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FCC Certification Test Report
For the
Siemens Medical Solutions USA, Inc.
ACUSON Freestyle Ultrasound System

FCC ID: XSB2300A

WLL JOB# 13187 Rev 4
November 12, 2013

Re-issued April 1, 2014

Prepared for:

Siemens Medical Solutions USA, Inc.
5168 Campus Drive
Plymouth Meeting, PA 19462

Prepared By:

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

ACLASS ACCREDITED TESTING

Testing Certificate AT-1448

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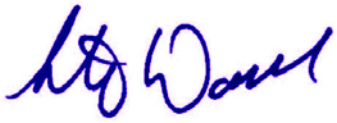

Steven Dovell
Compliance Engineer

Reviewed by:

Steven D. Koster
Vice President

Abstract

This report has been prepared on behalf of Siemens Medical Solutions USA, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a UWB pulse-modulated BPSK Transmitter under Part 15.519 (10/2013) of the FCC Rules and Regulations. This Certification Test Report documents the test configuration and test results for the Siemens Medical Solutions USA, Inc. ACUSON Freestyle Ultrasound System

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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 ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

The Siemens Medical Solutions USA, Inc. ACUSON Freestyle Ultrasound System complies with the limits for a UWB Transmitter device under FCC Part 15.503 and 15.519.

Summary of Results

Test Description	Rule Part	Complies
UWB Bandwidth	15.503(d)	Yes
Turn off time	15.519(a1)	Yes
Antenna Limitation	15.519(a2)	Yes
Operational Bandwidth	15.519(b)	Yes
Radiated Emissions	15.519(c) & 15.209	Yes
GPS Bands	15.519(d)	Yes
Peak Power	15.519(e)	Yes

Revision History	Description of Change	Date
Rev 0	Initial Release	November 12, 2013
Rev 1	Corrected as per client comments	January 15, 2014
Rev 2	Updated Company Name	March 4, 2014
Rev 3	Updated FCC ID	April 1, 2014
Rev 4	Corrected type errors, Model and EUT Name	July 23, 2014

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1 Introduction

1.1 Compliance Statement

The Siemens Medical Solutions USA, Inc. ACUSON Freestyle Ultrasound System complies with the limits for a UWB pulse-modulated BPSK Transmitter device under FCC Part 15.519 (10/2013).

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed according to the following documents:

- ANSI C63.4-2001, American National Standard for Methods of Measurement of Radio-Noise Emissions form Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- CFR 47, Part 15 Subpart F – Ultra Wideband Operation, October 10,2013
- ANSI C63.10-2013 - American National Standard of 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:	Siemens Medical Solutions USA, Inc. 5168 Campus Drive Plymouth Meeting, PA 19462
Purchase Order Number:	1590125717
Quotation Number:	67629

1.4 Test Dates

Testing was performed on the following date(s):	10/28/13 – 10/30/13

1.5 Test and Support Personnel

Washington Laboratories, LTD	Steven Dovell
Client Representative	Larry Engle

1.6 Abbreviations

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	**Amp**eres
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 Siemens Medical Solutions USA, Inc. ACUSON Freestyle Ultrasound System is a Handheld ultrasound transducer. The three models are identical with the exception of the sonic nosepiece.

Table 1: Device Summary

Model(s) Tested: *(name of the equipment as it should appear in the test report)*	Acuson Freestyle Ultrasound System Wireless Probes
EUT Specifications:	
Manufacturer:	Siemens Medical Solutions USA, Inc.
FCC ID:	XSB2300A
EUT Name:	11001401, 11001402, 11001403
Model:	L8-3 Probe, L13-5 Probe, C5-2 Probe
FCC Rule Parts:	15.519, 15.503
Industry Canada:	RSS-220 Issue 1 Section 6.5
Frequency Range:	7.535425GHz to 8.07705GHz
Maximum Output Power:	-20.279dBm/50MHz Peak , -52.09dBm/1MHz Average
Modulation:	Pulse BPSK
Occupied Bandwidth:	542.225MHz
Keying:	Automatic
Type of Information:	Digital data
Number of Channels:	1 channel, 6 selectable antennas
Antenna Connector:	none
Antenna Type:	Internal monopoles
Interface Cables:	None
Power Source & Voltage:	Custom Li-Ion battery pack, 3.6V nominal

Table 2: Summary of Results

Test Description	Rule Part	Complies
UWB Bandwidth	15.503(d)	Yes
Turn off time	15.519(a1)	Yes
Antenna Limitation	15.519(a2)	Yes
Operational Bandwidth	15.519(b)	Yes
Radiated Emissions	15.519(c) & 15.209	Yes
GPS Bands	15.519(d)	Yes
Peak Power	15.519(e)	Yes

2.2 Test Configuration

The was configured as part of the Siemens Medical Solutions USA, Inc. L8-3 Probe, which is part of the ACUSON Freestyle Ultrasound System. The UWB unit is a handheld, battery-operated unit for indoor use only. The UWB radio is used to transmit encoded medical imaging data to the Elettra Ultrasound system. The Elettra Ultrasound System controls the L8-3 Probe via a Bluetooth radio. The UWB radio can only transmit when commanded by the Elettra Ultrasound system. See Figure 1.

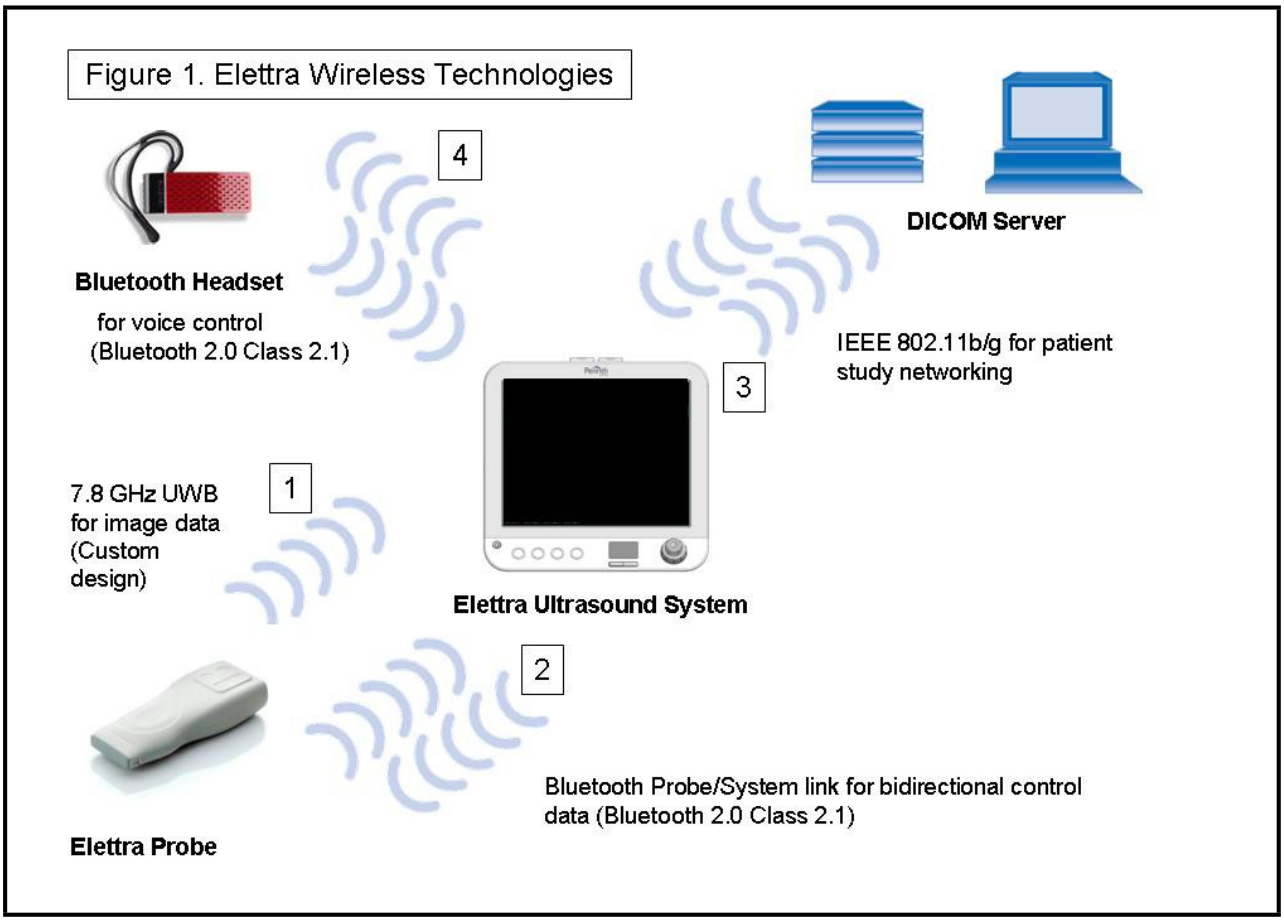

Figure 1: System Configuration

2.3 Testing Algorithm

The probe was put into a test mode, where only the UWB transmitter is running. Other circuitry used for the ultrasound data collection is disabled in this 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 ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

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.

ANSI C63.10-2013 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 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 3 below.

Table 3: Expanded Uncertainty List

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

Table 4: Test Equipment List

Test Name: **UWB Testing**		Test Date: **10/30/2013**	
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
00029	EMCO - 3146A	ANTENNA LOG PERIODIC	1/22/2015
00034	EMCO - BIA-30	ANTENNA BICONICAL	4/26/2014
00425	ARA - DRG-118/A	ANTENNA DRG 1-18GHZ	9/7/2014
00210	NARDA - V638	HORN STANDARD GAIN	CNR
00209	NARDA - V637	HORN STANDARD GAIN	CNR
00823	AGILENT - N9010A	EXA SPECTRUM ANALYZER	1/26/2014
00558	HP - 8447D	AMPLIFIER	10/21/2014
00066	B&Z - BZ-01002650-401545-282525	PRE-AMPLIFIER RF. 1-26.5GHZ	10/2/2014
00453	AH SYSTEMS - PAM1840	PRE-AMPLIFIER 18GHZ-40 GHZ	2/13/2014
00644	SUNOL SCIENCES CORPORATION - JB1 925-833-9936	BICONALOG ANTENNA	1/11/2014
00070	HP - 85685A	PRESELECTOR RF W/OPT 8ZE	1/1/2014
00068	HP - 85650A	ADAPTER QP	1/1/2014
00072	HP - 8568B	ANALYZER SPECTRUM	1/1/2014
00528	AGILENT - E4446A	ANALYZER SPECTRUM	2/28/2014

4 Test Results

4.1 Technical requirements for handheld UWB systems, §15.519

4.1.1 §15.519 (a)

UWB devices operating under the provisions of this section must be hand held, *i.e.* , they are relatively small devices that are primarily hand held while being operated and do not employ a fixed infrastructure.

- The UWB Transmitter is a Handheld ultrasound transducer which is battery operated.

4.1.2 §15.519 (a1)

UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

- The UWB transmitter is controlled via a Bluetooth link to the base station. Transmission will cease within 10 seconds of a loss of control/command from the base station. Figure 2 shows the time to turn off is only 8.73 seconds once the command link is no longer present. The Unit complies with the requirement.

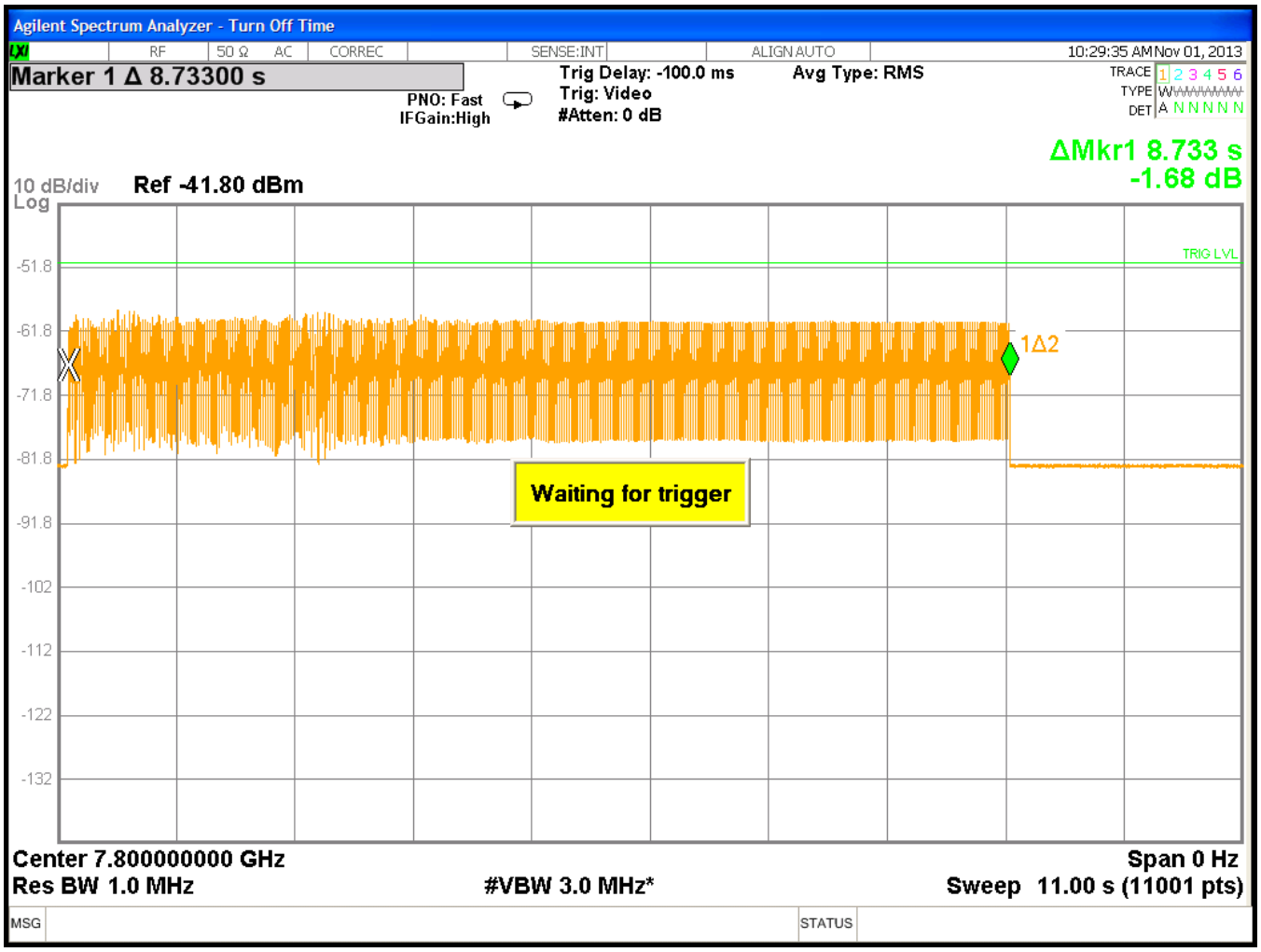

Figure 2: Turn off time

4.1.3 §15.519 (a2)

The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.

- The UWB transmitter is a fully contained, sealed unit without any external antenna connections. The device employs six identical internal antennas, only one of which is active during transmission. The selection of the antenna is controlled via software algorithm running on the base station to determine the antenna to be activated.

4.1.4 §15.519 (a3)

UWB devices operating under the provisions of this section may operate indoors or outdoors.

- The UWB Transmitter is designed for indoor use.

4.2 Bandwidth, §15.503, §15.519(b)

The UWB bandwidth of a UWB system operating under the provisions of Section 15.519 must be contained between 3100 MHz and 10,600 MHz. Part 15.503 states:

> (a) UWB bandwidth. For the purpose of this subpart, the UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated f_H and the lower boundary is designated f_L. The frequency at which the highest radiated emission occurs is designated f_M.
>
> (b) Center frequency. The center frequency, f_C, equals $(f_H + f_L)/2$.
>
> (c) Fractional bandwidth. The fractional bandwidth equals $2(f_H - f_L)/(f_H + f_L)$.
>
> (d) Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

4.2.1 Test Procedure

The bandwidth was measured using the Agilent analyzer with the receiving antenna located 3m from the EUT. The turntable was rotated through 360° and the antenna was raised between 1 and 4 meters to obtain the highest readings.

The resolution bandwidth of the receiver was set to 1 MHz and the frequency range was set from 7.3GHz to 8.3GHz. All corrections for the antenna, pre-amp and cable were input to the receiver.

4.2.2 Test Results

The bandwidth of the EUT was found to comply with the requirements of 15.519(b) and the minimum bandwidth as defined in 15.503(d). The Bandwidth plot is Figure 3. The Bandwidth results are in Table 5.

Table 5: Bandwidth Results

FCC Rule		Value	Result
§15.503(a)	f_L	7.535425GHz	Comply
§15.503(a)	f_H	8.07765GHz	Comply
§15.503(a)	f_m	7.855725GHz	Comply
§15.503(a)(d)	Measured Bandwidth $= f_h - f_l$	542.225MHz	Comply
§15.503(b)	Center Frequency $= (f_H + f_L)/2$	7.8065375GHz	Comply
§15.503(c)	Fractional bandwidth $= 2(f_H - f_L)/(f_H + f_L)$	0.0695	Comply

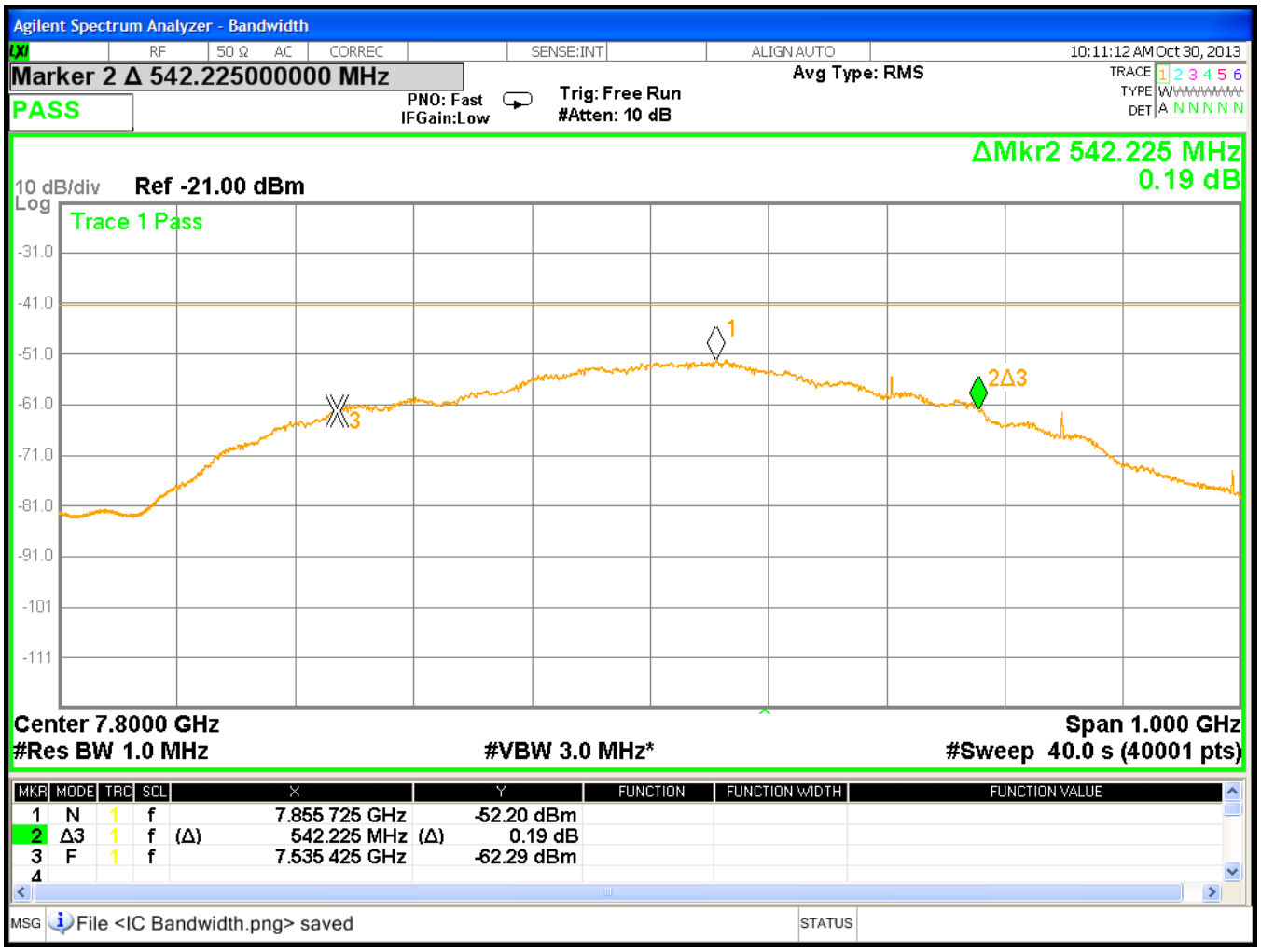

Figure 3: Bandwidth

4.3 Radiated Emissions, §15.519(c)

Emissions above 960 MHz must comply with the average limits given in the following table when measured with a 1 MHz resolution bandwidth. Scans and measurements were performed using an RMS average detector with RBW = 1MHz, except for the Bands 1164MHz to 1240MHz and 1559MHz to 1610MHz where the RBW = 1kHz. The averaging time was 1ms or less.

Table 6: §15.519(c) Limits (3m)

Frequency in MHz	EIRP in dBm
960 - 1610	-75.3
1610 – 1990	-63.3
1990 - 3100	-61.3
3100 – 10600	-41.3
Above 10600	-61.3

Due to measurement equipment limitations, it was necessary to move the antenna closer then 3m at frequencies above 18GHz. To compensate for the measurement distance, the limit was adjusted using the formula:

$$Limit_{new} = Limit + 20*LOG(D_n/3m)$$

Where D_n = the new distance

4.3.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing. 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 C63.4-1992. Both the horizontal and vertical field components were measured.

For all radiated emissions testing per §15.519(c), (d), and (e) all signal level corrections were entered into the receiver so that the plots obtained were final data that could be compared to the specification limit. The following is a sample of the factors and conversions entered in the receiver for calculations.

Sample Calculations:

Analyzer/Receiver Voltage (SA Level):	VdBµV
Antenna Factor (Ant Corr):	AFdB/m
Cable Loss Correction (Cable Corr):	CCdB
Amplifier Gain:	GdB (if applicable)
Distance Correction Factor:	DCdB (9.54dB for 3m to 1m, 19.08dB for 3m to 0.3m)
Electric Field (Corrected Level):	EdBµV/m = VdBµV + AFdB/m + CCdB – GdB + DCdB

The E-Field strength was then mathematically converted to an EIRP level using the equation from §15.521(g):

P(dBm EIRP) = E(dBµV/m) – 95.2

4.3.2 Test Results

The EUT complied with the requirements of Section 15.519(c). Table 7 and Figure 4 through Figure 18 show the emissions

Table 7: Worst Case Spurious Radiated Emissions > 960MHz

Frequency (GHz)	Antenna Polarity	Measurement Distance (m)	Measured Level (dBm)	Limit (dBm)	Margin (dB)
15.86420	V	3	-67.74	-61.3	-6.44
23.5794	V	0.3	-47.27	-42.2	-5.07
5.08791	H	3	-81.95	-41.3	-40.65
15.72039	H	3	-73.72	-61.3	-11.9
23.57940	H	0.3	-51.29	-42.2	-9.09

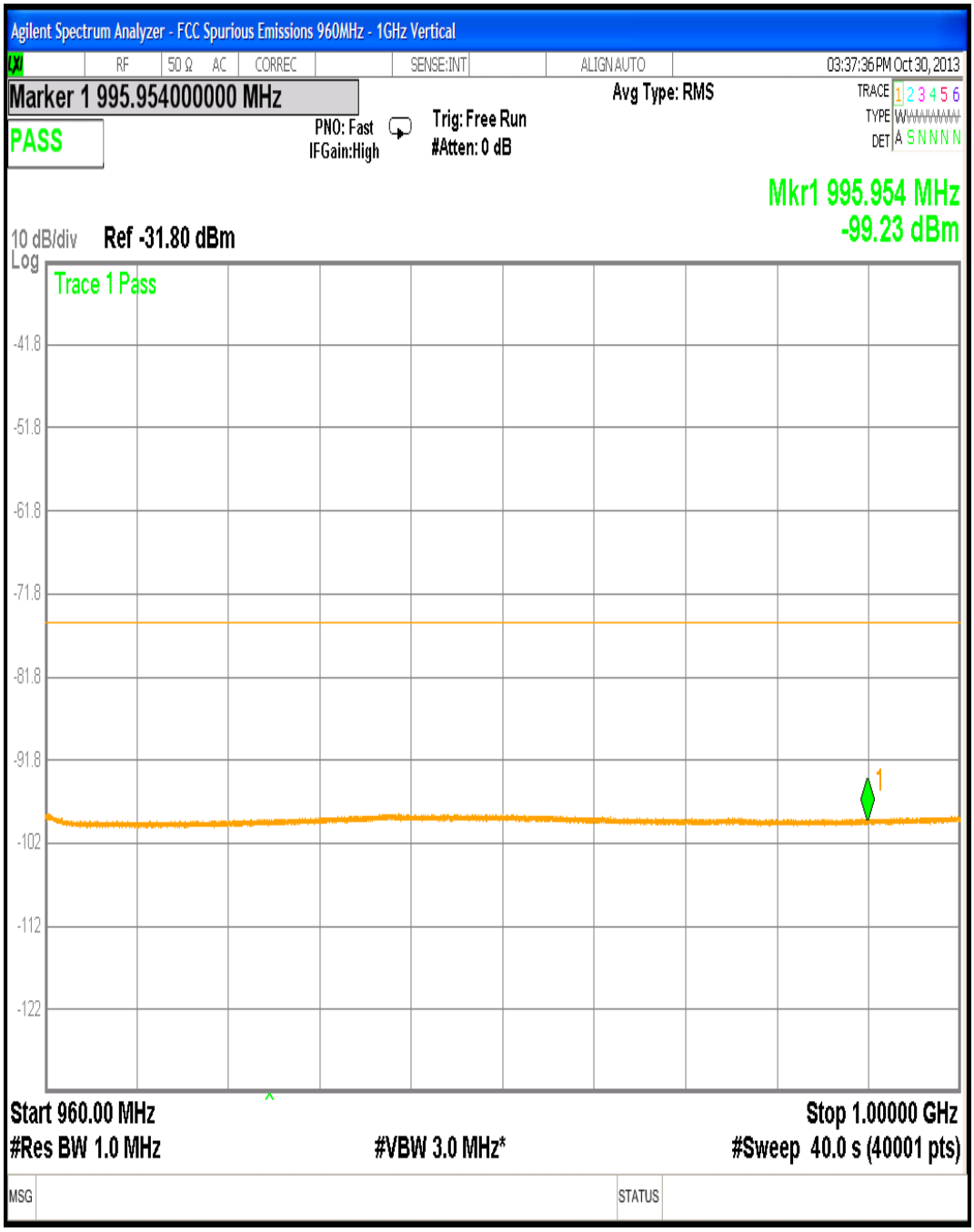

Figure 4. FCC Spurious Emissions 960MHz - 1GHz Vertical (3m)

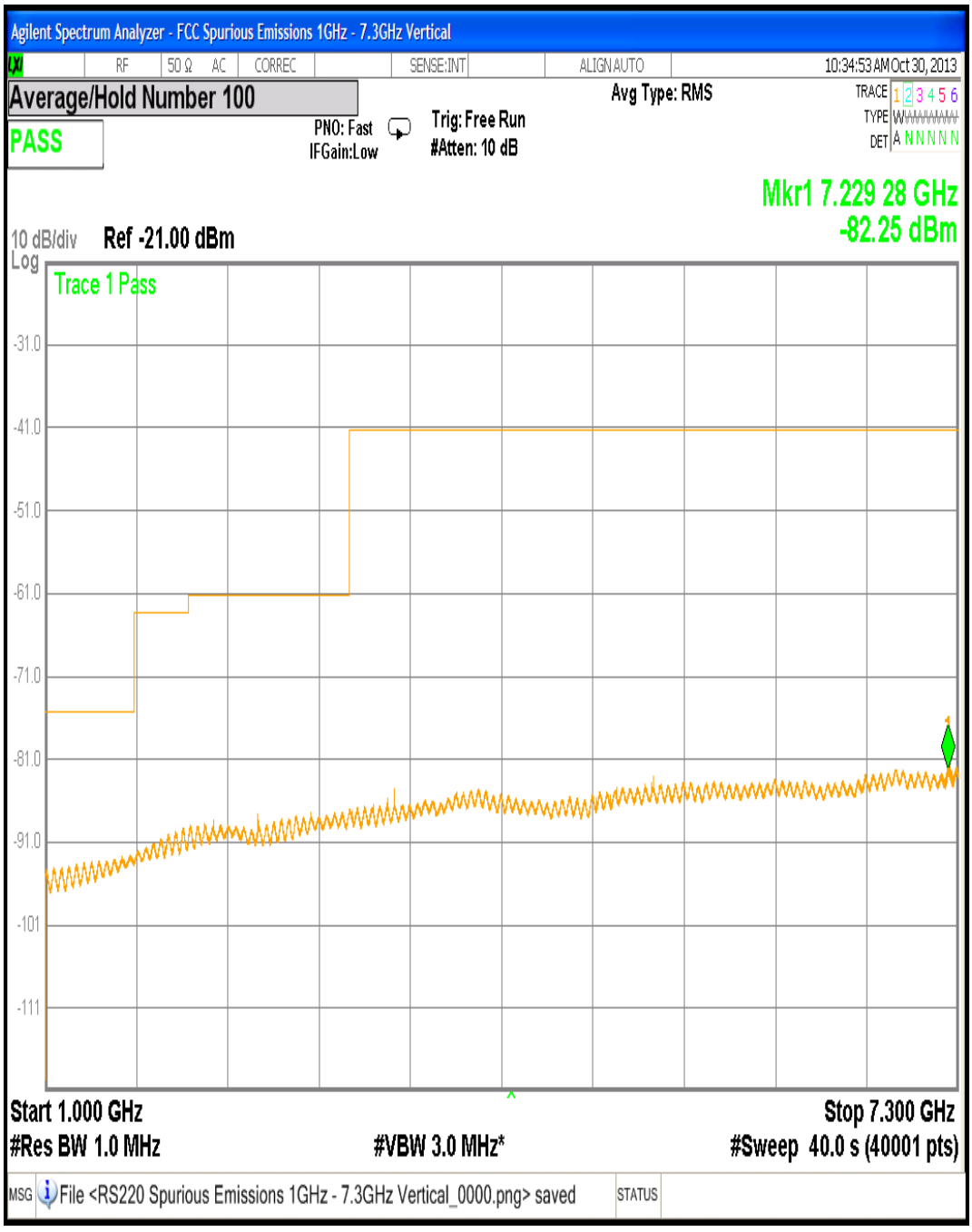

Figure 5. FCC Spurious Emissions 1GHz - 7.3GHz Vertical (3m)

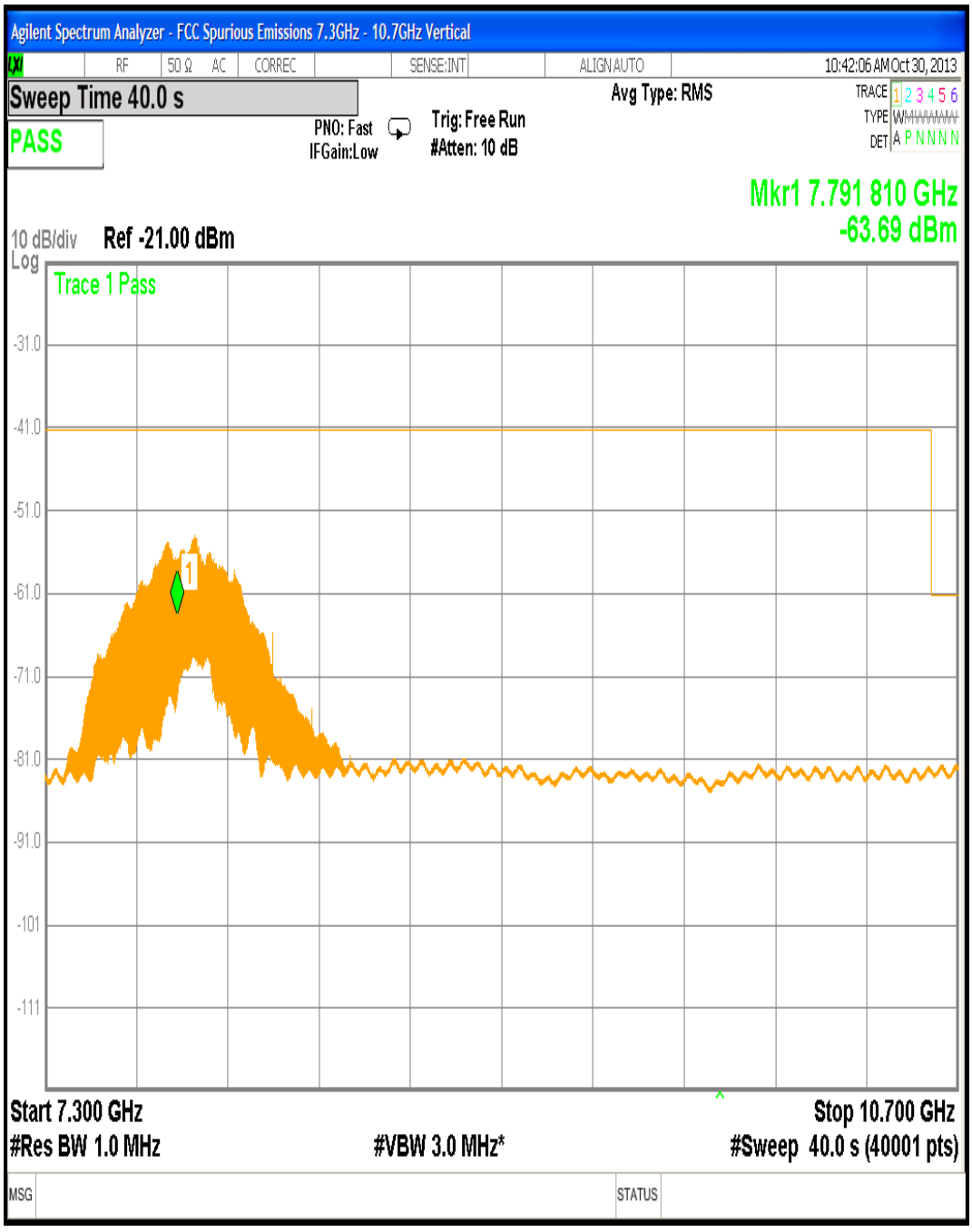

Figure 6. FCC Spurious Emissions 7.3GHz - 10.7GHz Vertical (3m)

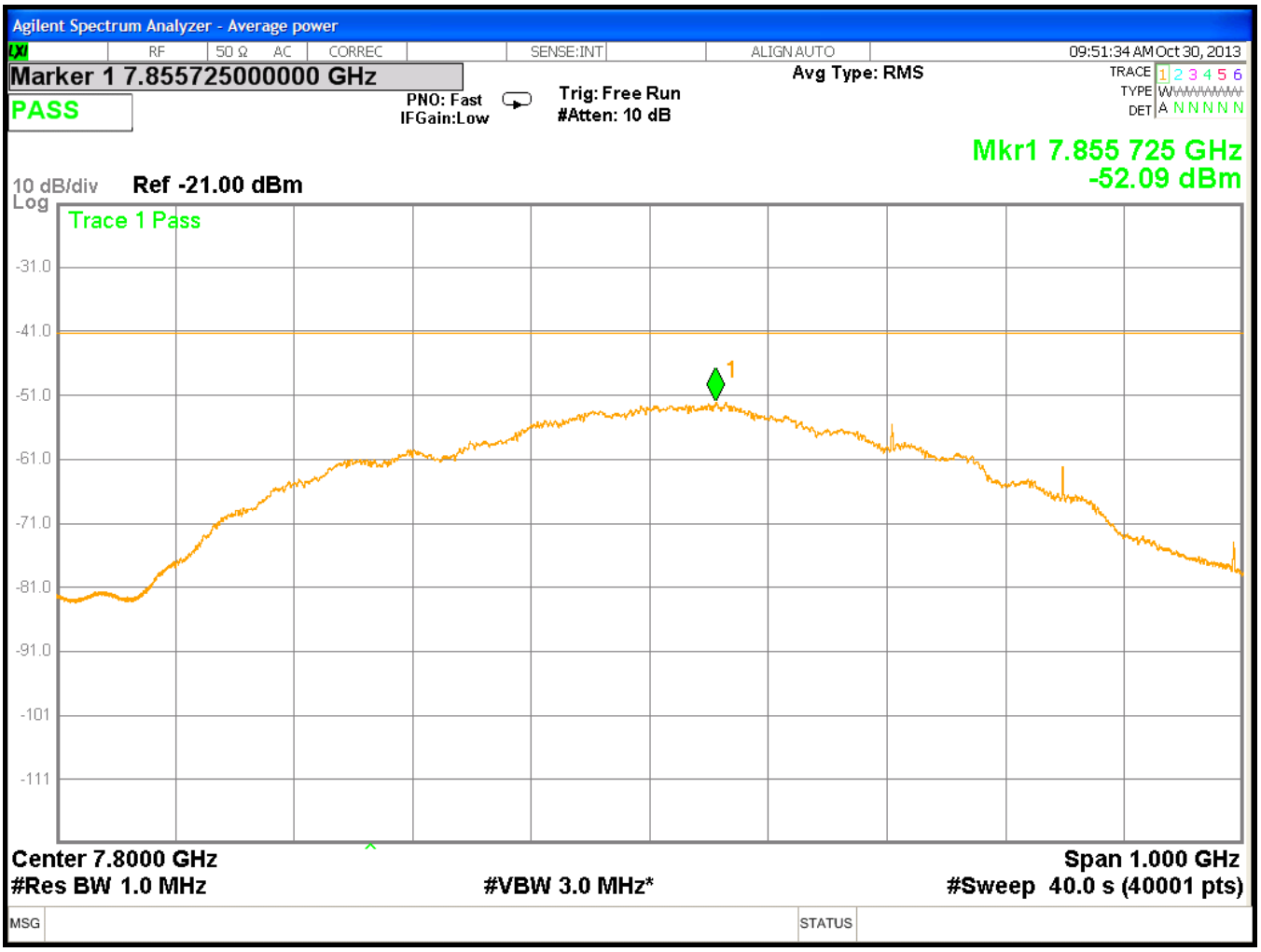

Figure 7. FCC Maximum Average Power (3m)

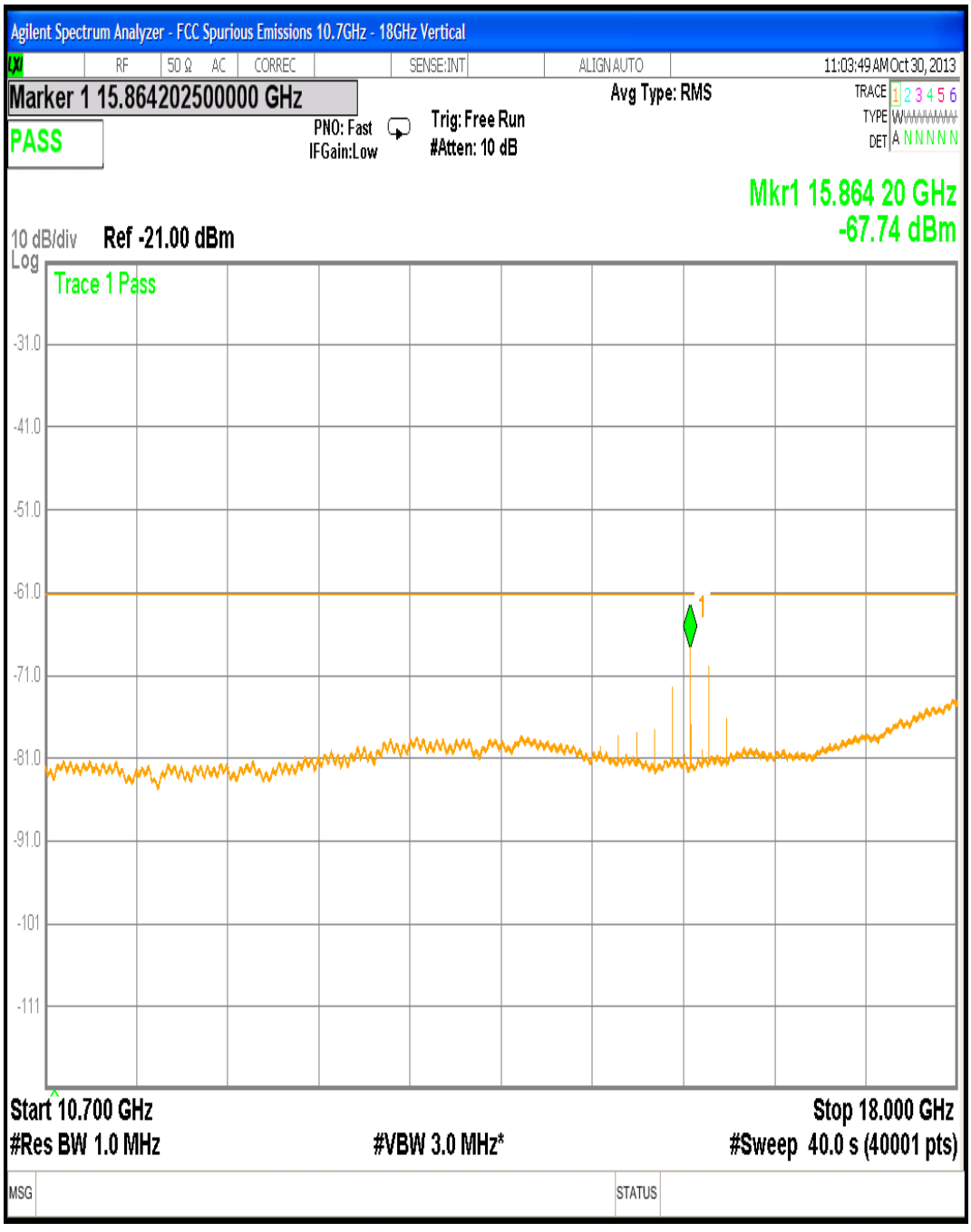

Figure 8. FCC Spurious Emissions 10.7GHz - 18GHz Vertical (3m)

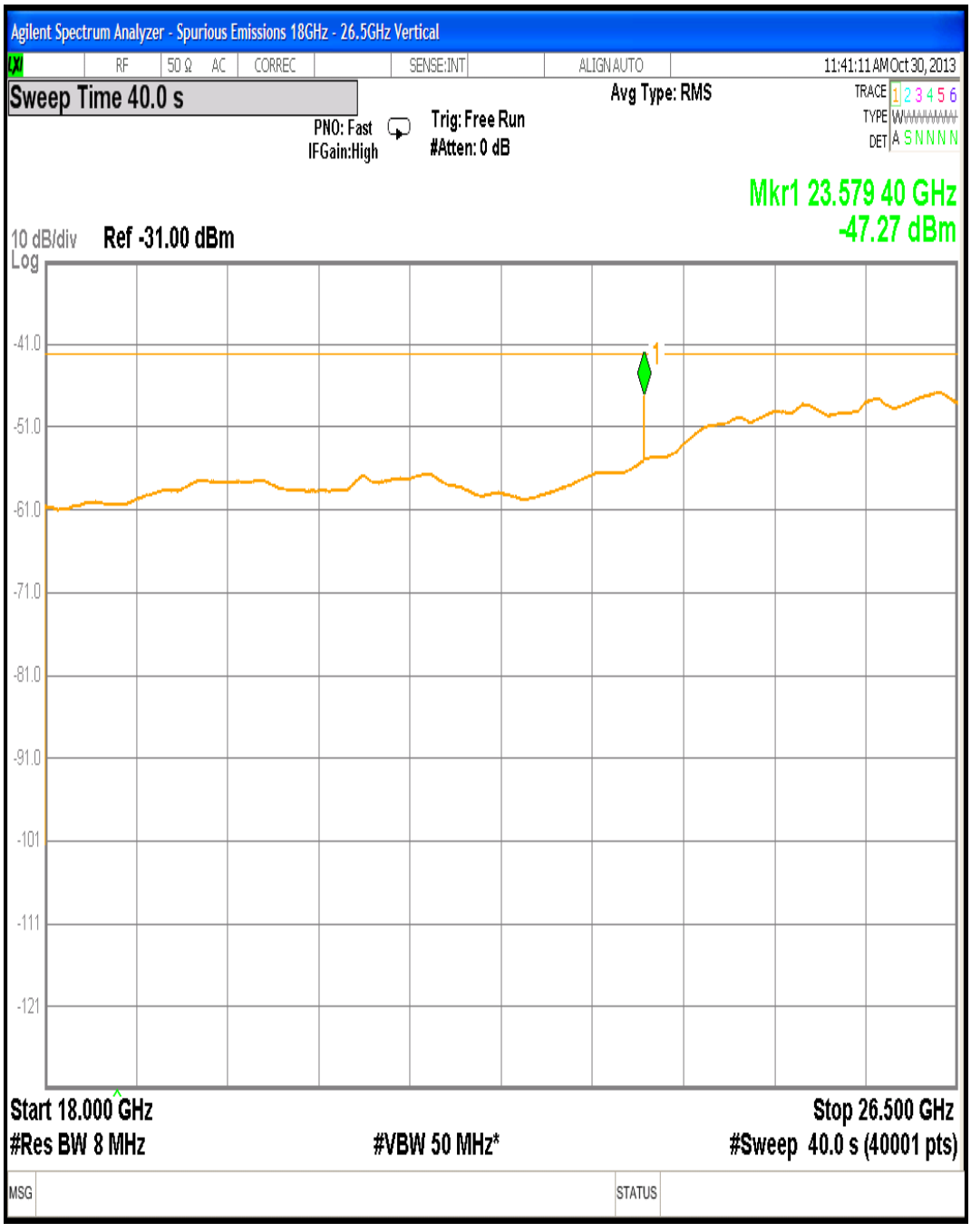

Figure 9. FCC Spurious Emissions 18GHz - 26.5GHz Vertical (0.3m)

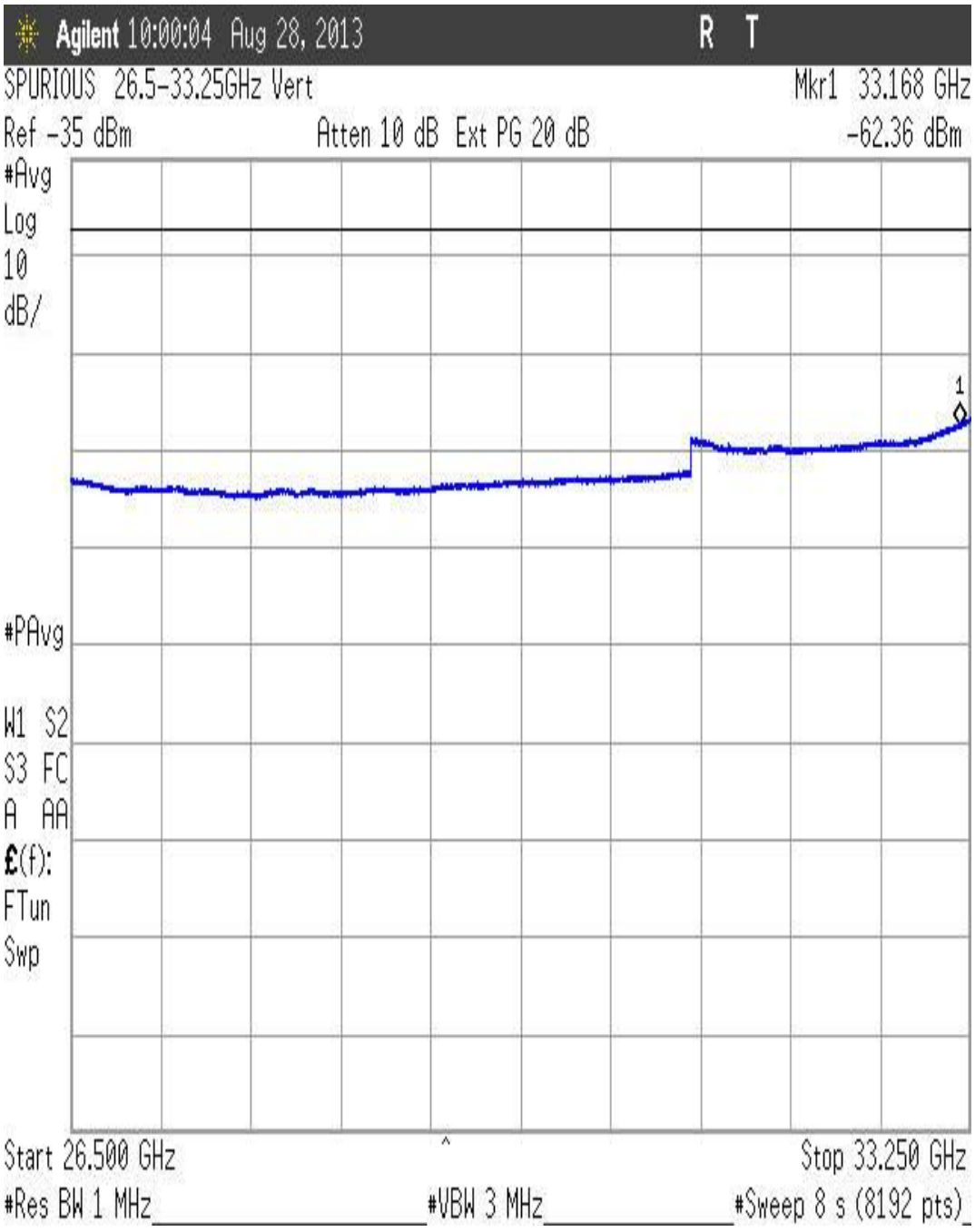

Figure 10. FCC Spurious Emissions 26.5GHz - 33.25GHz Vertical (0.3m)

Figure 11. FCC Spurious Emissions 33.25GHz - 40GHz Vertical (0.3m)

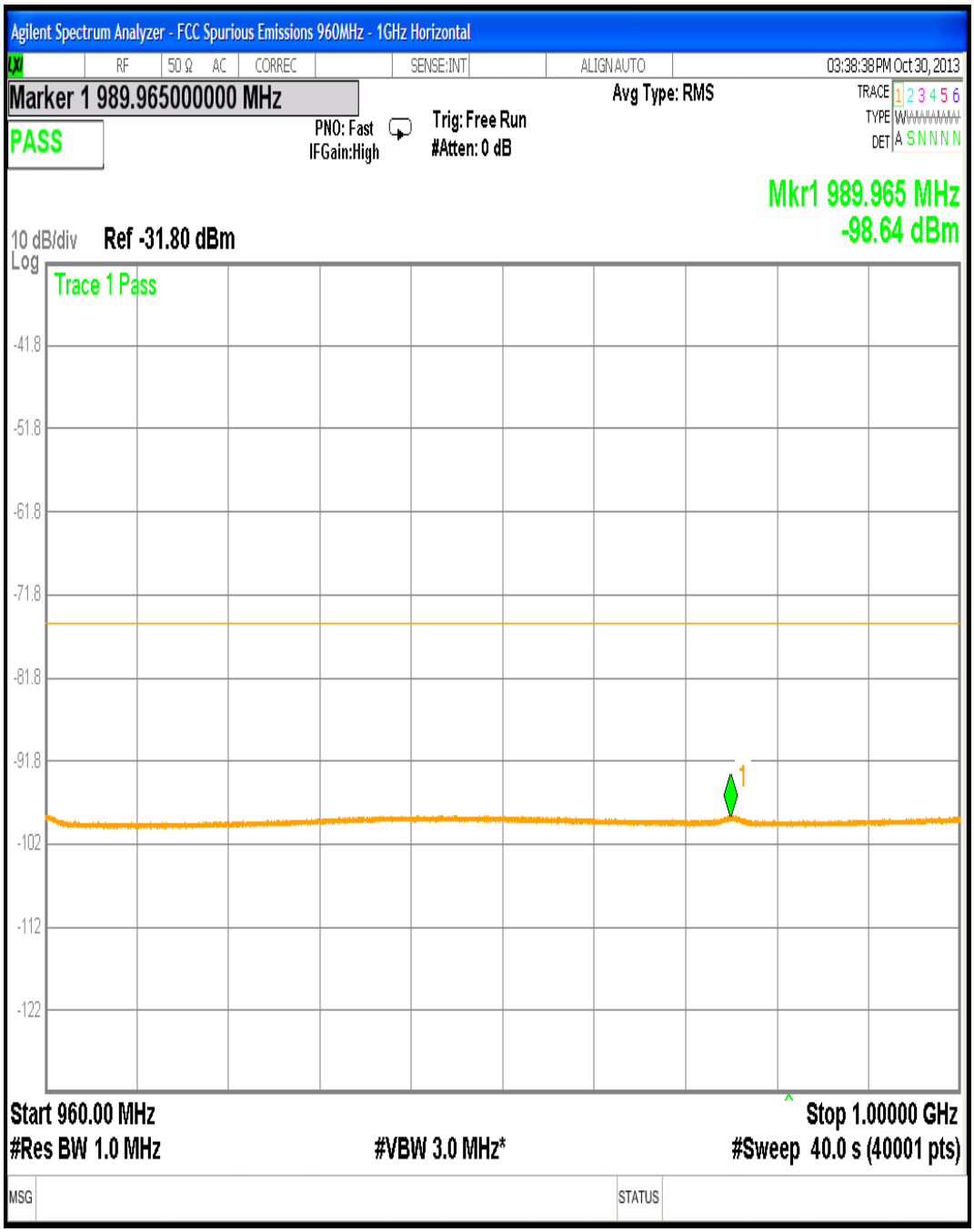

Figure 12. FCC Spurious Emissions 960MHz - 1GHz Horizontal (3m)

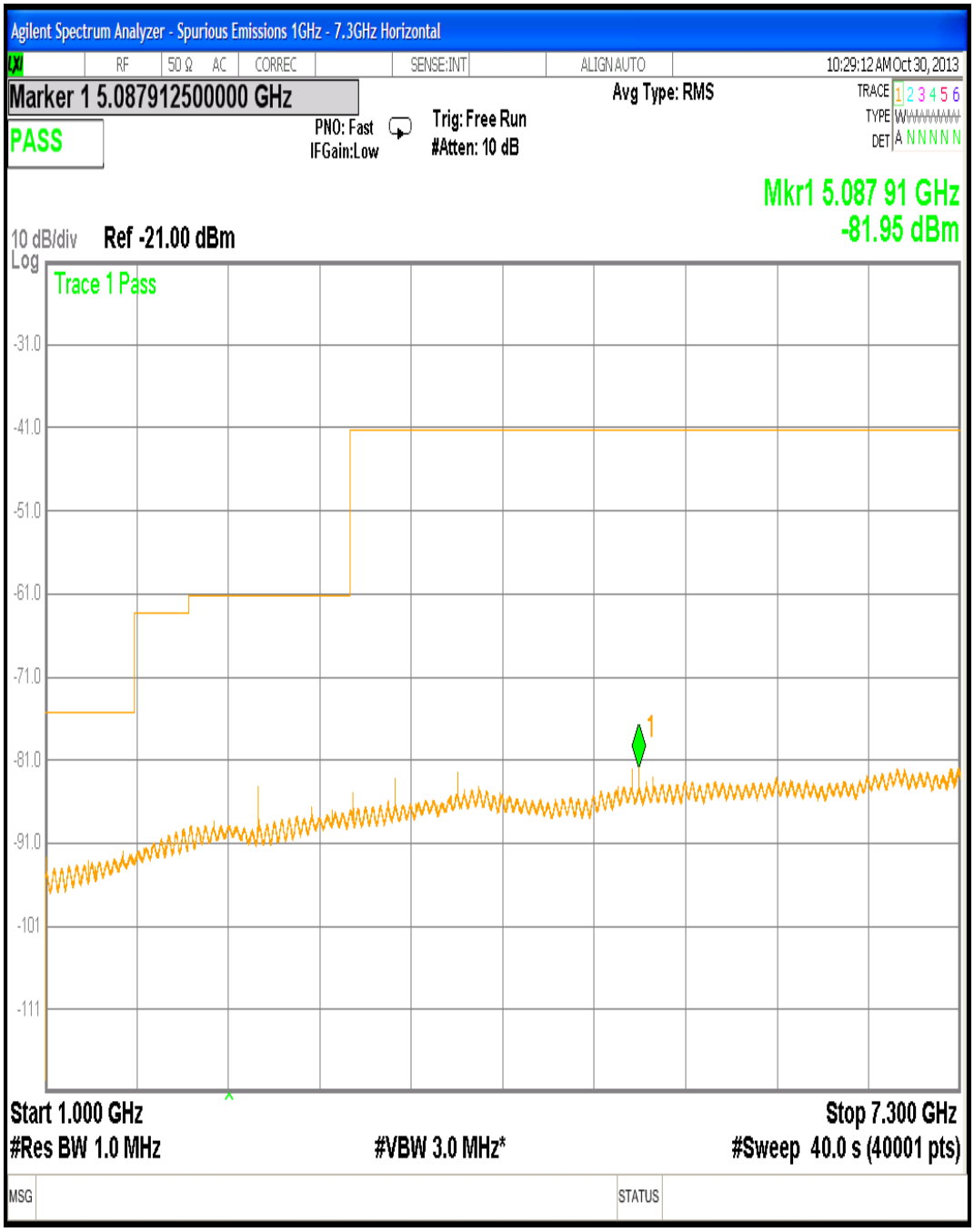

Figure 13. FCC Spurious Emissions 1GHz - 7.3GHz Horizontal (3m)

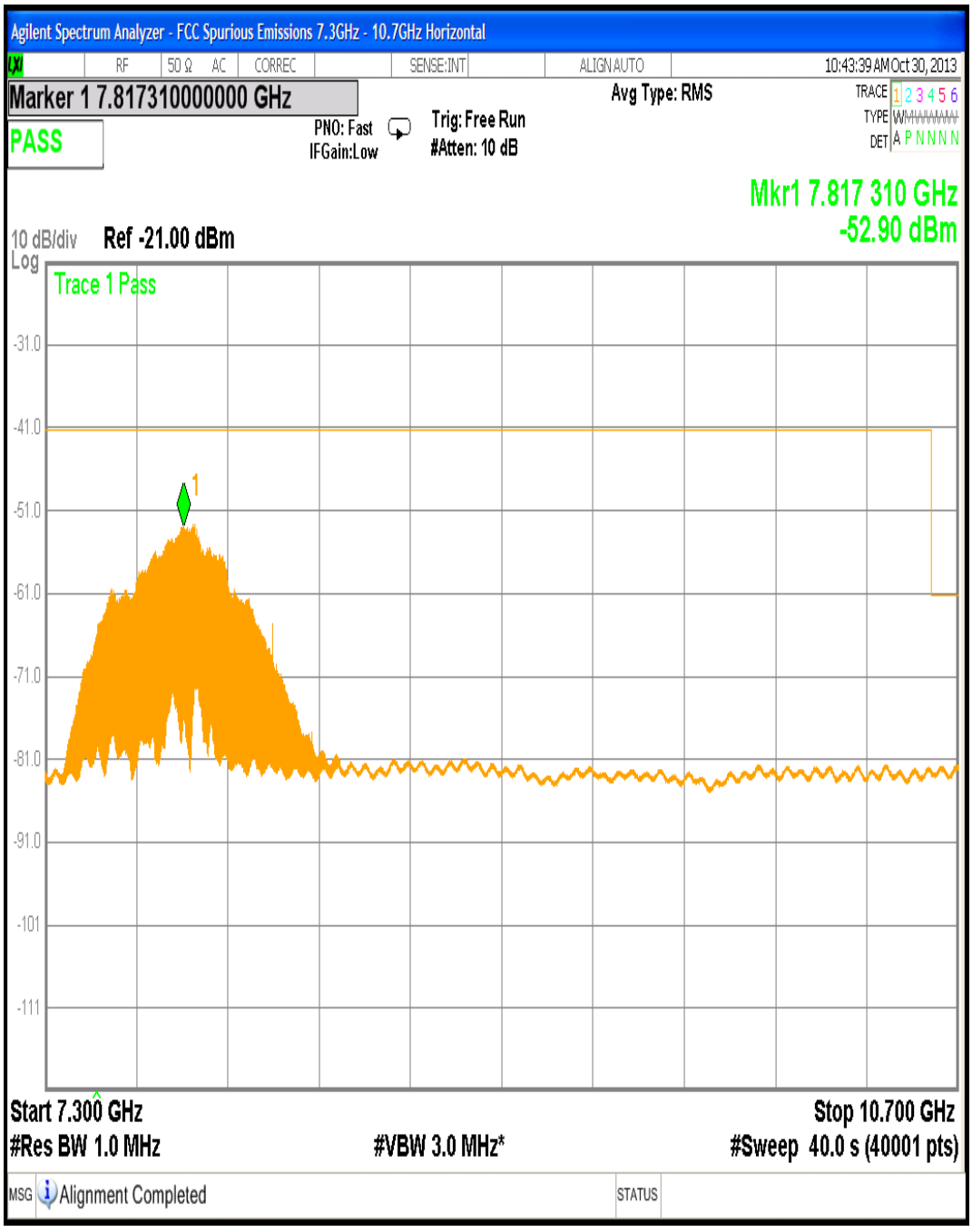

Figure 14. FCC Spurious Emissions 7.3GHz - 10.7GHz Horizontal (3m)

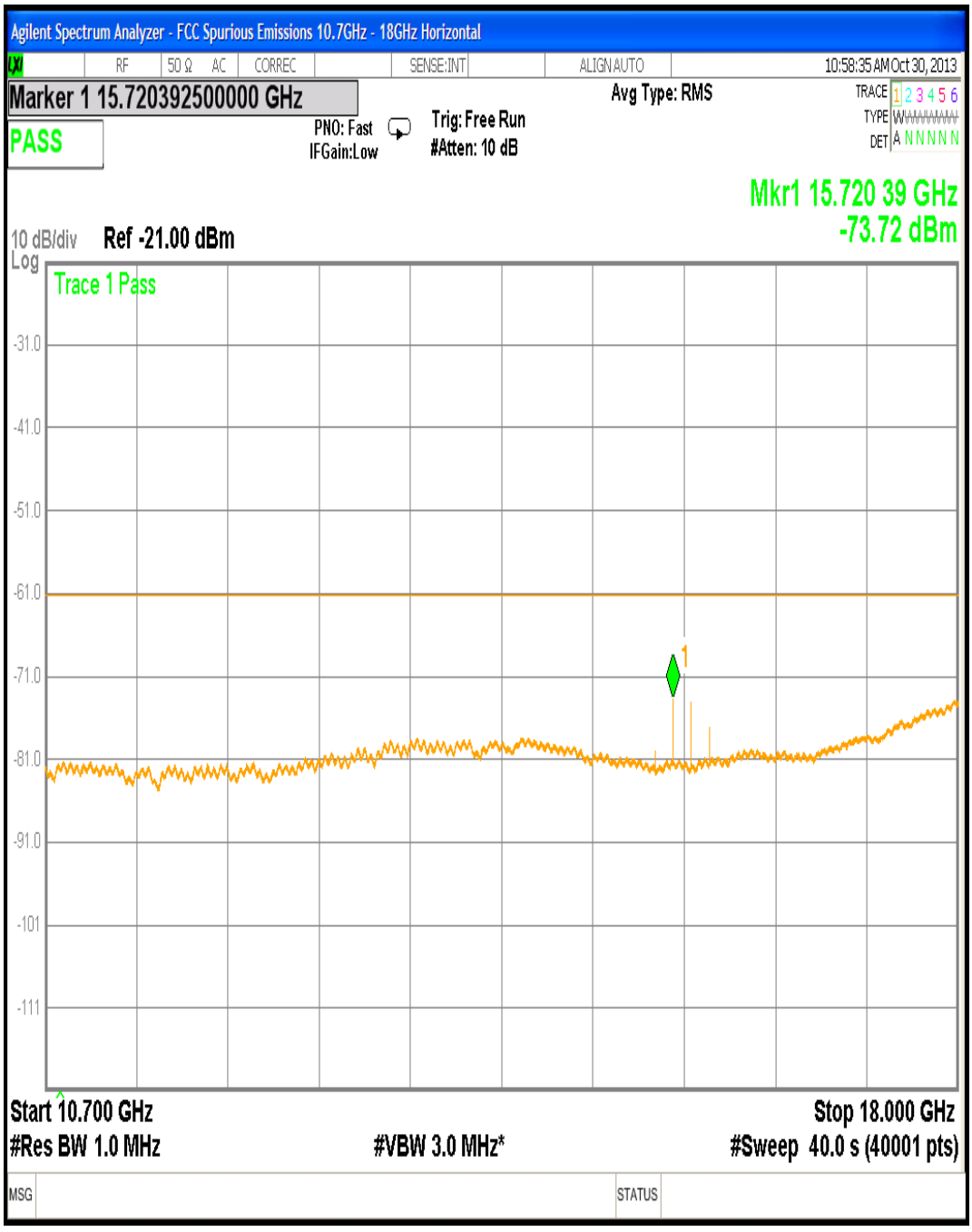

Figure 15. FCC Spurious Emissions 10.7GHz - 18GHz Horizontal (3m)

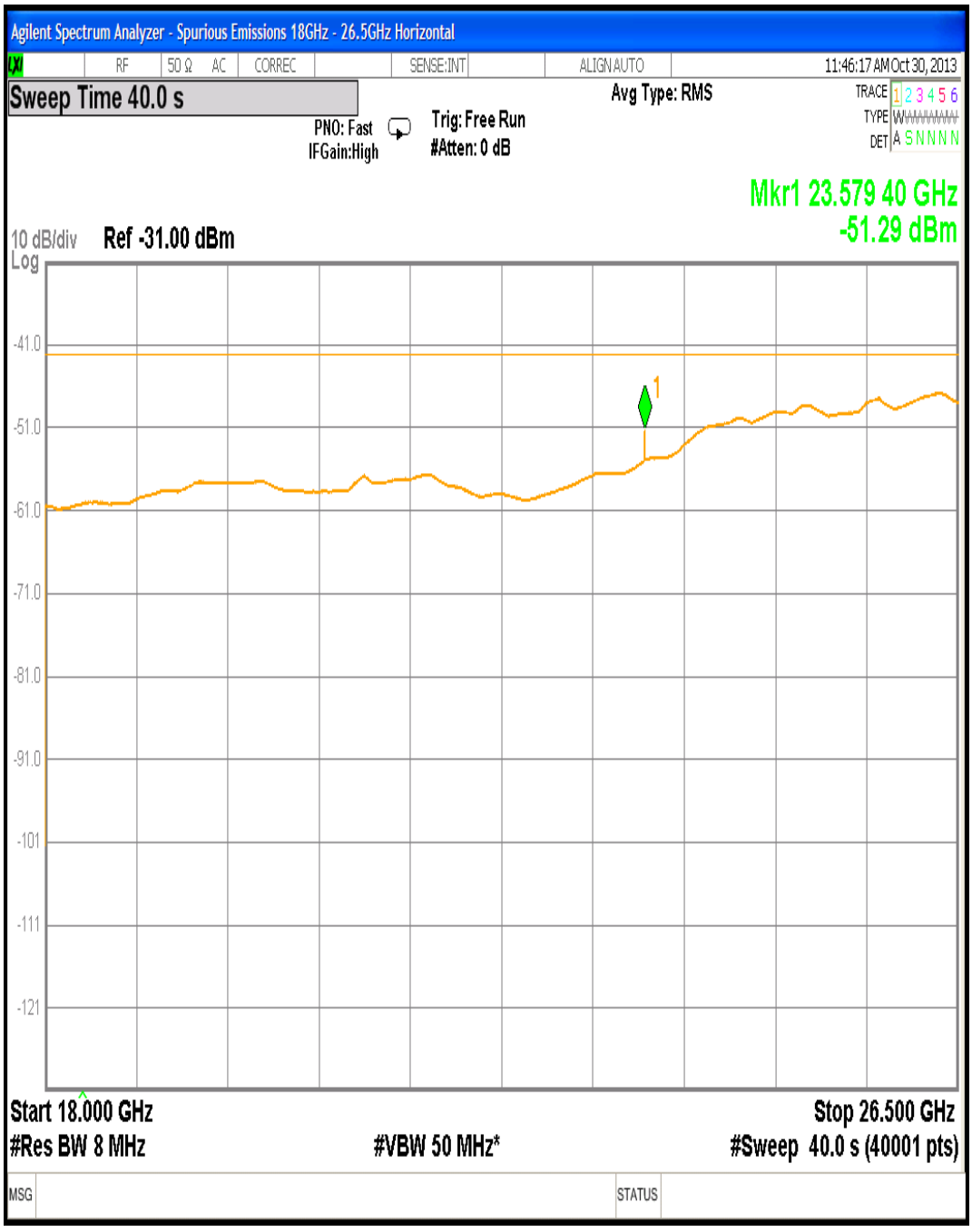

Figure 16. Spurious Emissions 18GHz - 26.5GHz Horizontal (0.3m)

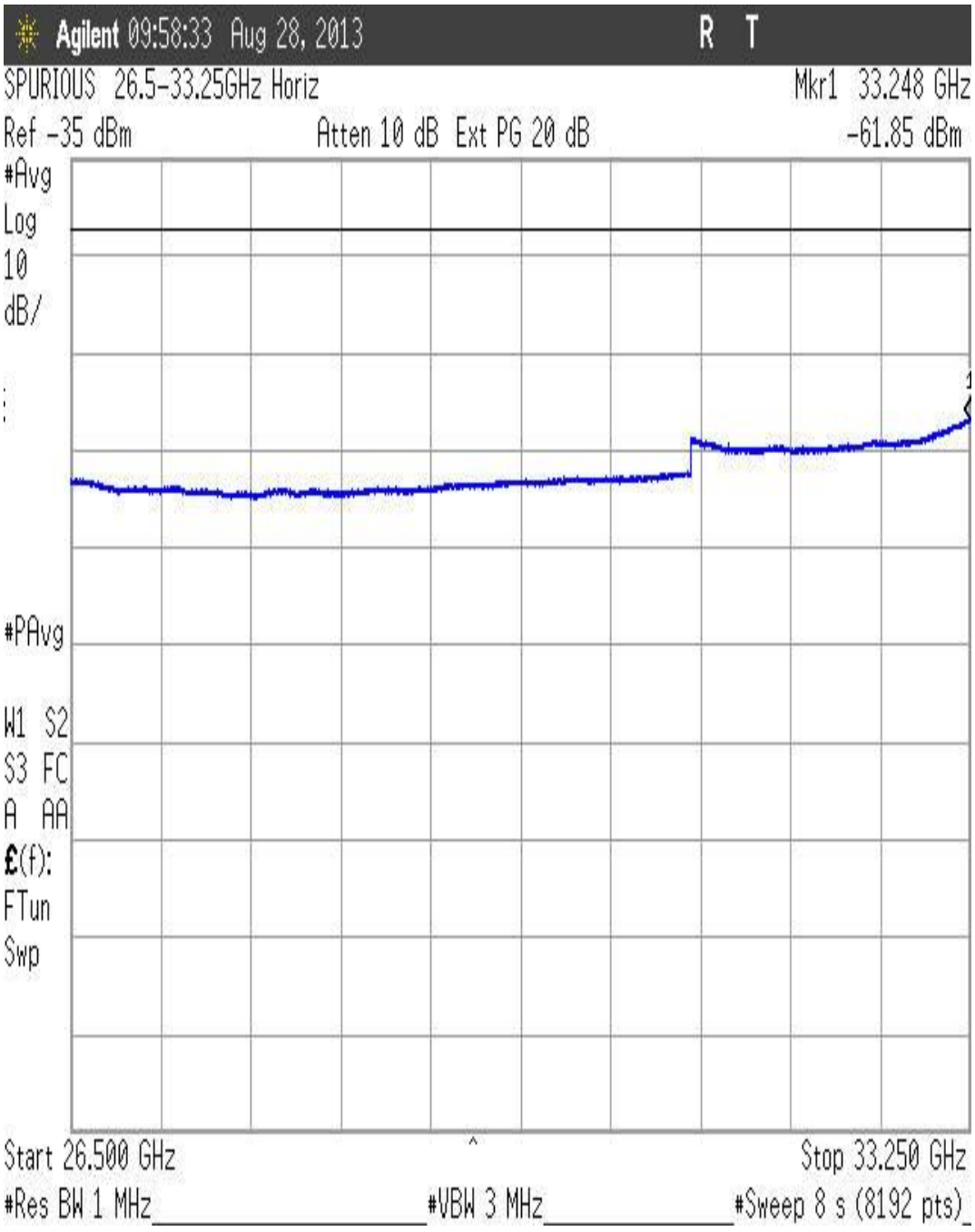

Figure 17. Spurious Emissions 26.5GHz - 33.25GHz Horizontal (0.3m)

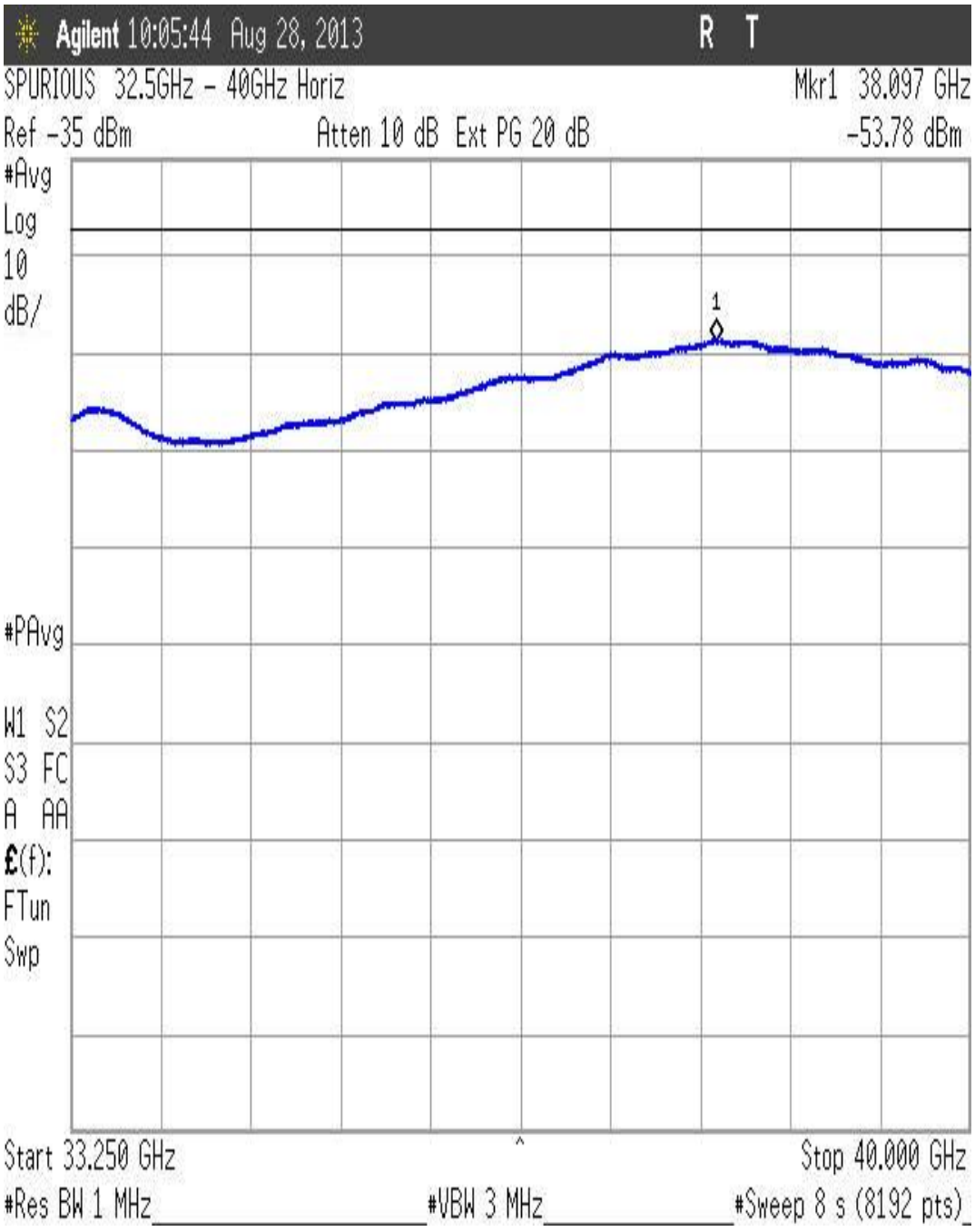

Figure 18. Spurious Emissions 33.25GHz - 40GHz Horizontal (0.3m)

4.4 Radiated Emissions in GPS Bands, §15.519(d)

The radiated emissions of a UWB system operating under the provisions of Section 15.519 shall not exceed the following average limits when measured with a resolution bandwidth of no less than 1 kHz:

Frequency (MHz)	EIRP (dBm)
1164 – 1240	-85.3
1559 - 1610	-85.3

4.4.1 Test Procedure

The radiated emissions were measured using the Agilent analyzer with the receiving antenna located 3m from the EUT.

The resolution bandwidth of the receiver was set to 30 kHz and the frequency range was set to each of the bands listed in the table above. All corrections for the antenna, pre-amp and cable were input to the receiver.

4.4.2 Test Results

The UWB device complies with the requirements of §15.519(d). Table 8 and Figure 19 through Figure 22 show the emissions in the GPS bands.

Table 8: Worst Case Spurious Radiated Emissions GPS Bands

Frequency (GHz)	Antenna Polarity	Measurement Distance (m)	Measured Level (dBm)	Limit (dBm)	Margin (dB)
1.1699793	H	3	-103.76	-85.3	-18.46
1.1700002	V	3	-105.25	-85.3	-19.95
1.5800018	H	3	-103.24	-85.3	-17.94
1.5999964	V	3	-102.7	-85.3	-17.4

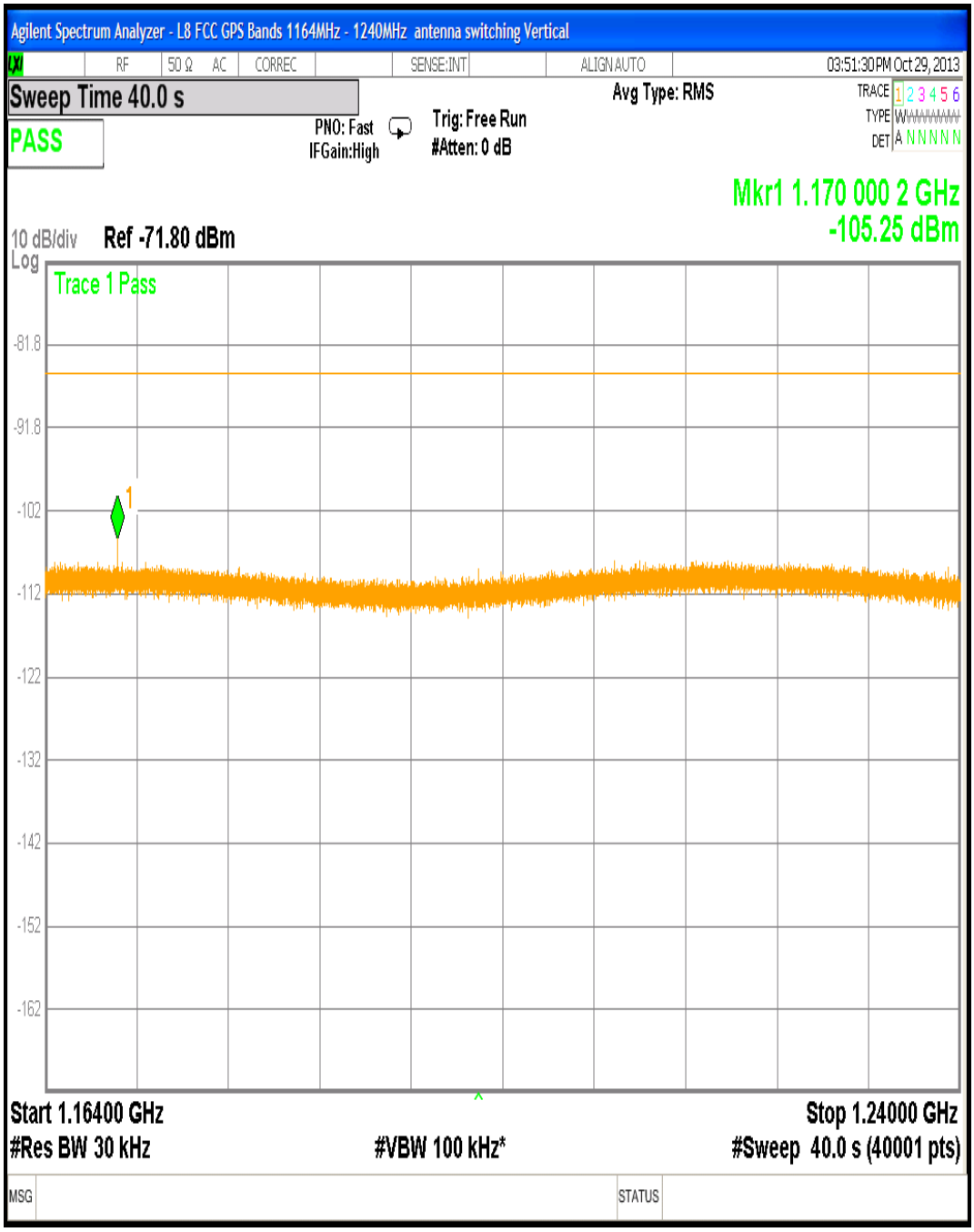

Figure 19. L8 FCC GPS Bands 1164MHz - 1240MHz -Vertical

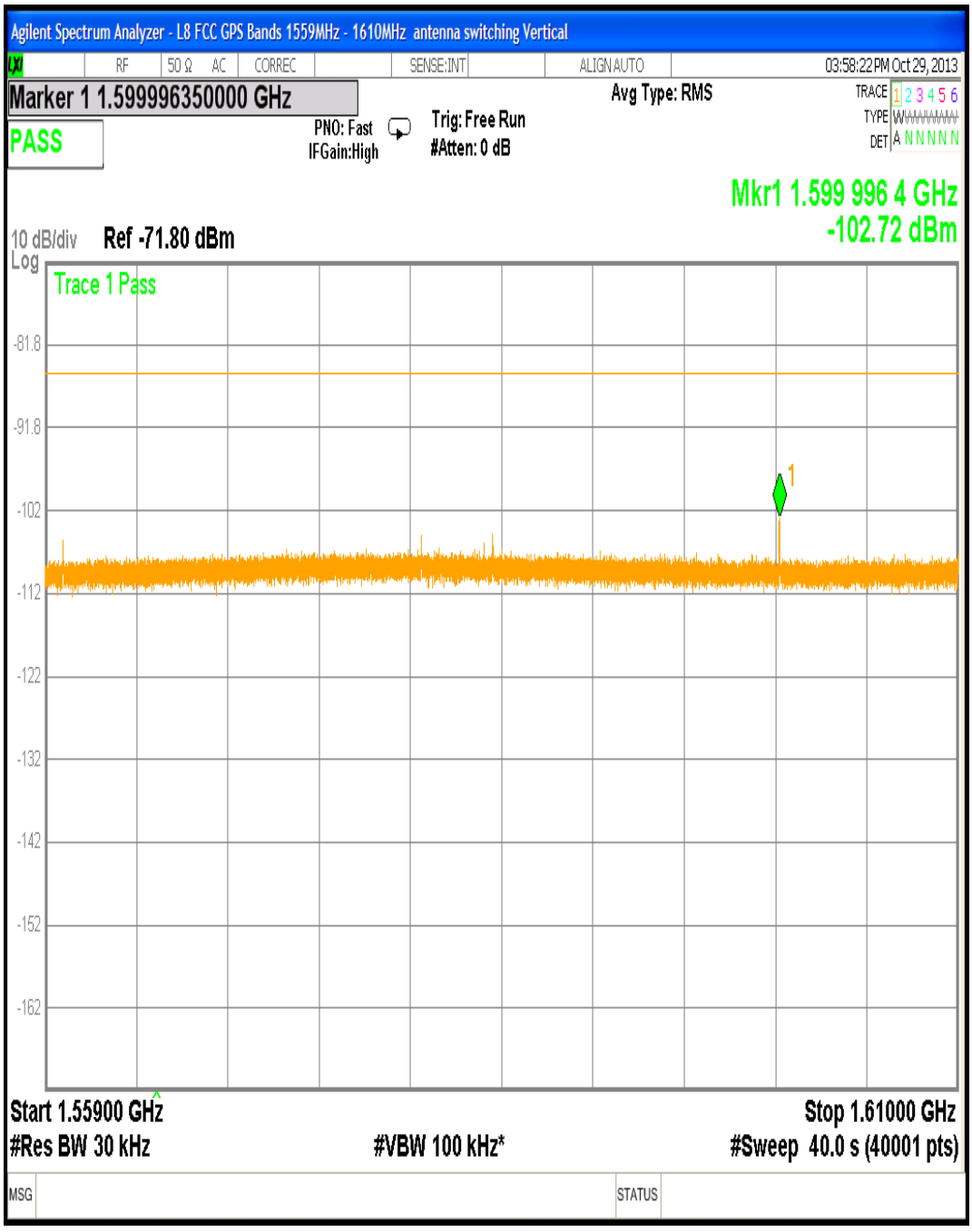

Figure 20. L8 FCC GPS Bands 1559MHz - 1610MHz - Vertical

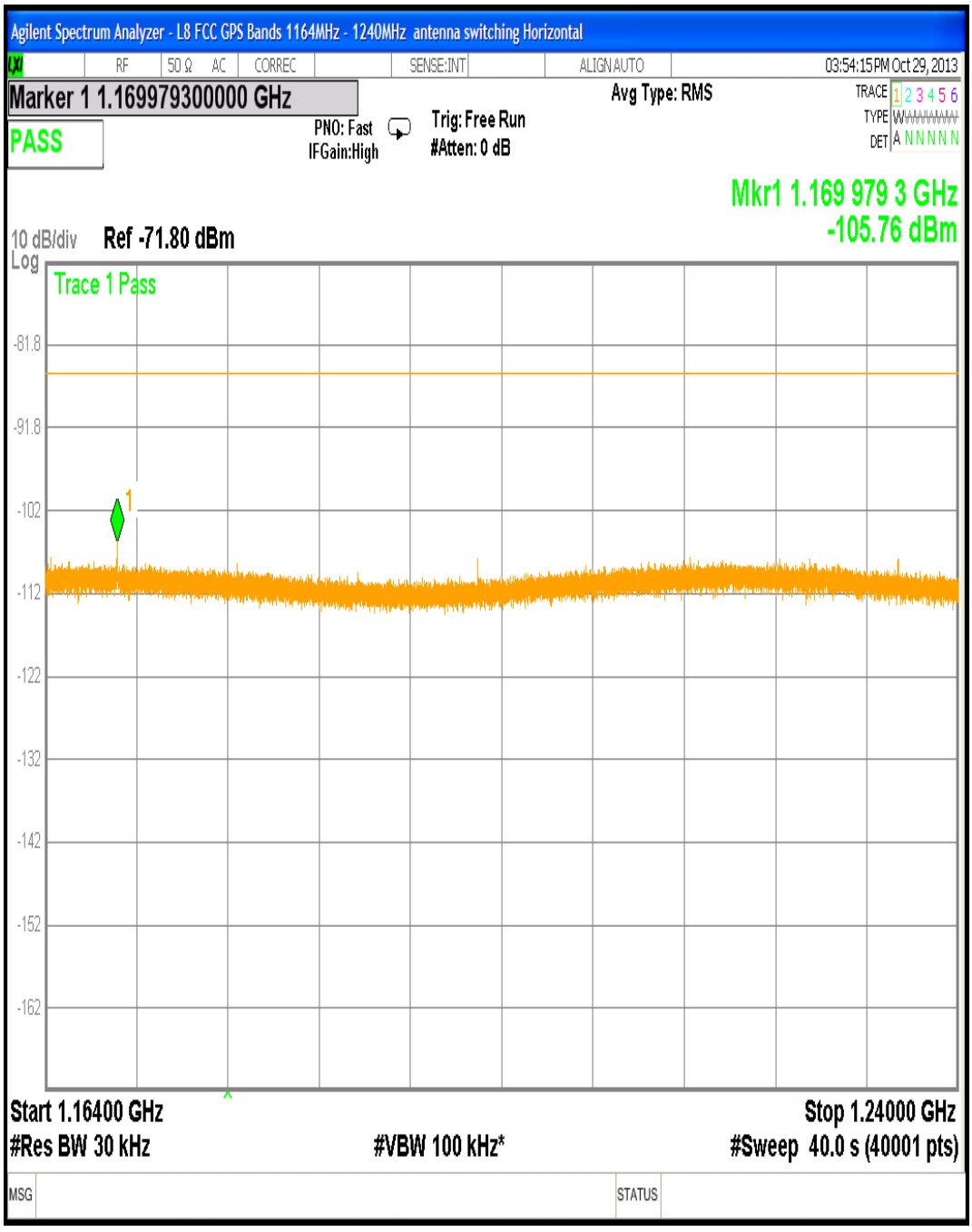

Figure 21. L8 FCC GPS Bands 1164MHz - 1240MHz - Horizontal

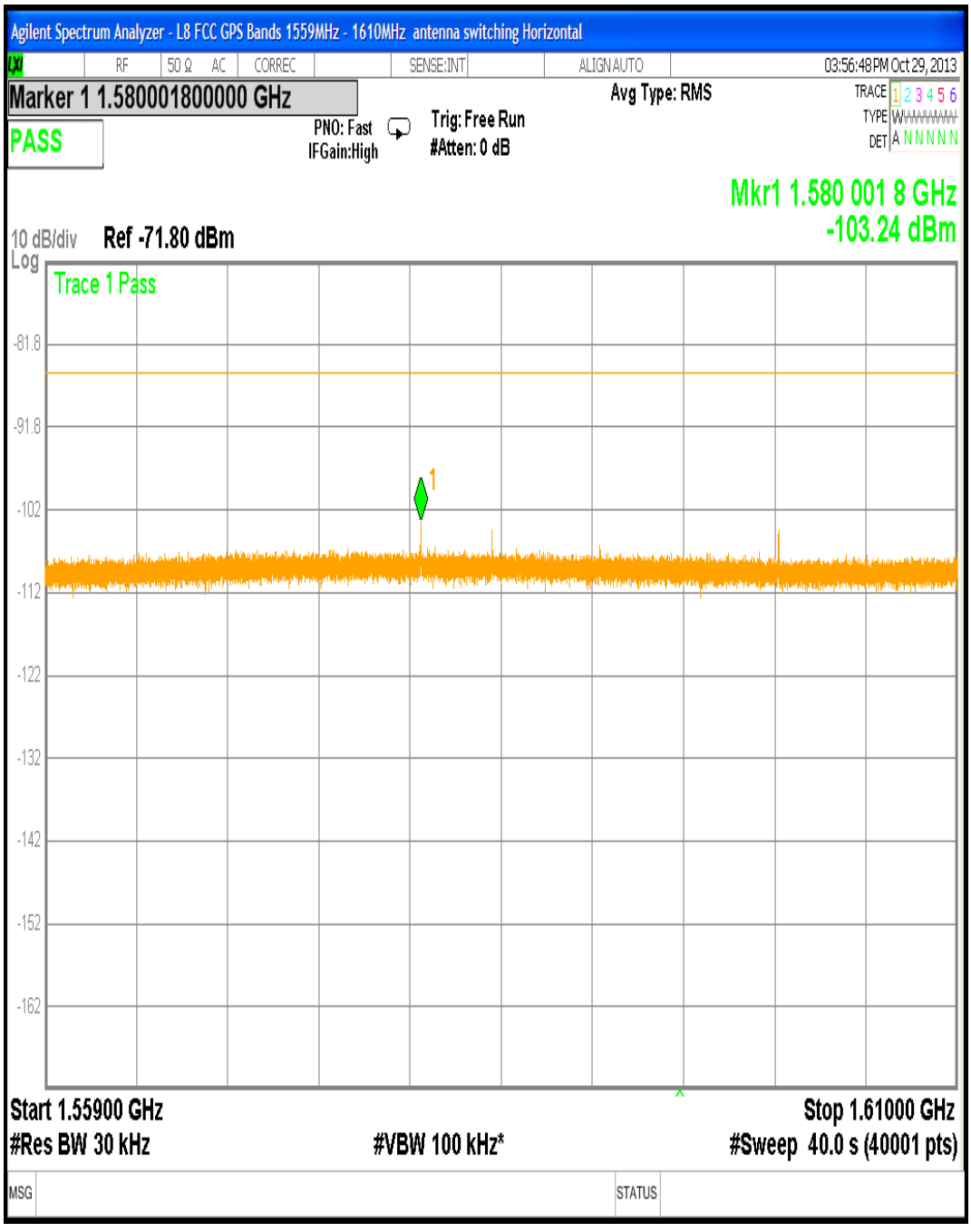

Figure 22. L8 FCC GPS Bands 1559MHz - 1610MHz - Horizontal

4.5 Radiated Spurious Emissions, §15.209

Radiated emissions below 960 MHz must comply with the emission limits of §15.209. Preliminary scans were performed using a RBW of 100 kHz peak measurement. Final measurements were made with a quasi-peak detector and a RBW = 120 kHz.

Table 9: §15.209 Limits < 960MHz

Frequency	Limits
30-88 MHz	100 µV/m
88-216 MHz	150 µV/m
216-960 MHz	200 µV/m

4.5.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing. 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 C63.4-1992. Both the horizontal and vertical field components were measured.

For emission measurements below 960MHz the following bandwidths were used.

Frequency Range	Resolution Bandwidth	Video Bandwidth
30 MHz-960 MHz	120 kHz	>120 kHz

Measurements below 960MHz were made with a spectrum analyzer equipped with a Quasi-peak detector. Testing were performed at 3m test distance.

4.5.2 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 linear amplitude, and then compared to the FCC limit.

Example:

Spectrum Analyzer Voltage:	VdBµV
Antenna Correction Factor:	AFdB/m
Cable Correction Factor:	CFdB
Electric Field:	EdBV/m = V dBµV + AFdB/m + CFdB
To convert to linear units of measure:	EdBV/m/20 Inv log

Table 10: Radiated Emission Test Data

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)
41.62	V	90.00	1.00	5.00	13.0	7.9	100.0	-22.0
80.02	V	45.00	1.00	9.60	8.4	7.9	100.0	-22.0
257.48	V	180.00	1.00	5.30	14.5	9.8	200.0	-26.2
285.76	V	0.00	1.00	4.90	16.6	11.8	200.0	-24.6
54.04	H	15.00	4.00	7.80	8.2	6.3	100.0	-24.0
80.02	H	125.00	4.00	6.60	8.4	5.6	100.0	-25.0
257.47	H	270.00	2.92	4.70	14.5	9.1	200.0	-26.8
285.09	H	90.00	2.70	1.80	16.6	8.3	200.0	-27.6

4.6 Peak Emissions within a 50 MHz Bandwidth, §15.519(e)

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_m . That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in § 15.521.

Measurements were performed using a peak detector with a RBW = 8MHz and a VBW = 50MHz . Measurements were made at a distance of 3m using an Agilent N9010A EXA Spectrum Analyzer. The limit was adjusted using the formula as specified in C63.10 §10.3.6:

$$Limit_{8MHz} = Limit_{50MHz} + 20*LOG(8MHz/50MHz)$$

$$-15.92dBm = 0dBm + (-15.92dB)$$

$$EIRP_{50MHz} = EIRP_{8MHz} - 20*LOG(8MHz/50MHz)$$

$$-20.28dBm = - 36.199dBm + 15.92dB$$

The E-Field strength was then mathematically converted to an EIRP level using the equation from §15.521(g):

$$\mathbf{P(dBm\ EIRP) = E(dB\mu V/m) - 95.2}$$

The EUT was rotated 360º to maximize emissions. The Spectrum analyzer was set with a peak detector and the Max Hold function was used to capture the peak emission. Figure 23 show the plots for Peak Radiated Power. Table 11 shows the tabulated value.

Table 11: Peak Power/8MHz

Frequency (GHz)	Antenna Polarization	Level (dBm/8MHz)	Limit (dBm/8MHz)	Margin (dB)	Result
7.786450	V	-36.199	-15.92	-20.279	Pass

Table 12: Peak Power/50MHz

Frequency (GHz)	Antenna Polarization	Level (dBm/50MHz)	Limit (dBm/50MHz)	Margin (dB)	Result
7.786450	V	-20.279	0	-20.279	Pass

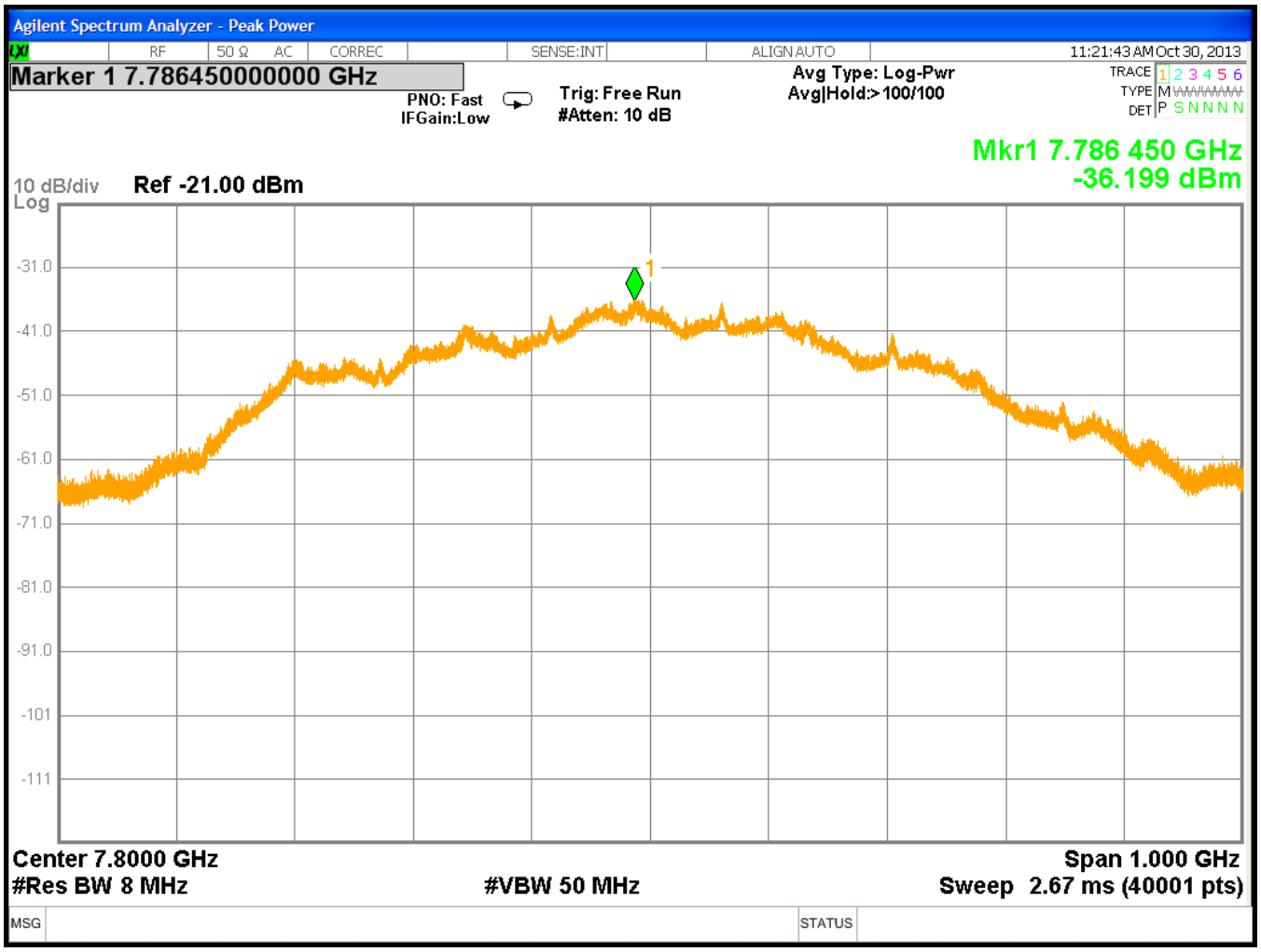

Figure 23: Peak Radiated Power