FCC & Industry Canada Certification Test Report

For the

EATON'S COOPER POWER SYSTEMS

RFN NS200 MODULE

FCC ID: P9X-NS200

IC: 6766A-NS200

WLL JOB# 15136-01 Rev 2
July 26, 2017

Re-Issued
December 12, 2017

Prepared for:

Eaton's Cooper Power Systems
910 Clopper Road, Suite 201 S
Gaithersburg MD 20878

Prepared By:

Washington Laboratories, Ltd.
7560 Lindbergh Drive
Gaithersburg, Maryland 20879

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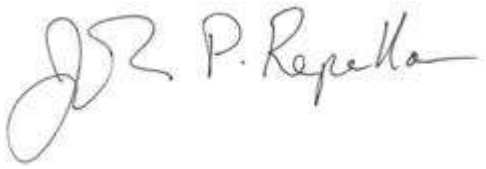

John P. Repella
Manager, EMC & Wireless Services

Reviewed by:

Steven D. Koster
President

Abstract

This report has been prepared on behalf of Eaton's Cooper Power Systems to support the attached Application for Equipment Authorization. The test report and application are submitted for a Frequency Hopping Spread Spectrum Transmitter under Part 15.247 (10/2014) of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-247 Issue 2 of Industry Canada. This Certification Test Report documents the test configuration and test results for the Eaton's Cooper Power Systems RFN NS200 Module.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. 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 Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

The Eaton's Cooper Power Systems RFN NS200 Module complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.247 and Industry Canada RSS-247.

Revision History	Description of Change	Date
Rev 0	Initial Release	July 26, 2017
Rev 1	Correct the Customer name and EUT Name	August 2, 2017
Rev 2	Additional comments to address ISED specific requirements	December 12, 2017

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1 Introduction

1.1 Compliance Statement

The Eaton's Cooper Power Systems RFN NS200 Module complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.247 (10/2014) and Industry Canada RSS-247 Issue 2.

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:	Eaton's Cooper Power Systems 910 Clopper Road, Suite 201 S Gaithersburg MD 20878
Purchase Order Number:	4509063957
Quotation Number:	70209

1.4 Test Dates

Testing was performed on the following date(s):	06/29/2017 to 06/30/2017, 11/21/2017

1.5 Test and Support Personnel

Washington Laboratories, LTD	John P. Repella
Customer Representative	Steve Seymour

1.6 Abbreviations

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	**Amp**ere**s**
b/s	**b**its per **s**econd
BW	**B**and**W**idth
CE	**C**onducted **E**mission
cm	**c**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FM	**F**requency **M**odulation
G	**g**iga - prefix for 10^9 multiplier
Hz	**H**ertz
IF	**I**ntermediate **F**requency
k	**k**ilo - prefix for 10^3 multiplier
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
M	**M**ega - prefix for 10^6 multiplier
m	**m**eter
µ	**m**icro - prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
QP	**Q**uasi-**P**eak
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
V	**V**olt

2 Equipment Under Test

2.1 EUT Identification & Description

The RFN NS200 is a radio communication device designed for use in Eaton radio communications products. It provides a 1W, 915 MHz radio interface to an RF mesh network.
This test report covers the 902-928MHz FHSS radio.

Table 1: Device Summary

ITEM	DESCRIPTION
Manufacturer:	Eaton's Cooper Power Systems
FCC ID:	P9X-NS200
IC:	6766A-NS200
Model:	RFN NS200
FCC Rule Parts:	§15.247
Industry Canada:	RSS-247
Frequency Range:	902.75 – 927.25MHz
Maximum Output Power:	29.30dBm (851mW)
Modulation:	FSK
20db Occupied Bandwidth:	474.6 kHz(153.6kbps), 294.3kHz(76.8kbps), 272.2kHz(38.4kbps), 298.0kHz(19.2kbps), 292.8kHz(9.6kbps),
99% Power Occupied Bandwidth	447.1kHz(153.6kbps), 297.3kHz(76.8kbps), 271.2kHz(38.4kbps), 312.3kHz(19.2kbps), 309.6kHz(9.6kbps),
Keying:	Automatic
Type of Information:	Data
Number of Channels:	50
Power Output Level	Variable from 29.30dBm to -7.21dBm
Antenna Connector	MCX
Antenna Type	4 antennas: Linx ¼ Wave Through-hole Helical, 2.4dBi Gain Laird OD9-5 900MHz Omnidirectional Antenna, 5dBi Gain Laird B(B)8965CN 5/8 Wave Loaded Coil 900MHz Laird TRAB9023 Phantom Antenna 3dBi
Interface Cables:	None (plug in module)
Power Source & Voltage:	5VDC
FCC Emission Designator	474KFXD
ISED Emission Designator	447KFXD, 294KFXD, 272KFXD, 312KFXD, 309KFXD
Highest TX spurious Emission	380.3uV/m @ 3m ; 9147.5MHz
Highest RX Spurious Emission	113.0uV/m @ 3m; 144.01MHz

2.2 Test Configuration

The Eaton's Cooper Power Systems RFN NS200, Equipment Under Test (EUT), was operated from a DC power supply providing 5V. Programming commands were sent from a support laptop using hyper-terminal via a custom RS232 adaptor board to a header on the EUT module

2.3 Testing Algorithm

The RFN NS200 was programmed for operation from a support laptop via a custom RS232 adaptor board to a header on the EUT module. Hyper-terminal program was used on the support laptop to enter commands setting the EUT to the desired channel or hopping mode.

Worst case 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 Gaithersburg, 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 Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. 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 C63.10 "Procedures for Compliance Testing of Unlicensed Wireless Devices"

ANSI C63.2 "Specifications for Electromagnetic Noise and Field Strength Instrumentation"

ANSI C63.4 "Methods of Measurement of Radio Noise from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz".

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

Parameter	Uncertainty	Actual (+/-)	Unit
Radio Frequency	±1 x 10^{-7}	8.64E-08	parts
RF Power conducted (up to 160 W)	±0.75 dB	0.3	dB
Conducted RF Power variations using a test fixture	±0.75 dB	0.3	dB
Radiated RF power	±6 dB	N/A	dB
Average sensitivity (radiated)	±3 dB	N/A	dB

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±2.63 dB
Radiated Emissions	CISPR11, CISPR22, 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:	**Radiated Emissions & Bench Conducted Emissions**	Test Date:	**06/30/2017, 11/21/2017**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
823	AGILENT - N9010A	EXA SPECTRUM ANALYZER	12/21/2017
382	SUNOL SCIENCES CORPORATION - JB1	ANTENNA BICONLOG	08/31/2017
276	ELECTROMETRICS - BPA-1000	PRE-AMPLIFIER RF 50KHZ-1GHZ	01/17/2018
627	AGILENT - 8449B	AMPLIFIER 1-26GHZ	11/07/2017
849	MEGAPHASE	HF RF CABLE	01/18/2018
425	ARA/DRG-118/A	HF ANTENNA 1-18GHz	11/23/2017
879	ETS LINDGREN/EMPower 7002-006	USB RF POWER SENSOR	06/23/2018

4 Test Summary

The Table Below shows the results of testing for compliance with a Frequency Hopping System in accordance with FCC Part 15.247 10/2014 and RSS-247 Issue 2. Full test results are shown in Section 5.

Table 4: Test Summary Table

TX Test Summary (Frequency Hopping Spread Spectrum)			
FCC Rule Part	**IC Rule Part**	**Description**	**Result**
15.247 (a)(1)(i)	RSS-247 Section 5.1 (a) & (c)	20dB Bandwidth	Pass
15.247 (b)(2)	RSS-247 Section 5.4 (a)	Transmit Output Power	Pass
15.247 (a)(1)	RSS-247 Section 5.1 (2)	Channel Separation	Pass
15.247 (a)(1)(i)	RSS-247 Section 5.1 (c)	Number of Channels =50 minimum	Pass
15.247 (a)(1)(i)	RSS-247 Section 5.1 (3)	Time of Occupancy	Pass
15.247 (d)	RSS-247 Section 5.5	Occupied BW / Out-of-Band Emissions (Band Edge @ 20dB below)	Pass
15.205 15.209	RSS-247 Section 5.5	General Field Strength Limits (Restricted Bands & RE Limits)	Pass
15.207	RSS-Gen	AC Conducted Emissions	Pass
RX/Digital Test Summary (Frequency Hopping Spread Spectrum)			
FCC Rule Part	**IC Rule Part**	**Description**	**Result**
15.207	RSS-Gen	AC Conducted Emissions	Pass
15.209	RSS-Gen	General Field Strength Limits	Pass

5 Test Results

5.1 Duty Cycle Correction and Time of Occupancy

In accordance with the FCC Public Notice the average spurious radiated emissions measurements may be further adjusted using a duty cycle correction factor if the dwell time per channel of the hopping signal is less than 100ms.

The duty cycle correction factor is calculated by:

10 * Log (dwell time/100ms)

The following tables show the dwell time for the transmitter for various data rates. Based on this information, the dwell time per hop is 20.142ms. The maximum total dwell time per 100ms is 40.241ms. This corresponds to a duty cycle correction of 3.956dB for radiated spurious emissions.

The transmitter shall have a time of occupancy for systems having a 20dB bandwidth greater than 250 kHz of no more than 0.4seconds in any 10 second period.

These tests were conducted with the RF output connected through appropriate attenuators to the input of a spectrum analyzer set to zero span mode. The unit was set to hopping mode with the spectrum analyzer set to 902.75MHz. The worst case results are shown in the plots below.

Table 5: Duty Cycle/Time of Occupancy Results (19.2kbps Data Rate)

Test	Result	Limit	Pass/Fail
Occupancy per Hop	20.142ms	NA	NA
Occupancy per 100ms	40.241ms 3.956dB Allowable Correction	NA	NA
Time of Occupancy	0.16114s/10 sec	0.4s/10 sec	Pass

Table 6: Duty Cycle Data Rate Summary

Data Rate (kbps)	Medium Utilization (%)	Duty Cycle (%)	Min. Gap Time (ms)	Max. Sequence Time (ms)	Max. Sequence Time (100ms)	RMS (dBm)
9.6	4.101	49.988	48.148	154.325	N/A	26.129
19.2	4.141	47.809	21.948	20.142	40.241	26.171
38.4	4.136	46.778	22.398	19.687	39.373	26.166
76.8	3.978	46.094	21.715	18.366	38.801	25.996
153.6	3.761	41.803	12.825	9.215	37.759	25.752

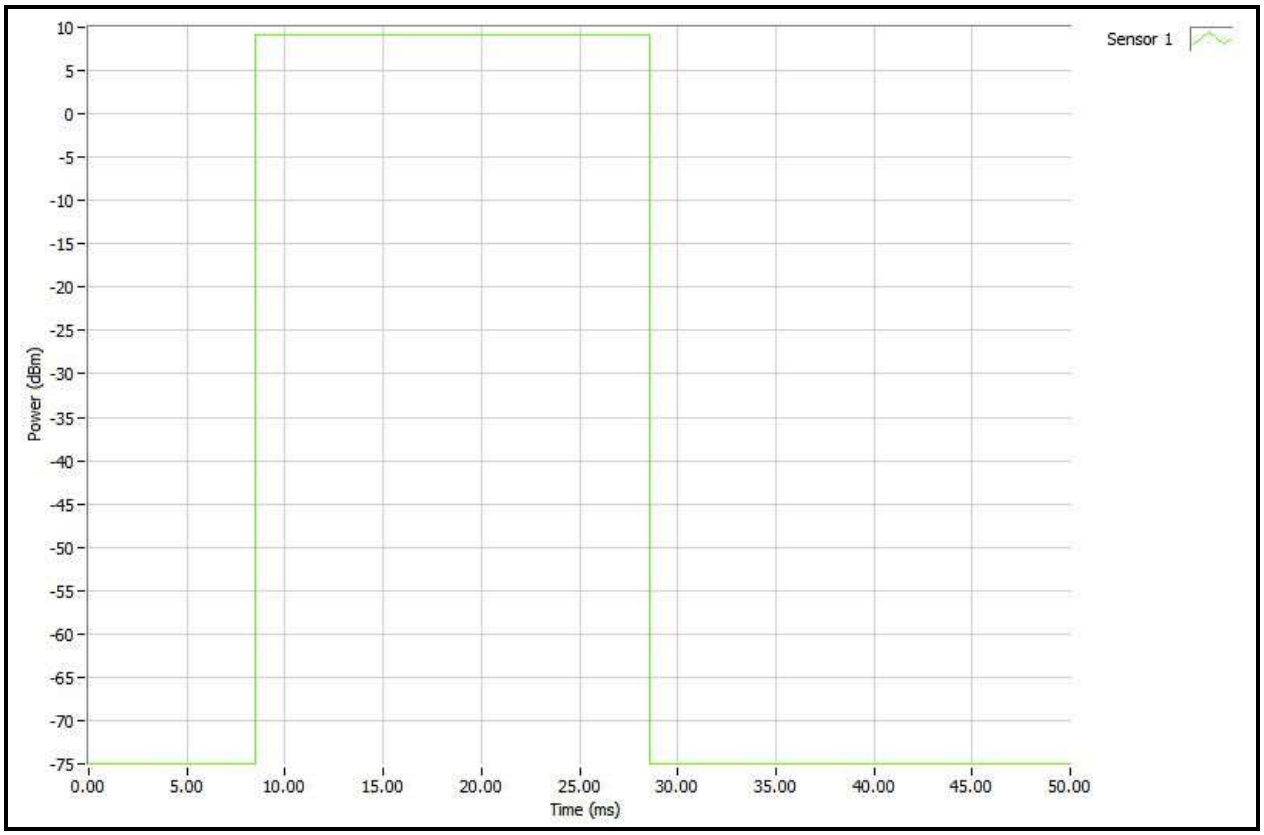

Figure 1: Single Hop Occupancy Plot

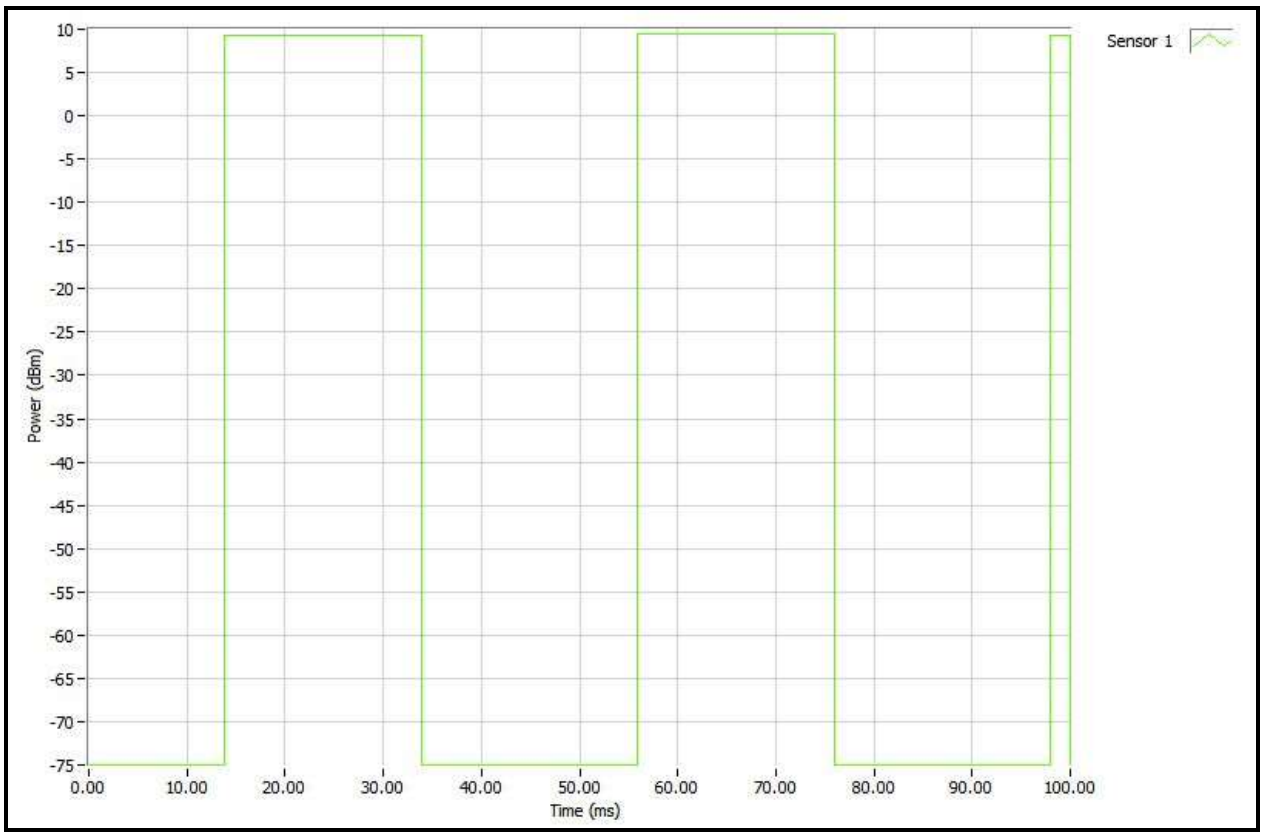

Figure 2: Occupancy per 100ms

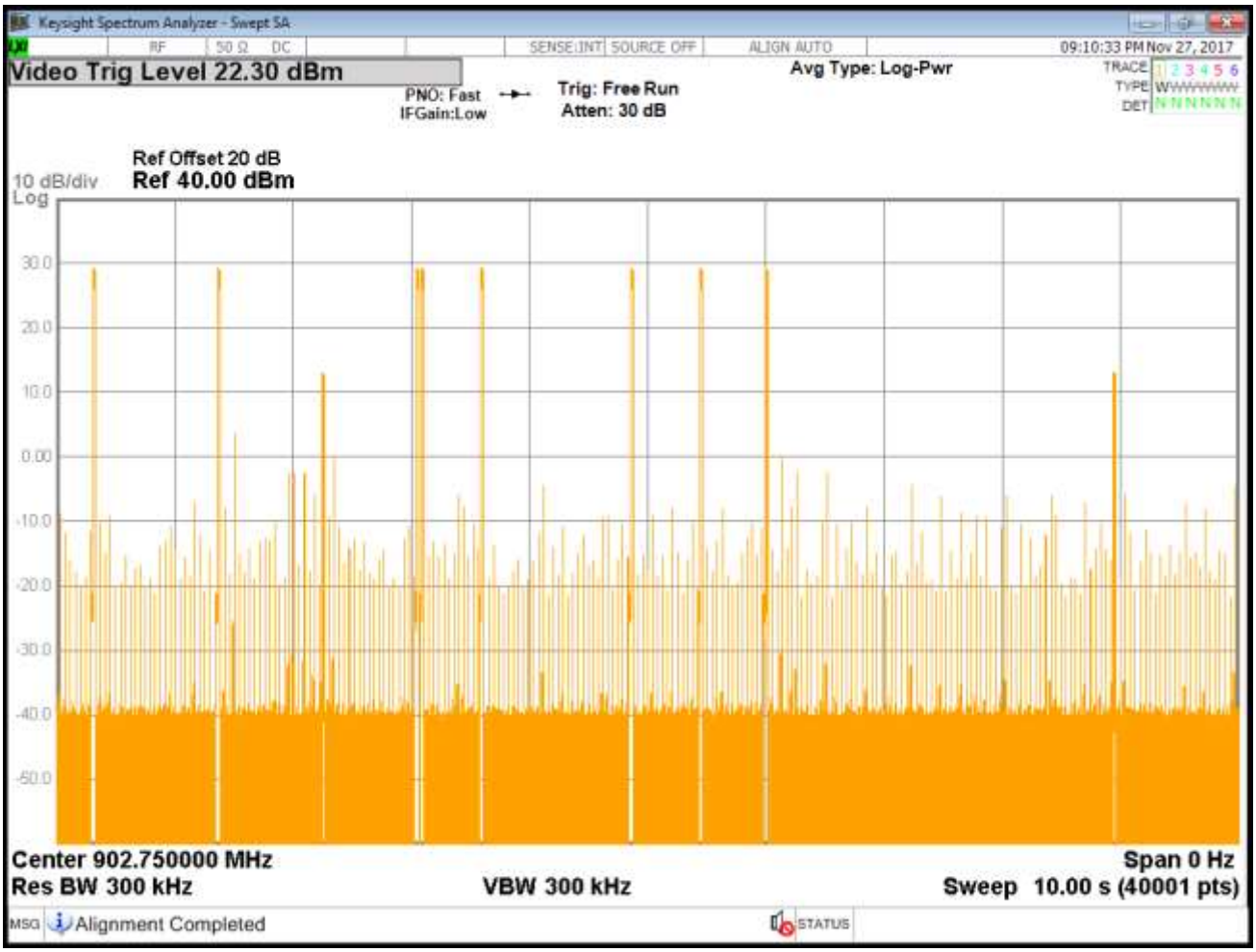

Figure 3: Time of Occupancy

5.2 RF Power Output: (FCC Part §2.1046)

To measure the output power the hopping sequence was stopped while the frequency dwelled on a low, high and Center channel. The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer. The analyzer offset was adjusted to compensate for the attenuator and other losses in the system. The EUT has an adjustable output range. The highest and lowest power available is shown below.

Table 7: RF Power Output

Frequency	Power Setting	Level (dBm)	Limit (dBm)	Pass/Fail
Low Channel: 902.75MHz	High	29.28	30	Pass
Center Channel: 914.75MHz	High	29.30	30	Pass
High Channel: 927.25MHz	High	29.21	30	Pass
Low Channel: 902.75MHz	Low	-7.21	30	Pass
Center Channel: 914.75MHz	Low	-7.24	30	Pass
High Channel: 927.25MHz	Low	-7.29	30	Pass

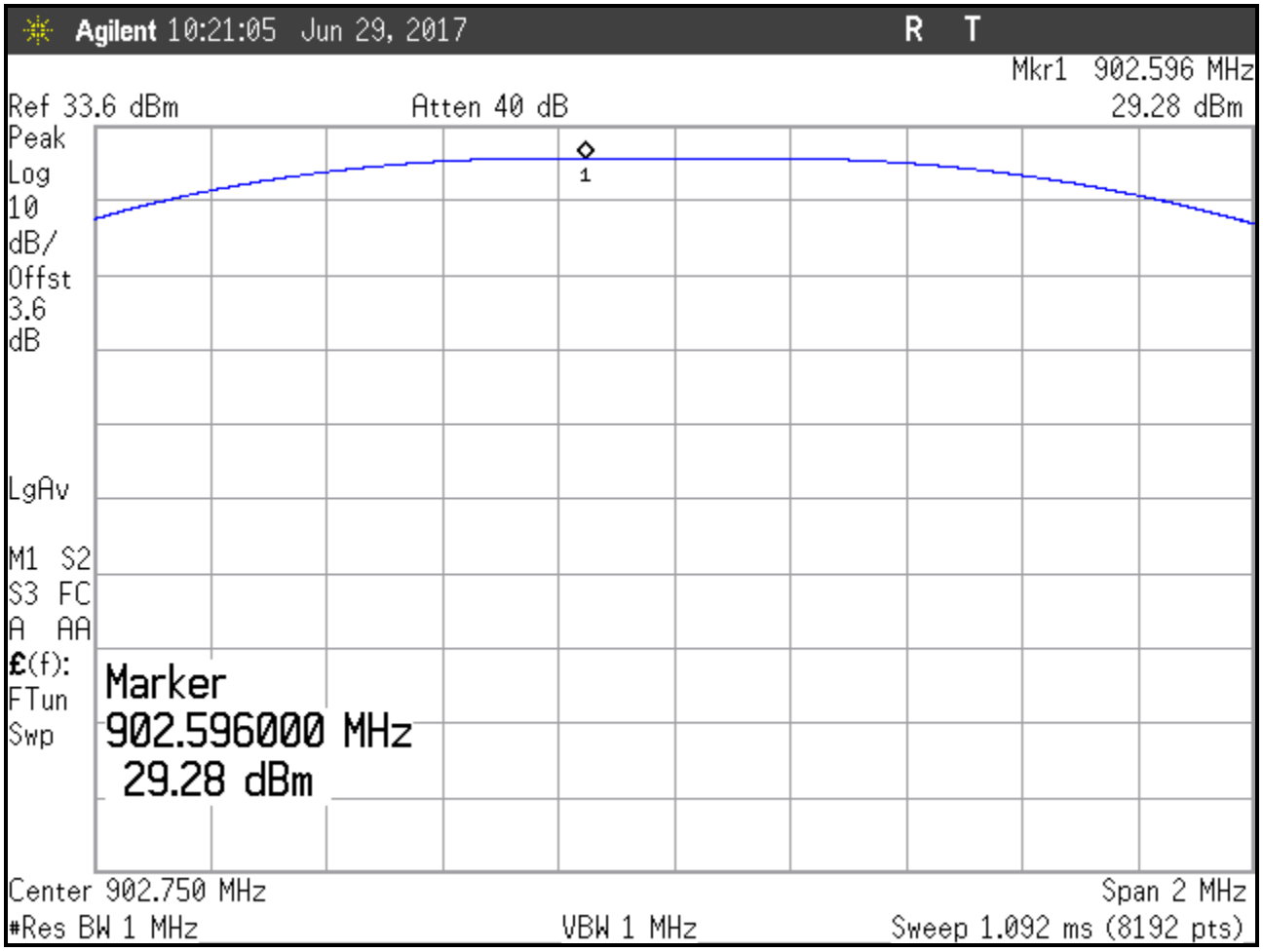

Figure 4: RF Peak Power, High Power, Low Channel

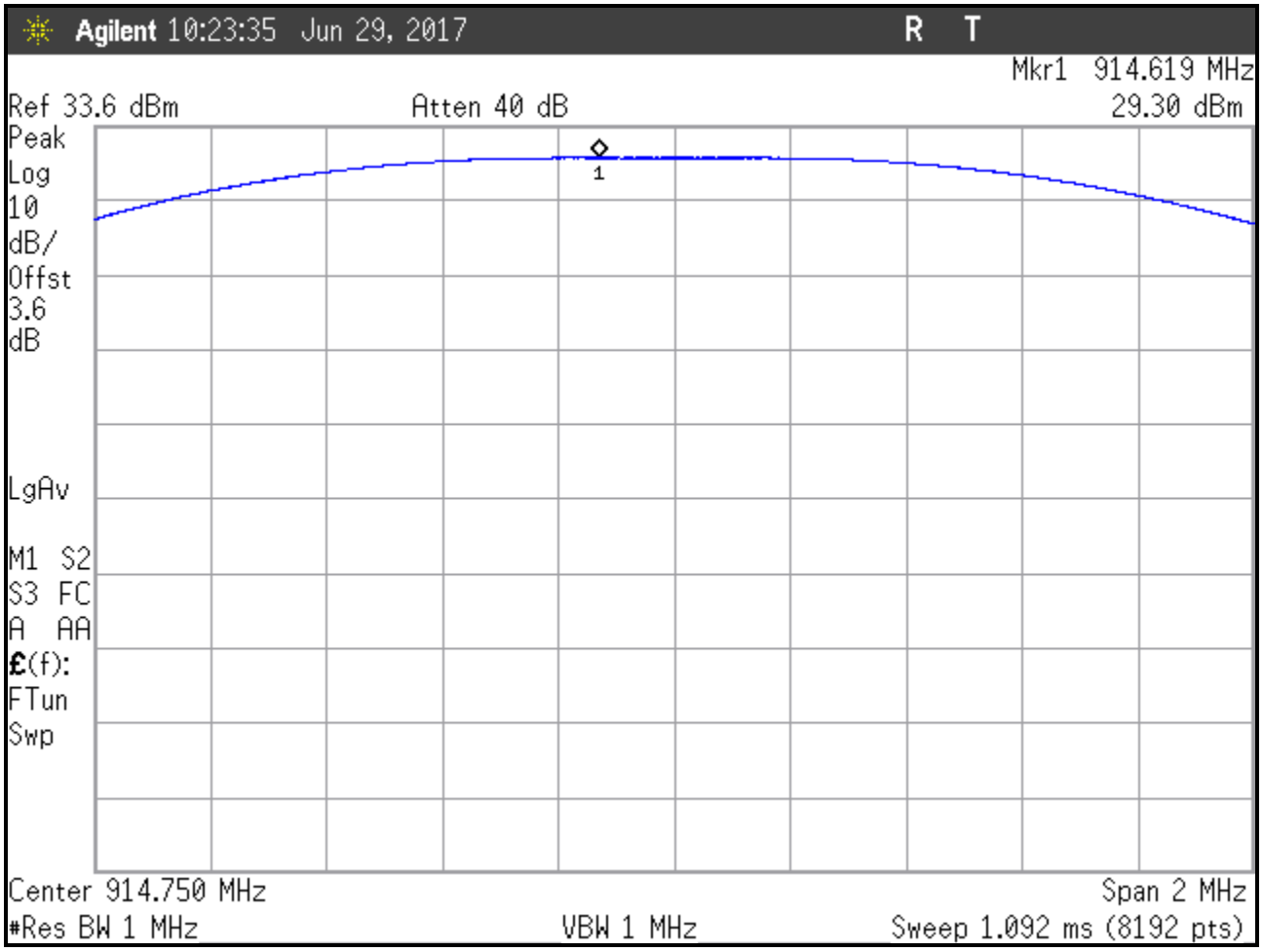

Figure 5: RF Peak Power, High Power, Center Channel

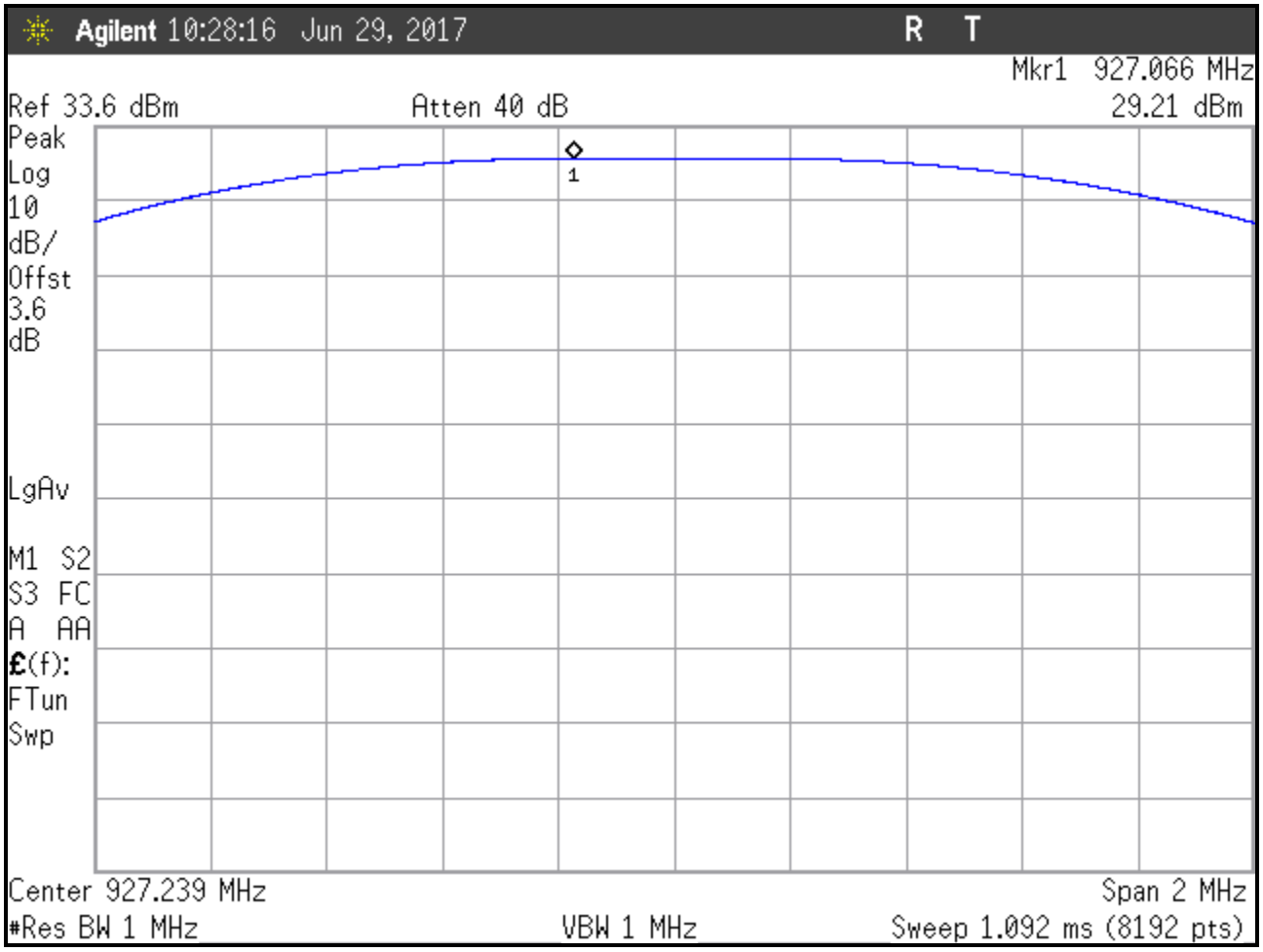

Figure 6: RF Peak Power, High Power, High Channel

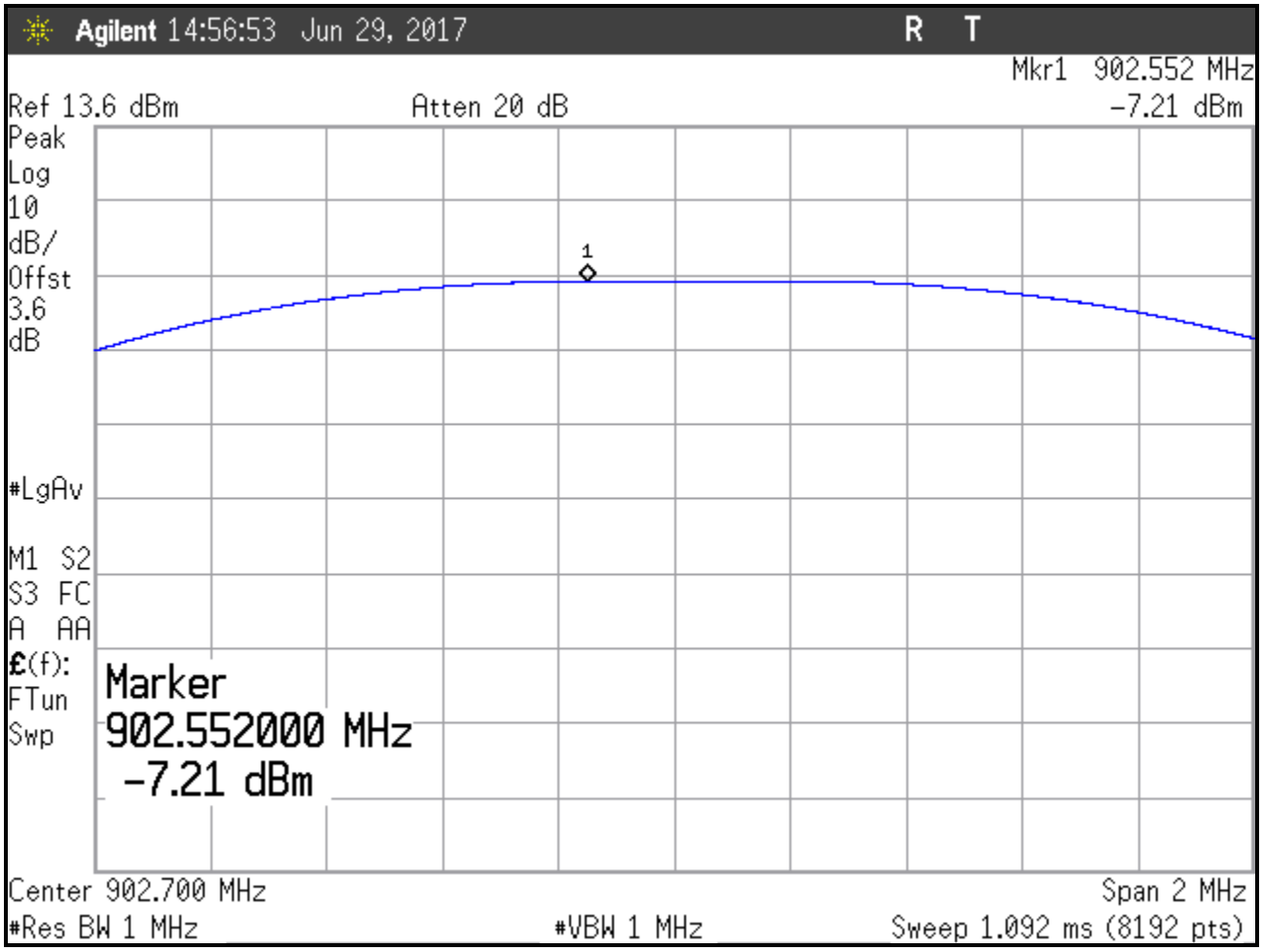

Figure 7: RF Peak Power, Low Power, Low Channel

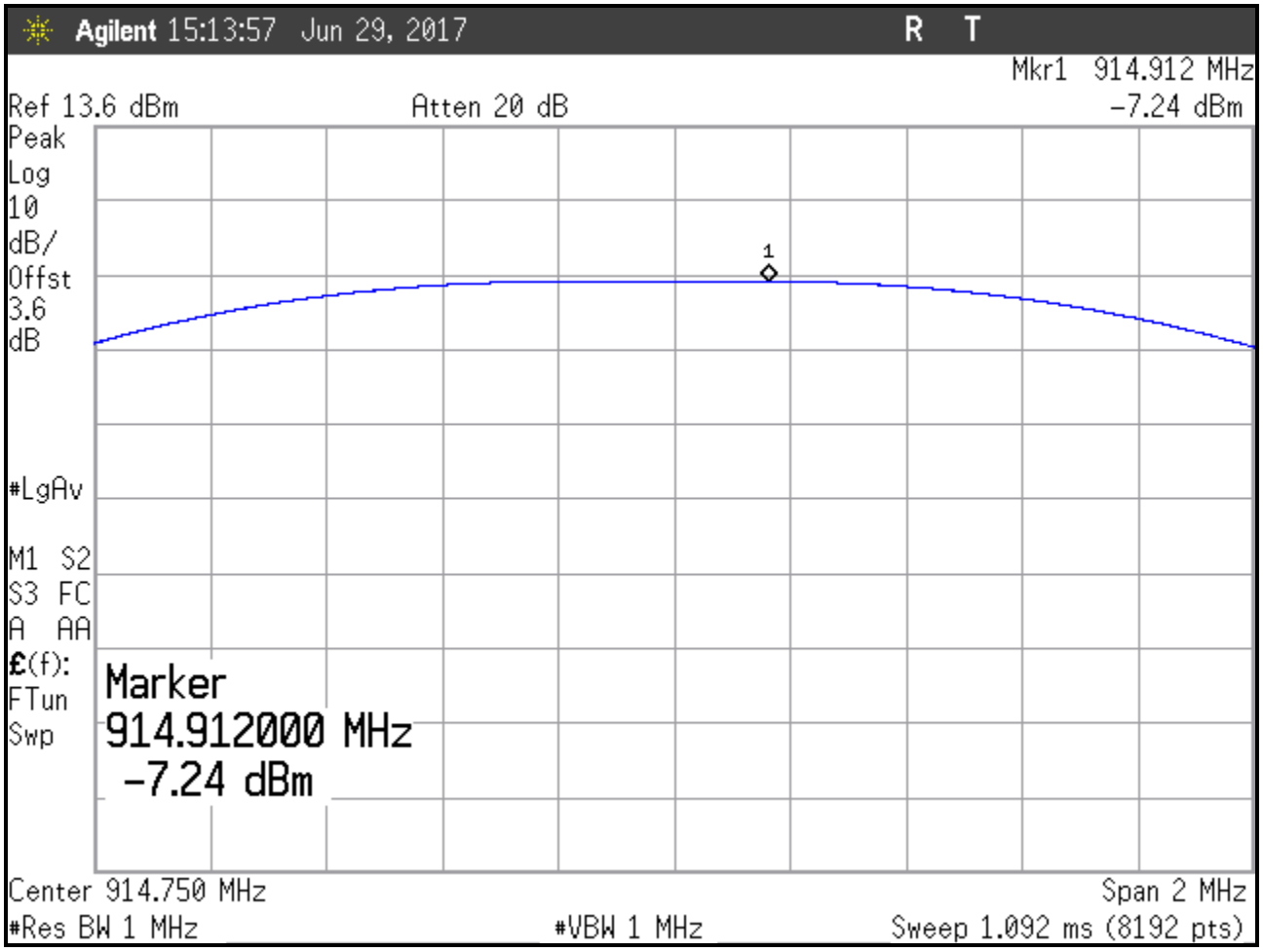

Figure 8: RF Peak Power, Low Power, Center Channel

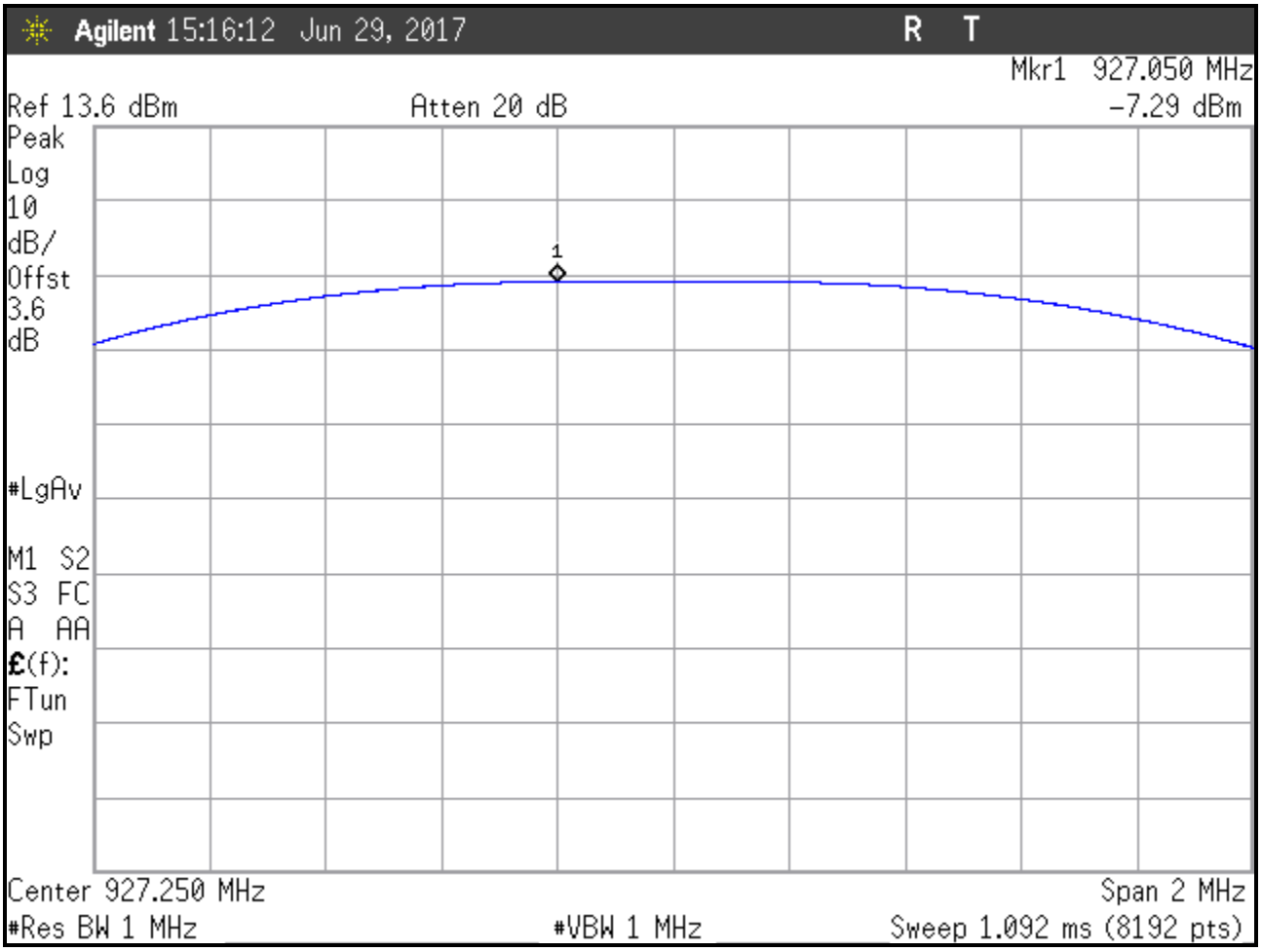

Figure 9: RF Peak Power, Low Power, High Channel

5.3 Occupied Bandwidth: (FCC 15.247 (a)(1)(i)), (ISED RSS-247 5.1(c))

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer. For Frequency Hopping Spread Spectrum Systems, FCC Part 15.247 requires the maximum 20 dB bandwidth not exceed 500 kHz. The automatic bandwidth measurement capability was employed using the X dB bandwidth mode with X set to 6 dB, (i.e., RBW = 10kHz, VBW ≥ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. Care was taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥6 dB.

Table 8 provides a summary of the Occupied Bandwidth Results for the various data rates.

Table 8: Occupied Bandwidth Results

Data Rate: 153.6kbps

Frequency	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	470.698	447.17	500	Pass
Center Channel: 914.75MHz	473.926	446.87	500	Pass
High Channel: 927.25MHz	474.621	447.05	500	Pass

Data Rate: 76.8kbps

Frequency	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	294.3	296.4	500	Pass
Center Channel: 914.75MHz	292.6	294.7	500	Pass
High Channel: 927.25MHz	293.5	297.3	500	Pass

Data Rate: 38.4kbps

Frequency	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	272.7	271.2	500	Pass
Center Channel: 914.75MHz	271.1	270.3	500	Pass
High Channel: 927.25MHz	271.1	269.9	500	Pass

Data Rate: 19.2kbps

Frequency	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	298.0	312.3	500	Pass
Center Channel: 914.75MHz	289.7	311.3	500	Pass
High Channel: 927.25MHz	287.1	304.5	500	Pass

Data Rate: 9.6kbps

Frequency	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	292.8	309.6	500	Pass
Center Channel: 914.75MHz	290.6	307.6	500	Pass
High Channel: 927.25MHz	288.3	305.7	500	Pass

At full modulation and the highest data rate (153.5kbps), the occupied bandwidth was measured as shown in the plots below.

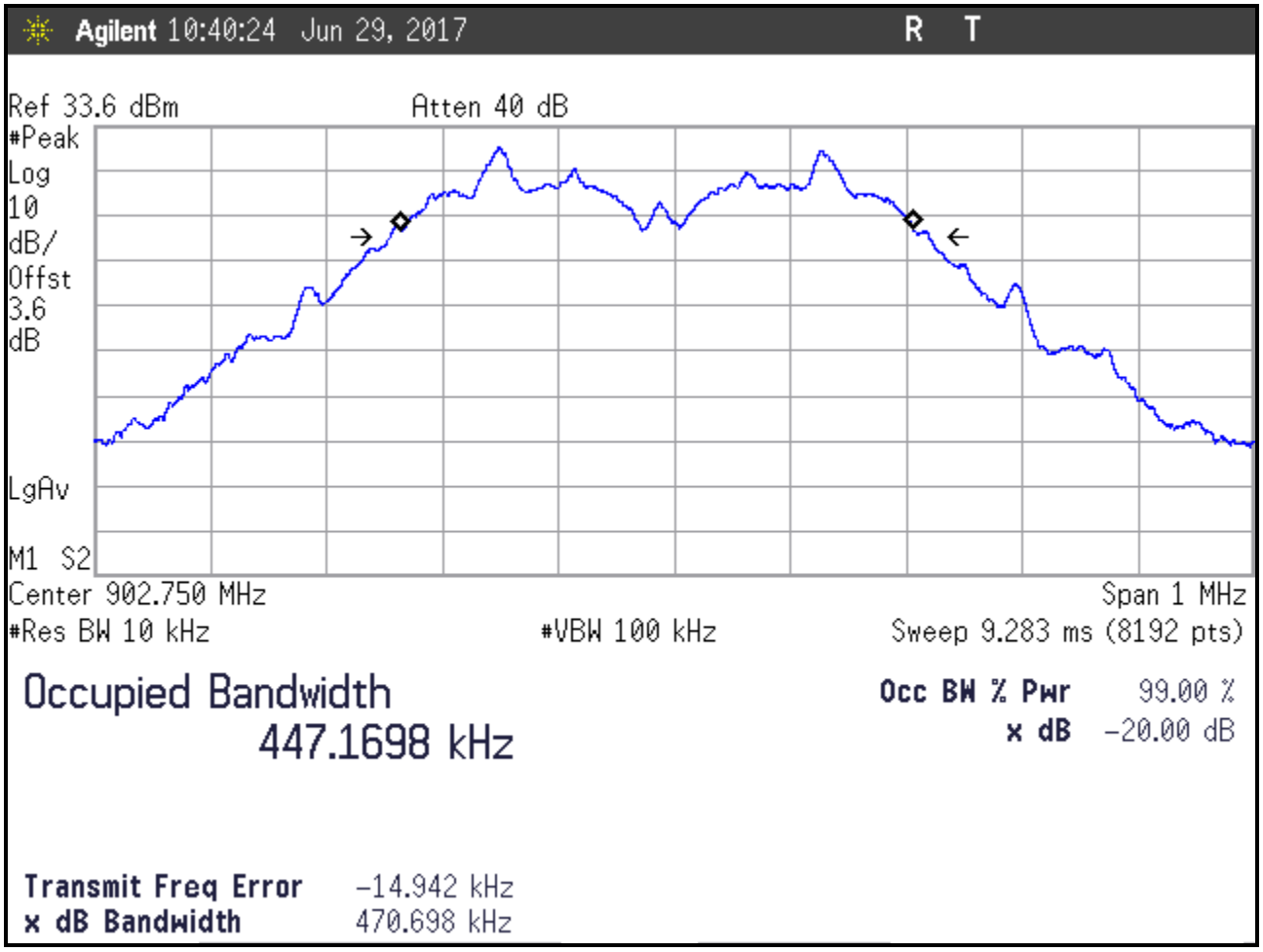

Figure 10: Occupied Bandwidth, Low Channel

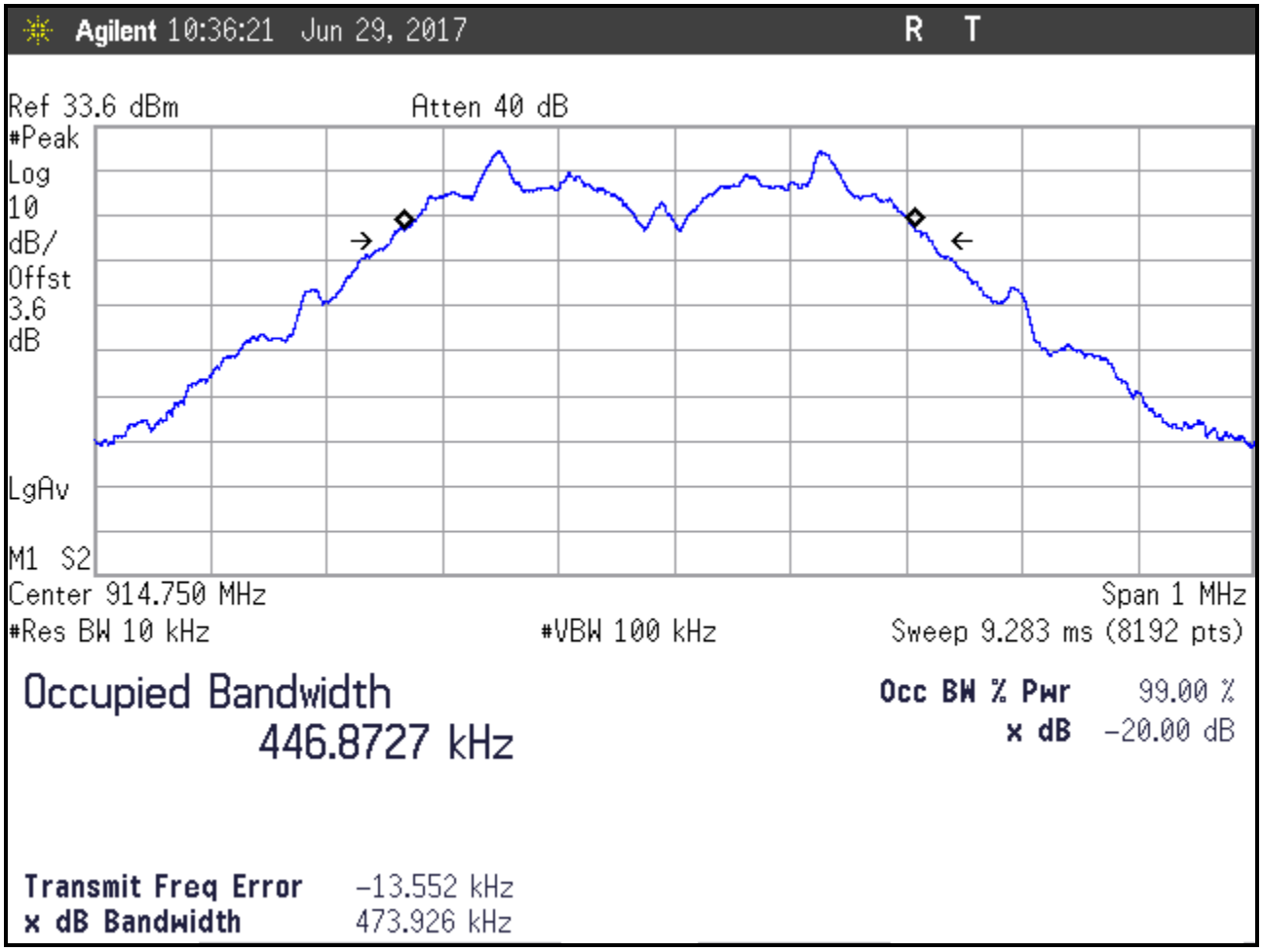

Figure 11: Occupied Bandwidth, Center Channel

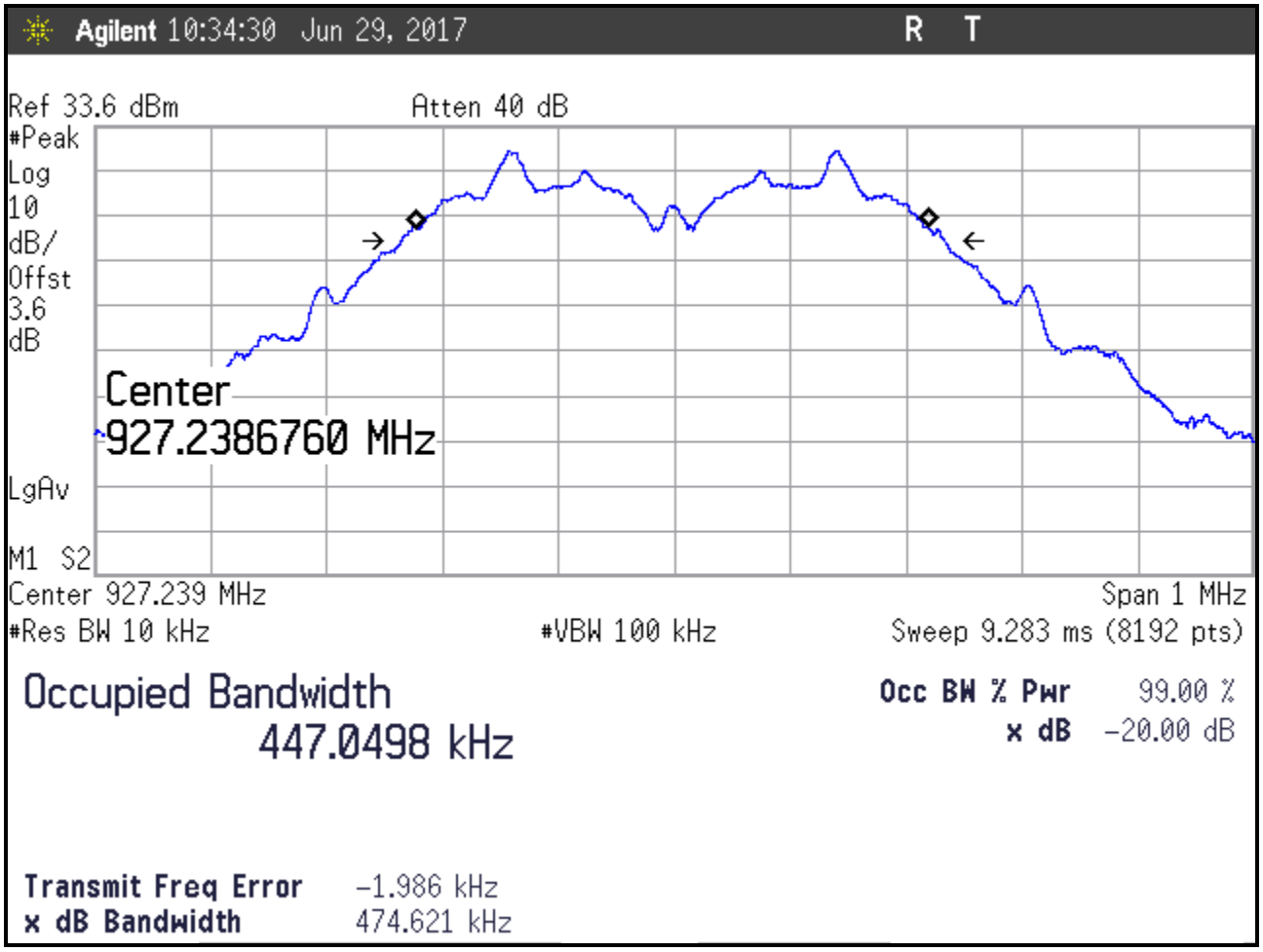

Figure 12: Occupied Bandwidth, High Channel

5.4 Channel Spacing and Number of Channels (FCC Part §15.247(a)(1)), (ISED RSS-

Per the FCC requirements, frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth, whichever is greater. The maximum 20dB bandwidth measured is 474.62 kHz so the channel spacing must be more than 476.4 kHz. In addition, for a 902-928MHz transmitter with an occupied bandwidth greater than 250 kHz the minimum number of hopping channels shall be 25.

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 20 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 30 kHz and the video bandwidth was set to 30 kHz. The channel spacing of 2 adjacent channels was measured using a spectrum analyzer span setting of 100 kHz. Also, the number of hopping channels was measured from 902-928MHz using a RBW/VBW setting of 30 kHz.

The following are plots of the channel spacing and number of hopping channels data. The channel spacing was measured to be 499 kHz and the number of channels used is 50.

Note: In the following plots each channel is composed of 2 distinct peaks.

Table 9: Channel Spacing and Number of Channels Results

	Result	Limit	Pass/Fail
Channel Spacing	499 kHz	474.621kHz Minimum	Pass
Number of channels	50 channels	25 Channels Minimum	Pass

Figure 13: Channel Spacing

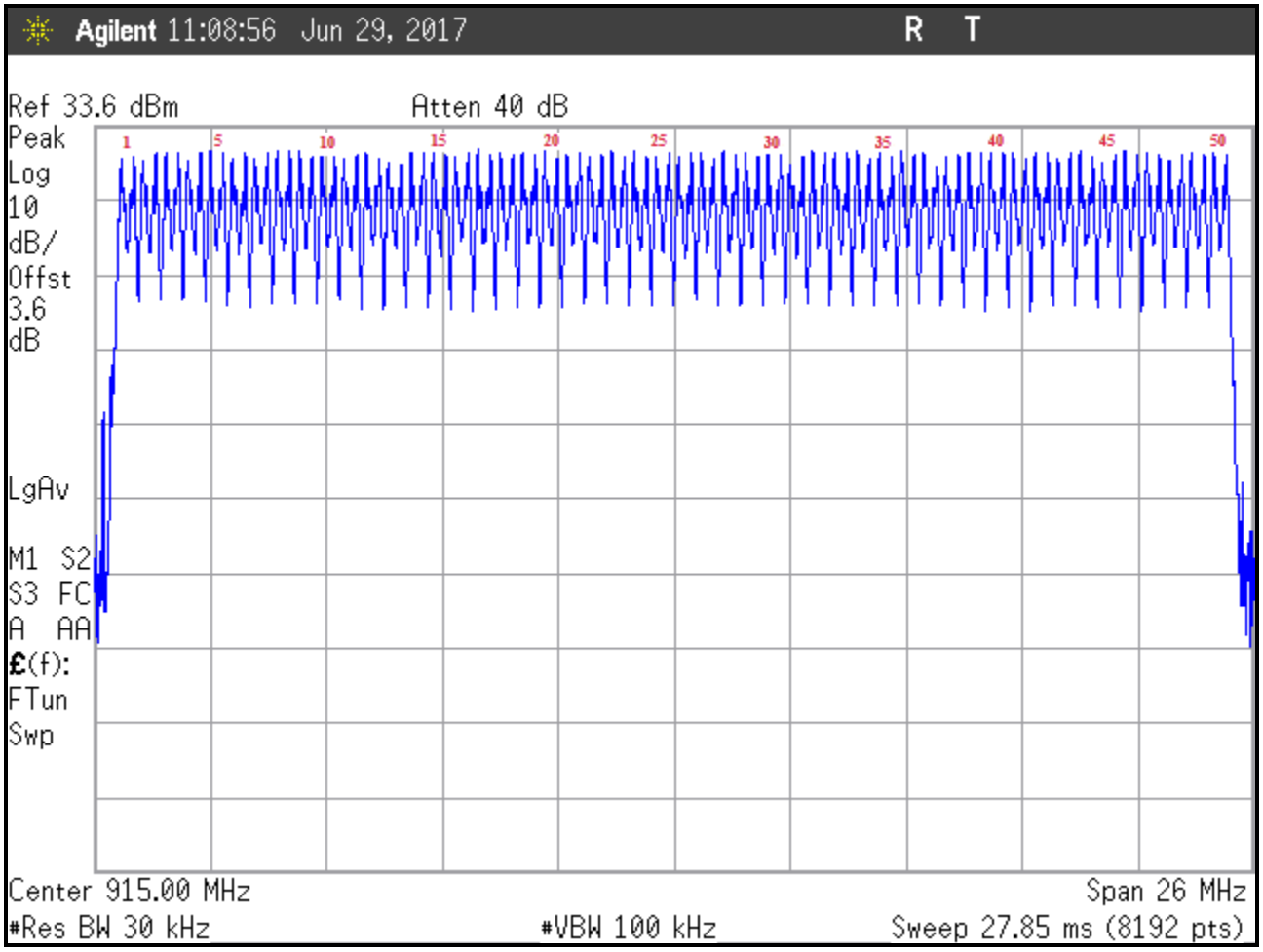

Figure 14: Number of Hopping Channels

5.5 Conducted Spurious Emissions at Antenna Terminals (FCC Part §2.1051)

The EUT must comply with requirements for spurious emissions at antenna terminals. Per §15.247(c) 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.

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 10 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 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.

The following are plots of the conducted spurious emissions data.

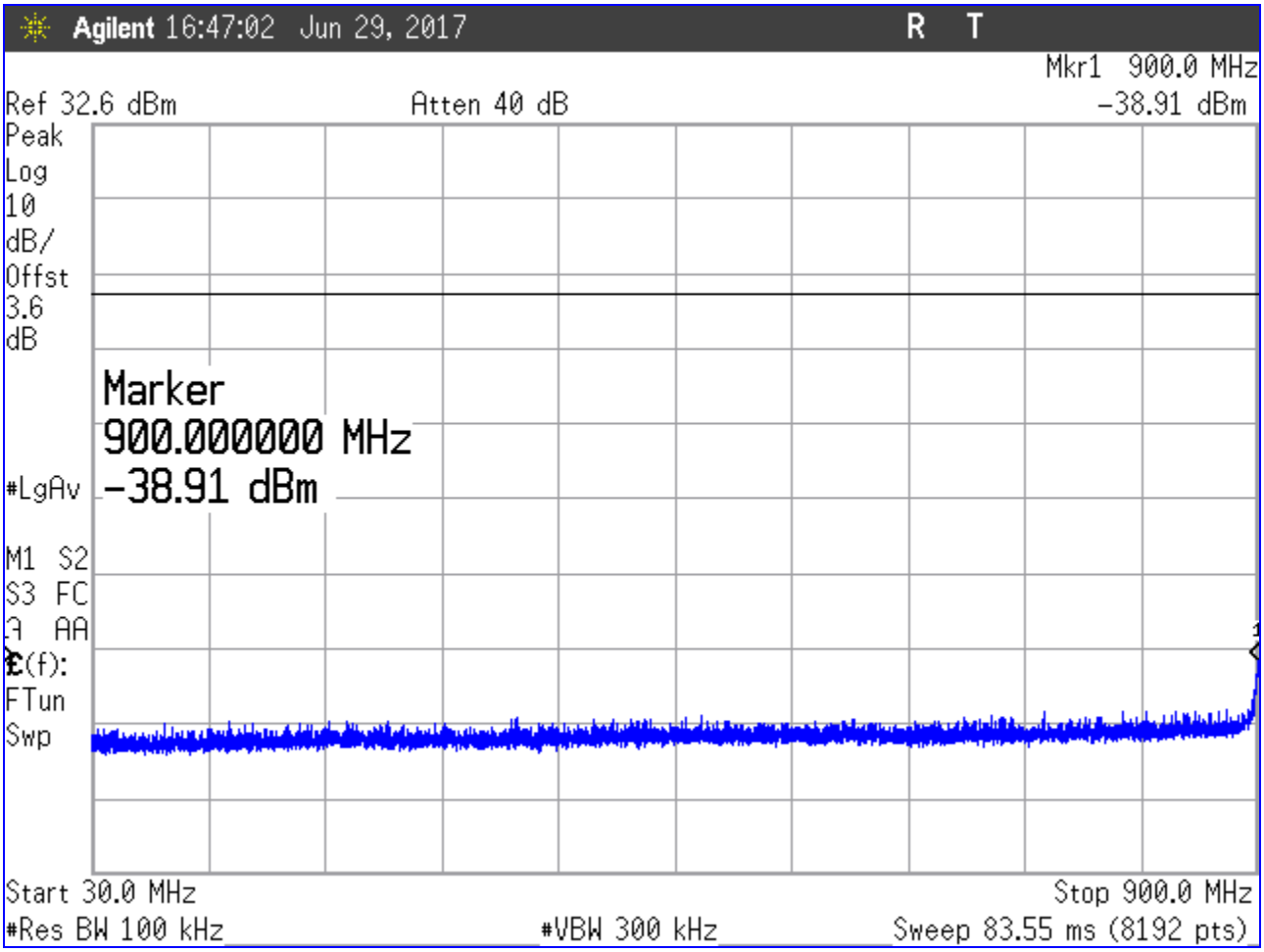

Figure 15: Conducted Spurious Emissions, High Power, Low Channel 30 - 900MHz

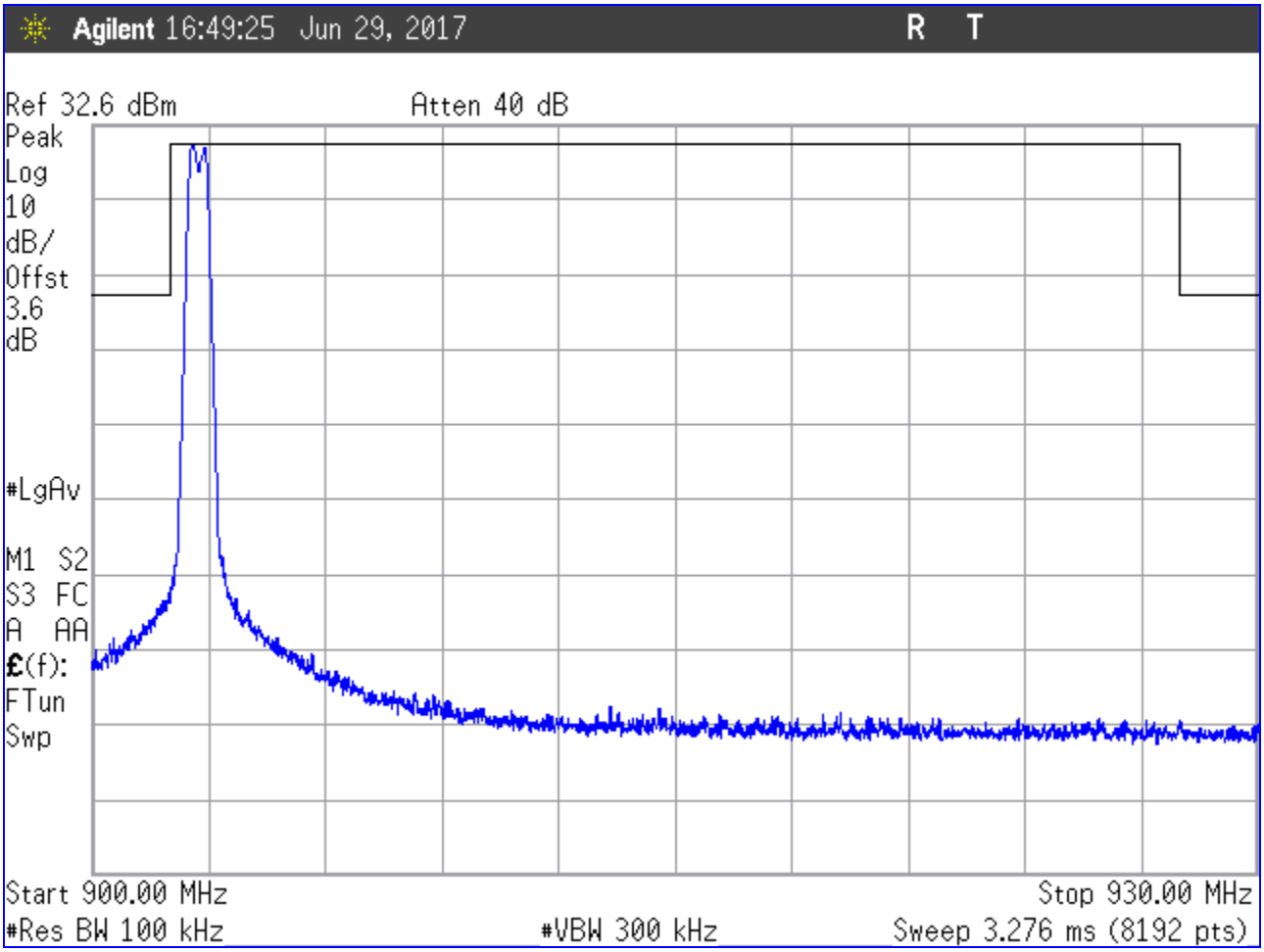

Figure 16: Conducted Spurious Emissions, High Power, Low Channel 900 – 930MHz

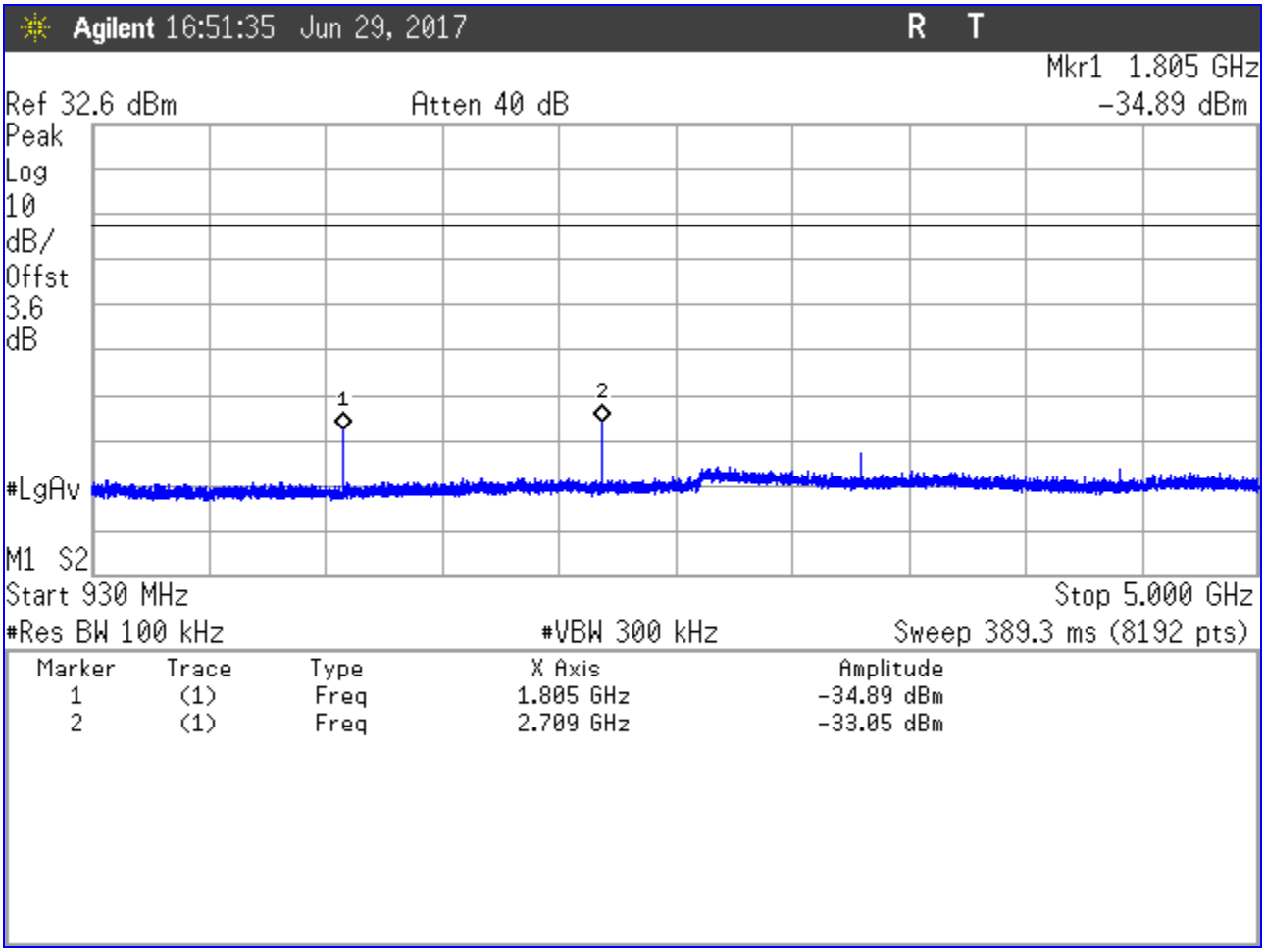

Figure 17: Conducted Spurious Emissions, High Power, Low Channel 930-5000MHz

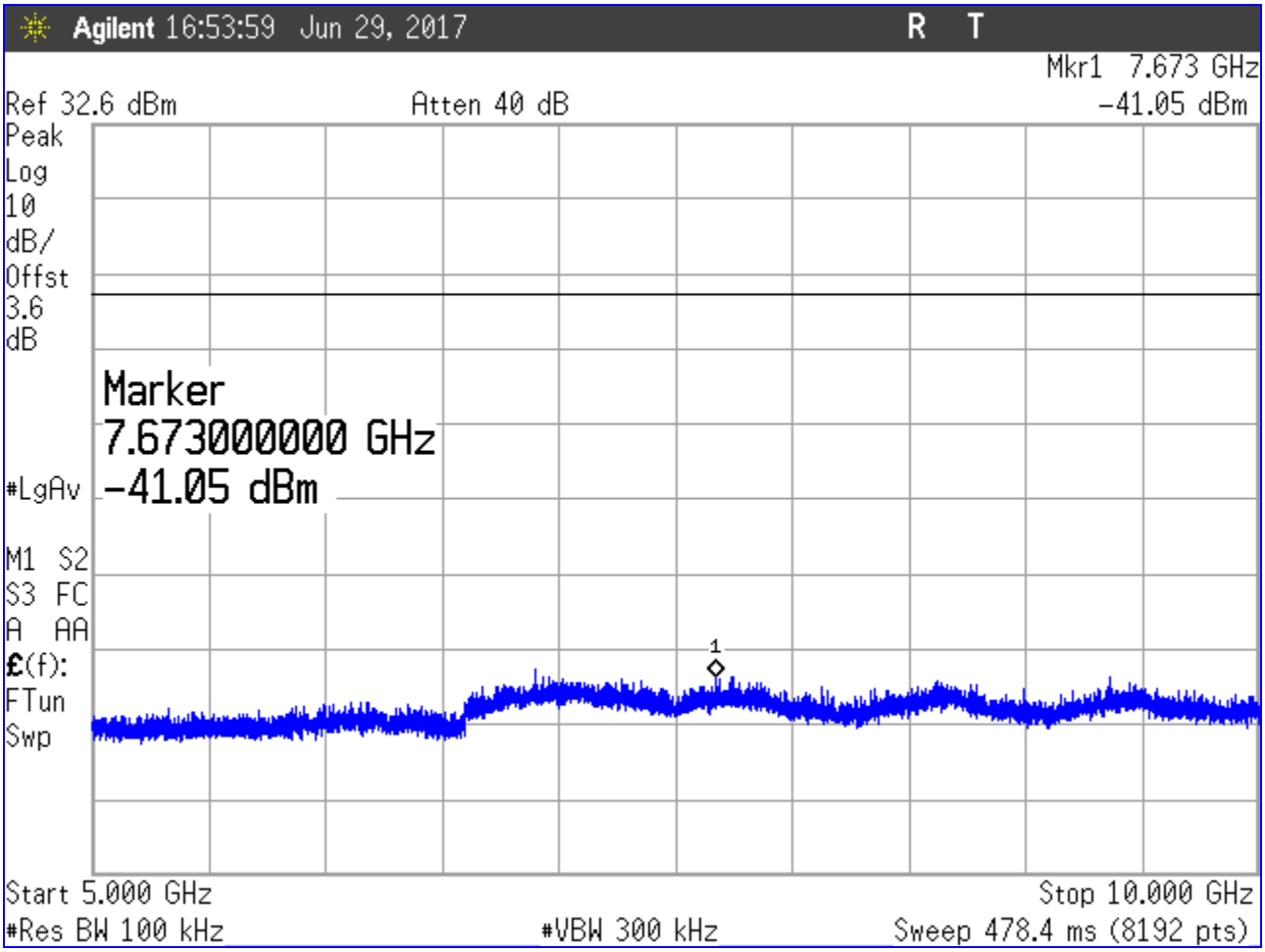

Figure 18: Conducted Spurious Emissions, High Power, Low Channel 5-10GHz

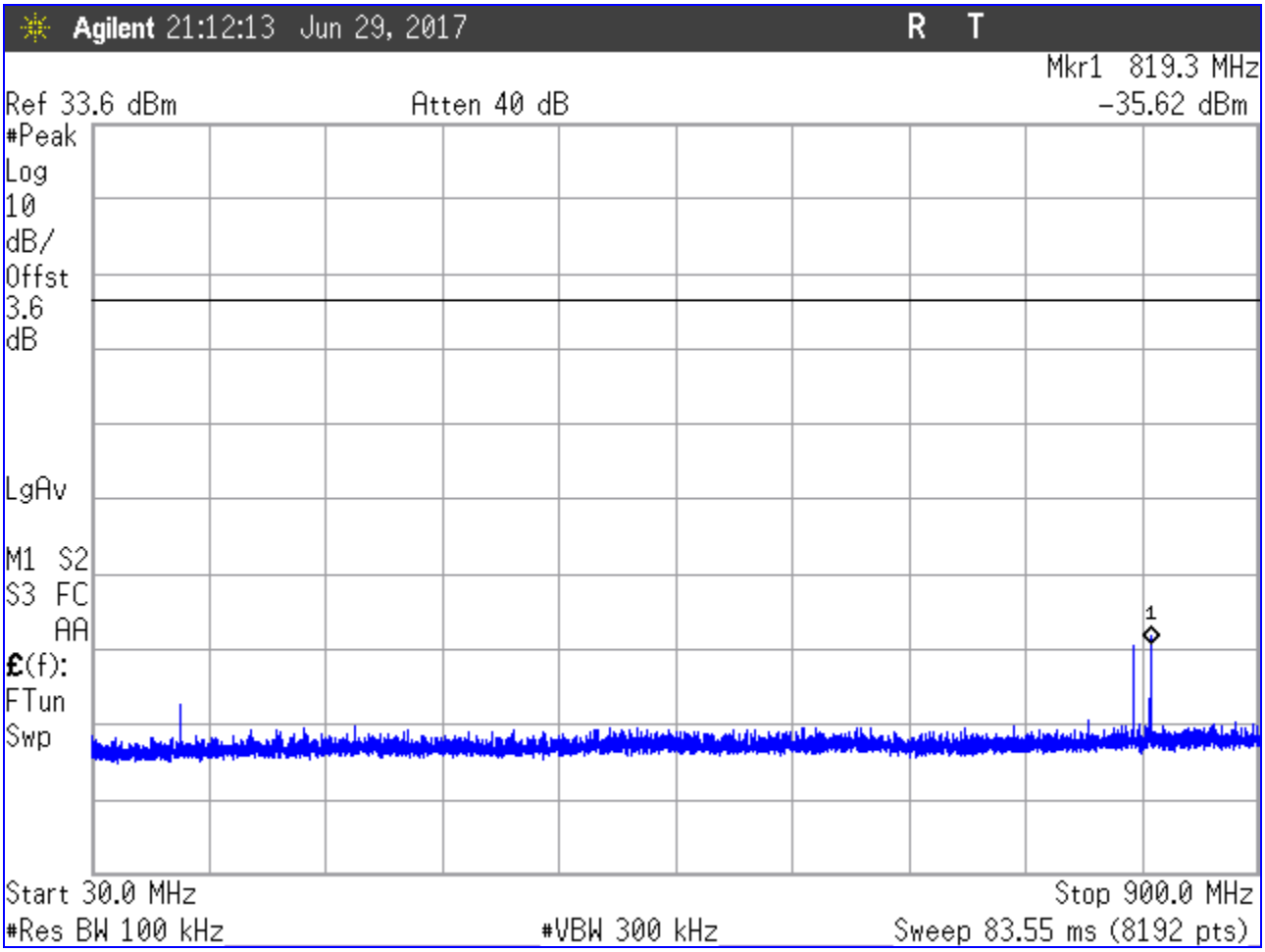

Figure 19: Conducted Spurious Emissions, High Power, Center Channel 30 - 900MHz

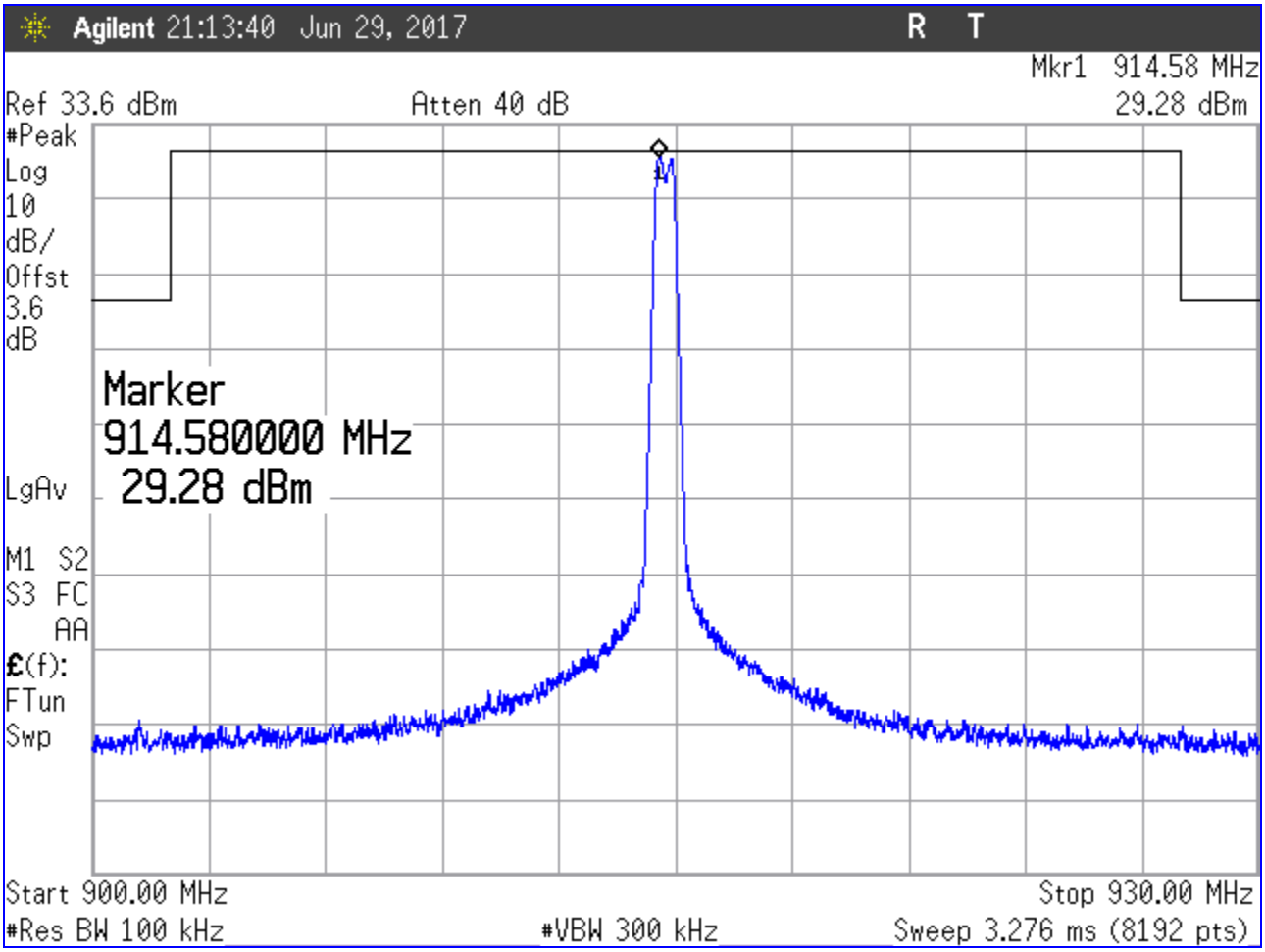

Figure 20: Conducted Spurious Emissions, High Power, Center Channel 900 – 930MHz

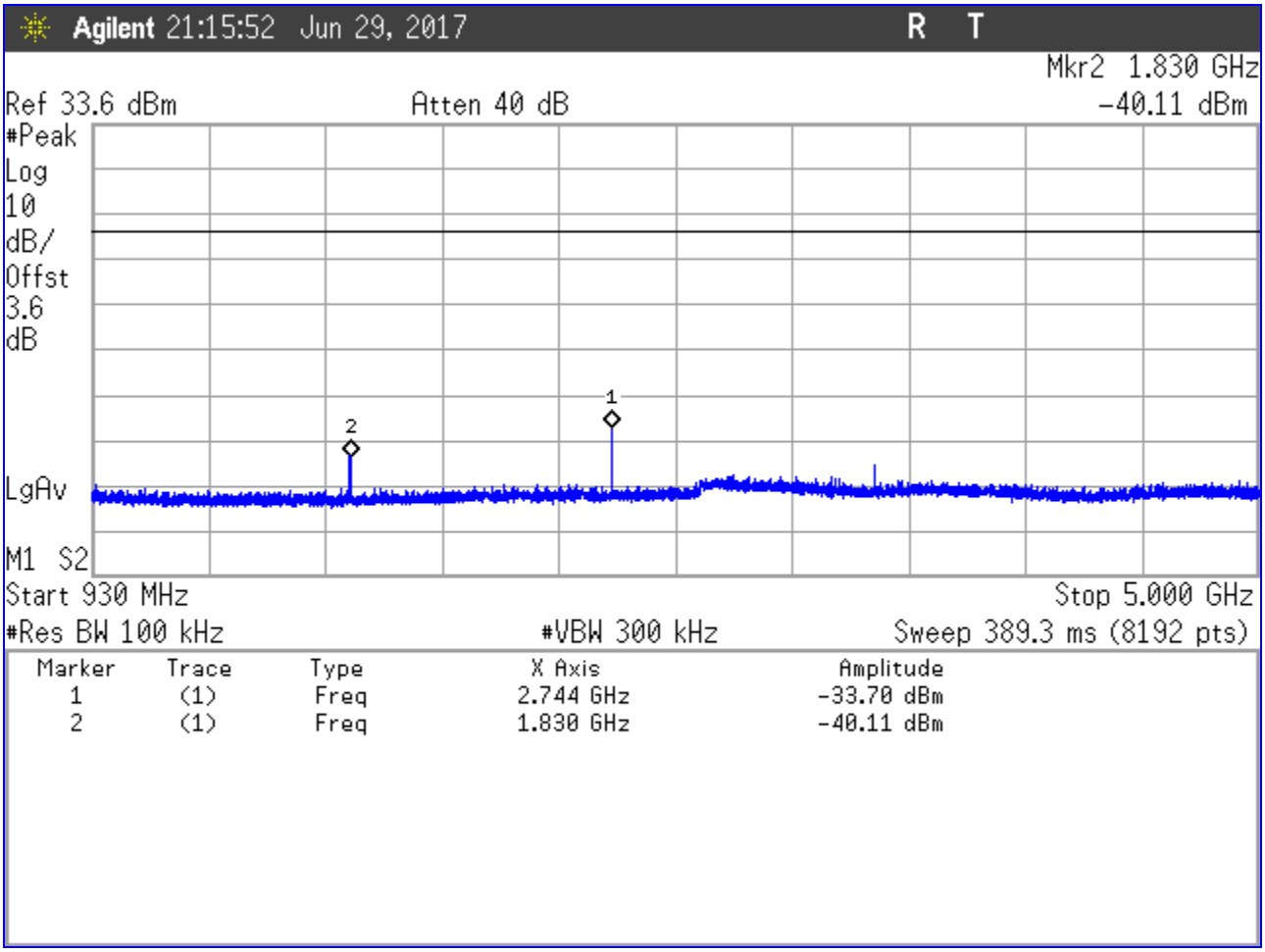

Figure 21: Conducted Spurious Emissions, High Power, Center Channel 930-5000MHz

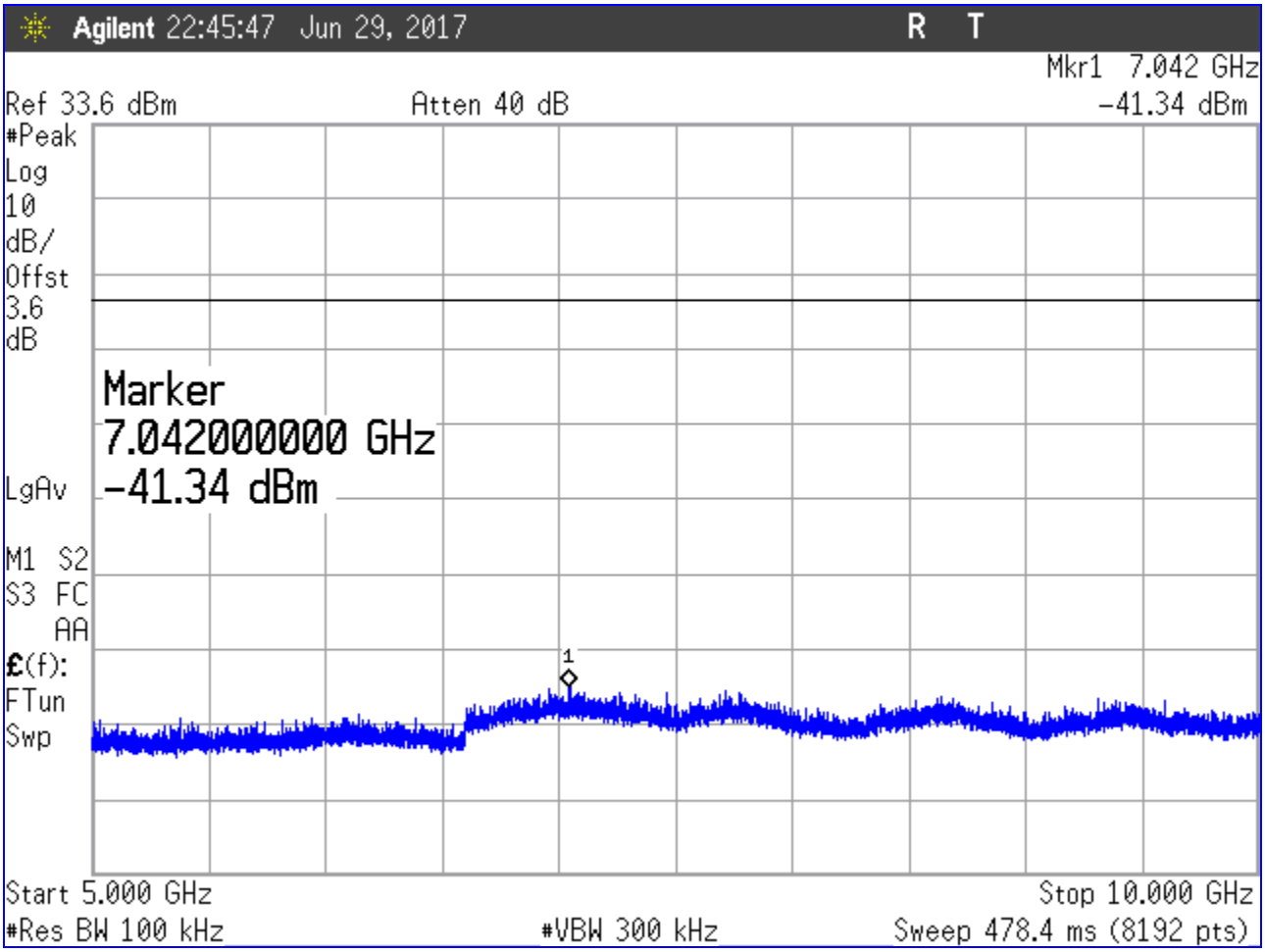

Figure 22: Conducted Spurious Emissions, High Power, Center Channel 5-10GHz

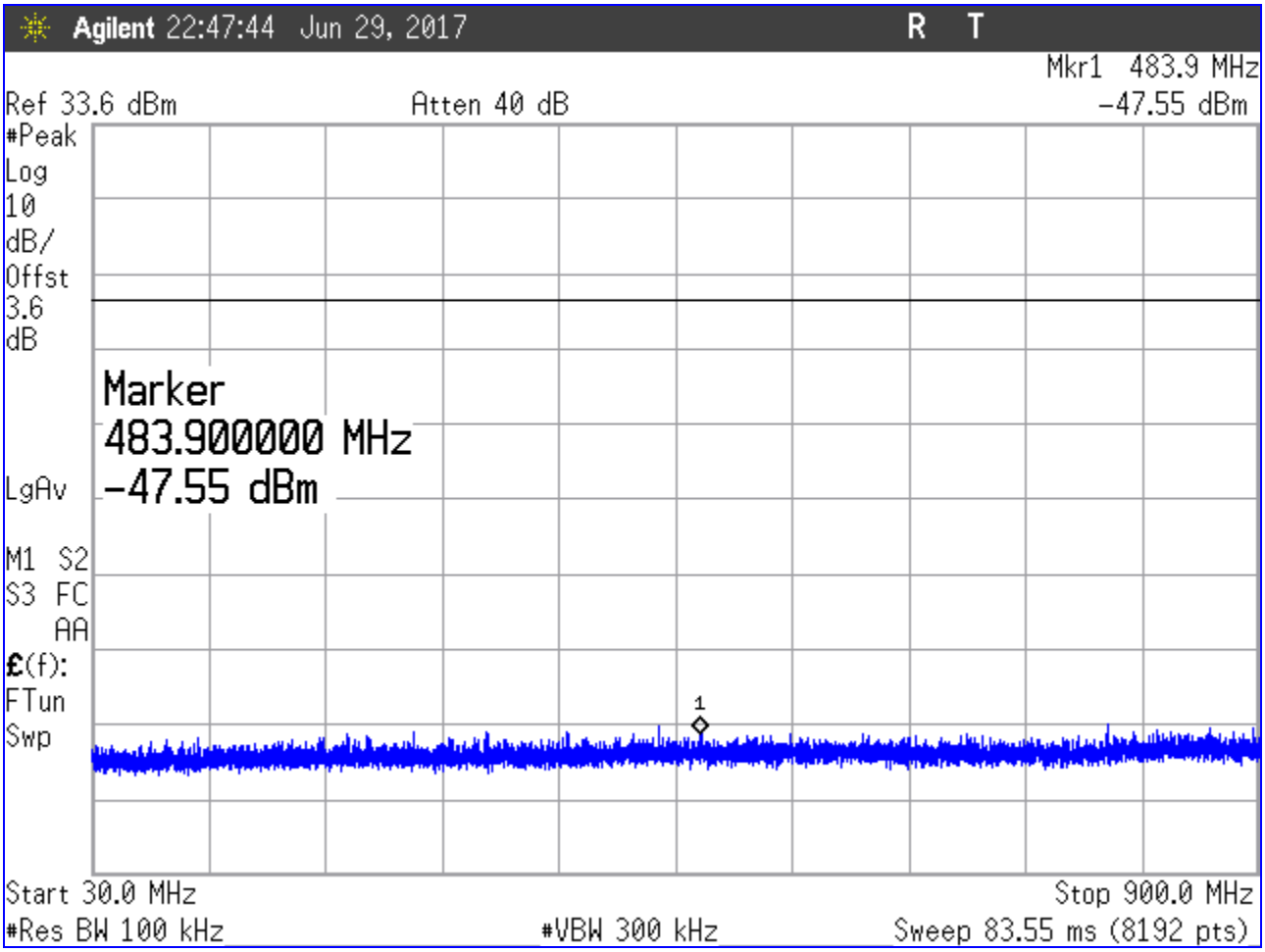

Figure 23: Conducted Spurious Emissions, High Power, High Channel 30 - 900MHz

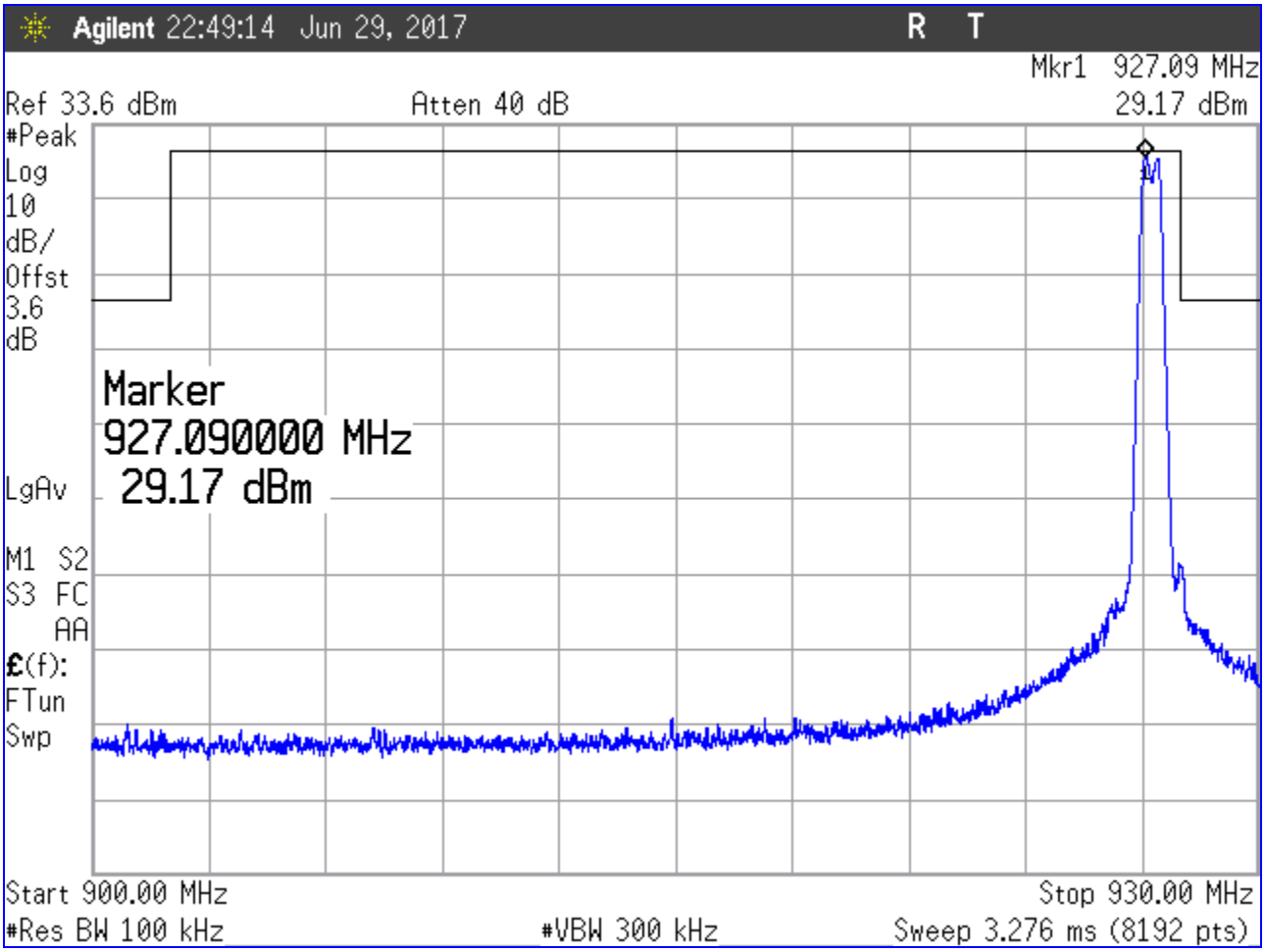

Figure 24: Conducted Spurious Emissions, High Power, High Channel 900 – 930MHz

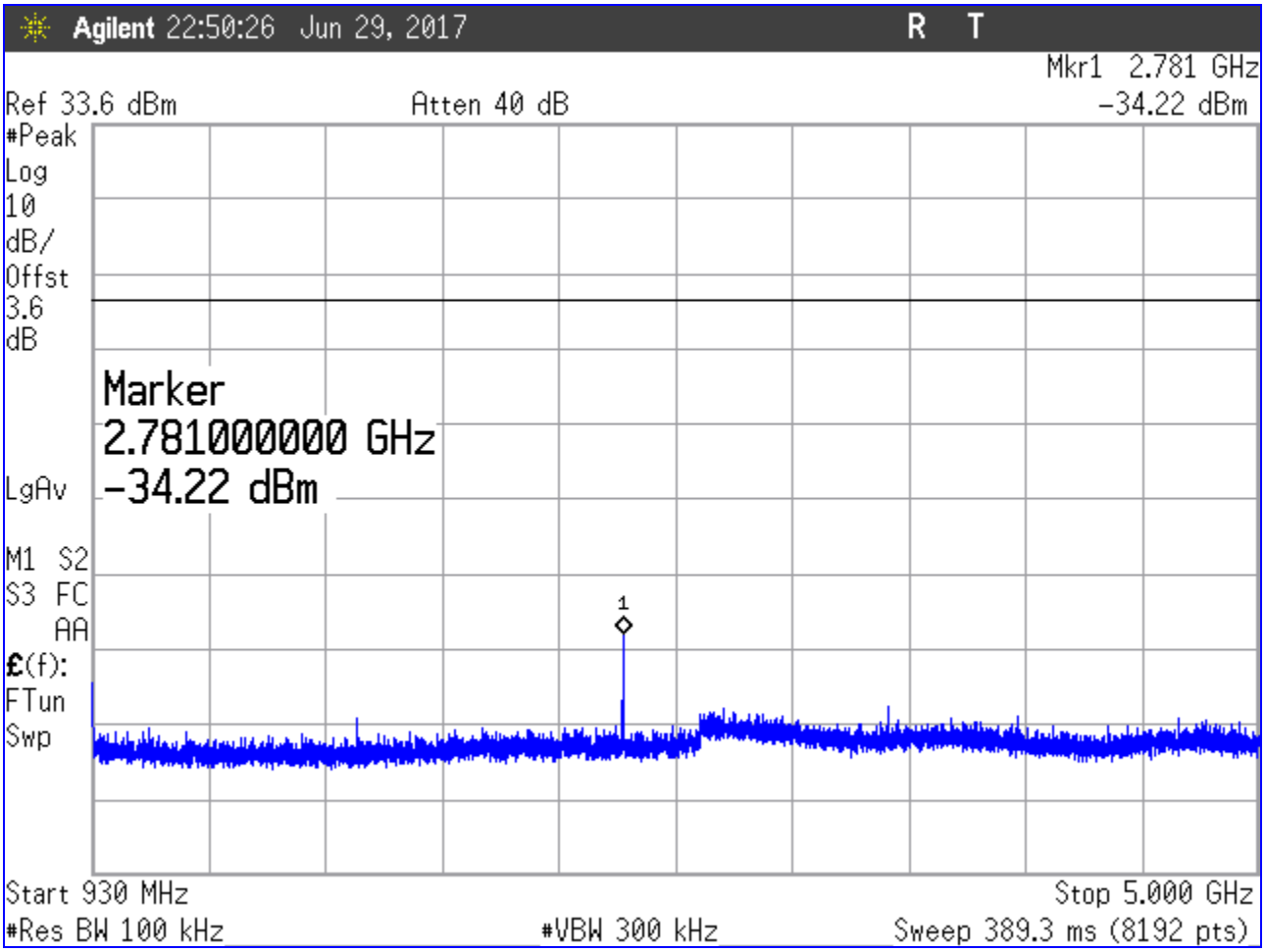

Figure 25: Conducted Spurious Emissions, High Power, High Channel 930-5000MHz

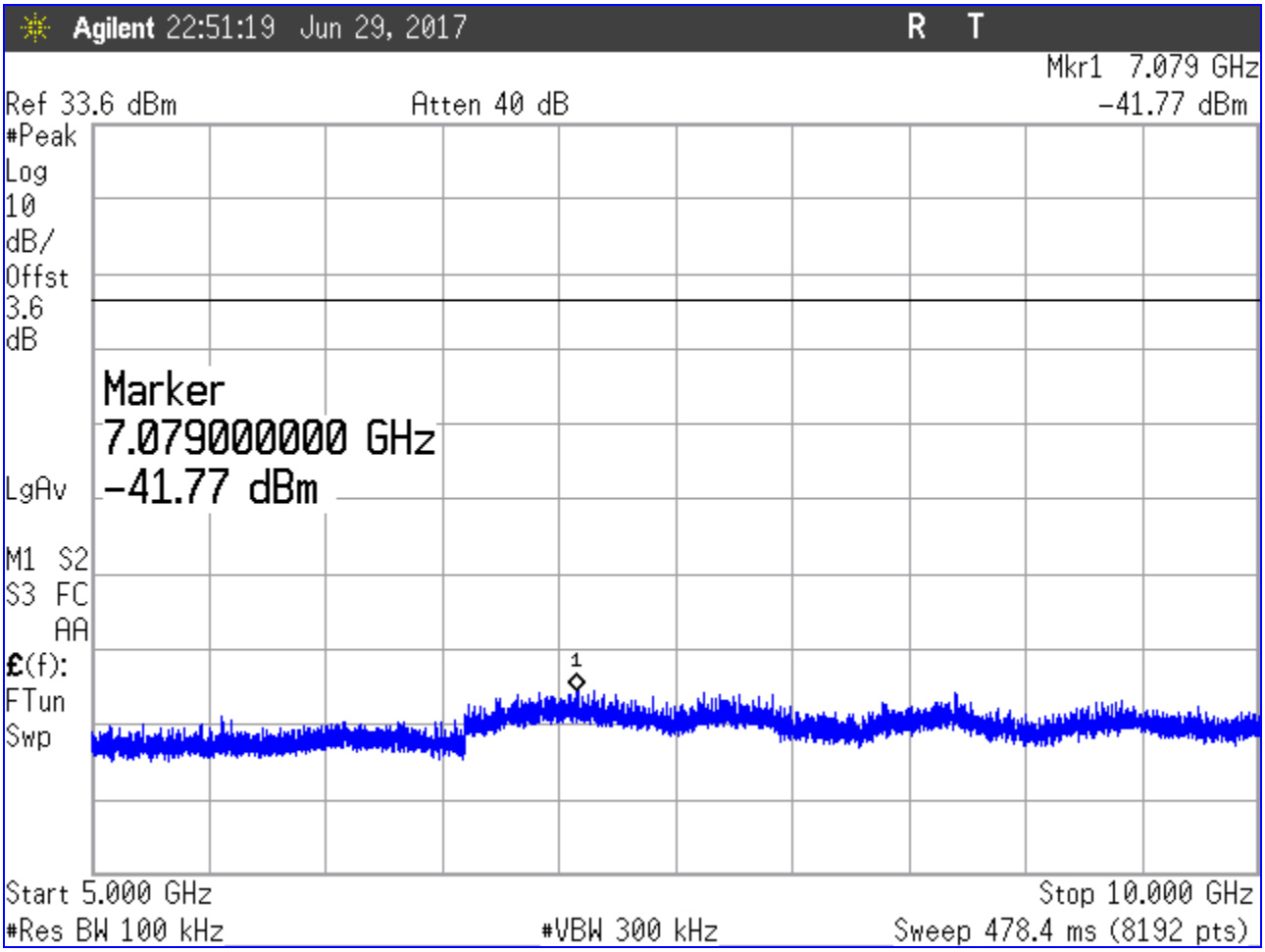

Figure 26: Conducted Spurious Emissions, High Power, High Channel 5-10GHz

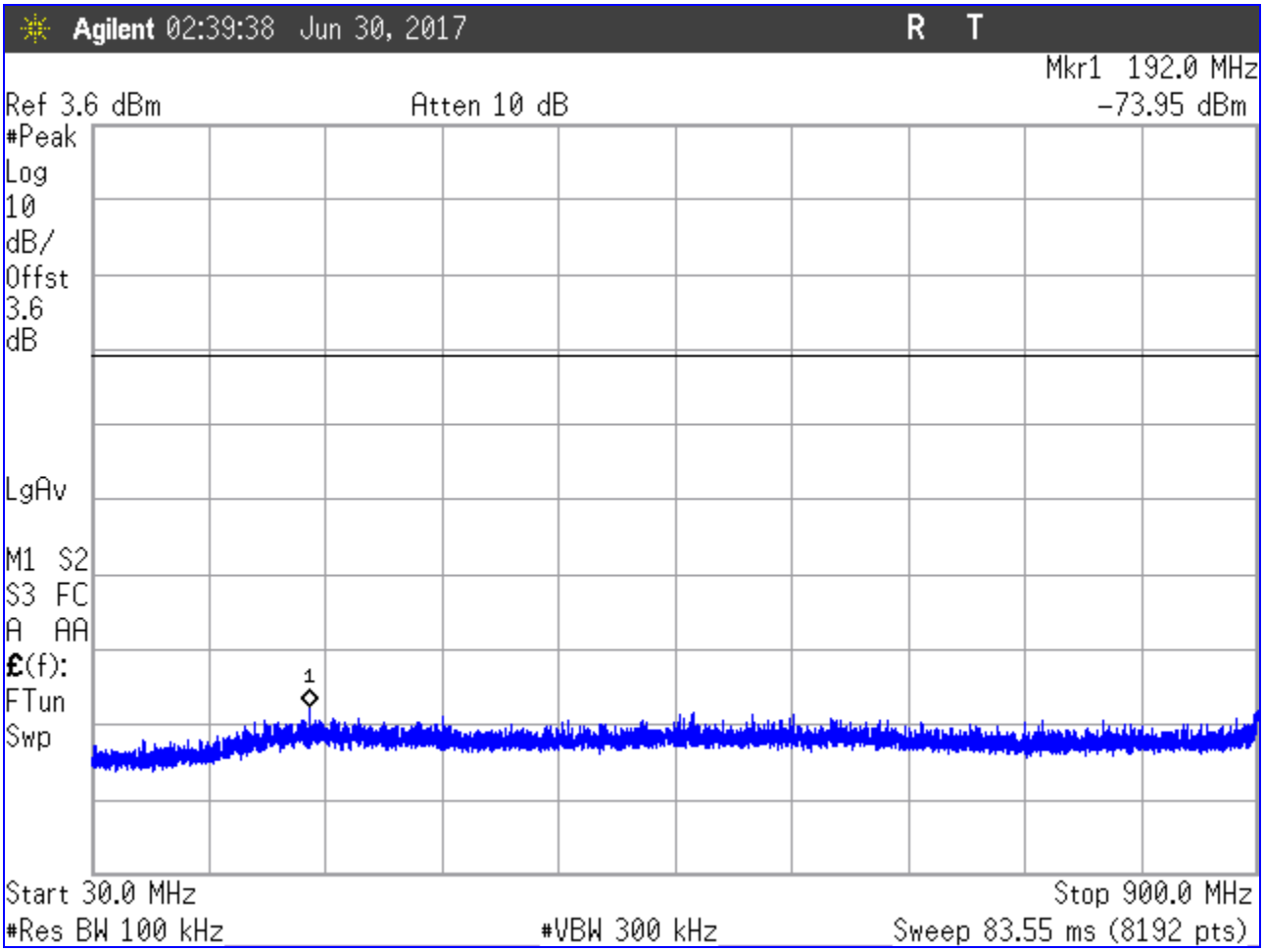

Figure 27: Conducted Spurious Emissions, Low Power, Low Channel 30 - 900MHz

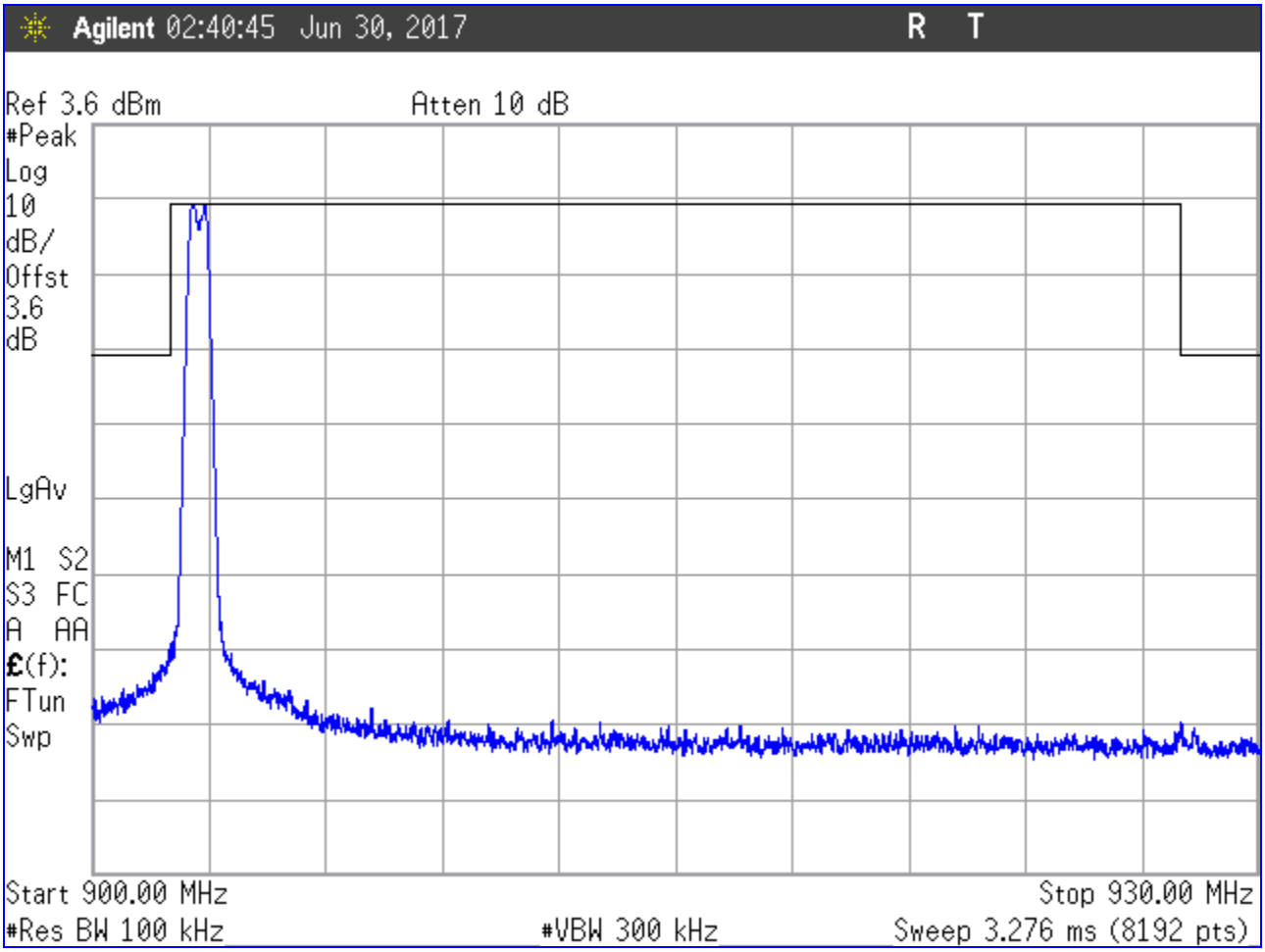

Figure 28: Conducted Spurious Emissions, Low Power, Low Channel 900 – 930MHz

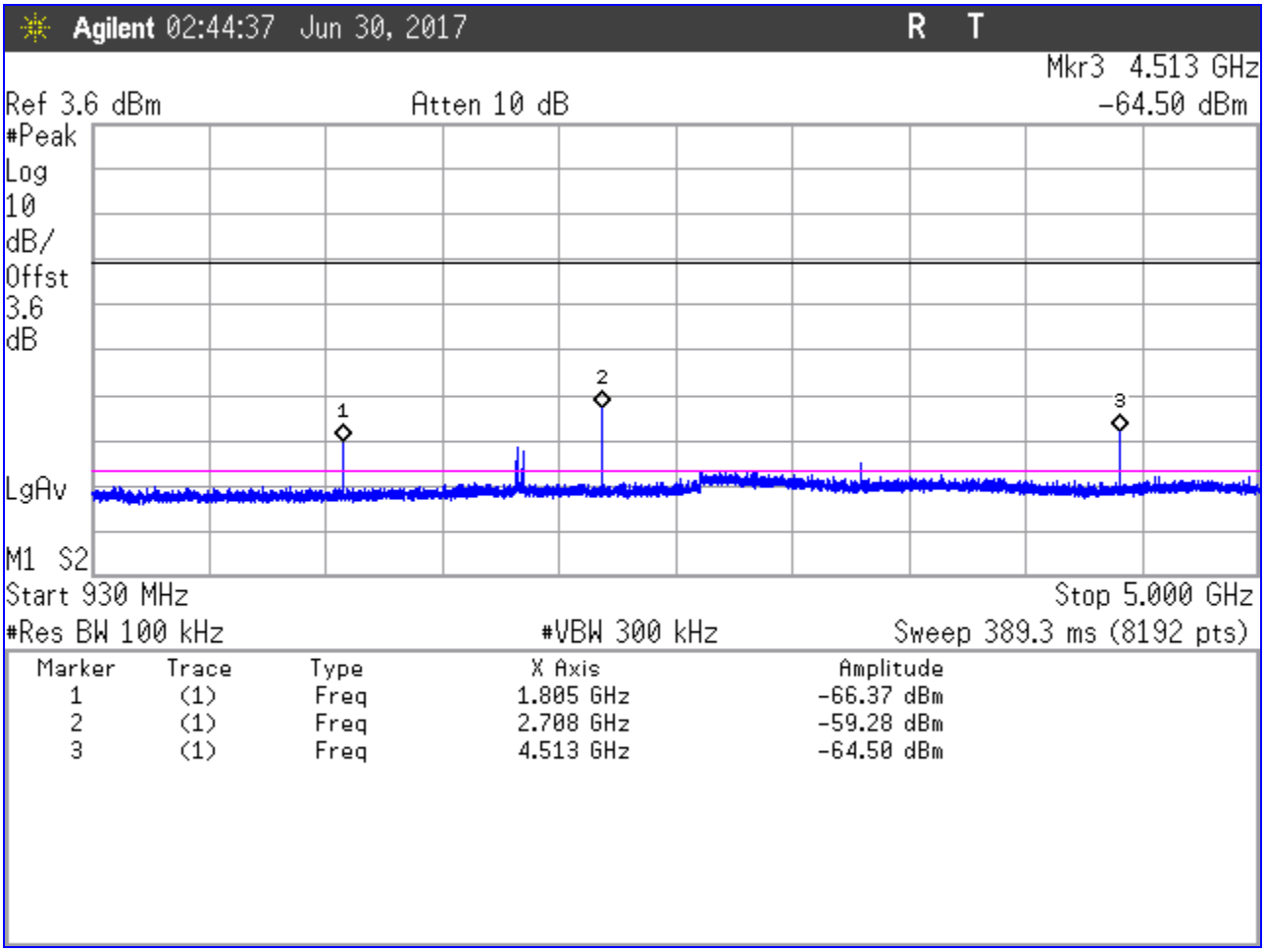

Figure 29: Conducted Spurious Emissions, Low Power, Low Channel 930-5000MHz

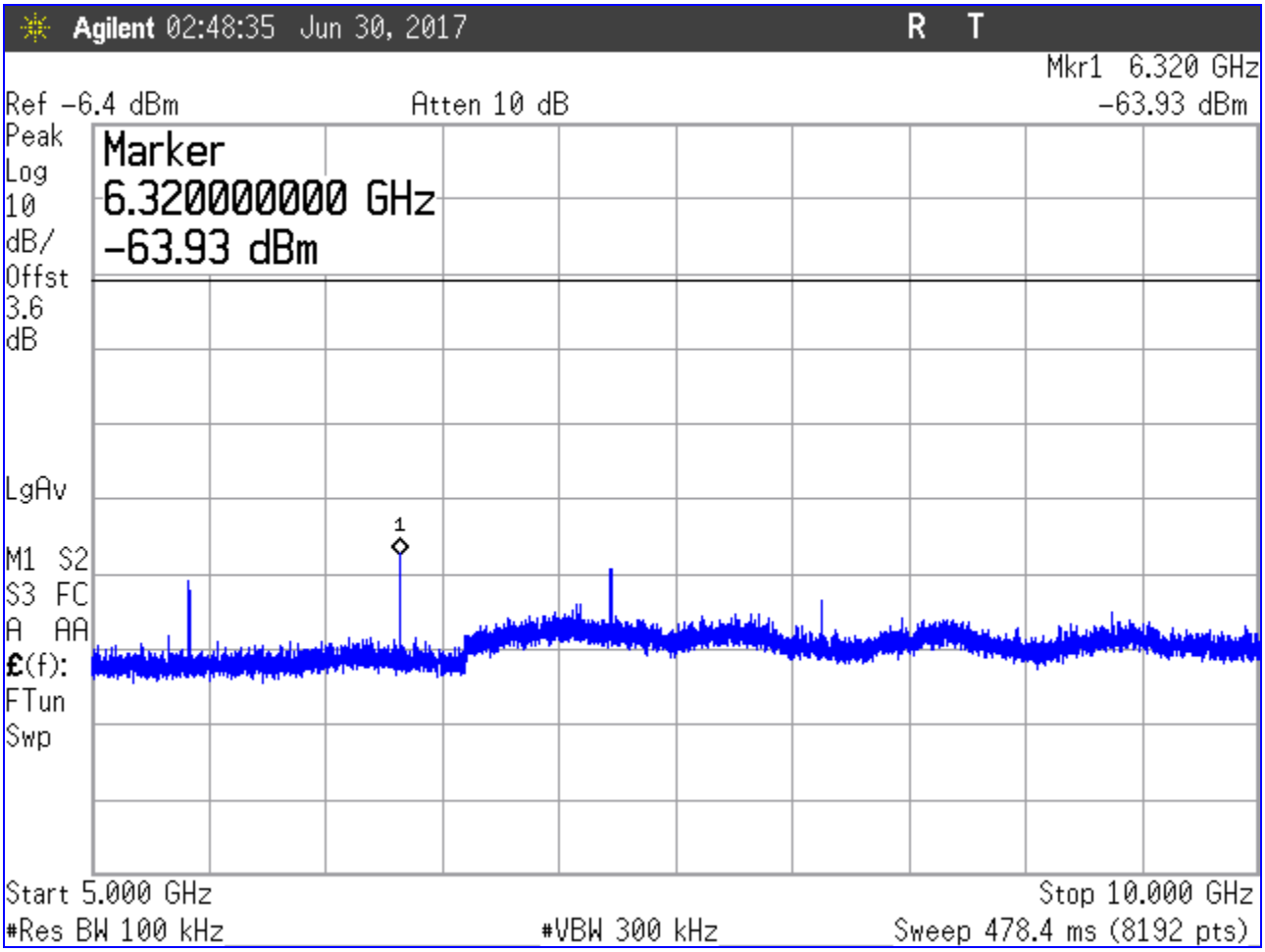

Figure 30: Conducted Spurious Emissions, Low Power, Low Channel 5-10GHz

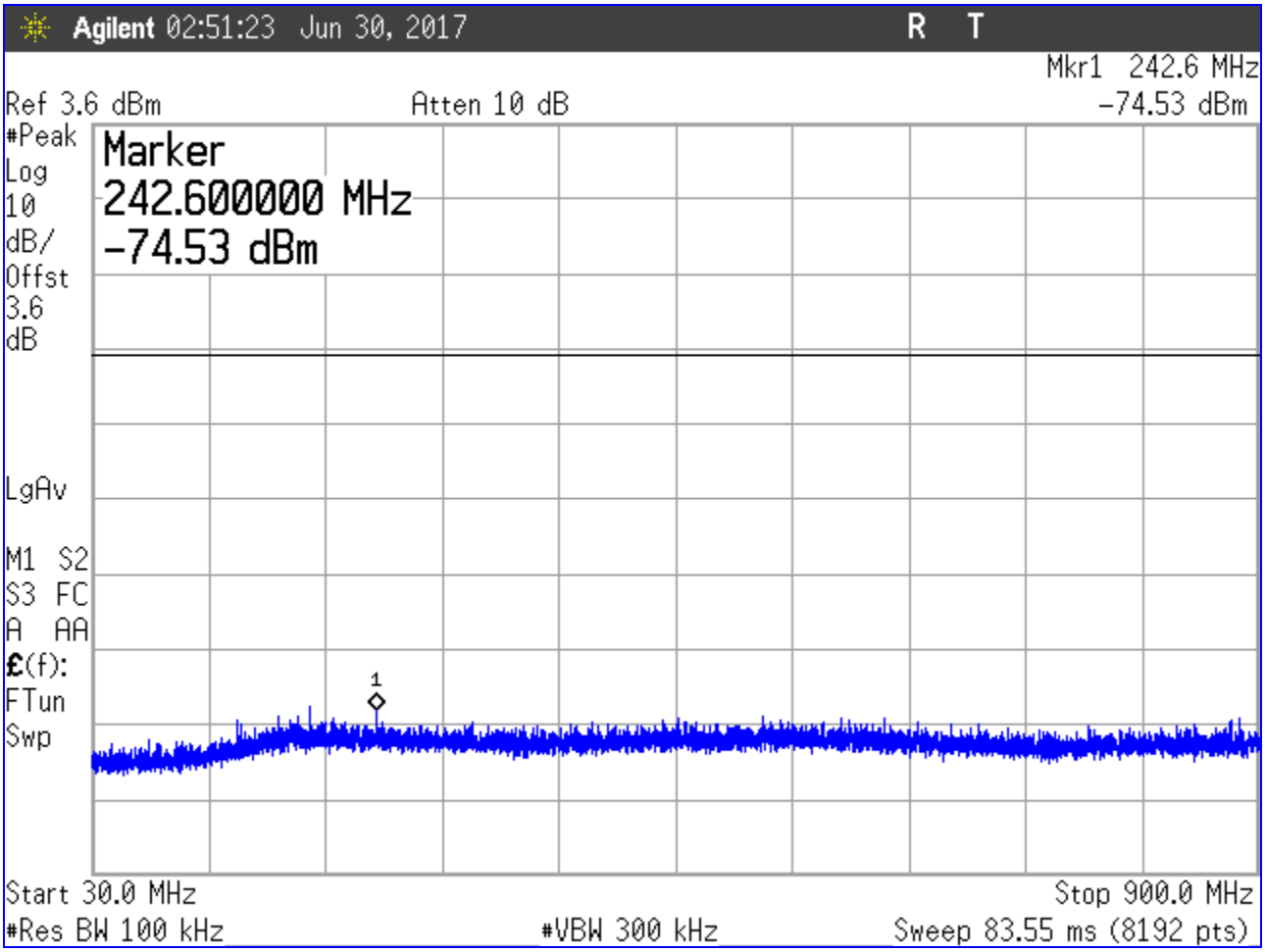

Figure 31: Conducted Spurious Emissions, Low Power, Center Channel 30 - 900MHz

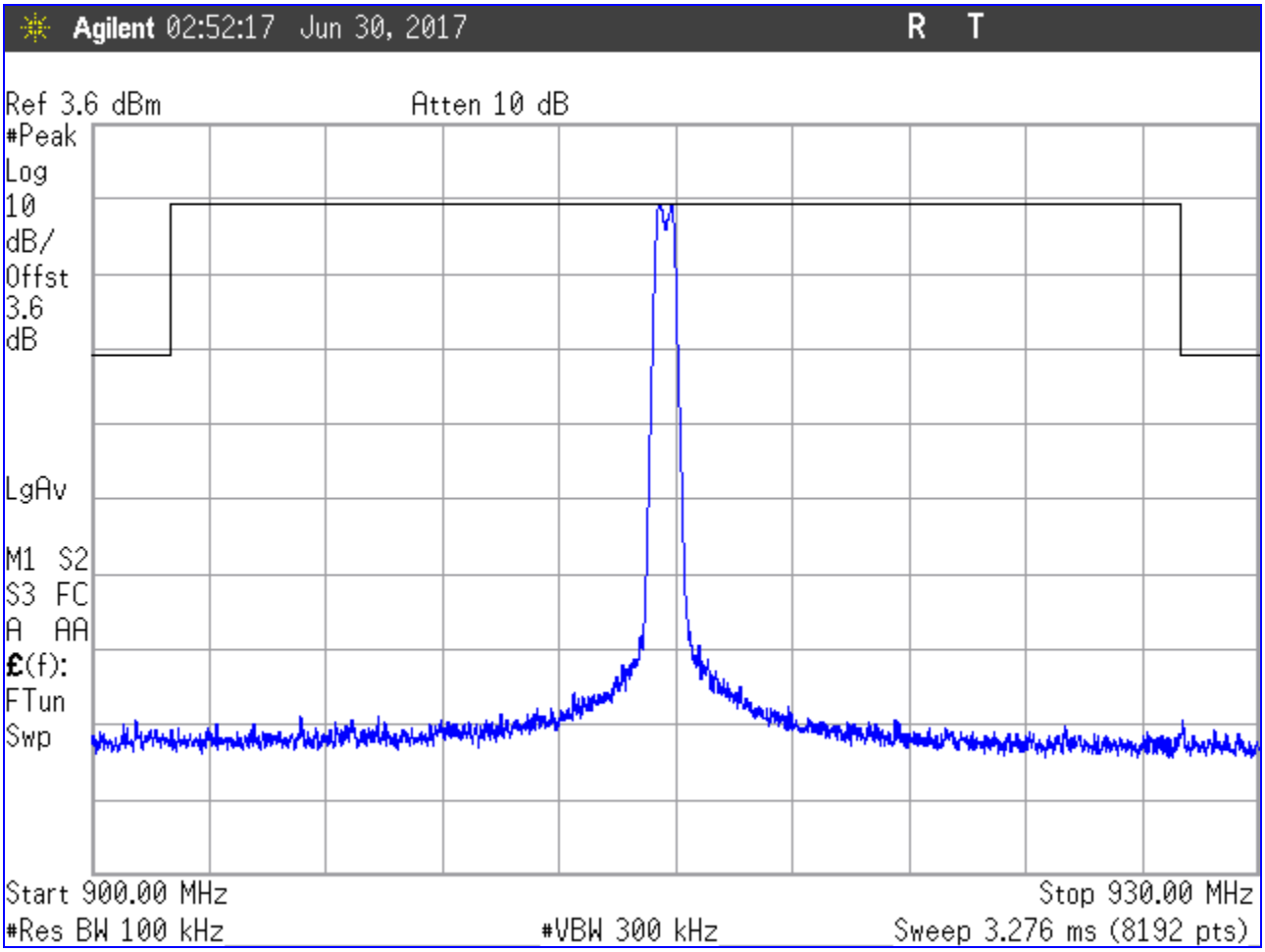

Figure 32: Conducted Spurious Emissions, Low Power, Center Channel 900 – 930MHz

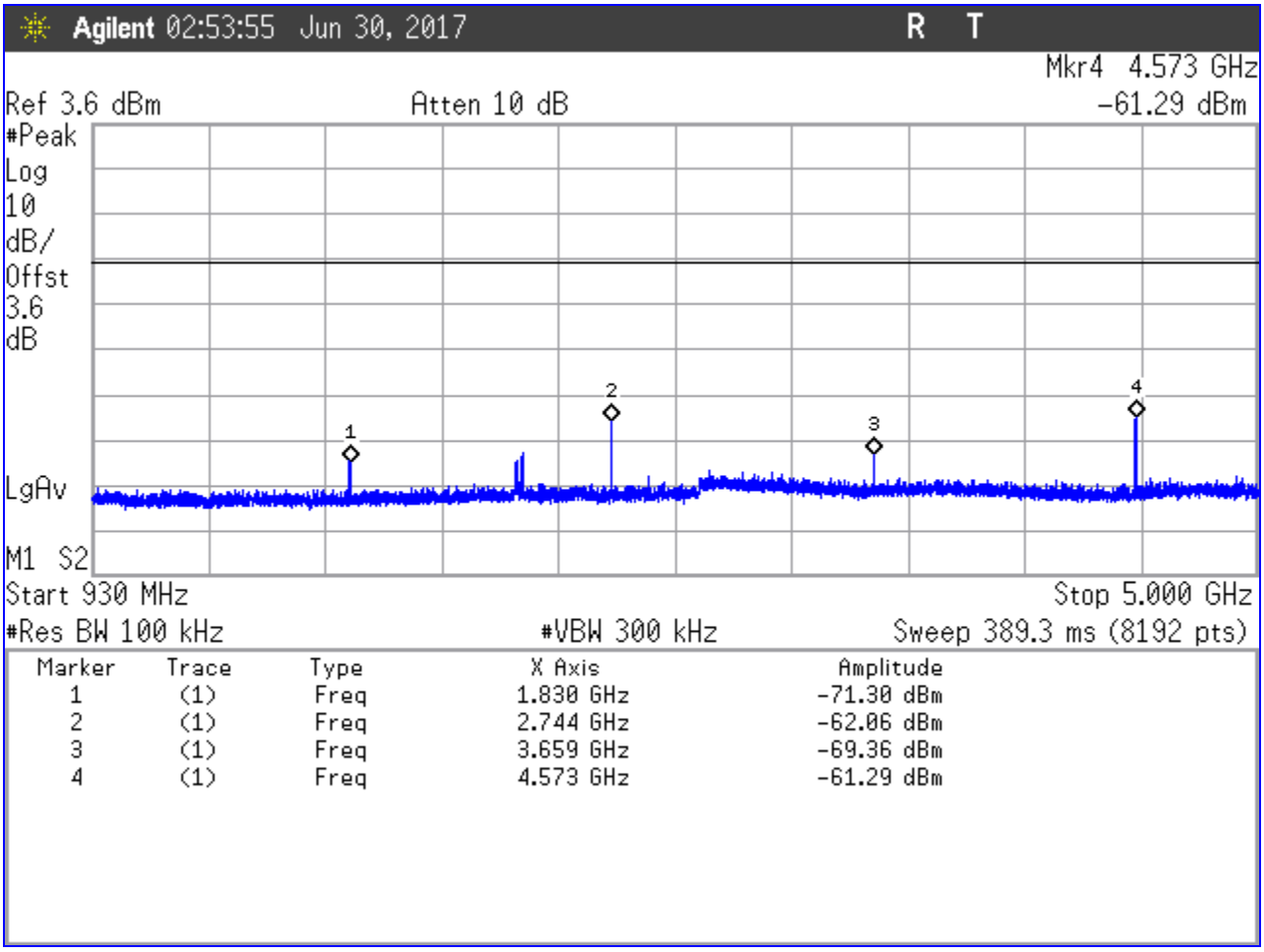

Figure 33: Conducted Spurious Emissions, Low Power, Center Channel 930-5000MHz

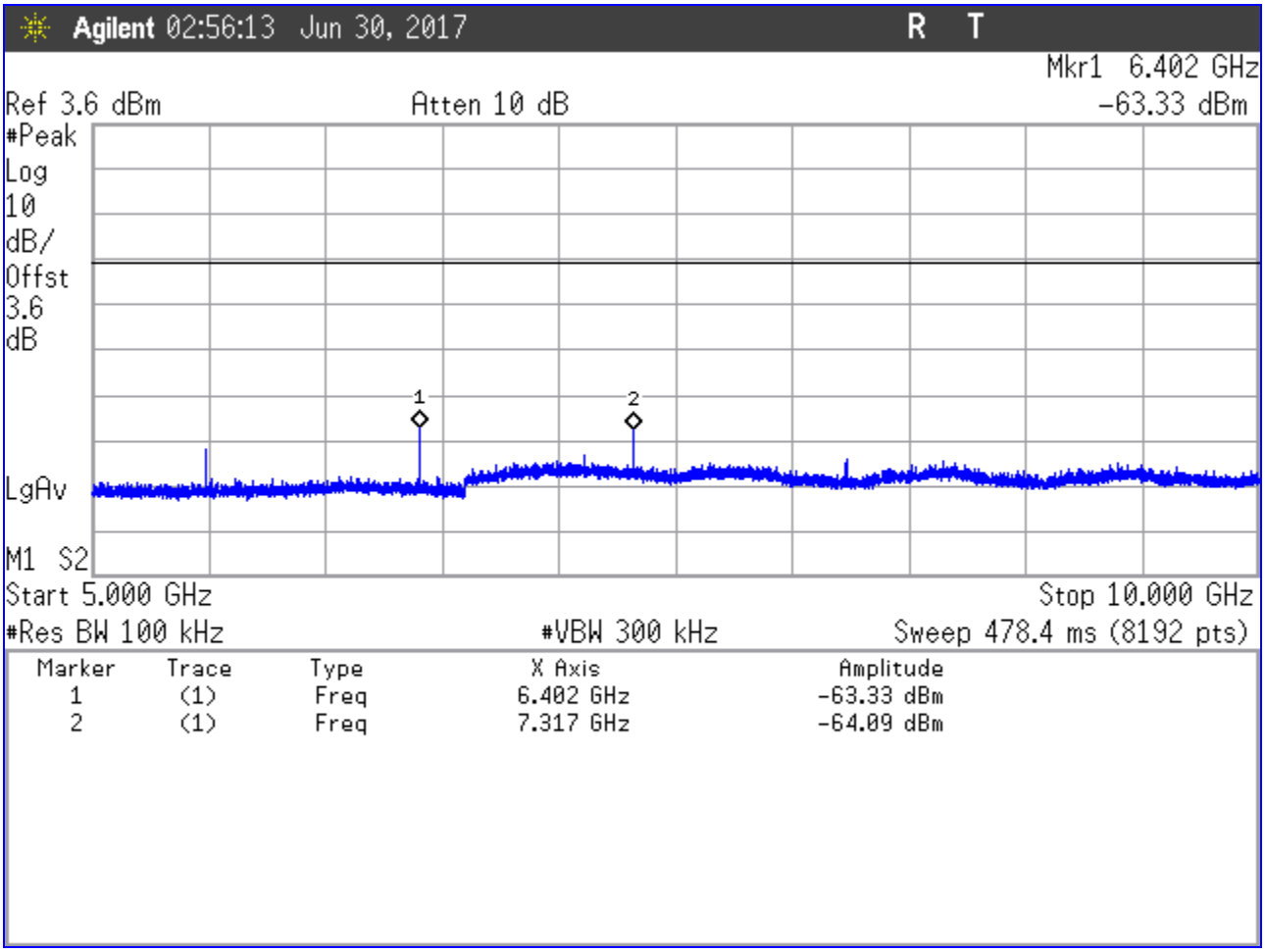

Figure 34: Conducted Spurious Emissions, Low Power, Center Channel 5-10GHz

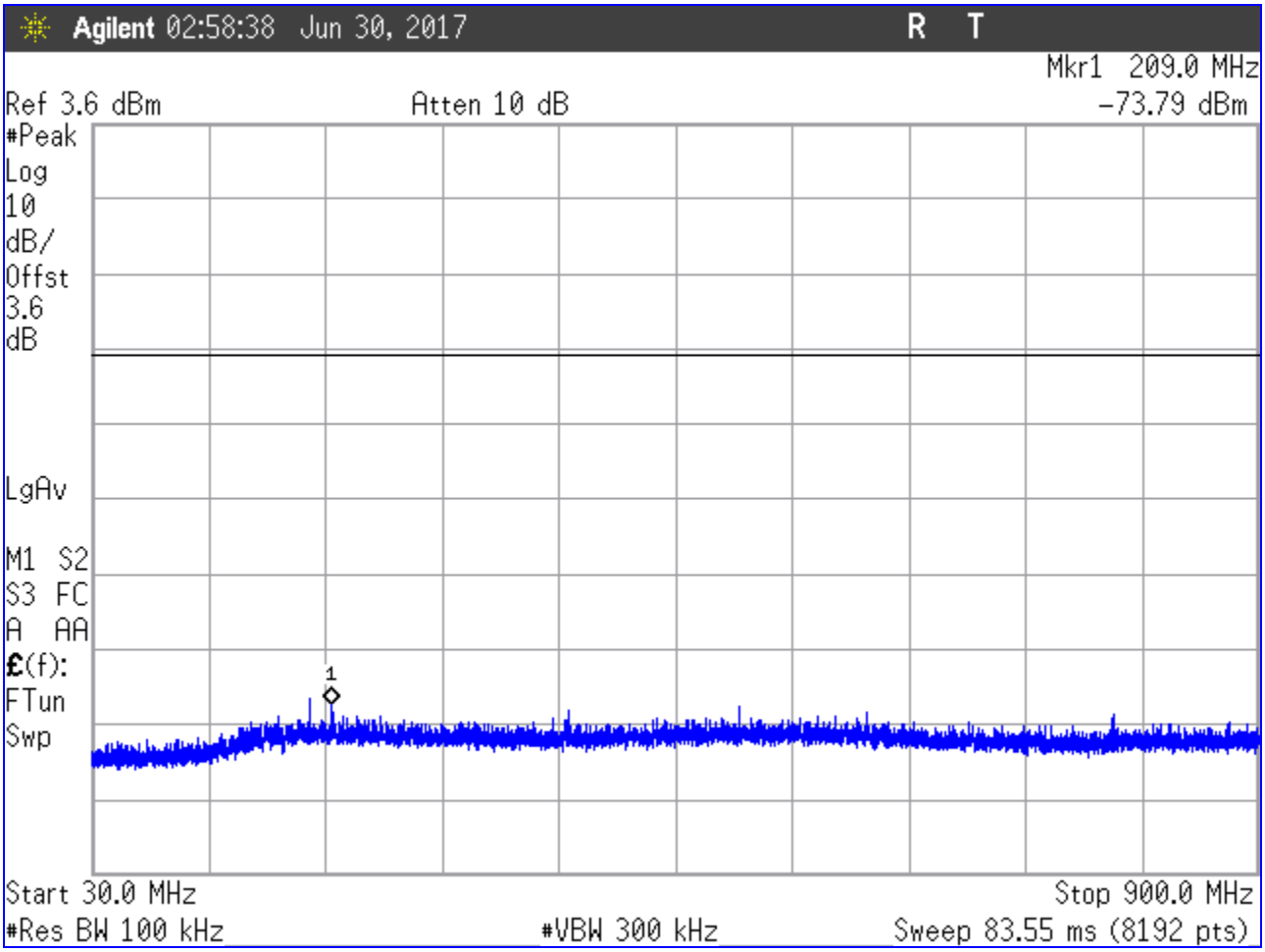

Figure 35: Conducted Spurious Emissions, Low Power, High Channel 30 - 900MHz

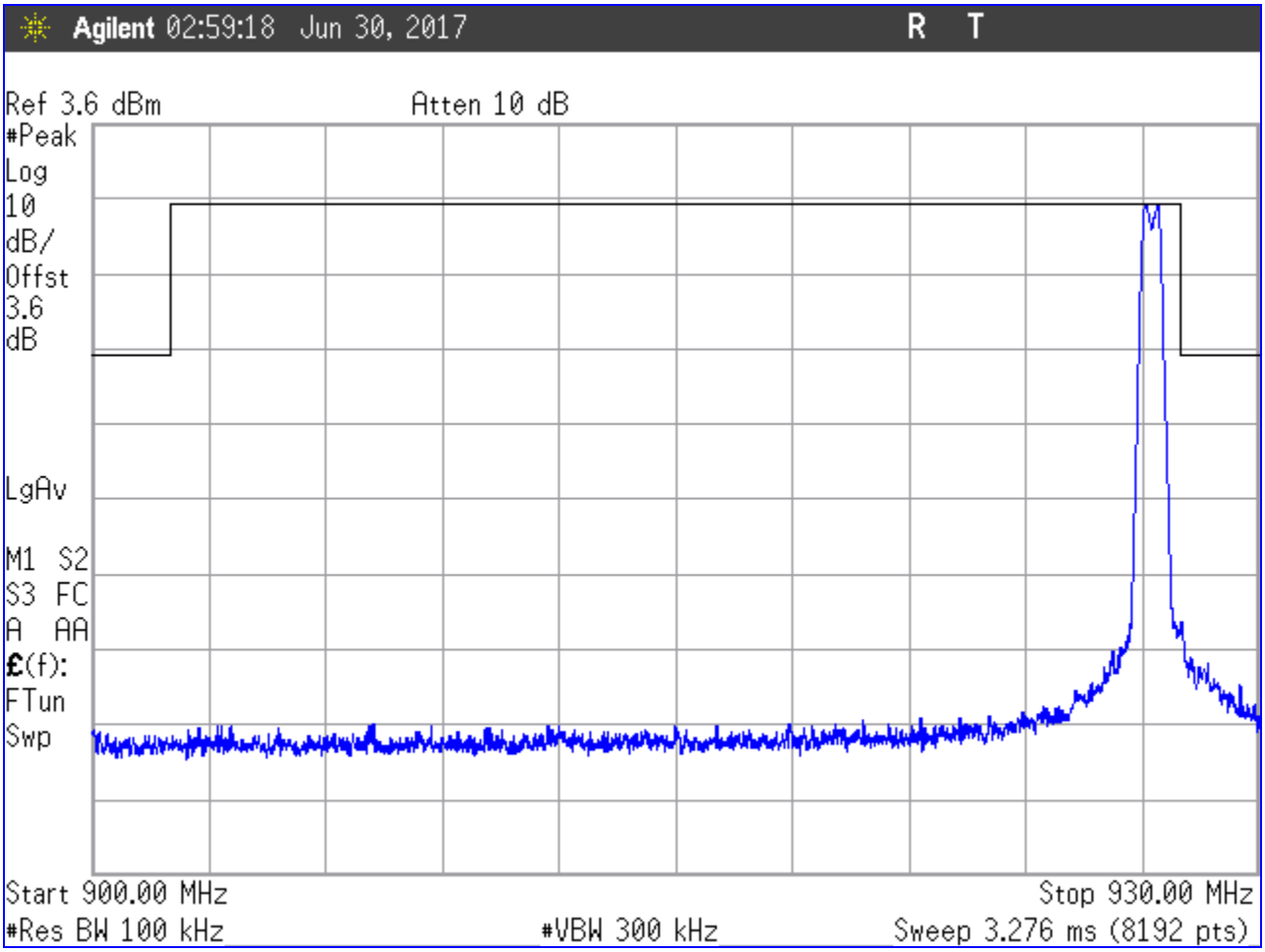

Figure 36: Conducted Spurious Emissions, Low Power, High Channel 900 – 930MHz

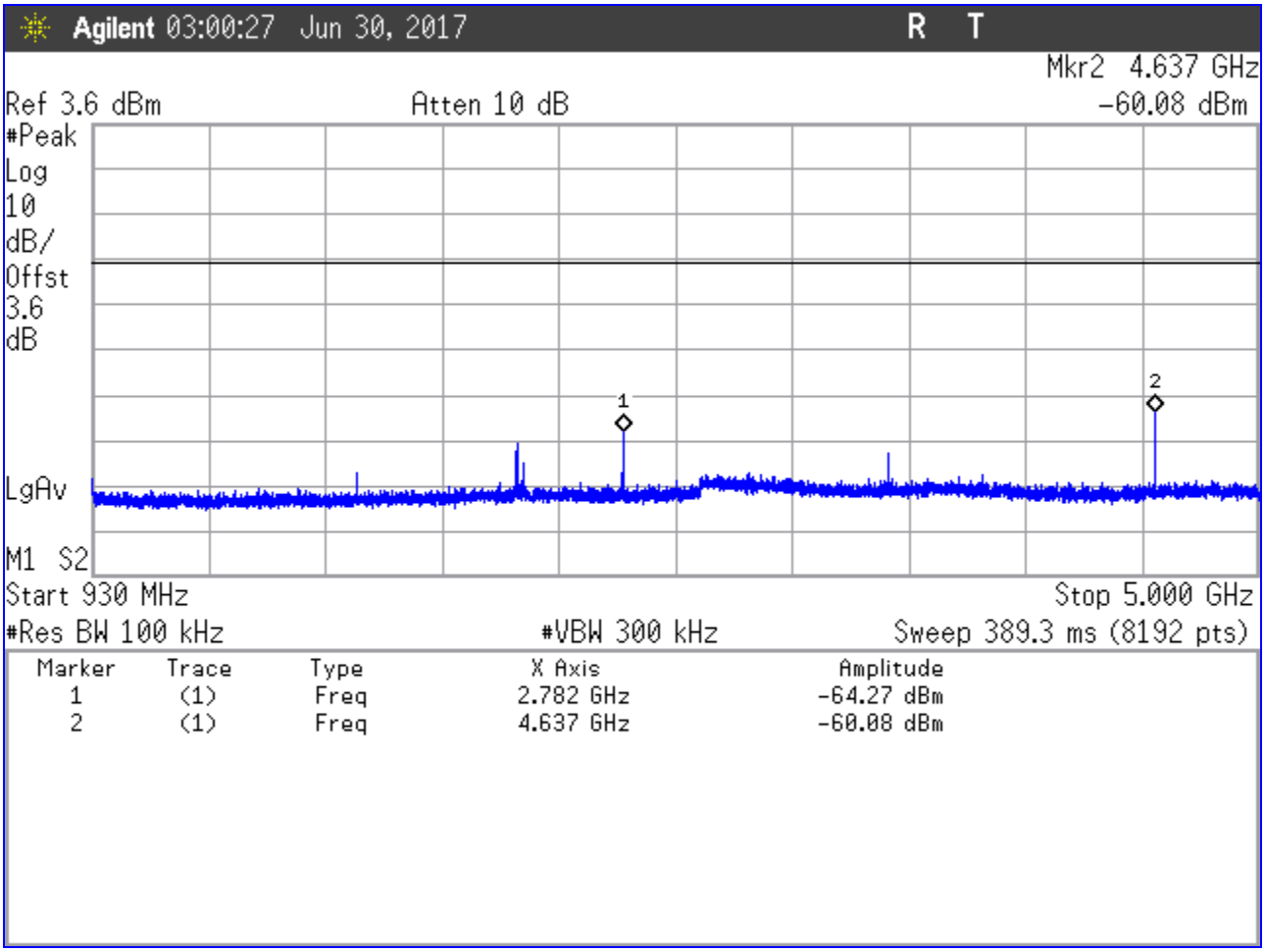

Figure 37: Conducted Spurious Emissions, Low Power, High Channel 930-5000MHz

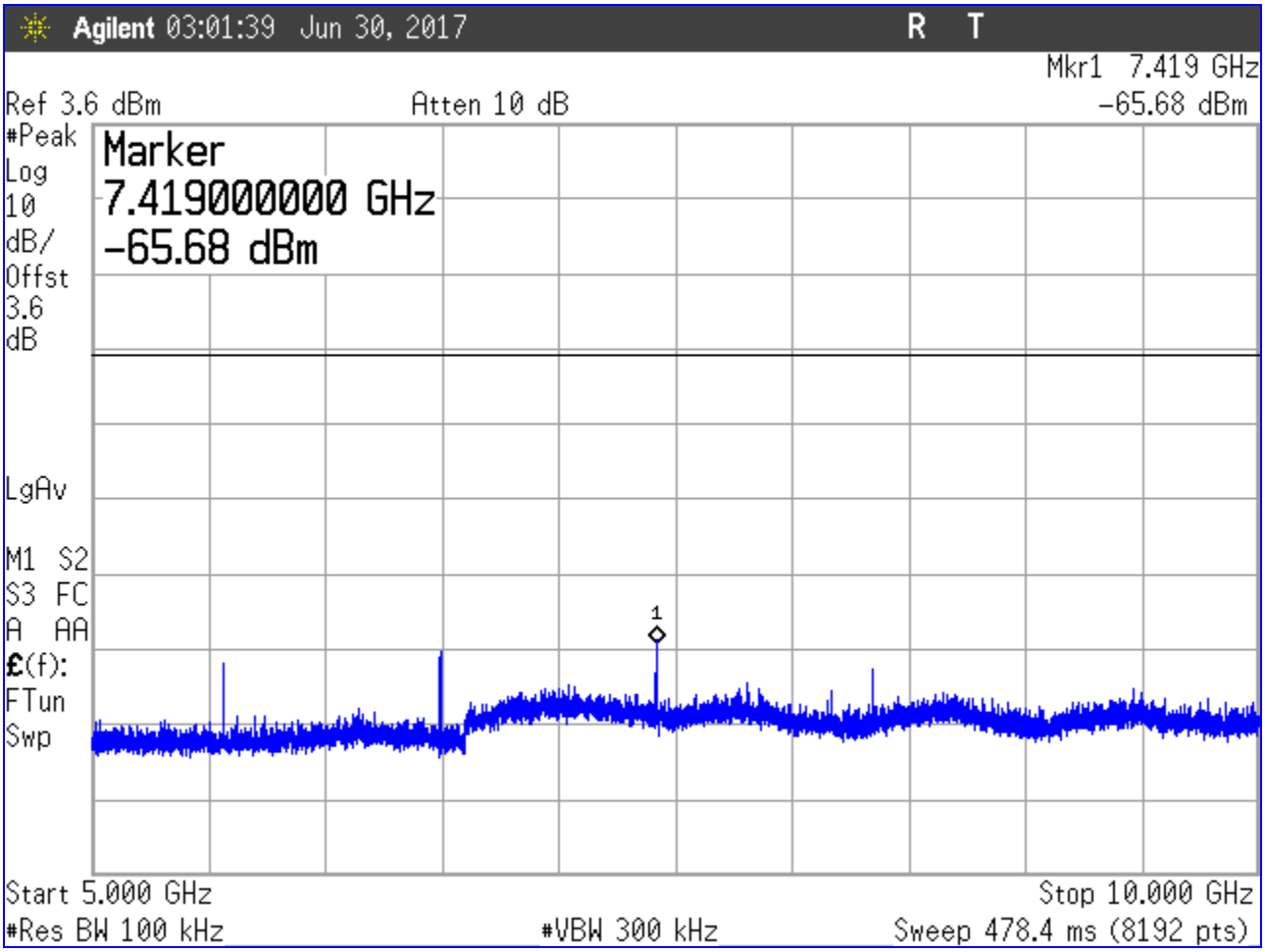

Figure 38: Conducted Spurious Emissions, Low Power, High Channel 5-10GHz

5.5.1 Band Edge Compliance

In accordance with FCC Public Notice DA-00-705 close-up plots of the upper and lower channels in both hopping and non-hopping modes with respect to the nearest authorized band-edges are provided below. The tests were performed in the same manner as the above conducted spurious emissions tests.

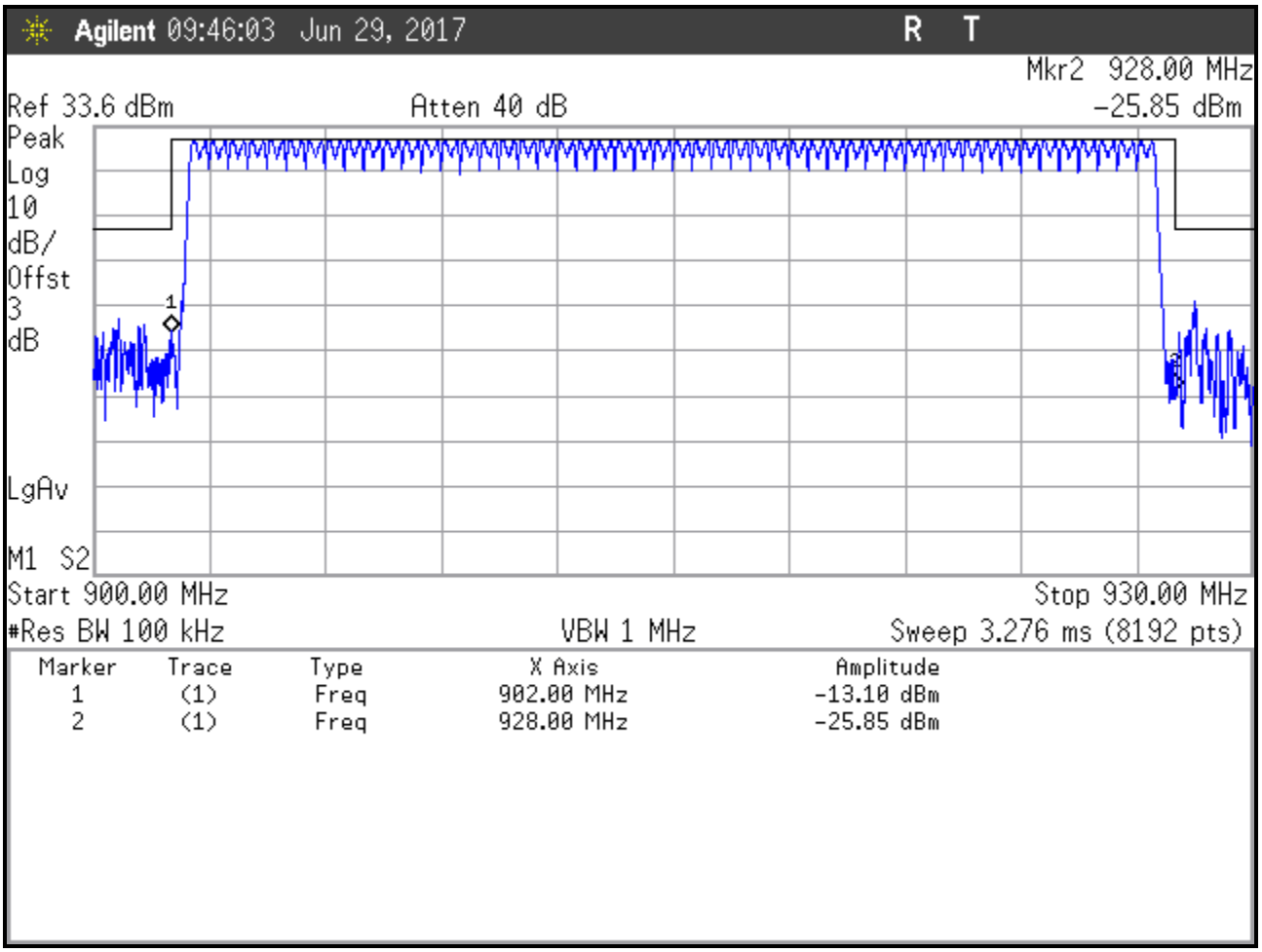

Figure 39: Band-edge, Hopping Mode, High Power Setting

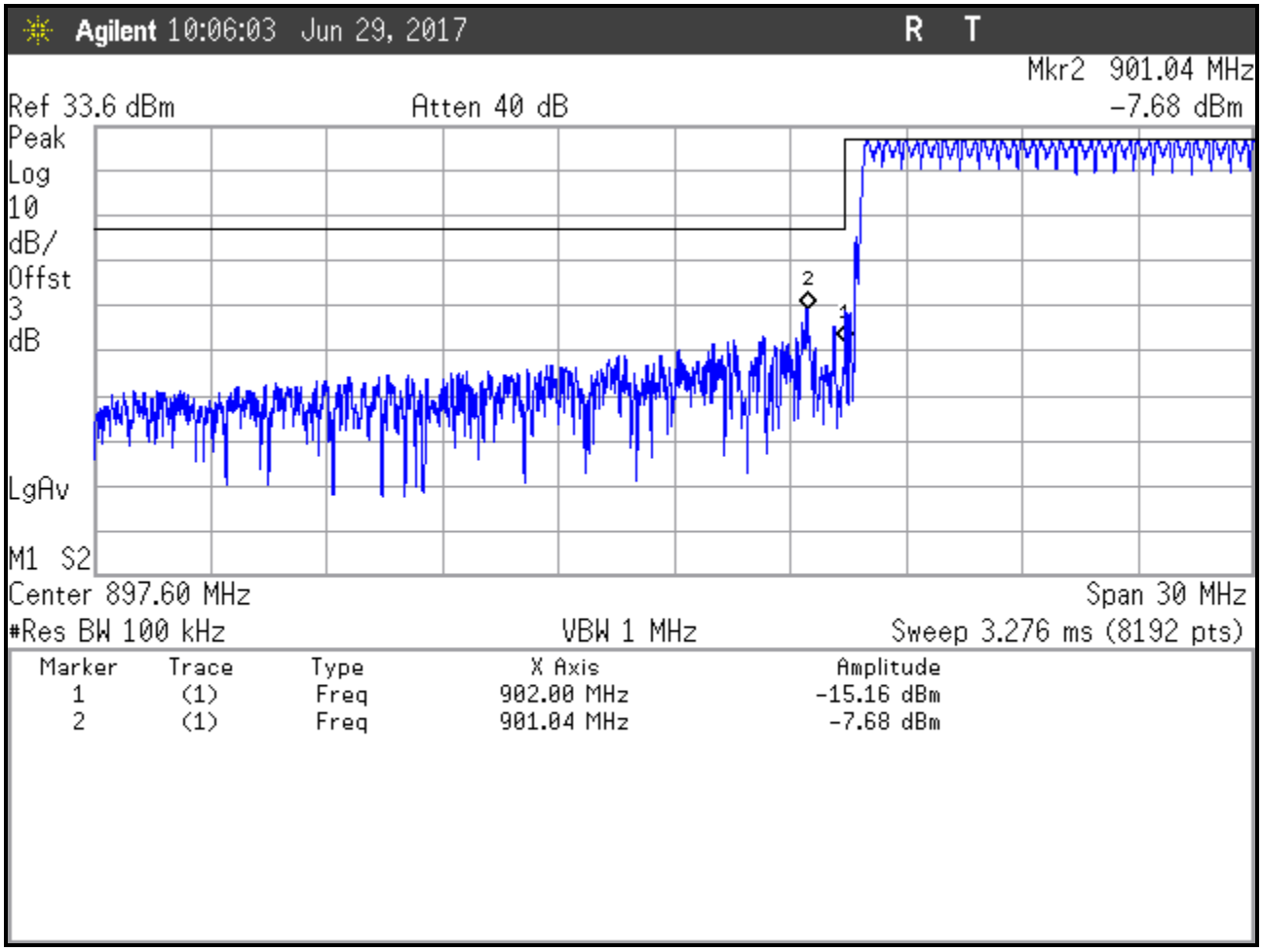

Figure 40: Lower Band-edge, High Power Setting

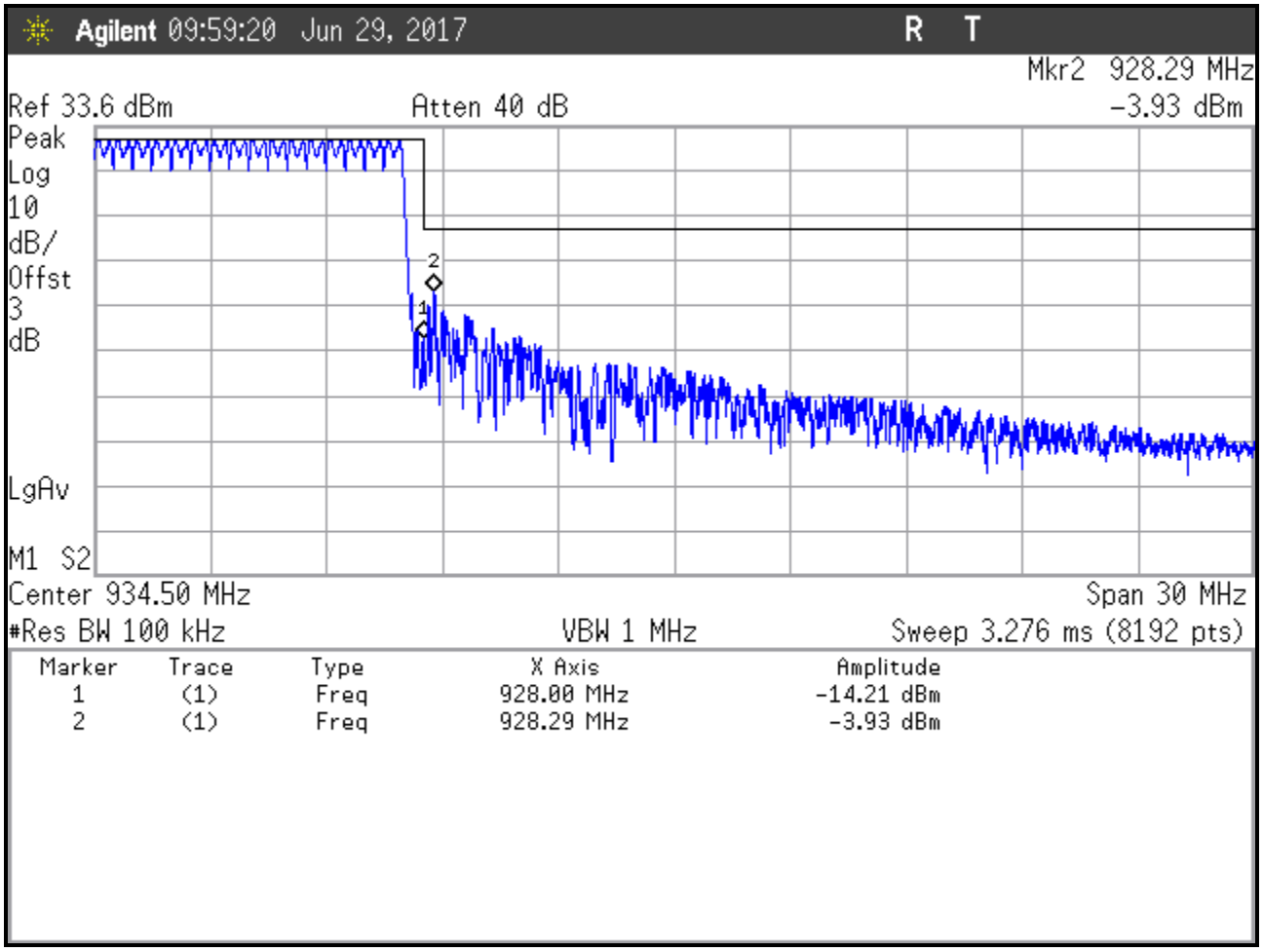

Figure 41: Upper Band-edge, High Power Setting

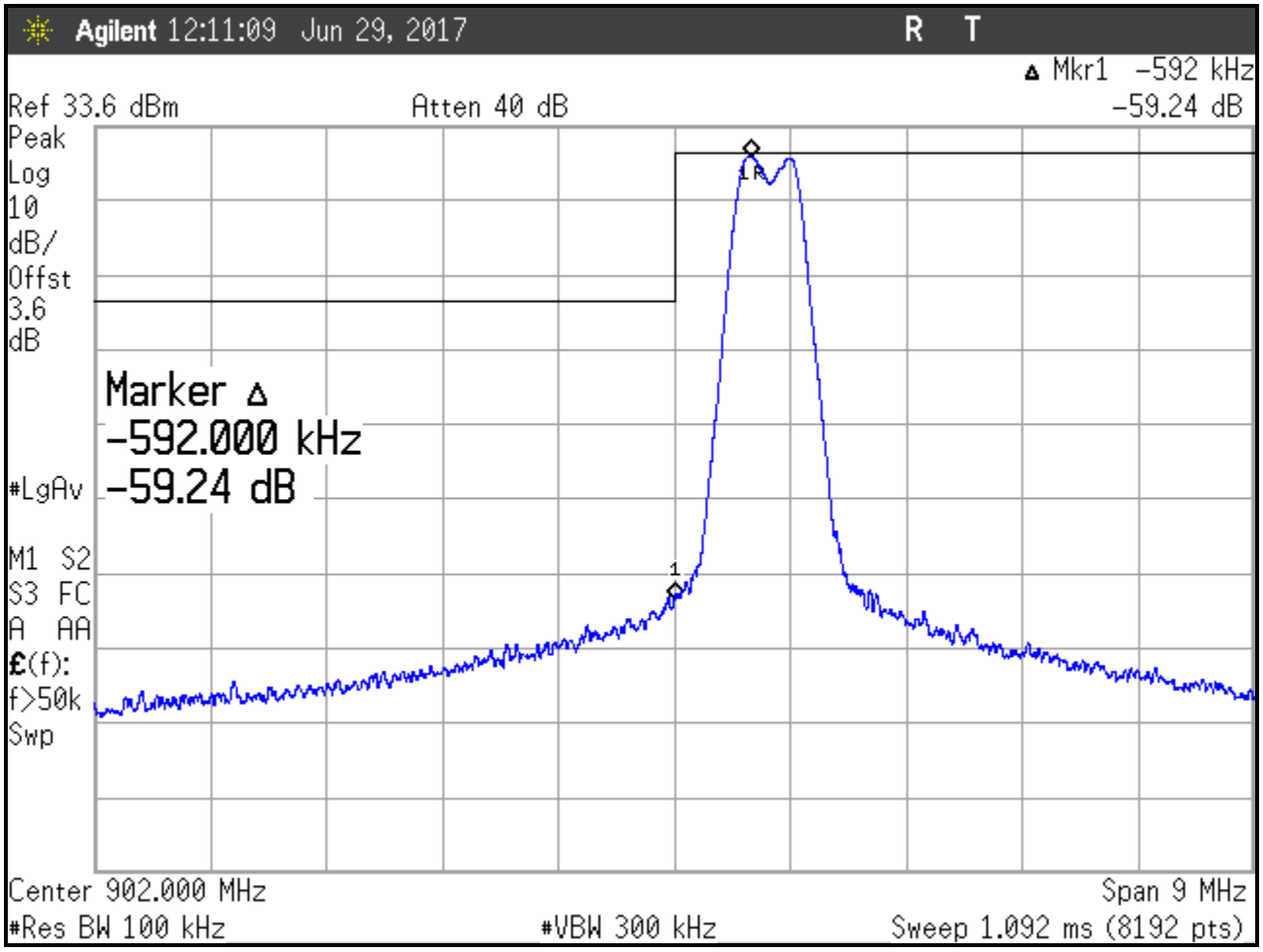

Figure 42: Low Channel (Single Hop), Band-edge, High Power Setting

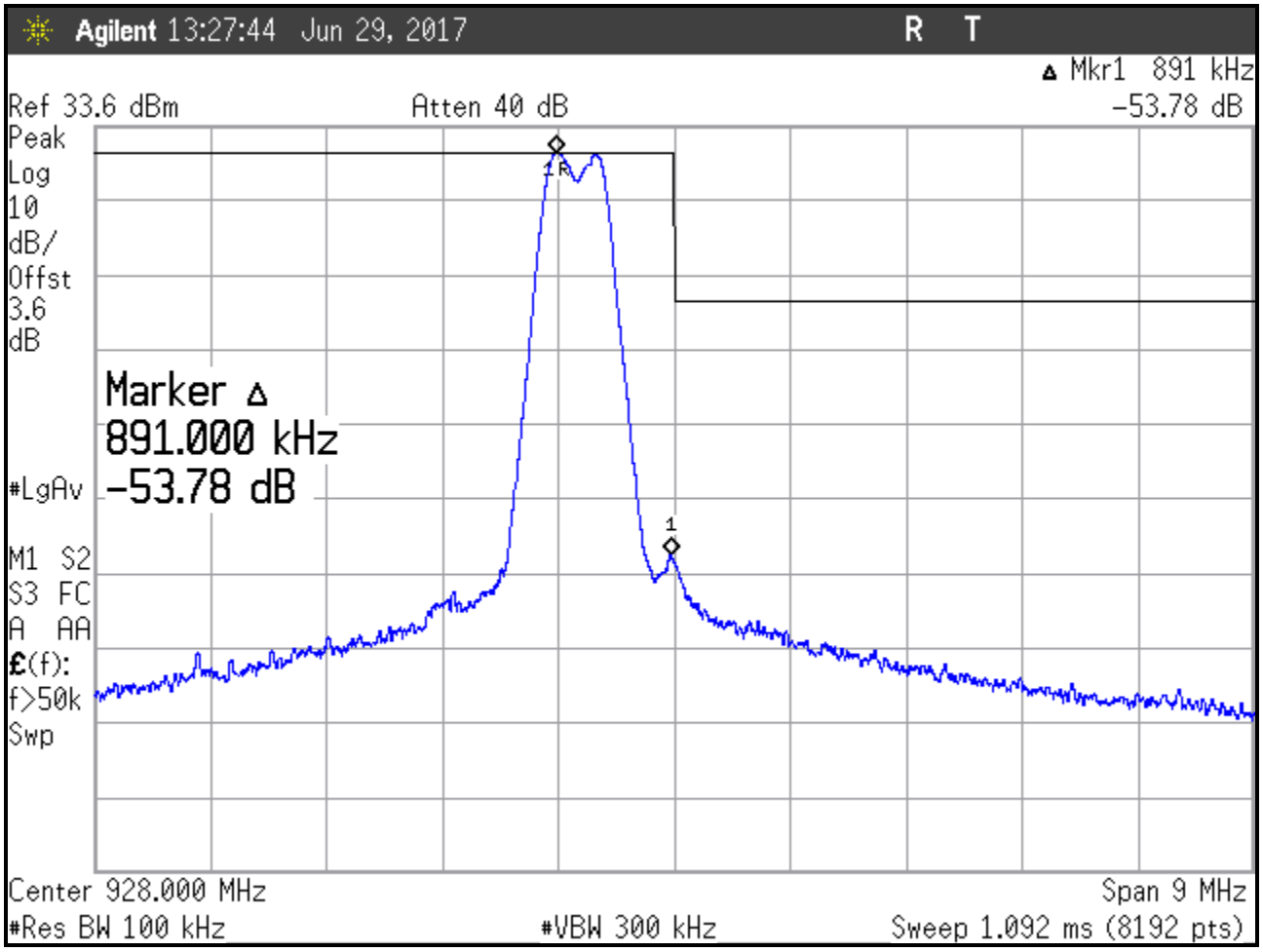

Figure 43: High Channel (Single Hop), Band-edge, High Power Setting

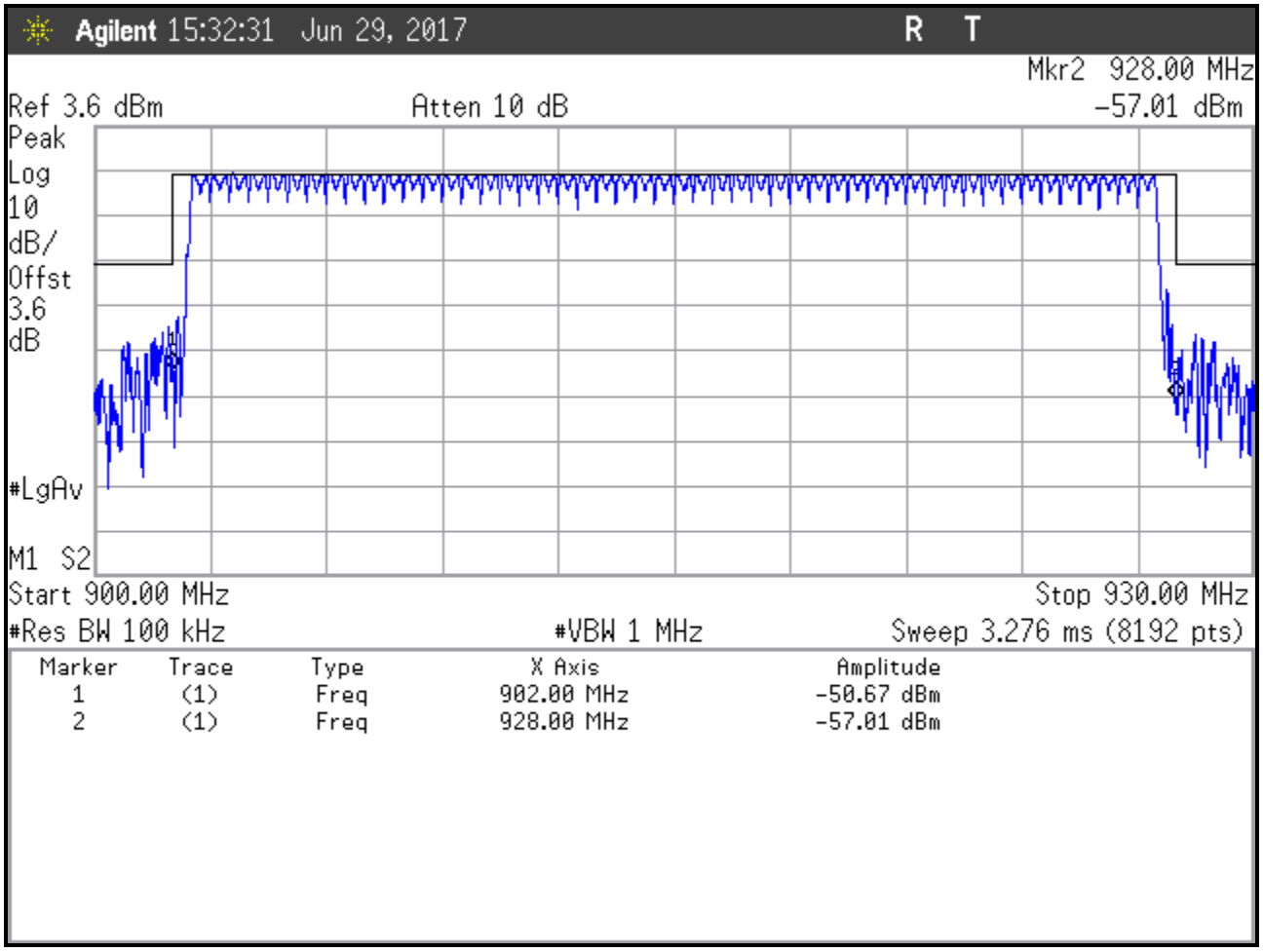

Figure 44: Band-edge, Hopping Mode, Low Power Setting

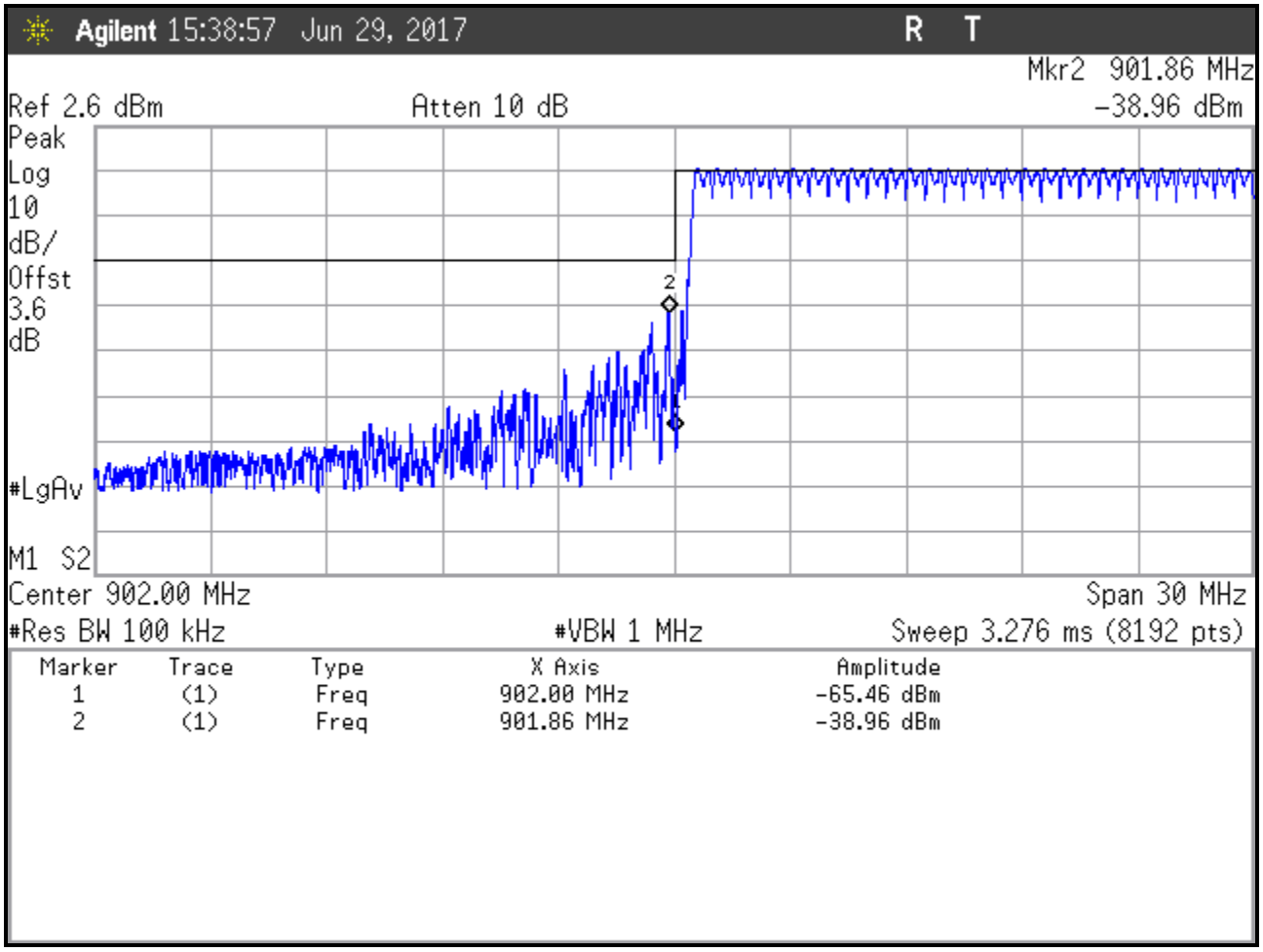

Figure 45: Low Channel, Lower Band-edge, Low Power Setting

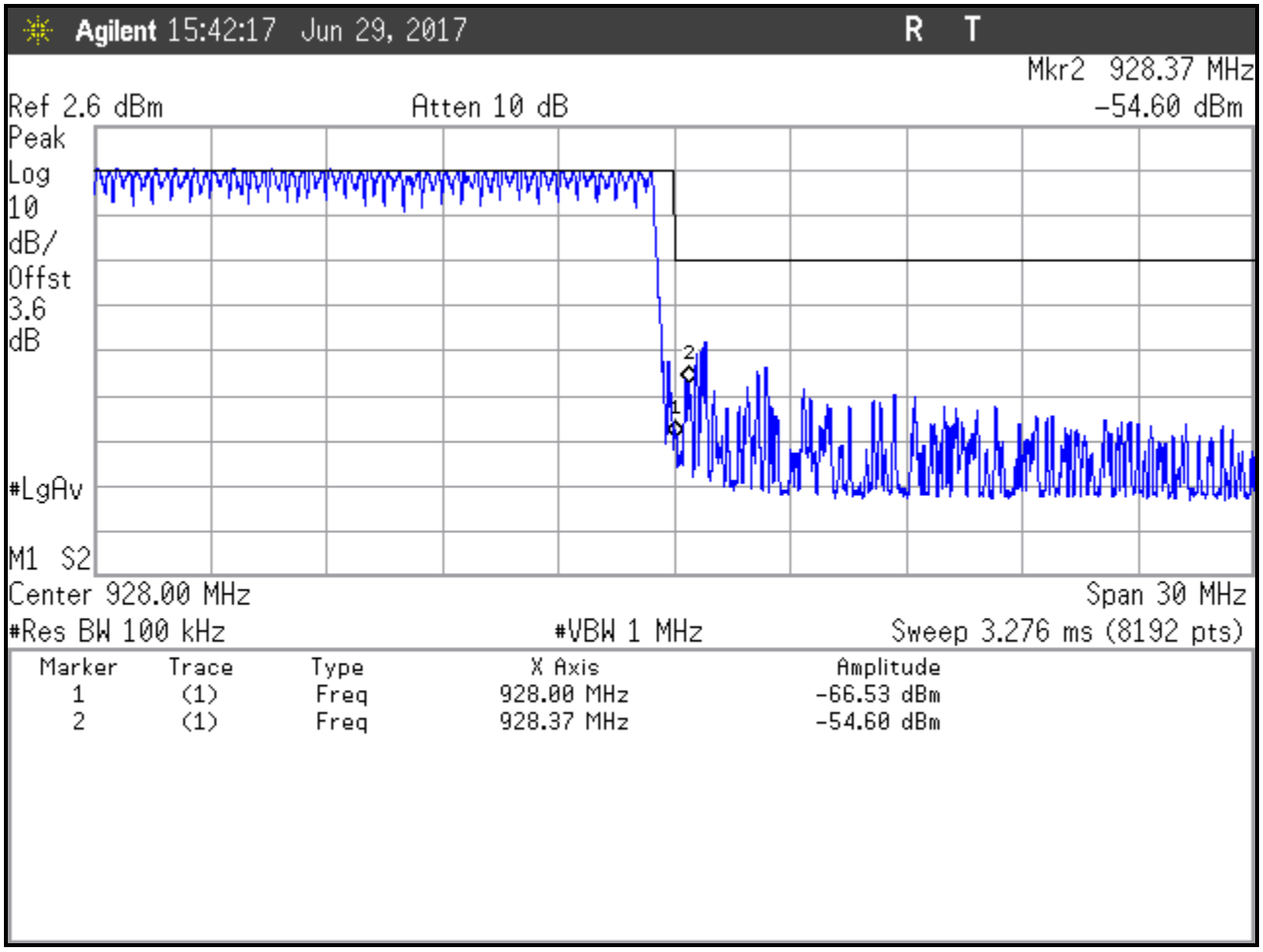

Figure 46: High Channel, Upper Band-edge, Low Power Setting

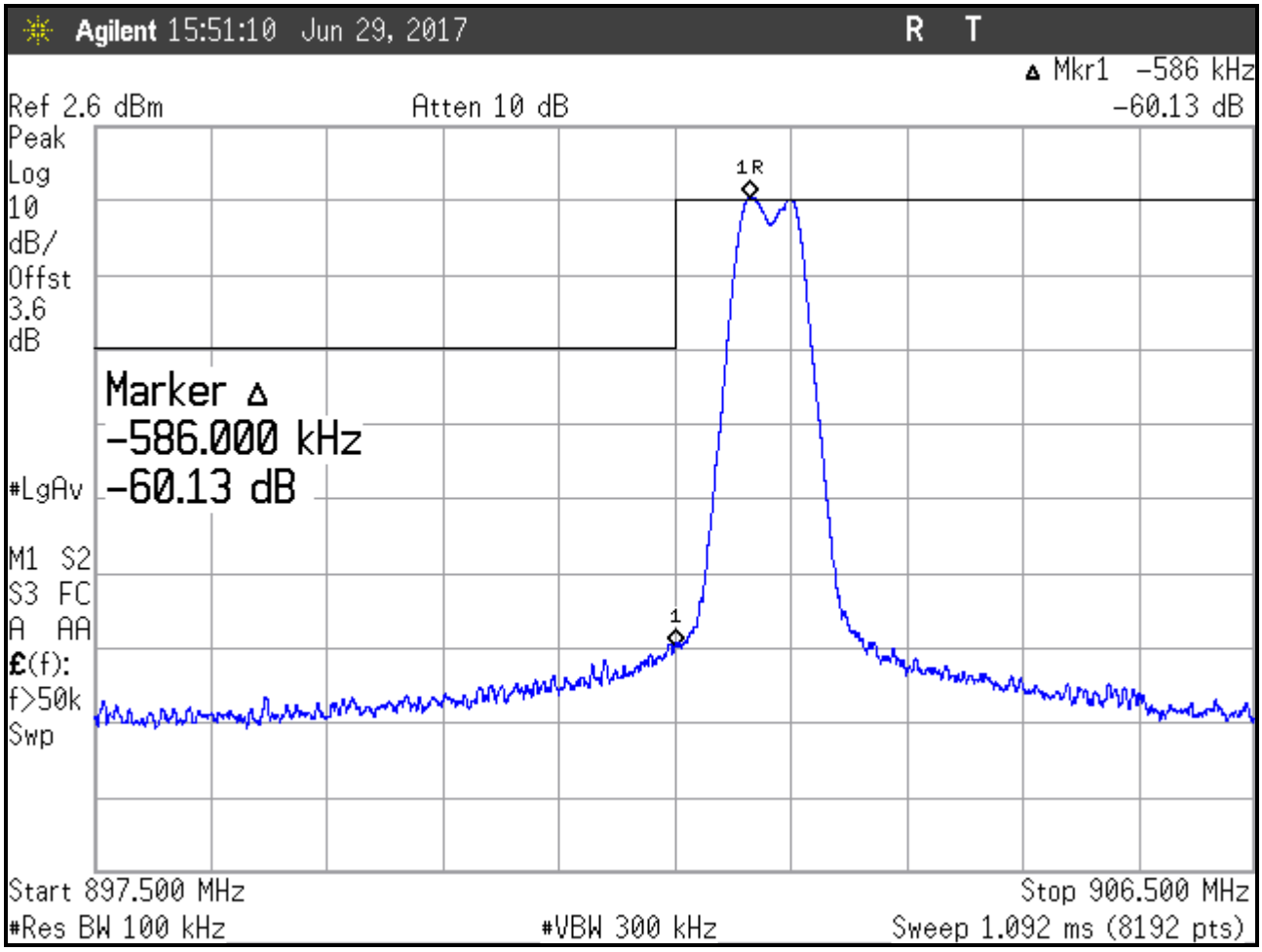

Figure 47: Low Channel (Single Hop), Band-edge, Low Power Setting

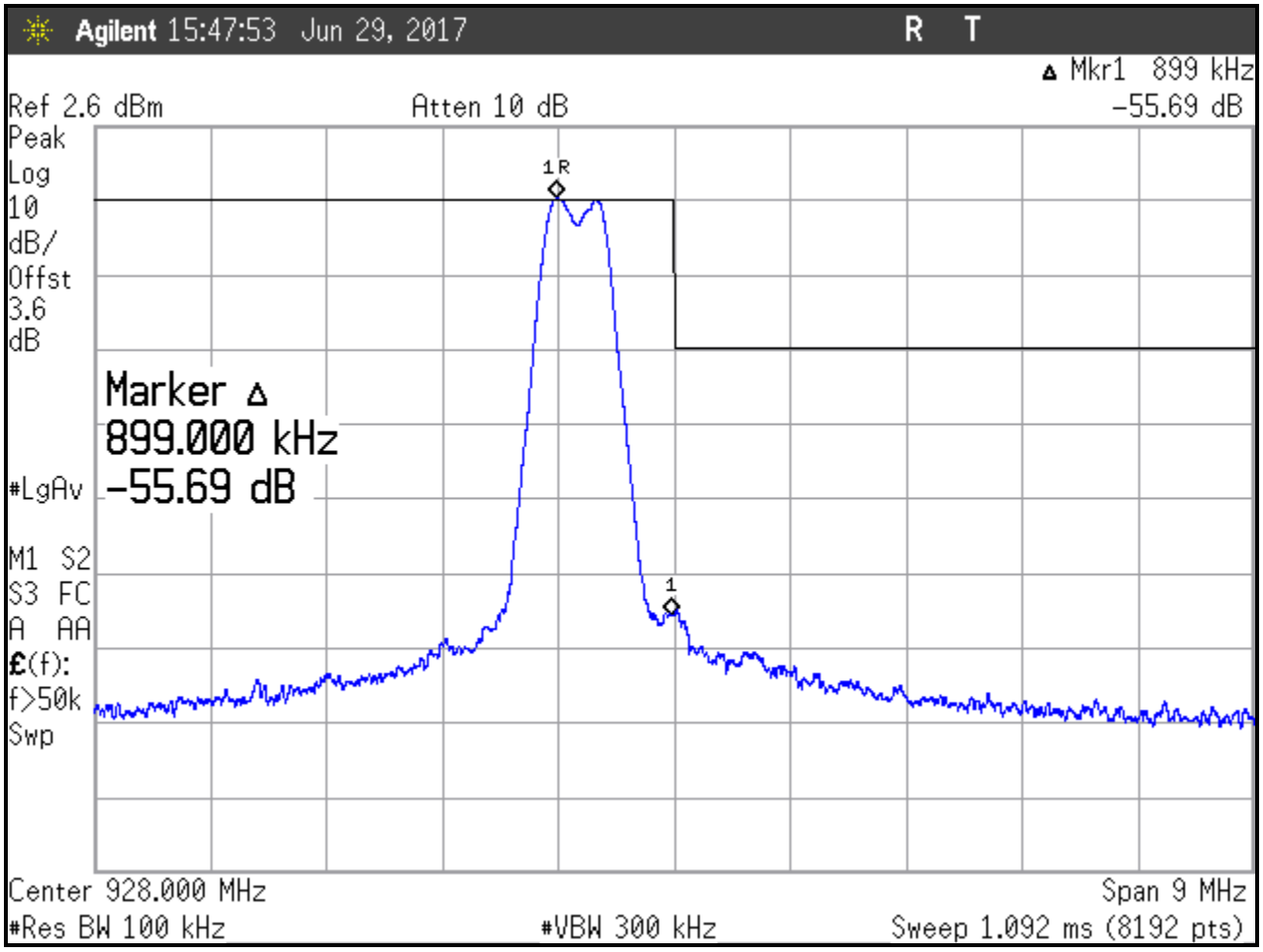

Figure 48: High Channel (Single Hop), Band-edge, Low Power Setting

5.6 Radiated Spurious Emissions: (FCC Part §2.1053)

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.209 and §15.35(b) for peak measurements.

5.6.1 Test Procedure

The EUT was placed on 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. Receiving 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 peripherals were placed on the table in accordance with ANSI C63.4-2014. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The emissions were measured using the following resolution bandwidths:

Table 10: Spectrum Analyzer Settings

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	<10 Hz (Avg.), 1MHz (Peak)

Table 11: Radiated Emission Test Data < 1GHz
(Covers all 4 antenna configurations)

Same for all channels

Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Peak or Average	Comments
40.43	V	180.00	1.0	43.9	-11.0	44.4	100.0	-7.1	Peak	
48.00	V	270.00	1.00	50.18	-15.7	52.8	100.0	-5.6	Peak	
54.15	V	180.00	1.00	46.37	-17.2	28.8	100.0	-10.8	Peak	
63.36	V	180.00	1.00	52.01	-16.4	60.6	100.0	-4.4	Peak	
144.01	V	90.00	1.2	41.3	-10.3	35.7	150.0	-12.5	Peak	
166.10	V	0.00	1.3	40.6	-10.6	31.3	150.0	-13.6	Peak	
192.00	V	90.00	1.50	50.02	-10.9	90.3	150.0	-4.4	Peak	
232.53	V	0.00	1.50	38.90	-10.5	26.2	200.0	-17.6	Peak	
240.00	V	90.00	1.50	47.59	-10.2	73.9	200.0	-8.6	Peak	
288.00	V	180.00	1.50	38.47	-7.9	33.9	200.0	-15.4	Peak	
299.00	V	0.00	1.50	37.13	-7.9	29.0	200.0	-16.8	Peak	
336.02	V	135.00	1.5	40.8	-6.9	49.8	200.0	-12.1	Peak	
384.01	V	180.00	2.0	47.0	-5.5	118.4	200.0	-4.6	Peak	
528.00	V	270.00	2.0	42.4	-1.1	115.3	200.0	-4.8	Peak	
720.01	V	90.00	1.8	38.3	2.1	104.8	200.0	-5.6	Peak	
40.43	H	180.00	4.00	38.30	-11.0	23.3	100.0	-12.7	Peak	
48.00	H	315.00	4.00	49.20	-15.7	47.1	100.0	-6.5	Peak	
54.15	H	225.00	4.00	36.20	-17.2	8.9	100.0	-21.0	Peak	
63.36	H	180.00	4.00	52.30	-16.4	62.6	100.0	-4.1	Peak	
144.01	H	180.00	4.00	42.30	-10.3	40.0	150.0	-11.5	Peak	
166.10	H	180.00	4.00	44.20	-10.6	47.6	150.0	-10.0	Peak	
192.00	H	0.00	4.00	49.60	-10.9	86.1	150.0	-4.8	Peak	
232.53	H	0.00	3.50	41.50	-10.5	35.4	200.0	-15.0	Peak	
240.00	H	135.00	3.00	46.30	-10.2	63.7	200.0	-9.9	Peak	
288.00	H	180.00	2.50	34.80	-7.9	22.2	200.0	-19.1	Peak	
336.02	H	315.00	2.50	33.80	-6.9	22.2	200.0	-19.1	Peak	
384.01	H	180.00	2.50	33.00	-5.5	23.7	200.0	-18.5	Peak	
528.00	H	180.00	2.50	36.70	-1.1	60.0	200.0	-10.5	Peak	
720.01	H	180.00	2.00	32.90	2.1	56.3	200.0	-11.0	Peak	

Table 12: Radiated Emission Test Data >1GHz, (Linx ¼ Wave Helical On-Board)
Low Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	0.00	1.00	53.18	1.2	522.0	5000.0	-19.6	
3611.00	V	190.00	1.00	49.90	3.2	453.4	5000.0	-20.8	
4513.75	V	290.00	1.00	47.31	5.3	427.0	5000.0	-21.4	
5416.50	V	90.00	1.00	47.68	8.8	666.9	5000.0	-17.5	
8124.80	V	190.00	1.00	42.53	14.9	745.9	5000.0	-16.5	
2708.25	V	0.00	1.00	47.68	1.2	277.1	500.0	-5.1	
3611.00	V	190.00	1.00	39.94	3.2	144.1	500.0	-10.8	
4513.75	V	290.00	1.00	36.05	5.3	116.9	500.0	-12.6	
5416.50	V	90.00	1.00	37.36	8.8	203.4	500.0	-7.8	
8124.80	V	190.00	1.00	32.20	14.9	227.1	500.0	-6.9	
2708.25	H	90.00	2.20	51.80	1.2	445.4	5000.0	-21.0	
3611.00	H	180.00	2.20	45.30	3.2	267.1	5000.0	-25.4	
4513.75	H	270.00	2.20	43.20	5.3	266.2	5000.0	-25.5	
5416.50	H	180.00	2.20	36.90	8.8	192.9	5000.0	-28.3	
8124.80	H	190.00	2.20	32.93	14.9	247.0	5000.0	-26.1	
2708.25	H	90.00	2.20	45.91	1.2	226.0	500.0	-6.9	
3611.00	H	180.00	2.20	39.12	3.2	131.1	500.0	-11.6	
4513.75	H	270.00	2.20	34.54	5.3	98.2	500.0	-14.1	
5416.50	H	180.00	2.20	37.35	8.8	203.1	500.0	-7.8	
8124.80	H	190.00	2.20	32.35	14.9	231.0	500.0	-6.7	

Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	180.00	1.00	50.28	1.2	375.1	5000.0	-22.5	
3659.00	V	190.00	1.00	49.14	3.3	417.2	5000.0	-21.6	
4573.75	V	180.00	1.00	44.42	5.5	314.6	5000.0	-24.0	
7318.00	V	0.00	1.00	44.57	14.2	866.1	5000.0	-15.2	
8232.75	V	180.00	1.00	44.09	15.1	910.0	5000.0	-14.8	
2744.25	V	180.00	1.00	40.82	1.2	126.3	500.0	-12.0	
3659.00	V	190.00	1.00	39.18	3.3	132.6	500.0	-11.5	
4573.75	V	180.00	1.00	35.37	5.5	111.1	500.0	-13.1	
7318.00	V	0.00	1.00	33.10	14.2	231.2	500.0	-6.7	
8232.75	V	180.00	1.00	33.28	15.1	262.0	500.0	-5.6	

2744.25	H	270.00	2.20	49.80	1.2	355.1	5000.0	-23.0
3659.00	H	165.00	2.20	47.40	3.3	341.6	5000.0	-23.3
4573.75	H	270.00	2.20	46.39	5.5	394.7	5000.0	-22.1
7318.00	H	90.00	2.20	34.50	14.2	271.7	5000.0	-25.3
8232.75	H	170.00	2.20	34.80	15.1	312.2	5000.0	-24.1
2744.25	H	270.00	2.20	39.66	1.2	110.5	500.0	-13.1
3659.00	H	165.00	2.20	37.19	3.3	105.5	500.0	-13.5
4573.75	H	270.00	2.20	35.08	5.5	107.4	500.0	-13.4
7318.00	H	90.00	2.20	33.29	14.2	236.5	500.0	-6.5
8232.75	H	170.00	2.20	33.32	15.1	263.3	500.0	-5.6

High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.75	V	270.00	1.00	50.96	1.2	407.5	5000.0	-21.8	
3709.00	V	240.00	1.00	50.73	3.3	503.8	5000.0	-19.9	
4636.25	V	90.00	1.00	46.49	6.0	419.0	5000.0	-21.5	
7418.00	V	200.00	1.00	42.92	14.2	713.6	5000.0	-16.9	
8345.25	V	90.00	1.00	42.79	15.1	788.3	5000.0	-16.0	
2781.75	V	270.00	1.00	43.02	1.2	163.3	500.0	-9.7	
3709.00	V	240.00	1.00	43.91	3.3	229.7	500.0	-6.8	
4636.25	V	90.00	1.00	34.67	6.0	107.5	500.0	-13.4	
7418.00	V	200.00	1.00	34.01	14.2	256.0	500.0	-5.8	
8345.25	V	90.00	1.00	33.02	15.1	256.0	500.0	-5.8	
2781.75	H	290.00	2.20	48.19	1.2	296.2	5000.0	-24.5	
3709.00	H	90.00	2.20	47.18	3.3	334.8	5000.0	-23.5	
4636.25	H	180.00	2.20	45.90	6.0	391.5	5000.0	-22.1	
7418.00	H	190.00	2.20	41.30	14.2	592.5	5000.0	-18.5	
8345.25	H	180.00	2.20	41.00	15.1	641.5	5000.0	-17.8	
2781.75	H	290.00	2.20	38.23	1.2	94.1	500.0	-14.5	
3709.00	H	90.00	2.20	36.63	3.3	99.4	500.0	-14.0	
4636.25	H	180.00	2.20	34.00	6.0	99.5	500.0	-14.0	
7418.00	H	190.00	2.20	32.90	14.2	225.3	500.0	-6.9	
8345.25	H	180.00	2.20	33.20	15.1	261.3	500.0	-5.6	

Table 13: Radiated Emission Test Data >1GHz, (Laird OD9-5)
Low Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	180.00	1.00	50.71	-14.4	65.3	5000.0	-37.7	
3611.00	V	180.00	1.00	49.47	-11.9	75.5	5000.0	-36.4	
4513.75	V	290.00	1.00	47.87	-9.1	86.6	5000.0	-35.2	
5416.50	V	180.00	1.00	48.68	-5.8	140.1	5000.0	-31.1	
8124.75	V	190.00	1.00	44.65	0.7	185.5	5000.0	-28.6	
9027.50	V	180.00	1.00	45.95	2.4	261.8	5000.0	-25.6	
2708.25	V	180.00	1.00	40.19	-14.4	19.4	500.0	-28.2	
3611.00	V	180.00	1.00	37.92	-11.9	20.0	500.0	-28.0	
4513.75	V	290.00	1.00	33.82	-9.1	17.2	500.0	-29.3	
5416.50	V	180.00	1.00	34.62	-5.8	27.8	500.0	-25.1	
8124.75	V	190.00	1.00	33.54	0.7	51.6	500.0	-19.7	
9027.50	V	180.00	1.00	33.94	2.4	65.7	500.0	-17.6	
2708.25	H	120.00	2.20	53.44	-14.4	89.4	5000.0	-35.0	
3611.00	H	180.00	2.20	48.88	-11.9	70.5	5000.0	-37.0	
4513.75	H	180.00	2.20	46.89	-9.1	77.3	5000.0	-36.2	
5416.50	H	90.00	2.20	45.25	-5.8	94.4	5000.0	-34.5	
8124.75	H	180.00	2.20	44.75	0.7	187.7	5000.0	-28.5	
9027.50	H	150.00	2.20	46.58	2.4	281.5	5000.0	-25.0	
2708.25	H	120.00	2.20	43.91	-14.4	29.8	500.0	-24.5	
3611.00	H	180.00	2.20	35.92	-11.9	15.9	500.0	-30.0	
4513.75	H	180.00	2.20	34.68	-9.1	19.0	500.0	-28.4	
5416.50	H	90.00	2.20	34.96	-5.8	28.9	500.0	-24.8	
8124.75	H	180.00	2.20	33.52	0.7	51.5	500.0	-19.7	
9027.50	H	150.00	2.20	33.92	2.4	65.5	500.0	-17.6	

Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	290.00	1.00	50.16	-14.4	61.7	5000.0	-38.2	
3659.00	V	190.00	1.00	47.72	-11.9	61.5	5000.0	-38.2	
4573.75	V	180.00	1.00	48.16	-8.7	93.7	5000.0	-34.5	
7318.00	V	180.00	1.00	46.33	-0.2	201.4	5000.0	-27.9	
8232.75	V	180.00	1.00	45.16	0.9	200.2	5000.0	-28.0	
9147.50	V	190.00	1.00	45.91	3.1	281.7	5000.0	-25.0	
2744.25	V	290.00	1.00	37.10	-14.4	13.7	500.0	-31.2	
3659.00	V	190.00	1.00	37.33	-11.9	18.6	500.0	-28.6	
4573.75	V	180.00	1.00	34.53	-8.7	19.5	500.0	-28.2	

7318.00	V	180.00	1.00	33.32	-0.2	45.0	500.0	-20.9
8232.75	V	180.00	1.00	33.85	0.9	54.4	500.0	-19.3
9147.50	V	190.00	1.00	33.70	3.1	69.1	500.0	-17.2
2744.25	H	190.00	2.20	51.28	-14.4	70.2	5000.0	-37.1
3659.00	H	90.00	2.20	49.32	-11.9	74.0	5000.0	-36.6
4573.75	H	190.00	2.20	45.61	-8.7	69.9	5000.0	-37.1
7318.00	H	180.00	2.20	42.68	-0.2	132.3	5000.0	-31.5
8232.75	H	180.00	2.20	44.85	0.9	193.2	5000.0	-28.3
9147.50	H	190.00	2.20	44.18	3.1	230.8	5000.0	-26.7
2744.25	H	190.00	2.20	38.42	-14.4	16.0	500.0	-29.9
3659.00	H	90.00	2.20	38.36	-11.9	20.9	500.0	-27.6
4573.75	H	190.00	2.20	34.43	-8.7	19.3	500.0	-28.3
7318.00	H	180.00	2.20	36.22	-0.2	62.9	500.0	-18.0
8232.75	H	180.00	2.20	33.85	0.9	54.4	500.0	-19.3
9147.50	H	190.00	2.20	33.65	3.1	68.7	500.0	-17.2

High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.75	V	180.00	1.00	52.21	-14.3	78.8	5000.0	-36.1	
3709.00	V	170.00	1.00	46.67	-11.8	55.1	5000.0	-39.2	
4636.25	V	195.00	1.00	46.19	-8.4	78.0	5000.0	-36.1	
7418.00	V	180.00	1.00	45.41	-0.3	180.5	5000.0	-28.9	
8345.25	V	180.00	1.00	45.73	0.9	214.8	5000.0	-27.3	
2781.75	V	180.00	1.00	44.05	-14.3	30.8	500.0	-24.2	
3709.00	V	170.00	1.00	35.75	-11.8	15.7	500.0	-30.1	
4636.25	V	195.00	1.00	34.43	-8.4	20.1	500.0	-27.9	
7418.00	V	180.00	1.00	33.73	-0.3	47.0	500.0	-20.5	
8345.25	V	180.00	1.00	33.30	0.9	51.3	500.0	-19.8	
2781.75	H	90.00	2.20	51.98	-14.3	76.7	5000.0	-36.3	
3709.00	H	190.00	2.20	45.80	-11.8	49.9	5000.0	-40.0	
4636.25	H	220.00	2.20	44.39	-8.4	63.4	5000.0	-37.9	
7418.00	H	170.00	2.20	45.47	-0.3	181.7	5000.0	-28.8	
8345.25	H	180.00	2.20	45.91	0.9	219.2	5000.0	-27.2	
2781.75	H	90.00	2.20	43.93	-14.3	30.4	500.0	-24.3	
3709.00	H	190.00	2.20	34.51	-11.8	13.6	500.0	-31.3	
4636.25	H	220.00	2.20	33.82	-8.4	18.8	500.0	-28.5	
7418.00	H	170.00	2.20	33.74	-0.3	47.1	500.0	-20.5	
8345.25	H	180.00	2.20	33.38	0.9	51.8	500.0	-19.7	

Table 14: Radiated Emission Test Data >1GHz, (Laird TRAB9023 3dBi)

Low Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	180.00	1.00	49.73	-12.5	72.9	5000.0	-36.7	
3611.00	V	180.00	1.00	44.93	-9.5	58.9	5000.0	-38.6	
4513.75	V	315.00	1.00	45.73	-6.5	91.8	5000.0	-34.7	
5416.50	V	180.00	1.00	44.83	-3.0	123.7	5000.0	-32.1	
8124.75	V	180.00	1.00	42.53	5.3	247.5	5000.0	-26.1	
9027.50	V	180.00	1.00	42.63	7.9	334.7	5000.0	-23.5	
2708.25	V	180.00	1.00	39.13	-12.5	21.5	500.0	-27.3	
3611.00	V	180.00	1.00	34.61	-9.5	18.0	500.0	-28.9	
4513.75	V	315.00	1.00	32.15	-6.5	19.2	500.0	-28.3	
5416.50	V	180.00	1.00	32.53	-3.0	30.0	500.0	-24.4	
8124.75	V	180.00	1.00	33.23	5.3	84.8	500.0	-15.4	
9027.50	V	180.00	1.00	32.47	7.9	103.9	500.0	-13.6	
2708.25	H	180.00	2.20	48.83	-12.5	65.7	5000.0	-37.6	
3611.00	H	270.00	2.20	46.63	-9.5	71.7	5000.0	-36.9	
4513.75	H	180.00	2.20	43.73	-6.5	72.9	5000.0	-36.7	
5416.50	H	180.00	2.20	44.53	-3.0	119.5	5000.0	-32.4	
8124.75	H	180.00	2.20	44.13	5.3	297.6	5000.0	-24.5	
9027.50	H	180.00	2.20	43.63	7.9	375.5	5000.0	-22.5	
2708.25	H	180.00	2.20	37.73	-12.5	18.3	500.0	-28.7	
3611.00	H	270.00	2.20	35.83	-9.5	20.7	500.0	-27.7	
4513.75	H	180.00	2.20	32.73	-6.5	20.6	500.0	-27.7	
5416.50	H	180.00	2.20	32.73	-3.0	30.7	500.0	-24.2	
8124.75	H	180.00	2.20	32.53	5.3	78.3	500.0	-16.1	
9027.50	H	180.00	2.20	31.83	7.9	96.5	500.0	-14.3	

Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	180.00	1.00	49.76	-12.5	73.3	5000.0	-36.7	Peak
3659.00	V	180.00	1.00	45.56	-9.5	63.2	5000.0	-38.0	Peak
4573.75	V	315.00	1.00	44.76	-6.0	86.4	5000.0	-35.3	Peak
7318.00	V	180.00	1.00	44.16	3.8	248.9	5000.0	-26.1	Peak
8232.75	V	180.00	1.00	41.26	5.6	221.3	5000.0	-27.1	Peak
9147.50	V	180.00	1.00	41.86	8.6	334.2	5000.0	-23.5	Peak
2744.25	V	180.00	1.00	39.78	-12.5	23.2	500.0	-26.7	Ave
3659.00	V	180.00	1.00	33.46	-9.5	15.7	500.0	-30.1	Ave

4573.75	V	315.00	1.00	31.18	-6.0	18.1	500.0	-28.8	Ave
7318.00	V	180.00	1.00	30.86	3.8	53.8	500.0	-19.4	Ave
8232.75	V	180.00	1.00	31.76	5.6	74.1	500.0	-16.6	Ave
9147.50	V	180.00	1.00	31.56	8.6	102.1	500.0	-13.8	Ave
2744.25	H	180.00	2.20	48.76	-12.5	65.3	5000.0	-37.7	Peak
3659.00	H	270.00	2.20	46.16	-9.5	67.7	5000.0	-37.4	Peak
4573.75	H	180.00	2.20	43.56	-6.0	75.2	5000.0	-36.5	Peak
7318.00	H	180.00	2.20	43.56	3.8	232.3	5000.0	-26.7	Peak
8232.75	H	180.00	2.20	42.76	5.6	263.0	5000.0	-25.6	Peak
9147.50	H	180.00	2.20	42.76	8.6	370.7	5000.0	-22.6	Peak
2744.25	H	180.00	2.20	37.56	-12.5	18.0	500.0	-28.9	Ave
3659.00	H	270.00	2.20	35.56	-9.5	20.0	500.0	-28.0	Ave
4573.75	H	180.00	2.20	31.46	-6.0	18.7	500.0	-28.6	Ave
7318.00	H	180.00	2.20	31.76	3.8	59.7	500.0	-18.5	Ave
8232.75	H	180.00	2.20	30.86	5.6	66.8	500.0	-17.5	Ave
9147.50	H	180.00	2.20	31.26	8.6	98.6	500.0	-14.1	Ave

High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.75	V	180.00	1.00	49.69	-12.4	72.9	5000.0	-36.7	Peak
3709.00	V	180.00	1.00	46.50	-9.5	71.2	5000.0	-36.9	Peak
4636.25	V	270.00	1.00	46.33	-5.7	108.0	5000.0	-33.3	Peak
7418.00	V	180.00	1.00	45.28	3.8	284.1	5000.0	-24.9	Peak
8345.25	V	180.00	1.00	41.47	5.8	231.4	5000.0	-26.7	Peak
2781.75	V	180.00	1.00	39.53	-12.4	22.6	500.0	-26.9	Ave
3709.00	V	180.00	1.00	34.61	-9.5	18.1	500.0	-28.8	Ave
4636.25	V	270.00	1.00	32.36	-5.7	21.6	500.0	-27.3	Ave
7418.00	V	180.00	1.00	32.26	3.8	63.4	500.0	-17.9	Ave
8345.25	V	190.00	1.00	31.79	5.8	75.9	500.0	-16.4	Ave
2781.75	H	270.00	2.20	49.16	-12.4	68.6	5000.0	-37.3	Peak
3709.00	H	90.00	2.20	46.76	-9.5	73.4	5000.0	-36.7	Peak
4636.25	H	180.00	2.20	44.64	-5.7	88.9	5000.0	-35.0	Peak
7418.00	H	180.00	2.20	43.51	3.8	231.7	5000.0	-26.7	Peak
8345.25	H	180.00	2.20	45.70	5.8	376.6	5000.0	-22.5	Peak
2781.75	H	270.00	2.20	38.05	-12.4	19.1	500.0	-28.4	Ave
3709.00	H	90.00	2.20	35.84	-9.5	20.9	500.0	-27.6	Ave
4636.25	H	180.00	2.20	32.35	-5.7	21.6	500.0	-27.3	Ave
7418.00	H	180.00	2.20	32.13	3.8	62.5	500.0	-18.1	Ave
8345.25	H	180.00	2.20	32.06	5.8	78.3	500.0	-16.1	Ave

Table 15: Radiated Emission Test Data >1GHz, (Laird 5/8th Wave)

Low Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	200.00	1.00	52.18	1.2	465.3	5000.0	-20.6	
3611.00	V	180.00	1.00	48.90	3.2	404.1	5000.0	-21.8	
4513.75	V	270.00	1.00	46.31	5.3	380.6	5000.0	-22.4	
5416.50	V	180.00	1.00	46.68	8.8	594.3	5000.0	-18.5	
8124.75	V	180.00	1.00	41.53	14.9	664.8	5000.0	-17.5	
9027.50	V	190.00	1.00	40.24	17.0	729.0	5000.0	-16.7	
2708.25	V	200.00	1.00	41.68	1.2	138.9	500.0	-11.1	
3611.00	V	180.00	1.00	38.94	3.2	128.4	500.0	-11.8	
4513.75	V	270.00	1.00	35.05	5.3	104.2	500.0	-13.6	
5416.50	V	180.00	1.00	36.36	8.8	181.3	500.0	-8.8	
8124.75	V	180.00	1.00	31.20	14.9	202.4	500.0	-7.9	
9027.50	V	190.00	1.00	30.96	17.0	250.5	500.0	-6.0	
2708.25	H	180.00	2.20	50.81	1.2	397.6	5000.0	-22.0	
3611.00	H	190.00	2.20	47.37	3.2	339.1	5000.0	-23.4	
4513.75	H	180.00	2.20	44.25	5.3	300.2	5000.0	-24.4	
5416.50	H	180.00	2.20	45.93	8.8	545.5	5000.0	-19.2	
8124.75	H	180.00	2.20	41.93	14.9	696.1	5000.0	-17.1	
9027.50	H	170.00	2.20	40.66	17.0	765.1	5000.0	-16.3	
2708.25	H	180.00	2.20	44.91	1.2	201.5	500.0	-7.9	
3611.00	H	190.00	2.20	38.12	3.2	116.9	500.0	-12.6	
4513.75	H	180.00	2.20	33.54	5.3	87.5	500.0	-15.1	
5416.50	H	180.00	2.20	36.35	8.8	181.0	500.0	-8.8	
8124.75	H	180.00	2.20	31.35	14.9	205.9	500.0	-7.7	
9027.50	H	170.00	2.20	30.96	17.0	250.5	500.0	-6.0	

Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	190.00	1.00	49.38	1.2	338.2	5000.0	-23.4	Peak
3659.00	V	180.00	1.00	48.24	3.3	376.1	5000.0	-22.5	Peak
4573.75	V	290.00	1.00	43.52	5.5	283.6	5000.0	-24.9	Peak
7318.00	V	160.00	1.00	43.67	14.2	780.9	5000.0	-16.1	Peak
8232.75	V	180.00	1.00	43.19	15.1	820.4	5000.0	-15.7	Peak
9147.50	V	180.00	1.00	35.80	17.8	478.7	5000.0	-20.4	Peak
2744.25	V	190.00	1.00	39.92	1.2	113.9	500.0	-12.9	Ave

3659.00	V	180.00	1.00	38.28	3.3	119.6	500.0	-12.4	Ave
4573.75	V	290.00	1.00	34.47	5.5	100.1	500.0	-14.0	Ave
7318.00	V	160.00	1.00	32.20	14.2	208.5	500.0	-7.6	Ave
8232.75	V	180.00	1.00	32.38	15.1	236.2	500.0	-6.5	Ave
9147.50	V	180.00	1.00	33.80	17.8	380.3	500.0	-2.4	Ave
2744.25	H	200.00	2.20	49.12	1.2	328.2	5000.0	-23.7	Peak
3659.00	H	270.00	2.20	47.48	3.3	344.9	5000.0	-23.2	Peak
4573.75	H	180.00	2.20	45.49	5.5	355.8	5000.0	-23.0	Peak
7318.00	H	180.00	2.20	43.58	14.2	773.2	5000.0	-16.2	Peak
8232.75	H	190.00	2.20	43.91	15.1	890.5	5000.0	-15.0	Peak
9147.50	H	190.00	2.20	37.50	17.8	582.2	5000.0	-18.7	Peak
2744.25	H	200.00	2.20	38.76	1.2	99.7	500.0	-14.0	Ave
3659.00	H	270.00	2.20	36.29	3.3	95.1	500.0	-14.4	Ave
4573.75	H	180.00	2.20	34.18	5.5	96.9	500.0	-14.3	Ave
7318.00	H	180.00	2.20	32.39	14.2	213.2	500.0	-7.4	Ave
8232.75	H	190.00	2.20	32.42	15.1	237.3	500.0	-6.5	Ave
9147.50	H	190.00	2.20	33.70	17.8	375.9	500.0	-2.5	Ave

High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.75	V	180.00	1.00	50.46	1.2	384.7	5000.0	-22.3	Peak
3709.00	V	180.00	1.00	50.23	3.3	475.7	5000.0	-20.4	Peak
4636.25	V	250.00	1.00	45.99	6.0	395.5	5000.0	-22.0	Peak
7418.00	V	170.00	1.00	42.42	14.2	673.7	5000.0	-17.4	Peak
8345.25	V	190.00	1.00	42.29	15.1	744.2	5000.0	-16.5	Peak
2781.75	V	180.00	1.00	42.52	1.2	154.2	500.0	-10.2	Ave
3709.00	V	180.00	1.00	43.41	3.3	216.9	500.0	-7.3	Ave
4636.25	V	250.00	1.00	34.17	6.0	101.4	500.0	-13.9	Ave
7418.00	V	170.00	1.00	33.51	14.2	241.6	500.0	-6.3	Ave
8345.25	V	190.00	1.00	32.52	15.1	241.7	500.0	-6.3	Ave
2781.75	H	250.00	2.20	47.69	1.2	279.6	5000.0	-25.0	Peak
3709.00	H	90.00	2.20	46.68	3.3	316.1	5000.0	-24.0	Peak
4636.25	H	160.00	2.20	45.40	6.0	369.6	5000.0	-22.6	Peak
7418.00	H	180.00	2.20	40.80	14.2	559.3	5000.0	-19.0	Peak
8345.25	H	200.00	2.20	40.50	15.1	605.6	5000.0	-18.3	Peak
2781.75	H	250.00	2.20	37.73	1.2	88.8	500.0	-15.0	Ave
3709.00	H	90.00	2.20	36.13	3.3	93.8	500.0	-14.5	Ave
4636.25	H	160.00	2.20	33.50	6.0	93.9	500.0	-14.5	Ave
7418.00	H	180.00	2.20	33.50	14.2	241.4	500.0	-6.3	Ave
8345.25	H	200.00	2.20	32.70	15.1	246.7	500.0	-6.1	Ave

5.7 Receiver Radiated Spurious Emissions: (RSS-GEN)

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.209 and §15.35(b) for peak measurements.

5.7.1 Test Procedure

The EUT was placed on 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. Receiving 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 peripherals were placed on the table in accordance with ANSI C63.4-2014. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The emissions were measured using the following resolution bandwidths:

Table 16: Spectrum Analyzer Settings

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	10 Hz (Avg.), 1MHz (Peak)

Table 17: Radiated Emission Test Data, Receiver

Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Peak or Average	Comments
40.43	V	180.00	1.0	36.3	-11.0	18.5	100.0	-14.7	Peak	
48.00	V	270.00	1.00	49.11	-15.7	46.7	100.0	-6.6	Peak	
54.15	V	180.00	1.00	46.37	-17.2	28.8	100.0	-10.8	Peak	
63.36	V	180.00	1.00	47.91	-16.4	37.8	100.0	-8.5	Peak	
144.01	V	90.00	1.2	40.6	-10.3	32.7	150.0	-13.2	Peak	
166.10	V	0.00	1.3	35.8	-10.6	18.2	150.0	-18.3	Peak	
192.00	V	90.00	1.50	43.60	-10.9	43.1	150.0	-10.8	Peak	
232.53	V	0.00	1.50	34.25	-10.5	15.4	200.0	-22.3	Peak	
240.00	V	90.00	1.50	40.33	-10.2	32.1	200.0	-15.9	Peak	
288.00	V	180.00	1.50	33.76	-7.9	19.7	200.0	-20.1	Peak	
299.00	V	0.00	1.50	35.20	-7.9	23.2	200.0	-18.7	Peak	
336.02	V	135.00	1.5	36.5	-6.9	30.3	200.0	-16.4	Peak	
384.01	V	180.00	2.0	40.1	-5.5	53.9	200.0	-11.4	Peak	
528.00	V	270.00	2.0	40.4	-1.1	91.9	200.0	-6.8	Peak	
40.43	H	180.00	4.00	36.30	-11.0	18.5	100.0	-14.7	Peak	
48.00	H	315.00	4.00	48.13	-15.7	41.7	100.0	-7.6	Peak	
54.15	H	225.00	4.00	36.60	-17.2	9.3	100.0	-20.6	Peak	
63.36	H	180.00	4.00	50.10	-16.4	48.6	100.0	-6.3	Peak	
144.01	H	180.00	4.00	51.33	-10.3	113.0	150.0	-2.5	Peak	
166.10	H	180.00	4.00	39.50	-10.6	27.7	150.0	-14.7	Peak	
192.00	H	0.00	4.00	49.56	-10.9	85.7	150.0	-4.9	Peak	
232.53	H	0.00	3.50	37.54	-10.5	22.4	200.0	-19.0	Peak	
240.00	H	135.00	3.00	46.60	-10.2	66.0	200.0	-9.6	Peak	
288.00	H	180.00	2.50	35.20	-7.9	23.3	200.0	-18.7	Peak	
336.02	H	315.00	2.50	35.10	-6.9	25.8	200.0	-17.8	Peak	
384.01	H	180.00	2.50	42.30	-5.5	69.2	200.0	-9.2	Peak	
528.00	H	180.00	2.50	42.50	-1.1	116.9	200.0	-4.7	Peak	

Note: No frequencies noted above 1GHz within 20 dB of the limits