

FCC / IC UNII REPORT

Certification

Applicant Name:

LG Electronics Inc.

Date of Issue:

October 12, 2018

Test Site/Location:**Address:**

222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1810-FI011

FCC ID:	BEJIL7FF
IC:	2703H-IL7FF
APPLICANT:	LG Electronics Inc.

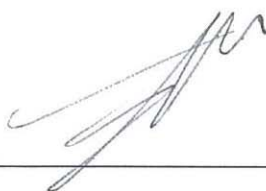
According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID :
BEJIL7FB / IC: 2703H-IL7FB report.

Model:	IL7FF
EUT Type:	Faceplate RADIO ASM-RECEIVER
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(UNII)
FCC Rule Part(s):	Part 15.407
IC Rule Part(s):	RSS-247 Issue 2 (February 2017), RSS-Gen Issue 5(April 2018)

Band	Mode	Channel Bandwidth (MHz)	Frequency Range (MHz)	Internal Ant Power (dBm)	External Ant Power (dBm)	Internal + External Power (dBm)	Internal Ant Power (W)	External Ant Power (W)
UNII1	802.11a	20	5180 – 5240	10.22	12.99	-	0.0105	0.0199
	802.11n	20	5180 – 5240	10.05	12.83	9.52	0.0101	0.0192
	802.11n	40	5190 - 5230	9.60	12.50	9.78	0.0091	0.0178
	802.11ac	20	5180 – 5240	10.07	12.52	9.24	0.0102	0.0179
	802.11ac	40	5190 - 5230	9.69	12.62	9.75	0.0093	0.0183
	802.11ac	80	5210	9.80	13.00	9.74	0.0096	0.0200
UNII2A	802.11a	20	5260 – 5320	10.20	12.93	-	0.0105	0.0196
	802.11n	20	5260 – 5320	9.95	12.81	10.13	0.0099	0.0191
	802.11n	40	5270 – 5310	9.44	12.99	10.00	0.0088	0.0199
	802.11ac	20	5260 – 5320	10.07	12.95	9.76	0.0102	0.0197
	802.11ac	40	5270 – 5310	9.48	12.49	9.94	0.0089	0.0177
	802.11ac	80	5290	9.57	13.04	9.78	0.0091	0.0201
UNII2C	802.11a	20	5500 – 5720	20.28	20.73	-	0.1067	0.1183
	802.11n	20	5500 – 5720	20.15	20.57	20.60	0.1035	0.1140
	802.11n	40	5510 – 5710	19.70	21.03	20.27	0.0933	0.1268
	802.11ac	20	5500 – 5720	20.01	21.60	20.69	0.1002	0.1445
	802.11ac	40	5510 – 5710	19.75	21.21	20.43	0.0944	0.1321
	802.11ac	80	5530 – 5690	19.79	21.07	20.34	0.0953	0.1279
UNII3	802.11a	20	5745 – 5825	20.12	20.86	-	0.1028	0.1219
	802.11n	20	5745 – 5825	20.07	20.59	23.14	0.1016	0.1146
	802.11n	40	5755 – 5795	19.39	20.36	23.08	0.0869	0.1086
	802.11ac	20	5745 – 5825	19.94	20.69	23.18	0.0986	0.1172
	802.11ac	40	5755 – 5795	19.37	20.70	23.18	0.0865	0.1175
	802.11ac	80	5775	19.16	20.04	22.73	0.0824	0.1009

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC / IC Rules under normal use and maintenance.



Report prepared by : Kwon Jeong
Engineer of Telecommunication Testing Center



Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1810-FI011	October 12, 2018	- First Approval Report

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1. GENERAL INFORMATION

Applicant: LG Electronics Inc.
Address: 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
FCC ID: BEJIL7FF
IC: 2703H-IL7FF
EUT Type: Faceplate RADIO ASM-RECEIVER
Model: IL7FF
Date(s) of Tests: September 5, 2018 ~ October 1, 2018
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model	IL7FF	
EUT Type	Faceplate RADIO ASM-RECEIVER	
Power Supply	DC 12.0 V	
Frequency Range	20 MHz BW	5180 MHz - 5240 MHz (UNII 1) / 5260 MHz - 5320 MHz (UNII 2A) / 5500 MHz - 5720 MHz (UNII 2C) / 5745 MHz - 5825 MHz (UNII 3)
	40 MHz BW	5190 MHz - 5230 MHz (UNII 1) / 5270 MHz - 5310 MHz (UNII 2A) / 5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3)
	80 MHz BW	5210 MHz (UNII 1) / 5290 MHz (UNII 2A) / 5530 MHz - 5690 MHz (UNII 2C) / 5775 MHz (UNII 3)
Modulation Type	OFDM(802.11a, 802.11n, 802.11ac)	
Antenna Specification	Internal Antenna: Peak Gain : 4.30 dBi (UNII 1) / 4.30 dBi(UNII 2A) / 4.70 dBi(UNII 2C) / 5.40 dBi(UNII 3) External Antenna: Peak Gain : 1.60 dBi (UNII 1) / 1.60 dBi(UNII 2A) / 1.40 dBi(UNII 2C) / 1.60 dBi(UNII 3)	

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 dated December 14, 2017 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’ were used in the measurement.

3.1 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.

3.2 EUT EXERCISE

The EUT was operated in the engineering 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 / RSS-Gen issue 5, RSS-247 issue 2.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033 D02 v02r01)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. 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 equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

For ISED, test facility was accepted dated July 30, 2018(Registration Number: 5944A-5)

5.2 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, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and 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."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407

"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 antennas of this E.U.T are permanently attached.

* The E.U.T Complies with the requirement of §15.203, §15.407 / RSS-Gen

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

8. ADDITIONAL INFORMATION

* Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (iii)

Directional gain = $G_{ANT\ MAX} + 10 \log(N_{ANT}/N_{SS})$ dBi

($N_{ANT} = 2$, $N_{SS} = 2$, $G_{ANT\ MAX}$ is the gain of the antenna having the highest gain)

Sample Calculation = $4.80 + 0 = 4.80$ dBi

* Ant Gain

Band	Ant Gain (dBi)		N_{ANT}/N_{SS}	Directional Gain (= $G_{ANT\ MAX} + 10 \log(N_{ANT}/N_{SS})$) (dBi)
UNII 1	Internal	4.3	2 / 2	4.3
	External	1.6		
UNII 2A	Internal	4.3	2 / 2	4.3
	External	1.6		
UNII 2C	Internal	4.7	2 / 2	4.7
	External	1.4		
UNII 3	Internal	5.4	2 / 2	5.4
	External	1.6		

* Operating mode

Mode	Operating Mode	Antenna
802.11a/g/n/ac(HT20)	SISO	Internal Antenna
		External Antenna
802.11n(HT20)	MIMO	Internal Antenna + External Antenna
802.11ac(VHT20)		
802.11n(HT40)		
802.11ac(VHT40)		
802.11ac(VHT80)		

* Power Level Setting(SISO)

Internal Antenna

Internal Antenna (20M BW)			
Channel	802.11a	802.11n(HT20)	802.11ac(VHT20)
36	8	8	8
40	8	8	8
48	8	8	8
52	8	8	8
60	8	8	8
64	8	8	8
100	17	17	17
116	18	18	18
144	18	18	18
149	18	18	18
157	18	18	18
165	18	18	18

Internal Antenna (40M BW)		
Channel	802.11n(HT40)	802.11ac(VHT40)
38	8	8
46	8	8
54	8	8
62	8	8
102	17	16
110	18	18
142	18	18
151	18	18
159	18	18

Internal Antenna (80M BW)	
Channel	802.11ac(VHT80)
42	8
58	8
106	15
122	18
138	18
155	18

External Antenna

External Antenna (20M BW)			
Channel	802.11a	802.11n(HT20)	802.11ac(VHT20)
36	17	17	17
40	17	17	17
48	16	16	16
52	15	16	16
60	15	15	15
64	14	15	14
100	17	17	18
116	17	17	17
144	17	17	17
149	18	18	18
157	18	18	18
165	18	18	18

External Antenna (40M BW)		
Channel	802.11n(HT40)	802.11ac(VHT40)
38	17	17
46	17	17
54	16	16
62	16	15
102	17	17
110	18	18
142	18	18
151	18	18
159	18	18

External Antenna (80M BW)	
Channel	802.11ac(VHT80)
42	17
58	15
106	17
122	18
138	18
155	18

*** Power Level Setting(MIMO)**

Internal Antenna + External Antenna						
Mod		n20	ac20	n40	ac40	ac80
U-NII-1	Low	8	8	8	8	8
	Mid	8	8	N/A	N/A	
	High	8	8	8	8	
U-NII-2A	Low	8	8	8	8	8
	Mid	8	8	N/A	N/A	
	High	8	8	8	8	
U-NII-2C	Low	15	15	15	15	15
	Mid	15	15	15	15	15
	High	15	15	15	15	15
U-NII-3	Low	18	18	18	18	18
	Mid	18	18	N/A	N/A	
	High	18	18	18	18	

*** Worst case configuration and mode**

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + external accessories
 - Worst case : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the test results are worst case in lowest datarate of each mode.
 - 802.11a : 6Mbps
 - 802.11n20 : MCS0
 - 802.11n40 : MCS0
 - 802.11ac20 : MCS0
 - 802.11ac40 : MCS0
 - 802.11ac80 : MCS0
4. SISO & MIMO(Multiple spatial streams) were tested and the worst case results are reported.
(Worst case : SISO(Internal Antenna & External Antenna))

Conducted test

1. The EUT was configured with data rate of highest power.
2. SISO & MIMO(Multiple spatial streams) were tested and the worst case results are reported.
Worst case : SISO(Internal Antenna & External Antenna)

9. SUMMARY OF TEST RESULTS

9.1 FCC Part

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	CONDUCTED	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)	< 250 mW (5150-5250 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log log ₁₀ (BW) dBm (5470-5725 MHz) <1 W (5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§15.407(g)	N/A		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits		N/A
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 9.8.1 (UNII 3)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

Note:

1. This device is installed in a car. Therefore the power source is a battery of car.

9.2 IC Part

Test Description	IC Part Section(s)	Test Limit	Test Condition	Test Result
99% Bandwidth	RSS-GEN, 6.7	N/A	CONDUCTED	PASS
6 dB Bandwidth	RSS-247, 6.2.4.1	> 500 kHz (5725~5850 MHz)		PASS
Maximum Conducted Output Power,	RSS-247, 6.2	< 250 mW or $11+10 \log_{10}$ (BW) dBm (5470-5600, 5650-5725 MHz) Whichever power is less		PASS
	RSS-247, 6.2.4.1	< 1 W (5725-5850 MHz)		
Maximum e.i.r.p	RSS-247, 6.2	< 30 mW or $1.76+10 \log_{10}$ (BW) dBm (5150-5250 MHz) < 30 mW or $1.76+10 \log_{10}$ (BW) dBm (5250-5350 MHz) < 1 W or $17+10 \log_{10}$ (BW) dBm (5470-5725 MHz) Whichever power is less		PASS
Power Spectral Density	RSS-247 6.2	<10 dBm/ MHz(e.i.r.p.) (5150-5250 MHz) <11 dBm/MHz(Conducted) (5250-5350 MHz, 5470-5600 MHz, 5650-5725 MHz)		PASS
	RSS-247, 6.2.4.1	<30 dBm/500 kHz(Conducted) (5725-5850 MHz)		
Frequency Stability	RSS-GEN 8.11	should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation.		PASS
AC Conducted Emissions 150 kHz-30 MHz	RSS-GEN, 8.8	RSS-GEN section 8.8 table 4		N/A
Undesirable Emissions	RSS-247, 6.2.1.2	26 dBc at 5250~5350 MHz (5150~5350 MHz)		PASS
	RSS-247, 6.2	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	RADIATED	PASS
	RSS-247, 6.2.4.2	cf. Section 9.8.1 (UNII 3)		
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-Gen, 8.9 RSS-Gen, 8.10	RSS-Gen section 8.9 table 5, 6 section 8.10 table 7		PASS
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.3	RSS-GEN section 7.3 table 3		PASS

Note:

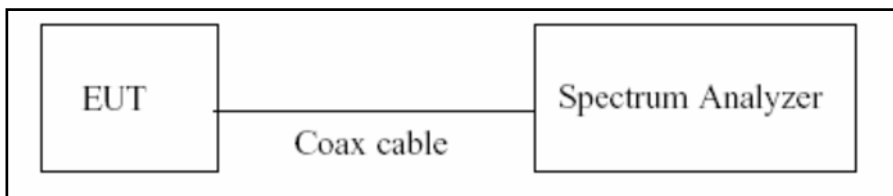
1. This device is installed in a car. Therefore the power source is a battery of car.

10. TEST RESULT

10.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in section B)1)a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, (B.2 in KDB 789033 D02 v02r01)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

■ Duty Cycle Factor

[Internal Ant]

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	2.063	2.167	0.95200007	0.214
	9	1.385	1.488	0.93063584	0.312
	12	1.046	1.147	0.91249444	0.398
	18	0.703	0.805	0.87370559	0.586
	24	0.533	0.634	0.84078809	0.753
	36	0.365	0.466	0.78345427	1.060
	48	0.276	0.378	0.73009556	1.366
	54	0.248	0.349	0.71008431	1.487
Mode	MCS INDEX	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11n_HT20	0	1.919	2.021	0.94970140	0.224
	1	0.980	1.081	0.90630696	0.427
	2	0.664	0.766	0.86654479	0.622
	3	0.508	0.609	0.83448276	0.786
	4	0.352	0.454	0.77572090	1.103
	5	0.272	0.373	0.72750065	1.382
	6	0.248	0.349	0.70967927	1.489
	7	0.228	0.330	0.69244810	1.596
802.11n_HT40	0	0.943	1.045	0.90238868	0.446
	1	0.492	0.593	0.82982894	0.810
	2	0.340	0.441	0.77120764	1.128
	3	0.264	0.365	0.72347686	1.406
	4	0.188	0.290	0.64912323	1.877
	5	0.152	0.254	0.59899758	2.226
	6	0.140	0.242	0.58070233	2.360
	7	0.128	0.230	0.55903818	2.526

Mode	MCS INDEX	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ac_VHT20	MCS 0	1.936	2.033	0.95199992	0.214
	MCS 1	0.988	1.089	0.90702395	0.424
	MCS 2	0.672	0.774	0.86799277	0.615
	MCS 3	0.515	0.617	0.83446712	0.786
	MCS 4	0.356	0.457	0.77755159	1.093
	MCS 5	0.280	0.381	0.73406079	1.343
	MCS 6	0.252	0.354	0.71308682	1.469
	MCS 7	0.233	0.334	0.69626966	1.572
	MCS 8	0.200	0.302	0.66404687	1.778
802.11ac_VHT40	MCS 0	0.951	1.054	0.90283147	0.444
	MCS 1	0.496	0.597	0.83035761	0.807
	MCS 2	0.343	0.445	0.77218300	1.123
	MCS 3	0.268	0.370	0.72619048	1.389
	MCS 4	0.192	0.293	0.65499961	1.838
	MCS 5	0.156	0.257	0.60655623	2.171
	MCS 6	0.144	0.245	0.58778607	2.308
	MCS 7	0.132	0.234	0.56513069	2.479
	MCS 8	0.117	0.218	0.53548369	2.713
	MCS 9	0.112	0.214	0.52631505	2.788
802.11ac_VHT80	MCS 0	0.460	0.561	0.81996435	0.862
	MCS 1	0.251	0.353	0.71104816	1.481
	MCS 2	0.180	0.280	0.64285714	1.919
	MCS 3	0.148	0.250	0.59311968	2.269
	MCS 4	0.148	0.249	0.59437751	2.259
	MCS 5	0.112	0.213	0.52582160	2.792
	MCS 6	0.096	0.197	0.48730964	3.122
	MCS 7	0.086	0.185	0.46486486	3.327
	MCS 8	0.075	0.177	0.42372881	3.729
	MCS 9	0.072	0.173	0.41618497	3.807

[External Ant]

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	2.062	2.163	0.95300605	0.209
	9	1.382	1.486	0.93002900	0.315
	12	1.045	1.146	0.91170825	0.401
	18	0.704	0.805	0.87431694	0.583
	24	0.532	0.634	0.84027778	0.756
	36	0.364	0.465	0.78279570	1.064
	48	0.276	0.378	0.73015873	1.366
	54	0.249	0.350	0.70961847	1.490
Mode	MCS INDEX	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11n_HT20	0	1.920	2.024	0.94860822	0.229
	1	0.981	1.082	0.90650407	0.426
	2	0.664	0.766	0.86781609	0.616
	3	0.508	0.610	0.83271366	0.795
	4	0.352	0.453	0.77750131	1.093
	5	0.272	0.373	0.72888040	1.373
	6	0.248	0.349	0.71008431	1.487
	7	0.228	0.330	0.69111212	1.605
802.11n_HT40	0	0.945	1.046	0.90322837	0.442
	1	0.492	0.593	0.82945736	0.812
	2	0.340	0.441	0.77013735	1.134
	3	0.264	0.366	0.72274856	1.410
	4	0.188	0.290	0.64912323	1.877
	5	0.152	0.253	0.60044727	2.215
	6	0.140	0.241	0.58079667	2.360
	7	0.128	0.229	0.55911320	2.525

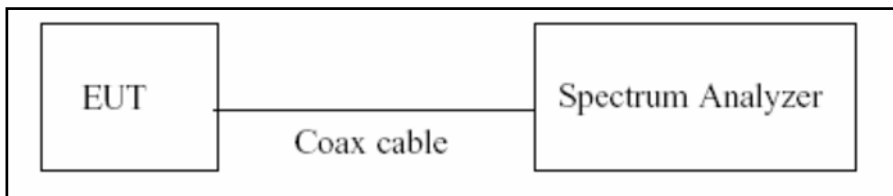
Mode	MCS INDEX	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ac_VHT20	MCS 0	1.936	2.033	0.95199992	0.214
	MCS 1	0.990	1.091	0.90719666	0.423
	MCS 2	0.672	0.773	0.86956522	0.607
	MCS 3	0.515	0.617	0.83446712	0.786
	MCS 4	0.356	0.458	0.77797203	1.090
	MCS 5	0.280	0.382	0.73375262	1.345
	MCS 6	0.252	0.354	0.71266968	1.471
	MCS 7	0.233	0.334	0.69784173	1.562
	MCS 8	0.200	0.302	0.66273200	1.787
802.11ac_VHT40	MCS 0	0.953	1.054	0.90392125	0.439
	MCS 1	0.496	0.596	0.83184211	0.800
	MCS 2	0.343	0.445	0.77218300	1.123
	MCS 3	0.268	0.370	0.72619048	1.389
	MCS 4	0.192	0.293	0.65499961	1.838
	MCS 5	0.156	0.258	0.60621683	2.174
	MCS 6	0.144	0.246	0.58695573	2.314
	MCS 7	0.132	0.234	0.56571348	2.474
	MCS 8	0.116	0.218	0.53374151	2.727
	MCS 9	0.112	0.214	0.52499918	2.798
802.11ac_VHT80	MCS 0	0.460	0.561	0.82020143	0.861
	MCS 1	0.252	0.353	0.71428571	1.461
	MCS 2	0.180	0.282	0.64035022	1.936
	MCS 3	0.148	0.250	0.59405845	2.262
	MCS 4	0.112	0.214	0.52546278	2.795
	MCS 5	0.096	0.197	0.48621637	3.132
	MCS 6	0.088	0.189	0.46475215	3.328
	MCS 7	0.084	0.185	0.45373638	3.432
	MCS 8	0.076	0.177	0.42936711	3.672
	MCS 9	0.072	0.173	0.41444889	3.825

10.2 EMISSION BANDWIDTH AND MINIMUM EMISSION BANDWIDTH MEASUREMENT

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 at its maximum power control level, as defined in KDB 789033 D02 v02r01, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

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

■ TEST CONFIGURATION



■ TEST PROCEDURE (26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (C.1 in KDB 789033 D02 v02r01)

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the maximum 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 %.

Note : We tested 26 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 26 dB.

1. In order to simplify the report, attached plots were only the most wide channel.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.

■ TEST PROCEDURE (for the band 5.725-5.85 GHz, 6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to(C.2 in KDB 789033 D02 v02r01)

1. RBW = 100 kHz
2. VBW $\geq$ 3*RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. 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.

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

■ TEST RESULTS for Internal Ant_802.11a

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	20.88	N/A	Pass
5200	40	20.94	N/A	Pass
5240	48	21.03	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	20.82	N/A	Pass
5300	60	20.92	N/A	Pass
5320	64	21.11	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.09	N/A	Pass
5580	116	21.78	N/A	Pass
5720	144	31.07	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

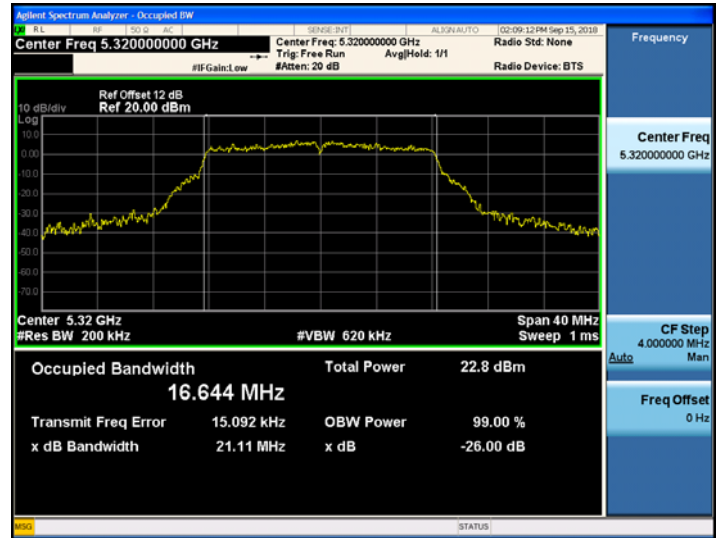
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	28.57	N/A	Pass
5785	157	30.01	N/A	Pass
5825	165	31.69	N/A	Pass

■ TEST Plot for Internal Ant_802.11a

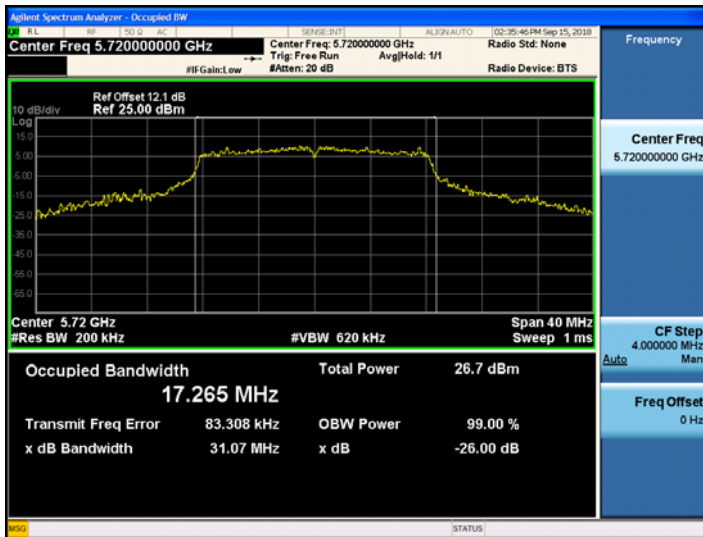
802.11a UNII 1 BAND 26dB Bandwidth (CH 48)



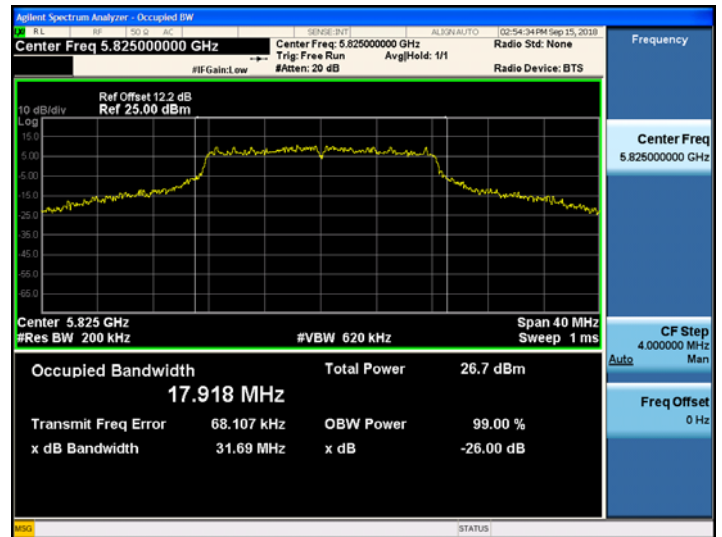
802.11a UNII 2A BAND 26dB Bandwidth (CH 64)



802.11a UNII 2C BAND 26dB Bandwidth (CH 144)



802.11a UNII 3 BAND 26dB Bandwidth (CH 165)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for External Ant_802.11a

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.80	N/A	Pass
5200	40	23.56	N/A	Pass
5240	48	21.56	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	21.74	N/A	Pass
5300	60	22.15	N/A	Pass
5320	64	21.96	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

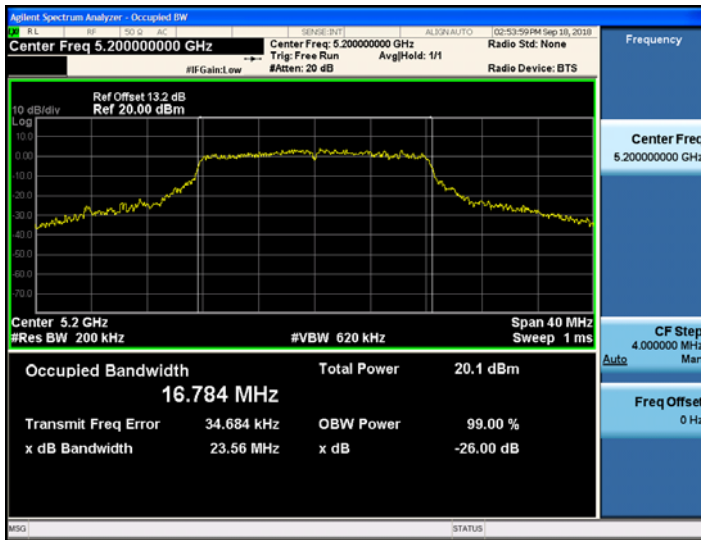
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.52	N/A	Pass
5580	116	21.93	N/A	Pass
5720	144	21.64	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11a

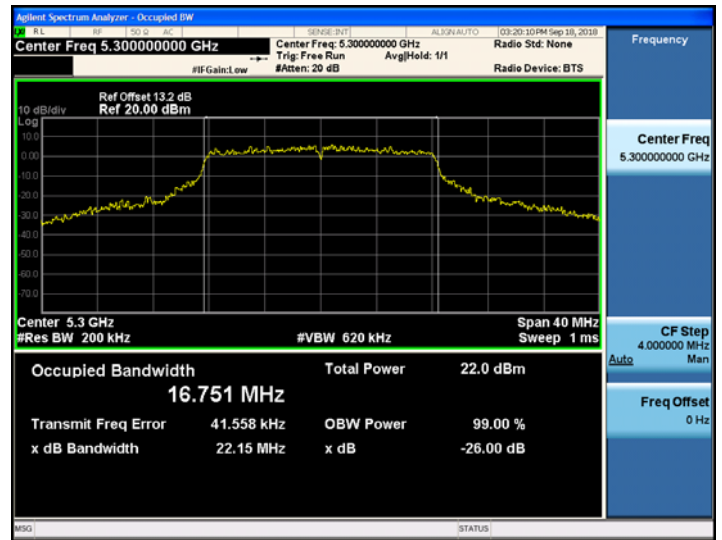
802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	29.18	N/A	Pass
5785	157	33.59	N/A	Pass
5825	165	35.65	N/A	Pass

■ TEST Plot for External Ant_802.11a

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)



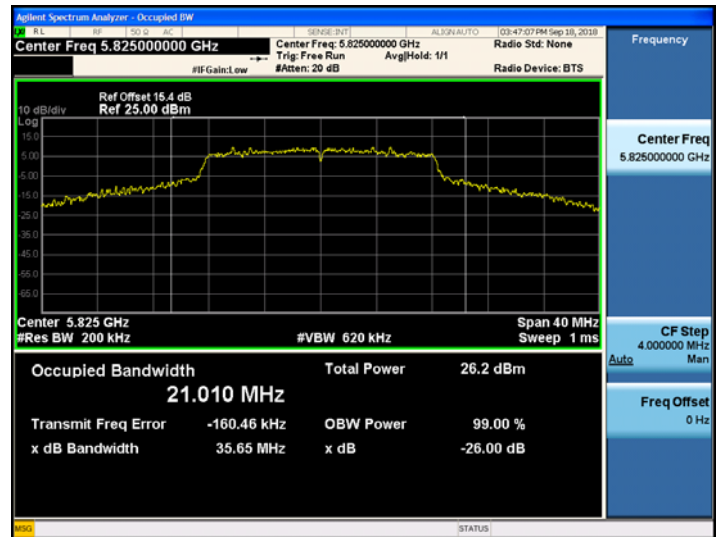
802.11a UNII 2A BAND 26dB Bandwidth (CH 60)



802.11a UNII 2C BAND 26dB Bandwidth (CH 116)



802.11a UNII 3 BAND 26dB Bandwidth (CH 165)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for Internal Ant_802.11n_HT20

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.43	N/A	Pass
5200	40	21.68	N/A	Pass
5240	48	21.42	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	21.36	N/A	Pass
5300	60	21.26	N/A	Pass
5320	64	21.62	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

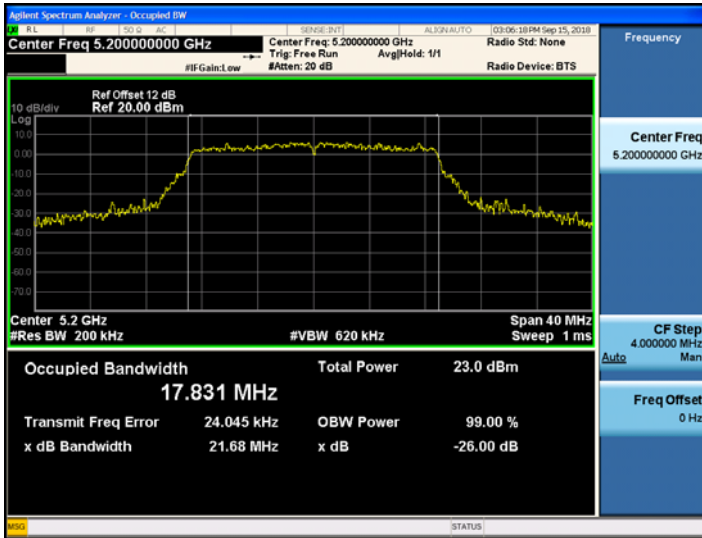
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.59	N/A	Pass
5580	116	23.82	N/A	Pass
5720	144	30.90	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

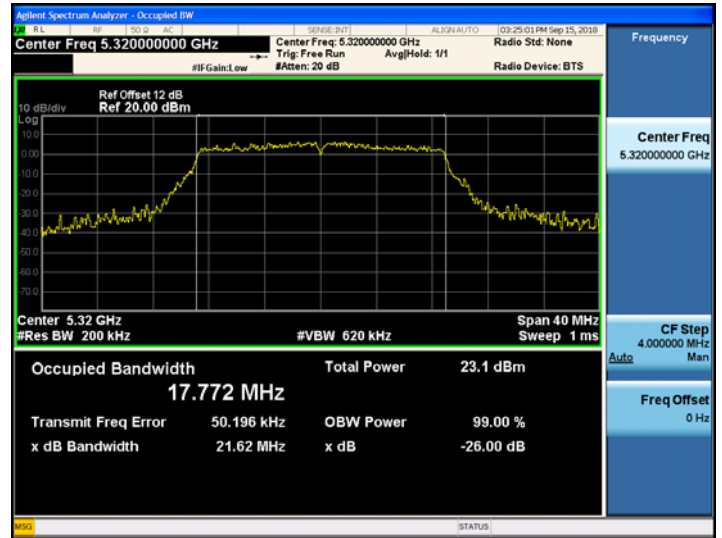
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	28.83	N/A	Pass
5785	157	34.73	N/A	Pass
5825	165	33.77	N/A	Pass

■ TEST Plot for Internal Ant_802.11n_HT20

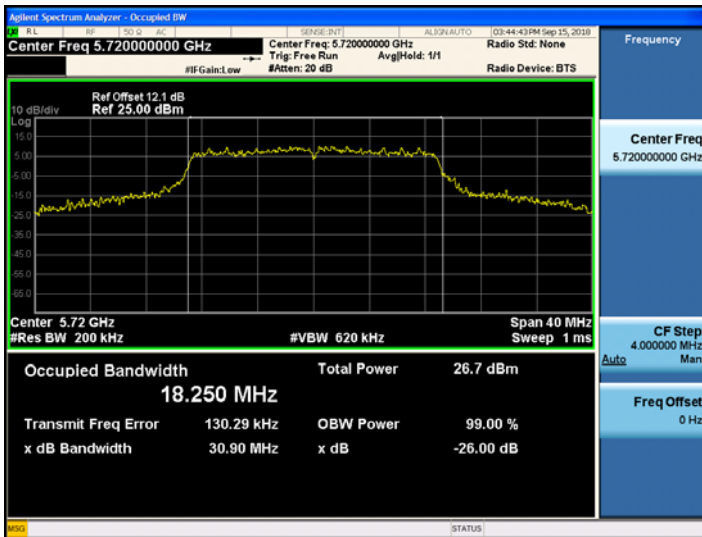
802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)



802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)



802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for External Ant_802.11n_HT20

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	25.48	N/A	Pass
5200	40	24.20	N/A	Pass
5240	48	22.94	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	24.84	N/A	Pass
5300	60	22.90	N/A	Pass
5320	64	22.57	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

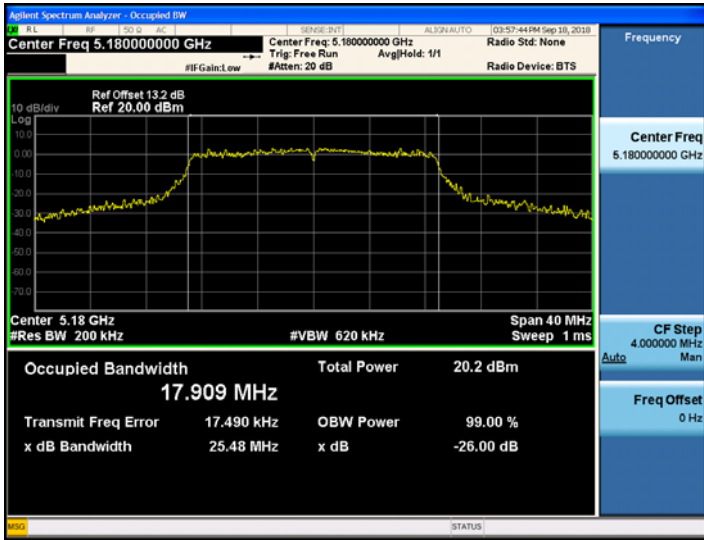
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	25.53	N/A	Pass
5580	116	23.06	N/A	Pass
5720	144	23.50	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT20

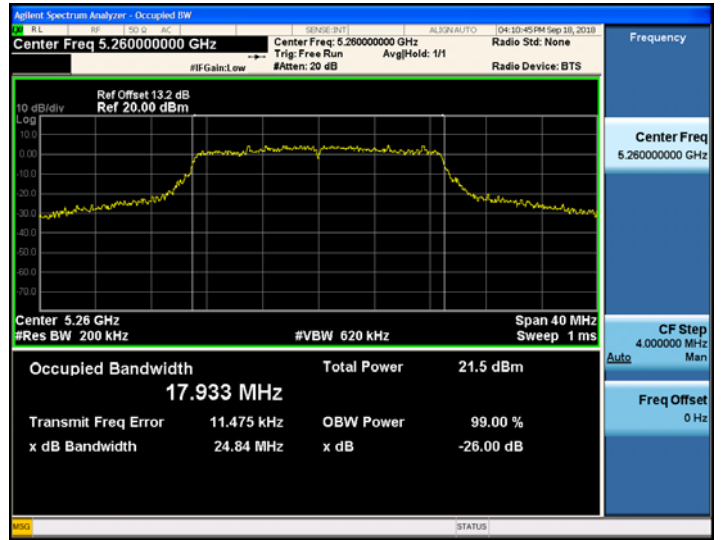
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	31.34	N/A	Pass
5785	157	35.80	N/A	Pass
5825	165	37.04	N/A	Pass

■ TEST Plot for External Ant_802.11n_HT20

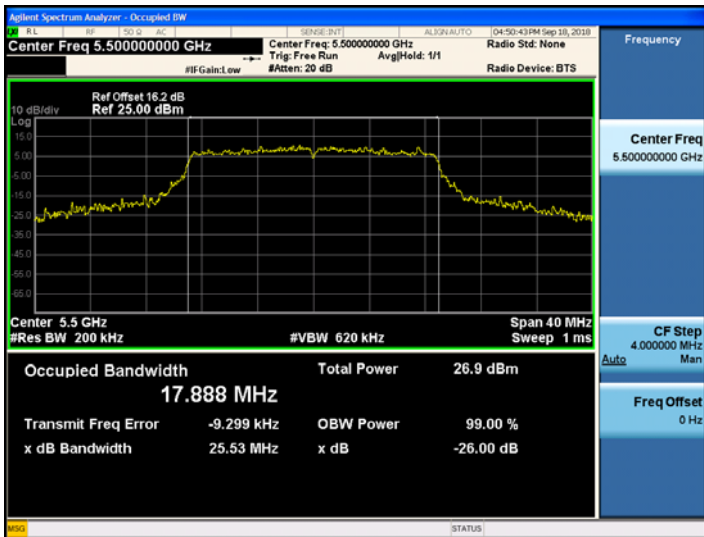
802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)



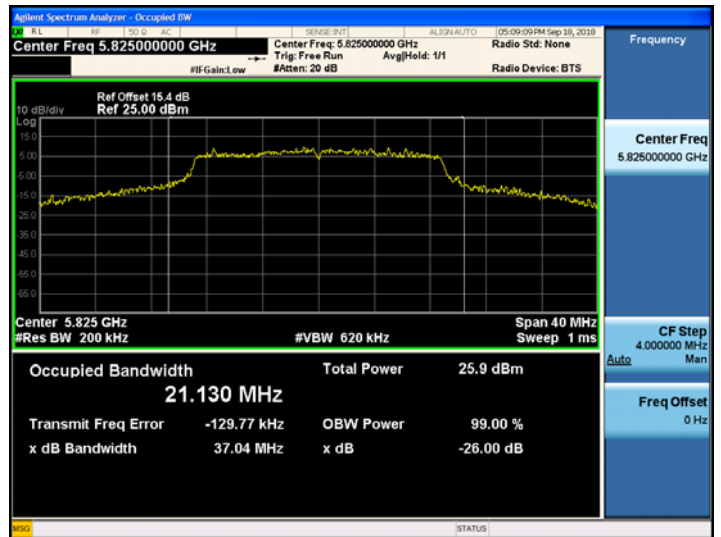
802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)



802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 165)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for Internal Ant_ 802.11ac_VHT20

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	21.28	N/A	Pass
5200	40	21.19	N/A	Pass
5240	48	21.35	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	21.48	N/A	Pass
5300	60	21.57	N/A	Pass
5320	64	21.26	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

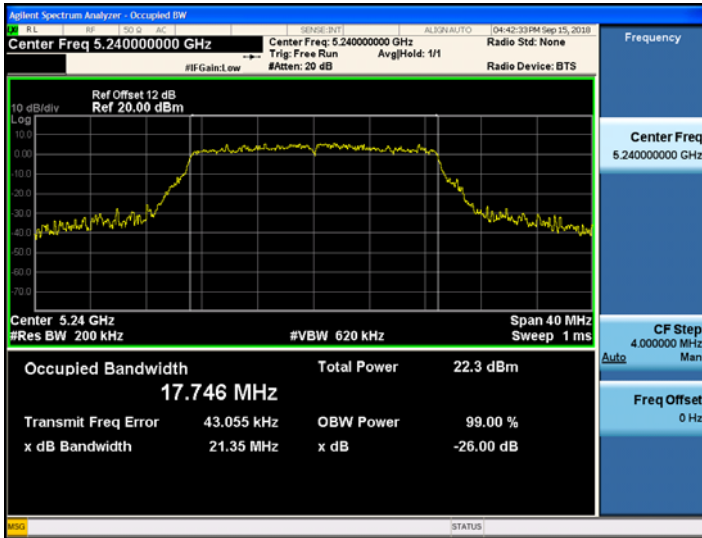
802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	21.66	N/A	Pass
5580	116	24.06	N/A	Pass
5720	144	29.70	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

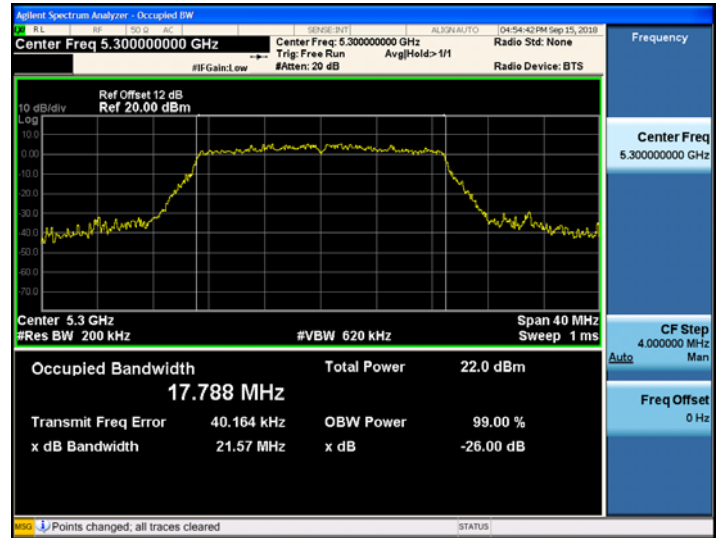
802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	32.10	N/A	Pass
5785	157	32.28	N/A	Pass
5825	165	34.10	N/A	Pass

■ TEST Plot for Internal Ant_ 802.11ac_VHT20

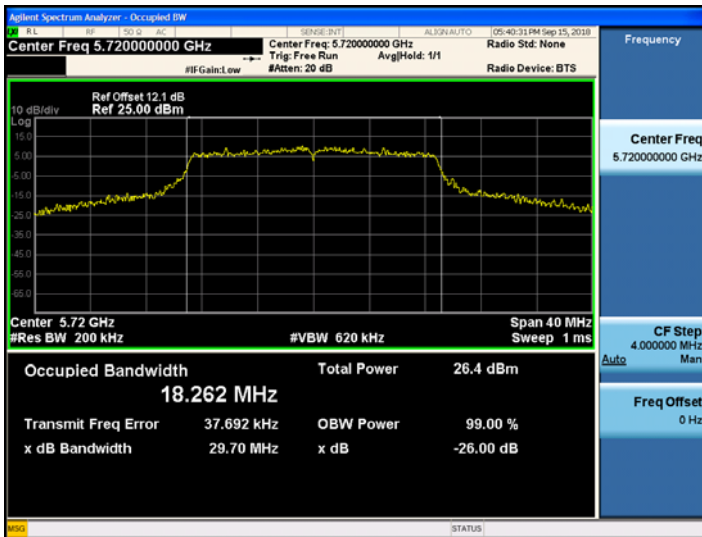
802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)



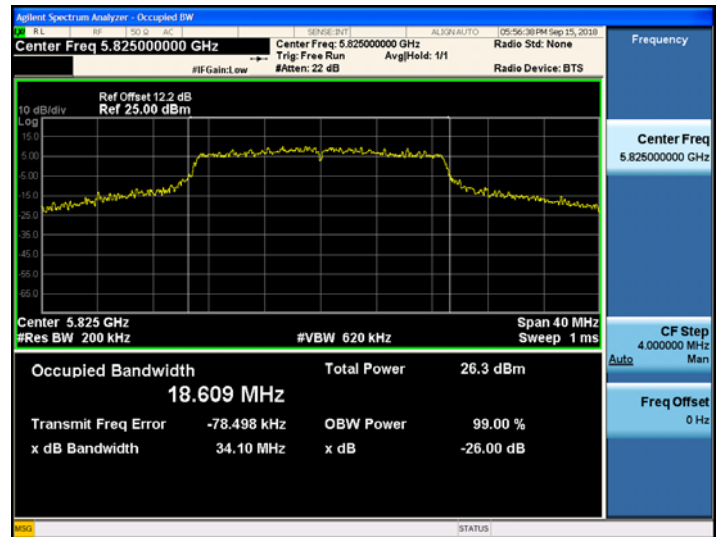
802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 60)



802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 165)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for External Ant_ 802.11ac_VHT20

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5180	36	25.61	N/A	Pass
5200	40	23.70	N/A	Pass
5240	48	25.68	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5260	52	23.71	N/A	Pass
5300	60	23.24	N/A	Pass
5320	64	22.95	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

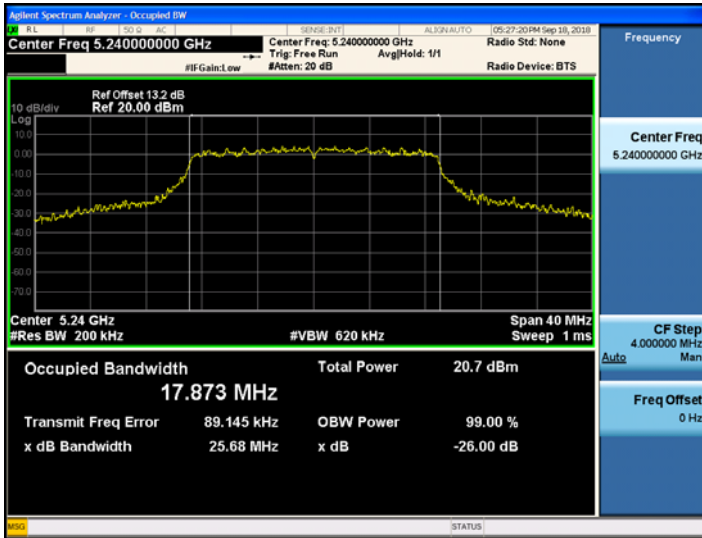
802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5500	100	24.83	N/A	Pass
5580	116	22.45	N/A	Pass
5720	144	26.90	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT20

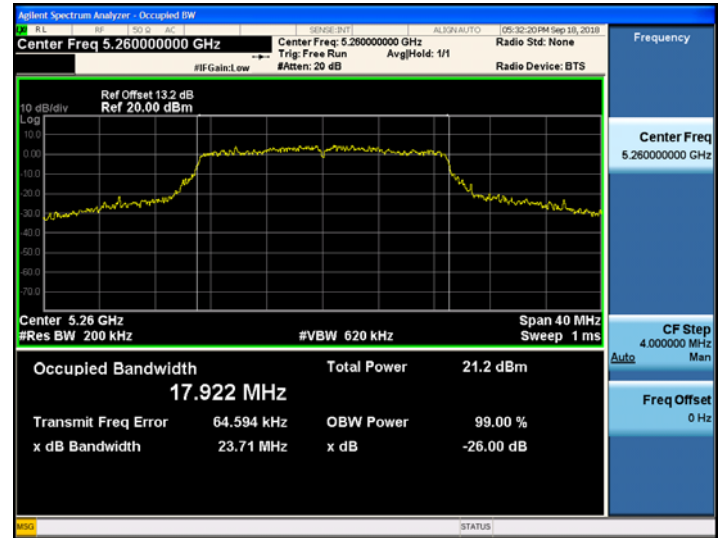
802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	30.80	N/A	Pass
5785	157	36.91	N/A	Pass
5825	165	36.61	N/A	Pass

■ TEST Plot for External Ant_ 802.11ac_VHT20

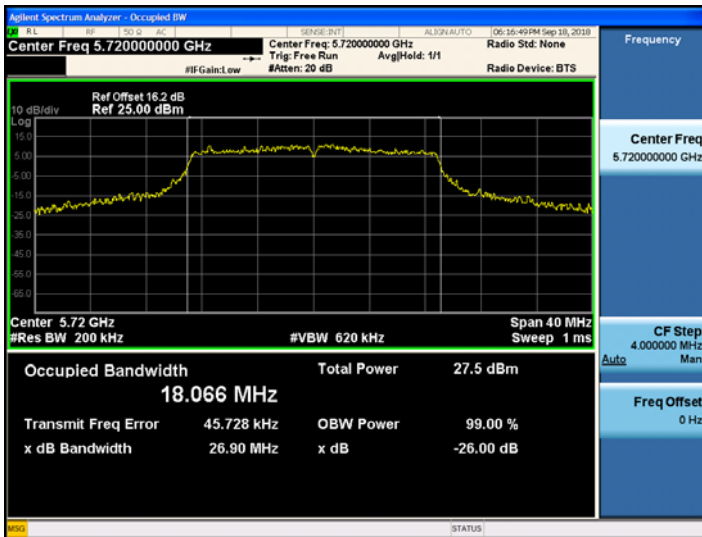
802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)



802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for Internal Ant_802.11n_HT40

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.68	N/A	Pass
5230	46	40.04	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.78	N/A	Pass
5310	62	39.60	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

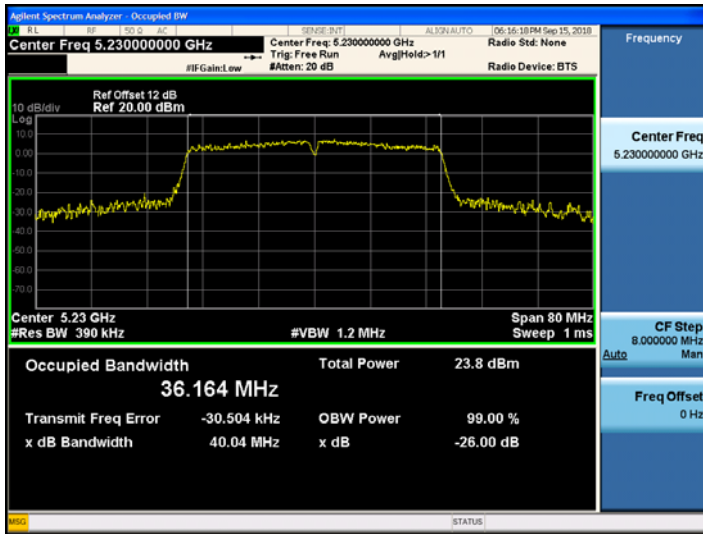
802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.49	N/A	Pass
5550	110	39.58	N/A	Pass
5710	142	52.20	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	56.52	N/A	Pass
5795	159	60.56	N/A	Pass

■ TEST Plot for Internal Ant_802.11n_HT40

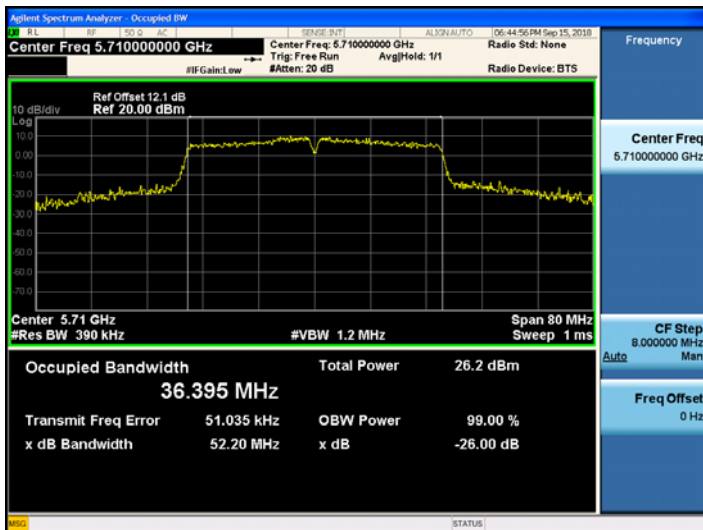
802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)



802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)



802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)



802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ TEST RESULTS for External Ant_802.11n_HT40

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	42.15	N/A	Pass
5230	46	42.17	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	39.67	N/A	Pass
5310	62	44.96	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

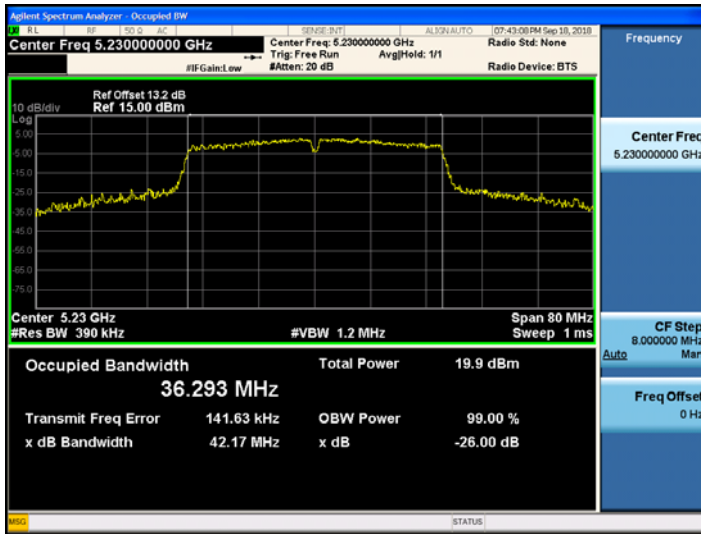
802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	41.93	N/A	Pass
5550	110	43.64	N/A	Pass
5710	142	47.93	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11n_HT40

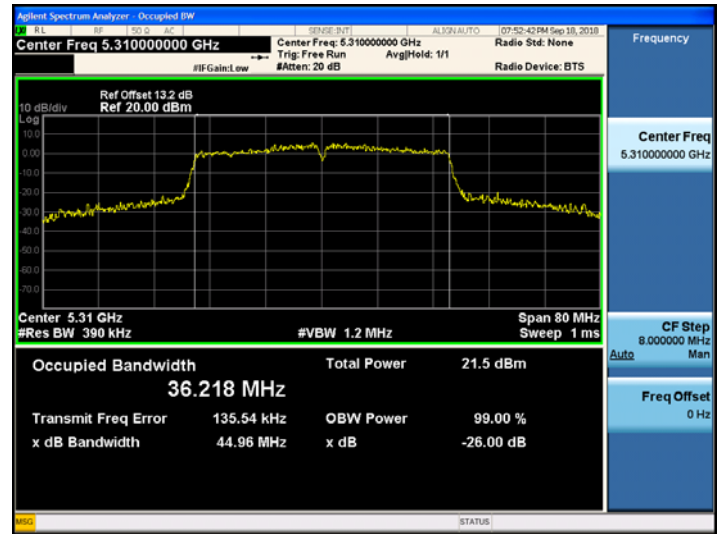
802.11n_HT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	63.43	N/A	Pass
5795	159	76.77	N/A	Pass

■ TEST Plot for External Ant_802.11n_HT40

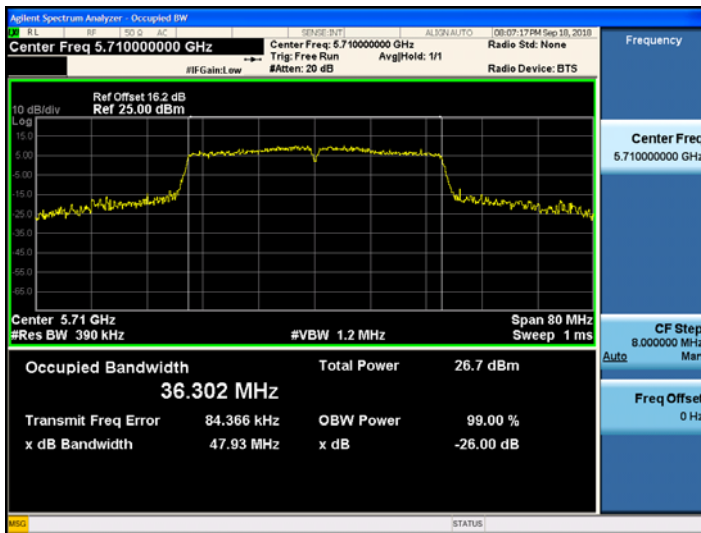
802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)



802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 62)



802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)



802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ TEST RESULTS for Internal Ant_802.11ac_VHT40

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	39.37	N/A	Pass
5230	46	39.72	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	40.56	N/A	Pass
5310	62	39.59	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

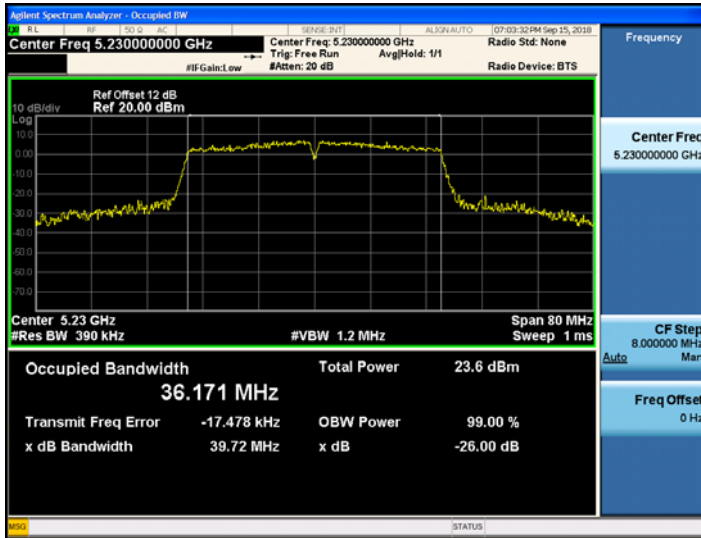
802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	39.44	N/A	Pass
5550	110	41.98	N/A	Pass
5710	142	54.36	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

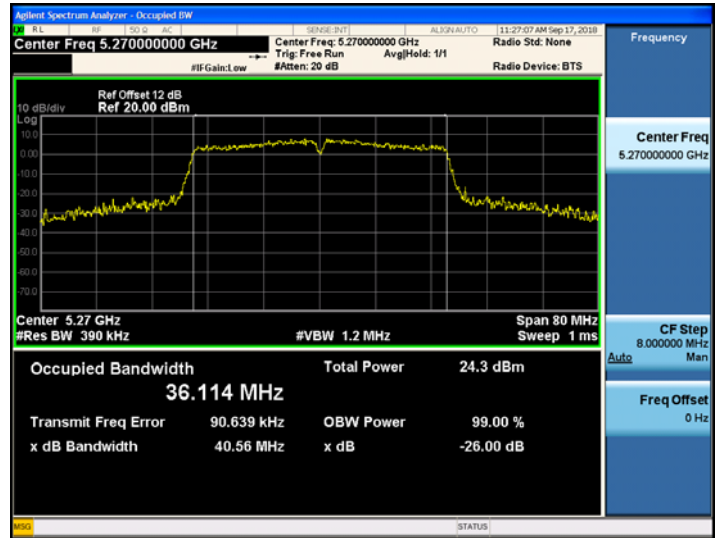
802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	55.13	N/A	Pass
5795	159	55.41	N/A	Pass

■ TEST Plot for Internal Ant_802.11ac_VHT40

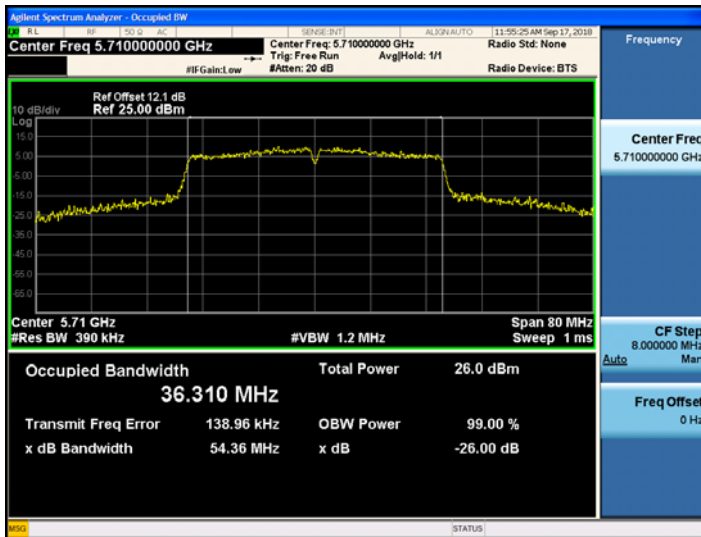
802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)



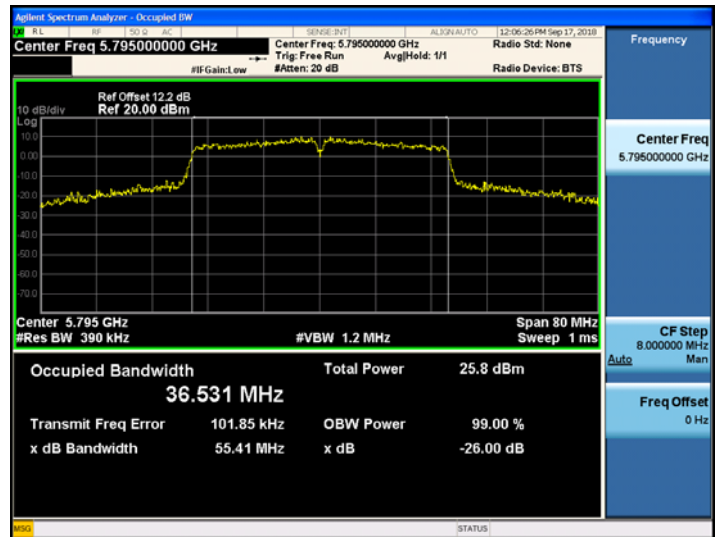
802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)



802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 142)



802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ TEST RESULTS for External Ant_802.11ac_VHT40

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5190	38	40.12	N/A	Pass
5230	46	39.97	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5270	54	41.03	N/A	Pass
5310	62	43.14	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

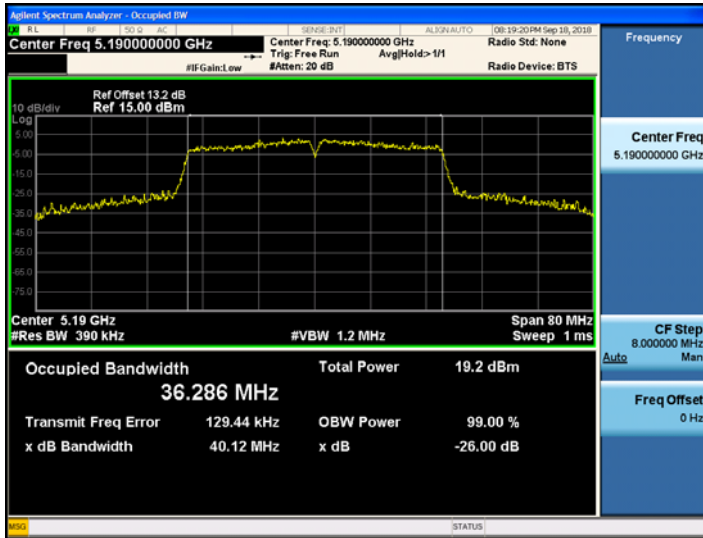
802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5510	102	40.10	N/A	Pass
5550	110	47.48	N/A	Pass
5710	142	42.80	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT40

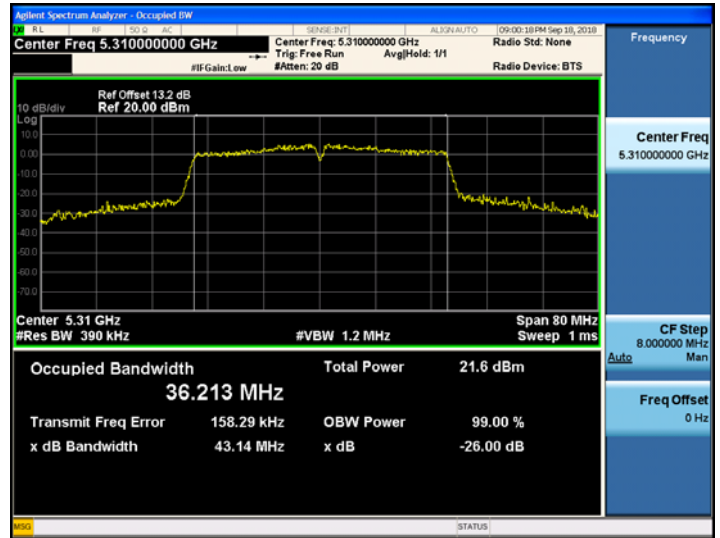
802.11ac_VHT40 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	64.23	N/A	Pass
5795	159	75.48	N/A	Pass

■ TEST Plot for External Ant_802.11ac_VHT40

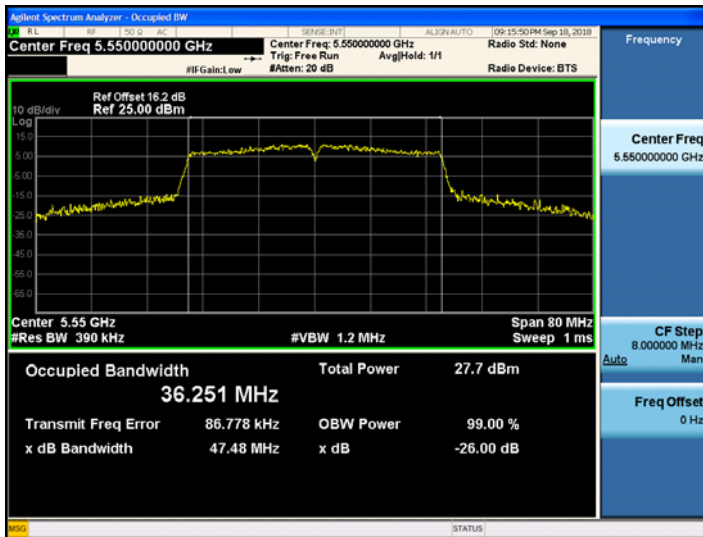
802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 38)



802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 62)



802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 110)



802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ **TEST RESULTS** for Internal Ant_802.11ac_VHT80

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5210	42	80.91	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5290	58	80.94	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

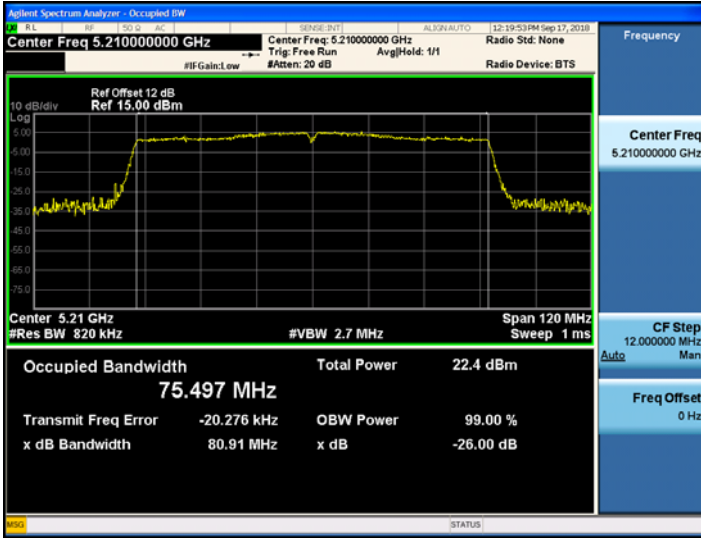
802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5530	106	81.00	N/A	Pass
5610	122	97.64	N/A	Pass
5690	138	108.00	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

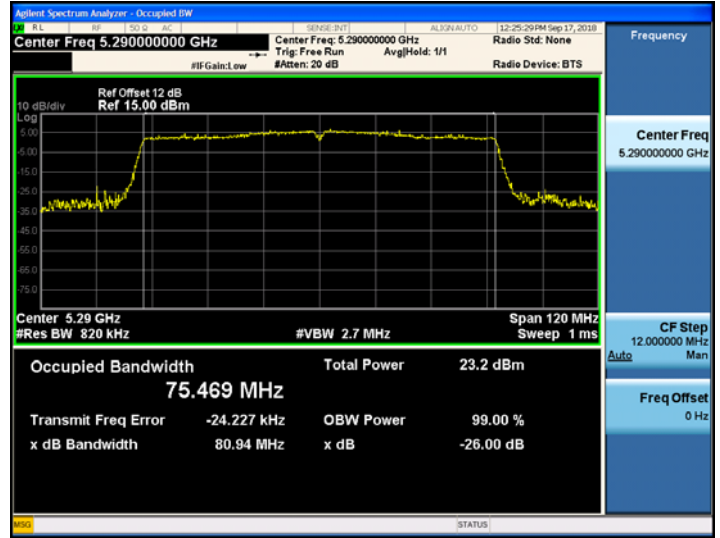
802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	116.00	N/A	Pass

■ TEST Plot for Internal Ant_802.11ac_VHT80

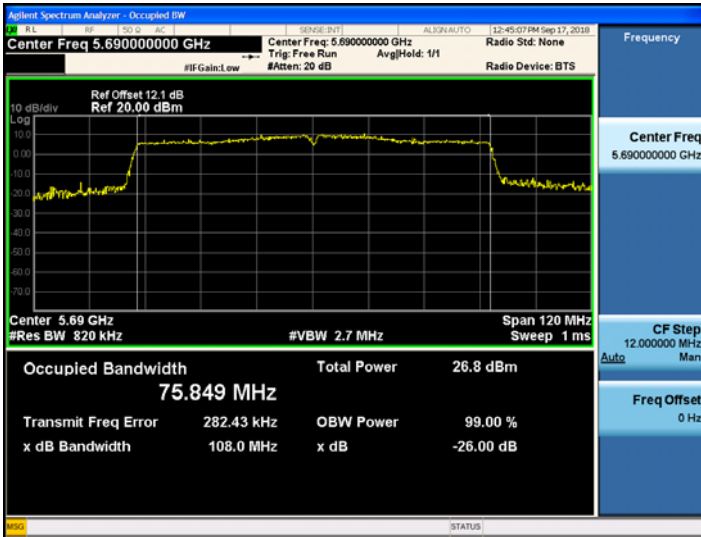
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)



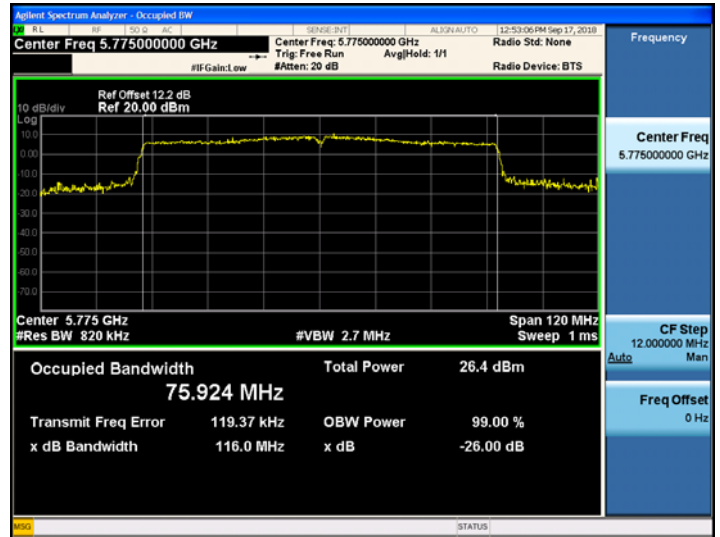
802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth(CH 58)



802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 138)



802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth(CH 155)



Note : In order to simplify the report, attached plots were only the most wide channel.

■ TEST RESULTS for External Ant_802.11ac_VHT80

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5210	42	97.11	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5290	58	81.77	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

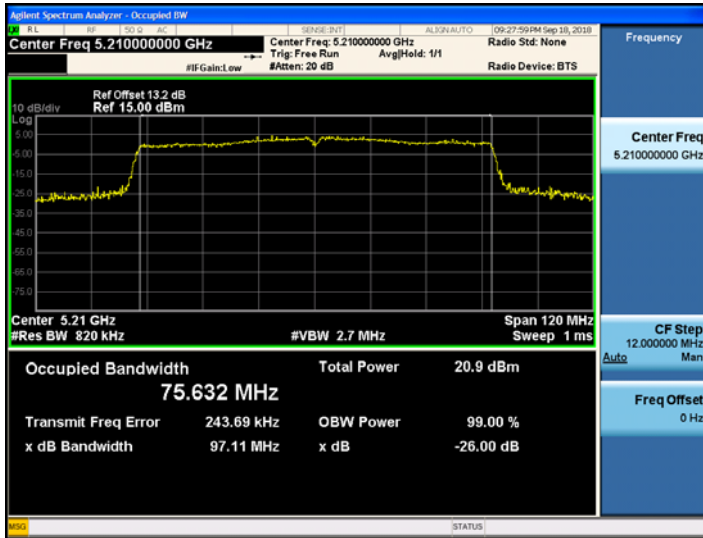
802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5530	106	84.88	N/A	Pass
5610	122	89.64	N/A	Pass
5690	138	81.34	N/A	Pass

Conducted 26 dB Bandwidth Measurements for 802.11ac_VHT80

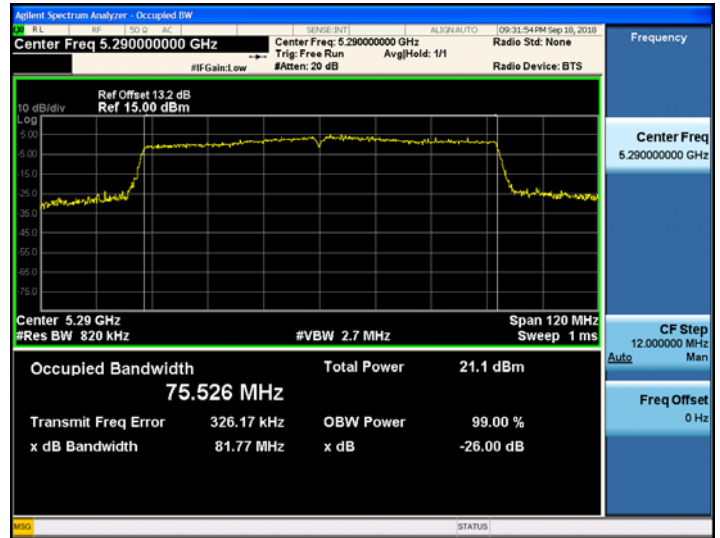
802.11ac_VHT80 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	119.50	N/A	Pass

■ TEST Plot for External Ant_802.11ac_VHT80

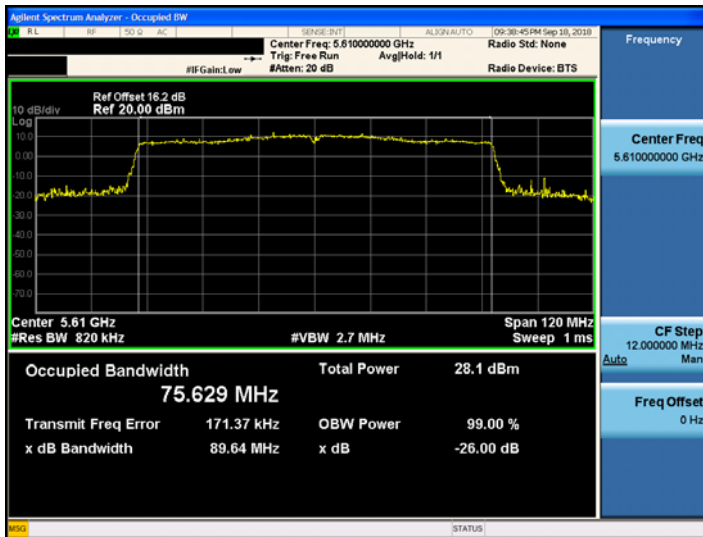
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)



802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth(CH 58)



802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 122)



802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth(CH 155)



Note : In order to simplify the report, attached plots were only the most wide channel.

Conducted 6 dB Bandwidth
■ TEST RESULTS for Internal Ant_802.11a/n_HT20/ac_VHT20
Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.38	0.5	Pass
5785	157	16.36	0.5	Pass
5825	165	16.36	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_HT20

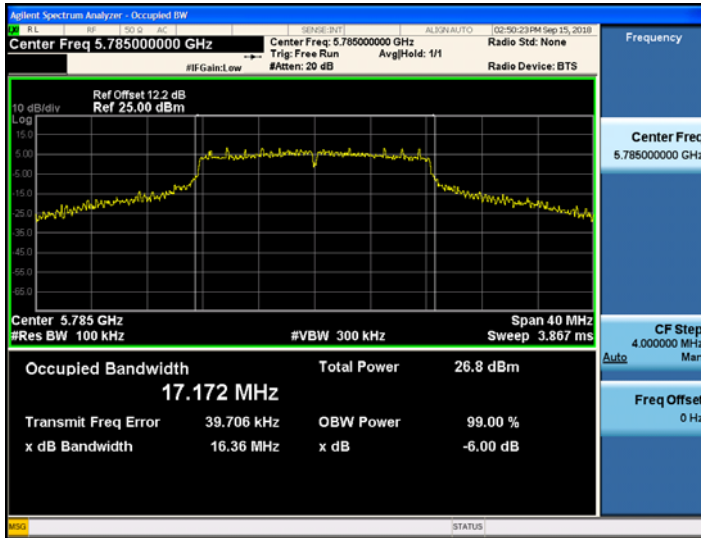
802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.36	0.5	Pass
5785	157	17.59	0.5	Pass
5825	165	17.55	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_VHT20

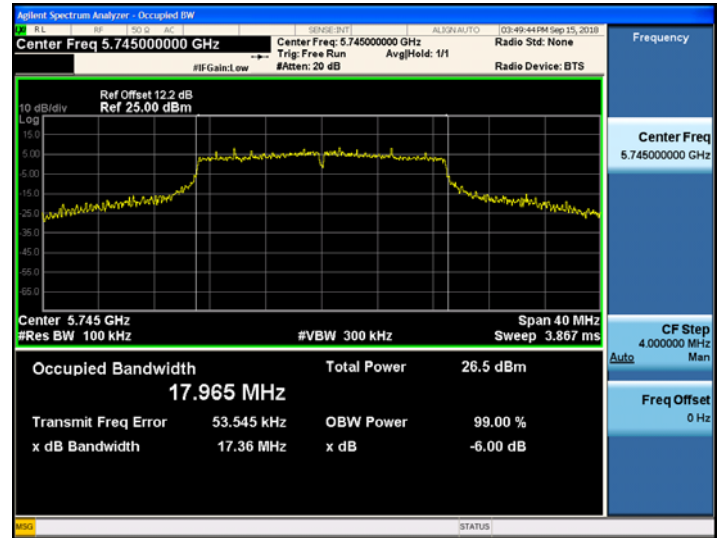
802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.59	0.5	Pass
5785	157	17.26	0.5	Pass
5825	165	17.57	0.5	Pass

■ TEST Plots for 802.11a/n_HT20/ac_VHT20

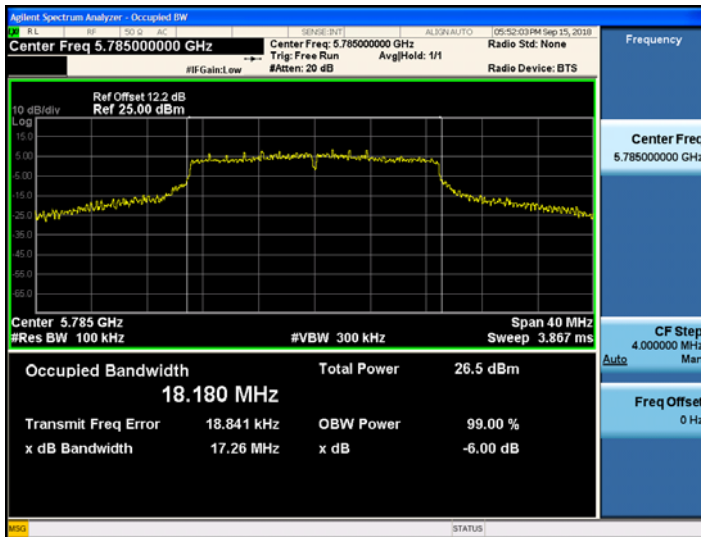
802.11a UNII 3 BAND 6dB Bandwidth (CH.157)



802.11n_HT20 UNII 3 BAND 6dB Bandwidth(CH.149)



802.11ac_VHT20 UNII 3 BAND 6dB Bandwidth(CH.157)



Note : In order to simplify the report, attached plots were only the most narrow channel.

■ TEST RESULTS for External Ant_802.11a/n_HT20/ac_VHT20

Conducted 6 dB Bandwidth Measurements for 802.11a

802.11a Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.35	0.5	Pass
5785	157	16.08	0.5	Pass
5825	165	16.34	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11n_HT20

802.11n_HT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.31	0.5	Pass
5785	157	17.56	0.5	Pass
5825	165	17.21	0.5	Pass

Conducted 6 dB Bandwidth Measurements for 802.11ac_VHT20

802.11ac_VHT20 Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.93	0.5	Pass
5785	157	17.40	0.5	Pass
5825	165	17.36	0.5	Pass