

# TEST REPORT



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1. Report No : DRTFCC1810-0246
2. Customer
  - Name : LG Electronics USA, Inc.
  - Address : 1000 Sylvan Ave. Englewood Cliffs, New Jersey, United States 07632
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : Mobile Phone / KX1801  
FCC ID : ZNFKX1801
5. Test Method Used : KDB789033 D02v02r01  
Test Specification : FCC Part 15.407 Subpart E
6. Date of Test : 2018.08.20 ~ 2018.09.28
7. Testing Environment : Refer to appended test report.
8. Test Result : Refer to the attached test result.

Affirmation	Tested by	Reviewed by
	Name : SunGeun Lee (Signature)	Name : Geunki Son (Signature)

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

2018 . 10 . 01 .

**DT&C Co., Ltd.**

If this report is required to confirmation of authenticity, please contact to [report@dtnc.net](mailto:report@dtnc.net)

## Test Report Version

Test Report No.	Date	Description
DRTFCC1810-0246	Oct. 01, 2018	Initial issue

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## 1. EUT DESCRIPTION

<b>FCC Equipment Class</b>	Unlicensed National Information Infrastructure (UNII)
<b>Product</b>	Mobile Phone
<b>Model Name</b>	KX1801
<b>Add Model Name</b>	NA
<b>Power Supply</b>	DC 3.85 V
<b>Modulation type</b>	OFDM
<b>Antenna Specification</b>	<b>Antenna type:</b> PIFA Antenna <b>Antenna gain:</b> Refer to the clause 7 in test report.

5GHz Band	Mode	Tx frequency (MHz)	Max power(dBm)
<b>U-NII 1</b>	802.11a	5180 ~ 5240	<b>18.70</b>
	802.11n(HT20)	5180 ~ 5240	17.16
	802.11ac(VHT20)	5180 ~ 5240	17.24
	802.11n(HT40)	5190 ~ 5230	16.99
	802.11ac(VHT40)	5190 ~ 5230	<b>17.05</b>
	802.11ac(VHT80)	5210	<b>16.64</b>
<b>U-NII 2A</b>	802.11a	5260 ~ 5320	<b>17.72</b>
	802.11n(HT20)	5260 ~ 5320	17.18
	802.11ac(VHT20)	5260 ~ 5320	17.10
	802.11n(HT40)	5270 ~ 5310	16.96
	802.11ac(VHT40)	5270 ~ 5310	<b>17.09</b>
	802.11ac(VHT80)	5290	<b>12.82</b>
<b>U-NII 2C</b>	802.11a	5500 ~ 5720	<b>18.97</b>
	802.11n(HT20)	5500 ~ 5720	17.44
	802.11ac(VHT20)	5500 ~ 5720	17.43
	802.11n(HT40)	5510 ~ 5710	<b>17.50</b>
	802.11ac(VHT40)	5510 ~ 5710	17.43
	802.11ac(VHT80)	5530 ~ 5690	<b>17.14</b>
<b>U-NII 3</b>	802.11a	5745 ~ 5825	<b>19.00</b>
	802.11n(HT20)	5745 ~ 5825	17.48
	802.11ac(VHT20)	5745 ~ 5825	17.47
	802.11n(HT40)	5755 ~ 5795	<b>17.50</b>
	802.11ac(VHT40)	5755 ~ 5795	<b>17.50</b>
	802.11ac(VHT80)	5775	<b>17.06</b>

## 2. INFORMATION ABOUT TEST ITEMS

### 2.1 Transmitting configuration of EUT

Mode	SISO		MIMO (CDD)	MIMO (SDM)
	Ant 1	Ant 2	Ant 1 & 2	Ant 1 & 2
	Data rate			
802.11a	6~54Mbps	6~54Mbps	6~54Mbps	-
802.11n(HT20)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15
802.11ac(VHT20)	MCS 0 ~ 8	MCS 0 ~ 8	MCS 0 ~ 8	MCS 0 ~ 8
802.11n(HT40)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15
802.11ac(VHT40)	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9
802.11ac(VHT80)	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9	MCS 0 ~ 9

Note1: SDM = Spatial Diversity Multiplexing, CDD = Cycle Delay Diversity

Note2: This device supports WiFi DBS(dual-band simultaneous) transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on each antenna. (Ant 1: 2.4GHz band transmitting & ANT 2: 5GHz band transmitting)

And the test results for WiFi DBS were included in this test report.

### 2.2 Tested Channel Information

5GHz Band	802.11a/n(HT20) /802.11ac(VHT20)		802.11n(HT40) /802.11ac(VHT40)		802.11ac(VHT80)	
	Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
U-NII 1	36	5180	38	5190	42	5210
	40	5200	-	-	-	-
	48	5240	46	5230	-	-
U-NII 2A	52	5260	54	5270	58	5290
	60	5300	-	-	-	-
	64	5320	62	5310	-	-
U-NII 2C	100	5500	102	5510	106	5530
	120	5600	118	5590	122	5610
	144	5720	142	5710	138	5690
U-NII 3	149	5745	151	5755	155	5775
	157	5785	-	-	-	-
	165	5825	159	5795	-	-

### 2.3 Testing Environment

Temperature	: 20 °C ~ 25 °C
Relative humidity content	: 40 % ~ 45 %
Details of power supply	: DC 3.85 V

### 2.4 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing  
 → None

### 2.5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C63.4-2014 and ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95 % level of confidence.

Test items	Measurement uncertainty
Transmitter Output Power	0.7 dB (The confidence level is about 95 %, $k = 2$ )
Conducted spurious emission	0.9 dB (The confidence level is about 95 %, $k = 2$ )
AC conducted emission	2.4 dB (The confidence level is about 95 %, $k = 2$ )
Radiated spurious emission (1 GHz Below)	5.1 dB (The confidence level is about 95 %, $k = 2$ )
Radiated spurious emission (1 GHz ~ 18 GHz)	5.4 dB (The confidence level is about 95 %, $k = 2$ )
Radiated spurious emission (18 GHz Above)	5.3 dB (The confidence level is about 95 %, $k = 2$ )

### 3. SUMMARY OF TESTS

FCC Part Section(s)	Parameter	Limit	Test Condition	Status Note 1
<b>I. Transmitter Mode (TX)</b>				
15.407(a)	Emission Bandwidth (26 dB Bandwidth)	N/A	Conducted	C
15.407(e)	Minimum Emission Bandwidth (6 dB Bandwidth)	> 500 kHz in 5725 ~ 5850 MHz		C
15.407(a)	Maximum Conducted Output Power	5150 ~ 5250 MHz : < 23.97 dBm 5250 ~ 5350 & 5470 ~ 5725 MHz : < 250 mW or < 11 + 10 log <sub>10</sub> (B) dBm, whichever power is less. (B is the 26dB BW.) 5725 ~ 5850 MHz : < 30 dBm		C
15.407(a)	Peak Power Spectral Density	5150 ~ 5250 MHz : 11 dBm/MHz 5250 ~ 5350 MHz : 11 dBm/MHz 5470 ~ 5725 MHz : 11 dBm/MHz 5725 ~ 5850 MHz : 30 dBm/500kHz		C
15.407(g)	Frequency Stability	N/A		C
15.407(h)	Dynamic Frequency Selection	FCC 15.407(h)		C Note 3
15.407(b)	Undesirable Emissions	5150 ~ 5725 MHz: < -27 dBm/MHz EIRP 5725 ~ 5850 MHz: < -27 dBm/MHz or < 10 dBm/MHz or 15.6 dBm/MHz < 27dBm/MHz EIRP		Radiated
15.205 15.209 15.407(b)	General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	C Note 4	
15.207	AC Conducted Emissions	FCC 15.207	AC Line Conducted	C
15.203	Antenna Requirements	FCC 15.203	-	C

Note 1: **C** = Comply    **NC** = Not Comply    **NT** = Not Tested    **NA** = Not Applicable

Note 2: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS.

Note 3: Refer to the DFS test report.

Note 4: In case of this test item, we have done all TX test cases. And we attached the result of MIMO mode since MIMO is the worst case.

Note 5: The sample was tested according to the following specification:

**KDB789033 D02v02r01, KDB662911 D01v02r01**

## 4. TEST METHODOLOGY

The measurement procedures described in the ANSI C63.10-2013 and the guidance provided in KDB 7899033 D02v02r01 were used in measurement of the EUT.

The EUT was tested per the guidance of KDB789033 D02v02r01. And ANSI C63.10-2013 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing.

### 4.1 EUT configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 4.2 EUT exercise

The EUT was operated in the test mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

### 4.3 General test procedures

#### Conducted Emissions

The power-line conducted emission test procedure is not described on the KDB789033 D02v02r01. So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10-2013.

The EUT is placed on the wooden table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector.

#### Radiated Emissions

Basically the radiated tests were performed with KDB789033 D02v02r01. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10-2013 as stated on KDB789033 D02v02r01.

The EUT is placed on a non-conductive table, which is 0.8 m above ground plane. For emission measurements above 1 GHz, the table height is 1.5 m. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 1 or 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axis.

### 4.4 Description of test modes

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics. A test program is used to control the EUT for staying in continuous transmitting mode with maximum fixed duty cycle.



## 5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

## 6. FACILITIES AND ACCREDITATIONS

### 6.1 Facilities

<b>DT&amp;C Co., Ltd.</b>		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.		
The test site complies with the requirements of § 2.948 according to ANSI C63.4-2014.		
<b>- FCC MRA Accredited Test Firm No. : KR0034</b>		
<a href="http://www.dtn.net">www.dtn.net</a>		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

### 6.2 Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, loop, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

## 7. ANTENNA REQUIREMENTS

### According to FCC 47 CFR §15.203:

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna is attached on the device by means of unique coupling method (Spring Tension).**

**Therefore this E.U.T Complies with the requirement of §15.203**

### Directional antenna gain:

Bands	SISO		MIMO (CDD) <sup>Note 1.</sup>	MIMO (SDM) <sup>Note 2</sup>
	ANT 1 [dBi]	ANT 2 [dBi]	Directional Gain[dBi]	Directional Gain[dBi]
U-NII 1	-0.81	-0.68	<b>2.27</b>	-0.74
U-NII 2A	-0.25	0.33	<b>3.06</b>	0.05
U-NII 2C	-0.27	0.90	<b>3.34</b>	0.35
U-NII 3	-3.41	0.28	<b>1.64</b>	-1.18

**Note 1. Directional gain(correlated signal with unequal antenna gain and equal transmit power)**

$$10 \log [ ( 10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20} )^2 / N^{ANT} ] \text{ dBi}$$

**Note 2. Directional gain(completely uncorrelated signal with unequal antenna gain and equal transmit power)**

$$10 \log [ ( 10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10} ) / N^{ANT} ] \text{ dBi}$$

## 8. TEST RESULT

### 8.1 Emission Bandwidth (26 dB Bandwidth)

#### ■ Test Requirements

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The 26 dB bandwidth is used to determine the conducted output power limit.

#### ■ Test Configuration

Refer to the APPENDIX I.

#### ■ Test Procedure

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of **KDB789033 D02v02r01**.

1. Set resolution bandwidth (RBW) = approximately **1 %** of the EBW.
2. Set the video bandwidth (**VBW**) > **RBW**.
3. Detector = **Peak**.
4. Trace mode = **max hold**.

Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

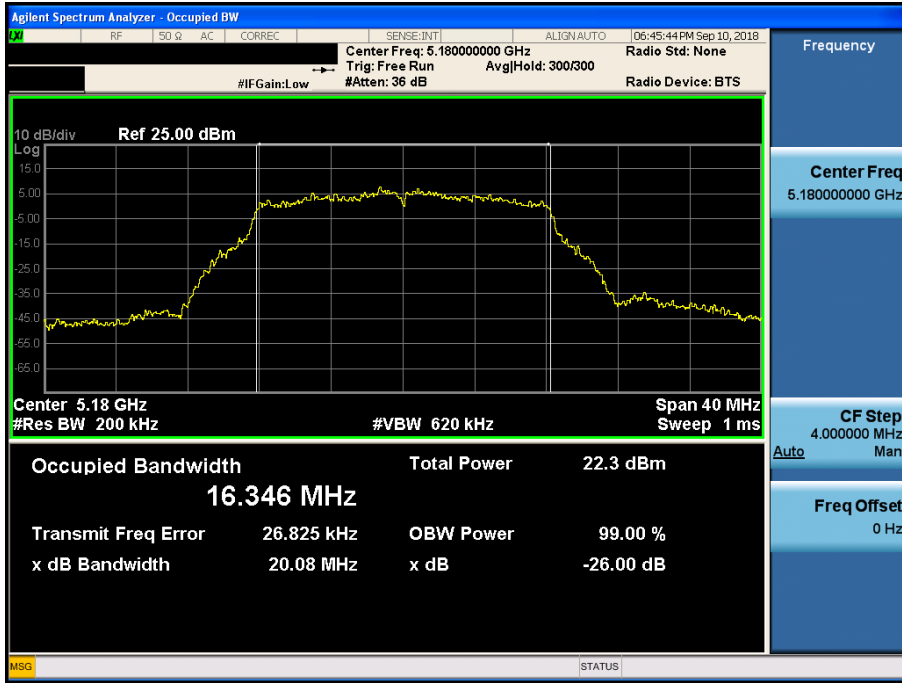
**Test Results: Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]	
				ANT 1	ANT 2
802.11a	U-NII 1	36	5180	20.08	19.76
		40	5200	19.93	20.01
		48	5240	19.91	19.98
	U-NII 2A	52	5260	19.66	19.68
		60	5300	19.87	20.11
		64	5320	20.03	19.61
	U-NII 2C	100	5500	19.69	20.06
		120	5600	19.95	20.08
		144	5720	20.15	20.15
802.11n (HT20)	U-NII 1	36	5180	20.35	20.24
		40	5200	20.14	19.93
		48	5240	19.86	19.85
	U-NII 2A	52	5260	20.04	20.01
		60	5300	20.33	20.30
		64	5320	20.24	20.19
	U-NII 2C	100	5500	19.98	20.03
		120	5600	20.06	19.76
		144	5720	19.83	20.06
802.11n (HT40)	U-NII 1	38	5190	40.03	39.97
		46	5230	40.08	39.88
	U-NII 2A	54	5270	39.81	40.28
		62	5310	40.01	40.13
	U-NII 2C	102	5510	39.94	39.77
		118	5590	40.20	40.42
802.11ac (VHT80)	U-NII 1	42	5210	81.03	80.97
	U-NII 2A	58	5290	81.97	81.10
	U-NII 2C	106	5530	81.08	81.12
		122	5610	81.38	81.40
		138	5690	81.65	81.39

Result Plots

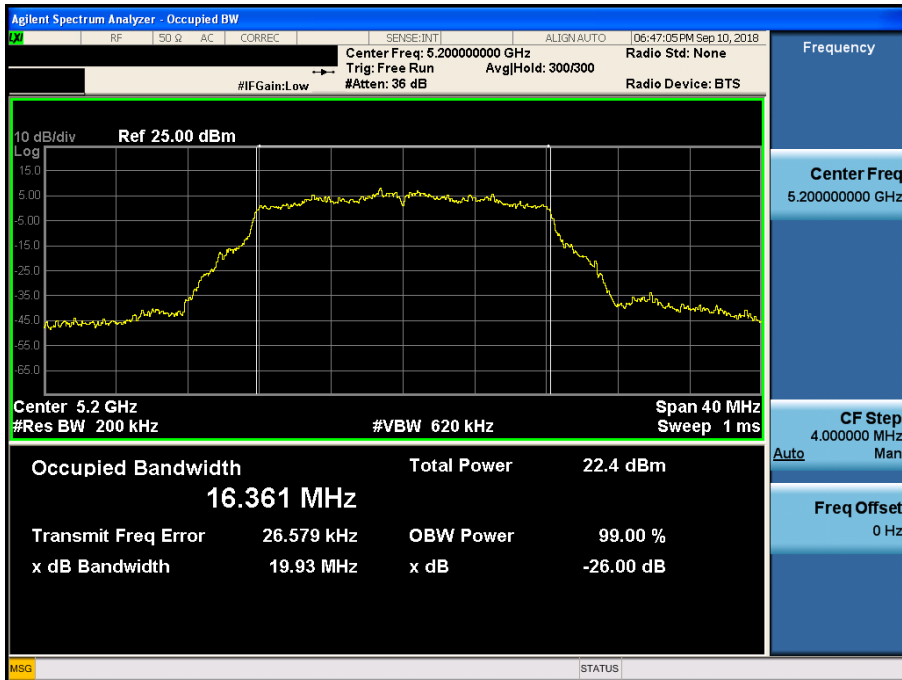
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.36



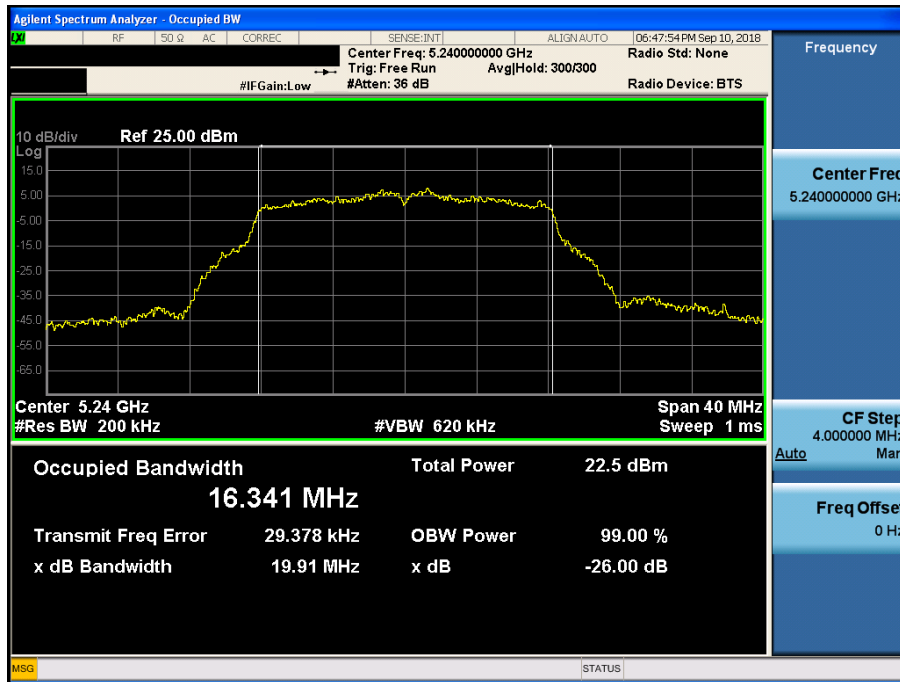
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.40



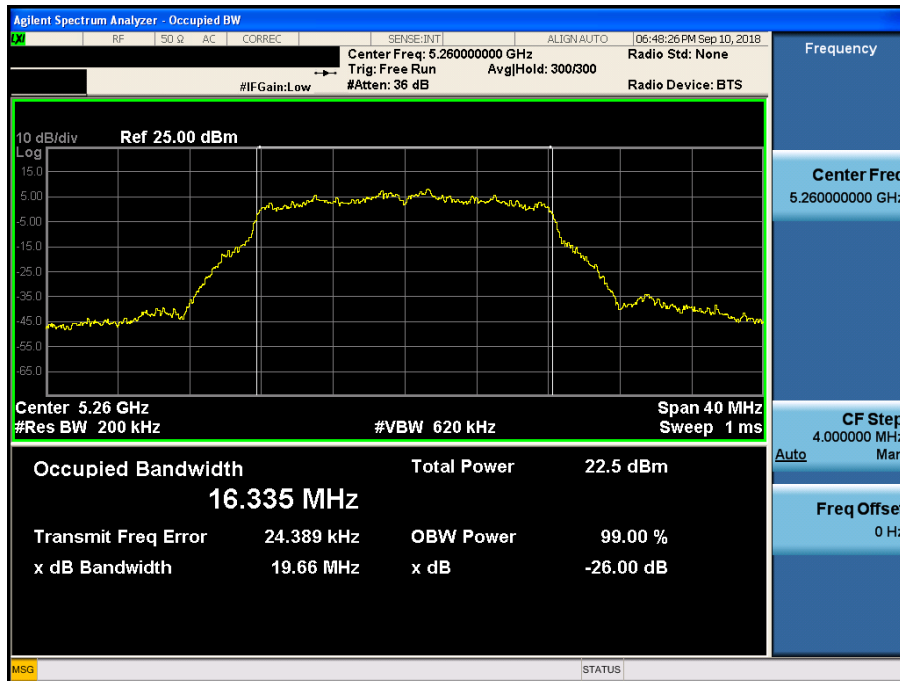
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.48



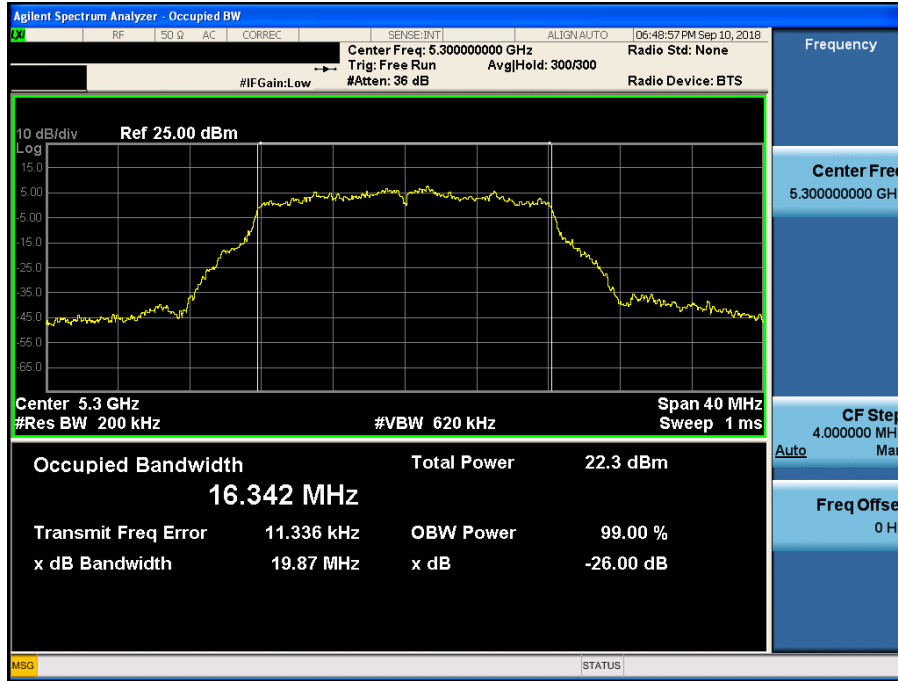
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.52



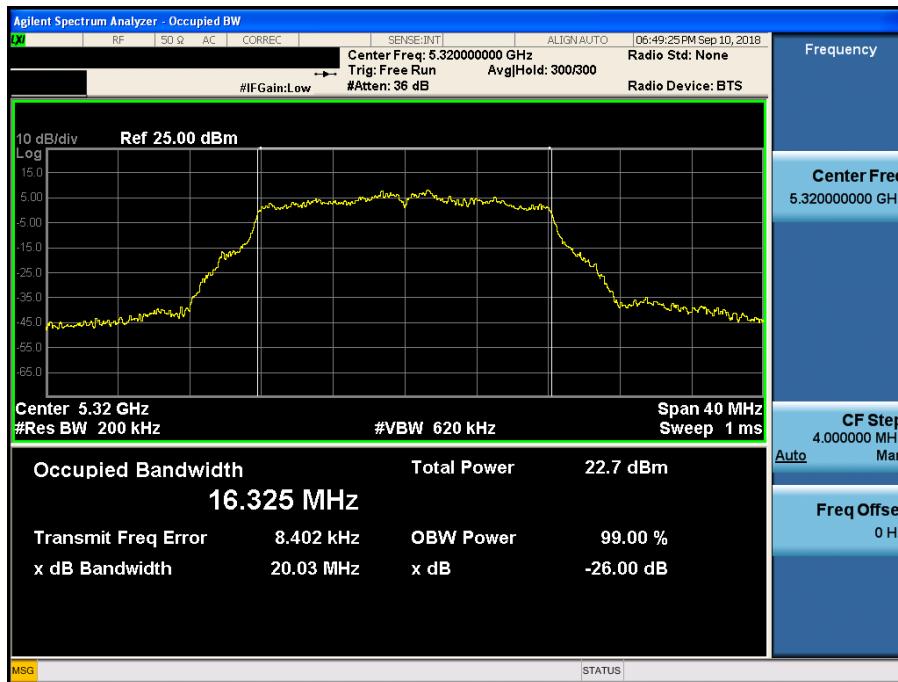
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.60



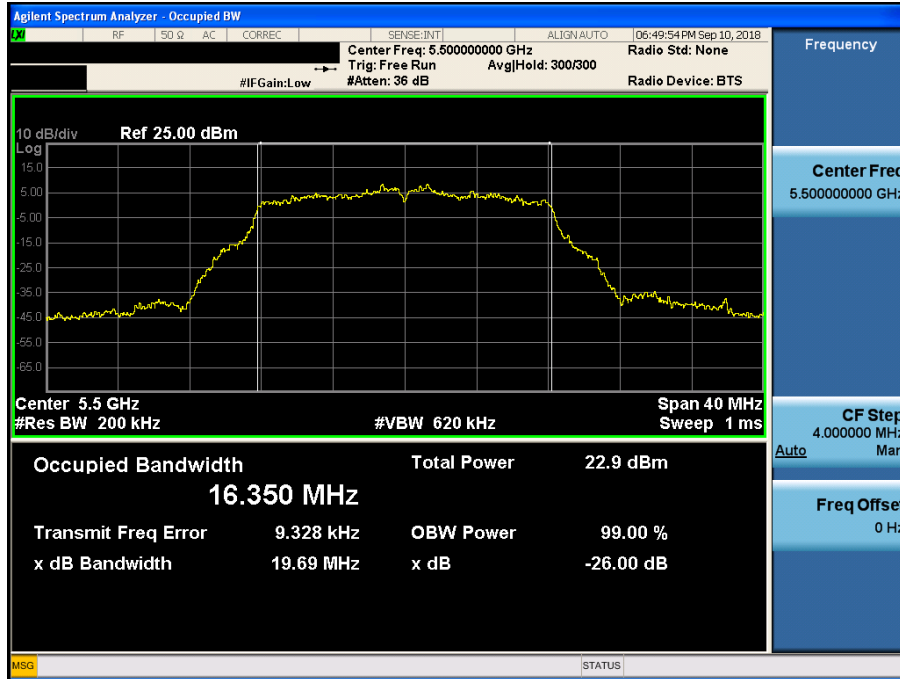
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.64



26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.100



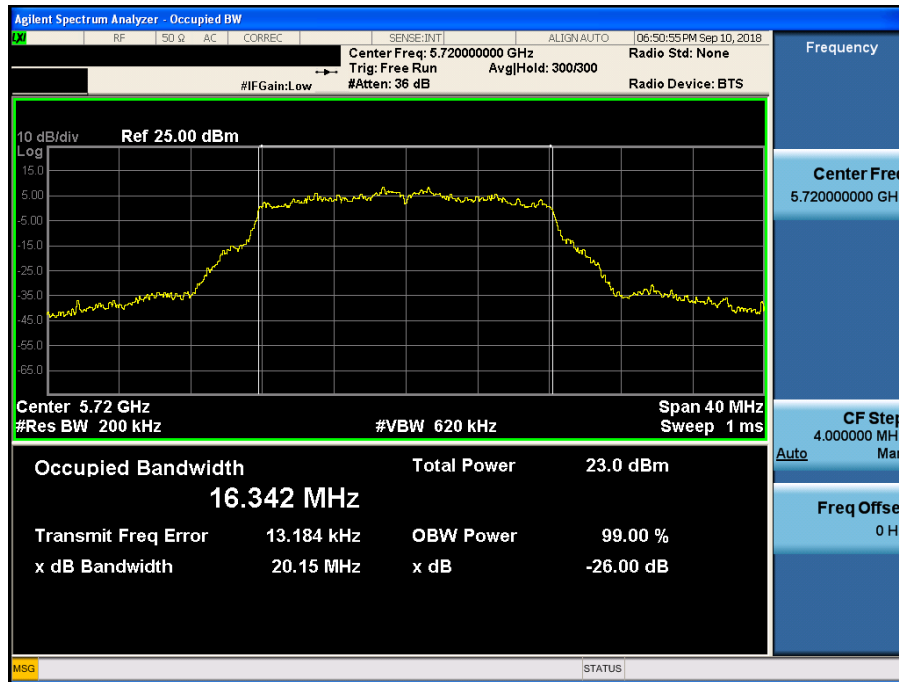
26 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.120



26 dB Bandwidth

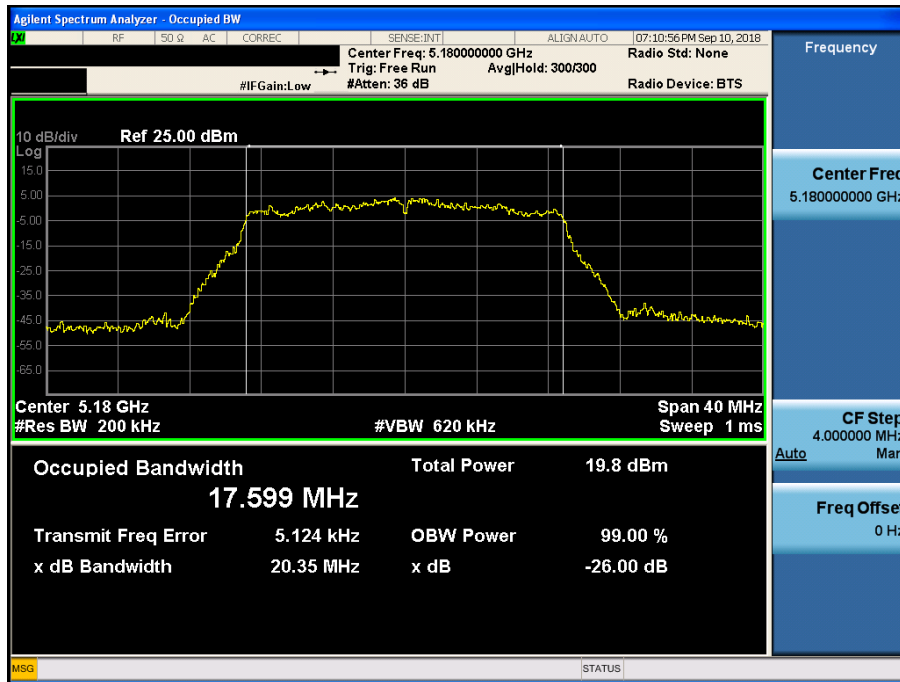
Test Mode: 802.11a & ANT 1 & Ch.144





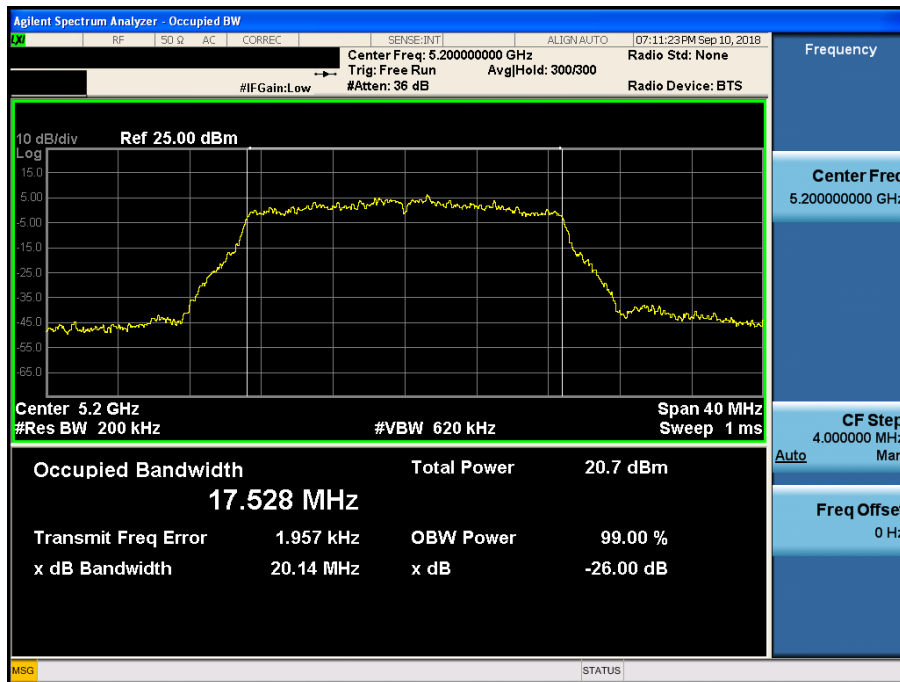
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.36



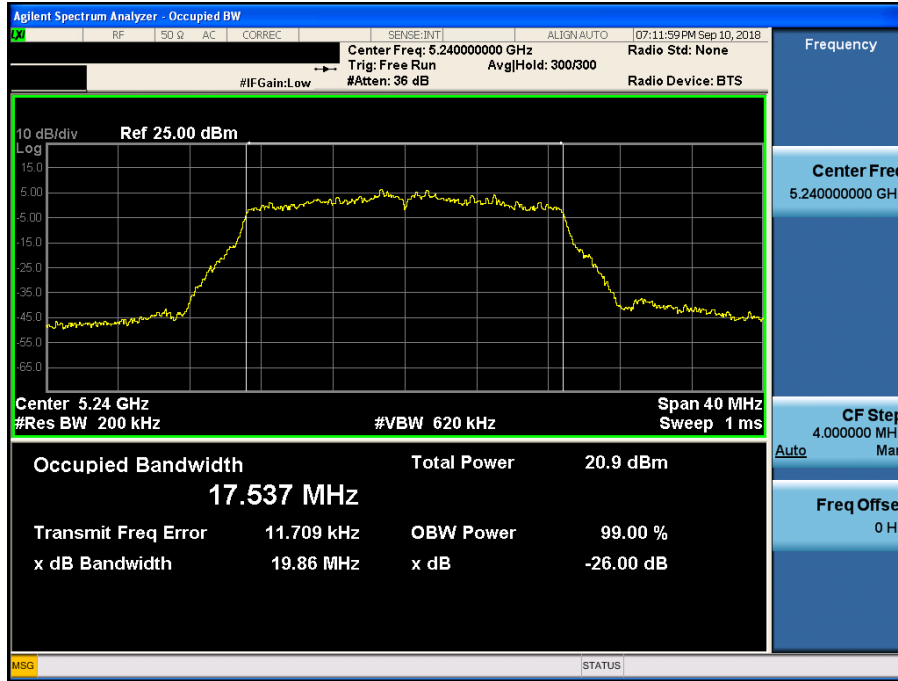
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.40



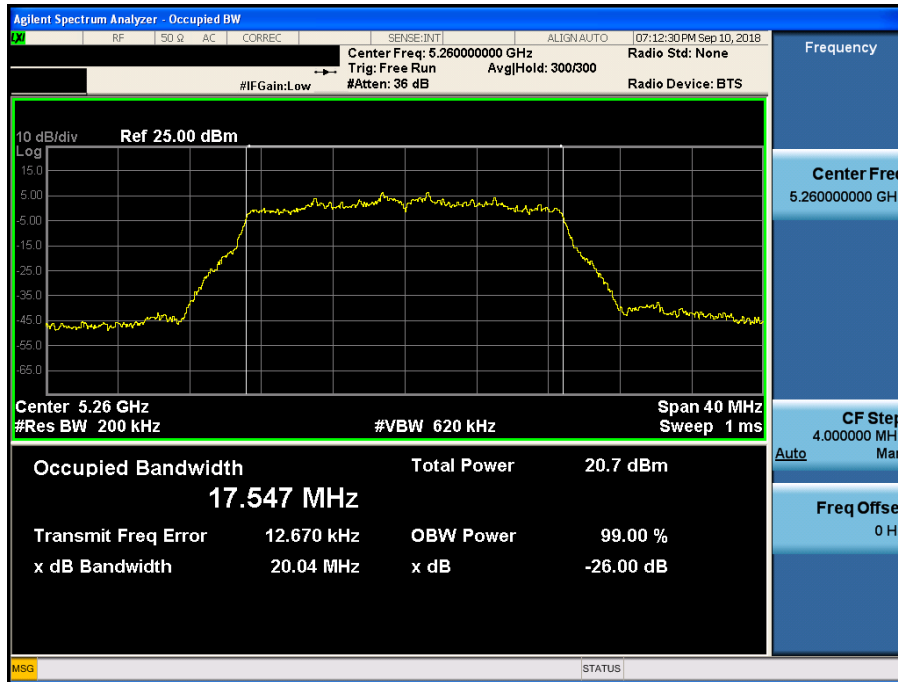
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.48



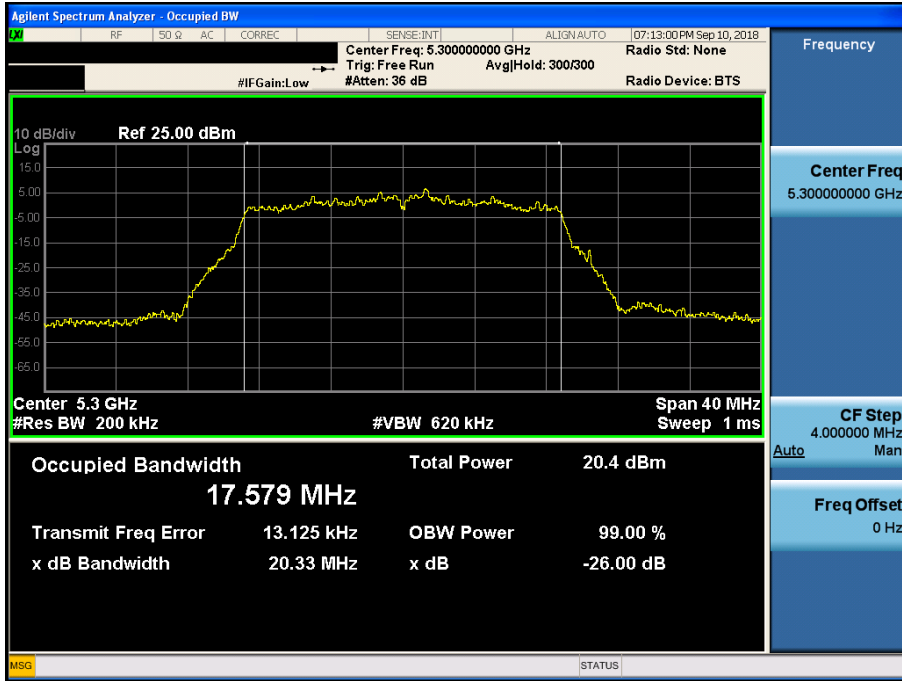
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.52



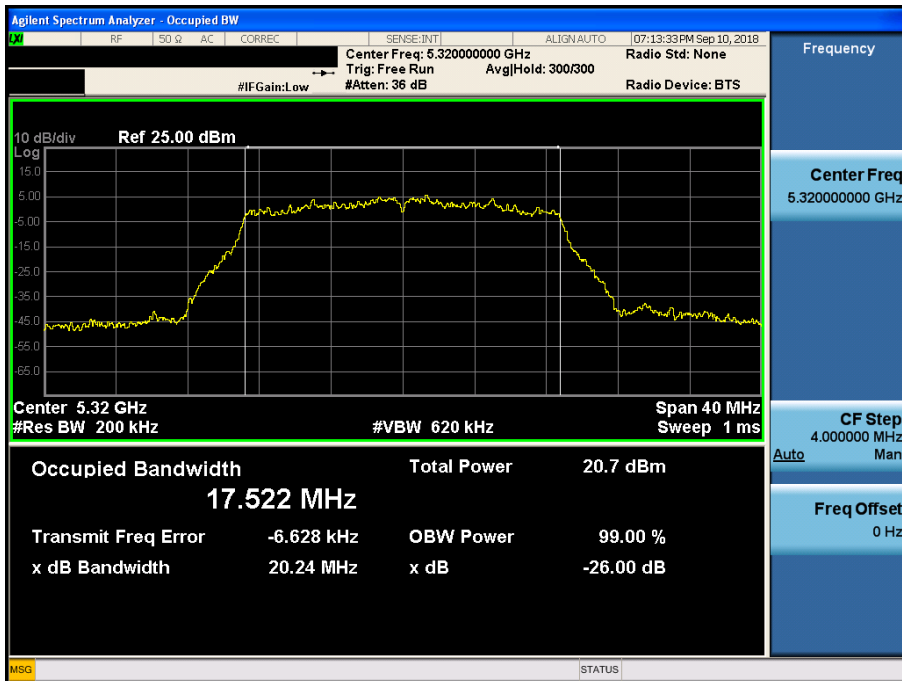
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.60



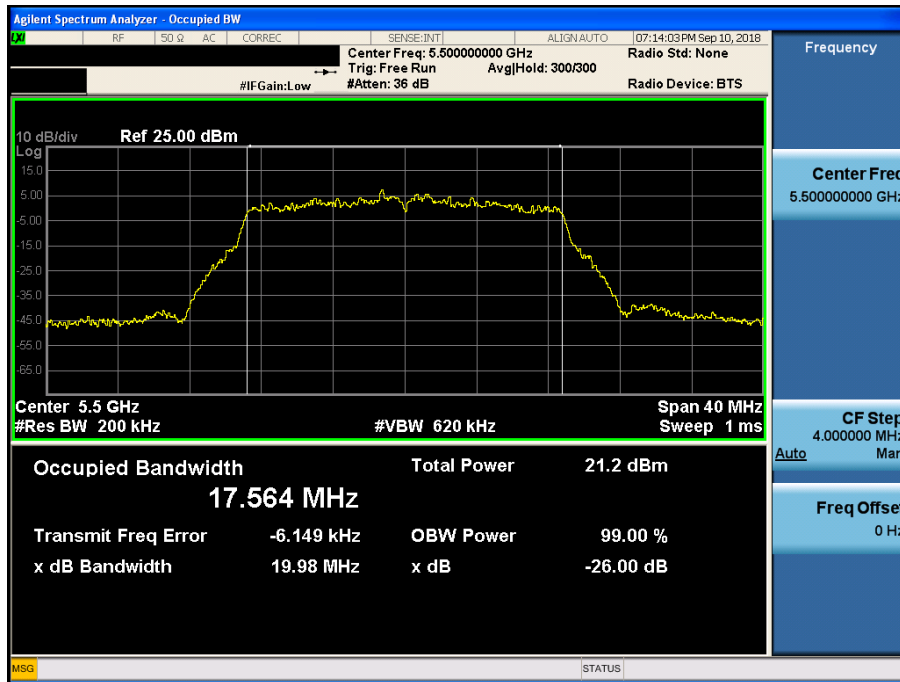
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.64



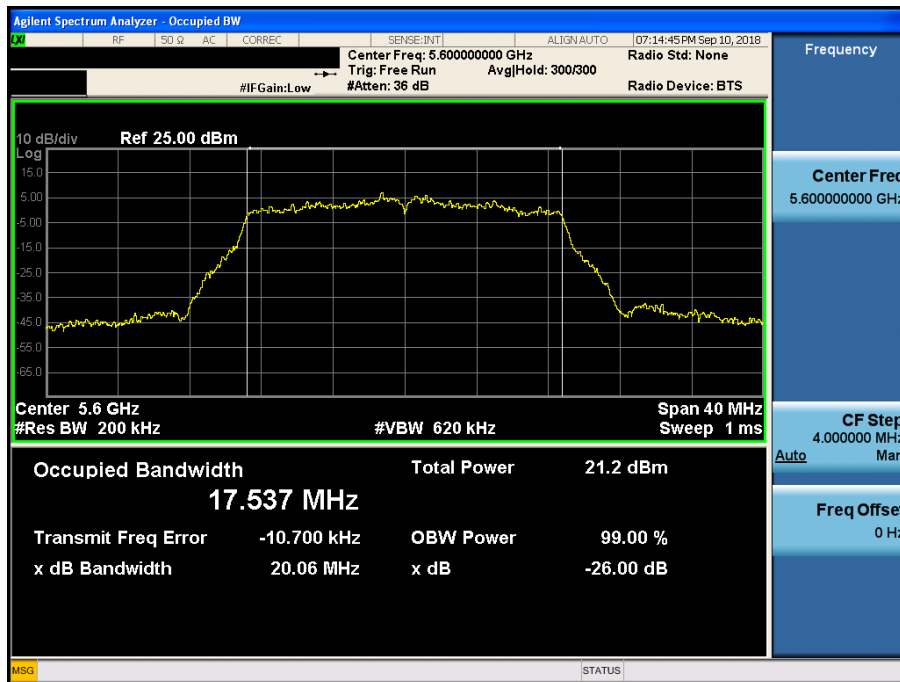
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.100



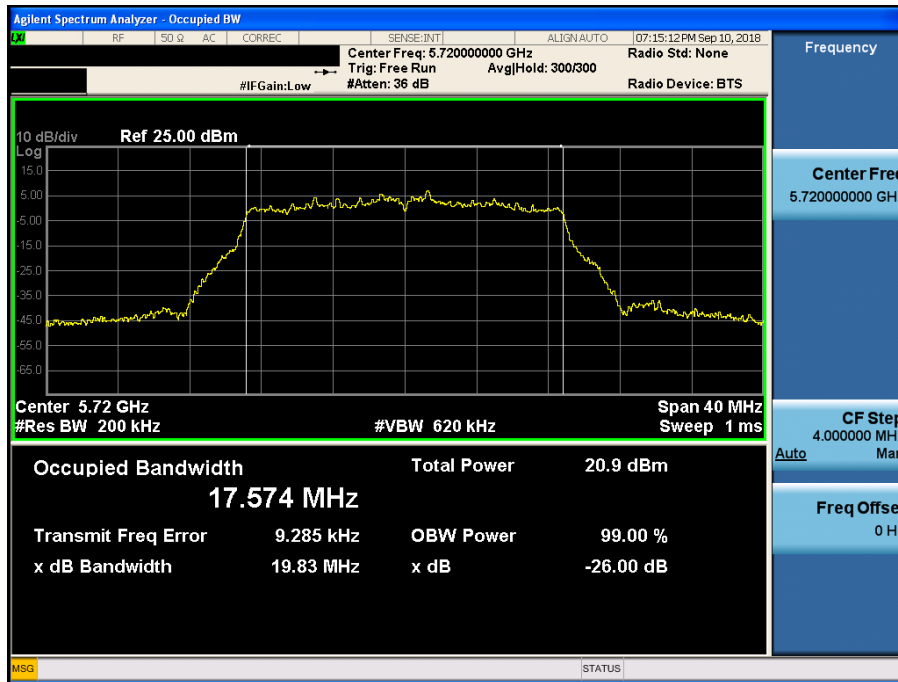
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.120



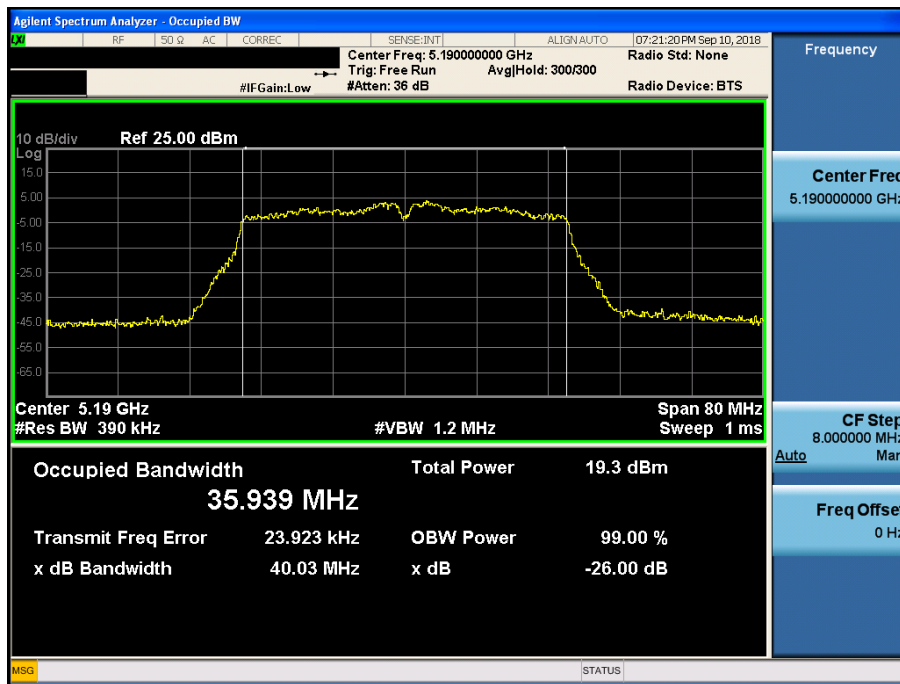
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.144



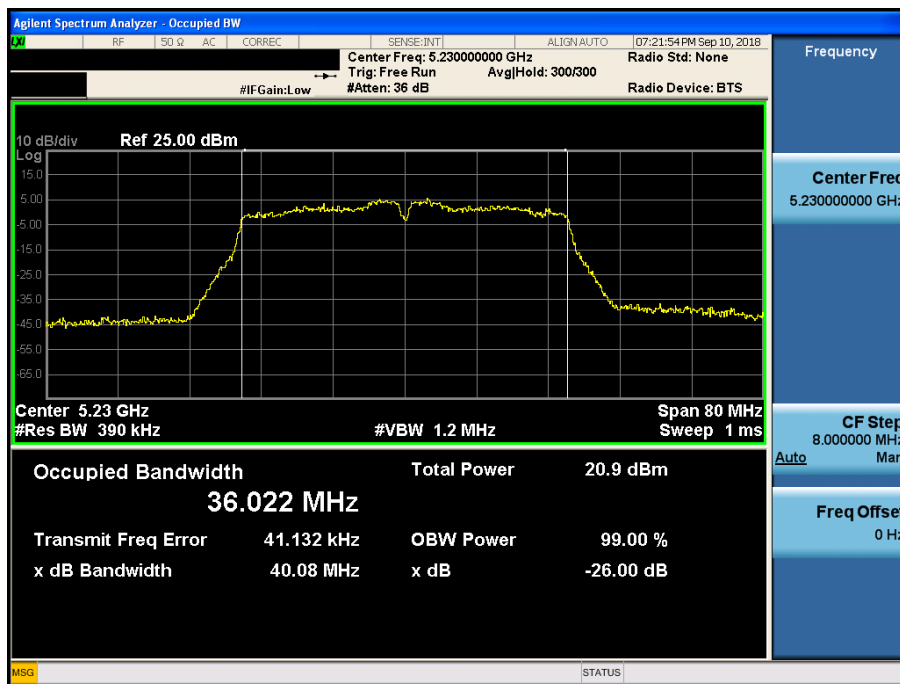
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.38



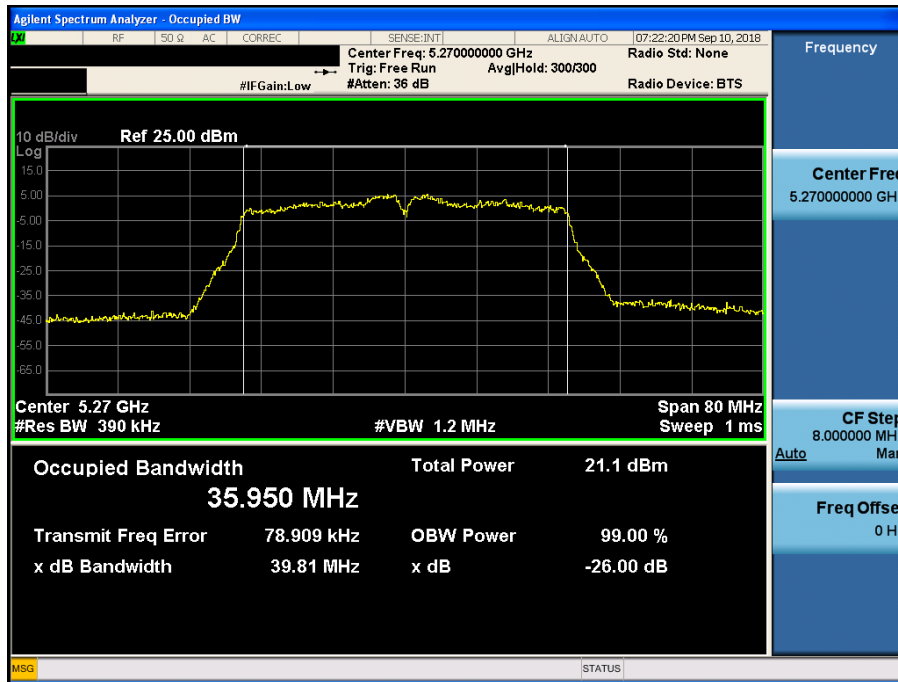
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.46



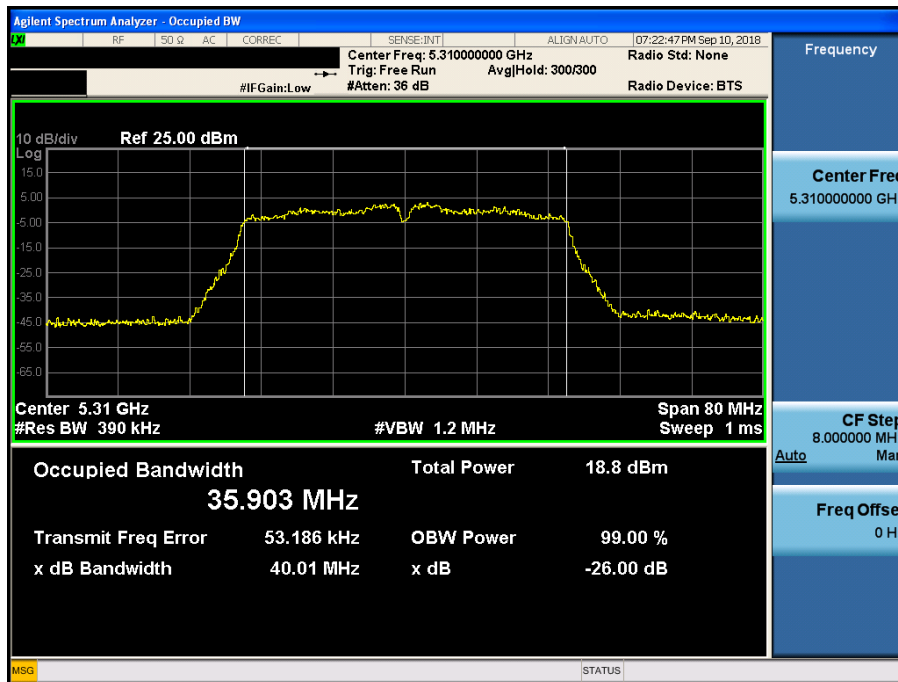
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.54



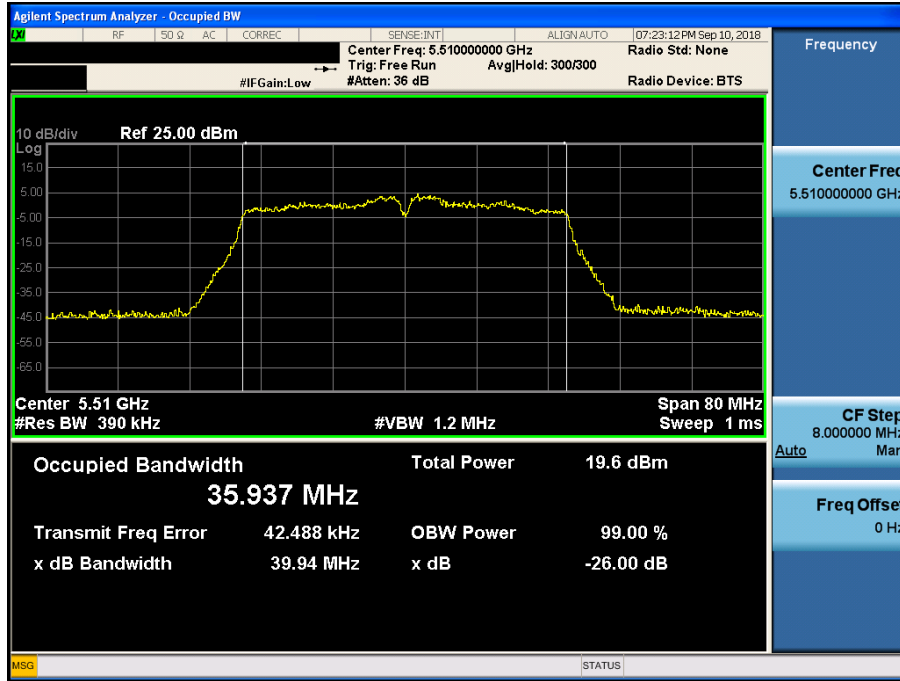
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.62



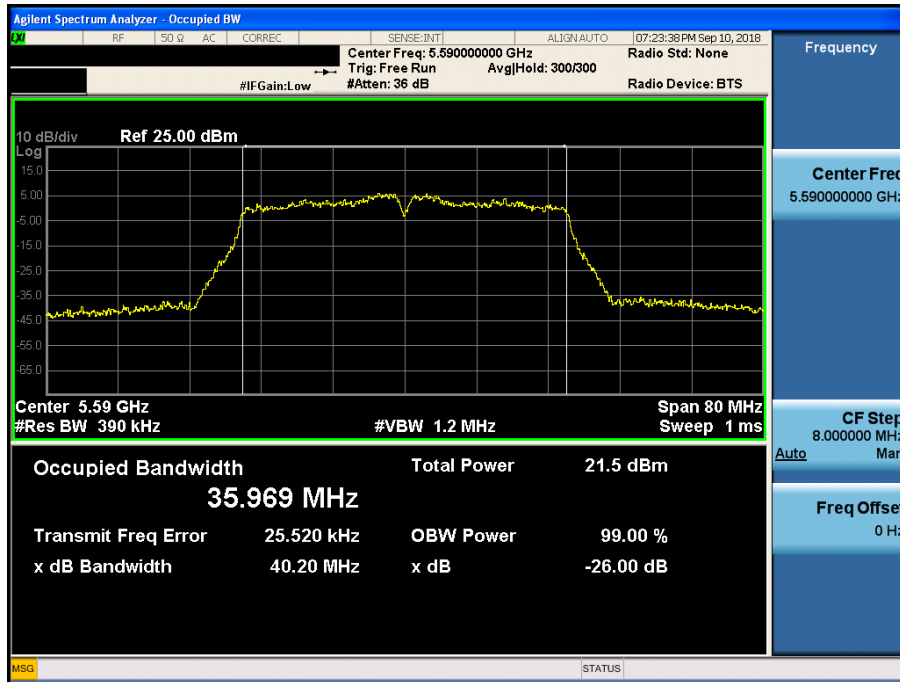
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.102



26 dB Bandwidth

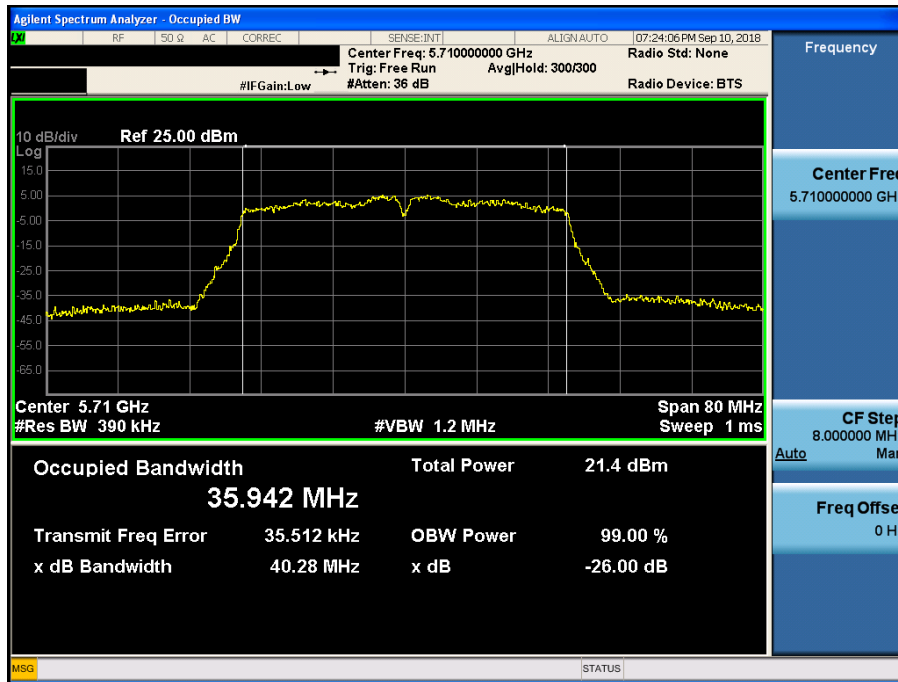
Test Mode: 802.11n HT40 & ANT 1 & Ch.118





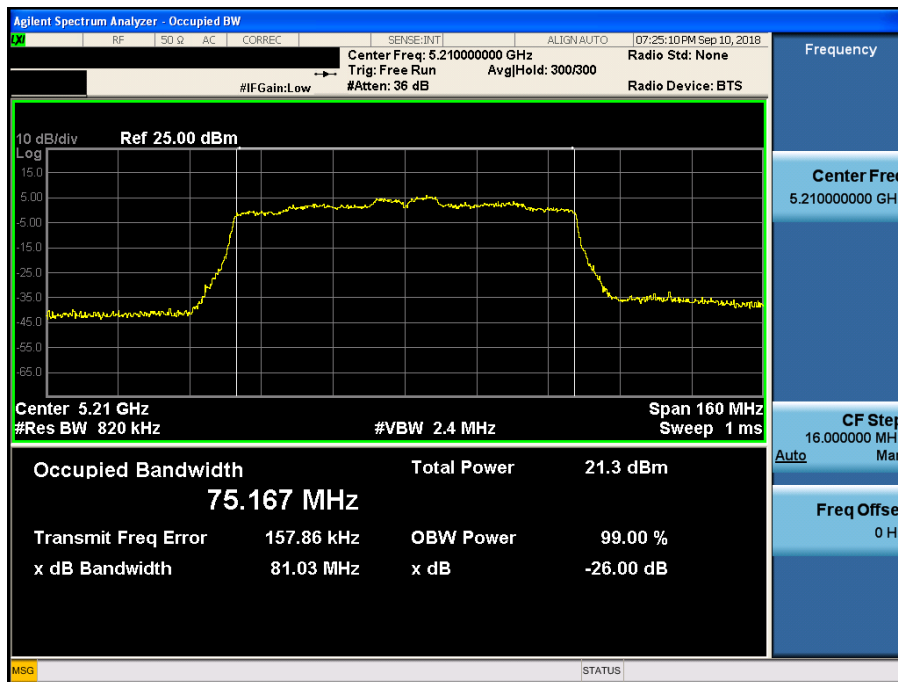
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.142



26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.42



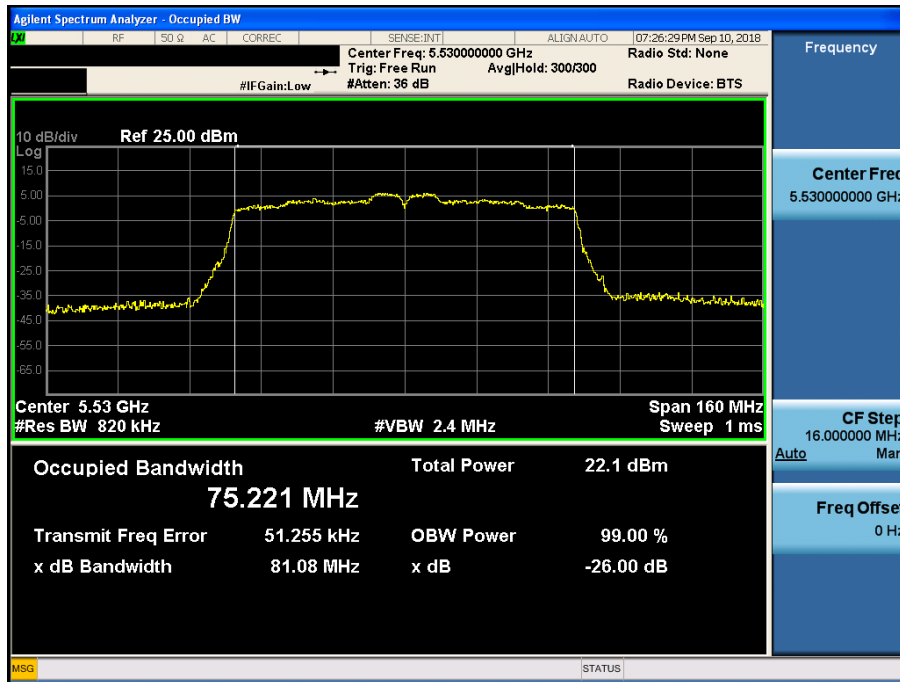
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.58



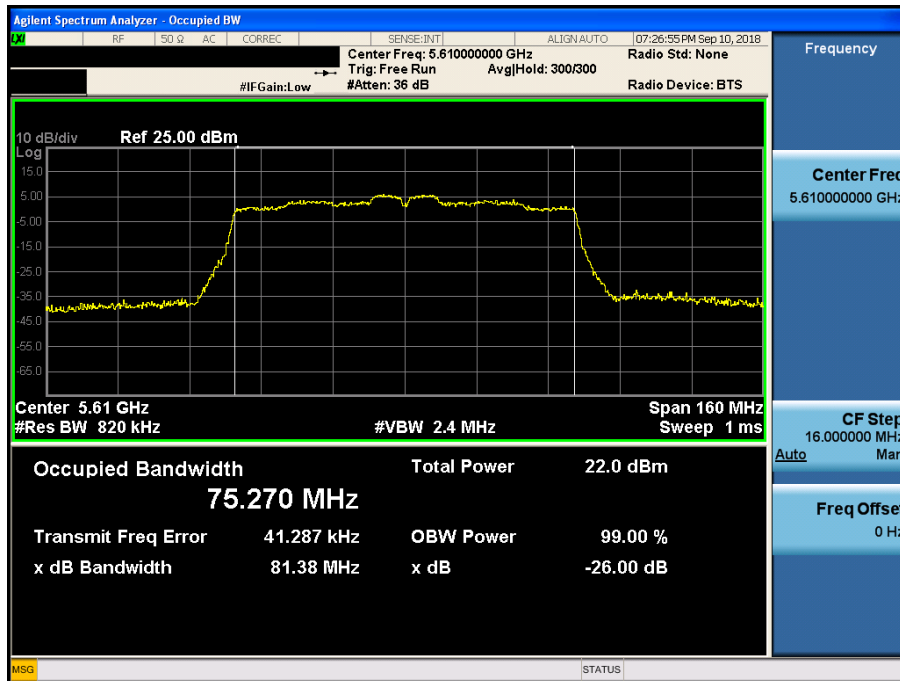
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.106



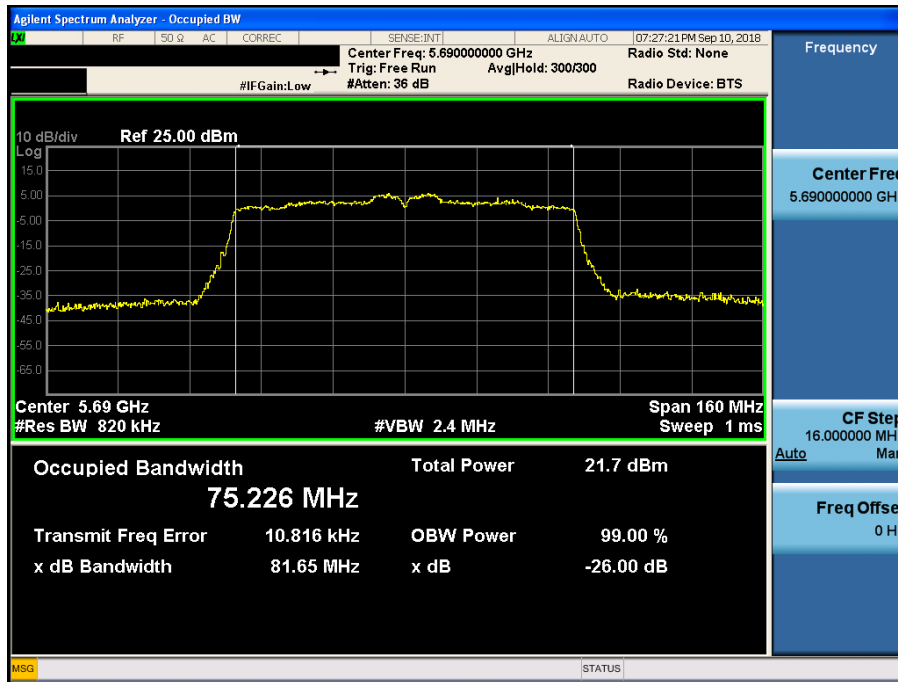
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.122



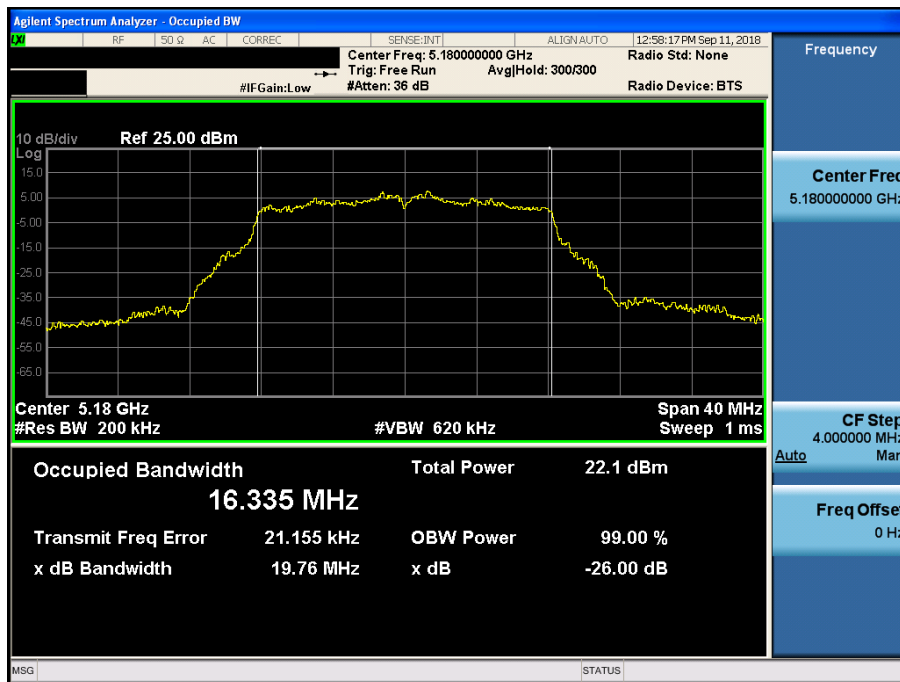
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.138



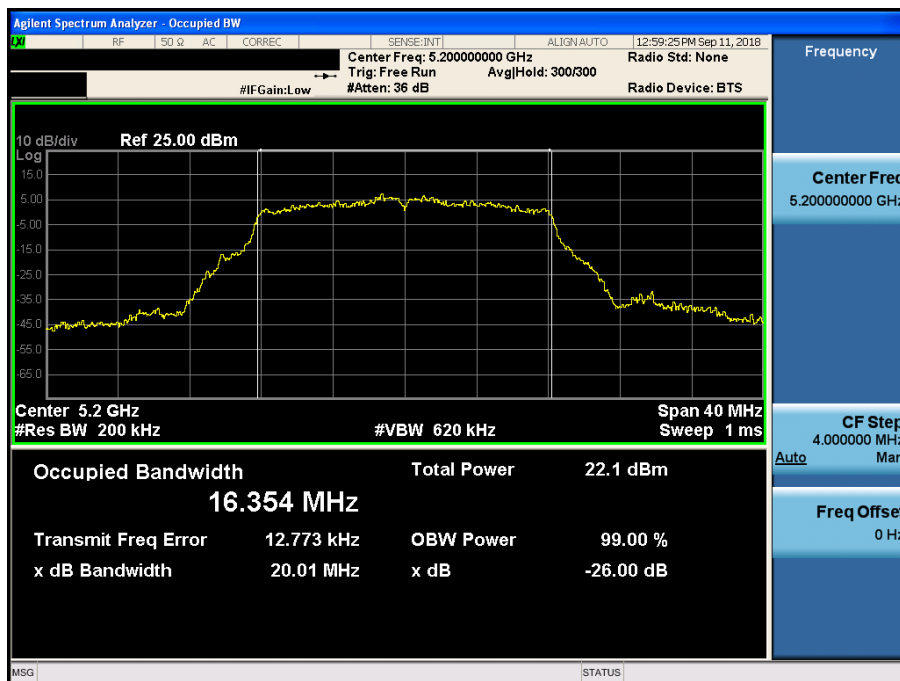
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.36



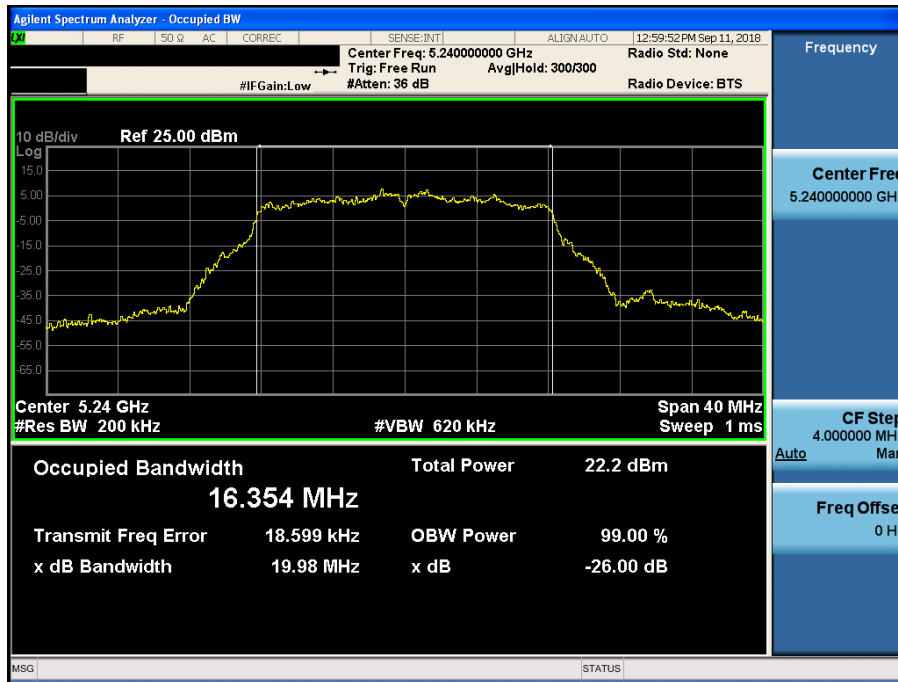
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.40



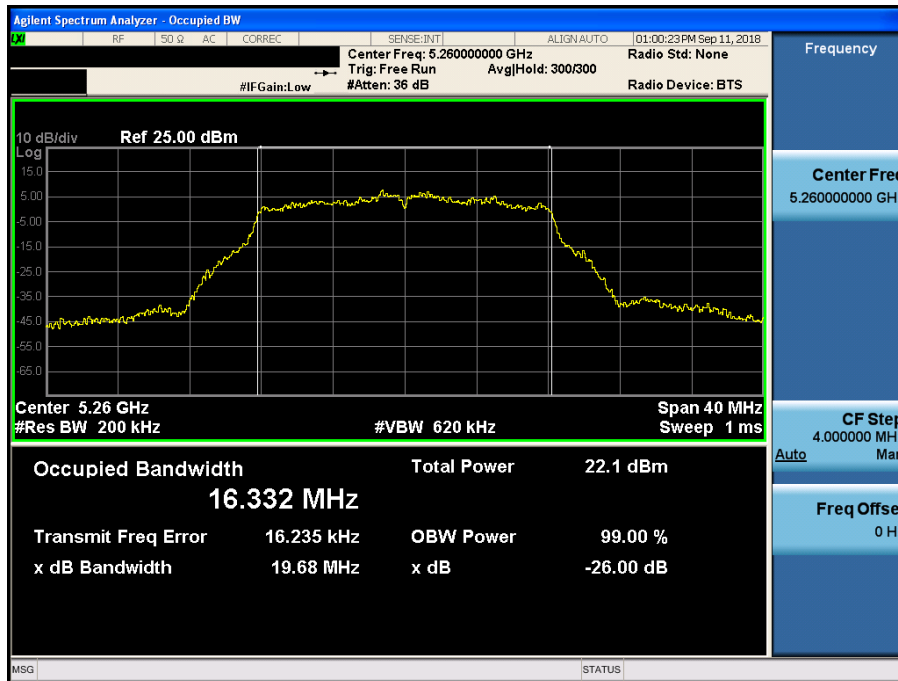
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.48



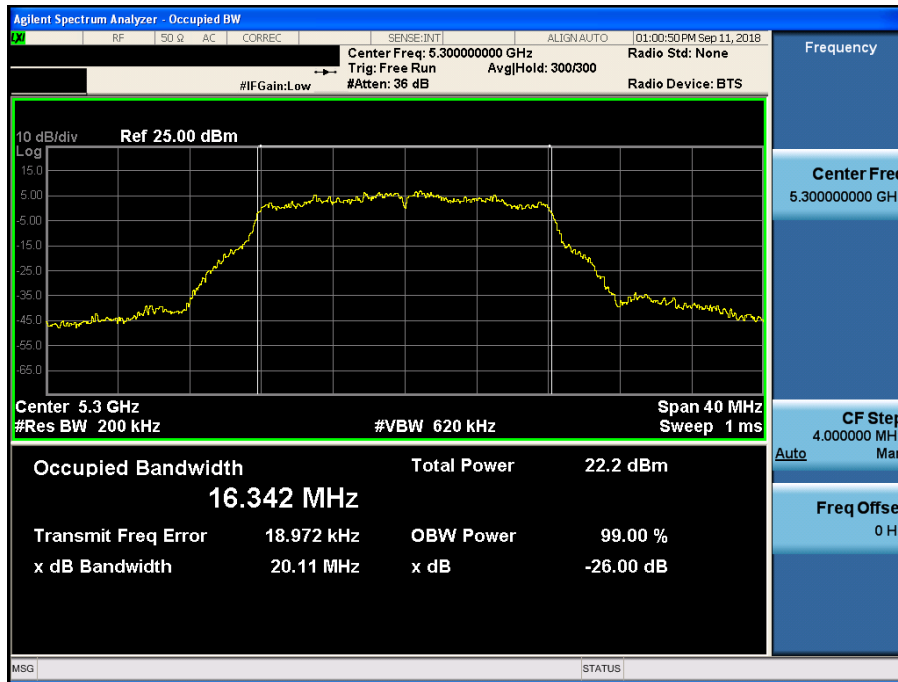
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.52



26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.60



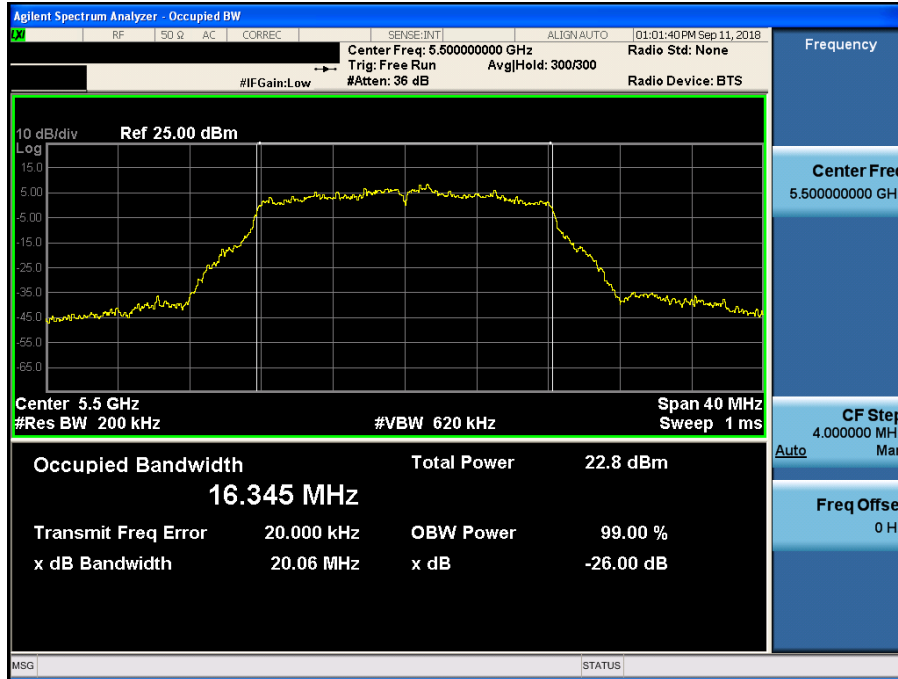
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.64



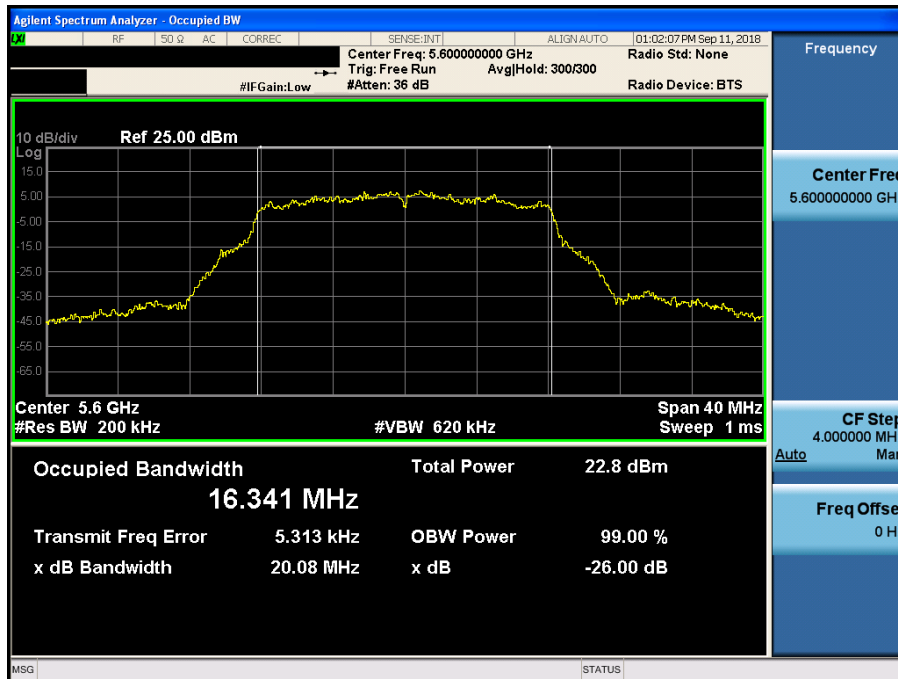
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.100



26 dB Bandwidth

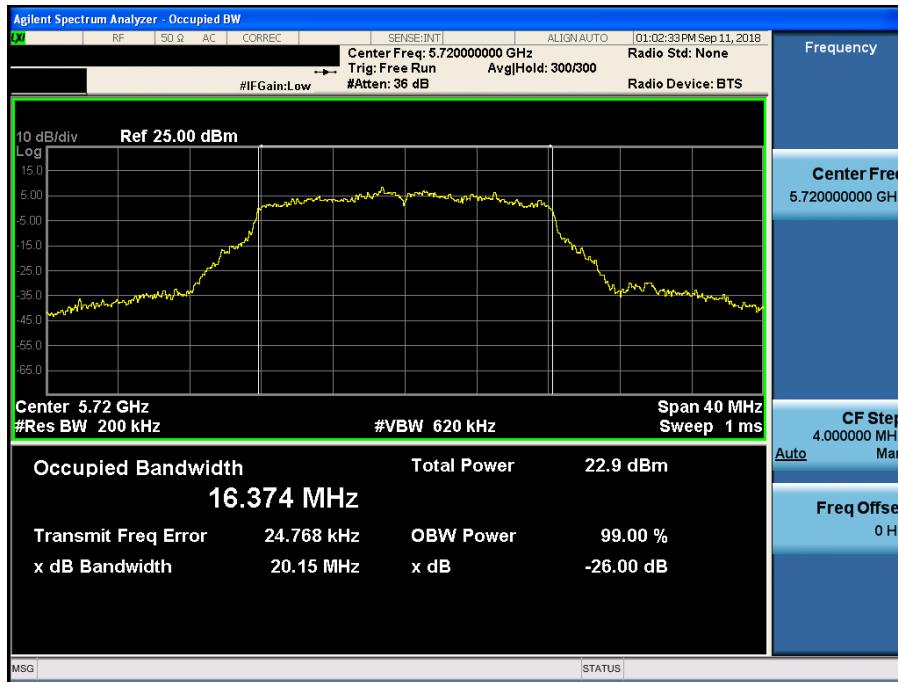
Test Mode: 802.11a & ANT 2 & Ch.120





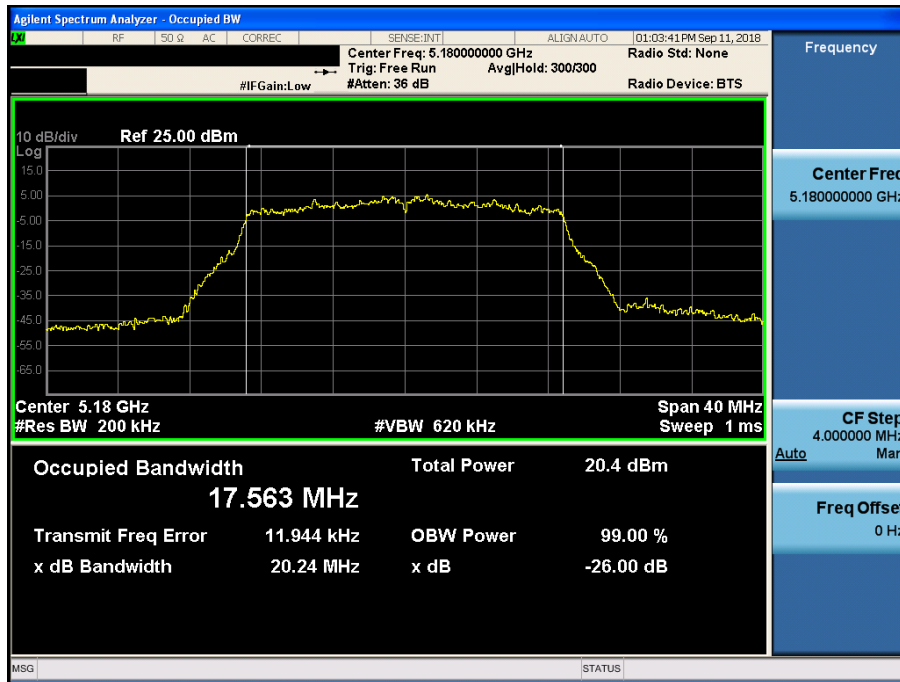
26 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.144



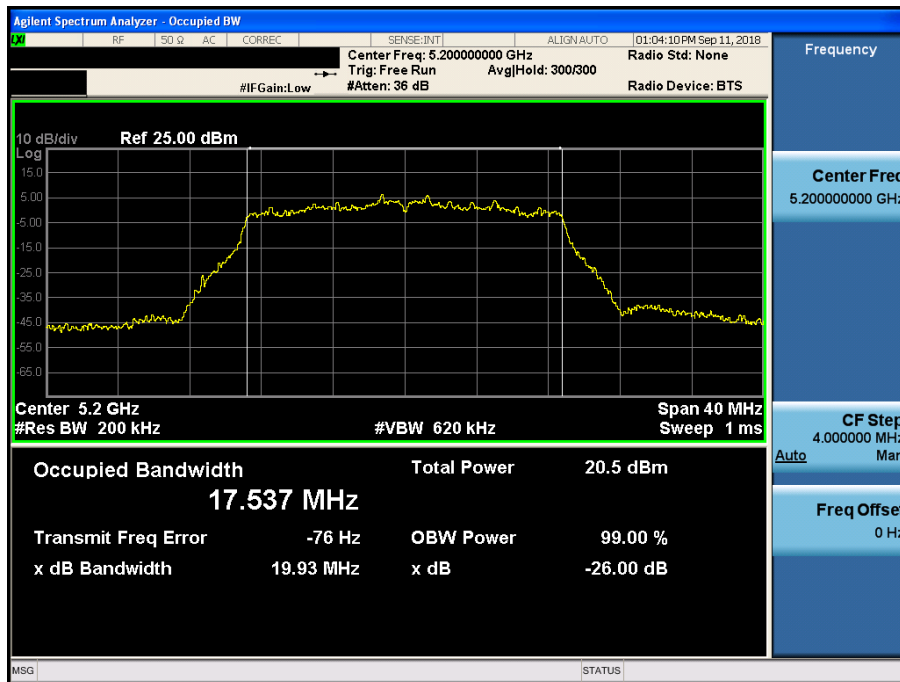
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.36



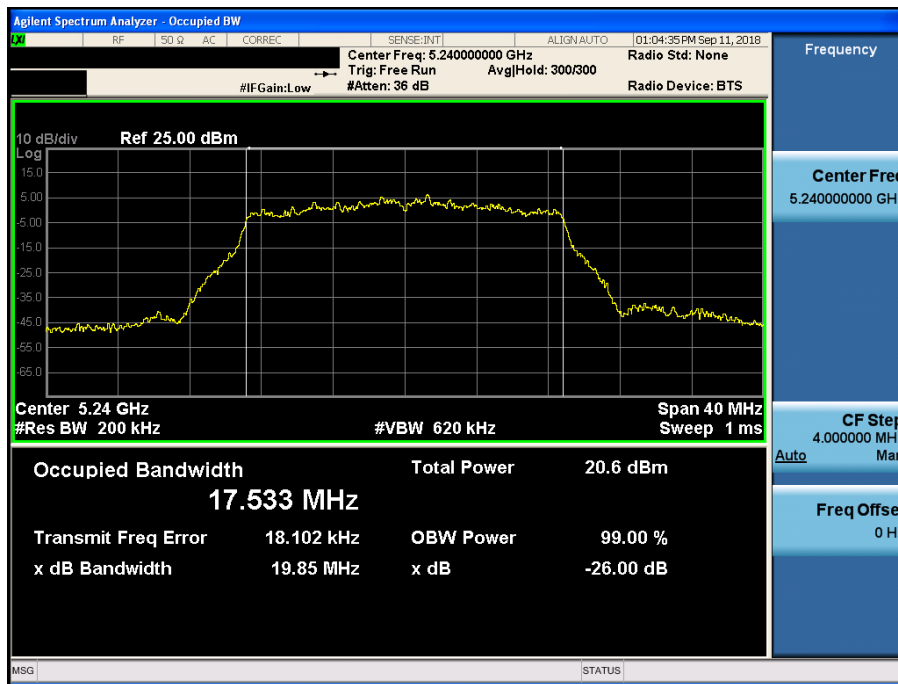
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.40



26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.48



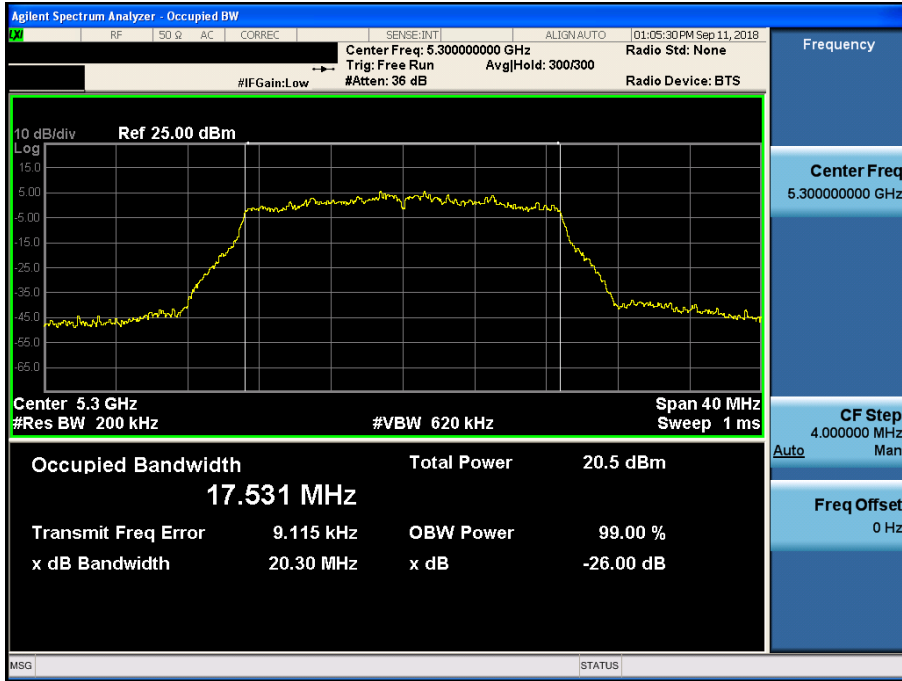
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.52



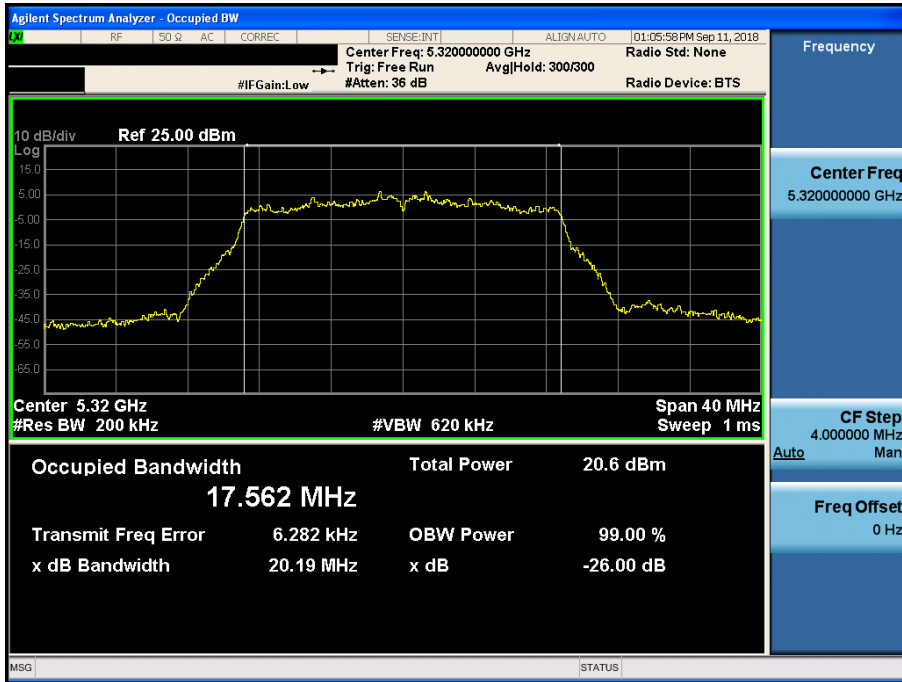
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.60



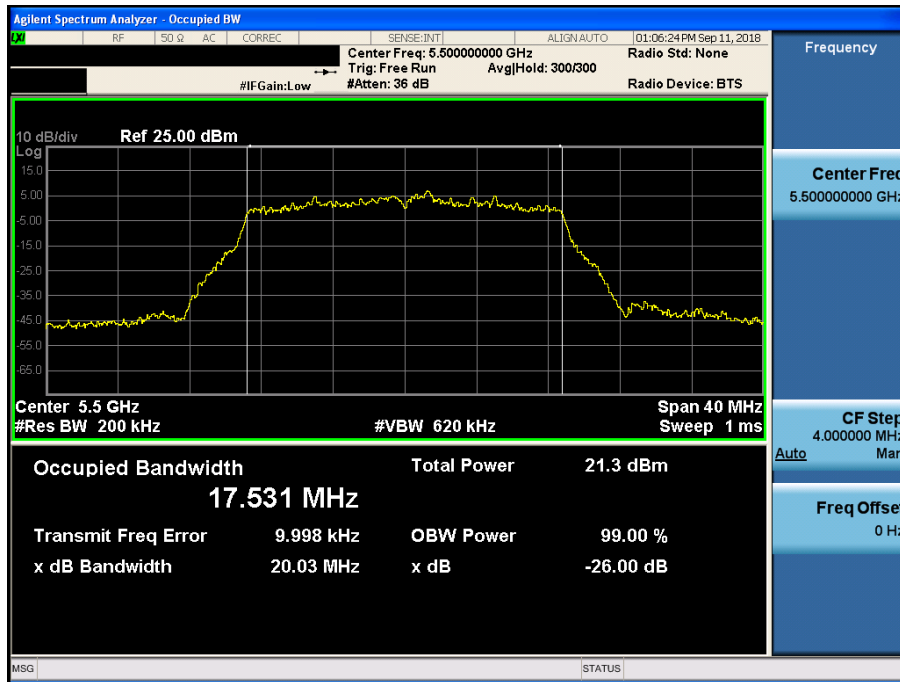
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.64



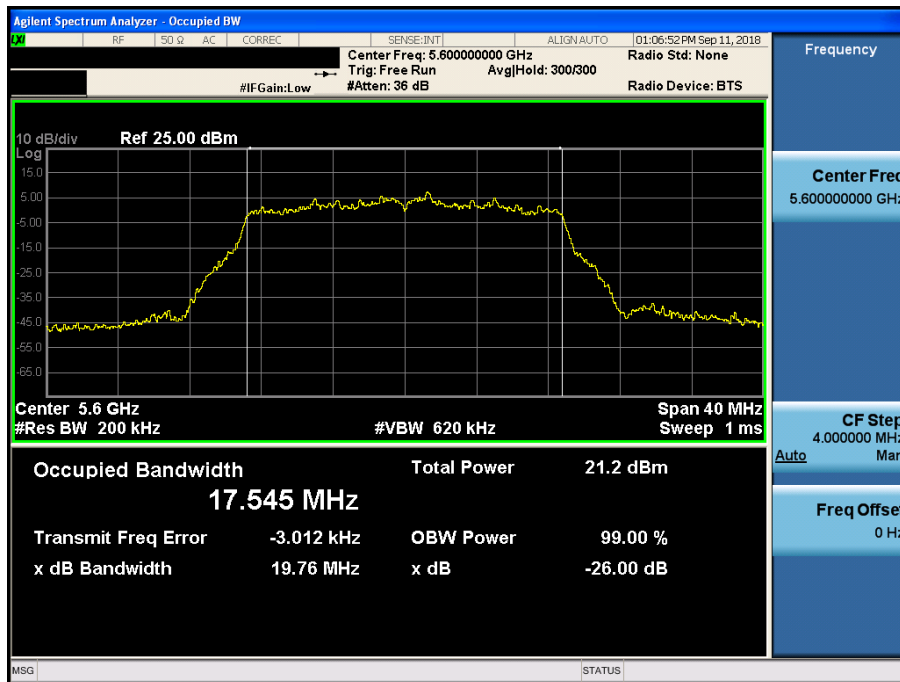
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.100



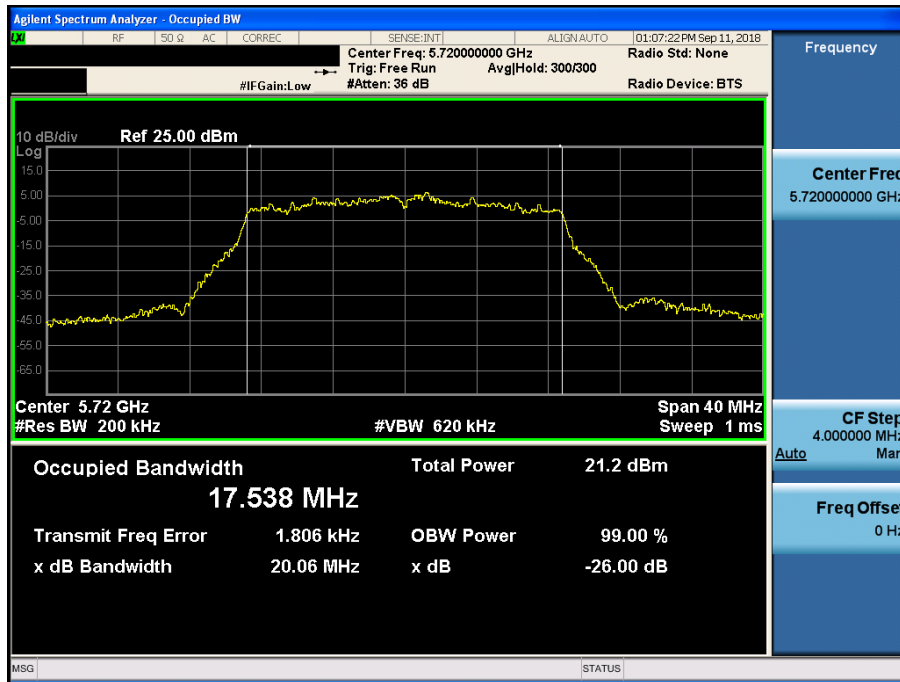
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.120



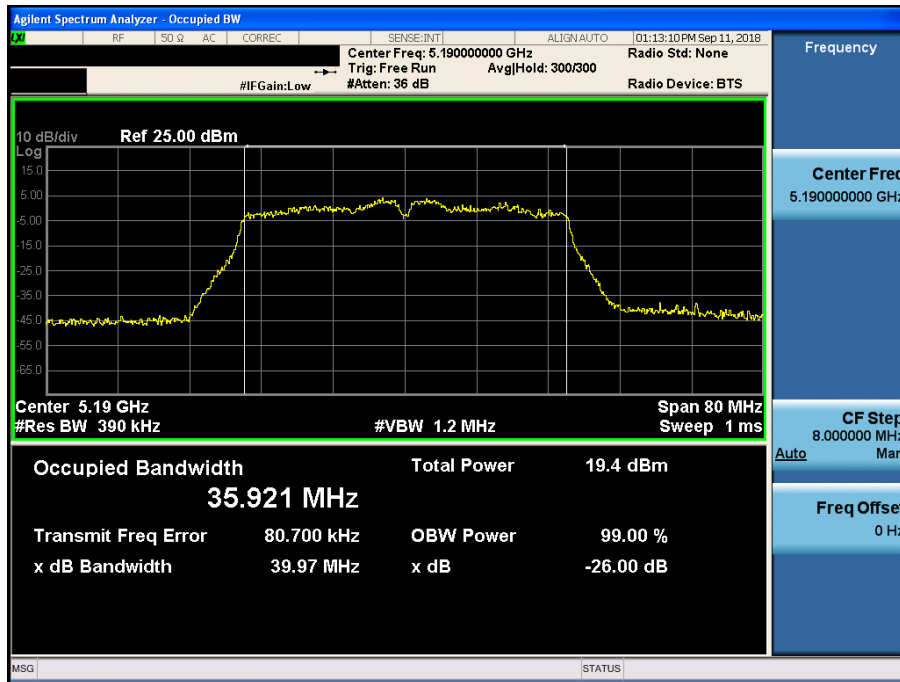
26 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.144



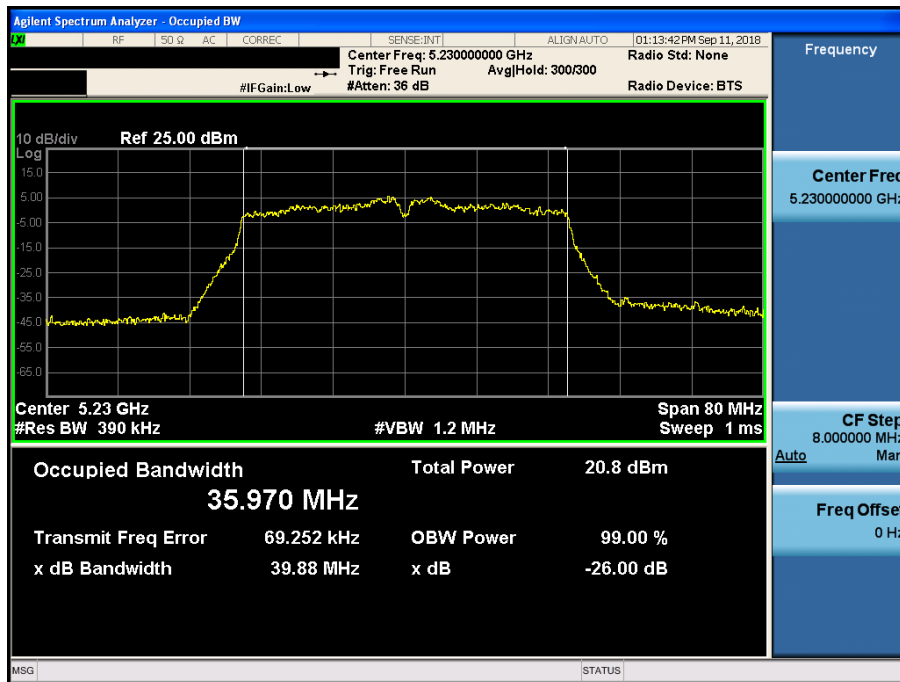
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.38



26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.46



26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.54



26 dB Bandwidth

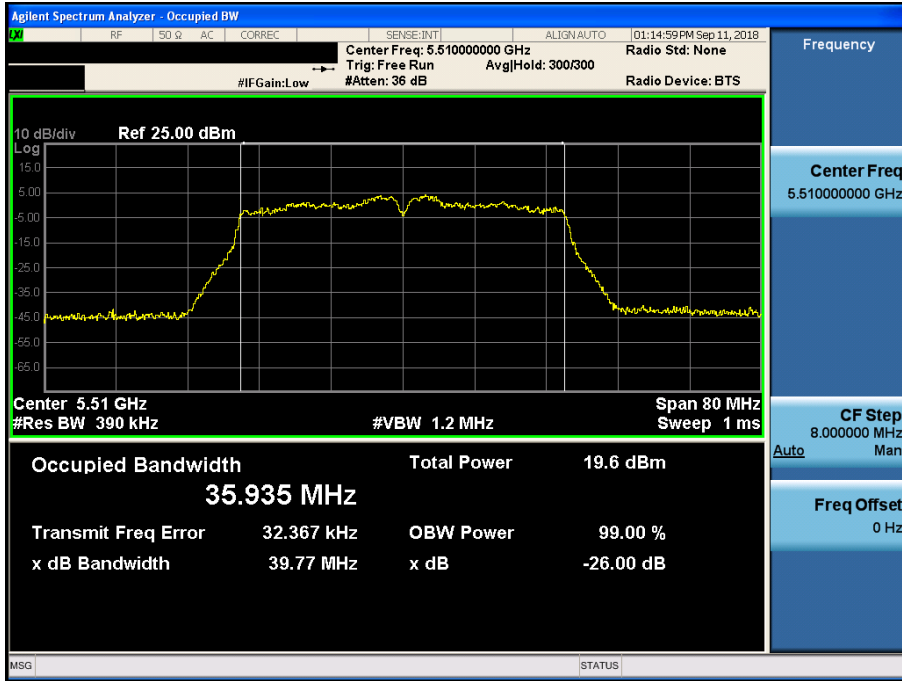
Test Mode: 802.11n HT40 & ANT 2 & Ch.62





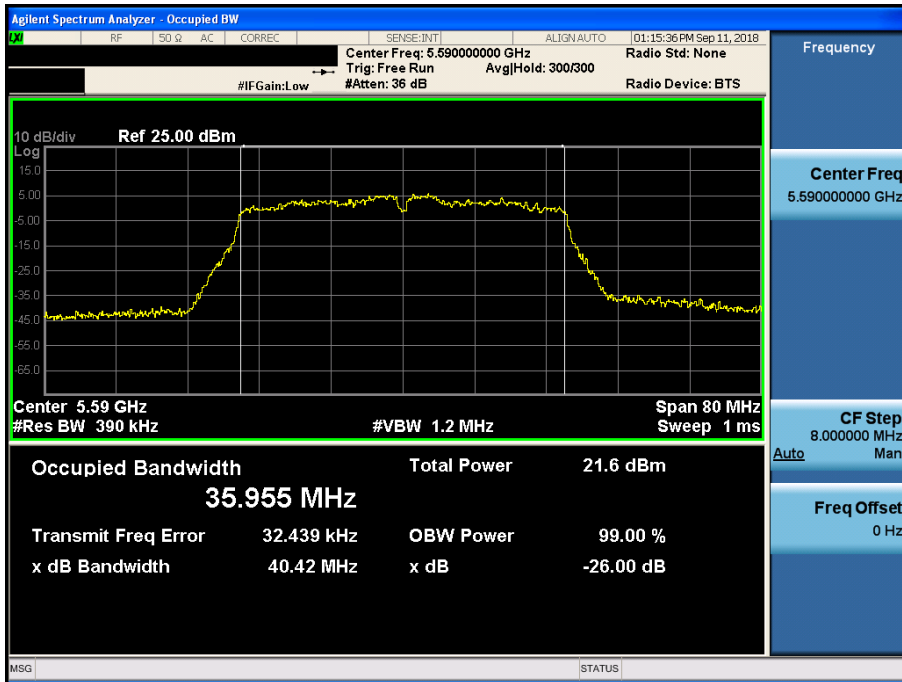
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.102



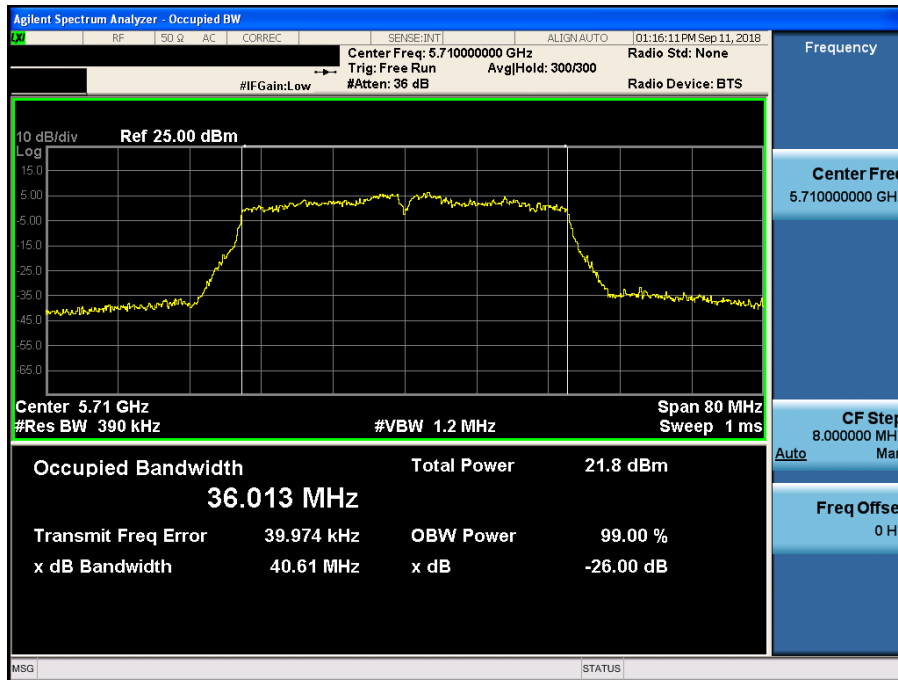
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.118



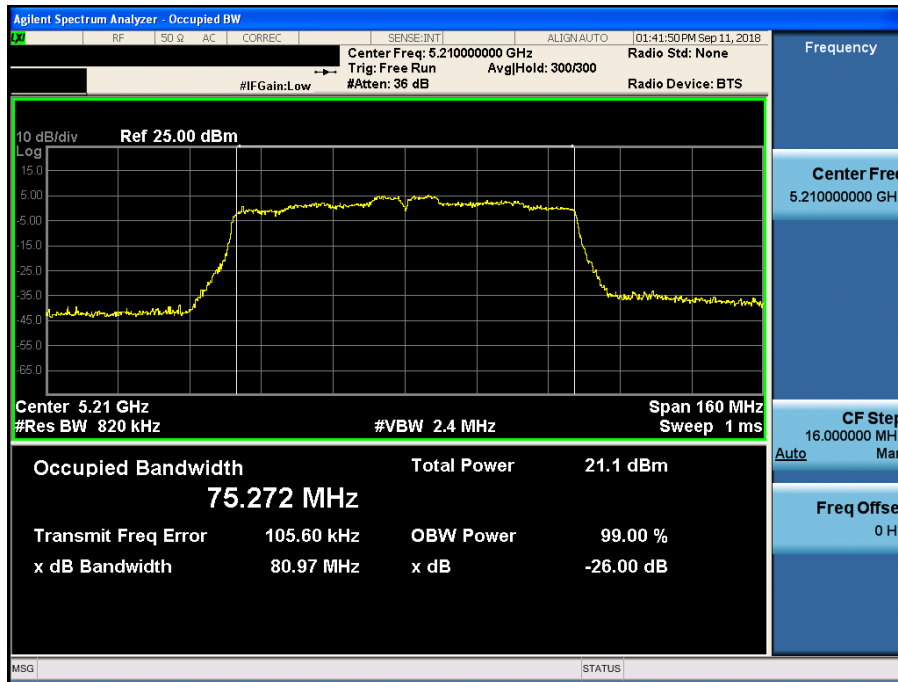
26 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.142



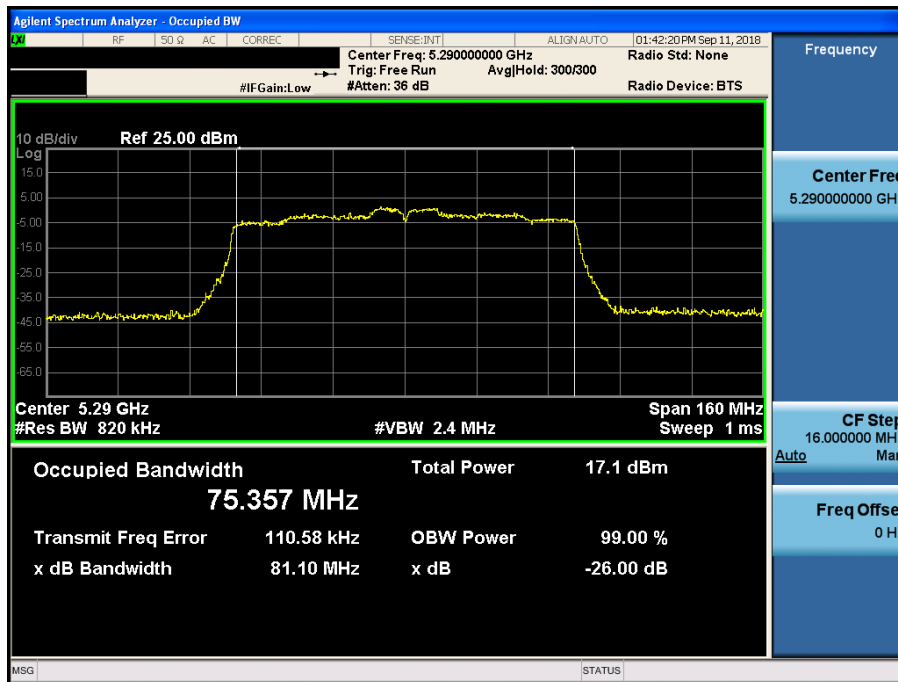
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.42



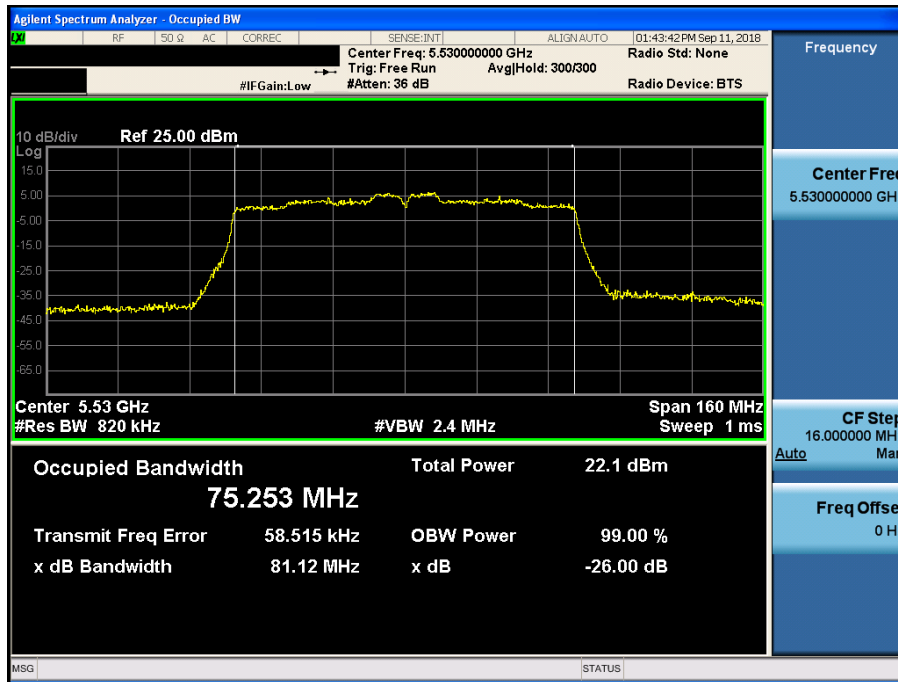
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.58



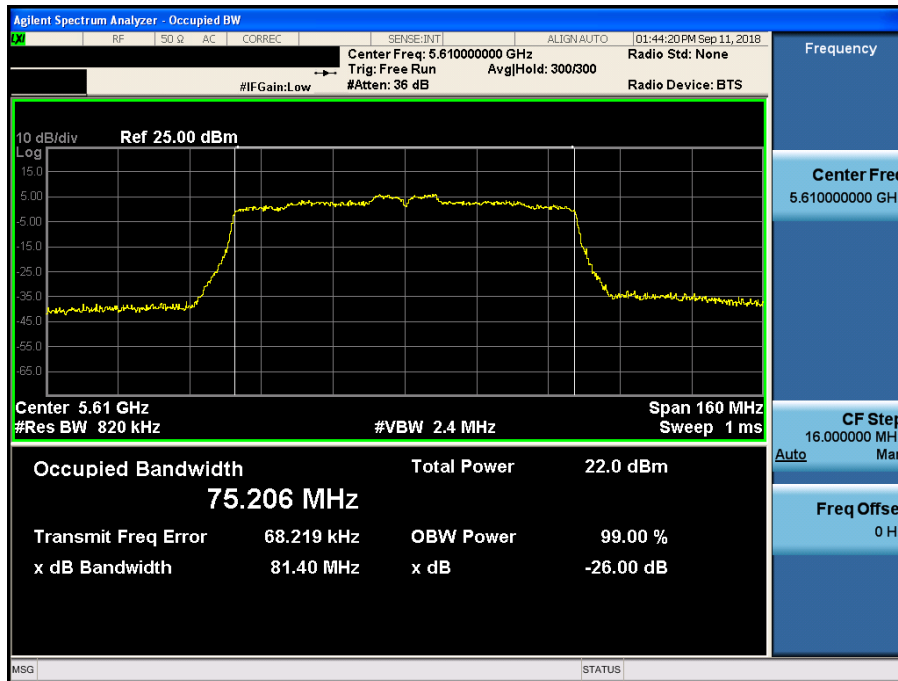
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.106



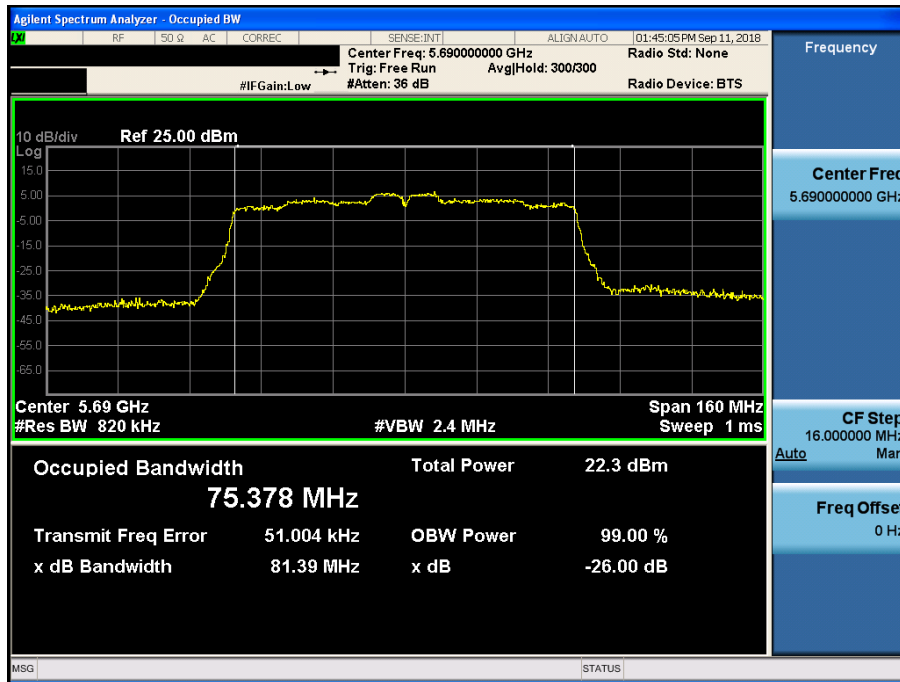
26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.122



26 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.138



## 8.2 Minimum Emission Bandwidth (6 dB Bandwidth)

### ■ Test Requirements

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### ■ Test Configuration

Refer to the APPENDIX I.

### ■ Test Procedure

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of **KDB789033 D02v02r01**.

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth  $\geq 3 \times \text{RBW}$ .
3. Detector = **Peak**.
4. Trace mode = **max hold**.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

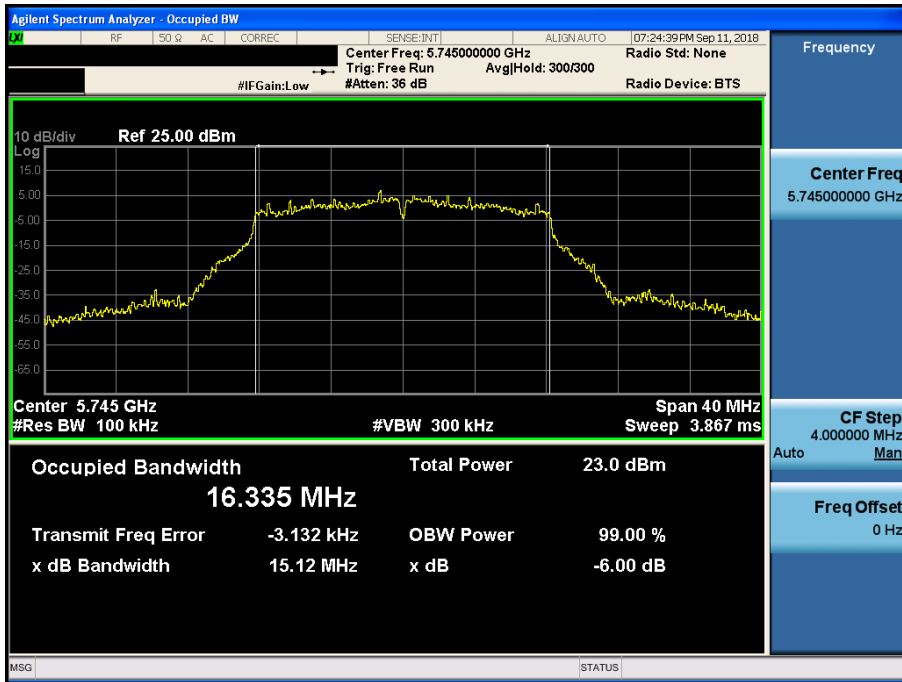
### ■ Test Results: **Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]	
				ANT 1	ANT 2
802.11a	U-NII 3	149	5745	15.12	15.07
		157	5785	15.04	15.00
		165	5825	13.82	13.83
802.11n (HT20)	U-NII 3	149	5745	15.09	15.10
		157	5785	15.07	15.07
		165	5825	15.11	15.05
802.11n (HT40)	U-NII 3	151	5755	35.11	35.06
		159	5795	35.07	35.07
802.11ac (VHT80)	U-NII 3	155	5775	72.55	71.14

Result Plots

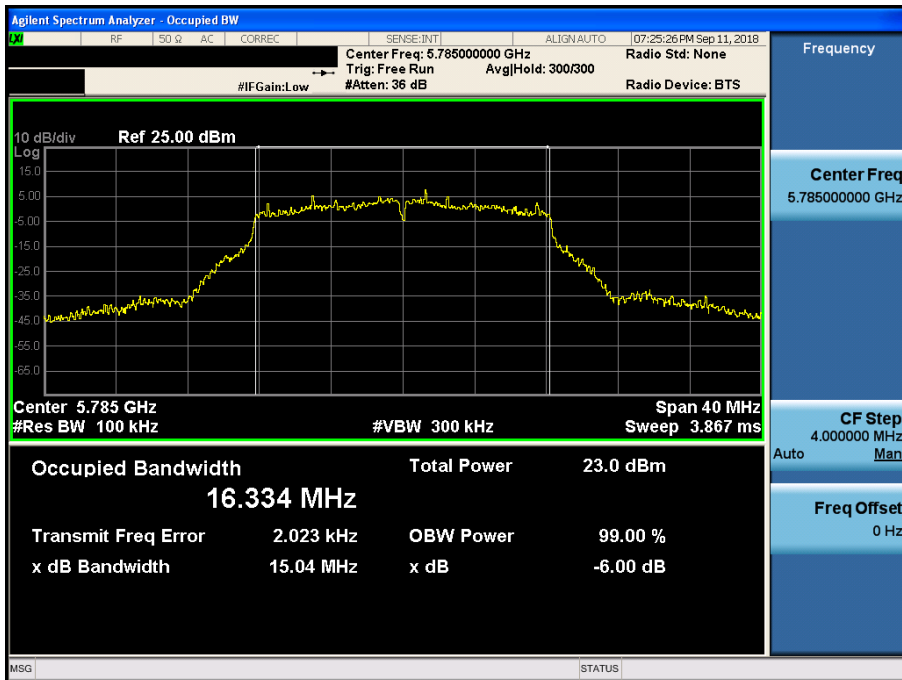
6 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.149



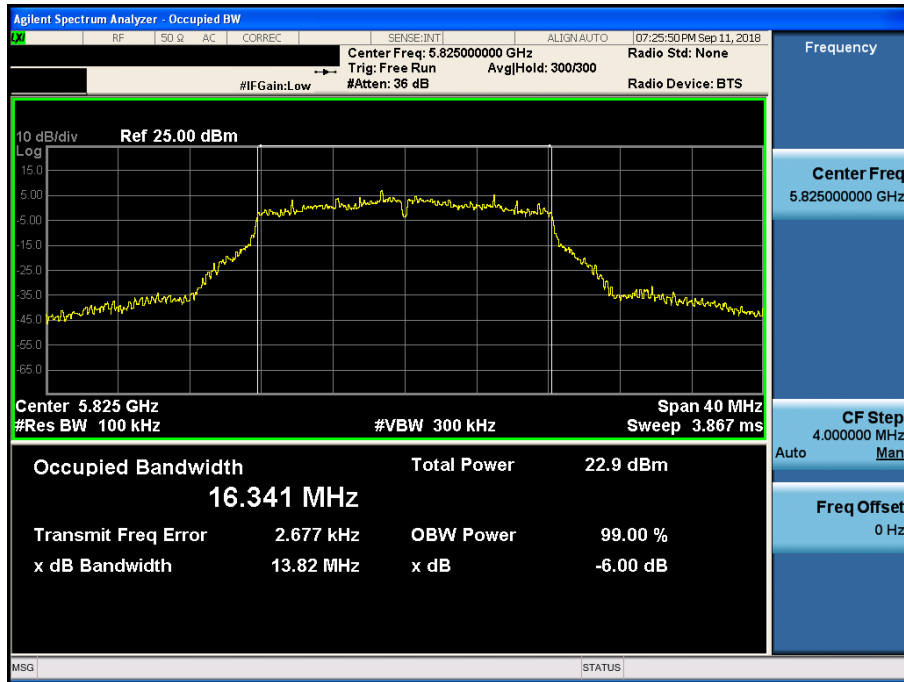
6 dB Bandwidth

Test Mode: 802.11a & ANT 1 & Ch.157



6 dB Bandwidth

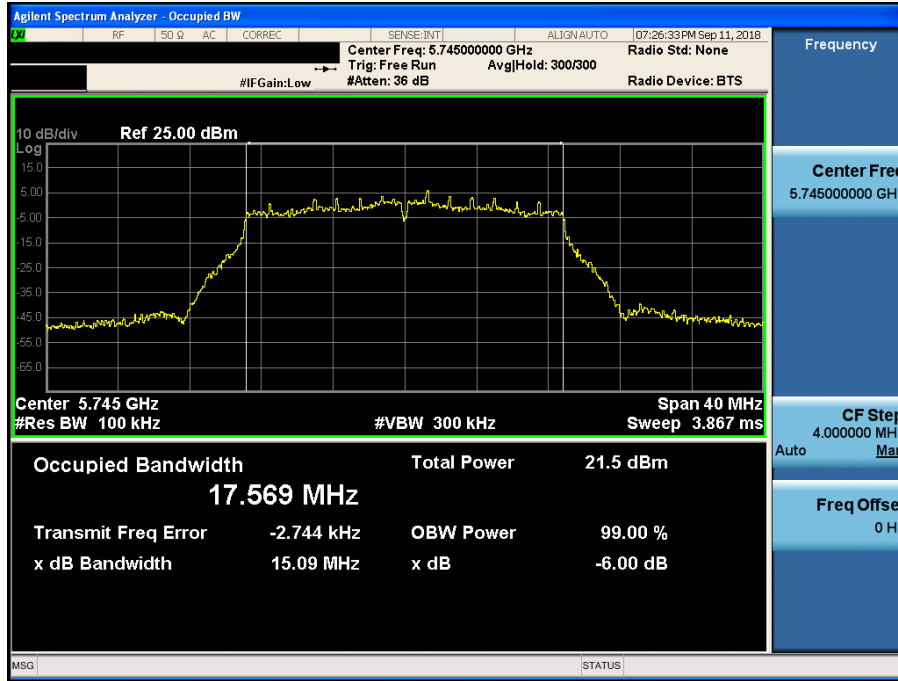
Test Mode: 802.11a & ANT 1 & Ch.165





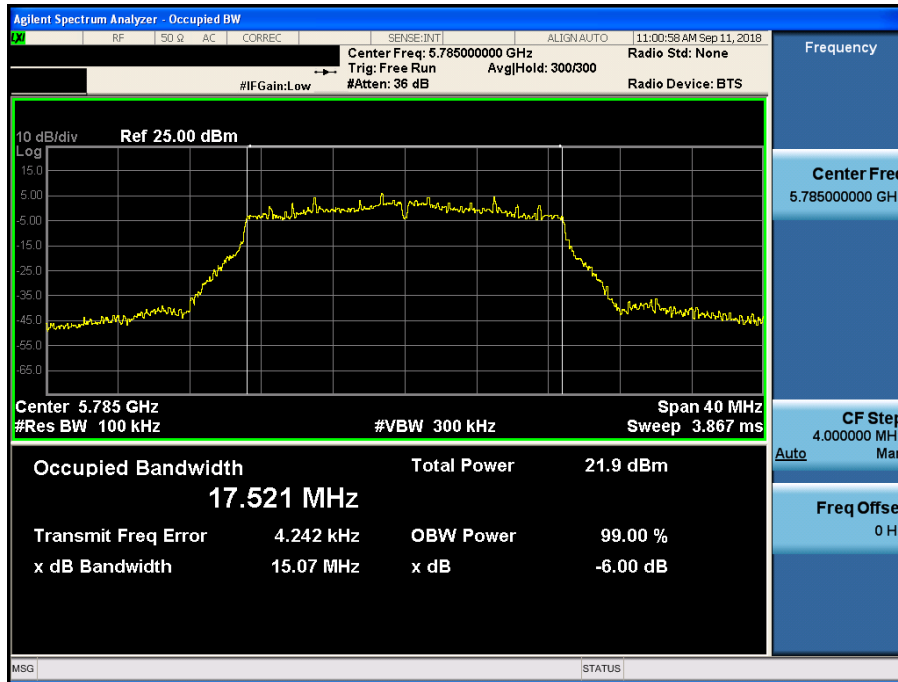
6 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.149



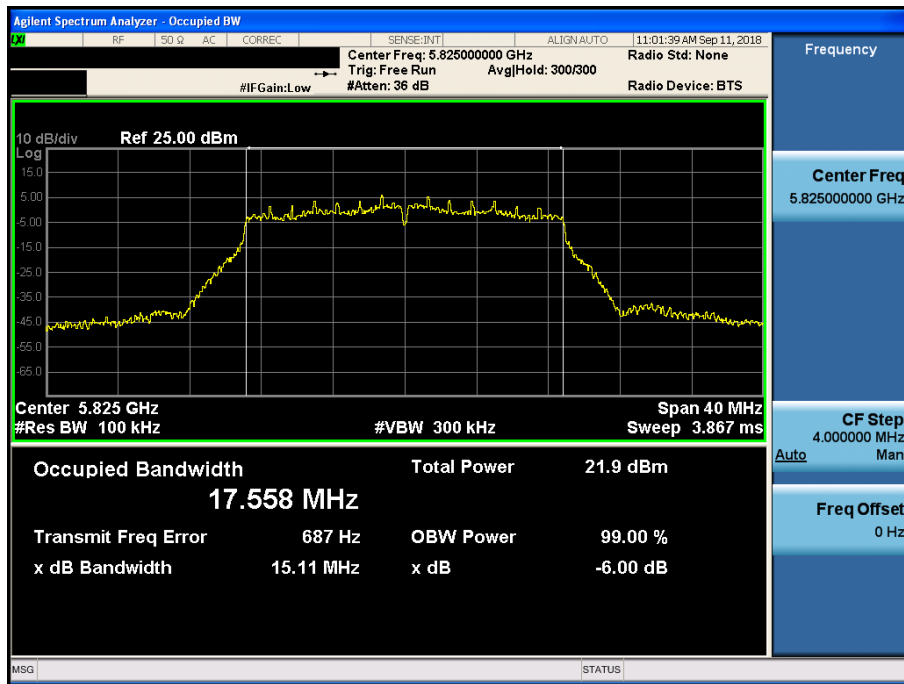
6 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.157



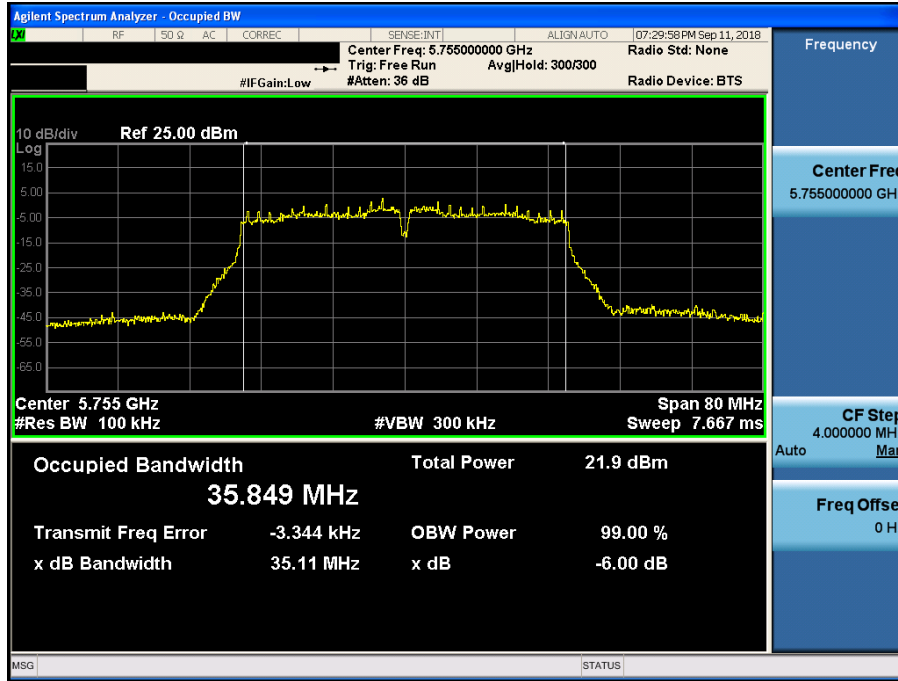
6 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 1 & Ch.165



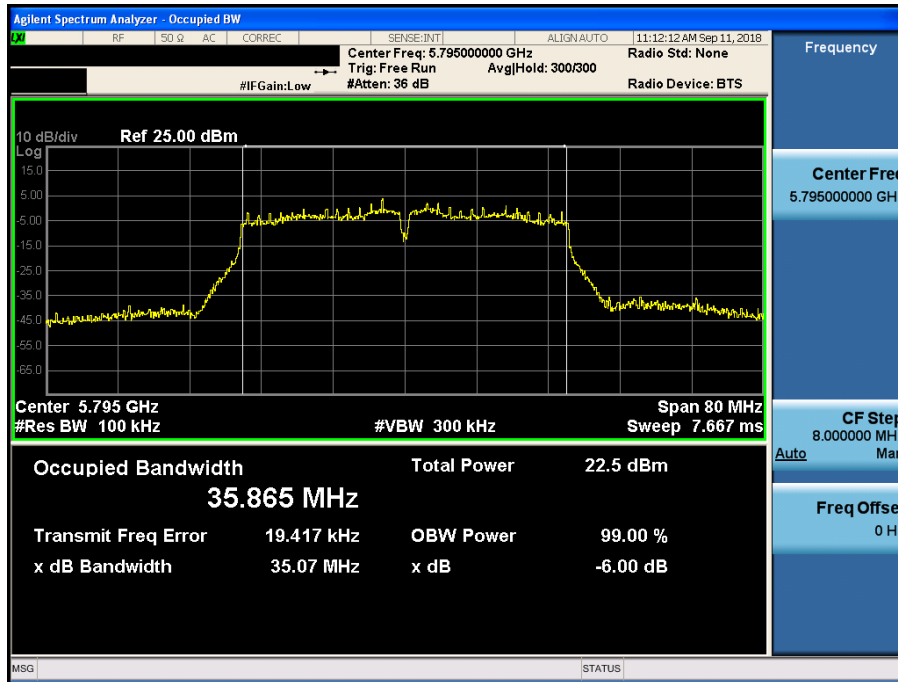
6 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.151



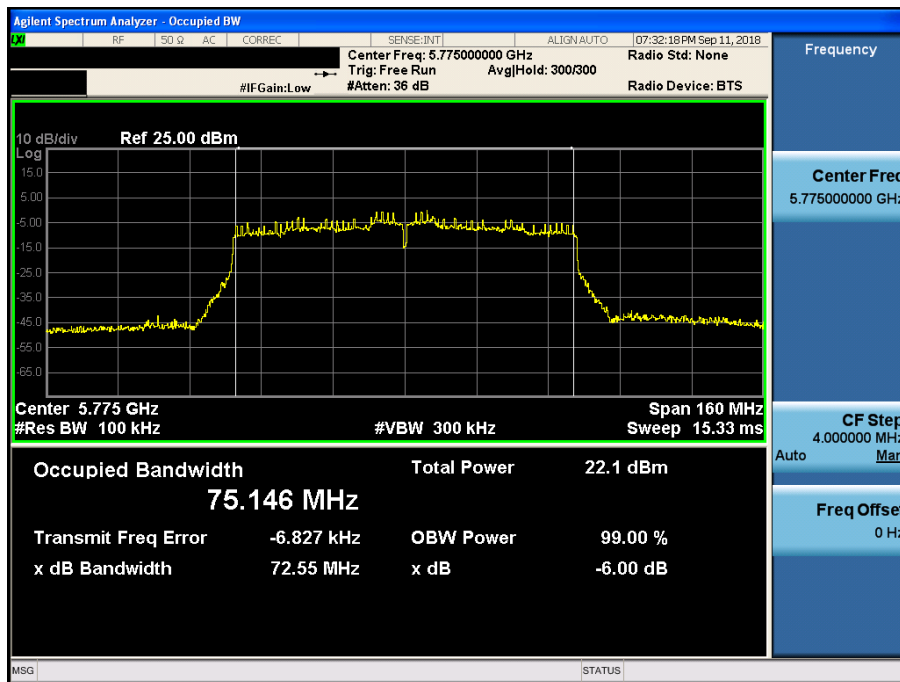
6 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 1 & Ch.159



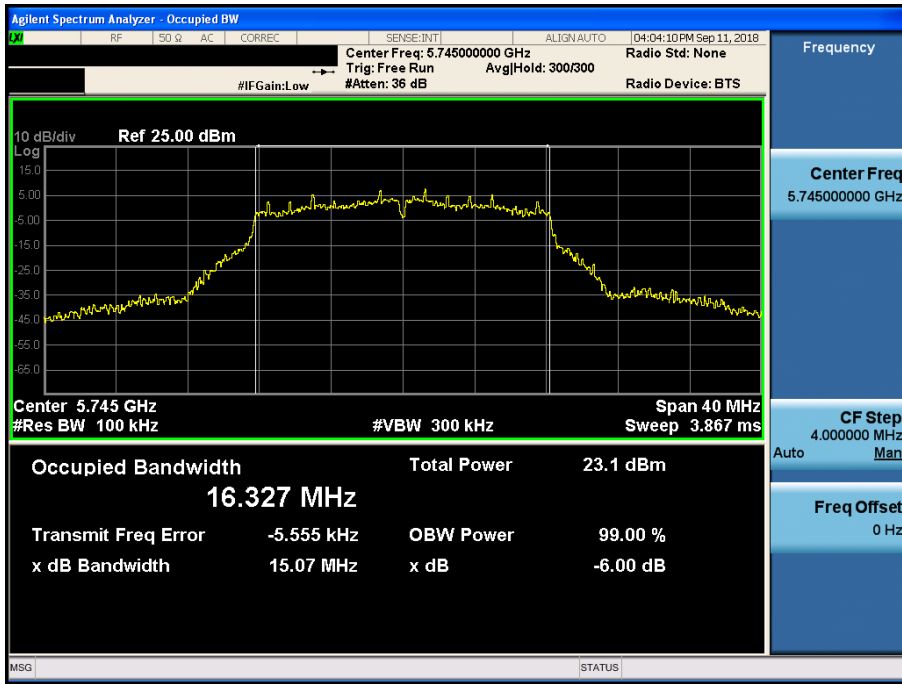
6 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 1 & Ch.155



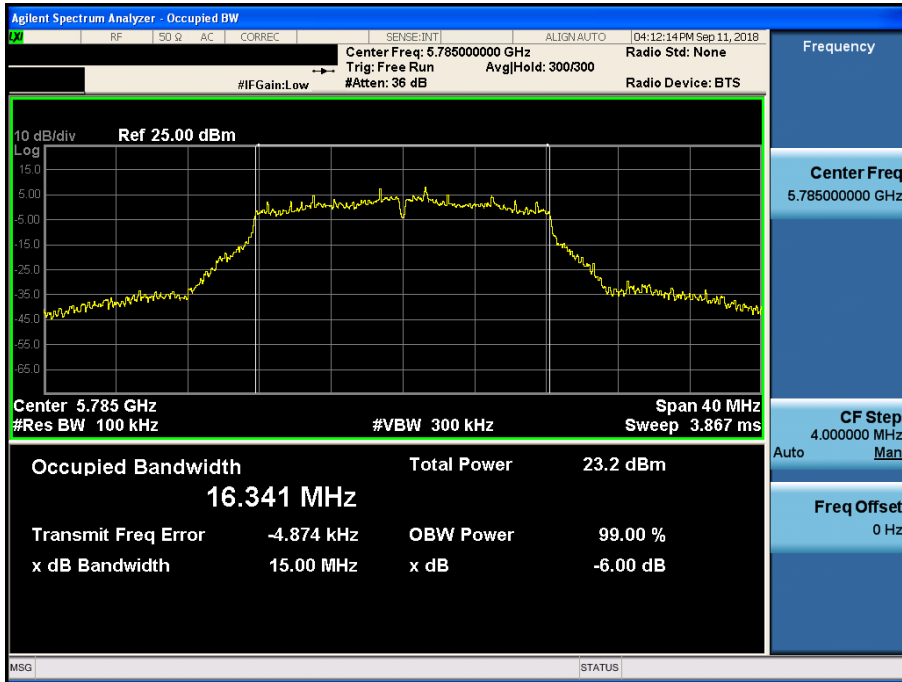
6 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.149



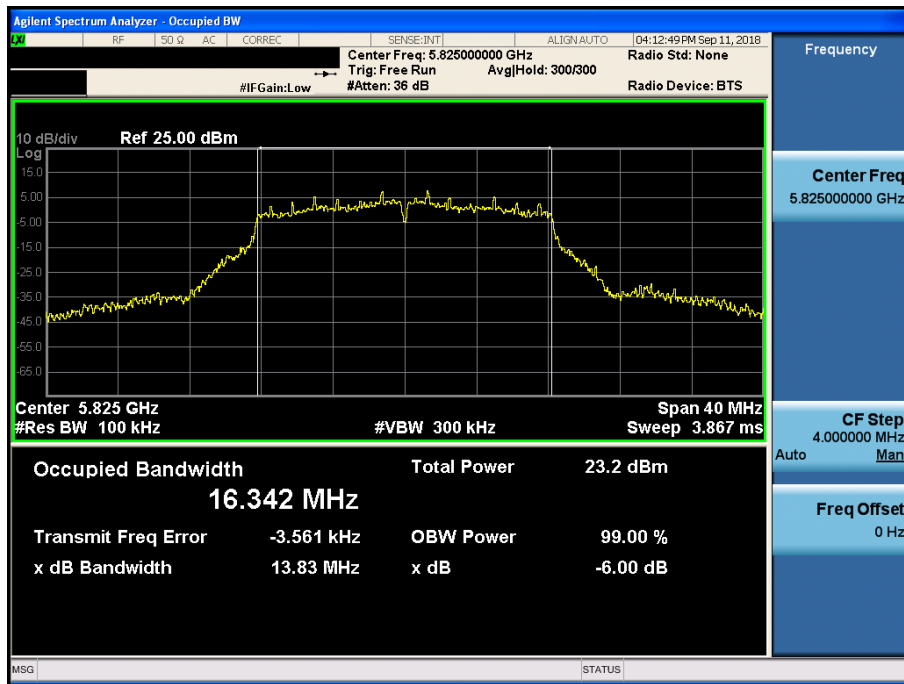
6 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.157



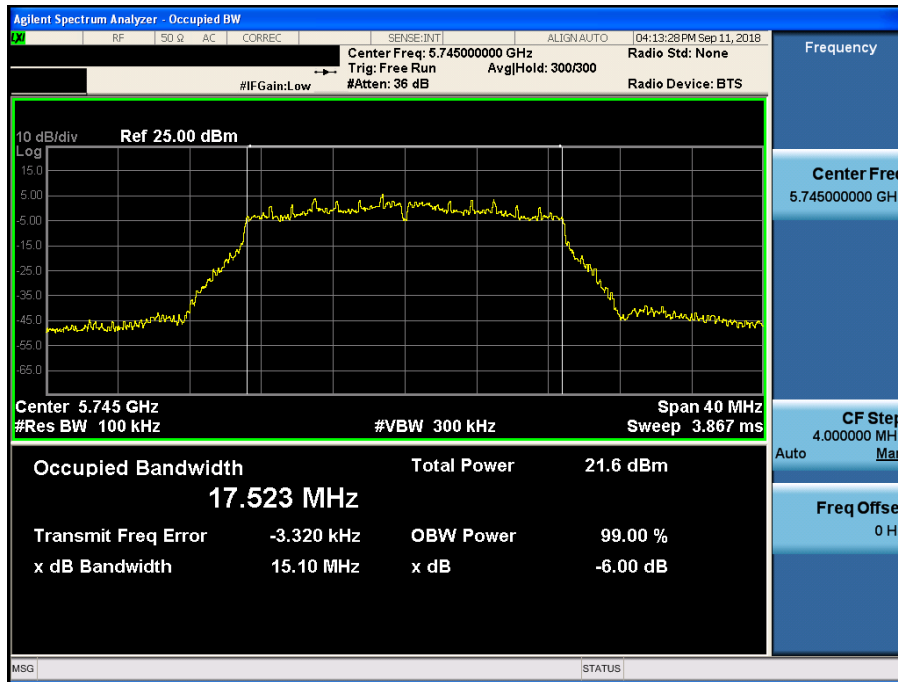
6 dB Bandwidth

Test Mode: 802.11a & ANT 2 & Ch.165



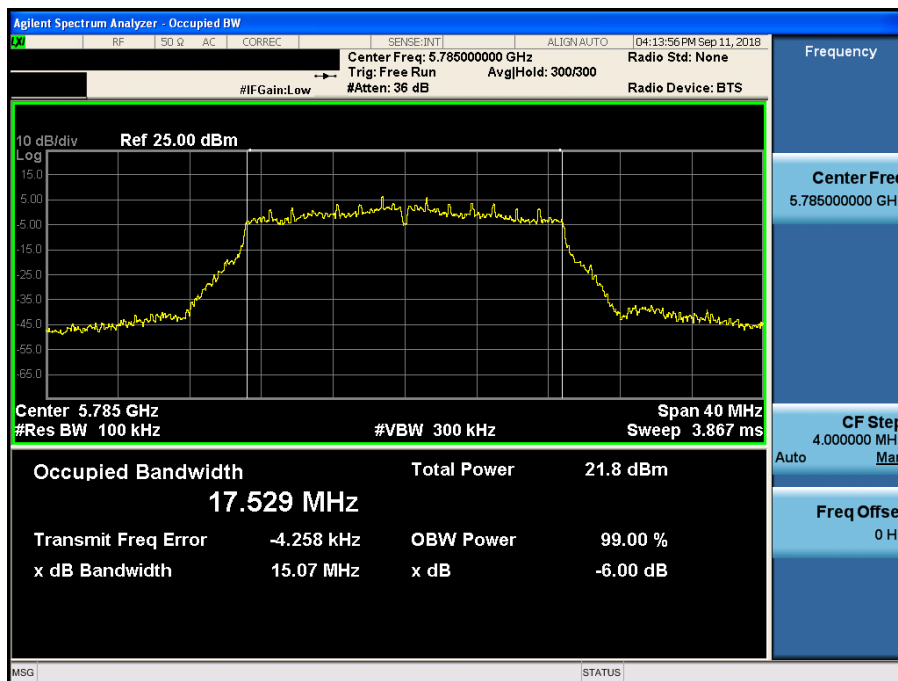
6 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.149



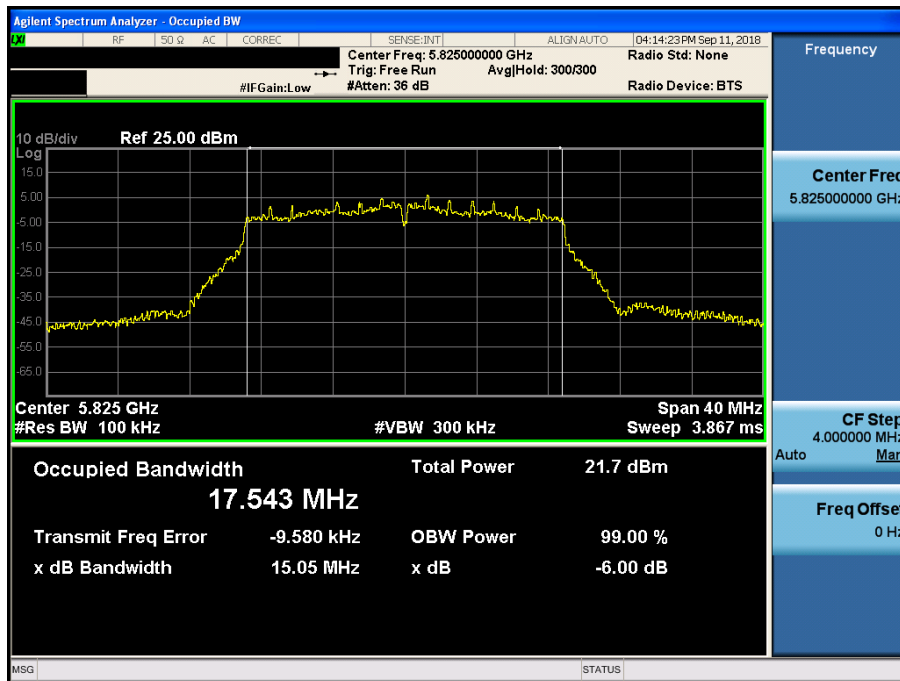
6 dB Bandwidth

Test Mode: 802.11n HT20 & ANT 2 & Ch.157



6 dB Bandwidth

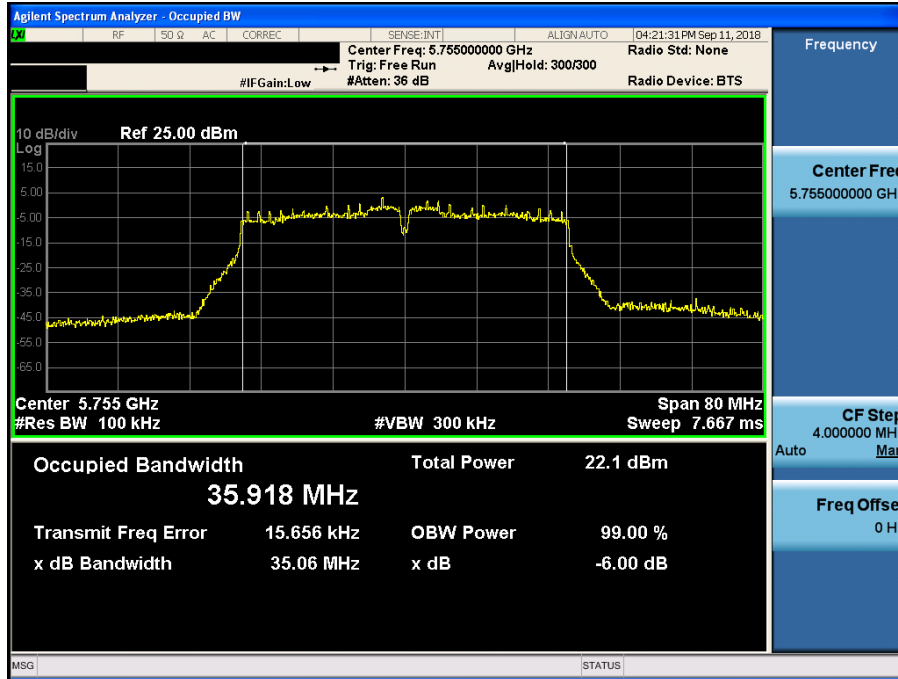
Test Mode: 802.11n HT20 & ANT 2 & Ch.165





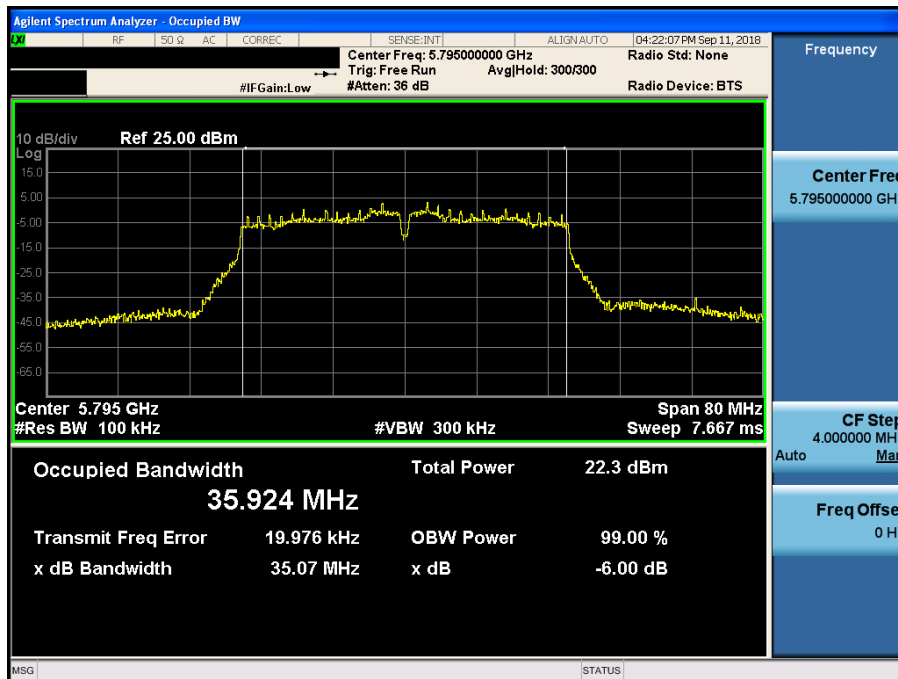
6 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.151



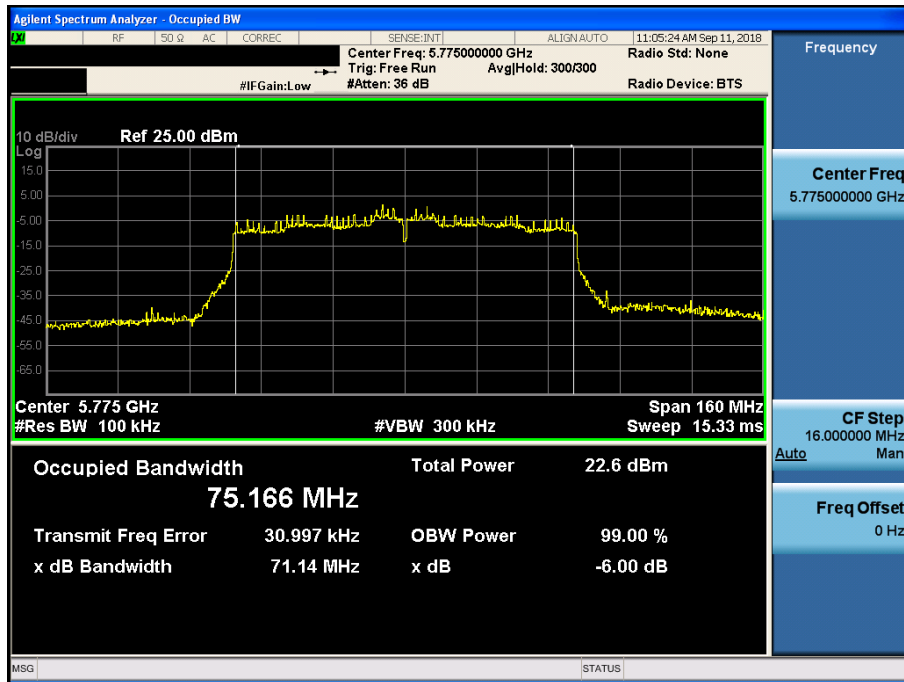
6 dB Bandwidth

Test Mode: 802.11n HT40 & ANT 2 & Ch.159



6 dB Bandwidth

Test Mode: 802.11ac VHT80 & ANT 2 & Ch.155



## 8.3 Maximum Conducted Output Power

### ■ Test Requirements

#### Part. 15.407(a)

##### (1) For the band 5.15 - 5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. 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.

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

**(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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.**

(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  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

### - Output power Limit Calculation

Band	Power Limit [mW]	Calculated Limit [dBm]	Antenna Gain (Worst case) [dBi]	Determined Limit [dBm]
U-NII 1	250	23.97	2.27	<b>23.97</b>

Band	Power Limit [mW]	Calculated Limit [dBm]	Antenna Gain (Worst case) [dBi]	Determined Limit [dBm]
	Least 26 dBc BW [MHz]			
U-NII 2A	250	23.97	3.06	<b>23.92</b>
	19.61	23.92		
U-NII 2C	250	23.97	3.34	<b>23.97</b>
	19.69	23.94		

Band	Power Limit [mW]	Calculated Limit [dBm]	Antenna Gain [dBi]	Determined Limit [dBm]
U-NII 3	1000	30.00	1.64	<b>30.00</b>

### ■ Test Configuration



Method PM-G

### ■ Test Procedure

#### Method PM-G of KDB789033 D02v02r01

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

■ Test Results: **Comply**

- Output Power: Single

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	-
802.11a	36	5180	15.45	15.36	-
	40	5200	15.63	15.25	-
	48	5240	15.64	15.74	-
	52	5260	14.67	14.31	-
	60	5300	14.51	14.42	-
	64	5320	14.74	14.68	-
	100	5500	15.85	15.86	-
	120	5600	15.93	15.98	-
	144	5720	15.83	15.97	-
	149	5745	15.90	15.97	-
	157	5785	15.98	15.99	-
	165	5825	15.79	15.91	-

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	-
802.11n (HT20)	36	5180	13.82	13.70	-
	40	5200	14.00	13.91	-
	48	5240	14.07	13.90	-
	52	5260	14.13	14.01	-
	60	5300	14.04	13.89	-
	64	5320	14.06	14.06	-
	100	5500	14.31	14.19	-
	120	5600	14.20	14.28	-
	144	5720	14.38	14.48	-
	149	5745	14.40	14.49	-
	157	5785	14.39	14.48	-
	165	5825	14.26	14.49	-

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	-
802.11n (HT40)	38	5190	12.40	12.42	-
	46	5230	13.95	13.85	-
	54	5270	14.00	13.83	-
	62	5310	11.96	12.01	-
	102	5510	12.35	12.22	-
	118	5590	14.47	14.25	-
	142	5710	14.48	14.49	-
	151	5755	14.50	14.45	-
	159	5795	14.49	14.49	-

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	-
802.11ac (VHT20)	36	5180	13.95	13.86	-
	40	5200	13.94	13.91	-
	48	5240	14.36	14.10	-
	52	5260	14.21	13.96	-
	60	5300	14.05	13.91	-
	64	5320	14.12	14.05	-
	100	5500	14.39	14.20	-
	120	5600	14.30	14.36	-
	144	5720	14.14	14.45	-
	149	5745	14.39	14.48	-
	157	5785	14.31	14.49	-
		165	5825	14.02	14.48

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	-
802.11ac (VHT40)	38	5190	12.40	12.30	-
	46	5230	14.12	13.59	-
	54	5270	14.08	13.69	-
	62	5310	11.85	11.69	-
	102	5510	12.47	12.37	-
	118	5590	14.48	14.08	-
	142	5710	14.35	14.49	-
	151	5755	14.48	14.48	-
	159	5795	14.48	14.49	-

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	-
802.11ac (VHT80)	42	5210	13.80	13.45	-
	58	5290	9.84	9.69	-
	106	5530	13.99	14.01	-
	122	5610	13.86	13.90	-
	138	5690	13.85	14.21	-
	155	5775	13.85	14.01	-

## - Summed Output Power: CDD

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11a	36	5180	15.45	15.36	18.42
	40	5200	15.63	15.25	18.45
	48	5240	15.64	15.74	18.70
	52	5260	14.67	14.31	17.50
	60	5300	14.51	14.42	17.48
	64	5320	14.74	14.68	17.72
	100	5500	15.85	15.86	18.87
	120	5600	15.93	15.98	18.97
	144	5720	15.83	15.97	18.91
	149	5745	15.90	15.97	18.95
	157	5785	15.98	15.99	19.00
	165	5825	15.79	15.91	18.86

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11n(HT20)	36	5180	13.82	13.70	16.77
	40	5200	14.00	13.91	16.97
	48	5240	14.07	13.90	17.00
	52	5260	14.13	14.01	17.08
	60	5300	14.04	13.89	16.98
	64	5320	14.06	14.06	17.07
	100	5500	14.31	14.19	17.26
	120	5600	14.20	14.28	17.25
	144	5720	14.38	14.48	17.44
	149	5745	14.40	14.49	17.46
	157	5785	14.39	14.48	17.45
	165	5825	14.26	14.49	17.39



Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11n (HT40)	38	5190	12.40	12.42	15.42
	46	5230	13.95	13.85	16.91
	54	5270	14.00	13.83	16.93
	62	5310	11.96	12.01	15.00
	102	5510	12.35	12.22	15.30
	118	5590	14.47	14.25	17.37
	142	5710	14.48	14.49	17.50
	151	5755	14.50	14.45	17.49
	159	5795	14.49	14.49	17.50

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11ac (VHT20)	36	5180	13.95	13.86	16.92
	40	5200	13.94	13.91	16.94
	48	5240	14.36	14.10	17.24
	52	5260	14.21	13.96	17.10
	60	5300	14.05	13.91	16.99
	64	5320	14.12	14.05	17.10
	100	5500	14.39	14.20	17.31
	120	5600	14.30	14.36	17.34
	144	5720	14.14	14.45	17.31
	149	5745	14.39	14.48	17.45
	157	5785	14.31	14.49	17.41
	165	5825	14.02	14.48	17.27