

FCC TEST REPORT  
for  
iTon Technology Corp.

BW2570-PCIE  
Model No.: BW2570-PCIE

Prepared for : iTon Technology Corp.  
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International Innovation Center (Futian Technology Square),  
Futian District, Shenzhen, China

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Report Number : R011609746Z  
Date of Test : Oct. 08~ 17, 2016  
Date of Report : Oct. 17, 2016

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## TEST REPORT

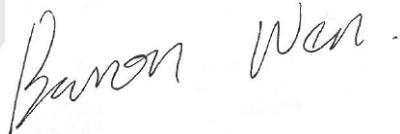
Applicant : iTon Technology Corp.  
Manufacturer : iTon Technology Corp.  
EUT : BW2570-PCIE  
Model No. : BW2570-PCIE  
Serial No. : N.A.  
Trade Mark : N.A.  
Rating : DC 3.3V, 680mA

Measurement Procedure Used:  
FCC Part15 Subpart E 2016, Paragraph 15.407

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Oct. 08~17, 2016



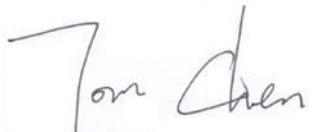
Prepared by :

(Tested Engineer / Baron Wen)



Reviewer :

(Project Manager / Amy Ding)



Approved & Authorized Signer :

(Manager / Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : BW2570-PCIE

Model Number : BW2570-PCIE  
(Note: During the test, the EUT is inserted into the PC)

Test Power Supply : DC 3.3V from the PC (AC 120V/60Hz for PC)

Frequency	Types of module	Operating Frequency
	BT 4.1+EDR	2402-2480MHz
	WiFi 2.4G (802.11b/ g/ n(HT20))	2412-2462MHz
	WiFi 2.4G (802.11n(HT40))	2422-2452MHz
	WiFi 5G (802.11a/ n(HT20)/ ac(HT20))	5180-5240MHz & 5745-5825MHz
	WiFi 5G (802.11n(HT40)/ ac(HT40))	5190MHz-MHz & 5755-5795MHz
	WiFi 5G (802.11ac(HT80))	5210MHz & 5775MHz

Antenna Spec. : 5 dBi

Modulation : BT EDR: GFSK,  $\pi/4$ DQPSK, 8DPSK  
BT 4.1: GFSK  
WiFi:  
802.11a OFDM, 802.11b CCK; 802.11g OFDM, 802.11n MCS;  
802.11ac MCS

Applicant : iTon Technology Corp.  
Address : 7 Floor East, Building C, No. 1006 Shennan Road, Shenzhen  
International Innovation Center (Futian Technology Square), Futian  
District, Shenzhen, China

Manufacturer/ Factory : iTon Technology Corp.  
Address : Room A1302, Building 4, Tianan Cyber Park, Huangge Rd.,  
Longgang, Shenzhen, China

Date of receipt : Sept. 23, 2016

Date of Test : Oct. 08~ 17, 2016

Remark : This report is for WiFi 5G.

## 1.2. Auxiliary Equipment Used during Test

PC

: Manufacturer: DELL  
M/N: Optiplex 3020 MT  
S/N: CN-079V51-70163-4AD-089K-A00  
Input Rating: AC 100-240V, 50-60Hz 5.4A  
CE , FCC DOC, CCC

MONITOR

: Manufacturer: DELL  
M/N: UZ2215Hf  
S/N: CN-035VN6-72872-45A-A3AB  
Input Rating: AC 100-240V, 50-60Hz, 1.5A  
Output Rating: DC 19.5V, 4.62A  
TUV-GS FCC CE KCC VCCI

KEYBOARD

: Manufacturer: DELL  
M/N: SK-8120  
S/N: CN-0DJ365-71616-49J-0MVR-A00  
Input Rating: DC 5V,0.05A  
CE FCC VCCI KCC TUV-GS  
Cable: 1.8m, unshielded

MOUSE

: Manufacturer: DELL  
M/N: MS111-T  
S/N: CN-0KW2YH-71616-488-1CBJ  
Input Rating: DC 5V,0.1A  
Cable: 1.8m, unshielded  
CE FCC VCCI KCC TUV-GS

Printer

: Manufacturer:Brother  
M/N: MFC-3360C  
S/N: N/A  
CE, FCC:DOC

Power Line

: Non-Shielded, 1.5m

VGA Cable

: Non-Shielded, 1.5m

### 1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### **FCC-Registration No.: 752021**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

#### **IC-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, Jun. 13, 2016.

#### **Test Location**

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

### 1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1 dB (Horizontal)  
Ur = 4.3 dB (Vertical)

Conduction Uncertainty : Uc = 3.4dB

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC Part 15, Paragraph 15.247.

### 2.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result
FCC Part 15, Paragraph 15.207 & 15.407	Conducted Emission	PASS
FCC Part 15, Paragraph 15.407(b)(1)(4)(5)(7)	Undesirable Emission Restricted Band	PASS
FCC Part 15, Paragraph 15.407(a)(1)	26dB Bandwidth	PASS
FCC Part 15, Paragraph 15.407(a)(1)(2)(3)	Maximum Conducted Output Power	PASS
FCC Part 15, Paragraph 15.407(a)(1)(2)(3)	Peak Power Spectral Density	PASS
FCC Part 15, Paragraph 15.203	Antenna Requirement	PASS

### 2.2. Description of Test Modes

The EUT has been tested under operating condition.

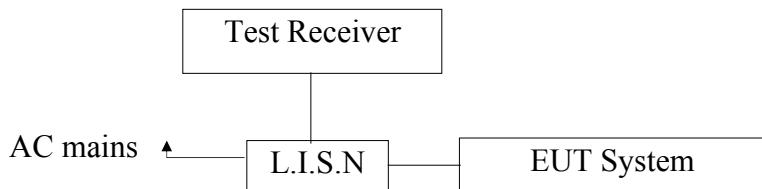
Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Mode	Test channel	Mode	Test channel
IEEE802.11a	5180MHz	IEEE802.11a	5745MHz
	5200MHz		5785MHz
	5240MHz		5825MHz
IEEE802.11n(HT20)	5180MHz	IEEE802.11n(HT20)	5745MHz
	5200MHz		5785MHz
	5240MHz		5825MHz
IEEE802.11n(HT40)	5190MHz	IEEE802.11n(HT40)	5755MHz
	5230MHz		5795MHz
IEEE802.11ac(HT20)	5180MHz	IEEE802.11ac(HT20)	5745MHz
	5200MHz		5785MHz
	5240MHz		5825MHz
IEEE802.11ac(HT40)	5190MHz	IEEE802.11ac(HT40)	5755MHz
	5230MHz		5795MHz
IEEE802.11ac(HT80)	5210MHz	IEEE802.11ac(HT80)	5775MHz

### 3. Conducted Emission Test

#### 3.1. Block Diagram of Test Setup

##### 3.1.1. Block diagram of connection between the EUT and simulators



#### 3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB( $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The lower limit shall apply at the transition frequencies.

#### 3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

#### 3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown as Section 3.1.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Let the EUT work in test mode (ON) and measure it.

### 3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

### 3.6. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 16, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 16, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 16, 2016	1 Year

### 3.7. Power Line Conducted Emission Measurement Results

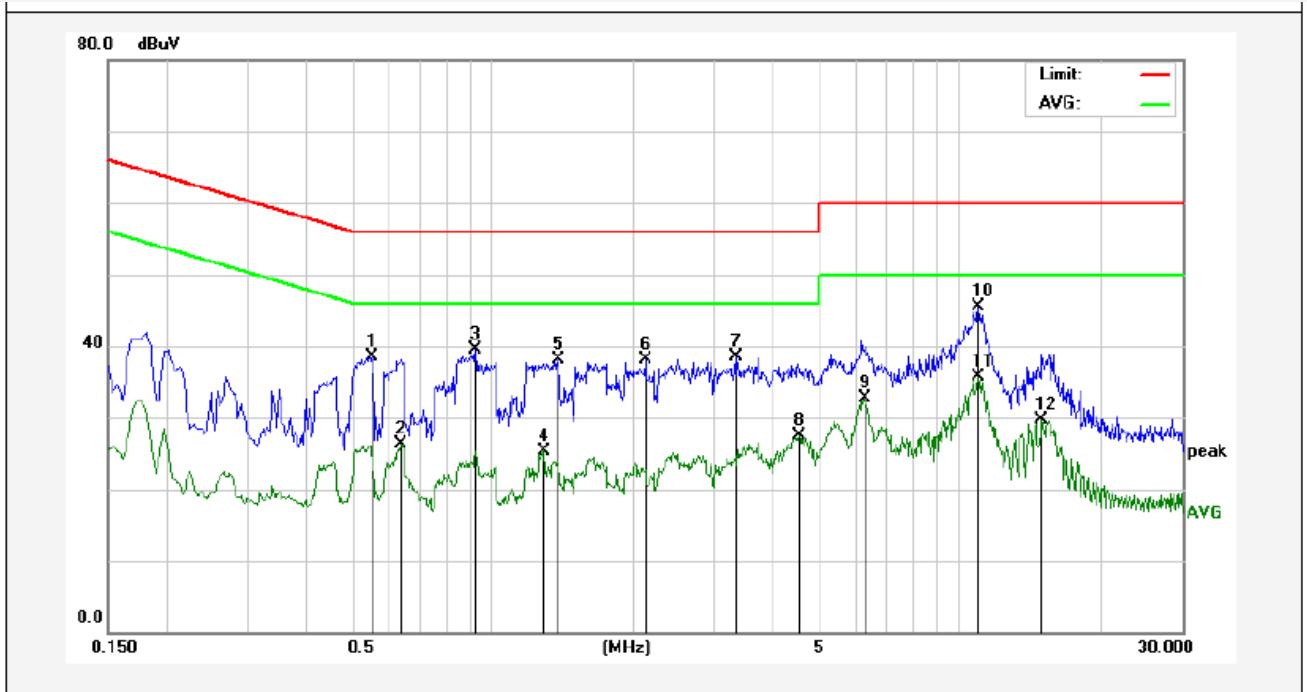
**PASS.**

The frequency range from 150KHz to 30 MHz is investigated.

The EUT was tested on (ON) Mode is attached in the following pages.

**CONDUCTED EMISSION TEST DATA**

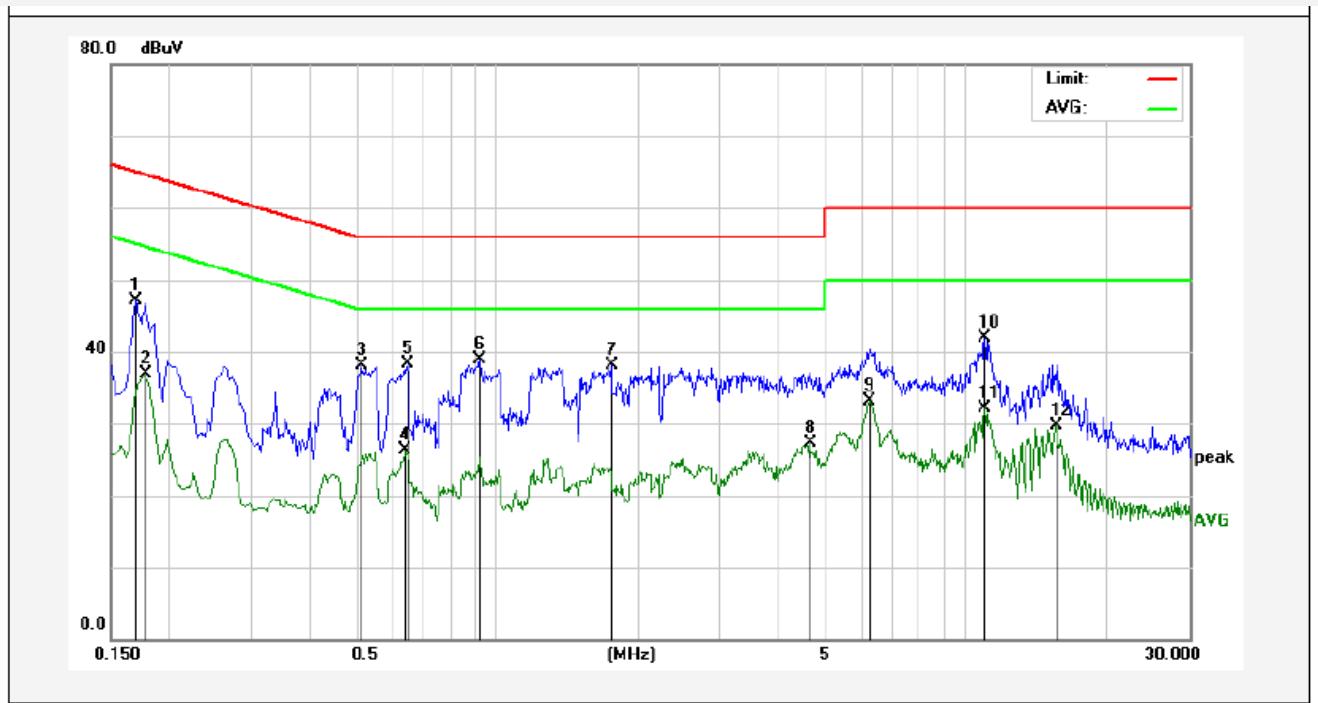
Test Site: 1# Shielded Room  
 Operating Condition: ON  
 Test Specification: AC 120V, 60Hz for PC  
 Comment: Live Line  
 Tem.:25°C Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.5540	18.60	19.98	38.58	56.00	-17.42	QP	
2	0.6380	6.40	20.01	26.41	46.00	-19.59	AVG	
3	0.9220	19.59	20.10	39.69	56.00	-16.31	QP	
4	1.2900	5.40	20.13	25.53	46.00	-20.47	AVG	
5	1.3820	18.13	20.13	38.26	56.00	-17.74	QP	
6	2.1220	18.04	20.15	38.19	56.00	-17.81	QP	
7	3.3220	18.55	20.16	38.71	56.00	-17.29	QP	
8	4.5380	7.54	20.18	27.72	46.00	-18.28	AVG	
9	6.2460	12.65	20.19	32.84	50.00	-17.16	AVG	
10	10.9819	25.48	20.34	45.82	60.00	-14.18	QP	
11	10.9819	15.73	20.34	36.07	50.00	-13.93	AVG	
12	15.0420	9.70	20.26	29.96	50.00	-20.04	AVG	

**CONDUCTED EMISSION TEST DATA**

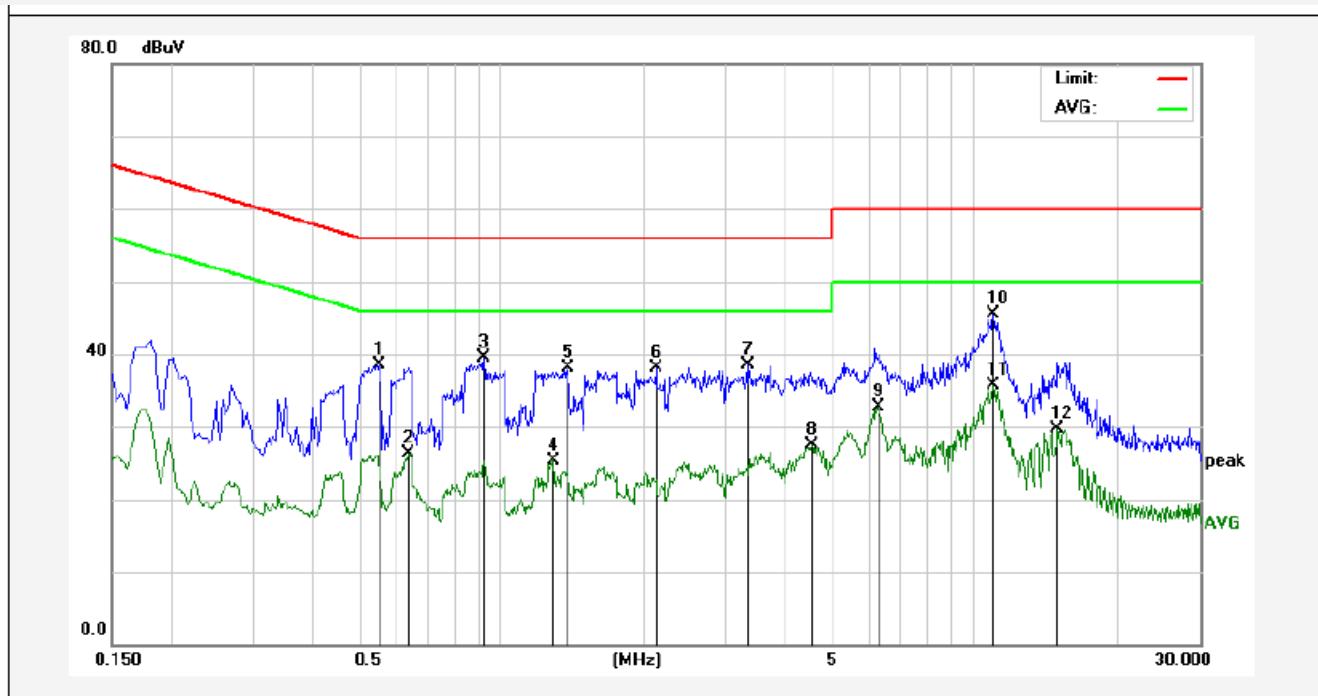
Test Site: 1# Shielded Room  
 Operating Condition: ON  
 Test Specification: AC 120V, 60Hz for PC  
 Comment: Neutral Line  
 Tem.:25°C Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1700	27.11	19.90	47.01	64.96	-17.95	QP	
2	0.1780	16.92	19.90	36.82	54.57	-17.75	AVG	
3	0.5140	18.02	19.98	38.00	56.00	-18.00	QP	
4	0.6380	6.29	19.98	26.27	46.00	-19.73	AVG	
5	0.6460	18.31	19.99	38.30	56.00	-17.70	QP	
6	0.9220	18.81	20.10	38.91	56.00	-17.09	QP	
7	1.7450	18.08	20.13	38.21	56.00	-17.79	QP	
8	4.6500	7.27	20.18	27.45	46.00	-18.55	AVG	
9	6.2340	13.09	20.23	33.32	50.00	-16.68	AVG	
10	10.9740	21.94	20.34	42.28	60.00	-17.72	QP	
11	10.9740	12.19	20.34	32.53	50.00	-17.47	AVG	
12	15.5260	9.79	20.26	30.05	50.00	-19.95	AVG	

**CONDUCTED EMISSION TEST DATA**

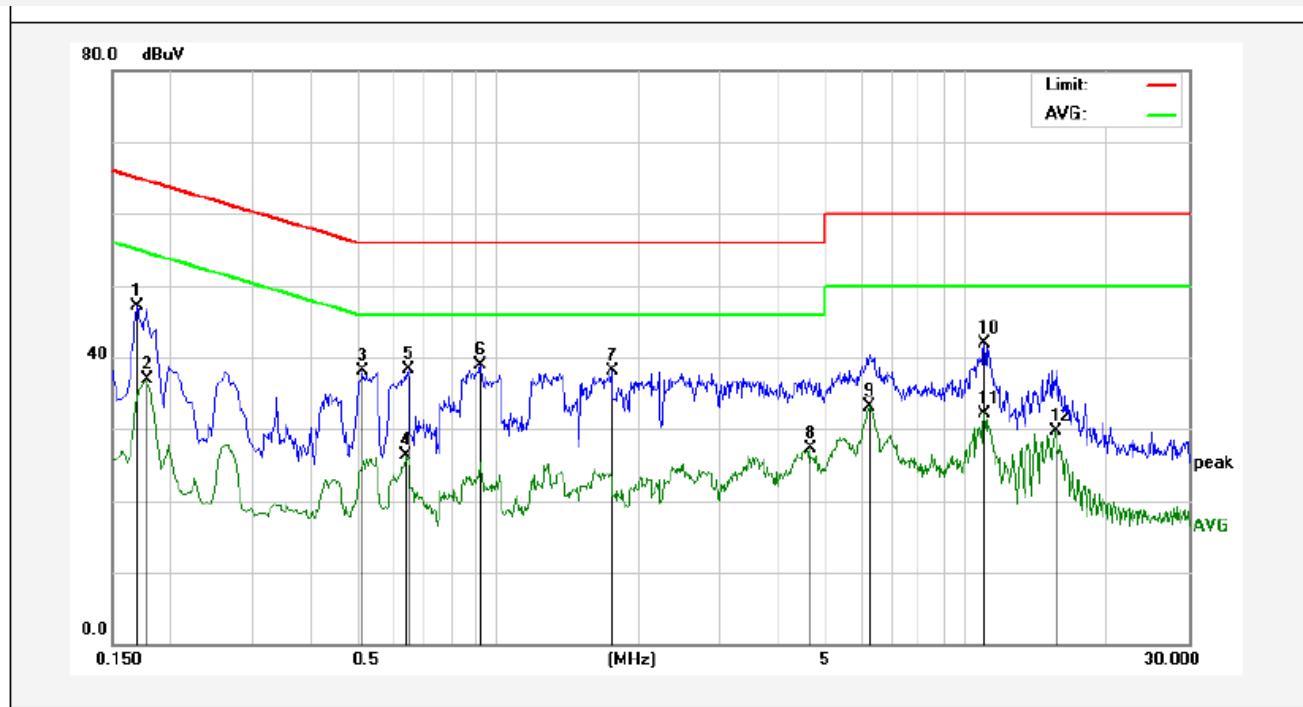
Test Site: 1# Shielded Room  
 Operating Condition: ON  
 Test Specification: AC 240V, 60Hz for PC  
 Comment: Live Line  
 Tem.:25°C Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.5540	18.60	19.90	38.50	56.00	-17.50	QP	
2	0.6380	6.40	20.00	26.40	46.00	-19.60	AVG	
3	0.9220	19.59	19.89	39.48	56.00	-16.52	QP	
4	1.2900	5.40	20.12	25.52	46.00	-20.48	AVG	
5	1.3820	18.13	20.12	38.25	56.00	-17.75	QP	
6	2.1220	18.04	20.13	38.17	56.00	-17.83	QP	
7	3.3220	18.55	20.15	38.70	56.00	-17.30	QP	
8	4.5380	7.54	20.18	27.72	46.00	-18.28	AVG	
9	6.2460	12.65	20.20	32.85	50.00	-17.15	AVG	
10	10.9819	25.48	20.34	45.82	60.00	-14.18	QP	
11	10.9819	15.73	20.34	36.07	50.00	-13.93	AVG	
12	15.0420	9.70	20.26	29.96	50.00	-20.04	AVG	

**CONDUCTED EMISSION TEST DATA**

Test Site: 1# Shielded Room  
 Operating Condition: ON  
 Test Specification: AC 240V, 60Hz for PC  
 Comment: Neutral Line  
 Tem.:25°C Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1700	27.11	19.90	47.01	47.11	-0.10	QP	
2	0.1780	16.92	19.90	36.82	36.92	-0.10	AVG	
3	0.5140	18.02	19.98	38.00	38.02	-0.02	QP	
4	0.6380	6.29	19.98	26.27	26.29	-0.02	AVG	
5	0.6460	18.31	20.00	38.31	38.31	0.00	QP	
6	0.9220	18.31	20.10	38.41	38.31	0.10	QP	
7	1.7540	18.08	20.14	38.22	38.08	0.14	QP	
8	4.6500	7.27	20.18	27.45	27.27	0.18	AVG	
9	6.2340	13.09	20.20	33.29	33.09	0.20	AVG	
10	10.9740	21.94	20.34	42.28	41.94	0.34	QP	
11	10.9740	12.19	20.34	32.53	32.19	0.34	AVG	
12	15.5260	9.79	20.26	30.05	29.79	0.26	AVG	

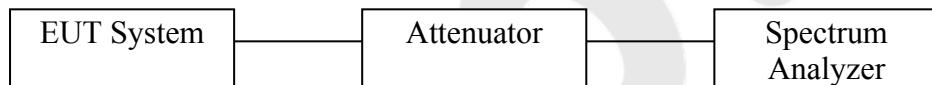
## 4.Bandwidth

### 4.1. Test Limit

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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

### 4.2. Test Setup



### 4.3. Test 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:

#### **26 dB & 99% bandwidth**

RBW = approximately 1% of the emission bandwidth;

Set the VBW > RBW;

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

#### **6 dB bandwidth**

RBW = 100kHz;

Set the video bandwidth (VBW)  $\geq 3$  RBW ;

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB /6dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.
5. Repeat until all the rest channels are investigated.

#### 4.4. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Apr. 16, 2016	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Apr. 16, 2016	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 16, 2016	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 19, 2016	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 19, 2016	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 16, 2016	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
8	Power Sensor	DAER	RPR3006 W	15I00041SN0 46	Jun 30, 2016	1 Year
9	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Jun 30, 2016	1 Year
10	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Jun 30, 2016	1 Year
11	Signal Generator	Agilent	E4421B	MY41000743	Jun 30, 2016	1 Year
12	DC Power supply	IV	IV-8080	YQSB0096	Jun 30, 2016	1 Year
13	TEMP&HUMI PROGRAMMABLE CHAMBER	Bell Group	BE-THK-1 50M8	SE-0137	Mar 16, 2016	1 Year
14	Spectrum Analysis	Rohde & Schwarz	FSV40	132.1.3008K3 9 -100965	Mar 17, 2016	1 Year
15	Pre-amplifier	Agilent	8449B	3008A00252	Mar 17, 2016	1 Year
16	Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Mar 17, 2016	1 Year

#### 4.5. Test Results

Pass.

Please refer to the following data.

**Bandwidth:**

ANT 0:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	16.40	21.60	16.922
Mid	5200	16.38	21.51	16.884
High	5240	16.42	21.68	16.916
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.61	21.73	16.910
Mid	5785	17.60	21.40	16.811
High	5825	17.59	21.66	16.889

ANT 0:

Test Mode: IEEE 802.11n(HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	17.61	21.87	18.013
Mid	5200	17.61	21.68	17.997
High	5240	17.60	21.88	18.021
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.61	21.83	17.979
Mid	5785	17.60	21.72	17.918
High	5825	17.59	21.83	18.008

ANT 0:

Test Mode: IEEE 802.11n(HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	36.33	40.25	36.337
High	5230	36.39	40.14	36.347
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	36.42	40.31	36.370
High	5795	36.40	40.09	36.340

ANT 1:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	16.39	21.69	16.910
Mid	5200	16.43	21.60	16.869
High	5240	16.40	21.62	16.842
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	16.39	21.65	16.915
Mid	5785	16.34	21.44	16.911
High	5825	16.34	21.58	16.877

ANT 1:

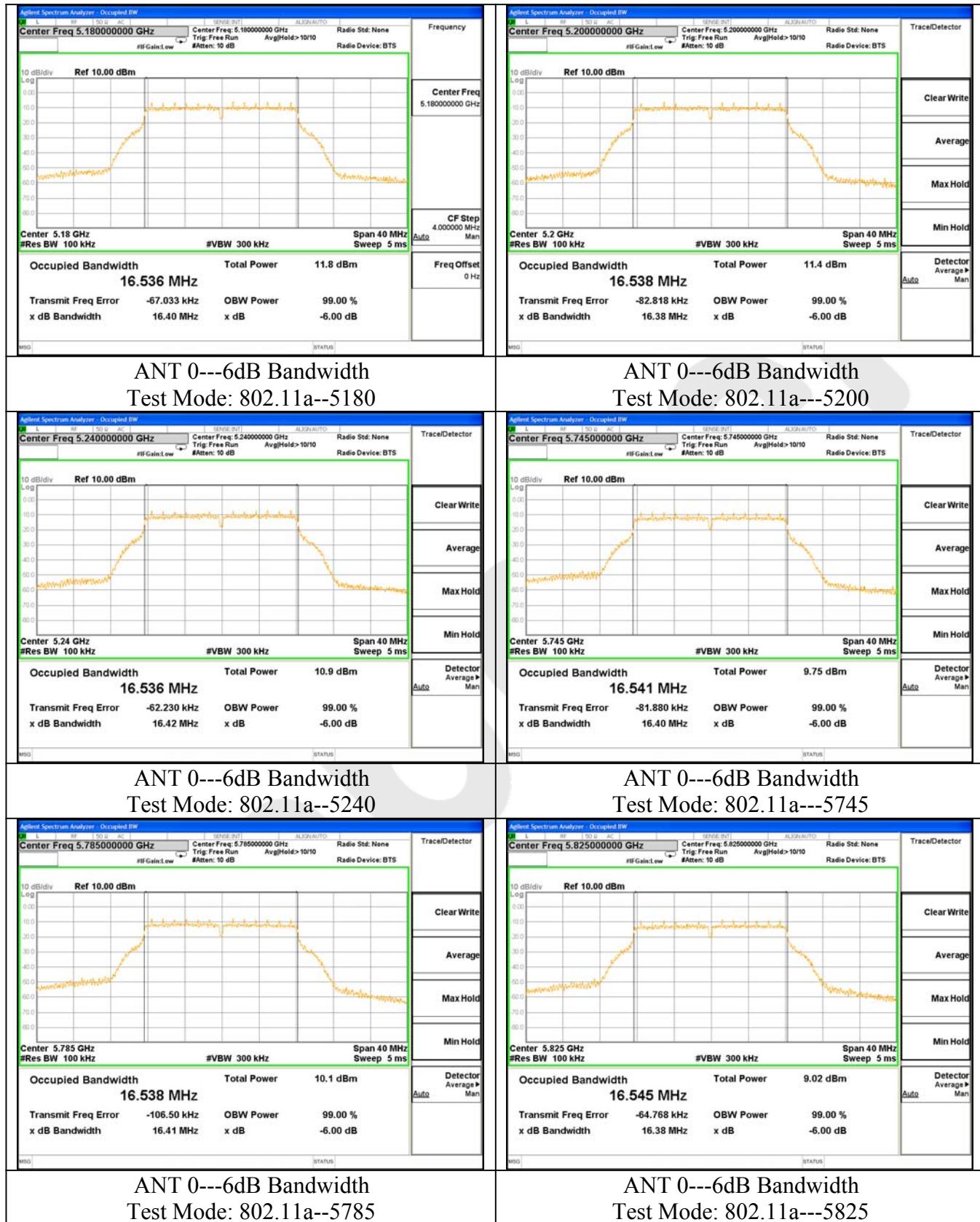
Test Mode: IEEE 802.11n(HT20)

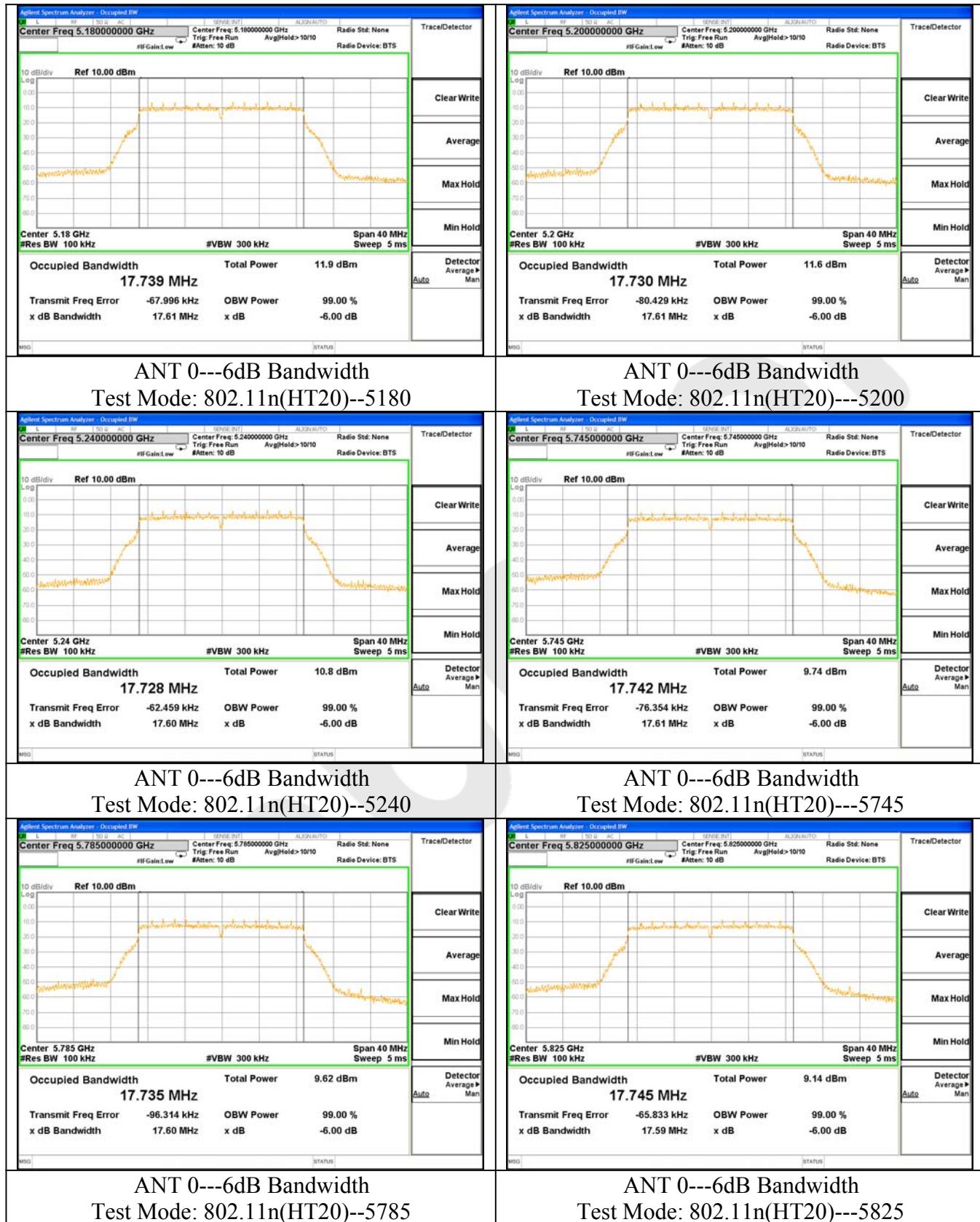
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	17.63	22.09	18.046
Mid	5200	17.60	21.68	17.944
High	5240	17.62	21.81	17.981
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.63	21.79	17.986
Mid	5785	16.96	21.83	17.975
High	5825	16.98	21.65	17.980

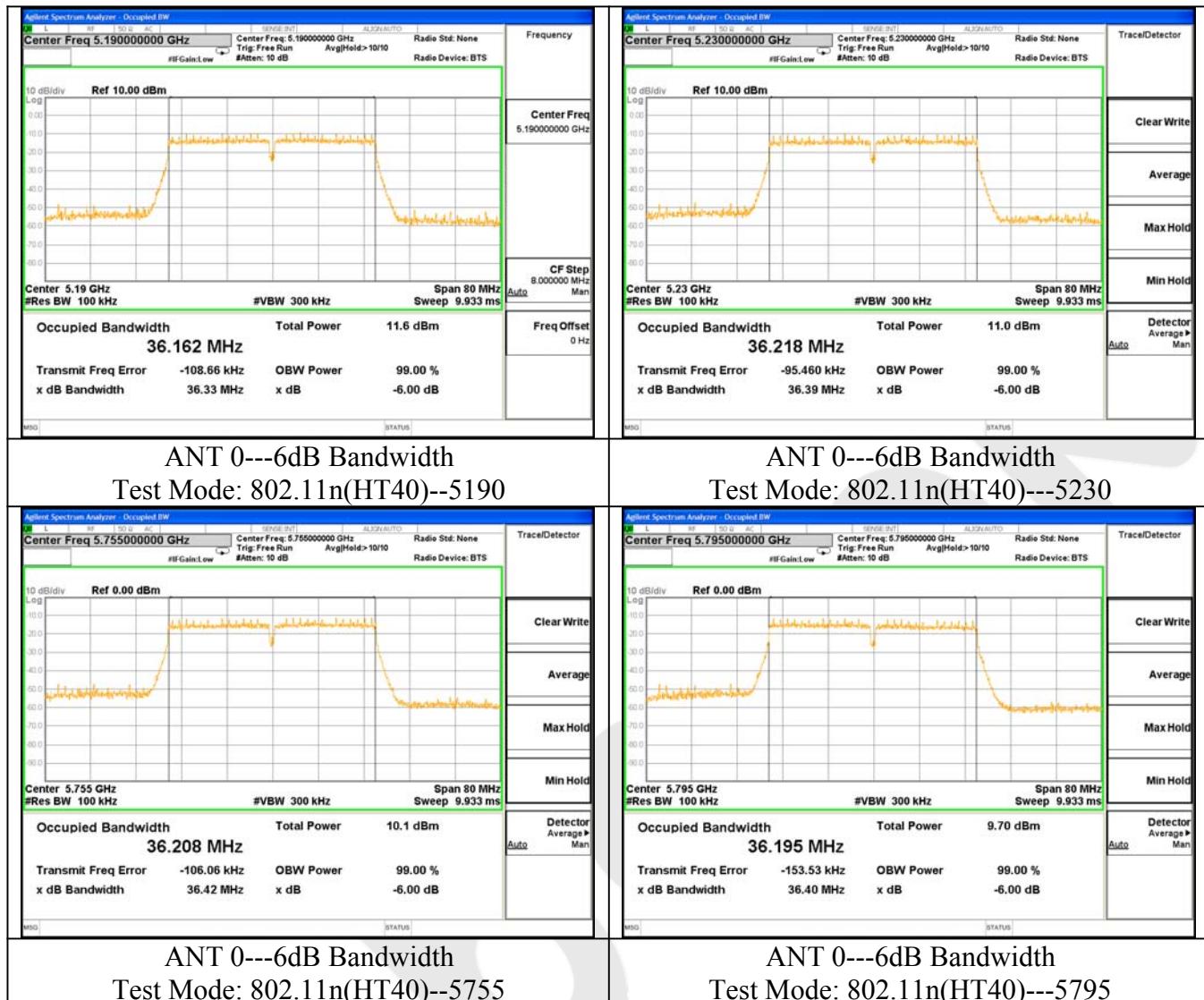
ANT 1:

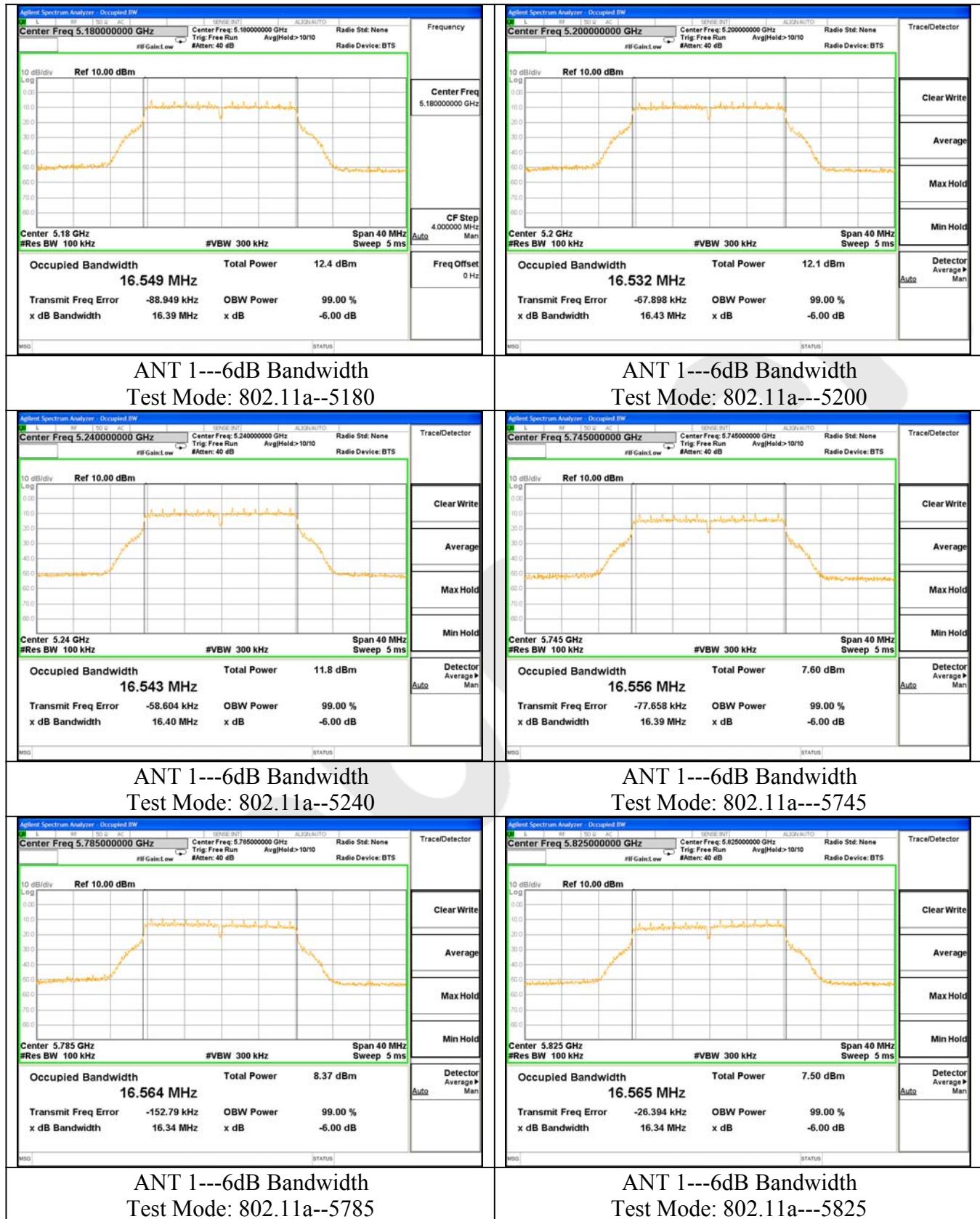
Test Mode: IEEE 802.11n(HT40)

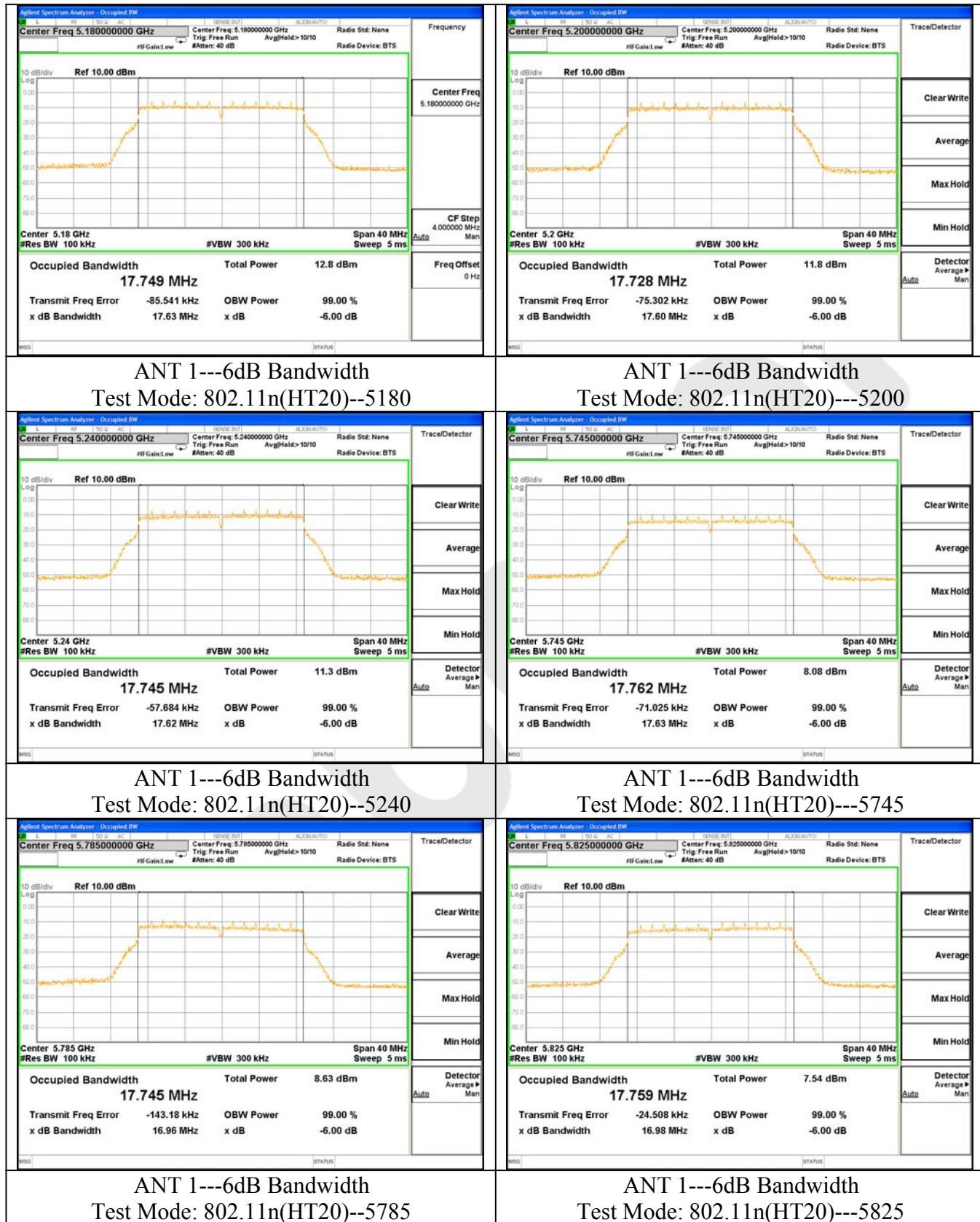
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	36.42	39.91	36.374
High	5230	36.41	39.91	36.325
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	36.32	39.98	36.359
High	5795	35.95	40.25	36.459

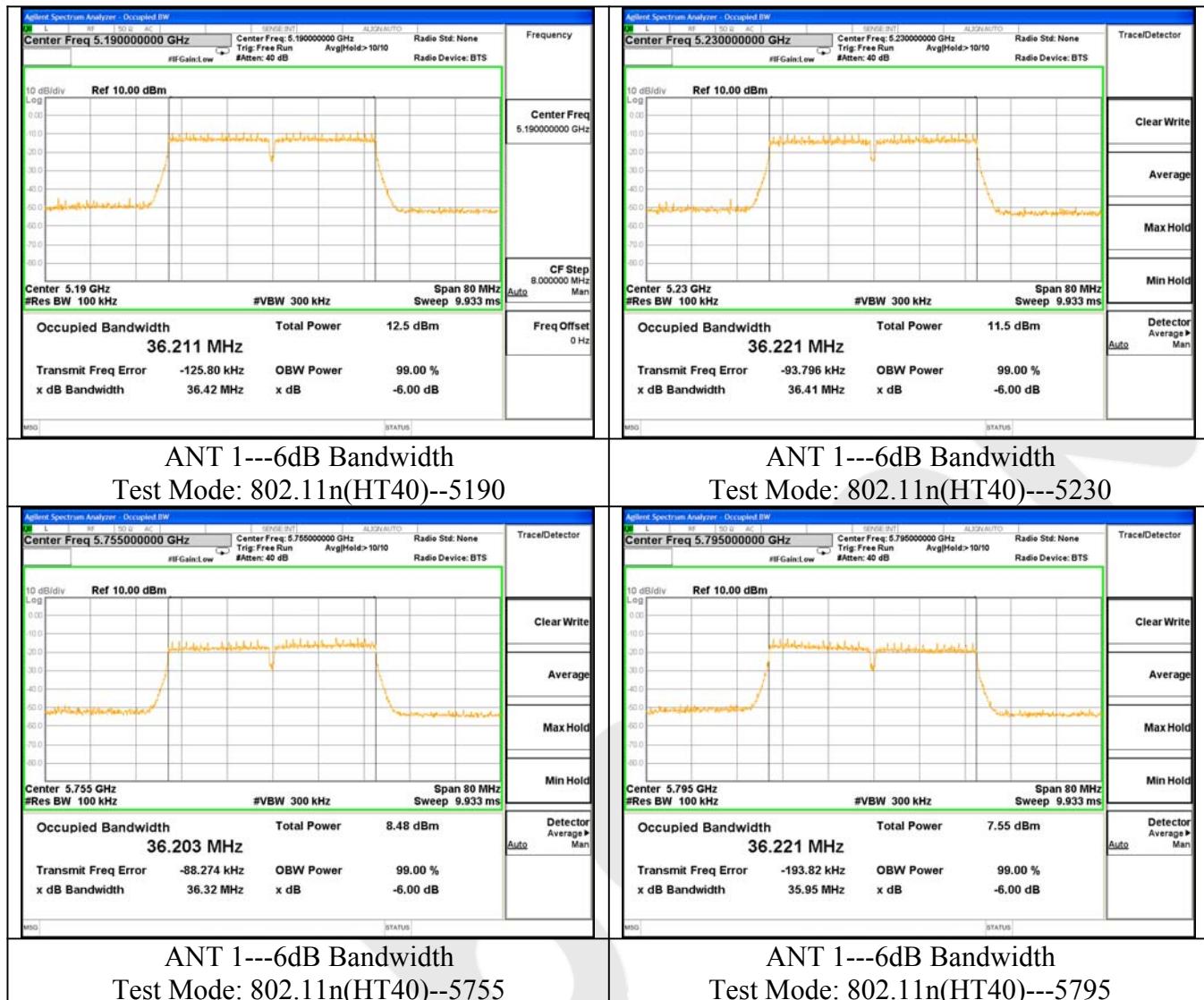


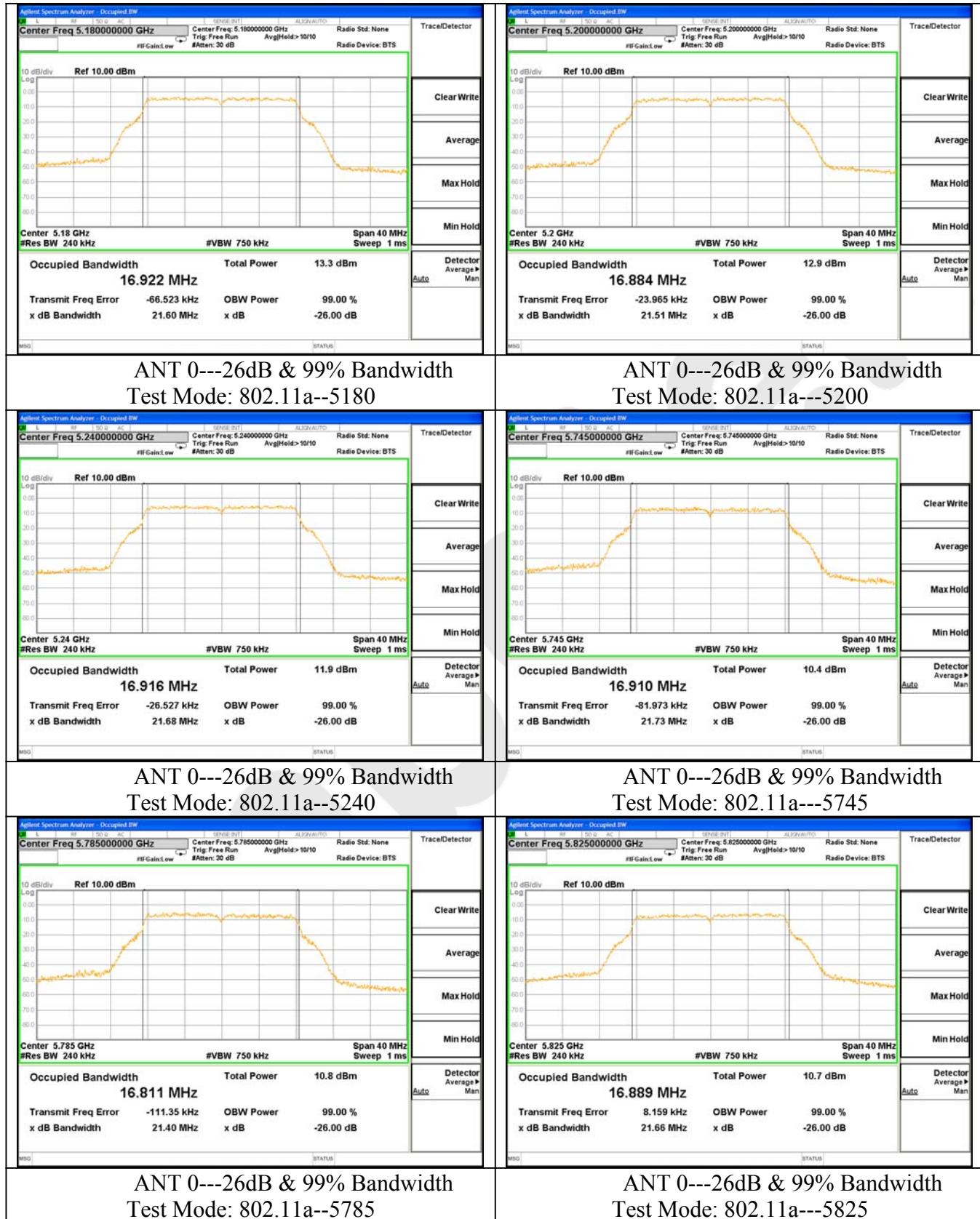


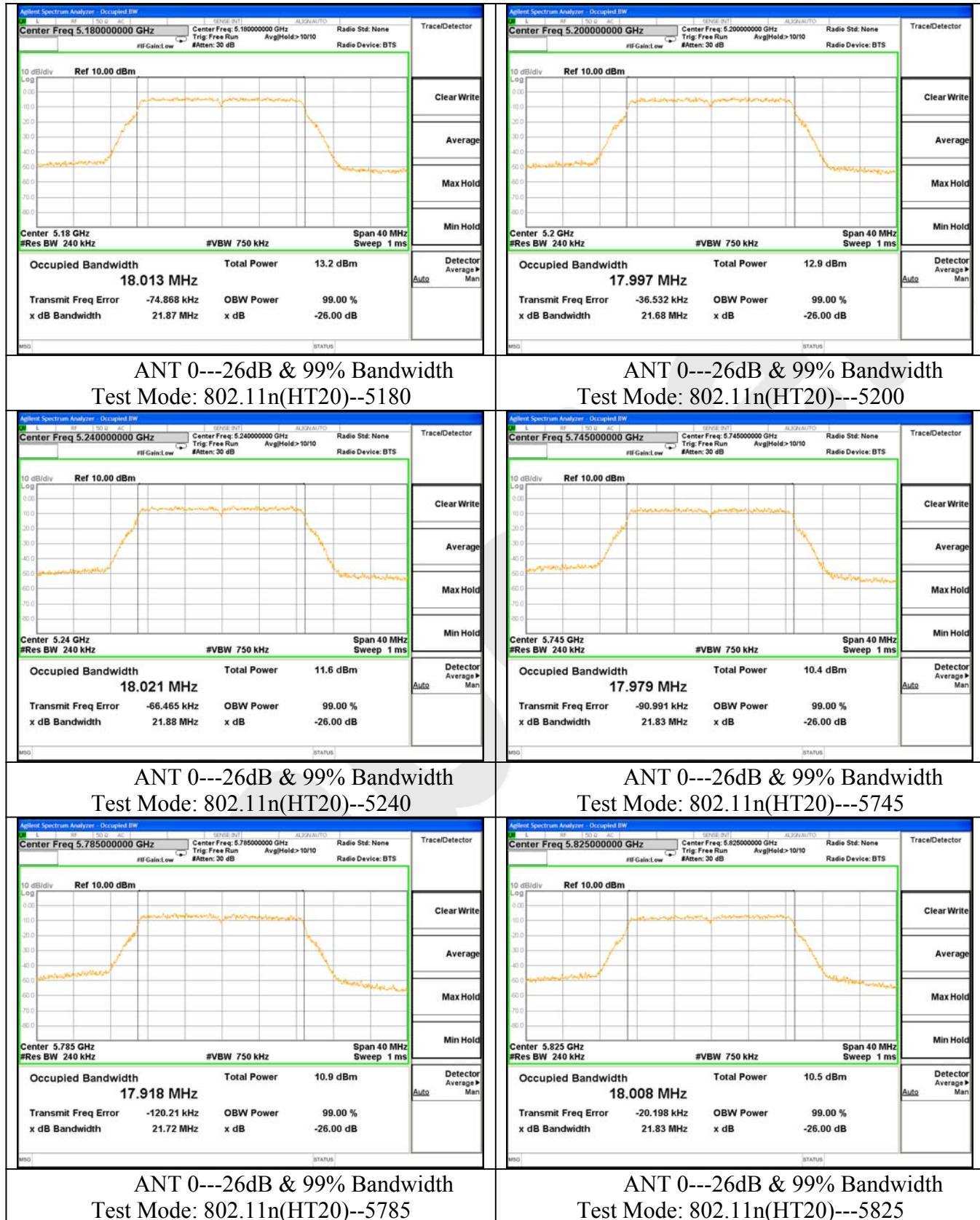


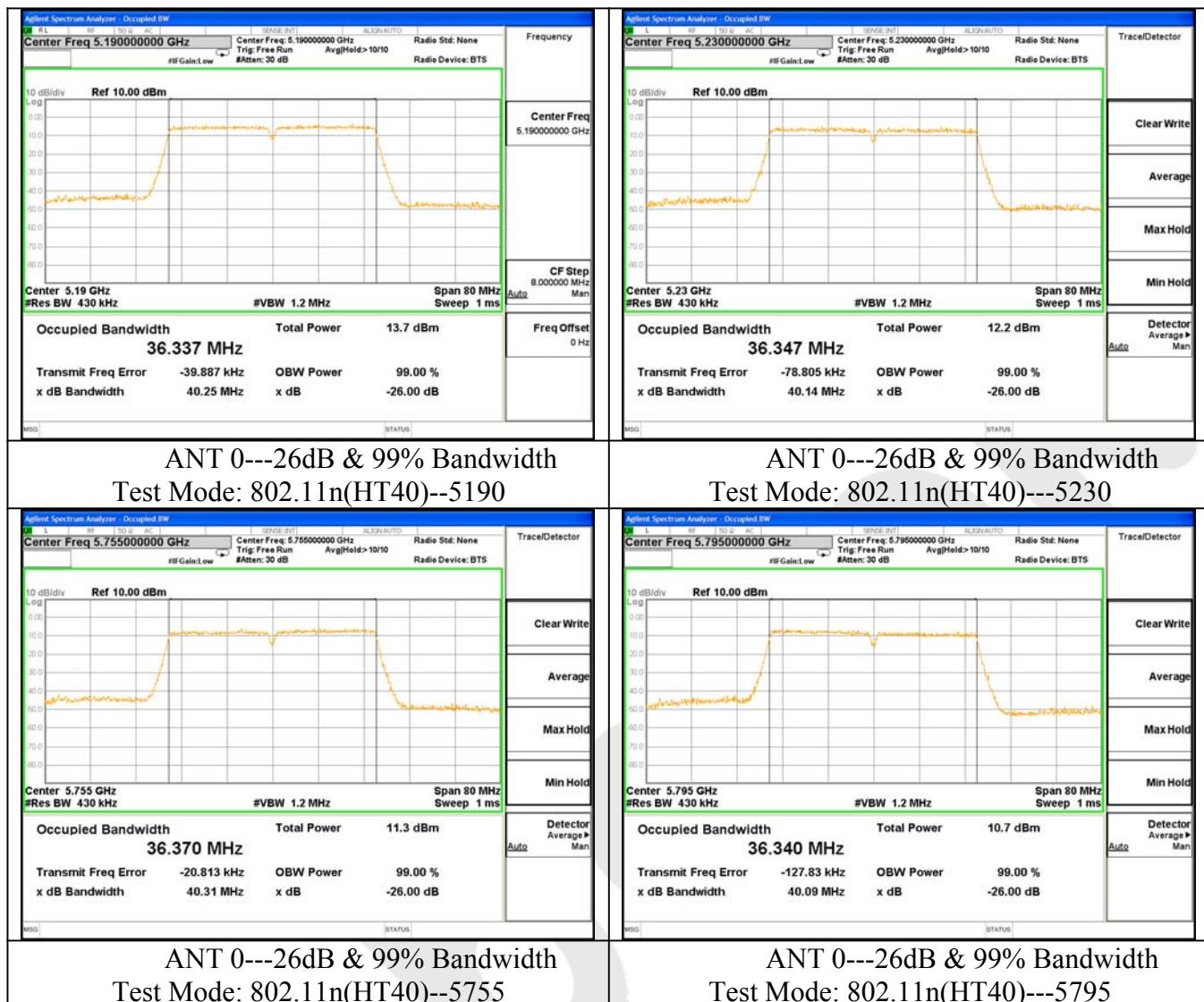


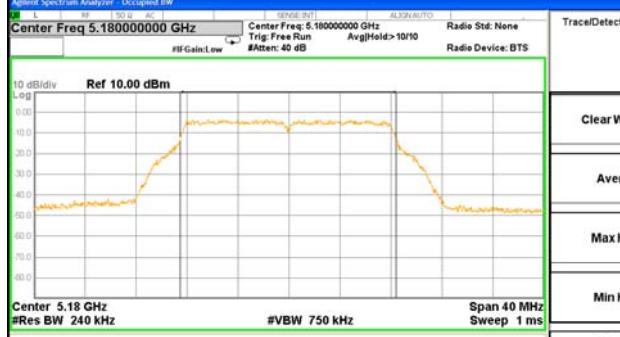
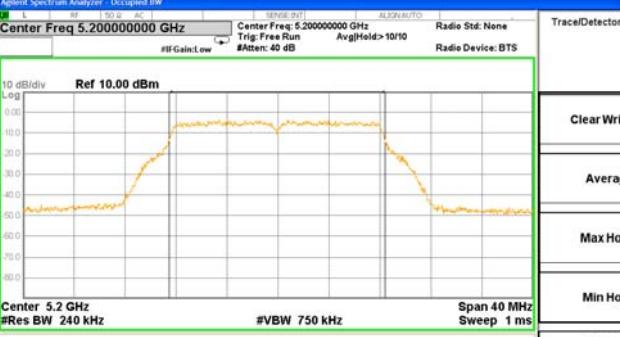
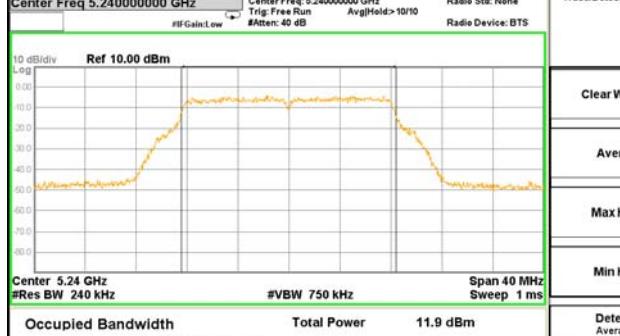


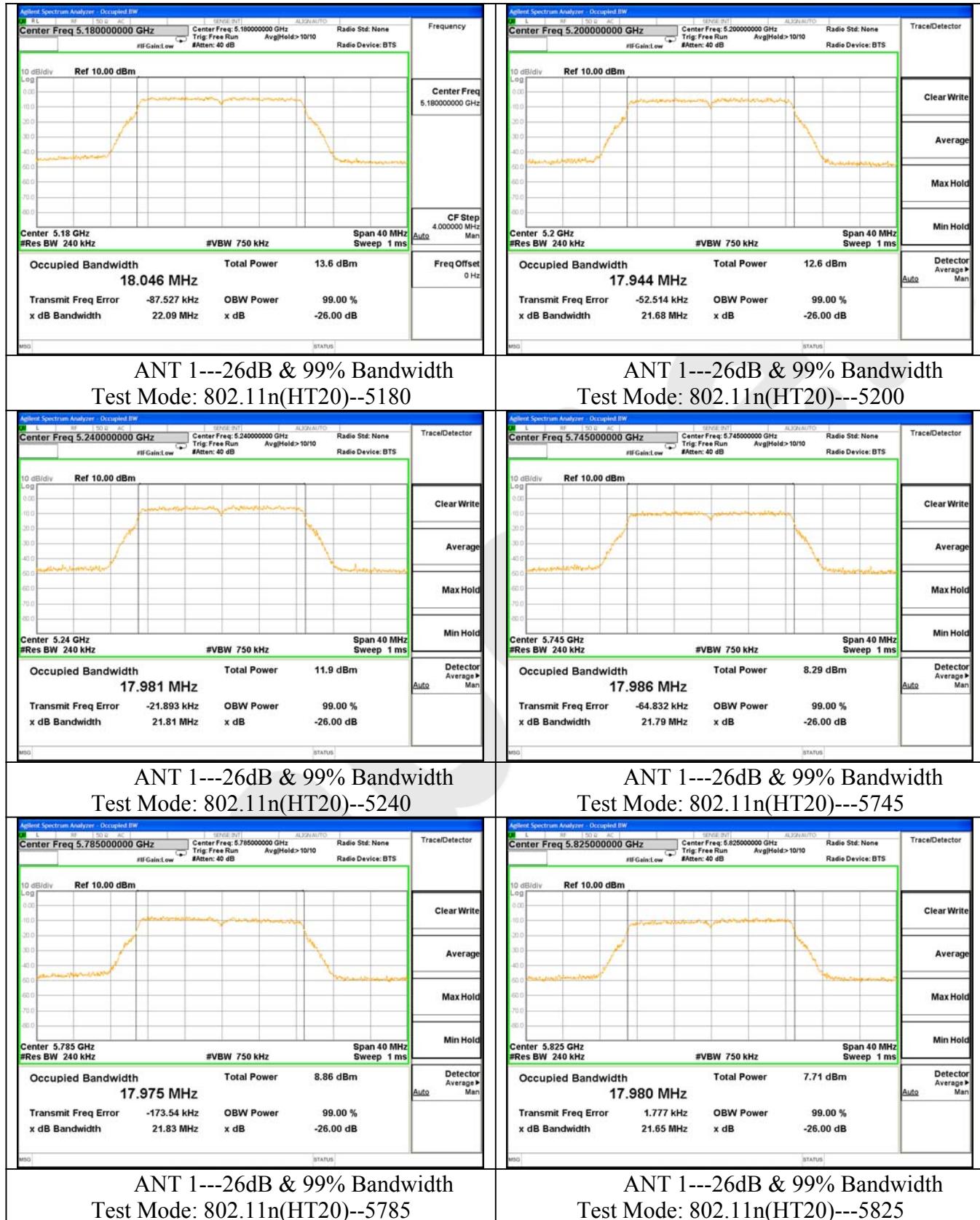


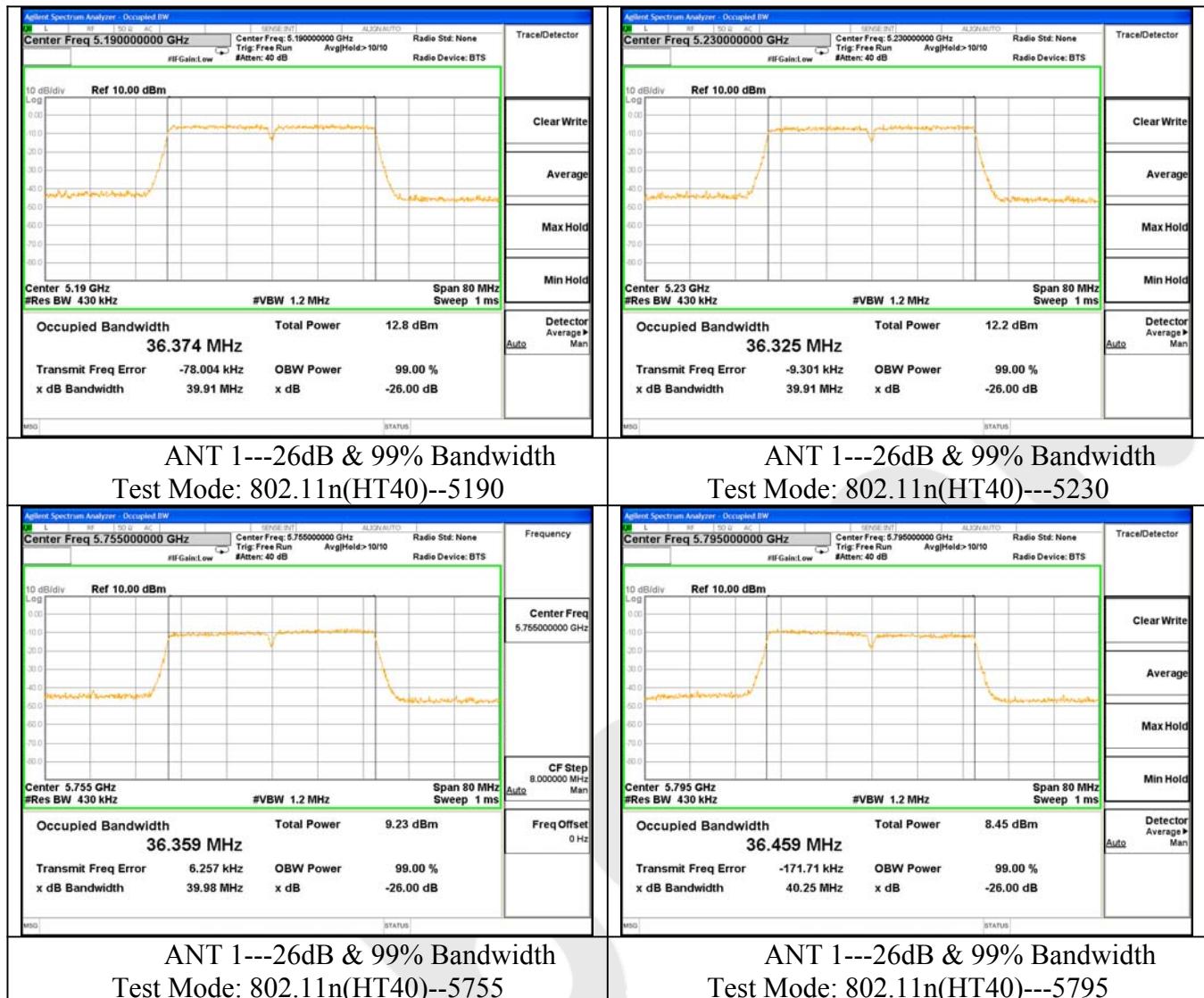






 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.180000000 GHz   Center Freq: 5.180000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.18 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.910 MHz Total Power 13.1 dBm</p> <p>Transmit Freq Error -72.015 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.69 MHz x dB -26.00 dB</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.200000000 GHz   Center Freq: 5.200000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.2 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.869 MHz Total Power 12.5 dBm</p> <p>Transmit Freq Error -58.177 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.60 MHz x dB -26.00 dB</p>
<p style="text-align: center;"><b>ANT 1---26dB &amp; 99% Bandwidth</b> <b>Test Mode: 802.11a--5180</b></p>  <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.240000000 GHz   Center Freq: 5.240000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.24 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.842 MHz Total Power 11.9 dBm</p> <p>Transmit Freq Error -14.753 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.62 MHz x dB -26.00 dB</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.745000000 GHz   Center Freq: 5.745000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.745 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.915 MHz Total Power 8.19 dBm</p> <p>Transmit Freq Error -68.218 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.65 MHz x dB -26.00 dB</p>
<p style="text-align: center;"><b>ANT 1---26dB &amp; 99% Bandwidth</b> <b>Test Mode: 802.11a--5240</b></p>  <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.785000000 GHz   Center Freq: 5.785000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.785 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.911 MHz Total Power 8.40 dBm</p> <p>Transmit Freq Error -201.40 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.44 MHz x dB -26.00 dB</p>	 <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 5.825000000 GHz   Center Freq: 5.825000000 GHz   Trig: Free Run   Avg/Hold&gt;10/10   Radio Std: None   Radio Device: BTS</p> <p>10 dB/div Ref 10.00 dBm</p> <p>Center 5.825 GHz #Res BW 240 kHz #VBW 750 kHz Span 40 MHz Sweep 1 ms</p> <p>Occupied Bandwidth 16.877 MHz Total Power 7.87 dBm</p> <p>Transmit Freq Error 17.332 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 21.58 MHz x dB -26.00 dB</p>
<p style="text-align: center;"><b>ANT 1---26dB &amp; 99% Bandwidth</b> <b>Test Mode: 802.11a--5785</b></p>	<p style="text-align: center;"><b>ANT 1---26dB &amp; 99% Bandwidth</b> <b>Test Mode: 802.11a---5825</b></p>





ANT 0:

Test Mode: IEEE 802.11AC(HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	17.62	21.85	18.009
Mid	5200	17.61	21.66	17.940
High	5240	17.62	21.73	17.982
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.63	21.89	18.004
Mid	5785	17.61	21.49	17.953
High	5825	17.63	21.80	18.008

ANT 0:

Test Mode: IEEE 802.11AC(HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	36.37	39.93	36.312
High	5230	36.40	40.13	36.338
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	36.37	39.90	36.373
High	5795	36.37	39.86	36.315

ANT 0:

Test Mode: IEEE 802.11AC(HT80)

Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	76.35	81.25	75.874
Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5755	75.87	81.46	75.801

ANT 1:

Test Mode: IEEE 802.11AC(HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	17.62	21.92	18.003
Mid	5200	17.63	21.78	17.966
High	5240	17.63	21.90	18.067
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.62	21.82	18.034
Mid	5785	17.20	21.86	17.985
High	5825	17.60	21.72	17.983

ANT 1:

Test Mode: IEEE 802.11AC(HT40)

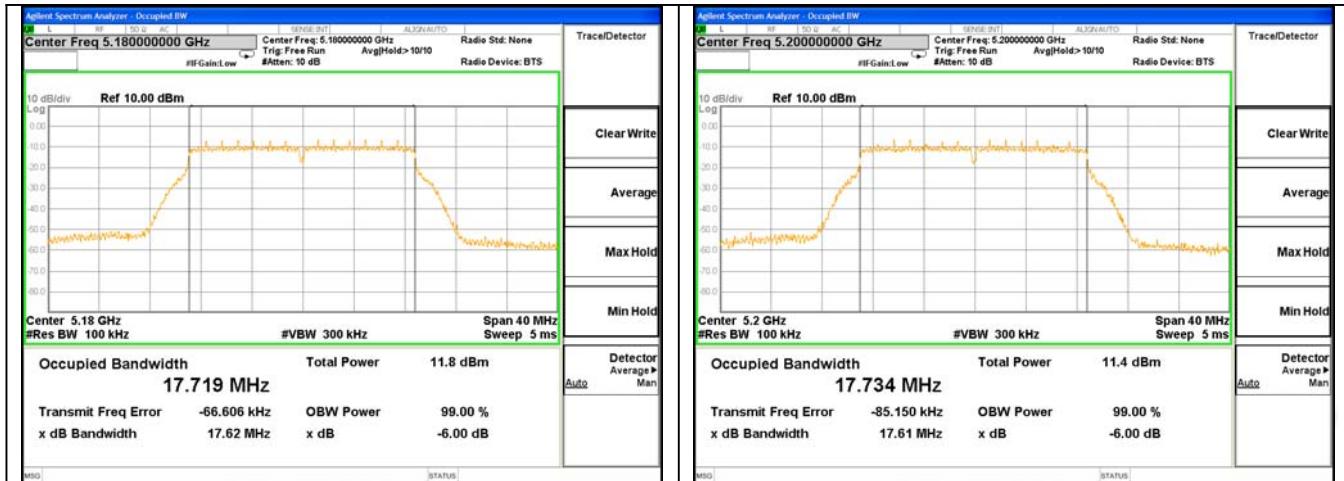
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	36.41	40.38	36.339
High	5230	36.40	39.80	36.351
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	36.31	39.70	36.370
High	5795	36.05	39.95	36.412

ANT 1:

Test Mode: IEEE 802.11AC(HT80)

Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	76.41	82.13	75.890
Frequency (MHz)	6dB Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5755	76.13	81.30	75.779

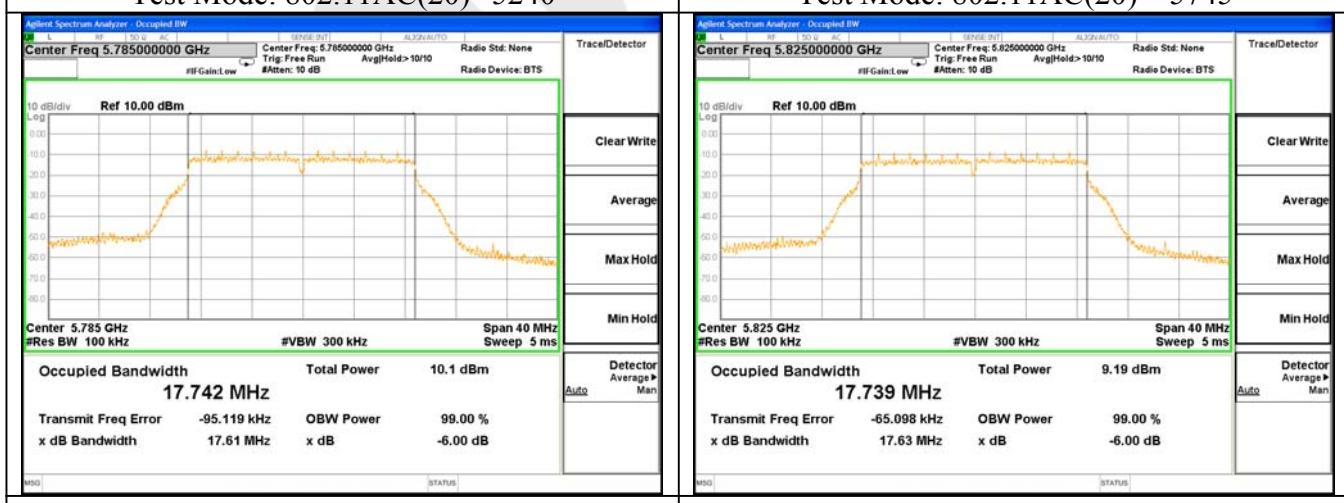
ANT 0:



ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)--5180



ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)--5240

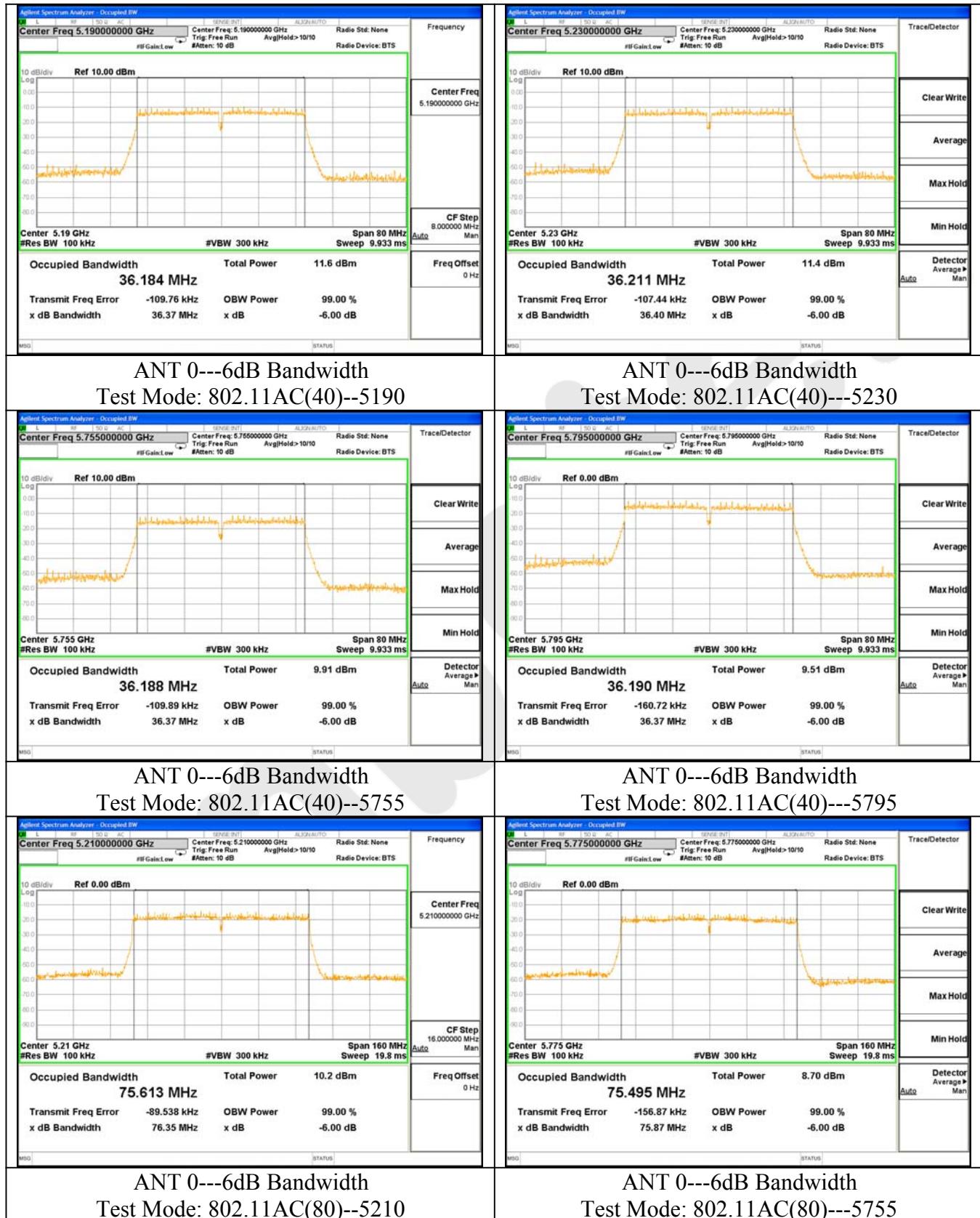


ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)--5785

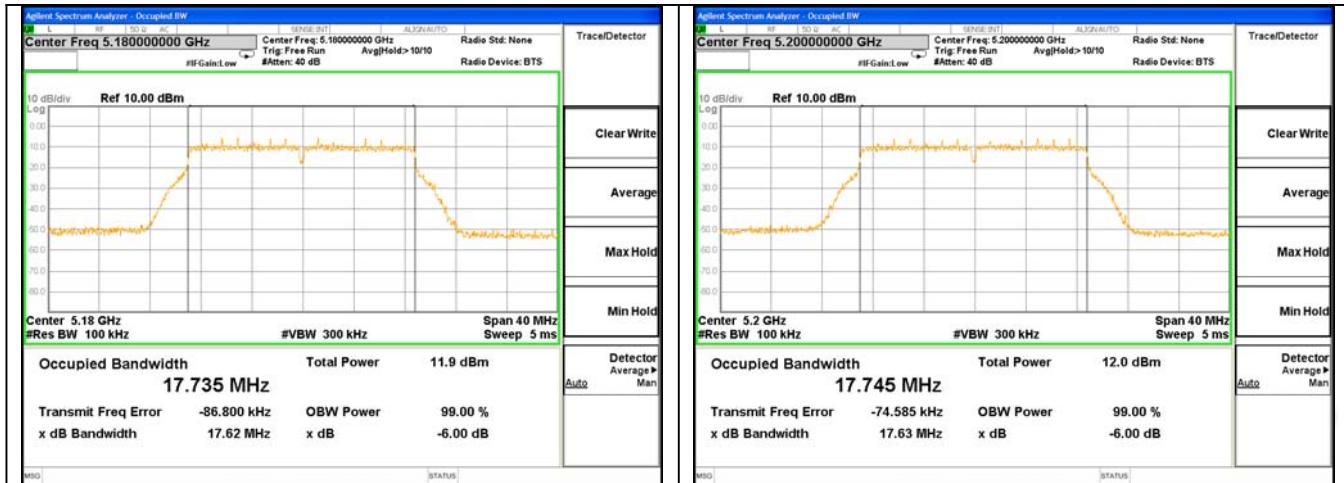
ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)---5200

ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)---5745

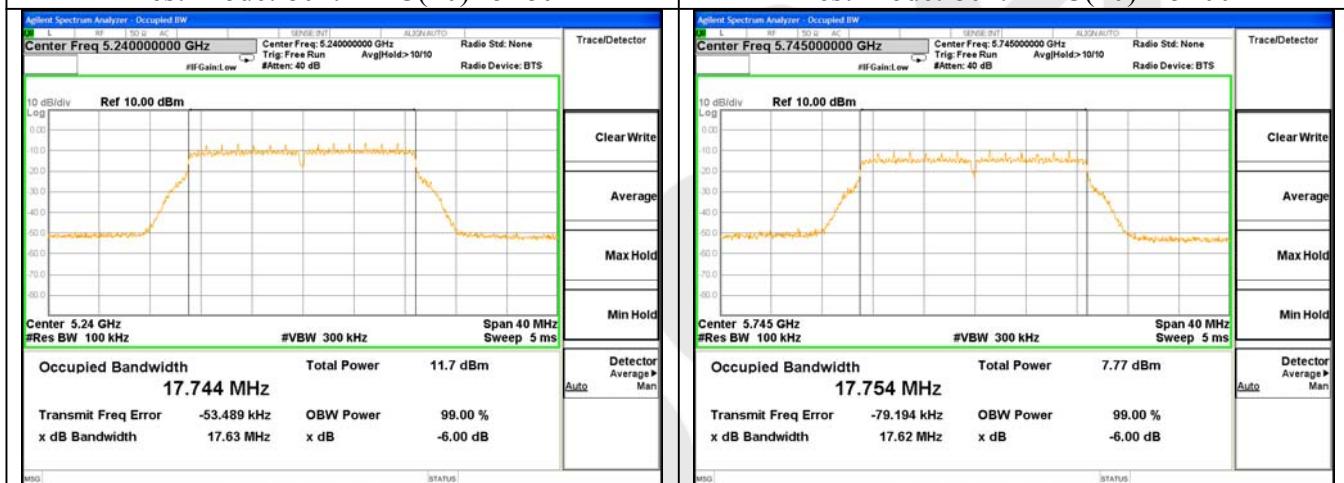
ANT 0---6dB Bandwidth  
Test Mode: 802.11AC(20)---5825



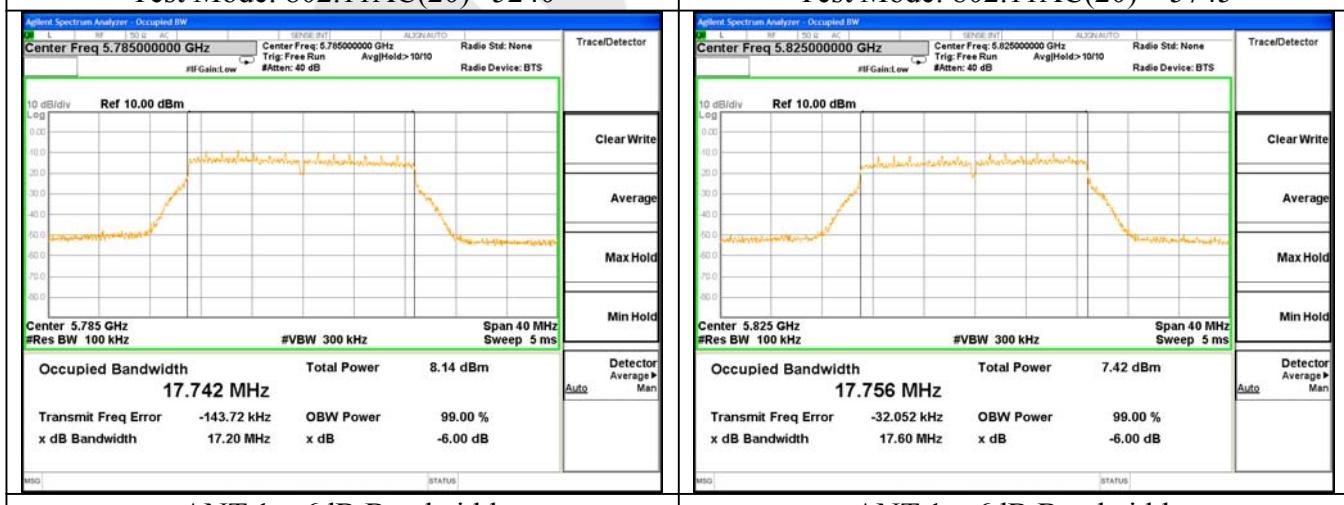
ANT 1:



ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)--5180



ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)--5240



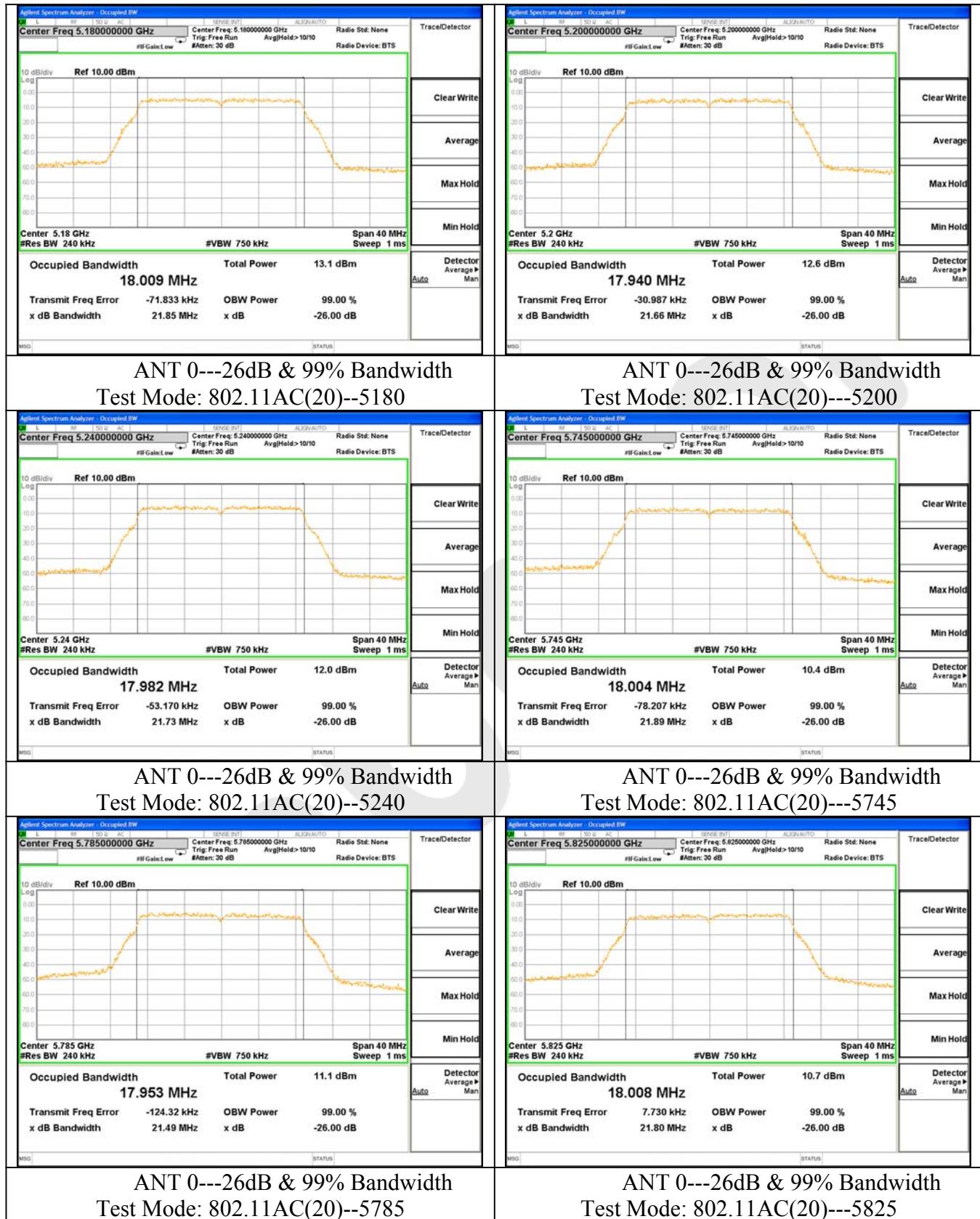
ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)--5785

ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)---5200

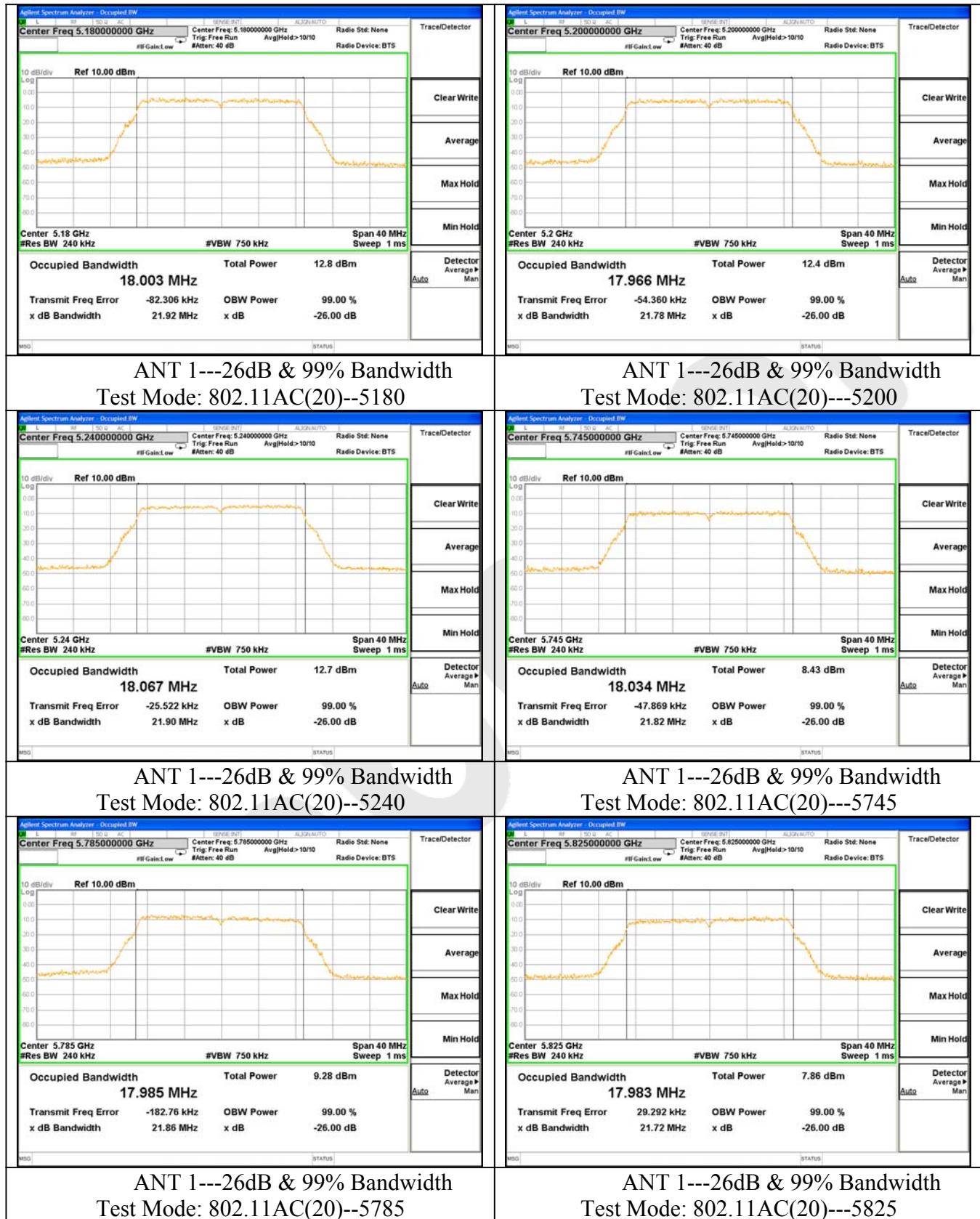
ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)---5745

ANT 1---6dB Bandwidth  
Test Mode: 802.11AC(20)---5825











## 5. Maximum Conducted Output Power Test

### 5.1. Test Limit

1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

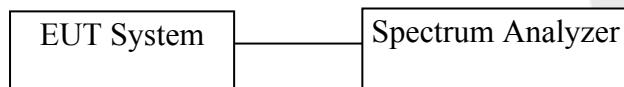
(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional

gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

## 5.2. Test Setup



## 5.3. Test Procedure

1. Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2. Set RBW = 1 MHz.
3. Set VBW  $\geq$  3 MHz.
4. Number of points in sweep  $\geq 2 \times$  span / RBW. (This ensures that bin-to-bin spacing is  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
7. If transmit duty cycle  $<$  98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle  $\geq$  98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode.
9. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

## 5.4. Test Equipment

Same as clause 4.4.

## 5.5. Test Results

Pass.

Please refer to the following data.

ANT 0:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	9.95	21.99	Pass
Mid	5200	9.90	21.99	Pass
High	5240	9.28	21.99	Pass
Low	5745	8.66	27.99	Pass
Mid	5785	8.68	27.99	Pass
High	5825	8.20	27.99	Pass

ANT 0:

Test Mode: IEEE 802.11n(HT20)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	10.96	21.99	Pass
Mid	5200	10.14	21.99	Pass
High	5240	9.41	21.99	Pass
Low	5745	8.84	27.99	Pass
Mid	5785	8.86	27.99	Pass
High	5825	8.47	27.99	Pass

ANT 0:

Test Mode: IEEE 802.11n(HT40)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5190	12.00	21.99	Pass
High	5230	10.48	21.99	Pass
Low	5755	9.61	27.99	Pass
High	5795	9.27	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	11.98	21.99	Pass
Mid	5200	11.46	21.99	Pass
High	5240	11.02	21.99	Pass
Low	5745	7.39	27.99	Pass
Mid	5785	7.84	27.99	Pass
High	5825	7.09	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11n(HT20)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	10.92	21.99	Pass
Mid	5200	10.67	21.99	Pass
High	5240	10.34	21.99	Pass
Low	5745	7.55	27.99	Pass
Mid	5785	7.89	27.99	Pass
High	5825	7.09	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11n(HT40)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5190	10.91	21.99	Pass
High	5230	10.84	21.99	Pass
Low	5755	8.43	21.99	Pass
High	5795	7.37	27.99	Pass

Channel	Channel Frequency (MHz)	ANT 0 Output Power (dBm)	ANT 1 Output Power (dBm)	Data Rate (Mbps)	MIMO Output Power (dBm)	Limit (dBm)
<b>802.11n (20M MIMO) Mode</b>						
Low	5180	10.96	10.92	MCS0	13.95	21.99
Middle	5200	10.14	10.67	MCS0	13.42	21.99
High	5240	9.41	10.34	MCS0	12.91	21.99
Low	5745	8.84	7.55	MCS0	11.25	27.99
Middle	5785	8.86	7.89	MCS0	11.41	27.99
High	5825	8.47	7.09	MCS0	10.84	27.99
<b>802.11n (40M MIMO) Mode</b>						
Low	5190	12.00	10.91	MCS0	14.50	21.99
High	5230	10.48	10.84	MCS0	13.67	21.99
Low	5755	9.61	8.43	MCS0	12.07	21.99
High	5795	9.27	7.37	MCS0	11.43	27.99

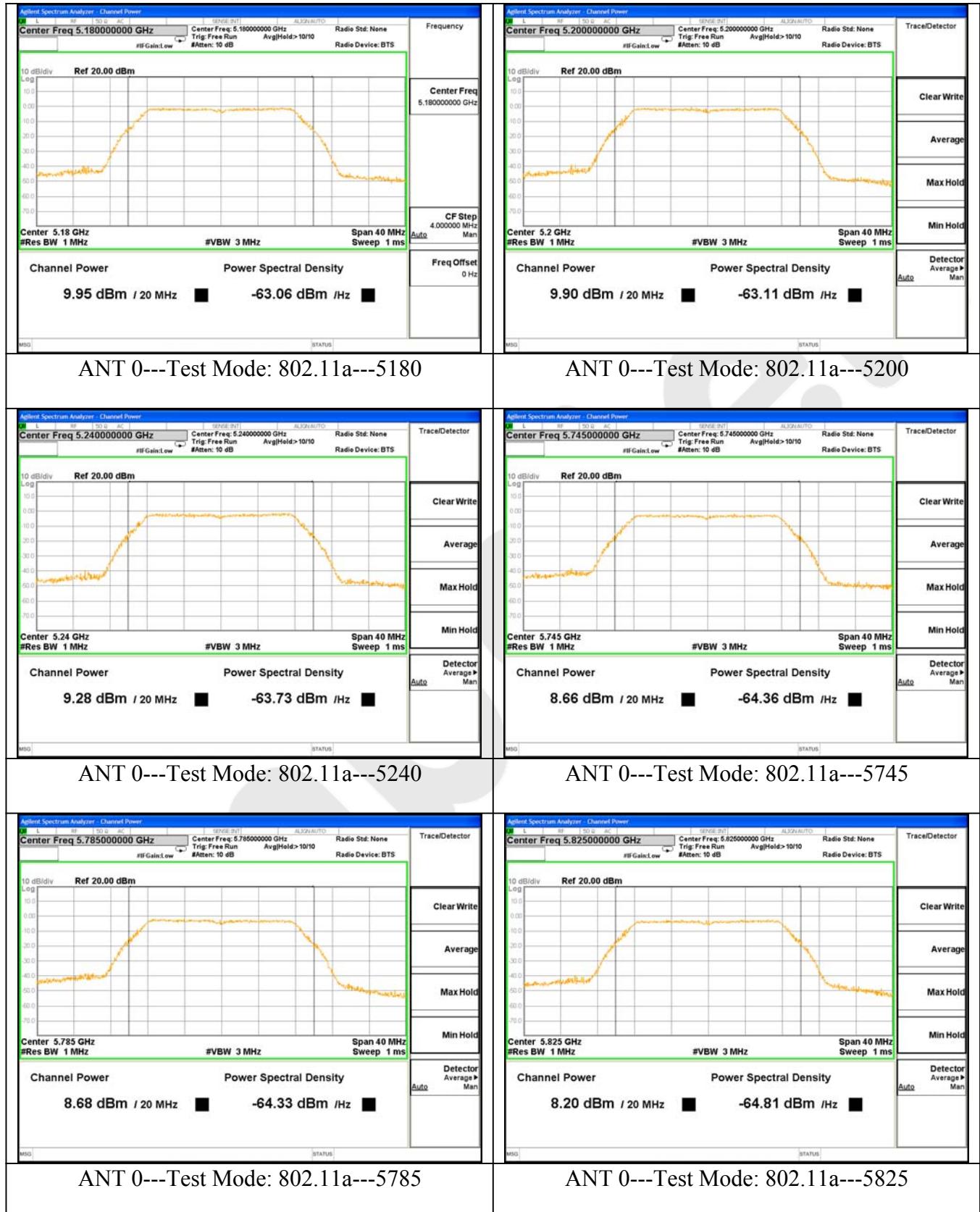
Remark:

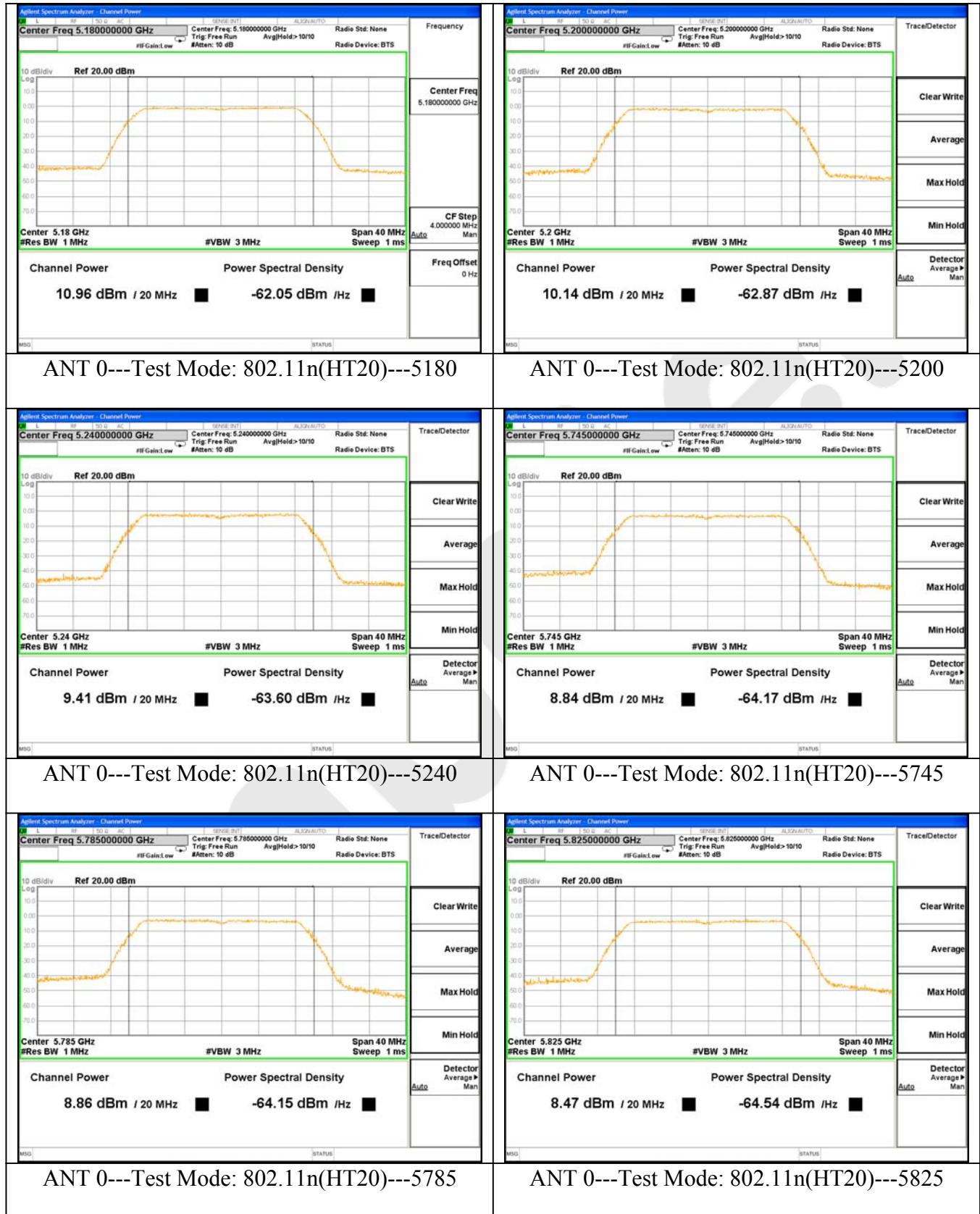
ANT 0 Gain= 5.0dBi

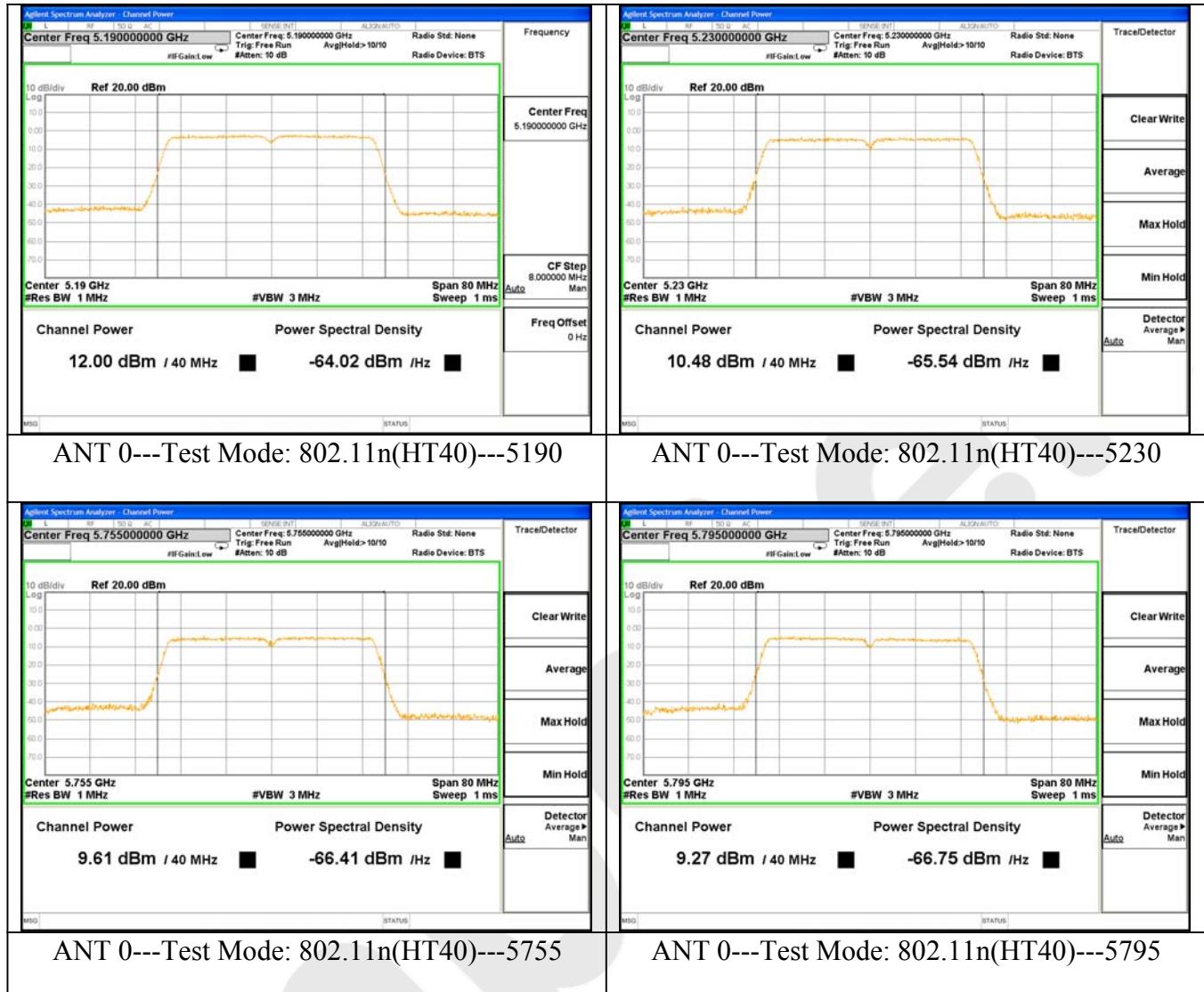
ANT 1 Gain= 5.0dBi

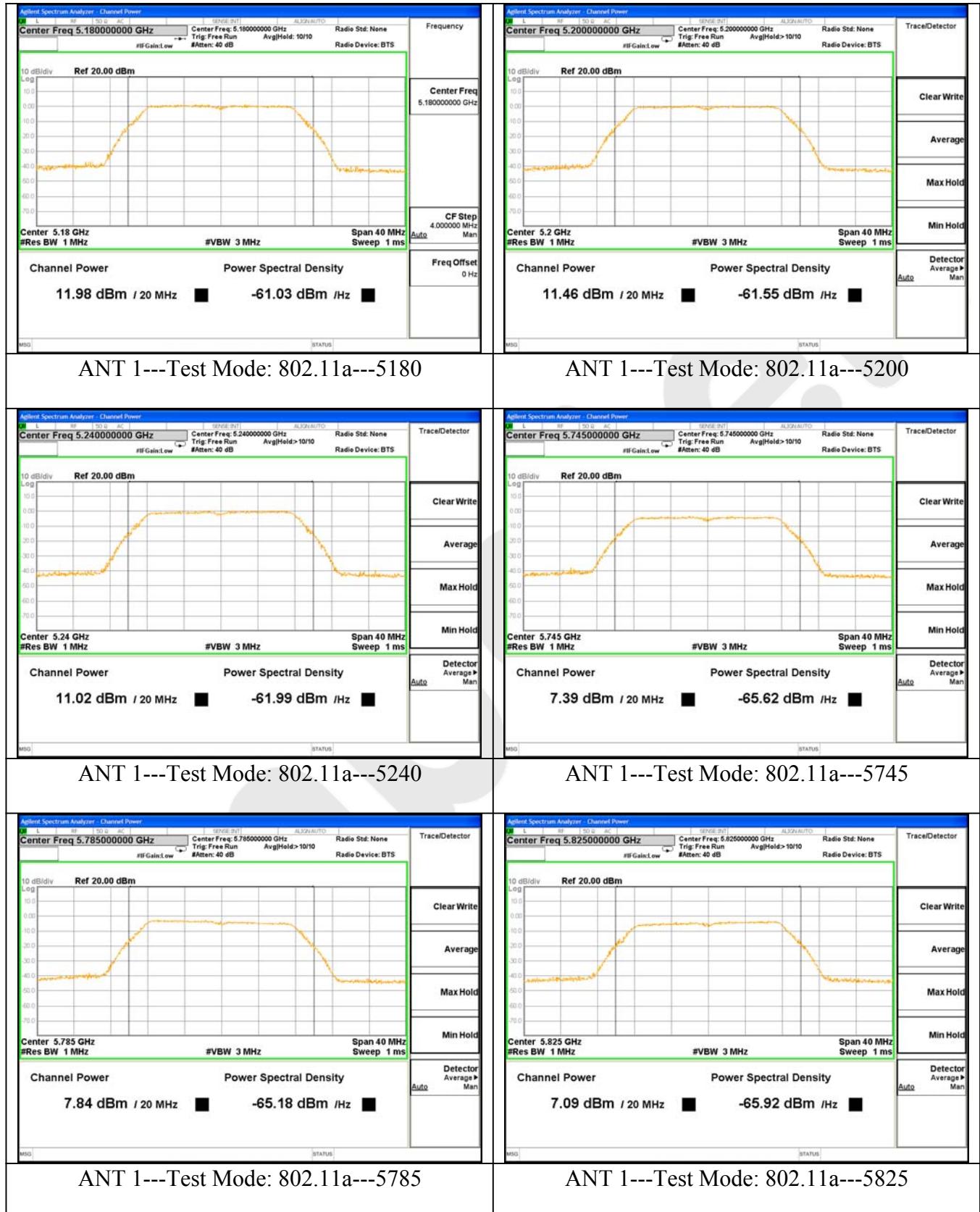
$$10 * \log[10^{(x/10)} + 10^{(y/10)}] = 8.01 \text{dBi}$$

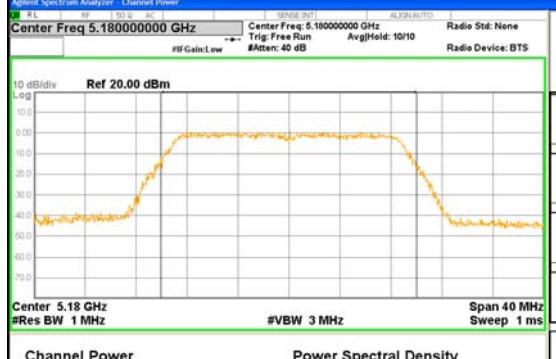
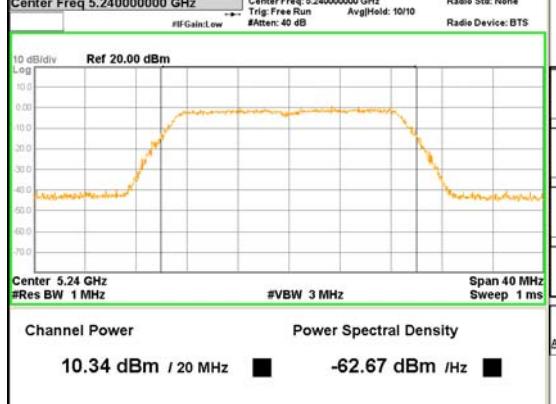
**Output Power Limit=Limit-(6-Ant gain)**









 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.180000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.18 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>10.92 dBm / 20 MHz -62.09 dBm /Hz</p>	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.200000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.2 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>10.67 dBm / 20 MHz -62.34 dBm /Hz</p>
 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.240000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.24 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>10.34 dBm / 20 MHz -62.67 dBm /Hz</p>	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.745000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.745 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>7.55 dBm / 20 MHz -65.46 dBm /Hz</p> <p>STATUS: RF Alignment Failure</p>
 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.785000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.785 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>7.89 dBm / 20 MHz -65.12 dBm /Hz</p>	 <p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq 5.825000000 GHz</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Center 5.825 GHz #Res BW 1 MHz #VBW 3 MHz Span 40 MHz Sweep 1 ms</p> <p>Channel Power Power Spectral Density</p> <p>7.09 dBm / 20 MHz -65.92 dBm /Hz</p>
<p>ANT 1---Test Mode: 802.11n(HT20)---5180</p>	<p>ANT 1---Test Mode: 802.11n(HT20)---5200</p>
<p>ANT 1---Test Mode: 802.11n(HT20)---5240</p>	<p>ANT 1---Test Mode: 802.11n(HT20)---5745</p>
<p>ANT 1---Test Mode: 802.11n(HT20)---5785</p>	<p>ANT 1---Test Mode: 802.11n(HT20)---5825</p>

