

**FCC PART 15, SUBPART B and C; RSS-247 and RSS-GEN
TEST REPORT***For***900 MHz Sensor****Model: VPx Pro****Part Number: DS-VP-PRO-900-S**

Prepared for

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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.

The client must not use this report to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the U.S. government.

Device Tested: 900 MHz Sensor
Models: VPx Pro
P/N: DS-VP-PRO-900-S

Product Description: The EUT a wireless sensor system to monitor the storage of vaccines. Clocks in the EUT are 32.168 kHz (main), 32.768 kHz and 48 MHz (Radio). The Dimensions of the EUT is 3.5" X 5.75" X 1.5". (G4 Configuration)

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

Customer: Mesa Labs, Inc.
12100 West 6th Avenue
Lakewood, Colorado 80228

Test Dates: October 4, 5, 6, 7, and 12 2021

Test Specifications 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;
RSS-247 and RSS-GEN



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	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; RSS-247 and RSS-GEN Highest reading in relation to spec limit: 44.03 dBuV @ 0.162 MHz (*U = 2.73 dB)
2	Radiated RF Emissions, 9 kHz –9300 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; RSS-247 and RSS-GEN Highest reading in relation to spec limit: 43.86 dBuV/m @ 298.40 MHz (*U = 3.27 dB)
3	20 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a) (1) (i); RSS-247
4	Peak Power Output	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b) (2); RSS-247
5	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (d); RSS-247
6	Carrier Frequency Separation	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a) (1); RSS-247
7	Average Time of Occupancy	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a) (1) (i); RSS-247
8	Peak Power Spectral Density from the International Radiator to the Antenna	This test was not performed because the EUT is a frequency hopper.
9	99% Bandwidth	This test was performed to obtain the emission designator required by Innovation, Science and Economic Development Canada.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the 900 MHz Sensor, Model: VPx Pro, Part Number: DS-VP-PRO-900-S. The emissions measurements were performed according to the measurement procedures described in ANSI C63.4 and ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247; RSS-247 and RSS-GEN.

Note: This test report is for the G4 configuration. For the G5/G6 configuration, please see Compatible Electronics, Inc. test report B10812D1.

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 considering 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

Mesa Labs, Inc.

Joel Cunningham	Engineering Lead
Nate Ihle	Firmware/Hardware Engineer
Wes Mahoney	Electrical/RF Engineer
Paul Hill	Senior Engineer

Compatible Electronics Inc.

Tae Hyun Kim	Test Technician
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on July 28th, 2021.

2.5 Disposition of the Test Sample

The test sample has not been returned to Mesa Labs, 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	Model
S/N	Serial Number
ITE	Information Technology Equipment
N/A	Not Applicable
RF	Radio Frequency
HP	Hewlett Packard
LISN	Line Impedance Stabilization Network
LO	Local Oscillator
TX	Transmit
RX	Receive

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this emission 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
KDB 558074 D01 v05r02	Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules
ANSI C63.4: 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2013	American National Standard of procedure for compliance testing of unlicensed wireless devices
RSS-GEN Issue 5 + Amendment 1 + Amendment 2	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmissions Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

AC Power Mode: The VPx Sensor 900 MHz with LCD, Model: CM-000272 (EUT) was connected to (2) RTD probes, I2C temperature-humidity sensor, and power supply via its J1 and J2; J4; and power ports, respectively. The J3 port of the EUT was also connected to an unterminated cable.

Battery Mode: The VPx Sensor 900 MHz with LCD, Model: CM-000272 (EUT) was connected to (2) RTD probes and I2C temperature-humidity sensor via its J1 and J2; and J4 ports, respectively. The J3 port of the EUT was also connected to an unterminated cable.

The unit is in its G4-Configuration.

For operating the EUT for the intentional radiator portion of the test: The EUT was connected to a laptop that had a program that locked one channel at a time so that the low, middle, and high channels could be tested. The EUT was tested in three orthogonal axis. The carrier was modulated in the same way it would be when the EUT was in its normal operating mode.

For operating the EUT for the unintentional radiator and conducted emission portion of the test: The EUT was connected to a laptop that allowed the EUT to function as normal. The laptop was then disconnected from the EUT. The receive mode was tested in the low, middle, and high channels as well as its normal hopping mode.

Note: The laptop was only connected to the EUT to program the correct configuration and then was removed during the testing.

The software used to program the EUT was the Mesa Labs VPx Configuration Utility Version 1.3.6.4 that had a special page that allowed the EUT to continually transmit on a single channel or frequency hop on a certain hop set.

The software is stored on the company's server.

The X-Axis is when the EUT is parallel to the ground reference plane. The Y-Axis is when the EUT is perpendicular to the ground reference plane.

The final radiated data for the EUT as well as the conducted data was taken in modes above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 (For AC Mode Only)

This is a 2-meter unshielded cable connecting the power supply to the EUT. The cable is hard wired at the power supply end and has a 1/8 inch power connector at the EUT end. The cable was bundled to a length of 1-meter.

Cable 2 This is a 3.65-meter unshielded cable connecting the EUT to the RTD sensor #1. The cable has a 4-pin terminal block at the EUT end and is hard wired into RTD sensor #1. The cable was bundled to so that it remained 40-centimeters above the ground plane.

Cable 3 This is a 3.65-meter unshielded cable connecting the EUT to the RTD sensor #2. The cable has a 4-pin terminal block at the EUT end and is hard wired into RTD sensor #2. The cable was bundled to so that it remained 40-centimeters above the ground plane.

Cable 4 This a 2-meter unshielded, unterminated cable connected to the EUT. The cable has a 2-pin terminal block at the EUT end. The cable was bundled to so that it remained 40-centimeters above the ground plane.

Cable 5 This is a 10-centimeter cable connecting the EUT to the I2C temperature-humidity sensor. The cable has an RJ-11 connector at the EUT end and is hard wired into the I2C temperature-humidity sensor..

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
900 MHz Sensor	MESA LABS, INC.	VPx Pro	Part Number: DS-VP-PRO-900-S	UUYVPXFLX
RTD SENSOR #1	MESA LABS, INC.	CM-000186	132394	N/A
RTD SENSOR #2	MESA LABS, INC.	CM-000186	132377	N/A
I2C TEMPERATURE- HUMIDITY SENSOR	N/A	N/A	N/A	N/A
POWER SUPPLY FOR 900 MHZ SENSOR	V-INFINITY	EPS050100	NA	N/A
SOFTWARE*	MESA LABS, INC.	VERSION 1.3.6.4	SW-00056	N/A
AC ADAPTER FOR LAPTOP*	HEWLETT PACKARD	PPP012D-S	WCNXF0ACX3OCXS	N/A
LAPTOP*	HEWLETT PACKARD	PROBOOK 6560B	N/A	N/A

*Used only for programming EUT. It was not part of the test.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
RF RADIATED AND CONDUCTED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
MXE EMI Receiver, 3 Hz – 44 GHz	Keysight Technologies, Inc.	N9038A	MY51210150	September 17, 2021	1 Year
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A
Loop Antenna	Com-Power	AL-130R	121090	February 5, 2019	3 Year
CombiLog Antenna	Com-Power	AC-220	10030004	January 14, 2020	2 Year
Horn Antenna	Com-Power	AH-118	10050113	February 4, 2020	2 Year
Preamplifier	Com-Power	PA-118	181653	March 3, 2021	1 Year
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
LISN	Com-Power	LI-215A	191951	August 4, 2021	2 Year
Attenuator 10 dB	Surecall	SC-ATT-10	17100025	November 20, 2020	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 of this report for emissions test location.

6.2 EUT Mounting, Bonding and Grounding

For frequencies 1 GHz and below: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 1.5 meters above the ground plane.

The EUT was not grounded.

6.3 Measurement Uncertainty

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}	$U_{lab} = 2 u_c(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3.4 dB	2.73 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	6.3 dB	3.27 dB (Vertical) 3.19 dB (Horizontal)
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(1 GHz - 6 GHz)	5.2 dB	3.95 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(6 GHz – 18 GHz)	5.5 dB	3.95 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(18 GHz – 26.5 GHz)	N/A	4.69 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(26.5 GHz – 40 GHz)	N/A	4.55 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 Description and Frequencies

The FHSS uses at least a minimum of 50 channels minimum using a pseudo random technique. It uses GFSK modulation. Please see the channel separation data sheet in Appendix E for the separation between channels for each sub-band.

The four sub-bands that the EUT can operate on are:

1. 906.00 to 924.00 MHz, which contains 58 channels
2. 903.00 to 926.00 MHz, which contains 58 channels
3. 903.00 to 913.325 MHz, which contains 58 channels
4. 914.773 to 926.00 MHz, which contains 58 channels

See Appendix E for the each plot showing the total number of channels in each sub-band.

7.2 Antenna Gain

The antenna has a gain of 1.971 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 was used for the protection of the EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the EMI Receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by computer software. The final qualification data is located in Appendix E.

The EUT was tested at 120 VAC. The six highest emissions are listed in Table 1.0.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Section 15.207; and the limits of RSS-247 and RSS-GEN for conducted emissions. Please see Appendix E for the data sheets.

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was 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. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured (200 Hz for 10 kHz to 150 kHz, 9 kHz for 150 kHz to 30 MHz, 120 kHz for 30 MHz to 1 GHz and 1 MHz for 1 GHz to 9.3 GHz).

The frequencies above 1 GHz were averaged by using duty cycle correction factor.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

The EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 2.0.

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 9.3 GHz	1 MHz	Horn Antenna

Test Results:

The EUT 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 sections 15.205, 15.209 and 15.247 (d); and the limits of RSS-247 and RSS-GEN for radiated emissions.

8.1.3 RF Emissions Test Results

Table 1.0 CONDUCTED EMISSION RESULTS
900 MHz Sensor
Models: VPx Pro; Part Number: DS-VP-PRO-900-S

Frequency MHz	Average Corrected Reading* dBuV	Average Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
0.162 (BL) (Rx)	44.03	54.93	-10.90
0.190 (BL) (Rx)	42.82	53.98	-11.16
0.178 (BL) (Rx)	42.58	53.76	-11.18
0.426 (WL) (Tx)	35.46	47.30	-11.84
0.430 (WL) (Rx)	34.80	47.28	-12.48
0.390 (WL) (Tx)	33.86	48.14	-14.28

Table 2.0 RADIATED EMISSION RESULTS
900 MHz Sensor
Models: VPx Pro; Part Number: DS-VP-PRO-900-S

Frequency MHz	Quasi-Peak EMI Reading* (dBuV)	Specification Limit (dBuV)	Delta (Cor. Reading – Spec. Limit) dB
298.40 (V) (Rx) (AC)	43.86	46.00	-2.14
381.40 (V) (Rx) (AC)	43.82	46.00	-2.18
96.40 (V) (Rx) (AC)	41.13	43.50	-2.37
273.60 (V) (Rx) (AC)	43.29	46.00	-2.71
96.40 (V) (Tx) (AC)	39.07	43.50	-4.43
108.40 (V) (Rx) (AC)	38.42	43.50	-5.08

Notes:

- * The complete emissions data is given in Appendix E of this report.
- (BL) Black Lead (Tx) Transmit
- (WL) White Lead (Rx) Receive
- (V) Vertical
- (H) Horizontal

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 ($\mu\text{V}/\text{m}$) $\log \times 20$ = Specification Limit in $\text{dB}\mu\text{V}/\text{m}$
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.

When the limit is in terms of magnetic field, the following equation applies:

$$H [\text{dB} (\mu\text{A}/\text{m})] = V [\text{dB} (\mu\text{V})] + L_C [\text{dB}] - G_{PA} [\text{dB}] + AF^H [\text{dB}(\text{S}/\text{m})]$$

where: H is the magnetic field strength (to be compared with the limit),
V is the voltage level measured by the receiver or spectrum analyzer,
L_C is the cable loss,
G_{PA} is the gain of the preamplifier (if used), and
AF^H is the magnetic antenna factor.

The G_{PA} term is only included in the equation when an external preamplifier is used in the measurement chain, in front of the receiver or spectrum analyzer. An external preamplifier is not usually necessary (or even advisable, due to risk of saturating the input mixer of the receiver) when an active loop antenna is used. In that case, the antenna factor of the loop already includes the gain of its built-in preamplifier

If the “electrical” antenna factor is used instead, the above equation becomes:

$$H [\text{dB} (\mu\text{A}/\text{m})] = V [\text{dB} (\mu\text{V})] + L_C [\text{dB}] - G_{PA} [\text{dB}] + AF^E [\text{dB} (\text{m}^{-1})] - 51.5 [\text{dB}\Omega]$$

Where: AF^E is the “electric” antenna factor, as provided by the antenna calibration laboratory.

When the limit is in terms of electric field, the following equation applies:

$$E [\text{dB} (\mu\text{V}/\text{m})] = V [\text{dB} (\mu\text{V})] + L_C [\text{dB}] - G_{PA} [\text{dB}] + AF^E [\text{dB} (\text{m}^{-1})]$$

or, if the magnetic antenna factor is used:

$$E [\text{dB} (\mu\text{V}/\text{m})] = V [\text{dB} (\mu\text{V})] + L_C [\text{dB}] - G_{PA} [\text{dB}] + AF^H [\text{dB}(\text{S}/\text{m})] + 51.5 [\text{dB}\Omega]$$

The display of the receiver (or spectrum analyzer) **shall not** be configured in units of current, e.g. μA or $\text{dB} (\mu\text{A})$. That conversion is calculated inside the receiver (or spectrum analyzer) using its input impedance, which is 50 Ω , while the magnetic field calculation is based on the free-space impedance of 377 Ω .

8.2 20 dB Bandwidth

The 20 dB Bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the RF output of the EUT. The resolution bandwidth was between 1% and 5% of the bandwidth and the video bandwidth was $\geq 3 \times \text{RBW}$.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a) (1) (i); and RSS-247. The 20 dB bandwidth is less than the separation between channels. Please see the data sheets located in Appendix E.

8.3 Peak Output Power

The Peak Output Power was measured using the EMI Receiver. The peak output power was measured using a direct connection from the RF output of the EUT. The resolution bandwidth was greater than the 20 dB bandwidth and the video bandwidth was $\geq 3 \times \text{RBW}$. The cable loss was also added back into the reading using the reference level offset.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (b) (2); and RSS-247. The maximum peak output power is less than 1 Watt. Please see the data sheets located in Appendix E.

8.4 RF Antenna Conducted Test

The RF antenna conducted test was performed using the EMI Receiver. The RF antenna conducted test measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The resolution bandwidth was 100 kHz, and the video bandwidth was 300 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d); and RSS-247. The RF power that is produced by the intentional radiator is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. Please see the radiated emission data sheets located in Appendix E.

8.5 RF Band Edges

The RF band edges were taken at the edges of the ISM spectrum (902 MHz when the EUT was on the low channel and 928 MHz when the EUT was on the high channel) using the EMI Receiver. The RBW was set to 100 kHz and the VBW was set to 300 kHz. Plots of the fundamental were taken to ensure the amplitude at the band edges were at least 20 dB down from the peak of the fundamental emission. The plots were taken in both frequency hopping mode and single channel mode.

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 band edges at 902 MHz and 928 MHz meet the requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d); and RSS-247. Please see the data sheets located in Appendix E.

8.6 Carrier Frequency Separation

The Channel Hopping Separation Test was measured using the EMI Receiver. The EUT was operating in its normal operating mode. The resolution bandwidth was approximately 30% of the channel spacing, and the video bandwidth $\geq$ RBW. The frequency span was wide enough to include the peaks of two adjacent channels.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a) (1); and RSS-247. The Channel Hopping Separation is greater than the 20 dB bandwidth. Please see the data sheets located in Appendix E.

8.7 Number of Hopping Frequencies

The Number of Hopping Frequencies was measured using the EMI Receiver. The EUT was operating in its normal operating mode. The resolution bandwidth was set to approximately 30% of the channel spacing, and the video bandwidth was $\geq$ RBW. The frequency span was wide enough to include all of the peaks in the frequency band of operation.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a) (1) and 15.247 (a) (1) (i); and RSS-247. Please see the data sheets located in Appendix E.

8.8 Average Time of Occupancy Test

The Average Time of Occupancy Test was measured using the EMI Receiver. The EUT was operating in normal operating mode. The frequency span was taken to 0 Hz to determine the time for each transmission and the number of transmissions over a 20 second period. The RBW was set to be less than the channel spacing. The low hop band table was determined to be the worst case because this mode results in the pulses appearing more frequently.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a) (1) (i); and RSS-247. Please see the data sheets located in Appendix E.

8.9 Fundamental Field Strength (Duty Cycle Calculations)

The Peak Transmit Radiated Field Strength was measured at a 3-meter test distance. The EMI Receiver was used to obtain the duty cycle. The 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

Duty Cycle Correction Factor = -20.00dB

Pulse = 1 * 18.7 mS

Total On Time = 18.7 mS

Duty Cycle Train was longer than 100mS; therefore 100mS span was used.

8.3 mS / 100 mS = 18.7%

$20 \log (0.187) = -14.56 \text{ dB}$ correction factor

8.10 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 of FCC Title 47, Part 15, Subpart C section 15.31(e); and RSS-247.

8.11 99% Bandwidth

The 99 % bandwidth was measured using an EMI Receiver.

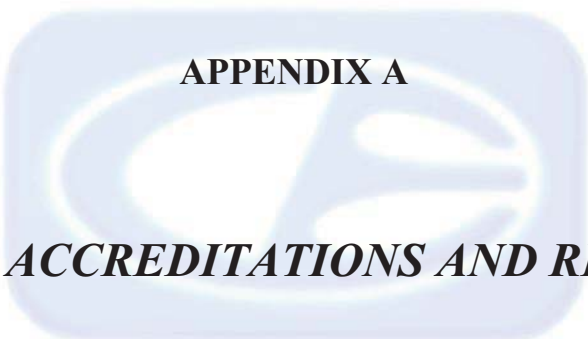
The following steps were performed for measuring the 99% bandwidth per RSS-GEN, Issue 5, clause 6.7:

1. Set RBW to 1 % to 5 % of the actual occupied bandwidth.
2. Set VBW to greater than 3 times the RBW.
3. Set the EMI Receiver to the occupied bandwidth Function set at 99%
4. Set the peak detector to max hold
5. Set the sweep time to auto
6. Allow the trace to stabilize.

Please note that this was only used to determine the emission bandwidth and that there are no limits or pass/fail criteria for this test. Please see the data sheets located in Appendix E.

9. CONCLUSIONS

The 900 MHz Sensor, Model: VPx Pro, Part Number: DS-VP-PRO-900-S (EUT), as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.



APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

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

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

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

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"

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 C, FCC 15.247, RSS-GEN, and RSS-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

900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

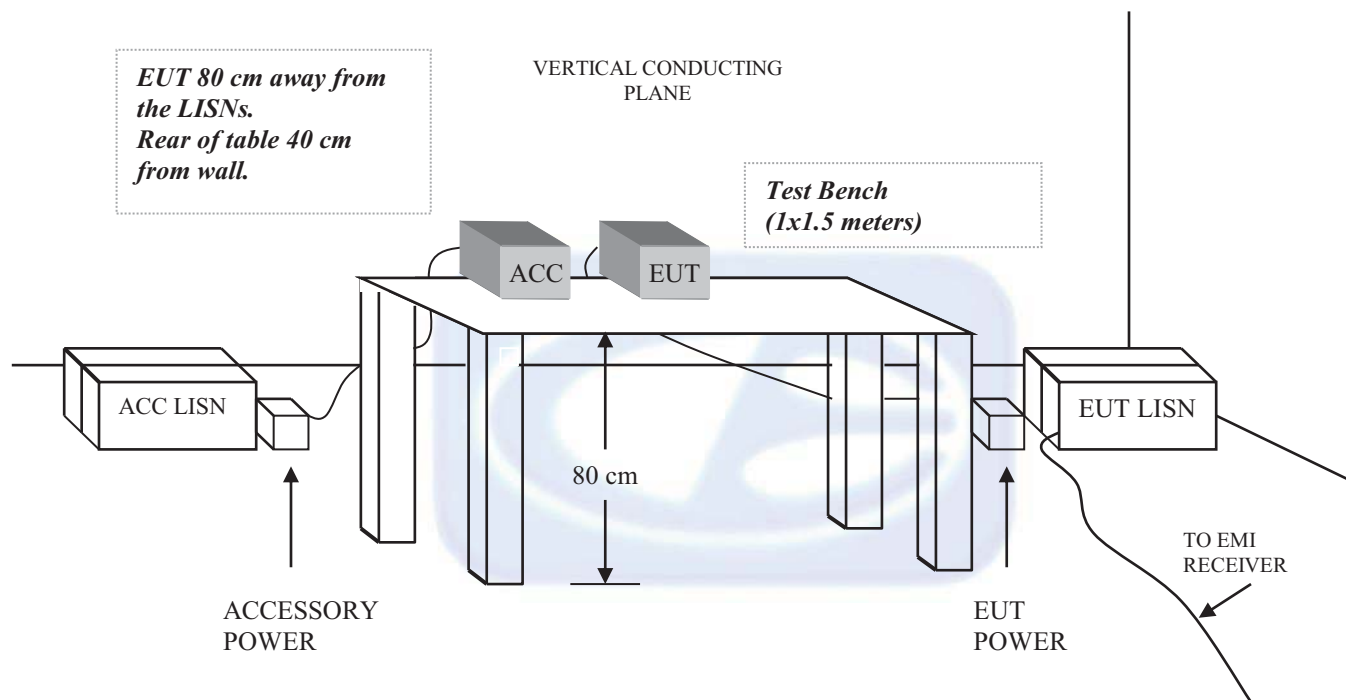
There are no additional models covered under this report.



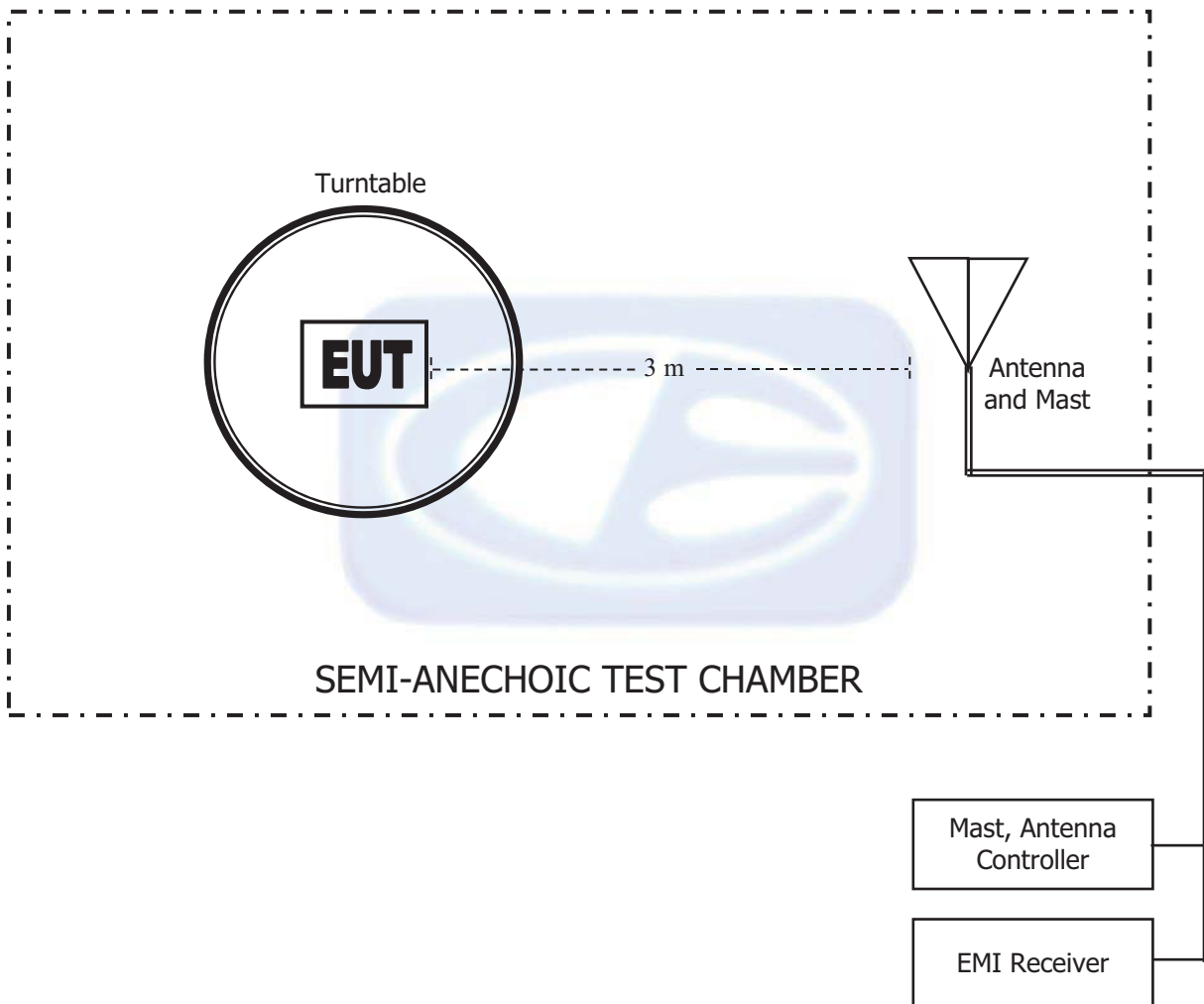
APPENDIX D

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 5, 2019

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.01	15.6	-35.9
0.02	14.8	-36.7
0.03	15.6	-35.9
0.04	15.1	-36.4
0.05	14.4	-37.0
0.06	14.6	-36.9
0.07	14.4	-37.1
0.08	14.3	-37.1
0.09	14.5	-36.9
0.10	14.1	-37.3
0.20	14.1	-37.3
0.30	14.0	-37.4
0.40	14.0	-37.4
0.50	14.2	-37.2
0.60	14.2	-37.2
0.70	14.2	-37.2
0.80	14.2	-37.3
0.90	14.3	-37.2
1.00	14.5	-37.0
2.00	14.5	-36.9
3.00	14.5	-36.9
4.00	14.7	-36.8
5.00	14.6	-36.9
6.00	14.6	-36.9
7.00	14.6	-36.9
8.00	14.6	-36.9
9.00	14.6	-36.9
10.00	14.8	-36.6
11.00	14.9	-36.6
12.00	14.8	-36.6
13.00	14.8	-36.7
14.00	14.6	-36.8
15.00	14.5	-36.9
16.00	14.5	-37.0
17.00	14.6	-36.9
18.00	14.7	-36.7
19.00	14.8	-36.6
20.00	14.9	-36.6
21.00	14.6	-36.8
22.00	14.2	-37.2
23.00	13.7	-37.7
24.00	13.3	-38.2
25.00	13.0	-38.5
26.00	12.9	-38.6
27.00	13.0	-38.5
28.00	13.1	-38.4
29.00	13.1	-38.4
30.00	12.9	-38.5

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 10030004

CALIBRATION DATE: JANAURY 14, 2020

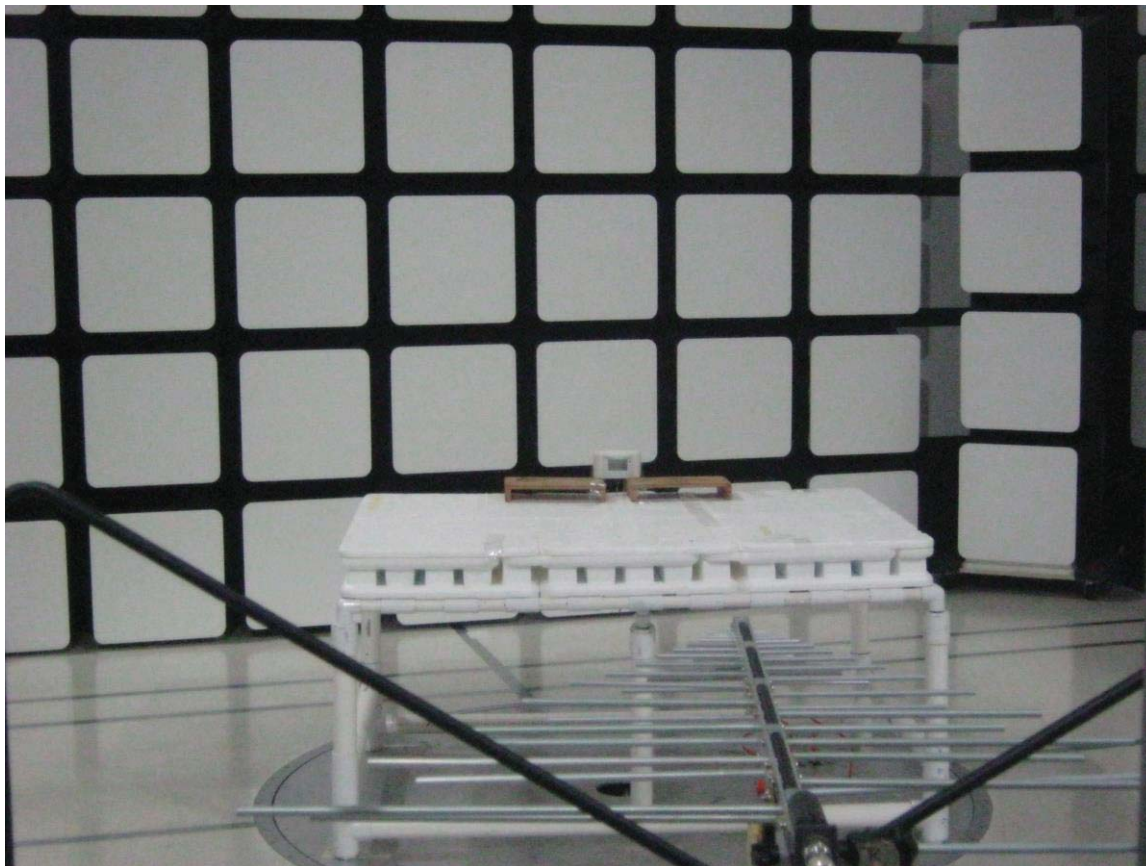
FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.5	200	15.1
35	21.2	250	16.7
40	20.2	300	18.2
45	19.2	350	19.2
50	18.1	400	20.7
60	14.5	450	21.2
70	11.7	500	22.0
80	11.5	550	22.6
90	13.2	600	24.1
100	14.3	650	24.2
120	15.1	700	24.3
125	15.0	750	25.6
140	13.6	800	25.9
150	13.6	850	26.1
160	13.9	900	27.0
175	14.8	950	28.0
180	14.5	1000	27.6

COM POWER AH-118**HORN ANTENNA****S/N: 10050113****CALIBRATION DATE: FEBRUARY 4, 2020**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.343	10.0	38.826
1.5	25.419	10.5	39.102
2.0	28.838	11.0	39.259
2.5	28.971	11.5	39.920
3.0	29.919	12.0	40.149
3.5	30.674	12.5	40.576
4.0	31.670	13.0	40.264
4.5	32.437	13.5	40.364
5.0	33.414	14.0	40.424
5.5	34.003	14.5	41.677
6.0	34.799	15.0	43.010
6.5	35.381	15.5	39.799
7.0	37.024	16.0	40.187
7.5	34.403	16.5	40.155
8.0	37.445	17.0	40.507
8.5	37.390	17.5	41.963
9.0	38.076	18.0	43.196
9.5	38.809		

COM-POWER PA-118**PREAMPLIFIER****S/N: 181653****CALIBRATION DATE: MARCH 3, 2021**

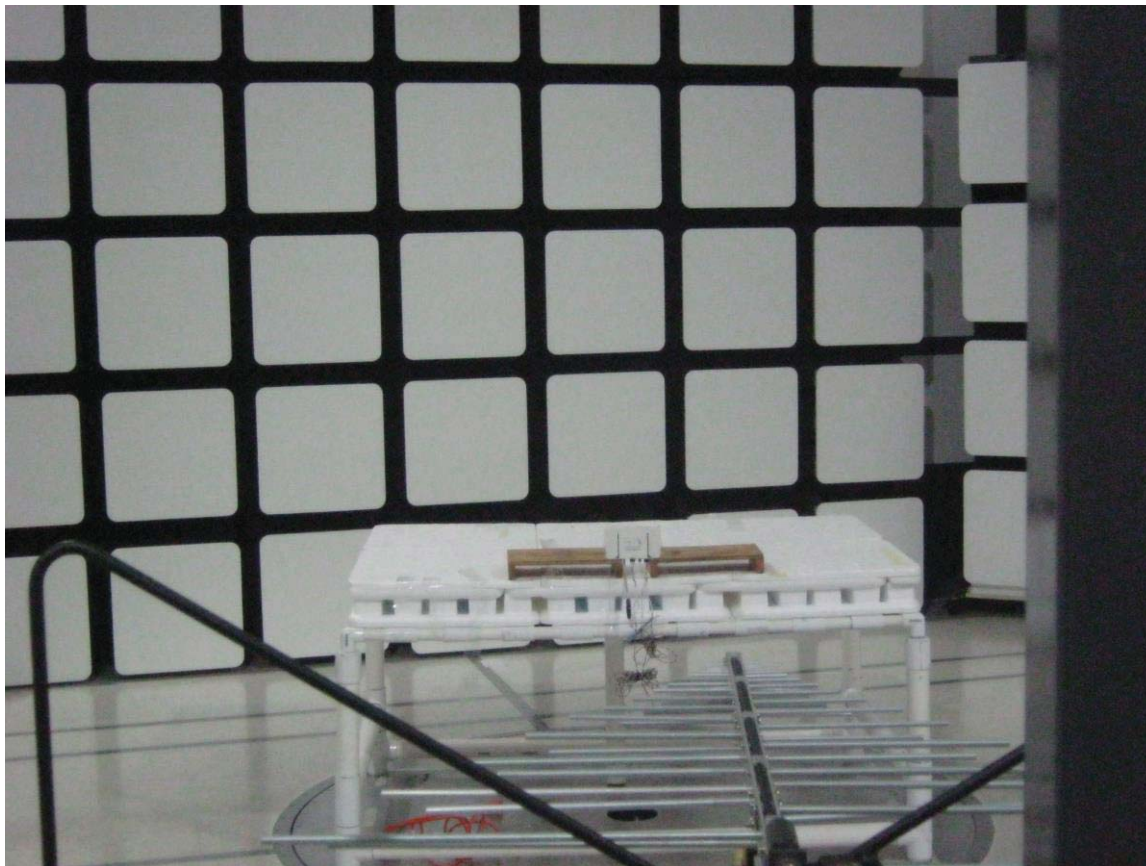
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.18	6.0	39.04
1.1	39.92	6.5	39.16
1.2	39.99	7.0	39.70
1.3	40.19	7.5	39.70
1.4	40.07	8.0	39.56
1.5	40.22	8.5	38.69
1.6	40.23	9.0	39.16
1.7	40.35	9.5	39.70
1.8	40.24	10.0	39.69
1.9	40.29	11.0	38.64
2.0	40.31	12.0	40.41
2.5	40.41	13.0	39.49
3.0	40.59	14.0	39.46
3.5	40.91	15.0	40.38
4.0	40.42	16.0	38.02
4.5	39.92	17.0	39.34
5.0	40.35	18.0	39.86
5.5	39.13		



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
Model: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BELOW 1 GHz
BATTERY MODE

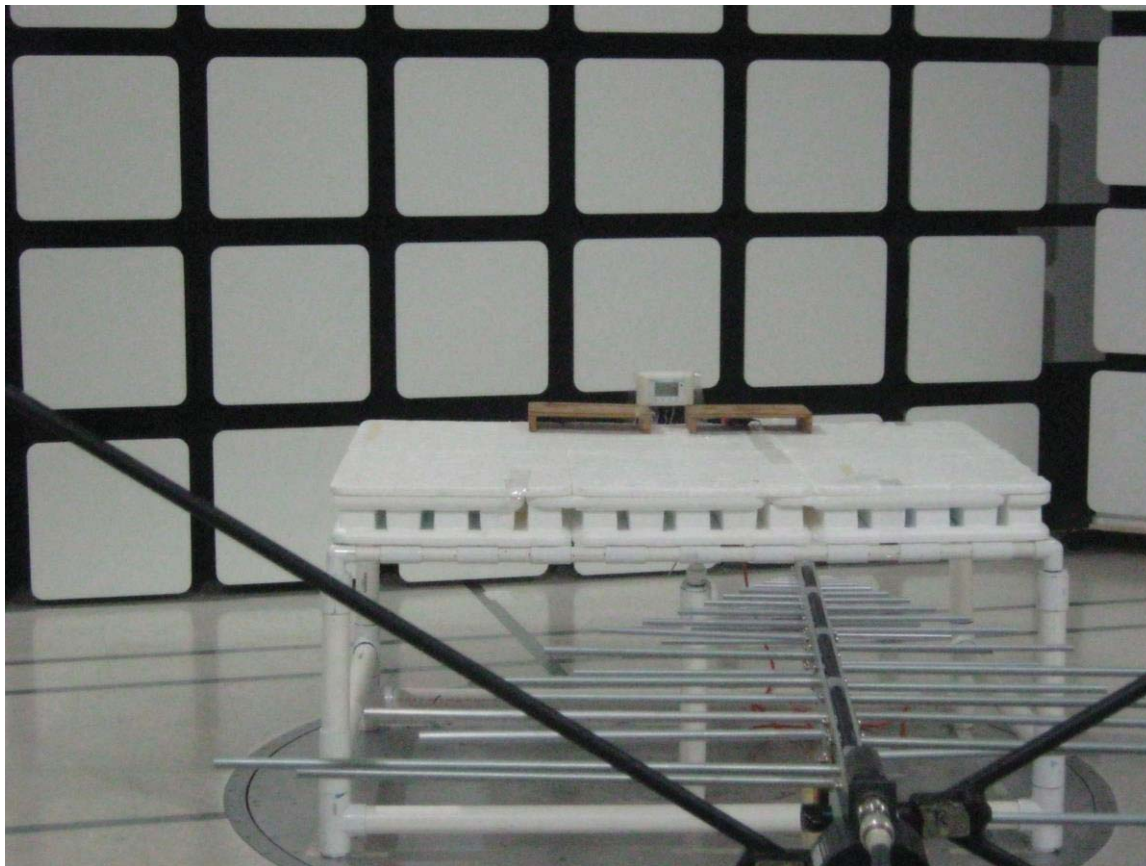
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BELOW 1 GHz
BATTERY MODE

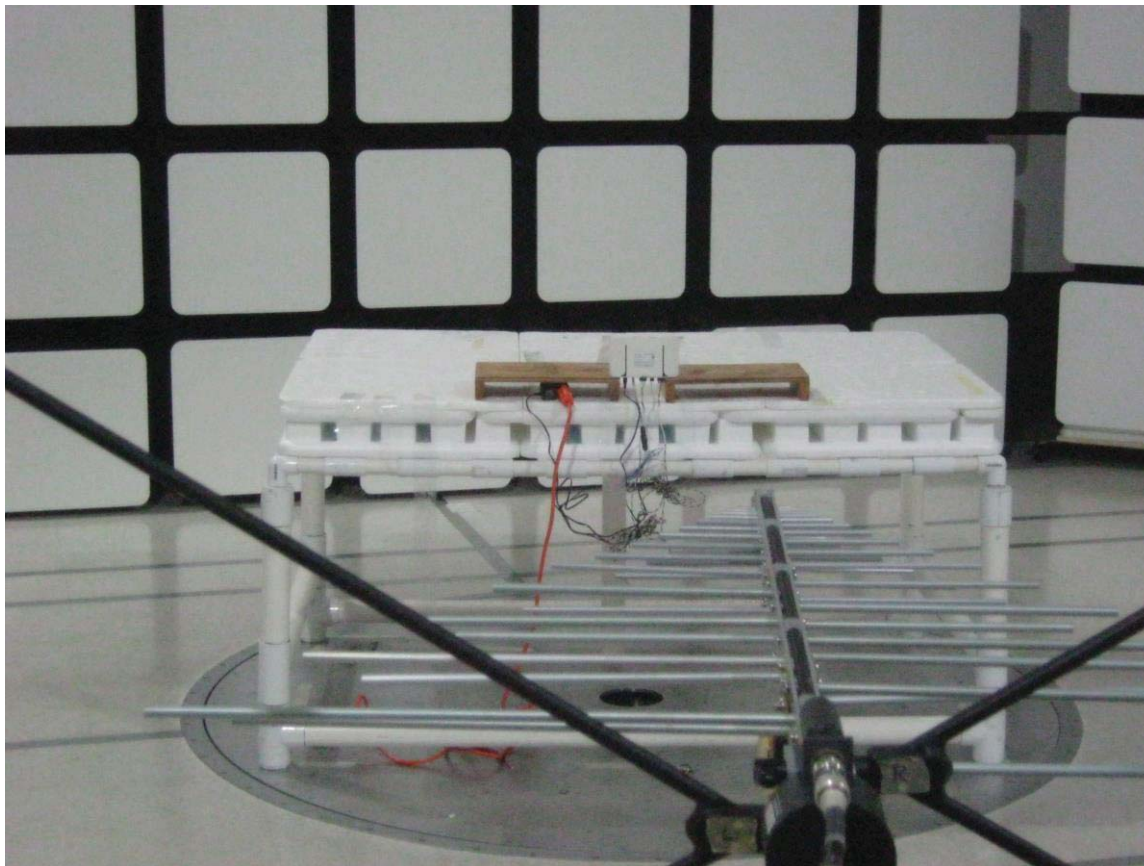
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BELOW 1 GHz
AC MODE

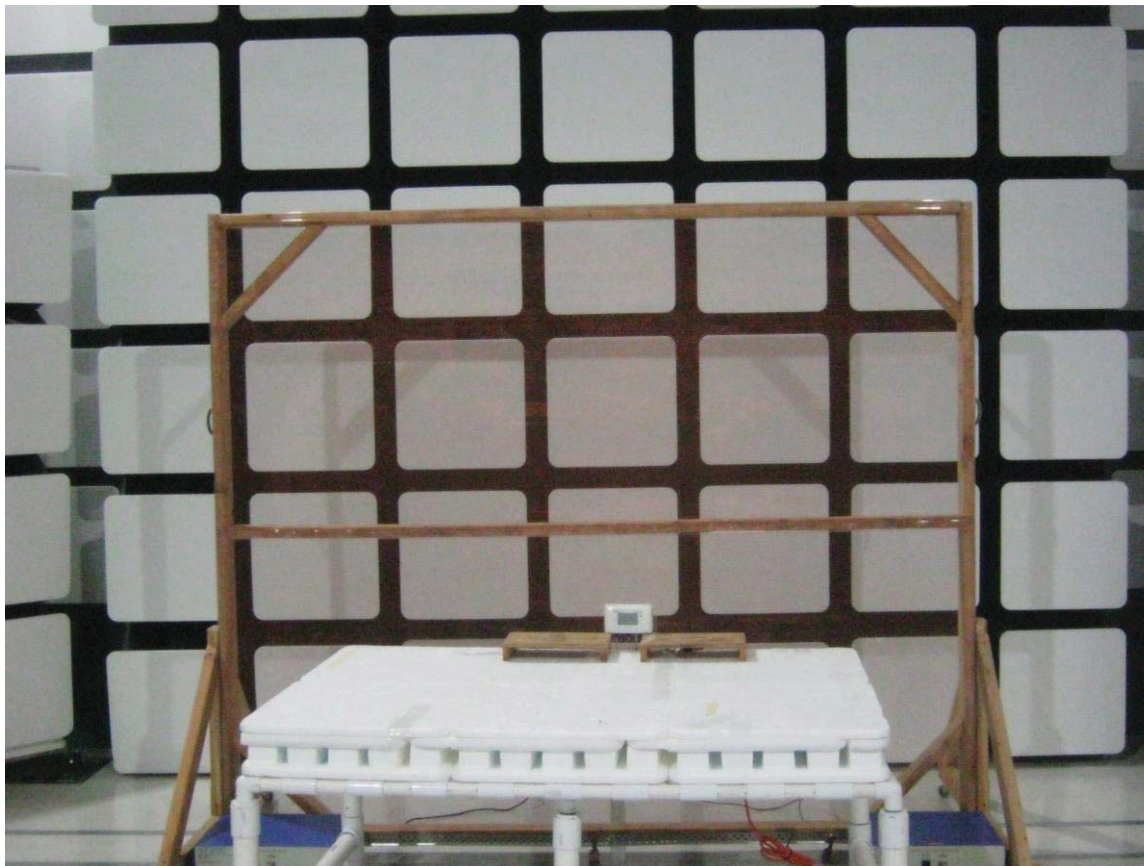
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BELOW 1 GHz
AC MODE

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



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – CONDUCTED EMISSIONS

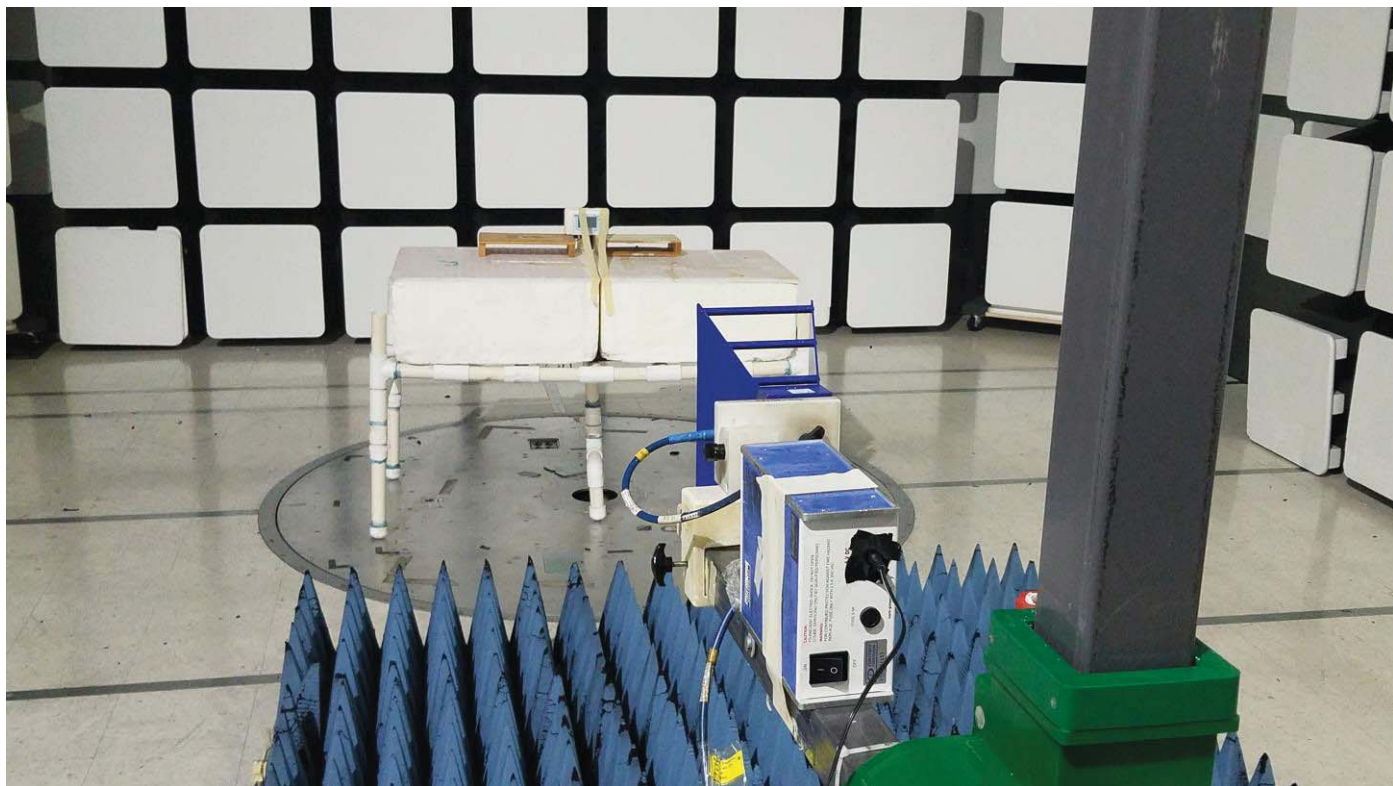
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – CONDUCTED EMISSIONS

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



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BATTERY MODE –
ABOVE 1 GHz – RECEIVE MODE

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



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BATTERY MODE –
ABOVE 1 GHz – RECEIVE MODE

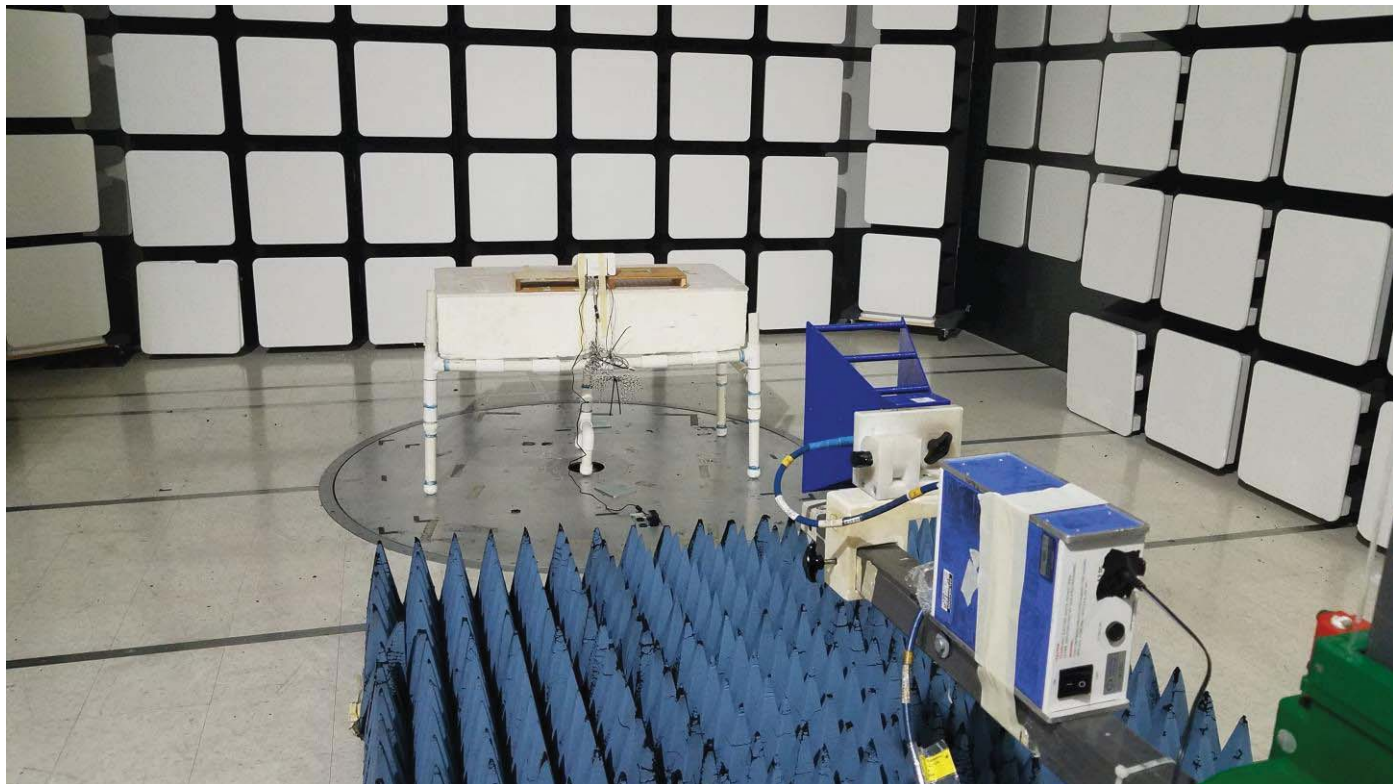
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – AC MODE –
ABOVE 1 GHz – RECEIVE MODE

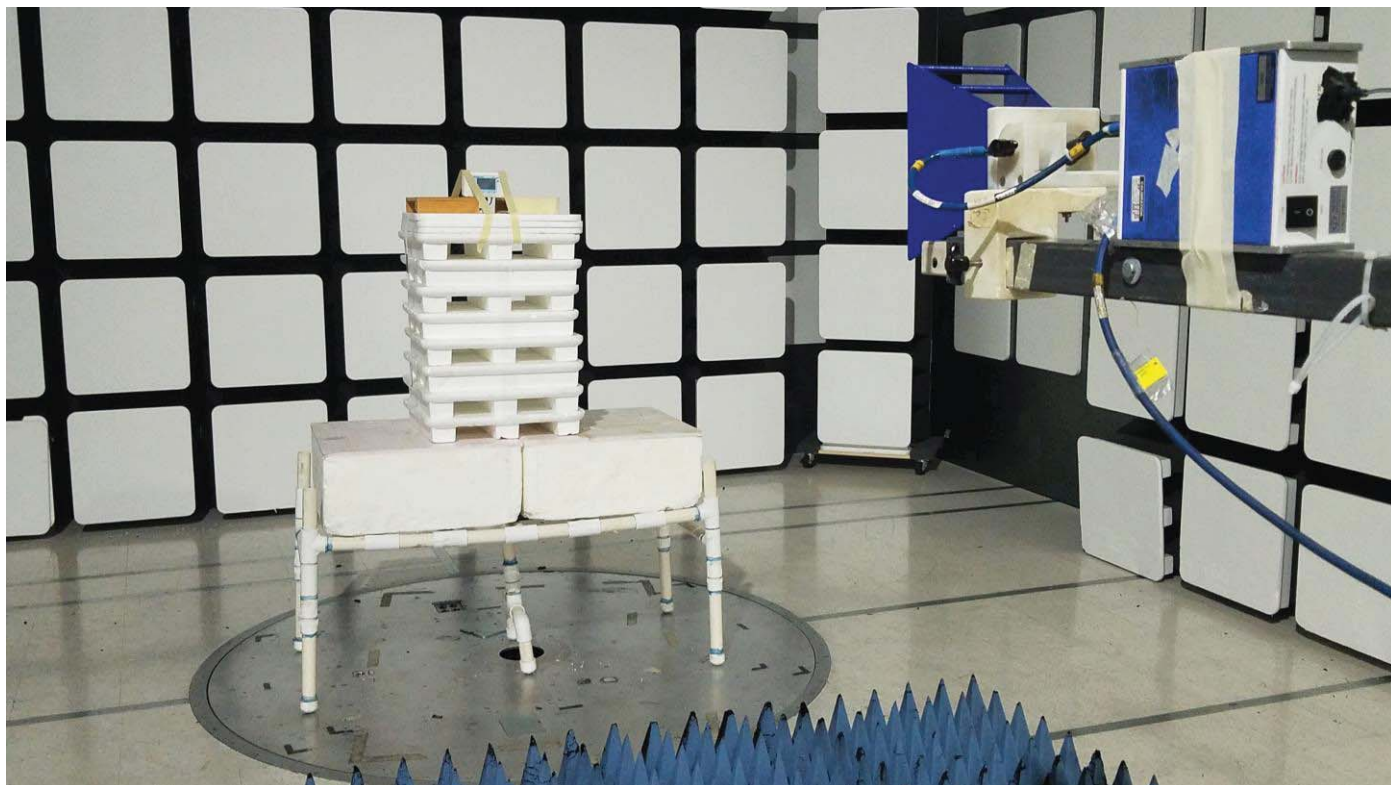
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – AC MODE –
ABOVE 1 GHz – RECEIVE MODE

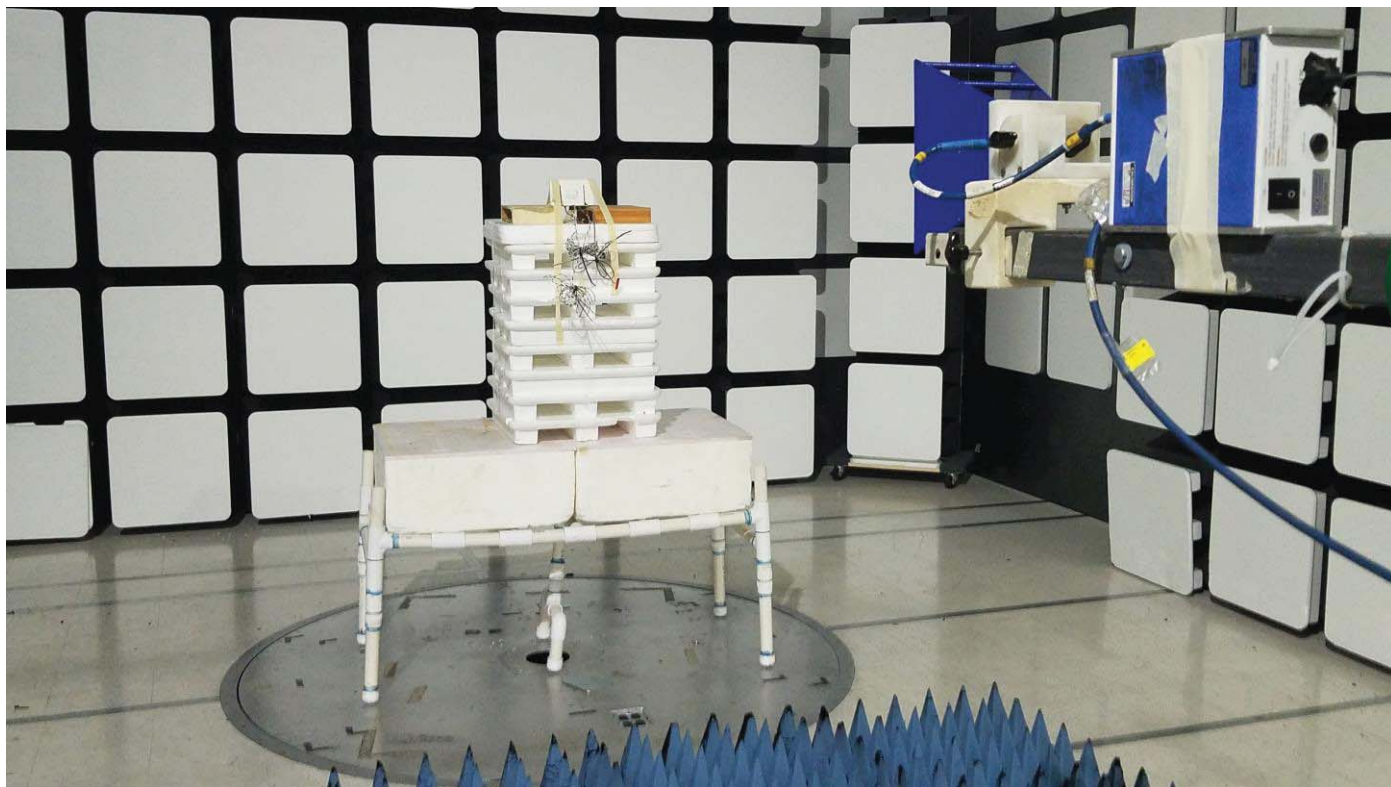
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BATTERY MODE
ABOVE 1 GHz – TRANSMIT MODE

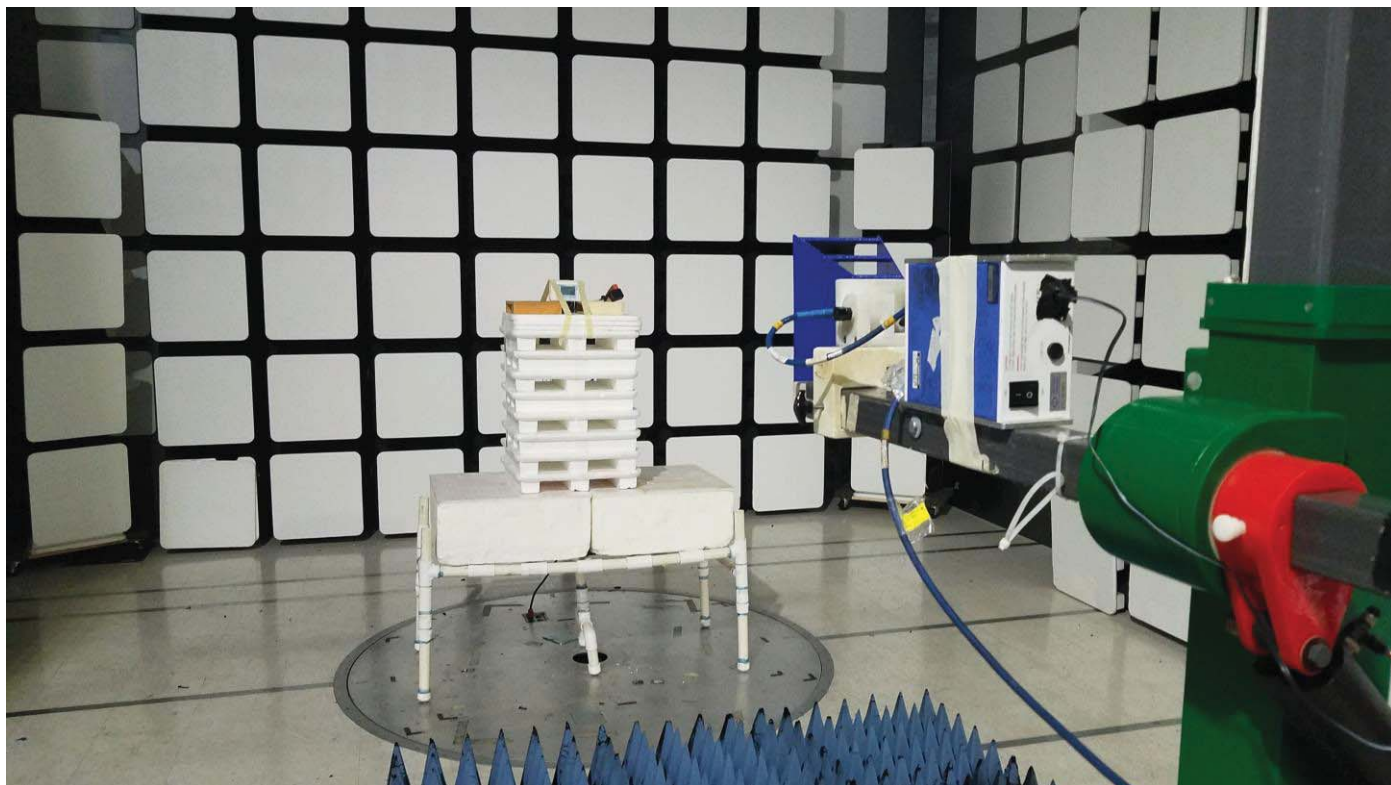
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – BATTERY MODE
ABOVE 1 GHz – TRANSMIT MODE

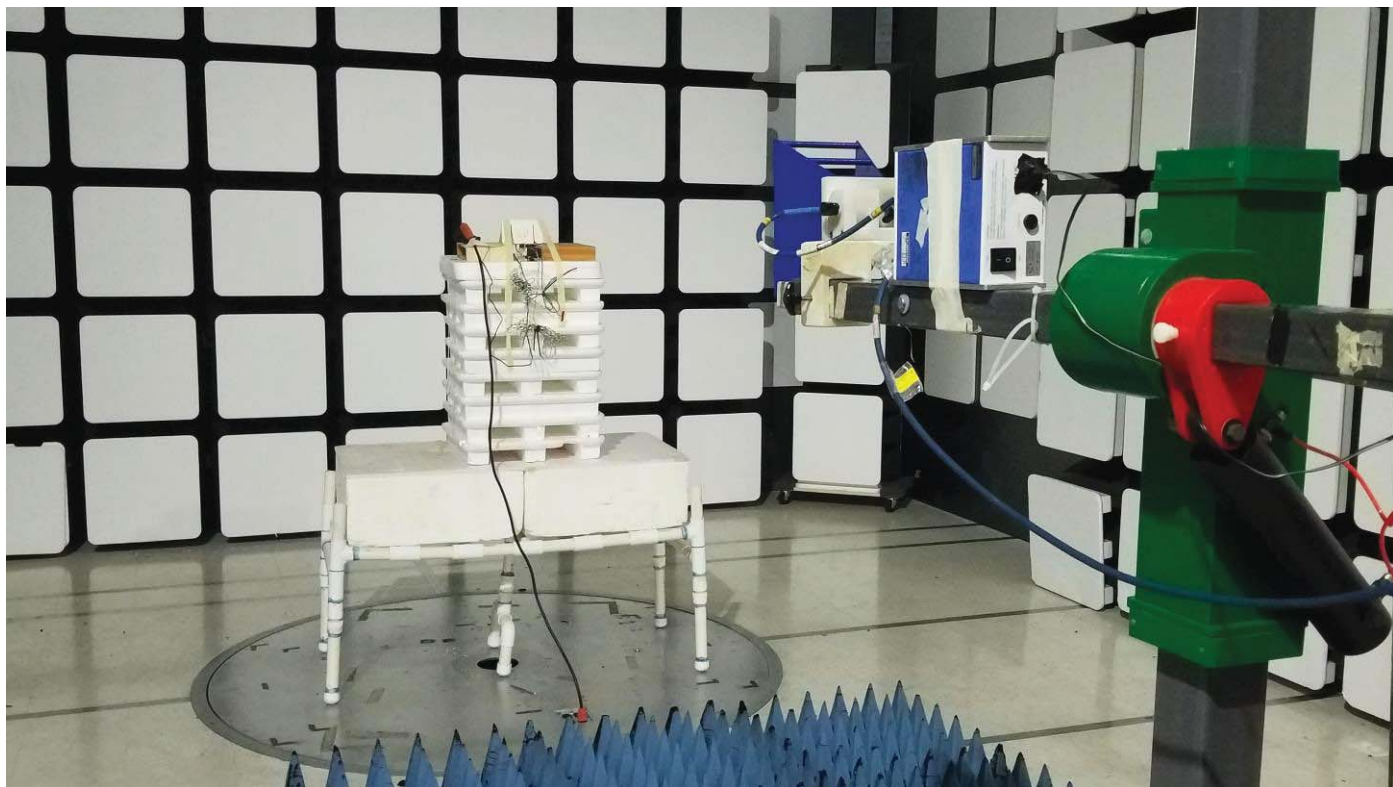
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – AC MODE
ABOVE 1 GHz – TRANSMIT MODE

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



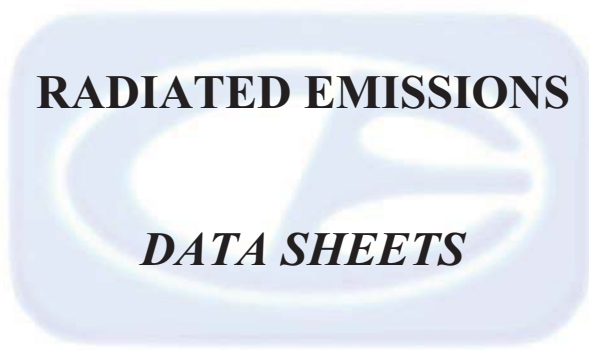
REAR VIEW

MESA LABORATORIES, INC.
900 MHz SENSOR – G4 CONFIGURATION
MODEL: VPx PRO; PART NUMBER: DS-VP-PRO-900-S
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – AC MODE
ABOVE 1 GHz – TRANSMIT MODE

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

APPENDIX E

DATA SHEETS



RADIATED EMISSIONS

DATA SHEETS

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
Lab: D
Tested By: Tae Hyun Kim

Low Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	54.78	V	73.97	-19.19	Peak	352.00	100.00	
2709.00	40.22	V	53.97	-13.75	Avg	352.00	100.00	
3612.00	45.45	V	73.97	-28.52	Peak	0.00	100.00	
3612.00	30.89	V	53.97	-23.08	Avg	0.00	100.00	
4515.00	60.06	V	73.97	-13.92	Peak	0.00	100.00	
4515.00	45.50	V	53.97	-8.48	Avg	0.00	100.00	
5418.00	47.74	V	73.97	-26.23	Peak	114.00	100.00	
5418.00	33.18	V	53.97	-20.79	Avg	114.00	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

Low Channel - Y-Axis

Transmit Mode - AC Power

G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	57.67	V	73.97	-16.30	Peak	262.00	100.00	
2709.00	43.11	V	53.97	-10.86	Avg	262.00	100.00	
3612.00	42.43	V	73.97	-31.54	Peak	217.50	100.00	
3612.00	27.87	V	53.97	-26.10	Avg	217.50	100.00	
4515.00	57.00	V	73.97	-16.97	Peak	50.50	111.16	
4515.00	42.44	V	53.97	-11.53	Avg	50.50	111.16	
5418.00	50.26	V	73.97	-23.71	Peak	163.25	100.00	
5418.00	35.70	V	53.97	-18.27	Avg	163.25	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Kyle Fujimoto

Low Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	59.02	V	73.97	-14.95	Peak	349.50	107.28	
2709.00	44.46	V	53.97	-9.51	Avg	349.50	107.28	
3612.00	47.87	V	73.97	-26.10	Peak	163.50	110.50	
3612.00	33.31	V	53.97	-20.66	Avg	163.50	110.50	
4515.00	61.81	V	73.97	-12.16	Peak	164.25	101.55	
4515.00	47.25	V	53.97	-6.72	Avg	164.25	101.55	
5418.00	46.34	V	73.97	-27.63	Peak	159.00	100.00	
5418.00	31.78	V	53.97	-22.19	Avg	159.00	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
Lab: D
Tested By: Tae Hyun Kim

Low Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	59.52	H	73.97	-14.45	Peak	256.25	100.00	
2709.00	44.96	H	53.97	-9.01	Avg	256.25	100.00	
3612.00	44.01	H	73.97	-29.96	Peak	152.50	100.00	
3612.00	29.45	H	53.97	-24.52	Avg	152.50	100.00	
4515.00	55.20	H	73.97	-18.77	Peak	135.50	100.00	
4515.00	40.64	H	53.97	-13.33	Avg	135.50	100.00	
5418.00	46.33	H	73.97	-27.65	Peak	168.25	100.00	
5418.00	31.77	H	53.97	-22.21	Avg	168.25	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

Low Channel - Y-Axis

Transmit Mode - AC Power

G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	57.59	H	73.97	-16.38	Peak	60.50	100.00	
2709.00	43.03	H	53.97	-10.94	Avg	60.50	100.00	
3612.00	49.71	H	73.97	-24.27	Peak	131.75	100.00	
3612.00	35.15	H	53.97	-18.83	Avg	131.75	100.00	
4515.00	63.10	H	73.97	-10.87	Peak	198.00	110.32	
4515.00	48.54	H	53.97	-5.43	Avg	198.00	110.32	
5418.00	48.75	H	73.97	-25.22	Peak	201.25	100.00	
5418.00	34.19	H	53.97	-19.78	Avg	201.25	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
 Lab: D
 Tested By: Tae Hyun Kim

Low Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	61.21	H	73.97	-12.76	Peak	50.00	120.05	
2709.00	46.65	H	53.97	-7.32	Avg	50.00	120.05	
3612.00	41.88	H	73.97	-32.09	Peak	204.00	100.00	
3612.00	27.32	H	53.97	-26.65	Avg	204.00	100.00	
4515.00	58.32	H	73.97	-15.65	Peak	214.25	100.00	
4515.00	43.76	H	53.97	-10.21	Avg	214.25	100.00	
5418.00	48.91	H	73.97	-25.07	Peak	182.50	100.00	
5418.00	34.35	H	53.97	-19.63	Avg	182.50	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

Middle Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	59.30	V	73.97	-14.67	Peak	178.50	100.00	
2743.50	44.74	V	53.97	-9.23	Avg	178.50	100.00	
3658.00	44.12	V	73.97	-29.85	Peak	101.25	100.00	
3658.00	29.56	V	53.97	-24.41	Avg	101.25	100.00	
4572.51	60.39	V	73.97	-13.58	Peak	124.00	102.98	
4572.51	45.83	V	53.97	-8.14	Avg	124.00	102.98	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
7316.01								
8230.51								No Emission Detected
8230.51								
9145.01								No Emission Detected
9145.01								

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
 Lab: D
 Tested By: Tae Hyun Kim

Middle Channel - Y-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	59.04	V	73.97	-14.93	Peak	192.75	131.52	
2743.50	44.48	V	53.97	-9.49	Avg	192.75	131.52	
3658.00	41.92	V	73.97	-32.05	Peak	72.50	100.00	
3658.00	27.36	V	53.97	-26.61	Avg	72.50	100.00	
4572.51	56.20	V	73.97	-17.77	Peak	55.00	110.32	
4572.51	41.64	V	53.97	-12.33	Avg	55.00	110.32	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
7316.01								
8230.51								No Emission Detected
8230.51								
9145.01								No Emission Detected
9145.01								

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
 Lab: D
 Tested By: Tae Hyun Kim

Middle Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	57.02	V	73.97	-16.95	Peak	336.00	100.00	
2743.50	42.46	V	53.97	-11.51	Avg	336.00	100.00	
3658.00	47.61	V	73.97	-26.36	Peak	158.25	100.00	
3658.00	33.05	V	53.97	-20.92	Avg	158.25	100.00	
4572.51	61.48	V	73.97	-12.49	Peak	165.75	100.00	
4572.51	46.92	V	53.97	-7.05	Avg	165.75	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
7316.01								
8230.51								No Emission Detected
8230.51								
9145.01								No Emission Detected
9145.01								

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

Middle Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	58.28	H	73.97	-15.69	Peak	214.75	100.00	
2743.50	43.72	H	53.97	-10.25	Avg	214.75	100.00	
3658.00	43.55	H	73.97	-30.42	Peak	47.75	100.00	
3658.00	28.99	H	53.97	-24.98	Avg	47.75	100.00	
4572.51	57.90	H	73.97	-16.07	Peak	193.75	121.19	
4572.51	43.34	H	53.97	-10.63	Avg	193.75	121.19	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
8230.51								No Emission Detected
9145.01								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - Y-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	57.14	H	73.97	-16.83	Peak	176.25	112.23	
2743.50	42.58	H	53.97	-11.39	Avg	176.25	112.23	
3658.00	46.40	H	73.97	-27.57	Peak	275.00	107.52	
3658.00	31.84	H	53.97	-22.13	Avg	275.00	107.52	
4572.51	60.33	H	73.97	-13.64	Peak	243.25	100.00	
4572.51	45.77	H	53.97	-8.20	Avg	243.25	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
7316.01								
8230.51								No Emission Detected
8230.51								
9145.01								No Emission Detected
9145.01								

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	58.61	H	73.97	-15.36	Peak	192.00	100.00	
2743.50	44.05	H	53.97	-9.92	Avg	192.00	100.00	
3658.00	40.59	H	73.97	-33.38	Peak	214.25	100.00	
3658.00	26.03	H	53.97	-27.94	Avg	214.25	100.00	
4572.51	58.20	H	73.97	-15.77	Peak	199.75	106.50	
4572.51	43.64	H	53.97	-10.33	Avg	199.75	106.50	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
8230.51								No Emission Detected
9145.01								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

High Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	59.94	V	73.97	-14.03	Peak	184.00	100.00	
2778.00	45.38	V	53.97	-8.59	Avg	184.00	100.00	
3704.00	44.08	V	73.97	-29.89	Peak	126.25	100.00	
3704.00	29.52	V	53.97	-24.45	Avg	126.25	100.00	
4630.00	58.99	V	73.97	-14.98	Peak	131.00	118.98	
4630.00	44.43	V	53.97	-9.54	Avg	131.00	118.98	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected
9260.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

High Channel - Y-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	60.59	V	73.97	-13.38	Peak	187.00	100.00	
2778.00	46.03	V	53.97	-7.94	Avg	187.00	100.00	
3704.00	41.56	V	73.97	-32.41	Peak	185.50	100.00	
3704.00	27.00	V	53.97	-26.97	Avg	185.50	100.00	
4630.00	57.21	V	73.97	-16.76	Peak	187.00	125.13	
4630.00	42.65	V	53.97	-11.32	Avg	187.00	125.13	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected
9260.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
 Lab: D
 Tested By: Tae Hyun Kim

High Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	57.00	V	73.97	-16.97	Peak	341.75	121.85	
2778.00	42.44	V	53.97	-11.53	Avg	341.75	121.85	
3704.00	47.13	V	73.97	-26.84	Peak	141.75	133.13	
3704.00	32.57	V	53.97	-21.40	Avg	141.75	133.13	
4630.00	61.91	V	73.97	-12.06	Peak	172.75	102.56	
4630.00	47.35	V	53.97	-6.62	Avg	172.75	102.56	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - X-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	59.18	H	73.97	-14.79	Peak	254.25	127.34	
2778.00	44.62	H	53.97	-9.35	Avg	254.25	127.34	
3704.00	44.91	H	73.97	-29.06	Peak	152.50	107.34	
3704.00	30.35	H	53.97	-23.62	Avg	152.50	107.34	
4630.00	54.92	H	73.97	-19.05	Peak	286.25	100.00	
4630.00	40.36	H	53.97	-13.61	Avg	286.25	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

High Channel - Y-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	59.19	H	73.97	-14.78	Peak	220.50	100.00	
2778.00	44.63	H	53.97	-9.34	Avg	220.50	100.00	
3704.00	48.45	H	73.97	-25.52	Peak	147.75	130.62	
3704.00	33.89	H	53.97	-20.08	Avg	147.75	130.62	
4630.00	62.22	H	73.97	-11.75	Peak	166.50	121.43	
4630.00	47.66	H	53.97	-6.31	Avg	166.50	121.43	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected
9260.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Tae Hyun Kim

High Channel - Z-Axis
Transmit Mode - AC Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	60.07	H	73.97	-13.90	Peak	79.75	107.88	
2778.00	45.51	H	53.97	-8.46	Avg	79.75	107.88	
3704.00	42.55	H	73.97	-31.43	Peak	209.25	100.00	
3704.00	27.99	H	53.97	-25.99	Avg	209.25	100.00	
4630.00	59.86	H	73.97	-14.11	Peak	122.25	100.00	
4630.00	45.30	H	53.97	-8.67	Avg	122.25	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
7408.00								
8334.00								No Emission Detected
8334.00								
9260.00								No Emission Detected
9260.00								



FCC 15.247 and FCC Class B

Mesa Laboratories, Inc.

900 MHz Sensor

Model: VPx Pro

Part Number: DS-VP-PRO-900-S

Date: 10/04/2021

Lab: D

Tested By: Tae Hyun Kim

AC Power

Non Harmonic Emissions from the Tx – 9 kHz to 30 MHz and 1 GHz to 9.3 GHz

Digital Portion from the EUT - 9 kHz to 30 MHz and 1 GHz to 9.3 GHz

G4 Configuration

[illegible]



FCC Class B and RSS-GEN

Mesa Laboratories, Inc.

900 MHz Sensor

Model: VPx Pro

Part Number: DS-VP-PRO-900-S

Receiver Portion - 1 GHz to 9.3 GHz

AC Power Mode

G4 Configuration

Date: 10/04/2021

Lab: D

Tested By: Tae Hyun Kim

[illegible]

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
 Lab: D
 Tested By: Tae Hyun Kim

Low Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	55.93	V	73.97	-18.04	Peak	234.50	127.28	
2709.00	41.37	V	53.97	-12.60	Avg	234.50	127.28	
3612.00	46.13	V	73.97	-27.84	Peak	0.00	100.00	
3612.00	31.57	V	53.97	-22.40	Avg	0.00	100.00	
4515.00	62.61	V	73.97	-11.36	Peak	0.00	100.00	
4515.00	48.05	V	53.97	-5.92	Avg	0.00	100.00	
5418.00	48.03	V	73.97	-25.94	Peak	118.00	100.00	
5418.00	33.47	V	53.97	-20.50	Avg	118.00	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Low Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	58.38	V	73.97	-15.59	Peak	73.00	121.73	
2709.00	43.82	V	53.97	-10.15	Avg	73.00	121.73	
3612.00	41.77	V	73.97	-32.20	Peak	122.25	106.38	
3612.00	27.21	V	53.97	-26.76	Avg	122.25	106.38	
4515.00	56.81	V	73.97	-17.16	Peak	229.50	103.40	
4515.00	42.25	V	53.97	-11.72	Avg	229.50	103.40	
5418.00	47.37	V	73.97	-26.60	Peak	191.00	100.00	
5418.00	32.81	V	53.97	-21.16	Avg	191.00	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021

Lab: D

Tested By: Tae Hyun Kim

Low Channel - Z-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	58.45	V	73.97	-15.52	Peak	337.25	119.16	
2709.00	43.89	V	53.97	-10.08	Avg	337.25	119.16	
3612.00	48.11	V	73.97	-25.86	Peak	164.00	100.00	
3612.00	33.55	V	53.97	-20.42	Avg	164.00	100.00	
4515.00	60.80	V	73.97	-13.17	Peak	164.00	100.00	
4515.00	46.24	V	53.97	-7.73	Avg	164.00	100.00	
5418.00	46.73	V	73.97	-27.24	Peak	140.25	100.00	
5418.00	32.17	V	53.97	-21.80	Avg	140.25	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Low Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	60.71	H	73.97	-13.27	Peak	342.25	100.00	
2709.00	46.15	H	53.97	-7.83	Avg	342.25	100.00	
3612.00	42.89	H	73.97	-31.08	Peak	219.25	100.00	
3612.00	28.33	H	53.97	-25.64	Avg	219.25	100.00	
4515.00	59.45	H	73.97	-14.52	Peak	19.00	107.28	
4515.00	44.89	H	53.97	-9.08	Avg	19.00	107.28	
5418.00	46.24	H	73.97	-27.73	Peak	249.75	100.00	
5418.00	31.68	H	53.97	-22.29	Avg	249.75	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021

Lab: D

Tested By: Tae Hyun Kim

Low Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	58.61	H	73.97	-15.36	Peak	26.25	100.00	
2709.00	44.05	H	53.97	-9.92	Avg	26.25	100.00	
3612.00	48.38	H	73.97	-25.59	Peak	128.75	100.00	
3612.00	33.82	H	53.97	-20.15	Avg	128.75	100.00	
4515.00	61.95	H	73.97	-12.02	Peak	194.00	105.55	
4515.00	47.39	H	53.97	-6.58	Avg	194.00	105.55	
5418.00	48.01	H	73.97	-25.96	Peak	200.50	138.02	
5418.00	33.45	H	53.97	-20.52	Avg	200.50	138.02	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Low Channel - Z-Axis

Transmit Mode - Battery Power

G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1806.00								Not in Restricted Band
1806.00								Tested via Conducted
2709.00	59.53	H	73.97	-14.44	Peak	30.75	144.47	
2709.00	44.97	H	53.97	-9.00	Avg	30.75	144.47	
3612.00	40.48	H	73.97	-33.50	Peak	122.50	100.00	
3612.00	25.92	H	53.97	-28.06	Avg	122.50	100.00	
4515.00	58.81	H	73.97	-15.17	Peak	202.75	100.00	
4515.00	44.25	H	53.97	-9.73	Avg	202.75	100.00	
5418.00	49.56	H	73.97	-24.41	Peak	173.50	100.00	
5418.00	35.00	H	53.97	-18.97	Avg	173.50	100.00	
6321.00								Not in Restricted Band
6321.00								Tested via Conducted
7224.00								No Emission
7224.00								Detected
8127.00								No Emission
8127.00								Detected
9030.00								No Emission
9030.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	58.56	V	73.97	-15.41	Peak	267.00	112.05	
2743.50	44.00	V	53.97	-9.97	Avg	267.00	112.05	
3658.00	44.37	V	73.97	-29.60	Peak	180.25	100.00	
3658.00	29.81	V	53.97	-24.16	Avg	180.25	100.00	
4572.51	59.75	V	73.97	-14.22	Peak	157.75	100.00	
4572.51	45.19	V	53.97	-8.78	Avg	157.75	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission
7316.01								Detected
8230.51								No Emission
8230.51								Detected
9145.01								No Emission
9145.01								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	58.89	V	73.97	-15.08	Peak	261.00	114.74	
2743.50	44.33	V	53.97	-9.64	Avg	261.00	114.74	
3658.00	43.88	V	73.97	-30.09	Peak	96.75	100.00	
3658.00	29.32	V	53.97	-24.65	Avg	96.75	100.00	
4572.51	60.19	V	73.97	-13.78	Peak	75.25	100.00	
4572.51	45.63	V	53.97	-8.34	Avg	75.25	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission
7316.01								Detected
8230.51								No Emission
8230.51								Detected
9145.01								No Emission
9145.01								Detected

FCC 15.247

Mesa Laboratories, Inc.
 900 MHz Sensor
 Model: VPx Pro
 Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
 Lab: D
 Tested By: Tae Hyun Kim

Middle Channel - Z-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	54.39	V	73.97	-19.58	Peak	172.00	104.77	
2743.50	39.83	V	53.97	-14.14	Avg	172.00	104.77	
3658.00	46.78	V	73.97	-27.19	Peak	160.75	148.35	
3658.00	32.22	V	53.97	-21.75	Avg	160.75	148.35	
4572.51	62.34	V	73.97	-11.63	Peak	156.25	100.00	
4572.51	47.78	V	53.97	-6.19	Avg	156.25	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission
7316.01								Detected
8230.51								No Emission
8230.51								Detected
9145.01								No Emission
9145.01								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	60.49	H	73.97	-13.49	Peak	336.50	100.00	
2743.50	45.93	H	53.97	-8.05	Avg	336.50	100.00	
3658.00	43.66	H	73.97	-30.31	Peak	226.00	100.00	
3658.00	29.10	H	53.97	-24.87	Avg	226.00	100.00	
4572.51	57.98	H	73.97	-15.99	Peak	10.50	158.26	
4572.51	43.42	H	53.97	-10.55	Avg	10.50	158.26	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission
7316.01								Detected
8230.51								No Emission
8230.51								Detected
9145.01								No Emission
9145.01								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	60.70	H	73.97	-13.27	Peak	247.75	100.00	
2743.50	46.14	H	53.97	-7.83	Avg	247.75	100.00	
3658.00	44.40	H	73.97	-29.57	Peak	140.50	100.00	
3658.00	29.84	H	53.97	-24.13	Avg	140.50	100.00	
4572.51	60.52	H	73.97	-13.45	Peak	157.25	100.00	
4572.51	45.96	H	53.97	-8.01	Avg	157.25	100.00	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission
7316.01								Detected
8230.51								No Emission
8230.51								Detected
9145.01								No Emission
9145.01								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

Middle Channel - Z-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1829.00								Not in Restricted Band
1829.00								Tested via Conducted
2743.50	60.54	H	73.97	-13.43	Peak	291.75	126.80	
2743.50	45.98	H	53.97	-7.99	Avg	291.75	126.80	
3658.00	40.71	H	73.97	-33.26	Peak	109.70	162.50	
3658.00	26.15	H	53.97	-27.82	Avg	109.70	162.50	
4572.51	57.92	H	73.97	-16.05	Peak	204.25	147.22	
4572.51	43.36	H	53.97	-10.61	Avg	204.25	147.22	
5487.01								Not in Restricted Band
5487.01								Tested via Conducted
6401.51								Not in Restricted Band
6401.51								Tested via Conducted
7316.01								No Emission Detected
8230.51								No Emission Detected
9145.01								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	58.00	V	73.97	-15.97	Peak	71.25	109.91	
2778.00	43.44	V	53.97	-10.53	Avg	71.25	109.91	
3704.00	43.76	V	73.97	-30.21	Peak	185.25	100.00	
3704.00	29.20	V	53.97	-24.77	Avg	185.25	100.00	
4630.00	57.82	V	73.97	-16.16	Peak	149.00	100.00	
4630.00	43.26	V	53.97	-10.72	Avg	149.00	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	58.30	V	73.97	-15.67	Peak	133.25	100.00	
2778.00	43.74	V	53.97	-10.23	Avg	133.25	100.00	
3704.00	41.74	V	73.97	-32.23	Peak	296.50	100.00	
3704.00	27.18	V	53.97	-26.79	Avg	296.50	100.00	
4630.00	54.55	V	73.97	-19.42	Peak	238.50	100.00	
4630.00	39.99	V	53.97	-13.98	Avg	238.50	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - Z-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	56.69	V	73.97	-17.28	Peak	148.00	115.16	
2778.00	42.13	V	53.97	-11.84	Avg	148.00	115.16	
3704.00	48.17	V	73.97	-25.80	Peak	164.50	100.00	
3704.00	33.61	V	53.97	-20.36	Avg	164.50	100.00	
4630.00	61.60	V	73.97	-12.37	Peak	169.50	100.00	
4630.00	47.04	V	53.97	-6.93	Avg	169.50	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission
7408.00								Detected
8334.00								No Emission
8334.00								Detected
9260.00								No Emission
9260.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - X-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	61.40	H	73.97	-12.57	Peak	351.25	100.00	
2778.00	46.84	H	53.97	-7.13	Avg	351.25	100.00	
3704.00	44.46	H	73.97	-29.51	Peak	232.50	100.00	
3704.00	29.90	H	53.97	-24.07	Avg	232.50	100.00	
4630.00	57.33	H	73.97	-16.64	Peak	104.75	105.97	
4630.00	42.77	H	53.97	-11.20	Avg	104.75	105.97	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission
7408.00								Detected
8334.00								No Emission
8334.00								Detected
9260.00								No Emission
9260.00								Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - Y-Axis
Transmit Mode - Battery Power
G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	59.39	H	73.97	-14.58	Peak	111.50	141.13	
2778.00	44.83	H	53.97	-9.14	Avg	111.50	141.13	
3704.00	48.42	H	73.97	-25.55	Peak	175.00	100.00	
3704.00	33.86	H	53.97	-20.11	Avg	175.00	100.00	
4630.00	60.70	H	73.97	-13.28	Peak	163.75	100.00	
4630.00	46.14	H	53.97	-7.84	Avg	163.75	100.00	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission Detected
8334.00								No Emission Detected
9260.00								No Emission Detected

FCC 15.247

Mesa Laboratories, Inc.
900 MHz Sensor
Model: VPx Pro
Part Number: DS-VP-PRO-900-S

Date: 10/04/2021
Lab: D
Tested By: Tae Hyun Kim

High Channel - Z-Axis

Transmit Mode - Battery Power

G4 Configuration

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1852.00								Not in Restricted Band
1852.00								Tested via Conducted
2778.00	61.34	H	73.97	-12.63	Peak	37.25	128.17	
2778.00	46.78	H	53.97	-7.19	Avg	37.25	128.17	
3704.00	43.28	H	73.97	-30.69	Peak	200.50	105.31	
3704.00	28.72	H	53.97	-25.25	Avg	200.50	105.31	
4630.00	60.24	H	73.97	-13.73	Peak	105.25	103.76	
4630.00	45.68	H	53.97	-8.29	Avg	105.25	103.76	
5556.00								Not in Restricted Band
5556.00								Tested via Conducted
6482.00								Not in Restricted Band
6482.00								Tested via Conducted
7408.00								No Emission
7408.00								Detected
8334.00								No Emission
8334.00								Detected
9260.00								No Emission
9260.00								Detected



FCC 15.247 and FCC Class B

Mesa Laboratories, Inc.

900 MHz Sensor

Model: VPx Pro

Part Number: DS-VP-PRO-900-S

Date: 10/06/2021

Lab: D

Tested By: Kyle Fujimoto

Battery Power

Non Harmonic Emissions from the Tx - 9 kHz to 30 MHz and 1 GHz to 9.3 GHz

Digital Portion from the EUT – 9 kHz to 30 MHz and 1 GHz to 9.3 GHz

G4 Configuration

[illegible]



FCC Class B and 2RSS-GEN

Mesa Laboratories, Inc.

900 MHz

Sensor

Model: VPx Pro

Part Number: DS-VP-PRO-900-S

Receiver Portion - 1 GHz to 9.3 GHz

Battery Mode

G4 Configuration

Date: 08/11/2021

Lab: D

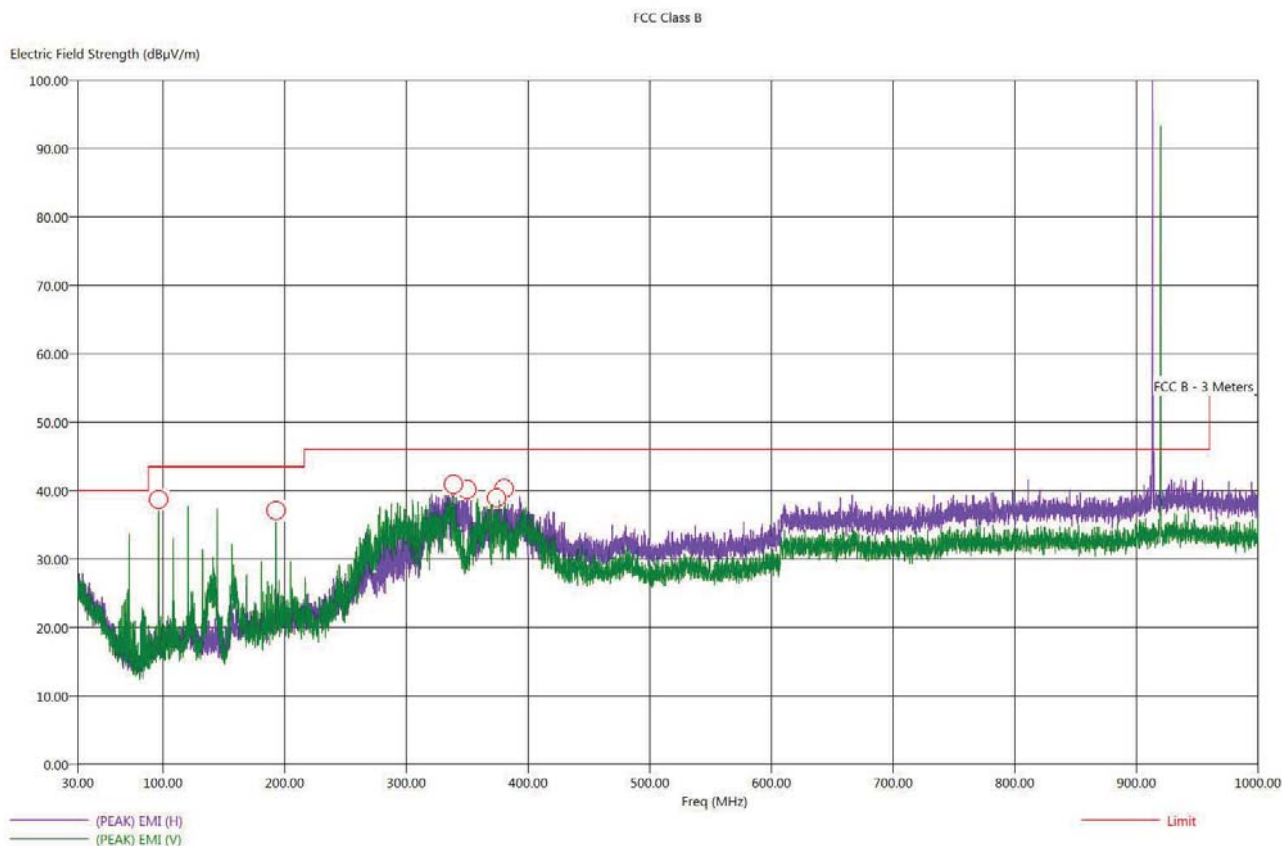
Tested By: Kyle Fujimoto

[illegible]

***RADIATED EMISSIONS
DATA SHEETS***

Title: Pre-Scan - FCC Class B
 File: 3 - Pre-Scan - AC Mode - Tx Mode - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT is continuously transmitting in FHSS Mode
 Comments: Company: Mesa Laboratories, Inc.
 M/N: VPx
 P/N: DS-VP-PRO-900-S
 AC Mode
 Y-Axis Worst Case
 Note: The Frequencies from 902 MHz to 928 MHz are from the FHSS and are subject to the limits of FCC 15.247 instead.

10/7/2021 10:27:48 AM
 Sequence: Preliminary Scan



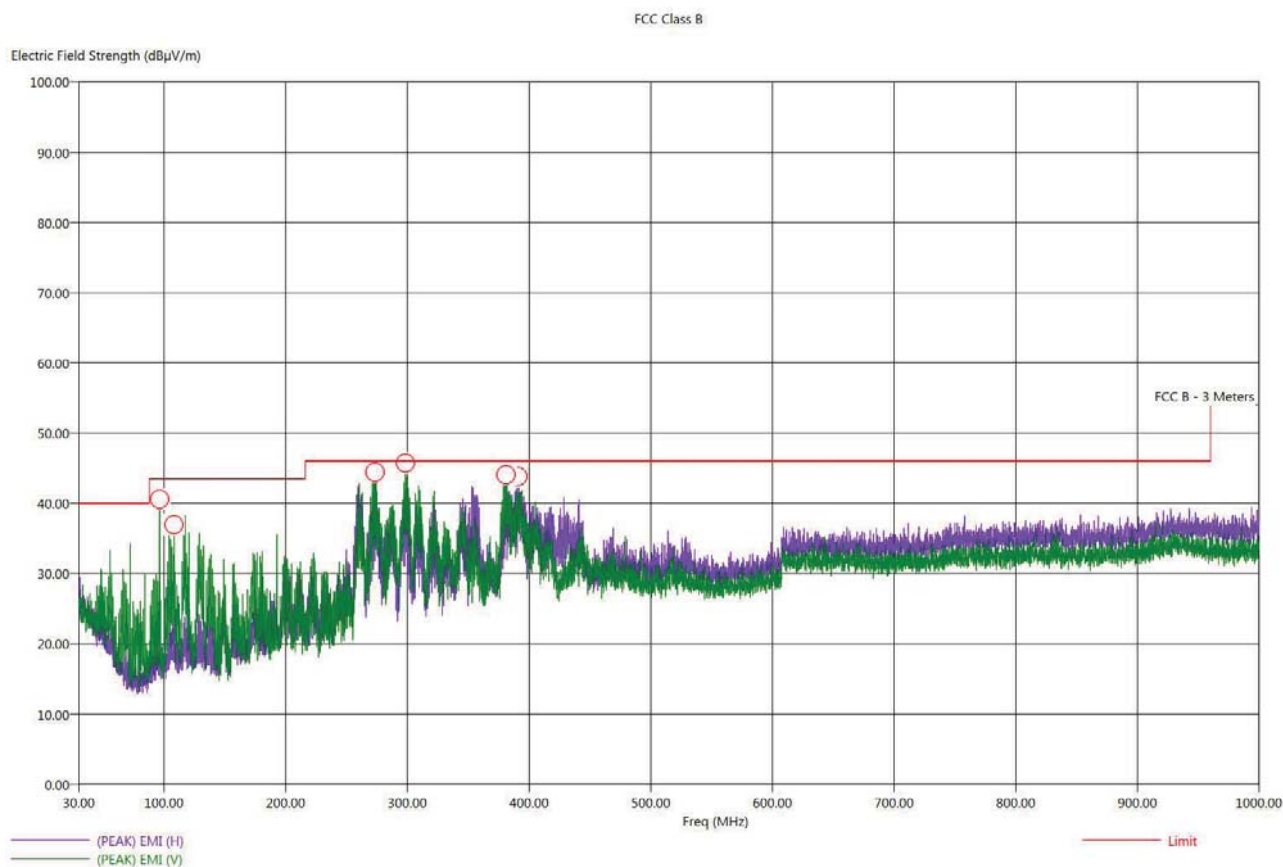
Title: Radiated Final - FCC Class B
File: 3 - Final Scan - AC Mode - Tx Mode - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously in FHSS Mode
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S
AC Mode
Y-Axis Worst Case

10/7/2021 10:40:00 AM
Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dB μ V/m)	(QP) EMI (dB μ V/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dB μ V/m)	Transducer (dB)	Cable (dB)	Tbl Aql (deg)	Twr Ht (cm)
96.40	V	39.87	39.07	-3.63	-4.43	43.50	14.04	0.77	287.50	111.22
192.80	V	39.53	36.07	-3.97	-7.43	43.50	15.86	1.17	185.50	110.56
338.80	V	42.84	36.81	-3.16	-9.19	46.00	19.54	1.54	153.50	142.38
349.50	H	38.62	33.27	-7.38	-12.73	46.00	19.20	1.57	176.75	143.10
373.90	H	37.73	32.12	-8.27	-13.88	46.00	20.27	1.64	285.25	270.26
380.10	H	35.91	29.93	-10.09	-16.07	46.00	20.91	1.66	290.50	366.92

Title: Pre-Scan - FCC Class B
 File: 4 - Pre-Scan - AC Mode - Rx Mode - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT is continuously receiving at the low channel
 Company: Mesa Laboratories, Inc.
 Model: VPx Pro
 P/N: DS-VP-PRO-900-S
 AC Mode
 Y-Axis Worst Case

10/7/2021 10:58:32 AM
 Sequence: Preliminary Scan



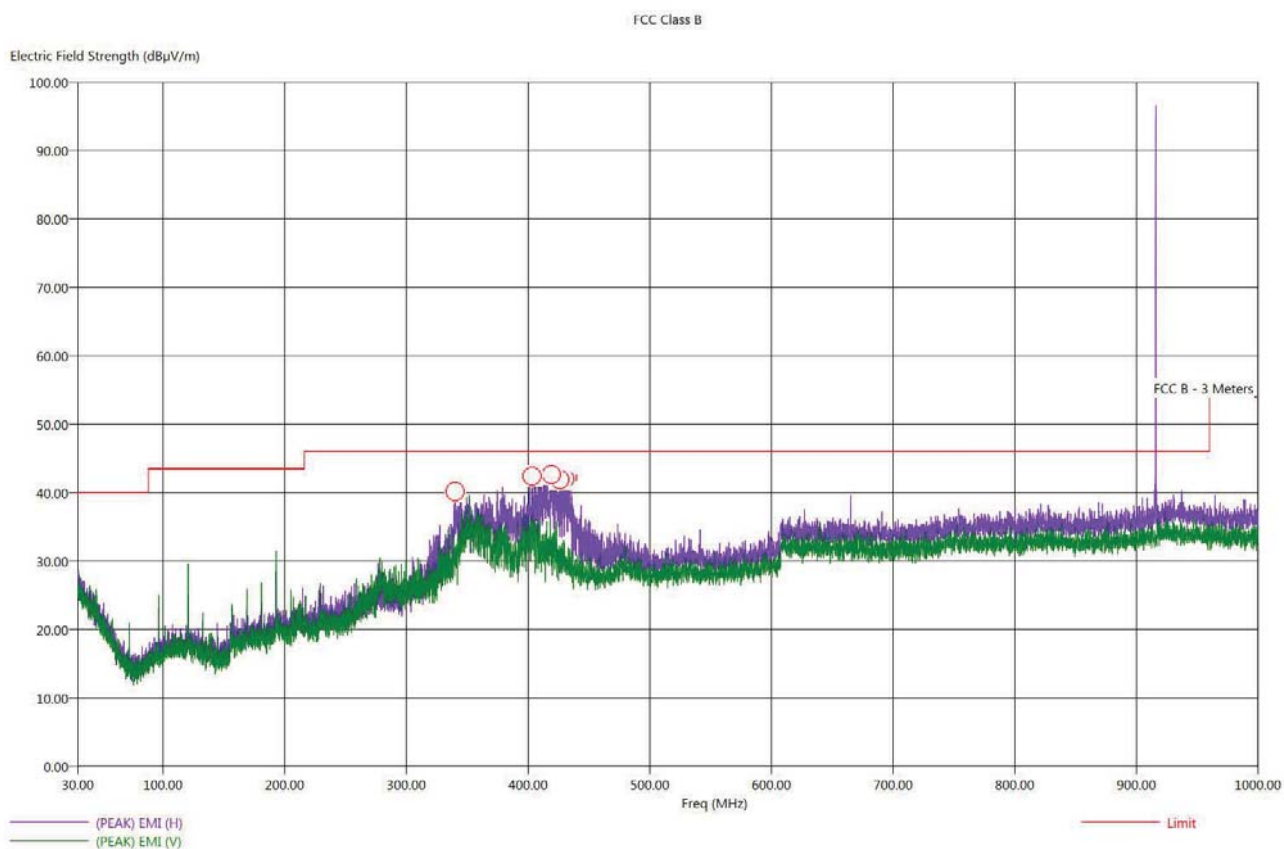
Title: Radiated Final - FCC Class B
 File: 4 - Final Scan - AC Mode - Rx Mode - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT is continuously receiving at the low channel
 Company: Mesa Laboratories, Inc.
 Model: VPx Pro
 P/N: DS-VP-PRO-900-S
 AC Mode
 Y-Axis Worst Case

10/7/2021 11:07:14 AM
 Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dB μ V/m)	(QP) EMI (dB μ V/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dB μ V/m)	Transducer (dB)	Cable (dB)	Tbl Aql (deg)	Twr Ht (cm)
96.40	V	42.33	41.13	-1.17	-2.37	43.50	14.04	0.77	280.00	126.38
108.40	V	40.74	38.42	-2.76	-5.08	43.50	14.70	0.83	285.50	111.28
273.60	V	46.28	43.29	0.28	-2.71	46.00	18.00	1.46	85.50	110.80
298.40	V	47.13	43.86	1.13	-2.14	46.00	18.10	1.42	152.75	158.74
381.40	V	47.69	43.82	1.69	-2.18	46.00	21.03	1.67	176.25	111.16
390.80	H	44.71	40.63	-1.29	-5.37	46.00	21.00	1.69	311.25	106.56

Title: Pre-Scan - FCC Class B
File: 1 - Pre-Scan - Battery - Tx Mode - FCC Class B - VPx - 10-06-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously transmitting in FHSS Mode
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S
Battery Mode
Y-Axis Worst Case
Note: The Frequencies from 902 MHz to 928 MHz are from the FHSS and are subject to the limits of FCC 15.247 instead.

10/6/2021 4:18:05 PM
Sequence: Preliminary Scan



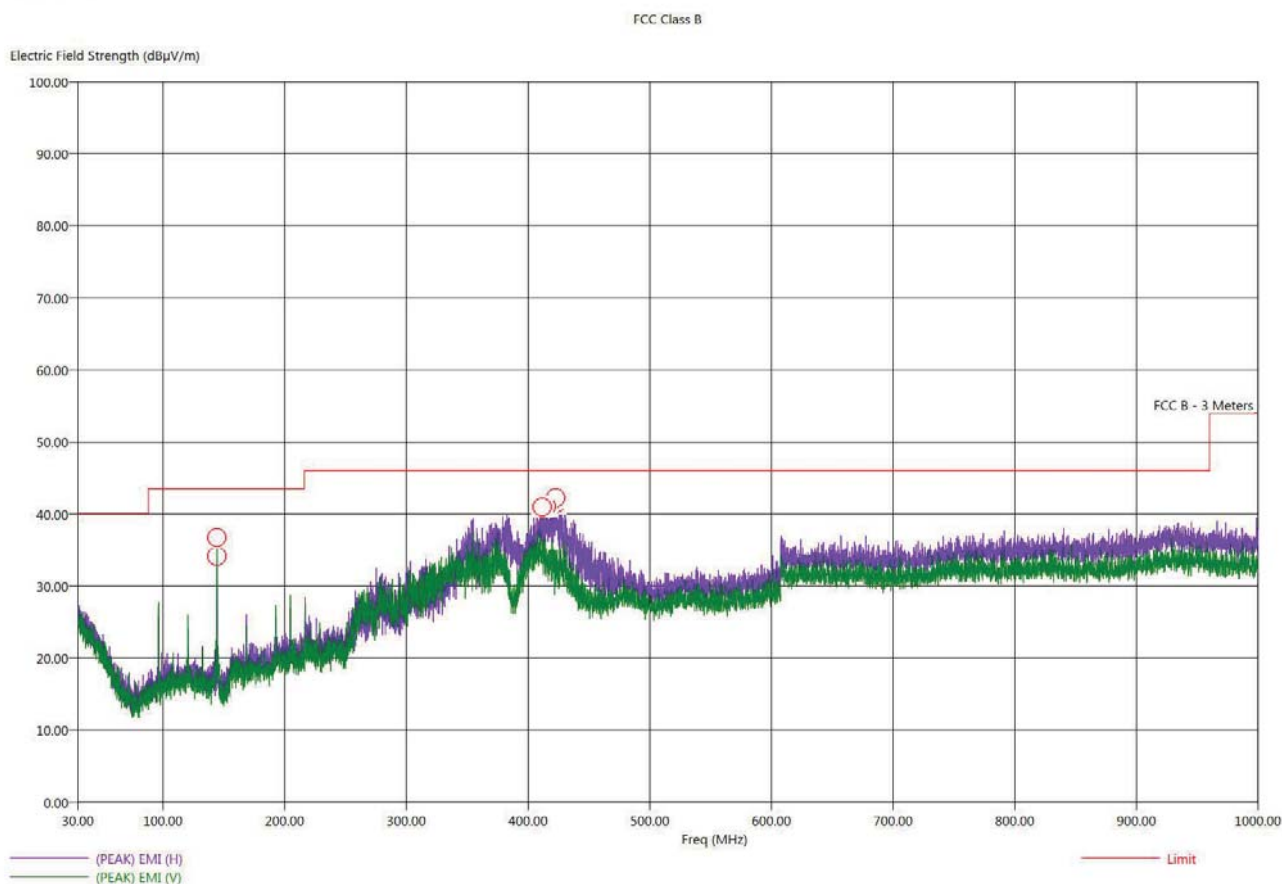
Title: Radiated Final - FCC Class B
File: 1 - Final Scan - Battery - Tx Mode - FCC Class B - VPx - 10-06-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously transmitting in FHSS Mode
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S
Battery Mode
Y-Axis Worst Case

10/6/2021 4:27:11 PM
Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dB μ V/m)	(QP) EMI (dB μ V/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dB μ V/m)	Transducer (dB)	Cable (dB)	Tbl Aql (deg)	Twr Ht (cm)
340.10	H	34.92	29.58	-11.08	-16.42	46.00	19.40	1.54	282.00	238.74
403.40	H	46.51	39.92	0.51	-6.08	46.00	20.60	1.73	130.25	207.04
419.20	H	43.70	38.78	-2.30	-7.22	46.00	21.09	1.75	297.00	175.04
425.90	H	46.25	40.44	0.25	-5.56	46.00	21.79	1.76	144.50	206.86
430.30	H	44.59	39.49	-1.41	-6.51	46.00	21.88	1.76	144.50	191.16
432.30	H	46.06	39.96	0.06	-6.04	46.00	21.80	1.77	122.50	206.80

Title: Pre-Scan - FCC Class B
 File: 2 - Pre-Scan - Battery - Rx Mode - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT is continuously receiving FHSS
 Company: Mesa Laboratories, Inc.
 Model: VPx Pro
 P/N: DS-VP-PRO-900-S
 Y-Axis Worst Case

10/7/2021 8:09:44 AM
 Sequence: Preliminary Scan





Title: Radiated Final - FCC Class B
File: 2 - Final Scan - Battery - Rx Mode - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously receiving FHSS
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S
Y-Axis Worst Case

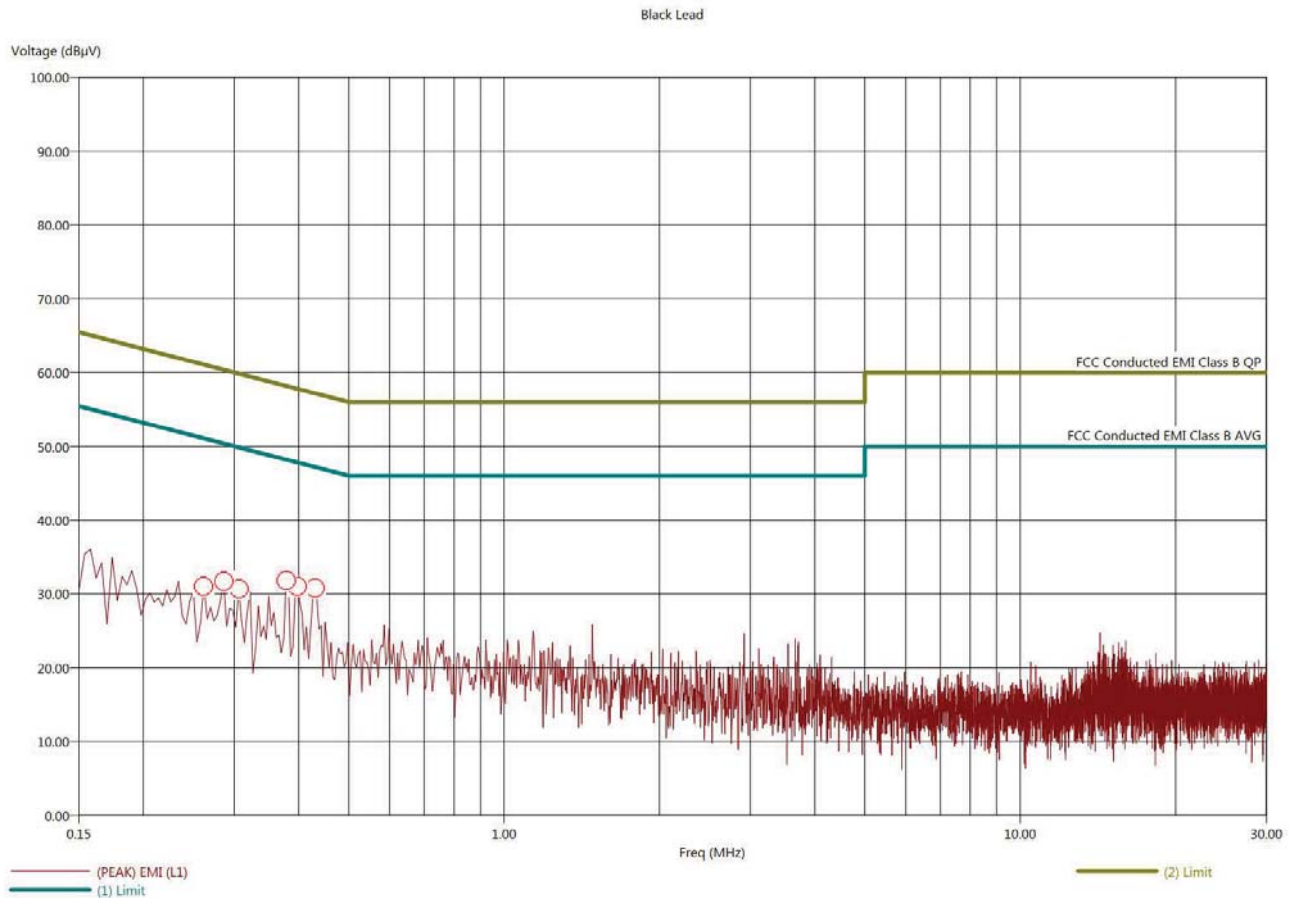
10/7/2021 8:18:56 AM
Sequence: Final Measurements

FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dB μ V/m)	(QP) EMI (dB μ V/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dB μ V/m)	Transducer (dB)	Cable (dB)	Ttbi Agl (deg)	Twr Ht (cm)
121.20	V	21.79	16.09	-21.71	-27.41	43.50	15.10	0.89	159.75	190.92
340.10	H	35.50	29.49	-10.50	-16.51	46.00	19.41	1.54	318.75	334.92
360.50	H	37.30	31.60	-8.70	-14.40	46.00	19.17	1.60	163.75	302.68
365.70	H	32.84	27.22	-13.16	-18.78	46.00	19.46	1.62	49.75	109.25
370.80	H	39.25	33.75	-6.75	-12.25	46.00	20.00	1.64	176.75	222.68
385.20	H	39.50	34.40	-6.50	-11.60	46.00	21.20	1.68	333.50	206.98
391.60	H	39.28	33.61	-6.72	-12.39	46.00	21.00	1.70	306.50	238.74

***CONDUCTED EMISSIONS
DATA SHEETS***

Title: FCC Class B - Black Lead
 File: TX Mode - Pre-Scan - Black Lead - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT is continuously transmitting in FHSS Mode
 Company: Mesa Laboratories, Inc.
 Model: VPx Pro
 P/N: DS-VP-PRO-900-S

10/7/2021 1:58:53 PM
 Sequence: Preliminary Scan



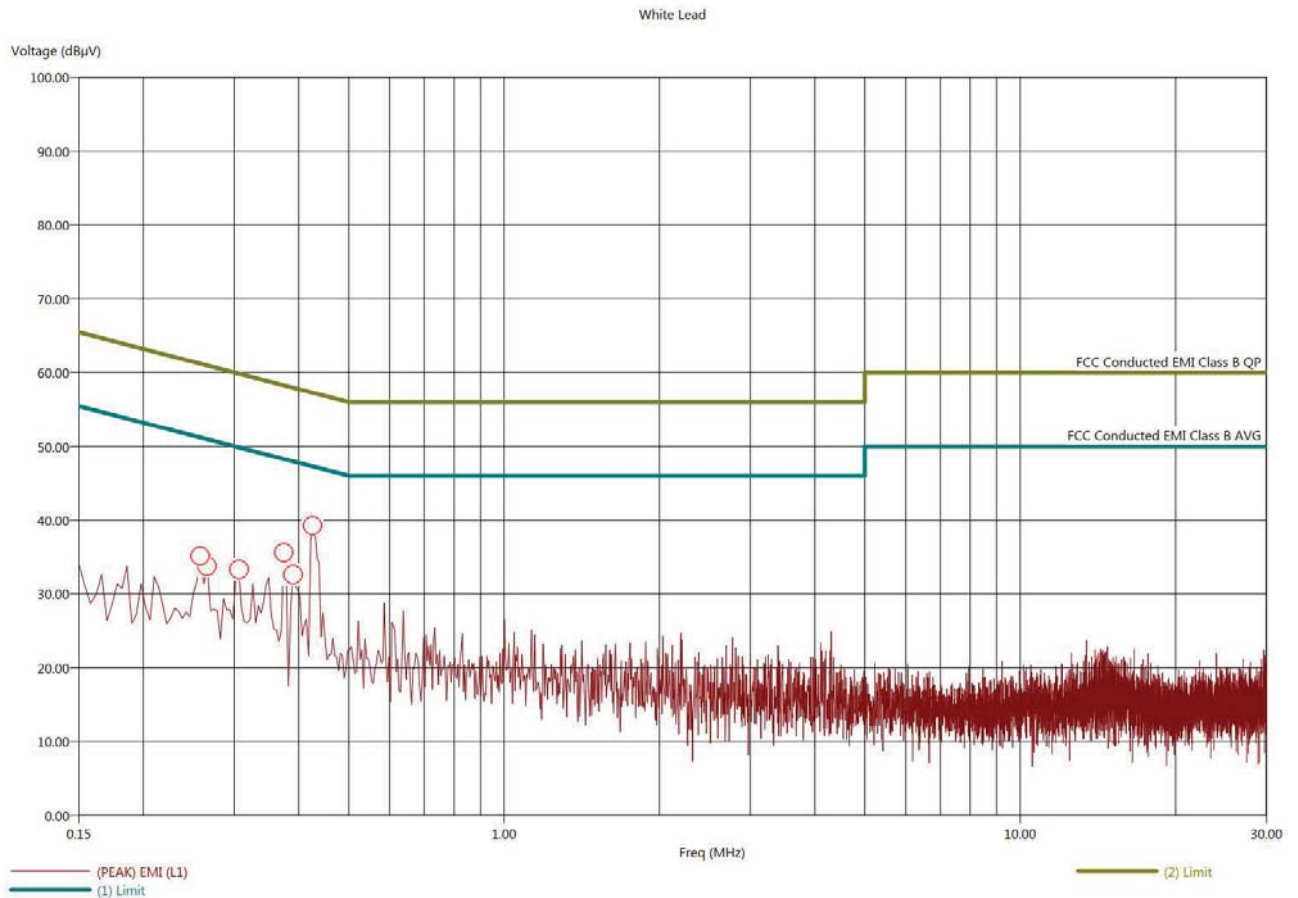
Title: FCC Class B - Black Lead
File: TX Mode - Final Scan - Black Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously transmitting in FHSS Mode
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S

10/7/2021 2:10:16 PM
Sequence: Final Measurements

Black Lead									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (dB)	(AVG) Margin (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.262	48.70	33.78	-2.60	-17.52	51.30	0.13	0.10	9.70	
0.286	48.29	33.30	-2.32	-17.31	50.61	0.13	0.10	9.70	
0.306	45.98	32.07	-4.03	-17.94	50.00	0.13	0.10	9.70	
0.378	44.90	30.90	-3.25	-17.25	48.15	0.13	0.10	9.70	
0.398	44.86	30.47	-3.00	-17.39	47.86	0.13	0.09	9.70	
0.430	44.19	31.14	-2.92	-15.97	47.11	0.14	0.09	9.70	

Title: FCC Class B - White Lead
File: TX Mode - Pre-Scan - White Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT continuously transmitting in FHSS Mode
Company: Mesa Laboratories, Inc.
Model: VPx Pro
S/N: DS-VP-PRO-900-S

10/7/2021 1:47:50 PM
Sequence: Preliminary Scan



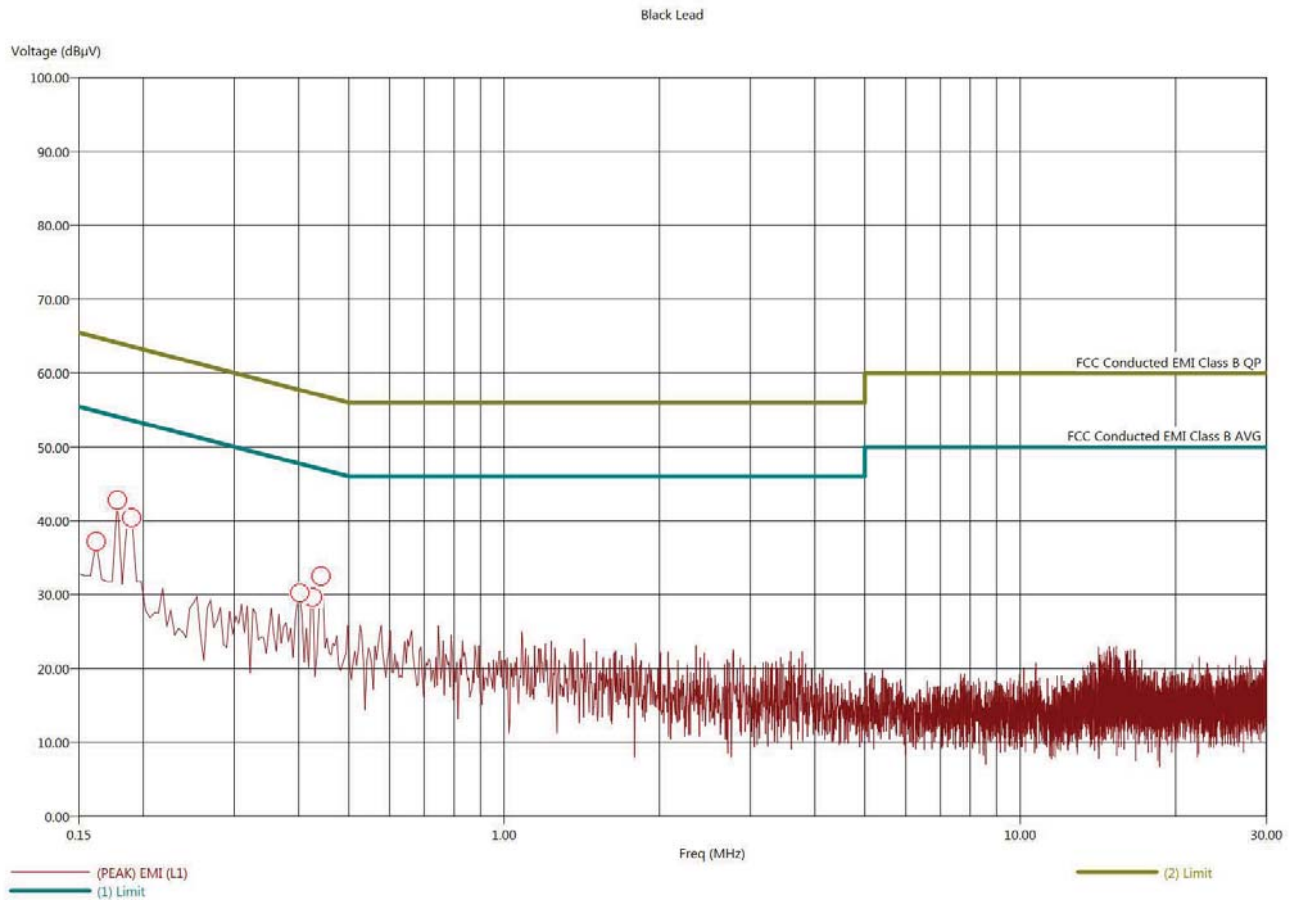
Title: FCC Class B - White Lead
 File: TX Mode - Final Scan - White Lead - FCC Class B - VPx - 10-07-2021.set
 Operator: Tae Hyun Kim
 EUT Type: 900 MHz Sensor
 EUT Condition: The EUT continuously transmitting in FHSS Mode
 Company: Mesa Laboratories, Inc.
 Model: VPx Pro
 S/N: DS-VP-PRO-900-S

10/7/2021 2:12:12 PM
 Sequence: Final Measurements

White Lead									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (dB)	(AVG) Margin (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.258	50.34	35.54	-0.93	-15.73	51.27	0.13	0.10	9.70	
0.266	51.08	35.09	0.12	-15.87	50.96	0.13	0.10	9.70	
0.306	48.40	33.97	-1.50	-15.93	49.90	0.13	0.09	9.70	
0.374	46.65	33.73	-1.47	-14.39	48.12	0.13	0.09	9.70	
0.390	48.32	33.86	0.18	-14.28	48.14	0.13	0.09	9.70	
0.426	50.06	35.46	2.76	-11.84	47.30	0.14	0.08	9.70	

Title: FCC Class B - Black Lead
File: RX Mode - Pre-Scan - Black Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously receiving at the low channel
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S

10/7/2021 1:13:28 PM
Sequence: Preliminary Scan



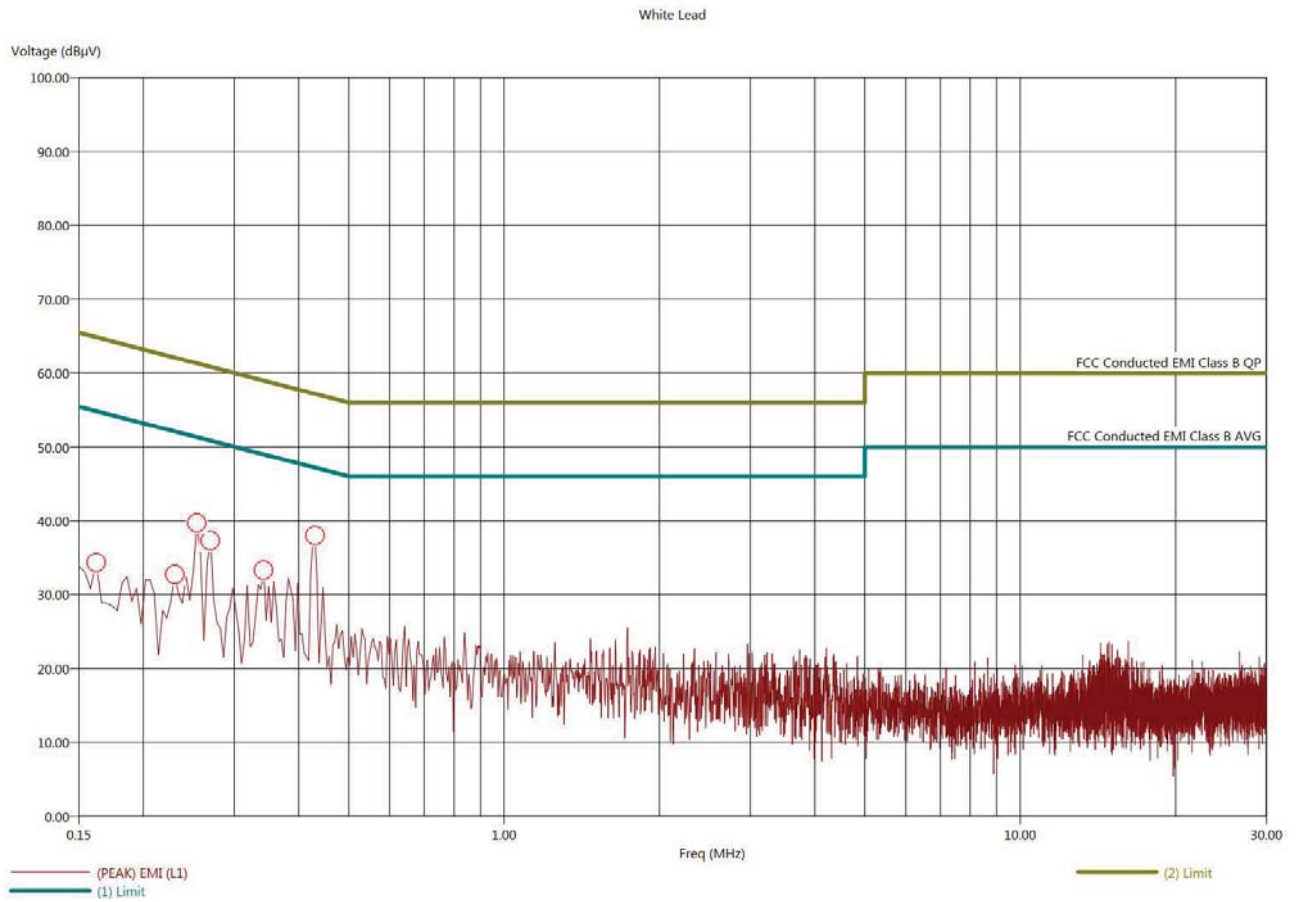
Title: FCC Class B - Black Lead
File: RX Mode - Final Scan - Black Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT is continuously receiving at the low channel
Company: Mesa Laboratories, Inc.
Model: VPx Pro
P/N: DS-VP-PRO-900-S

10/7/2021 2:20:02 PM
Sequence: Final Measurements

Black Lead									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (dB)	(AVG) Margin (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.162	60.61	44.03	5.68	-10.90	54.93	0.13	0.14	9.70	
0.178	56.74	42.58	2.98	-11.18	53.76	0.12	0.12	9.70	
0.190	56.74	42.82	2.76	-11.16	53.98	0.12	0.12	9.70	
0.402	45.55	30.90	-2.20	-16.85	47.75	0.14	0.09	9.70	
0.426	44.89	31.29	-2.41	-16.01	47.30	0.14	0.09	9.70	
0.442	43.84	30.38	-3.13	-16.59	46.97	0.14	0.09	9.70	

Title: FCC Class B - White Lead
File: RX Mode - Pre-Scan - White Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT continuously receiving at the low channel
Company: Mesa Laboratories, Inc.
Model: VPx Pro
S/N: DS-VP-PRO-900-S

10/7/2021 1:21:08 PM
Sequence: Preliminary Scan



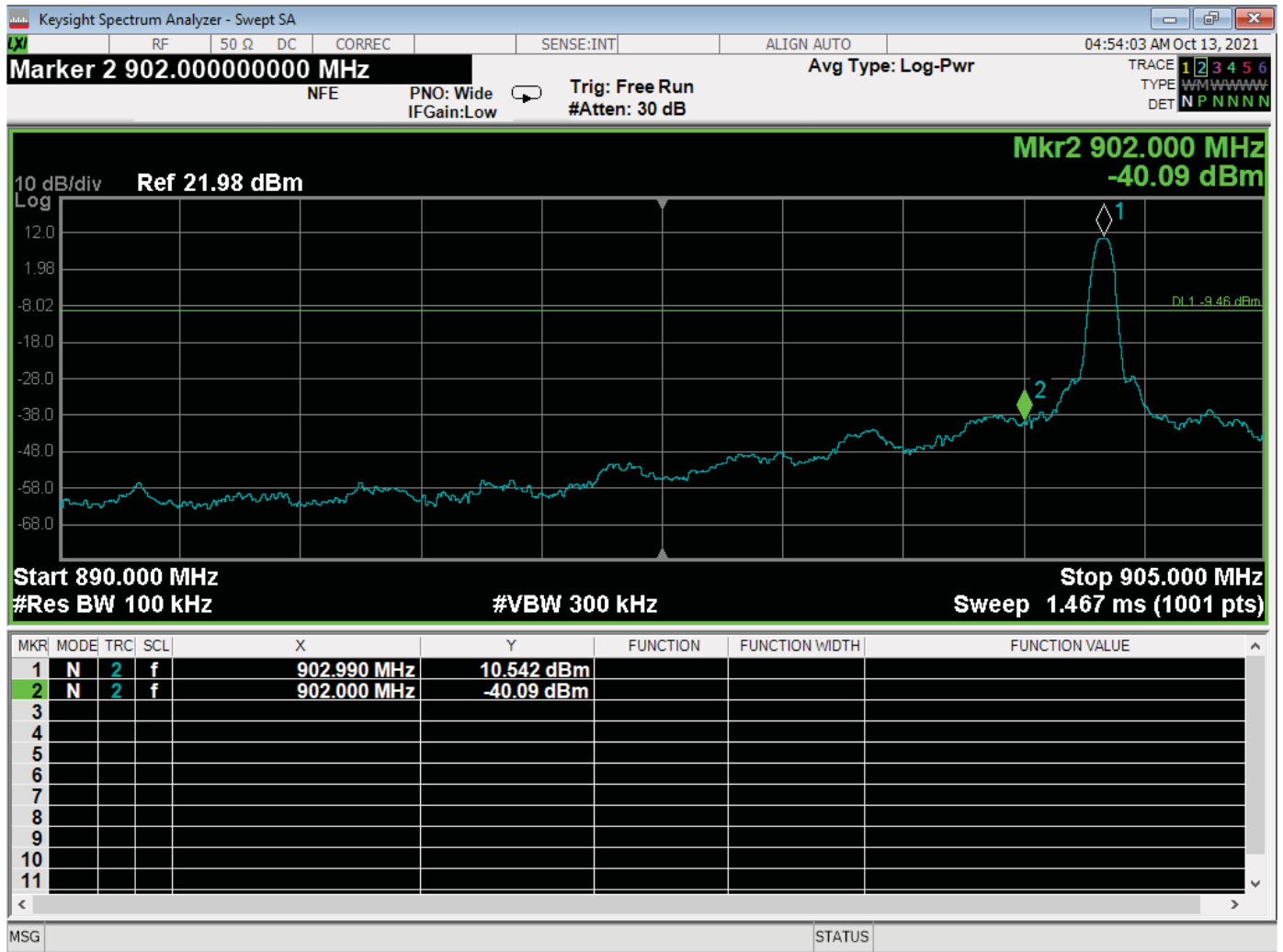


Title: FCC Class B - White Lead
File: RX Mode - Final Scan - White Lead - FCC Class B - VPx - 10-07-2021.set
Operator: Tae Hyun Kim
EUT Type: 900 MHz Sensor
EUT Condition: The EUT continuously receiving at the low channel
Company: Mesa Laboratories, Inc.
Model: VPx Pro
S/N: DS-VP-PRO-900-S

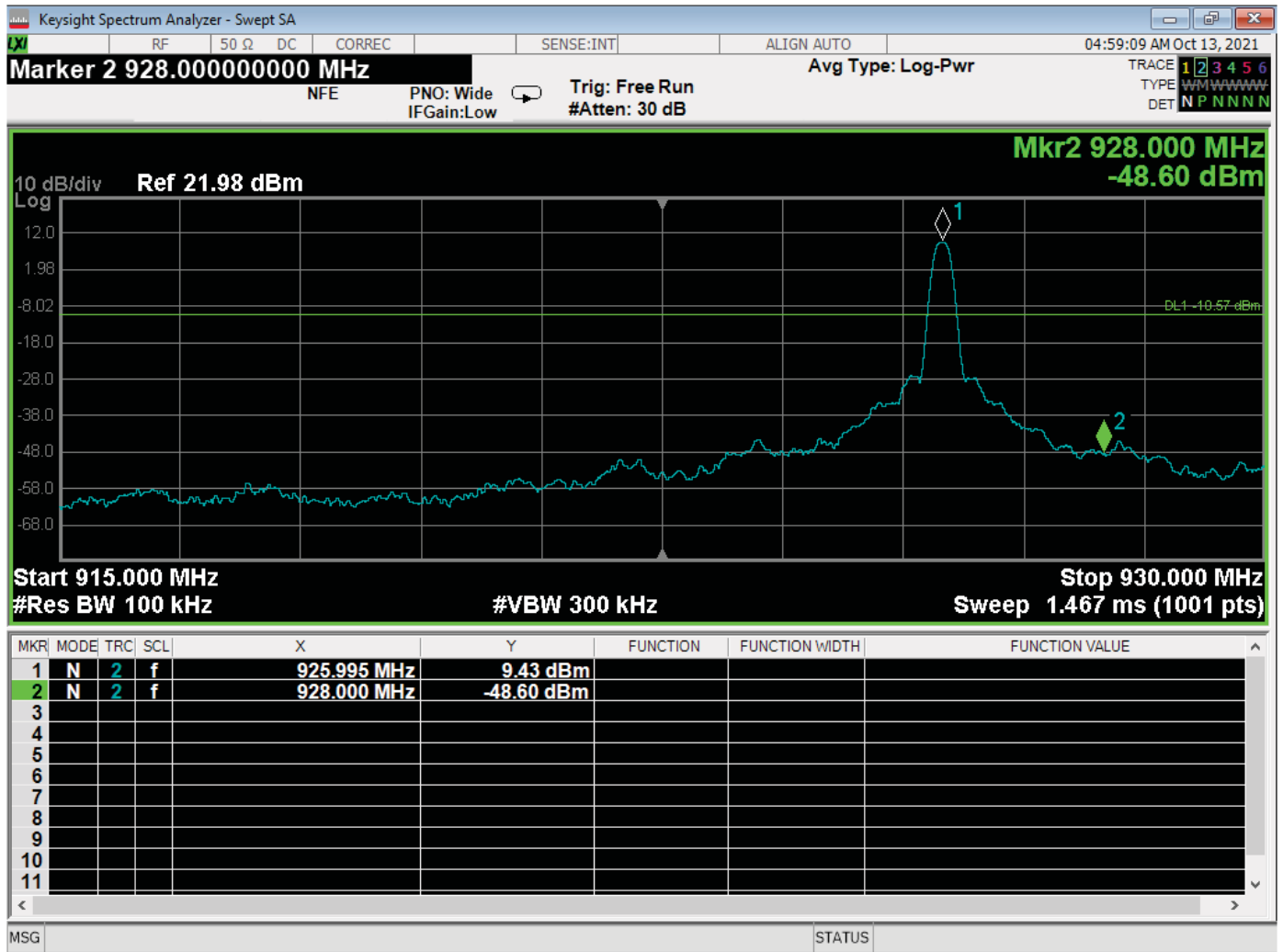
10/7/2021 2:16:21 PM
Sequence: Final Measurements

White Lead									
Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin (dB)	(AVG) Margin (AVG) (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)	
0.162	57.82	37.33	2.80	-17.69	55.02	0.13	0.14	9.70	
0.230	51.10	33.05	-0.83	-18.88	51.93	0.12	0.10	9.70	
0.254	51.41	35.07	0.25	-16.09	51.16	0.13	0.10	9.70	
0.270	51.04	34.78	-0.05	-16.31	51.09	0.13	0.10	9.70	
0.342	47.44	34.08	-1.78	-15.14	49.22	0.13	0.09	9.70	
0.430	49.93	34.80	2.65	-12.48	47.28	0.14	0.08	9.70	

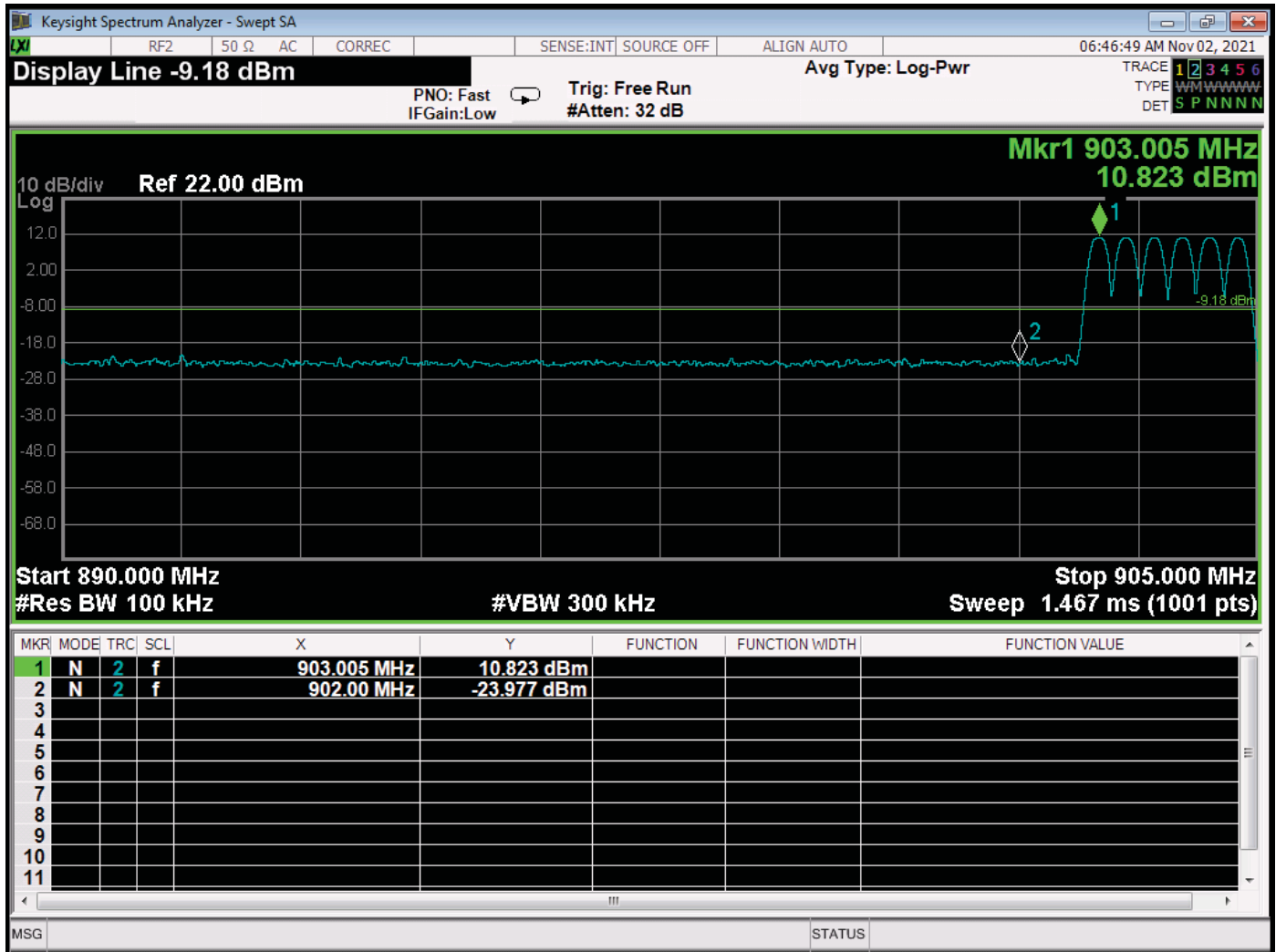




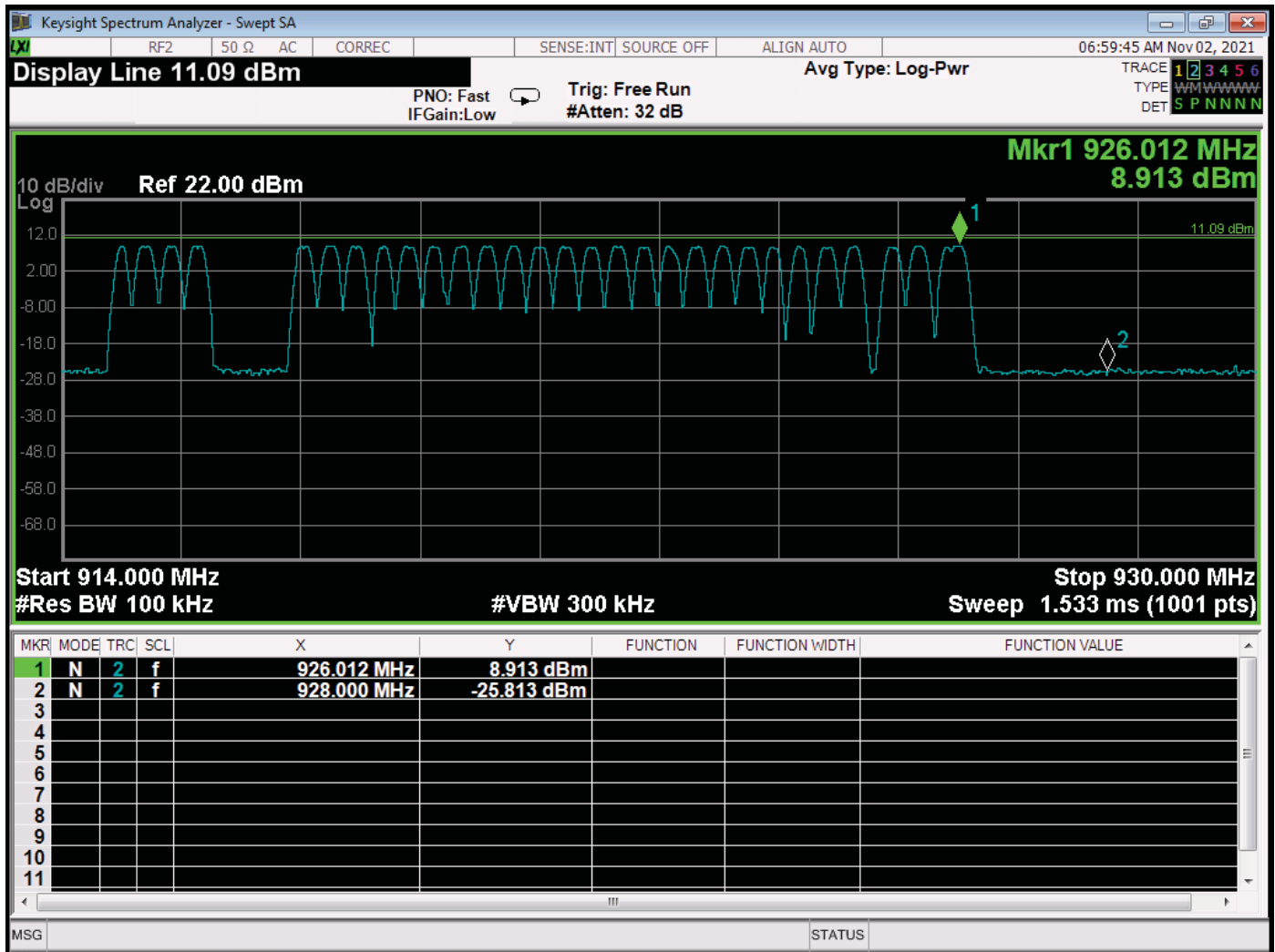
Band Edge – Low Channel – Fixed Frequency Mode



Band Edge – High Channel – Fixed Frequency Mode

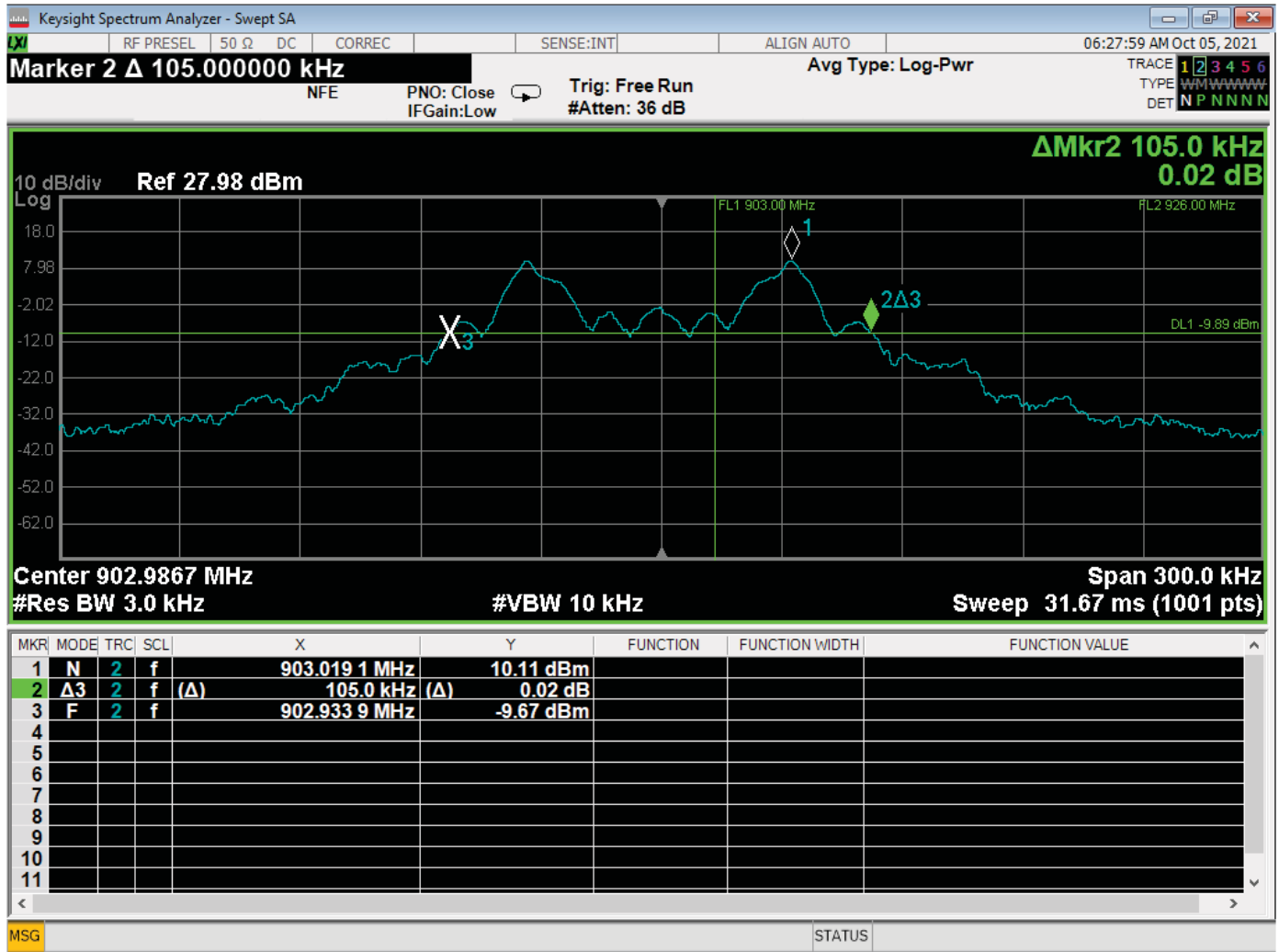


Band Edge – Low Channel – Frequency Hopping Mode

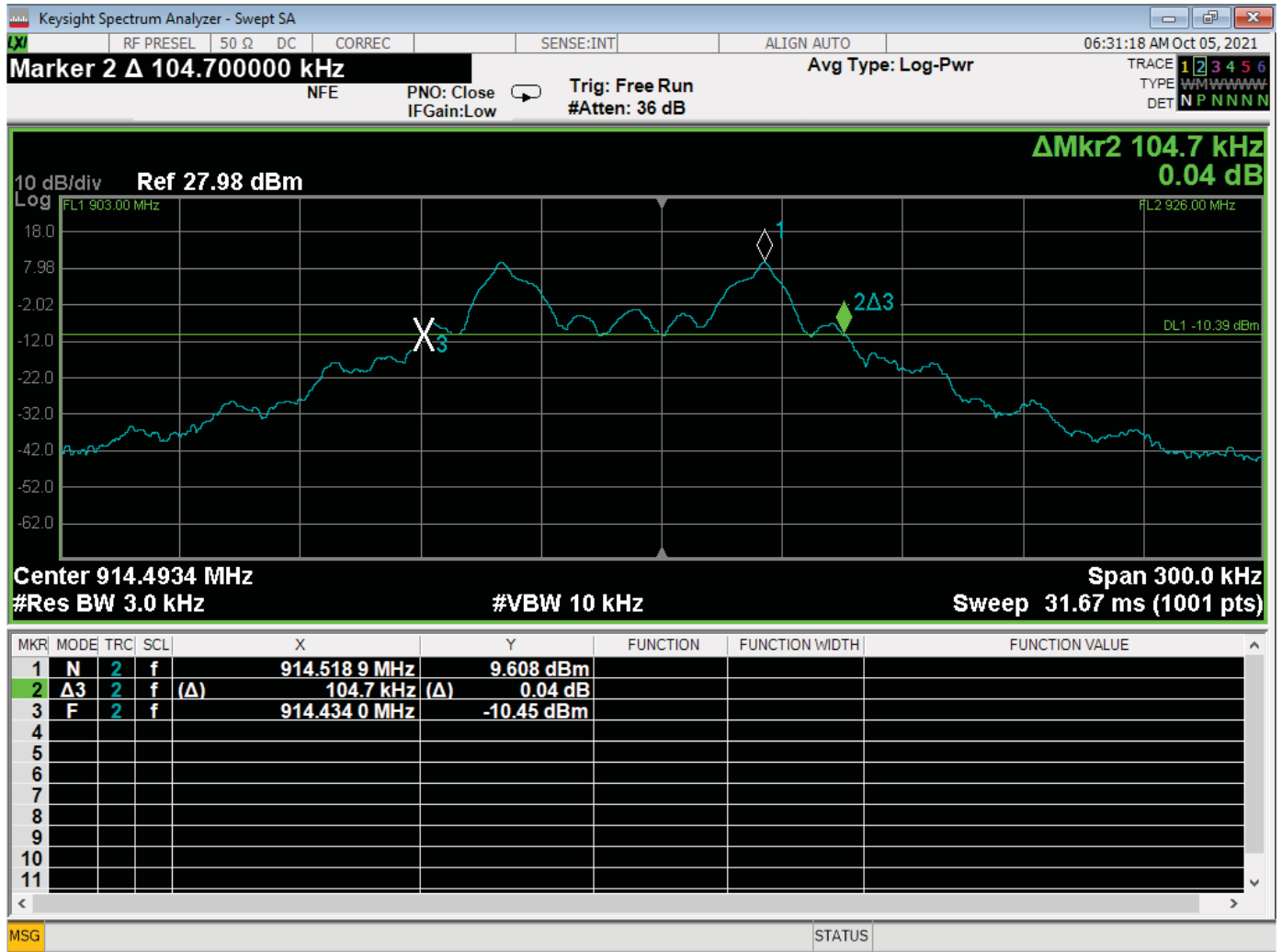


Band Edge – High Channel – Frequency Hopping Mode

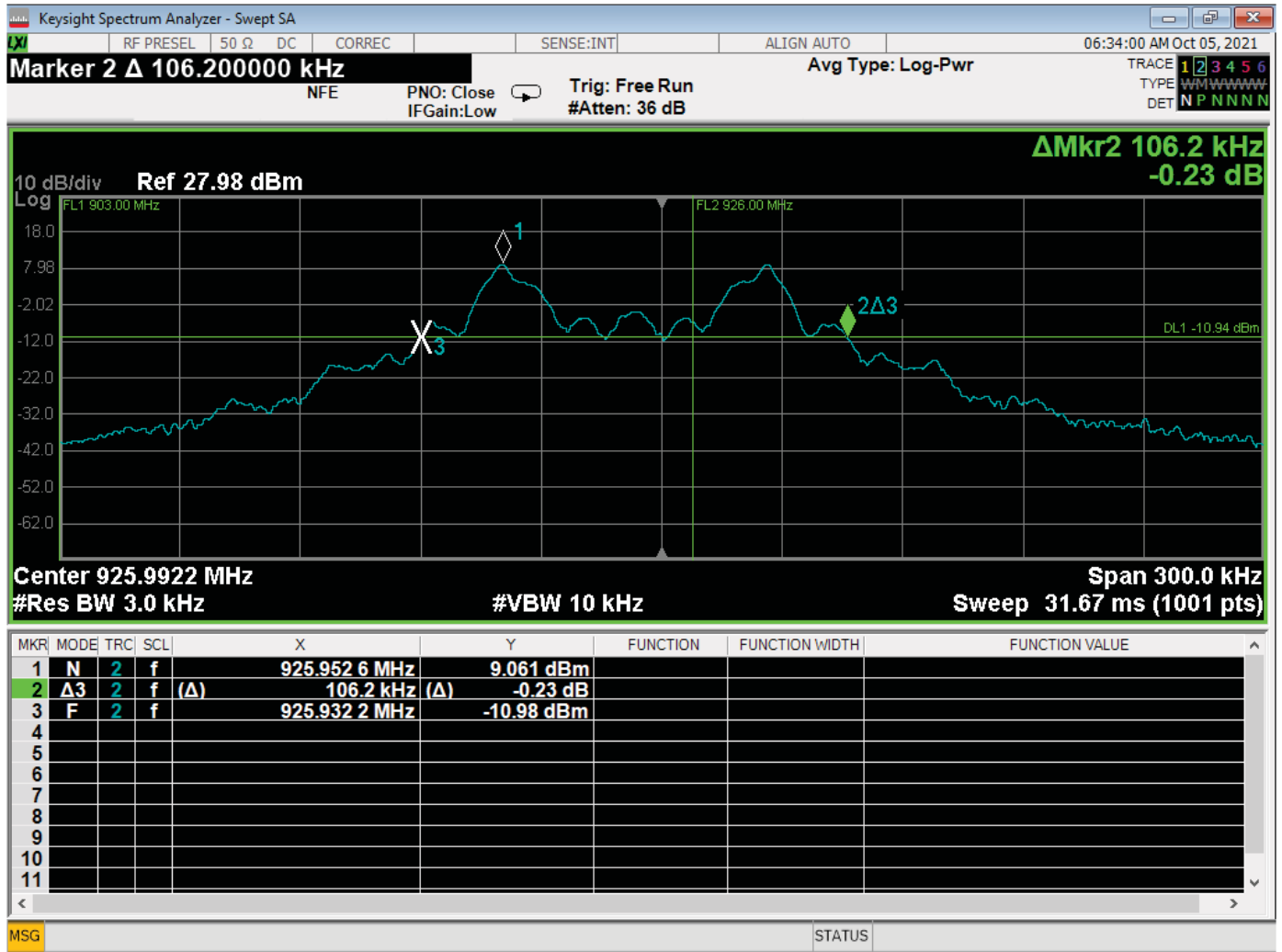
***-20 DB BANDWIDTH
DATA SHEETS***



-20 dB Bandwidth – Low Channel

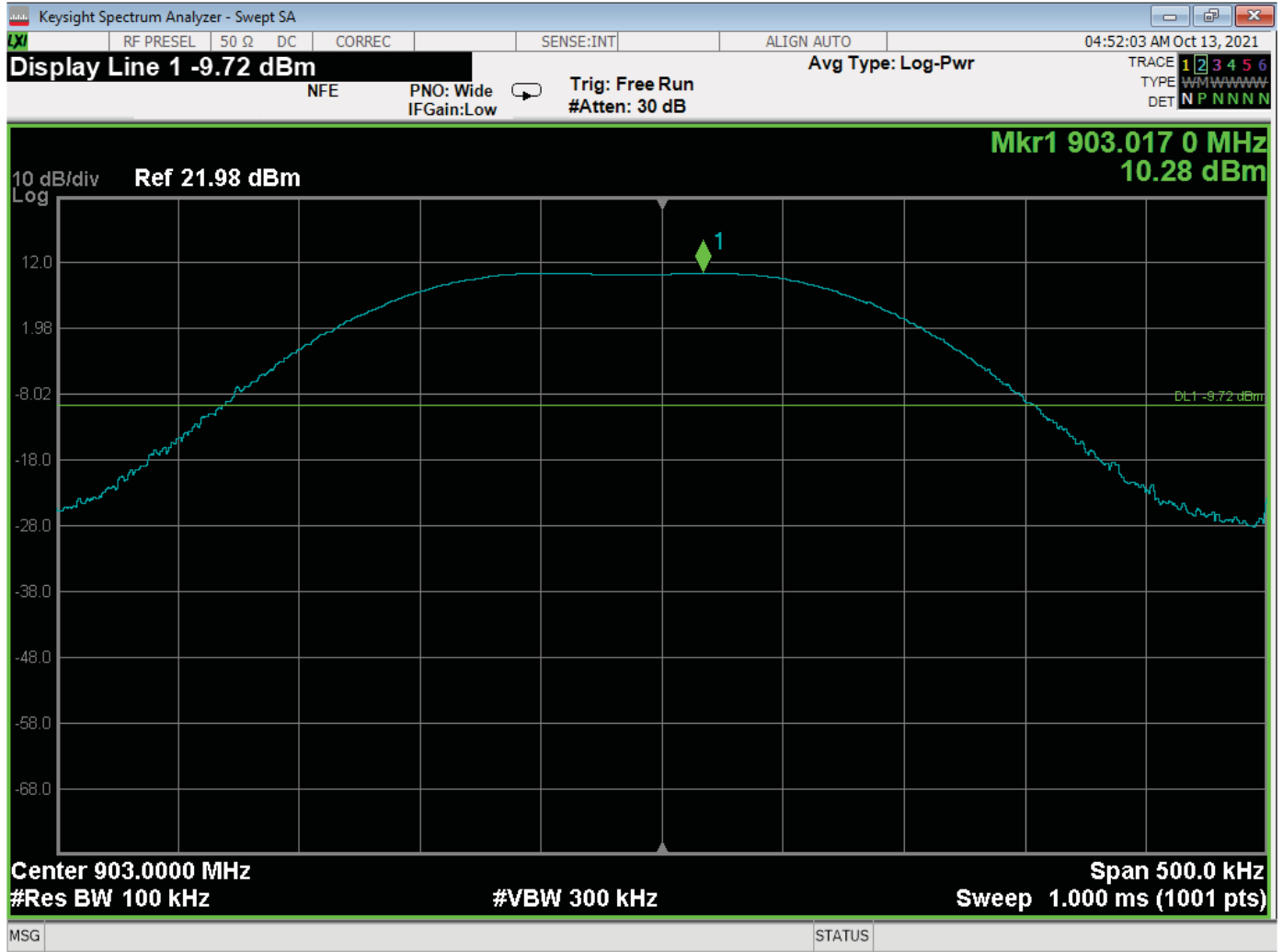


-20 dB Bandwidth – Middle Channel

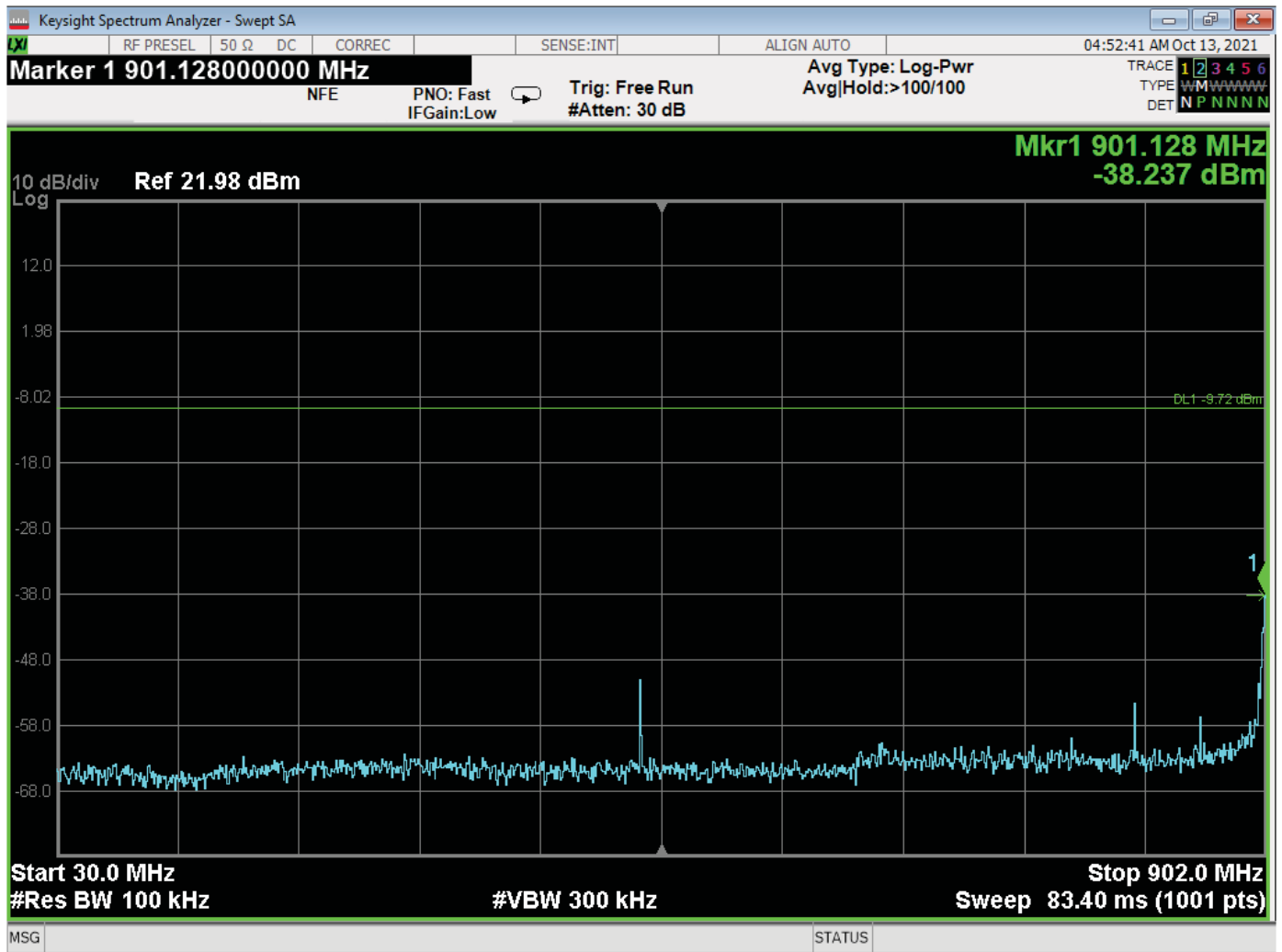


-20 dB Bandwidth – High Channel

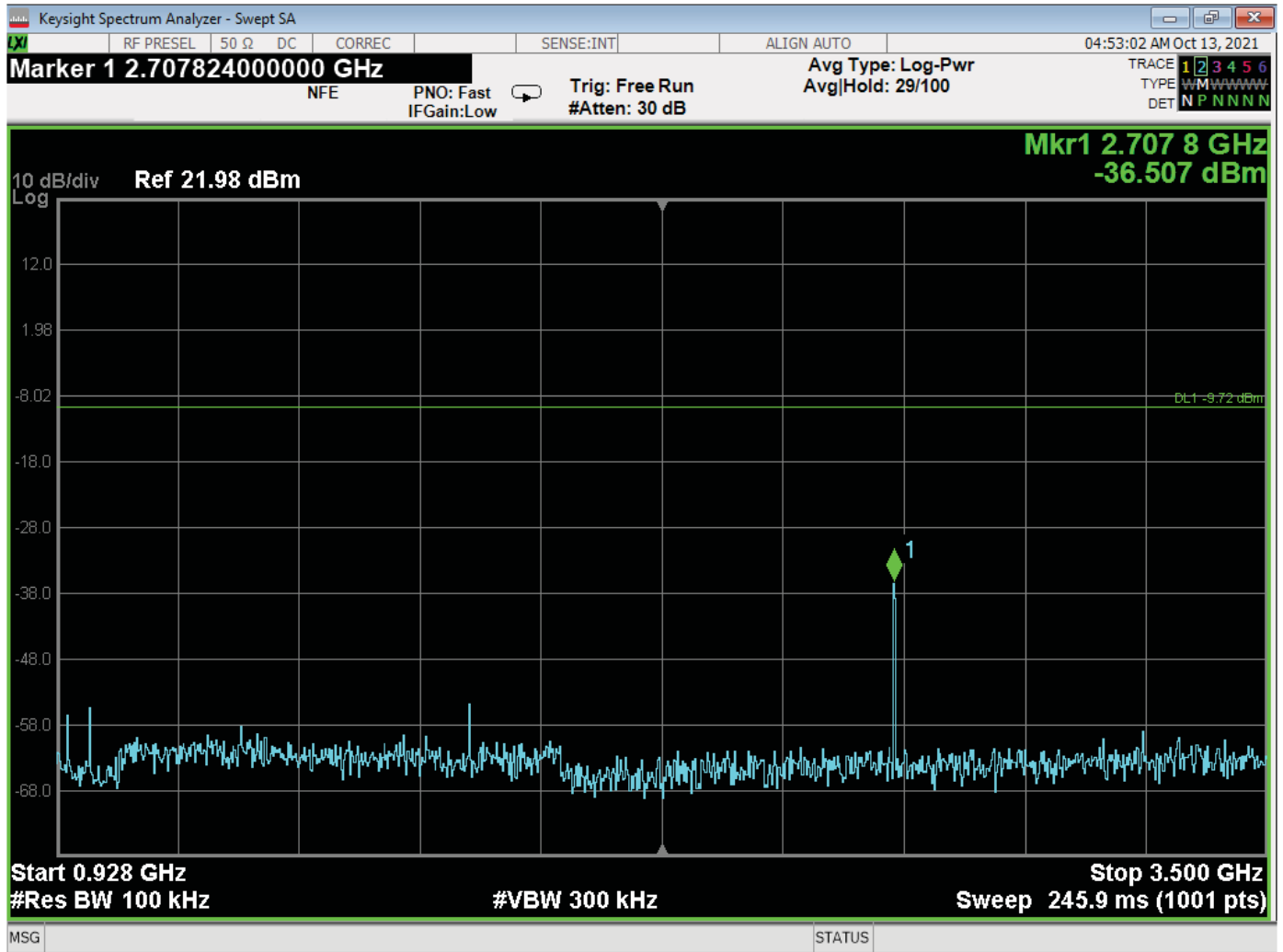
***RF ANTENNA CONDUCTED
DATA SHEETS***



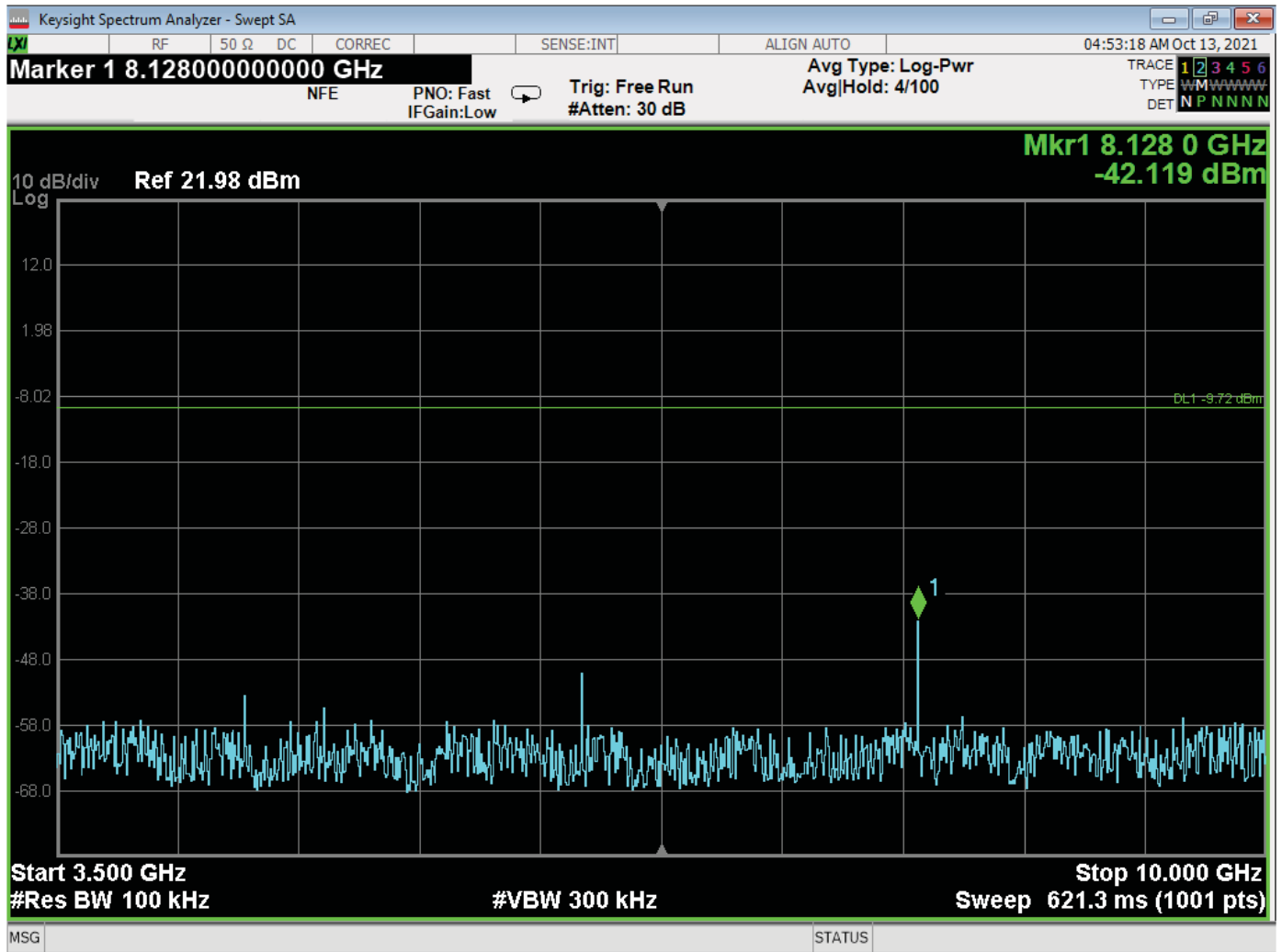
RF Antenna Conducted – Low Channel Reference Level



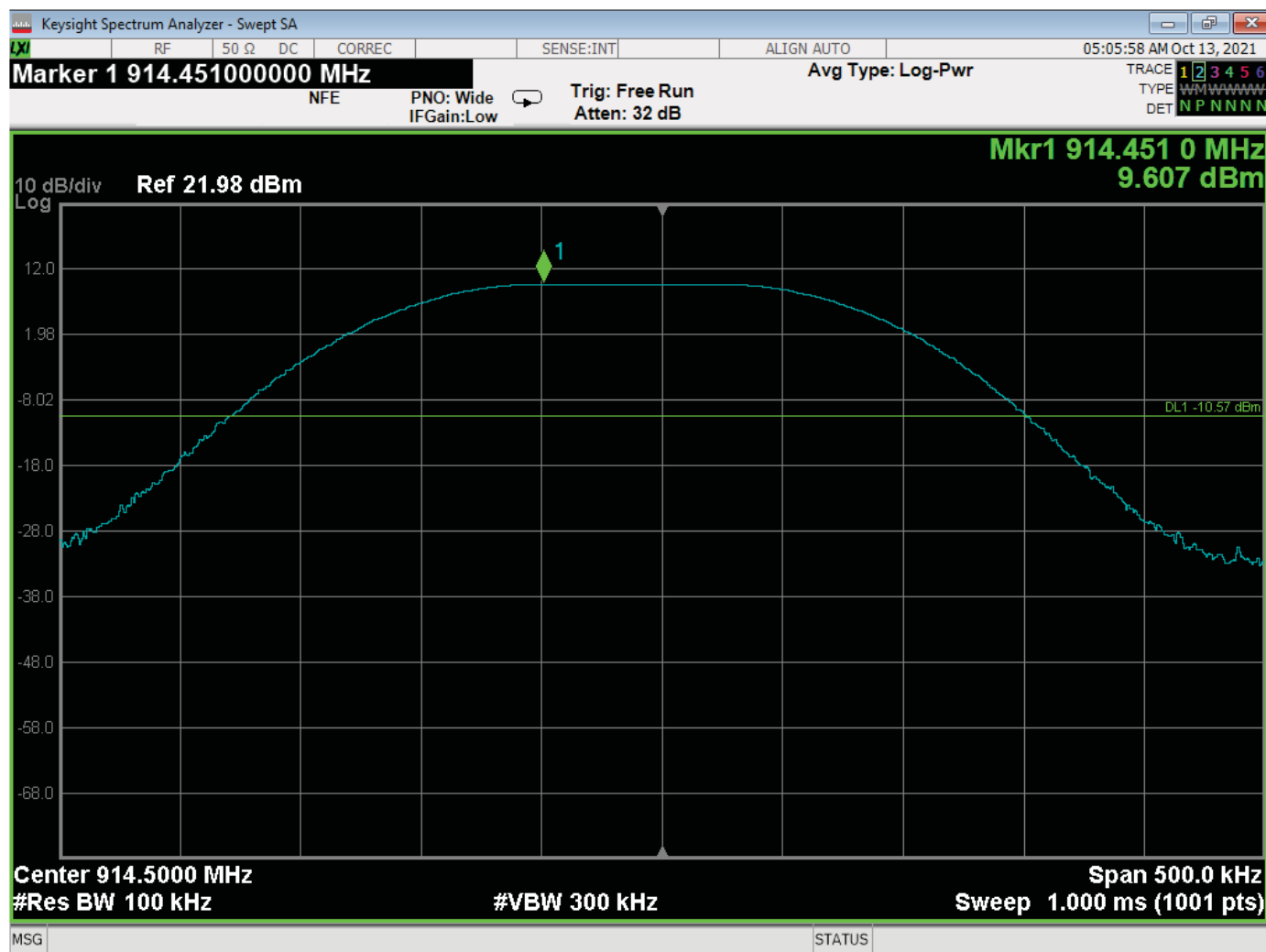
RF Antenna Conducted – Low Channel – 30 MHz to 902 MHz



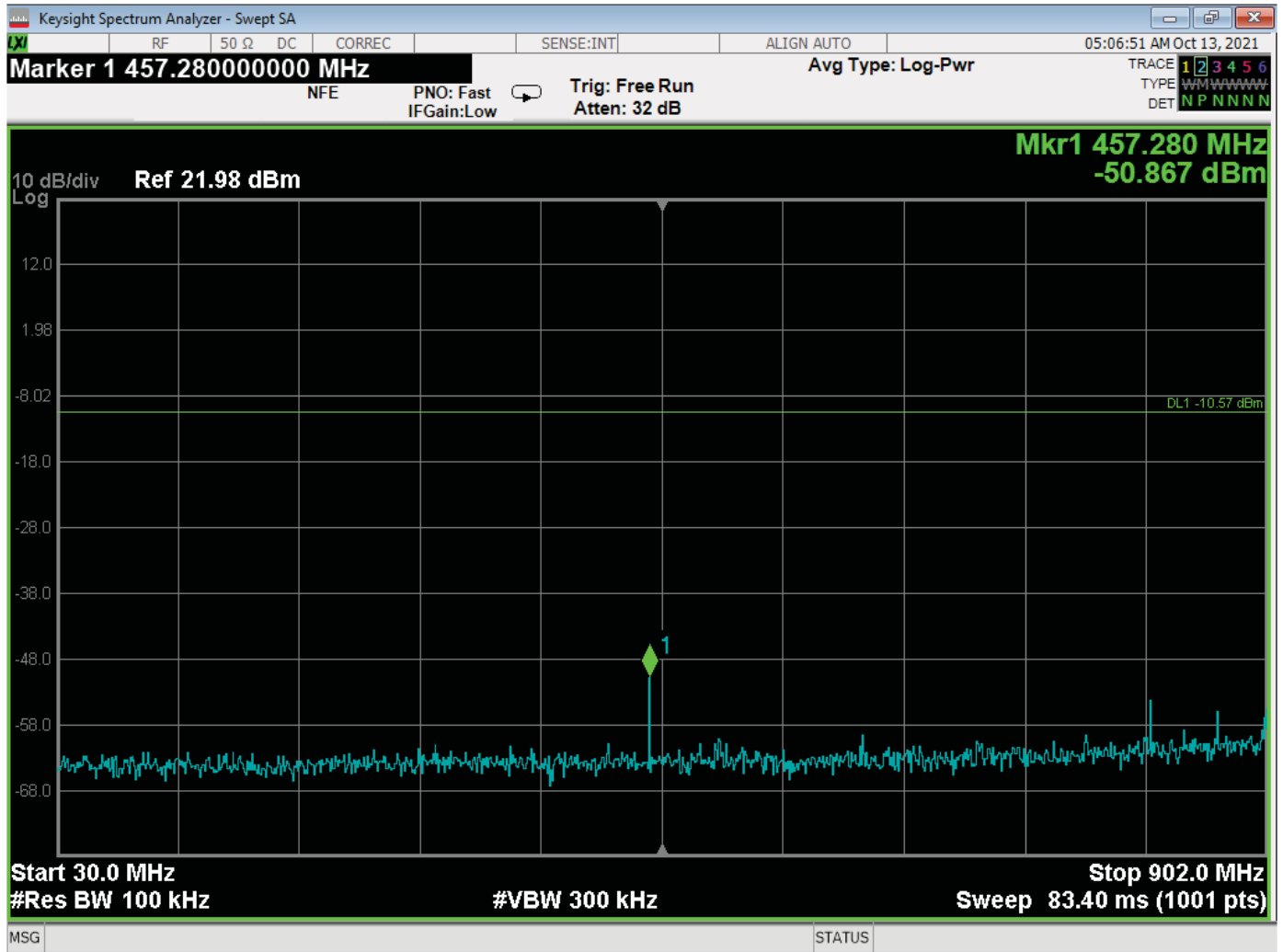
RF Antenna Conducted – Low Channel – 928 MHz to 3.5 GHz



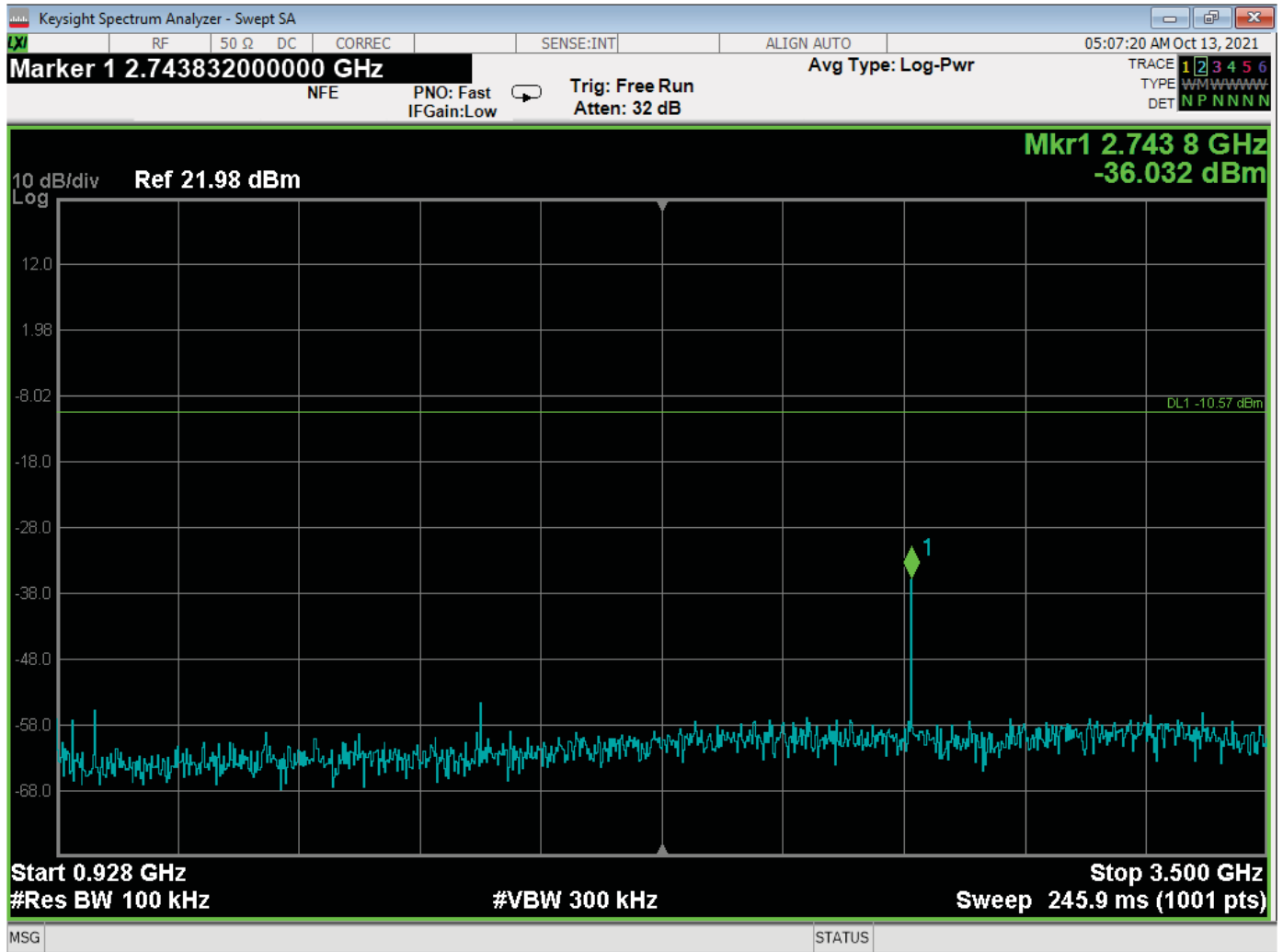
RF Antenna Conducted – Low Channel – 3.5 GHz to 10 GHz



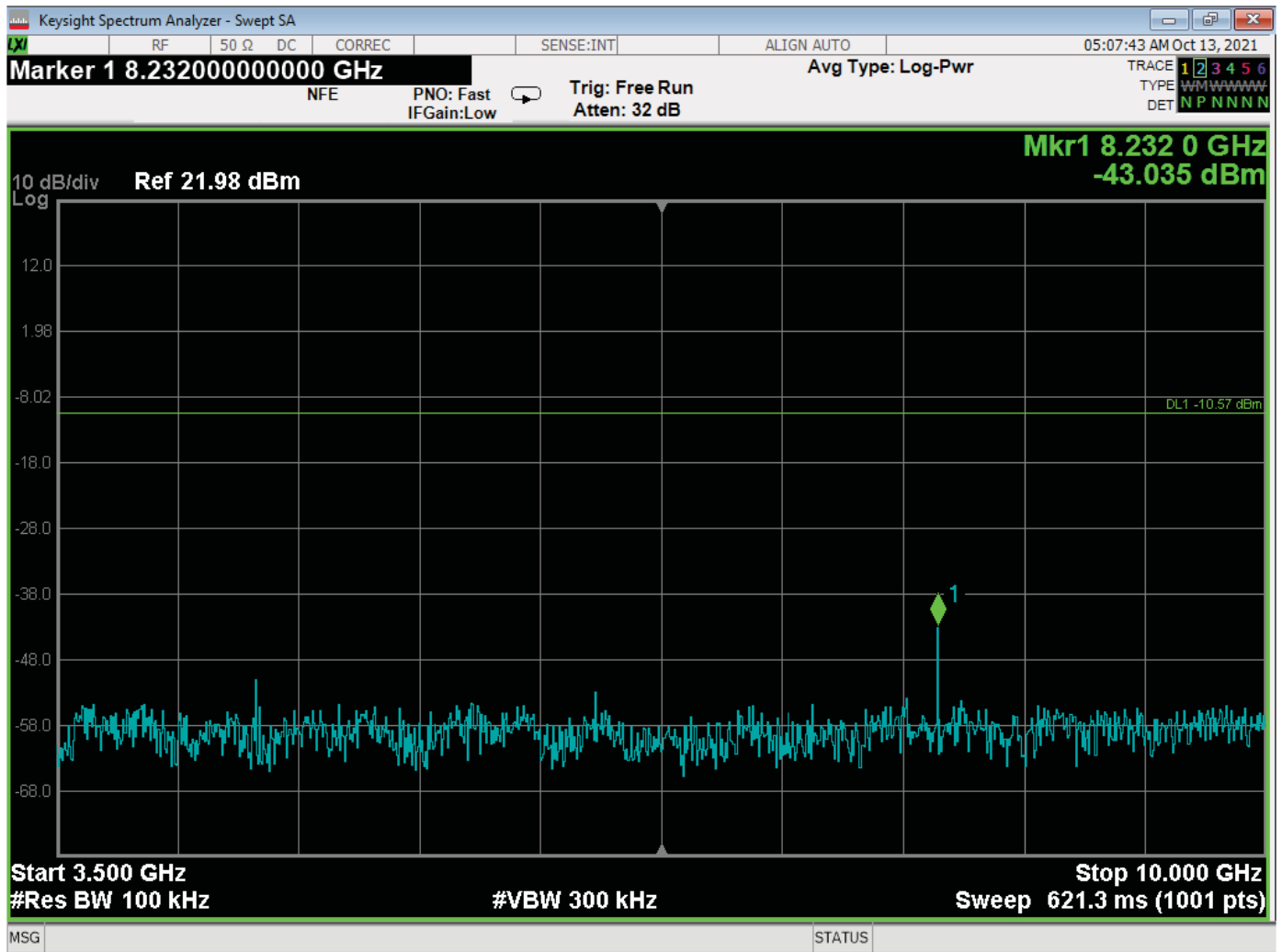
RF Antenna Conducted – Middle Channel – Reference Level



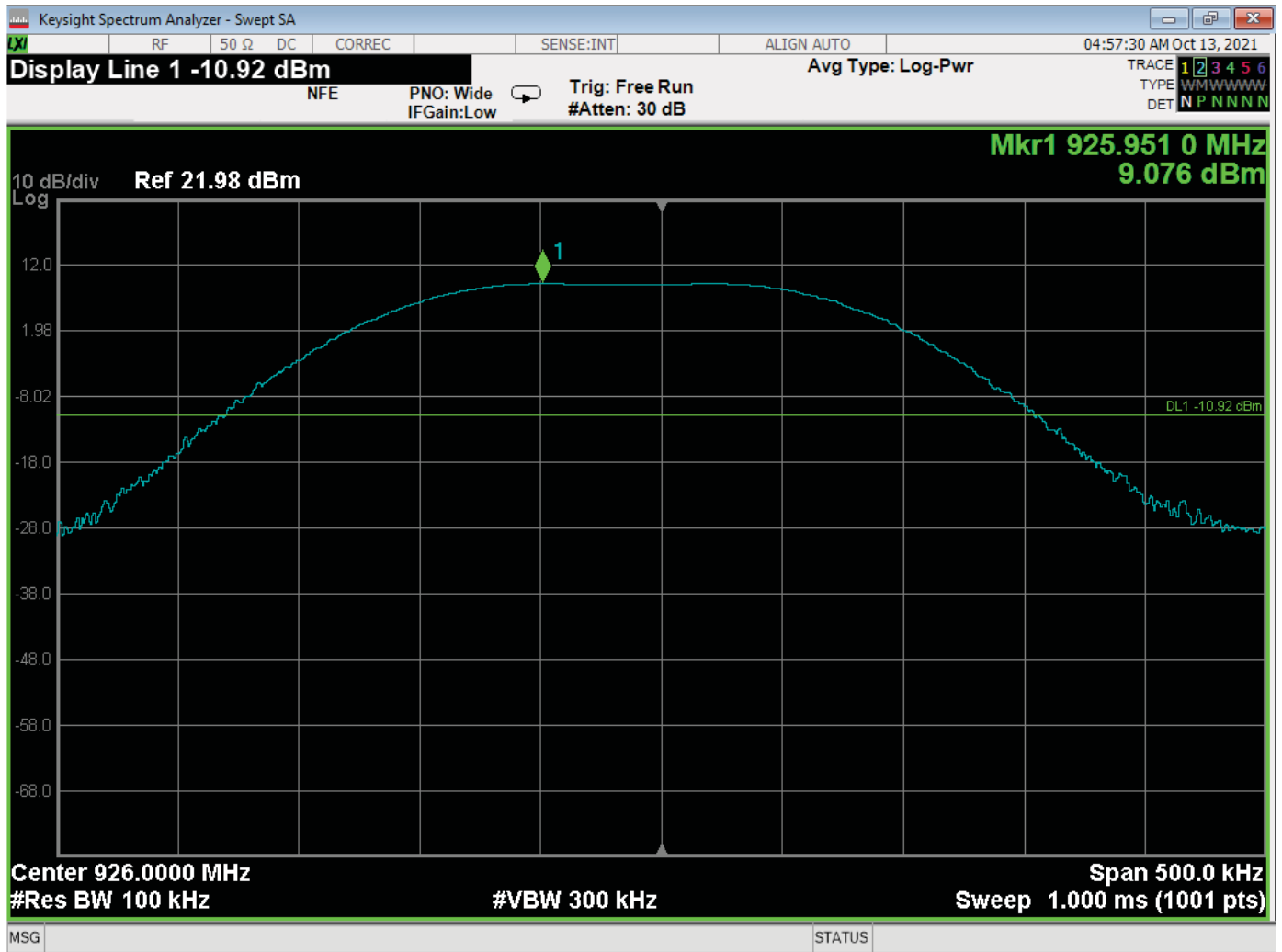
RF Antenna Conducted – Middle Channel – 30 MHz to 902 MHz



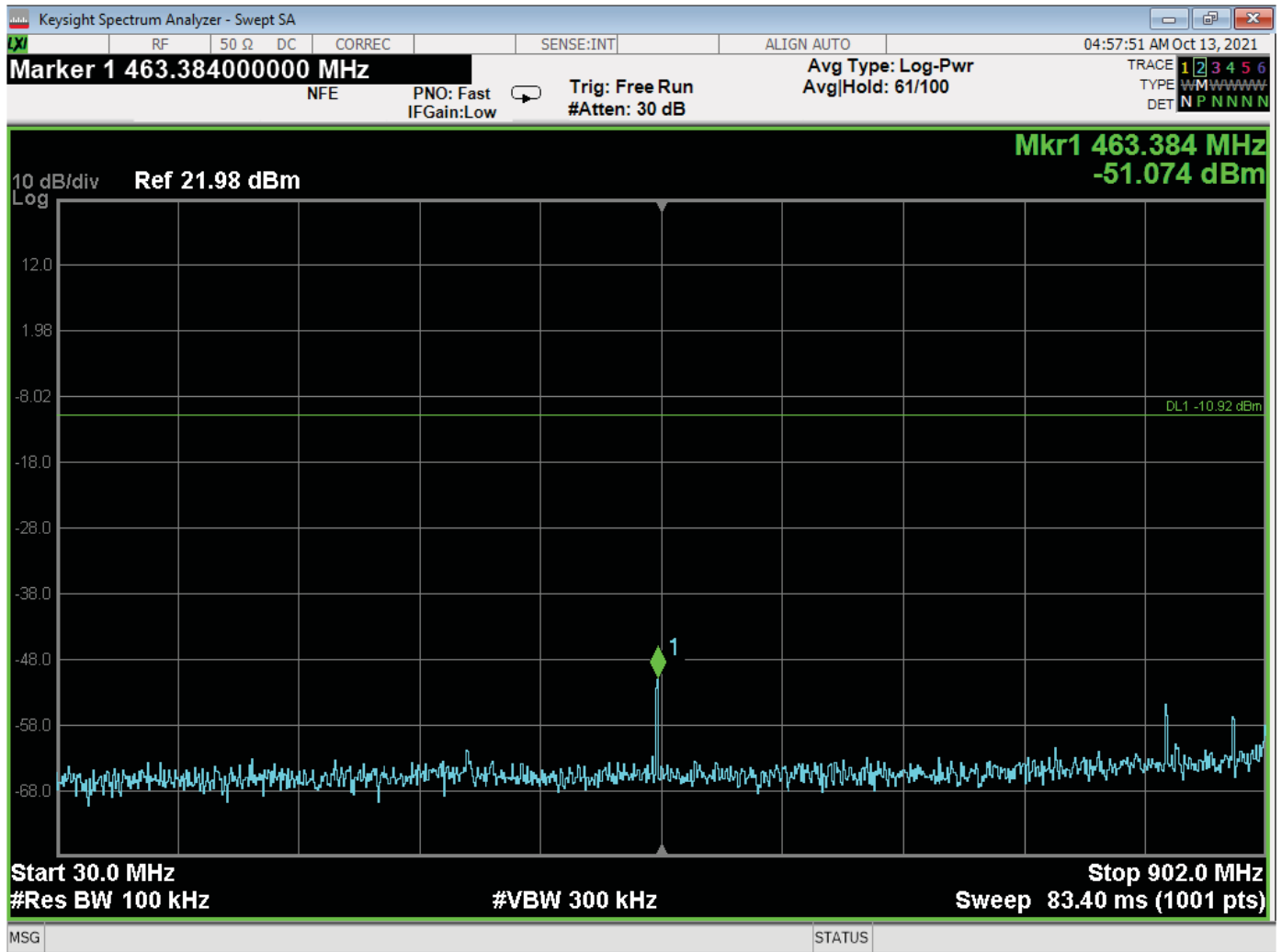
RF Antenna Conducted – Middle Channel – 928 MHz to 3.5 GHz



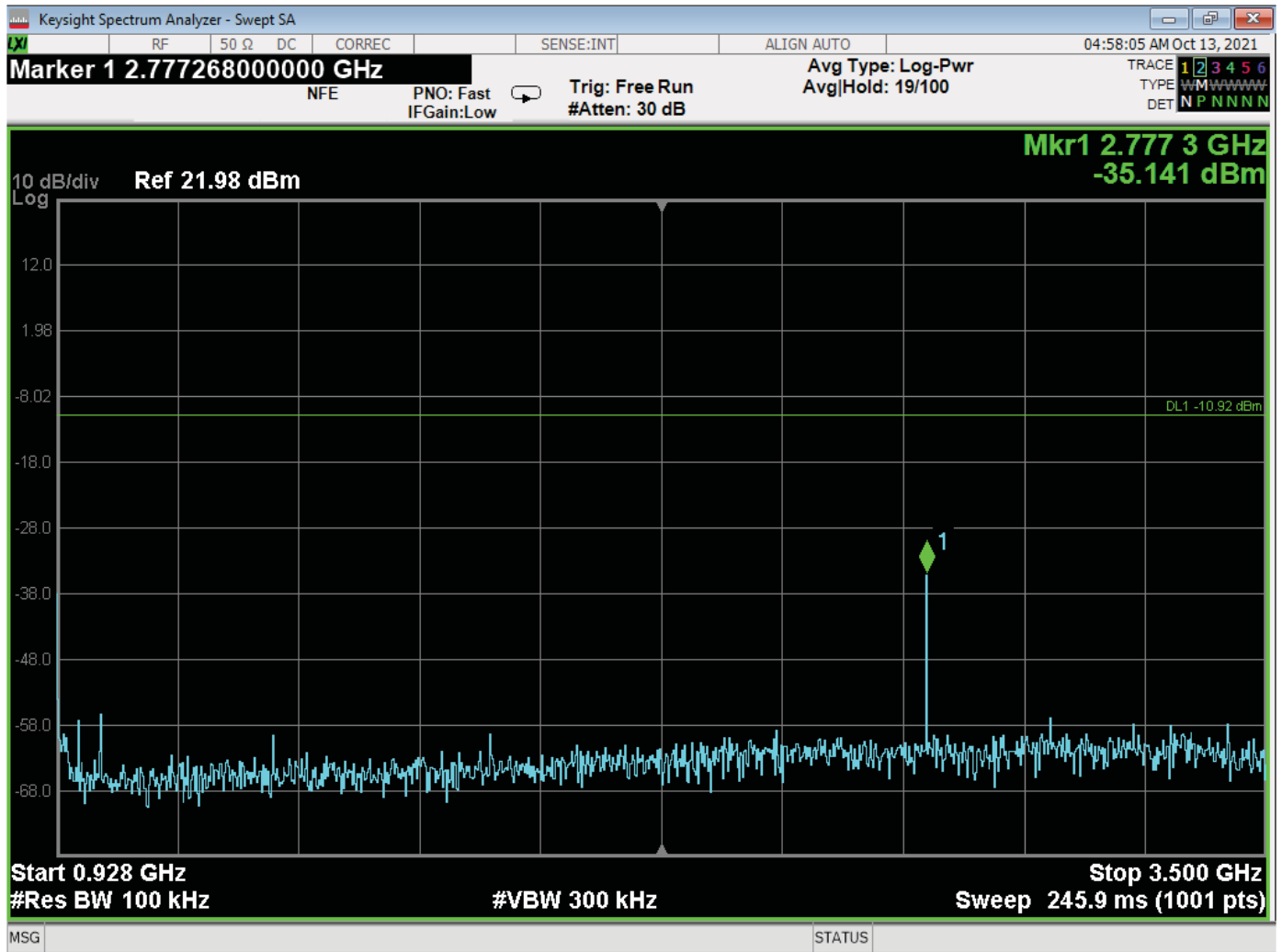
RF Antenna Conducted – Middle Channel – 3.5 GHz to 10 GHz



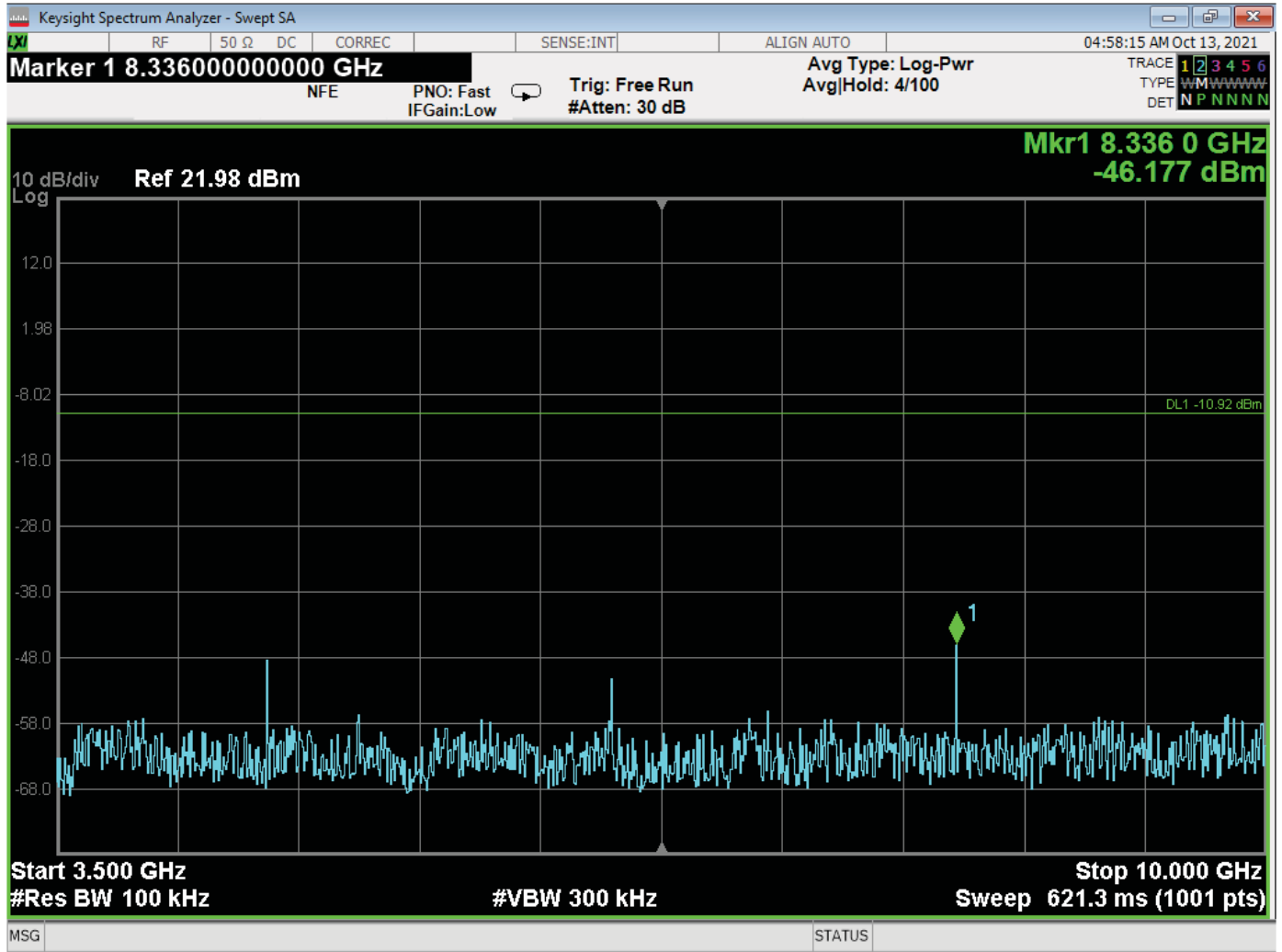
RF Antenna Conducted – High Channel – Reference Level



RF Antenna Conducted – High Channel – 30 MHz to 902 MHz

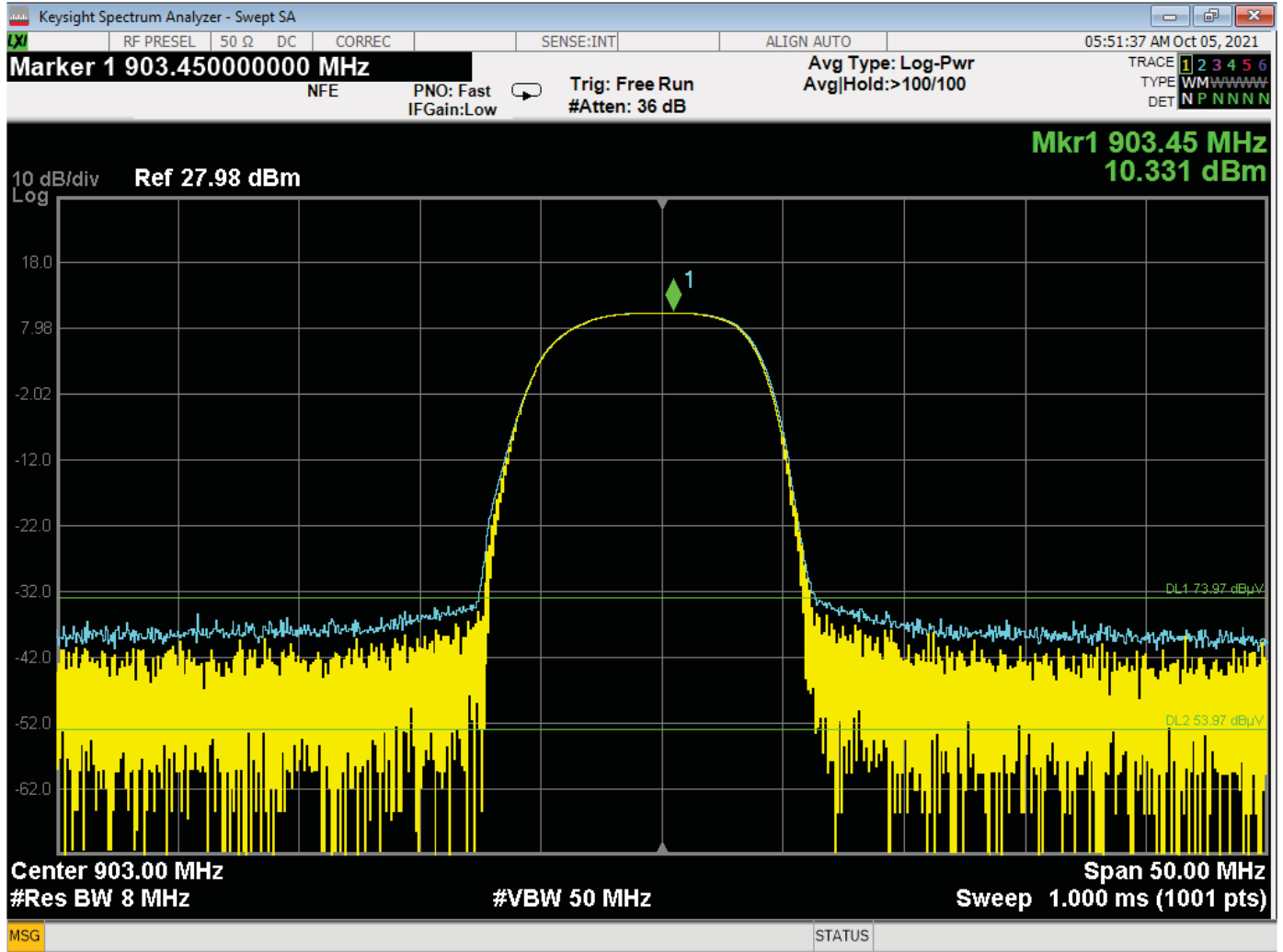


RF Antenna Conducted – High Channel – 928 MHz to 3.5 GHz

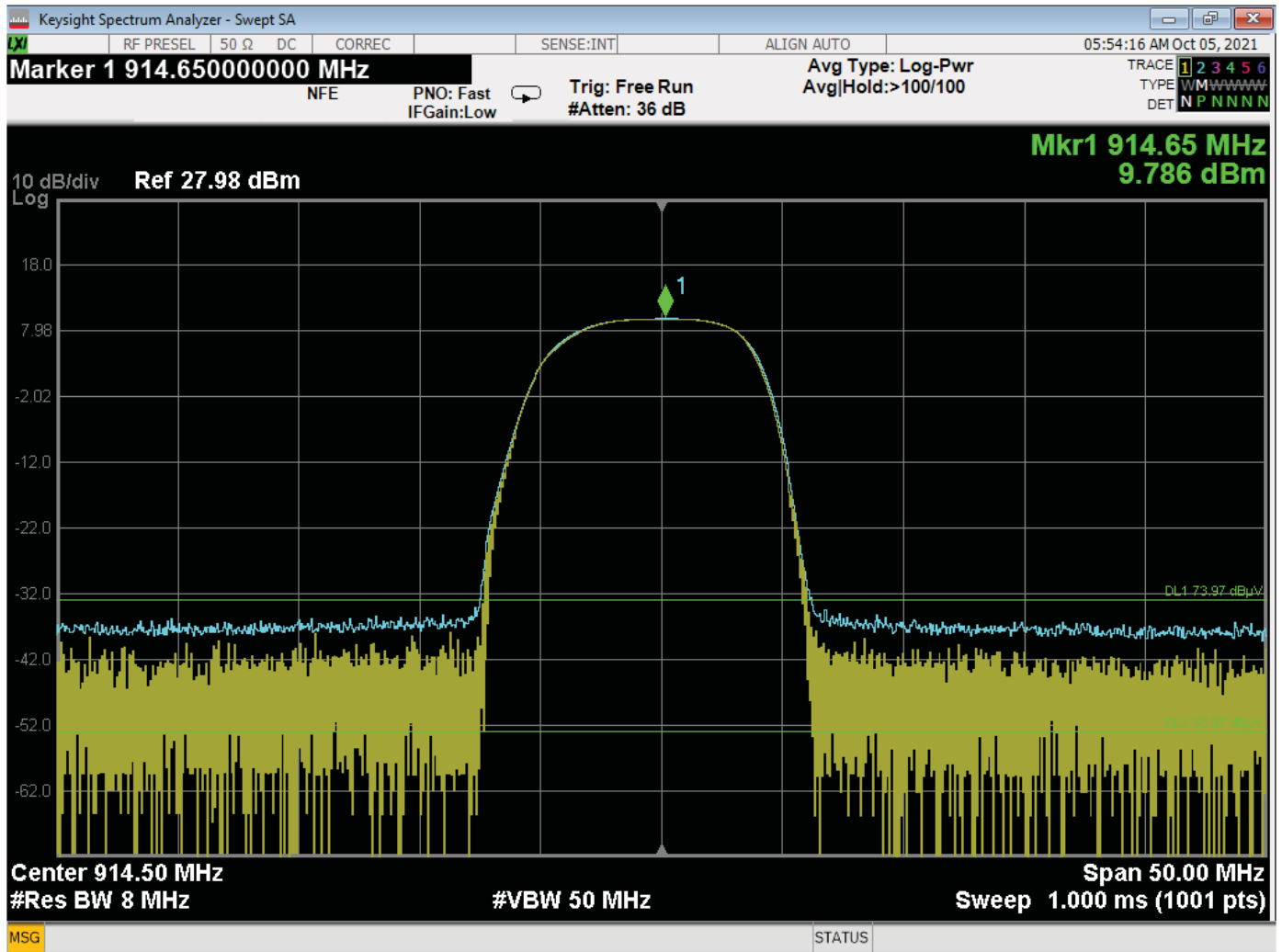


RF Antenna Conducted – High Channel – 3.5 GHz to 10 GHz

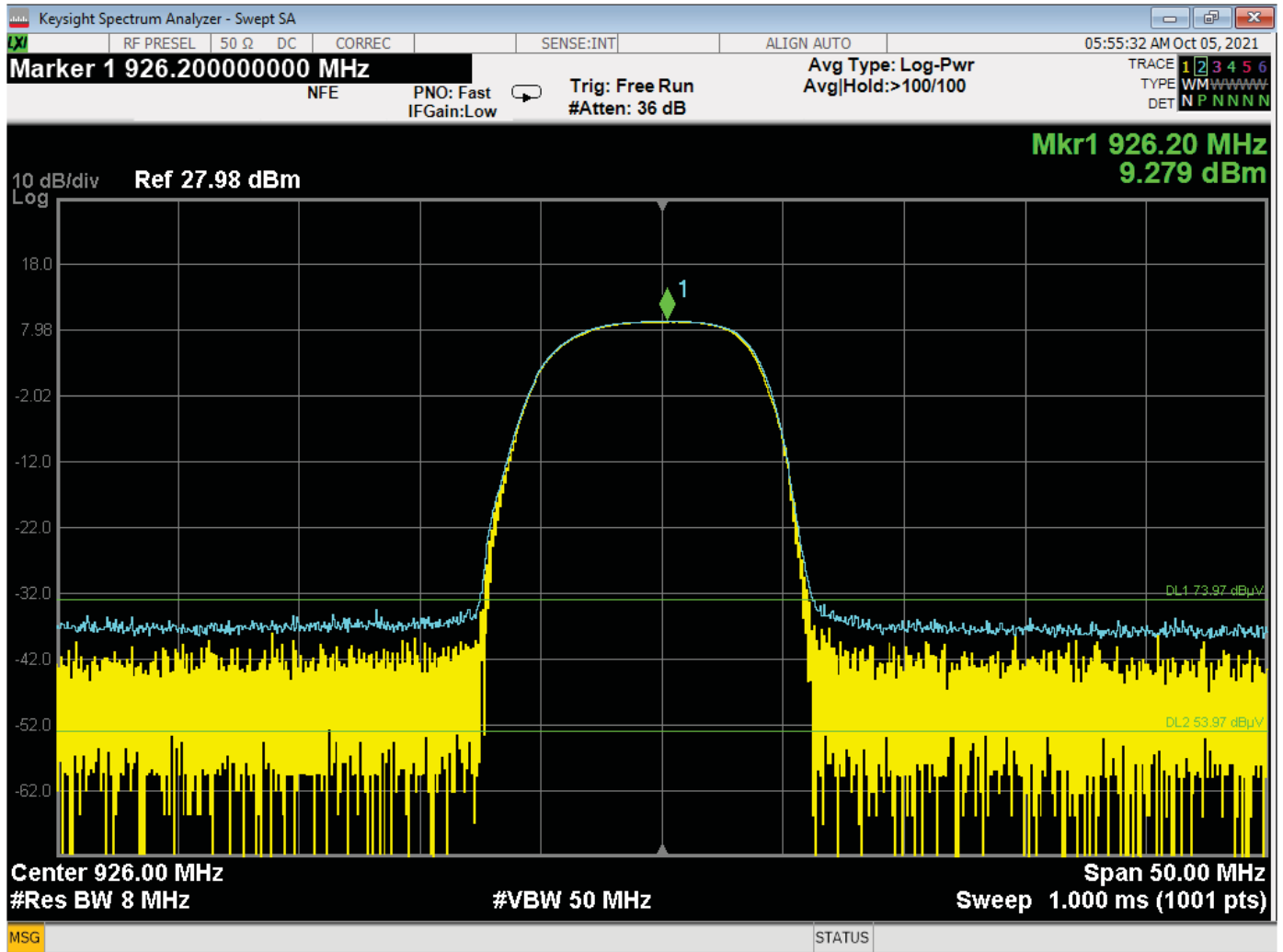
***PEAK POWER OUTPUT
DATA SHEETS***



Peak Power Output – Low Channel

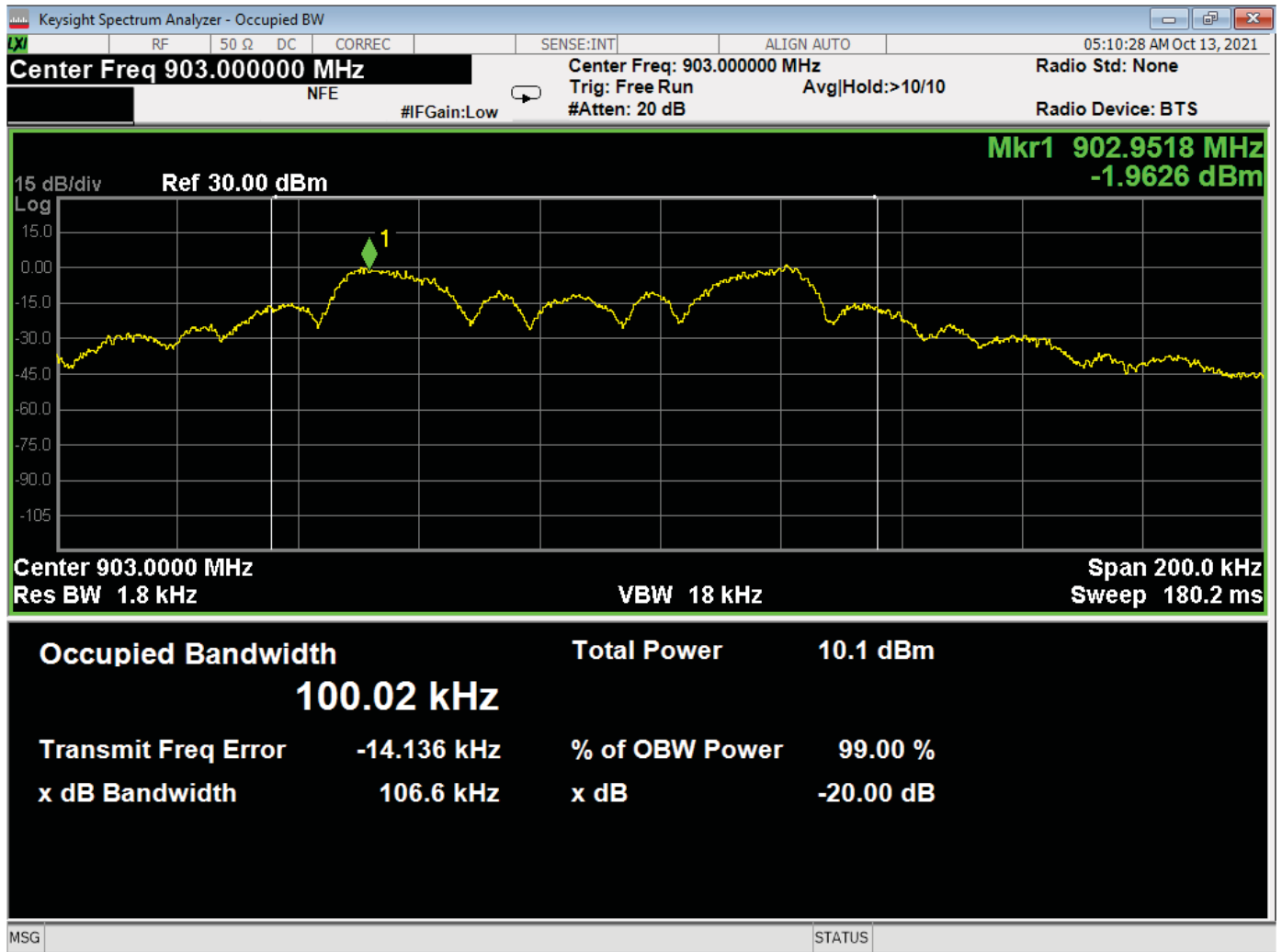


Peak Power Output – Middle Channel

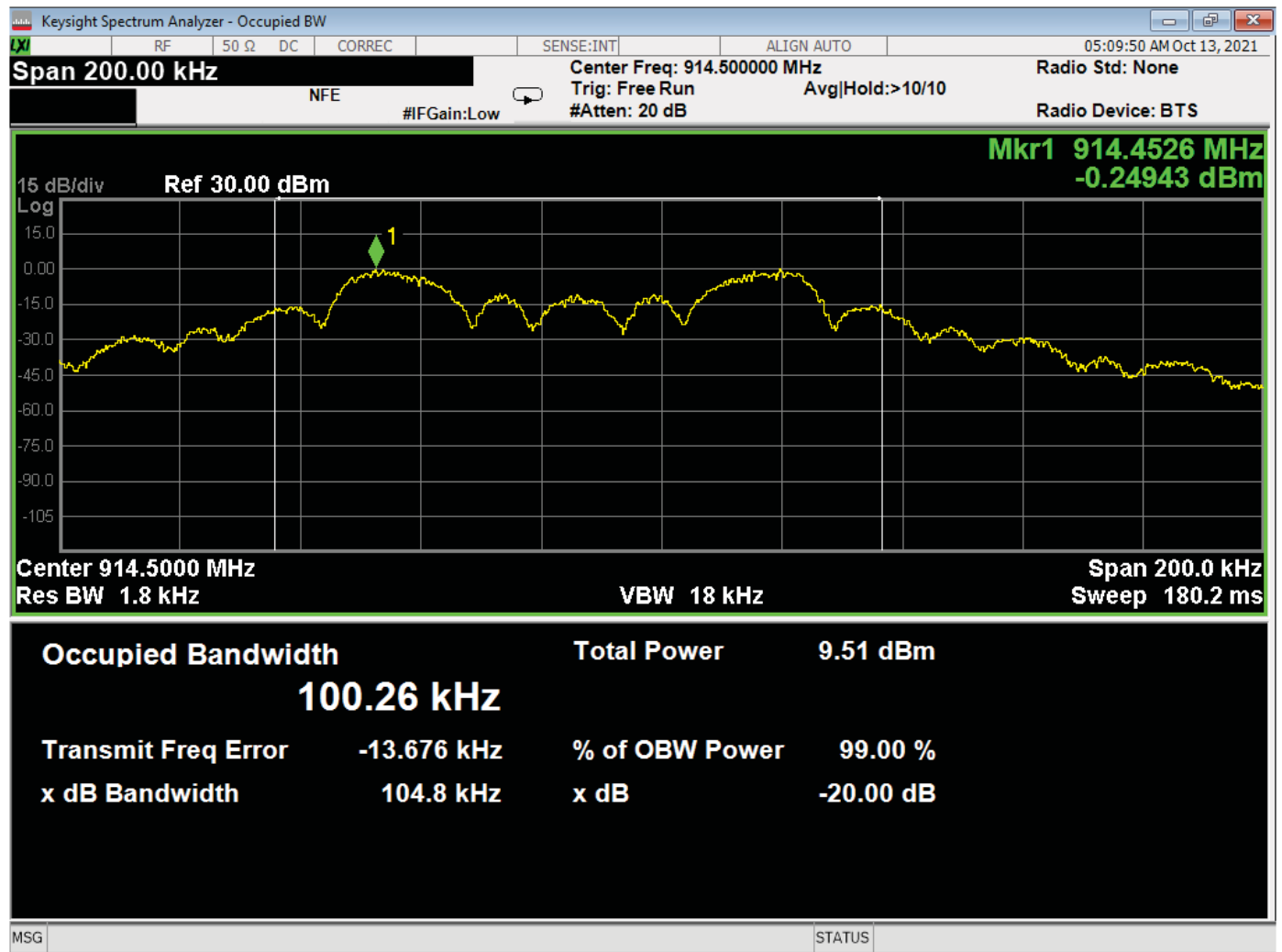


Peak Power Output – High Channel

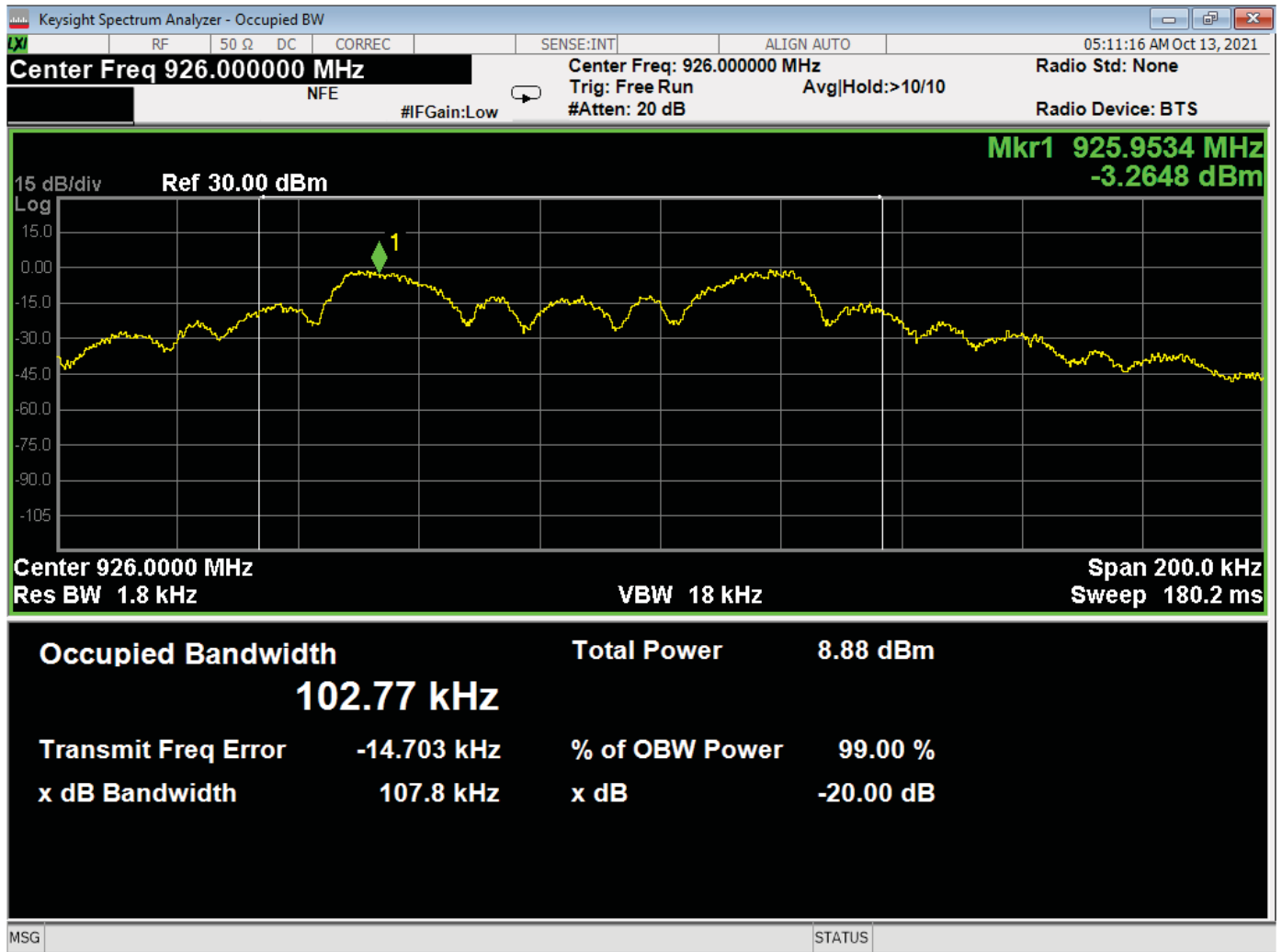
***99% BANDWIDTH
DATA SHEET***



99 % Bandwidth – Low Channel

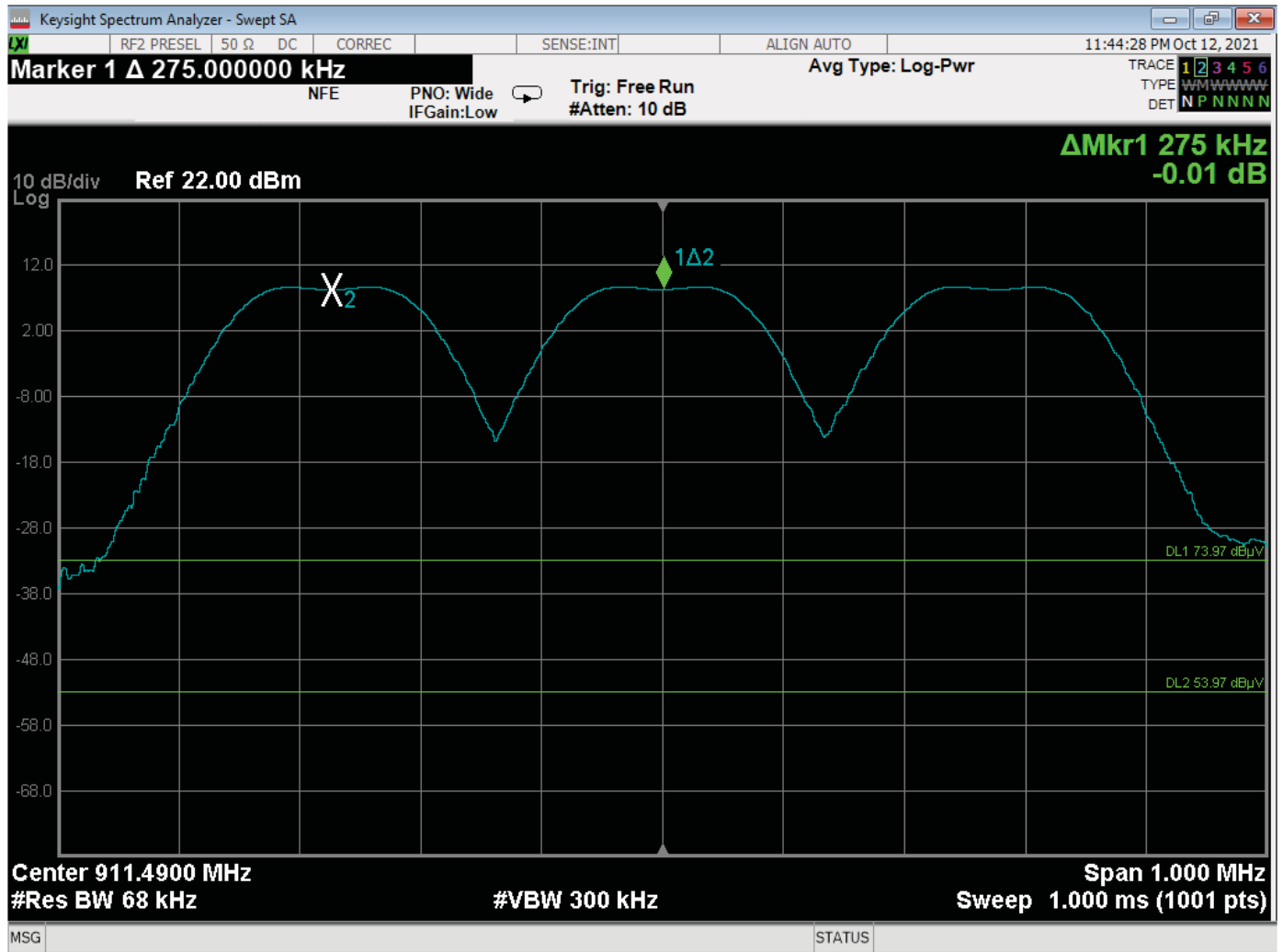


99 % Bandwidth – Middle Channel

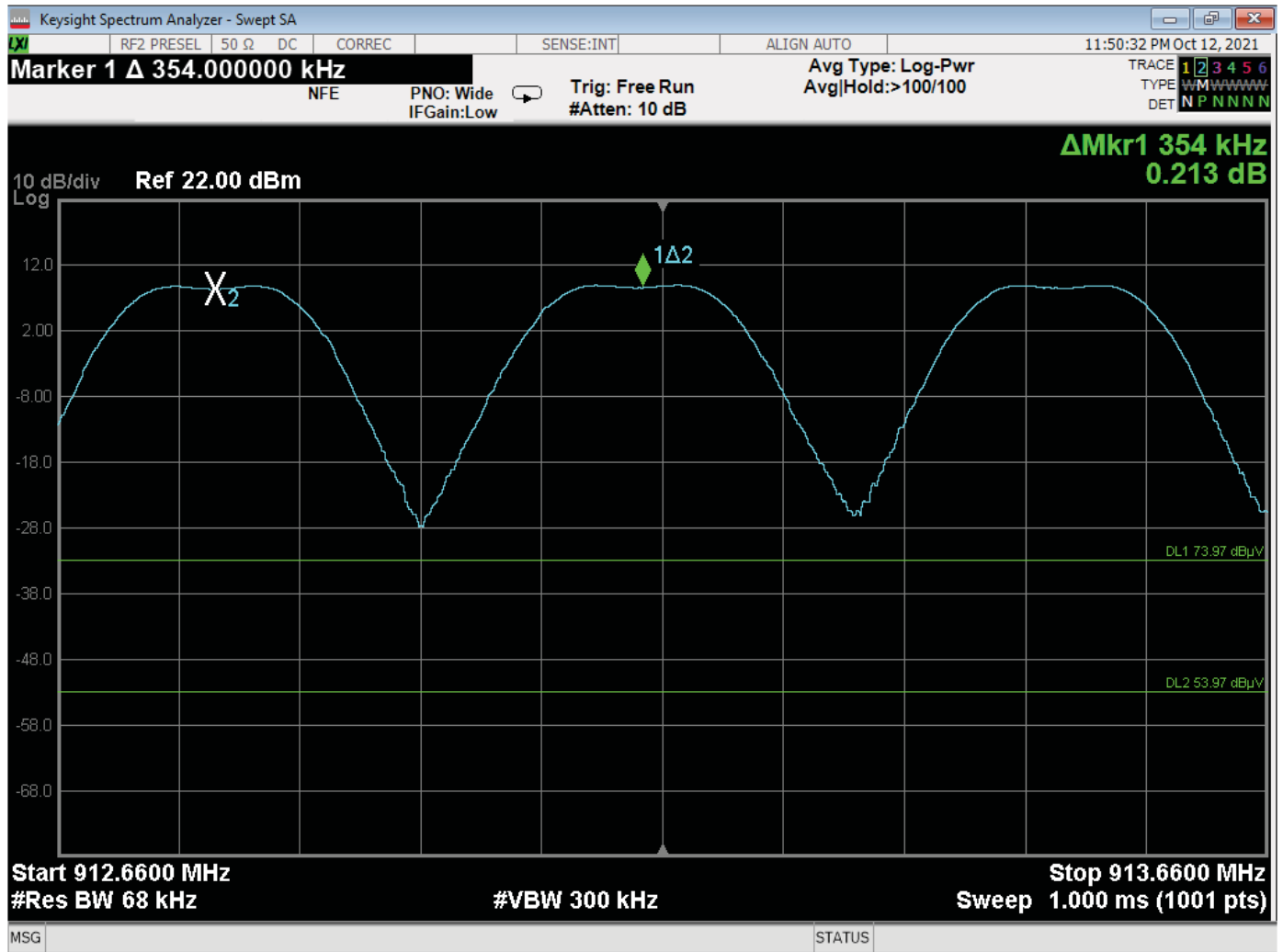


99 % Bandwidth – High Channel

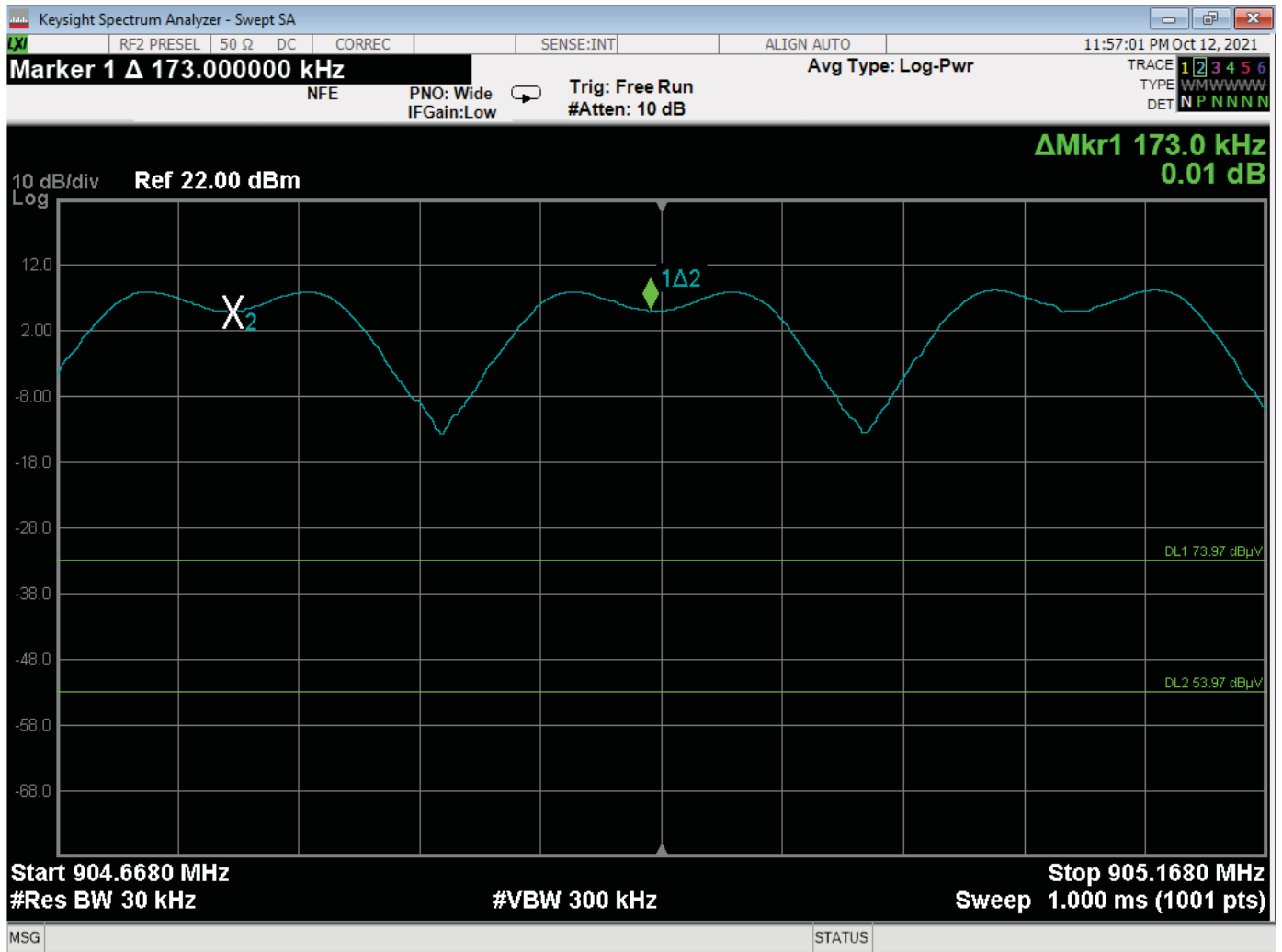
***CHANNEL FREQUENCY SEPARATION
DATA SHEET***



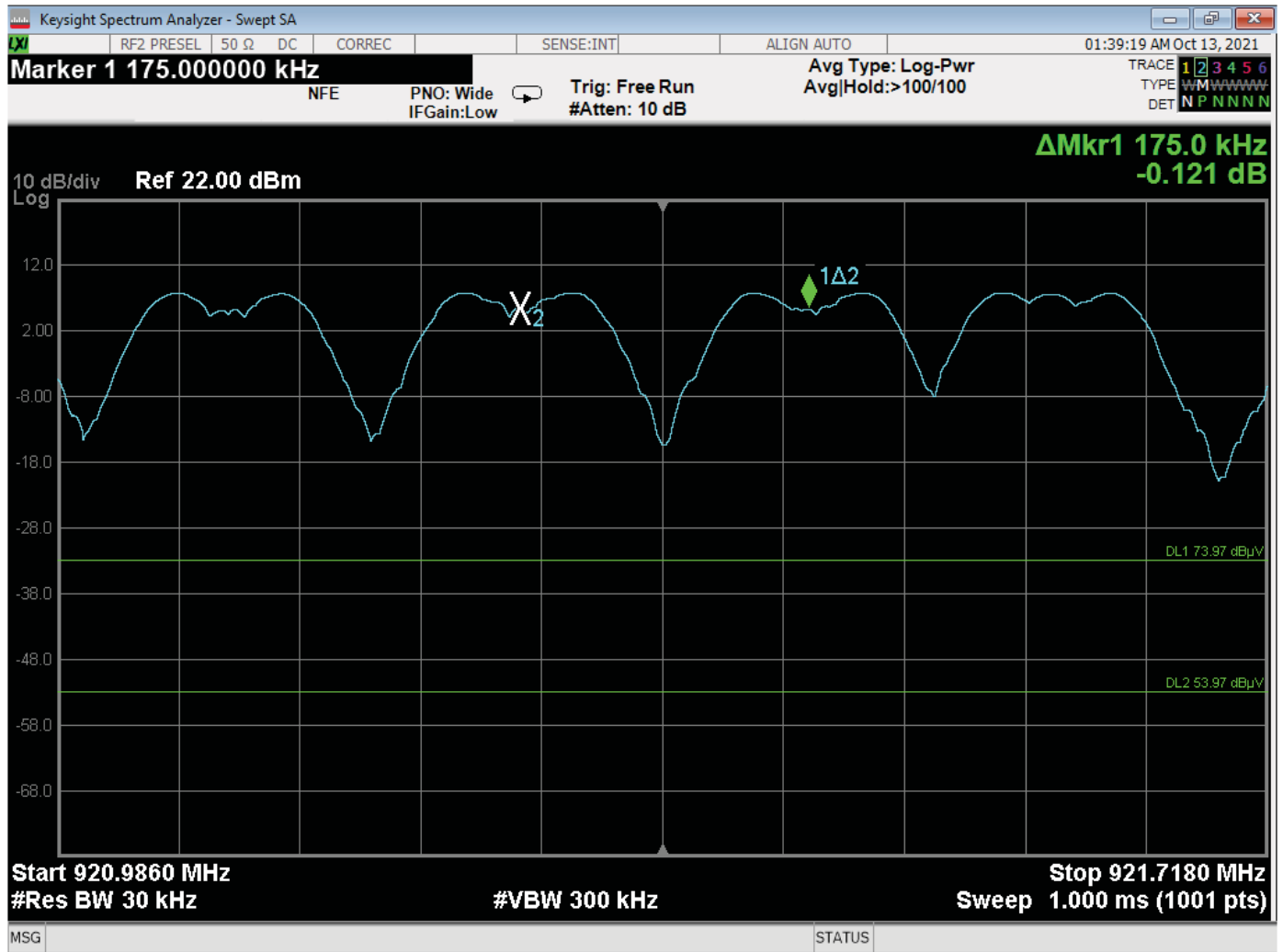
Channel Frequency Separation – Hop Set 0



Channel Frequency Separation – Hop Set 1

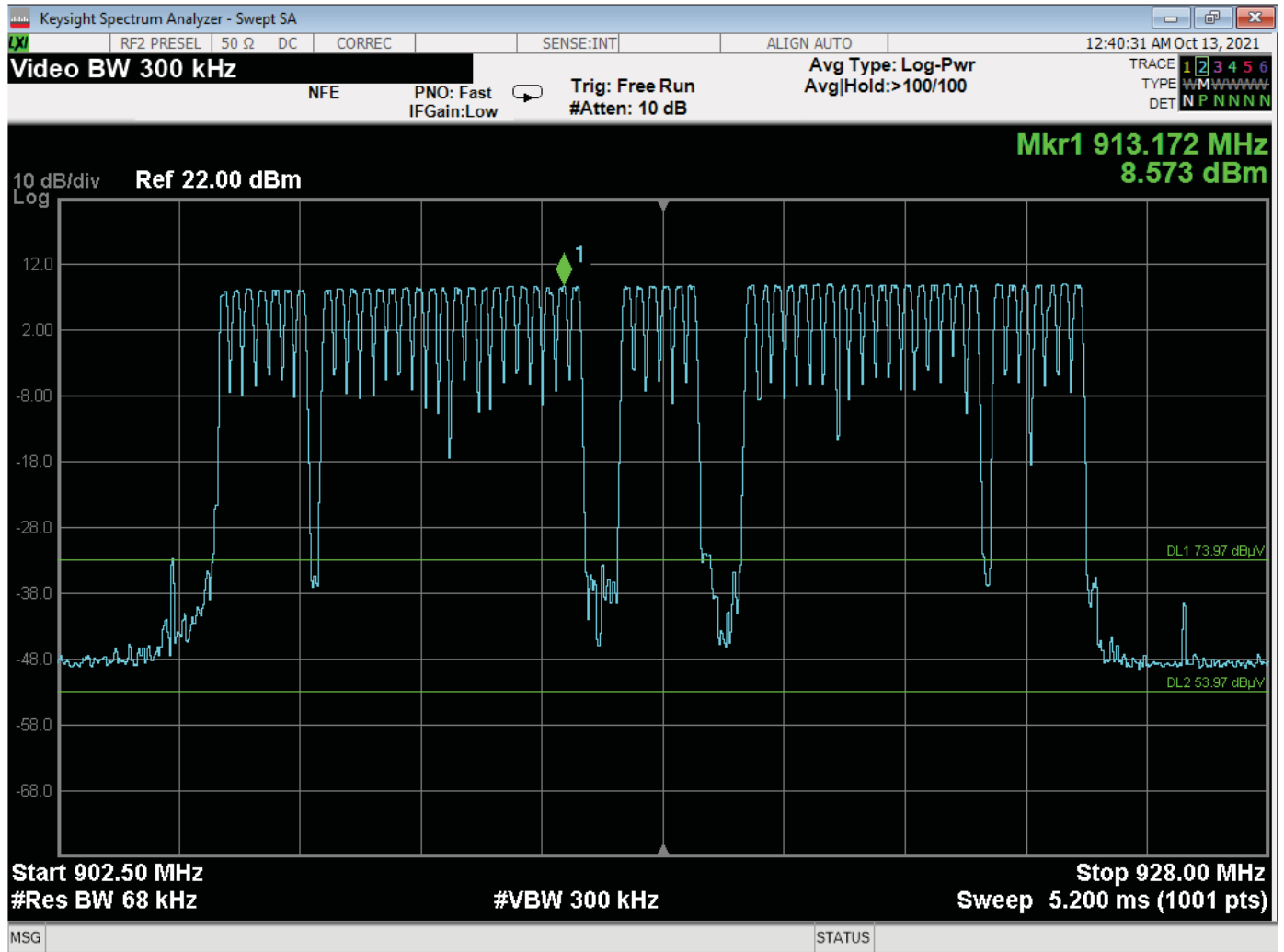


Channel Frequency Separation – Hop Set 2

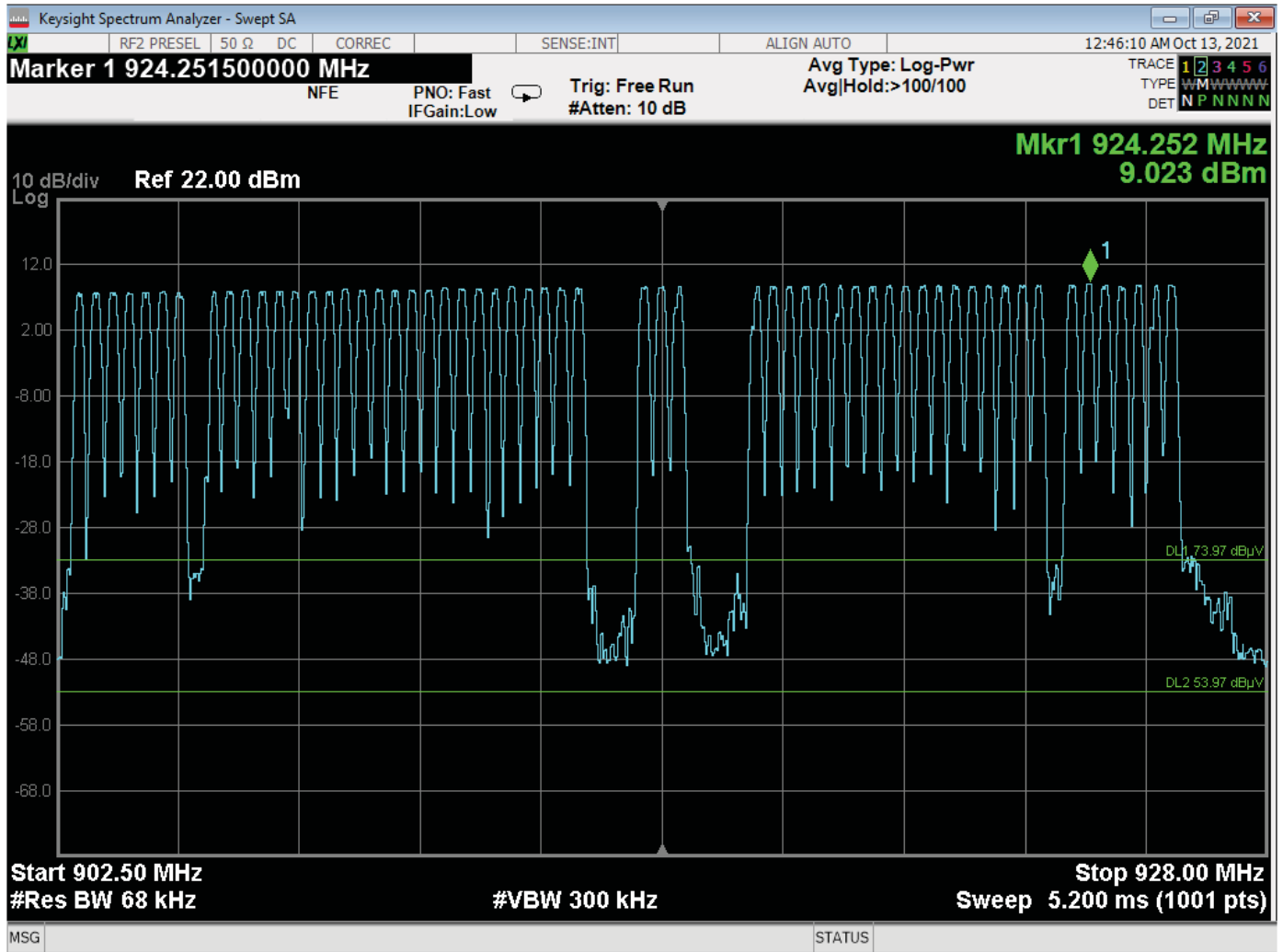


Channel Frequency Separation – Hop Set 3

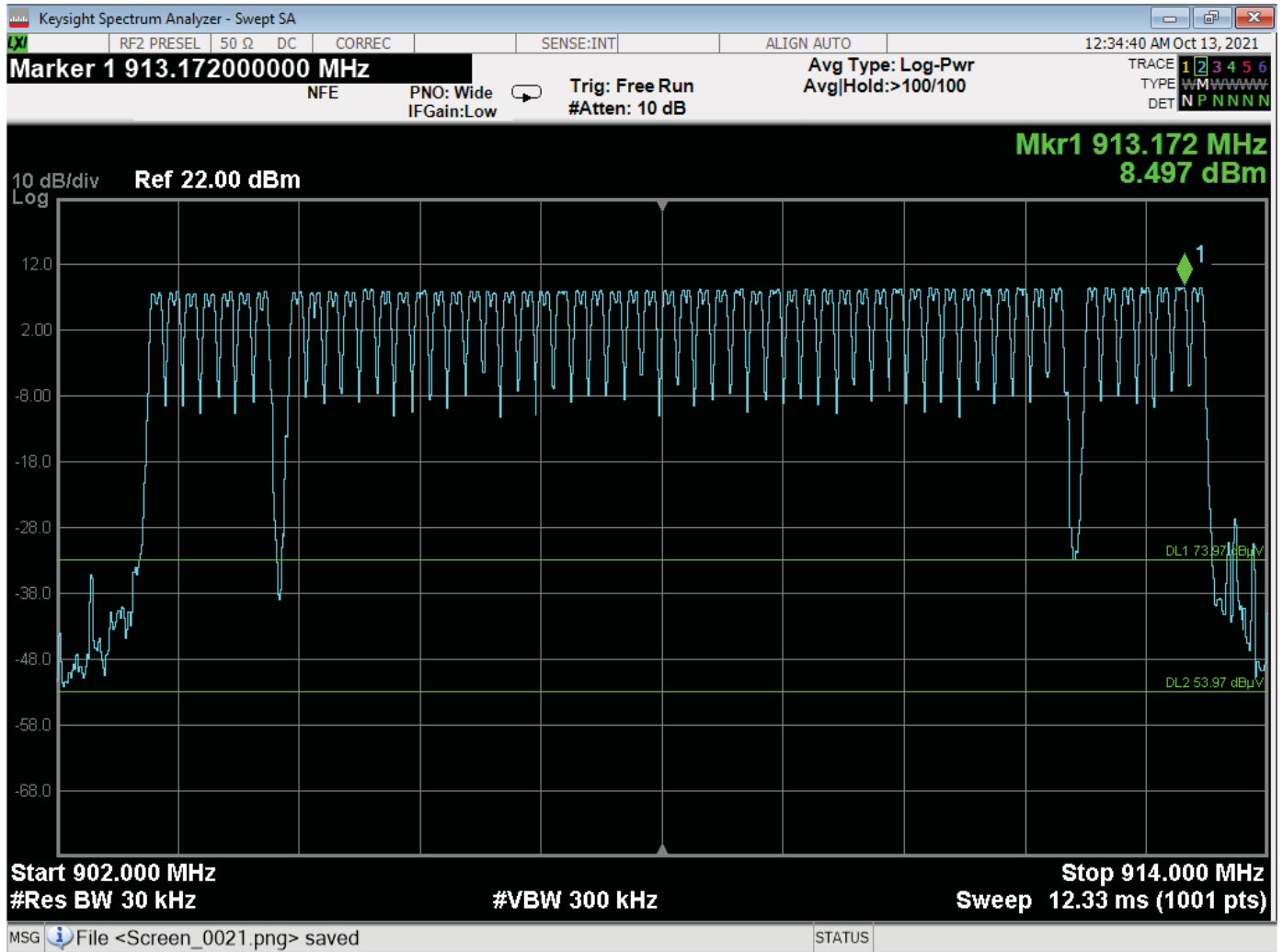
NUMBER OF FREQUENCIES
DATA SHEET



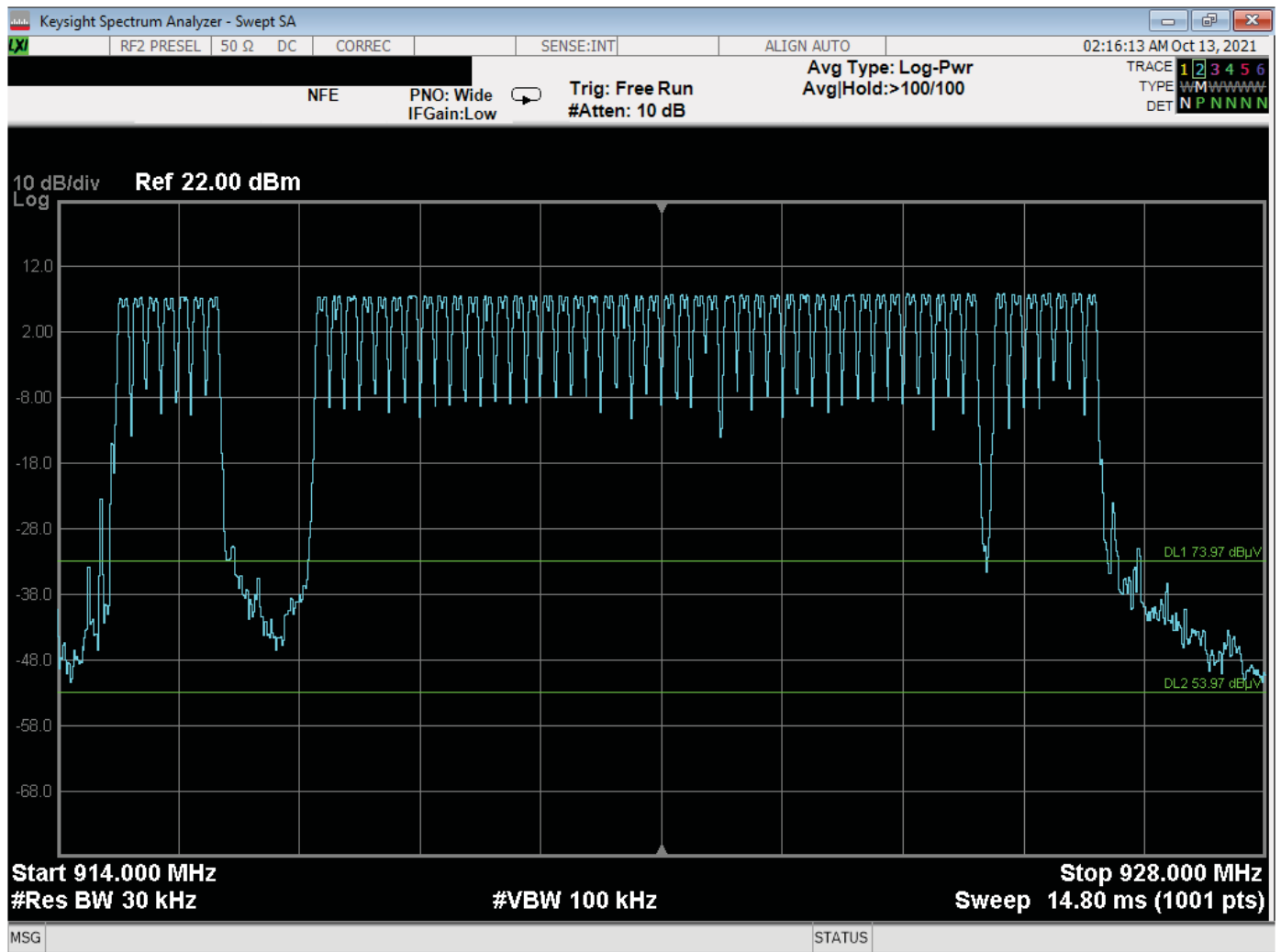
Number of Maximum Channels is 58 – Hop Set 0



Number of Maximum Channels is 58 – Hop Set 1

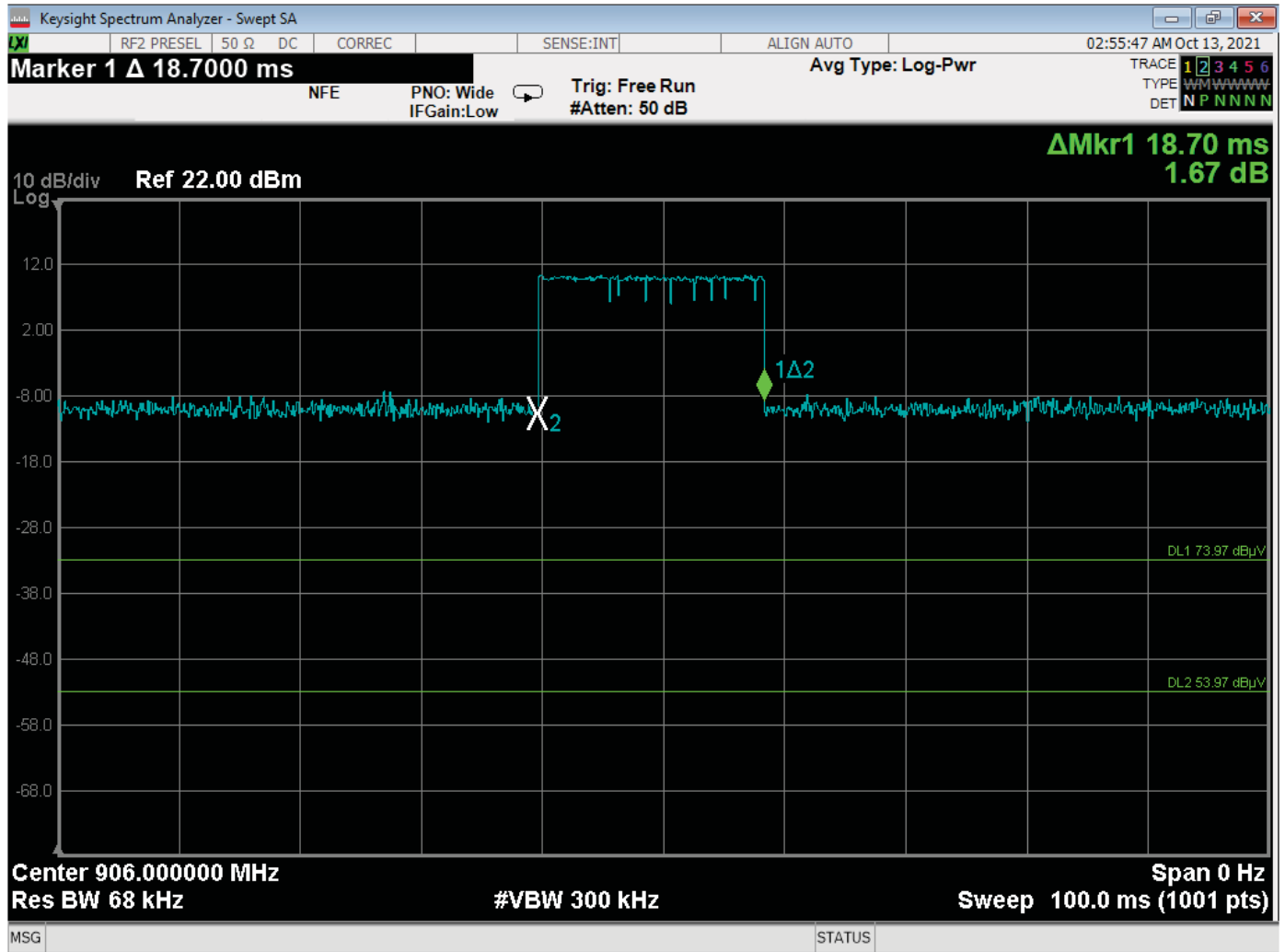


Number of Maximum Channels is 58 – Hop Set 2

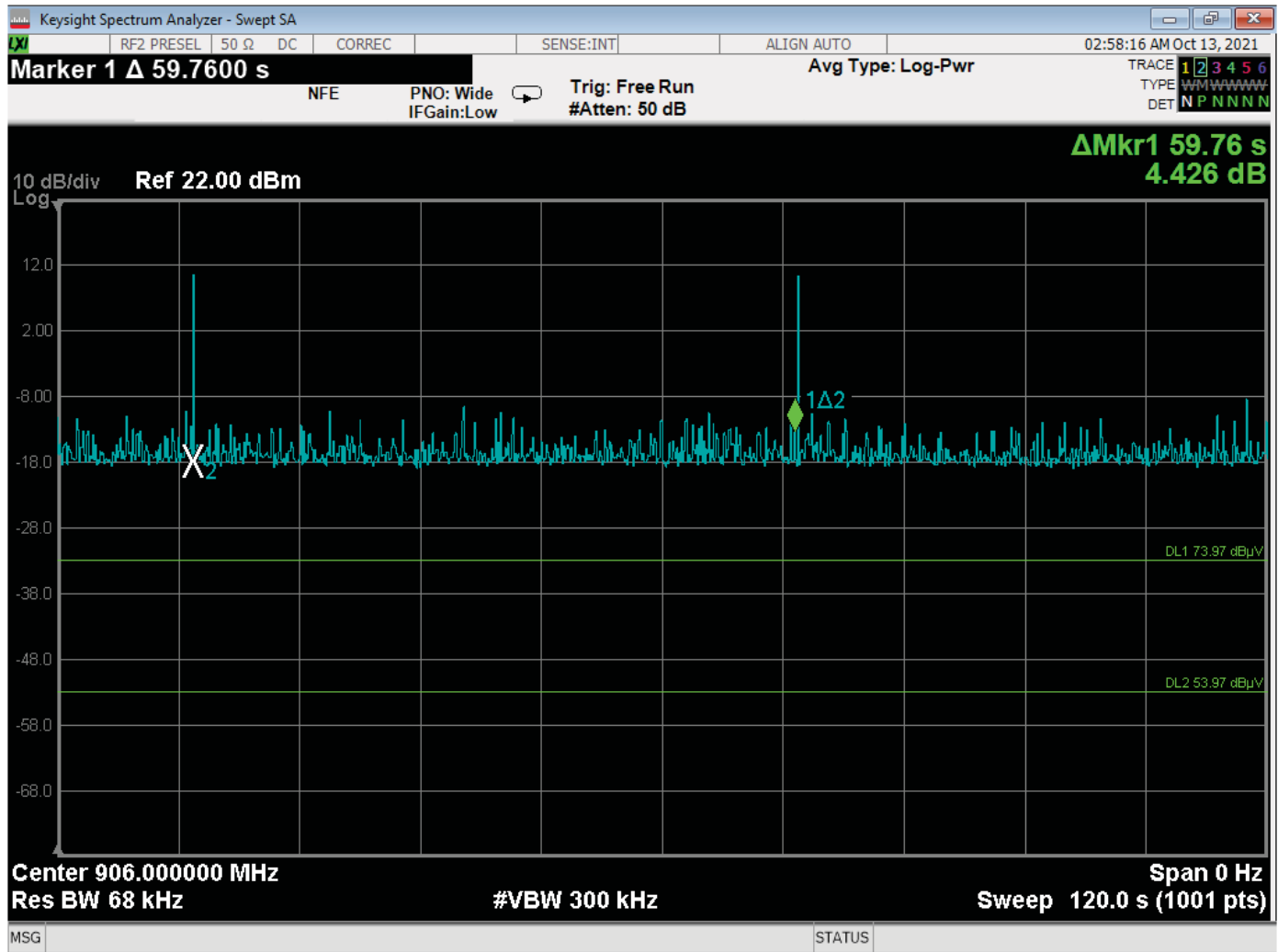


Number of Maximum Channels is 58 – Hop Set 3

TIME OF OCCUPANCY
DATA SHEETS



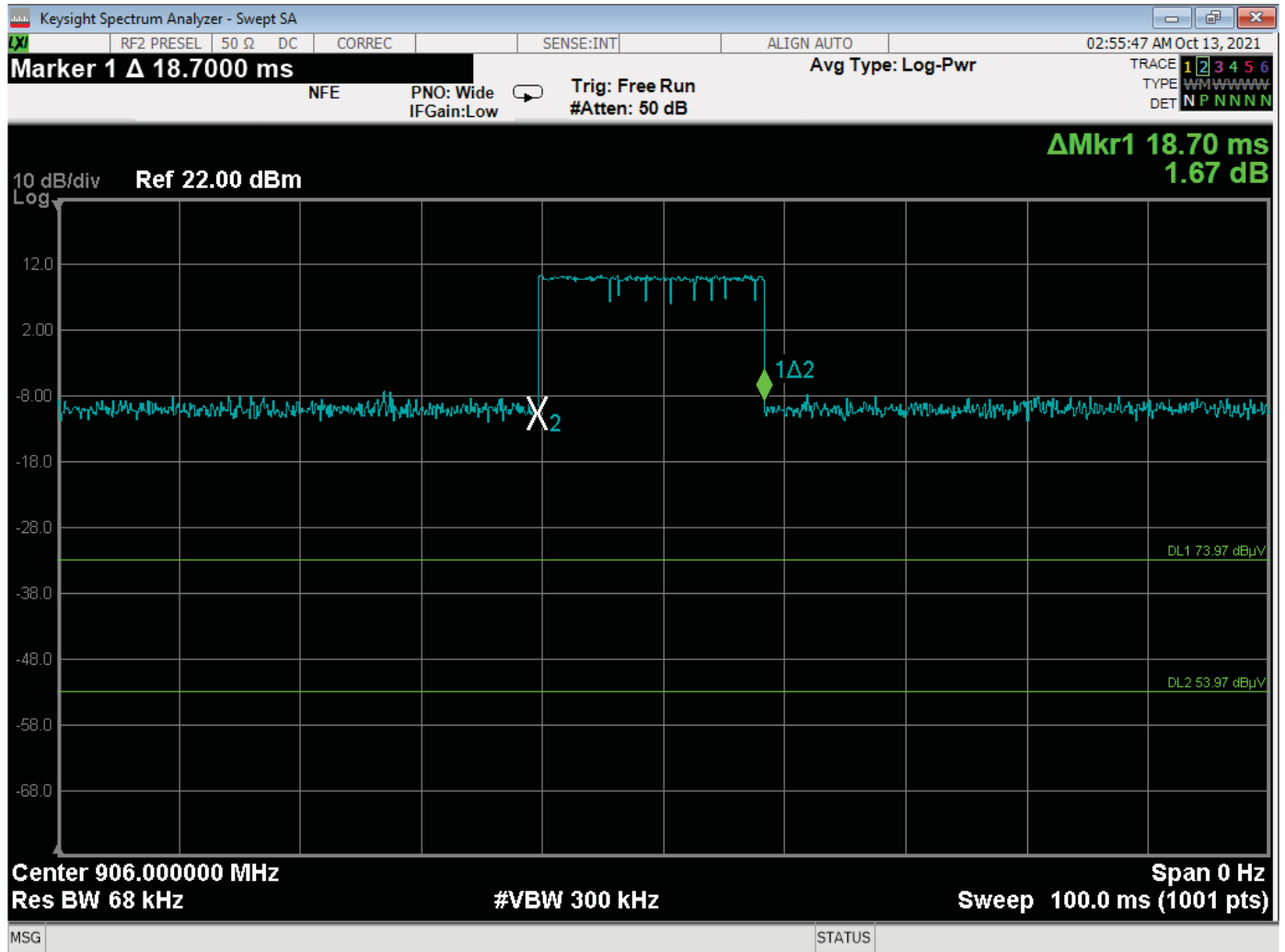
Time of One Pulse – 18.7 ms



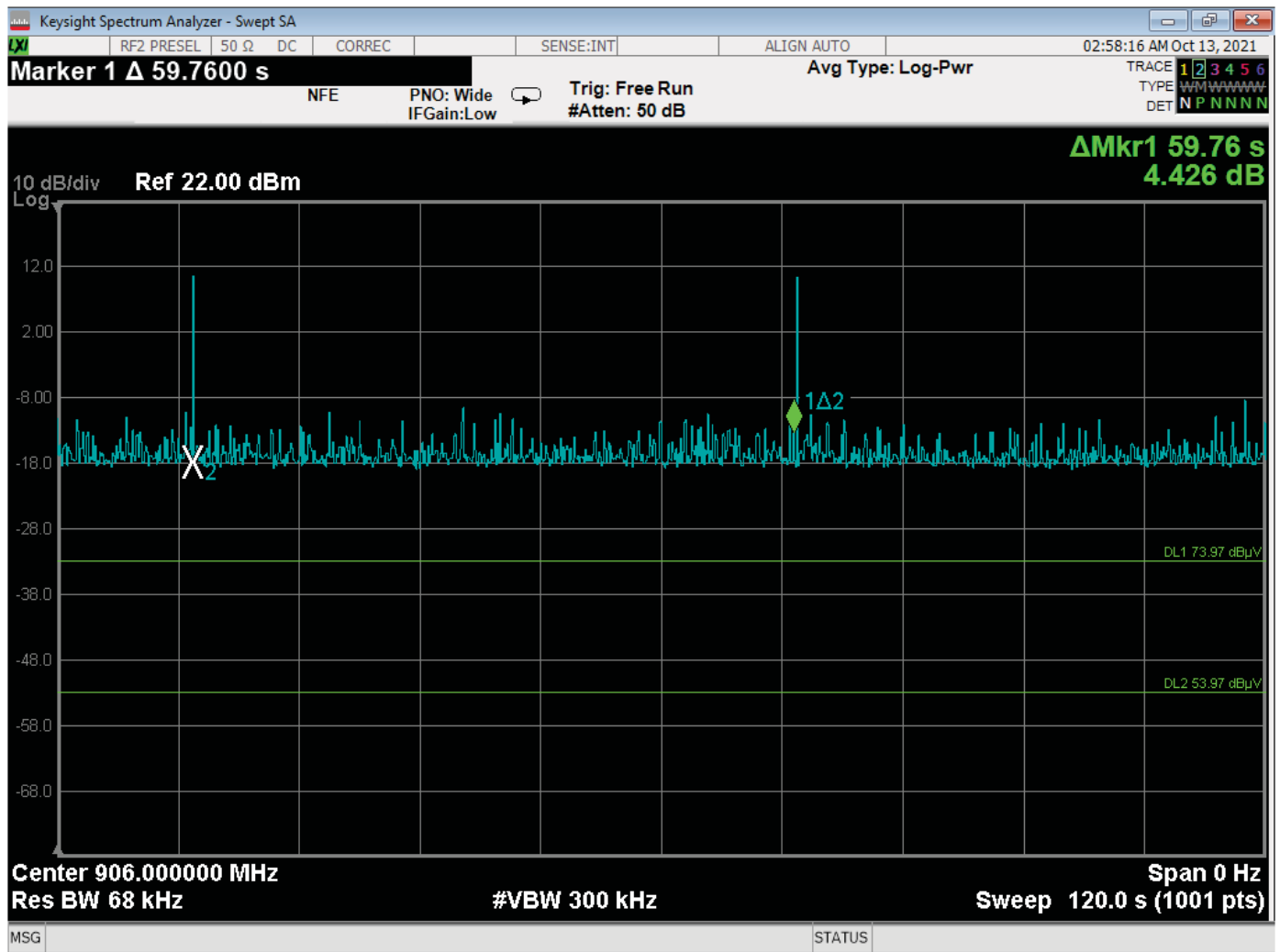
One Pulse per 59.76 Seconds
Note: Worst Case Mode of low band hop table used, which results in the pulses appearing more frequently.

Time of Occupancy = 18.7 ms in a 20 second period
Limit = 400 ms in a 20 second period.

***DUTY CYCLE
DATA SHEETS***



Time of One Pulse – 18.7 ms



One pulse per 59.76 Seconds

Note: Worst Case Mode of low band hop table used, which results in the pulses appearing more frequently.

Duty Cycle = 18.7%