FCC CERTIFICATION TEST REPORT
FOR THE
TERMA
SCANTER 1002
GROUND SURVEILLANCE RADAR (GSR)

FCC ID: N9MSC1002

WLL REPORT# 15001-01 Rev 1
July 05, 2018

Prepared for:

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ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY AT-1448

FCC Certification Test Report

For the

TERMA

SCANTER 1002

GROUND SURVEILLANCE RADAR (GSR)

WLL REPORT# 15001-01 Rev 1
Re-Issued

July 05, 2018

Prepared by:

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President

Abstract

This report has been prepared on behalf of Terma North America to support the TERMA SCANTER 1002. This document describes the tests to be performed to show that the TERMA SCANTER 1002 complies with the requirements to the emission mask, and out of band emissions stated by the NTIA for FCC approval of the TERMA SCANTER 1002 as a radio-determination station.

The test report was constructed with guidance from Part 90 Private Land Mobile Radio Services, Subpart I- General Technical Standards section of the FCC Rules and Regulations (10/2014).

Additional guidance was provided by the RedBook.

Testing was performed at Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879.

Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

Revision History	Reason	Date
Rev 0	Initial Release	02/21/2018
Rev 1	Updated to address reviewers comments	07/05/2018

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1 Introduction

1.1 Compliance Statement

The TERMA SCANTER 1002 GSR complies with the general requirements as referenced in various sections of Part 2, Part 90 and the guidance provided in section 1.6 of this report.

1.2 Test Scope Summary

The following tests were performed using the applicable parts of the FCC rules as guidance:

Tests	Reference Requirement
RF Output Power	2.1046, 90.205, 90.103
Occupied Bandwidth	2.1049
Spurious Emissions @ Antenna Port	2.1051, 90.210
Radiated Spurious Emissions	2.1053, 90.210
Frequency Stability	2.1055
Receiver Selectivity	None

1.3 Contract Information

Customer:	Terma North America
Purchase Order Number:	Deposit Terms, Reference PO 837520
Quotation Number:	Q69899

1.4 Test Dates

Testing was performed on the following date(s):	03/15/2017 to 04/07/2017, 7/19/2017 & 04/29/2018

1.5 Test and Support Personnel

Washington Laboratories, Ltd.	John P. Repella
Customer Representative	Dottie Hersey

1.6 References

- NTIA Report TR-05-420
- Measurement Procedures for the Radar Spectrum Engineering Criteria (RSEC)
  SCANTER 1002 Series FCC Requirement Mapping, Doc. no: 721002-DN, rev. A
- Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook); May 2014 Revision of the May 2013 Edition Sections 5.512-5.513
- Part 90 Private Land Mobile Radiolocation (Section 103)

1.7 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
CISPR	**C**omité **I**nternational **S**pécial des **P**erturbations **R**adioélectriques
cm	**c**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EIRP	**E**ffective **I**sotropic **R**adiated **P**ower
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FCC	**F**ederal **C**ommunications **C**ommission
FM	**F**requency **M**odulation
G	**g**iga - prefix for 10^9 multiplier
H/V	**H**orizontal/**V**ertical antenna polarity
Hz	**H**ertz
IF	**I**ntermediate **F**requency
ISED	**I**nnovation**,** **S**cience **and** **E**conomic **D**evelopment (Canada)
k	**k**ilo - prefix for 10^3 multiplier
LC, CC, HC	**L**ow **C**hannel**,** **C**enter **C**hannel**,** **H**igh **C**hannel
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
LO	**L**ocal **O**scillator
M	**M**ega - prefix for 10^6 multiplier
m	**m**eter
µ	**m**icro - prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
NTIA	**N**ational **T**elecommunications **and** **I**nformation **A**dministration
OATS	**O**pen **A**rea **T**est **S**ite
OBW	**O**ccupied **B**and**w**idth
PCB	**P**rinted **C**ircuit **B**oard
QP	**Q**uasi-**P**eak
RBW	**R**esolution **B**and**w**idth
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
RSEC	**R**adar **S**pectrum **E**ngineering **C**riteria
SMA	**S**ub**M**iniature version **A**(connector)
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
TX	**T**ransmit
V	**V**olt
VBW	**V**ideo **B**and**w**idth

2 Equipment Under Test

2.1 EUT Identification

The following table identifies the specific characteristics of the SCANTER Radar.

Table 1: Overview of SCANTER 1002 Unit, Equipment Under Test

Model(s) Tested: *(name of the equipment as it should appear in the test report)*	SCANTER 1002 Ground Surveillance Radar
EUT Specifications:	
Manufacturer:	TERMA
FCC ID:	N9MSC1002
ISED:	None
EUT Name:	SCANTER 1002
Model:	721002-XXX
FCC Rule Parts:	Part 90.103
Industry Canada:	None
Frequency Range(Passband):	17.1-17.3GHz (Ku-Band)
Maximum Output Power:	Stated (39.8dBm)
Modulation:	Pulsed FM
Occupied Bandwidth:	200MHz
Keying:	Automatic, Manual
Number of Channels:	4
Measured Output Power:	38.12dBm
Frequency Tolerance:	±100ppm, ±1.73MHz
Antenna Connector:	PBR220 waveguide flange
Antenna Type:	Parabolic Dish
Antenna Gain(dBi):	33
Interface Cables:	Mains input, Network interface
Power Source & Voltage:	Mains supply, 115/230 VAC
RF LO:	15700 MHz
IF LO:	1500 MHz
Modes	3m and 6m
Pulse Characteristics	2 long and 2 short chirps

2.2 EUT Description

The Equipment Under Test (EUT), (the TERMA SCANTER 1002 GSR) is designed for surveillance of areas ranging from small airports to full border size solutions. With 360º surveillance and high update rates, the radar and its embedded tracker deliver constant real-time data that enables evaluation and behavior analysis of potential threats. The unique detection and tracking features of the TERMA SCANTER 1002 makes it a highly valued asset to maximize the time available for assessment, decision, and possible intervention. In the ground surveillance segment where traditional electronic perimeter protection solutions typically only monitor the boundaries and lines, the TERMA SCANTER 1002 provides complete meter-by-meter coverage both outside and inside a physical perimeter for detection and tracking of slow (man or animal) and fast-moving objects (landing aircraft) at the same time.

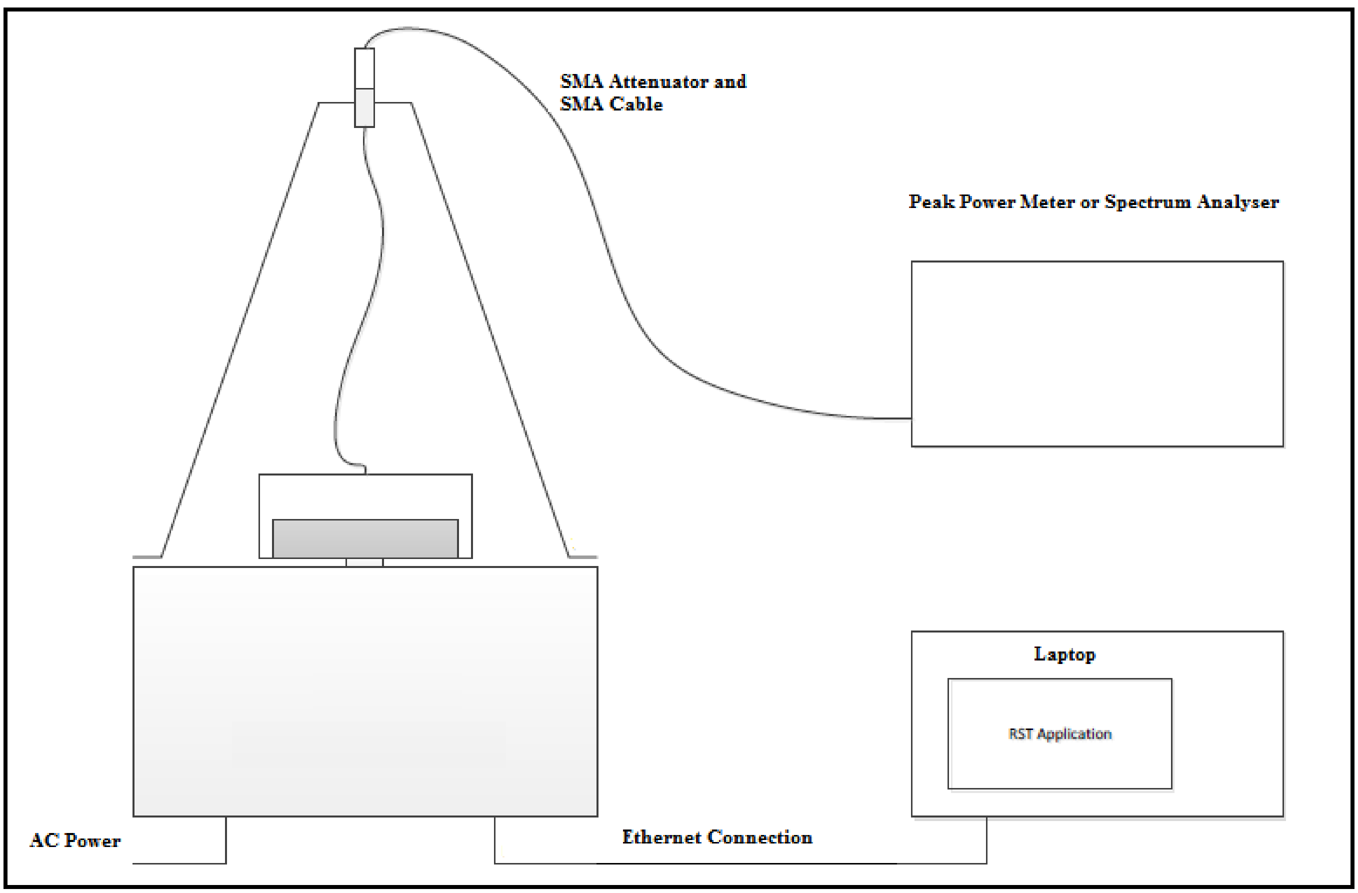


Figure 1: EUT Test Setup Diagram

2.3 Test Configuration

The TERMA SCANTER 1002, Equipment Under Test (EUT), was operated from an internal AC power supply. The device is pre-configured with the transmit frequency (not user changeable). A single unit was provided and was configured to operate in the frequency Range 17.1 -17.3GHz.

2.4 Equipment Configuration

The EUT was comprised of the following equipment. (All Modules, PCBs, etc. listed were considered as part of the EUT, as tested.)

Table 2: Equipment Configuration

Name/Description	Manufacturer	Serial #	Part #
SCANTER 1002/Ground Surveillance Radar	TERMA	3002	721002-101
Microwave Antenna	Commscope Microwave antenna systems	13C7031414842	VHLP1-18-2WH
Waveguide BP-filter	Terma	N/A	721066-001
Waveguide LP-filter	Terma	N/A	721036-001

2.5 Support Equipment

The following support equipment was used during testing

Table 3: Support Equipment

Name / Description	Manufacturer	Model/Rev Number
Laptop	Dell	Latitude 630
Radar Service Software Tool	TERMA	357641-001 rev. K

2.6 Interface Cables

Table 4: Interface Cables

Ref. ID	Port name on EUT	Cable Description	Qty.	Length (m)	Shielded?	Termination Box ID & Port ID
1	AC Power	Power (PN 721136-025)	1	25	Y	AC Mains
2	Ethernet	Patch LAN (RG-45 CAT 5e)PN 721137-025	1	25	Y	EUT to Laptop
3	Antenna Port	Waveguide to SMA connector (Refer to Table 2)	1	N/A	Y	Power Meter or Spectrum Analyzer

2.7 EUT Modifications

There were no modifications needed to comply with the requirements.

2.8 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

2.9 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

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

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 5 below.

Table 5: Expanded Uncertainty List

Parameter	**Uncertainty**	**Actual (+/-)**	**Unit**
Radio Frequency	$\pm 1 \times 10^{-7}$	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
Adjacent channel power	±5 dB	0.6	dB
Transmitter transient time	±20 %	9.2	%

Scope	**Standard(s)**	**Expanded Uncertainty**
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±4.55 dB
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±2.33 dB

3 Test Equipment

Test Name:	**Radiated & Bench Conducted Emissions**	Test Date:	**3/15/2017 &7/19/2017**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
00528	Agilent/E4446A	3Hz - 44GHz PSA SPECTRUM ANALYZER	8/10/2017
00823	Agilent/N9010A	EXA SPECTRUM ANALYZER	12/21/2017
00605	Agilent/N1911A	P-Series Power Meter	04/29/2019
00833	KEITHLEY/3390	50MHz ARBITRARY WAVEFORM GENERATOR	01/04/2018
00698	KEITHLEY/3390	50MHz ARBITRARY WAVEFORM GENERATOR	01/04/2018
Rental	TELEDYNE Lecroy/HDO6104-MS	High Definition Mixed Signal O-Scope	03/01/2018
00803	R&S/SMR 40	Signal Generator 1 - 40GHz	10/15/2017

4 Test Results

4.1 Transmitted Peak Output Power

4.1.1 Test method

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.
The radar transmitter peak power (Pp) is measured using a wideband power sensor. The peak transmitter power is measured 2.5µs into the pulse to avoid measuring short duration peaks within the pulse. The maximum peak power would be given by:
$Pp[dBm] = PPwr,sensor\ peak\ [dBm] + LossWG{-}SMA[dB] + Attenuator\ [dB]$

Note:

A peak measuring power meter and sensor, where permitted, may be used to measure the output power of the fundamental emission. The VBW of the peak power meter and sensor combination shall be greater than the OBW of the transmitter and the rise time of the detector shall be faster than the EUT pulse rise time or the rate of variation of the modulation envelope. For performing average power compliance measurements, an average power meter, or a peak power meter that averages multiple measurements, may be used where permitted, as long as it satisfies the requirements for VBW and rise time specified above. All types of power meters shall have an RF bandwidth that encompasses the fundamental emission frequency, and a dynamic range sufficient to accommodate the peak pulse power without clipping or non-linearity. Impedance is typically 50 Ω. Thermal power sensors can be used for measuring average power over broad frequency ranges and signal bandwidths. Typically thermal sensors are subject to thermal drift and must be compensated frequently. Diode sensors are more stable and can be calibrated over a broad frequency range. The development of wide bandwidth diode power sensors provides the most reliable and accurate instrument for the measurement of broadband complex modulated signals.

4.1.2 Test Limit

No test limit exists within this frequency ranges as stated in Part 90.103. Manufacturers stated output power as measured is stated as 39.8dBm.

4.1.3 Test Summary

Measured output power using a power meter as per the referenced procedures stated in section 4.1.1

4.1.4 Test Results

The measured results are listed in Table 6

Table 6: Conducted Output Power

Mode	Measured PWR (dBm)
3m	38.21
6m	37.27

4.2 Occupied Bandwidth (26dB Necessary Bandwidth)

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable

4.2.1 Test Method

The emission bandwidth test was performed as an occupied bandwidth measurement. The EUT antenna was disconnected from its internal antenna port and replaced with a calibrated cable connected to a spectrum analyzer through appropriate attenuators. A spectrum analyzer was tuned to the center of the transmit frequency. The span of the analyzer was the reduced to approximately 2 to 3 times the span of the TX signal. The resolution bandwidth of the device was lowered to approximately 1% of the estimated occupied bandwidth. The span between points on each side of the TX signal corresponding to 26dB below the peak was then recorded as the emission bandwidth.
Set RBW = 100 kHz.
Set the VBW [3 × RBW].
Detector = peak.
Trace mode = max hold.
Sweep = auto couple.

4.2.2 Test Limit

No applicable limit is available for the device and the stated manufacturers OBW will be used for the emissions designators.

4.2.3 Test Results

Table 7 lists the OBW for the two available modes, and Figures 2-9 show the plots of the bandwidth measurements.

Table 7: Occupied Bandwidth

Channelized Bandwidths		
3m Mode	**99% (MHz)**	**26dB(MHz)**
Low Channel	38.639	40.83
High Channel	38.737	40.94

6m Mode	**99% (MHz)**	**26dB(MHz)**
Low Channel	18.425	20.13
High Channel	18.419	20.18

Operational Bandwidth		
Mode	**99% (MHz)**	**26dB(MHz)**
3m	157.77	175.6
6m	160.01	177.9

4.2.4 Test Summary

The plots below show the maximum measured emissions bandwidths for the available modes of operation.

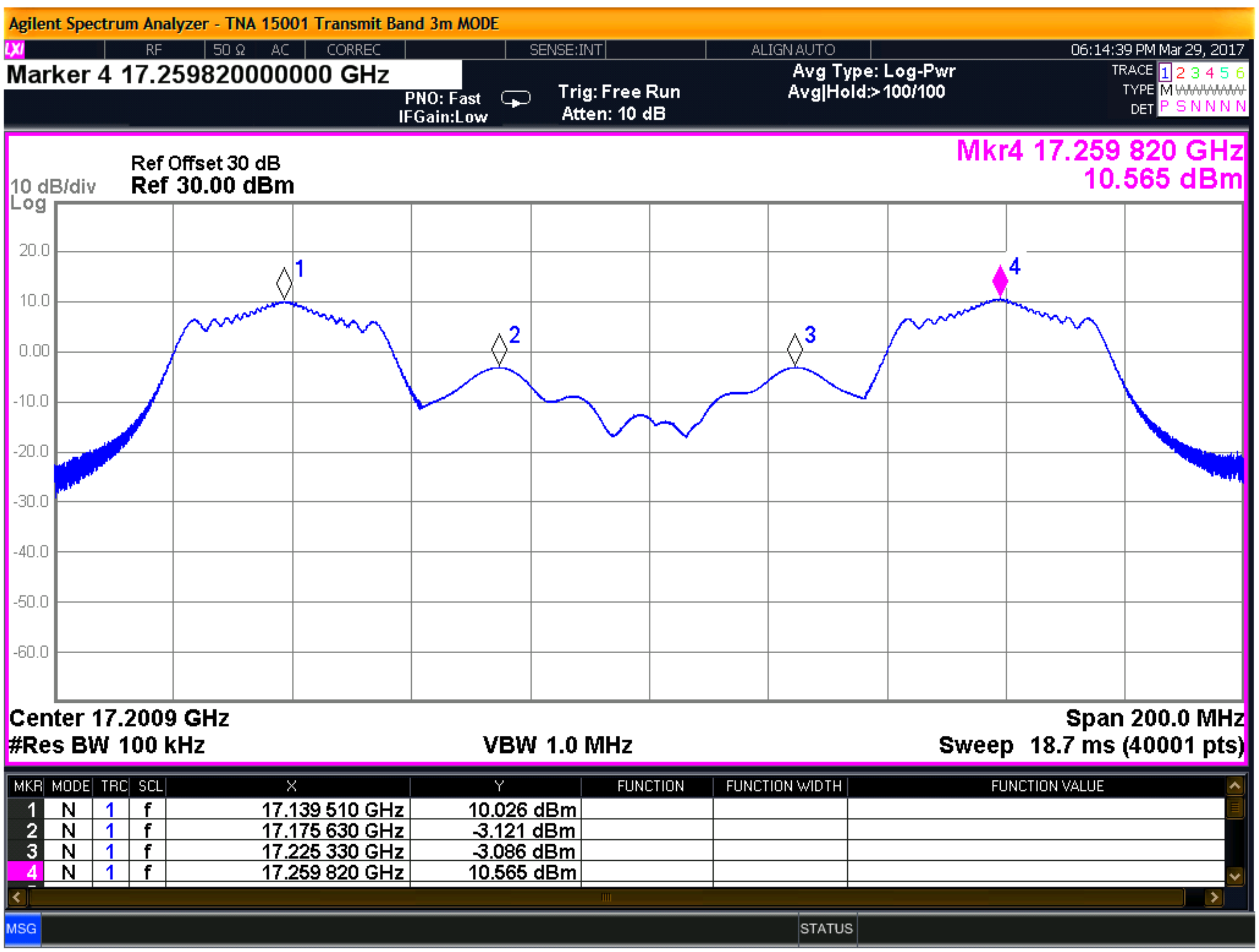


Figure 2: Transmit Band Channels (3m Mode)

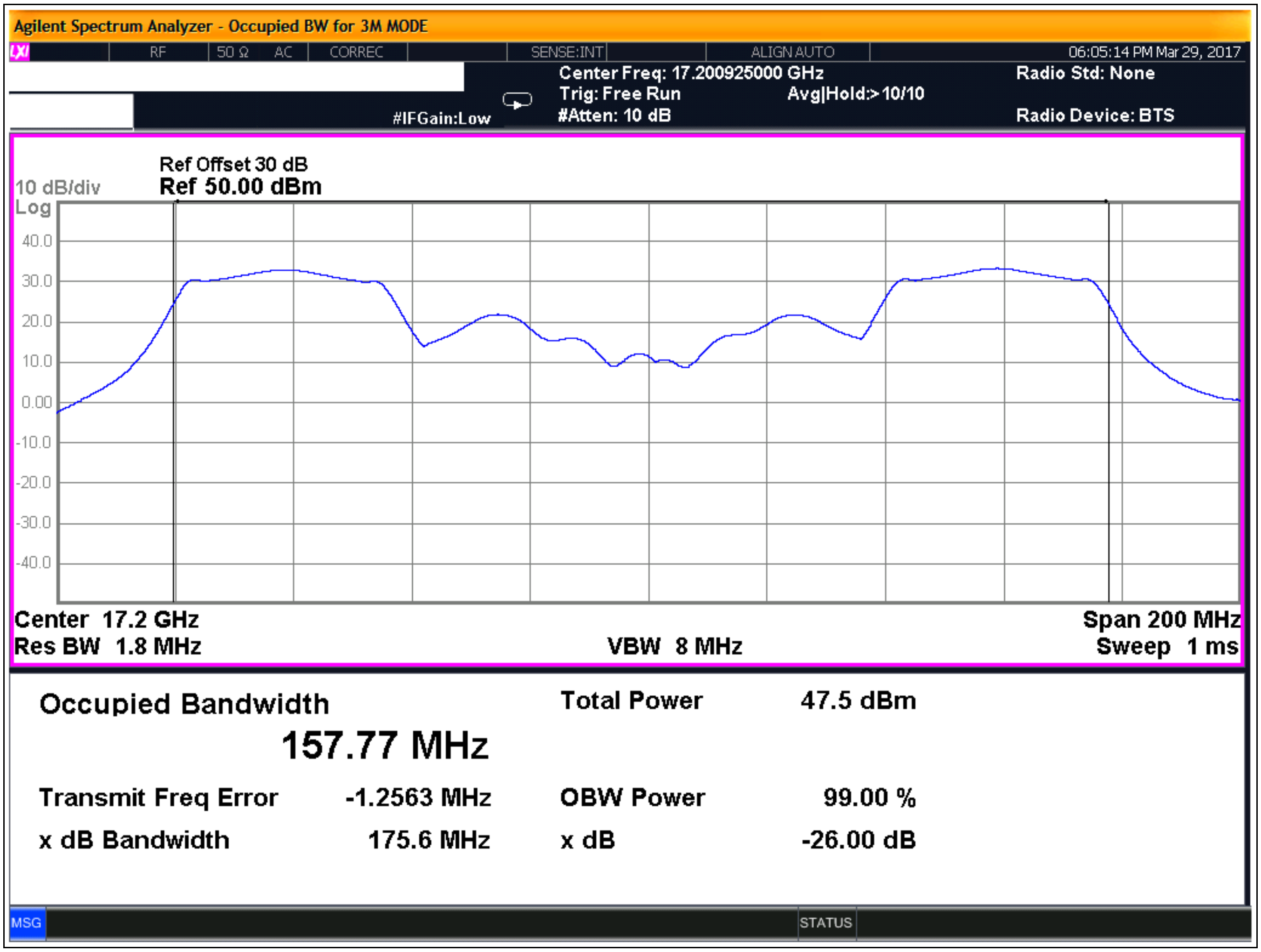


Figure 3: Transmit Band (3m Mode)

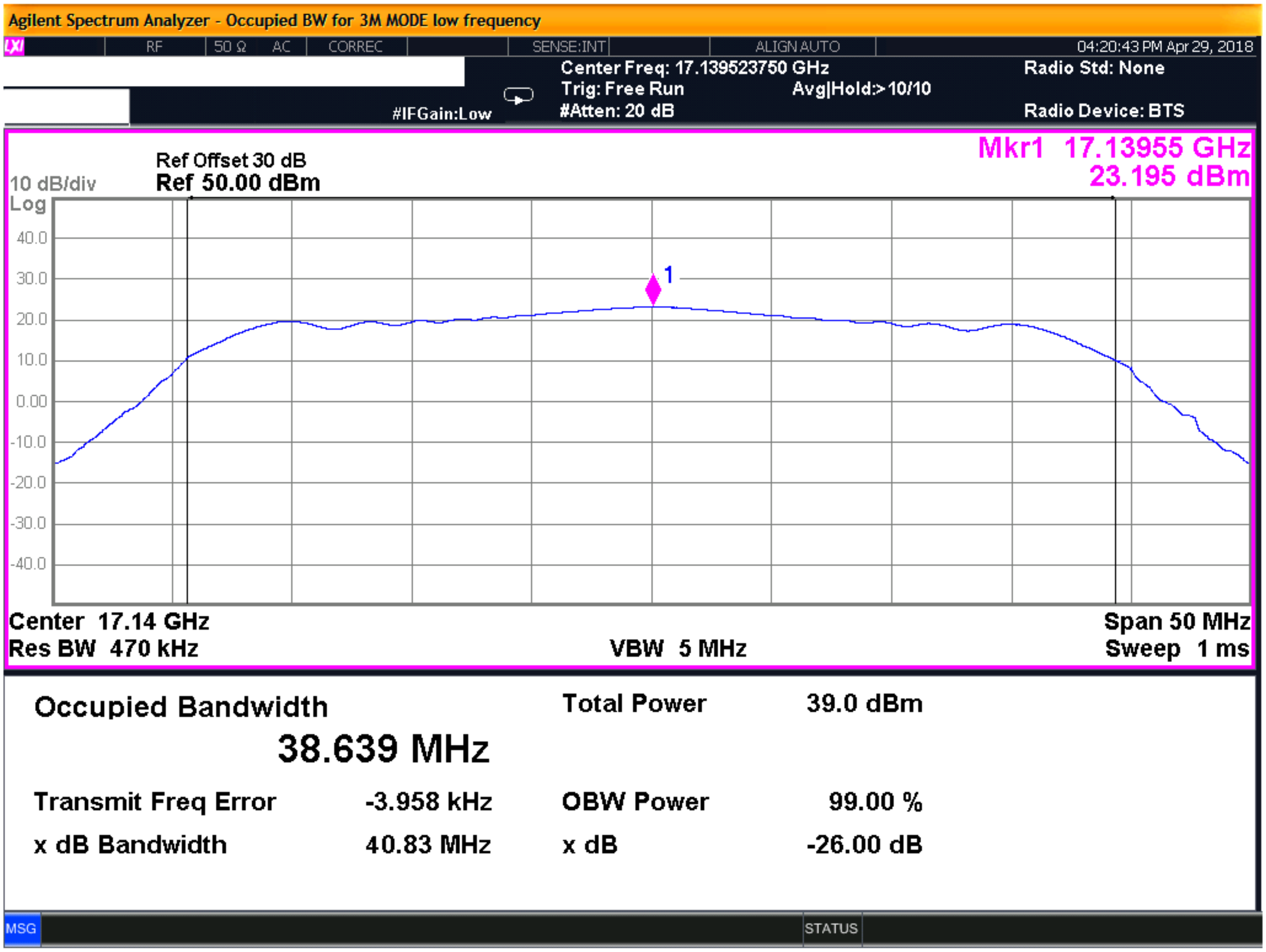


Figure 4: Occupied bandwidth LC (3m Mode)

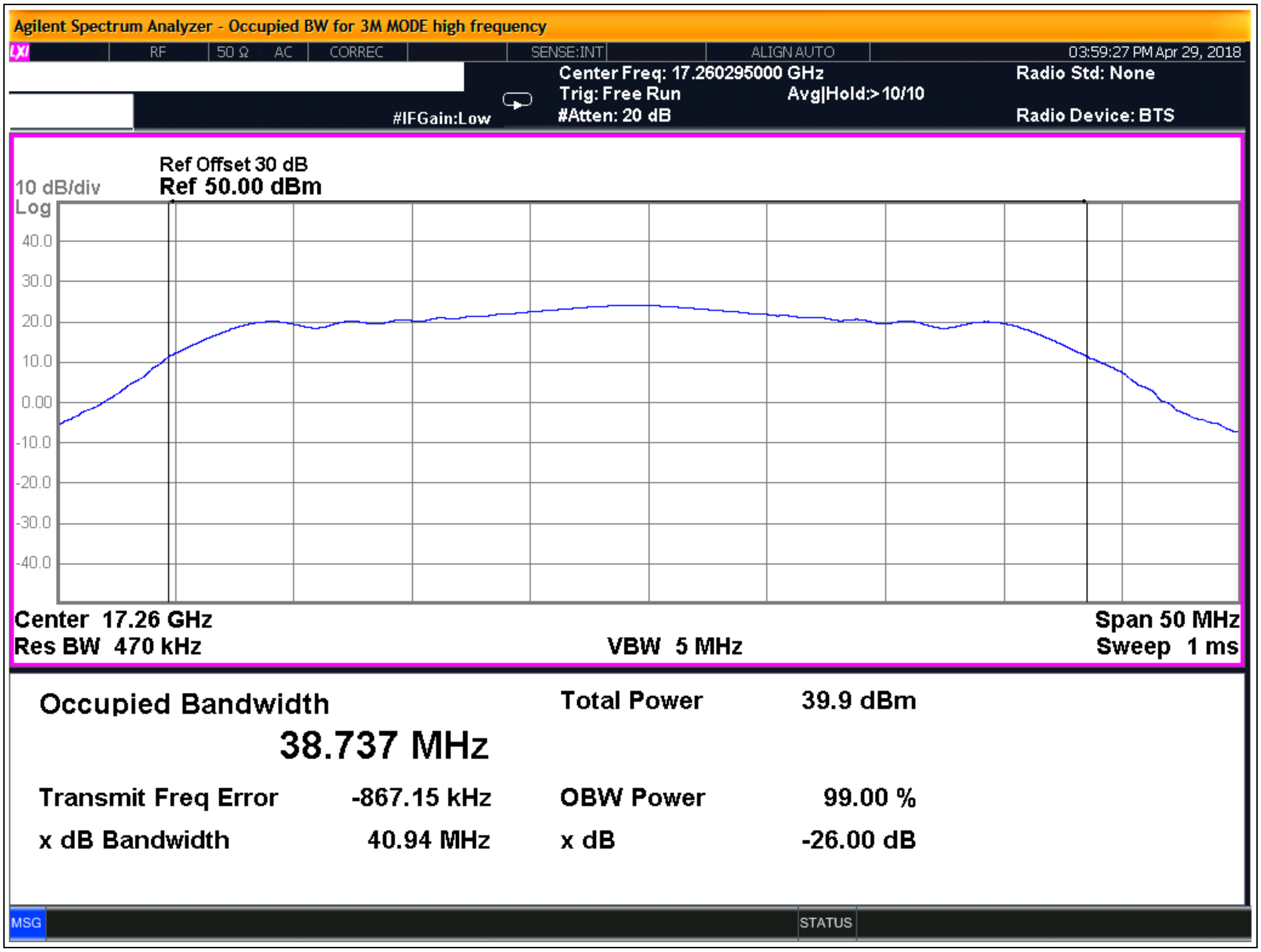
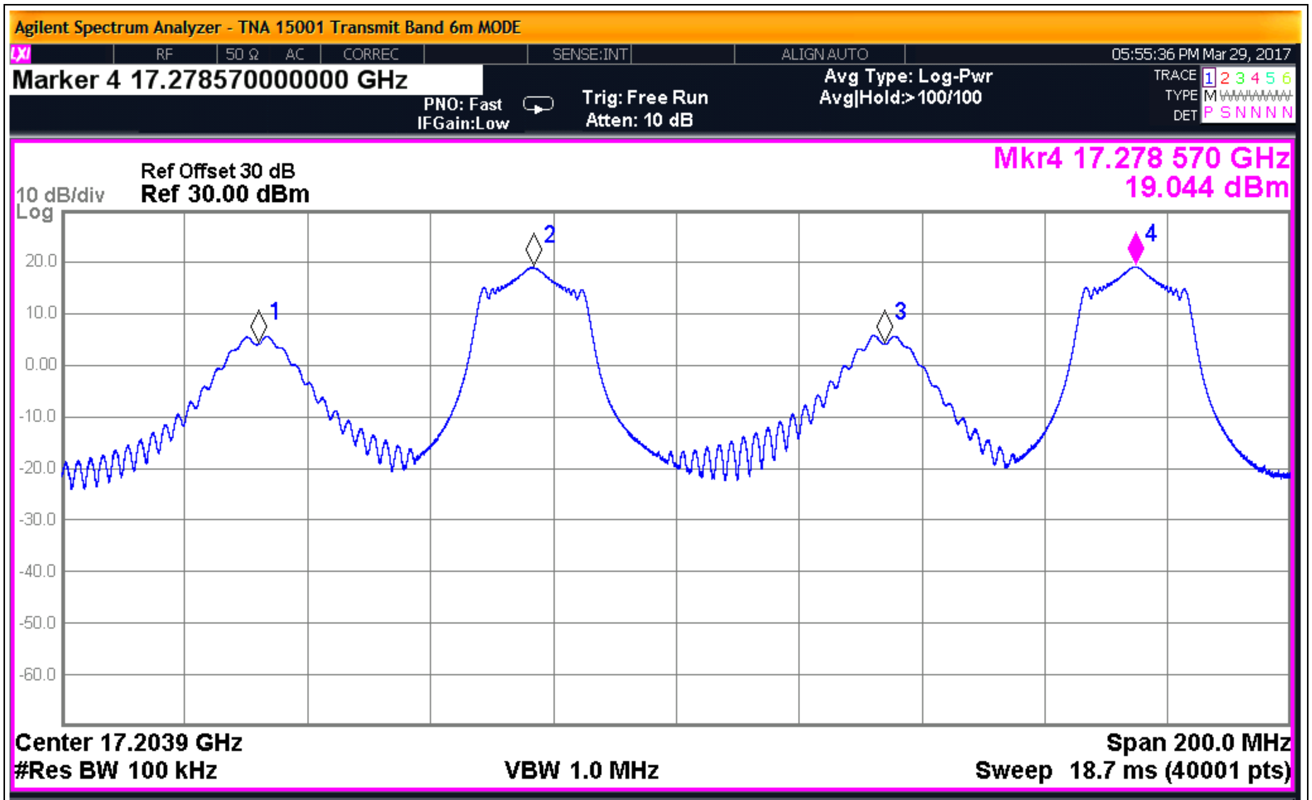


Figure 5: Occupied bandwidth HC (3m Mode)



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	17.135 955 GHz	4.074 dBm			
2	N	1	f	17.180 780 GHz	18.892 dBm			
3	N	1	f	17.237 750 GHz	4.001 dBm			
4	N	1	f	17.278 570 GHz	19.044 dBm			

Figure 6: Transmit Band Channels (6m Mode)

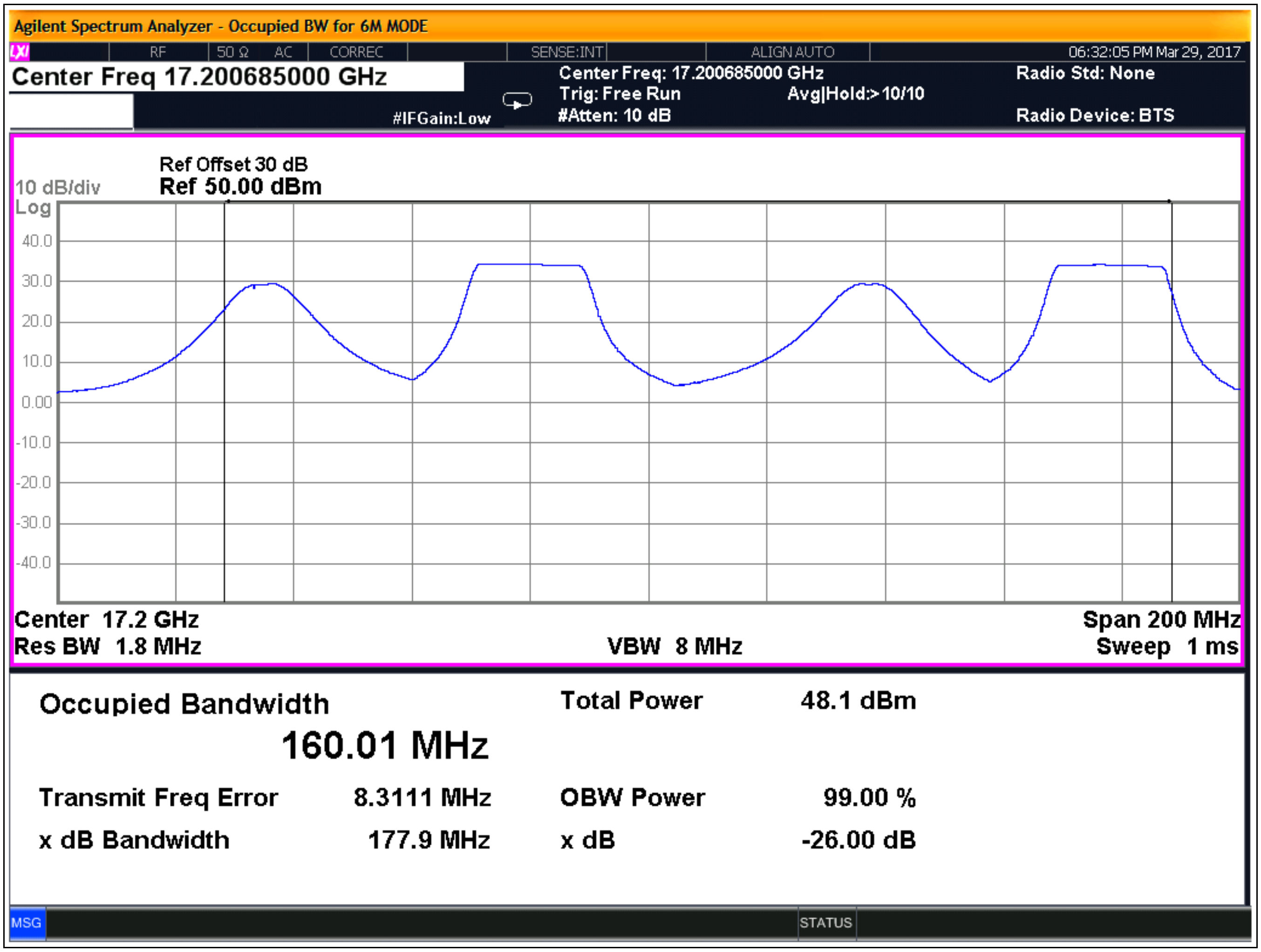


Figure 7: Transmit Band (6m Mode)

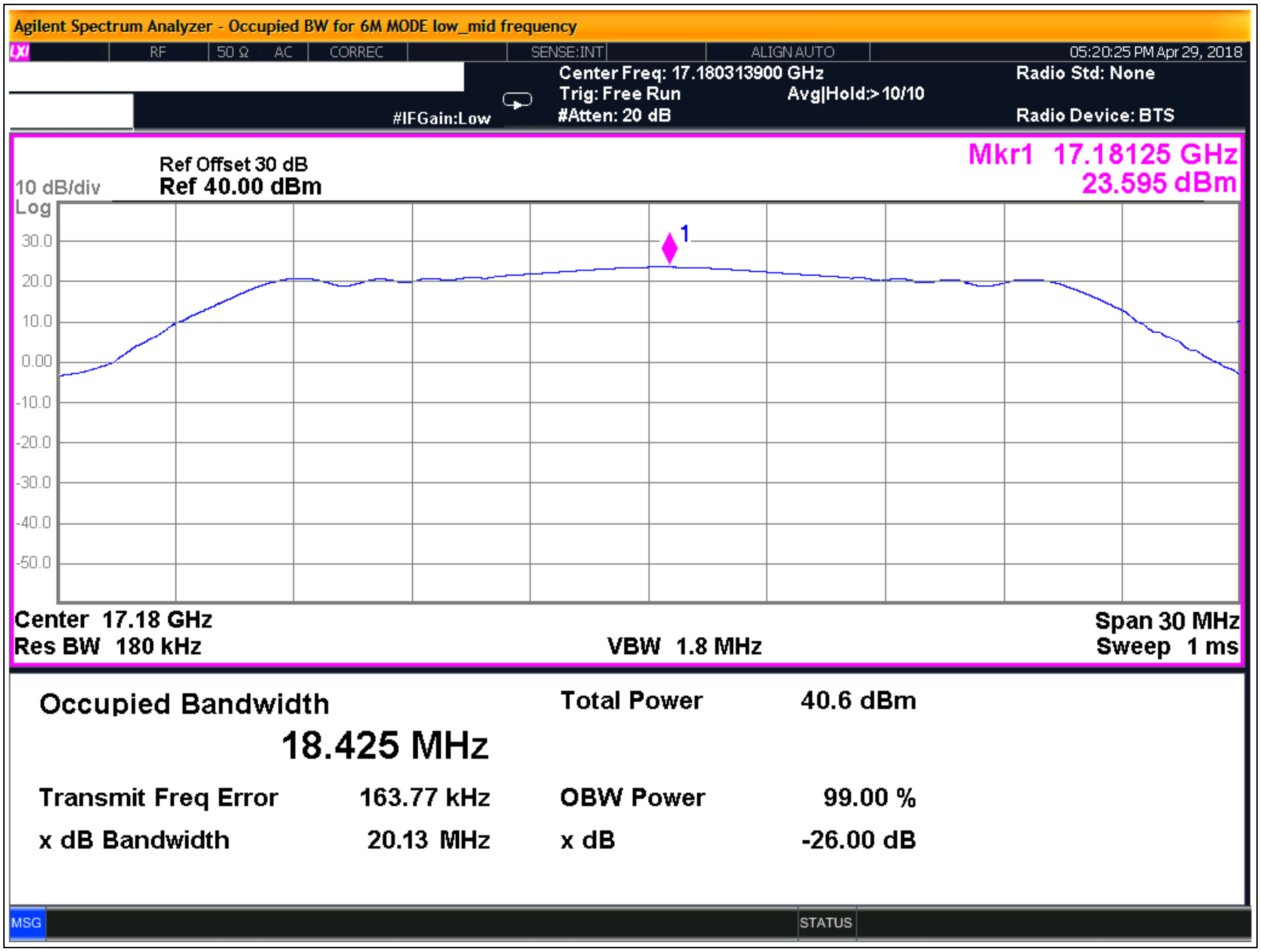


Figure 8: Occupied bandwidth LC (6m Mode)

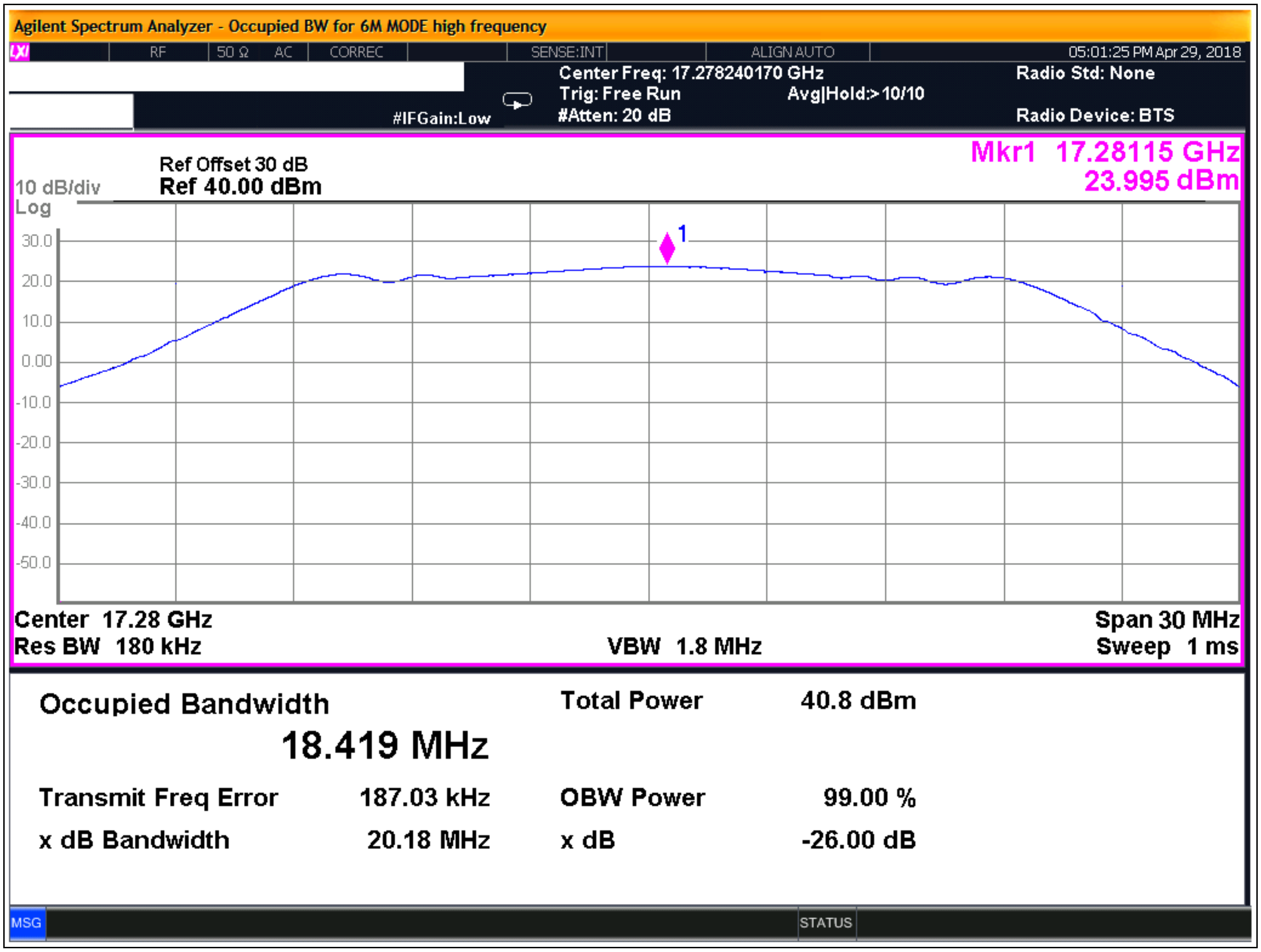


Figure 9: Occupied bandwidth HC (6m Mode)

4.3 Pulse Modulation Parameter Measurement

The radar utilizes two different pulse widths for the four chirps. The parameters to be measured for both the short and long chirps are:

t , pulse duration (50% of voltage)

tr and tf , pulse rise and fall time (10% and 90% points)

Table 8: Pulse Characteristics

Mode	Channel	Long/Short	Pulse Duration	Pulse Rise Time (t_r)	Pulse Fall Time (t_f)
3m	f0	Long	3.55us	17.04ns	23.07ns
3m	f1	Short	98.97ns	22.08ns	24.05ns
3m	f2	Short	97.83ns	21.19ns	23.07ns
3m	f3	Long	3.55us	17.65ns	18.89ns
6m	f0	Short	458.11ns	21.09ns	21.19ns
6m	f1	Long	11.56us	20.07ns	10.69ns
6m	f2	Short	464.52ns	20.92ns	24.32ns
6m	f3	Long	11.57us	23.13ns	10.36ns

4.4 (Emissions Masks & Out of Band Unwanted Radiation [FCC Part 90.210 (b)(1)(2)(3)]) (Mask B)

4.4.1 Test Method

For the conducted measurements:

The EUT antenna was disconnected from its internal antenna port and replaced with a calibrated cable and waveguides connected to a spectrum analyzer through appropriate attenuators. All losses in the system were accounted for and the conducted measurements were made.

For the radiated measurements:

In addition the EUT was tested out of band (>250 % of authorized bandwidth) for radiated emissions on an open air test site (OATS) using a substitution method. 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. A resolution bandwidth of 100 kHz was used for radiated measurements. The EUT antenna was in place for these readings.

For the Substitution Method:

The receiving antenna is set to the appropriate polarity. Each spurious frequency is maximized by raising and lowering the test antenna from 1m to 4m while rotating the turntable 360°. Once the maximum emission is found, it is recorded.

The EUT is then removed and replaced with a substitute antenna of the appropriate frequency range. The center of the substitute antenna is placed in the same spot as the geometric center of the EUT and parallel with the receiving antenna.

The substitute antenna is connected to a signal generator through a non-radiating cable. With the antennas at both ends set to the same polarization as the maximized signal, the SG is then tuned to the particular spurious frequency, the receiving antenna is then raised and lowered to obtain the maximum reading at the spectrum analyzer. The output power of the SG is adjusted until the previously recorded maximum reading is obtained for the particular spurious frequency. The above steps are repeated until all spurious frequencies are measured.

The readings obtained from the method described above are then placed into the following equation:

EIRP (dBm) = PSG (dBm) – PL (dB) + G (dBi)
Where,

PSG is the output power of the SG into the substitute antenna,

G is the gain of the substitution antenna relative to an isotropic antenna (dBi)

PL (dB) is the path loss of the cable which connects the signal generator to the substitution antenna

PSG (dBm): Column 11
PL (dB): Column 15
G (dBi): Column 13 & 14

Sample Data Table:

1	2	3	4	5	6	7	8	9	10
Frequency (MHz)	Polarity	Azimuth	Ant. Height (m)	Spurious Level (dBuV)	Corr Factors (dB)	Corr. Level (dBuV/m)	EIRP Level (dBm)	Limit (dBm)	Margin (dB)

11	12	13	14	15	16
Sub. Sig. Gen. Level (dBm)	Sub. Power Level (dBm)	Sub. Ant. Factor (dB)	Sub. Ant. Gain (dBi)	Cable Corr. (dB)	Amplifier Gain (dB)

4.4.2 Test Limit

The Part 90.210 Mask B and the general out of band emissions limits of -13dBm, this was chosen as per Part90.210 (n)

4.4.3 Test Results

The EUT complied with the requirements of the general out of band emissions limits of -13dBm and the in-band mask as referenced above.

4.4.4 Test Summary

The following plots show the in-band mask measurements and the out of band emissions for the 3m and 6m Modes.

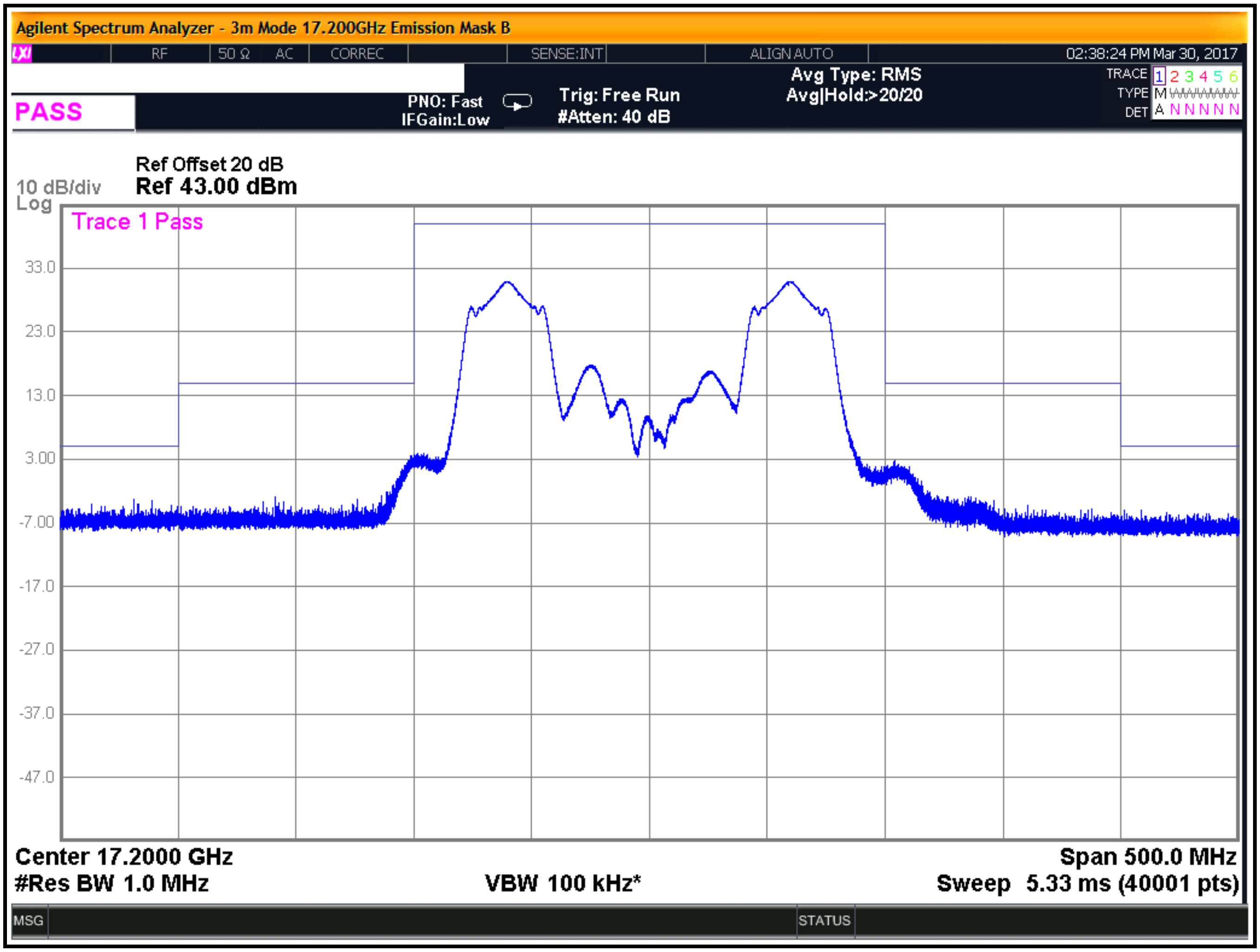


Figure 10: In-Band Emissions Mask (Mask B), 3m Mode

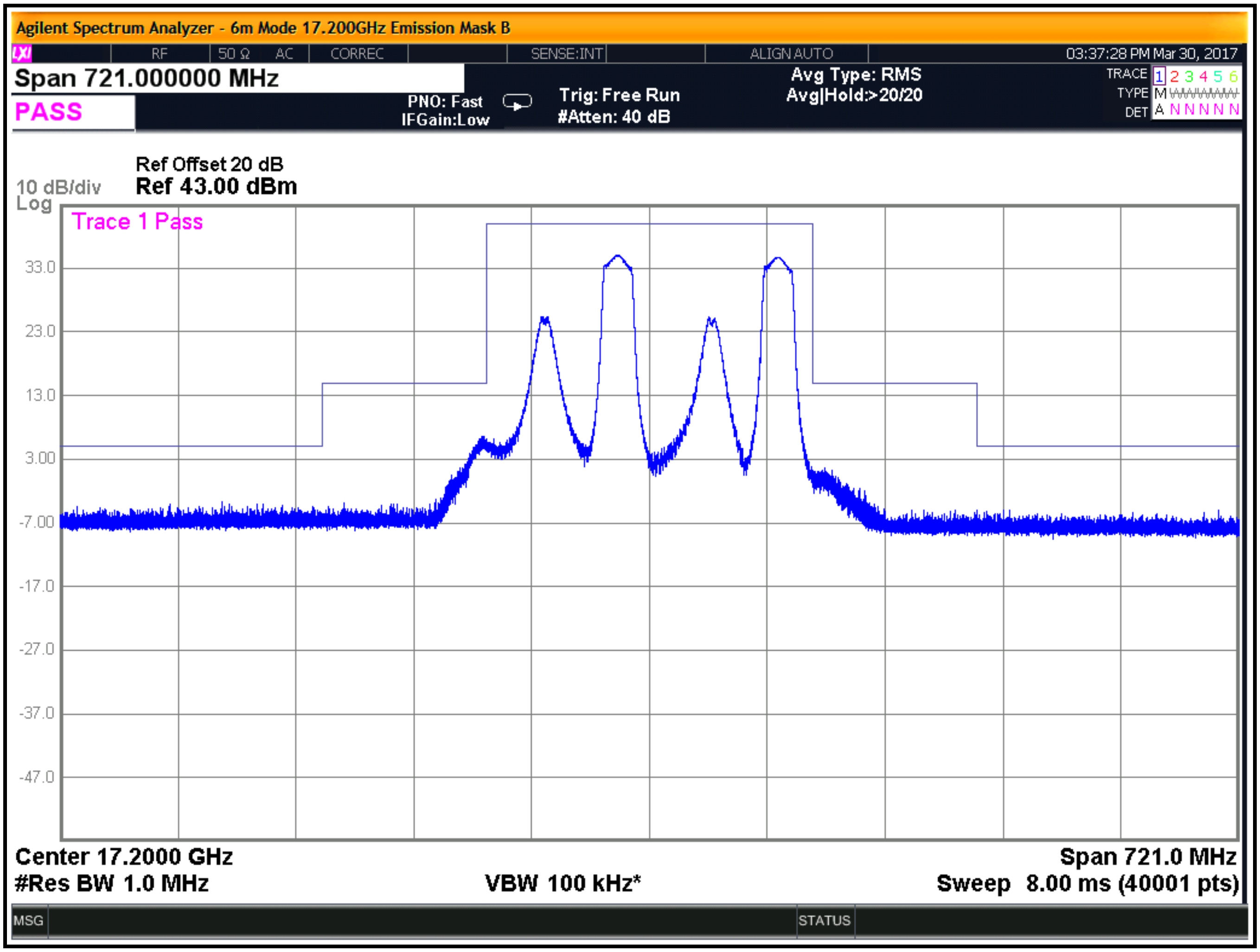


Figure 11: In-Band Emissions Mask (Mask B), 6m Mode

Table 9: Unwanted Radiated Emissions (Worst Case)

Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Peak or Average	Comments
30.47	V	90.0	1.0	29.6	-58.2	-13.0	-45.2	Peak	
51.19	V	90.0	1.0	36.7	-64.6	-13.0	-51.6	Peak	
80.00	V	0.0	1.2	37.5	-63.2	-13.0	-50.2	Peak	
85.81	V	180.0	1.1	37.5	-63.4	-13.0	-50.4	Peak	
250.00	V	180.0	1.8	37.5	-58.3	-13.0	-45.3	Peak	
400.00	V	180.0	1.8	30.9	-60.1	-13.0	-47.1	Peak	
500.00	V	180.0	2.5	25.9	-62.5	-13.0	-49.5	Peak	
800.00	V	180.0	2.8	29.6	-54.2	-13.0	-41.2	Peak	
	V								
30.47	H	180.0	2.6	20.6	-67.2	-13.0	-54.2	Peak	
51.19	H	45.0	2.0	40.5	-60.8	-13.0	-47.8	Peak	
80.00	H	180.0	3.5	39.1	-61.6	-13.0	-48.6	Peak	
85.81	H	0.0	3.0	35.4	-65.5	-13.0	-52.5	Peak	
250.00	H	0.0	3.0	40.0	-55.8	-13.0	-42.8	Peak	
400.00	H	180.0	3.2	32.7	-58.3	-13.0	-45.3	Peak	
500.00	H	45.0	3.0	34.3	-54.1	-13.0	-41.1	Peak	
800.00	H	180.0	3.5	27.2	-56.6	-13.0	-43.6	Peak	

Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Peak or Average	Comments
1399.00	V	180.0	1.8	47.2	-44.6	-13.0	-31.6	Peak	
1594.47	V	0.0	1.5	55.7	-36.1	-13.0	-23.1	Peak	
6000.00	V	180.0	1.0	43.3	-33.1	-13.0	-20.1	Peak	
10496.95	V	90.0	1.2	46.1	-22.1	-13.0	-9.1	Peak	
17100.00	V	180.0	1.2	41.2	-22.4	-13.0	-9.4	Peak	**Band Edge**
17300.00	V	180.0	1.2	41.6	-21.2	-13.0	-8.2	Peak	**Band Edge**
17278.00	V	180.0	1.2	54.1	-8.8				Fundamental
1595.12	H	0.0	2.5	39.6	-52.2	-13.0	-39.2	Peak	
1399.00	H	0.0	1.3	33.4	-58.4	-13.0	-45.4	Peak	
6000.00	H	45.0	2.0	41.5	-34.9	-13.0	-21.9	Peak	
10496.00	H	180.0	2.0	47.4	-20.9	-13.0	-7.9	Peak	
17100.00	H	180.0	2.0	40.6	-23.0	-13.0	-10.0	Peak	**Band Edge**
17300.00	H	0.0	1.0	40.3	-22.5	-13.0	-9.5	Peak	**Band Edge**
17278.00	H	0.0	1.0	54.6	-8.3				Fundamental

4.5 Transmitter Conducted Spurious Emissions

4.5.1 Test Method

The active antenna port of the device is connected to the spectrum analyzer after applying appropriate precautions to protect the instrumentation. The results, account for all losses between the device output and the spectrum analyzer. Conducted spurious emissions shall be measured for the transmit frequency and at the maximum transmit powers.

4.5.2 Test Limit

The out of band limit of -13dBm is applicable for the radar device.

4.5.3 Test Results

The EUT complies with the general out of band spurious limits.

4.5.4 Test Summary

The following plots reference the spurious measurements for the 3m and 6m Modes.

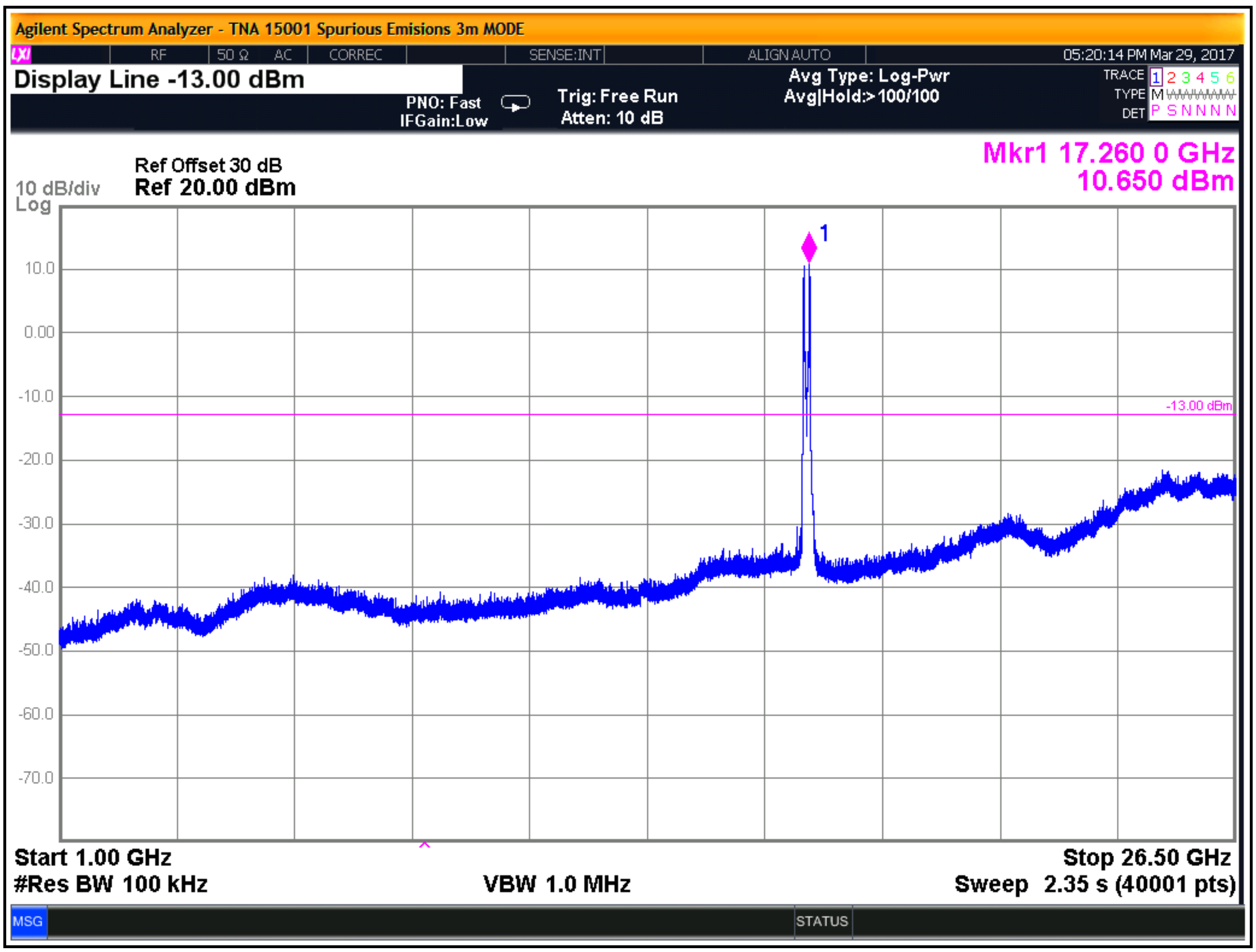


Figure 12: Spurious Emissions 1-26.5GHz, 3m Mode

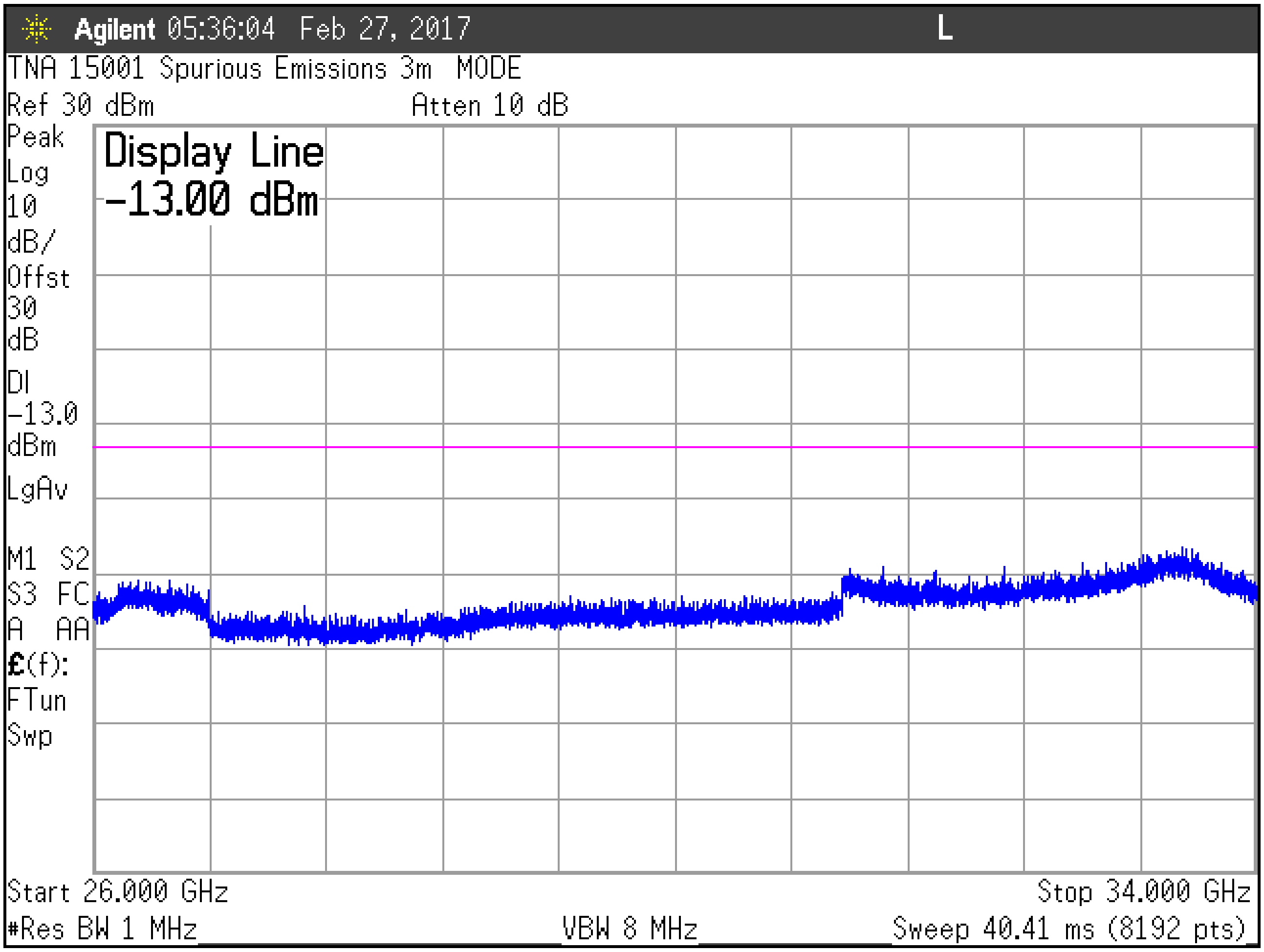


Figure 13: Spurious Emissions, 3m Mode

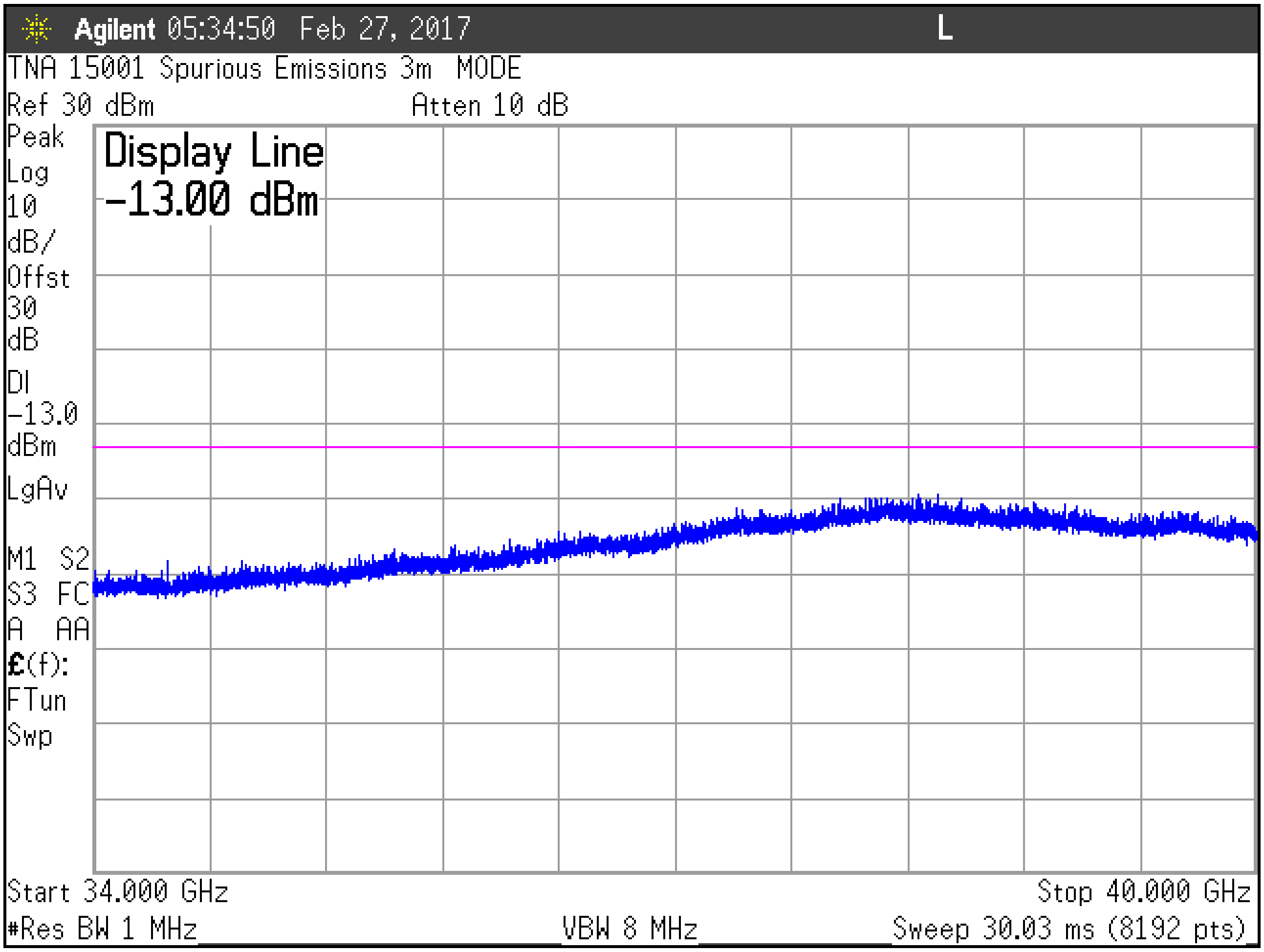


Figure 14: Spurious Emissions, 3m Mode

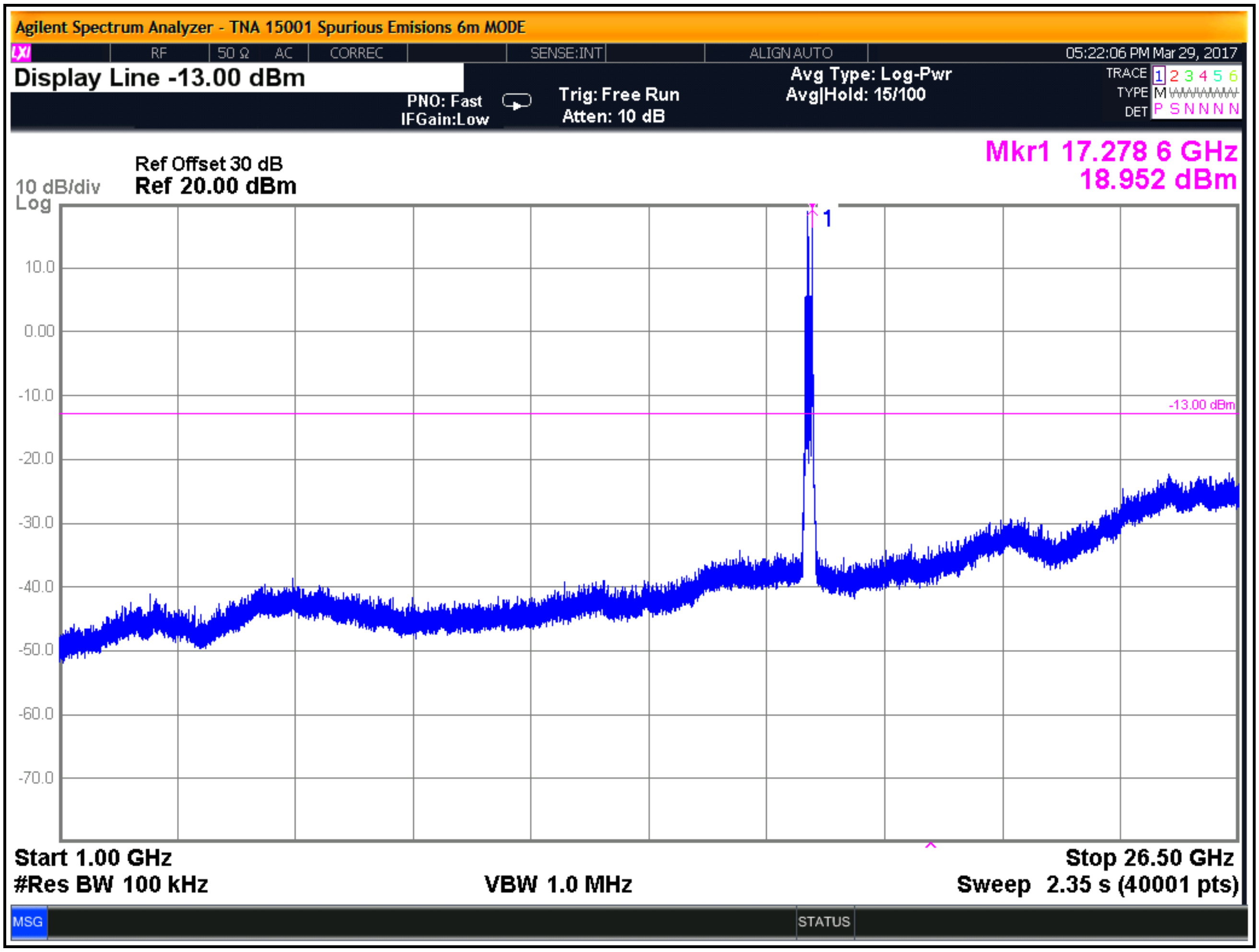


Figure 15: Spurious Emissions 1-26.5GHz, 6m Mode

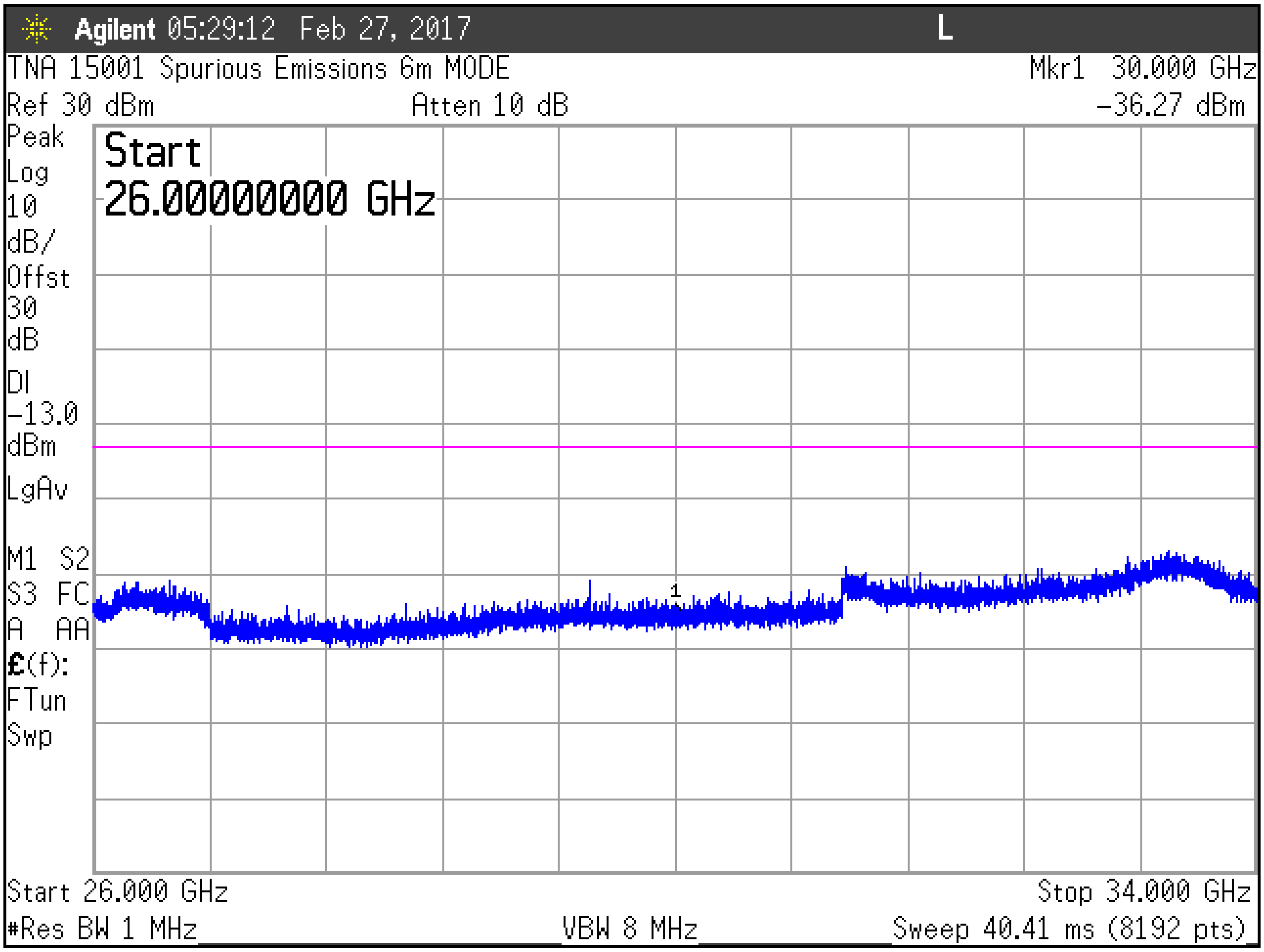


Figure 16: Spurious Emissions, 6m Mode

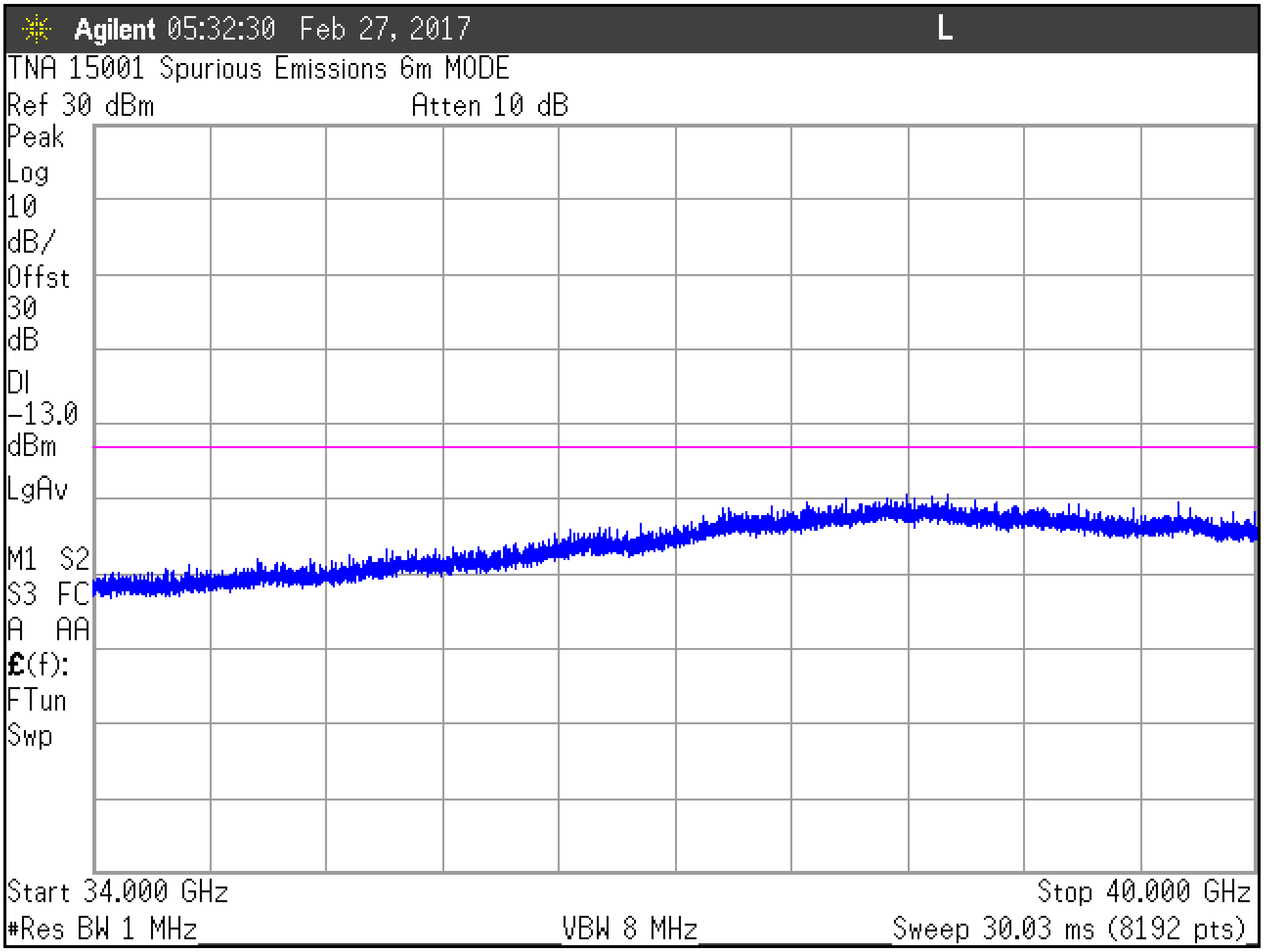


Figure 17: Spurious Emissions, 6m Mode

4.6 Receiver IF Selectivity Measurement (Not Required for FCC, Informational Purposes Only)

4.6.1 Test Method

A CW signal of -30dBm is applied at one of the carrier frequencies and the amplitude on the Radar Service Tool PPI (A-scope) is observed. The video gain on the A-scope shall is set so the measured signal is at least 60dB above the noise floor of the receiver (defined by no RF input signal). The same signal level (-30dBm) is applied for all of the spurious frequencies to be tested. Hereby it can be verified through the Radar Service Tool PPI (A-scope) that the receiver suppresses spurious frequencies at least 50dB. It is considered necessary to make only one measurement, in 6m Mode, for establishing that the receiver selectivity is commensurate with the transmitter bandwidth.

4.6.2 Test Limit

The overall receiver selectivity characteristics shall be commensurate with the transmitter bandwidth. Rejection of spurious responses, other than image responses, shall be 50 dB or better. Receivers shall not exhibit any local oscillator radiation greater than -40 dBm at the receiver input terminals. The frequency stability shall be commensurate with, or better than, that of the associated transmitter.

4.6.3 Test Results

The EUT was subjected to CW frequency sweeps in the operating range as stated above for the 6m Mode only.

4.6.4 Test Summary

The observed rejection in-band was better than 55dB, and this value corresponds to the manufacturers reported rejection measurements.

