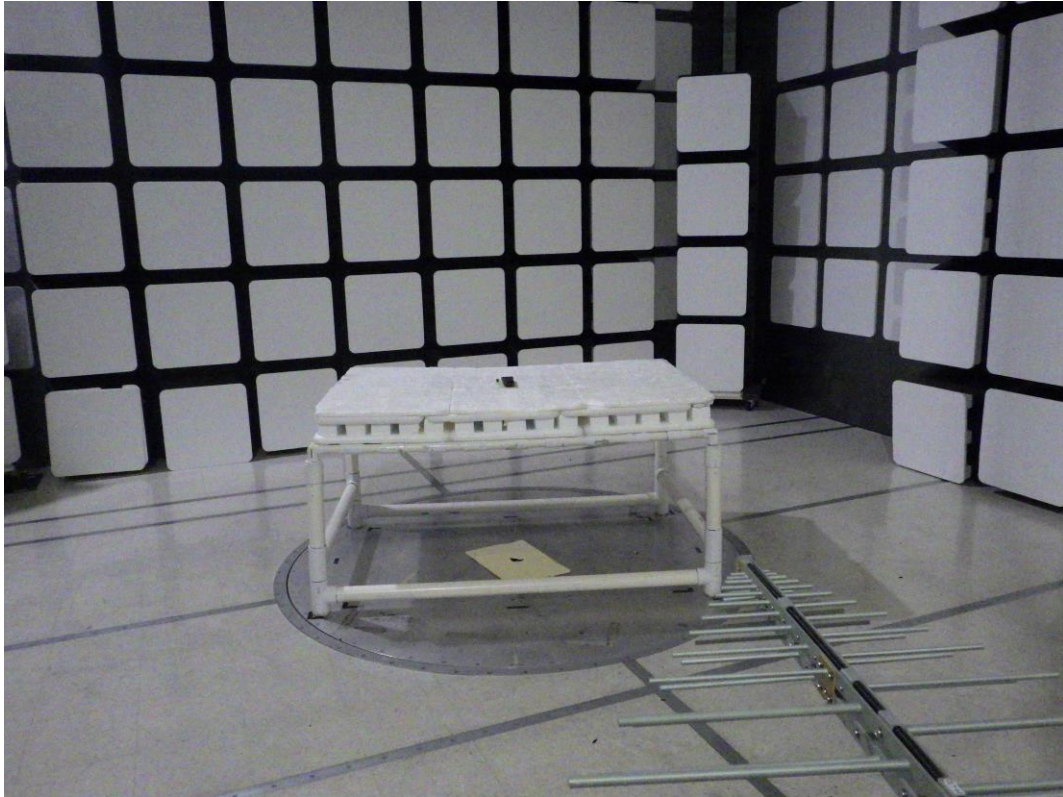
COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MAY 10, 2018

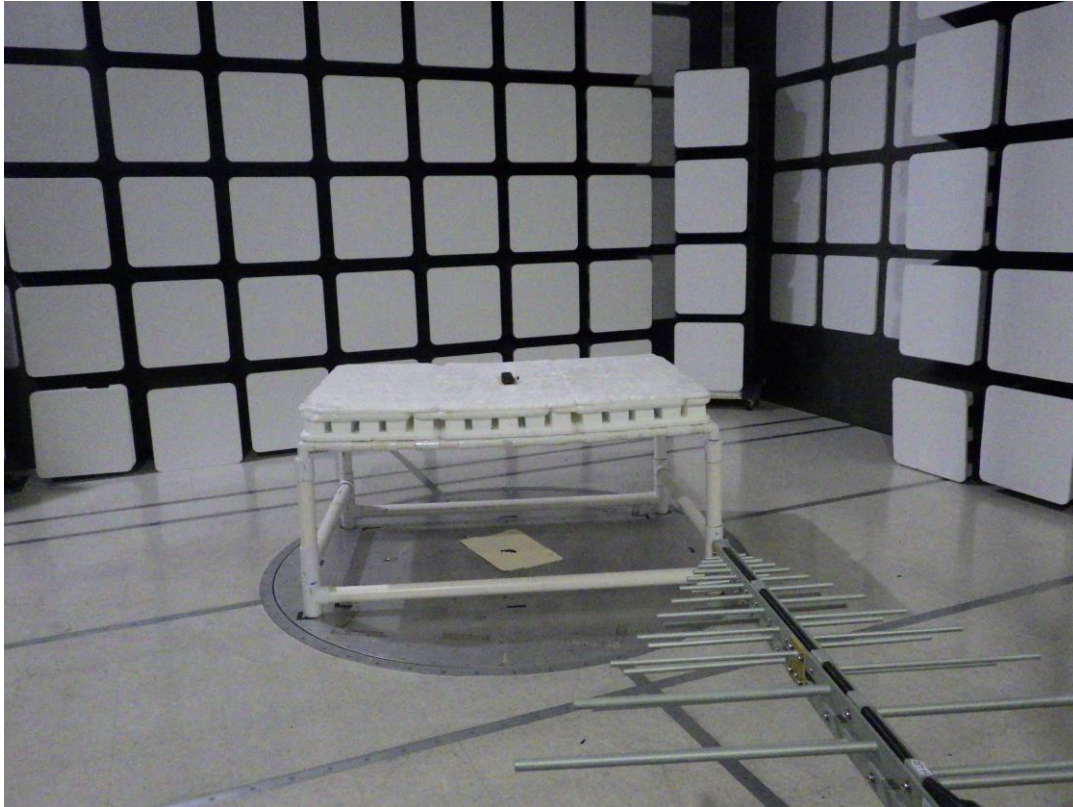
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	26.90	31.0	24.56
19.0	24.65	31.5	25.84
20.0	25.74	32.0	26.93
21.0	24.78	32.5	27.76
22.0	24.83	33.0	25.76
23.0	24.81	33.5	26.76
24.0	25.52	34.0	26.51
25.0	24.90	34.5	27.49
26.0	25.92	35.0	27.64
26.5	26.53	35.5	27.45
27.0	26.41	36.0	25.08
27.5	24.78	36.5	25.61
28.0	25.13	37.0	24.69
28.5	29.29	37.5	24.10
29.0	28.44	38.0	24.83
29.5	27.51	38.5	24.41
30.0	27.12	39.0	24.44
30.5	26.42	39.5	22.96
		40.0	22.29



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
DISH 54.0 BRISBANE CR 2018
MODEL: R32027BA00-00006
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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

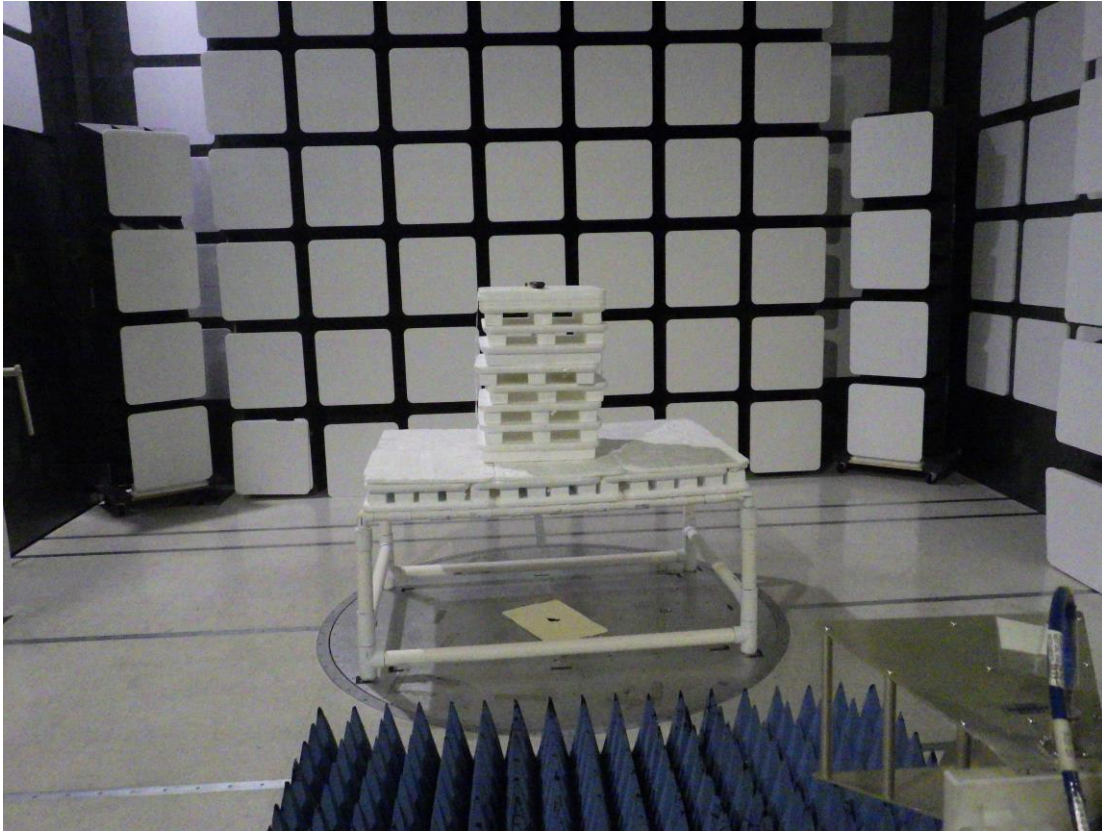


REAR VIEW

UNIVERSAL ELECTRONICS, INC.
DISH 54.0 BRISBANE CR 2018
MODEL: R32027BA00-00006

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

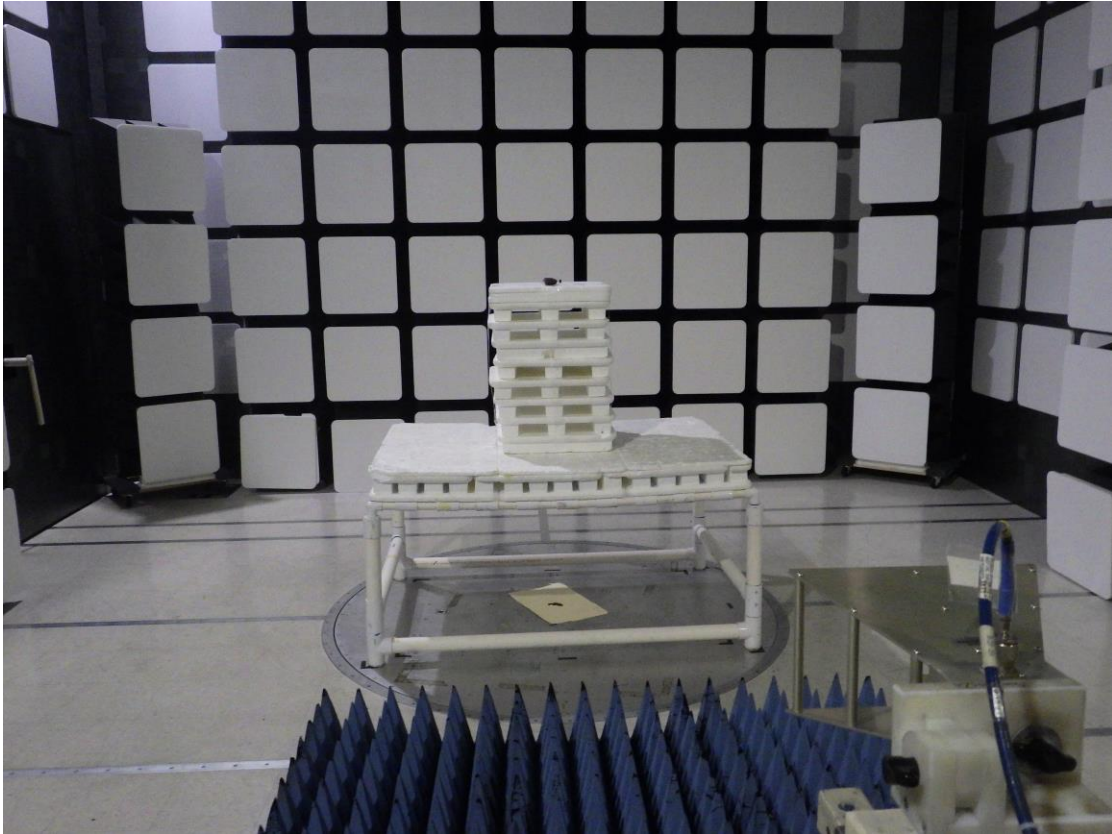
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
DISH 54.0 BRISBANE CR 2018
MODEL: R32027BA00-00006
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
DISH 54.0 BRISBANE CR 2018
MODEL: R32027BA00-00006
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 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - Low Channel - RF4CE Mode
Transmit Mode - X-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	53.83	V	73.97	-20.14	Peak	198.00	145.50	
4850.00	45.30	V	53.97	-8.67	Avg	198.00	145.50	
7275.00	47.75	V	73.97	-26.22	Peak	29.50	100.00	
7275.00	39.11	V	53.97	-14.86	Avg	29.50	100.00	
9700.00	51.76	V	81.40	-29.65	Peak	116.75	100.00	Not in Restricted Band
12125.00								No Emission
12125.00								Detected
14550.00								No Emission
14550.00								Detected
16975.00								No Emission
16975.00								Detected
19400.00								No Emission
19400.00								Detected
21825.00								No Emission
21825.00								Detected
24250.00								No Emission
24250.00								Detected

*The limit at the 4th harmonic is 20 dB below the maximum fundamental
of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	53.47	V	73.97	-20.50	Peak	186.75	197.97	
4850.00	46.02	V	53.97	-7.95	Avg	186.75	197.97	
7275.00	47.13	V	73.97	-26.84	Peak	162.00	180.23	
7275.00	36.97	V	53.97	-17.00	Avg	162.00	180.23	
9700.00	52.30	V	81.40	-29.11	Peak	335.75	205.01	Not in Restricted Band
12125.00								No Emission Detected
12125.00								
14550.00								No Emission Detected
14550.00								
16975.00								No Emission Detected
16975.00								
19400.00								No Emission Detected
19400.00								
21825.00								No Emission Detected
21825.00								
24250.00								No Emission Detected
24250.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

**Harmonics - Low Channel - RF4CE Mode
Transmit Mode - Z-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	52.86	V	73.97	-21.11	Peak	166.50	174.98	
4850.00	44.77	V	53.97	-9.20	Avg	166.50	174.98	
7275.00	46.49	V	73.97	-27.48	Peak	177.25	100.00	
7275.00	36.70	V	53.97	-17.27	Avg	177.25	100.00	
9700.00	50.49	V	81.40	-30.91	Peak	208.00	100.00	Not in Restricted Band
12125.00								No Emission Detected
12125.00								
14550.00								No Emission Detected
14550.00								
16975.00								No Emission Detected
16975.00								
19400.00								No Emission Detected
19400.00								
21825.00								No Emission Detected
21825.00								
24250.00								No Emission Detected
24250.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - Low Channel - RF4CE Mode
Transmit Mode - X-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	53.32	H	73.97	-20.65	Peak	204.00	100.00	
4850.00	44.02	H	53.97	-9.95	Avg	204.00	100.00	
7275.00	48.99	H	73.97	-24.98	Peak	47.50	100.00	
7275.00	38.48	H	53.97	-15.49	Avg	47.50	100.00	
9700.00	52.14	H	81.40	-29.26	Peak	241.25	100.00	Not in Restricted Band
12125.00								No Emission Detected
12125.00								
14550.00								No Emission Detected
14550.00								
16975.00								No Emission Detected
16975.00								
19400.00								No Emission Detected
19400.00								
21825.00								No Emission Detected
21825.00								
24250.00								No Emission Detected
24250.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	53.47	H	73.97	-20.50	Peak	159.50	164.00	
4850.00	45.60	H	53.97	-8.37	Avg	159.50	164.00	
7275.00	47.46	H	73.97	-26.51	Peak	147.75	132.11	
7275.00	38.17	H	53.97	-15.81	Avg	147.75	132.11	
9700.00	49.37	H	81.40	-32.03	Peak	194.75	100.00	Not in Restricted Band
12125.00								No Emission Detected
12125.00								
14550.00								No Emission Detected
14550.00								
16975.00								No Emission Detected
16975.00								
19400.00								No Emission Detected
19400.00								
21825.00								No Emission Detected
21825.00								
24250.00								No Emission Detected
24250.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - Low Channel - RF4CE Mode
Transmit Mode - Z-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	53.96	H	73.97	-20.01	Peak	170.50	100.00	
4850.00	45.94	H	53.97	-8.04	Avg	170.50	100.00	
7275.00	47.92	H	73.97	-26.06	Peak	178.25	100.00	
7275.00	38.61	H	53.97	-15.36	Avg	178.25	100.00	
9700.00	52.23	H	81.40	-29.17	Peak	277.50	100.00	Not in Restricted Band
12125.00								No Emission
12125.00								Detected
14550.00								No Emission
14550.00								Detected
16975.00								No Emission
16975.00								Detected
19400.00								No Emission
19400.00								Detected
21825.00								No Emission
21825.00								Detected
24250.00								No Emission
24250.00								Detected

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - X-Axis - Tested at + 8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	51.21	V	73.97	-22.76	Peak	204.75	151.34	
4900.00	45.19	V	53.97	-8.78	Avg	204.75	151.34	
7350.00	47.85	V	73.97	-26.12	Peak	25.25	100.00	
7350.00	38.10	V	53.97	-15.87	Avg	25.25	100.00	
9800.00	53.10	V	81.40	-28.31	Peak	120.25	100.00	Not in
								Restricted Band
12250.00								No Emission
12250.00								Detected
14700.00								No Emission
14700.00								Detected
17150.00								No Emission
17150.00								Detected
19600.00								No Emission
19600.00								Detected
22050.00								No Emission
22050.00								Detected
24500.00								No Emission
24500.00								Detected

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	53.57	V	73.97	-20.40	Peak	162.50	188.29	
4900.00	47.88	V	53.97	-6.09	Avg	162.50	188.29	
7350.00	47.57	V	73.97	-26.40	Peak	138.50	100.00	
7350.00	37.16	V	53.97	-16.81	Avg	138.50	100.00	
9800.00	53.32	V	81.40	-28.08	Peak	0.00	181.07	Not in Restricted Band
12250.00								No Emission Detected
12250.00								
14700.00								No Emission Detected
14700.00								
17150.00								No Emission Detected
17150.00								
19600.00								No Emission Detected
19600.00								
22050.00								No Emission Detected
22050.00								
24500.00								No Emission Detected
24500.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

**Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - Z-Axis - Tested at +8 dBm**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	52.11	V	73.97	-21.86	Peak	174.25	146.08	
4900.00	45.88	V	53.97	-8.09	Avg	174.25	146.08	
7350.00	46.71	V	73.97	-27.26	Peak	169.25	100.00	
7350.00	36.80	V	53.97	-17.17	Avg	169.25	100.00	
9800.00	52.33	V	81.40	-29.07	Peak	210.75	100.00	Not in Restricted Band
12250.00								No Emission Detected
12250.00								
14700.00								No Emission Detected
14700.00								
17150.00								No Emission Detected
17150.00								
19600.00								No Emission Detected
19600.00								
22050.00								No Emission Detected
22050.00								
24500.00								No Emission Detected
24500.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - X-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	51.97	H	73.97	-22.00	Peak	181.25	100.00	
4900.00	44.52	H	53.97	-9.45	Avg	181.25	100.00	
7350.00	46.97	H	73.97	-27.00	Peak	332.25	100.00	
7350.00	36.84	H	53.97	-17.13	Avg	332.25	100.00	
9800.00	52.74	H	81.40	-28.66	Peak	334.75	100.00	Not in
								Restricted Band
12250.00								No Emission
12250.00								Detected
14700.00								No Emission
14700.00								Detected
17150.00								No Emission
17150.00								Detected
19600.00								No Emission
19600.00								Detected
22050.00								No Emission
22050.00								Detected
24500.00								No Emission
24500.00								Detected

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	52.03	H	73.97	-21.94	Peak	163.00	138.68	
4900.00	46.02	H	53.97	-7.95	Avg	163.00	138.68	
7350.00	47.23	H	73.97	-26.75	Peak	151.75	100.00	
7350.00	38.09	H	53.97	-15.88	Avg	151.75	100.00	
9800.00	51.39	H	81.40	-30.01	Peak	39.25	115.40	Not in Restricted Band
12250.00								No Emission Detected
12250.00								
14700.00								No Emission Detected
14700.00								
17150.00								No Emission Detected
17150.00								
19600.00								No Emission Detected
19600.00								
22050.00								No Emission Detected
22050.00								
24500.00								No Emission Detected
24500.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel - RF4CE Mode
Transmit Mode - Z-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	53.49	H	73.97	-20.48	Peak	164.75	137.25	
4900.00	47.89	H	53.97	-6.08	Avg	164.75	137.25	
7350.00	47.59	H	73.97	-26.38	Peak	207.00	100.00	
7350.00	37.62	H	53.97	-16.35	Avg	207.00	100.00	
9800.00	53.79	H	81.40	-27.61	Peak	216.25	100.00	Not in Restricted Band
12250.00								No Emission Detected
12250.00								
14700.00								No Emission Detected
14700.00								
17150.00								No Emission Detected
17150.00								
19600.00								No Emission Detected
19600.00								
22050.00								No Emission Detected
22050.00								
24500.00								No Emission Detected
24500.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel - RF4CE Mode
Transmit Mode - X-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	51.11	V	73.97	-22.86	Peak	207.25	127.40	
4950.00	45.20	V	53.97	-8.77	Avg	207.25	127.40	
7425.00	47.63	V	73.97	-26.34	Peak	212.00	100.00	
7425.00	38.12	V	53.97	-15.85	Avg	212.00	100.00	
9900.00	52.28	V	81.40	-29.12	Peak	19.75	100.00	Not in
								Restricted Band
12375.00								No Emission
12375.00								Detected
14850.00								No Emission
14850.00								Detected
17325.00								No Emission
17325.00								Detected
19800.00								No Emission
19800.00								Detected
22275.00								No Emission
22275.00								Detected
24750.00								No Emission
24750.00								Detected

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	54.13	V	73.97	-19.84	Peak	164.25	174.14	
4950.00	48.57	V	53.97	-5.40	Avg	164.25	174.14	
7425.00	47.59	V	73.97	-26.38	Peak	165.25	100.00	
7425.00	38.47	V	53.97	-15.50	Avg	165.25	100.00	
9900.00	53.44	V	81.40	-27.96	Peak	0.00	176.53	Not in Restricted Band
12375.00								No Emission Detected
12375.00								
14850.00								No Emission Detected
14850.00								
17325.00								No Emission Detected
17325.00								
19800.00								No Emission Detected
19800.00								
22275.00								No Emission Detected
22275.00								
24750.00								No Emission Detected
24750.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel - RF4CE Mode
Transmit Mode - Z-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	51.76	V	73.97	-22.21	Peak	176.00	150.38	
4950.00	45.88	V	53.97	-8.09	Avg	176.00	150.38	
7425.00	46.91	V	73.97	-27.06	Peak	190.25	100.00	
7425.00	37.01	V	53.97	-16.96	Avg	190.25	100.00	
9900.00	52.08	V	81.40	-29.32	Peak	186.25	100.00	Not in Restricted Band
12375.00								No Emission Detected
12375.00								
14850.00								No Emission Detected
14850.00								
17325.00								No Emission Detected
17325.00								
19800.00								No Emission Detected
19800.00								
22275.00								No Emission Detected
22275.00								
24750.00								No Emission Detected
24750.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - High Channel - RF4CE Mode**
Transmit Mode - X-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	51.67	H	73.97	-22.30	Peak	287.00	100.00	
4950.00	45.35	H	53.97	-8.62	Avg	287.00	100.00	
7425.00	47.99	H	73.97	-25.98	Peak	335.25	100.00	
7425.00	38.41	H	53.97	-15.56	Avg	335.25	100.00	
9900.00	51.86	H	81.40	-29.54	Peak	297.75	100.00	Not in Restricted Band
12375.00								No Emission Detected
12375.00								
14850.00								No Emission Detected
14850.00								
17325.00								No Emission Detected
17325.00								
19800.00								No Emission Detected
19800.00								
22275.00								No Emission Detected
22275.00								
24750.00								No Emission Detected
24750.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247

Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006

Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel - RF4CE Mode
Transmit Mode - Y-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	52.99	H	73.97	-20.98	Peak	154.75	154.62	
4950.00	47.26	H	53.97	-6.71	Avg	154.75	154.62	
7425.00	47.91	H	73.97	-26.06	Peak	147.00	100.00	
7425.00	39.02	H	53.97	-14.95	Avg	147.00	100.00	
9900.00	51.39	H	81.40	-30.01	Peak	55.50	100.00	Not in Restricted Band
12375.00								No Emission Detected
12375.00								
14850.00								No Emission Detected
14850.00								
17325.00								No Emission Detected
17325.00								
19800.00								No Emission Detected
19800.00								
22275.00								No Emission Detected
22275.00								
24750.00								No Emission Detected
24750.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Harmonics - High Channel - RF4CE Mode**
Transmit Mode - Z-Axis - Tested at +8 dBm

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	53.25	H	73.97	-20.72	Peak	166.75	100.00	
4950.00	47.66	H	53.97	-6.31	Avg	166.75	100.00	
7425.00	46.77	H	73.97	-27.20	Peak	237.00	100.00	
7425.00	37.33	H	53.97	-16.64	Avg	237.00	100.00	
9900.00	53.34	H	81.40	-28.07	Peak	219.75	100.00	Not in Restricted Band
12375.00								No Emission Detected
12375.00								
14850.00								No Emission Detected
14850.00								
17325.00								No Emission Detected
17325.00								
19800.00								No Emission Detected
19800.00								
22275.00								No Emission Detected
22275.00								
24750.00								No Emission Detected
24750.00								

*The limit at the 4th harmonic is 20 dB below the maximum fundamental of 101.40 dBuV/m per section 11.11.2 of ANSI C63.10: 2013

Title: Radiated Pre-Scan - FCC Class B
File: 1 - Pre-Scan - Dish 54.0 Brisbane CR 2019 - Low Ch - X-axis - 30 MHz to 1 GHz.set
Operator: Harvey Samaco
EUT Type: Dish 54.0 Brisband CR 2019
EUT Condition: The EUT is continuously transmitting RF4CE at 2425 MHz
Company: Universal Electronics, Inc.
P/N: R32027BA00-00006
S/N: N/A
X-axis (Worst case)

12/16/2019 3:51:02 PM
Sequence: Preliminary Scan



Title: Radiated Final Scan - FCC Class B
File: 1 - Final Scan - Dish 54.0 Brisbane CR 2019 - Low Ch - 30 MHz to 1 GHz.set
Operator: Harvey Samaco
EUT Type: Dish 54.0 Brisbane CR 2019
EUT Condition: The EUT is continuously transmitting RF4CE at 2425 MHz
Company: Universal Electronics, Inc.
P/N: R32027BA00-00006
S/N: N/A
X-axis

12/16/2019 3:59:39 PM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBμV/m)	(QP) EMI (dBμV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBμV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (deg)	Twr Ht (cm)
707.50	V	40.32	33.84	-5.68	-12.16	46.00	24.63	2.53	304.00	270.08
708.40	H	41.53	34.71	-4.47	-11.29	46.00	24.70	2.54	291.00	365.73
709.40	V	38.78	33.95	-7.22	-12.05	46.00	24.70	2.54	7.00	190.56
711.00	V	38.61	33.95	-7.39	-12.05	46.00	24.70	2.54	155.75	238.26
712.30	V	40.11	34.03	-5.89	-11.97	46.00	24.80	2.55	132.00	127.16
712.80	V	39.02	34.03	-6.98	-11.97	46.00	24.80	2.55	301.50	317.79



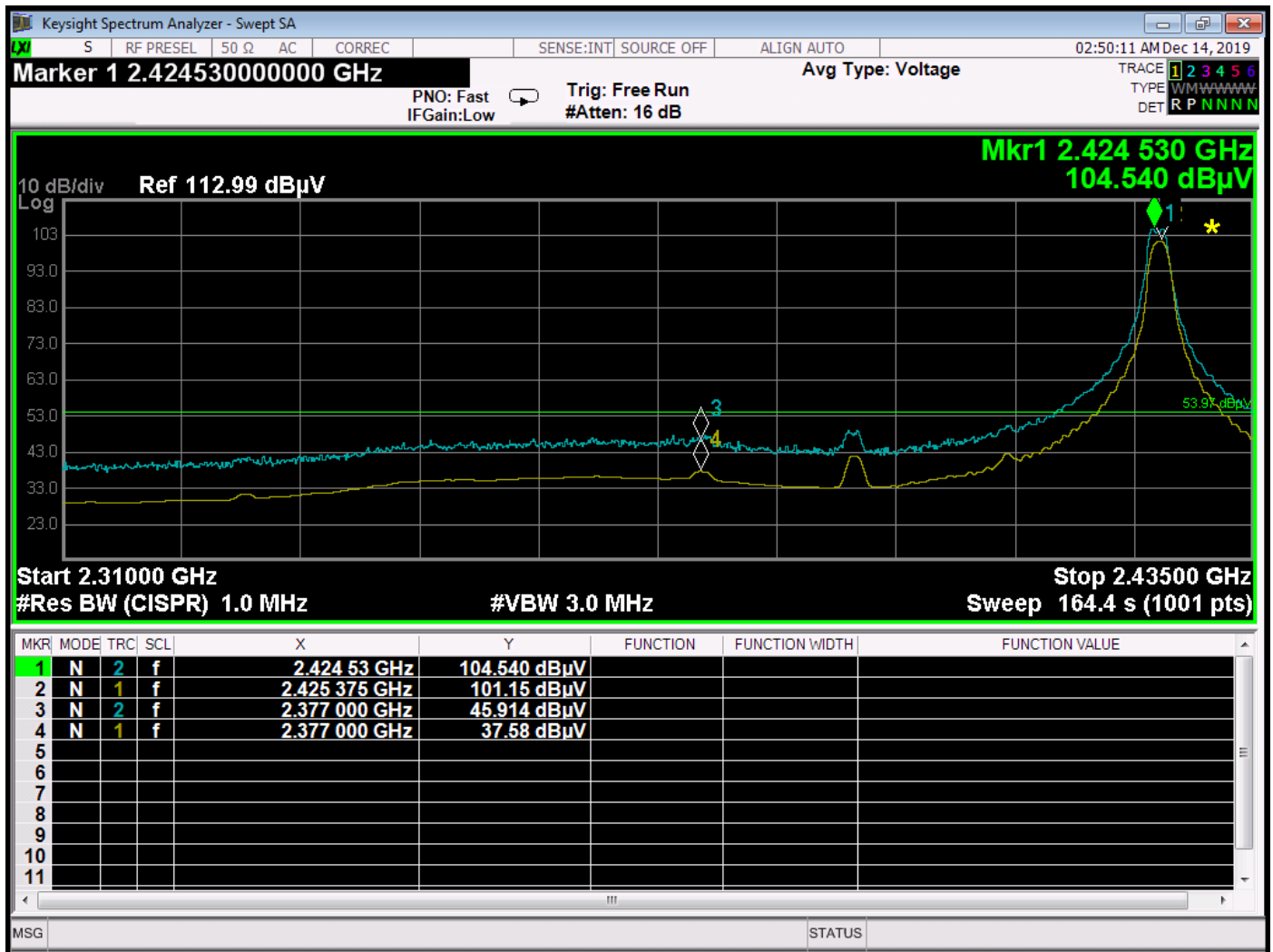
***BAND EDGES
DATA SHEETS***

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Band Edges - RF4CE Mode**

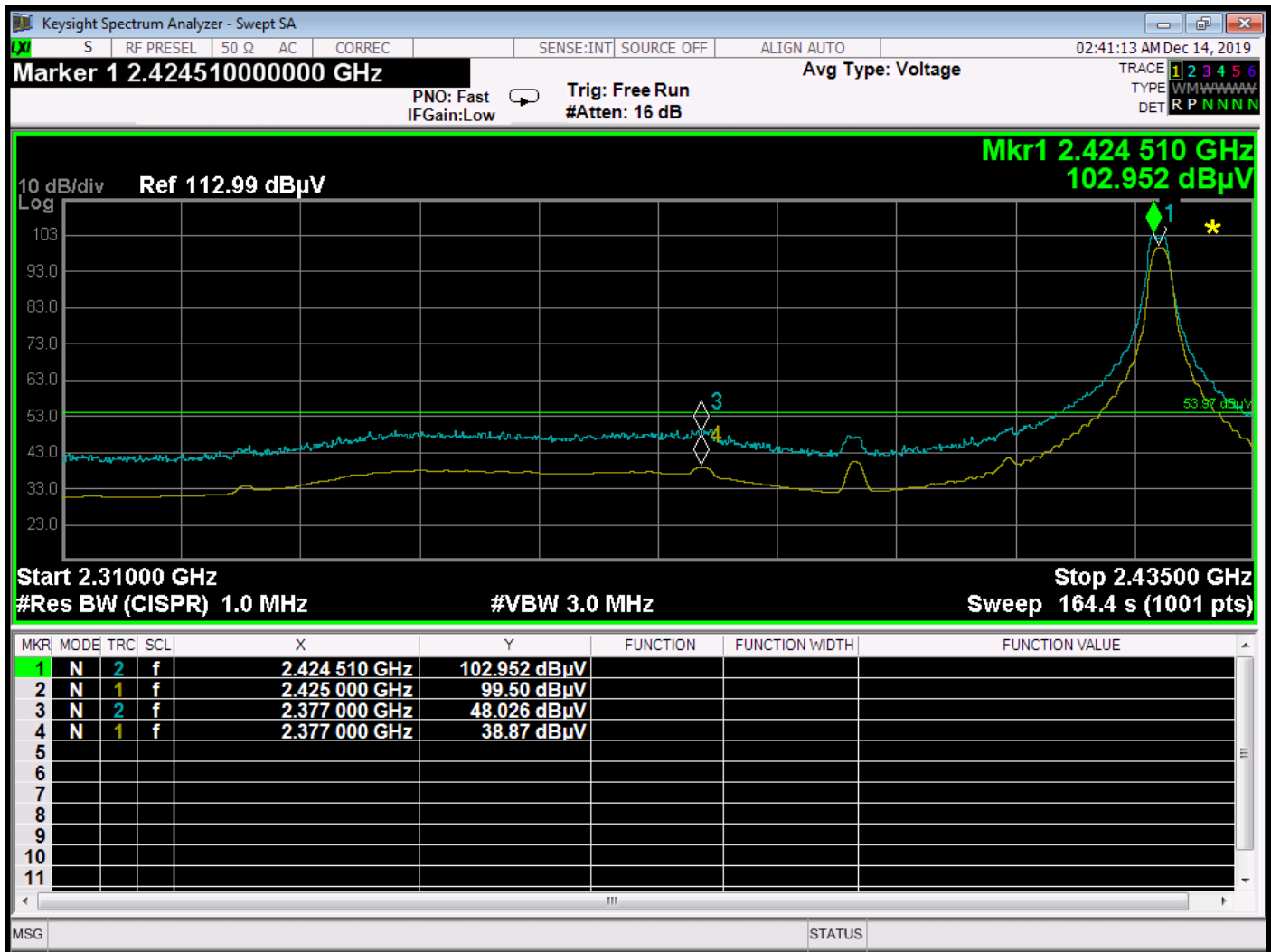
Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
2425.00	104.54	H	--	--	Peak	175.25	100.00	Fundamental - Low Ch.
2425.00	101.15	H	--	--	Avg	175.25	100.00	Z-Axis - Worst Case
2377.00	45.91	H	73.97	-28.06	Peak	175.25	100.00	Band Edge
2377.00	37.58	H	53.97	-16.39	Avg	175.25	100.00	Z-Axis - Worst Case
2425.00	102.95	V	--	--	Peak	196.00	144.00	Fundamental - Low Ch.
2425.00	99.50	V	--	--	Avg	196.00	144.00	X-Axis - Worst Case
2377.00	48.03	V	73.97	-25.94	Peak	196.00	144.00	Band Edge
2377.00	38.87	V	53.97	-15.10	Avg	196.00	144.00	X-Axis - Worst Case

FCC 15.247Universal Electronics, Inc.
Dish 54.0 Brisbane CR 2018
Model: R32027BA00-00006Date: 12/13/2019
Lab: D
Tested By: Harvey Samaco**Band Edges - RF4CE Mode**

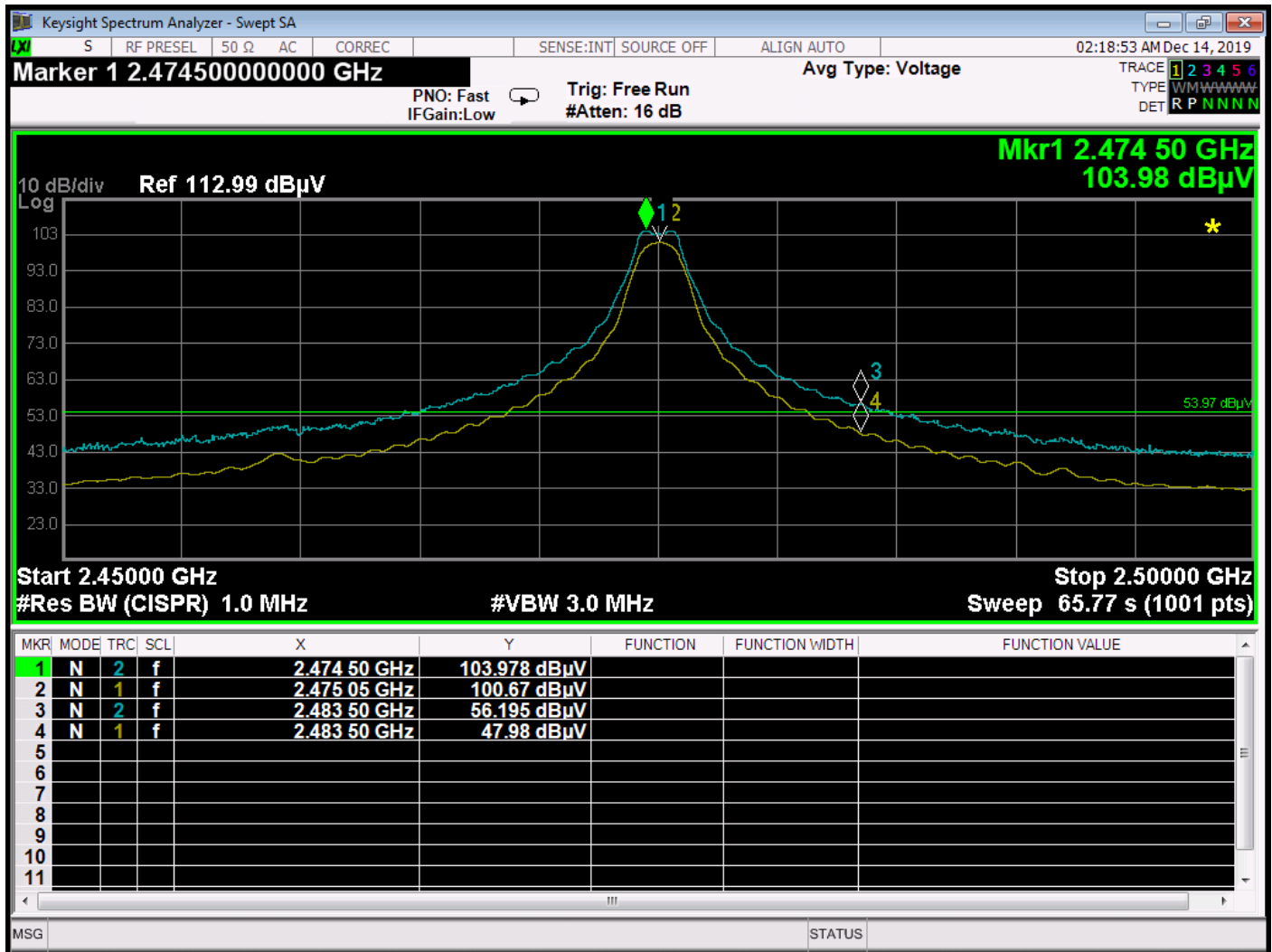
Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
2475.00	103.98	H	--	--	Peak	282.00	100.00	Fundamental - High Ch.
2475.00	100.67	H	--	--	Avg	282.00	100.00	X-Axis - Worst Case
2483.50	56.20	H	73.97	-17.78	Peak	282.00	100.00	Band Edge
2483.50	47.98	H	53.97	-5.99	Avg	282.00	100.00	X-Axis - Worst Case
2475.00	102.54	V	--	--	Peak	177.00	150.25	Fundamental - High Ch.
2475.00	99.21	V	--	--	Avg	177.00	150.25	Z-Axis - Worst Case
2483.50	55.08	V	73.97	-18.90	Peak	177.00	150.25	Band Edge
2483.50	46.69	V	53.97	-7.28	Avg	177.00	150.25	Z-Axis - Worst Case



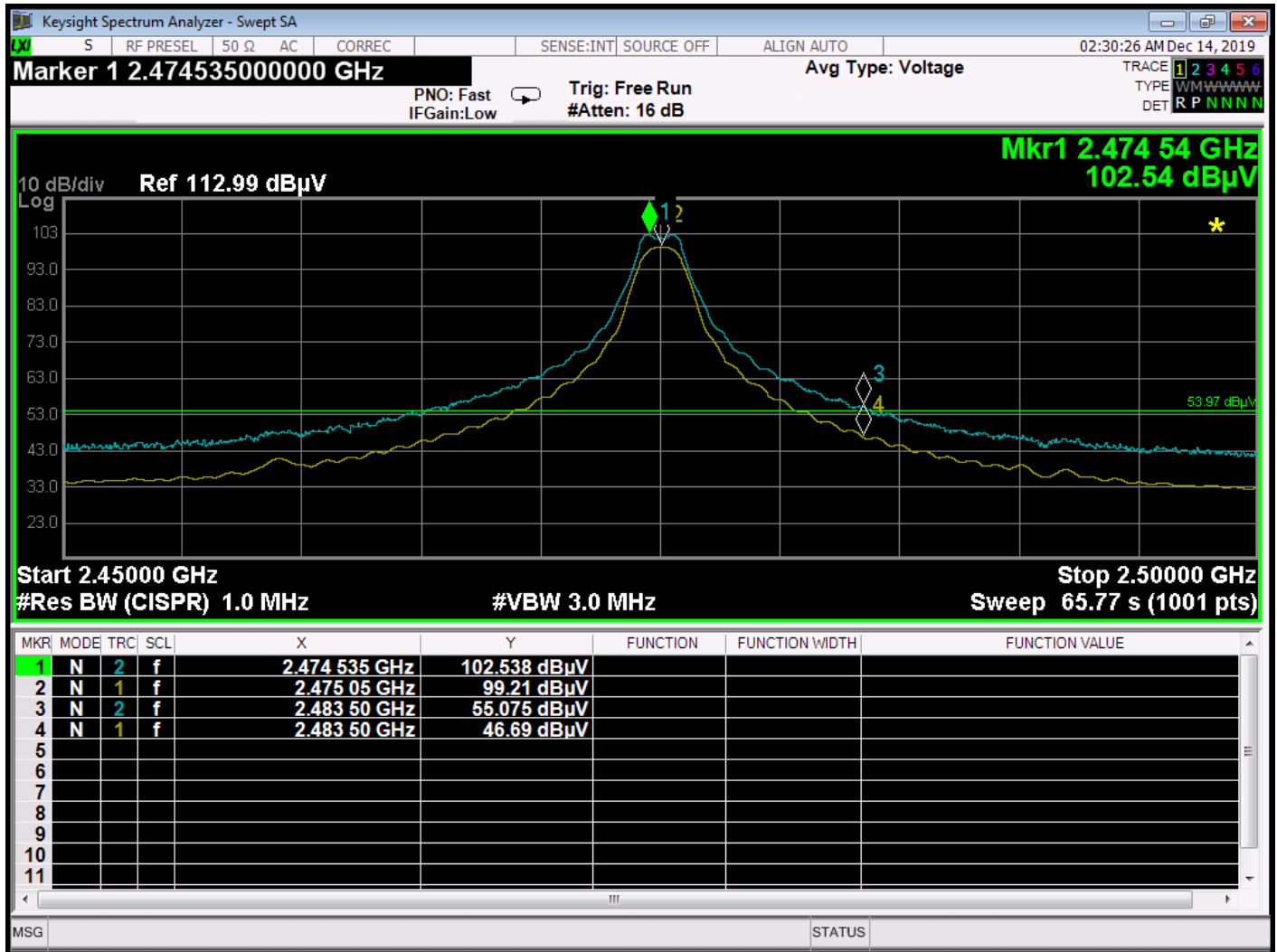
BE - 2425 MHz - Horizontal- Z-Axis Worst Case



BE - 2425 MHz - Vertical- X-Axis Worst Case

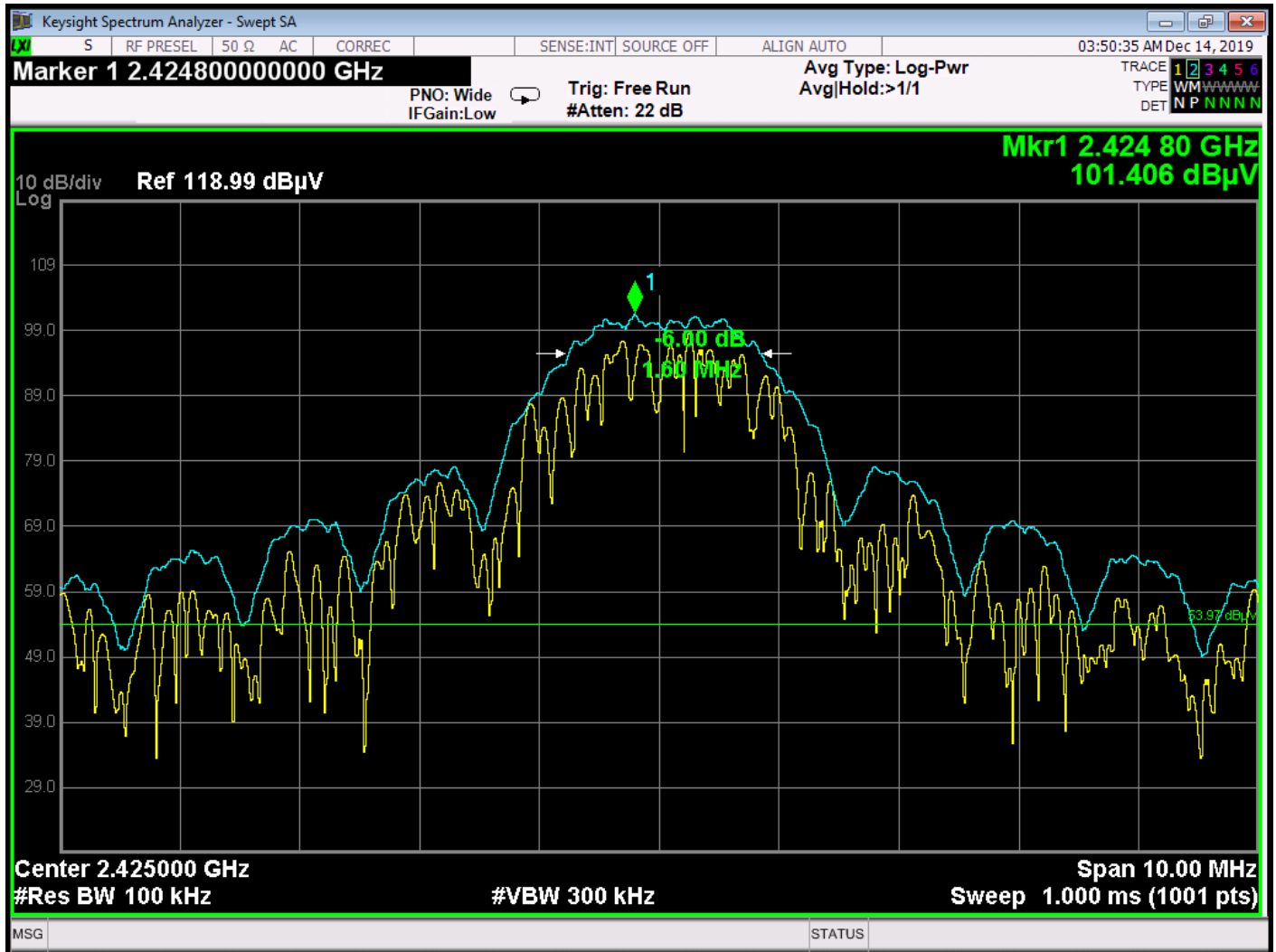


BE - 2475 MHz - Horizontal - X-Axis Worst Case

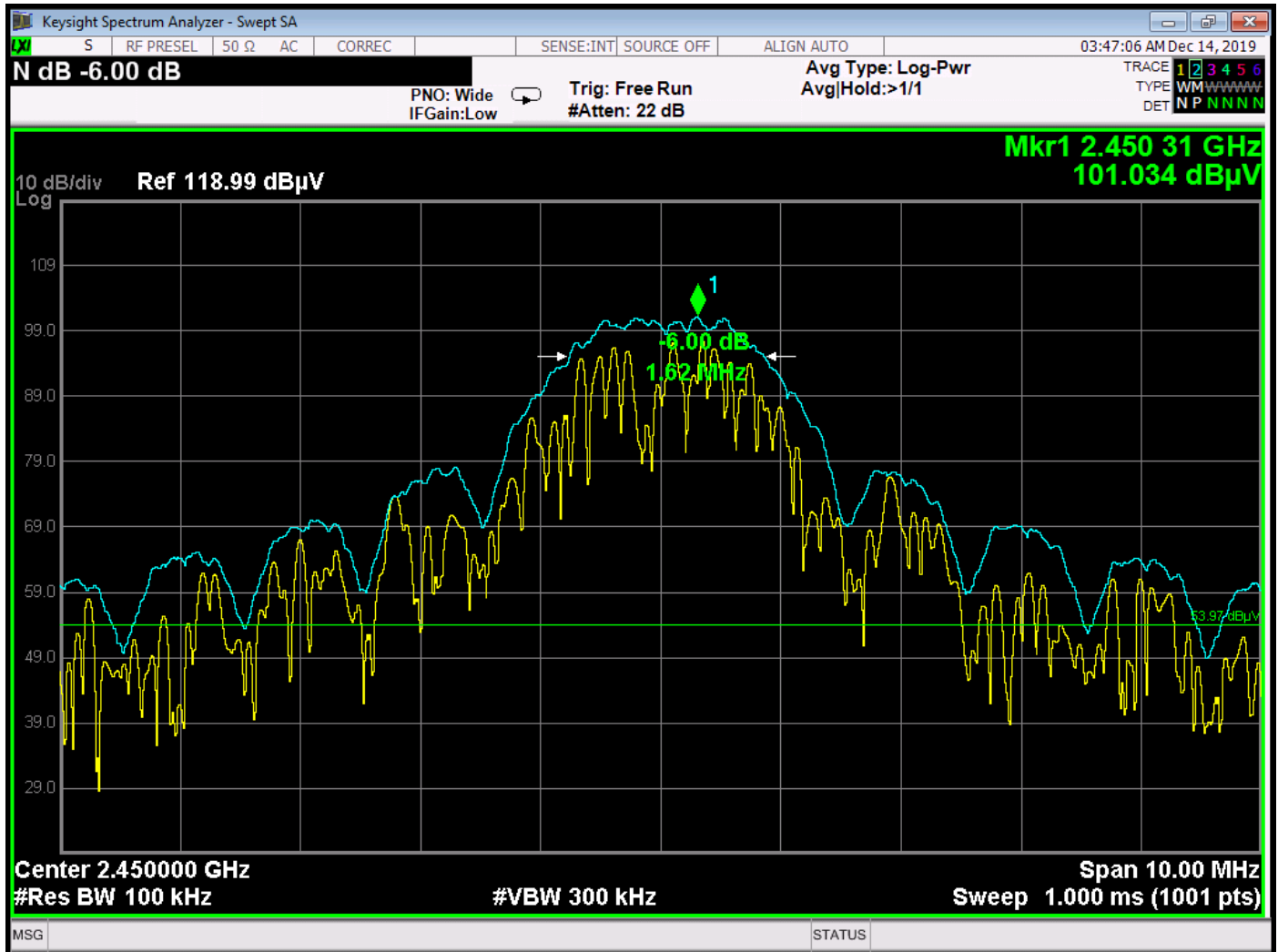


BE - 2475 MHz - Vertical - Z-Axis Worst Case

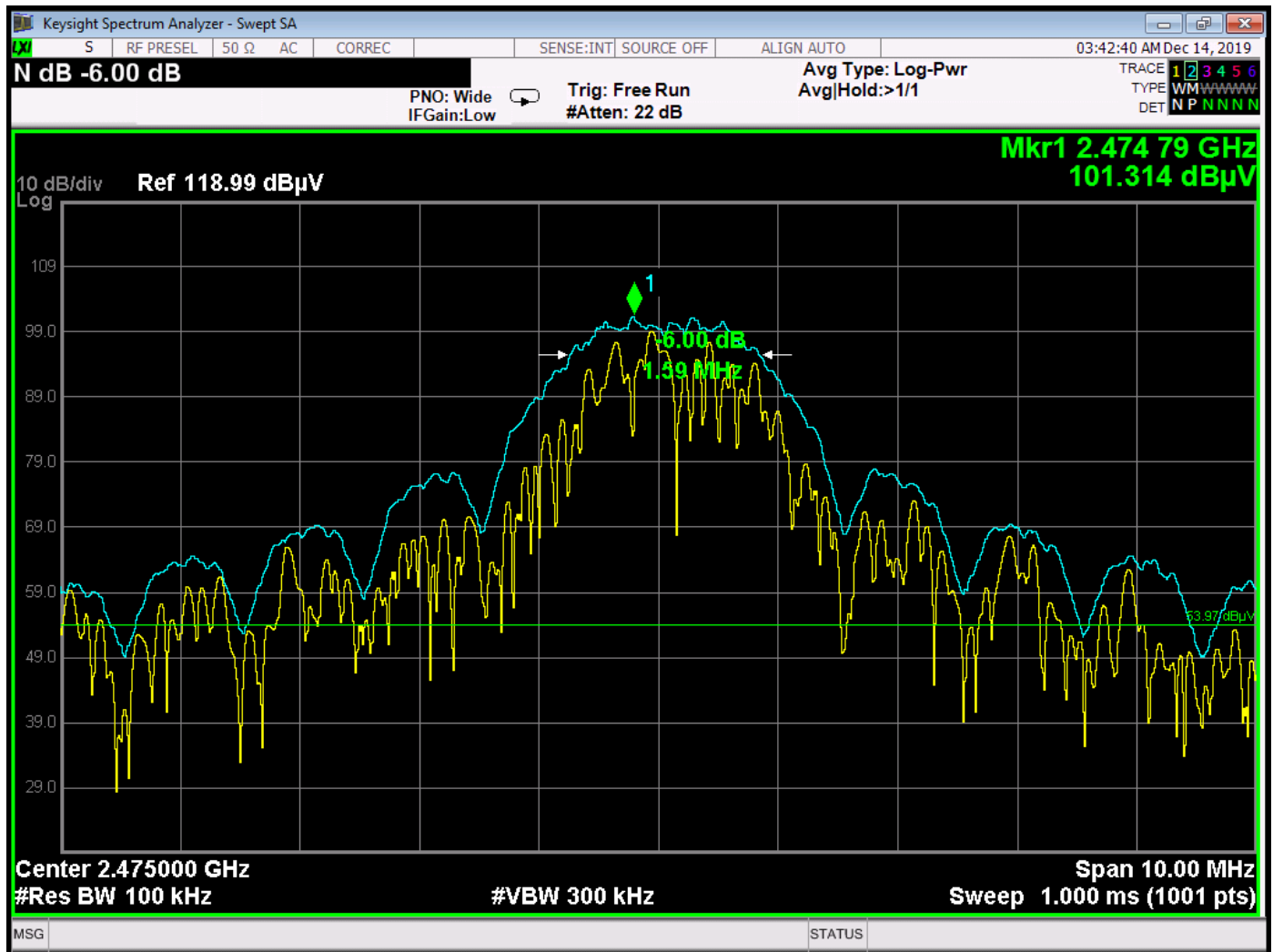
***DTS BANDWIDTH
DATA SHEETS***



Bandwidth 6 dB - 2425 MHz



Bandwidth 6 dB - 2450 MHz



Bandwidth 6 dB - 2475 MHz

APPENDIX F

CLASS II PERMISSIVE CHANGE INFORMATION

The following change(s) were made to the EUT for the Class II Permissive Change:

1. PCB layout changes and component removal to non-RF portion of PCB. Changes are to boost circuit near the middle battery terminals.

No changes were made to the RF parameters such as output power, frequencies, and modulations supported.

DELTA FROM CLASS II PERMISSIVE CHANGE TO ORIGINAL UNIT

FREQUENCY (MHz)	Worse case Delta from Test Report B90603D2 (dBuV/m)	Worst case Delta from Test Report B91216D1 (dBuV/m)	DELTA
4850.00	-18.34	-7.95	+10.39
7275.00	-15.64	-14.86	+0.78
9700.00	-26.68	-29.11	-2.43
4900.00	-15.26	-6.08	+9.18
7350.00	-15.34	-15.87	-0.53
9800.00	-25.37	-27.61	-2.24
4950.00	-13.58	-5.40	+8.18
7425.00	-16.54	-14.95	+1.59
9900.00	-29.37	-27.96	+1.41
(LBE) 2425.00 – 2377.00	-16.23	-15.10	+1.13
(HBE) 2475.00 – 2483.50	-5.51	-5.99	-0.48

Notes

LBE – Low Band Edge

HBE – High Band Edge