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August 5, 2016

Amimon
2 Maskit St Building D, 2nd Floor
Herzelia, Israel 46733

Dear Gabi Nocham,

Enclosed is the EMC Wireless test report for compliance testing of the Amimon, AMNCVRX01 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 2).

Thank you for using the services of MET Laboratories, 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,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Amimon\EMC89646B-FCC407 UNII 2 Rev. 2)

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Electromagnetic Compatibility Criteria Test Report

for the

Amimon
Model AMNCVRX01

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

MET Report: EMC89646B-FCC407 UNII 2 Rev. 2

August 5, 2016

Prepared For:

Amimon
2 Maskit St Building D, 2nd Floor
Herzelia, Israel 46733

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
Test Report

for the

Amimon
Model AMNCVRX01

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

Hadid Jones, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
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.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	June 29, 2016	Initial Issue.
1	June 30, 2016	Editorial correction.
2	August 5, 2016	Updated MPE.

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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
µ**H**	**microh**enry
µ	**microf**arad
µ**s**	**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 Amimon AMNCVRX01, 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 AMNCVRX01. Amimon should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the AMNCVRX01, 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 Amimon, purchase order number 16000358. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference	Description	Results
§15.203	Antenna Requirement	Compliant
§15.403(i)	26 dB Occupied Bandwidth	Compliant
§15.407 (a)(2)	Maximum Conducted Output Power	Compliant
§15.407 (a)(2)	Maximum Power Spectral Density	Compliant
§15.407 (b)(2 – 3)& (6 - 7)	Undesirable Emissions	Compliant
§15.407(b)(6)	Conducted Emission	Compliant
§15.407(f)	RF Exposure	Compliant
15.407 (h)(2)	U-NII Detection Bandwidth	Compliant
15.407(h)(2)(ii)	Channel Availability Check Time	Compliant
15.407(h)(2)(ii-iii)	In-Service Monitoring	Compliant
15.407(h)(2)	Statistical Performance Check	Compliant

Table 1. Executive Summary of EMC Part 15.407 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Amimon to perform testing on the AMNCVRX01, under Amimon's purchase order number 16000358.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Amimon AMNCVRX01.

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

Model(s) Tested:	AMNCVRX01	
Model(s) Covered:	AMNCVRX01	
EUT Specifications:	Primary Power: 120 VAC, 60 Hz	
	FCC ID: VQSAMNCVRX01	
	Type of Modulations:	BPSK, OFDM
	Equipment Code:	NII
	Peak RF Output Power:	21.4 dBm (U-NII 2A), 21.6 dBm (U-NII 2C),
	EUT Frequency Ranges:	5250-5350 MHz and 5470-5725 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	
Type of Filing:	Original	
Evaluated by:	Hadid Jones	
Report Date(s):	June 21, 2016	

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 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
789033 D02 General UNII Test Procedures New Rules v01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
905462 DO2 UNII DFS Compliance Procedures New Rules v01r02	Compliance Measurement Procedures for Unlicensed-National Information Infrastructure Devices Operating in the 5250-5350 MHz and 5470-5725 MHz Bands Incorporating Dynamic Frequency Selection

Table 3. References

C. Test Site

All testing was performed at 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 MET Laboratories.

D. Description of Test Sample

The AMNCVRX01 video Sink module is designed to be at the receiver end of the WHDI downstream. The AMNCVRX01 receives wireless downstream transmission, demodulates it and regenerates the video, audio and control content transmitted by the WHDI source.

The receiver works in the 2.4GHz and 5GHz unlicensed bands.

The channel bandwidth can be operated at 40MHz, 20 MHz and 10MHz modes.

The AMNCVRX01 board has 5 receiving channels (Multiple-In), and single transmitting channel (Single-Out).

The AMNCVRX01 is a DFS Master device. It is equipped with all features and characteristics required to fully provide CAC and ISM requirements for Radar-Detection.

The AMNCVRX01 board is designed to be integrated with any custom-designed end-product, to form a complete product with standard video output and wireless capabilities.

The Petit-RX board is independent module, fully performing the wireless functionality of the WHDI video link.

The AMNCVRX01 has an approved BT module by muRata with FCC ID: VPYLBZY.

E. Equipment Configuration

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
--	Camera Vision RX device	AMNCVRX01	--	--	--

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
1	PC Laptop	N/A	N/A
2	Debug Flat Cable	N/A	N/A
3	USB-to-Serial Converter (APP; MAGLAN)	ATEN	UC-232A
4	USB cable (optional)	N/A	N/A
5	Debug Board (APP; KITE)	Amimon	AMN043PCB
6	HDMI Cable	standard	standard
7	HDMI Pattern Generator	CYPRESS	CPHD-1
8	HDMI Monitor (not supplied)	Any	Any

Table 5. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Shielded (Y/N)	Termination Point
1	RF connectors	N/A	3+5	N/A	J2, J3, J5, J4, J7, J8, J10, J11
2	DC Power	N/A	N/A	N/A	J14
3	USB	Telecommunication port	1	Yes	J15
4	UART	Telecommunication port	N/A	N/A	J16
5	debug	N/A	N/A	N/A	N/A
6	HDMI	I/O	N/A	N/A	J12

Table 6. Ports and Cabling Information

H. Mode of Operation

The AMNCVRX01 board can be set into Test mode, simulating continuous normal operating mode.

This mode is enabled by simple GUI provided by AMIMON's 'AppCom' Tool.

The tool enables setting the EUT to Transmit or Receive modes. It controls the center channel frequency, the operating channel bandwidth, and the TX channel power.

A complete description of operation is detailed in 'How to use AppCom Regulation control.doc' file.

I. Method of Monitoring EUT Operation

Slow blinking (on-off once during 1sec) blue LED indicates that board is functioning.

Fast blinking (on-off 3-4 times during 1sec) same LED, means that the board is out of calibration.

When this LED is not blinking this means that board has a certain problem.

Using the SW tool to configure the board, when configuration ended successfully a clear green indication appears, while a red bad indication appears when the desired configuration fails.

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 Amimon 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. The EUT has a unique reverse polarity antenna.

Test Engineer(s): Hadid Jones

Test Date(s): 01/12/16

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 403(i) 26dB Bandwidth

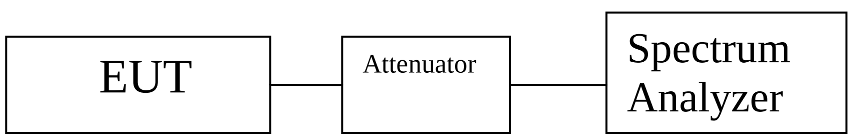
Test Requirements: **§ 15.403(i):** For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of 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): Hadid Jones

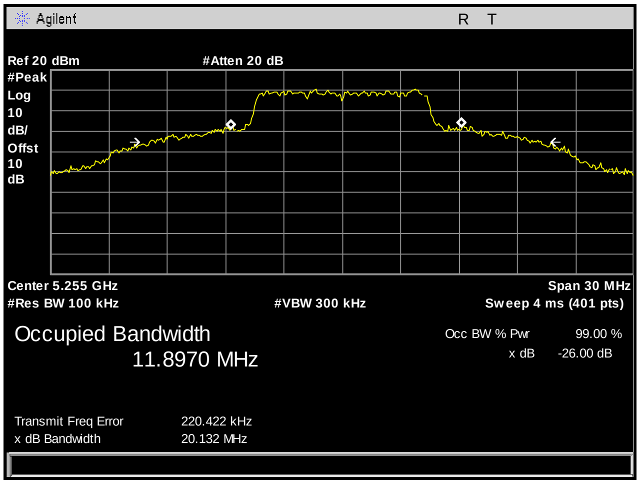
Test Date(s): 02/13/16



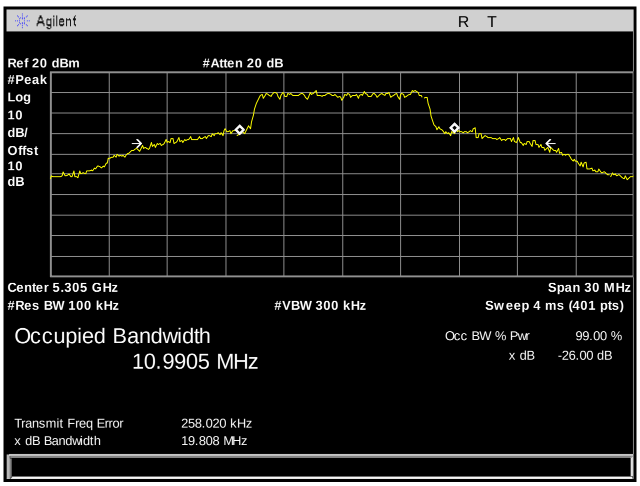
OBW 10MHz	
Frequency MHz	**-26db**
5255	20.13
5305	19.80
5325	19.05
5495	17.42
5555	18.25
5705	21.63
OBW 20MHz	
Frequency MHz	**-26db**
5260	19.95
5300	20.19
5320	19.80
5500	19.53
5540	19.64
5620	19.84
5700	21.37
OBW 40MHz	
Frequency MHz	**-26db**
5270	53.35
5310	41.7
5510	40.52
5590	43.72
5670	43.32

Table 7. Occupied Bandwidth, Test Results

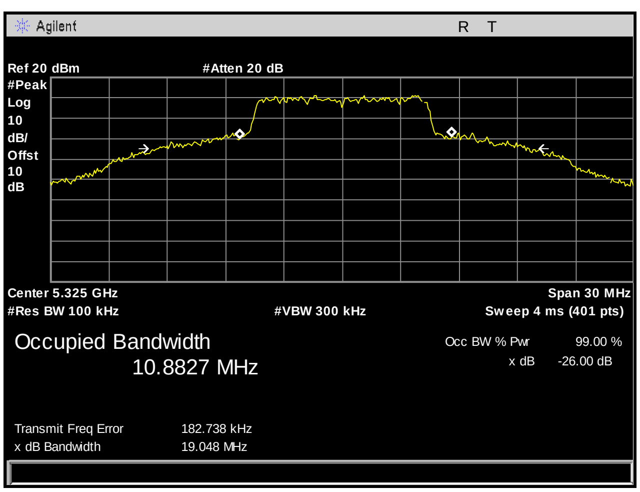
Occupied Bandwidth, 10 MHz



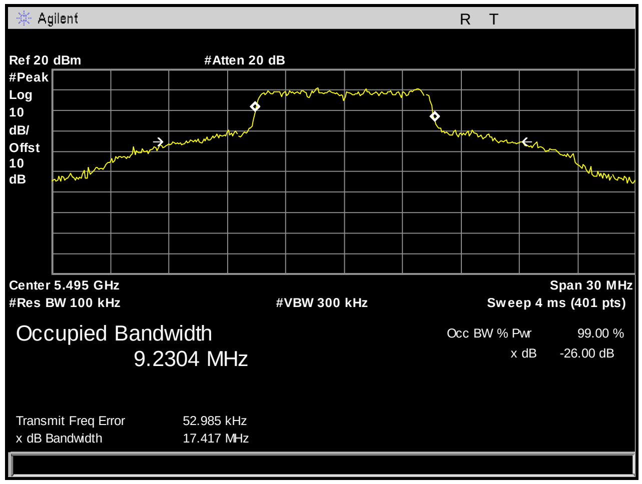
Plot 1. Occupied Bandwidth, 5255 MHz, 10 MHz



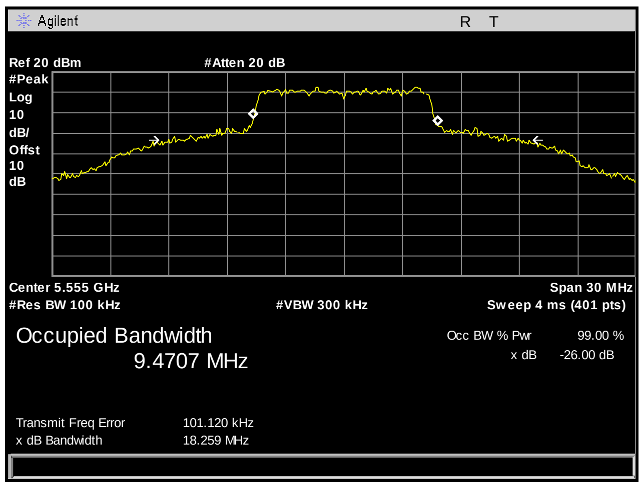
Plot 2. Occupied Bandwidth, 5305 MHz, 10 MHz



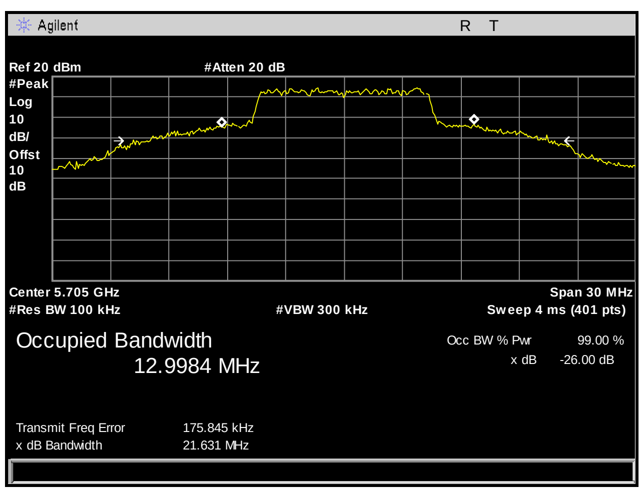
Plot 3. Occupied Bandwidth, 5325 MHz, 10 MHz



Plot 4. Occupied Bandwidth, 5495 MHz, 10 MHz

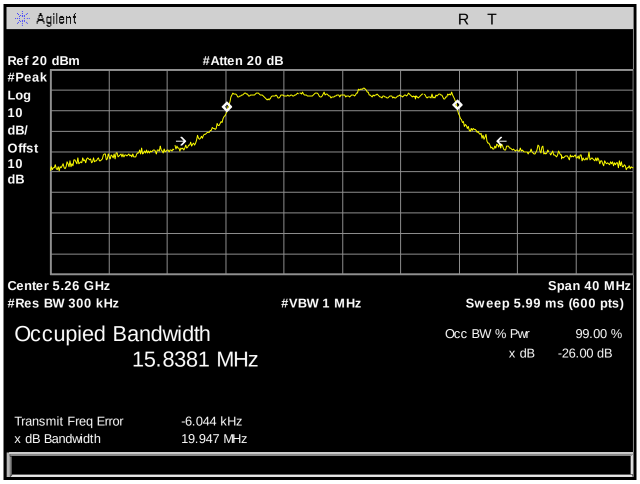


Plot 5. Occupied Bandwidth, 5555 MHz, 10 MHz

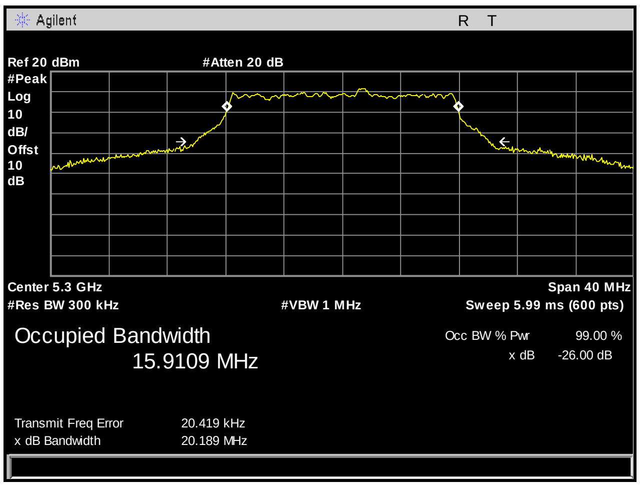


Plot 6. Occupied Bandwidth, 5705 MHz, 10 MHz

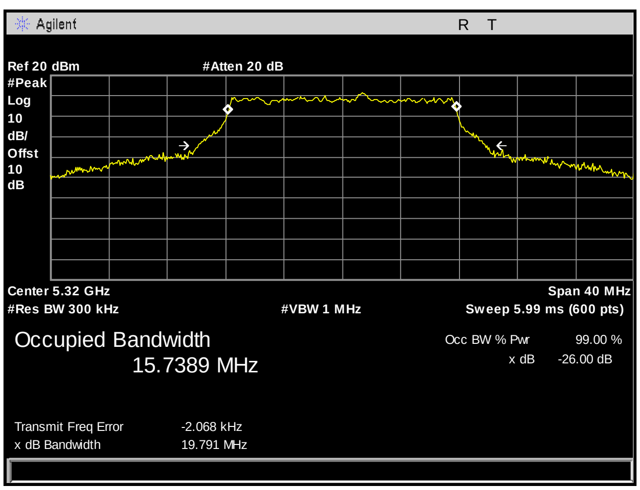
Occupied Bandwidth, 20 MHz



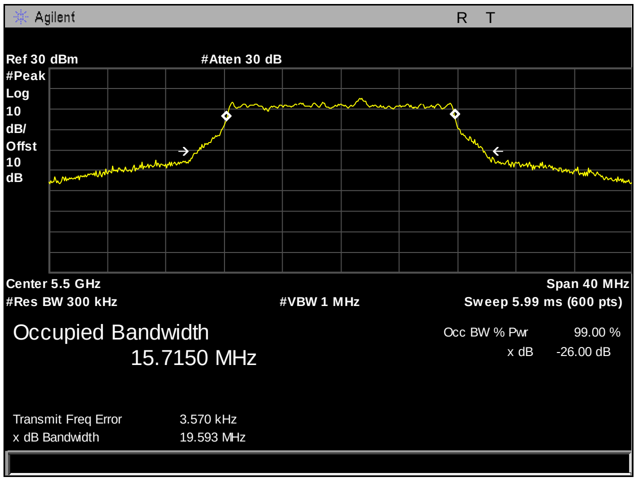
Plot 7. Occupied Bandwidth, 5260 MHz, 20 MHz



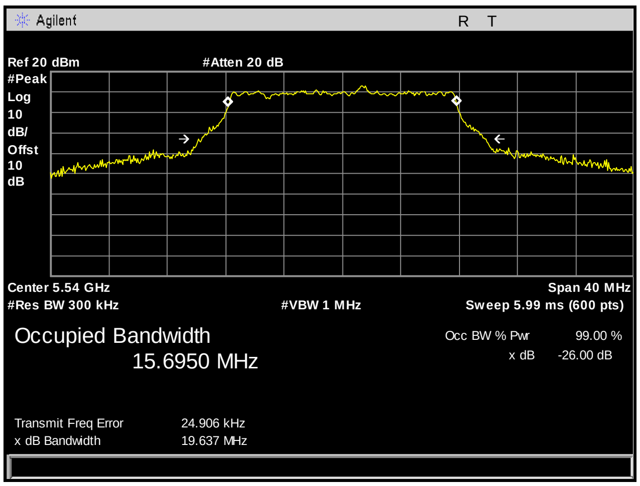
Plot 8. Occupied Bandwidth, 5300 MHz, 20 MHz



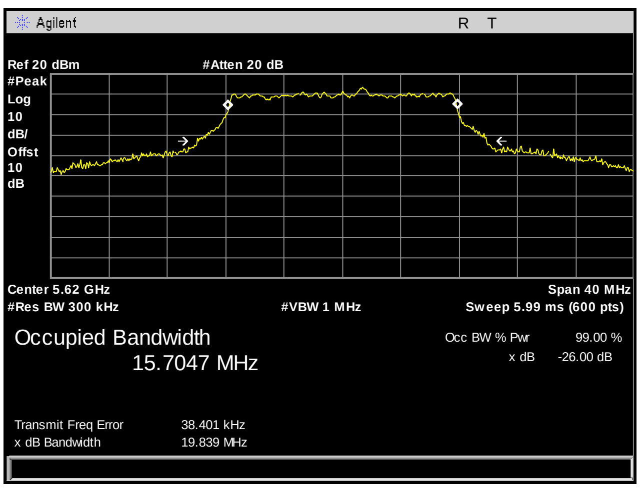
Plot 9. Occupied Bandwidth, 5320 MHz, 20 MHz



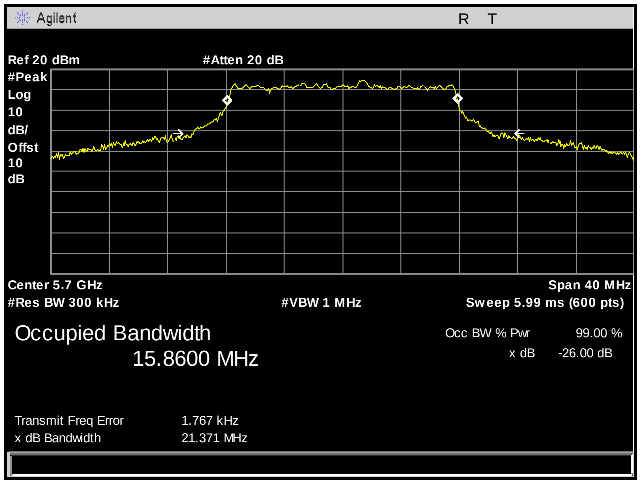
Plot 10. Occupied Bandwidth, 5500 MHz, 20 MHz



Plot 11. Occupied Bandwidth, 5540 MHz, 20 MHz

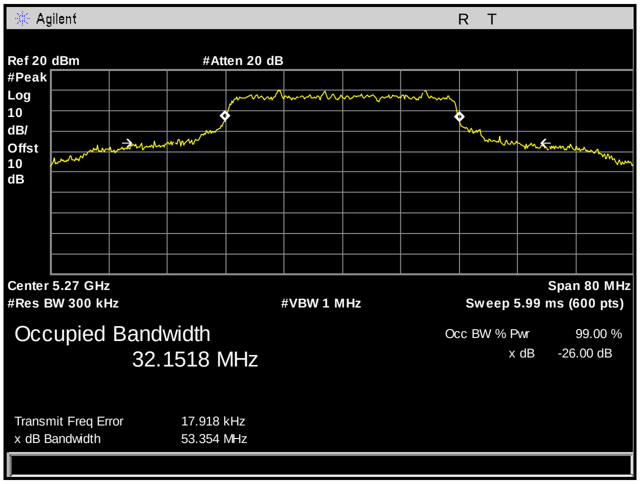


Plot 12. Occupied Bandwidth, 5620 MHz, 20 MHz

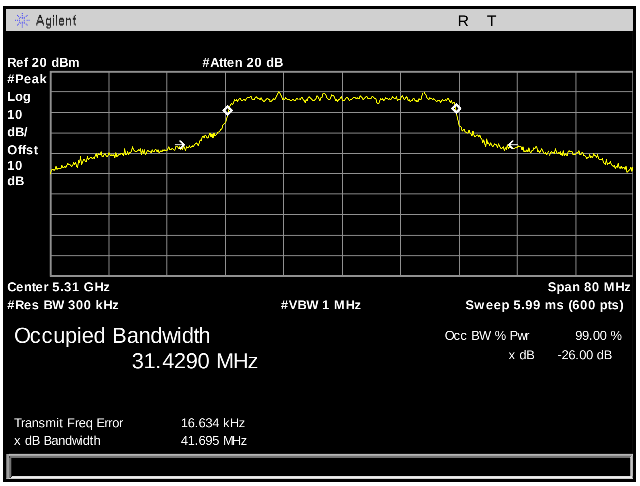


Plot 13. Occupied Bandwidth, 5700 MHz, 20 MHz

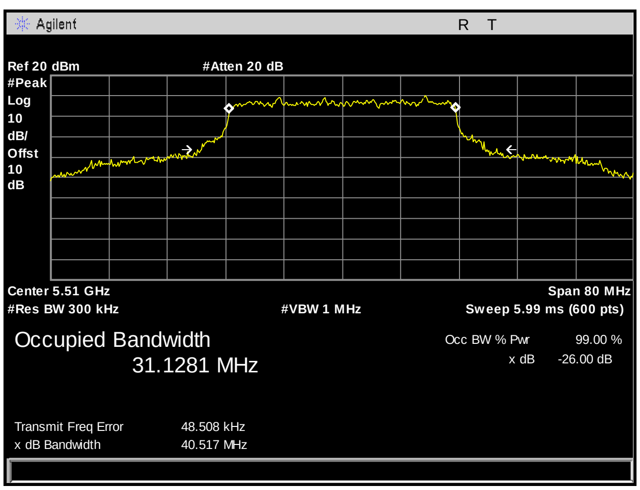
Occupied Bandwidth, 40 MHz



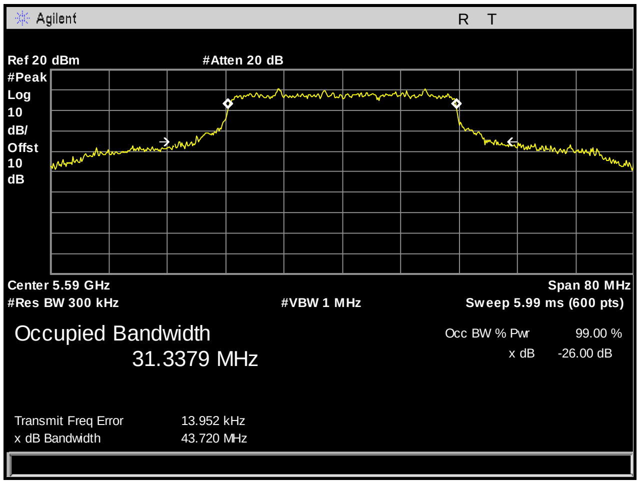
Plot 14. Occupied Bandwidth, 5270 MHz, 40 MHz



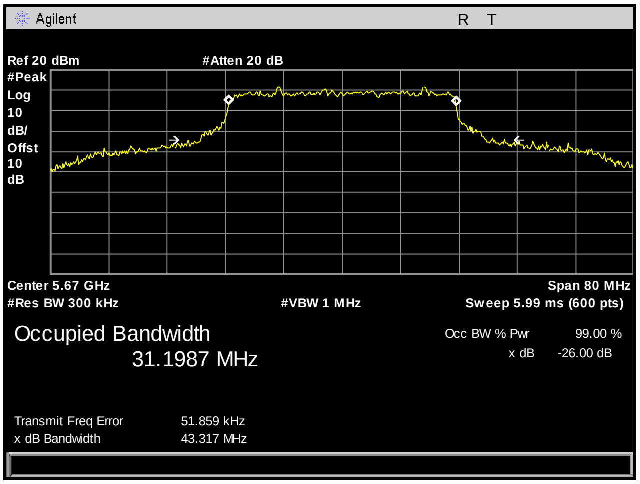
Plot 15. Occupied Bandwidth, 5310 MHz, 40 MHz



Plot 16. Occupied Bandwidth, 5510 MHz, 40 MHz



Plot 17. Occupied Bandwidth, 5590 MHz, 40 MHz



Plot 18. Occupied Bandwidth, 5760 MHz, 40 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§15. 407(a)(2) Maximum Conducted Output Power

Test Requirements: **§15.407(a)(2):** For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.
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.

§15.407(h)(1): Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

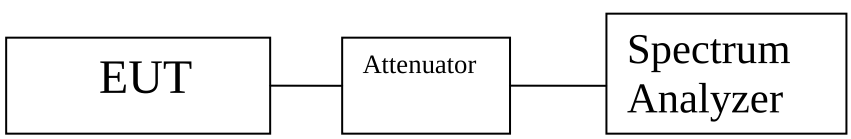
Test Procedure: The EUT was connected to a spectrum analyzer through a cable and attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels. Its power was measured according to measurement method SA-1, as described in 789033 D02 General UNII Test Procedures v01.

To verify the TPC requirement of the rule part, observations using the same measurement method were made with the EUT set to a lower power setting.

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

Test Engineer(s): Hadid Jones

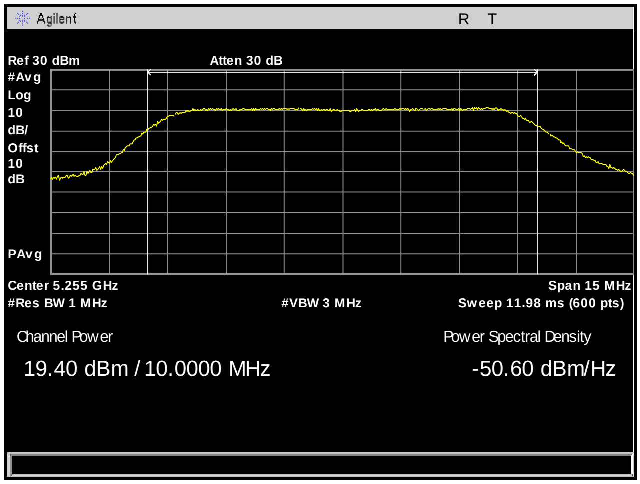
Test Date(s): 02/13/16



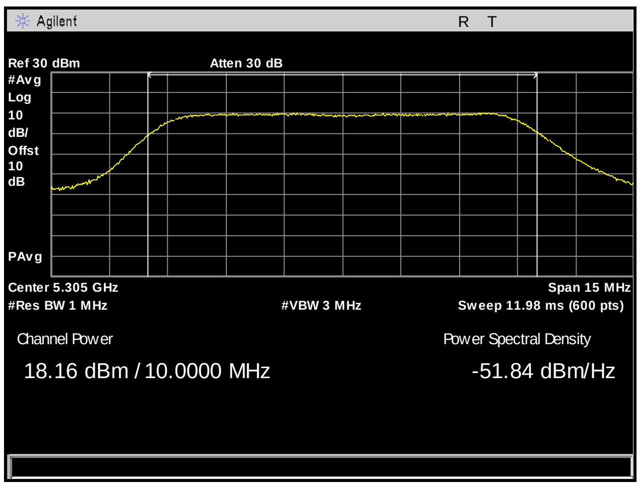
Maximum Output Power 10MHz (FCC)					
Frequency MHz	**Conducted Power (dBm)**	**-26db Bw (worse case)**	**Conducted Power limit (dBm)**	**Conducted Power Margin**	**Antenna Gain**
5255	19.4	17.4	23.4	**-4.0**	2
5305	18.2	17.4	23.4	**-5.2**	2
5325	18.4	17.4	23.4	**-5.0**	2
5495	18.4	17.4	23.4	**-5.0**	2
5555	17.9	17.4	23.4	**-5.5**	2
5705	18.5	17.4	23.4	**-4.9**	2
Maximum Output Power 20MHz (FCC)					
Frequency MHz	**Conducted Power (dBm)**	**-26db Bw (worse case)**	**Conducted Power limit (dBm)**	**Conducted Power Margin**	**Antenna Gain**
5260	20.0	19.6	24	**-4.0**	2
5300	19.5	19.6	24	**-4.5**	2
5320	19.1	19.6	24	**-4.9**	2
5500	19.97	19.6	24	**-4.03**	2
5540	19.0	19.6	24	**-5**	2
5620	19.9	19.6	24	**-4.1**	2
5700	20.5	19.6	24	**-3.5**	2
Maximum Output Power 40MHz (FCC)					
Frequency MHz	**Conducted Power (dBm)**	**-26db Bw (worse case)**	**Conducted Power limit (dBm)**	**Conducted Power Margin**	**Antenna Gain**
5270	21.4	40.52	24	**-2.6**	2
5310	17.9	40.52	24	**-6.1**	2
5510	19.5	40.52	24	**-4.5**	2
5550	20.3	40.52	24	**-3.7**	2
5590	21.6	40.52	24	**-2.4**	2
5670	19.6	40.52	24	**-4.4**	2

Table 8. Maximum Conducted Output Power, Test Results

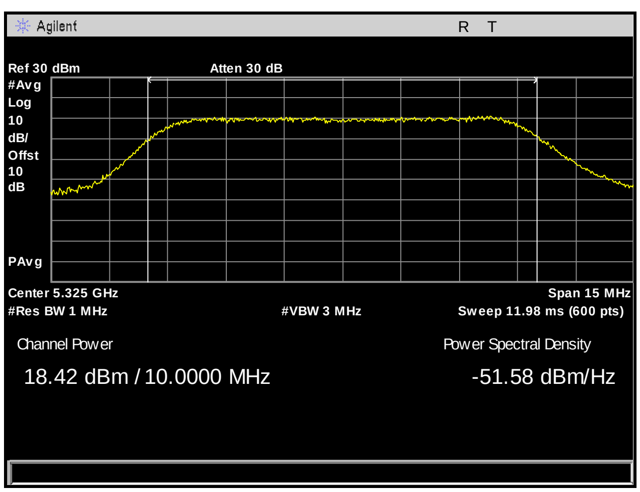
Maximum Conducted Output Power, 10 MHz



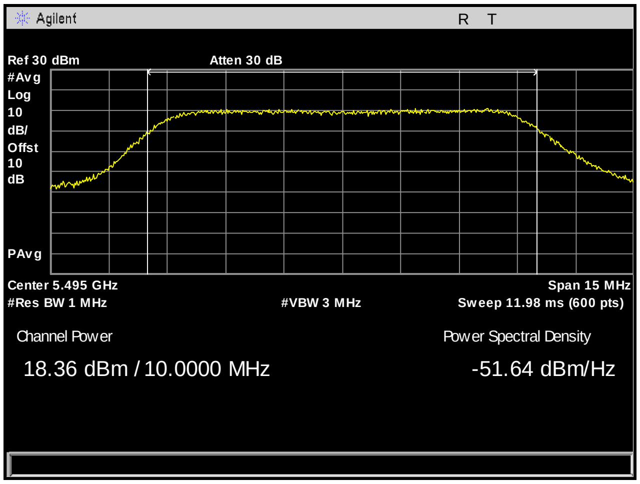
Plot 19. Maximum Conducted Output Power, 5255 MHz, 10 MHz



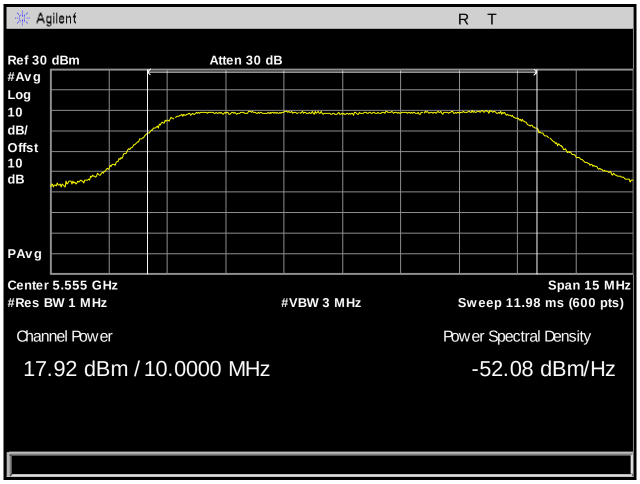
Plot 20. Maximum Conducted Output Power, 5305 MHz, 10 MHz



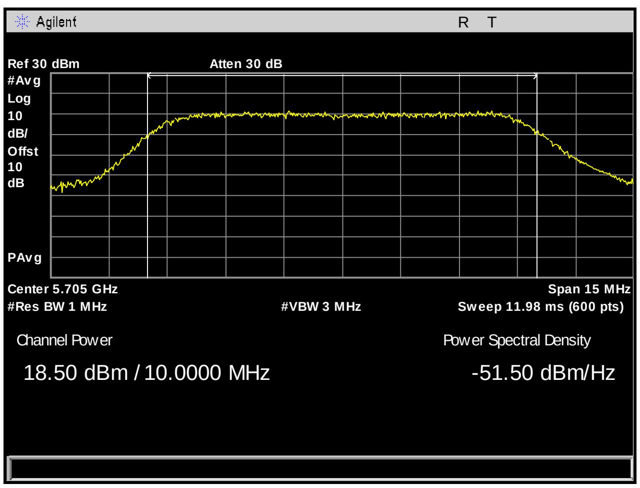
Plot 21. Maximum Conducted Output Power, 5325 MHz, 10 MHz



Plot 22. Maximum Conducted Output Power, 5495 MHz, 10 MHz

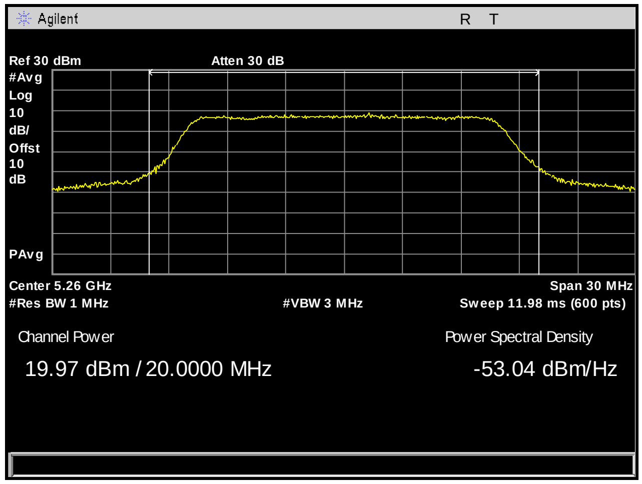


Plot 23. Maximum Conducted Output Power, 5555 MHz, 10 MHz

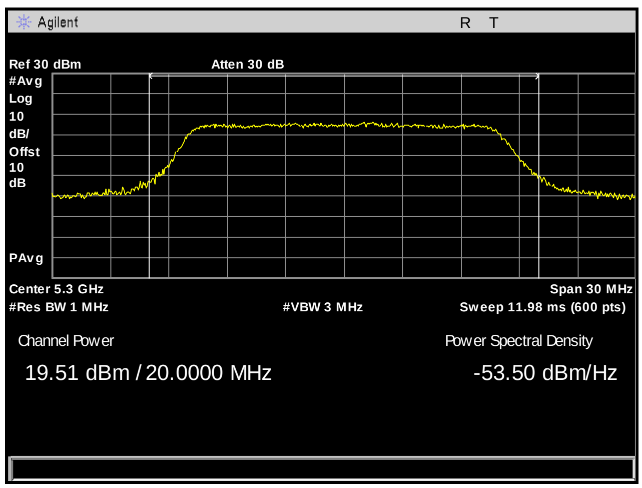


Plot 24. Maximum Conducted Output Power, 5705 MHz, 10 MHz

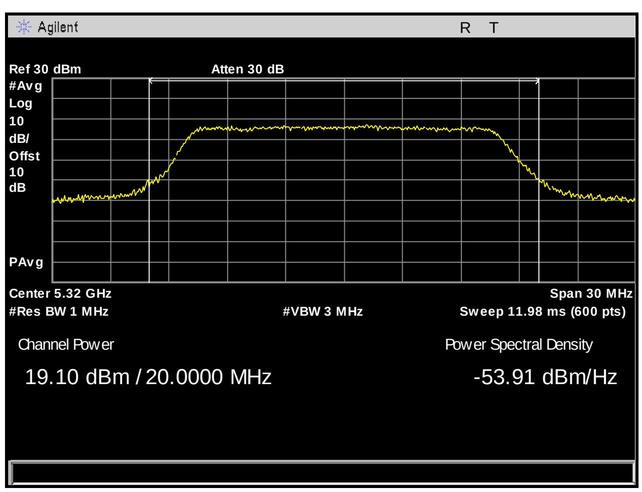
Maximum Conducted Output Power, 20 MHz



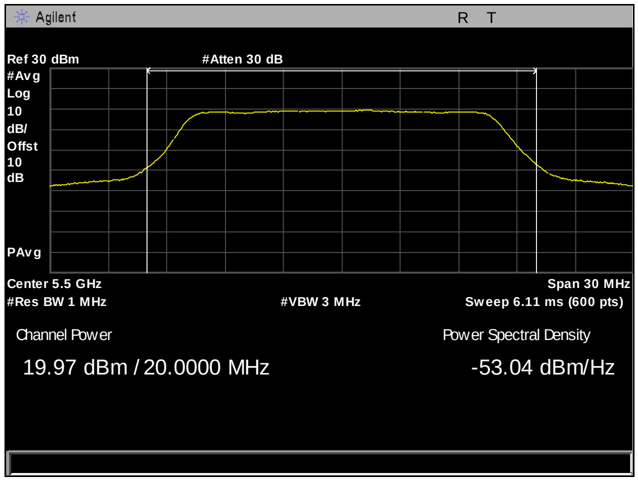
Plot 25. Maximum Conducted Output Power, 5260 MHz, 20 MHz



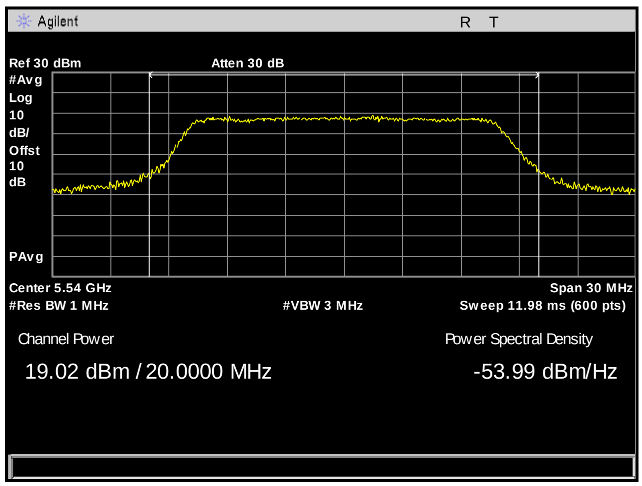
Plot 26. Maximum Conducted Output Power, 5300 MHz, 20 MHz



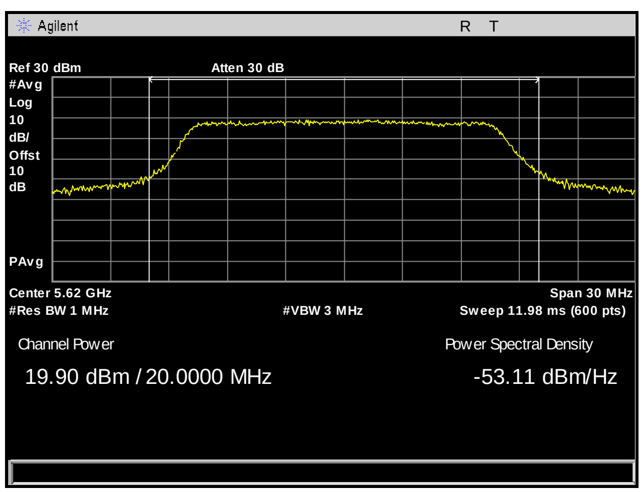
Plot 27. Maximum Conducted Output Power, 5320 MHz, 20 MHz



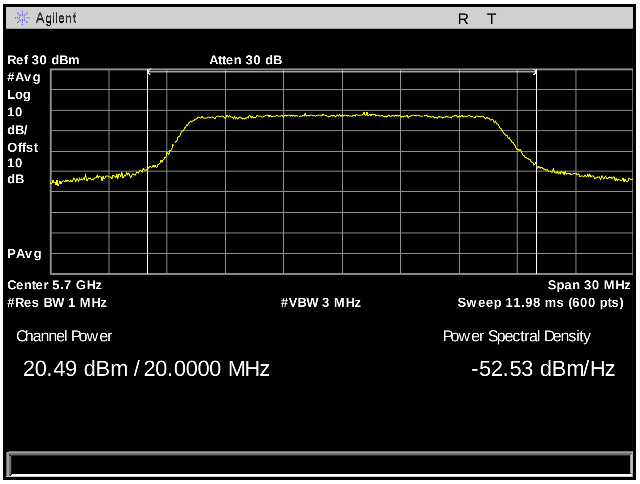
Plot 28. Maximum Conducted Output Power, 5500 MHz, 20 MHz



Plot 29. Maximum Conducted Output Power, 5540 MHz, 20 MHz

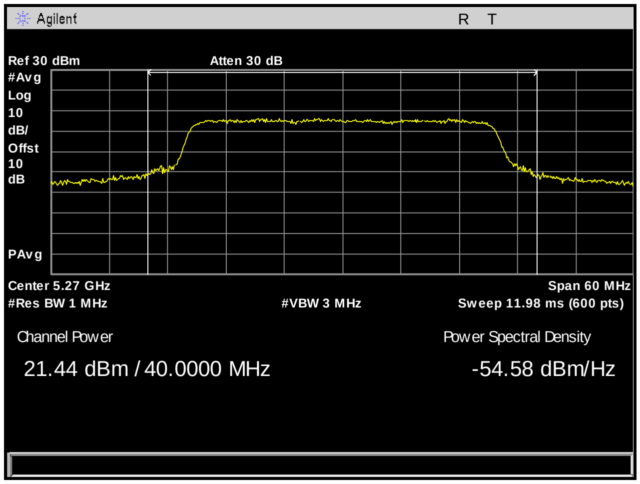


Plot 30. Maximum Conducted Output Power, 5620 MHz, 20 MHz

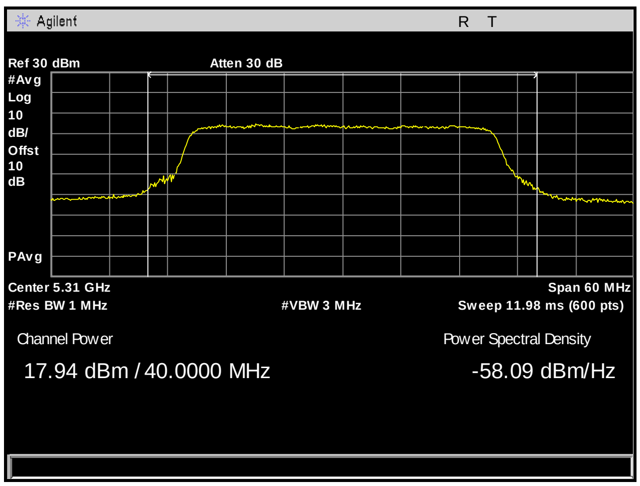


Plot 31. Maximum Conducted Output Power, 5700 MHz, 20 MHz

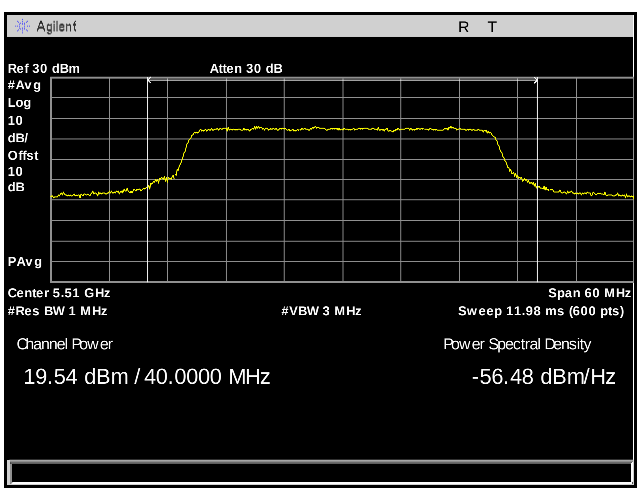
Maximum Conducted Output Power, 40 MHz



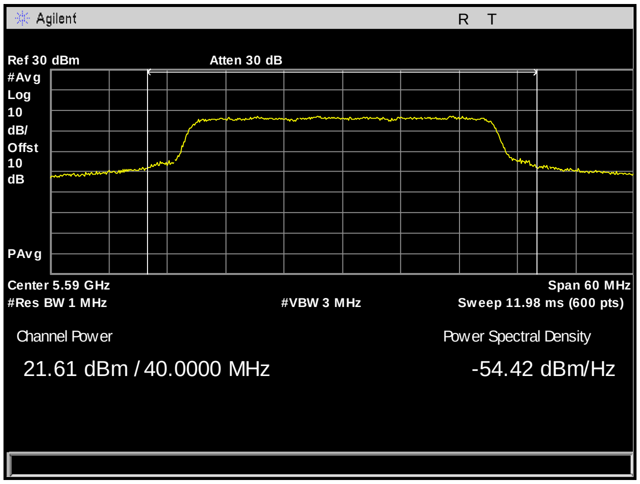
Plot 32. Maximum Conducted Output Power, 5270 MHz, 40 MHz



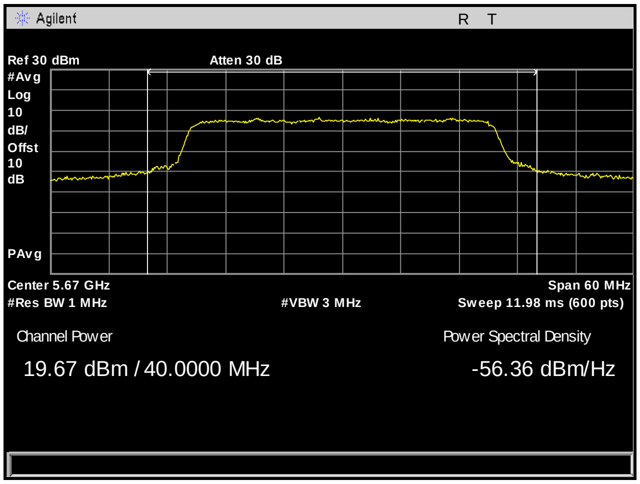
Plot 33. Maximum Conducted Output Power, 5310 MHz, 40 MHz



Plot 34. Maximum Conducted Output Power, 5510 MHz, 40 MHz



Plot 35. Maximum Conducted Output Power, 5590 MHz, 40 MHz



Plot 36. Maximum Conducted Output Power, 5760 MHz, 40 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(a)(2) Maximum Power Spectral Density

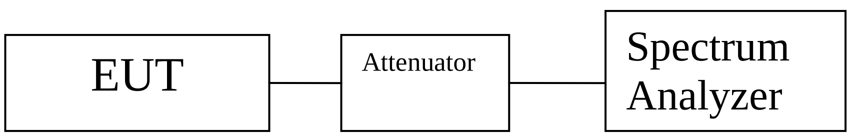
Test Requirements: **§15.407(a)(2):** In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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 on its low, mid, and high channels. Its power was measured according KDB 789033 D02 General UNII Test Procedures v01.

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

Test Engineer(s): Hadid Jones

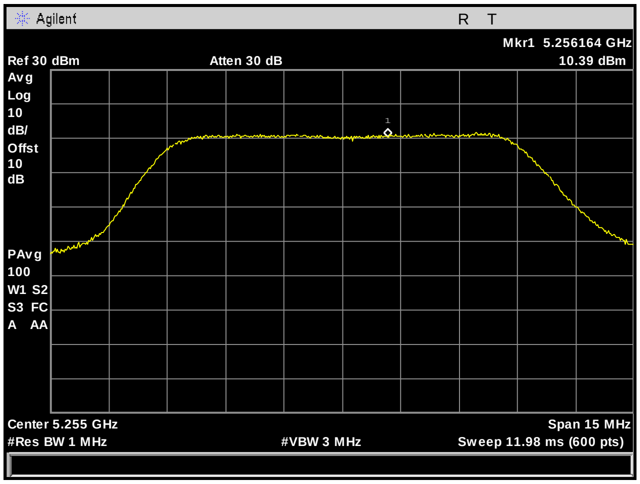
Test Date(s): 02/13/16



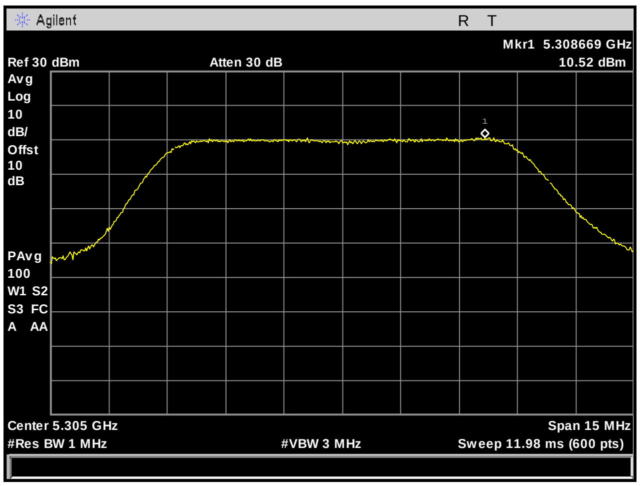
PSD 10MHz,(FCC)			
Frequency MHz	**PSD**	**PSD Limit (dBm)**	**PSD Margin**
5255	10.39	11.0	**-0.6**
5305	10.52	11.0	**-0.5**
5325	10.74	11.0	**-0.3**
5495	10.45	11.0	**-0.6**
5555	10.5	11.0	**-0.5**
5705	10.81	11.0	**-0.2**
PSD 20MHz (FCC)			
Frequency MHz	**PSD**	**PSD Limit (dBm)**	**PSD Margin**
5260	9.76	11.0	**-1.2**
5300	10.43	11.0	**-0.6**
5320	9.13	11.0	**-1.9**
5500	9.31	11.0	**-1.7**
5540	9.24	11.0	**-1.8**
5620	9.43	11.0	**-1.6**
5700	9.75	11.0	**-1.2**
PSD 40MHz (FCC)			
Frequency MHz	**PSD**	**PSD Limit (dBm)**	**PSD Margin**
5270	8.30	11.0	**-2.7**
5310	4.73	11.0	**-6.3**
5510	6.63	11.0	**-4.4**
5550	7.28	11.0	**-3.7**
5590	7.05	11.0	**-3.9**
5670	6.53	11.0	**-4.5**

Table 9. Maximum Power Spectral Density, Test Results

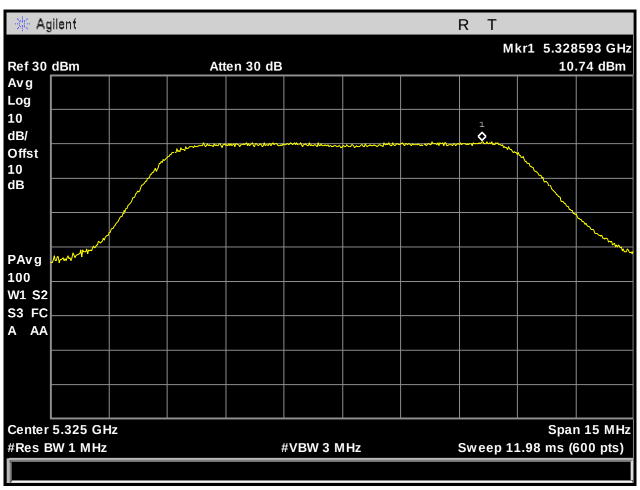
Maximum Power Spectral Density, 10 MHz



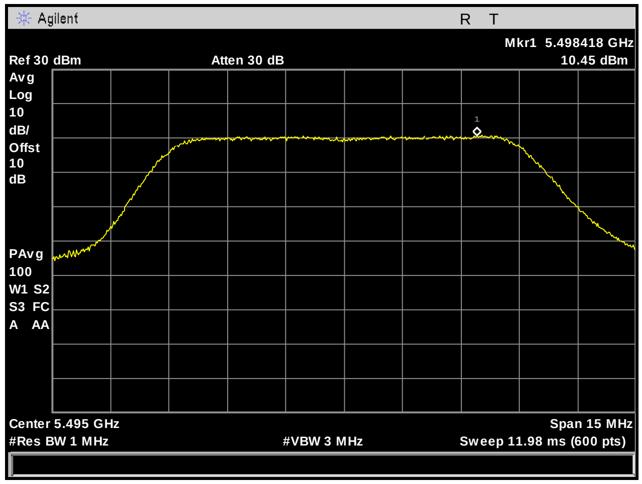
Plot 37. Maximum Power Spectral Density, 5255 MHz, 10 MHz



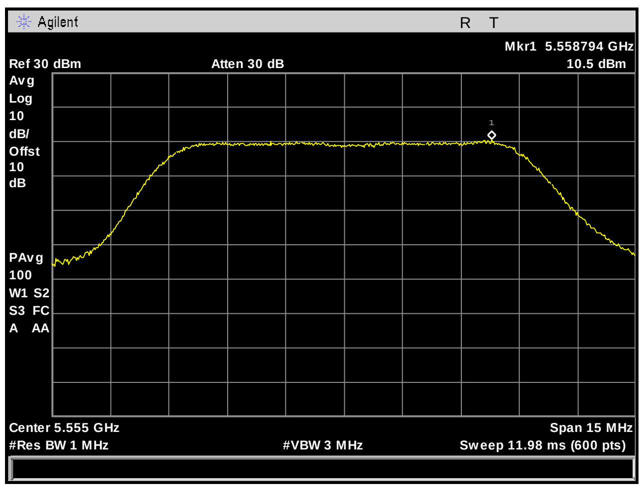
Plot 38. Maximum Power Spectral Density, 5305 MHz, 10 MHz



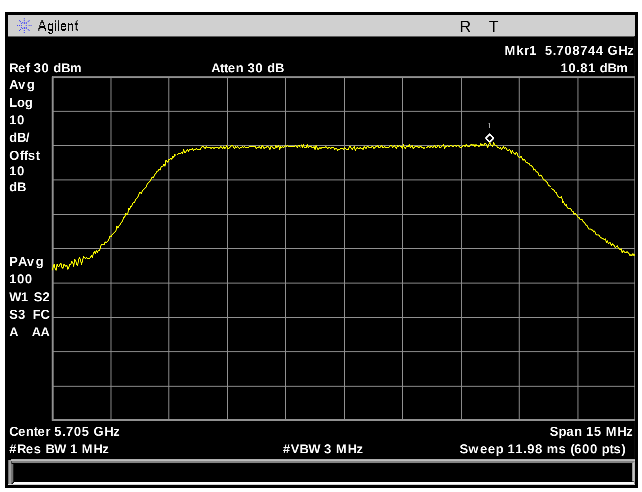
Plot 39. Maximum Power Spectral Density, 5325 MHz, 10 MHz



Plot 40. Maximum Power Spectral Density, 5495 MHz, 10 MHz

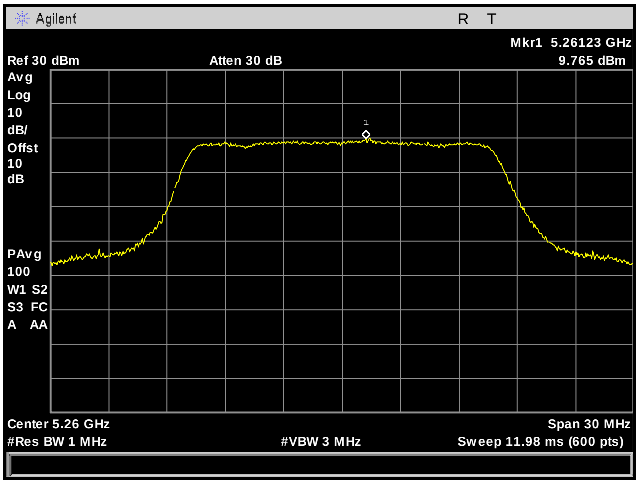


Plot 41. Maximum Power Spectral Density, 5555 MHz, 10 MHz

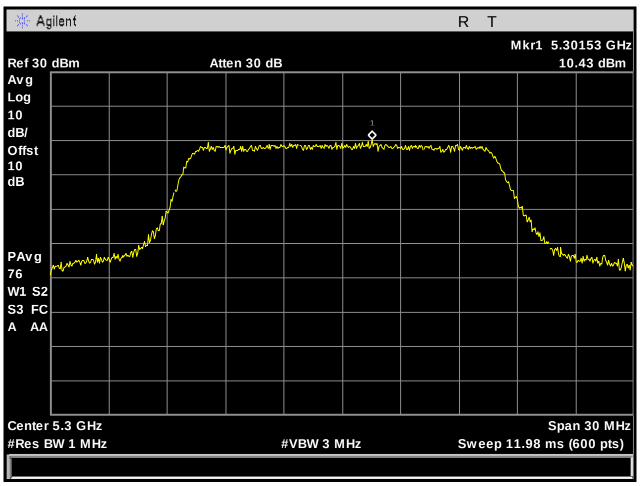


Plot 42. Maximum Power Spectral Density, 5705 MHz, 10 MHz

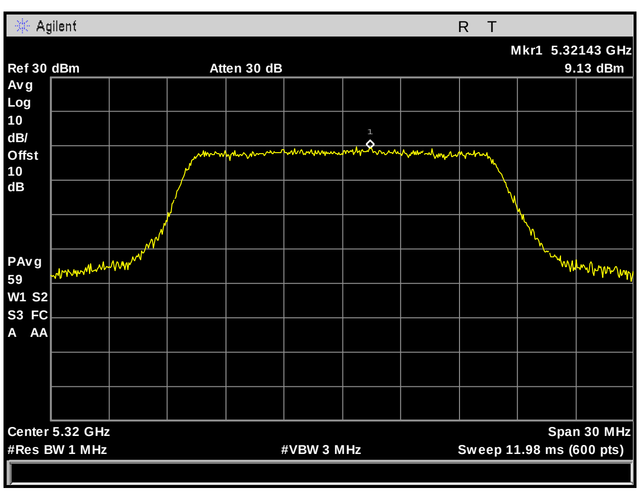
Maximum Power Spectral Density, 20 MHz



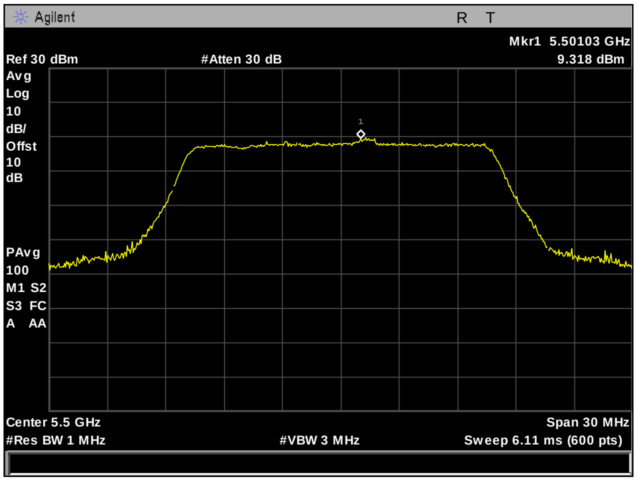
Plot 43. Maximum Power Spectral Density, 5260 MHz, 20 MHz



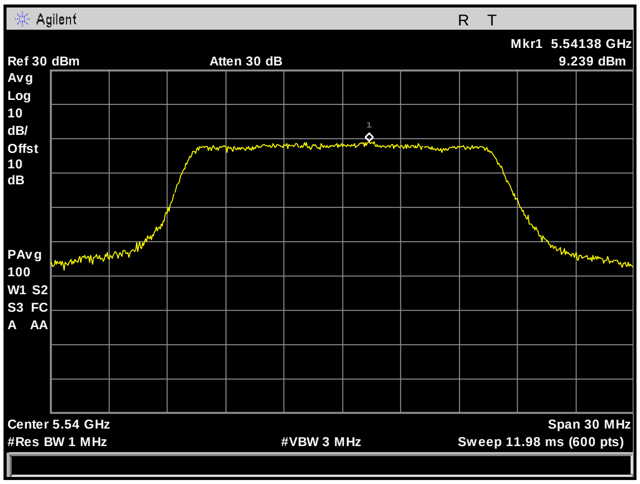
Plot 44. Maximum Power Spectral Density, 5300 MHz, 20 MHz



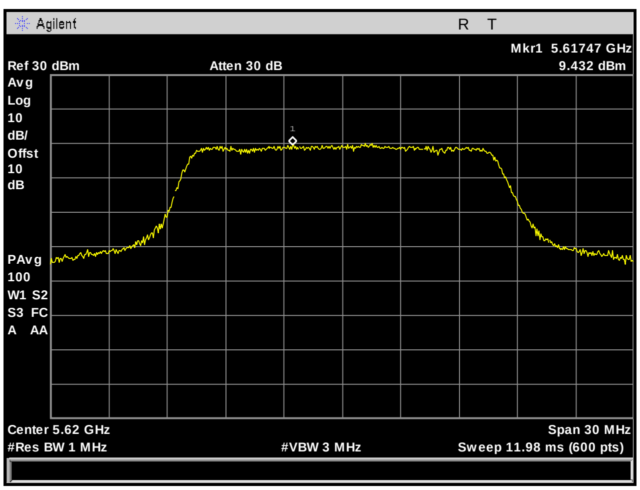
Plot 45. Maximum Power Spectral Density, 5320 MHz, 20 MHz



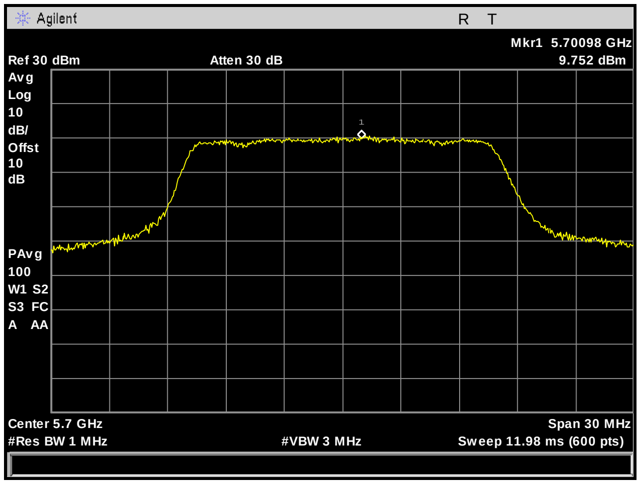
Plot 46. Maximum Power Spectral Density, 5500 MHz, 20 MHz



Plot 47. Maximum Power Spectral Density, 5540 MHz, 20 MHz

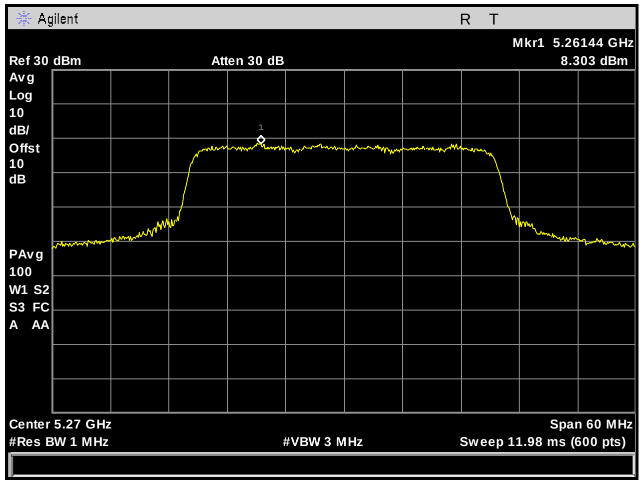


Plot 48. Maximum Power Spectral Density, 5620 MHz, 20 MHz

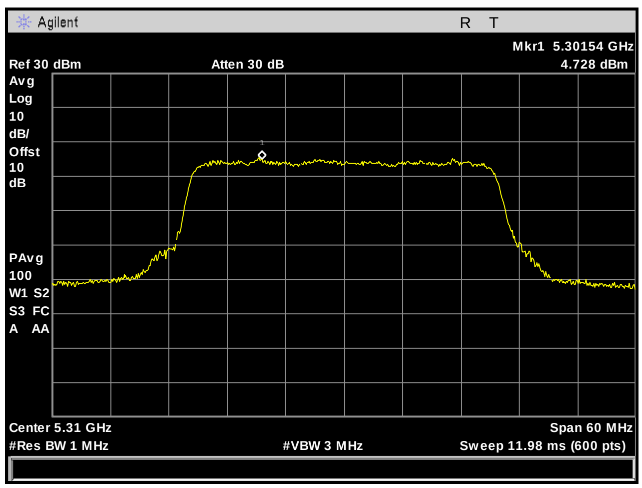


Plot 49. Maximum Power Spectral Density, 5700 MHz, 20 MHz

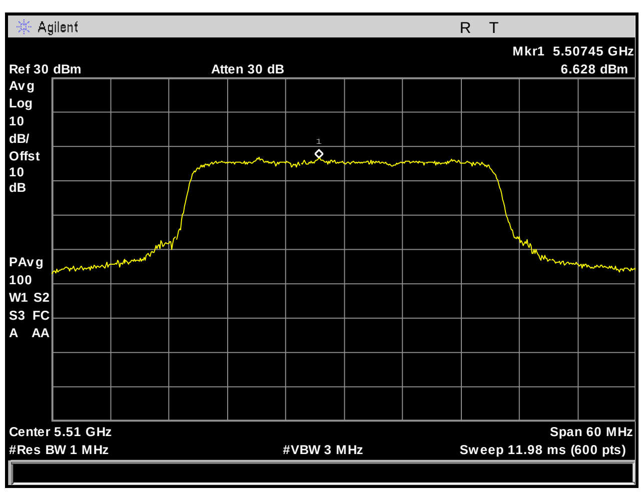
Maximum Power Spectral Density, 40 MHz



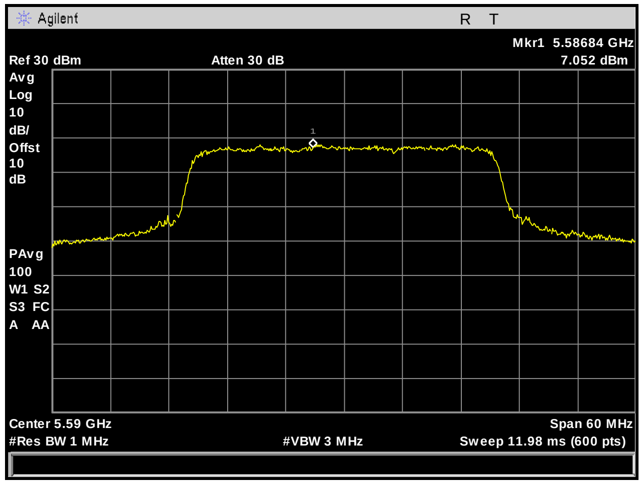
Plot 50. Maximum Power Spectral Density, 5270 MHz, 40 MHz



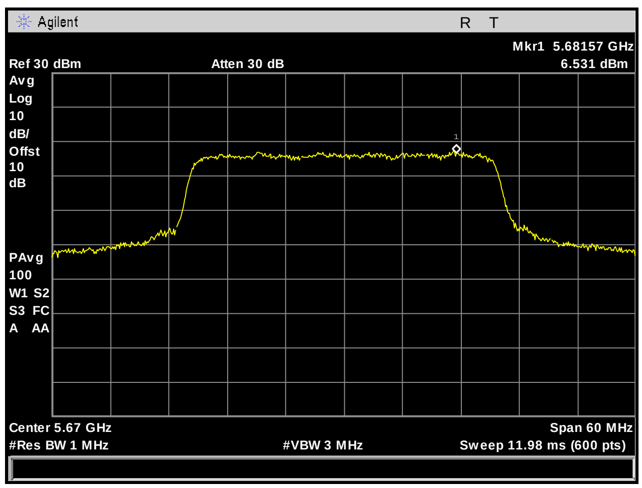
Plot 51. Maximum Power Spectral Density, 5310 MHz, 40 MHz



Plot 52. Maximum Power Spectral Density, 5510 MHz, 40 MHz



Plot 53. Maximum Power Spectral Density, 5590 MHz, 40 MHz



Plot 54. Maximum Power Spectral Density, 5760 MHz, 40 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(b)(2 – 3) & (6 – 7) Undesirable Emissions

Test Requirements:

§ 15.407(b)(2): For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

§ 15.407(b)(3): For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

§ 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.

Above 1 GHz, measurements were made pursuant the method described in FCC KDB 789033 D02 General UNII Test Procedure New Rules v01. 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.

As an alternative, according to FCC KDB 789033 D02 General UNII Test Procedure New Rules v01, all emissions above 1 GHz that comply with the peak and average limits of 15.209 satisfy the requirements of unwanted emissions in 15.407.

Test Results:

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

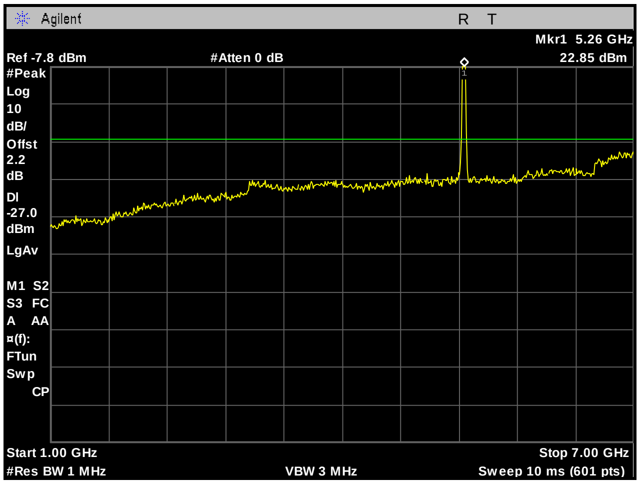
For above 1 GHz, the EUT was compliant with the requirements of this section.

Note. From 30-1000MHz and 7-18GHz, the worse case configuration was reported i.e. 40MHz bw.

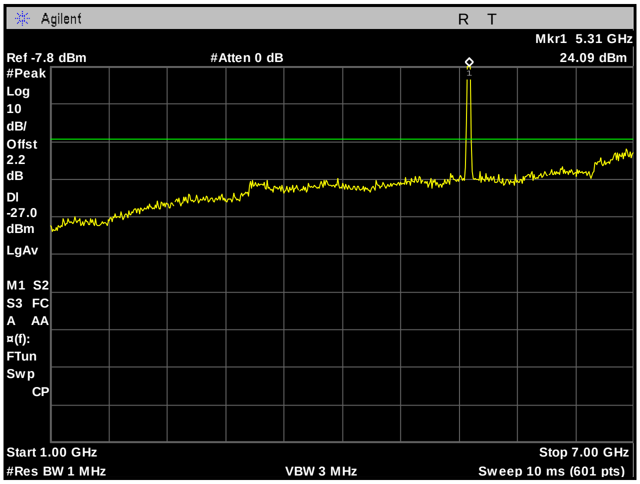
Test Engineer(s): Hadid Jones

Test Date(s): 06/14/16

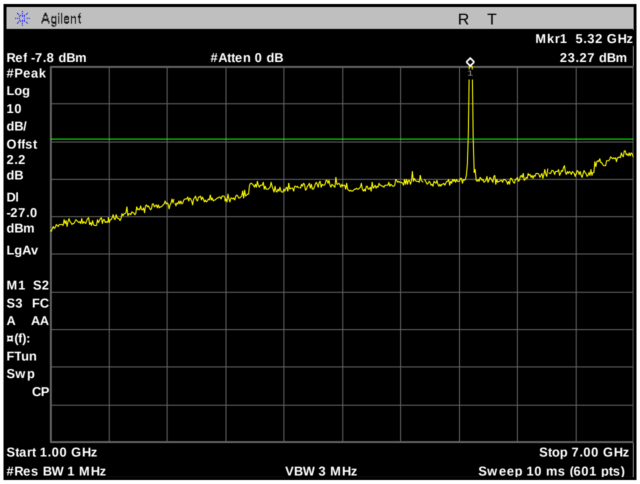
Radiated Spurious Emissions, 10 MHz



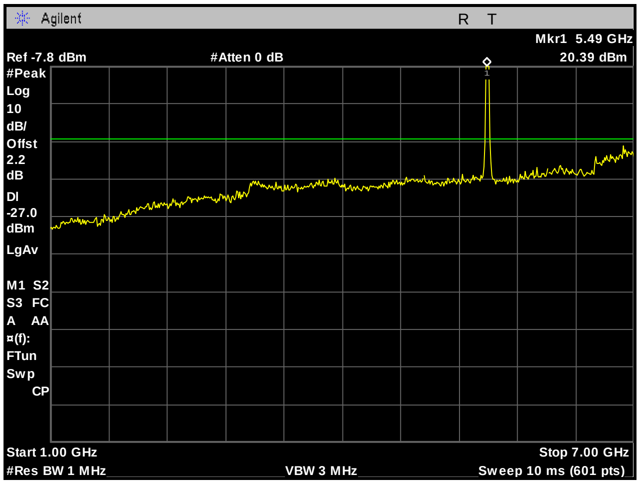
Plot 55. Radiated Spurious Emissions, 5255 MHz, 10 MHz, 1 GHz – 7 GHz



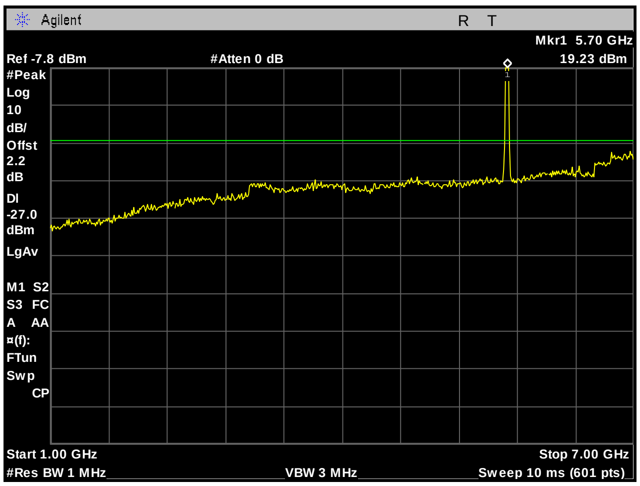
Plot 56. Radiated Spurious Emissions, 5305 MHz, 10 MHz, 1 GHz – 7 GHz



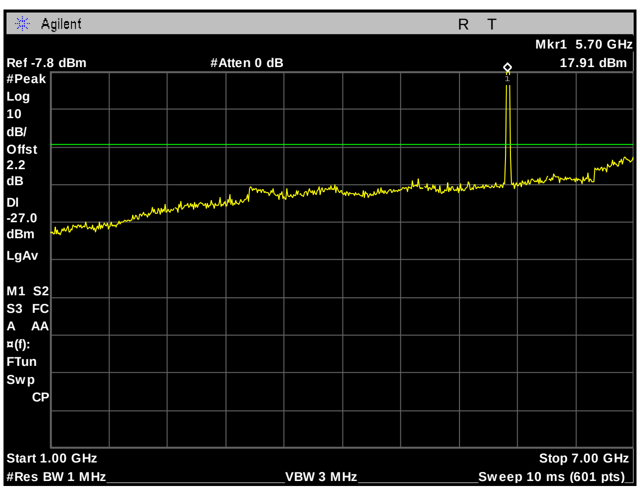
Plot 57. Radiated Spurious Emissions, 5325 MHz, 10 MHz, 1 GHz – 7 GHz



Plot 58. Radiated Spurious Emissions, 5495 MHz, 10 MHz, 1 GHz – 7 GHz

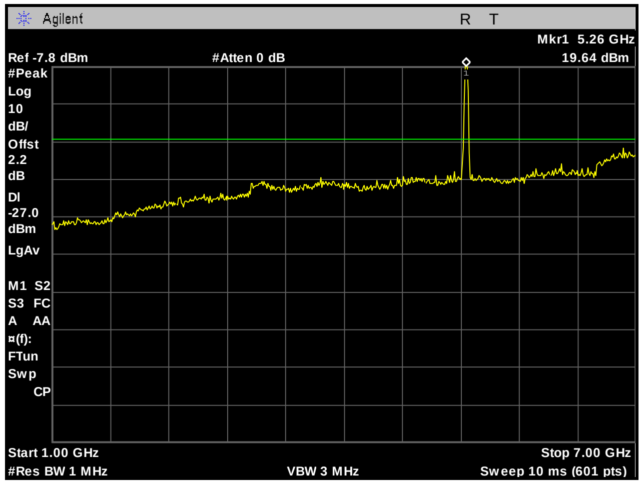


Plot 59. Radiated Spurious Emissions, 5695 MHz, 10 MHz, 1 GHz – 7 GHz

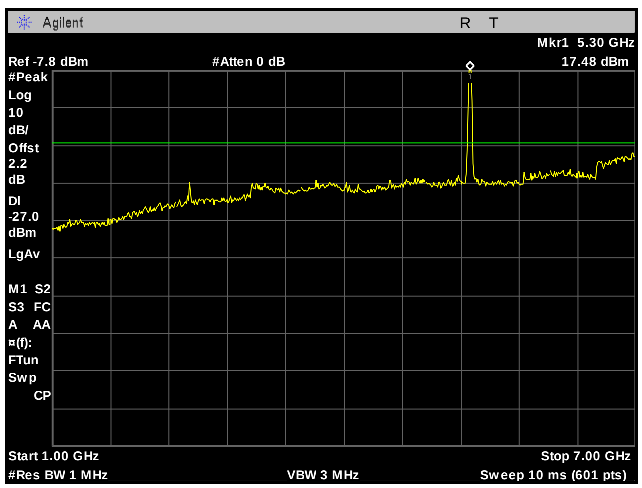


Plot 60. Radiated Spurious Emissions, 5705 MHz, 10 MHz, 1 GHz – 7 GHz

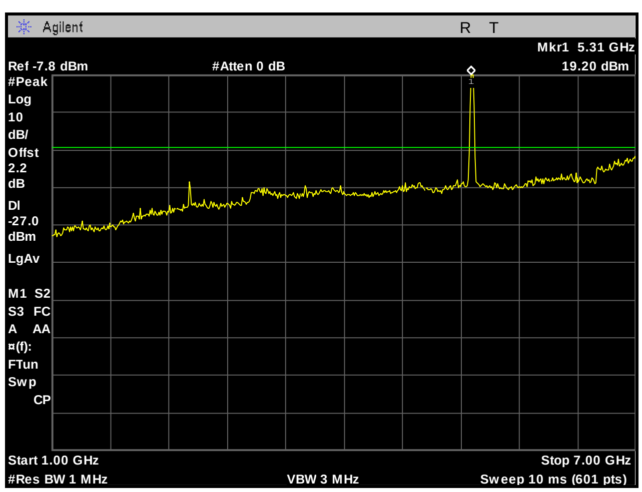
Radiated Spurious Emissions, 20 MHz



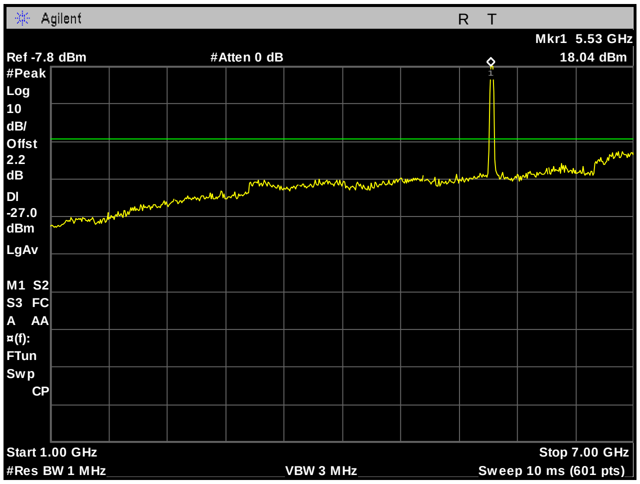
Plot 61. Radiated Spurious Emissions, 5260 MHz, 20 MHz, 1 GHz – 7 GHz



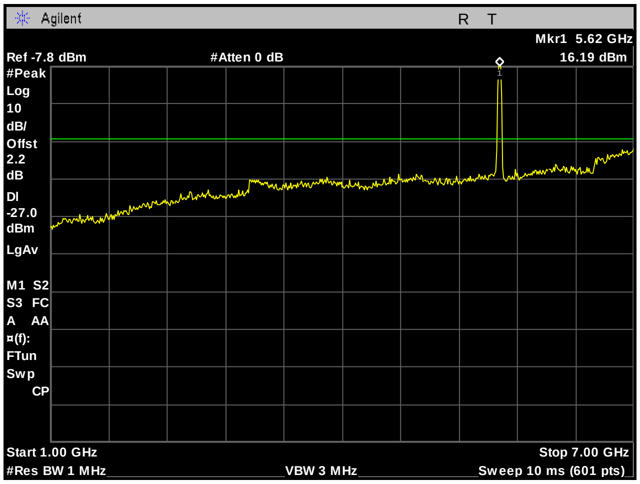
Plot 62. Radiated Spurious Emissions, 5300 MHz, 20 MHz, 1 GHz – 7 GHz



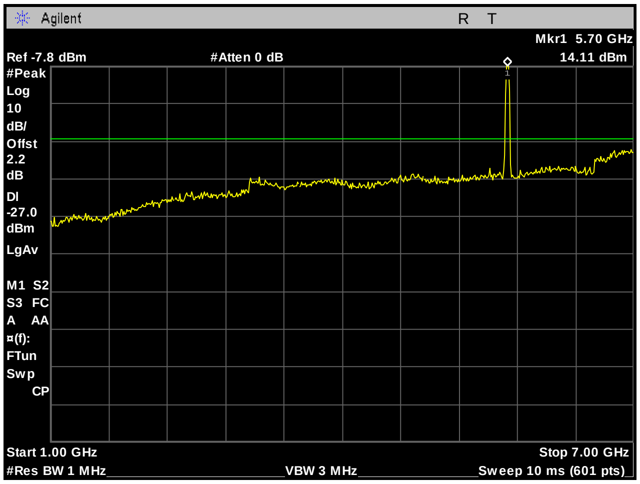
Plot 63. Radiated Spurious Emissions, 5320 MHz, 20 MHz, 1 GHz – 7 GHz



Plot 64. Radiated Spurious Emissions, 5540 MHz, 20 MHz, 1 GHz – 7 GHz

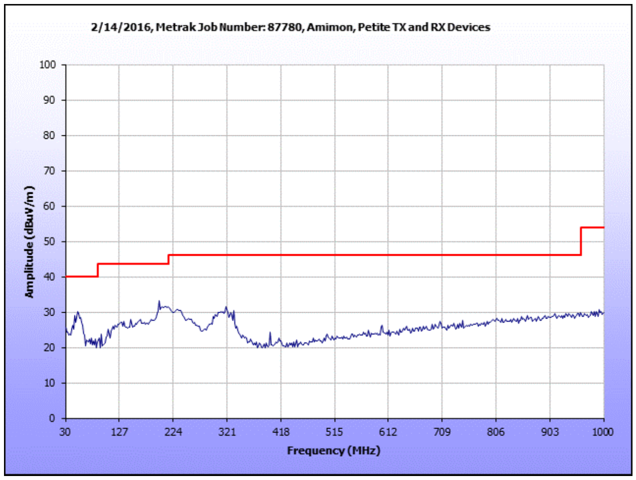


Plot 65. Radiated Spurious Emissions, 5620 MHz, 20 MHz, 1 GHz – 7 GHz

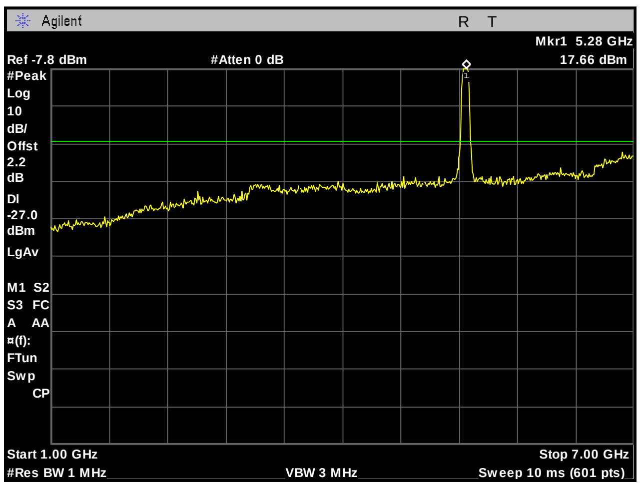


Plot 66. Radiated Spurious Emissions, 5700 MHz, 20 MHz, 1 GHz – 7 GHz

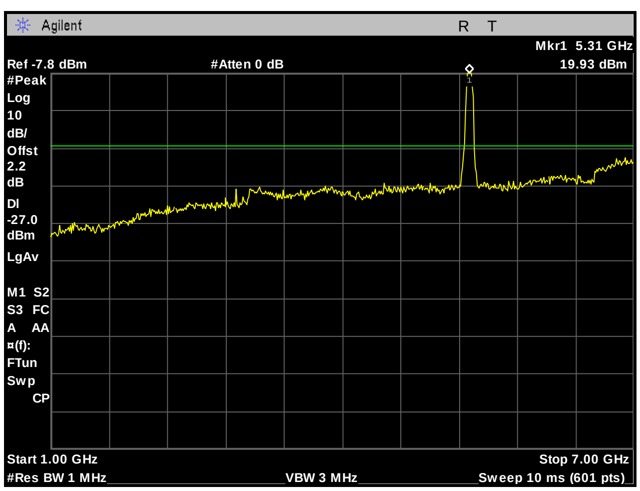
Radiated Spurious Emissions, 40 MHz



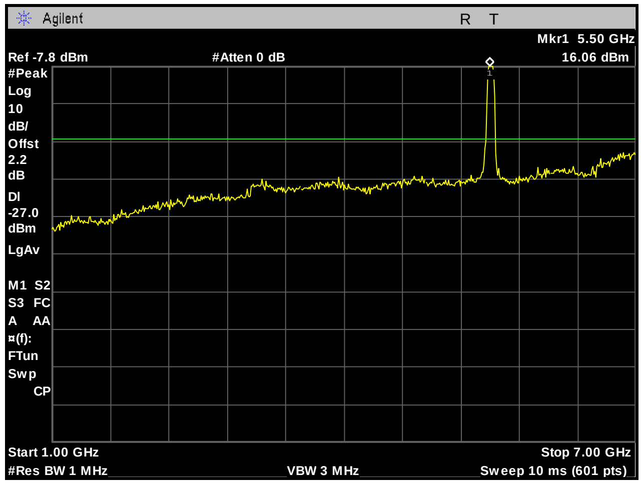
Plot 67. Radiated Spurious Emissions, Low Channel, 40 MHz, 30 MHz – 1 GHz



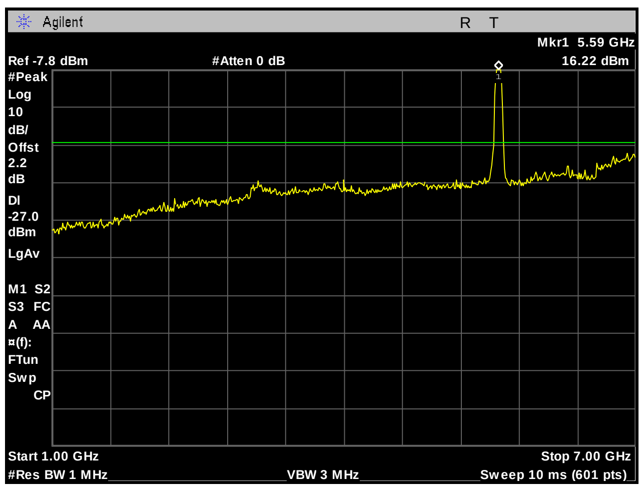
Plot 68. Radiated Spurious Emissions, 5270 MHz, 40 MHz, 1 GHz – 7 GHz



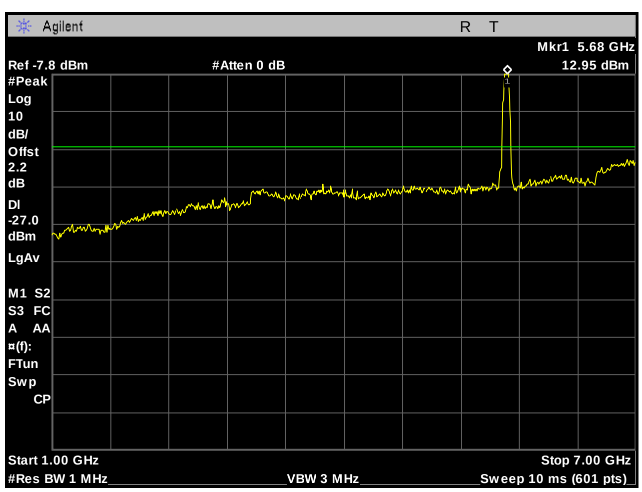
Plot 69. Radiated Spurious Emissions, 5310 MHz, 40 MHz, 1 GHz – 7 GHz



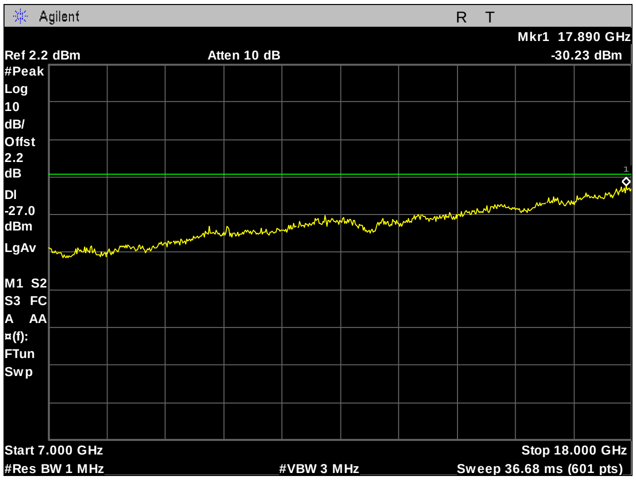
Plot 70. Radiated Spurious Emissions, 5510 MHz, 40 MHz, 1 GHz – 7 GHz



Plot 71. Radiated Spurious Emissions, 5590 MHz, 40 MHz, 1 GHz – 7 GHz



Plot 72. Radiated Spurious Emissions, 5760 MHz, 40 MHz, 1 GHz – 7 GHz

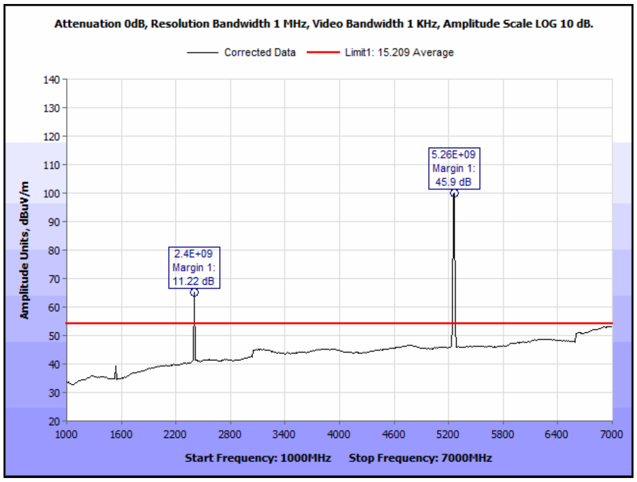


Plot 73. Radiated Spurious Emissions, Low Channel, 40 MHz, 7 GHz – 18 GHz

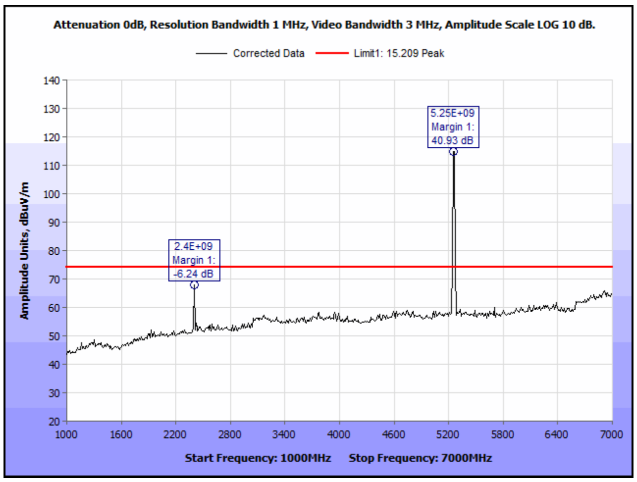
Radiated Spurious Emissions, Simultaneous Transmission

Bluetooth and WiFi radios activated for the channels with the maximum output power in each bandwidth.

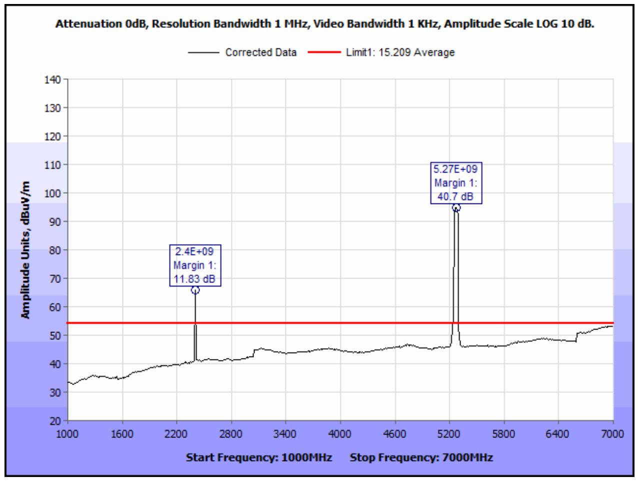
Note 1: From 7-18GHz, the worst case configuration is reported, i.e. 40MHz BW.



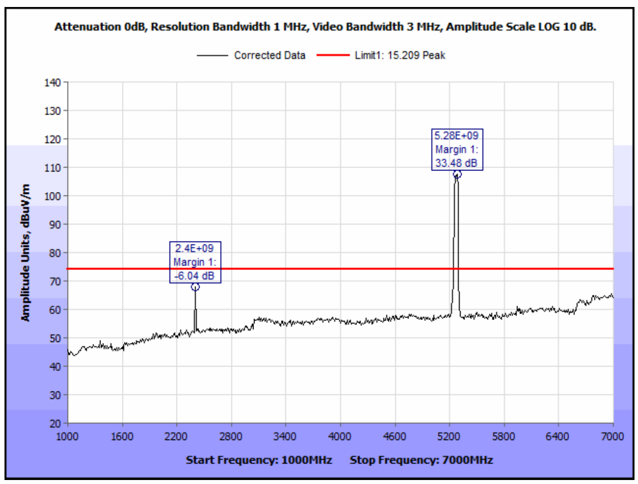
Plot 74. Radiated Spurious Emissions, 5255 MHz, 10 MHz, 1 GHz – 7 GHz, Average



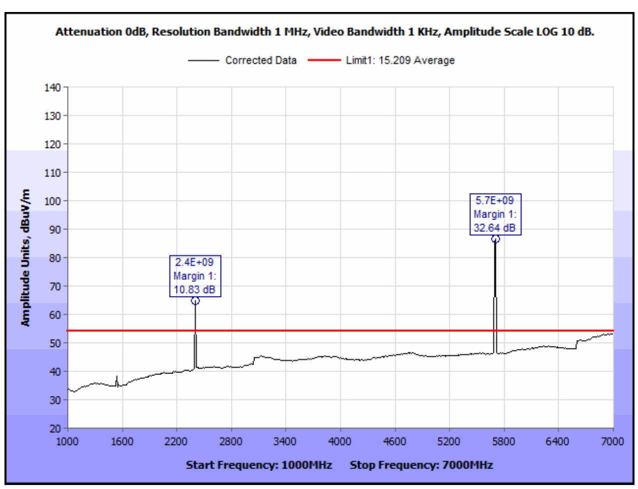
Plot 75. Radiated Spurious Emissions, 5255 MHz, 10 MHz, 1 GHz – 7 GHz, Peak



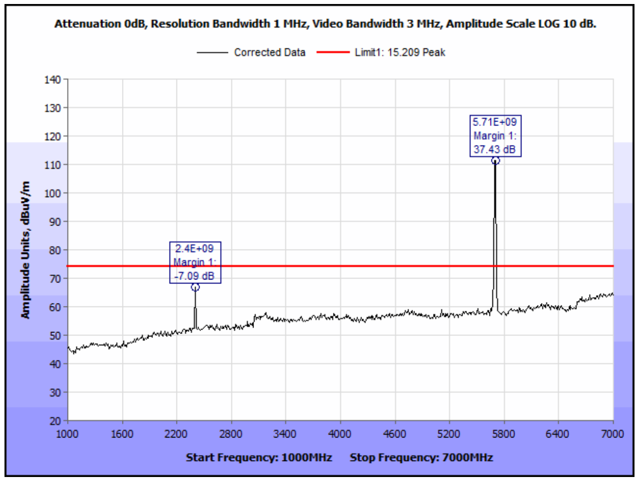
Plot 76. Radiated Spurious Emissions, 5270 MHz, 40 MHz, 1 GHz – 7 GHz, Average



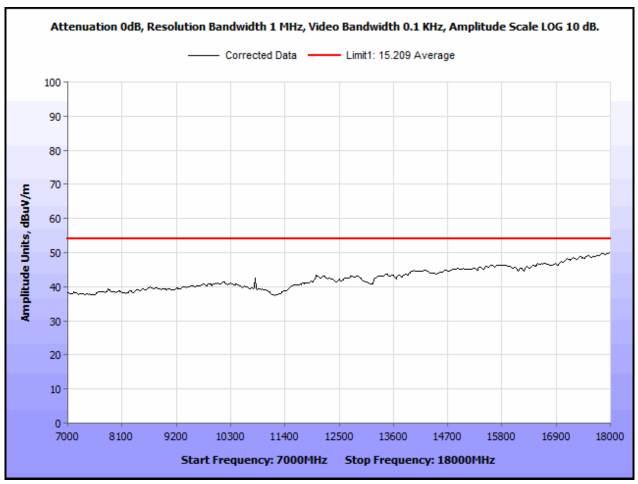
Plot 77. Radiated Spurious Emissions, 5270 MHz, 40 MHz, 1 GHz – 7 GHz, Peak



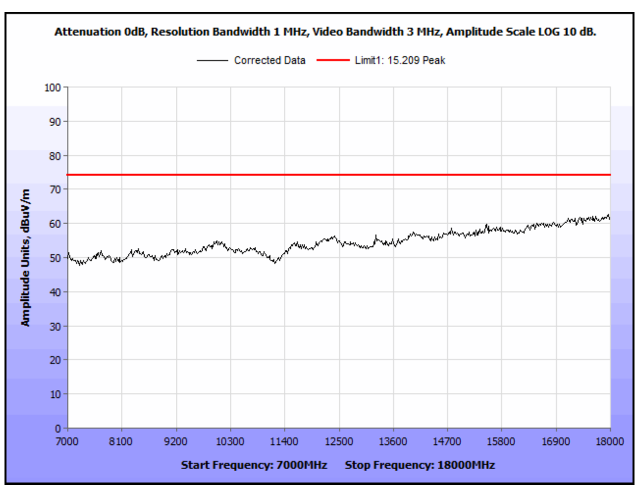
Plot 78. Radiated Spurious Emissions, 5700 MHz, 20 MHz, 1 GHz – 7 GHz, Average



Plot 79. Radiated Spurious Emissions, 5700 MHz, 20 MHz, 1 GHz – 7 GHz, Peak

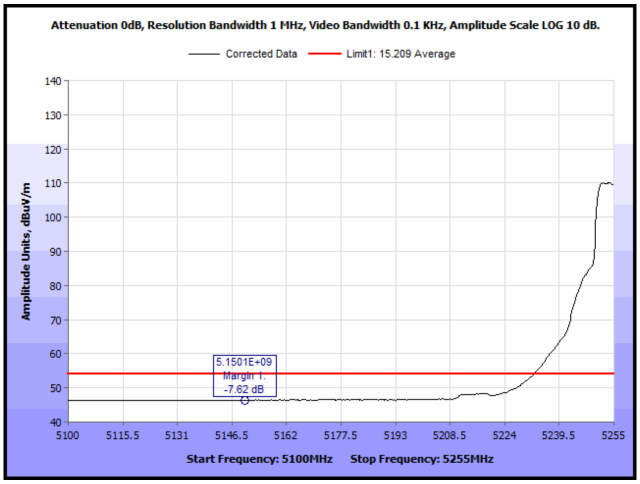


Plot 80. Radiated Spurious Emissions, 5230MHz, 40MHz, 7 GHz – 18 GHz, Average

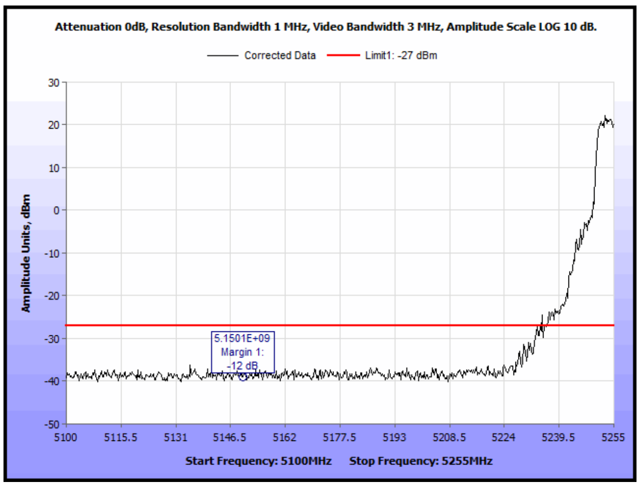


Plot 81. Radiated Spurious Emissions, 5230MHz, 40MHz, 7 GHz – 18 GHz, Peak

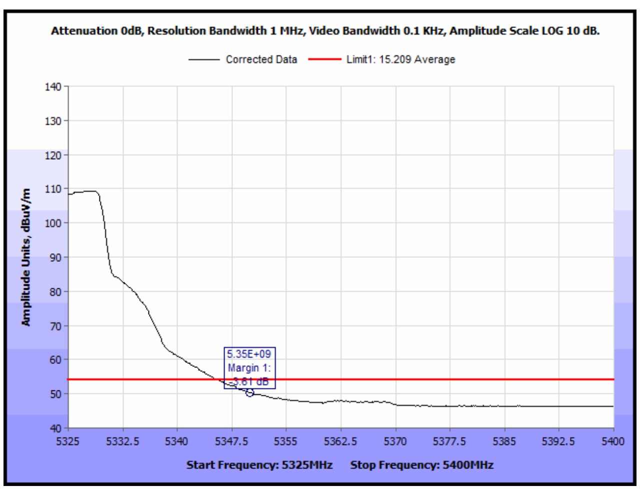
Radiated Band Edge, 10 MHz



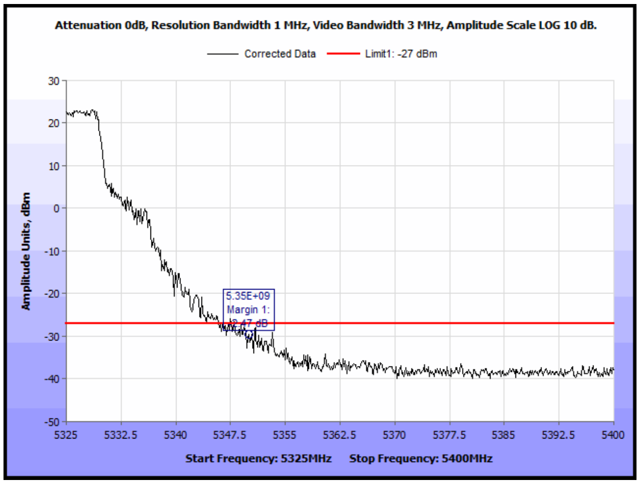
Plot 82. Radiated Band Edge, 5255 MHz, 10 MHz, Average



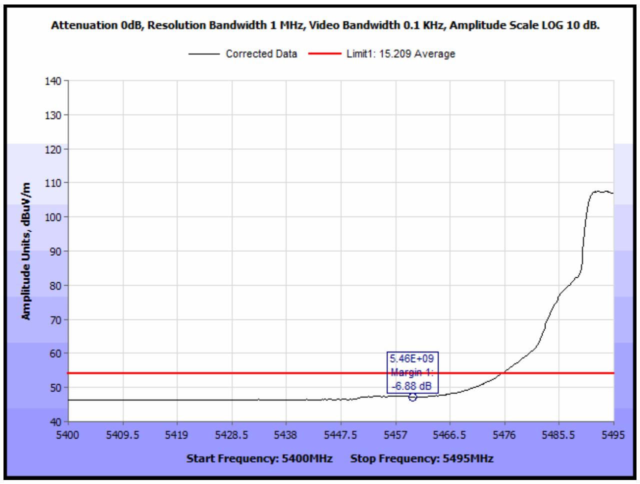
Plot 83. Radiated Band Edge, 5255 MHz, 10 MHz, Peak



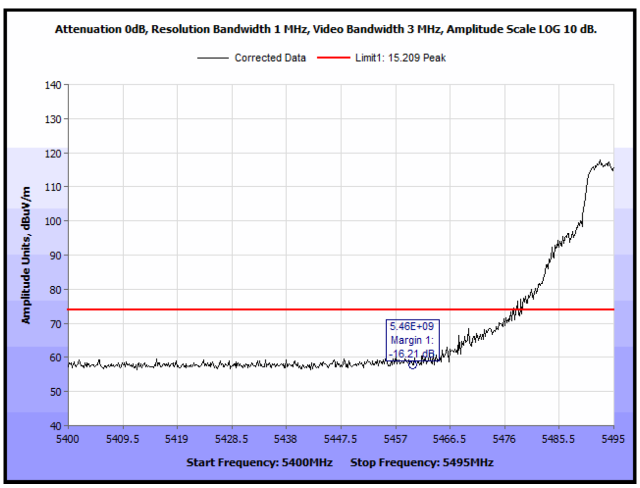
Plot 84. Radiated Band Edge, 5325 MHz, 10 MHz, Average



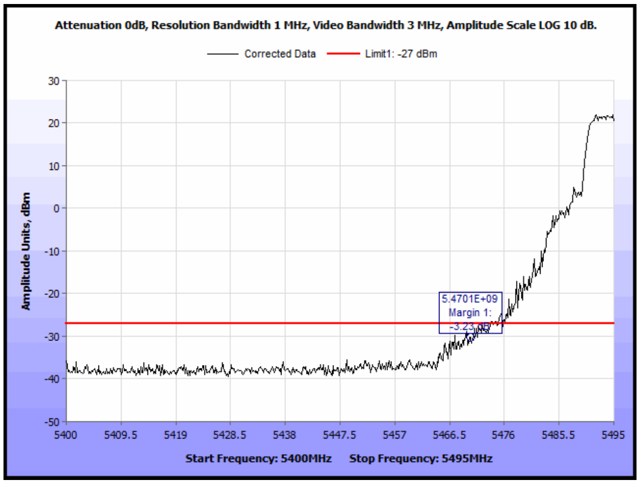
Plot 85. Radiated Band Edge, 5325 MHz, 10 MHz, Peak



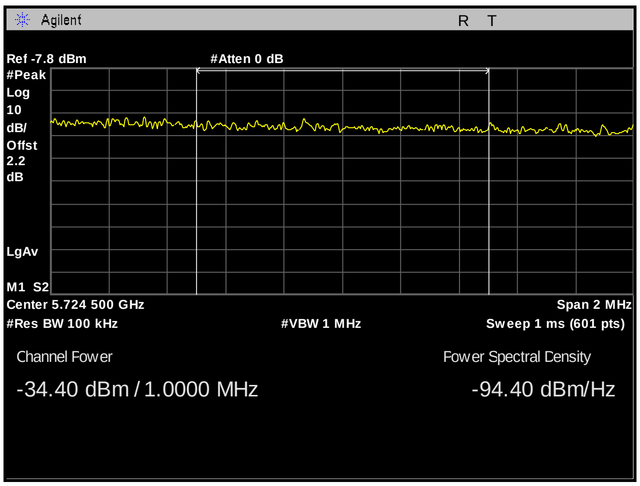
Plot 86. Radiated Band Edge, 5495 MHz, 10 MHz, Average



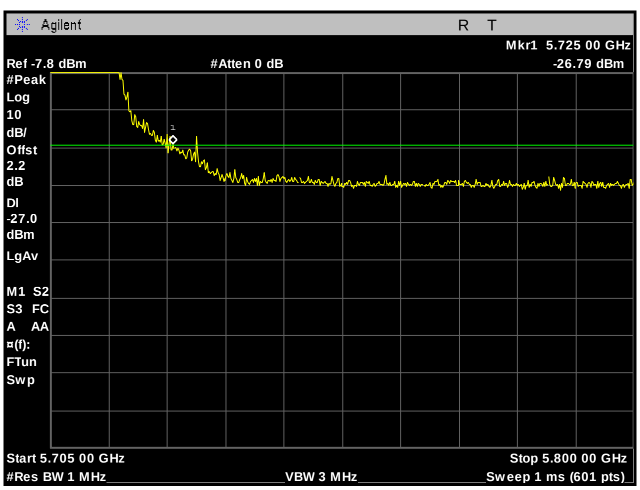
Plot 87. Radiated Band Edge, 5495 MHz, 10 MHz, Peak



Plot 88. Radiated Band Edge, 5495 MHz, 10 MHz, -27 Peak

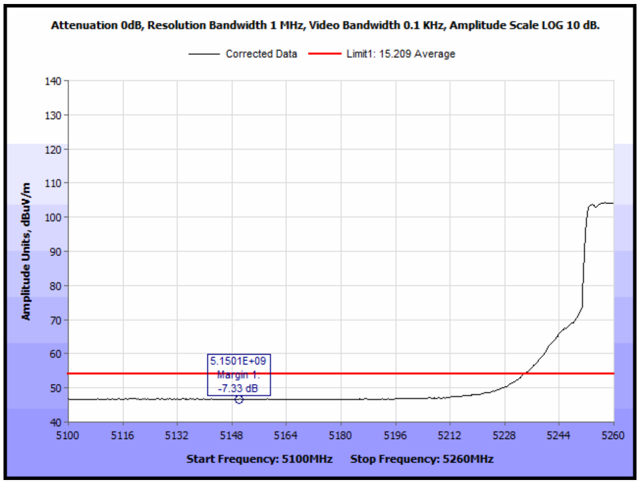


Plot 89. Radiated Band Edge, 5705 MHz, 10 MHz, Peak Integration

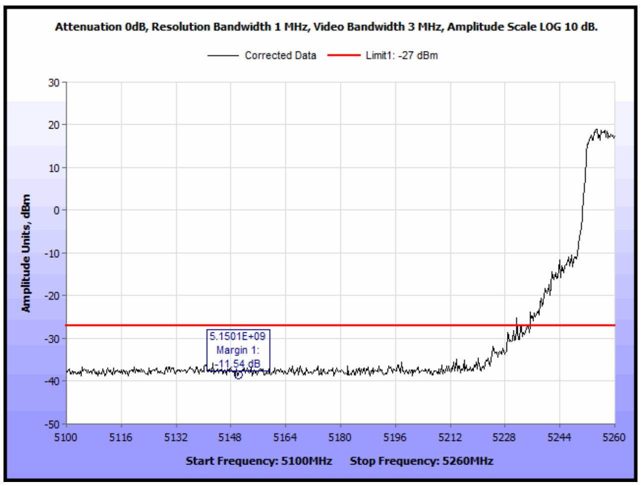


Plot 90. Radiated Band Edge, 5705 MHz, 10 MHz, Peak

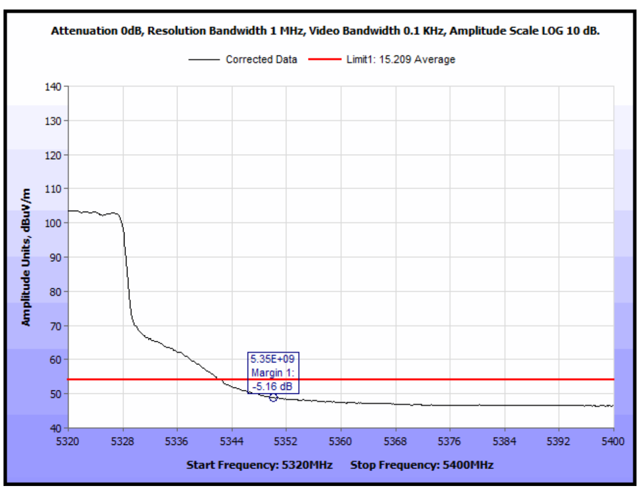
Radiated Band Edge, 20 MHz



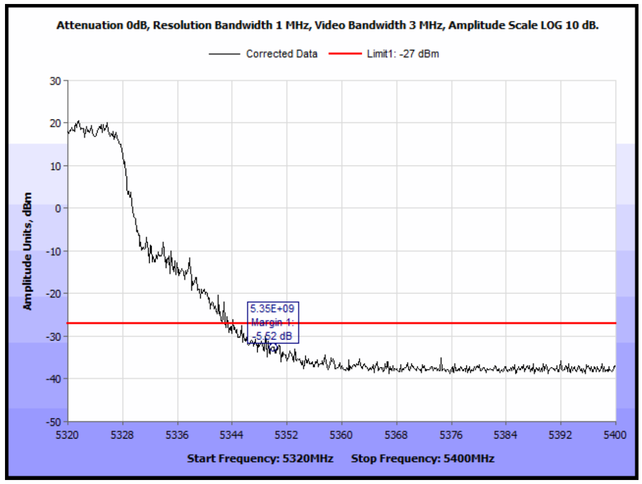
Plot 91. Radiated Band Edge, 5260 MHz, 20 MHz, Average



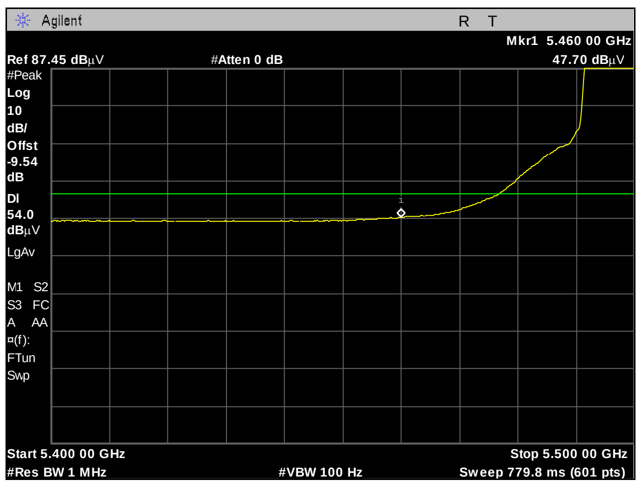
Plot 92. Radiated Band Edge, 5260 MHz, 20 MHz, Peak



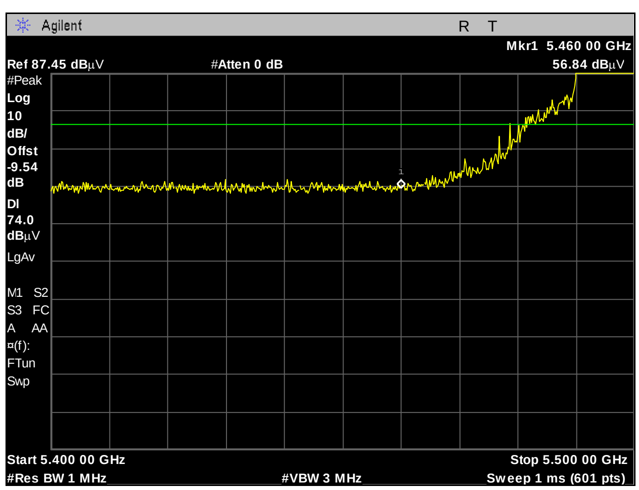
Plot 93. Radiated Band Edge, 5350 MHz, 20 MHz, Average



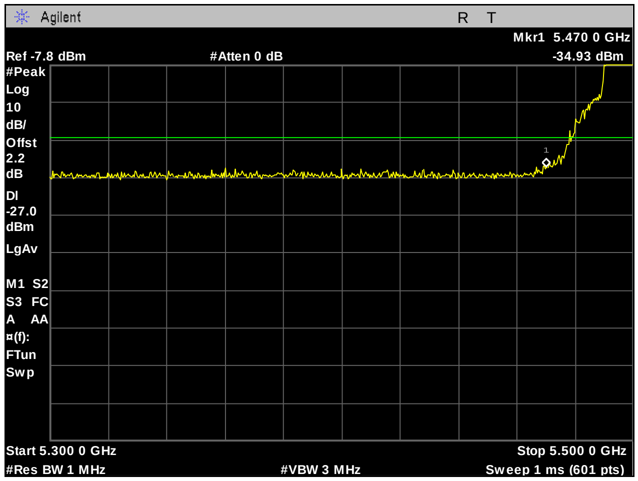
Plot 94. Radiated Band Edge, 5350 MHz, 20 MHz, Peak



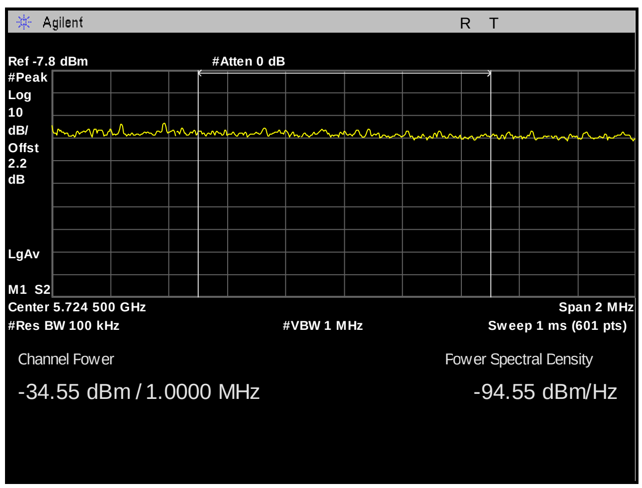
Plot 95. Radiated Band Edge, 5550 MHz, 20 MHz, Average



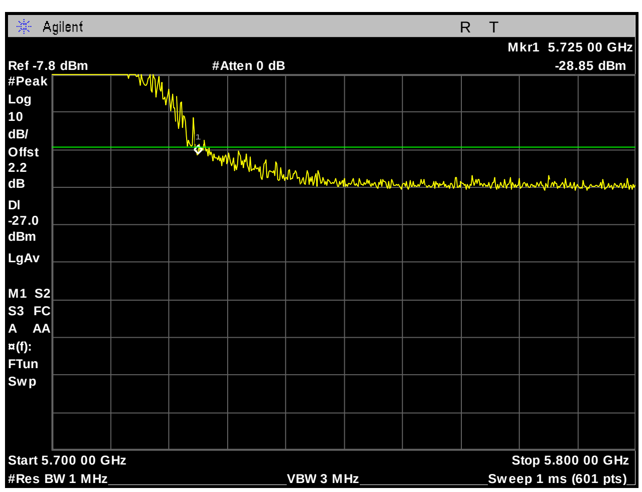
Plot 96. Radiated Band Edge, 5550 MHz, 20 MHz, Peak



Plot 97. Radiated Band Edge, 5550 MHz, 20 MHz, -27 Peak

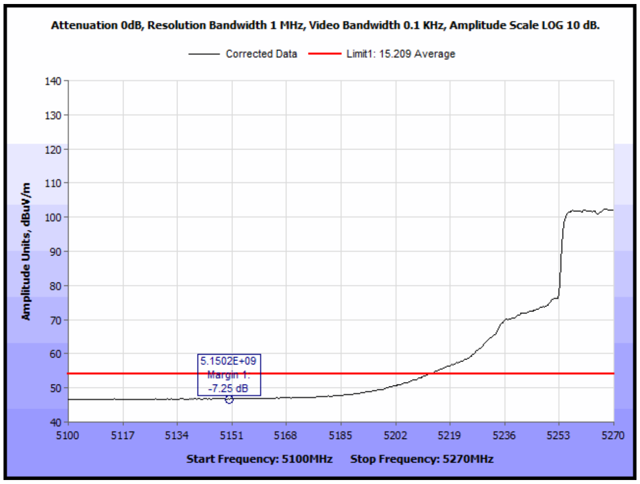


Plot 98. Radiated Band Edge, 5700 MHz, 20 MHz, Peak Integration

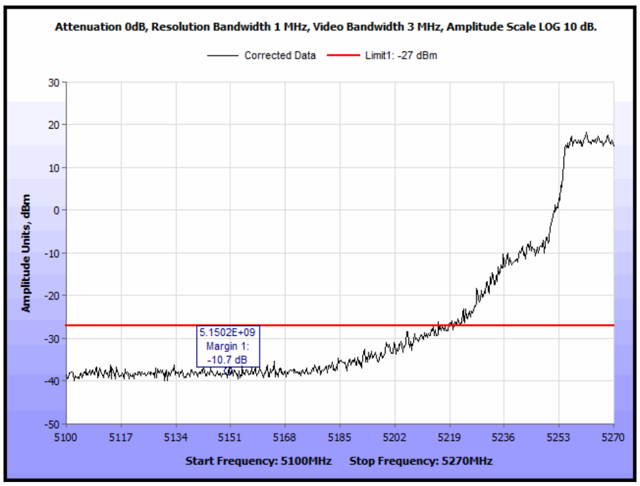


Plot 99. Radiated Band Edge, 5700 MHz, 20 MHz, Peak

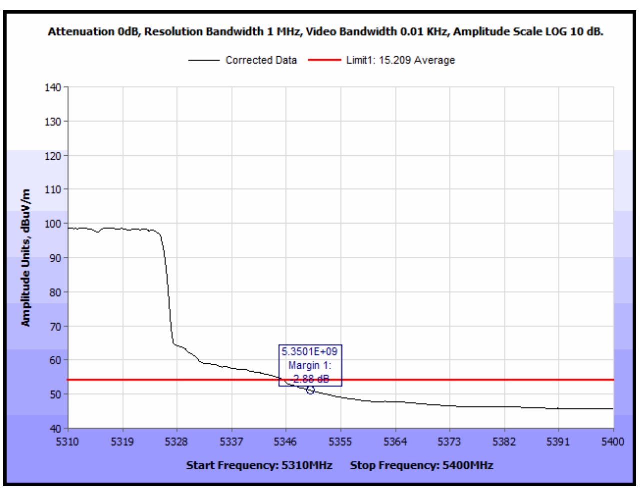
Radiated Band Edge, 40 MHz



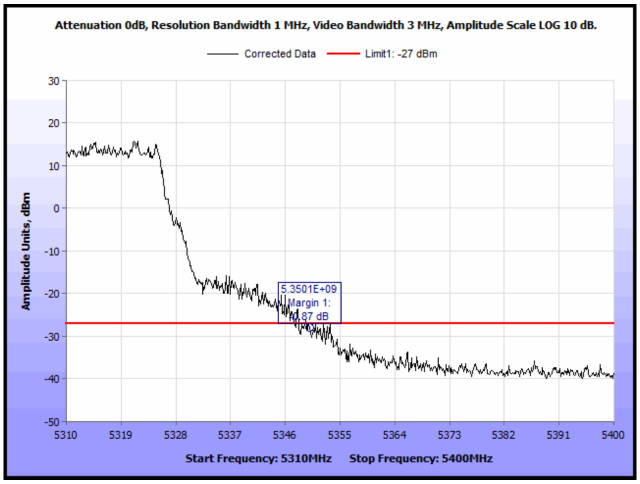
Plot 100. Radiated Band Edge, 5270 MHz, 40 MHz, Average



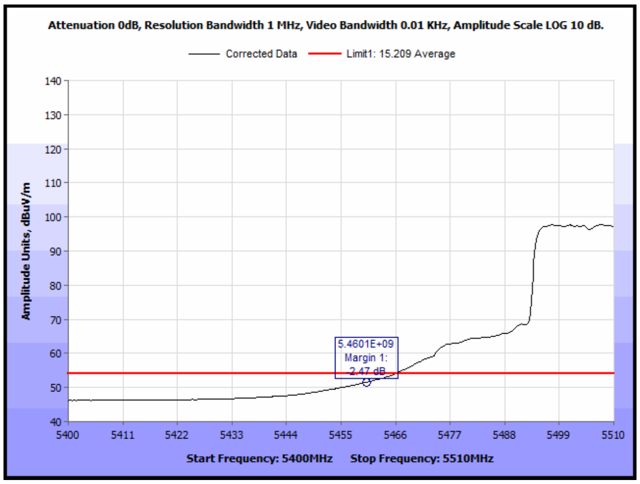
Plot 101. Radiated Band Edge, 5270 MHz, 40 MHz, Peak



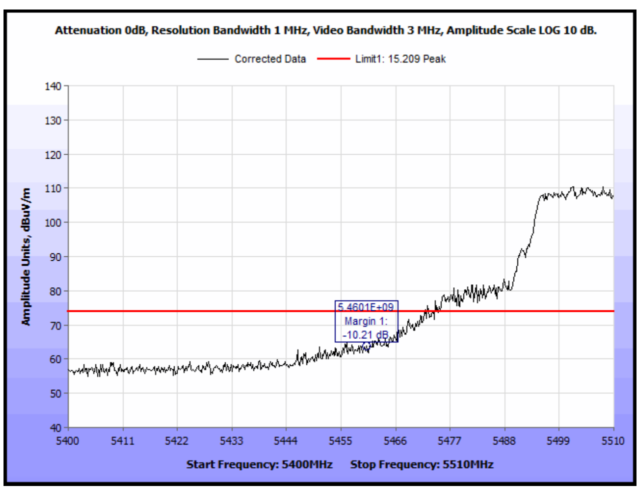
Plot 102. Radiated Band Edge, 5310 MHz, 40 MHz, Average



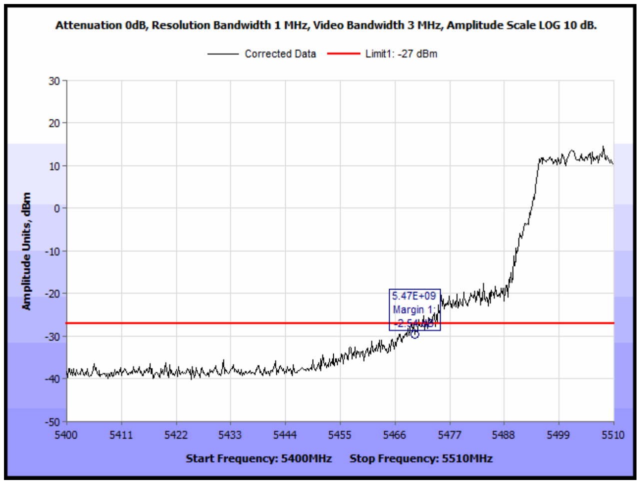
Plot 103. Radiated Band Edge, 5310 MHz, 40 MHz, Peak



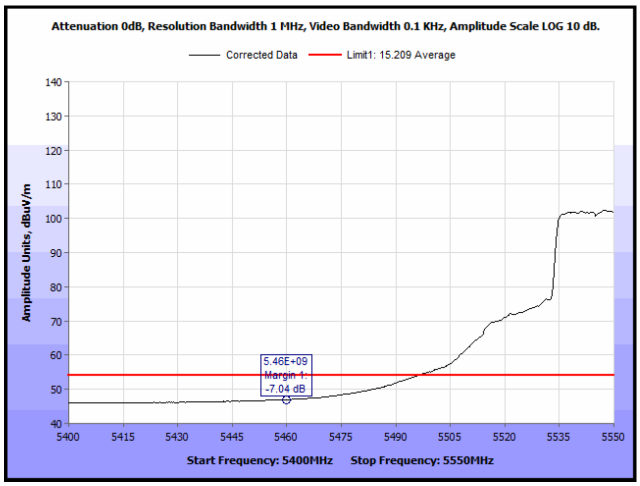
Plot 104. Radiated Band Edge, 5510 MHz, 40 MHz, Average



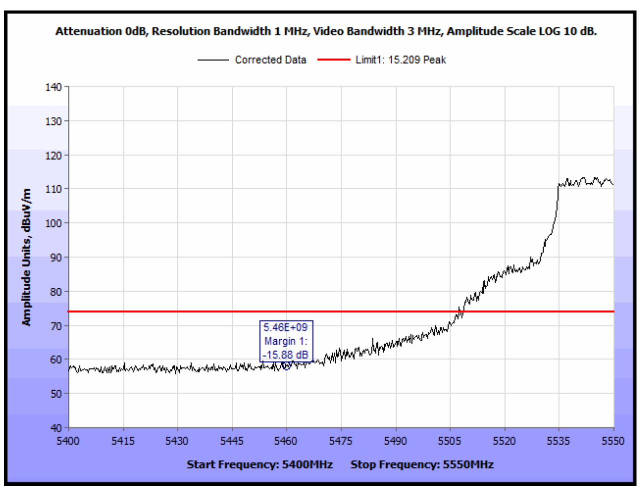
Plot 105. Radiated Band Edge, 5510 MHz, 40 MHz, Peak



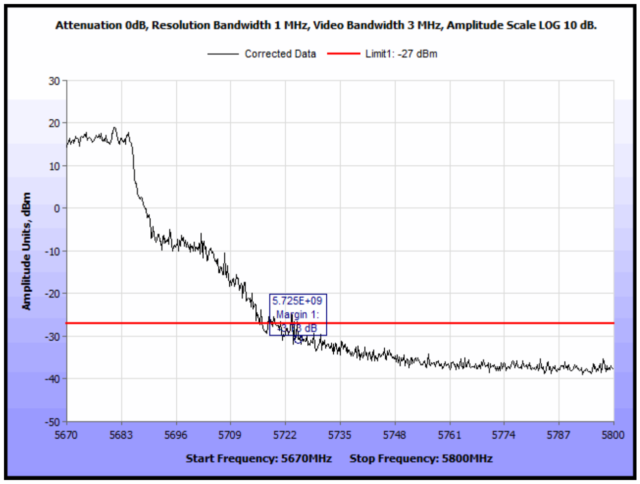
Plot 106. Radiated Band Edge, 5510 MHz, 40 MHz, -27 Peak



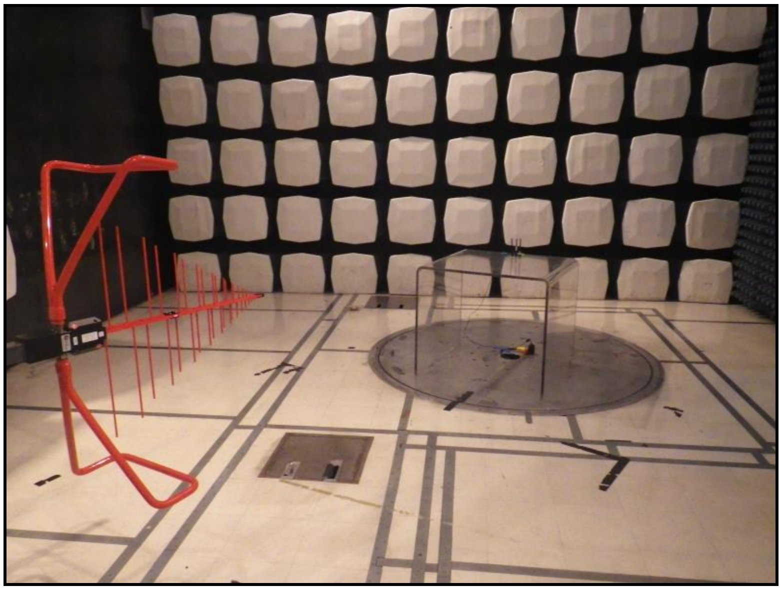
Plot 107. Radiated Band Edge, 5550 MHz, 40 MHz, Average



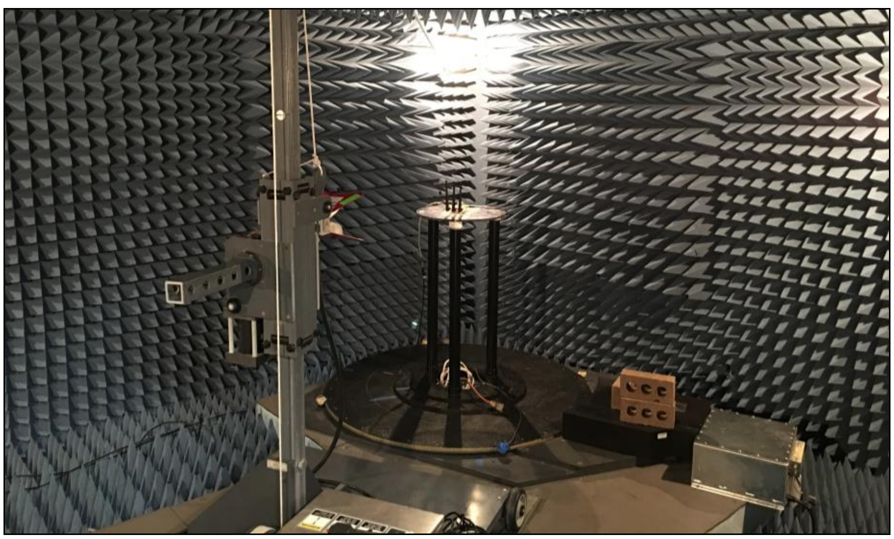
Plot 108. Radiated Band Edge, 5550 MHz, 40 MHz, Peak



Plot 109. Radiated Band Edge, 5670MHz, 40 MHz, Peak



Photograph 1. Radiated Emissions, Test Setup Below 1GHz



Photograph 2. Radiated Emissions, Test Setup Above 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 Σ 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 10. 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 C63.4-2014 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. Scans were performed with the transmitter on.

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits

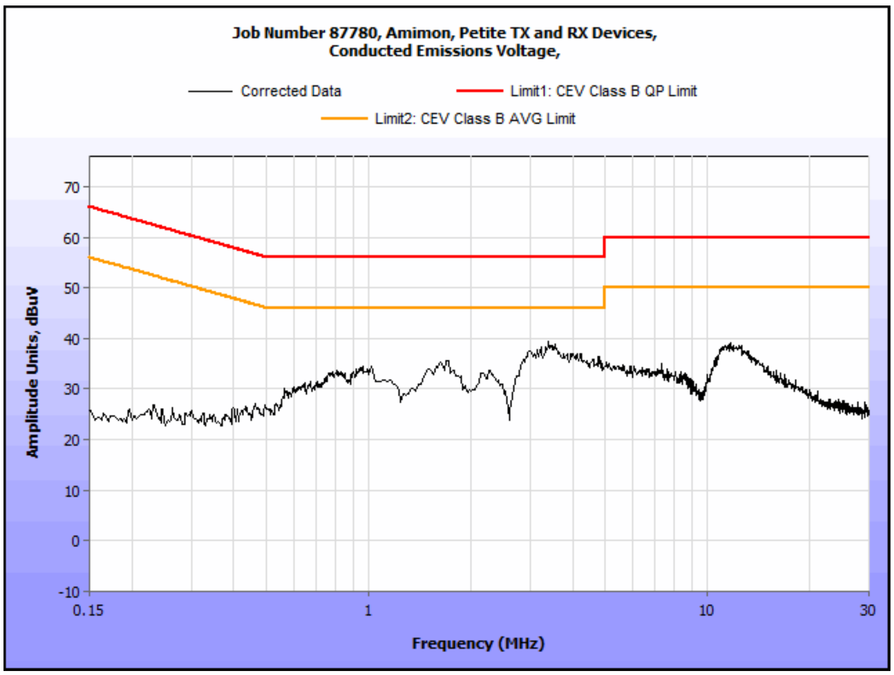
Test Engineer(s): Hadid Jones

Test Date(s): 12/19/15

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.814	20.54	0	20.54	56	-35.46	11.16	0	11.16	46	-34.84
1.011	20.39	0	20.39	56	-35.61	11.51	0	11.51	46	-34.49
1.783	18.88	0	18.88	56	-37.12	10.23	0	10.23	46	-35.77
2.199	18.7	0	18.7	56	-37.3	9.3	0	9.3	46	-36.7
3.45	27.26	0	27.26	56	-28.74	14.49	0	14.49	46	-31.51
11.83	24.12	0	24.12	60	-35.88	17.37	0	17.37	50	-32.63

Table 11. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

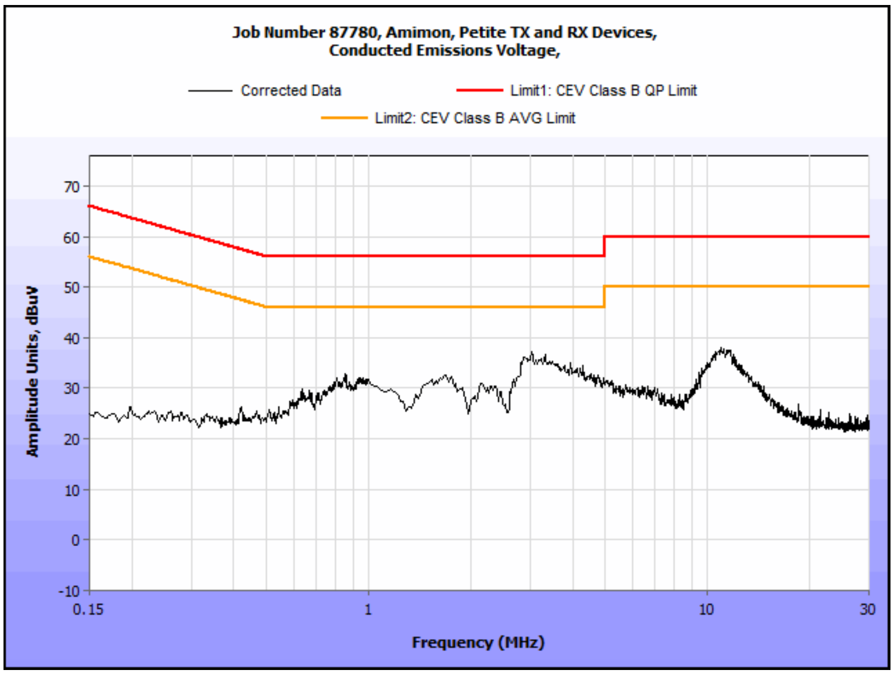


Plot 110. Conducted Emission, Phase Line Plot

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.84	17.38	0	17.38	56	-38.62	7.8	0	7.8	46	-38.2
1.68	18.08	0	18.08	56	-37.92	8.6	0	8.6	46	-37.4
1.649	18.21	0	18.21	56	-37.79	9.45	0	9.45	46	-36.55
2.9	20.93	0	20.93	56	-35.07	10.1	0	10.1	46	-35.9
4.19	18.17	0	18.17	56	-37.83	10.17	0	10.17	46	-35.83
11.29	22.05	0	22.05	60	-37.95	15.34	0	15.34	50	-34.66

Table 12. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 111. Conducted Emission, Neutral Line Plot

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 @ 5250-5350 MHz and 5470 – 5725 MHz; **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

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

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

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

Test Results:

This EUT is capable of simultaneous operation of its Bluetooth and 5GHz radios and therefore the individual contributions of both radios were summed to produce the combined power density listed in the table.

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**
5590	21.6	144.544	2	1.585	0.04558	1	0.95442	20	Pass
2402	0.1	1.023	-0.6	0.871	0.00018	1	0.99982	20	Pass
Combined Power Endsity					0.04576	1	0.95424	20	Pass

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

IV. DFS Requirements and Radar Waveform Description & Calibration

A. DFS Requirements

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 13. Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

Table 14. Applicability of DFS Requirements During Normal Operation

Maximum Transmit Power	**Value (See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 15. DFS Detection Thresholds for Master or Client Devices Incorporating DFS

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 16. DFS Response Requirement Values

B. Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu sec}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Table 17. Pulse Repetition Intervals Values for Test A

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Bursts	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 Bursts are randomly generated for the Burst_Count.
3) Burst 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) Bursts 2 through 8 are generated using steps 3 – 5.
7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).

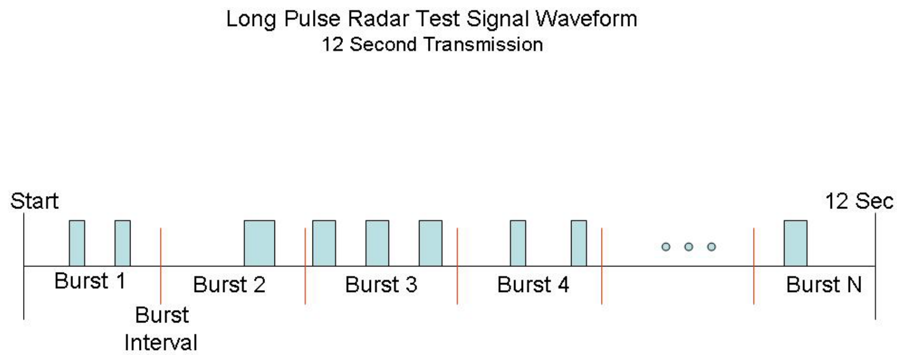


Figure 1. Long Pulse Radar Test Signal Waveform

Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected1 from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

C. Radar Waveform Calibration

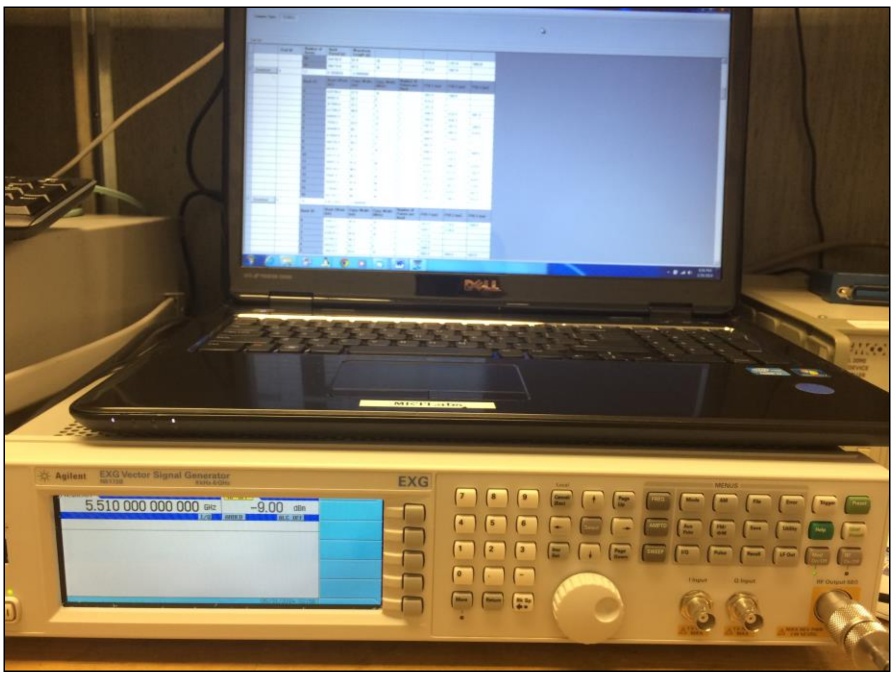
Calibration of the DFS test was done using radiated methods. A signal generator capable of producing all radar pulse types (0-6) was connected to a transmitting antenna. A receive antenna, through an external pre-amp, was connected to a spectrum analyzer. The spectrum analyzer was set to a zero span with a peak detector and an RBW and VBW of 3 MHz. The transmit and receive antennas were vertically polarized during this calibration.

With the signal generator and spectrum analyzer tuned to the test frequency, each radar pulse was triggered and observed on the spectrum analyzer. The DFS Detection Threshold was verified for each radar pulse type (0-6).

During this process there were no transmissions by either the Master or Client Device.

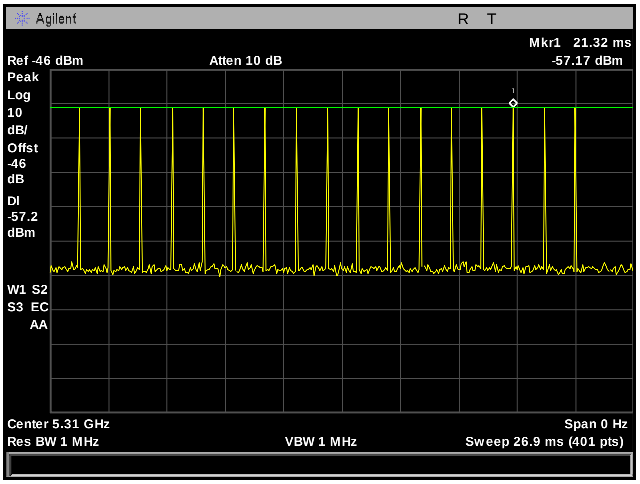
Note: Testing with pulse types 0-4 and 6 was done in the conducted configuration. The detection threshold was computed based on the total gain of the 3 antennas in the normal setup where G(total) = g = 10Log(N) or 6.77dbi. The calibration level was therefore -64 + 6.77, or -57.2dBm.

Test pulse 5 was done in the radiated configuration with a the threshold level of -64dBm

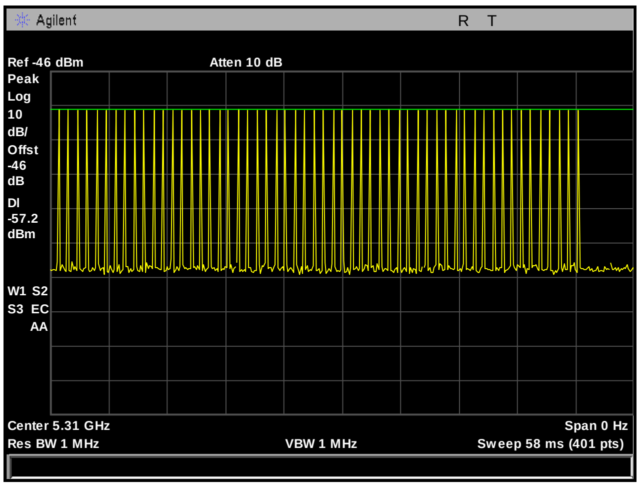


Photograph 3. DFS Radar Test Signal Generator

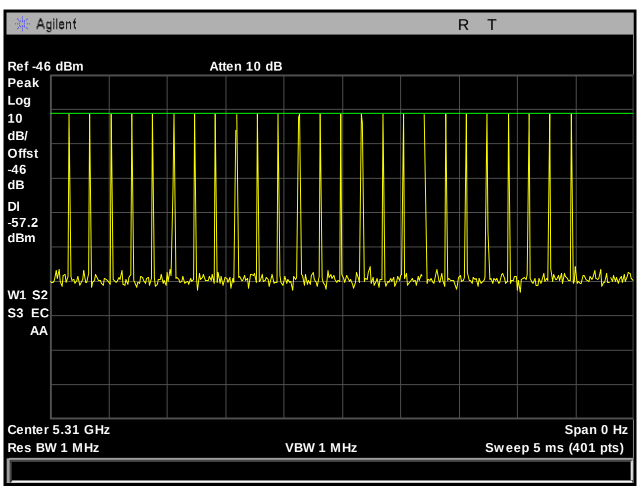
Radar Waveform Calibration, 5310 MHz



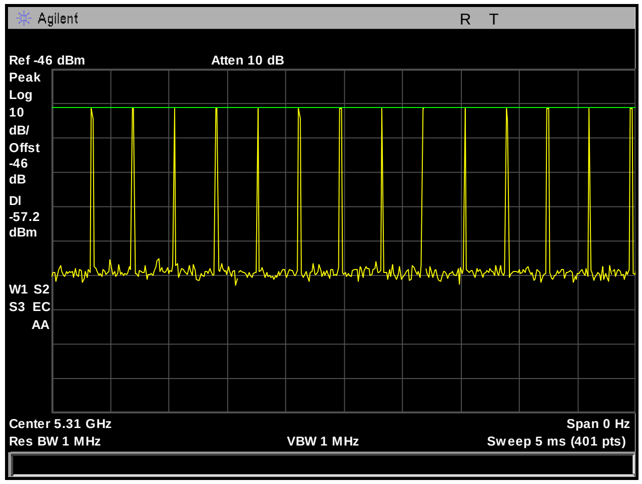
Plot 112. Radar Waveform Calibration, Type 0, 5310 MHz, 6.5 dBm



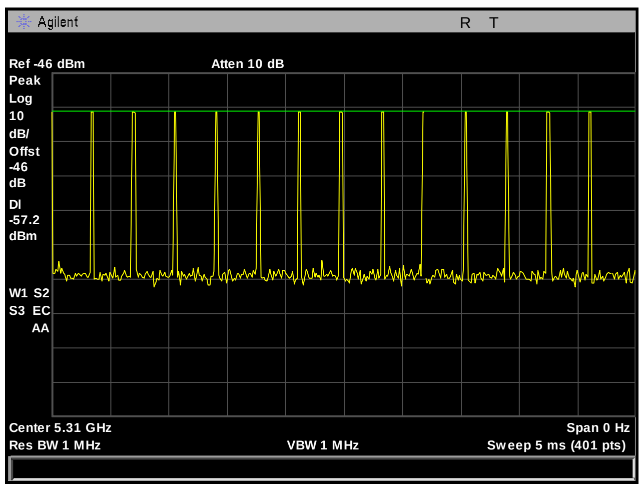
Plot 113. Radar Waveform Calibration, Type 1, 5310 MHz, 6.5 dBm



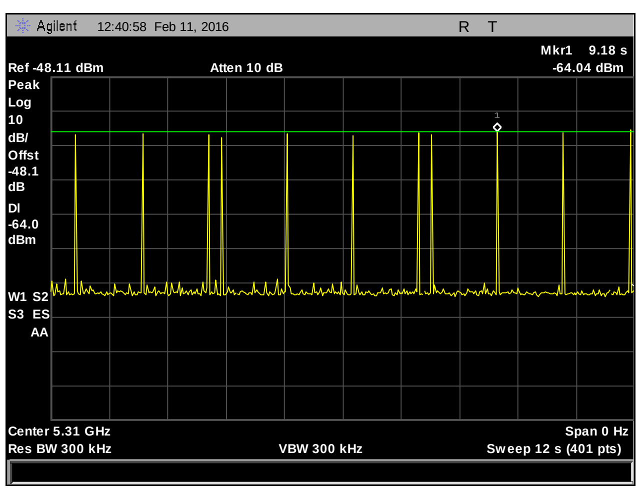
Plot 114. Radar Waveform Calibration, Type 2, 5310 MHz, 5 dBm



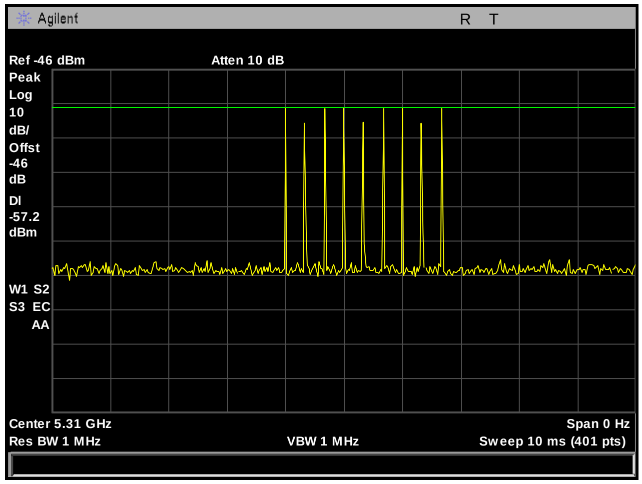
Plot 115. Radar Waveform Calibration, Type 3, 5310 MHz, 4.5 dBm



Plot 116. Radar Waveform Calibration, Type 4, 5310 MHz, 4.5 dBm

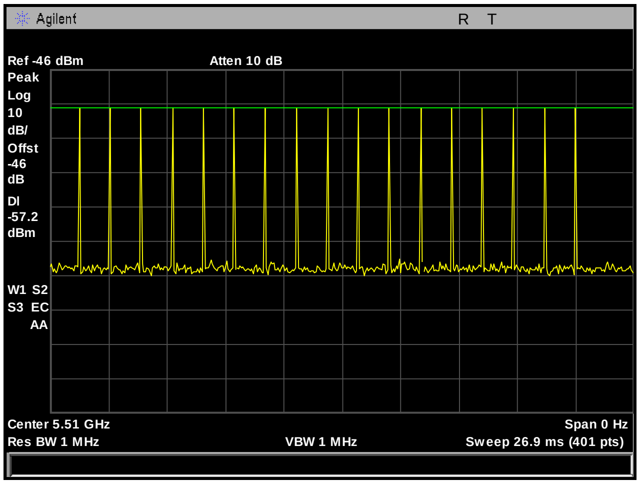


Plot 117. Radar Waveform Calibration, Type 5, 5310 MHz, -13 dBm

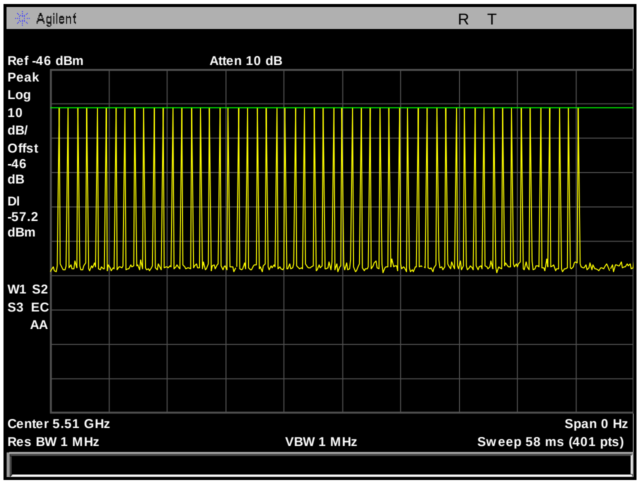


Plot 118. Radar Waveform Calibration, Type 6, 5310 MHz, 6 dBm

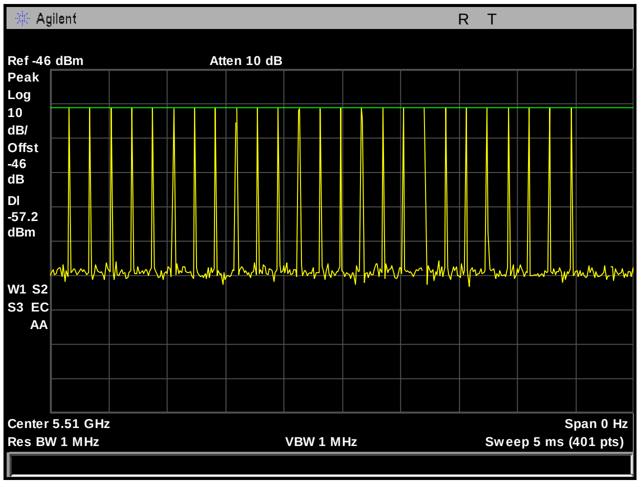
Radar Waveform Calibration, 5510 MHz



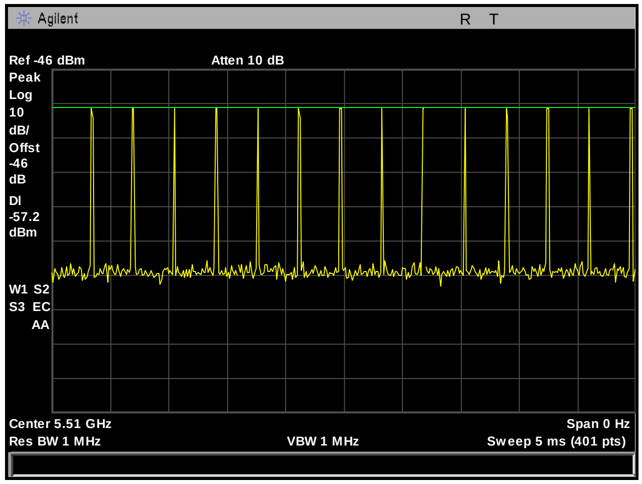
Plot 119. Radar Waveform Calibration, Type 0, 5510 MHz, 6.5 dBm



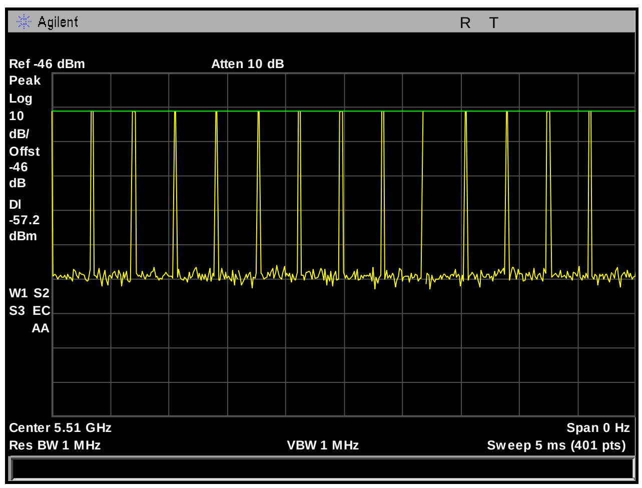
Plot 120. Radar Waveform Calibration, Type 1, 5510 MHz, 6.5 dBm



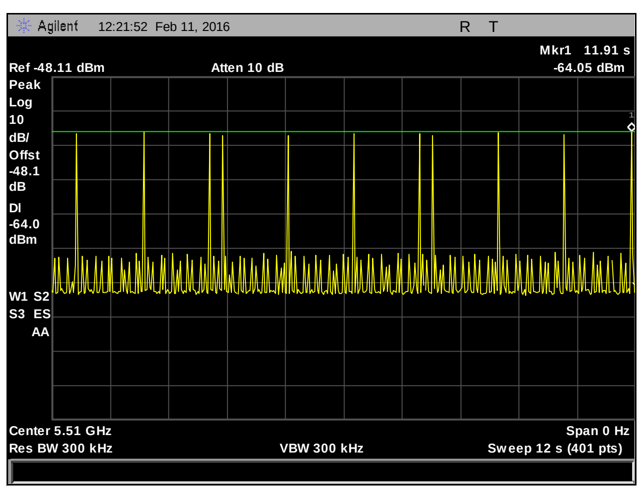
Plot 121. Radar Waveform Calibration, Type 2, 5510 MHz, 4.5 dBm



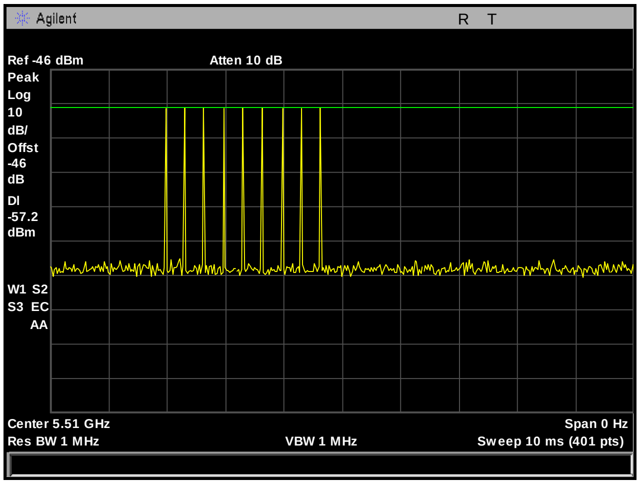
Plot 122. Radar Waveform Calibration, Type 3, 5510 MHz, 4.5 dBm



Plot 123. Radar Waveform Calibration, Type 4, 5510 MHz, 4.5 dBm



Plot 124. Radar Waveform Calibration, Type 5, 5510 MHz, -11 dBm

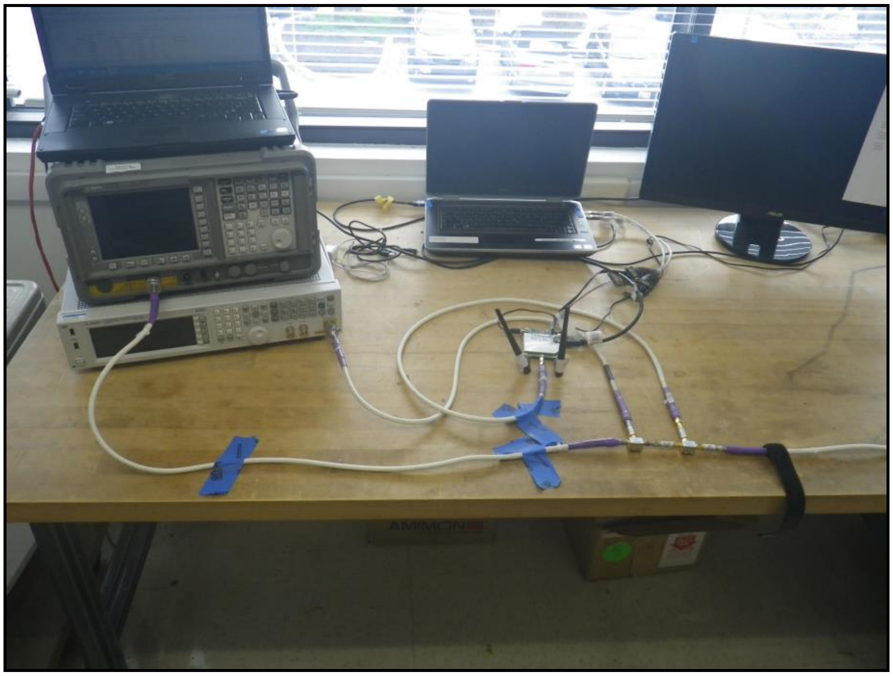


Plot 125. Radar Waveform Calibration, Type 6, 5510 MHz, 6 dBm

V. DFS Test Procedure and Test Results

A. DFS Test Setup

1. A spectrum analyzer is used as a monitor to verify that the Unit Under Test (EUT) has vacated the Channel within the Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and subsequent Channel move. It is also used to monitor EUT transmissions during the Channel Availability Check Time.
2. The test setup, which consists of test equipment and equipment under test (EUT), is diagrammed in Photograph 4.



Photograph 4. DFS, Test Setup

B. Channel Availability Check Time

Test Requirements: **§15.407(h)(2)(ii)** A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed in paragraph (h)(2) of this section, is detected within 60 seconds.

Test Procedure: The spectrum analyzer was set to a zero span mode with a 3 MHz RBW and 3 MHz VBW on the test channel with a 2.5 minute sweep time. The spectrum analyzer's sweep was started at the same time power was applied to the U-NII device.

For the initial Channel Availability Check Time no radar burst was generated and the EUT was monitored for how long after startup transmission started.

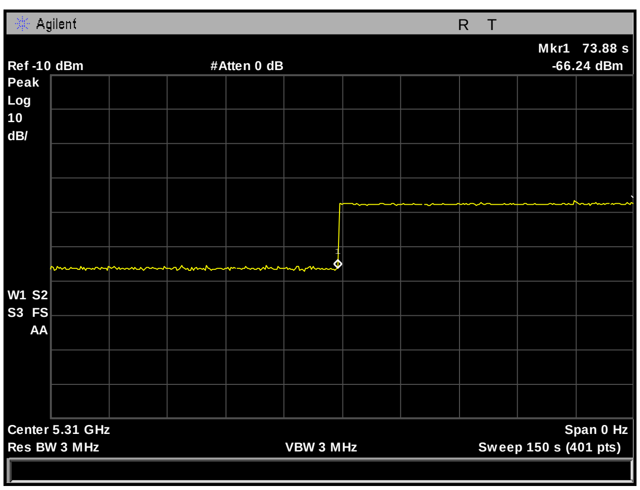
For radar burst at the beginning of the Channel Availability Check Time a short pulse radar type (0-4) with a level equal to the DFS Detection Threshold + 1 dB was generated within the first 6 seconds of the EUT's channel availability check. The EUT was monitored to ensure that it did not start transmitting on the channel.

For radar burst at the end of the Channel Availability Check Time a short pulse radar type (0-4) with a level equal to the DFS Detection Threshold + 1 dB was generated within the last 6 seconds of the EUT's channel availability check. The EUT was monitored to ensure that it did not start transmitting on the channel.

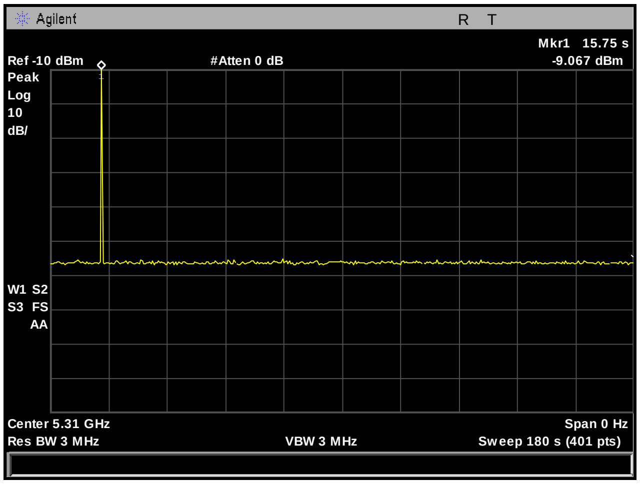
Test Results: The EUT was compliant with the requirements of this section.

Test Engineer(s): Hadid Jones

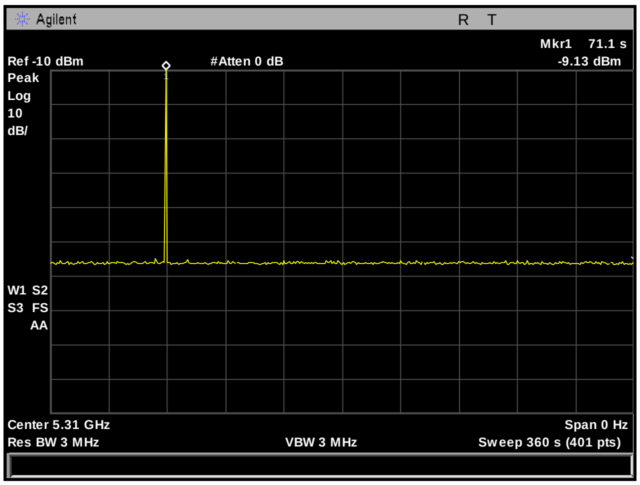
Test Date(s): 12/10/15



Plot 126. Channel Availability Check Time, 40 MHz



Plot 127. Radar Burst at the Beginning of Channel Availability Check Time, 40 MHz



Plot 128. Radar Burst at the End of Channel Availability Check Time, 40 MHz

C. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time, and Non-Occupancy Period

Test Requirements: **§15.407(h)(2)(iii)** Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

§15.407(h)(2)(iv) Non-occupancy Period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

KDB 905462 §5.1 Test using widest BW mode available.

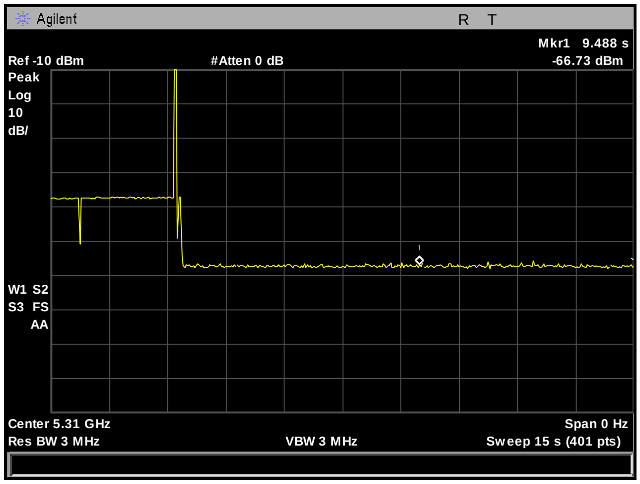
Test Procedure: The EUT was setup as a Master device and associated with a Client device. A test file was streamed from the Master device to the Client device for the entire period of the test. A Radar Burst of type 0 with a level equal to the DFS Detection Threshold + 1 dB was used.

A radar pulse was generated while the EUT was transmitting. A spectrum analyzer set to a zero span was used to observe the transmission of the EUT at the end of the burst.

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

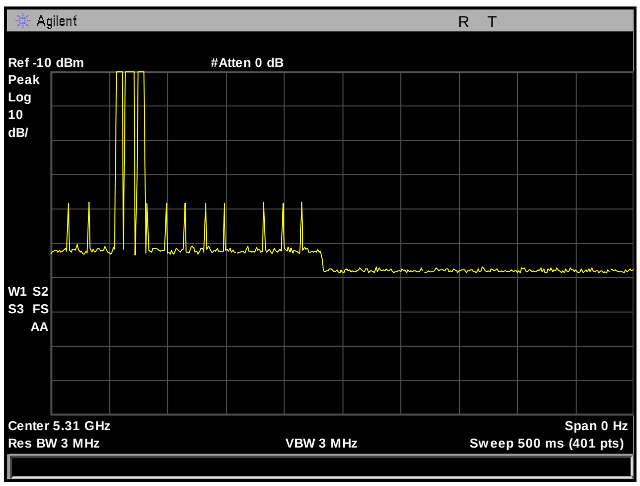
Test Engineer(s): Hadid Jones

Test Date(s): 12/11/15



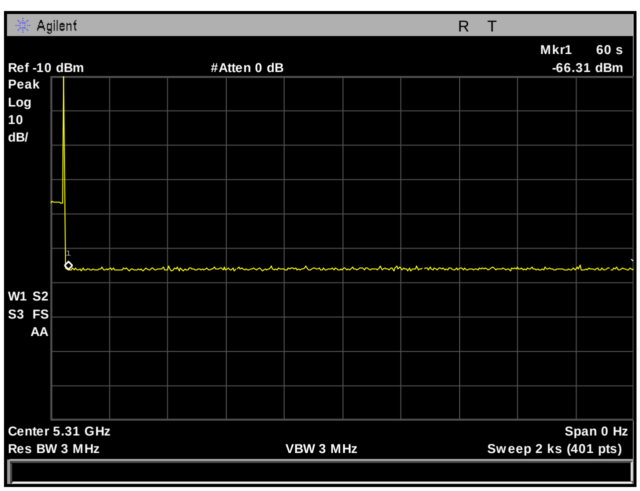
Plot 129. Channel Move Time, 40 MHz

Note: In the above graph the pulse was injected after ~3 seconds and the transmission moved in less than .5 seconds.



Plot 130. Channel Close Time, 40 MHz

Note: In the graph above the pulse was injected at ~50ms and the transmission stopped ~180ms thereafter.



Plot 131. Non-Occupancy Period, 40 MHz

D. UNII Detection Bandwidth

Test Requirement(s): **KDB 905462 §5.1** All BW modes must be tested.

§5.3 A minimum 100% detection rate is required across a EUT's 99% bandwidth.

Test Procedure: The EUT was set up as a standalone device (no associated Client or Master, as appropriate) and no traffic.

A single radar burst of type 0 and the center frequency was generated and the response of the EUT was noted. This was repeated for a minimum of 10 trials. The minimum percentage of detection was 90%, as per the KDB 905462.

Starting at the center frequency of the EUT operating Channel, the radar frequency was increased in 5 MHz steps, repeating the minimum of 10 trials, until the detection rate fell below the U-NII Detection Bandwidth criterion (90%). The measurement was repeated in 1MHz steps at frequencies 5 MHz below where the detection rate began to fall. The highest frequency (denoted as F_H) at which detection was greater or equal than the U-NII Detection Bandwidth criterion (90%) was recorded.

Starting at the center frequency of the EUT operating Channel, the radar frequency was decreased in 5 MHz steps, repeating the minimum of 10 trials, until the detection rate fell below the U-NII Detection Bandwidth criterion (90%). The measurement was repeated in 1MHz steps at frequencies 5 MHz below where the detection rate began to fall. The lowest frequency (denoted as F_L) at which detection was greater or equal than the U-NII Detection Bandwidth criterion (90%) was recorded.

The U-NII Detection Bandwidth was calculated as follow:

U-NII Detection Bandwidth = FH – FL

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

Test Engineer(s): Hadid Jones

Test Date(s): 12/10/15

EUT Frequency- 5500MHz											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5495	0	0	0	0	0	0	0	0	0	0	100
5496	1	1	1	1	1	1	1	1	1	1	100
5497	1	1	1	1	1	1	1	1	1	1	100
5498	1	1	1	1	1	1	1	1	1	1	100
5499	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5501	1	1	1	1	1	1	1	1	1	1	100
5502	1	1	1	1	1	1	1	1	1	1	100
5503	1	1	1	1	1	1	1	1	1	1	100
5504	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
											100%
Detection Bandwidth = f_h - f_l = 5505 MHz-5495MHz = 10MHz											
EUT 99% Bandwidth = 9.3MHz											

Table 18. Detection Bandwidth, 10 MHz

EUT Frequency- 5500MHz											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5490	0	0	0	0	0	0	0	0	0	0	-
5491	1	1	1	1	1	1	1	1	1	1	100
5492	1	1	1	1	1	1	1	1	1	1	100
5493	1	1	1	1	1	1	1	1	1	1	100
5494	1	1	1	1	1	1	1	1	1	1	100
5495	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
5506	1	1	1	1	1	1	1	1	1	1	100
5507	1	1	1	1	1	1	1	1	1	1	100
5508	1	1	1	1	1	1	1	1	1	1	100
5509	1	1	1	1	1	1	1	1	1	1	100
5510	0	0	0	0	0	0	0	0	0	0	-
											100%
Detection Bandwidth = f_h - f_l = 5509 MHz-5491MHz = 18MHz											
EUT 99% Bandwidth = 17.8MHz											

Table 19. Detection Bandwidth, 20 MHz

EUT Frequency- 5510MHz											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5491	0	0	0	0	0	0	0	0	0	0	
5492	1	1	1	1	1	1	1	1	1	1	
5493	1	1	1	1	1	1	1	1	1	1	
5494	1	1	1	1	1	1	1	1	1	1	
5495	1	1	1	1	1	1	1	1	1	1	
5500	1	1	1	1	1	1	1	1	1	1	
5505	1	1	1	1	1	1	1	1	1	1	
5510	1	1	1	1	1	1	1	1	1	1	
5515	1	1	1	1	1	1	1	1	1	1	
5520	1	1	1	1	1	1	1	1	1	1	
5525	1	1	1	1	1	1	1	1	1	1	
5526	1	1	1	1	1	1	1	1	1	1	
5527	1	1	1	1	1	1	1	1	1	1	
5528	1	1	1	1	1	1	1	1	1	1	
5529	0	0	0	0	0	0	0	0	0	0	
											100%
Detection Bandwidth = f_h - f_l = 5528MHz-5492MHz = 36MHz											
EUT 99% Bandwidth = 32.1MHz											

Table 20. Detection Bandwidth, 40 MHz

E. Statistical Performance Check

Test Requirements: **KDB 905462 §5.1** All BW modes must be tested.

KDB 905462: Each of the Radar Pulse types requires a minimum percentage of detections while the EUT is transmitting and listening for potential radar systems operating within the DFS Detection Bandwidth.
For Short Pulse Radar types the aggregate minimum percentage of detections is 80 percent.
Fort the Long Pulse Radar types the minimum percentage of detections is 80 percent.
For the Frequency Hopping Radar type the minimum percentage of detections is 70 percent.

Test Procedure: The EUT was setup as a Master device and associated with a Client device. A test file was streamed from the Master device to the Client device for the entire period of the test. The EUT was also set to a test mode as to demonstrate when the detection occurred without reseting the device between trials.
A Radar Burst of each type (1-6) with a level equal to the DFS Detection Threshold + 1 dB was used. The frequencies selected for the radar burst included several frequencies within the DFS Detection Bandwidth and frequencies near the edge of the bandwidth.
For Short Pulse Radar types, an observation of the EUT's transmission was made for duration greater than 10 seconds after the burst to ensure detection occurred.
For Long Pulse Radar types, an observation of the EUT's transmission was made for duration greater than 10 seconds after the burst to ensure detection occurred. Also, center frequencies for the 30 trials were randomly selected within 80% of the Occupied Bandwidth.
Once the performance check was completed, statistical data was gathered as to determine the ability of the EUT to detect radar waveforms. An aggregate total for the Short Pulse Radar detections was calculated.

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

Test Engineer(s): Hadid Jones

Test Date(s): 02/14/16

Statistical Performance Check, 10 MHz

Radar Type	Trial #	Pulses Repetition Frequency Number (1-23)	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (μsec)	Detection 1 = Yes, 0 = No
1	1	9	1139.0	878	1
	2	14	1567.4	638	1
	3	2	1792.1	558	1
	4	5	1165.5	858	1
	5	15	1253.1	798	1
	6	19	1519.8	658	1
	7	8	1432.7	698	1
	8	1	1730.1	578	1
	9	11	1618.1	618	1
	10	18	1319.3	758	1
	11	3	1858.7	538	1
	12	22	1222.5	818	1
	13	7	1193.3	838	1
	14	17	326.2	3066	1
	15	4	1355.0	738	1
	16	n/a	545.3	1834	1
	17	n/a	445.0	2247	1
	18	n/a	522.7	1913	1
	19	n/a	441.9	2263	1
	20	n/a	1455.6	687	1
	21	n/a	397.1	2518	1
	22	n/a	362.8	2756	1
	23	n/a	1572.3	636	1
	24	n/a	564.0	1773	1
	25	n/a	335.6	2980	1
	26	n/a	390.5	2561	1
	27	n/a	459.3	2177	1
	28	n/a	371.6	2691	1
	29	n/a	457.5	2186	1
	30	n/a	563.1	1776	1
Detection Percentage					100% (> 60%)
EUT Test Frequency					5500 MHz
Radar Frequency					5496 - 5504 MHz

Table 21. Statistical Performance Check, 10 MHz, Radar Type 1

Radar Type	Trial #	Pulse Width 1- 5 µsec	PRI 150-230 µsec	Number of Pulses 23-29	Detection 1 = Yes, 0 = No
2	1	2	171	24	1
	2	1.4	170	23	1
	3	2.9	174	26	1
	4	4.1	185	28	1
	5	3.6	187	27	1
	6	2.7	195	26	1
	7	2.4	203	25	1
	8	4.8	181	29	1
	9	1.4	213	23	1
	10	3.6	155	27	1
	11	1.1	180	23	1
	12	2	218	24	1
	13	2.3	226	25	1
	14	5	167	29	1
	15	3.7	217	27	1
	16	3.6	229	27	1
	17	2.1	211	24	1
	18	3.5	186	27	1
	19	3.8	161	27	1
	20	3.8	157	27	1
	21	4.8	193	29	1
	22	1.3	194	23	1
	23	1.6	177	24	1
	24	2.5	225	25	1
	25	4.2	230	28	1
	26	1.6	150	24	1
	27	4.2	206	28	1
	28	2.2	163	25	1
	29	4.3	158	28	1
	30	4.6	209	29	1
	Detection Percentage				**100% (> 60%)**
	EUT Test Frequency				**5500 MHz**
	Radar Frequency				**5496 - 5504 MHz**

Table 22. Statistical Performance Check, 10 MHz, Radar Type 2

Radar Type	Trial #	Pulse Width 6-10 µsec	PRI 200-500 µsec	Number of Pulses 16-18	Detection 1 = Yes, 0 = No
3	1	7	418	16	1
	2	6.4	308	16	1
	3	7.9	392	17	1
	4	9.1	478	18	1
	5	8.6	306	17	1
	6	7.7	235	17	1
	7	7.4	404	17	1
	8	9.8	435	18	1
	9	6.4	469	16	1
	10	8.6	461	17	1
	11	6.1	423	16	1
	12	7	428	16	1
	13	7.3	349	16	1
	14	10	348	18	1
	15	8.7	463	18	1
	16	8.6	380	17	1
	17	7.1	383	16	1
	18	8.5	249	17	1
	19	8.8	270	18	1
	20	8.8	210	18	1
	21	9.8	477	18	1
	22	6.3	389	16	1
	23	6.6	370	16	1
	24	7.5	449	17	1
	25	9.2	322	18	1
	26	6.6	361	16	1
	27	9.2	204	18	1
	28	7.2	395	16	1
	29	9.3	298	18	1
	30	9.6	236	18	1
	Detection Percentage				100% (> 60%)
	EUT Test Frequency				5500 MHz
	Radar Frequency				5496 - 5504 MHz

Table 23. Statistical Performance Check, 10 MHz, Radar Type 3

Radar Type	Trial #	Pulse Width 11-20 µsec	PRI 200-500 µsec	Number of Pulses 12-16	Detection 1 = Yes, 0 = No
4	1	13.2	418	13	1
	2	12	308	12	1
	3	15.2	392	14	1
	4	18	478	15	1
	5	16.9	306	15	1
	6	14.9	235	14	1
	7	14.2	404	13	1
	8	19.5	435	16	1
	9	11.9	469	12	1
	10	16.8	461	15	1
	11	11.2	423	12	1
	12	13.2	428	13	1
	13	13.9	349	13	1
	14	20	348	16	1
	15	17.2	463	15	1
	16	16.9	380	15	1
	17	13.5	383	13	1
	18	16.5	249	15	1
	19	17.4	270	15	1
	20	17.3	210	15	1
	21	19.6	477	16	1
	22	11.8	389	12	1
	23	12.4	370	12	1
	24	14.4	449	13	1
	25	18.2	322	15	1
	26	12.5	361	12	1
	27	18.2	204	15	1
	28	13.7	395	13	1
	29	18.4	298	16	1
	30	9.6	236	18	1
	Detection Percentage				100% (> 60%)
	EUT Test Frequency				5500 MHz
	Radar Frequency				5496 - 5504 MHz

Table 24. Statistical Performance Check, 10 MHz, Radar Type 4

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detections
1	30	30	100%
2	30	30	100%
3	30	30	100%
4	30	30	100%
Aggregate = (100% + 100% + 100% + 100%)/4 = 100%			

Table 25. Statistical Performance Check, 10 MHz, Aggregate

Radar Type	Trial #	Pulse Width (µsec) 50-100	PRI (µsec) 1000-2000	Number of Bursts 8-20	Detection 1 = Yes, 0 = No
5	1	11	1.0909091	12	1
	2	9	1.3333333	12	1
	3	14	0.8571429	12	1
	4	18	0.6666667	12	1
	5	16	0.75	12	1
	6	13	0.9230769	12	1
	7	12	1	12	1
	8	20	0.6	12	1
	9	9	1.3333333	12	1
	10	16	0.75	12	1
	11	8	1.5	12	1
	12	11	1.0909091	12	1
	13	12	1	12	1
	14	20	0.6	12	1
	15	16	0.75	12	1
	16	16	0.75	12	1
	17	11	1.0909091	12	1
	18	15	0.8	12	1
	19	17	0.7058824	12	1
	20	17	0.7058824	12	1
	21	20	0.6	12	1
	22	9	1.3333333	12	1
	23	10	1.2	12	1
	24	12	1	12	1
	25	18	0.6666667	12	1
	26	10	1.2	12	1
	27	18	0.6666667	12	1
	28	11	1.0909091	12	1
	29	18	0.6666667	12	1
	30	19	0.6315789	12	1
	Detection Percentage				**100% (> 80%)**
	EUT Test Frequency				**5500 MHz**
	Radar Frequency				**5496 - 5504 MHz**

Table 26. Statistical Performance Check, 10 MHz, Radar Type 5

Radar Type	Trial #	Frequency (MHz)	Pulses/Hop	Pulse Width (μsec)	PRI (μsec)	Detection 1 = Yes, 0 = No
6	1	5494-5526	9	1	333	1
	2	5494-5526	9	1	333	1
	3	5494-5526	9	1	333	1
	4	5494-5526	9	1	333	1
	5	5494-5526	9	1	333	1
	6	5494-5526	9	1	333	1
	7	5494-5526	9	1	333	1
	8	5494-5526	9	1	333	1
	9	5494-5526	9	1	333	1
	10	5494-5526	9	1	333	1
	11	5494-5526	9	1	333	1
	12	5494-5526	9	1	333	1
	13	5494-5526	9	1	333	1
	14	5494-5526	9	1	333	1
	15	5494-5526	9	1	333	1
	16	5494-5526	9	1	333	1
	17	5494-5526	9	1	333	1
	18	5494-5526	9	1	333	1
	19	5494-5526	9	1	333	1
	20	5494-5526	9	1	333	1
	21	5494-5526	9	1	333	1
	22	5494-5526	9	1	333	1
	23	5494-5526	9	1	333	1
	24	5494-5526	9	1	333	1
	25	5494-5526	9	1	333	1
	26	5494-5526	9	1	333	1
	27	5494-5526	9	1	333	1
	28	5494-5526	9	1	333	1
	29	5494-5526	9	1	333	1
	30	5494-5526	9	1	333	1
	Detection Percentage					**100% (> 70%)**
	EUT Test Frequency					**5500 MHz**
	Radar Frequency					**5496 - 5504 MHz**

Table 27. Statistical Performance Check, 10 MHz, Radar Type 6

Statistical Performance Check, 20 MHz

Radar Type	Trial #	Pulses Repetition Frequency Number (1-23)	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (μsec)	Detection 1 = Yes, 0 = No
1	1	9	1139.0	878	1
	2	14	1567.4	638	1
	3	2	1792.1	558	1
	4	5	1165.5	858	1
	5	15	1253.1	798	1
	6	19	1519.8	658	1
	7	8	1432.7	698	1
	8	1	1730.1	578	1
	9	11	1618.1	618	1
	10	18	1319.3	758	1
	11	3	1858.7	538	1
	12	22	1222.5	818	1
	13	7	1193.3	838	1
	14	17	326.2	3066	1
	15	4	1355.0	738	1
	16	n/a	545.3	1834	1
	17	n/a	445.0	2247	1
	18	n/a	522.7	1913	1
	19	n/a	441.9	2263	1
	20	n/a	1455.6	687	1
	21	n/a	397.1	2518	1
	22	n/a	362.8	2756	1
	23	n/a	1572.3	636	1
	24	n/a	564.0	1773	1
	25	n/a	335.6	2980	1
	26	n/a	390.5	2561	1
	27	n/a	459.3	2177	1
	28	n/a	371.6	2691	1
	29	n/a	457.5	2186	1
	30	n/a	563.1	1776	1
Detection Percentage					**100% (> 60%)**
EUT Test Frequency					**5500 MHz**
Radar Frequency					**5492 - 5508 MHz**

Table 28. Statistical Performance Check, 20 MHz, Radar Type 1

Radar Type	Trial #	Pulse Width 1- 5 µsec	PRI 150-230 µsec	Number of Pulses 23-29	Detection 1 = Yes, 0 = No
2	1	2	171	24	1
	2	1.4	170	23	1
	3	2.9	174	26	1
	4	4.1	185	28	1
	5	3.6	187	27	1
	6	2.7	195	26	1
	7	2.4	203	25	1
	8	4.8	181	29	1
	9	1.4	213	23	1
	10	3.6	155	27	1
	11	1.1	180	23	1
	12	2	218	24	1
	13	2.3	226	25	1
	14	5	167	29	1
	15	3.7	217	27	1
	16	3.6	229	27	1
	17	2.1	211	24	1
	18	3.5	186	27	1
	19	3.8	161	27	1
	20	3.8	157	27	1
	21	4.8	193	29	1
	22	1.3	194	23	1
	23	1.6	177	24	1
	24	2.5	225	25	1
	25	4.2	230	28	1
	26	1.6	150	24	1
	27	4.2	206	28	1
	28	2.2	163	25	1
	29	4.3	158	28	1
	30	4.6	209	29	1
	Detection Percentage				**100% (> 60%)**
	EUT Test Frequency				**5500 MHz**
	Radar Frequency				**5492 - 5508 MHz**

Table 29. Statistical Performance Check, 20 MHz, Radar Type 2

Radar Type	Trial #	Pulse Width 6-10 µsec	PRI 200-500 µsec	Number of Pulses 16-18	Detection 1 = Yes, 0 = No
3	1	7	418	16	1
	2	6.4	308	16	1
	3	7.9	392	17	1
	4	9.1	478	18	1
	5	8.6	306	17	1
	6	7.7	235	17	1
	7	7.4	404	17	1
	8	9.8	435	18	1
	9	6.4	469	16	1
	10	8.6	461	17	1
	11	6.1	423	16	1
	12	7	428	16	1
	13	7.3	349	16	1
	14	10	348	18	1
	15	8.7	463	18	1
	16	8.6	380	17	1
	17	7.1	383	16	1
	18	8.5	249	17	1
	19	8.8	270	18	1
	20	8.8	210	18	1
	21	9.8	477	18	1
	22	6.3	389	16	1
	23	6.6	370	16	1
	24	7.5	449	17	1
	25	9.2	322	18	1
	26	6.6	361	16	1
	27	9.2	204	18	1
	28	7.2	395	16	1
	29	9.3	298	18	1
	30	9.6	236	18	1
	Detection Percentage				100% (> 60%)
	EUT Test Frequency				5500 MHz
	Radar Frequency				5492 - 5508 MHz

Table 30. Statistical Performance Check, 20 MHz, Radar Type 3

Radar Type	Trial #	Pulse Width 11-20 µsec	PRI 200-500 µsec	Number of Pulses 12-16	Detection 1 = Yes, 0 = No
4	1	13.2	418	13	1
	2	12	308	12	1
	3	15.2	392	14	1
	4	18	478	15	1
	5	16.9	306	15	1
	6	14.9	235	14	1
	7	14.2	404	13	1
	8	19.5	435	16	1
	9	11.9	469	12	1
	10	16.8	461	15	1
	11	11.2	423	12	1
	12	13.2	428	13	1
	13	13.9	349	13	1
	14	20	348	16	1
	15	17.2	463	15	1
	16	16.9	380	15	1
	17	13.5	383	13	1
	18	16.5	249	15	1
	19	17.4	270	15	1
	20	17.3	210	15	1
	21	19.6	477	16	1
	22	11.8	389	12	1
	23	12.4	370	12	1
	24	14.4	449	13	1
	25	18.2	322	15	1
	26	12.5	361	12	1
	27	18.2	204	15	1
	28	13.7	395	13	1
	29	18.4	298	16	1
	30	9.6	236	18	1
	Detection Percentage				**100% (> 60%)**
	EUT Test Frequency				**5500 MHz**
	Radar Frequency				**5492 - 5508 MHz**

Table 31. Statistical Performance Check, 20 MHz, Radar Type 4

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detections
1	30	30	100%
2	30	30	100%
3	30	30	100%
4	30	30	100%
Aggregate = (100% + 100% + 100% + 100%)/4 = 100%			

Table 32. Statistical Performance Check, 20 MHz, Radar Type 5, Aggregate

Radar Type	Trial #	Pulse Width (µsec) 50-100	PRI (µsec) 1000-2000	Number of Bursts 8-20	Detection 1 = Yes, 0 = No
5	1	11	1.0909091	12	1
	2	9	1.3333333	12	1
	3	14	0.8571429	12	1
	4	18	0.6666667	12	1
	5	16	0.75	12	1
	6	13	0.9230769	12	1
	7	12	1	12	1
	8	20	0.6	12	1
	9	9	1.3333333	12	1
	10	16	0.75	12	1
	11	8	1.5	12	1
	12	11	1.0909091	12	1
	13	12	1	12	1
	14	20	0.6	12	1
	15	16	0.75	12	1
	16	16	0.75	12	1
	17	11	1.0909091	12	1
	18	15	0.8	12	1
	19	17	0.7058824	12	1
	20	17	0.7058824	12	1
	21	20	0.6	12	1
	22	9	1.3333333	12	1
	23	10	1.2	12	1
	24	12	1	12	1
	25	18	0.6666667	12	1
	26	10	1.2	12	1
	27	18	0.6666667	12	1
	28	11	1.0909091	12	1
	29	18	0.6666667	12	1
	30	19	0.6315789	12	1
	Detection Percentage				**100% (> 80%)**
	EUT Test Frequency				**5500 MHz**
	Radar Frequency				**5492 - 5508 MHz**

Table 33. Statistical Performance Check, 20 MHz, Radar Type 5

Radar Type	Trial #	Frequency (MHz)	Pulses/Hop	Pulse Width (µsec)	PRI (µsec)	Detection 1 = Yes, 0 = No
6	1	5494-5526	9	1	333	1
	2	5494-5526	9	1	333	1
	3	5494-5526	9	1	333	1
	4	5494-5526	9	1	333	1
	5	5494-5526	9	1	333	1
	6	5494-5526	9	1	333	1
	7	5494-5526	9	1	333	1
	8	5494-5526	9	1	333	1
	9	5494-5526	9	1	333	1
	10	5494-5526	9	1	333	1
	11	5494-5526	9	1	333	1
	12	5494-5526	9	1	333	1
	13	5494-5526	9	1	333	1
	14	5494-5526	9	1	333	1
	15	5494-5526	9	1	333	1
	16	5494-5526	9	1	333	1
	17	5494-5526	9	1	333	1
	18	5494-5526	9	1	333	1
	19	5494-5526	9	1	333	1
	20	5494-5526	9	1	333	1
	21	5494-5526	9	1	333	1
	22	5494-5526	9	1	333	1
	23	5494-5526	9	1	333	1
	24	5494-5526	9	1	333	1
	25	5494-5526	9	1	333	1
	26	5494-5526	9	1	333	1
	27	5494-5526	9	1	333	1
	28	5494-5526	9	1	333	1
	29	5494-5526	9	1	333	1
	30	5494-5526	9	1	333	1
	Detection Percentage					**100% (> 70%)**
	EUT Test Frequency					**5500 MHz**
	Radar Frequency					**5492 - 5508 MHz**

Table 34. Statistical Performance Check, 20 MHz, Radar Type 6

Statistical Performance Check, 40 MHz

Radar Type	Trial #	Pulses Repetition Frequency Number (1-23)	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (μsec)	Detection 1 = Yes, 0 = No
1	1	9	1139.0	878	1
	2	14	1567.4	638	1
	3	2	1792.1	558	1
	4	5	1165.5	858	1
	5	15	1253.1	798	1
	6	19	1519.8	658	1
	7	8	1432.7	698	1
	8	1	1730.1	578	1
	9	11	1618.1	618	1
	10	18	1319.3	758	1
	11	3	1858.7	538	1
	12	22	1222.5	818	1
	13	7	1193.3	838	1
	14	17	326.2	3066	1
	15	4	1355.0	738	1
	16	n/a	545.3	1834	1
	17	n/a	445.0	2247	1
	18	n/a	522.7	1913	1
	19	n/a	441.9	2263	1
	20	n/a	1455.6	687	1
	21	n/a	397.1	2518	1
	22	n/a	362.8	2756	1
	23	n/a	1572.3	636	1
	24	n/a	564.0	1773	1
	25	n/a	335.6	2980	1
	26	n/a	390.5	2561	1
	27	n/a	459.3	2177	1
	28	n/a	371.6	2691	1
	29	n/a	457.5	2186	1
	30	n/a	563.1	1776	1
Detection Percentage					**100% (> 60%)**
EUT Test Frequency					**5510 MHz**
Radar Frequency					**5497 - 5523 MHz**

Table 35. Statistical Performance Check, 40 MHz, Radar Type 1

Radar Type	Trial #	Pulse Width 1- 5 µsec	PRI 150-230 µsec	Number of Pulses 23-29	Detection 1 = Yes, 0 = No
2	1	2	171	24	1
	2	1.4	170	23	1
	3	2.9	174	26	1
	4	4.1	185	28	1
	5	3.6	187	27	1
	6	2.7	195	26	1
	7	2.4	203	25	1
	8	4.8	181	29	1
	9	1.4	213	23	1
	10	3.6	155	27	1
	11	1.1	180	23	1
	12	2	218	24	1
	13	2.3	226	25	1
	14	5	167	29	1
	15	3.7	217	27	1
	16	3.6	229	27	1
	17	2.1	211	24	1
	18	3.5	186	27	1
	19	3.8	161	27	1
	20	3.8	157	27	1
	21	4.8	193	29	1
	22	1.3	194	23	1
	23	1.6	177	24	1
	24	2.5	225	25	1
	25	4.2	230	28	1
	26	1.6	150	24	1
	27	4.2	206	28	1
	28	2.2	163	25	1
	29	4.3	158	28	1
	30	4.6	209	29	1
	Detection Percentage				**100% (> 60%)**
	EUT Test Frequency				**5510 MHz**
	Radar Frequency				**5497 - 5523 MHz**

Table 36. Statistical Performance Check, 40 MHz, Radar Type 2

Radar Type	Trial #	Pulse Width 6-10 µsec	PRI 200-500 µsec	Number of Pulses 16-18	Detection 1 = Yes, 0 = No
3	1	7	418	16	1
	2	6.4	308	16	1
	3	7.9	392	17	1
	4	9.1	478	18	1
	5	8.6	306	17	1
	6	7.7	235	17	1
	7	7.4	404	17	1
	8	9.8	435	18	1
	9	6.4	469	16	1
	10	8.6	461	17	1
	11	6.1	423	16	1
	12	7	428	16	1
	13	7.3	349	16	1
	14	10	348	18	1
	15	8.7	463	18	1
	16	8.6	380	17	1
	17	7.1	383	16	1
	18	8.5	249	17	1
	19	8.8	270	18	1
	20	8.8	210	18	1
	21	9.8	477	18	1
	22	6.3	389	16	1
	23	6.6	370	16	1
	24	7.5	449	17	1
	25	9.2	322	18	1
	26	6.6	361	16	1
	27	9.2	204	18	1
	28	7.2	395	16	1
	29	9.3	298	18	1
	30	9.6	236	18	1
	Detection Percentage				100% (> 60%)
	EUT Test Frequency				5510 MHz
	Radar Frequency				5497 - 5523 MHz

Table 37. Statistical Performance Check, 40 MHz, Radar Type 3

Radar Type	Trial #	Pulse Width 11-20 µsec	PRI 200-500 µsec	Number of Pulses 12-16	Detection 1 = Yes, 0 = No
4	1	13.2	418	13	1
	2	12	308	12	1
	3	15.2	392	14	1
	4	18	478	15	1
	5	16.9	306	15	1
	6	14.9	235	14	1
	7	14.2	404	13	1
	8	19.5	435	16	1
	9	11.9	469	12	1
	10	16.8	461	15	1
	11	11.2	423	12	1
	12	13.2	428	13	1
	13	13.9	349	13	1
	14	20	348	16	1
	15	17.2	463	15	1
	16	16.9	380	15	1
	17	13.5	383	13	1
	18	16.5	249	15	1
	19	17.4	270	15	1
	20	17.3	210	15	1
	21	19.6	477	16	1
	22	11.8	389	12	1
	23	12.4	370	12	1
	24	14.4	449	13	1
	25	18.2	322	15	1
	26	12.5	361	12	1
	27	18.2	204	15	1
	28	13.7	395	13	1
	29	18.4	298	16	1
	30	9.6	236	18	1
	Detection Percentage				100% (> 60%)
	EUT Test Frequency				5510 MHz
	Radar Frequency				5497 - 5523 MHz

Table 38. Statistical Performance Check, 40 MHz, Radar Type 4

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detections
1	30	30	100%
2	30	30	100%
3	30	30	100%
4	30	30	100%
Aggregate = (100% + 100% + 100% + 100%)/4 = 100%			

Table 39. Statistical Performance Check, 40 MHz, Radar Type 5, Aggregate

Radar Type	Trial #	Pulse Width (μsec) 50-100	PRI (μsec) 1000-2000	Number of Bursts 8-20	Detection 1 = Yes, 0 = No
5	1	11	1.0909091	12	1
	2	9	1.3333333	12	1
	3	14	0.8571429	12	1
	4	18	0.6666667	12	1
	5	16	0.75	12	1
	6	13	0.9230769	12	1
	7	12	1	12	1
	8	20	0.6	12	1
	9	9	1.3333333	12	1
	10	16	0.75	12	1
	11	8	1.5	12	1
	12	11	1.0909091	12	1
	13	12	1	12	1
	14	20	0.6	12	1
	15	16	0.75	12	1
	16	16	0.75	12	1
	17	11	1.0909091	12	1
	18	15	0.8	12	1
	19	17	0.7058824	12	1
	20	17	0.7058824	12	1
	21	20	0.6	12	1
	22	9	1.3333333	12	1
	23	10	1.2	12	1
	24	12	1	12	1
	25	18	0.6666667	12	1
	26	10	1.2	12	1
	27	18	0.6666667	12	1
	28	11	1.0909091	12	1
	29	18	0.6666667	12	1
	30	19	0.6315789	12	1
	Detection Percentage				**100% (> 80%)**
	EUT Test Frequency				**5510 MHz**
	Radar Frequency				**5497 - 5523 MHz**

Table 40. Statistical Performance Check, 40 MHz, Radar Type 5

Radar Type	Trial #	Frequency (MHz)	Pulses/Hop	Pulse Width (µsec)	PRI (µsec)	Detection 1 = Yes, 0 = No
6	1	5494-5526	9	1	333	1
	2	5494-5526	9	1	333	1
	3	5494-5526	9	1	333	1
	4	5494-5526	9	1	333	1
	5	5494-5526	9	1	333	1
	6	5494-5526	9	1	333	1
	7	5494-5526	9	1	333	1
	8	5494-5526	9	1	333	1
	9	5494-5526	9	1	333	1
	10	5494-5526	9	1	333	1
	11	5494-5526	9	1	333	1
	12	5494-5526	9	1	333	1
	13	5494-5526	9	1	333	1
	14	5494-5526	9	1	333	1
	15	5494-5526	9	1	333	1
	16	5494-5526	9	1	333	1
	17	5494-5526	9	1	333	1
	18	5494-5526	9	1	333	1
	19	5494-5526	9	1	333	1
	20	5494-5526	9	1	333	1
	21	5494-5526	9	1	333	1
	22	5494-5526	9	1	333	1
	23	5494-5526	9	1	333	1
	24	5494-5526	9	1	333	1
	25	5494-5526	9	1	333	1
	26	5494-5526	9	1	333	1
	27	5494-5526	9	1	333	1
	28	5494-5526	9	1	333	1
	29	5494-5526	9	1	333	1
	30	5494-5526	9	1	333	1
	Detection Percentage					100% (> 60%)
	EUT Test Frequency					5510 MHz
	Radar Frequency					5497 - 5523 MHz

Table 41. Statistical Performance Check, 40 MHz, Radar Type 6

VI. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

MET ASSET #	EQUIPMENT	MANUFACTURER	MODEL	LAST CAL DATE	CAL DUE DATE
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	09/01/2015	03/01/2017
1T4871	VECTOR SIGNAL GENERATOR	AGILENT TECHNOLOGIES	N5172B	02/03/2016	08/03/2017
1T8818	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	12/16/2015	12/16/2016
1T4300B	SEMI-ANECHOIC 3M CHAMBER # 1 D (2043A-1) (IC)	EMC TEST SYSTEMS	NONE	01/11/2015	01/11/2018
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	10/29/2014	10/29/2016
1T4753	ANTENNA - BILOG	SUNOL SCIENCES	JB6	03/09/2015	09/09/2016
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	10/08/2015	04/08/2017
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	11/25/2014	05/25/2016

Table 42. Test Equipment List

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

VII. 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.

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[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.