TEST REPORT

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Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2007-0200(2)
2. Customer
   - Name : LG Electronics USA, Inc.
   - Address : 111 Sylvan Avenue, North Building Englewood Cliffs, NJ 07632
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : Mobile Phone / LM-G910EMW
   FCC ID : ZNFG910EMW
5. Test Method Used : KDB789033 D02v02r01
   Test Specification : FCC Part 15.407 Subpart E
6. Date of Test : 2020.04.16 ~ 2020.05.19, 2020.06.11 ~ 2020.07.01
7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing
8. Testing Environment : See appended test report.
9. Test Result : Refer to the attached Test Result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name : JungWoo Kim (Signature)	Reviewed by Name : GeunKi Son (Signature)

2020 . 07 . 10 .

DT&C Co., Ltd.

Not abided by KS Q ISO / IEC 17025 and KOLAS accreditation.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2007-0200	Jul. 03, 2020	Initial issue	InHee Bae	GeunKi Son
DRTFCC2007-0200(1)	Jul. 09, 2020	Revised the section 2	JungWoo Kim	GeunKi Son
DRTFCC2007-0200(2)	Jul. 10, 2020	Revised the section 2	JungWoo Kim	GeunKi Son

CONTENTS

1. EUT DESCRIPTION

1.1 EUT Description

FCC Equipment Class	Unlicensed National Information Infrastructure (UNII)
Product	Mobile Phone
Model Name	LM-G910EMW
Add Model Name	LMG910EMW, G910EMW
Power Supply	DC 3.87 V
Modulation type	OFDM
Antenna Specification	**Antenna type:** PIFA Antenna **Antenna gain:** Refer to the clause 7 in test report.

5GHz Band	Mode	Tx frequency (MHz)	Max power(dBm)
U-NII 1	802.11a	5 180 ~ 5 240	**18.93**
	802.11n(HT20)	5 180 ~ 5 240	17.73
	802.11ac(VHT20)	5 180 ~ 5 240	17.96
	802.11n(HT40)	5 190 ~ 5 230	17.91
	802.11ac(VHT40)	5 190 ~ 5 230	17.90
	802.11ac(VHT80)	5 210	17.32
U-NII 2A	802.11a	5 260 ~ 5 320	**18.15**
	802.11n(HT20)	5 260 ~ 5 320	17.16
	802.11ac(VHT20)	5 260 ~ 5 320	17.18
	802.11n(HT40)	5 270 ~ 5 310	17.34
	802.11ac(VHT40)	5 270 ~ 5 310	17.48
	802.11ac(VHT80)	5 290	16.56
U-NII 2C	802.11a	5 500 ~ 5 720	**18.89**
	802.11n(HT20)	5 500 ~ 5 720	17.79
	802.11ac(VHT20)	5 500 ~ 5 720	17.80
	802.11n(HT40)	5 510 ~ 5 710	17.92
	802.11ac(VHT40)	5 510 ~ 5 710	17.95
	802.11ac(VHT80)	5 530 ~ 5 690	17.48
U-NII 3	802.11a	5 745 ~ 5 825	**18.81**
	802.11n(HT20)	5 745 ~ 5 825	17.80
	802.11ac(VHT20)	5 745 ~ 5 825	17.74
	802.11n(HT40)	5 755 ~ 5 795	17.61
	802.11ac(VHT40)	5 755 ~ 5 795	17.72
	802.11ac(VHT80)	5 775	16.97

1.2 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 ~ 54 Mbps	6 ~ 54 Mbps	6 ~ 54 Mbps	-
802.11n(HT20)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15
802.11ac(VHT20)	MCS 0 ~ 8(1SS)	MCS 0 ~ 8(1SS)	MCS 0 ~ 8(1SS)	MCS 0 ~ 8(2SS)
802.11n(HT40)	MCS 0 ~ 7	MCS 0 ~ 7	MCS 0 ~ 7	MCS 8 ~ 15
802.11ac(VHT40)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(2SS)
802.11ac(VHT80)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(1SS)	MCS 0 ~ 9(2SS)

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

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 2.4 GHz and 5 GHz bands simultaneously on each antenna. (Ant 1: 2.4 GHz band transmitting & ANT 2: 5 GHz band transmitting) And the test results for WiFi DBS were included in this test report.

2. Information about test items

2.1 Explanations for Reference Test Data

2.1.1 Introduction

This report includes the 5G WLAN test data of FCC ID: ZNFG910HMW with reference to KDB 484596 D01v01. The applicant takes full responsibility that the test data as reference section below represents compliance for FCC ID: ZNFG910EMW.

Reference FCC ID	Exhibit type	Separated FCC ID
ZNFG910HMW	Original Grant	ZNFG910EMW

2.1.2 Explain the Differences

FCC ID: ZNFG910EMW is same the internal printed circuit board with FCC ID: ZNFG910HMW. Two products differ only the depopulation of components for the purposes of adding or removing frequency bands of operating in non US. (It does not changed the SW/HW component of 5G WLAN)

Change Bands(Frequency) Information

FCC ID	ZNFG910EMW	ZNFG910HMW
LTE	B1,2,3,4,5,7,8,12,13,17,20,28,32,38,39,40,41,66	B1,2,3,4,5,7,8,12,13,17,20,25,26,28,38,40,41,66

Component changes information

REF.	ZNFG910EMW	ZNFG910HMW	Changes(vs ZNFG910HMW)
U1201	EAN64893201	EAN64996301	MB L-PAMID
FL1360	EAM64393501	DNI	B32 PRx SAW added (B32 is supported)
FL1301	EAN64973501	DNI	B32 DRx module added (B32 is supported)
FL5610	EAM62491401	DNI	GPS Extractor (for B32) added
FL5602	DNI	EAM65742901	GPS SAW deleted
FL1201	EAM64390401	DNI	B39 PRx SAW added (B39 is supported)

2.1.3 Spot Check Verification Data

Equipment Class (Feature)	FCC Part	Mode	TX Freq. (MHz)	Test item	Test note	Detector Mode	Reference FCC ID: ZNFG910HMW		Separated FCC ID: ZNFG910EMW		Limit (dBuV/m)	Deviation (dB)
							Frequency (MHz)	Result (dBuV/m)	Frequency (MHz)	Result (dBuV/m)		
NII	15.407	802.11ac (VHT80)	5 210	Radiated Band edge	-	Average	5 149.50	48.83	5 149.30	45.99	54.00	-2.84
		802.11ac (VHT20)	5 180	Radiated Spurious emission	-	Peak	10 360.17	55.30	10 360.06	54.45	68.20	-0.85
		802.11ac (VHT80)	5 290	Radiated Band edge	-	Average	5 350.30	48.19	5 350.16	46.42	54.00	-1.77
		802.11a	5 300	Radiated Spurious emission	-	Average	10 600.17	44.68	10 600.03	44.38	54.00	-0.30
		802.11ac (VHT20)	5 500	Radiated Band edge	-	Average	5 458.94	44.51	5 459.29	44.67	54.00	0.16
		802.11ac (VHT40)	5 710	Radiated Spurious emission	-	Average	11 419.76	45.36	11 419.93	45.09	54.00	-0.27
		802.11ac (VHT80)	5 775	Radiated Band edge	-	Peak	5 714.22	56.51	5 714.36	56.05	68.20	-0.46
		802.11ac (VHT20)	5 825	Radiated Spurious emission	With DD+WCP	Peak	17 474.95	64.41	17 474.71	64.29	68.20	-0.12

Note1: The spot check were performed based on worst-case results reported in the original FCC report.
The spot check test results are within 3dB and two products shows a good correlation. It also complies with the FCC/IC limit.

2.1.4 Refer Section

Reference FCC ID: ZNFG910HMW

Equipment Class	FCC Part	Feature	Band(MHz)	Exhibit type	Report title	Reference Sections
NII	Part 15.407	WLAN	5 180 ~ 5 240 5 260 ~ 5 320 5 500 ~ 5 720 5 745 ~ 5 825	Original Grant	UNII-WLAN	All

2.2 Test Mode

Test Mode		ANT configuration	Worst data rate
TM 1	802.11a	CDD Multiple transmitting	6Mbps
TM 2	802.11ac(VHT20)	SDM Multiple transmitting	MCS0
TM 3	802.11ac(VHT40)	SDM Multiple transmitting	MCS0
TM 4	802.11ac(VHT80)	CDD Multiple transmitting	MCS0

Note 1: The worst case data rate is determined as above test mode according to the power measurements.
Note 2: The power measurement results for all modes and data rate were reported.

2.3 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	5 180	38	5 190	42	5 210
	40	5 200	-	-	-	-
	48	5 240	46	5 230	-	-
U-NII 2A	52	5 260	54	5 270	58	5 290
	60	5 300	-	-	-	-
	64	5 320	62	5 310	-	-
U-NII 2C	100	5 500	102	5 510	106	5 530
	120	5 600	118	5 590	122	5 610
	144	5 720	142	5 710	138	5 690
U-NII 3	149	5 745	151	5 755	155	5 775
	157	5 785	-	-	-	-
	165	5 825	159	5 795	-	-

2.4 Testing Environment

Temperature	:	20 ºC ~ 26 ºC
Relative humidity content	:	38 % ~ 45 %
Details of power supply	:	DC 3.87 V

2.5 EMI Suppression Device(s)/Modifications

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

2.6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014 and ANSI C 63.10-2013. 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	0.9 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	3.6 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz Below)	4.86 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz ~ 18 GHz)	5.02 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (18 GHz Above)	5.30 dB (The confidence level is about 95 %, k = 2)

3. SUMMARY OF TESTS

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
15.407(a)	RSS-247(6.2)	Emission Bandwidth (26 dB Bandwidth)	N/A	Conducted	C
15.407(e)	RSS-247(6.2)	Minimum Emission Bandwidth (6 dB Bandwidth)	> 500 kHz in 5725 MHz ~ 5850 MHz		C
15.407(a)	RSS-247(6.2)	Maximum Conducted Output Power	5 150 MHz ~ 5 250 MHz : < 23.97 dBm 5 250 MHz ~ 5 350 MHz & 5470 MHz ~ 5 725 MHz : < 250 mW or < 11 + 10 log10(B) dBm, whichever power is less. (B is the 26 dB BW.) 5 725 MHz ~ 5 850 MHz : < 30 dBm		C
15.407(a)	RSS-247(6.2)	Peak Power Spectral Density	5 150 MHz ~ 5 250 MHz : 11 dBm/MHz 5 250 MHz ~ 5 350 MHz : 11 dBm/MHz 5 470 MHz ~ 5 725 MHz : 11 dBm/MHz 5 725 MHz ~ 5 850 MHz : 30 dBm/500kHz		C
15.407(h)	RSS-247(6.3)	Dynamic Frequency Selection	FCC 15.407(h)		C Note 3
15.407(b)	RSS-247(6.2)	Undesirable Emissions	5 150 MHz ~ 5 725 MHz: < -27 dBm/MHz EIRP 5 725 MHz ~ 5 850 MHz: < -27 dBm/MHz or < 10 dBm/MHz or 15.6 dBm/MHz < 27dBm/MHz EIRP	Radiated	C Note 4,5
15.205 15.209 15.407(b)	RSS-GEN(8.9) RSS-GEN(8.10) RSS-247(6.2)	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 4,5
15.207	RSS-GEN(8.8)	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: This device supports wireless charging & Dual Display.
So per KDB648474 D03v01r04, the radiated test items were performed all not charging, charging and Dual Display conditions. For wireless charging condition, the handset is placed on the representative charging pad under normal conditions and in a simulated call configuration.
Note 6: The sample was tested according to the following specification:
KDB789033 D02v02r01, KDB662911 D01v02r01, KDB648474 D03v01r04

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

DT&C Co., Ltd.		
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. **- FCC MRA Accredited Test Firm No. : KR0034**		
www.dtnc.net		
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) Note 1.	MIMO (SDM) Note 2
	ANT 1 [dBi]	ANT 2 [dBi]	Directional Gain[dBi]	Directional Gain[dBi]
U-NII 1	-2.39	-4.76	***-0.48***	-3.42
U-NII 2A	-2.39	-4.76	***-0.48***	-3.42
U-NII 2C	-1.39	-1.10	***1.77***	-1.24
U-NII 3	-2.11	-2.10	***0.91***	-2.10

Note 1. Directional gain(correlated signal with unequal antenna gain and equal transmit power)
$10 \log [(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N^{ANT}]$ dBi
Note 2. Directional gain(completely uncorrelated signal with unequal antenna gain and equal transmit power)
$10 \log [(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N^{ANT}]$ 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 %.

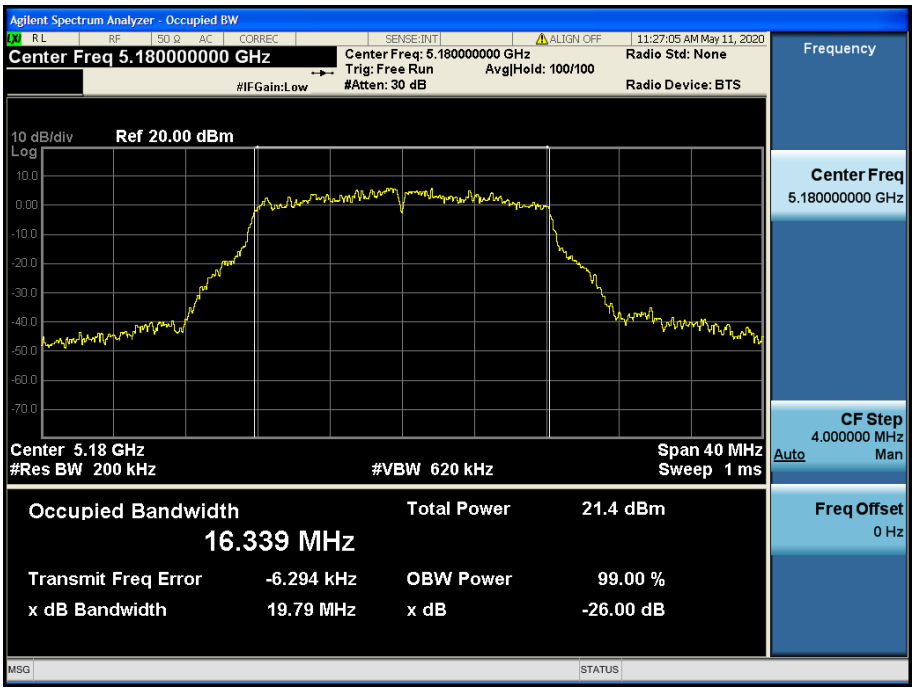
▣ **Test Results : Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]	
				ANT 1	ANT 2
TM 1	U-NII 1	36	5 180	19.79	20.38
		40	5 200	19.98	19.25
		48	5 240	19.98	19.55
	U-NII 2A	52	5 260	19.53	19.39
		60	5 300	18.85	19.74
		64	5 320	19.51	19.83
	U-NII 2C	100	5 500	19.94	19.64
		120	5 600	20.38	20.16
		144	5 720	19.90	18.97
TM 2	U-NII 1	36	5 180	19.75	20.46
		40	5 200	19.80	20.20
		48	5 240	19.90	20.19
	U-NII 2A	52	5 260	19.65	19.57
		60	5 300	19.77	19.64
		64	5 320	19.97	19.50
	U-NII 2C	100	5 500	19.86	19.59
		120	5 600	19.85	19.38
		144	5 720	19.48	19.74
TM 3	U-NII 1	38	5 190	40.03	39.43
		46	5 230	39.95	39.17
	U-NII 2A	54	5 270	39.59	39.87
		62	5 310	40.42	39.45
	U-NII 2C	102	5 510	39.71	39.57
		118	5 590	39.66	39.74
		142	5 710	40.19	39.19
TM 4	U-NII 1	42	5 210	80.87	81.53
	U-NII 2A	58	5 290	81.88	80.91
	U-NII 2C	106	5 530	81.00	80.85
		122	5 610	81.15	81.25
		138	5 690	81.41	81.03

▣ Result Plots

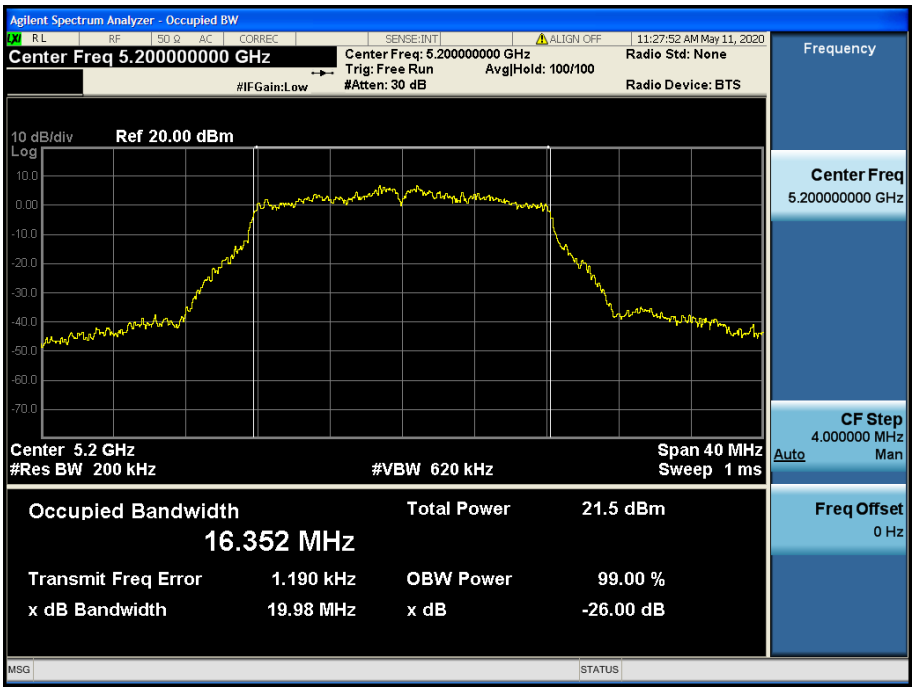
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.36



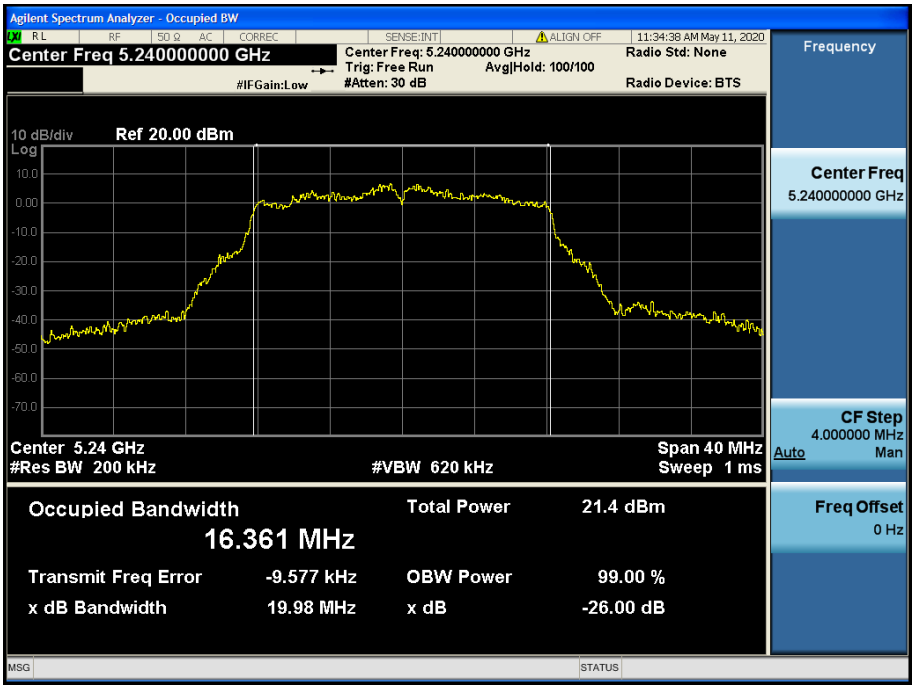
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.40



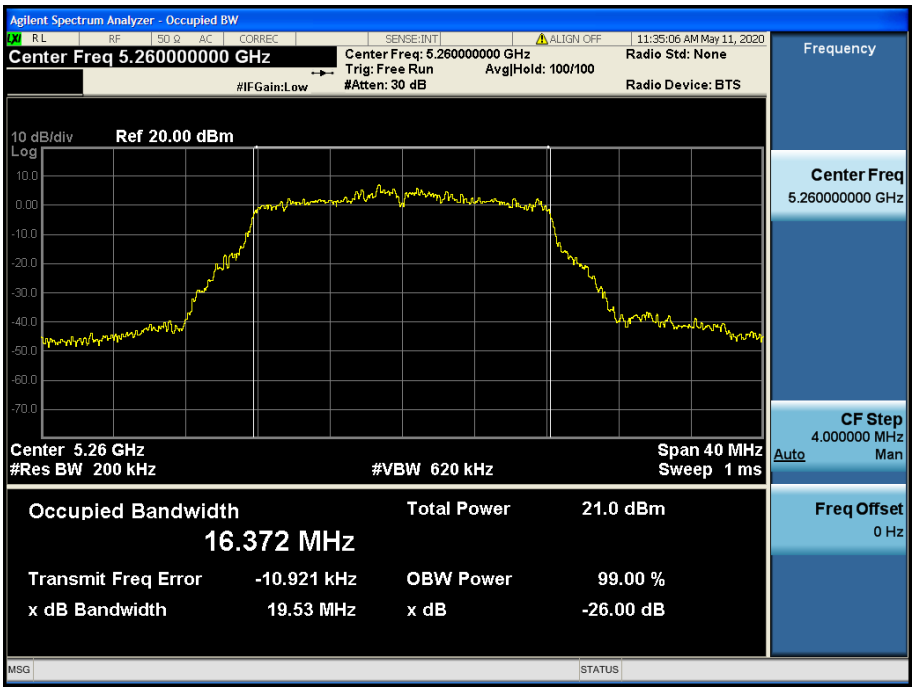
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.48



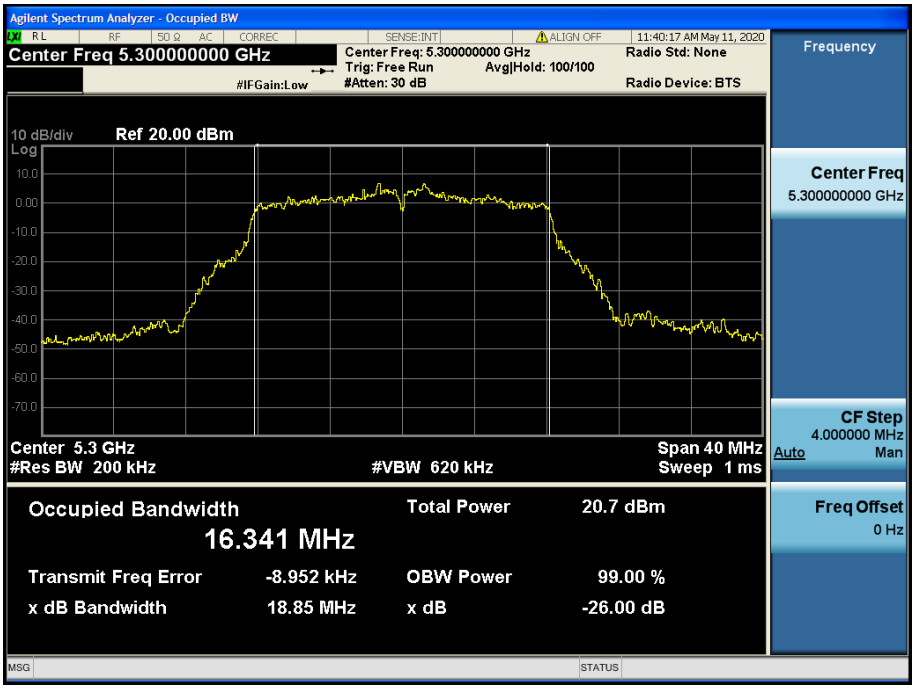
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.52



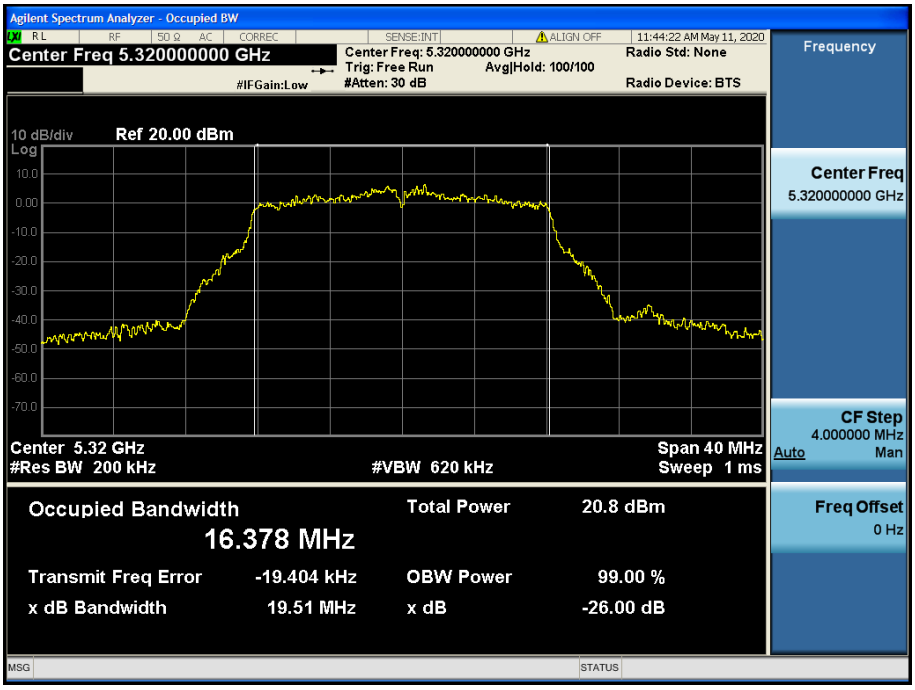
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.60



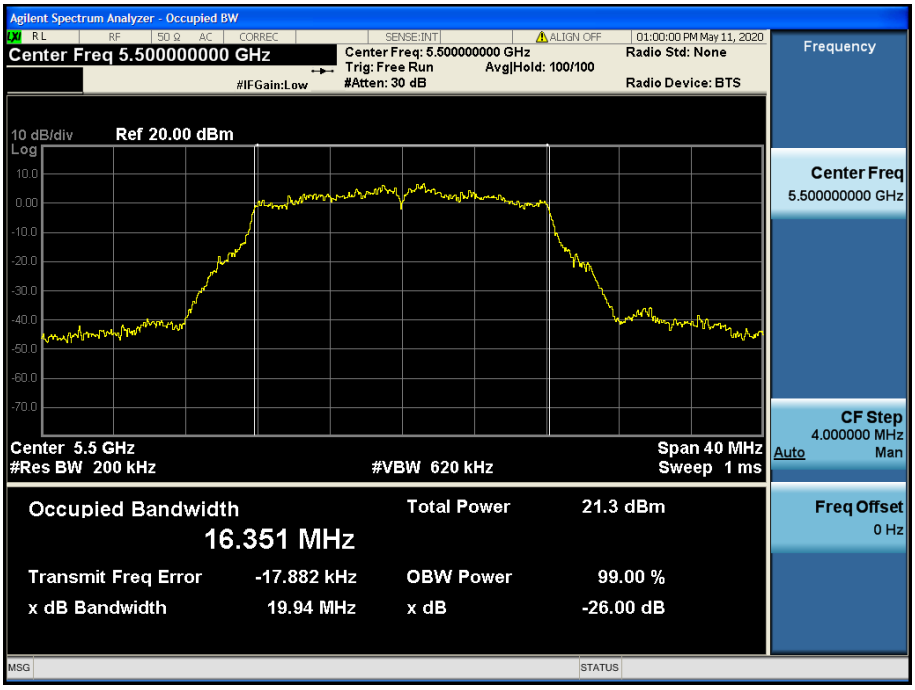
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.64



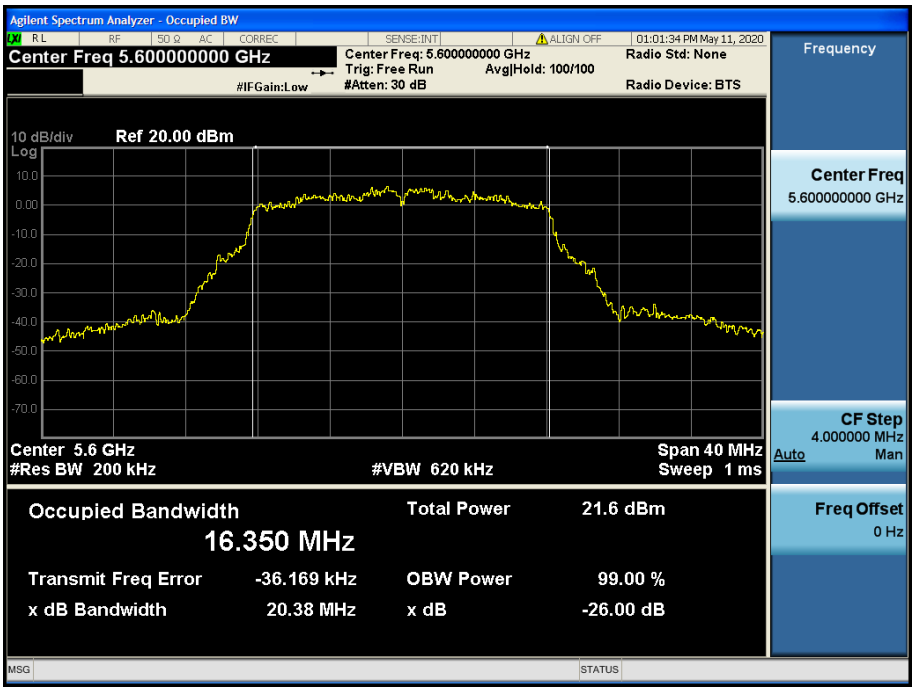
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.100



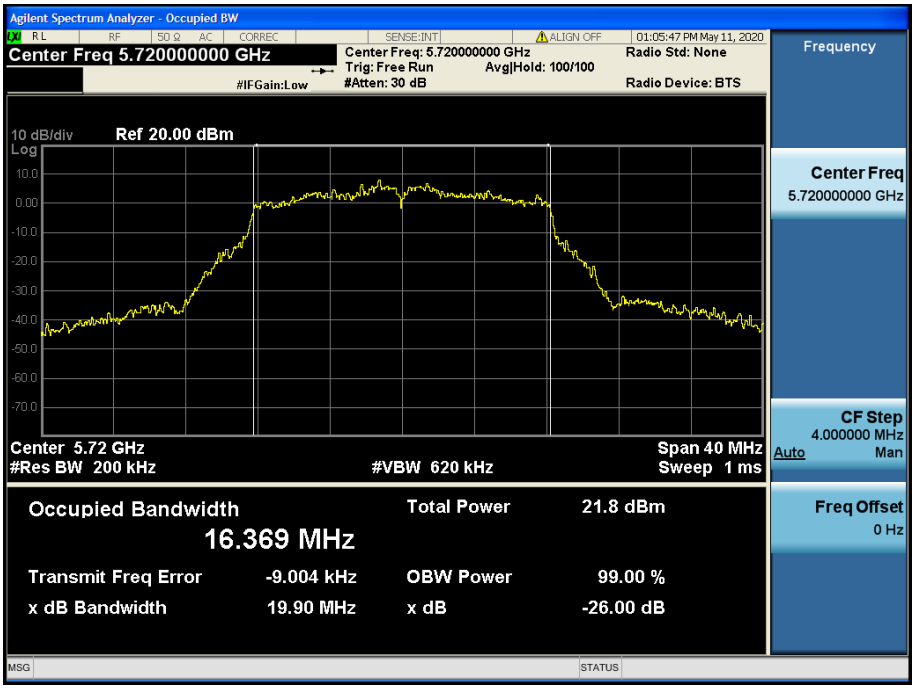
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.120



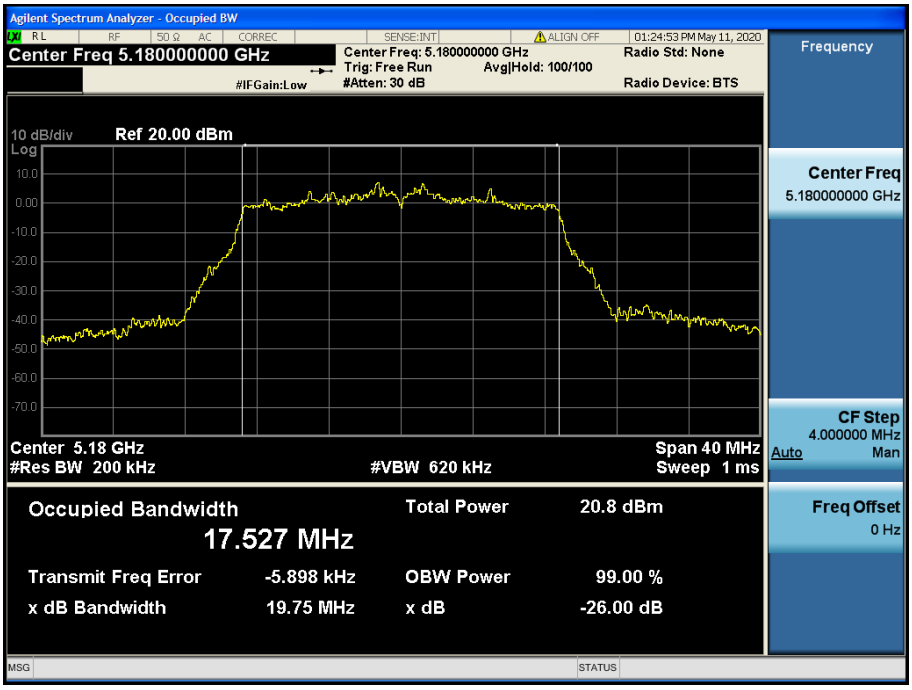
26 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.144



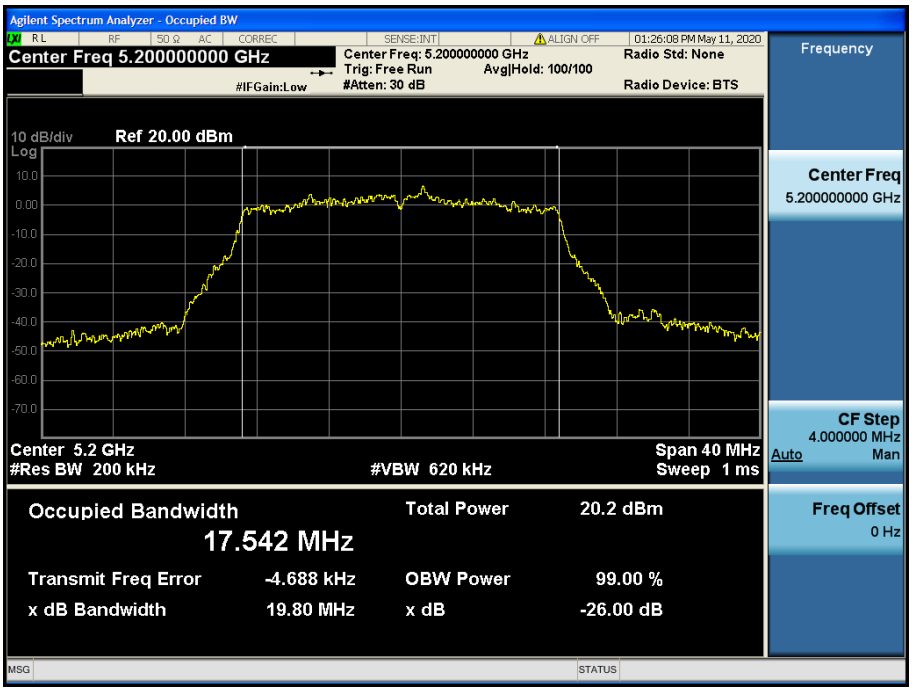
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.36



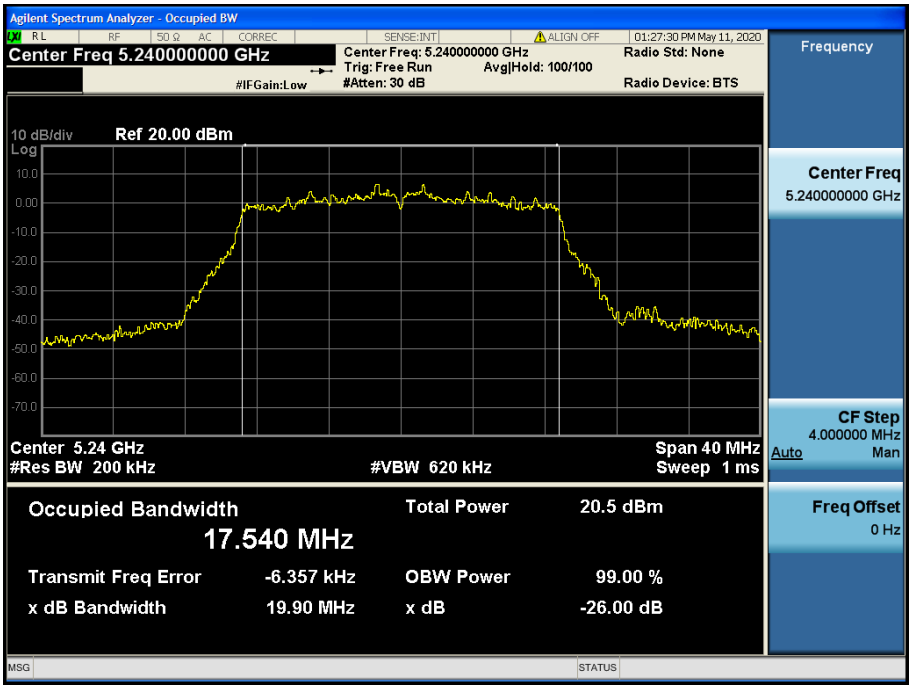
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.40



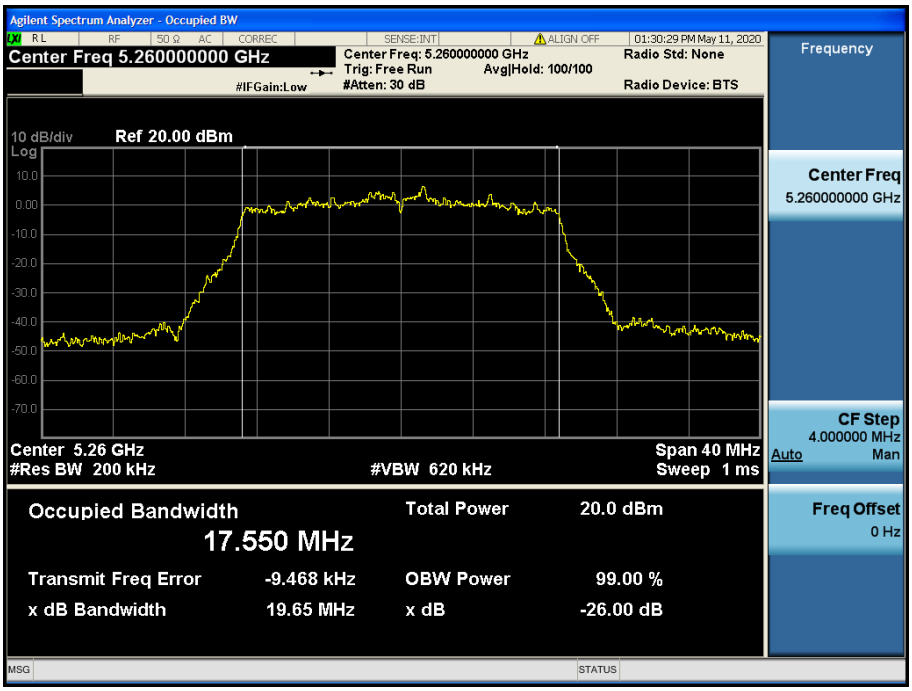
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.48



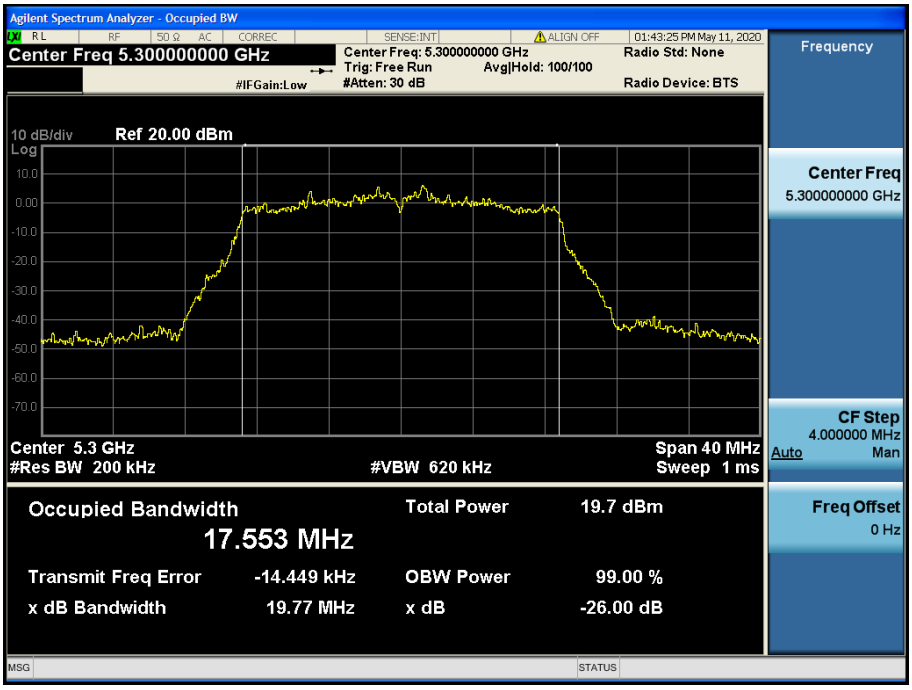
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.52



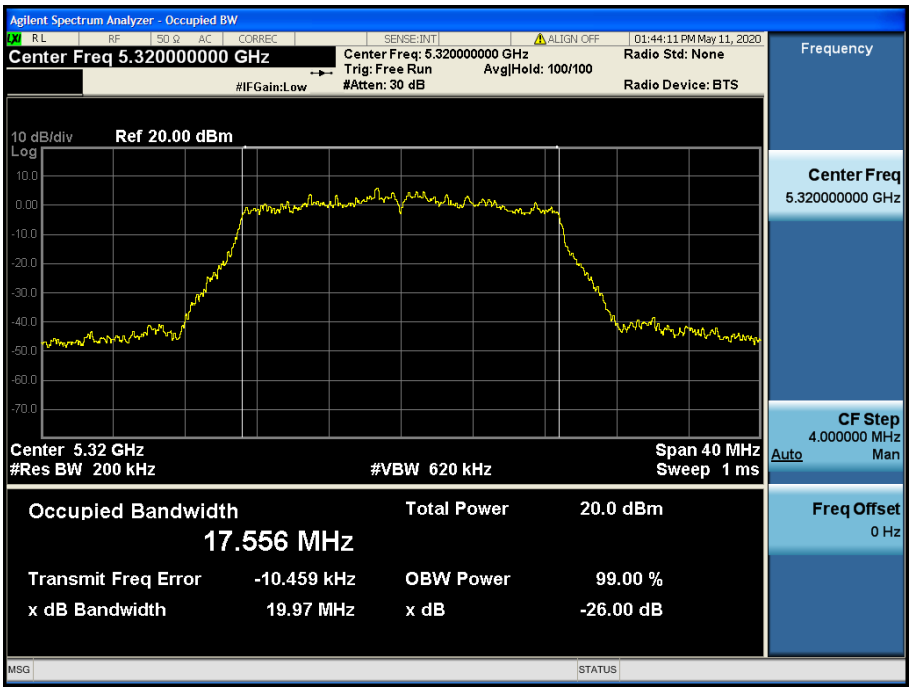
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.60



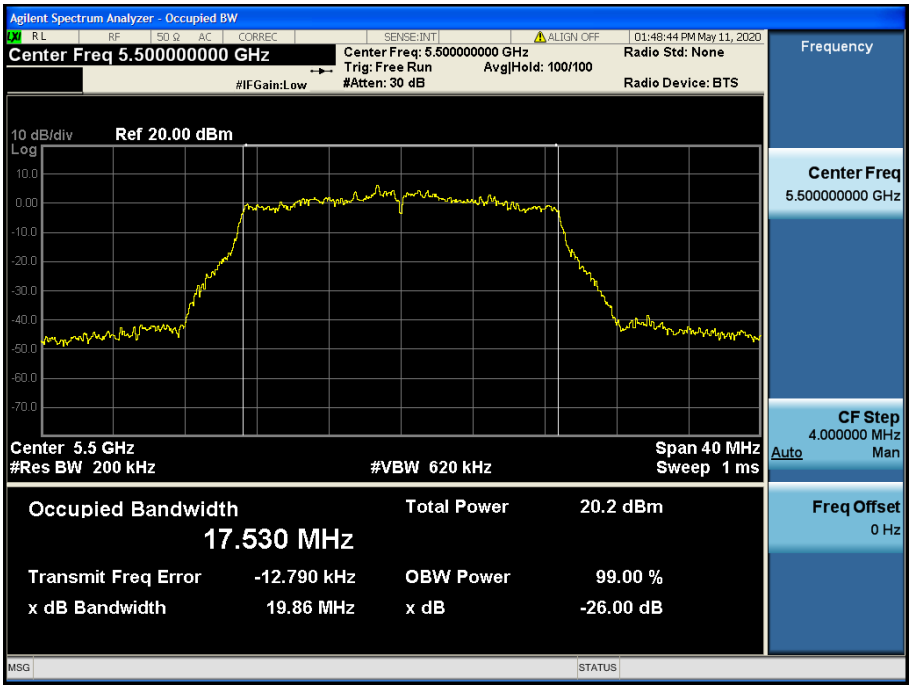
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.64



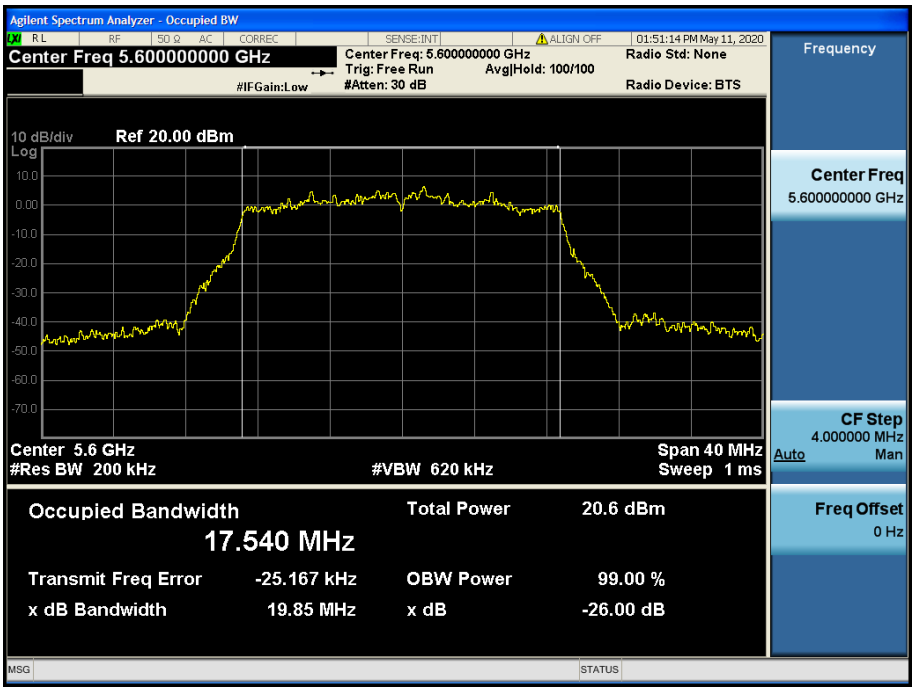
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.100



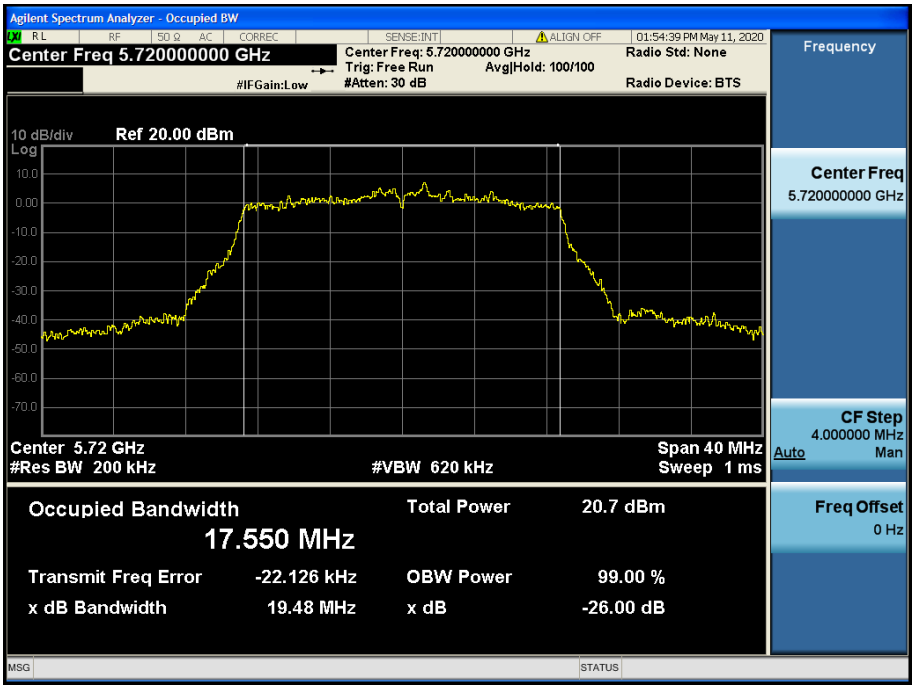
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.120



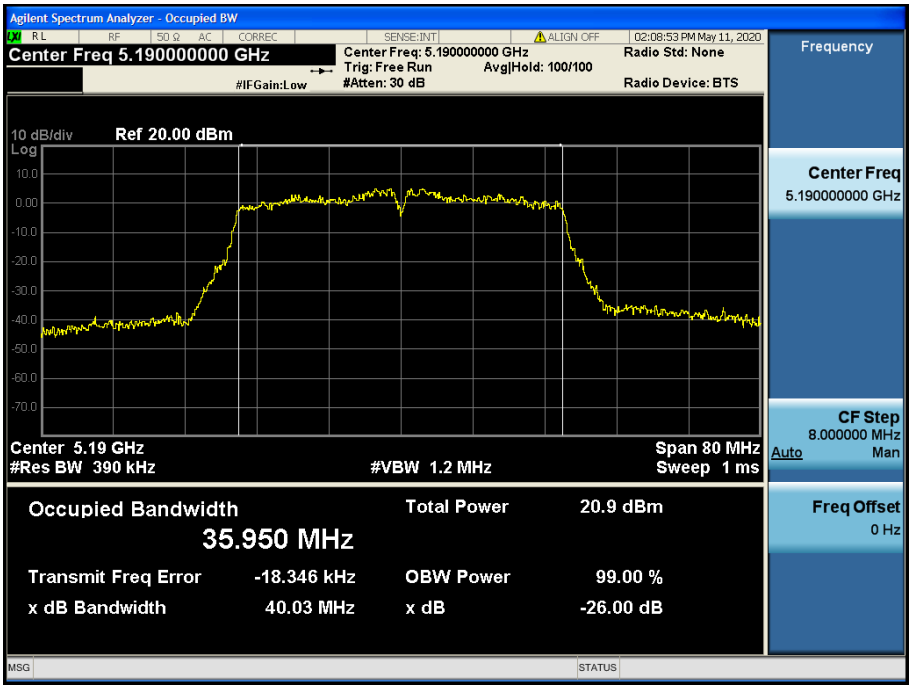
26 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.144



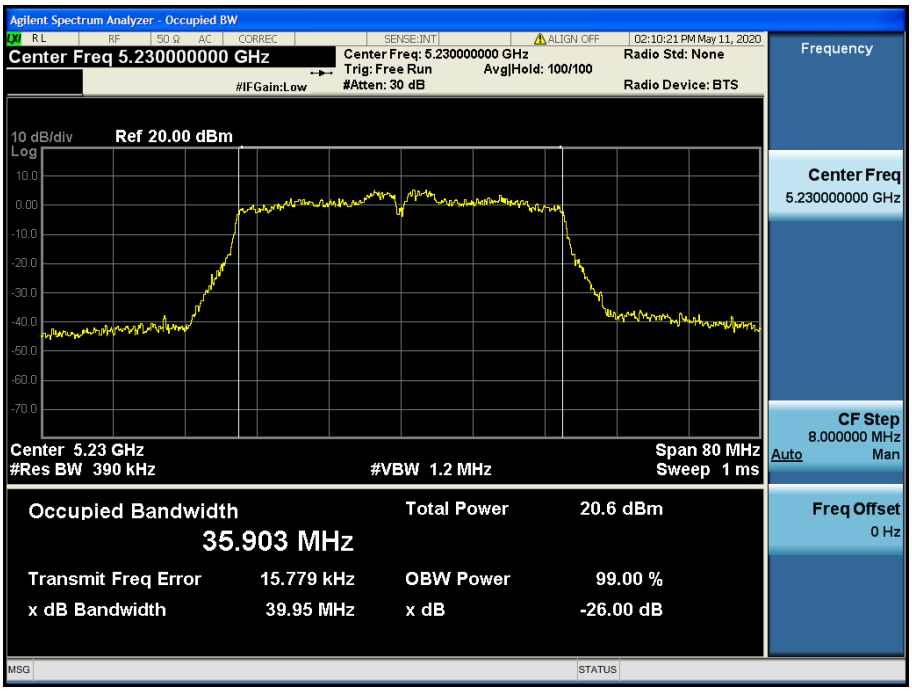
26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.38



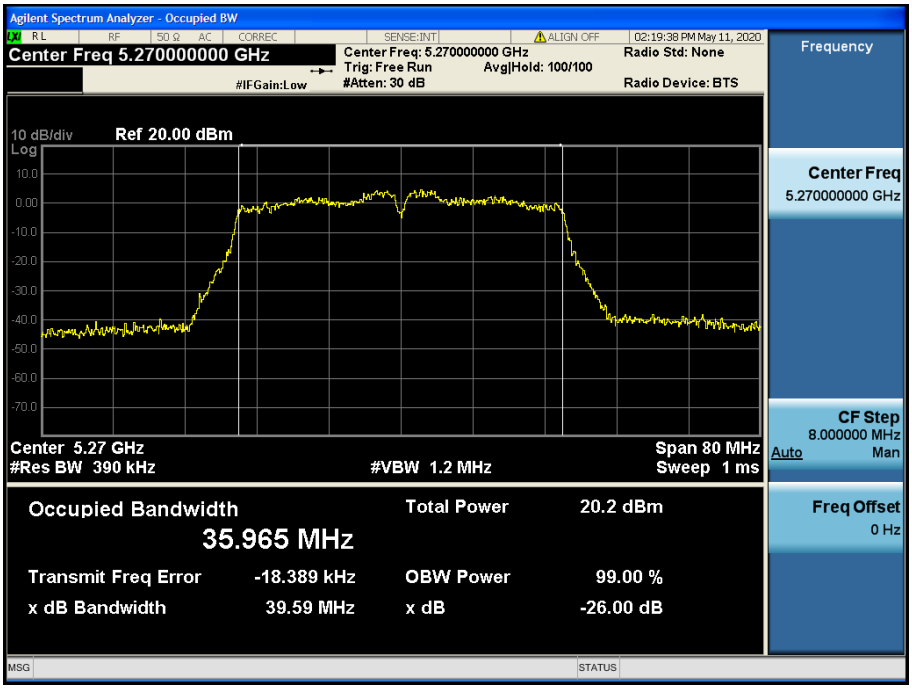
26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.46



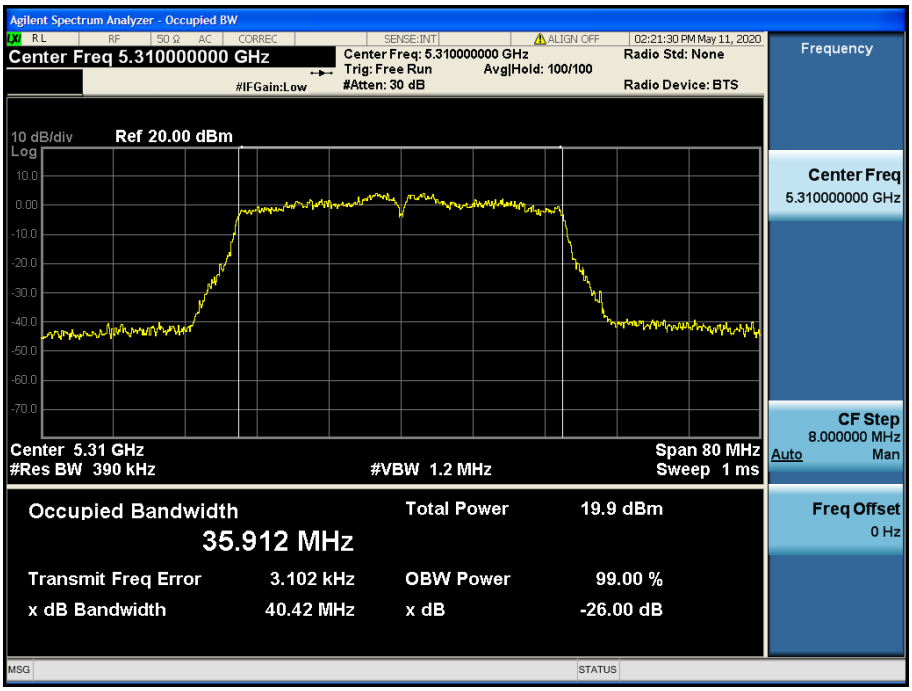
26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.54



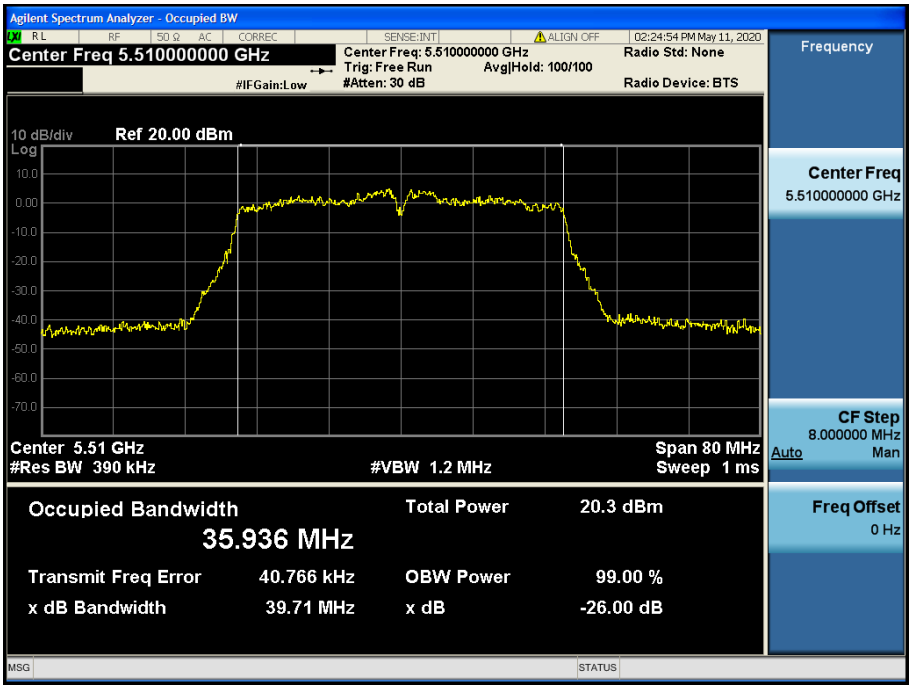
26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.62



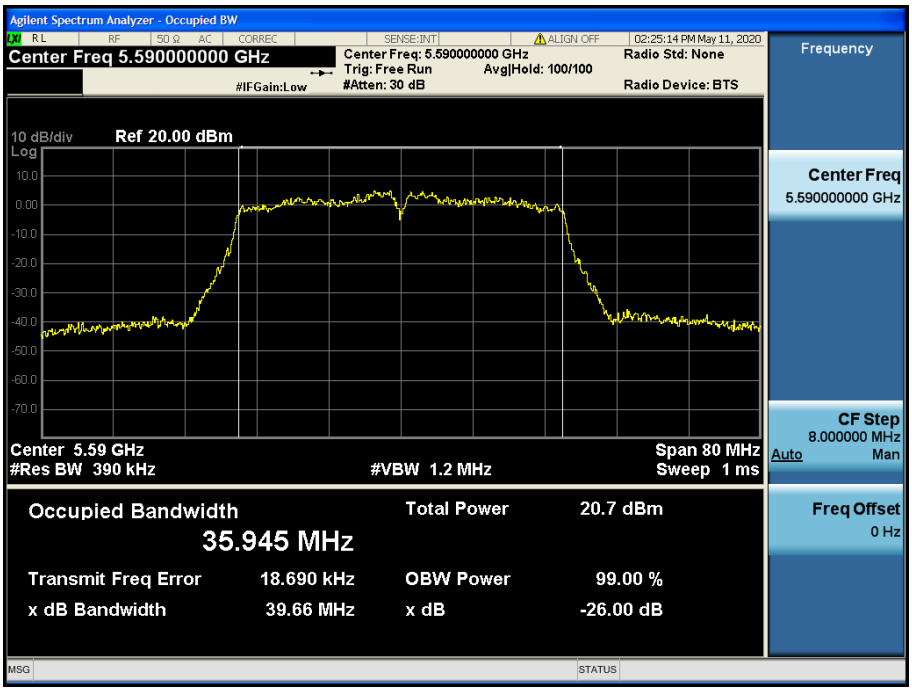
26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.102

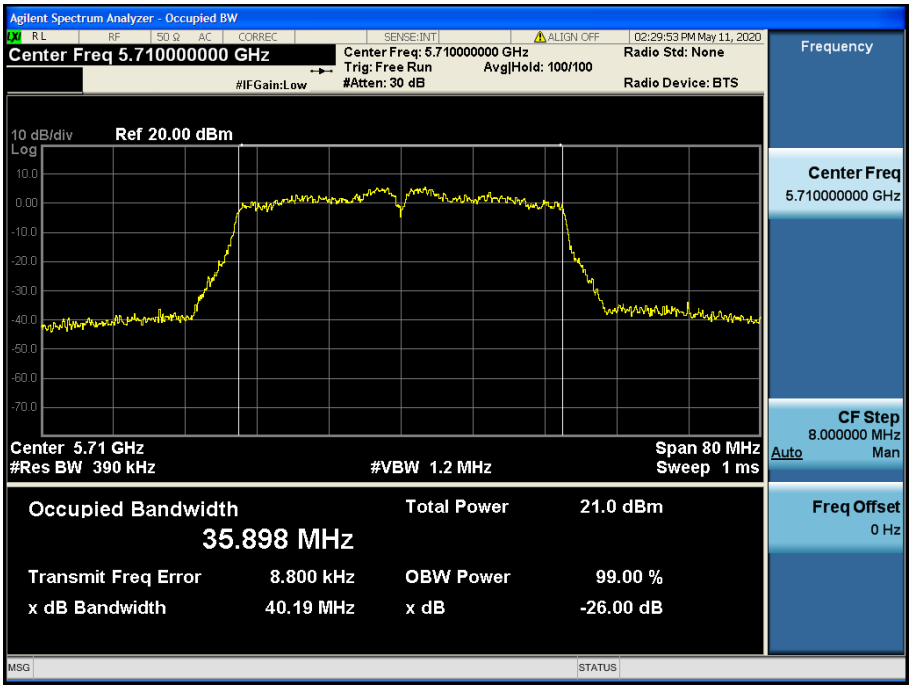


26 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.118

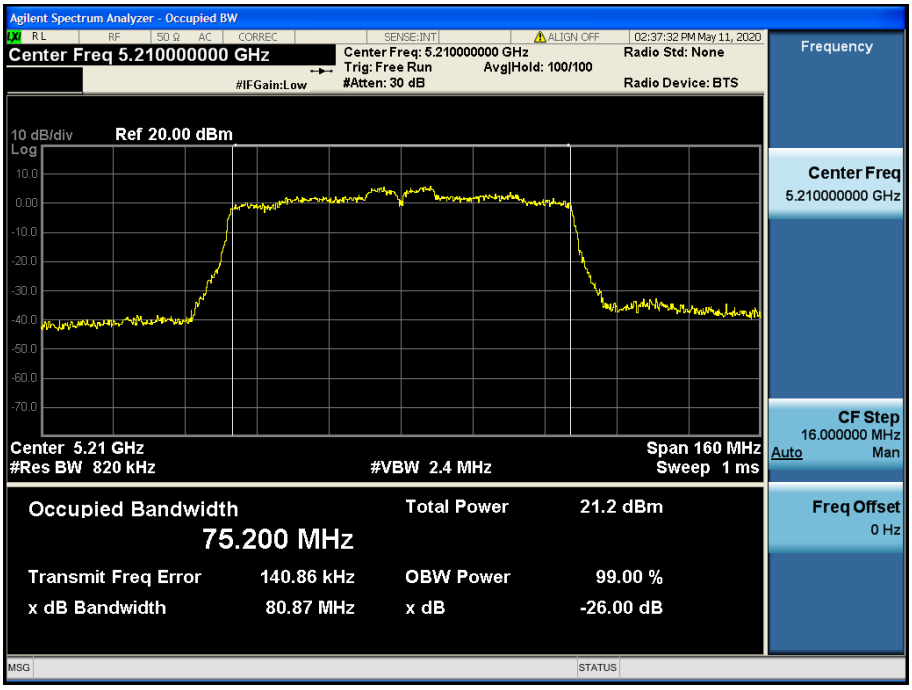


26 dB Bandwidth Test Mode: TM 3 & ANT 1 & Ch.142



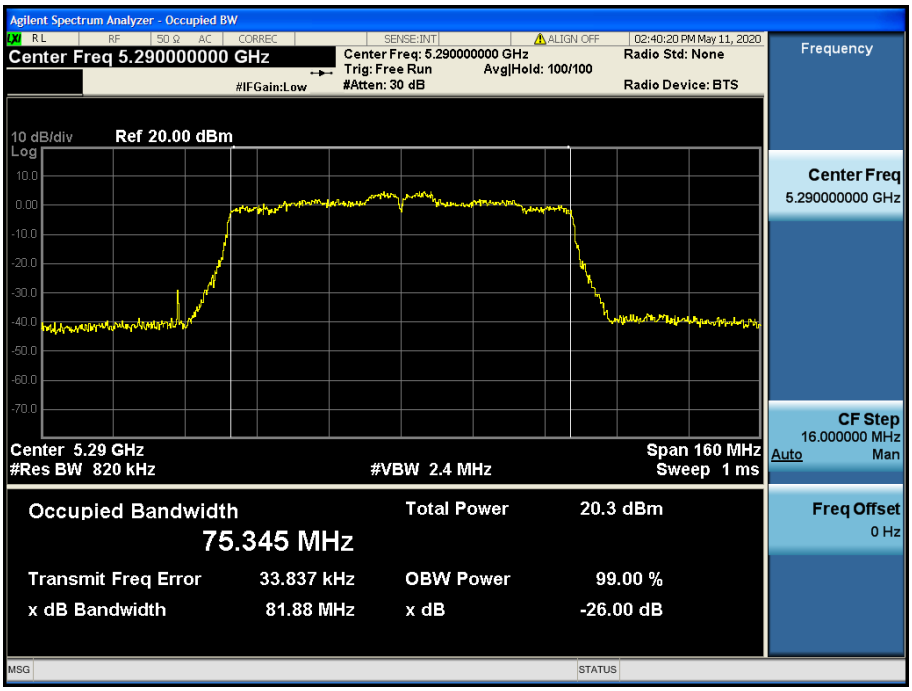
26 dB Bandwidth

Test Mode: TM 4 & ANT 1 & Ch.42



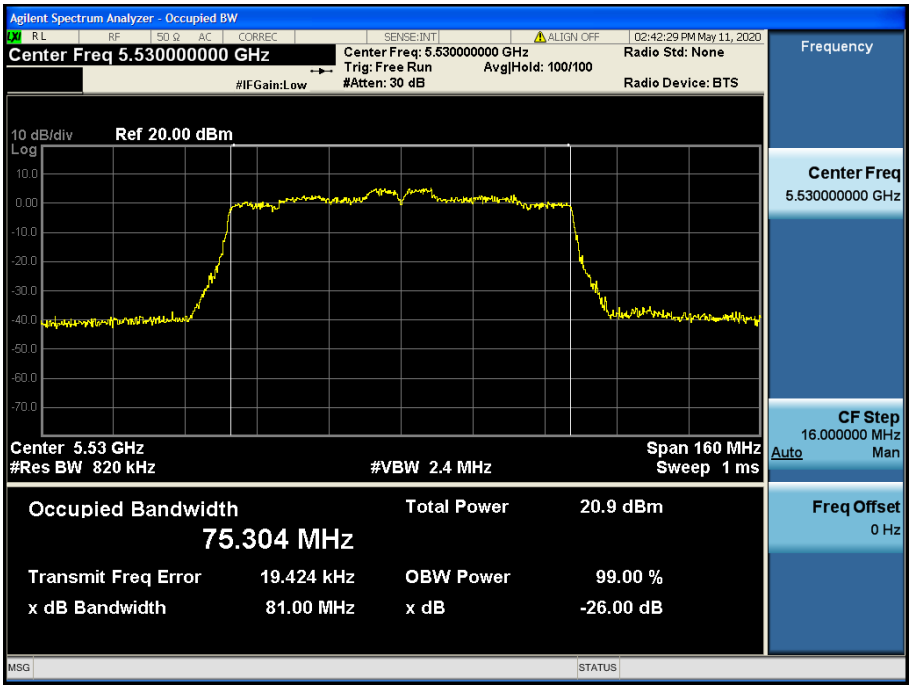
26 dB Bandwidth

Test Mode: TM 4 & ANT 1 & Ch.58



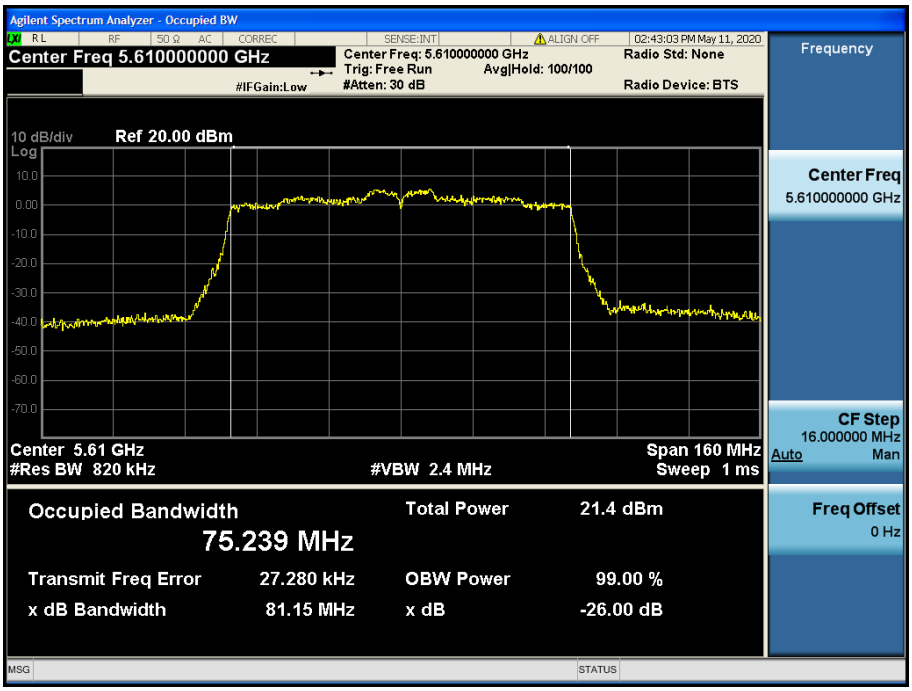
26 dB Bandwidth

Test Mode: TM 4 & ANT 1 & Ch.106



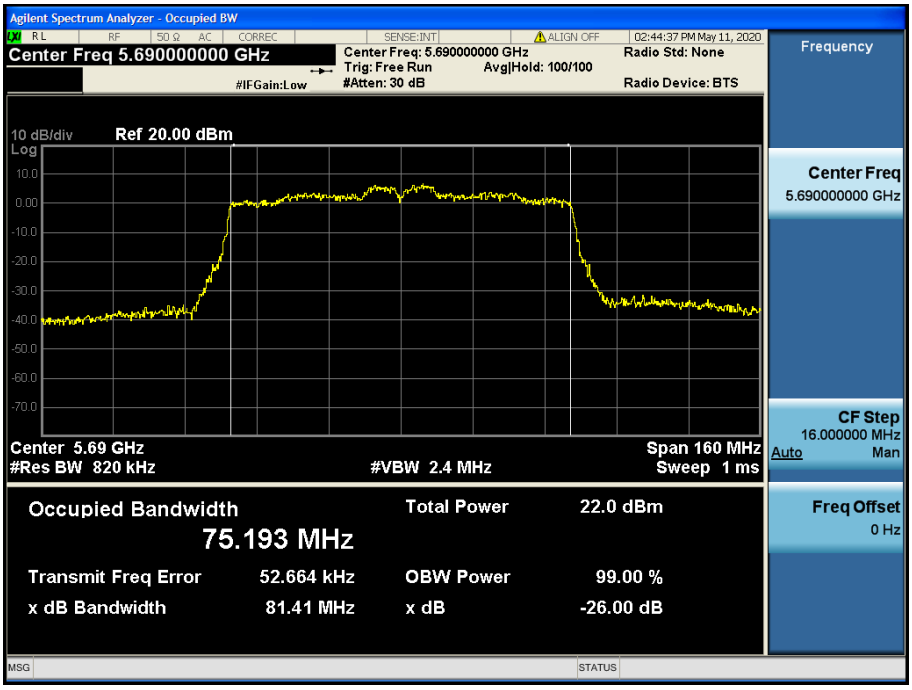
26 dB Bandwidth

Test Mode: TM 4 & ANT 1 & Ch.122



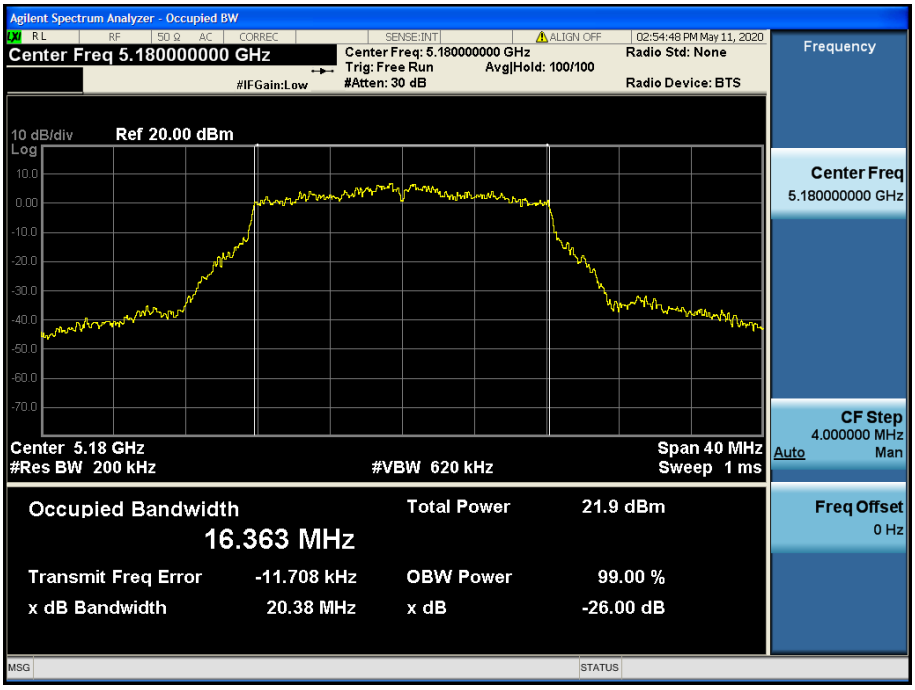
26 dB Bandwidth

Test Mode: TM 4 & ANT 1 & Ch.138



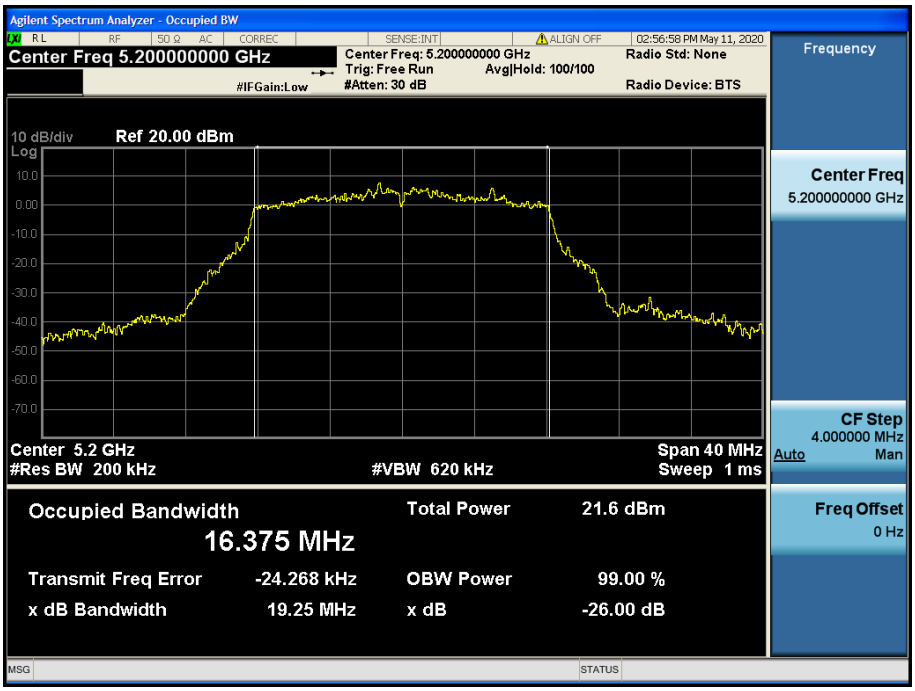
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.36



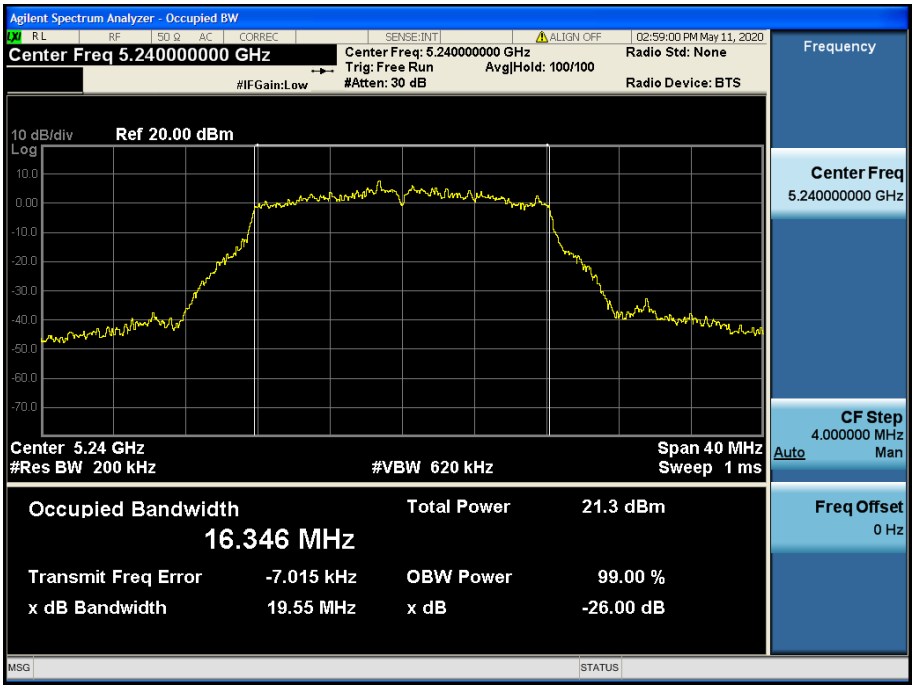
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.40



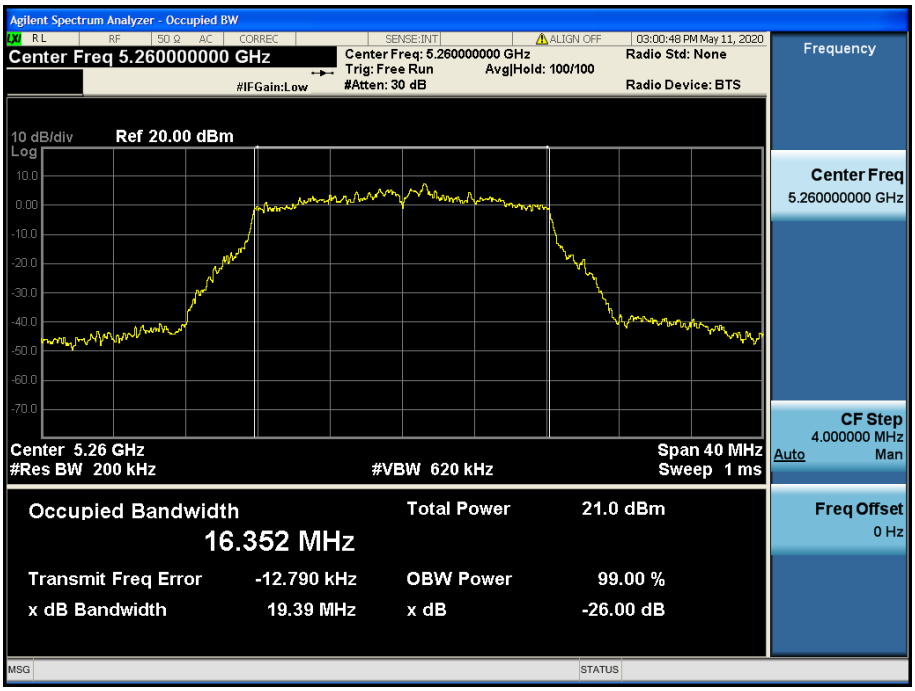
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.48



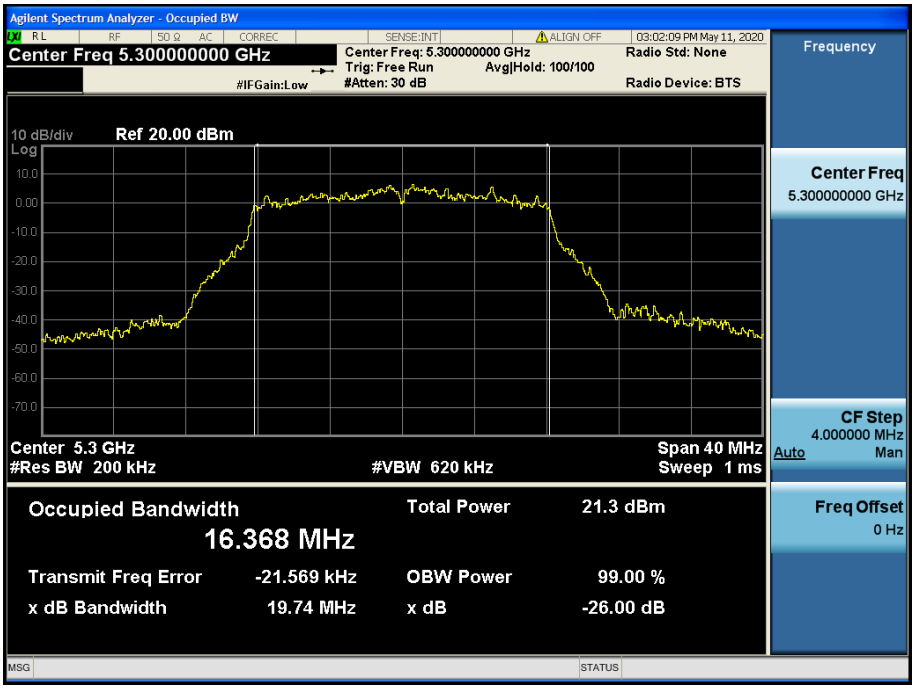
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.52



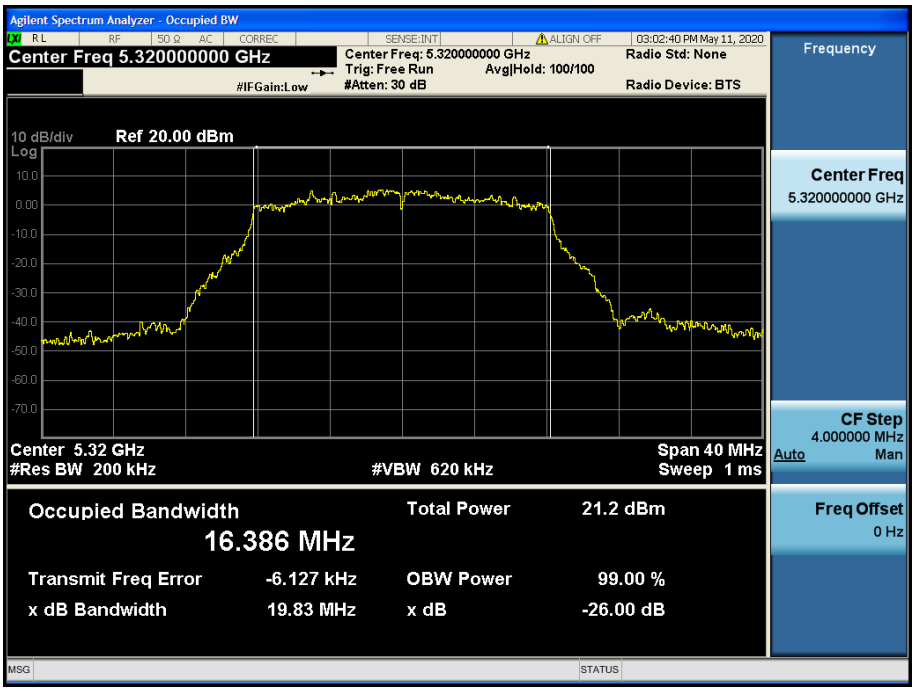
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.60



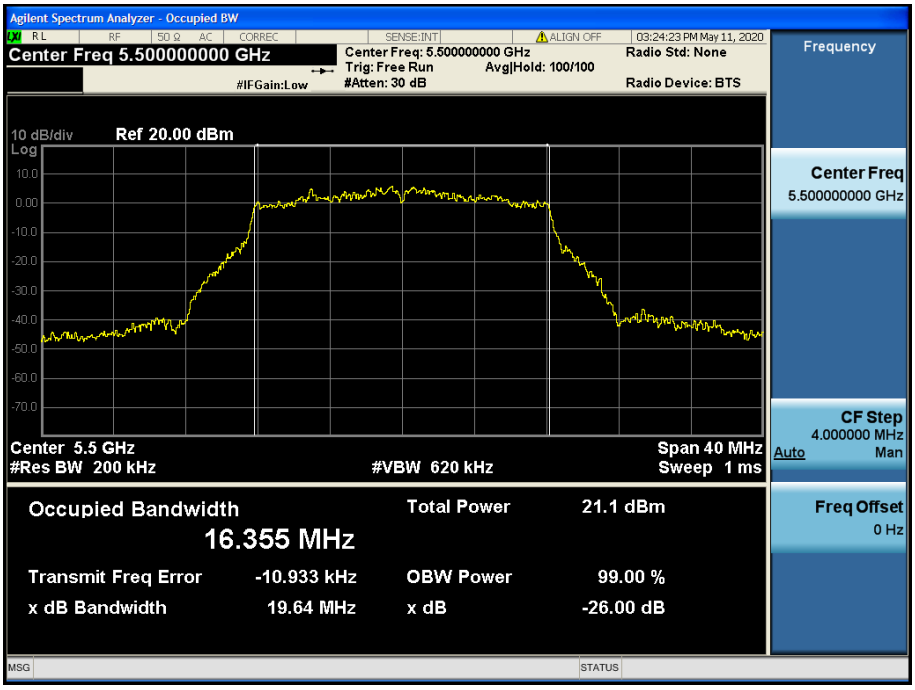
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.64



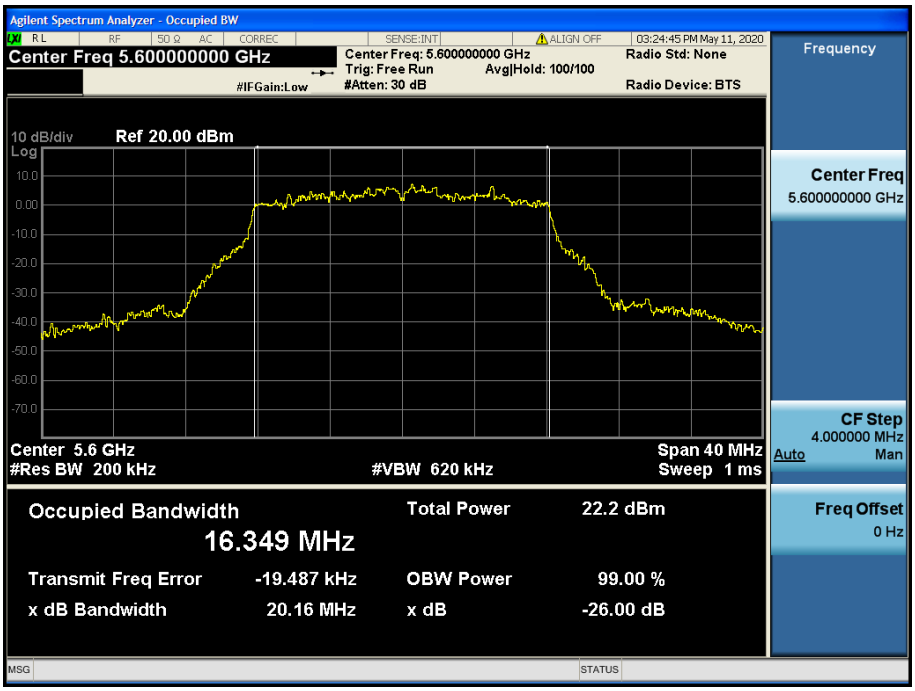
26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.100

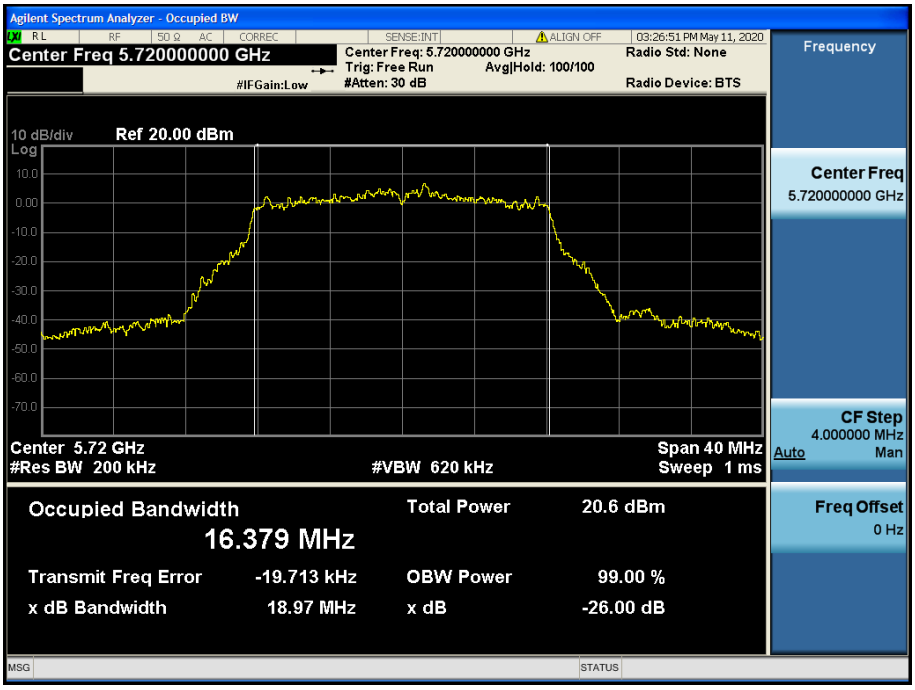


26 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.120

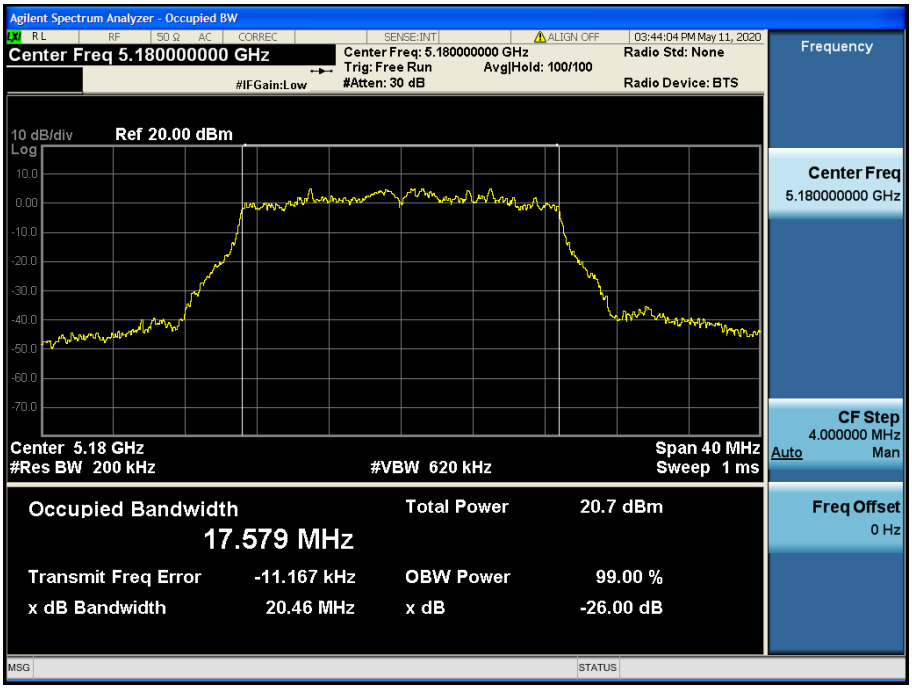


26 dB Bandwidth Test Mode: TM 1 & ANT 2 & Ch.144



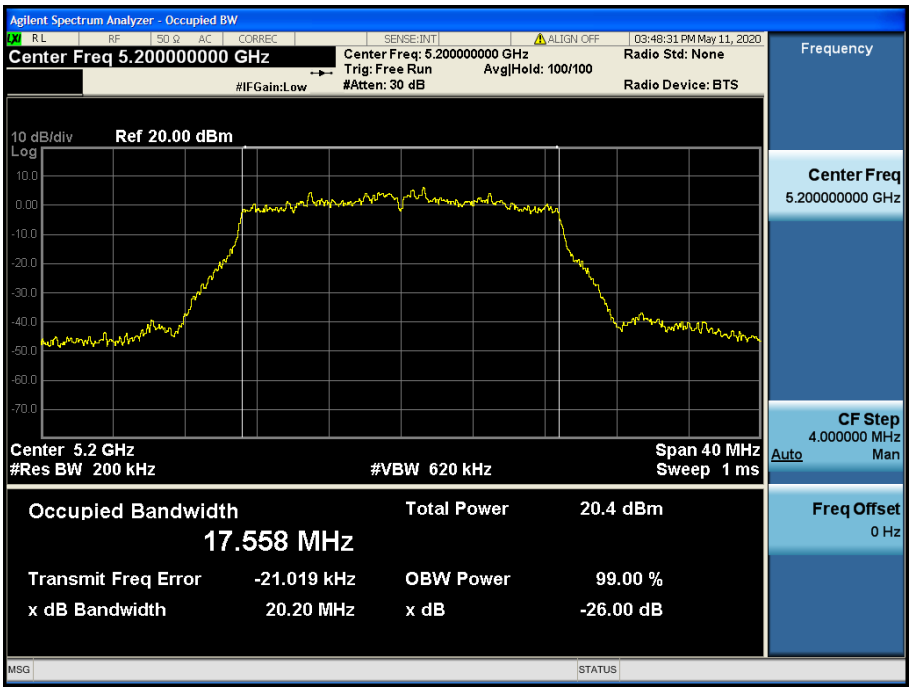
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.36



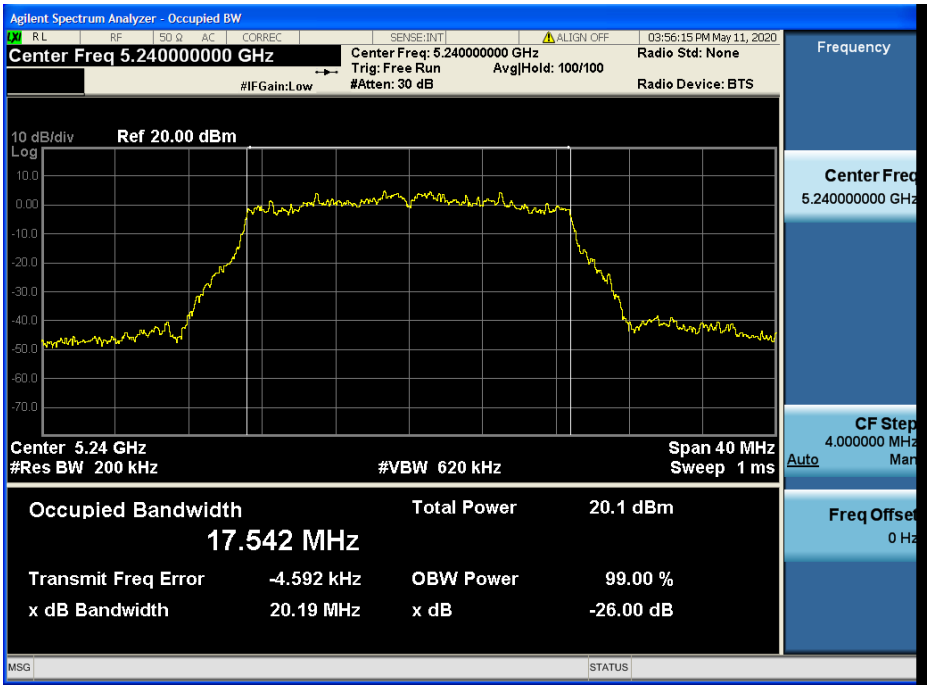
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.40



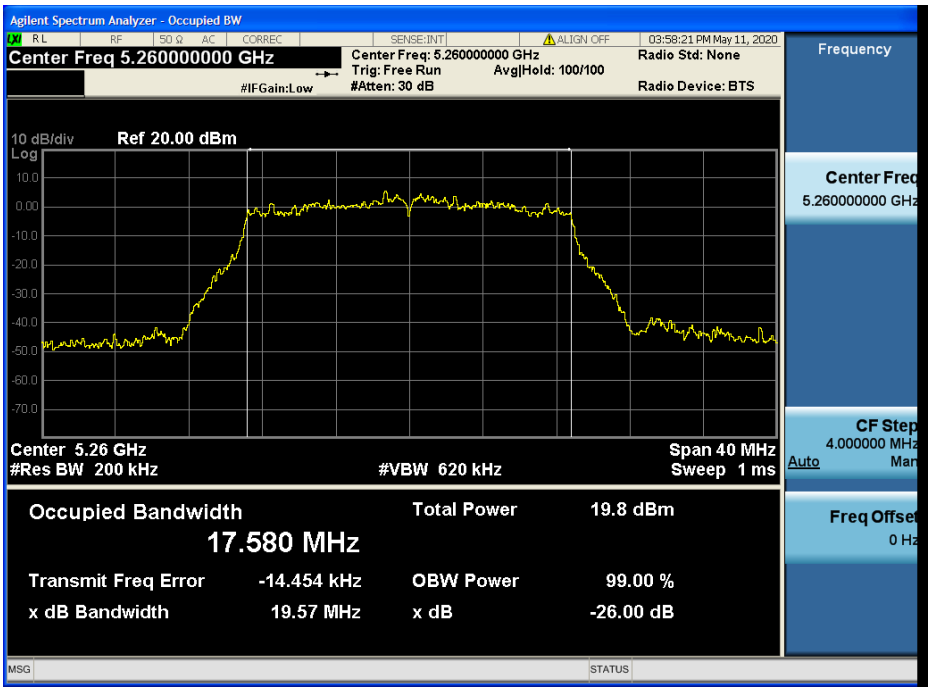
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.48



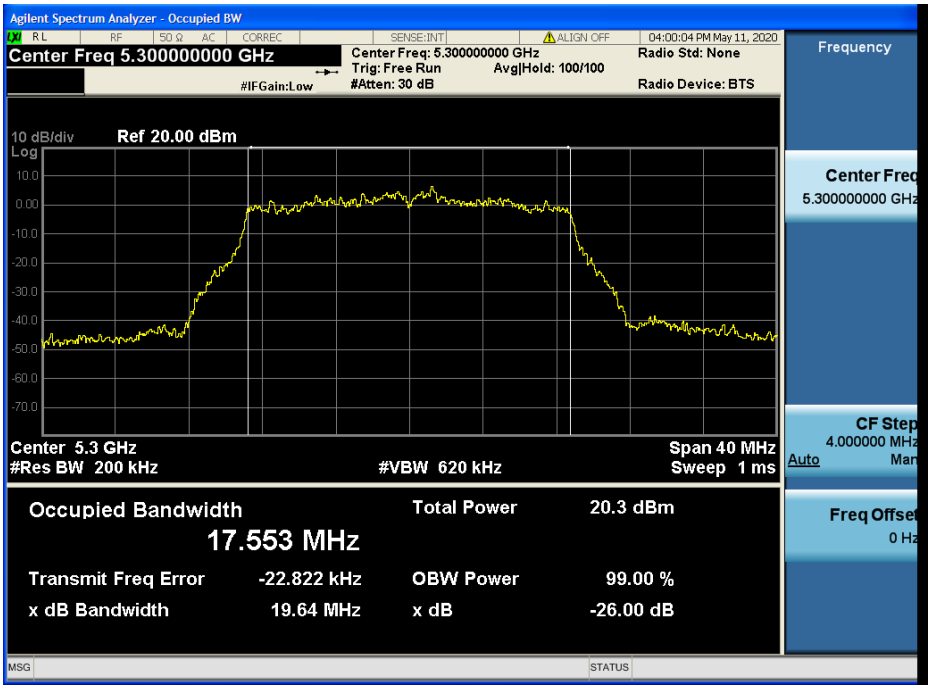
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.52



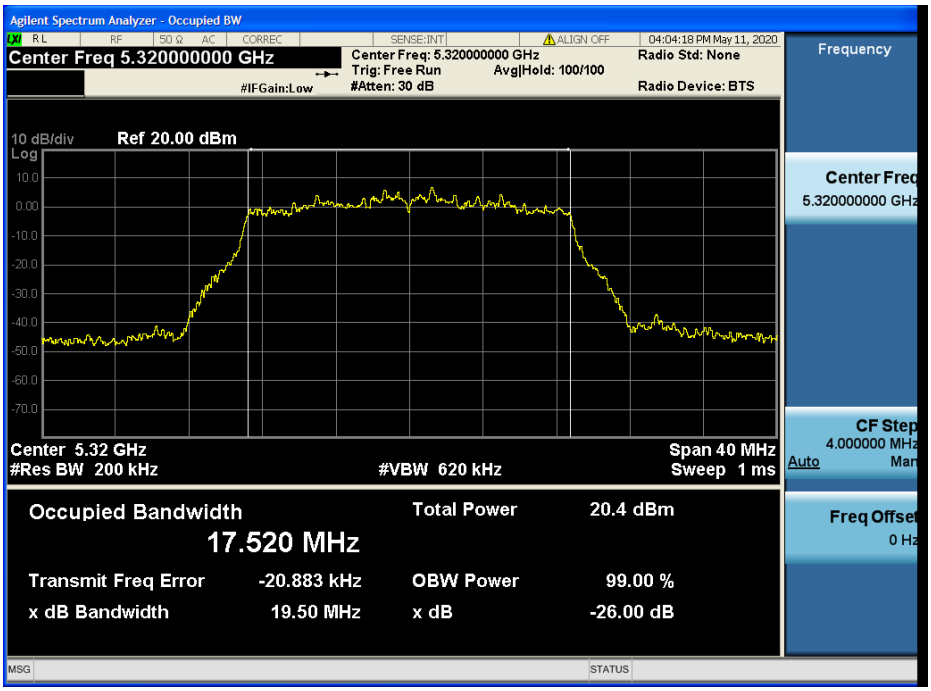
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.60



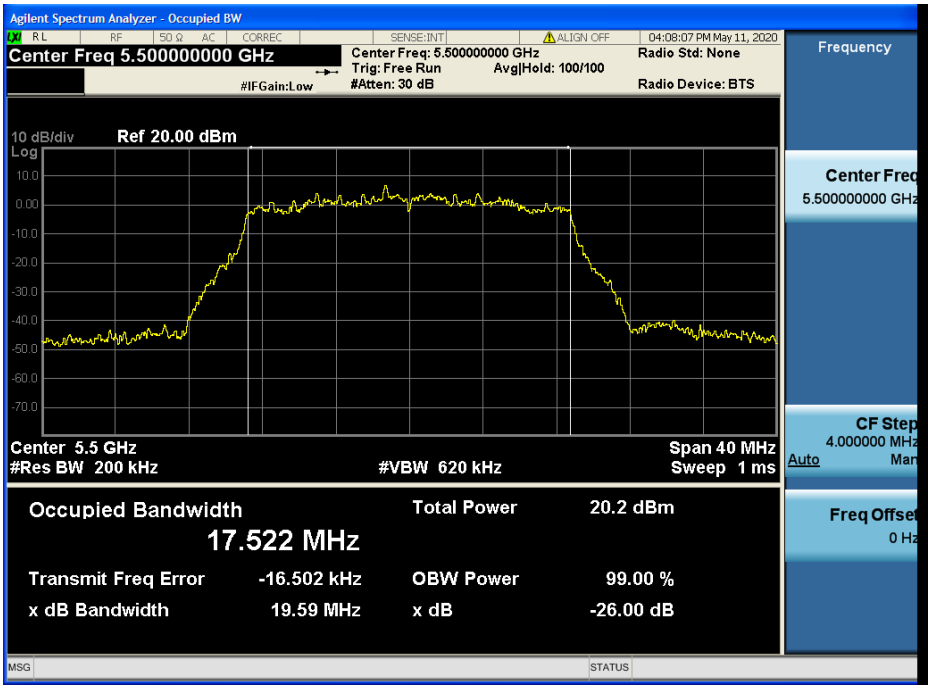
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.64



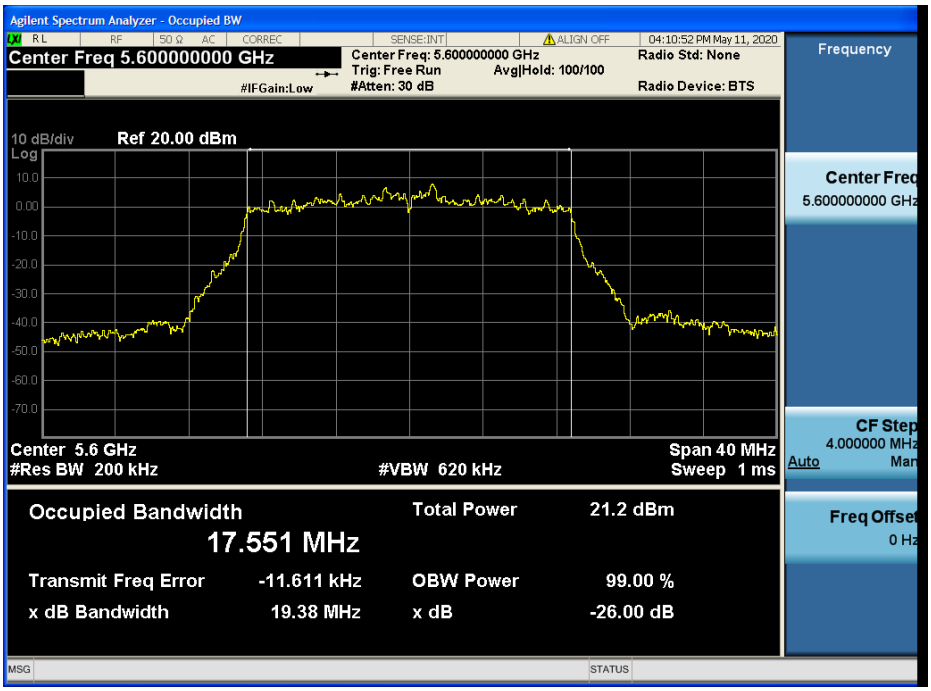
26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.100

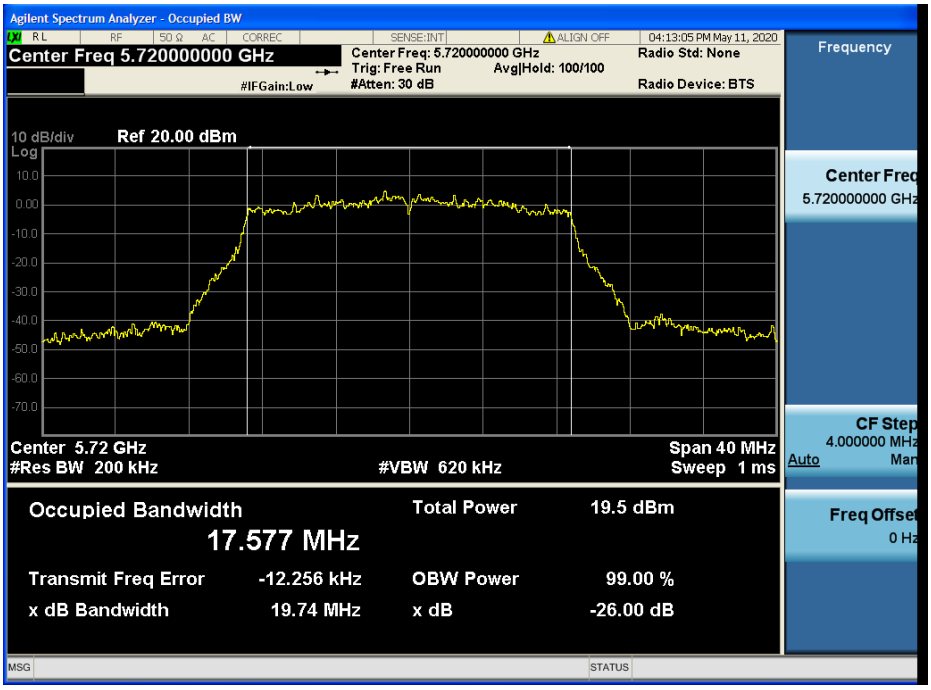


26 dB Bandwidth

Test Mode: TM 2 & ANT 2 & Ch.120

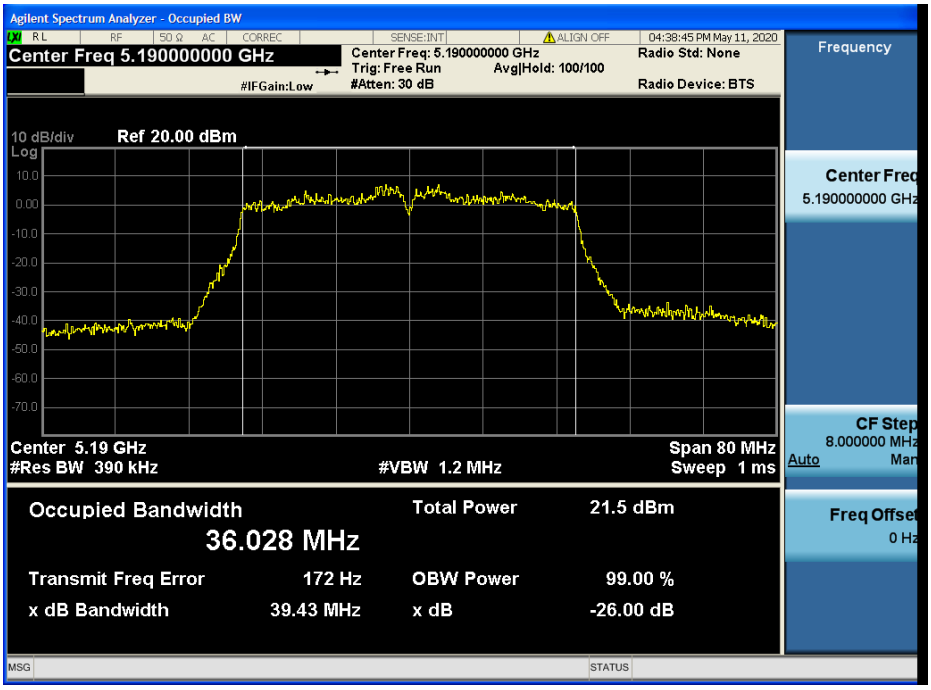


26 dB Bandwidth Test Mode: TM 2 & ANT 2 & Ch.144



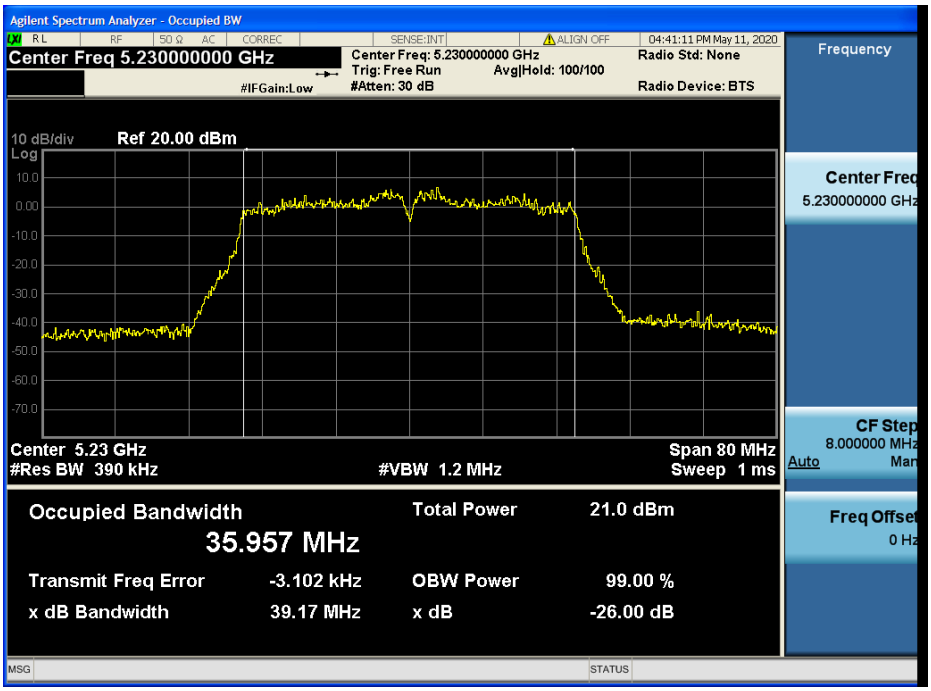
26 dB Bandwidth

Test Mode: TM 3 & ANT 2 & Ch.38



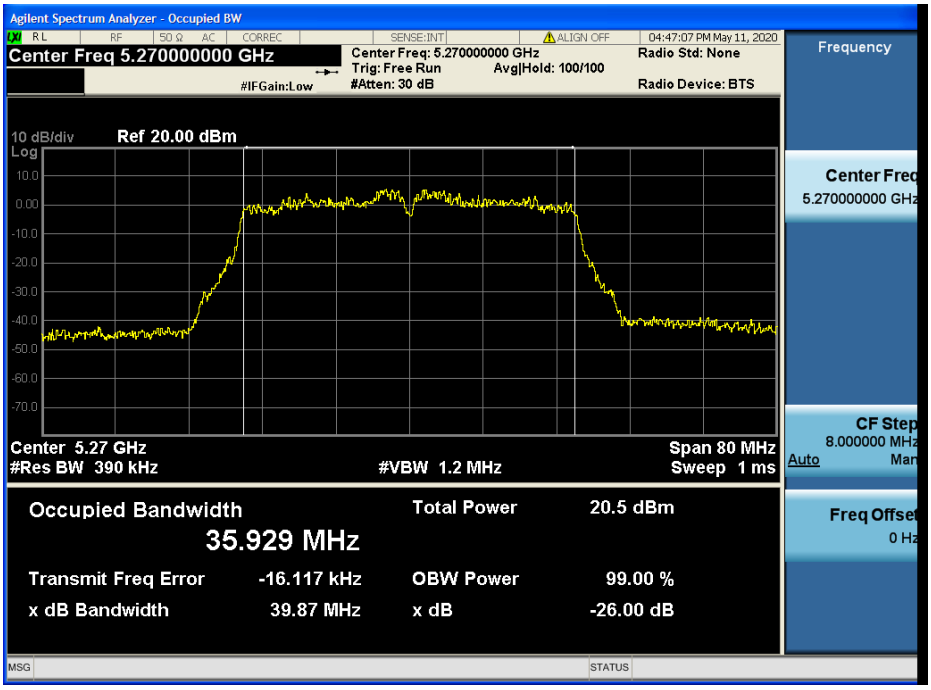
26 dB Bandwidth

Test Mode: : TM 3 & ANT 2 & Ch.46



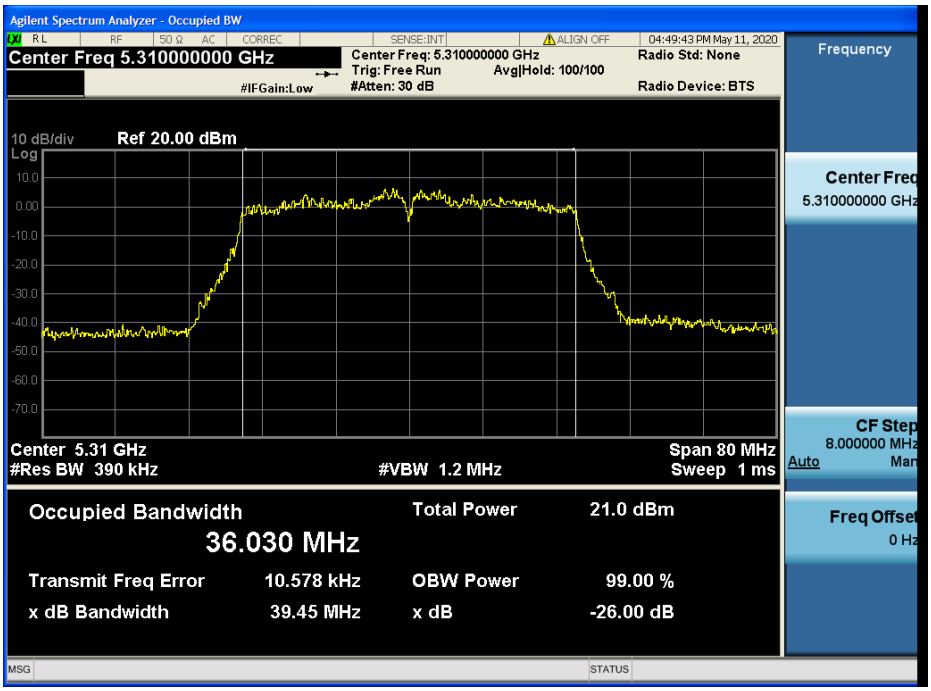
26 dB Bandwidth

Test Mode: TM 3 & ANT 2 & Ch.54



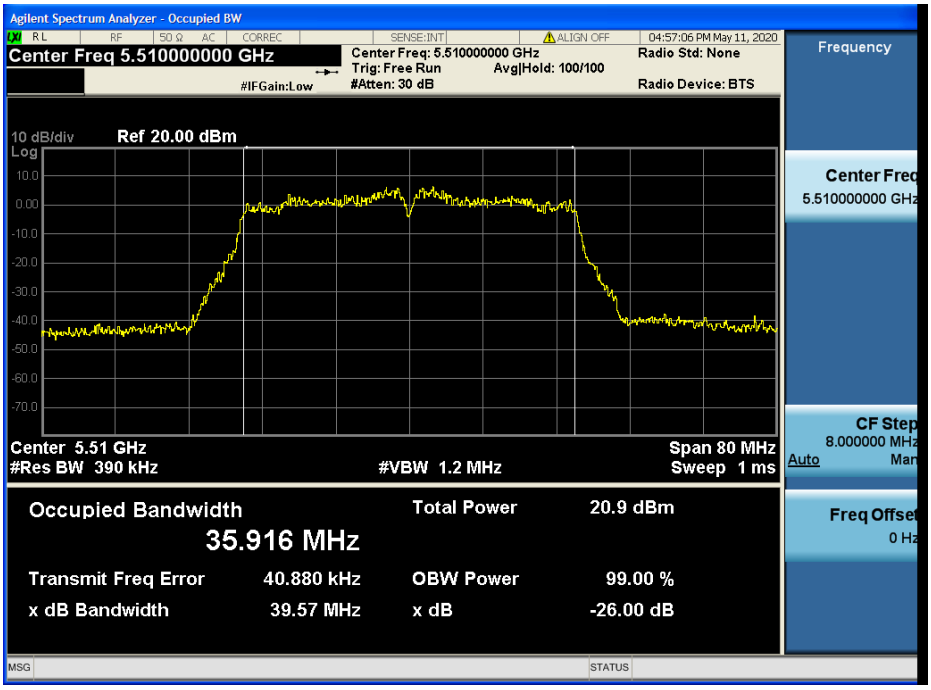
26 dB Bandwidth

Test Mode: TM 3 & ANT 2 & Ch.62



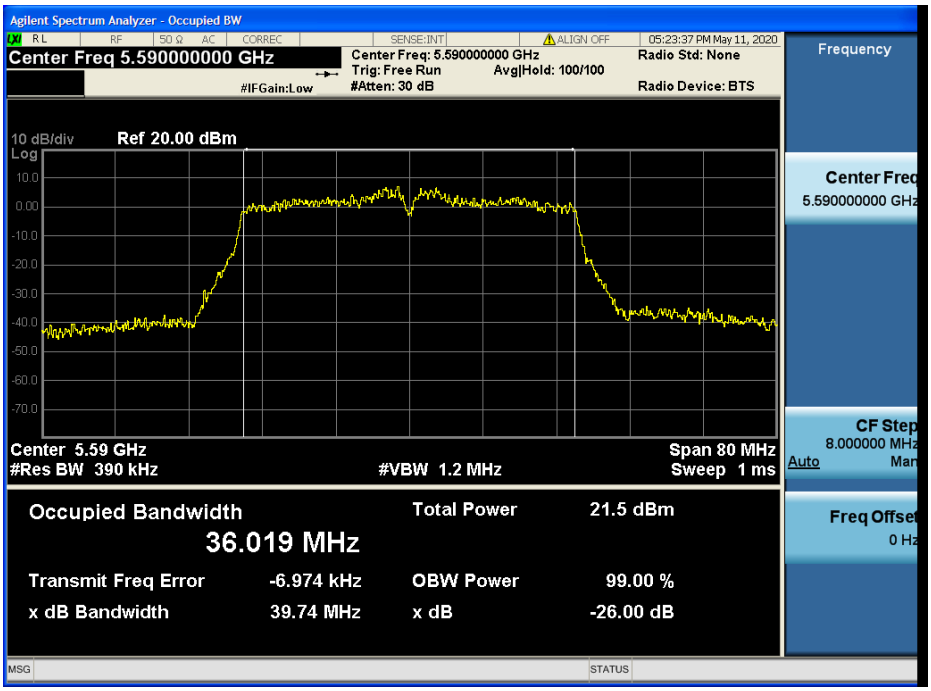
26 dB Bandwidth

Test Mode: TM 3 & ANT 2 & Ch.102

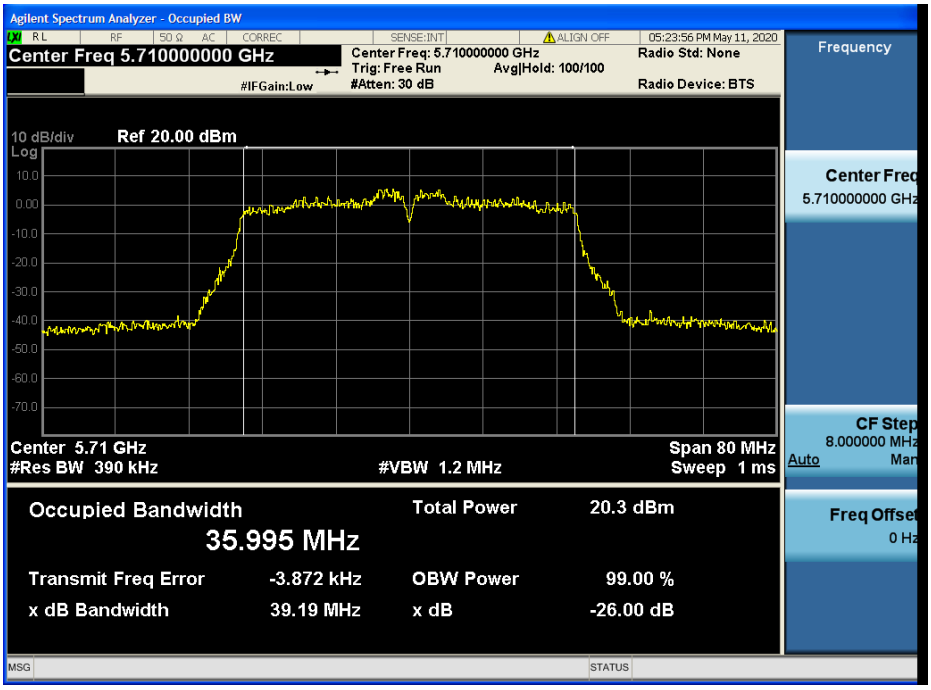


26 dB Bandwidth

Test Mode: TM 3 & ANT 2 & Ch.118

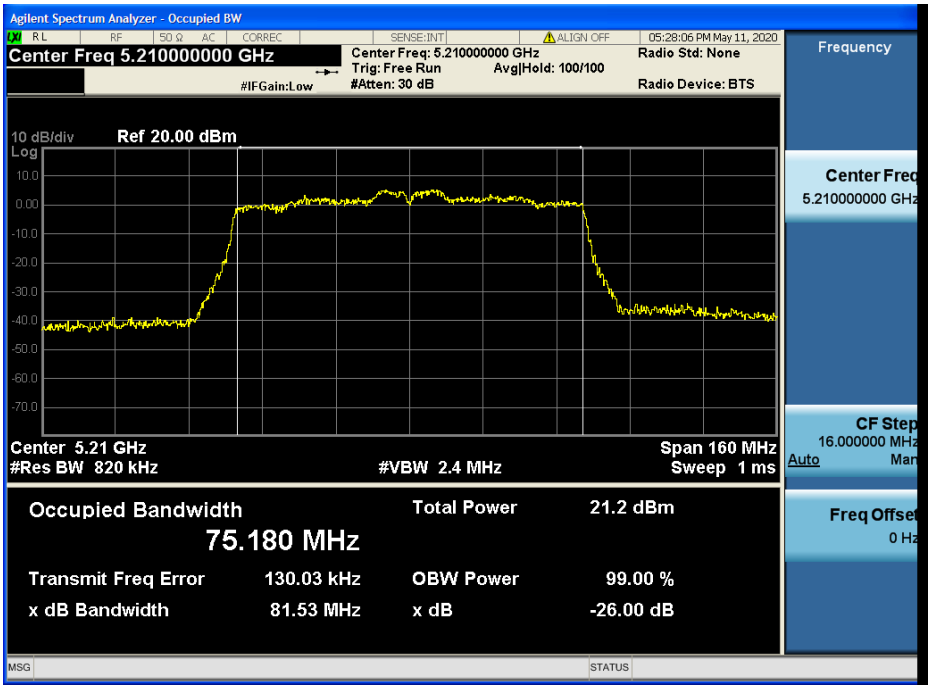


26 dB Bandwidth Test Mode: TM 3 & ANT 2 & Ch.142



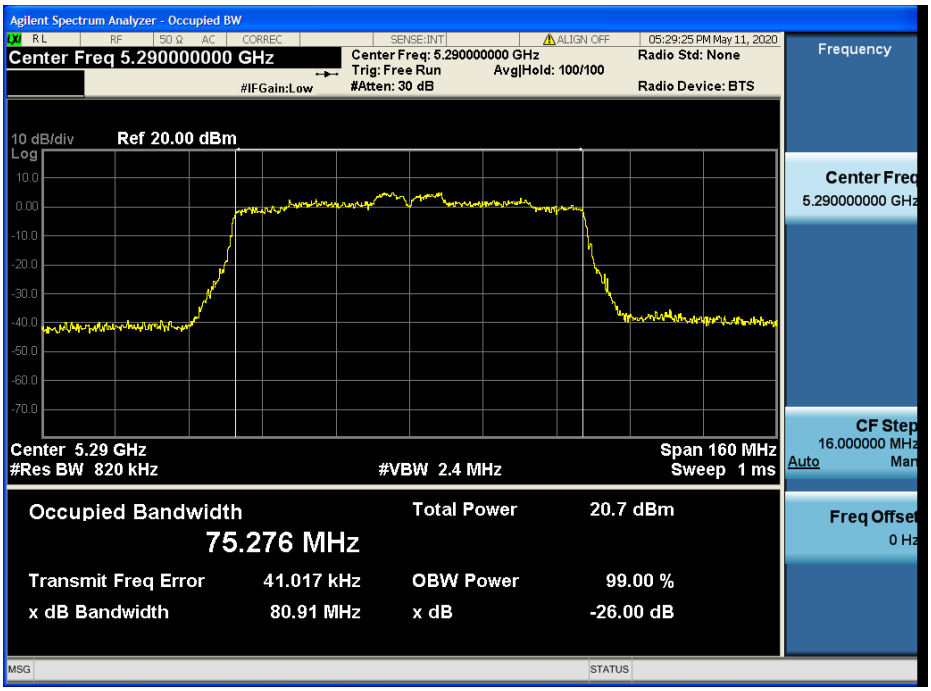
26 dB Bandwidth

Test Mode: TM 4 & ANT 2 & Ch.42



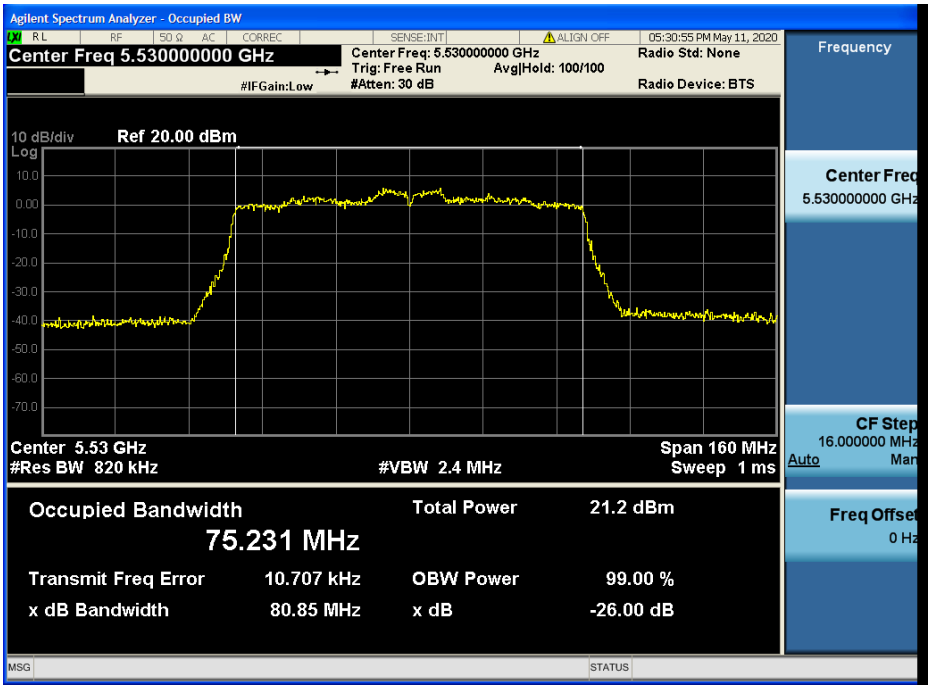
26 dB Bandwidth

Test Mode: TM 4 & ANT 2 & Ch.58



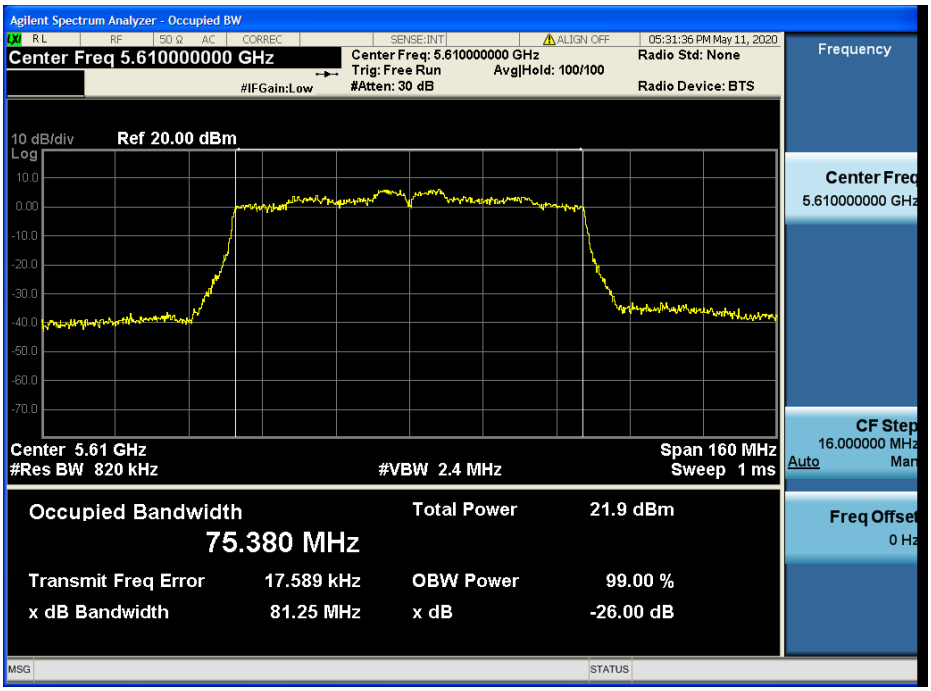
26 dB Bandwidth

Test Mode: TM 4 & ANT 2 & Ch.106

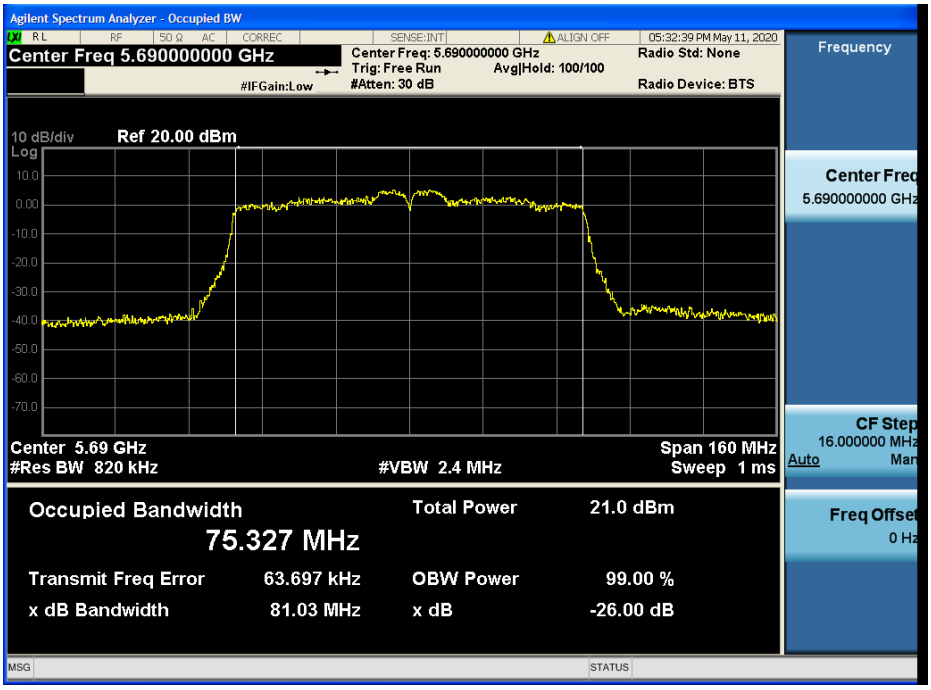


26 dB Bandwidth

Test Mode: TM 4 & ANT 2 & Ch.122



26 dB Bandwidth Test Mode: TM 4 & ANT 2 & Ch.138



8.2 Minimum Emission Bandwidth (6 dB Bandwidth)

▣ Test Requirements

Within the 5.725 GHz - 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 **≥ 3 x 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.

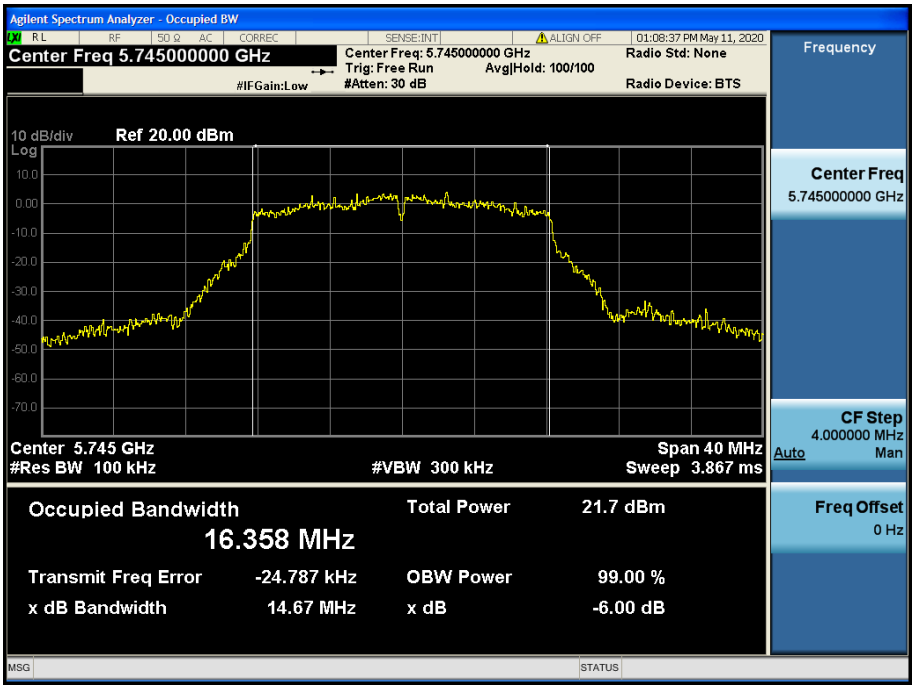
▣ Test Results: Comply

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]	
				ANT 1	ANT 2
TM 1	U-NII 3	149	5 745	14.67	11.67
		157	5 785	13.84	12.60
		165	5 825	13.79	14.71
TM 2		149	5 745	10.16	13.41
		157	5 785	12.63	11.39
		165	5 825	14.10	16.30
TM 3		151	5 755	32.52	30.14
		159	5 795	33.80	33.82
TM 4		155	5 775	73.78	61.46

▣ Result Plots

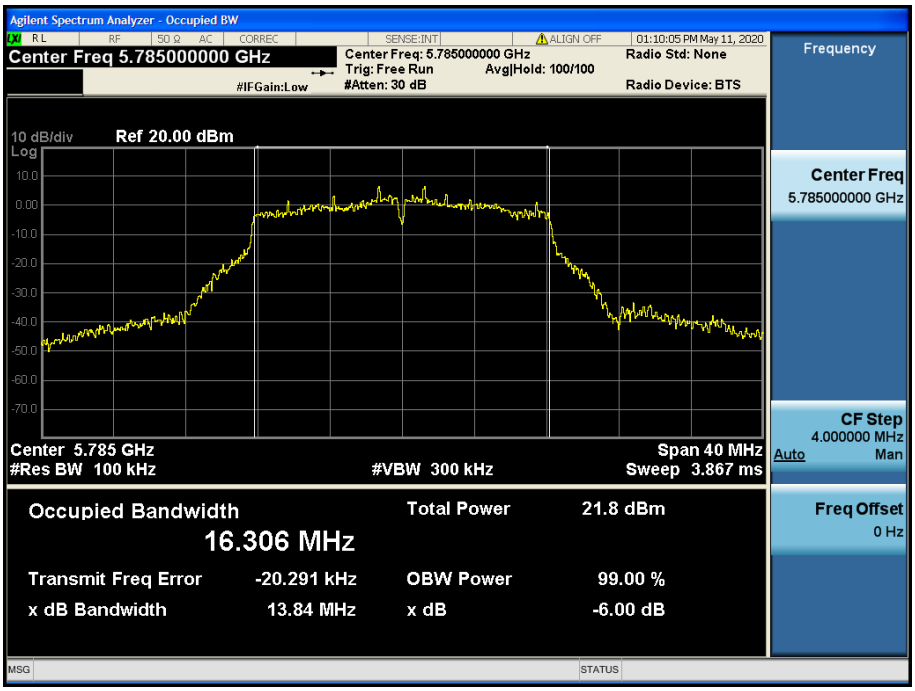
6 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.149



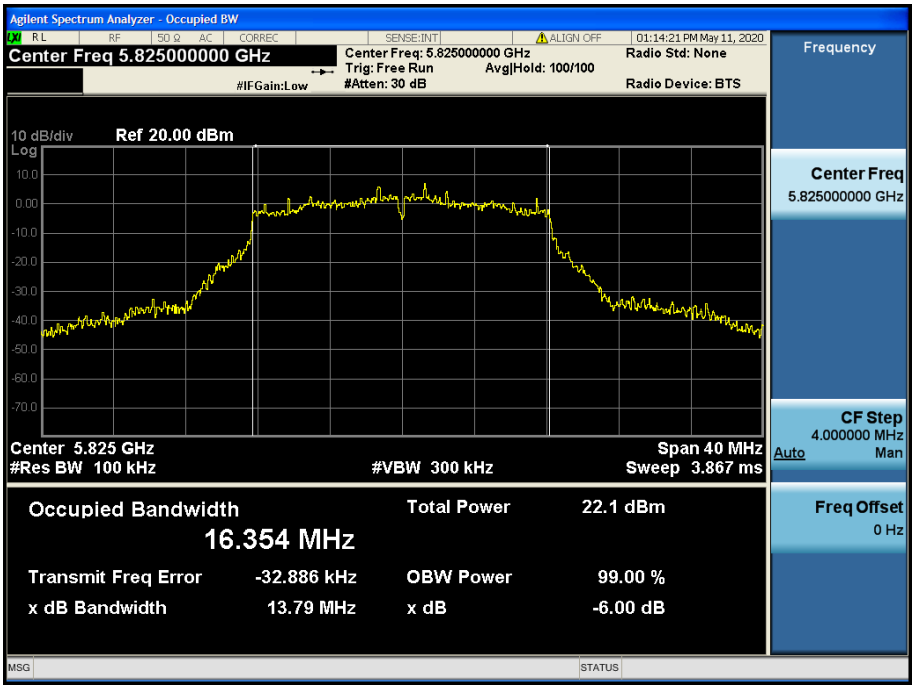
6 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.157



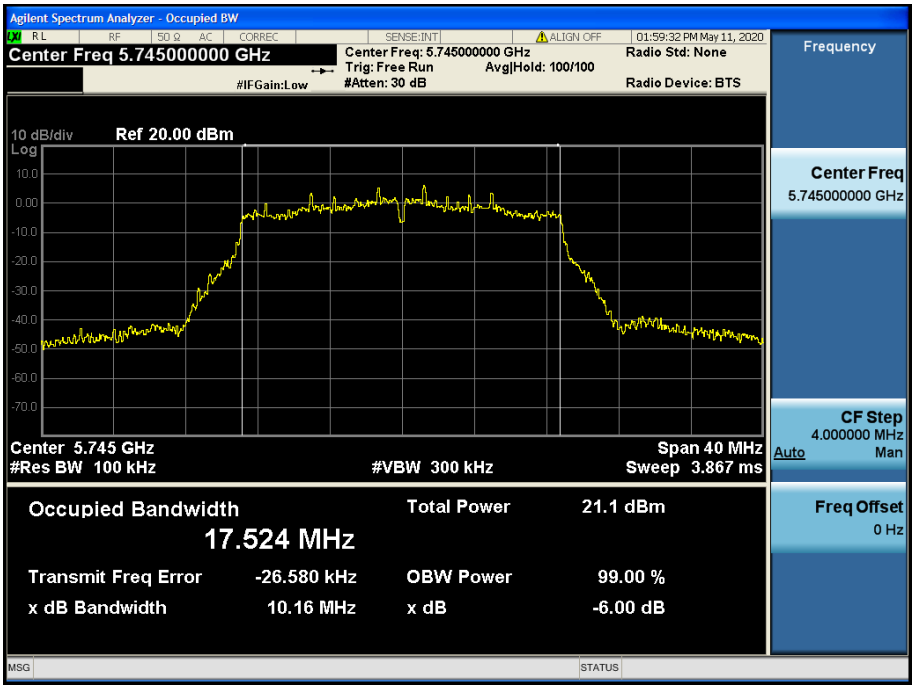
6 dB Bandwidth

Test Mode: TM 1 & ANT 1 & Ch.165



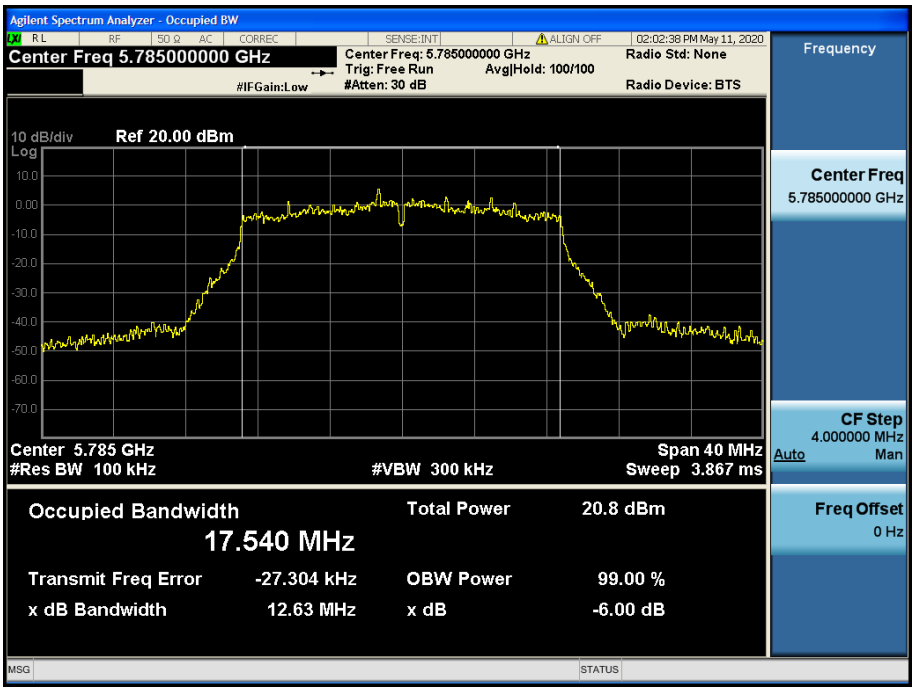
6 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.149



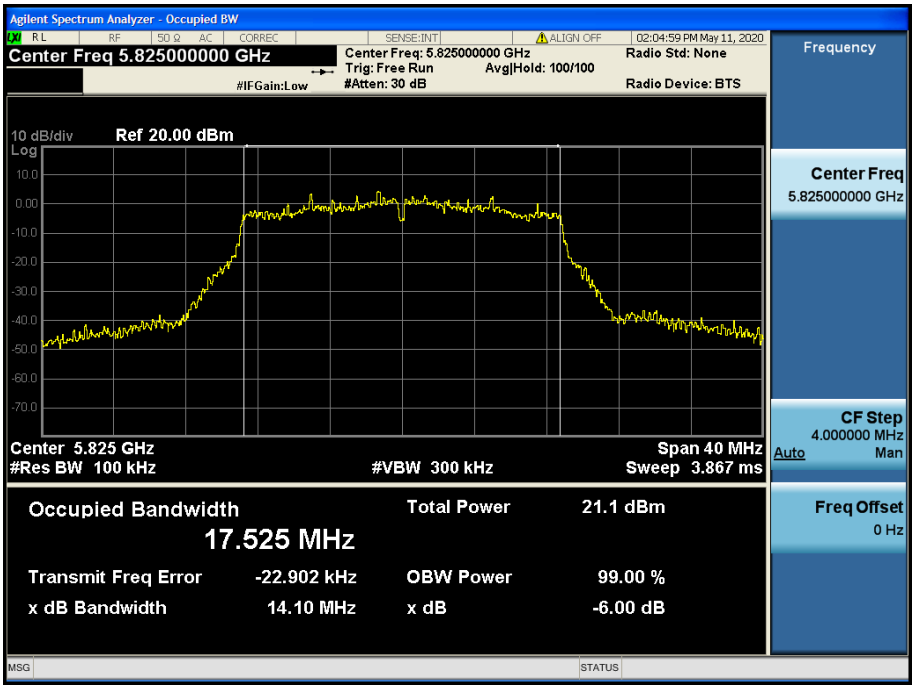
6 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.157



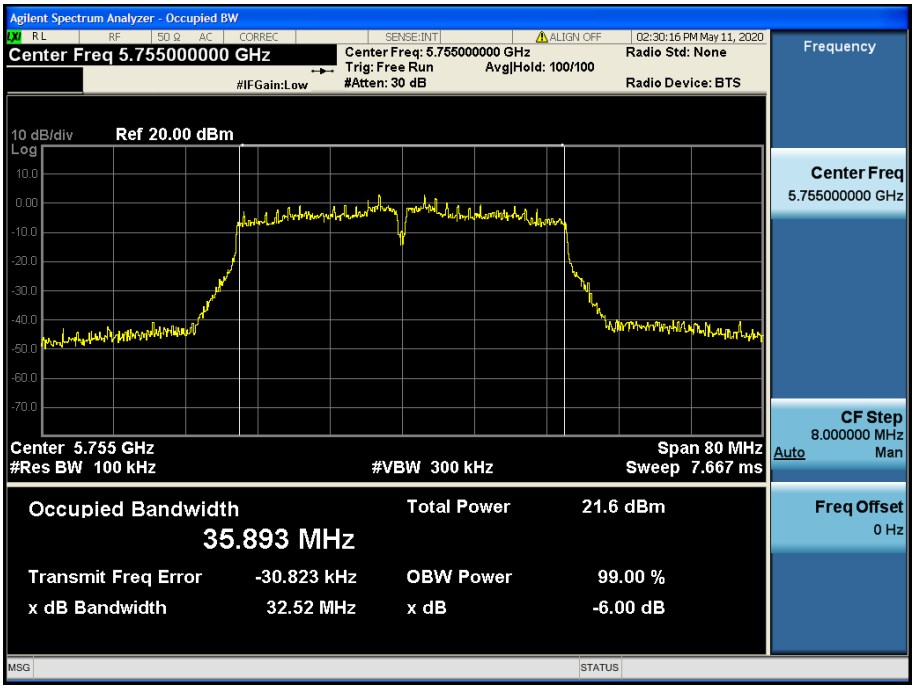
6 dB Bandwidth

Test Mode: TM 2 & ANT 1 & Ch.165



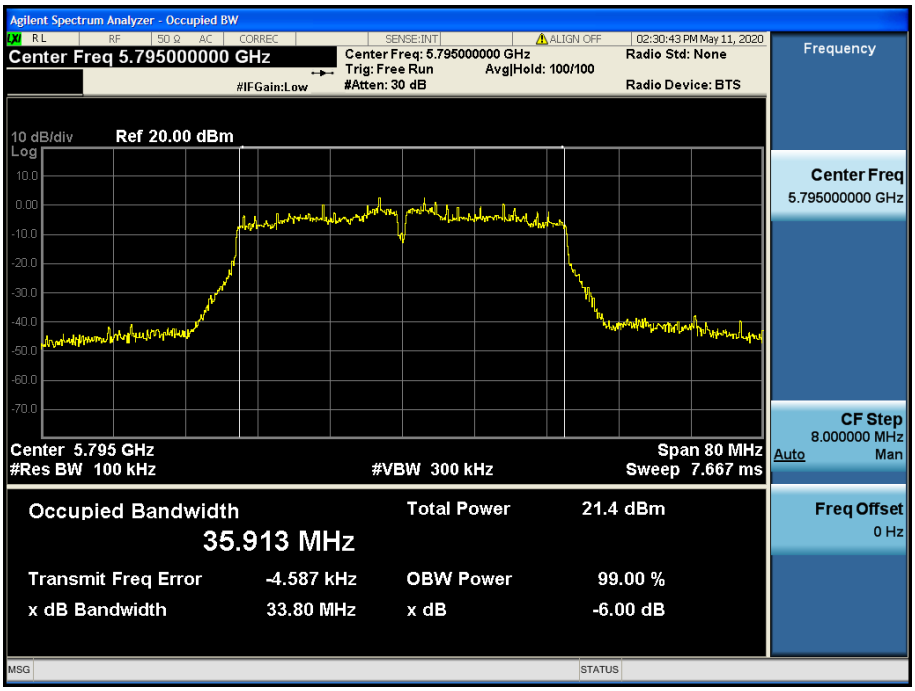
6 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.151

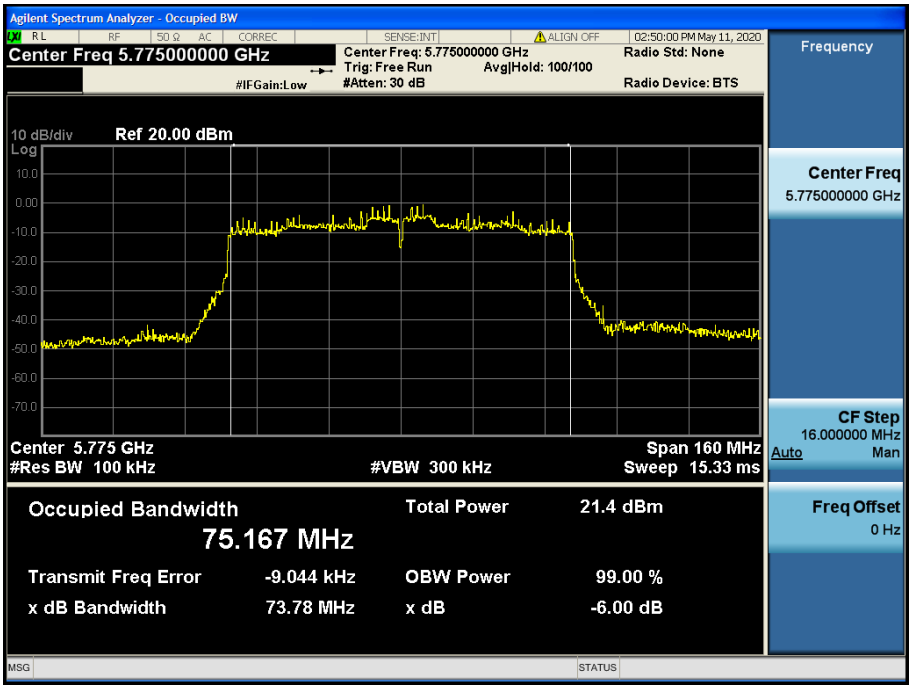


6 dB Bandwidth

Test Mode: TM 3 & ANT 1 & Ch.159

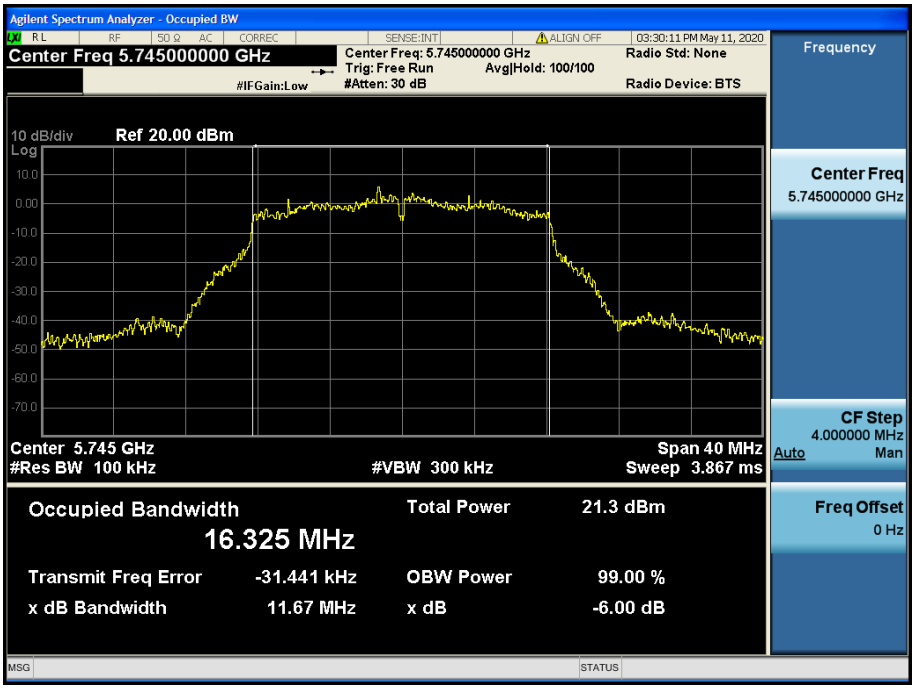


6 dB Bandwidth Test Mode: TM 4 & ANT 1 & Ch.155



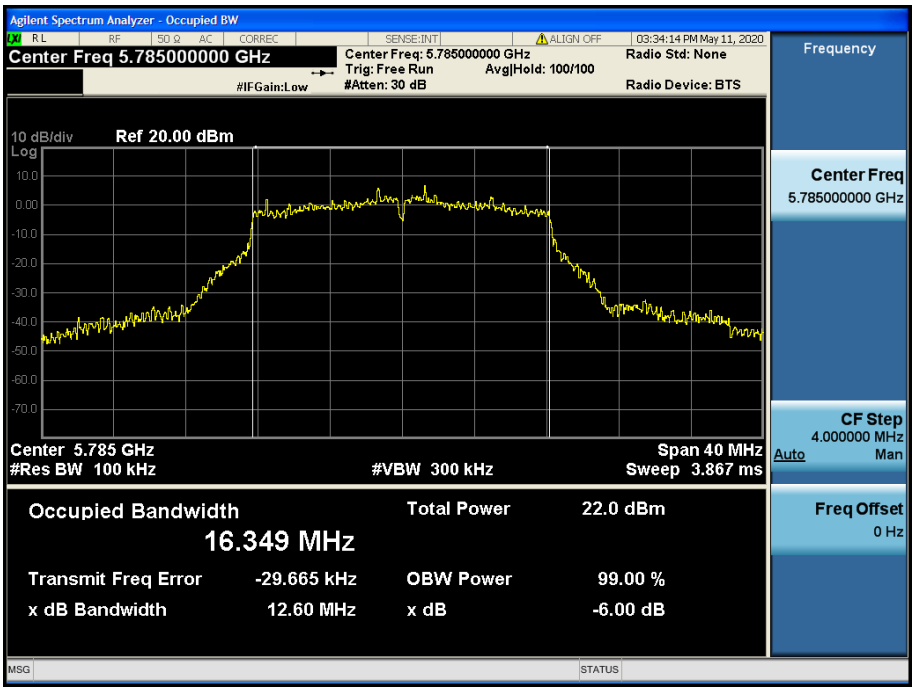
6 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.149



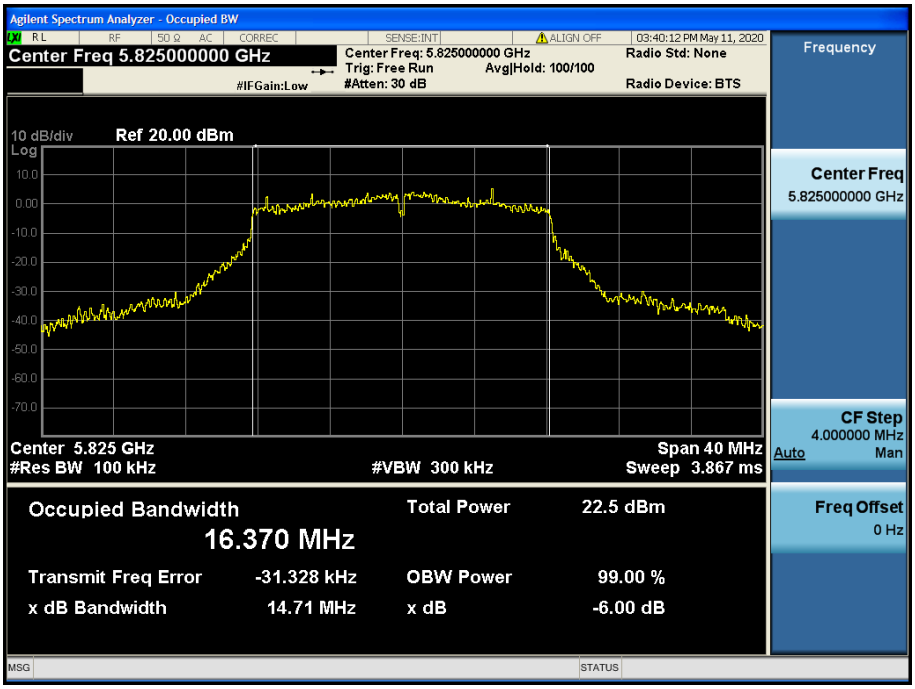
6 dB Bandwidth

Test Mode: TM 1 & ANT 2 & Ch.157

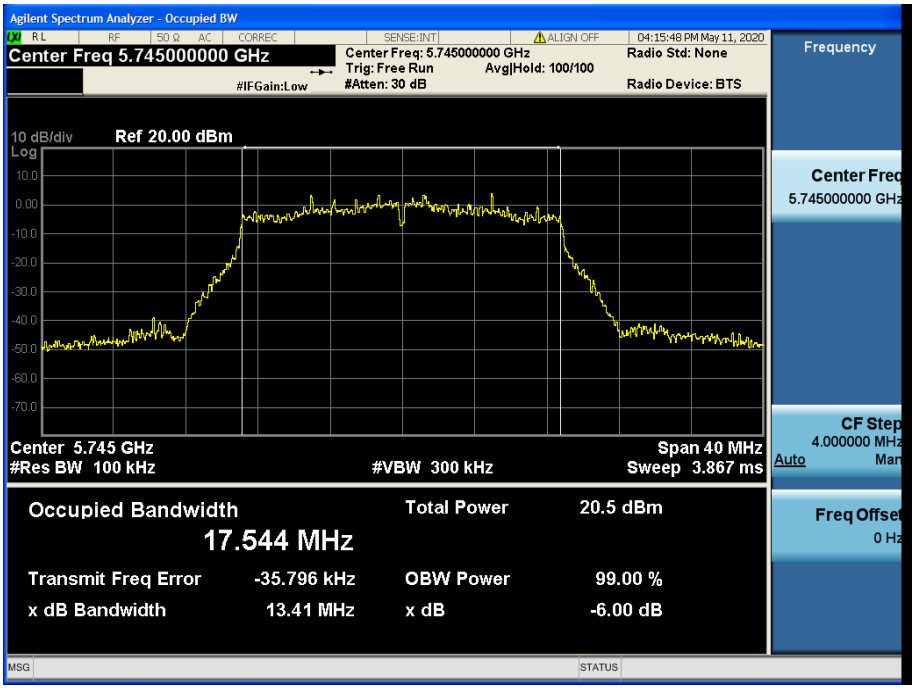


6 dB Bandwidth

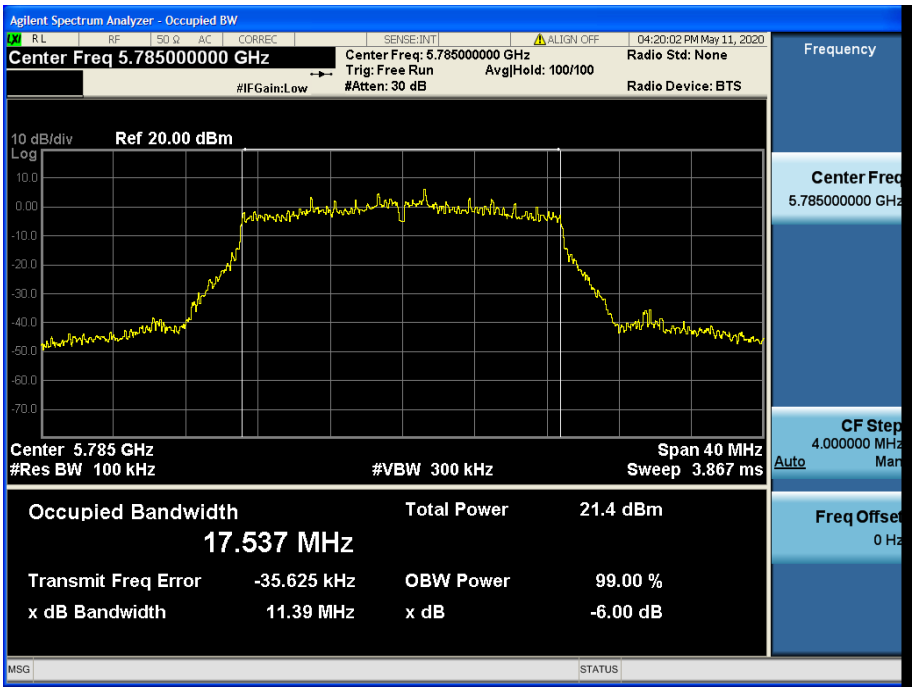
Test Mode: TM 1 & ANT 2 & Ch.165



6 dB Bandwidth Test Mode: TM 2 & ANT 2 & Ch.149

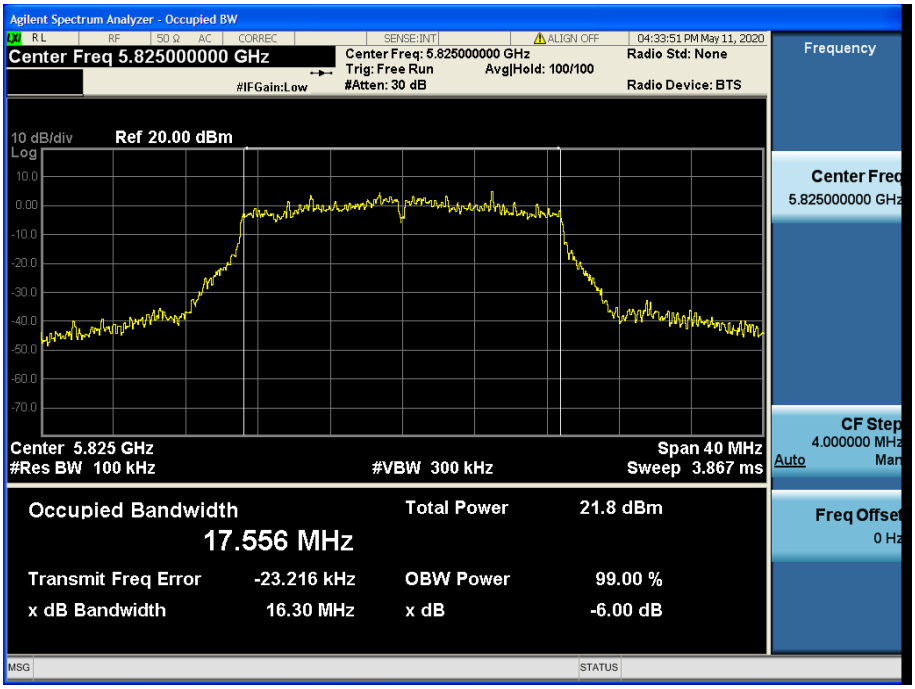


6 dB Bandwidth Test Mode: TM 2 & ANT 2 & Ch.157

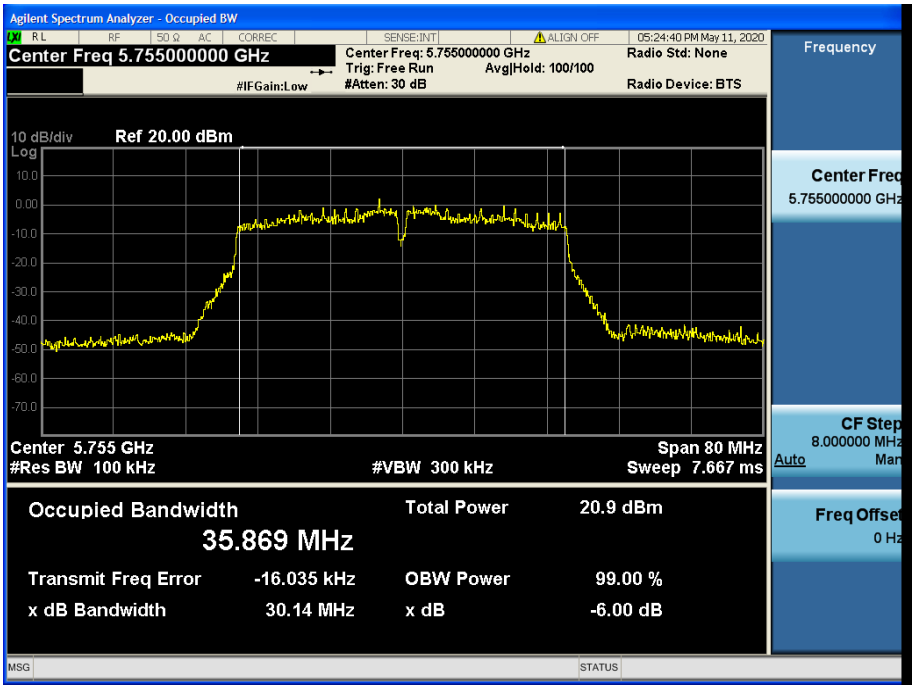


6 dB Bandwidth

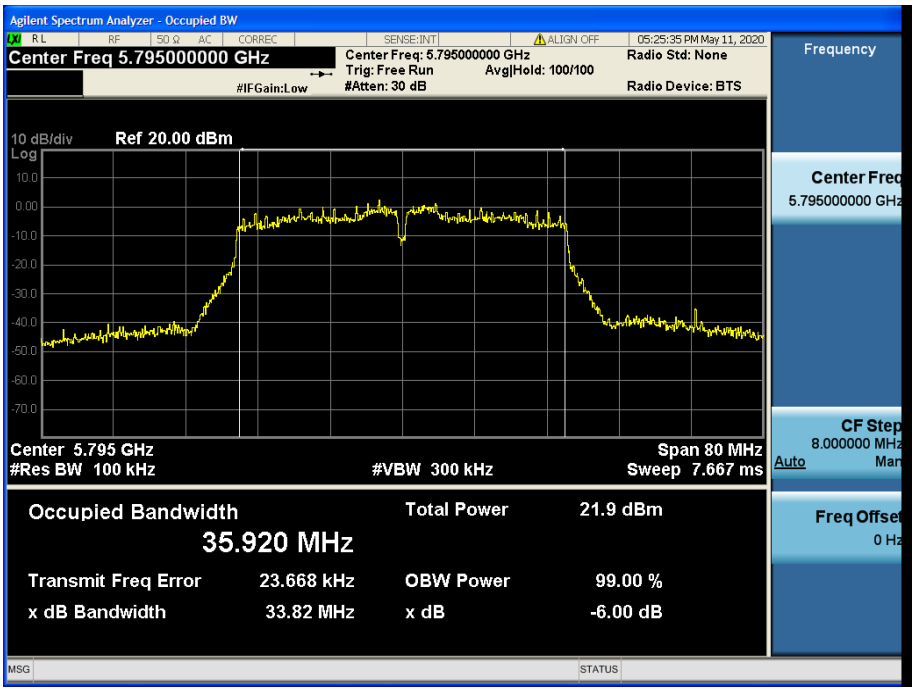
Test Mode: TM 2 & ANT 2 & Ch.165



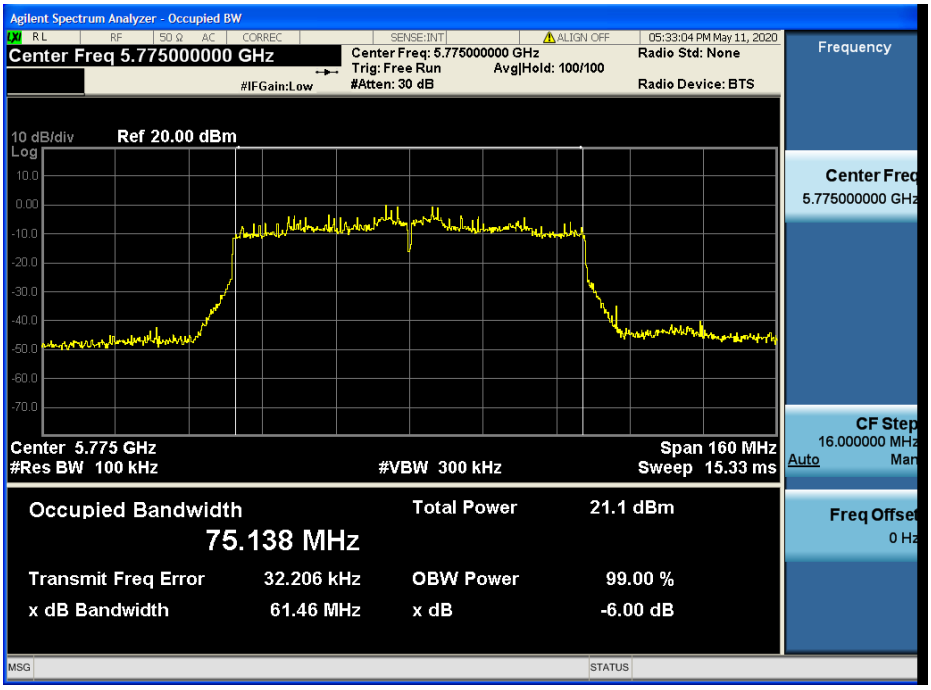
6 dB Bandwidth Test Mode: TM 3 & ANT 2 & Ch.151



6 dB Bandwidth Test Mode: TM 3 & ANT 2 & Ch.159



6 dB Bandwidth Test Mode: TM 4 & ANT 2 & Ch.155



8.3 Maximum Conducted Output Power

▣ Test Requirements

Part. 15.407(a)

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

(i) For an outdoor access point operating in the band 5.15 GHz - 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 GHz - 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 GHz - 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 GHz - 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 GHz - 5.35 GHz

(3) and 5.47 GHz - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(4) For the band 5.725 GHz - 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	-0.48	**23.97**

Band	Power Limit [mW] / Least 26 dBc BW [MHz]	Calculated Limit [dBm]	Antenna Gain (Worst case) [dBi]	Determined Limit [dBm]
U-NII 2A	250	23.97	-0.48	**23.75**
	18.85	23.75		
U-NII 2C	250	23.97	1.77	**23.78**
	18.97	23.78		

Band	Power Limit [mW]	Calculated Limit [dBm]	Antenna Gain [dBi]	Determined Limit [dBm]
U-NII 3	250	23.97	0.91	**23.97**

▣ Test Configuration

Method PM-G

▣ Test Procedure

Method PM-G of KDB789033 D02

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	5 180	15.99	15.85
	40	5 200	15.43	15.70
	48	5 240	15.47	14.89
	52	5 260	14.98	14.70
	60	5 300	14.63	15.60
	64	5 320	14.93	15.24
	100	5 500	14.89	15.12
	120	5 600	15.82	15.94
	144	5 720	15.51	14.44
	149	5 745	15.41	15.43
	157	5 785	15.10	15.47
	165	5 825	15.61	15.98

Mode	CH	Freq.[MHz]	Test Result [dBm]	
			ANT 1	ANT 2
802.11n (HT20)	36	5 180	14.54	14.66
	40	5 200	14.38	14.28
	48	5 240	14.32	14.15
	52	5 260	13.70	13.45
	60	5 300	13.84	14.44
	64	5 320	13.77	14.22
	100	5 500	13.94	14.01
	120	5 600	14.55	14.79
	144	5 720	14.52	13.59
	149	5 745	14.36	14.02
	157	5 785	14.31	14.22
	165	5 825	14.41	14.79

Mode	CH	Freq.[MHz]	Test Result[dBm]	
			ANT 1	ANT 2
802.11n (HT40)	38	5 190	14.88	14.86
	46	5 230	14.48	14.37
	54	5 270	13.56	13.59
	62	5 310	14.11	14.54
	102	5 510	14.26	14.35
	118	5 590	14.82	14.99
	142	5 710	14.76	13.51
	151	5 755	14.67	13.87
	159	5 795	14.51	14.64

Mode	CH	Freq.[MHz]	Test Result[dBm]	
			ANT 1	ANT 2
802.11ac (VHT20)	36	5 180	14.72	15.00
	40	5 200	14.30	14.50
	48	5 240	14.29	14.16
	52	5 260	13.68	13.82
	60	5 300	13.88	14.12
	64	5 320	13.76	14.27
	100	5 500	13.87	14.02
	120	5 600	14.54	14.72
	144	5 720	14.47	13.36
	149	5 745	14.32	13.83
	157	5 785	14.21	14.26
	165	5 825	14.42	14.80

Mode	CH	Freq.[MHz]	Test Result[dBm]	
			ANT 1	ANT 2
802.11ac (VHT40)	38	5 190	14.78	14.99
	46	5 230	14.59	14.32
	54	5 270	13.57	13.56
	62	5 310	14.09	14.72
	102	5 510	14.21	14.33
	118	5 590	14.87	14.99
	142	5 710	14.64	13.60
	151	5 755	14.48	14.19
	159	5 795	14.55	14.75

Mode	CH	Freq.[MHz]	Test Result[dBm]	
			ANT 1	ANT 2
802.11ac (VHT80)	42	5 210	14.02	14.06
	58	5 290	13.31	13.71
	106	5 530	13.55	13.39
	122	5 610	14.38	14.56
	138	5 690	14.48	13.30
	155	5 775	14.01	13.61

- Summed Output Power: CDD

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11a	36	5 180	15.99	15.85	18.93
	40	5 200	15.43	15.70	18.58
	48	5 240	15.47	14.89	18.20
	52	5 260	14.98	14.70	17.85
	60	5 300	14.63	15.60	18.15
	64	5 320	14.93	15.24	18.10
	100	5 500	14.89	15.12	18.02
	120	5 600	15.82	15.94	18.89
	144	5 720	15.51	14.44	18.02
	149	5 745	15.41	15.43	18.43
	157	5 785	15.10	15.47	18.30
	165	5 825	15.61	15.98	18.81

Mode	CH	Freq.[MHz]	Test Result [dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11n(HT20)	36	5 180	14.54	14.66	17.61
	40	5 200	14.38	14.28	17.34
	48	5 240	14.32	14.15	17.25
	52	5 260	13.70	13.45	16.59
	60	5 300	13.84	14.44	17.16
	64	5 320	13.77	14.22	17.01
	100	5 500	13.94	14.01	16.99
	120	5 600	14.55	14.79	17.68
	144	5 720	14.52	13.59	17.09
	149	5 745	14.36	14.02	17.20
	157	5 785	14.31	14.22	17.28
	165	5 825	14.41	14.79	17.61

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11n (HT40)	38	5 190	14.88	14.86	17.88
	46	5 230	14.48	14.37	17.44
	54	5 270	13.56	13.59	16.59
	62	5 310	14.11	14.54	17.34
	102	5 510	14.26	14.35	17.32
	118	5 590	14.82	14.99	17.92
	142	5 710	14.76	13.51	17.19
	151	5 755	14.67	13.87	17.30
	159	5 795	14.51	14.64	17.59

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11ac (VHT20)	36	5 180	14.72	15.00	17.87
	40	5 200	14.30	14.50	17.41
	48	5 240	14.29	14.16	17.24
	52	5 260	13.68	13.82	16.76
	60	5 300	13.88	14.12	17.01
	64	5 320	13.76	14.27	17.03
	100	5 500	13.87	14.02	16.96
	120	5 600	14.54	14.72	17.64
	144	5 720	14.47	13.36	16.96
	149	5 745	14.32	13.83	17.09
	157	5 785	14.21	14.26	17.25
	165	5 825	14.42	14.80	17.62

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11ac (VHT40)	38	5 190	14.78	14.99	17.90
	46	5 230	14.59	14.32	17.47
	54	5 270	13.57	13.56	16.58
	62	5 310	14.09	14.72	17.43
	102	5 510	14.21	14.33	17.28
	118	5 590	14.87	14.99	17.94
	142	5 710	14.64	13.60	17.16
	151	5 755	14.48	14.19	17.35
	159	5 795	14.55	14.75	17.66

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (CDD)
802.11ac (VHT80)	42	5 210	14.02	14.06	17.05
	58	5 290	13.31	13.71	16.52
	106	5 530	13.55	13.39	16.48
	122	5 610	14.38	14.56	17.48
	138	5 690	14.48	13.30	16.94
	155	5 775	14.01	13.61	16.82

- Summed Output Power: SDM

Mode	CH	Freq. [MHz]	Test Result [dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (SDM)
802.11n (HT20)	36	5 180	14.71	14.72	17.73
	40	5 200	14.58	14.55	17.58
	48	5 240	14.22	14.30	17.27
	52	5 260	13.88	13.98	16.94
	60	5 300	13.60	14.42	17.04
	64	5 320	13.97	14.31	17.15
	100	5 500	13.88	14.16	17.03
	120	5 600	14.61	14.95	17.79
	144	5 720	14.65	13.58	17.16
	149	5 745	14.02	13.68	16.86
	157	5 785	14.30	14.41	17.37
	165	5 825	14.63	14.95	17.80

Mode	CH	Freq.[MHz]	Test Result[dBm]		
			ANT 1	ANT 2	ANT1+ANT2 (SDM)
802.11n (HT40)	38	5 190	14.81	14.98	17.91
	46	5 230	14.37	14.31	17.35
	54	5 270	13.86	14.02	16.95
	62	5 310	13.77	14.60	17.22
	102	5 510	13.97	13.80	16.90
	118	5 590	14.65	14.98	17.83
	142	5 710	14.63	13.74	17.22
	151	5 755	14.32	13.81	17.08
	159	5 795	14.29	14.88	17.61