Washington Laboratories, Ltd.

FCC & ISED CANADA CERTIFICATION TEST REPORT

for the

TX91503

FCC ID: YESTX91503

IC ID: 8985A-TX91503

REPORT# 16324-01 -01 REV 1

Prepared for:

Powercast Corporation

620 Alpha Drive

Pittsburgh, Pennsylvania 15238

Prepared By:

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4840 Winchester Blvd. Suite 5
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FCC & ISED Canada Certification Test Report

for the

Powercast Corporation

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FCC ID: YESTX91503

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RE-ISSUED

FEBRUARY 20, 2020
WLL REPORT# 16324-01 -01 REV 1

Prepared by:

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Manager, EMC & Wireless Services

Reviewed by:

Steven D. Koster
President

ABSTRACT

This report has been prepared on behalf of Powercast Corporation to support the attached Application for Equipment Authorization. The test report and application are submitted for a Digital Transmission System (DTS) Transmitter under Part 15.247 of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy and under RSS-247 of Innovation, Science and Economic Development Canada (ISED). This Certification Test Report documents the test configuration and test results for the Powercast Corporation TX91503.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 4840 Winchester Blvd., Suite 5, Frederick, MD 21703. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada OATS numbers are 3035A for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory.

The Powercast Corporation TX91503 complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 and Innovation, Science and Economic Development Canada (ISED) RSS-247.

Revision History	Description of Change	Date
Rev 0	Initial Release	December 18, 2019
Rev 1	Corrected typos, references to old address and incorrect reported field strength values	February 20, 2020

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1 INTRODUCTION

1.1 COMPLIANCE STATEMENT

The Powercast Corporation TX91503 complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.247 and ISED Canada RSS-247.

1.2 TEST SCOPE

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance with C63.10 "ANSI Procedures for Compliance Testing of Unlicensed Wireless Devices". The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 CONTRACT INFORMATION

Customer:	Powercast Corporation
Address	620 Alpha Drive
	Pittsburgh, Pennsylvania 15238
Purchase Order Number:	Visa - PO #2019-1029-201-R-02 for reference use only
Quotation Number:	71620

1.4 TEST DATES

Testing was performed on the following date(s): 12/02/2019 – 12/04/2019

1.5 TEST AND SUPPORT PERSONNEL

Washington Laboratories, LTD	John P. Repella
Customer Representative	John Macho

2 EQUIPMENT UNDER TEST

2.1 EUT IDENTIFICATION & DESCRIPTION

Table 1: Device Summary

Item	Powerspot
Manufacturer:	Powercast Corporation
FCC ID:	YESTX91503
ISED ID:	8985A-TX91503
Model:	TX91503
Serial Number of Unit Tested	Not available
FCC Rule Parts:	§15.247 Subpart C
ISED Rule Parts:	RSS-247
Frequency Range:	2400-2483.5
Maximum Output Power:	0.177mW (-7.51dBm)
Modulation:	FSK
Occupied Bandwidth (99%):	1.7353MHz
Occupied Bandwidth (6dB):	803.99kHz
FCC Emission Designator:	8K04G1D
ISED Emissions Designators:	1M7G1D
Keying:	Automatic, Manual
Type of Information:	BLE is used for a special mode, firmware upgrades over-the-air
Number of Channels:	40
Power Output Level	Mfg. stated (0dBm), Measured (-7.51dBm)
Highest TX Spurious Emission:	389.7uV/m @ 7.320 GHz
Highest RX Spurious Emission:	33.8 uV/m @ 675.64 MHz
Antenna Connector	None
Antenna Type	PCB trace antenna
Interface Cables:	Power Cable
Power Source & Voltage:	VDC cable from AC/DC power supply, 5VDC 1A

The Powercast TX91503 PowerSpot transmitter is specially designed to provide both power and data to end devices containing Powercast's power harvesting technology. The TX91503 contains a receiver that can hear when a harvesting device is in range, allowing the TX91503 to stop power transmission when no harvesting devices are around. The TX91503 can also be controlled by an app that can set periods of use. The TX91503 is housed in a durable plastic case with several mounting options. Operational power is provided to the DC power connector. The TX91503 includes a status LED to provide feedback on functional state.

2.2 TEST CONFIGURATION

The test firmware for BLE testing switches between 3 BLE channels (low 2.402GHz, mid 2.44GHz, high 2.48GHz) and the modulation can be turned on and off at each frequency.

2.3 TESTING ALGORITHM

The TX91503 was tested was programmed for FHSS operation by pressing a single button for test. In this mode, BLE transmit test mode, the LED will indicate the mode of operation. The BLE transmission frequency can be changed between the low, mid, and high channel via a short button press (<2 seconds). After a short button press, the LED will blink indicating the channel that is set (1 blink for low, 2 blinks for mid, 3 blinks for high). The transmission can be changed between modulated and un-modulated via a long button press (>4 seconds). After a long button press, the LED will blink indicating the channel that is set as indicted above, and then will be solid green for modulated and solid red for un-modulated. Worst cast emission levels are provided in the test results data.

2.4 TEST LOCATION

All measurements herein were performed at Washington Laboratories, Ltd. test center in Frederick, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada OATS number is 3035A for Washington Laboratories, Ltd. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

2.5 MEASUREMENTS

2.5.1 References

ANSI C63.2 (Jan-2016) Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 (Jan 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 (Jun 2013) American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

2.6 MEASUREMENT UNCERTAINTY

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a^2} + \frac{b^2}{div_b^2} + \frac{c^2}{div_c^2} + ...}$$

Where u_c = standard uncertainty

a, b, c,.. = individual uncertainty elements

$Div_{a, b, c}$ = the individual uncertainty element divisor based on the probability distribution

Divisor = 1.732 for rectangular distribution

Divisor = 2 for normal distribution

Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where U = expanded uncertainty

k = coverage factor

$k \leq 2$ for 95% coverage (ANSI/NCSL Z540-2 Annex G)

u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 2 below.

Table 2: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	±2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR32, CISPR14, FCC Part 15	±4.55 dB

3 TEST EQUIPMENT

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Table 3: Test Equipment List

Test Name:	**Conducted Emissions Voltage**	**Test Date:**	**12/04/2019**
Asset #	Manufacturer/Model	Description	Cal. Due
00528	AGILENT/ E4446A	Spectrum Analyzer	2/7/2020
00125	SOLAR/8028-50-TS-24-BNC	LISN	07/15/2020
00126	SOLAR/8028-50-TS-24-BNC	LISN	07/15/2020
Test Name:	**Radiated Emissions**	**Test Date:**	**12/04/2019**
Asset #	Manufacturer/Model	Description	Cal. Due
00528	AGILENT/ E4446A	Spectrum Analyzer	2/7/2020
00558	HP/8447D	Pre-amp	4/3/2020
00522	HP/8449B	Pre-amp	4/4/2020
00004	ARA/ DRG-118/A	Double Ridge Horn	12/14/2019
00849	AH SYSTEMS/ SAC-18G-16	Coaxial Cable	1/18/2020
00687	MEGAPHASE/ LMR400-N1N1-1080	Coaxial Cable	10/6/2020
00382	SUNOL/JB1	Hybrid Antenna	3/21/2020

4 TEST RESULTS

The Table Below shows the results of testing for compliance with a Digital Transmission System in accordance with FCC Part 15.247 10/2014 and RSS-247 Issue 1. Full test results are shown in subsequent sub-sections.

Table 4: Test Summary Table

Digital Transmission System (DTS) TX Test Summary			
FCC Rule Part	**IC Rule Part**	**Description**	**Result**
15.247(a) (2)	RSS-247 [5.2 (1)]	6dB Bandwidth	Pass
15.247 (b)(3)	RSS-247 [5.4 (4)]	Transmit Output Power	Pass
15.247 (e)	RSS-247 [5.2 (2)]	Power Spectral Density	Pass
15.247 (d)	RSS-247 [5.5]	Out-of-Band Emissions (Band Edge @ 20dB below)	Pass
15.205 15.209	RSS-Gen [8.9/8.10]	General Field Strength Limits (Restricted Bands & RE Limits)	Pass
15.207	RSS-Gen [8.8]	AC Conducted Emissions	Pass

4.1 OCCUPIED (DTS) BANDWIDTH:

Occupied bandwidth was performed by monitoring the output of the EUT antenna port with a spectrum analyzer corrected for any cable/attenuator losses.

For Direct Sequence Spread Spectrum Systems, FCC Part 15.247 requires the minimum 6 dB bandwidth be at least 500 kHz.

4.1.1 Measurement Method:

Tests were performed as specified in ANSI C63.10 section 11.8 "DTS bandwidth" Option 1 (11.8.1).

Table 5: Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth
100kHz	300kHz

At full modulation, the occupied bandwidth was measured as shown in Figures 1-3.

Table 6 provides a summary of the Occupied Bandwidth Results.

Table 6: Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel 2402MHz	760.35kHz	≥500kHz	Pass
Center Channel 2440MHz	803.99kHz	≥500kHz	Pass
High Channel 2480MHz	774.85kHz	≥500kHz	Pass

Figure 1: Occupied Bandwidth, Low Channel

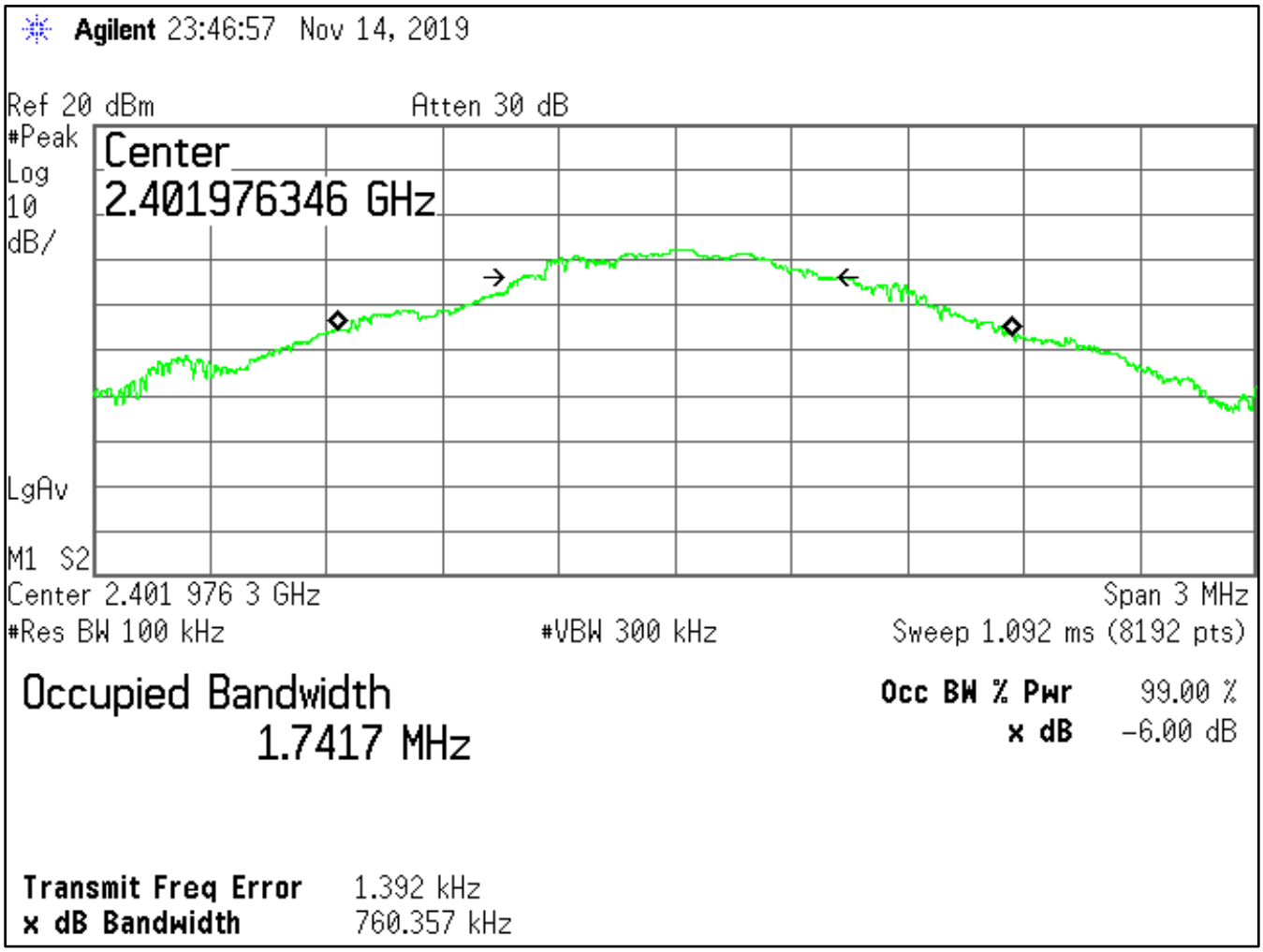


Figure 2: Occupied Bandwidth, Center Channel

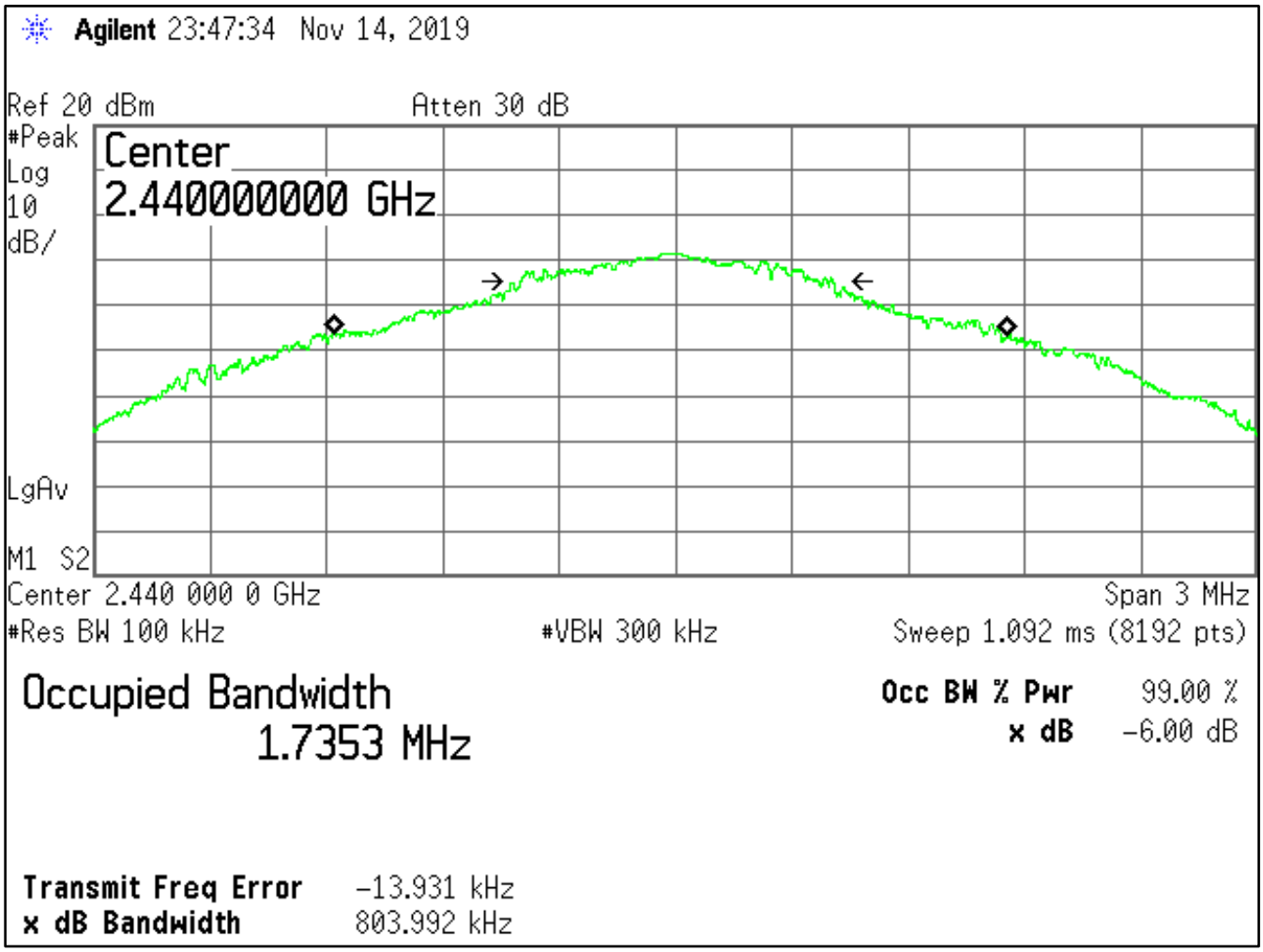
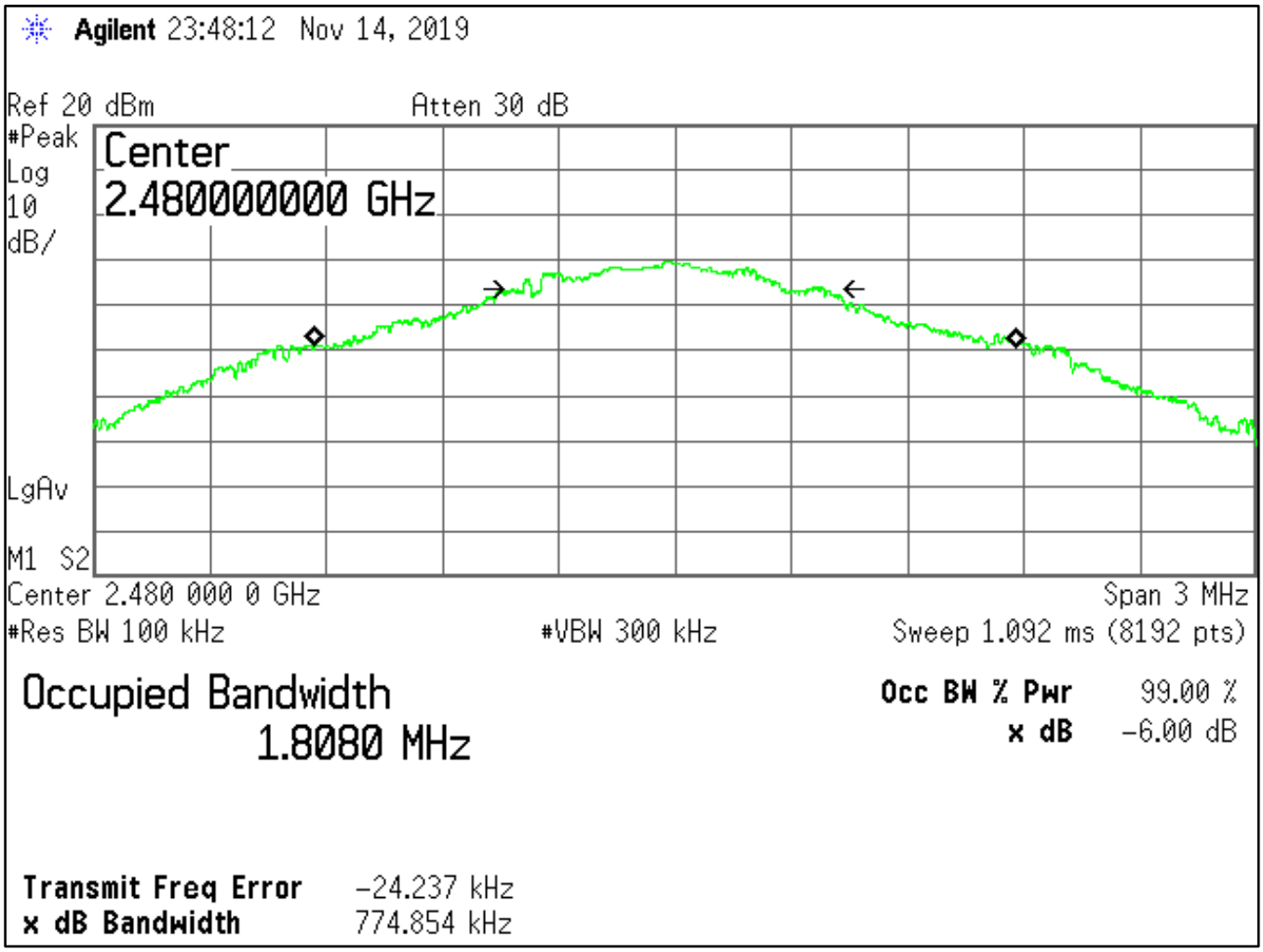


Figure 3: Occupied Bandwidth, High Channel



4.2 RF POWER OUTPUT

To measure the output power the unit was set to dwell on the low, high and middle channel with a continuous 100% duty cycle. Testing was performed using the method from C63.10 section 11.9.1.1 "RBW ⩾ DTS bandwidth" at the antenna port as follows:

a) Set the RBW ⩾ DTS bandwidth.
b) Set VBW ⩾ [3 × RBW].
c) Set span ⩾ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

4.2.1 Measurement Method:

ANSI C63.10 section "11.9.1 Maximum peak conducted output power" subsection "11.9.1.1 RBW > DTS bandwidth"

Table 7: Spectrum Analyzer Settings

Resolution Bandwidth	Video Bandwidth
1MHz	3MHz

Table 8: RF Power Output Summary

Frequency	Level (dBm)	Limit (dBm)	Pass/Fail
Low Channel: 2402MHz	-7.51dBm	30 dBm	Pass
Center Channel: 2440MHz	-8.32dBm	30 dBm	Pass
High Channel: 2480MHz	-10.31dBm	30 dBm	Pass

Figure 4: RF Peak Power, Low Channel

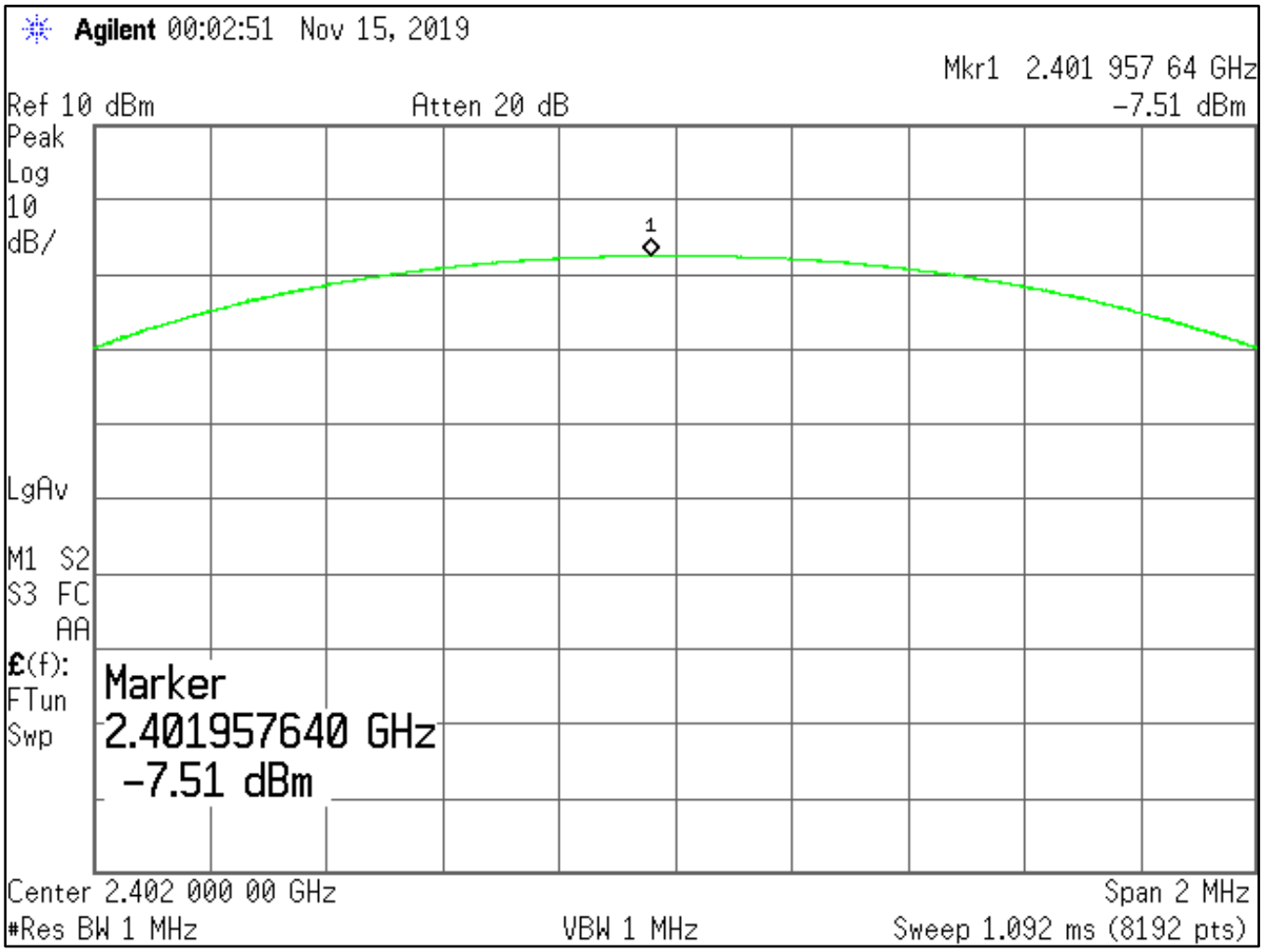


Figure 5: RF Peak Power, Mid Channel

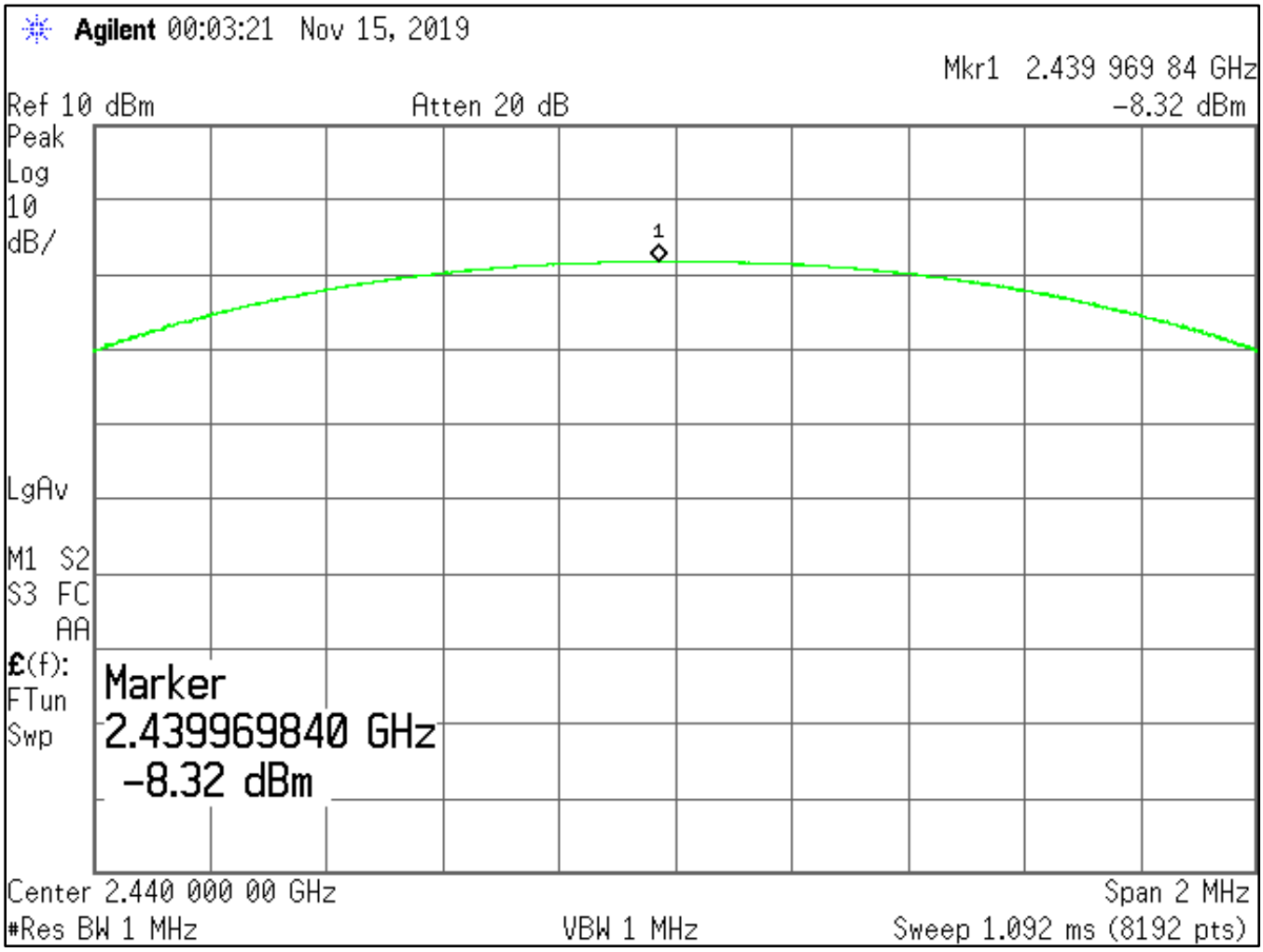
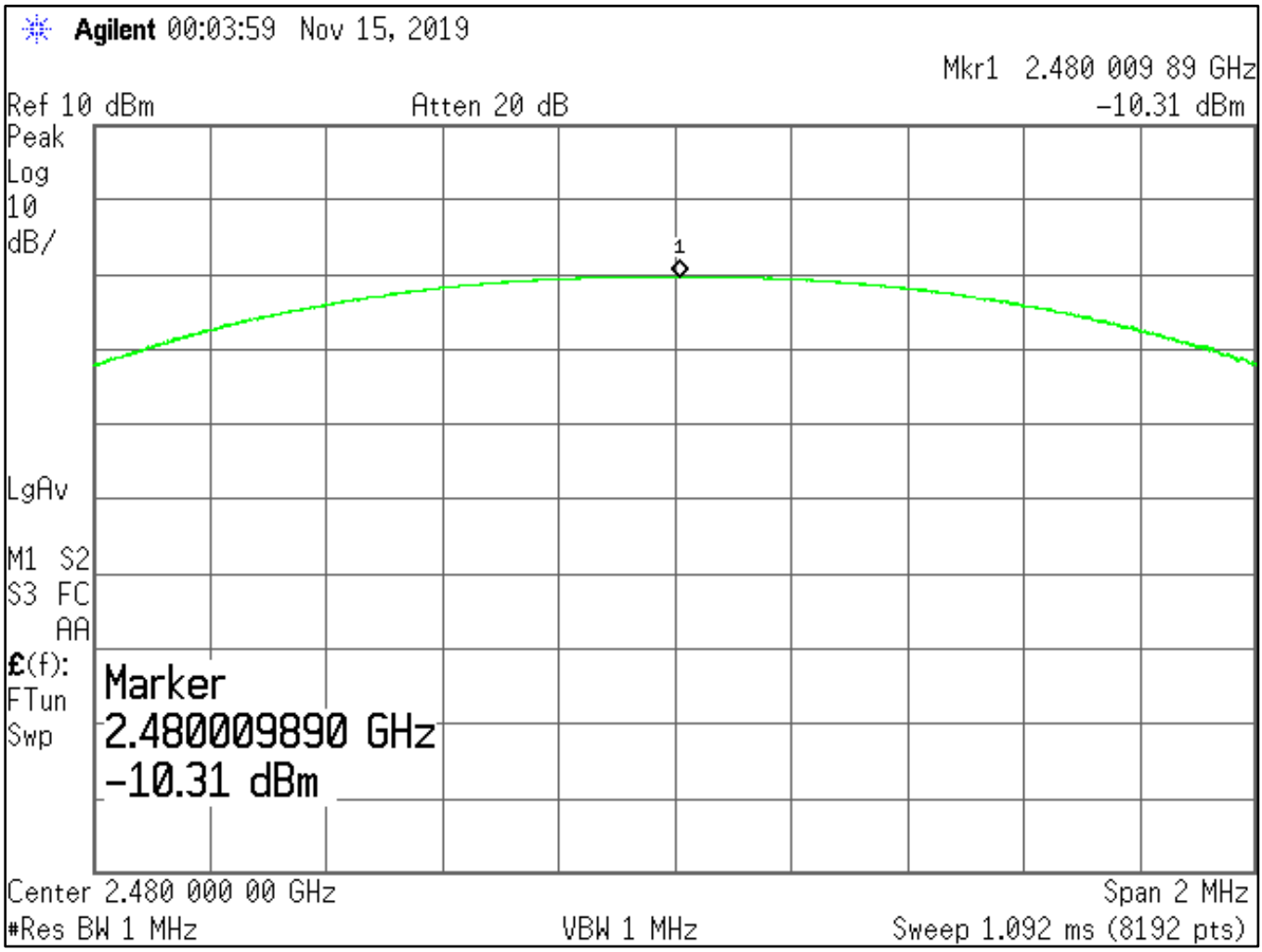


Figure 6: RF Peak Power, High Channel



4.3 POWER SPECTRAL DENSITY

Measurements for power spectral density were taken at the antenna port in accordance with ANSI C63.10. The spectrum analyzer was set to peak detect mode with a RBW of 3kHz, VBW of 10kHz across a span 1.5X the DTS bandwidth using an auto sweep time.

4.3.1 Measurement Method:

ANSI C63.10 SECTION 11.10 "Maximum power spectral density level in the fundamental emission subsection 11.10.2 "Method PKPSD (peak PSD)"

The highest level detected across any 3 kHz band for continuous transmission was then recorded and compared to the limit of 8dBm. The following table and plots give the results for power spectral density testing.

Table 9: Power Spectral Density

Frequency	Peak Level (dBm)	Limit (dBm)	Pass/Fail
Low Channel: 2402MHz	-20.84	8	Pass
Center Channel: 2440MHz	-20.10	8	Pass
High Channel: 2480MHz	-22.85	8	Pass

Figure 7: Power Spectral Density, Low Channel

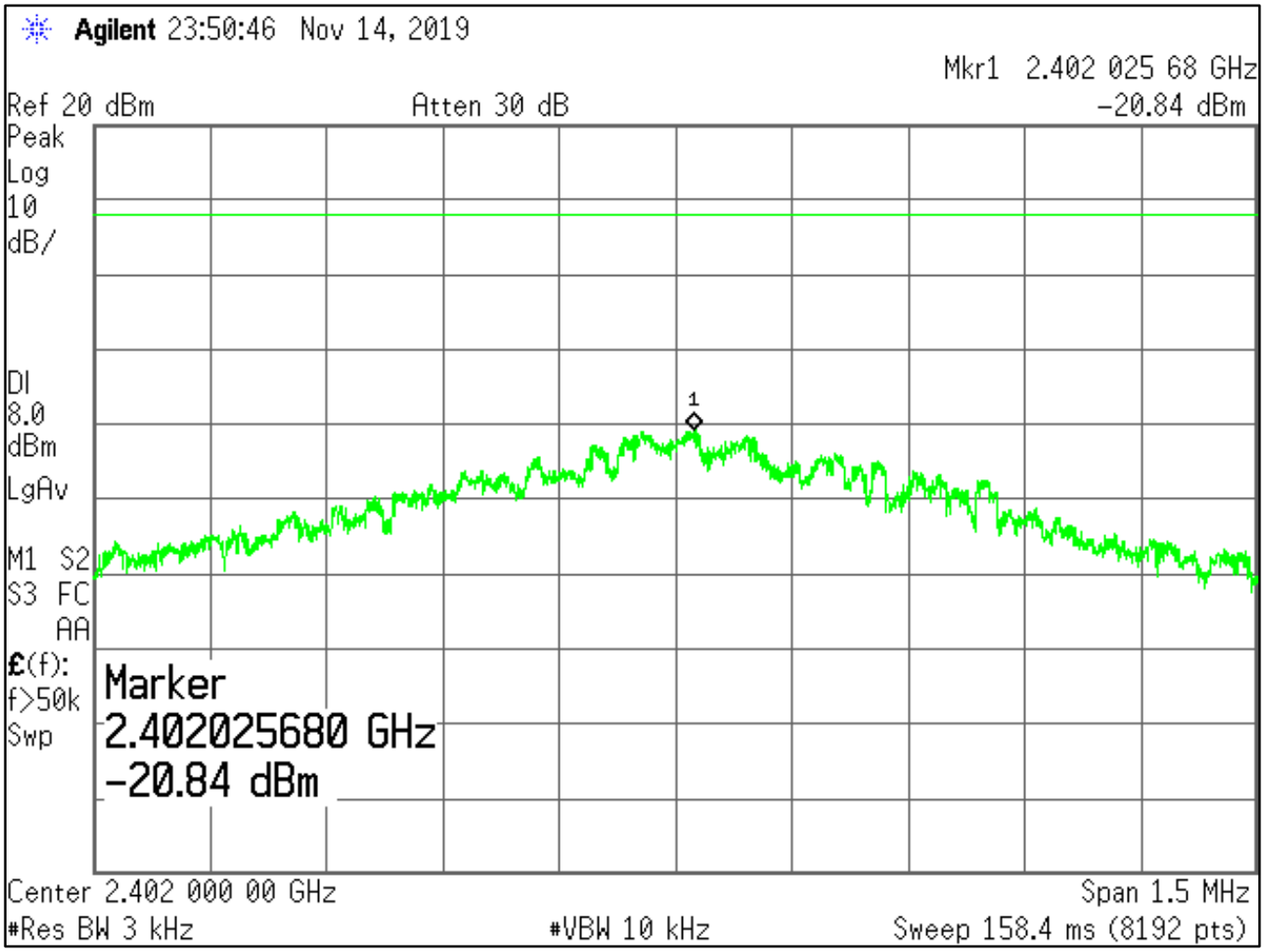


Figure 8: Power Spectral Density, Mid Channel

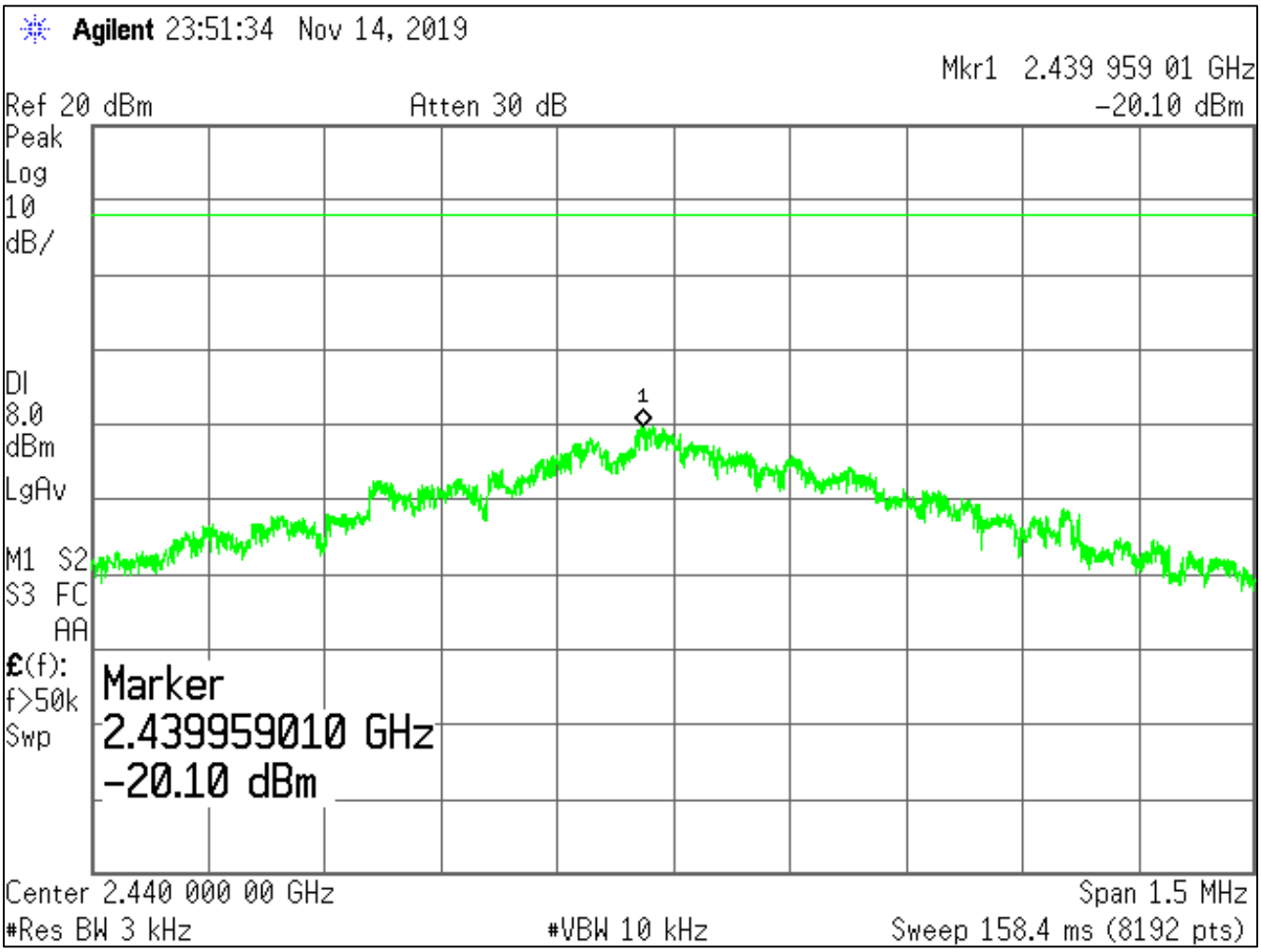


Figure 9: Power Spectral Density, High Channel

4.4 CONDUCTED SPURIOUS EMISSIONS COMPLIANCE

The EUT must comply with requirements for spurious emissions. Per §15.247(d) all spurious emissions in any 100 kHz bandwidth outside the frequency band in which the spread spectrum device is operating shall be attenuated 20 dB below the highest power level in a 100 kHz bandwidth within the band containing the highest level of the desired power.

Per ANSI C63.10 section 11.11 "Emissions in non-restricted frequency bands" this test may be performed in an antenna port conducted manner. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 300 kHz. The amplitude of the EUT carrier frequency was measured to determine the emissions limit (20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier.

As per ANSI C63.10 section 11.11.2 the center channel has the highest peak in a 100 kHz bandwidth and the limit for all channels was based on this level.

The following table shows the spurious emissions data.

Emissions were investigated to 10X fundamental frequency.

Band edge compliance was investigated by measuring the peak output power at the band edges using the Marker-Delta function of the specturm analyzer.

4.4.1 Test Summary

The EUT complied with the requirements for spurious emissions at the antenna port.

Figure 10: Low Channel Conducted Spurious Plot 1

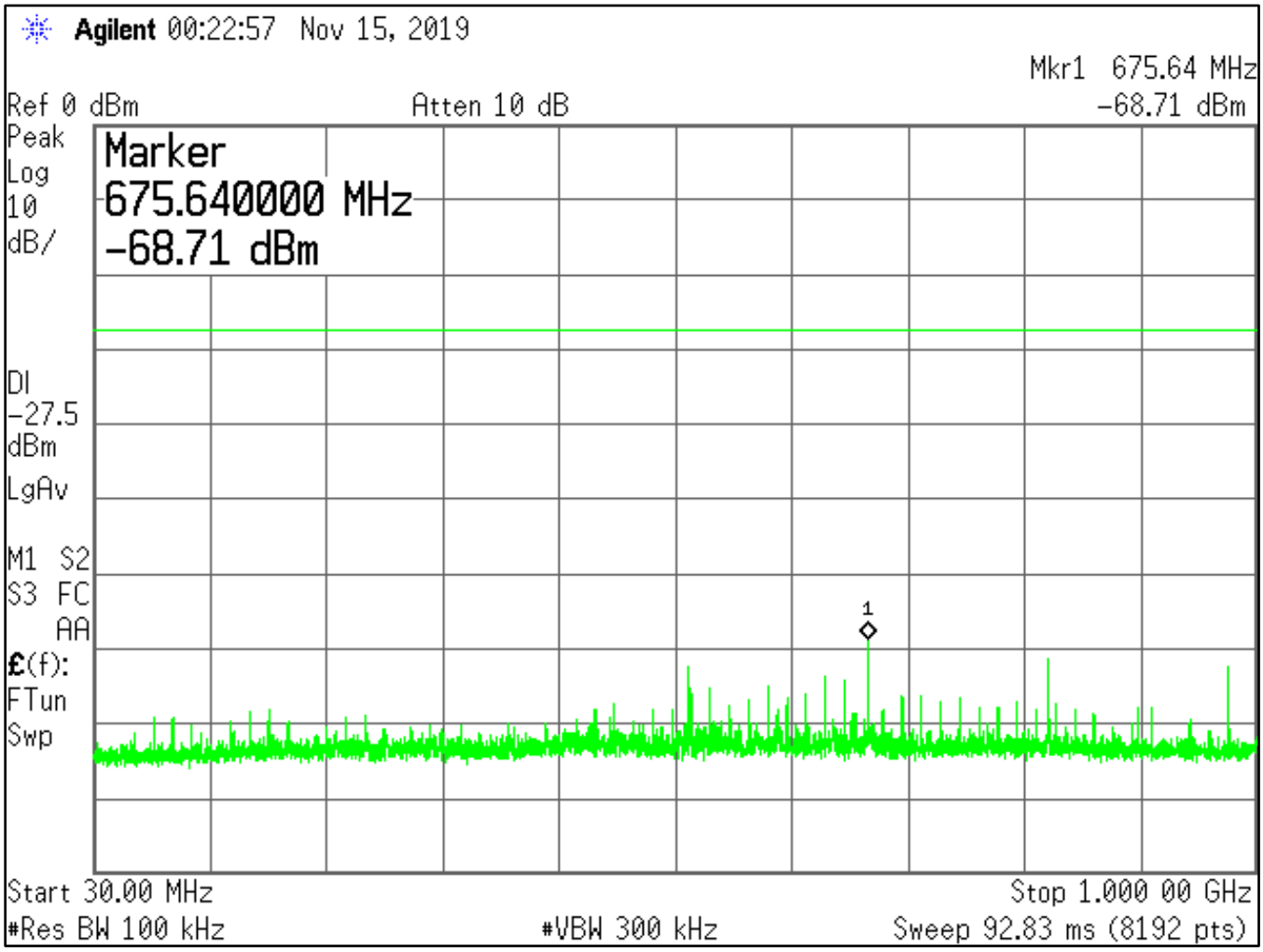


Figure 11: Low Channel Conducted Spurious Plot 2

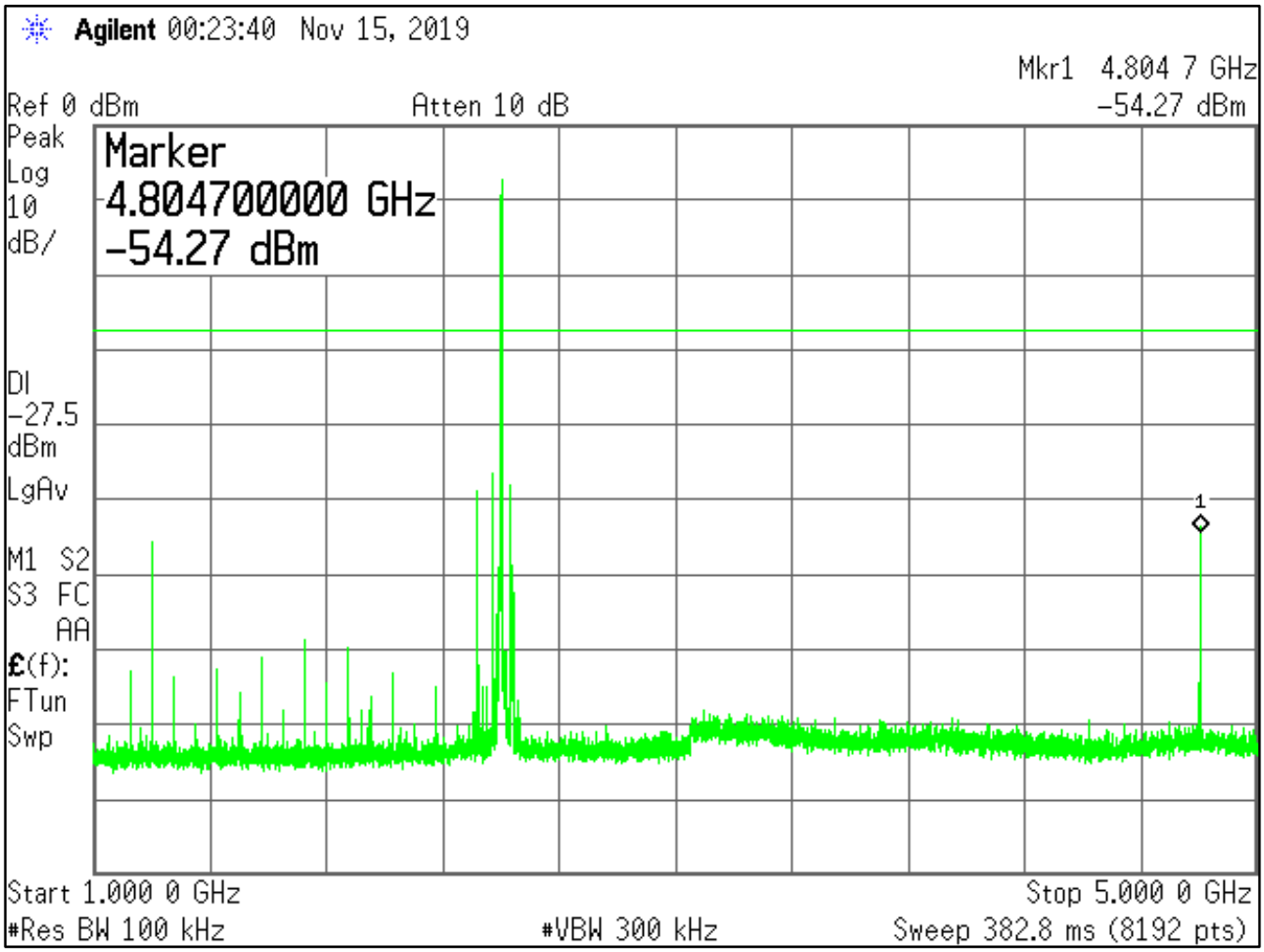


Figure 12: Low Channel Conducted Spurious Plot 3

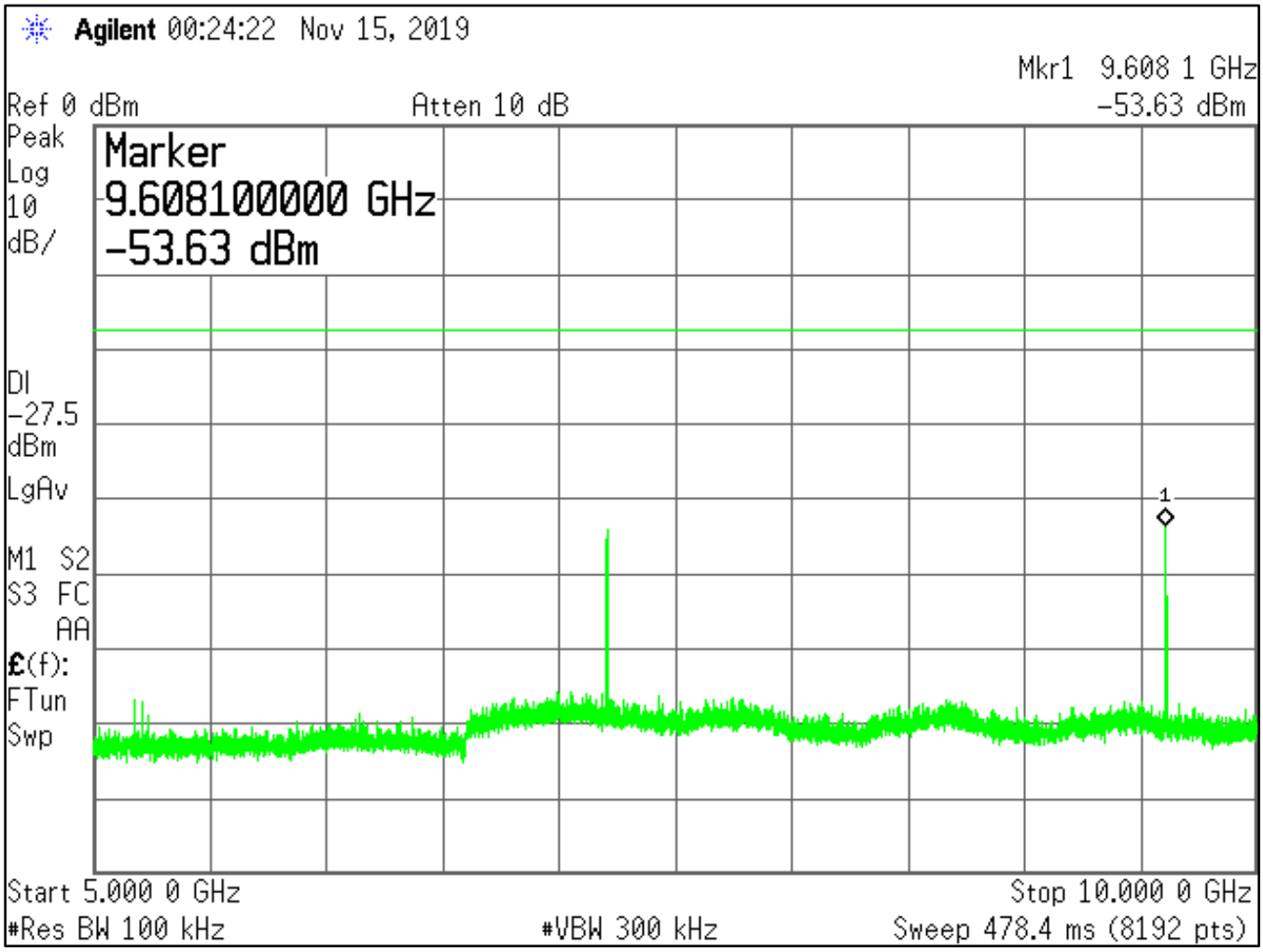


Figure 13: Low Channel Conducted Spurious Plot 4

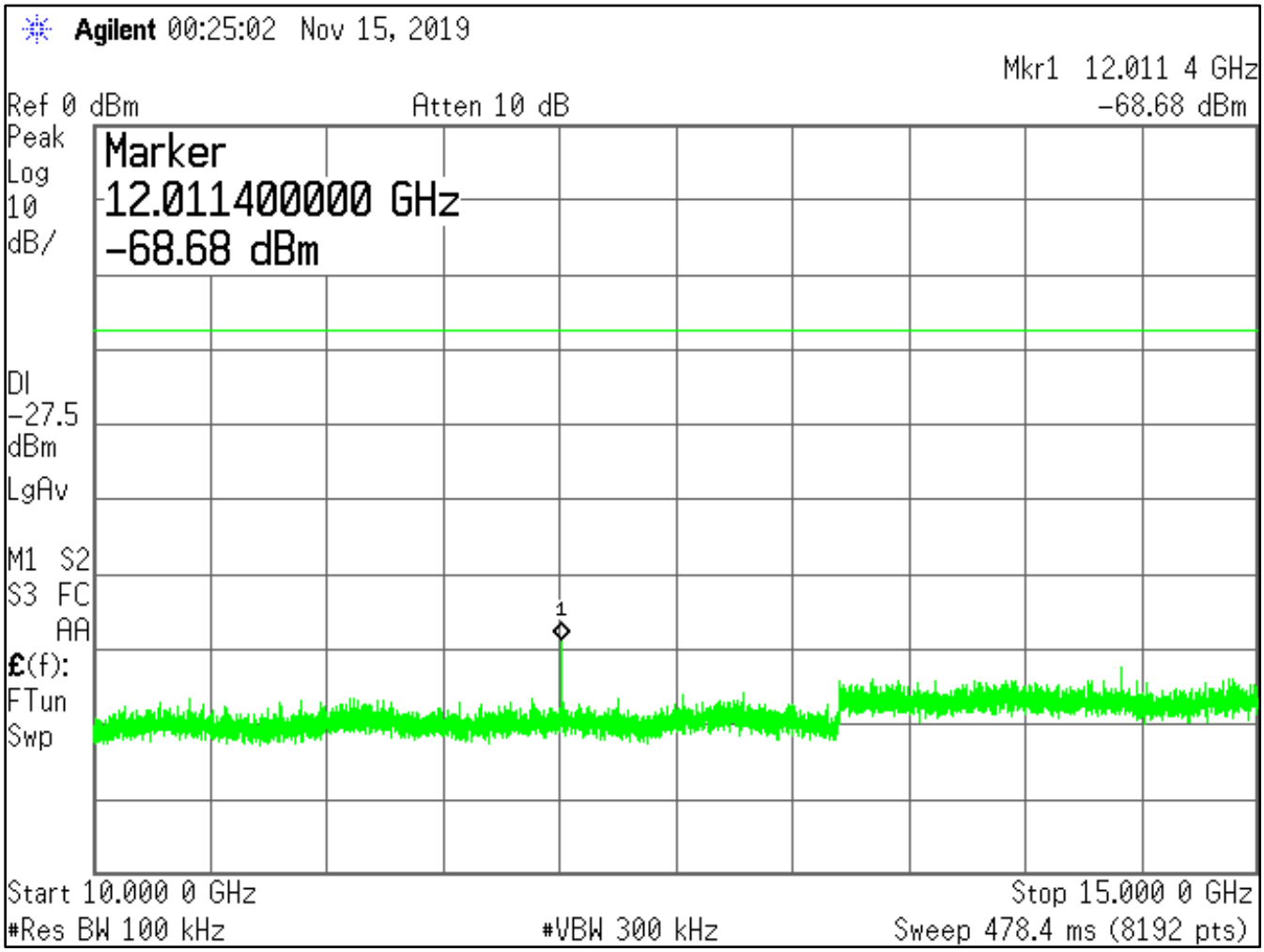


Figure 14: Low Channel Conducted Spurious Plot 5

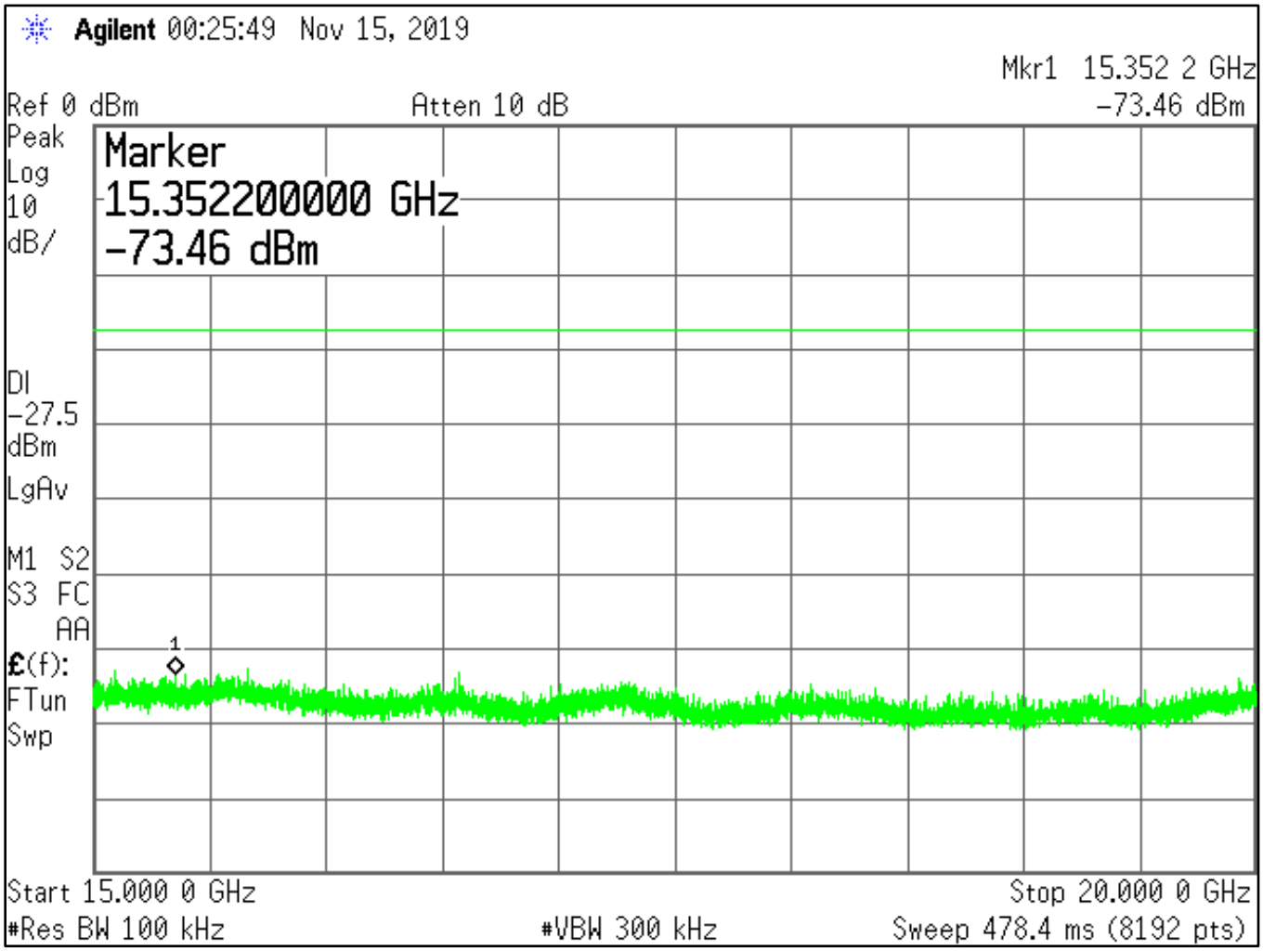


Figure 15: Low Channel Conducted Spurious Plot 6

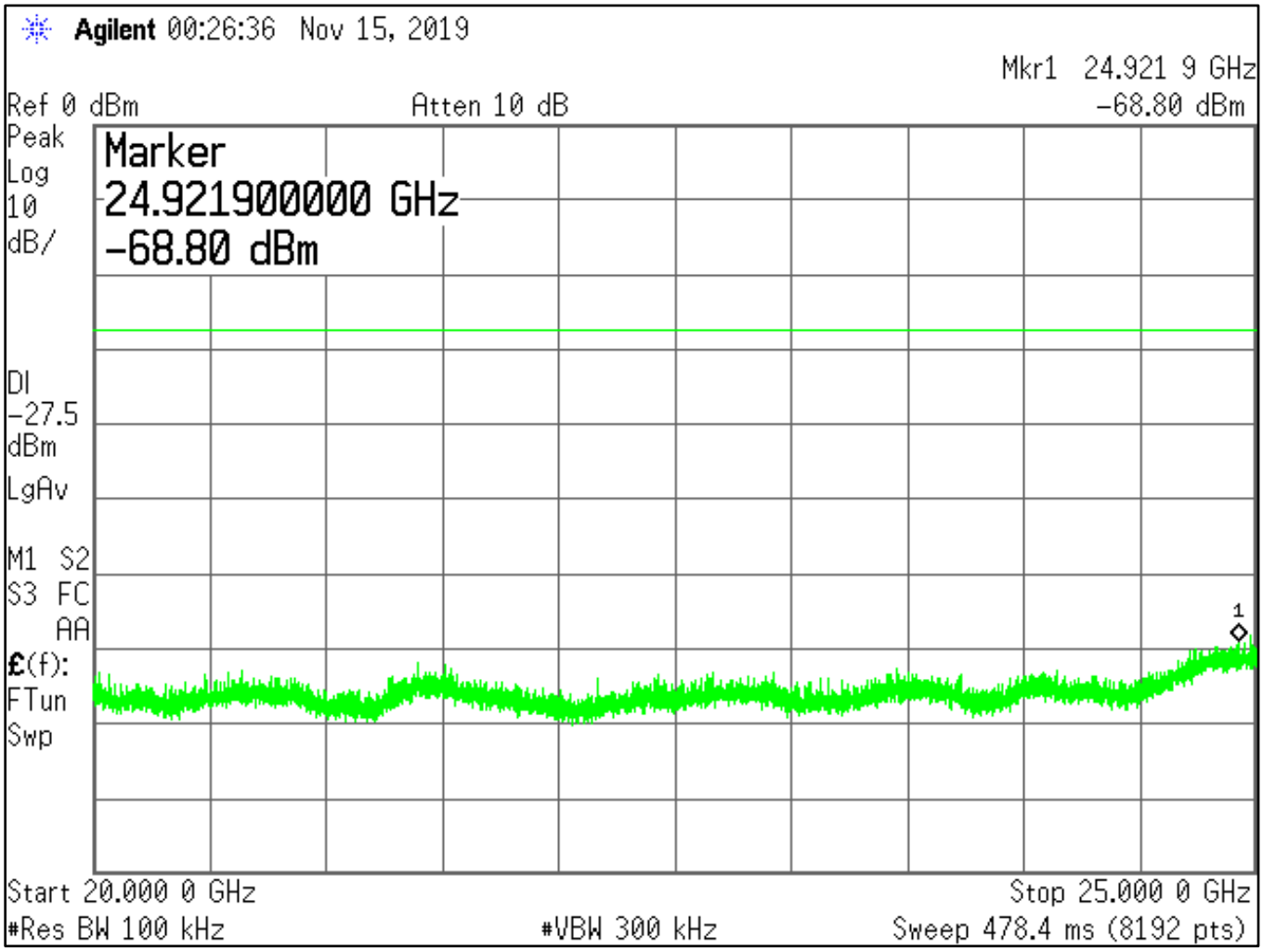


Figure 16: Low Channel, Band Edge Plot

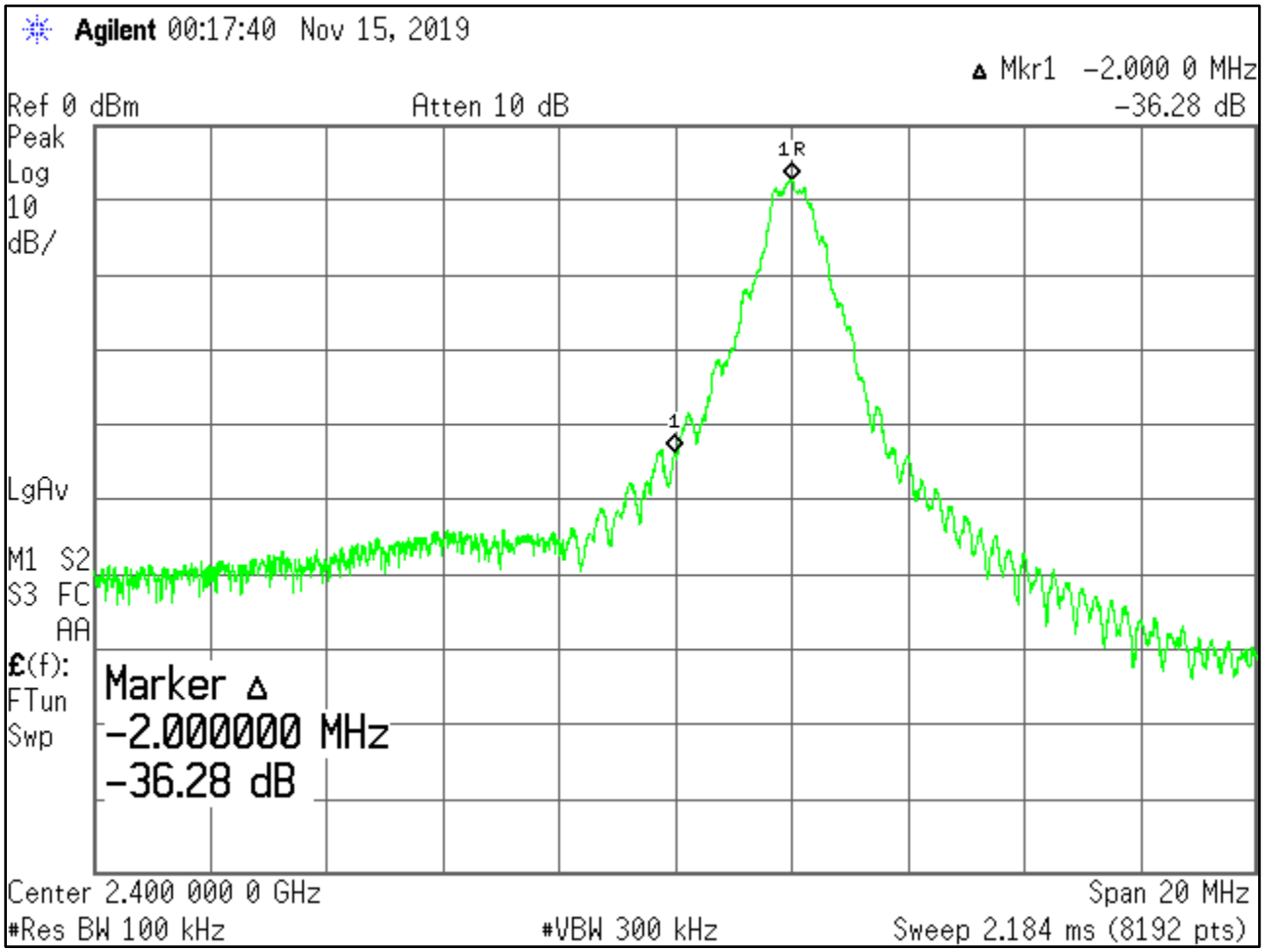


Figure 17: Center Channel Conducted Spurious Plot 1

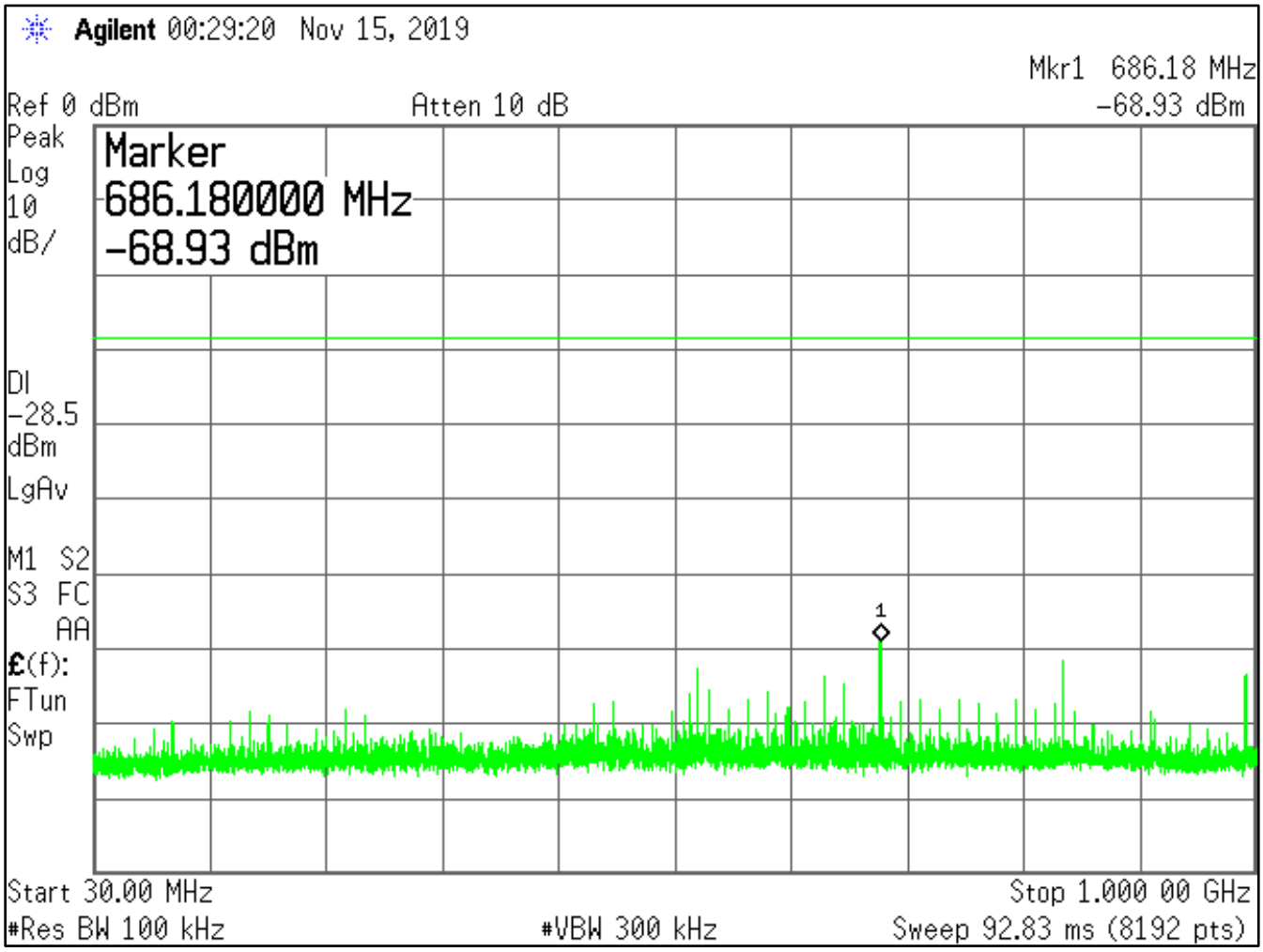


Figure 18: Center Channel Conducted Spurious Plot 2

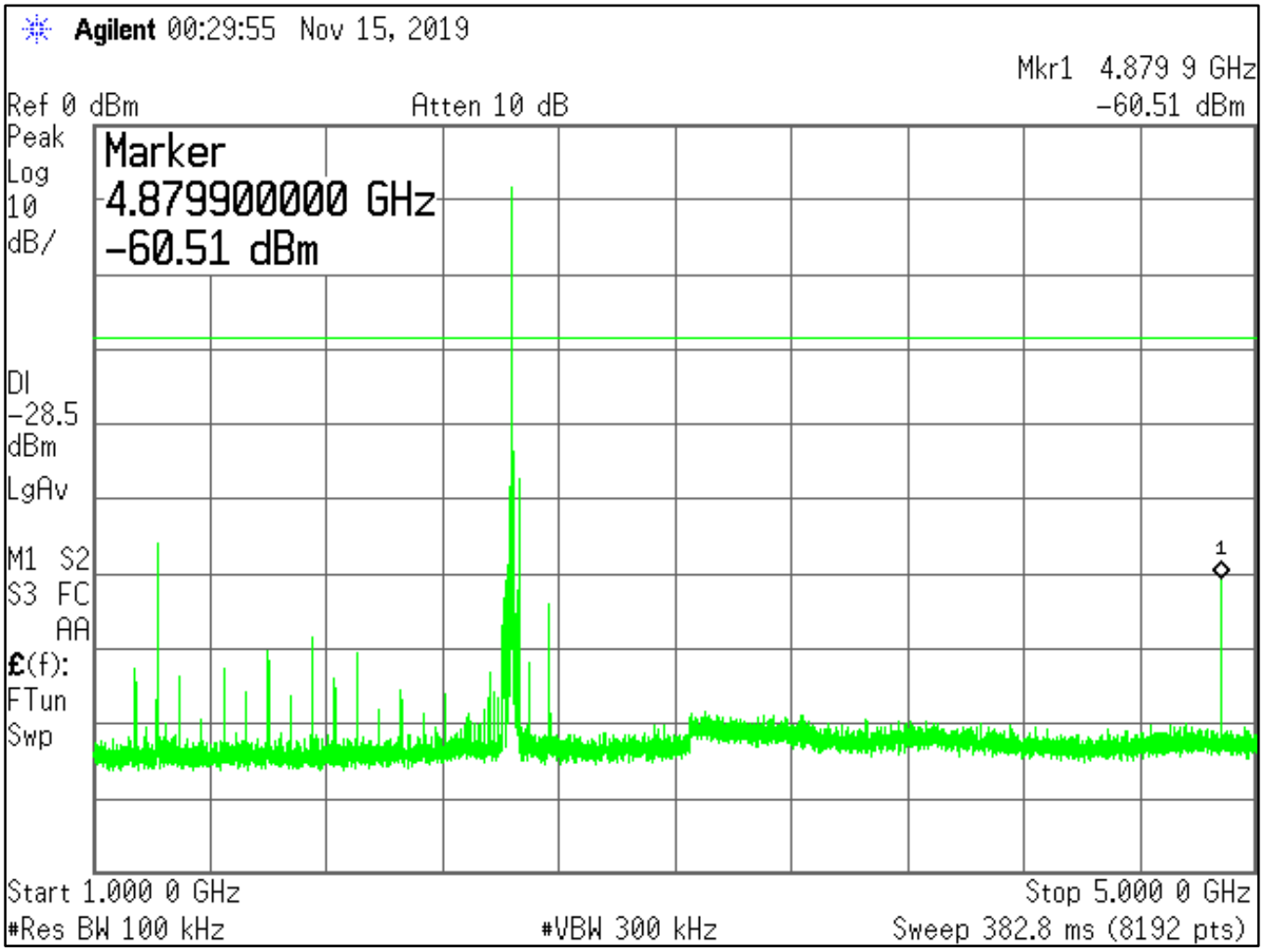


Figure 19: Center Channel Conducted Spurious Plot 3

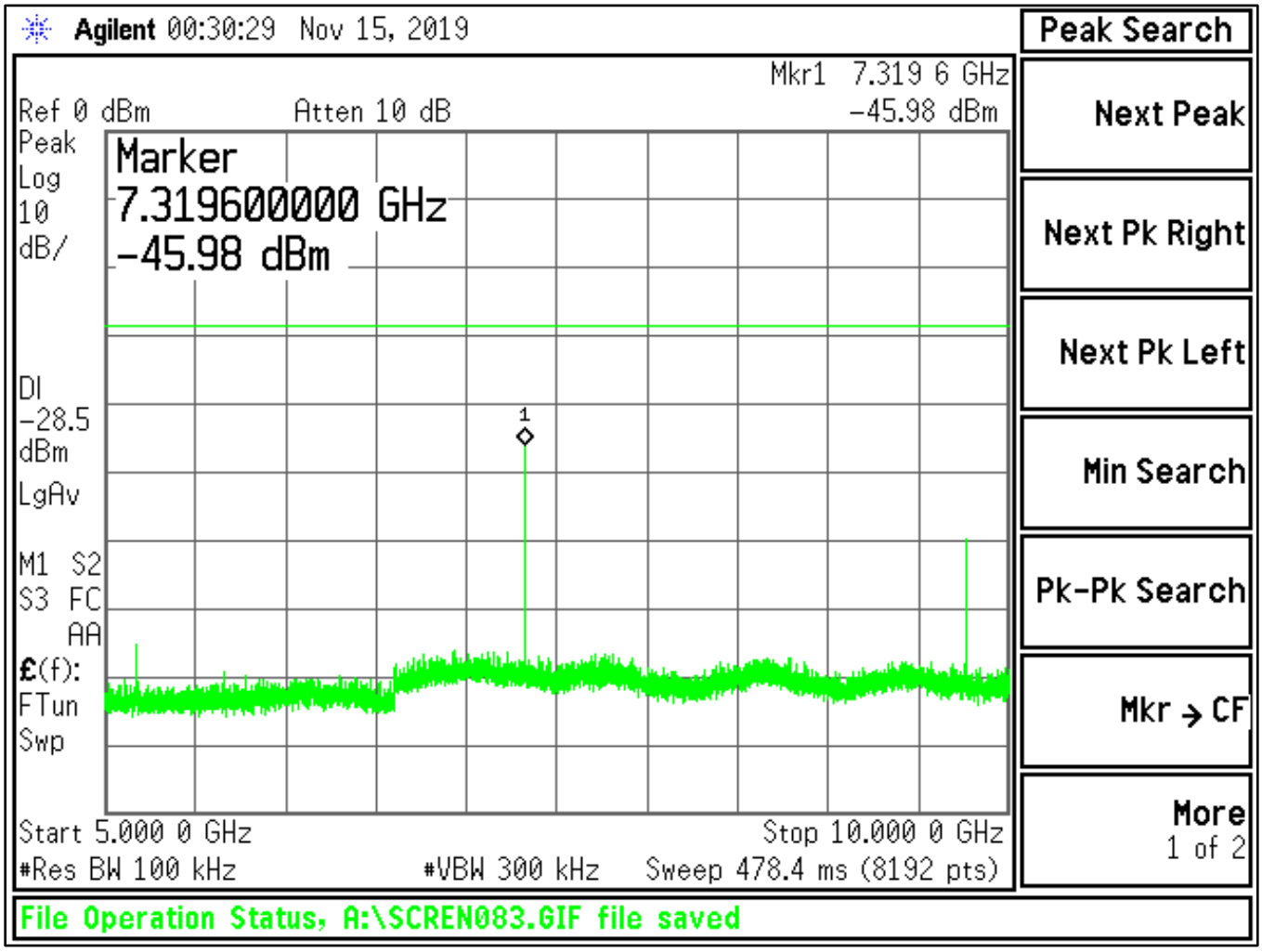


Figure 20: Center Channel Conducted Spurious Plot 4

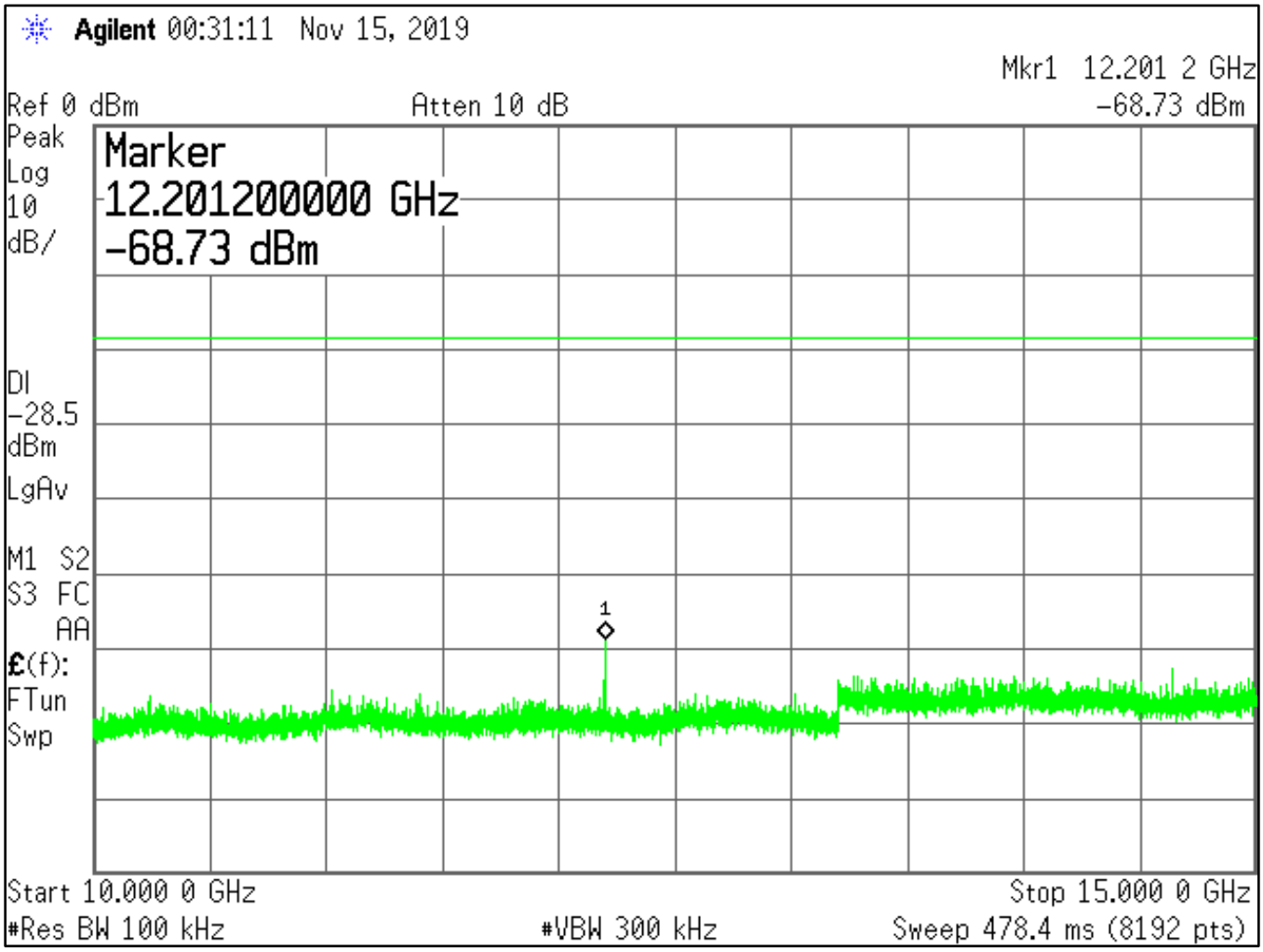


Figure 21: Center Channel Conducted Spurious Plot 5

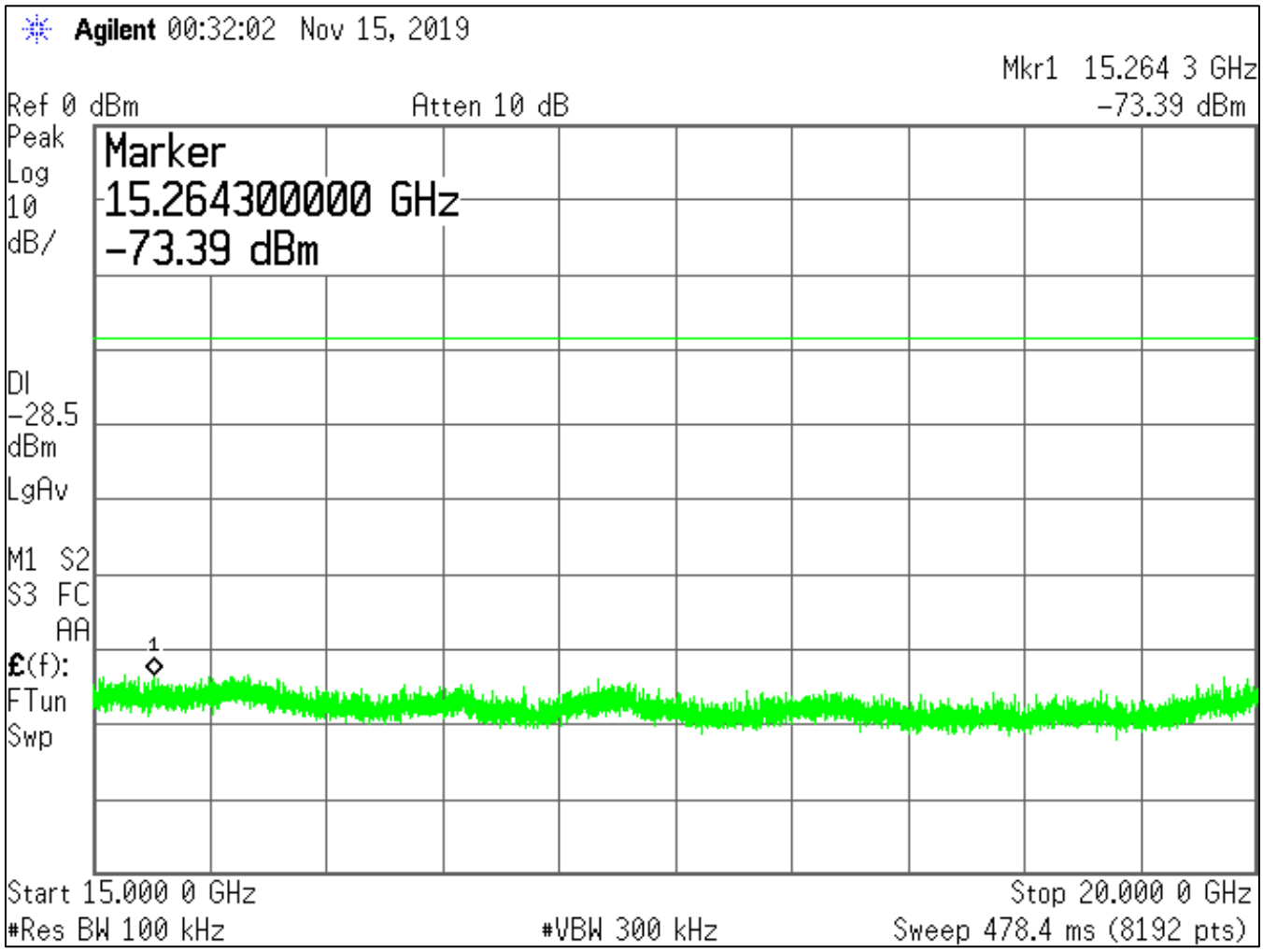


Figure 22: Center Channel Conducted Spurious Plot 6

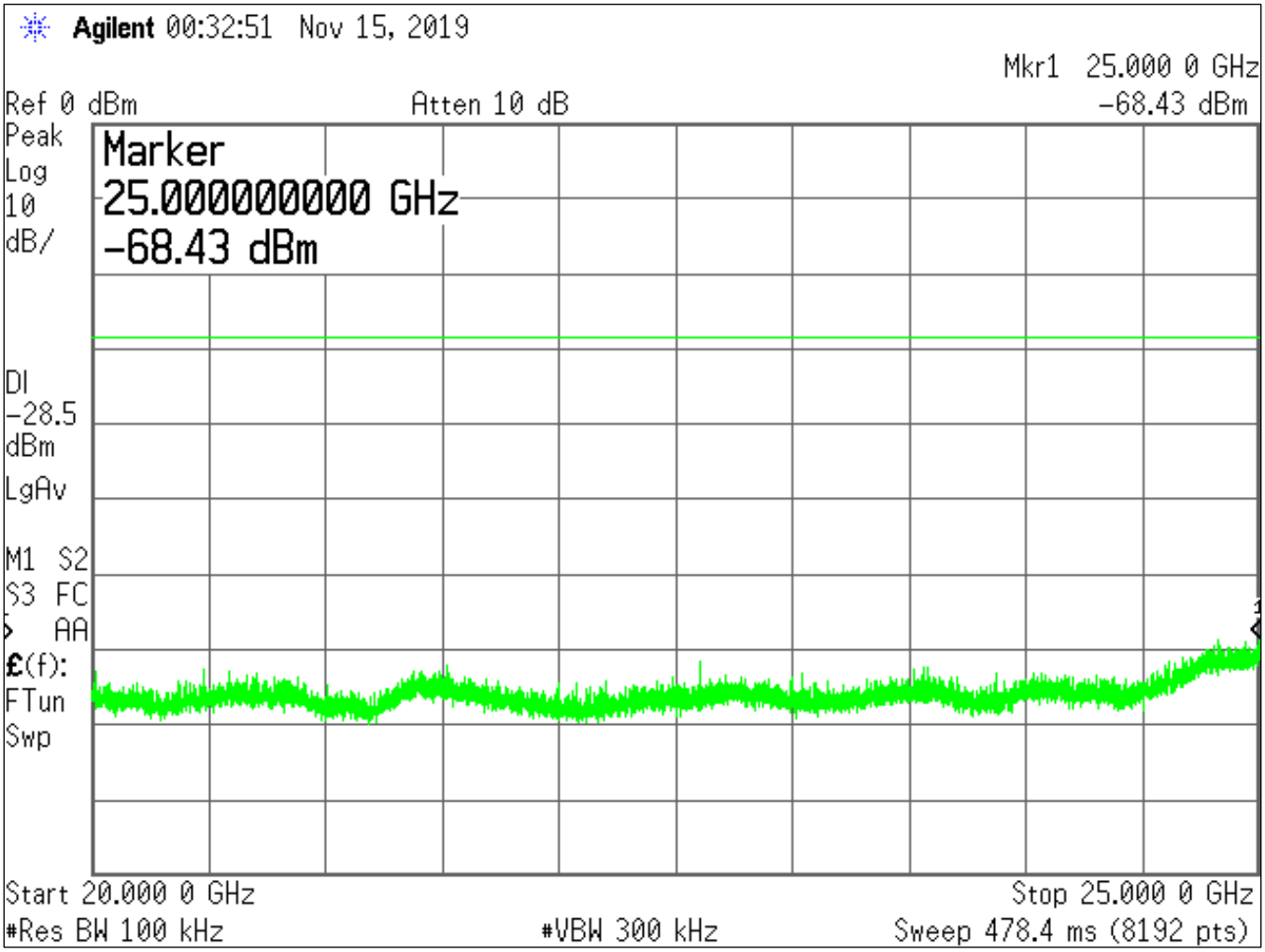


Figure 23: High Channel Conducted Spurious Plot 1

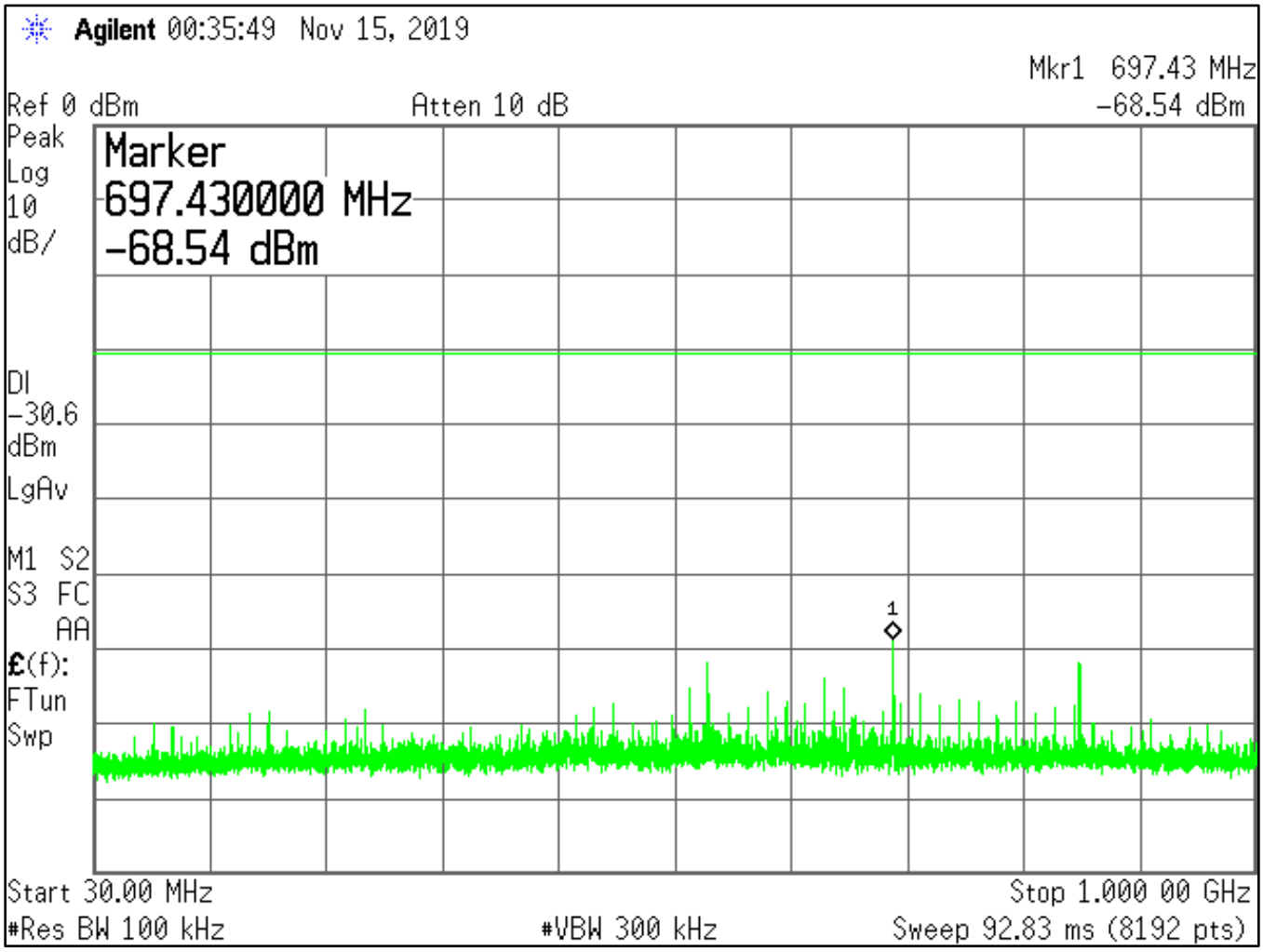


Figure 24: High Channel Conducted Spurious Plot 2

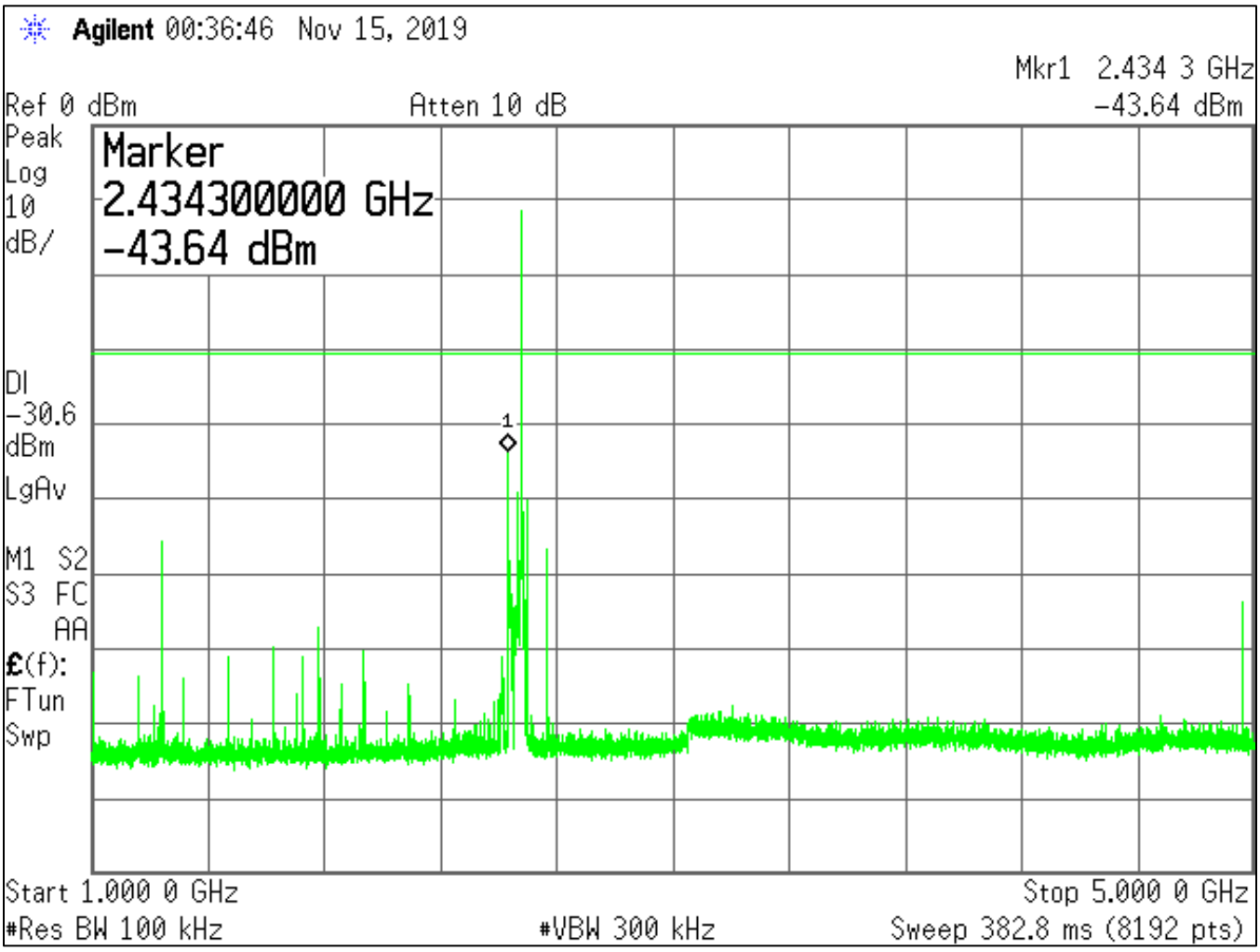


Figure 25: High Channel Conducted Spurious Plot 3

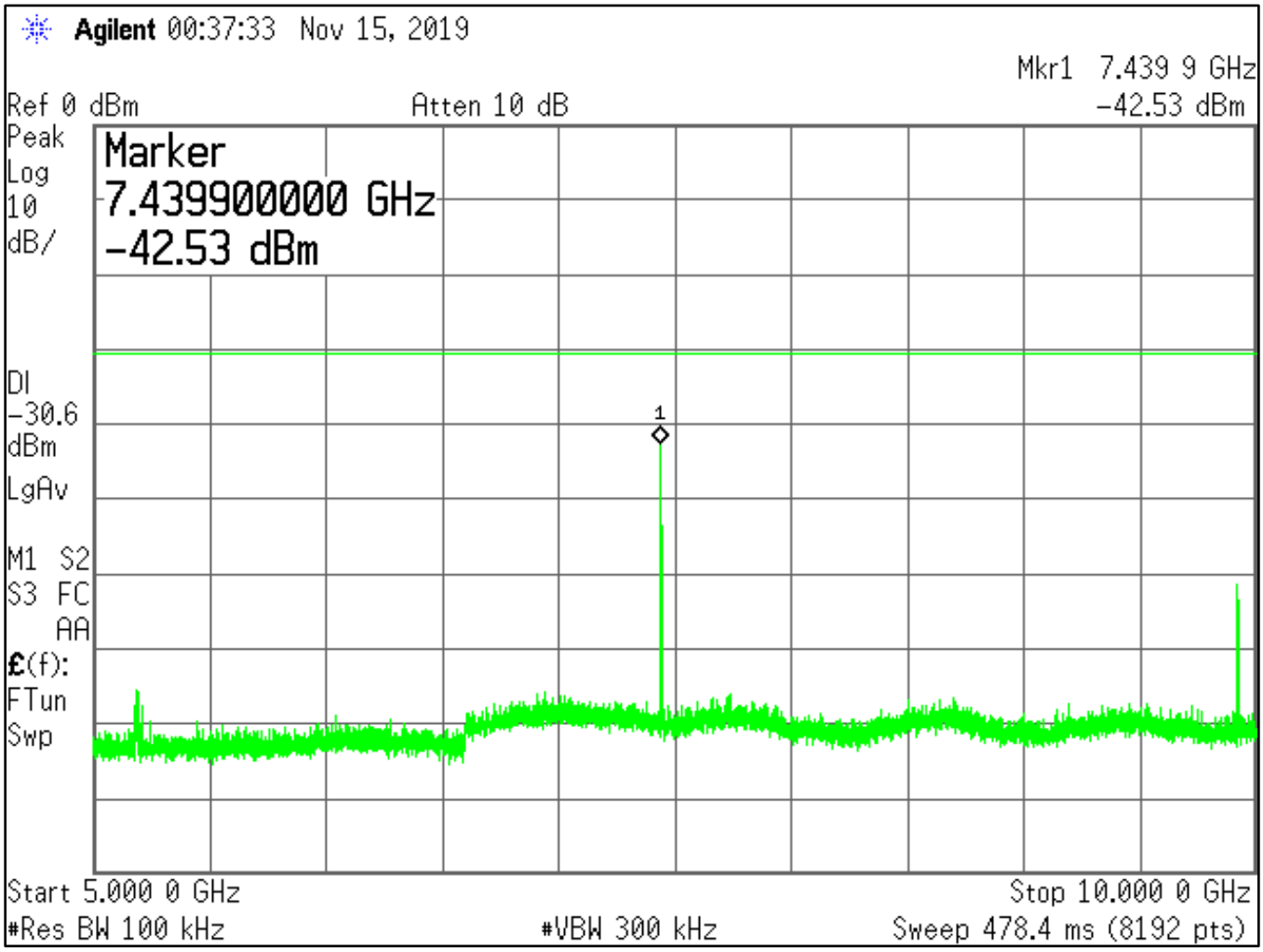


Figure 26: High Channel Conducted Spurious Plot 4

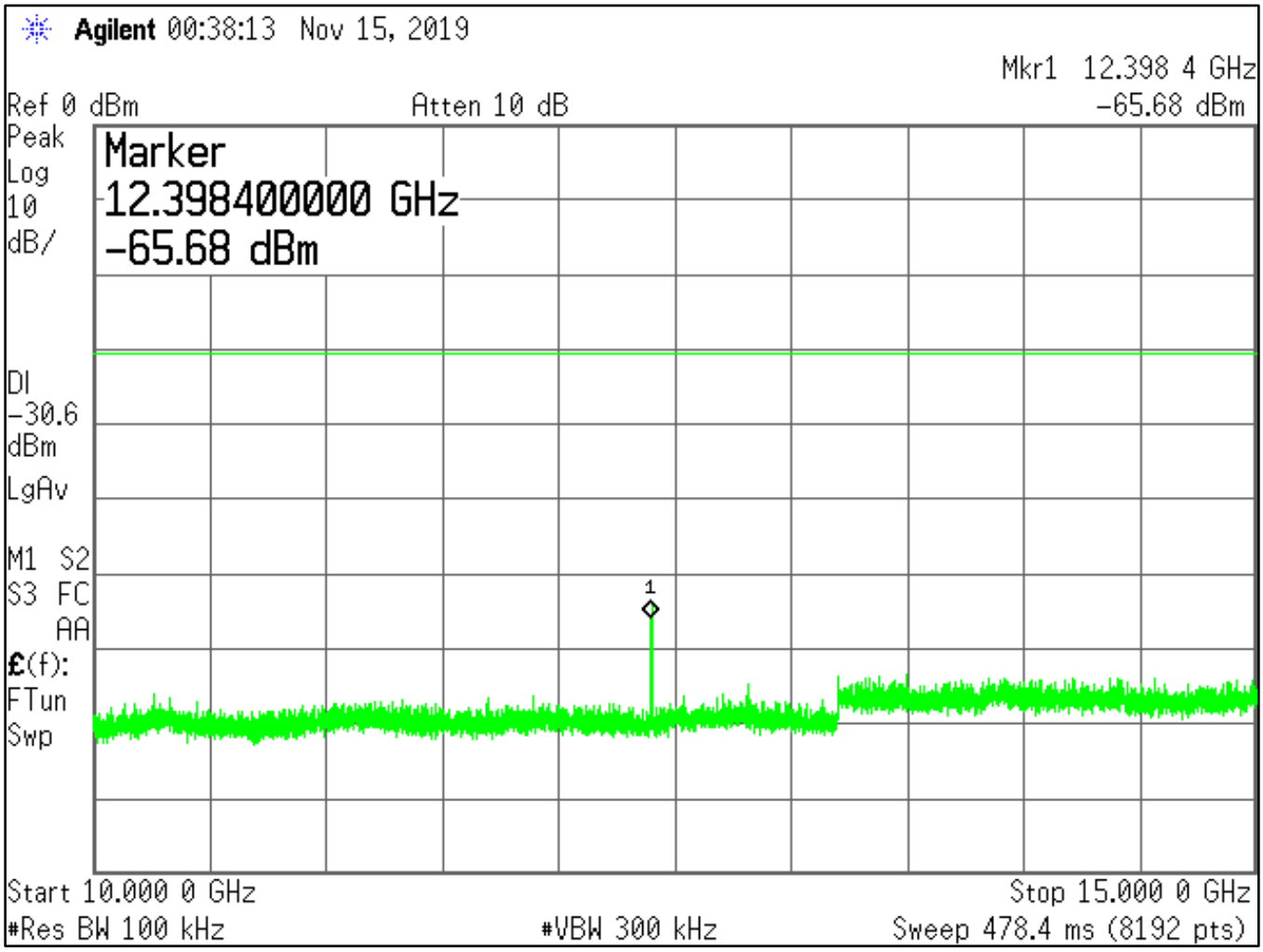


Figure 27: High Channel Conducted Spurious Plot 5

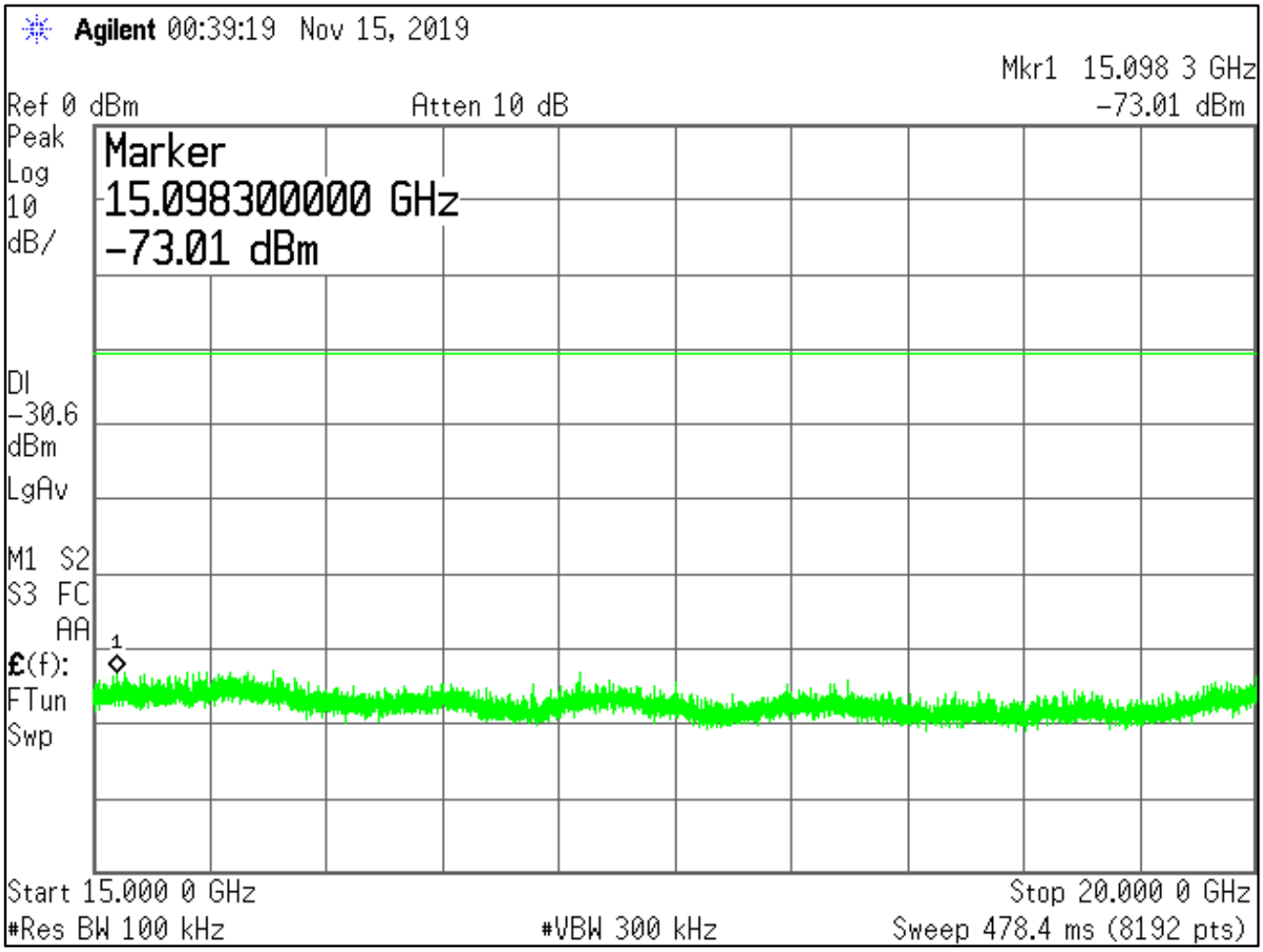


Figure 28: High Channel Conducted Spurious Plot 6

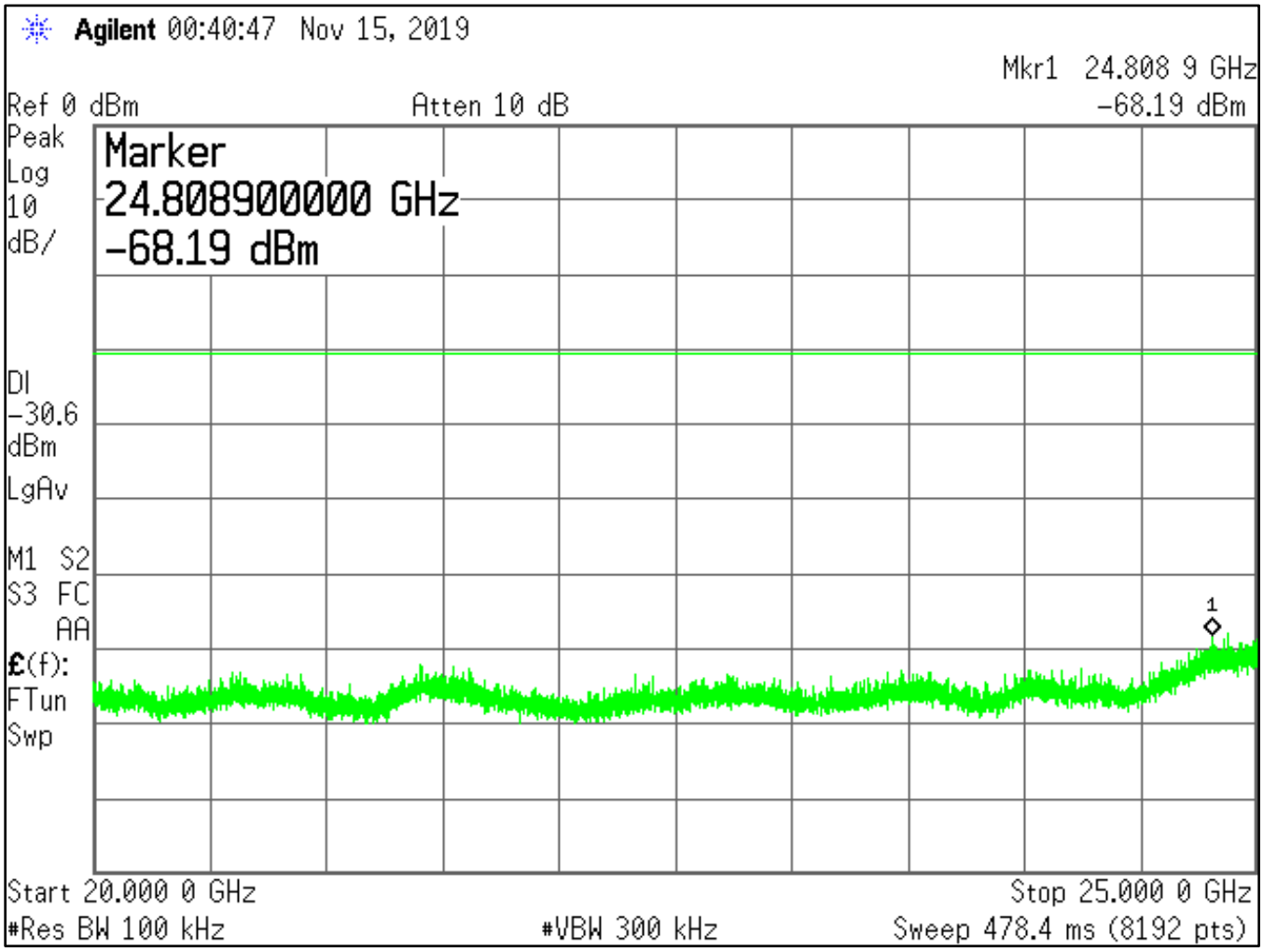
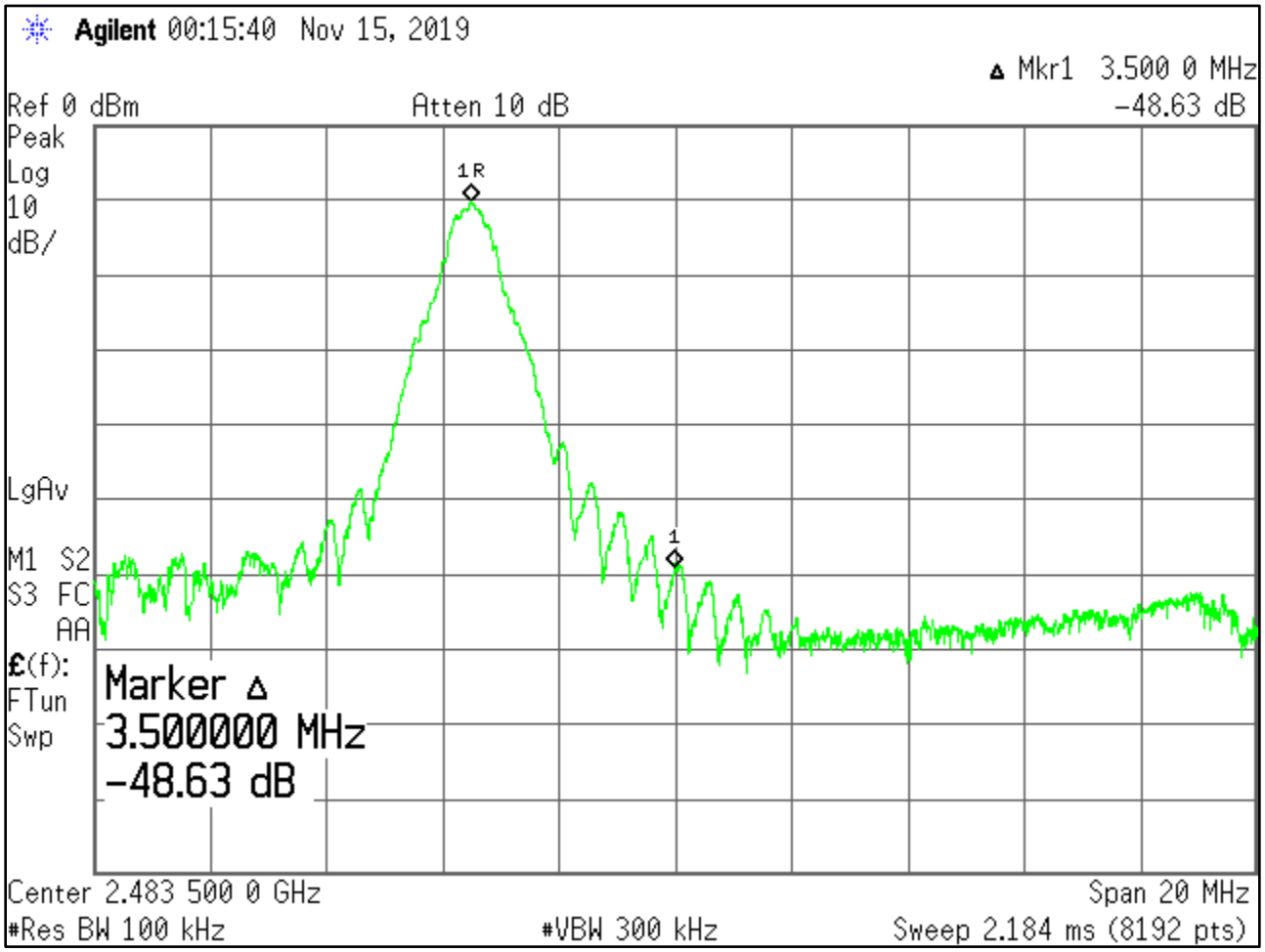


Figure 29: High Channel, Band Edge Plot



4.5 AC CONDUCTED EMISSIONS

4.5.1 Requirements

Compliance Standard: FCC Part 15, Class B

FCC Compliance Limits				
Frequency Range	Class A Digital Device		Class B Digital Device	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5MHz	79dBµV	66dBµV	66 to 56dBµV	56 to 46dBµV
0.5 to 5MHz	79dBµV	66dBµV	56dBµV	46dBµV
0.5-30MHz	73dBµV	60dBµV	60dBµV	50dBµV

4.5.2 Test Procedure

The requirements of FCC Part 15 and RSS GEN 7.2 call for the EUT to be placed on an 80cm-high 1 X 1.5-meter non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 µH Line Impedance Stabilization Network bonded to a 3 X 2-meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power was supplied to the peripherals through a second LISN. The peripherals were placed on the table in accordance with ANSI C63.4. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak, peak, or average as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth. For average measurements, the post-detector filter was set to 10 Hz.

These emissions must meet the limits specified for quasi-peak and average measurements. At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed.

4.5.3 Conducted Data Reduction and Reporting

At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed. The Conducted emissions level to be compared to the FCC limit is calculated as shown in the following example.

Example:

Spectrum Analyzer Voltage: VdBµV
LISN Correction Factor: LISN dB
Cable Correction Factor: CF dB
Electric Field: EdBµV = V dBµV + LISN dB + CF dB

4.5.4 Test Data

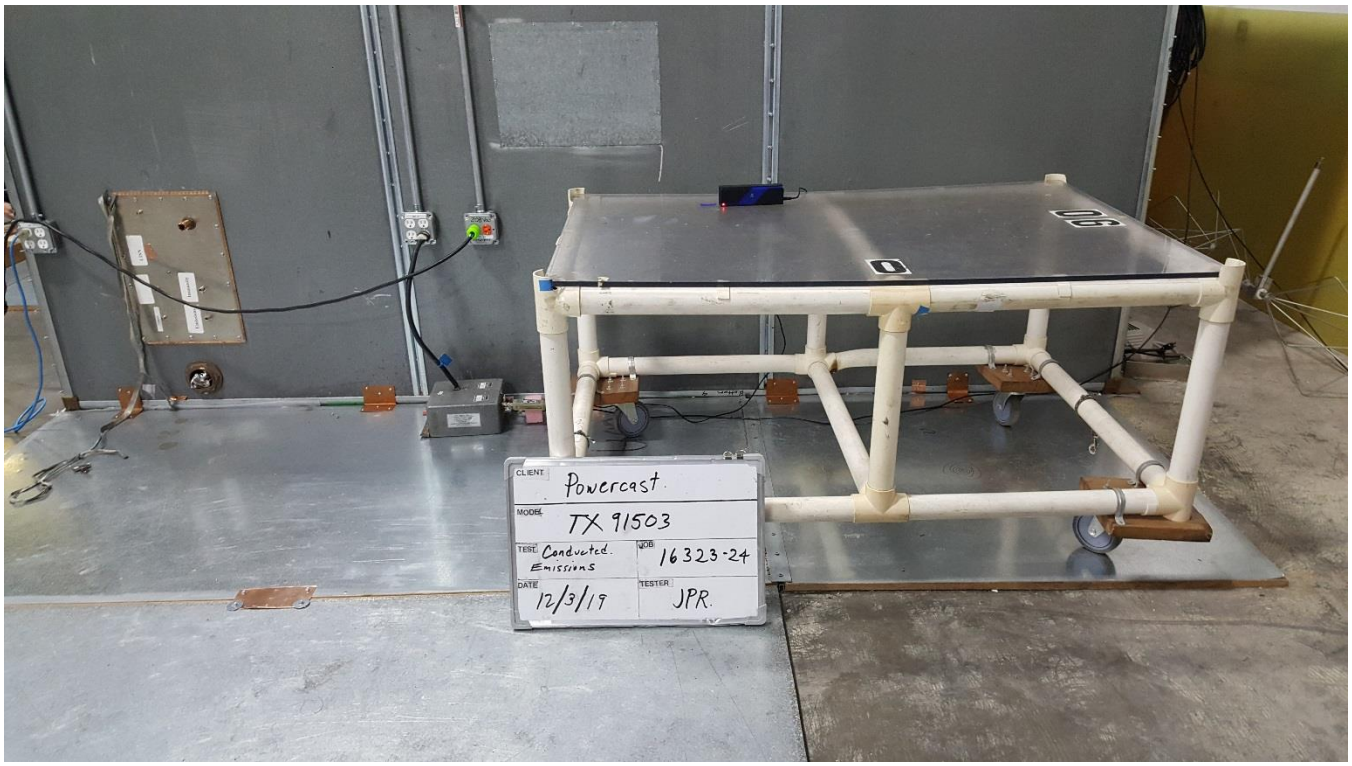
The EUT complied with the Conducted Emissions requirements.

Table 10 provides a summary of the Conducted Emissions results. Photograph 1 & Photograph 2 show a sample of the conducted emissions test configuration.

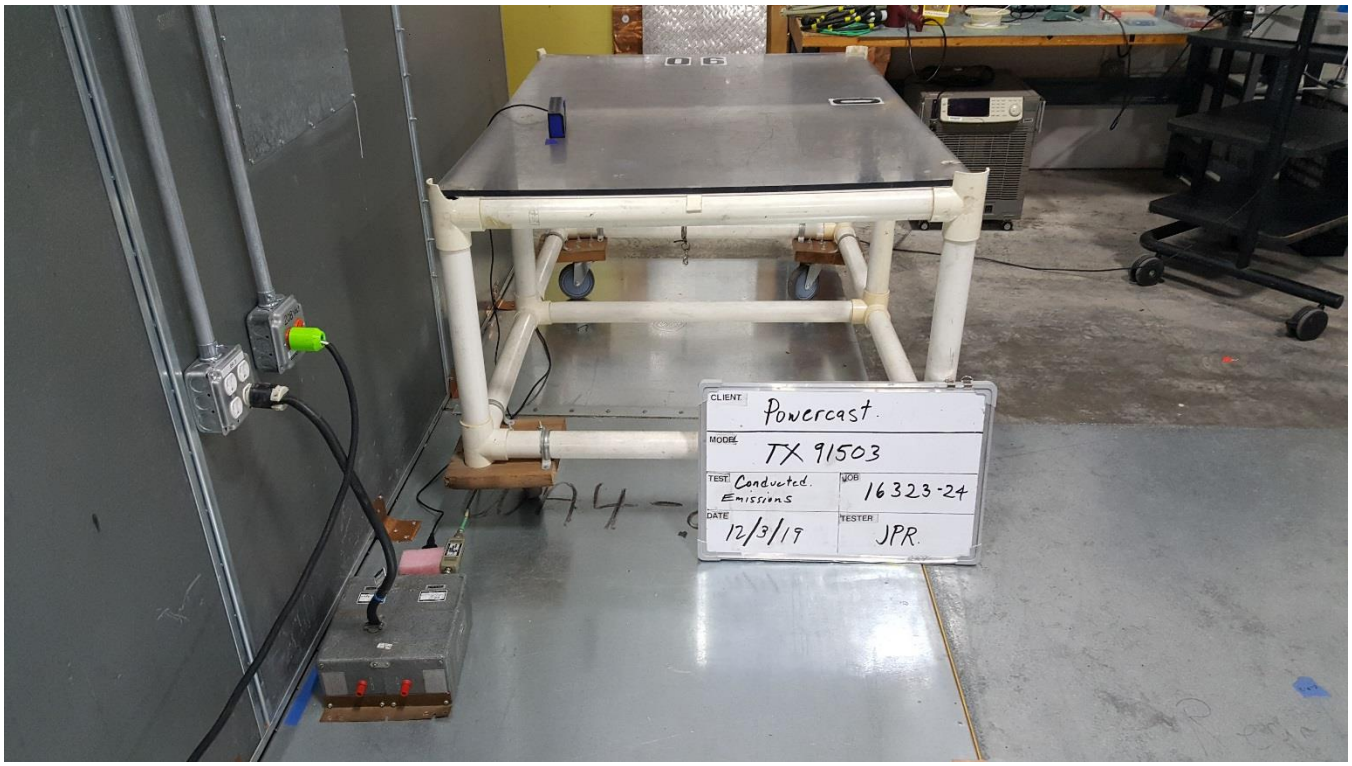
Table 10: Conducted Emission Test Data

NEUTRAL										
Freq MHz	**Level QP dBµV**	**Level AVG dBµV**	**Cable Loss dB**	**LISN Corr dB**	**Level QP Corr dBµV**	**Level Corr Avg dBµV**	**Limit QP dBµV**	**Limit AVG dBµV**	**Margin QP dB**	**Margin AVG dB**
0.215	30.9	10.5	10.2	0.2	41.3	20.9	63.0	53.0	-21.7	-32.1
0.409	42.1	32.9	10.2	0.3	52.6	43.4	57.7	47.7	-5.1	-4.2
0.719	26.1	15.8	10.3	0.3	36.8	26.4	56.0	46.0	-19.2	-19.6
1.684	20.8	9.4	10.2	0.3	31.3	19.9	56.0	46.0	-24.7	-26.1
8.784	21.3	12.9	11.1	0.1	32.5	24.1	60.0	50.0	-27.5	-25.9
11.429	21.9	12.1	11.2	0.3	33.4	23.6	60.0	50.0	-26.6	-26.4
PHASE										
Freq (MHz)	**Level QP dBµV**	**Level AVG dBµV**	**Cable Loss (dB)**	**LISN Corr dB**	**Level QP Corr dBµV**	**Level Corr Avg dBµV**	**Limit QP dBµV**	**Limit AVG dBµV**	**Margin QP dB**	**Margin AVG (dB)**
0.224	35.4	11.0	10.2	0.1	45.6	21.2	62.7	52.7	-17.1	-31.5
0.416	38.6	21.6	10.2	0.2	49.0	32.0	57.5	47.5	-8.5	-15.5
5.463	17.6	7.6	10.8	0.1	28.5	18.5	60.0	50.0	-31.5	-31.5
8.754	19.8	8.1	11.1	0.1	31.0	19.2	60.0	50.0	-29.0	-30.8
9.601	19.5	9.1	11.1	0.2	30.8	20.4	60.0	50.0	-29.2	-29.6
11.486	20.5	9.7	11.2	0.3	32.0	21.2	60.0	50.0	-28.0	-28.8

Photograph 1: Conducted Emissions Test Configuration - Front



Photograph 2: Conducted Emissions Test Configuration - Side



4.6 RADIATED EMISSIONS

4.6.1 Requirements

Compliance Standard: FCC Part 15, Class B

FCC Compliance Limits		
Frequency Range	**Limit (distance)**	
	Class A (10 meter)	**Class B (3 meter)**
30-88 MHz	90 µV/m	100 µV/m
88-216 MHz	150 µV/m	150 µV/m
216-960 MHz	210 µV/m	200 µV/m
>960MHz	300 µV/m	500 µV/m

4.6.2 Test Procedure

The requirements of FCC Part 15 and RSS GEN 7.2 call for the EUT to be placed on an 80 cm high 1 X 1.5 meters non-conductive motorized turntable for radiated testing on a 3-meter open field test site.

The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Bi-conical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The output of the antenna was connected to the input of the spectrum analyzer and the emissions in the frequency range of 30 MHz to 25 GHz were measured. The peripherals were placed on the table in accordance with ANSI C63.4. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak or peak, as appropriate. Above 1GHz average measurement are recorded. The measurement bandwidth of the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. Frequencies above 1GHz were performed using a measurement bandwidth of 1MHz with a video bandwidth setting of 10 Hz for the average measurement.

4.6.3 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are included into the antenna factor (AF) column of the table and in the cable factor (CF) column of the table. The AF (in dB/m) and the CF (in dB) is algebraically added to the raw Spectrum Analyzer Voltage in dBµV to obtain the Radiated Electric Field in dBµV/m. This logarithm amplitude is converted to a linear amplitude, then compared to the FCC limit.

Example:

Spectrum Analyzer Voltage: VdBµV
Antenna Correction Factor: AFdB/m
Cable Correction Factor: CFdB
Pre-Amplifier Gain (if applicable): GdB
Electric Field: EdBµV/m = V dBµV + AFdB/m + CFdB - GdB
To convert to linear units of measure: EdBµV/m/20 Inv log

4.6.4 Test Data

The EUT complied with the Class B Radiated Emissions requirements. Table 11 provides the test results for radiated emissions. **Error! Reference source not found.** thru **Error! Reference source not found.** show samples of the radiated emissions test configuration.

Table 11: Radiated Emission Test Data

Freq MHz	Polarity H/V	Azimuth Degree	Ant. Height m	SA Level dBuV	Corr Factors dB	Corr. Level uV/m	Limit uV/m	Margin dB	Pk/Ave	Comm
30.63	V	180.0	1.0	32.8	-4.9	24.7	100.0	-12.1	Peak	
32.37	V	180.0	1.0	33.0	-6.2	21.8	100.0	-13.2	Peak	
47.90	V	180.0	1.0	40.6	-16.9	15.3	100.0	-16.3	Peak	
52.09	V	180.0	1.0	38.4	-18.1	10.4	100.0	-19.7	Peak	
85.83	V	180.0	1.0	30.1	-17.4	4.4	100.0	-27.2	Peak	
117.52	V	180.0	1.0	34.4	-11.1	14.5	150.0	-20.3	Peak	
675.64	V	0.0	2.5	32.3	-1.9	33.0	200.0	-15.6	Peak	L
686.18	V	0.0	2.5	31.8	-2.0	30.8	200.0	-16.2	Peak	M
697.43	V	0.0	2.5	32.5	-2.3	32.5	200.0	-15.8	Peak	H
30.63	H	180.0	4.0	32.5	-4.9	23.9	100.0	-12.4	Peak	
32.37	H	180.0	4.0	34.2	-6.2	25.2	100.0	-12.0	Peak	
47.90	H	180.0	4.0	39.6	-16.9	13.6	100.0	-17.3	Peak	
52.09	H	180.0	4.0	37.5	-18.1	9.3	100.0	-20.6	Peak	
85.83	H	180.0	4.0	31.2	-17.4	4.9	100.0	-26.2	Peak	
117.52	H	180.0	4.0	33.5	-11.1	13.2	150.0	-21.1	Peak	
675.64	H	0.0	2.5	32.5	-1.9	33.8	200.0	-15.4	Peak	L
686.18	H	0.0	2.5	31.5	-2.0	29.8	200.0	-16.5	Peak	M
697.43	H	0.0	2.5	32.8	-2.3	33.6	200.0	-15.5	Peak	H

The Margin is calculated by the difference between the Corrected Level and Limit Level and is reported in dB.

Freq MHz	Polarity H/V	Azimuth Degree	Ant. Height m	SA Level dBuV	Corr Factors dB	Corr. Level uV/m	Limit uV/m	Margin dB	Comm
4804.00	V	0.0	1.0	39.2	5.2	166.1	5000.0	-29.6	
4804.00	V	0.0	1.0	28.5	5.2	48.5	500.0	-20.3	
12010.00	V	0.0	1.0	0.0	17.6	7.6	5000.0	-56.3	
12010.00	V	0.0	1.0	0.0	17.6	7.6	500.0	-36.3	
4880.00	V	0.0	1.0	39.3	5.6	175.8	5000.0	-29.1	
4880.00	V	0.0	1.0	27.5	5.6	45.3	500.0	-20.9	
7320.00	V	0.0	1.0	42.2	10.8	447.7	5000.0	-21.0	
7320.00	V	0.0	1.0	30.5	10.8	116.0	500.0	-12.7	
4960.00	V	0.0	1.0	39.3	6.0	182.8	5000.0	-28.7	
4960.00	V	0.0	1.0	28.4	6.0	52.3	500.0	-19.6	
7440.00	V	0.0	1.0	40.1	10.6	342.9	5000.0	-23.3	
7440.00	V	0.0	1.0	29.5	10.6	101.3	500.0	-13.9	
4804.00	H	0.0	1.5	40.5	5.2	192.8	5000.0	-28.3	
4804.00	H	0.0	1.5	28.8	5.2	50.2	500.0	-20.0	
12010.00	H	0.0	1.5	0.0	17.6	7.6	5000.0	-56.3	
12010.00	H	0.0	1.5	0.0	17.6	7.6	500.0	-36.3	
4880.00	H	0.0	1.5	40.6	5.6	203.7	5000.0	-27.8	
4880.00	H	0.0	1.5	29.2	5.6	55.0	500.0	-19.2	
7320.00	H	0.0	1.5	41.0	10.8	389.9	5000.0	-22.2	
7320.00	H	0.0	1.5	31.4	10.8	128.1	500.0	-11.8	
4960.00	H	0.0	1.5	40.3	6.0	204.7	5000.0	-27.8	
4960.00	H	0.0	1.5	29.4	6.0	58.7	500.0	-18.6	
7440.00	H	0.0	1.5	41.2	10.6	389.7	5000.0	-22.2	
7440.00	H	0.0	1.5	31.1	10.6	121.8	500.0	-12.3	