

*FCC PART 15, SUBPART B and C; and FCC SECTION 15.247
TEST REPORT*

for

DIRECTV RC83V REMOTE CONTROL 2022

Model: RC83V

Prepared for

UNIVERSAL ELECTRONICS, INC.
201 EAST SANDPOINTE AVENUE, 7TH FLOOR
SANTA ANA, CALIFORNIA 92707

Prepared by: *Kyle Fujimoto*

KYLE FUJIMOTO

Approved by: *James Ross*

JAMES ROSS

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

DATE: NOVEMBER 1, 2022

	REPORT BODY	APPENDICES					TOTAL
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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 by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the U.S. Government.

Device Tested: DirecTV RC83V Remote Control 2022
Model: RC83V
P/N: R35602BB00-00001

Product Description: The equipment is a remote control used to control DirecTV set top boxes.
Dimensions: 2.7 cm (H) x 7 cm (W) x 7 cm (L)
Clock(s): 32.768 kHz, 32 MHz, and 40 MHz

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

Customer: Universal Electronics, Inc.
201 East Sandpointe Avenue, 7th Floor
Santa Ana, California 92707

Test Dates: October 10, 11, 24, and 25, 2022

Test Specification covered by accreditation:



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

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

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

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	This test was not performed because the EUT operates on battery power only.
2	Radiated RF Emissions, 9 kHz – 25000 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15 Subpart C, 15.205, 15.209 and 15.247 (d) See section 6.3 for Measurement Uncertainty
3	DTS Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(2)
4	Peak Output Power	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(3)
5	RF Band Edges	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d)
6	Spectral Density	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (e)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the DirecTV RC83V Remote Control 2022, Model: RC83V (EUT). The emissions measurements were performed according to the measurement procedure described in ANSI C 63.4 and ANSI C 63.10. 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 15.247.

1.1 DECISION RULE & RISK

If a measured value exceeds a specification limit it implies non-compliance. If the value is below a specification limit it implies compliance. Measurement uncertainty of the laboratory is reported with all measurement results but generally not taken into consideration unless a standard, rule or law requires it to be considered.

Qualification test reports are only produced for products that are in compliance with the test requirements, therefore results are always in conformity. Otherwise, an engineering report or just the data is provided to the customer.

When performing a measurement and making a statement of conformity, in or out-of-specification to manufacturer's specifications or Pass/Fail against a requirement, there are two possible outcomes:

- The result is reported as conforming with the specification
- The result is reported as not conforming with the specification

The decision rule is defined below.

When the test result is found to be below the limit but within our measurement uncertainty of the limit, it is our policy that the final acceptance decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be exactly on the specification, it is our policy, in the case of unwanted emissions measurements to consider the result non-compliant; however, the final decision is left to the customer, after discussing the implications and potential risks of the decision.

When the test result is found to be over the specification limit under any condition, it is our policy to consider the result non-compliant.

In terms of uncertainty of measurement, the laboratory is a calibrated and tightly controlled environment and generally exceptionally stable, the measurement uncertainties are evaluated without the consideration of the test sample. When it comes to the test sample however, as most testing is performed on a single sample rather than a sample population, and that sample is often a pre-production representation of the final product that test sample represents a significantly higher source of measurement uncertainty. We advise our customers of this and that when in doubt (small test to limit margins), they may wish to perform statistical sampling on a population to gain a higher confidence in the results. All lab reported results are that of a single sample in any event.

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.

Kyle Fujimoto Sr. Test Engineer
James Ross Sr. Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to initial date of testing. Received as defined in product description.

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
FCC	Federal Communications Commission
IC	Industry Canada
RSS	Radio Standards Specification
N/A	Not Applicable
Tx	Transmit
Rx	Receive
Inc.	Incorporated
RF	Radio Frequency
GND	Ground
LED	Light Emitting Diode

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
558074 D01 DTS Meas Guidance v05r02	Guidance for Performing Compliance Measurements on Digital Transmissions Systems (DTS) Operating Under Section 15.247
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation
ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2013	American National Standard for Testing Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION

The DirecTV RC83V Remote Control 2022, Model: RC83V (EUT) was tested as a stand-alone. The EUT was continuously transmitting at the low, middle, or high channel.

The EUT was powered by two “AA” batteries.

The EUT was tested for emissions while in the X, Y, and Z axis. The X orientation is when the EUT is parallel to the ground mounted horizontally. The Y orientation is when the EUT is perpendicular to the ground mounted vertically. The Z orientation is when the EUT is perpendicular to the ground mounted horizontally.

The firmware inside the EUT to continuously transmit at the low, middle, and high during the intentional radiator tests.

The firmware is stored on the company’s servers.

The radiated data was taken in the mode described above. All initial investigations were performed with the EMI Receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix D.

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
DIRECTV RC83V REMOTE CONTROL 2022 (EUT)	UNIVERSAL ELECTRONICS, INC.	RC83V	P/N: R35602BB00-0001	MG3-R35602B
LAPTOP*	HEWLETT PACKARD	HSTNN-C82C	N/A	N/A
AC ADAPTER FOR LAPTOP*	HEWLETT PACKARD	HSTNN-DA40	N/A	N/A
FIRMWARE*	UNIVERSAL ELECTRONICS, INC.	RADIO CONTROL CONSOLE	v4.6.2	N/A

*Only used to program the EUT to continuously transmit at the low, middle, and high channels

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
RF RADIATED AND AC CONDUCTED 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, Inc.	N9038A	MY51210510	September 17, 2021	September 17, 2023
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 10, 2022	February 10, 2025
CombiLog Antenna	Com-Power	AC-220	61093	December 14, 2021	December 14, 2023
Preamplifier	Com-Power	PA-840	711013	April 8, 2022	April 8, 2024
Horn Antenna	Com-Power	AH-826	71957	N/A	N/A
Horn Antenna	Com-Power	AH-118	10050113	December 16, 2021	December 16, 2023
Preamplifier	Com-Power	PA-118	181653	March 7, 2022	March 7, 2023
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 0.6 by 1.2 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 0.6 by 1.2 meter non-conductive table 1.5 meters above the ground plane.

The EUT was not grounded.

6.3 Measurement Uncertainty

“Compatible Electronics” U_{lab} value is less than U_{cispr} , thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit.

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

$$u_c(y) = \sqrt{\sum_1^n c_i^2 u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2u_c(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3.4 dB	2.72 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1,000 MHz)	6.3 dB	3.32 dB (Vertical) 3.30 dB (Horizontal)
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(1 GHz – 6 GHz)	5.2 dB	4.06 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(6 GHz – 18 GHz)	5.5 dB	4.06 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(18 GHz – 26 GHz)	N/A	4.43 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(26.5 GHz – 40 GHz)	N/A	4.57 dB

7. CHARACTERISTICS OF THE TRANSMITTER

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

7.1 Channel Number and Frequencies

The EUT uses a total of 40 channels.

The low channel is 2402 MHz

The middle channel is 2440 MHz

The high channel is 2480 MHz

7.2 Antenna

The antenna is a PCB trace dipole type antenna with -1.753 dBi.

8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

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

Test Results:

This test was not performed because the EUT operates on battery power only.

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. Above 1000 MHz, preamplifiers were used to increase the sensitivity of the instrument. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured.

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

The frequencies above 1 GHz were averaged using the duty cycle correction factor in section 8.7 of this test report.

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 and ANSI C63.10. 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.

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; the limits of CFR Title 47, Part 15, Subpart C sections 15.205, 15.209 and 15.247 for radiated emissions.

8.1.3 RF Emissions Test ResultsTable 1 RADIATED EMISSION RESULTS
DirecTV RC83V Remote Control 2022
Model: RC83V

Frequency (MHz)	EMI Reading (dB μ V/m)	Specification Limit (dB μ V/m)	Delta (Cor. Reading – Spec. Limit) (dB)
7320 (V) (Y-Axis)	33.03 (AV)	53.97	-20.94
7440 (V) (Y-Axis)	32.60 (AV)	53.97	-21.37
7320 (H) (X-Axis)	31.98 (AV)	53.97	-21.99
2370.00 (V) (Y-Axis)	31.70 (AV)	53.97	-22.27
2369.75 (H) (X-Axis)	31.56 (AV)	53.97	-22.41
162.00 (H) (X-Axis)	20.81 (QP)	43.50	-22.69

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

(V) Vertical
(H) Horizontal
(QP) Quasi-Peak
(AV) Average

8.1.4 Sample Calculations

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

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

To correct for distance when measuring at a distance other than the specification

For measurements below 30 MHz: (Specification distance / test distance) $\log \times 40$ = distance factor

For measurements above 30 MHz: (Specification distance / test distance) $\log \times 20$ = distance factor

Note: When using an Active Antenna, the Antenna factor shall be subtracted due to the combination of the internal amplification and antenna loss.

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

where: F = antenna factor

A= amplifier gain

C = cable loss

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

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

8.2 DTS Bandwidth

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

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

Test Results:

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

8.3 Maximum Peak Conducted Output Power

The Maximum Peak Conducted Output Power was measured using the EMI Receiver. The Maximum Peak Conducted Output Power was measured using the procedure described in section 11.9.1.1 of ANSI C63.10. The Maximum Peak Conducted Output Power was then taken. The following steps were performed for measuring the Maximum Peak Conducted Output Power.

1. Set the $RBW \geq$ DTS bandwidth
2. Set $VBW \geq [3 \times RBW]$
3. Set $span \geq [3 \times RBW]$
4. Sweep time = auto couple
5. Detector = peak
6. Trace mode = max hold
7. Allow trace to fully stabilize
8. Use peak marker function to determine the peak amplitude level

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (b)(3).

8.4 Emissions in Non-restricted Frequency Bands

The emissions in the non-restricted frequency bands measurements were performed using the EMI receiver directly connected to the EUT. The reference level was established by setting the instrument center frequency to the DTS channel center frequency. The span was set to ≥ 1.5 times the DTS bandwidth. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with sweep set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the reference level. For emission level measurement, the center frequency and span were set to encompass the frequency range to be measured. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than the span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

Test Results:

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

8.5 RF Band Edges

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

Test Results:

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

8.6 Spectral Density Test

The spectrum density output was measured using the EMI Receiver. The spectral density output was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The following steps were performed for measuring the spectral density.

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span to 1.5 times the OBW.
3. Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
4. Set the VBW $\geq [3 \times \text{RBW}]$
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow the trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Results:

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

8.7 Duty Cycle Calculation

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 is when the EUT is in advertising mode.

Duty Cycle Correction Factor = -20.00 dB

Total On Time = 0.43 ms

Duty Cycle = 0.43 ms / 38 ms = 0.0113 = 1.13 %

The maximum peak to average ratio of -20.00 dB can be utilized.

8.8 Variation of the Input Power

The variation of the input power test was performed using the EMI Receiver. The EUT input power was varied between 85 % and 115 % of the nominal rated supply voltage. The carrier frequency was monitored for any change in amplitude.

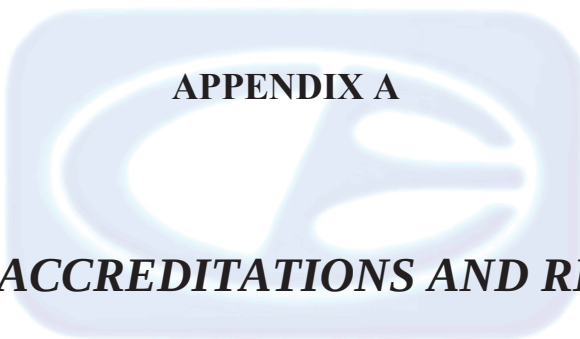
Test Results:

This test was not performed because the EUT operates on battery power only.

9. CONCLUSIONS

The DirecTV RC83V Remote Control 2022, Model: RC83V (EUT), as tested, meets all of the specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247.





APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

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

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

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 the Management Systems Requirements of ISO/IEC 17025, General Requirements for the competence of testing and calibration laboratories:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025 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 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001"

ISED Test Site Registration Number: 2154A

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.247 specifications.

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

No modifications were made to the EUT during the testing.



APPENDIX C

***MODELS COVERED
UNDER THIS REPORT***

MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

DirecTV RC83V Remote Control 2022
Model: RC83V
S/N: N/A

There are no additional models covered under this report.





APPENDIX D

DIAGRAMS AND CHARTS

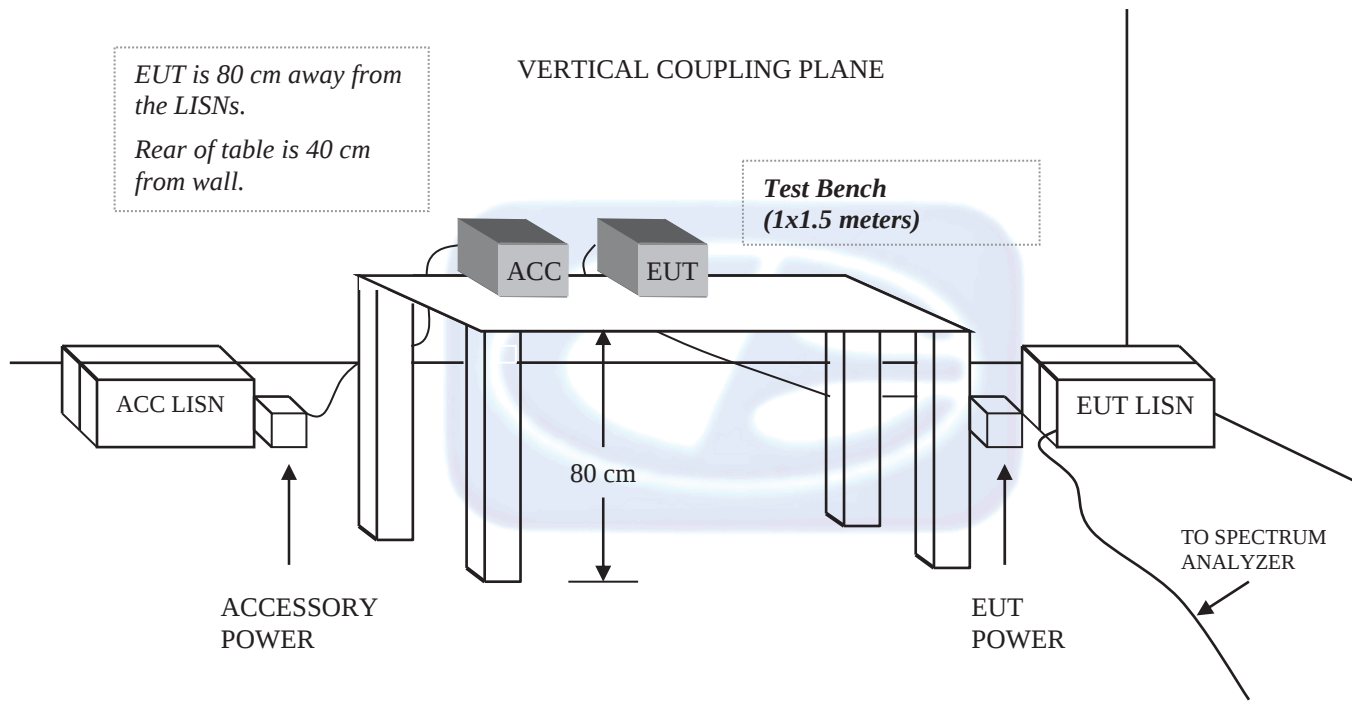
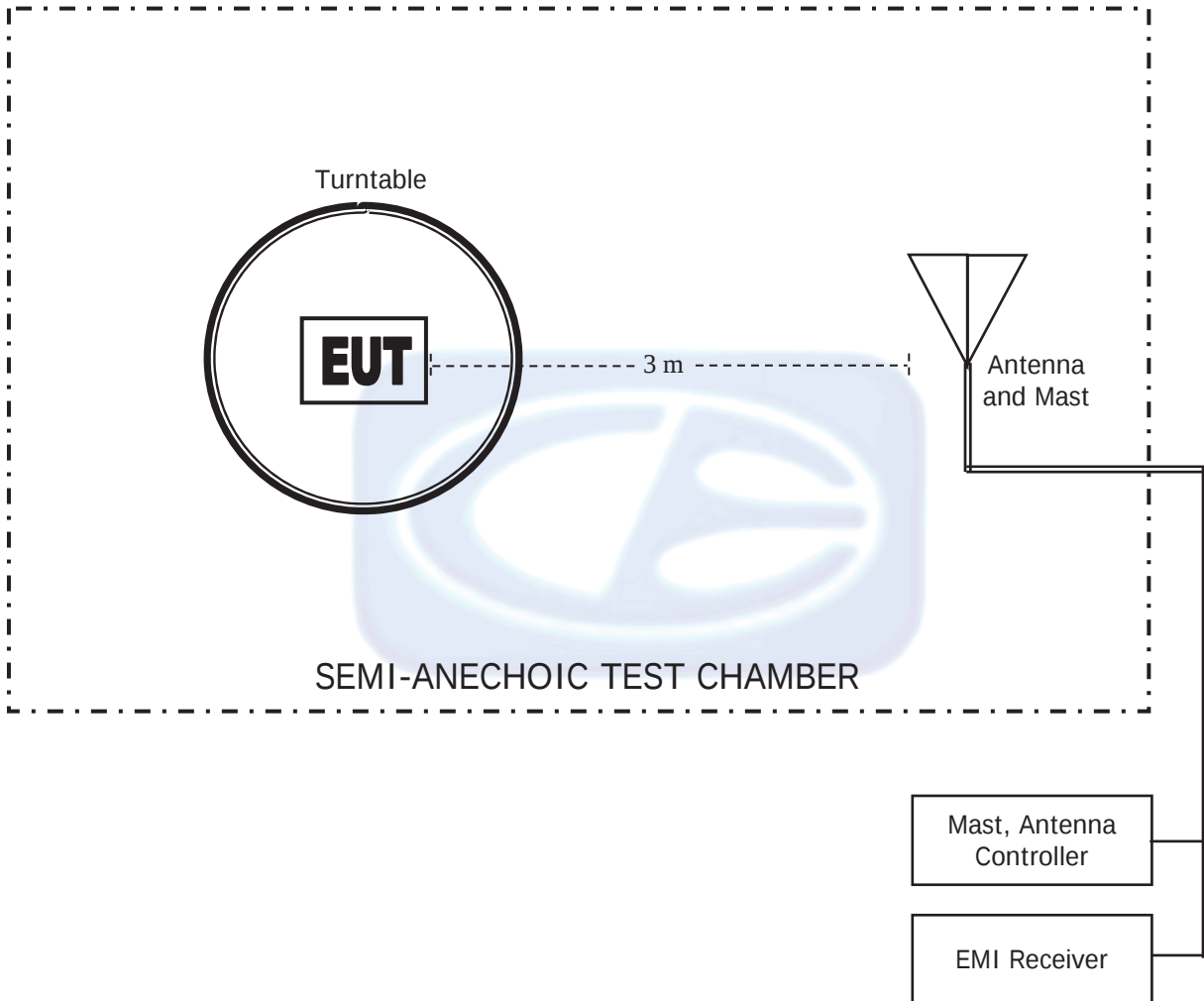
FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER





COM-POWER AL-130R

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 10, 2022

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	15.6	-35.8
0.01	15.8	-35.6
0.02	14.8	-36.6
0.03	15.6	-35.9
0.04	15.0	-36.5
0.05	14.4	-37.1
0.06	14.6	-36.9
0.07	14.3	-37.2
0.08	14.3	-37.2
0.09	14.4	-37.0
0.10	14.1	-37.4
0.20	14.1	-37.4
0.30	14.0	-37.5
0.40	13.9	-37.6
0.50	14.1	-37.3
0.60	14.1	-37.3
0.70	14.2	-37.3
0.80	14.2	-37.3
0.90	14.2	-37.2
1.00	14.4	-37.0
2.00	14.6	-36.9
3.00	14.6	-36.8
4.00	14.9	-36.6
5.00	14.9	-36.7
6.00	14.8	-36.7
7.00	14.6	-36.8
8.00	14.5	-37.0
9.00	14.3	-37.2
10.00	14.5	-37.0
11.00	14.6	-36.9
12.00	14.7	-36.7
13.00	14.9	-36.6
14.00	15.0	-36.5
15.00	14.9	-36.6
16.00	14.9	-36.6
17.00	14.6	-36.8
18.00	14.4	-37.1
19.00	14.5	-37.0
20.00	14.5	-37.0
21.00	14.2	-37.3
22.00	13.9	-37.5
23.00	13.9	-37.5
24.00	13.8	-37.7
25.00	13.4	-38.0
26.00	13.2	-38.2
27.00	13.2	-38.3
28.00	12.7	-38.7
29.00	12.7	-38.8
30.00	12.4	-39.0

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

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

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

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61093

CALIBRATION DATE: DECEMBER 14, 2021

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.50	200	16.00
35	21.40	250	17.40
40	21.00	300	19.70
45	20.60	350	20.00
50	19.70	400	22.20
60	16.10	450	22.40
70	12.80	500	23.10
80	12.50	550	23.40
90	14.20	600	24.90
100	15.40	650	25.30
120	16.50	700	25.40
125	16.80	750	26.40
140	15.90	800	26.70
150	16.60	850	27.10
160	18.50	900	27.90
175	15.90	950	28.00
180	15.50	1000	28.00

COM POWER AH-118**HORN ANTENNA****S/N: 10050113****CALIBRATION DATE: DECEMBER 16, 2021**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.86	10.0	38.91
1.5	25.67	10.5	39.94
2.0	28.25	11.0	39.10
2.5	29.17	11.5	39.70
3.0	29.78	12.0	40.29
3.5	30.88	12.5	41.93
4.0	31.21	13.0	41.34
4.5	32.96	13.5	40.57
5.0	33.30	14.0	40.23
5.5	34.24	14.5	42.25
6.0	34.57	15.0	43.63
6.5	35.61	15.5	39.96
7.0	36.60	16.0	40.38
7.5	37.49	16.5	40.56
8.0	37.44	17.0	40.93
8.5	37.98	17.5	42.27
9.0	38.01	18.0	43.77
9.5	38.53		

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

S/N: 71957

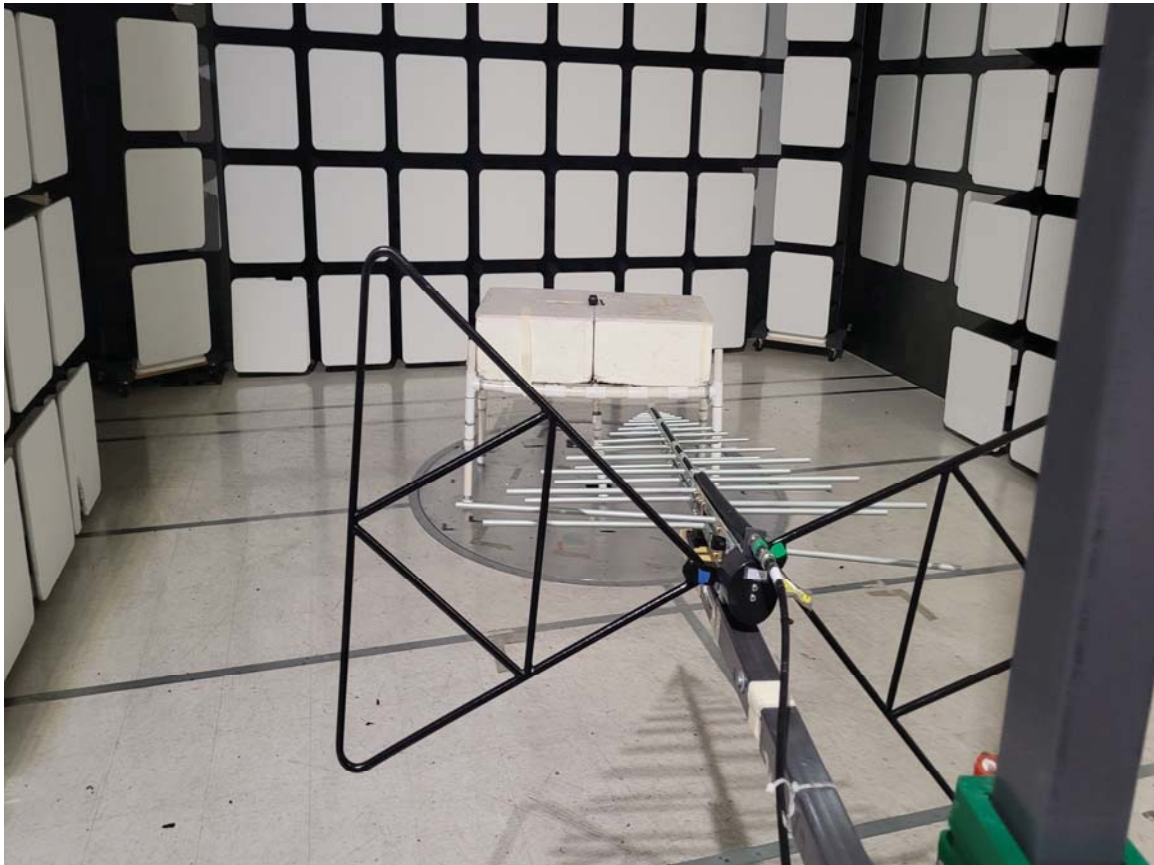
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.5	22.5	35.5
18.5	33.5	23.0	35.9
19.0	34.0	23.5	35.7
19.5	34.0	24.0	35.6
20.0	34.3	24.5	36.0
20.5	34.9	25.0	36.2
21.0	34.7	25.5	36.1
21.5	35.0	26.0	36.2
22.0	35.0	26.5	35.7

COM-POWER PA-118**PREAMPLIFIER****S/N: 181653****CALIBRATION DATE: MARCH 7, 2022**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.02	6.0	38.84
1.1	39.72	6.5	39.20
1.2	39.93	7.0	39.46
1.3	39.98	7.5	39.67
1.4	39.99	8.0	39.28
1.5	40.20	8.5	38.63
1.6	40.05	9.0	38.96
1.7	40.15	9.5	39.33
1.8	40.20	10.0	39.58
1.9	40.33	11.0	38.25
2.0	40.33	12.0	40.03
2.5	40.60	13.0	40.55
3.0	40.76	14.0	40.36
3.5	40.87	15.0	39.34
4.0	40.39	16.0	37.34
4.5	39.55	17.0	42.14
5.0	40.34	18.0	42.54
5.5	39.45		

COM-POWER PA-840**MICROWAVE PREAMPLIFIER****S/N: 711013****CALIBRATION DATE: APRIL 8, 2022**

FREQUENCY (GHz)	FACTOR (dB)
18.0	24.85
19.0	24.25
20.0	22.69
21.0	22.17
22.0	22.78
23.0	23.23
24.0	23.72
25.0	24.13
26.0	24.28
26.5	25.06



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
DIRECTV RC83V REMOTE CONTROL 2022
MODEL: RC83V
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

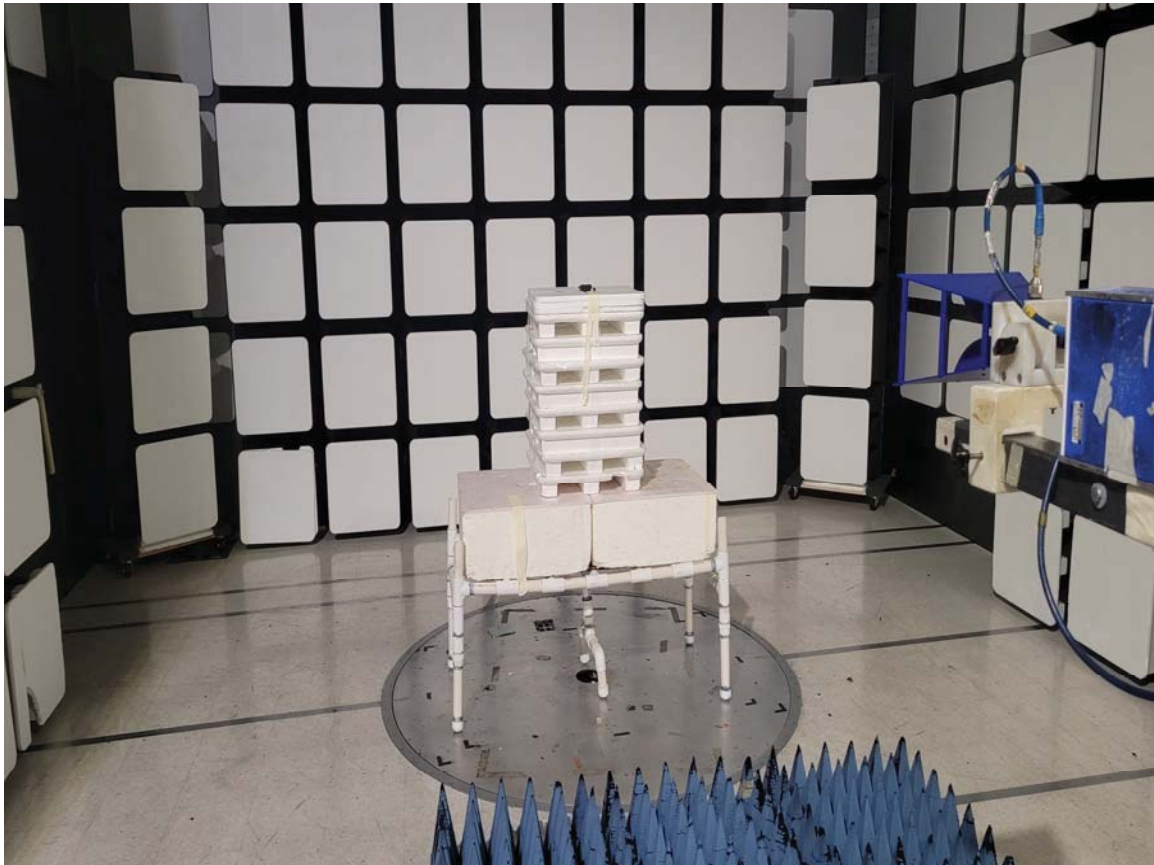
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
DIRECTV RC83V REMOTE CONTROL 2022
MODEL: RC83V
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

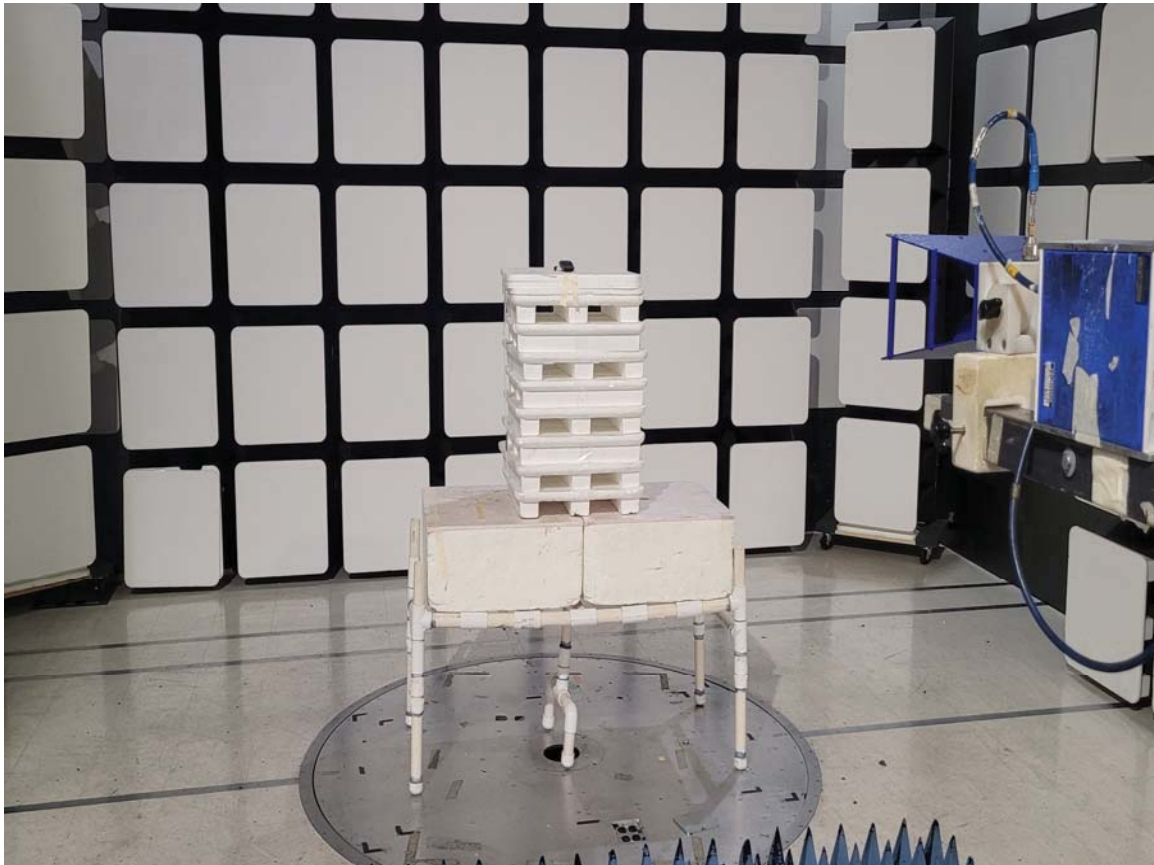
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UNIVERSAL ELECTRONICS, INC.
DIRECTV RC83V REMOTE CONTROL 2022
MODEL: RC83V
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

UNIVERSAL ELECTRONICS, INC.
DIRECTV RC83V REMOTE CONTROL 2022
MODEL: RC83V
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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

APPENDIX E

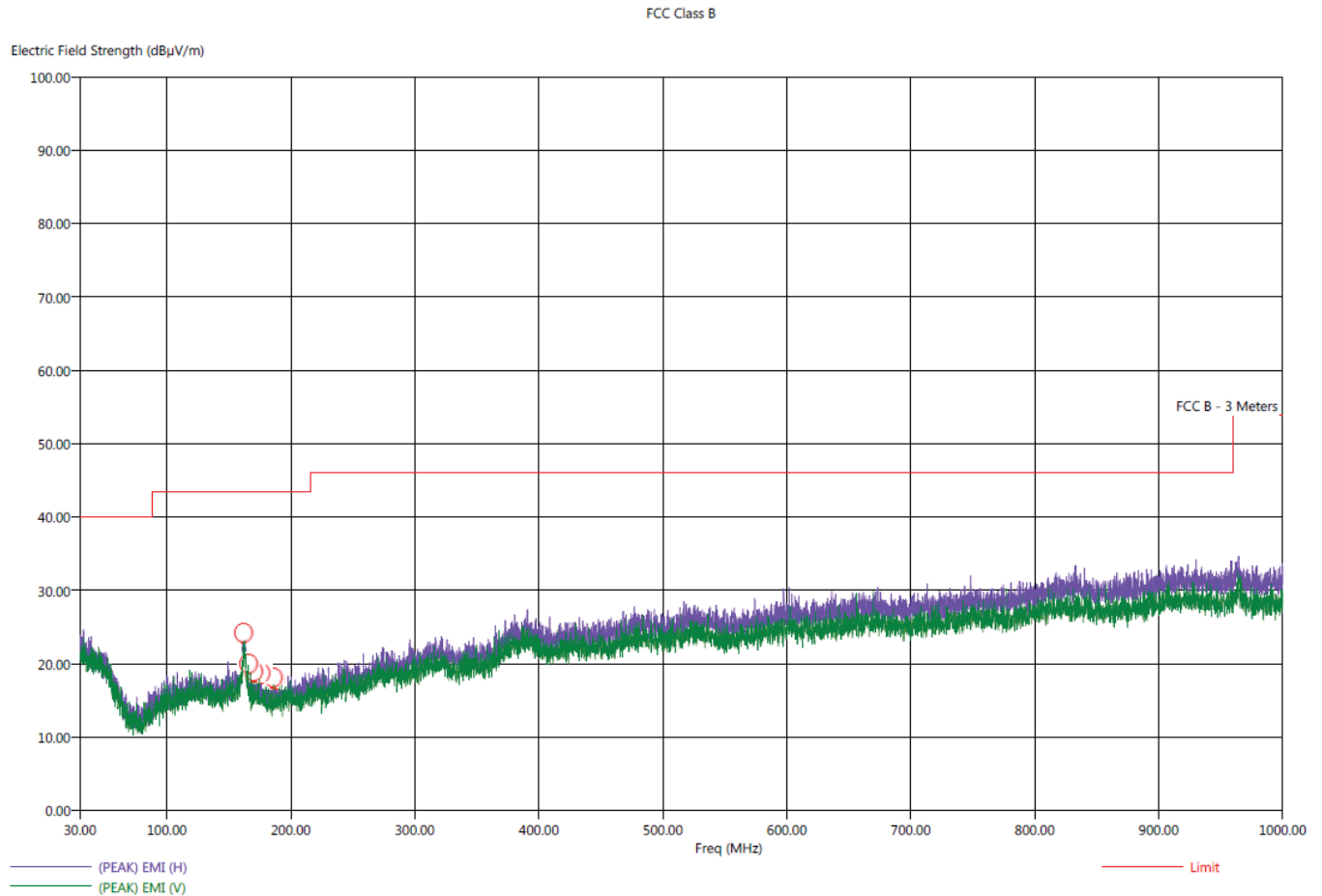
DATA SHEETS

***RADIATED EMISSIONS
DATA SHEETS***

***30 MHz to 1000 MHz
SPURIOUS EMISSIONS
(WORST CASE)
DATA SHEETS***

Title: Pre-Scan - FCC Class B
File: 1 - Pre-Scan -X-Axis - FCC Class B - 10-24-2022.set
Operator: Kyle Fujimoto
EUT Type: DirecTV RC83V Remote Control 2022
EUT Condition: The EUT is continuously transmitting at 2402 MHz
Company: Universal Electronics, Inc.
Model: RC83V
P/N: R35602BB00-00001
X-Axis (Worst Case)

10/24/2022 11:45:33 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 1 - Final Scan - X-Axis - FCC Class B - 10-24-2022.set
Operator: Kyle Fujimoto
EUT Type: DirecTV RC83V Remote Control 2022
EUT Condition: The EUT is continuously transmitting at 2402 MHz
Company: Universal Electronics, Inc.
Model: RC83V
P/N: R35602BB00-00001
X-Axis

10/24/2022 12:25:58 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)
162.00	H	25.35	20.81	-18.15	-22.69	43.50	22.88	0.94	157.25	111.28
165.90	H	20.70	14.90	-22.80	-28.60	43.50	16.98	0.95	65.50	126.98
170.10	H	19.65	13.93	-23.85	-29.57	43.50	16.00	0.96	85.25	127.04
176.00	H	19.32	13.73	-24.18	-29.77	43.50	15.82	0.98	237.75	141.49
185.90	H	19.42	13.43	-24.08	-30.07	43.50	15.40	1.02	220.50	318.32
187.60	H	18.44	13.43	-25.06	-30.07	43.50	15.40	1.02	163.50	255.04



***TRANSMIT HARMONICS
DATA SHEETS***

FCC 15.247Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83VDate: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto**Harmonics - Low Channel****Transmit Mode - X-Axis - Power Level = 8**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	44.62	V	73.97	-29.35	Peak	265.50	159.18	
4804.00	24.62	V	53.97	-29.35	Avg	265.50	159.18	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	47.43	V	73.97	-26.54	Peak	271.00	249.08	
12010.00	27.43	V	53.97	-26.54	Avg	271.00	249.08	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel

Transmit Mode - Y-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	50.10	V	73.97	-23.87	Peak	113.00	143.28	
4804.00	30.10	V	53.97	-23.87	Avg	113.00	143.28	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	48.27	V	73.97	-25.70	Peak	203.50	249.08	
12010.00	28.27	V	53.97	-25.70	Avg	203.50	249.08	
14412.00								No Emission Detected
14412.00								
16814.00								No Emission Detected
16814.00								
19216.00								No Emission Detected
19216.00								
21618.00								No Emission Detected
21618.00								
24020.00								No Emission Detected
24020.00								

FCC 15.247Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83VDate: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto**Harmonics - Low Channel****Transmit Mode - Z-Axis - Power Level = 8**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	43.33	V	73.97	-30.64	Peak	255.75	127.28	
4804.00	23.33	V	53.97	-30.64	Avg	255.75	127.28	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	48.74	V	73.97	-25.23	Peak	101.50	127.28	
12010.00	28.74	V	53.97	-25.23	Avg	101.50	127.28	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel

Transmit Mode - X-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	49.17	H	73.97	-24.80	Peak	45.00	111.22	
4804.00	29.17	H	53.97	-24.80	Avg	45.00	111.22	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	48.19	H	73.97	-25.78	Peak	77.50	127.16	
12010.00	28.19	H	53.97	-25.78	Avg	77.50	127.16	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel

Transmit Mode - Y-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	43.82	H	73.97	-30.15	Peak	137.75	111.46	
4804.00	23.82	H	53.97	-30.15	Avg	137.75	111.46	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	47.97	H	73.97	-26.00	Peak	308.50	190.98	
12010.00	27.97	H	53.97	-26.00	Avg	308.50	190.98	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel

Transmit Mode - Z-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4804.00	47.58	H	73.97	-26.39	Peak	17.00	127.28	
4804.00	27.58	H	53.97	-26.39	Avg	17.00	127.28	
7206.00								Not in Restricted Band
7206.00								Done via Conducted
9608.00								Not in Restricted Band
9608.00								Done via Conducted
12010.00	47.44	H	73.97	-26.53	Peak	191.50	143.40	
12010.00	27.44	H	53.97	-26.53	Avg	191.50	143.40	
14412.00								No Emission Detected
14412.00								
16814.00								No Emission Detected
16814.00								
19216.00								No Emission Detected
19216.00								
21618.00								No Emission Detected
21618.00								
24020.00								No Emission Detected
24020.00								



FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - X-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	45.74	V	73.97	-28.23	Peak	169.50	127.16	
4880.00	25.74	V	53.97	-28.23	Avg	169.50	127.16	
7320.00	46.30	V	73.97	-27.67	Peak	298.25	111.46	
7320.00	26.30	V	53.97	-27.67	Avg	298.25	111.46	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	48.73	V	73.97	-25.24	Peak	12.50	175.40	
12200.00	28.73	V	53.97	-25.24	Avg	12.50	175.40	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - Y-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	49.93	V	73.97	-24.04	Peak	292.75	127.10	
4880.00	29.93	V	53.97	-24.04	Avg	292.75	127.10	
7320.00	53.03	V	73.97	-20.94	Peak	283.00	111.40	
7320.00	33.03	V	53.97	-20.94	Avg	283.00	111.40	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	50.54	V	73.97	-23.43	Peak	287.00	111.28	
12200.00	30.54	V	53.97	-23.43	Avg	287.00	111.28	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - Z-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	45.25	V	73.97	-28.72	Peak	225.25	143.16	
4880.00	25.25	V	53.97	-28.72	Avg	225.25	143.16	
7320.00	49.13	V	73.97	-24.84	Peak	202.00	110.86	
7320.00	29.13	V	53.97	-24.84	Avg	202.00	110.86	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	49.61	V	73.97	-24.36	Peak	148.75	127.22	
12200.00	29.61	V	53.97	-24.36	Avg	148.75	127.22	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - X-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	43.50	H	73.97	-30.47	Peak	233.25	127.34	
4880.00	23.50	H	53.97	-30.47	Avg	233.25	127.34	
7320.00	51.98	H	73.97	-21.99	Peak	263.75	111.46	
7320.00	31.98	H	53.97	-21.99	Avg	263.75	111.46	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	49.24	H	73.97	-24.73	Peak	63.25	207.22	
12200.00	29.24	H	53.97	-24.73	Avg	63.25	207.22	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - Y-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	41.96	H	73.97	-32.01	Peak	298.50	143.64	
4880.00	21.96	H	53.97	-32.01	Avg	298.50	143.64	
7320.00	46.04	H	73.97	-27.93	Peak	30.25	159.22	
7320.00	26.04	H	53.97	-27.93	Avg	30.25	159.22	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	48.36	H	73.97	-25.61	Peak	236.00	191.10	
12200.00	28.36	H	53.97	-25.61	Avg	236.00	191.10	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Middle Channel

Transmit Mode - Z-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4880.00	46.84	H	73.97	-27.13	Peak	194.00	127.34	
4880.00	26.84	H	53.97	-27.13	Avg	194.00	127.34	
7320.00	49.31	H	73.97	-24.66	Peak	302.50	111.46	
7320.00	29.31	H	53.97	-24.66	Avg	302.50	111.46	
9760.00								Not in Restricted Band
9760.00								Done via Conducted
12200.00	48.89	H	73.97	-25.08	Peak	26.50	126.92	
12200.00	28.89	H	53.97	-25.08	Avg	26.50	126.92	
14640.00								No Emission
14640.00								Detected
17080.00								No Emission
17080.00								Detected
19520.00								No Emission
19520.00								Detected
21960.00								No Emission
21960.00								Detected
24400.00								No Emission
24400.00								Detected

FCC 15.247Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83VDate: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto**Harmonics - High Channel****Transmit Mode - X-Axis - Power Level = 8**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	45.47	V	73.97	-28.50	Peak	160.75	127.22	
4960.00	25.47	V	53.97	-28.50	Avg	160.75	127.22	
7440.00	44.47	V	73.97	-29.50	Peak	33.16	127.00	
7440.00	24.47	V	53.97	-29.50	Avg	33.16	127.00	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	48.69	V	73.97	-25.28	Peak	128.00	175.26	
12400.00	28.69	V	53.97	-25.28	Avg	128.00	175.26	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel

Transmit Mode - Y-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	48.09	V	73.97	-25.88	Peak	118.75	223.10	
4960.00	28.09	V	53.97	-25.88	Avg	118.75	223.10	
7440.00	52.60	V	73.97	-21.37	Peak	106.50	111.40	
7440.00	32.60	V	53.97	-21.37	Avg	106.50	111.40	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	49.07	V	73.97	-24.90	Peak	309.75	175.28	
12400.00	29.07	V	53.97	-24.90	Avg	309.75	175.28	
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 15.247Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83VDate: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto**Harmonics - High Channel****Transmit Mode - Z-Axis - Power Level = 8**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	43.81	V	73.97	-30.16	Peak	69.25	111.45	
4960.00	23.81	V	53.97	-30.16	Avg	69.25	111.45	
7440.00	49.45	V	73.97	-24.52	Peak	209.75	249.97	
7440.00	29.45	V	53.97	-24.52	Avg	209.75	249.97	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	49.38	V	73.97	-24.59	Peak	223.50	190.98	
12400.00	29.38	V	53.97	-24.59	Avg	223.50	190.98	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel

Transmit Mode - X-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	47.12	H	73.97	-26.85	Peak	58.75	143.28	
4960.00	27.12	H	53.97	-26.85	Avg	58.75	143.28	
7440.00	49.73	H	73.97	-24.24	Peak	54.50	159.22	
7440.00	29.73	H	53.97	-24.24	Avg	54.50	159.22	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	48.58	H	73.97	-25.39	Peak	97.00	207.22	
12400.00	28.58	H	53.97	-25.39	Avg	97.00	207.22	
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 15.247Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83VDate: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto**Harmonics - High Channel****Transmit Mode - Y-Axis - Power Level = 8**

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	41.16	H	73.97	-32.81	Peak	140.50	111.34	
4960.00	21.16	H	53.97	-32.81	Avg	140.50	111.34	
7440.00	45.62	H	73.97	-28.35	Peak	216.25	111.52	
7440.00	25.62	H	53.97	-28.35	Avg	216.25	111.52	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	48.65	H	73.97	-25.32	Peak	45.50	239.04	
12400.00	28.65	H	53.97	-25.32	Avg	45.50	239.04	
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 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel

Transmit Mode - Z-Axis - Power Level = 8

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
4960.00	46.43	H	73.97	-27.54	Peak	295.00	111.40	
4960.00	26.43	H	53.97	-27.54	Avg	295.00	111.40	
7440.00	49.00	H	73.97	-24.97	Peak	201.75	111.40	
7440.00	29.00	H	53.97	-24.97	Avg	201.75	111.40	
9920.00								Not in Restricted Band
9920.00								Done via Conducted
12400.00	48.75	H	73.97	-25.22	Peak	279.50	191.28	
12400.00	28.75	H	53.97	-25.22	Avg	279.50	191.28	
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



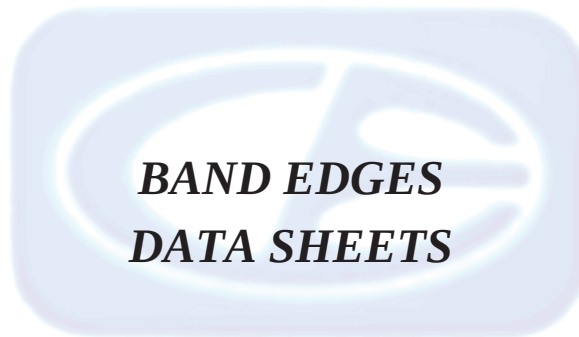
FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
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]





FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Band Edges - Low Channel - Power Level = 8

[illegible]



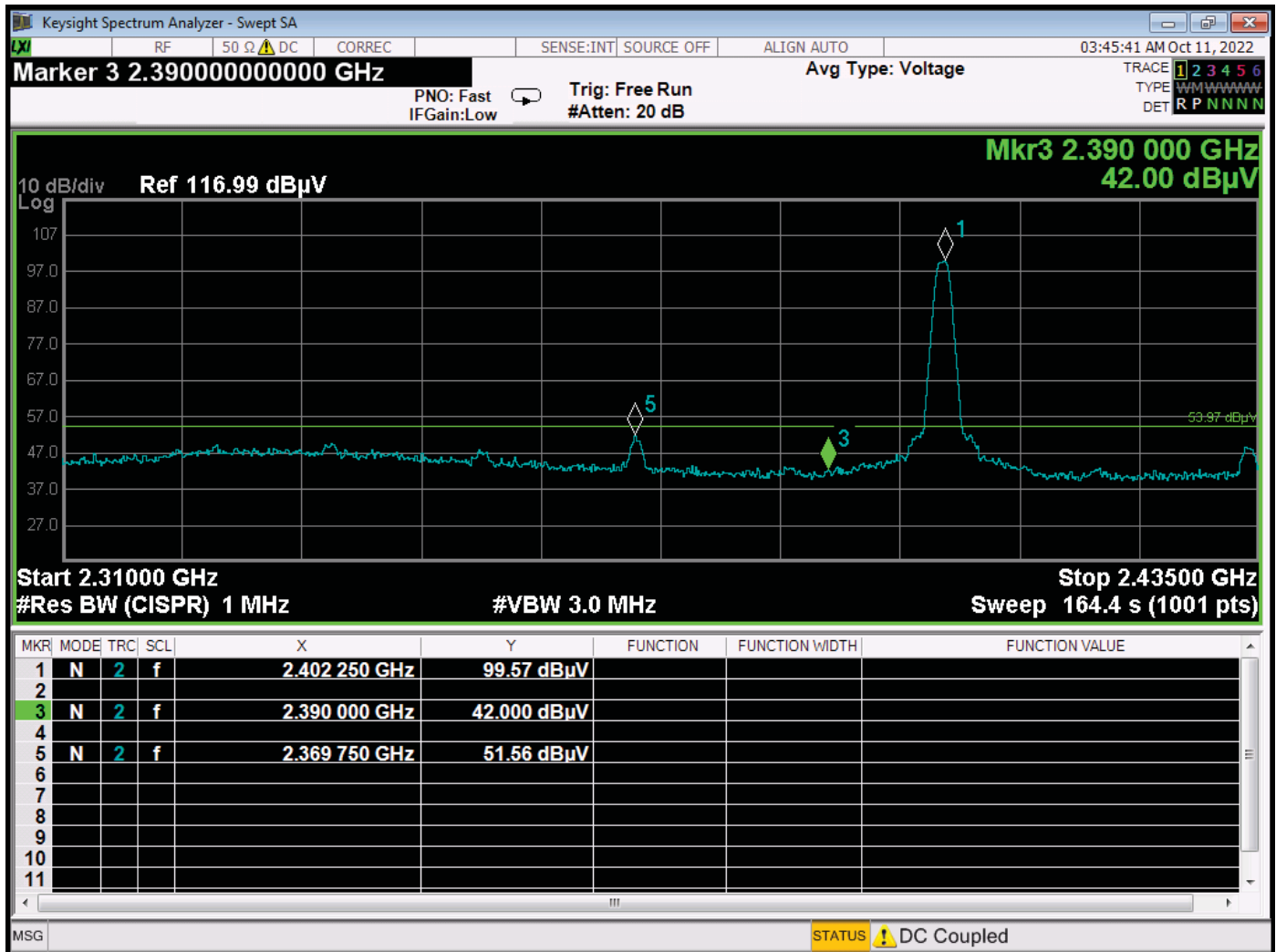
FCC 15.247

Universal Electronics, Inc.
DirecTV RC83V Remote Control 2022
Model: RC83V

Date: 10/10/2022
Lab: D
Tested By: Kyle Fujimoto

Band Edges - High Channel - Power Level = 8

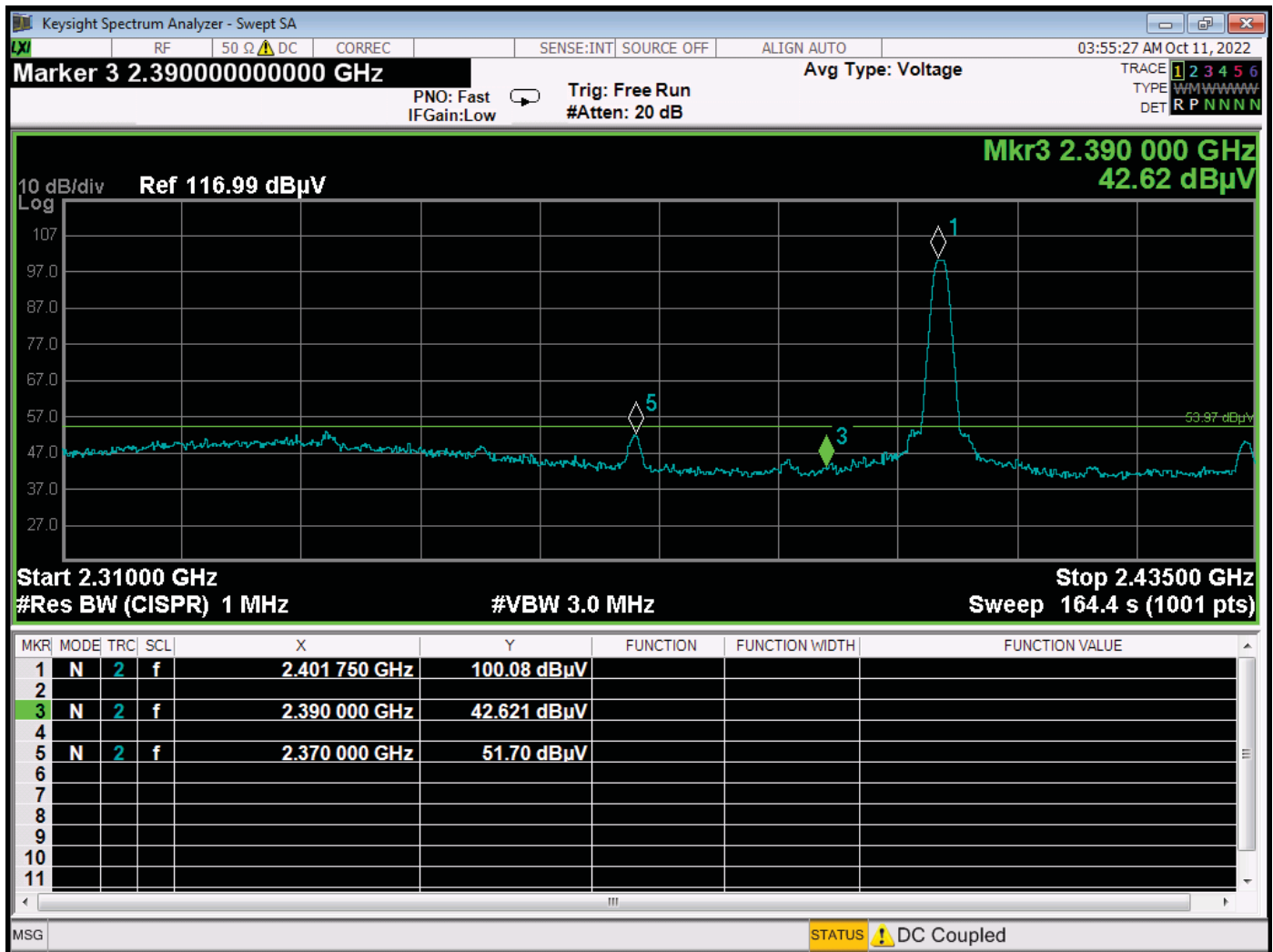
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Band Edge – Low Channel – Horizontal Polarization – X-Axis Worst Case



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



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

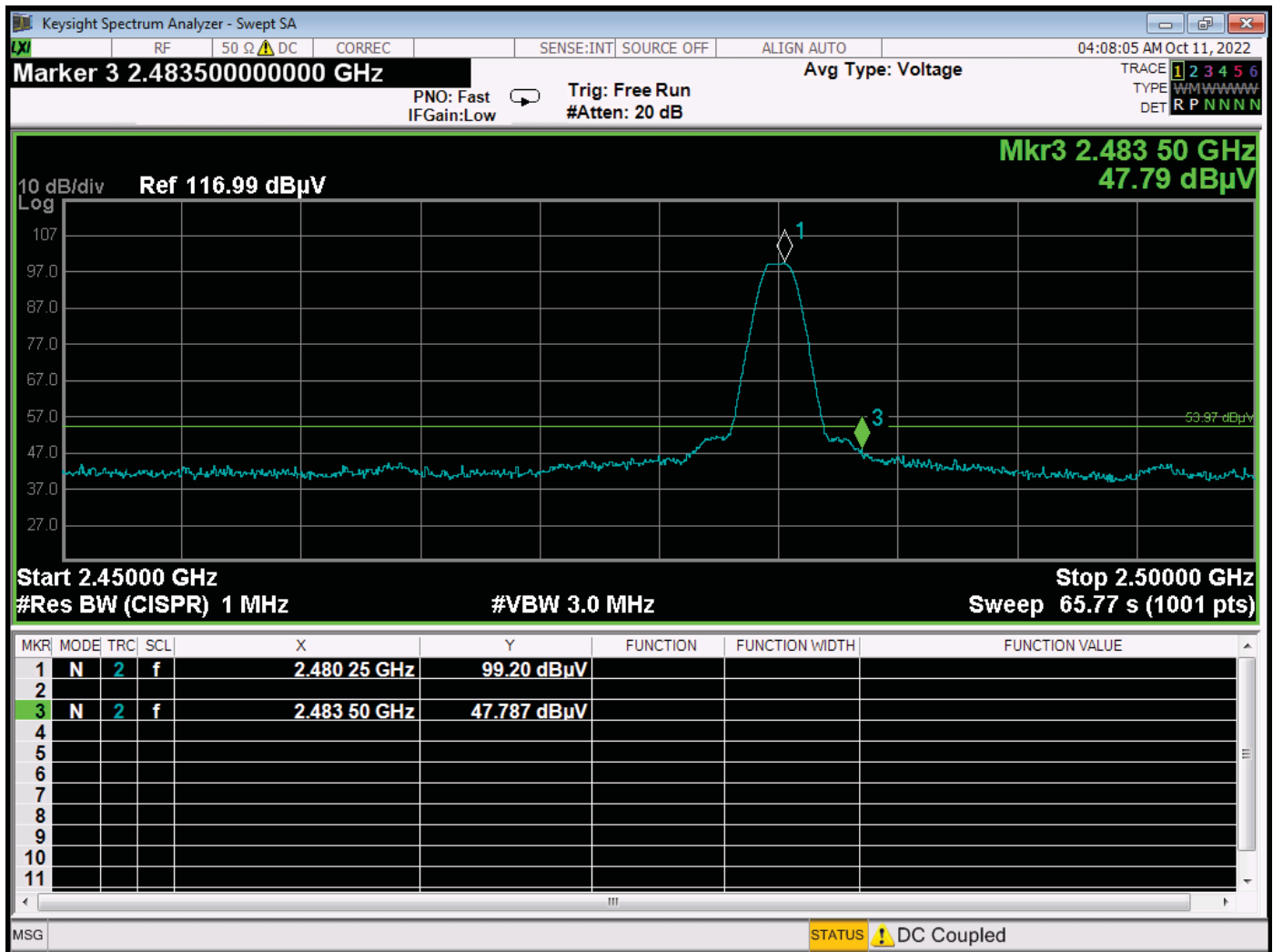
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



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

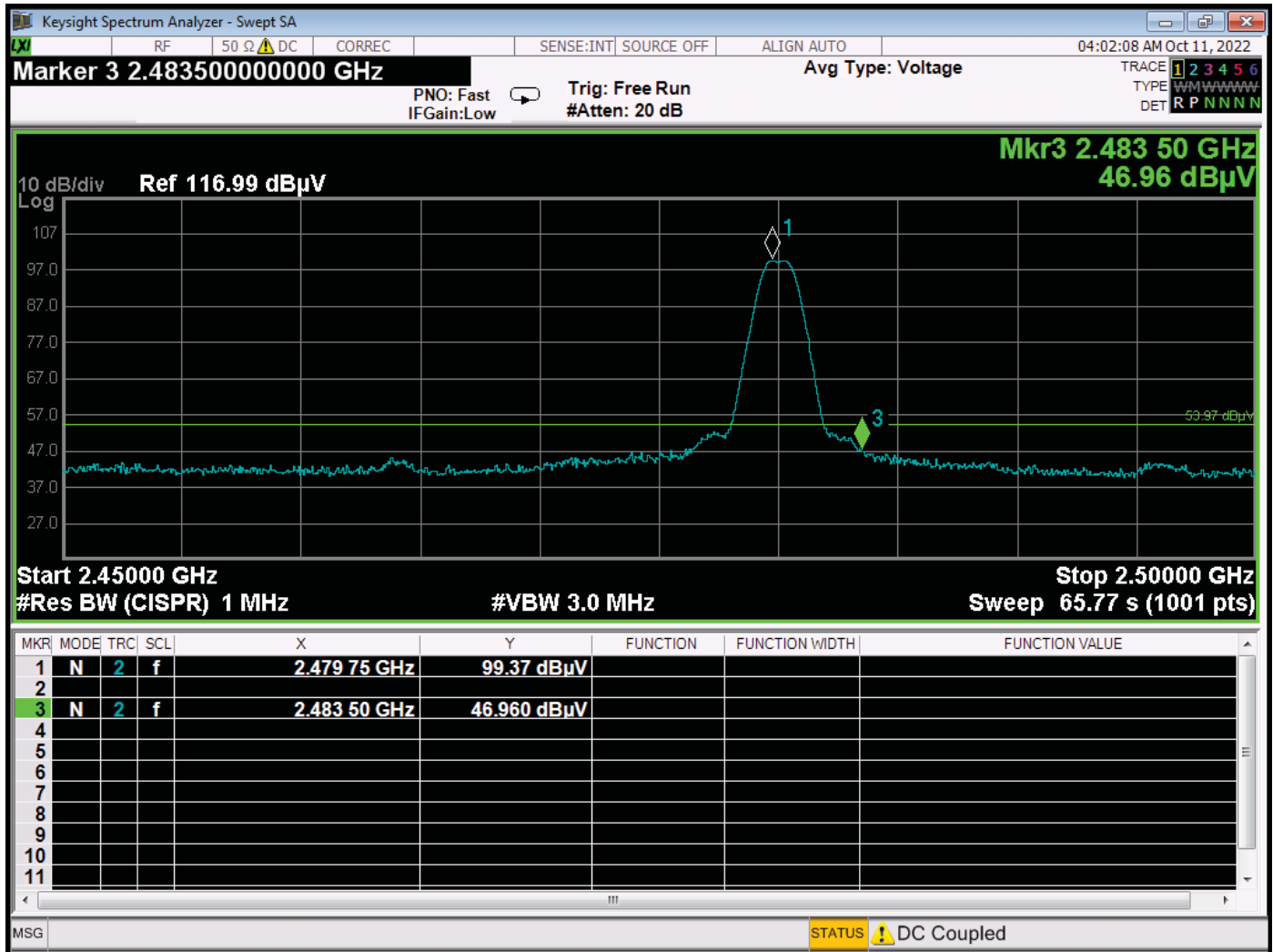
Brea Division
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 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



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

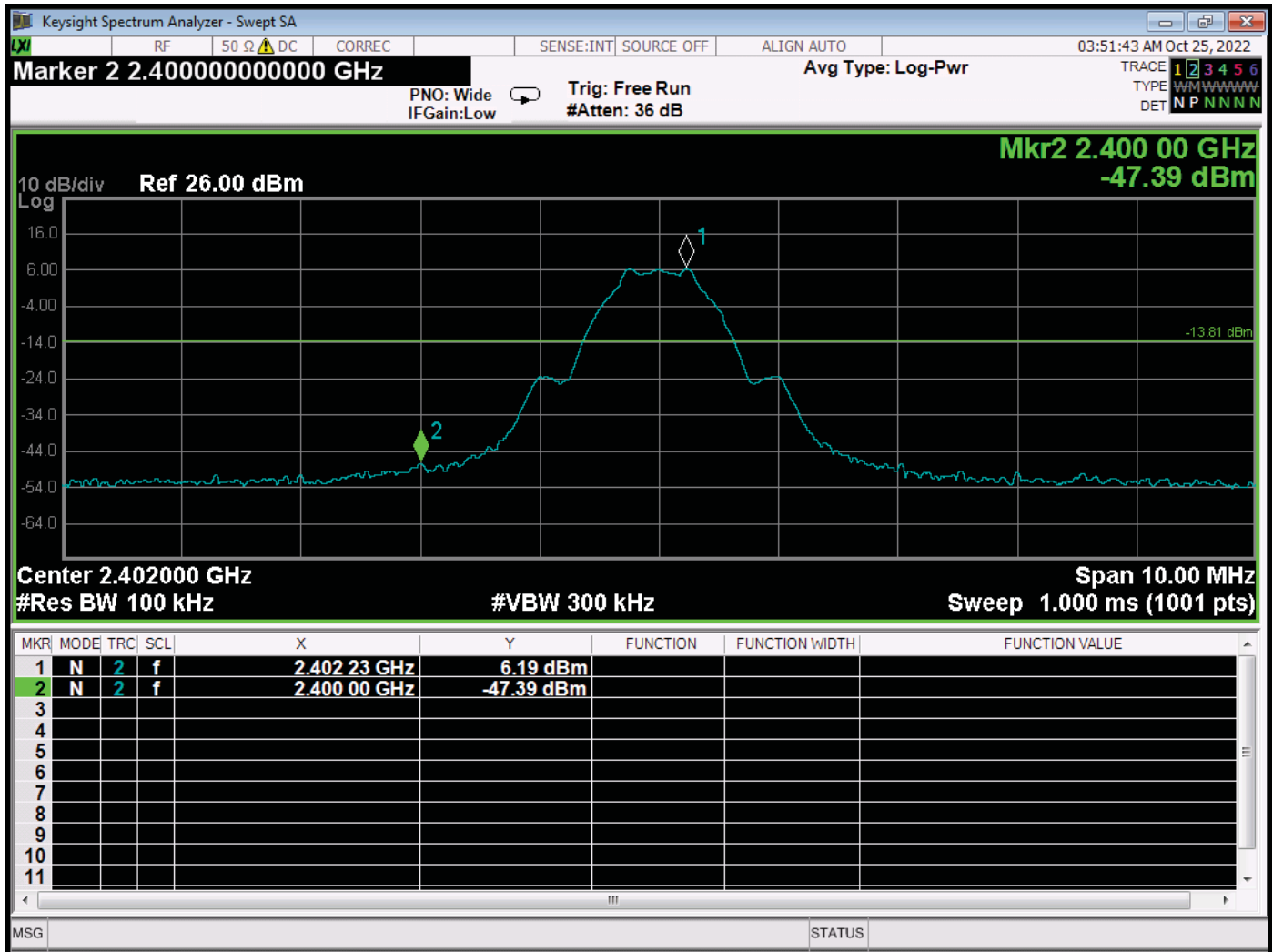
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

Newbury Park Division
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 (805) 480-4044



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



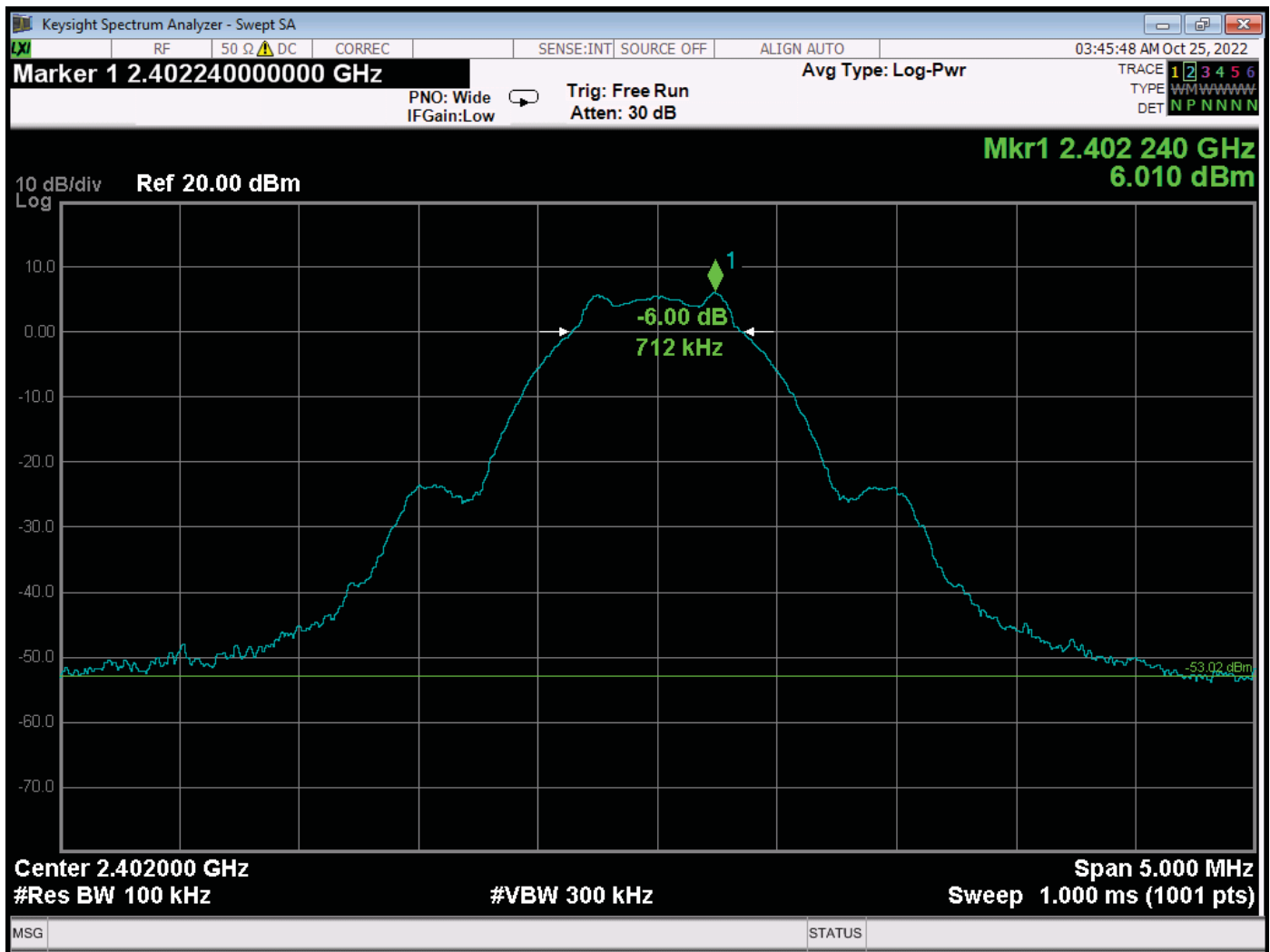
Band Edge – Low Channel – at 2400 MHz – Conducted Measurement

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

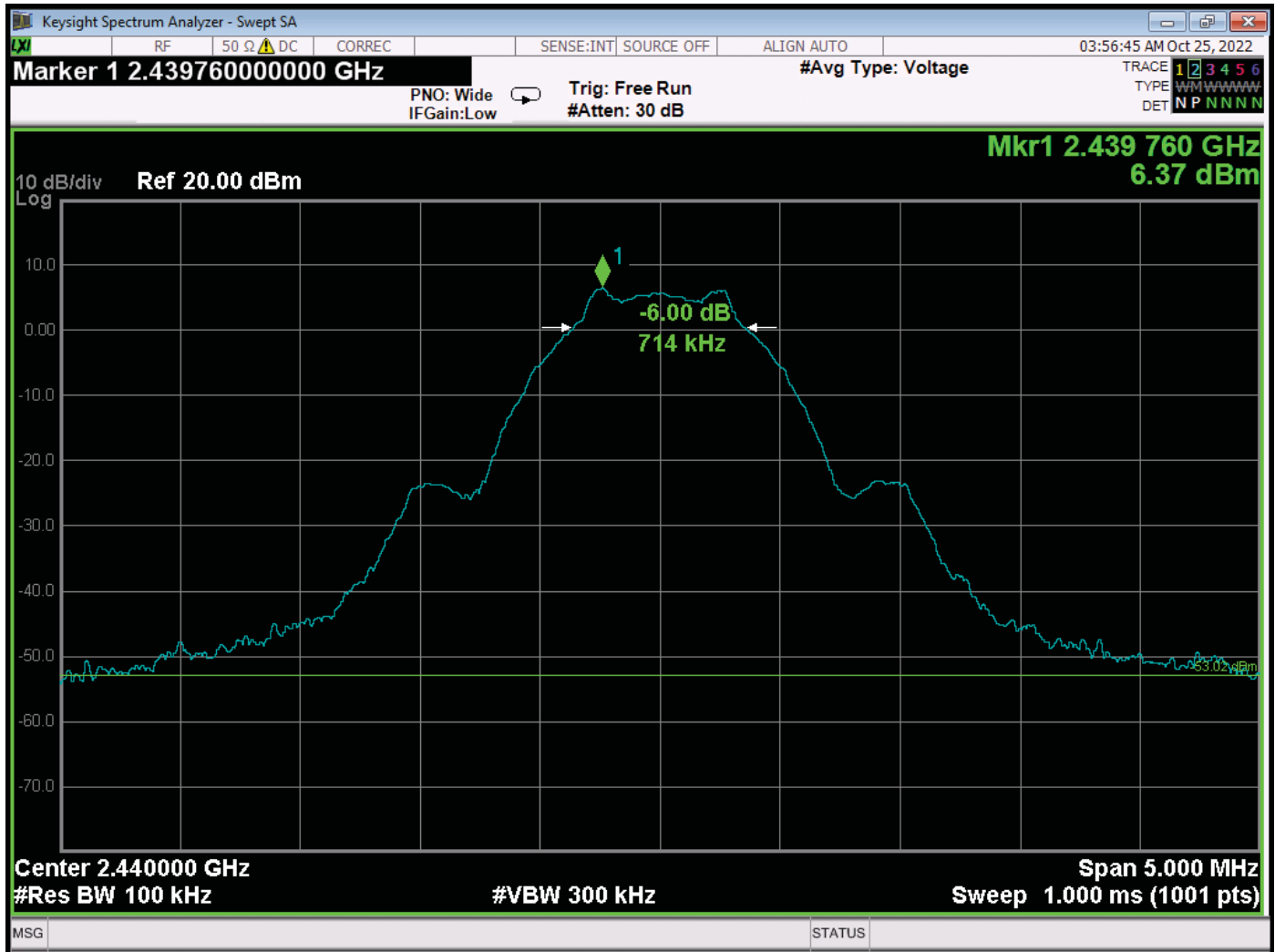
Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400

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

***DTS BANDWIDTH
DATA SHEETS***



Bandwidth 6 dB – Low Channel

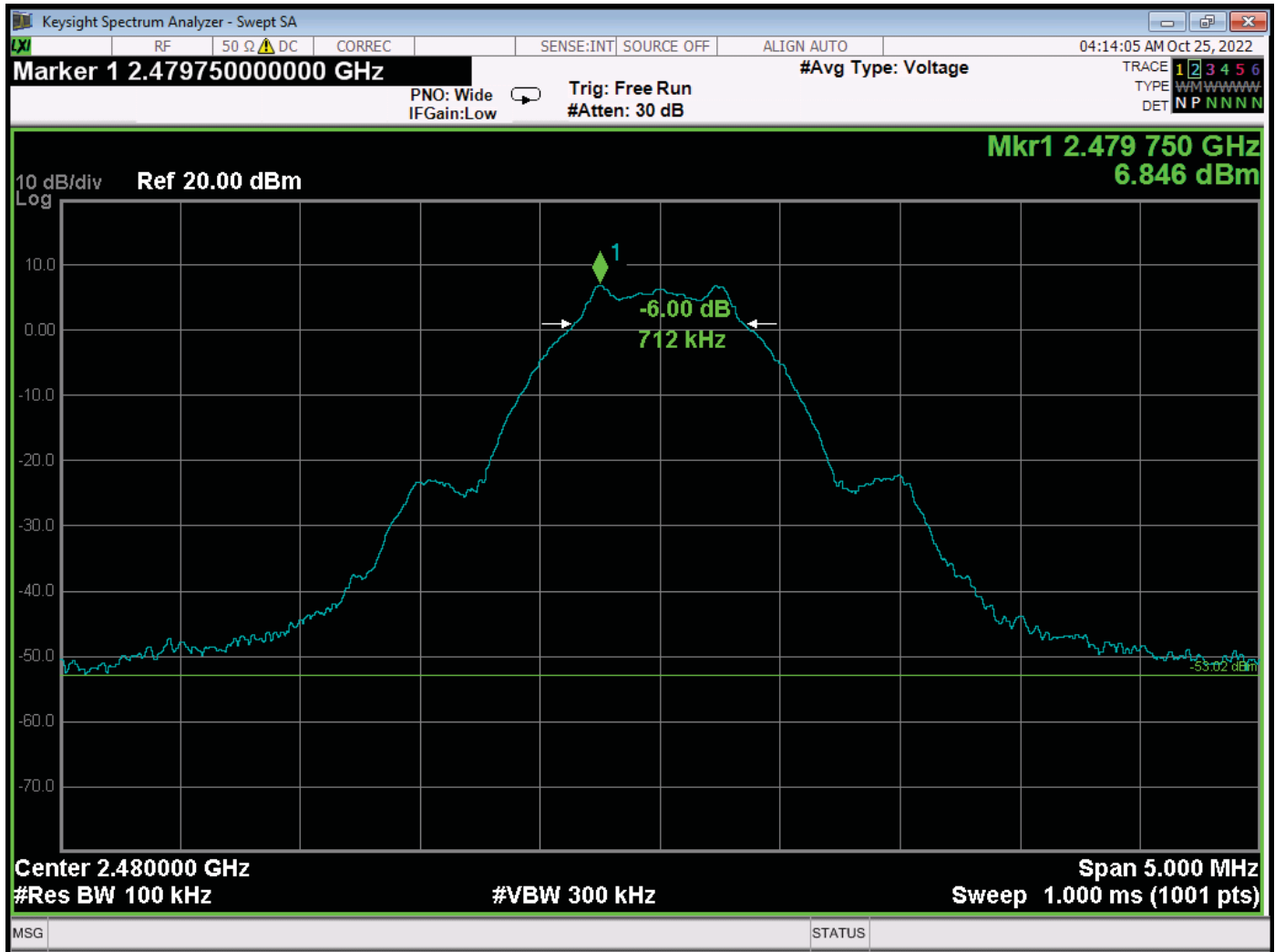


Bandwidth 6 dB – Middle Channel

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

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

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



Bandwidth 6 dB – High Channel

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

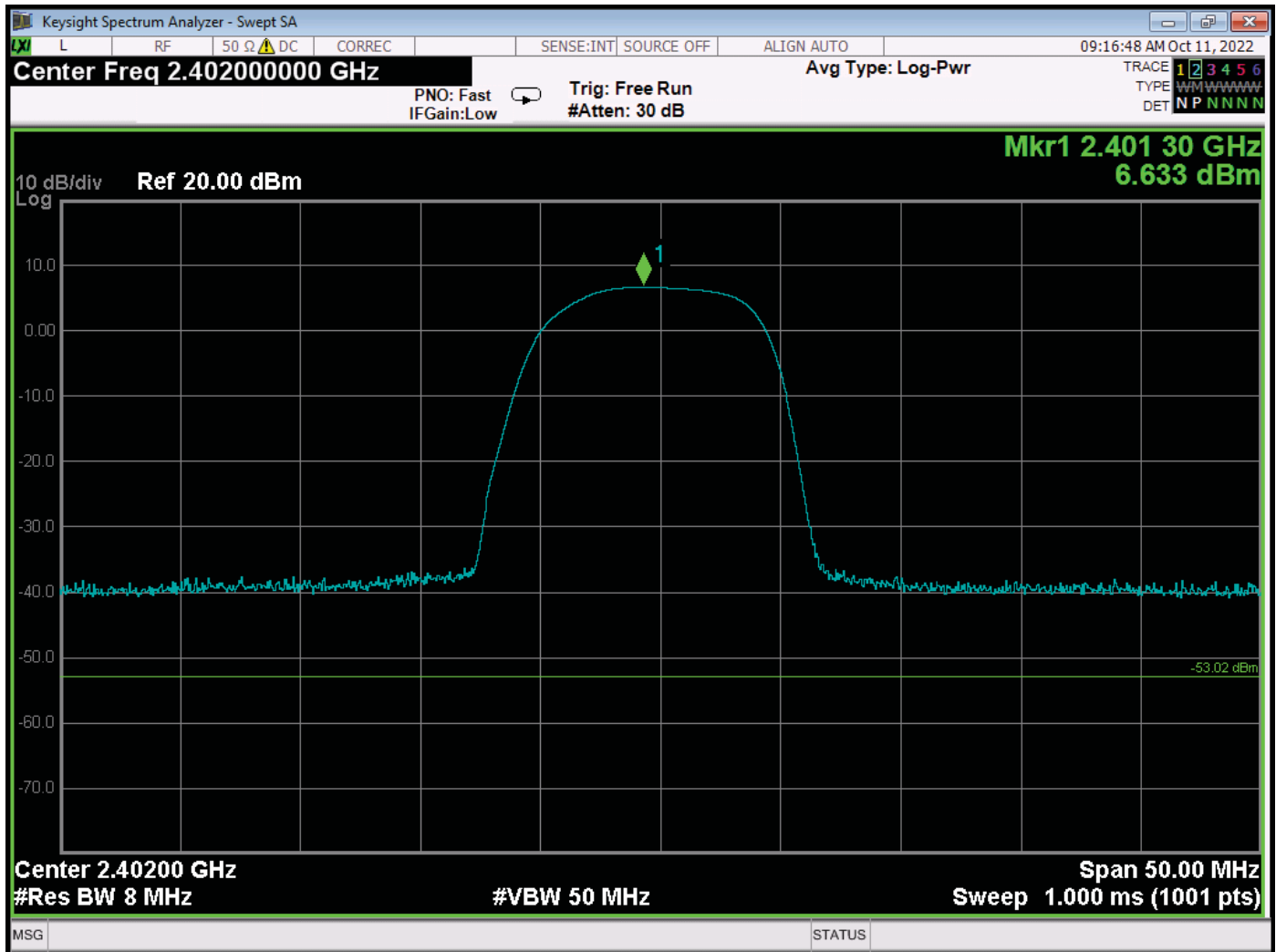
Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400

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

***PEAK OUTPUT POWER
DATA SHEETS***



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V

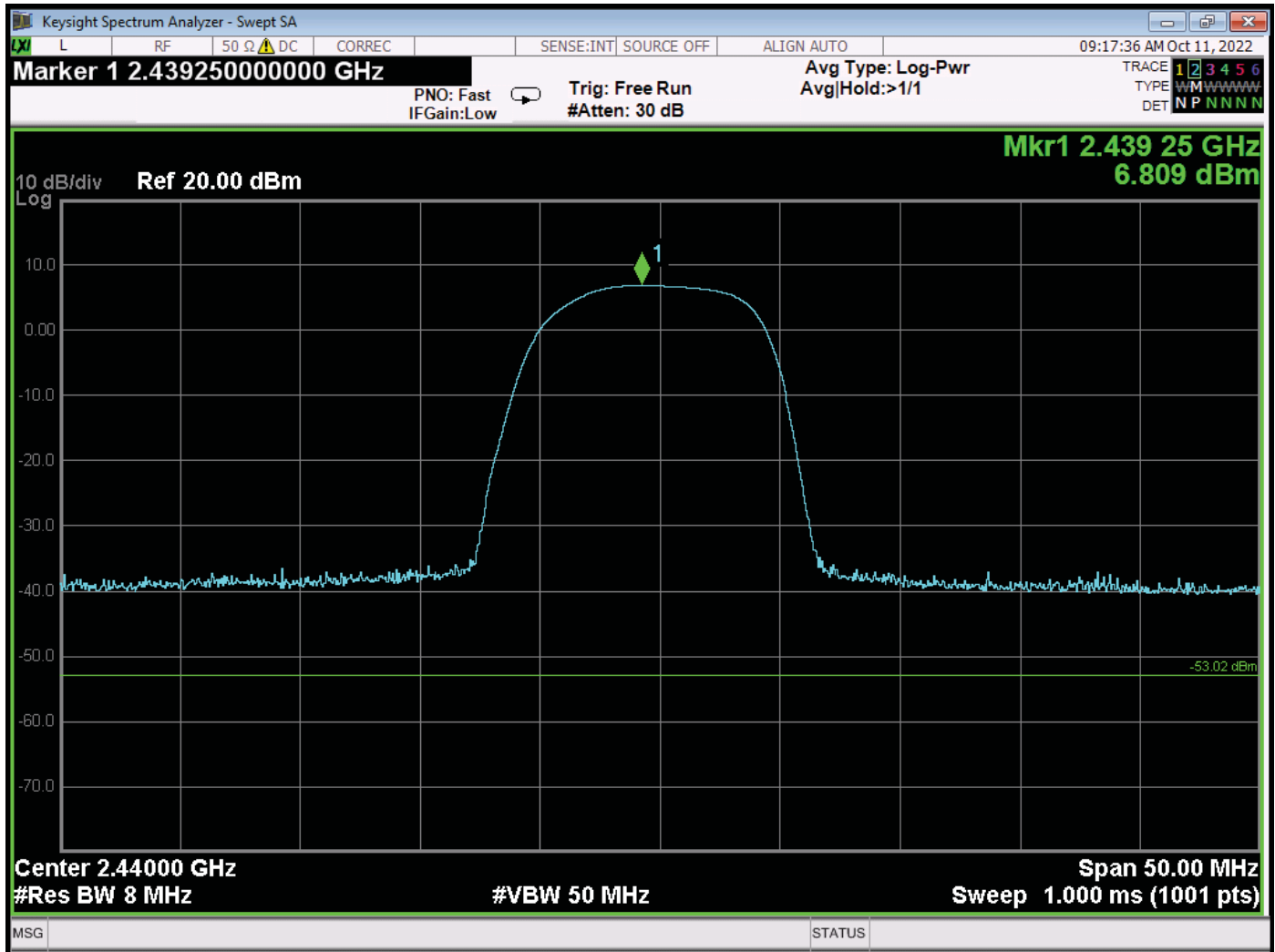


Peak Power Output – Low Channel

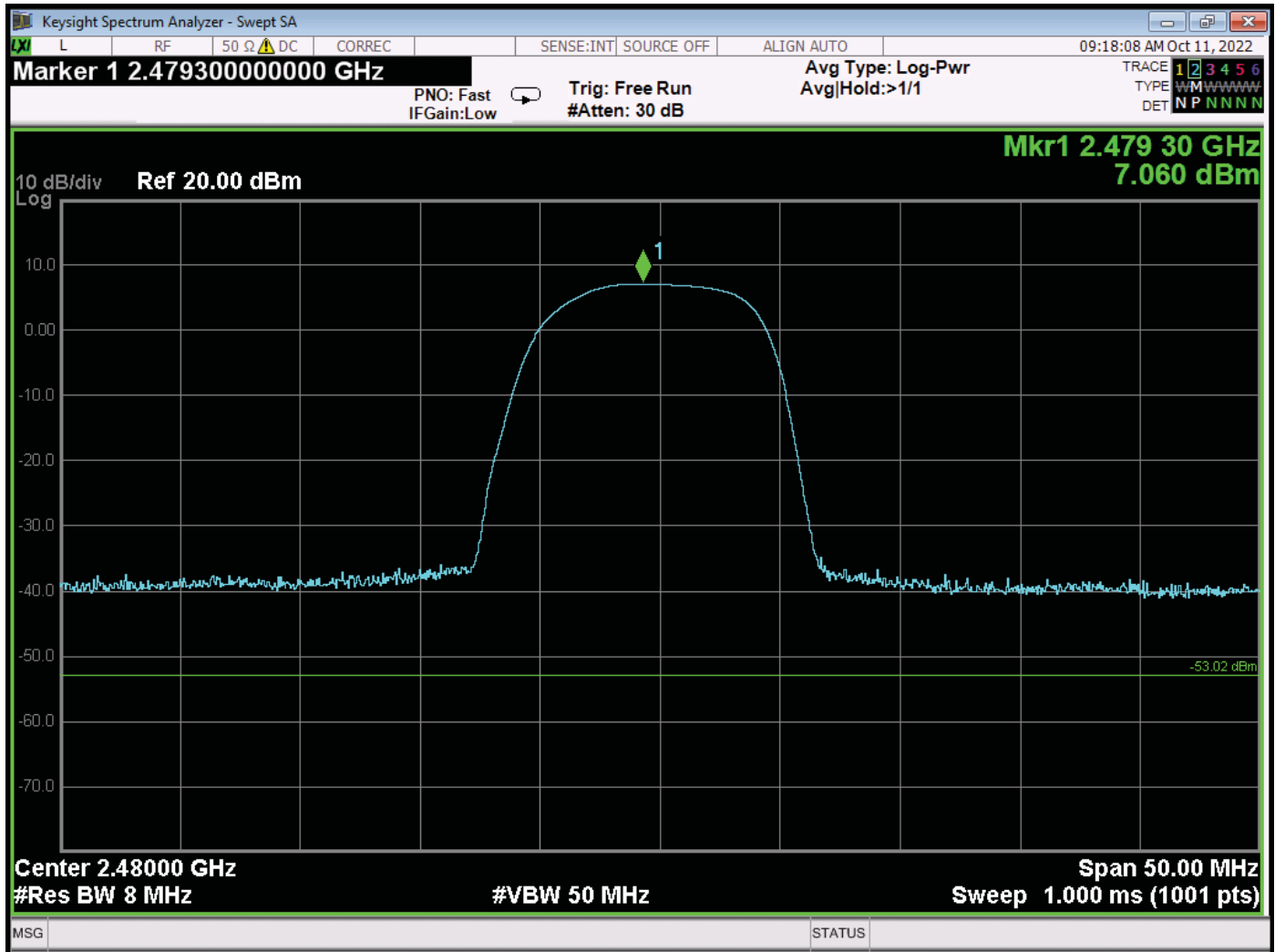
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
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Newbury Park Division
 1050 Lawrence Drive
 Newbury Park, CA 91320
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Peak Power Output – Middle Channel

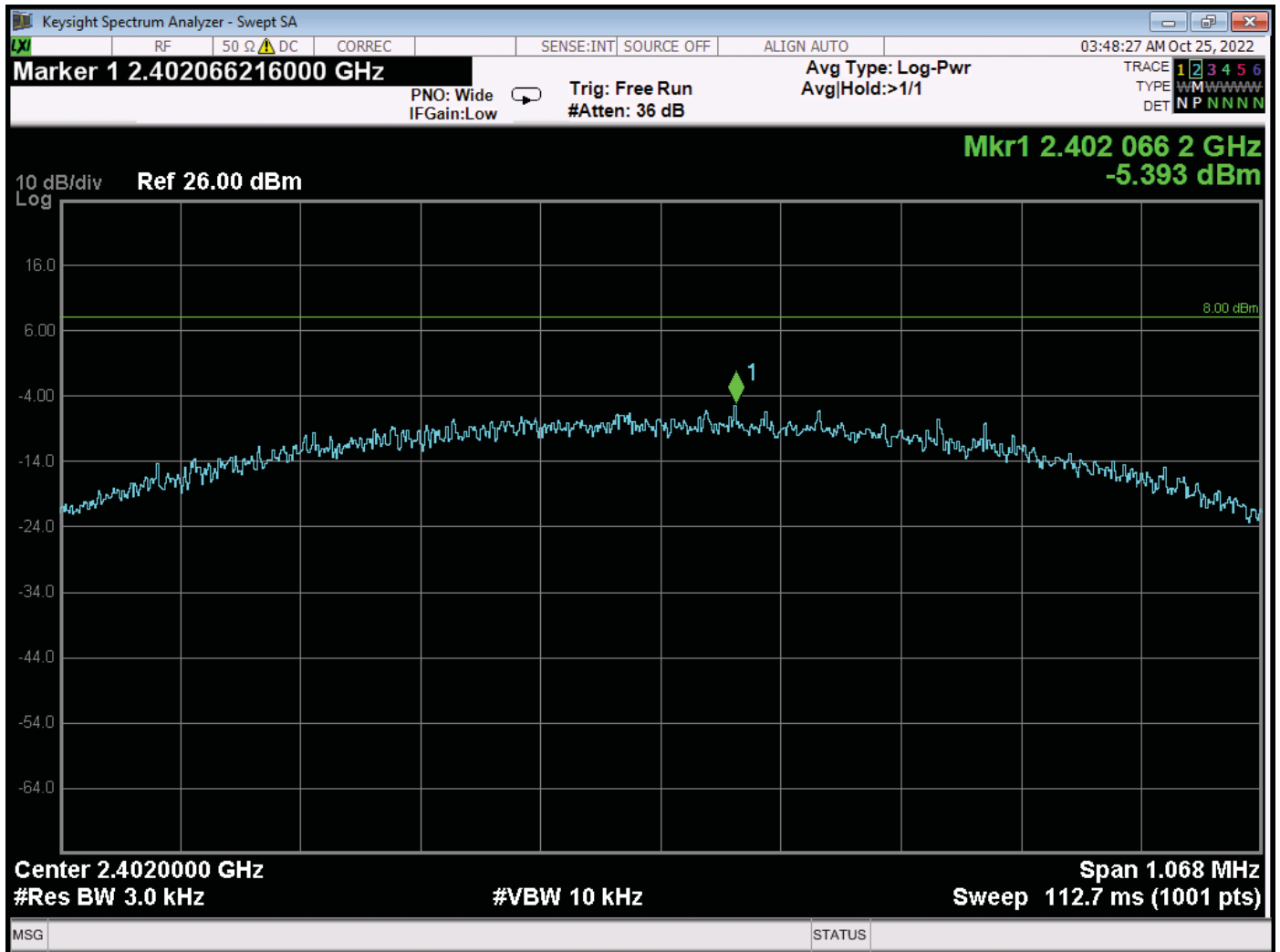


Peak Power Output – High Channel

***SPECTRAL DENSITY OUTPUT
DATA SHEETS***



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



Special Density Output – Low Channel

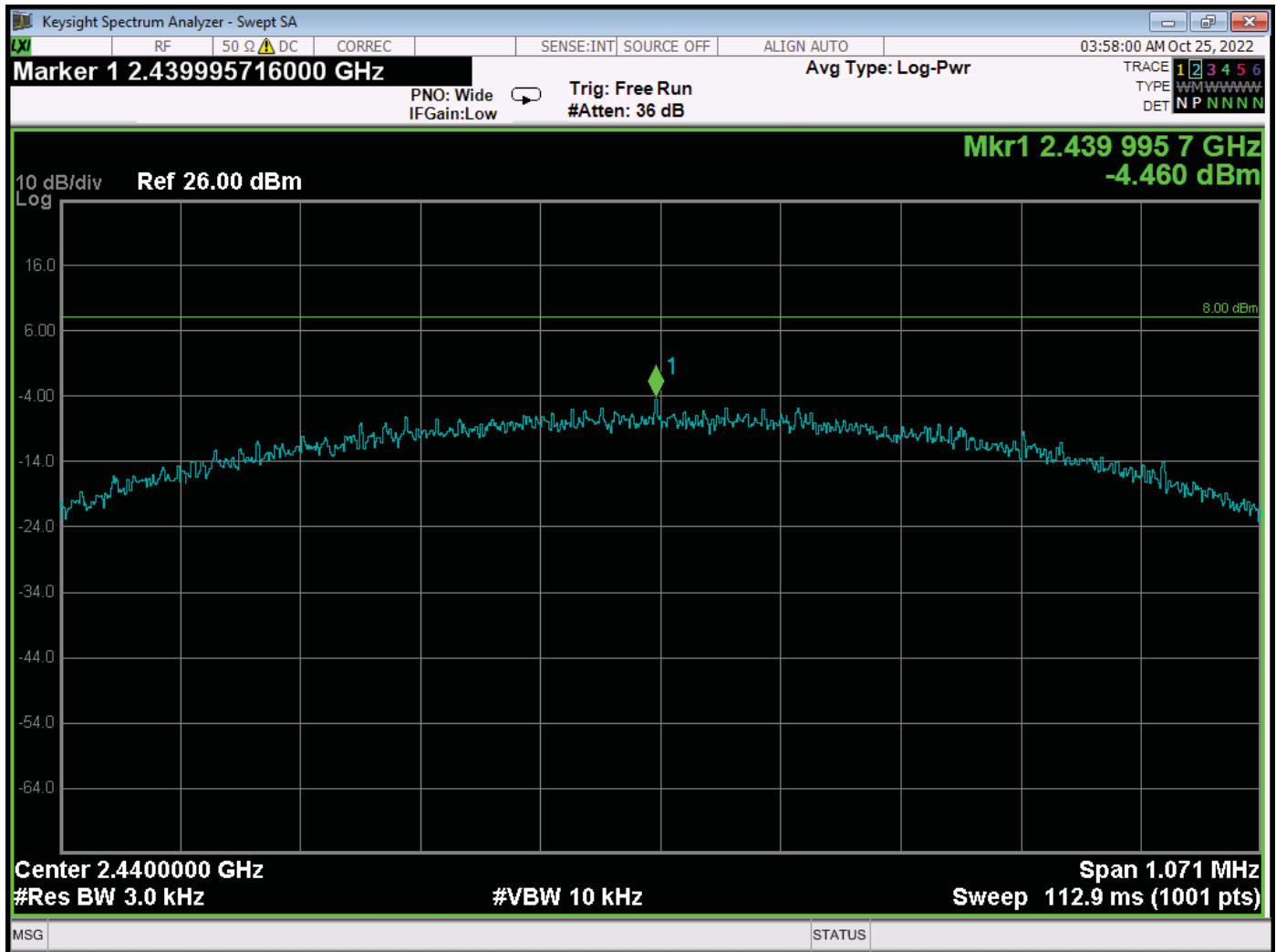
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V

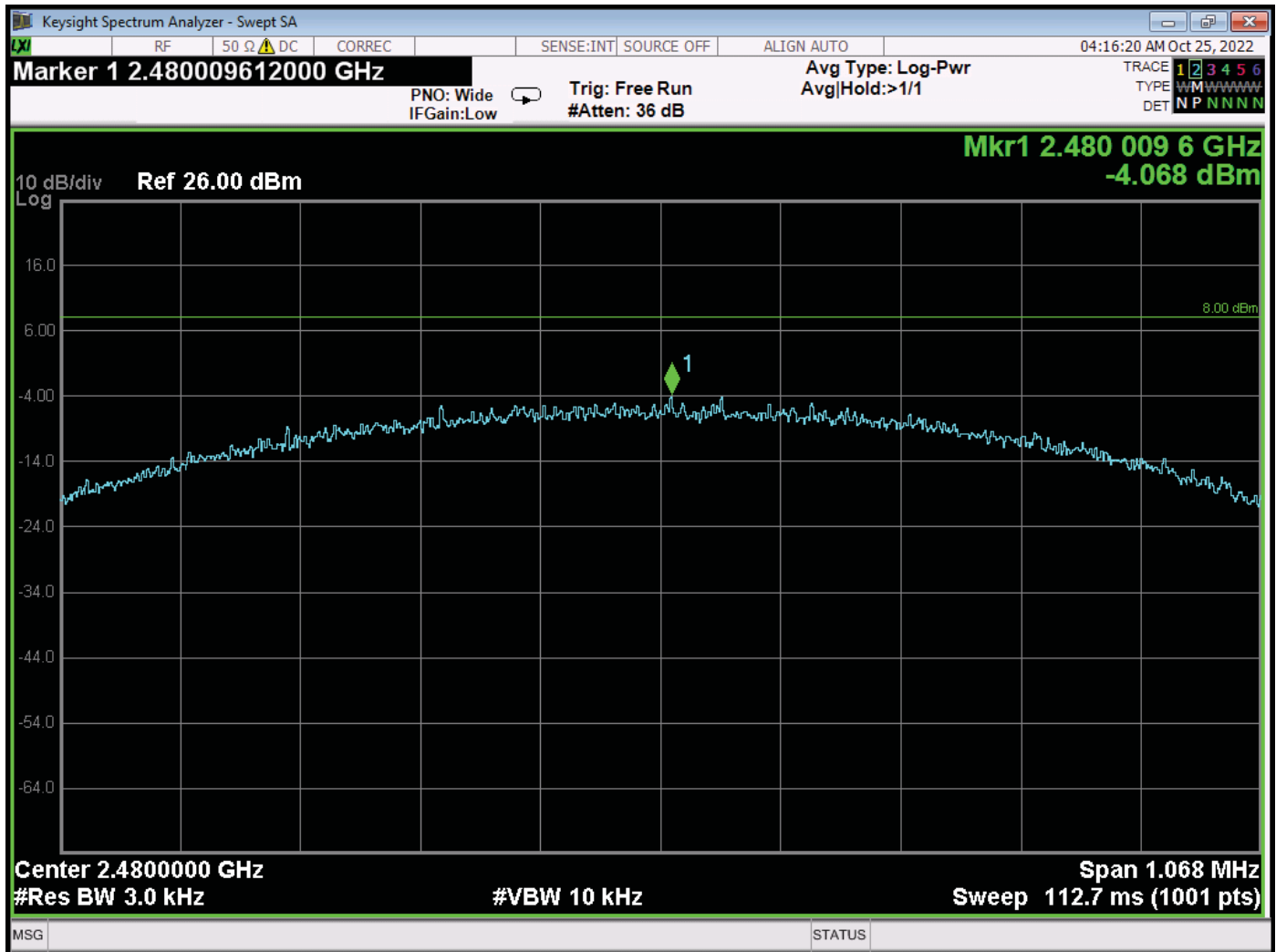


Special Density Output – Middle Channel

Brea Division
 114 Olinda Drive
 Brea, CA 92823
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Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400

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



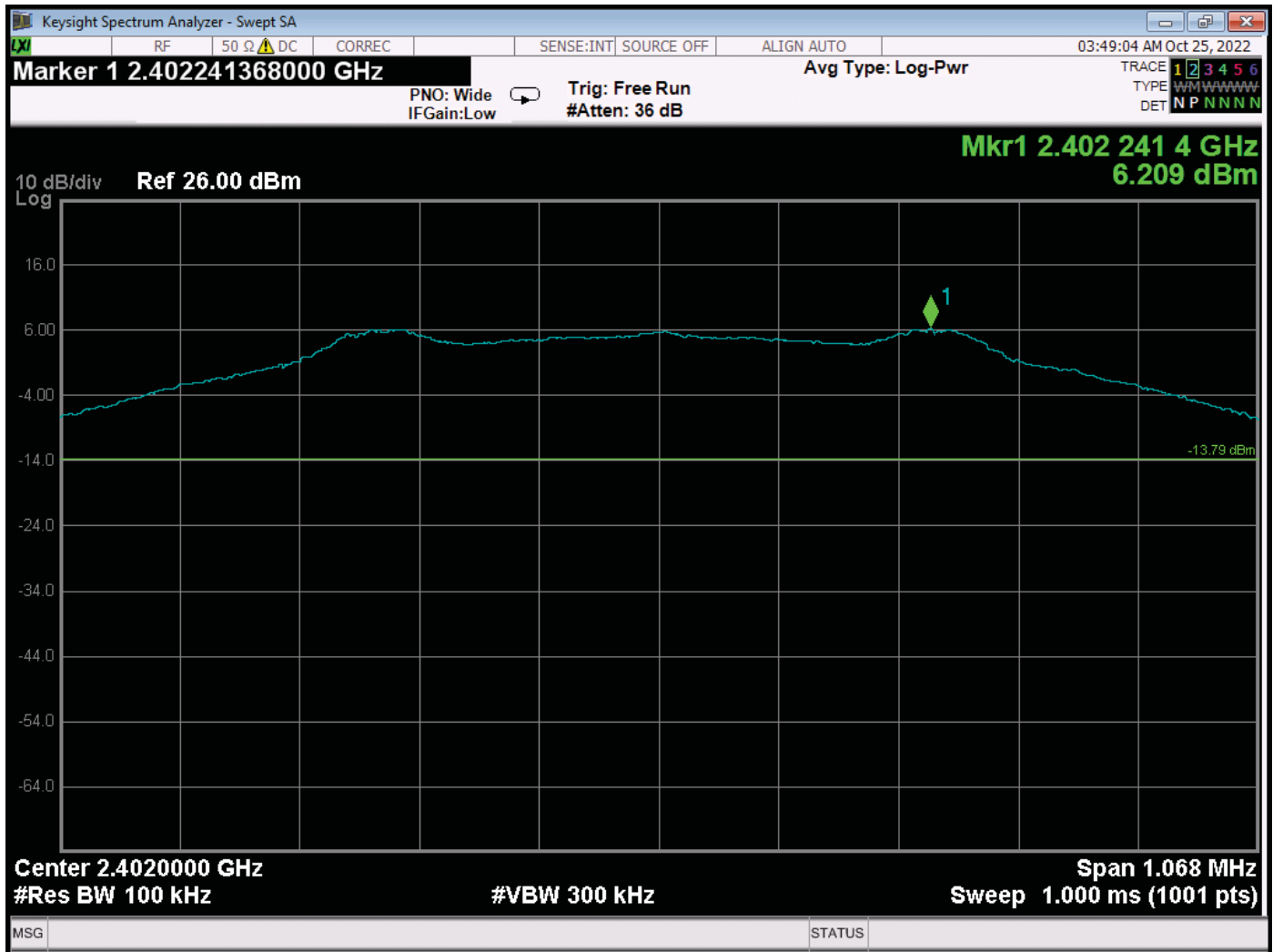
Special Density Output – High Channel

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

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

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

***RF ANTENNA CONDUCTED
DATA SHEETS***



RF Antenna Conducted Test – Low Channel – Reference Level

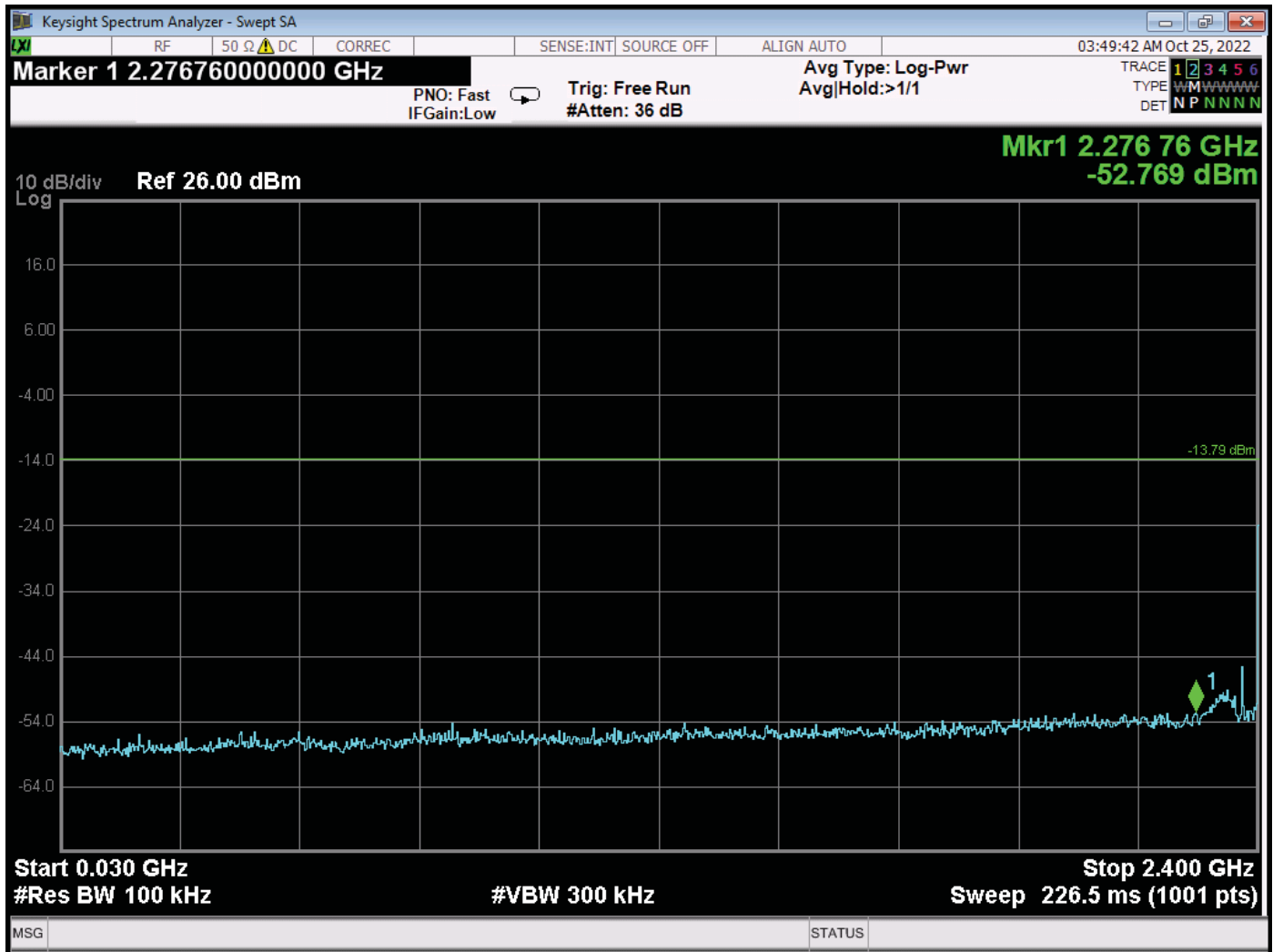
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



RF Antenna Conducted Test – Low Channel – 30 MHz to 2.4 GHz

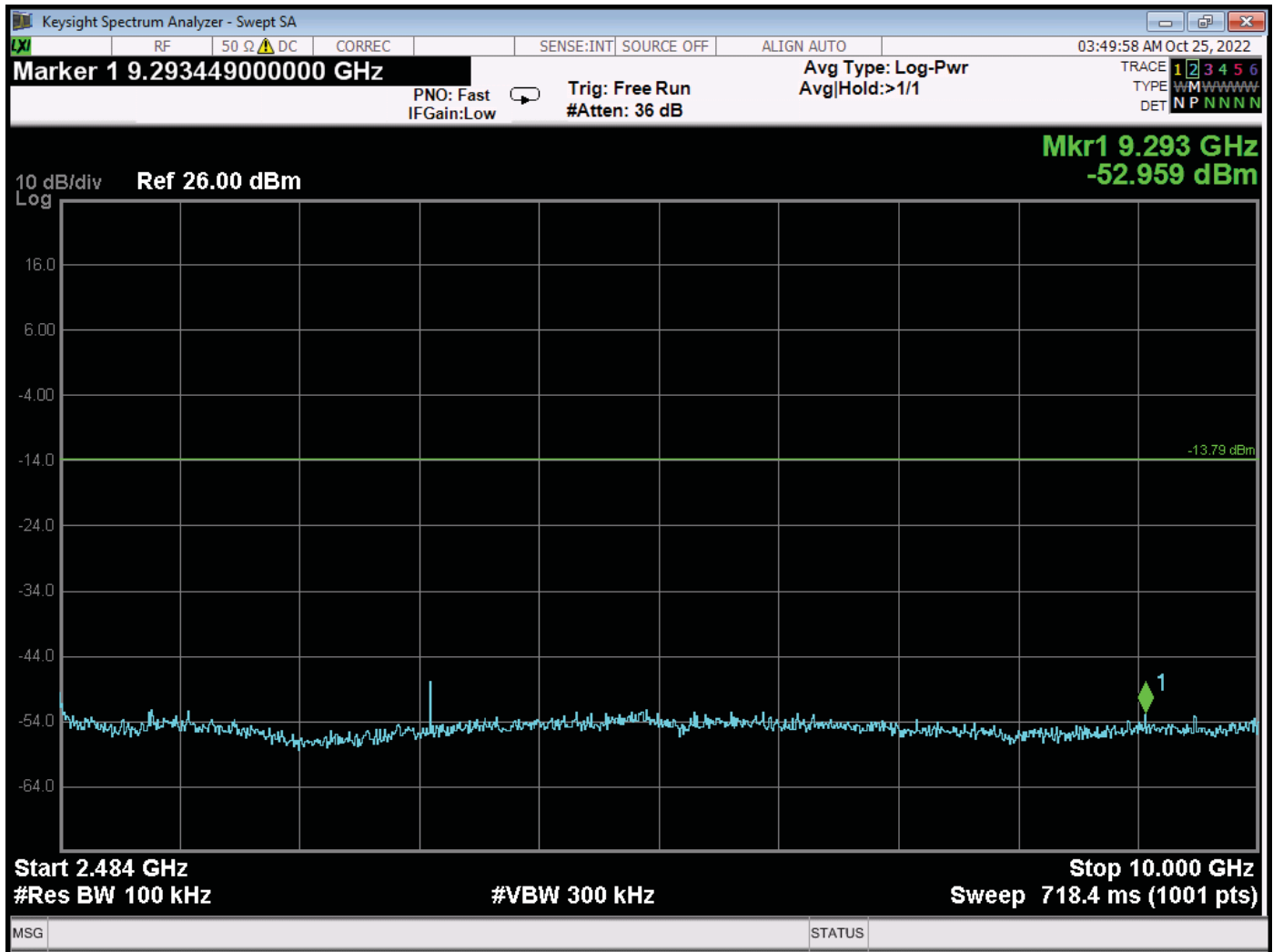
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



RF Antenna Conducted Test – Low Channel – 2483.5 MHz to 10 GHz

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

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V

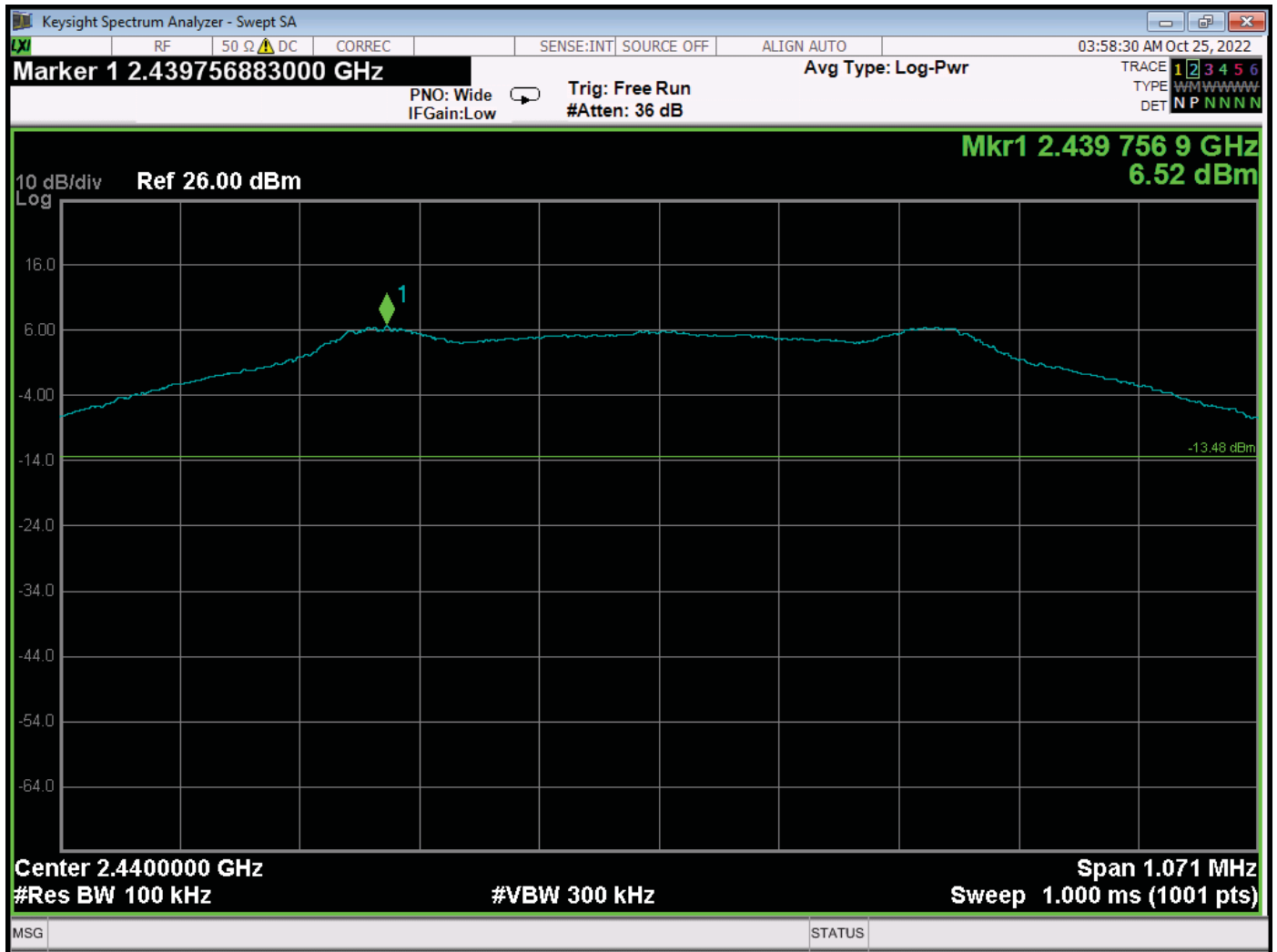


RF Antenna Conducted Test – Low Channel – 10 GHz to 25 GHz

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

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

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



RF Antenna Conducted Test – Mid Channel – Reference Level

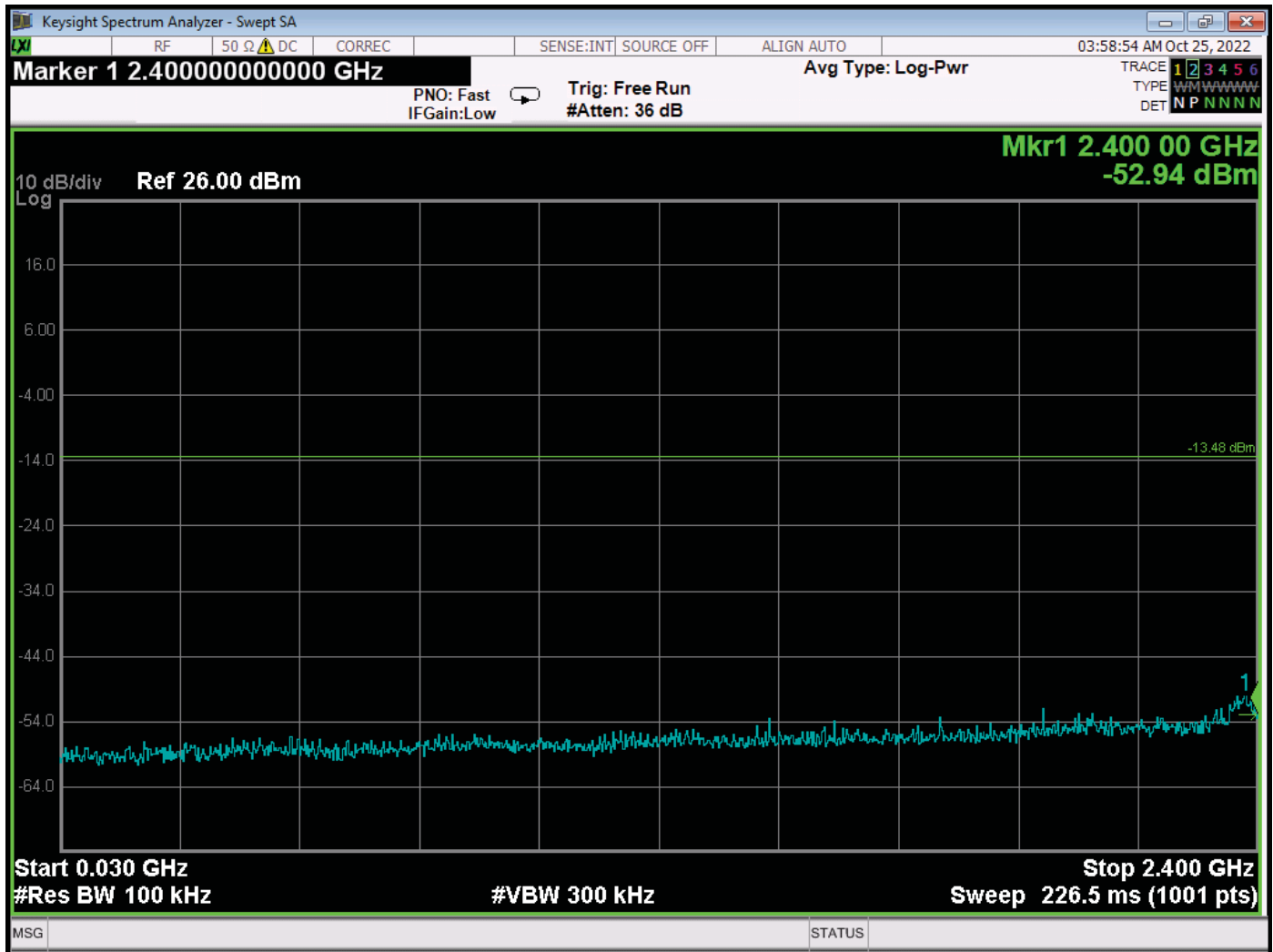
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V

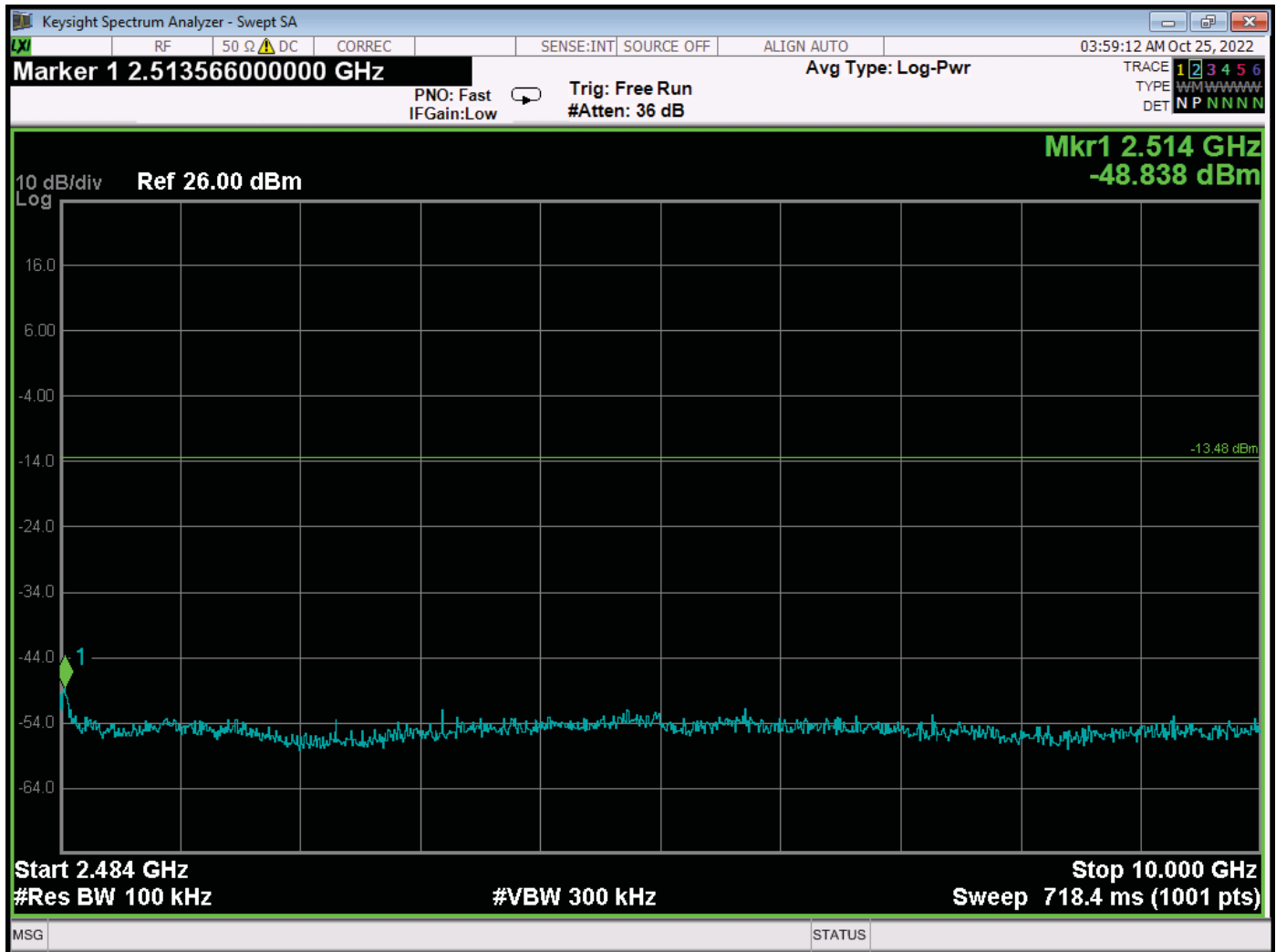


RF Antenna Conducted Test – Mid Channel – 30 MHz to 2.4 GHz

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

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

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



RF Antenna Conducted Test – Mid Channel – 2483.5 MHz to 10 GHz

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

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

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



FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V

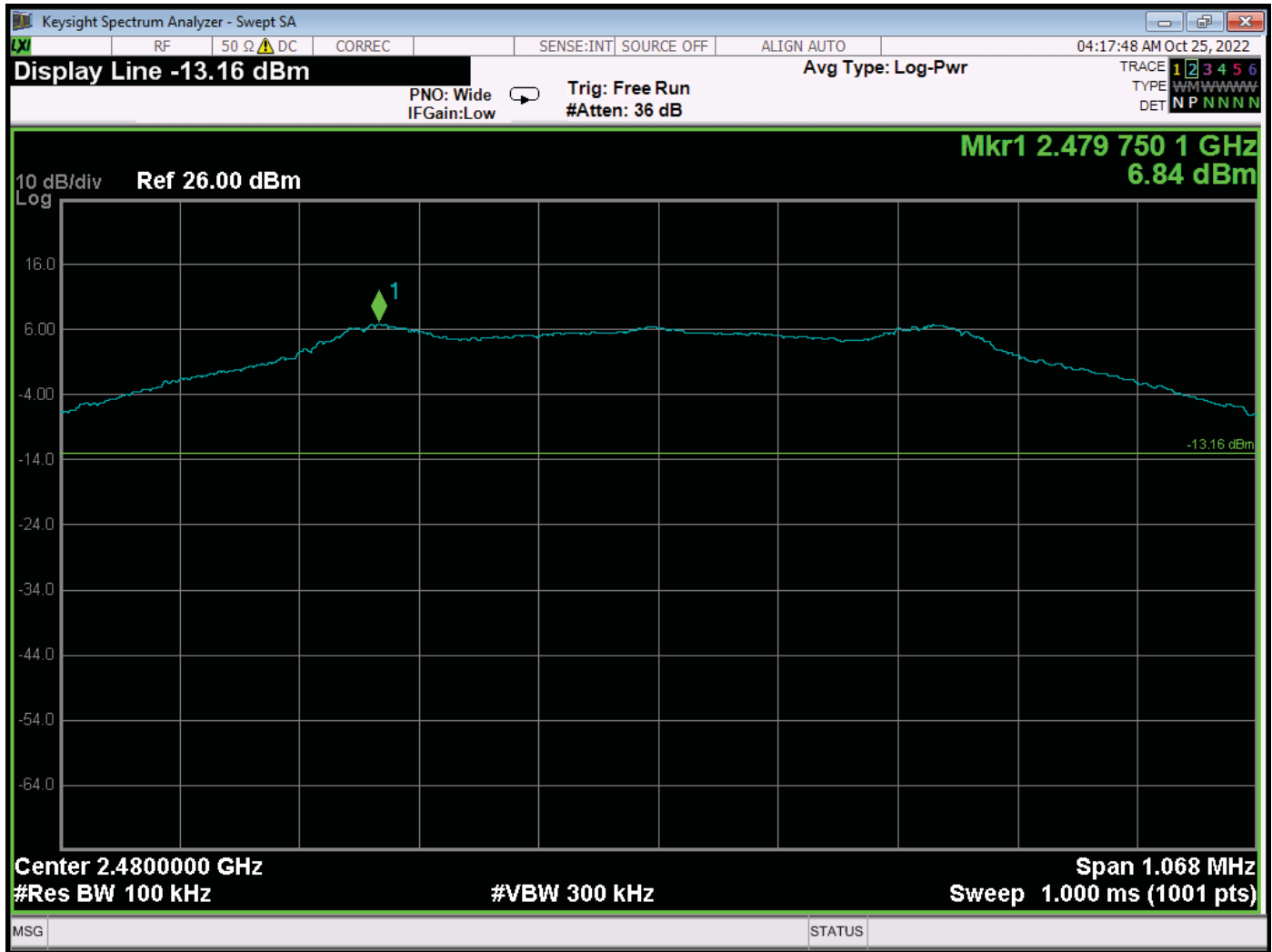


RF Antenna Conducted Test – Mid Channel – 10 GHz to 25 GHz

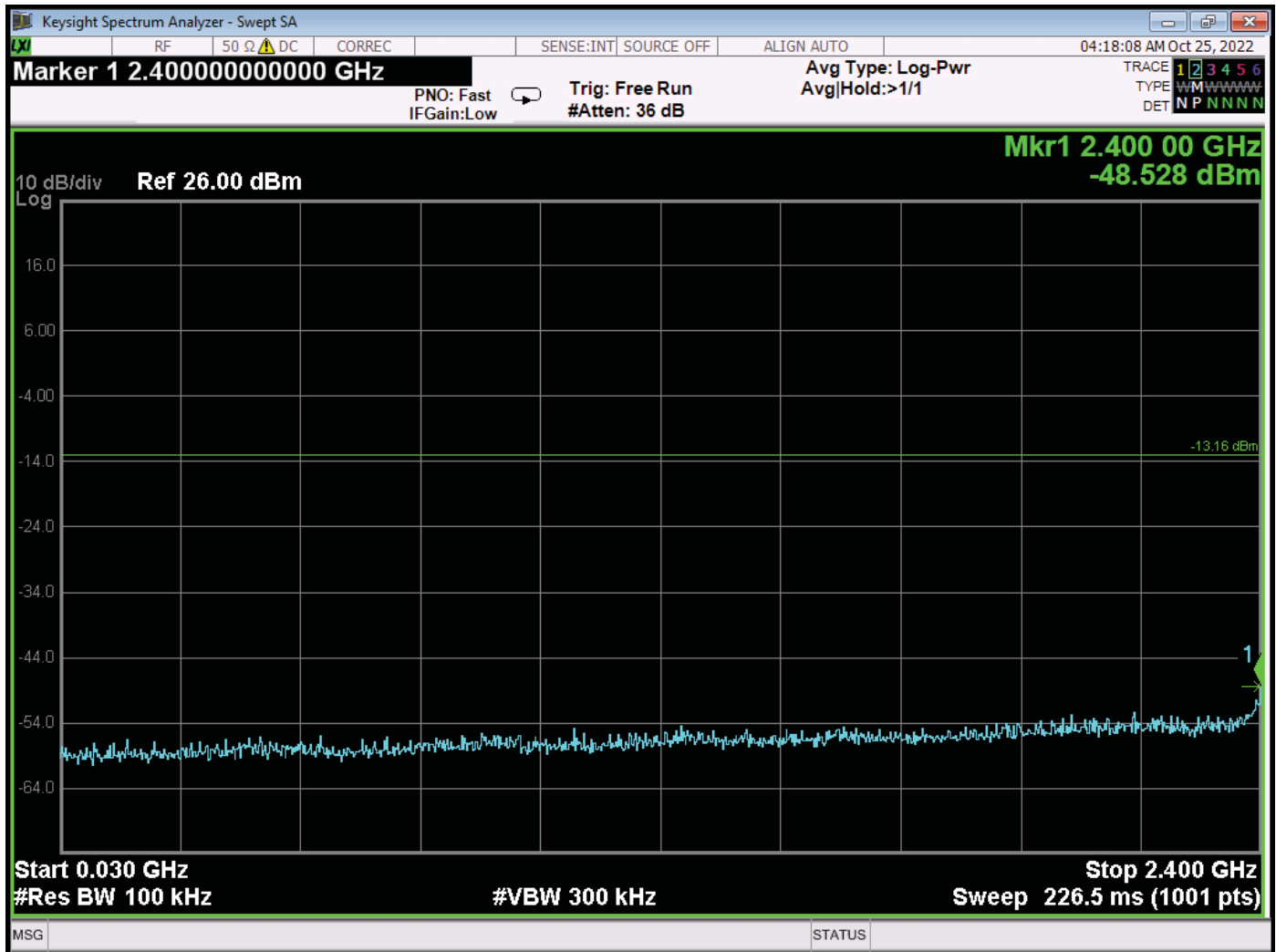
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

Newbury Park Division
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 Newbury Park, CA 91320
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RF Antenna Conducted Test – High Channel – Reference Level

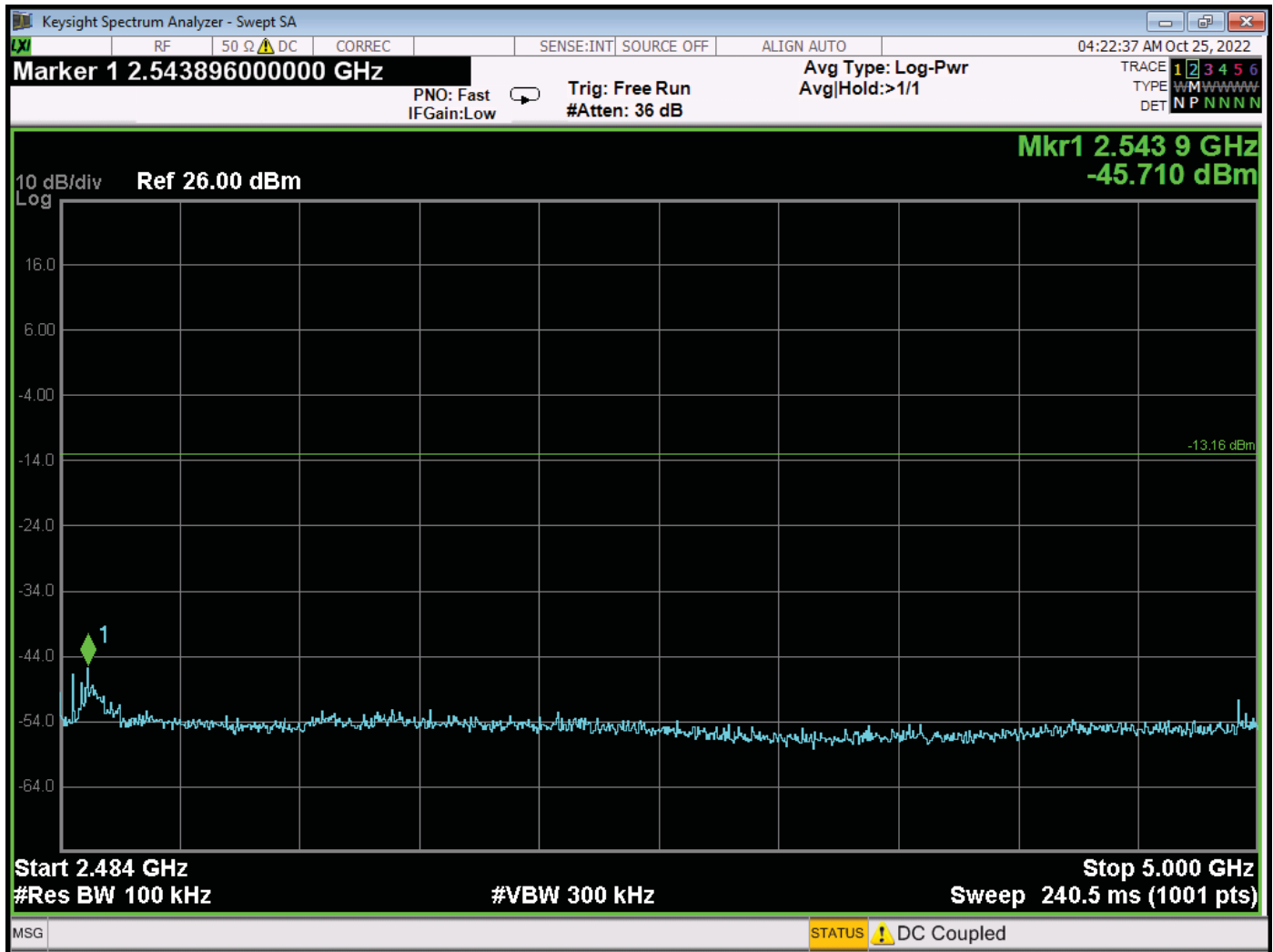


RF Antenna Conducted Test – High Channel – 30 MHz to 2.4 GHz

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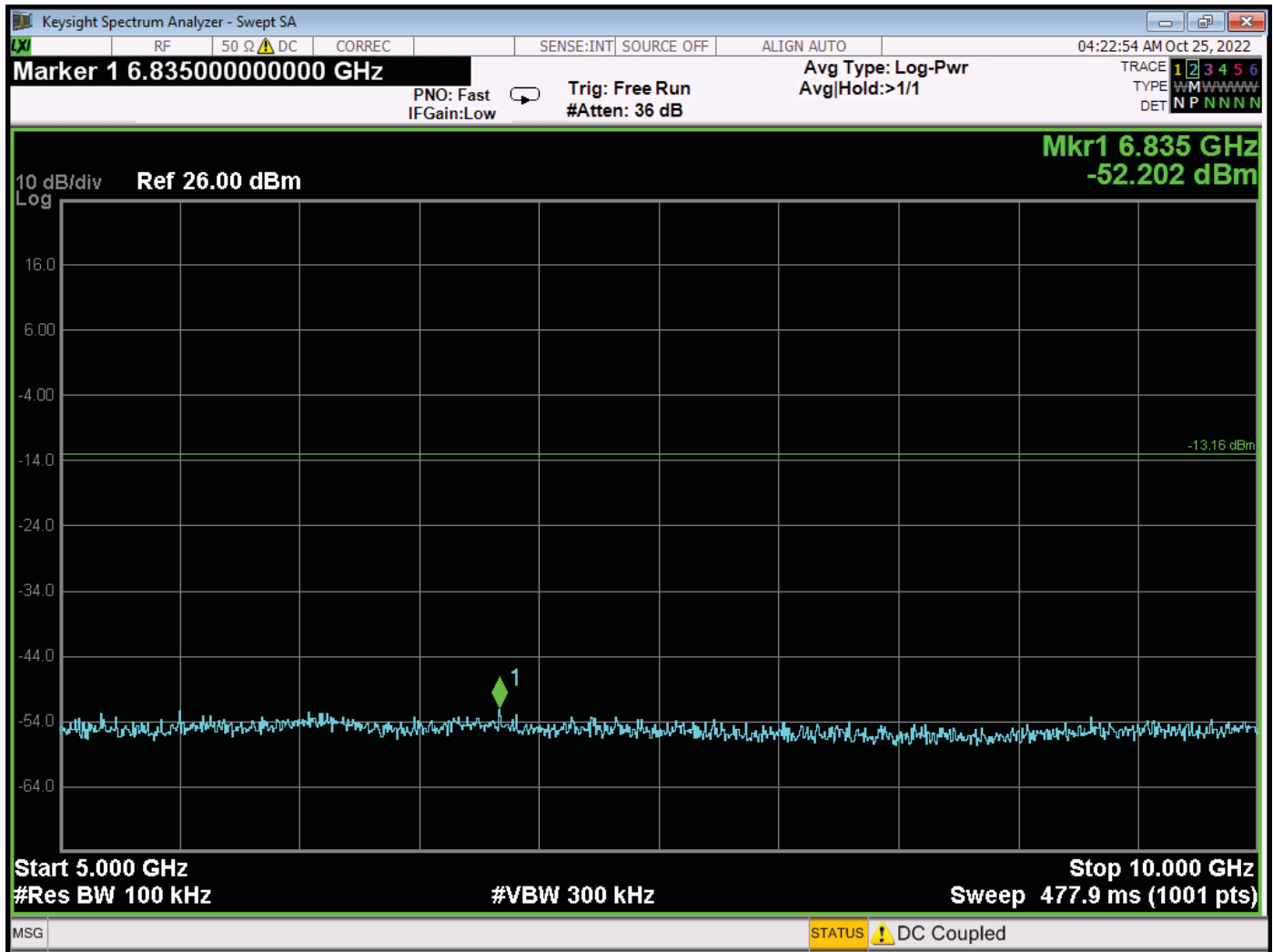


RF Antenna Conducted Test – High Channel – 2483.5 MHz to 5 GHz

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RF Antenna Conducted Test – High Channel – 5 GHz to 10 GHz

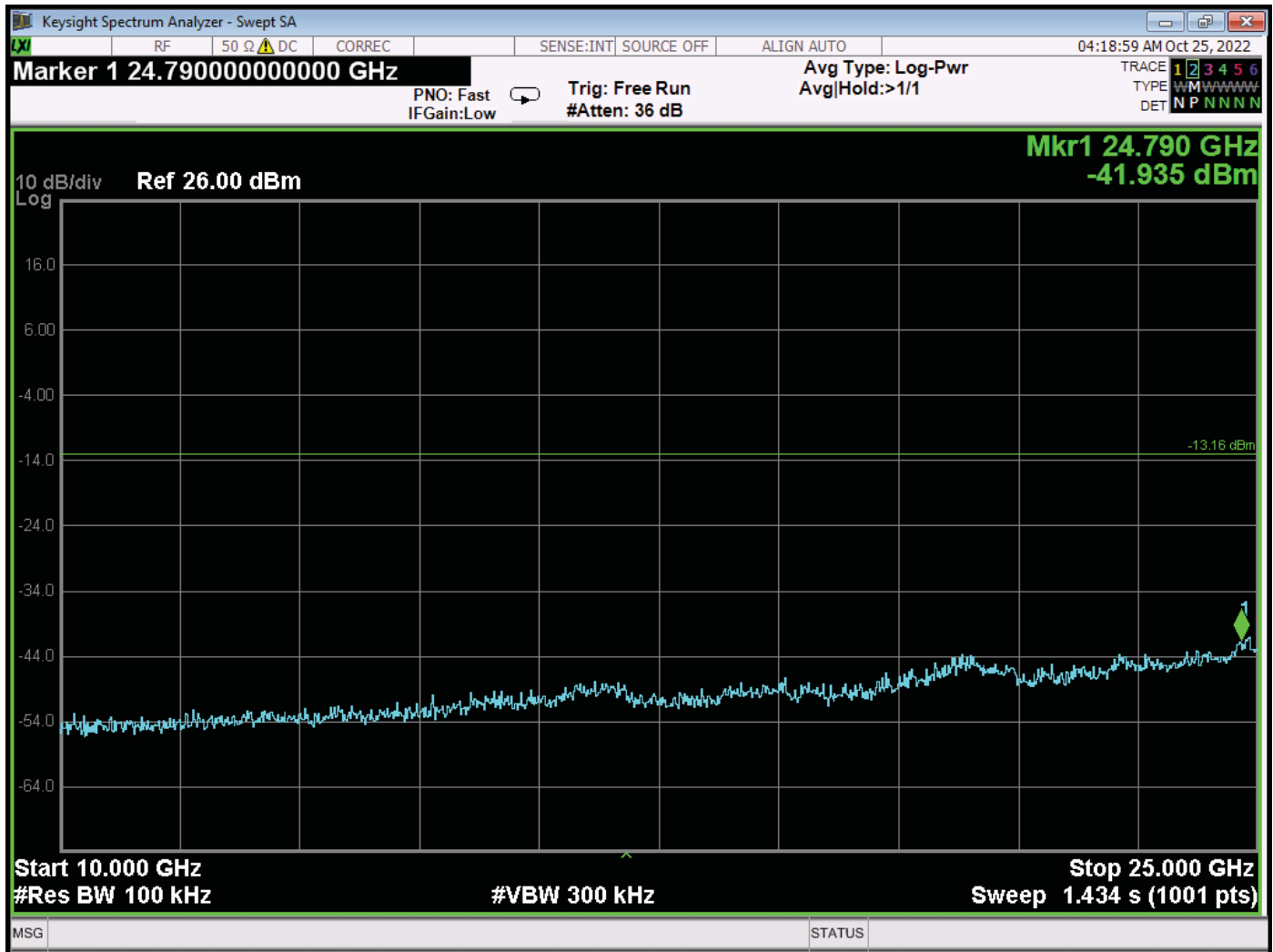
Brea Division
 114 Olinda Drive
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FCC Part 15 Subpart B and C; and FCC Section 15.247 Test Report
 DirecTV RC83V Remote Control 2022
 Model: RC83V



RF Antenna Conducted Test – High Channel – 10 GHz to 25 GHz

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UNIVERSAL ELECTRONICS, INC.

DIRECTV RC83V REMOTE CONTROL 2022

MODEL: RC83V

EMISSIONS IN NON-RESTRICTED BANDS

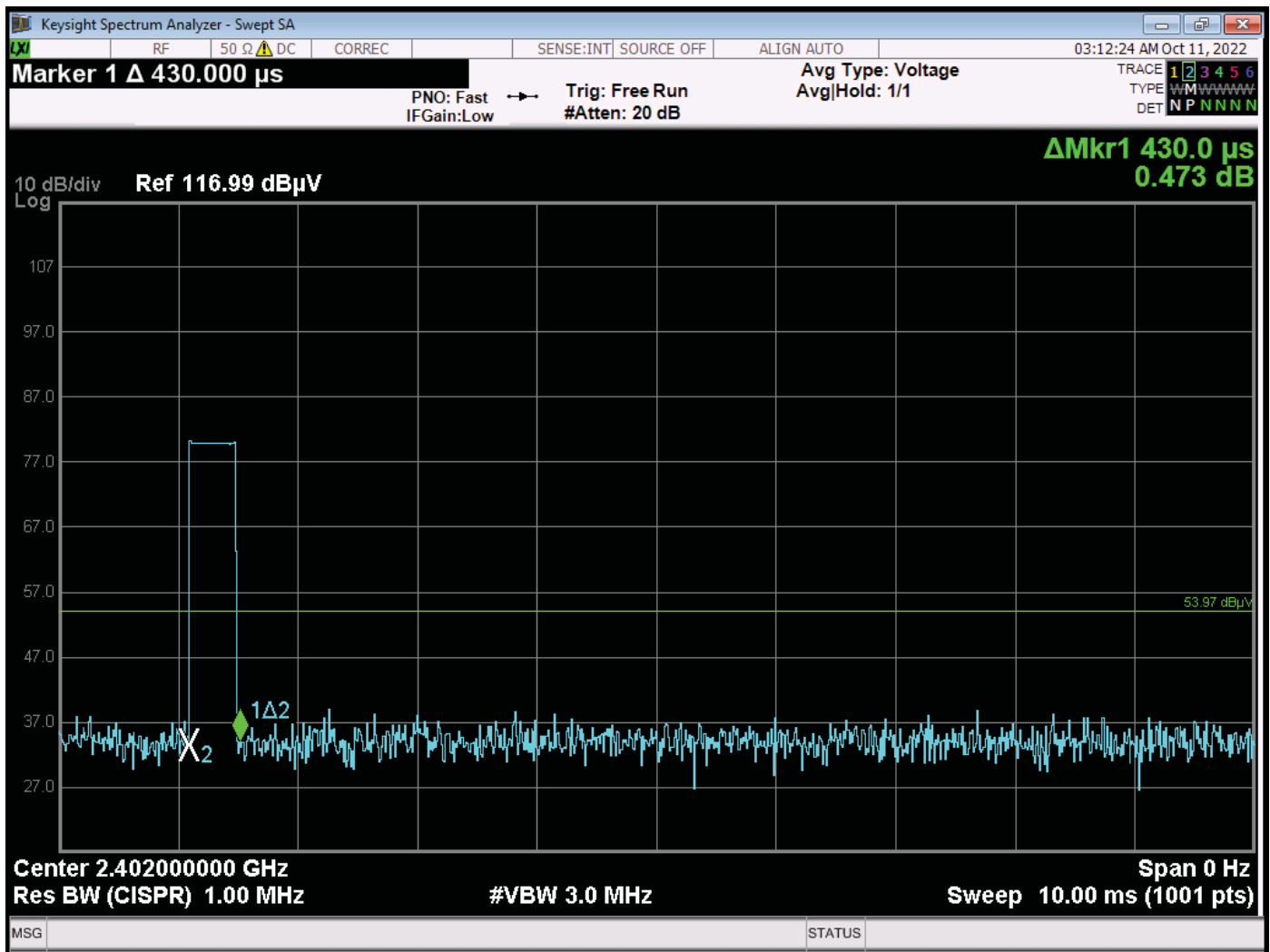
FREQUENCY (MHz)	LEVEL (dBm)	Limit* (dBm)	Margin (dB)
24010	-45.036	-13.790	-31.246
23230	-43.597	-13.480	-30.117
24790	-41.935	-13.160	-28.775

Note: The three highest non-restricted emissions are reported.

*The Limit is based on 20 dB below the highest reference level obtained on the previous pages.

DUTY CYCLE

DATA SHEETS

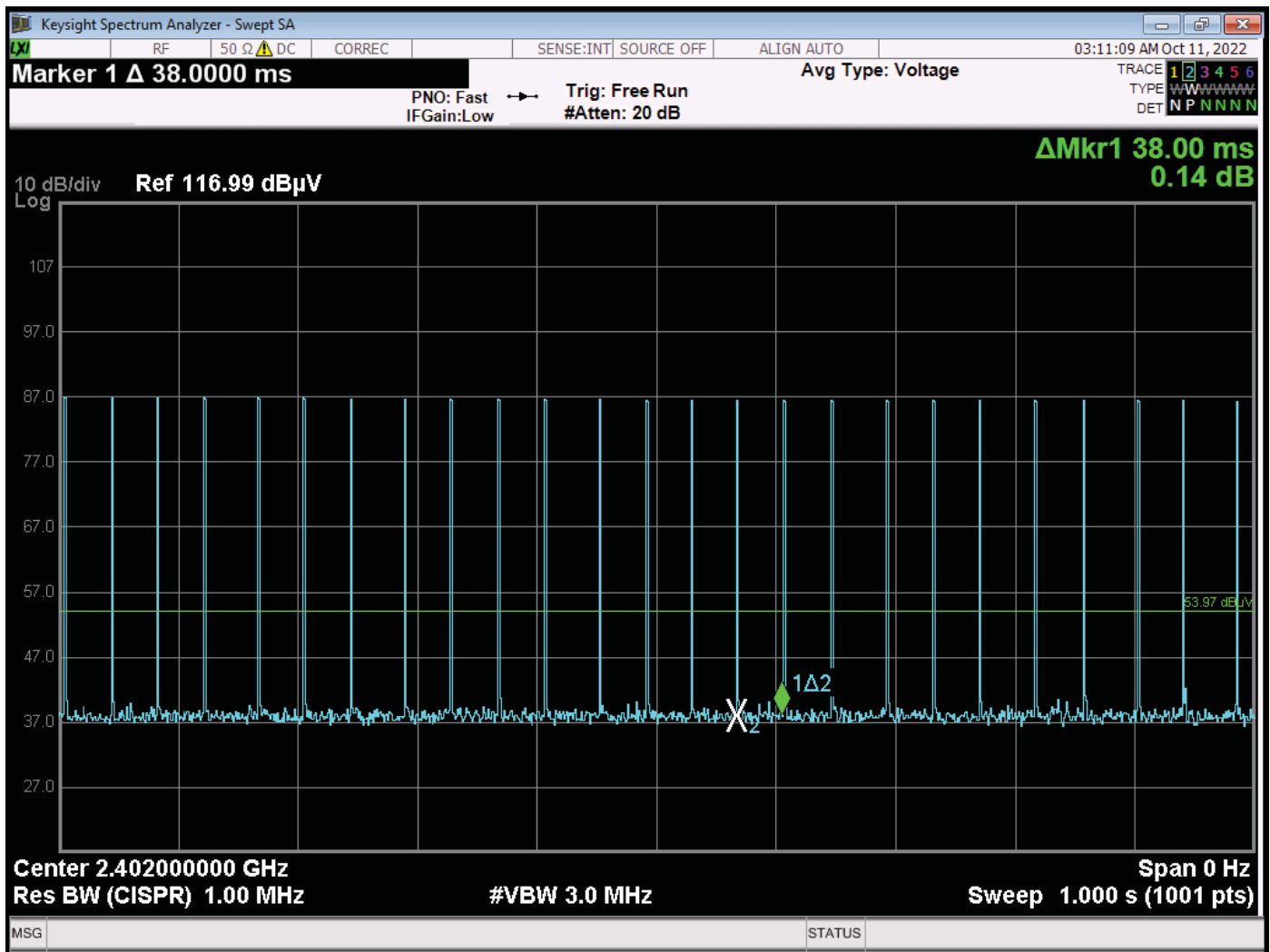


Time of one pulse = 430 μ s – Advertising Mode (Worst Case)

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The pulse train repeats every 38 ms – Advertising Mode (Worst Case)

$$\text{Total On Time} = 430 \text{ us} = 0.43 \text{ ms}$$

$$\text{Duty Cycle} = 0.43 \text{ ms} / 38 \text{ ms} = 0.0113 = 1.13 \%$$

The maximum peak to average ratio of -20.00 dB can be utilized.