FCC PART 15 SUBPART B & SUBPART C SECTION 15.247
RSS GEN, RSS 247
TEST REPORT

For

RADIO
MODEL: OS-RAD2
FCC ID: 2A3CJ-400102

Prepared for

OSTREAM, INC.
25422 TRABUCO ROAD, STE: 105-467
LAKE FOREST, CA 92630

Prepared by: _____

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DATE: DECEMBER 14, 2021

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NVLAP® TESTING
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GENERAL REPORT SUMMARY

This electromagnetic emission 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 in any form except in full, without the written permission of Compatible Electronics.

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:	Radio Model: OS-RAD2 FCC ID: 2A3CJ-400102
Product Description:	The EUT a low-power module for transmitting and receiving digital data via radio frequency. (Dimensions: 4cm x 4cm x 0.2cm) Clock Frequency: 52 MHz
Modifications:	The EUT was not modified during the testing in order to comply with the specifications.
Manufacturer:	OStream, Inc. 25422 Trabuco Road, Ste: 105-467 Lake Forest, CA 92630
Test Date:	September 8-10, 2021

Test Specifications Covered by Accreditation:

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Test Specifications: EMI requirements
FCC CFR Title 47, Part 15 Subpart B, Subpart C Section 15.247
RSS GEN, RSS 247
Test Procedure: ANSI C63.4 & C63.10.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.107 & Subpart C Section 15.205, 15.207, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
2	Spurious RF Emissions, 9 kHz – 25 GHz.	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
3	Fundamental and Harmonics Emissions produced by the Intentional Radiator	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
4	DTS Bandwidth	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
5	Maximum Conducted Output Power	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
6	RF Conducted Antenna Test	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
7	Power Spectral Density from the Intentional Radiator to the Antenna	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty
8	Variation of Input Power	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.205, 15.209, & 15.247, RSS-247, RSS-GEN See section 6.4 for Measurement Uncertainty

Reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Radio Model: OS-RAD2. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 and C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by RSS 247 Issue 2, RSS Gen Issue 5 Amendment 1, and the Code of Federal Regulations Title 47, Part 15 Subpart B sections, 15.107 and 15.109, & Part 15 Subpart C sections 15.205, 15.207, 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, 20621 Pascal Way, Lake Forest, California 92630.

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

OStream, Inc.

Kerry Shih	CEO

Compatible Electronics, Inc.

Howard Huang	Test Engineer
Joey Madlangbayan	Special Services Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was received

The test sample was received on September 8, 2021 as described in product description.

2.5 Disposition of the Test Sample

The test samples remain at Compatible Electronics, Inc.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
NVLAP	National Voluntary Laboratory Accreditation Program
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NCR	No Calibration Required
RX	Receive
TX	Transmit
PCB	Printed Circuit Board
PSU	Power Supply Unit
GFSK	Gaussian Frequency-shift Keying

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC CFR Title 47, Part 15, Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
FCC CFR Title 47, Part 15, Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.10: 2013	American National Standard for Testing Unlicensed Wireless Devices
ANSI C63.4 2014	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
RSS GEN, Issue 5 Amendment 2 (February 2021)	General Requirements for Compliance of Radio Apparatus
RSS 247, Issue 2 (February 2017)	Digital Transmission Systems, Frequency Hopping Systems and License-Exempt Local Area Network Devices

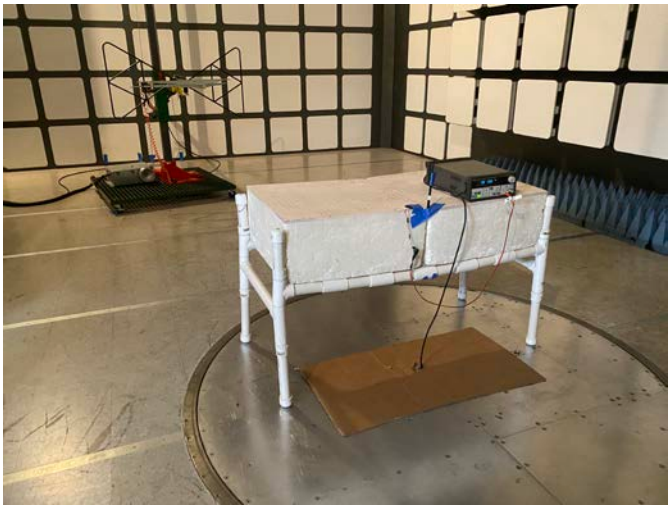
4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The EUT was set up in a standalone table-top configuration. The EUT was tested in the following configuration seen in the image below. The EUT is powered by a DC power supply at 3V. For Power Spectral Density and Conducted Peak Power measurement, and DTS BW, the EUT was tested with a direct connection to the receiver as noted in section 8. The EUT was configured using the Semtech Deviation Board, firmware version 1.6.1.

The EUT was checked using two external antennas. The module was checked in x, y, and z axes. The Antennas were cylindrical shape, so they were tested in x axis and y axis. The worst-case axis was deemed to be X axis and the worst-case antenna was deemed to be Antenna 2 and worst-case setting was tested to be transmitting using GFSK modulation. The GFSK modulation was also deemed to be the worst case for AC conducted emissions, Bandwidth test, Peak Conducted Output Power, Power Spectral Density, non-restricted band emissions and Band Edge tests. The power output on the EUT was adjusted to 10dBm on low channel, 13dBm on mid channel, and 4dBm on high channel to comply with the specifications listed in this document.

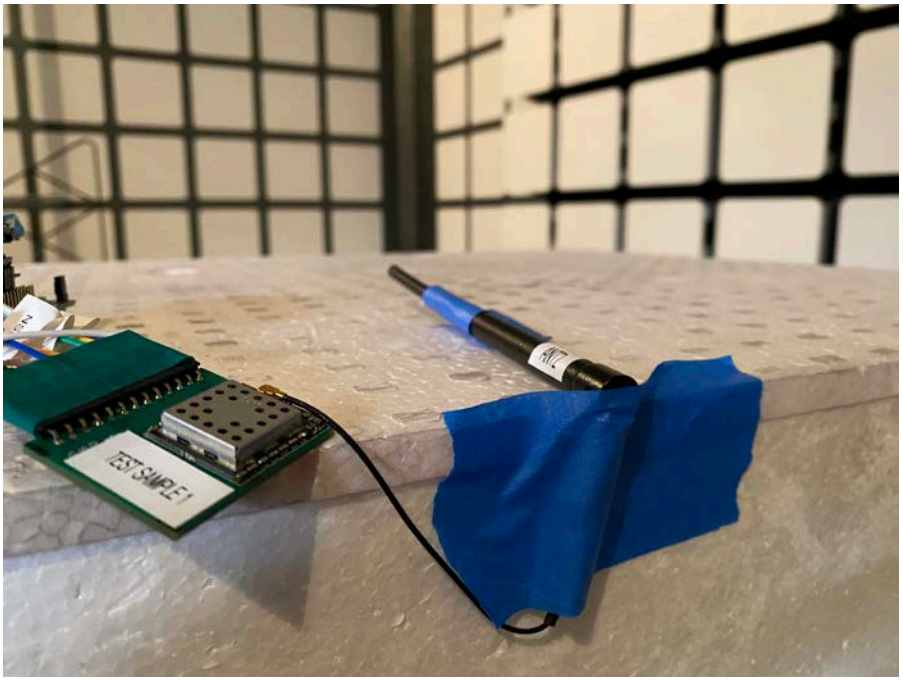
4.1.1. Photograph of Test Configuration



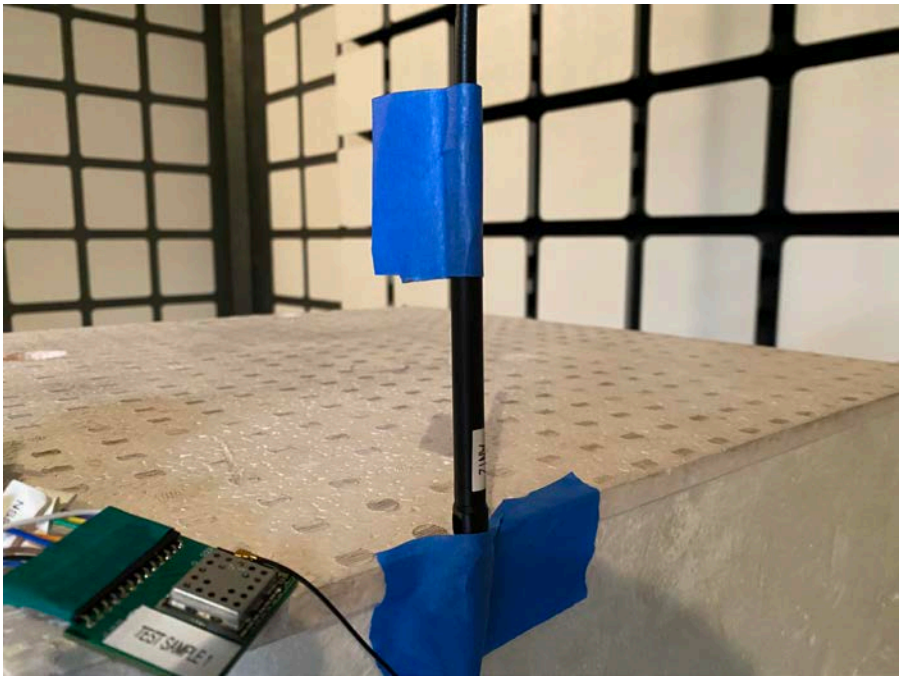
ANSI 63.4

ANSI C63.10

4.1.1.1 Photograph of Test Configuration (Continued)



X-Axis



Y-Axis

4.1.2 Cable Construction and Termination

Cables 1-8 These are 10 centimeter, unshielded jumper wires that connect the EUT to the DevBoard.

Cable 9 This is a 10 centimeter, braided, coax cable that connects the EUT to the external antenna. The cable has a U.FL connector at the EUT end and a female SMA connector at the antenna end.

Cable 10 This is a 1 meter, unshielded, round cable that connects the DevBoard to its PSU. The cable has a mini USB connector at the DevBoard end and a USB type A connector at the PSU end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL /PART NUMBER
EUT	RADIO	OSTREAM, INC.	OS-RAD2	NONE
1	DEV BOARD	SEMTECH	SX 1280 DEMO KIT	NONE
2	ANTENNA 1 (LEFT)	LINX TECHNOLOGIES	ANT-2.4-CW-RH-SMA	NONE
	ANTENNA 2 (RIGHT)	LINX TECHNOLOGIES	ANT-2.4- OC-LG-SMA	NONE
3	DC POWER SUPPLY	KEITHLEY	2200-60-2	NONE
4	PSU (DEV BOARD)	SHENZHEN LUDA ELECTRICAL CO LTD	HL-5/3-8E0S	NONE
	PSU (ONLY USED FOR AC CONDUCTED EMISSIONS)	VOLGEN	KTPS05-03315U-VI	NONE

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Barometer & Thermometer	Control Company	4088	97080656	01/17/2020	01/17/2023
Computer	Compatible Electronics	NONE	NONE	NCR	NCR
EMI Receiver	Keysight Technologies	N9038A	MY56400077	08/04/2021	08/04/2022
Antenna, CombiLog	Com-Power	AC-220	10030000	04/05/2019	12/01/2021
Antenna, Horn	Com-Power	AH-118	10050074	07/13/2021	07/13/2023
Antenna, Horn	Com-Power	AH-826	081078	07/13/2021	07/13/2023
Preamplifier 1-18 GHz	Com-Power	PAM-118A	551033	01/11/2021	01/11/2022
Preamplifier 18-40 GHz	Com-Power	PA-840	181289	08/16/2021	08/16/2022
Mast, Antenna Positioner	Sunol Science Corporation	SC104V	020808-1	NCR	NCR
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	NCR	NCR
Turntable	Sunol Science Corporation	FM2011VS	NONE	NCR	NCR

5.3 Test Software

LAB(S)	SOFTWARE TITLE	MANUFACTURER	VERSION
P, R	Measurement and Automation Software	TDK TestLab	11.24

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

All the radiated emissions measurements were performed in a semi-anechoic chamber.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 0.6 by 1.2-meter by 0.8 meters high non-conductive table for below 1 GHz which was placed on the ground plane. For above 1 GHz, the EUT was mounted 1.5 meters above the ground plane.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature and barometric pressure.

6.4 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

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

Measurement		U_{cispr}	U_{lab} = 2 uc (y)
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3.6 dB	2.88 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1000 MHz)	6.3 dB	3.67 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(1 GHz - 18 GHz)	5.2 dB	3.59 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(18 GHz - 26 GHz)	N/A	3.71 dB

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

The Radio, OS-RAD2 was tested operating on three channels, 2402, 2450, and 2480 MHz.

7.2 Antennas

Antenna 1 is a reduced-height helical whip antenna and antenna 2 is a half-wave dipole antenna

7.3 Software

The EUT was configured using SemTech Board SX1280, version 1.6.1.

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 10-dB attenuation pad was used for the protection of the EMI Receiver input stage. All factors associated with attenuator and cables were recorded into the EMI Software Program accordingly to display the actual corrected measured level. The LISN output was connected to the input of the EMI Receiver. The second LISN output was terminated with a 50-ohm terminator. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

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

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the computer in several overlapping sweeps by running the EMI Receiver at a minimum scan rate of 10 seconds per octave.

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart C sections 15.205, 15.207 and 15.247; and RSS-247, RSS-GEN. The six highest emissions are listed in Table 1.

8.1.2 Radiated Emissions (Harmonics and Spurious) Test

The EMI receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps.

For spurious emissions, the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

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

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
.009 to .150	Active Loop Antenna	200 Hz
.150 to 30	Active Loop Antenna	9 kHz
30 to 1000	Combilog Antenna	100 kHz (120kHz for QP Measurements)
1000 to 25000	Horn Antenna	1 MHz

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4 & 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 in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart C sections 15.205, 15.209 and 15.247; and RSS-247, RSS-GEN. The six highest emissions are listed in Table 2.

8.1.3 RF Emissions Test Results

Table 1 CONDUCTED EMISSION RESULTS
RADIO MODEL: OS-RAD2

Frequency MHz	Corrected Reading* dBuV/m	Specification Limit dBuV/m	Delta (Cor. Reading – Spec. Limit) dB
0.39 **L**	45.92 **A**	47.87	-1.95
0.40 **N**	45.65 **A**	47.86	-2.21
0.43 **N**	40.99 **A**	47.37	-6.38
0.51 **L**	38.11 **A**	46.00	-7.89
0.50 **L**	37.27 **A**	46.00	-8.73
2.08 **L**	35.96 **A**	46.00	-10.04

Table 2 SPURIOUS EMISSION RESULTS
RADIO MODEL: OS-RAD2

Frequency MHz	Corrected Reading* dBuV/m	Specification Limit dBuV/m	Delta (Cor. Reading – Spec. Limit) dB
144.00 **V**	28.91 **#**	43.52	-14.61
41.90 **H**	22.33 **#**	40.00	-17.67
144.00 **H**	24.64 **#**	43.52	-18.88
89.70 **V**	20.49 **#**	43.52	-23.03
95.90 **H**	18.75 **#**	43.52	-24.77
110.90 **V**	16.55 **#**	43.52	-26.97

Notes:

* The complete emissions data is given in Appendix E of this report.
** The factors for the antenna are attached in Appendix D of this report.
Quasi-Peak Reading
A Average Reading
L Line Reading
N Neutral Reading
V Vertical Reading
H Horizontal Reading

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 (μ V/m) log x 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 x 40 = distance factor

For measurements above 30 MHz: (Specification distance / test distance) log x 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 Bandwidth was measured using a direct connection from the EUT. The following steps were performed for measuring the DTS Bandwidth, as described in section 11.8.1 of ANSI C63.10

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 as specified in the Summary of Test Results starting on Page 5.

8.3 Maximum Peak Conducted Output Power

The Conducted Peak Output Power was measured using the EMI Receiver. The Peak Output Power was measured using the peak power measurement procedure describe in section 11.9.1.1 of ANSI C63.10. The Maximum Conducted Output Power was then taken.

1. Set RBW ≥ DTS Bandwidth
2. Set the VBW ≥ [3x RBW]
3. Set span ≥ [3x RBW]
4. Detector = Peak
5. Sweep time = Auto Couple
6. Trace mode = Max Hold
7. Allow the trace to stabilize
8. 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 as specified in the Summary of Test Results starting on Page 5.

8.4 Emissions in Non-Restricted 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 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 level and 20 dB below that was 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 as specified in the Summary of Test Results starting on Page 5.

8.5 RF Band Edges and Out of Band Emissions

The RF band edges were measured using the EMI Receiver. The RF band edges were measured twice using a direct connection from the RF out on the EUT into the input of the EMI Receiver for non-restricted bands and using radiated field strength measurement for restricted bands.

The RF band edges were taken at 2390 MHz (restricted bands) when the EUT was on the low channel and 2483.5 MHz when the EUT was on the high channel using the EMI Receiver. The radiated emissions test procedure as describe in section 8.1.2 of this test report was used to maximize the emission.

The RF band edge was also taken at 2400 MHz (DTS bands) when the EUT was on the low channel.

The following steps were performed for measuring the band edge at 2400 MHz:
1. Set analyzer center frequency to DTS channel center frequency
2. Set the span wide enough to cover the band edges.
3. Set the RBW to 100 kHz (1 MHz for non-restricted band)
4. Set the VBW ≥ 3 X RBW
5. Detector = Peak
6. Sweep time = auto couple
7. Allow the trace to stabilize
8. Use the peak marker function to determine the maximum amplitude level

Test Results:

The EUT complies with the relevant requirements as specified in the Summary of Test Results starting on Page 5.

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, per section 11.10.2 of ANSI C63.10.

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

Test Results:

The EUT complies with the relevant requirements as specified in the Summary of Test Results starting on Page 5.

8.7 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:

The EUT complies with the relevant requirements as specified in the Summary of Test Results starting on Page 5.

9. TEST PROCEDURE DEVIATIONS

There were no deviations from the test procedures.

10. CONCLUSIONS

The Radio Model: OS-RAD2 as tested, meets all the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart B section, 15.107 and 15.109, & Subpart C sections 15.205, 15.207, 15.209 and 15.247, RSS 247 Issue 2, and RSS Gen, Issue 5 Amendment 2.

APPENDIX A

LABORATORY ACCREDITATIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP TESTING
NVLAP LAB CODE 200527-0

ilac-MRA

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"

Innovation, Science and Economic Development Canada Lab Code 2154C

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

There were no modifications made to the EUT.

APPENDIX C

ADDITIONAL MODELS

ADDITIONAL MODELS

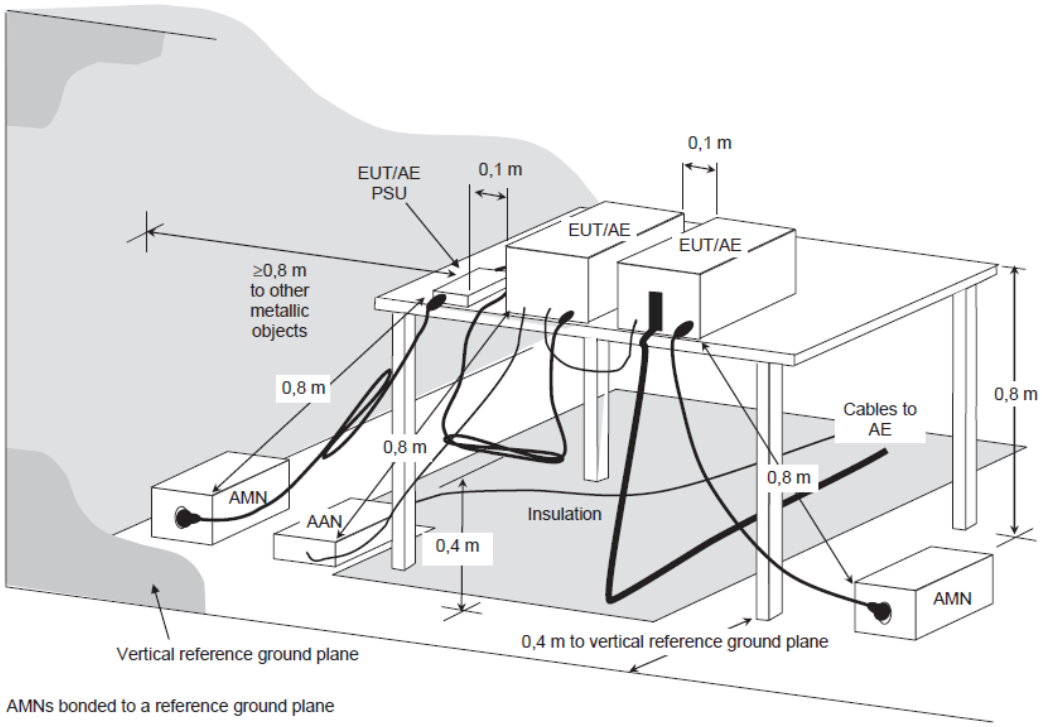
Used for the Primary Tests	Radio Model: OS-RAD2 FCC ID: 2A3CJ-400102

No additional models.

APPENDIX D

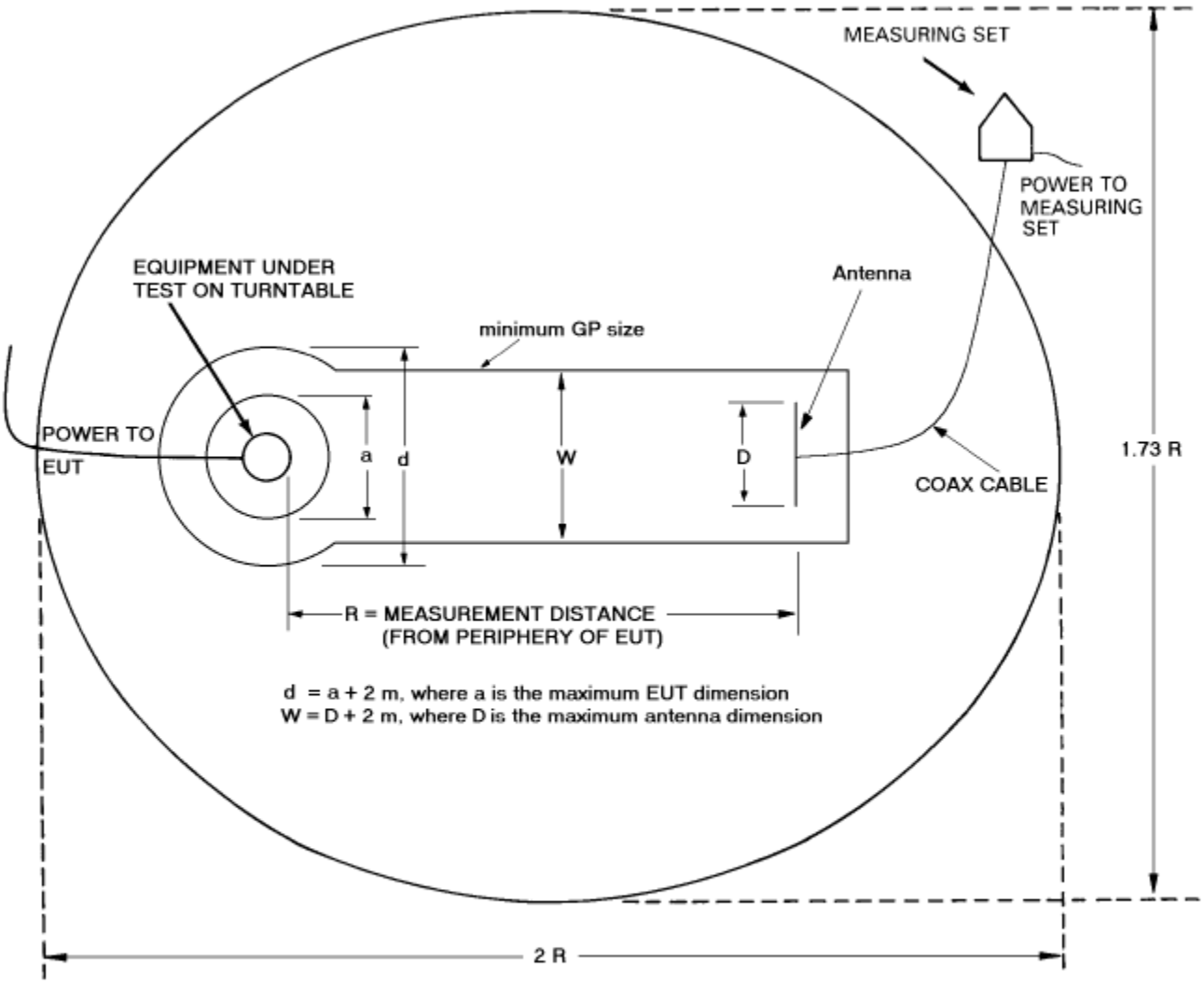
DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP



AMNs bonded to a reference ground plane

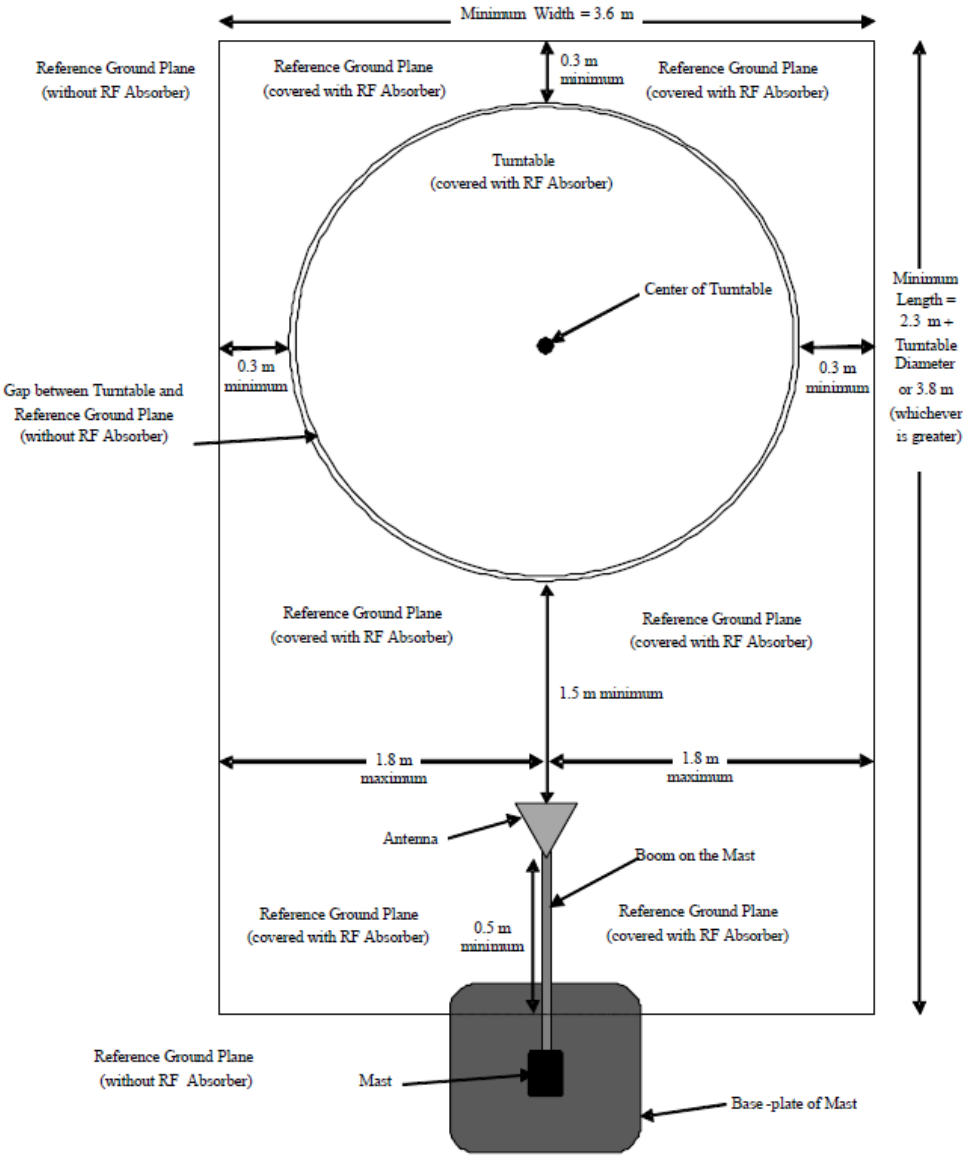
FIGURE 2: RADIATED EMISSIONS 3-METER SEMI -ANECHOIC TEST CHAMBER



AREA DIMENSIONS =

R = 3m	R = 10 m	R = 30 m
6 m x 5.2 m	20 m x 17.3 m	60 m x 52 m

FIGURE 3: HIGH FREQUENCY TEST VOLUME



COM-POWER AC-220

LAB R - COMBILOG ANTENNA

S/N: 10030000

CALIBRATION DUE DATE: DECEMBER 1, 2021

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	24.05	**160**	13.57
35	22.46	**180**	14.07
40	19.36	**200**	14.72
45	17.42	**250**	18.27
50	15.77	**300**	20.95
60	12.86	**400**	23.16
70	11.22	**500**	21.86
80	11.84	**600**	23.54
90	13.48	**700**	23.85
100	14.80	**800**	25.91
120	16.38	**900**	26.71
140	14.41	**1000**	27.60

COM-POWER AH-118

HORN ANTENNA

S/N: 10050074

CALIBRATION DUE DATE: JULY 13, 2023

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
700	25.84	**7500**	37.73
750	25.46	**8000**	38.05
800	24.96	**8500**	38.29
850	24.51	**9000**	38.93
900	24.01	**9500**	39.64
950	23.73	**10000**	39.12
1000	23.83	**10500**	39.16
1250	24.81	**11000**	39.18
1500	25.32	**11500**	39.85
1750	26.30	**12000**	40.27
2000	27.94	**12500**	40.91
2250	28.16	**13000**	40.50
2500	29.07	**13500**	40.59
3000	30.07	**14000**	40.44
3500	30.81	**14500**	40.62
4000	31.68	**15000**	43.35
4500	32.64	**15500**	40.76
5000	33.79	**16000**	41.61
5500	34.20	**16500**	40.38
6000	35.24	**17000**	40.88
6500	35.74	**17500**	42.79
7000	37.17	**18000**	43.86

COM-POWER AH-826

HORN ANTENNA

S/N: 081078

CALIBRATION DUE DATE: JULY 13, 2023

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
18.00	32.83	**21.25**	33.71
18.10	32.74	**21.50**	33.58
18.20	32.68	**21.75**	33.70
18.30	32.67	**22.00**	33.88
18.40	32.73	**22.25**	33.88
18.50	32.83	**22.50**	34.00
18.60	32.90	**22.75**	33.91
18.70	32.95	**23.00**	33.93
18.80	33.00	**23.25**	34.07
18.90	33.06	**23.50**	34.17
19.00	33.08	**23.75**	34.36
19.10	33.12	**24.00**	34.35
19.20	33.17	**24.25**	34.29
19.30	33.18	**24.50**	34.34
19.40	33.15	**24.75**	34.40
19.50	33.10	**25.00**	34.58
19.75	33.07	**25.25**	34.65
20.00	33.21	**25.50**	34.60
20.25	33.31	**25.75**	34.61
20.50	33.64	**26.00**	34.64
20.75	33.65	**26.25**	34.74
21.00	33.58	**26.50**	35.08

COM-POWER PAM-118A

1-18GHz – PREAMPLIFIER

S/N: 551033

CALIBRATION DUE DATE: JANUARY 11, 2022

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	39.68	**6000**	41.31
600	39.94	**6500**	41.35
700	39.99	**7000**	41.61
800	40.24	**7500**	41.72
900	39.93	**8000**	41.73
1000	40.44	**8500**	40.82
1250	40.63	**9000**	40.78
1500	40.80	**9500**	42.10
1750	41.00	**10000**	42.62
2000	41.35	**10500**	41.43
2250	41.60	**11000**	41.00
2500	41.82	**11500**	41.26
2750	42.08	**12000**	41.50
3000	42.33	**12500**	41.01
3250	42.50	**13000**	40.50
3500	42.59	**13500**	40.28
3750	42.64	**14000**	40.32
4000	42.60	**14500**	40.55
4250	42.42	**15000**	40.62
4500	42.20	**15500**	40.74
4750	42.04	**16000**	40.69
5000	41.88	**16500**	40.98
5250	41.69	**17000**	40.16
5500	41.59	**17500**	39.29
5750	41.44	**18000**	39.52

COM-POWER PA 840

18-40 GHz – PREAMPLIFIER

S/N: 181289

CALIBRATION DUE DATE: AUGUST 16, 2022

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
18000	31.85	**31500**	28.93
19000	30.79	**32000**	30.00
20000	31.27	**32500**	30.38
21000	32.75	**33000**	29.41
22000	32.16	**33500**	29.40
23000	30.30	**34000**	29.57
24000	30.70	**34500**	28.50
25000	31.35	**35000**	29.78
26000	32.41	**35500**	28.01
26500	32.65	**36000**	28.24
27000	32.85	**36500**	28.12
27500	32.14	**37000**	27.91
28000	32.61	**37500**	28.14
28500	31.93	**38000**	28.36
29000	31.46	**38500**	29.46
29500	30.93	**39000**	30.04
30000	29.91	**39500**	31.33
30500	29.37	**40000**	30.71
31000	28.62		

FRONT VIEW
OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW
OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - CONDUCTED EMISSIONS
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

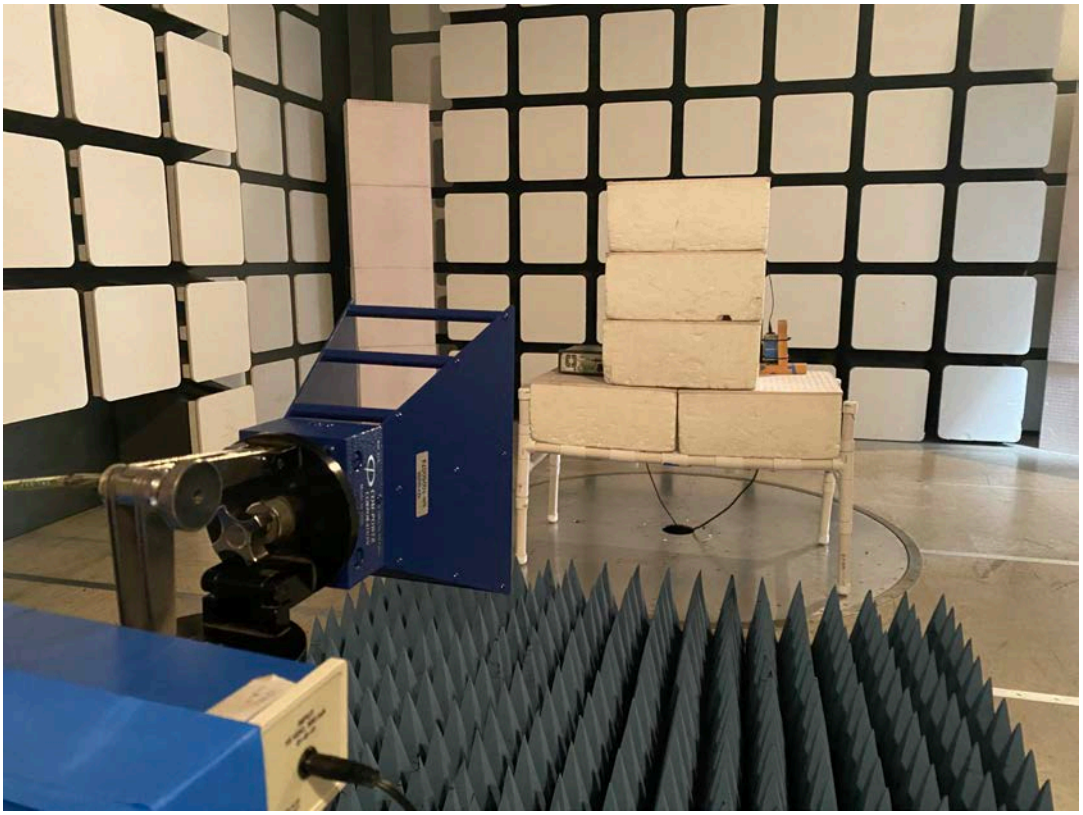
OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - RADIATED EMISSIONS UNDER 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - RADIATED EMISSIONS UNDER 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - RADIATED EMISSIONS ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

OSTREAM, INC.
RADIO
MODEL: OS-RAD2
FCC SUBPART C - RADIATED EMISSIONS ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

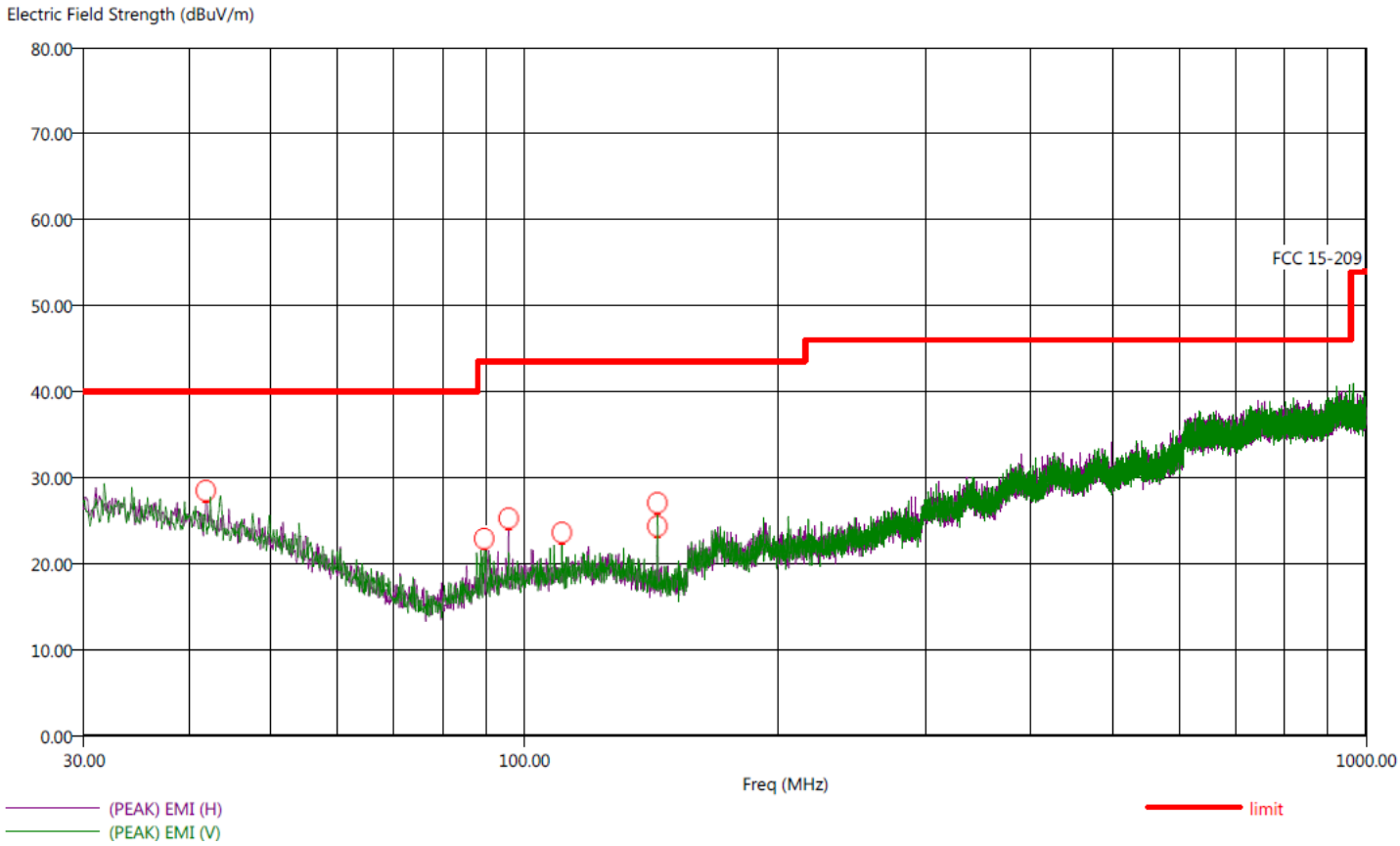
RADIATED EMISSIONS

DATA SHEETS

Test title: FCC 15.209
File: 05-Radiated Pre - Scan 30 - 1000MHz
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at the mid channel
Notes: Company: OStream
Temp:74f
Hum:37%
3V DC
Worst case Antenna

9/10/2021 10:55:50 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



No spurious emissions found besides fundamental and harmonics from 9kHz to 30 MHz and from 1 to 25 GHz

Test title: FCC 15.209
File: 05-Radiated Final - Scan 30 - 1000MHz
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at the mid channel
Notes: Company: OStream
Temp:74f
Hum:37%
3V DC
Worst case Antenna

9/10/2021 11:08:33 AM
Sequence: Final Measurements

Compatible Electronics, Inc. FAC-3 (LAB R)

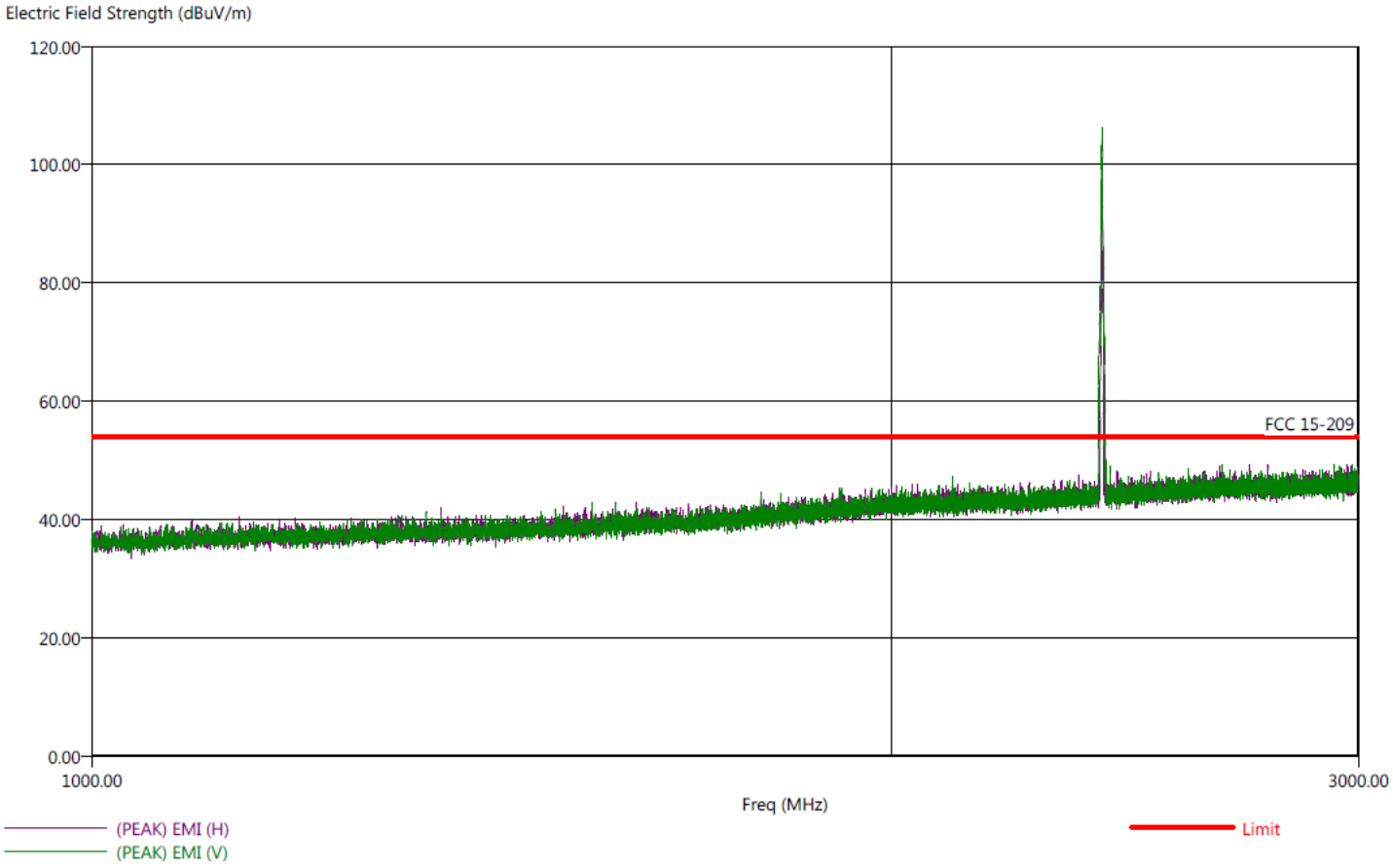
Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(QP) Margin (dB)	Limit (dBµV/m)	Twr Ht (cm)	Ttbl Ang (deg)	Cable (dB)	Transducer (dB)
41.90	H	27.31	22.33	-17.67	40.00	327.05	335.25	0.66	20.15
89.70	V	26.04	20.49	-23.03	43.52	140.07	227.25	0.95	13.17
95.90	H	25.22	18.75	-24.77	43.52	345.02	27.00	1.01	13.97
110.90	V	21.94	16.55	-26.97	43.52	112.85	270.50	1.09	15.09
144.00	H	26.99	24.64	-18.88	43.52	306.16	275.75	1.24	14.00
144.00	V	30.32	28.91	-14.61	43.52	103.35	325.50	1.24	14.00

No spurious emissions found besides fundamental and harmonics from 9kHz to 30 MHz and from 1 to 25 GHz

Test title: FCC 15.209
File: 01-Radiated Pre - Scan 1-3 GHz
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:67f
Hum:31%
3V DC
Worst case Antenna

9/9/2021 9:33:13 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)

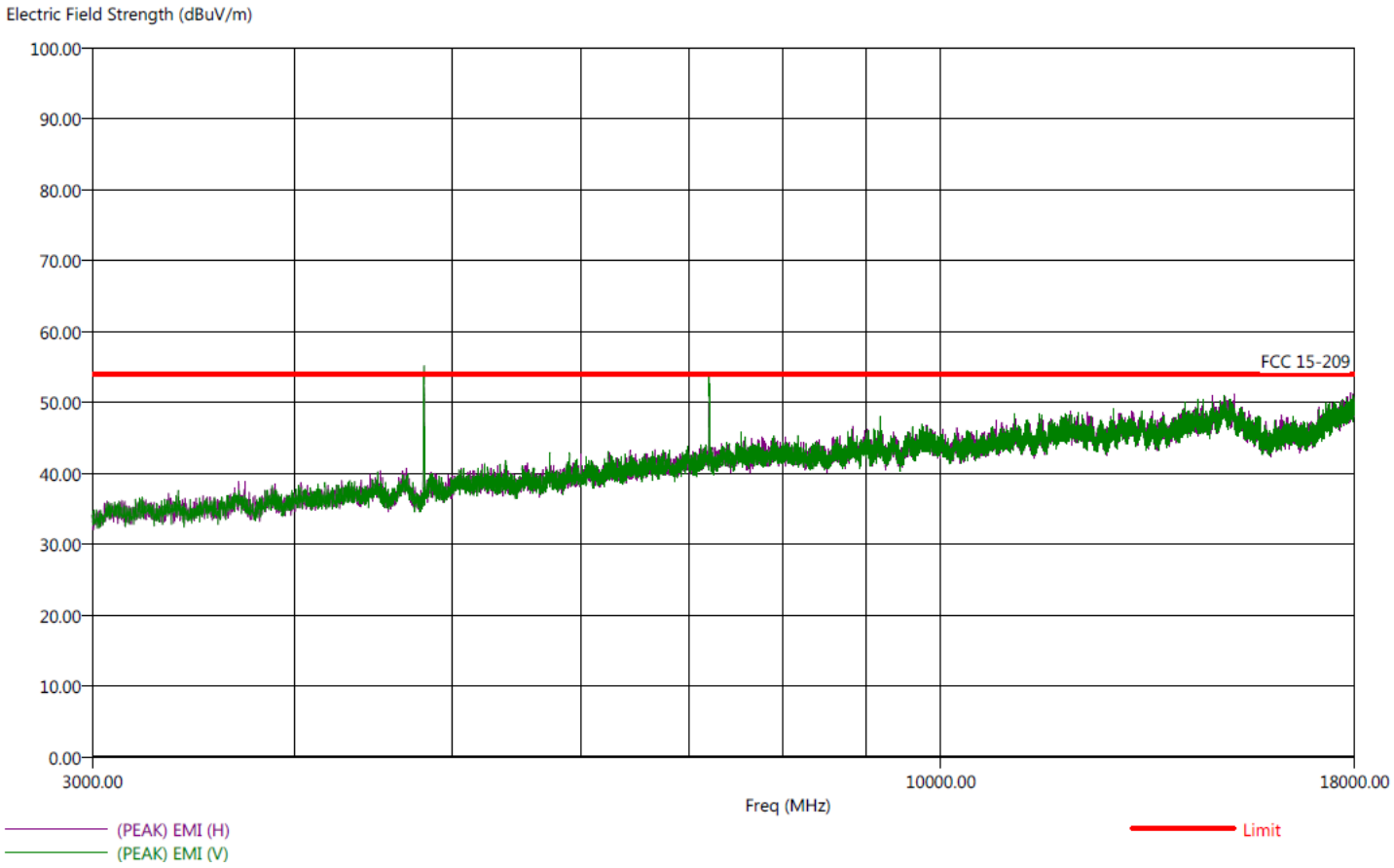


No spurious emissions found besides fundamental and harmonics from 9kHz to 30 MHz and from 1 to 25 GHz. The peaks shown are harmonics emissions coming from the transmitter.

Test title: FCC 15.209
File: 01-Radiated Pre - Scan 3-18GHz
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:72f
Hum:31%
3V DC
Worst case Antenna

9/9/2021 8:58:09 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



No spurious emissions found besides fundamental and harmonics from 9kHz to 30 MHz and from 1 to 25 GHz. The peaks shown are harmonics emissions coming from the transmitter.

HARMONICS HORIZONTAL – LOW CHANNEL

Company Ostream
EUT Radio
Model OS-RAD2, ANT 1

Date 9/9/2021
Lab R
Tested by Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4804.0	56.20	73.98	-17.78	Peak			Worst case
4804.0	47.22	53.98	-6.76	Avg	120.00	127	X-Axis
7206.0							Not in Restricted Bands
7206.0							Done via Conducted
9608.0							Not in Restricted Bands
9608.0							Done via Conducted
12010.0	49.69	73.98	-24.29	Peak			Worst case
12010.0	32.21	53.98	-21.77	Avg	274.00	125	X-Axis
14412.0							Not in Restricted Bands
14412.0							Done via Conducted
16814.0							Not in Restricted Bands
16814.0							Done via Conducted
19216.0							No Emissions Found
19216.0							
21618.0							Not in Restricted Bands
21618.0							Done via Conducted
24020.0							Not in Restricted Bands
24020.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – LOW CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 1	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4804.0	52.69	73.98	-21.29	Peak			Worst case
4804.0	41.28	53.98	-12.70	Avg	143.00	175	X-Axis
7206.0							Not in Restricted Bands
7206.0							Done via Conducted
9608.0							Not in Restricted Bands
9608.0							Done via Conducted
12010.0	51.00	73.98	-22.98	Peak			Worst case
12010.0	33.24	53.98	-20.74	Avg	244.00	176	X-Axis
14412.0							Not in Restricted Bands
14412.0							Done via Conducted
16814.0							Not in Restricted Bands
16814.0							Done via Conducted
19216.0							No Emissions Found
19216.0							
21618.0							Not in Restricted Bands
21618.0							Done via Conducted
24020.0							Not in Restricted Bands
24020.0							Done via Conducted

Test Distance: 3 meters

HARMONICS HORIZONTAL – MID CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 1	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4900.0	58.99	73.98	-14.99	Peak			Worst case
4900.0	48.05	53.98	-5.93	Avg	240.00	100	X-Axis
7350.0	59.88	73.98	-14.10	Peak			Worst case
7350.0	46.44	53.98	-7.54	Avg	330.00	100	X-Axis
9800.0							Not in Restricted Bands
9800.0							Done via Conducted
12250.0	50.30	73.98	-23.68	Peak			Worst case
12250.0	31.60	53.98	-22.38	Avg	8.00	100	X-Axis
14700.0							Not in Restricted Bands
14700.0							Done via Conducted
17150.0							Not in Restricted Bands
17150.0							Done via Conducted
19600.0							No Emissions Found
19600.0							
22050.0							No Emissions Found
22050.0							
24500.0							Not in Restricted Bands
24500.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – MID CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 1	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4900.0	56.65	73.98	-17.33	Peak			Worst case
4900.0	44.70	53.98	-9.28	Avg	348.00	108	X-Axis
7350.0	56.26	73.98	-17.72	Peak			Worst case
7350.0	43.63	53.98	-10.35	Avg	0.00	100	X-Axis
9800.0							Not in Restricted Bands
9800.0							Done via Conducted
12250.0	52.31	73.98	-21.67	Peak			Worst case
12250.0	34.88	53.98	-19.10	Avg	0.00	100	X-Axis
14700.0							Not in Restricted Bands
14700.0							Done via Conducted
17150.0							Not in Restricted Bands
17150.0							Done via Conducted
19600.0							No Emissions Found
19600.0							
22050.0							No Emissions Found
22050.0							
24500.0							Not in Restricted Bands
24500.0							Done via Conducted

Test Distance: 3 meters

HARMONICS HORIZONTAL – HIGH CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 1	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4960.0	49.64	73.98	-24.34	Peak			Worst case
4960.0	41.69	53.98	-12.29	Avg	236.00	148	X-Axis
7440.0	47.66	73.98	-26.32	Peak			Worst case
7440.0	33.08	53.98	-20.90	Avg	180.00	148	X-Axis
9920.0							Not in Restricted Bands
9920.0							Done via Conducted
12400.0							No Emissions Found
12400.0							
14880.0							Not in Restricted Bands
14880.0							Done via Conducted
17360.0							Not in Restricted Bands
17360.0							Done via Conducted
19840.0							No Emissions Found
19840.0							
22320.0							No Emissions Found
22320.0							
24800.0							Not in Restricted Bands
24800.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – HIGH CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 1	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4960.0	47.64	73.98	-26.34	Peak			Worst case
4960.0	40.50	53.98	-13.48	Avg	301.00	153	X-Axis
7440.0	47.69	73.98	-26.29	Peak			Worst case
7440.0	33.42	53.98	-20.56	Avg	169.00	153	X-Axis
9920.0							Not in Restricted Bands
9920.0							Done via Conducted
12400.0							No Emissions Found
12400.0							
14880.0							Not in Restricted Bands
14880.0							Done via Conducted
17360.0							Not in Restricted Bands
17360.0							Done via Conducted
19840.0							No Emissions Found
19840.0							
22320.0							No Emissions Found
22320.0							
24800.0							Not in Restricted Bands
24800.0							Done via Conducted

Test Distance: 3 meters

HARMONICS HORIZONTAL – LOW CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 2	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4804.0	57.26	73.98	-16.72	Peak			Worst case
4804.0	45.30	53.98	-8.68	Avg	322.00	144	X-Axis
7206.0							Not in Restricted Bands
7206.0							Done via Conducted
9608.0							Not in Restricted Bands
9608.0							Done via Conducted
12010.0							No Emissions Found
12010.0							
14412.0							Not in Restricted Bands
14412.0							Done via Conducted
16814.0							Not in Restricted Bands
16814.0							Done via Conducted
19216.0							No Emissions Found
19216.0							
21618.0							Not in Restricted Bands
21618.0							Done via Conducted
24020.0							Not in Restricted Bands
24020.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – LOW CHANNEL

Company Ostream
EUT Radio
Model OS-RAD2, ANT 2

Date 9/9/2021
Lab R
Tested by Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4804.0	57.25	73.98	-16.73	Peak			Worst case
4804.0	45.30	53.98	-8.68	Avg	339.00	122	X-Axis
7206.0							Not in Restricted Bands
7206.0							Done via Conducted
9608.0							Not in Restricted Bands
9608.0							Done via Conducted
12010.0							No Emissions Found
12010.0							
14412.0							Not in Restricted Bands
14412.0							Done via Conducted
16814.0							Not in Restricted Bands
16814.0							Done via Conducted
19216.0							No Emissions Found
19216.0							
21618.0							Not in Restricted Bands
21618.0							Done via Conducted
24020.0							Not in Restricted Bands
24020.0							Done via Conducted

Test Distance: 3 meters

HARMONICS HORIZONTAL – MID CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 2	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4900.0	61.53	73.98	-12.45	Peak			Worst case
4900.0	49.36	53.98	-4.62	Avg	213.00	125	X-Axis
7350.0	58.63	73.98	-15.35	Peak			Worst case
7350.0	45.04	53.98	-8.94	Avg	60.00	146	X-Axis
9800.0							Not in Restricted Bands
9800.0							Done via Conducted
12250.0	54.70	73.98	-19.28	Peak			Worst case
12250.0	39.45	53.98	-14.53	Avg	335.00	114	X-Axis
14700.0							Not in Restricted Bands
14700.0							Done via Conducted
17150.0							Not in Restricted Bands
17150.0							Done via Conducted
19600.0							No Emissions Found
19600.0							
22050.0							No Emissions Found
22050.0							
24500.0							Not in Restricted Bands
24500.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – MID CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 2	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4900.0	60.29	73.98	-13.69	Peak			Worst case
4900.0	48.60	53.98	-5.38	Avg	332.00	123	X-Axis
7350.0	59.38	73.98	-14.60	Peak			Worst case
7350.0	46.11	53.98	-7.87	Avg	162.00	192	X-Axis
9800.0							Not in Restricted Bands
9800.0							Done via Conducted
12250.0	54.56	73.98	-19.42	Peak			Worst case
12250.0	38.40	53.98	-15.58	Avg	200.00	110	X-Axis
14700.0							Not in Restricted Bands
14700.0							Done via Conducted
17150.0							Not in Restricted Bands
17150.0							Done via Conducted
19600.0							No Emissions Found
19600.0							
22050.0							No Emissions Found
22050.0							
24500.0							Not in Restricted Bands
24500.0							Done via Conducted

Test Distance: 3 meters

HARMONICS HORIZONTAL – HIGH CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 2	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4960.0	51.53	73.98	-22.45	Peak			Worst case
4960.0	42.41	53.98	-11.57	Avg	322.00	152	X-Axis
7440.0	49.31	73.98	-24.67	Peak			Worst case
7440.0	35.37	53.98	-18.61	Avg	228.00	150	X-Axis
9920.0							Not in Restricted Bands
9920.0							Done via Conducted
12400.0							No Emissions Found
12400.0							
14880.0							Not in Restricted Bands
14880.0							Done via Conducted
17360.0							Not in Restricted Bands
17360.0							Done via Conducted
19840.0							No Emissions Found
19840.0							
22320.0							No Emissions Found
22320.0							
24800.0							Not in Restricted Bands
24800.0							Done via Conducted

Test Distance: 3 meters

HARMONICS VERTICAL – HIGH CHANNEL

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2, ANT 2	Tested by	Howard Huang

Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comment
4960.0	48.71	73.98	-25.27	Peak			Worst case
4960.0	39.11	53.98	-14.87	Avg	144.00	150	X-Axis
7440.0	49.63	73.98	-24.35	Peak			Worst case
7440.0	34.79	53.98	-19.19	Avg	163.00	139	X-Axis
9920.0							Not in Restricted Bands
9920.0							Done via Conducted
12400.0							No Emissions Found
12400.0							
14880.0							Not in Restricted Bands
14880.0							Done via Conducted
17360.0							Not in Restricted Bands
17360.0							Done via Conducted
19840.0							No Emissions Found
19840.0							
22320.0							No Emissions Found
22320.0							
24800.0							Not in Restricted Bands
24800.0							Done via Conducted

Test Distance: 3 meters

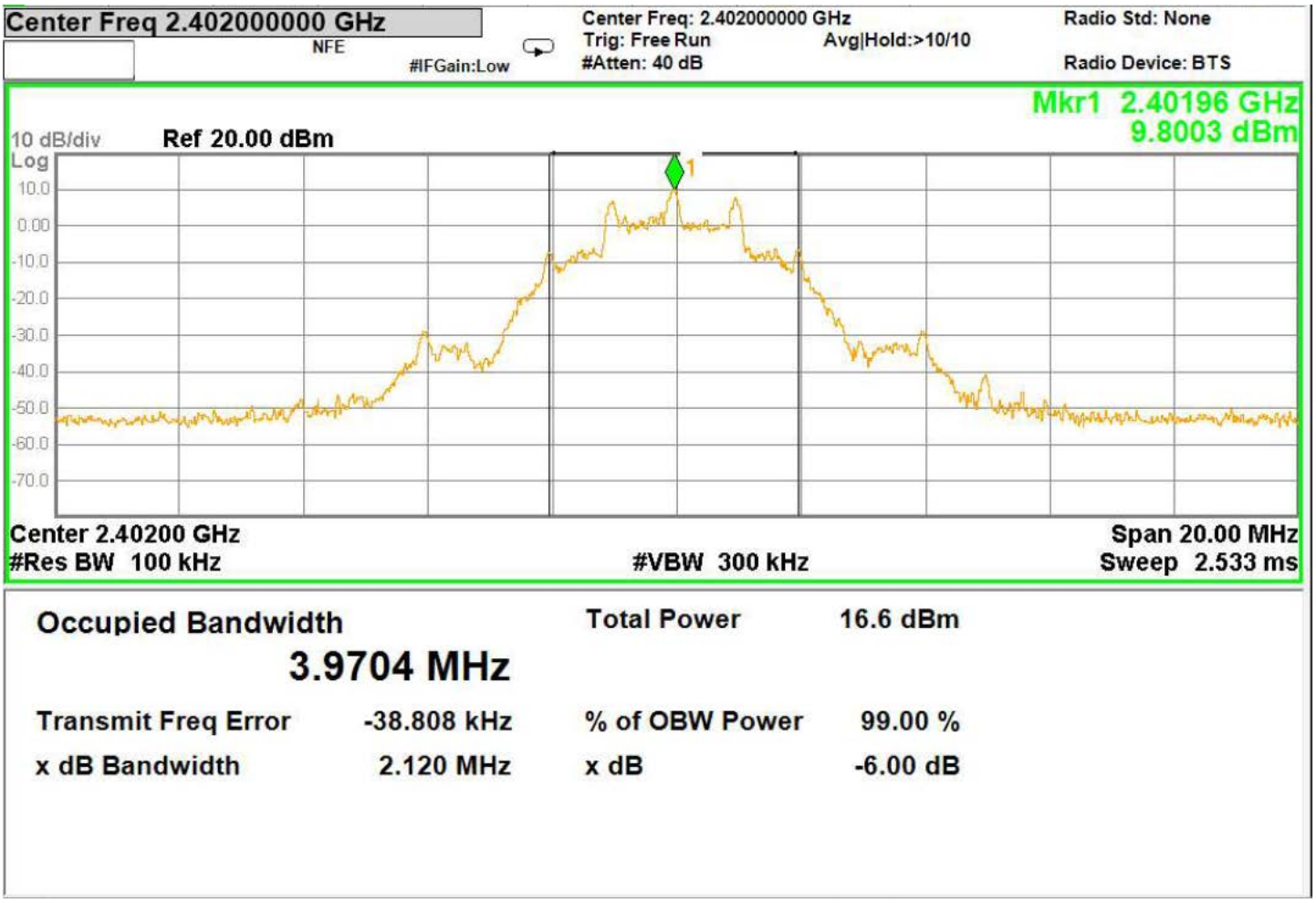
DTS BANDWIDTH

DATA SHEETS

DTS BANDWIDTH – LOW CHANNEL

FCC 15.247

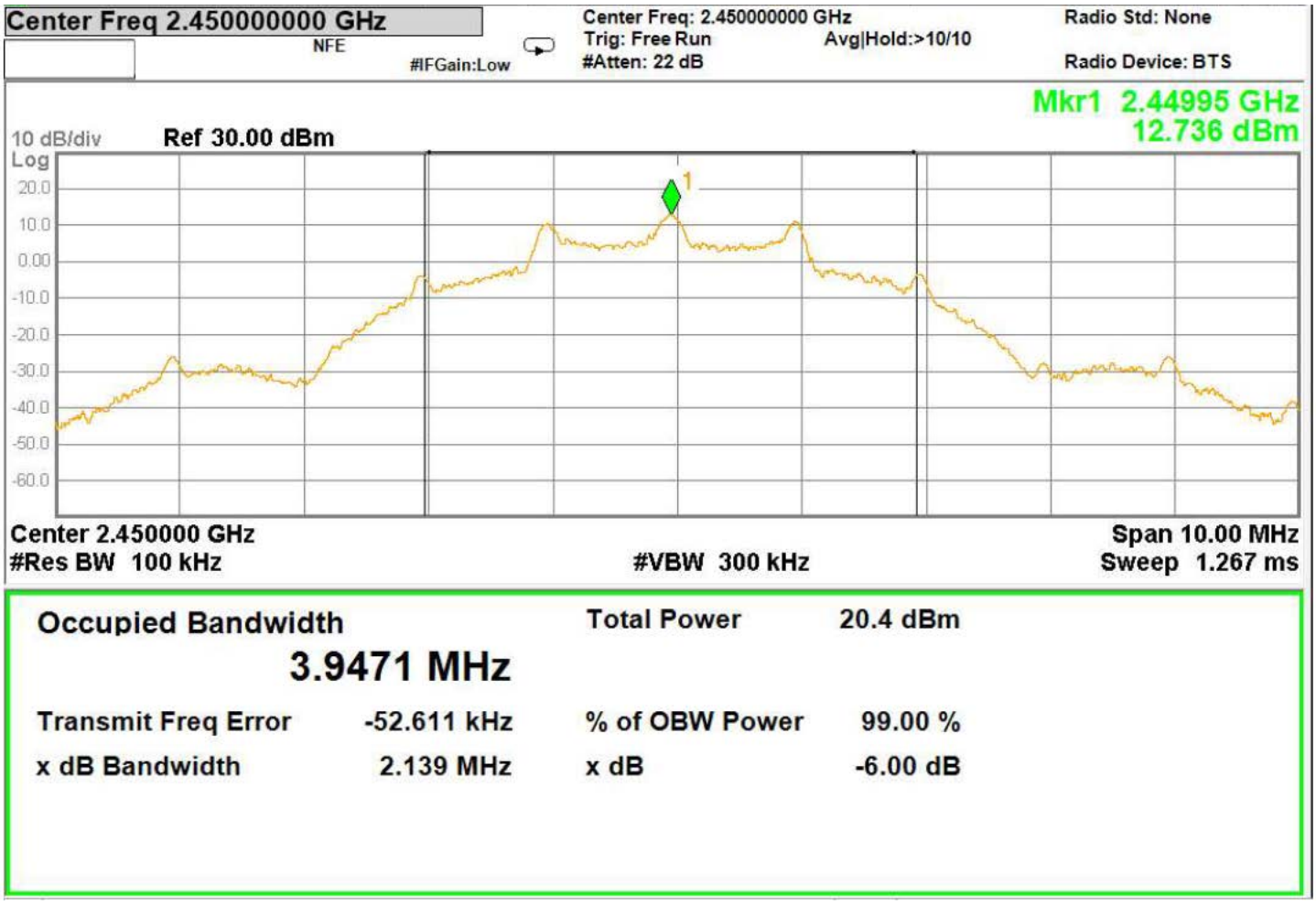
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



DTS BANDWIDTH – MID CHANNEL

FCC 15.247

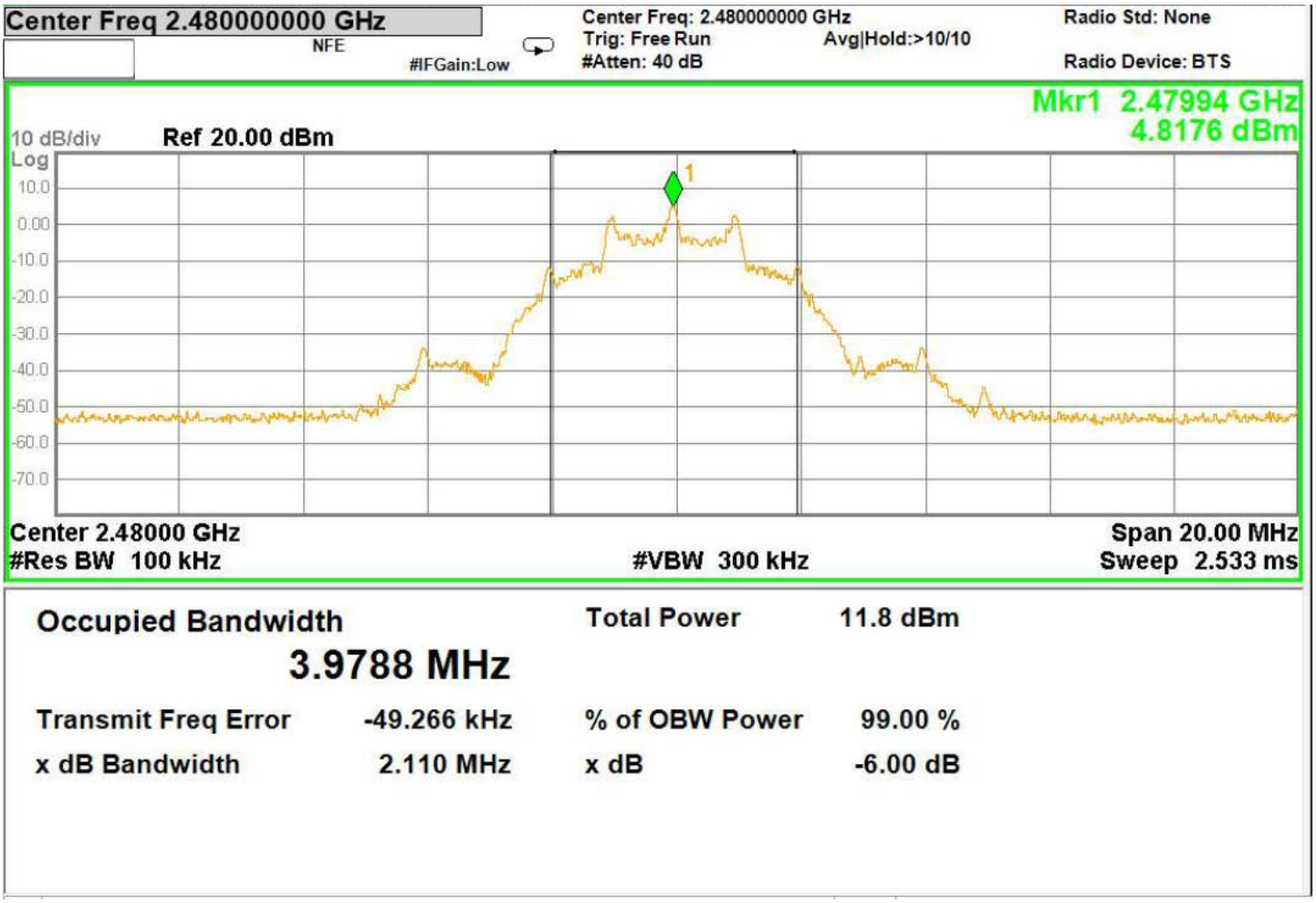
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



DTS BANDWIDTH – HIGH CHANNEL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



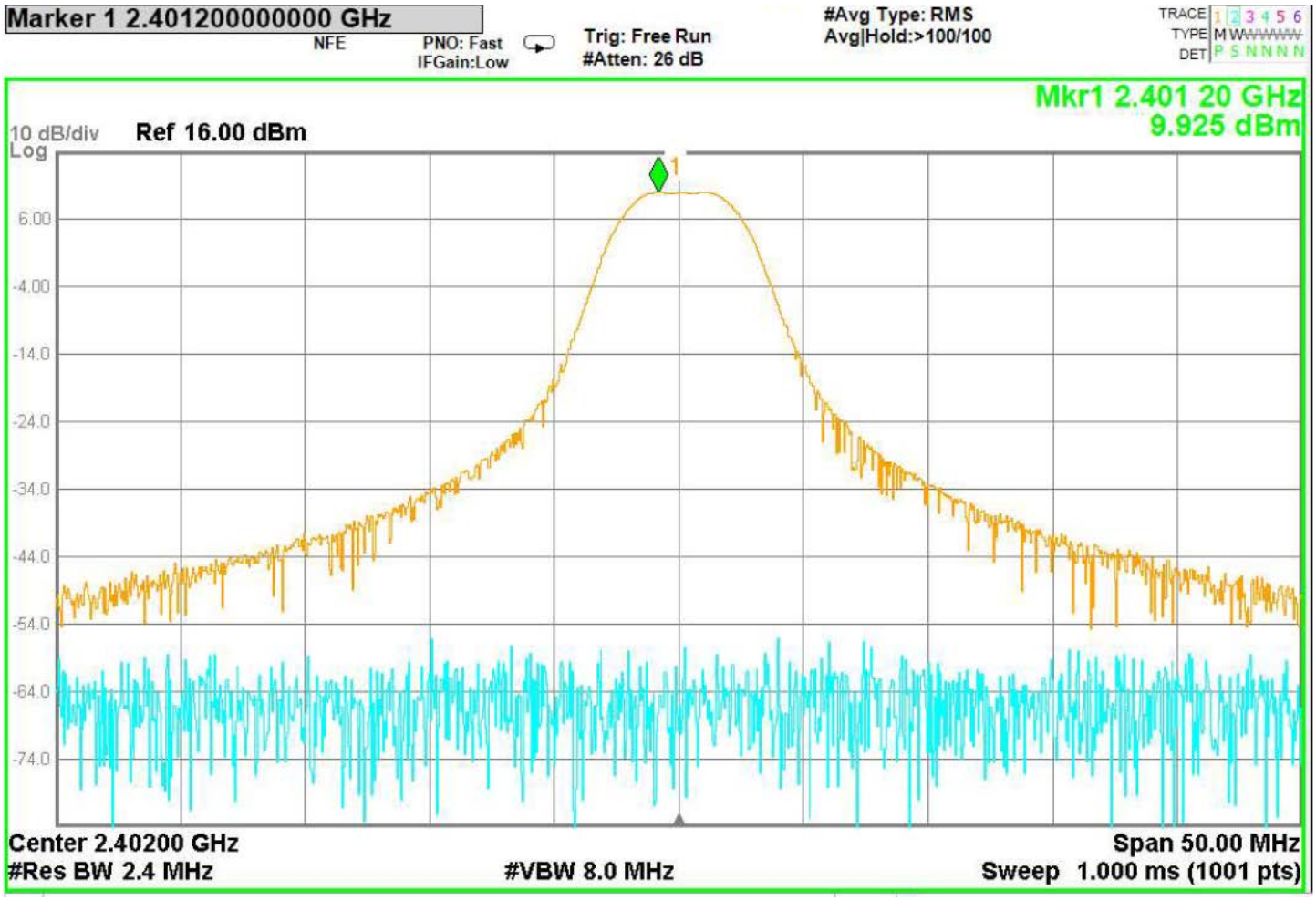
PEAK OUTPUT POWER

DATA SHEETS

PEAK OUTPUT POWER – LOW CHANNEL

FCC 15.247

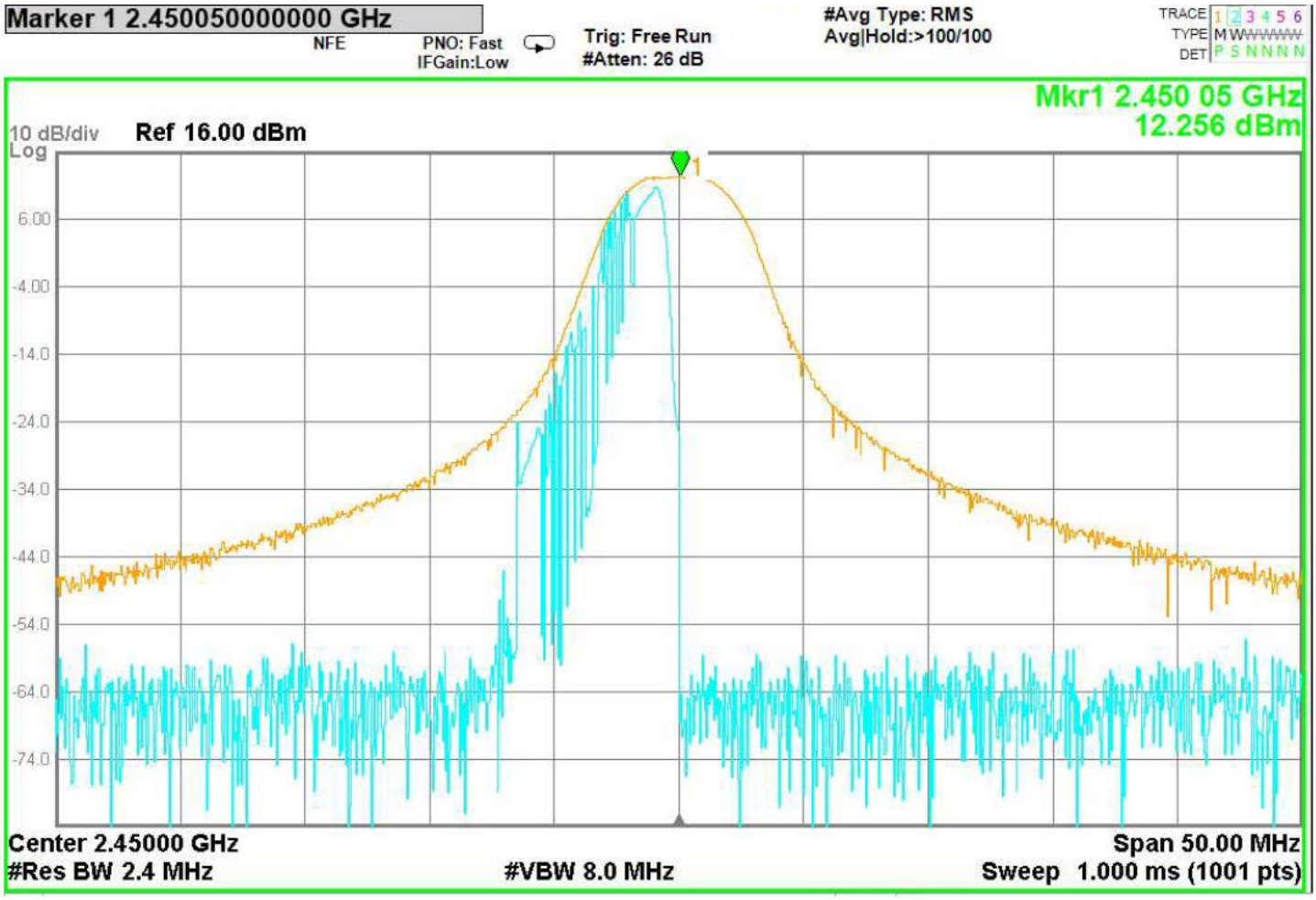
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



PEAK OUTPUT POWER – MID CHANNEL

FCC 15.247

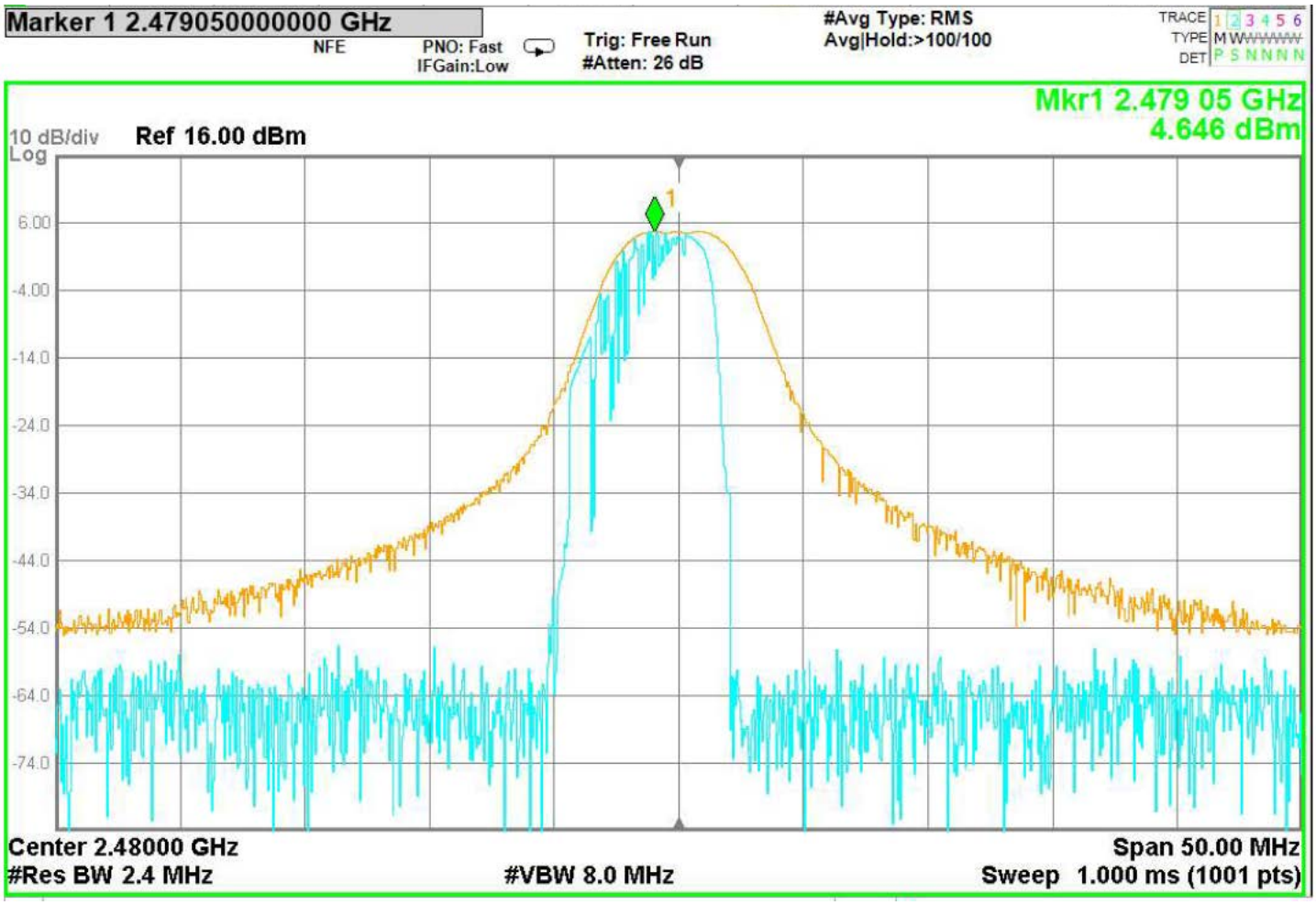
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



PEAK OUTPUT POWER – HIGH CHANNEL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



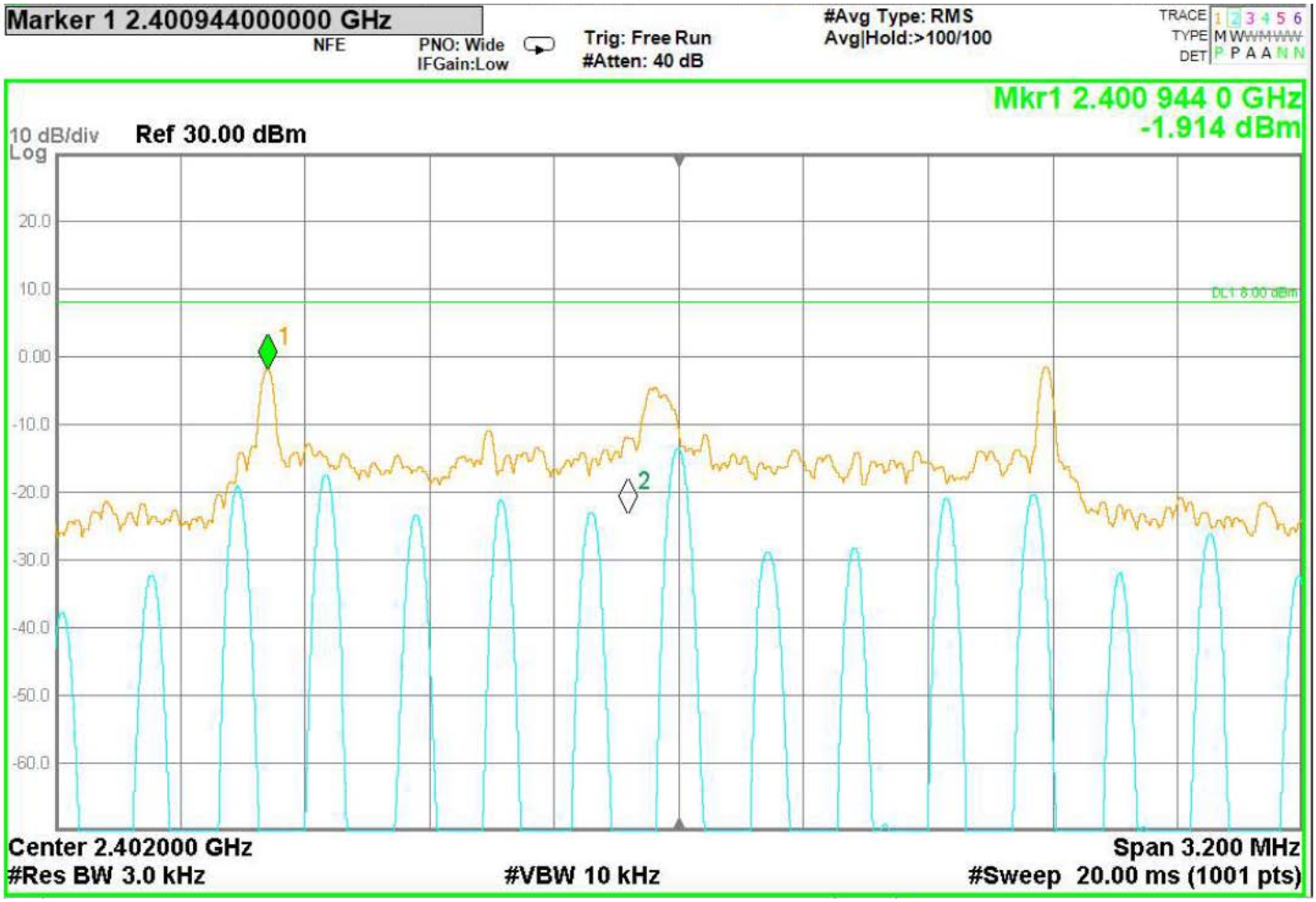
POWER SPECTRAL DENSITY

DATA SHEETS

POWER SPECTRAL DENSITY – LOW CHANNEL

FCC 15.247

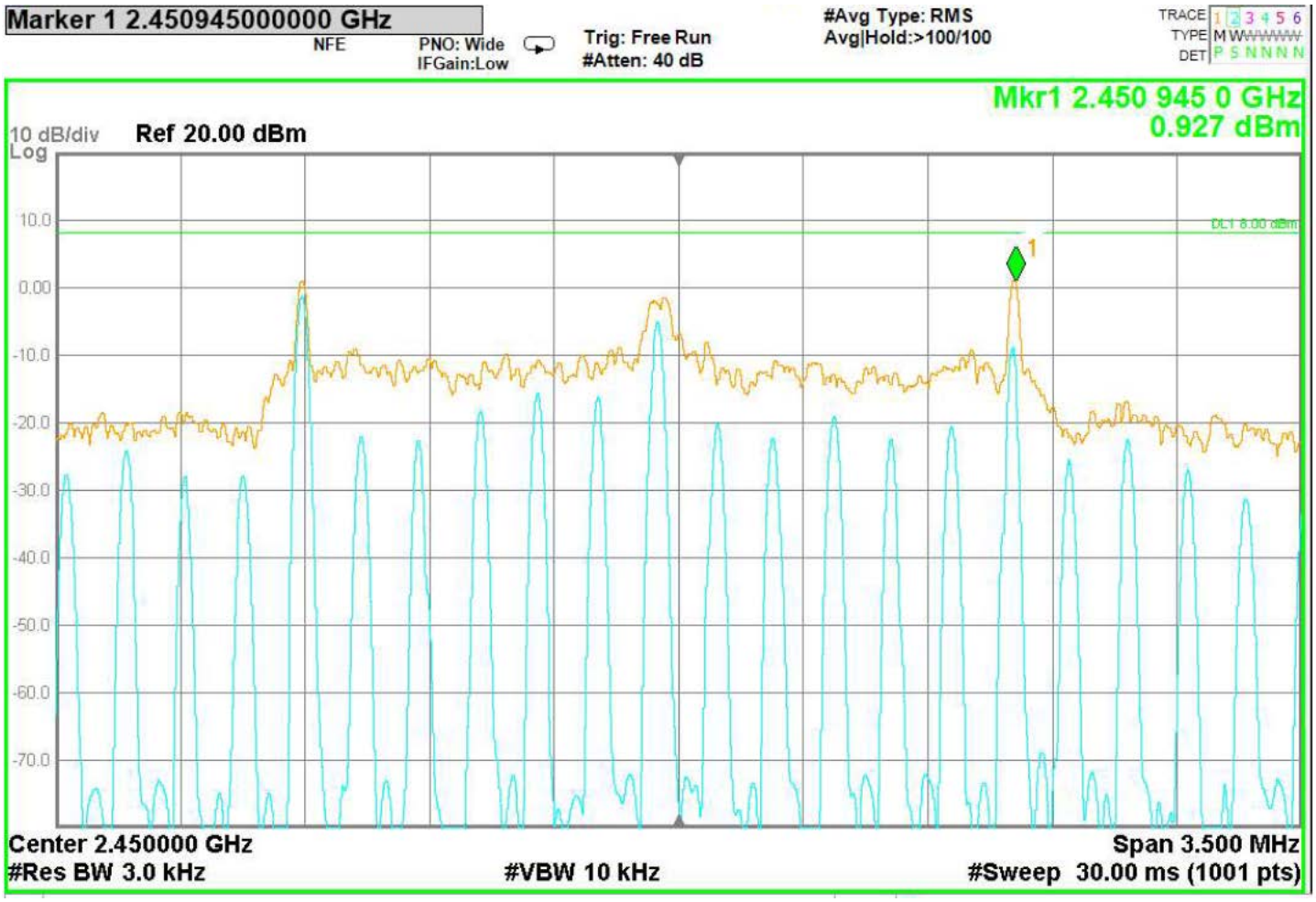
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



POWER SPECTRAL DENSITY – MID CHANNEL

FCC 15.247

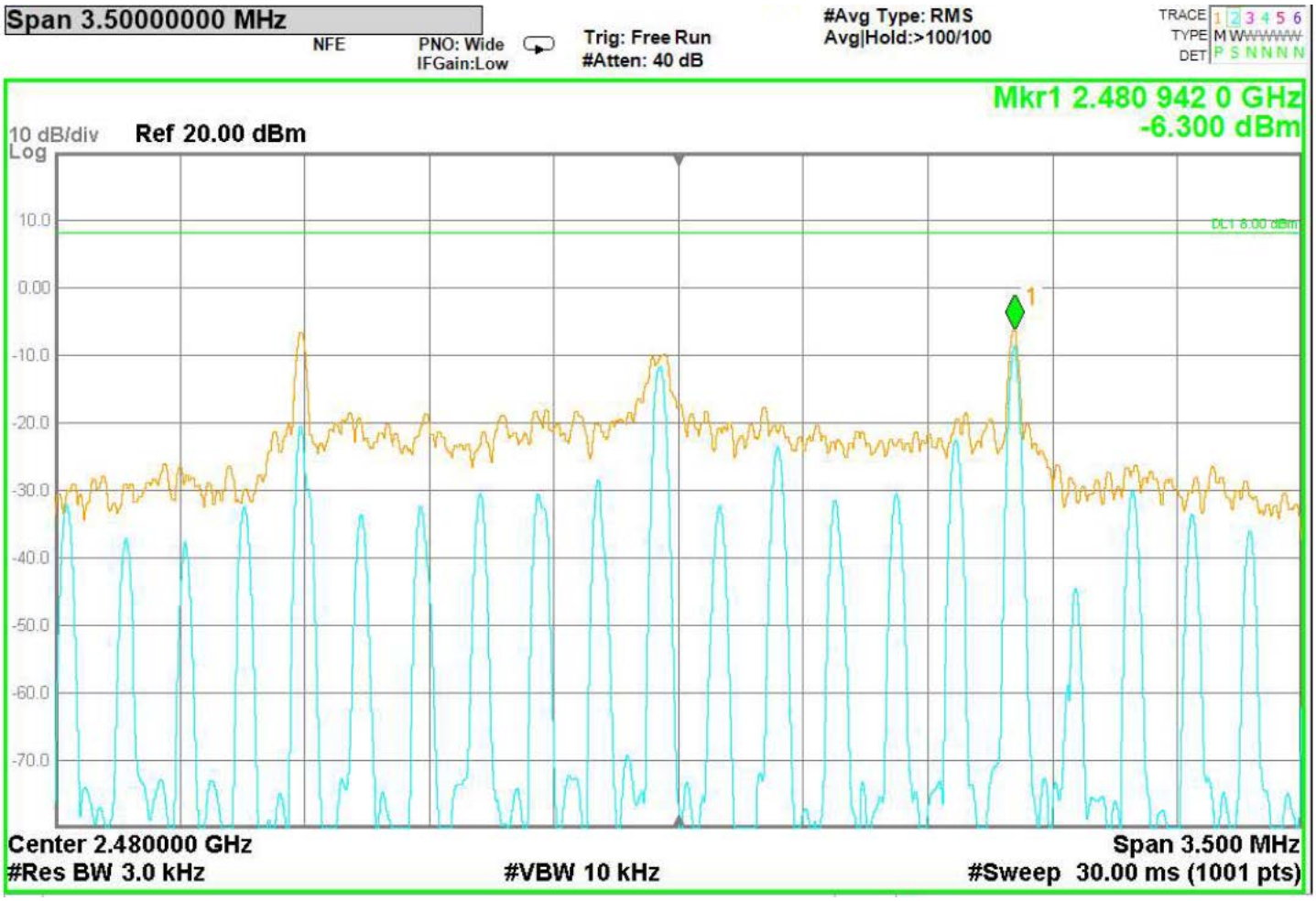
Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



POWER SPECTRAL DENSITY – HIGH CHANNEL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang



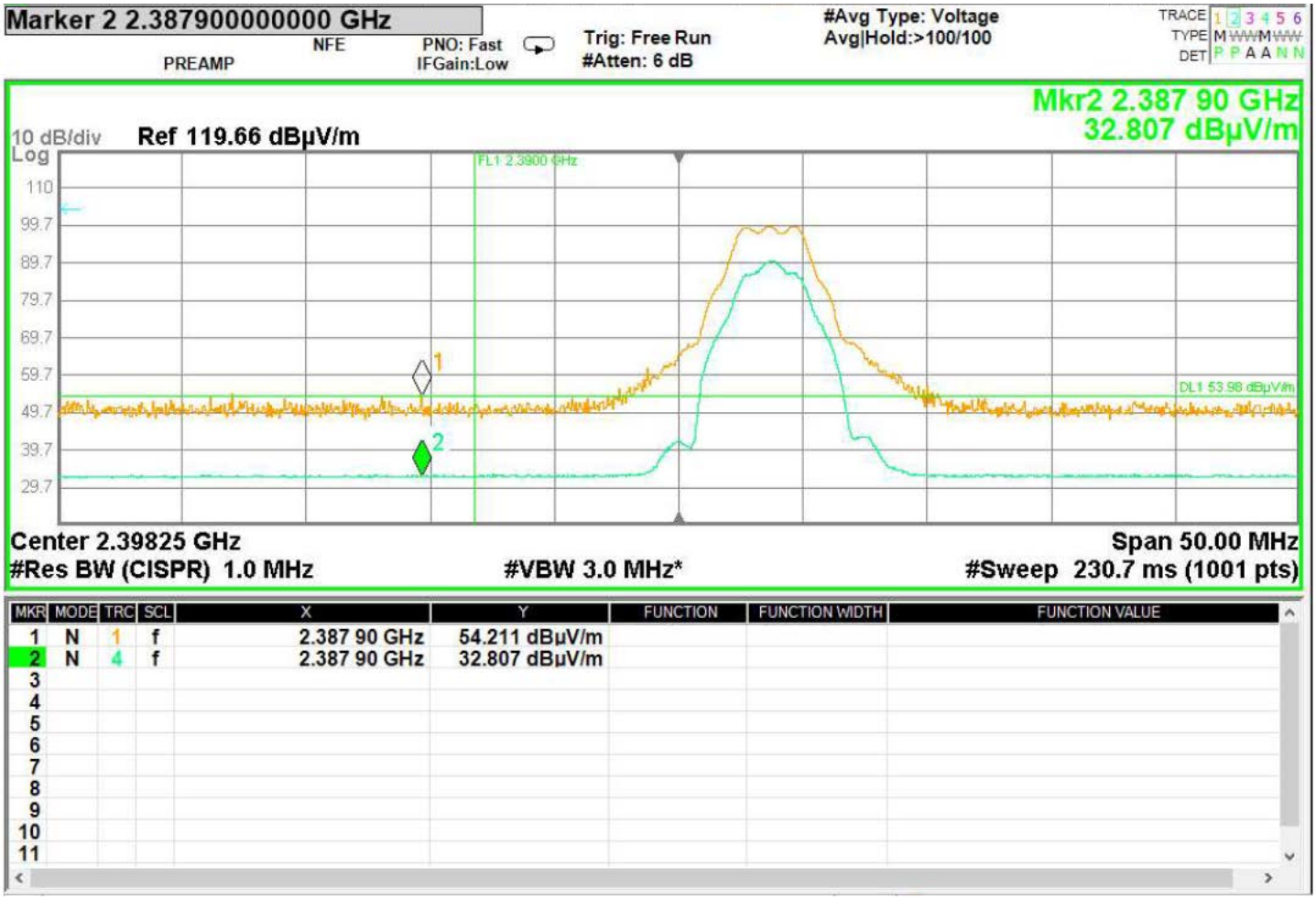
BAND EDGES

DATA SHEETS

LOWER BAND EDGE IN RESTRICTED BANDS - HORIZONTAL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang

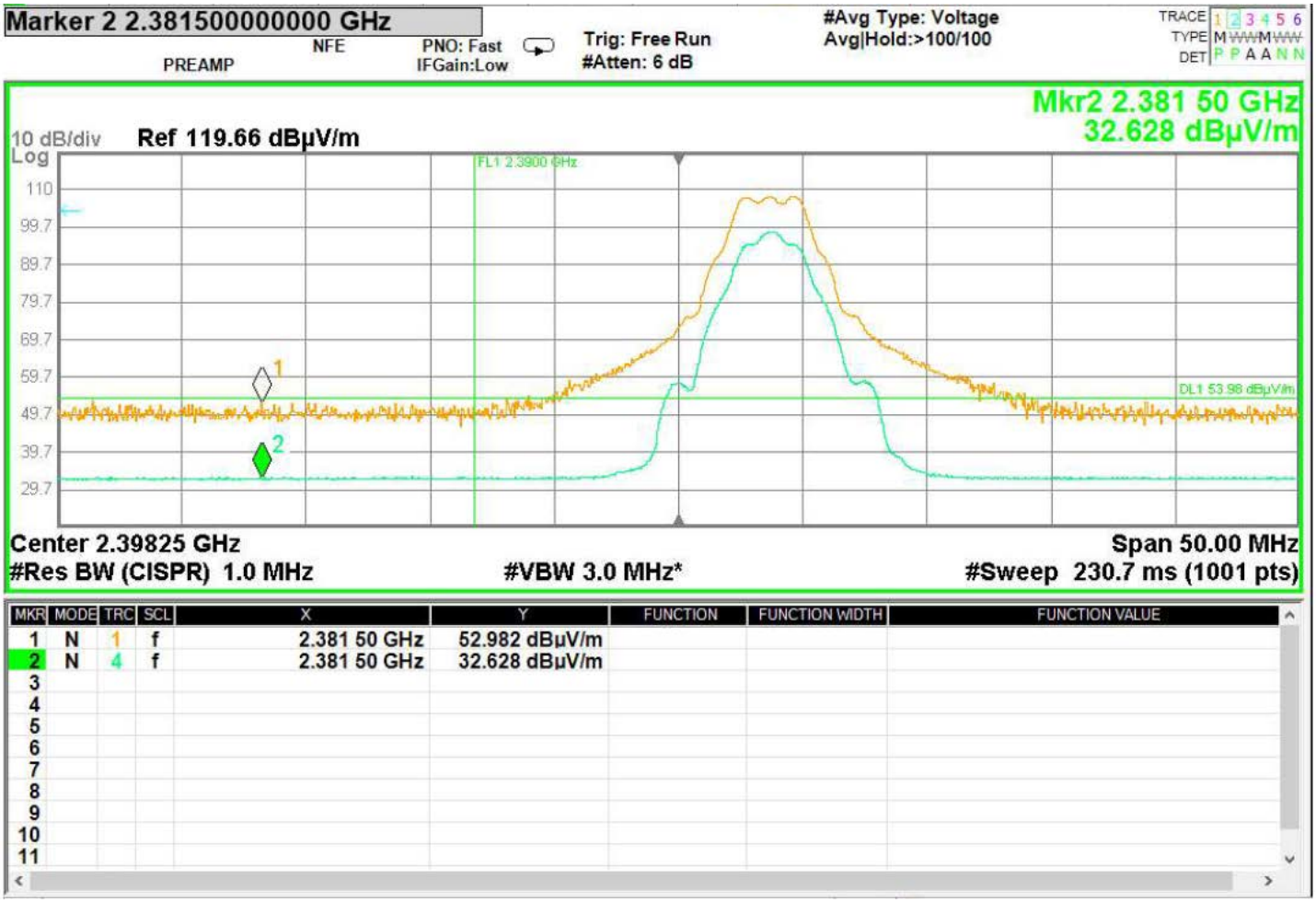


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.387 90 GHz	54.211 dBµV/m			
2	N	4	f	2.387 90 GHz	32.807 dBµV/m			
3								
4								
5								
6								
7								
8								
9								
10								
11								

LOWER BAND EDGE IN RESTRICTED BANDS - VERTICAL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang

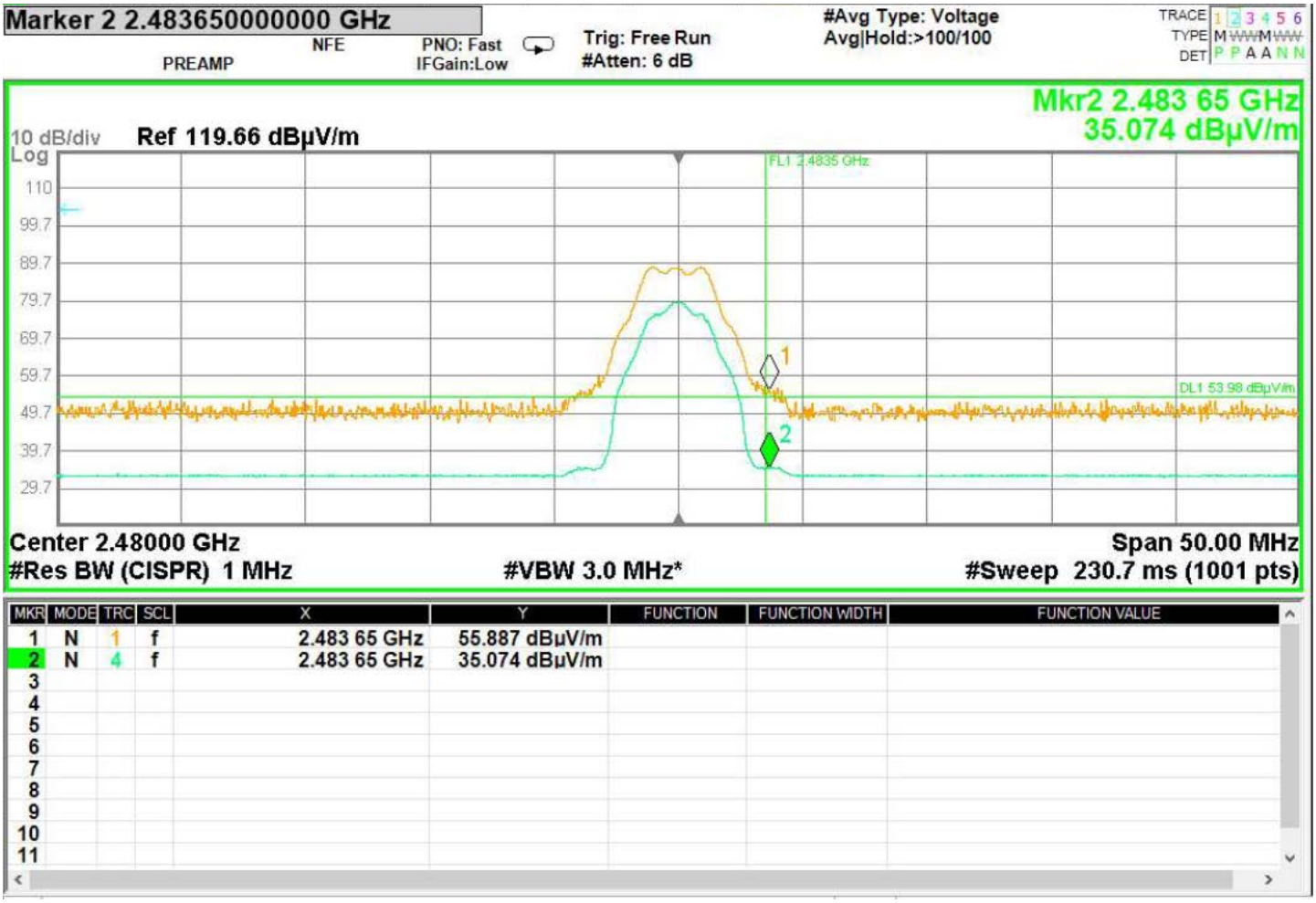


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.381 50 GHz	52.982 dBµV/m			
2	N	4	f	2.381 50 GHz	32.628 dBµV/m			
3								
4								
5								
6								
7								
8								
9								
10								
11								

UPPER BAND EDGE IN RESTRICTED BANDS - HORIZONAL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang

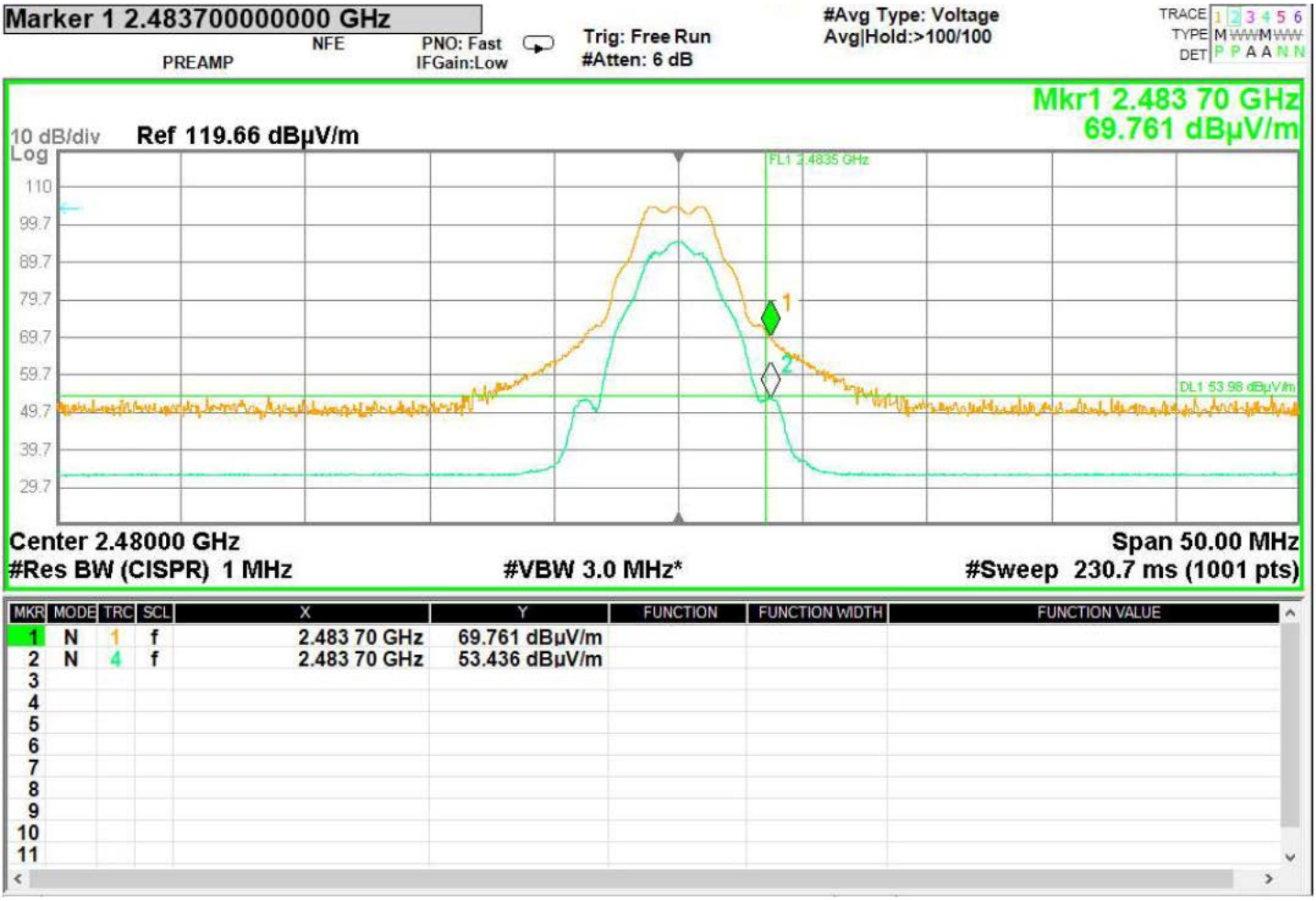


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.483 65 GHz	55.887 dBµV/m			
2	N	4	f	2.483 65 GHz	35.074 dBµV/m			
3								
4								
5								
6								
7								
8								
9								
10								
11								

UPPER BAND EDGE IN RESTRICTED BANDS - VERTICAL

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang

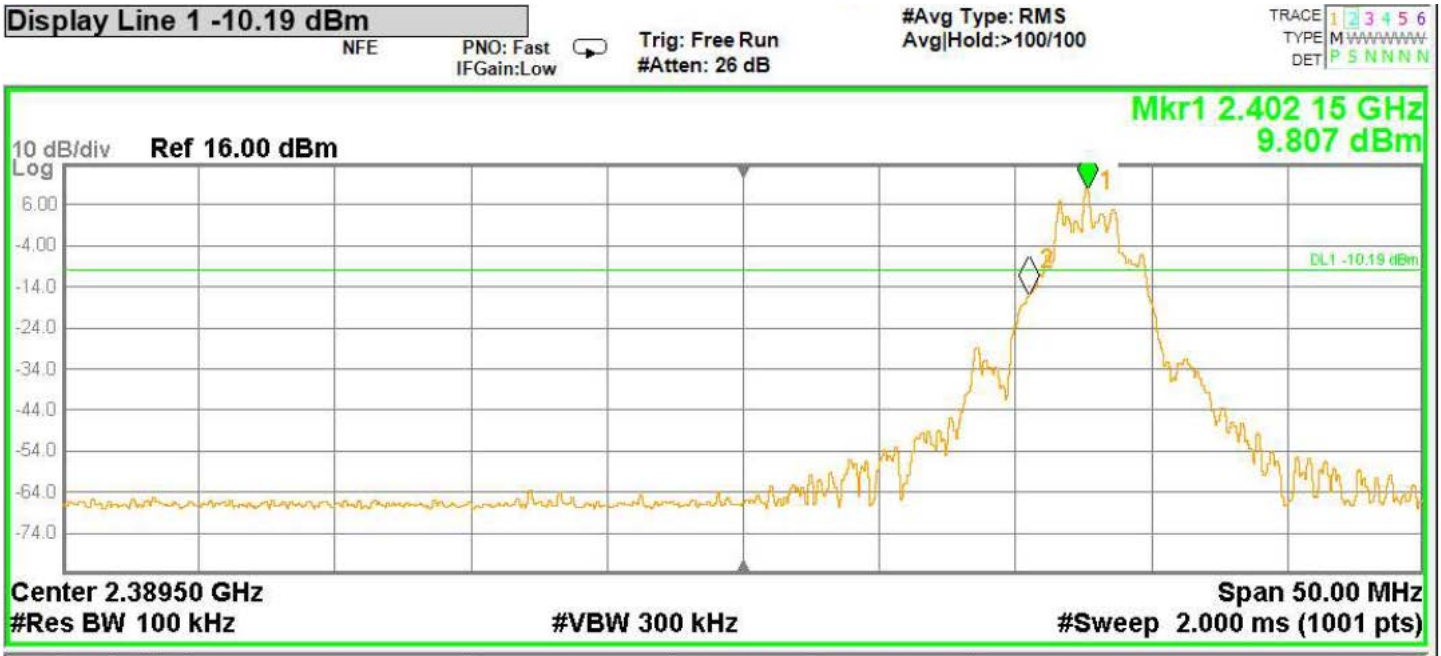


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.483 70 GHz	69.761 dBµV/m			
2	N	4	f	2.483 70 GHz	53.436 dBµV/m			
3								
4								
5								
6								
7								
8								
9								
10								
11								

LOWER BAND EDGE AND OUT OF BANDS EMISSIONS

FCC 15.247

Company:	OStream, Inc.	Date:	9/9/2021
EUT:	Radio	Lab:	R
Model:	OS-RAD2	Tested By:	Howard Huang

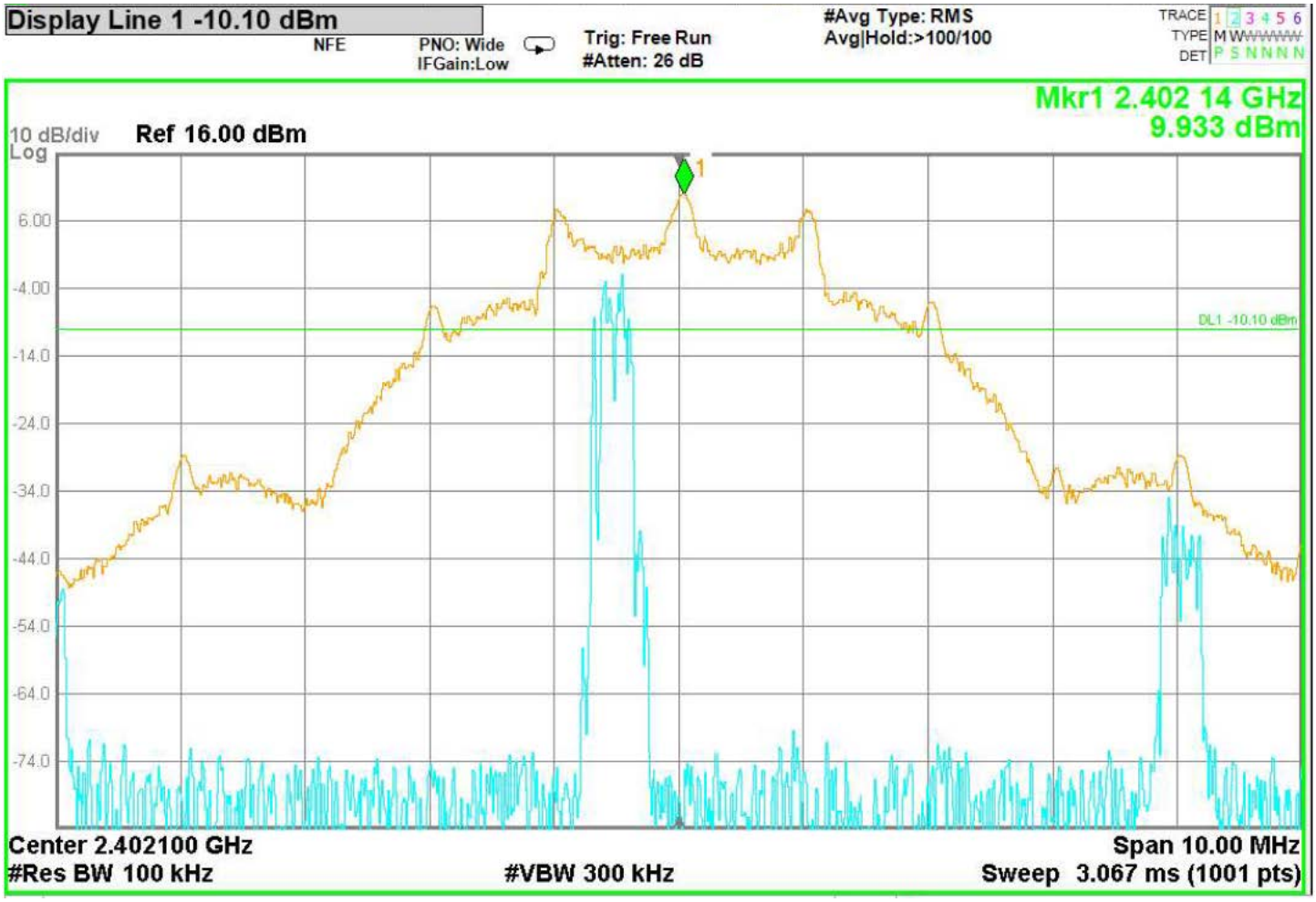


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 15 GHz	9.807 dBm			
2	N	1	f	2.400 00 GHz	-16.246 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

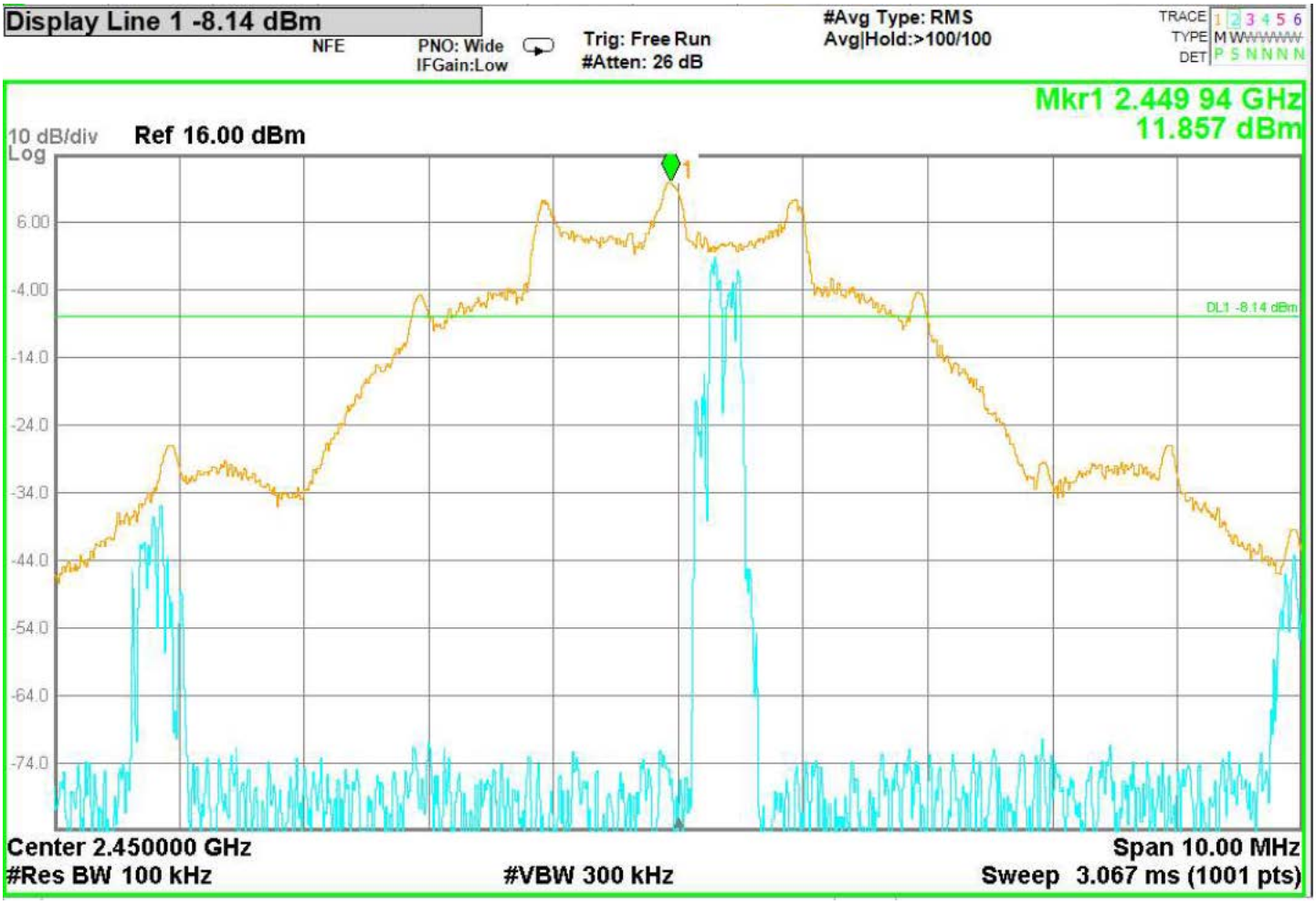
EMISSIONS IN NON-RESTRICTED BANDS

DATA SHEETS

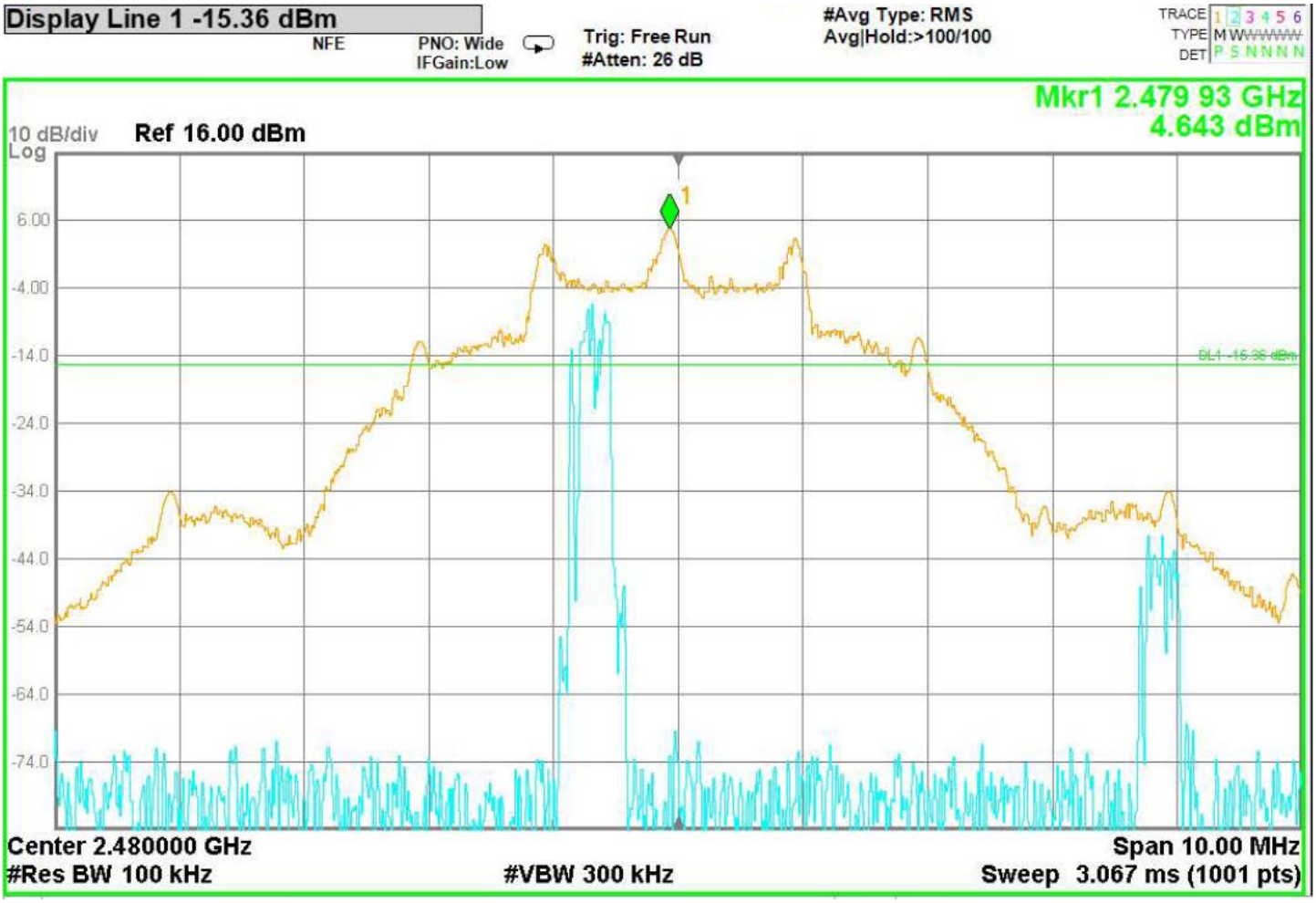
RF ANTENNA CONDUCTED – REFERENCE LEVEL – LOW CHANNEL



RF ANTENNA CONDUCTED – REFERENCE LEVEL – MID CHANNEL



RF ANTENNA CONDUCTED – REFERENCE LEVEL – HIGH CHANNEL



HARMONICS IN NON-RESTRICTED BANDS

Company	Ostream	Date	9/9/2021
EUT	Radio	Lab	R
Model	OS-RAD2	Tested by	Howard Huang

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
Low Channel			
7206	-65.16	-10.10	-55.06
9608	-55.80	-10.10	-45.70
14412	-49.86	-10.10	-39.76
16814	-64.50	-10.10	-54.40
21618	-47.72	-10.10	-37.62
24020	-53.98	-10.10	-43.88
Mid Channel			
9800	-47.36	-8.14	-39.22
14700	-53.05	-8.14	-44.91
17150	-54.77	-8.14	-46.63
24500	-54.35	-8.14	-46.21
High Channel			
9920	-56.06	-15.36	-40.70
14880	-65.71	-15.36	-50.35
17360	-65.55	-15.36	-50.19
24800	-61.81	-15.36	-46.45

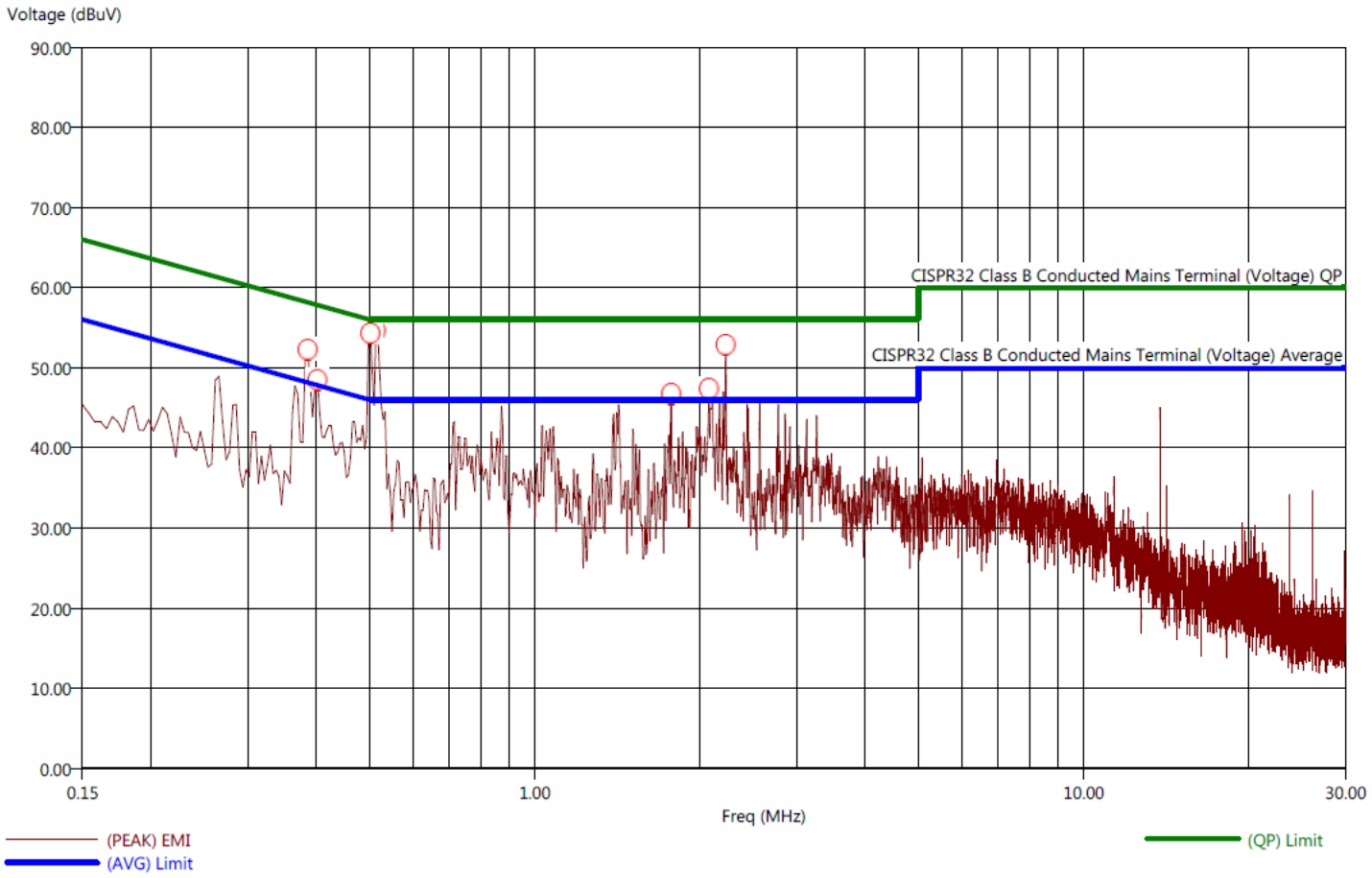
CONDUCTED EMISSIONS

DATA SHEETS

Test title: CISPR 32 Class B
File: 04-Conducted Pre-Line-120V
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:62f
Hum:37%
120V 60Hz (Volgen PSU)

1/21/2022 8:45:34 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: CISPR 32 Class B
File: 04-Conducted Final-Line-120V
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:62f
Hum:37%
120V 60Hz (Volgen PSU)

1/21/2022 8:47:22 AM
Sequence: Final Measurements

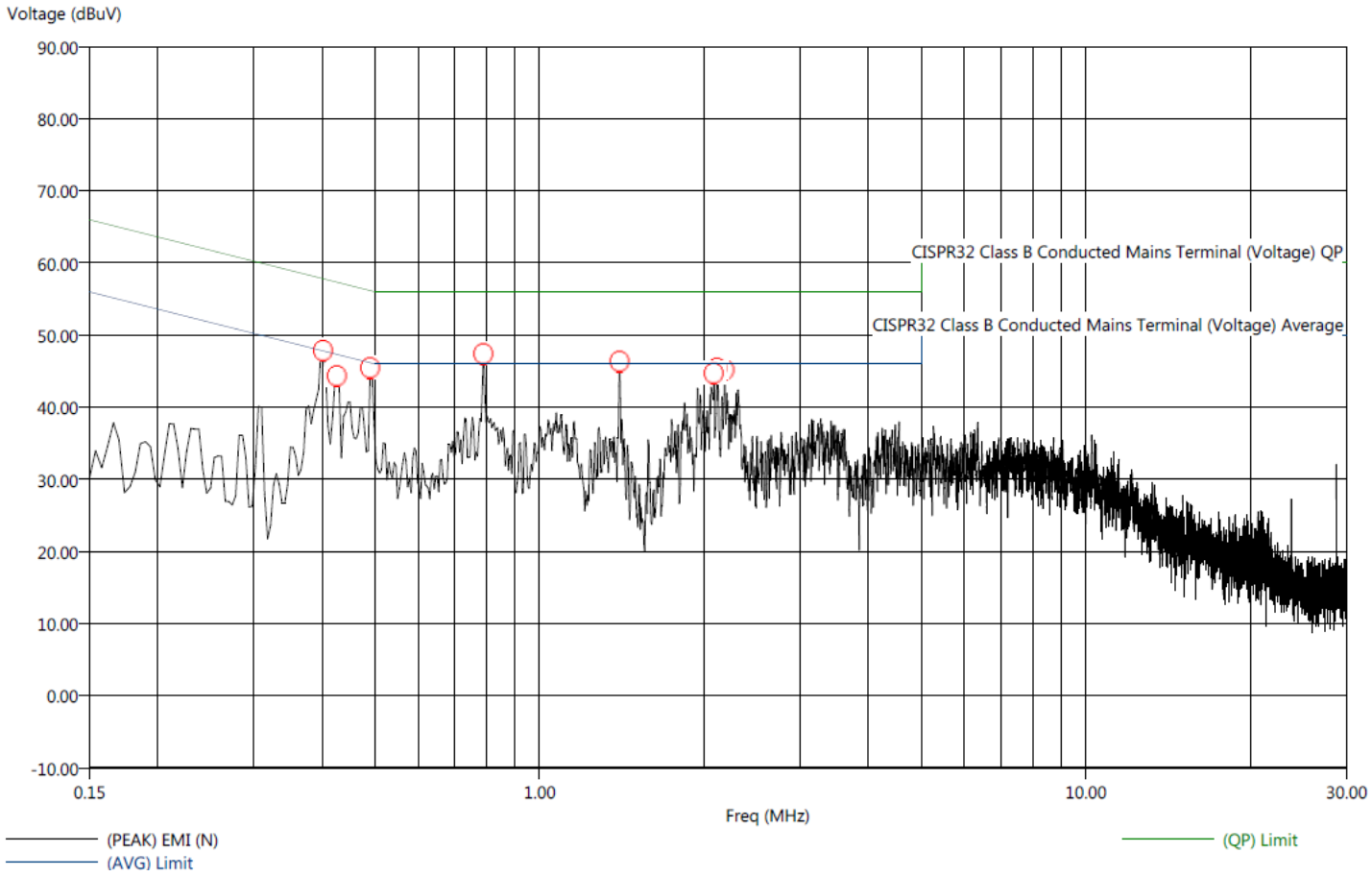
Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	AVG Margin (dB)	QP Margin (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.39	-1.95	-7.21	45.92	50.66	55.15	47.87	57.87	0.04	0.00
0.40	-13.09	-12.15	34.64	45.58	50.85	47.72	57.72	0.04	0.00
0.50	-8.73	-2.07	37.27	53.93	60.33	46.00	56.00	0.03	0.00
0.51	-7.89	-0.93	38.11	55.07	60.16	46.00	56.00	0.03	0.00
1.77	-14.08	-13.04	31.92	42.96	49.07	46.00	56.00	0.04	0.04
2.08	-10.04	-9.47	35.96	46.53	53.58	46.00	56.00	0.04	0.04
2.23	-14.28	-11.56	31.72	44.44	52.44	46.00	56.00	0.04	0.05

Test title: CISPR 32 Class B
File: 04-Conducted Pre-Neutral-120V
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:62f
Hum:37%
120V 60Hz (Volgen PSU)

1/21/2022 8:31:42 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB R)



Test title: CISPR 32 Class B
File: 04-Conducted Final-Neutral-120V
Operator name: Howard Huang
EUT type: Radio/OS-RAD2
EUT condition: The EUT is constantly transmitting at mid channel
Notes: Company: OStream
Temp:62f
Hum:37%
120V 60Hz (Volgen PSU)

1/21/2022 8:33:00 AM
Sequence: Final Measurements

Compatible Electronics, Inc. FAC-3 (LAB R)

Freq (MHz)	AVG Margin (dB)	QP Margin (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.40	-2.21	-9.87	45.65	47.99	52.91	47.86	57.86	0.04	0.00
0.43	-6.38	-11.95	40.99	45.42	51.59	47.37	57.37	0.04	0.00
0.49	-10.18	-9.26	35.91	46.83	58.36	46.09	56.09	0.03	0.00
0.79	-11.08	-15.41	34.92	40.59	48.95	46.00	56.00	0.03	0.01
1.40	-18.07	-20.41	27.93	35.59	44.38	46.00	56.00	0.04	0.02
2.09	-11.42	-11.39	34.58	44.61	51.11	46.00	56.00	0.04	0.05
2.11	-12.68	-12.89	33.32	43.11	48.92	46.00	56.00	0.04	0.05
2.18	-11.84	-12.68	34.16	43.32	49.70	46.00	56.00	0.04	0.05