HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

May 20, 2021

Thales Defense & Security, Inc.
22605 Gateway Center Drive
Clarksburg, MD 20871

Dear Robert Peterson,

Enclosed is the EMC Wireless test report for compliance testing of the Thales Defense & Security, Inc., VesseLINK 200. The Thales Defense & Security, Inc. VesseLINK 200 were tested to the requirements of the FCC Certification rules under Title 47 of the CFR Part 25 for Satellite Communications.

Thank you for using the services of Eurofins E&E North America. If you have any questions regarding these results or if we can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS E&E NORTH AMERICA

Michelle Tawmging

Michelle Tawmging
Documentation Department

Reference: (\Thales Defense & Security, Inc.\WIR108742-FCC25 Rev. 3)

HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

Electromagnetic Compatibility Criteria
Test Report

For the

Thales Defense & Security, Inc.
Model VesseLINK 200

Tested under

FCC Certification Rules
Title 47 of the CFR, Part 25 for Satellite Communications

Report: WIR108742-FCC25 Rev. 3

May 20, 2021

Prepared For:

Thales Defense & Security, Inc.22605 Gateway Center Drive
Clarksburg, MD 20871

Prepared By:
Eurofins E&E North America
914 W. Patapsco Ave.
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
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Donald Salguero, Project Engineer
Electromagnetic Compatibility Lab

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 25 of the FCC Rules under normal use and maintenance.

Deepak Giri,
Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	January 25, 2021	Initial Issue.
1	February 5, 2021	Implemented Customer-Requested Revisions.
2	April 5, 2021	Updates per TCB Comments
3	May 20, 2021	Updated Frequency Stability Section

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

Executive Summary

A. Purpose of Test

An EMC evaluation to determine compliance of the Thales Defense & Security, Inc. model VesseLINK 200 with the requirements of Part 25, was performed. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Thales Defense & Security, Inc. model VesseLINK 200. Thales Defense & Security, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the VesseLINK 200 has been **permanently** discontinued.

B. Requirements Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 25, in accordance with Thales Defense & Security, Inc., purchase order RCI-717862-SV. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference	Description	Compliance
§25.216	Protection of Aeronautical Satellite Service	Compliant
§25.202(f)	Emissions Mask	Compliant
§25.204	Conducted RF Output Power	Compliant
§2.1049	Occupied Bandwidth	Compliant
§25.202(f), §2.1051	Spurious Emissions at Antenna Terminals	Compliant
§25.202(d), §2.1055	Frequency Stability	Compliant
§25.202(f), §2.1053	Radiated Spurious Emissions	Compliant

Figure 1: Requirements Summary of EMC Part 25 ComplianceTesting

Equipment Configuration

A. Overview

Eurofins MET Laboratories, Inc. was contracted by Thales Defense & Security, Inc. to perform testing on the VesseLINK 200, under Thales Defense & Security, Inc.' purchase order RCI-717862-SV.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Thales Defense & Security, Inc., VesseLINK 200.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	MF200BV, Terminal with Land Antenna VF200BM, Terminal with Maritime Antenna	
Model(s) Covered:	VesseLINK 200	
EUT Specifications:	Primary Power: 120V 60Hz	
	OKCVF200BM (VesseLINK 200)	
	Type of Modulations:	QPSK
	EUT Frequency Ranges:	1616.02083 – 1625.64583 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Donald Salguero	
Date(s):	February 5, 2021	

Figure 2: EUT Summary Table

B. References

CFR 47, Part 25	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 25: Satellite Communications
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.26:2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

Figure 3: Standard References

C. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Figure 4: Uncertainty Calculations Summary

D. Test Site

All testing was performed at Eurofins MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins MET Laboratories.

E. Description of Test Sample

The Thales Defense & Security, Inc. VesseLINK 200, Equipment Under Test (EUT), will be used to support voice and data communications in a maritime environment. The Terminal and Antenna are capable of supporting wireless voice and data that links the user with the Iridium satellite network. As a wireless access point, the Terminal provides Wi-Fi (802.11) access for data. Three RJ-45 Ethernet connectors and one RJ14 jack enables the user to tether directly to the Terminal if desired. The Management Portal lets the user modify settings and indicates status. The Terminal is powered by an either an external 12 Volt AC to DC power source or a wider input voltage range (10-32V) that can come from a DC supply or a battery.

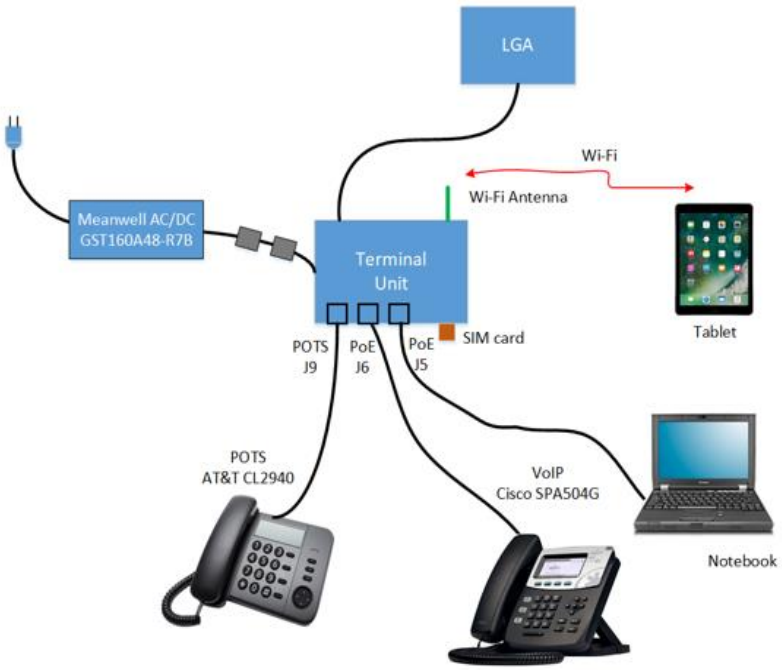

Figure 5: Block Diagram of Test Configuration, VesseLINK 200

F. Equipment Configuration

The EUT was set up as outlined in **Error! Reference source not found.** and Figure 6. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
A	Thales VesseLINK Terminal	VF200BM	4102947-511 (Maritime)	SN100001	A
B	Thales VesseLINK Maritime Low Gain Antenna	Maritime LGA	1600952-1	S/N 16	A
C	Wi-Fi Antenna	LS Research 001-0001	85728-001		N/A
D	AC/DC Power Supply	Meanwell GST160A12-TDSI	84670-001		TBD

Figure 6: Equipment Configuration, VesseLINK 200

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number
E	POTs Phone	ATT	CL2940
F	VoIP Phone	Cisco	SPA504G
G	Notebook Computer (outside chamber)	Apple Mac Book	N/A

Figure 7: Support Equipment, VesseLINK 200

H. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)	Termination Point
1	Antenna	LMR-300 Coaxial Cable for Maritime (855023-082)	1	25	Yes	Yes
2	12VDC	Cable AC Power USA Plug Type B	1	1.8	Not Specified	No
3	POTs Phone	POTS phone cable	1	~7 ft.	Not specified	No
4	RJ-45	Tera Grand 10’ CAT7 Shielded Ethernet Cable	1	10’	Not specified	Yes
5	WAN	Tera Grand 25’ Shielded Ethernet Cable	1	25’+	Not Specified	Yes
6	10-32VDC	Cable Power Harness 20’ TDSI Part No. 855024-20	1	20’	N/A	No

Figure 8: Ports and Cabling Information, VesseLINK 200

I. Mode of Operation

VesseLINK 200: For normal communications, the Terminal resides inside and the Antenna is fixed onto a roof so there is a good view of the sky. A data session is setup between the Antenna and satellites. For most of the conducted and ESD testing, however, the Terminal can be connected to an antenna without connection to the satellite system.

For transmit testing, the Terminal is set to a Test Mode that transmits two C8 QPSK modulation waveforms with a datarate of 176 kbps. This test mode was written by Iridium and script to initiate. The transmission data payload contains random bits. The format is two uplink transmit slots in the 90 millisecond Iridium TDMA frame structure. This should be representative of the worst case EMI mode.

J. Method of Monitoring EUT Operation

VesseLINK 200: There are 3 LEDs on the Terminal. During normal operation, all three must be solid green to indicate Terminal health or the right and left can be green and the middle blue (indicating a satellite link). The left LED is overall terminal operation, the middle is the on-board Modem proper operation, and the right LED is the status of the Wi-Fi operation. If any of these LEDs are blinking or red there is a problem. For the BCX Test mode operation, which will be used extensively for EMI testing, the middle LED may light up red.

The other indication the terminal is working is the presence of the RF transmit signal in the 1616 to 1626 MHz frequency range.

K. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the Test Standard.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Thales Defense & Security, Inc. upon completion of testing.

Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Satellite Communications

§25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service

Test Requirements:

(g) Mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03–283 with assigned uplink frequencies in the 1610–1626.5 MHz band shall suppress the power density of emissions in the 1605– 1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -10 dBW/MHz at 1610 MHz averaged over any 2 millisecond active transmission interval. The e.i.r.p of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from -80 dBW at 1605 MHz to -20 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

(i) The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after FEDERAL REGISTER publication of the rule changes adopted in FCC 03–283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed -80 dBW/MHz in the 1559–1610 MHz band averaged over any two millisecond interval.

(j) A Root-Mean-Square detector shall be used for all power density measurements.

Test Procedures: The EUT was set to transmit at maximum power. The test was done on the low, mind and high channels for 4 different emission bandwidths. The EUT was connected to a spectrum analyzer thru an attenuator. Plots were corrected with path loss factors and attenuator value as offsets. The spectrum analyzer was set to 1MHz RBW and 3MHz VBW with an RMS detector and average trace. For the low channel, the RBW was reduced to 30kHz and the frequencies of interest were later integrated over a 1MHz span.

channels. Procedure was repeated with the EUT in carrier off state.

Test Results: The EUT was compliant with the requirement(s) of this section. MissionLINK LGA and the VesseLINK LGA have identical electrical circuitry and therefore conducted tests on any LGA are representative of both.

Test Engineer(s): Donald Salguero

Test Date(s): November 18, 2020

Bandwidth (kHz)	Frequency (MHz)	Measurement (dBm/MHz)	Limit (dBm/MHz)
83.334	1605.3417	-37.34	-35.8996
41.668	1605.32	-38.06	-36.16
333.333	1605.4667	-35.9	-34.3996
666.666	1605.6317	-32.56	-32.4196

Figure 9: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, Low Channel, Frequencies of Interest

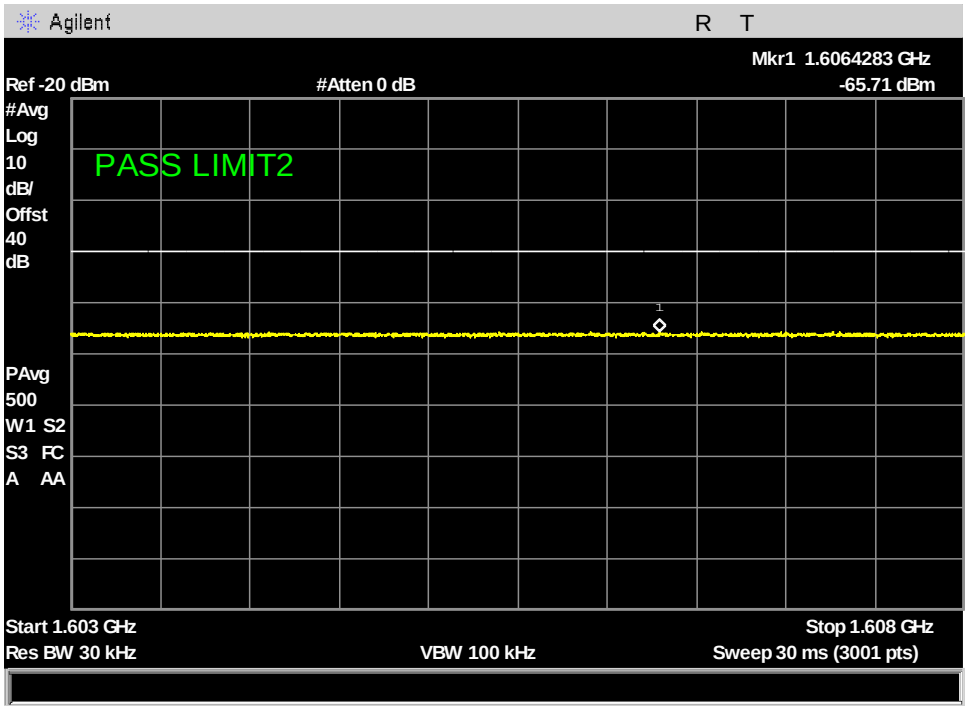

Figure 10: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, carrier off state_30kHz

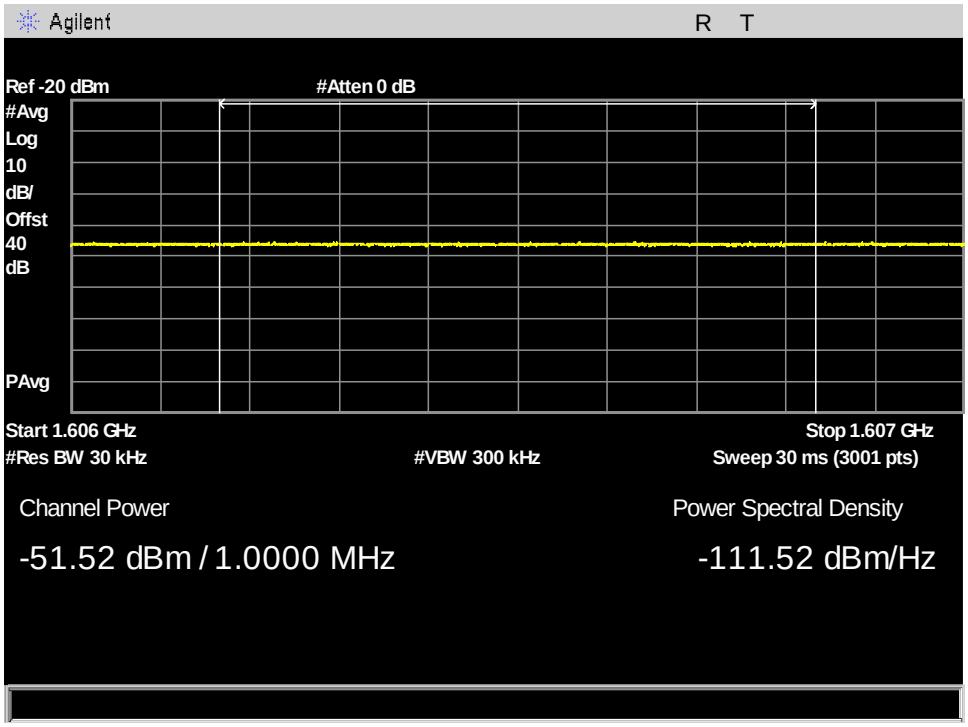

Figure 11: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, carrier off state_30kHz_1MHz integration

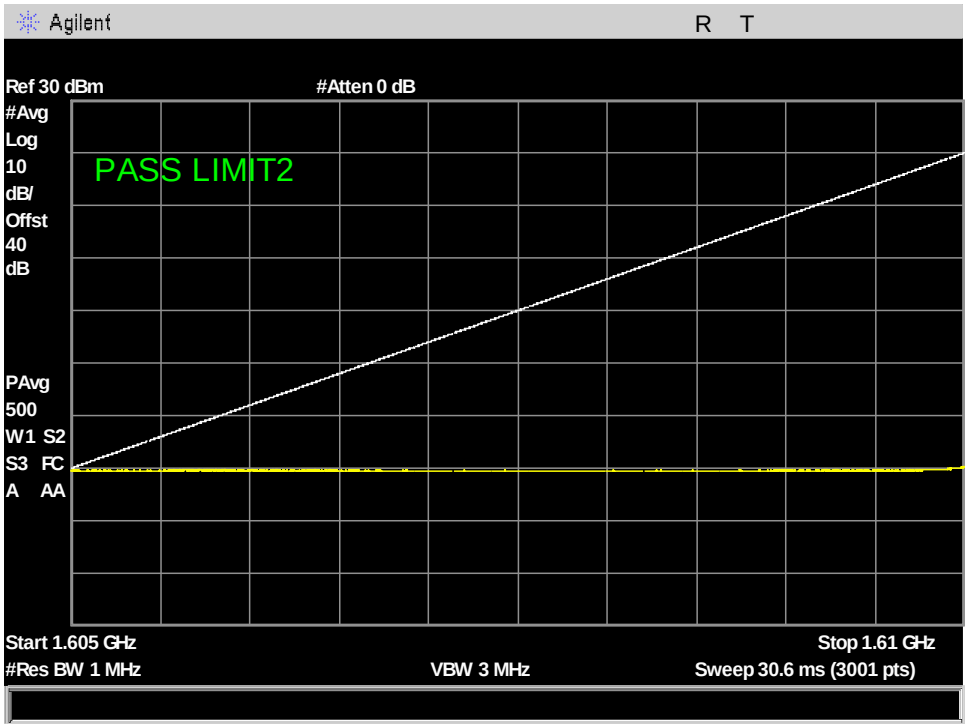

Figure 12: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch121_333.333kHz

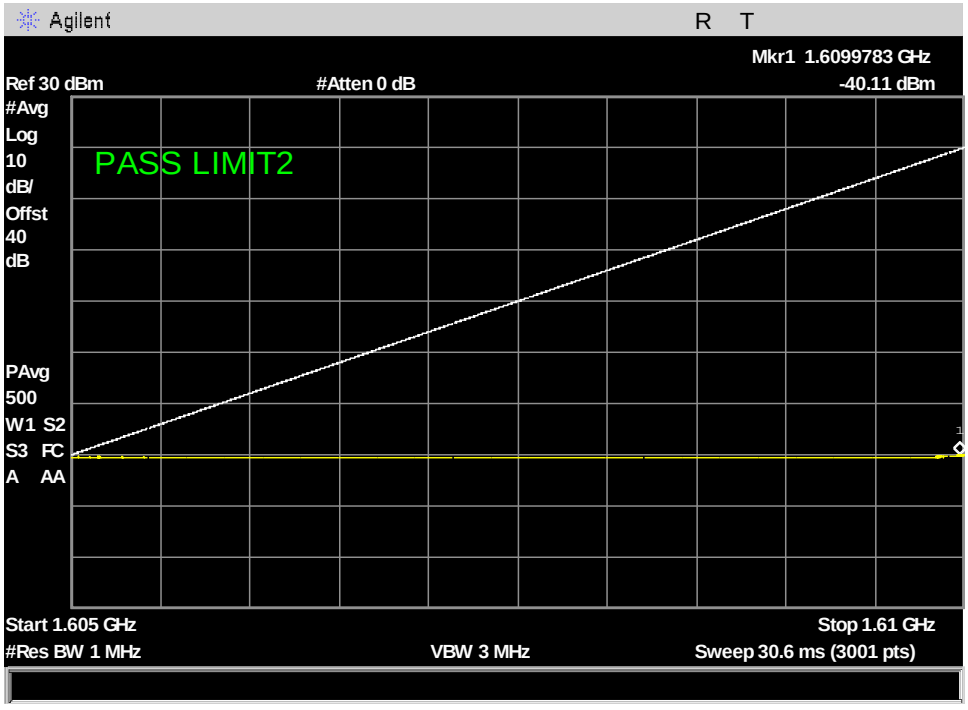

Figure 13: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch121_41.668kHz

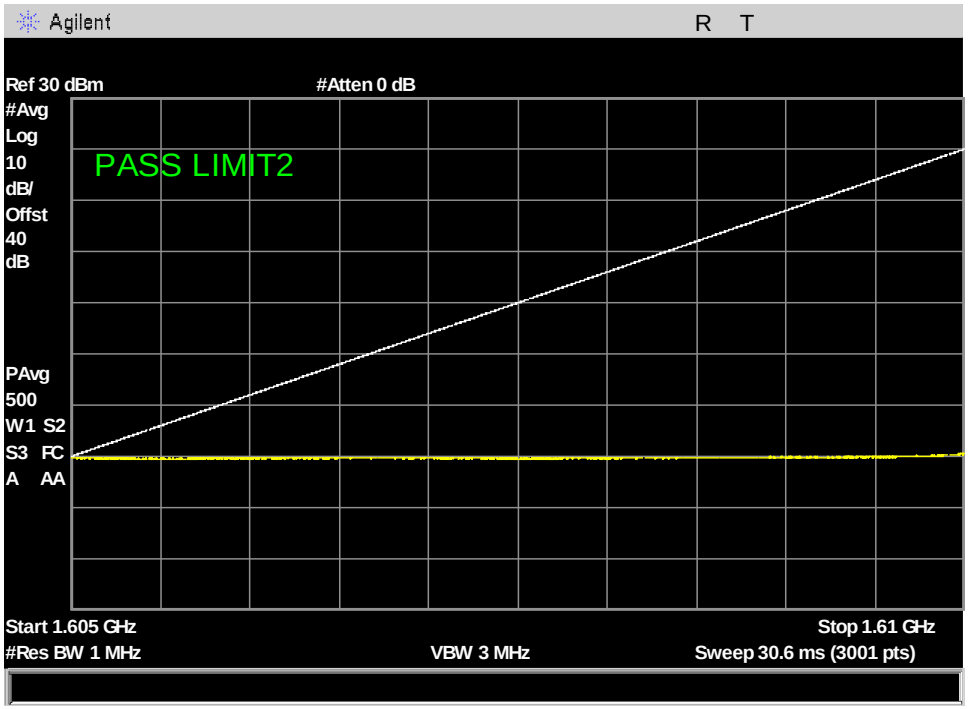

Figure 14: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch121_666.666kHz

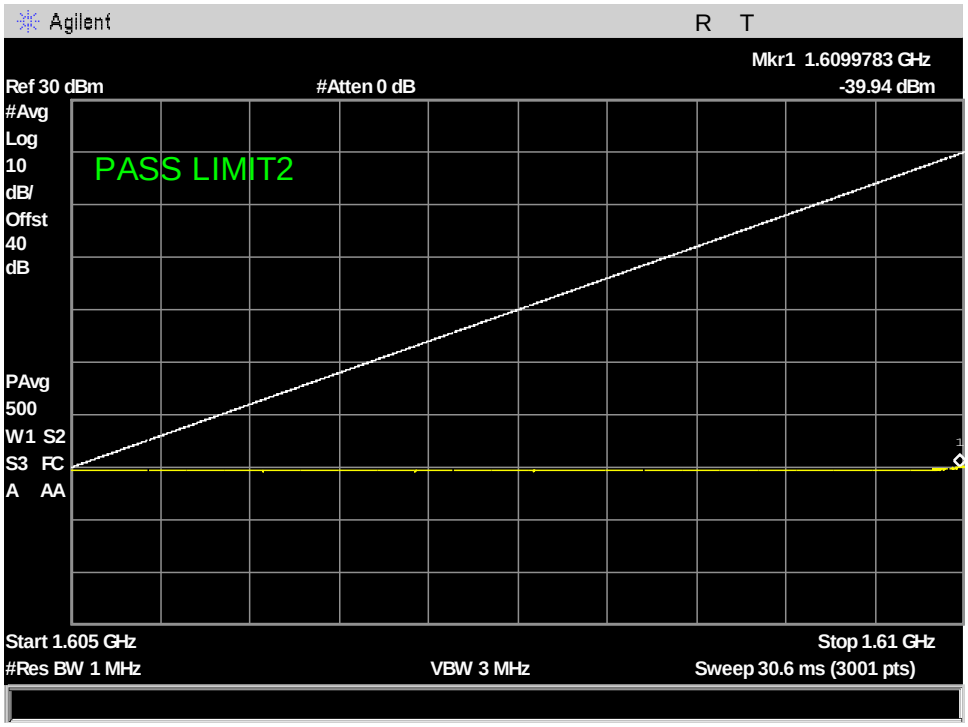

Figure 15: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch121_83.334kHz

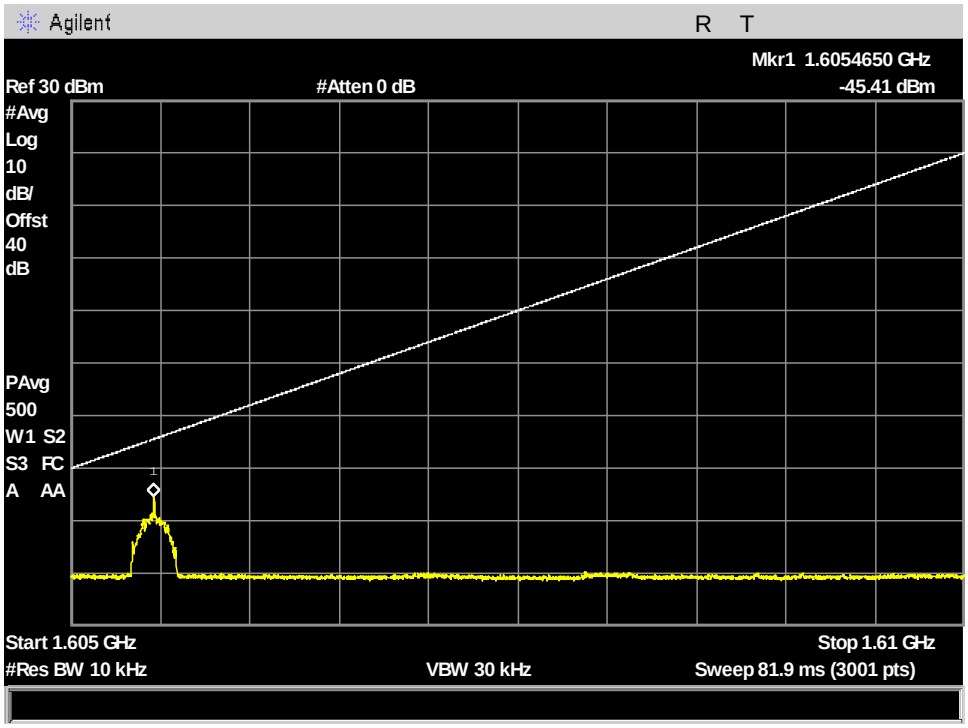

Figure 16: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_333.333kHz

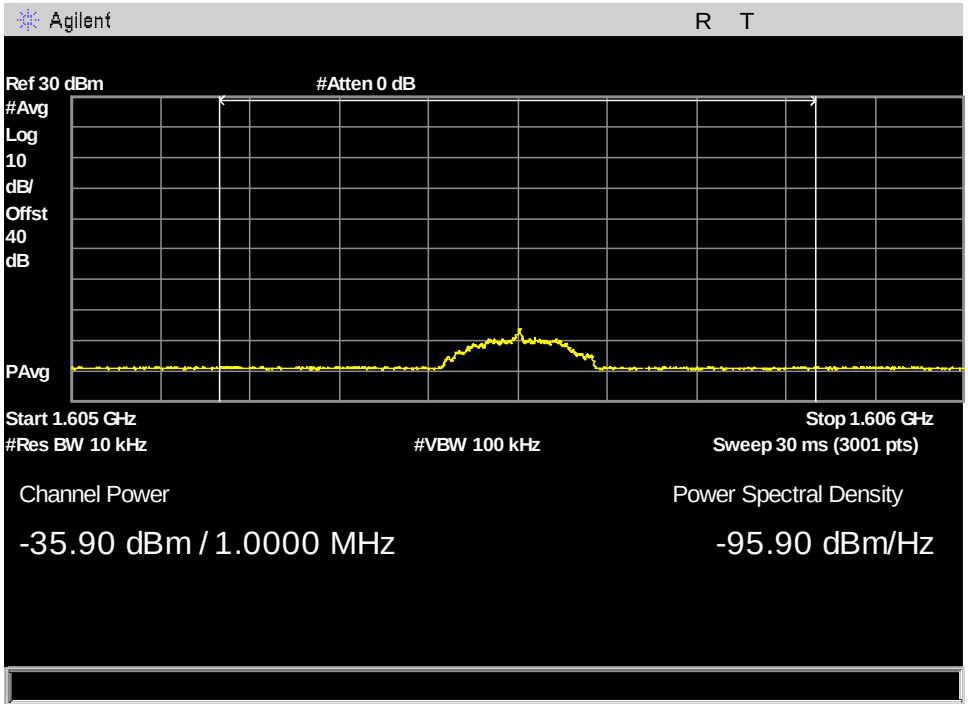

Figure 17: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_333.333kHz_1MHz integration over frequency of interest

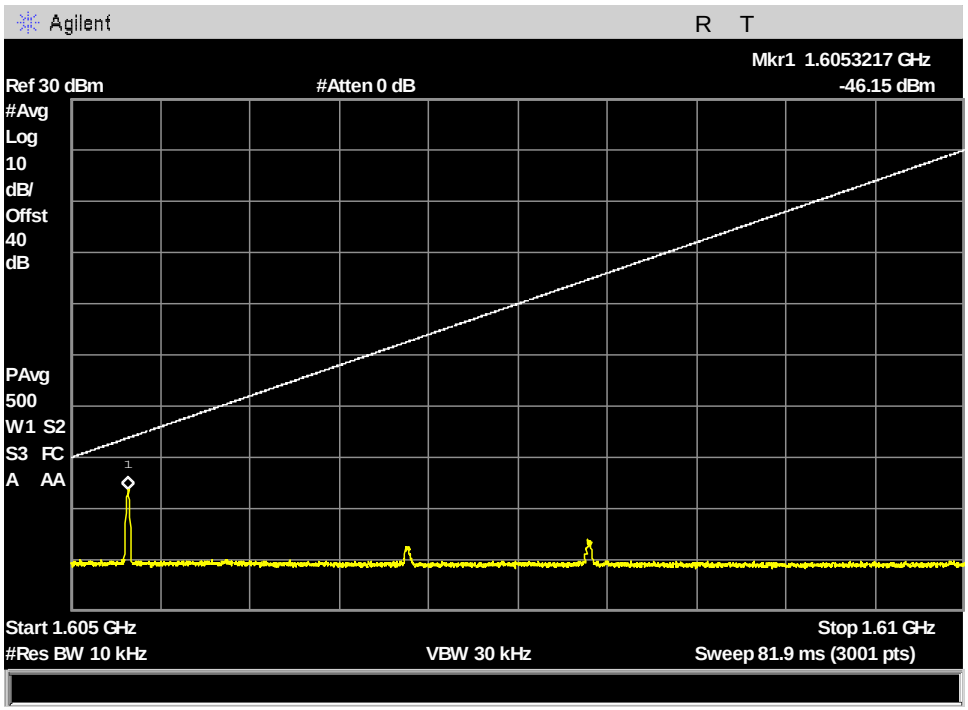

Figure 18: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_41.668kHz

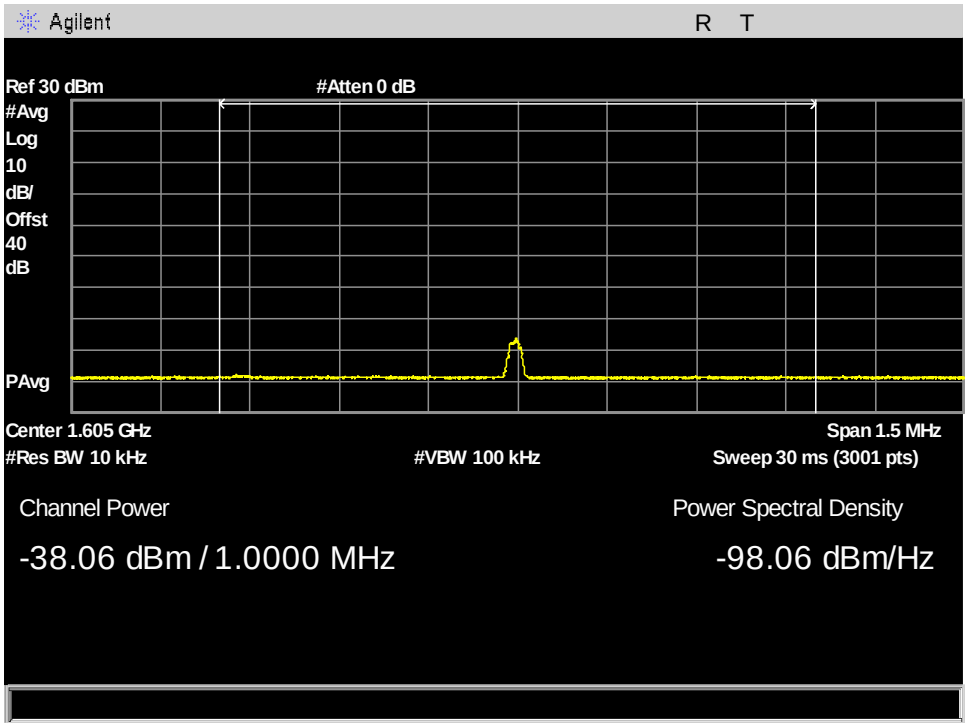

Figure 19: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_41.668kHz_1MHz integration over frequency of interest

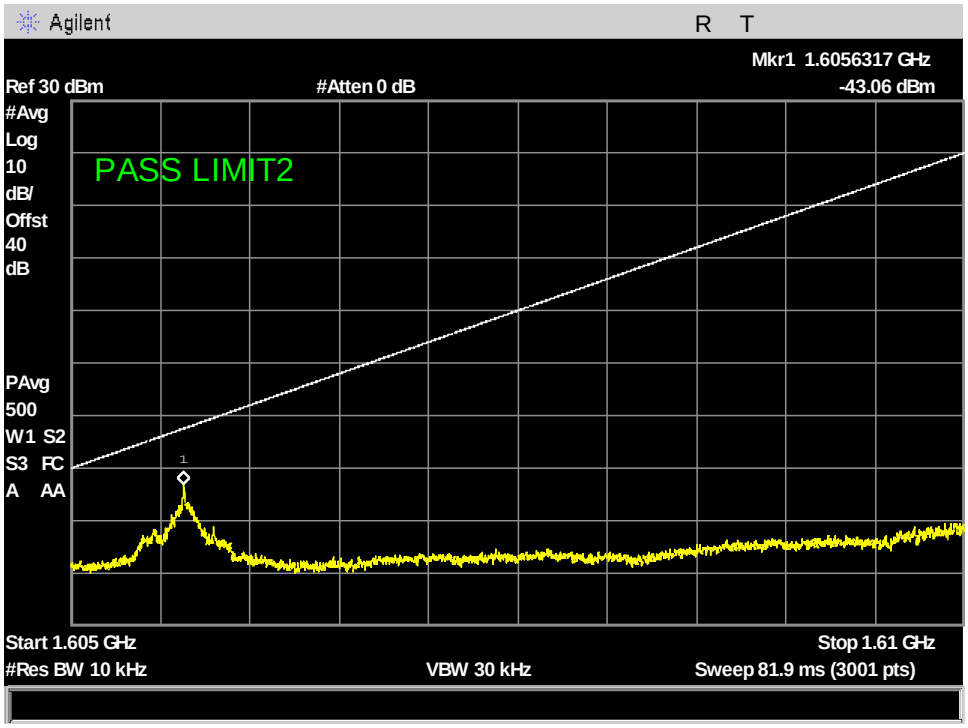

Figure 20: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_666.666kHz

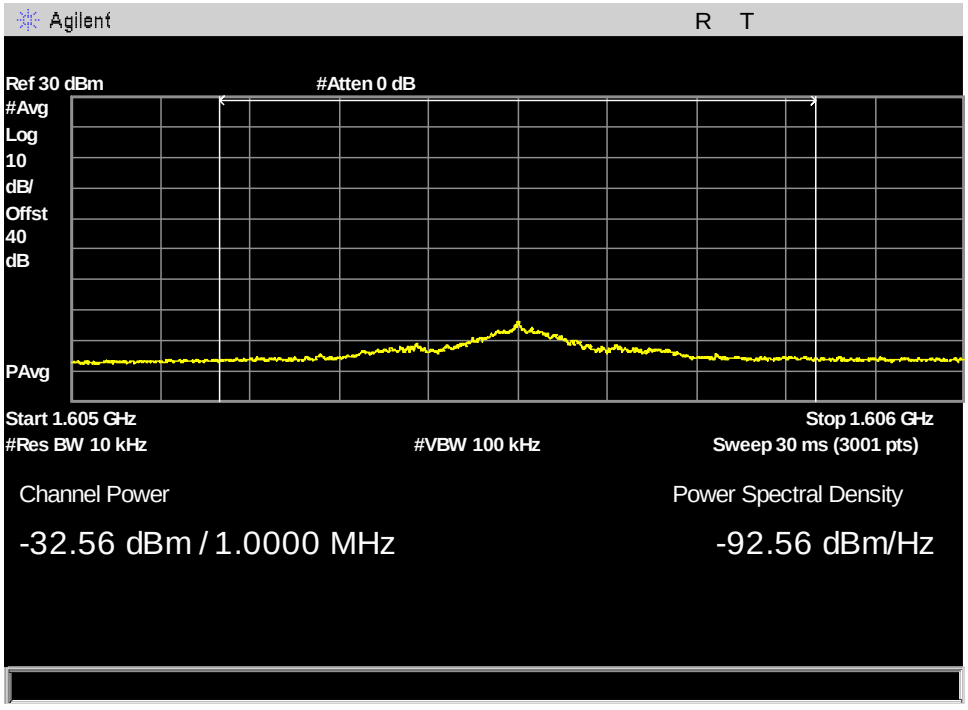

Figure 21: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_666.666kHz_1MHz integration over frequency of interest

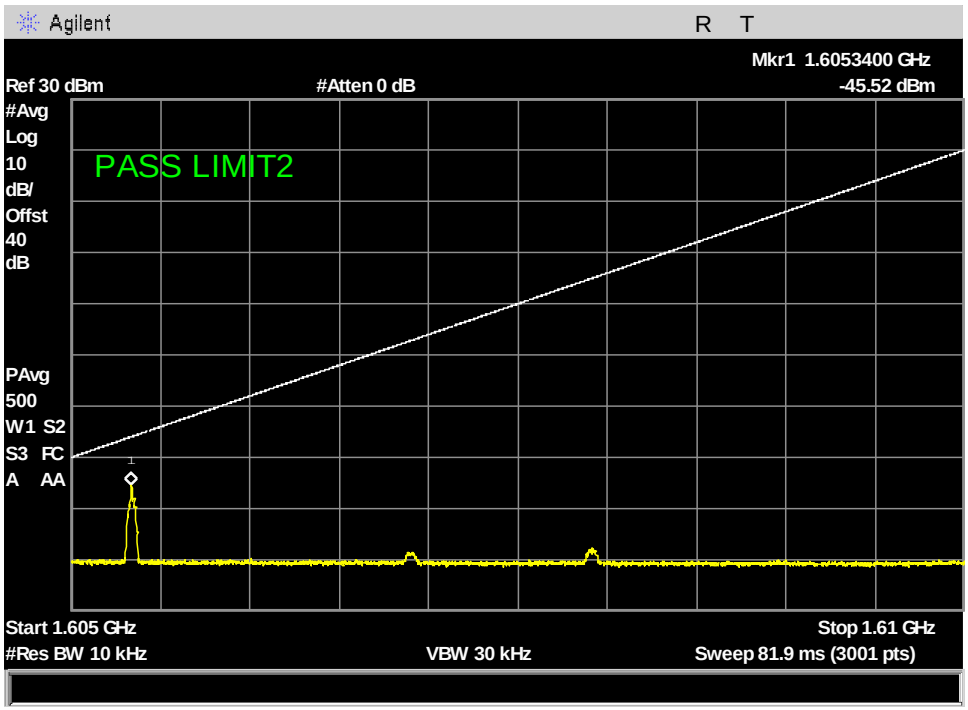

Figure 22: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_83.334kHz

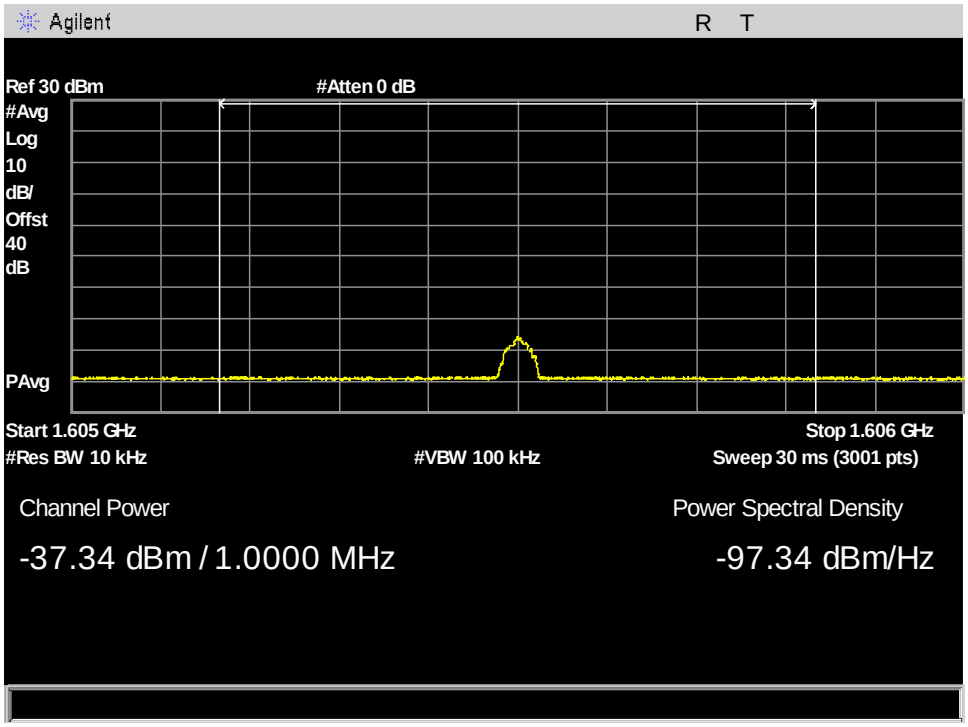

Figure 23: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch1_83.334kHz_1MHz integration over frequency of interest

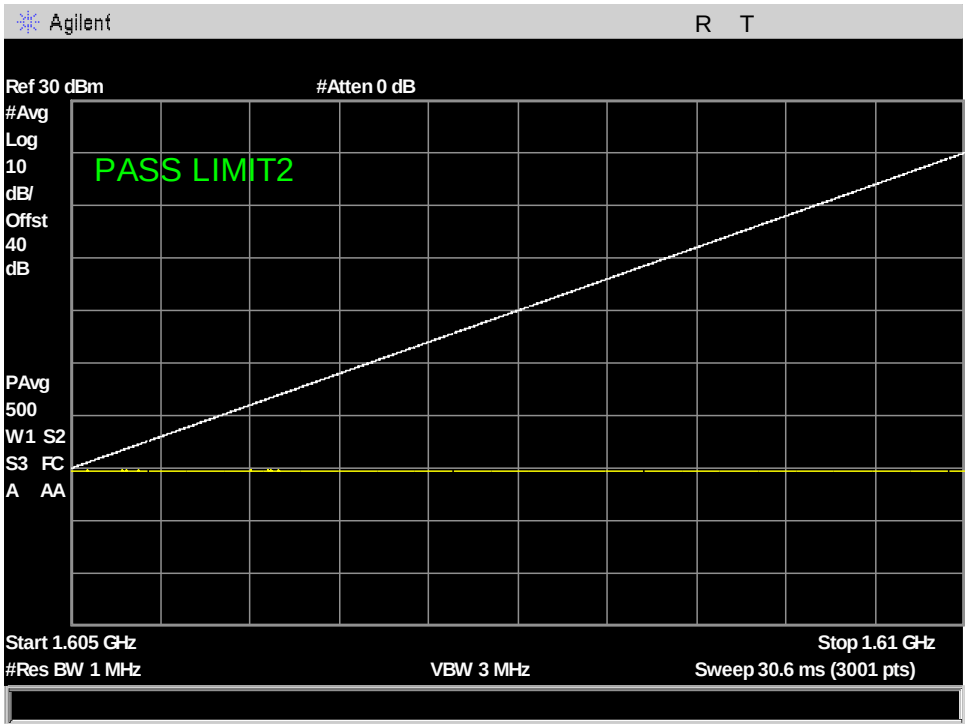

Figure 24: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch232_333.333kHz

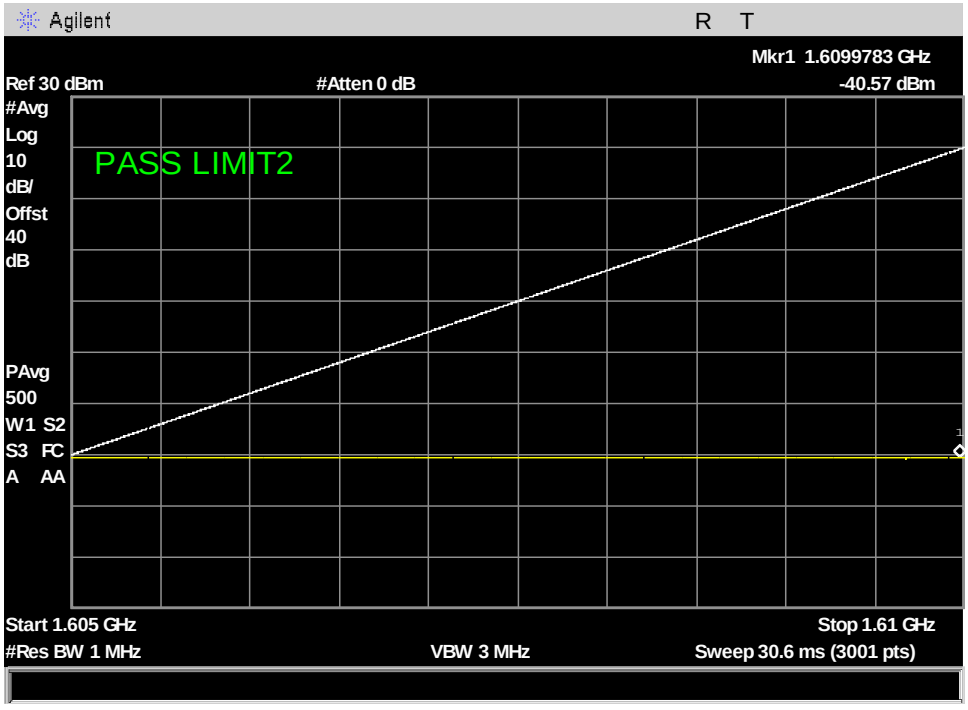

Figure 25: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch232_41.668kHz

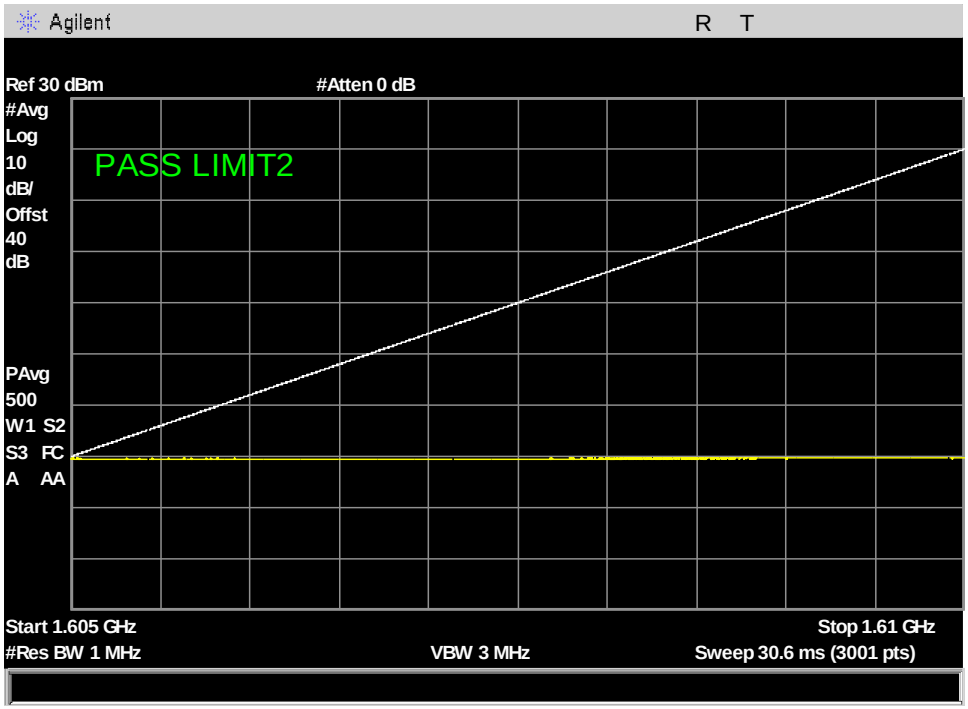

Figure 26: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch232_666.666kHz

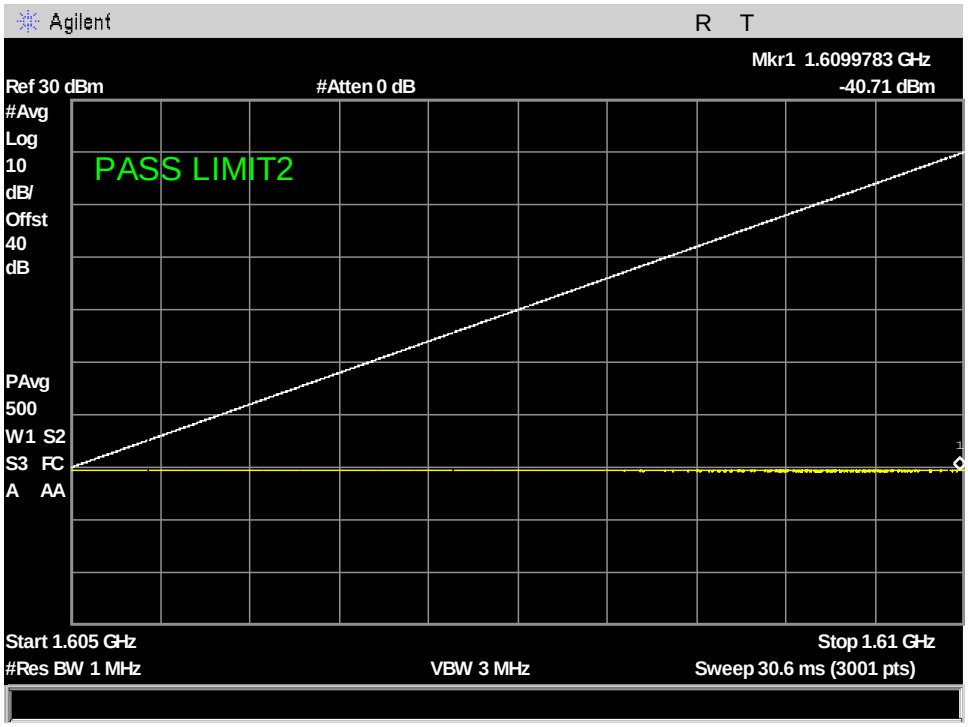

Figure 27: §25.216 Limits on Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service, mask_ch232_83.334kHz

Electromagnetic Compatibility Criteria for Satellite Communications

§25.202(f) Emissions Mask

Test Requirement(s): **§25.202(f) Emission Limitations:** Except for SDARS terrestrial repeaters, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

Test Procedures: The EUT was connected directly to a spectrum analyzer through an attenuator and the center frequency of the analyzer was set as the frequency of the low, middle and high channels. Each channel's emissions were observed and compared to the emissions limitations of §25.202(f).

Due to spectrum analyzer limitations, measurements were performed with a 3kHz RBW, the bandwidth correction factor was added as an offset (10 Log[4/3]).

An RMS detector was used to perform the measurements.

Test Results: The EUT is compliant with the requirements of this section. MissionLINK LGA and the VesseLINK LGA have identical electrical circuitry and therefore conducted tests on any LGA are representative of both

Test Engineer(s): Donald Salguero

Test Date(s): December 1, 2020

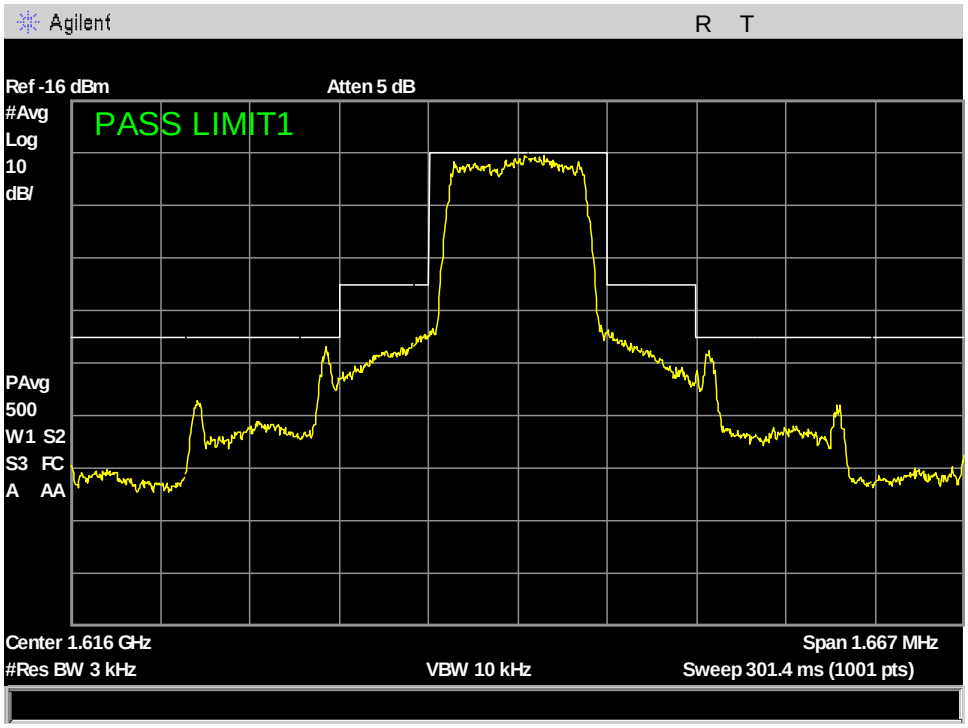

Figure 28: §25.202(f) Emissions Mask, Ch1 - 333.333kHz

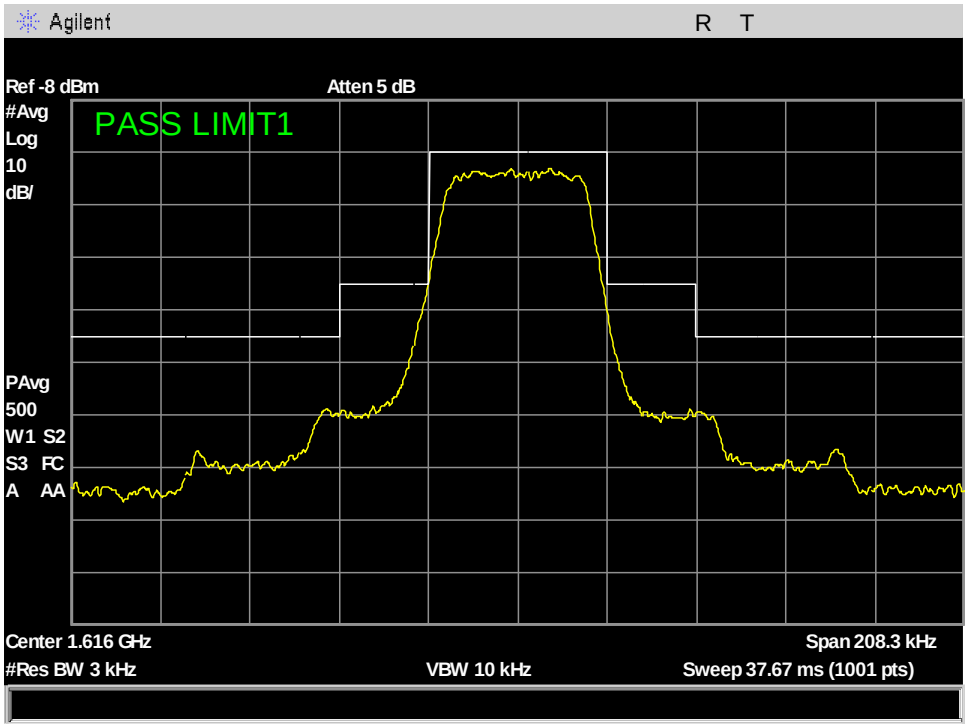

Figure 29: §25.202(f) Emissions Mask, Ch1 - 41.668kHz

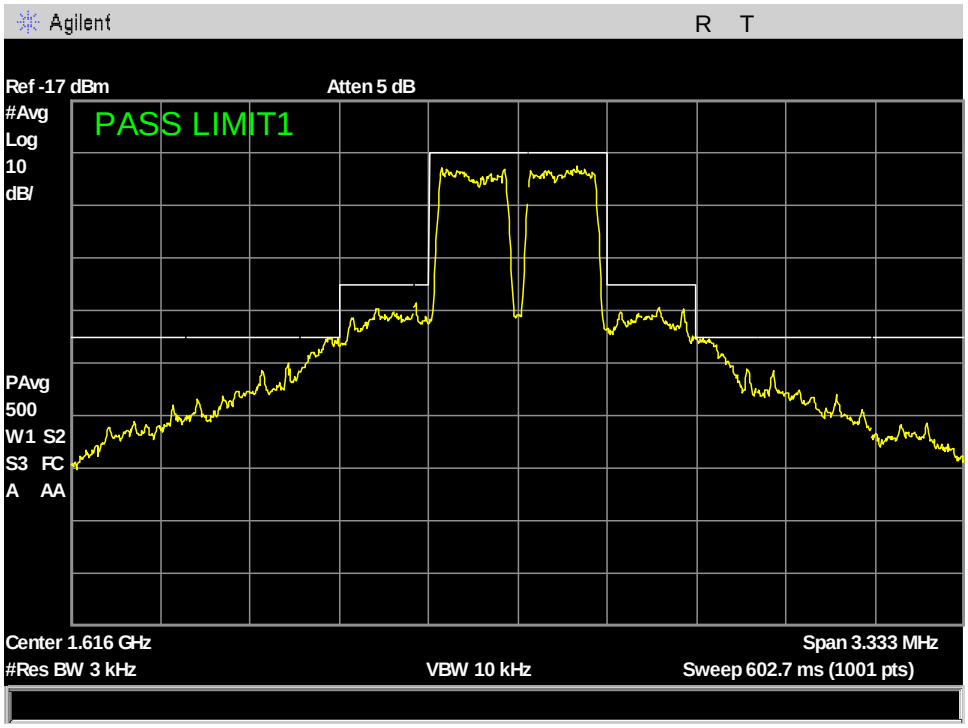

Figure 30: §25.202(f) Emissions Mask, Ch1 - 666.666kHz

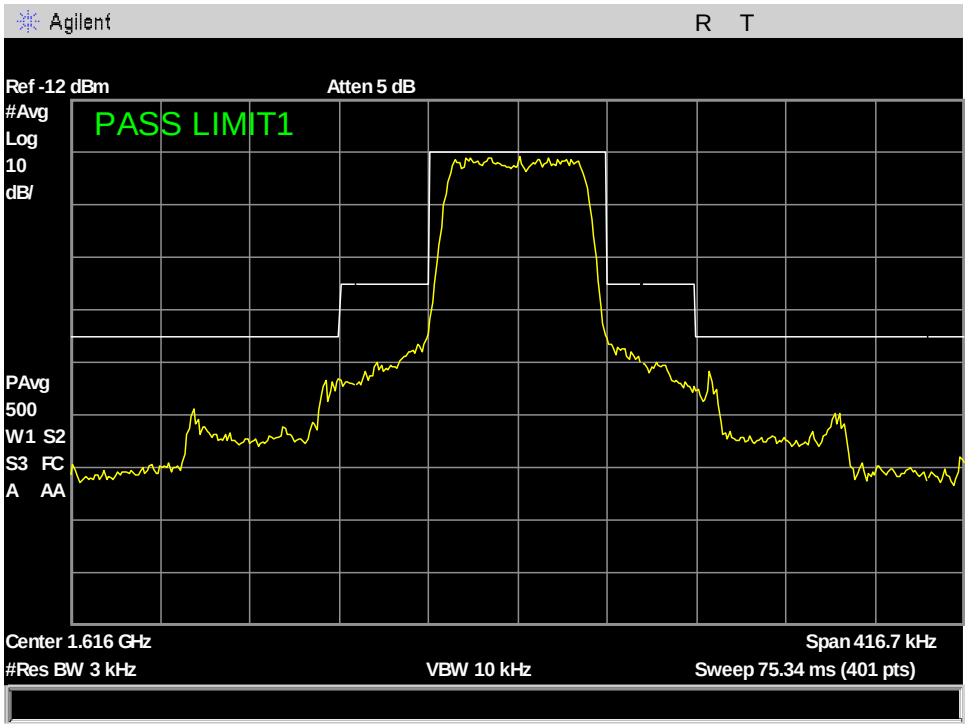

Figure 31: §25.202(f) Emissions Mask, Ch1 - 83.334kHz

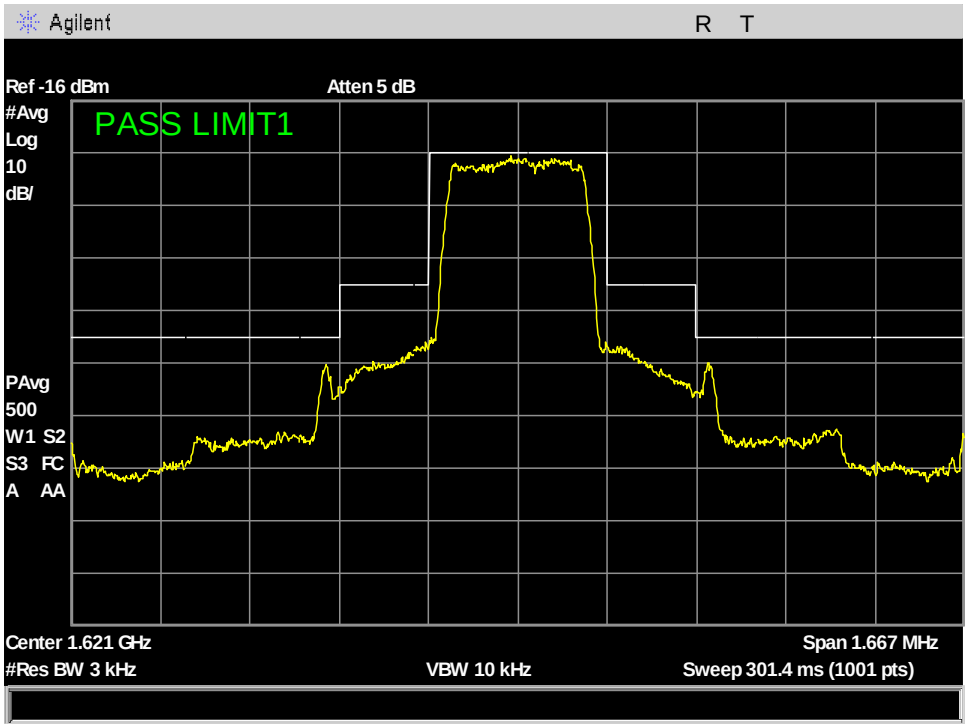

Figure 32: §25.202(f) Emissions Mask, Ch121 - 333.333kHz

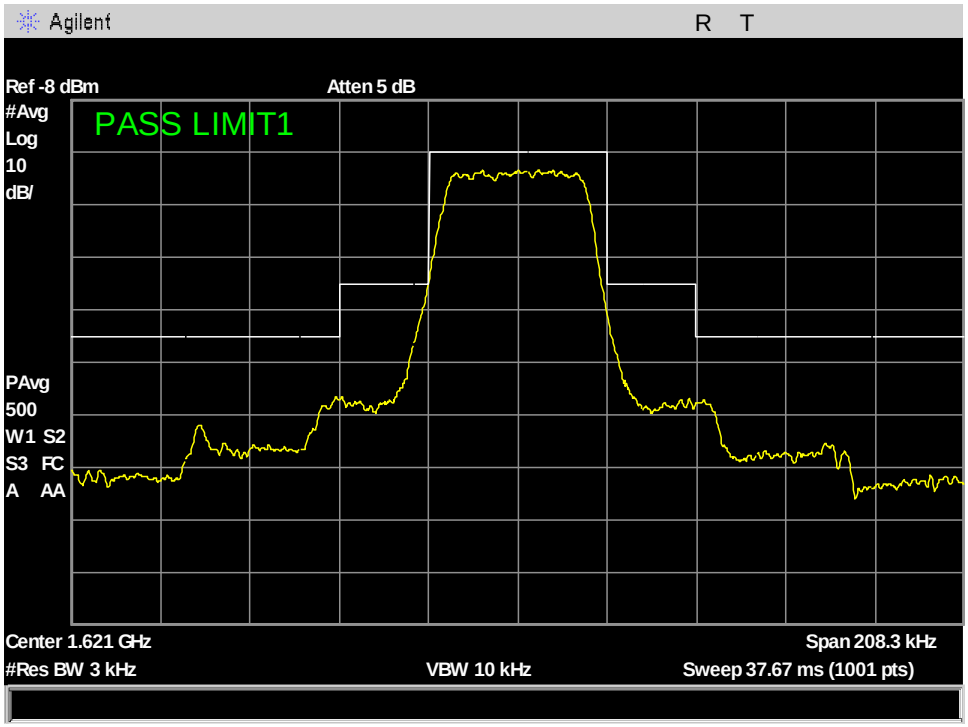

Figure 33: §25.202(f) Emissions Mask, Ch121 - 41.668kHz

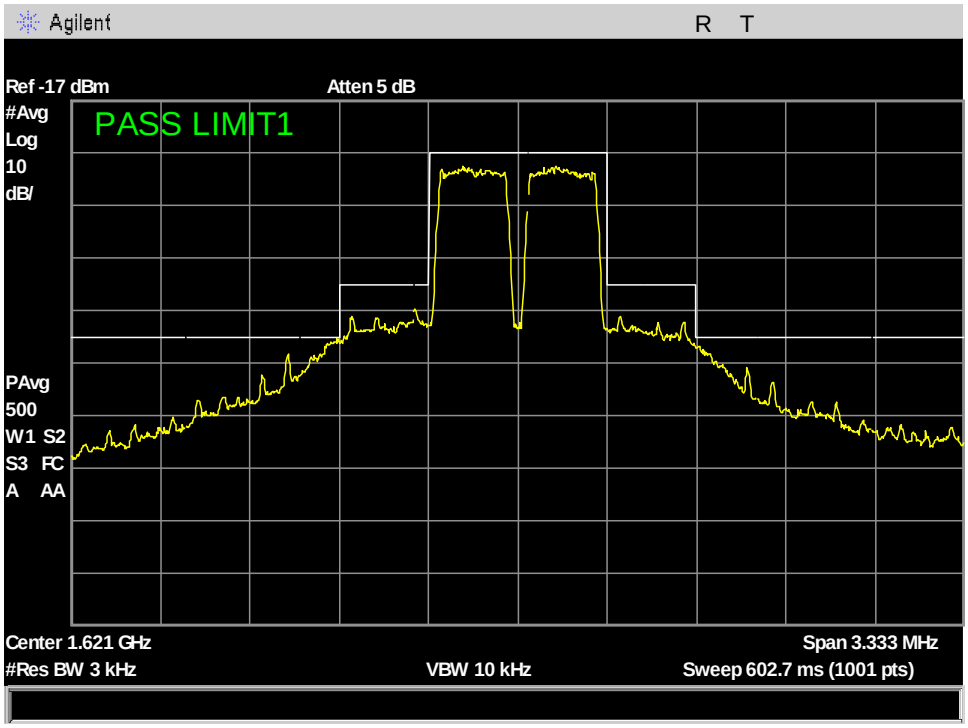

Figure 34: §25.202(f) Emissions Mask, Ch121 - 666.666kHz

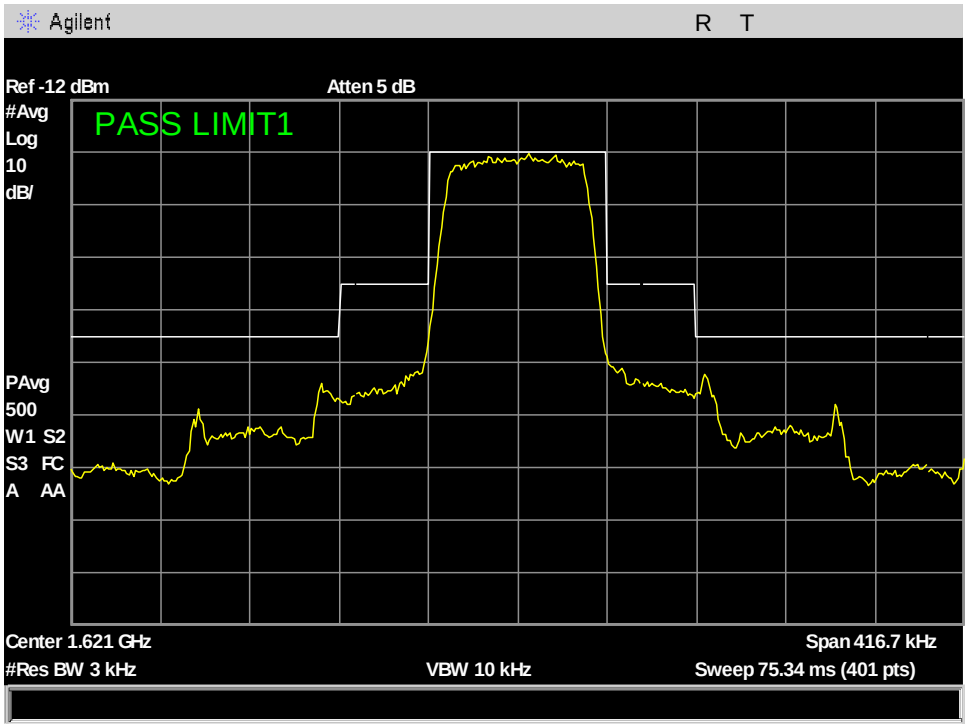

Figure 35: §25.202(f) Emissions Mask, Ch121 - 83.334kHz

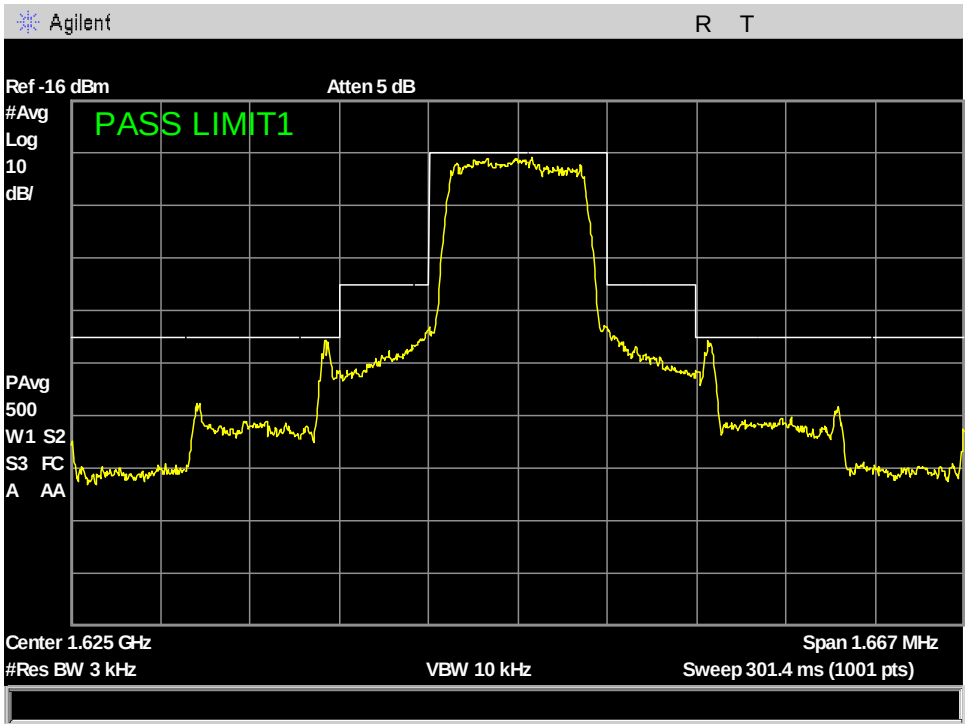

Figure 36: §25.202(f) Emissions Mask, Ch232 - 333.333kHz

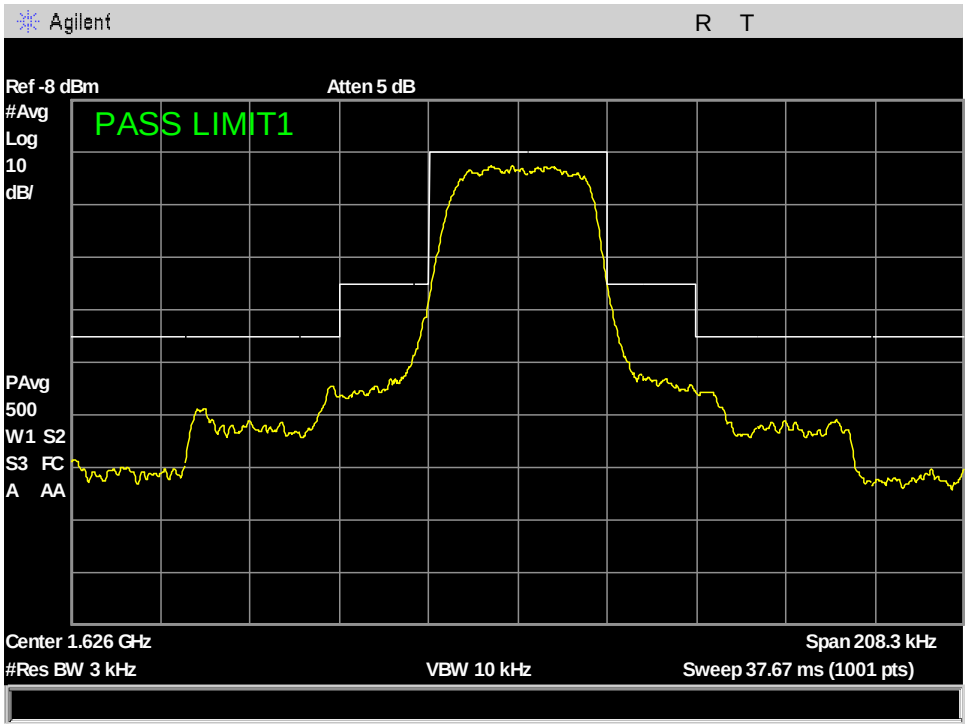

Figure 37: §25.202(f) Emissions Mask, Ch232 - 41.668kHz

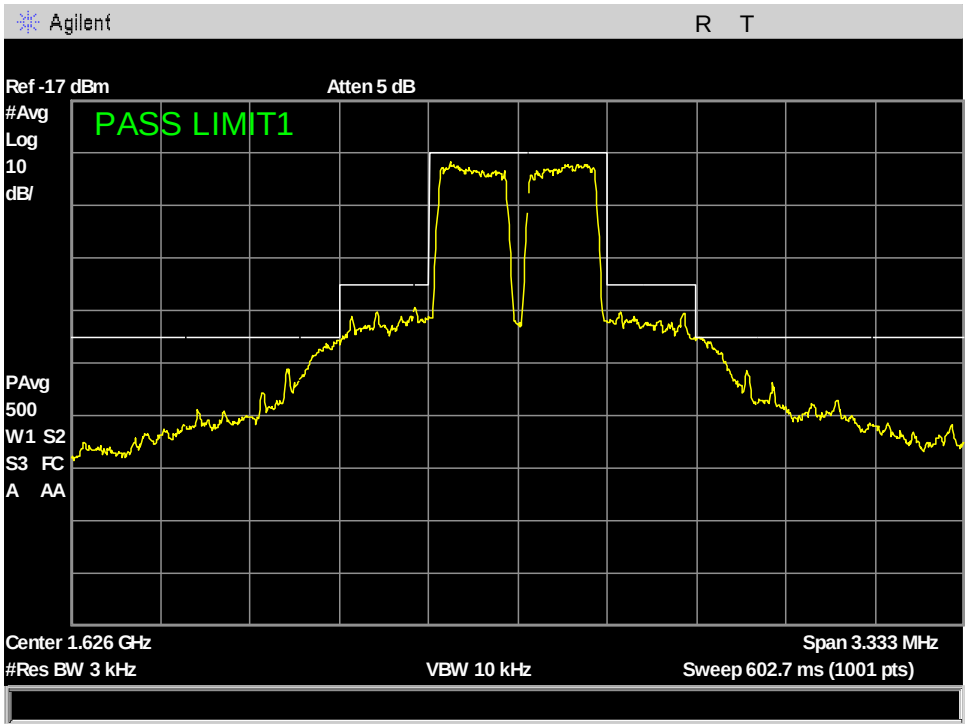

Figure 38: §25.202(f) Emissions Mask, Ch232 - 666.666kHz

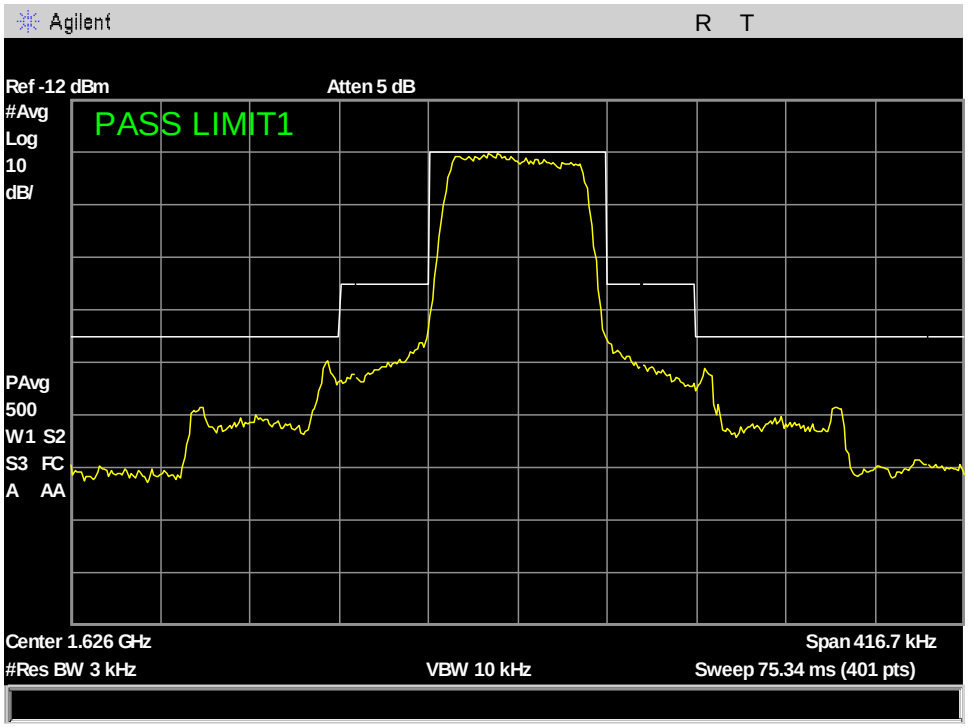

Figure 39: §25.202(f) Emissions Mask, Ch232 - 83.334kHz

Electromagnetic Compatibility Criteria for Satellite Communications

§25.204(a) Conducted RF Output Power

Test Requirement(s): **§25.204 Power Limits:**

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+40 dBW in any 4 kHz band for $\theta \leq 0°$
+40 + 3 θ dBW in any 4 kHz band for $0° < \theta \leq 5°$
Where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

(c) For angles of elevation of the horizon greater than 5° there shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.

(d) Notwithstanding the e.i.r.p. and e.i.r.p. density limits specified in the station authorization, each earth station transmission shall be conducted at the lowest power level that will provide the required signal quality as indicated in the application and further amended by coordination agreements.

Test Procedures: ANSI C63.26 – 2015 Procedures for peak and average measurements of narrowband signal with a spectrum analyzer were used to determine the output conducted power. The EUT was set to transmit at full power. It was connected directly to a spectrum analyzer thru an attenuator. The measurements were performed on the low, middle and high channels.

The EIRP was calculated with:
EIRP = P + G
Where P is the conducted output power in dBm, and G is the antenna gain in dBi

Test Results: The EUT is compliant with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): November 9, 2020

Bandwidth (kHz)	Channel	Measured Conducted Power (dBm)	Duty Cycle Correction Factor (dB)	Average Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Peak Conducted Power (dBm)
41.668	Low (1)	28.67	10.44	39.11	1.00	40.11	70.00	44.06
	Mid (121)	29.17	10.44	39.61	1.00	40.61	70.00	43.35
	High (232)	28.81	10.44	39.25	1.00	40.25	70.00	42.40
83.334	Low (1)	29.92	10.44	40.36	1.00	41.36	70.00	44.02
	Mid (121)	29.56	10.44	40.00	1.00	41.00	70.00	43.88
	High (232)	28.61	10.44	39.05	1.00	40.05	70.00	42.81
333.333	Low (1)	31.43	10.37	41.80	1.00	42.80	70.00	45.13
	Mid (121)	30.22	10.37	40.59	1.00	41.59	70.00	45.26
	High (232)	29.59	10.37	39.96	1.00	40.96	70.00	44.61
666.666	Low (1)	32.60	10.37	42.97	1.00	43.97	70.00	46.15
	Mid (121)	31.77	10.37	42.14	1.00	43.14	70.00	46.15
	High (232)	31.23	10.37	41.60	1.00	42.60	70.00	46.13

Figure 40: §25.204(a) Conducted RF Output Power, MissionLINK 200

Bandwidth (kHz)	Channel	Measured Conducted Power (dBm)	Duty Cycle Correction Factor (dB)	Average Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Peak Conducted Power (dBm)
41.668	Low (1)	29.06	10.44	39.50	1.00	40.50	70.00	43.40
	Mid (121)	29.26	10.44	39.70	1.00	40.70	70.00	43.61
	High (232)	28.41	10.44	38.85	1.00	39.85	70.00	42.99
83.334	Low (1)	28.75	10.44	39.19	1.00	40.19	70.00	43.83
	Mid (121)	28.73	10.44	39.17	1.00	40.17	70.00	43.57
	High (232)	28.80	10.44	39.24	1.00	40.24	70.00	43.20
333.333	Low (1)	31.37	10.37	41.74	1.00	42.74	70.00	45.26
	Mid (121)	30.06	10.37	40.43	1.00	41.43	70.00	45.18
	High (232)	31.26	10.37	41.63	1.00	42.63	70.00	45.21
666.666	Low (1)	30.90	10.37	41.27	1.00	42.27	70.00	45.91
	Mid (121)	30.70	10.37	41.07	1.00	42.07	70.00	45.88
	High (232)	30.94	10.37	41.31	1.00	42.31	70.00	45.95

Figure 41: §25.204(a) Conducted RF Output Power, VesseLINK 200

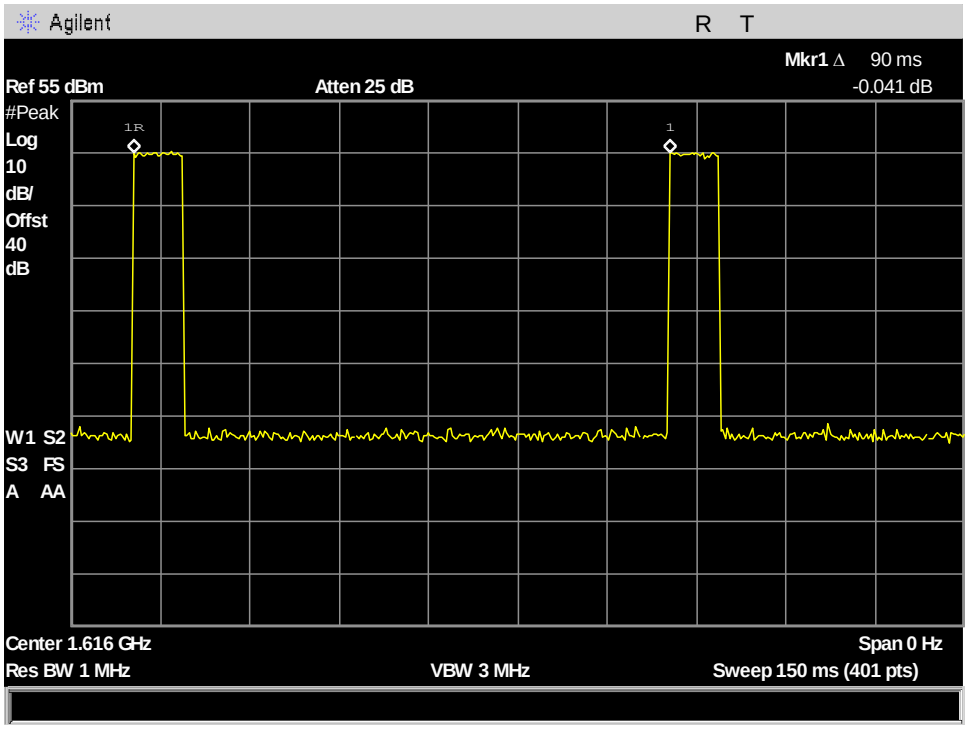

Figure 42: §25.204(a) Conducted RF Output Power, 333.333kHz_Period

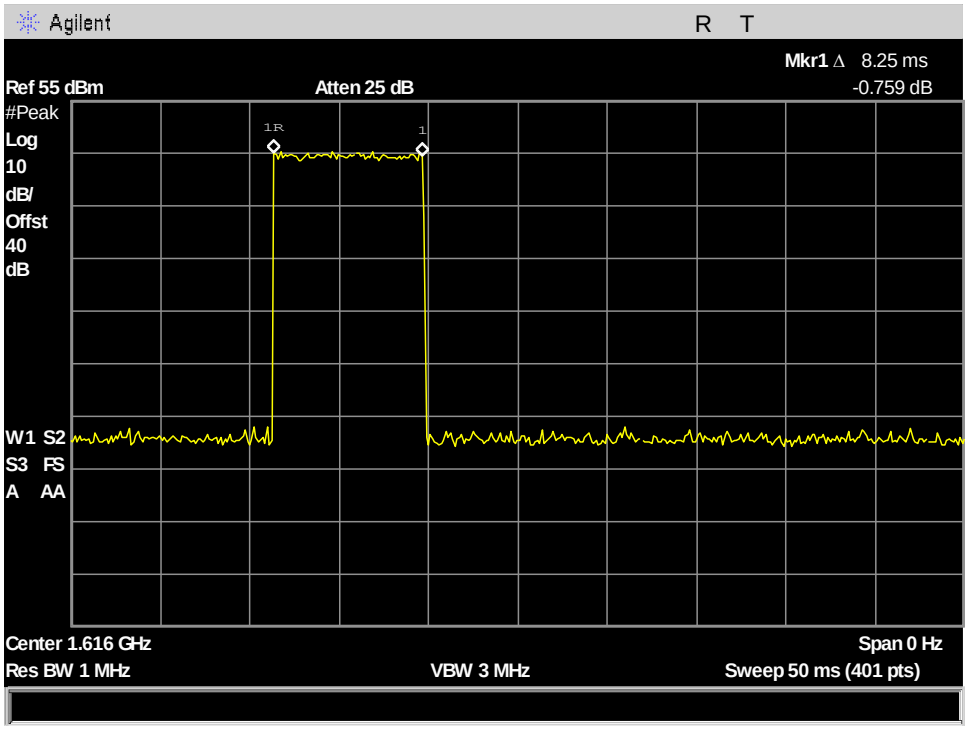

Figure 43: §25.204(a) Conducted RF Output Power, 333.333kHz_Ton

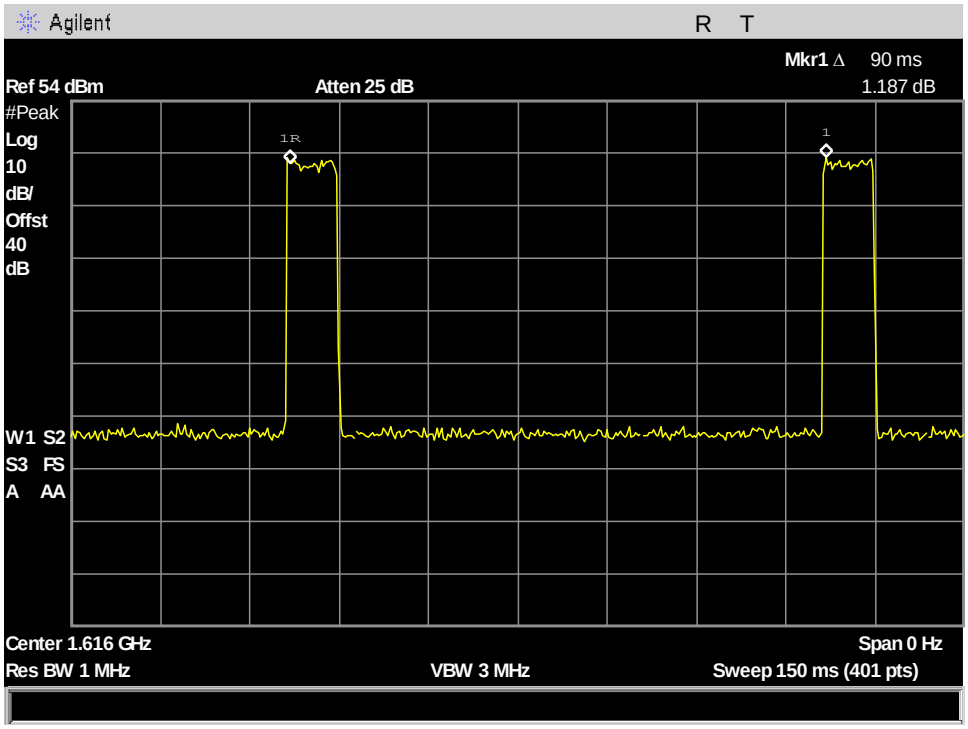

Figure 44: §25.204(a) Conducted RF Output Power, 41.668kHz_Period

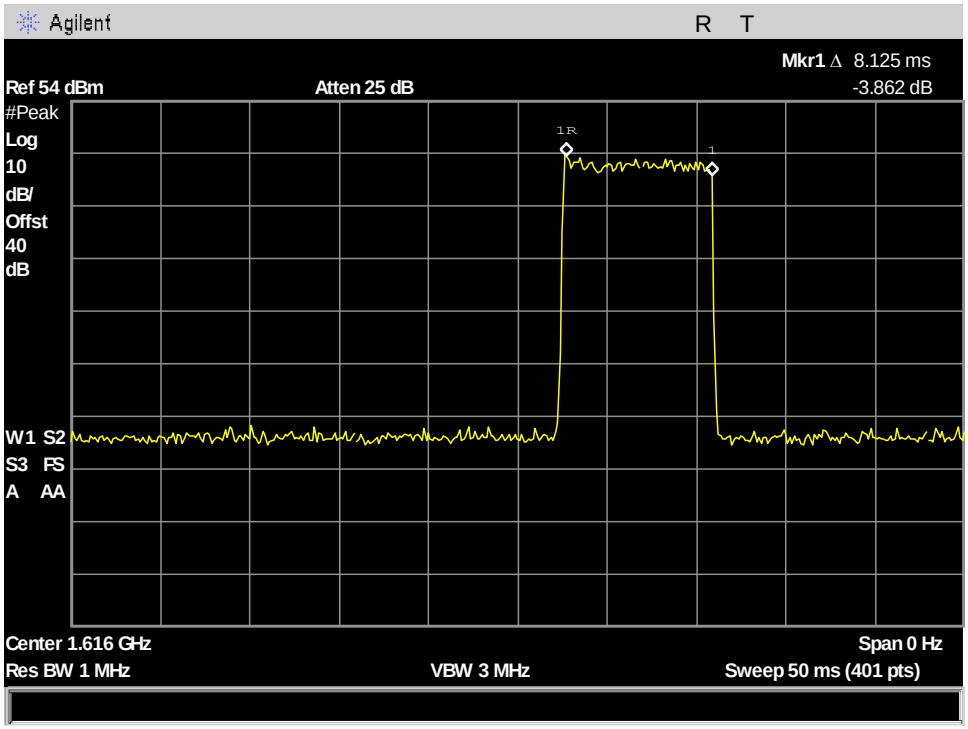

Figure 45: §25.204(a) Conducted RF Output Power, 41.668kHz_Ton

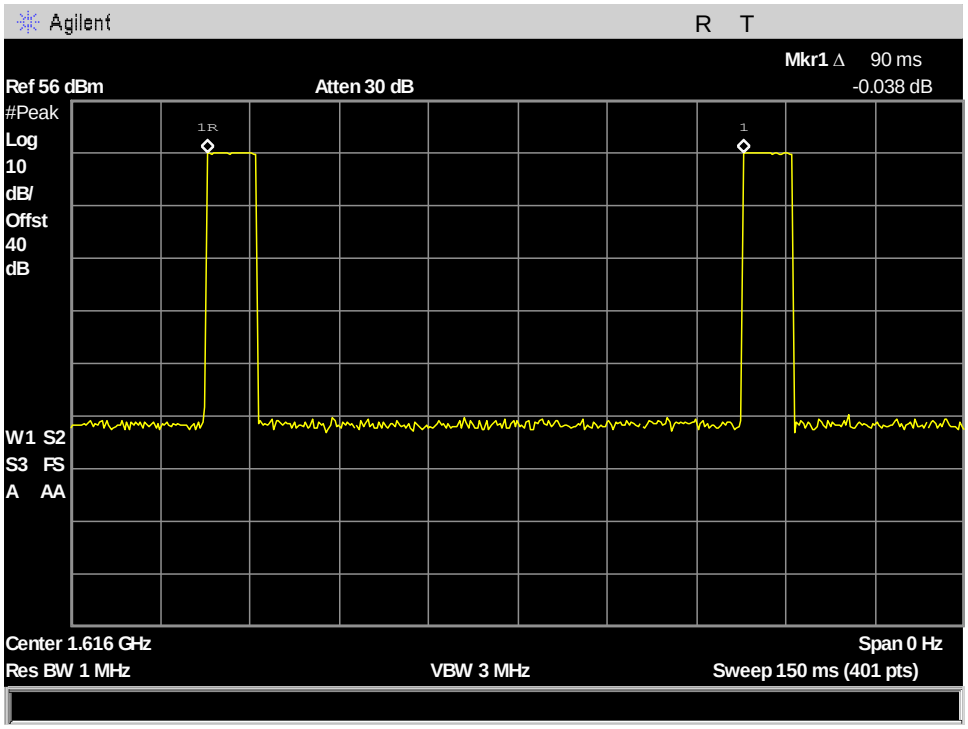

Figure 46: §25.204(a) Conducted RF Output Power, 666.666kHz_Period

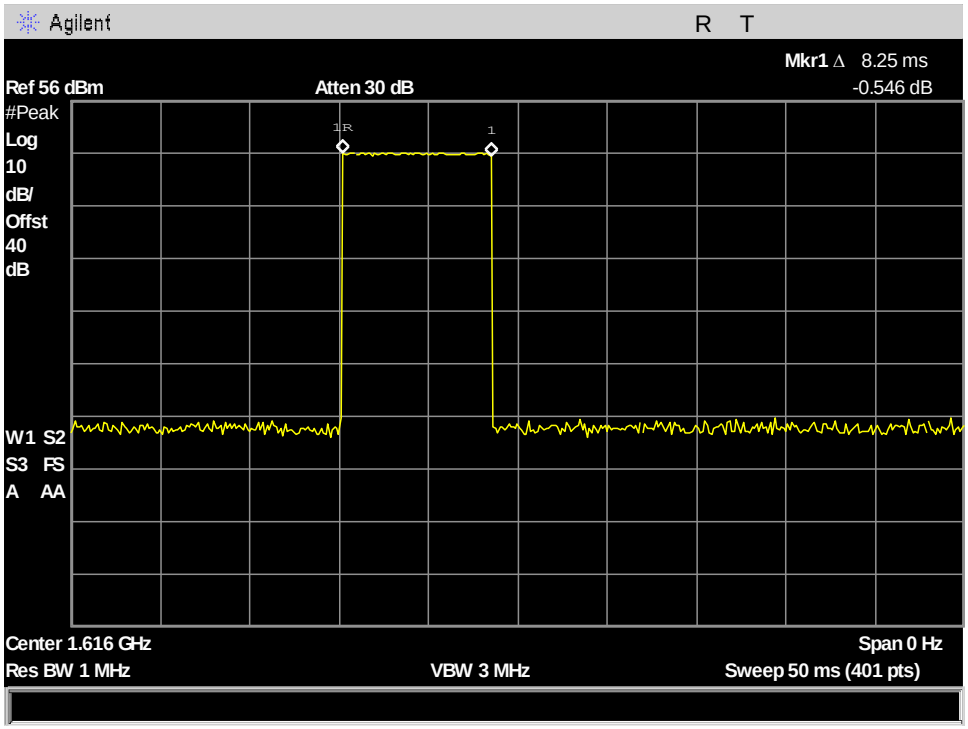

Figure 47: §25.204(a) Conducted RF Output Power, 666.666kHz_Ton

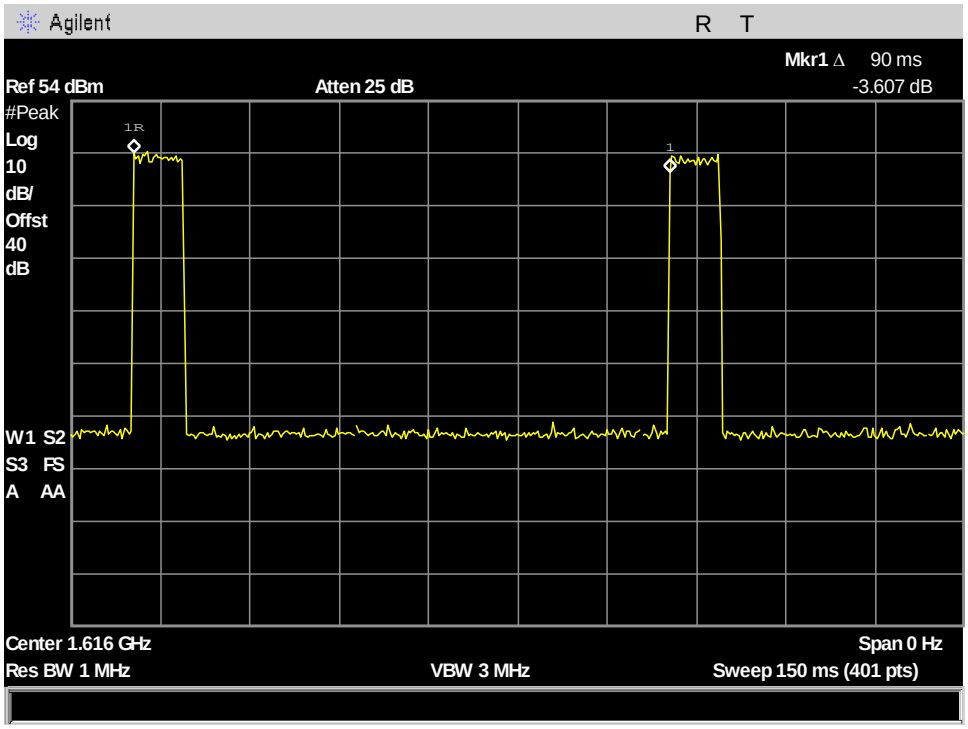

Figure 48: §25.204(a) Conducted RF Output Power, 83.334kHz_Period

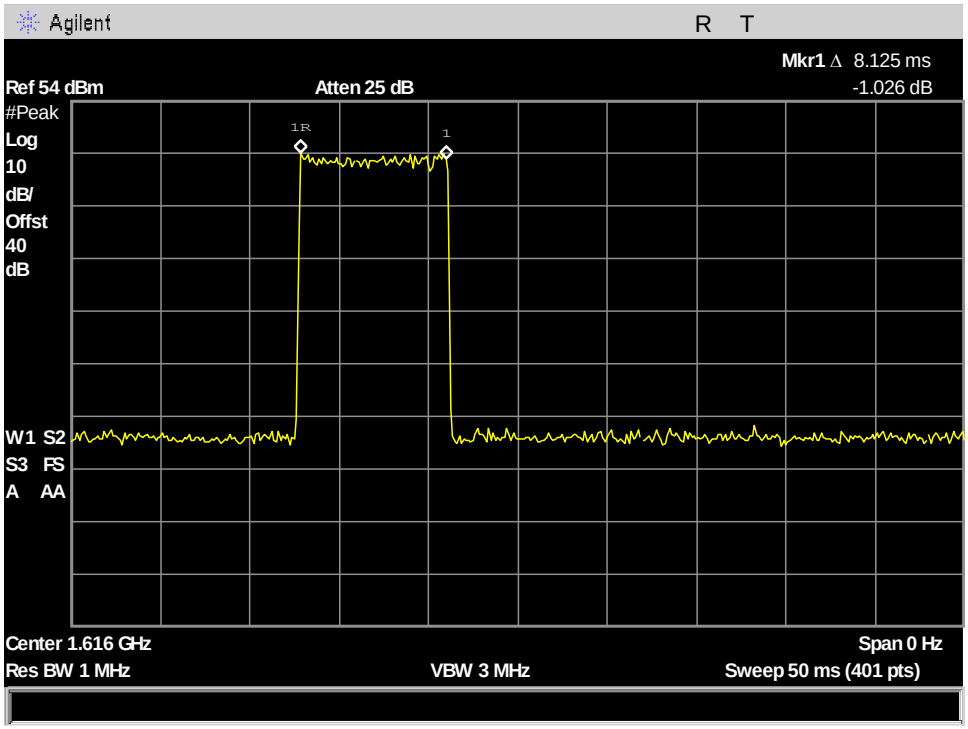

Figure 49: §25.204(a) Conducted RF Output Power, 83.334kHz_Ton

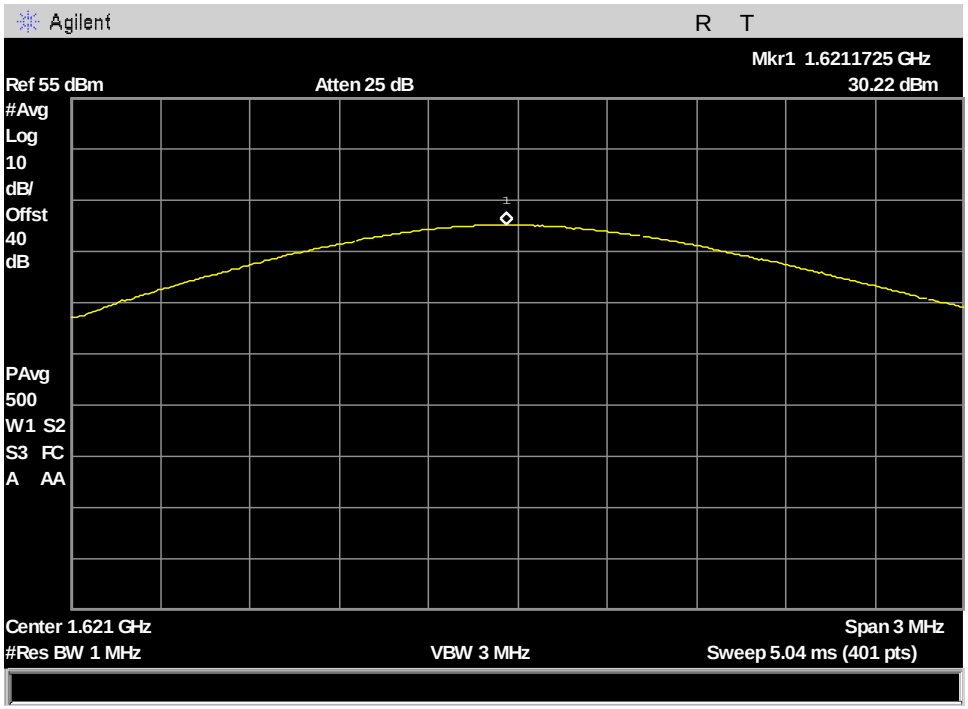

Figure 50: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch121_333.333kHz BW

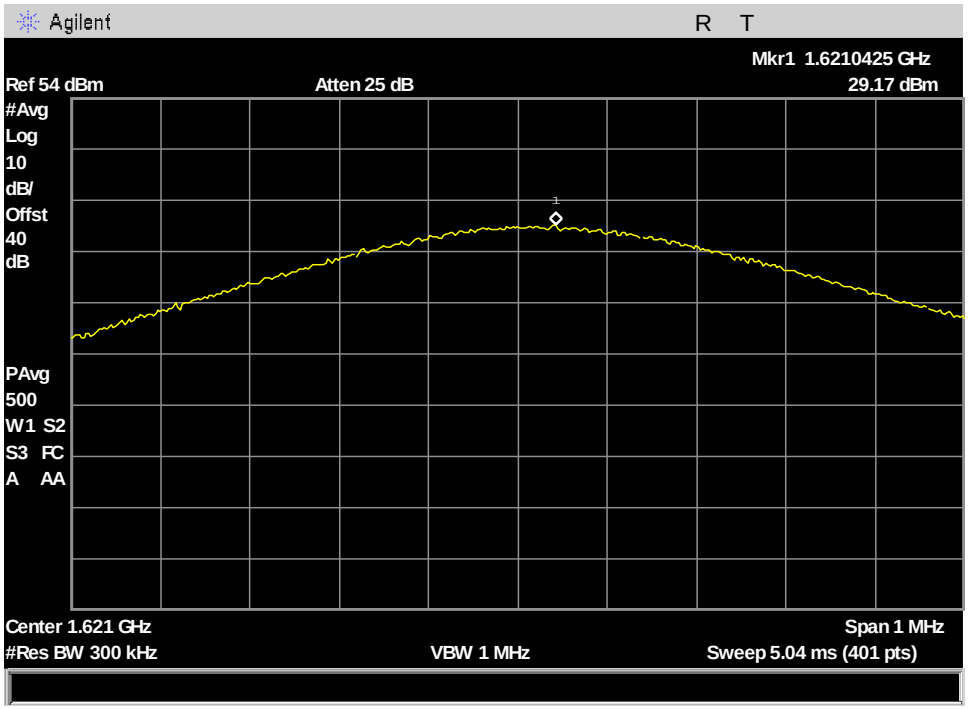

Figure 51: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch121_41.668kHz BW

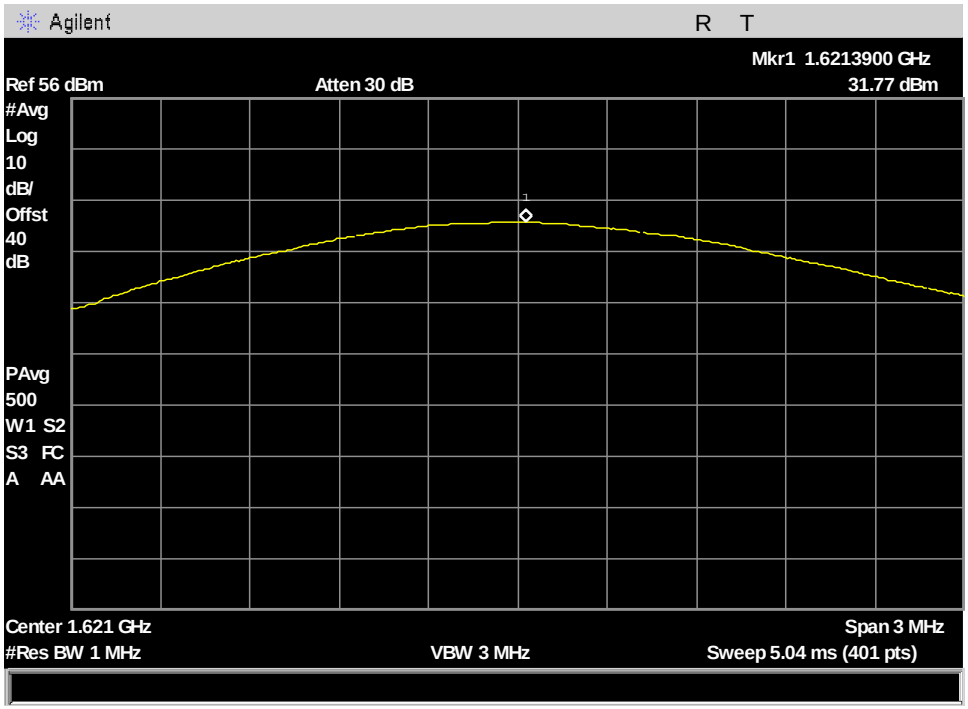

Figure 52: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch121_666.666kHz BW

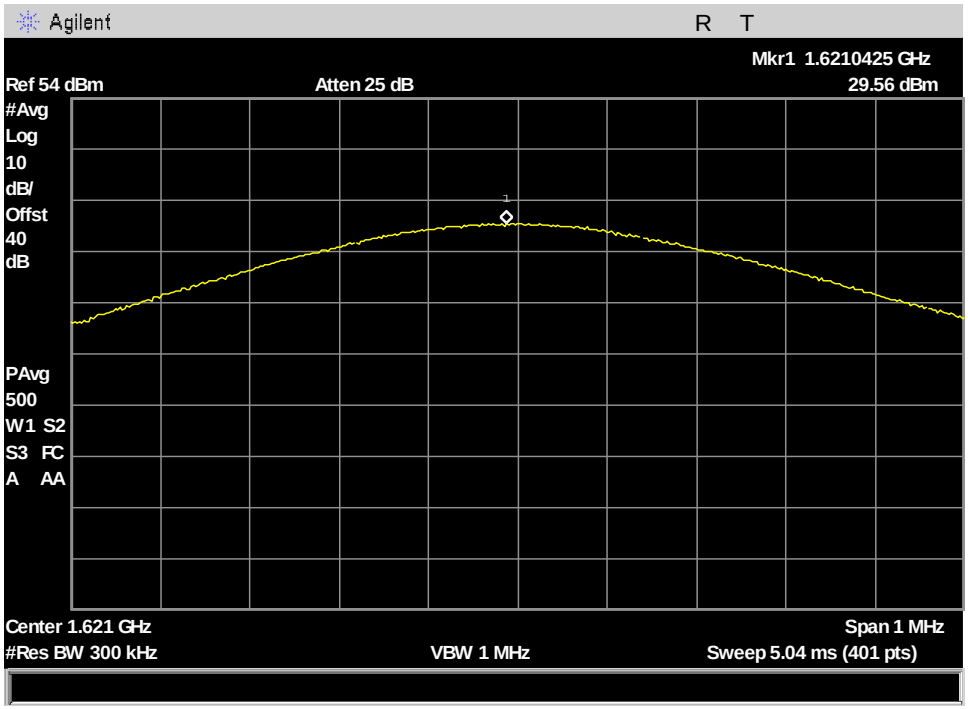

Figure 53: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch121_83.334kHz BW

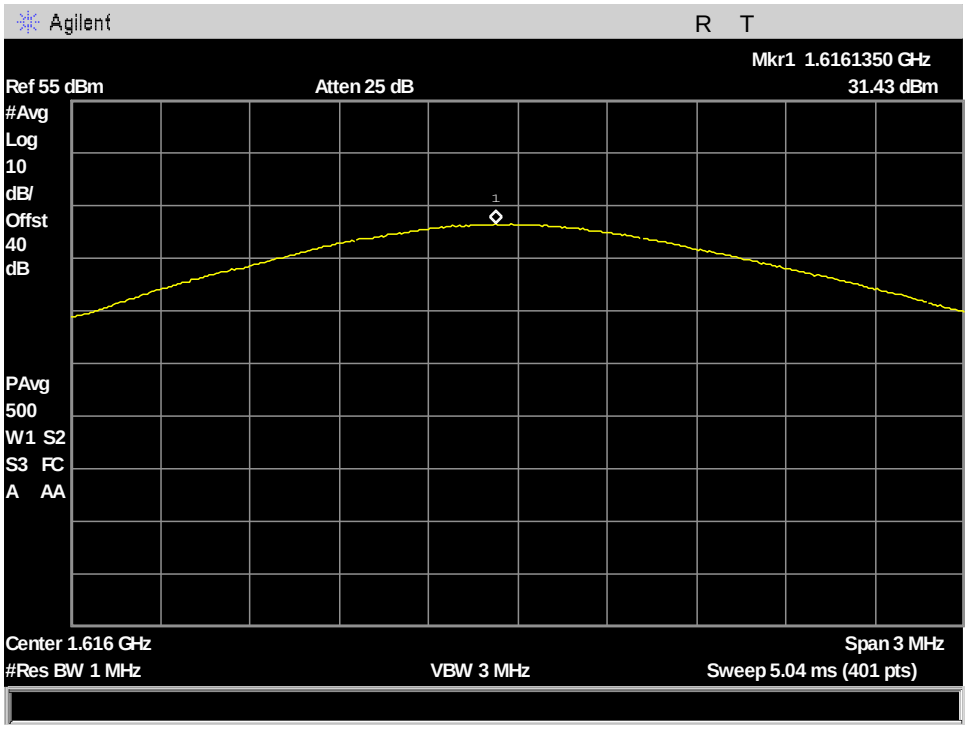

Figure 54: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch1_333.333kHz BW

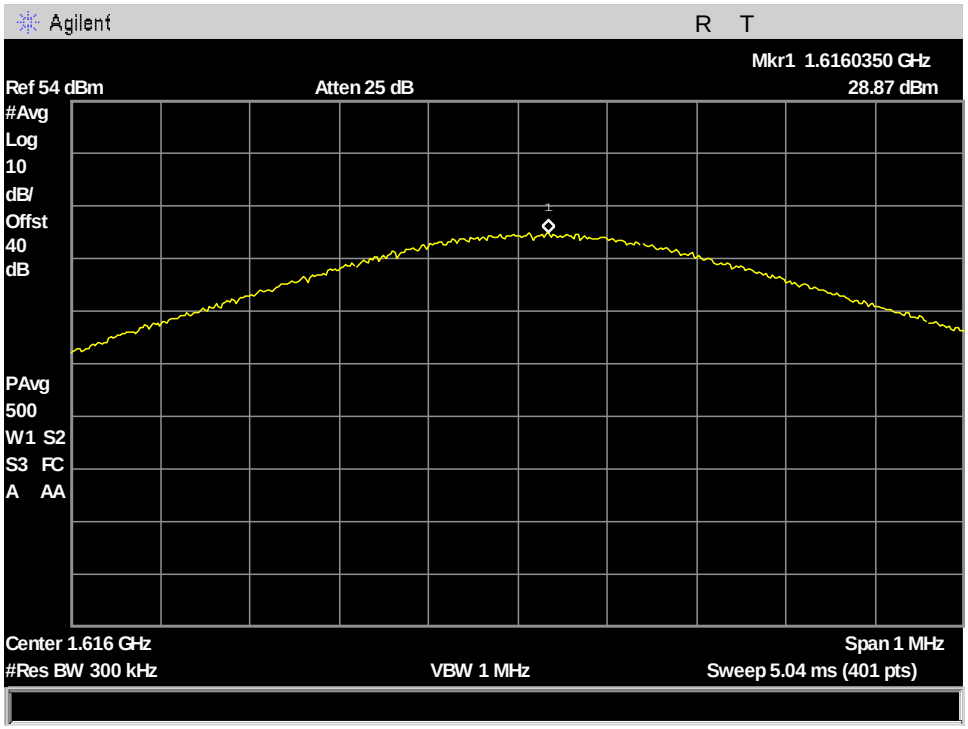

Figure 55: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch1_41.668kHz BW

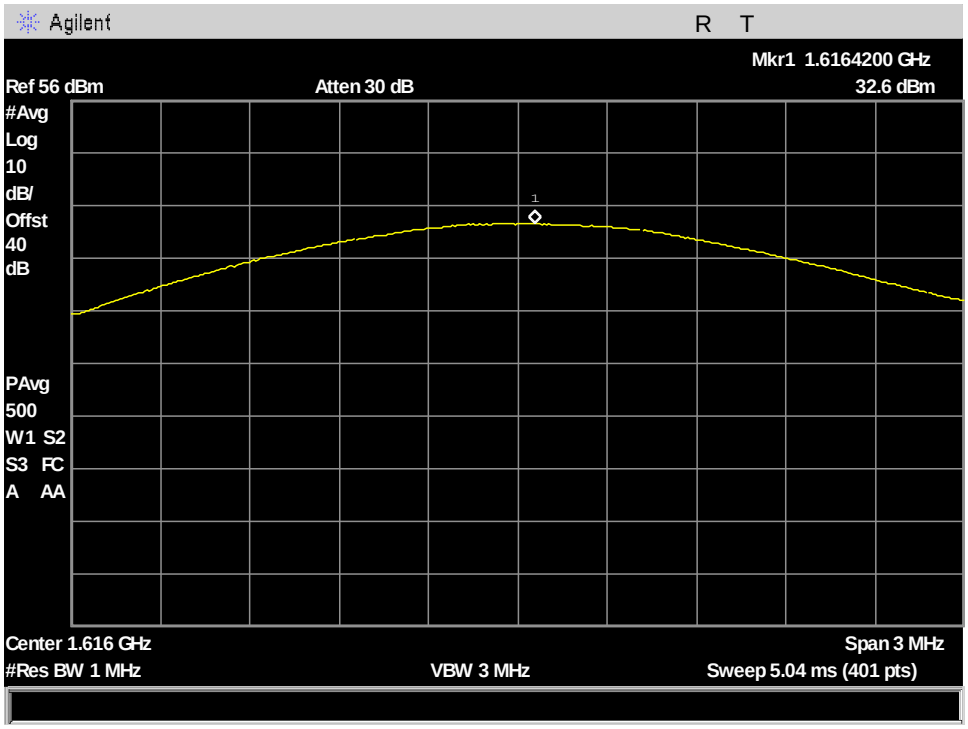

Figure 56: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch1_666.666kHz BW

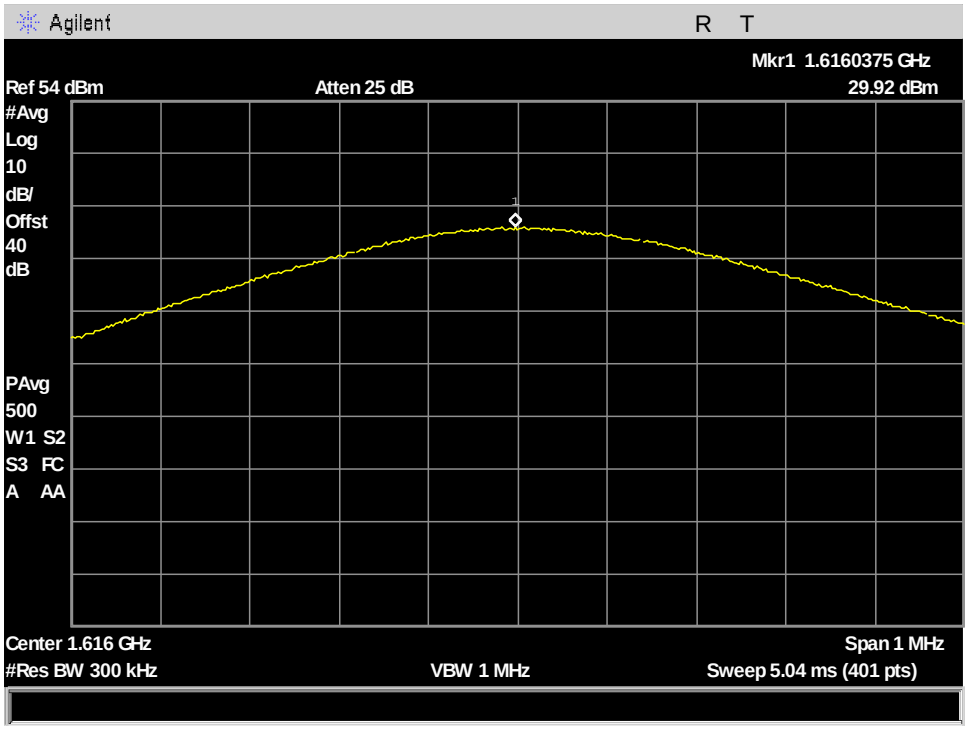

Figure 57: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch1_83.334kHz BW

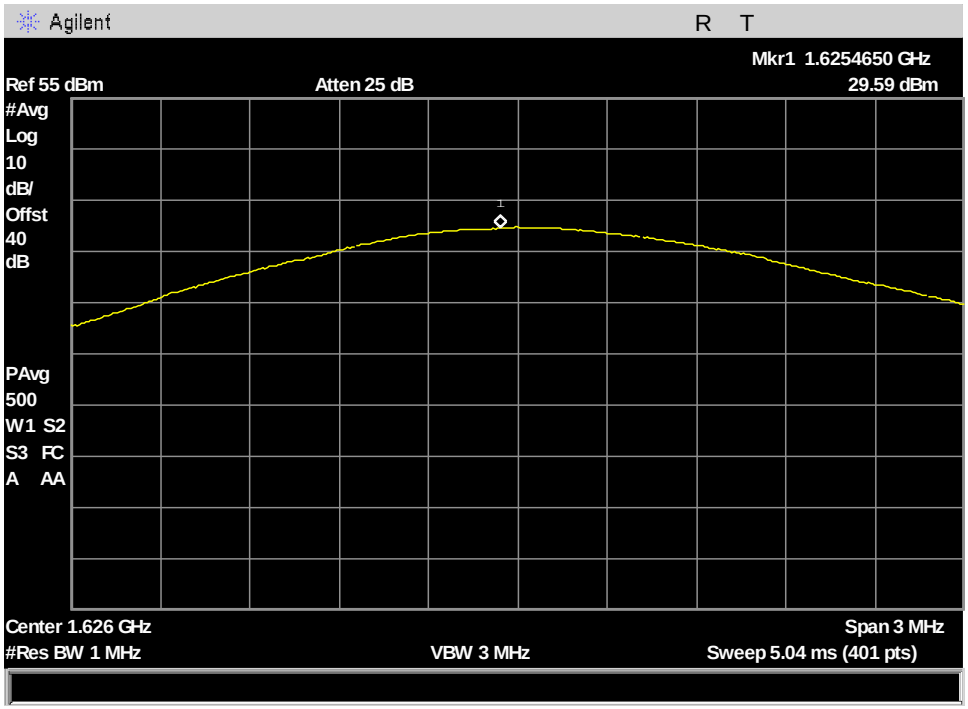

Figure 58: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch232_333.333kHz BW

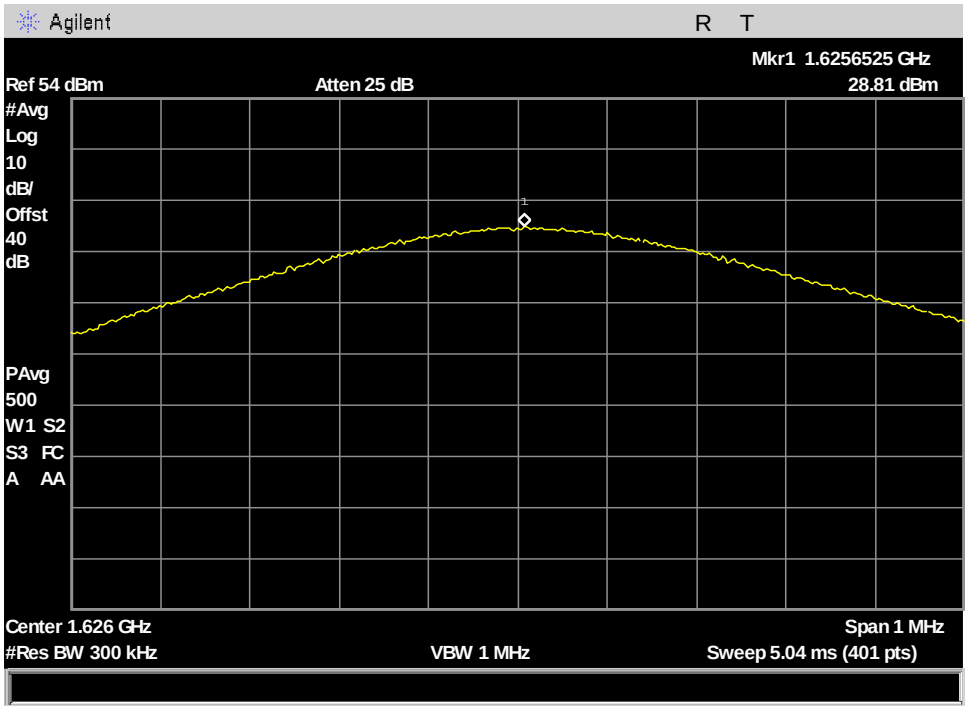

Figure 59: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch232_41.668kHz BW

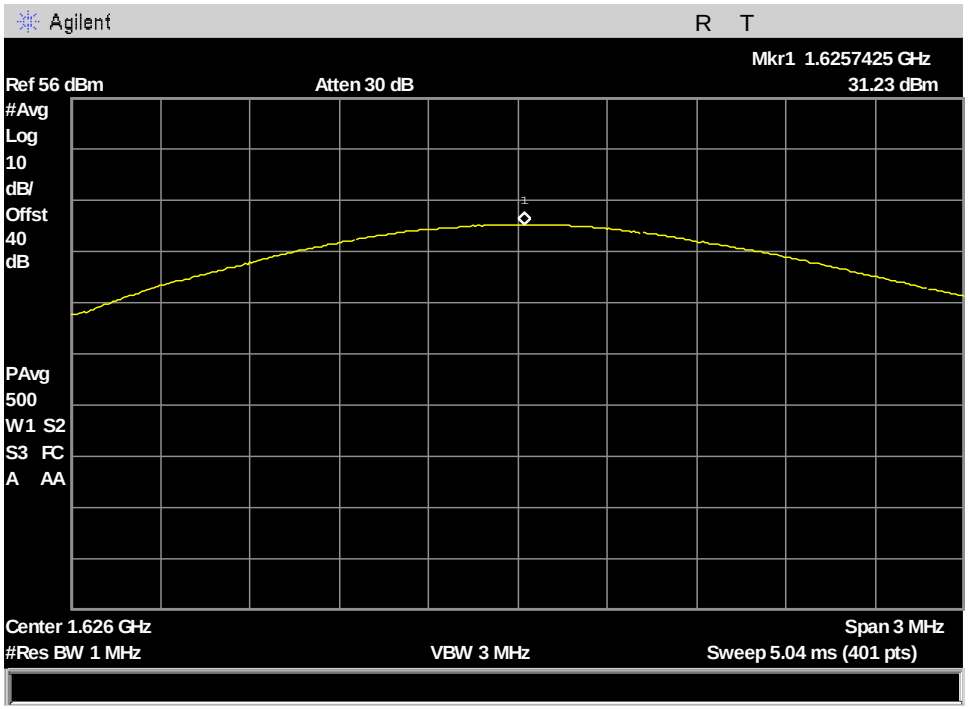

Figure 60: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch232_666.666kHz BW

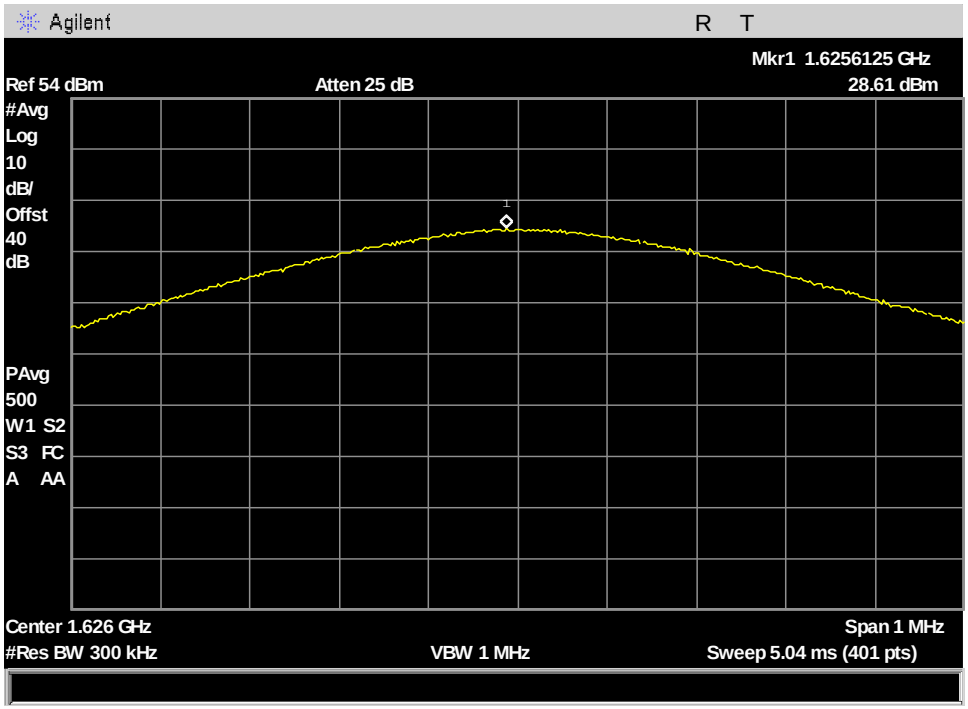

Figure 61: §25.204(a) Conducted RF Output Power, MissionLINK AVG_Output Power_ch232_83.334kHz BW

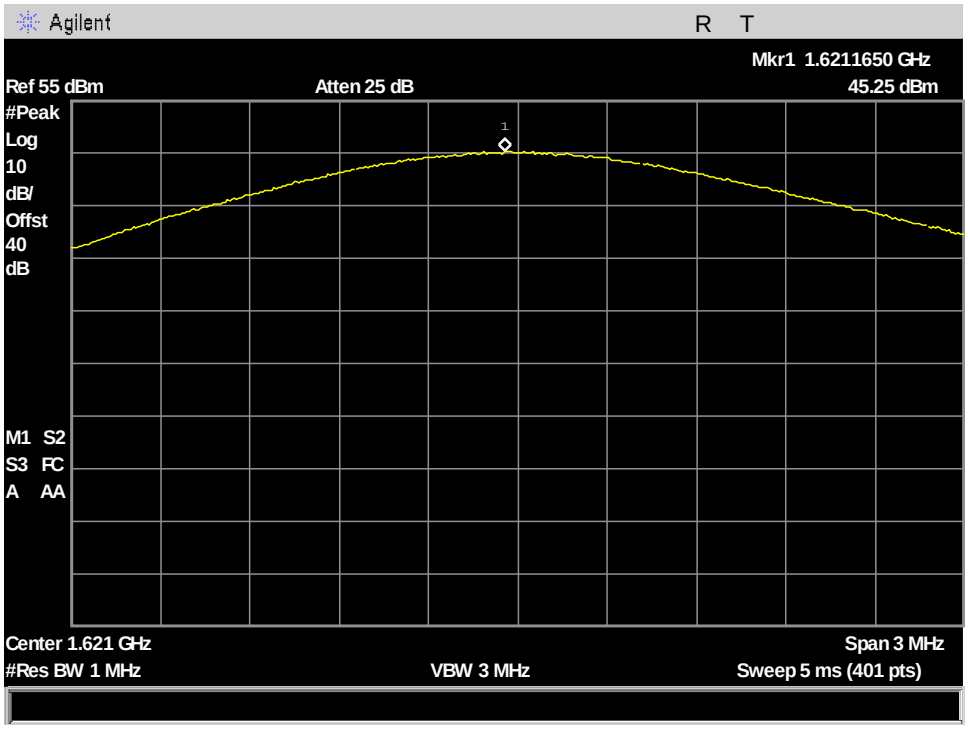

Figure 62: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch121_333.333kHz BW

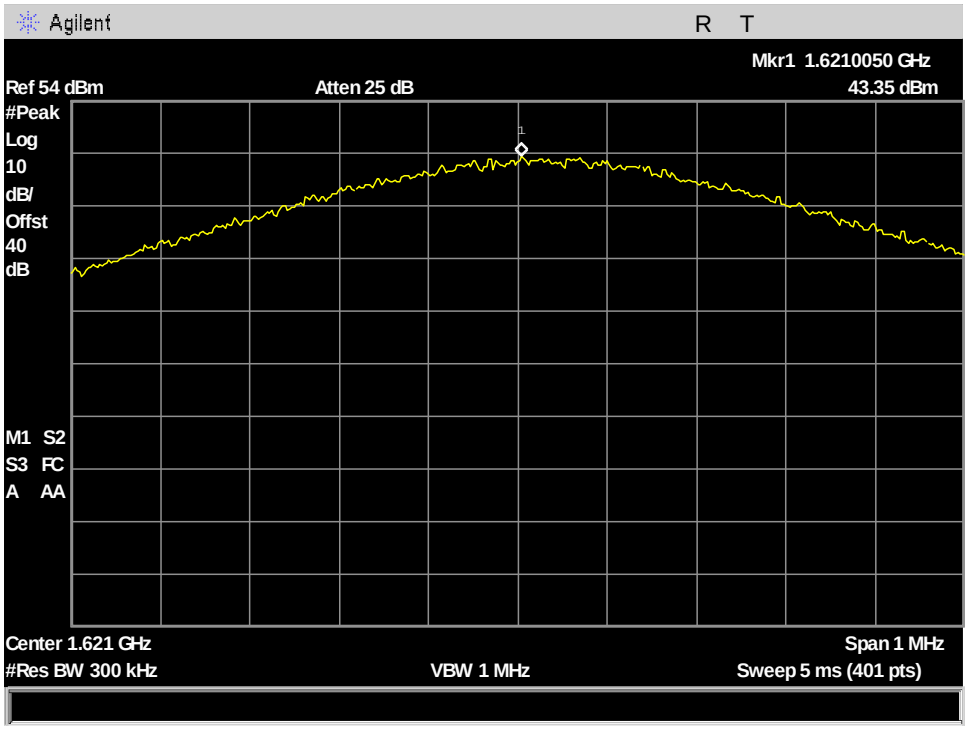

Figure 63: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch121_41.668kHz BW

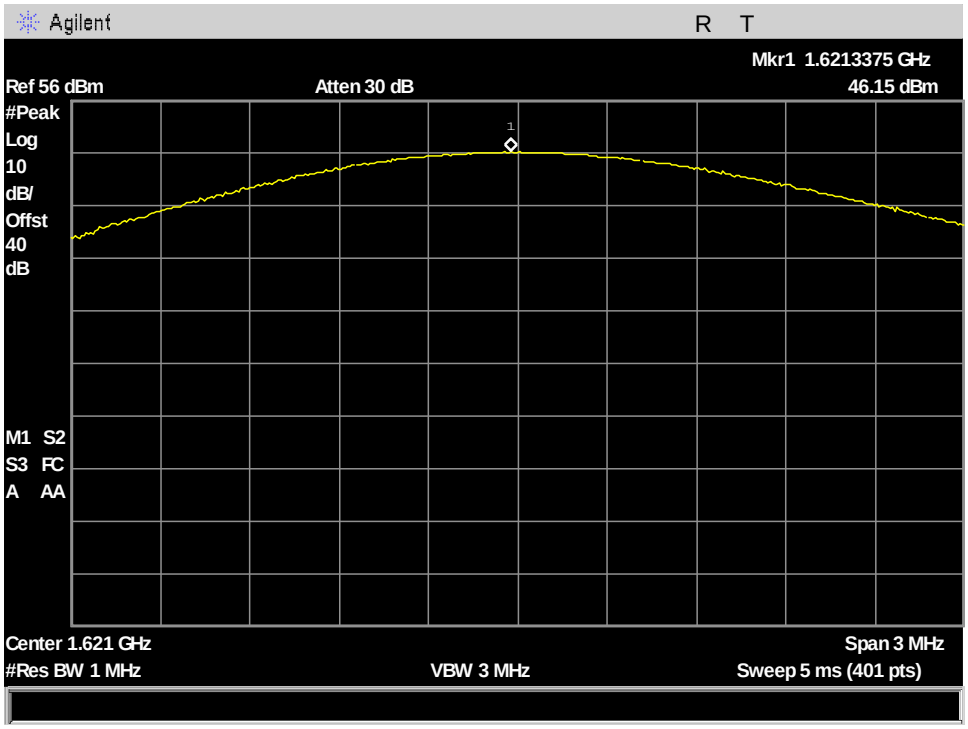

Figure 64: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch121_666.666kHz BW

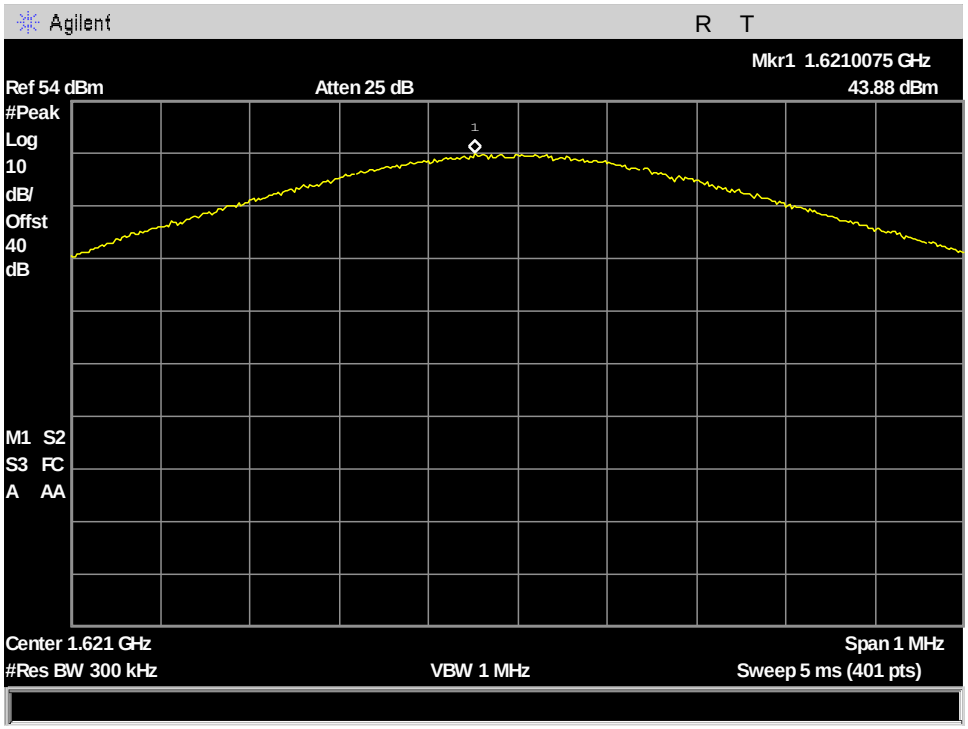

Figure 65: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch121_83.334kHz BW

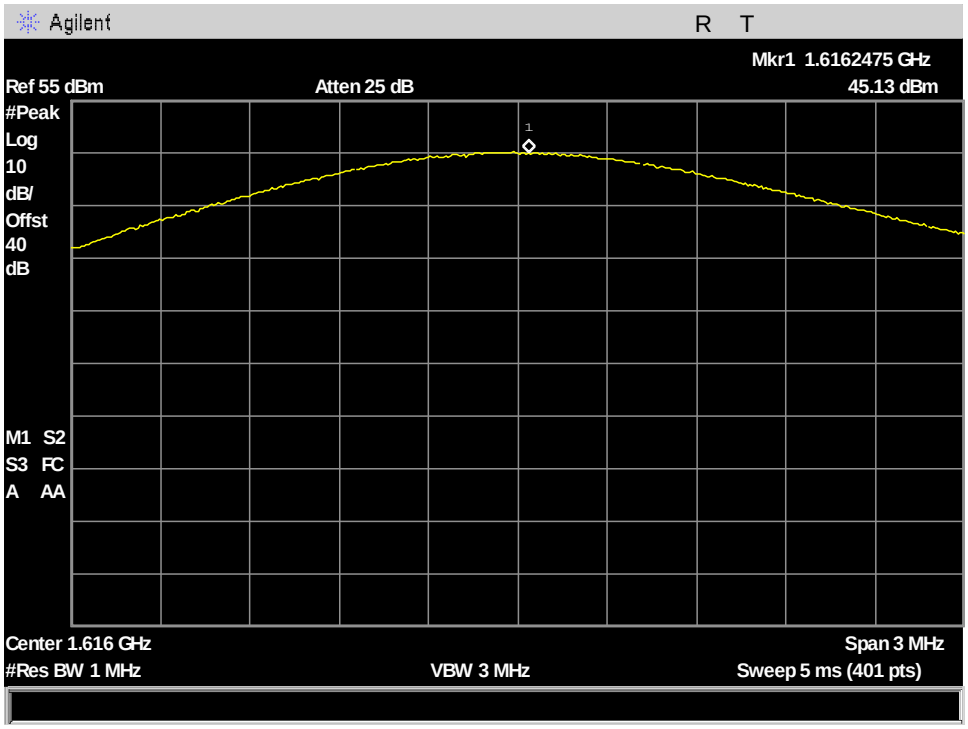

Figure 66: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch1_333.333kHz BW

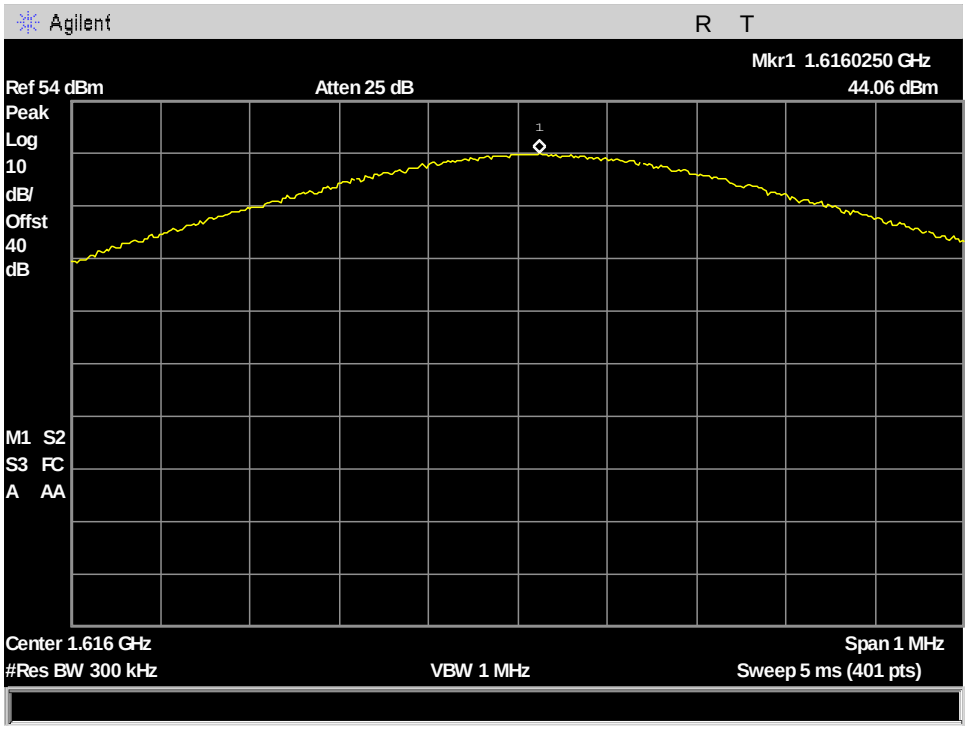

Figure 67: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch1_41.668kHz BW

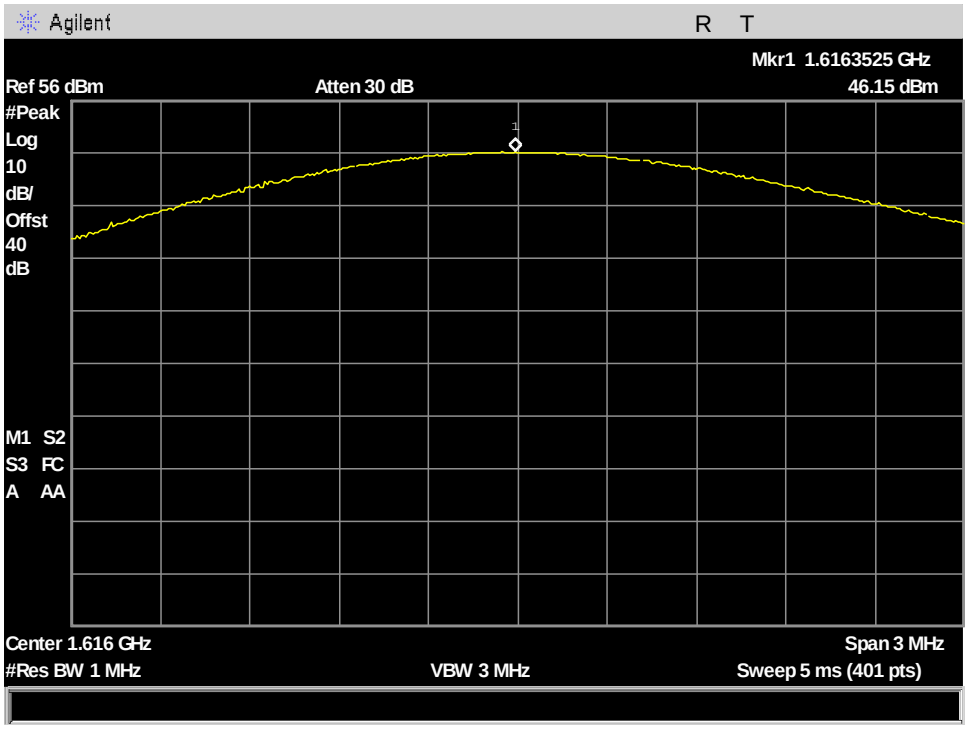

Figure 68: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch1_666.666kHz BW

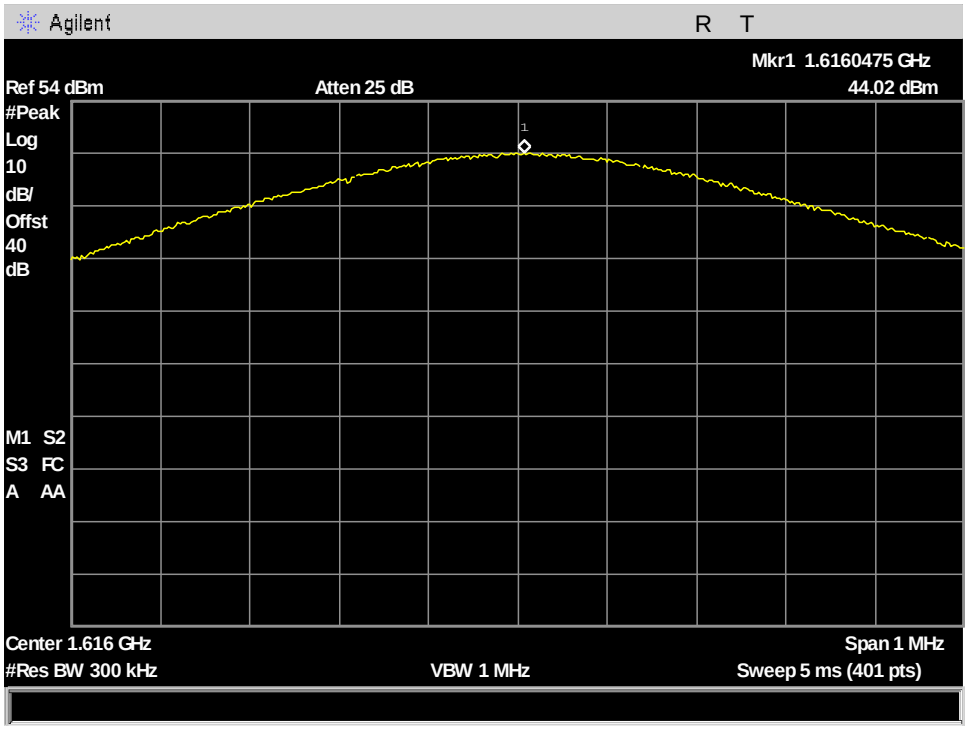

Figure 69: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch1_83.334kHz BW

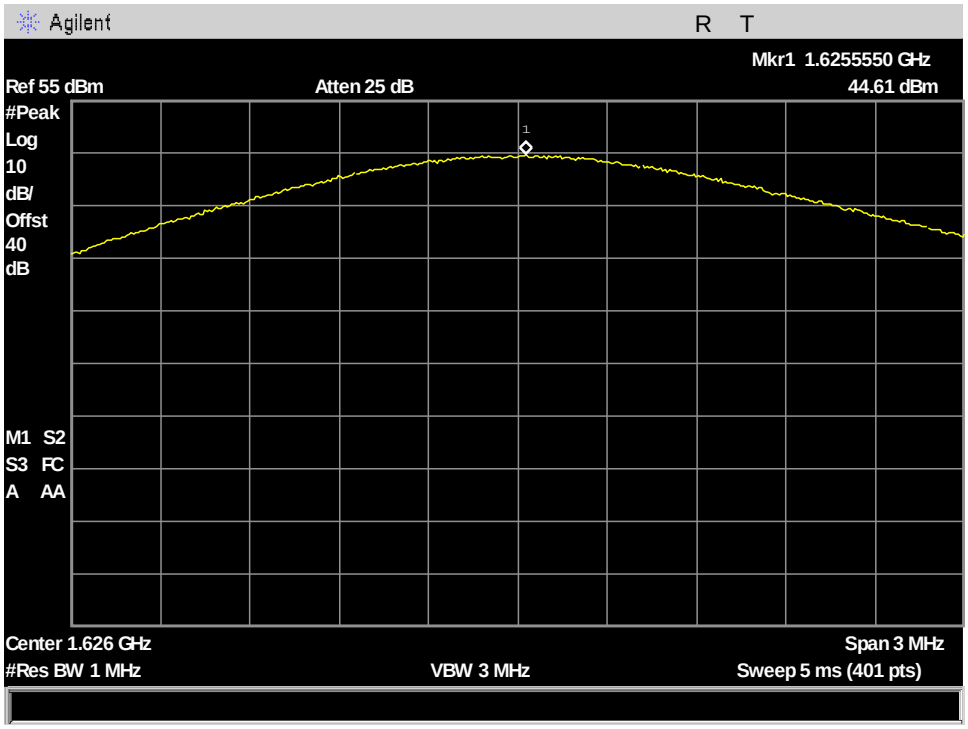

Figure 70: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch232_333.333kHz BW

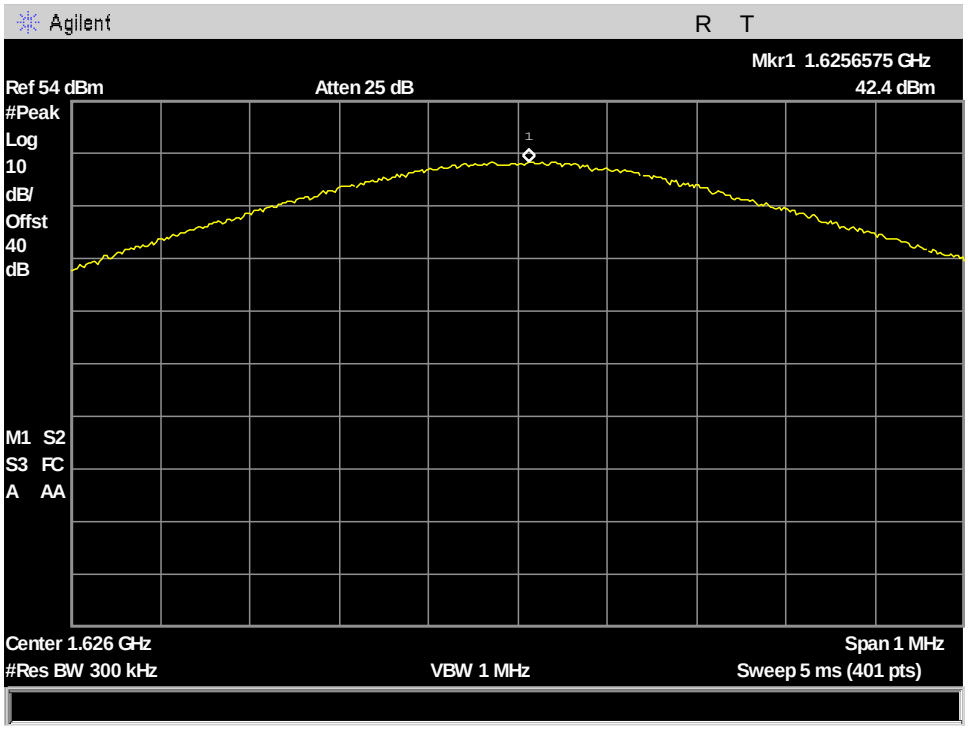

Figure 71: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch232_41.668kHz BW

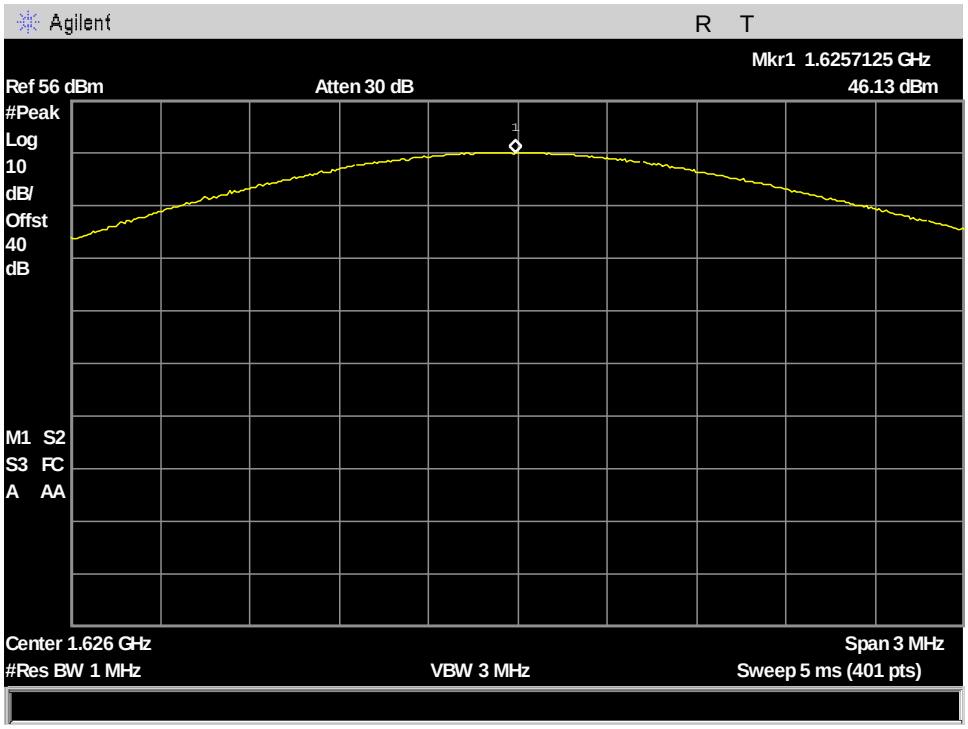

Figure 72: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch232_666.666kHz BW

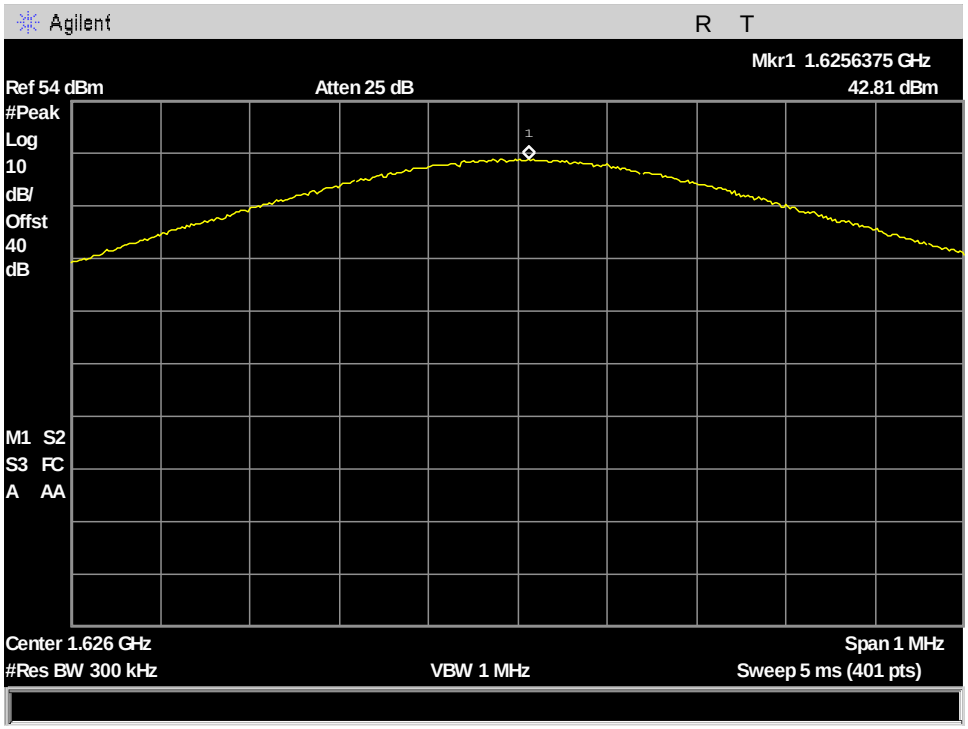

Figure 73: §25.204(a) Conducted RF Output Power, MissionLINK PK_Output Power_ch232_83.334kHz BW

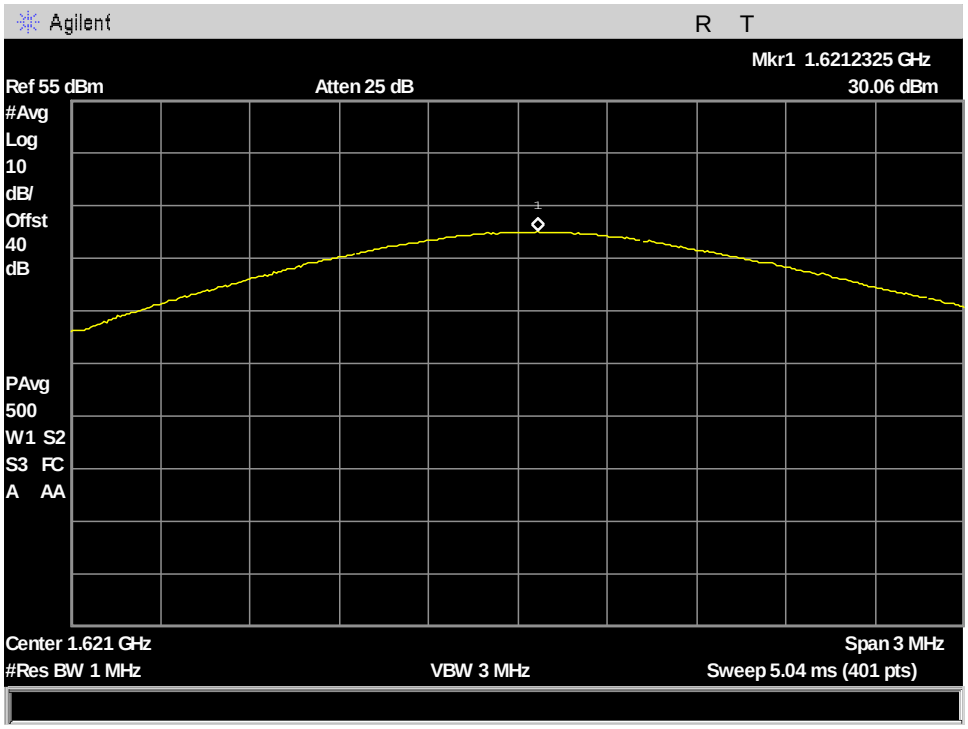

Figure 74: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch121_333.333kHz BW

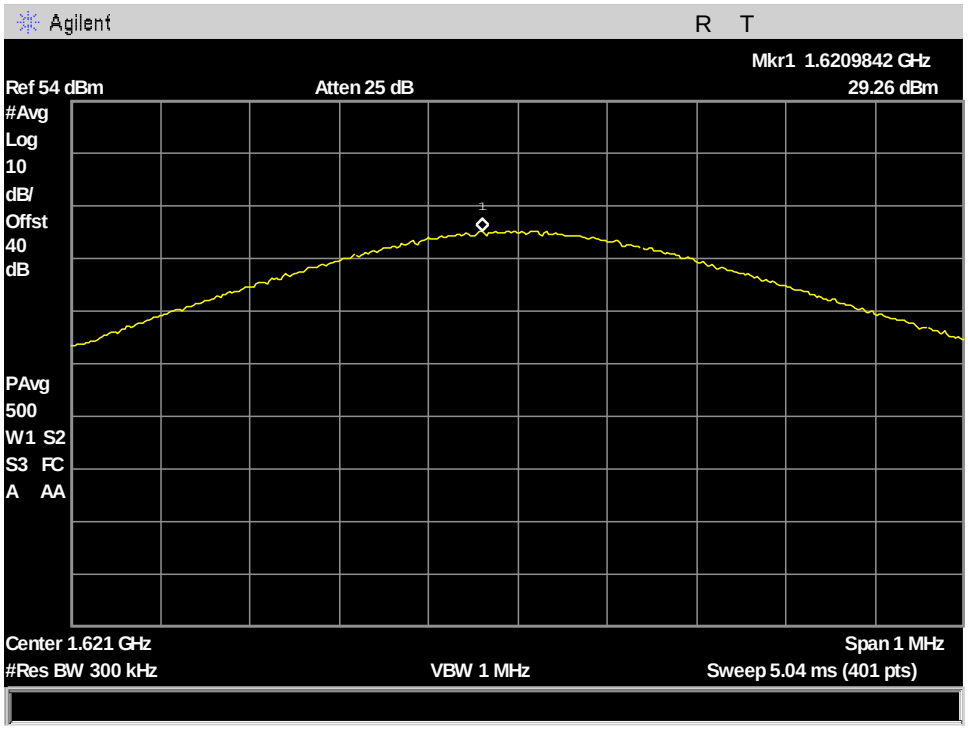

Figure 75: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch121_41.668kHz BW

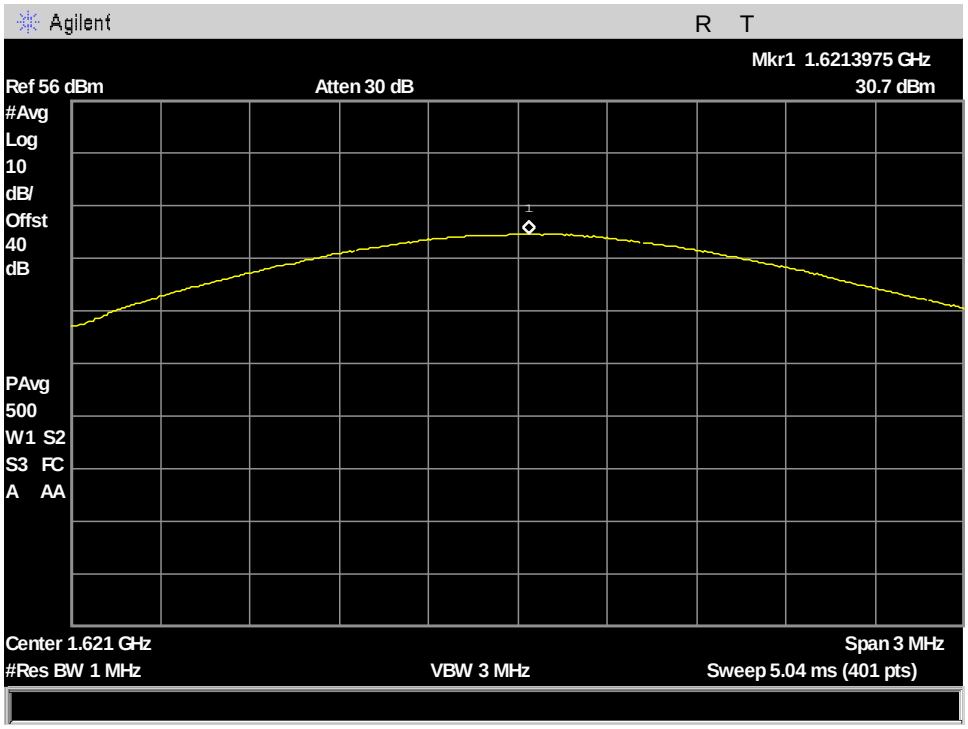

Figure 76: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch121_666.666kHz BW

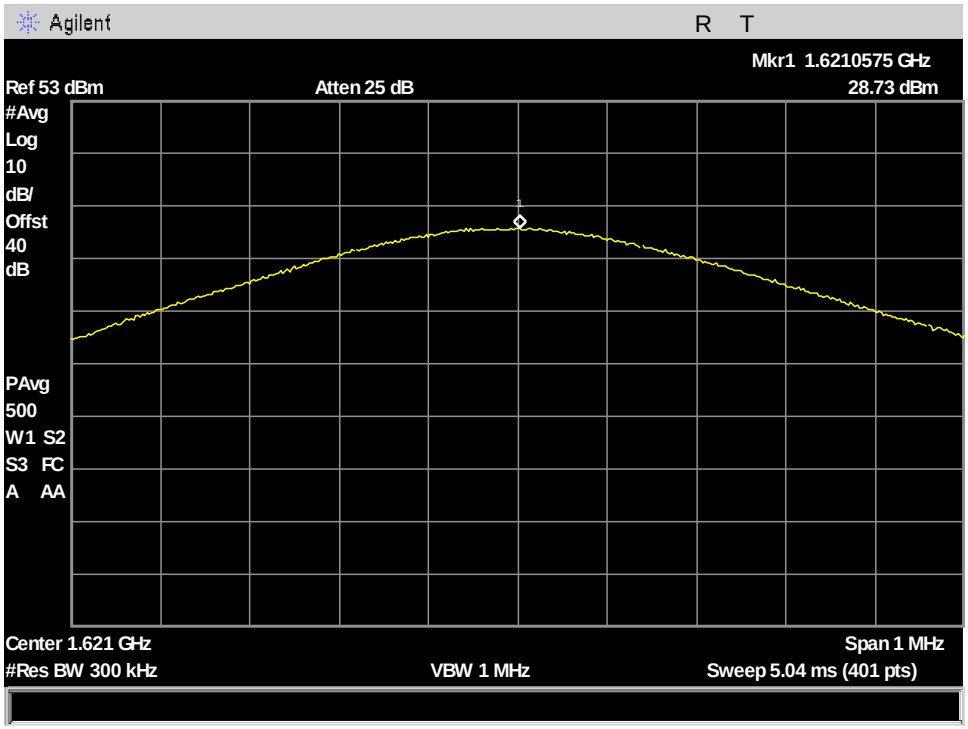

Figure 77: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch121_83.334kHz BW

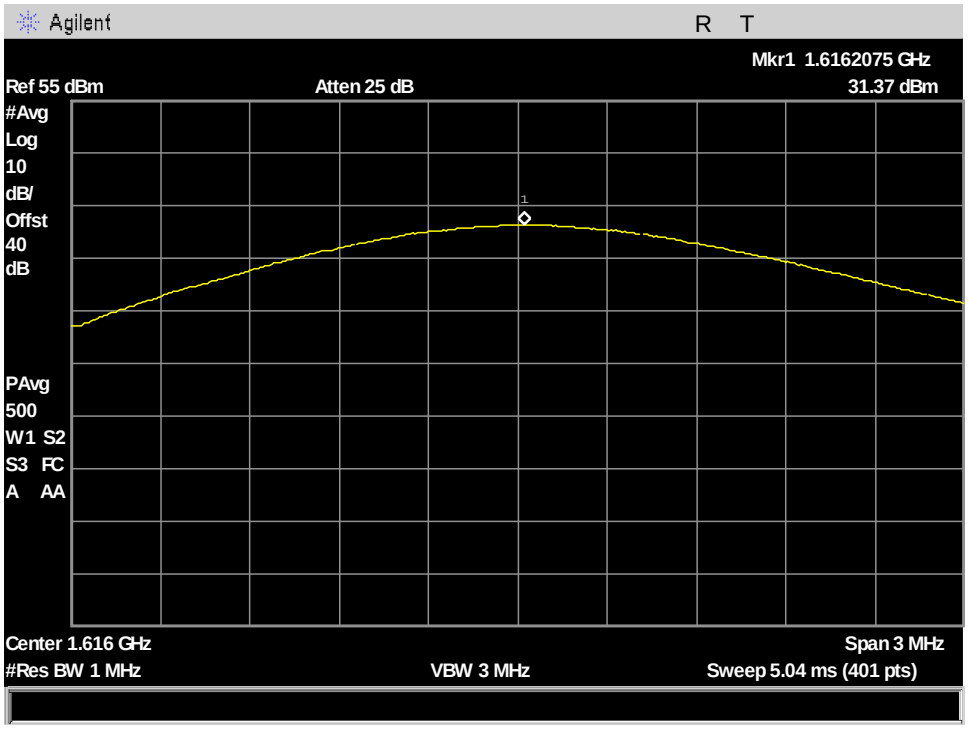

Figure 78: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch1_333.333kHz BW

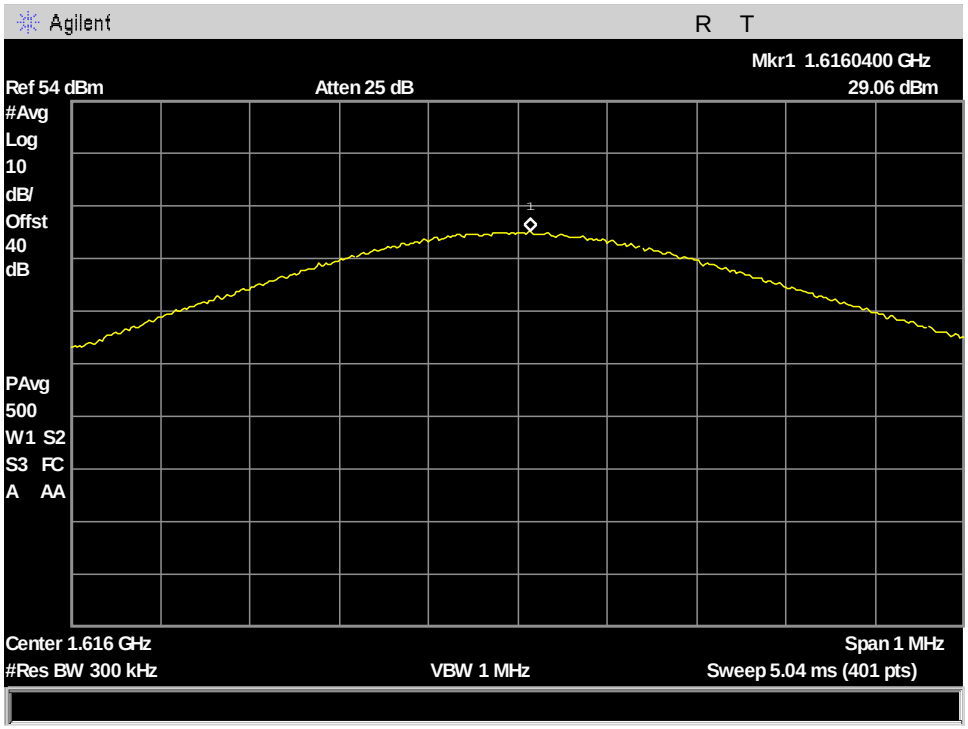

Figure 79: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch1_41.668kHz BW

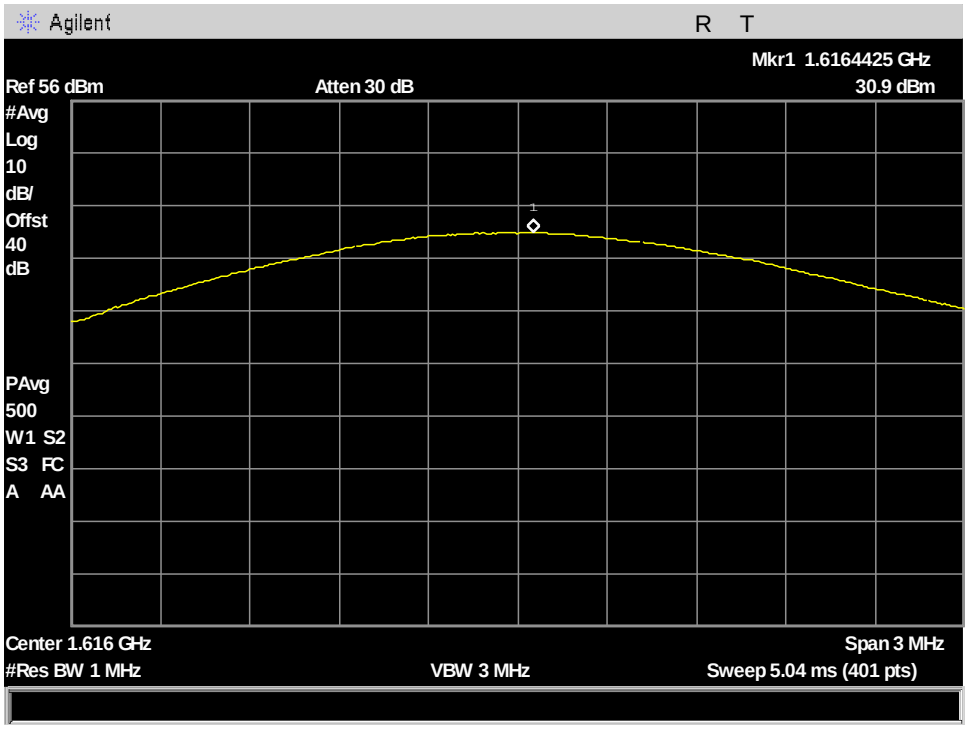

Figure 80: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch1_666.666kHz BW

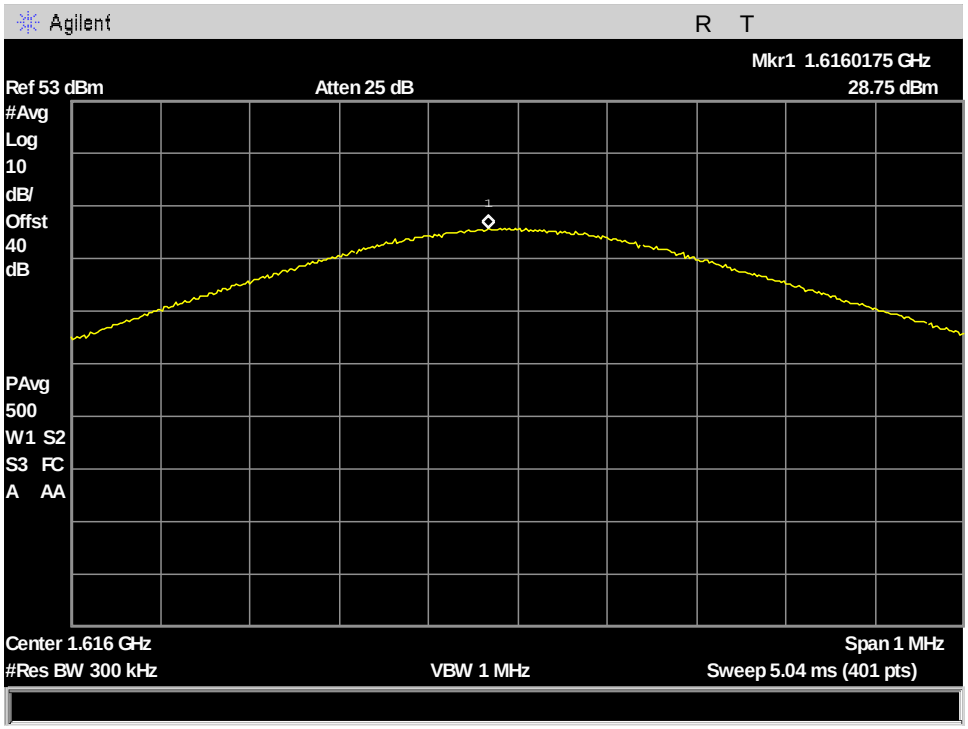

Figure 81: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch1_83.334kHz BW

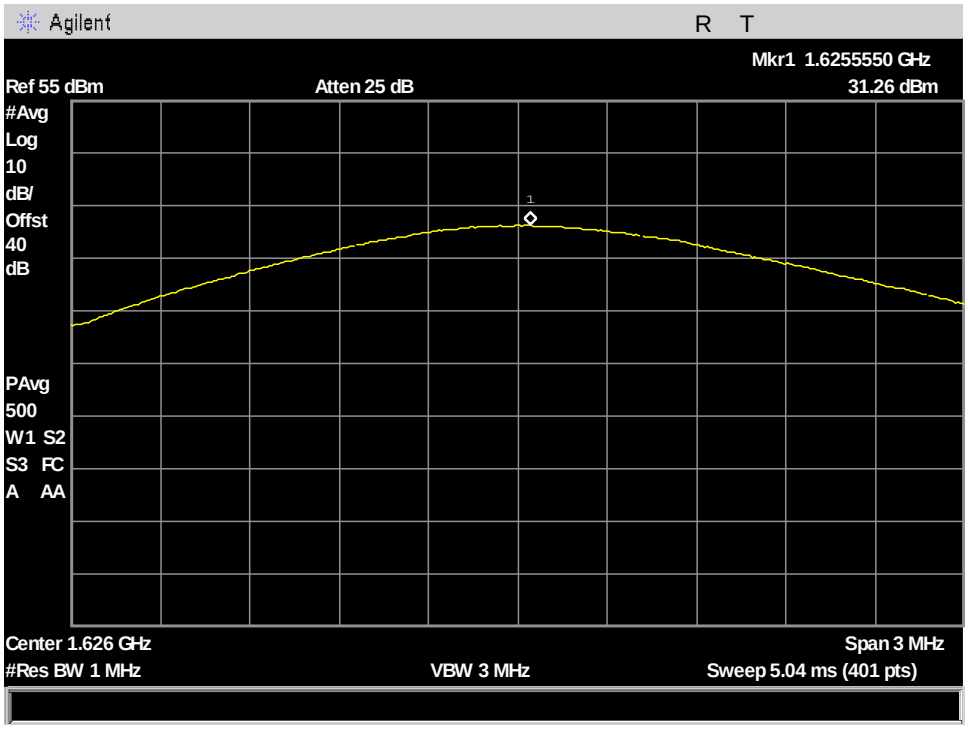

Figure 82: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch232_333.333kHz BW

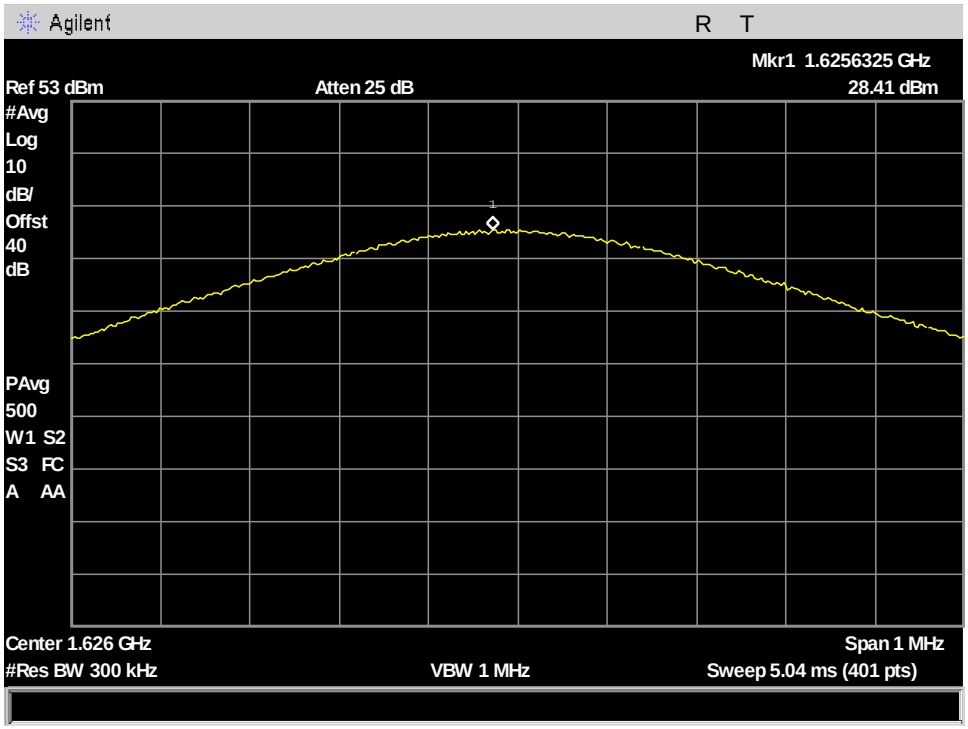

Figure 83: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch232_41.668kHz BW

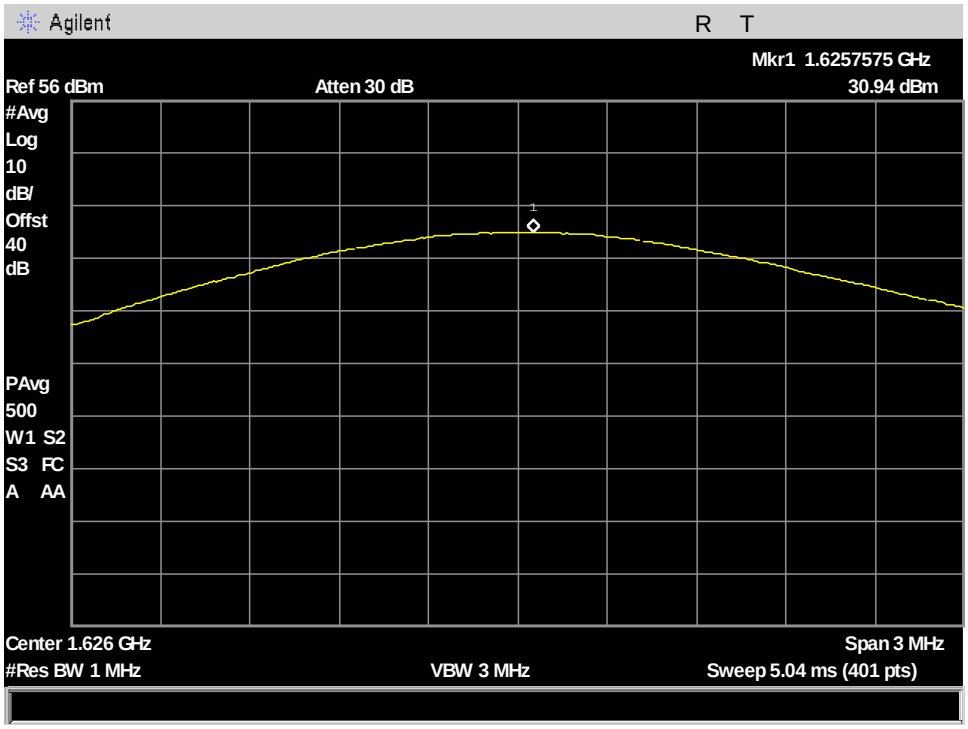

Figure 84: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch232_666.666kHz BW

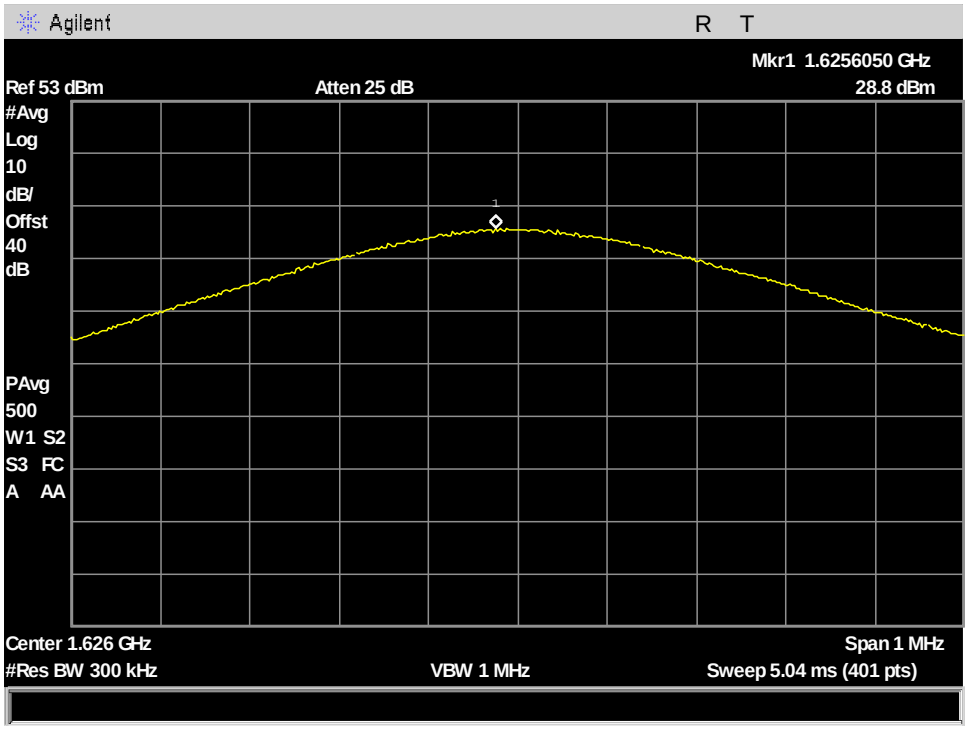

Figure 85: §25.204(a) Conducted RF Output Power, VesseLINK AVG_Output Power_ch232_83.334kHz BW

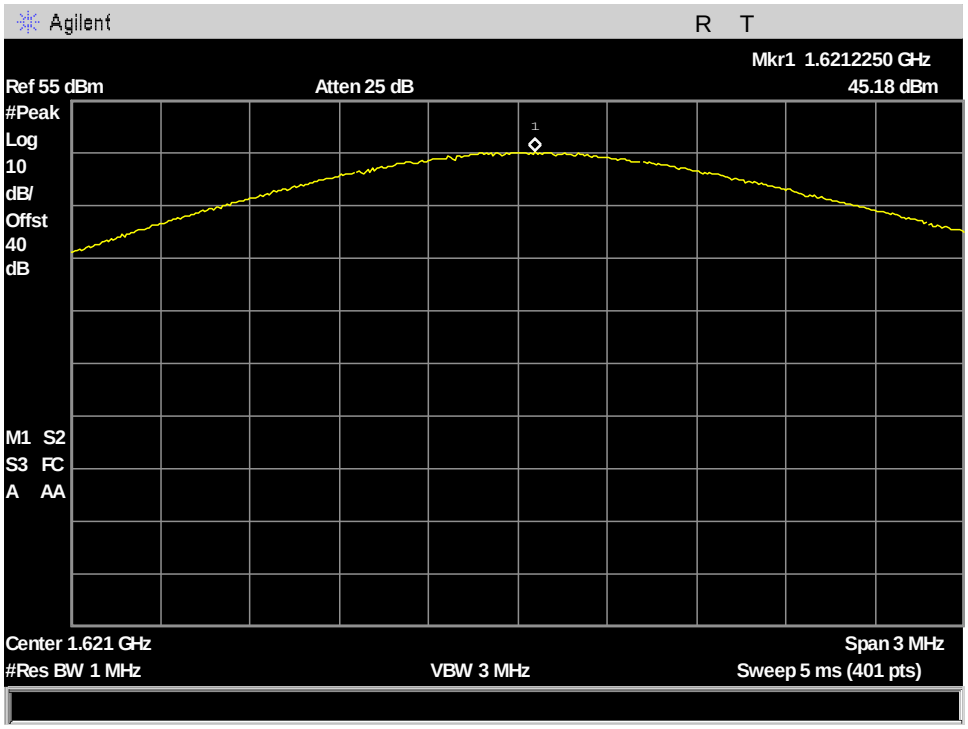

Figure 86: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch121_333.333kHz BW

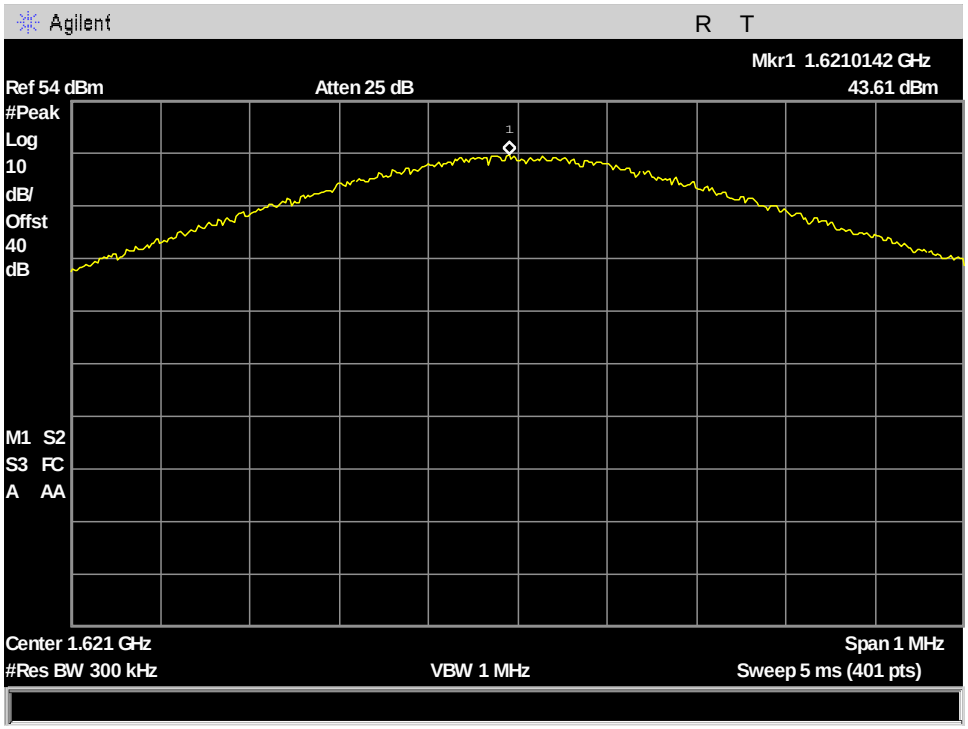

Figure 87: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch121_41.668kHz BW

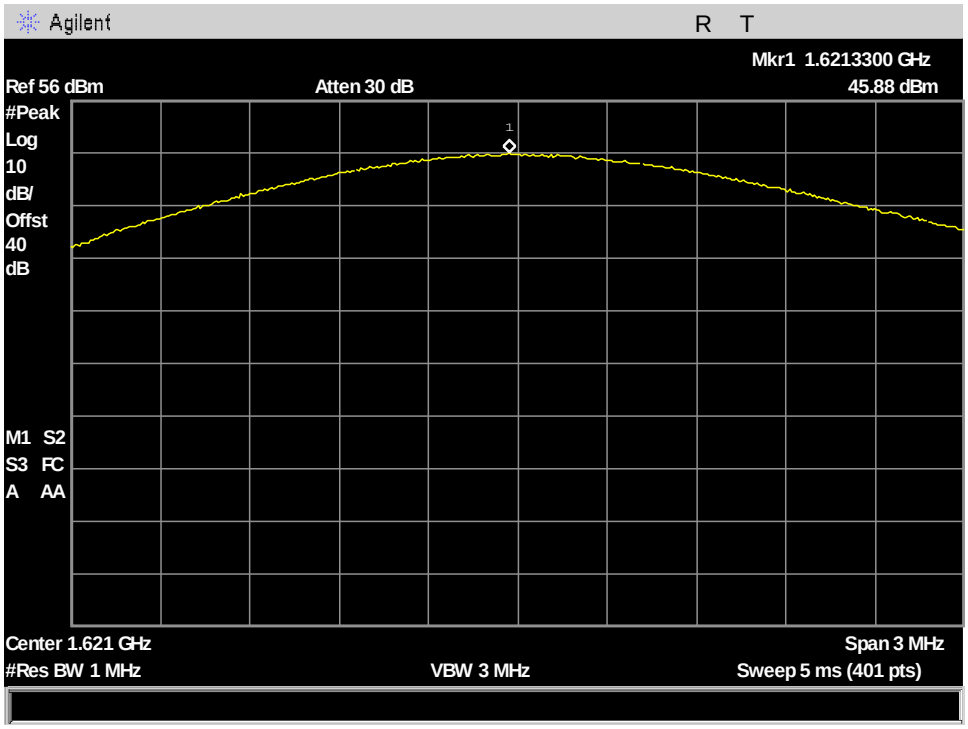

Figure 88: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch121_666.666kHz BW

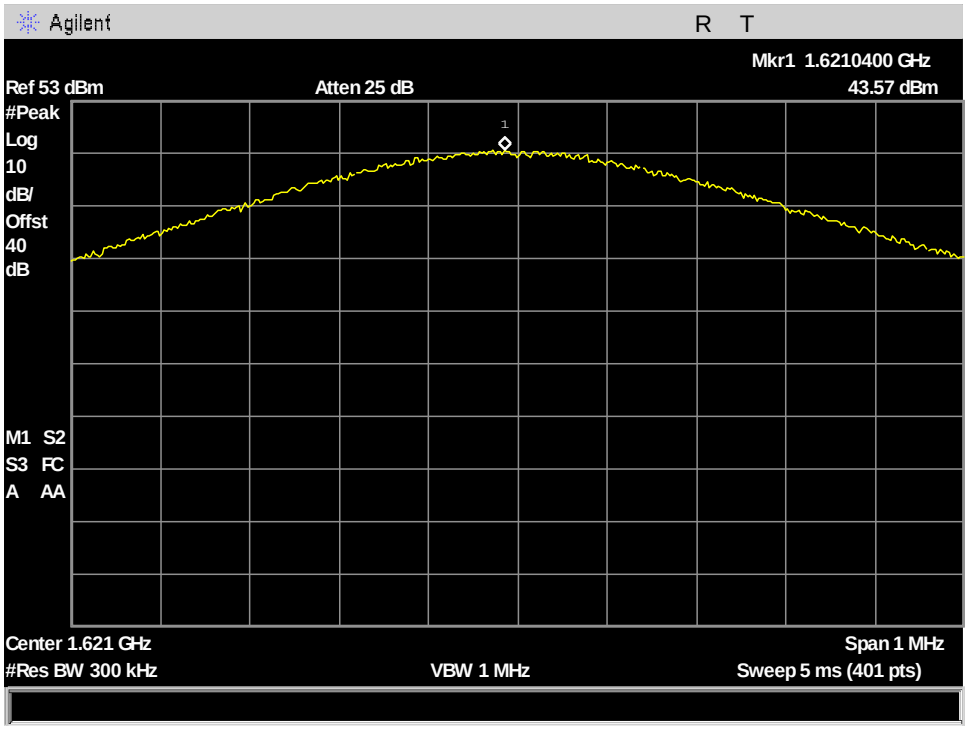

Figure 89: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch121_83.334kHz BW

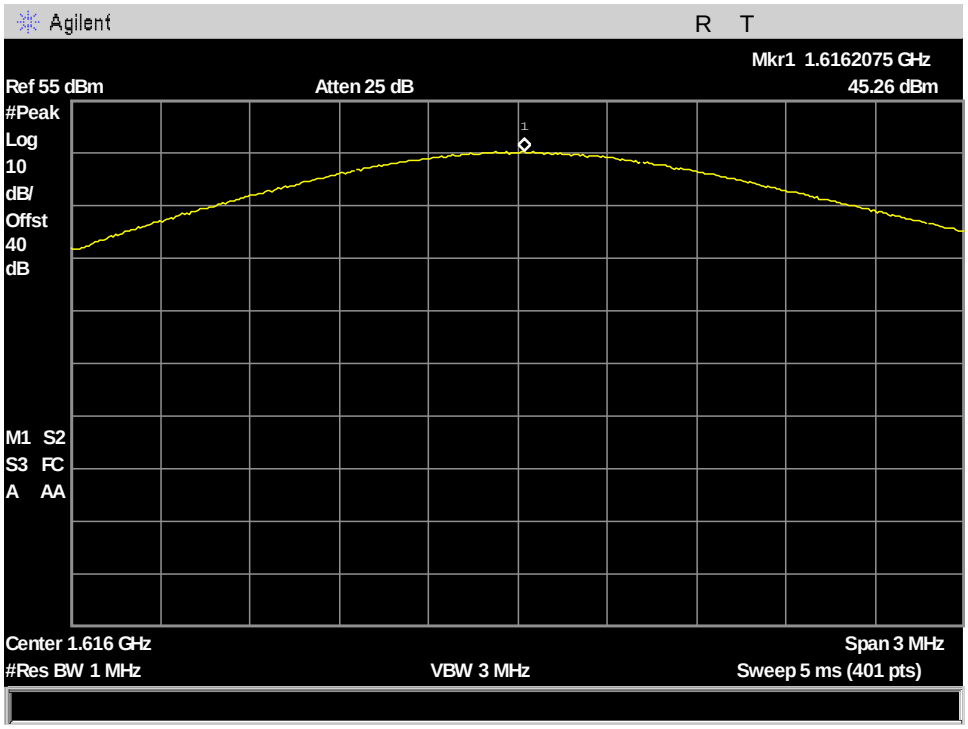

Figure 90: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch1_333.333kHz BW

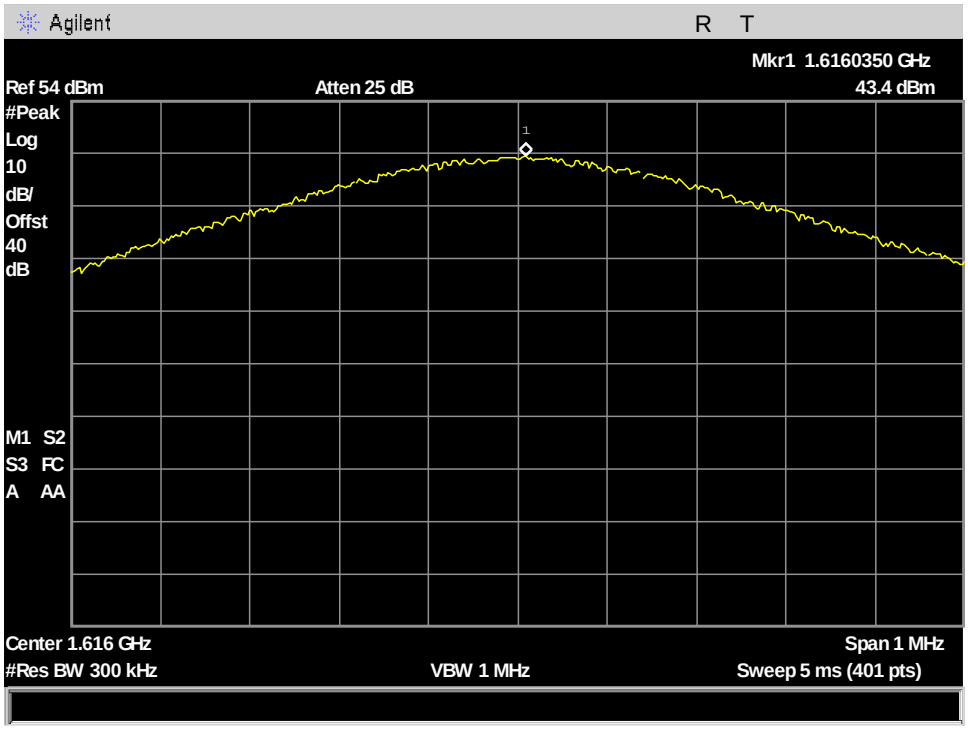

Figure 91: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch1_41.668kHz BW

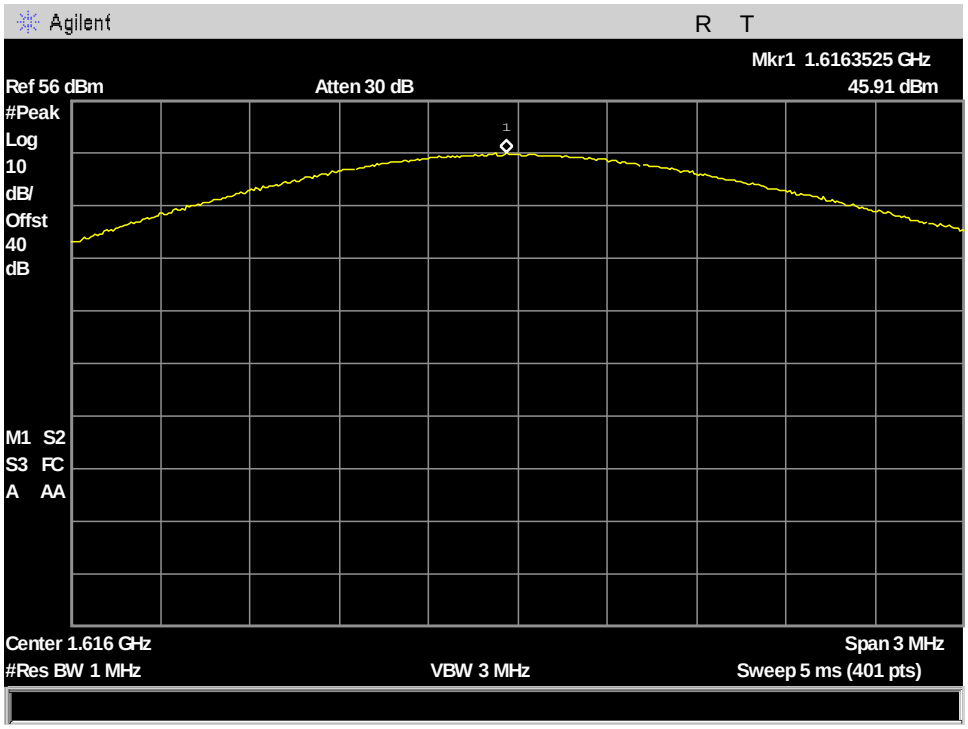

Figure 92: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch1_666.666kHz BW

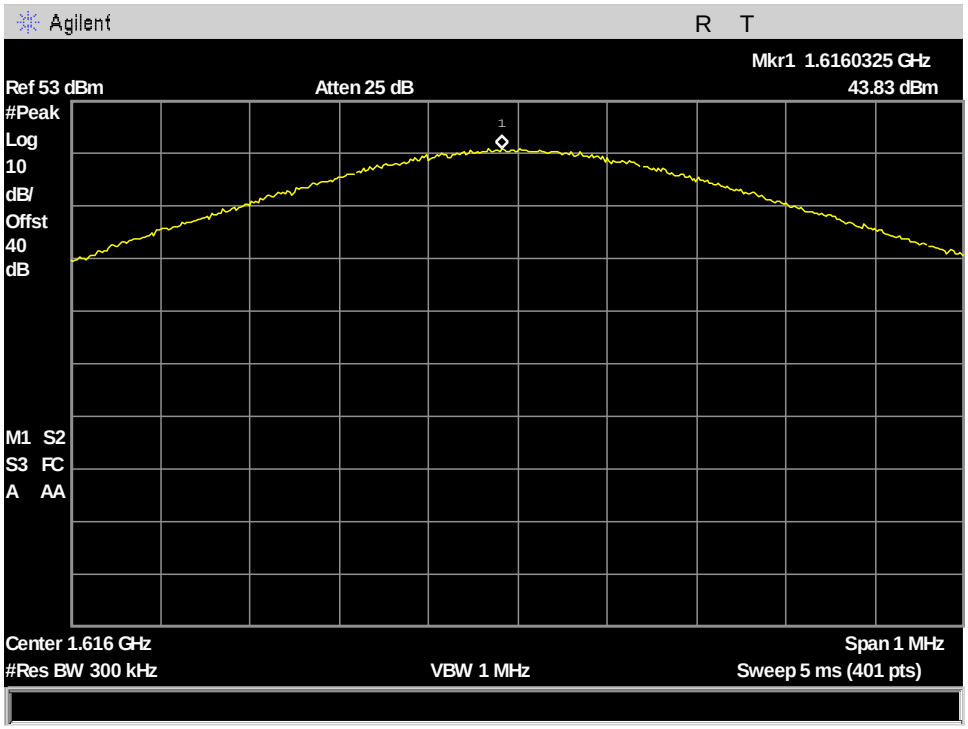

Figure 93: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch1_83.334kHz BW

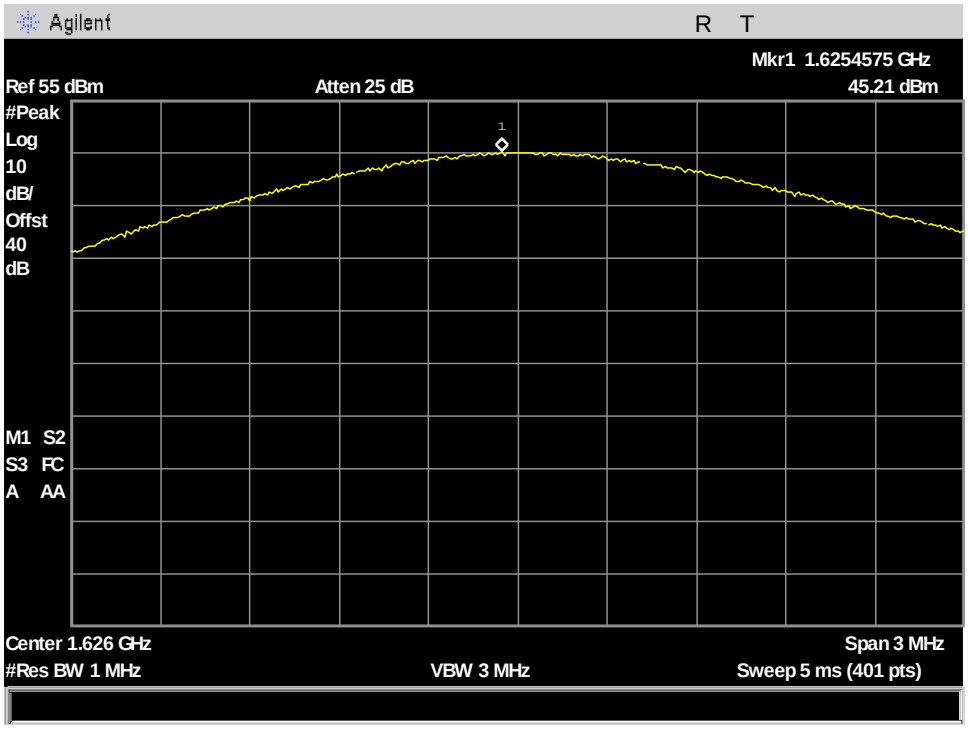

Figure 94: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch232_333.333kHz BW

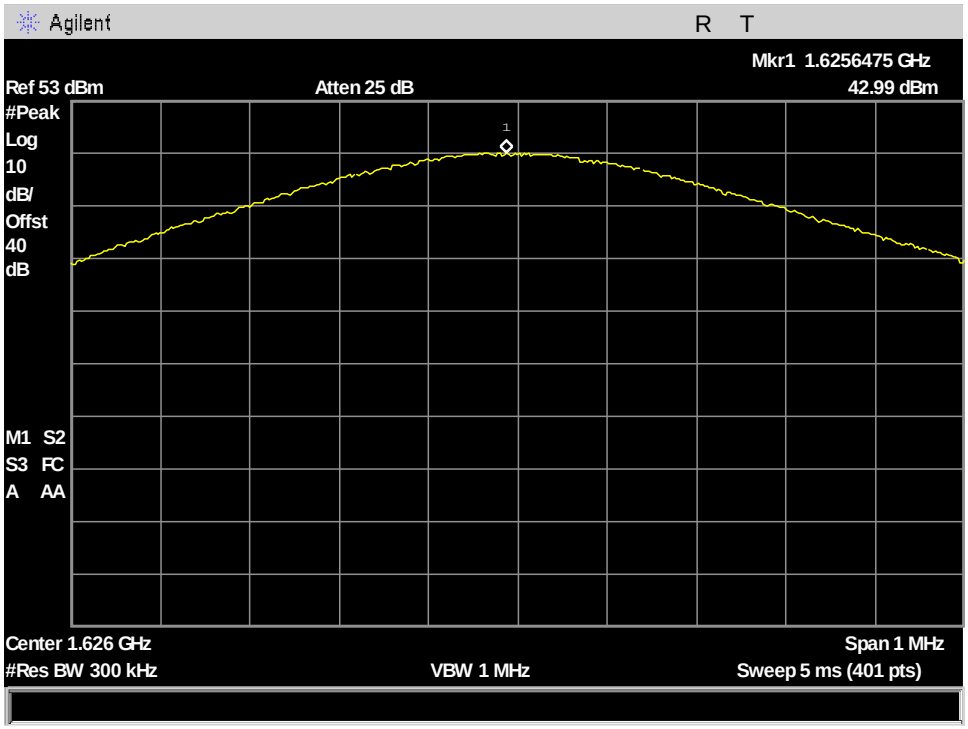

Figure 95: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch232_41.668kHz BW

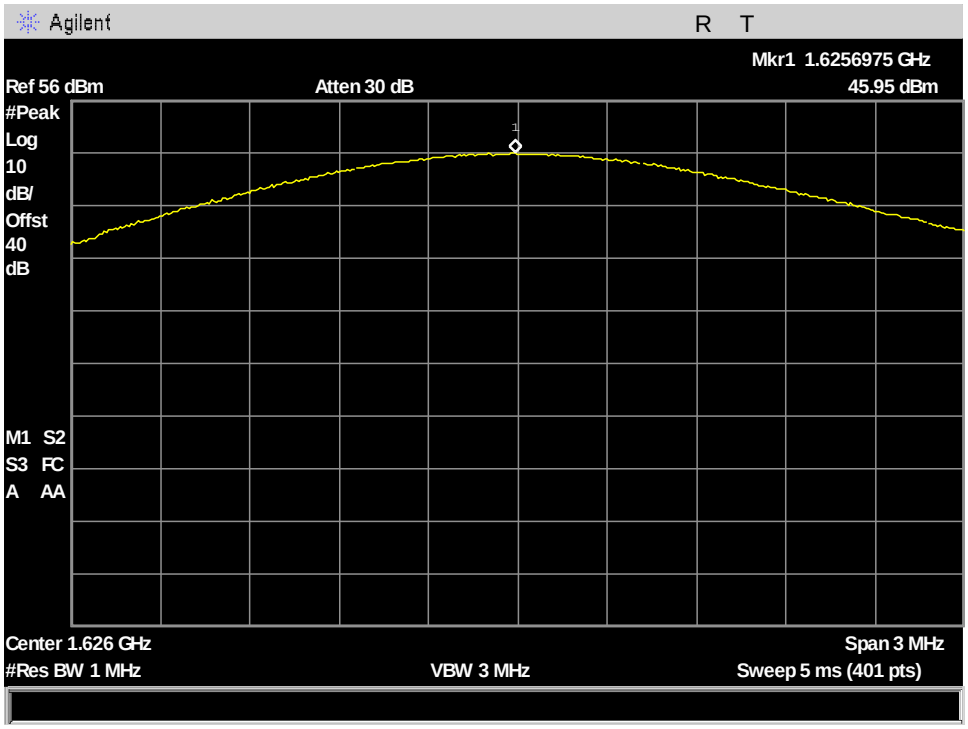

Figure 96: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch232_666.666kHz BW

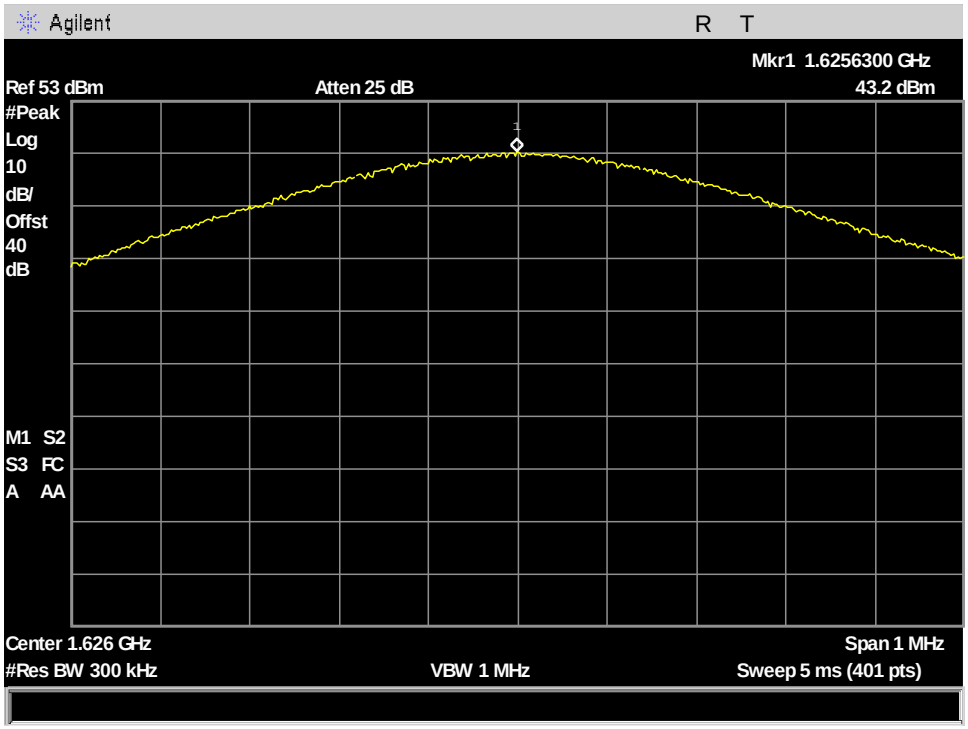

Figure 97: §25.204(a) Conducted RF Output Power, VesseLINK PK_Output Power_ch232_83.334kHz BW

Electromagnetic Compatibility Criteria for Satellite Communications

§2.1049(b) Occupied Bandwidth

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Test Requirement(s): (b) Emissions with an occupied bandwidth of less than 2 MHz are not protected from interference from wider bandwidth transmissions if the r.f. carrier frequency of the narrowband signal is within ±1 MHz of one of the frequencies specified in § 25.211(a).

Test Procedures: The transmitter was on and transmitting at the highest output power. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The bandwidth of the fundamental frequency was measured with the spectrum analyzer OBW built-in function using a RBW approximately 1-5% of the anticipated OBW, VBW = 3*RBW, the detector was set to peak, and trace mode was set to max-hold.

Test Results: The EUT is compliant with the requirements of this section. MissionLINK LGA and the VesseLINK LGA have identical electrical circuitry and therefore conducted tests on any LGA are representative of both.

Test Engineer(s): **Donald Salguero**

Test Date(s): November 6, 2020

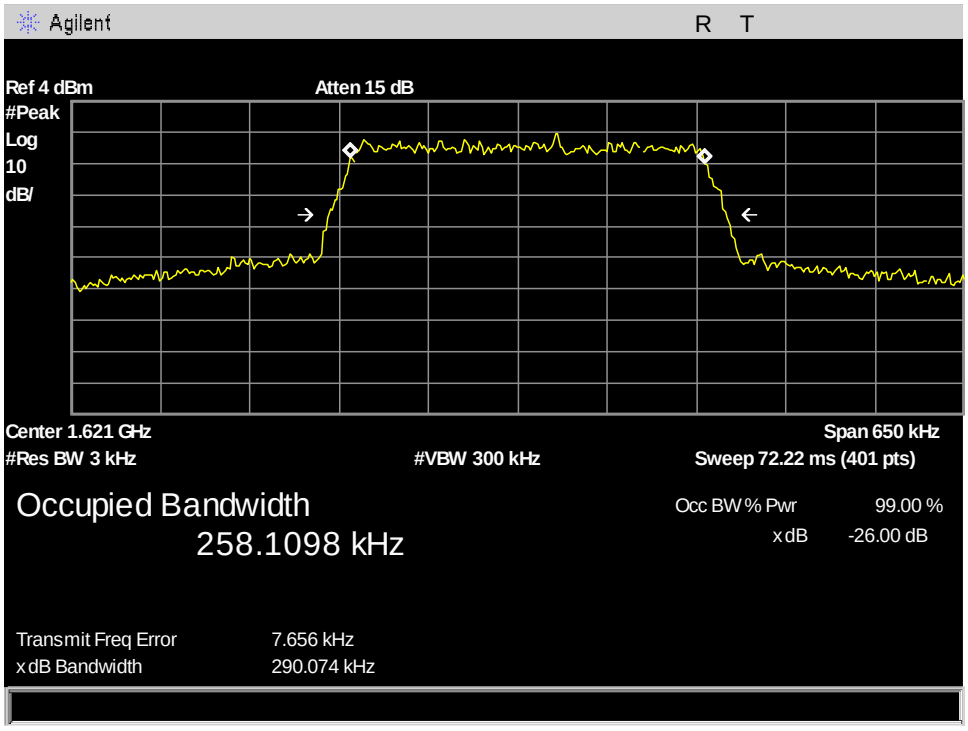

Figure 98: §2.1049(b) Occupied Bandwidth, Ch121_OBW_333.333kHz

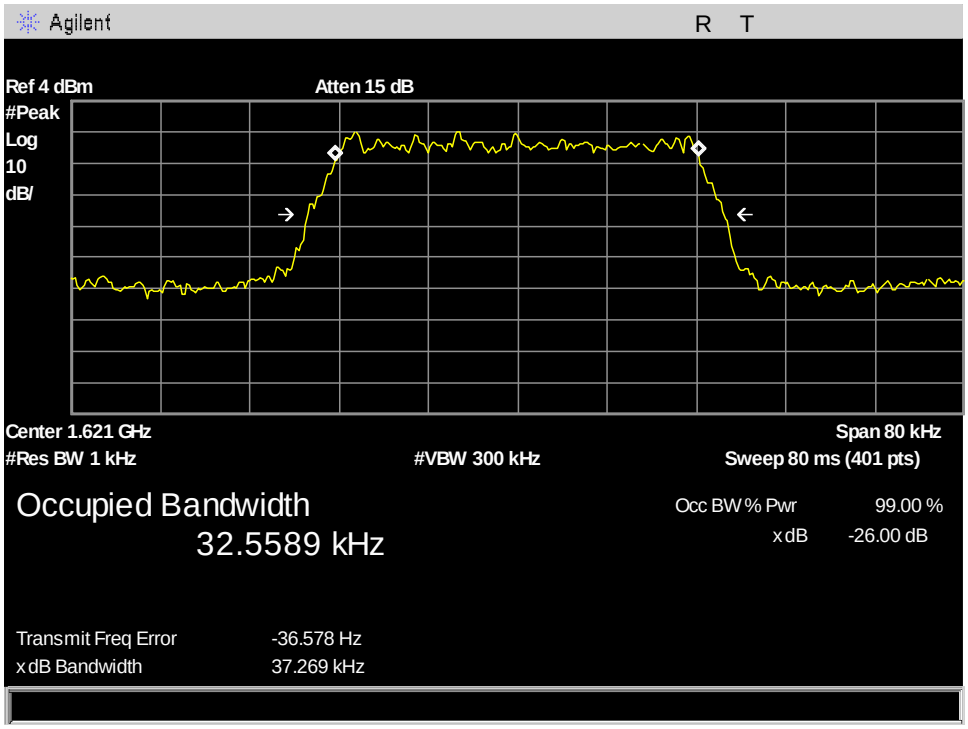

Figure 99: §2.1049(b) Occupied Bandwidth, Ch121_OBW_41.668kHz

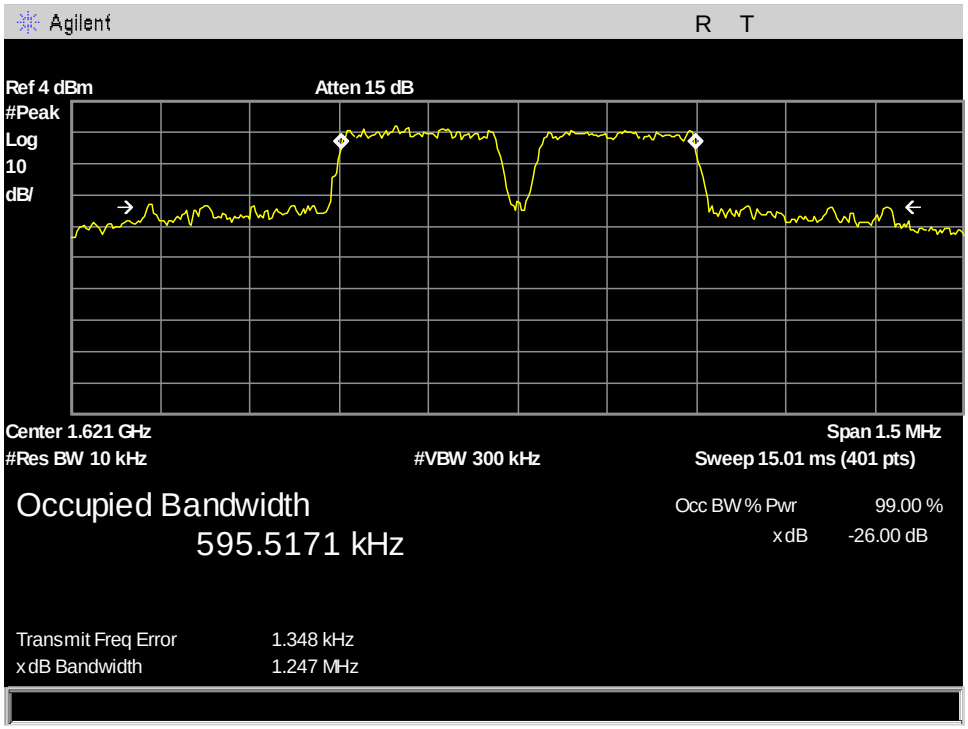

Figure 100: §2.1049(b) Occupied Bandwidth, Ch121_OBW_666.666kHz

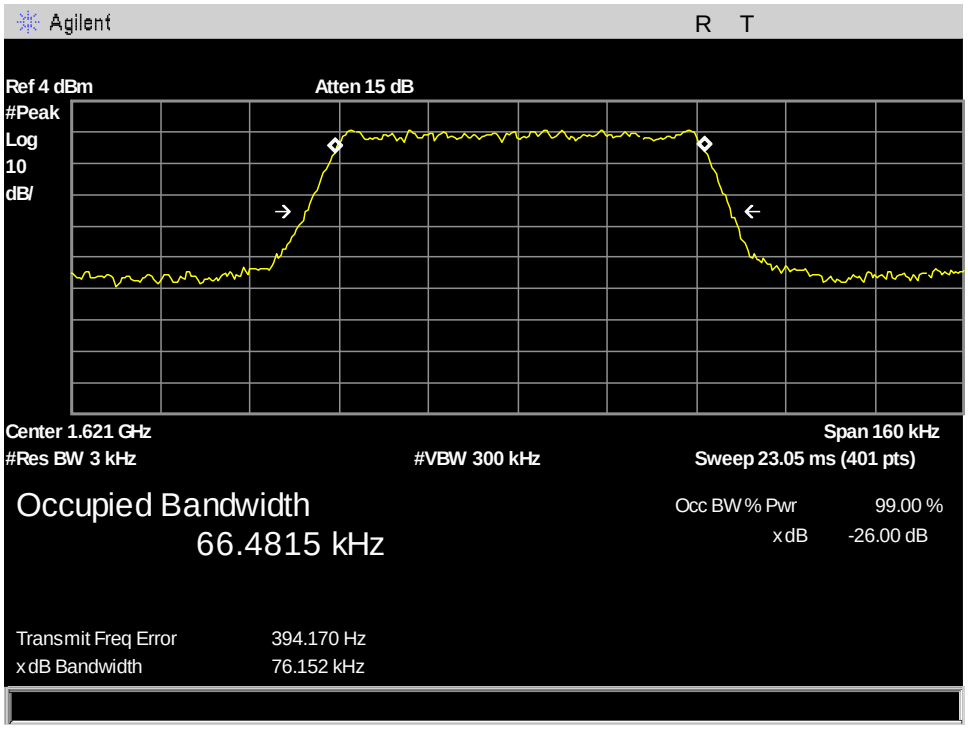

Figure 101: §2.1049(b) Occupied Bandwidth, Ch121_OBW_83.334kHz

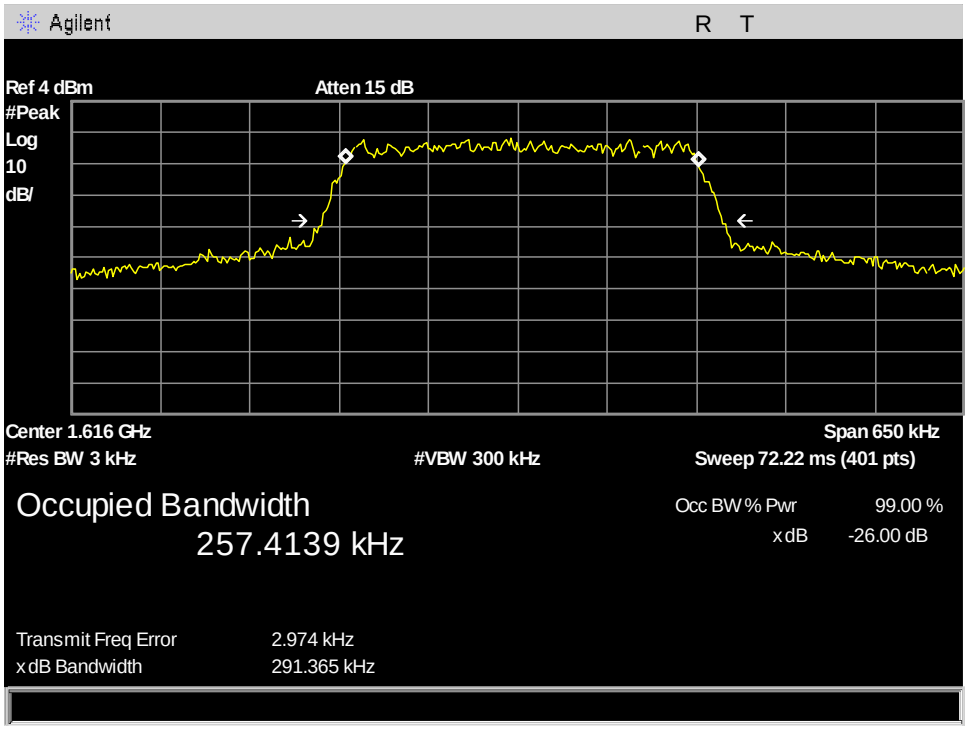

Figure 102: §2.1049(b) Occupied Bandwidth, Ch1_OBW_333.333kHz

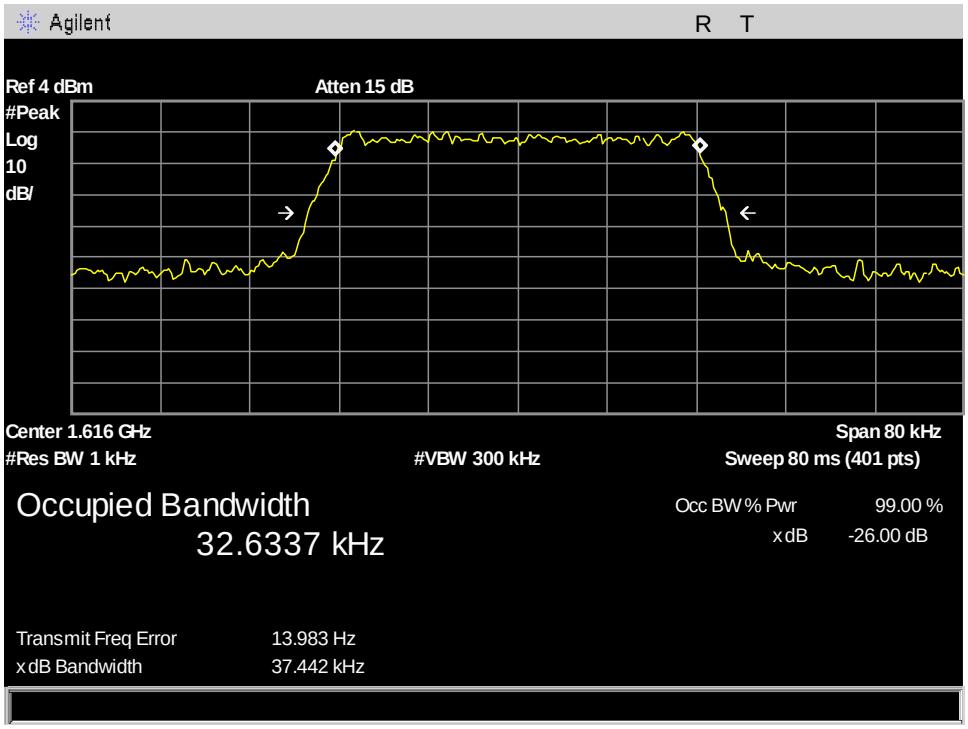

Figure 103: §2.1049(b) Occupied Bandwidth, Ch1_OBW_41.668kHz

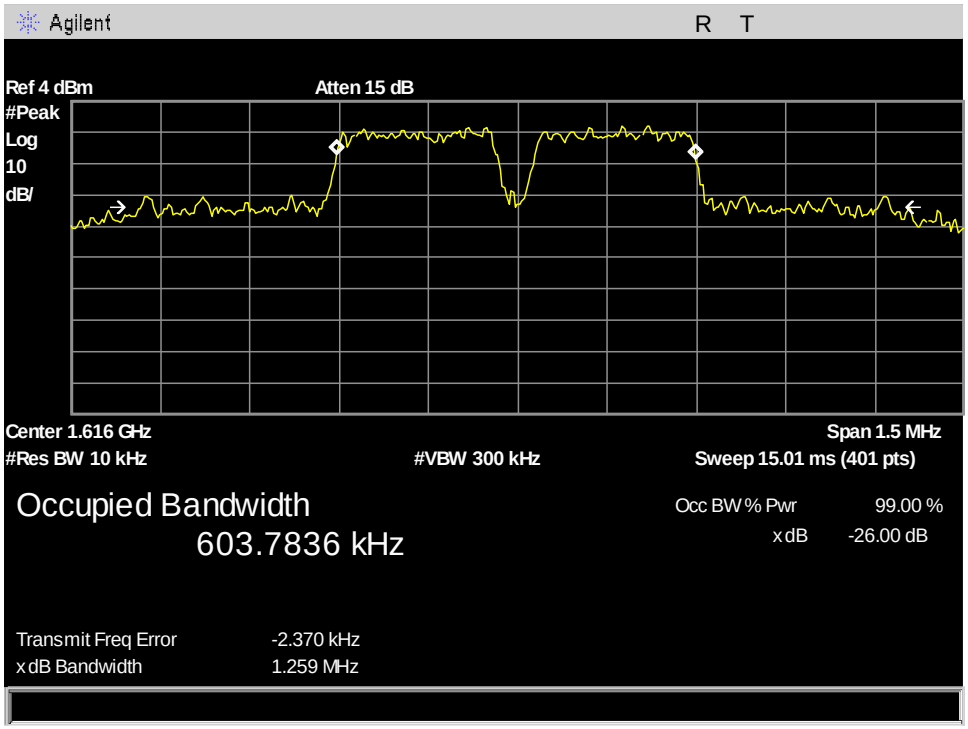

Figure 104: §2.1049(b) Occupied Bandwidth, Ch1_OBW_666.666kHz

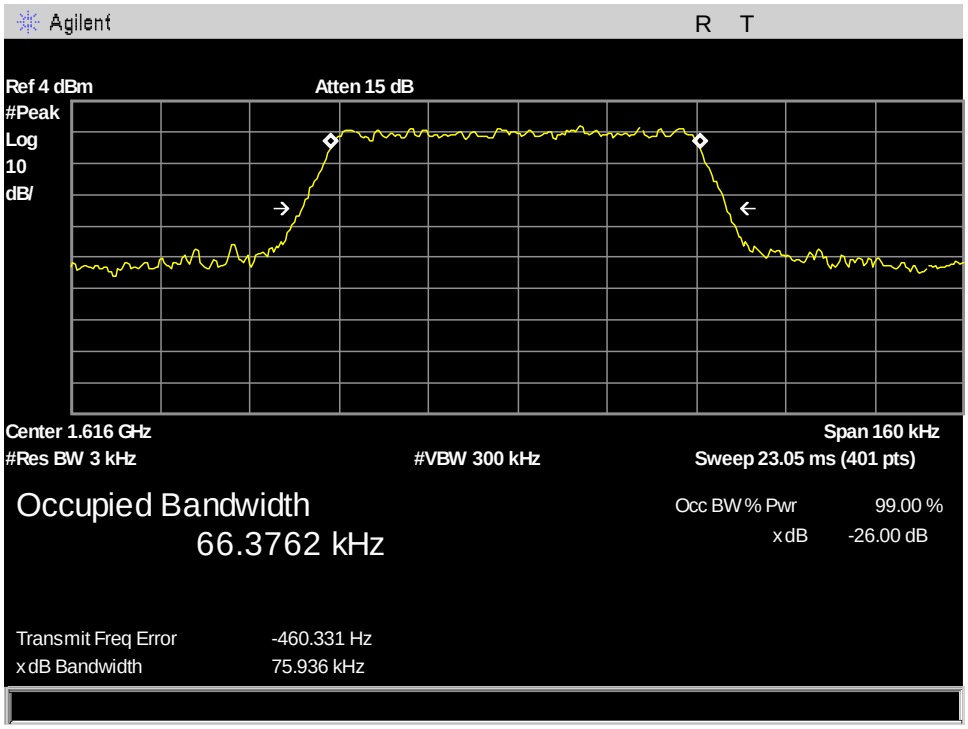

Figure 105: §2.1049(b) Occupied Bandwidth, Ch1_OBW_83.334kHz

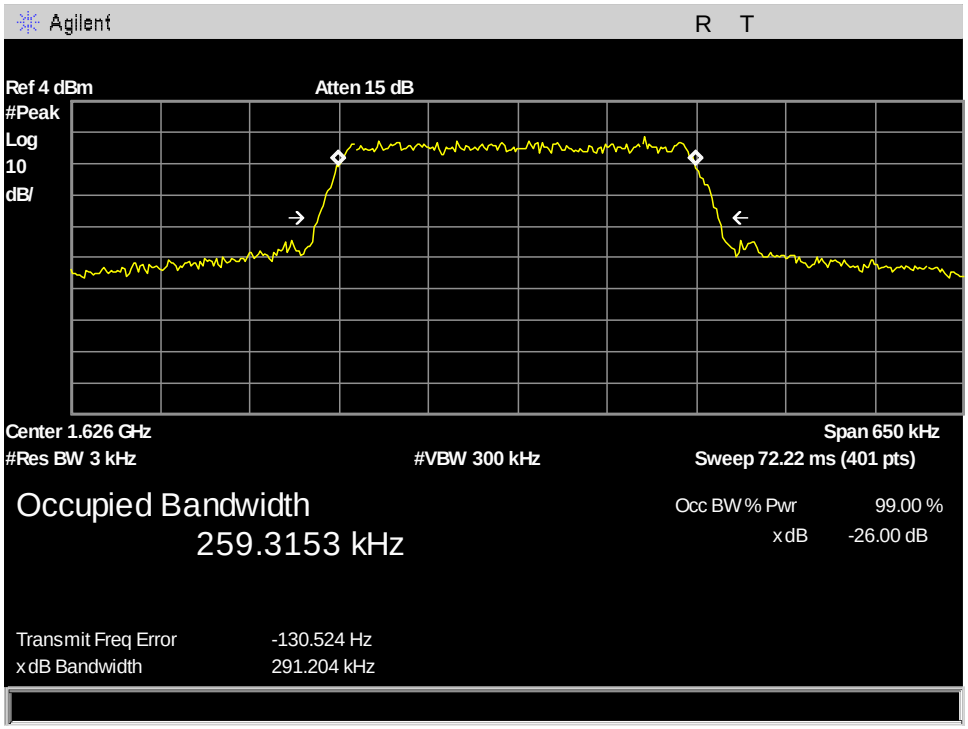

Figure 106: §2.1049(b) Occupied Bandwidth, Ch232_OBW_333.333kHz

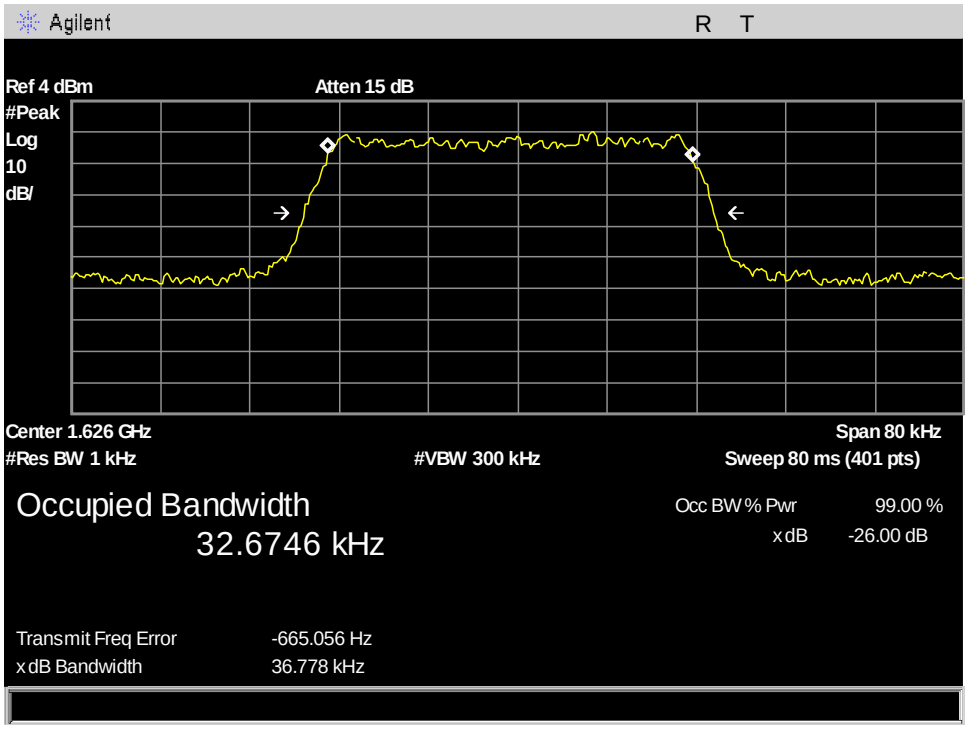

Figure 107: §2.1049(b) Occupied Bandwidth, Ch232_OBW_41.668kHz

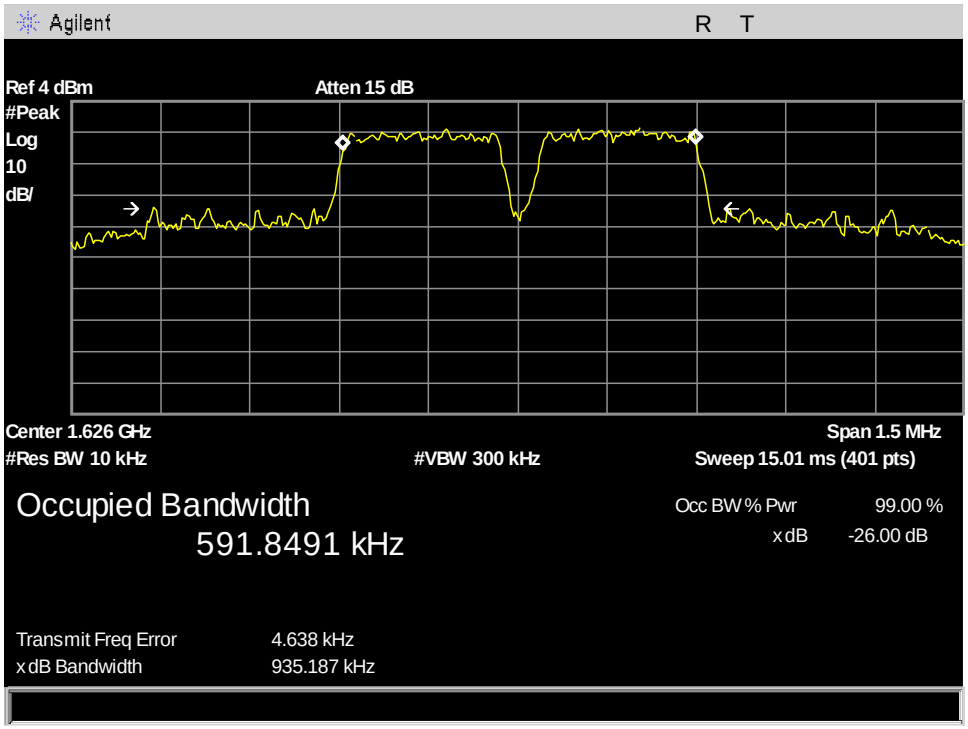

Figure 108: §2.1049(b) Occupied Bandwidth, Ch232_OBW_666.666kHz

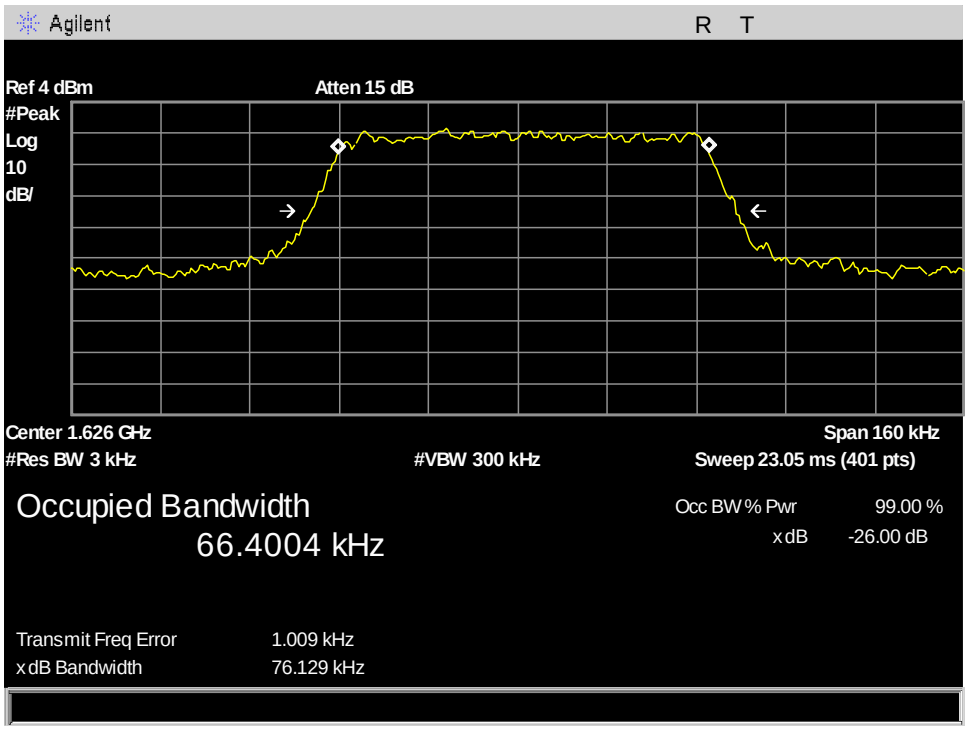

Figure 109: §2.1049(b) Occupied Bandwidth, Ch232_OBW_83.334kHz

Electromagnetic Compatibility Criteria for Satellite Communications

§25.202(f) **Spurious Emissions at Antenna Terminals**

Test Requirement(s): **§25.202 Emission Limitations:**

(f) Except for SDARS terrestrial repeaters, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

Test Procedures: The EUT was connected directly to a spectrum analyzer through an attenuator and set to transmit on its low, middle and high channels at max transmit power. Emissions were measured and compared to the limits of 25.202(f).

See following pages for detailed test results with RF Conducted Spurious Emissions.

Note: Emissions on the frequency range 9kHz – 30MHz were attenuated more than 20dB below the permissible value.

Test Results: The EUT is compliant with the requirements of this section. MissionLINK LGA and the VesseLINK LGA have identical electrical circuitry and therefore conducted tests on any LGA are representative of both

Test Engineer(s): **Donald Salguero**

Test Date(s): November 10, 2020

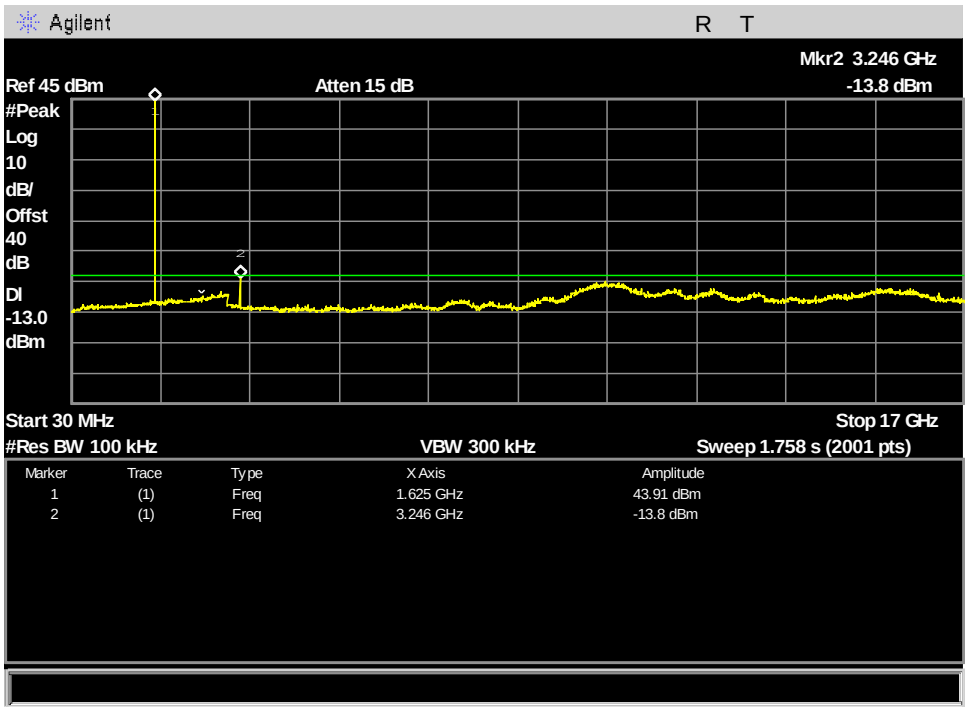

Figure 110: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch121_333.333kHz_30MHz - 17GHz

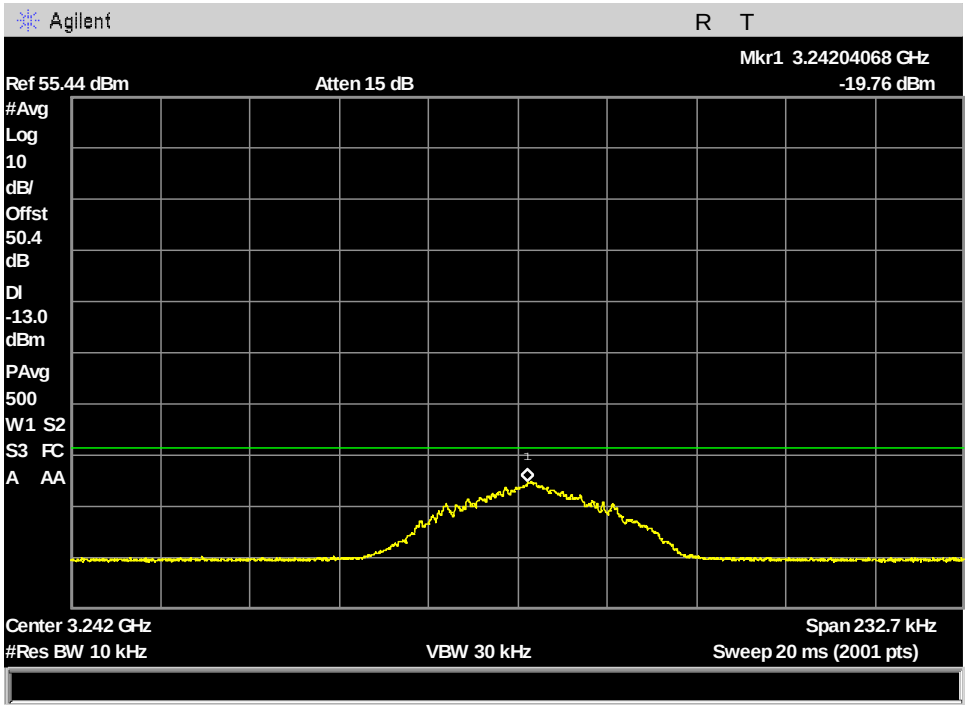

Figure 111: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch121_41.668kHz_2x harmonic Avg measurement

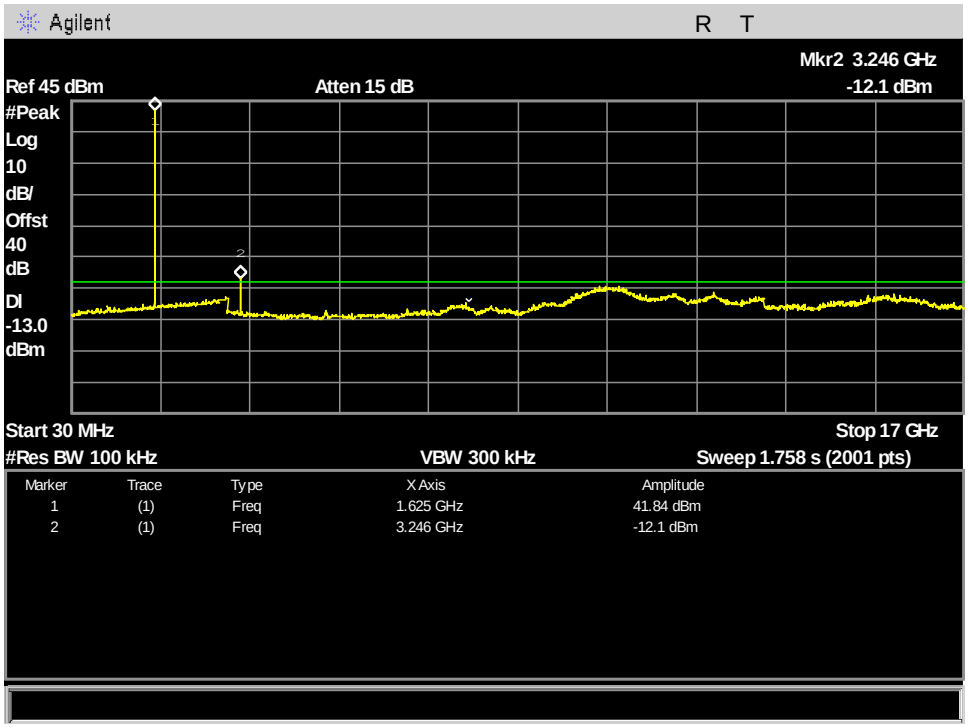

Figure 112: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch121_41.668kHz_30MHz - 17GHz

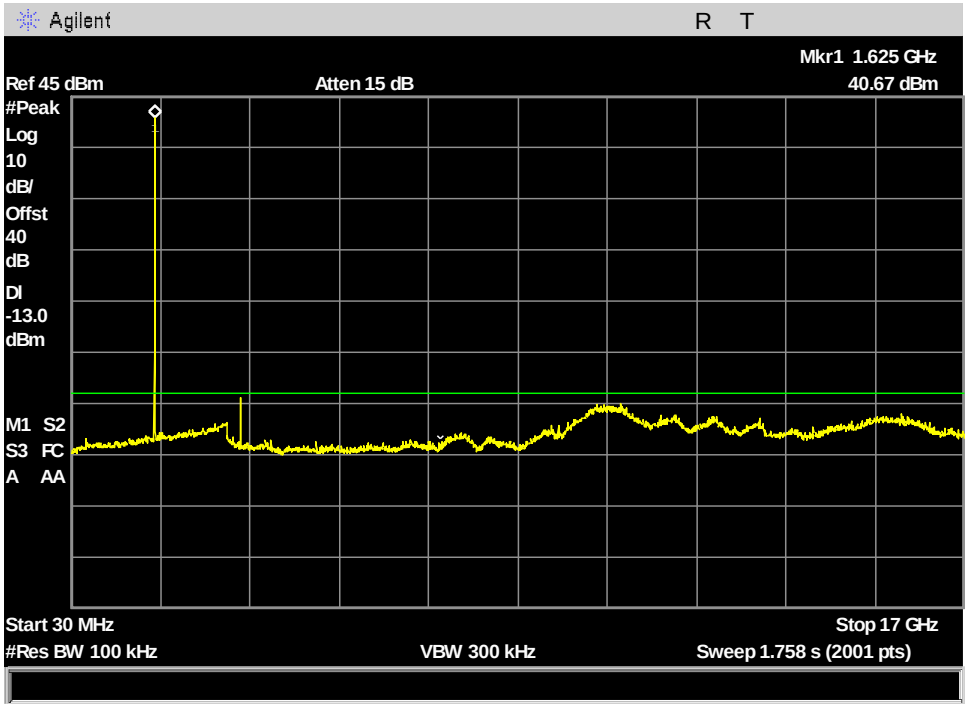

Figure 113: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch121_666.666kHz_30MHz - 17GHz

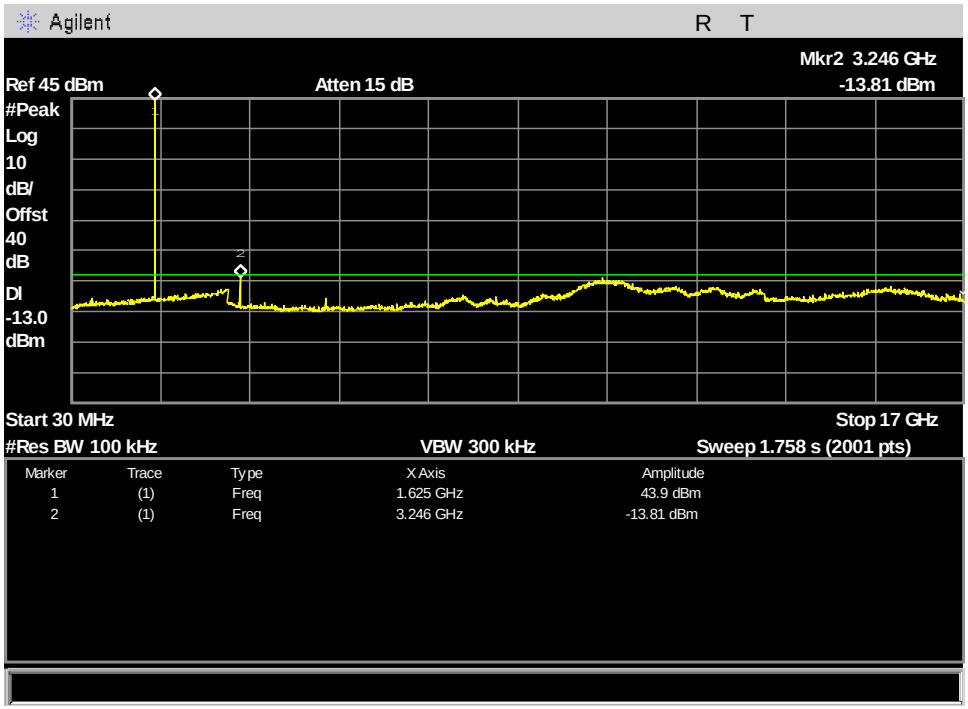

Figure 114: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch121_83.334kHz_30MHz - 17GHz

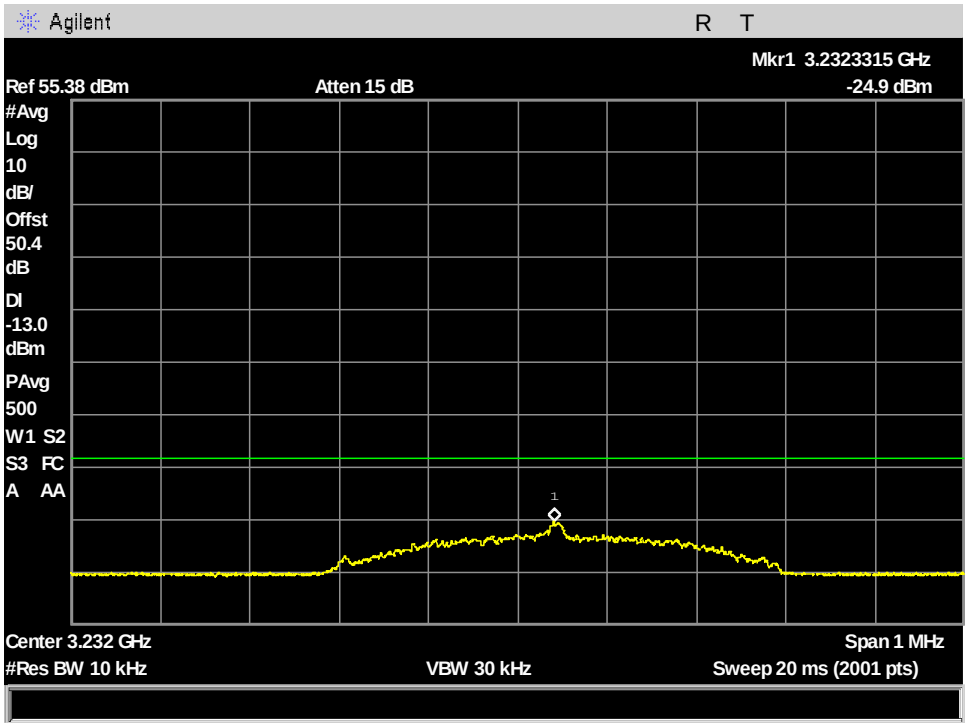

Figure 115: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_333.333kHz_2x harmonic Avg measurement

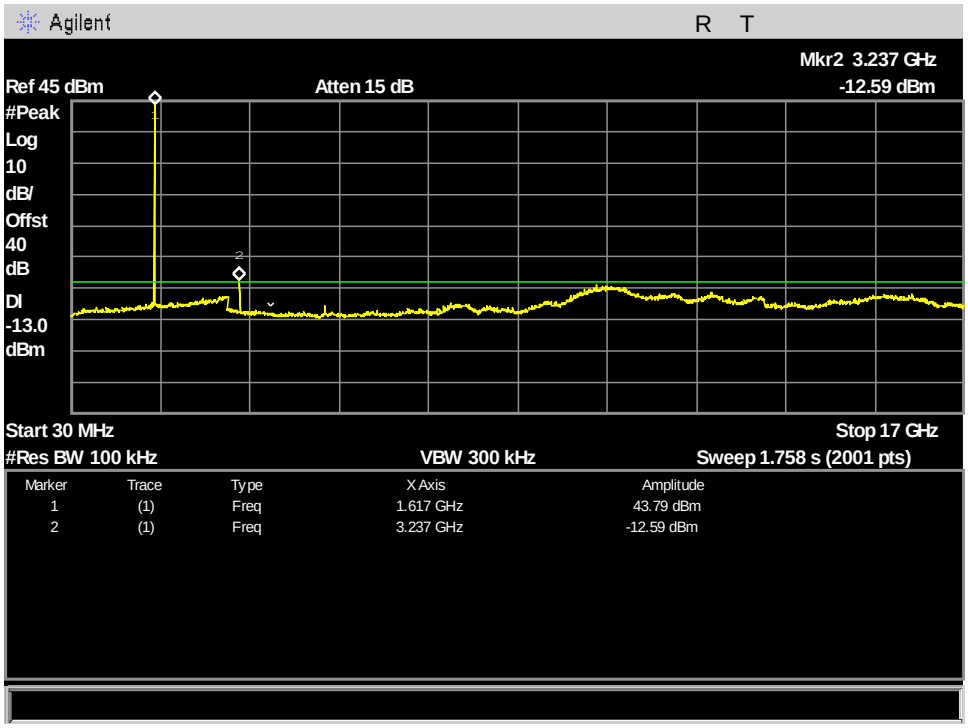

Figure 116: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_333.333kHz_30MHz - 17GHz

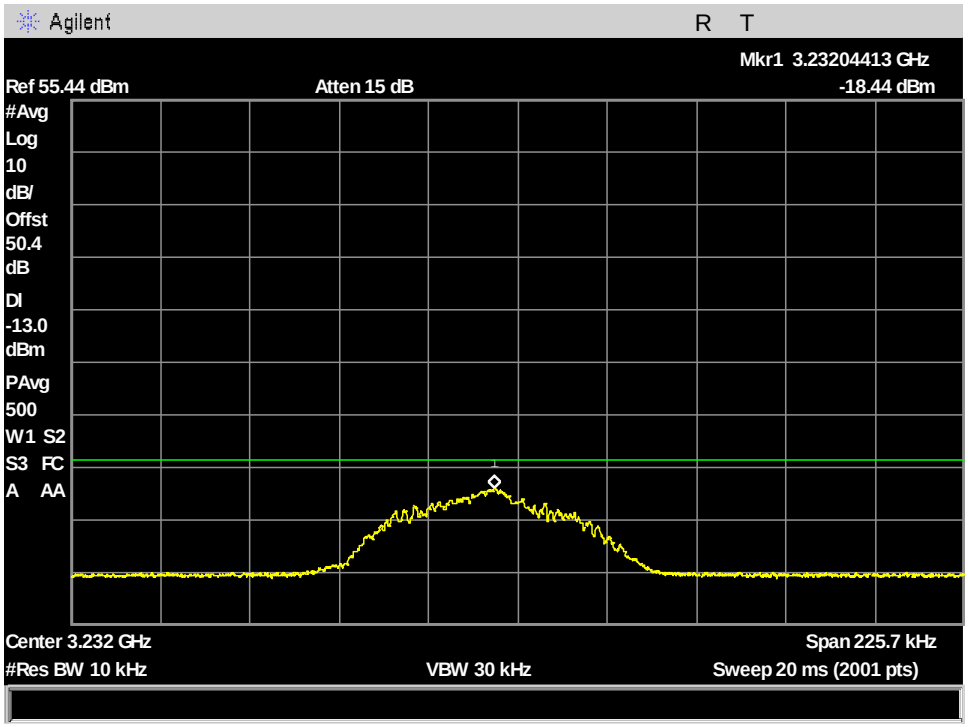

Figure 117: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_41.668kHz_2x harmonic Avg measurement

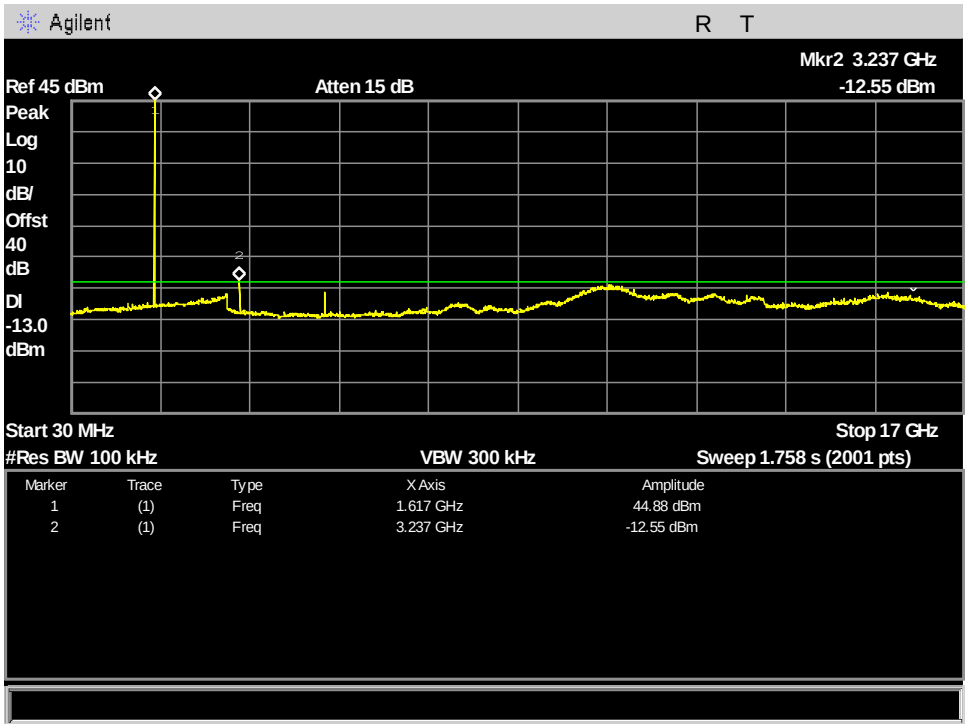

Figure 118: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_41.668kHz_30MHz - 17GHz

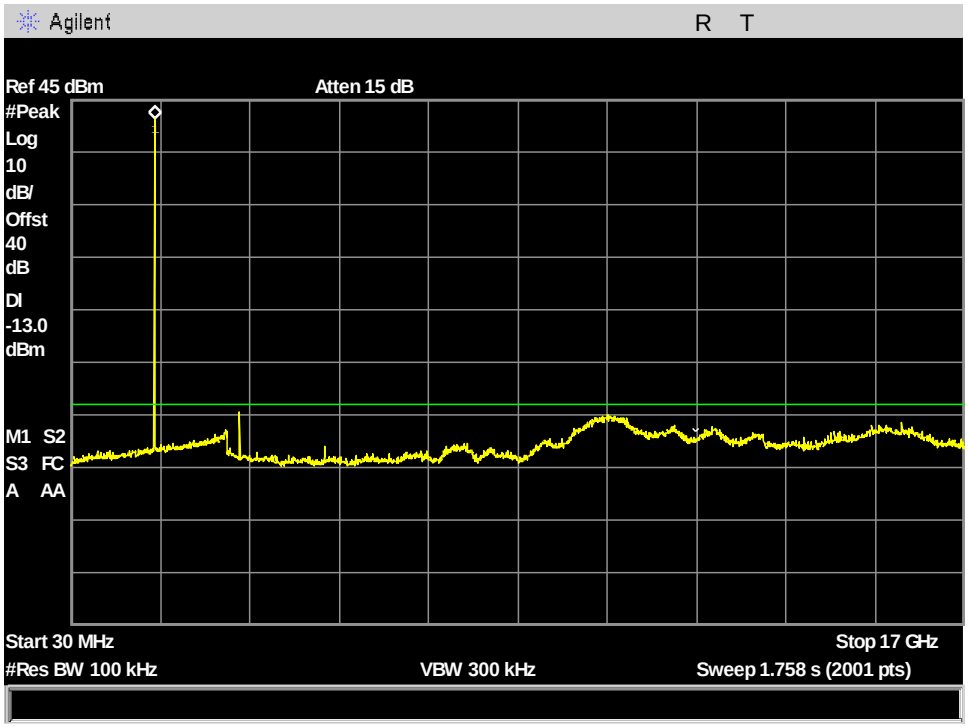

Figure 119: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_666.666kHz_30MHz - 17GHz

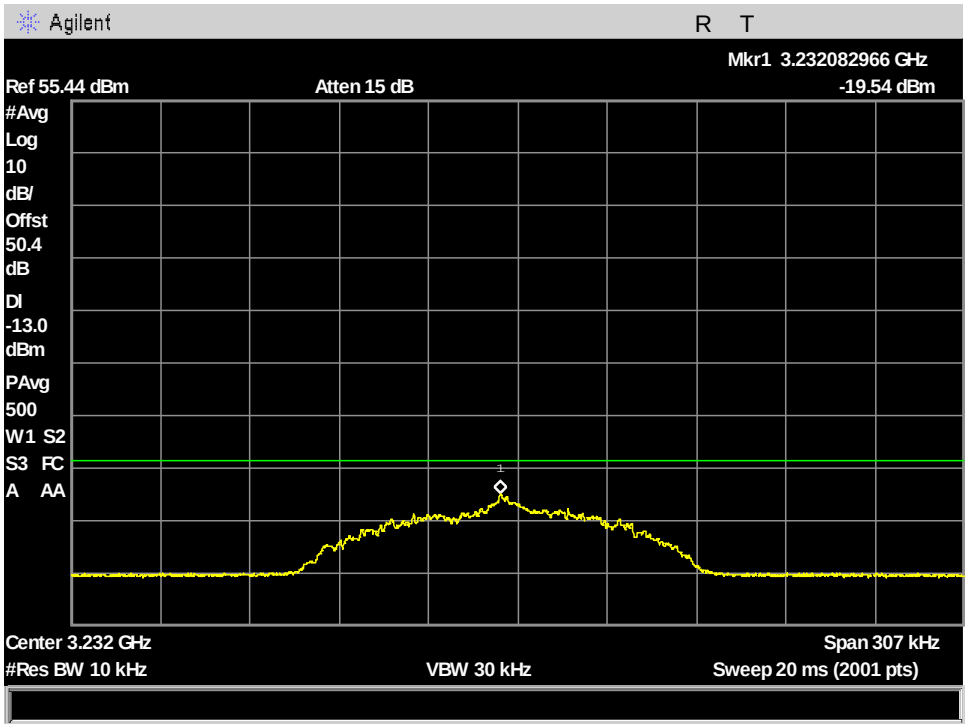

Figure 120: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_83.334kHz_2x harmonic Avg measurement

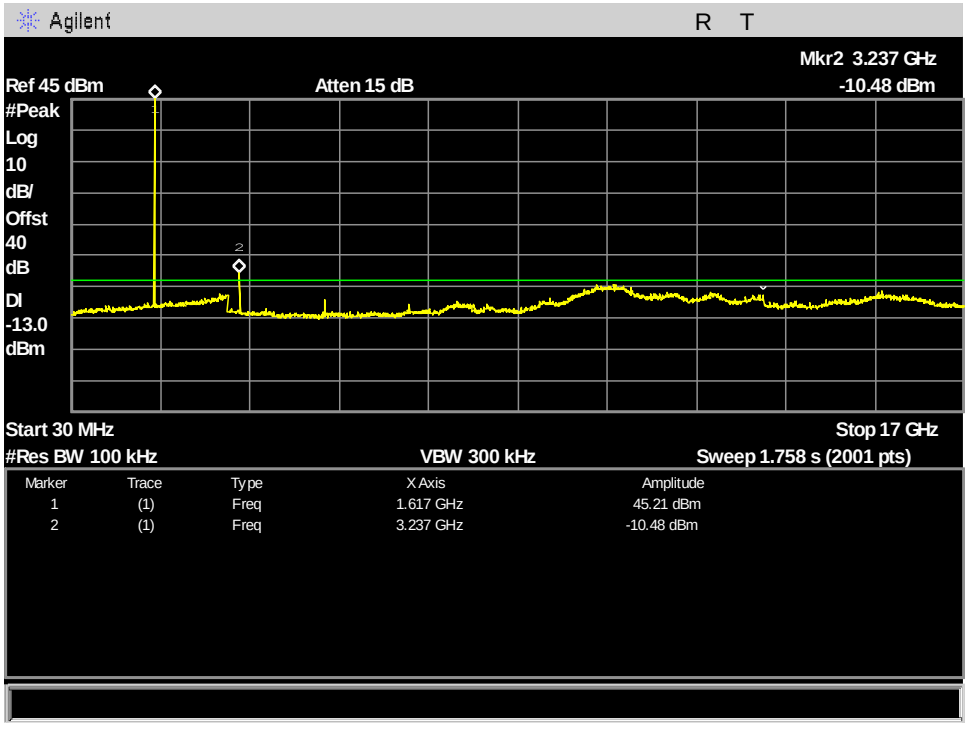

Figure 121: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch1_83.334kHz_30MHz - 17GHz

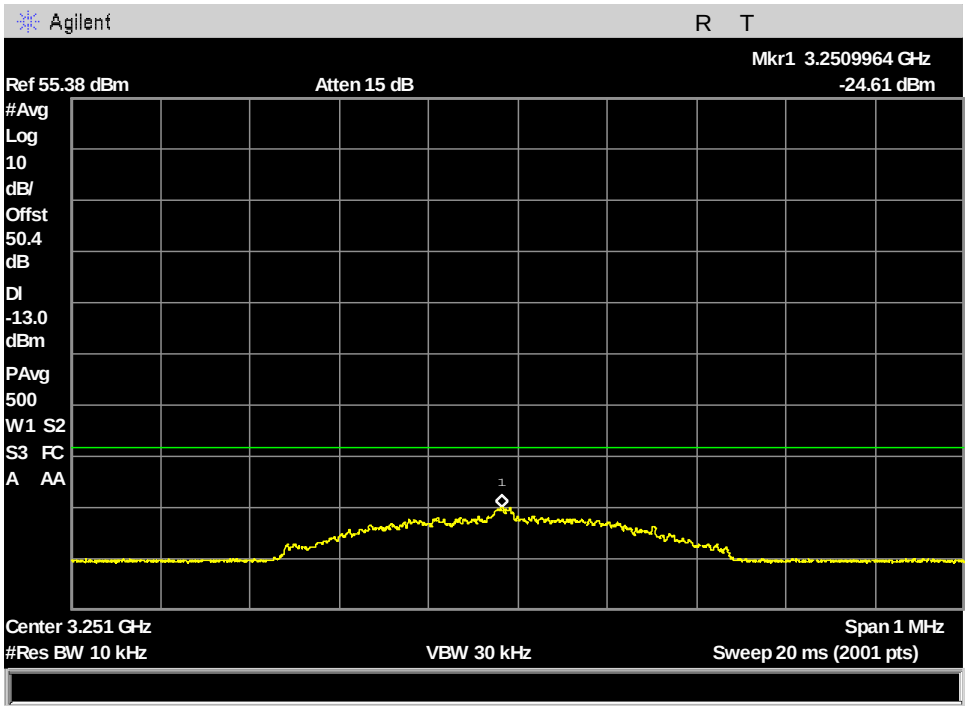

Figure 122: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_333.333kHz_2x harmonic Avg measurement

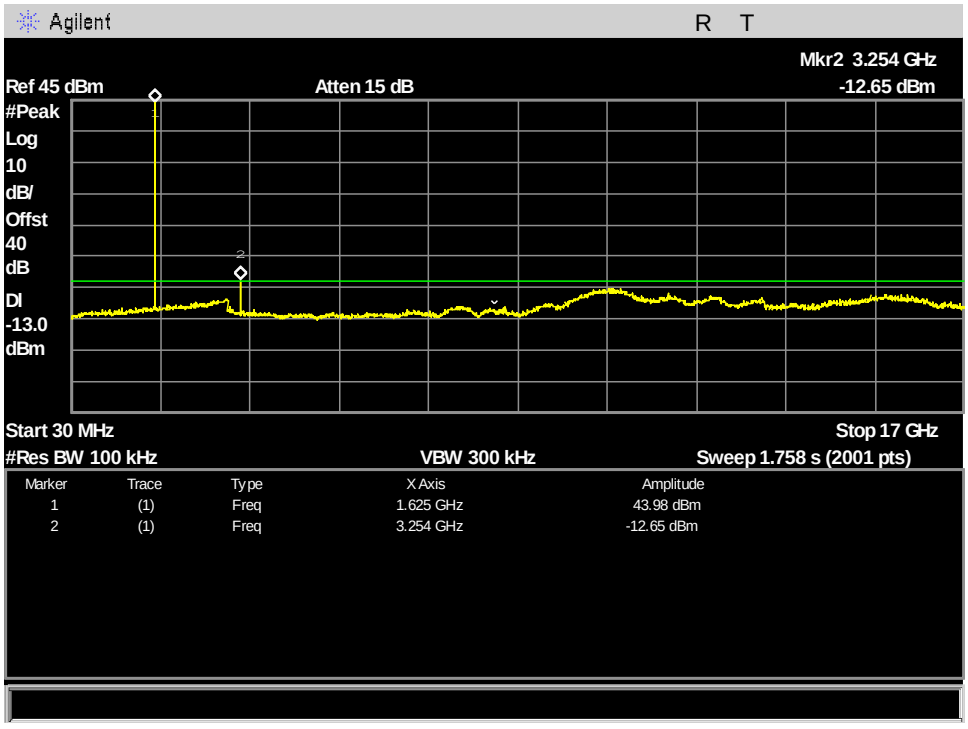

Figure 123: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_333.333kHz_30MHz - 17GHz

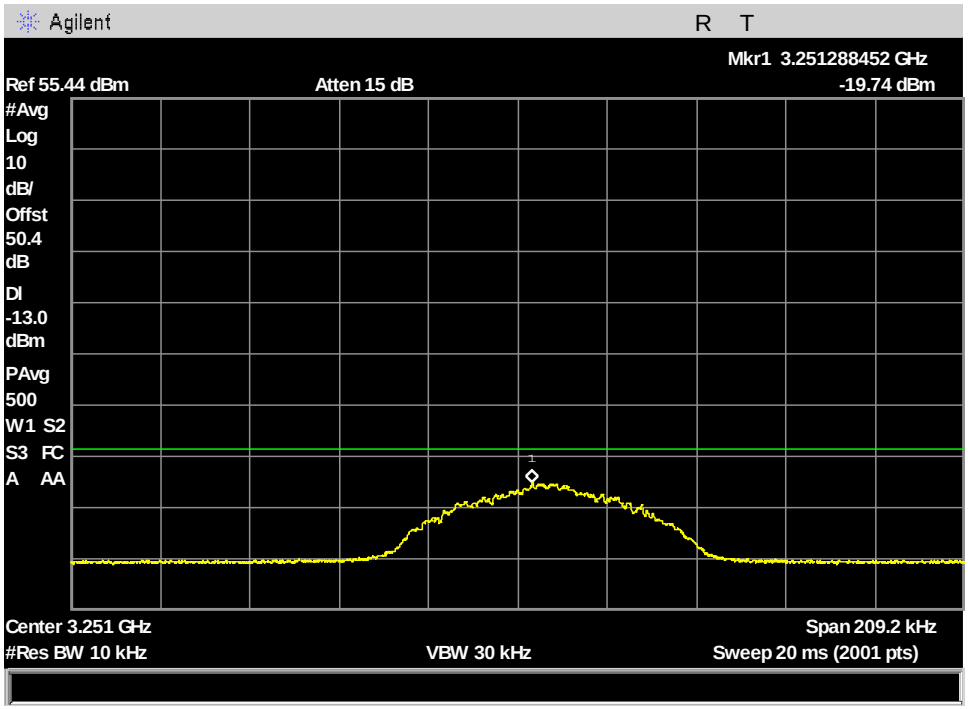

Figure 124: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_41.668kHz_2x harmonic Avg measurement

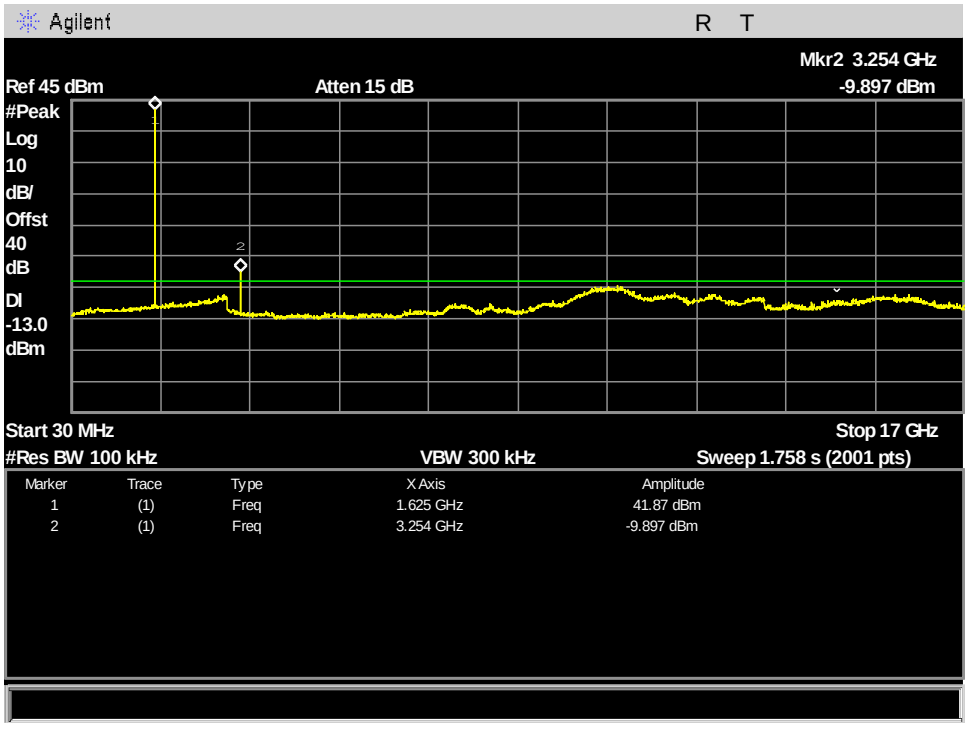

Figure 125: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_41.668kHz_30MHz - 17GHz

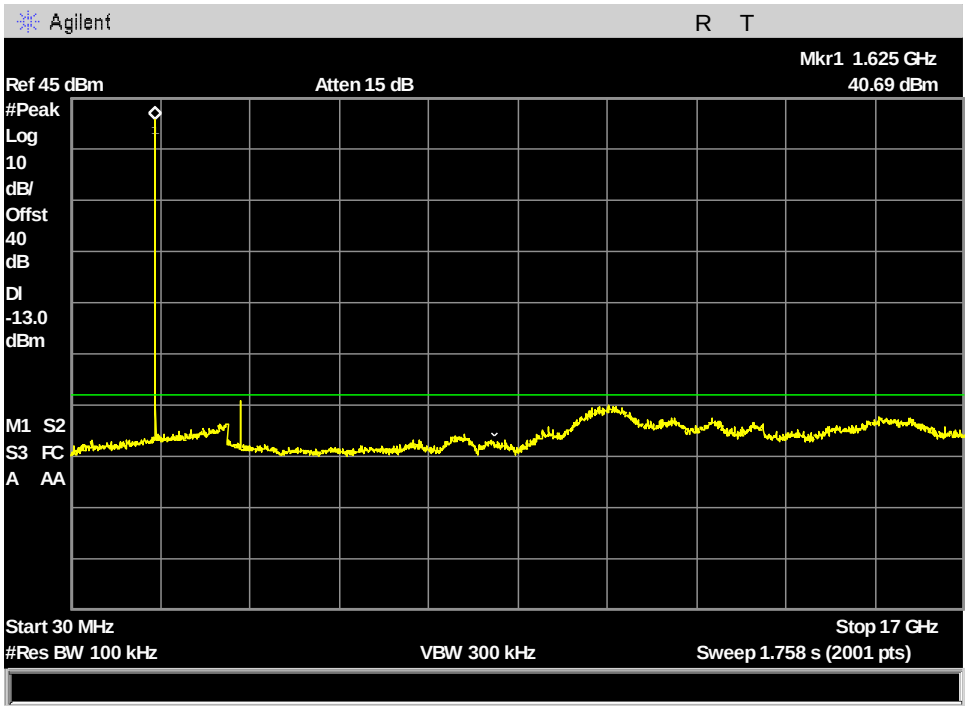

Figure 126: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_666.666kHz_30MHz - 17GHz

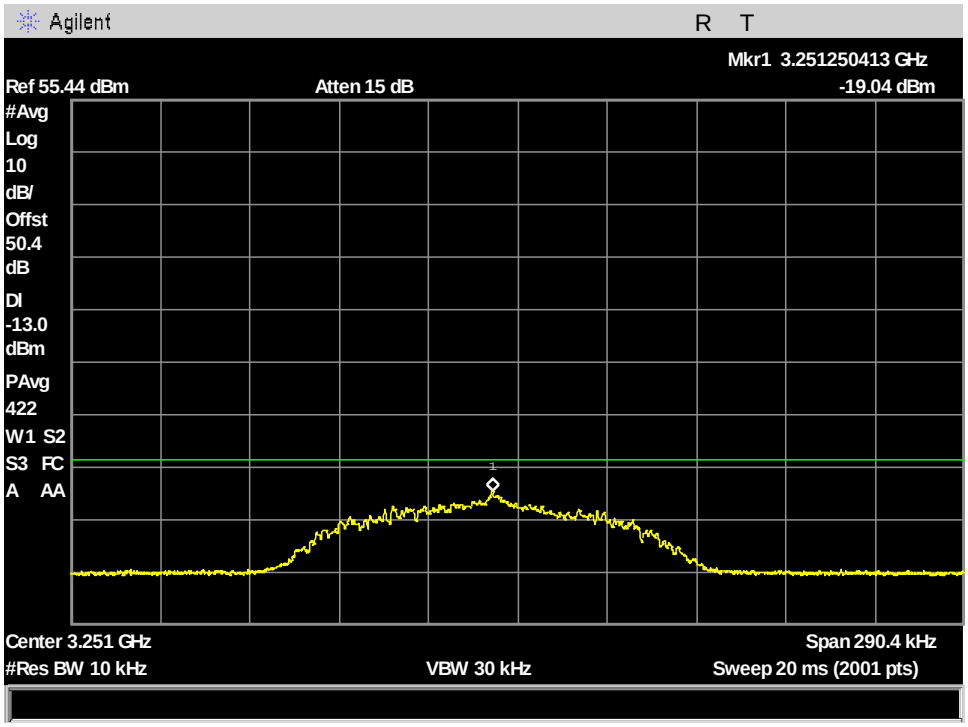

Figure 127: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_83.334kHz_2x harmonic Avg measurement

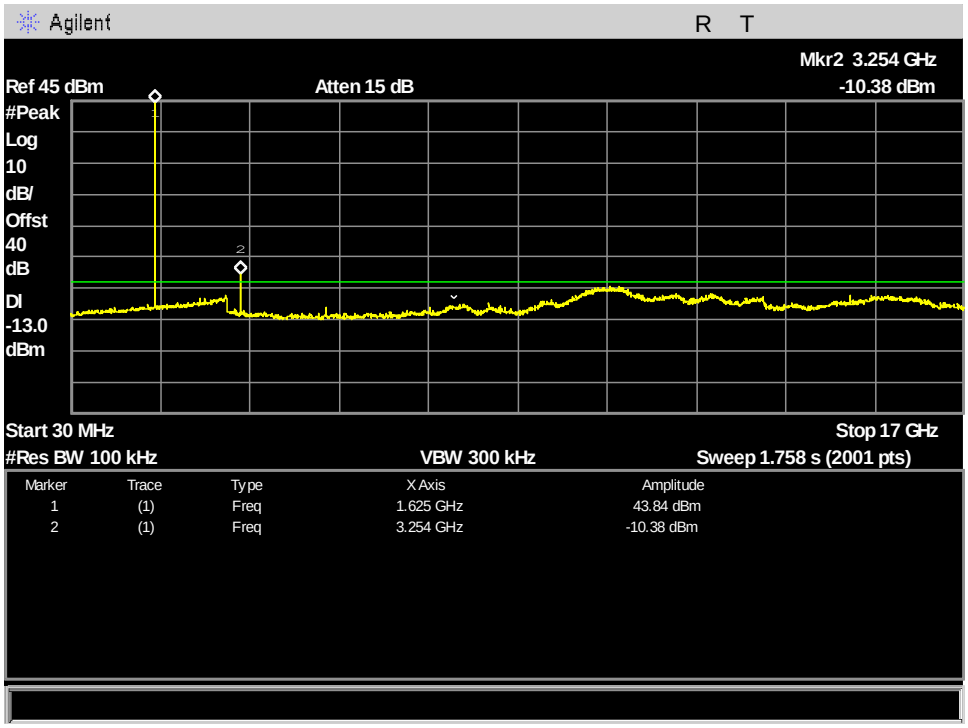

Figure 128: §25.202(f) MissionLINK Spurious Emissions at Antenna Terminals, ch232_83.334kHz_30MHz - 17GHz

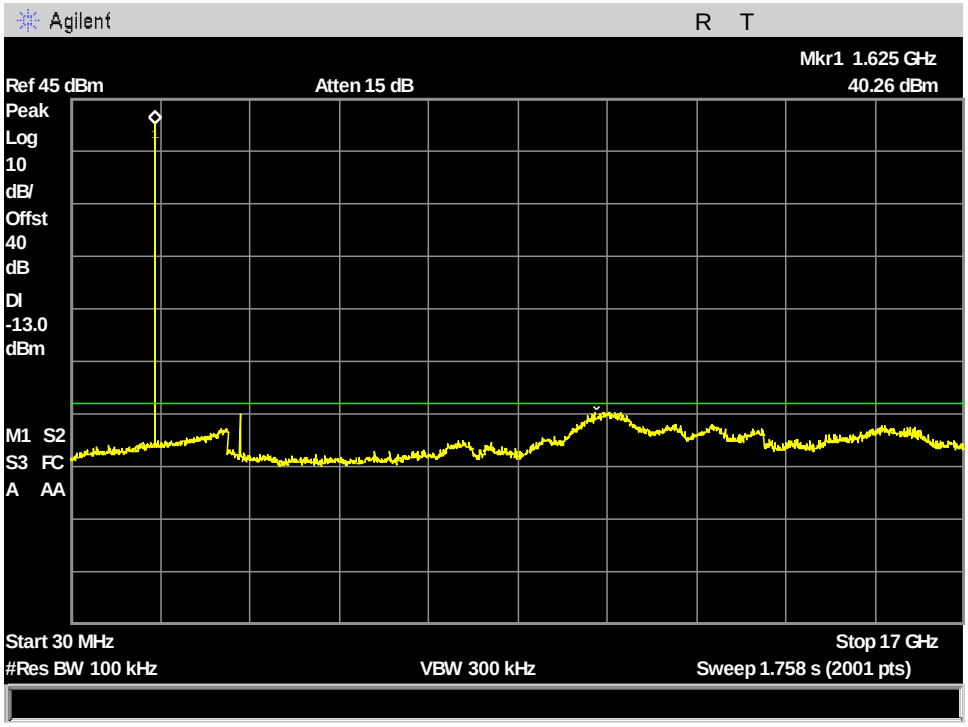

Figure 129: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch121_333.333kHz_30MHz - 17GHz

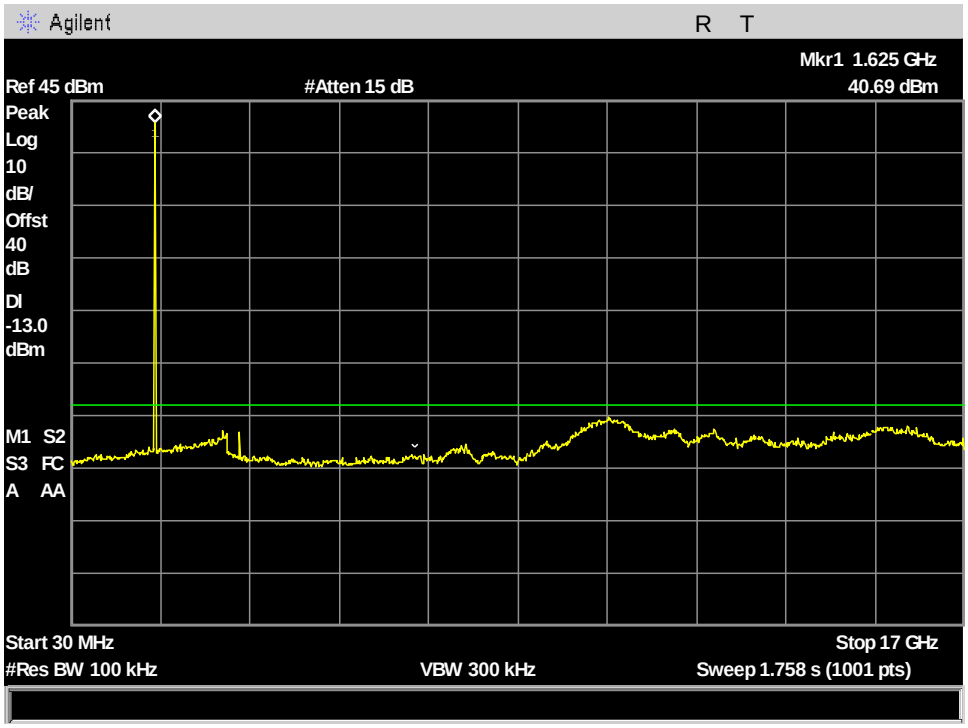

Figure 130: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch121_41.668kHz_30MHz - 17GHz

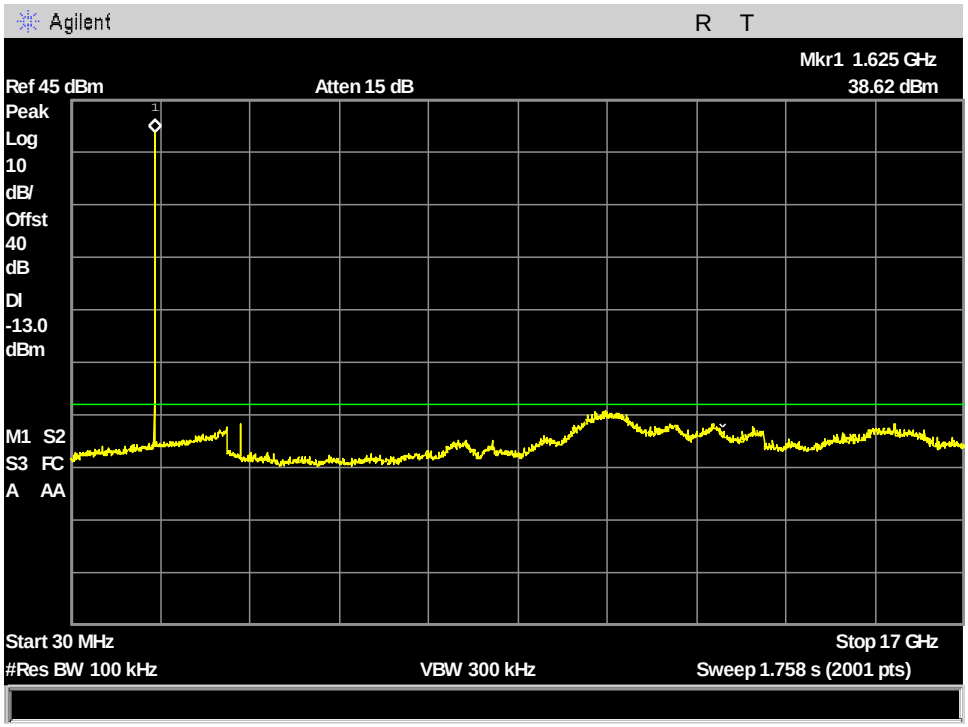

Figure 131: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch121_666.666kHz_30MHz - 17GHz

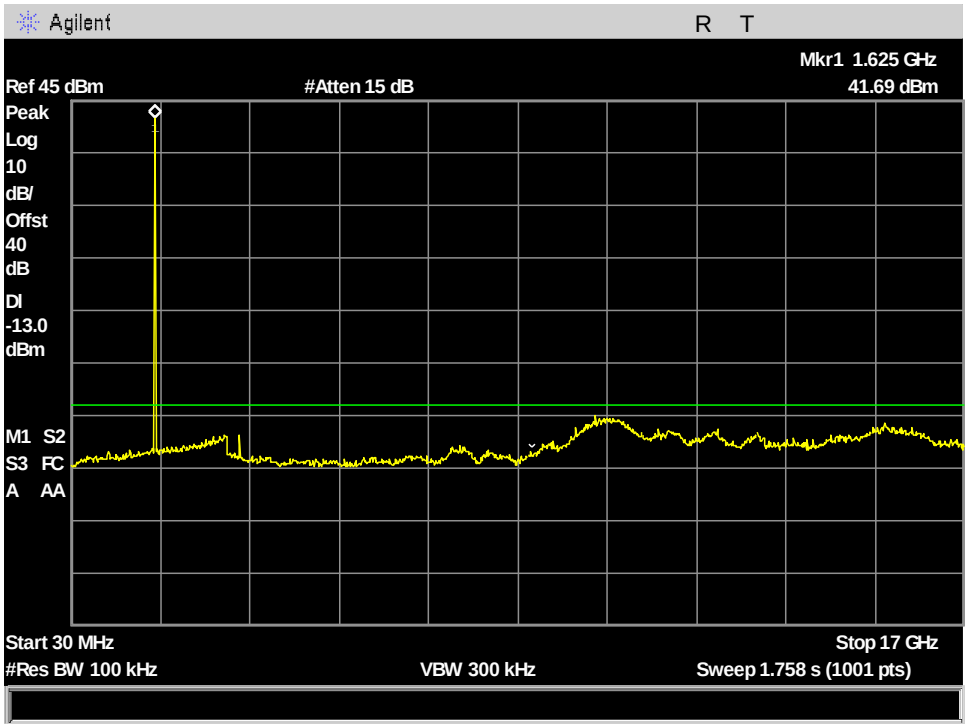

Figure 132: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch121_83.334kHz_30MHz - 17GHz

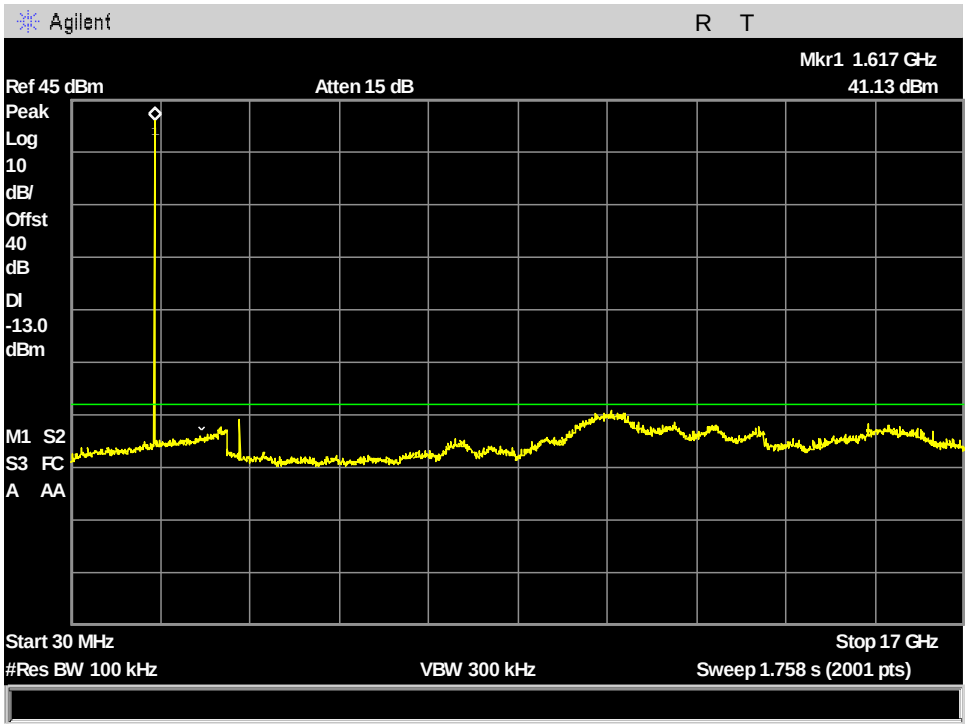

Figure 133: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch1_333.333kHz_30MHz - 17GHz

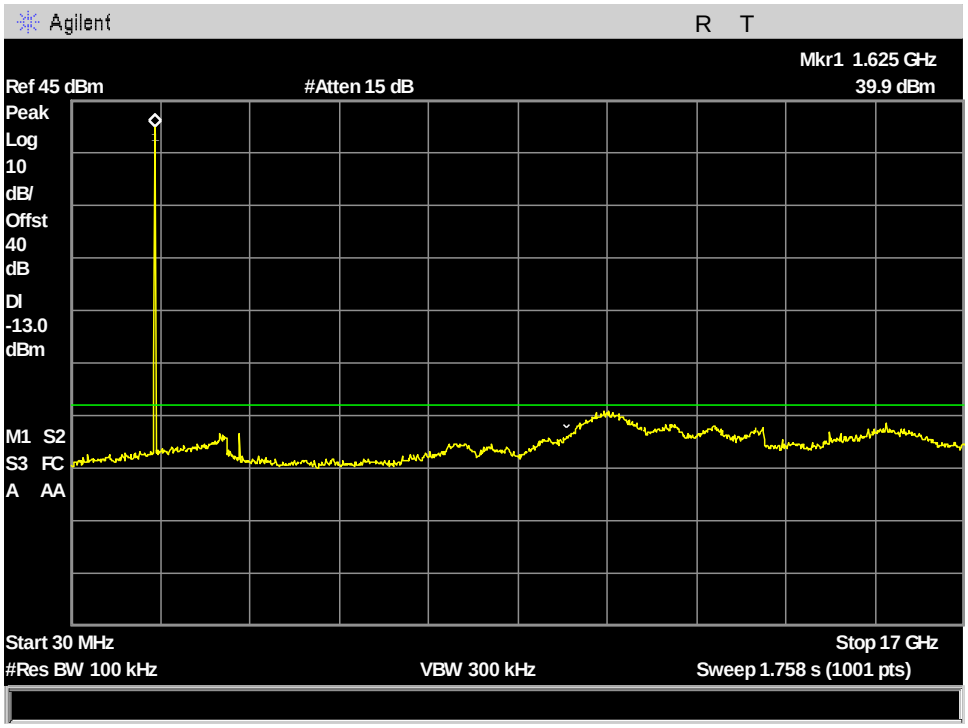

Figure 134: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch1_41.668kHz_30MHz - 17GHz

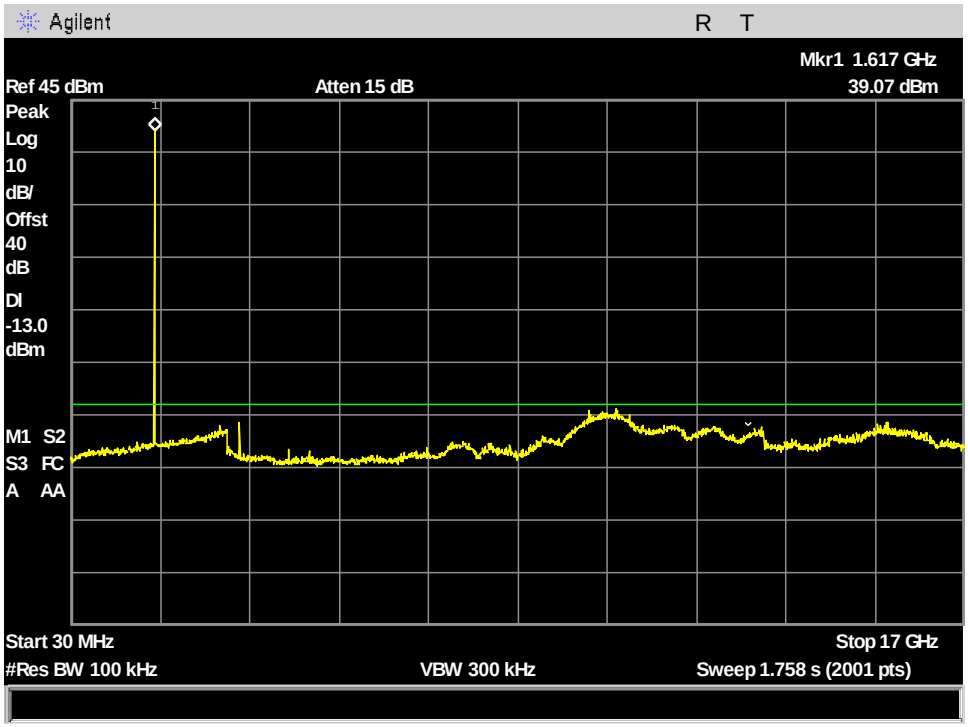

Figure 135: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch1_666.666kHz_30MHz - 17GHz

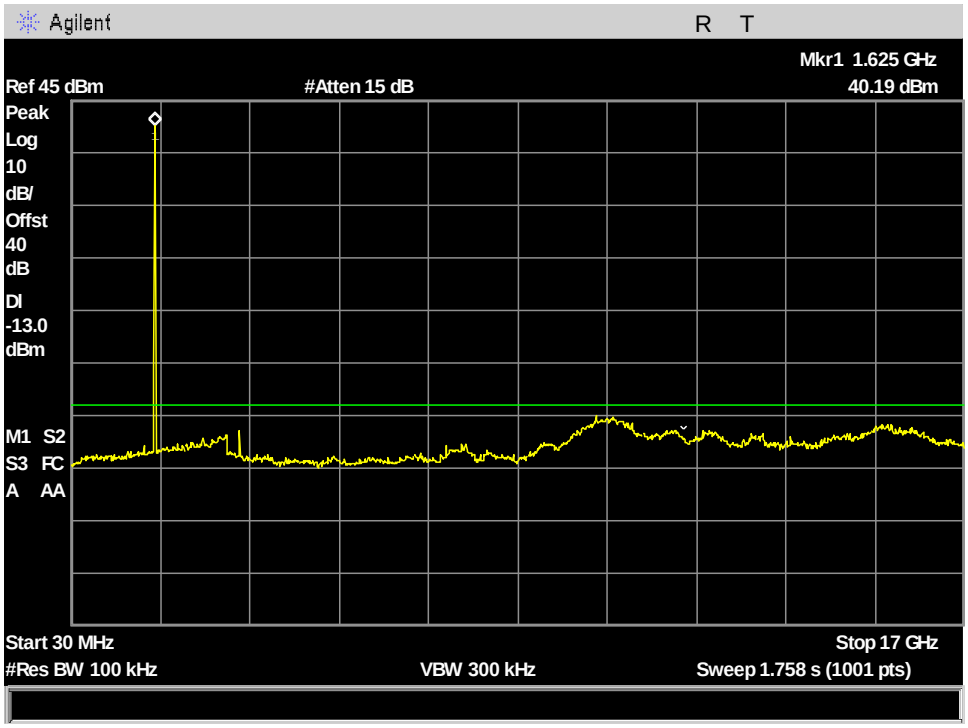

Figure 136: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch1_83.334kHz_30MHz - 17GHz

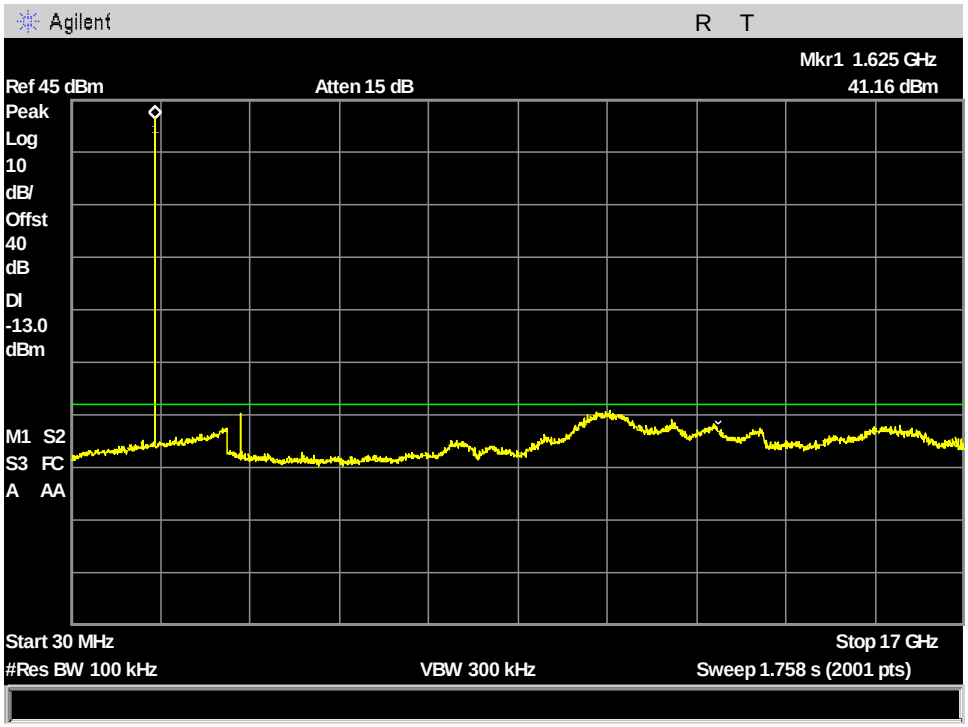

Figure 137: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch232_333.333kHz_30MHz - 17GHz

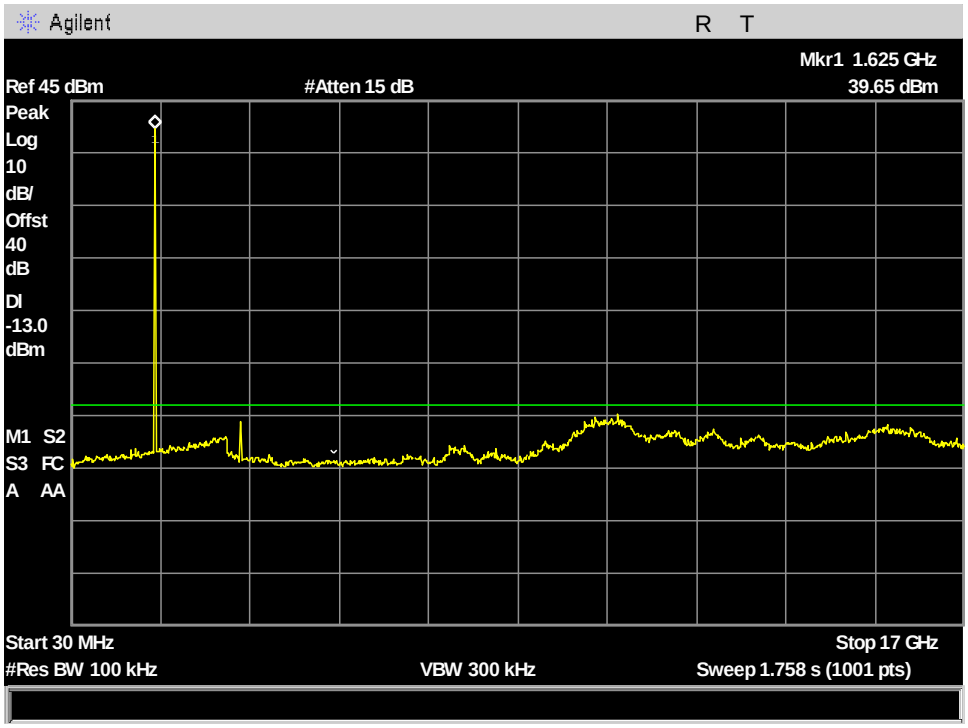

Figure 138: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch232_41.668kHz_30MHz - 17GHz

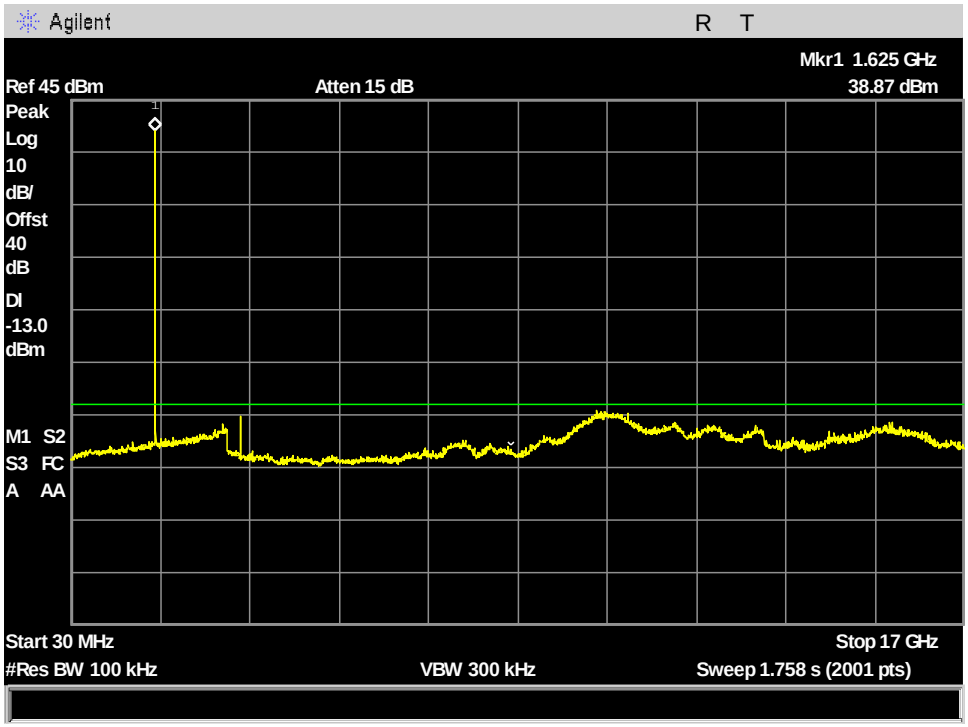

Figure 139: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch232_666.666kHz_30MHz - 17GHz

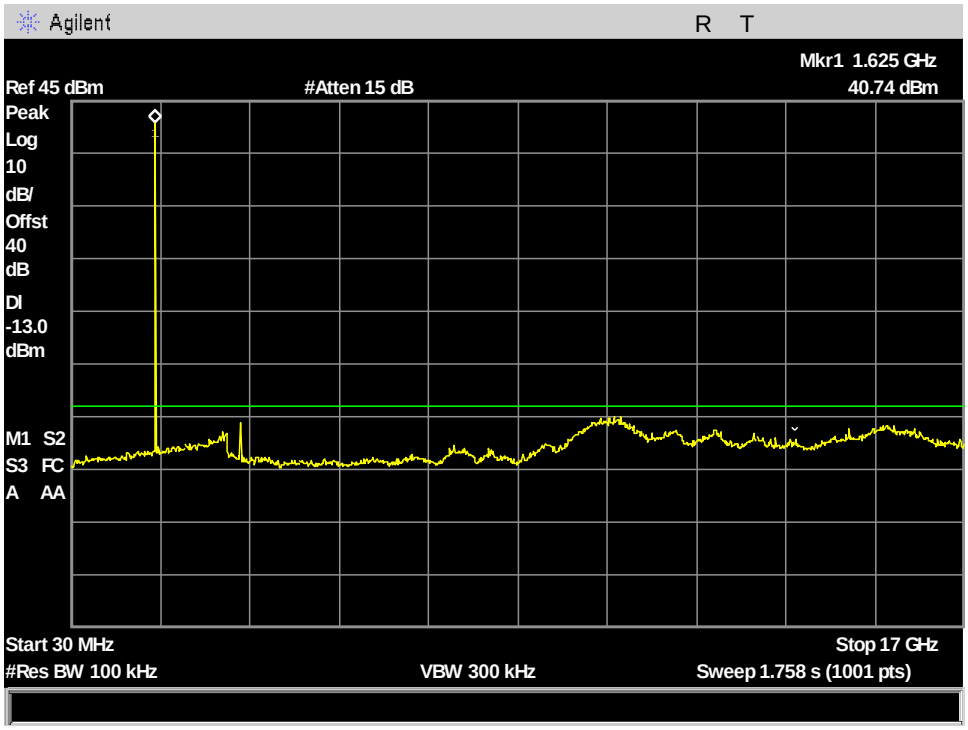

Figure 140: §25.202(f) VesseLINK Spurious Emissions at Antenna Terminals, ch232_83.334kHz_30MHz - 17GHz

Electromagnetic Compatibility Criteria for Satellite Communications

§25.202(d) Frequency Stability

Test Requirement(s): **§2.1055 Measurements required: Frequency stability.**

a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.
(3) From 0° to + 50° centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§25.202(d) Frequency Tolerance, Earth Stations – The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

Test Procedures: The resolution bandwidth of the spectrum analyzer was set to 1 kHz and the trace was set to max hold. The EUT was set to transmit on four channels. At nominal input voltage and at 20°C, the center frequency of each channel was measured using a frequency counter. At 20°C, the input voltage was varied between 85% and 115% of nominal and the measurement was repeated. The temperature was increased and decreased in increments of no more than 10°C and the center frequency measurement was repeated For each case, the measured center frequency was compared to the reference frequency taken at 20°C and 12VDC. The temperature range at which the measurements were performed was from -30C to 50C. Procedure was repeated for the high channel.

Test Results: The EUT is compliant with the requirements of this section.

Test Engineer(s): **Donald Salguero**

Test Date(s): November 20, 2020

Channel 1 - 41.668kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1616.0201	1616.02083	0.00004517	0.001
40	1616.020625	1616.02083	0.00001269	0.001
30	1616.021525	1616.02083	0.00004301	0.001
20	1616.021825	1616.02083	0.00006157	0.001
10	1616.021575	1616.02083	0.00004610	0.001
0	1616.02105	1616.02083	0.00001361	0.001
-10	1616.02097	1616.02083	0.00000866	0.001
-20	1616.021645	1616.02083	0.00005043	0.001
-30	1616.021975	1616.02083	0.00007085	0.001

Figure 141: §25.202(d) Frequency Stability, Channel 1 - 41.668kHz Bandwidth

Channel 232 - 41.668kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1625.645	1625.64583	0.00005106	0.001
40	1625.6459	1625.64583	0.00000431	0.001
30	1625.6465	1625.64583	0.00004121	0.001
20	1625.64695	1625.64583	0.00006890	0.001
10	1625.64665	1625.64583	0.00005044	0.001
0	1625.64605	1625.64583	0.00001353	0.001
-10	1625.64613	1625.64583	0.00001845	0.001
-20	1625.646575	1625.64583	0.00004583	0.001
-30	1625.64693	1625.64583	0.00006767	0.001

Figure 142: §25.202(d) Frequency Stability, Channel 232 - 41.668kHz Bandwidth

Channel 1 - 666.666kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1616.331	1616.3333	0.00014230	0.001
40	1616.331	1616.3333	0.00014230	0.001
30	1616.332	1616.3333	0.00008043	0.001
20	1616.333	1616.3333	0.00001856	0.001
10	1616.333	1616.3333	0.00001856	0.001
0	1616.33	1616.3333	0.00020417	0.001
-10	1616.331	1616.3333	0.00014230	0.001
-20	1616.332	1616.3333	0.00008043	0.001
-30	1616.331	1616.3333	0.00014230	0.001

Figure 143: §25.202(d) Frequency Stability, Channel 1 - 666.666kHz Bandwidth

Channel 232 - 666.666kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1625.664	1625.6667	0.00016609	0.001
40	1625.665	1625.6667	0.00010457	0.001
30	1625.666	1625.6667	0.00004306	0.001
20	1625.665	1625.6667	0.00010457	0.001
10	1625.665	1625.6667	0.00010457	0.001
0	1625.666	1625.6667	0.00004306	0.001
-10	1625.665	1625.6667	0.00010457	0.001
-20	1625.666	1625.6667	0.00004306	0.001
-30	1625.665	1625.6667	0.00010457	0.001

Figure 144: §25.202(d) Frequency Stability, Channel 232 - 666.666kHz Bandwidth

Channel 1 – 83.334kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1616.0422	1616.04167	0.00003280	0.001
40	1616.0422	1616.04167	0.00003280	0.001
30	1616.0424	1616.04167	0.00004517	0.001
20	1616.0415	1616.04167	0.00001052	0.001
10	1616.0417	1616.04167	0.00000186	0.001
0	1616.0423	1616.04167	0.00003898	0.001
-10	1616.0427	1616.04167	0.00006374	0.001
-20	1616.0425	1616.04167	0.00005136	0.001
-30	1616.0427	1616.04167	0.00006374	0.001

Figure 145: §25.202(d) Frequency Stability, Channel 1 – 83.334kHz Bandwidth

Channel 232 – 83.334kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1625.622	1625.625	0.00018454	0.001
40	1625.623	1625.625	0.00012303	0.001
30	1625.628	1625.625	0.00018454	0.001
20	1625.622	1625.625	0.00018454	0.001
10	1625.624	1625.625	0.00006151	0.001
0	1625.623	1625.625	0.00012303	0.001
-10	1625.621	1625.625	0.00024606	0.001
-20	1625.627	1625.625	0.00012303	0.001
-30	1625.622	1625.625	0.00018454	0.001

Figure 146: §25.202(d) Frequency Stability, Channel 232 – 83.334kHz Bandwidth

Channel 1 – 333.333kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1616.1677	1616.16667	0.00006373	0.001
40	1616.1659	1616.16667	0.00004764	0.001
30	1616.1669	1616.16667	0.00001423	0.001
20	1616.1666	1616.16667	0.00000433	0.001
10	1616.1643	1616.16667	0.00014664	0.001
0	1616.1649	1616.16667	0.00010952	0.001
-10	1616.1672	1616.16667	0.00003279	0.001
-20	1616.1647	1616.16667	0.00012189	0.001
-30	1616.1689	1616.16667	0.00013798	0.001

Figure 147: §25.202(d) Frequency Stability, Channel 1 – 333.333kHz Bandwidth

Channel 232 – 333.333kHz Bandwidth				
Temperature (ºC)	Measured Center Frequency (MHz)	Nominal Center Frequency (MHz)	Maximum Deviation from Frequency (%)	Limit
50	1625.5031	1625.5	0.00019071	0.001
40	1625.4987	1625.5	0.00007998	0.001
30	1625.4992	1625.5	0.00004922	0.001
20	1625.4997	1625.5	0.00001846	0.001
10	1625.5012	1625.5	0.00007382	0.001
0	1625.5025	1625.5	0.00015380	0.001
-10	1625.4988	1625.5	0.00007382	0.001
-20	1625.4995	1625.5	0.00003076	0.001
-30	1625.5026	1625.5	0.00015995	0.001

Figure 148: §25.202(d) Frequency Stability, Channel 232 – 333.333kHz Bandwidth

Electromagnetic Compatibility Criteria for Satellite Communications

§25.202(f) Radiated Spurious Emissions

Test Requirement(s): **§25.202 Emission Limitations:**

(f) Except for SDARS terrestrial repeaters, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

5) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
6) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
7) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
8) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 10 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40 GHz, which ever was the lesser, were investigated.

The spectrum analyzer was set with a 100kHz RBW and 300kHz VBW for all frequencies from 30MHz to 18GHz

The field strength was corrected using antenna factors, cable loss. An offset of 10Log(100/4) was applied to the trace to account for a 4kHz RBW measurement as per the standard.

Note: Emissions on the frequency range 9kHz – 30MHz were attenuated more than 20dB below the permissible value.

Test Results: The EUT is compliant with the requirements of this section. The plots have been corrected to EIRP on dBm by way of: EIRP = E + 20log(d) – 104.77
Where E is the measured field strength in dBuV/m, and 'd' is the measurement distance

Test Engineer(s): **Donald Salguero**

Test Date(s): November 9, 2020

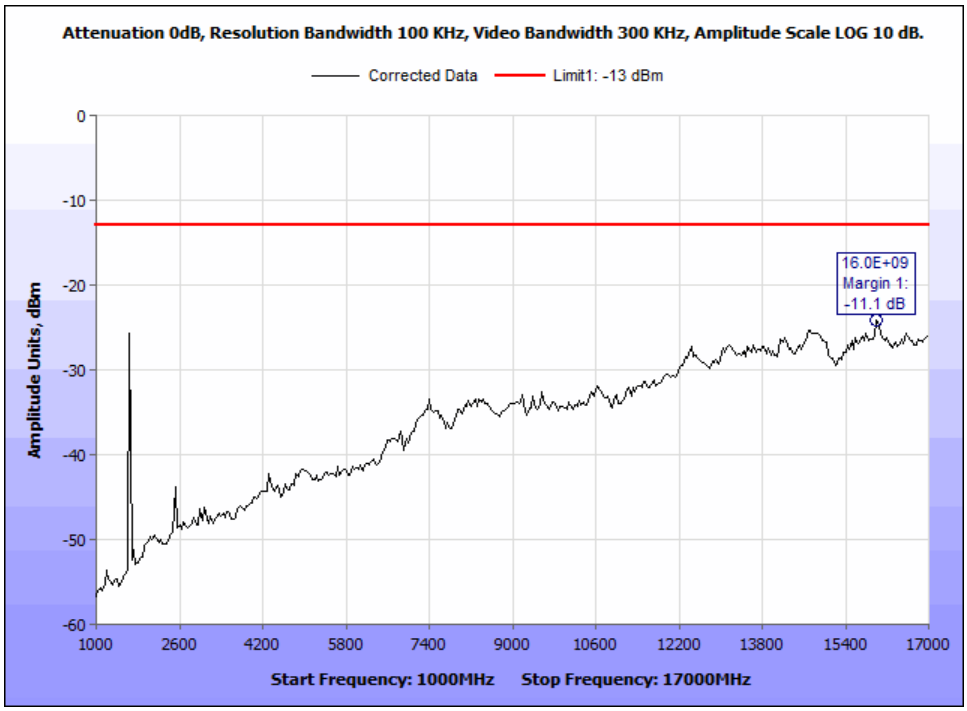

Figure 149: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_333.333kHz BW_1-17 GHz.

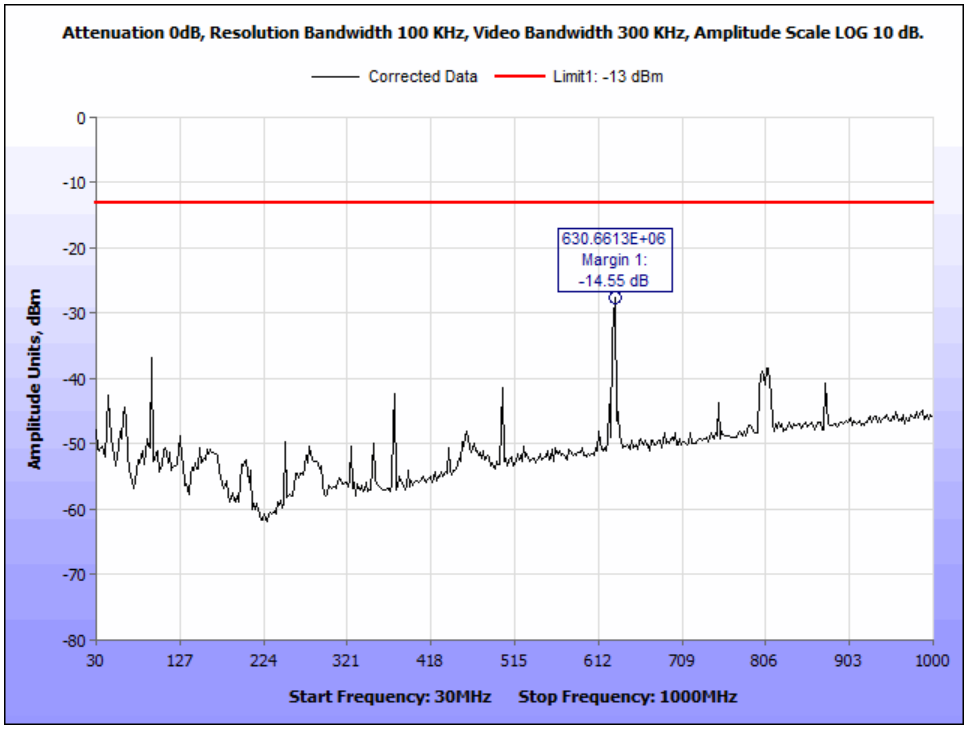

Figure 150: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_333.333kHz BW_30-1000MHz.

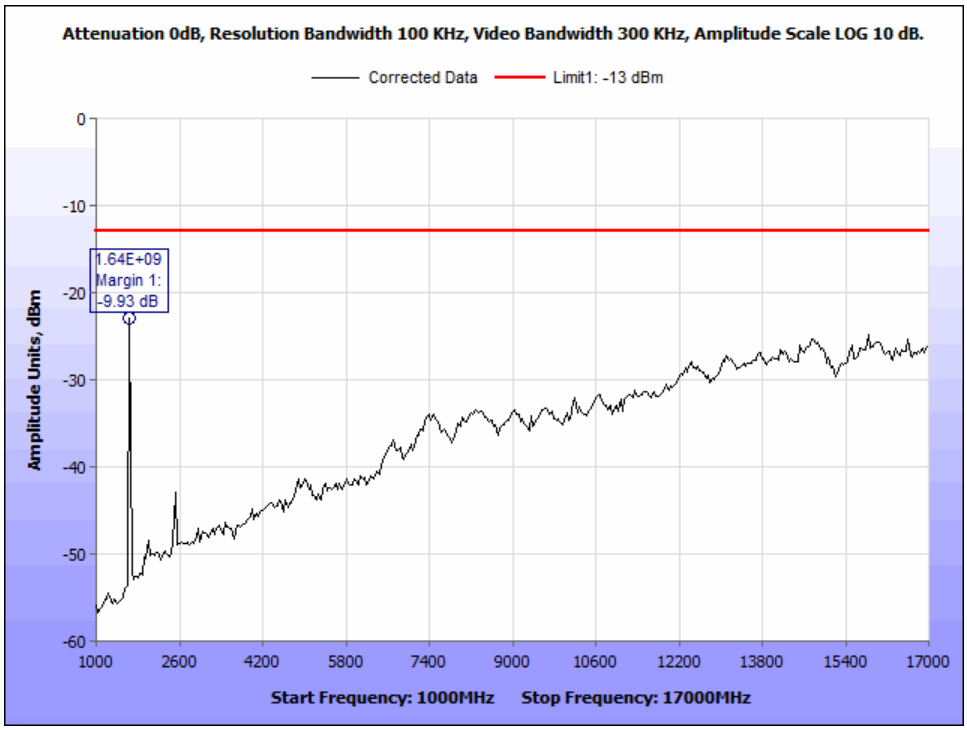

Figure 151: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_41.668kHz BW_1-17 GHz.

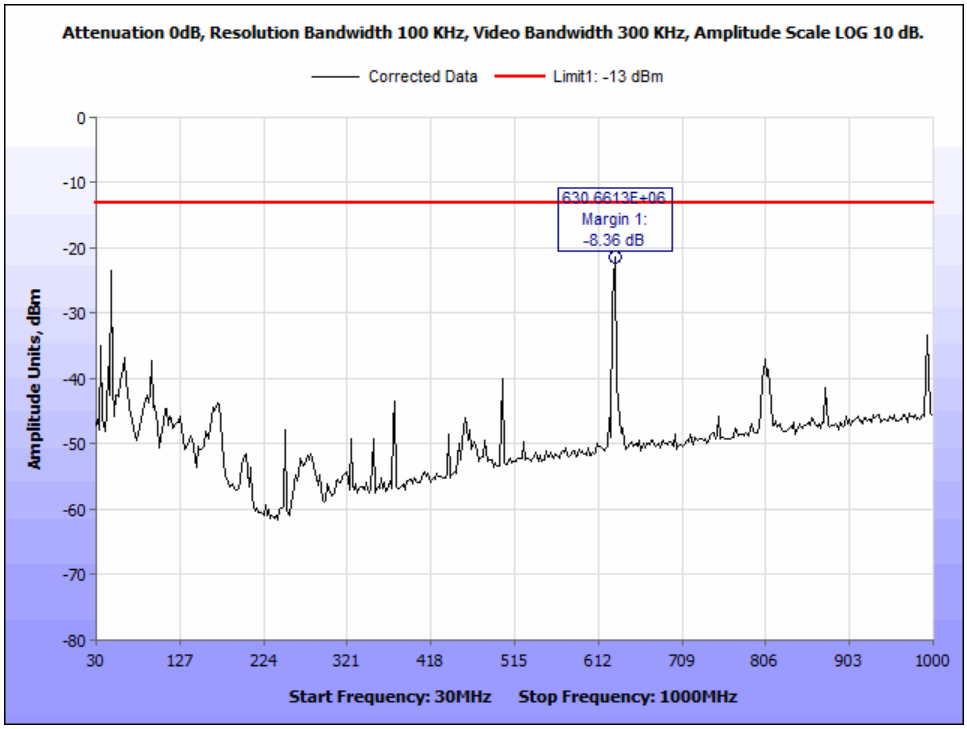

Figure 152: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_41.668kHz BW_30-1000MHz.

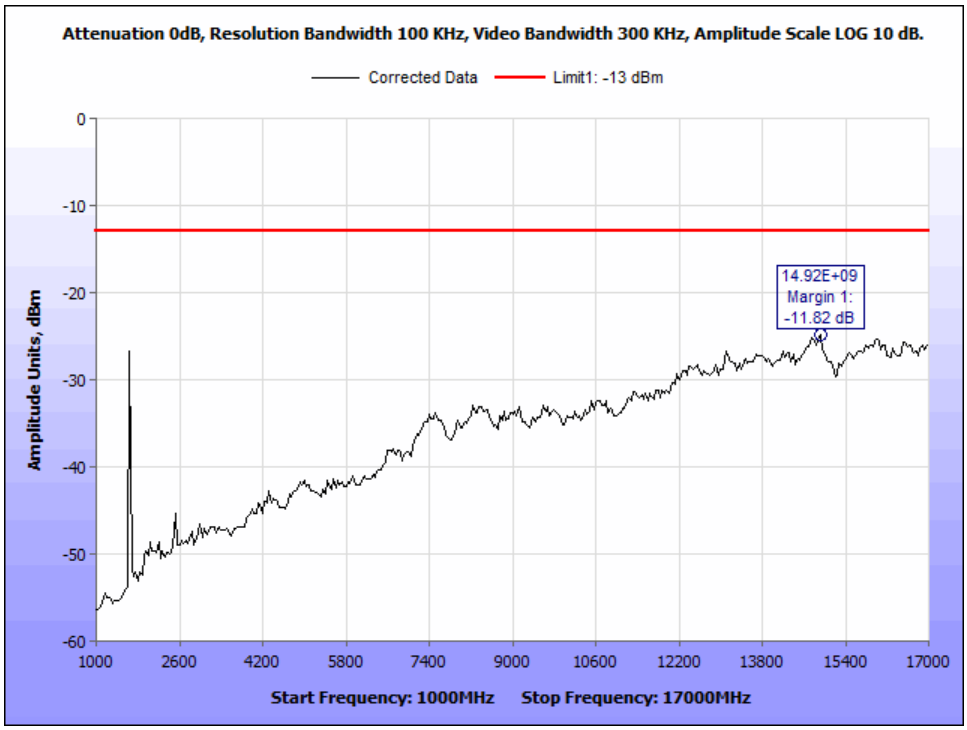

Figure 153: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_666.666kHz BW_1-17 GHz.

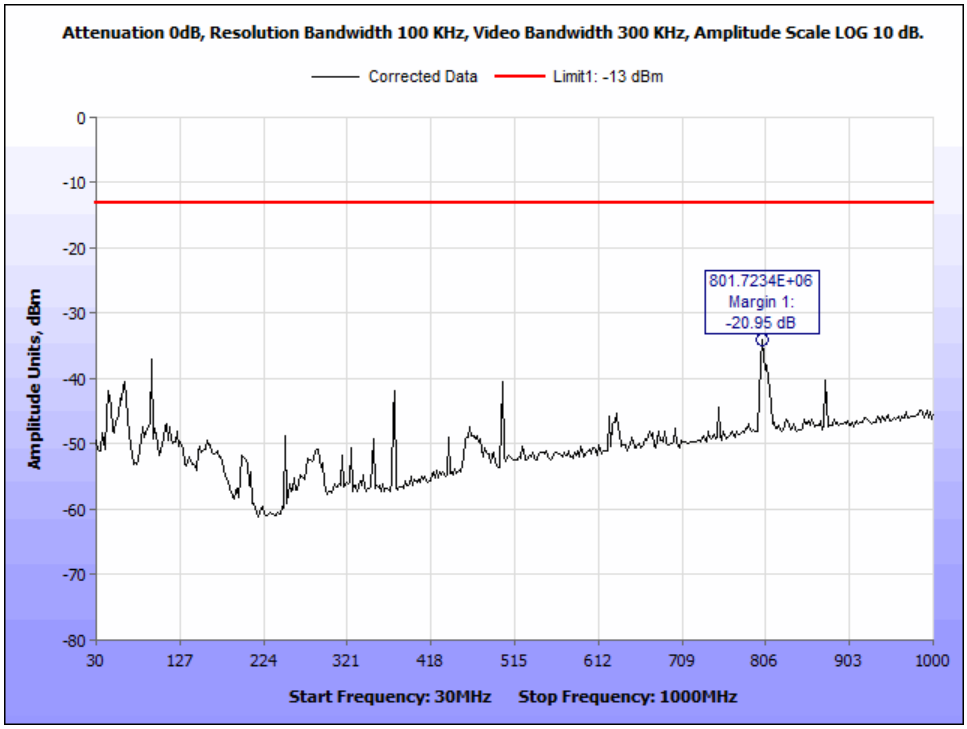

Figure 154: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_666.666kHz BW_30-1000MHz.

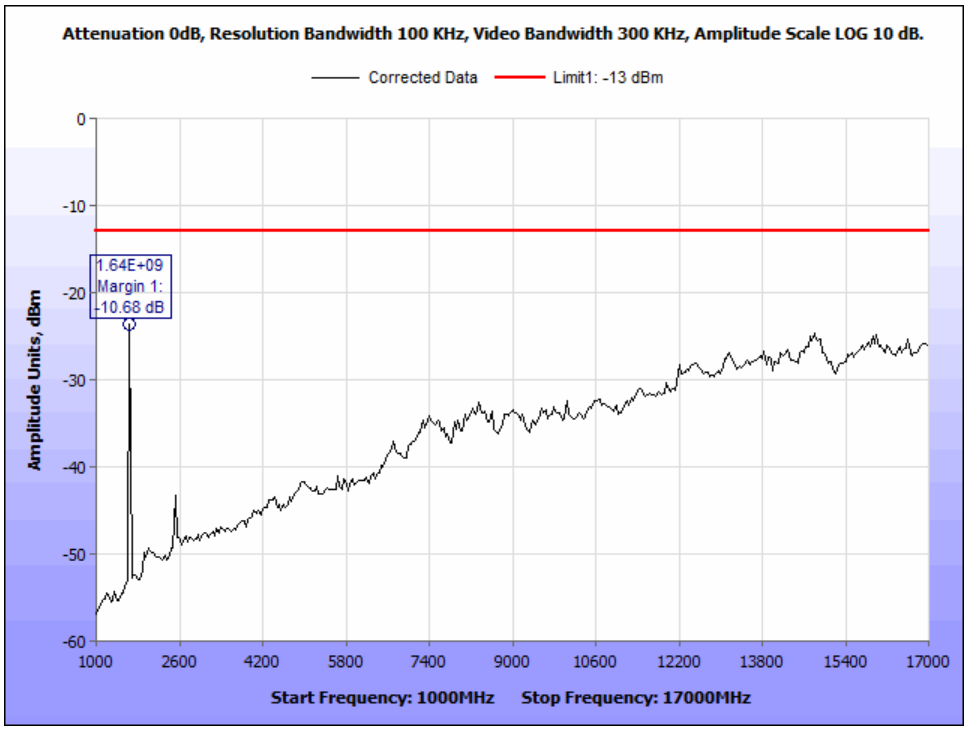

Figure 155: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_83.334kHz BW_1-17 GHz.

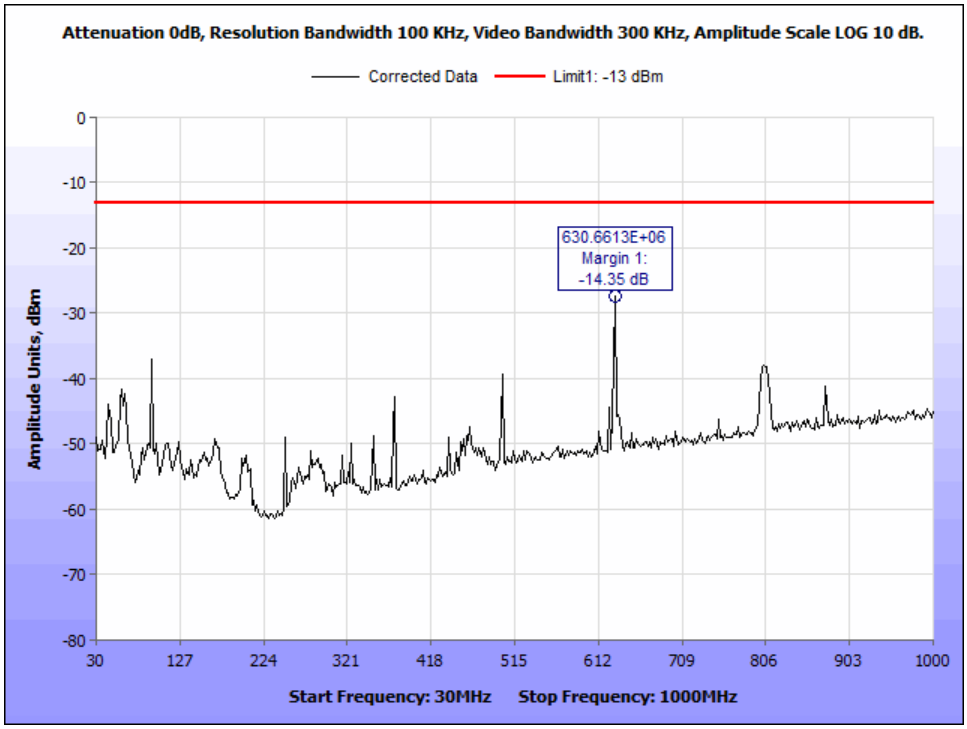

Figure 156: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch121_83.334kHz BW_30-1000MHz.

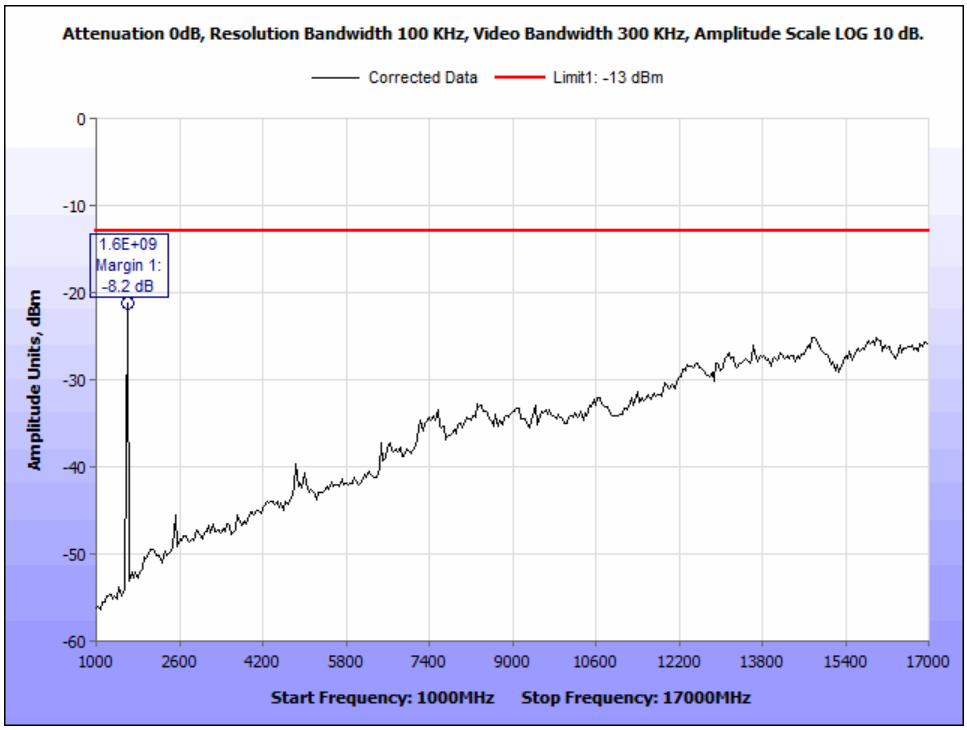

Figure 157: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_333.333kHz BW_1-17 GHz.

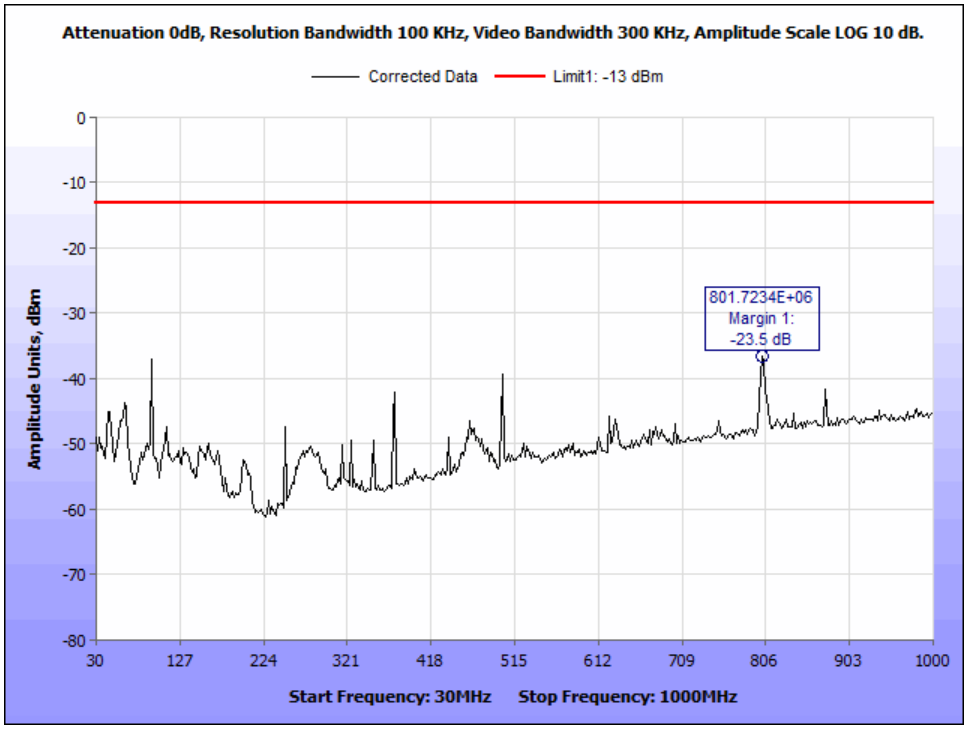

Figure 158: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_333.333kHz BW_30-1000MHz.

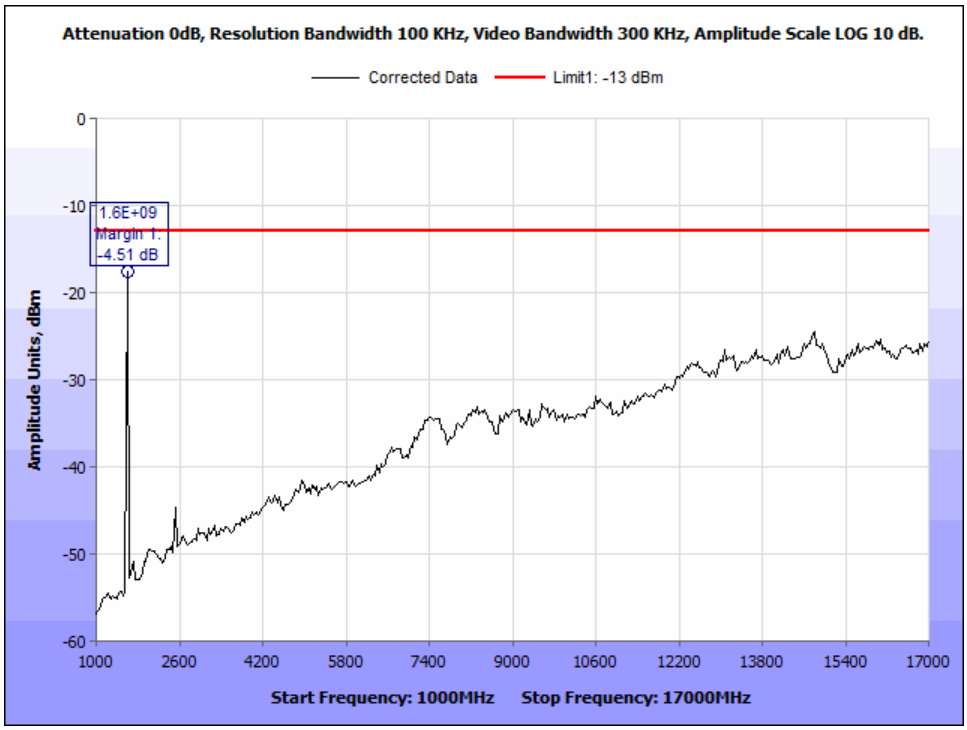

Figure 159: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_41.668kHz BW_1-17 GHz.

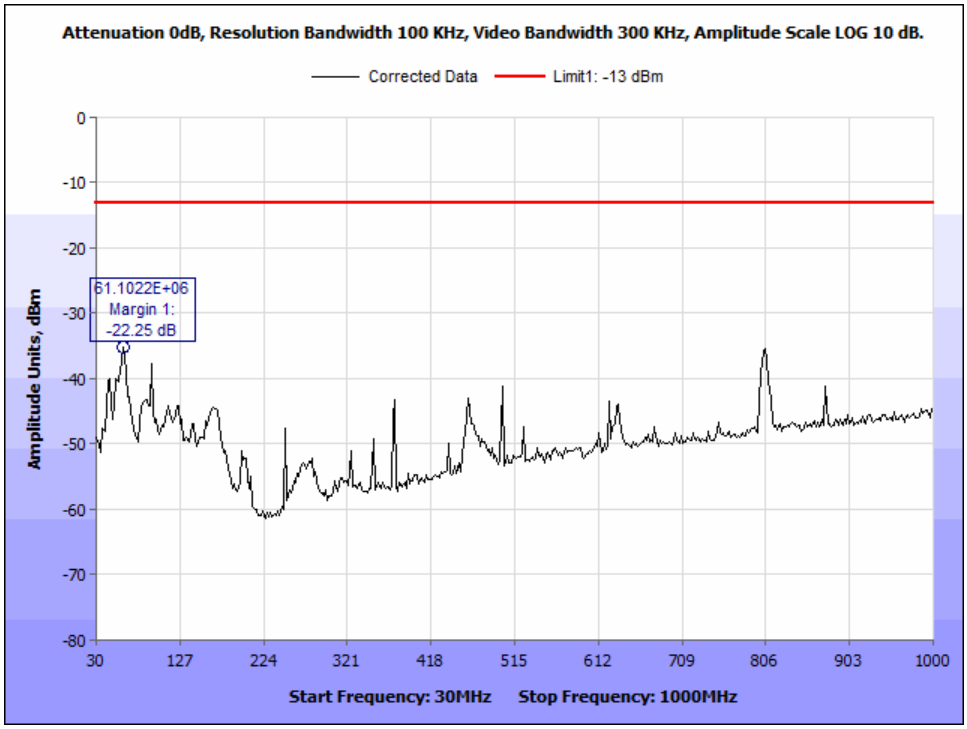

Figure 160: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_41.668kHz BW_30-1000MHz.

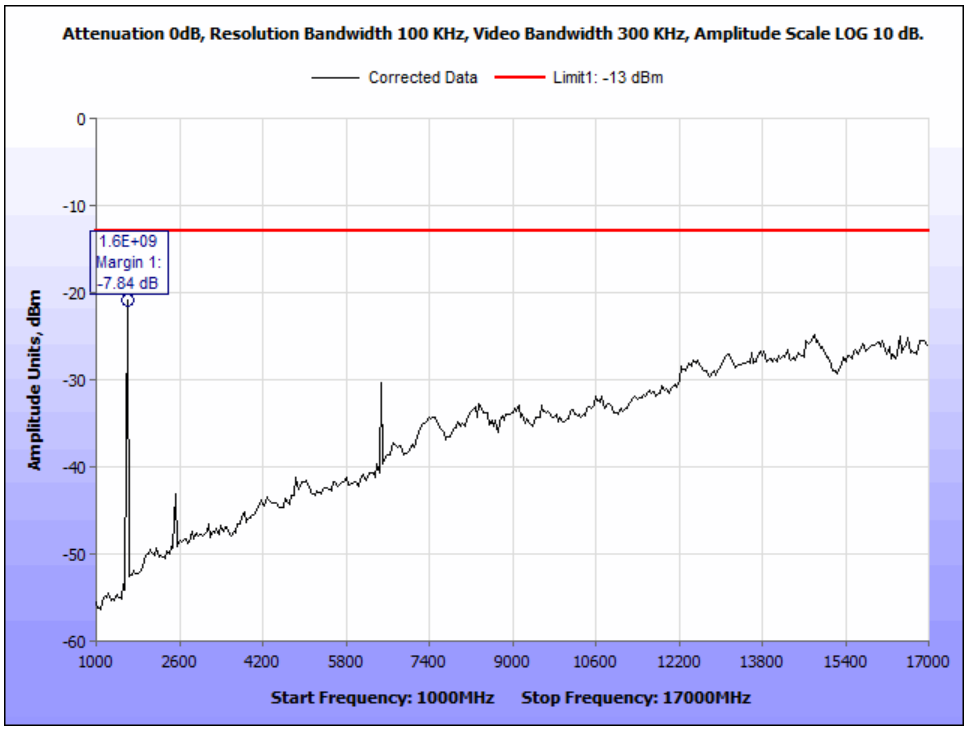

Figure 161: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_666.666kHz BW_1-17 GHz.

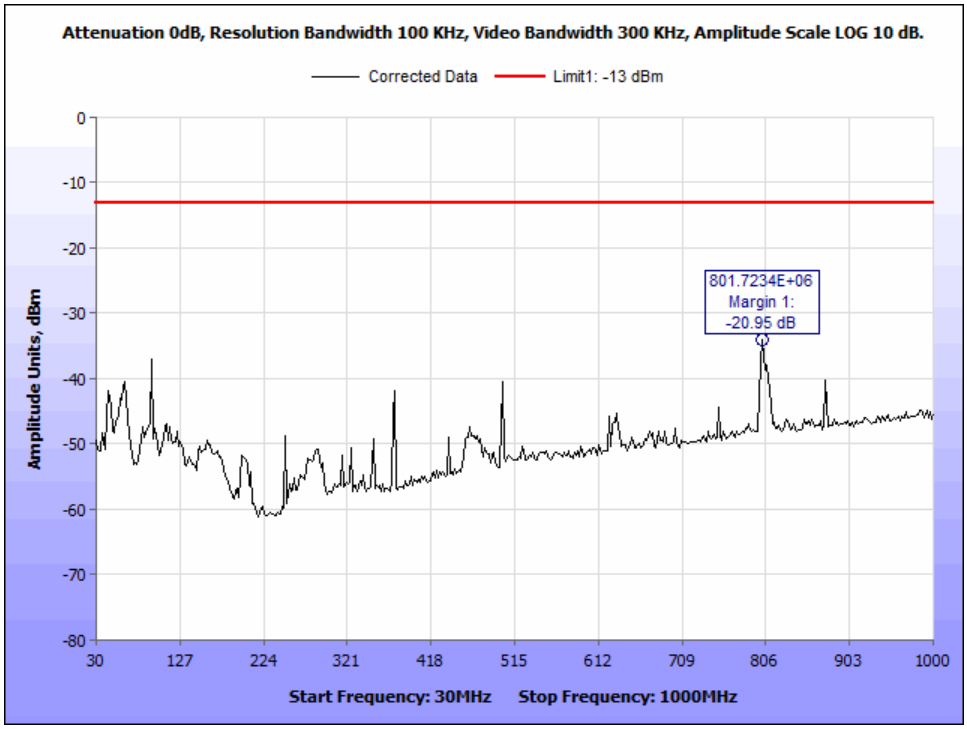

Figure 162: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_666.666kHz BW_30-1000MHz.

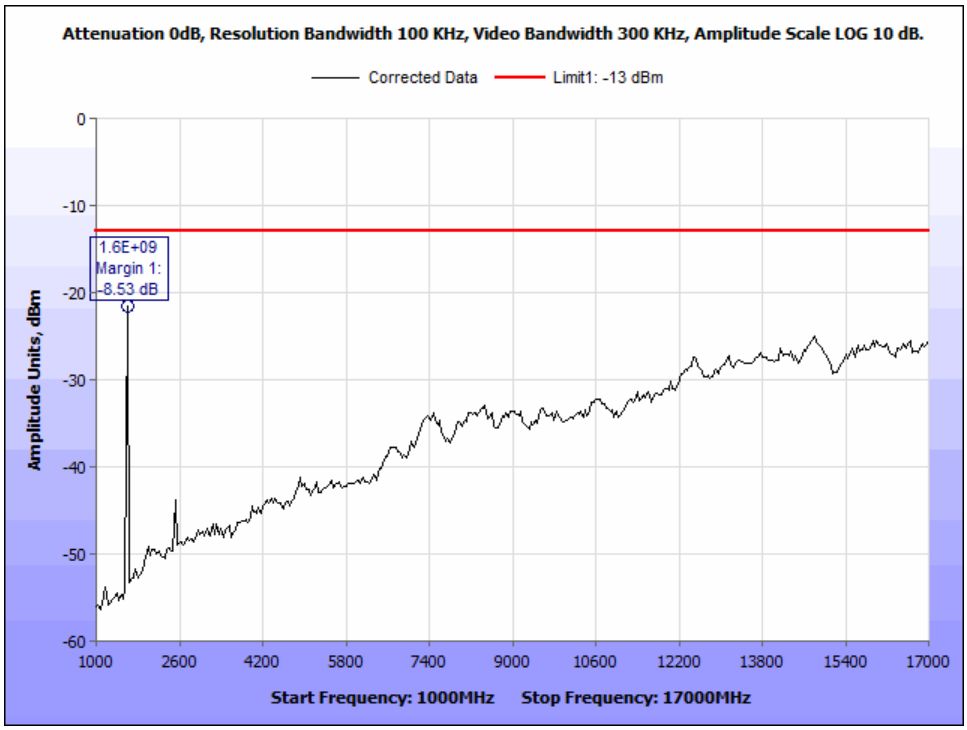

Figure 163: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_83.334kHz BW_1-17 GHz.

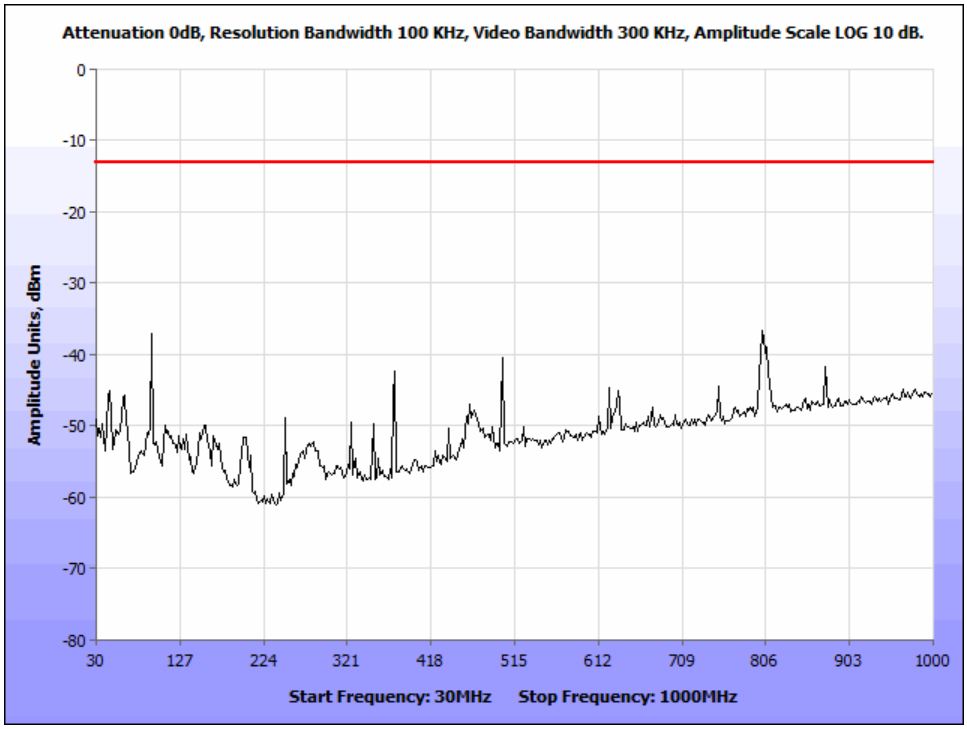

Figure 164: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch1_83.334kHz BW_30-1000MHz.

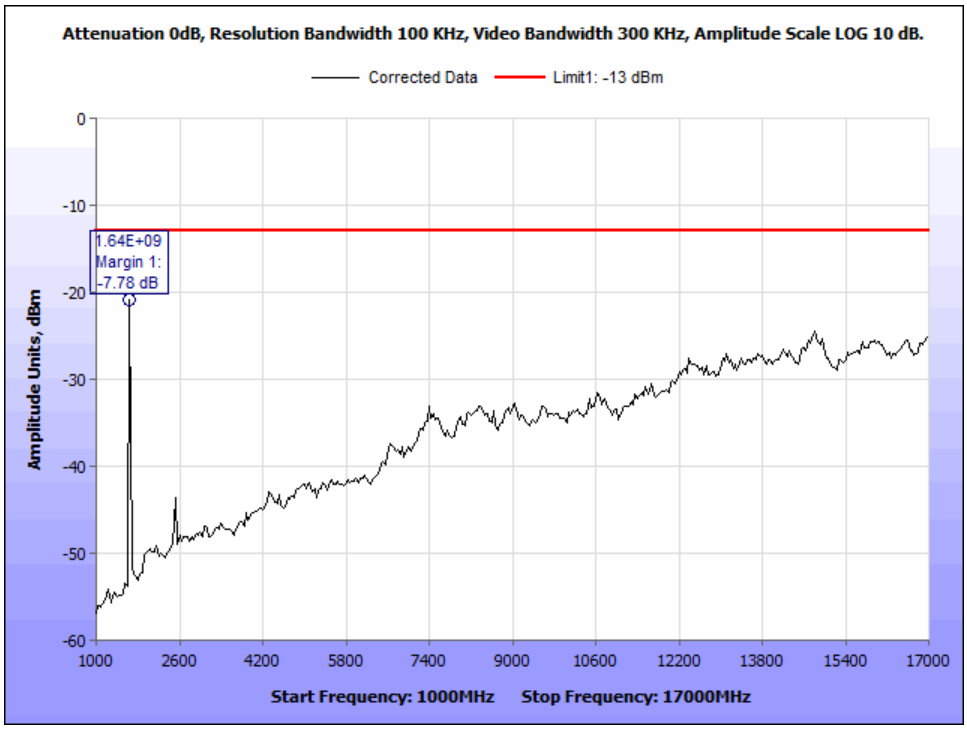

Figure 165: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_333.333kHz BW_1-17 GHz.

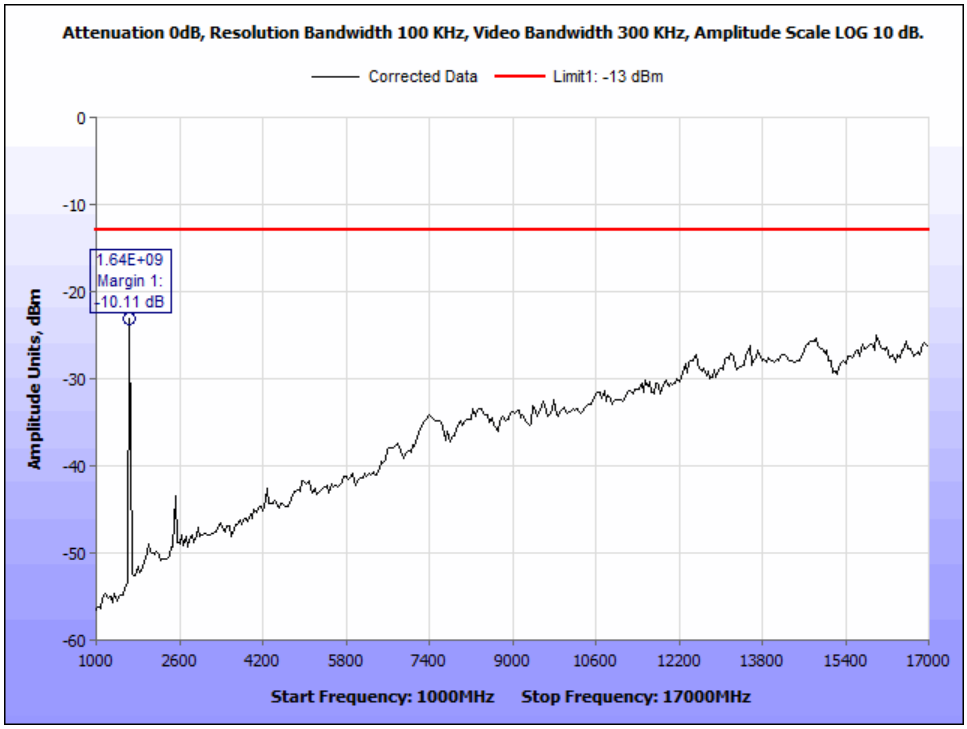

Figure 166: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_41.668kHz BW_1-17 GHz.

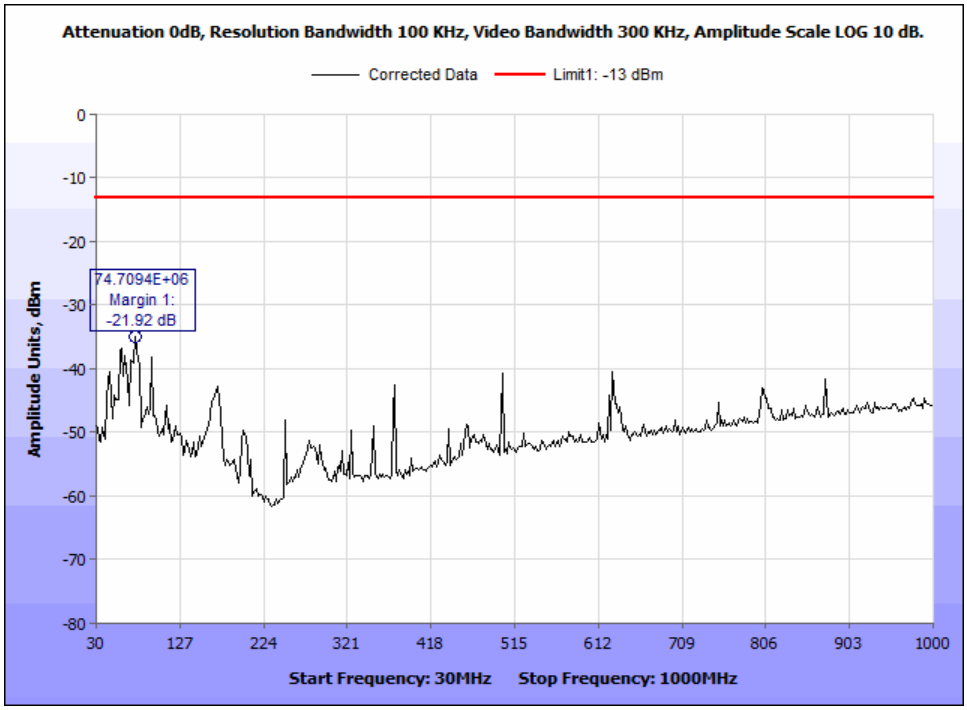

Figure 167: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_41.668kHz BW_30-1000MHz.

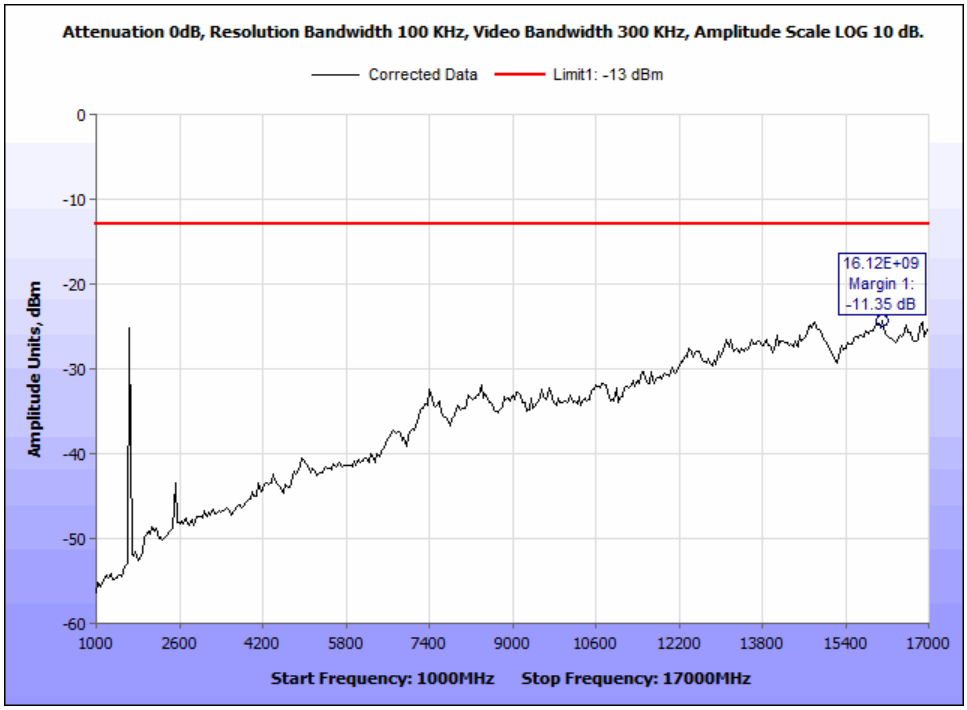

Figure 168: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_666.666kHz BW_1-17 GHz.

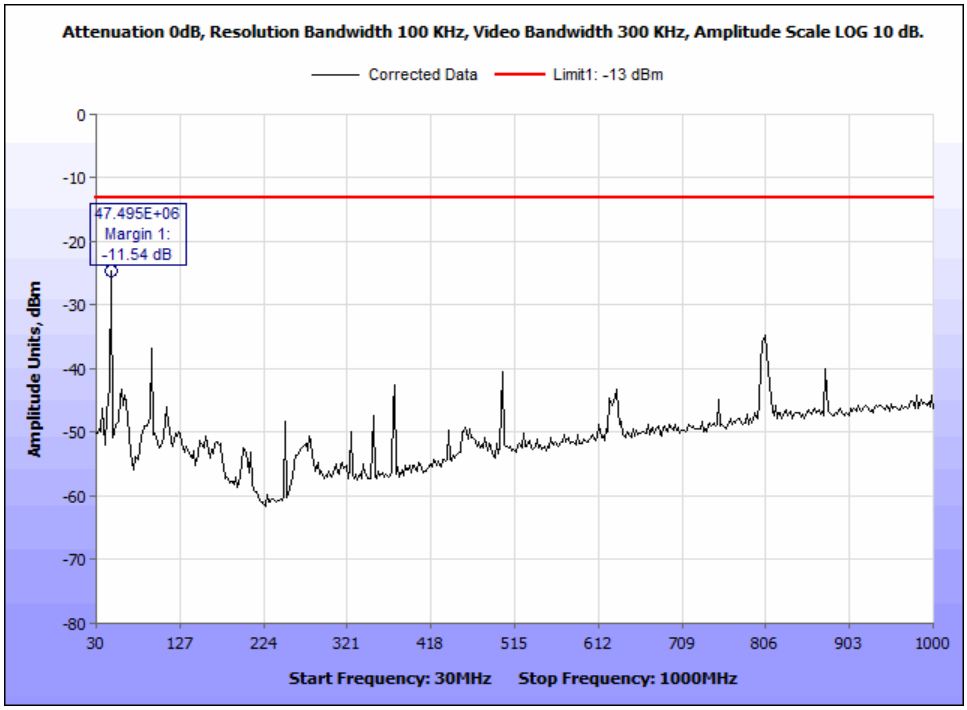

Figure 169: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_666.666kHz BW_30-1000MHz.

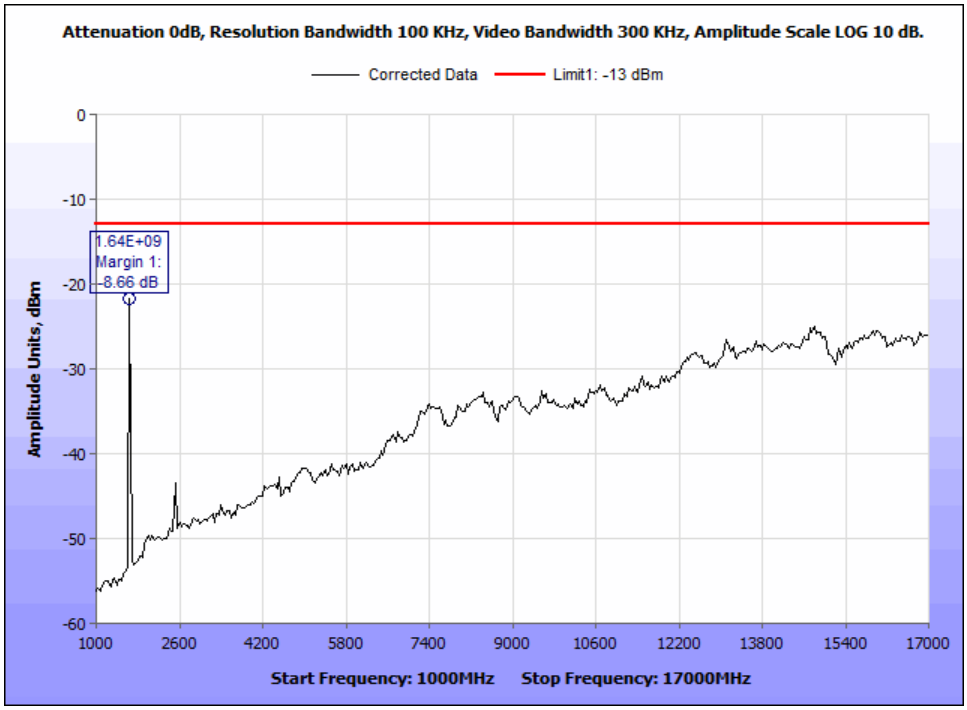

Figure 170: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_83.334kHz BW_1-17 GHz.

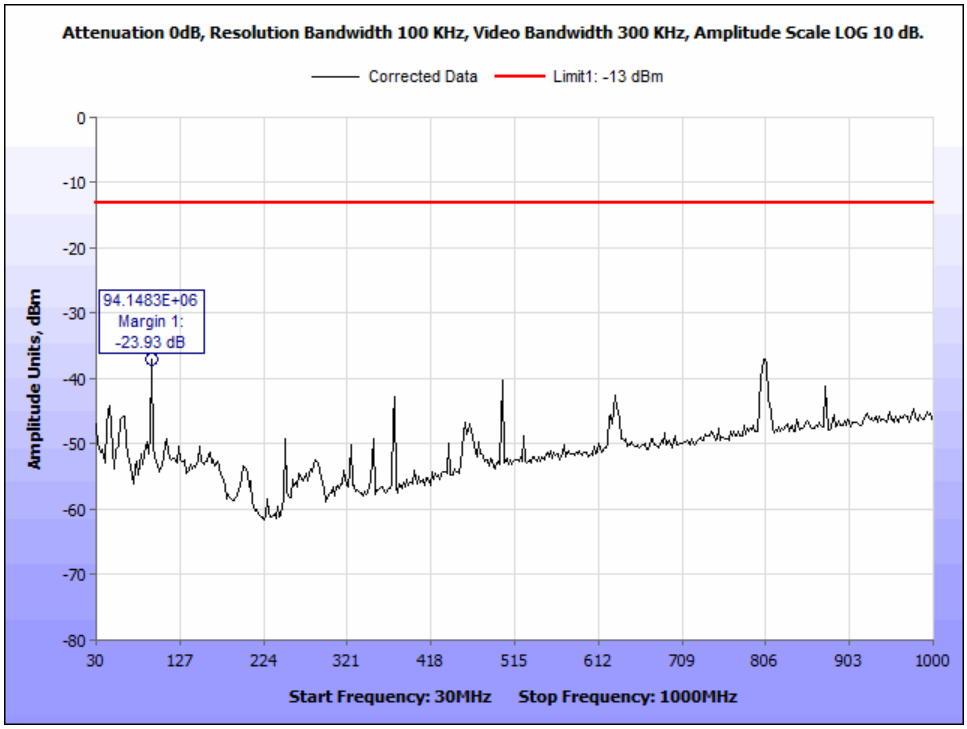

Figure 171: §25.202(f) Radiated Spurious Emissions, VesseLINK 200, Ch232_83.334kHz BW_30-1000MHz.

Electromagnetic Compatibility Criteria for Satellite Communications

§ 1.1310 Radiofrequency radiation exposure limits.

RF Exposure Requirements:

§1.1307(b)(1) and §1.1307(b)(2): Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

As required by §§ 2.1091(d)(2) and 2.1093(d)(5), RF exposure compliance must be determined at the maximum average power level according to source-based time-averaging requirements to determine compliance for general population exposure conditions. Unless it is specified differently in the published RF exposure KDB procedures, these requirements also apply to test reduction and test exclusion considerations. Time-averaged maximum conducted output power applies to SAR and, as required by § 2.1091(c), time-averaged effective radiated power applies to MPE

RF Radiation Exposure Limit:

§1.1310: As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit: EUT's operating frequencies @ 1616.333 – 1625.666 MHz; **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{(PG / 4\pi S)}$

where, S = Power Density (mW/cm^2)
P = Power Input to antenna (mW)
G = Antenna Gain (numeric value)
R = Distance (cm)

Result:

The safe distance where Power Density is less than the MPE Limit listed above was found to be 44.7 cm for MissionLINK.

The safe distance where Power Density is less than the MPE Limit listed above was found to be 38.716 cm for VesseLINK..

FCC									
Frequency (MHz)	**Con. Pwr. (dBm)**	**Con. Pwr. (mW)**	**Ant. Gain (dBi)**	**Ant. Gain numeric**	**Pwr. Density (mW/cm^2)**	**Limit (mW/cm^2)**	**Margin**	**Distance (cm)**	**Result**
1616.3333	43	19952.623	1	1.259	1	1	0	44.709	Pass

Figure 172: § 1.1310 Radiofrequency radiation exposure limits, MissionLINK

Con. Pwr. accounts for a +1dB tune-up tolerance

FCC									
Frequency (MHz)	**Con. Pwr. (dBm)**	**Con. Pwr. (mW)**	**Ant. Gain (dBi)**	**Ant. Gain numeric**	**Pwr. Density (mW/cm^2)**	**Limit (mW/cm^2)**	**Margin**	**Distance (cm)**	**Result**
1616.3333	43	19952.623	1	1.259	1	1	0	44.709	Pass

Figure 173: § 1.1310 Radiofrequency radiation exposure limits, VesseLINK

Con. Pwr. accounts for a +1dB tune-up tolerance

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

ASSET #	NOMENCLATURE	MANUFACTURER	MODEL	LAST CAL DATE	CAL DUE DATE
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	1/4/2019	1/4/2021
1T4300B	SEMI-ANECHOIC 3M CHAMBER SVSWR	EMC TEST SYSTEMS	NONE	8/16/2019	8/16/2021
1T4300	SEMI-ANECHOIC CHAMBER (NSA)	EMC TEST SYSTEMS	NONE	8/16/2019	8/16/2021
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	5/2/2019	12/2/2020
1T4905	HORN ANTENNA	COM-POWER	AH-118	5/7/2019	12/7/2020
1T8743	PREAMPLIFIER	A.H. SYSTEMS, INC.	PAM-0118P	FUNC VERIFY	FUNC VERIFY
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	3/4/2020	9/4/2021
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	2/26/2020	8/26/2021
2T4000	ESPEC TEMPERATURE/HUMIDITY CHAMBER	ESPEC NORTH AMERICA, INC.	EPX-4H	4/10/2020	4/10/2021
1T9586	ACTIVE LOOP ANTENNA	ETS-LINDGREN	6502	10/30/2019	4/30/2021

Figure 174: Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

Certification & User's Manual Information

Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

M. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

> Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> – Reorient or relocate the receiving antenna.
>
> – Increase the separation between the equipment and receiver.
>
> – Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
>
> – Consult the dealer or an experienced radio/TV technician for help.

End of Report