

**RSS-210, RSS GEN, FCC PART 15, SUBPART B and C
TEST REPORT**

for

TIVO S6Z MSO BACKLIT VOICE REMOTE 2017

Model: R37022CA00-00001

Prepared for

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DATE: FEBRUARY 5, 2019

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	18	2	2	2	13	40	77

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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: TIVO S6Z MSO Backlit Voice Remote 2017
Model: R37022CA00-00001
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 to meet the specifications.

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

Test Dates: December 19 and 20, 2018, January 29, 2019

Test Specifications covered by accreditation:

Test Specifications: Emissions requirements
CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, 15.249,
RSS-210 Issue 9 (2017), and RSS-Gen Issue 5 (2018)



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

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

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 9 kHz –25000 MHz (Transmitter, Receiver, 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 Highest reading in relation to spec limit 44.23 dBuV/m (Avg) @ 2361.13 MHz (*U = 3.67 dB)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the TIVO S6Z MSO Backlit Voice Remote 2017, Model: R37022CA00-00001. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the RSS-210, RSS-Gen, and the Class B specification limits defined by Code of Federal Regulations Title 47, Part 15 Subpart B sections 15.107, 15.109, & Part 15 Subpart C sections 15.205, 15.207, 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 Staff Engineer, Electrical

Compatible Electronics Inc.

Tom Szynal Test Technician

James Ross Test Engineer

Kyle Fujimoto Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to the date of this report.

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
RSS-210 Issue 9: 2017	License-exempt Radio Apparatus: Category I Equipment
RSS Gen Issue 5: 2018	General Requirements for Compliance of Radio Apparatus
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) –Unintentional Radiators
ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2013	American National Standard of procedure for compliance testing of unlicensed wireless devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The TIVO S6Z MSO Backlit Voice Remote 2017, Model: R37022CA00-00001 (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 from 9 kHz to 25 GHz, as well as in its IR mode from 30 MHz to 1 GHz.

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 X-axis (worse case). 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 and IC ID
TIVO S6Z MSO BACKLIT VOICE REMOTE 2017 (EUT)	UNIVERSAL ELECTRONICS, INC.	R37022CA00-00001	N/A	FCC ID: MG3-R37022C IC: 2575A-R37022C
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	CAL. DATE	CAL. CYCLE
RF RADIATED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Keysight Technologies	N9038A	MY51210150	July 26, 2018	1 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
Loop Antenna	Com-Power	AL-130R	121090	February 9, 2017	2 Year
CombiLog Antenna	Com-Power	AC-220	61060	July 27, 2017	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 22, 2018	2 Year
Horn Antenna	Com-Power	AH-826	71957	N/A	N/A
Preamplifier	Com-Power	PAM-118A	551024	May 10, 2018	1 Year
Preamplifier	Com-Power	PA-840	711013	May 10, 2018	1 Year
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 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	3.67 dB (Both Vertical and Horizontal)
AC LINE CONDUCTED EMISSIONS	3-METER CHAMBER, COM-POWER LISN	2.72 dB



7. TEST PROCEDURES

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

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. A 10 dB attenuator 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.

Test Results:

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

7.1.2 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 for the fundamental, low and high channel band edge, and harmonics above 1 GHz were averaged using a duty cycle correction factor.

All the other frequencies above 1 GHz were averaged using the average detector of 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 EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 1.

Radiated Emissions Test (Continued)

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 15.249 for radiated emissions.

7.1.3 RF Emissions Test Results

Table 1 RADIATED EMISSION RESULTS
TIVO S6Z MSO Backlit Voice Remote 2017
Model: R37022CA00-00001

Frequency (MHz)	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) (dB)
2361.13 (H) (X-Axis)	44.23 (Avg)	53.97	-9.74
940.60 (H) (X-Axis)	33.76 (QP)	46.00	-12.24
2361.63 (V) (Y-Axis)	41.72 (Avg)	53.97	-12.25
40.10 (H) (X-Axis)	27.06 (QP)	40.00	-12.94
38.60 (H) (X-Axis)	26.99 (QP)	40.00	-13.01
38.20 (H) (X-Axis)	26.89 (QP)	40.00	-13.11

Notes:

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

7.1.4 Duty Cycle Calculation

The fundamental and harmonics were measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Where

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

n is the number of pulses of duration t_1

m is the number of pulses of duration t_2

ξ is the number of pulses of duration t_x

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

The worst case was when the EUT was in pairing mode

Duty Cycle Correction Factor = -20.00 dB

Time of One Pulse = 1.540 ms

Total On Time = 1.540 ms

The time between pulses is 55.80 ms

Duty Cycle = 1.540 ms / 55.80 ms x 100% = 2.760%

The duty cycle is less than 10%, so the maximum Peak to Average ratio of -20 dB can be utilized.



8. CONCLUSIONS

The TIVO S6Z MSO Backlit Voice Remote 2017, Model: R37022CA00-00001 (EUT), as tested, meets all of the specification limits defined in RSS-210, RSS-Gen, and the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209 and 15.249.





APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

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

LABORATORY ACCREDITATIONS AND RECOGNITIONS



For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025. **For the most up-to-date version of our scopes and certificates please visit <http://celectronics.com/quality/scope/>**

Quote from ISO-ILAC-IAF Communiqué on 17025:

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

Innovation, Science and Economic Development Canada
Lab Code 2154A



APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass RSS-210, RSS-Gen, FCC Subpart B and FCC 15.249 specifications.

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

No modifications were made to the EUT during the testing.



APPENDIX C

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

ADDITIONAL MODEL COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

TIVO S6Z MSO Backlit Voice Remote 2017
Model: R37022CA00-00001
S/N: N/A

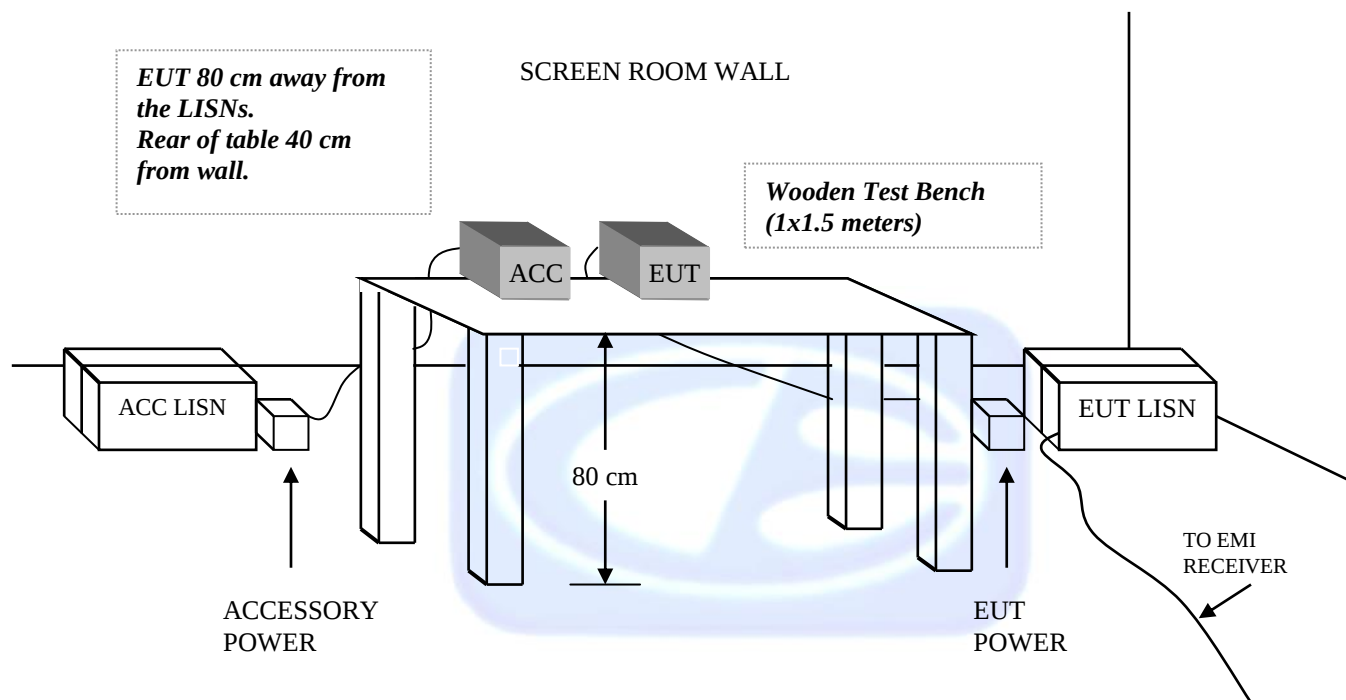
There are no additional models covered under this report.



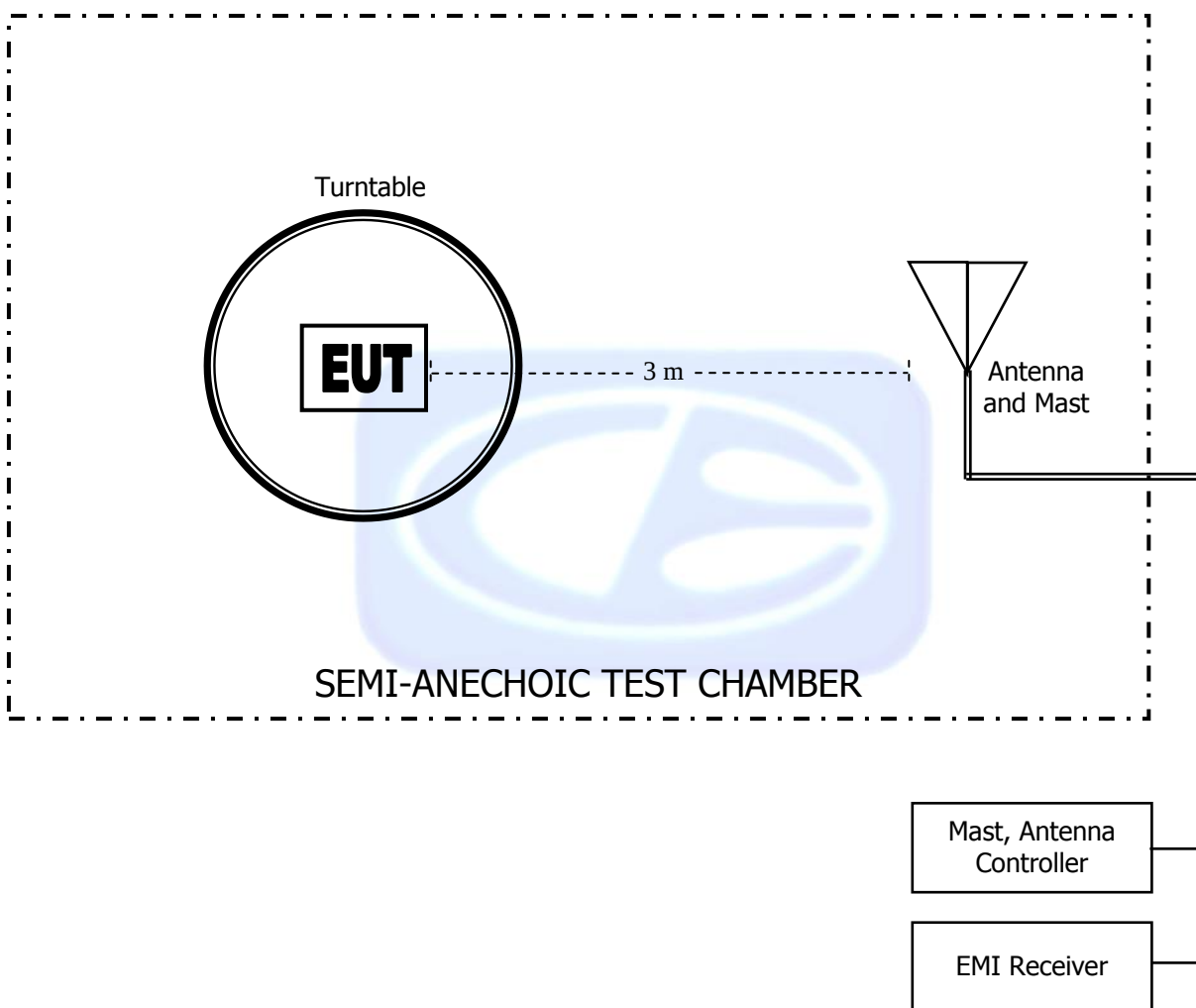
APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP



**FIGURE 1: LAYOUT OF THE SEMI -ANECHOIC
TEST CHAMBER**



COM-POWER AL-130R**LOOP ANTENNA****S/N: 121090****CALIBRATION DATE: FEBRUARY 9, 2017**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-36.17	15.33
0.01	-35.86	15.64
0.02	-37.30	14.20
0.03	-36.58	14.92
0.04	-36.99	14.51
0.05	-37.66	13.84
0.06	-37.53	13.97
0.07	-37.64	13.86
0.08	-37.52	13.98
0.09	-37.62	13.88
0.1	-37.59	13.91
0.2	-37.79	13.71
0.3	-37.80	13.70
0.4	-37.70	13.80
h0.5	-37.79	13.71
0.6	-37.79	13.71
0.7	-37.69	13.81
0.8	-37.49	14.01
0.9	-37.39	14.11
1	-37.39	14.11
2	-37.09	14.41
3	-37.09	14.41
4	-37.19	14.31
5	-36.98	14.52
6	-37.17	14.33
7	-37.05	14.45
8	-36.85	14.65
9	-36.84	14.66
10	-36.75	14.75
15	-37.16	14.34
20	-36.44	15.06
25	-37.88	13.62
30	-39.14	12.36

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

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

COM POWER AH-118**HORN ANTENNA****S/N: 071175****CALIBRATION DATE: FEBRUARY 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 PAM-118A**PREAMPLIFIER****S/N: 551024****CALIBRATION DATE: MAY 10, 2018**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.99	6.0	39.01
1.1	39.77	6.5	39.00
1.2	39.02	7.0	39.69
1.3	39.44	7.5	38.96
1.4	39.64	8.0	38.57
1.5	40.23	8.5	39.17
1.6	40.17	9.0	38.82
1.7	40.23	9.5	39.30
1.8	39.48	10.0	38.90
1.9	39.85	11.0	38.86
2.0	39.99	12.0	39.87
2.5	40.38	13.0	39.55
3.0	40.64	14.0	38.92
3.5	40.68	15.0	39.33
4.0	40.87	16.0	39.60
4.5	40.04	17.0	40.28
5.0	39.54	18.0	39.58
5.5	39.58		

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.
TIVO S6Z MSO BACKLIT VOICE REMOTE 2017
MODEL: R37022CA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

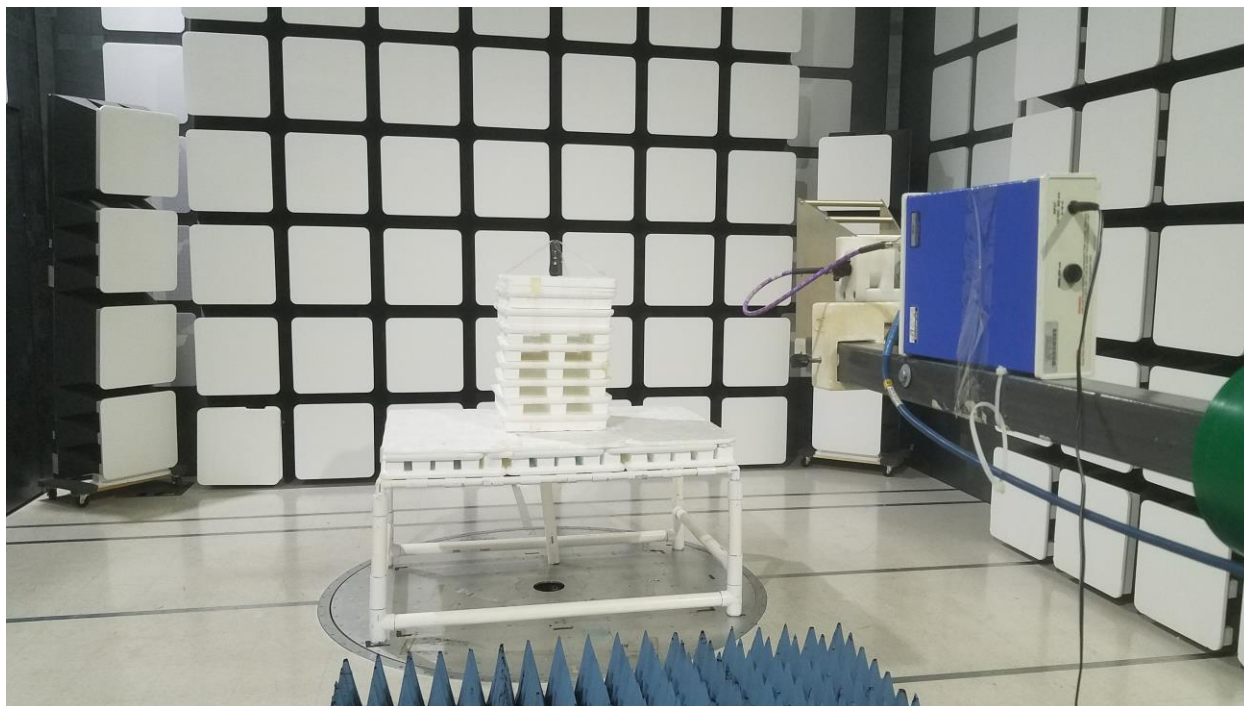
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
TIVO S6Z MSO BACKLIT VOICE REMOTE 2017
MODEL: R37022CA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

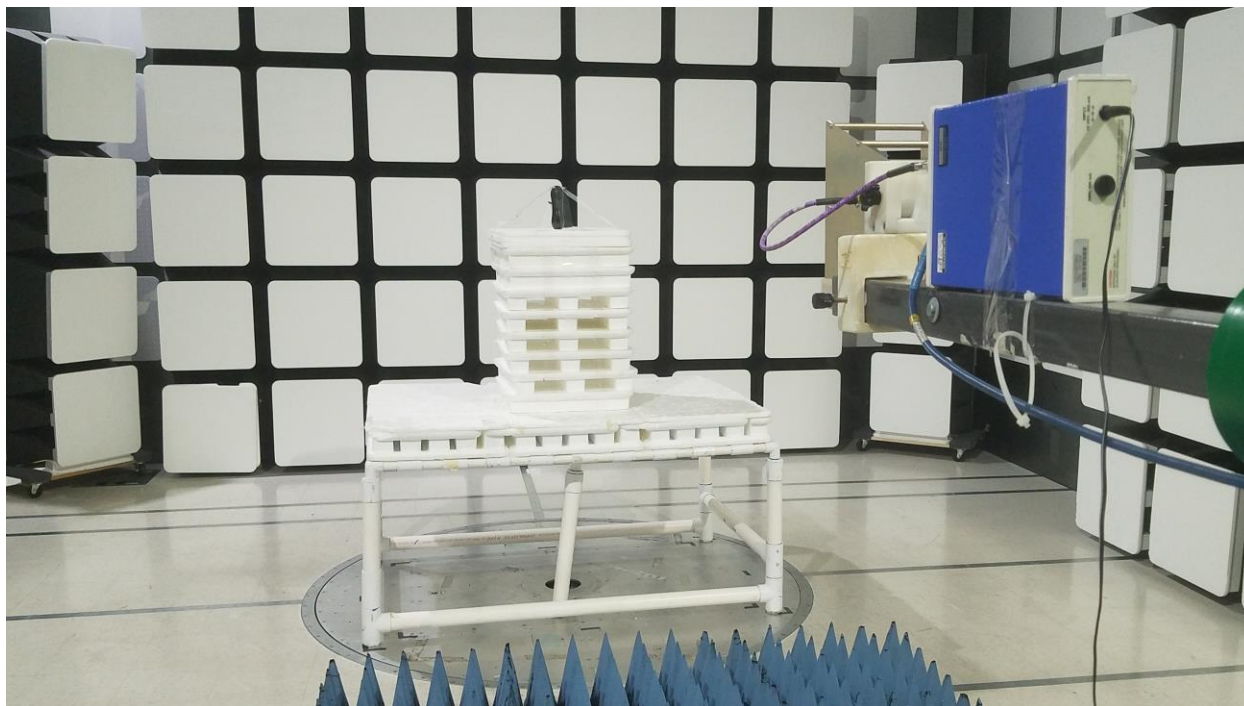
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
TIVO S6Z MSO BACKLIT VOICE REMOTE 2017
MODEL: R37022CA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
TIVO S6Z MSO BACKLIT VOICE REMOTE 2017
MODEL: R37022CA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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

APPENDIX E

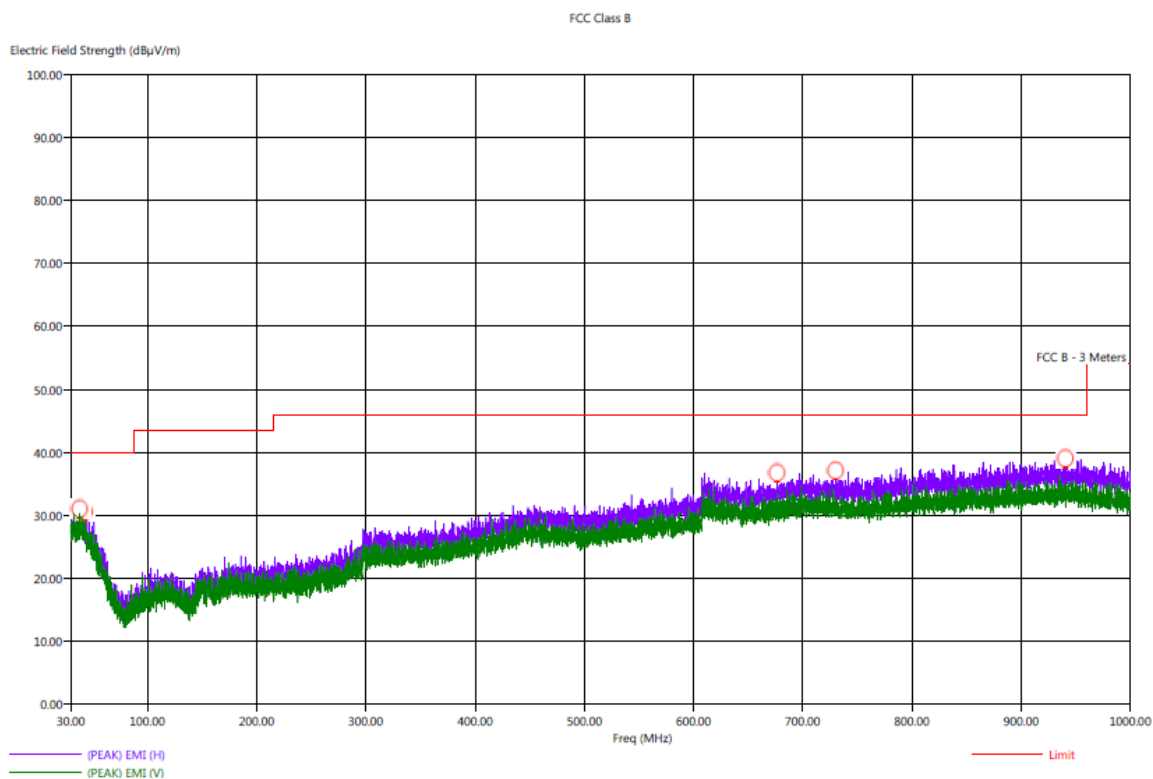
DATA SHEETS

***RADIATED EMISSIONS
DATA SHEETS***

Title: Radiated Pre-Scan - FCC Class B
File: Agilent - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz.set
Operator: James Ross
EUT Type: TIVO S6Z MSO Backlit Voice Remote 2017
EUT Condition: The EUT was programmed via a laptop PC to continuously transmit as a stand-alone device
Comments: Company: Universal Electronics, Inc.
Model: URC R37022CA00-00001
S/N: N/A

1/29/2019 2:35:40 PM
Sequence: Preliminary Scan

Note: Worst case X-Axis





Title: Radiated Final Scan - FCC Class B
File: Agilent - Final Scan - FCC Class B - 30 MHz to 1000 MHz.set
Operator: James Ross
EUT Type: TIVO S6Z MSO Backlit Voice Remote 2017
EUT Condition: The EUT was programmed via a laptop PC to continuously transmit as a stand-alone device
Comments: Company: Universal Electronics, Inc.
Model: URC R37022CA00-00001
S/N: N/A

1/29/2019 3:24:06 PM
Sequence: Final Measurements

Note: Worst case X-Axis

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)	Tbl Aql (dec)	Twr Ht (cm)
38.20	H	32.62	26.89	-7.38	-13.11	40.00	24.45	0.88	246.50	255.02
38.60	H	32.16	26.99	-7.84	-13.01	40.00	24.52	0.89	159.00	223.08
40.10	H	32.21	27.06	-7.79	-12.94	40.00	24.59	0.90	65.25	191.02
42.90	H	31.48	25.75	-8.52	-14.25	40.00	23.57	0.90	226.50	223.02
676.60	H	35.89	30.98	-10.11	-15.02	46.00	23.82	2.50	132.50	254.97
730.20	H	36.46	31.33	-9.54	-14.67	46.00	24.54	2.62	104.50	143.38
940.60	H	38.96	33.76	-7.04	-12.24	46.00	27.69	3.08	112.00	366.67

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Fundamental Low Channel

[illegible]

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Fundamental Middle Channel

[illegible]

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Fundamental High Channel

[illegible]

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/19/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	51.72	V	73.97	-22.25	Peak	161.50	127.08	
4850.00	31.72	V	53.97	-22.25	Avg	161.50	127.08	
7275.00	45.23	V	73.97	-28.74	Peak	339.50	127.20	
7275.00	25.23	V	53.97	-28.74	Avg	339.50	127.20	
9700.00	54.62	V	73.97	-19.35	Peak	213.25	111.56	
9700.00	34.62	V	53.97	-19.35	Avg	213.25	111.56	
12125.00	47.65	V	73.97	-26.32	Peak	136.50	127.26	
12125.00	27.65	V	53.97	-26.32	Avg	136.50	127.26	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/19/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	51.05	V	73.97	-22.92	Peak	280.75	159.32	
4850.00	31.05	V	53.97	-22.92	Avg	280.75	159.32	
7275.00	43.95	V	73.97	-30.02	Peak	152.75	158.49	
7275.00	23.95	V	53.97	-30.02	Avg	152.75	158.49	
9700.00	50.74	V	73.97	-23.23	Peak	279.50	158.73	
9700.00	30.74	V	53.97	-23.23	Avg	279.50	158.73	
12125.00	46.55	V	73.97	-27.42	Peak	28.00	221.83	
12125.00	26.55	V	53.97	-27.42	Avg	28.00	221.83	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/19/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	52.83	V	73.97	-21.14	Peak	157.00	142.85	
4850.00	32.83	V	53.97	-21.14	Avg	157.00	142.85	
7275.00	46.97	V	73.97	-27.00	Peak	330.50	143.26	
7275.00	26.97	V	53.97	-27.00	Avg	330.50	143.26	
9700.00	51.07	V	73.97	-22.90	Peak	226.50	222.97	
9700.00	31.07	V	53.97	-22.90	Avg	226.50	222.97	
12125.00	46.63	V	73.97	-27.34	Peak	193.50	143.20	
12125.00	26.63	V	53.97	-27.34	Avg	193.50	143.20	
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

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/19/2018
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	51.91	H	73.97	-22.06	Peak	166.75	127.32	
4850.00	31.91	H	53.97	-22.06	Avg	166.75	127.32	
7275.00	48.25	H	73.97	-25.72	Peak	61.75	249.95	
7275.00	28.25	H	53.97	-25.72	Avg	61.75	249.95	
9700.00	54.62	H	73.97	-19.35	Peak	92.00	222.97	
9700.00	34.62	H	53.97	-19.35	Avg	92.00	222.97	
12125.00	47.14	H	73.97	-26.83	Peak	72.75	238.73	
12125.00	27.14	H	53.97	-26.83	Avg	72.75	238.73	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/19/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	48.58	H	73.97	-25.39	Peak	326.50	143.38	
4850.00	28.58	H	53.97	-25.39	Avg	326.50	143.38	
7275.00	44.50	H	73.97	-29.47	Peak	28.00	189.89	
7275.00	24.50	H	53.97	-29.47	Avg	28.00	189.89	
9700.00	54.08	H	73.97	-19.89	Peak	89.00	110.91	
9700.00	34.08	H	53.97	-19.89	Avg	89.00	110.91	
12125.00	47.05	H	73.97	-26.92	Peak	129.75	207.02	
12125.00	27.05	H	53.97	-26.92	Avg	129.75	207.02	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/19/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4850.00	47.59	H	73.97	-26.38	Peak	50.50	127.20	
4850.00	27.59	H	53.97	-26.38	Avg	50.50	127.20	
7275.00	45.33	H	73.97	-28.64	Peak	141.25	249.99	
7275.00	25.33	H	53.97	-28.64	Avg	141.25	249.99	
9700.00	52.66	H	73.97	-21.31	Peak	270.75	142.85	
9700.00	32.66	H	53.97	-21.31	Avg	270.75	142.85	
12125.00	46.85	H	73.97	-27.12	Peak	190.00	249.99	
12125.00	26.85	H	53.97	-27.12	Avg	190.00	249.99	
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

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	48.20	V	73.97	-25.77	Peak	169.75	127.32	
4900.00	28.20	V	53.97	-25.77	Avg	169.75	127.32	
7350.00	47.03	V	73.97	-26.94	Peak	212.75	127.32	
7350.00	27.03	V	53.97	-26.94	Avg	212.75	127.32	
9800.00	54.63	V	73.97	-19.34	Peak	216.25	127.32	
9800.00	34.63	V	53.97	-19.34	Avg	216.25	127.32	
12250.00	47.32	V	73.97	-26.65	Peak	131.50	222.79	
12250.00	27.32	V	53.97	-26.65	Avg	131.50	222.79	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	51.46	V	73.97	-22.51	Peak	52.25	127.26	
4900.00	31.46	V	53.97	-22.51	Avg	52.25	127.26	
7350.00	48.03	V	73.97	-25.94	Peak	101.00	223.02	
7350.00	28.03	V	53.97	-25.94	Avg	101.00	223.02	
9800.00	51.72	V	73.97	-22.25	Peak	81.75	222.73	
9800.00	31.72	V	53.97	-22.25	Avg	81.75	222.73	
12250.00	47.83	V	73.97	-26.14	Peak	92.00	159.08	
12250.00	27.83	V	53.97	-26.14	Avg	92.00	159.08	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	51.44	V	73.97	-22.53	Peak	166.75	143.38	
4900.00	31.44	V	53.97	-22.53	Avg	166.75	143.38	
7350.00	46.27	V	73.97	-27.70	Peak	178.00	111.38	
7350.00	26.27	V	53.97	-27.70	Avg	178.00	111.38	
9800.00	54.72	V	73.97	-19.25	Peak	219.75	143.38	
9800.00	34.72	V	53.97	-19.25	Avg	219.75	143.38	
12250.00	47.14	V	73.97	-26.83	Peak	89.00	143.32	
12250.00	27.14	V	53.97	-26.83	Avg	89.00	143.32	
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

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	52.02	H	73.97	-21.95	Peak	166.25	159.20	
4900.00	32.02	H	53.97	-21.95	Avg	166.25	159.20	
7350.00	48.69	H	73.97	-25.28	Peak	60.00	175.20	
7350.00	28.69	H	53.97	-25.28	Avg	60.00	175.20	
9800.00	50.62	H	73.97	-23.35	Peak	146.25	127.20	
9800.00	30.62	H	53.97	-23.35	Avg	146.25	127.20	
12250.00	47.17	H	73.97	-26.80	Peak	92.50	175.20	
12250.00	27.17	H	53.97	-26.80	Avg	92.50	175.20	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	50.31	H	73.97	-23.66	Peak	166.75	111.44	
4900.00	30.31	H	53.97	-23.66	Avg	166.75	111.44	
7350.00	44.31	H	73.97	-29.66	Peak	218.25	238.97	
7350.00	24.31	H	53.97	-29.66	Avg	218.25	238.97	
9800.00	51.94	H	73.97	-22.03	Peak	261.75	127.08	
9800.00	31.94	H	53.97	-22.03	Avg	261.75	127.08	
12250.00	47.21	H	73.97	-26.76	Peak	161.50	250.07	
12250.00	27.21	H	53.97	-26.76	Avg	161.50	250.07	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4900.00	54.12	H	73.97	-19.85	Peak	167.25	127.26	
4900.00	34.12	H	53.97	-19.85	Avg	167.25	127.26	
7350.00	48.81	H	73.97	-25.16	Peak	59.25	249.95	
7350.00	28.81	H	53.97	-25.16	Avg	59.25	249.95	
9800.00	50.15	H	73.97	-23.82	Peak	249.00	127.20	
9800.00	30.15	H	53.97	-23.82	Avg	249.00	127.20	
12250.00	47.70	H	73.97	-26.27	Peak	243.50	206.91	
12250.00	27.70	H	53.97	-26.27	Avg	243.50	206.91	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	48.48	V	73.97	-25.49	Peak	338.25	159.14	
4950.00	28.48	V	53.97	-25.49	Avg	338.25	159.14	
7425.00	46.22	V	73.97	-27.75	Peak	29.00	143.38	
7425.00	26.22	V	53.97	-27.75	Avg	29.00	143.38	
9900.00	54.82	V	73.97	-19.15	Peak	51.75	159.02	
9900.00	34.82	V	53.97	-19.15	Avg	51.75	159.02	
12375.00	47.32	V	73.97	-26.65	Peak	72.50	100.02	
12375.00	27.32	V	53.97	-26.65	Avg	72.50	100.02	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	47.65	V	73.97	-26.32	Peak	265.50	111.38	
4950.00	27.65	V	53.97	-26.32	Avg	265.50	111.38	
7425.00	48.23	V	73.97	-25.74	Peak	266.00	249.13	
7425.00	28.23	V	53.97	-25.74	Avg	266.00	249.13	
9900.00	50.17	V	73.97	-23.80	Peak	291.75	191.02	
9900.00	30.17	V	53.97	-23.80	Avg	291.75	191.02	
12375.00	47.47	V	73.97	-26.50	Peak	3.50	249.95	
12375.00	27.47	V	53.97	-26.50	Avg	3.50	249.95	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	51.80	V	73.97	-22.17	Peak	174.75	127.14	
4950.00	31.80	V	53.97	-22.17	Avg	174.75	127.14	
7425.00	44.44	V	73.97	-29.53	Peak	347.50	159.20	
7425.00	24.44	V	53.97	-29.53	Avg	347.50	159.20	
9900.00	52.28	V	73.97	-21.69	Peak	215.50	159.14	
9900.00	32.28	V	53.97	-21.69	Avg	215.50	159.14	
12375.00	47.22	V	73.97	-26.75	Peak	120.25	173.83	
12375.00	27.22	V	53.97	-26.75	Avg	120.25	173.83	
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

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	51.37	H	73.97	-22.60	Peak	183.75	111.26	
4950.00	31.37	H	53.97	-22.60	Avg	183.75	111.26	
7425.00	50.54	H	73.97	-23.43	Peak	225.75	159.14	
7425.00	30.54	H	53.97	-23.43	Avg	225.75	159.14	
9900.00	51.86	H	73.97	-22.11	Peak	33.75	126.91	
9900.00	31.86	H	53.97	-22.11	Avg	33.75	126.91	
12375.00	46.94	H	73.97	-27.03	Peak	281.00	207.02	
12375.00	26.94	H	53.97	-27.03	Avg	281.00	207.02	
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

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	47.41	H	73.97	-26.56	Peak	328.50	111.50	
4950.00	27.41	H	53.97	-26.56	Avg	328.50	111.50	
7425.00	45.95	H	73.97	-28.02	Peak	23.00	238.79	
7425.00	25.95	H	53.97	-28.02	Avg	23.00	238.79	
9900.00	50.04	H	73.97	-23.93	Peak	89.00	249.99	
9900.00	30.04	H	53.97	-23.93	Avg	89.00	249.99	
12375.00	48.03	H	73.97	-25.94	Peak	208.50	127.26	
12375.00	28.03	H	53.97	-25.94	Avg	208.50	127.26	
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

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4950.00	48.21	H	73.97	-25.76	Peak	163.00	143.14	
4950.00	28.21	H	53.97	-25.76	Avg	163.00	143.14	
7425.00	47.58	H	73.97	-26.39	Peak	323.50	175.20	
7425.00	27.58	H	53.97	-26.39	Avg	323.50	175.20	
9900.00	53.14	H	73.97	-20.83	Peak	168.00	111.32	
9900.00	33.14	H	53.97	-20.83	Avg	168.00	111.32	
12375.00	48.26	H	73.97	-25.71	Peak	79.25	110.97	No Emission
12375.00	28.26	H	53.97	-25.71	Avg	79.25	110.97	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

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Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

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

Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 25 GHz

[illegible]

***BAND EDGES
DATA SHEETS***

FCC 15.249

Universal Electronics, Inc.
 TIVO S6Z MSO Backlit Voice Remote 2017
 Model: URC R37022CA00-00001

Date: 12/20/2018
 Lab: D
 Tested By: Kyle Fujimoto

Band Edges

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
2425.00	100.25	H	113.97	-13.72	Peak	145.00	165.77	Fundamental - Low Ch.
2425.00	80.25	H	93.97	-13.72	Avg	145.00	165.77	X-Axis - Worst Case
2400.00	43.13	H	73.97	-30.84	Peak	145.00	165.77	Band Edge
2400.00	23.13	H	53.97	-30.84	Avg	145.00	165.77	X-Axis - Worst Case
2361.13	52.22	H	73.97	-21.75	Peak	145.00	165.77	Band Edge
2361.13	44.23	H	53.97	-9.74	Avg	145.00	165.77	X-Axis - Worst Case
2425.00	99.96	V	113.97	-14.01	Peak	159.25	175.50	Fundamental - Low Ch.
2425.00	79.96	V	93.97	-14.01	Avg	159.25	175.50	Y-Axis - Worst Case
2400.00	42.73	V	73.97	-31.24	Peak	159.25	175.50	Band Edge
2400.00	22.73	V	53.97	-31.24	Avg	159.25	175.50	Y-Axis - Worst Case
2361.63	51.08	V	73.97	-22.89	Peak	159.25	175.50	Band Edge
2361.63	41.72	V	53.97	-12.25	Avg	159.25	175.50	Y-Axis - Worst Case

FCC 15.249

Universal Electronics, Inc.
TIVO S6Z MSO Backlit Voice Remote 2017
Model: URC R37022CA00-00001

Date: 12/20/2018
Lab: D
Tested By: Kyle Fujimoto

Band Edges

[illegible]

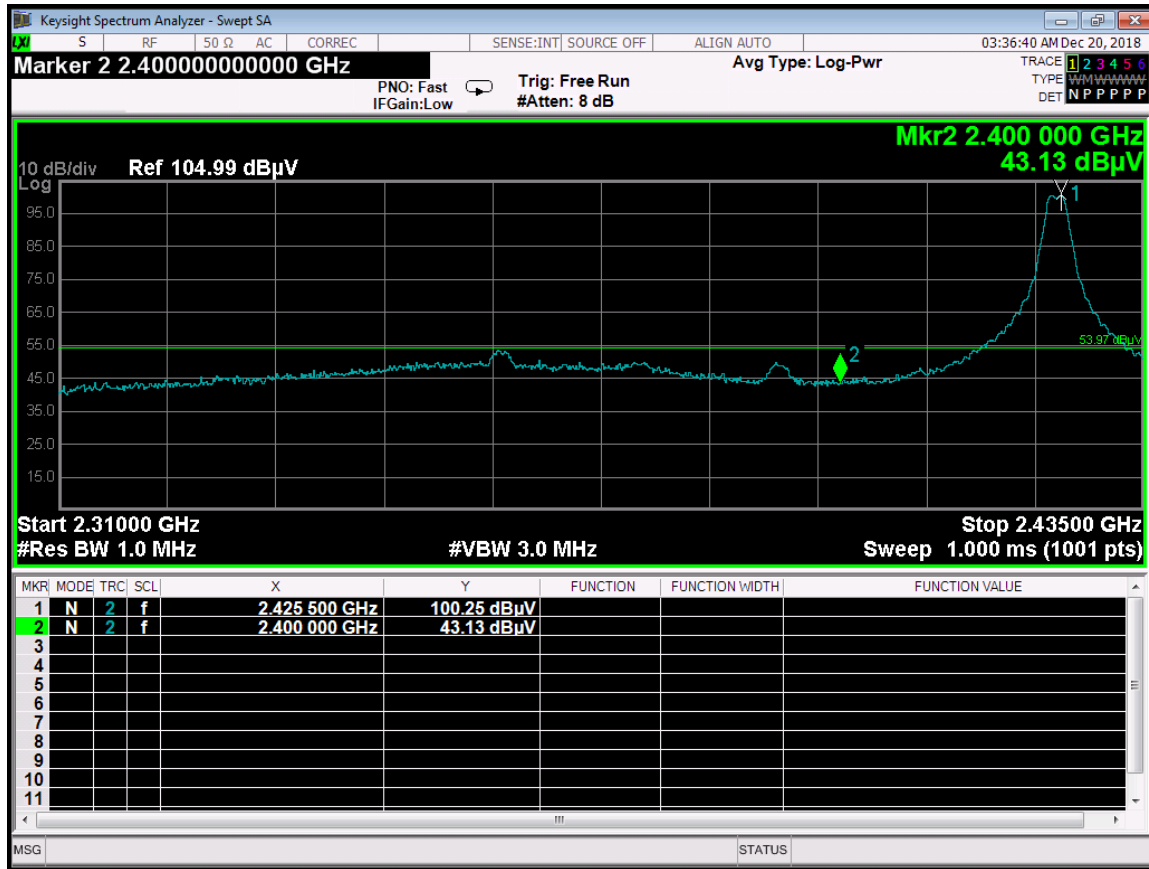


**COMPATIBLE
ELECTRONICS**

RSS-210, RSS-Gen, FCC Part 15 Subpart B and FCC Section 15.249 Test Report

TIVO S6Z MSO Backlit Voice Remote 2017

Model: R37022CA00-00001

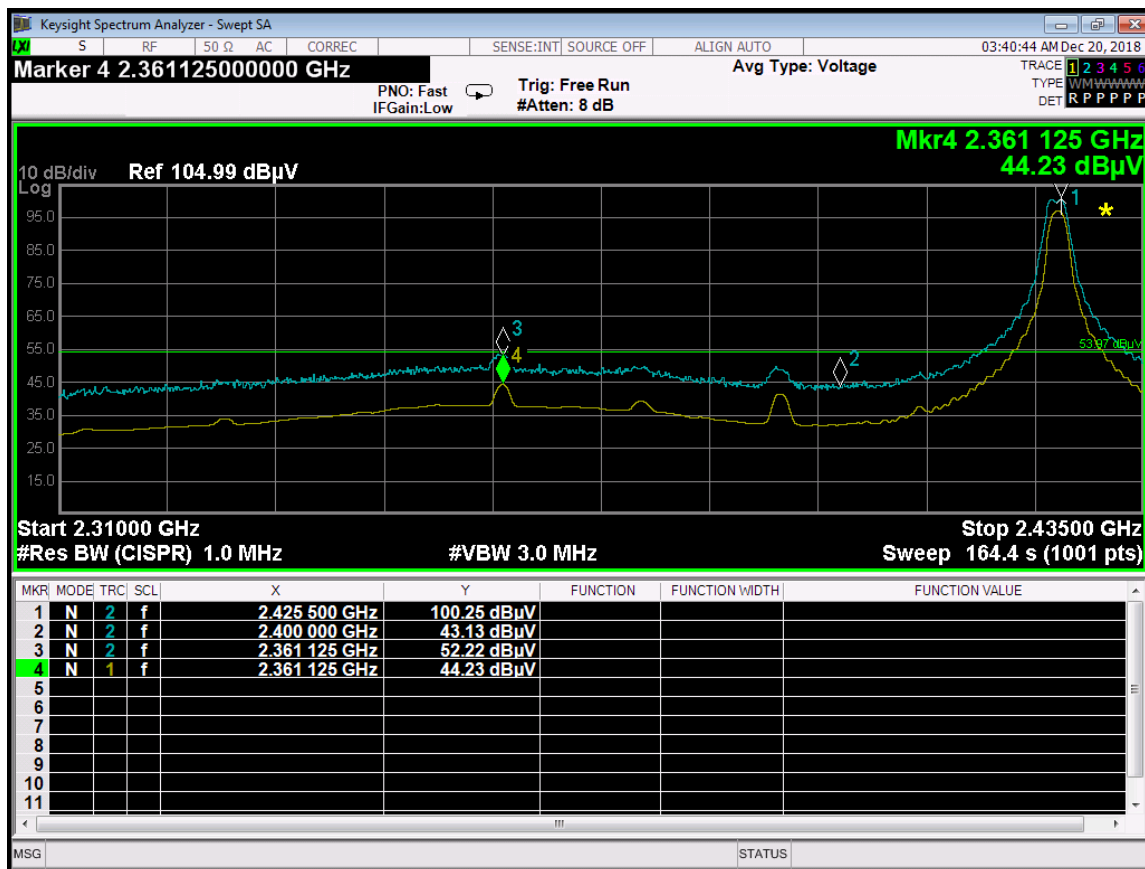


Band Edge - 2425 MHz - Horizontal - X-Axis Worst Case - Duty Cycle

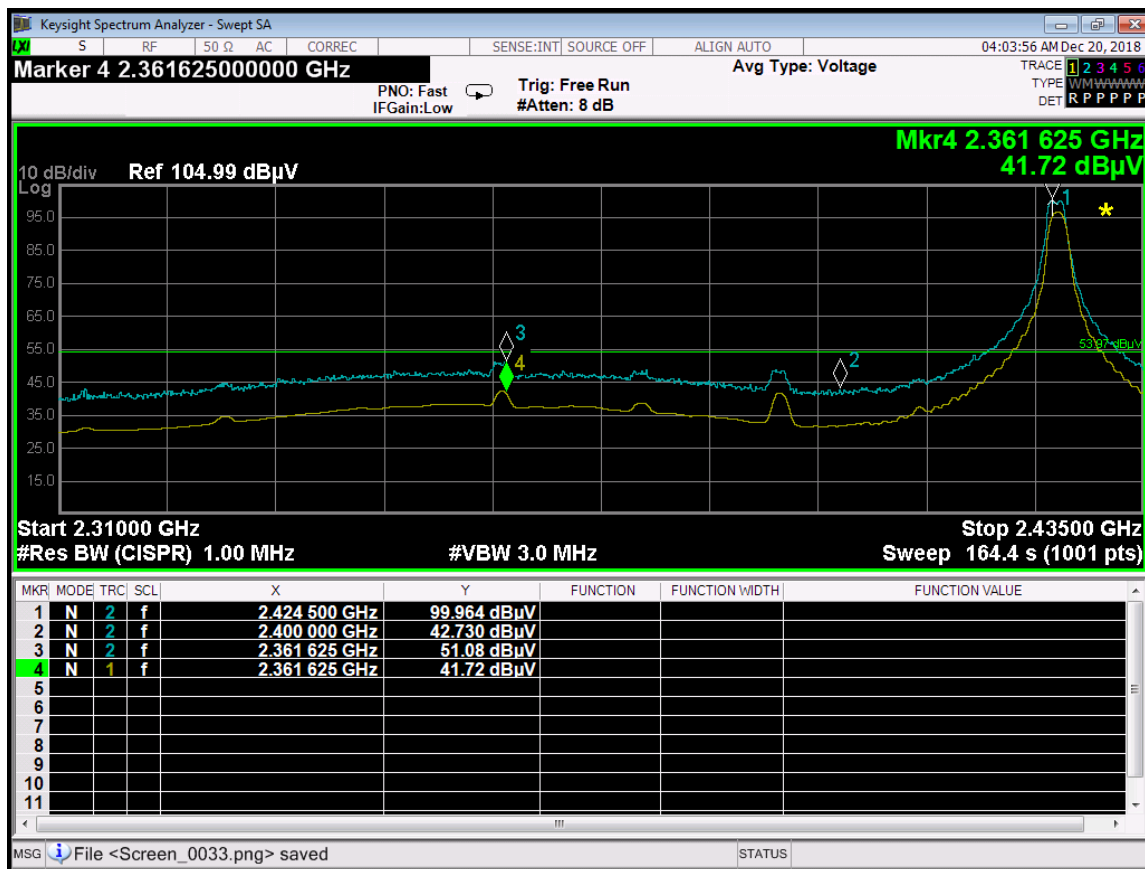
Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

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

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



Band Edge - 2425 MHz - Horizontal - X-Axis Worst Case - RMS



Band Edge - 2425 MHz - Vertical - Y-Axis Worst Case - Duty Cycle

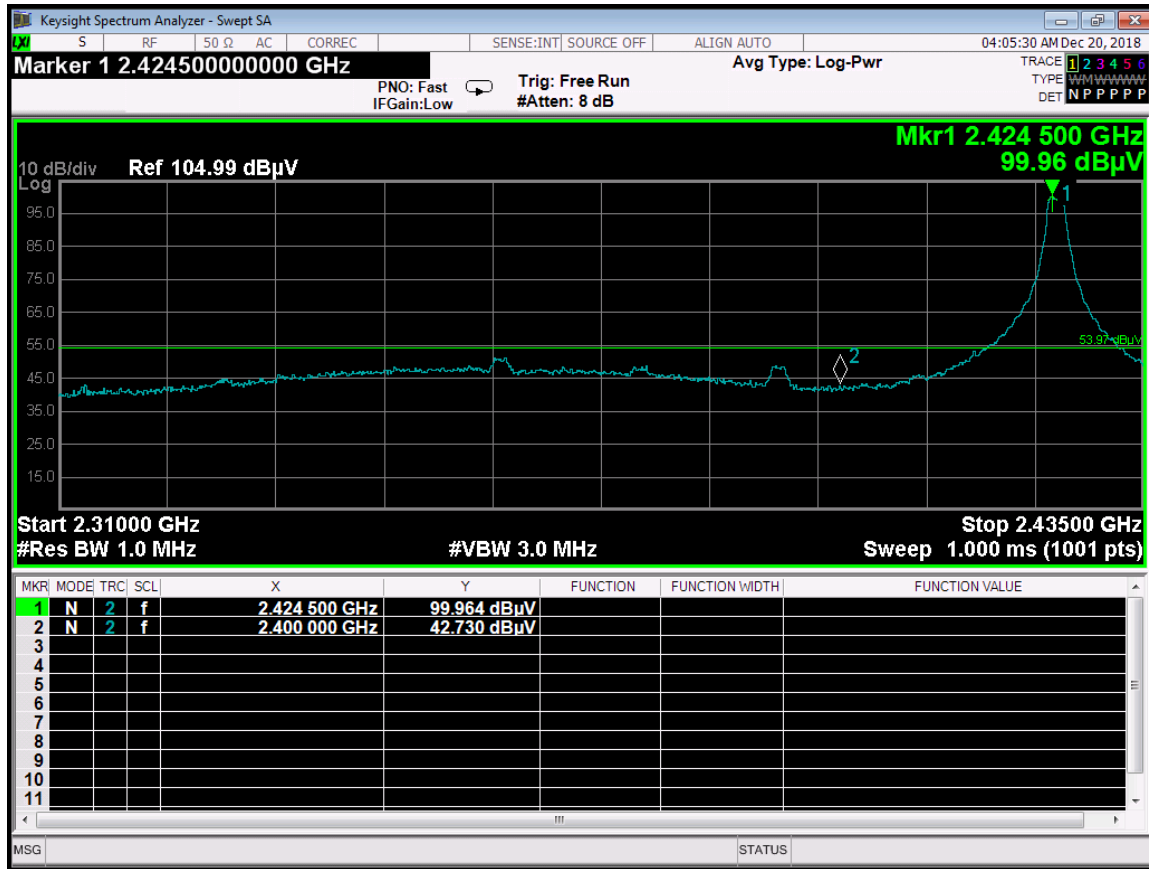


**COMPATIBLE
ELECTRONICS**

RSS-210, RSS-Gen, FCC Part 15 Subpart B and FCC Section 15.249 Test Report

TIVO S6Z MSO Backlit Voice Remote 2017

Model: R37022CA00-00001

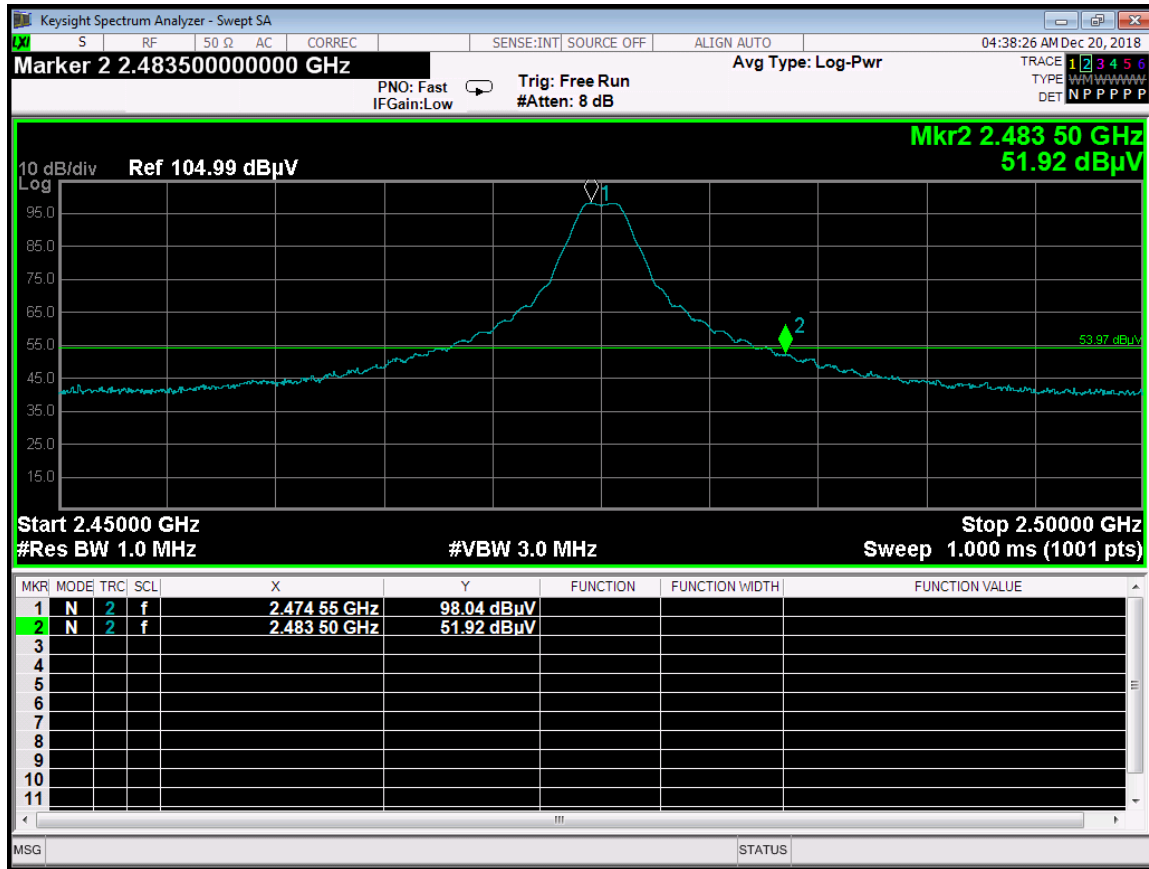


Band Edge - 2425 MHz - Vertical - Y-Axis Worst Case - RMS

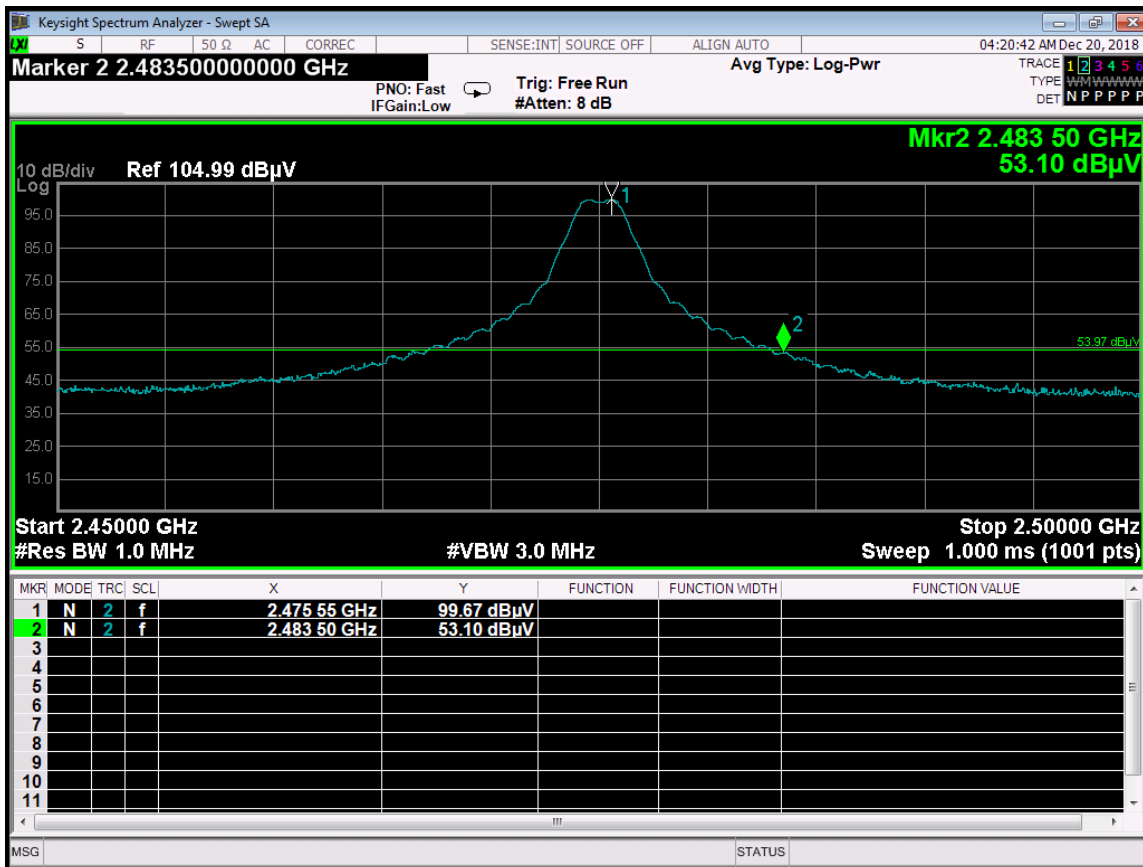
Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

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

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

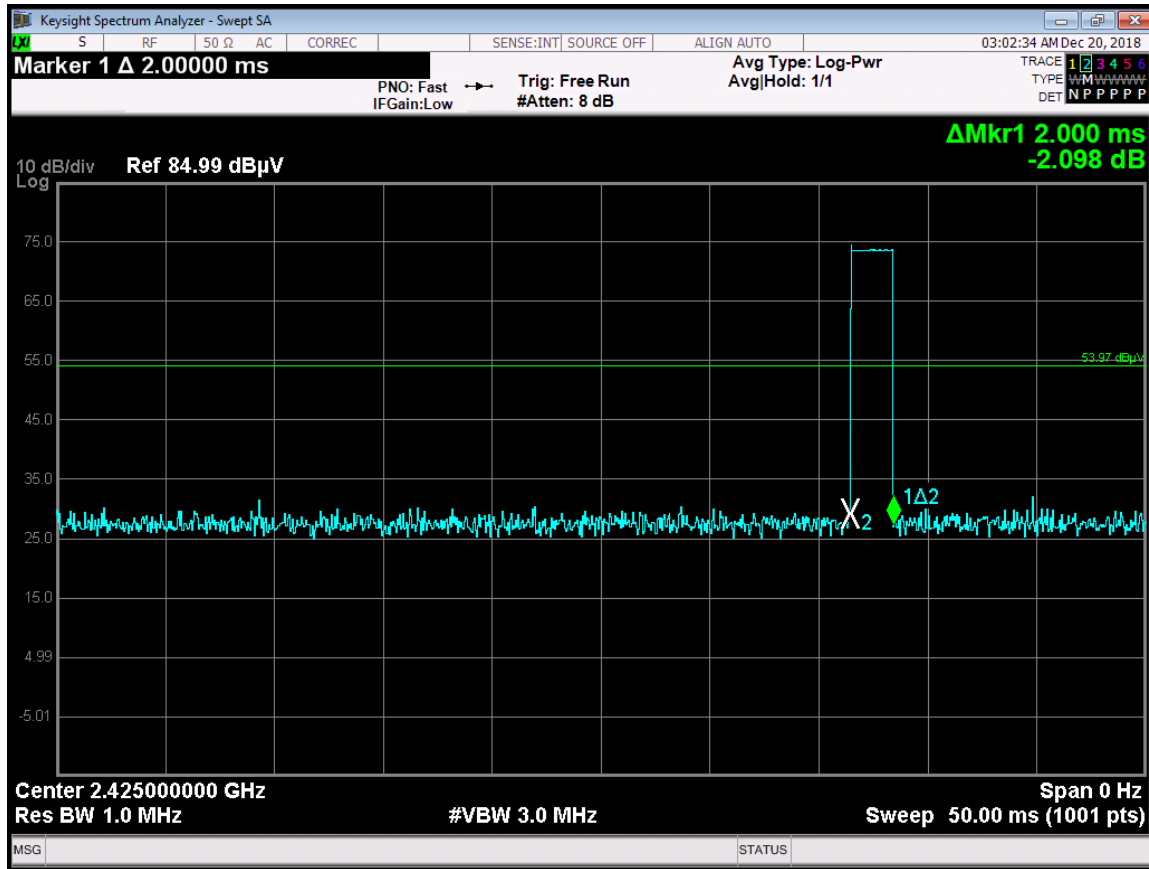


Band Edge - 2475 MHz - Horizontal - X-Axis Worst Case



Band Edge - 2475 MHz - Vertical - Y-Axis Worst Case

***DUTY CYCLE
DATA SHEETS***



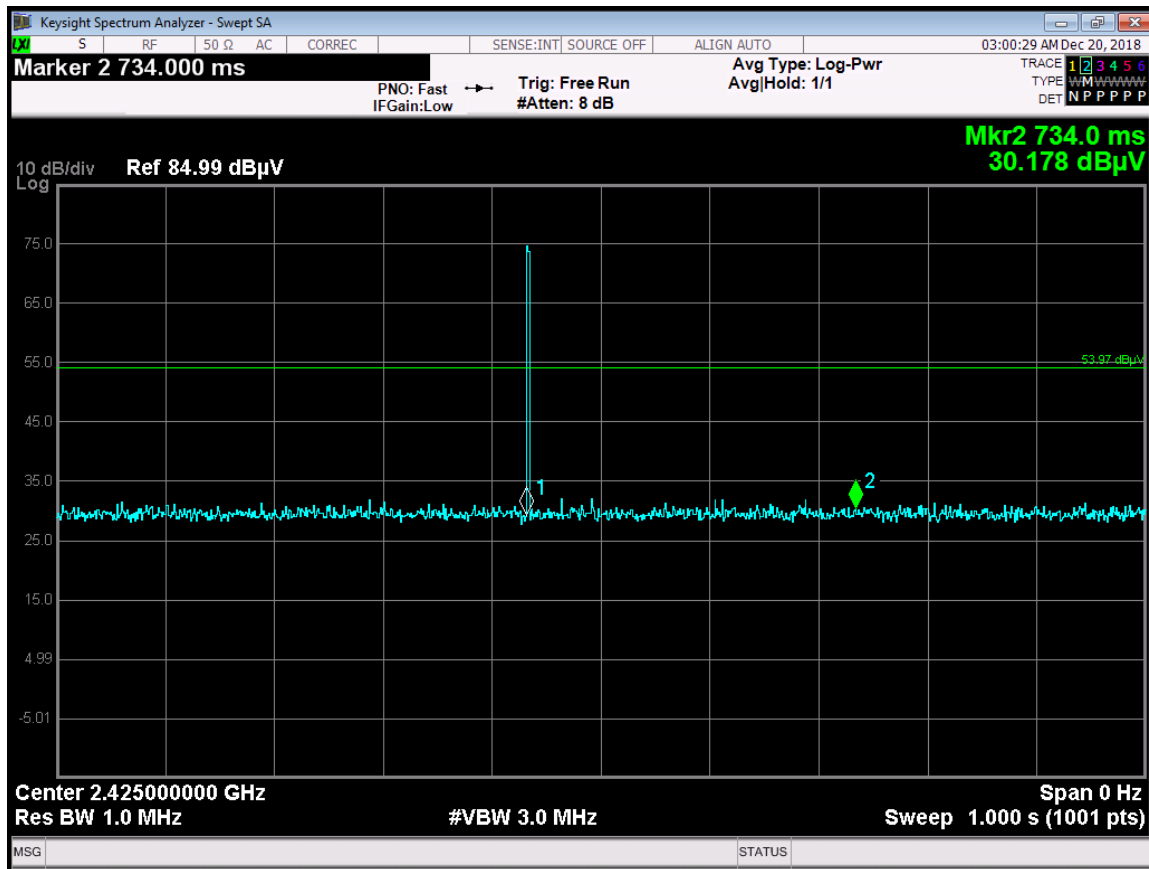
Time of One Pulse = 2.000 ms
Advertising Mode

(This Time of One Pulse is less than when in Pairing Mode)

Brea Division
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Brea, CA 92823
(714) 579-0500

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

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



Time between Pulses – Greater than 400 ms – 1.000 sec Scale
Advertising Mode

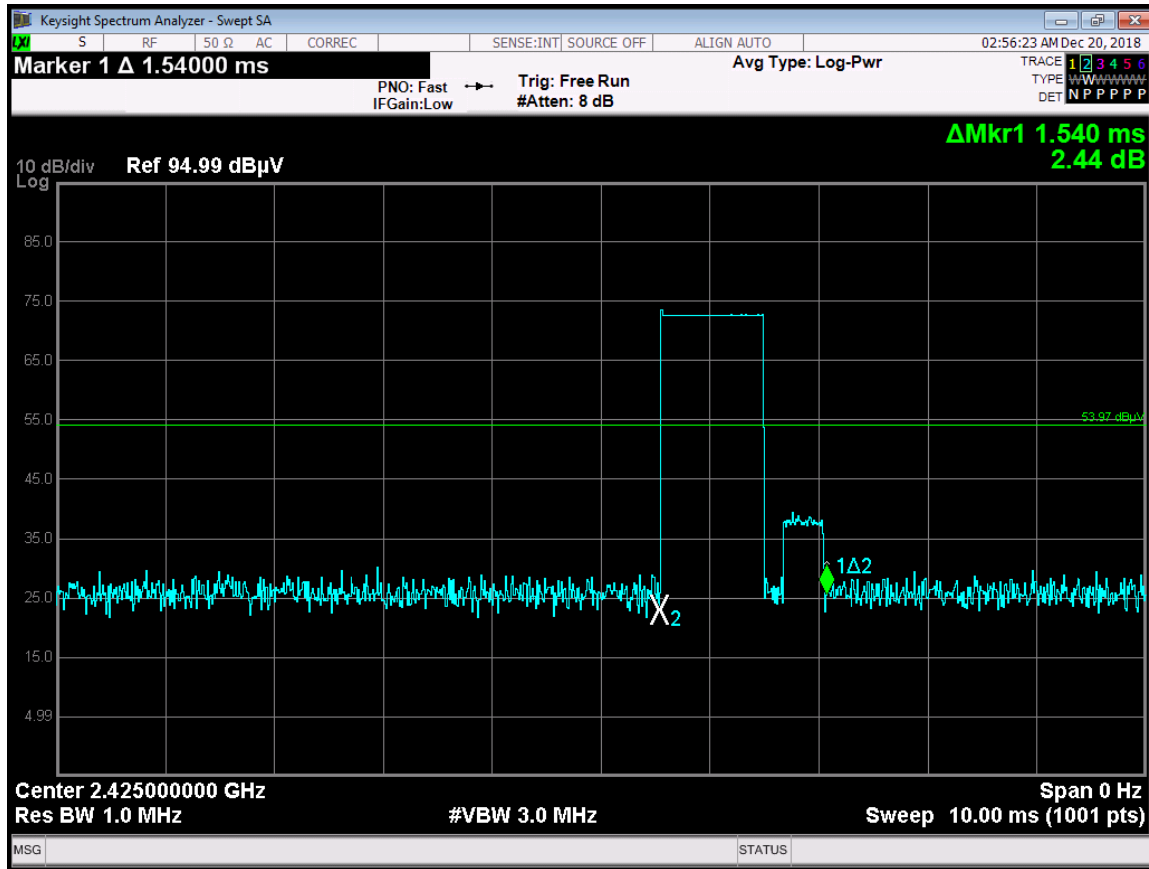
$$\text{Duty Cycle} = 2.000\text{ms} / 400 \text{ ms} \times 100\% = 0.500\%$$

The duty cycle is less than 10%, thus the full -20 dB peak to average ratio can be used.

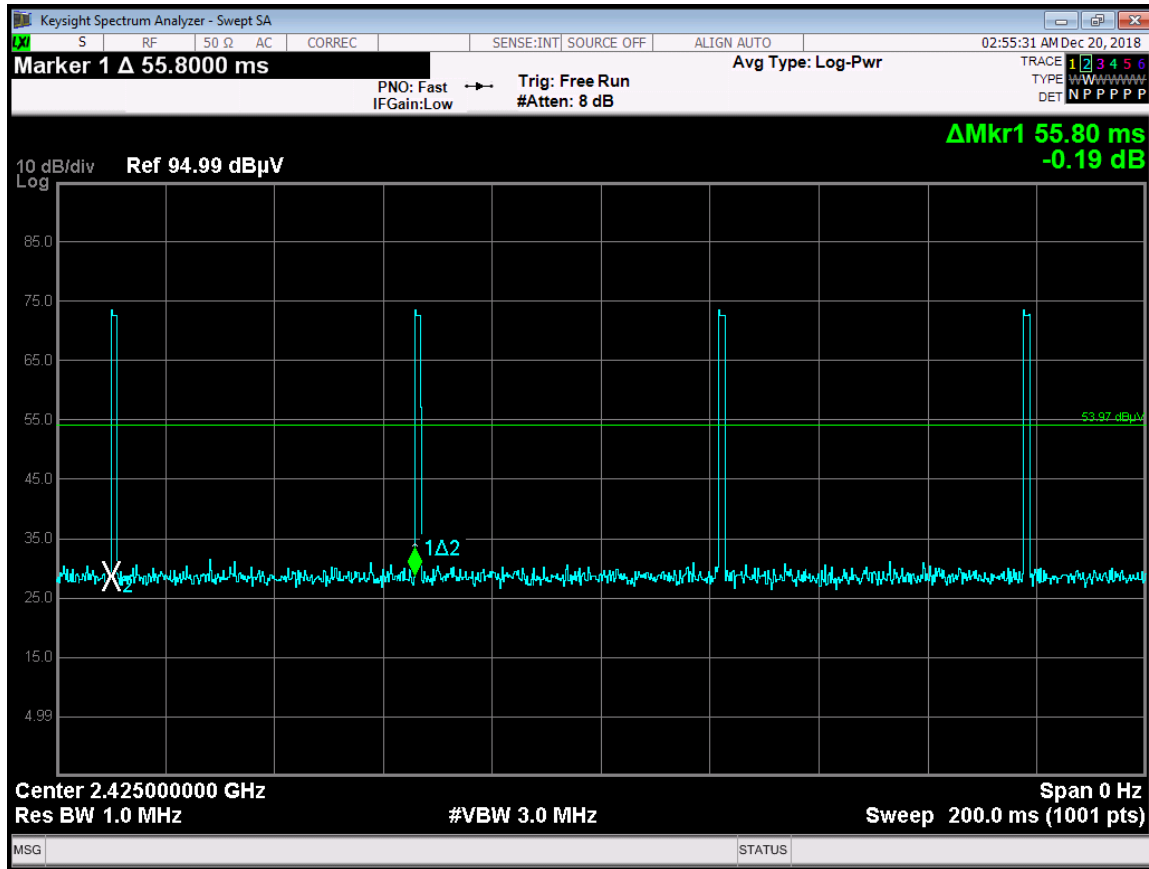
Brea Division
114 Olinda Drive
Brea, CA 92823
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Newbury Park, CA 91320
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(949) 587-0400



Time of One Pulse – 1.540 ms
 Pairing Mode
 See the calculation in Section 7.1.4 of this report



Only One Pulse per 55.80 ms
Pairing Mode

$$\text{Duty Cycle} = 1.540 \text{ ms} / 55.80 \text{ ms} \times 100\% = 2.760\%$$

The duty cycle is less than 10%, thus the full -20 dB peak to average ratio can be used.