

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

*for*

**TIVO S6Z MSO NETFLIX VOICE REMOTE 2017**

**P/N: R37022B00-00001**

Prepared for

UNIVERSAL ELECTRONICS  
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SANTA ANA CALIFORNIA, 92707

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DATE: DECEMBER 22, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	2	12	38	73

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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 Netflix Voice Remote 2017  
P/N: R37022B00-00001  
S/N: N/A

Product Description: The TIVO S6Z MSO Netflix Voice Remote 2017 (EUT) is a custom three device universal remote control.

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

Customer: Universal Electronics  
201 East Sandpointe Avauue, 8<sup>th</sup> Floor  
Santa Ana California, 92707

Test Dates: December 4 and 8, 2017

Test Specifications covered by accreditation:

CFR Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209, and 15.249



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


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**SUMMARY OF TEST RESULTS**

<i>TEST</i>	<b>DESCRIPTION</b>	<b>RESULTS</b>
1	Spurious Radiated RF Emissions, 9 kHz -25000MHz	Complies with the <b>Class B</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 83.39 (Avg) dBuV/m @ 2425.00 MHz (*U = 3.70 dB)

**1. PURPOSE**

This document is a qualification test report based on the emissions tests performed on the TIVO S6Z MSO Netflix Voice Remote 2017, P/N: R37022B00-00001. 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, 15.209, and 15.249.





### 3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this emissions Test Report.

<b>SPEC</b>	<b>TITLE</b>
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 25 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 Netflix Voice Remote 2017, P/N: R37022B00-00001 (EUT) was setup in a stand-alone configuration. The EUT was investigated in all three orthogonal axis. During the testing, the EUT was continuously transmitting at 2425 MHz, 2450 MHz, or 2475 MHz. The EUT was tested from 9 kHz to 25 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 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**

<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>FCC ID</b>
TIVO S6Z MSO NETFLIX VOICE REMOTE 2017 (EUT)	UNIVERSAL ELECTRONICS, INC.	P/N: R37022B00-00001	N/A	MG3-R37022
LAPTOP*	HEWLETT PACKARD	HSTNN-C82C	N/A	N/A
AC ADAPTER FOR LAPTOP*	HEWLETT PACKARD	HSTNN-DA40	N/A	N/A
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
<b>GENERAL TEST EQUIPMENT USED IN LAB D</b>					
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver 20 Hz – 40 GHz	Rohde & Schwarz	ESIB40	100194	September 26, 2017	1 Year
<b>RF RADIATED EMISSIONS TEST EQUIPMENT</b>					
Loop Antenna	Com-Power	AL-130R	121090	February 9, 2017	2 Year
CombiLog Antenna	Com-Power	AC-220	61060	July 27, 2017	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
Horn Antenna	Com-Power	AH-118	071175	February 26, 2016	2 Year
Preamplifier	Com-Power	PAM-118A	551024	May 12, 2016	2 Year
Preamplifier	Com-Power	PA-840	711013	May 13, 2016	2 Year
Horn Antenna	Com-Power	AH-826	71957	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.

## 7. TEST PROCEDURES

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

### 7.1 RF Emissions

#### 7.1.1 Radiated Emissions 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, band edges, and harmonics above 1 GHz were averaged using a duty cycle correction factor.

The all other frequencies above 1 GHz were averaged using the RMS 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 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.

**Radiated Emissions Test (Continued)**

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

<b>FREQUENCY RANGE</b>	<b>EFFECTIVE MEASUREMENT BANDWIDTH</b>	<b>TRANSDUCER</b>
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.

### 7.1.2 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS  
TIVO S6Z MSO Netflix Voice Remote 2017  
P/N: R37022B00-00001

Frequency MHz	Average EMI Reading (dBuV/m)	Average Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) dB
2425.00 (H) (X-Axis)	83.39	93.97	-10.58
2450.00 (H) (X-Axis)	83.21	93.97	-10.76
2475.00 (H) (X-Axis)	83.16	93.97	-10.81
2425.00 (H) (Z-Axis)	82.33	93.97	-11.64
2475.00 (V) (Y-Axis)	82.31	93.97	-11.66
2475.00 (H) (Z-Axis)	82.31	93.97	-11.66

Notes:

- \* The complete emissions data is given in Appendix E of this report.
- (V) Vertical
- (H) Horizontal

### 7.1.3 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

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

$n$  is the number of pulses of duration  $t_1$

$m$  is the number of pulses of duration  $t_2$

$\xi$  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 = 1.563126 ms

Total On Time = 1.563126 ms

The time between pulses is 53.106212 ms

Duty Cycle = 1.563126 ms / 53.106212 ms = 0.0294 = 2.94%

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 Netflix Voice Remote 2017, P/N: R37022B00-00001, as tested, meets all of 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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## LABORATORY ACCREDITATIONS AND RECOGNITIONS



NVLAP LAB CODE 200528-0

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfillment 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."



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/>



**APPENDIX B**

***MODIFICATIONS TO THE EUT***

## **MODIFICATIONS TO THE EUT**

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.249 specifications.

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

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 Netflix Voice Remote 2017  
Model: R37022B00-00001  
S/N: N/A

There are no additional Models covered under this report.



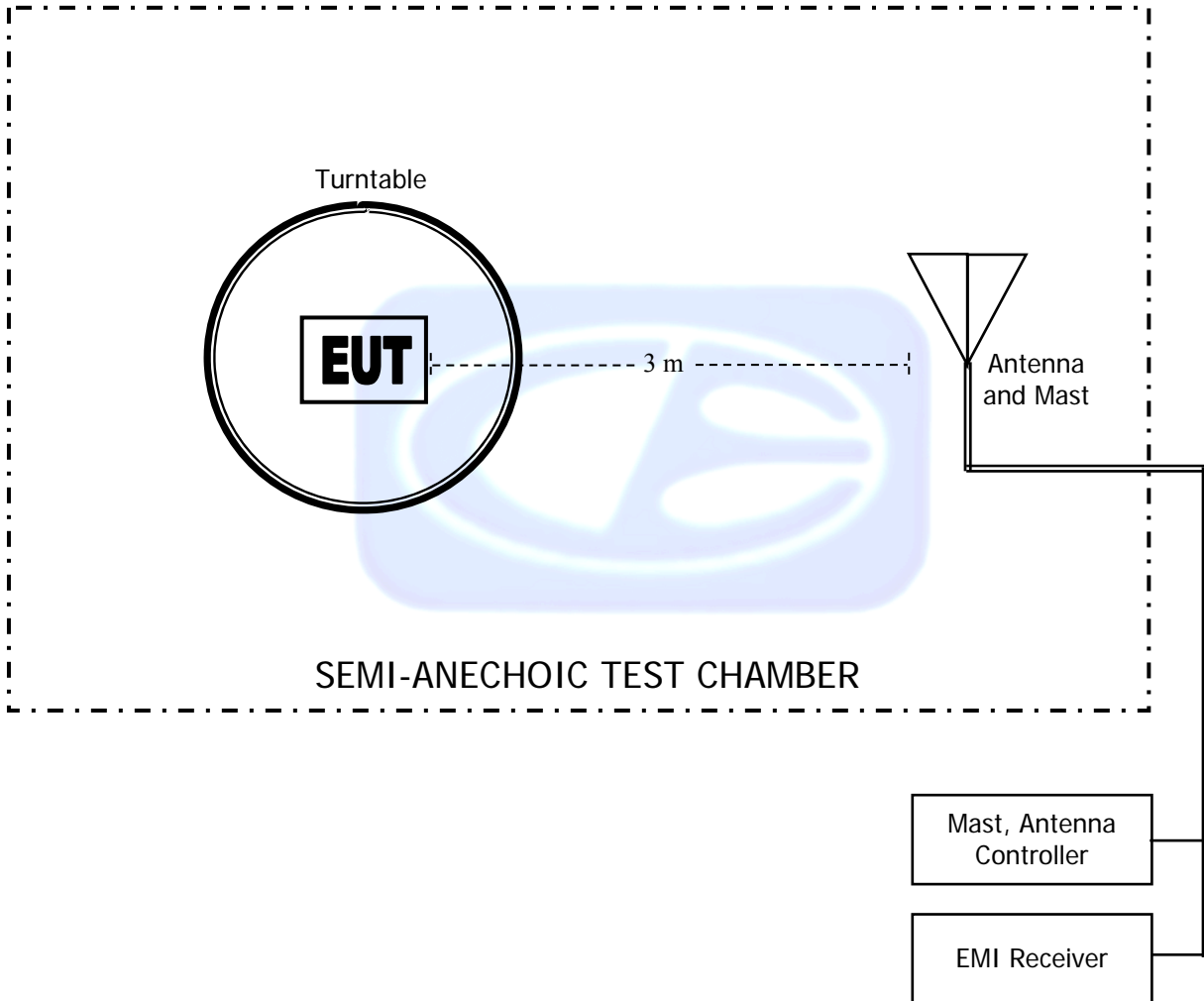


**APPENDIX D**

***DIAGRAMS AND CHARTS***



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



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

S/N: 121090

CALIBRATION DATE: FEBRUARY 9, 2017

<b>FREQUENCY (MHz)</b>	<b>MAGNETIC (dB/m)</b>	<b>ELECTRIC (dB/m)</b>
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
0.5	-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**

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
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 26, 2016

<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>
1.0	23.93	10.0	39.33
1.5	25.54	10.5	39.64
2.0	28.09	11.0	41.04
2.5	30.21	11.5	44.29
3.0	30.15	12.0	41.22
3.5	30.17	12.5	41.50
4.0	31.90	13.0	41.62
4.5	33.51	13.5	40.63
5.0	33.87	14.0	39.94
5.5	35.08	14.5	41.84
6.0	34.81	15.0	42.69
6.5	34.26	15.5	39.03
7.0	36.33	16.0	39.07
7.5	37.03	16.5	41.40
8.0	37.56	17.0	43.18
8.5	40.07	17.5	47.01
9.0	38.92	18.0	46.48
9.5	38.21		

**COM-POWER PAM-118A****PREAMPLIFIER**

S/N: 551024

CALIBRATION DATE: MAY 12, 2016

<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>
1.0	39.84	6.0	39.05
1.1	39.40	6.5	38.94
1.2	39.58	7.0	39.25
1.3	39.68	7.5	39.09
1.4	39.91	8.0	39.01
1.5	39.78	8.5	38.60
1.6	39.50	9.0	38.64
1.7	39.81	9.5	39.67
1.8	39.89	10.0	39.30
1.9	39.94	11.0	39.15
2.0	39.57	12.0	39.24
2.5	40.39	13.0	39.49
3.0	40.63	14.0	39.44
3.5	40.80	15.0	39.94
4.0	40.86	16.0	40.09
4.5	39.94	17.0	40.06
5.0	34.47	18.0	39.76
5.5	39.32		

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

S/N: 71957

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

**COM-POWER PA-840****MICROWAVE PREAMPLIFIER**

S/N: 711013

CALIBRATION DATE: MAY 13, 2016

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

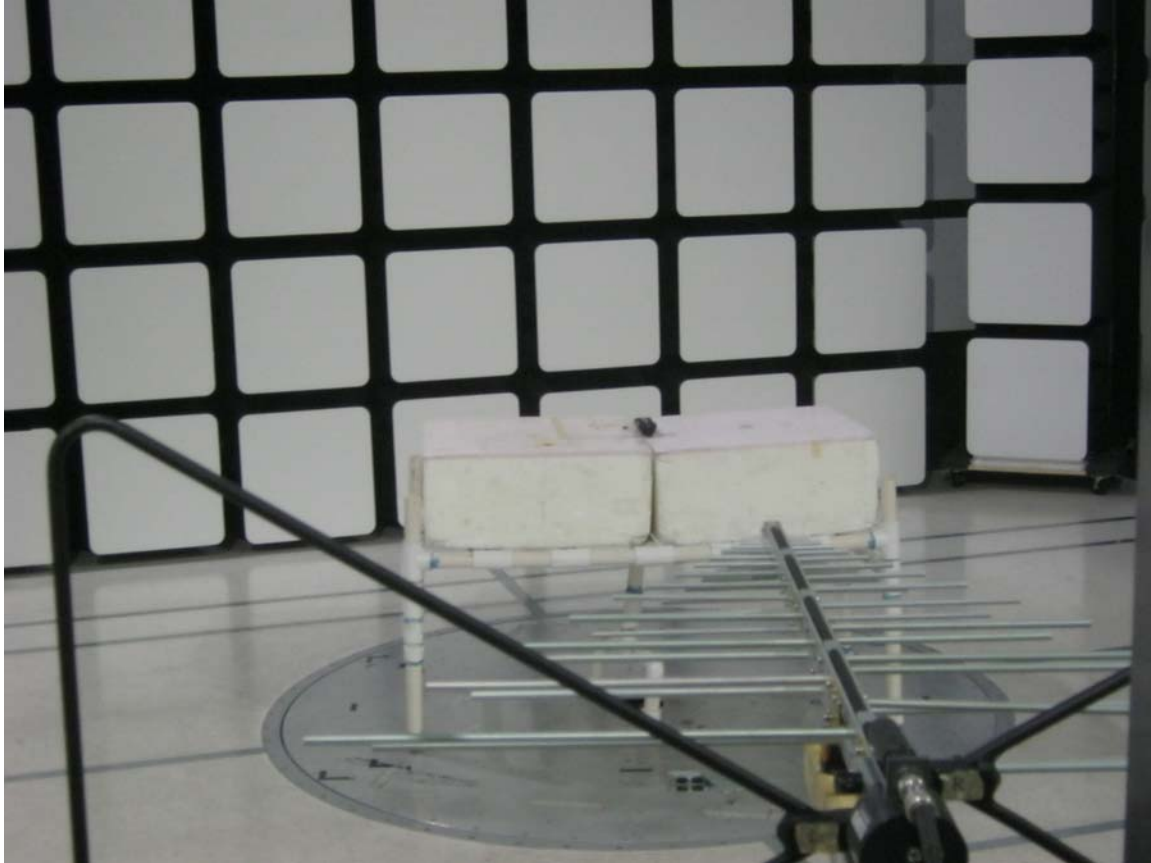


**FRONT VIEW**

UNIVERSAL ELECTRONICS  
TIVO S6Z MSO NETFLIX VOICE REMOTE 2017  
P/N: R37022B00-00001  
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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

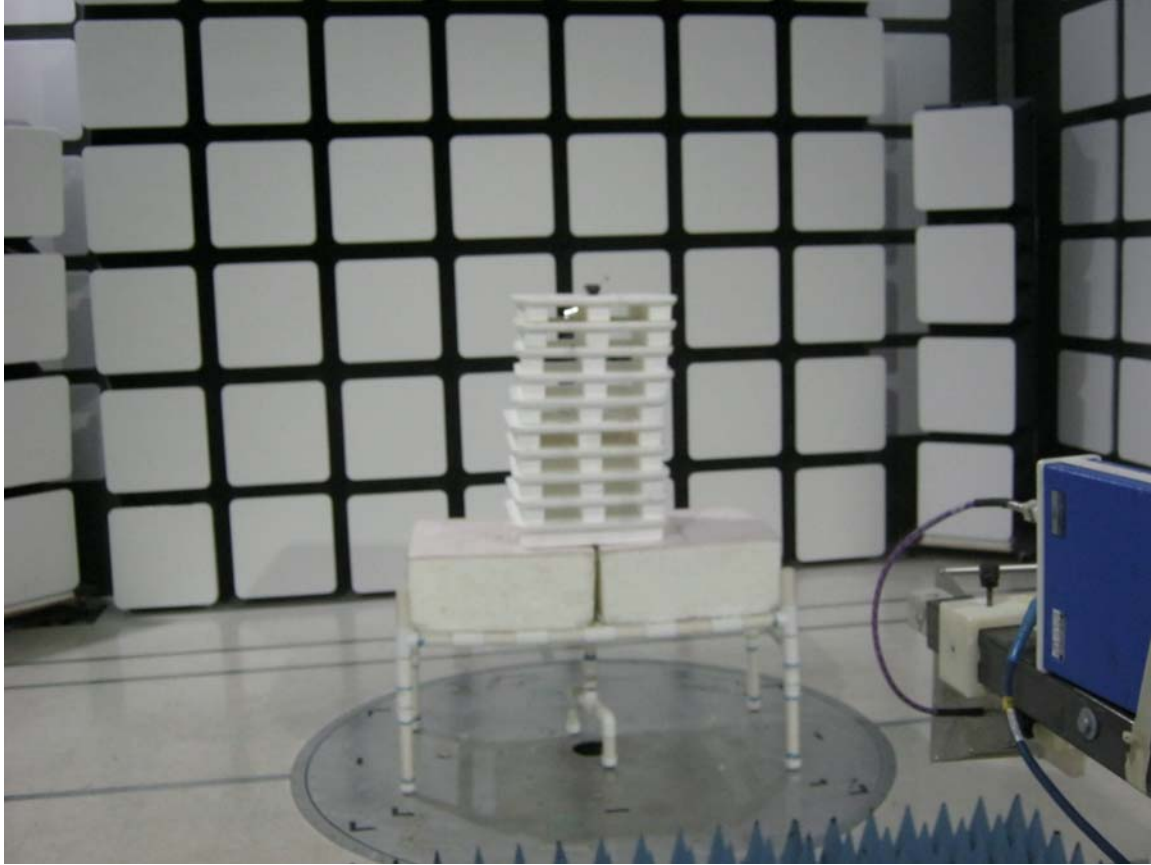




**REAR VIEW**

UNIVERSAL ELECTRONICS  
TIVO S6Z MSO NETFLIX VOICE REMOTE 2017  
P/N: R37022B00-00001  
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

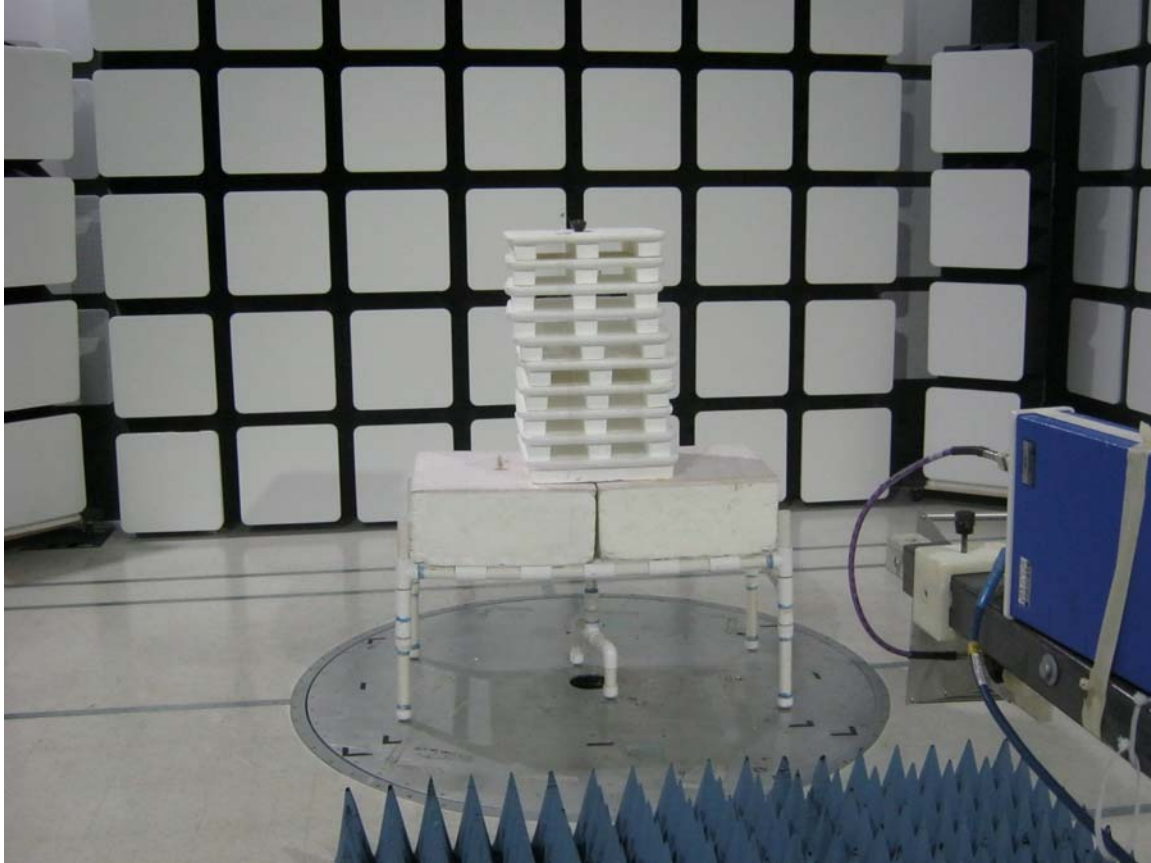
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



**FRONT VIEW**

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TIVO S6Z MSO NETFLIX VOICE REMOTE 2017  
P/N: R37022B00-00001  
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

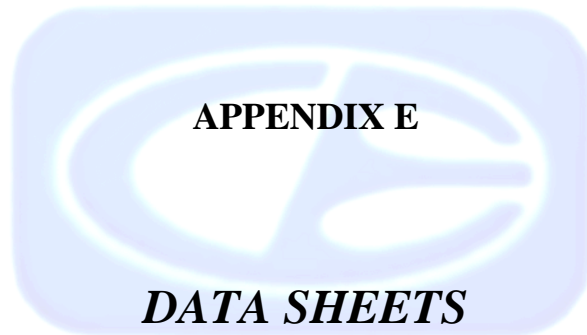
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



**REAR VIEW**

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

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





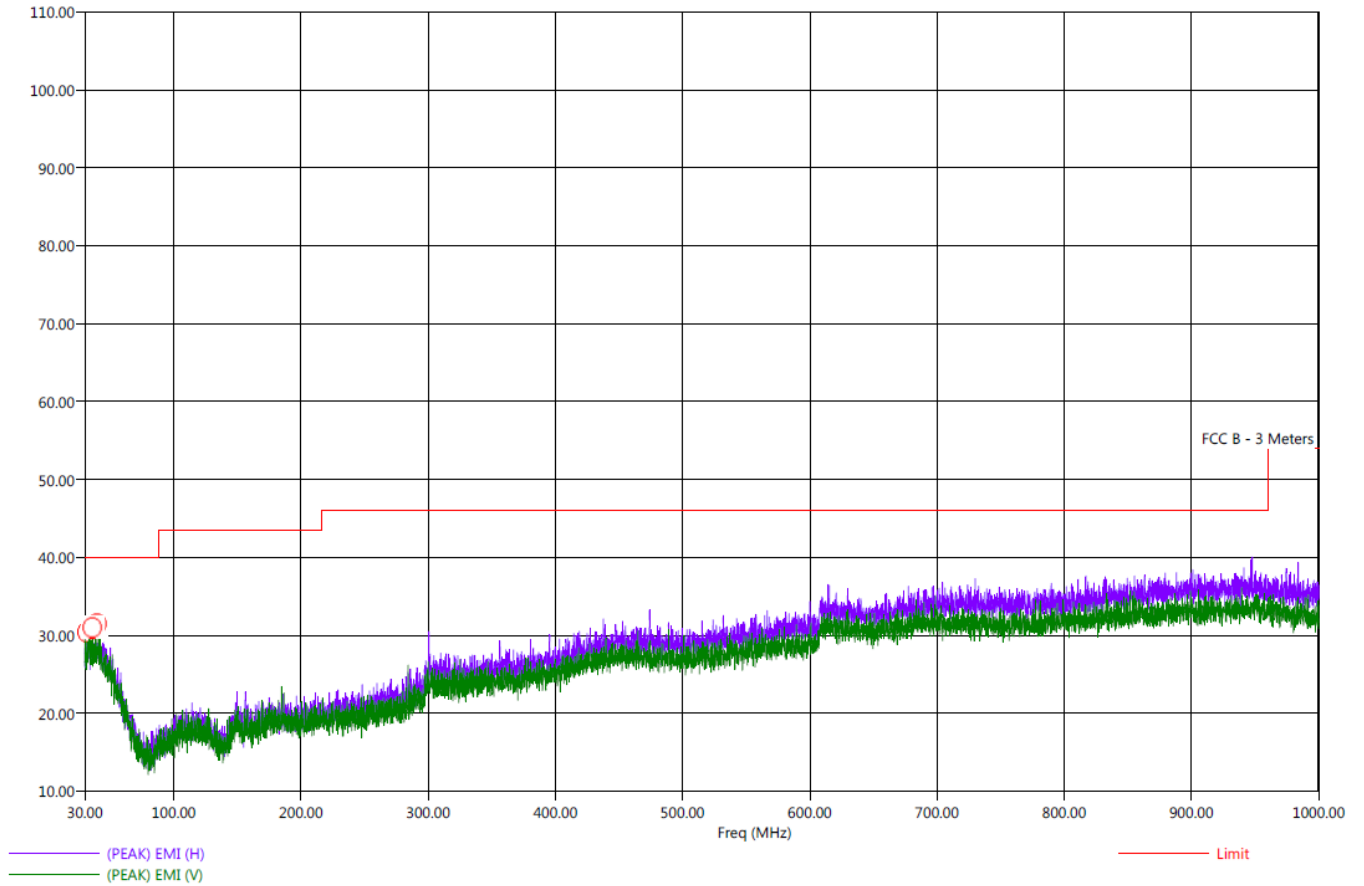
***RADIATED EMISSIONS  
DATA SHEETS***

Title: Pre-Scan - FCC Class B  
File: 1 - Pre-Scan - FCC Class B - 30 MHz to 1000 MHz - 12-08-2017.set  
Operator: Kyle Fujimoto  
EUT Type: TIVO S6Z MSO NETFLIX Voice Remote 2017  
EUT Condition: The EUT was continuously transmitting at the low channel - X-Axis Worst Case  
Comments: Company: Universal Electronics, Inc  
P/N: R37022B00-00001

12/8/2017 1:34:45 PM  
Sequence: Preliminary Scan

FCC Class B

Electric Field Strength (dBμV/m)



Title: Radiated Final - FCC Class B  
 File: 1 - Final Scan - FCC Class B - 30 MHz to 1000 MHz - 08-07-2017.set  
 Operator: Kyle Fujimoto  
 EUT Type: TIVO S6Z MSO NETFLIX Voice Remote 2017  
 EUT Condition: The EUT was continuously transmitting at the low channel - X-Axis Worst Case  
 Comments: Company: Universal Electronics Inc  
 P/N: R37022B00-00001

12/8/2017 1:57:53 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 (deq)	Twr Ht (cm)
31.70	H	31.54	26.29	-8.46	-13.71	40.00	23.87	0.32	118.75	398.95
35.60	H	31.53	26.35	-8.47	-13.65	40.00	24.07	0.36	130.75	127.37
36.00	V	31.49	26.42	-8.51	-13.58	40.00	24.13	0.36	247.25	111.55
37.80	H	31.72	26.58	-8.28	-13.42	40.00	24.43	0.38	152.00	334.83
39.00	H	31.89	26.76	-8.11	-13.24	40.00	24.54	0.39	143.00	400.08
39.60	V	31.57	26.89	-8.43	-13.11	40.00	24.62	0.39	157.50	191.37



**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 Lab: D  
 Tested By: Kyle Fujimoto

**Fundamental  
 Low Channel**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
2425.00	91.64	V	113.97	-22.33	Peak	314.75	238.50	X-Axis
2425.00	71.64	V	93.97	-22.33	Avg	314.75	238.50	Vertical Polarization
2425.00	99.41	V	113.97	-14.56	Peak	309.25	104.89	Y-Axis
2425.00	79.41	V	93.97	-14.56	Avg	309.25	104.89	Vertical Polarization
2425.00	101.32	V	113.97	-12.65	Peak	359.50	168.41	Z-Axis
2425.00	81.32	V	93.97	-12.65	Avg	359.50	168.41	Vertical Polarization
2425.00	103.39	H	113.97	-10.58	Peak	315.75	199.04	X-Axis
2425.00	83.39	H	93.97	-10.58	Avg	315.75	199.04	Horizontal Polarization
2425.00	99.23	H	113.97	-14.74	Peak	167.00	201.97	Y-Axis
2425.00	79.23	H	93.97	-14.74	Avg	167.00	201.97	Horizontal Polarization
2425.00	102.33	H	113.97	-11.64	Peak	89.75	159.58	Z-Axis
2425.00	82.33	H	93.97	-11.64	Avg	89.75	159.58	Horizontal Polarization







**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	50.62	V	73.97	-23.35	Peak	194.75	151.82	
4850.00	30.62	V	53.97	-23.35	Avg	194.75	151.82	
7275.00	48.39	V	73.97	-25.58	Peak	16.75	124.23	
7275.00	28.39	V	53.97	-25.58	Avg	16.75	124.23	
9700.00	59.20	V	73.97	-14.77	Peak	207.50	120.05	
9700.00	39.20	V	53.97	-14.77	Avg	207.50	120.05	
12125.00								No Emission Detected
14550.00								No Emission Detected
16975.00								No Emission Detected
19400.00								No Emission Detected
21825.00								No Emission Detected
24250.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	50.37	V	73.97	-23.60	Peak	212.50	110.32	
4850.00	30.37	V	53.97	-23.60	Avg	212.50	110.32	
7275.00	49.10	V	73.97	-24.87	Peak	350.00	101.07	
7275.00	29.10	V	53.97	-24.87	Avg	350.00	101.07	
9700.00	54.99	V	73.97	-18.98	Peak	104.25	100.25	
9700.00	34.99	V	53.97	-18.98	Avg	104.25	100.25	
12125.00								No Emission Detected
14550.00								No Emission Detected
16975.00								No Emission Detected
19400.00								No Emission Detected
21825.00								No Emission Detected
24250.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	49.76	V	73.97	-24.21	Peak	145.50	197.85	
4850.00	29.76	V	53.97	-24.21	Avg	145.50	197.85	
7275.00	49.39	V	73.97	-24.58	Peak	47.25	154.20	
7275.00	29.39	V	53.97	-24.58	Avg	47.25	154.20	
9700.00	56.57	V	73.97	-17.40	Peak	189.25	136.11	
9700.00	36.57	V	53.97	-17.40	Avg	189.25	136.11	
12125.00								No Emission Detected
14550.00								No Emission Detected
16975.00								No Emission Detected
19400.00								No Emission Detected
21825.00								No Emission Detected
24250.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	52.09	H	73.97	-21.88	Peak	190.25	140.77	
4850.00	32.09	H	53.97	-21.88	Avg	190.25	140.77	
7275.00	50.64	H	73.97	-23.33	Peak	59.25	171.64	
7275.00	30.64	H	53.97	-23.33	Avg	59.25	171.64	
9700.00	56.19	H	73.97	-17.78	Peak	94.75	131.94	
9700.00	36.19	H	53.97	-17.78	Avg	94.75	131.94	
12125.00								No Emission Detected
14550.00								No Emission Detected
16975.00								No Emission Detected
19400.00								No Emission Detected
21825.00								No Emission Detected
24250.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	47.33	H	73.97	-26.64	Peak	70.00	122.62	
4850.00	27.33	H	53.97	-26.64	Avg	70.00	122.62	
7275.00	48.50	H	73.97	-25.47	Peak	231.00	115.76	
7275.00	28.50	H	53.97	-25.47	Avg	231.00	115.76	
9700.00	56.74	H	73.97	-17.23	Peak	74.00	134.38	
9700.00	36.74	H	53.97	-17.23	Avg	74.00	134.38	
12125.00								<b>No Emission Detected</b>
14550.00								<b>No Emission Detected</b>
16975.00								<b>No Emission Detected</b>
19400.00								<b>No Emission Detected</b>
21825.00								<b>No Emission Detected</b>
24250.00								<b>No Emission Detected</b>

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	51.89	H	73.97	-22.08	Peak	67.75	170.74	
4850.00	31.89	H	53.97	-22.08	Avg	67.75	170.74	
7275.00	47.77	H	73.97	-26.20	Peak	190.00	128.05	
7275.00	27.77	H	53.97	-26.20	Avg	190.00	128.05	
9700.00	55.45	H	73.97	-18.52	Peak	205.25	132.29	
9700.00	35.45	H	53.97	-18.52	Avg	205.25	132.29	
12125.00								No Emission Detected
14550.00								No Emission Detected
16975.00								No Emission Detected
19400.00								No Emission Detected
21825.00								No Emission Detected
24250.00								No Emission Detected



**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	49.93	V	73.97	-24.04	Peak	192.50	152.29	
4900.00	29.93	V	53.97	-24.04	Avg	192.50	152.29	
7350.00	48.49	V	73.97	-25.48	Peak	1.00	160.41	
7350.00	28.49	V	53.97	-25.48	Avg	1.00	160.41	
9800.00	59.43	V	73.97	-14.54	Peak	221.50	125.07	
9800.00	39.43	V	53.97	-14.54	Avg	221.50	125.07	
12250.00								No Emission Detected
14700.00								No Emission Detected
17150.00								No Emission Detected
19600.00								No Emission Detected
22050.00								No Emission Detected
24500.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	52.69	V	73.97	-21.28	Peak	110.50	222.62	
4900.00	32.69	V	53.97	-21.28	Avg	110.50	222.62	
7350.00	49.71	V	73.97	-24.26	Peak	263.25	184.53	
7350.00	29.71	V	53.97	-24.26	Avg	263.25	184.53	
9800.00	56.81	V	73.97	-17.16	Peak	47.00	165.43	
9800.00	36.81	V	53.97	-17.16	Avg	47.00	165.43	
12250.00								No Emission Detected
14700.00								No Emission Detected
17150.00								No Emission Detected
19600.00								No Emission Detected
22050.00								No Emission Detected
24500.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	53.24	V	73.97	-20.73	Peak	63.75	154.98	
4900.00	33.24	V	53.97	-20.73	Avg	63.75	154.98	
7350.00	48.12	V	73.97	-25.85	Peak	63.00	119.52	
7350.00	28.12	V	53.97	-25.85	Avg	63.00	119.52	
9800.00	57.50	V	73.97	-16.47	Peak	112.00	131.22	
9800.00	37.50	V	53.97	-16.47	Avg	112.00	131.22	
12250.00								No Emission Detected
14700.00								No Emission Detected
17150.00								No Emission Detected
19600.00								No Emission Detected
22050.00								No Emission Detected
24500.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	52.81	H	73.97	-21.16	Peak	55.75	154.98	
4900.00	32.81	H	53.97	-21.16	Avg	55.75	154.98	
7350.00	51.99	H	73.97	-21.98	Peak	48.75	123.94	
7350.00	31.99	H	53.97	-21.98	Avg	48.75	123.94	
9800.00	58.82	H	73.97	-15.15	Peak	245.00	154.02	
9800.00	38.82	H	53.97	-15.15	Avg	245.00	154.02	
12250.00								No Emission Detected
14700.00								No Emission Detected
17150.00								No Emission Detected
19600.00								No Emission Detected
22050.00								No Emission Detected
24500.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	54.78	H	73.97	-19.19	Peak	320.25	182.44	
4900.00	34.78	H	53.97	-19.19	Avg	320.25	182.44	
7350.00	47.71	H	73.97	-26.26	Peak	67.75	142.38	
7350.00	27.71	H	53.97	-26.26	Avg	67.75	142.38	
9800.00	56.72	H	73.97	-17.25	Peak	225.00	137.97	
9800.00	36.72	H	53.97	-17.25	Avg	225.00	137.97	
12250.00								No Emission Detected
14700.00								No Emission Detected
17150.00								No Emission Detected
19600.00								No Emission Detected
22050.00								No Emission Detected
24500.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	49.91	H	73.97	-24.06	Peak	136.75	181.49	
4900.00	29.91	H	53.97	-24.06	Avg	136.75	181.49	
7350.00	50.93	H	73.97	-23.04	Peak	352.25	184.53	
7350.00	30.93	H	53.97	-23.04	Avg	352.25	184.53	
9800.00	57.56	H	73.97	-16.41	Peak	91.00	136.17	
9800.00	37.56	H	53.97	-16.41	Avg	91.00	136.17	
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								

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	50.03	V	73.97	-23.94	Peak	235.75	125.24	
4950.00	30.03	V	53.97	-23.94	Avg	235.75	125.24	
7425.00	52.45	V	73.97	-21.52	Peak	15.50	134.21	
7425.00	32.45	V	53.97	-21.52	Avg	15.50	134.21	
9900.00	56.03	V	73.97	-17.94	Peak	244.50	181.25	
9900.00	36.03	V	53.97	-17.94	Avg	244.50	181.25	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	51.75	V	73.97	-22.22	Peak	91.25	211.46	
4950.00	31.75	V	53.97	-22.22	Avg	91.25	211.46	
7425.00	50.84	V	73.97	-23.13	Peak	123.75	233.19	
7425.00	30.84	V	53.97	-23.13	Avg	123.75	233.19	
9900.00	54.32	V	73.97	-19.65	Peak	350.00	235.15	
9900.00	34.32	V	53.97	-19.65	Avg	350.00	235.15	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected



**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	53.71	V	73.97	-20.26	Peak	70.00	177.58	
4950.00	33.71	V	53.97	-20.26	Avg	70.00	177.58	
7425.00	48.91	V	73.97	-25.06	Peak	162.50	176.89	
7425.00	28.91	V	53.97	-25.06	Avg	162.50	176.89	
9900.00	56.50	V	73.97	-17.47	Peak	350.00	197.49	
9900.00	36.50	V	53.97	-17.47	Avg	350.00	197.49	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	48.82	H	73.97	-25.15	Peak	138.75	130.25	
4950.00	28.82	H	53.97	-25.15	Avg	138.75	130.25	
7425.00	51.67	H	73.97	-22.30	Peak	61.00	129.19	
7425.00	31.67	H	53.97	-22.30	Avg	61.00	129.19	
9900.00	54.98	H	73.97	-18.99	Peak	239.75	174.56	
9900.00	34.98	H	53.97	-18.99	Avg	239.75	174.56	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected

**FCC 15.249**

Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	56.42	H	73.97	-17.55	Peak	153.00	193.07	
4950.00	36.42	H	53.97	-17.55	Avg	153.00	193.07	
7425.00	48.56	H	73.97	-25.41	Peak	34.50	134.98	
7425.00	28.56	H	53.97	-25.41	Avg	34.50	134.98	
9900.00	56.00	H	73.97	-17.97	Peak	259.00	170.74	
9900.00	36.00	H	53.97	-17.97	Avg	259.00	170.74	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected

**FCC 15.249**

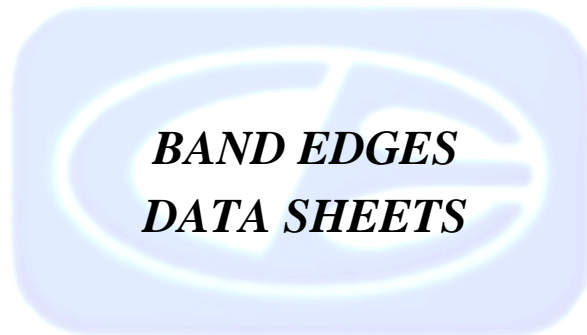
Universal Electronics, Inc.  
 TIVO S6Z MSO NETFLIX Voice Remote 2017  
 P/N: R37022B00-00001

Date: 12/04/2017  
 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	51.51	H	73.97	-22.46	Peak	40.25	191.46	
4950.00	31.51	H	53.97	-22.46	Avg	40.25	191.46	
7425.00	50.38	H	73.97	-23.59	Peak	269.25	191.40	
7425.00	30.38	H	53.97	-23.59	Avg	269.25	191.46	
9900.00	56.21	H	73.97	-17.76	Peak	355.75	189.67	
9900.00	36.21	H	53.97	-17.76	Avg	355.75	189.67	
12375.00								No Emission Detected
14850.00								No Emission Detected
17325.00								No Emission Detected
19800.00								No Emission Detected
22275.00								No Emission Detected
24750.00								No Emission Detected





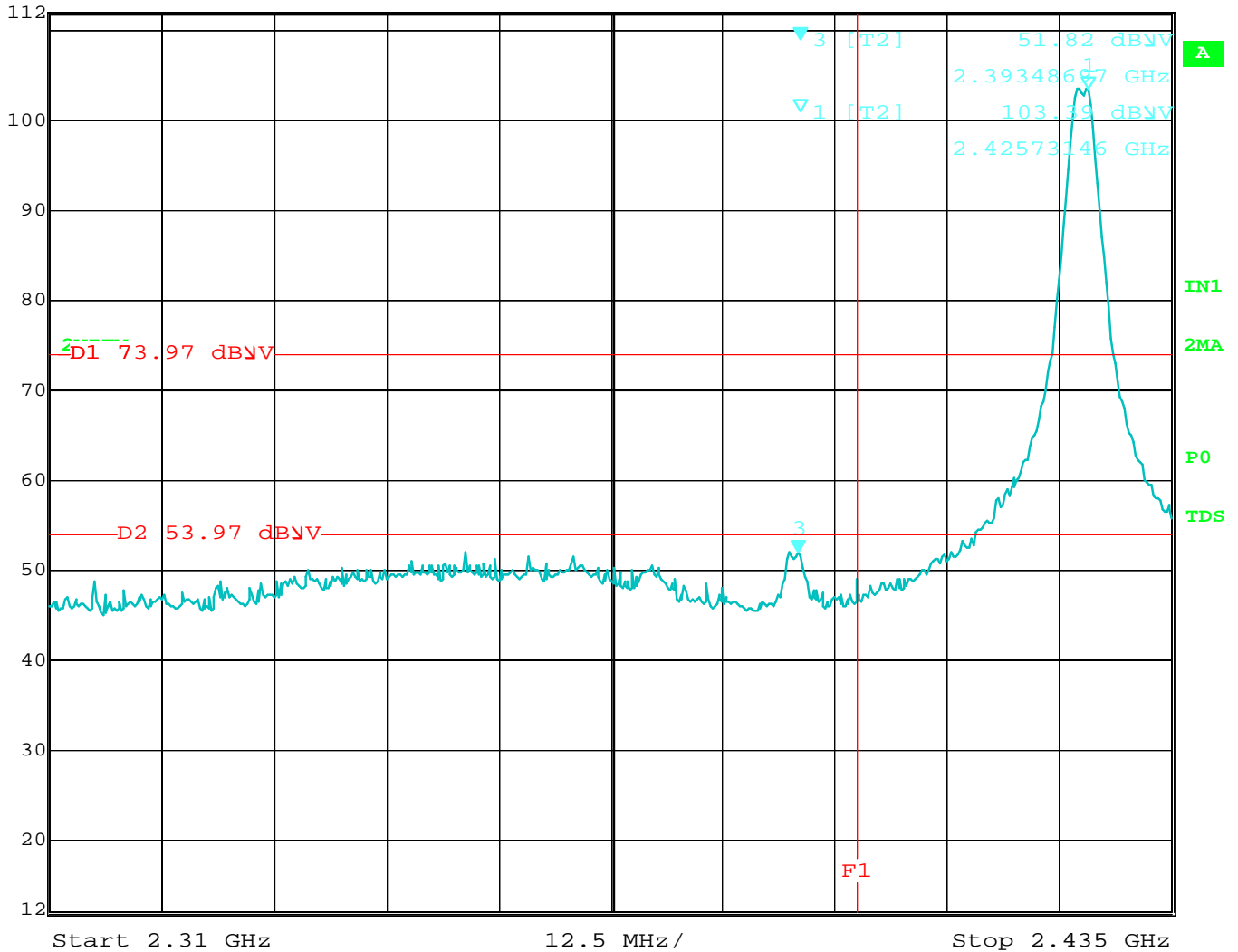






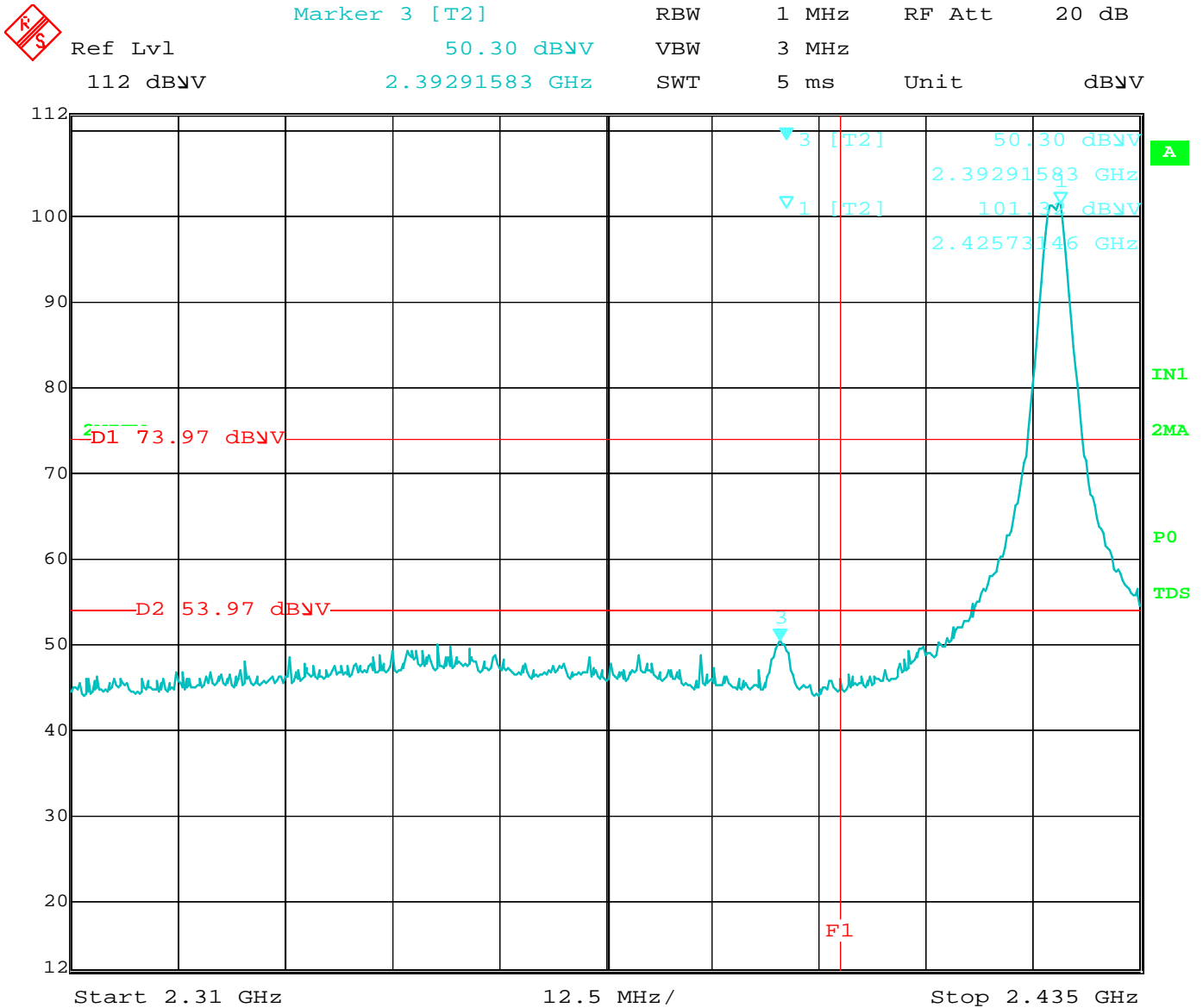


Marker 3 [T2] RBW 1 MHz RF Att 20 dB  
 Ref Lvl 112 dBV 51.82 dBV VBW 3 MHz  
 2.39348697 GHz 2.42573146 GHz  
 103.39 dBV  
 5 ms Unit dBV



Date: 4.DEC.2017 09:39:14

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

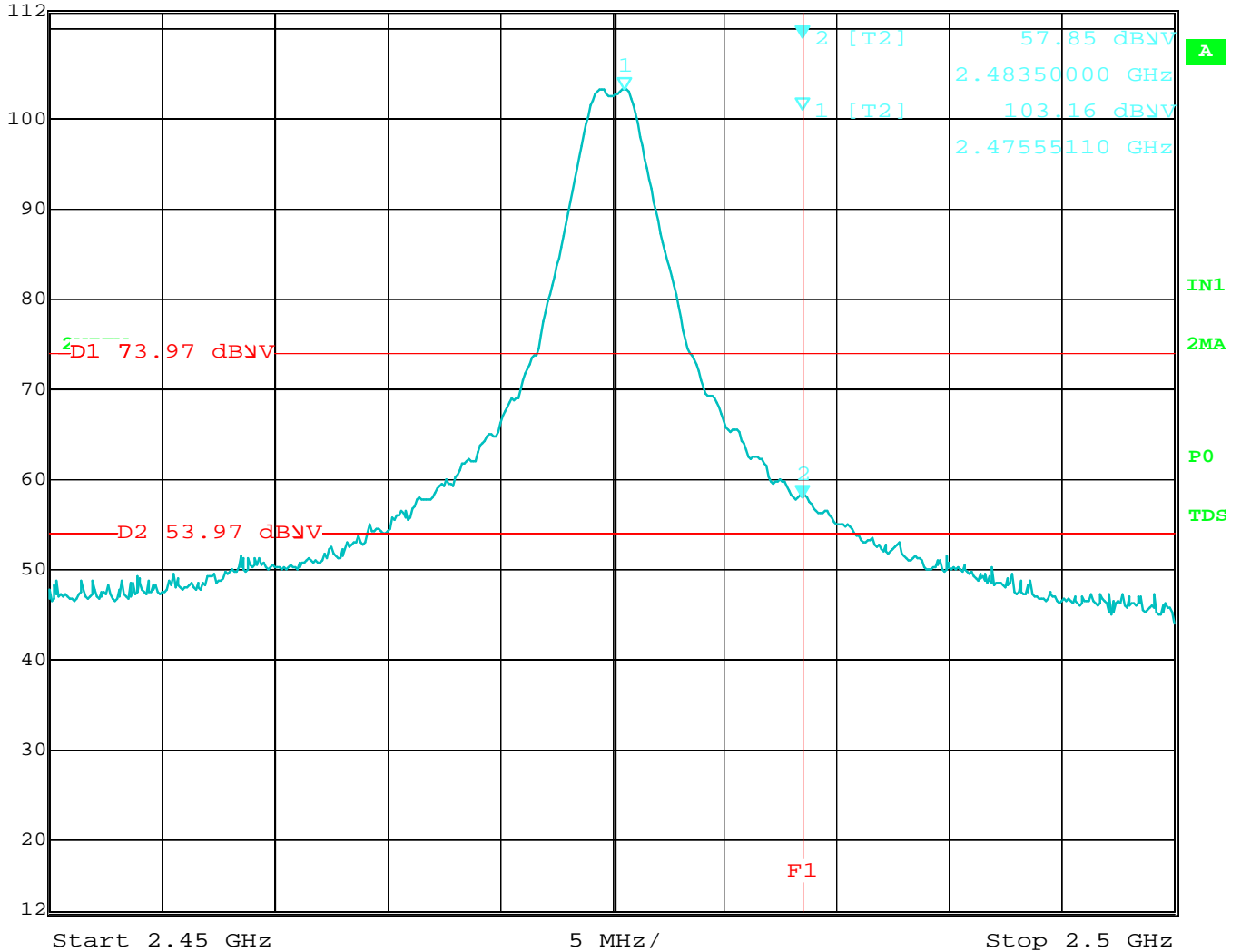


Date: 4.DEC.2017 09:57:53

Band Edge - 2425 MHz - Vertical - Z-Axis - Worst Case



Marker 2 [T2] RBW 1 MHz RF Att 20 dB  
 Ref Lvl 112 dBV 57.85 dBV VBW 3 MHz  
 2.48350000 GHz 2.47555110 GHz  
 103.16 dBV  
 5 ms Unit dBV

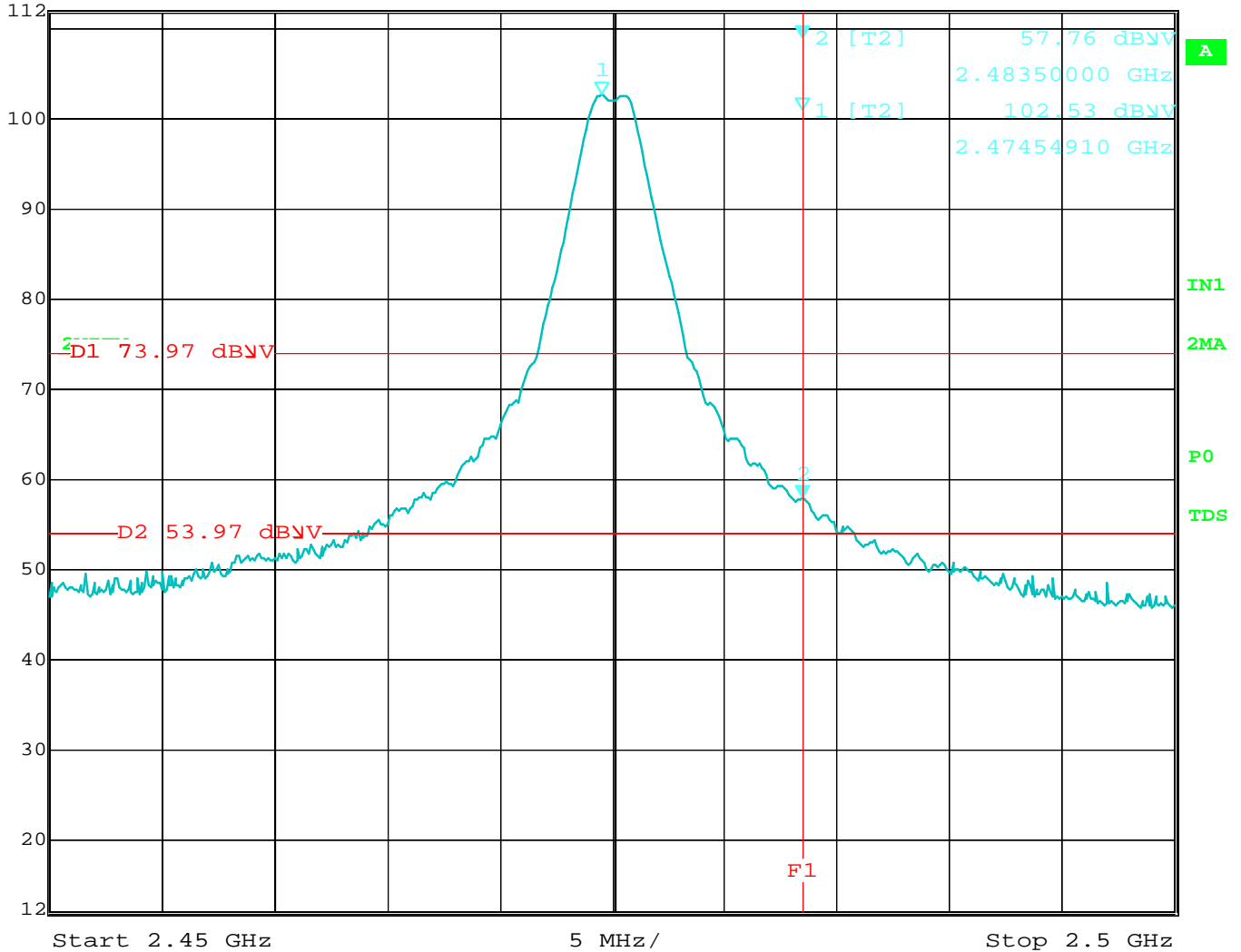


Date: 4.DEC.2017 10:26:18

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

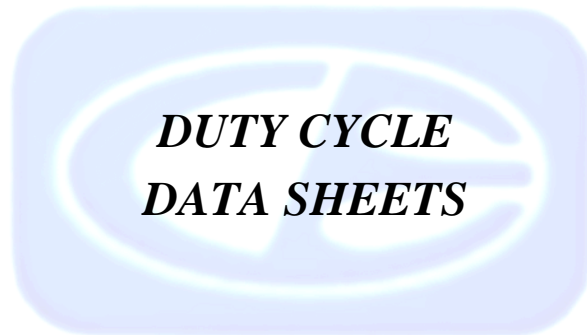


Marker 2 [T2] RBW 1 MHz RF Att 20 dB  
 Ref Lvl 112 dBμV 57.76 dBμV VBW 3 MHz  
 2.48350000 GHz 2.47454910 GHz  
 2.48350000 GHz 102.53 dBμV  
 5 ms Unit dBμV



Date: 4.DEC.2017 10:09:51

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





Delta 1 [T2]

RBW 1 MHz RF Att 20 dB

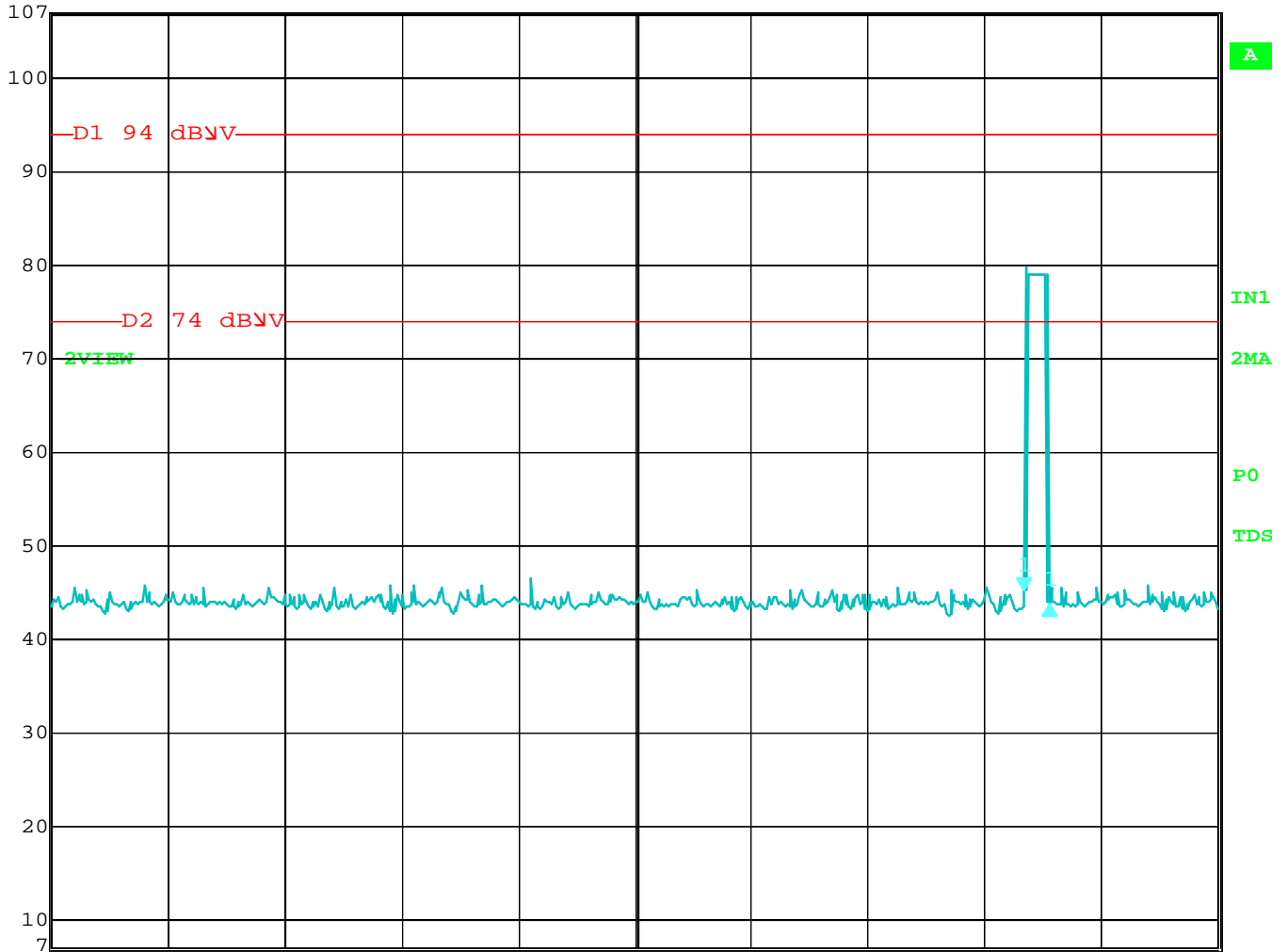
Ref Lvl -1.41 dB

VBW 3 MHz

107 dBμV 2.204409 ms

SWT 100 ms

Unit dBμV

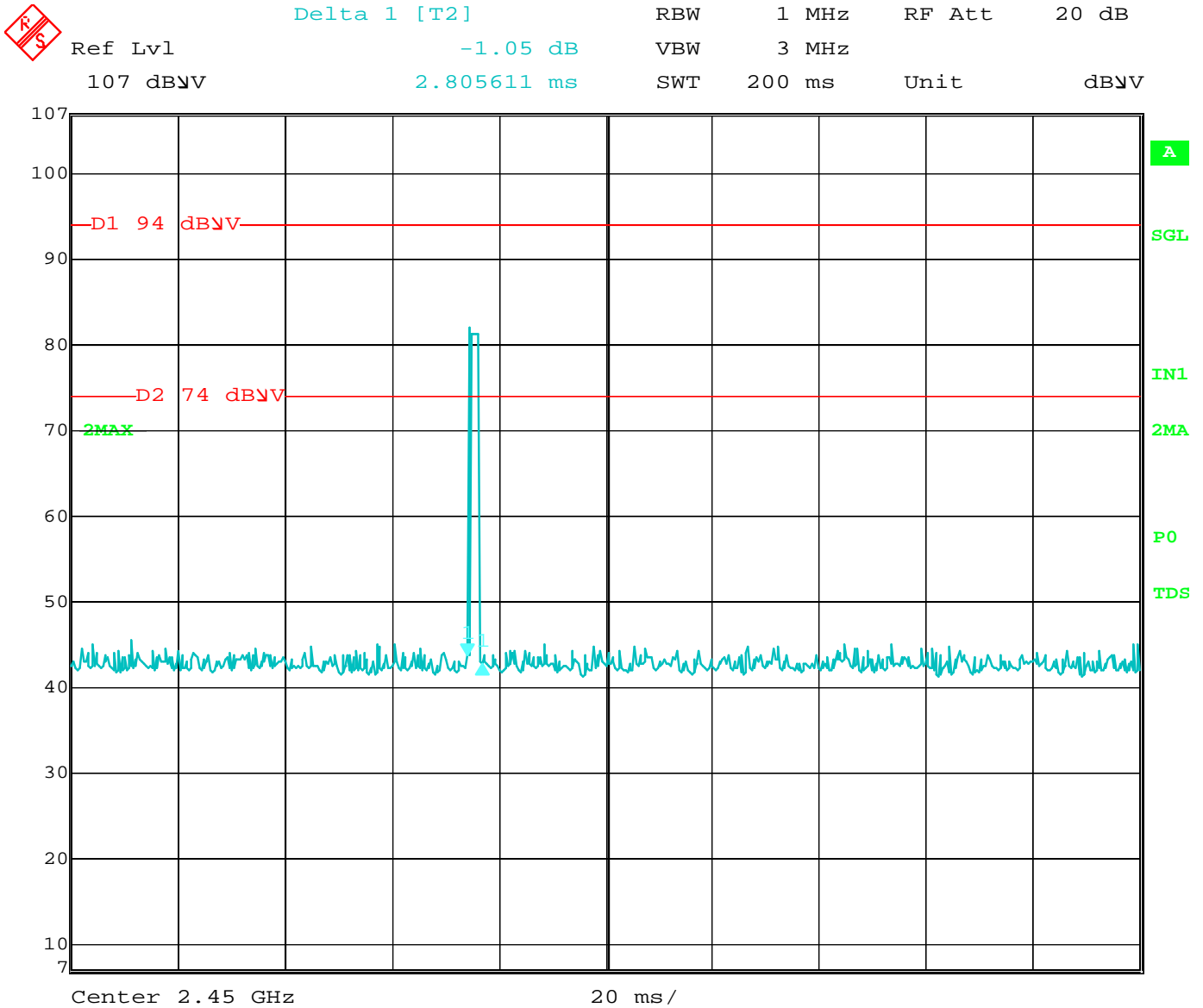


Center 2.45 GHz

10 ms/

Date: 4.DEC.2017 09:19:01

Time of Pulse = 2.204409 ms – Advertising Mode



Date: 4.DEC.2017 09:19:42

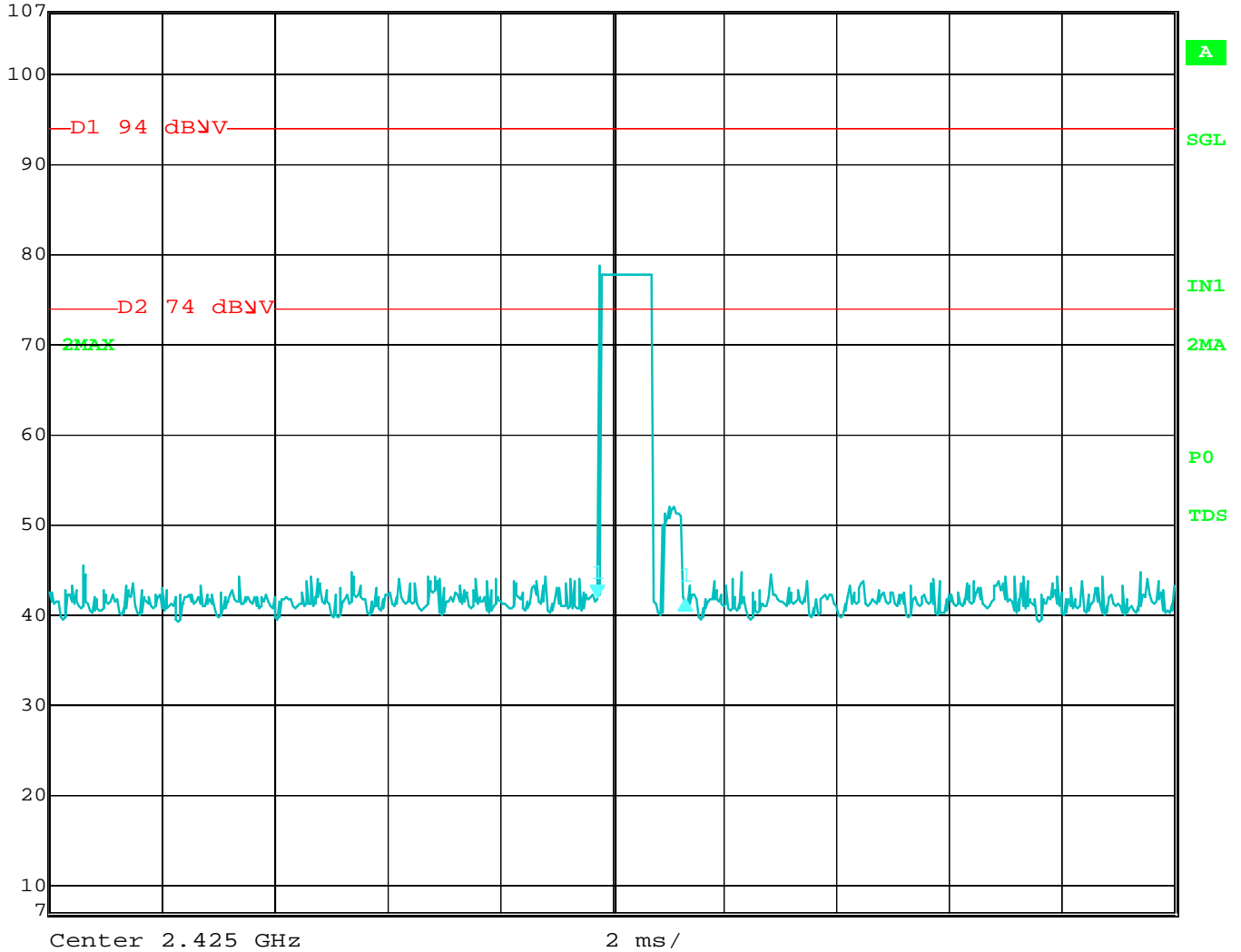
Only one pulse per 100 ms – Advertising Mode

Total Duty Cycle = 2.204409 ms / 100 ms = 2.20% Duty Cycle

The Maximum Peak to Average Ratio of -20 dB can be used



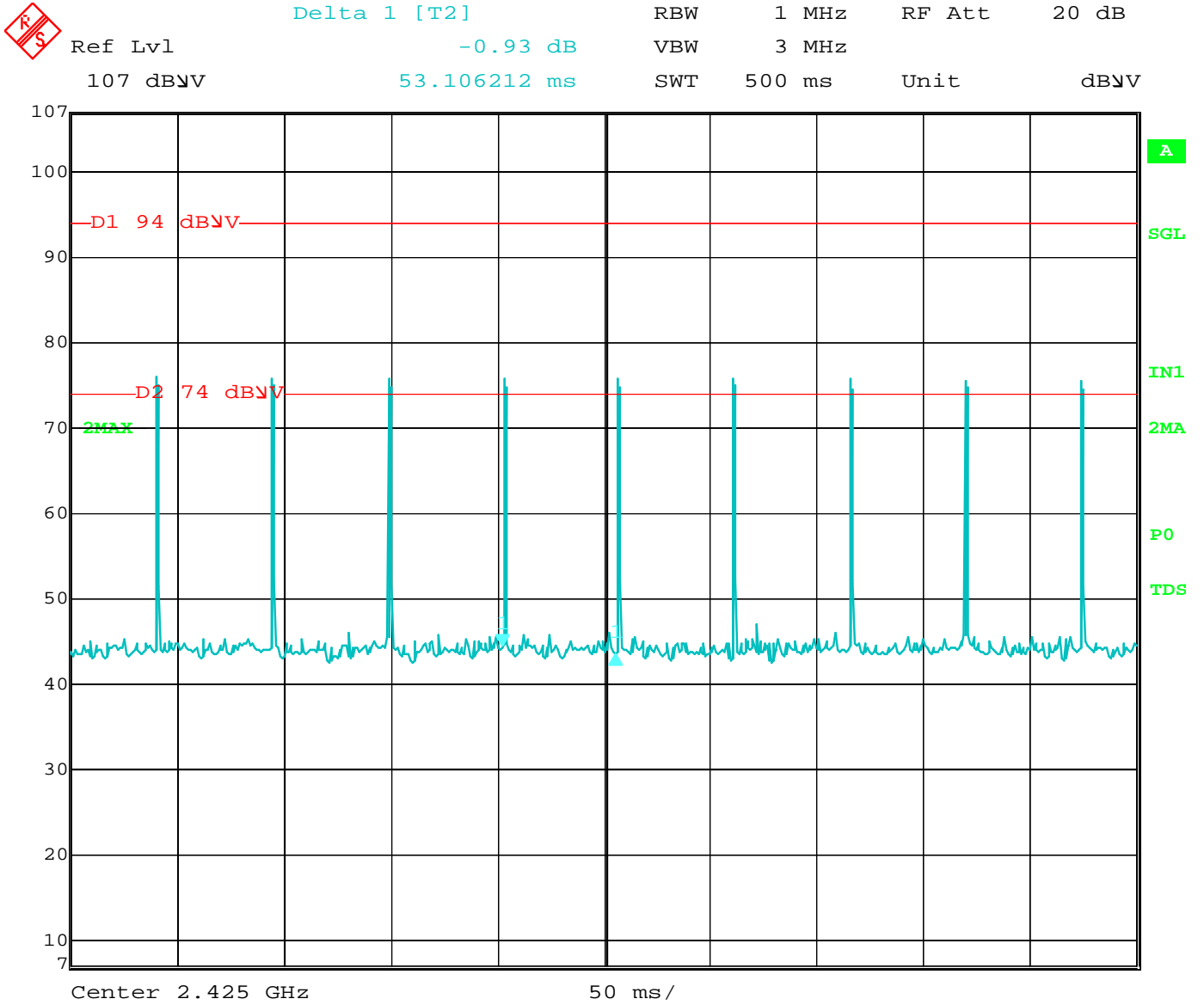
Delta 1 [T2] RBW 1 MHz RF Att 20 dB  
 Ref Lvl -0.44 dB VBW 3 MHz  
 107 dBμV 1.563126 ms SWT 20 ms Unit dBμV



Date: 4.DEC.2017 09:24:33

Time of One Pulse = 1.563126 ms – Pairing Mode





Date: 4.DEC.2017 09:23:44

Time Between Pulses = 53.106212 ms – Pairing Mode

Total Duty Cycle = 1.563126 ms / 53.106212 ms = 2.94%

The Maximum Peak to Average Ratio of -20 dB can be used