FCC PART 15, SUBPART B and C; FCC 15.247; RSS-247 and RSS-GEN TEST REPORT

for

Z-WAVE ELECTRONIC DEADBOLT

MODEL: 450126VHC

Prepared for

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	REPORT BODY	APPENDICES					TOTAL
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Device Tested:	Z-Wave Electronic Deadbolt Model: 450126VHC S/N: Unit 1
Product Description:	The EUT is a Z-Wave Electronic Deadbolt. The clock oscillator is 39 MHz.
Modifications:	The EUT was not modified to meet the specifications.
Customer:	Spectrum Brands, Inc. 19701 DaVinci Lake Forest, California 92610
Test Dates:	May 24, 28, 29 and 30, 2024

Test Specifications covered by accreditation:

Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B; CFR Title 47, Part 15, Subpart C, sections 15.205, 15.207, 15.209, and 15.247; RSS-247 and RSS-Gen

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Test Procedures:	ANSI C63.4 and ANSI C63.10
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	This test was not performed because the EUT operates on battery power only.
2	Spurious Radiated RF Emissions, 30 MHz – 93s00 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; the limits of CFR Title 47, Part 15, Subpart C, section 15.209; RSS-247 and RSS-GEN Highest reading in relation to spec limit 52.58 dBuV/m (AVG) @ 4804 MHz (*U = 4.06 dB)
3	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 9 kHz – 9300 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d); RSS-247 and RSS-GEN
4	Emissions produced by the intentional radiator in restricted bands, 9 kHz – 9300 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209, section 15.247 (d); RSS-247 and RSS-GEN
5	DTS Bandwidth	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (a)(2); RSS-247
6	Maximum Conducted Output Power	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(3); RSS-247
7	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (d); RSS-247
8	Power Spectral Density from the Intentional Radiator to the Antenna	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (e); RSS-247
9	Variation of the Input Power	This test was not performed because the EUT operates on battery power only.
10	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 Z-Wave Electronic Deadbolt, Model: 450126VHC. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B, section 15.109; and Subpart C, sections 15.205, 15.207, 15.209 and 15.247; and the specifications limits defined by RSS-247 and RSS-Gen.

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

Spectrum Brands, Inc.

Thuan Nguyen	Associate Principal Engineer

Compatible Electronics Inc.

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

2.4 Date Test Sample was Received

The test sample was received on prior to the initial test date.

2.5 Disposition of the Test Sample

The test sample has not been returned to Spectrum Brands, Inc. as of the date of this test report.

2.6 Abbreviations and Acronyms

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

EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
FCC	Federal Communications Commission
DoC	Declaration of Conformity
N/A	Not Applicable
Tx	Transmit
Rx	Receive
Inc.	Incorporated
RF	Radio Frequency
BLE	Bluetooth Low Energy
CFR	Code of Federal Regulations
Sr.	Senior
DC	Direct Current
RSS	Radio Standards Specification

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
558074 D01 DTS Meas Guidance v05 r02	Guidance for Performing Compliance Measurements on Digital Transmissions Systems (DTS) Operating Under Section 15.247
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation
ANSI C63.4 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices
RSS-Gen Issue 5: 2018 + Amendment 1: 2019 + Amendment 2: 2021	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 3 August 2023	Digital Transmissions Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

4. DESCRIPTION OF TEST CONFIGURATION

The Z-Wave Electronic Deadbolt, Model: 450126VHC (EUT) was mounted on two different enclosures. The EUT was continuously transmitting Z-Wave long range at 912 MHz or 920 MHz on a continuous basis.

Two different enclosures were tested. One had a keypad enclosure and the other a touchscreen enclosure.

The HVIN of the keypad enclosure is GED2152 and the HVIN of the touchscreen is GED1800.

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

The firmware was stored on the company's servers.

4.1 Cable Construction and Termination

The EUT had no external cables.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	ID
Z-WAVE ELECTRONIC DEADBOLT	SPECTRUM BRANDS, INC.	450126VHC	UNIT 1	FCC ID: NUL450126HCT IC: 3022A-450126HCT
LAPTOP*	VOSTRO	3490	DQNH703	DoC
SIMPLICITY COMMANDER TEST SOFTWARE**	SILICON LABS, INC.	Version 1v16	N/A	N/A
J-LINK BASE*	SEGGER	P/N: 8.08.00	51024137	N/A

*This equipment was used to program the EUT only and was removed from the test setup after the EUT was programmed.
**This is the software used to control the EUT during the testing.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
EMI Receiver, 3 Hz – 44 GHz	Keysight Technologies, Inc.	N9038A	MY59050117	July 14, 2023	July 14, 2024
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A
Loop Antenna	Com-Power	AL-130R	121090	February 10, 2022	February 10, 2025
CombiLog Antenna	Com-Power	AC-220	10030004	November 22, 2023	November 22, 2025
Horn Antenna	Com-Power	AH-118	10050192	November 30, 2023	November 30, 2025
Preamplifier	Com-Power	PA-118	181653	March 7, 2022	March 7, 2025
Horn Antenna	Com-Power	AH826	0071957	NCR	NCR
High Pass Filter	Microwave Circuits	H3G020G4	495523	December 6, 2023	December 6, 2025
Preamplifier	Com-Power	PA-840	711013	April 8, 2022	April 8, 2025
Below 1 GHz Radiated Cable	N/A	N/A	Asset #: 0006	October 27, 2023	October 27, 2025
Above 1 GHz Cable	Suhner	Sucoflex 102EA	2291	August 22, 2023	August 22, 2025
Above 1 GHz Cable	Suhner	Sucoflex 102EA	501393	August 22, 2023	August 22, 2025
Above 1 GHz Cable	Suhner	Sucoflex 102EA	501394	August 22, 2023	August 22, 2025
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

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

6.2 EUT Mounting, Bonding and Grounding

For frequencies 1 GHz and below: The EUT was mounted on a 0.6 by 1.2 meter non-conductive table 0.8 meters above the ground plane.

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

The EUT was not grounded.

6.3 Measurement Uncertainty

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

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

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

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Description and Frequencies

Z-Wave Long Range: The EUT operates at 912 MHz and 920 MHz.

7.2 Antenna Gain

The EUT utilizes a chip antenna with 1.94 dBi gain.

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.

Test Results:

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

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. An internal preamplifier was used to increase the sensitivity of the instrument during emissions tests up to 1000 MHz, and an external preamplifier was used to increase the sensitivity of the instrument during emissions tests above 1 GHz. 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 considers the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured.

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

The frequencies above 1 GHz were averaged using the RMS detector of the EMI Receiver.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees 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 to ensure accurate results.

The EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 1.

Radiated Emissions Test (Continued)

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna
1 GHz to 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; the limits of CFR Title 47, Part 15, Subpart C sections 15.205, 15.209 and 15.247; and the limits of RSS-247 and RSS-Gen for radiated emissions.

8.1.3 RF Emissions Test Results

Table 1 RADIATED EMISSION RESULTS
Z-Wave Electronic Deadbolt, Model: 450126VHC

Frequency MHz	Corrected Reading* dBµV/m	Specification Limit dBµV/m	Delta (Cor. Reading – Spec. Limit) dB
3648.00 (V) (GED2152)	41.66 (AV)	53.97	-12.31
897.00 (V) (GED1800)	33.45 (QP)	46.00	-12.55
3648.00 (V) (GED1800)	40.99 (AV)	53.97	-12.98
3680.00 (V) (GED2152)	40.64 (AV)	53.97	-13.33
3648.00 (H) (GED1800)	40.51 (AV)	53.97	-13.46
9200.00 (V) (GED1800)	37.65 (AV)	53.97	-16.32

Notes:

* The complete emissions data is given in Appendix E of this report.
(V) Vertical
(H) Horizontal
(AV) Average
(QP) Quasi-Peak

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 (µV/m) log x 20 = Specification Limit in dBuV/m
To correct for distance when measuring at a distance other than the specification
For measurements below 30 MHz: (Specification distance / test distance) log x 40 = distance factor
For measurements above 30 MHz: (Specification distance / test distance) log x 20 = distance factor
Note: When using an Active Antenna, the Antenna factor shall be subtracted due to the combination of the internal amplification and antenna loss.
Corrected Meter Reading = meter reading + F – A + C

where: F = antenna factor
A= amplifier gain
C = cable loss

The correction factors for the antenna and the amplifier gain are attached in Appendix D of this report. The data sheets are attached in Appendix E.
The distance factor D is 0 when the test is performed at the required specification distance.
When the limit is in terms of magnetic field, the following equation applies:

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

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.

Sample Calculations (Continued)

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

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

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:

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

or, if the magnetic antenna factor is used:

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

The display of the receiver (or spectrum analyzer) **shall not** be configured in units of current, e.g. µA or dB(µA). 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 DTS Bandwidth

The DTS Bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the EUT. The following steps were performed for measuring the DTS Bandwidth.

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

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(2); and RSS-247.

8.3 Maximum Peak Conducted Output Power

The maximum peak conducted output power was measured using the EMI Receiver. The following steps were performed for measuring the maximum peak conducted output power.

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

Test Results:

The EUT complies with the relevant requirements of CFR Title 47, Part 15, Subpart C Section 15.247 (b)(3); and RSS-247.

8.4 Emissions in Non-Restricted Bands

The emissions in the non-restricted frequency bands measurements were performed using the EMI receiver directly connected to the EUT. The reference level was established by setting the instrument center frequency to DTS channel center frequency. The span was set to ≥ 1.5 times the DTS bandwidth. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with sweep set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the level and 20 dB below that was the reference level. For emission level measurement, the center frequency and span were set to encompass the frequency range to be measured. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than the span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d); and RSS-247.

8.5 RF Band Edges

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

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power at the restricted bands closest to the band edges at 2390 MHz and 2483.5 MHz also meet the limits of section 15.209; and RSS-247. Please see the data sheets located in Appendix E.

8.6 Spectral Density Test

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

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

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (e); and RSS-247.

8.7 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.

8.8 Variation of the Input Power

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

Test Results:

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

9. CONCLUSIONS

The Z-Wave Electronic Deadbolt, Model: 450126VHC, 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; RSS-GEN and RSS-247.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.
For the most up-to-date version of our scopes and certificates please visit http://celectronics.com/quality/scope/

Quote from ISO-ILAC-IAF Communiqué on 17025:
"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

ISED Test Site Registration Number: 2154A

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.247; 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	Z-Wave Electronic Deadbolt Model: 450126VHC S/N: Unit 1

There are no additional models covered under this report.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

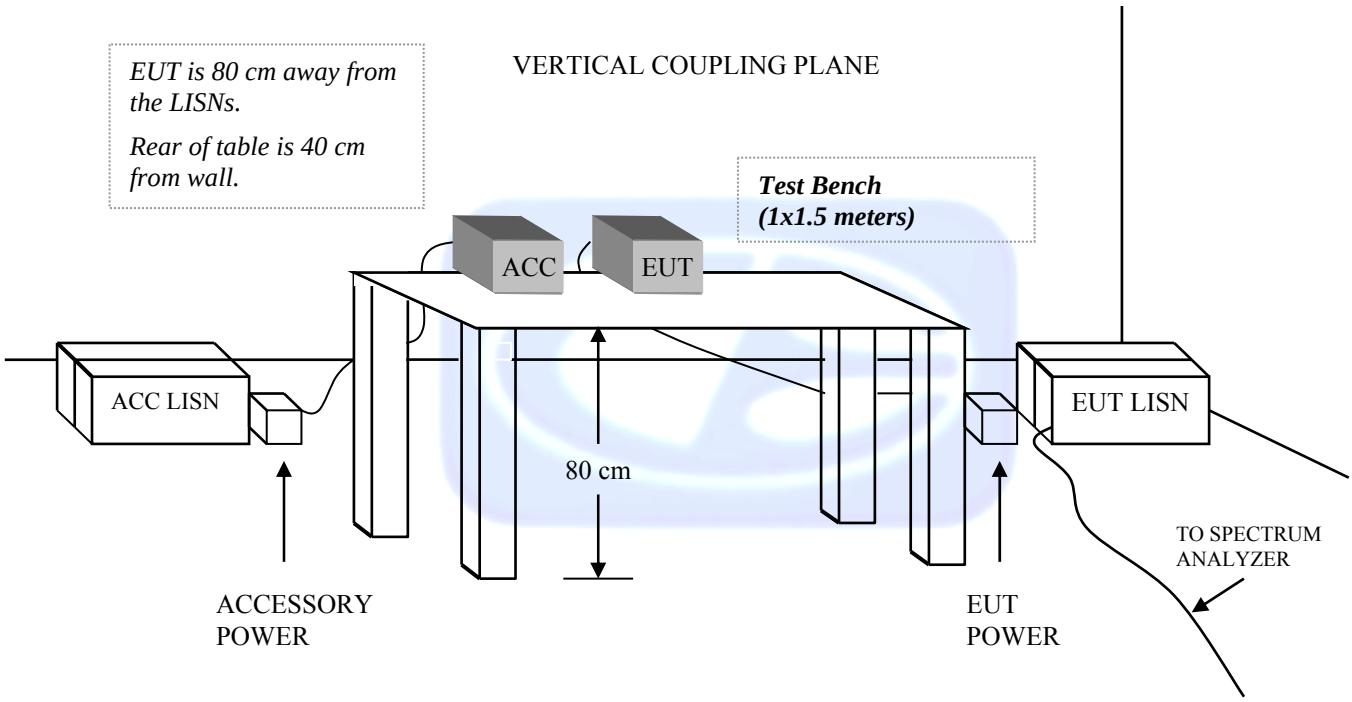
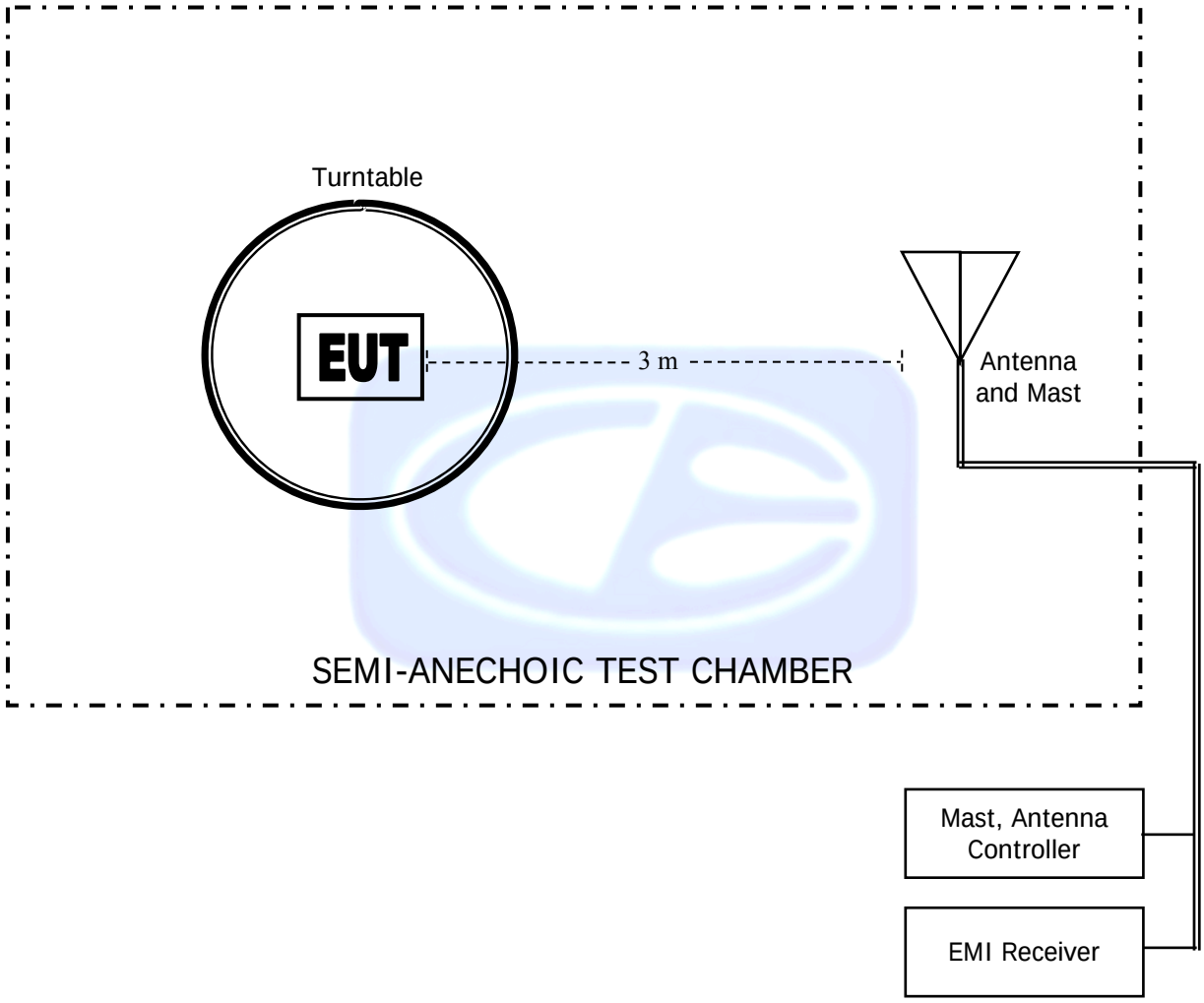


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



COM-POWER AL-130R

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 10, 2022

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

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 10030004

CALIBRATION DATE: NOVEMBER 22, 2023

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.10	200	16.10
35	22.00	250	17.90
40	41.30	300	19.10
45	20.50	350	20.30
50	19.30	400	21.60
60	15.40	450	22.20
70	12.40	500	23.20
80	12.40	550	23.70
90	14.10	600	25.10
100	15.50	650	25.30
120	15.90	700	25.10
125	15.90	750	26.70
140	14.80	800	26.60
150	14.60	850	27.20
160	14.80	900	28.00
175	15.90	950	29.10
180	15.50	1000	28.90

COM POWER AH-118

HORN ANTENNA

S/N: 10050192

CALIBRATION DATE: NOVEMBER 30, 2023

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.01	10.0	38.78
1.5	25.25	10.5	39.29
2.0	27.21	11.0	39.30
2.5	27.42	11.5	39.87
3.0	28.89	12.0	39.77
3.5	30.58	12.5	40.21
4.0	31.78	13.0	40.01
4.5	32.48	13.5	40.06
5.0	33.13	14.0	40.63
5.5	34.27	14.5	41.41
6.0	34.92	15.0	41.53
6.5	35.58	15.5	40.59
7.0	36.83	16.0	41.63
7.5	37.02	16.5	40.93
8.0	36.93	17.0	41.27
8.5	37.67	17.5	41.69
9.0	37.53	18.0	44.00
9.5	38.76		

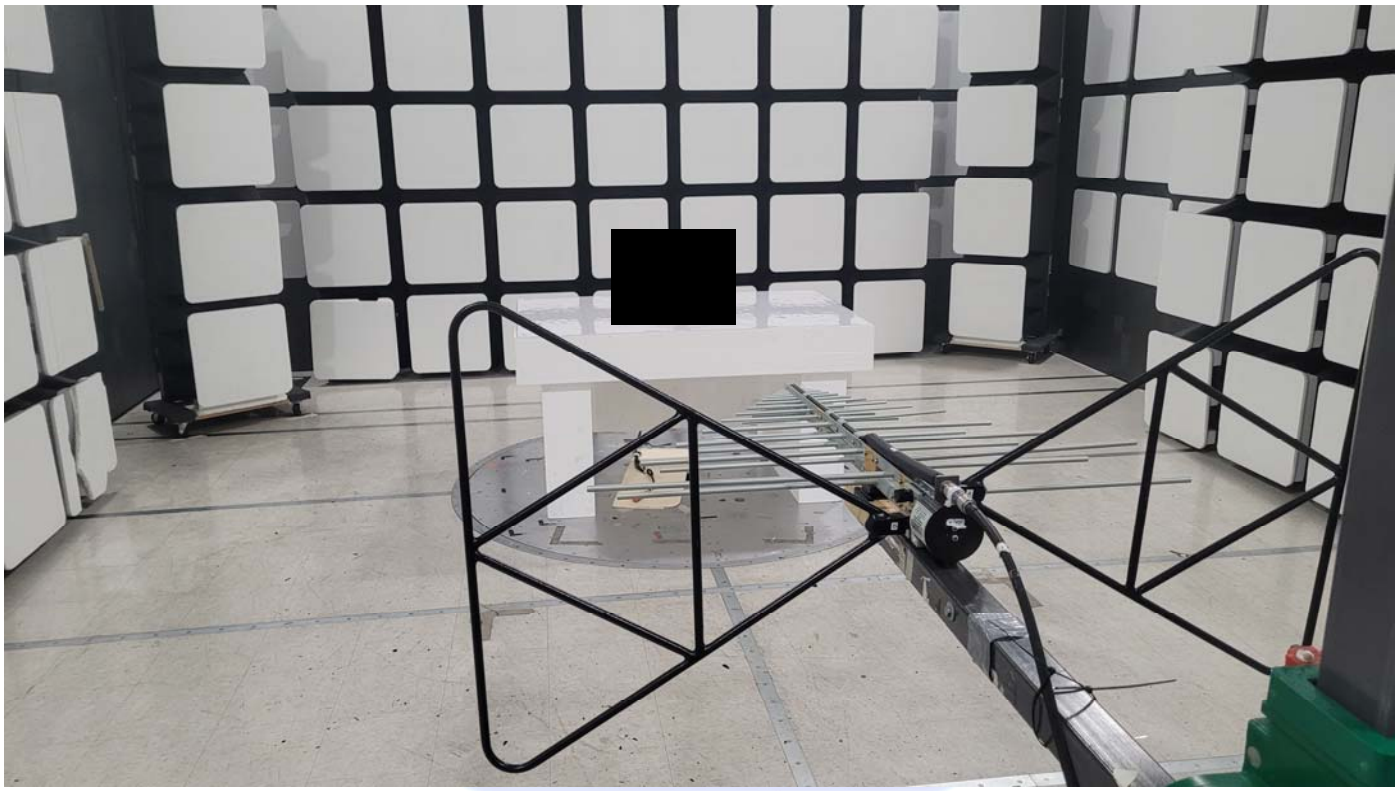
COM-POWER PAM-118

PREAMPLIFIER

S/N: 181653

CALIBRATION DATE: MARCH 7, 2022

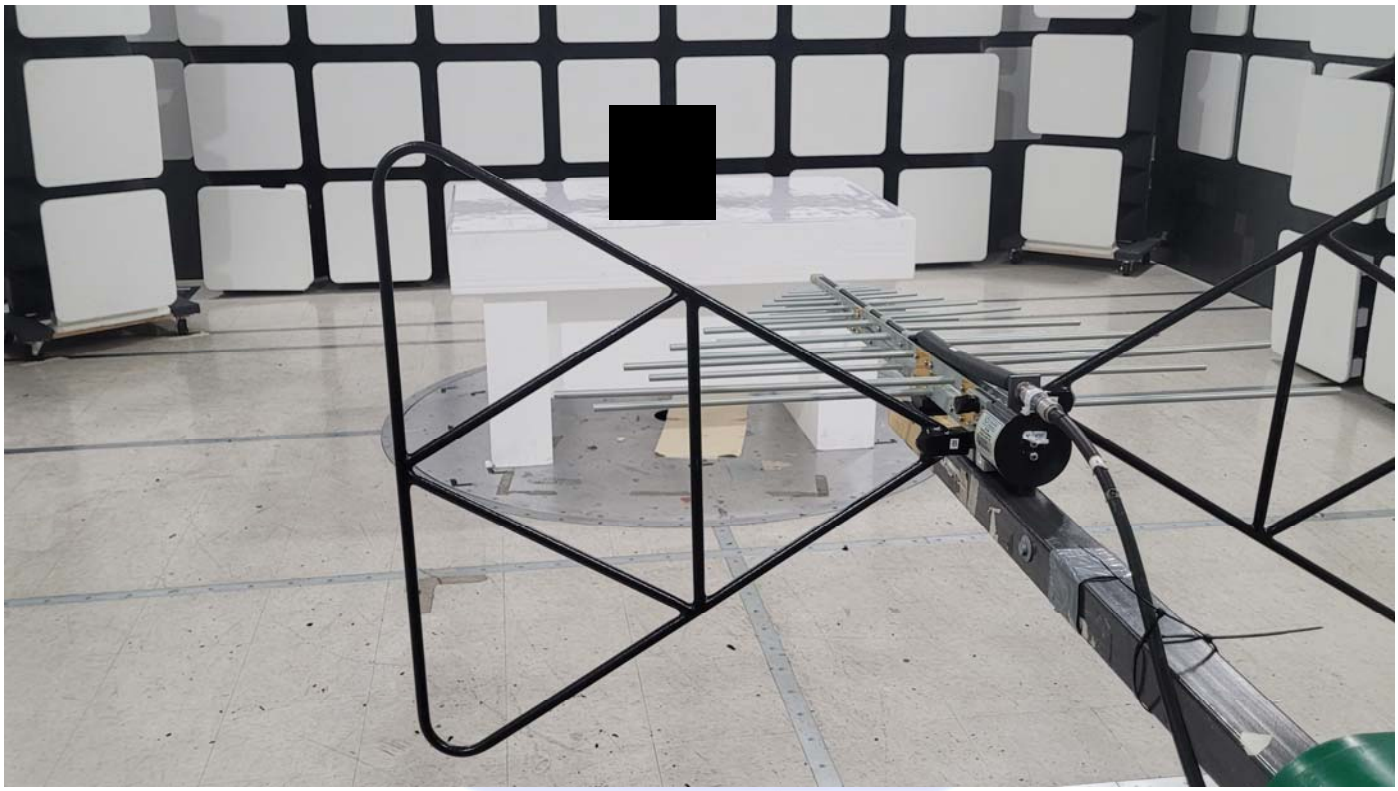
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.02	6.0	38.84
1.1	39.72	6.5	39.20
1.2	39.93	7.0	39.46
1.3	39.98	7.5	39.67
1.4	39.99	8.0	39.28
1.5	40.20	8.5	38.63
1.6	40.05	9.0	38.96
1.7	40.15	9.5	39.33
1.8	40.20	10.0	39.58
1.9	40.33	11.0	38.25
2.0	40.33	12.0	40.03
2.5	40.60	13.0	40.55
3.0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



FRONT VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED2152
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

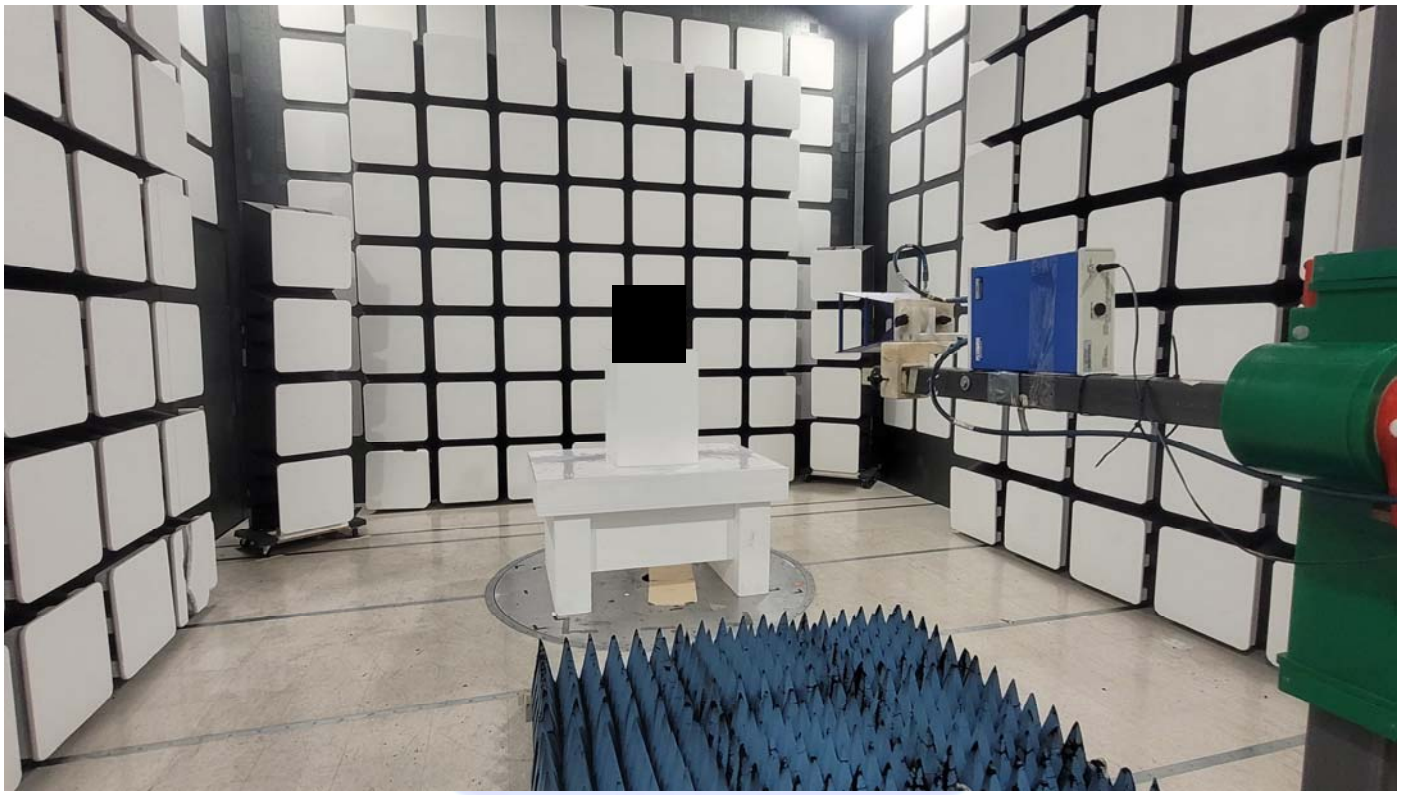
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED2152
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

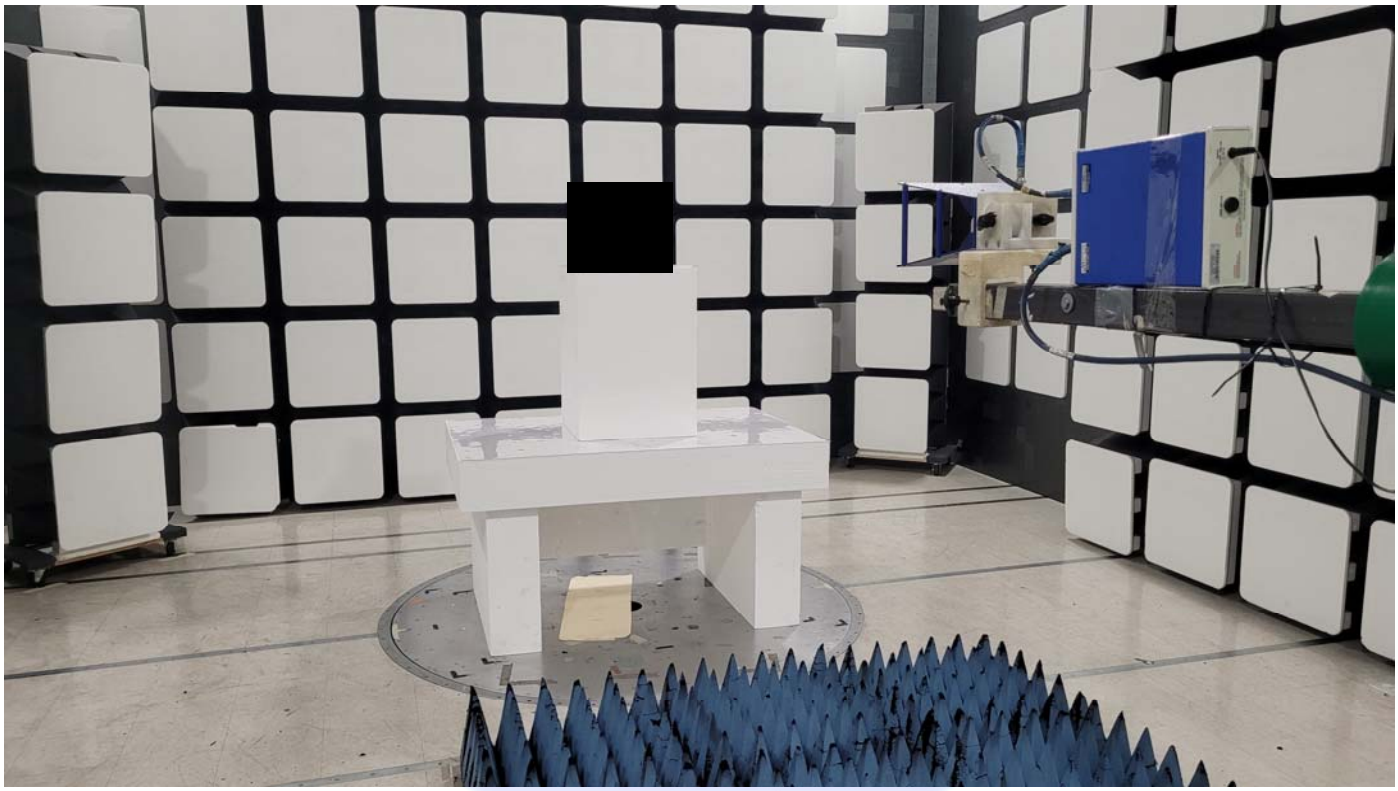
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED2152
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

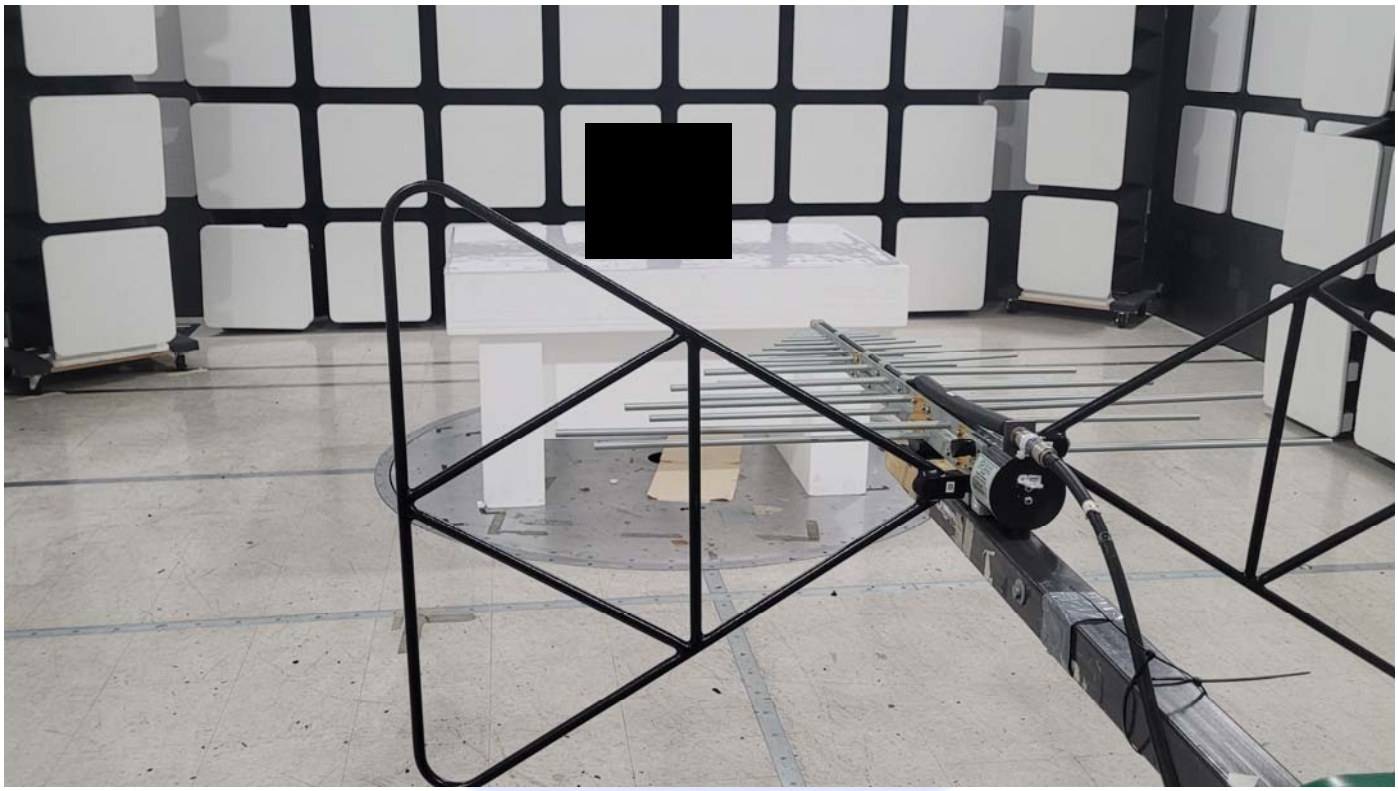
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED2152
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

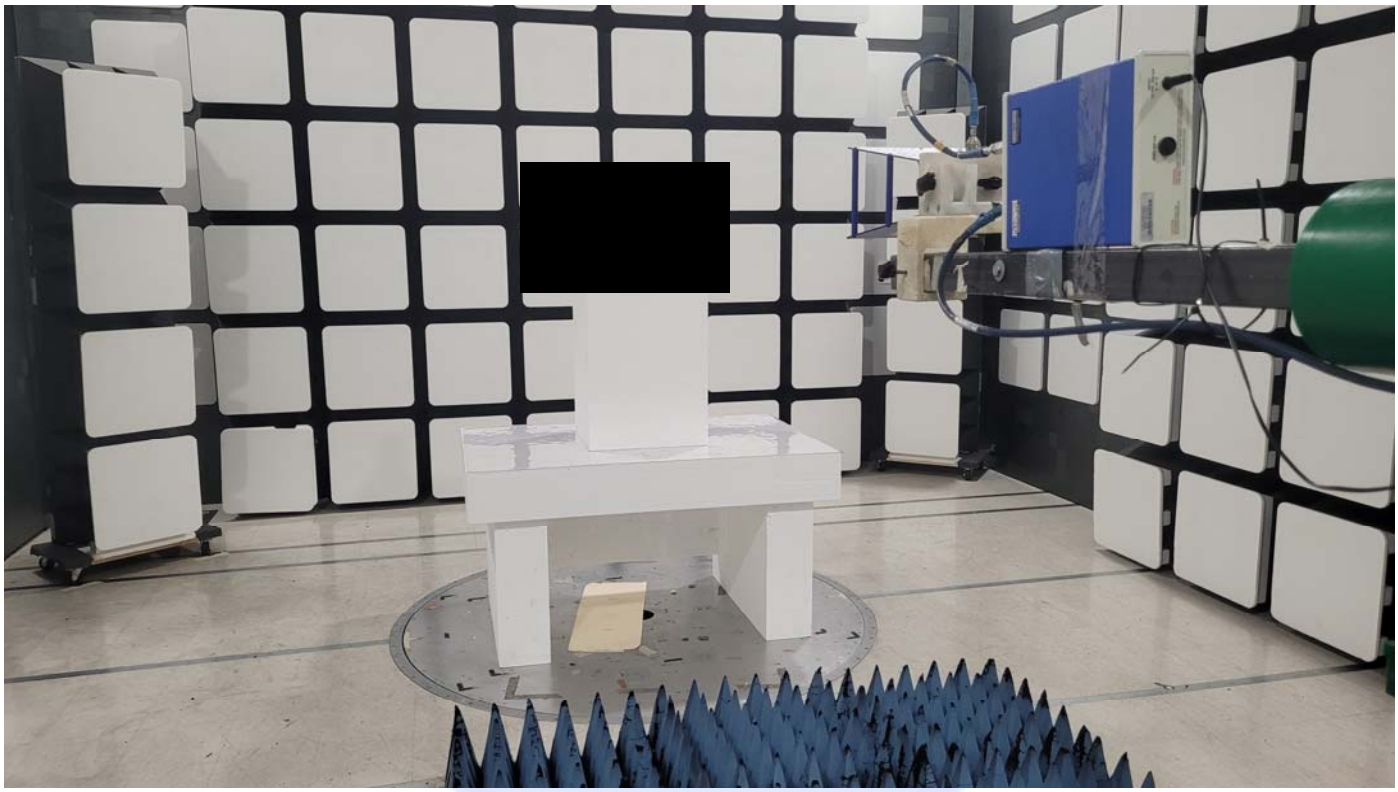
SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED1800
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED1800
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

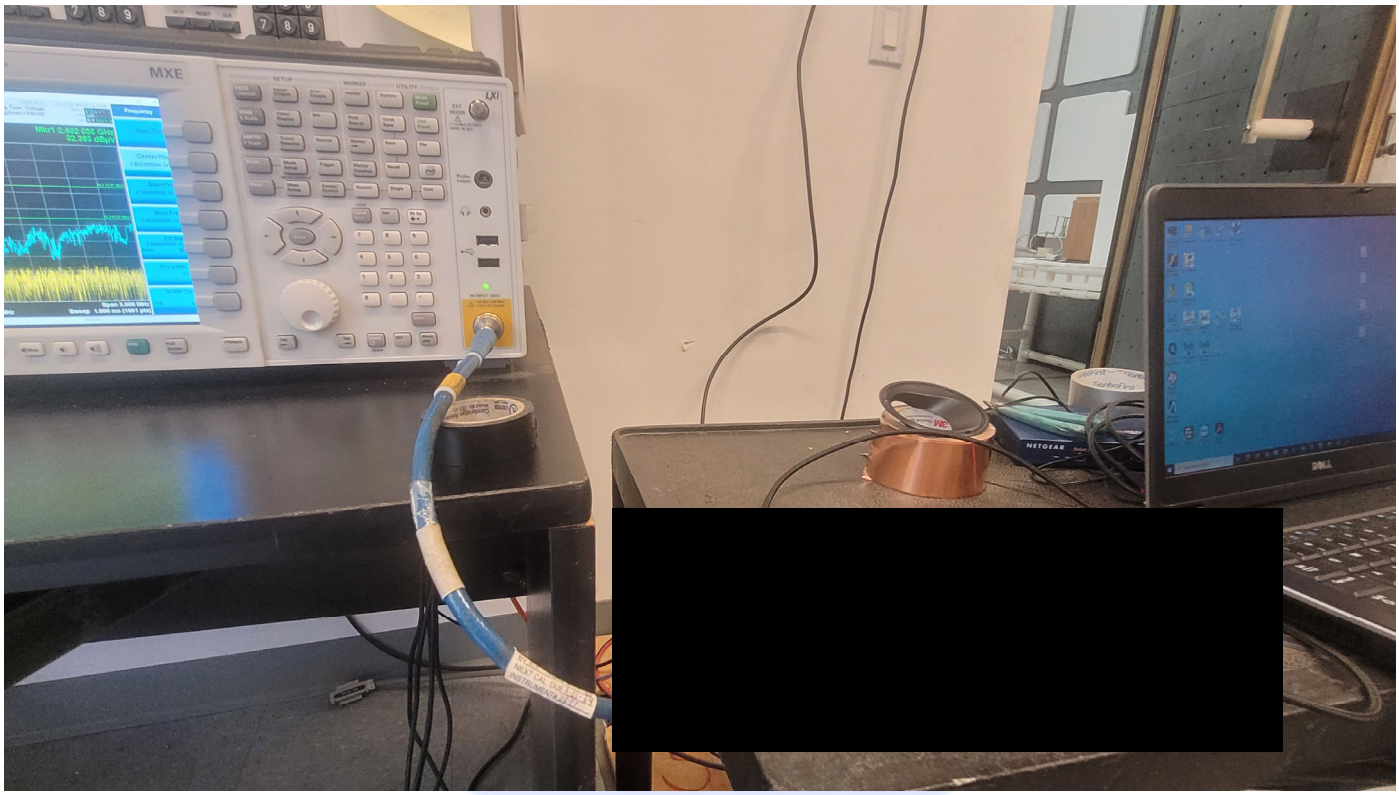
SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED1800
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED1800
FCC SUBPART B AND C; RSS-247 AND RSS-GEN – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

SPECTRUM BRANDS, INC.
Z-WAVE ELECTRONIC DEADBOLT
MODEL: 450126VHC, HVIN: GED1800 and GED2152
FCC SUBPART C; RSS-247 AND RSS-GEN – RF PORT CONDUCTED MEASUREMENTS

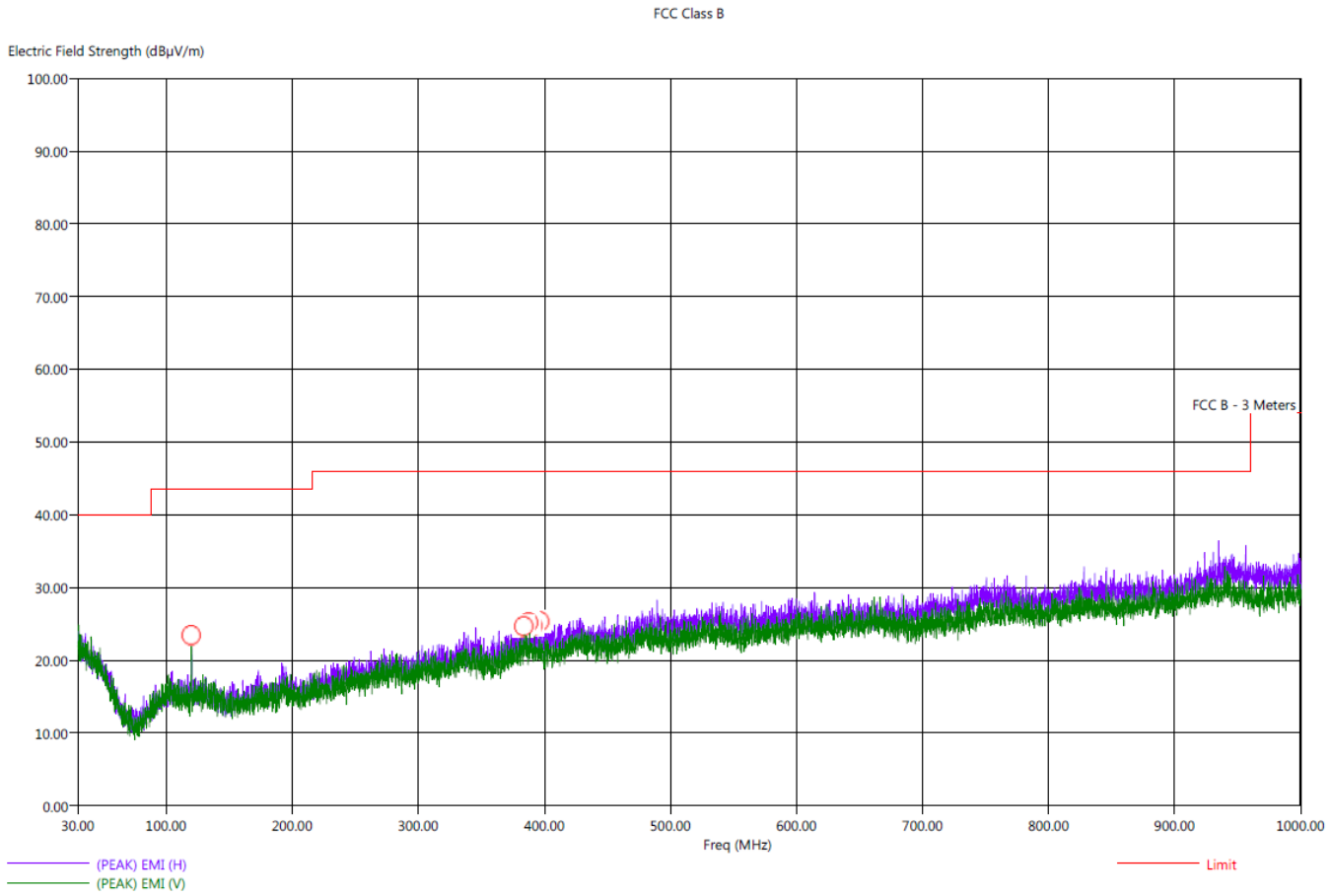
APPENDIX E

DATA SHEETS

RADIATED EMISSIONS DATA SHEETS

Title: Pre-Scan - FCC Class B
File: 1 - LF - Pre-Scan - FCC Class B - HomeConnect 620 - Rx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

5/29/2024 8:58:02 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 1 - LF - Final Scan - FCC Class B - HomeConnect 620 - Rx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

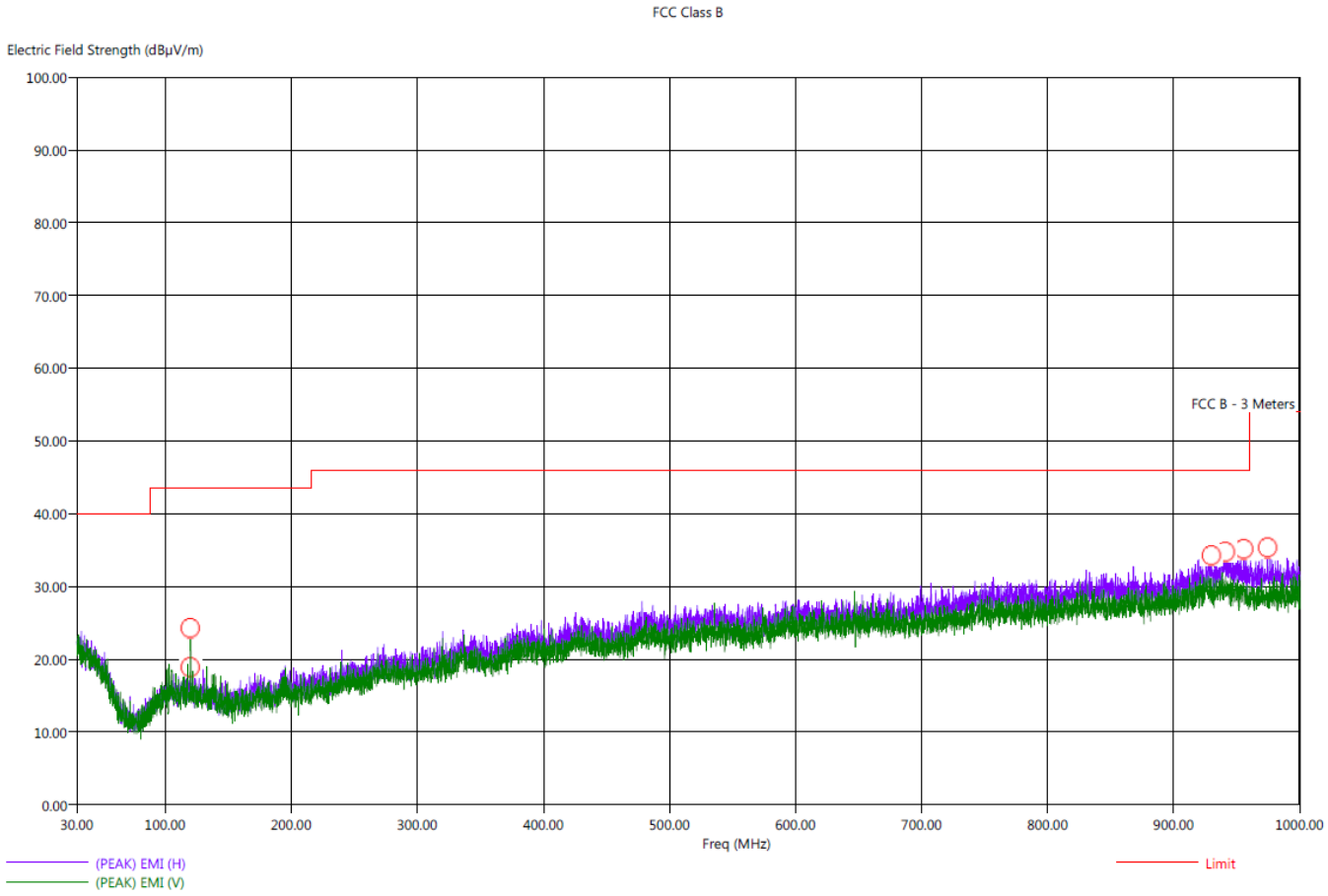
5/29/2024 9:14:22 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	V	28.25	25.05	-15.25	-18.45	43.50	15.90	0.70	176.00	111.05
383.80	H	26.16	20.74	-19.84	-25.26	46.00	22.30	1.35	173.00	238.76
387.60	H	26.95	20.65	-19.05	-25.35	46.00	22.15	1.36	262.50	159.17
388.30	H	25.55	20.55	-20.45	-25.45	46.00	22.10	1.37	41.00	127.11
390.80	H	25.93	20.49	-20.07	-25.51	46.00	22.03	1.38	121.75	238.76
396.40	H	25.19	20.30	-20.81	-25.70	46.00	21.80	1.40	248.50	238.52

Title: Pre-Scan - FCC Class B
File: 2 - LF - Pre-Scan - FCC Class B - HomeConnect 620 - Rx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

5/29/2024 9:44:49 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 2 - LF - Final Scan - FCC Class B - HomeConnect 620 - Rx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

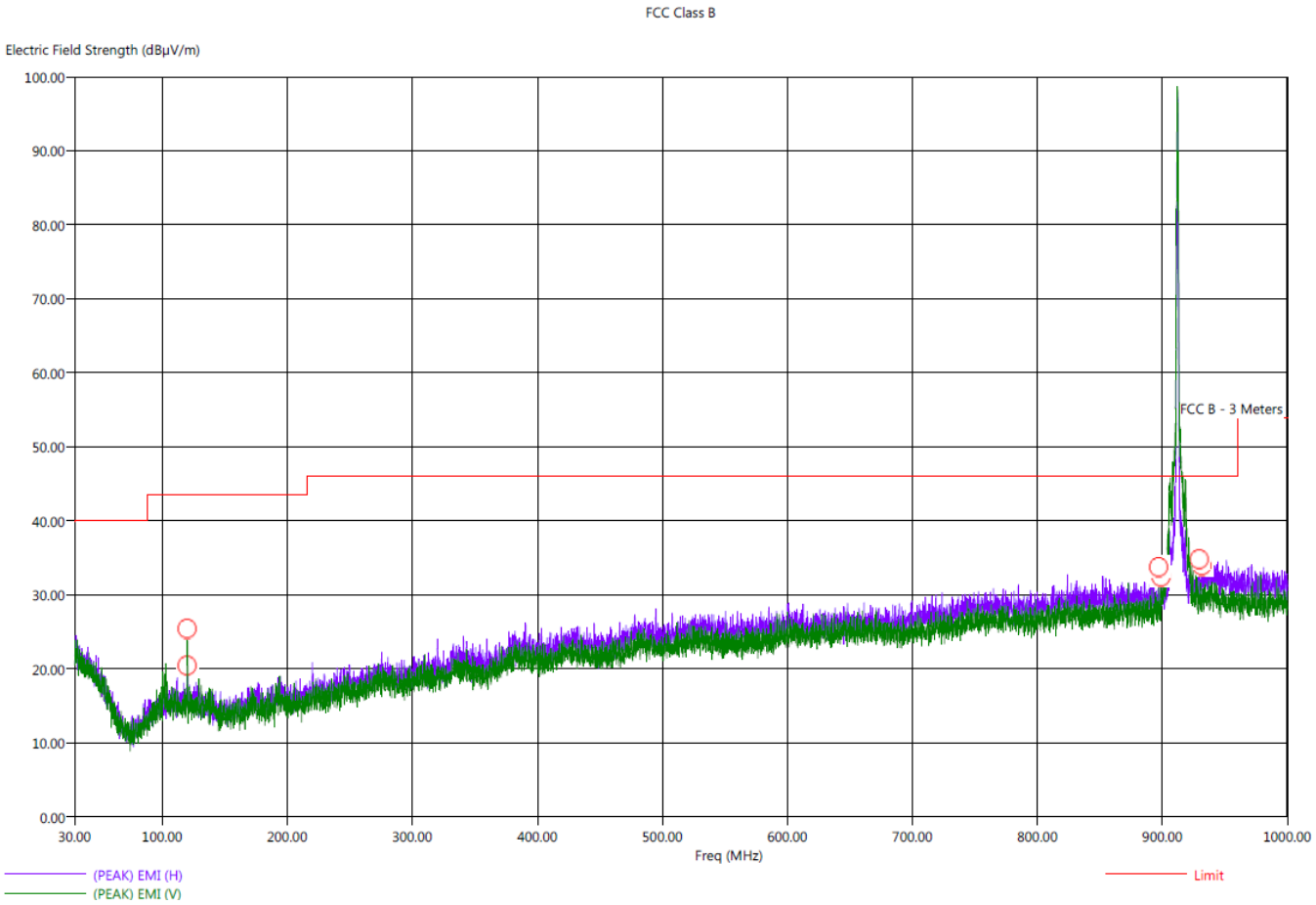
5/29/2024 9:59:15 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	22.63	18.74	-20.87	-24.76	43.50	15.90	0.70	165.25	249.92
120.00	V	27.15	24.27	-16.35	-19.23	43.50	15.90	0.70	212.00	127.11
930.10	H	35.22	29.54	-10.78	-16.46	46.00	29.20	2.34	333.25	206.82
941.10	H	35.55	30.52	-10.45	-15.48	46.00	29.89	2.62	299.50	238.52
955.70	H	34.63	29.65	-11.37	-16.35	46.00	28.80	2.83	39.50	127.05
974.70	H	36.75	29.37	-17.22	-24.60	53.97	28.64	2.72	280.00	250.16

Title: Pre-Scan - FCC Class B
File: 3 - LF - Pre-Scan - FCC Class B - HomeConnect 620 - Tx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1
Note: The Frequency at 912 MHz is from the intentional radiator and is subject to the limits of FCC 15.247 instead.

5/29/2024 10:32:31 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 3 - LF - Final Scan - FCC Class B - HomeConnect 620 - Tx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

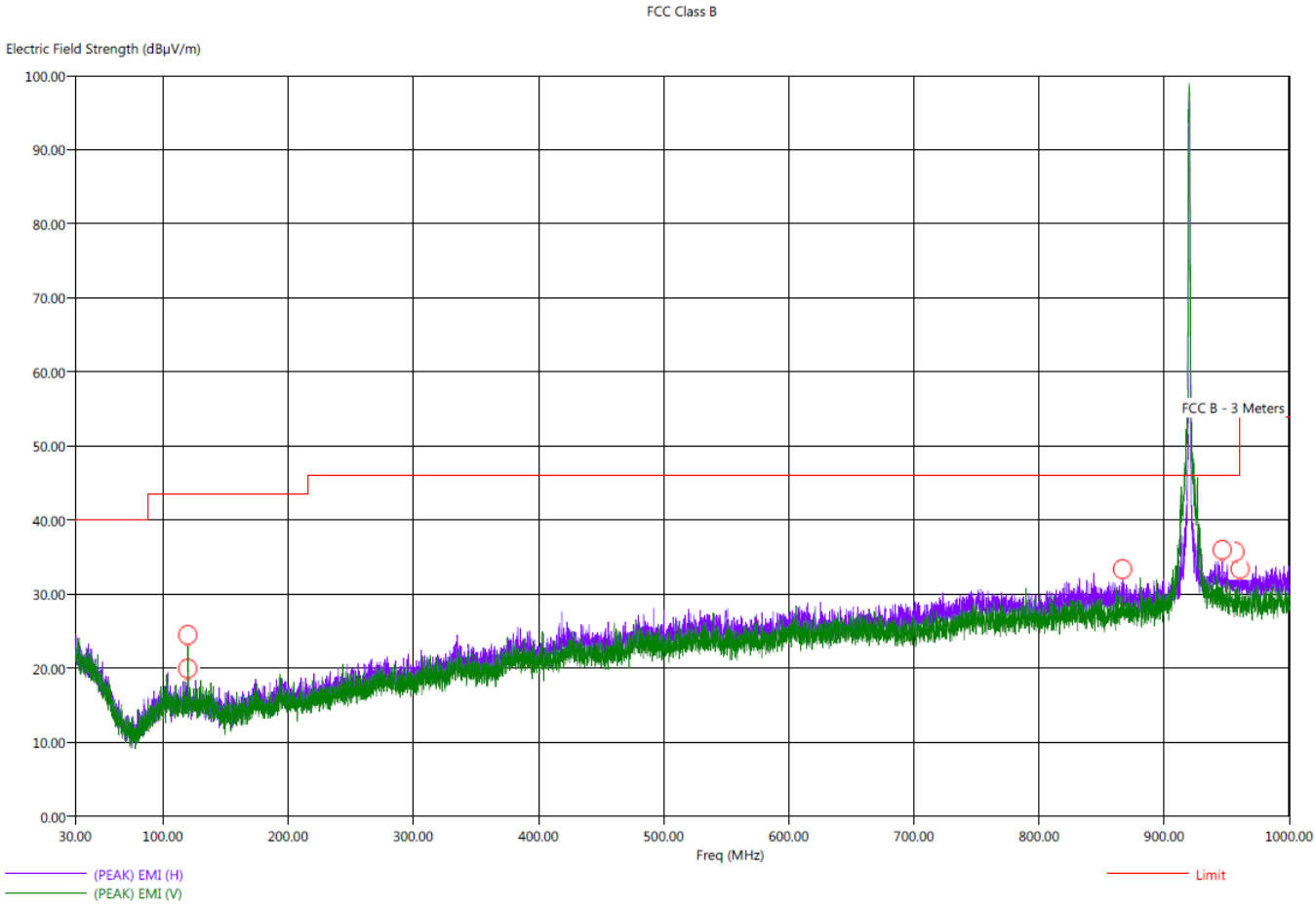
5/29/2024 10:46:21 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	22.14	18.46	-21.36	-25.04	43.50	15.90	0.70	279.25	142.88
120.00	V	27.71	24.84	-15.79	-18.66	43.50	15.90	0.70	161.25	111.05
897.00	V	36.83	33.45	-9.17	-12.55	46.00	27.90	1.57	169.50	159.23
899.00	V	33.64	27.89	-12.36	-18.11	46.00	27.98	1.55	152.25	250.04
929.50	H	35.49	29.75	-10.51	-16.25	46.00	29.20	2.32	37.50	127.17
931.60	H	34.81	29.61	-11.19	-16.39	46.00	29.27	2.38	273.75	207.29

Title: Pre-Scan - FCC Class B
File: 4 - LF - Pre-Scan - FCC Class B - HomeConnect 620 - Tx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1
Note: The Frequency at 920 MHz is from the intentional radiator and is subject to the limits of FCC 15.247 instead.

5/29/2024 11:17:59 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 4 - LF - Final Scan - FCC Class B - HomeConnect 620 - Tx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED1800
S/N: Unit 1

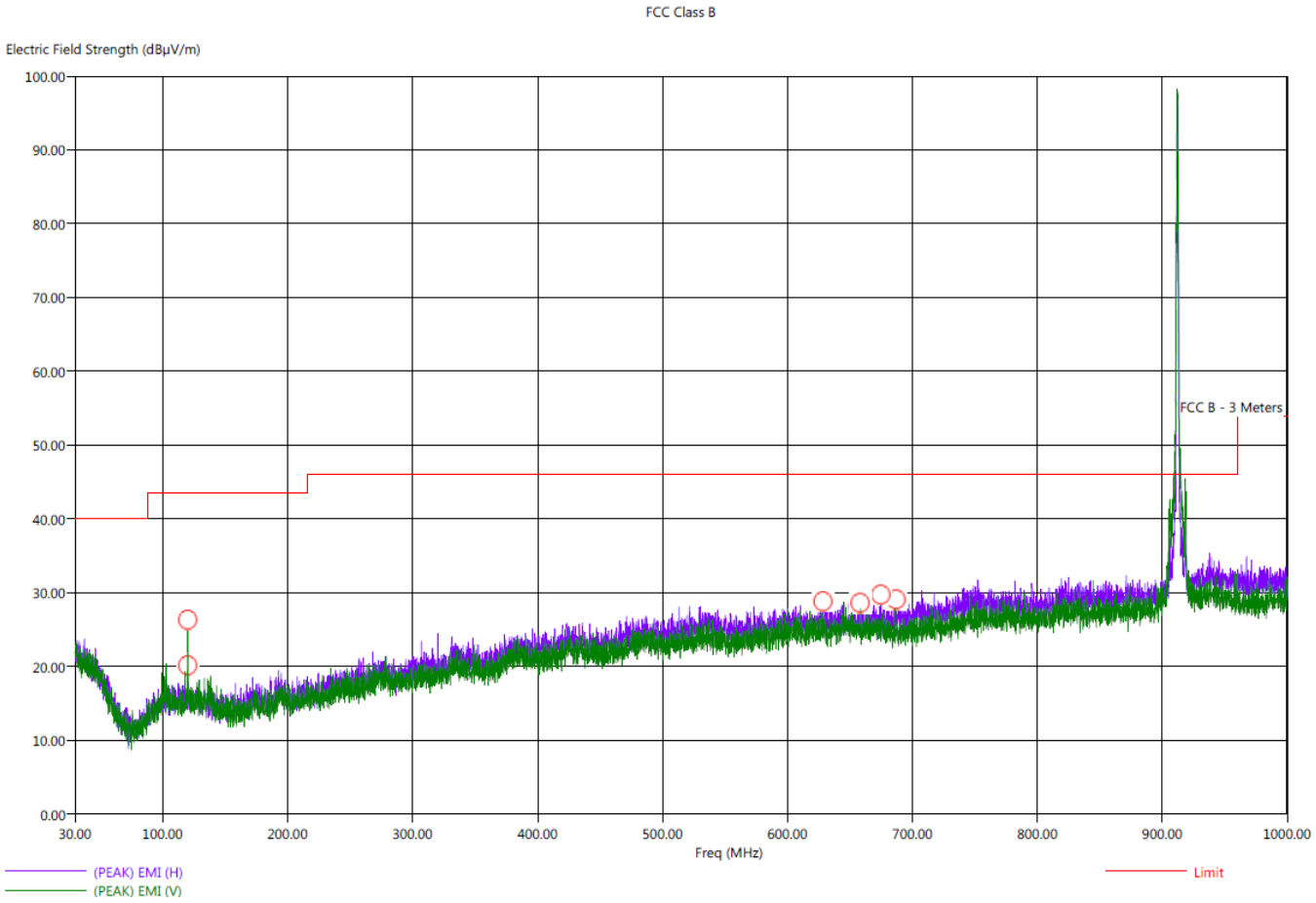
5/29/2024 11:32:08 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	24.92	21.14	-18.58	-22.36	43.50	15.90	0.70	120.75	111.23
120.00	V	27.52	24.49	-15.98	-19.01	43.50	15.90	0.70	94.00	127.35
866.90	H	32.24	27.17	-13.76	-18.83	46.00	27.40	1.97	94.00	223.05
946.60	H	35.91	30.22	-10.09	-15.78	46.00	29.36	2.77	170.50	158.70
956.60	H	36.04	29.61	-9.96	-16.39	46.00	28.80	2.82	327.00	222.70
960.80	H	35.51	29.42	-18.46	-24.55	53.97	28.61	2.80	256.00	223.59

Title: Pre-Scan - FCC Class B
File: 5 - LF - Pre-Scan - FCC Class B - HomeConnect 918 - Tx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1
Note: The Frequency at 912 MHz is from the intentional radiator and is subject to the limits of FCC 15.247 instead.

5/29/2024 1:16:37 PM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 5 - LF - Final Scan - FCC Class B - HomeConnect 918 - Tx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

5/29/2024 1:30:28 PM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.10	H	23.41	18.39	-20.09	-25.11	43.50	15.90	0.70	283.00	111.17
120.10	V	28.28	25.78	-15.22	-17.72	43.50	15.90	0.70	160.00	111.23
628.50	H	28.96	23.60	-17.04	-22.40	46.00	25.00	1.08	163.00	159.05
658.20	H	29.44	23.93	-16.56	-22.07	46.00	25.34	1.03	142.00	190.88
674.90	H	29.33	24.28	-16.67	-21.72	46.00	25.33	1.38	27.25	159.00
687.10	H	28.91	24.04	-17.09	-21.96	46.00	24.92	1.64	335.25	159.35

Title: Pre-Scan - FCC Class B
File: 6 - LF - Pre-Scan - FCC Class B - HomeConnect 918 - Tx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1
Note: The Frequency at 920 MHz is from the intentional radiator and is subject to the limits of FCC 15.247 instead.

5/29/2024 2:03:48 PM
Sequence: Preliminary Scan

Title: Radiated Final - FCC Class B
File: 6 - LF - Final Scan - FCC Class B - HomeConnect 918 - Tx Mode - 920 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously transmitting at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

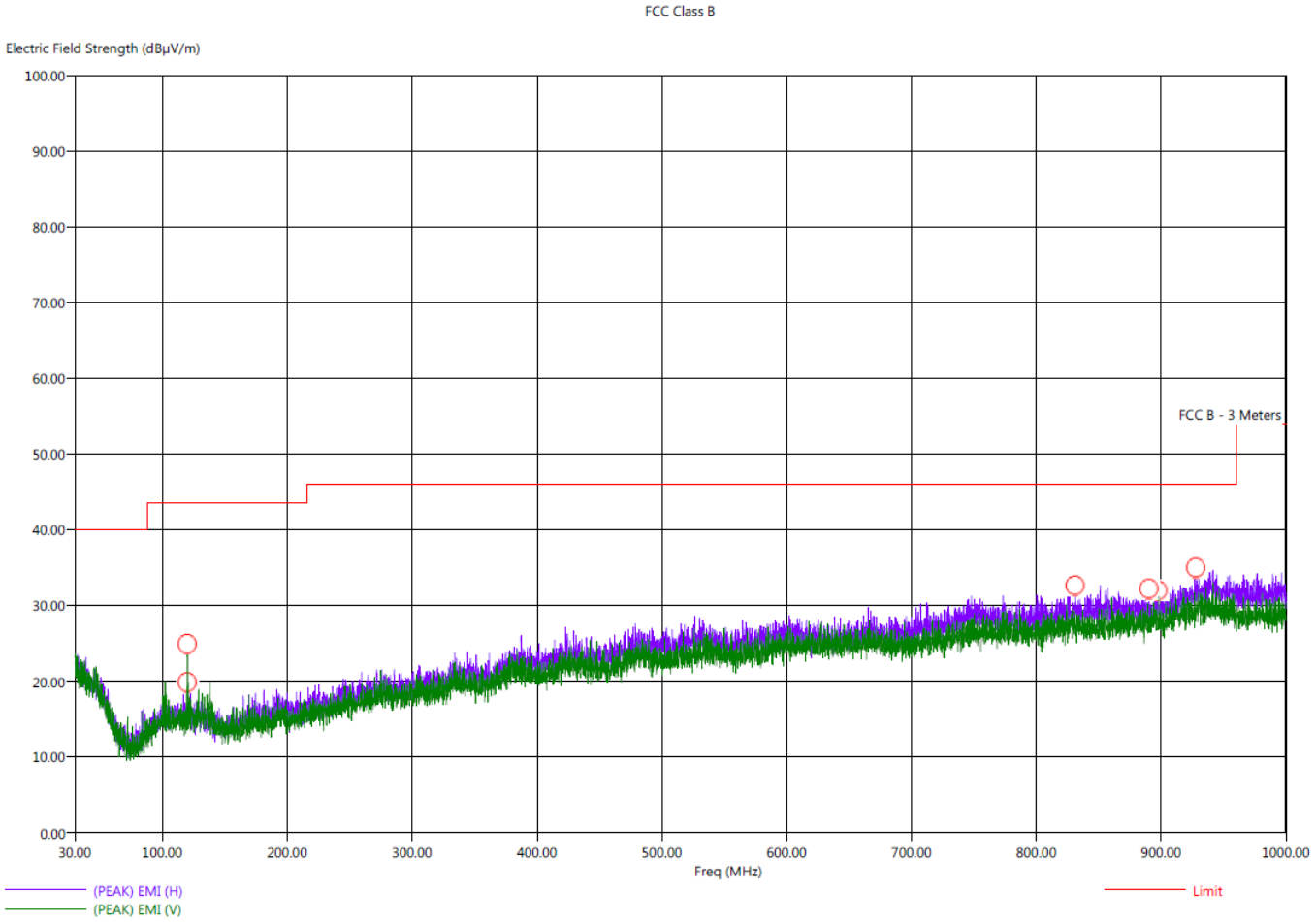
5/29/2024 2:28:12 PM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	21.80	16.94	-21.70	-26.56	43.50	15.90	0.70	25.75	238.46
120.10	V	22.57	17.46	-20.93	-26.04	43.50	15.90	0.70	160.75	250.10
813.90	H	31.31	26.47	-14.69	-19.53	46.00	26.97	1.80	163.75	191.17
829.50	H	31.95	27.11	-14.05	-18.89	46.00	27.33	1.98	318.00	174.58
835.60	H	32.18	26.98	-13.82	-19.02	46.00	27.20	2.04	10.25	206.88
848.80	H	33.07	27.16	-12.93	-18.84	46.00	27.20	2.19	331.50	250.04

Title: Pre-Scan - FCC Class B
File: 7 - LF - Pre-Scan - FCC Class B - HomeConnect 918 - Rx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

5/29/2024 3:30:45 PM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 7 - LF - Final Scan - FCC Class B - HomeConnect 918 - Rx Mode - 912 MHz - 05-29-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 912 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

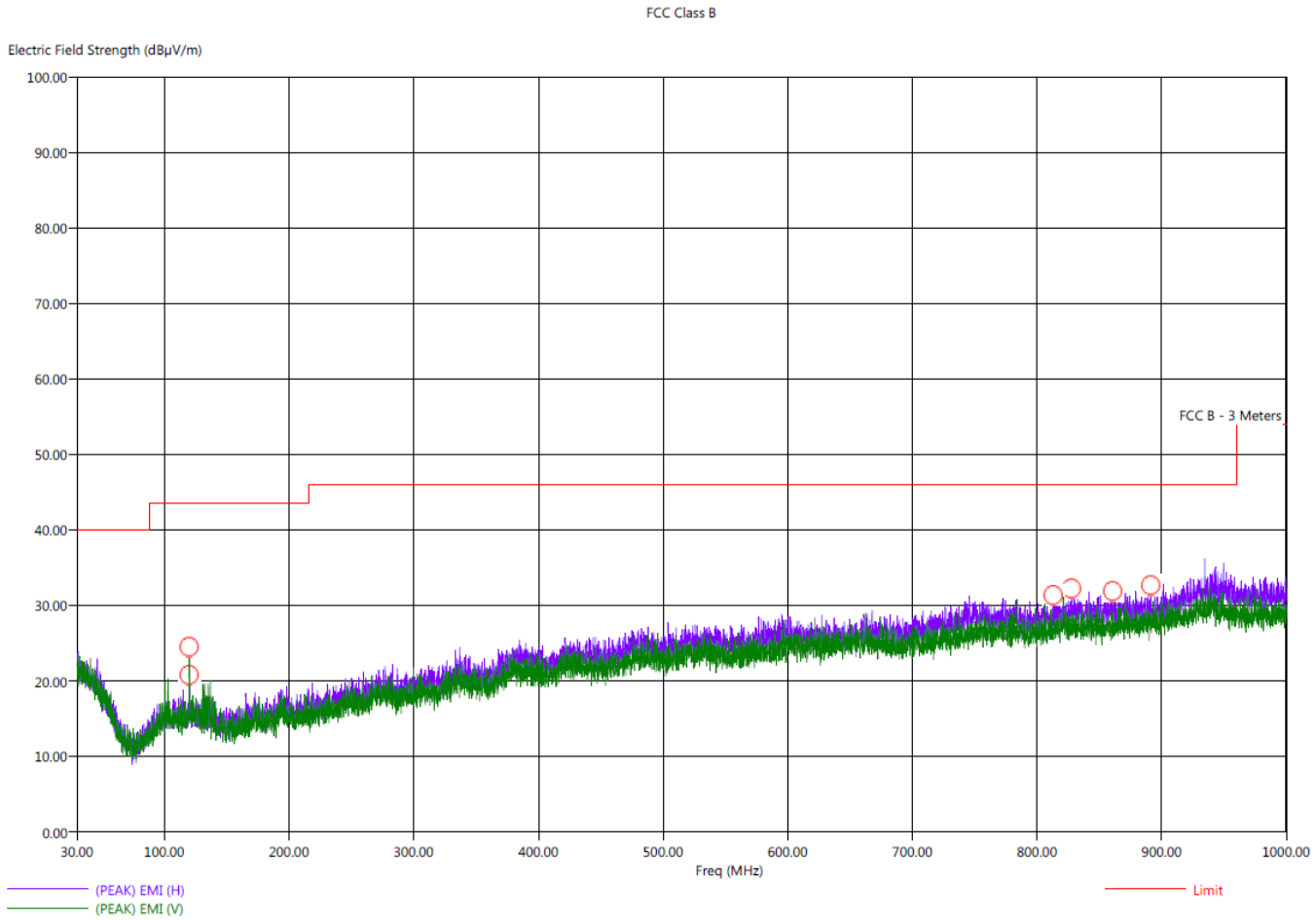
5/29/2024 3:47:39 PM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	23.70	20.42	-19.80	-23.08	43.50	15.90	0.70	200.00	249.92
120.00	V	27.71	25.69	-15.79	-17.81	43.50	15.90	0.70	182.00	109.74
831.10	H	31.96	27.18	-14.04	-18.82	46.00	27.37	2.00	221.75	159.11
890.30	H	32.11	27.13	-13.89	-18.87	46.00	27.61	1.66	295.25	190.46
897.40	H	32.35	27.34	-13.65	-18.66	46.00	27.90	1.56	342.75	158.58
927.80	H	34.85	29.40	-11.15	-16.60	46.00	29.10	2.27	8.00	156.91

Title: Pre-Scan - FCC Class B
File: 8 - LF - Pre-Scan - FCC Class B - HomeConnect 918 - Rx Mode - 920 MHz - 05-30-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

5/30/2024 8:06:21 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 8 - LF - Final Scan - FCC Class B - HomeConnect 918 - Rx Mode - 920 MHz - 05-30-2024.set
Operator: Kyle Fujimoto
EUT Type: Z-Wave Electronic Deadbolt
EUT Condition: The EUT is continuously receiving at 920 MHz
Comments: Company: Spectrum Brands, Inc.
Model: 450126VHC, HVIN: GED2152
S/N: Unit 1

5/30/2024 8:24:07 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
120.00	H	23.69	13.68	-19.81	-29.82	43.50	15.90	0.70	188.75	249.98
120.00	V	28.49	24.73	-15.01	-18.77	43.50	15.90	0.70	325.75	111.41
813.10	H	31.52	26.45	-14.48	-19.55	46.00	26.90	1.80	14.75	190.88
827.80	H	32.10	27.16	-13.90	-18.84	46.00	27.38	1.96	289.50	127.29
860.70	H	31.76	27.14	-14.24	-18.86	46.00	27.30	2.06	241.25	239.00
891.30	H	32.98	27.21	-13.02	-18.79	46.00	27.70	1.65	28.00	143.83

FUNDAMENTAL AND HARMONICS

DATA SHEETS

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1824.00								**Not in Restricted Band**
1824.00								**Done Via Conducted**
2736.00	38.13	V	73.97	-35.84	Peak	50.00	143.17	
2736.00	27.49	V	53.97	-26.48	Avg	50.00	143.17	
3648.00	47.35	V	73.97	-26.62	Peak	213.50	126.94	
3648.00	40.99	V	53.97	-12.98	Avg	213.50	126.94	
4560.00	45.27	V	73.97	-28.70	Peak	87.25	158.88	
4560.00	33.10	V	53.97	-20.87	Avg	87.25	158.88	
5472.00								**Not in Restricted Band**
5472.00								**Done Via Conducted**
6384.00								**Not in Restricted Band**
6384.00								**Done Via Conducted**
7296.00	45.27	V	73.97	-28.70	Peak	87.25	158.88	
7296.00	33.10	V	53.97	-20.87	Avg	87.25	158.88	
8208.00	46.11	V	73.97	-27.86	Peak	322.00	207.05	
8208.00	33.57	V	53.97	-20.40	Avg	322.00	207.05	
9120.00	46.55	V	73.97	-27.42	Peak	4.75	199.70	
9120.00	34.87	V	53.97	-19.10	Avg	4.75	199.70	

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1824.00								**Not in Restricted Band**
1824.00								**Done Via Conducted**
2736.00	40.43	H	73.97	-33.54	Peak	352.50	143.00	
2736.00	31.52	H	53.97	-22.45	Avg	352.50	143.00	
3648.00	49.01	H	73.97	-24.96	Peak	22.25	110.25	
3648.00	40.51	H	53.97	-13.46	Avg	22.25	110.25	
4560.00	41.91	H	73.97	-32.06	Peak	14.25	191.29	
4560.00	30.26	H	53.97	-23.71	Avg	14.25	191.29	
5472.00								**Not in Restricted Band**
5472.00								**Done Via Conducted**
6384.00								**Not in Restricted Band**
6384.00								**Done Via Conducted**
7296.00	44.93	H	73.97	-29.04	Peak	91.00	286.94	
7296.00	33.20	H	53.97	-20.77	Avg	91.00	286.94	
8208.00	45.33	H	73.97	-28.64	Peak	289.00	111.00	
8208.00	33.30	H	53.97	-20.67	Avg	289.00	111.00	
9120.00	46.83	H	73.97	-27.14	Peak	179.50	175.41	
9120.00	34.73	H	53.97	-19.24	Avg	179.50	175.41	

FCC 15.247 and RSS-247
Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/28/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1840.00								**Not in Restricted Band**
1840.00								**Done Via Conducted**
2760.00	35.12	V	73.97	-38.85	Peak	59.25	207.23	
2760.00	23.58	V	53.97	-30.39	Avg	59.25	207.23	
3680.00	45.49	V	73.97	-28.48	Peak	22.25	111.35	
3680.00	36.13	V	53.97	-17.84	Avg	22.25	111.35	
4600.00	39.65	V	73.97	-34.32	Peak	161.00	271.35	
4600.00	28.35	V	53.97	-25.62	Avg	161.00	271.35	
5520.00								**Not in Restricted Band**
5520.00								**Done Via Conducted**
6440.00								**Not in Restricted Band**
6440.00								**Done Via Conducted**
7360.00	48.39	V	73.97	-25.58	Peak	12.75	111.35	
7360.00	35.39	V	53.97	-18.58	Avg	12.75	111.35	
8280.00	45.19	V	73.97	-28.78	Peak	29.75	127.17	
8280.00	33.10	V	53.97	-20.87	Avg	29.75	127.17	
9200.00	49.67	V	73.97	-24.30	Peak	333.50	255.41	
9200.00	37.65	V	53.97	-16.32	Avg	333.50	255.41	

FCC 15.247 and RSS-247
Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/28/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1840.00								**Not in Restricted Band**
1840.00								**Done Via Conducted**
2760.00	36.70	H	73.97	-37.27	Peak	3.75	175.47	
2760.00	26.04	H	53.97	-27.93	Avg	3.75	175.47	
3680.00	45.25	H	73.97	-28.72	Peak	48.25	111.47	
3680.00	37.51	H	53.97	-16.46	Avg	48.25	111.47	
4600.00	40.27	H	73.97	-33.70	Peak	350.25	300.07	
4600.00	28.25	H	53.97	-25.72	Avg	350.25	300.07	
5520.00								**Not in Restricted Band**
5520.00								**Done Via Conducted**
6440.00								**Not in Restricted Band**
6440.00								**Done Via Conducted**
7360.00	46.30	H	73.97	-27.67	Peak	20.75	254.82	
7360.00	34.40	H	53.97	-19.57	Avg	20.75	254.82	
8280.00	44.81	H	73.97	-29.16	Peak	68.00	175.00	
8280.00	32.84	H	53.97	-21.13	Avg	68.00	175.00	
9200.00	49.70	H	73.97	-24.27	Peak	321.00	127.17	
9200.00	36.74	H	53.97	-17.23	Avg	321.00	127.17	

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								Investigated in the
								Y-Axis
								Investigated at both Low
								channel and High channel

FCC Class B and RSS-GEN

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED1800

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Receive Mode - 9 kHz to 30 MHz
Receive Mode - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Receive Mode
								of the EUT
								No Emissions Detected
								9 kHz to 30 MHz
								for the Receive Mode
								of the EUT
								Investigated in the
								Y-Axis
								Investigated at both Low
								channel and High channel

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1824.00								**Not in Restricted Band**
1824.00								**Done Via Conducted**
2736.00	35.58	V	73.97	-38.39	Peak	22.50	159.00	
2736.00	23.84	V	53.97	-30.13	Avg	22.50	159.00	
3648.00	48.68	V	73.97	-25.29	Peak	152.50	159.05	
3648.00	41.66	V	53.97	-12.31	Avg	152.50	159.05	
4560.00	39.77	V	73.97	-34.20	Peak	54.25	299.89	
4560.00	27.97	V	53.97	-26.00	Avg	54.25	299.89	
5472.00								**Not in Restricted Band**
5472.00								**Done Via Conducted**
6384.00								**Not in Restricted Band**
6384.00								**Done Via Conducted**
7296.00	44.94	V	73.97	-29.03	Peak	185.50	254.76	
7296.00	33.31	V	53.97	-20.66	Avg	185.50	254.76	
8208.00	45.46	V	73.97	-28.51	Peak	203.50	299.89	
8208.00	33.43	V	53.97	-20.54	Avg	203.50	299.89	
9120.00	47.09	V	73.97	-26.88	Peak	182.25	159.17	
9120.00	35.67	V	53.97	-18.30	Avg	182.25	159.17	

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1824.00								**Not in Restricted Band**
1824.00								**Done Via Conducted**
2736.00	41.95	H	73.97	-32.02	Peak	192.00	111.00	
2736.00	23.97	H	53.97	-30.00	Avg	192.00	111.00	
3648.00	42.59	H	73.97	-31.38	Peak	116.25	254.76	
3648.00	33.60	H	53.97	-20.37	Avg	116.25	254.76	
4560.00	40.23	H	73.97	-33.74	Peak	293.50	174.82	
4560.00	27.69	H	53.97	-26.28	Avg	293.50	174.82	
5472.00								**Not in Restricted Band**
5472.00								**Done Via Conducted**
6384.00								**Not in Restricted Band**
6384.00								**Done Via Conducted**
7296.00	45.80	H	73.97	-28.17	Peak	45.25	270.34	
7296.00	33.11	H	53.97	-20.86	Avg	45.25	270.34	
8208.00	44.73	H	73.97	-29.24	Peak	214.50	286.40	
8208.00	33.31	H	53.97	-20.66	Avg	214.50	286.40	
9120.00	46.52	H	73.97	-27.45	Peak	59.75	207.05	
9120.00	34.72	H	53.97	-19.25	Avg	59.75	207.05	

FCC 15.247 and RSS-247
Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1840.00								**Not in Restricted Band**
1840.00								**Done Via Conducted**
2760.00	35.84	V	73.97	-38.13	Peak	144.75	270.94	
2760.00	23.62	V	53.97	-30.35	Avg	144.75	270.94	
3680.00	47.51	V	73.97	-26.46	Peak	164.50	175.23	
3680.00	40.64	V	53.97	-13.33	Avg	164.50	175.23	
4600.00	40.46	V	73.97	-33.51	Peak	263.50	223.05	
4600.00	29.25	V	53.97	-24.72	Avg	263.50	223.05	
5520.00								**Not in Restricted Band**
5520.00								**Done Via Conducted**
6440.00								**Not in Restricted Band**
6440.00								**Done Via Conducted**
7360.00	45.45	V	73.97	-28.52	Peak	141.00	300.19	
7360.00	33.64	V	53.97	-20.33	Avg	141.00	300.19	
8280.00	46.92	V	73.97	-27.05	Peak	217.75	190.52	
8280.00	35.43	V	53.97	-18.54	Avg	217.75	190.52	
9200.00	46.83	V	73.97	-27.14	Peak	54.75	158.34	
9200.00	35.12	V	53.97	-18.85	Avg	54.75	158.34	

FCC 15.247 and RSS-247
Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

Harmonics - High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1840.00								**Not in Restricted Band**
1840.00								**Done Via Conducted**
2760.00	37.59	H	73.97	-36.38	Peak	205.00	238.88	
2760.00	25.22	H	53.97	-28.75	Avg	205.00	238.88	
3680.00	43.61	H	73.97	-30.36	Peak	103.00	270.52	
3680.00	35.55	H	53.97	-18.42	Avg	103.00	270.52	
4600.00	42.90	H	73.97	-31.07	Peak	187.50	159.23	
4600.00	31.01	H	53.97	-22.96	Avg	187.50	159.23	
5520.00								**Not in Restricted Band**
5520.00								**Done Via Conducted**
6440.00								**Not in Restricted Band**
6440.00								**Done Via Conducted**
7360.00	45.42	H	73.97	-28.55	Peak	216.25	286.76	
7360.00	33.61	H	53.97	-20.36	Avg	216.25	286.76	
8280.00	44.35	H	73.97	-29.62	Peak	142.75	111.17	
8280.00	33.12	H	53.97	-20.85	Avg	142.75	111.17	
9200.00	46.79	H	73.97	-27.18	Peak	332.75	300.10	
9200.00	35.28	H	53.97	-18.69	Avg	332.75	300.13	

FCC 15.247 and RSS-247

Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the digital portion
								of the EUT
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Non-Harmonic Emissions
								of the Transmitter for the EUT
								Investigated in the X-Axis,
								Y-Axis, and Z-Axis
								Investigated at both Low
								channel and High channel

FCC Class B and RSS-GEN

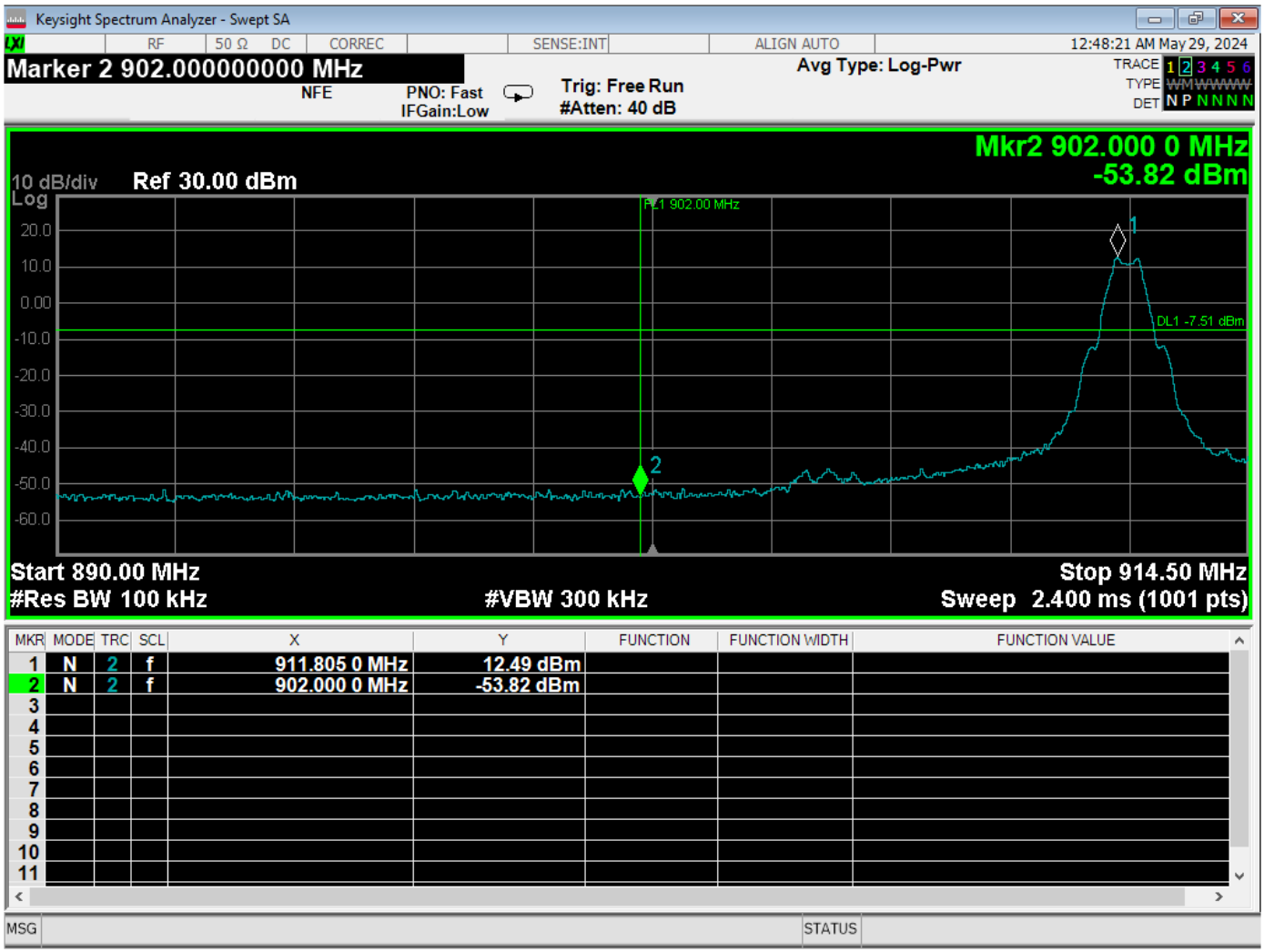
Spectrum Brands, Inc.
Z-Wave Electronic Deadbolt
Model: 450126VHC, HVIN: GED2152

Date: 05/24/2024
Lab: D
Tested By: Kyle Fujimoto

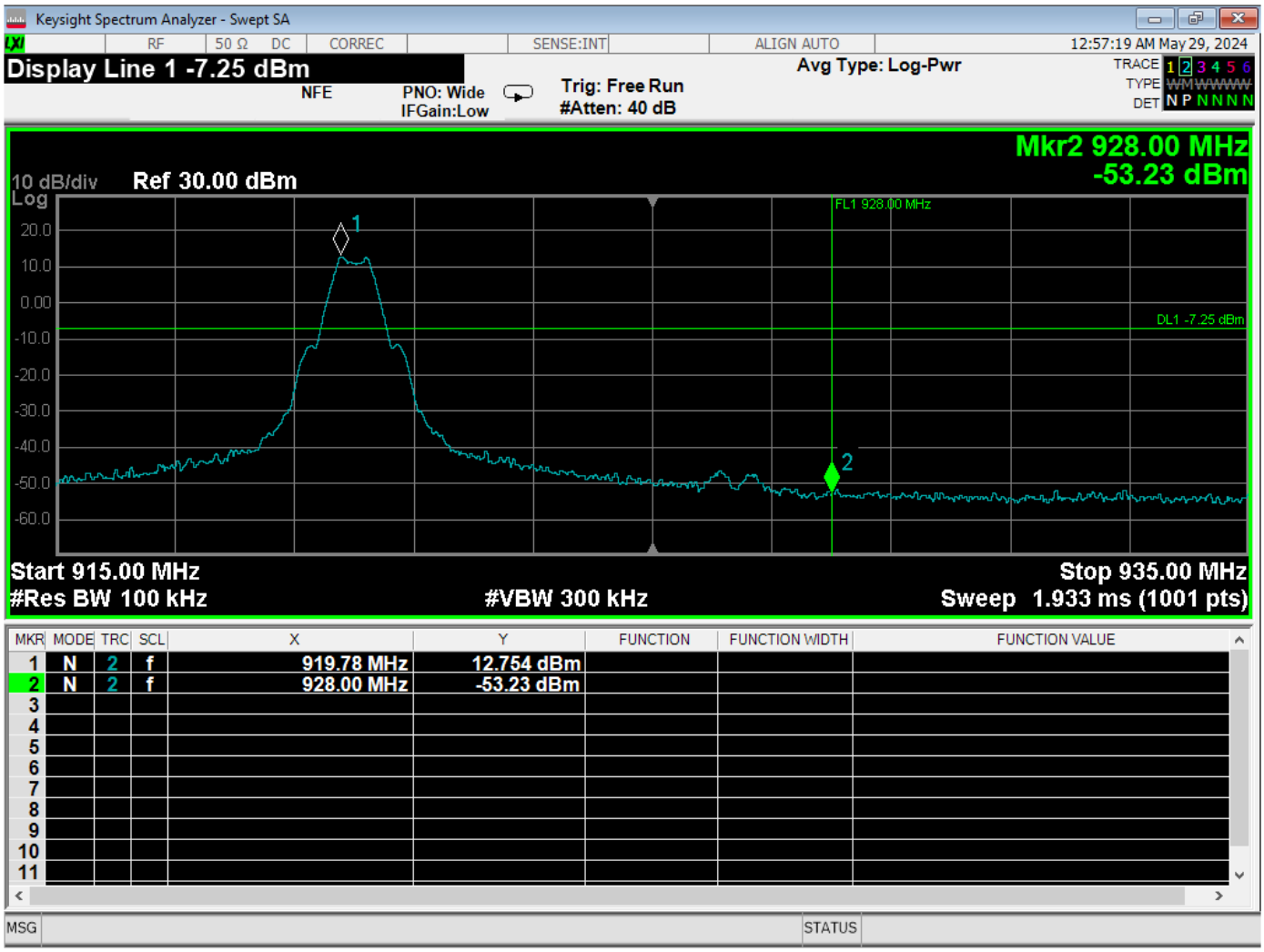
Receive Mode - 9 kHz to 30 MHz
Receive Mode - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dB)	Margin (dB)	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the Receive Mode
								of the EUT
								No Emissions Detected
								9 kHz to 30 MHz
								for the Receive Mode
								of the EUT
								Investigated in the
								Y-Axis
								Investigated at both Low
								channel and High channel

BAND EDGE DATA SHEETS

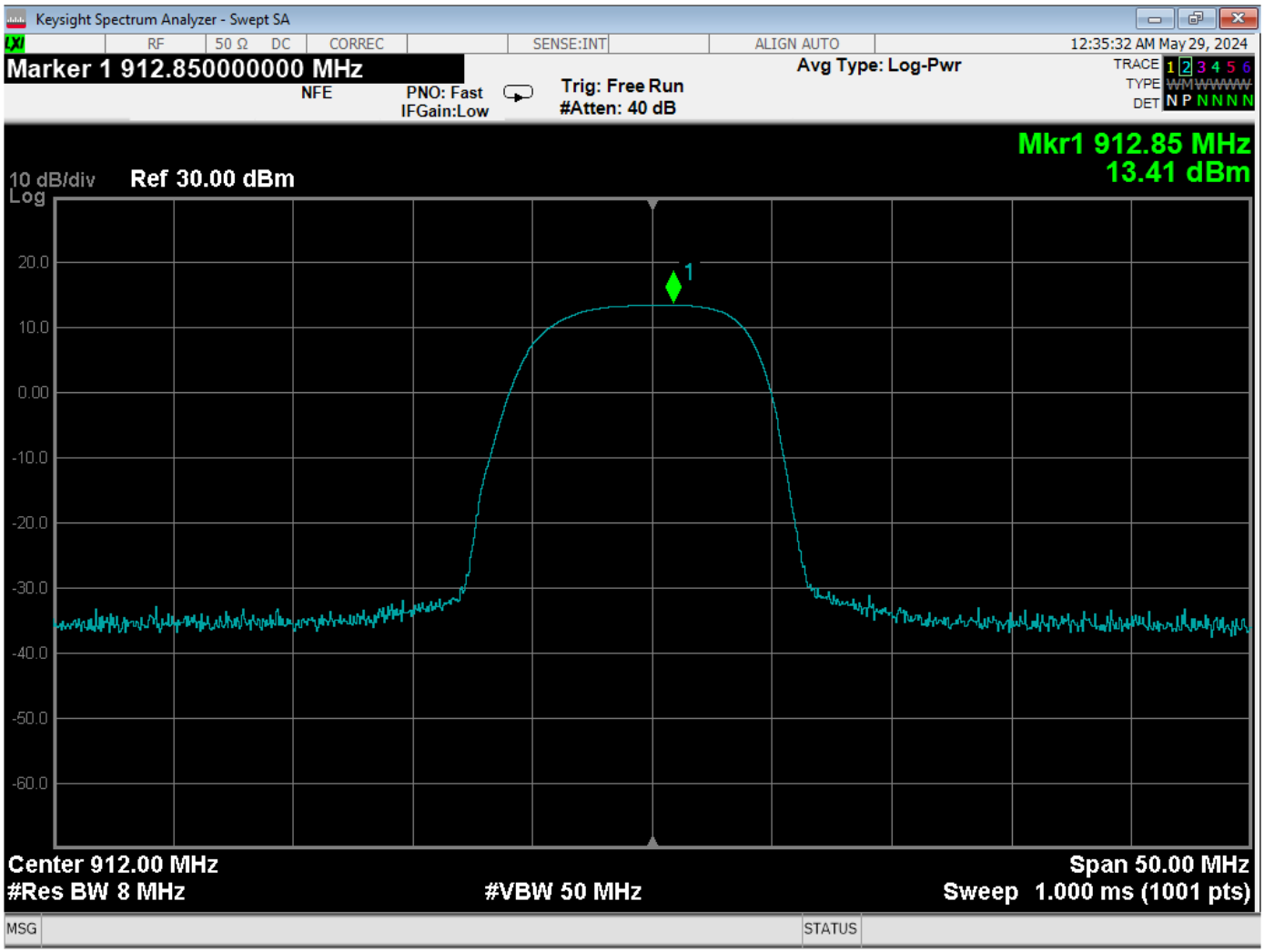


Band Edge – Low Channel – via Conducted Measurement

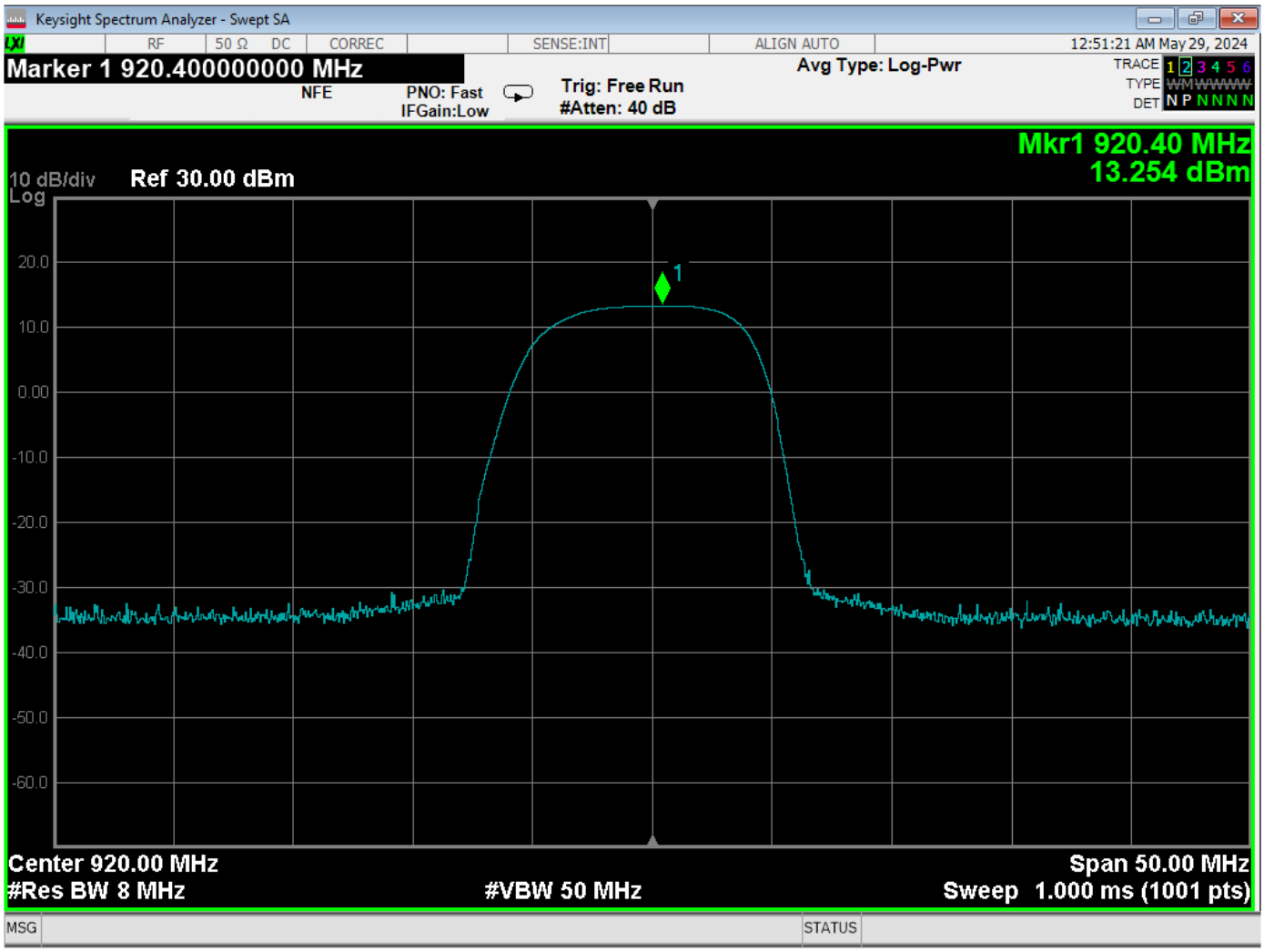


Band Edge – High Channel – via Conducted Measurement

PEAK POWER DATA SHEETS



Peak Output Power – Low Channel



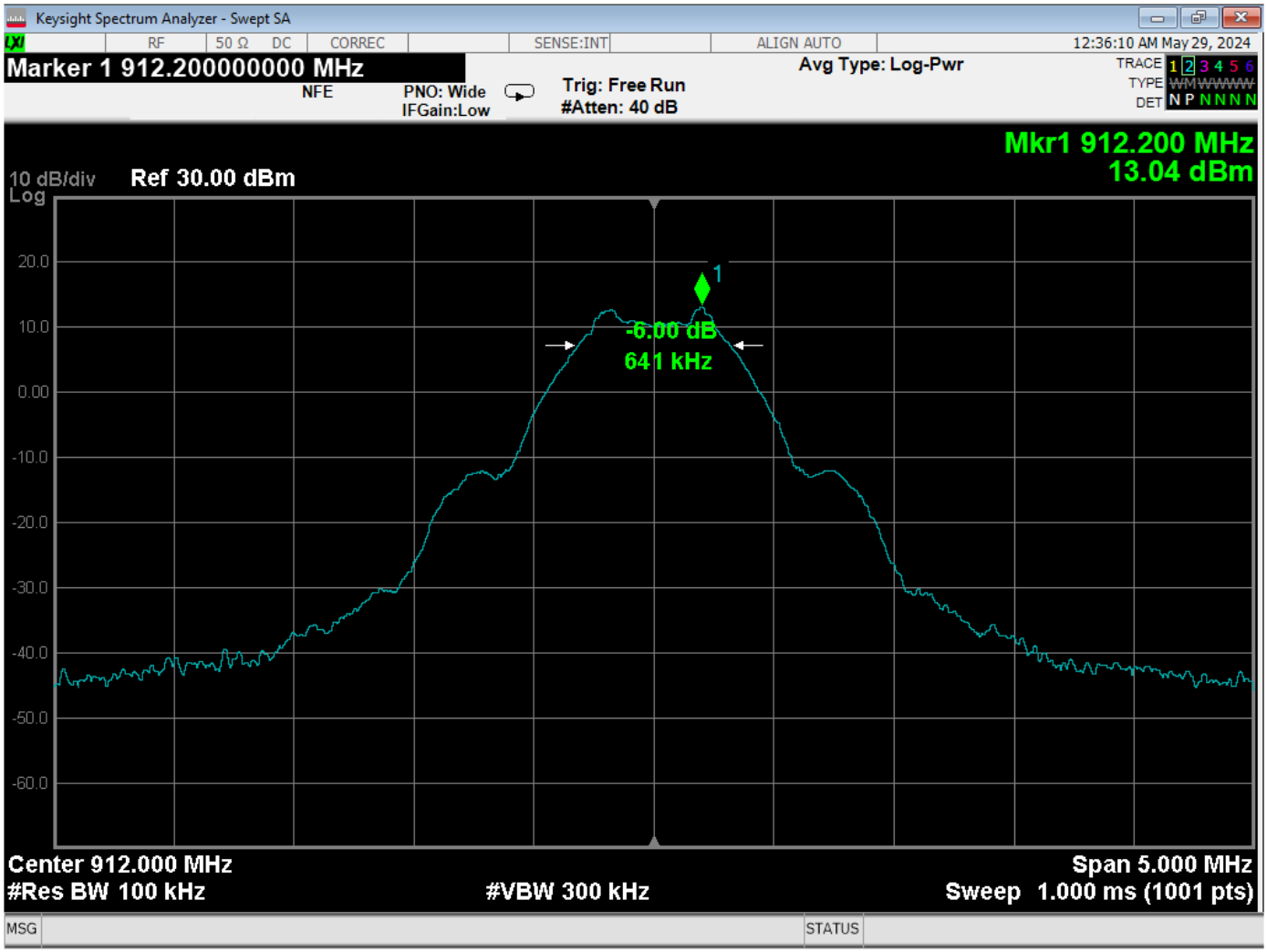
Peak Output Power – High Channel

PEAK OUTPUT POWER

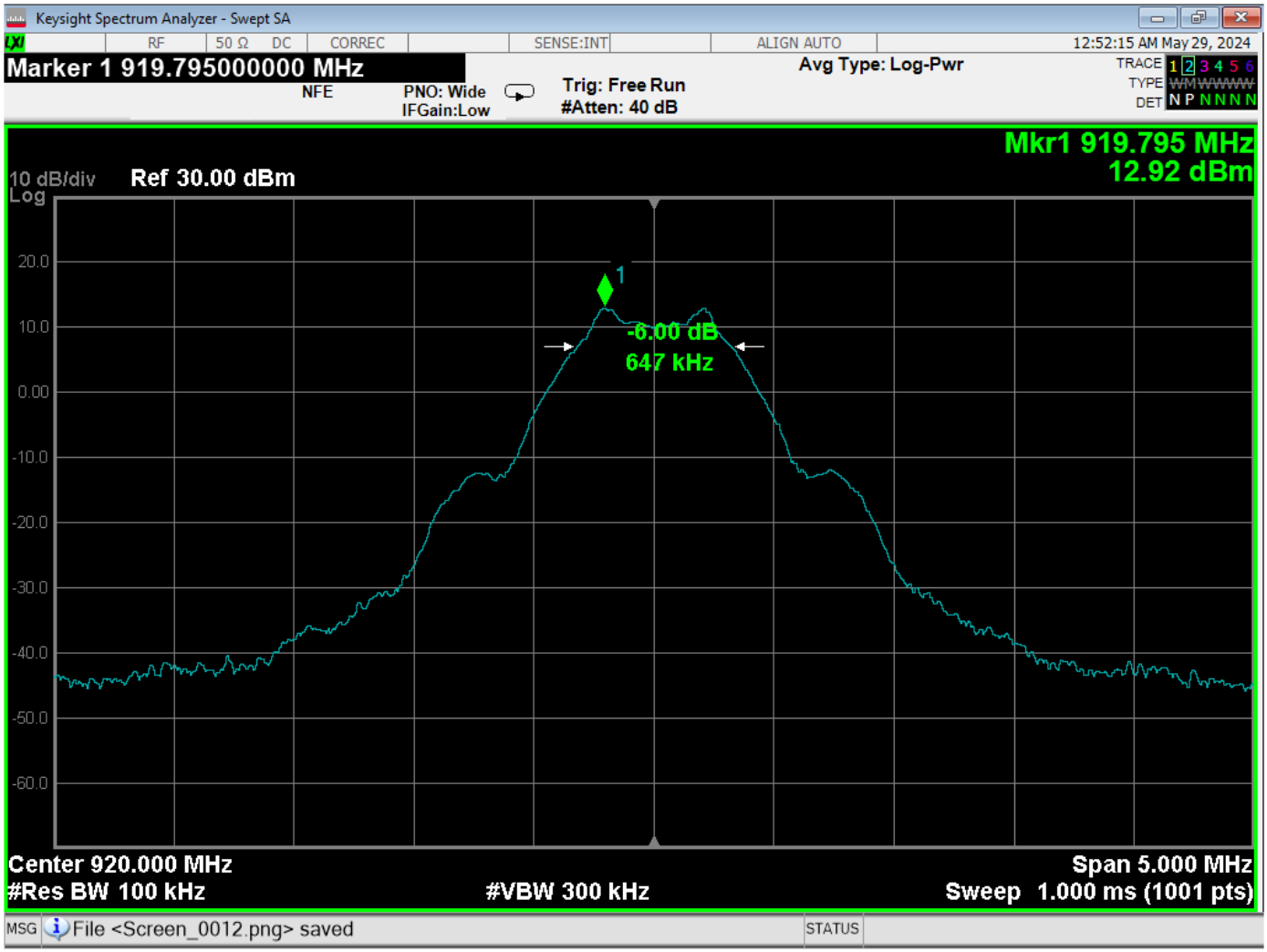
Z-Wave Electronic Deadbolt
Model: 450126VHC

FREQUENCY (MHz)	PEAK POWER (dBm)	LIMIT (dB)	MARGIN (dBm)
912.00	13.410	30.00	-16.590
920.00	13.254	30.00	-16.746

BANDWIDTH 6 dB
DATA SHEETS

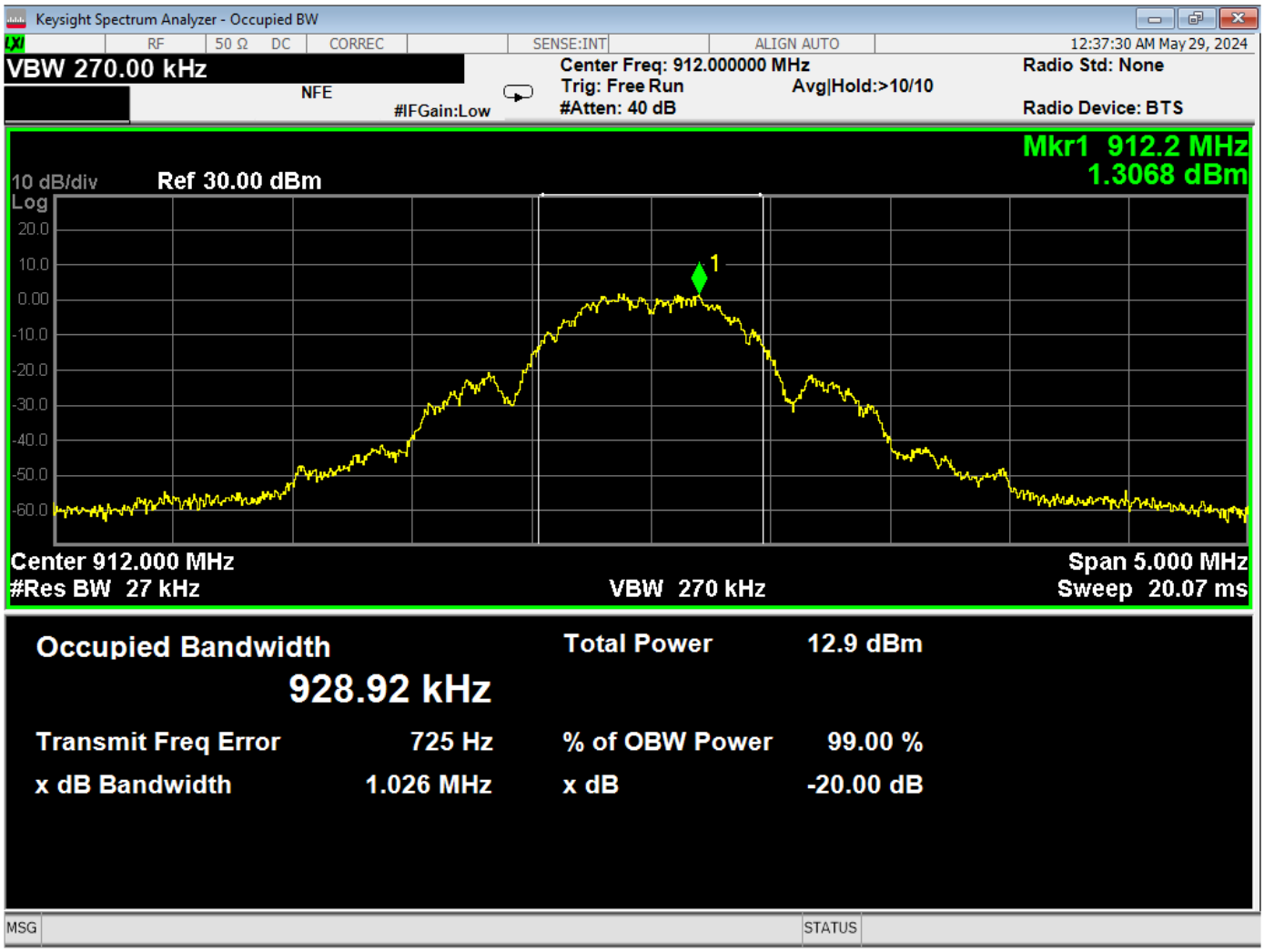


Bandwidth 6 dB – Low Channel

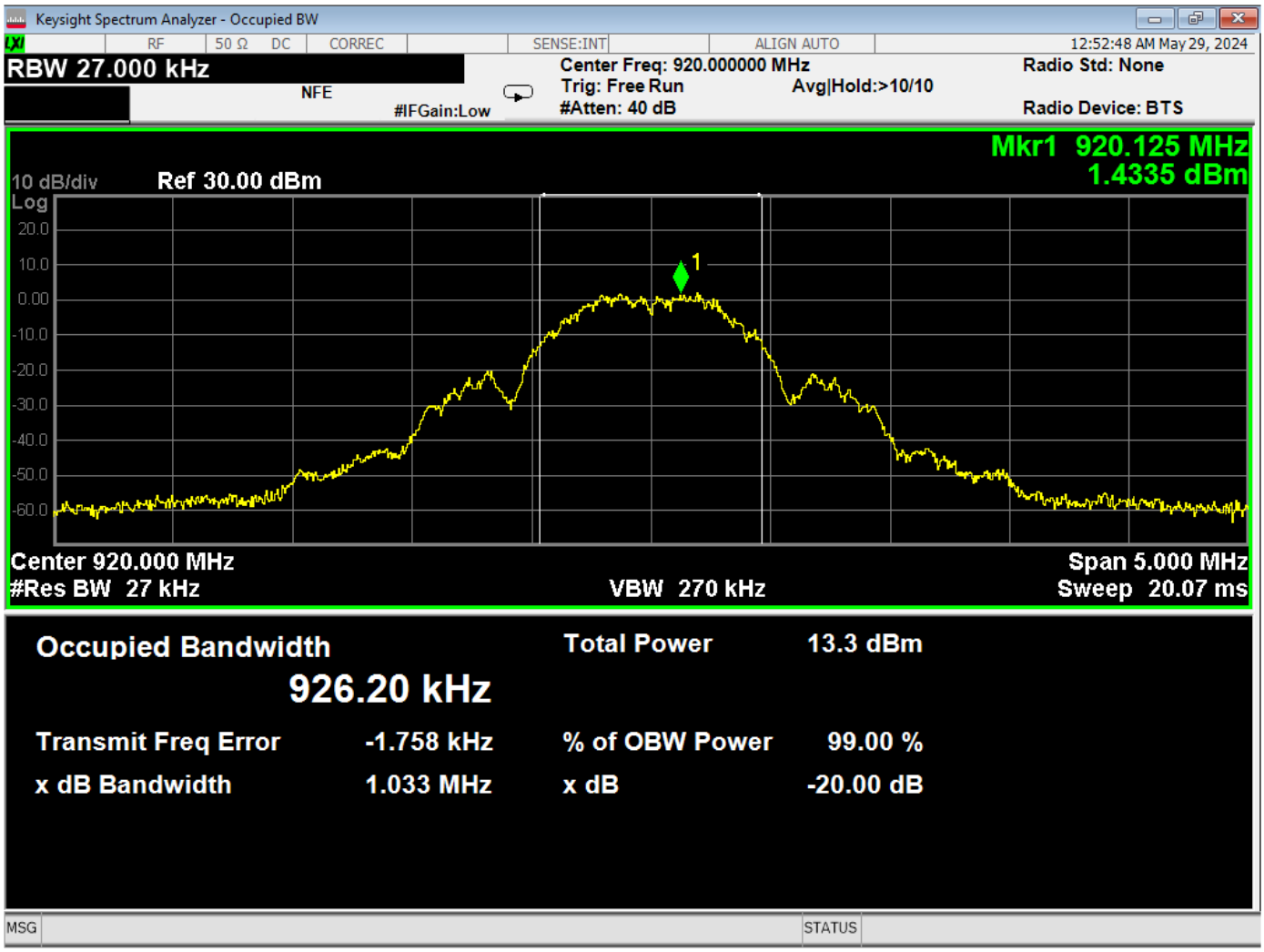


Bandwidth 6 dB – High Channel

BANDWIDTH 99 PERCENT DATA SHEETS

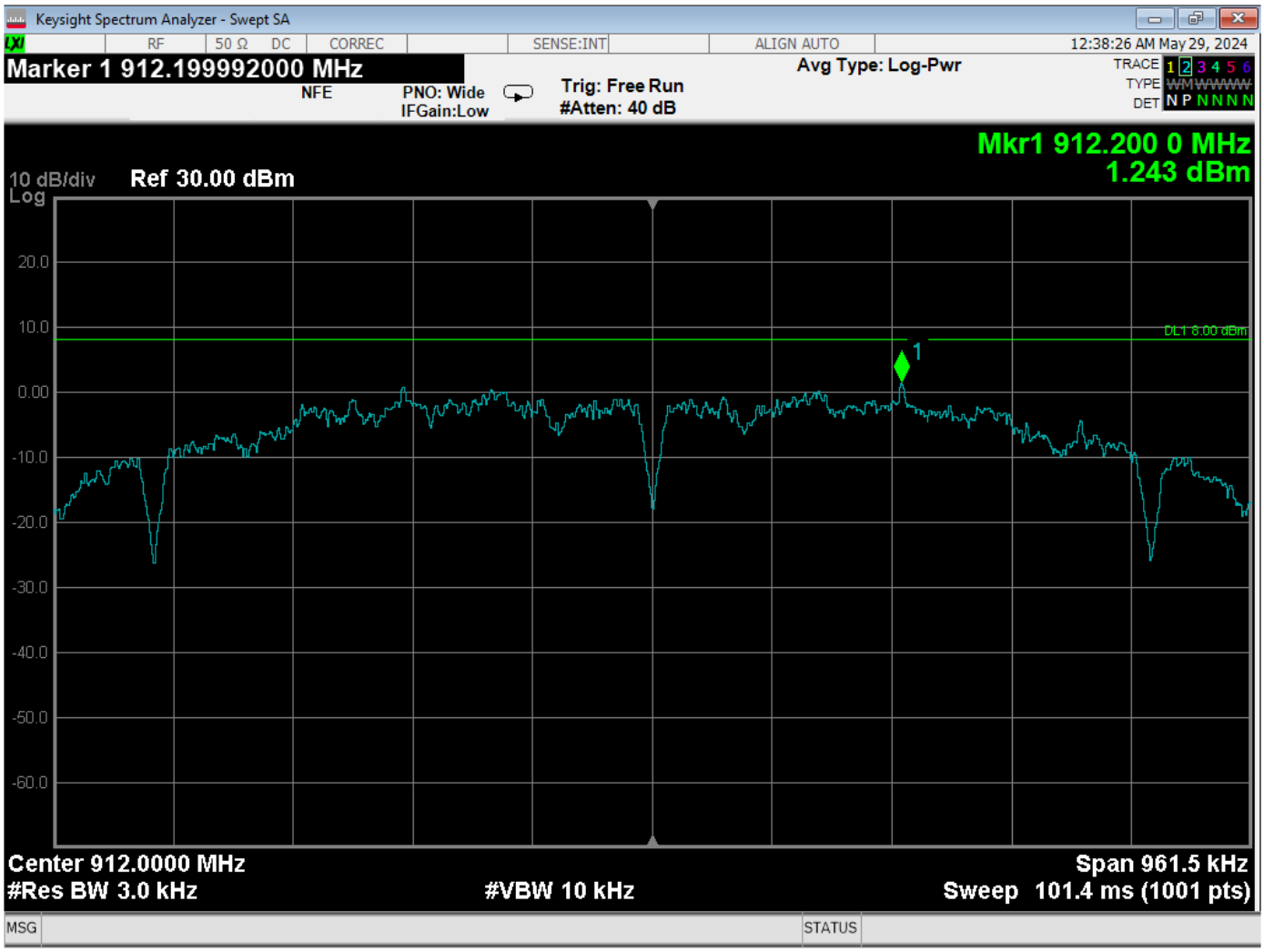


Bandwidth 99 Percent – Low Channel

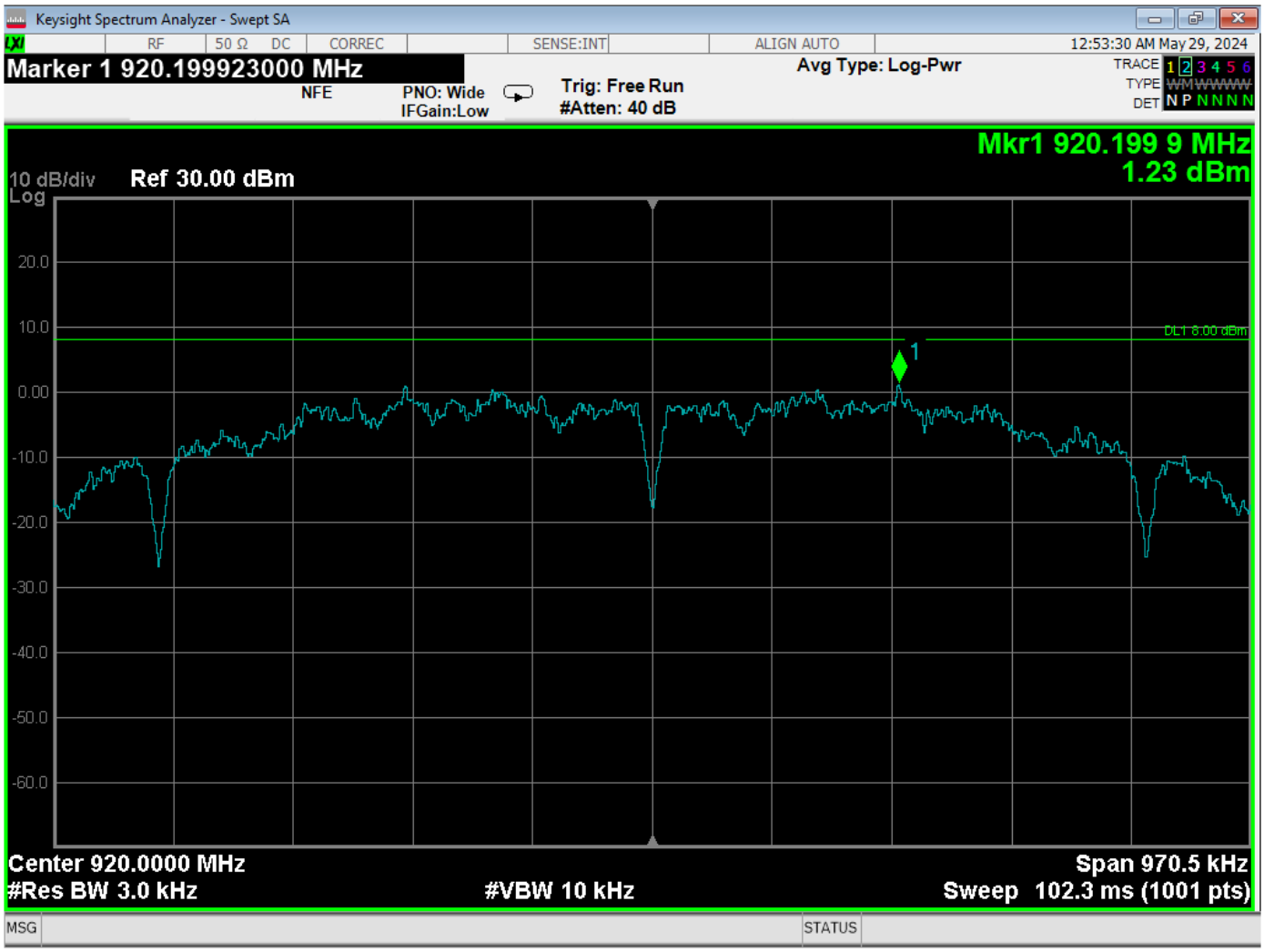


Bandwidth 99 Percent – High Channel

SPECTRAL DENSITY OUTPUT DATA SHEETS



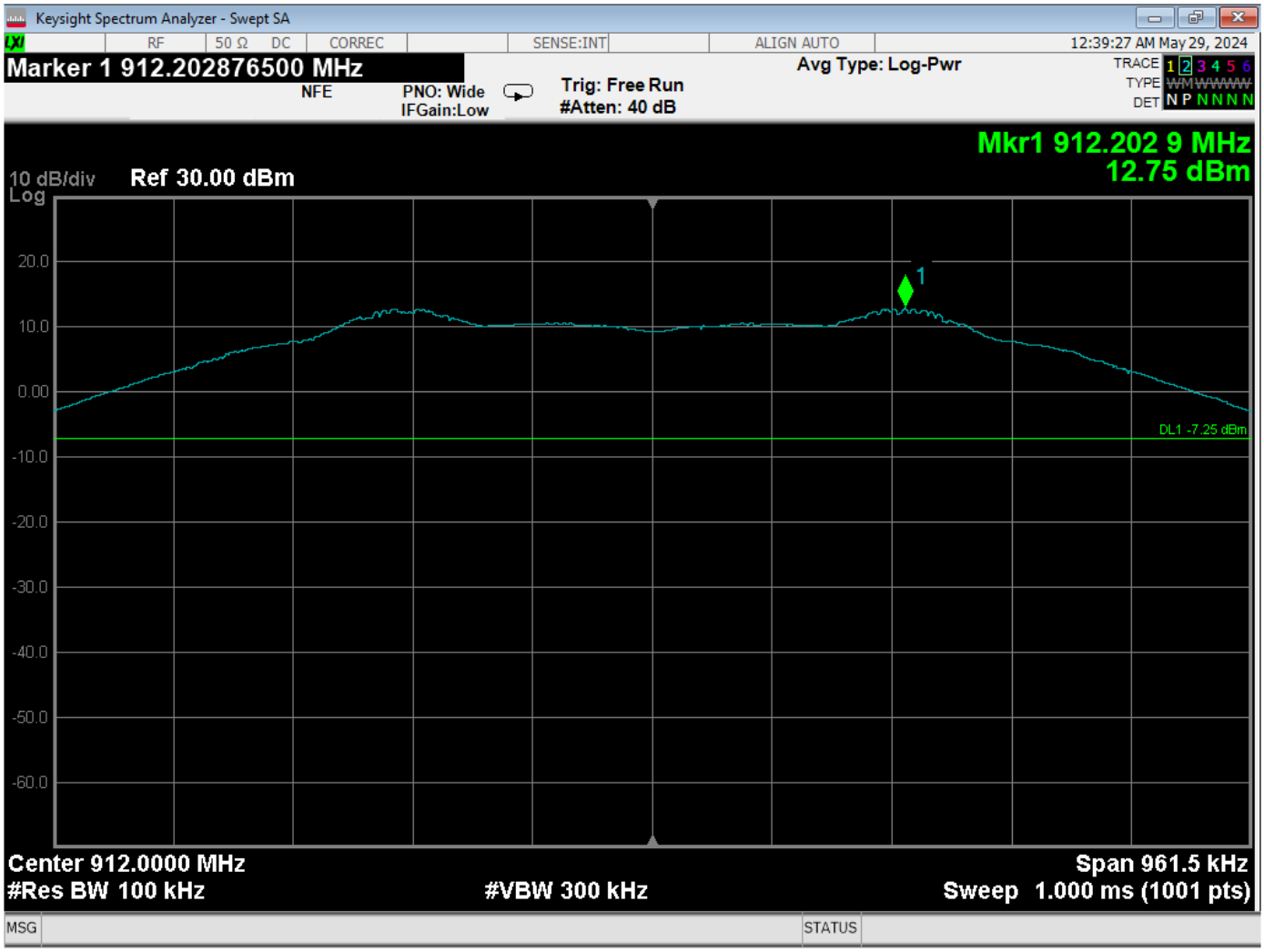
Spectral Density Output – Low Channel



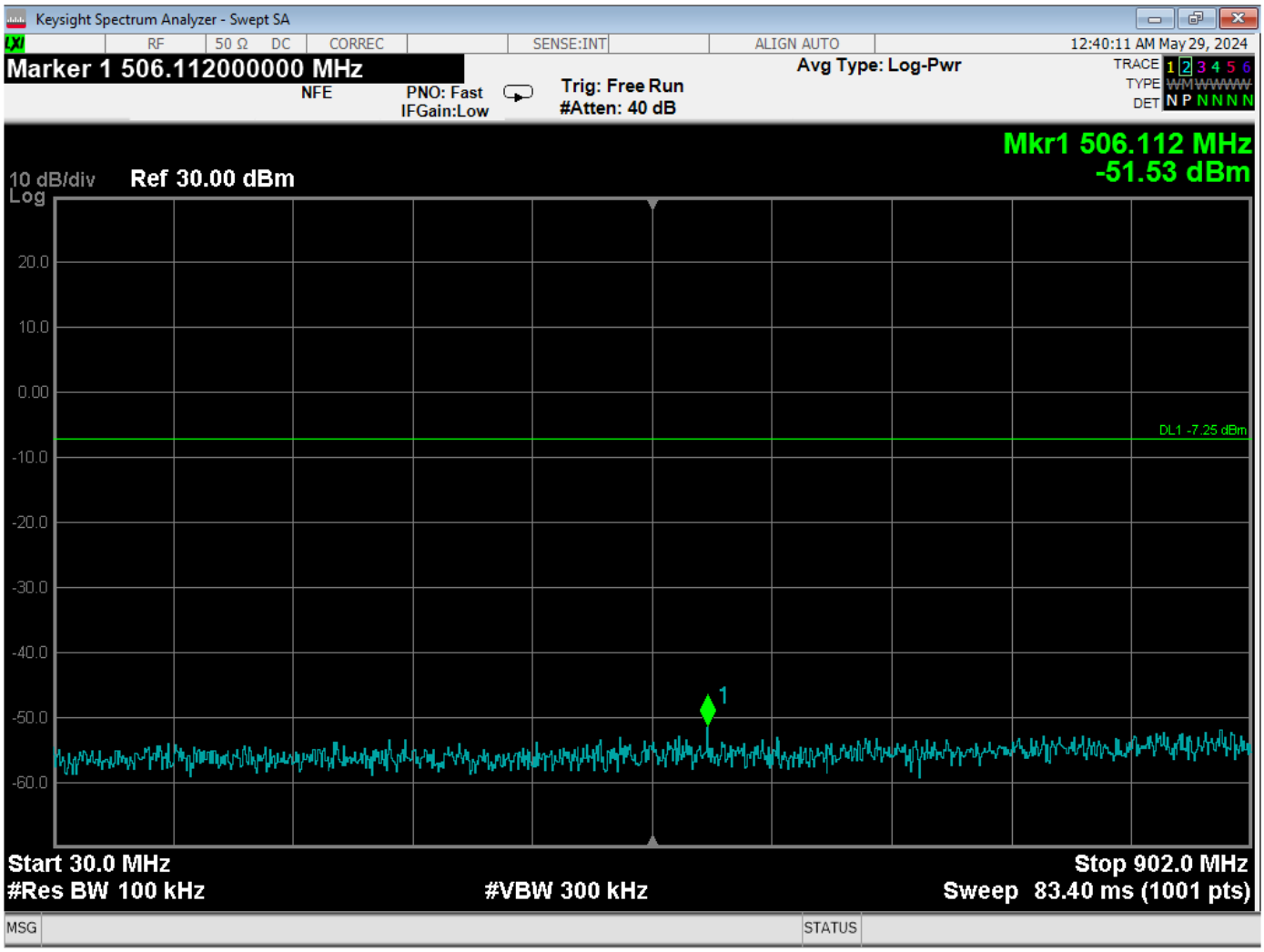
Spectral Density Output – High Channel

RF ANTENNA CONDUCTED

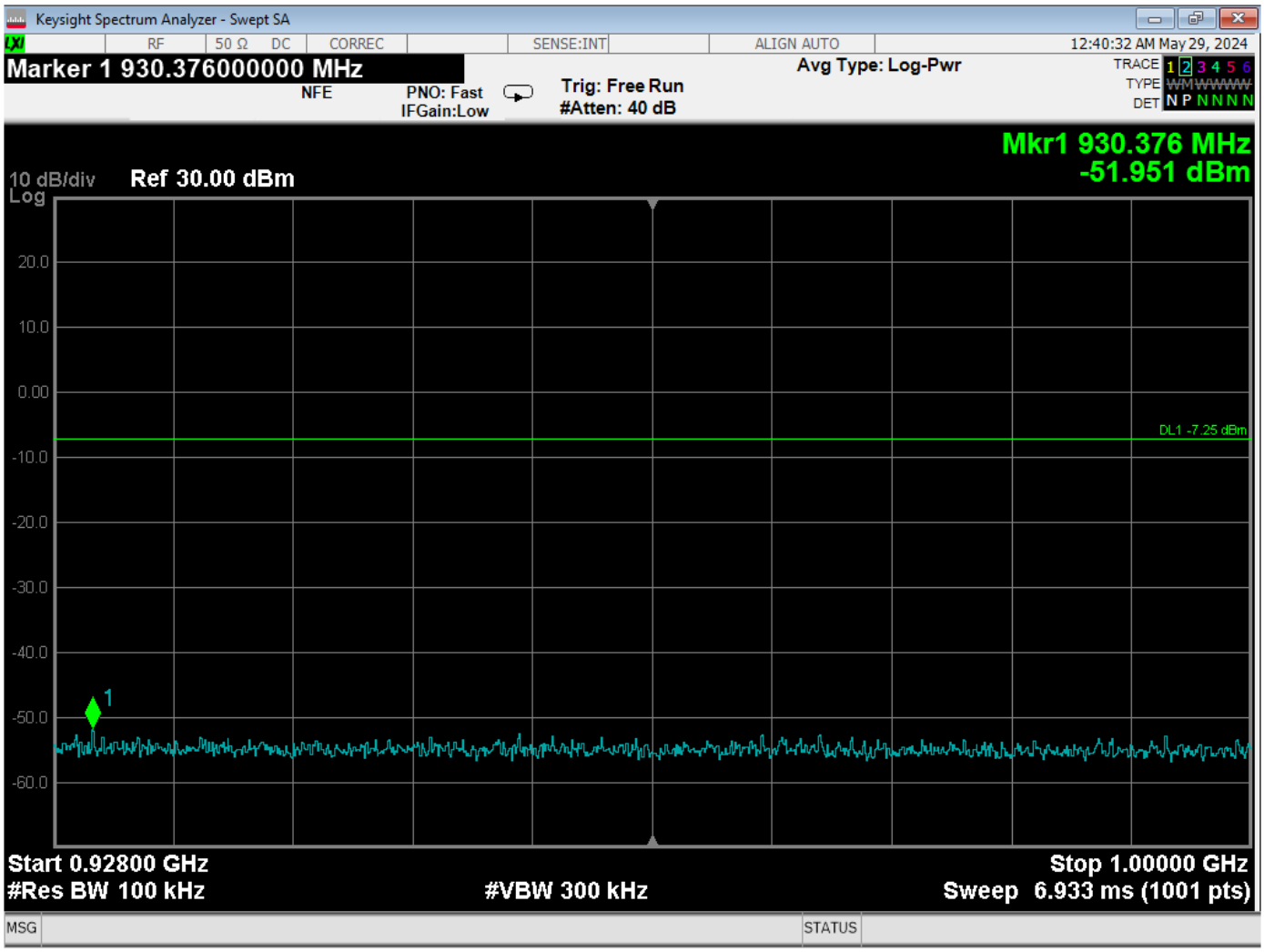
DATA SHEETS



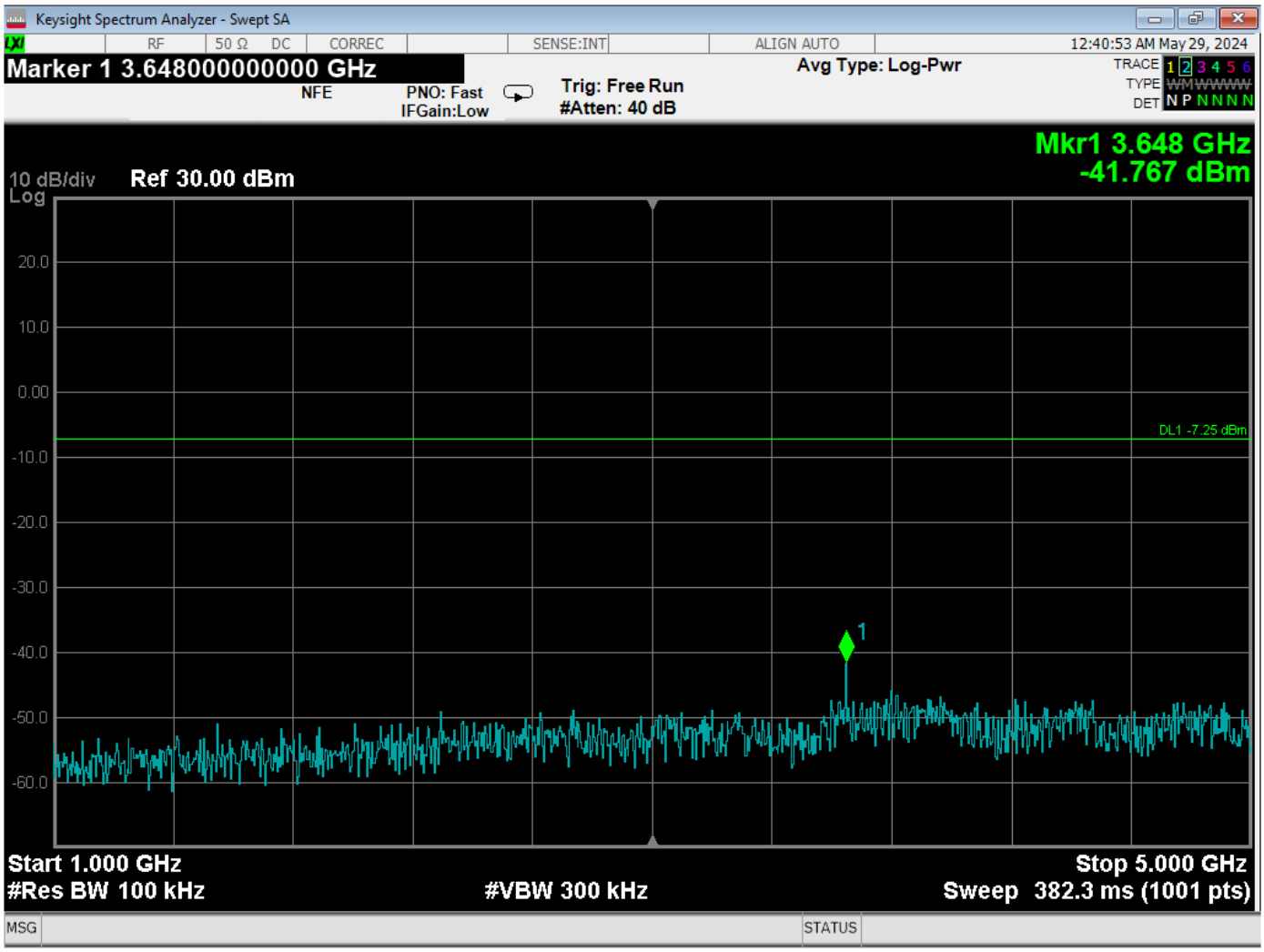
RF Antenna Conducted – Low Channel – Reference Level



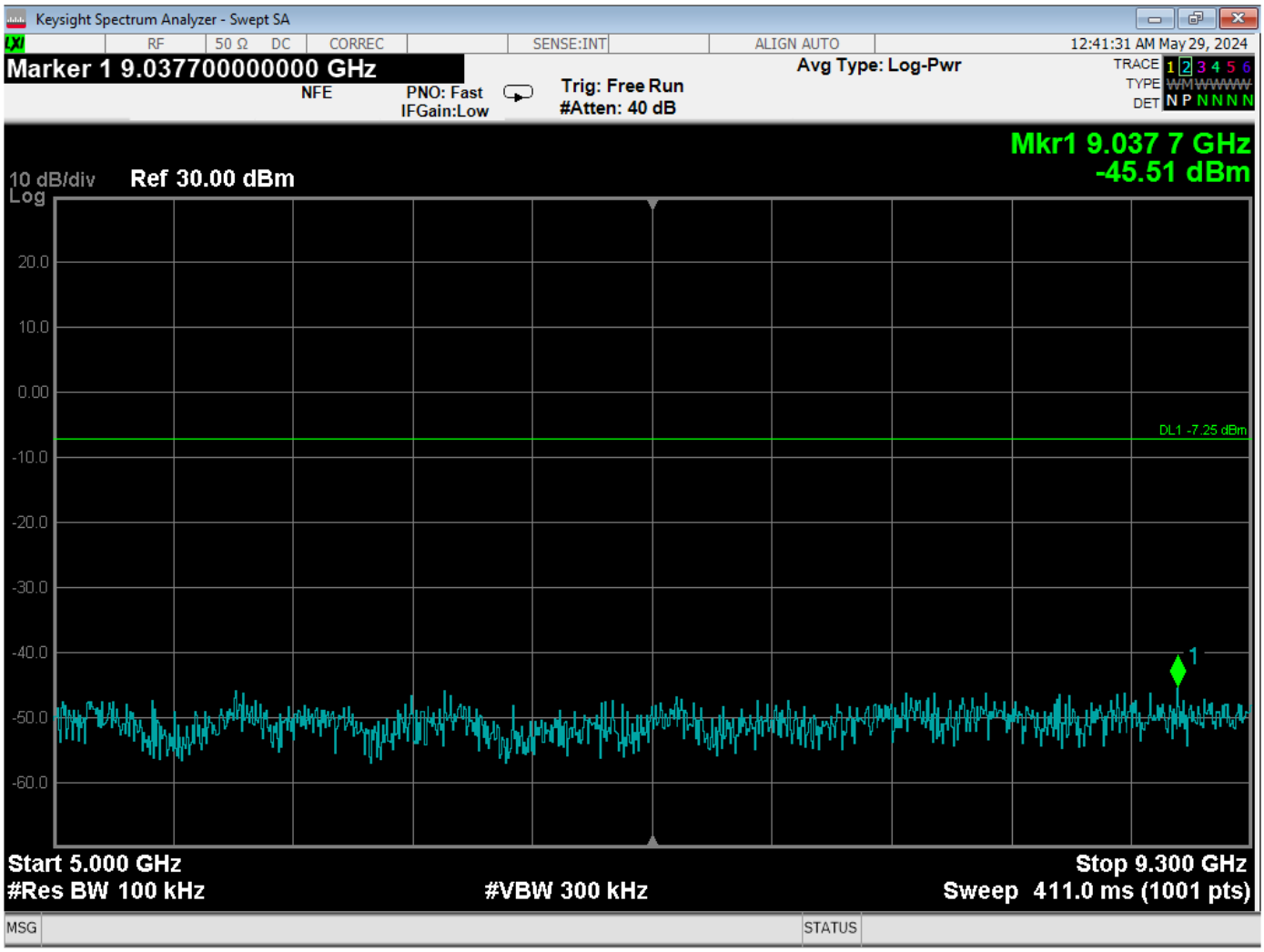
RF Antenna Conducted – Low Channel – 30 MHz to 902 MHz



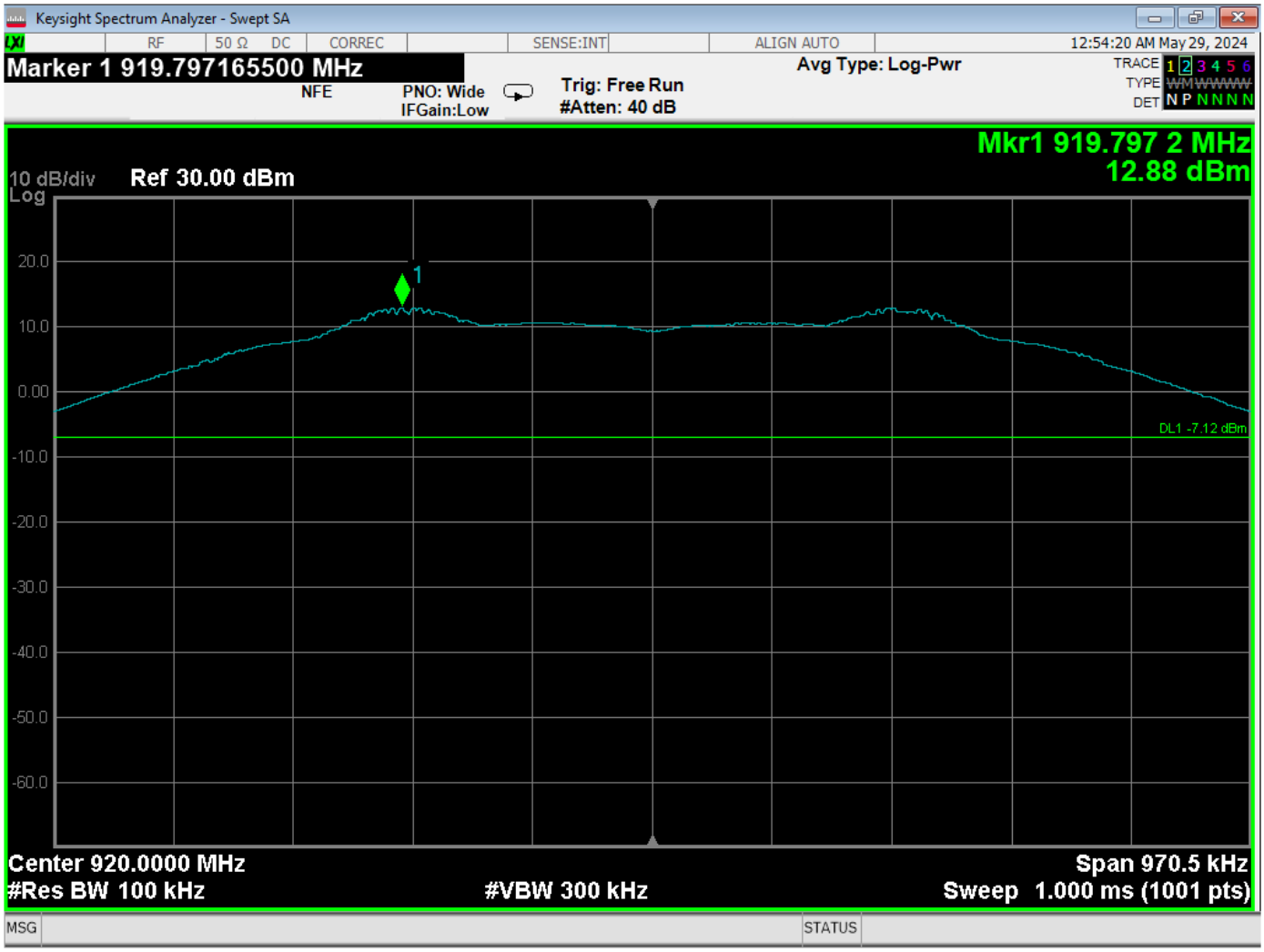
RF Antenna Conducted – Low Channel – 928 MHz to 1 GHz



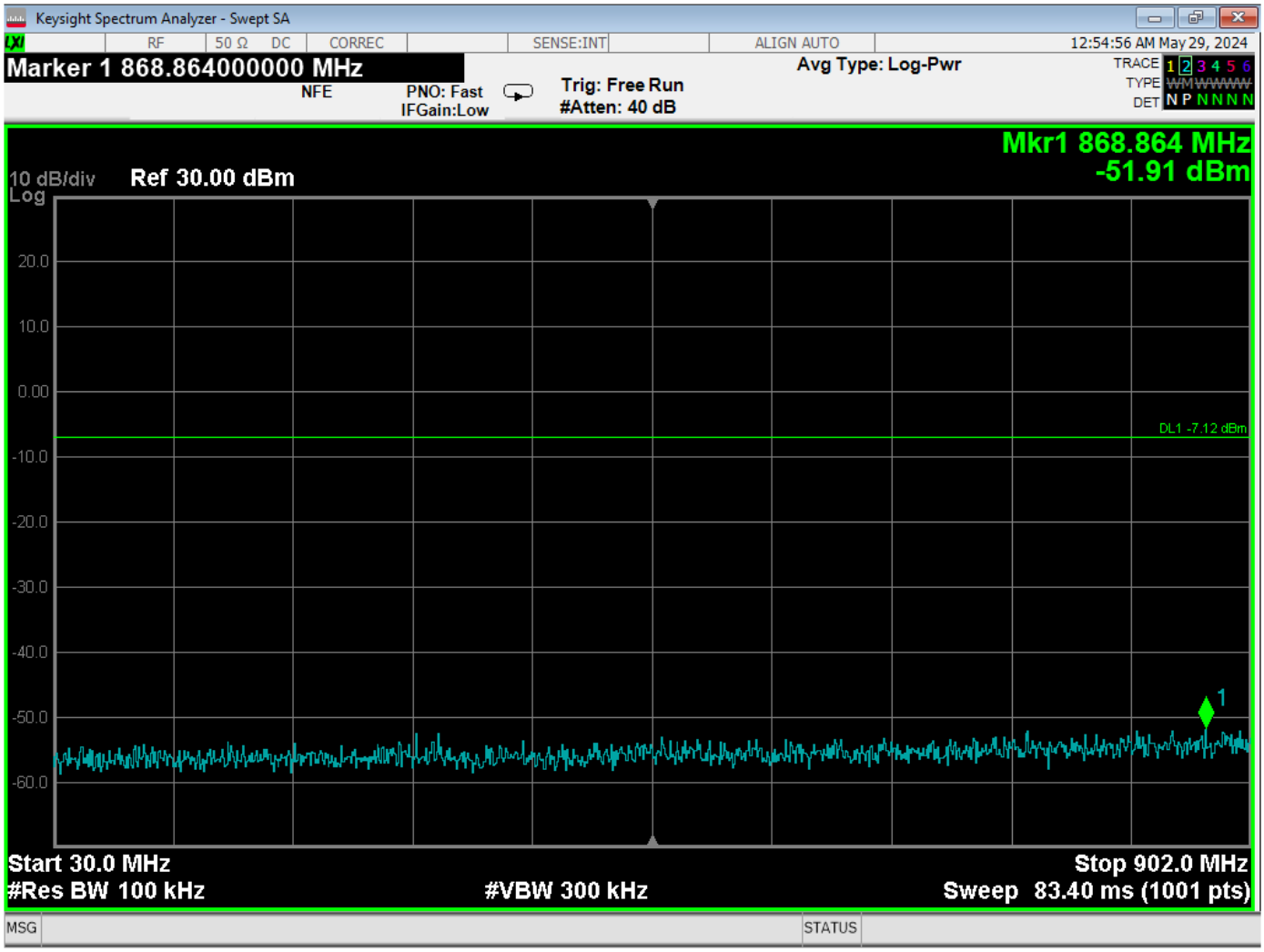
RF Antenna Conducted – Low Channel – 1 GHz to 5 GHz



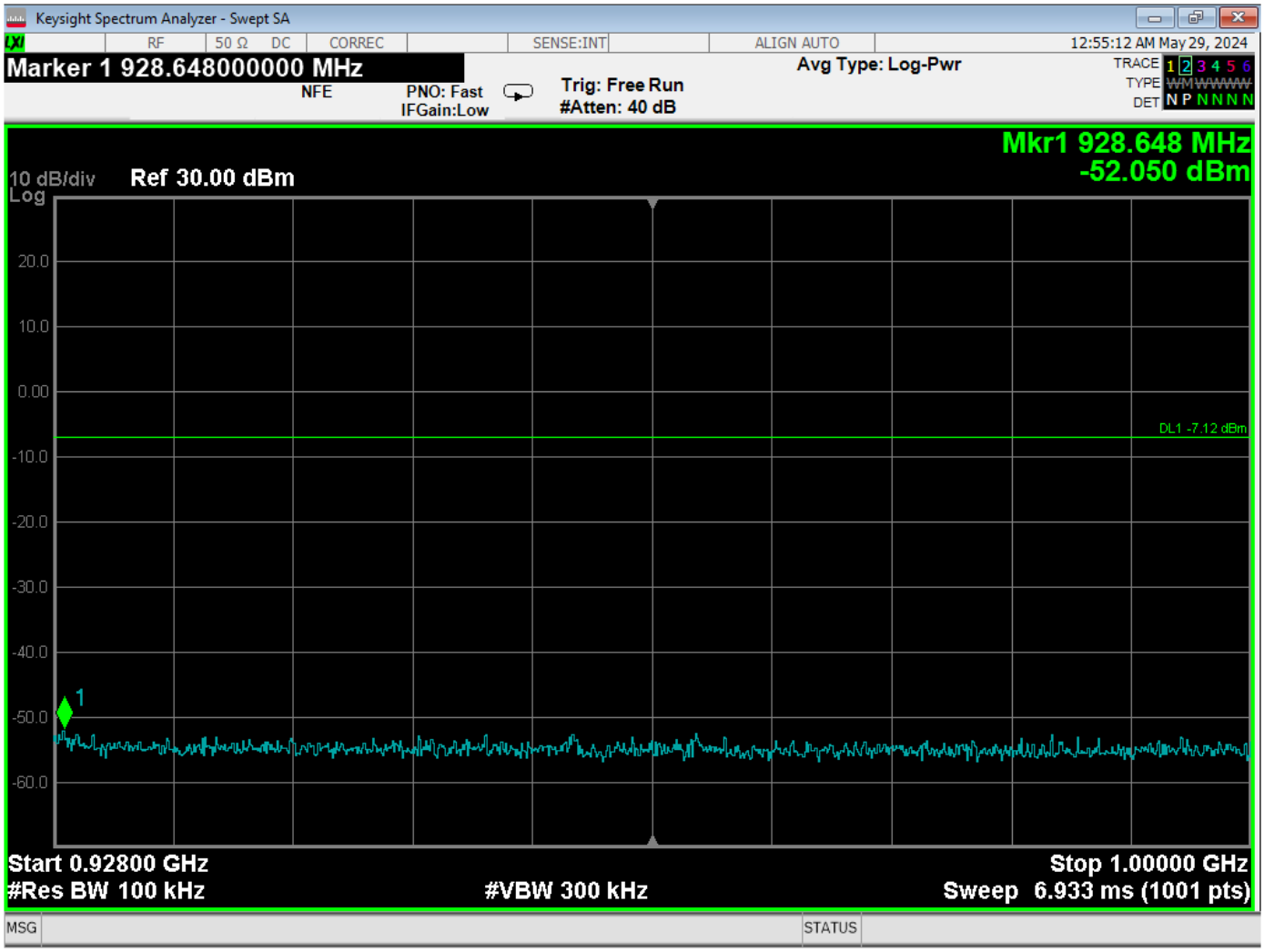
RF Antenna Conducted – Low Channel – 5 GHz to 9.3 GHz



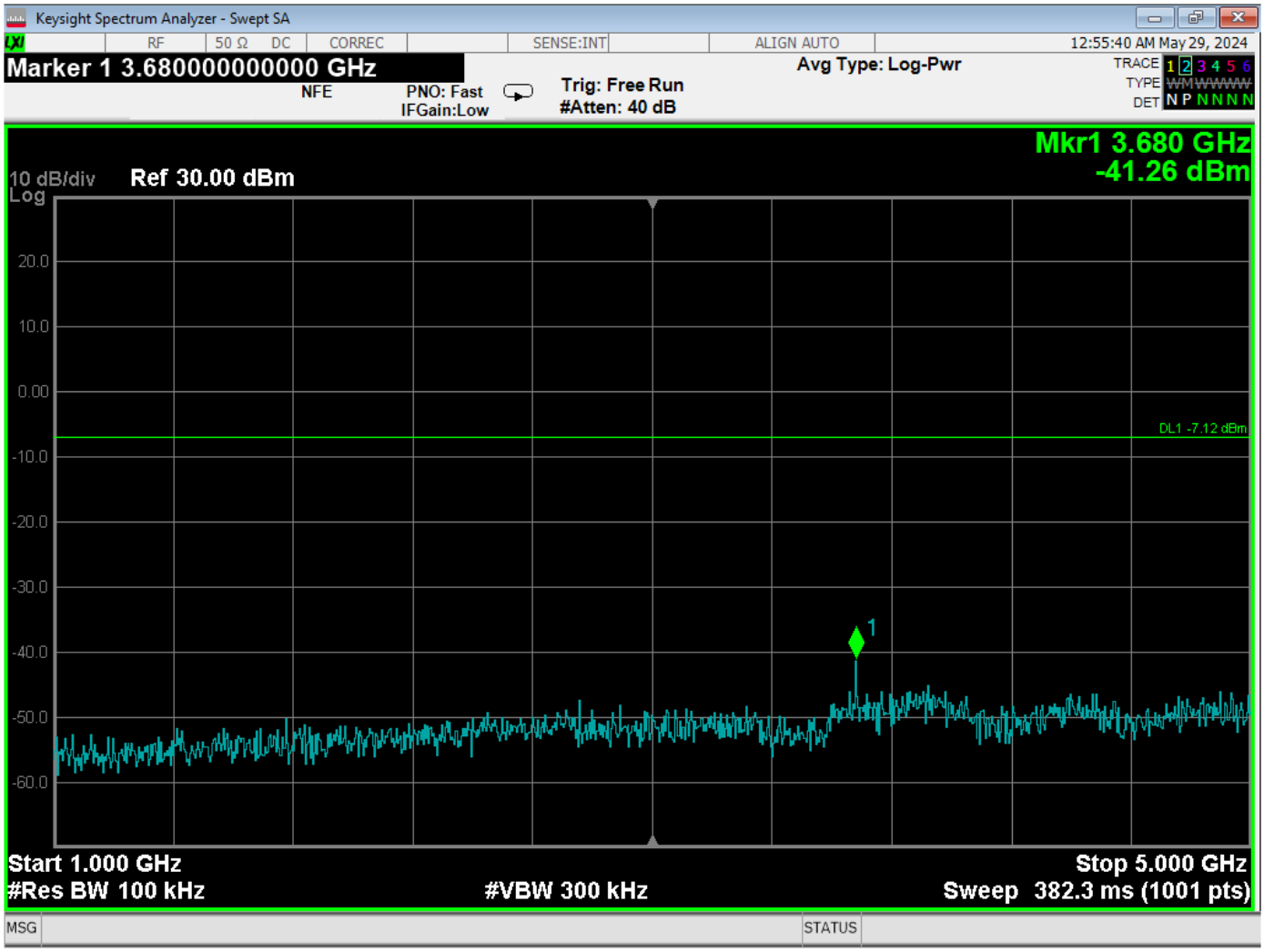
RF Antenna Conducted – High Channel – Reference Level



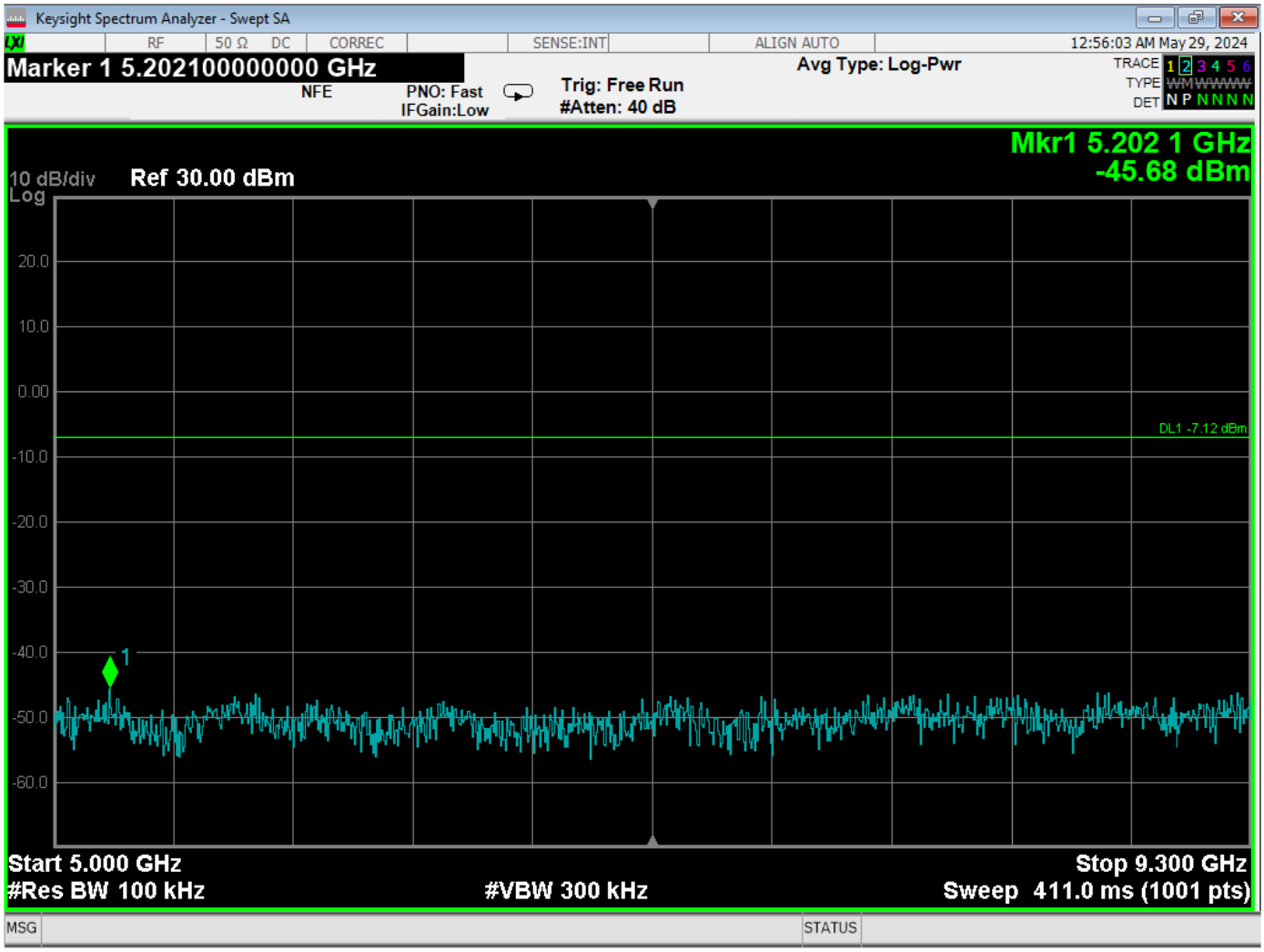
RF Antenna Conducted – High Channel – 30 MHz to 902 MHz



RF Antenna Conducted – High Channel – 928 MHz to 1 GHz



RF Antenna Conducted – High Channel – 1 GHz to 5 GHz



RF Antenna Conducted – High Channel – 5 GHz to 9.3 GHz

SPECTRUM BRANDS, INC.

Z-WAVE ELECTRONIC DEADBOLT

MODEL: 450126VHC

EMISSIONS IN NON-RESTRICTED BANDS

FREQUENCY (MHz)	LEVEL (dBm)	Limit* (dBm)	Margin (dB)
5202.10	-45.68	-7.12	-38.56
506.112	-51.53	-7.12	-44.41
868.864	-51.91	-7.12	-44.79

*Per ANSI C63.10 section 11.11.2, the channel found to contain the maximum level can be used to establish the reference level