



# FCC 47 CFR PART 15 SUBPART E

for

Big Blue 100 Model: AD107A4BKA Brand: Brookstone

## Test Report Number:

C170111Z03-RP1-2

Issued Date: January 23, 2017

Issued for

### **Zylux Acoustic Corporation**

3F, 22, Lane 35, Jihu Road, Neihu Technology Park, Taipei 114 Taiwan

Issued by:

### Compliance Certification Services (Shenzhen) Inc.

No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China TEL: 86-755-28055000 FAX: 86-755-28055221 E-Mail: service@ccssz.com



**Note:** This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc. This document may be altered or revised by Compliance Certification Services (Shenzhen) Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, A2LA, NVLAP, NIST or any government agencies. The TEST RESULTS in the report only apply to the tested sample.



## **Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 23, 2017	Initial Issue	ALL	Sabrina Wang



### TABLE OF CONTENTS

1. TE	EST CERTIFICATION	4
	UT DESCRIPTION	
3. TE	EST METHODOLOGY	9
	1 EUT CONFIGURATION	
3.2	2 EUT EXERCISE	9
0.1	3 GENERAL TEST PROCEDURES	
	4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	
	5 DESCRIPTION OF TEST MODES	
4. SI	ETUP OF EQUIPMENT UNDER TEST	
	1 DESCRIPTION OF SUPPORT UNITS	
	2 CONFIGURATION OF SYSTEM UNDER TEST	
	ACILITIES AND ACCREDITATIONS	
	1 FACILITIES	
	2 EQUIPMENT	
	3 ACCREDITATIONS	
	4 MEASUREMENT UNCERTAINTY	
	CC PART 15 REQUIREMENTS	
	1 26dB EMISSION BANDWIDTH	
6.2		
	3 ANTENNA GAIN	
0.		
6.		
6.0 6		
6.		
0.0	9 POWERLINE CONDUCTED EMISSION	
0.0	10 FREQUENCY STABILITY	
0.		



## 1. TEST CERTIFICATION

Product	Big Blue 100
Model	AD107A4BKA
Brand	Brookstone
Tested	January 11~23, 2017
Applicant	<b>Zylux Acoustic Corporation</b> 3F, 22, Lane 35, Jihu Road, Neihu Technology Park, Taipei 114 Taiwan
Manufacturer	<b>Zylux Acoustic Corporation</b> 3F, 22, Lane 35, Jihu Road, Neihu Technology Park, Taipei 114 Taiwan

APPLICABLE STANDARDS		
STANDARD TEST RESULT		
FCC 47 CFR Part 15 Subpart E	No non-compliance noted	

### We hereby certify that:

Compliance Certification Services (Shenzhen) Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407, FCC 14-30.

The TEST RESULTS of this report relate only to the tested sample identified in this report.

Approved by:

chant

Sunday Hu Supervisor of EMC Dept. Compliance Certification Services (Shenzhen) Inc.

Reviewed by:

Ruby Zhang Supervisor of Report Dept. Compliance Certification Services (Shenzhen) Inc.



## 2. EUT DESCRIPTION

Product	Big Blue 100		
Model Number	AD107A4BKA		
Brand	Brookstone		
Model Discrepancy	N/A		
Serial Number	C170111Z03-RP1-2		
Received Date	January 11, 2017		
Power Supply	DC 16V supplied by adapter		
Adapter Manufacturer / Model No.	Brookstone / DYS624-160180W-1 Input: 100-240V ~ 50/60Hz 0.8A MAX Output: DC16V 1.8A DC Output Cable: Unshielded 1.80m		
Frequency Range	UNII Band I: IEEE 802.11a, 802.11n HT20 : IEEE 802.11ac 20 : IEEE 802.11ac 20 : IEEE 802.11ac 40: IEEE 802.11ac 80: UNII Band II: IEEE 802.11a, 802.11n HT20 : IEEE 802.11ac 20 : IEEE 802.11ac 20 : IEEE 802.11ac 80: UNII Band III: IEEE 802.11ac 80: UNII Band III: IEEE 802.11ac 20 : IEEE 802.11ac 20 : IEEE 802.11ac 20 : IEEE 802.11ac 40: IEEE 802.11ac 40: IEEE 802.11ac 80: UNII Band IV: IEEE 802.11a, 802.11n HT20 : IEEE 802.11a HT20 : IEEE 802 HT20 : IE	5180MHz ~ 5240MHz 5190MHz ~ 5230MHz 5180MHz ~ 5240MHz 5190MHz ~ 5230MHz 5210MHz 5260MHz ~ 5320MHz 5270MHz ~ 5310MHz 5260MHz ~ 5320MHz 5270MHz ~ 5310MHz 5290MHz 5500MHz ~ 5700MHz 5510MHz ~ 5670MHz 5510MHz ~ 5670MHz 5510MHz ~ 5670MHz 5510MHz ~ 5670MHz 5530MHz	
Transmit Power	Antenna 1 UNII Band I: IEEE 802.11a: IEEE 802.11n HT 20 MHz: IEEE 802.11n HT 40 MHz: IEEE 802.11ac 20: IEEE 802.11ac 40: IEEE 802.11ac 80: UNII Band II: IEEE 802.11a: IEEE 802.11n HT 20 MHz: IEEE 802.11n HT 40 MHz	14.43 dBm 14.54 dBm 10.23 dBm 14.08 dBm 12.02 dBm 8.60 dBm 14.17 dBm 14.10 dBm 11.41 dBm	

FCC ID: XN6-AD107A4BKA

Page 5 / 455

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.



	IEEE 802.11ac 20:	13.89	dBm
	IEEE 802.11ac 40:	11.77	dBm
	IEEE 802.11ac 80:	8.52	dBm
	UNII Band III:	0.52	dBill
	IEEE 802.11a:	14 75	dPm
		14.75	dBm
	IEEE 802.11n HT 20 MHz:	14.68	dBm
	IEEE 802.11n HT 40 MHz:	11.46	dBm
	IEEE 802.11ac 20:	14.68	dBm
	IEEE 802.11ac 40:	11.63	dBm
	IEEE 802.11ac 80: UNII Band IV:	10.34	dBm
	IEEE 802.11a:	15.08	dBm
	IEEE 802.11n HT 20 MHz:	15.09	dBm
	IEEE 802.11n HT 40 MHz:	15.22	dBm
	IEEE 802.11ac 20:	15.03	dBm
	IEEE 802.11ac 40:	15.14	dBm
	IEEE 802.11ac 80:	10.51	dBm
	Antenna 2		
	UNII Band I:		
	IEEE 802.11a:	14.37	dBm
	IEEE 802.11n HT 20 MHz:	14.41	dBm
	IEEE 802.11n HT 40 MHz:	11.39	dBm
	IEEE 802.11ac 20:	14.50	dBm
	IEEE 802.11ac 40:	10.15	dBm
	IEEE 802.11ac 80:	6.61	dBm
	UNII Band II:		
	IEEE 802.11a:	14.10	dBm
	IEEE 802.11n HT 20 MHz:	14.08	dBm
	IEEE 802.11n HT 40 MHz:	14.47	dBm
	IEEE 802.11ac 20:	13.91	dBm
	IEEE 802.11ac 40:	9.59	dBm
	IEEE 802.11ac 80:	6.30	dBm
	UNII Band III:		
	IEEE 802.11a:	14.41	
	IEEE 802.11n HT 20 MHz:	14.43	dBm
	IEEE 802.11n HT 40 MHz:	12.62	dBm
	IEEE 802.11ac 20:	14.36	dBm
	IEEE 802.11ac 40:	12.57	dBm
	IEEE 802.11ac 80:	10.30	dBm
	UNII Band IV:	44.00	
	IEEE 802.11a:	14.32	dBm
	IEEE 802.11n HT 20 MHz:	14.55	dBm
	IEEE 802.11n HT 40 MHz:	14.55	dBm
	IEEE 802.11ac 20:	14.27	dBm
	IEEE 802.11ac 40:	14.07	dBm
	IEEE 802.11ac 80:	9.62	dBm
Modulation Technique	OFDM (QPSK, BPSK, 16-QAM	1, 64-QAM)	



Transmit Data Rate	IEEE 802.11a mode: 48, 36, 24, 18, 12, 9, 6Mbps IEEE802.11n HT20MHz mode: 6.5,13,19.5,26,39,52,58.5,65Mbps IEEE802.11n HT40MHz mode: 13.5,27,40.5,54,81,108,121.5,135Mbps IEEE802.11ac 20 mode: 6.5,13,19.5,26,39,52,58.5,65Mbps IEEE802.11ac 40 mode mode: 13.5,27,40.5,54,81,108,121.5,135Mbps IEEE802.11ac VHT80MHz mode: 29.3,58.5,84.8,117,175.5,234,263.3, 292.5,351,390Mbps		
Number of Channels	UNII Band I: IEEE 802.11a, 802.11n HT20 : IEEE 802.11ac 20: IEEE 802.11ac 20: IEEE 802.11ac 80: UNII Band II: IEEE 802.11a, 802.11n HT20 : IEEE 802.11a, 802.11n HT20 : IEEE 802.11ac 20: IEEE 802.11ac 40: IEEE 802.11ac 80: UNII Band III: IEEE 802.11a, 802.11n HT20 : IEEE 802.11ac 80: UNII Band III: IEEE 802.11ac 20: IEEE 802.11ac 20: IEEE 802.11ac 80: UNII Band IV: IEEE 802.11ac 80: UNII Band IV: IEEE 802.11ac 20: IEEE 802.11ac 20: IEEE 802.11ac 80: UNII Band IV: IEEE 802.11ac 20: IEEE 802.11ac 80: UNII Band IV: IEEE 802.11ac 80: IEEE 80:	2 Channels 4 Channels 2 Channels 1 Channel 4 Channels 2 Channels 4 Channels 2 Channels 1 Channel 9 Channels 4 Channels 9 Channels 4 Channels 1 Channels 1 Channel	
Antenna Specification	Embedded Antenna with 3.12dBi gain (Max)		
Channels Spacing	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40: 40MHz IEEE 802.11ac 20: 20MHz IEEE 802.11ac 40: 40MHz IEEE 802.11ac 80: 80MHz		
Temperature Range	0°C ~ +45℃		
Hardware Version	В		
Software Version	ns-mmi-FS5332-0000-0025_1.0.4	-7-10	

**Note:** 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.



#### **Operation Frequency:**

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)			
CHANNEL	MHz		
36	5180		
38	5190		
40	5200		
42	5210		
44	5220		
46	5230		
48	5240		
52	5260		
54	5270		
56	5280		
58	5290		
60	5300		
62	5310		
64	5320		
100	5500		
102	5510		
104	5520		
106	5530		
108	5540		
110	5550		
112	5560		
116	5580		
132	5660		
134	5670		
136	5680		
140	5700		
149	5745		
151	5755		
153	5765		
155	5775		
157	5785		
159	5795		
161	5805		
165	5825		

Remark:

- 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
- This submittal(s) (test report) is intended for <u>FCC ID</u>: <u>XN6-AD107A4BKA</u> filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules and FCC 14-30.



## 3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 Radiated testing was performed at an antenna to EUT distance 3 meters. The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.407 and FCC 14-30. Radio testing was performed according to KDB DA 02-2138 KDB 789033 D02 KDB 905462 D06;

## 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

## 3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

## 3.3 GENERAL TEST PROCEDURES

### **Conducted Emissions**

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

### Radiated Emissions

The EUT is placed on the turntable, which is 0.8 m (below 1GHz) /1.5m (Above 1GHz) above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10.

## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



## 3.5 DESCRIPTION OF TEST MODES

The EUT is a 2x2 configuration spatial SISO (2TX & 2RX) without beam forming function. Software used to control the EUT for staying in continuous transmitting mode was programmed.

Test Item	Test mode	Worse mode
Conducted	Mode 1: TX(AC120V/60Hz)	$\square$
Emission	Mode 2: TX(AC240V/50Hz)	$\square$
Radiated Emission	Mode 1: TX	$\square$

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

#### UNII Band I:

#### IEEE 802.11a for 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5200MHz) and Channel High (5240MHz) with 6Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 20 MHz for 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5200MHz) and Channel High (5240MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 40 MHz Channel for 5190 ~ 5230MHz:

Channel Low (5190MHz) and Channel High (5230MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 20 for 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5200MHz) and Channel High (5240MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 40 Channel for 5190 ~ 5230MHz:

Channel Low (5190MHz) and Channel High (5230MHz) with 13.5Mbps data rate were chosen for full testing.

### IEEE 802.11ac 80 Channel for 5210MHz:

Channel Low (5210MHz) with 13.5Mbps data rate were chosen for full testing.



#### **UNII Band II:**

#### IEEE 802.11a for 5260 ~ 5320MHz:

Channel Low (5260MHz), Channel Mid (5300MHz) and Channel High (5320MHz) with 6Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 20 MHz for 5260 ~ 5320MHz:

Channel Low (5260MHz), Channel Mid (5300MHz) and Channel High (5320MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 40 MHz Channel for 5270~ 5310MHz:

Channel Low (5270MHz) and Channel High (5310MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 20 for 5260 ~ 5320MHz:

Channel Low (5260MHz), Channel Mid (5300MHz) and Channel High (5320MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 40 Channel for 5270~ 5310MHz:

Channel Low (5270MHz) and Channel High (5310MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 80 Channel for 5290MHz:

Channel Low (5290MHz) with 13.5Mbps data rate were chosen for full testing.

#### UNII Band III:

#### IEEE 802.11a for 5500 ~ 5700MHz:

Channel Low (5500MHz), Channel Mid (5580MHz) and Channel High (5700MHz) with 6Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 20 MHz for 5500 ~ 5700MHz:

Channel Low (5500MHz), Channel Mid (5580MHz) and Channel High (5700MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 40 MHz Channel for 5510~ 5670MHz:

Channel Low (5510MHz) and Channel High (5670MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 20 for 5500 ~ 5700MHz:

Channel Low (5500MHz), Channel Mid (5580MHz) and Channel High (5700MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 40 Channel for 5510~ 5670MHz:

Channel Low (5510MHz) and Channel High (5670MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 80 Channel for 5530MHz:

Channel Low (5530MHz) with 13.5Mbps data rate were chosen for full testing.



#### **UNII Band IV:**

#### IEEE 802.11a for 5745 ~ 5825MHz:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 20 MHz for 5745 ~ 5825MHz:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11n HT 40 MHz Channel for 5755~ 5795MHz:

Channel Low (5755MHz) and Channel High (5795MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 20 for 5745 ~ 5825MHz:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 40 Channel for 5755~ 5795MHz:

Channel Low (5755MHz) and Channel High (5795MHz) with 13.5Mbps data rate were chosen for full testing.

#### IEEE 802.11ac 80 Channel for 5775MHz:

Channel Low (5775MHz) with 13.5Mbps data rate were chosen for full testing.



## 4. SETUP OF EQUIPMENT UNDER TEST

## 4.1 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook	Probook 5310M	N/A	DoC	HP	Unshielded 1.80m	Shielded 1.80m (AC cable) Unshielded 1.70m (DC cable)

Note:

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 4.2 CONFIGURATION OF SYSTEM UNDER TEST

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.



## 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.10, ANSI C63.7 and CISPR Publication 22.

## 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, 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."

## 5.3 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	A2LA
China	CNAS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	FCC
Japan	VCCI(C-4815, R-4320, T-2317, G-10624)
Canada	INDUSTRY CANADA

Copies of granted accreditation certificates are available for downloading from our web site, <u>http://www.ccssz.com</u>



### 5.4 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF frequency	+/-1 * 10-5
RF power conducted	+/- 1,5 dB
RF power radiated	+/- 6 dB
Spurious emissions, conducted	+/- 3 dB
Spurious emissions, radiated	+/- 6 dB
Humidity	+/- 5 %
Temperature	+/- 1°C
Time	+/-10 %

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



## 6. FCC PART 15 REQUIREMENTS

## 6.1 26dB EMISSION BANDWIDTH

### 6.1.1 LIMIT

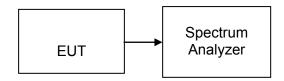
According to §15.403(c), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

### 6.1.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

Remark: Each piece of equipment is scheduled for calibration once a year.

### 6.1.3 TEST CONFIGURATION



### 6.1.4TEST PROCEDURE

- 1. Place the EUT on the table and set it in the transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW > 1%EBW, VBW > RBW, Span >26dB bandwidth, Detector = Peak, and Sweep = auto.
- 4. Mark the peak frequency and –26dB (upper and lower) frequency.
- 5. Repeat until all the rest channels were investigated.



### 6.1.5 TEST RESULTS

No non-compliance noted

#### <u>Test Data</u>

#### Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5180	22.25	20.23
Mid	5200	20.27	19.90
High	5240	20.37	20.13

#### Test mode: IEEE 802.11a mode / 5260 ~ 5320MHz

	Frequency	ency (N	ndwidth(B) /IHz)	
	(MHz)	Antenna 1	Antenna 2	
Low	5260	20.60	20.62	
Mid	5300	20.18	21.19	
High	5320	21.61	24.17	

#### Test mode: IEEE 802.11a mode / 5500 ~ 5700MHz

Channel	Frequency	26dB Ban (M	dwidth(B) Hz)
	(MHz)	Antenna 1	Antenna 2
Low	5500	24.21	22.65
Mid	5580	24.53	20.88
High	5700	24.09	25.85



### Test mode: IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5180	23.34	27.13
Mid	5200	22.93	27.04
High	5240	25.67	25.56

### Test mode: IEEE 802.11n HT 20 MHz mode / 5260 ~ 5320MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5260	25.21	23.45
Mid	5300	27.08	25.91
High	5320	26.18	24.12

### Test mode: IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5500	27.16	25.54
Mid	5580	27.92	25.41
High	5700	26.53	27.69

#### Test mode: IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	26dB Ban (M	dwidth(B) Hz)
		Antenna 1	Antenna 2
Low	5190	40.89	40.54
High	5230	40.30	40.77

#### Test mode: IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz

Channel	26dB Bandwidth(B)Frequency(MHz)		
	(MHz)	Antenna 1	Antenna 2
Low	5270	40.65	40.81
High	5310	40.53	40.69

#### Test mode: IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5510	41.08	40.69
Mid	5550	40.48	40.74
High	5670	40.66	40.48

#### Test mode: IEEE 802.11ac 20 mode / 5180 ~ 5240MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1 Antenna 2	
Low	5180	20.31	20.21
Mid	5200	20.09	20.11
High	5240	20.21 20.27	

#### Test mode: IEEE 802.11ac 20 mode / 5260 ~ 5320MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1 Antenna 2	
Low	5260	20.23	20.22
Mid	5300	20.47	20.24
High	5320	20.40 20.44	

#### Test mode: IEEE 802.11ac 20 mode / 5500 ~ 5700MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1 Antenna 2	
Low	5500	20.45	20.11
Mid	5580	21.29	20.25
High	5700	20.23 21.12	

#### Test mode: IEEE 802.11ac 40 mode / 5190 ~ 5230MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1	Antenna 2
Low	5190	40.09	42.28
High	5230	40.11 40.04	

#### Test mode: IEEE 802.11ac 40 mode / 5270 ~ 5310MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)		
	(MHz)	Antenna 1 Antenna		Antenna 1 Ante
Low	5270	40.32	40.03	
High	5310	40.20	40.33	

#### Test mode: IEEE 802.11ac 40 mode / 5510 ~ 5670MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)		Antenna 2
Low	5510	40.49	43.10
Mid	5550	40.23	40.34
High	5670	40.48 47.26	

#### Test mode: IEEE 802.11ac 80 mode / 5210MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1 Antenna	Antenna 2
	5210	81.63	82.02

#### Test mode: IEEE 802.11ac 80 mode / 5290MHz

Channel	Channel Frequency (MHz) An		dwidth(B) Hz)
			Antenna 2
	5290	81.77	81.86

#### Test mode: IEEE 802.11ac 80 mode / 5530MHz

Channel	Frequency	26dB Bandwidth(B) (MHz)	
	(MHz)	Antenna 1 Antenna	Antenna 2
	5530	81.63	81.91

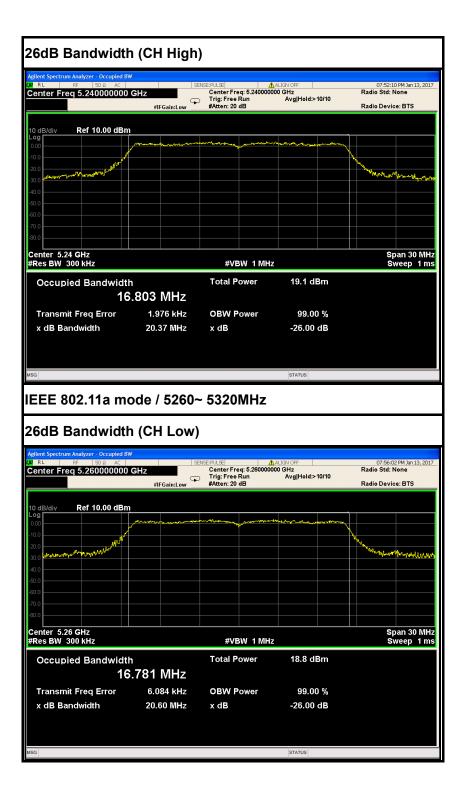


## <u>Test Plot</u>

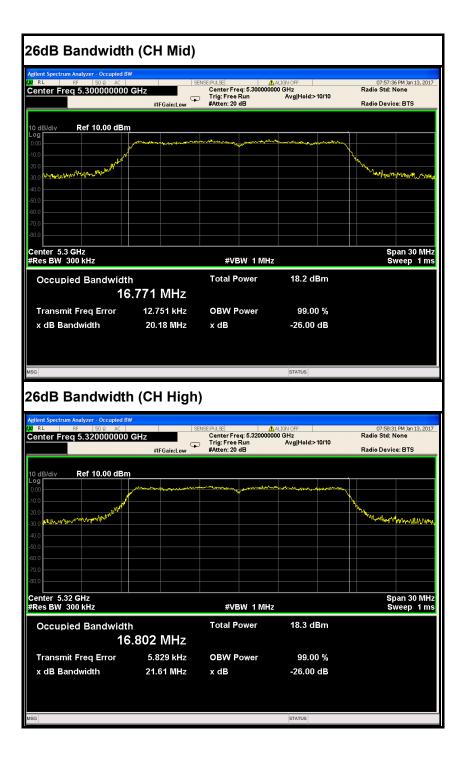
### <u>Antenna 1</u>

IEEE 802.11a mo	ode / 5180	~ 5240MHz		
26dB Bandwidth	n (CH Low)			
Agilent Spectrum Analyzer - Occupied BV X RL RE 50 Ω AC Span 30.000 MHz		Center Freq: 5.180000 Trig: Free Run #Atten: 20 dB	ALIGN OFF DODO GHz Avg Hold>10/10	07:47:59 PM Jan 13, 2017 Radio Std: None Radio Device: BTS
10 dB/div Ref 10.00 dBm				
Log 0.00	- mental management	mannen	hand the mander and the second	
-10.0				m man and man and man
-30.0				
-50.0				
-70.0				
-80.0				
Center 5.18 GHz #Res BW 300 kHz		#VBW 1 MH	Z	Span 30 MHz Sweep 1 ms
Occupied Bandwidtl		Total Power	19.6 d <b>B</b> m	
	.836 MHz		00.00 %	
Transmit Freq Error x dB Bandwidth	14.826 kHz 22.25 MHz	OBW Power x dB	99.00 % -26.00 dB	
MSG			STATUS	
26dB Bandwidth	n (CH Mid)			
Agilent Spectrum Analyzer - Occupied BV				
RL         RF         50 Ω         AC           Center Freq 5.200000000         50 Ω         AC         50 Ω         AC		Center Freq: 5.200000	ALIGN OFF 0000 GHz Avg Hold>10/10	07:49:41 PM Jan 13, 2017 Radio Std: None
	#IFGain:Low	#Atten: 20 dB		Radio Device: BTS
10 dB/div Ref 10.00 dBm				
0.00	and a second and a s	the second se	and water from the second for second	
-20.0 -30.0				Were Mingham Mingher Marker
-40.0				
-60.0				
-70.0				
Center 5.2 GHz				Span 30 MHz
#Res BW 300 kHz		#VBW 1 MH	z	Sweep 1 ms
Occupied Bandwidtl	n .837 MHz	Total Power	19.1 dBm	
۲۵ Transmit Freq Error	9.848 kHz	OBW Power	99.00 %	
x dB Bandwidth	20.27 MHz	x dB	-26.00 dB	
MSG			STATUS	











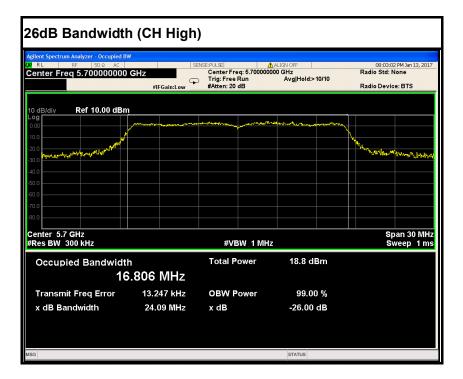
IEEE 802.11a mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 08:00:28 PM Jan 13, 2017 Radio Std: None 
 Jernservutze;
 JALIGN OFF

 Center Freq: 5.50000000 GHz
 Trig: Free Run

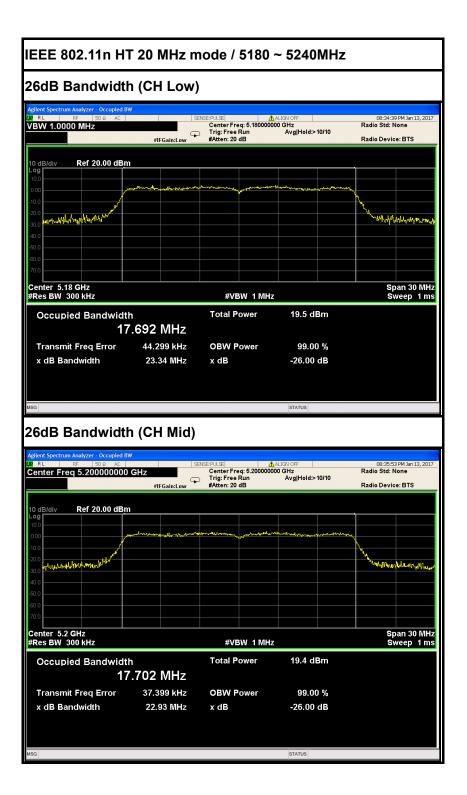
 Trig: Free Run
 Avg|Hold>10/10

 #Atten: 20 dB
 Avg|Hold>10/10
 Center Freq 5.500000000 GHz Radio Device: BTS Ref 10.00 dBm Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 19.9 dBm **Occupied Bandwidth** 16.834 MHz Transmit Freq Error 17.938 kHz **OBW Power** 99.00 % 24.21 MHz -26.00 dB x dB Bandwidth x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 08:01:19 PM Jan 13, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 10.00 dBm 0 dB/div A.L.N. Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.1 dBm 16.790 MHz Transmit Freq Error 20.552 kHz **OBW Power** 99.00 % x dB Bandwidth 24.53 MHz x dB -26.00 dB

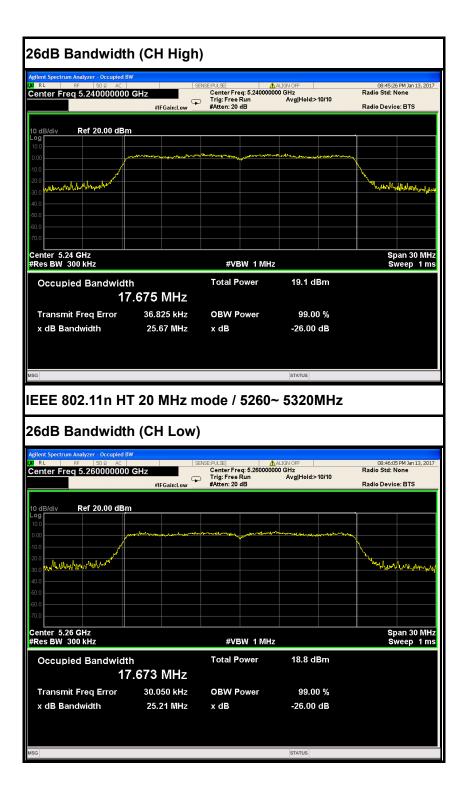


















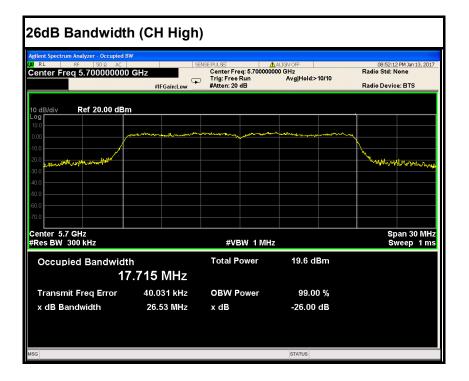
IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 08:49:49 PM Jan 13, 2017 Radio Std: None 
 Jernservutze;
 JALIGN OFF

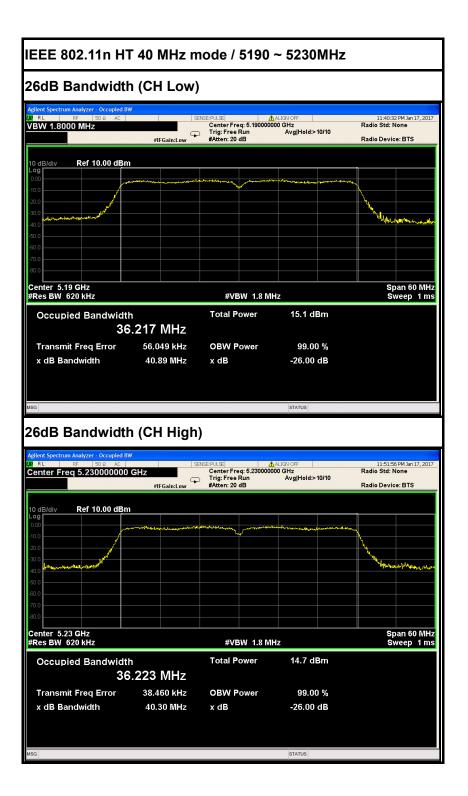
 Center Freq: 5.50000000 GHz
 Trig: Free Run

 Trig: Free Run
 Avg|Hold>10/10

 #Atten: 20 dB
 Avg|Hold>10/10
 Center Freq 5.500000000 GHz Radio Device: BTS Ref 20.00 dBm Wing ab www. wh/h MAMAN Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 20.2 dBm **Occupied Bandwidth** 17.701 MHz Transmit Freq Error 55.734 kHz **OBW Power** 99.00 % 27.16 MHz -26.00 dB x dB Bandwidth x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 08:50:34 PM Jan 13, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 20.00 dBm 0 dB/div When Month work for the Margan and Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.6 dBm 17.679 MHz Transmit Freq Error 25.444 kHz **OBW Power** 99.00 % x dB Bandwidth 27.92 MHz x dB -26.00 dB





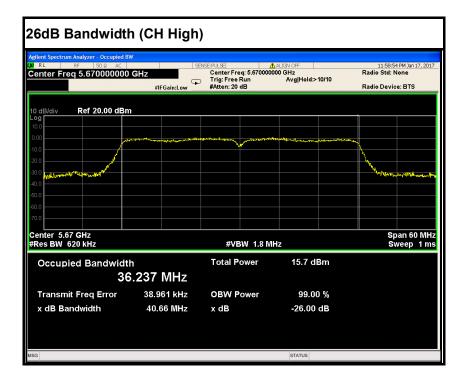


IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.27000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 11:54:04 PM Jan 17, 2017 Radio Std: None Center Freq 5.270000000 GHz Radio Device: BTS Ref 10.00 dBm Span 60 MHz Sweep 1 ms Center 5.27 GHz #Res BW 620 kHz #VBW 1.8 MHz 16.5 dBm Total Power **Occupied Bandwidth** 36.209 MHz 11.116 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 40.65 MHz x dB -26.00 dB 26dB Bandwidth (CH High) SENSE:PLLSE ALIGN OFF Center Freq: 5.31000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 11:54:50 PM Jan 17, 2017 Radio Std: None Center Freq 5.310000000 GHz Radio Device: BTS Ref 10.00 dBm Span 60 MHz Sweep 1 ms Center 5.31 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 16.3 dBm 36.246 MHz Transmit Freq Error 23.927 kHz **OBW Power** 99.00 % 40.53 MHz -26.00 dB x dB Bandwidth x dB STATUS



IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.51000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 11:56:24 PM Jan 17, 2017 Radio Std: None Center Freq 5.510000000 GHz Radio Device: BTS Ref 10.00 dBm Span 60 MHz Sweep 1 ms Center 5.51 GHz #Res BW 620 kHz #VBW 1.8 MHz 16.5 dBm Total Power **Occupied Bandwidth** 36.179 MHz 81.798 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 41.08 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) SENSE:PLLSE ALIGN OFF Center Freq: 5.55000000 GHz Trig:Free Run Avg|Hold>10/10 #Atten: 20 dB 11:57:14 PM Jan 17, 2017 Radio Std: None Center Freq 5.550000000 GHz Radio Device: BTS Ref 20.00 dBm Span 60 MHz Sweep 1 ms Center 5.55 GHz #Res BW 620 kHz #VBW 1.8 MHz 16.3 dBm Occupied Bandwidth Total Power 36.204 MHz Transmit Freq Error 58.077 kHz **OBW Power** 99.00 % x dB Bandwidth 40.48 MHz -26.00 dB x dB STATUS

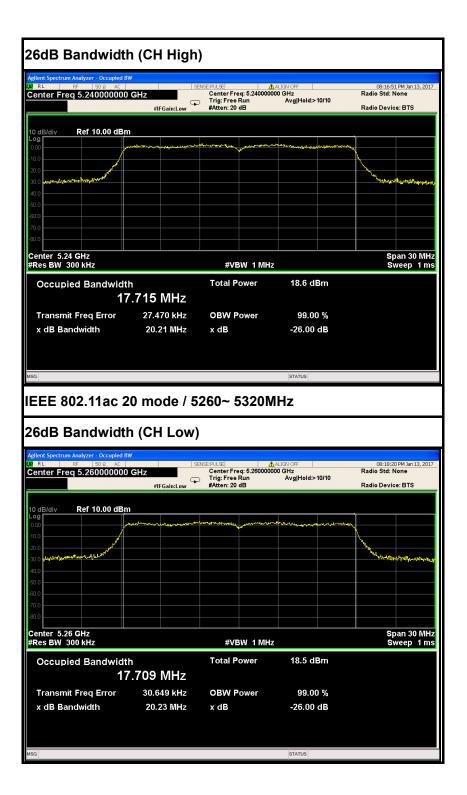




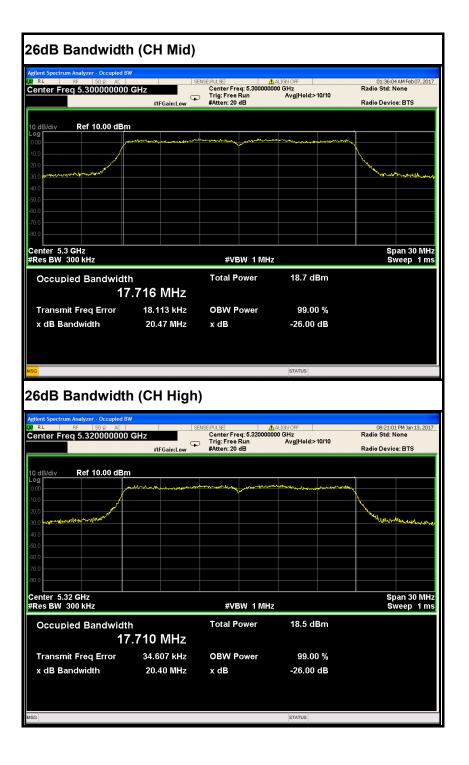


IEEE 802.11ac 20 mode / 5180 ~ 5240MHz 26dB Bandwidth (CH Low) #IFGain:Low #Atten: 20 dB 08:15:49 PM Jan 13, 2017 Radio Std: None Center Freq 5.180000000 GHz Radio Device: BTS Ref 10.00 dBm Center 5.18 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz 18.8 dBm Occupied Bandwidth Total Power 17.702 MHz Transmit Freq Error 38.889 kHz **OBW Power** 99.00 % x dB Bandwidth 20.31 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) 08:14:21 PM Jan 13, 2017 Radio Std: None #IFGain:Low #Atten: 20 dB x dB -26.00 dB Radio Device: BTS Ref 10.00 dBm Span 30 MHz Sweep 1 ms Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 18.8 dBm Occupied Bandwidth 17.711 MHz 41.769 kHz 99.00 % Transmit Freq Error **OBW Power** x dB Bandwidth 20.09 MHz -26.00 dB x dB STATUS





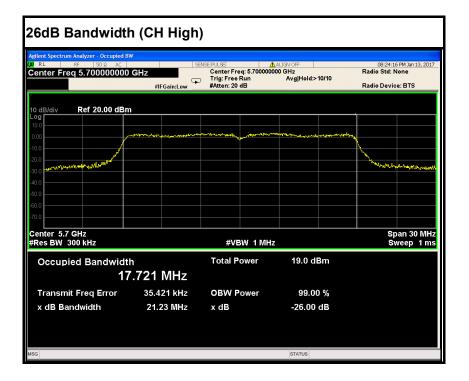






IEEE 802.11ac 20 mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 08:21:58 PM Jan 13, 2017 Radio Std: None #IFGain:Low #Atten: 20 dB Center Freq 5.500000000 GHz Radio Device: BTS Ref 20.00 dBm Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Occupied Bandwidth Total Power 19.7 dBm 17.709 MHz Transmit Freq Error 50.020 kHz **OBW Power** 99.00 % 20.45 MHz -26.00 dB x dB Bandwidth x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 08:23:26 PM Jan 13, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 20.00 dBm 0 dB/div warn the and the the Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.2 dBm 17.705 MHz Transmit Freq Error 43.099 kHz **OBW Power** 99.00 % x dB Bandwidth 20.29 MHz x dB -26.00 dB



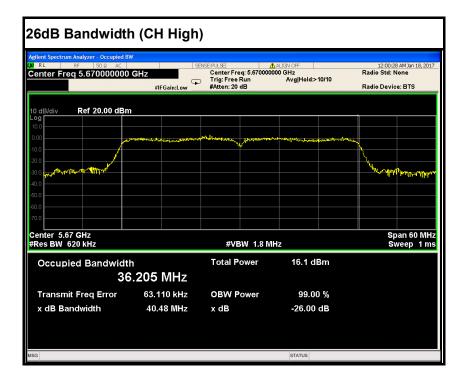


IEEE 802.11ac 40 mode / 5190 ~ 5230MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.19000000 GHz Trig: Free Run #/IFGein:Low #Atten: 20 dB ALIGN OFF ALIGN ALIGN OFF ALIGN ALIGN OFF ALIGN ALIGN OFF ALIGN ALIGN ALIGN OFF ALIGN ALIG 12:08:23 AM Jan 18, 2017 Radio Std: None Center Freq 5.190000000 GHz Radio Device: BTS Ref 20.00 dBm η<sup>ρα</sup>ίγ» wall\_\_\_\_ Span 60 MHz Sweep 1 ms Center 5.19 GHz #Res BW 620 kHz #VBW 1.8 MHz 17.3 dBm Total Power **Occupied Bandwidth** 36.237 MHz Transmit Freq Error 85.965 kHz **OBW Power** 99.00 % x dB Bandwidth 40.09 MHz x dB -26.00 dB 26dB Bandwidth (CH High) 12:07:32 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.23000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.230000000 GHz Radio Device: BTS Ref 20.00 dBm Span 60 MHz Sweep 1 ms Center 5.23 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 17.7 dBm 36.256 MHz Transmit Freq Error 49.383 kHz **OBW Power** 99.00 % 40.11 MHz -26.00 dB x dB Bandwidth x dB File <ScreenCapture.png> saved STATUS

IEEE 802.11ac 40 mode / 5270 ~ 5310MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.27000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:05:09 AM Jan 18, 2017 Radio Std: None Center Freq 5.270000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF will wh THE PARTY ۳Ŋ. The second Span 60 MHz Sweep 1 ms Center 5.27 GHz #Res BW 620 kHz #VBW 1.8 MHz 16.7 dBm Total Power **Occupied Bandwidth** 36.242 MHz Transmit Freq Error 44.774 kHz **OBW Power** 99.00 % x dB Bandwidth 40.32 MHz x dB -26.00 dB 26dB Bandwidth (CH High) 12:04:21 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.31000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.310000000 GHz Radio Device: BTS Ref 20.00 dBm /ጣኪ~ሶ Mr. Span 60 MHz Sweep 1 ms Center 5.31 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 16.3 dBm 36.207 MHz Transmit Freq Error 41.570 kHz **OBW Power** 99.00 % 40.20 MHz -26.00 dB x dB Bandwidth x dB STATUS

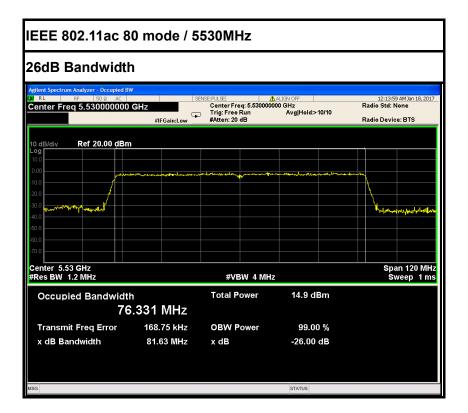
IEEE 802.11ac 40 mode / 5510 ~ 5670MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.51000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:02:57 AM Jan 18, 2017 Radio Std: None Center Freq 5.510000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF n h all a reality of the second second Span 60 MHz Sweep 1 ms Center 5.51 GHz #Res BW 620 kHz #VBW 1.8 MHz 16.6 dBm Total Power **Occupied Bandwidth** 36.211 MHz 100.23 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 40.49 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) 12:02:05 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.55000000 GHz Trig:Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.550000000 GHz Radio Device: BTS Ref 20.00 dBm all when a start Span 60 MHz Sweep 1 ms Center 5.55 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 16.8 dBm 36.195 MHz Transmit Freq Error 70.841 kHz **OBW Power** 99.00 % x dB Bandwidth 40.23 MHz -26.00 dB x dB STATUS





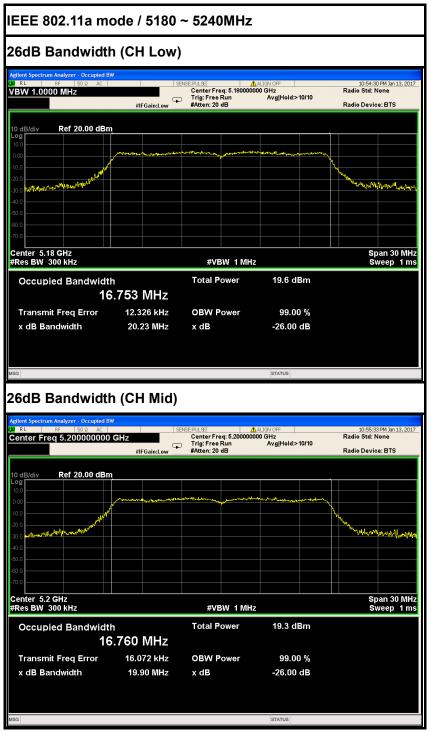
EEE 802.11ac 80	0 mode / 5	210MHz		
26dB Bandwidth	)			
Agilent Spectrum Analyzer - Occupied BW				
RL RF 50Ω AC Ref Value 20.00 dBm	#IFGain:Low	Center Freq: 5.210000	ALIGN OFF D00 GHz Avg Hold:>10/10	12:11:37 AM Jan 18, 2017 Radio Std: None Radio Device: BTS
10 dB/div Ref 20.00 dBm				
0.00				
-10.0	· · · · · · · · · · · · · · · · · · ·			
-20.0				
-40.0				Multimetermanelowski
-50.0				
-60.0				
				Span 120 MHz
Center 5.21 GHz #Res BW 1.2 MHz		#VBW 4 MH:	z	Span 120 MHz Sweep 1 ms
Occupied Bandwidth 76.	.271 MHz	Total Power	13.7 dBm	
Transmit Freq Error	159.69 kHz	OBW Power	99.00 %	
x dB Bandwidth	81.63 MHz	x dB	-26.00 dB	
	0 mode / 5	290MHz	STATUS	
≝≊ EEE 802.11ac 80 26dB Bandwidth		290MHz	STATUS	
EEE 802.11ac 80 26dB Bandwidth Aglient Spectrum Analyzer Occupied BW	l			12-12-17 AM Jan 18, 2017
EEE 802.11ac 80 26dB Bandwidth Agitent Spectrum Analyzer - Occupied BW	GHz	ENSEIPULSE 2 Center Freq: 5.290000 Teinte Freq: 5.290000	ALIGN OFF	12:12:17 AMJan 18, 2017 Radio Std: None
EEE 802.11ac 80 26dB Bandwidth Agitent Spectrum Analyzer - Occupied BW		ENSEIPULSE 2 Center Freq: 5.290000 Teinte Freq: 5.290000		
EEE 802.11ac 80 26dB Bandwidth Aglient Spectrum Analyzer - Occupied BW R RL RF 50.8 AC Center Freq 5.290000000 C	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None
EEE 802.11ac 8 26dB Bandwidth Aglient Spectrum Analyzer - Occupied BW R R - RF - 500 AC Center Freq 5.2900000000 (	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None
EEE 802.11ac 80 26dB Bandwidth Agilent Spectrum Analyzer - Occupied BW R RL RF 500 AC Center Freq 5.2900000000 0 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None
EEE 802.11ac 80 26dB Bandwidth Aglent Spectrum Analyzer - Occupied BW M RL RF 50.9 AC Center Freq 5.2900000000 C 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None
EEE 802.11ac 80 26dB Bandwidth Aglent Spectrum Analyzer - Occupied BW MRL BF 50.0 AC Center Freq 5.2900000000 0 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None Radio Device: BTS
EEE 802.11ac 80	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None
EEE 802.11ac 8( 26dB Bandwidth Aglent Spectrum Analyzer - Occupied DW RL RF 500 AC Center Freq 5.2900000000 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 Trig: Free Run	ALIGN OFF	Radio Std: None Radio Device: BTS
EEE 802.11ac 8( 26dB Bandwidth Addent Spectrum Analyzer - Occupied BW R RL 95 500 AC Center Freq 5.2900000000 ( 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 7 Trig: Free Run	ALIGN OFF	Radio Std: None Radio Device: BTS
EEE 802.11ac 80 26dB Bandwidth Aglient Spectrum Analyzer - Occupied BW RL RF 50.0 AC Center Freq 5.2900000000 (C 10 dB/dly Ref 20.00 dBm 10	GHz	ENSE.PULSE 2 Center Freq: 5.290000 Trig: Free Run #Atten: 20 dB	ALIGN OFF OO GHz Avg Hold>10/10	Radio Std: None Radio Device: BTS
EEE 802.11ac 8( 26dB Bandwidth Aglent Spectrum Analyzer - Occupied DW R R R 500 AC Center Free 5.2900000000 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm	GHz	ENSEIPULSE d Center Freq: 5.290000 7 Trig: Free Run	ALIGN OFF OO GHz Avg Hold>10/10	Radio Std: None Radio Device: BTS
EEE 802.11ac 80	GHZ #IFGain:Low	ENSE.PULSE 2 Center Freq: 5.290000 Trig: Free Run #Atten: 20 dB	ALIGN OFF OO GHz Avg Hold>10/10	Radio Std: None Radio Device: BTS
EEE 802.11ac 80	GHz #IFGain:Low	ENSE-PULSE Center Freq: 5.29000 Trig: Free Run #Atten: 20 dB	ALIGN OFF	Radio Std: None Radio Device: BTS
EEE 802.11ac 80 26dB Bandwidth Aglent Spectrum Analyzer - Occupied IW RL IF 50.0 AC Center Freq 5.29000000000 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	GHz #IFGain:Low	ENSEPULSE // Center Freq: 5.290000 Trig: Free Run #Atten: 20 dB // Center Freq: 5.290000 #Atten: 20 dB // Center Freq: 5.2900000 // Center Freq: 5.290000 // Center Freq: 5.2900000 // Center Freq: 5.29000000 // Center Freq: 5.29000000000 // Center Freq: 5.29000000000000000000000000000000000000	ALIGN OFF OP OF H2 Avg Hold>10/10	Radio Std: None Radio Device: BTS



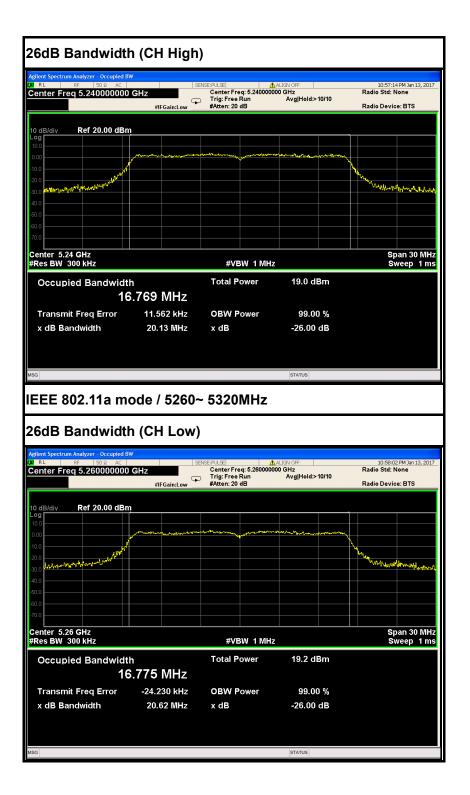




### Antenna 2







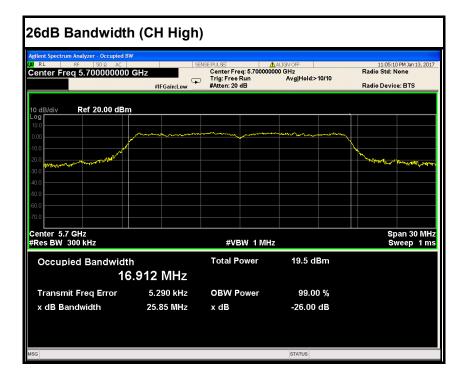






IEEE 802.11a mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 11:01:24 PM Jan 13, 2017 Radio Std: None #IFGain:Low #Atten: 20 dB Center Freq 5.500000000 GHz Radio Device: BTS Ref 20.00 dBm Not the second Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 20.0 dBm **Occupied Bandwidth** 16.817 MHz Transmit Freq Error 14.283 kHz **OBW Power** 99.00 % 22.65 MHz -26.00 dB x dB Bandwidth x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 11:03:37 PM Jan 13, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 20.00 dBm 0 dB/div Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.4 dBm 16.822 MHz Transmit Freq Error 89 Hz **OBW Power** 99.00 % x dB Bandwidth 20.88 MHz x dB -26.00 dB

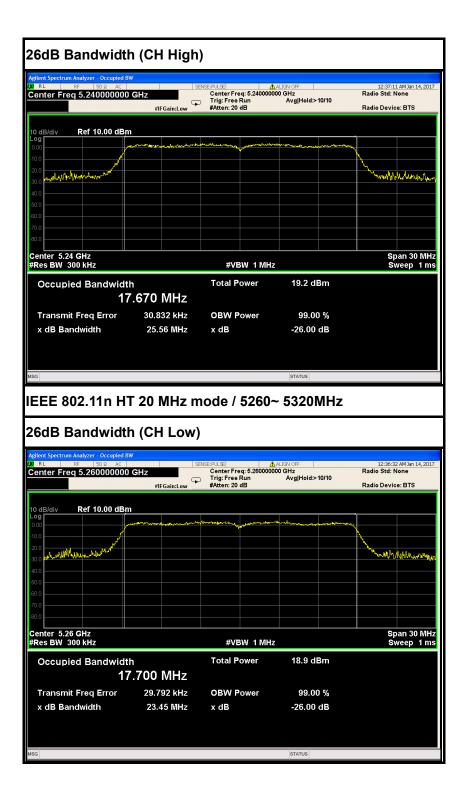




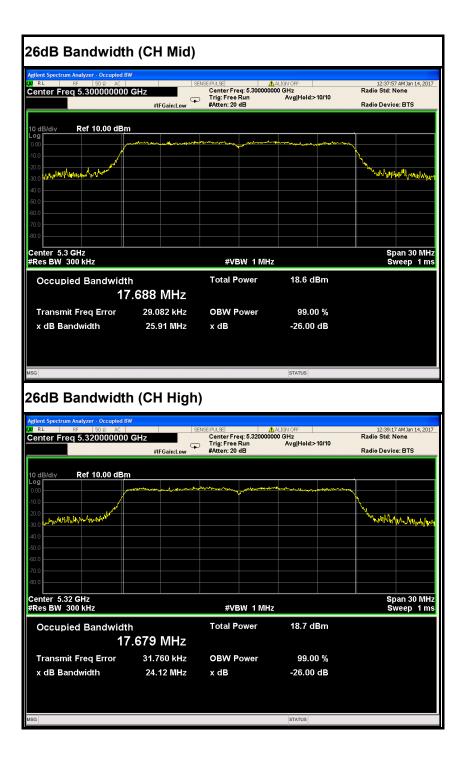


IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz 26dB Bandwidth (CH Low) 12:33:54 AM Jan 14, 201 Radio Std: None Center Freq: 5.18000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB x dB -26.00 dB Radio Device: BTS #IFGain:Low Ref 10.00 dBm 0 dB/di and Marking ll a Ab Span 30 MHz Sweep 1 ms Center 5.18 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 19.7 dBm Occupied Bandwidth 17.690 MHz **OBW Power** Transmit Freq Error 47.752 kHz 99.00 % x dB Bandwidth 27.13 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) ctrum Analyzer - Occupied BW #IFGain:Low #Atten: 20 dB 12:34:33 AM Jan 14, 2017 Radio Std: None Center Freq 5.200000000 GHz Radio Device: BTS Ref 10.00 dBm Washing the har war and a second www Span 30 MHz Sweep 1 ms Center 5.2 GHz #Res BW 300 kHz #VBW 1 MHz 19.4 dBm Total Power **Occupied Bandwidth** 17.672 MHz Transmit Freq Error 37.606 kHz **OBW Power** 99.00 % x dB Bandwidth 27.04 MHz x dB -26.00 dB STATUS





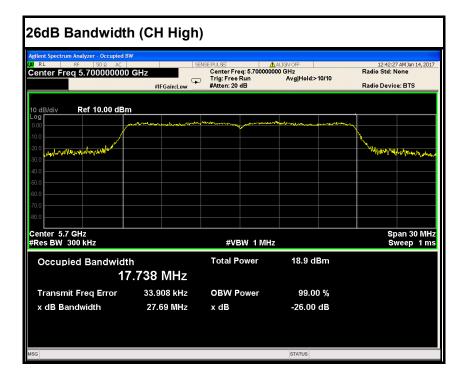




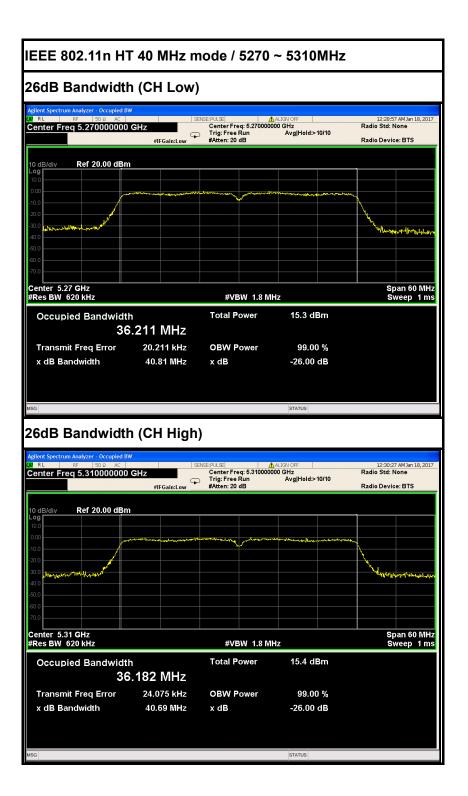


IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 12:40:07 AM Jan 14, 2017 Radio Std: None #IFGain:Low #Atten: 20 dB Center Freq 5.500000000 GHz Radio Device: BTS Ref 10.00 dBm William Jack M Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 19.9 dBm **Occupied Bandwidth** 17.721 MHz 44.825 kHz Transmit Freq Error **OBW Power** 99.00 % 25.54 MHz -26.00 dB x dB Bandwidth x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:41:37 AM Jan 14, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 10.00 dBm 0 dB/div hadhaverstander howhold MM Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.1 dBm 17.708 MHz Transmit Freq Error 35.244 kHz **OBW Power** 99.00 % x dB Bandwidth 25.41 MHz x dB -26.00 dB



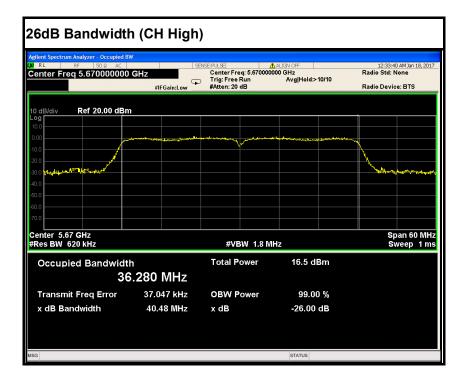


IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.19000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:26:41 AM Jan 18, 2017 Radio Std: None Center Freq 5.190000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF Span 60 MHz Sweep 1 ms Center 5.19 GHz #Res BW 620 kHz #VBW 1.8 MHz 15.9 dBm Total Power **Occupied Bandwidth** 36.215 MHz 52.999 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 40.54 MHz x dB -26.00 dB STATUS 26dB Bandwidth (CH High) 12:28:17 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.23000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.230000000 GHz Radio Device: BTS Ref 20.00 dBm Span 60 MHz Sweep 1 ms Center 5.23 GHz #Res BW 620 kHz #VBW 1.8 MHz 15.5 dBm Occupied Bandwidth Total Power 36.207 MHz Transmit Freq Error 53.023 kHz **OBW Power** 99.00 % x dB Bandwidth 40.77 MHz -26.00 dB x dB STATUS

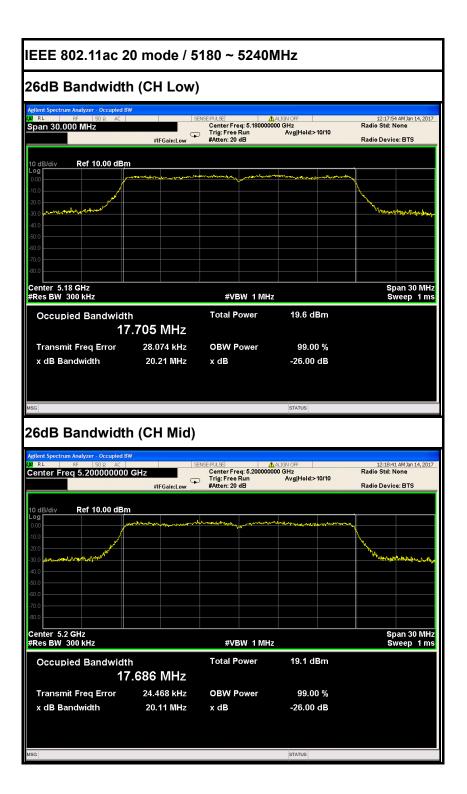


IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.51000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:31:14 AM Jan 18, 2017 Radio Std: None Center Freq 5.510000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF Wellman a de la ca Span 60 MHz Sweep 1 ms Center 5.51 GHz #Res BW 620 kHz #VBW 1.8 MHz 17.6 dBm Total Power **Occupied Bandwidth** 36.230 MHz 82.562 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 40.69 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) 12:32:45 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.55000000 GHz Trig:Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.550000000 GHz Radio Device: BTS Ref 20.00 dBm John Span 60 MHz Sweep 1 ms Center 5.55 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 16.9 dBm 36.201 MHz Transmit Freq Error 61.508 kHz **OBW Power** 99.00 % x dB Bandwidth 40.74 MHz -26.00 dB x dB STATUS

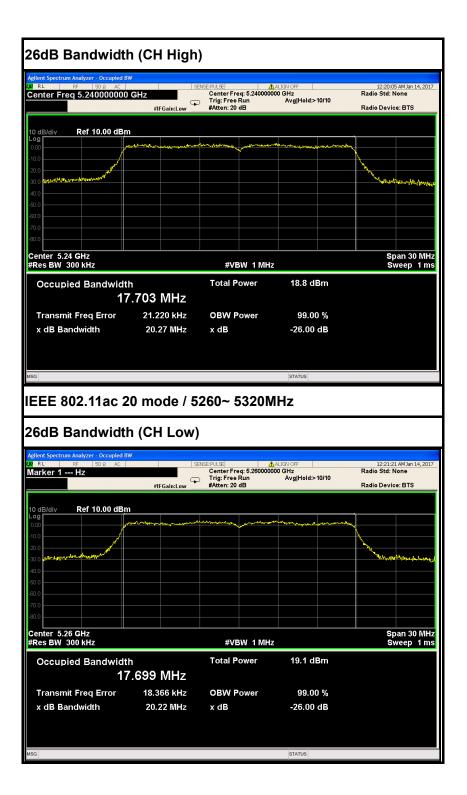












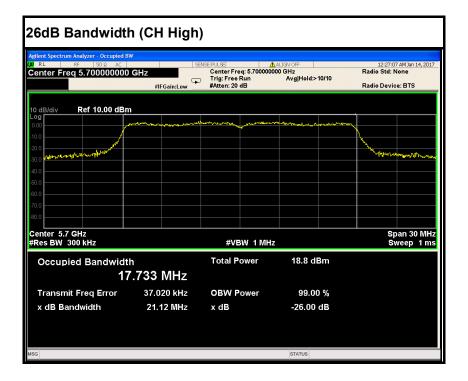




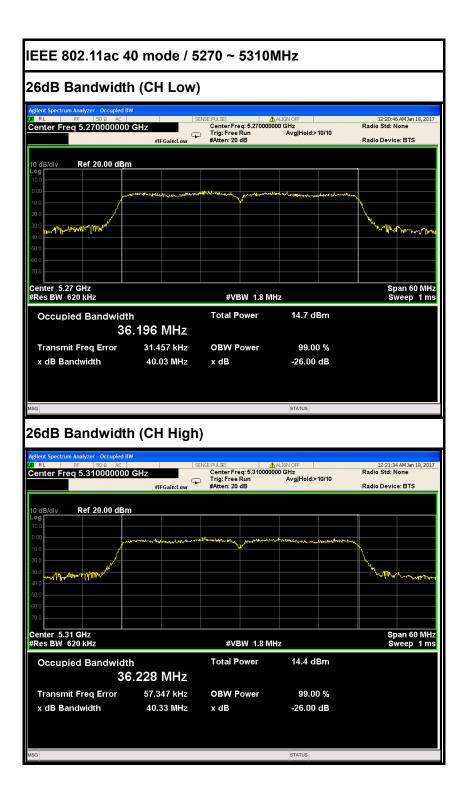


IEEE 802.11ac 20 mode / 5500 ~ 5700MHz 26dB Bandwidth (CH Low) 12:24:53 AM Jan 14, 2017 Radio Std: None #IFGain:Low #Atten: 20 dB Center Freq 5.500000000 GHz Radio Device: BTS Ref 10.00 dBm Span 30 MHz Sweep 1 ms Center 5.5 GHz #Res BW 300 kHz #VBW 1 MHz Total Power 19.8 dBm **Occupied Bandwidth** 17.723 MHz Transmit Freq Error 34.957 kHz **OBW Power** 99.00 % -26.00 dB x dB Bandwidth 20.11 MHz x dB STATUS 26dB Bandwidth (CH Mid) I SENSE PULSE ALTON OFF Center Freq: 5.58000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:25:42 AM Jan 14, 2017 Radio Std: None Center Freq 5.580000000 GHz Radio Device: BTS Ref 10.00 dBm 0 dB/div Center 5.58 GHz #Res BW 300 kHz Span 30 MHz Sweep 1 ms #VBW 1 MHz **Occupied Bandwidth** Total Power 19.4 dBm 17.707 MHz Transmit Freq Error 21.657 kHz **OBW Power** 99.00 % x dB Bandwidth 20.25 MHz x dB -26.00 dB



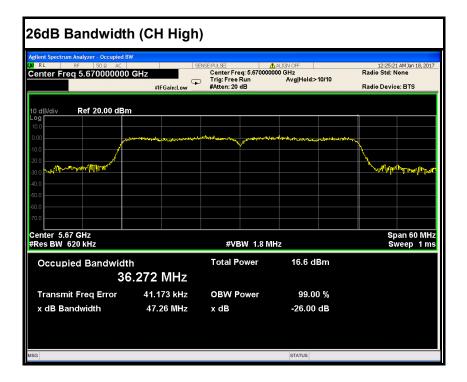


IEEE 802.11ac 40 mode / 5190 ~ 5230MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.19000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:18:30 AM Jan 18, 2017 Radio Std: None Center Freq 5.190000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF wallow warming MIN MINT TO M Span 60 MHz Sweep 1 ms Center 5.19 GHz #Res BW 620 kHz #VBW 1.8 MHz 14.9 dBm Total Power **Occupied Bandwidth** 36.183 MHz Transmit Freq Error 88.752 kHz **OBW Power** 99.00 % x dB Bandwidth 42.28 MHz x dB -26.00 dB 26dB Bandwidth (CH High) 12:19:14 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.23000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.230000000 GHz Radio Device: BTS Ref 20.00 dBm Mon Marth Span 60 MHz Sweep 1 ms Center 5.23 GHz #Res BW 620 kHz #VBW 1.8 MHz 15.0 dBm Occupied Bandwidth Total Power 36.162 MHz Transmit Freq Error 40.692 kHz **OBW Power** 99.00 % x dB Bandwidth 40.04 MHz -26.00 dB x dB STATUS

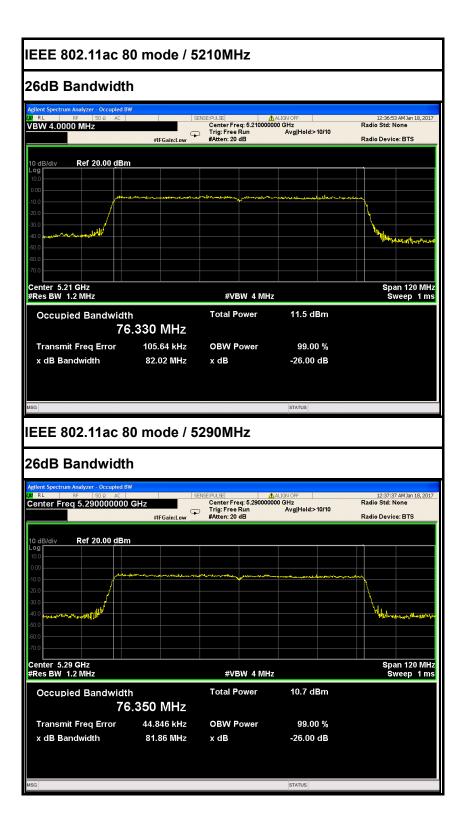


IEEE 802.11ac 40 mode / 5510 ~ 5670MHz 26dB Bandwidth (CH Low) I SENSE/PULSE Center Freq: 5.51000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 12:23:07 AM Jan 18, 2017 Radio Std: None Center Freq 5.510000000 GHz Radio Device: BTS Ref 20.00 dBm 10 dF ጠካጥ 1700 hundred and a second Span 60 MHz Sweep 1 ms Center 5.51 GHz #Res BW 620 kHz #VBW 1.8 MHz 18.1 dBm Total Power **Occupied Bandwidth** 36.283 MHz 67.704 kHz **OBW Power** 99.00 % Transmit Freq Error x dB Bandwidth 43.10 MHz x dB -26.00 dB 26dB Bandwidth (CH Mid) 12:23:52 AM Jan 18, 2017 Radio Std: None SENSE:PLLSE ALIGN OFF Center Freq: 5.55000000 GHz Trig:Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freq 5.550000000 GHz Radio Device: BTS Ref 20.00 dBm Span 60 MHz Sweep 1 ms Center 5.55 GHz #Res BW 620 kHz #VBW 1.8 MHz Occupied Bandwidth Total Power 17.5 dBm 36.244 MHz Transmit Freq Error 65.769 kHz **OBW Power** 99.00 % x dB Bandwidth 40.34 MHz -26.00 dB x dB STATUS

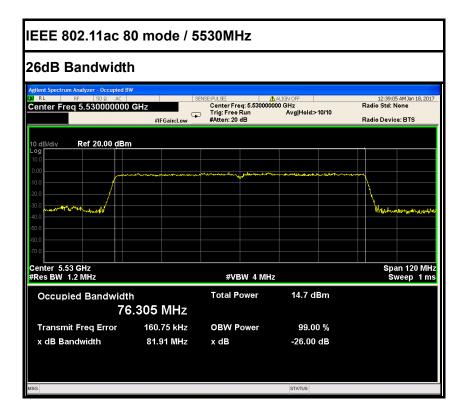














# 6.2 6dB BANDWIDTH MEASUREMENT

### 6.2.1 LIMITS

According to §15.407(e), Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

## 6.2.2 TEST INSTRUMENTS

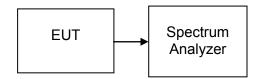
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

### 6.2.3 TEST PROCEDURES (please refer to measurement standard)

### 8.2 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW  $\geq$  3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$  6 dB.

# 6.2.4 TEST SETUP





# 6.2.5 TEST RESULTS

No non-compliance noted

### <u>Test Data</u>

#### Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz) 6dB Bandwidth(B) (MHz)		Limit	Test Result	
		Antenna 1	Antenna 2	(kHz)	
Low	5745	16.35	16.36		PASS
Mid	5785	16.35	16.36	>500	PASS
High	5825	16.35	16.34		PASS

#### Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

	Frequency	6dB Bandwidth(B) (MHz)		Limit	Test Result
	(MHz)	Antenna 1	Antenna 2	(kHz)	
Low	5745	17.56	17.53		PASS
Mid	5785	17.40	17.53	>500	PASS
High	5825	17.53	17.55		PASS

#### Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)		dwidth(B) IHz)	Limit (kHz)	Test Result
		Antenna 1	Antenna 2	(KПZ)	
Low	5755	35.92	35.47	> 500	PASS
High	5795	35.43	35.70	>500	PASS

### Test mode: IEEE 802.11ac 20 mode / 5745 ~ 5825MHz

Channel	Frequency	6dB Bandwidth(B) (MHz)		Limit	Test Result
	(MHz)	Antenna 1	Antenna 2	(kHz)	
Low	5745	17.61	17.61		PASS
Mid	5785	17.30	17.59	>500	PASS
High	5825	17.35	17.58		PASS

#### Test mode: IEEE 802.11ac 40 mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)		dwidth(B) Hz)	Limit (kHz)	Test Result
		Antenna 1	Antenna 2	(KПZ)	
Low	5755	35.70	35.70	>500	PASS
High	5795	35.97	35.70	/500	PASS

#### Test mode: IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)		dwidth(B)  Hz)	Limit	Test Result	
		Antenna 1	Antenna 2	(kHz)		
	5775	76.45	76.47	>500	PASS	

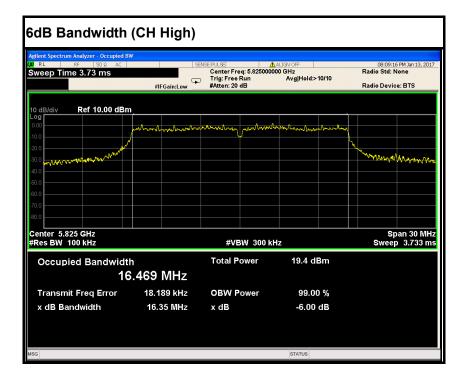


### <u>Test Plot</u>

### Antenna 1

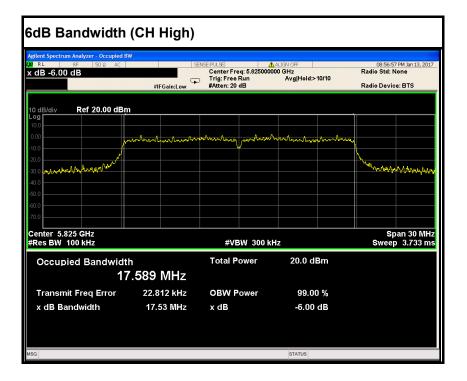
EEE 802.11a mo	ode / 5745	~ 5825MHz		
dB Bandwidth	(CH Low)			
gilent Spectrum Analyzer - Occupied BV	V			
RL RF 50Ω AC	S	Center Freq: 5.7450000	ALIGN OFF	08:04:37 PM Jan 13, 2017 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold>10/10	Radio Device: BTS
0 dB/div Ref 10.00 dBm				
.00	water Anna Maria	maran mary mandaned	hand and marking	
0.0				Why was a
0.0 Winner and a regarder of the				www.anananananananananananananananananan
J.O				
.0				
0.0				
D.0				
enter 5.745 GHz Res BW 100 kHz		#VBW 300 k	Hz	Span 30 MHz Sweep 3.733 ms
Occupied Bandwidtl	•	Total Power	19.2 dBm	
	.485 MHz			
Transmit Freq Error	16.181 kHz	OBW Power	99.00 %	
x dB Bandwidth	16.35 MHz	x dB	-6.00 dB	
			0.000 42	
G			STATUS	
dB Bandwidth	(CH Mid)			
gilent Spectrum Analyzer - Occupied BV				
RL RF 50Ω AC		Center Freq: 5.7850000		08:06:49 PM Jan 13, 2017 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:>10/10	Radio Device: BTS
0 dB/div Ref 10.00 dBm				
0.00	montomation	mansal wenter	her monormound	
0.0				
D.O when the same had a far				monuntellingungener
0.0				
0.0				
0.0				
0.0				
enter 5.785 GHz		#\/B\%_200-b	u	Span 30 MHz
Res BW 100 kHz		#VBW 300 k		Sweep 3.733 ms
Occupied Bandwidtl		Total Power	19.1 dBm	
16	.474 MHz			
Transmit Freq Error	25.464 kHz	OBW Power	99.00 %	
	46.06 MUL	x dB	-6.00 dB	
x dB Bandwidth	16.35 MHz	X UD	0.00 42	
	16.35 WHZ			
	10.35 MHZ	X (1)		





IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz 6dB Bandwidth (CH Low) Occupied B Center Freq: 5.744997000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB 08:53:31 PM Jan 13, 20: Radio Std: None VBW 300.00 kHz  $\mathbf{r}$ Radio Device: BTS #IFGain:Low Ref 20.00 dBm 0 dB/di Mandre www.www.www. www.Wwww Span 30 MHz Sweep 3.733 ms Center 5.745 GHz #Res BW 100 kHz #VBW 300 kHz Total Power 19.2 dBm Occupied Bandwidth 17.590 MHz 23.773 kHz Transmit Freq Error **OBW Power** 99.00 % x dB Bandwidth 17.56 MHz -6.00 dB x dB 6dB Bandwidth (CH Mid) Center Freq: 5.78500000 GHz Trig: Free Run #IFGain:Low #Atten: 20 dB 08:54:30 PM Jan 13, 2017 Radio Std: None Center Freq 5.785000000 GHz Radio Device: BTS Ref 20.00 dBm Marth manahamma www. Span 30 MHz Sweep 3.733 ms Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Total Power 19.7 dBm Occupied Bandwidth 17.595 MHz Transmit Freq Error 29.578 kHz **OBW Power** 99.00 % x dB Bandwidth 17.40 MHz x dB -6.00 dB STATUS





IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz 6dB Bandwidth (CH Low) Center Freq: 5.755000000 GHz
Trig: Free Run Avg|Hold>10/10
#Atten: 20 dB 09:14:59 PM Jan 13, 20 Radio Std: None VBW 300.00 kHz Radio Device: BTS #IFGain:Low Ref 20.00 dBm Anders dated at Anda Span 60 MHz Sweep 7.467 ms Center 5.755 GHz #Res BW 100 kHz #VBW 300 kHz Occupied Bandwidth Total Power 19.0 dBm 36.052 MHz 63.380 kHz Transmit Freq Error **OBW Power** 99.00 % x dB Bandwidth 35.92 MHz x dB -6.00 dB 6dB Bandwidth (CH High) 09:15:37 PM Jan 13, 2017 Radio Std: None SE-PULSE ALIGN OFF Center Freq: 5.795000000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 20 dB Center Freg 5.795000000 G #IFGain:Low Radio Device: BTS Ref 20.00 dBm 10 dB And www.mahabetrutusta h halat Center 5.795 GHz #Res BW 100 kHz Span 60 MHz Sweep 7.467 ms #VBW 300 kHz 19.4 dBm Occupied Bandwidth Total Power 36.038 MHz Transmit Freq Error 65.076 kHz **OBW Power** 99.00 % 35.43 MHz x dB Bandwidth x dB -6.00 dB STATUS