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

October 31, 2019

InfiNet Malta LTD
Level 1, Britannia House
9 Old Bakery Street
Valletta VLT1450, Malta

Dear Vsevolod Doronin,

Enclosed is the EMC Wireless test report for compliance testing of the InfiNet Malta LTD, Quanta 5 as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15.407, Subpart E (UNII 3).

Thank you for using the services of Eurofins MET Labs, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS MET LABS, INC.

Angela D. Kekovski
Documentation Department

Reference: (\InfiNet Malta LTD\ EMC103526-FCC407 UNII 3 Rev. 2)

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Electromagnetic Compatibility Criteria
Test Report

for the

InfiNet Malta LTD
Model Quanta 5

Tested under
The FCC Certification Rules
contained in
Title 47 of the CFR
15.407 Subpart E

MET Report: EMC103526-FCC407 UNII 3 Rev. 2

October 31, 2019

Prepared For:

InfiNet Malta LTD
Level 1, Britannia House
9 Old Bakery Street
Valletta VLT1450, Malta

Prepared By:
Eurofins MET Labs, Inc.
914 W. Patapsco Avenue
Baltimore, MD 21230

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15.407 Subpart E

Donald Salguero, Project Engineer
Electromagnetic Compatibility Lab

Angela D. Kekovski
Documentation Department

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 15.407 of the FCC Rules under normal use and maintenance.

Chris Dennison,
Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	July 5, 2019	Initial Issue.
1	October 7, 2019	TCB Comments
2	October 31, 2019	TCB Comments

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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**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**Micro**henry
µ	**Micro**farad
µs	**Micros**econds
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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the InfiNet Malta LTD Quanta 5, with the requirements of Part 15, §15.407. 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 Quanta 5. InfiNet Malta LTD should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Quanta 5, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.407, in accordance with InfiNet Malta LTD, purchase order number IM00-000139. All tests were conducted using measurement procedure ANSI C63.10-2013.

FCC Reference	Description	Results
§15.203	Antenna Requirement	Compliant
§15.403(i)	26 dB Bandwidth	Compliant
§15.407 (a)(3)	Maximum Conducted Output Power	Compliant
§15.407 (a)(3)	Maximum Power Spectral Density	Compliant
§15.407 (b)(4)& (6 - 7)	Undesirable Emissions	Compliant
§15.407(b)(6)	Conducted Emission Limits	Compliant
§15.407(e)	6 dB Bandwidth	Compliant
§15.407(f)	RF Exposure	Compliant

Table 1. Executive Summary of EMC Part 15.407 ComplianceTesting

II. Equipment Configuration

A. Overview

Eurofins MET Labs, Inc. was contracted by InfiNet Malta LTD to perform testing on the Quanta 5, under InfiNet Malta LTD's purchase order number IM00-000139.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the InfiNet Malta LTD Quanta 5.

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

Model(s) Tested:	Quanta 5 Q5-23		
Model(s) Covered:	Quanta 5 Q5-23		
EUT Specifications:	Primary Power: 120 VAC 60Hz		
	FCC ID: X8Q-Q5-23		
	Type of Modulations:	QPSK, QAM	
	Equipment Code:	NII	
	Bandwidth (MHz)	EUT Frequency Ranges (MHz)	Power (dBm)
	10 20 40	5735 – 5845 5750 – 5830 5760 – 5800	11.56 11.68 11.25
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		
Report Date(s):	July 5, 2019		

Table 2. EUT Summary

B. References

CFR 47, Part 15, Subpart E	Unlicensed National Information Infrastructure Devices (UNII)
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 C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 789033 D02 v02r01	General UNII Test Procedures New Rules

Table 3. References

C. Test Site

All testing was performed at Eurofins MET Labs, Inc., 914 W. Patapsco Avenue, 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 Labs.

D. Description of Test Sample

The InfiNet Malta LTD Quanta 5, Equipment Under Test (EUT), is 5GHz fixed wireless service point-to-point RF-transceiver for various purposes, with wired Ethernet network connection, PoE powered, intended to be mounted on towers/masts.

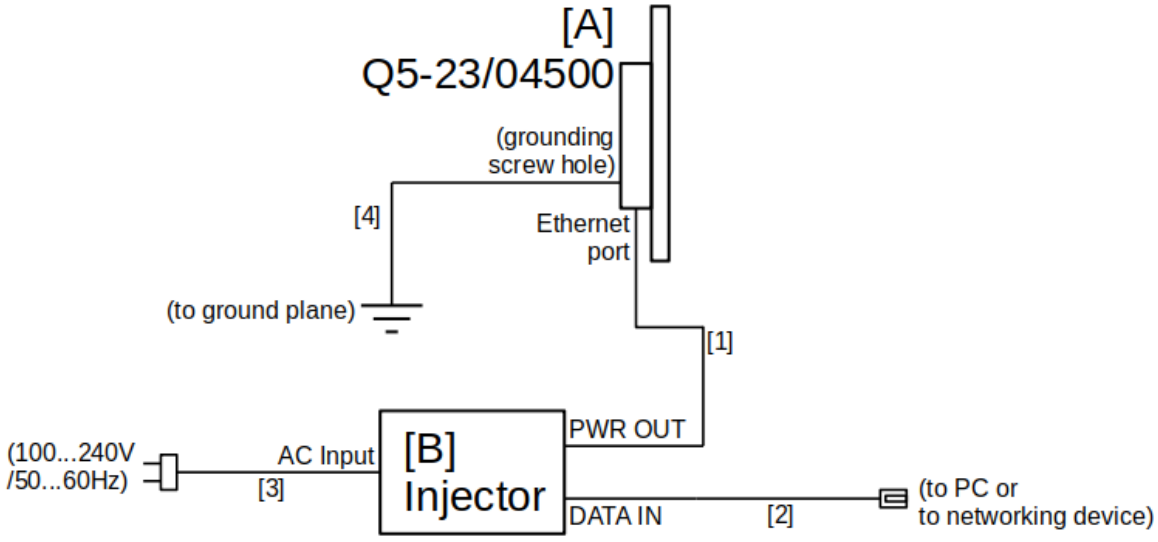


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. 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	RF transceiver	Q5-23/04500	Q5-23/04500	700113, 700115, 700119, 700567	
	Kit for mounting on a pipe rack		MOUNT-KIT-85		
	Flat-panel antenna		IWA-55D23DP-PU-R8-00		

Table 4. Equipment Configuration

F. 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
B	PoE Injector, AC/DC converter	Microsemi	PD-ACDC48GR/AC (PD-6641G300)

Table 5. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)	Termination Point
1	A. Ethernet port	Cat5e UTP, 4 pairs	1	2	No	B. PWR OUT
2	B. DATA IN	Cat5e UTP, 4 pairs	1	2	No	(to PC or to networking device)
3	B. AC Input	3 conductor cord	1	2	No	(100...240V/50...60Hz)
4	A. (grounding screw hole)	Grounding wire crimped with grounding ring, wire gauge not less than 10awg	1	2	No	(to ground plane)

Table 6. Ports and Cabling Information

H. Mode of Operation

1) Single device, Master mode - for the purpose of testing of transmitter qualities (i.e. spurious emissions, power and power density, etc.) it is enough to manage device to work in a Master mode on a desired channel. In that mode, radio of device continuously transmits beacon packets, representative of actual traffic. This mode also can be used during testing of EMC (e.g., conductive emissions) and Immunity (e.g., fast transients);

2) Single device, Slave mode - for the purpose of testing of receiver qualities (i.e. spurious emissions) it is enough to manage device to work in a Slave mode on a desired channel. In that mode and in the absence of master, radio of device is in constant receiving state. This mode also can be used during testing of EMC (e.g., conductive emissions) and Immunity (e.g., fast transients);
3) Pair of devices, Radio link - for the purpose of testing of Radar Detection, Adaptivity (frame based), Immunity (e.g., immunity to RF electromagnetic field) it is necessary to establish a radio link. In that state and if aforementioned Radar Detection and Adaptivity permit, devices will constantly exchange link-sustaining packets in both directions (and that exchange is representative of actual data traffic sent over radio link), manage modulations and transmit power (if ATPC mechanism is on) and measure link parameters (e.g., errors, crosstalk, RSSI, etc.)

I. Method of Monitoring EUT Operation

LEDs on the rear side of the enclosure are indicating powering and Received Signal Strength (RSSI). Monitoring of link quality may be done via HTTP (user web-interface) or Telnet protocol.

1. LED on the bottom of the scale, the closest one to 'PWR' designator, when glowing, indicates that the board is powered. Green LEDs of the rest part of the scale indicate comfortable RSSI (probability of errors and deterioration of service is low).

State of established and normally operating radio link is "connected". That can be observed from browser viewing web-page of user interface or with aid of a utility supporting Telnet connection. For more details on how to access and interpret readings refer to Technical User Manual (can be found online: https://infinetwireless.com/wiki/display/DR/Quanta+5)

State of the radio of a normally operating single device in Master mode is "started". In that state, device already transmits beacon packets.

2. Not glowing LEDs indicate that EUT is not powered. Red LEDs mean that conditions on link are not comfortable (probability of errors and deterioration of service is increased), but still permissible.

States of equipment when link is not operating (i.e., data is not being transmitted in both directions), even though both devices of link are properly arranged, are all those that are not "connected". These states are usually intermediate and do not necessarily indicate malfunction. States can be observed from browser viewing web-page of user interface or with aid of a utility supporting Telnet connection.
State of the radio of a normally operating single device is "connecting" or "base_detection". In that state, device is already constantly receiving.

J. 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.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to InfiNet Malta LTD upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant the criteria of §15.203. Unit must be professionally installed.

Test Engineer(s): Donald Salguero

Test Date(s): June 11, 2019

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 403(i) 26 dB Bandwidth

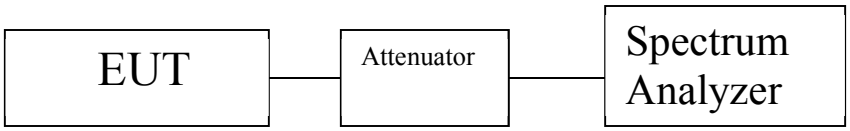
Test Requirements: **§ 15.403(i):** For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Procedure: The transmitter was set to low, mid, and high operating frequencies at the highest output power and connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, VBW > RBW. The 26 dB Bandwidth was measured and recorded.

Test Results The 26 dB Bandwidth was compliant with the requirements of this section.

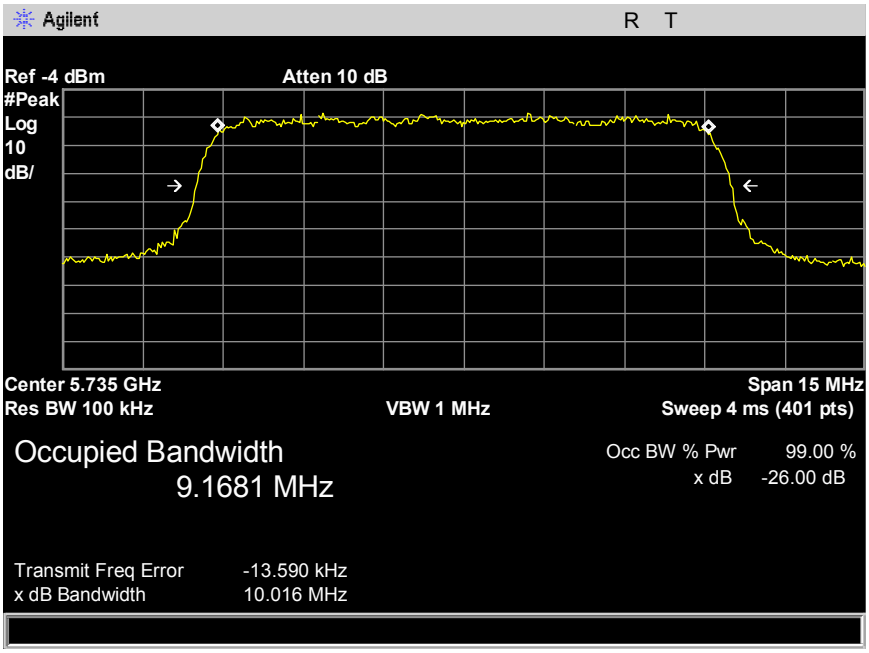
Test Engineer(s): Donald Salguero

Test Date(s): June 11, 2019

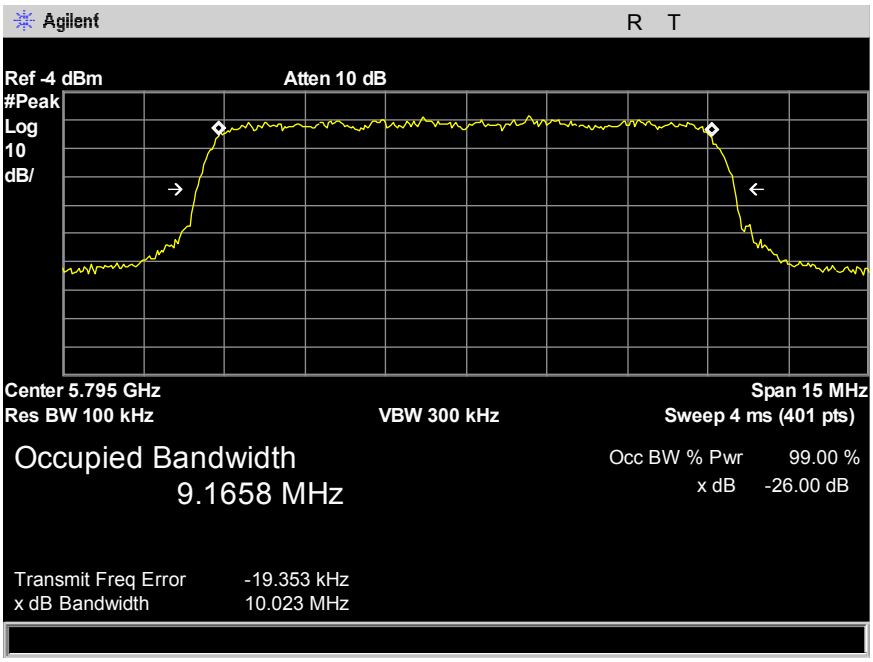


Nominal Bandwidth (MHz)	Center Frequency (MHz)	26dB BW (MHz)
10	5735	10.016
	5795	10.023
	5845	10.017
20	5750	20.067
	5790	20.032
	5830	20.071
40	5760	40.978
	5800	40.981

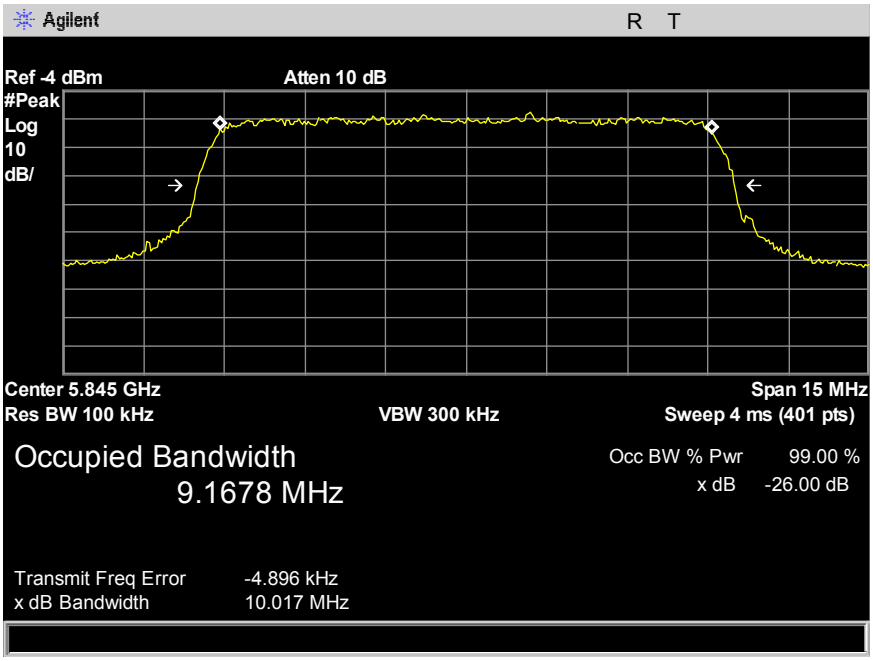
Plot 1. 26dB Bandwidth, Test Results



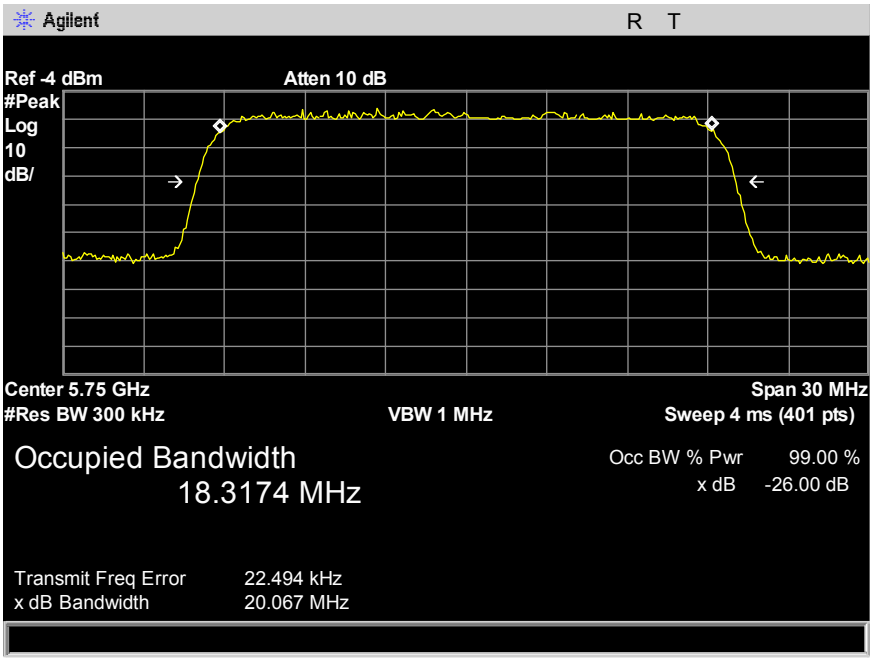
Plot 2. 26 dB Bandwidth, 10 MHz – 5735 MHz



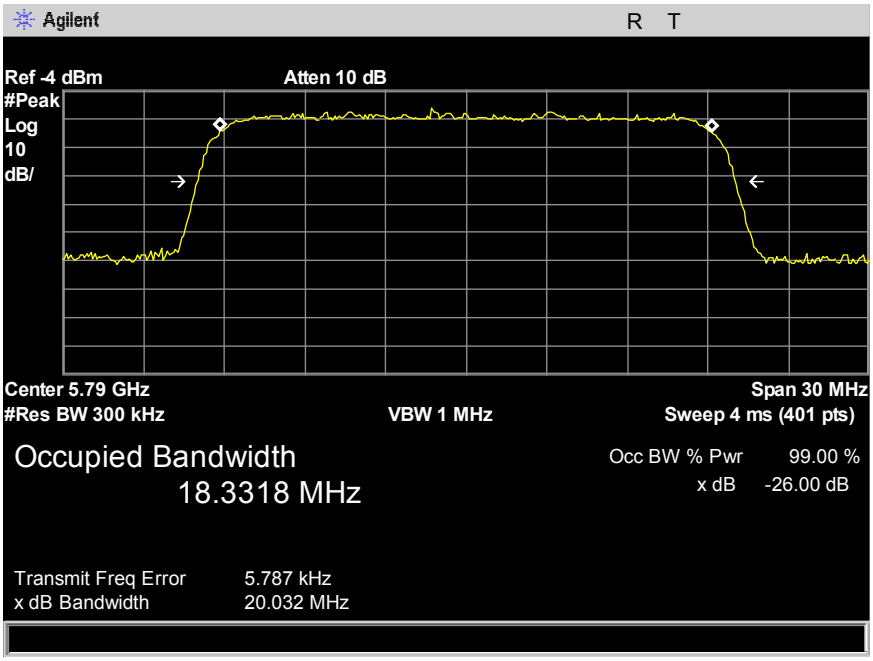
Plot 3. 26 dB Bandwidth, 10 MHz – 5795 MHz



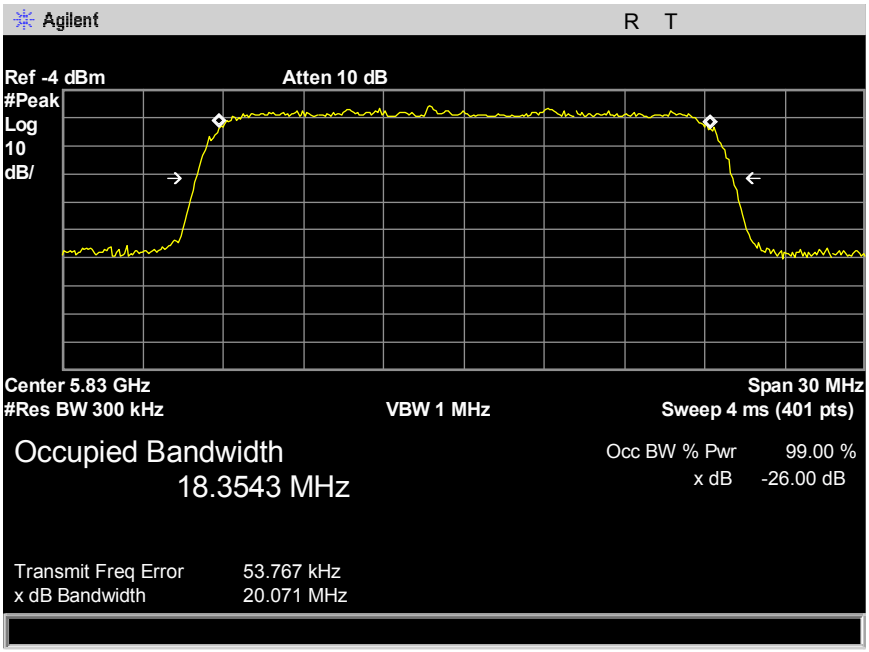
Plot 4. 26 dB Bandwidth, 10 MHz – 5845 MHz



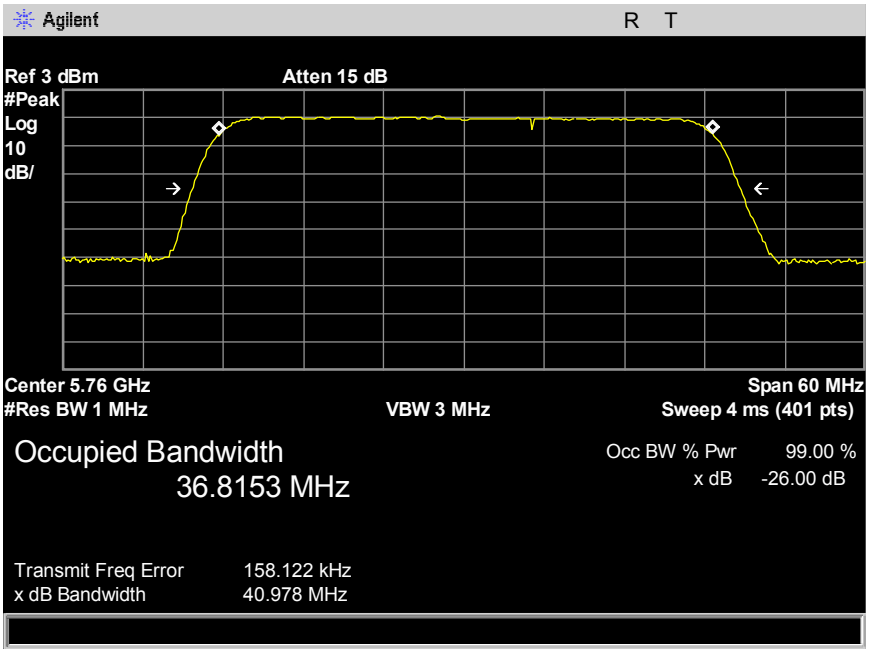
Plot 5. 26 dB Bandwidth, 20 MHz – 5750 MHz



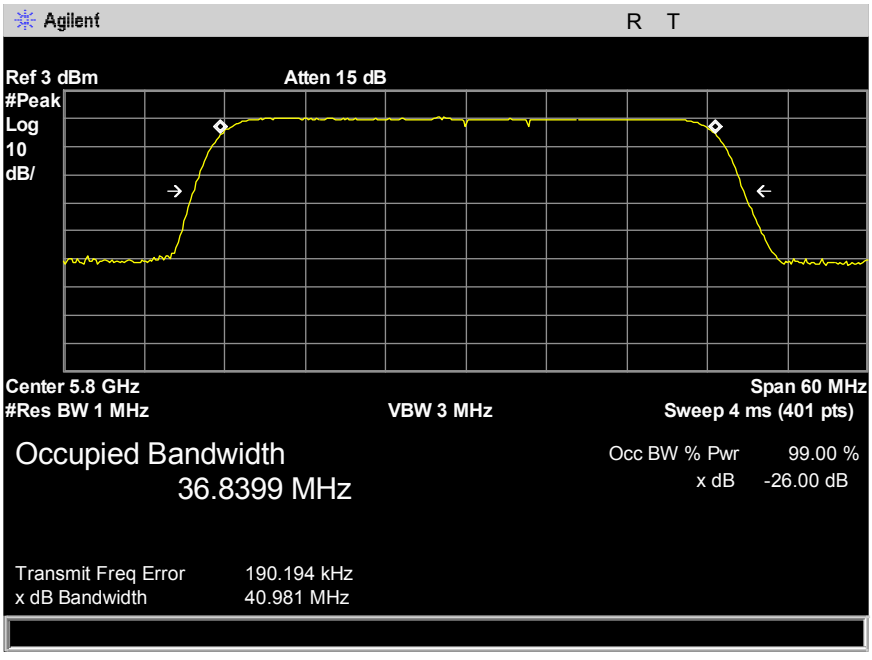
Plot 6. 26 dB Bandwidth, 20 MHz – 5790 MHz



Plot 7. 26 dB Bandwidth, 20 MHz – 5830 MHz



Plot 8. 26 dB Bandwidth, 40 MHz – 5760 MHz



Plot 9. 26 dB Bandwidth, 40 MHz – 5800 MHz

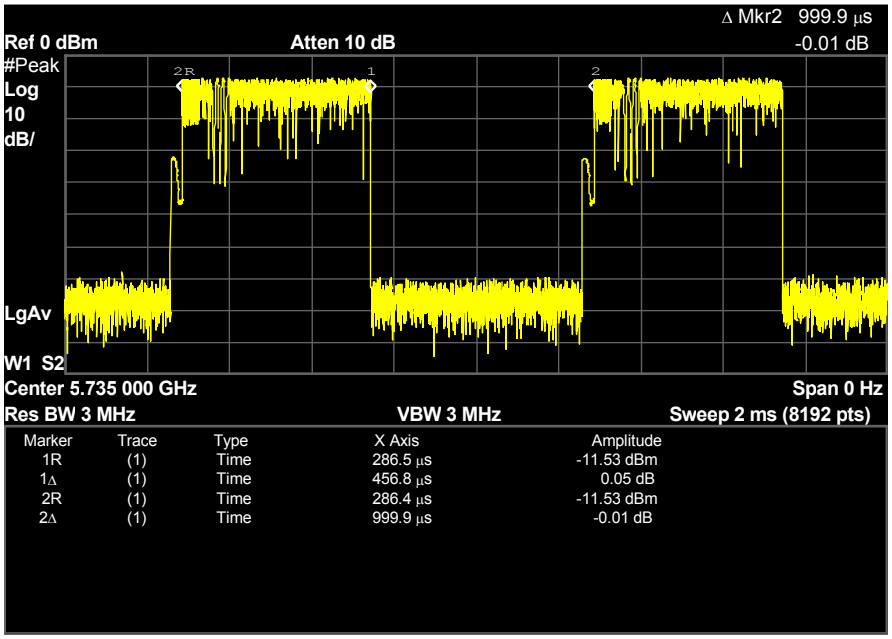
Duty Cycle

Test Procedure: The EUT was connected to a spectrum analyzer and was ran at maximum achievable duty cycle for all modes. The duty cycle was measured in accordance with section 12.2 of ANSI C63.10-2013.

Test Engineer(s): Donald Salguero

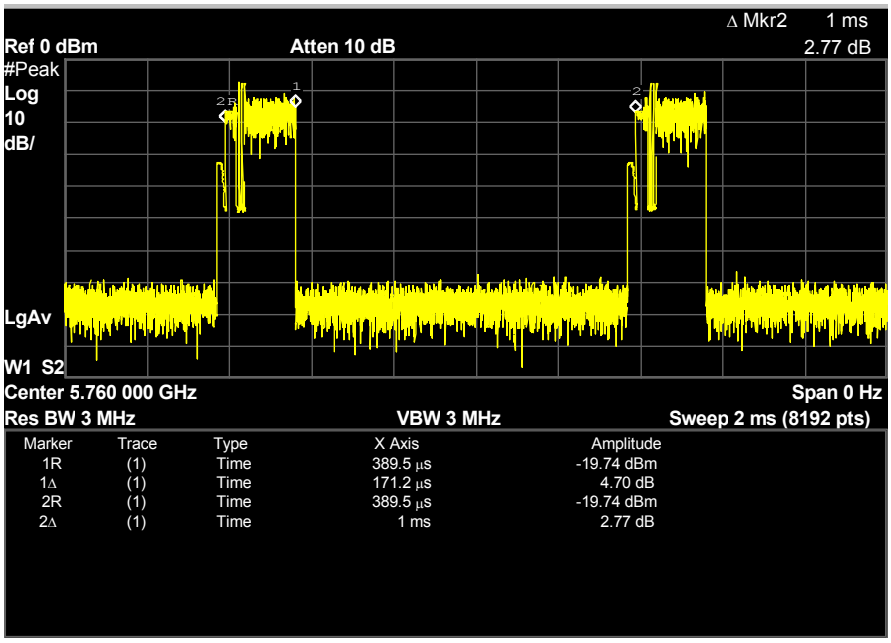
Test Date(s): June 11, 2019

Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	DCCF (dB)	1/T Minimum VBW (Hz)
10 MHz	0.4568	0.9999	45.68	3.40	1000.1
20 MHz	0.178	0.9999	17.8	7.50	1000.1
40 MHz	0.1712	1	17.12	7.66	1000



Duty Cycle, 10MHz Bandwidth Channel

Duty Cycle, 20MHz Bandwidth Channel



Duty Cycle, 40MHz Bandwidth Channel

Electromagnetic Compatibility Criteria for Intentional Radiators

§15. 407(a)(3) Maximum Conducted Output Power

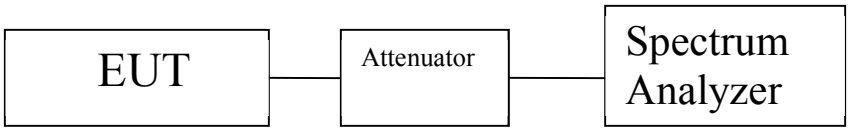
Test Requirements: **§15.407(a)(3):** For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.
If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.
However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure: The EUT was connected to a spectrum analyzer through a cable and attenuator. Measurements were taken with the EUT set to transmit continuously at max power on its low, mid, and high channels. Its power was measured according to measurement method SA-2A, as described in 789033 D02 General UNII Test Procedures v02r01.

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

Test Engineer(s): Donald Salguero

Test Date(s): June 11, 2019



10MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted Power	Limit (dBm)	Margin
5735	4.74	5.38	8.08	23	3.4	11.48	30	-18.52
5795	4.43	5.4	7.95	23	3.4	11.35	30	-18.65
5845	4.82	5.45	8.16	23	3.4	11.56	30	-18.44

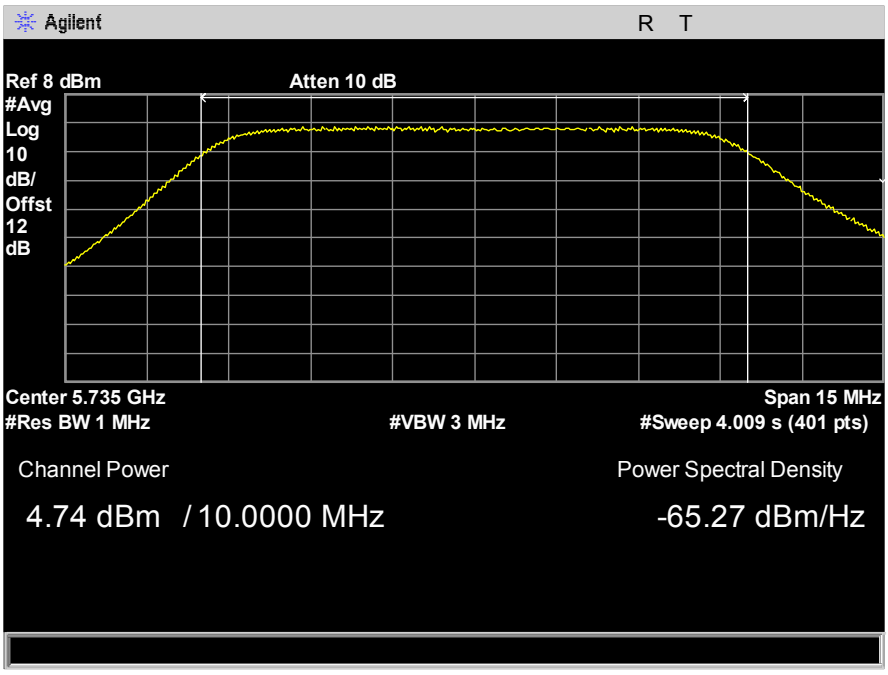
Table 7. Conducted Output Power, Test Results 1

20MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted Power	Limit (dBm)	Margin
5750	0.67	1.52	4.13	23	7.5	11.63	30	-18.37
5790	0.63	1.1	3.88	23	7.5	11.38	30	-18.62
5830	1.11	1.22	4.18	23	7.5	11.68	30	-18.32

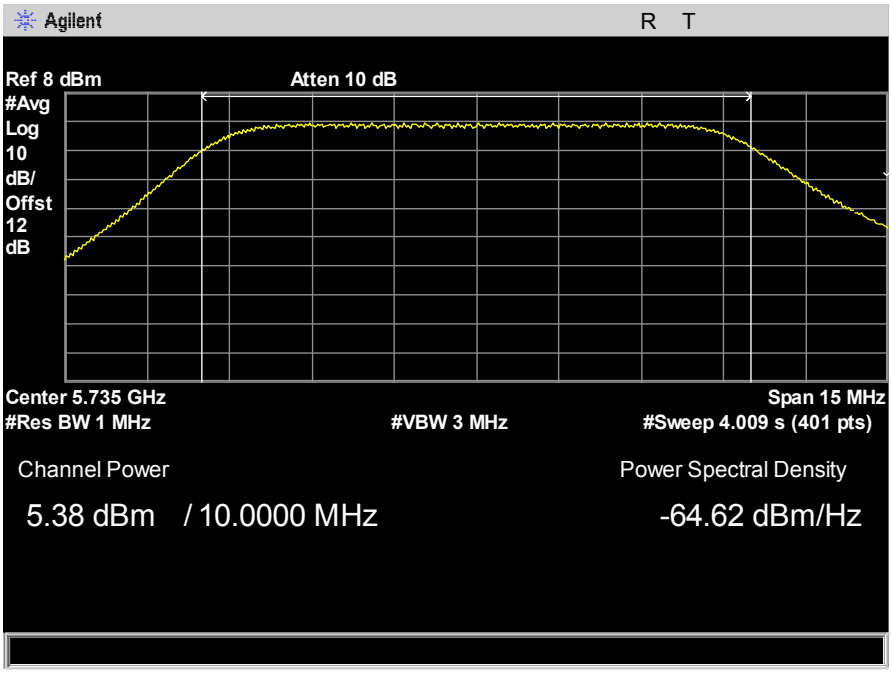
Table 8. Conducted Output Power, Test Results 2

40MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted Power	Limit (dBm)	Margin
5760	-0.16	1.22	3.59	23	7.66	11.25	30	-18.75
5800	-0.24	0.99	3.43	23	7.66	11.09	30	-18.91

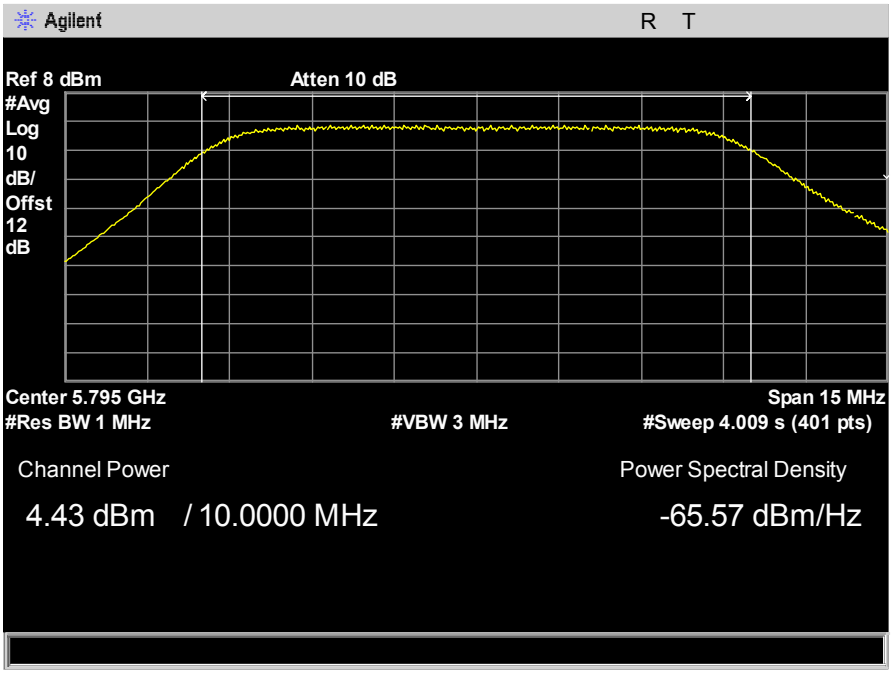
Table 9. Conducted Output Power, Test Results 3



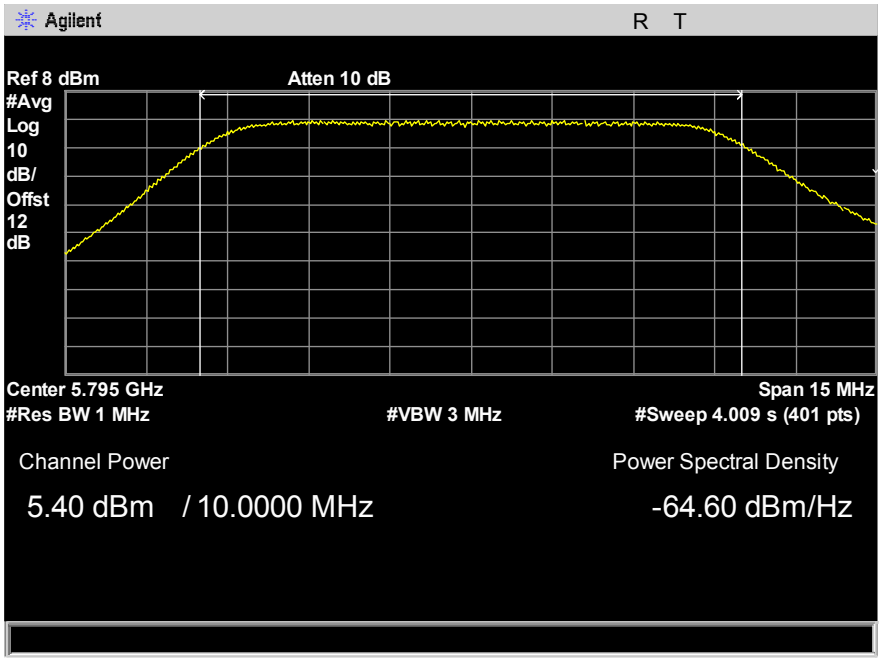
Plot 10. Maximum Conducted Output Power, 10 MHz – 5735 MHz, Chain 0



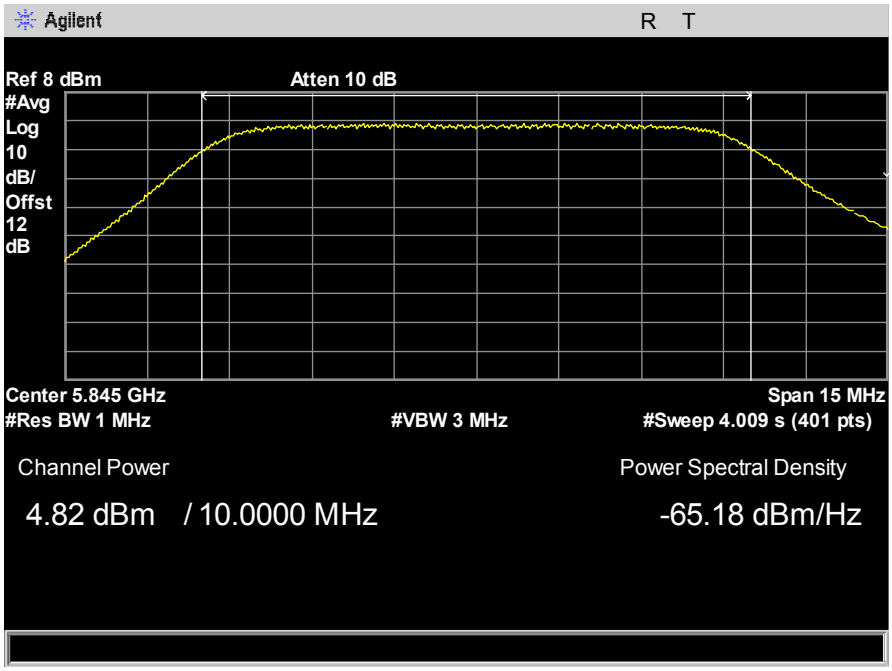
Plot 11. Maximum Conducted Output Power, 10 MHz – 5735 MHz, Chain 1



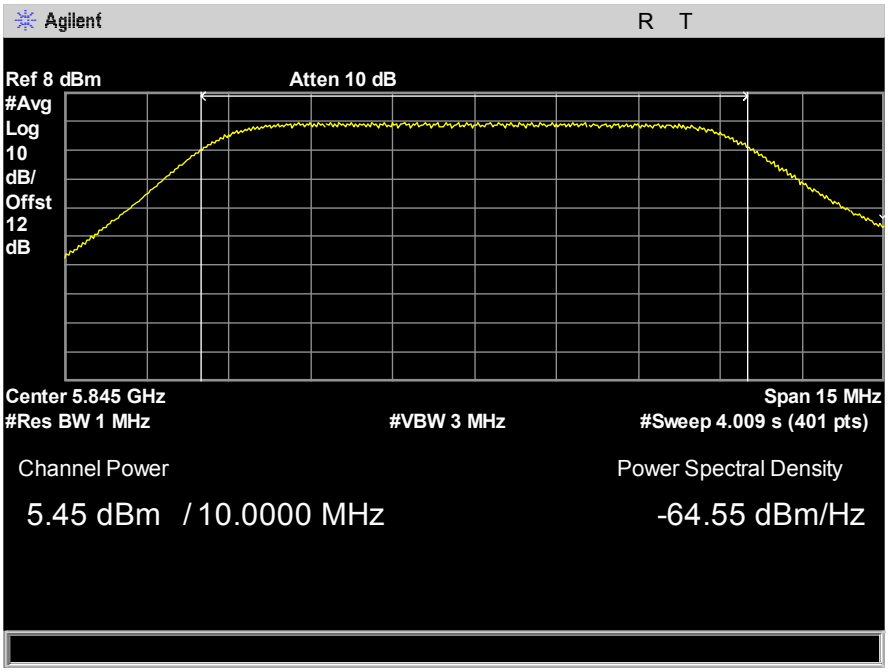
Plot 12. Maximum Conducted Output Power, 10 MHz – 5795 MHz, Chain 0



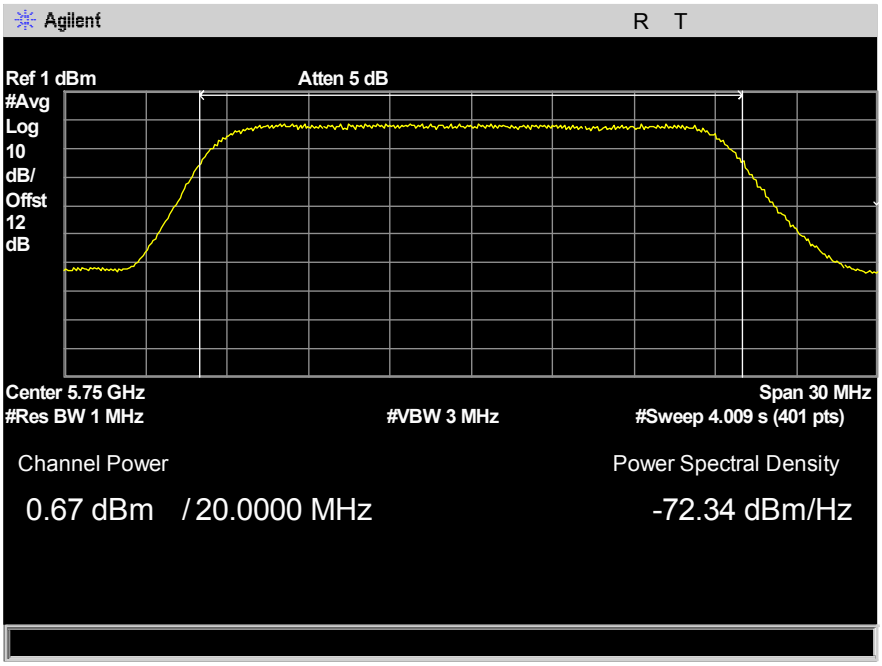
Plot 13. Maximum Conducted Output Power, 10 MHz – 5795 MHz, Chain 1



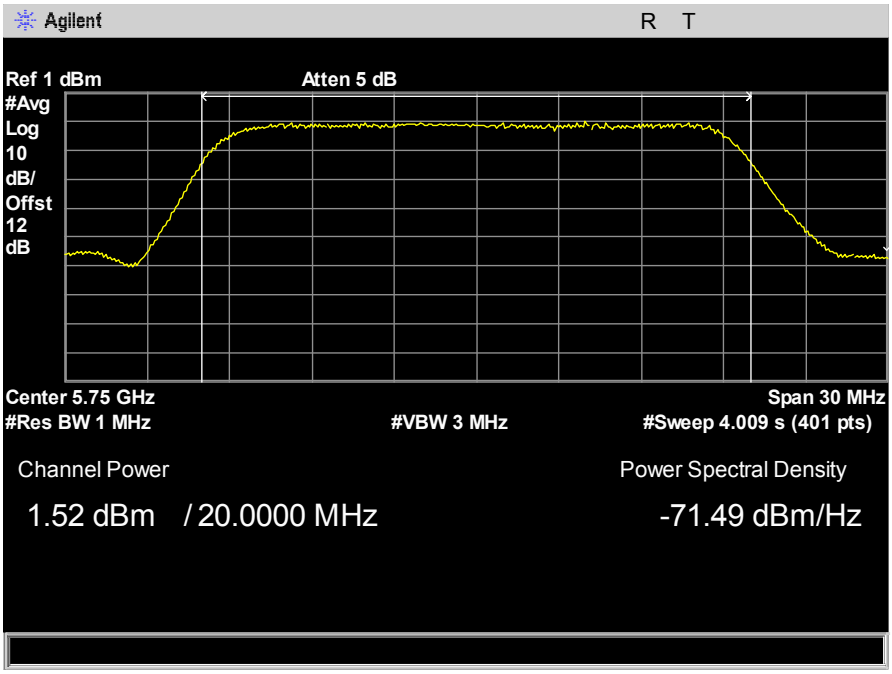
Plot 14. Maximum Conducted Output Power, 10 MHz – 5845 MHz, Chain 0



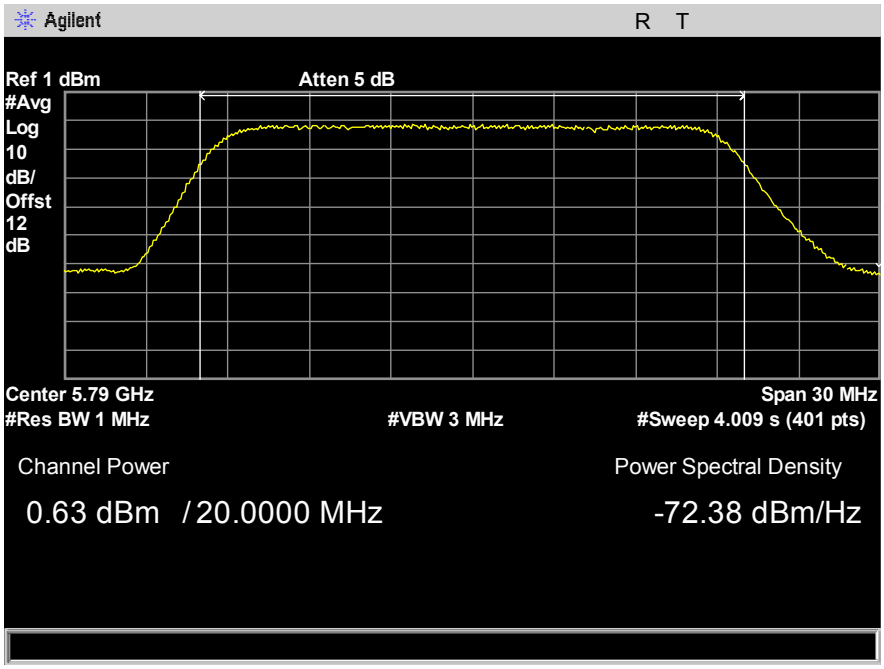
Plot 15. Maximum Conducted Output Power, 10 MHz – 5845 MHz, Chain 1



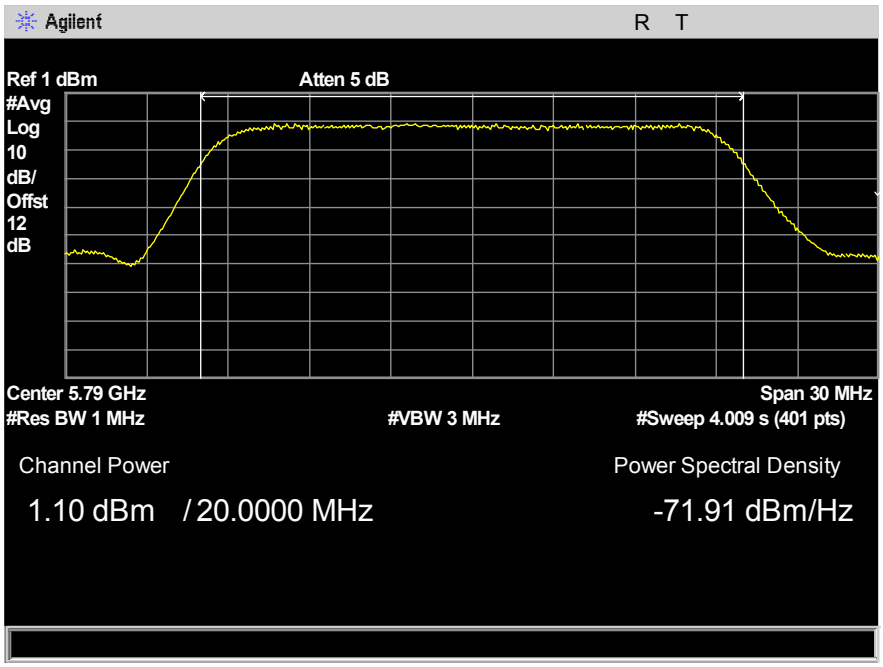
Plot 16. Maximum Conducted Output Power, 20 MHz – 5750 MHz, Chain 0



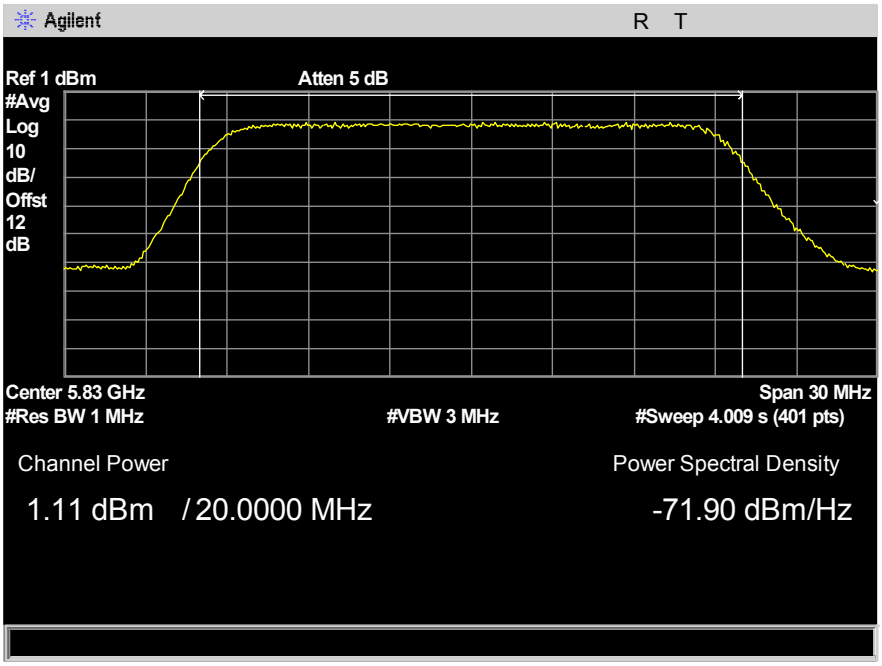
Plot 17. Maximum Conducted Output Power, 20 MHz – 5750 MHz, Chain 1



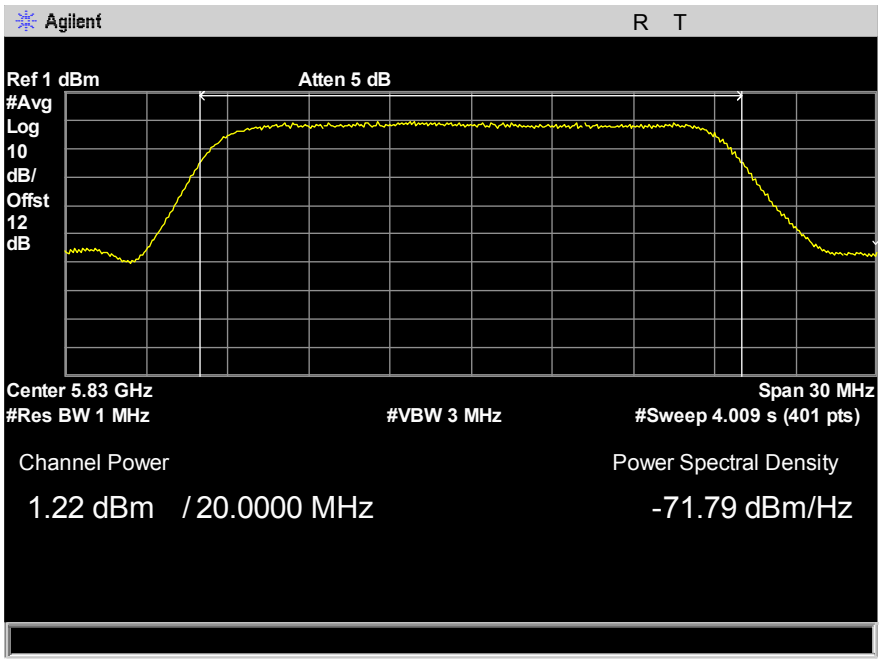
Plot 18. Maximum Conducted Output Power, 20 MHz – 5790 MHz, Chain 0



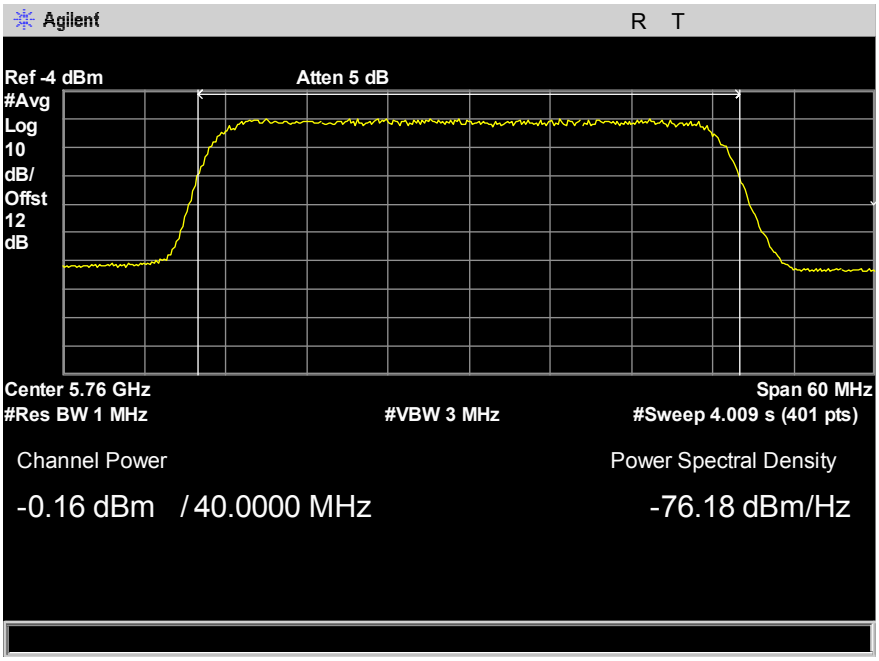
Plot 19. Maximum Conducted Output Power, 20 MHz – 5790 MHz, Chain 1



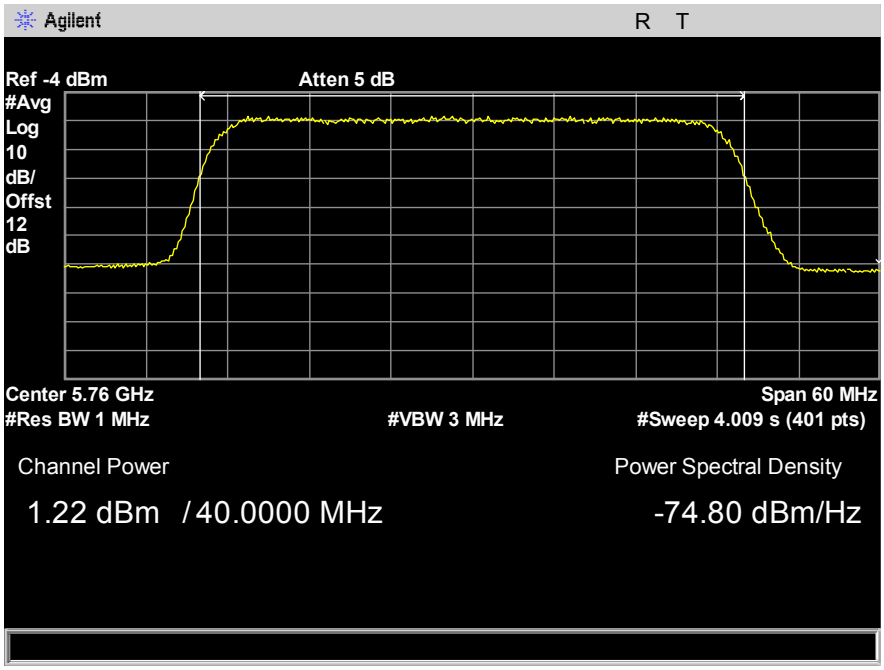
Plot 20. Maximum Conducted Output Power, 20 MHz – 5830 MHz, Chain 0



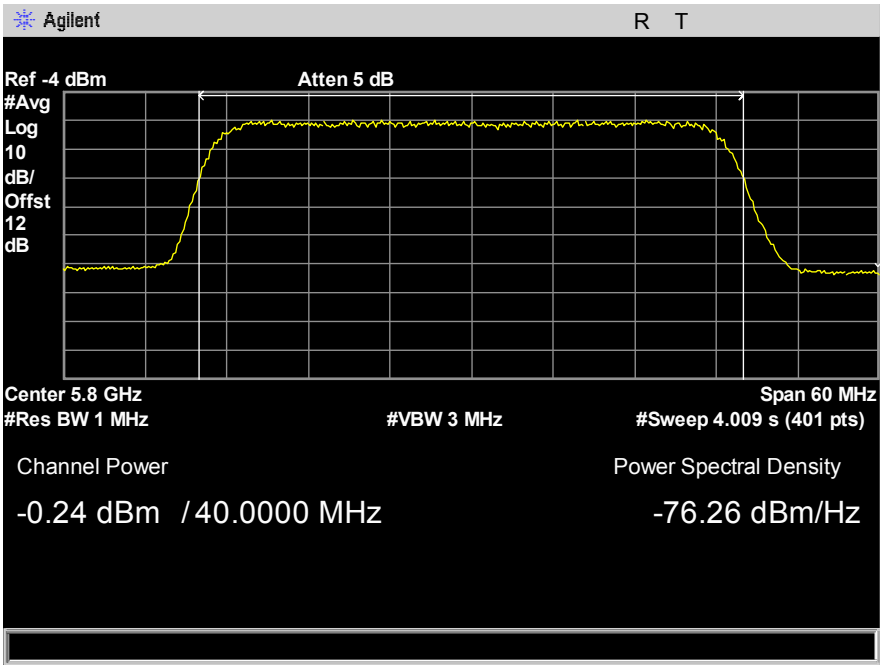
Plot 21. Maximum Conducted Output Power, 20 MHz – 5830 MHz, Chain 1



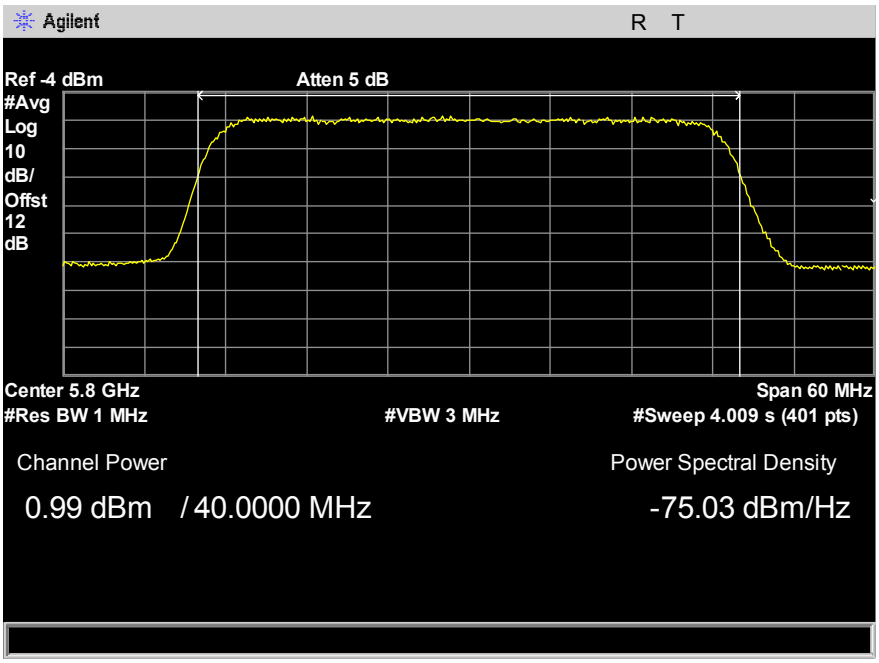
Plot 22. Maximum Conducted Output Power, 40 MHz – 5760 MHz, Chain 0



Plot 23. Maximum Conducted Output Power, 40 MHz – 5760 MHz, Chain 1



Plot 24. Maximum Conducted Output Power, 40 MHz – 5780 MHz, Chain 0



Plot 25. Maximum Conducted Output Power, 40 MHz – 5780 MHz, Chain 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(a)(3) Maximum Power Spectral Density

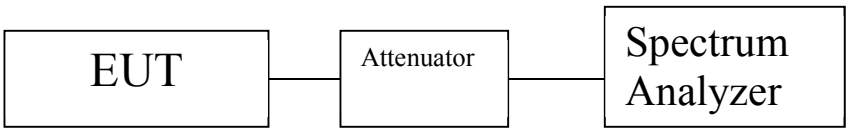
Test Requirements: **§15.407(a)(3):** In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.
If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

Test Procedure: The EUT was connected to a spectrum analyzer through a cable and attenuator. Measurements were taken with the EUT set to transmit continuously at max power on its low, mid, and high channels. Its power was measured according KDB 789033 D02 General UNII Test Procedures v02r01 using method SA-2A. A 1 MHz RBW was used during testing, as this provides a worst-case scenario.

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

Test Engineer(s): Donald Salguero

Test Date(s): June 11, 2019



10MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted PSD (dBm)	Limit (dBm)	Margin
5735	-2.933	-2.406	0.35	23	3.4	3.75	30	-26.25
5795	-3.399	-2.552	0.06	23	3.4	3.46	30	-26.54
5845	-2.947	-2.448	0.32	23	3.4	3.72	30	-26.28

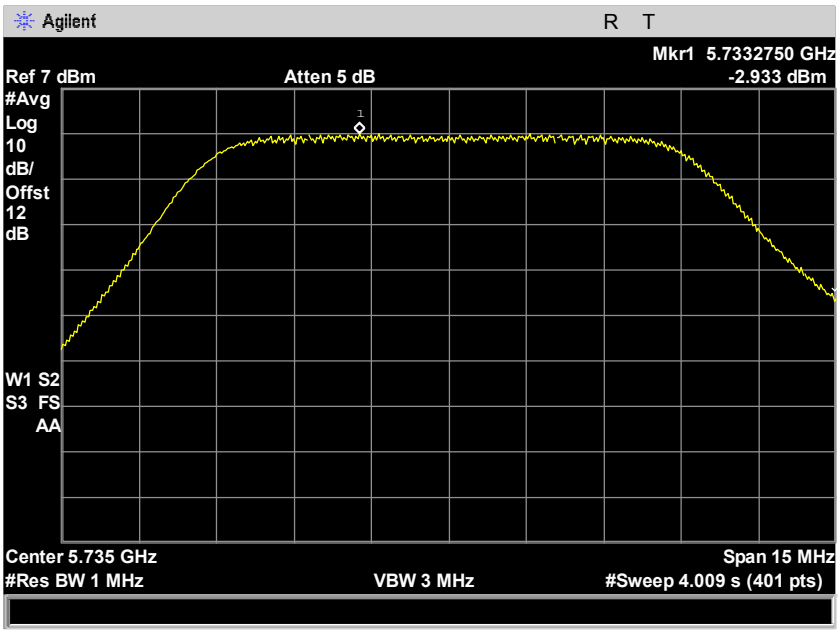
Table 10. Conducted Power Spectral Density, Test Results 1

20MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted PSD (dBm)	Limit (dBm)	Margin
5750	-10.26	-9.687	-6.95	23	7.5	0.65	30	-29.45
5790	-10.25	-9.804	-7.01	23	7.5	0.49	30	-29.51
5830	-9.968	-9.684	-6.81	23	7.5	0.69	30	-29.31

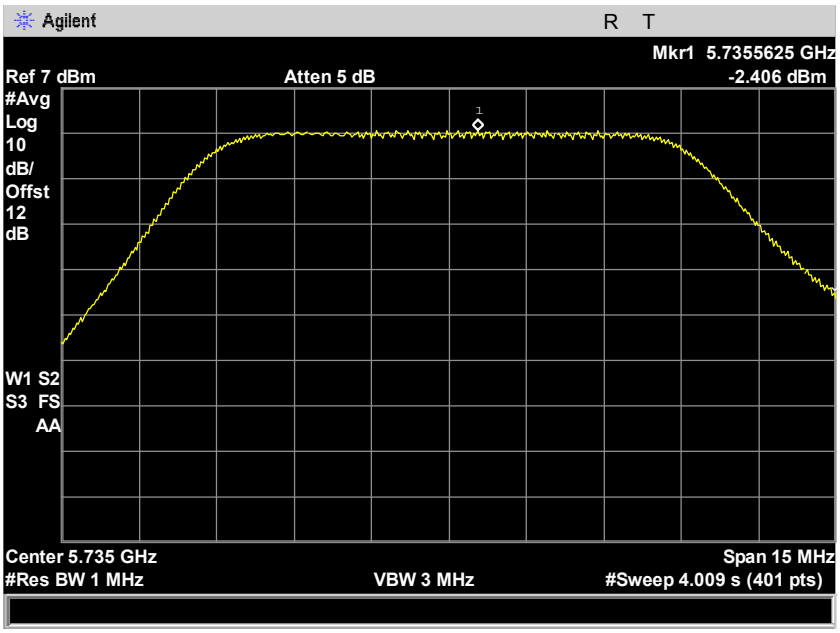
Table 11. Conducted Power Spectral Density, Test Results 2

40MHz Bandwidth								
Center Frequency (MHz)	Chain 0 (dBm)	Chain 1 (dBm)	Sum (dBm)	Antenna Gain (dBi)	DCCF (dB)	Total Conducted PSD (dBm)	Limit (dBm)	Margin
5760	-13.19	-12.19	-9.65	23	7.66	-1.99	30	-31.99
5800	-14.05	-13	-10.48	23	7.66	-2.82	30	-32.82

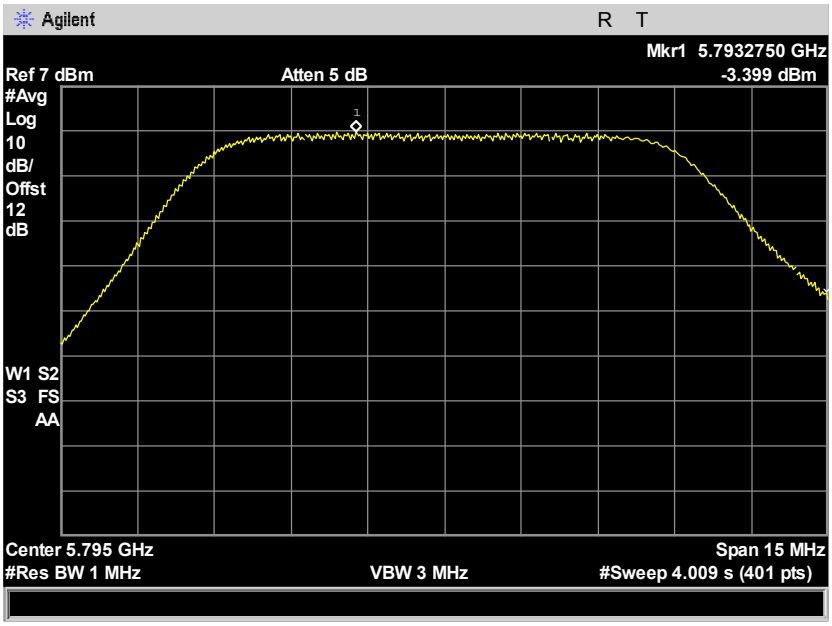
Table 12. Conducted Power Spectral Density, Test Results 3



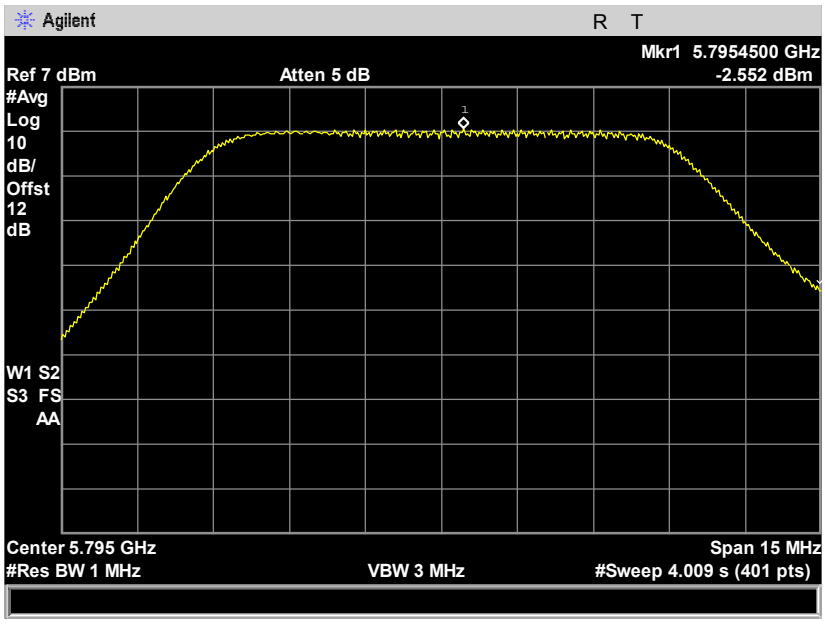
Plot 26. Maximum Power Spectral Density, 10 MHz – 5735 MHz, Chain 0



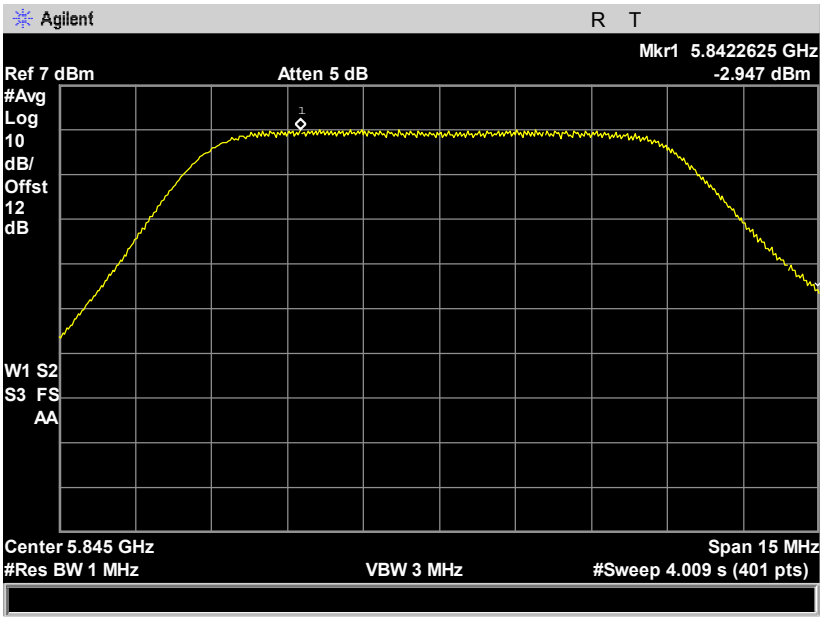
Plot 27. Maximum Power Spectral Density, 10 MHz – 5735 MHz, Chain 1



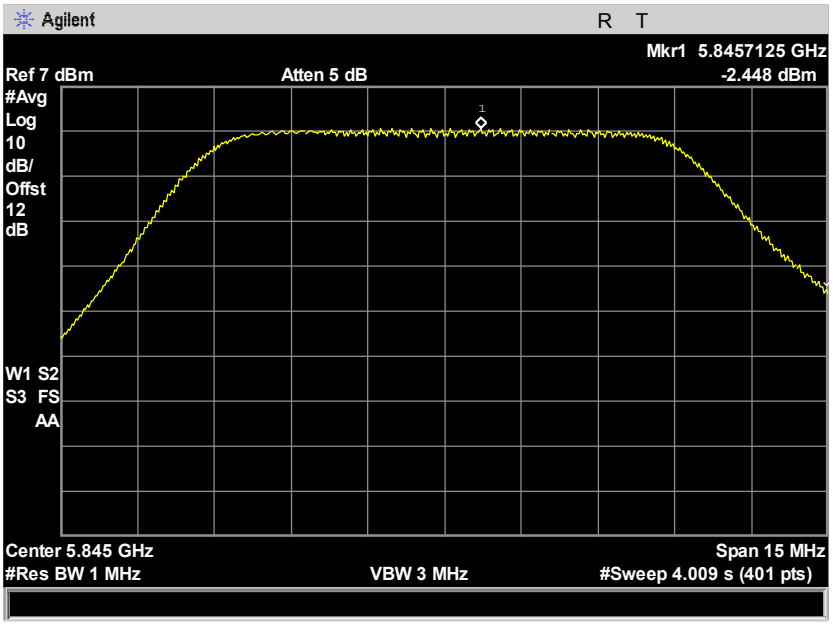
Plot 28. Maximum Power Spectral Density, 10 MHz – 5795 MHz, Chain 0



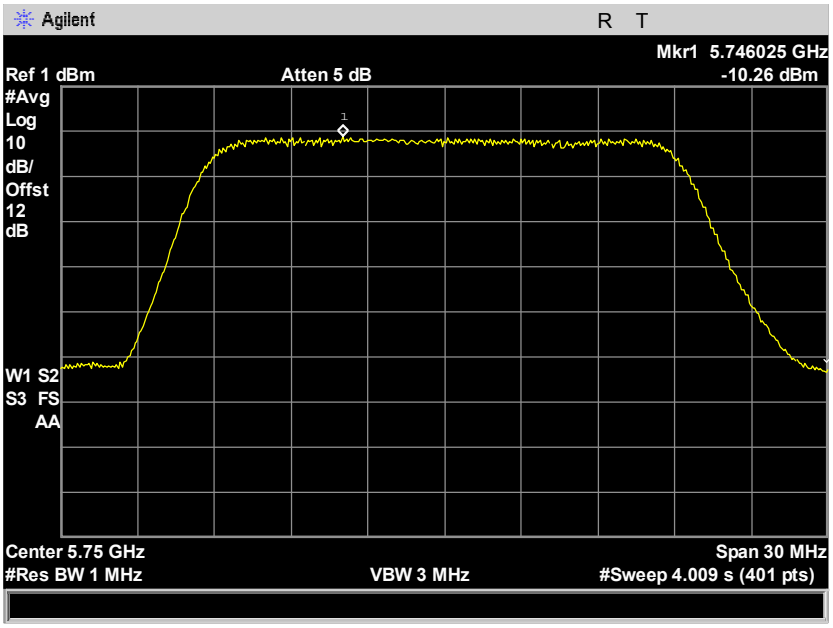
Plot 29. Maximum Power Spectral Density, 10 MHz – 5795 MHz, Chain 1



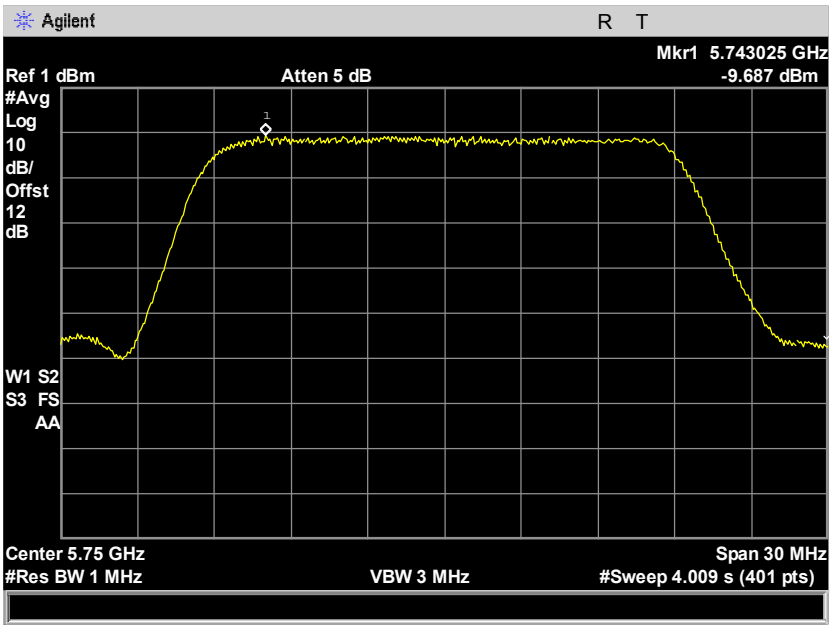
Plot 30. Maximum Power Spectral Density, 10 MHz – 5845 MHz, Chain 0



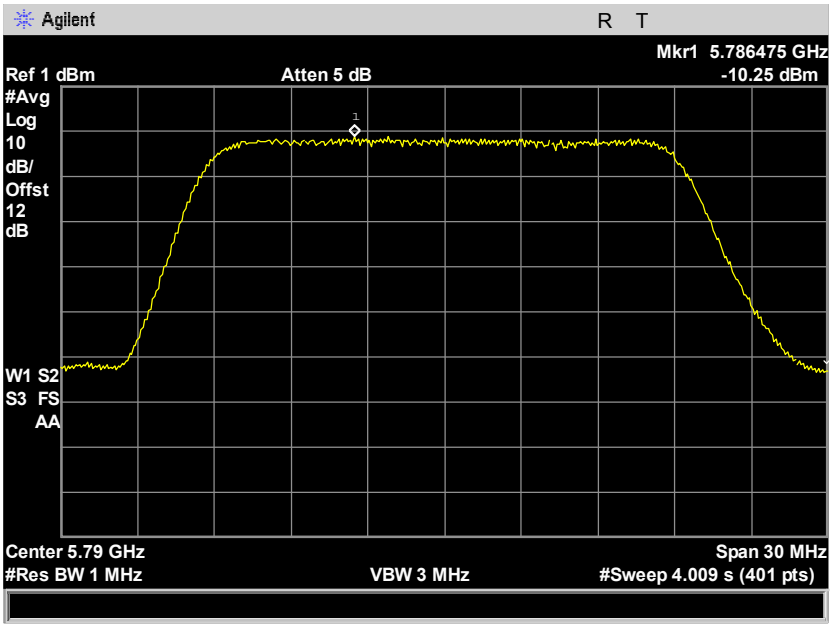
Plot 31. Maximum Power Spectral Density, 10 MHz – 5845 MHz, Chain 1



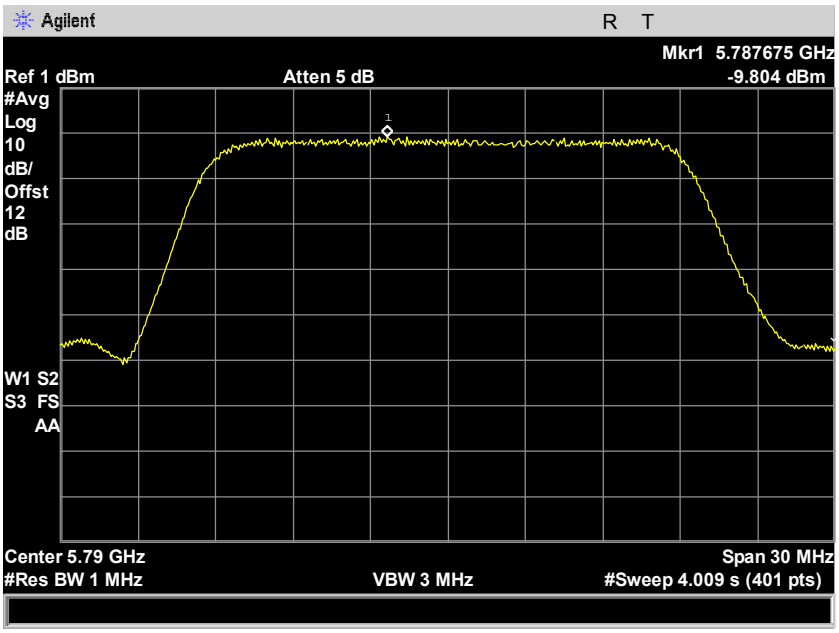
Plot 32. Maximum Power Spectral Density, 20 MHz – 5750 MHz, Chain 0



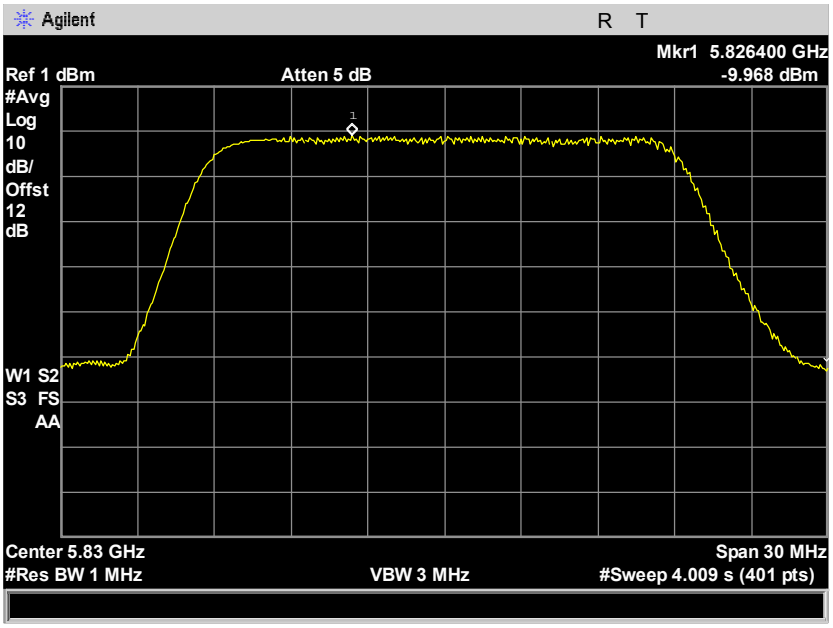
Plot 33. Maximum Power Spectral Density, 20 MHz – 5750 MHz, Chain 1



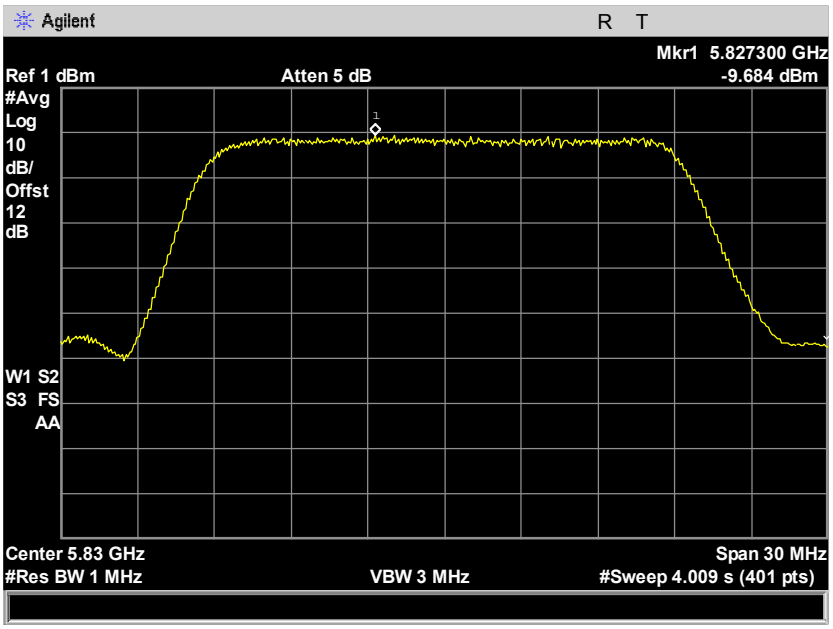
Plot 34. Maximum Power Spectral Density, 20 MHz – 5790 MHz, Chain 0



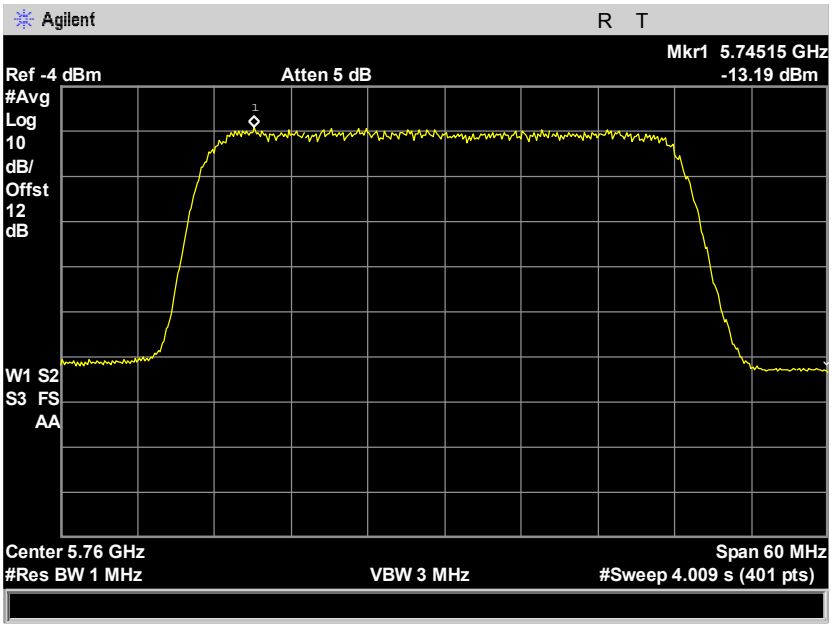
Plot 35. Maximum Power Spectral Density, 20 MHz – 5790 MHz, Chain 1



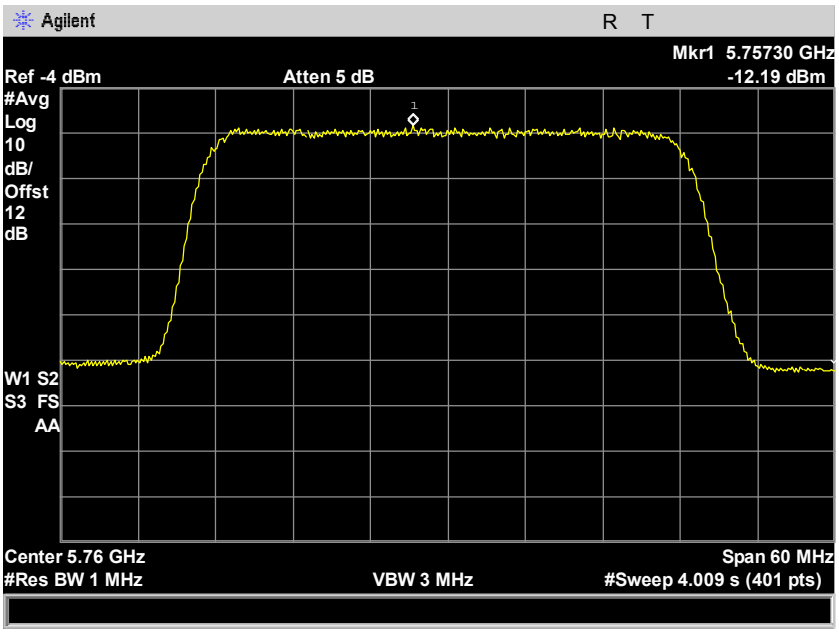
Plot 36. Maximum Power Spectral Density, 20 MHz – 5830 MHz, Chain 0



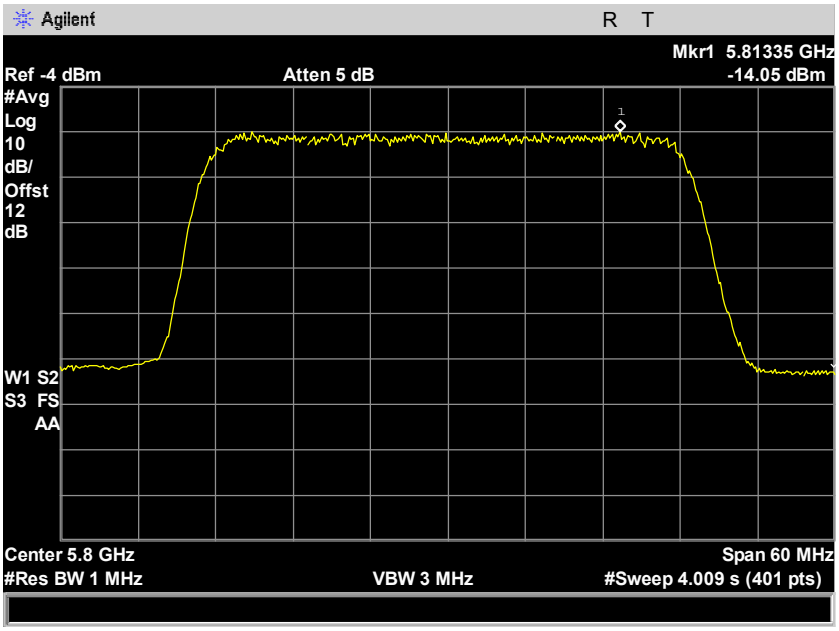
Plot 37. Maximum Power Spectral Density, 20 MHz – 5830 MHz, Chain 1



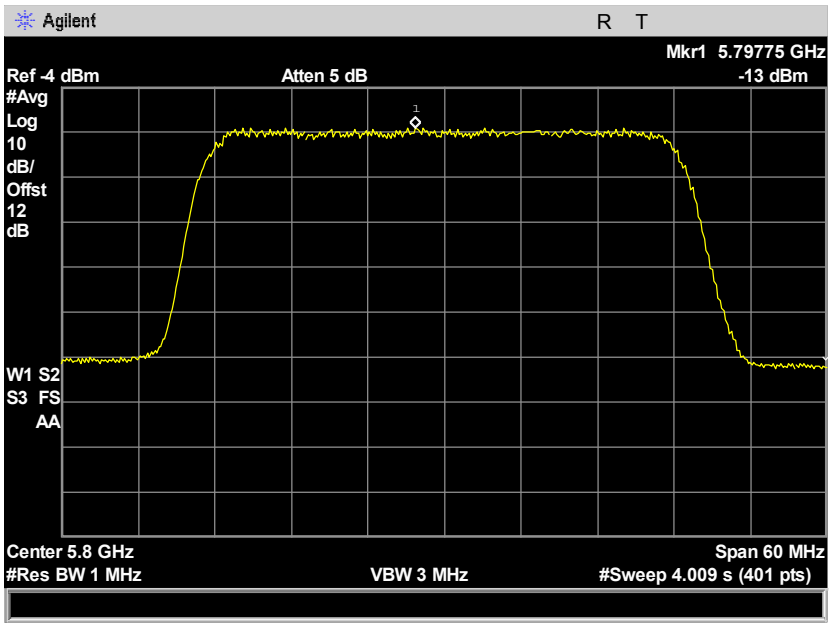
Plot 38. Maximum Power Spectral Density, 40 MHz – 5760 MHz, Chain 0



Plot 39. Maximum Power Spectral Density, 40 MHz – 5760 MHz, Chain 1



Plot 40. Maximum Power Spectral Density, 40 MHz – 5800 MHz, Chain 0



Plot 41. Maximum Power Spectral Density, 40 MHz – 5800 MHz, Chain 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(b)(4) & (6 – 7) Undesirable Emissions

Test Requirements:

§ 15.407(b)(4): For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

§ 15.407(b)(6): Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

§ 15.407(b)(7): The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Test Procedure:

The EUT was placed on a non-conducting stand on a turntable in a chamber. To find the maximum emission the EUT was set to transmit on low, mid, and high channels. Additionally, the turntable was rotated 360 degrees, the EUT was oriented through its three orthogonal axes, and the receive antenna height was varied in order to maximize emissions.

For frequencies from 30 MHz to 1 GHz, measurements were first made using a peak detector with a 100 kHz resolution bandwidth. Emissions which exceeded the limits were re-measured using a quasi-peak detector with a 120 kHz resolution bandwidth. The receive antenna was located 3m away from EUT.

Above 1 GHz, measurements were made pursuant the method described in FCC KDB 789033 D02 General UNII Test Procedure New Rules v02r01. The equation, **EIRP= E + 20 log D – 104.8** was used to convert field strength to EIRP (**E** = field strength (dBµV/m) and **D** = Reference measurement distance**).**

For emissions above 1 GHz and in restricted bands, measurements of the field strength were made with a peak detector and an average detector and compared with the limits of 15.209.

Test Results:

For below 1 GHz, the EUT was compliant with the requirements of this section.

For above 1 GHz, the EUT was compliant with the requirements of this section. Only noise floor was observed above 18GHz. The noise floor was below applicable limits.

Test Engineer(s): Donald Salguero

Test Date(s): June 12-14, 2019

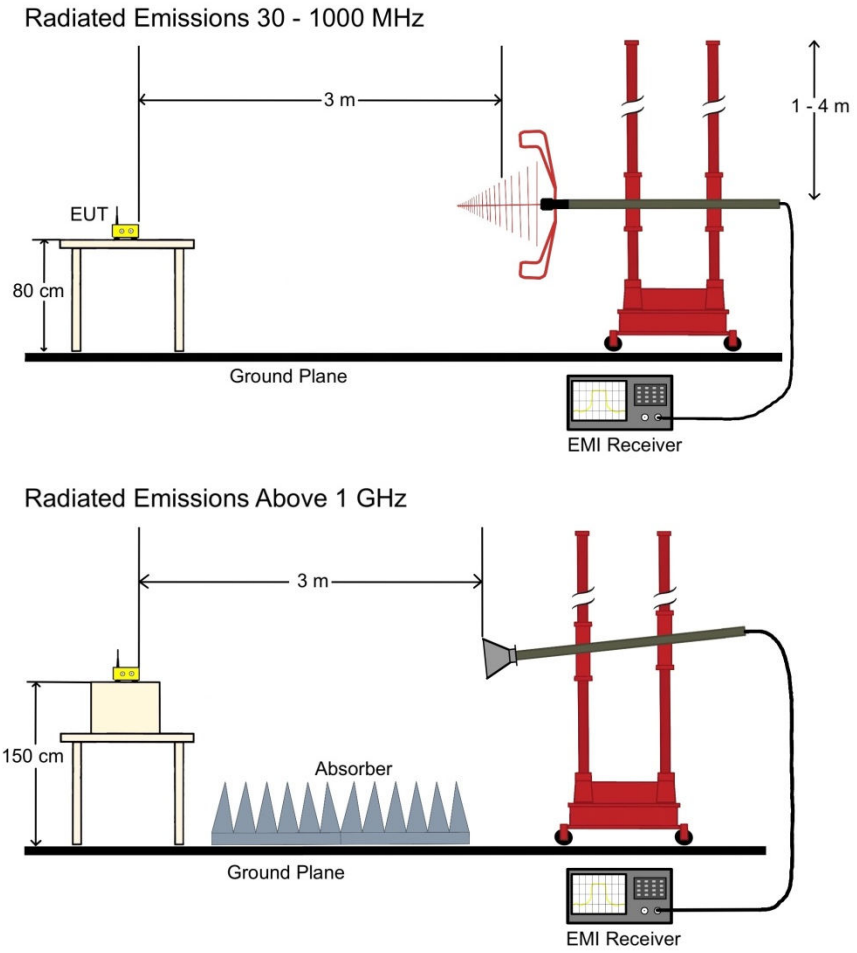
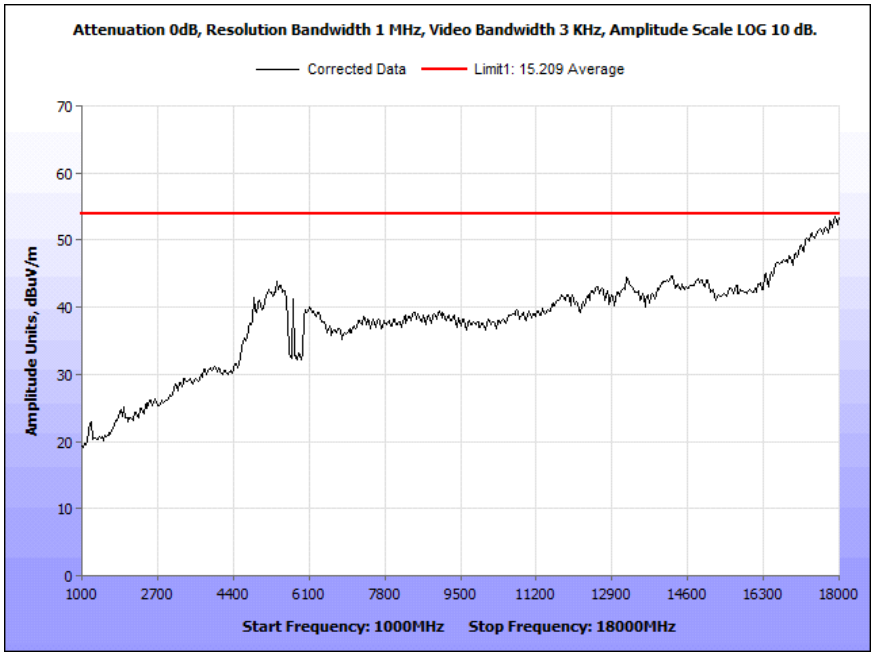
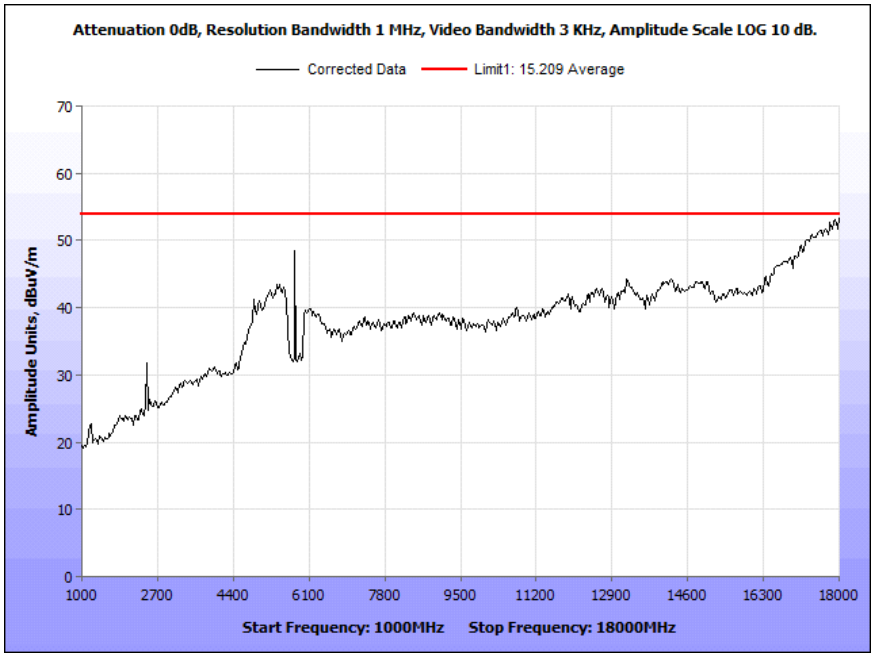


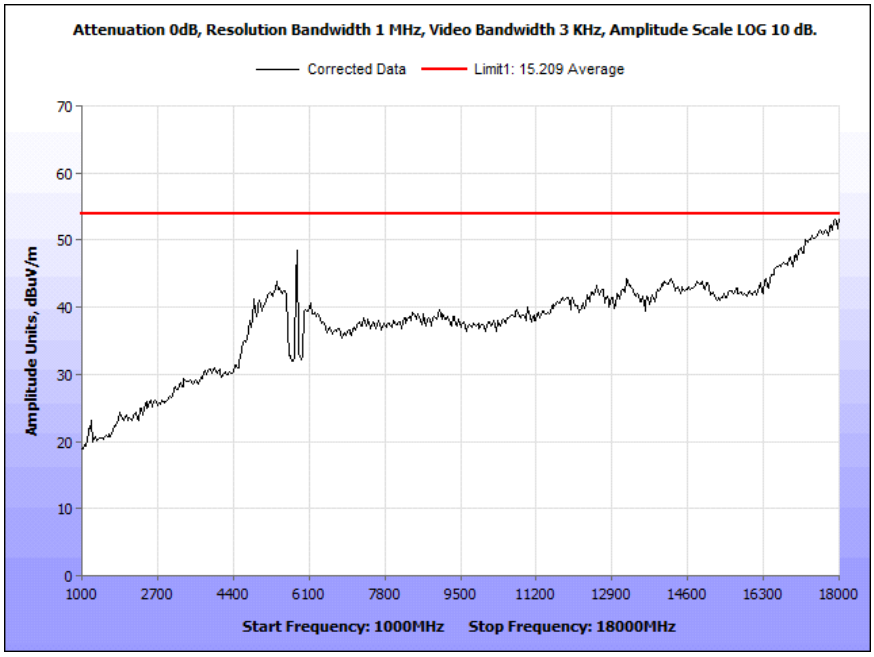
Figure 2: Radiated Emissions Test Setups



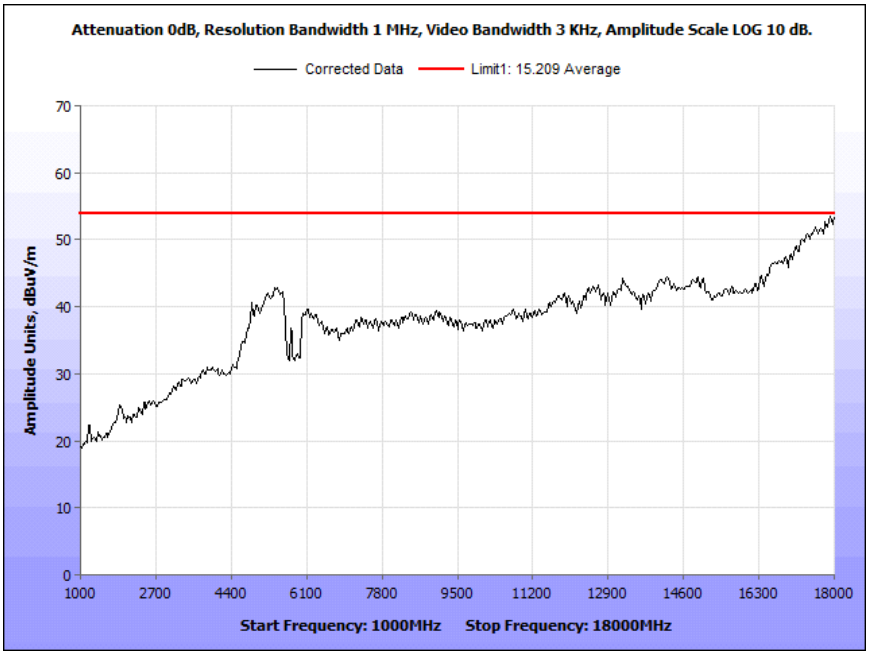
Plot 42. Average Radiated Emissions, 10 MHz – 5735 MHz, 1 – 18 GHz



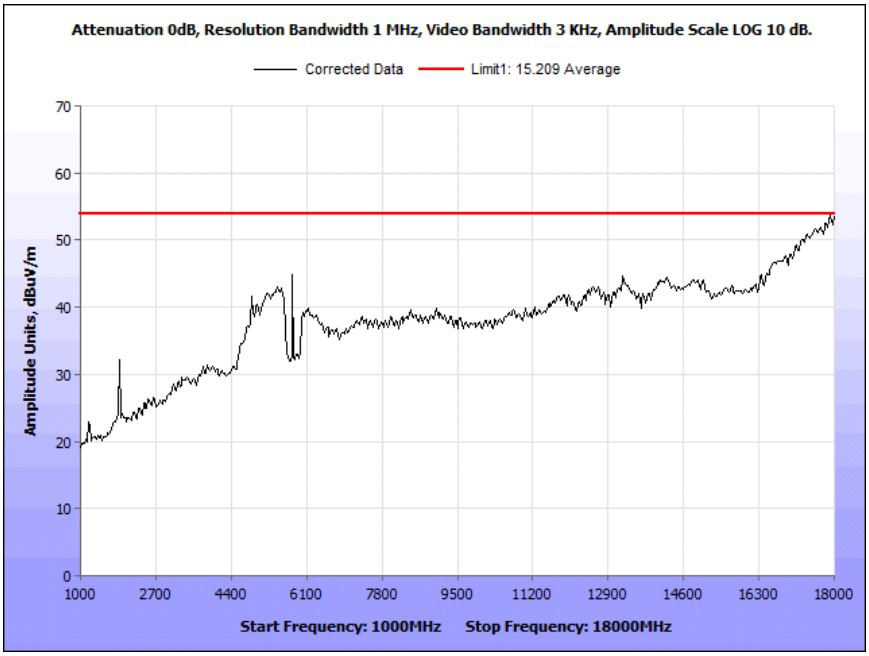
Plot 43. Average Radiated Emissions, 10 MHz – 5795 MHz, 1 – 18 GHz



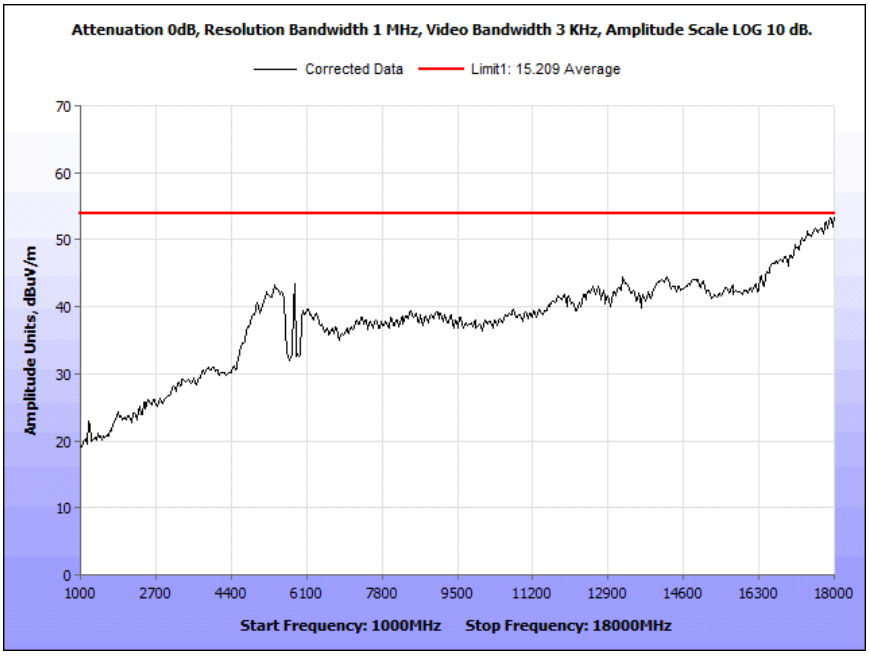
Plot 44. Average Radiated Emissions, 10 MHz – 5845 MHz, 1 – 18 GHz



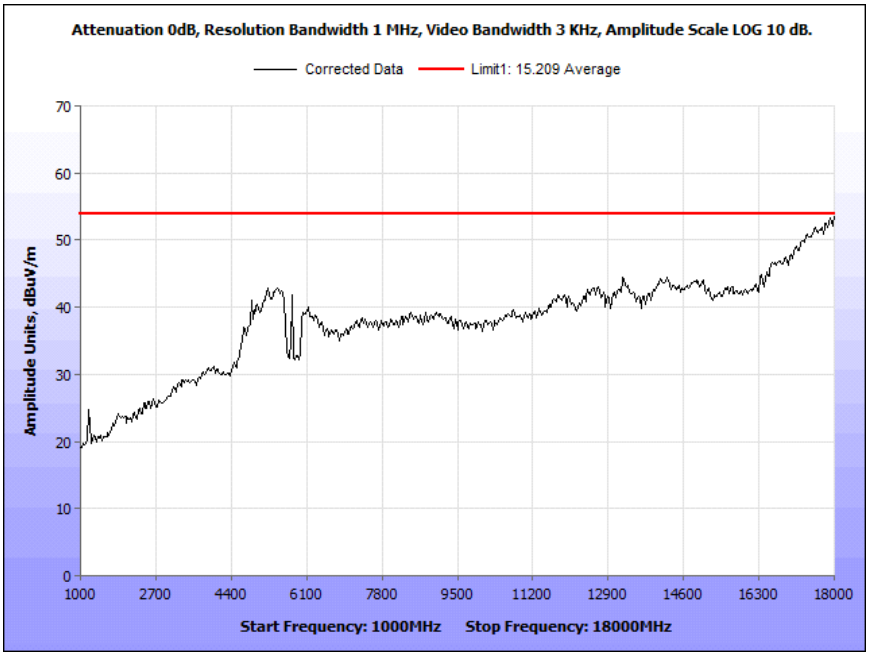
Plot 45. Average Radiated Emissions, 20 MHz – 5750 MHz, 1 – 18 GHz



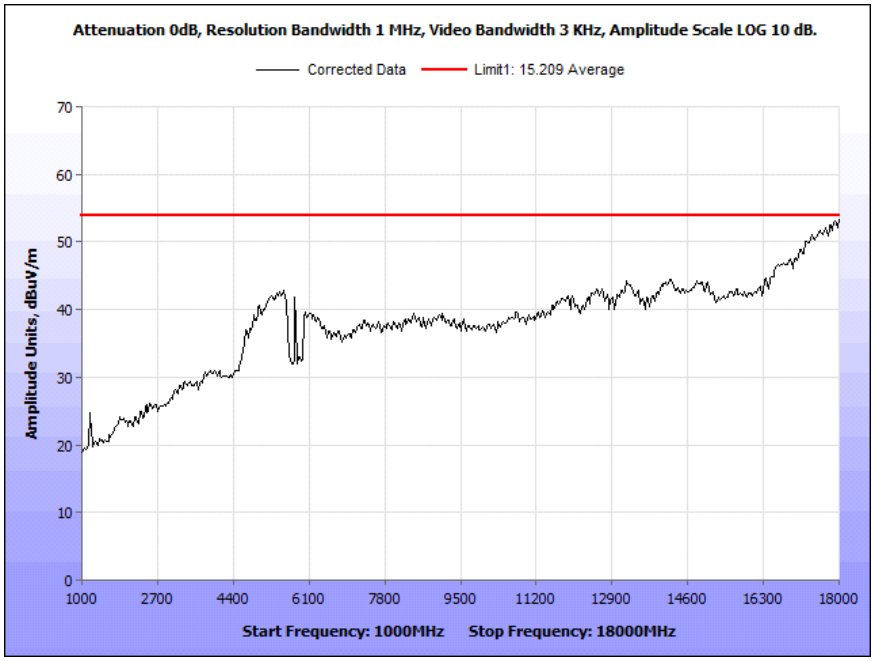
Plot 46. Average Radiated Emissions, 20 MHz – 5790 MHz, 1 – 18 GHz



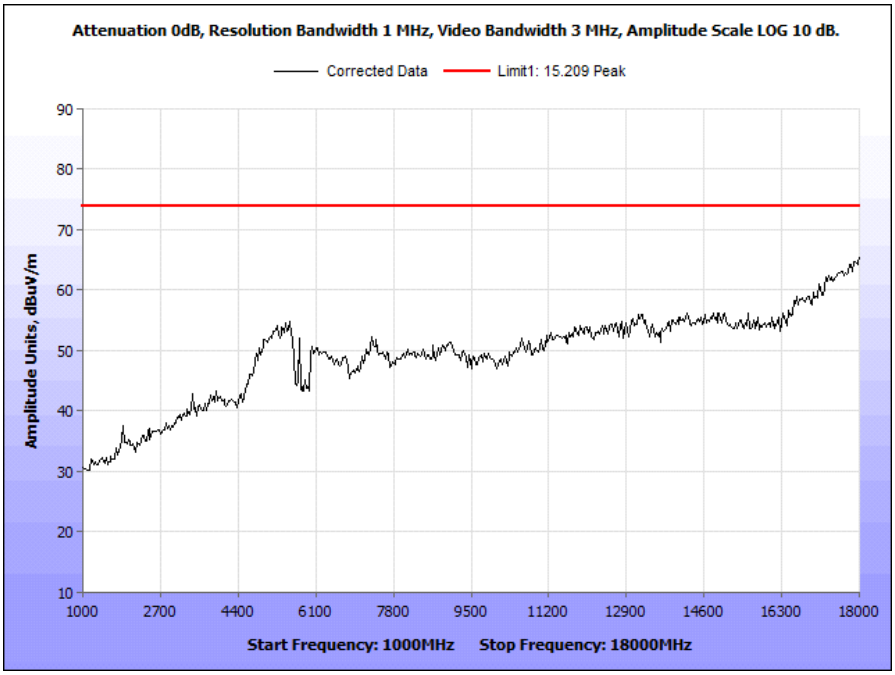
Plot 47. Average Radiated Emissions, 20 MHz – 5830 MHz, 1 – 18 GHz



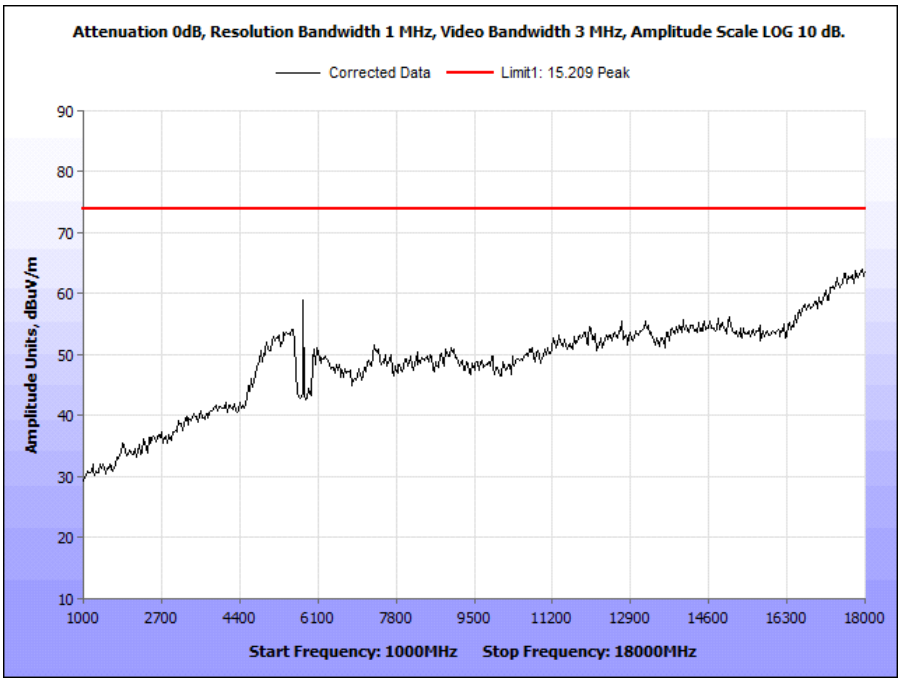
Plot 48. Average Radiated Emissions, 40 MHz – 5760 MHz, 1 – 18 GHz



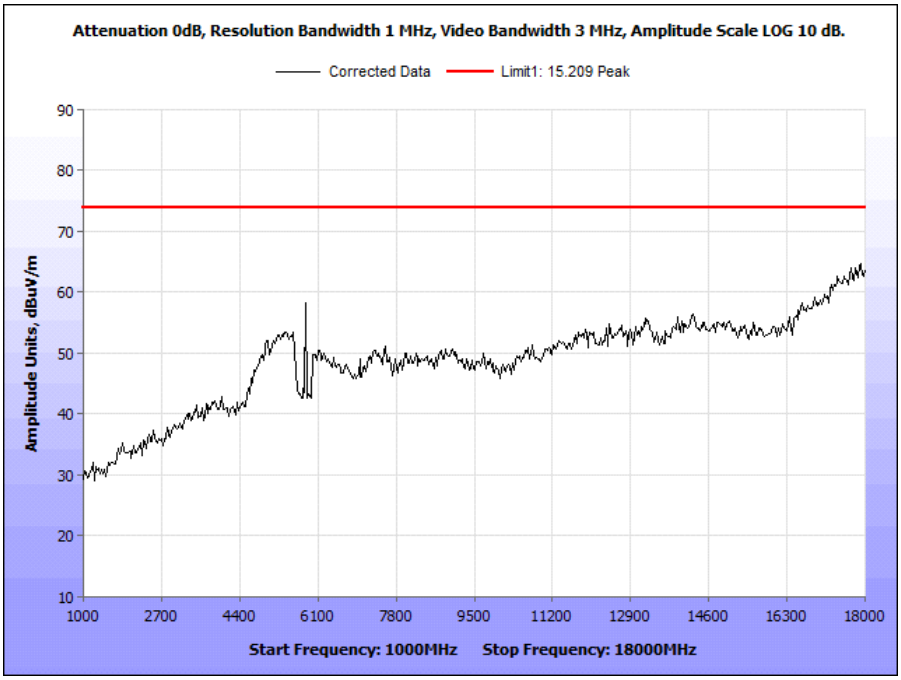
Plot 49. Average Radiated Emissions, 40 MHz – 5800 MHz, 1 – 18 GHz



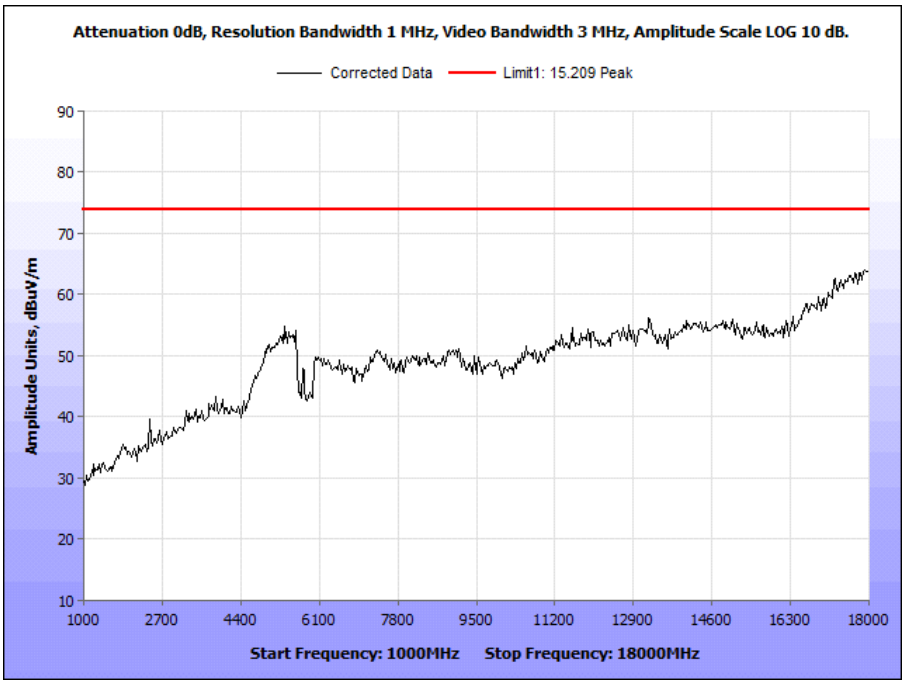
Plot 50. Peak Radiated Emissions, 10 MHz – 5735 MHz, 1 – 18 GHz



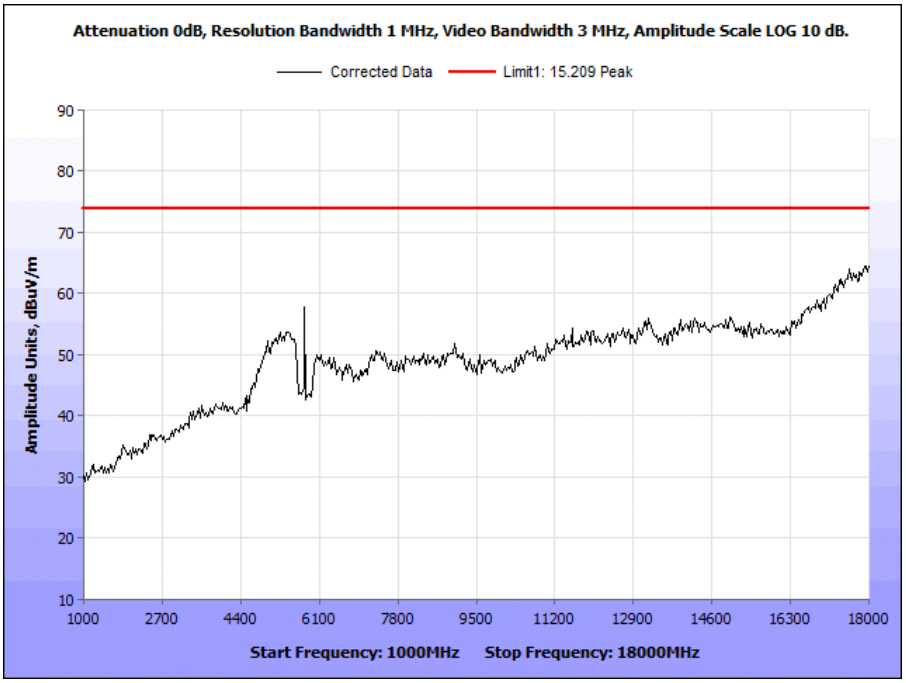
Plot 51. Peak Radiated Emissions, 10 MHz – 5795 MHz, 1 – 18 GHz



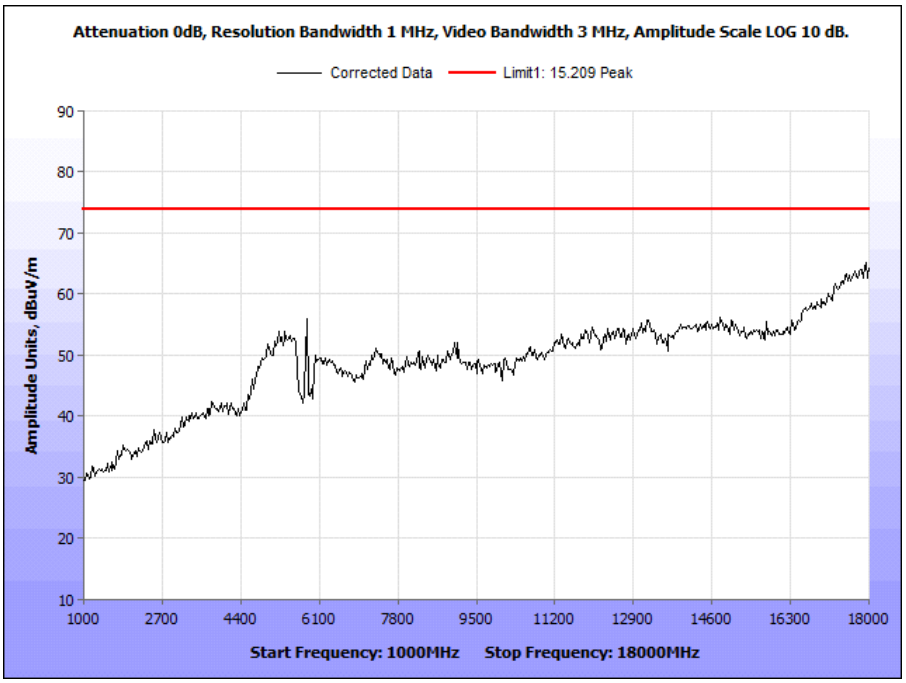
Plot 52. Peak Radiated Emissions, 10 MHz – 5845 MHz, 1 – 18 GHz



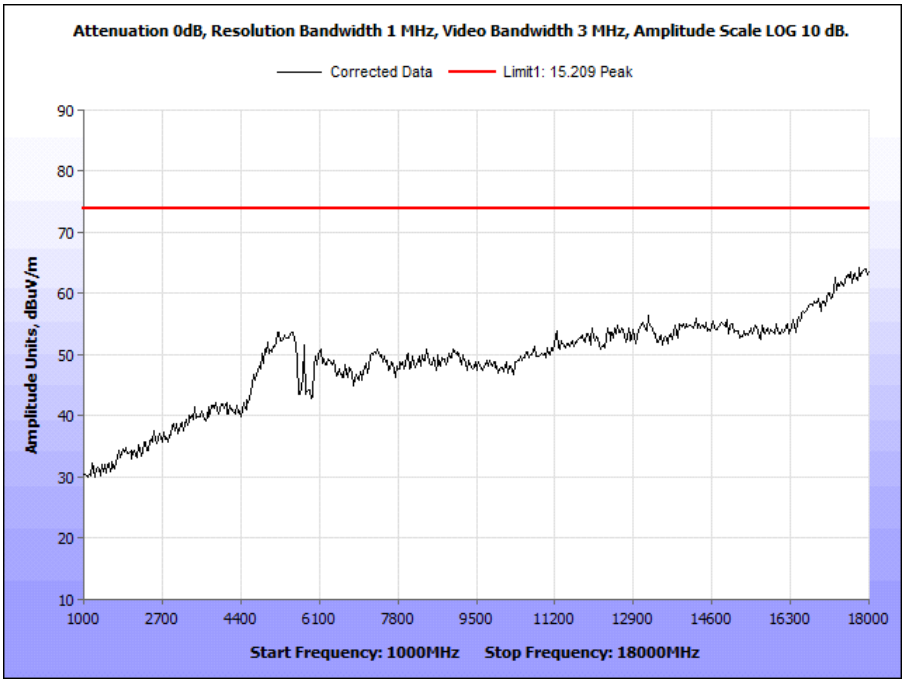
Plot 53. Peak Radiated Emissions, 20 MHz – 5750 MHz, 1 – 18 GHz



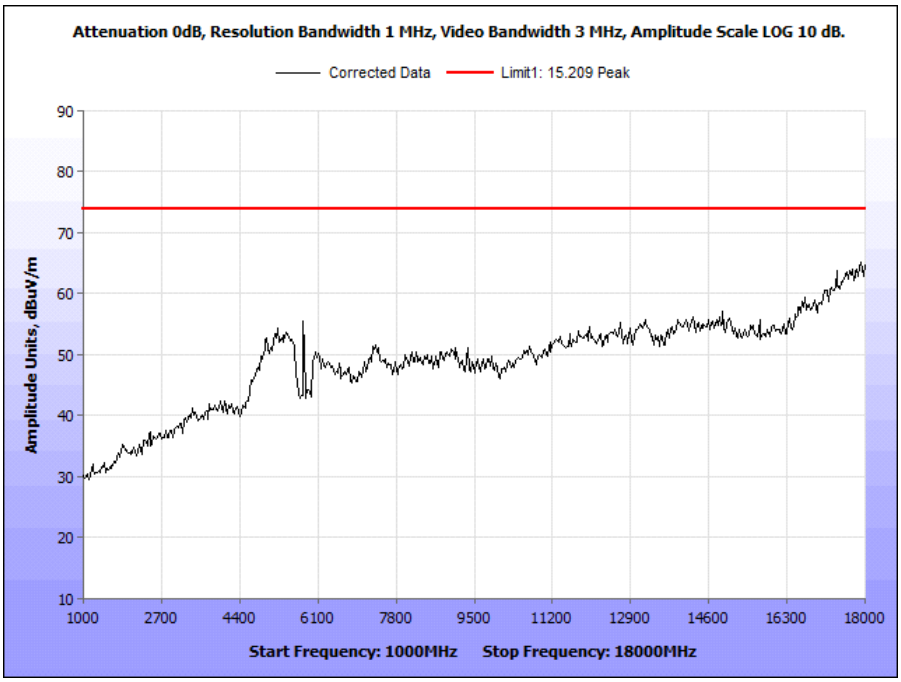
Plot 54. Peak Radiated Emissions, 20 MHz – 5790 MHz, 1 – 18 GHz



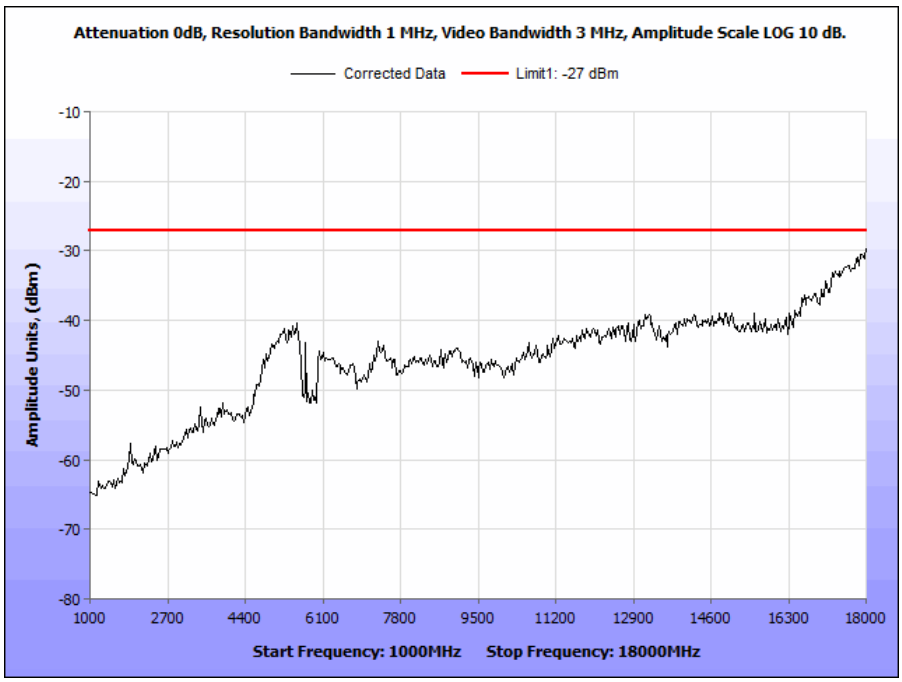
Plot 55. Peak Radiated Emissions, 20 MHz – 5830 MHz, 1 – 18 GHz



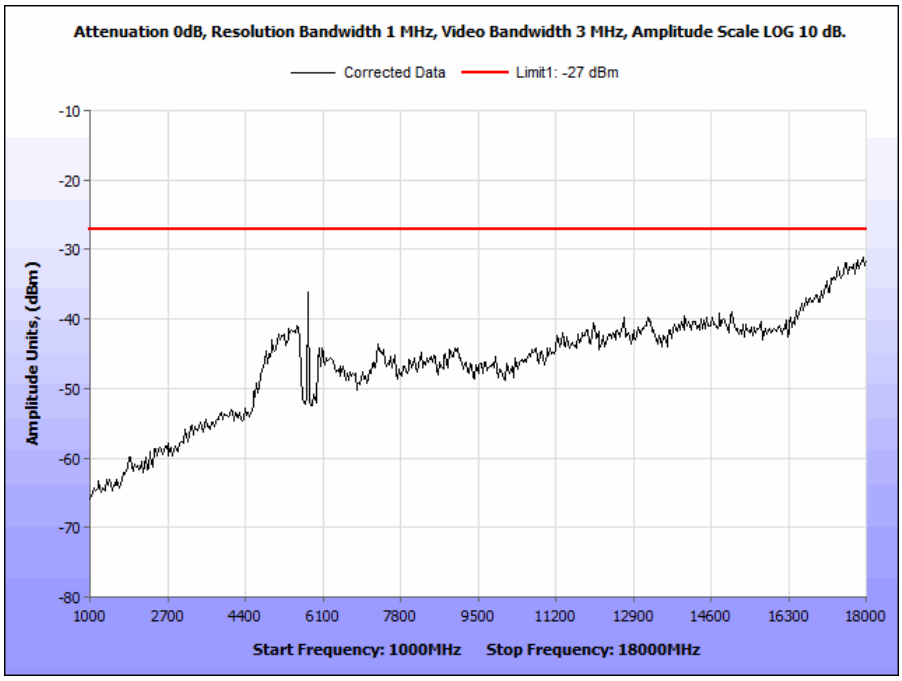
Plot 56. Peak Radiated Emissions, 40 MHz – 5760 MHz, 1 – 18 GHz



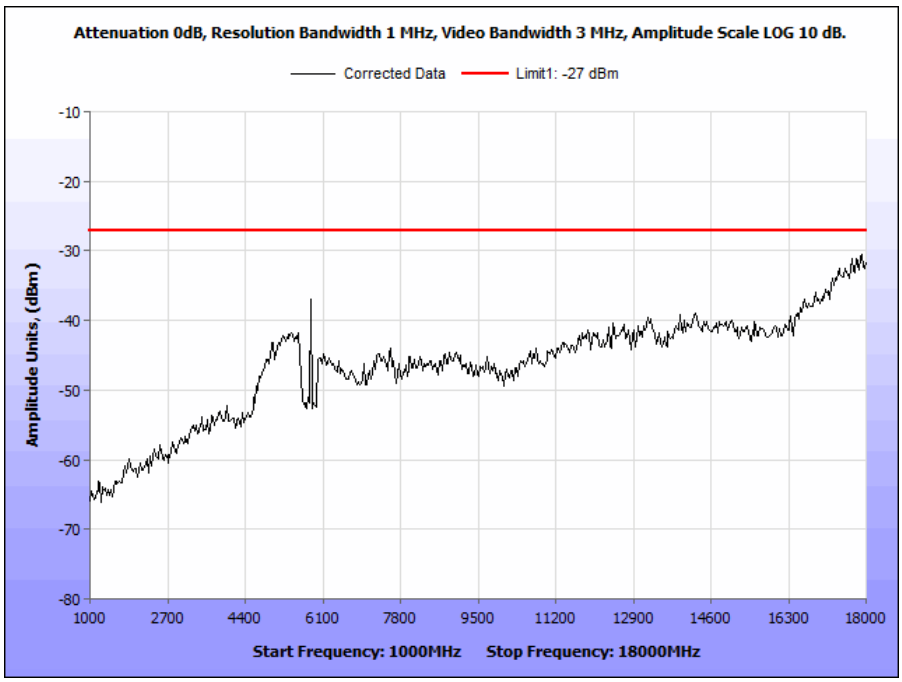
Plot 57. Peak Radiated Emissions, 40 MHz – 5800 MHz, 1 – 18 GHz



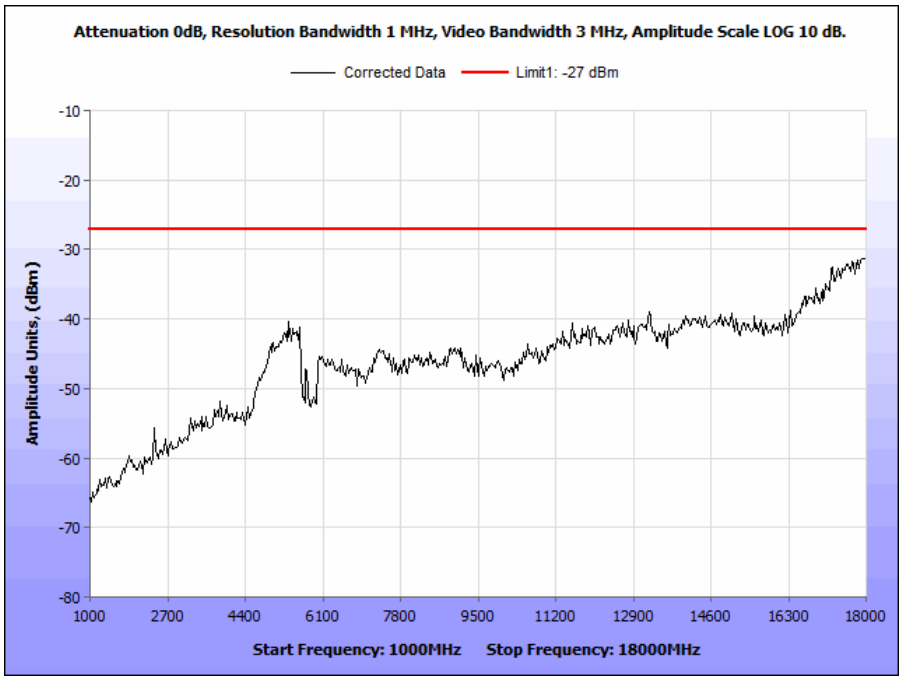
Plot 58. Unwanted EIRP Spurious Emissions, 10 MHz – 5735 MHz, 1 – 18 GHz



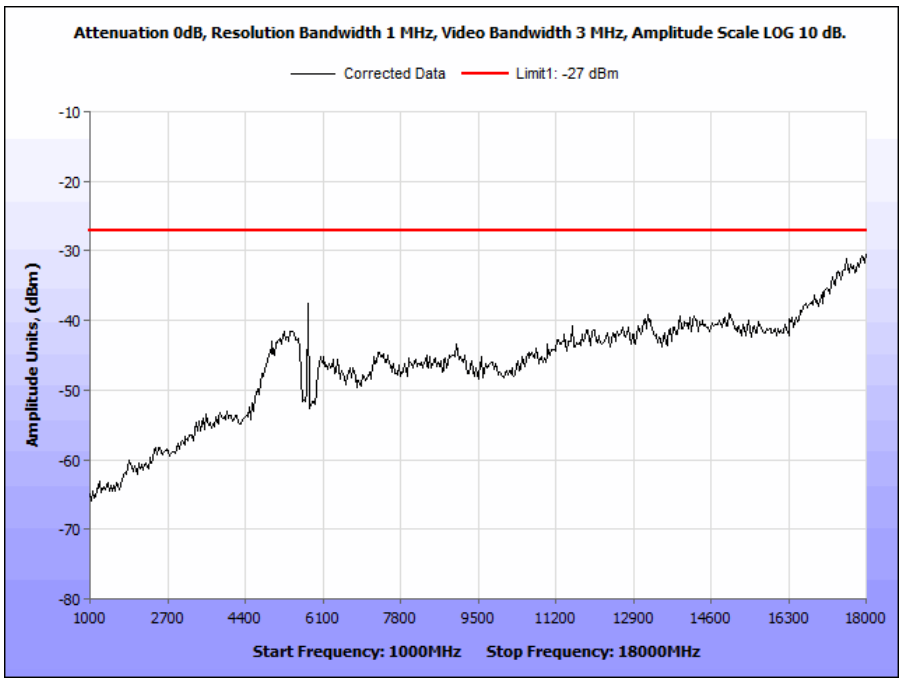
Plot 59. Unwanted EIRP Spurious Emissions, 10 MHz – 5795 MHz, 1 – 18 GHz



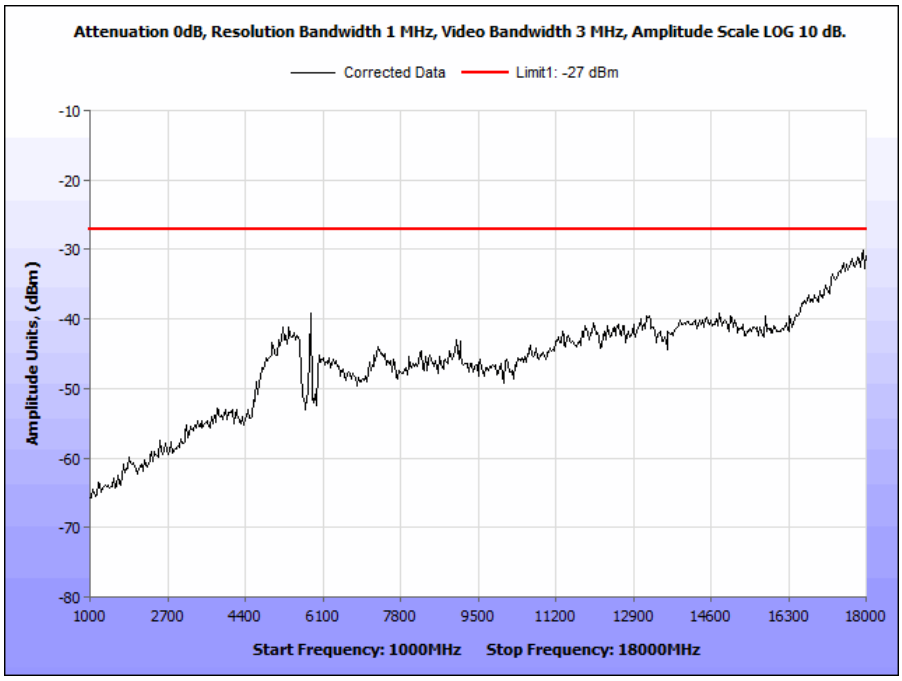
Plot 60. Unwanted EIRP Spurious Emissions, 10 MHz – 5845 MHz, 1 – 18 GHz



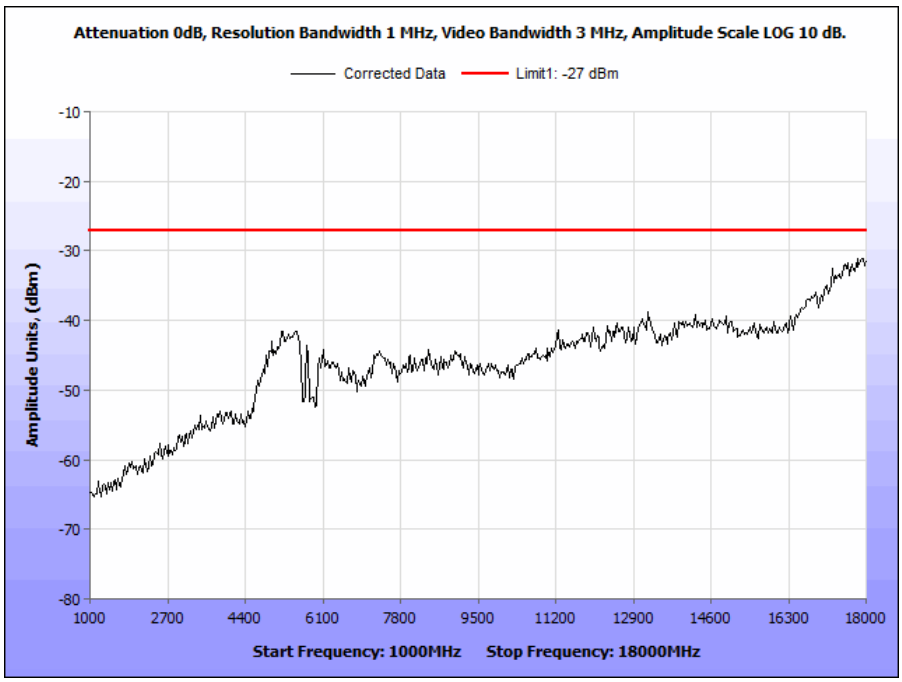
Plot 61. Unwanted EIRP Spurious Emissions, 20 MHz – 5750 MHz, 1 – 18 GHz



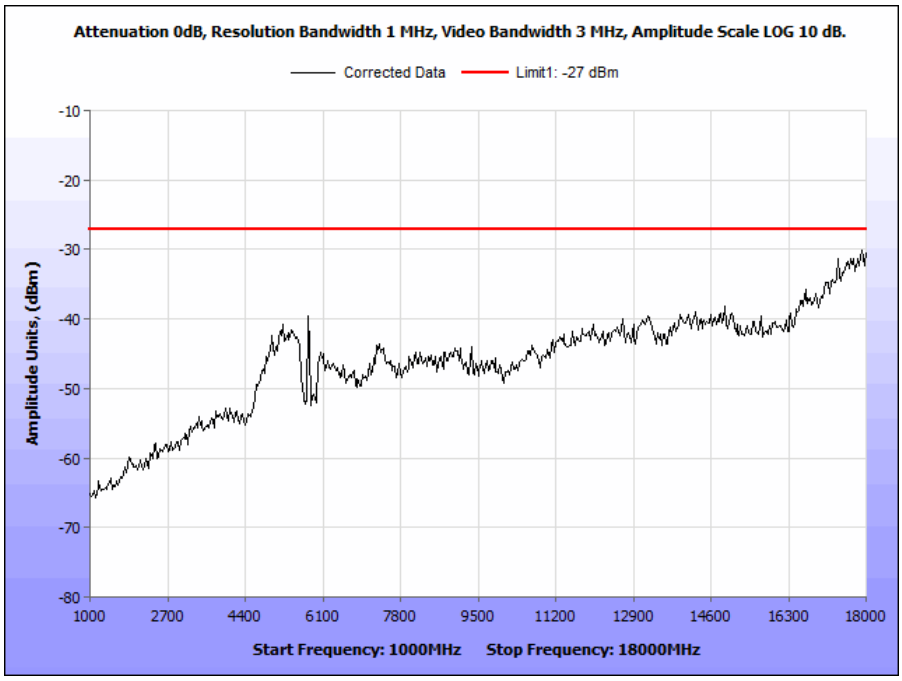
Plot 62. Unwanted EIRP Spurious Emissions, 20 MHz – 5790 MHz, 1 – 18 GHz



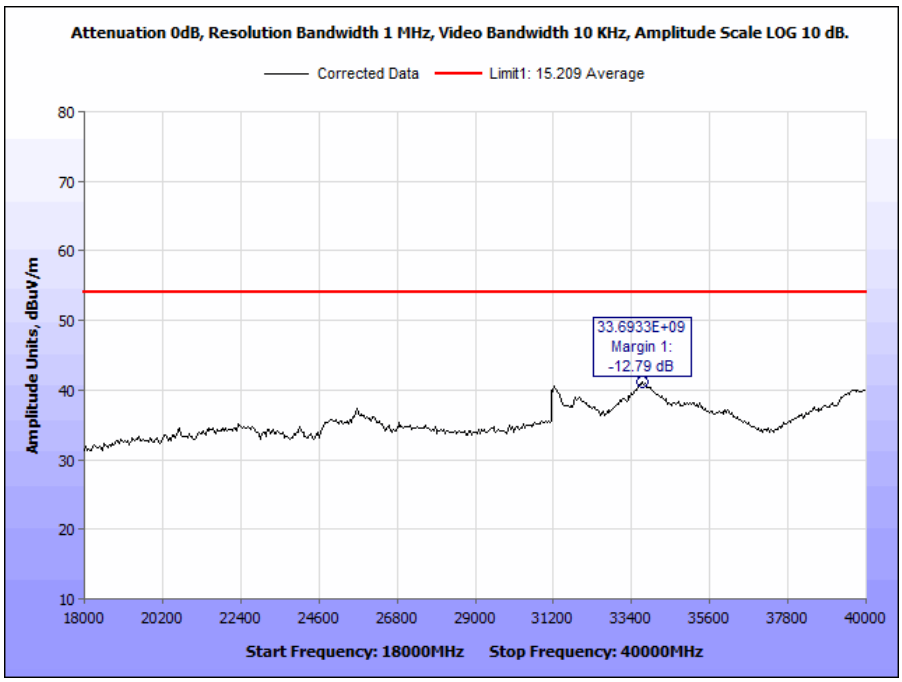
Plot 63. Unwanted EIRP Spurious Emissions, 20 MHz – 5830 MHz, 1 – 18 GHz



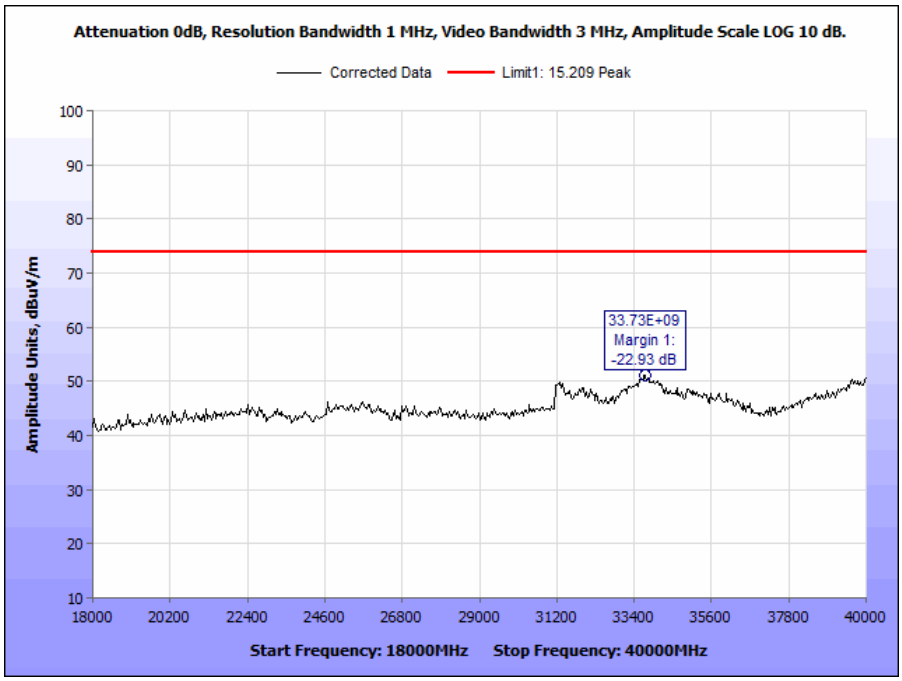
Plot 64. Unwanted EIRP Spurious Emissions, 40 MHz – 5760 MHz, 1 – 18 GHz



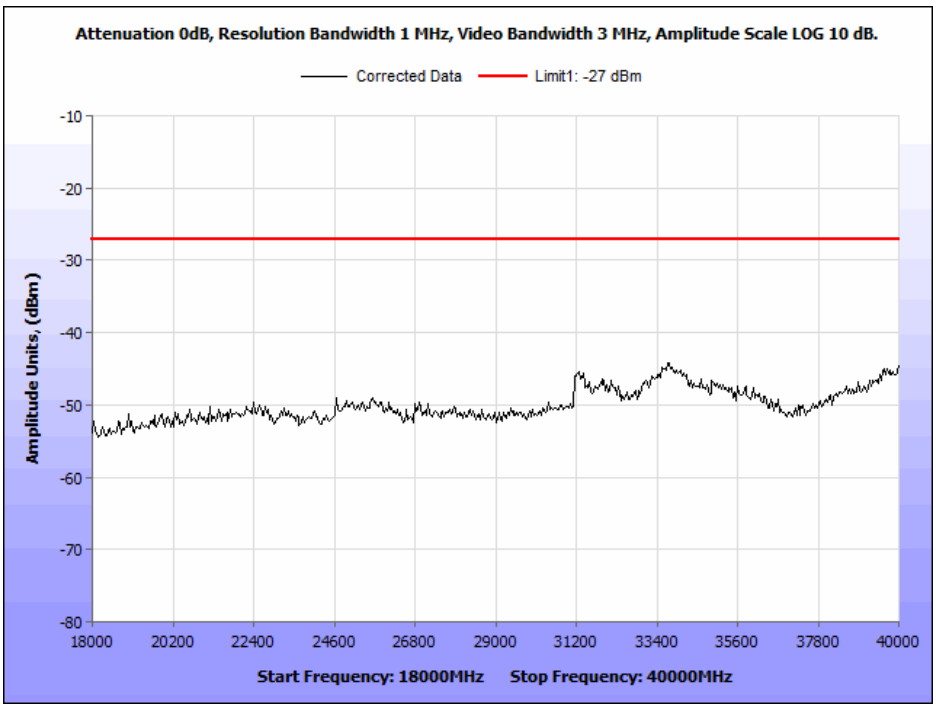
Plot 65. Unwanted EIRP Spurious Emissions, 40 MHz – 5800 MHz, 1 – 18 GHz



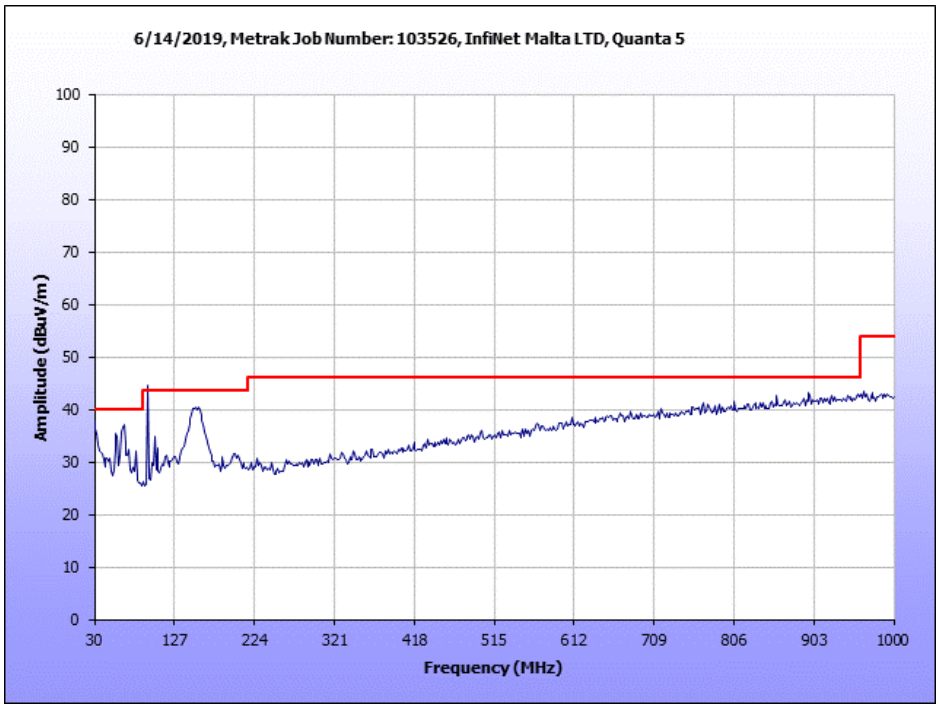
Plot 66. Average Radiated Emissions, 18 – 40 GHz



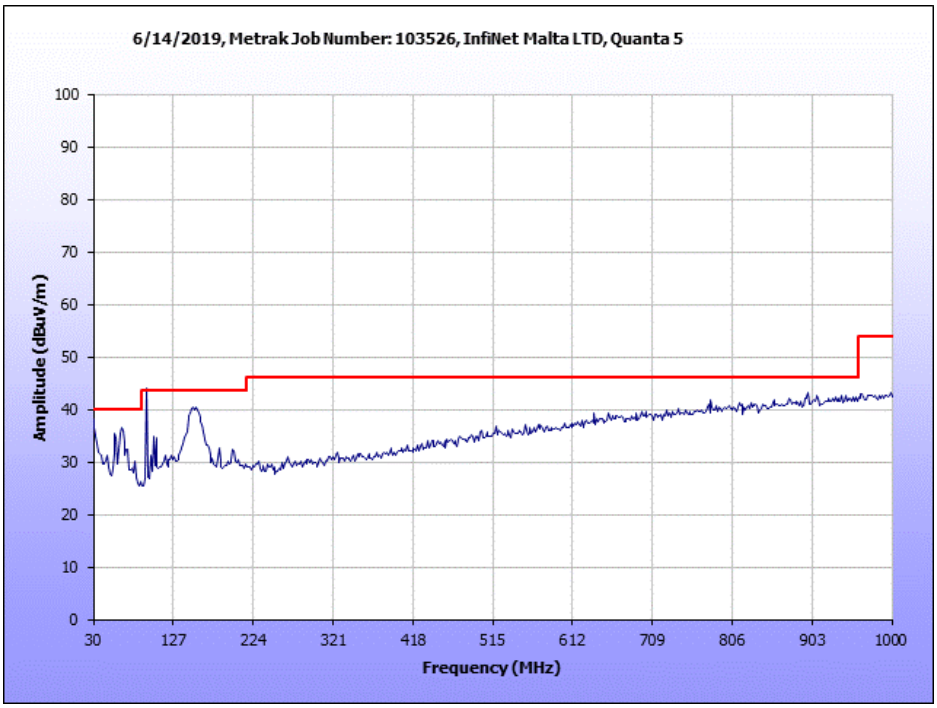
Plot 67. Peak Radiated Emissions, 18 – 40 GHz



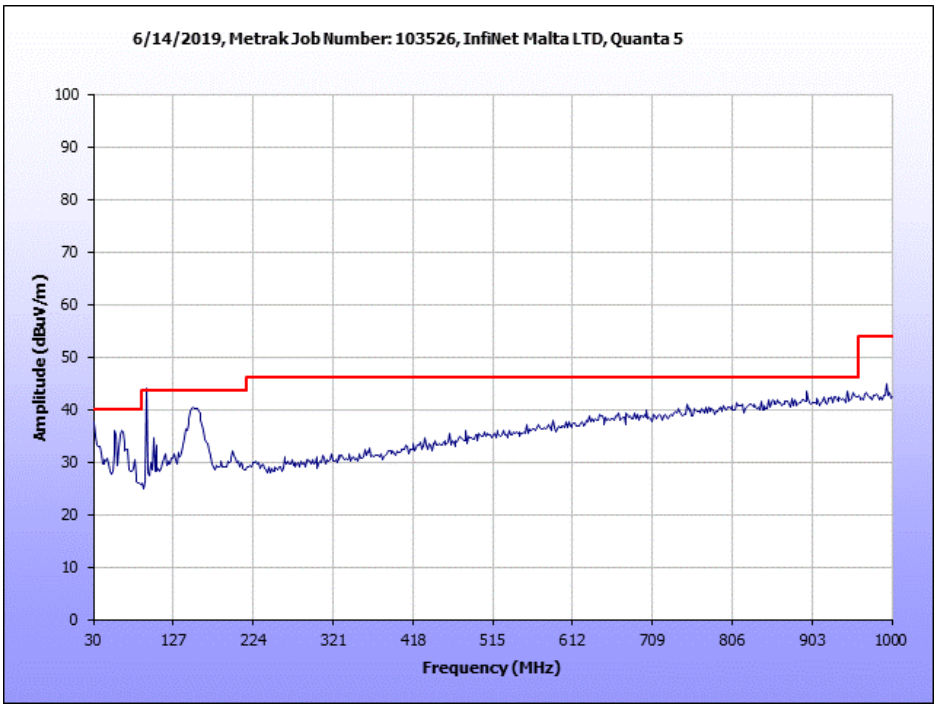
Plot 68. Unwanted EIRP Spurious Emissions, 18 – 40 GHz



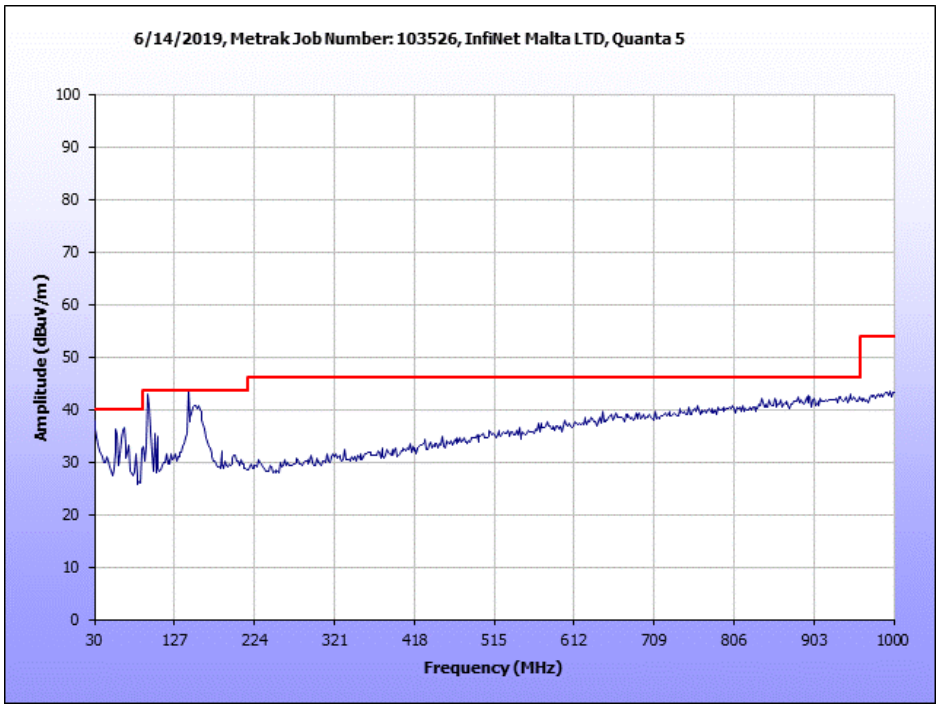
Plot 69. Radiated Spurious, 10 MHz – 5735 MHz, 30 MHz – 1 GHz



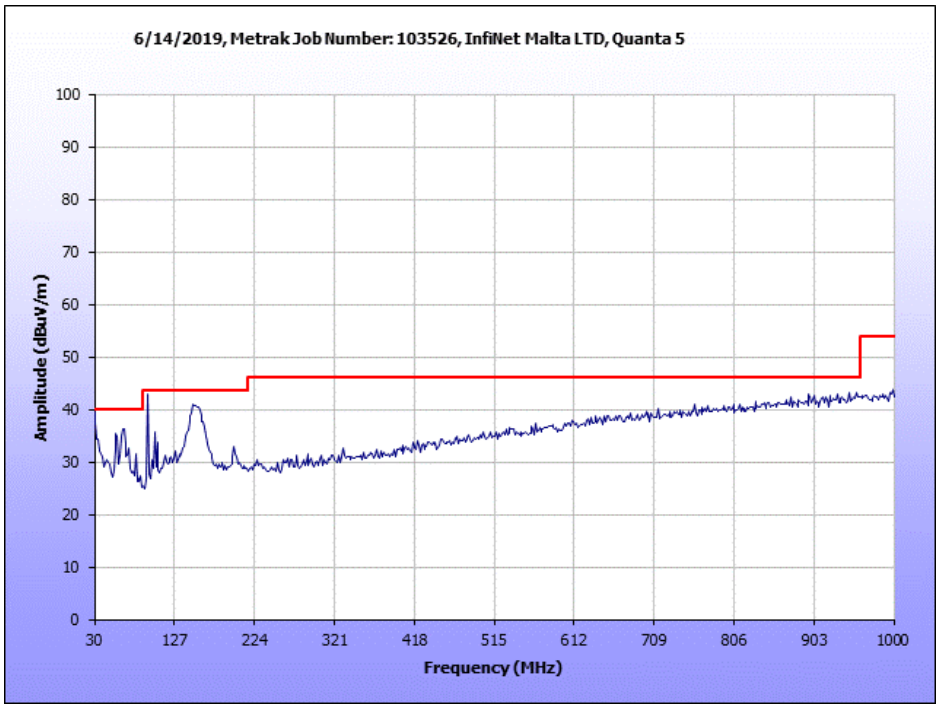
Plot 70. Radiated Spurious, 10 MHz – 5795 MHz, 30 MHz – 1 GHz



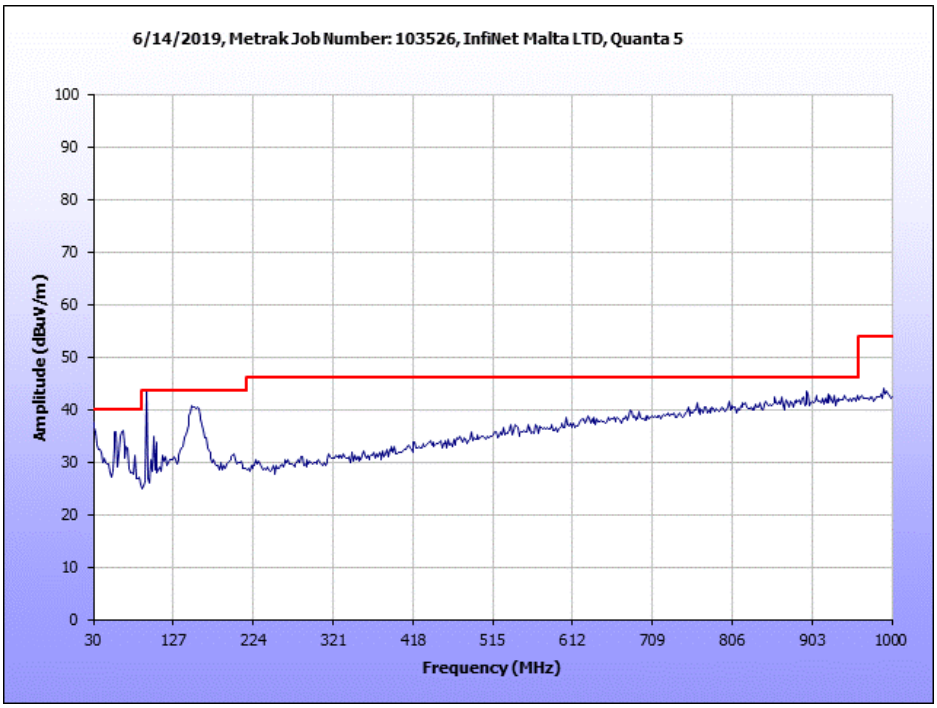
Plot 71. Radiated Spurious, 10 MHz – 5845 MHz, 30 MHz – 1 GHz



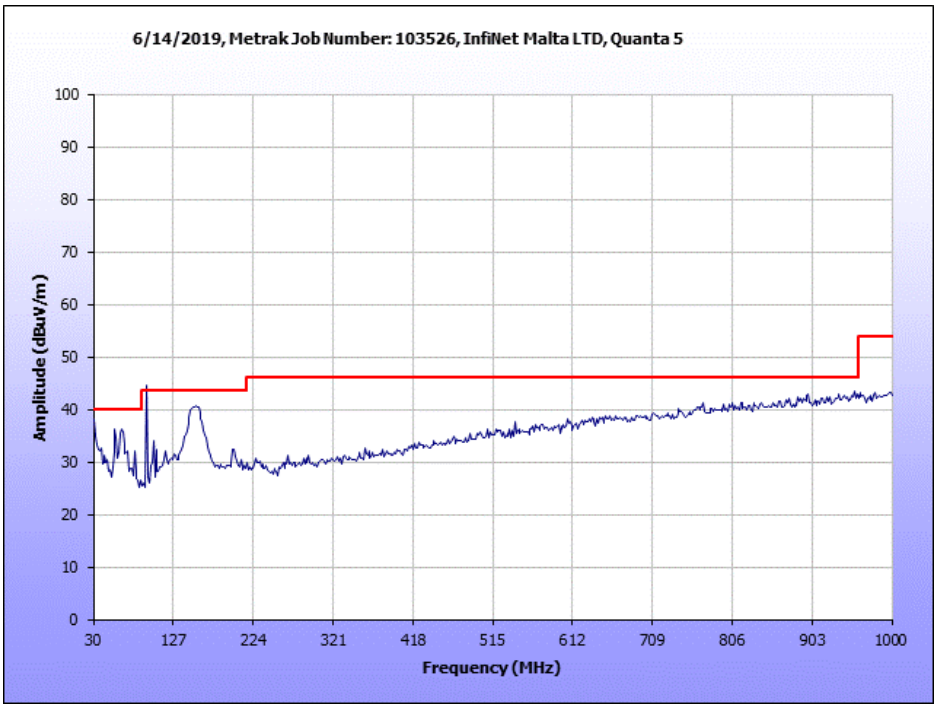
Plot 72. Radiated Spurious, 20 MHz – 5750 MHz, 30 MHz – 1 GHz



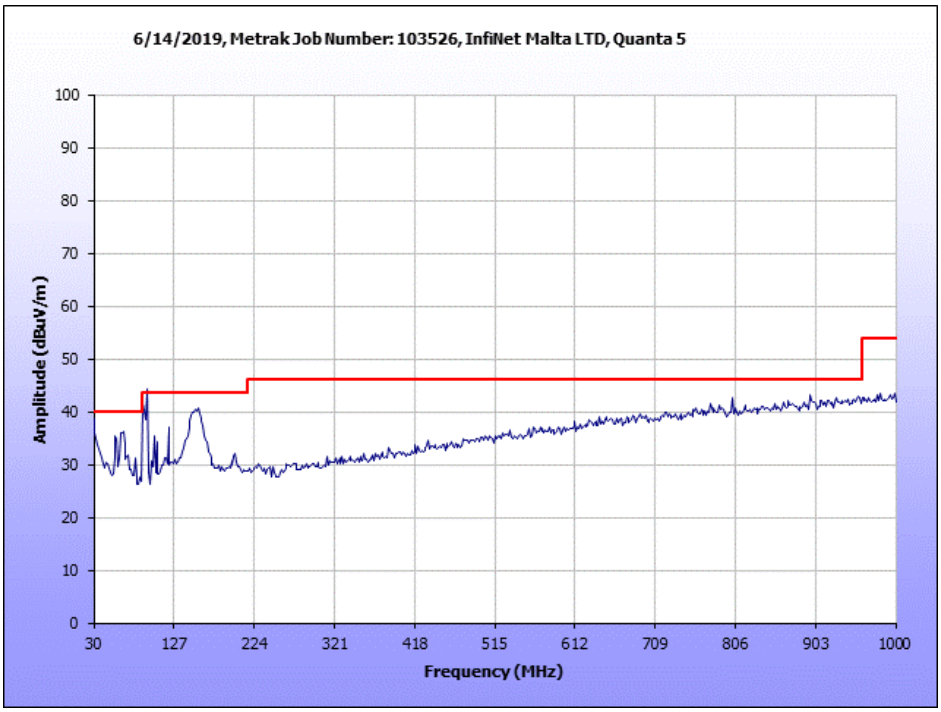
Plot 73. Radiated Spurious, 20 MHz – 5790 MHz, 30 MHz – 1 GHz



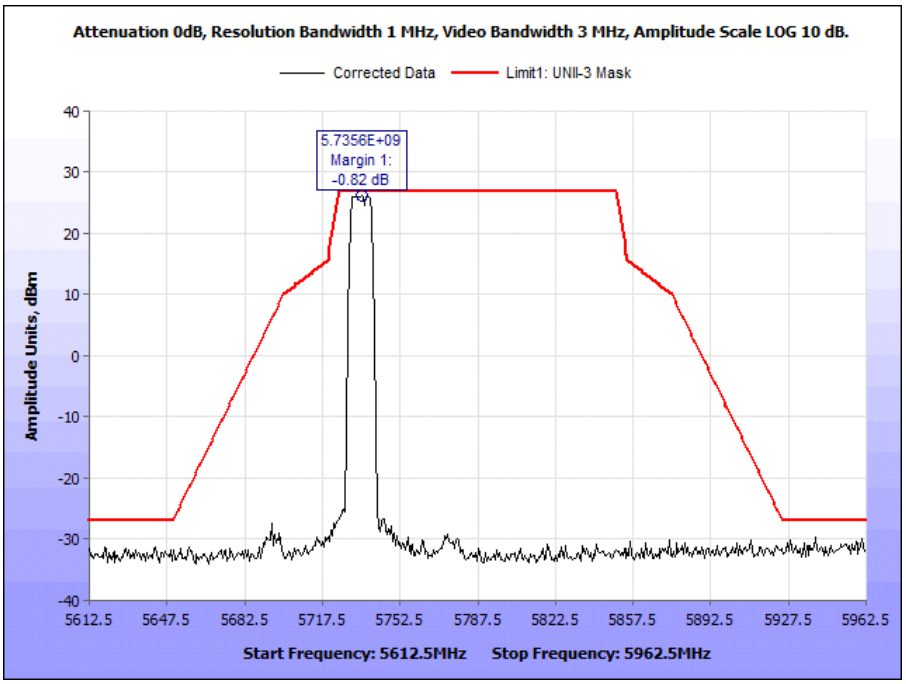
Plot 74. Radiated Spurious, 20 MHz – 5830 MHz, 30 MHz – 1 GHz



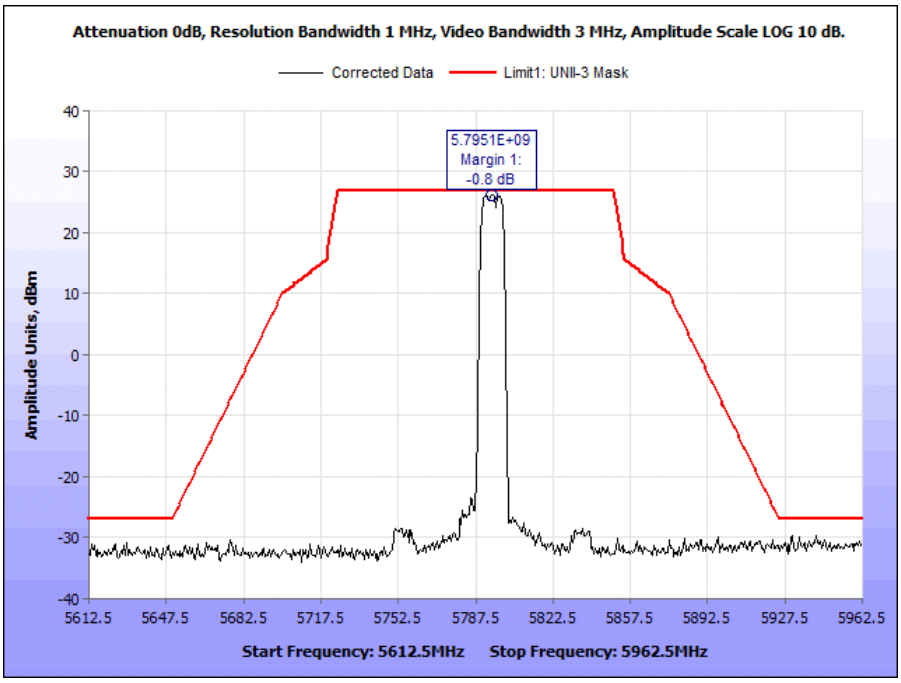
Plot 75. Radiated Spurious, 40 MHz – 5760 MHz, 30 MHz – 1 GHz



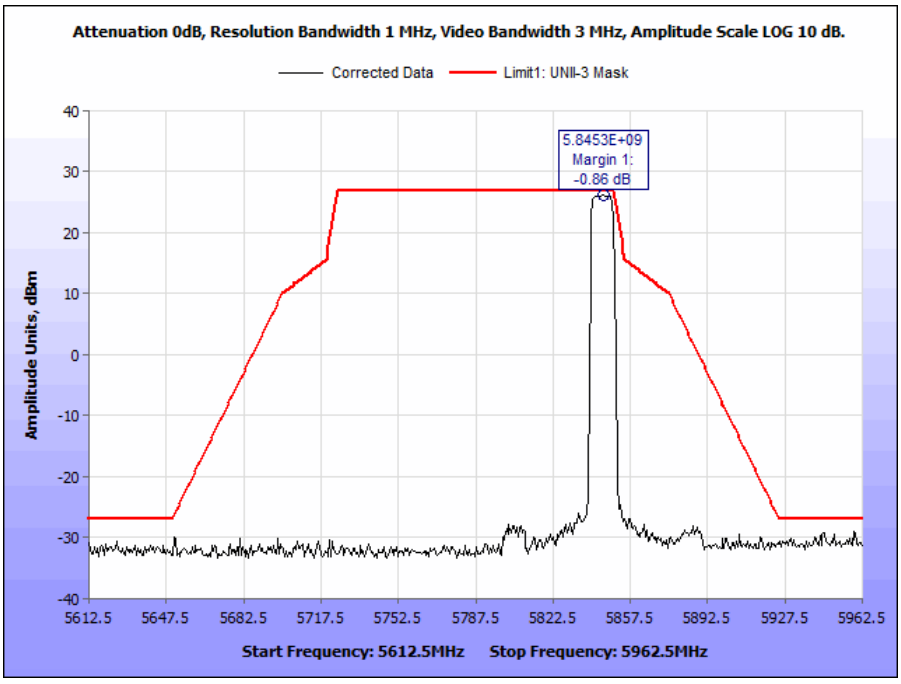
Plot 76. Radiated Spurious, 40 MHz – 5800 MHz, 30 MHz – 1 GHz



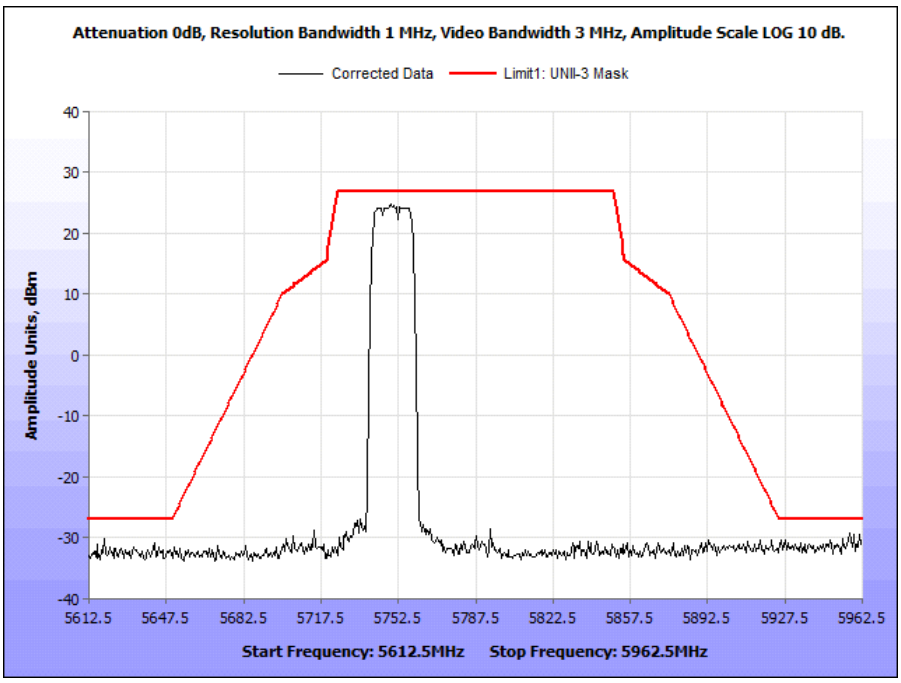
Plot 77. UNII3 – Mask, Radiated Emissions, 10 MHz – 5735 MHz, Vertical



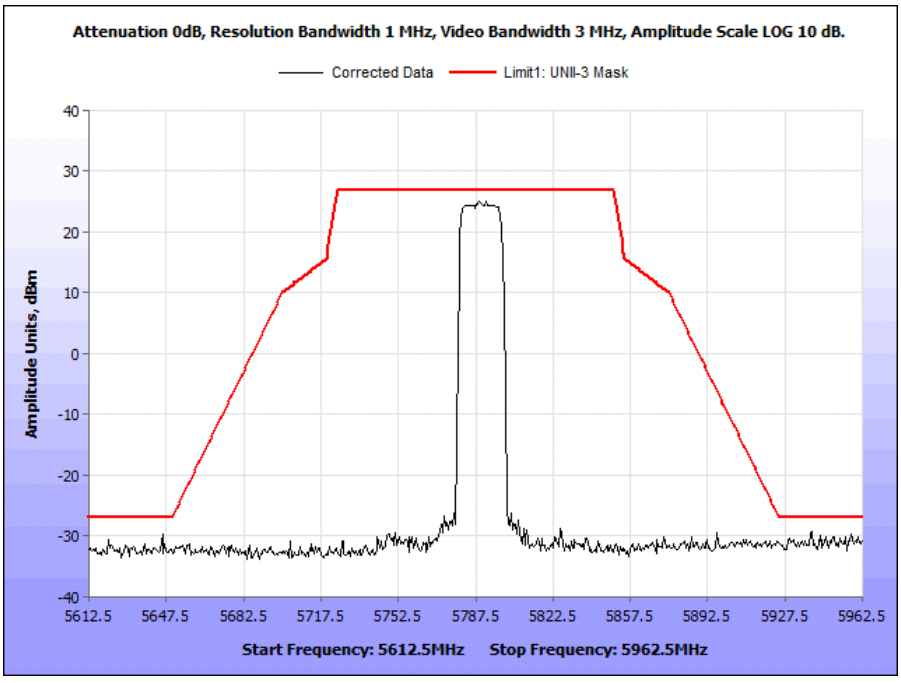
Plot 78. UNII3 – Mask, Radiated Emissions, 10 MHz – 5795 MHz, Vertical



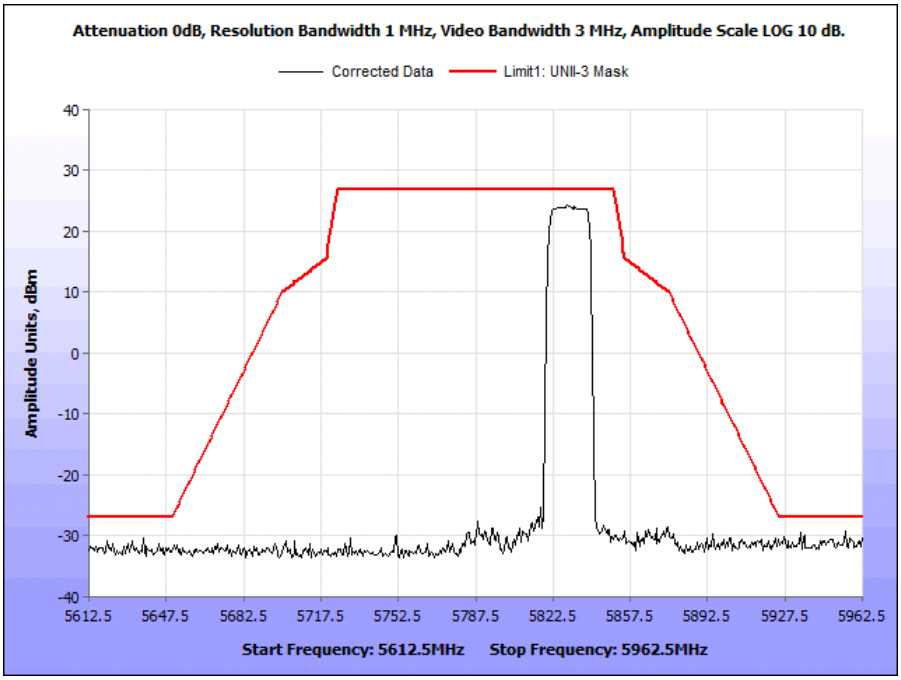
Plot 79. UNII3 – Mask, Radiated Emissions, 10 MHz – 5845 MHz, Vertical



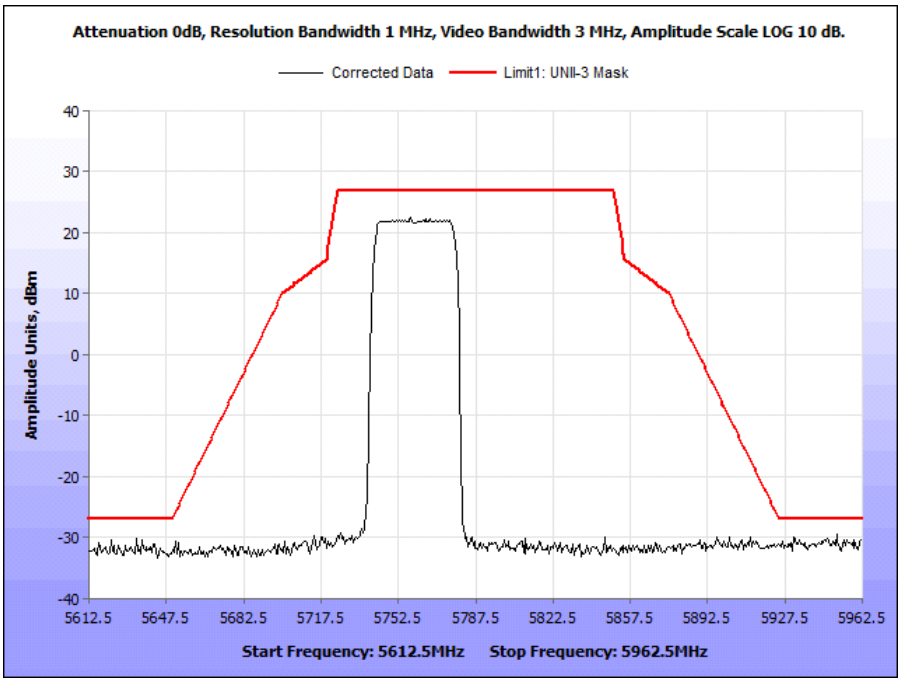
Plot 80. UNII3 – Mask, Radiated Emissions, 20 MHz – 5750 MHz, Vertical



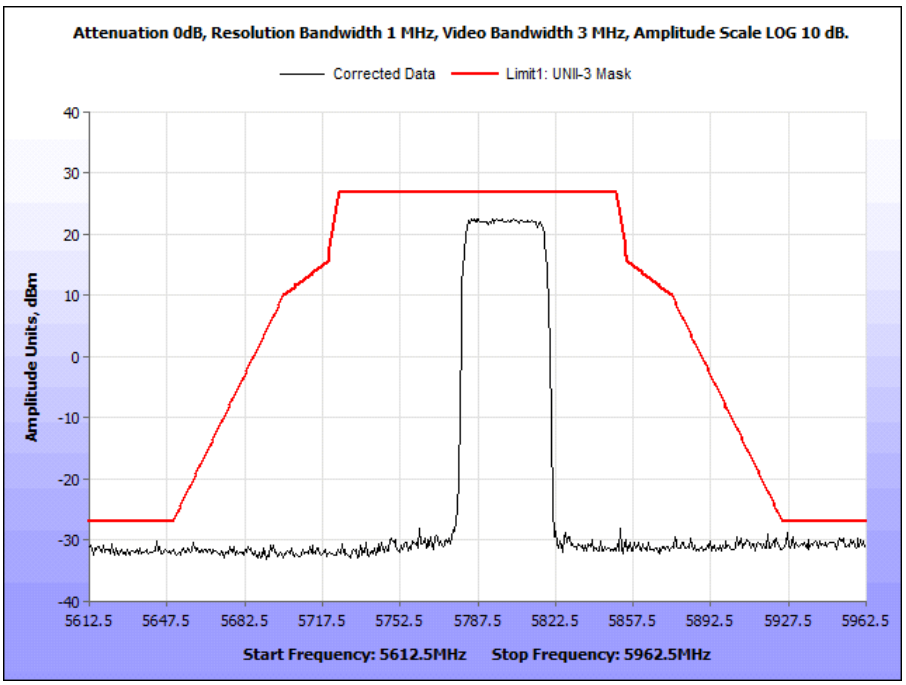
Plot 81. UNII3 – Mask, Radiated Emissions, 20 MHz – 5790 MHz, Vertical



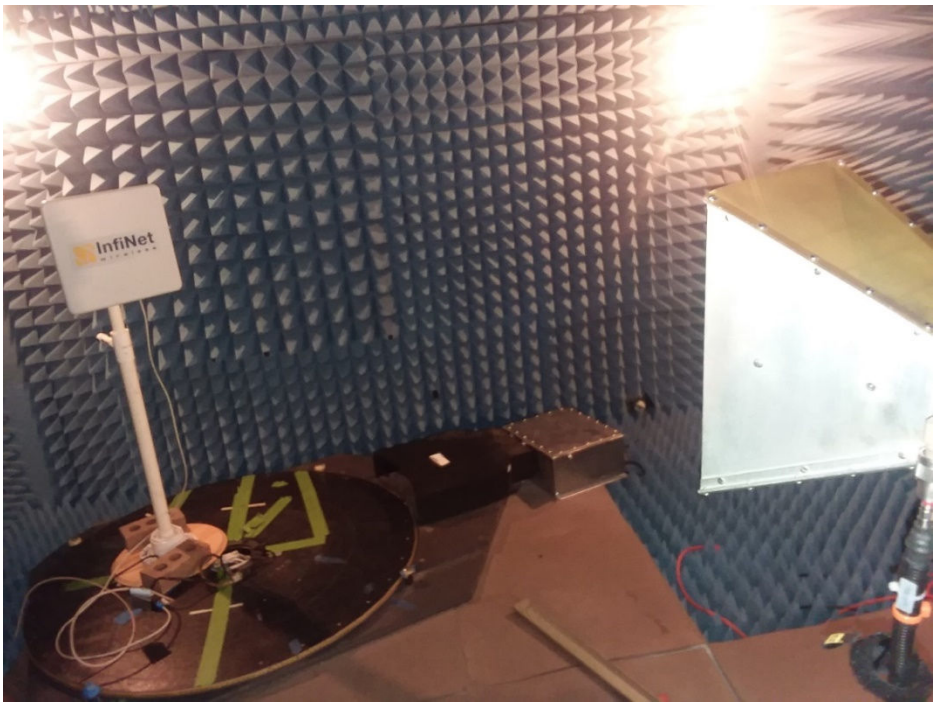
Plot 82. UNII3 – Mask, Radiated Emissions, 20 MHz – 5830 MHz, Vertical



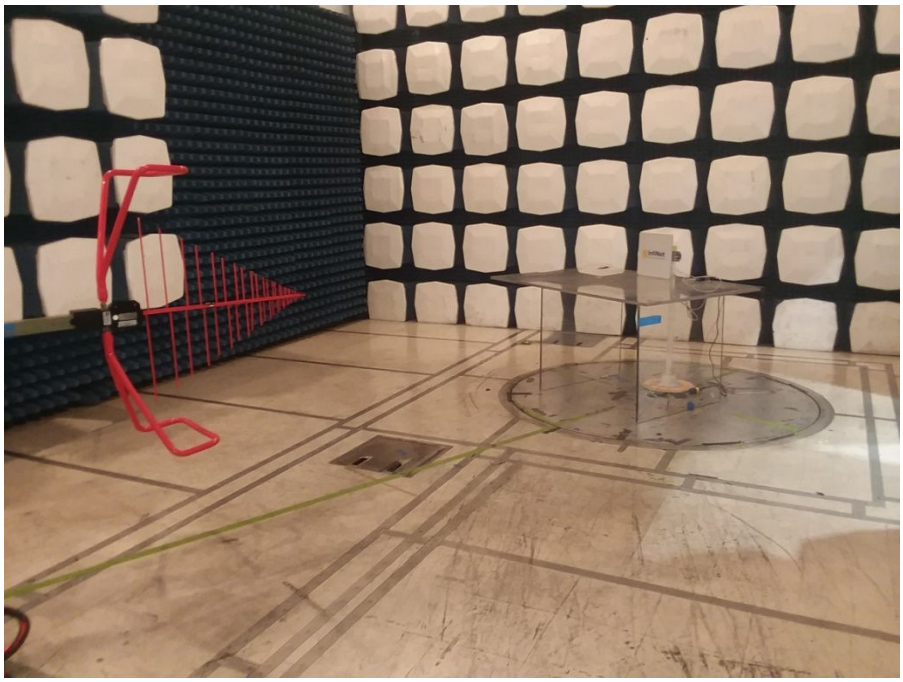
Plot 83. UNII3 – Mask, Radiated Emissions, 40 MHz – 5760 MHz, Vertical



Plot 84. UNII3 – Mask, Radiated Emissions, 40 MHz – 5800 MHz, Vertical



Photograph 1. Radiated Emissions Setup between 1 – 18 GHz



Photograph 2. Radiated Emissions Setup between 30MHz - 1GHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(b)(6) Conducted Emissions

Test Requirement(s): **§ 15.407 (b)(6):** Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

§ 15.207 (a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 – 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 13. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a non-metallic table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.10-2013* . Scans were performed with the transmitter on.

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

Test Engineer(s): Donald Salguero

Test Date(s): June 12, 2019

Conducted Emissions Voltage Test Setup

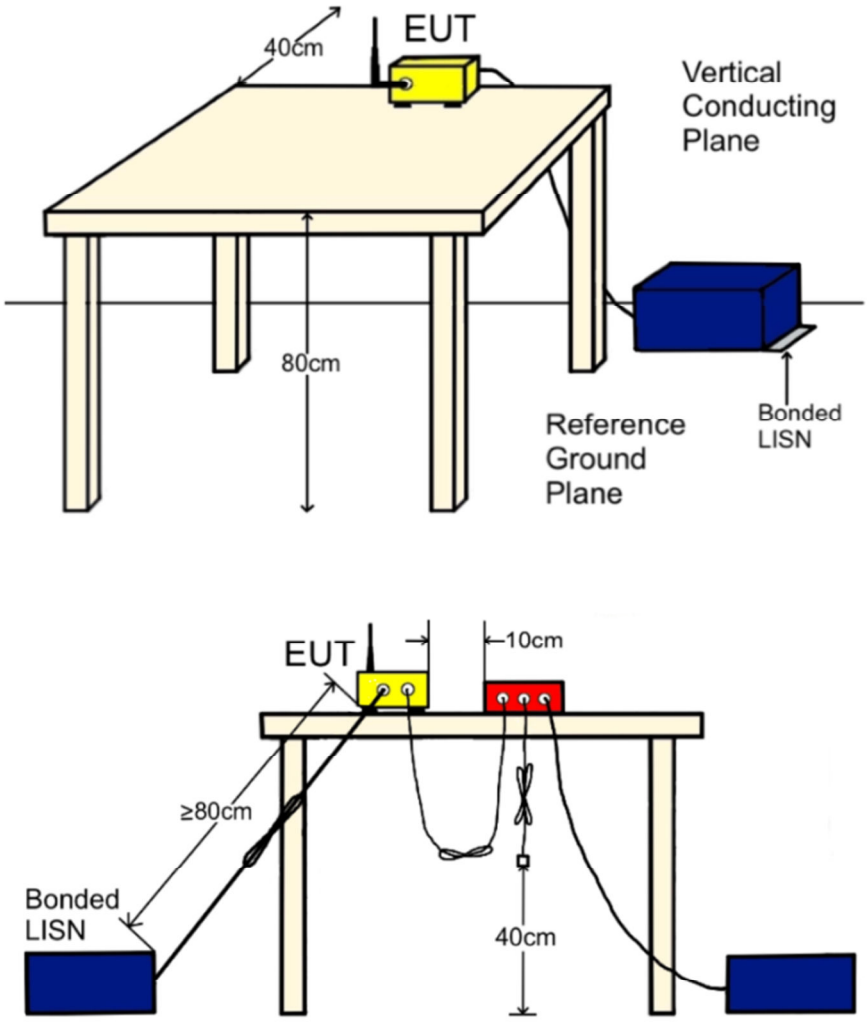
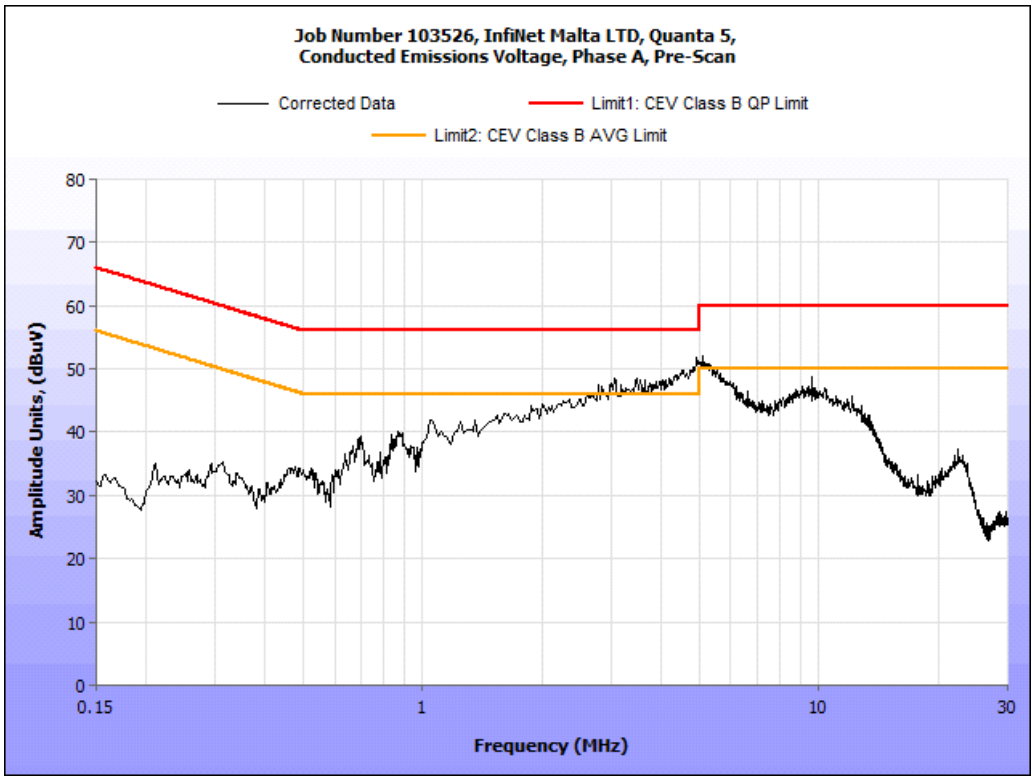


Figure 3: CEV Test Setup

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Pass/ Fail QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Pass/ Fail AVG	Margin (dB) AVG
4.982	36.01	46.01	56	PASS	-9.99	29.33	0	39.33	46	PASS	-6.67
4.718	35.97	45.97	56	PASS	-10.03	28.6	0	38.6	46	PASS	-7.4
5.075	36.13	46.13	60	PASS	-13.87	29.61	0	39.61	50	PASS	-10.39
3.328	32.23	42.23	56	PASS	-13.77	25.07	0	35.07	46	PASS	-10.93
9.52	32.06	42.06	60	PASS	-17.94	25.55	0	35.55	50	PASS	-14.45
4.51	35.08	45.08	56	PASS	-10.92	27.96	0	37.96	46	PASS	-8.04

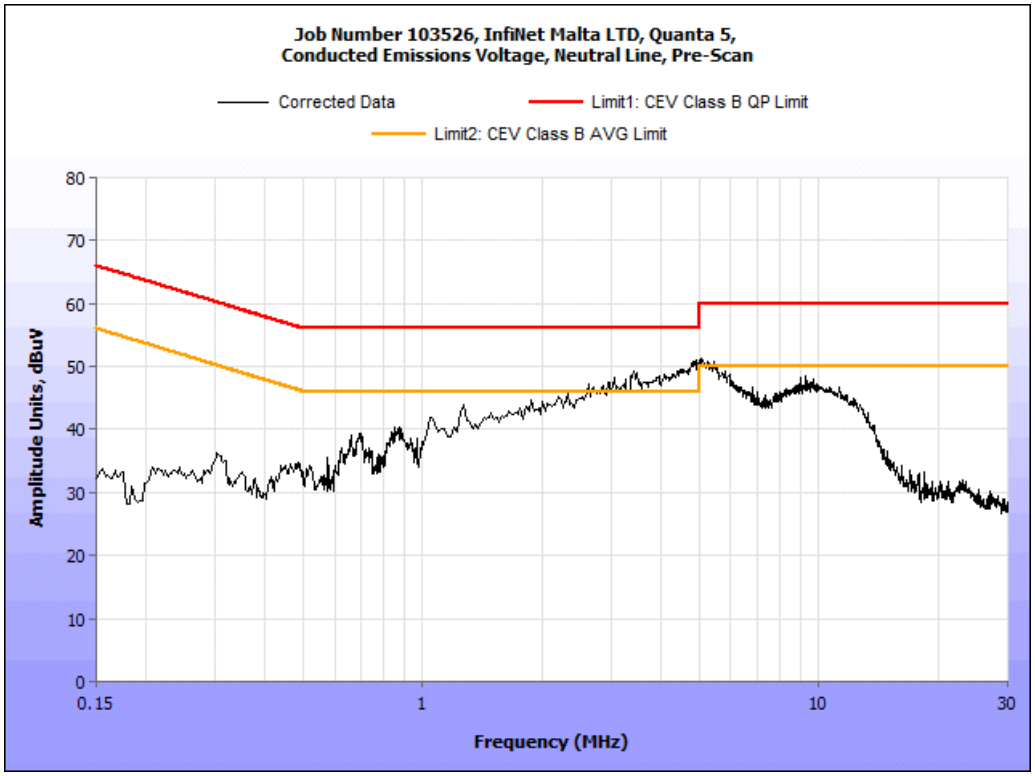
Table 14. Conducted Emissions, Test Results, Phase Line



Plot 85. Conducted Emissions Prescan, Phase

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Pass/ Fail QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Pass/ Fail AVG	Margin (dB) AVG
5.122	36.3	46.3	60	PASS	-13.7	29.61	0	39.61	50	PASS	-10.39
4.98	36.01	46.01	56	PASS	-9.99	29.49	0	39.49	46	PASS	-6.51
4.681	35.89	45.89	56	PASS	-10.11	28.93	0	38.93	46	PASS	-7.07
3.455	33.83	43.83	56	PASS	-12.17	26.51	0	36.51	46	PASS	-9.49
9.025	32.32	42.32	60	PASS	-17.68	25.97	0	35.97	50	PASS	-14.03
5.47	35.36	45.36	60	PASS	-14.64	29.13	0	39.13	50	PASS	-10.87

Table 15. Conducted Emissions, Test Results, Neutral Line



Plot 86. Conducted Emissions, Prescan, Neutral

Photograph 3. Conducted Emissions, Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 407(e) 6 dB Bandwidth

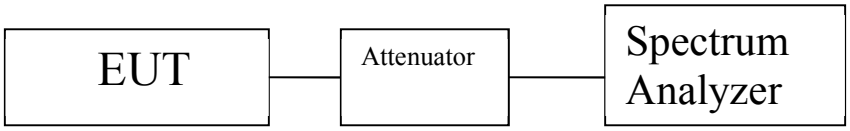
Test Requirements: **§ 15.407(e):** Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure: The transmitter was set to low, mid, and high operating frequencies at the highest output power and connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW = 100 kHz, VBW= 3xRBW. The 6 dB Bandwidth was measured and recorded.

Test Results The 6 dB Bandwidth was compliant with the requirements of this section.

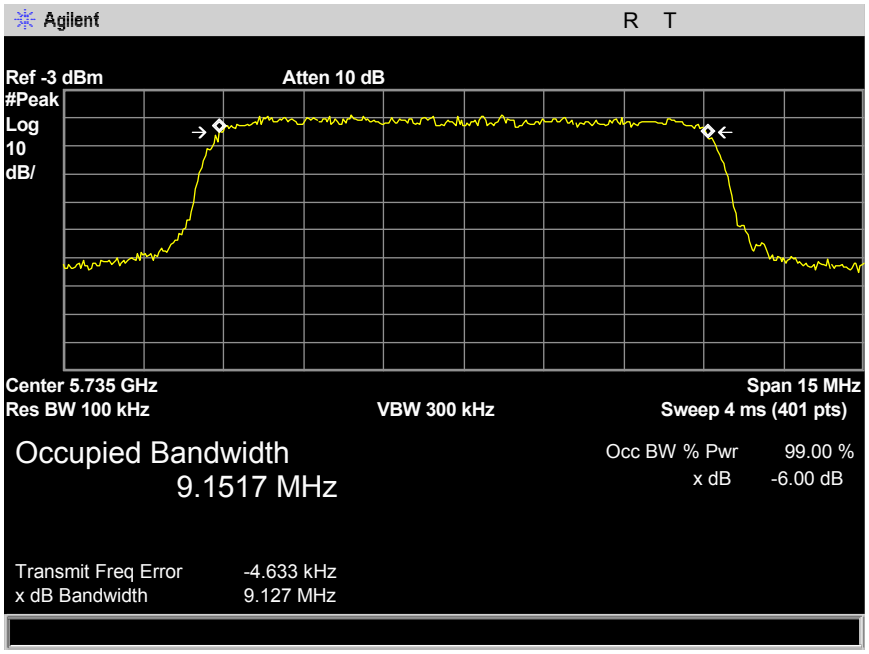
Test Engineer(s): Donald Salguero

Test Date(s): June 11, 2019

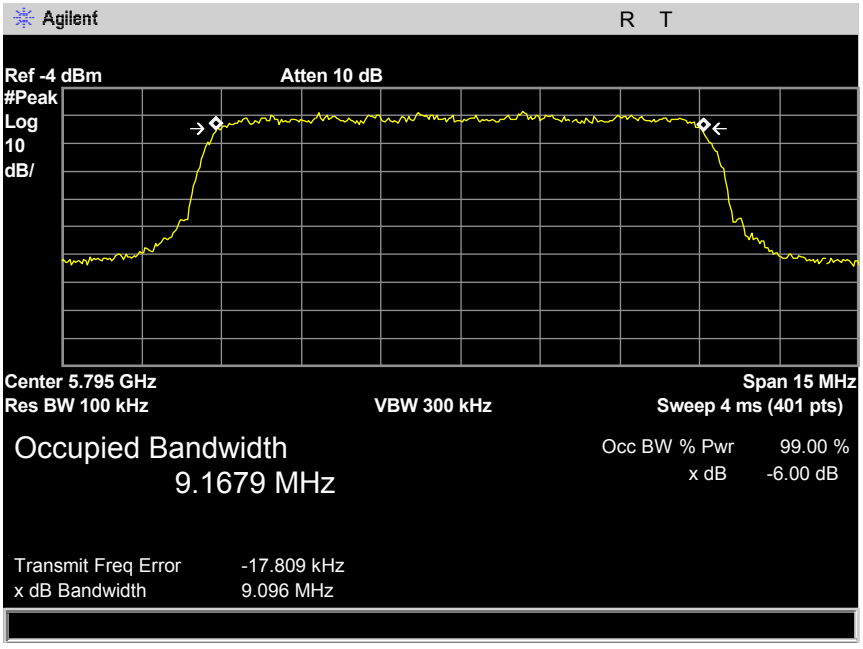


Nominal Bandwidth (MHz)	Center Frequency (MHz)	6dB BW (MHz)
10	5735	9.127
	5795	9.096
	5845	9.102
20	5750	17.664
	5790	17.981
	5830	17.854
40	5760	36.192
	5800	36.194

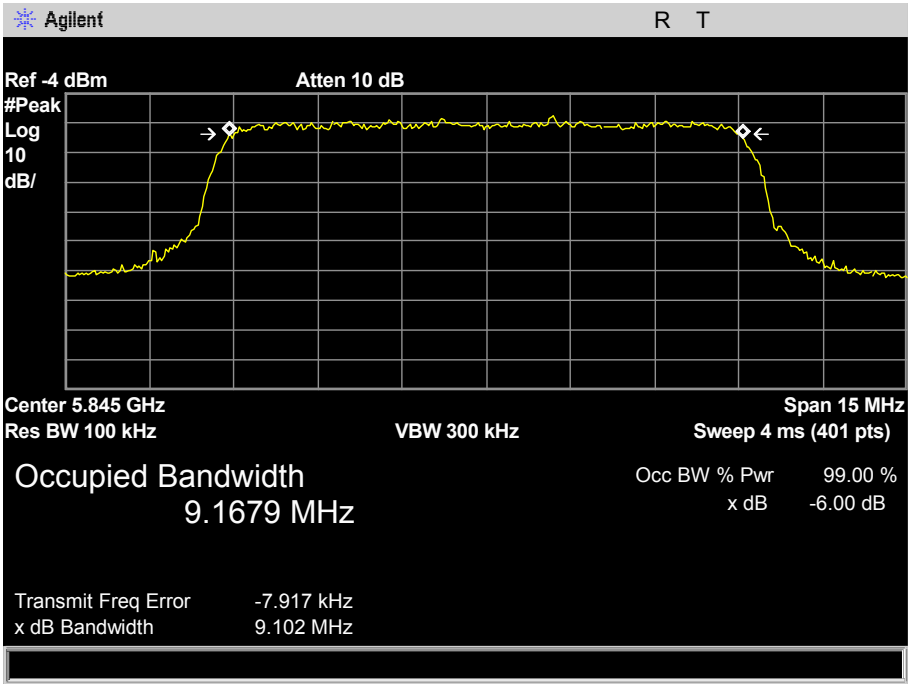
Table 16. 6dB Bandwidth, Test Results



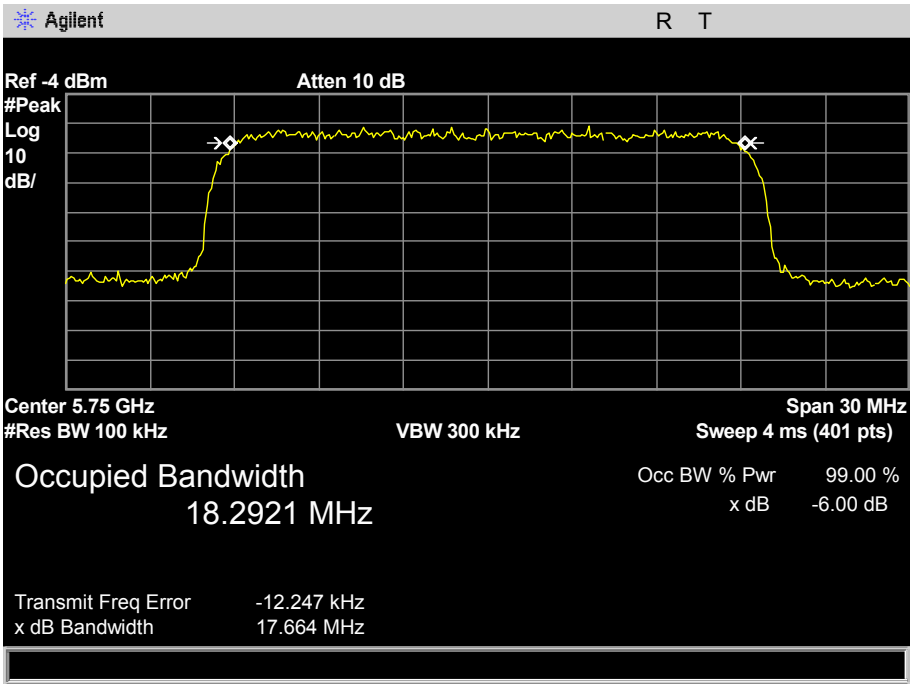
Plot 87. 6 dB Bandwidth, 10 MHz – 5735 MHz



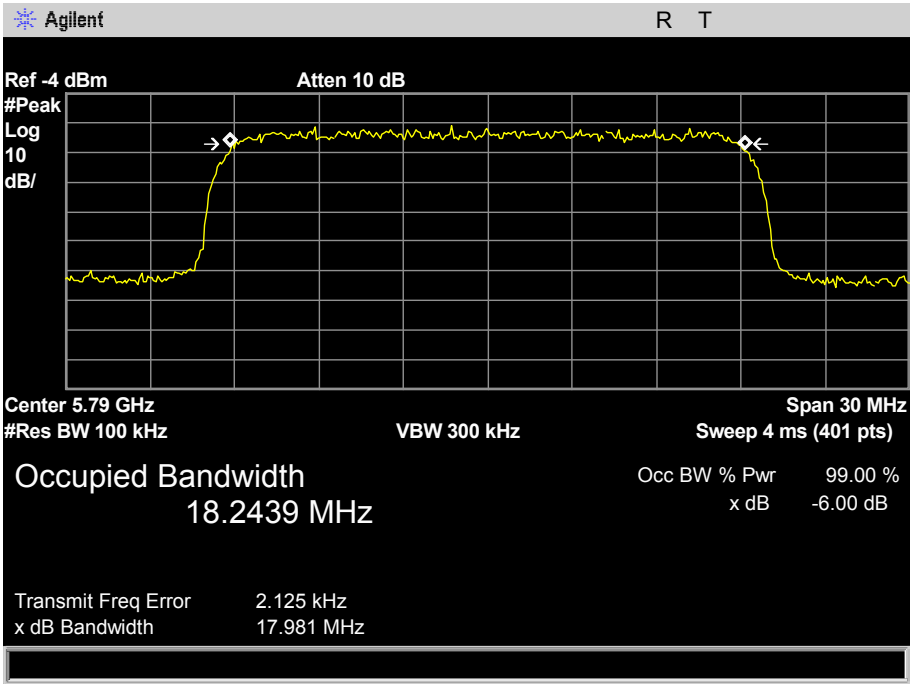
Plot 88. 6 dB Bandwidth, 10 MHz – 5795 MHz



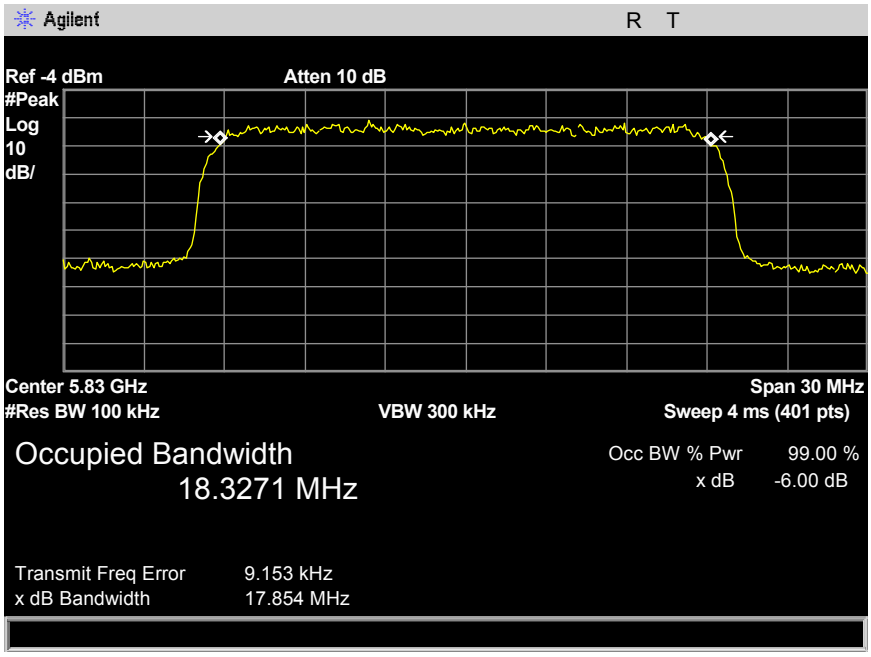
Plot 89. 6 dB Bandwidth, 10 MHz – 5845 MHz



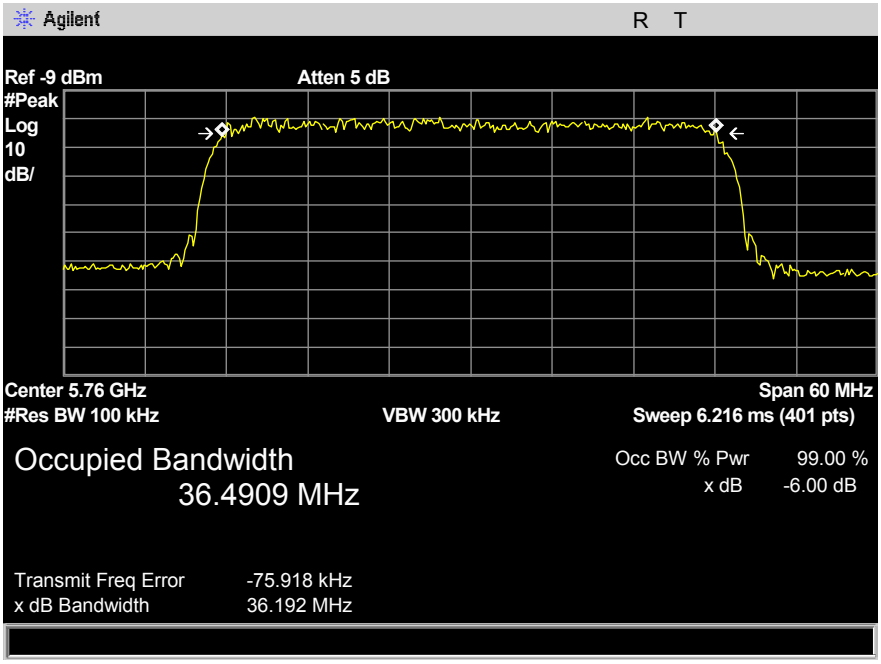
Plot 90. 6 dB Bandwidth, 10 MHz – 5750 MHz



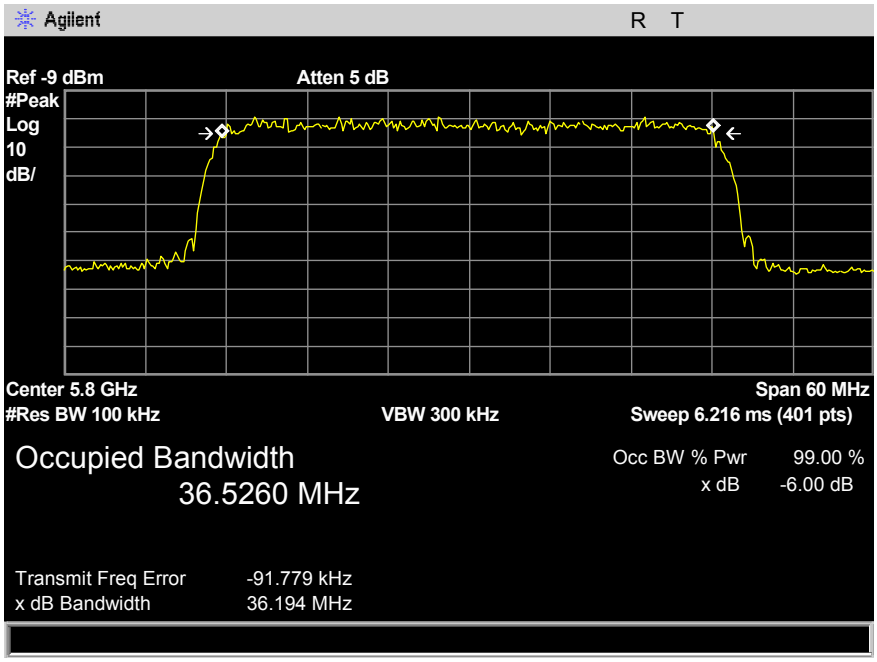
Plot 91. 6 dB Bandwidth, 10 MHz – 5790 MHz



Plot 92. 6 dB Bandwidth, 10 MHz – 5830 MHz



Plot 93. 6 dB Bandwidth, 10 MHz – 5760 MHz



Plot 94. 6 dB Bandwidth, 10 MHz – 5800 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(f) Maximum Permissible Exposure

Test Requirement(s): **§15.407(f):** U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment.

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.

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 @ 5725 - 5850 MHz; **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

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

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

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

Test Results:

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**
5830	11.68	14.723	23	199.526	0.58443	1	0.41557	20	Pass

The safe distance where Power Density is less than the MPE Limit listed above was found to be 20 cm.

IV. Test Equipment

Test Equipment

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

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1A1083	Test Receiver	Rohde & Schwarz	ESU40	10/18/2018	10/18/2019
1T4753	Antenna - Bilog	Sunol Sciences	JB6	8/30/2018	2/29/2020
1T4300	SEMI-ANECHOIC CHAMBER (NSA)	EMC TEST SYSTEMS	NONE	1/30/2019	6/30/2020
1T8743	Preamplifier	A.H. Systems, Inc.	PAM-0118P	See Note	
1T2665	Antenna; Horn	EMCO	3115	6/22/2017	6/22/2019
1T4771	PSA Spectrum Analyzer	Agilent Technologies	E4446A	5/16/2018	11/16/2019
1T4745	Antenna, Horn	ETS-Lindgren	3116	11/27/2018	5/27/2020
1T4752	Pre-Amplifier	Miteq	JS44-18004000-35-8P	Func Verify	
1T2948	LISN	Solar Electronics Company	8028-50-TS-24-BNC	8/31/2018	2/29/2020
1T2947	LISN	Solar Electronics Company	8028-50-TS-24-BNC	8/31/2018	2/29/2020
1T7450	Transient Limiter	Com-Power	LIT-153A	See Note	
1T4612	Spectrum Analyzer	Agilent Technologies	E4407B	5/15/2018	11/15/2019
1T4503	Shielded Room	Universal Shielding Corp	N/A	Not Required	
1T4149A	HF Wireless Chamber - NSA			1/30/2019	6/30/2020

Table 17. Test Equipment List

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

V. Certification & User's Manual Information

Certification & User's Manual Information

L. 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.

Certification & User's Manual Information

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.

Certification & User's Manual Information

§ 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.

Certification & User's Manual Information

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 users 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.

Verification & User's Manual Information

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 A 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 A 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 commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) 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

