

**FCC PART 15, SUBPART B and C
TEST REPORT***for***VERIZON VRC4100 BLE VOICE REMOTE 2018****Model: R32140BA00-00001**

Prepared for

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DATE: AUGUST 10, 2018

	REPORT BODY	APPENDICES					TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
PAGES	17	2	2	2	12	40	75

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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: Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001
S/N: N/A

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

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: June 22 and July 5, 2018

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

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious 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, section 15.205, 15.209 and 15.249 Highest reading in relation to spec limit 45.41 (Avg) dBuV/m @ 2400.00 MHz (*U = 3.67 dB)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Verizon VRC4100 BLE Voice Remote 2018, Model: R32140BA00-00001. 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 **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.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
ANSI C63.4: 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 Verizon VRC4100 BLE Voice Remote 2018, Model: R32140BA00-00001 (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 (2402 MHz, 2442 MHz, and 2480 MHz), respectively. During the testing, the EUT was continuously transmitting. Finally, 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 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
VERIZON VRC4100 BLE VOICE REMOTE 2018 (EUT)	UNIVERSAL ELECTRONICS, INC.	R32140BA00-00001	N/A	MG3-R32140B
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	Rohde & Schwarz	ESIB40	100194	September 26, 2017	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	1 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.

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, 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 1.0.

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.

7.1.2 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Frequency (MHz)	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) (dB)
2400.00 (V) (Y-Axis)	45.41 (AVG)	53.97	-8.56
4960.00 (H) (X-Axis)	44.41 (AVG)	53.97	-9.56
4960.00 (H) (Z-Axis)	43.96 (AVG)	53.97	-10.01
2400.00 (H) (Z-Axis)	43.86 (AVG)	53.97	-10.11
4960.00 (V) (Y-Axis)	42.85 (AVG)	53.97	-11.12
2442.00 (H) (X-Axis)	82.25 (AVG)	93.97	-11.72

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

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 advertising mode

Duty Cycle Correction Factor = -20.00 dB

Time of One Pulse = 480.961924 us

Total On Time = 480.961924 us

The time between pulses is 16.793587 ms

Duty Cycle = 480.961924 us / 16.793587ms = 2.86%

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

8. CONCLUSIONS

The Verizon VRC4100 BLE Voice Remote 2018, Model: R32140BA00-00001, as tested, meets all 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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Lake Forest, CA 92630
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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 15.249 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

Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001
S/N: N/A

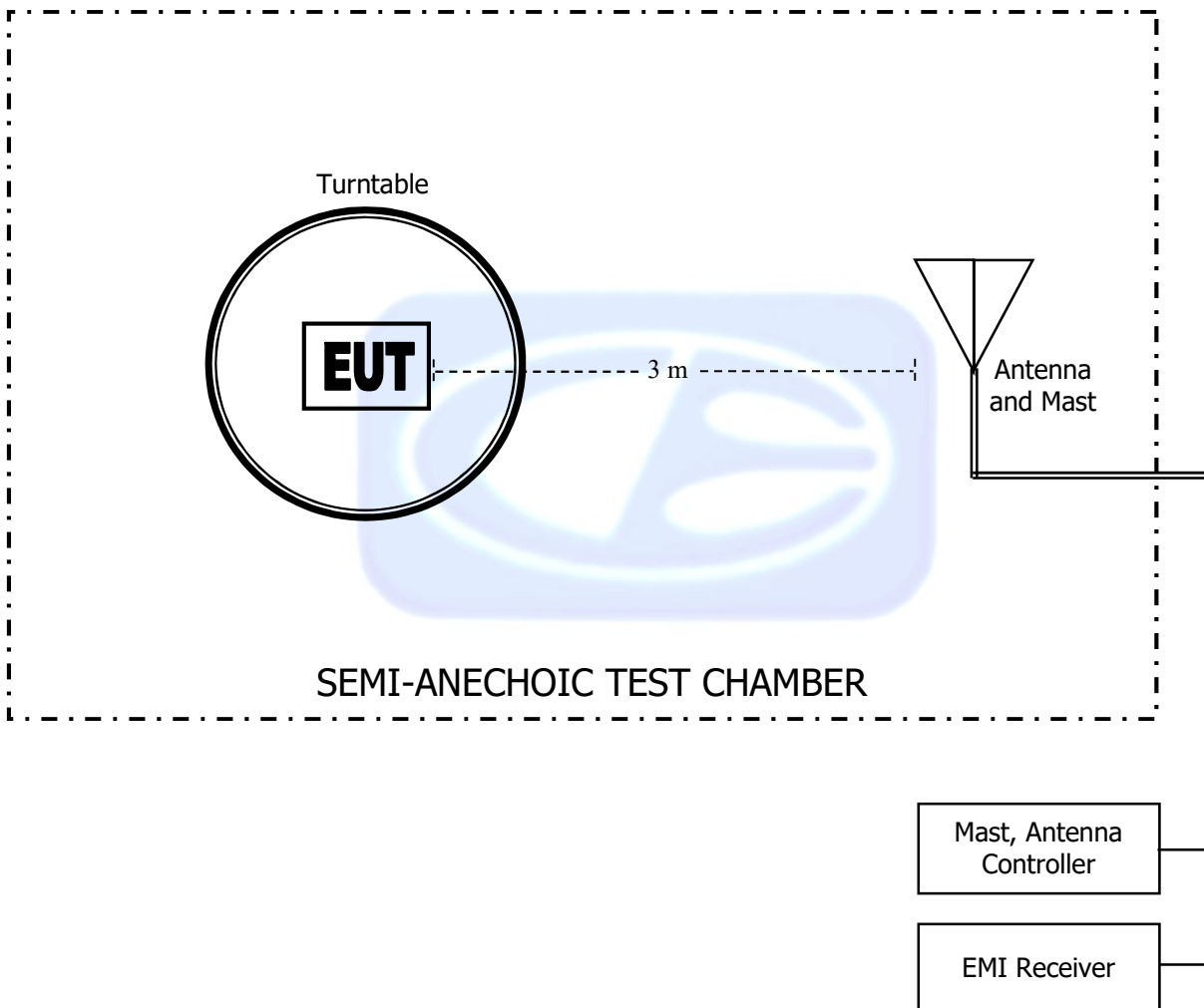
There are no additional models covered under this report.



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**

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**

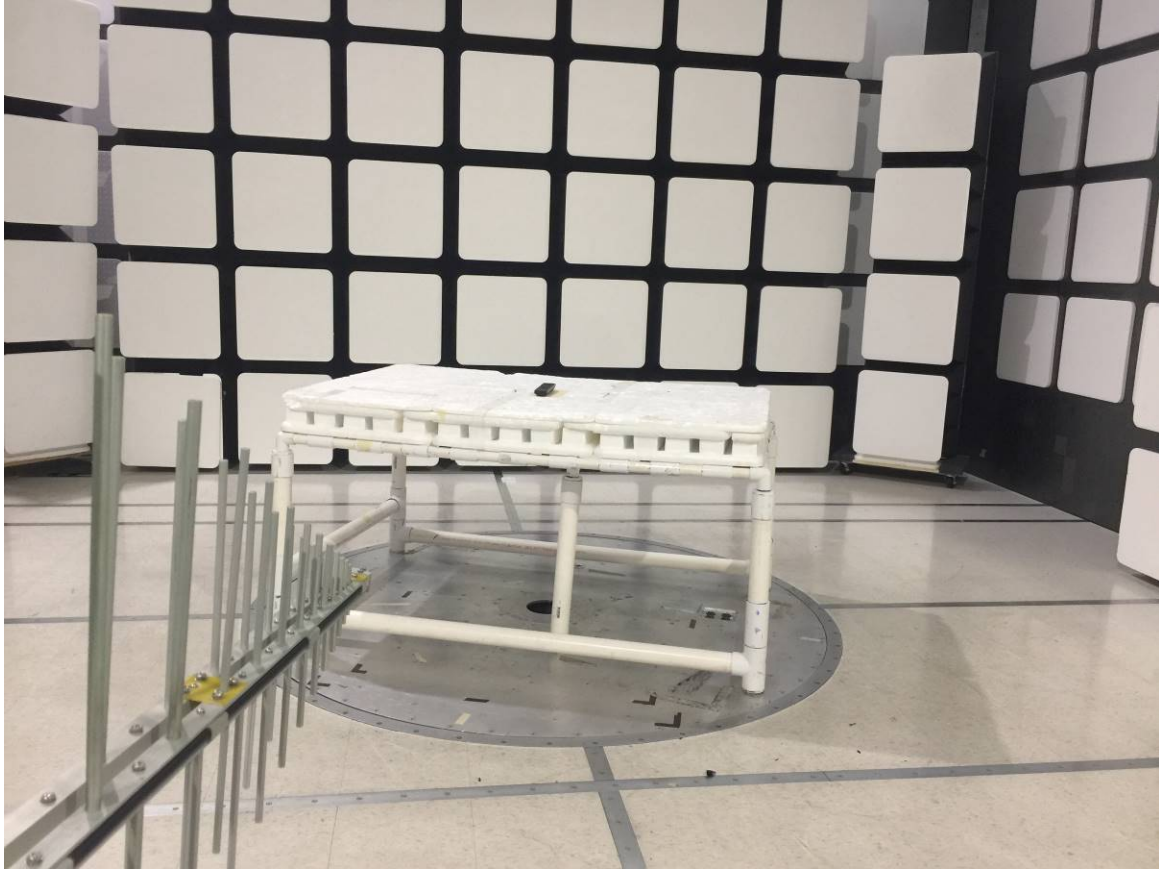
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	26.90	31.0	24.56
19.0	24.65	31.5	25.84
20.0	25.74	32.0	26.93
21.0	24.78	32.5	27.76
22.0	24.83	33.0	25.76
23.0	24.81	33.5	26.76
24.0	25.52	34.0	26.51
25.0	24.90	34.5	27.49
26.0	25.92	35.0	27.64
26.5	26.53	35.5	27.45
27.0	26.41	36.0	25.08
27.5	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.
VERIZON VRC4100 BLE VOICE REMOTE 2018
MODEL: R32140BA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

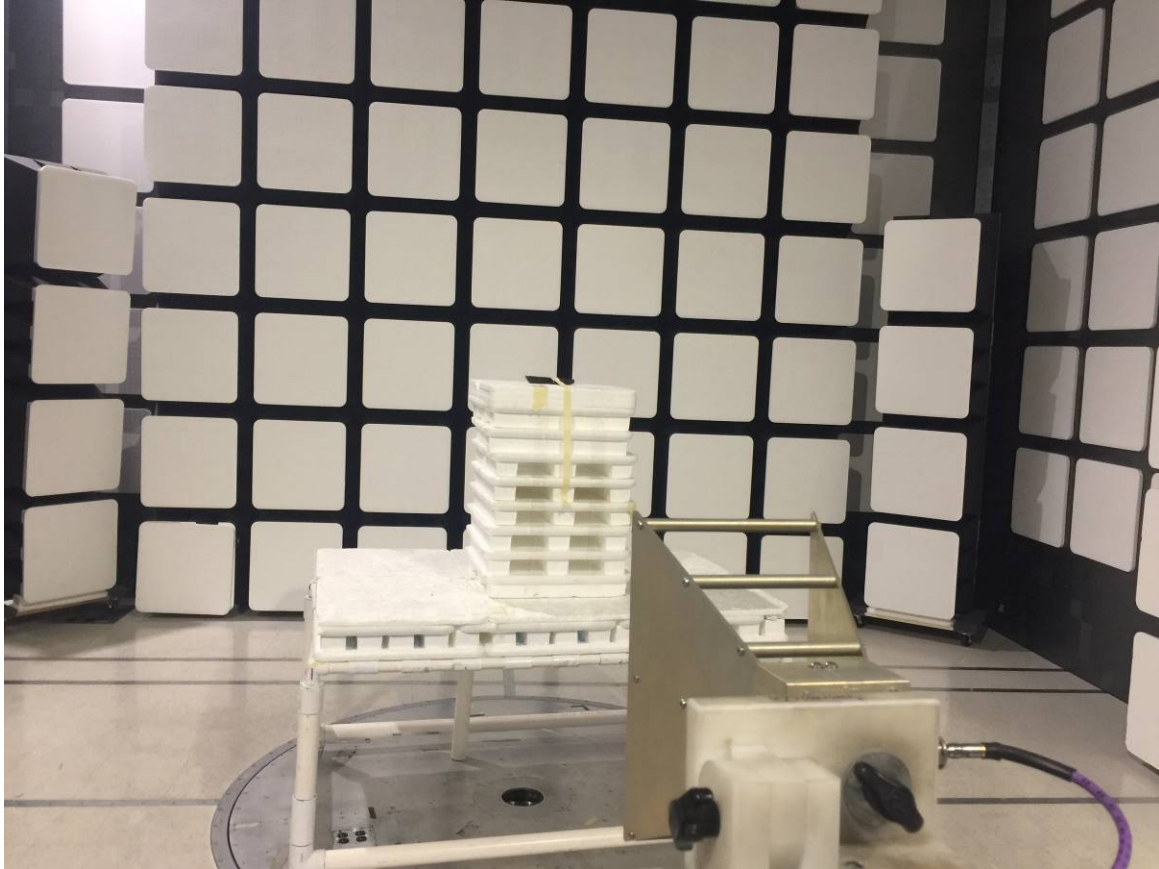
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
VERIZON VRC4100 BLE VOICE REMOTE 2018
MODEL: R32140BA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

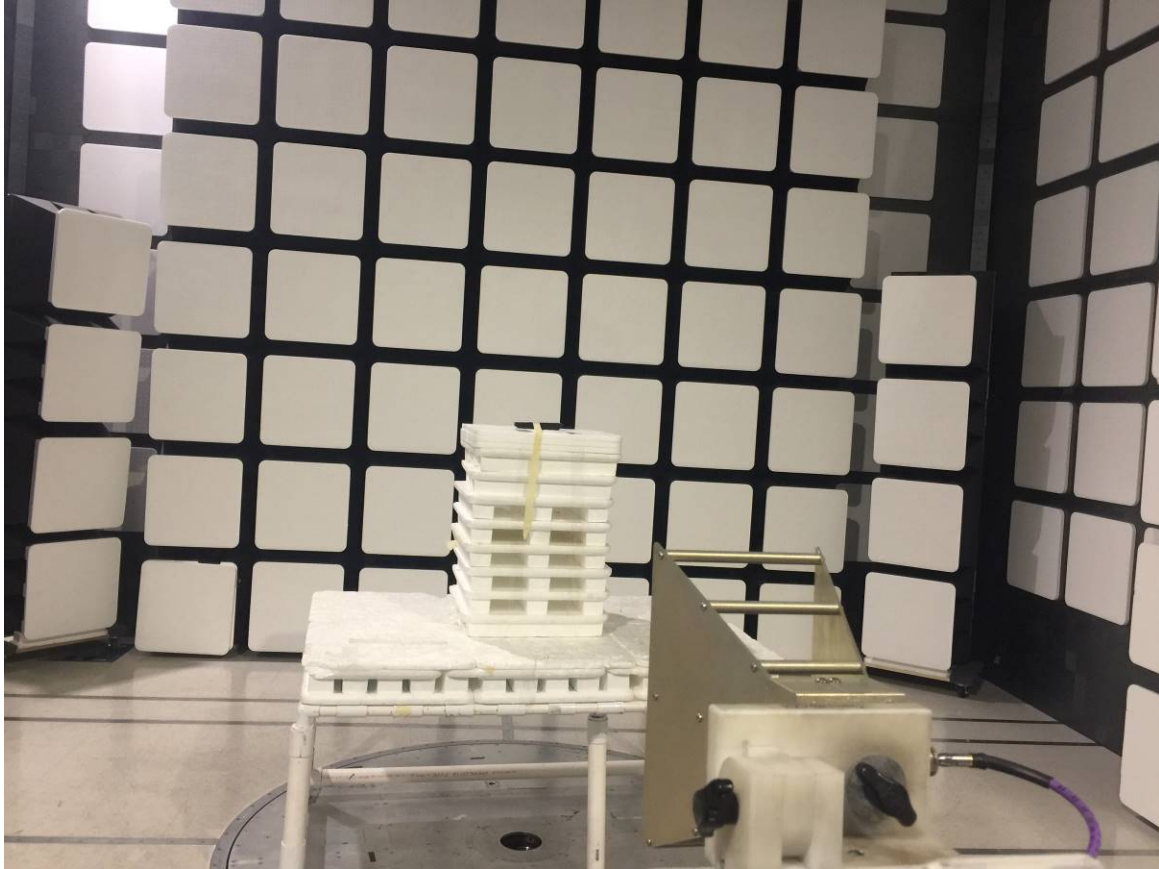
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
VERIZON VRC4100 BLE VOICE REMOTE 2018
MODEL: R32140BA00-00001
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
VERIZON VRC4100 BLE VOICE REMOTE 2018
MODEL: R32140BA00-00001
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***

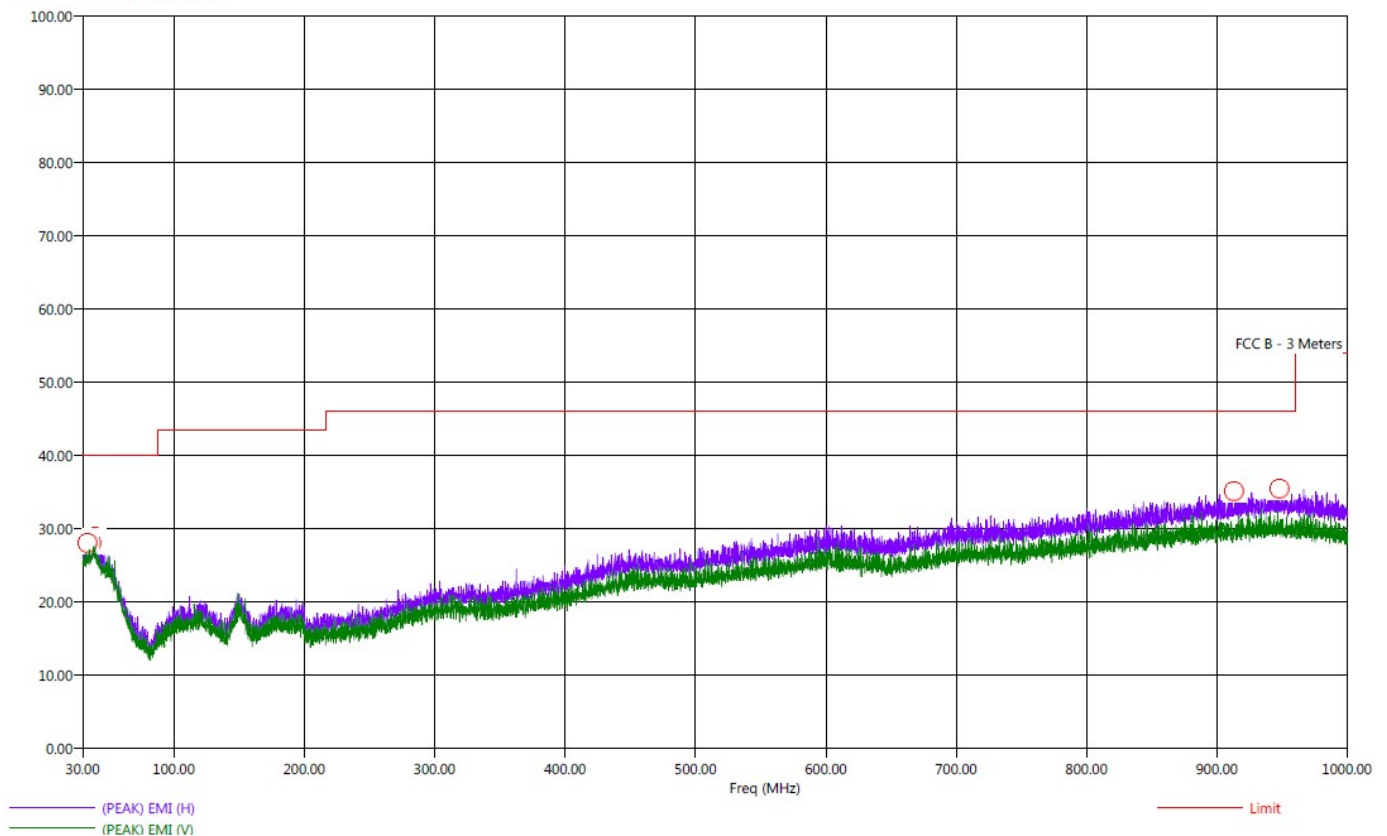
Title: Pre-Scan - FCC Class B
File: A Rohde & Schwarz -RF MODE X AXIS Pre-Scan - FCC Class B - 30 MHz to 1000 MHz.set
Operator: Tom
EUT Type: Verizon VRC4100 BLE Voice Remote 2018
EUT Condition: EUT is continuously transmitting
Comments: Company: Universal Electronics, Inc.
Model: R32140BA00-00001
S/N:

7/5/2018 9:54:43 AM
Sequence: Preliminary Scar

Note: RF MODE
X AXIS

FCC Class B

Electric Field Strength (dBμV/m)



Title: Radiated Final - FCC Class B
 File: A Rohde & Schwarz -RF MODE X AXIS Final-Scan - FCC Class B - 30 MHz to 1000 MHz.set
 Operator: Tom
 EUT Type: Verizon VRC4100 BLE Voice Remote 2018
 EUT Condition: The EUT is continuously transmitting
 Comments: Company: Universal Electronics Inc.
 Model: R32140BA00-00001
 S/N:

7/5/2018 10:45:55 AM
 Sequence: Final Measurements

Note: RF MODE
 X AXIS

FCC Class B

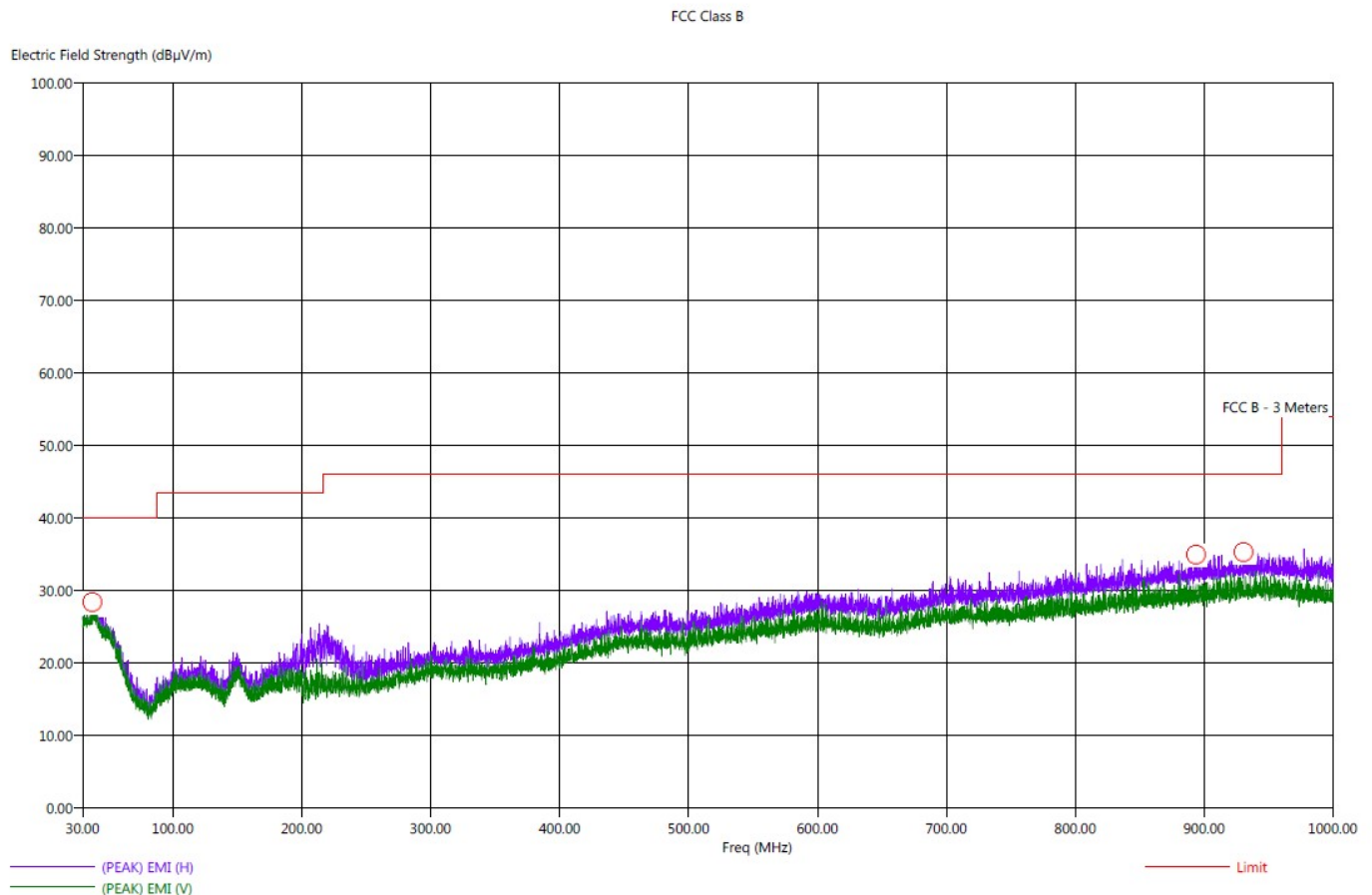
Freq (MHz)	Pol	(PEAK) EMI (dBμV/m)	(OP) EMI (dBμV/m)	(PEAK) Margin (dB)	(OP) Margin (dB)	Limit (dBμV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (deg)	Twr Ht (cm)
33.40	H	26.44	21.89	-13.56	-18.11	40.00	23.94	0.84	308.25	127.56
37.00	H	27.74	22.39	-12.26	-17.61	40.00	24.29	0.87	299.75	144.04
38.30	H	28.37	22.66	-11.63	-17.34	40.00	24.48	0.89	90.75	390.43
39.50	H	28.60	22.82	-11.40	-17.18	40.00	24.63	0.90	291.75	275.74
913.60	H	34.26	29.49	-11.74	-16.51	46.00	27.37	3.03	262.75	357.29
948.10	H	35.11	30.02	-10.89	-15.98	46.00	27.78	3.10	124.50	160.58



Title: Pre-Scan - FCC Class B
File: A Rohde & Schwarz -IR MODE X AXIS Pre-Scan - FCC Class B - 30 MHz to 1000 MHz.set
Operator: Tom
EUT Type: Verizon VRC4100 BLE Voice Remote 2018
EUT Condition: EUT is continuously transmitting
Comments: Company: Universal Electronics, Inc.
Model: R32140BA00-00001
S/N:

7/5/2018 11:15:10 AM
Sequence: Preliminary Scan

Note: IR MODE
X AXIS



Title: Radiated Final - FCC Class B
File: A Rohde & Schwarz -IR MODE X AXIS Final-Scan - FCC Class B - 30 MHz to 1000 MHz.set
Operator: Tom
EUT Type: Verizon VRC4100 BLE Voice Remote 2018
EUT Condition: The EUT is continuously transmitting
Comments: Company: Universal Electronics Inc.
Model: R32140BA00-00001
S/N:

7/5/2018 11:44:11 AM
Sequence: Final Measurements

Note: IR MODE
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)	Ttbl Aql (deg)	Twr Ht (cm)
37.50	V	28.01	22.46	-11.99	-17.54	40.00	24.35	0.88	48.00	324.16
38.00	H	27.27	22.68	-12.73	-17.32	40.00	24.44	0.88	356.75	274.61
39.40	H	27.71	22.84	-12.29	-17.16	40.00	24.59	0.89	26.50	356.82
40.50	H	27.15	22.74	-12.85	-17.26	40.00	24.54	0.90	225.00	291.14
893.70	H	34.75	29.22	-11.25	-16.78	46.00	27.10	2.97	0.75	225.89
930.70	H	35.65	29.83	-10.35	-16.17	46.00	27.57	3.06	146.50	242.31



Report Number: **B80705D1**
FCC Part 15 Subpart B and FCC Section 15.249 Test Report
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Report Number: **B80705D1**
FCC Part 15 Subpart B and FCC Section 15.249 Test Report
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Report Number: **B80705D1**
FCC Part 15 Subpart B and FCC Section 15.249 Test Report
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4804.00	59.17	V	73.97	-14.80	Peak	113.50	167.44	
4804.00	39.17	V	53.97	-14.80	Avg	113.50	167.44	
7206.00								No Emission
7206.00								Detected
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4804.00	50.83	V	73.97	-23.14	Peak	327.50	220.28	
4804.00	30.83	V	53.97	-23.14	Avg	327.50	220.28	
7206.00								No Emission
7206.00								Detected
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4804.00	59.67	V	73.97	-14.30	Peak	156.50	159.86	
4804.00	39.67	V	53.97	-14.30	Avg	156.50	159.86	
7206.00	46.15	V	73.97	-27.82	Peak	178.25	159.68	
7206.00	26.15	V	53.97	-27.82	Avg	178.25	159.68	
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4804.00	59.03	H	73.97	-14.94	Peak	220.75	156.16	
4804.00	39.03	H	53.97	-14.94	Avg	220.75	156.16	
7206.00	48.03	H	73.97	-25.94	Peak	221.50	157.05	
7206.00	28.03	H	53.97	-25.94	Avg	221.50	157.05	
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

**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
4804.00	50.38	H	73.97	-23.59	Peak	168.75	191.68	
4804.00	30.38	H	53.97	-23.59	Avg	168.75	191.68	
7206.00								No Emission
7206.00								Detected
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4804.00	56.60	H	73.97	-17.37	Peak	60.75	118.37	
4804.00	36.60	H	53.97	-17.37	Avg	60.75	118.37	
7206.00								No Emission
7206.00								Detected
9608.00								No Emission
9608.00								Detected
12010.00								No Emission
12010.00								Detected
14412.00								No Emission
14412.00								Detected
16814.00								No Emission
16814.00								Detected
19216.00								No Emission
19216.00								Detected
21618.00								No Emission
21618.00								Detected
24020.00								No Emission
24020.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4884.00	50.89	V	73.97	-23.08	Peak	352.00	244.10	
4884.00	30.89	V	53.97	-23.08	Avg	352.00	244.10	
7326.00								No Emission
7326.00								Detected
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4884.00	51.56	V	73.97	-22.41	Peak	119.00	187.50	
4884.00	31.56	V	53.97	-22.41	Avg	119.00	187.50	
7326.00	51.61	V	73.97	-22.36	Peak	77.00	187.08	
7326.00	31.61	V	53.97	-22.36	Avg	77.00	187.08	
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

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
4884.00	55.99	V	73.97	-17.98	Peak	243.75	152.10	
4884.00	35.99	V	53.97	-17.98	Avg	243.75	152.10	
7326.00								No Emission
7326.00								Detected
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

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
4884.00	60.65	H	73.97	-13.32	Peak	71.75	201.47	
4884.00	40.65	H	53.97	-13.32	Avg	71.75	201.47	
7326.00	51.95	H	73.97	-22.02	Peak	71.00	200.16	
7326.00	31.95	H	53.97	-22.02	Avg	71.00	200.16	
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4884.00	52.34	H	73.97	-21.63	Peak	164.50	235.14	
4884.00	32.34	H	53.97	-21.63	Avg	164.50	235.14	
7326.00								No Emission
7326.00								Detected
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4884.00	57.19	H	73.97	-16.78	Peak	30.50	204.40	
4884.00	37.19	H	53.97	-16.78	Avg	30.50	204.40	
7326.00	47.93	H	73.97	-26.04	Peak	185.00	100.00	
7326.00	27.93	H	53.97	-26.04	Avg	185.00	100.00	
9768.00								No Emission
9768.00								Detected
12210.00								No Emission
12210.00								Detected
14652.00								No Emission
14652.00								Detected
17094.00								No Emission
17094.00								Detected
19536.00								No Emission
19536.00								Detected
21978.00								No Emission
21978.00								Detected
24420.00								No Emission
24420.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

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
4960.00	54.98	V	73.97	-18.99	Peak	127.00	249.65	
4960.00	34.98	V	53.97	-18.99	Avg	127.00	249.65	
7440.00								No Emission
7440.00								Detected
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

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
4960.00	62.85	V	73.97	-11.12	Peak	67.75	223.50	
4960.00	42.85	V	53.97	-11.12	Avg	67.75	223.50	
7440.00								No Emission
7440.00								Detected
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

FCC 15.249

Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001

Date: 06-22-2018
Lab: D
Tested By: Johnny Le

**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
4960.00	58.02	V	73.97	-15.95	Peak	264.00	131.86	
4960.00	38.02	V	53.97	-15.95	Avg	264.00	131.86	
7440.00								No Emission
7440.00								Detected
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**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
4960.00	64.41	H	73.97	-9.56	Peak	70.50	199.44	
4960.00	44.41	H	53.97	-9.56	Avg	70.50	199.44	
7440.00	51.73	H	73.97	-22.24	Peak	73.25	217.83	
7440.00	31.73	H	53.97	-22.24	Avg	73.25	217.83	
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

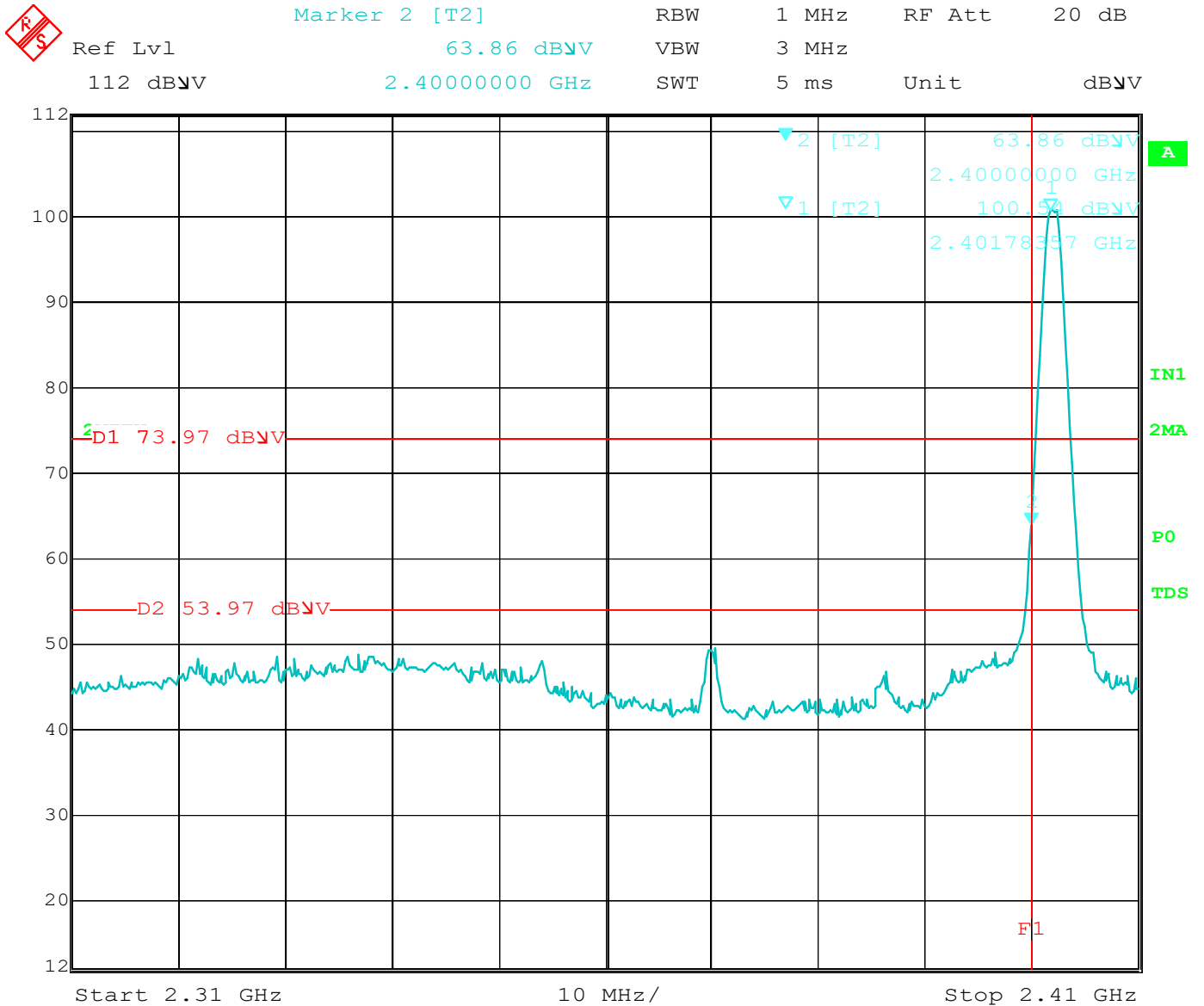
FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**Harmonics - High Channel
Transmit Mode - Y-Axis**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	51.29	H	73.97	-22.68	Peak	30.50	127.20	
4960.00	31.29	H	53.97	-22.68	Avg	30.50	127.20	
7440.00								No Emission
7440.00								Detected
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

FCC 15.249Universal Electronics, Inc.
Verizon VRC4100 BLE Voice Remote 2018
Model: R32140BA00-00001Date: 06-22-2018
Lab: D
Tested By: Johnny Le**Harmonics - High Channel
Transmit Mode - Z-Axis**

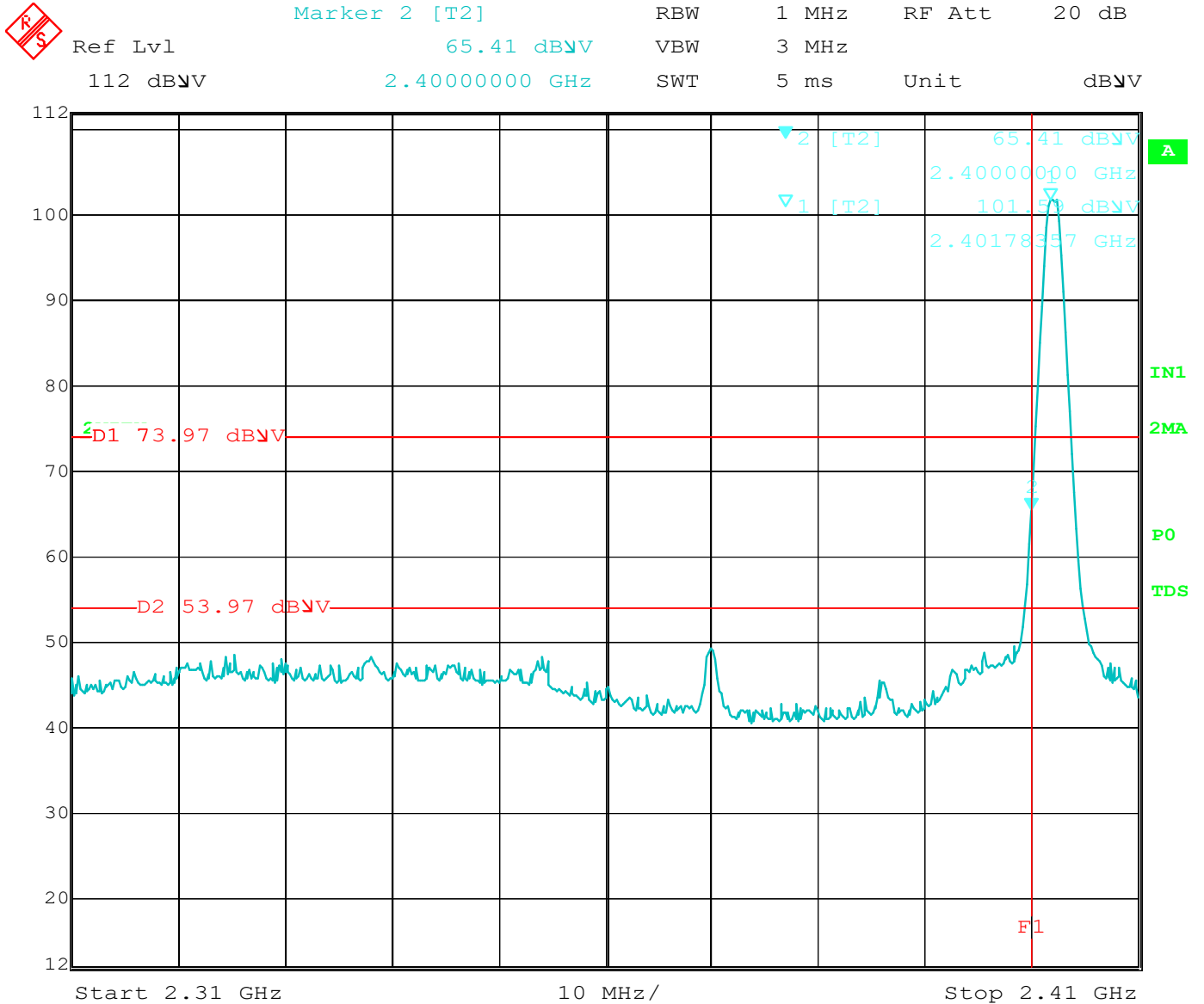
Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	63.96	H	73.97	-10.01	Peak	212.50	200.04	
4960.00	43.96	H	53.97	-10.01	Avg	212.50	200.04	
7440.00	49.43	H	73.97	-24.54	Peak	213.00	200.40	
7440.00	29.43	H	53.97	-24.54	Avg	213.00	200.40	
9920.00								No Emission
9920.00								Detected
12400.00								No Emission
12400.00								Detected
14880.00								No Emission
14880.00								Detected
17360.00								No Emission
17360.00								Detected
19840.00								No Emission
19840.00								Detected
22320.00								No Emission
22320.00								Detected
24800.00								No Emission
24800.00								Detected

***BAND EDGES
DATA SHEETS***



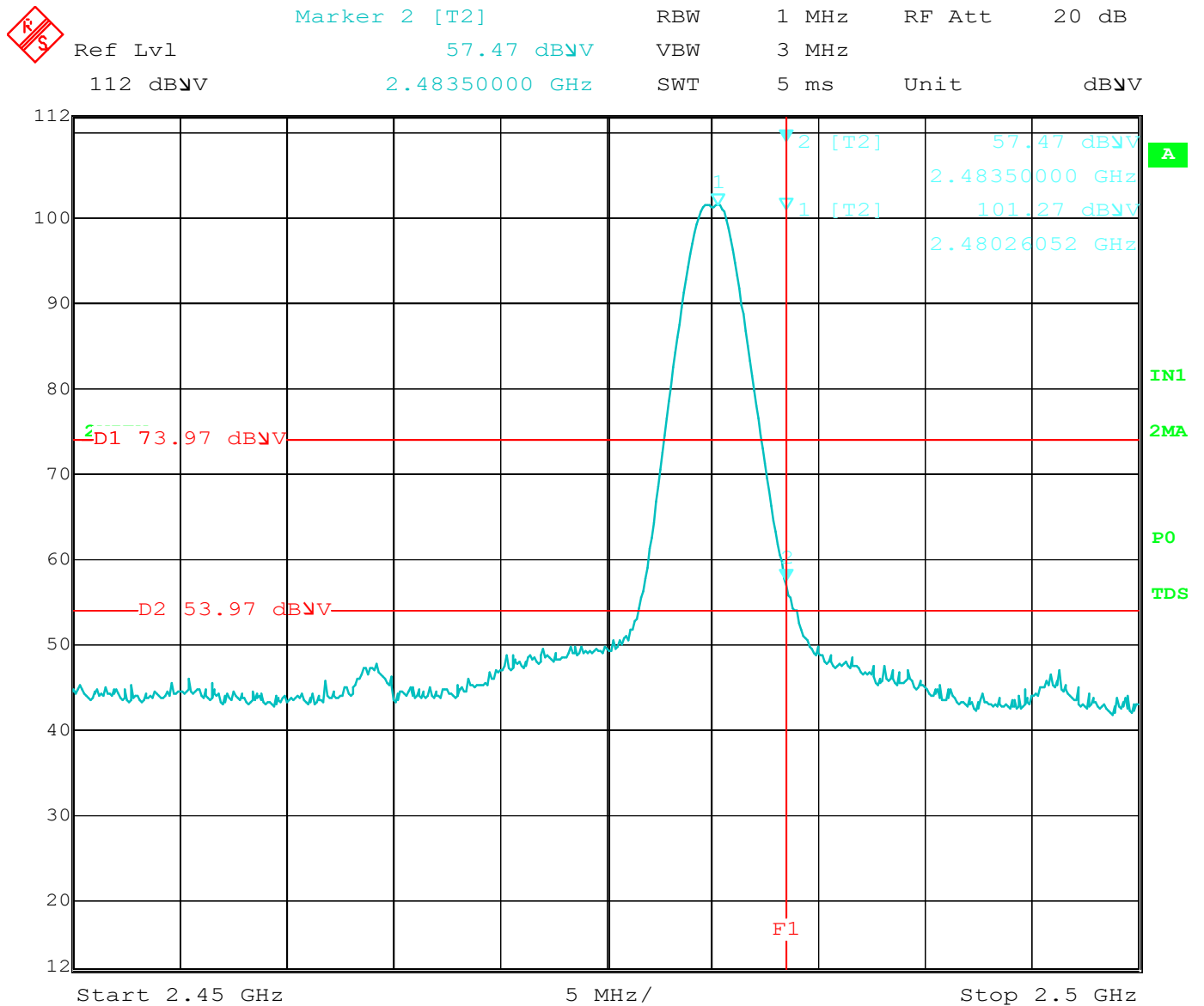
Date: 22.JUN.2018 16:16:25

Band Edge - 2402 MHz - Horizontal - Z-Axis Worse Case - Peak



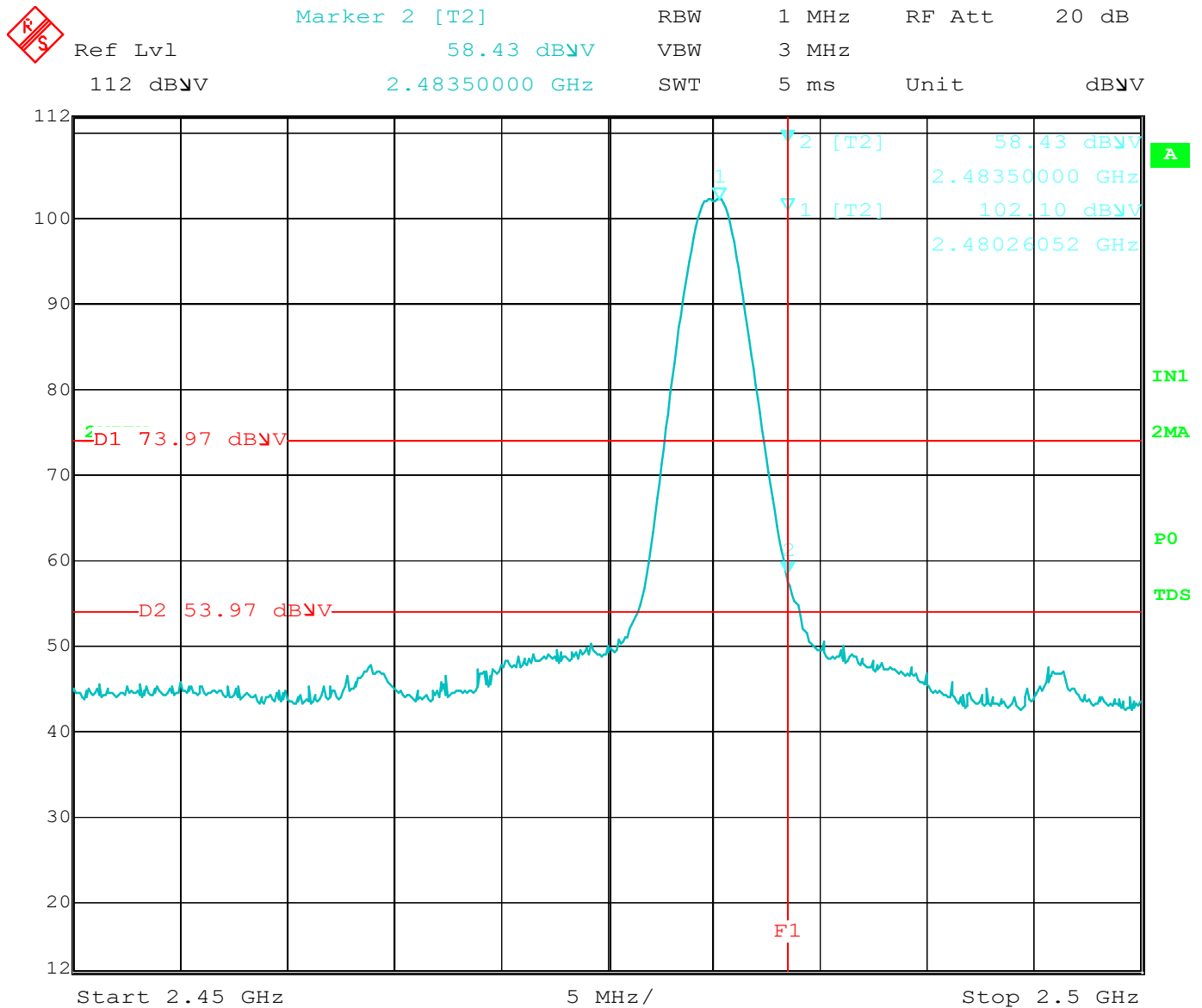
Date: 22.JUN.2018 16:14:51

Band Edge - 2402 MHz - Vertical - Y-Axis Worse Case - Peak



Date: 22.JUN.2018 16:04:37

Band Edge – 2480 MHz - Vertical - Y-Axis Worse Case - Peak



Date: 22.JUN.2018 16:02:41

Band Edge - 2480 MHz - Horizontal - X-Axis Worse Case - Peak

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

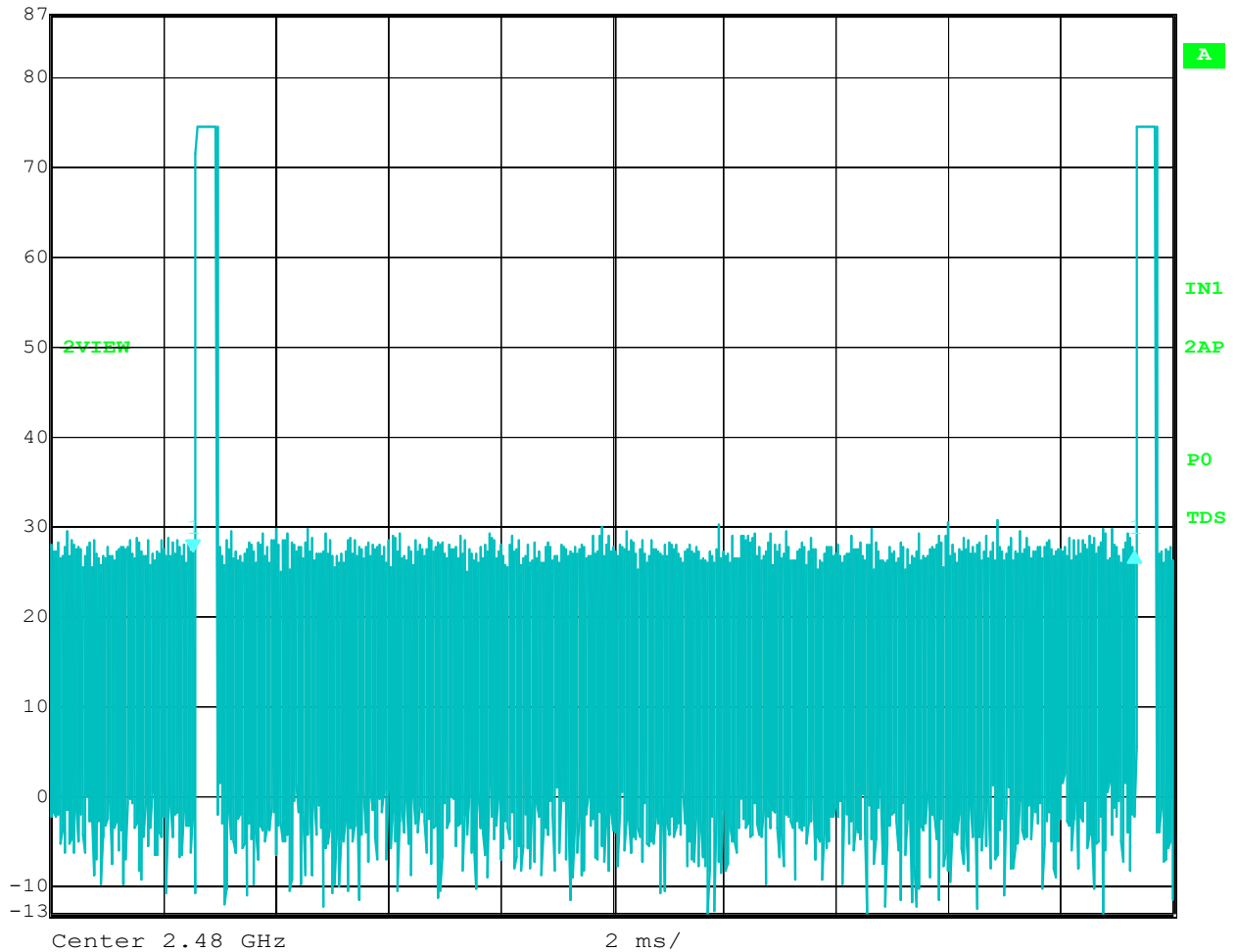
**Newbury Park Division
1050 Lawrence Drive
Newbury Park, CA 91320
(805) 480-4044**

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

***DUTY CYCLE
DATA SHEETS***

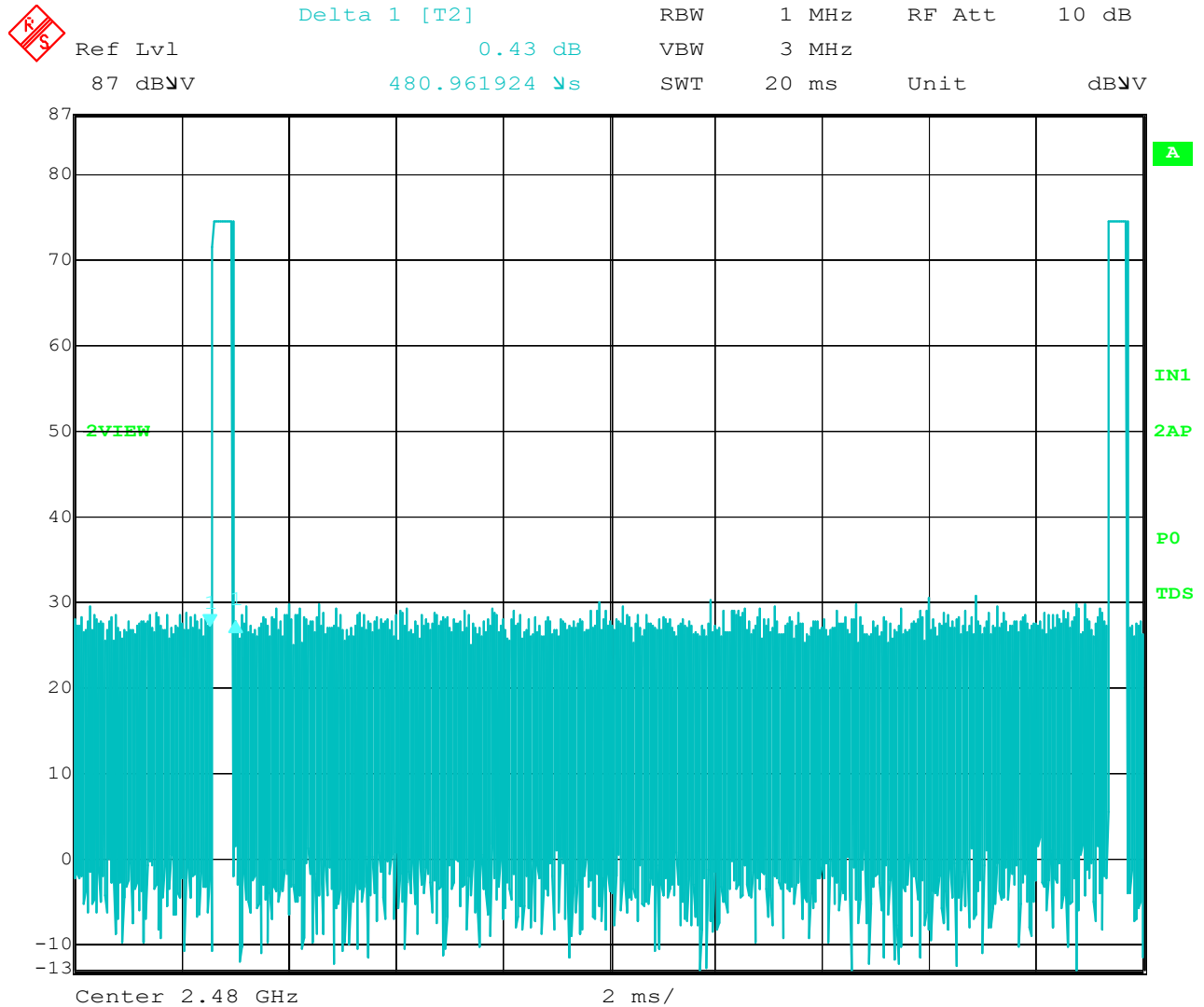


Delta 1 [T2] RBW 1 MHz RF Att 10 dB
 Ref Lvl -0.10 dB VBW 3 MHz
 87 dBμV 16.793587 ms SWT 20 ms Unit dBμV



Date: 22.JUN.2018 09:29:16

Worst Case Time Between Pulses = 16.793587 ms
 Advertising Mode

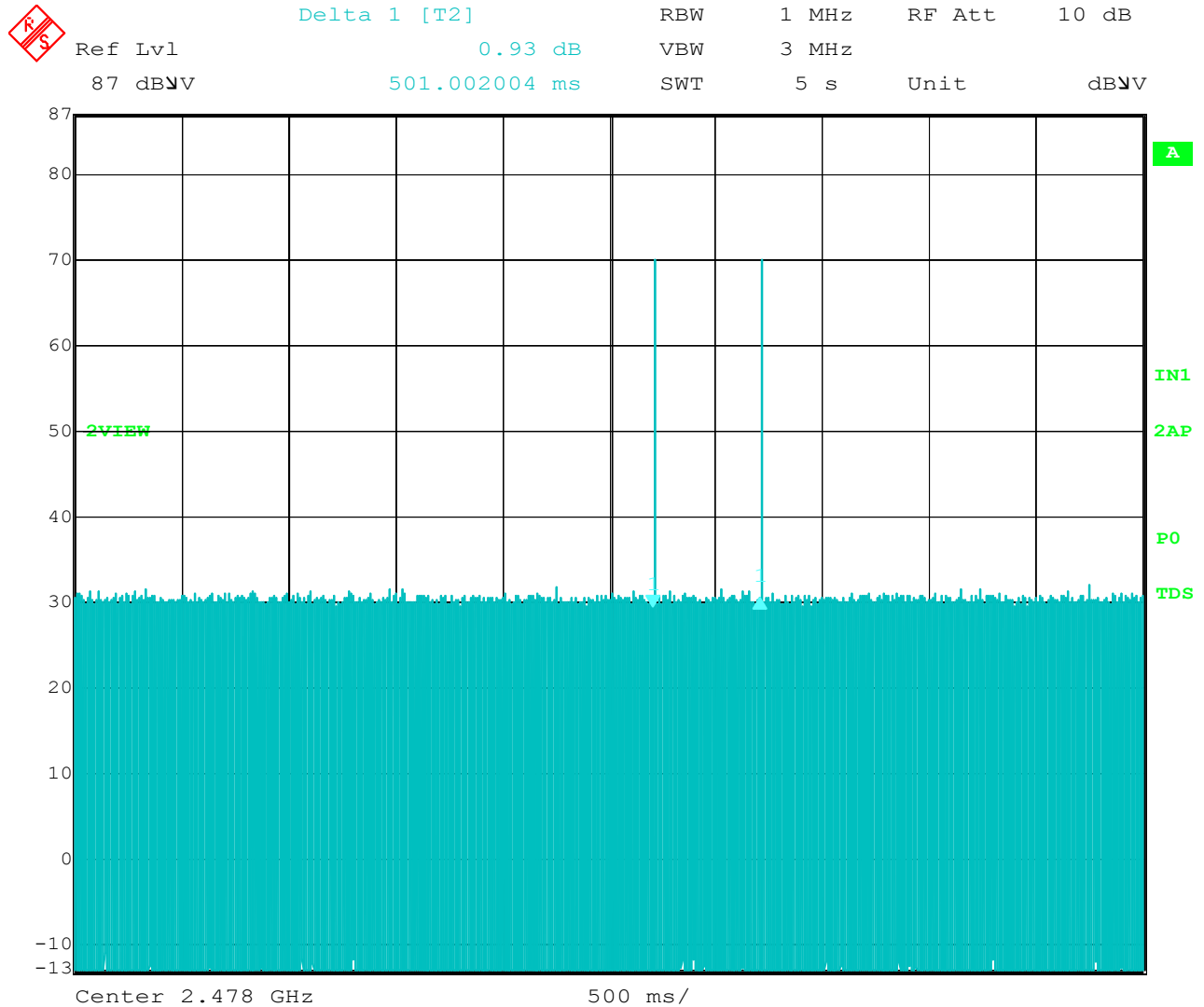


Date: 22.JUN.2018 09:28:58

Time of One Pulse = 480.961924 us
Advertising Mode

Duty Cycle = 480.961924 us / 16.793587 ms = 2.86%

The maximum 20 dB peak to average ratio can be utilized.

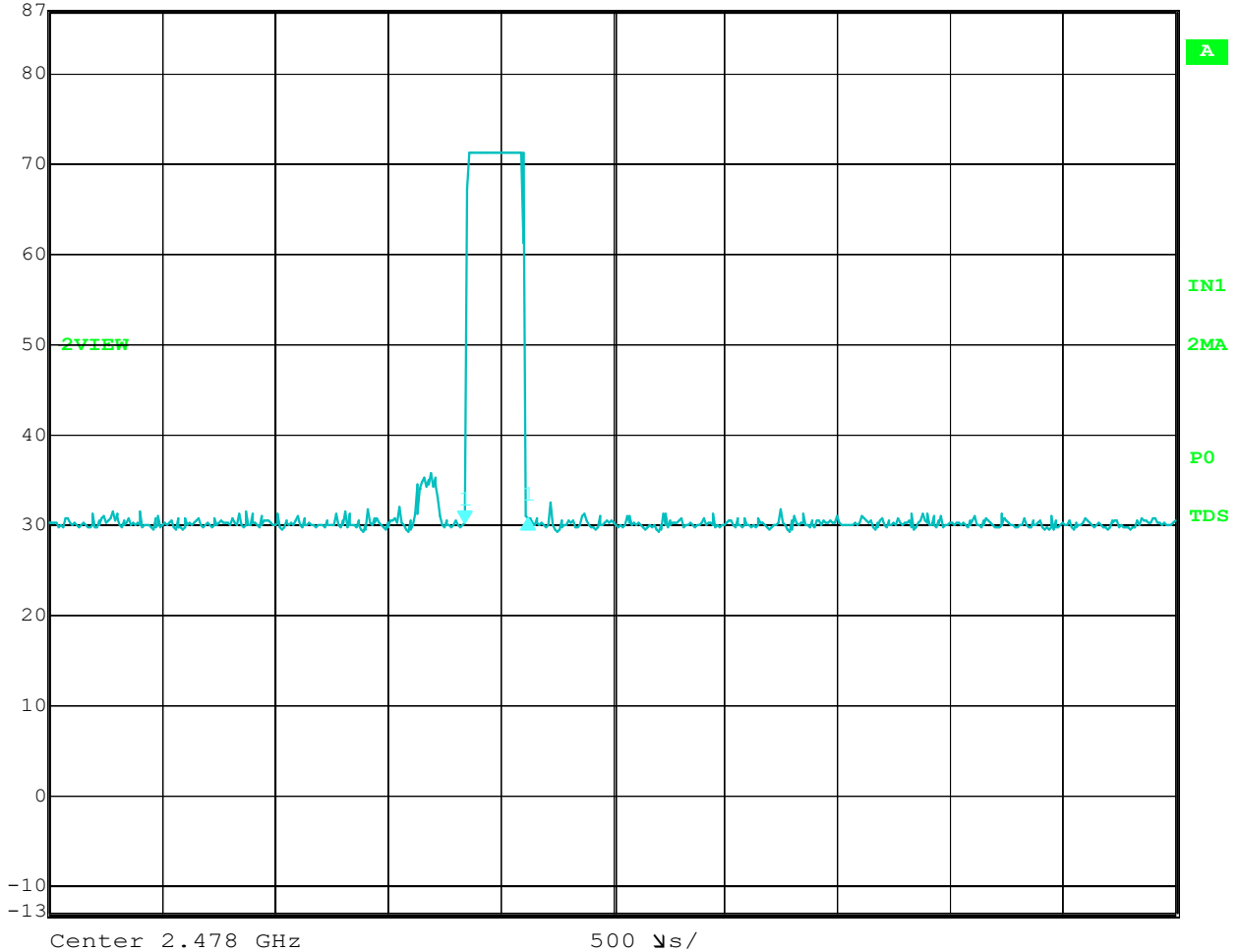


Date: 22.JUN.2018 09:34:26

Worst Case Time Between Pulses = 501.002004 ms
Pairing Mode



Delta 1 [T2] RBW 1 MHz RF Att 10 dB
Ref Lvl 0.47 dB VBW 3 MHz
87 dBμV 280.561122 μs SWT 5 ms Unit dBμV



Date: 22.JUN.2018 09:36:53

Time of One Pulse = 280.561122 us
Pairing Mode

Duty Cycle = 280.561122 us / 501.002004 ms = 0.055%

The maximum 20 dB peak to average ratio can be utilized.