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March 3, 2015

Ubiquiti Networks  
1250 S. Grove Ave., Suite 100  
Barrington, IL 60010

Dear Alexandros Pavlos,

Enclosed is the EMC Wireless test report for compliance testing of the Ubiquiti Networks, AF-5X as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15, Subpart B for Unintentional Radiators and Part 15.407 for Intentional Radiators.

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: (\Ubiquiti Networks\EMC84027-FCC407 UNII 2 Rev. 4)

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### **Electromagnetic Compatibility Criteria Test Report**

for the

**Ubiquiti Networks  
Model AF-5X**

**Tested under**  
the FCC Certification Rules  
contained in  
Title 47 of the CFR, Parts 15 Subpart B  
for Class B Digital Devices  
&  
FCC Part 15.407 for Intentional Radiators

**MET Report: EMC84027-FCC407 UNII 2 Rev. 4**

March 3, 2015

**Prepared For:**

**Ubiquiti Networks  
1250 S. Grove Ave., Suite 100  
Barrington, IL 60010**

**Prepared By:**  
**MET Laboratories, Inc.**  
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Baltimore, MD 21230

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&  
FCC Part 15.407 for Intentional Radiators



Jason Allnutt, 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 Parts 15B, 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
∅	January 23, 2015	Initial Issue.
1	January 26, 2015	Revised to add customer information.
2	February 4, 2015	Revised to reflect model change.
3	March 2, 2015	Revised to add 23 dBi antenna information.
4	March 3, 2015	Editorial correction.

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## List of Terms and Abbreviations

<b>AC</b>	<b>Alternating Current</b>
<b>ACF</b>	<b>Antenna Correction Factor</b>
<b>Cal</b>	<b>Calibration</b>
<i>d</i>	<b>Measurement Distance</b>
<b>dB</b>	<b>Decibels</b>
<b>dB<math>\mu</math>A</b>	<b>Decibels above one microamp</b>
<b>dB<math>\mu</math>V</b>	<b>Decibels above one microvolt</b>
<b>dB<math>\mu</math>A/m</b>	<b>Decibels above one microamp per meter</b>
<b>dB<math>\mu</math>V/m</b>	<b>Decibels above one microvolt per meter</b>
<b>DC</b>	<b>Direct Current</b>
<b>E</b>	<b>Electric Field</b>
<b>DSL</b>	<b>Digital Subscriber Line</b>
<b>ESD</b>	<b>Electrostatic Discharge</b>
<b>EUT</b>	<b>Equipment Under Test</b>
<i>f</i>	<b>Frequency</b>
<b>FCC</b>	<b>Federal Communications Commission</b>
<b>GRP</b>	<b>Ground Reference Plane</b>
<b>H</b>	<b>Magnetic Field</b>
<b>HCP</b>	<b>Horizontal Coupling Plane</b>
<b>Hz</b>	<b>Hertz</b>
<b>IEC</b>	<b>International Electrotechnical Commission</b>
<b>kHz</b>	<b>kilohertz</b>
<b>kPa</b>	<b>kilopascal</b>
<b>kV</b>	<b>kilovolt</b>
<b>LISN</b>	<b>Line Impedance Stabilization Network</b>
<b>MHz</b>	<b>Megahertz</b>
<b><math>\mu</math>H</b>	<b>microhenry</b>
<b><math>\mu</math></b>	<b>microfarad</b>
<b><math>\mu</math>s</b>	<b>microseconds</b>
<b>PRF</b>	<b>Pulse Repetition Frequency</b>
<b>RF</b>	<b>Radio Frequency</b>
<b>RMS</b>	<b>Root-Mean-Square</b>
<b>TWT</b>	<b>Traveling Wave Tube</b>
<b>V/m</b>	<b>Volts per meter</b>
<b>VCP</b>	<b>Vertical Coupling Plane</b>

# I. Executive Summary

## A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Ubiquiti Networks AF-5X, 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 AF-5X. Ubiquiti Networks should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the AF-5X, 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 Ubiquiti Networks, purchase order number US100789. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	Description	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant
§15.203	Antenna Requirements	Compliant
§15.207	AC Conducted Emissions 150KHz – 30MHz	Compliant
§15.403 (i)	26dB Occupied Bandwidth	Compliant
§15.407 (a)(2)	Conducted Transmitter Output Power	Compliant
§15.407 (a)(2)	Power Spectral Density	Compliant
§15.407 (b)(2), (3), (7)	Undesirable Emissions (15.205/15.209 - General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Compliant
§15.407(f)	RF Exposure	Compliant
§15.407(g)	Frequency Stability	Not Applicable
15.407 (h)(2)(ii)	Initial Channel Availability Check Time	Compliant
15.407 (h)	DFS Bandwidth	Compliant
15.407 (h)(2)(ii)	Radar Burst at the Beginning of Channel Availability Check Time	Compliant
15.407 (h)(2)(ii)	Radar Burst at the End of Channel Availability Check Time	Compliant
15.407 (h)(2)(iii)	Channel Move Time and Channel Closing Time	Compliant
15.407 (h)(2)(iv)	Non-Occupancy Period	Compliant
15.407 (h)(2)	Statistical Performance Check	Compliant

**Table 1. Executive Summary of EMC Part 15.407 Compliance Testing**

## **II. Equipment Configuration**

## A. Overview

MET Laboratories, Inc. was contracted by Ubiquiti Networks to perform testing on the AF-5X, under Ubiquiti Networks's purchase order number US100789.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Ubiquiti Networks AF-5X.

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

<b>Model(s) Tested:</b>	AF-5X	
<b>Model(s) Covered:</b>	AF-5X	
<b>EUT Specifications:</b>	Primary Power: 120 VAC, 60 Hz	
	FCC ID: SWX-AF5X	
	Type of Modulations:	OFDM
	Equipment Code:	NII
	Max RF Output Power:	6.90 dBm
	EUT Frequency Ranges:	5255 – 5342 MHz 5475 – 5720 MHz
<b>Analysis:</b>	The results obtained relate only to the item(s) tested.	
<b>Environmental Test Conditions:</b>	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
<b>Evaluated by:</b>	Jason Allnut	
<b>Report Date(s):</b>	March 3, 2015	

**Table 2. EUT Summary**

## B. References

<b>CFR 47, Part 15, Subpart B</b>	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
<b>CFR 47, Part 15, Subpart E</b>	Unlicensed National Information Infrastructure Devices (UNII)
<b>ANSI C63.4:2003</b>	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
<b>ISO/IEC 17025:2005</b>	General Requirements for the Competence of Testing and Calibration Laboratories
<b>ANSI C63.10-2009</b>	American National Standard for Testing Unlicensed Wireless Devices

**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 Ubiquiti Networks AF-5X, Equipment Under Test (EUT), is a 5.1GHz, 5.2GHz, 5.4GHz and 5.8GHz Point-to-Point radio that uses OFDM MIMO Uncorrelated Cross-Polarized communication with a 50MHz/40MHz/30MHz/20MHz/10MHz bandwidth configuration. The EUT would be used outdoors and pole mounted. It is powered from a PoE adapter. The reverse-polarized connectorized has the ability when professionally installed by a user with cross-polarized antennas. This is the only matter that would be able to create a functional link to work.

## E. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length as tested (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	Management Port	RJ45 Ethernet	1	2	Yes	--
2	Data Port	RJ45 Ethernet	1	2	Yes	--
3	RP sma CH0	RF coax	1	2	Yes	--
4	RP sma CH1	RF coax	1	2	Yes	--

**Table 4. Ports and Cabling Information**

## **F. Mode of Operation**

Using internal test modes only for testing purposes the radio is set up in a continuous transmit mode. This allows for frequency, power, and channel bandwidth to be adjusted for measurement purposes. Scripts and specific command line commands are used to manipulate the radio in test mode.

## **G. Method of Monitoring EUT Operation**

1. A blinking green “Data” LED will indicate error-free data is being transferred on the test cable.
2. Any other LED status besides the blinking green LED (i.e. LED light off, etc) will indicate error-free data is not being transferred on the test cable.

## **H. 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.

## **I. Disposition of EUT**

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



### **III. Electromagnetic Compatibility Criteria for Unintentional Radiators**

## Electromagnetic Compatibility Criteria

### § 15.107 Conducted Emissions Limits

**Test Requirement(s):** **15.107 (a)** Except for Class A digital devices, for equipment 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 30 MHz shall not exceed the limits in Table 5. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

**15.107 (b)** For a Class A digital device 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 30 MHz shall not exceed the limits in Table 5. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

Frequency range (MHz)	Class A Conducted Limits (dB $\mu$ V)		*Class B Conducted Limits (dB $\mu$ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50

Note 1 — The lower limit shall apply at the transition frequencies.  
Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.

**Table 5. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b)**

**Test Procedures:** The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a screen room. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50 $\Omega$ /50 $\mu$ H LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate.

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

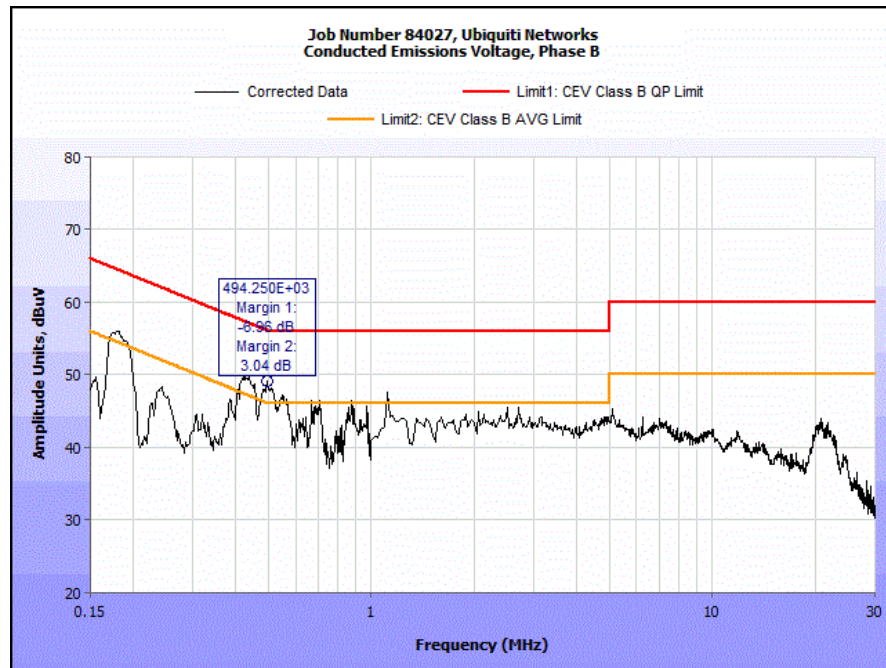
**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 11/03/14

**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) Avg.	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) Avg.	Limit (dBμV) Avg.	Margin (dB) Avg.
0.1714	51.87	0	51.87	79	-27.13	34.77	0	34.77	66	-31.23
0.2351	45.24	0	45.24	79	-33.76	31.46	0	31.46	66	-34.54
0.4445	38.33	0	38.33	79	-40.67	28.06	0	28.06	66	-37.94
1.079	31.86	0	31.86	73	-41.14	20.43	0	20.43	60	-39.57
2.71	40.21	0	40.21	73	-32.79	29.36	0	29.36	60	-30.64
3.136	40.92	0	40.92	73	-32.08	31.04	0	31.04	60	-28.96

**Table 6. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)**

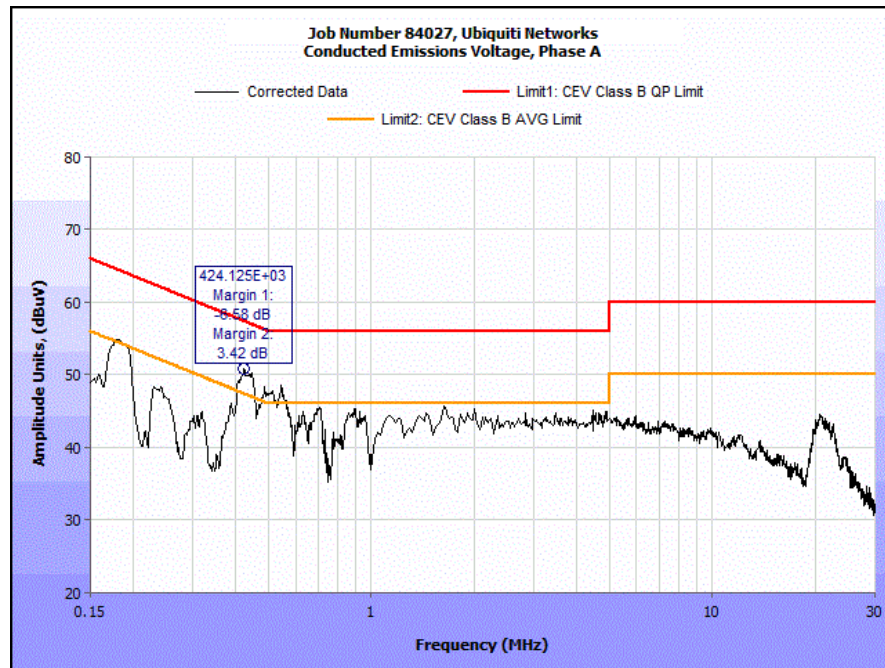


**Plot 1. Conducted Emissions, Phase Line**

### 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) Avg.	Margin (dB) QP	Uncorrected Meter Reading (dBμV) Avg.	Cable Loss (dB)	Corrected Measurement (dBμV) Avg.	Limit (dBμV) Avg.	Margin (dB) Avg.
0.174	51.26	0	51.26	79	-27.74	51.8	0	51.8	66	-14.2
0.2249	44.72	0	44.72	79	-34.28	31.78	0	31.78	66	-34.22
0.4621	41.73	0	41.73	79	-37.27	35.8	0	35.8	66	-30.2
2.8	37.3	0	37.3	73	-35.7	28.93	0	28.93	60	-31.07
4.335	32.67	0	32.67	73	-40.33	32.9	0	32.9	60	-27.1
5.955	30	0.17	30.17	73	-42.83	23	0.17	23.17	60	-36.83

Table 7. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 2. Conducted Emissions, Neutral Line

## Radiated Emission Limits

### § 15.109 Radiated Emissions Limits

**Test Requirement(s):** **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 8.

**15.109 (b)** The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 8.

Frequency (MHz)	Field Strength (dB $\mu$ V/m)	
	§15.109 (b), Class A Limit (dB $\mu$ V) @ 10m	§15.109 (a), Class B Limit (dB $\mu$ V) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

**Table 8. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)**

**Test Procedures:** The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

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

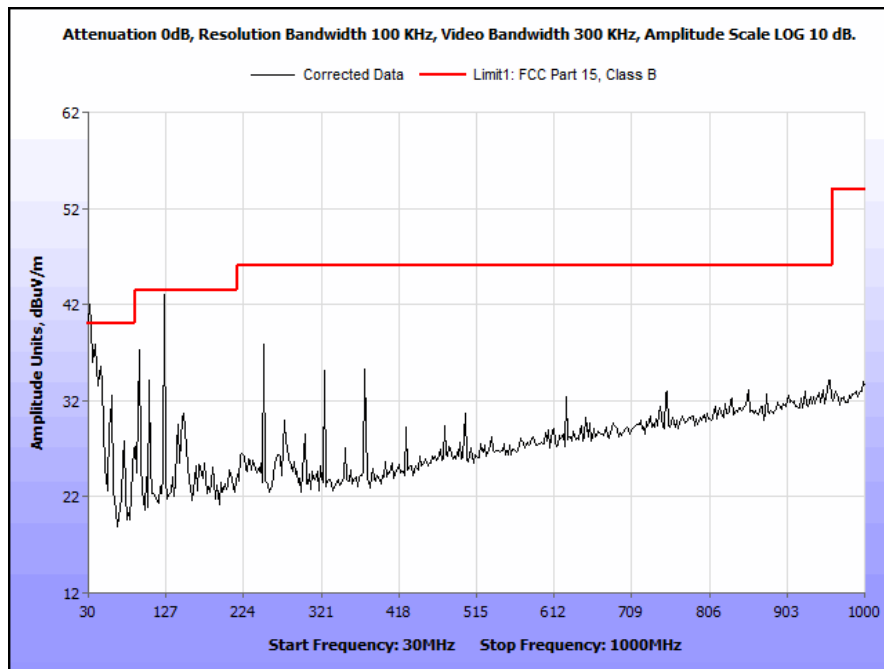
**Test Engineer(s):** Surinder Singh

**Test Date(s):** 10/29/14

### Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected Amplitude (dBμV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
42.56	26	H	1.26	42.00	12.66	-20.68	0.00	33.98	40.00	-6.02
42.56	345	V	1.45	41.29	12.66	-20.68	0.00	33.27	40.00	-6.73
95.2	12	H	1.44	38.96	8.86	-20.15	0.00	27.67	43.50	-15.83
95.2	19	V	1.55	40.28	8.86	-20.15	0.00	28.99	43.50	-14.51
126.28	15	H	1.67	36.49	14.27	-20.23	0.00	30.53	43.50	-12.97
126.28	358	V	1.51	38.53	14.27	-20.23	0.00	32.57	43.50	-10.93
249.45	8	H	1.74	34.08	12.11	-19.74	0.00	26.45	46.00	-19.55
249.45	348	V	1.63	35.68	12.11	-19.74	0.00	28.05	46.00	-17.95
375.49	22	H	1.26	26.45	15.71	-19.33	0.00	22.83	46.00	-23.17
375.49	4	V	1.36	25.88	15.71	-19.33	0.00	22.26	46.00	-23.74
626.54	355	H	1.61	24.12	19.86	-19.72	0.00	24.26	46.00	-21.74
626.54	16	V	1.52	21.45	19.86	-19.72	0.00	21.59	46.00	-24.41

Table 9. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz



Plot 3. Radiated Emissions, Pre-Scan, 30 MHz – 1 GHz

## **IV. 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 with the criteria of §15.203 as the antenna is professionally installed. The device was tested with two antennas. The gains of the antennas are 23 dBi, 29 dBi and 34 dBi. They are used for point-to-point applications only.

**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 12/01/14



## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.207 Conducted Emissions Limits

**Test Requirement(s):** § 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  $\mu$ H/50  $\Sigma$  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 (dB $\mu$ V)	
	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 0.8 m-high wooden 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  $\Omega$ /50  $\mu$ H 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 C63.4-2003 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50  $\Omega$ /50  $\mu$ H LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

**Test Results:** The EUT was compliant with this requirement.

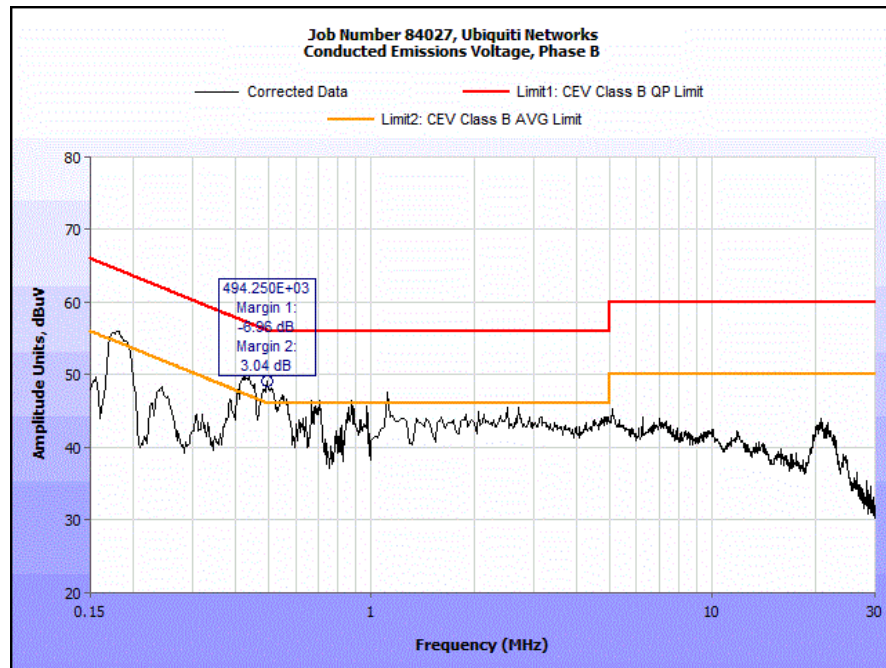
**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 11/03/14

**Conducted Emissions 15.207(a) - 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.
0.1714	51.87	0	51.87	79	-27.13	34.77	0	34.77	66	-31.23
0.2351	45.24	0	45.24	79	-33.76	31.46	0	31.46	66	-34.54
0.4445	38.33	0	38.33	79	-40.67	28.06	0	28.06	66	-37.94
1.079	31.86	0	31.86	73	-41.14	20.43	0	20.43	60	-39.57
2.71	40.21	0	40.21	73	-32.79	29.36	0	29.36	60	-30.64
3.136	40.92	0	40.92	73	-32.08	31.04	0	31.04	60	-28.96

**Table 11. Conducted Emissions - Voltage, AC Power, 15.207(a), Phase Line (120 VAC, 60 Hz)**

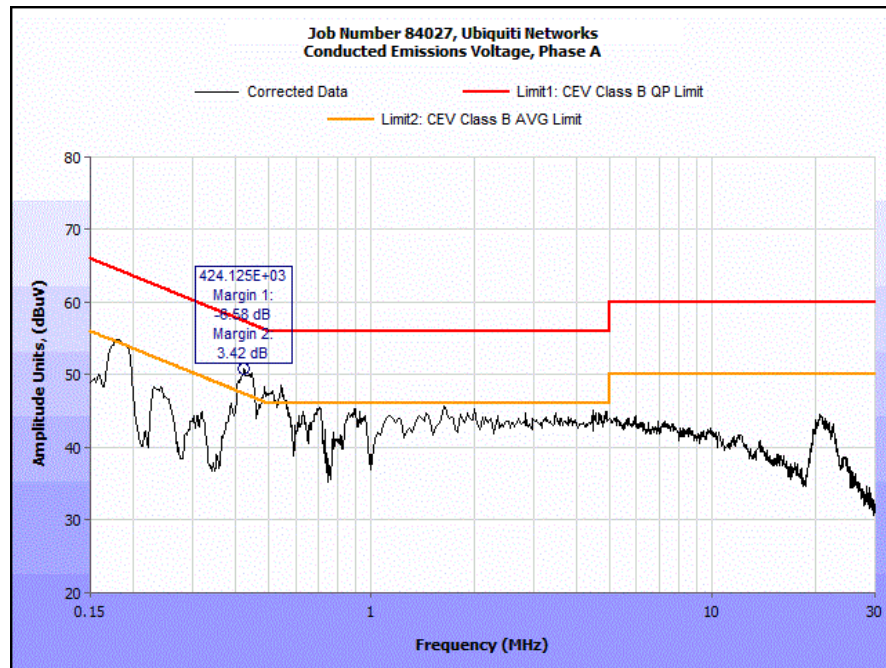


**Plot 4. Conducted Emissions, 15.207(a), Phase Line**

**Conducted Emissions 15.207(a) - 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.
0.174	51.26	0	51.26	79	-27.74	51.8	0	51.8	66	-14.2
0.2249	44.72	0	44.72	79	-34.28	31.78	0	31.78	66	-34.22
0.4621	41.73	0	41.73	79	-37.27	35.8	0	35.8	66	-30.2
2.8	37.3	0	37.3	73	-35.7	28.93	0	28.93	60	-31.07
4.335	32.67	0	32.67	73	-40.33	32.9	0	32.9	60	-27.1
5.955	30	0.17	30.17	73	-42.83	23	0.17	23.17	60	-36.83

**Table 12. Conducted Emissions - Voltage, AC Power, 15.207(a), Neutral Line (120 VAC, 60 Hz)**



**Plot 5. Conducted Emissions, 15.207(a), Neutral Line**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.403(c) 26dB Bandwidth

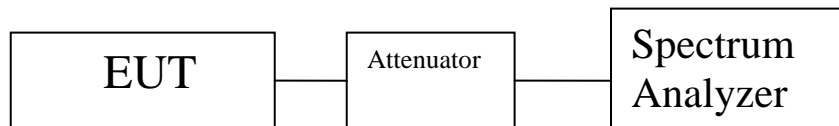
**Test Requirements:** § 15.403 (i): For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of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

**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 01/15/15



**Figure 1. Occupied Bandwidth, Test Setup**

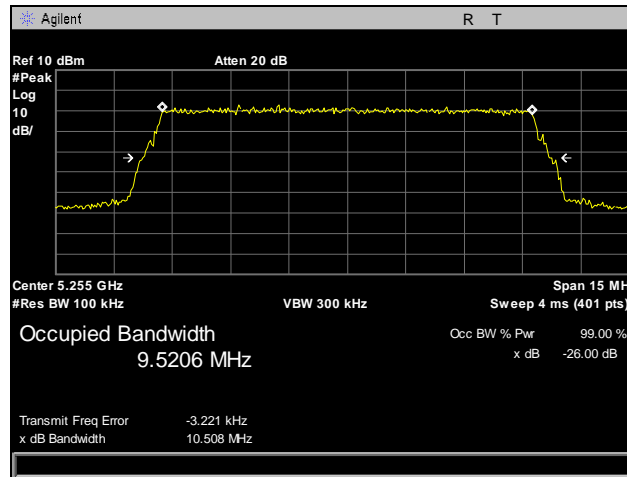
	Frequency (MHz)	26 dB Occupied Bandwidth
Antenna 0, 10 MHz	5255	10.508
	5300	10.626
	5342	10.495
Antenna 1, 10 MHz	5255	10.566
	5300	10.558
	5342	10.672
Antenna 0, 20 MHz	5260	21.406
	5300	21.301
	5338	21.352
Antenna 1, 20 MHz	5260	21.510
	5300	21.367
	5338	21.310
Antenna 0, 30 MHz	5265	31.750
	5300	31.812
	5333	31.792
Antenna 1, 30 MHz	5265	31.950
	5300	32.048
	5333	32.156
Antenna 0, 40 MHz	5270	42.379
	5300	42.916
	5328	42.620
Antenna 1, 40 MHz	5270	42.596
	5300	42.561
	5328	42.339
Antenna 0, 50 MHz	5275	54.018
	5300	54.063
	5322	53.804
Antenna 1, 50 MHz	5275	53.998
	5300	53.969
	5322	54.316

**Table 13. 26 dB Occupied Bandwidth, Test Results, Lower Band**

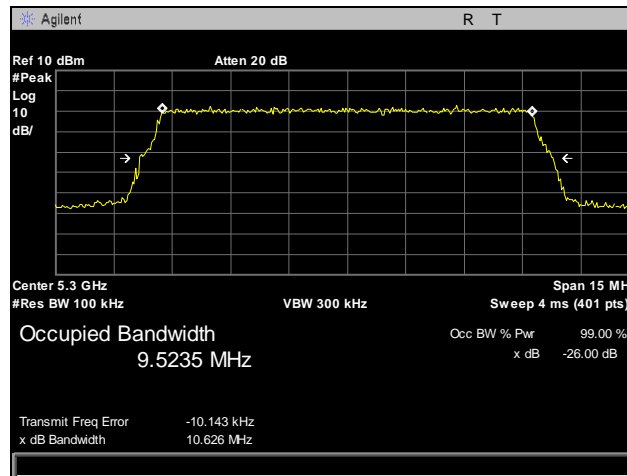
	Frequency (MHz)	26 dB Occupied Bandwidth
Antenna 0, 10 MHz	5475	10.467
	5600	10.584
	5720	10.510
Antenna 1, 10 MHz	5475	10.667
	5600	10.550
	5720	10.562
Antenna 0, 20 MHz	5480	21.570
	5600	21.405
	5715	21.455
Antenna 1, 20 MHz	5480	21.441
	5600	21.520
	5715	21.295
Antenna 0, 30 MHz	5485	31.983
	5600	32.027
	5710	31.606
Antenna 1, 30 MHz	5485	32.031
	5600	31.602
	5710	31.976
Antenna 0, 40 MHz	5490	42.385
	5600	42.590
	5705	42.662
Antenna 1, 40 MHz	5490	42.255
	5600	42.361
	5705	42.332
Antenna 0, 50 MHz	5495	53.954
	5600	53.710
	5700	53.628
Antenna 1, 50 MHz	5495	53.789
	5600	54.111
	5700	53.845

**Table 14. 26 dB Occupied Bandwidth, Test Results, Upper Band**

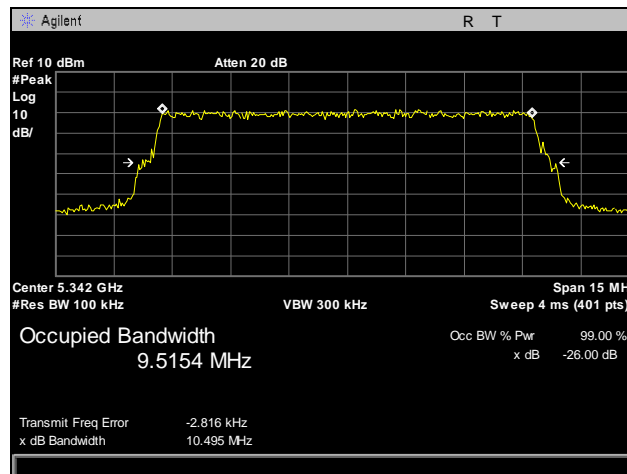
## 26 dB Occupied Bandwidth, Antenna 0, 10 MHz, Lower Bands



Plot 6. 26 dB Occupied Bandwidth, 5255 MHz, Antenna 0, 10 MHz

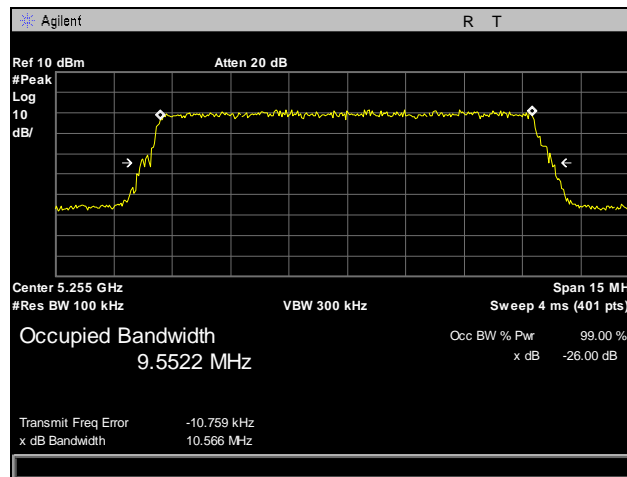


Plot 7. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 0, 10 MHz

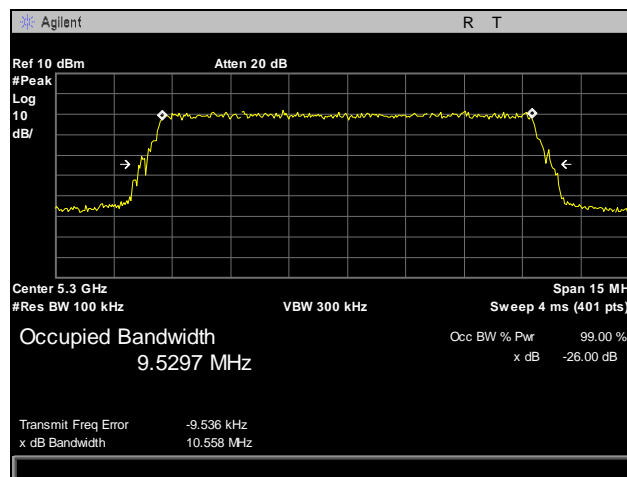


Plot 8. 26 dB Occupied Bandwidth, 5342 MHz, Antenna 0, 10 MHz

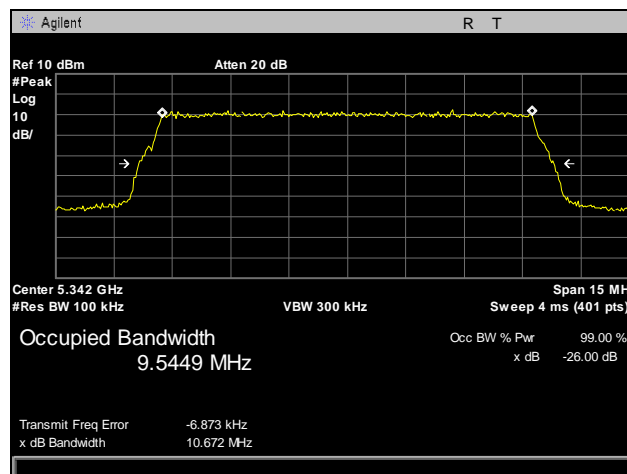
## 26 dB Occupied Bandwidth, Antenna 1, 10 MHz, Lower Bands



Plot 9. 26 dB Occupied Bandwidth, 5255 MHz, Antenna 1, 10 MHz



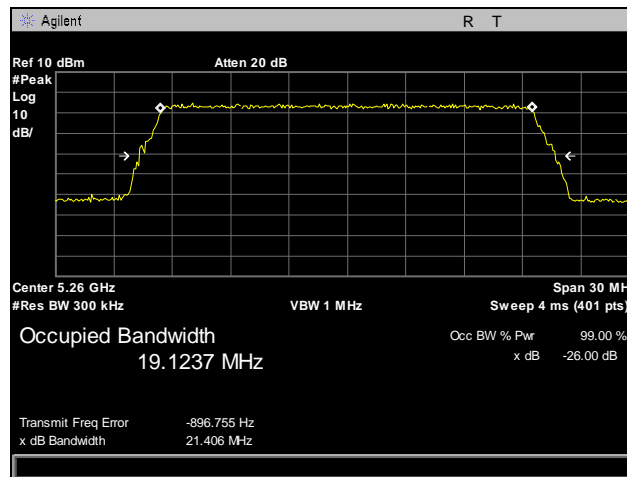
Plot 10. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 1, 10 MHz



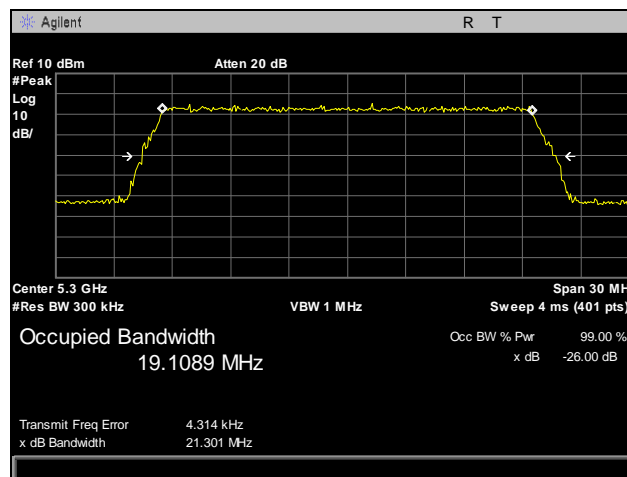
Plot 11. 26 dB Occupied Bandwidth, 5342 MHz, Antenna 1, 10 MHz



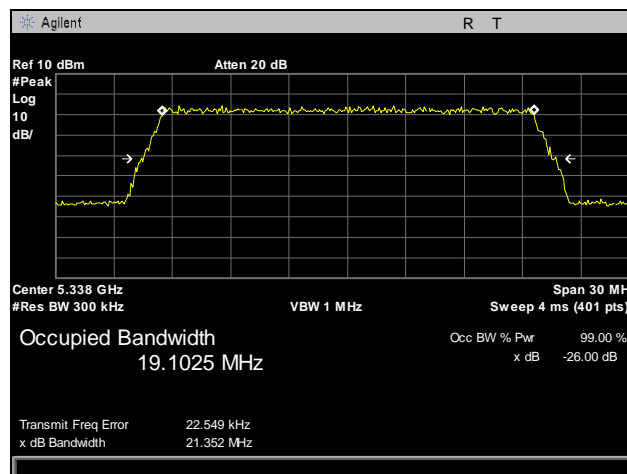
## 26 dB Occupied Bandwidth, Antenna 0, 20 MHz, Lower Bands



Plot 12. 26 dB Occupied Bandwidth, 5260 MHz, Antenna 0, 20 MHz

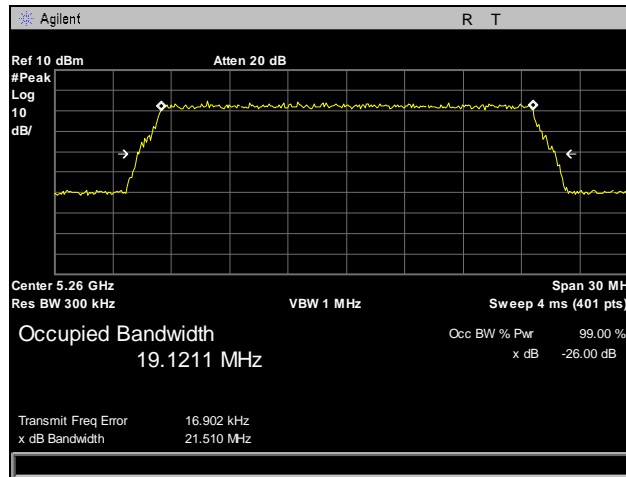


Plot 13. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 0, 20 MHz

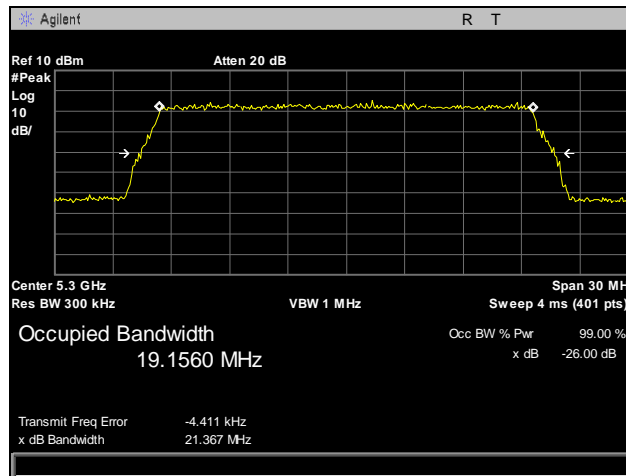


Plot 14. 26 dB Occupied Bandwidth, 5338 MHz, Antenna 0, 20 MHz

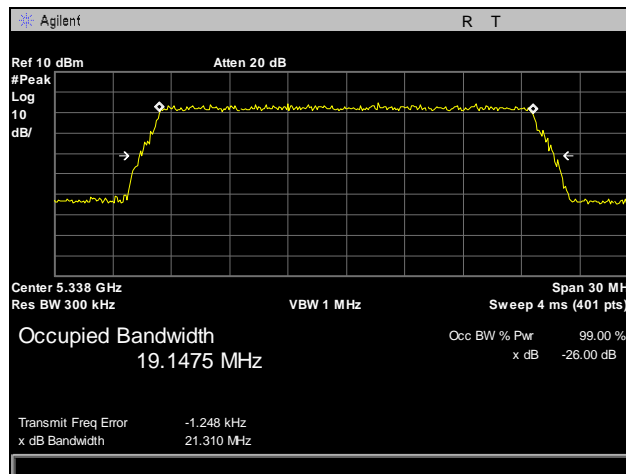
### 26 dB Occupied Bandwidth, Antenna 1, 20 MHz, Lower Bands



Plot 15. 26 dB Occupied Bandwidth, 5260 MHz, Antenna 1, 20 MHz

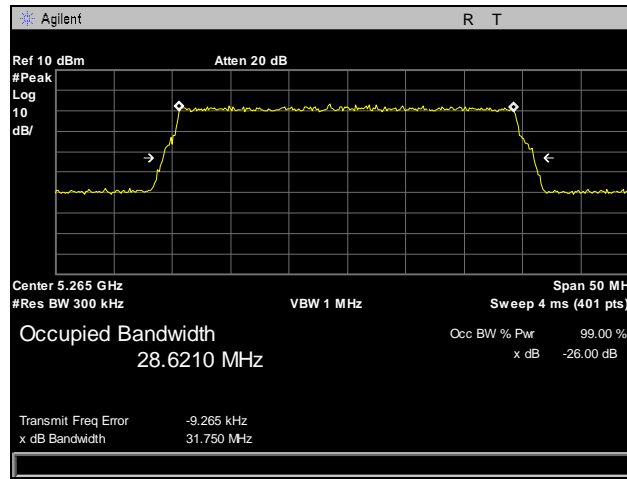


Plot 16. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 1, 20 MHz

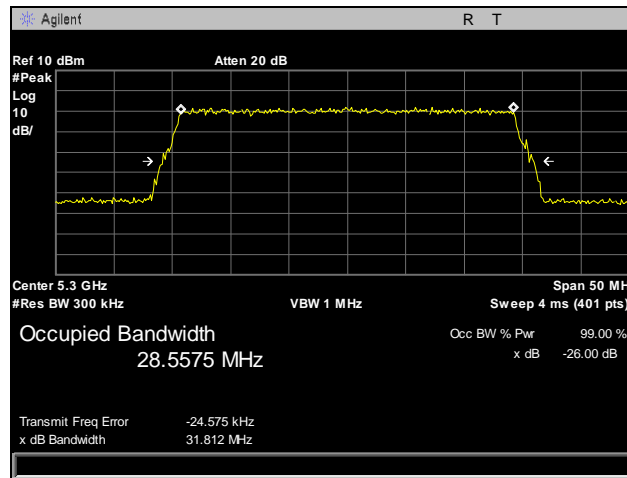


Plot 17. 26 dB Occupied Bandwidth, 5338 MHz, Antenna 1, 20 MHz

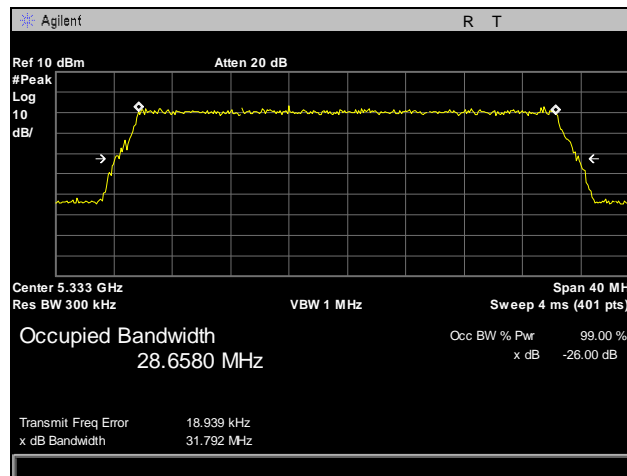
**26 dB Occupied Bandwidth, Antenna 0, 30 MHz, Lower Bands**



**Plot 18. 26 dB Occupied Bandwidth, 5265 MHz, Antenna 0, 30 MHz**

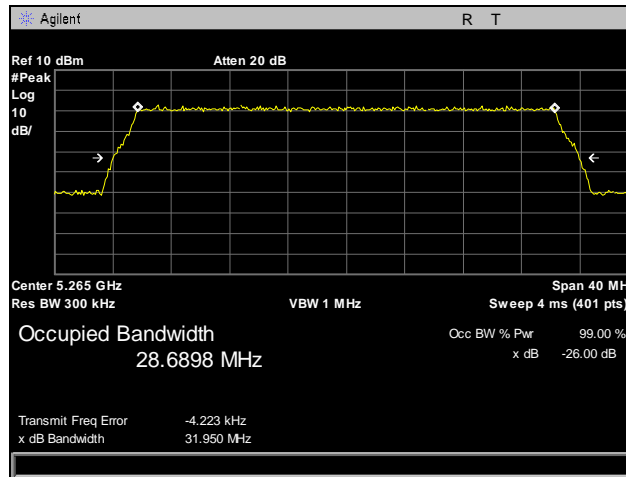


**Plot 19. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 0, 30 MHz**

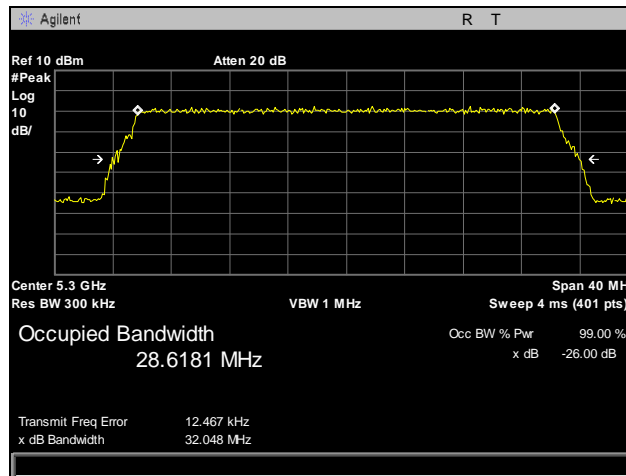


**Plot 20. 26 dB Occupied Bandwidth, 5333 MHz, Antenna 0, 30 MHz**

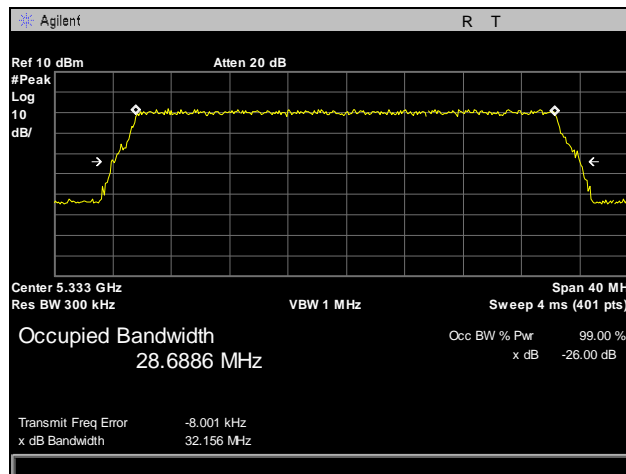
## 26 dB Occupied Bandwidth, Antenna 1, 30 MHz, Lower Bands



Plot 21. 26 dB Occupied Bandwidth, 5265 MHz, Antenna 1, 30 MHz

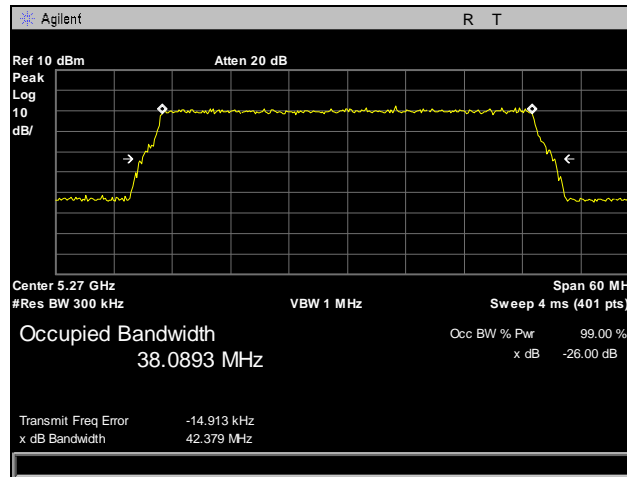


Plot 22. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 1, 30 MHz

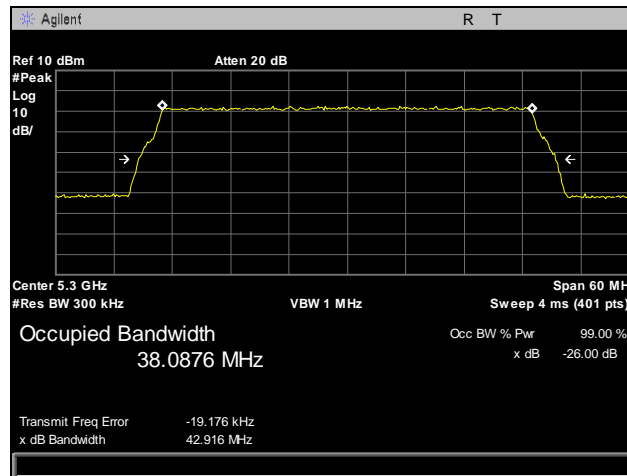


Plot 23. 26 dB Occupied Bandwidth, 5333 MHz, Antenna 1, 30 MHz

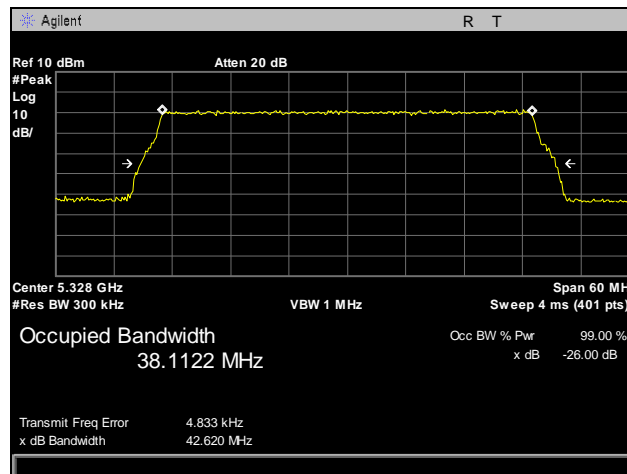
**26 dB Occupied Bandwidth, Antenna 0, 40 MHz, Lower Bands**



**Plot 24. 26 dB Occupied Bandwidth, 5270 MHz, Antenna 0, 40 MHz**

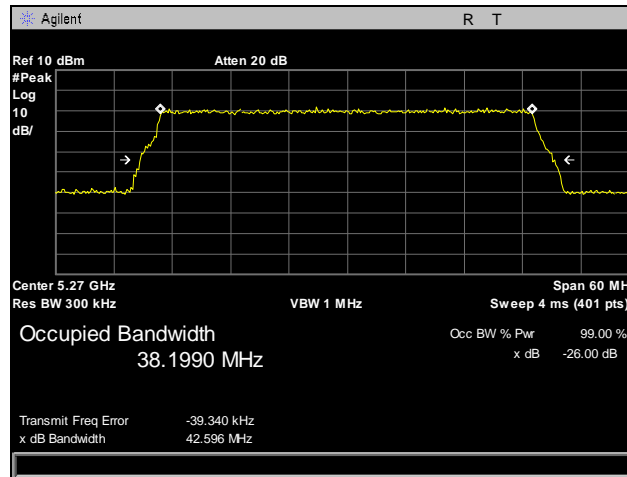


**Plot 25. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 0, 40 MHz**

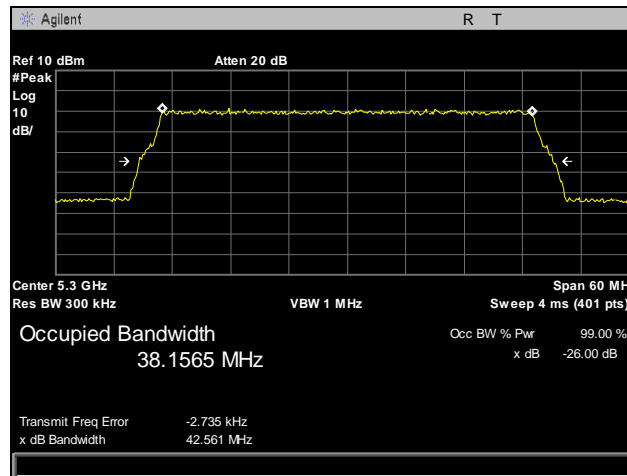


**Plot 26. 26 dB Occupied Bandwidth, 5328 MHz, Antenna 0, 40 MHz**

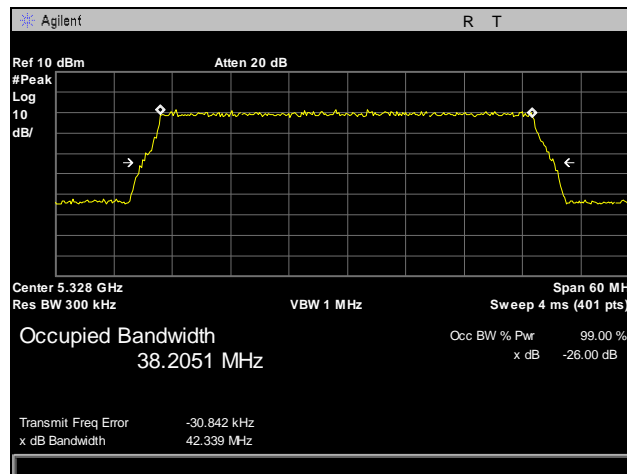
### 26 dB Occupied Bandwidth, Antenna 1, 40 MHz, Lower Bands



Plot 27. 26 dB Occupied Bandwidth, 5270 MHz, Antenna 1, 40 MHz

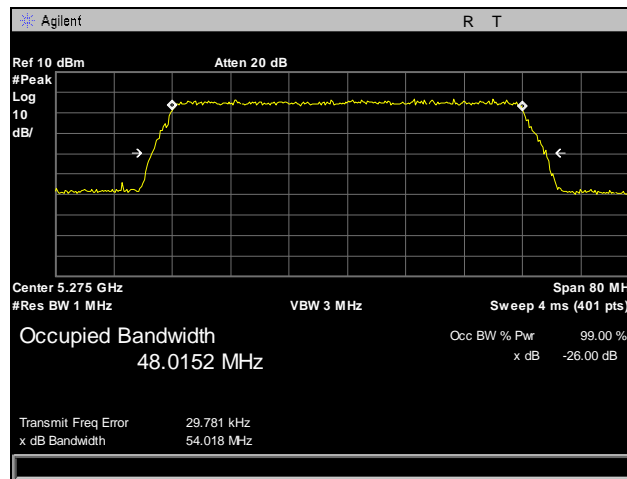


Plot 28. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 1, 40 MHz

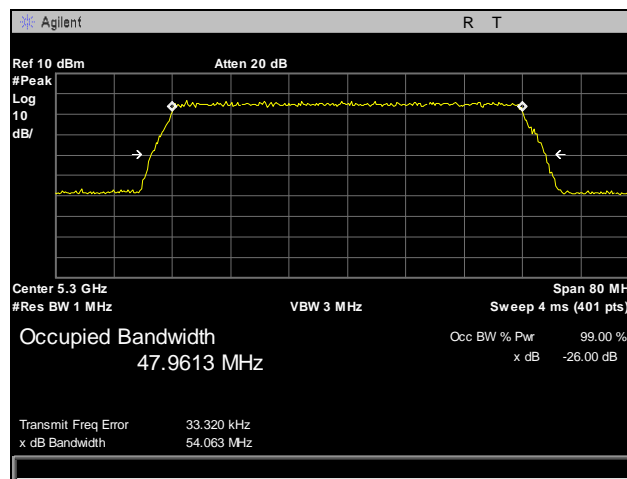


Plot 29. 26 dB Occupied Bandwidth, 5328 MHz, Antenna 1, 40 MHz

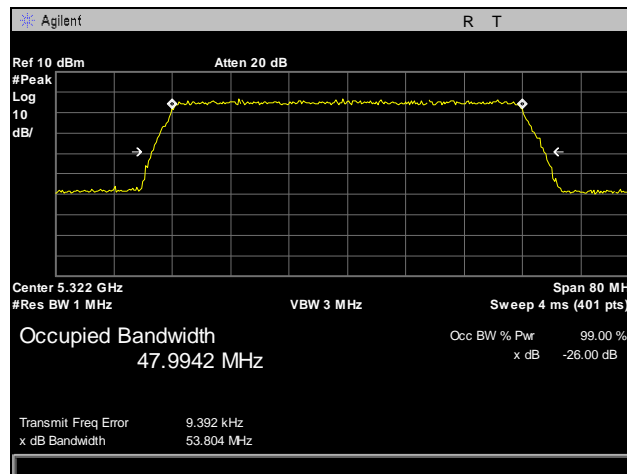
### 26 dB Occupied Bandwidth, Antenna 0, 50 MHz, Lower Bands



Plot 30. 26 dB Occupied Bandwidth, 5275 MHz, Antenna 0, 50 MHz

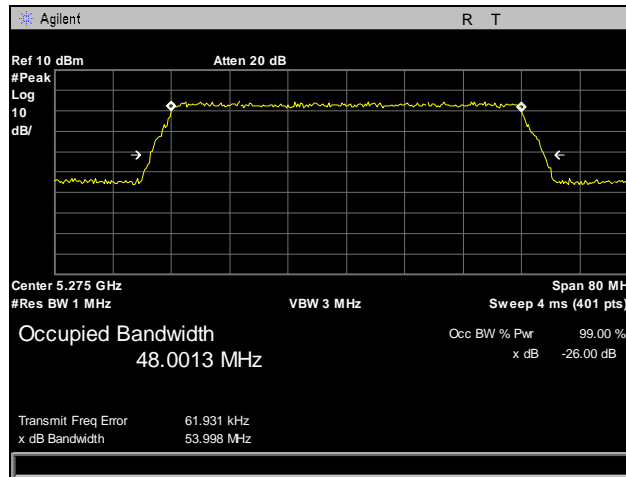


Plot 31. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 0, 50 MHz

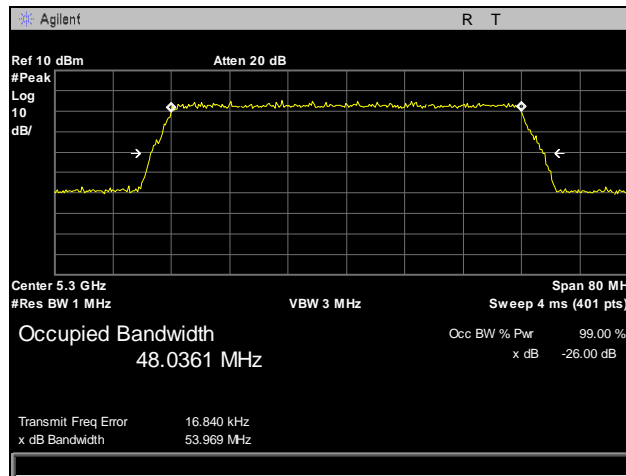


Plot 32. 26 dB Occupied Bandwidth, 5322 MHz, Antenna 0, 50 MHz

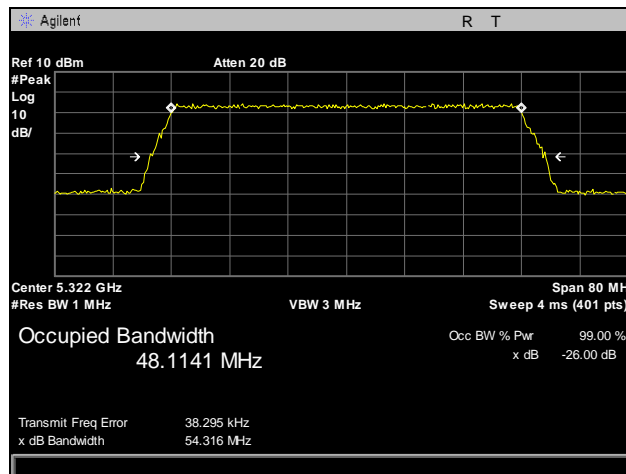
### 26 dB Occupied Bandwidth, Antenna 1, 50 MHz, Lower Bands



Plot 33. 26 dB Occupied Bandwidth, 5275 MHz, Antenna 1, 50 MHz



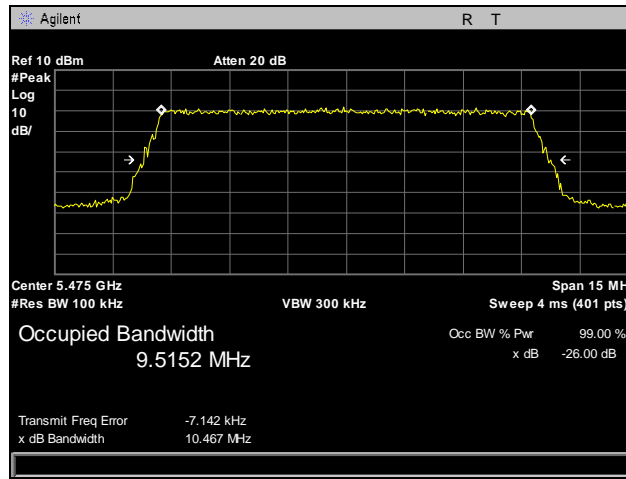
Plot 34. 26 dB Occupied Bandwidth, 5300 MHz, Antenna 1, 50 MHz



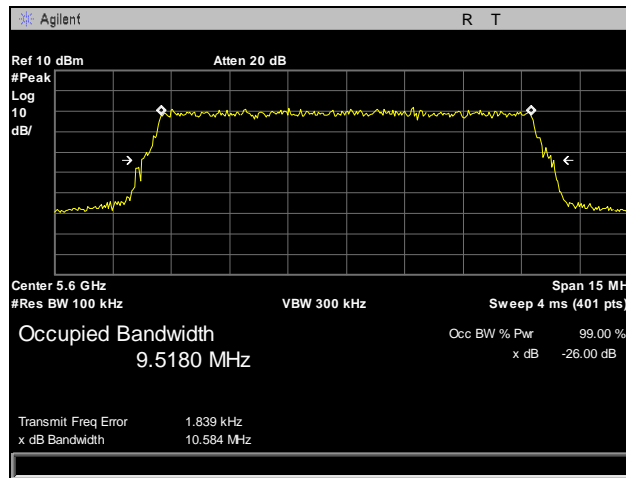
Plot 35. 26 dB Occupied Bandwidth, 5322 MHz, Antenna 1, 50 MHz



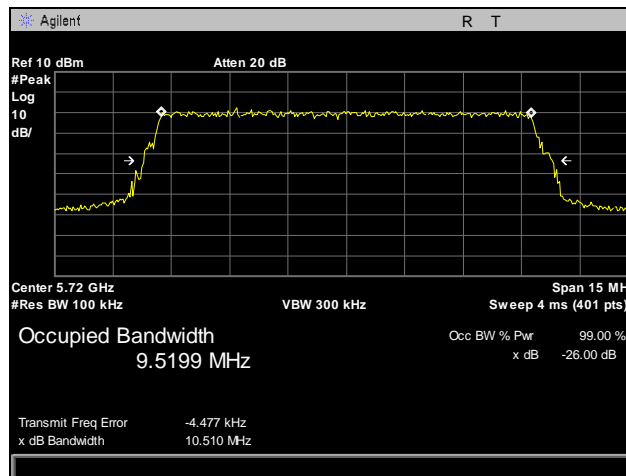
### 26 dB Occupied Bandwidth, Antenna 0, 10 MHz, Upper Bands



Plot 36. 26 dB Occupied Bandwidth, 5475 MHz, Antenna 0, 10 MHz

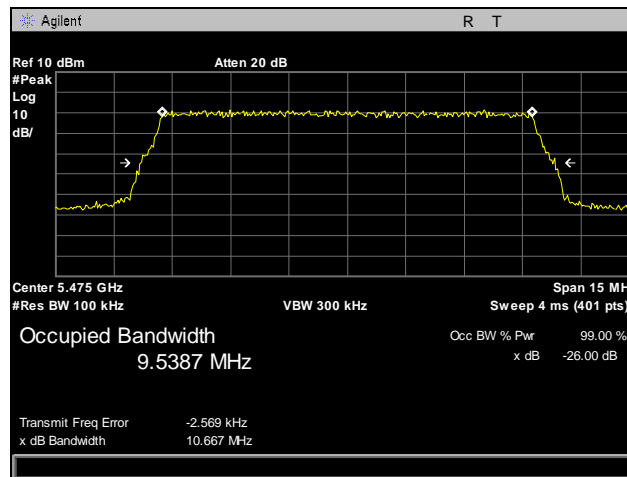


Plot 37. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 0, 10 MHz

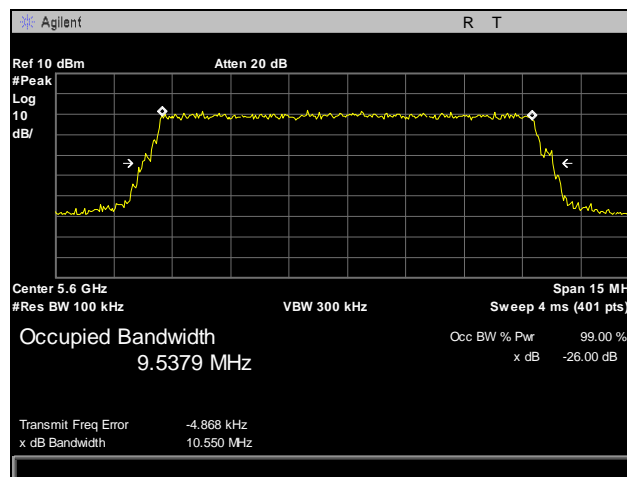


Plot 38. 26 dB Occupied Bandwidth, 5720 MHz, Antenna 0, 10 MHz

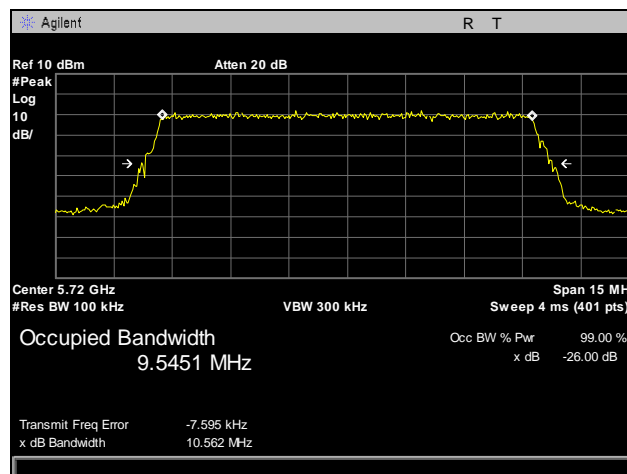
## 26 dB Occupied Bandwidth, Antenna 1, 10 MHz, Upper Bands



Plot 39. 26 dB Occupied Bandwidth, 5475 MHz, Antenna 1, 10 MHz

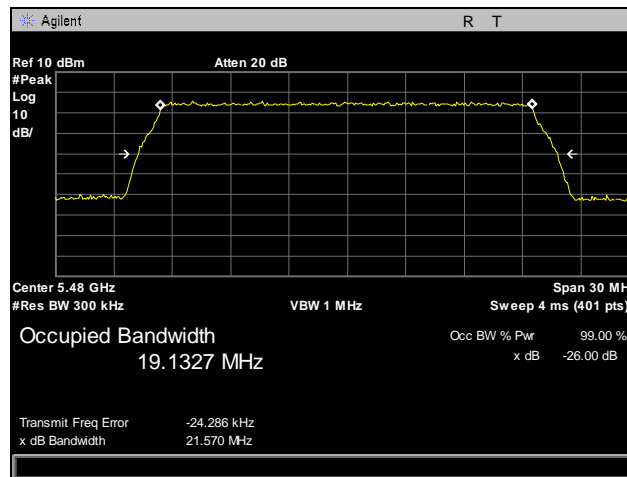


Plot 40. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 1, 10 MHz

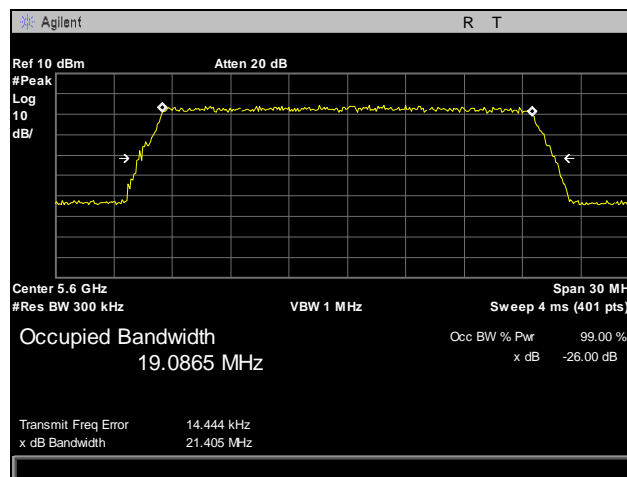


Plot 41. 26 dB Occupied Bandwidth, 5720 MHz, Antenna 1, 10 MHz

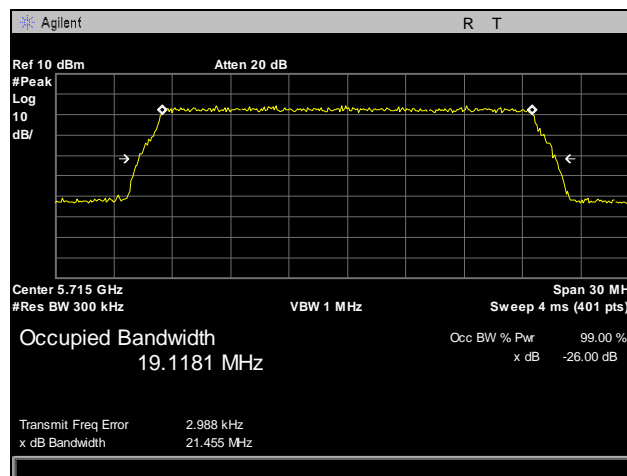
### 26 dB Occupied Bandwidth, Antenna 0, 20 MHz, Upper Bands



Plot 42. 26 dB Occupied Bandwidth, 5480 MHz, Antenna 0, 20 MHz

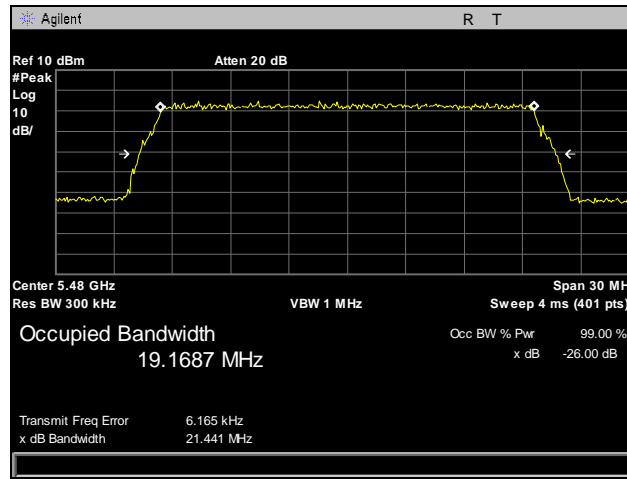


Plot 43. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 0, 20 MHz

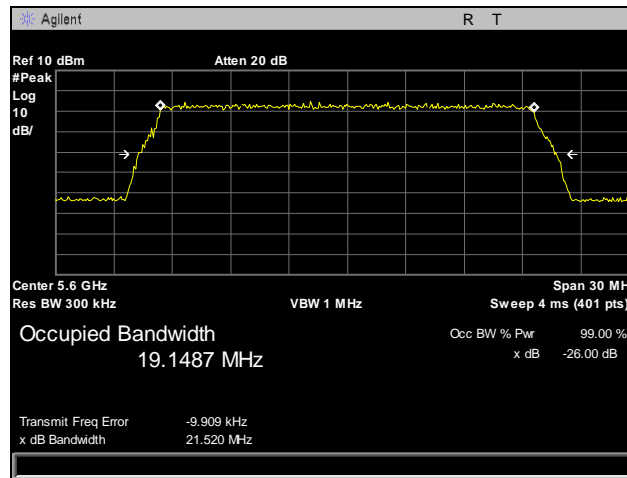


Plot 44. 26 dB Occupied Bandwidth, 5715 MHz, Antenna 0, 20 MHz

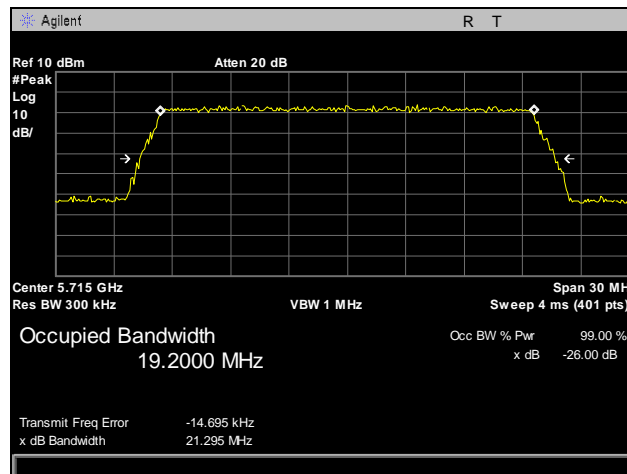
### 26 dB Occupied Bandwidth, Antenna 1, 20 MHz, Upper Bands



Plot 45. 26 dB Occupied Bandwidth, 5480 MHz, Antenna 1, 20 MHz

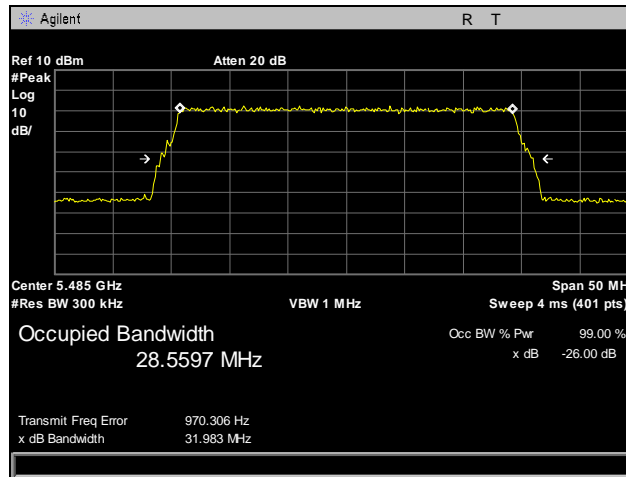


Plot 46. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 1, 20 MHz

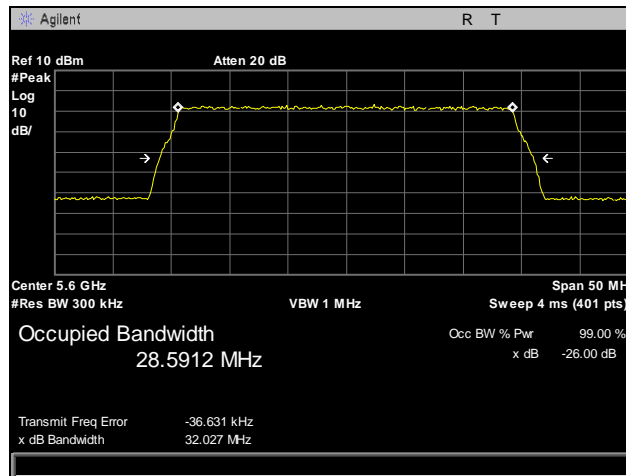


Plot 47. 26 dB Occupied Bandwidth, 5715 MHz, Antenna 1, 20 MHz

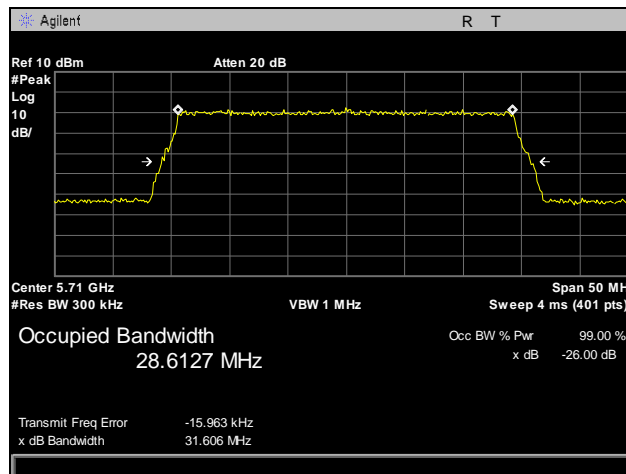
**26 dB Occupied Bandwidth, Antenna 0, 30 MHz, Upper Bands**



**Plot 48. 26 dB Occupied Bandwidth, 4585 MHz, Antenna 0, 30 MHz**

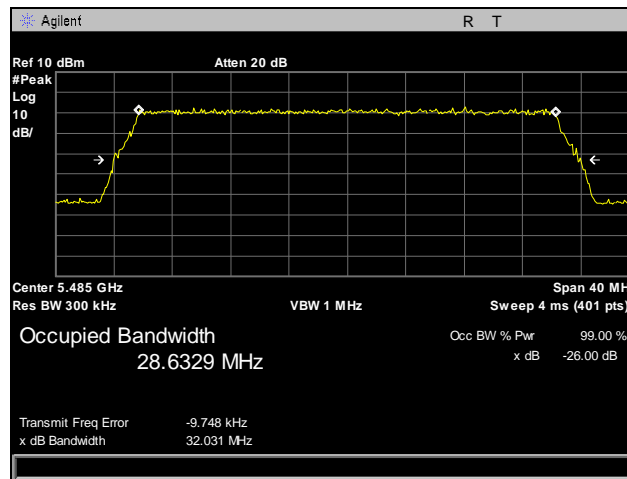


**Plot 49. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 0, 30 MHz**

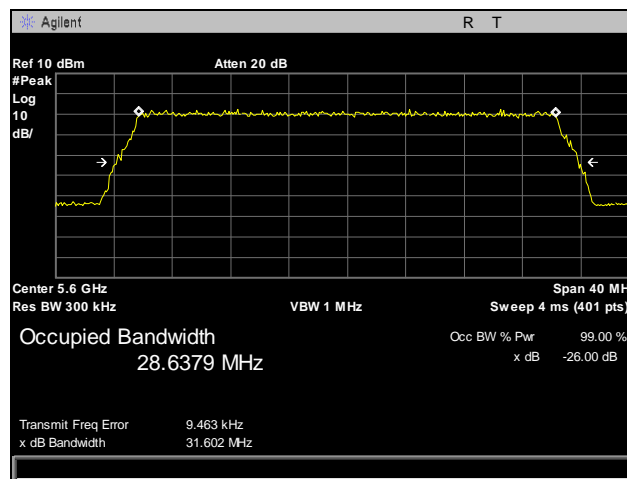


**Plot 50. 26 dB Occupied Bandwidth, 5710 MHz, Antenna 0, 30 MHz**

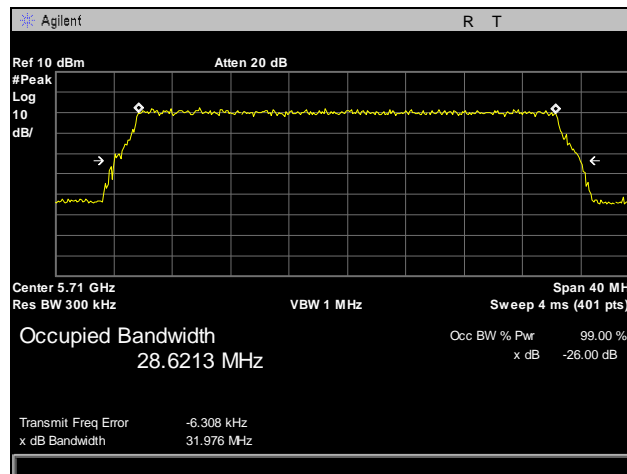
## 26 dB Occupied Bandwidth, Antenna 1, 30 MHz, Upper Bands



Plot 51. 26 dB Occupied Bandwidth, 5485 MHz, Antenna 1, 30 MHz

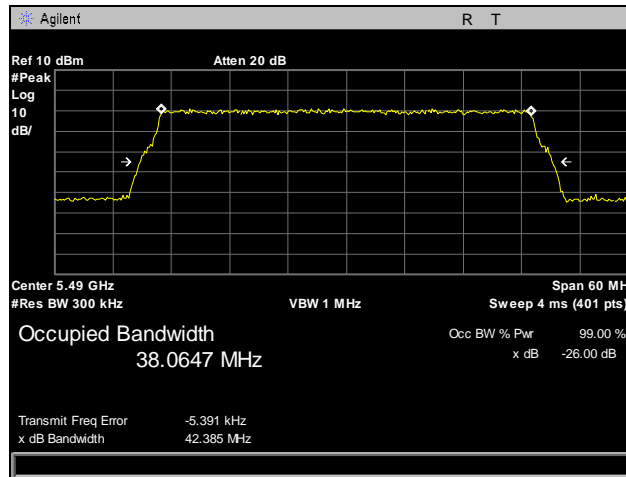


Plot 52. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 1, 30 MHz

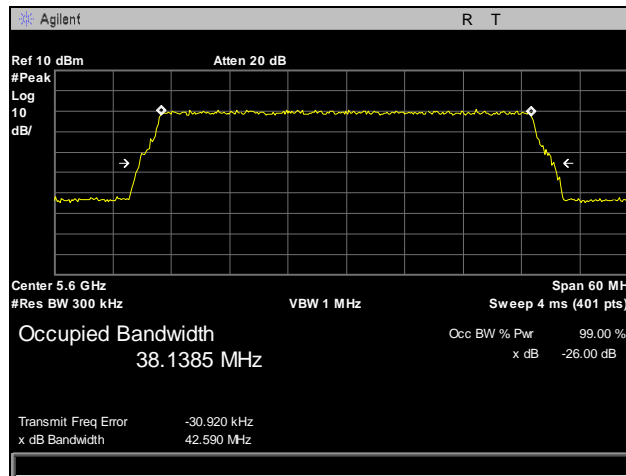


Plot 53. 26 dB Occupied Bandwidth, 5710 MHz, Antenna 1, 30 MHz

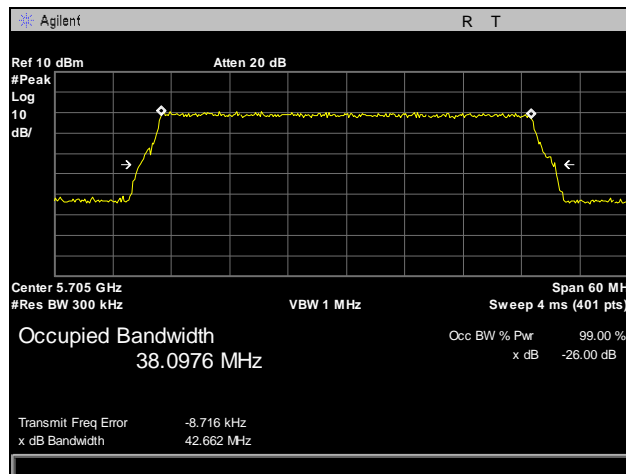
### 26 dB Occupied Bandwidth, Antenna 0, 40 MHz, Upper Bands



Plot 54. 26 dB Occupied Bandwidth, 5490 MHz, Antenna 0, 40 MHz

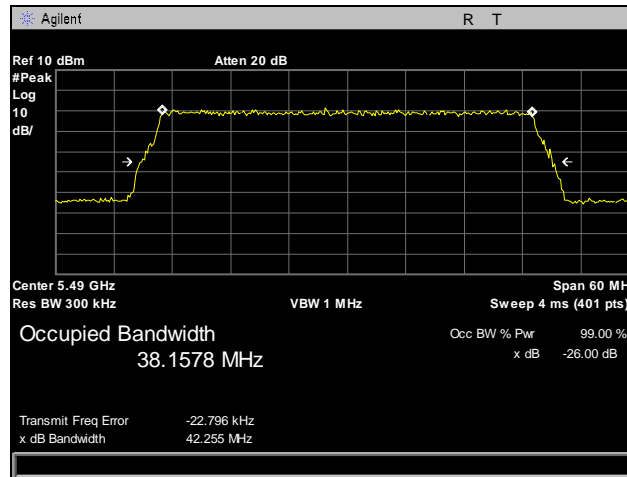


Plot 55. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 0, 40 MHz

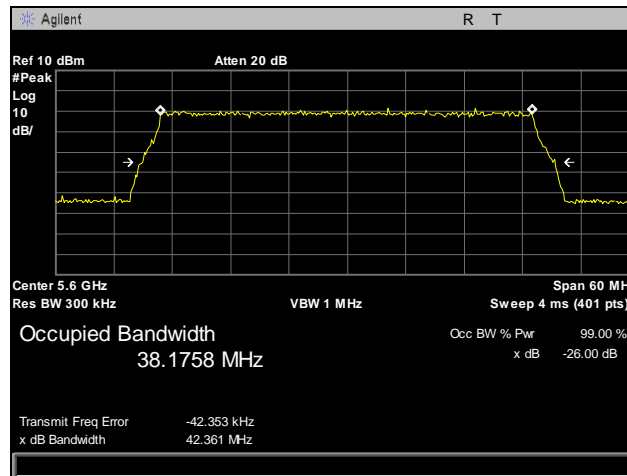


Plot 56. 26 dB Occupied Bandwidth, 5705 MHz, Antenna 0, 40 MHz

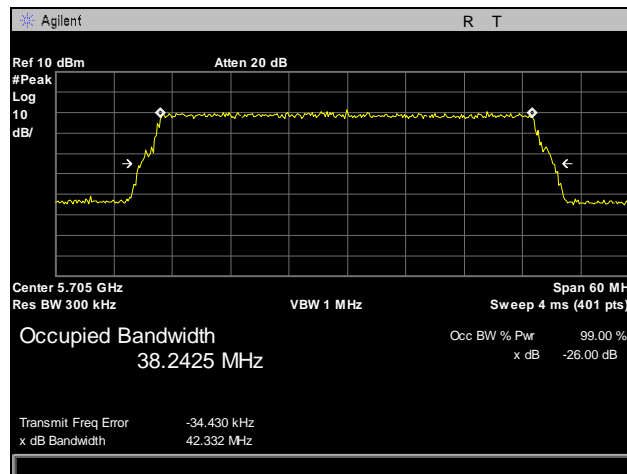
## 26 dB Occupied Bandwidth, Antenna 1, 40 MHz, Upper Bands



Plot 57. 26 dB Occupied Bandwidth, 5490 MHz, Antenna 1, 40 MHz



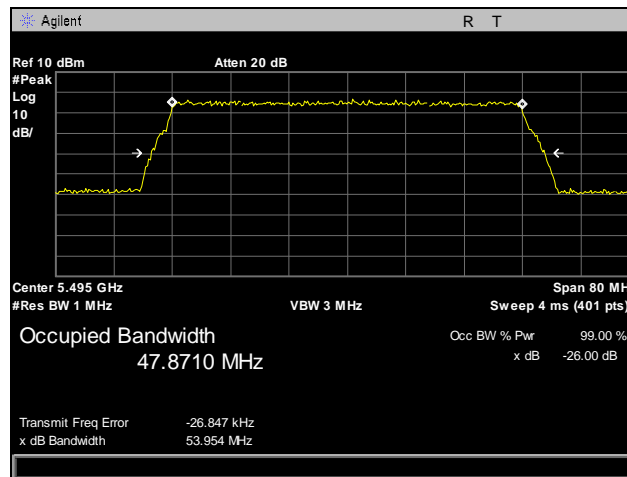
Plot 58. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 1, 40 MHz



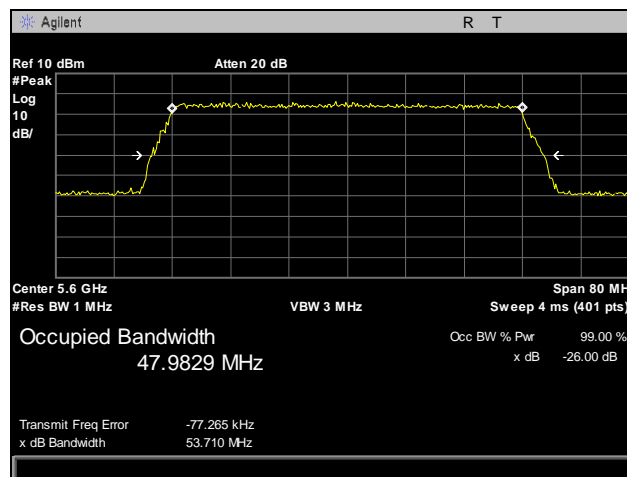
Plot 59. 26 dB Occupied Bandwidth, 5705 MHz, Antenna 1, 40 MHz



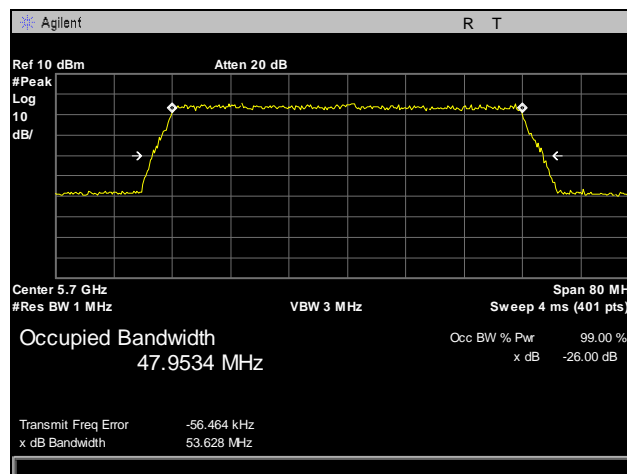
## 26 dB Occupied Bandwidth, Antenna 0, 50 MHz, Upper Bands



Plot 60. 26 dB Occupied Bandwidth, 5495 MHz, Antenna 0, 50 MHz

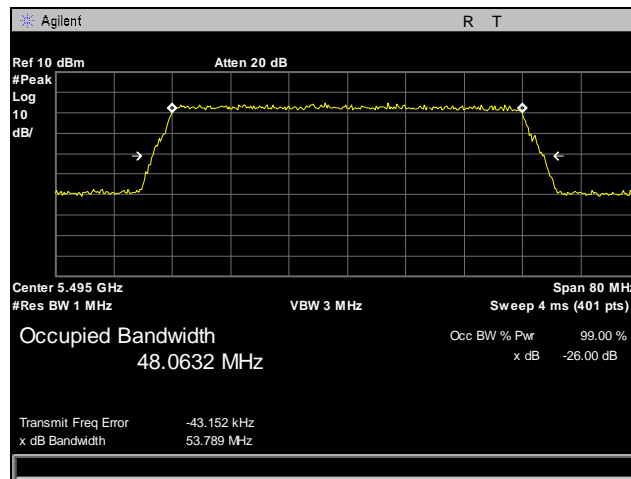


Plot 61. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 0, 50 MHz

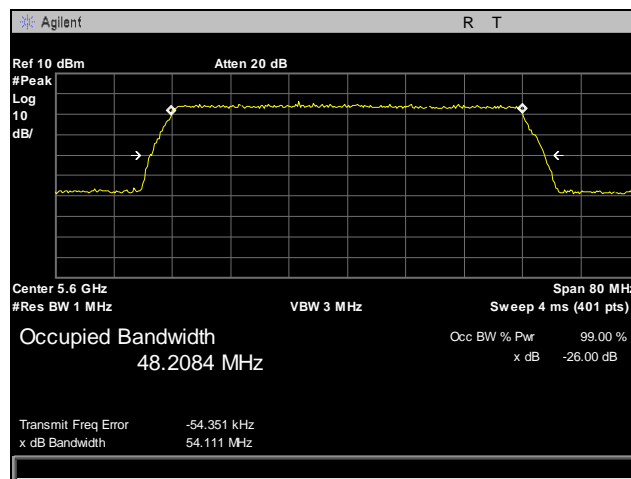


Plot 62. 26 dB Occupied Bandwidth, 5700 MHz, Antenna 0, 50 MHz

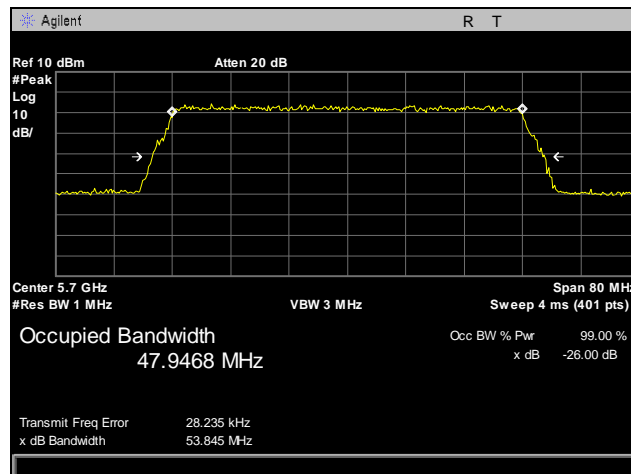
## 26 dB Occupied Bandwidth, Antenna 1, 50 MHz, Upper Bands



Plot 63. 26 dB Occupied Bandwidth, 5495 MHz, Antenna 1, 50 MHz



Plot 64. 26 dB Occupied Bandwidth, 5600 MHz, Antenna 1, 50 MHz



Plot 65. 26 dB Occupied Bandwidth, 5700 MHz, Antenna 1, 50 MHz

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15. 407(a)(2) RF Power Output

**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..

**Test Procedure:** The EUT was connected to a spectrum analyzer through an attenuator and set to transmit continuously on the 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. Plots were corrected for attenuator and cable loss. Tables provide power levels for both a 29 dBi and 34 dBi antenna as mentioned in 15.203.

**Test Results:** Equipment was compliant with the Peak Power Output limits of § 15.407(a)(2).

**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 11/17/14

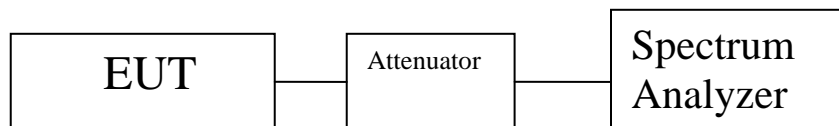


Figure 2. Power Output Test Setup

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	-2.560	-2.310	0.55	0.59	1.14	0.58	Compliant
5300	-2.770	-2.380	0.53	0.58	1.11	0.44	Compliant
5342	-2.430	-2.030	0.57	0.63	1.20	0.78	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	-2.530	-2.160	0.56	0.61	1.17	0.67	Compliant
5300	-2.300	-2.180	0.59	0.61	1.19	0.77	Compliant
5338	-2.210	-2.130	0.60	0.61	1.21	0.84	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	-2.680	-2.090	0.54	0.62	1.16	0.64	Compliant
5300	-2.130	-2.010	0.61	0.63	1.24	0.94	Compliant
5333	-2.240	-2.070	0.60	0.62	1.22	0.86	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	-2.530	-2.240	0.56	0.60	1.16	0.63	Compliant
5300	-2.230	-2.120	0.60	0.61	1.21	0.84	Compliant
5328	-2.070	-2.110	0.62	0.62	1.24	0.92	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	-2.170	-2.210	0.61	0.60	1.21	0.82	Compliant
5300	-2.130	-2.090	0.61	0.62	1.23	0.90	Compliant
5322	-2.000	-2.110	0.63	0.62	1.25	0.96	Compliant

Table 15. RF Output Power, Test Results, 5250 – 5350 MHz, 29 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	-2.850	-2.350	0.52	0.58	1.10	0.42	Compliant
5600	-2.550	-2.210	0.56	0.60	1.16	0.63	Compliant
5720	-2.400	-2.180	0.58	0.61	1.18	0.72	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	-2.440	-2.250	0.57	0.60	1.17	0.67	Compliant
5600	-2.490	-2.350	0.56	0.58	1.15	0.59	Compliant
5715	-2.100	-2.070	0.62	0.62	1.24	0.93	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	-2.420	-2.240	0.57	0.60	1.17	0.68	Compliant
5600	-2.290	-2.200	0.59	0.60	1.19	0.77	Compliant
5710	-2.220	-2.160	0.60	0.61	1.21	0.82	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	-2.100	-2.030	0.62	0.63	1.24	0.95	Compliant
5600	-2.450	-2.600	0.57	0.55	1.12	0.49	Compliant
5705	-2.060	-2.090	0.62	0.62	1.24	0.94	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	-2.270	-2.210	0.59	0.60	1.19	0.77	Compliant
5600	-2.310	-2.140	0.59	0.61	1.20	0.79	Compliant
5700	-2.470	-2.350	0.57	0.58	1.15	0.60	Compliant

Table 16. RF Output Power, Test Results, 5470 – 5725 MHz, 29 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	-8.670	-8.420	0.14	0.14	0.28	-5.53	Compliant
5300	-8.880	-8.490	0.13	0.14	0.27	-5.67	Compliant
5342	-8.540	-8.140	0.14	0.15	0.29	-5.33	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	-8.640	-8.270	0.14	0.15	0.29	-5.44	Compliant
5300	-8.410	-8.290	0.14	0.15	0.29	-5.34	Compliant
5338	-8.320	-8.240	0.15	0.15	0.30	-5.27	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	-7.740	-7.150	0.17	0.19	0.36	-4.42	Compliant
5300	-7.190	-7.070	0.19	0.20	0.39	-4.12	Compliant
5333	-7.300	-7.130	0.19	0.19	0.38	-4.20	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	-7.600	-7.310	0.17	0.19	0.36	-4.44	Compliant
5300	-7.300	-7.190	0.19	0.19	0.38	-4.23	Compliant
5328	-7.140	-7.180	0.19	0.19	0.38	-4.15	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	-7.310	-7.350	0.19	0.18	0.37	-4.32	Compliant
5300	-7.270	-7.230	0.19	0.19	0.38	-4.24	Compliant
5322	-7.140	-7.250	0.19	0.19	0.38	-4.18	Compliant

Table 17. RF Output Power, Test Results, 5250 – 5350 MHz, 34 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	-9.750	-9.250	0.11	0.12	0.22	-6.48	Compliant
5600	-9.450	-9.110	0.11	0.12	0.24	-6.27	Compliant
5720	-9.300	-9.080	0.12	0.12	0.24	-6.18	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	-7.570	-7.380	0.17	0.18	0.36	-4.46	Compliant
5600	-7.620	-7.480	0.17	0.18	0.35	-4.54	Compliant
5715	-7.230	-7.200	0.19	0.19	0.38	-4.20	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	-7.970	-7.790	0.16	0.17	0.33	-4.87	Compliant
5600	-7.840	-7.750	0.16	0.17	0.33	-4.78	Compliant
5710	-7.770	-7.710	0.17	0.17	0.34	-4.73	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	-7.540	-7.470	0.18	0.18	0.36	-4.49	Compliant
5600	-7.890	-8.040	0.16	0.16	0.32	-4.95	Compliant
5705	-7.500	-7.530	0.18	0.18	0.35	-4.50	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	-7.310	-7.250	0.19	0.19	0.37	-4.27	Compliant
5600	-7.350	-7.180	0.18	0.19	0.38	-4.25	Compliant
5700	-7.510	-7.390	0.18	0.18	0.36	-4.44	Compliant

Table 18. RF Output Power, Test Results, 5470 – 5725 MHz, 34 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	0.840	0.830	1.21	1.21	2.42	3.85	Compliant
5300	0.800	0.940	1.20	1.24	2.44	3.88	Compliant
5344	0.900	0.630	1.23	1.16	2.39	3.78	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	3.610	3.760	2.30	2.38	4.67	6.70	Compliant
5300	3.560	3.880	2.27	2.44	4.71	6.73	Compliant
5339	3.830	3.950	2.42	2.48	4.90	6.90	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	3.670	3.870	2.33	2.44	4.77	6.78	Compliant
5300	3.460	3.840	2.22	2.42	4.64	6.66	Compliant
5333	3.900	3.800	2.45	2.40	4.85	6.86	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	3.730	3.920	2.36	2.47	4.83	6.84	Compliant
5300	3.620	3.750	2.30	2.37	4.67	6.70	Compliant
5328	3.740	3.780	2.37	2.39	4.75	6.77	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	3.830	3.660	2.42	2.32	4.74	6.76	Compliant
5300	3.820	3.920	2.41	2.47	4.88	6.88	Compliant
5322	3.750	3.830	2.37	2.42	4.79	6.80	Compliant

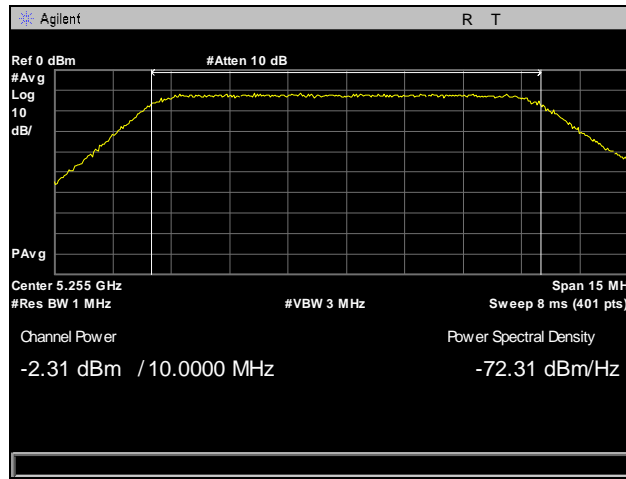
Table 19. RF Output Power, Test Results, 5250 – 5350 MHz, 23 dBi Antenna



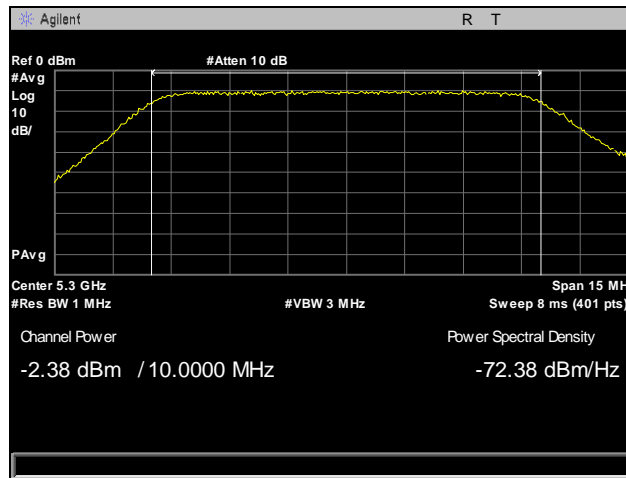
10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	0.790	0.970	1.20	1.25	2.45	3.89	Compliant
5600	0.860	0.790	1.22	1.20	2.42	3.84	Compliant
5720	0.910	0.930	1.23	1.24	2.47	3.93	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	3.540	3.810	2.26	2.40	4.66	6.69	Compliant
5600	3.840	3.710	2.42	2.35	4.77	6.79	Compliant
5715	3.910	3.910	2.46	2.46	4.92	6.92	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	3.840	3.770	2.42	2.38	4.80	6.82	Compliant
5600	3.780	3.760	2.39	2.38	4.76	6.78	Compliant
5710	3.940	3.390	2.48	2.18	4.66	6.68	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	3.530	3.820	2.25	2.41	4.66	6.69	Compliant
5600	3.780	3.910	2.39	2.46	4.85	6.86	Compliant
5705	3.940	3.800	2.48	2.40	4.88	6.88	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	3.440	3.780	2.21	2.39	4.60	6.62	Compliant
5600	3.660	3.620	2.32	2.30	4.62	6.65	Compliant
5700	3.530	3.760	2.25	2.38	4.63	6.66	Compliant

Table 20. RF Output Power, Test Results, 5470 – 5725 MHz, 23 dBi Antenna

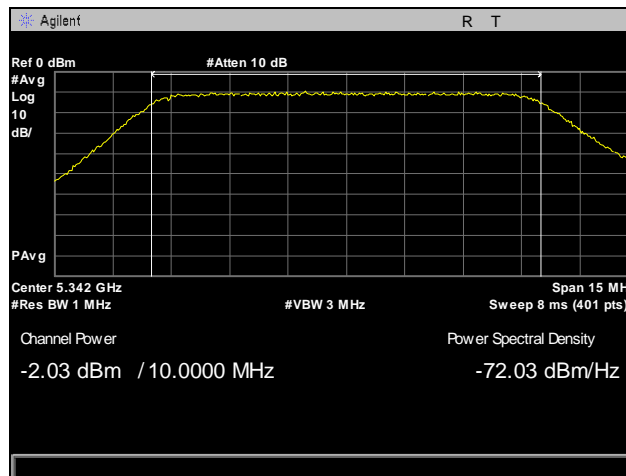
**Output Power, Antenna 0, 10 MHz, Lower Bands**



**Plot 66. Output Power, 5255 MHz, Antenna 0, 10 MHz**

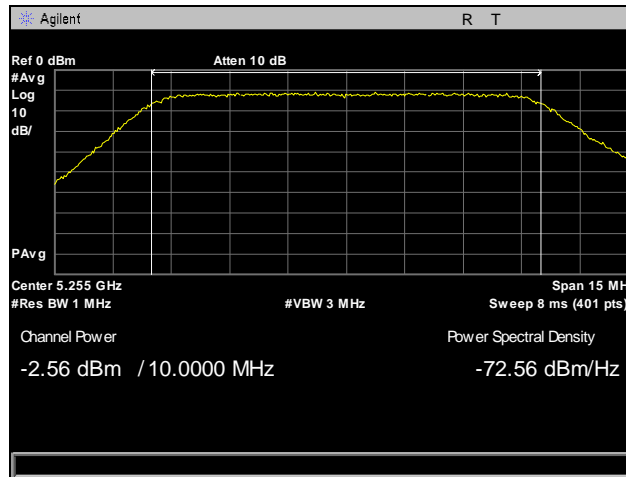


**Plot 67. Output Power, 5300 MHz, Antenna 0, 10 MHz**

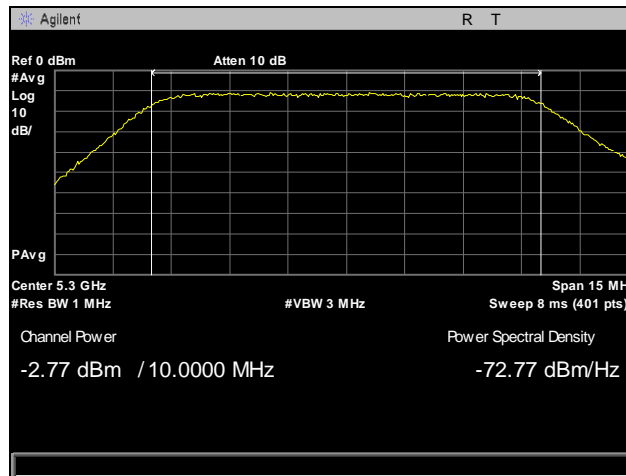


**Plot 68. Output Power, 5342 MHz, Antenna 0, 10 MHz**

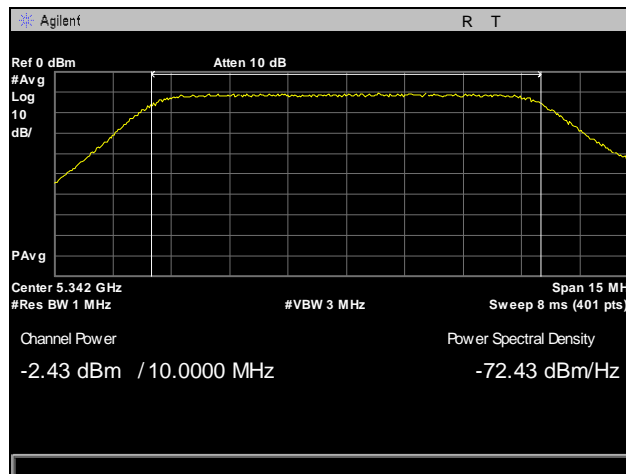
**Output Power, Antenna 1, 10 MHz, Lower Bands**



**Plot 69. Output Power, 5255 MHz, Antenna 1, 10 MHz**

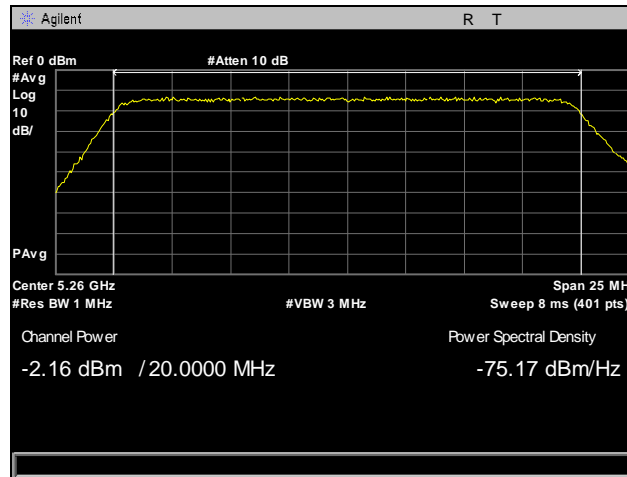


**Plot 70. Output Power, 5300 MHz, Antenna 1, 10 MHz**

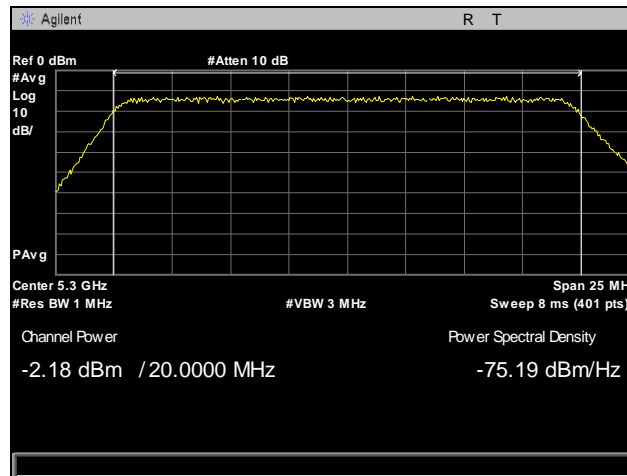


**Plot 71. Output Power, 5342 MHz, Antenna 1, 10 MHz**

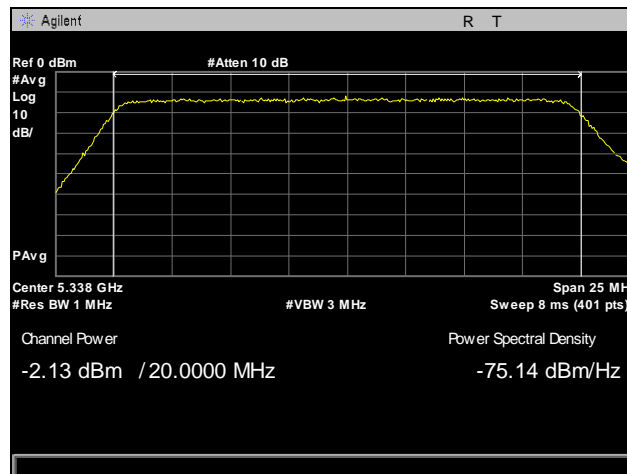
**Output Power, Antenna 0, 20 MHz, Lower Bands**



**Plot 72. Output Power, 5260 MHz, Antenna 0, 20 MHz**

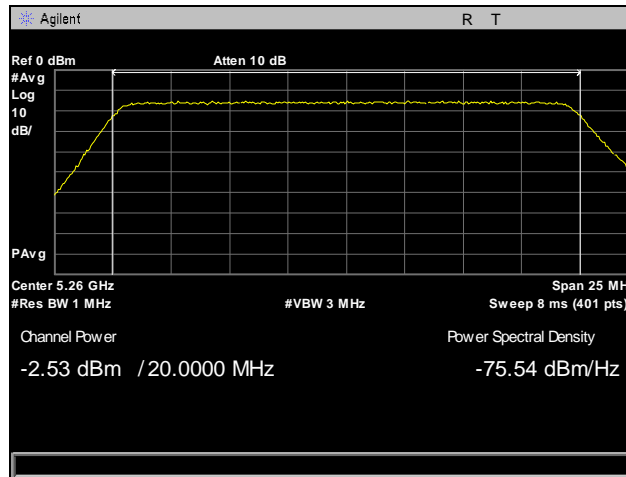


**Plot 73. Output Power, 5300 MHz, Antenna 0, 20 MHz**

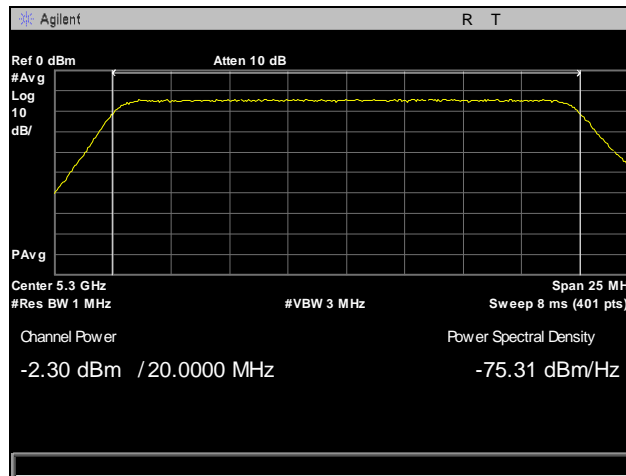


**Plot 74. Output Power, 5338 MHz, Antenna 0, 20 MHz**

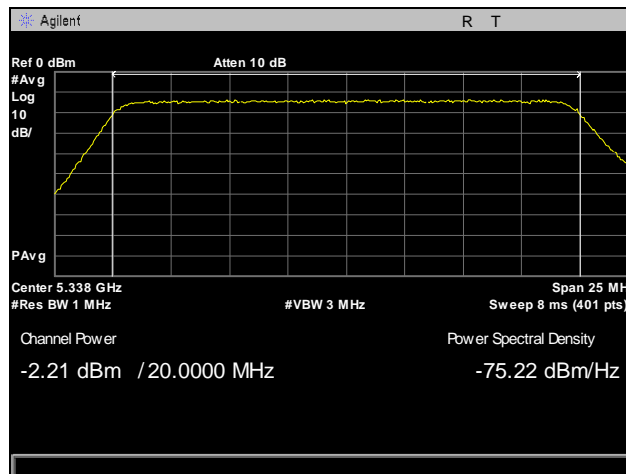
**Output Power, Antenna 1, 20 MHz, Lower Bands**



**Plot 75. Output Power, 5260 MHz, Antenna 1, 20 MHz**

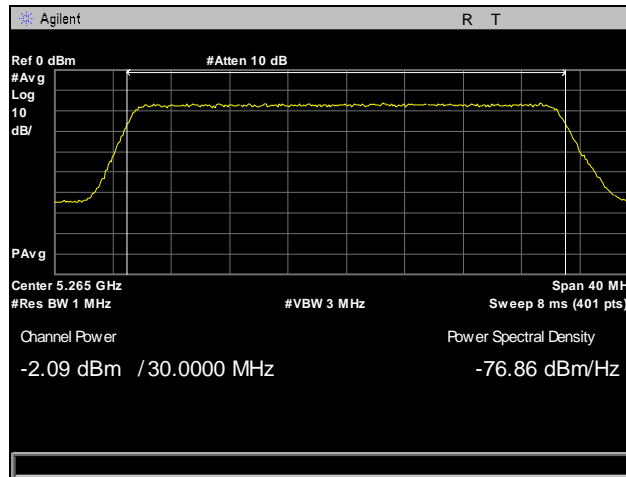


**Plot 76. Output Power, 5300 MHz, Antenna 1, 20 MHz**

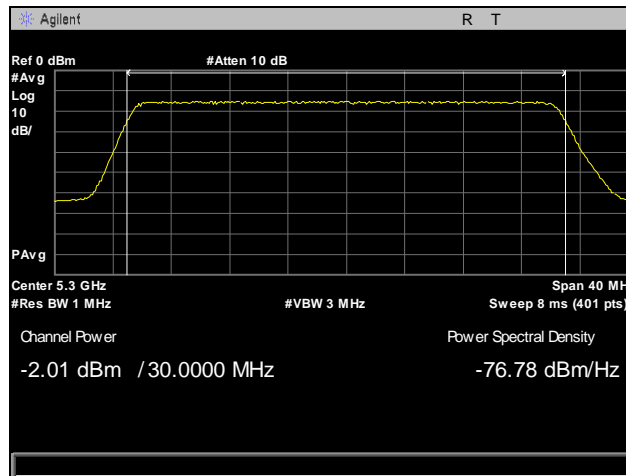


**Plot 77. Output Power, 5338 MHz, Antenna 1, 20 MHz**

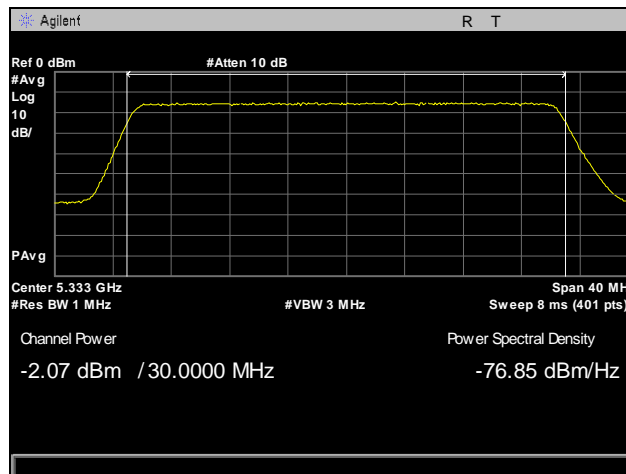
**Output Power, Antenna 0, 30 MHz, Lower Bands**



**Plot 78. Output Power, 5265 MHz, Antenna 0, 30 MHz**

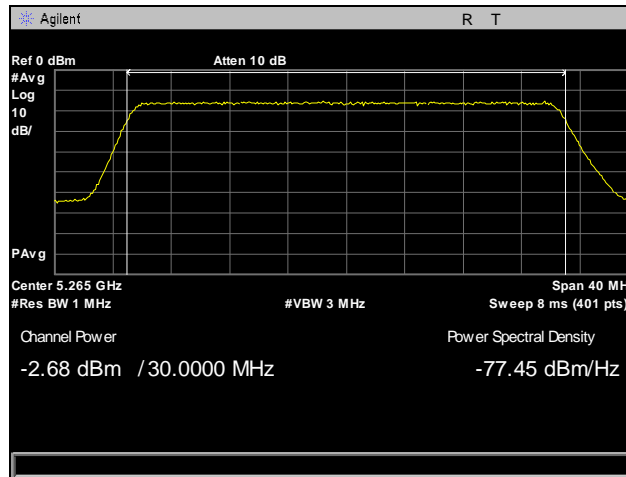


**Plot 79. Output Power, 5300 MHz, Antenna 0, 30 MHz**

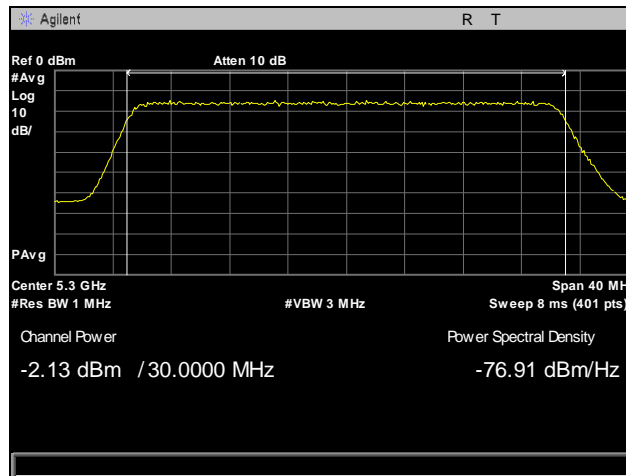


**Plot 80. Output Power, 5333 MHz, Antenna 0, 30 MHz**

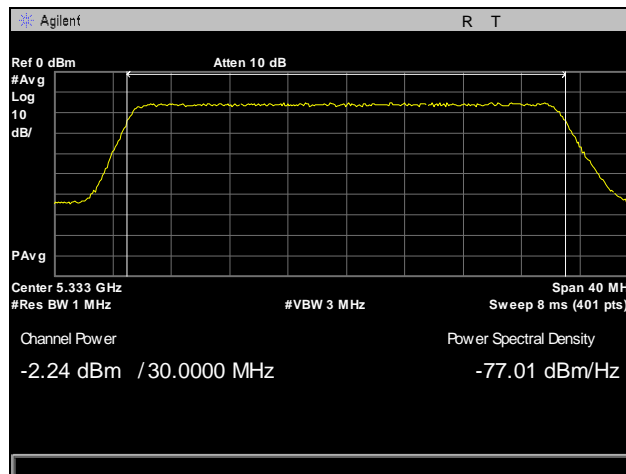
**Output Power, Antenna 1, 30 MHz, Lower Bands**



**Plot 81. Output Power, 5265 MHz, Antenna 1, 30 MHz**

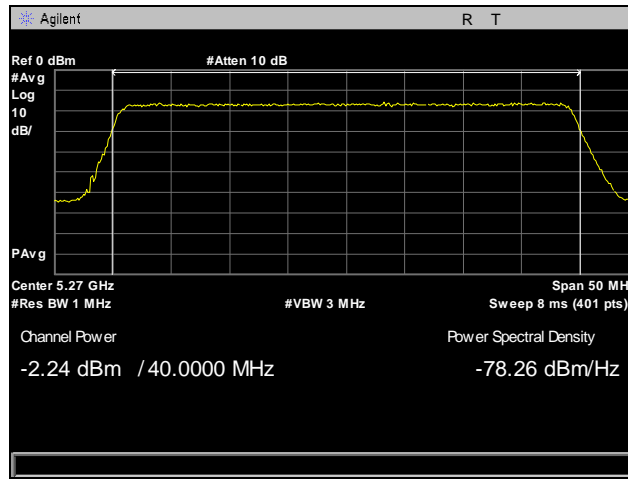


**Plot 82. Output Power, 5300 MHz, Antenna 1, 30 MHz**

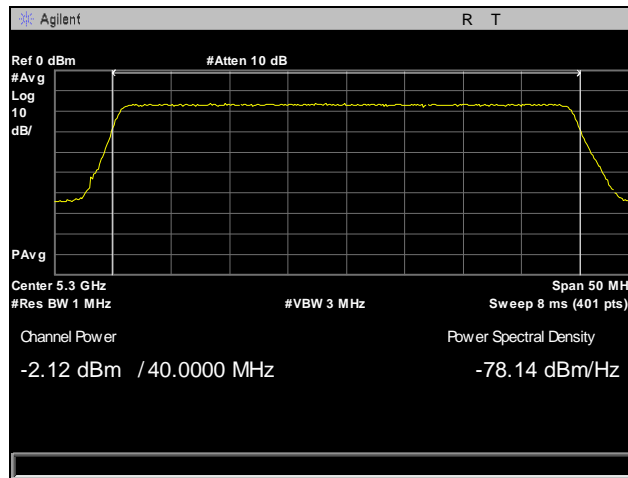


**Plot 83. Output Power, 5333 MHz, Antenna 1, 30 MHz**

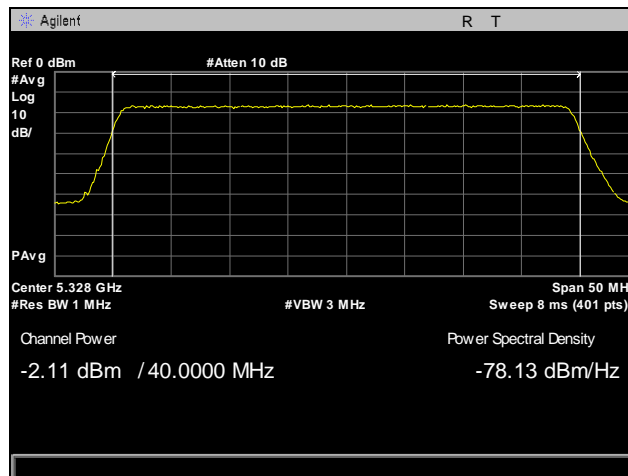
**Output Power, Antenna 0, 40 MHz, Lower Bands**



**Plot 84. Output Power, 5270 MHz, Antenna 0, 40 MHz**



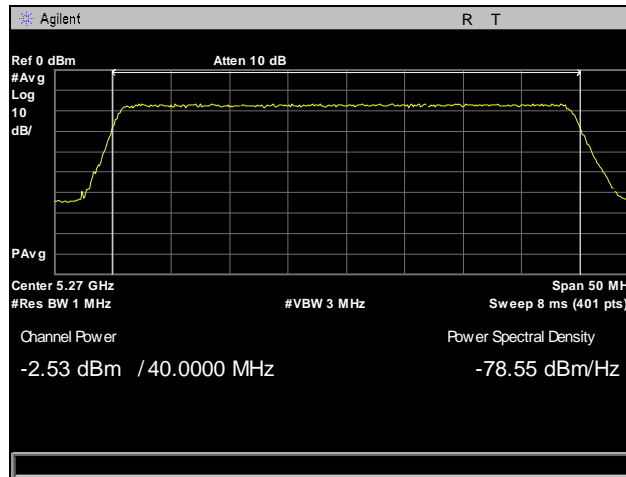
**Plot 85. Output Power, 5300 MHz, Antenna 0, 40 MHz**



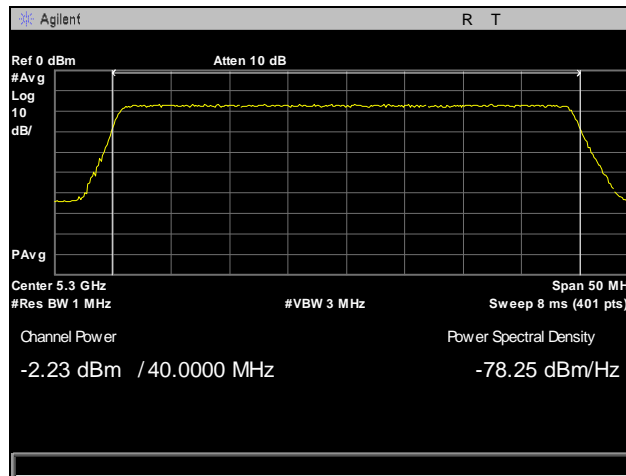
**Plot 86. Output Power, 5328 MHz, Antenna 0, 40 MHz**



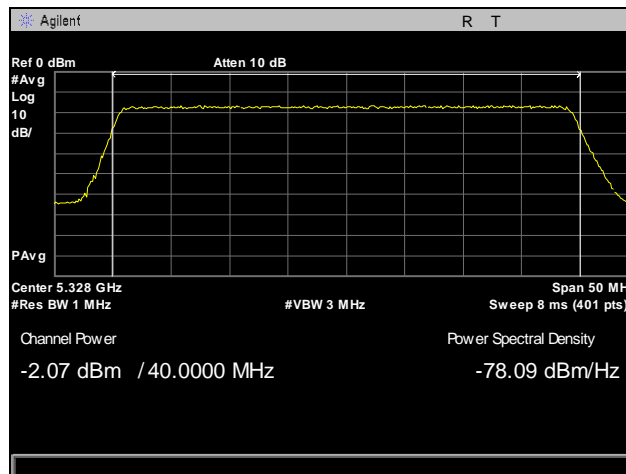
**Output Power, Antenna 1, 40 MHz, Lower Bands**



**Plot 87. Output Power, 5270 MHz, Antenna 1, 40 MHz**

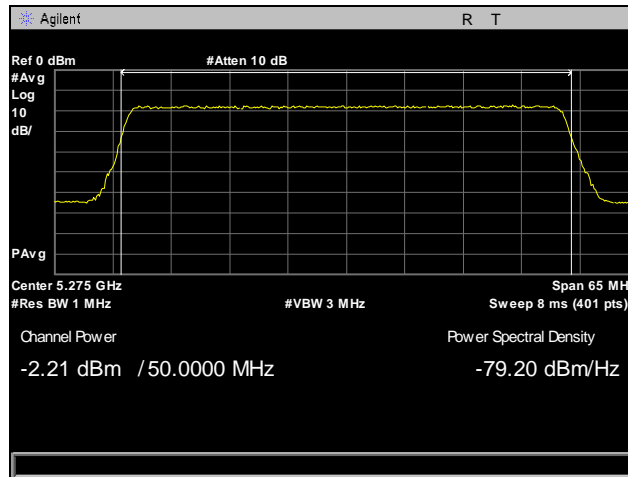


**Plot 88. Output Power, 5300 MHz, Antenna 1, 40 MHz**

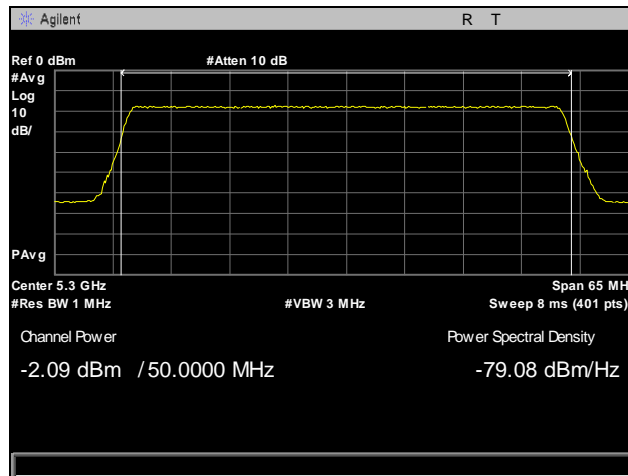


**Plot 89. Output Power, 5328 MHz, Antenna 1, 40 MHz**

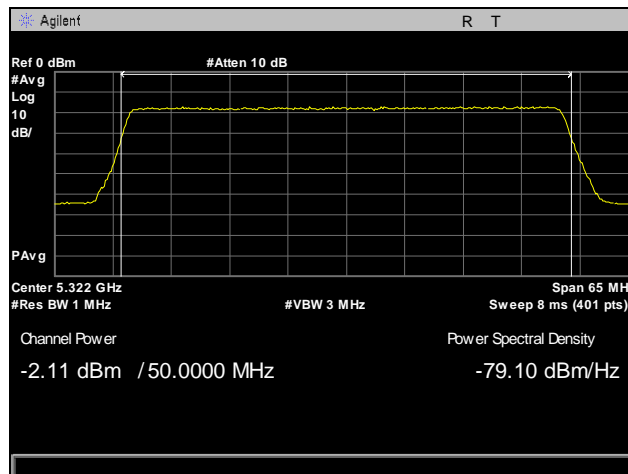
**Output Power, Antenna 0, 50 MHz, Lower Bands**



**Plot 90. Output Power, 5275 MHz, Antenna 0, 50 MHz**

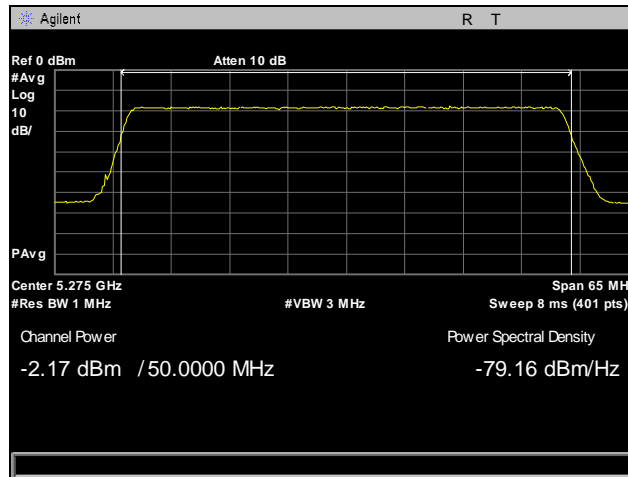


**Plot 91. Output Power, 5300 MHz, Antenna 0, 50 MHz**

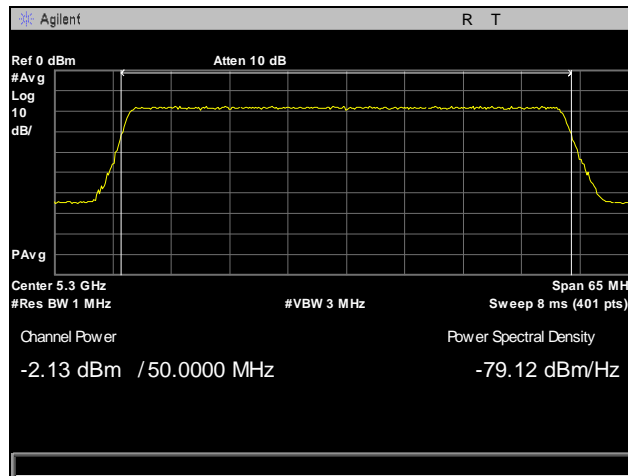


**Plot 92. Output Power, 5322 MHz, Antenna 0, 50 MHz**

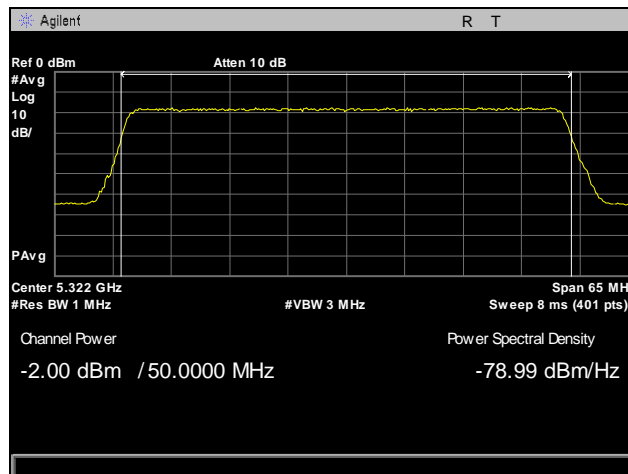
**Output Power, Antenna 1, 50 MHz, Lower Bands**



**Plot 93. Output Power, 5275 MHz, Antenna 1, 50 MHz**

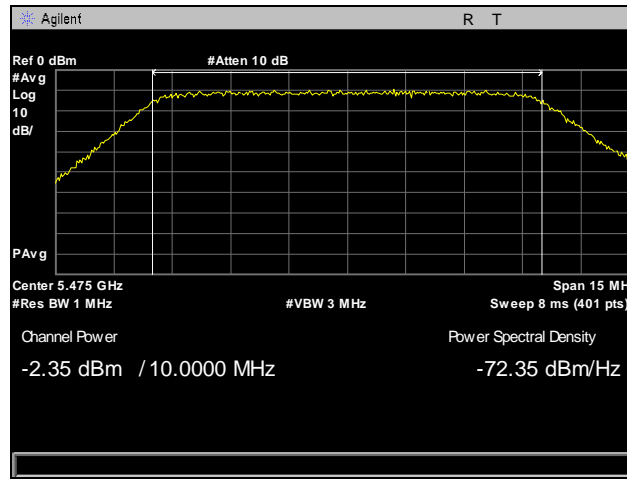


**Plot 94. Output Power, 5300 MHz, Antenna 1, 50 MHz**

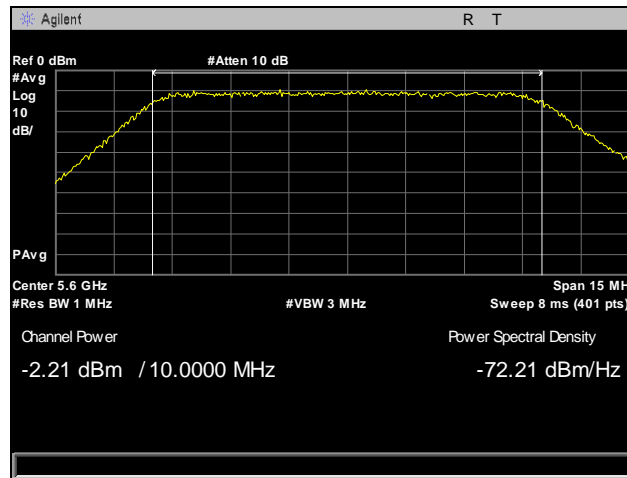


**Plot 95. Output Power, 5322 MHz, Antenna 1, 50 MHz**

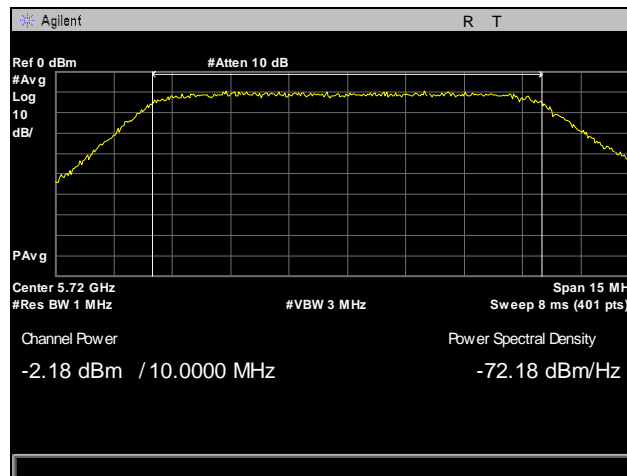
**Output Power, Antenna 0, 10 MHz, Upper Bands**



**Plot 96. Output Power, 5475 MHz, Antenna 0, 10 MHz**

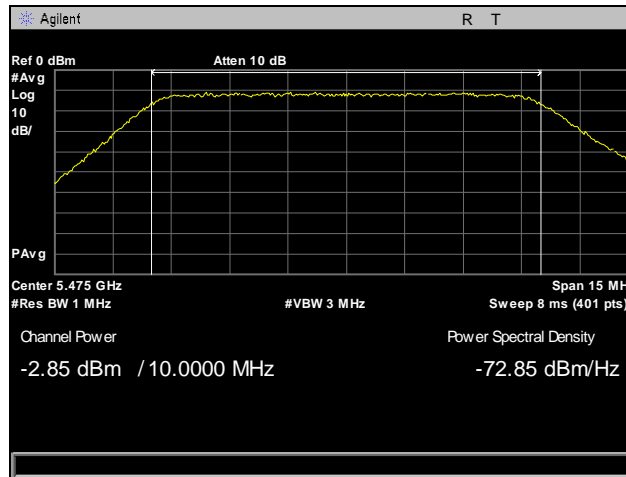


**Plot 97. Output Power, 5600 MHz, Antenna 0, 10 MHz**

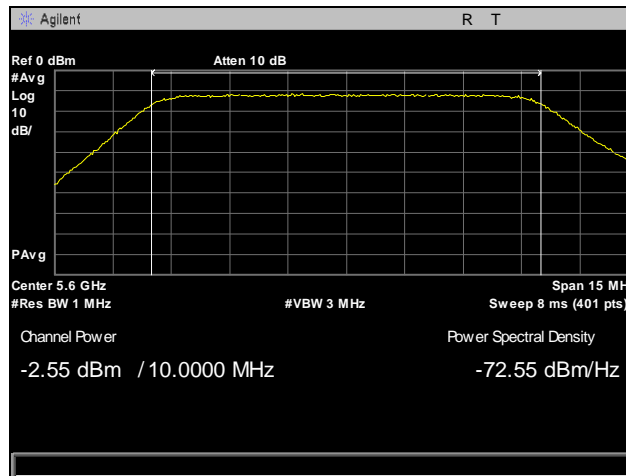


**Plot 98. Output Power, 5720 MHz, Antenna 0, 10 MHz**

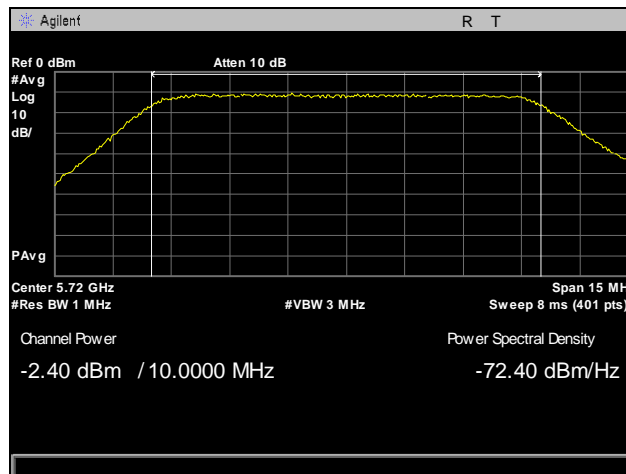
### Output Power, Antenna 1, 10 MHz, Upper Bands



Plot 99. Output Power, 5475 MHz, Antenna 1, 10 MHz

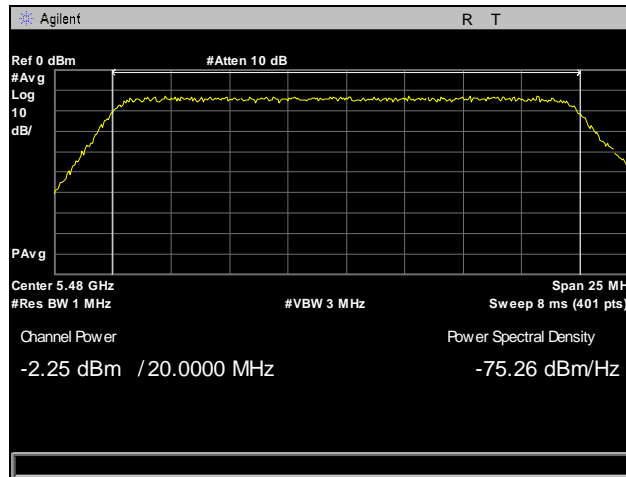


Plot 100. Output Power, 5600 MHz, Antenna 1, 10 MHz

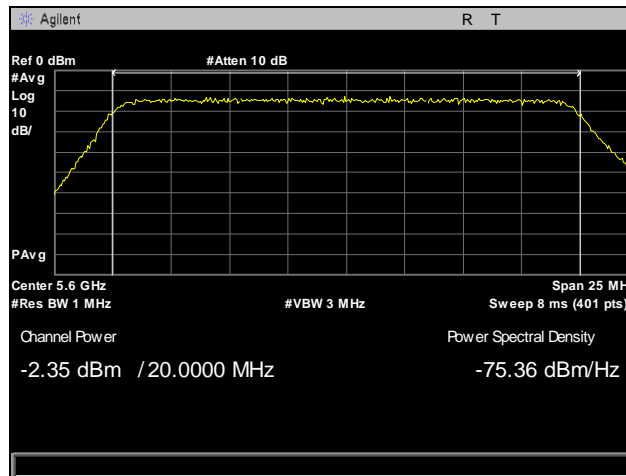


Plot 101. Output Power, 5720 MHz, Antenna 1, 10 MHz

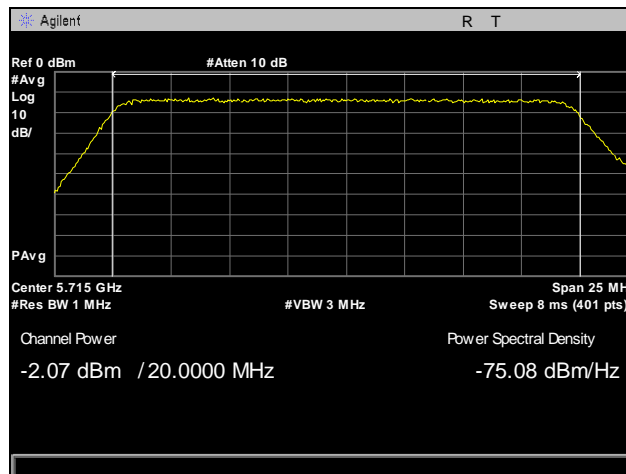
**Output Power, Antenna 0, 20 MHz, Upper Bands**



**Plot 102. Output Power, 5480 MHz, Antenna 0, 20 MHz**

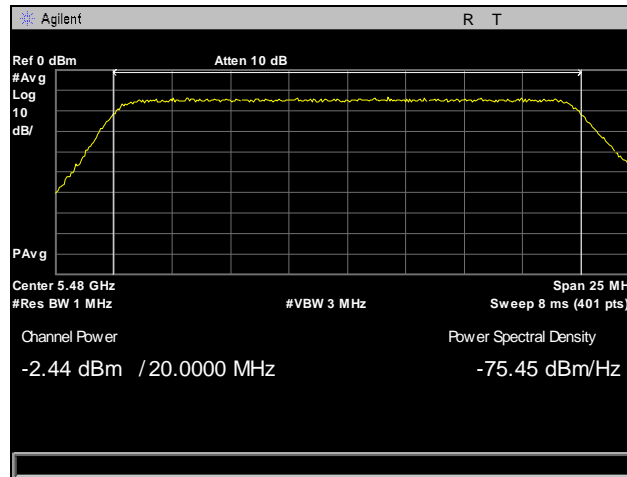


**Plot 103. Output Power, 5600 MHz, Antenna 0, 20 MHz**

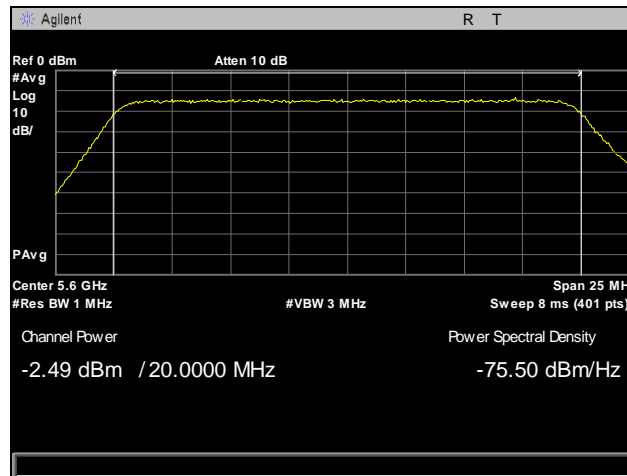


**Plot 104. Output Power, 5715 MHz, Antenna 0, 20 MHz**

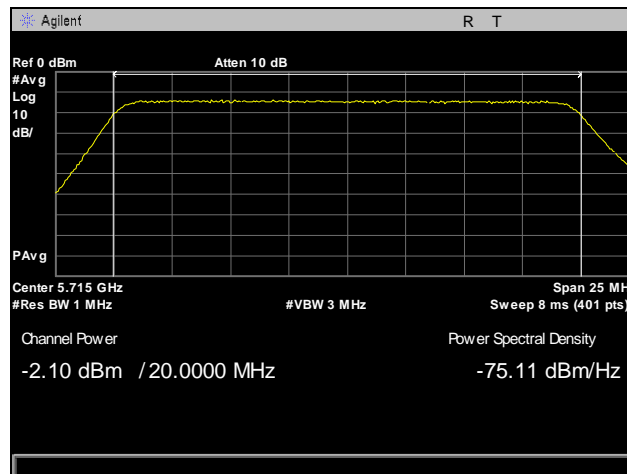
### Output Power, Antenna 1, 20 MHz, Upper Bands



Plot 105. Output Power, 5480 MHz, Antenna 1, 20 MHz

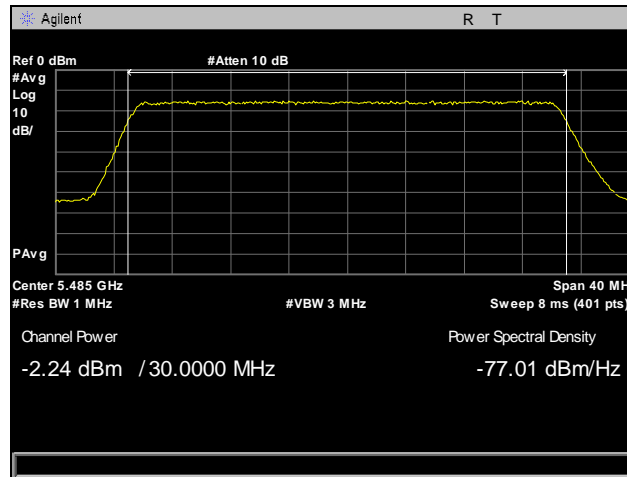


Plot 106. Output Power, 5600 MHz, Antenna 1, 20 MHz

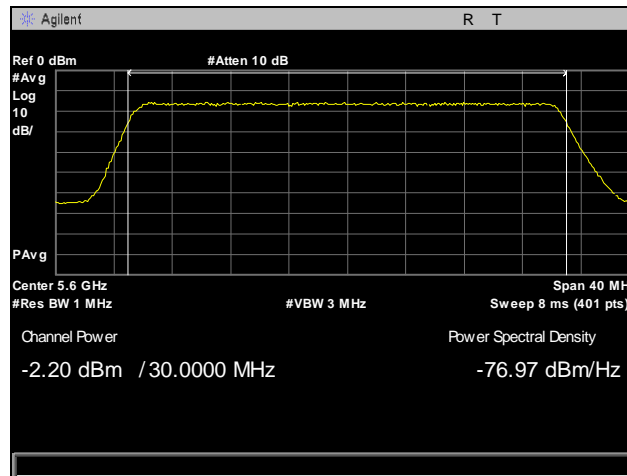


Plot 107. Output Power, 5715 MHz, Antenna 1, 20 MHz

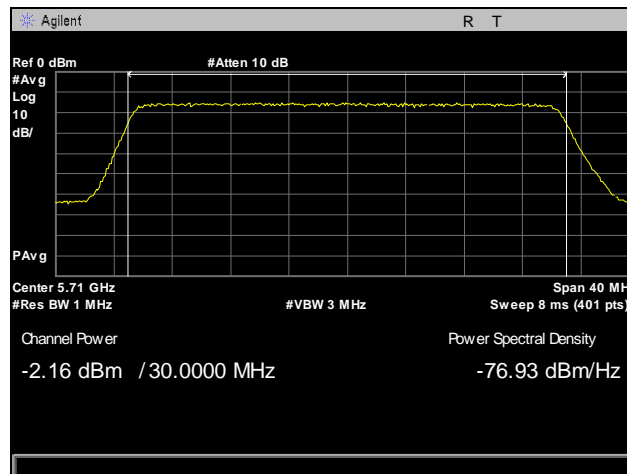
### Output Power, Antenna 0, 30 MHz, Upper Bands



Plot 108. Output Power, 4585 MHz, Antenna 0, 30 MHz



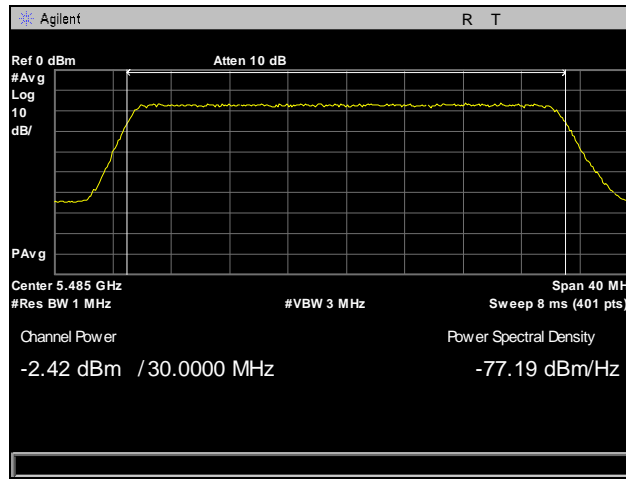
Plot 109. Output Power, 5600 MHz, Antenna 0, 30 MHz



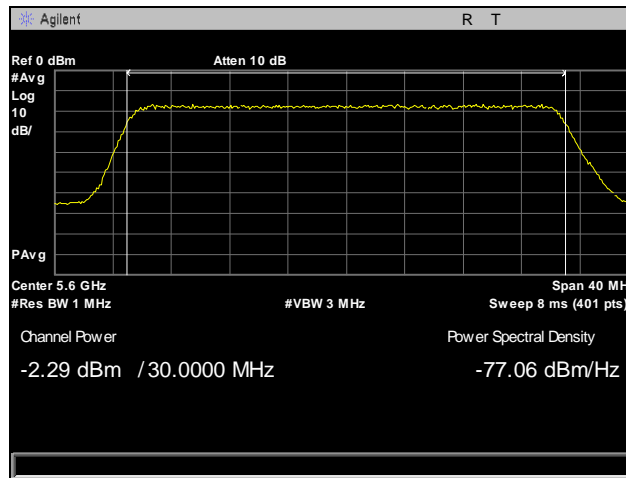
Plot 110. Output Power, 5710 MHz, Antenna 0, 30 MHz



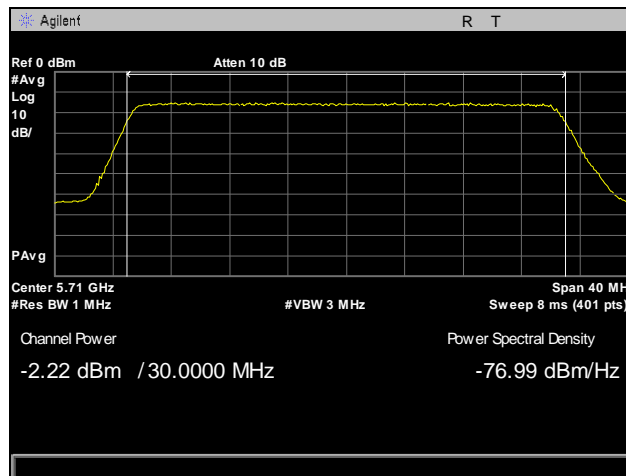
**Output Power, Antenna 1, 30 MHz, Upper Bands**



**Plot 111. Output Power, 5485 MHz, Antenna 1, 30 MHz**

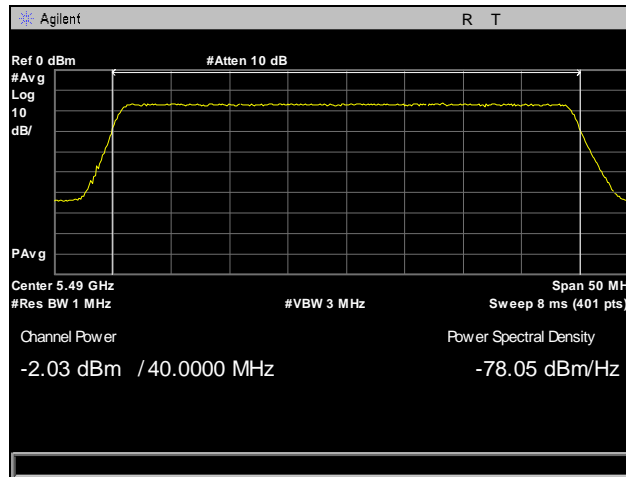


**Plot 112. Output Power, 5600 MHz, Antenna 1, 30 MHz**

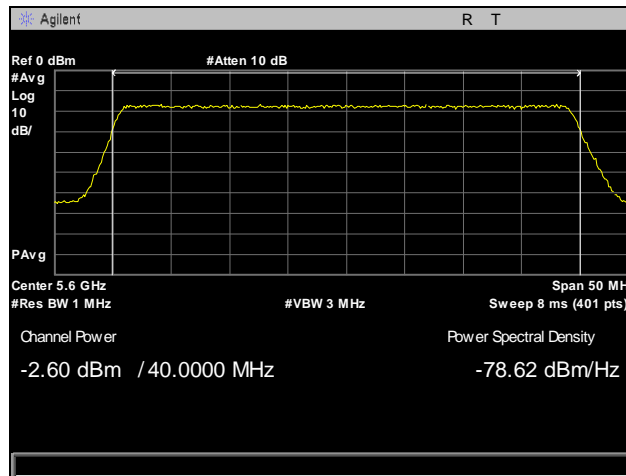


**Plot 113. Output Power, 5710 MHz, Antenna 1, 30 MHz**

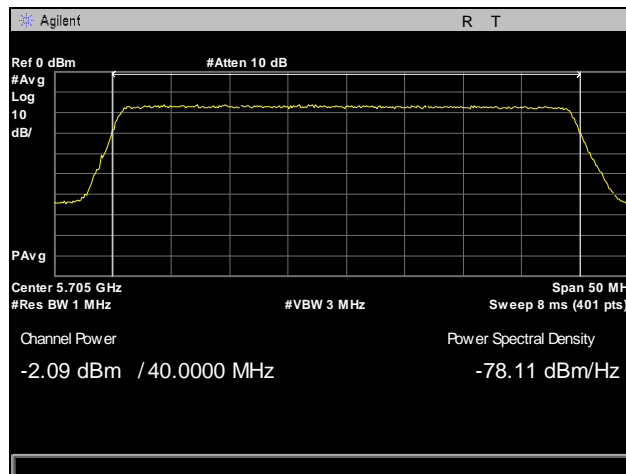
### Output Power, Antenna 0, 40 MHz, Upper Bands



Plot 114. Output Power, 5490 MHz, Antenna 0, 40 MHz

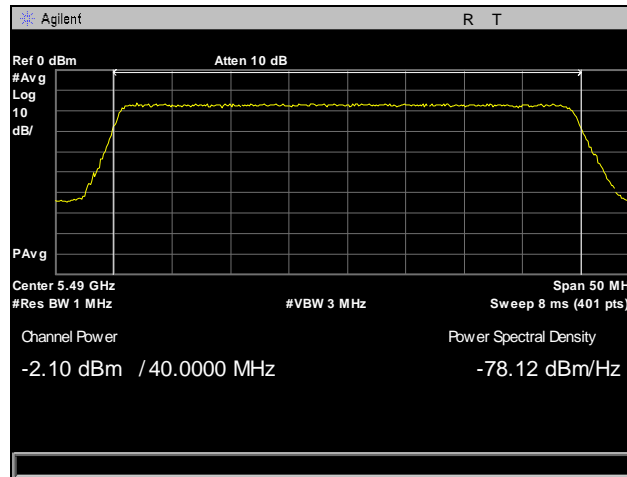


Plot 115. Output Power, 5600 MHz, Antenna 0, 40 MHz

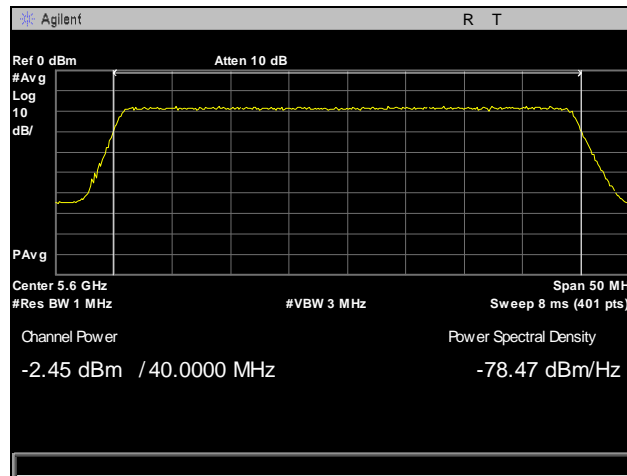


Plot 116. Output Power, 5705 MHz, Antenna 0, 40 MHz

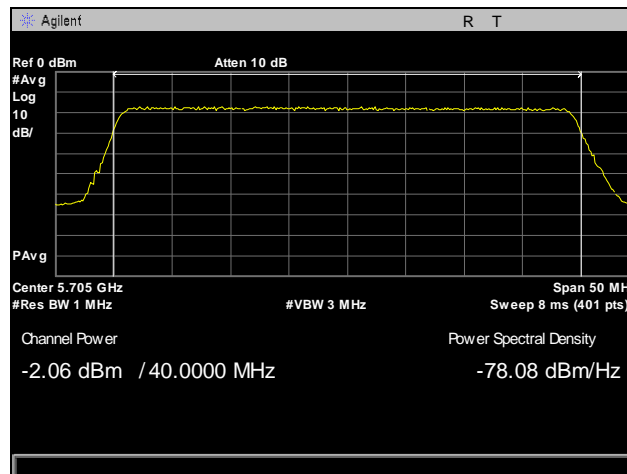
**Output Power, Antenna 1, 40 MHz, Upper Bands**



**Plot 117. Output Power, 5490 MHz, Antenna 1, 40 MHz**

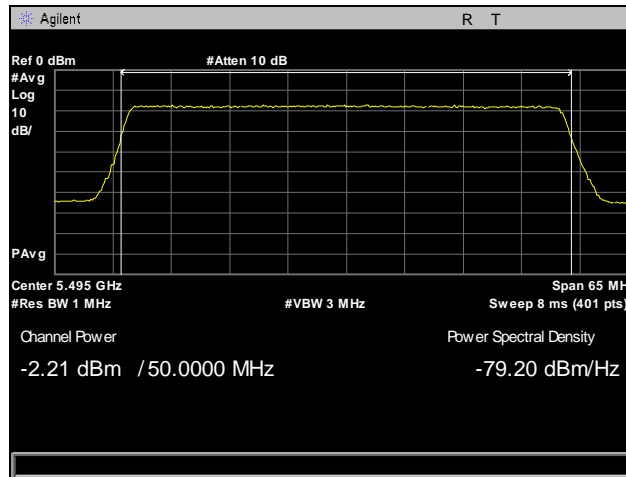


**Plot 118. Output Power, 5600 MHz, Antenna 1, 40 MHz**

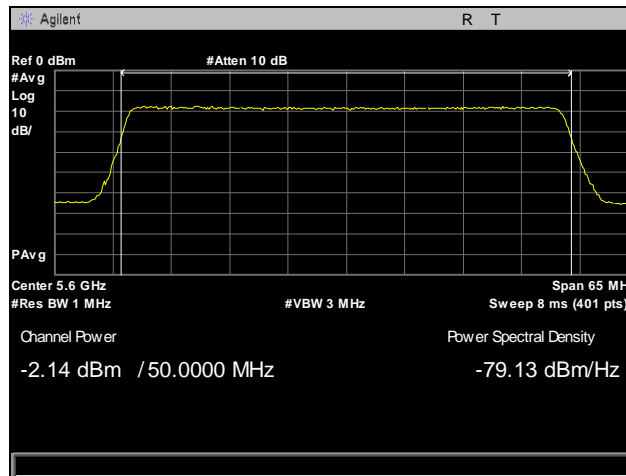


**Plot 119. Output Power, 5705 MHz, Antenna 1, 40 MHz**

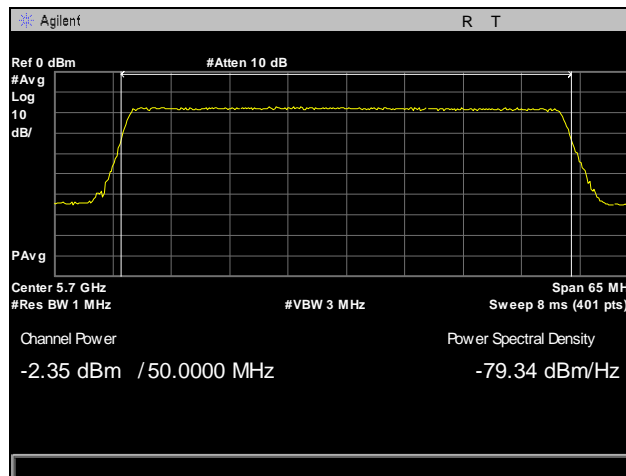
**Output Power, Antenna 0, 50 MHz, Upper Bands**



**Plot 120. Output Power, 5495 MHz, Antenna 0, 50 MHz**

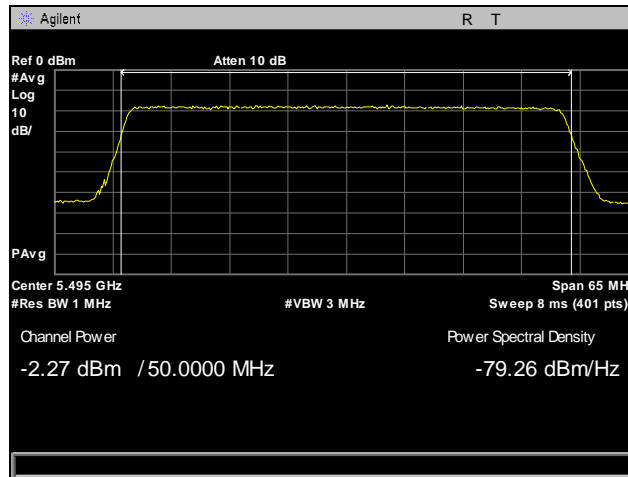


**Plot 121. Output Power, 5600 MHz, Antenna 0, 50 MHz**

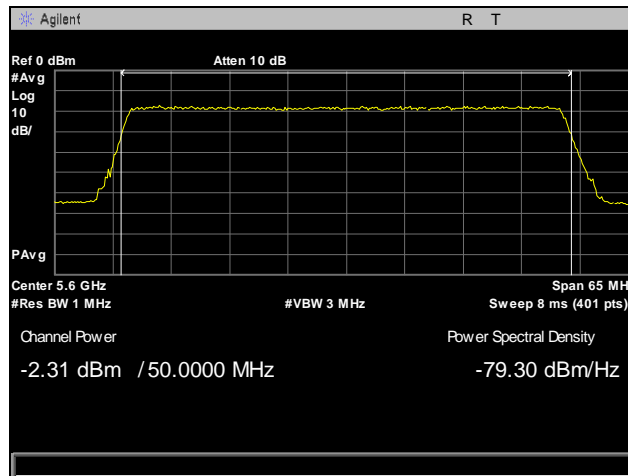


**Plot 122. Output Power, 5700 MHz, Antenna 0, 50 MHz**

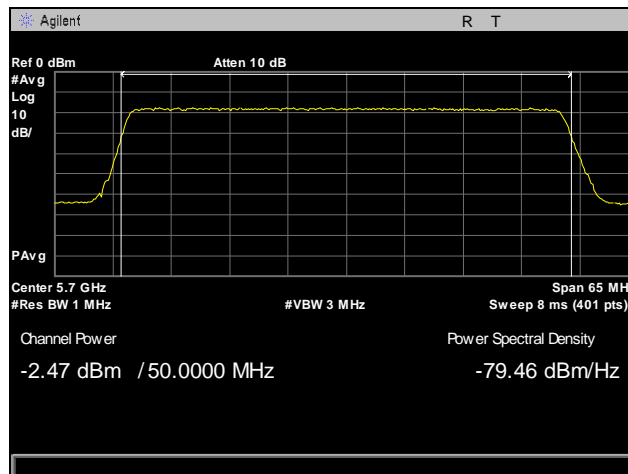
### Output Power, Antenna 1, 50 MHz, Upper Bands



Plot 123. Output Power, 5495 MHz, Antenna 1, 50 MHz



Plot 124. Output Power, 5600 MHz, Antenna 1, 50 MHz



Plot 125. Output Power, 5700 MHz, Antenna 1, 50 MHz

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.407(a)(2) Peak Power Spectral Density

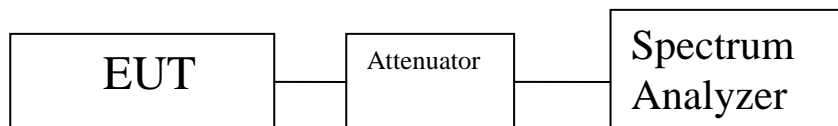
**Test Requirements:** § 15.407(a)(2): In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced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

**Test Procedure:** The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level on the EUT. The RBW was set to 1MHz and the VBW was set to 3MHz. The method of measurement used was method SA-1 from 789033 D02 General UNII Test Procedures v01. Plots are correct for attenuators and cable loss. Tables provide power levels for both a 29 dBi and 34 dBi antenna as mentioned in 15.203.

**Test Results:** Equipment was compliant with the peak power spectral density limits of § 15.407 (a)(2).

**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 01/15/15



**Figure 3. Power Spectral Density Test Setup**

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	-15.692	-15.328	0.027	0.029	0.056	-12.496	Compliant
5300	-15.370	-15.410	0.029	0.029	0.058	-12.380	Compliant
5342	-15.560	-15.299	0.028	0.030	0.057	-12.417	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	-15.197	-15.866	0.030	0.026	0.056	-12.508	Compliant
5300	-15.649	-15.154	0.027	0.031	0.058	-12.384	Compliant
5338	-15.578	-15.673	0.028	0.027	0.055	-12.615	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	-16.260	-15.460	0.024	0.028	0.052	-12.831	Complaint
5300	-15.670	-14.980	0.027	0.032	0.059	-12.301	Complaint
5333	-15.470	-15.650	0.028	0.027	0.056	-12.549	Complaint
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	-16.670	-16.320	0.022	0.023	0.045	-13.481	Complaint
5300	-16.470	-16.520	0.023	0.022	0.045	-13.485	Complaint
5328	-17.080	-16.130	0.020	0.024	0.044	-13.569	Complaint
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	-18.360	-17.570	0.015	0.017	0.032	-14.937	Complaint
5300	-18.190	-17.360	0.015	0.018	0.034	-14.745	Complaint
5322	-17.820	-17.330	0.017	0.018	0.035	-14.558	Complaint

Table 21. Peak Spectral Density, Test Results, Lower Bands, 29 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	-16.384	-15.904	0.023	0.026	0.049	-13.127	Compliant
5600	-16.006	-15.162	0.025	0.030	0.056	-12.553	Compliant
5720	-15.810	-16.383	0.026	0.023	0.049	-13.077	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	-15.652	-15.986	0.027	0.025	0.052	-12.805	Compliant
5600	-15.942	-15.542	0.025	0.028	0.053	-12.727	Compliant
5715	-15.420	-16.319	0.029	0.023	0.052	-12.836	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	-15.240	-15.530	0.030	0.028	0.058	-12.372	Compliant
5600	-15.830	-15.910	0.026	0.026	0.052	-12.860	Compliant
5710	-15.910	-15.750	0.026	0.027	0.052	-12.819	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	-17.360	-16.240	0.018	0.024	0.042	-13.754	Compliant
5600	-17.560	-17.030	0.018	0.020	0.037	-14.277	Compliant
5705	-16.910	-16.420	0.020	0.023	0.043	-13.648	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	-18.240	-17.320	0.015	0.019	0.034	-14.745	Compliant
5600	-18.100	-17.330	0.015	0.018	0.034	-14.688	Compliant
5700	-18.350	-17.940	0.015	0.016	0.031	-15.130	Compliant

Table 22. Peak Spectral Density, Test Results, Upper Bands, 29 dBi Antenna



10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	-20.782	-20.418	0.008	0.009	0.017	-17.586	Compliant
5300	-20.460	-20.500	0.009	0.009	0.018	-17.470	Compliant
5342	-20.650	-20.389	0.009	0.009	0.018	-17.507	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	-20.157	-20.826	0.010	0.008	0.018	-17.468	Compliant
5300	-20.609	-20.114	0.009	0.010	0.018	-17.344	Compliant
5338	-20.538	-20.633	0.009	0.009	0.017	-17.575	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	-21.900	-21.100	0.006	0.008	0.014	-18.471	Complaint
5300	-21.310	-20.620	0.007	0.009	0.016	-17.941	Complaint
5333	-21.110	-21.290	0.008	0.007	0.015	-18.189	Complaint
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	-22.340	-21.990	0.006	0.006	0.012	-19.151	Complaint
5300	-22.140	-22.190	0.006	0.006	0.012	-19.155	Complaint
5328	-22.750	-21.800	0.005	0.007	0.012	-19.239	Complaint
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	-23.770	-22.980	0.004	0.005	0.009	-20.347	Complaint
5300	-23.600	-22.770	0.004	0.005	0.010	-20.155	Complaint
5322	-23.230	-22.740	0.005	0.005	0.010	-19.968	Complaint

Table 23. Peak Spectral Density, Test Results, Lower Bands, 34 dBi Antenna

10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	-20.664	-20.184	0.009	0.010	0.018	-17.407	Compliant
5600	-20.486	-19.642	0.009	0.011	0.020	-17.033	Compliant
5720	-20.090	-20.663	0.010	0.009	0.018	-17.357	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	-19.952	-20.286	0.010	0.009	0.019	-17.105	Compliant
5600	-20.242	-19.842	0.009	0.010	0.020	-17.027	Compliant
5715	-19.720	-20.619	0.011	0.009	0.019	-17.136	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	-20.790	-21.080	0.008	0.008	0.016	-17.922	Compliant
5600	-21.380	-21.460	0.007	0.007	0.014	-18.410	Compliant
5710	-21.460	-21.300	0.007	0.007	0.015	-18.369	Compliant
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	-22.610	-21.490	0.005	0.007	0.013	-19.004	Compliant
5600	-22.810	-22.280	0.005	0.006	0.011	-19.527	Compliant
5705	-22.160	-21.670	0.006	0.007	0.013	-18.898	Compliant
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	-22.960	-22.040	0.005	0.006	0.011	-19.465	Compliant
5600	-22.820	-22.050	0.005	0.006	0.011	-19.408	Compliant
5700	-23.070	-22.660	0.005	0.005	0.010	-19.850	Compliant

Table 24. Peak Spectral Density, Test Results, Upper Bands, 34 dBi Antenna

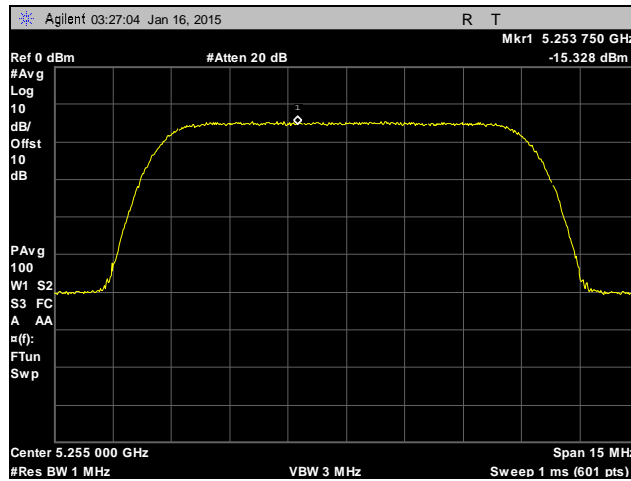
10 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5255	-9.251	-9.322	0.119	0.117	0.236	-6.276	Compliant
5300	-9.769	-9.080	0.105	0.124	0.229	-6.401	Compliant
5344	-9.144	-9.188	0.122	0.121	0.242	-6.156	Compliant
20 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5260	-9.077	-9.390	0.124	0.115	0.239	-6.220	Compliant
5300	-9.823	-9.226	0.104	0.120	0.224	-6.504	Compliant
5339	-9.099	-9.371	0.123	0.116	0.239	-6.223	Compliant
30 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5265	-10.210	-11.150	0.095	0.077	0.172	-7.644	Complaint
5300	-9.723	-10.020	0.107	0.100	0.206	-6.859	Complaint
5333	-9.656	-9.613	0.108	0.109	0.218	-6.624	Complaint
40 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5270	-11.390	-11.190	0.073	0.076	0.149	-8.279	Complaint
5300	-11.370	-10.850	0.073	0.082	0.155	-8.092	Complaint
5328	-11.910	-10.810	0.064	0.083	0.147	-8.315	Complaint
50 MHz							
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5275	-12.920	-12.110	0.051	0.062	0.113	-9.486	Complaint
5300	-12.630	-11.740	0.055	0.067	0.122	-9.152	Complaint
5322	-12.190	-11.770	0.060	0.067	0.127	-8.965	Complaint

Table 25. Peak Spectral Density, Test Results, Lower Bands, 23 dBi Antenna

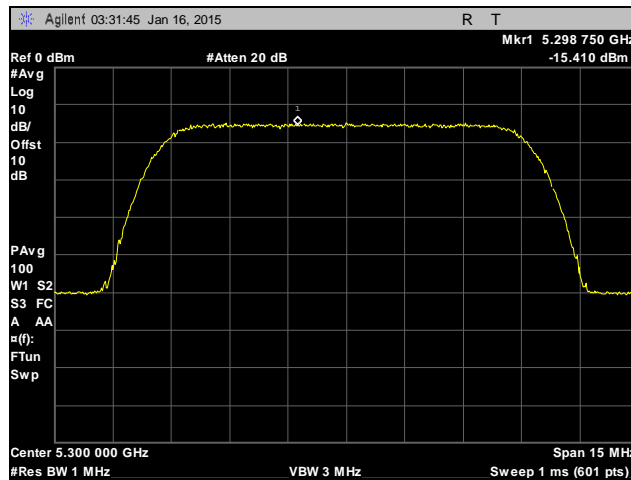
10 MHz									
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5475	-9.216	-9.931	-13.396	-14.111	0.046	0.039	0.085	-10.729	Compliant
5600	-9.317	-9.768	-13.497	-13.948	0.045	0.040	0.085	-10.706	Compliant
5720	-9.120	-9.169	-13.300	-13.349	0.047	0.046	0.093	-10.314	Compliant
20 MHz									
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5480	-9.049	-9.679	-13.349	-13.979	0.046	0.040	0.086	-10.642	Compliant
5600	-9.755	-9.181	-14.055	-13.481	0.039	0.045	0.084	-10.748	Compliant
5715	-10.230	-9.275	-14.530	-13.575	0.035	0.044	0.079	-11.016	Compliant
30 MHz									
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5485	-10.670	-10.690	-16.220	-16.240	0.024	0.024	0.048	-13.220	Compliant
5600	-10.350	-9.555	-15.900	-15.105	0.026	0.031	0.057	-12.474	Compliant
5710	-9.727	-9.367	-15.277	-14.917	0.030	0.032	0.062	-12.083	Compliant
40 MHz									
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5490	-11.730	-11.030	-16.980	-16.280	0.020	0.024	0.044	-13.606	Compliant
5600	-11.030	-10.690	-16.280	-15.940	0.024	0.025	0.049	-13.096	Compliant
5705	-9.264	-10.730	-14.514	-15.980	0.035	0.025	0.061	-12.175	Compliant
50 MHz									
Freq.	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (dBm)	Antenna 0 (dBm)	Antenna 1 (mW)	Antenna 0 (mW)	Sum (mW)	Sum (dBm)	Result
5495	-12.220	-11.870	-16.940	-16.590	0.020	0.022	0.042	-13.751	Compliant
5600	-12.740	-11.790	-17.460	-16.510	0.018	0.022	0.040	-13.949	Compliant
5700	-11.990	-11.090	-16.710	-15.810	0.021	0.026	0.048	-13.226	Compliant

Table 26. Peak Spectral Density, Test Results, Upper Bands, 23 dBi Antenna

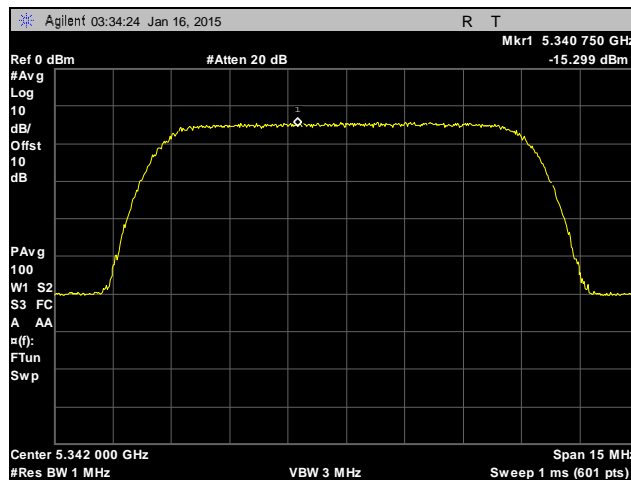
**Power Spectral Density, Antenna 0, 10 MHz, Lower Bands**



**Plot 126. Power Spectral Density, 5255 MHz, Antenna 0, 10 MHz**

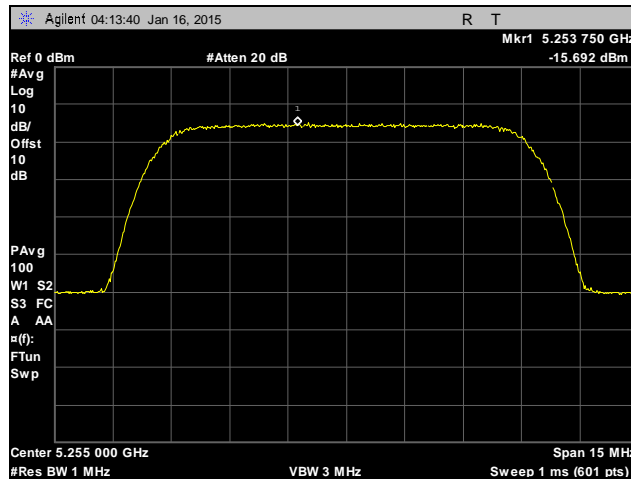


**Plot 127. Power Spectral Density, 5300 MHz, Antenna 0, 10 MHz**

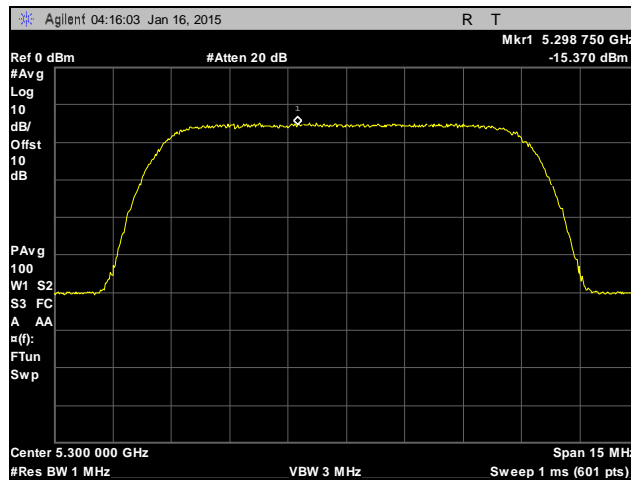


**Plot 128. Power Spectral Density, 5342 MHz, Antenna 0, 10 MHz**

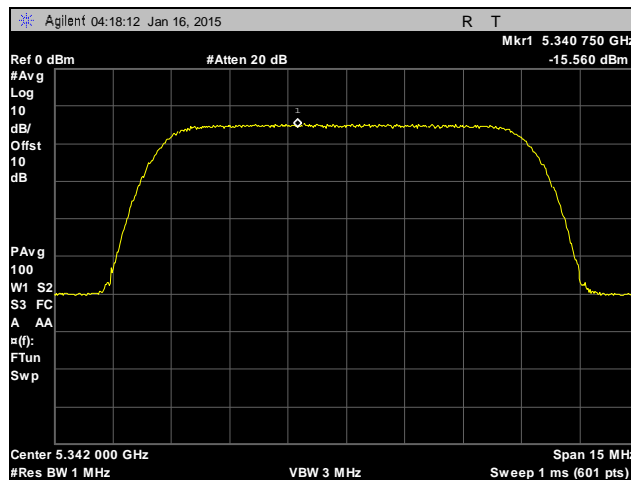
### Power Spectral Density, Antenna 1, 10 MHz, Lower Bands



Plot 129. Power Spectral Density, 5255 MHz, Antenna 1, 10 MHz

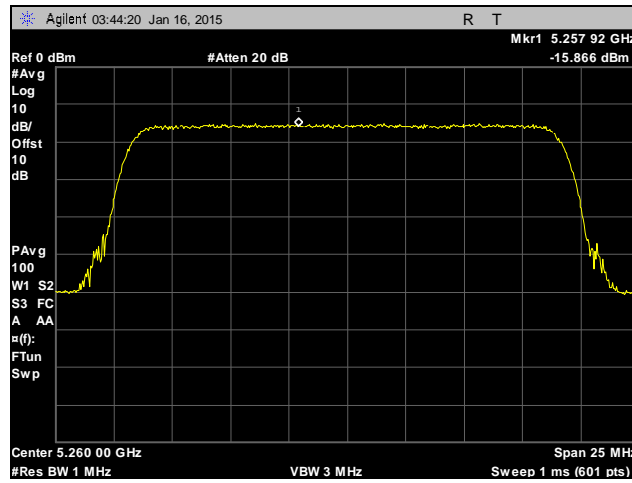


Plot 130. Power Spectral Density, 5300 MHz, Antenna 1, 10 MHz

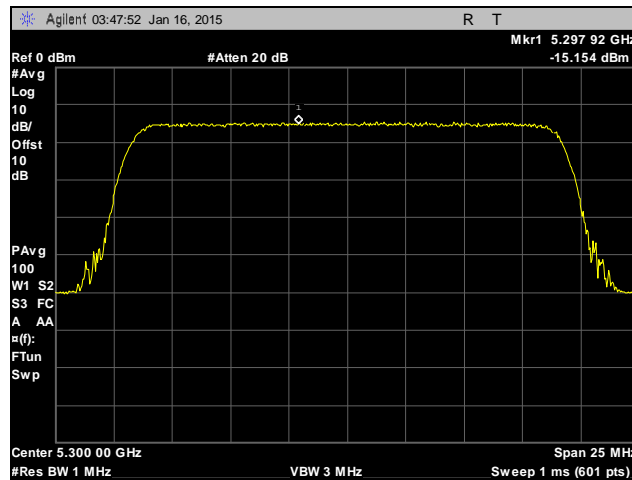


Plot 131. Power Spectral Density, 5342 MHz, Antenna 1, 10 MHz

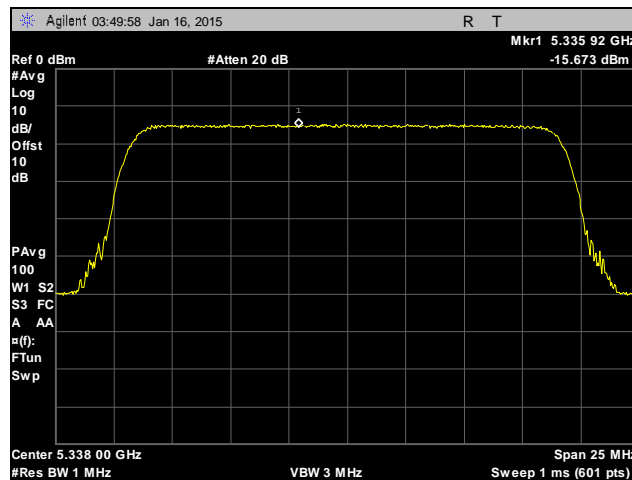
### Power Spectral Density, Antenna 0, 20 MHz, Lower Bands



Plot 132. Power Spectral Density, 5260 MHz, Antenna 0, 20 MHz

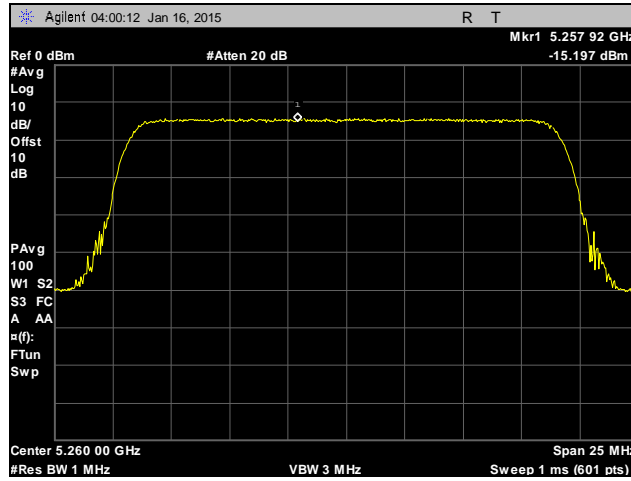


Plot 133. Power Spectral Density, 5300 MHz, Antenna 0, 20 MHz

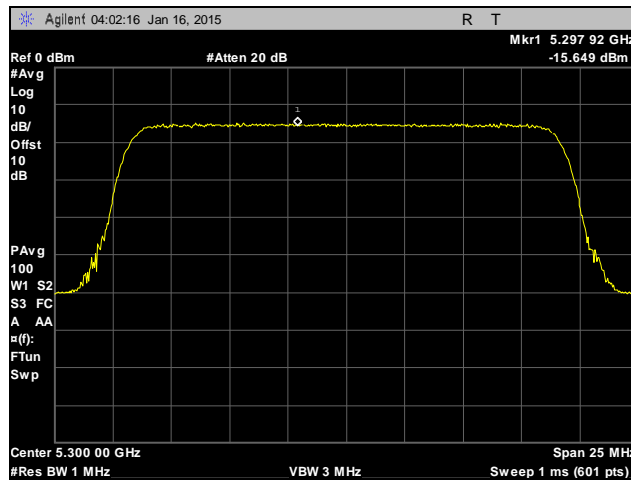


Plot 134. Power Spectral Density, 5338 MHz, Antenna 0, 20 MHz

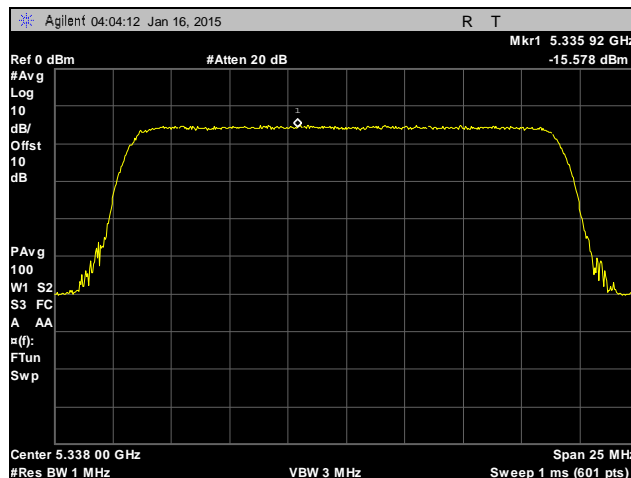
**Power Spectral Density, Antenna 1, 20 MHz, Lower Bands**



**Plot 135. Power Spectral Density, 5260 MHz, Antenna 1, 20 MHz**



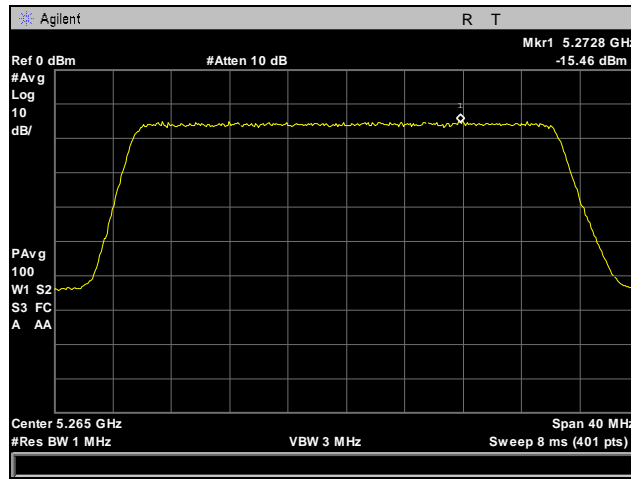
**Plot 136. Power Spectral Density, 5300 MHz, Antenna 1, 20 MHz**



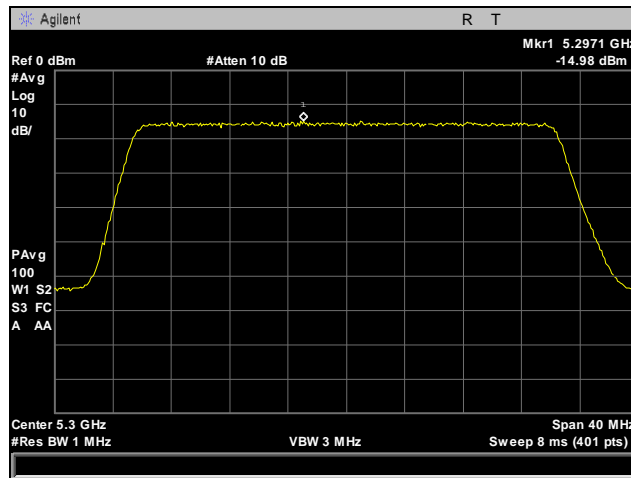
**Plot 137. Power Spectral Density, 5338 MHz, Antenna 1, 20 MHz**



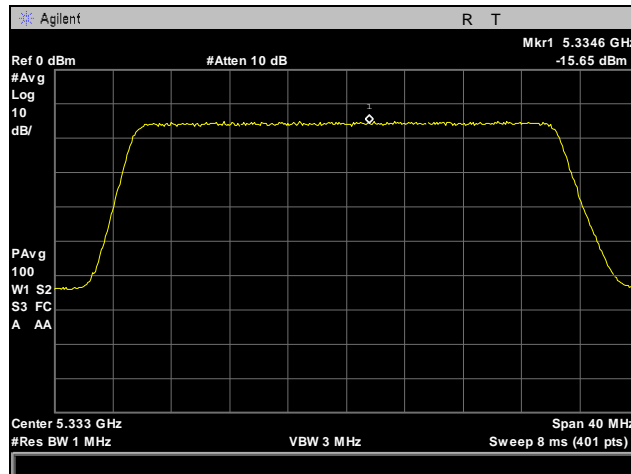
### Power Spectral Density, Antenna 0, 30 MHz, Lower Bands



Plot 138. Power Spectral Density, 5265 MHz, Antenna 0, 30 MHz

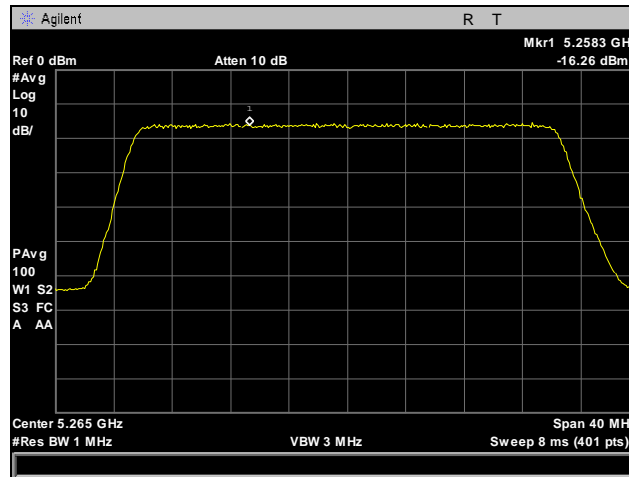


Plot 139. Power Spectral Density, 5300 MHz, Antenna 0, 30 MHz

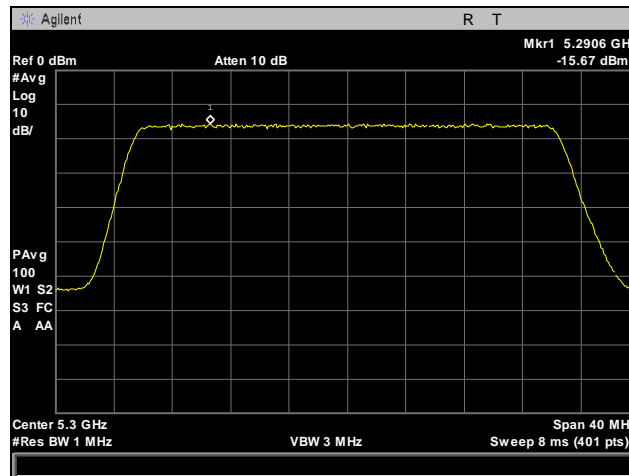


Plot 140. Power Spectral Density, 5333 MHz, Antenna 0, 30 MHz

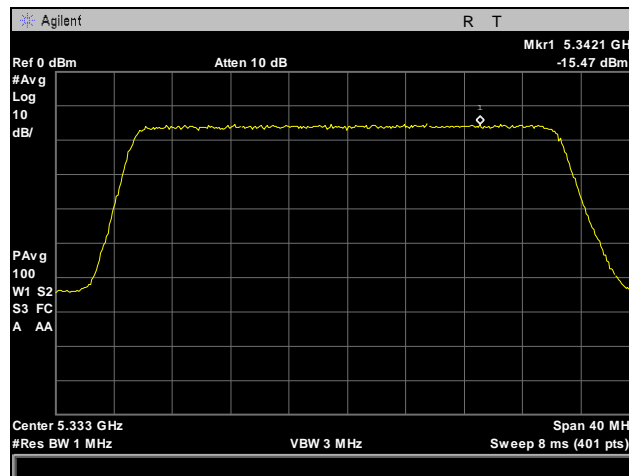
**Power Spectral Density, Antenna 1, 30 MHz, Lower Bands**



**Plot 141. Power Spectral Density, 5265 MHz, Antenna 1, 30 MHz**

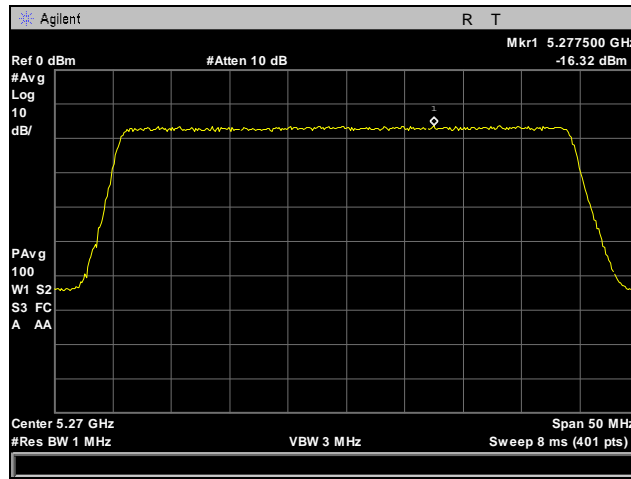


**Plot 142. Power Spectral Density, 5300 MHz, Antenna 1, 30 MHz**

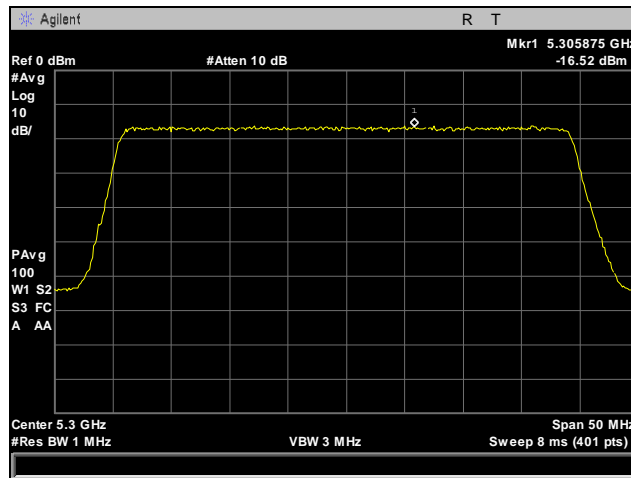


**Plot 143. Power Spectral Density, 5333 MHz, Antenna 1, 30 MHz**

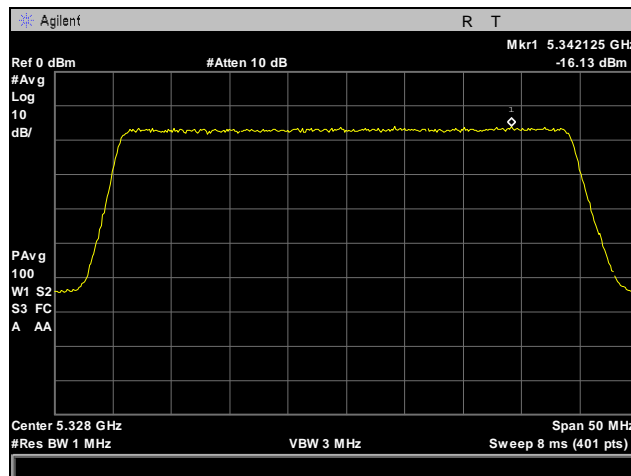
**Power Spectral Density, Antenna 0, 40 MHz, Lower Bands**



**Plot 144. Power Spectral Density, 5270 MHz, Antenna 0, 40 MHz**

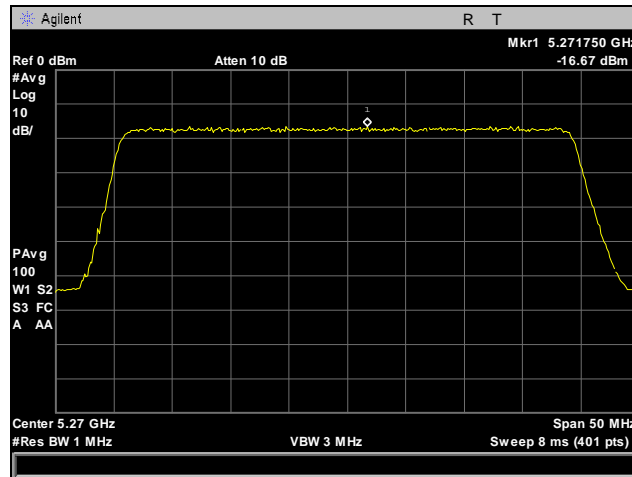


**Plot 145. Power Spectral Density, 5300 MHz, Antenna 0, 40 MHz**

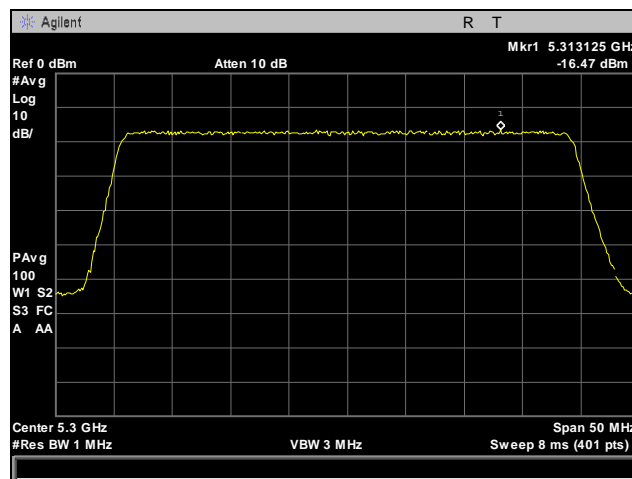


**Plot 146. Power Spectral Density, 5328 MHz, Antenna 0, 40 MHz**

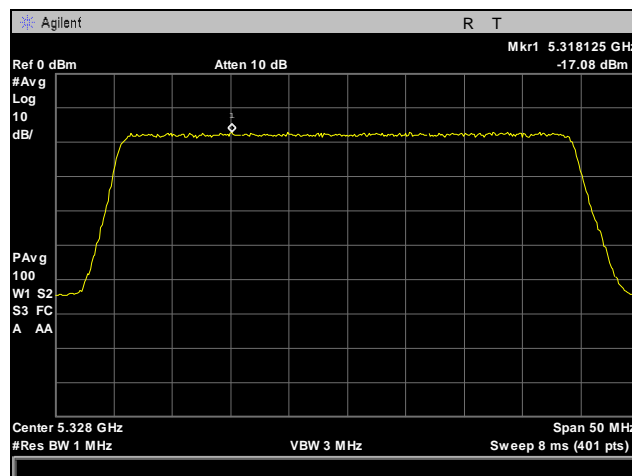
**Power Spectral Density, Antenna 1, 40 MHz, Lower Bands**



**Plot 147. Power Spectral Density, 5270 MHz, Antenna 1, 40 MHz**

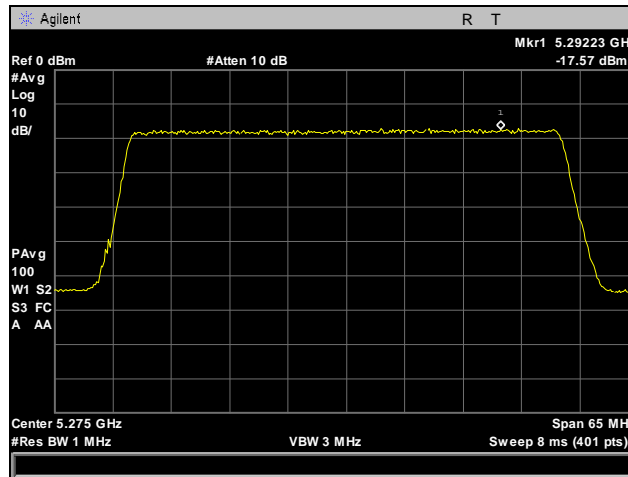


**Plot 148. Power Spectral Density, 5300 MHz, Antenna 1, 40 MHz**

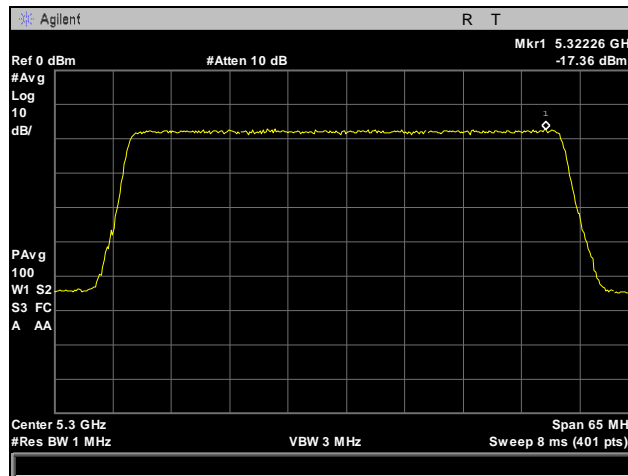


**Plot 149. Power Spectral Density, 5328 MHz, Antenna 1, 40 MHz**

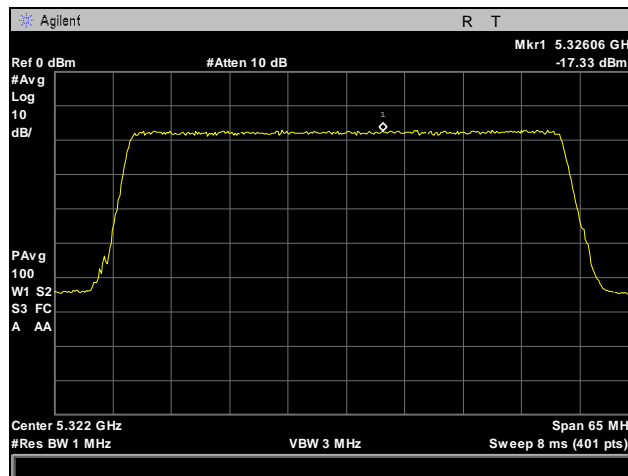
**Power Spectral Density, Antenna 0, 50 MHz, Lower Bands**



**Plot 150. Power Spectral Density, 5275 MHz, Antenna 0, 50 MHz**

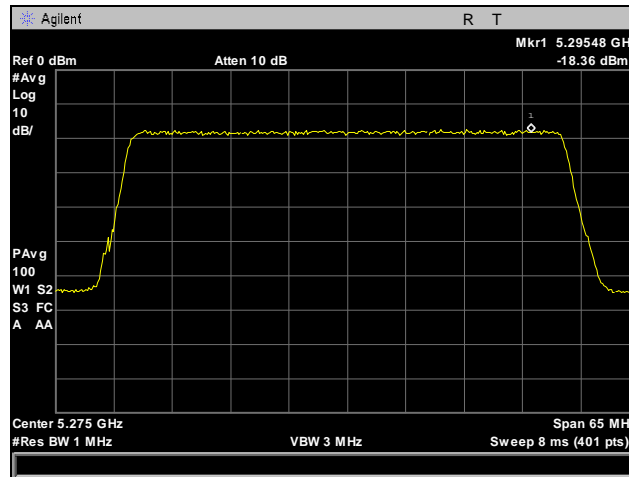


**Plot 151. Power Spectral Density, 5300 MHz, Antenna 0, 50 MHz**

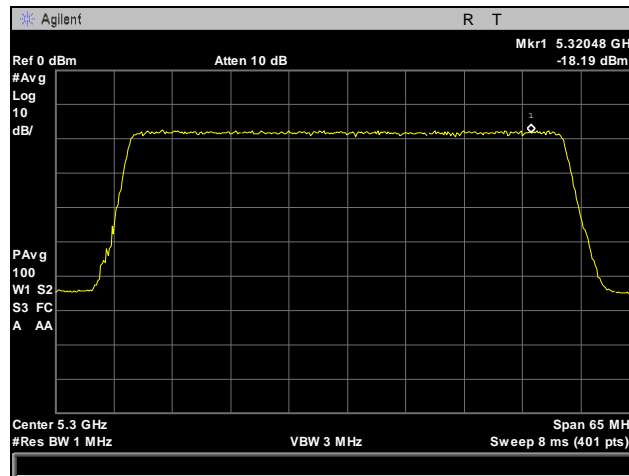


**Plot 152. Power Spectral Density, 5322 MHz, Antenna 0, 50 MHz**

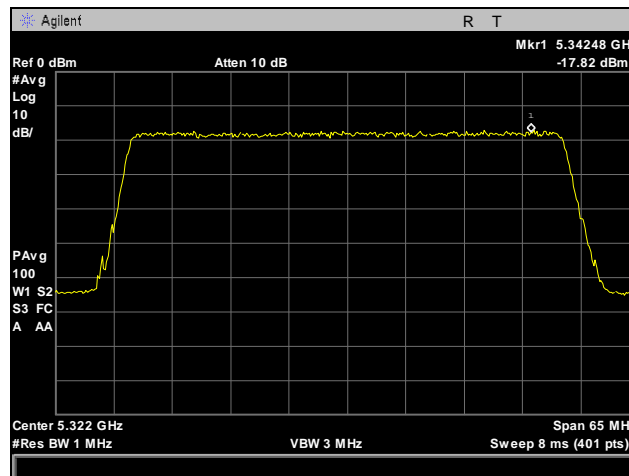
**Power Spectral Density, Antenna 1, 50 MHz, Lower Bands**



**Plot 153. Power Spectral Density, 5275 MHz, Antenna 1, 50 MHz**

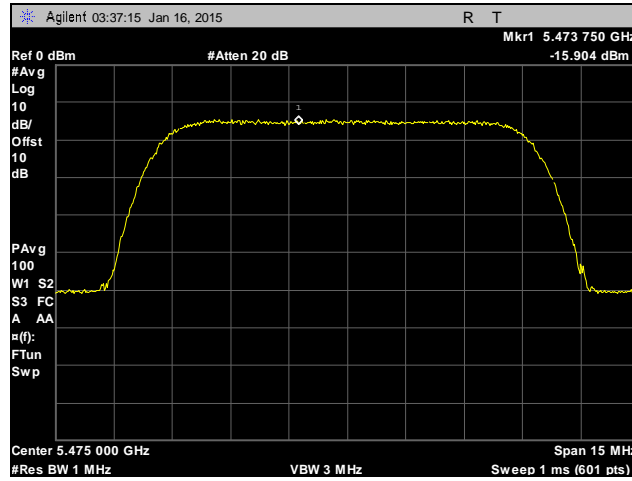


**Plot 154. Power Spectral Density, 5300 MHz, Antenna 1, 50 MHz**

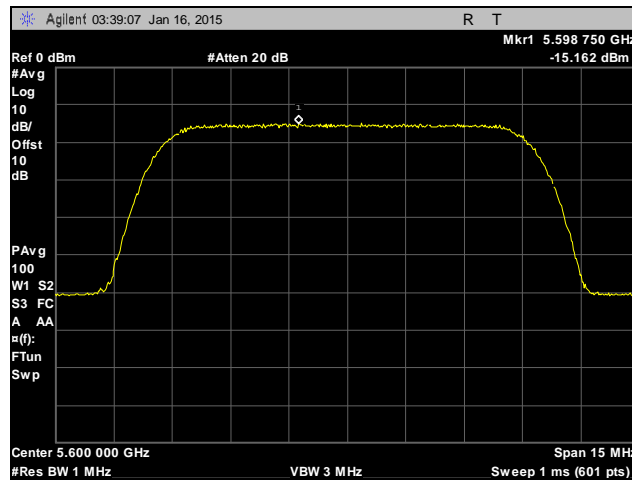


**Plot 155. Power Spectral Density, 5322 MHz, Antenna 1, 50 MHz**

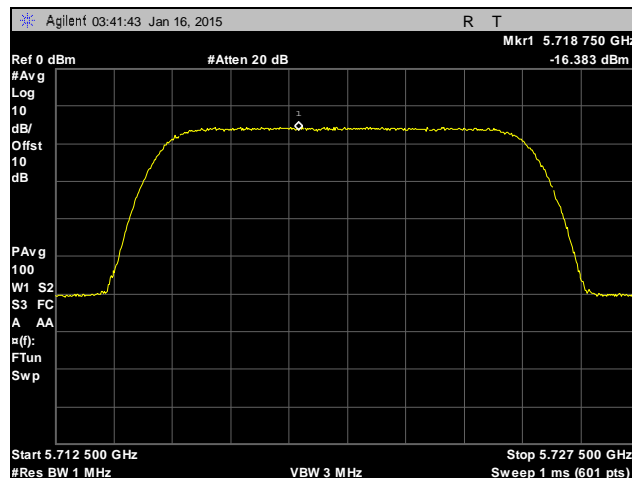
### Power Spectral Density, Antenna 0, 10 MHz, Upper Bands



Plot 156. Power Spectral Density, 5475 MHz, Antenna 0, 10 MHz

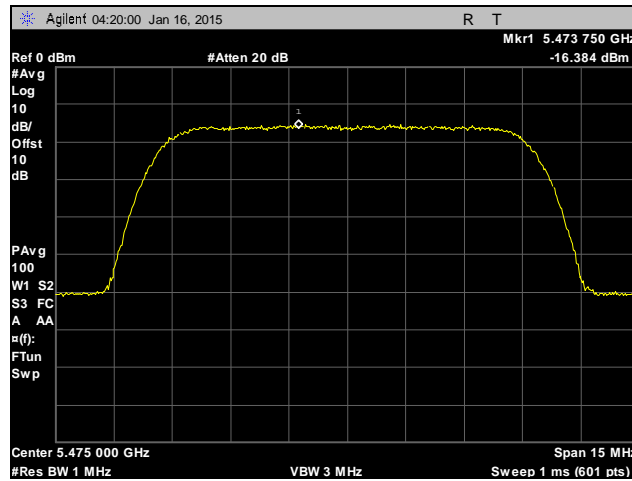


Plot 157. Power Spectral Density, 5600 MHz, Antenna 0, 10 MHz

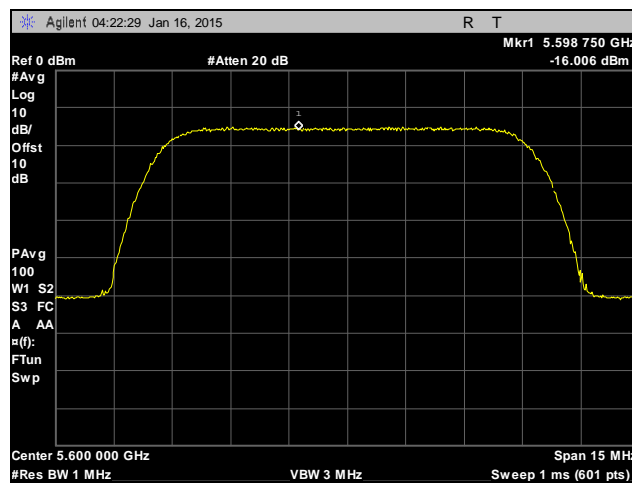


Plot 158. Power Spectral Density, 5720 MHz, Antenna 0, 10 MHz

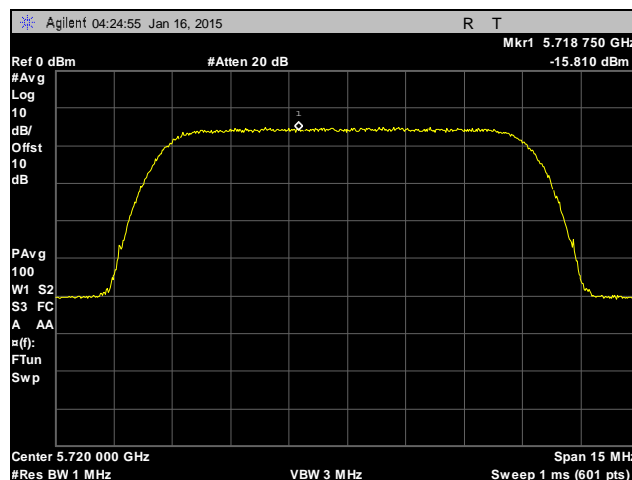
### Power Spectral Density, Antenna 1, 10 MHz, Upper Bands



Plot 159. Power Spectral Density, 5475 MHz, Antenna 1, 10 MHz



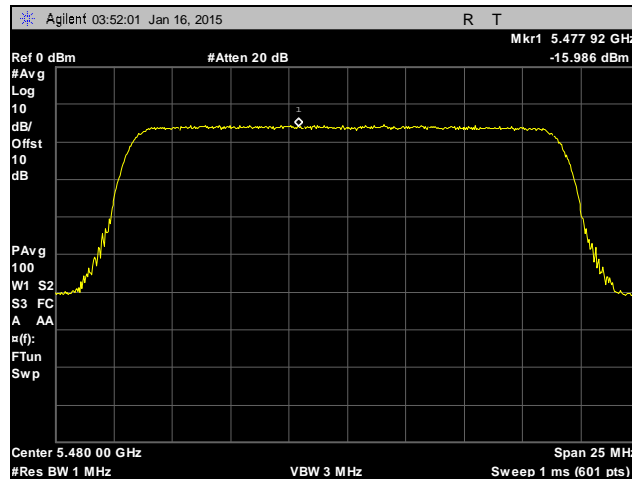
Plot 160. Power Spectral Density, 5600 MHz, Antenna 1, 10 MHz



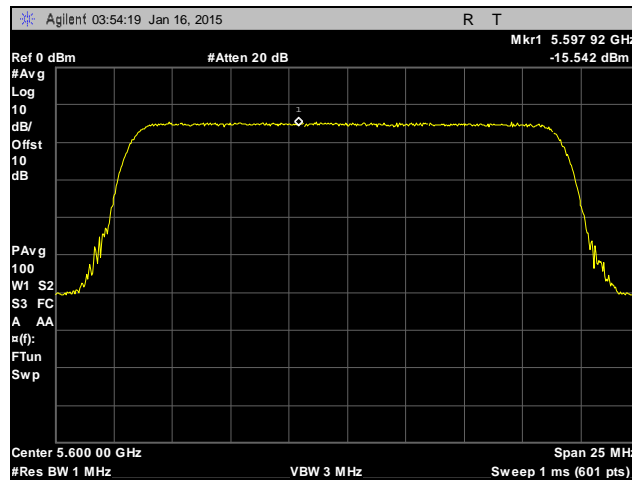
Plot 161. Power Spectral Density, 5720 MHz, Antenna 1, 10 MHz



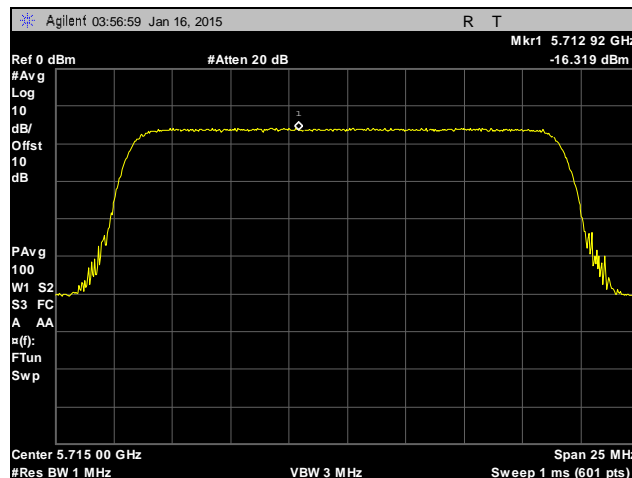
**Power Spectral Density, Antenna 0, 20 MHz, Upper Bands**



**Plot 162. Power Spectral Density, 5480 MHz, Antenna 0, 20 MHz**

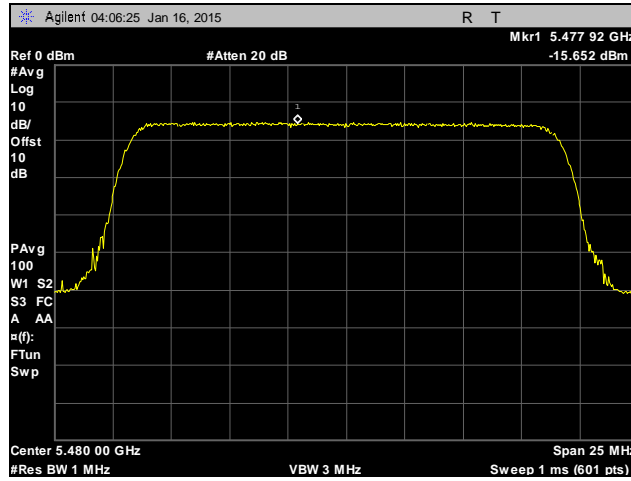


**Plot 163. Power Spectral Density, 5600 MHz, Antenna 0, 20 MHz**

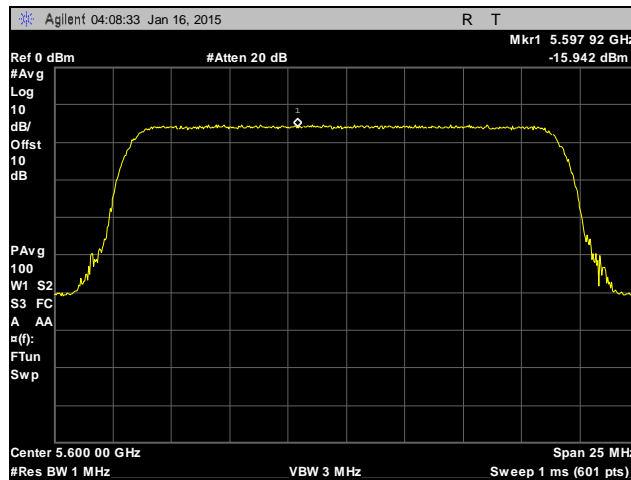


**Plot 164. Power Spectral Density, 5715 MHz, Antenna 0, 20 MHz**

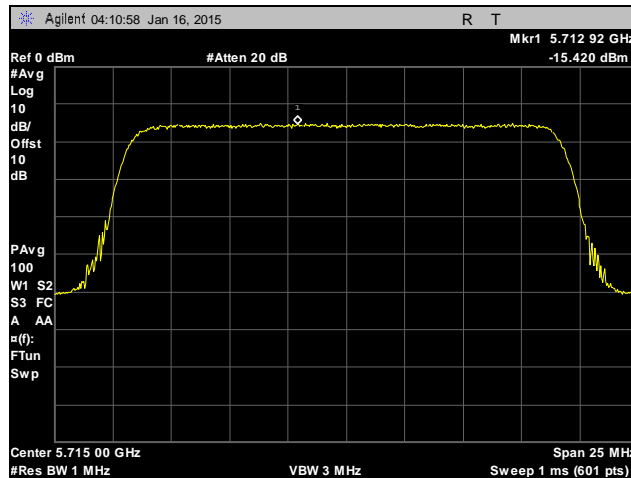
**Power Spectral Density, Antenna 1, 20 MHz, Upper Bands**



**Plot 165. Power Spectral Density, 5480 MHz, Antenna 1, 20 MHz**

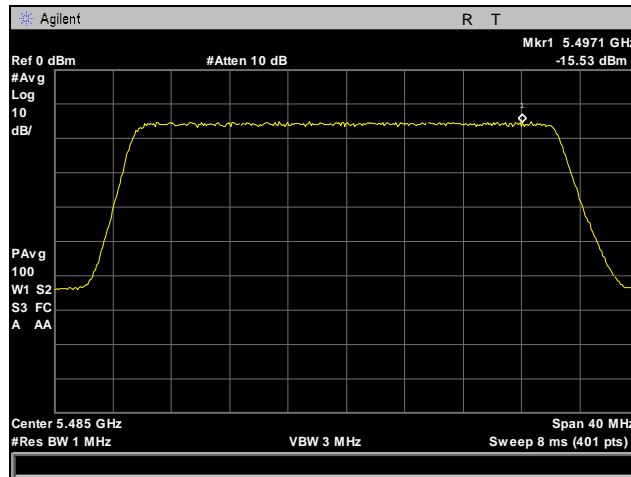


**Plot 166. Power Spectral Density, 5600 MHz, Antenna 1, 20 MHz**

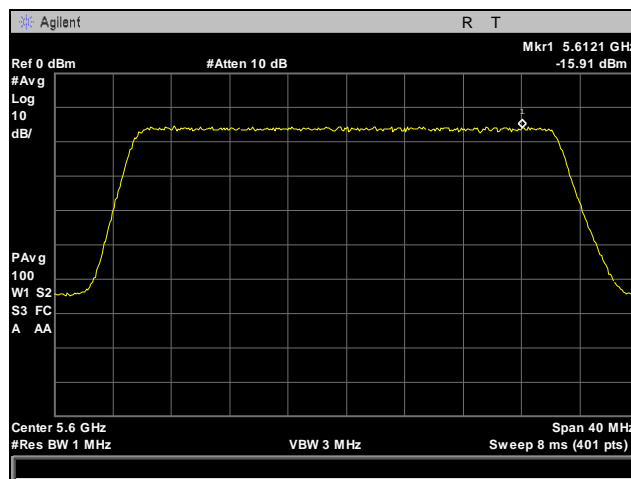


**Plot 167. Power Spectral Density, 5715 MHz, Antenna 1, 20 MHz**

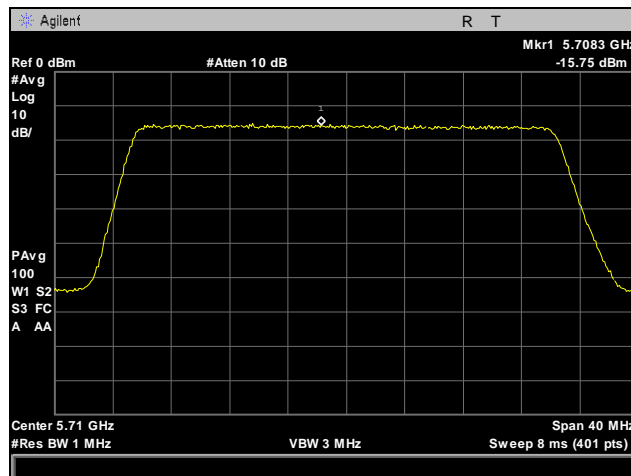
### Power Spectral Density, Antenna 0, 30 MHz, Upper Bands



Plot 168. Power Spectral Density, 4585 MHz, Antenna 0, 30 MHz

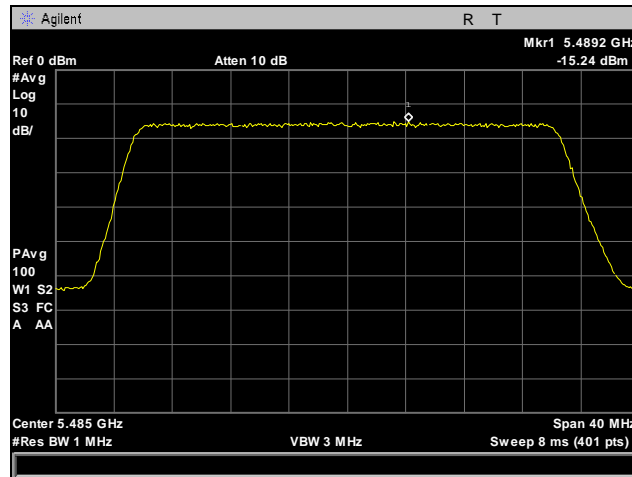


Plot 169. Power Spectral Density, 5600 MHz, Antenna 0, 30 MHz

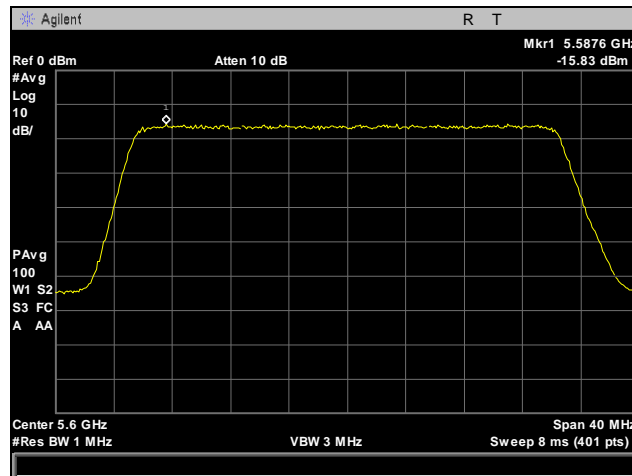


Plot 170. Power Spectral Density, 5710 MHz, Antenna 0, 30 MHz

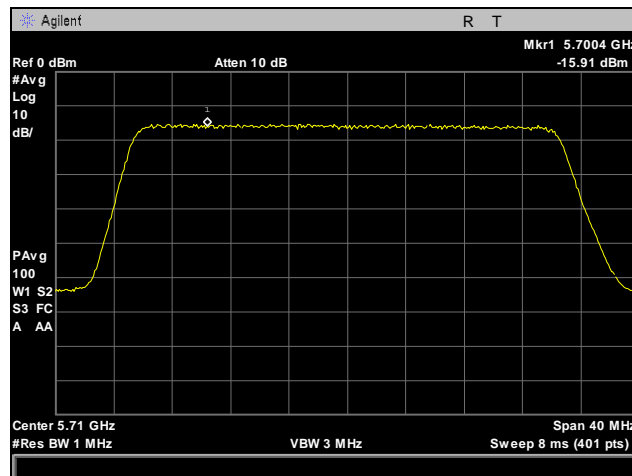
### Power Spectral Density, Antenna 1, 30 MHz, Upper Bands



Plot 171. Power Spectral Density, 5485 MHz, Antenna 1, 30 MHz

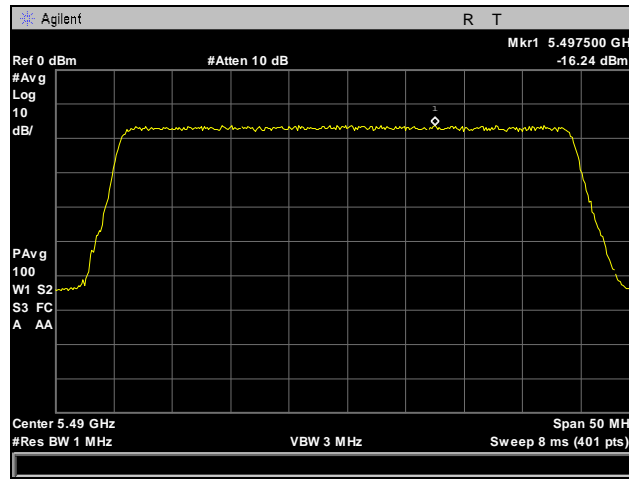


Plot 172. Power Spectral Density, 5600 MHz, Antenna 1, 30 MHz

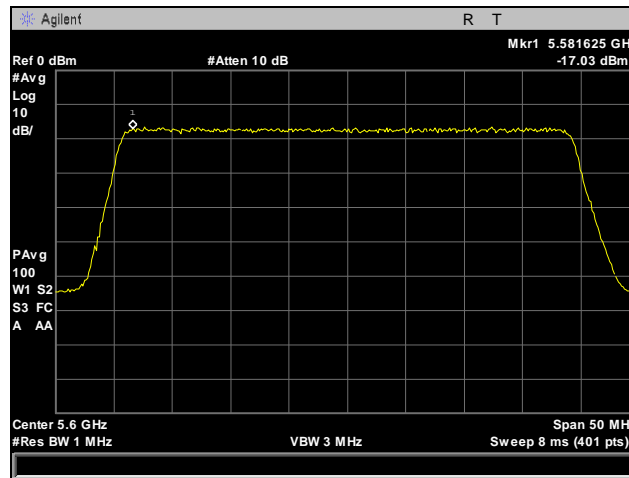


Plot 173. Power Spectral Density, 5710 MHz, Antenna 1, 30 MHz

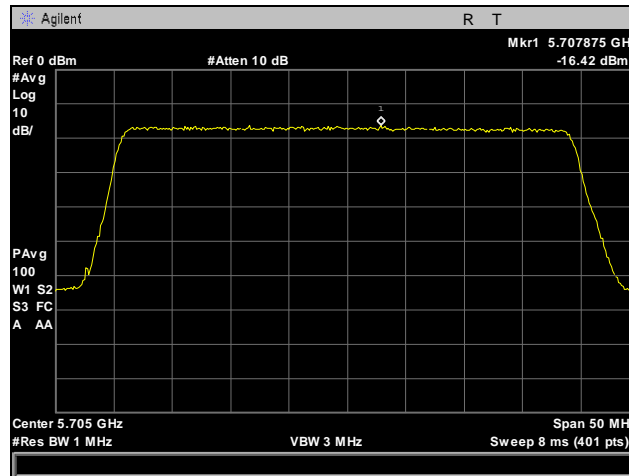
**Power Spectral Density, Antenna 0, 40 MHz, Upper Bands**



**Plot 174. Power Spectral Density, 5490 MHz, Antenna 0, 40 MHz**

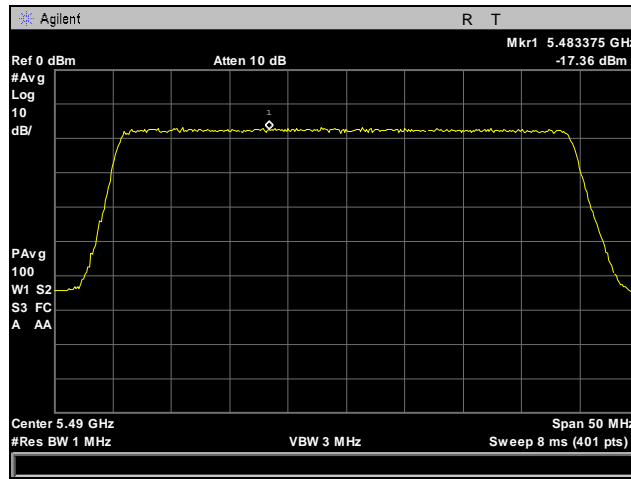


**Plot 175. Power Spectral Density, 5600 MHz, Antenna 0, 40 MHz**

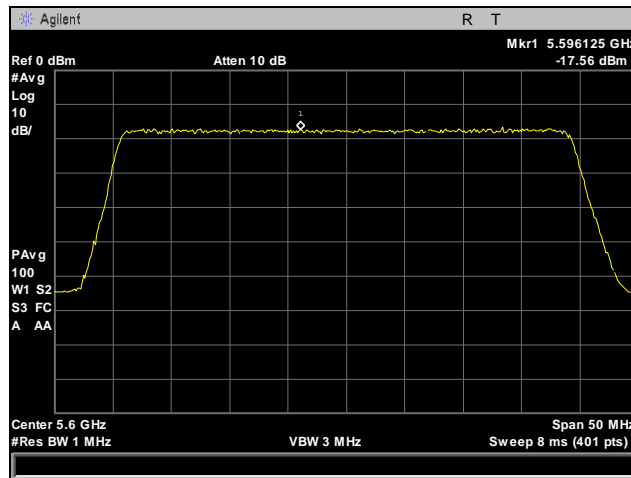


**Plot 176. Power Spectral Density, 5705 MHz, Antenna 0, 40 MHz**

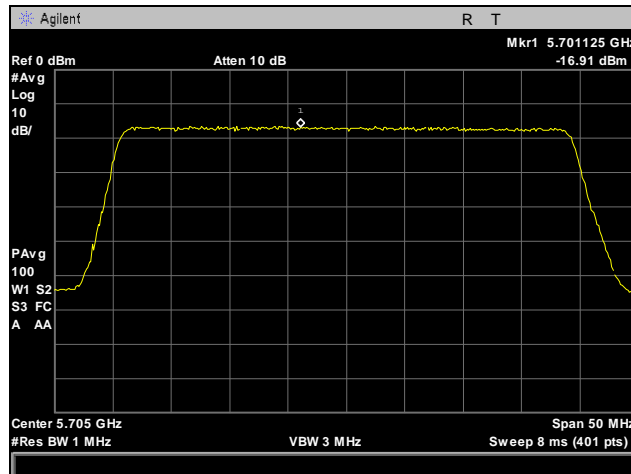
**Power Spectral Density, Antenna 1, 40 MHz, Upper Bands**



**Plot 177. Power Spectral Density, 5490 MHz, Antenna 1, 40 MHz**

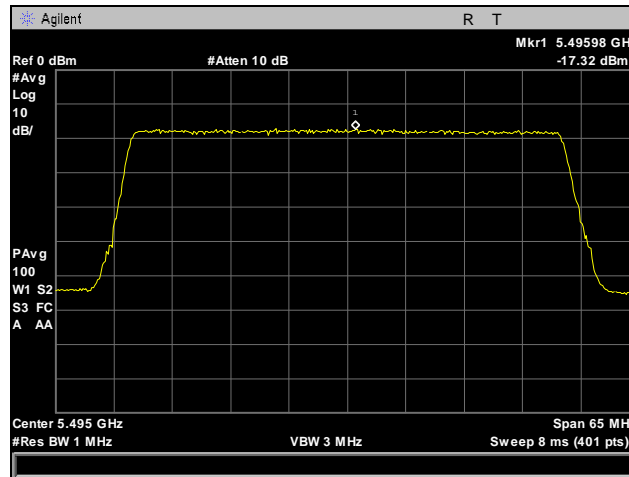


**Plot 178. Power Spectral Density, 5600 MHz, Antenna 1, 40 MHz**

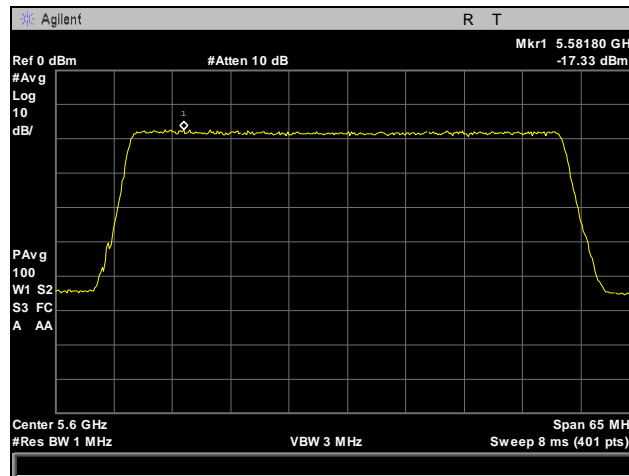


**Plot 179. Power Spectral Density, 5705 MHz, Antenna 1, 40 MHz**

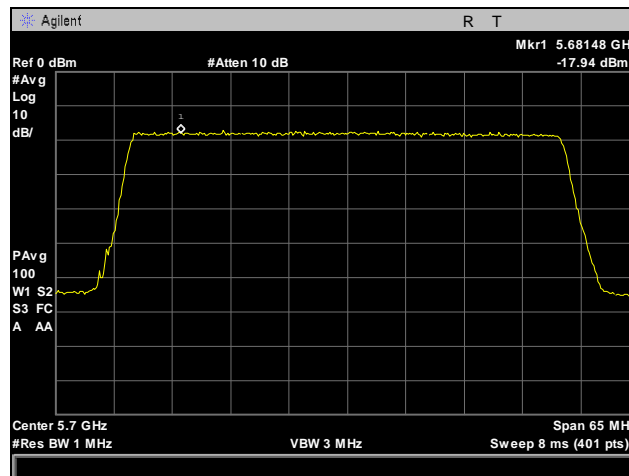
**Power Spectral Density, Antenna 0, 50 MHz, Upper Bands**



**Plot 180. Power Spectral Density, 5495 MHz, Antenna 0, 50 MHz**

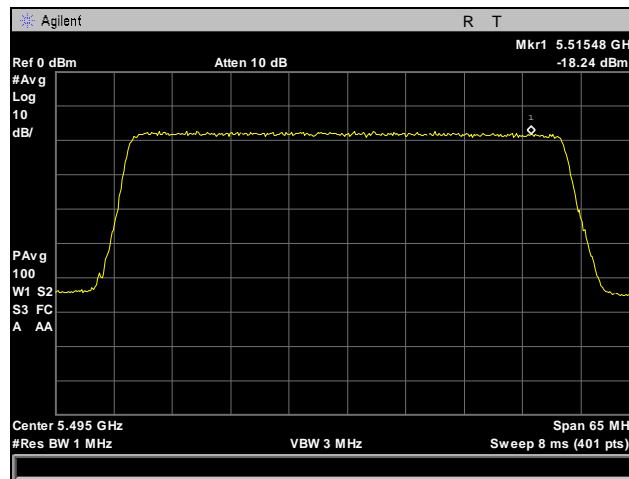


**Plot 181. Power Spectral Density, 5600 MHz, Antenna 0, 50 MHz**

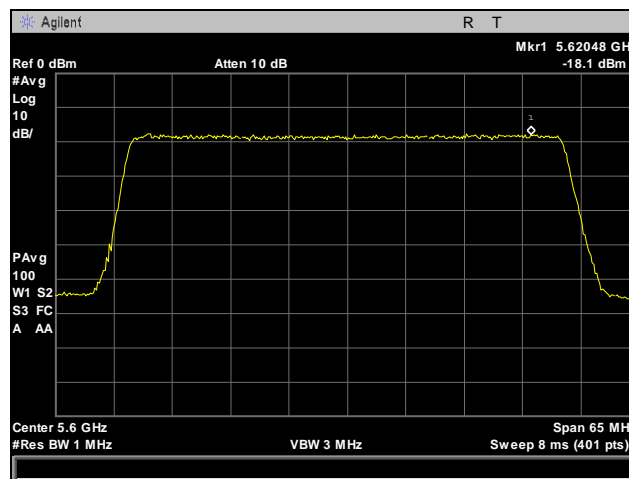


**Plot 182. Power Spectral Density, 5700 MHz, Antenna 0, 50 MHz**

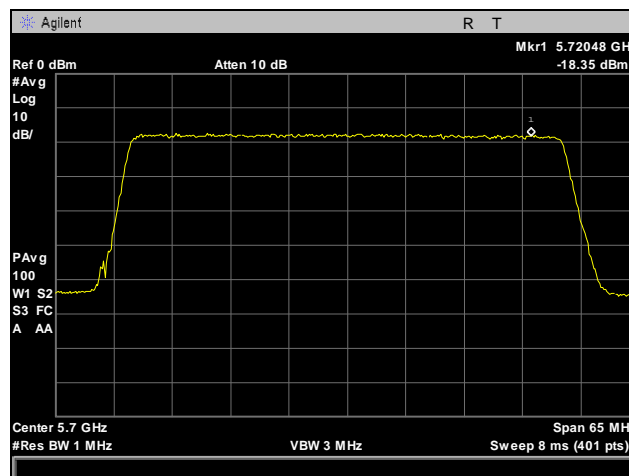
**Power Spectral Density, Antenna 1, 50 MHz, Upper Bands**



**Plot 183. Power Spectral Density, 5495 MHz, Antenna 1, 50 MHz**



**Plot 184. Power Spectral Density, 5600 MHz, Antenna 1, 50 MHz**



**Plot 185. Power Spectral Density, 5700 MHz, Antenna 1, 50 MHz**



## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 15.407(b)(2), (3), (7) Undesirable Emissions

**Test Requirements:** § 15.407(b)(2), (3), (7); §15.205: Emissions outside the frequency band.

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

**Test Procedure:** The transmitter was placed on an 80cm non-metallic table inside in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast height to determine worst case orientation for maximum emissions. A preamp was used in the range from 7-18GHz to improve noise floor. Plots were corrected for cable loss, antenna, and preamp gain.

For frequencies from 30 MHz to 1 GHz, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

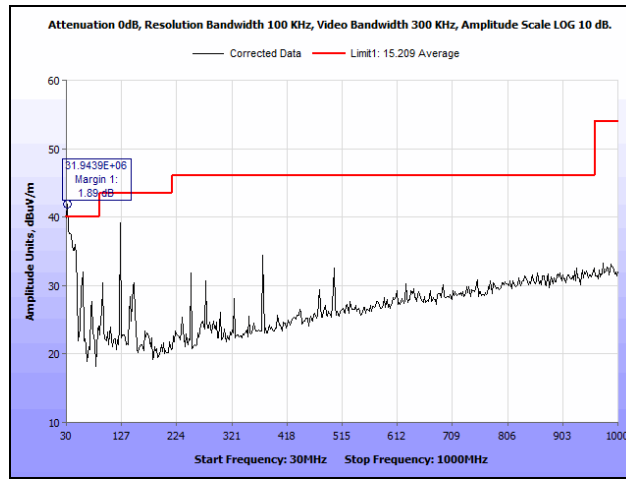
For measurements above 1 GHz, measurements were made with a Peak detector with 1 MHz resolution bandwidth. A notch filter was used to filter out the fundamental. Where the spurious emissions fell into a restricted band, measurements were also made with an average detector to make sure they complied with 15.209 limits. Only noise floor was observed above 18 GHz.

**Test Results:** The EUT was compliant with the Radiated Emission limits for Intentional Radiators. See following pages for detailed test results. The 30 MHz to 1 GHz, 1 GHz to 7 GHz and 7 GHz to 18 GHz plots are represented of using both a 29 dBi and 34 dBi antenna. All emissions above 18 GHz were at the noise floor of the receiver.

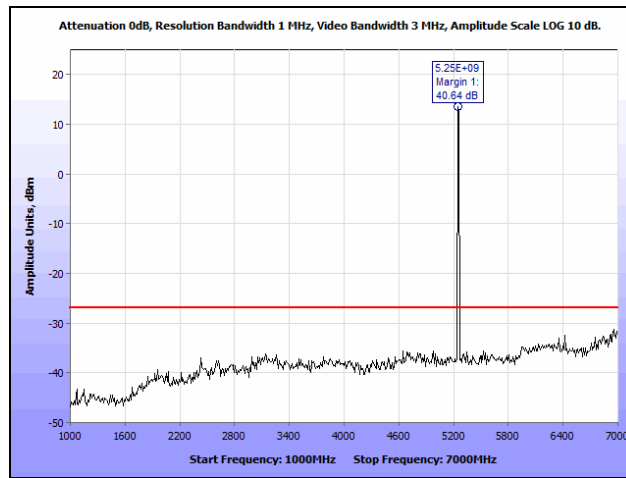
**Test Engineer(s):** Jason Allnutt

**Test Date(s):** 01/16/15

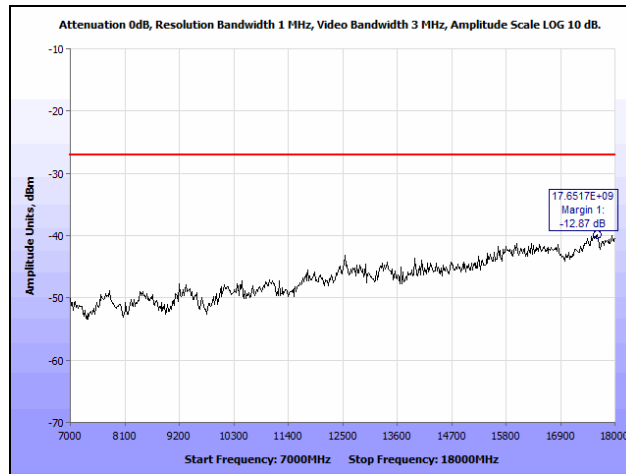
### Radiated Spurious Emissions, 10 MHz, Lower Bands



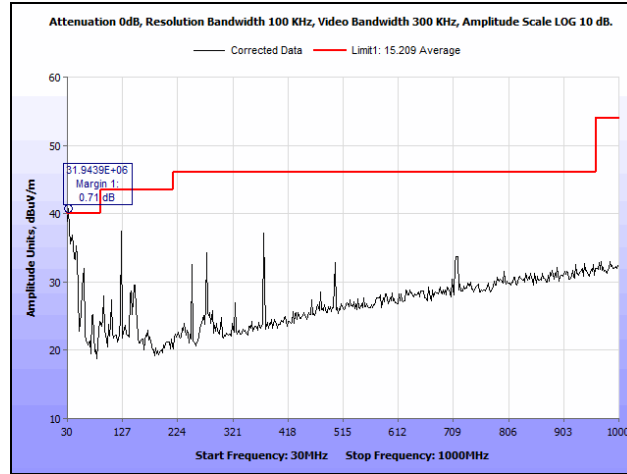
Plot 186. Radiated Spurious Emissions, 10 MHz, Low Channel, 30 MHz – 1 GHz, Lower Band



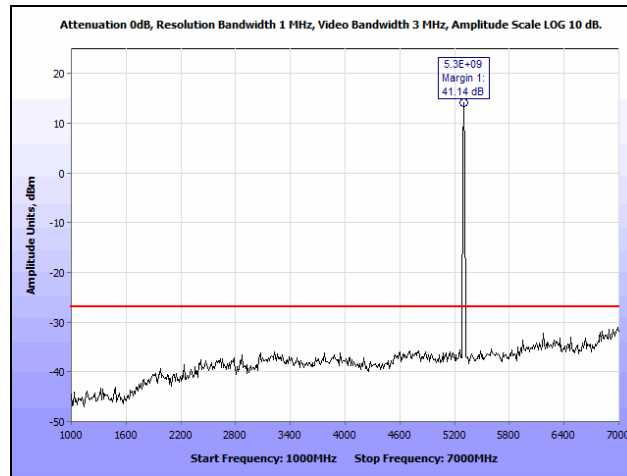
Plot 187. Radiated Spurious Emissions, 10 MHz, Low Channel, 1 GHz – 7 GHz, Lower Band



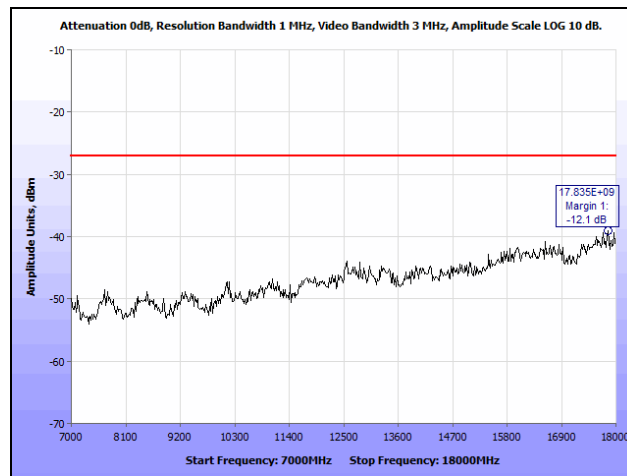
Plot 188. Radiated Spurious Emissions, 10 MHz, Low Channel, 7 GHz – 18 GHz, Lower Band



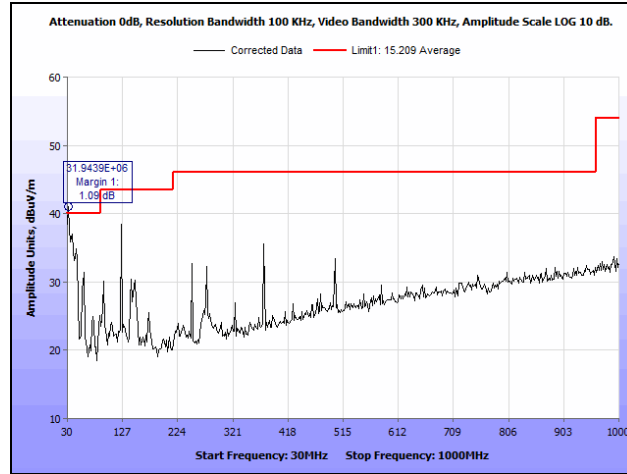
Plot 189. Radiated Spurious Emissions, 10 MHz, Mid Channel, 30 MHz – 1 GHz, Lower Band



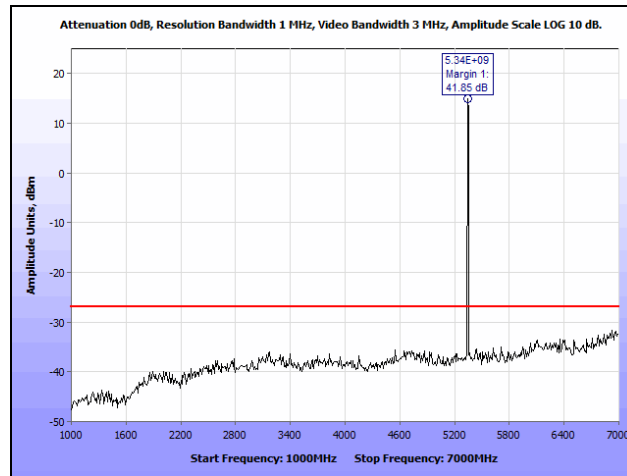
Plot 190. Radiated Spurious Emissions, 10 MHz, Mid Channel, 1 GHz – 7 GHz, Lower Band



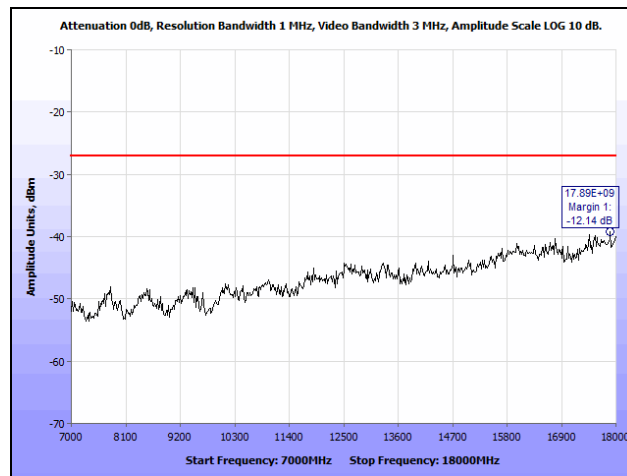
Plot 191. Radiated Spurious Emissions, 10 MHz, Mid Channel, 7 GHz – 18 GHz, Lower Band



Plot 192. Radiated Spurious Emissions, 10 MHz, High Channel, 30 MHz – 1 GHz, Lower Band

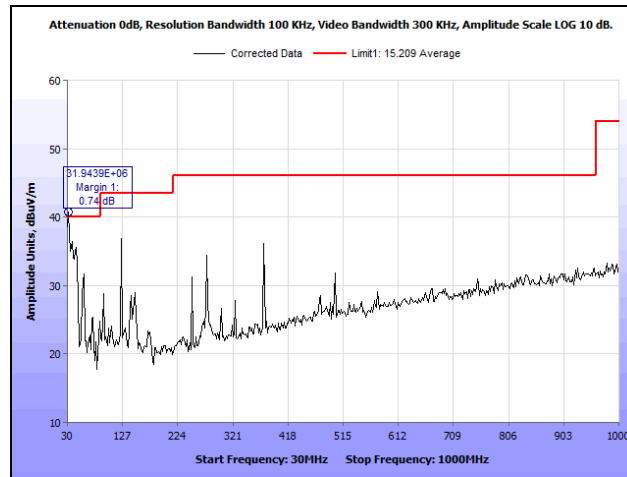


Plot 193. Radiated Spurious Emissions, 10 MHz, High Channel, 1 GHz – 7 GHz, Lower Band

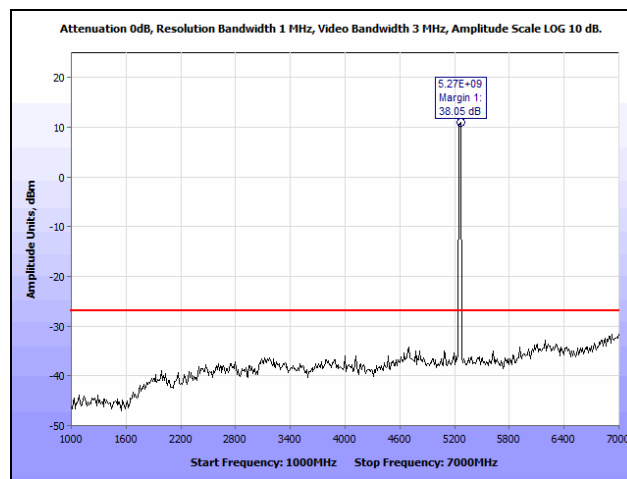


Plot 194. Radiated Spurious Emissions, 10 MHz, High Channel, 7 GHz – 18 GHz, Lower Band

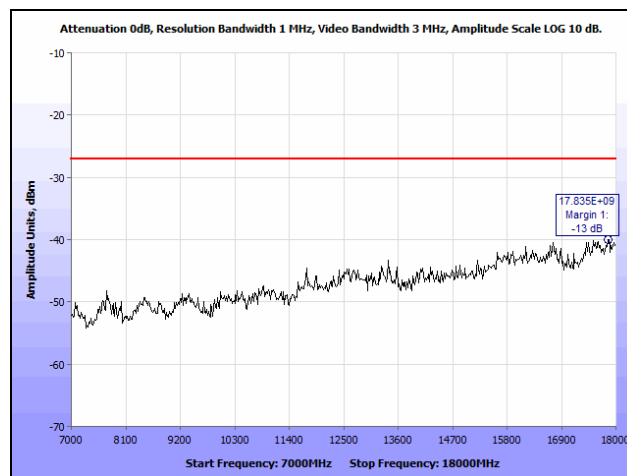
## Radiated Spurious Emissions, 20 MHz, Lower Bands



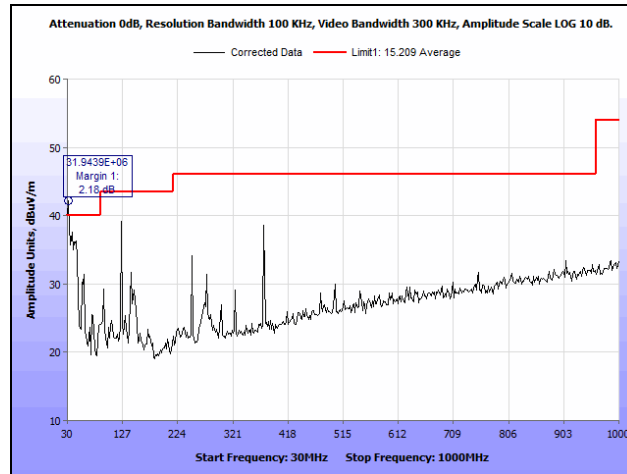
Plot 195. Radiated Spurious Emissions, 20 MHz, Low Channel, 30 MHz – 1 GHz, Lower Band



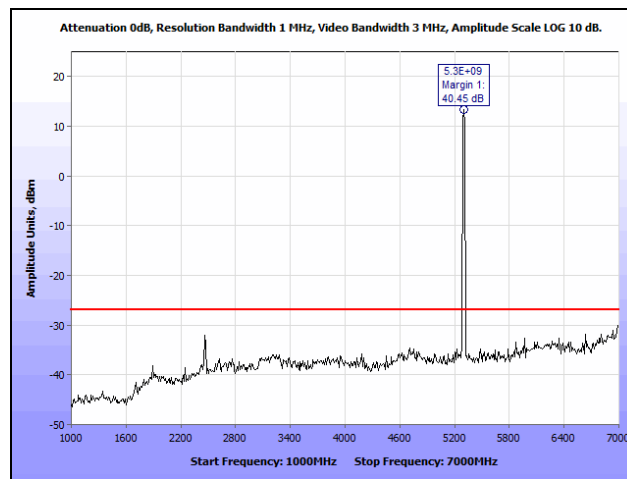
Plot 196. Radiated Spurious Emissions, 20 MHz, Low Channel, 1 GHz – 7 GHz, Lower Band



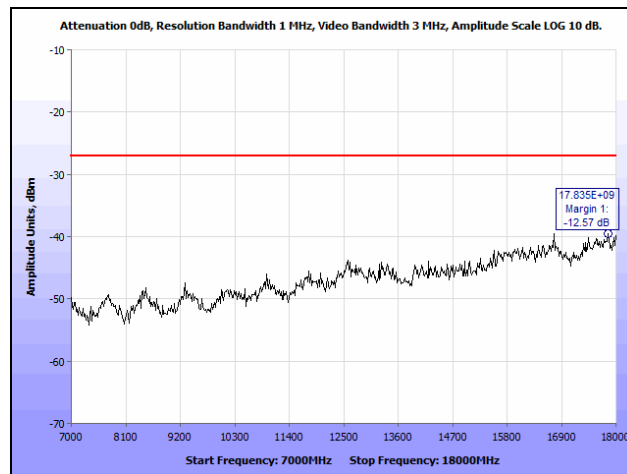
Plot 197. Radiated Spurious Emissions, 20 MHz, Low Channel, 7 GHz – 18 GHz, Lower Band



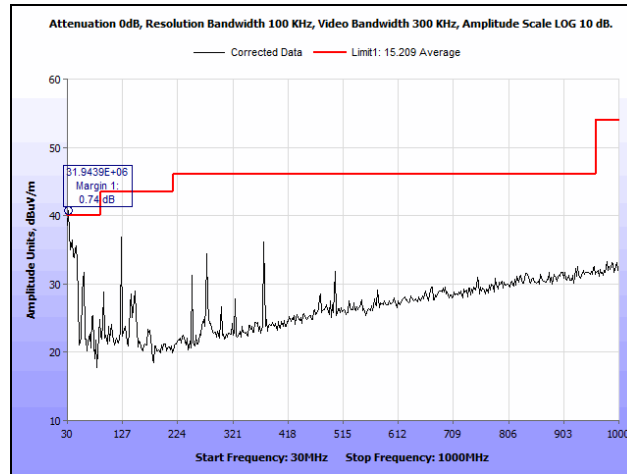
Plot 198. Radiated Spurious Emissions, 20 MHz, Mid Channel, 30 MHz – 1 GHz, Lower Band



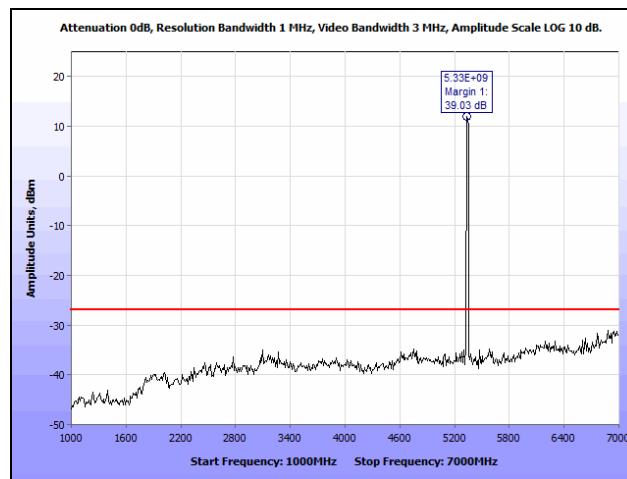
Plot 199. Radiated Spurious Emissions, 20 MHz, Mid Channel, 1 GHz – 7 GHz, Lower Band



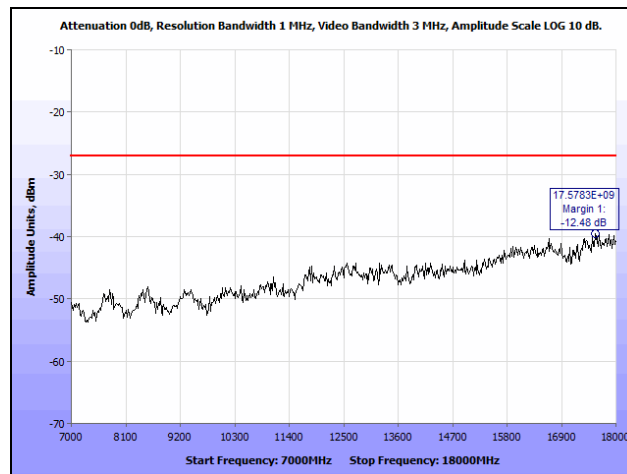
Plot 200. Radiated Spurious Emissions, 20 MHz, Mid Channel, 7 GHz – 18 GHz, Lower Band



Plot 201. Radiated Spurious Emissions, 20 MHz, High Channel, 30 MHz – 1 GHz, Lower Band

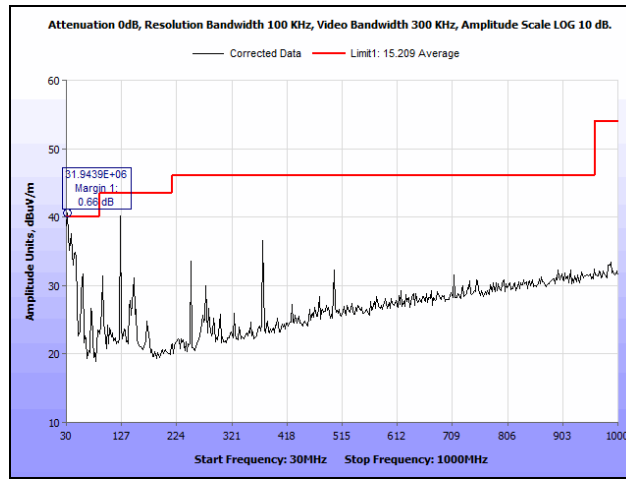


Plot 202. Radiated Spurious Emissions, 20 MHz, High Channel, 1 GHz – 7 GHz, Lower Band

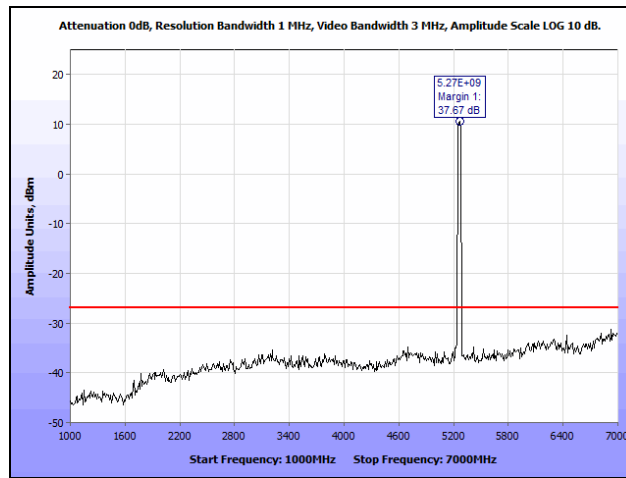


Plot 203. Radiated Spurious Emissions, 20 MHz, High Channel, 7 GHz – 18 GHz, Lower Band

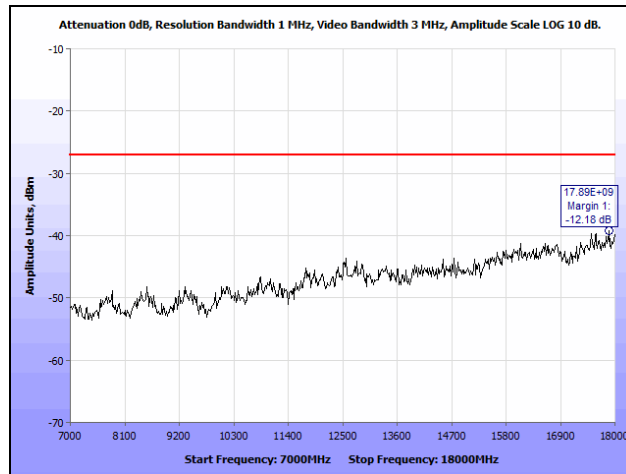
### Radiated Spurious Emissions, 30 MHz, Lower Bands



Plot 204. Radiated Spurious Emissions, 30 MHz, Low Channel, 30 MHz – 1 GHz, Lower Band

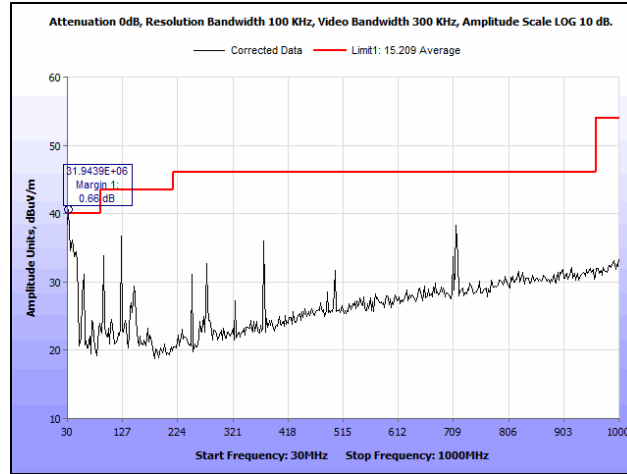


Plot 205. Radiated Spurious Emissions, 30 MHz, Low Channel, 1 GHz – 7 GHz, Lower Band

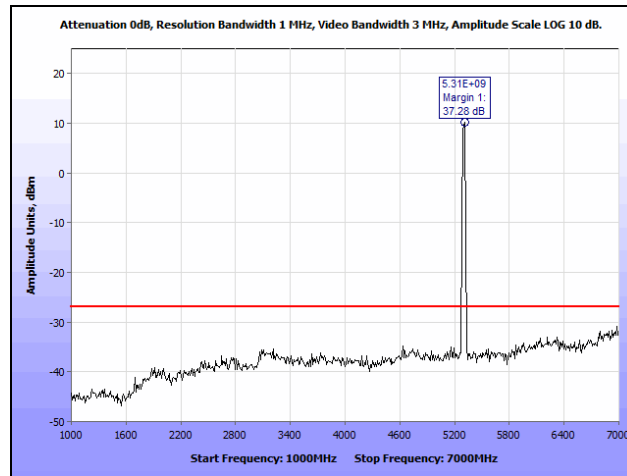


Plot 206. Radiated Spurious Emissions, 30 MHz, Low Channel, 7 GHz – 18 GHz, Lower Band

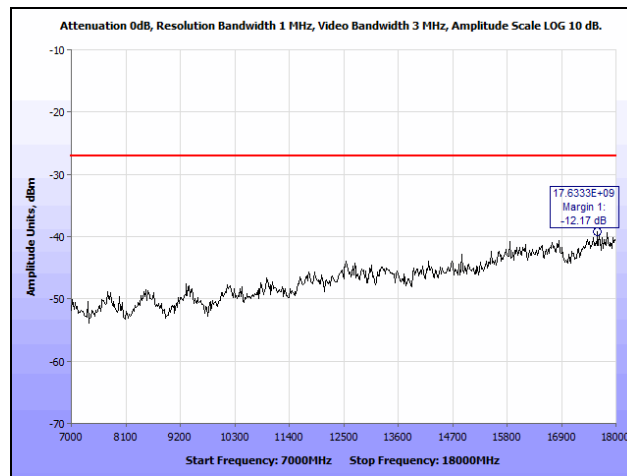




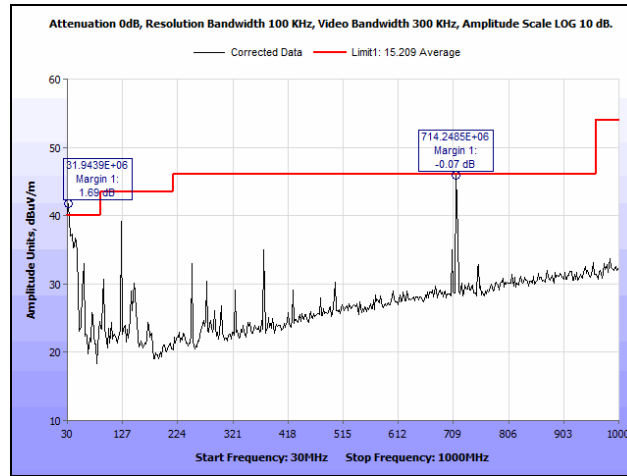
Plot 207. Radiated Spurious Emissions, 30 MHz, Mid Channel, 30 MHz – 1 GHz, Lower Band



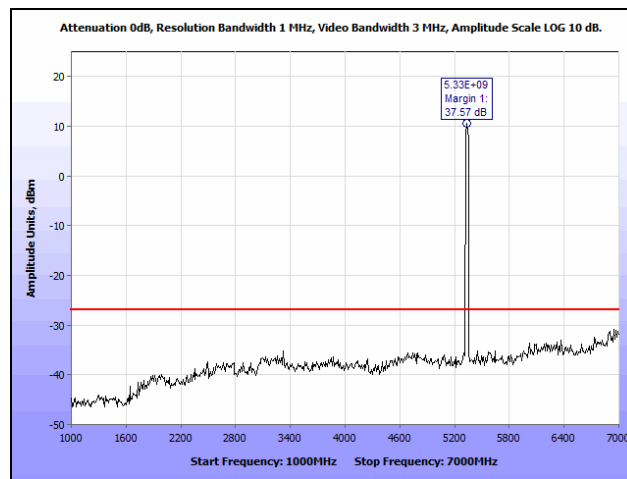
Plot 208. Radiated Spurious Emissions, 30 MHz, Mid Channel, 1 GHz – 7 GHz, Lower Band



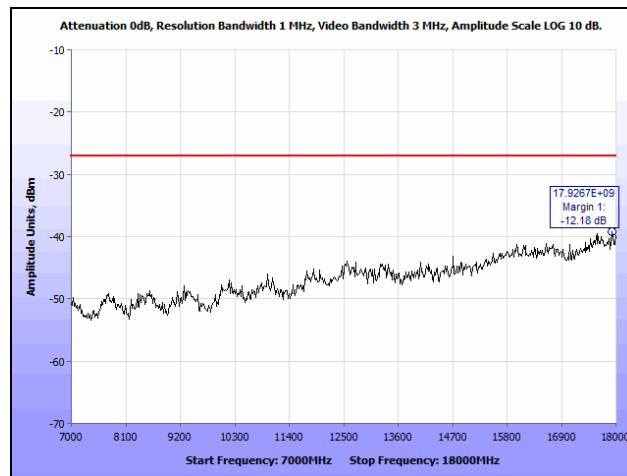
Plot 209. Radiated Spurious Emissions, 30 MHz, Mid Channel, 7 GHz – 18 GHz, Lower Band



Plot 210. Radiated Spurious Emissions, 30 MHz, High Channel, 30 MHz – 1 GHz, Lower Band

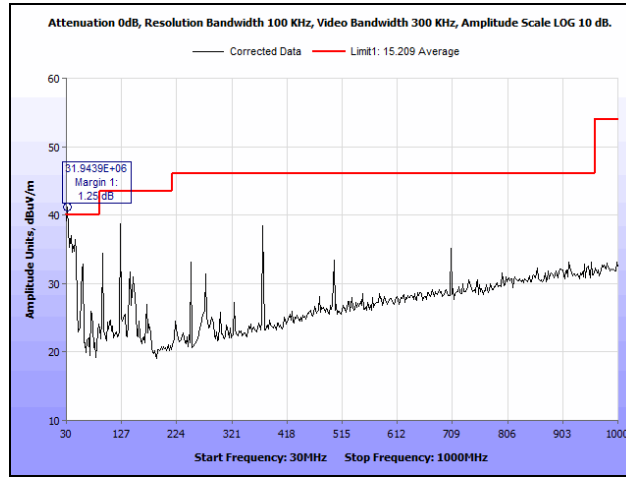


Plot 211. Radiated Spurious Emissions, 30 MHz, High Channel, 1 GHz – 7 GHz, Lower Band

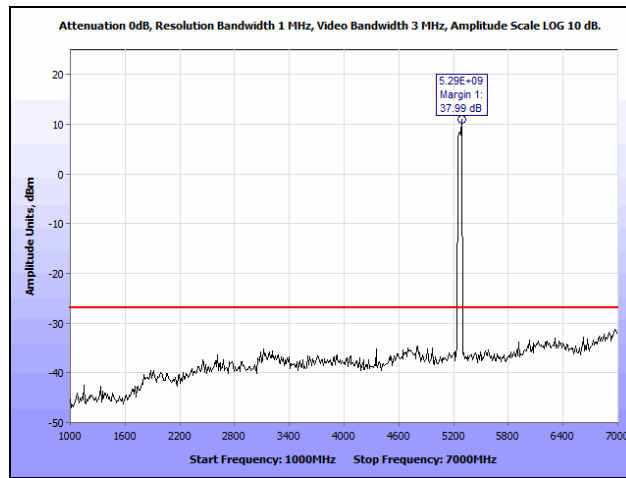


Plot 212. Radiated Spurious Emissions, 30 MHz, High Channel, 7 GHz – 18 GHz, Lower Band

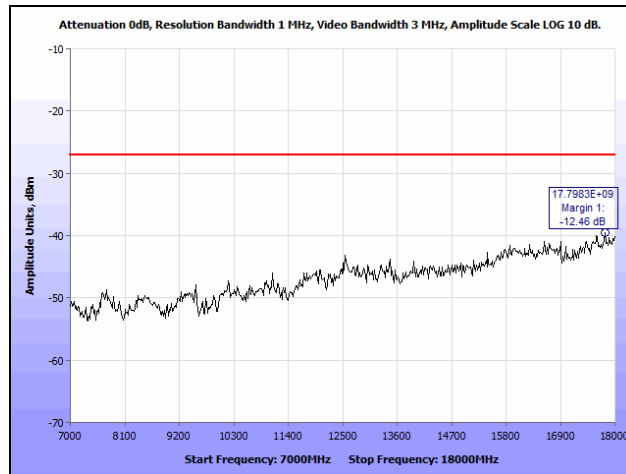
### Radiated Spurious Emissions, 40 MHz, Lower Bands



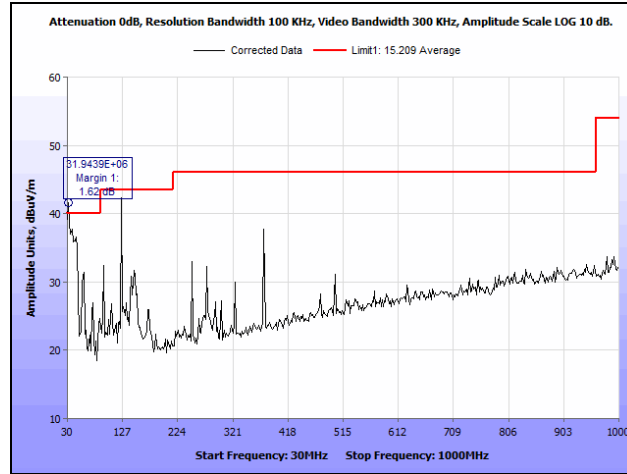
Plot 213. Radiated Spurious Emissions, 40 MHz, Low Channel, 30 MHz – 1 GHz, Lower Band



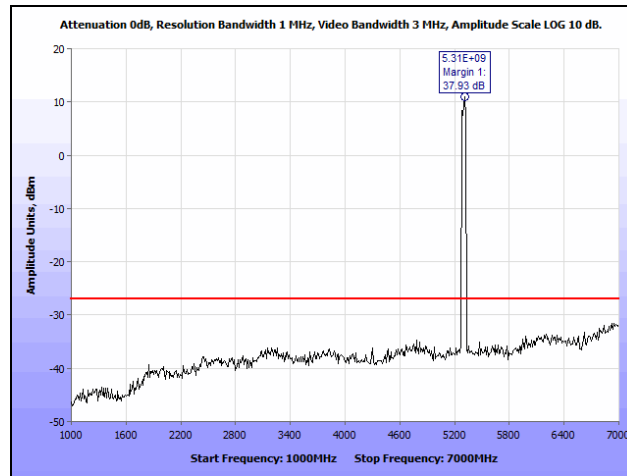
Plot 214. Radiated Spurious Emissions, 40 MHz, Low Channel, 1 GHz – 7 GHz, Lower Band



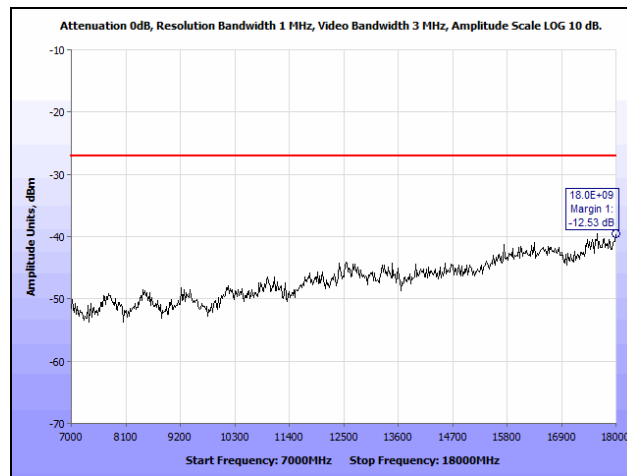
Plot 215. Radiated Spurious Emissions, 40 MHz, Low Channel, 7 GHz – 18 GHz, Lower Band



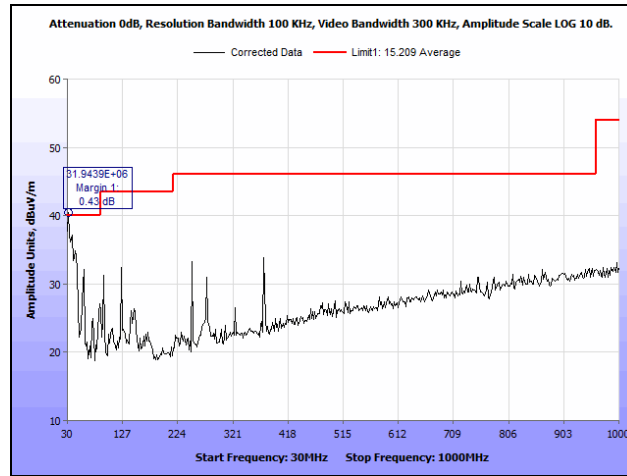
**Plot 216. Radiated Spurious Emissions, 40 MHz, Mid Channel, 30 MHz – 1 GHz, Lower Band**



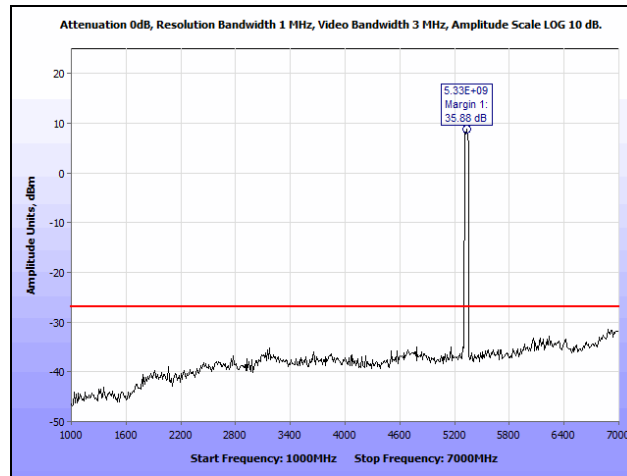
**Plot 217. Radiated Spurious Emissions, 40 MHz, Mid Channel, 1 GHz – 7 GHz, Lower Band**



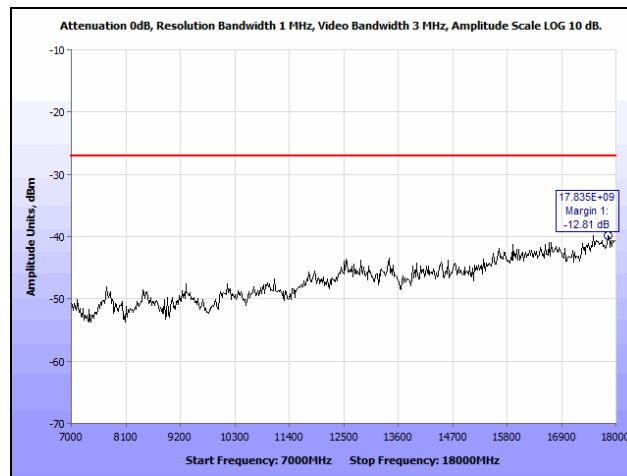
**Plot 218. Radiated Spurious Emissions, 40 MHz, Mid Channel, 7 GHz – 18 GHz, Lower Band**



Plot 219. Radiated Spurious Emissions, 40 MHz, High Channel, 30 MHz – 1 GHz, Lower Band

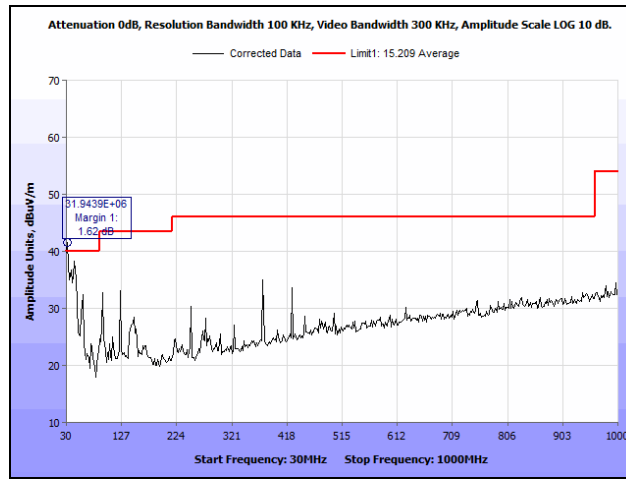


Plot 220. Radiated Spurious Emissions, 40 MHz, High Channel, 1 GHz – 7 GHz, Lower Band

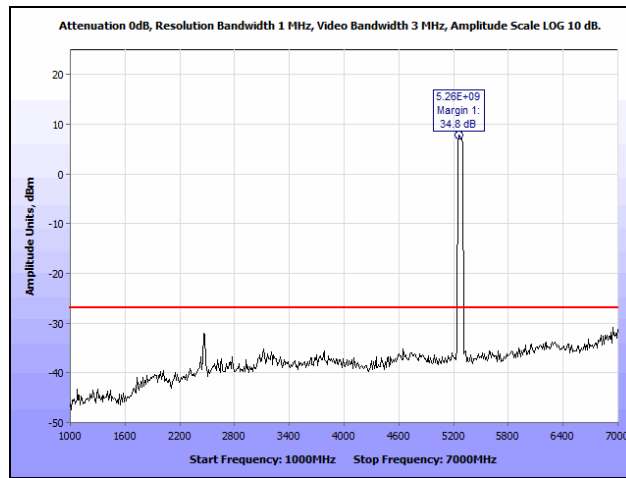


Plot 221. Radiated Spurious Emissions, 40 MHz, High Channel, 7 GHz – 18 GHz, Lower Band

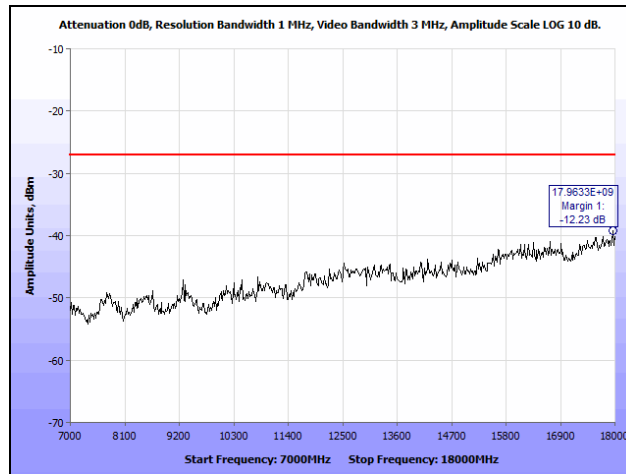
### Radiated Spurious Emissions, 50 MHz, Lower Bands



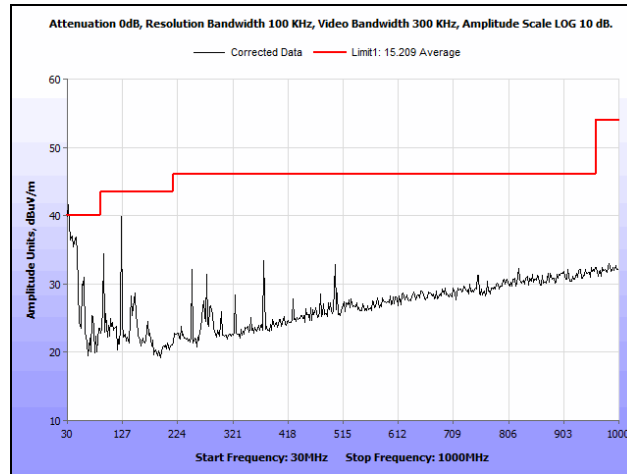
Plot 222. Radiated Spurious Emissions, 50 MHz, Low Channel, 30 MHz – 1 GHz, Lower Band



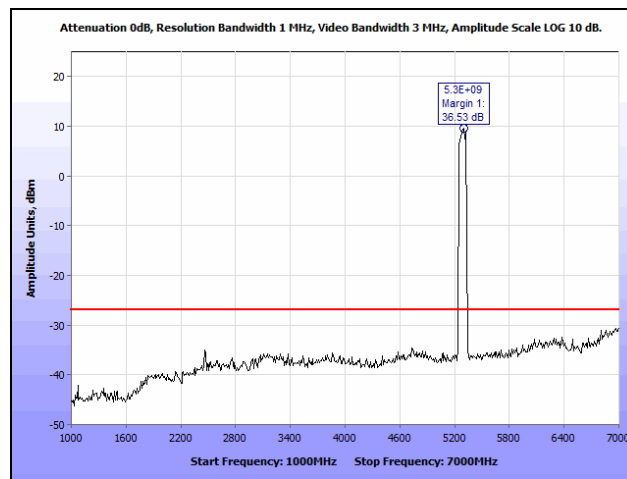
Plot 223. Radiated Spurious Emissions, 50 MHz, Low Channel, 1 GHz – 7 GHz, Lower Band



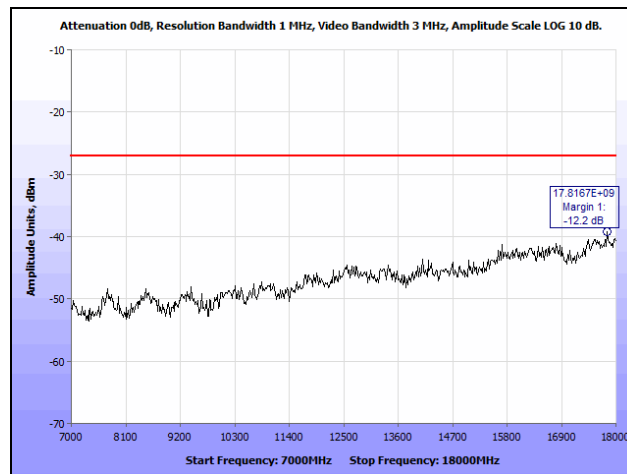
Plot 224. Radiated Spurious Emissions, 50 MHz, Low Channel, 7 GHz – 18 GHz, Lower Band



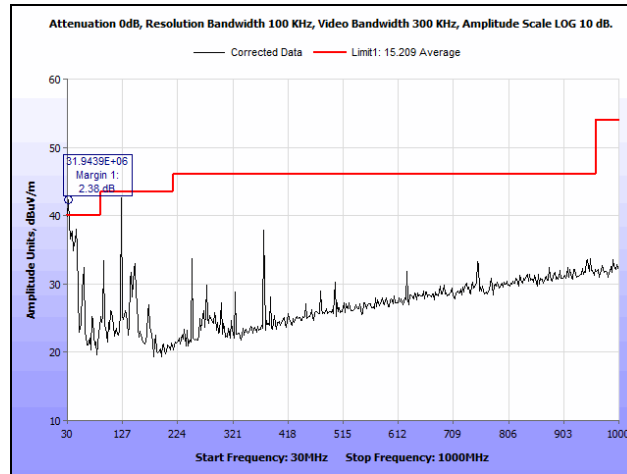
Plot 225. Radiated Spurious Emissions, 50 MHz, Mid Channel, 30 MHz – 1 GHz, Lower Band



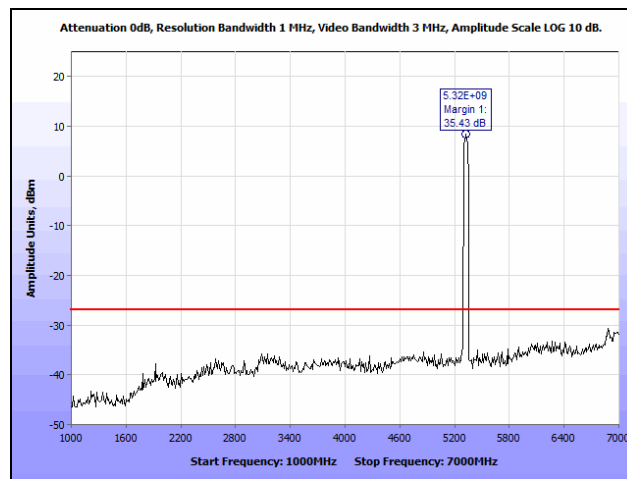
Plot 226. Radiated Spurious Emissions, 50 MHz, Mid Channel, 1 GHz – 7 GHz, Lower Band



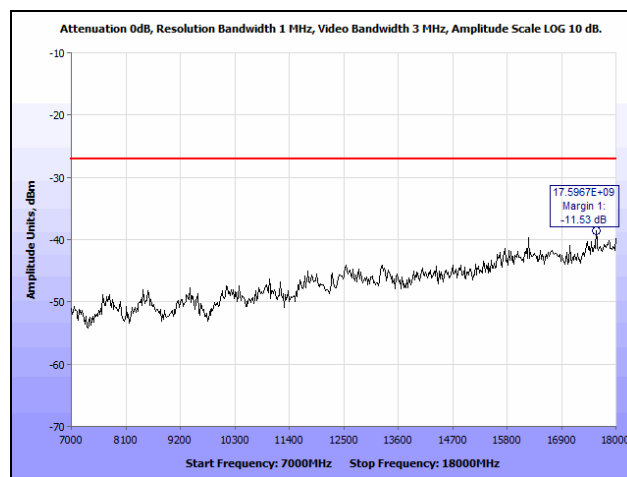
Plot 227. Radiated Spurious Emissions, 50 MHz, Mid Channel, 7 GHz – 18 GHz, Lower Band



Plot 228. Radiated Spurious Emissions, 50 MHz, High Channel, 30 MHz – 1 GHz, Lower Band



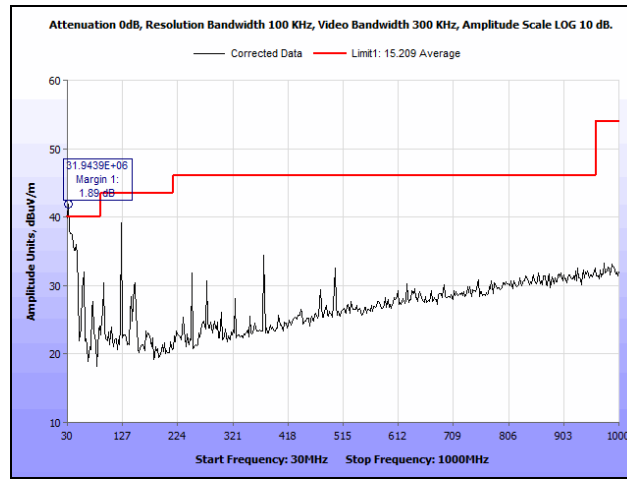
Plot 229. Radiated Spurious Emissions, 50 MHz, High Channel, 1 GHz – 7 GHz, Lower Band



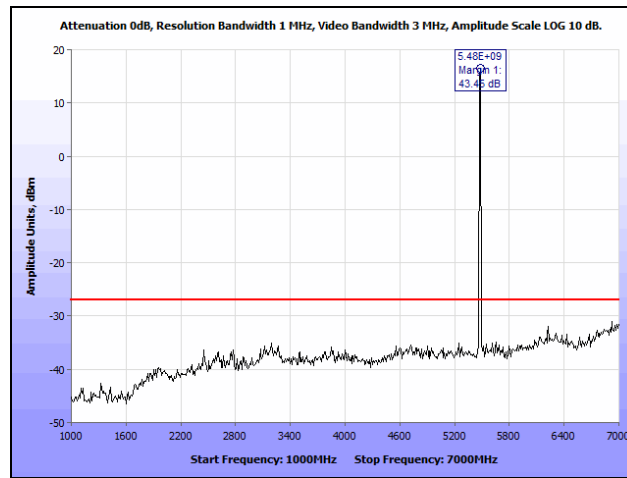
Plot 230. Radiated Spurious Emissions, 50 MHz, High Channel, 7 GHz – 18 GHz, Lower Band



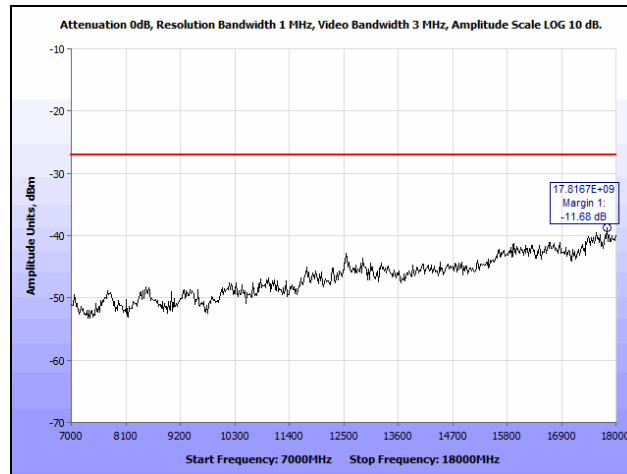
### Radiated Spurious Emissions, 10 MHz, Upper Bands



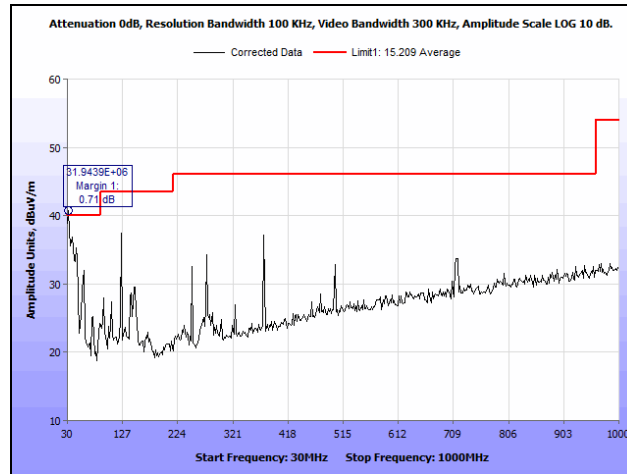
Plot 231. Radiated Spurious Emissions, 10 MHz, Low Channel, 30 MHz – 1 GHz, Upper Band



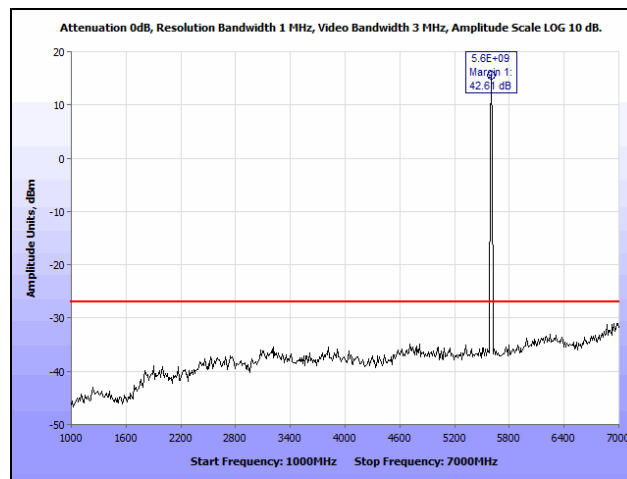
Plot 232. Radiated Spurious Emissions, 10 MHz, Low Channel, 1 GHz – 7 GHz, Upper Band



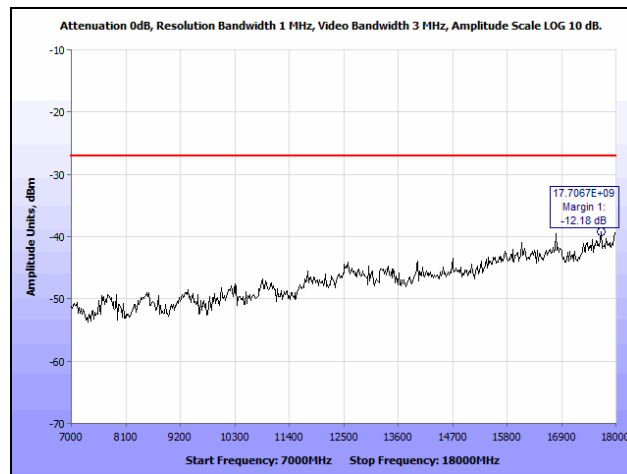
Plot 233. Radiated Spurious Emissions, 10 MHz, Low Channel, 7 GHz – 18 GHz, Upper Band



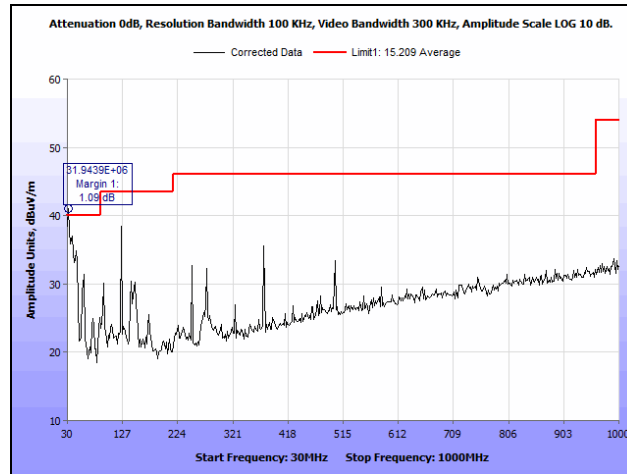
Plot 234. Radiated Spurious Emissions, 10 MHz, Mid Channel, 30 MHz – 1 GHz, Upper Band



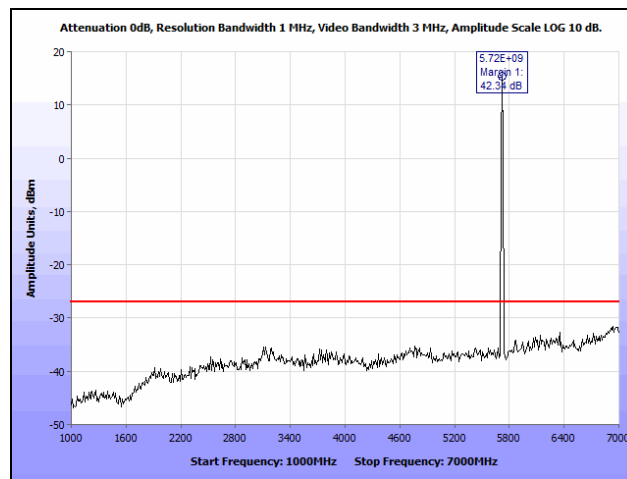
Plot 235. Radiated Spurious Emissions, 10 MHz, Mid Channel, 1 GHz – 7 GHz, Upper Band



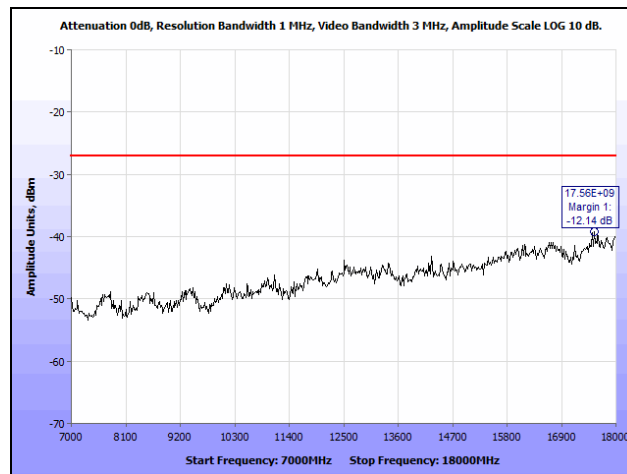
Plot 236. Radiated Spurious Emissions, 10 MHz, Mid Channel, 7 GHz – 18 GHz, Upper Band



Plot 237. Radiated Spurious Emissions, 10 MHz, High Channel, 30 MHz – 1 GHz, Upper Band



Plot 238. Radiated Spurious Emissions, 10 MHz, High Channel, 1 GHz – 7 GHz, Upper Band



Plot 239. Radiated Spurious Emissions, 10 MHz, High Channel, 7 GHz – 18 GHz, Upper Band