FCC TEST REPORT

Test report
On Behalf of
Sales peritias d.o.o.
For
Abacus Smart POS
Model No.: SP-101AU

FCC ID: 2AUS3-SP-101AU

Prepared for :	**Sales peritias d.o.o.** **Dobranska 18, 10000 Zagreb, Croatia**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Aug. 15, 2019 ~ Aug. 22, 2019**
Date of Report:	**Aug. 22, 2019**
Report Number:	**HK1908222082-3E**

TEST RESULT CERTIFICATION

Applicant's name.....: Sales peritias d.o.o.

Address .....: Dobranska 18, 10000 Zagreb, Croatia

Manufacture's Name.....: Sales peritias d.o.o.

Address .....: Dobranska 18, 10000 Zagreb, Croatia

Product description

Trade Mark: SALES PERITAS /

Product name.....: Abacus Smart POS

Model and/or type reference .: SP-101AU

Standards .....: FCC Rules and Regulations Part 15 Subpart C Section 15.407
ANSI C63.10: 2013

Date of Test.....:

Date (s) of performance of tests .....: Aug. 15, 2019 ~ Aug. 22, 2019

Date of Issue.....: Aug. 22, 2019

Test Result.....: Pass

Prepared by: Gary Qian

Project Engineer

Reviewed by: Leo Zhang

Project Supervisor

Approved by: James Zhou

Technical Director

TABLE OF CONTENTS

1. Test Result Summary

1.1. TEST PROCEDURES AND RESULTS

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
6dB Emission Bandwidth	§15.407(e)	PASS
26dB Emission Bandwidth& 99% Occupied Bandwidth	§15.407(a)	PASS
Power Spectral Density	§15.407(a)	PASS
Band edge	§ 15.407(b)	PASS
Radiated Emission	§ 15.407(b)	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

1.2. TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

1.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

2. EUT Description

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Abacus Smart POS
Model Name	SP-101AU
Serial No.	/
Trade Mark	SALES PERITAS / 
Model Difference	/
FCC ID	**2AUS3- SP-101AU**
Operation Frequency:	IEEE 802.11a/n/ac(HT20) 5.180GHz-5.240GHz IEEE 802.11n/ac(HT40) 5.190GHz-5.230GHz
	IEEE 802.11a/n/ac(HT20)5.745GHz-5.825GHz IEEE 802.11n/ac(HT40)5.755GHz-5.795GHz
Modulation Technology:	IEEE 802.11a/n/ac
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Antenna Type	Internal Antenna
Antenna Gain	0dBi
Power Source	DC12V from DC charging input or DC 7.4V from battery
Power Supply:	DC12V from DC charging input or DC 7.4V from battery

2.2. Operation Frequency each of channel

802.11a/802.11n(HT20) 802.11ac(HT20)		802.11n(HT40)/ 802.11ac(HT40)	
Channel	Frequency	Channel	Frequency
36	5180	38	5190
40	5200	46	5230
44	5220	151	5755
48	5240	159	5790
149	5745		
153	5765		
157	5785		
161	5805		
165	5825		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

2.3. Operation of EUT during testing

For 802.11a/n (HT20)/ac(HT20)

Band I (5150 - 5250 MHz)			Band IV (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
36	Low	5180	149	Low	5745
40	Mid	5200	157	Mid	5785
48	High	5240	165	High	5825

For 802.11n (HT40)/ ac(HT40)

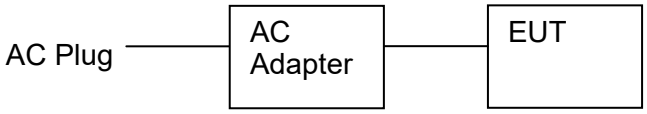
Band I (5150 - 5250 MHz)			Band IV (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
38	Low	5190	151	Low	5755
46	High	5230	159	High	5795

For 802.11ac(HT80)

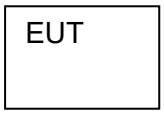
Band I (5150 - 5250 MHz)		Band IV (5725 - 5850 MHz)	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
42	5210	155	5775

2.4. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted and Radiation testing:



Operation of EUT Above1GHz Radiation testing:



- Adapter information
  Model: FX65C-120500Z
  Input: 100-240V~, 50/60Hz, 1.5A
  Output: 12VDC, 5A

The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X&Z position

3. Genera Information

3.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 100%)
The sample was placed 0.8m/1.5m for blow/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11a	6 Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0
802.11ac(HT20)/ac(HT40)	/
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation

3.2. 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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

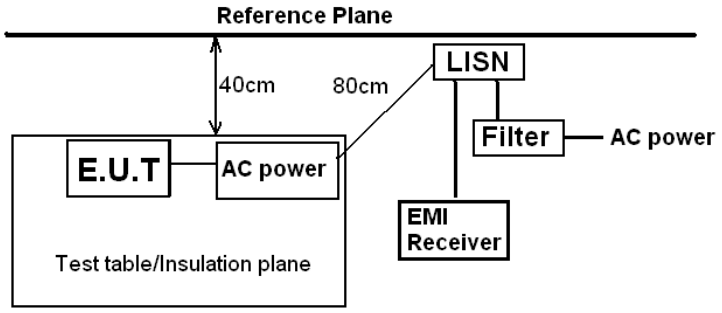
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. For conducted measurements (Output Power, Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

4. Test Results and Measurement Data

4.1. Conducted Emission

4.1.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Mode:</td><td>Tx Mode</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

4.1.2. Test Instruments

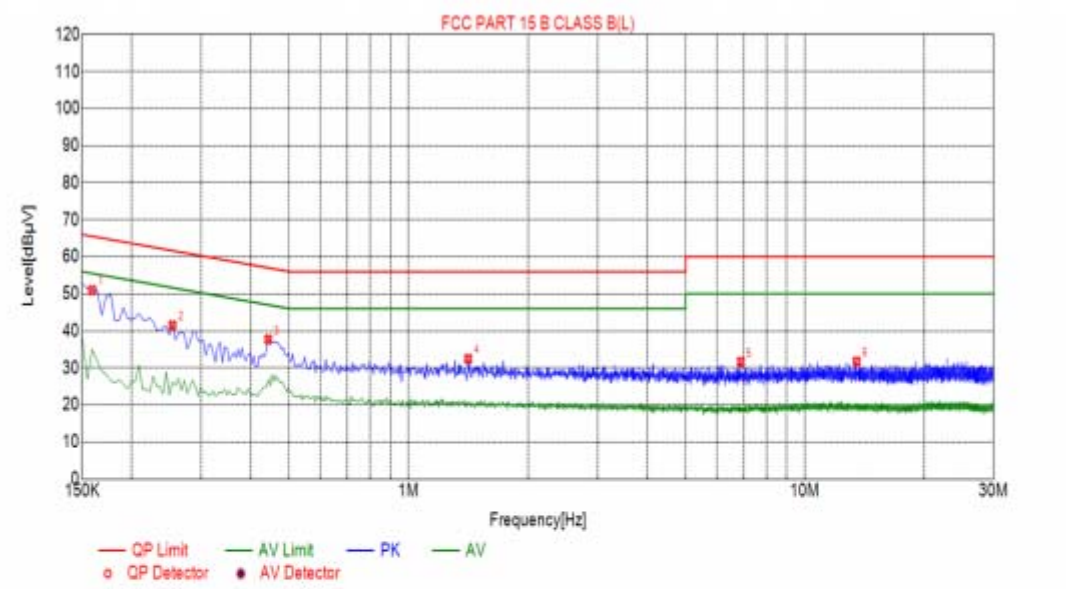
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESCI 7	HKE-010	Dec. 27, 2019
LISN	R&S	ENV216	HKE-002	Dec. 27, 2019
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Dec. 27, 2019
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.1.3. Test data

All the test modes completed for test. only the worst result of AC 240V/60Hz (802.11a at 5180MHz) was reported

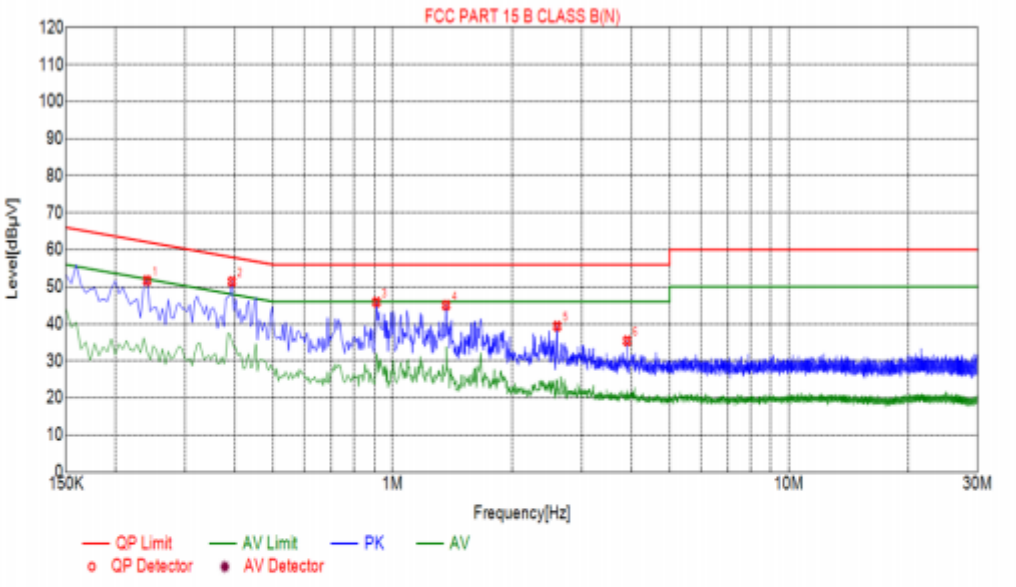
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1590	50.98	10.01	65.52	14.54	PK
2	0.2535	41.48	10.04	61.64	20.16	PK
3	0.4425	37.68	10.05	57.01	19.33	PK
4	1.4145	32.45	10.11	56.00	23.55	PK
5	6.9000	31.61	10.20	60.00	28.39	PK
6	13.5195	31.74	9.96	60.00	28.26	PK

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)

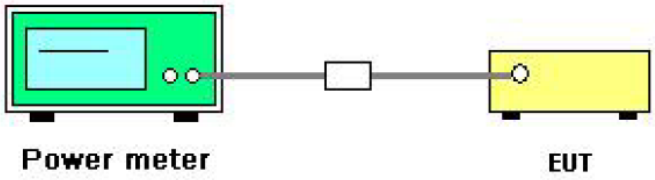


Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.2400	51.71	10.03	62.10	10.39	PK
2	0.3930	51.42	10.04	58.00	6.58	PK
3	0.9105	45.89	10.06	56.00	10.11	PK
4	1.3650	45.05	10.11	56.00	10.95	PK
5	2.6025	39.38	10.21	56.00	16.62	PK
6	3.9075	35.42	10.25	56.00	20.58	PK

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

4.2. Maximum Conducted Output Power

4.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046</td></tr>
<tr><td>Test Method:</td><td>KDB789033 D02 General UNII Test Procedures New Rules v02.r01 Section E</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency Band (MHz)</td><td>Limit</td></tr>
<tr><td>5150-5250</td><td>250mW for client devices</td></tr>
<tr><td>5725-5850</td><td>1 W</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test Mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Test Procedure:</td><td>1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
5. Measure the conducted output power and record the results in the test report.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
<tr><td>Remark:</td><td>Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0
Conducted output power= measurement power</td></tr>
</table>

4.2.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Power meter	Agilent	E4419B	HKE-085	Dec. 27, 2019
Power Sensor	Agilent	E9300A	HKE-086	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

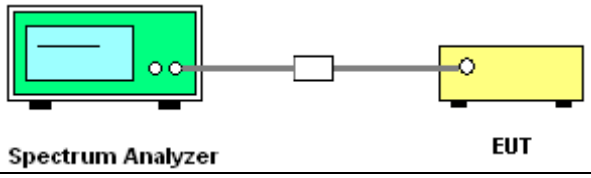
4.2.3. Test Data

Configuration Band I (5150 - 5250 MHz)				
Mode	Test channel	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)	Result
11a	CH36	7.48	23.98	PASS
11a	CH40	7.39	23.98	PASS
11a	CH48	6.42	23.98	PASS
11n(HT20)	CH36	7.51	23.98	PASS
11n(HT20)	CH40	7.38	23.98	PASS
11n(HT20)	CH48	6.35	23.98	PASS
11n(HT40)	CH38	7.68	23.98	PASS
11n(HT40)	CH46	6.95	23.98	PASS
11ac(HT20)	CH36	7.53	23.98	PASS
11ac(HT20)	CH40	7.42	23.98	PASS
11ac(HT20)	CH48	6.41	23.98	PASS
11ac(HT40)	CH38	7.71	23.98	PASS
11ac(HT40)	CH46	7.01	23.98	PASS

Configuration Band IV (5725 - 5850 MHz)				
Mode	Test channel	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)	Result
11a	CH149	6.73	30.00	PASS
11a	CH157	5.95	30.00	PASS
11a	CH165	5.59	30.00	PASS
11n (HT20)	CH149	7.02	30.00	PASS
11n (HT20)	CH157	5.95	30.00	PASS
11n (HT20)	CH165	5.32	30.00	PASS
11n (HT40)	CH151	7.10	30.00	PASS
11n (HT40)	CH159	5.91	30.00	PASS
11ac(HT20)	CH149	6.93	30.00	PASS
11ac(HT20)	CH157	6.05	30.00	PASS
11ac(HT20)	CH165	5.48	30.00	PASS
11ac(HT40)	CH151	7.21	30.00	PASS
11ac(HT40)	CH159	6.38	30.00	PASS

4.3. 6dB Emission Bandwidth

4.3.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)& Part 2 J Section 2.1049
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

4.3.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

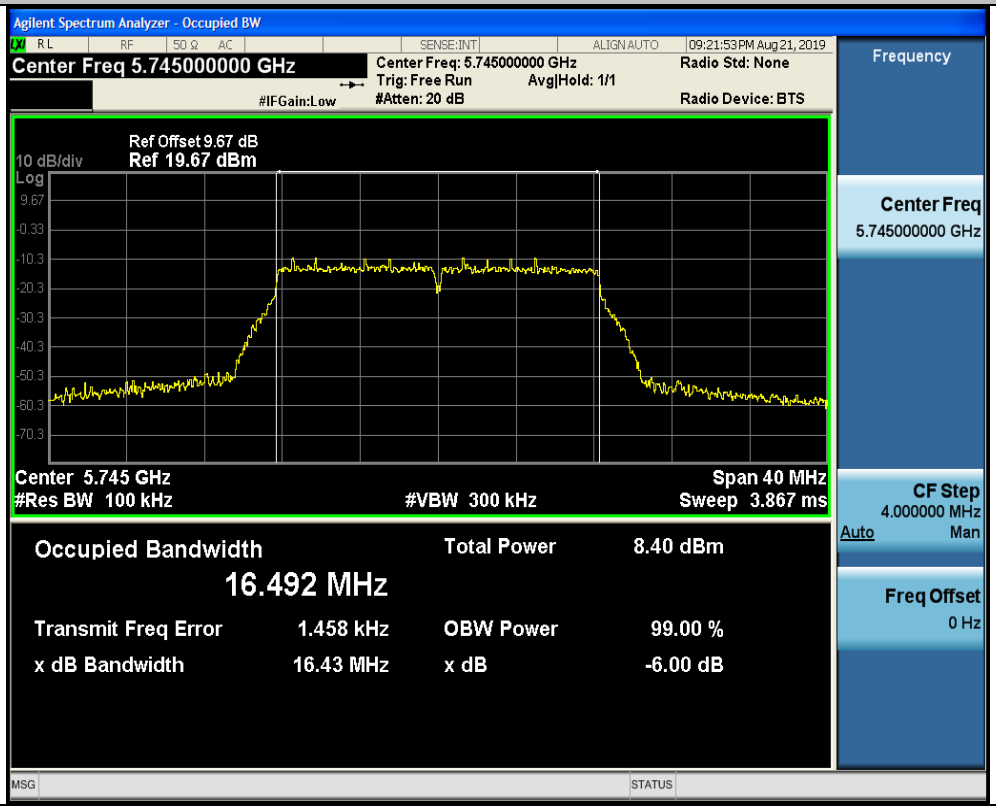
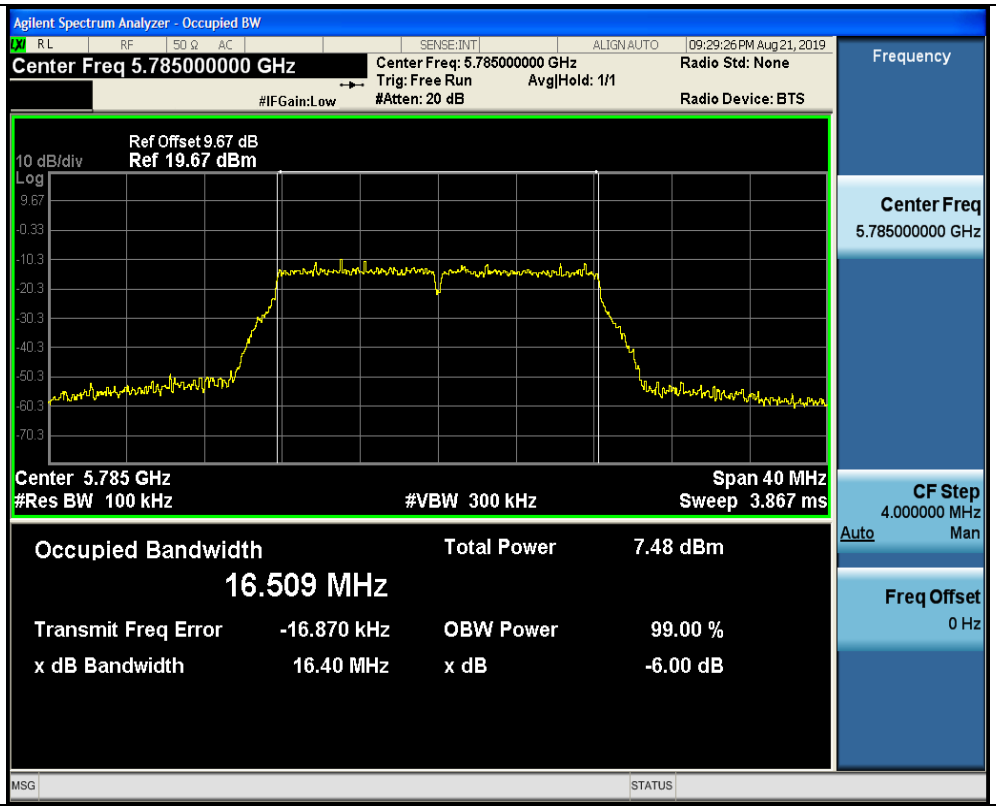
Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.3.3. Test data

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	16.43	0.5	PASS
11a	CH157	5785	16.40	0.5	PASS
11a	CH161	5825	16.39	0.5	PASS
11n(HT20)	CH149	5745	17.67	0.5	PASS
11n(HT20)	CH157	5785	17.64	0.5	PASS
11n(HT20)	CH161	5825	17.64	0.5	PASS
11n(HT40)	CH151	5755	36.12	0.5	PASS
11n(HT40)	CH159	5795	36.35	0.5	PASS
11ac(HT20)	CH149	5745	17.65	0.5	PASS
11ac(HT20)	CH157	5785	17.63	0.5	PASS
11ac(HT20)	CH165	5825	17.63	0.5	PASS
11ac(HT40)	CH151	5755	36.13	0.5	PASS
11ac(HT40)	CH159	5795	36.11	0.5	PASS

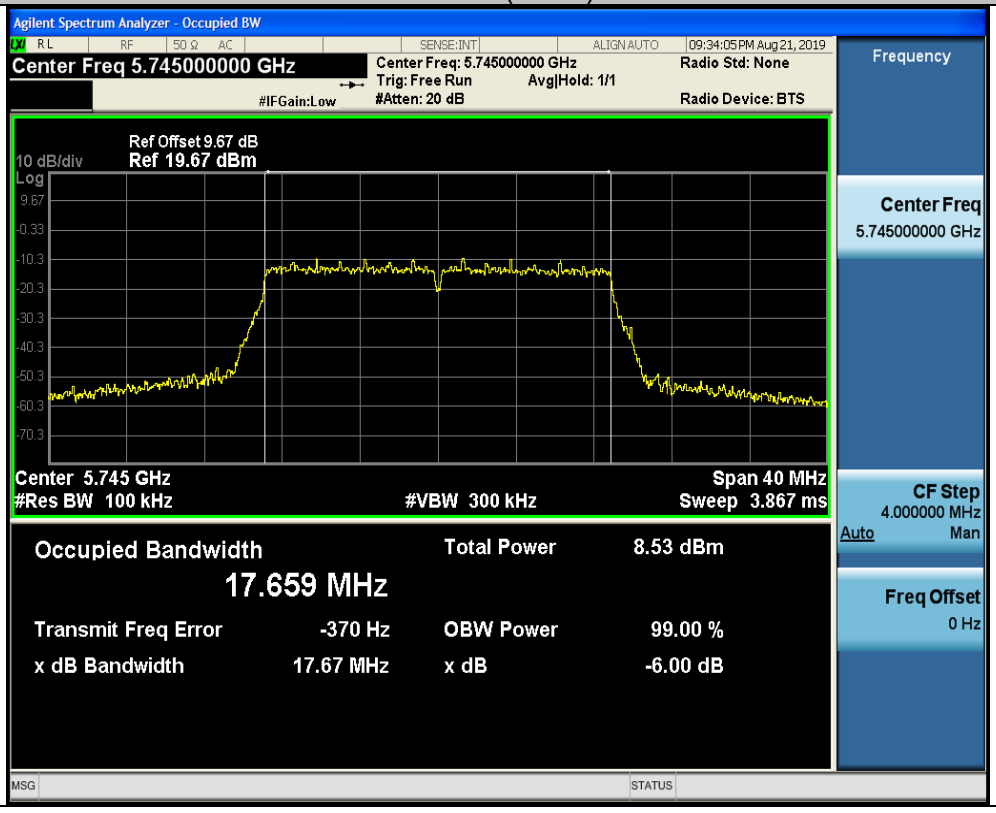
Test plots as follows:

Band IV (5725 – 5850 MHz)

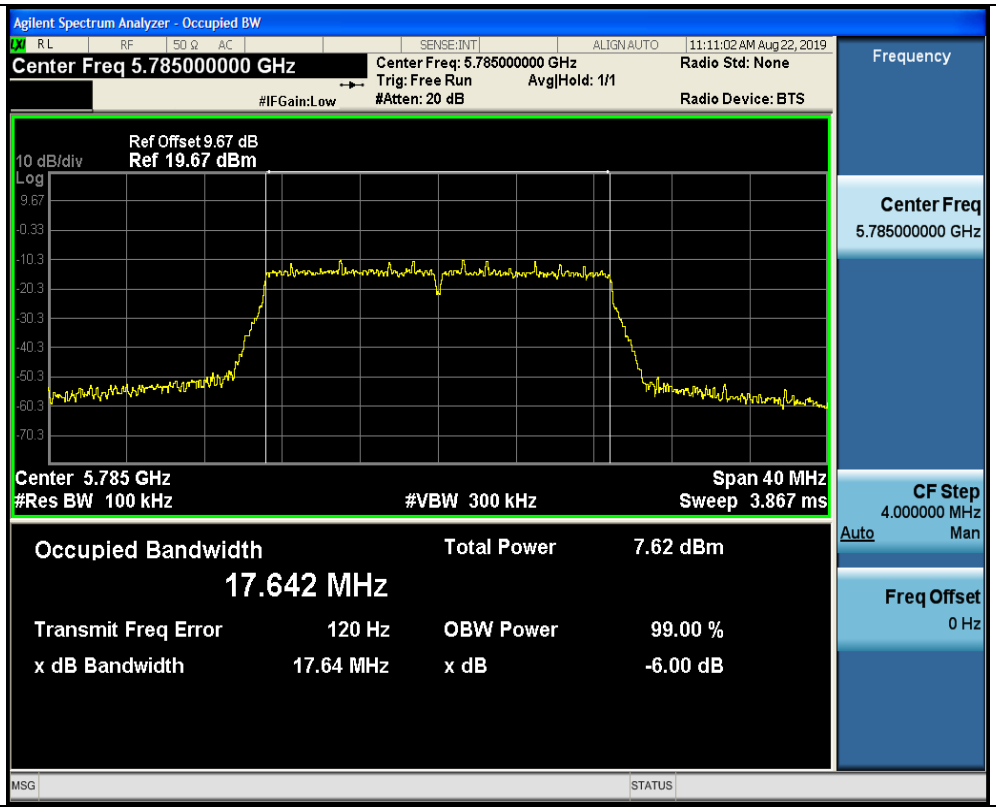
802.11a

Low

Mid

High

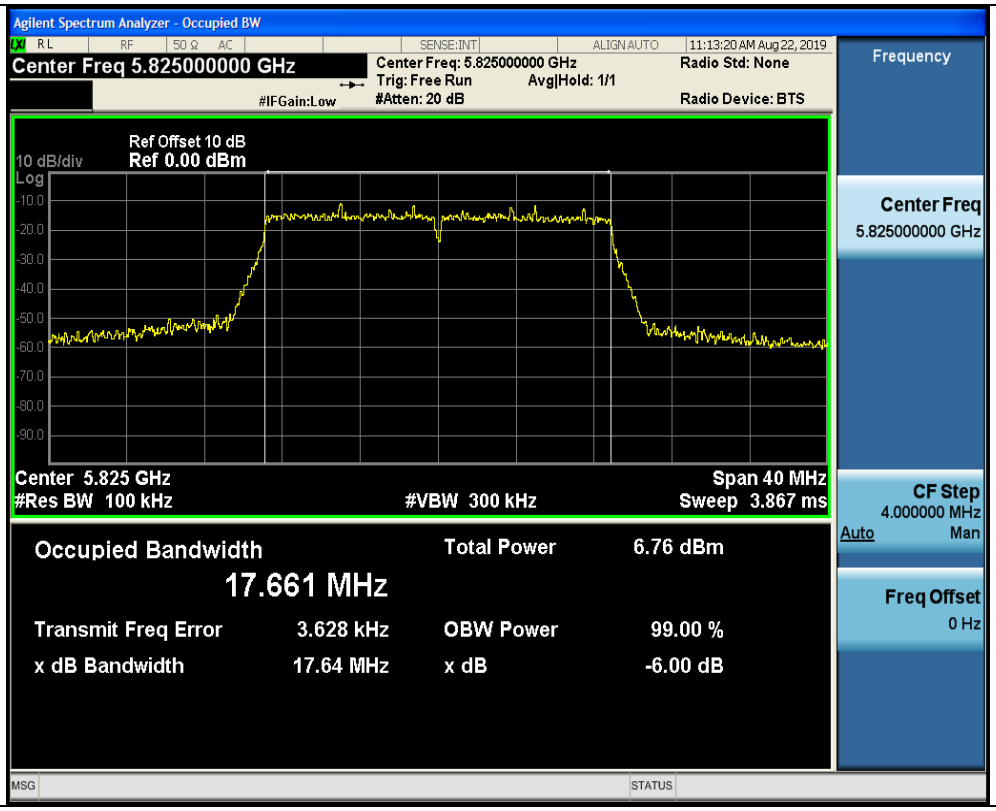
802.11n(HT20)



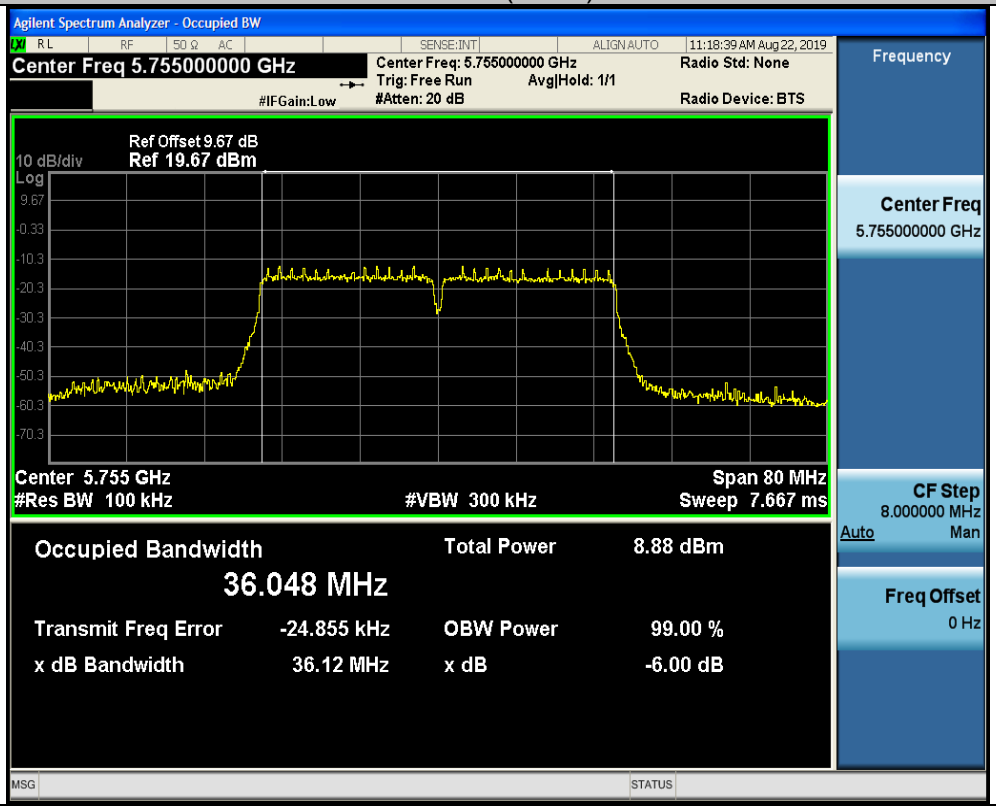
Low

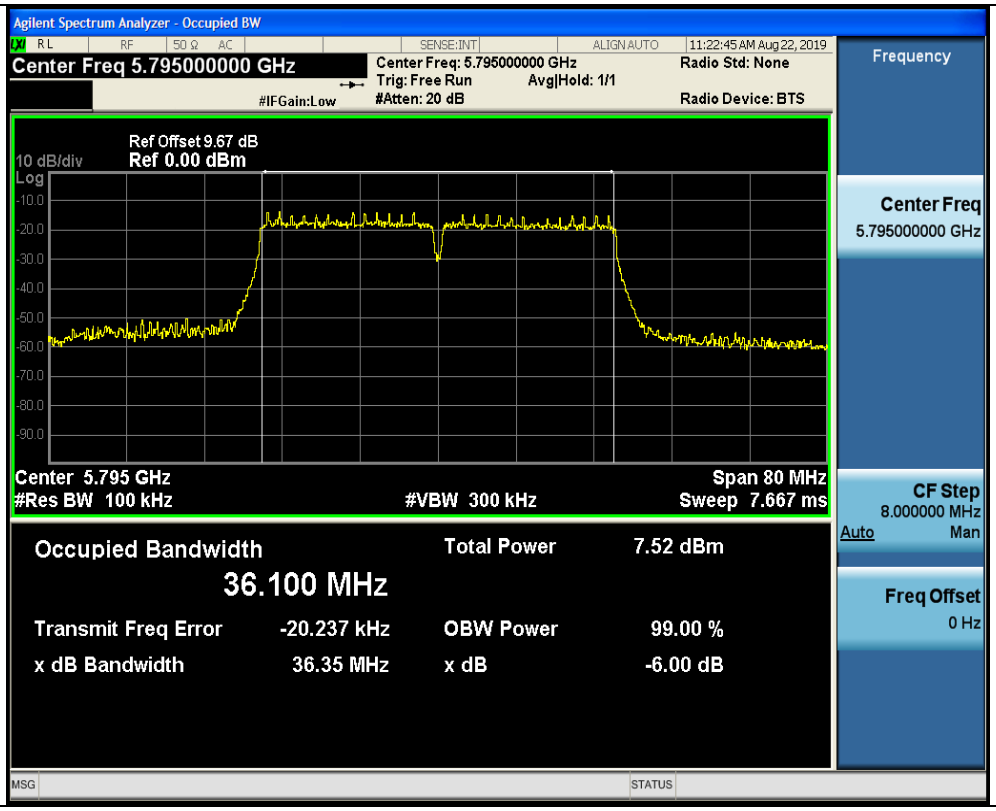

Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:11:02 AM Aug 22, 2019
Center Freq 5.785000000 GHz
Center Freq: 5.785000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.67 dB
10 dB/div
Ref 19.67 dBm
Log
9.67
-0.33
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center Freq
5.785000000 GHz
Center 5.785 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40 MHz
Sweep 3.867 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.642 MHz
Total Power
7.62 dBm
Transmit Freq Error
120 Hz
OBW Power
99.00 %
x dB Bandwidth
17.64 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

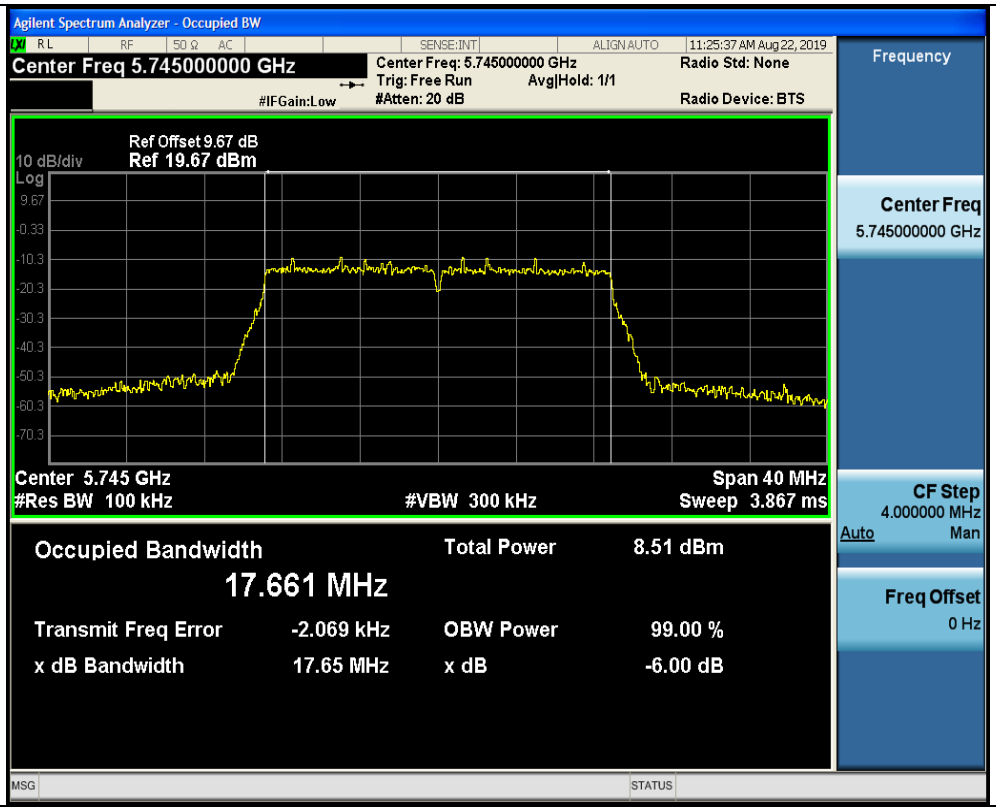
Mid


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:13:20 AM Aug 22, 2019
Center Freq 5.825000000 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 10 dB
10 dB/div
Ref 0.00 dBm
Log
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Center Freq
5.825000000 GHz
Center 5.825 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40 MHz
Sweep 3.867 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.661 MHz
Total Power
6.76 dBm
Transmit Freq Error
3.628 kHz
OBW Power
99.00 %
x dB Bandwidth
17.64 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

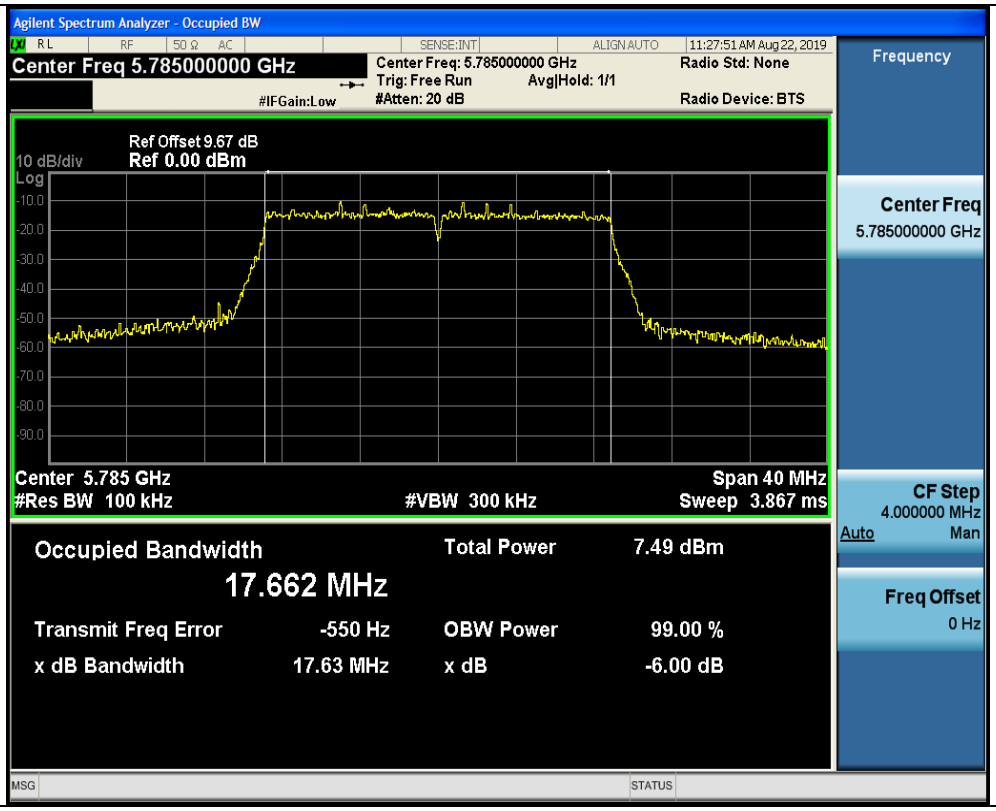
High

802.11n(HT40)

Low

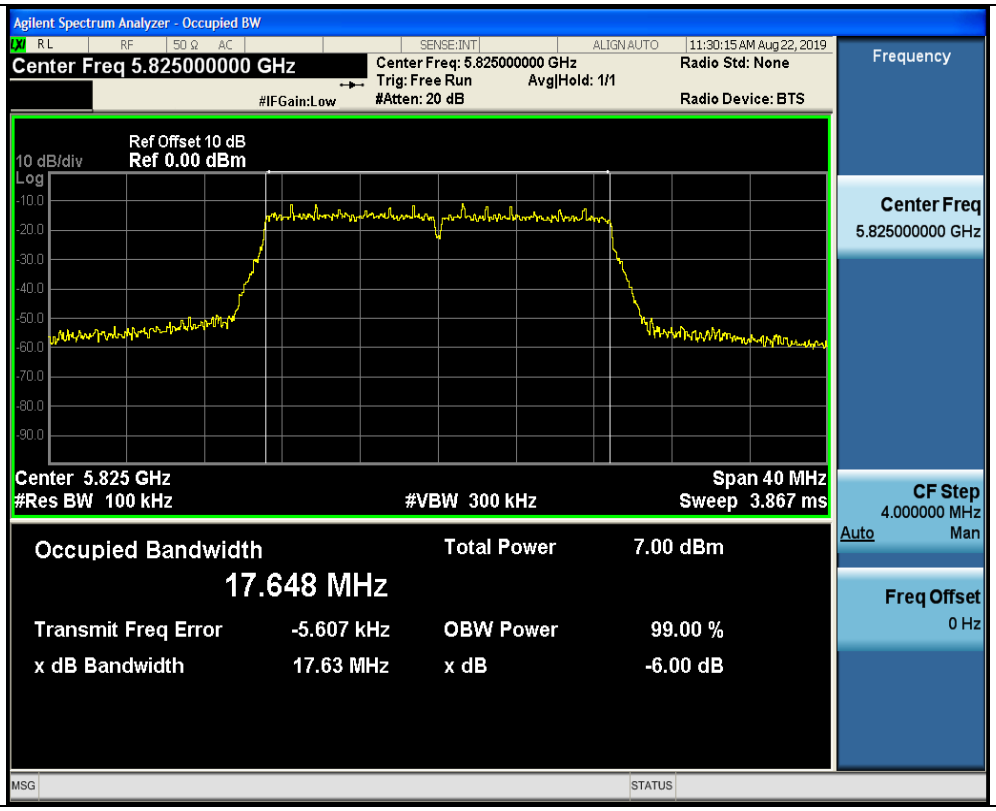

High
802.11ac(HT20)


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:25:37 AM Aug 22, 2019
Center Freq 5.745000000 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.67 dB
10 dB/div
Ref 19.67 dBm
Log
9.67
-0.33
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center Freq
5.745000000 GHz
Center 5.745 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40 MHz
Sweep 3.867 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.661 MHz
Total Power
8.51 dBm
Transmit Freq Error
-2.069 kHz
OBW Power
99.00 %
x dB Bandwidth
17.65 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

Low

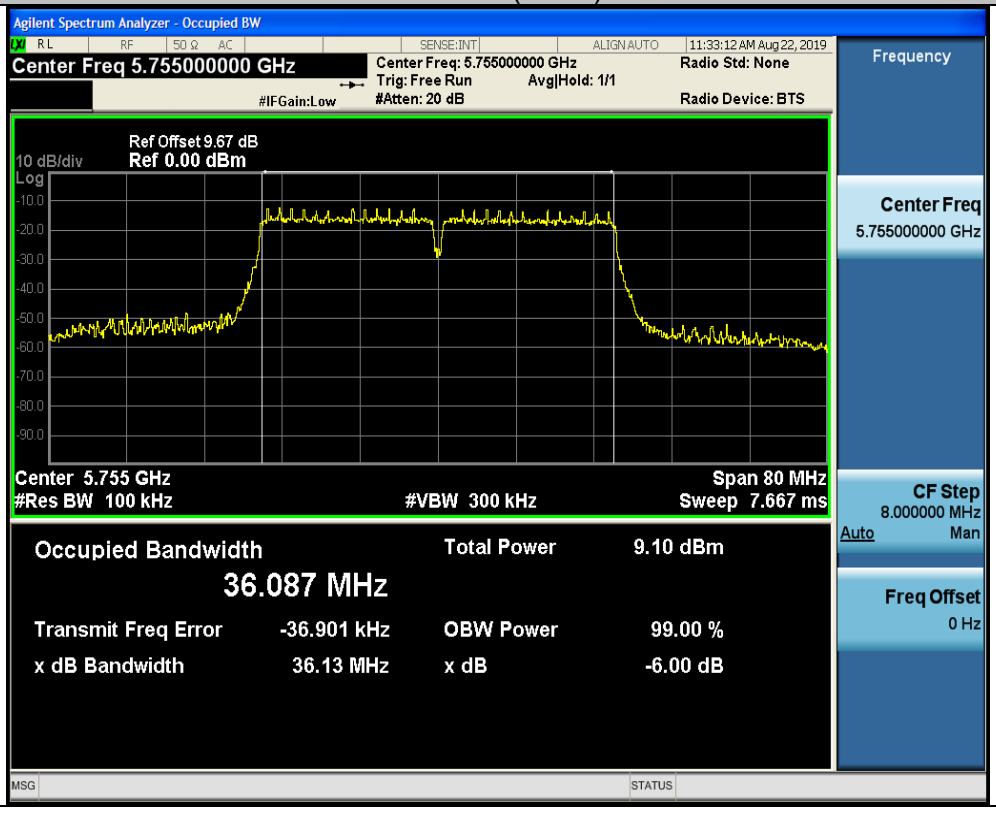

Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:27:51 AM Aug 22, 2019
Center Freq 5.785000000 GHz
Center Freq: 5.785000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.67 dB
10 dB/div
Ref 0.00 dBm
Log
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Center Freq
5.785000000 GHz
Center 5.785 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 40 MHz
Sweep 3.867 ms
CF Step
4.000000 MHz
Auto
Man
Occupied Bandwidth
17.662 MHz
Total Power
7.49 dBm
Transmit Freq Error
-550 Hz
OBW Power
99.00 %
x dB Bandwidth
17.63 MHz
x dB
-6.00 dB
Freq Offset
0 Hz
MSG
STATUS

Mid

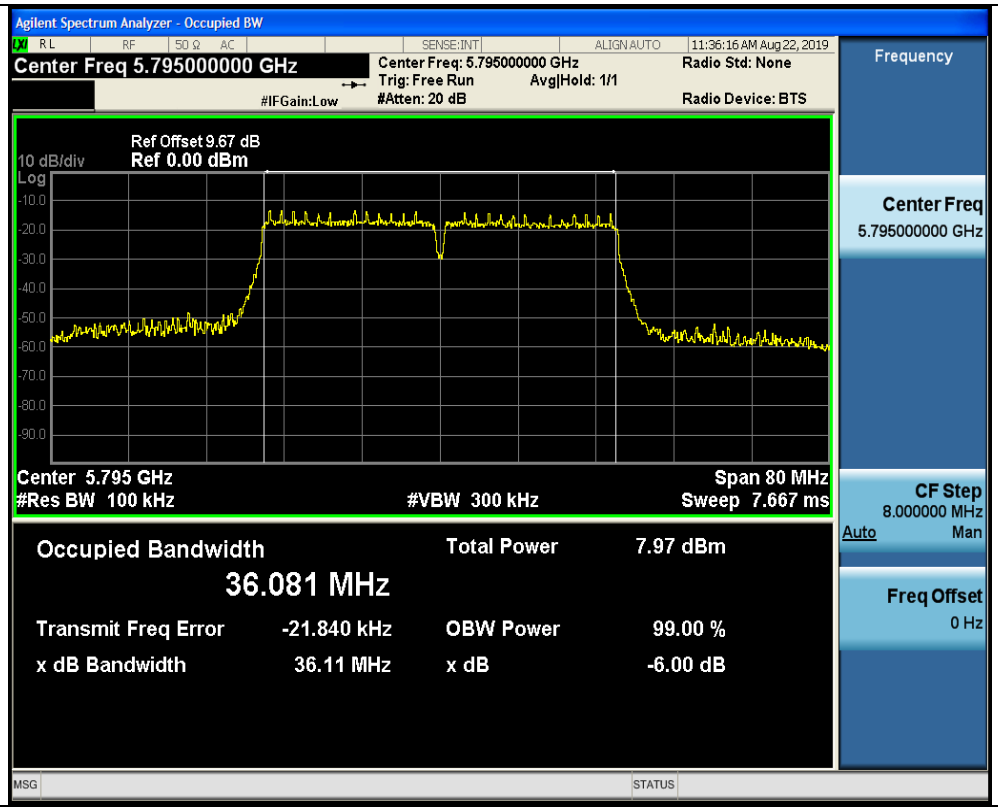


High

802.11ac(HT40)



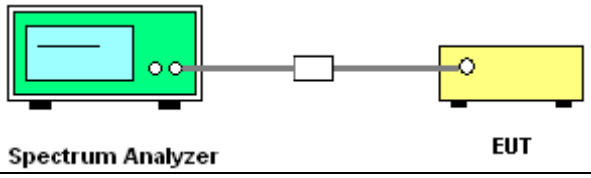
Low


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:36:16 AM Aug 22, 2019
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.67 dB
10 dB/div
Ref 0.00 dBm
Log
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Center Freq
5.795000000 GHz
Center 5.795 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 80 MHz
Sweep 7.667 ms
CF Step
8.000000 MHz
Auto
Man
Occupied Bandwidth
36.081 MHz
Total Power
7.97 dBm
Freq Offset
0 Hz
Transmit Freq Error
-21.840 kHz
OBW Power
99.00 %
x dB Bandwidth
36.11 MHz
x dB
-6.00 dB
MSG
STATUS

High

4.4. 26dB Bandwidth and 99% Occupied Bandwidth

4.4.1. Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407 (a)& Part 2 J Section 2.1049
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	No restriction limits
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth RBW = 1% EBW, VBW≥3RBW, In order to make an accurate measurement. 4. Measure and record the results in the test report.
Test Result:	PASS

4.4.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.4.3. Test data

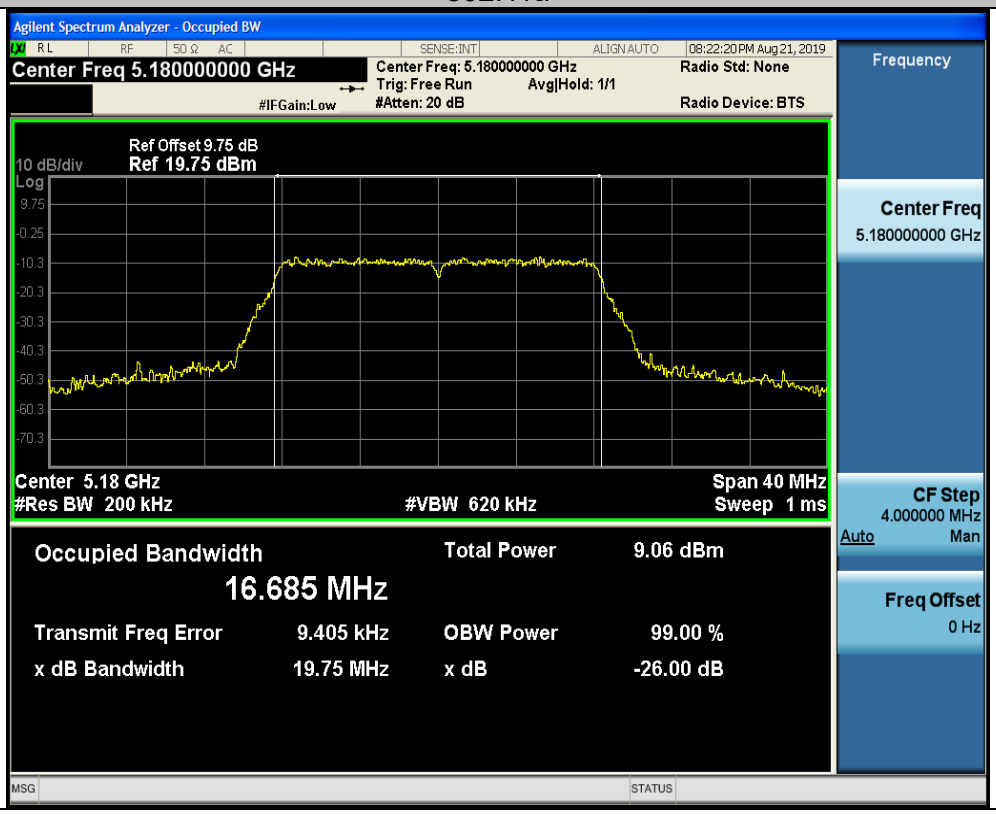
Band I

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
11a	CH36	5180	19.75	PASS
11a	CH40	5200	19.69	PASS
11a	CH48	5240	19.83	PASS
11n(HT20)	CH36	5180	20.01	PASS
11n(HT20)	CH40	5200	19.89	PASS
11n(HT20)	CH48	5240	19.94	PASS
11n(HT40)	CH38	5190	39.81	PASS
11n(HT40)	CH46	5230	39.89	PASS
11ac(HT20)	CH36	5180	20.11	PASS
11ac(HT20)	CH40	5200	19.89	PASS
11ac(HT20)	CH48	5240	19.92	PASS
11ac(HT40)	CH38	5190	39.98	PASS
11ac(HT40)	CH46	5230	40.03	PASS

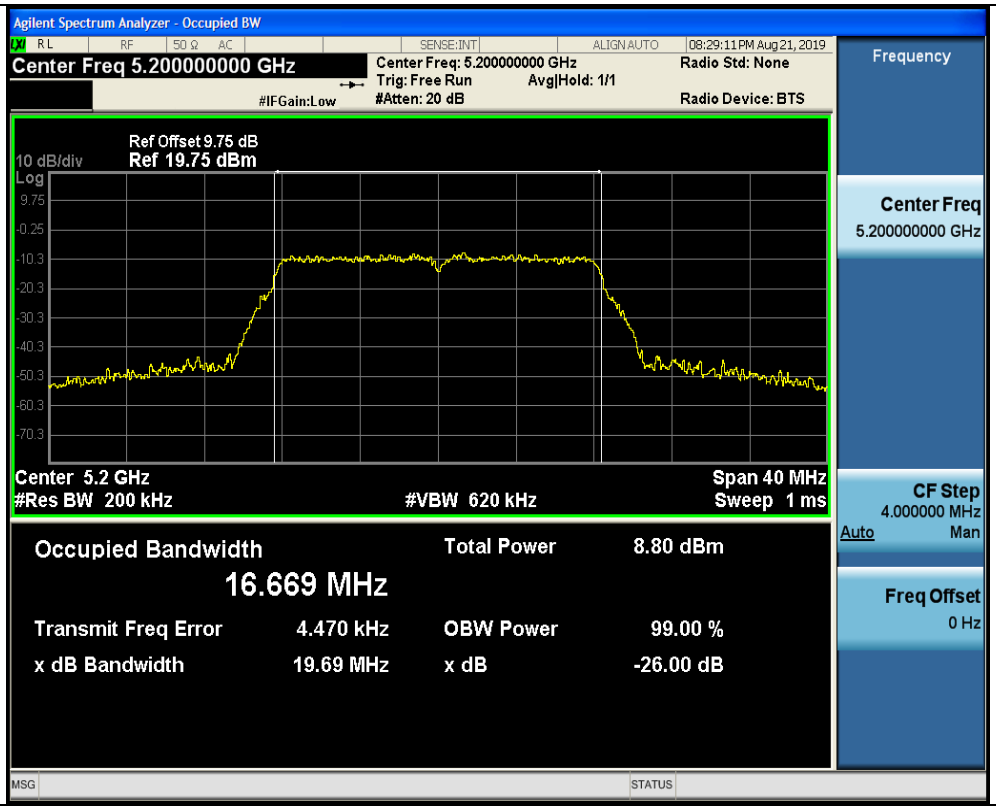
Test plots as follows:

Band I （5150 – 5250 MHz）

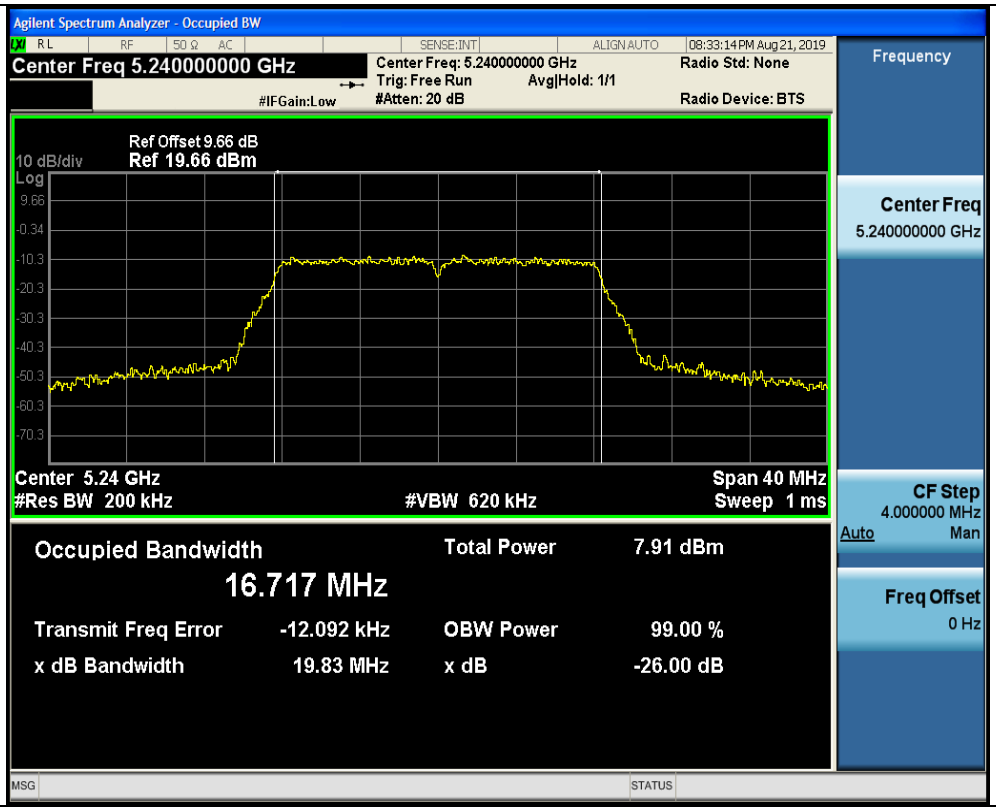
802.11a



Low

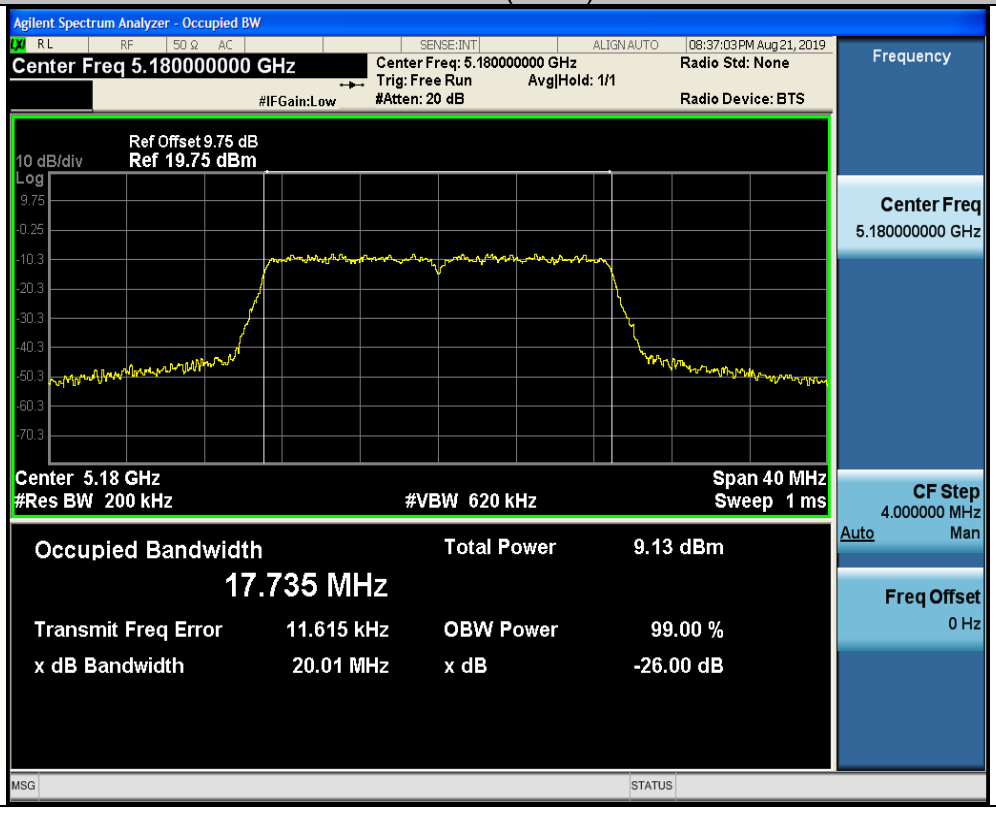


Mid

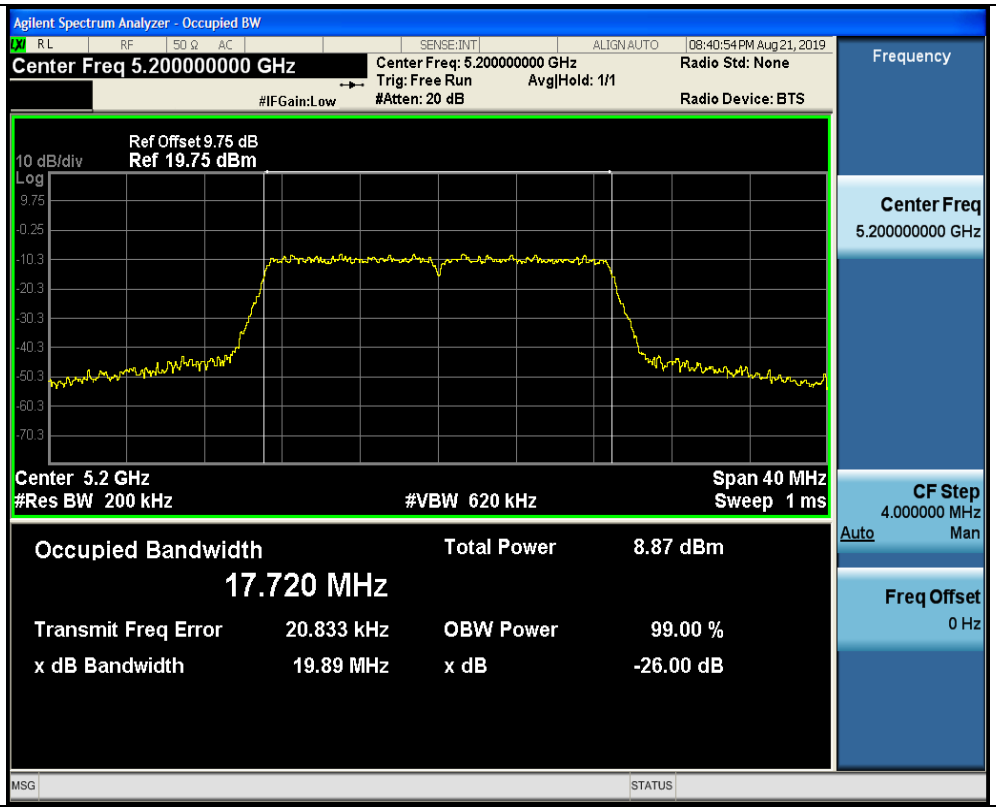


High

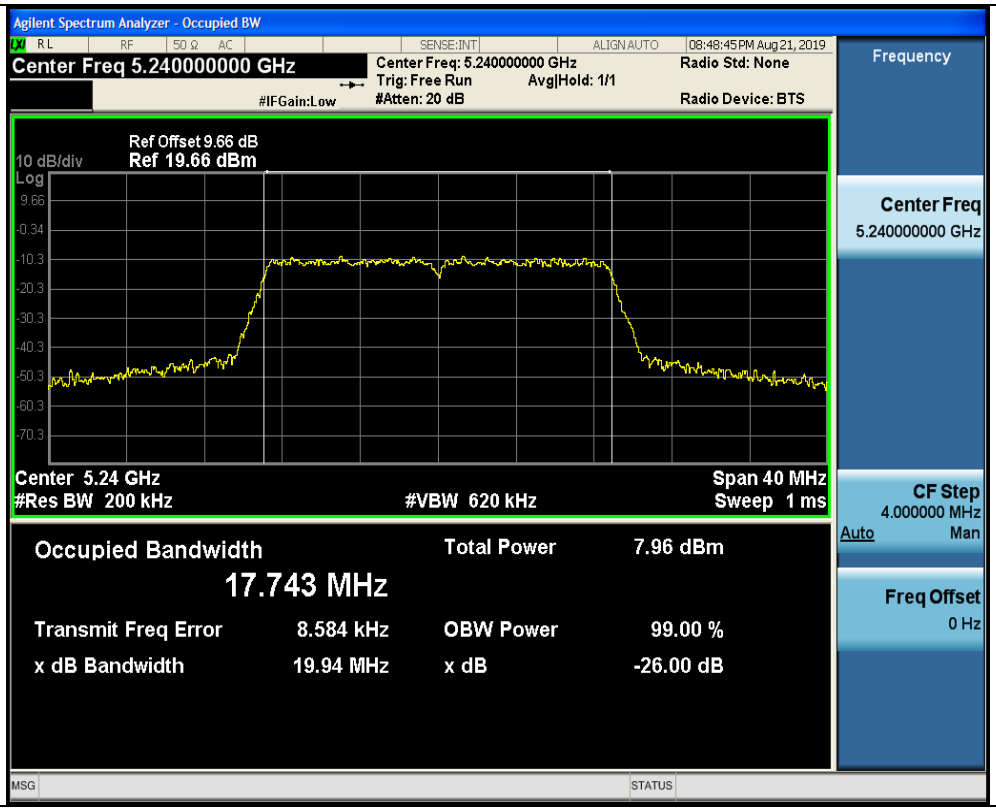
802.11n(HT20)



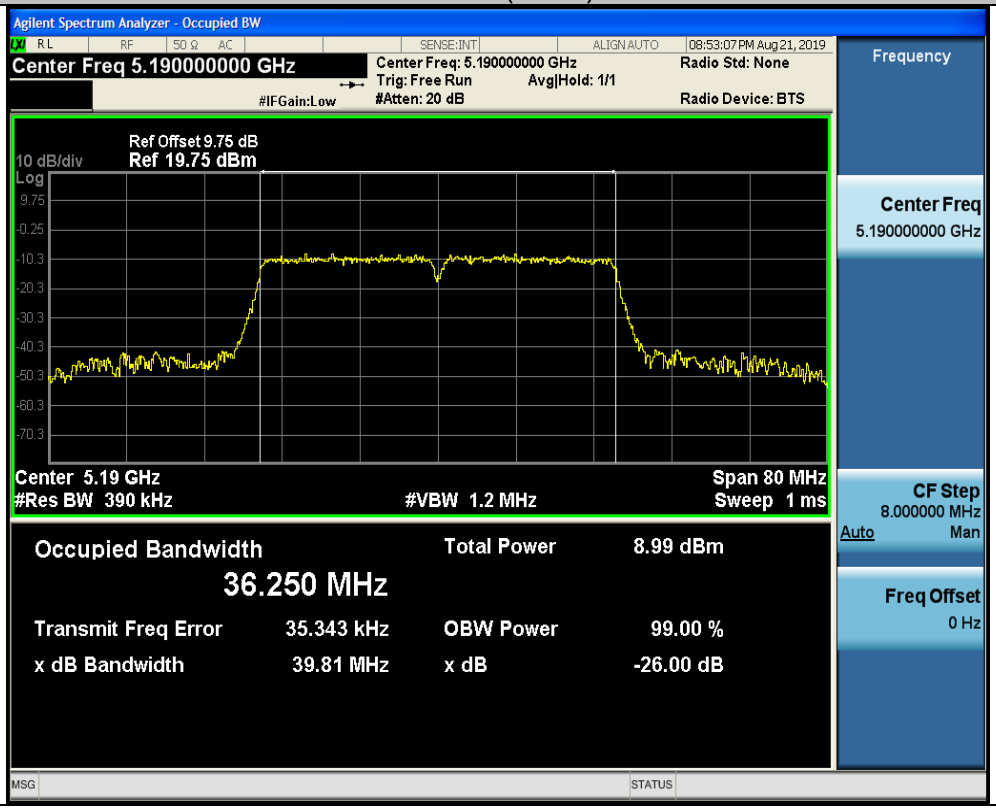
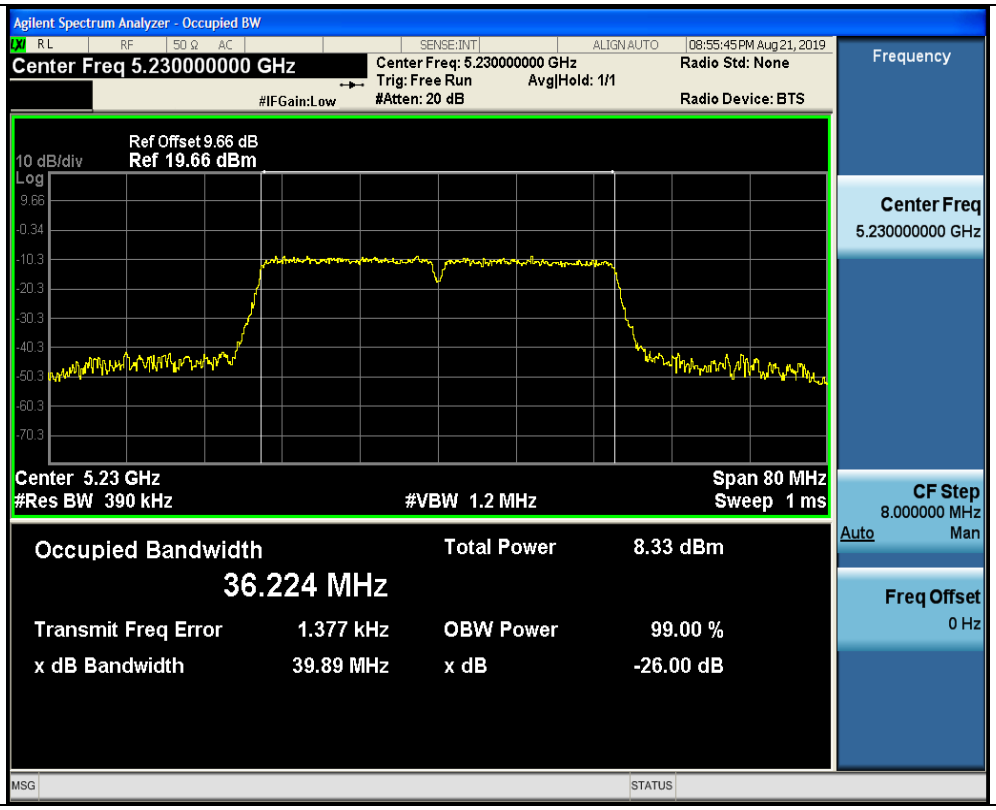
Low

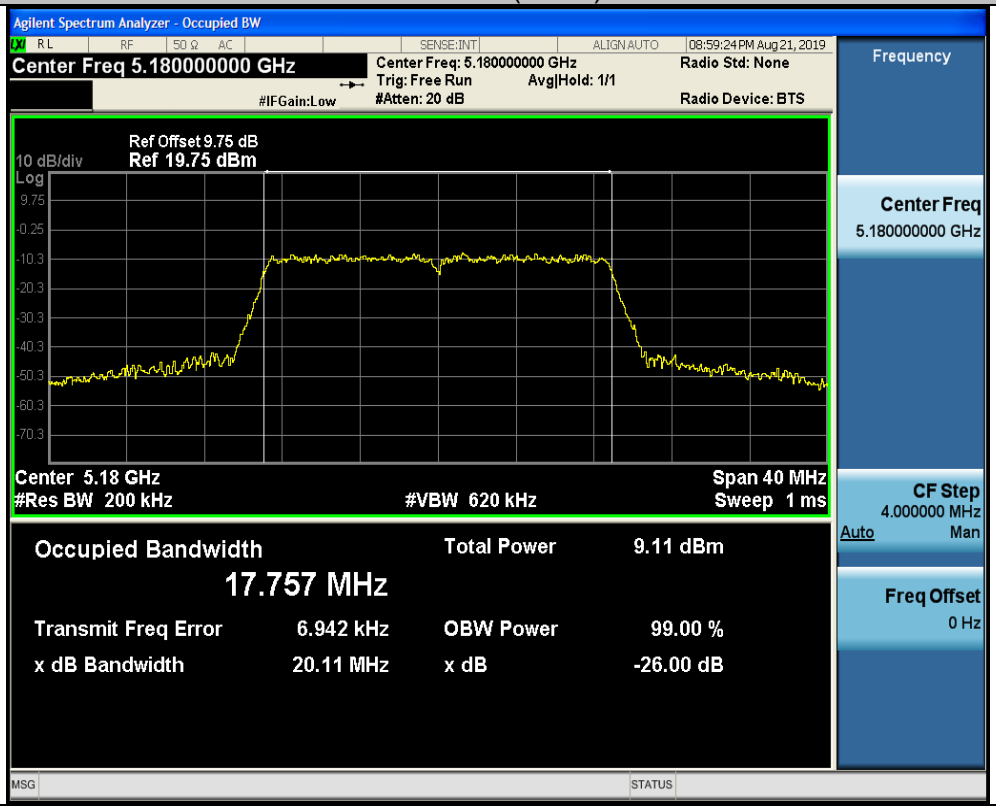
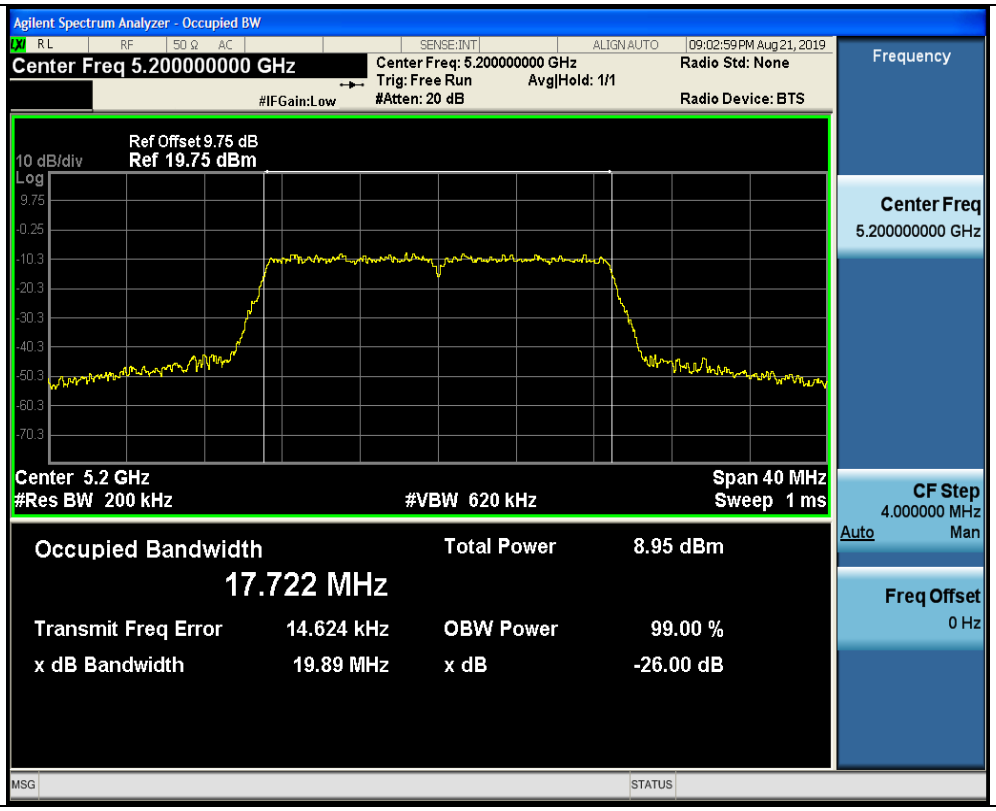

Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
08:40:54 PM Aug 21, 2019
Center Freq 5.200000000 GHz
Center Freq: 5.200000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.75 dB
10 dB/div
Ref 19.75 dBm
Log
9.75
-0.25
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center 5.2 GHz
#Res BW 200 kHz
#VBW 620 kHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.720 MHz
Total Power
8.87 dBm
Transmit Freq Error
20.833 kHz
OBW Power
99.00 %
x dB Bandwidth
19.89 MHz
x dB
-26.00 dB
Center Freq
5.200000000 GHz
CF Step
4.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

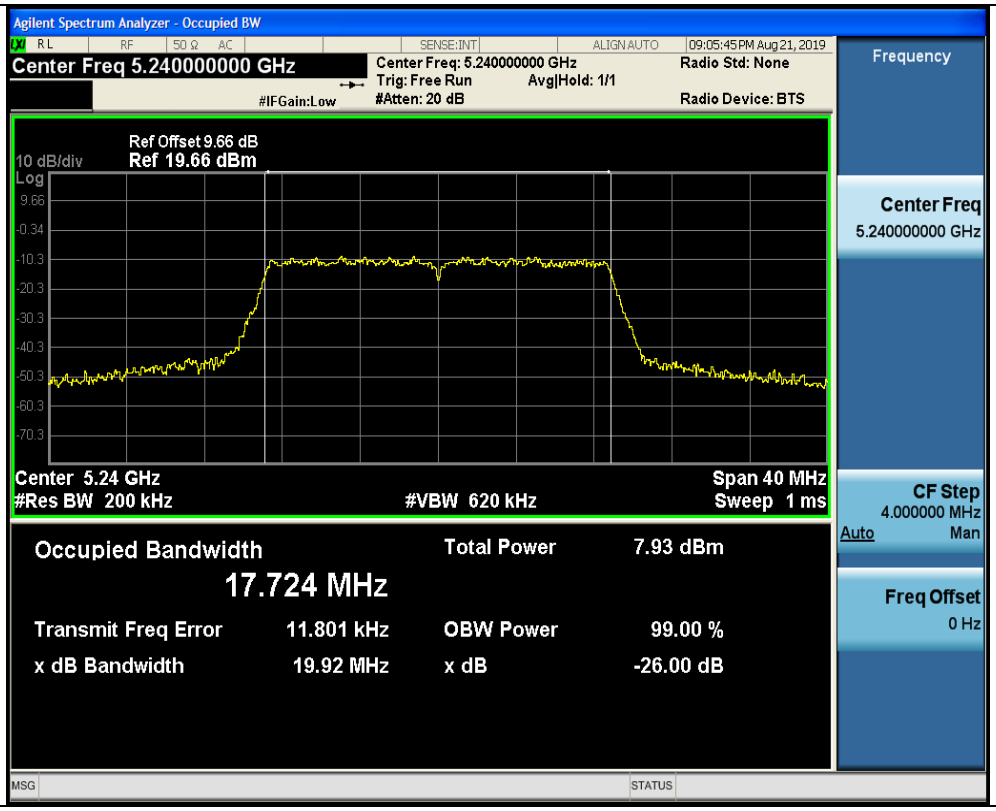
Mid


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
08:48:45 PM Aug 21, 2019
Center Freq 5.240000000 GHz
Center Freq: 5.240000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.66 dB
10 dB/div
Ref 19.66 dBm
Log
9.66
-0.34
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center 5.24 GHz
#Res BW 200 kHz
#VBW 620 kHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.743 MHz
Total Power
7.96 dBm
Transmit Freq Error
8.584 kHz
OBW Power
99.00 %
x dB Bandwidth
19.94 MHz
x dB
-26.00 dB
Center Freq
5.240000000 GHz
CF Step
4.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

High

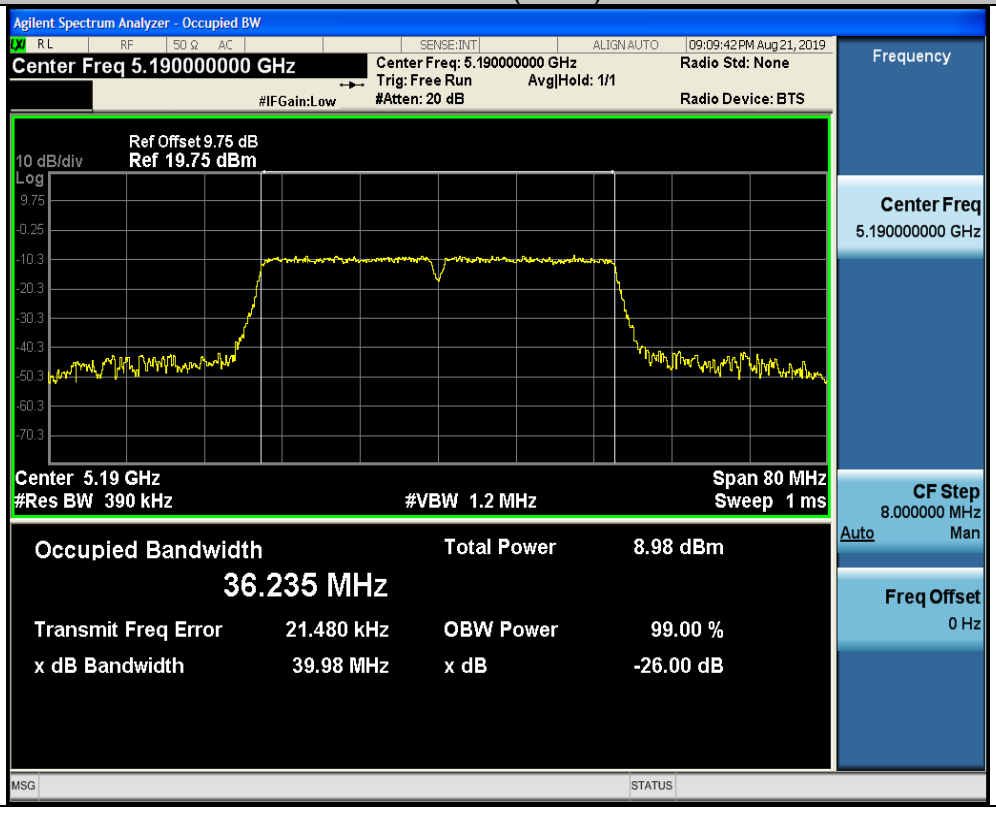
802.11n(HT40)

Low

High

802.11ac(HT20)

Low

Mid

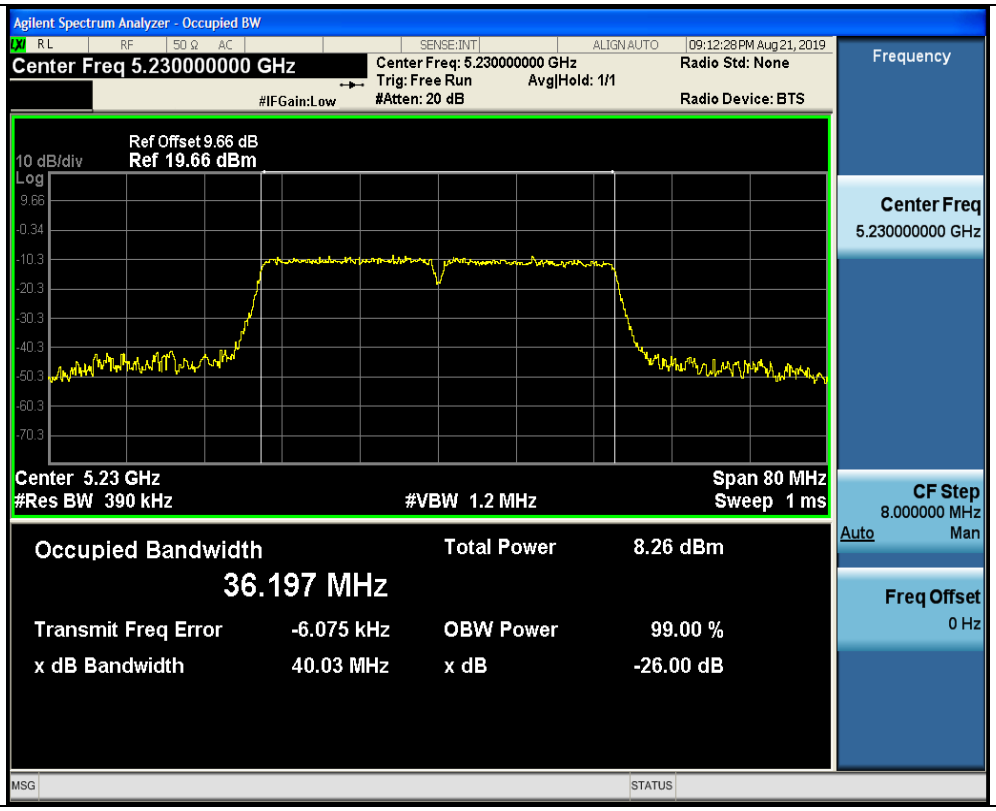


High

802.11ac(HT40)



Low


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:12:28 PM Aug 21, 2019
Center Freq 5.230000000 GHz
Center Freq: 5.230000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 9.66 dB
10 dB/div
Ref 19.66 dBm
Log
9.66
-0.34
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center Freq
5.230000000 GHz
Center 5.23 GHz
#Res BW 390 kHz
#VBW 1.2 MHz
Span 80 MHz
Sweep 1 ms
CF Step
8.000000 MHz
Auto
Man
Occupied Bandwidth
36.197 MHz
Total Power
8.26 dBm
Freq Offset
0 Hz
Transmit Freq Error
-6.075 kHz
OBW Power
99.00 %
x dB Bandwidth
40.03 MHz
x dB
-26.00 dB
MSG
STATUS

High

4.5. Power Spectral Density

4.5.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	≤11.00dBm/MHz for Band I 5150MHz-5250MHz ≤30.00dBm/500KHz for Band IV 5725MHz-5850MHz The e.i,r,p spectral density for Band I 5150MHz – 5250 MHz should not exceed 10dBm/MHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 1. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS. 2. Allow the sweeps to continue until the trace stabilizes. 3. Use the peak marker function to determine the maximum amplitude level. 4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

4.5.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2019

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.5.3. Test data

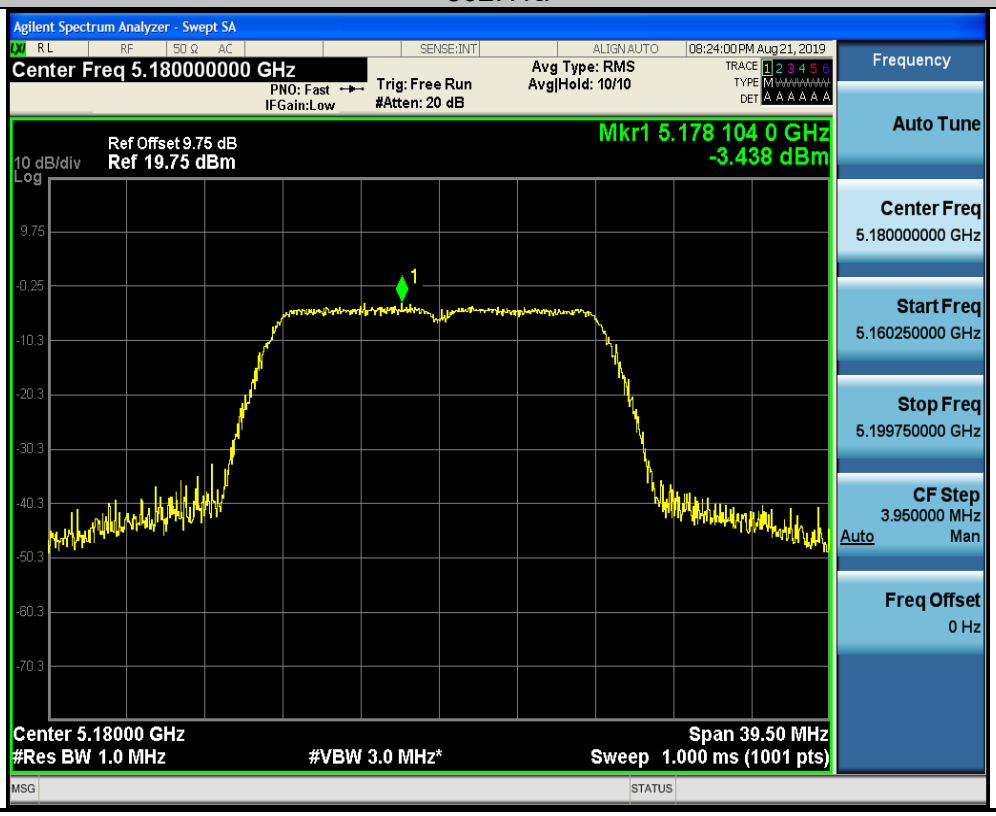
Configuration Band I (5150 - 5250 MHz)						
Mode	Test channel	Level [dBm/MHz]	10log(1/x) Factor [dB]	Power Spectral Density	Limit (dBm/MHz)	Result
11a	CH36	-3.44	0.12	-3.32	11	PASS
11a	CH40	-3.03	0.12	-2.91	11	PASS
11a	CH48	-4.56	0.12	-4.44	11	PASS
11n(HT20)	CH36	-3.78	0.13	-3.65	11	PASS
11n(HT20)	CH40	-3.77	0.13	-3.64	11	PASS
11n(HT20)	CH48	-4.50	0.13	-4.37	11	PASS
11n(HT40)	CH38	-6.28	0.24	-6.04	11	PASS
11n(HT40)	CH46	-7.45	0.24	-7.21	11	PASS
11ac(HT20)	CH36	-3.07	0.13	-2.94	11	PASS
11ac(HT20)	CH40	-3.55	0.13	-3.42	11	PASS
11ac(HT20)	CH48	-5.08	0.13	-4.95	11	PASS
11ac(HT40)	CH38	-6.44	0.24	-6.20	11	PASS
11ac(HT40)	CH46	-7.41	0.25	-7.16	11	PASS

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Level [dBm/500kHz]	10log(1/x) Factor[dB]	Power Spectral Density	Limit (dBm/500kHz)	Result
11a	CH149	-5.93	0.12	-5.81	30	PASS
11a	CH157	-6.33	0.12	-6.21	30	PASS
11a	CH161	-6.61	0.12	-6.49	30	PASS
11n(HT20)	CH149	-6.06	0.13	-5.93	30	PASS
11n(HT20)	CH157	-7.17	0.13	-7.04	30	PASS
11n(HT20)	CH161	-7.57	0.13	-7.44	30	PASS
11n(HT40)	CH151	-8.89	0.24	-8.65	30	PASS
11n(HT40)	CH159	-9.92	0.24	-9.68	30	PASS
11ac(HT20)	CH149	-6.16	0.13	-6.03	30	PASS
11ac(HT20)	CH157	-6.74	0.13	-6.61	30	PASS
11ac(HT20)	CH161	-7.86	0.13	-7.73	30	PASS
11ac(HT40)	CH151	-9.14	0.24	-8.90	30	PASS
11ac(HT40)	CH159	-9.69	0.25	-9.44	30	PASS

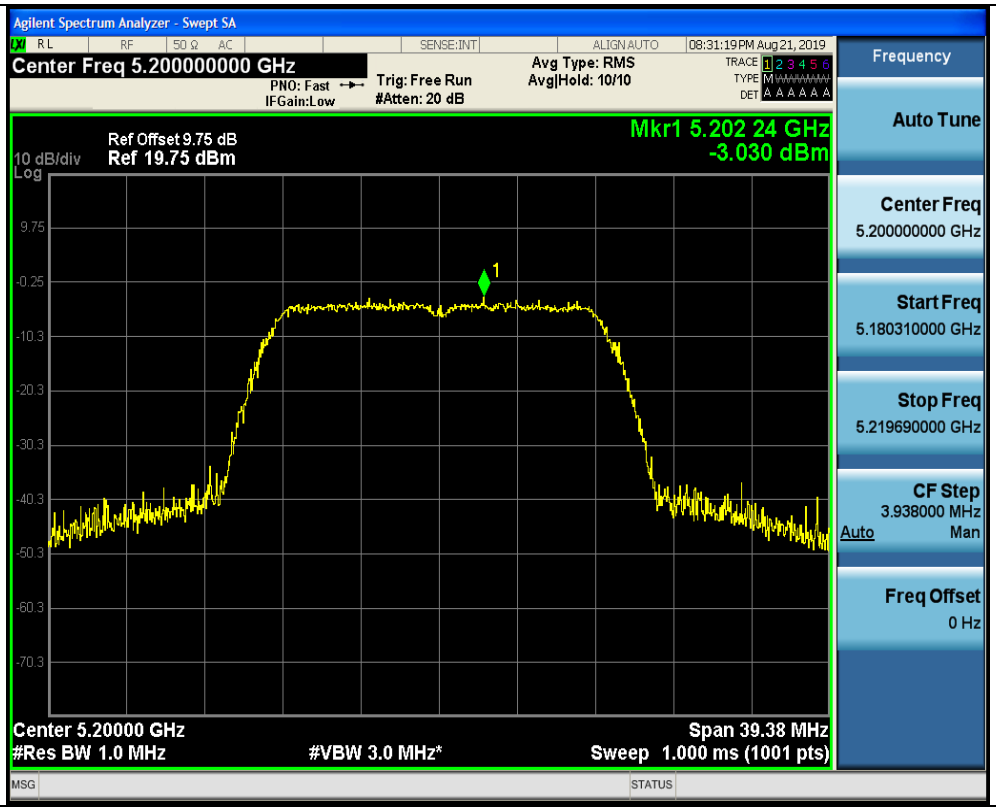
Test plots as follows:

Band I （5150 – 5250 MHz）

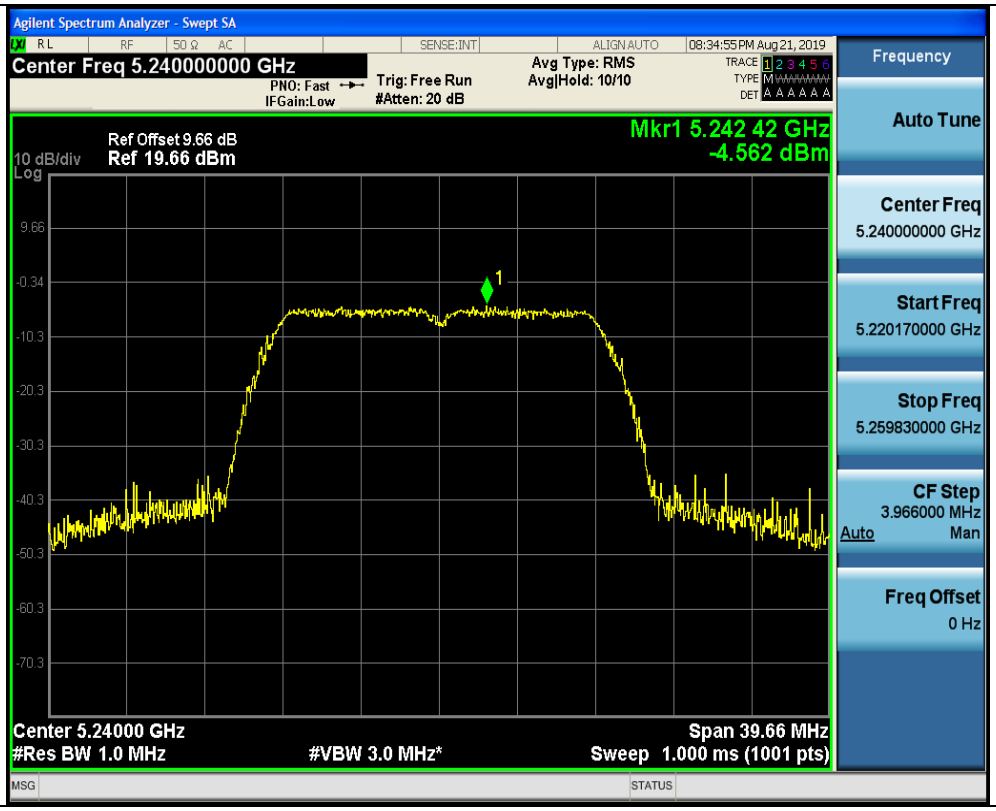
802.11a



Low

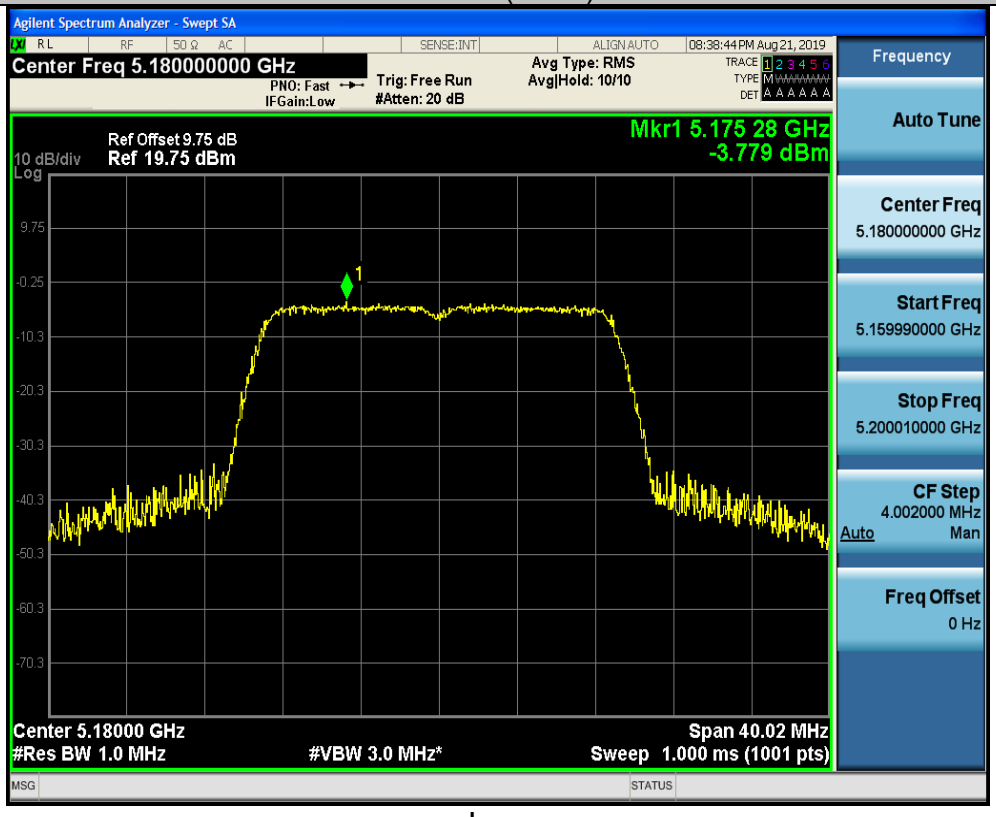


Mid

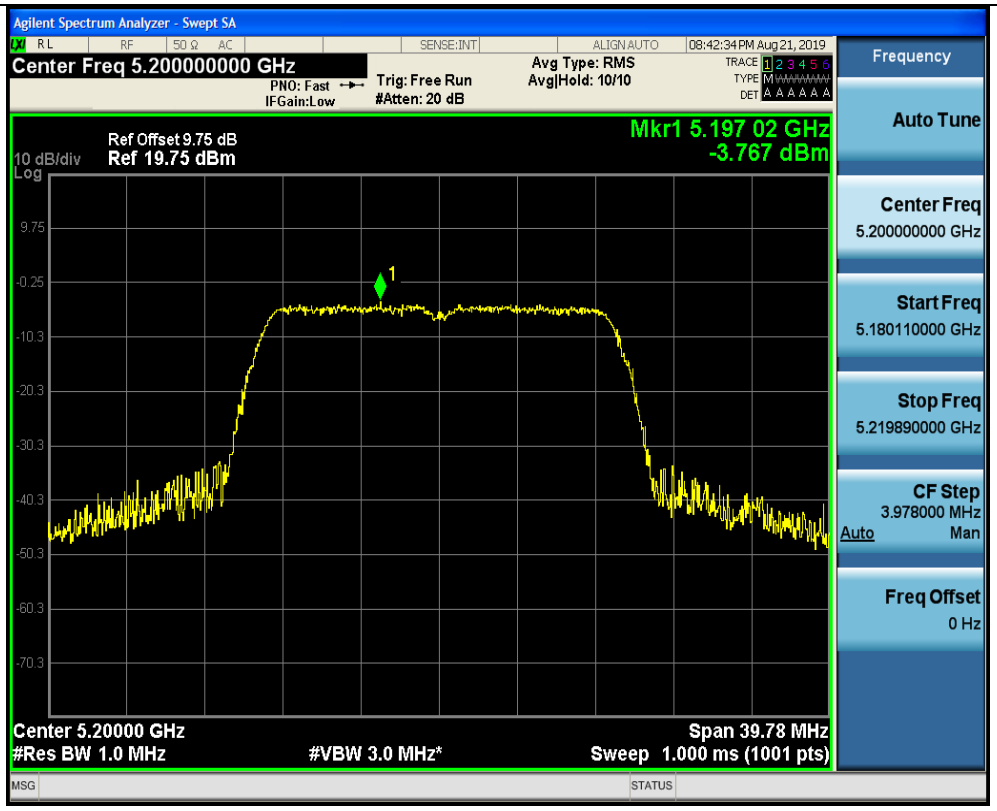


High

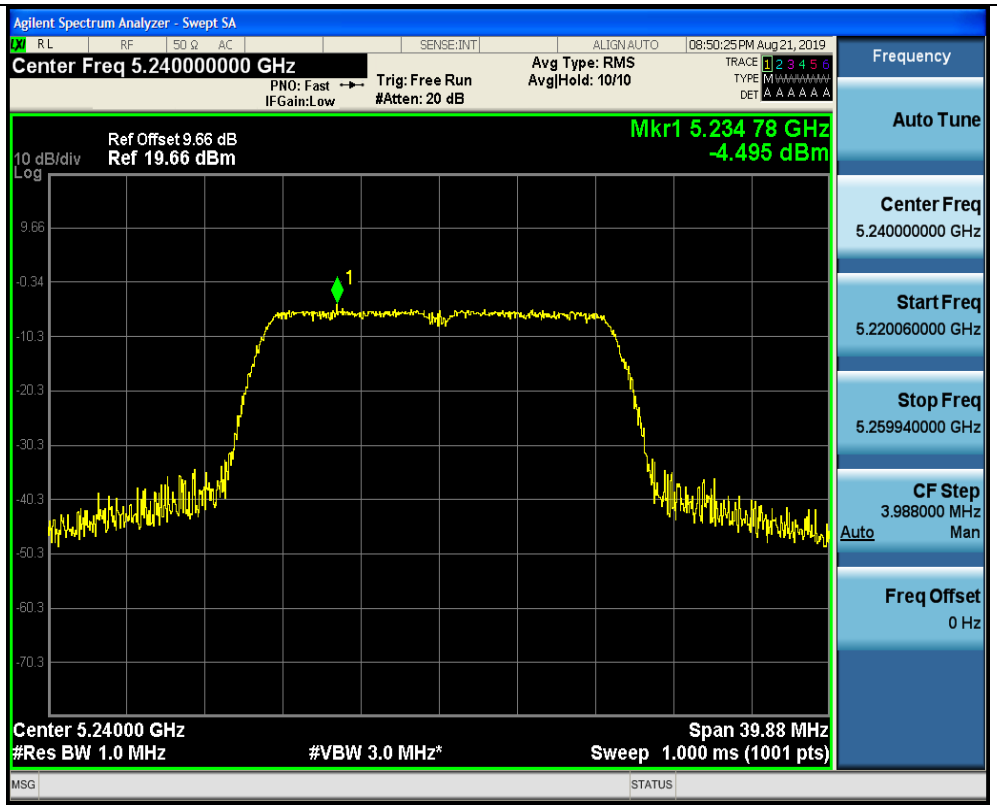
802.11n(HT20)



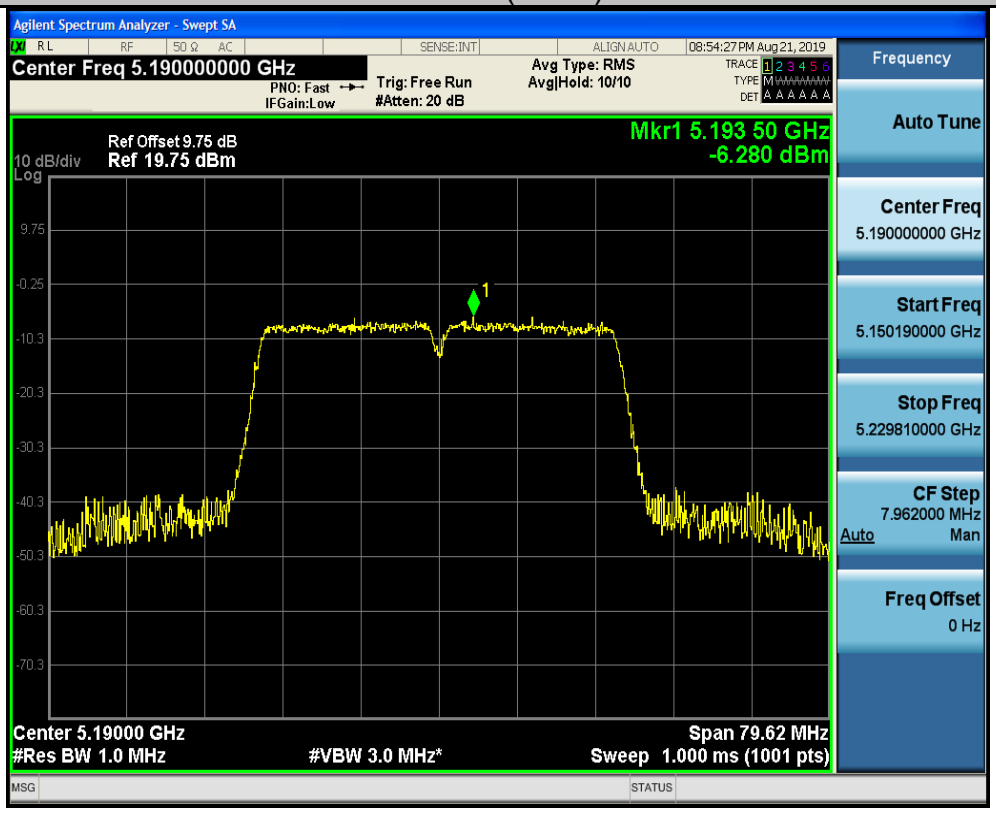
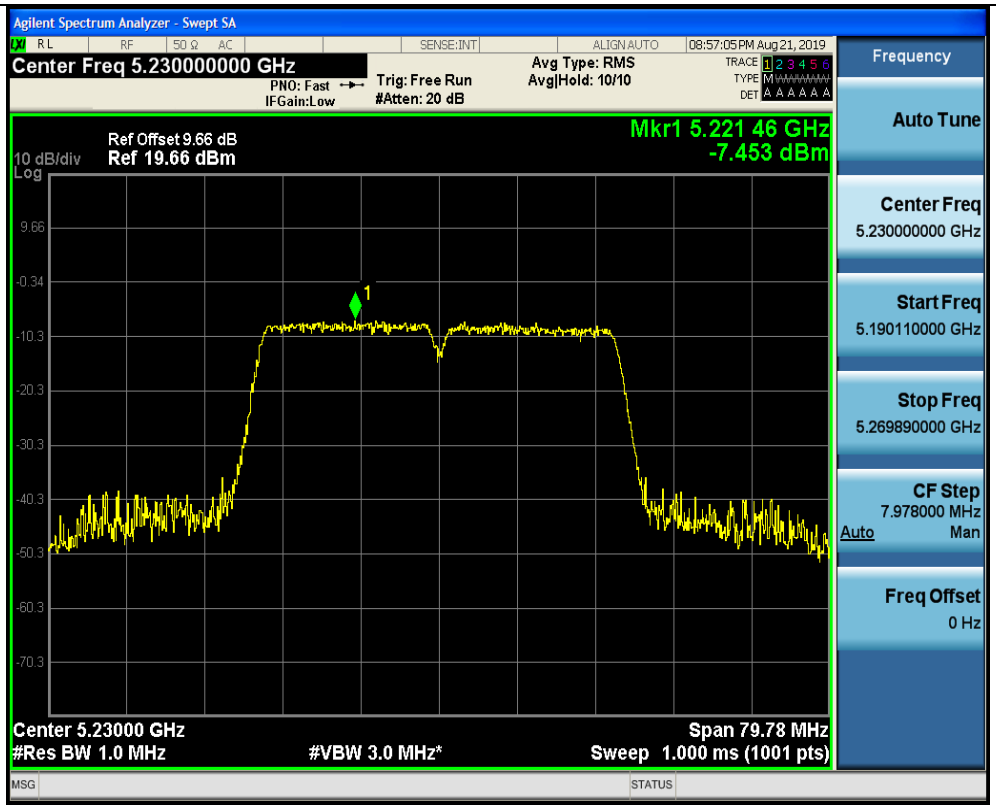
Low

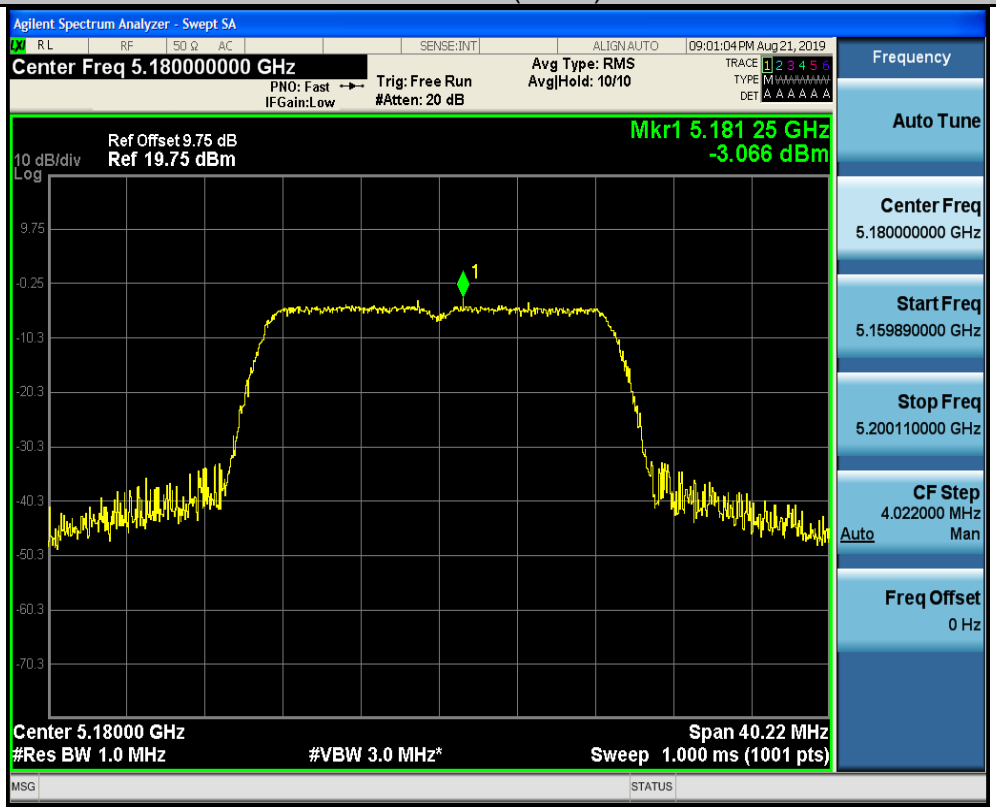
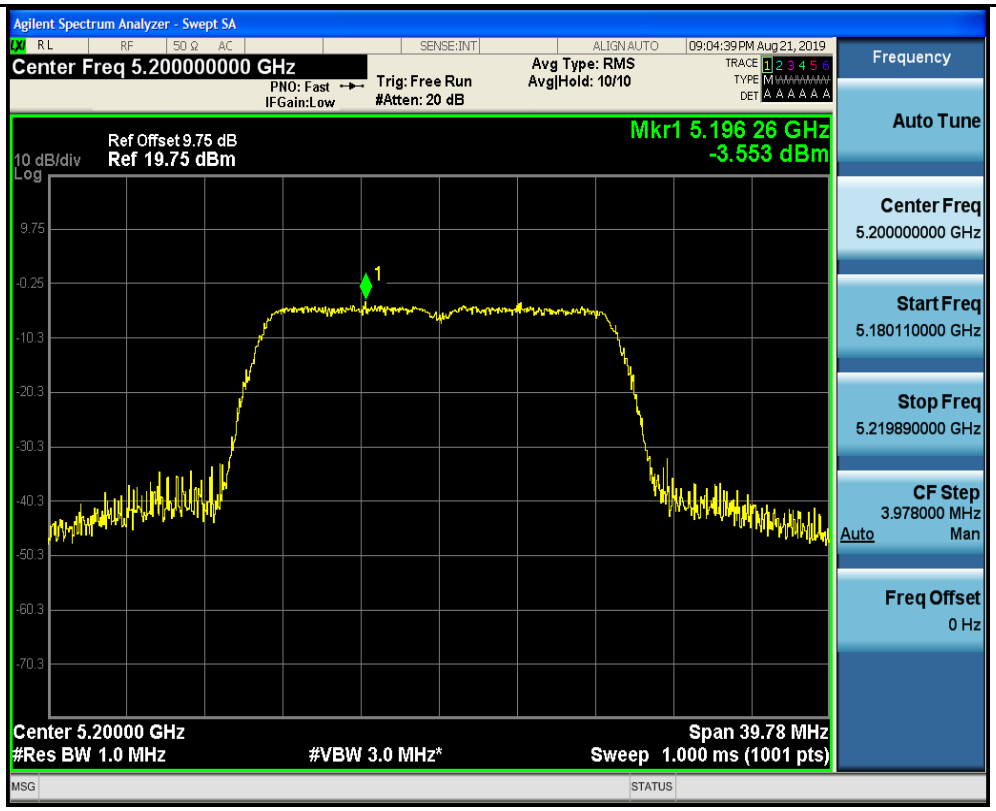

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.200000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
08:42:34 PM Aug 21, 2019
Frequency
Auto Tune
Ref Offset 9.75 dB
10 dB/div
Ref 19.75 dBm
Log
Mkr1 5.197 02 GHz
-3.767 dBm
Center Freq
5.200000000 GHz
Start Freq
5.180110000 GHz
Stop Freq
5.219890000 GHz
CF Step
3.978000 MHz
Auto
Man
Freq Offset
0 Hz
Center 5.20000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 39.78 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

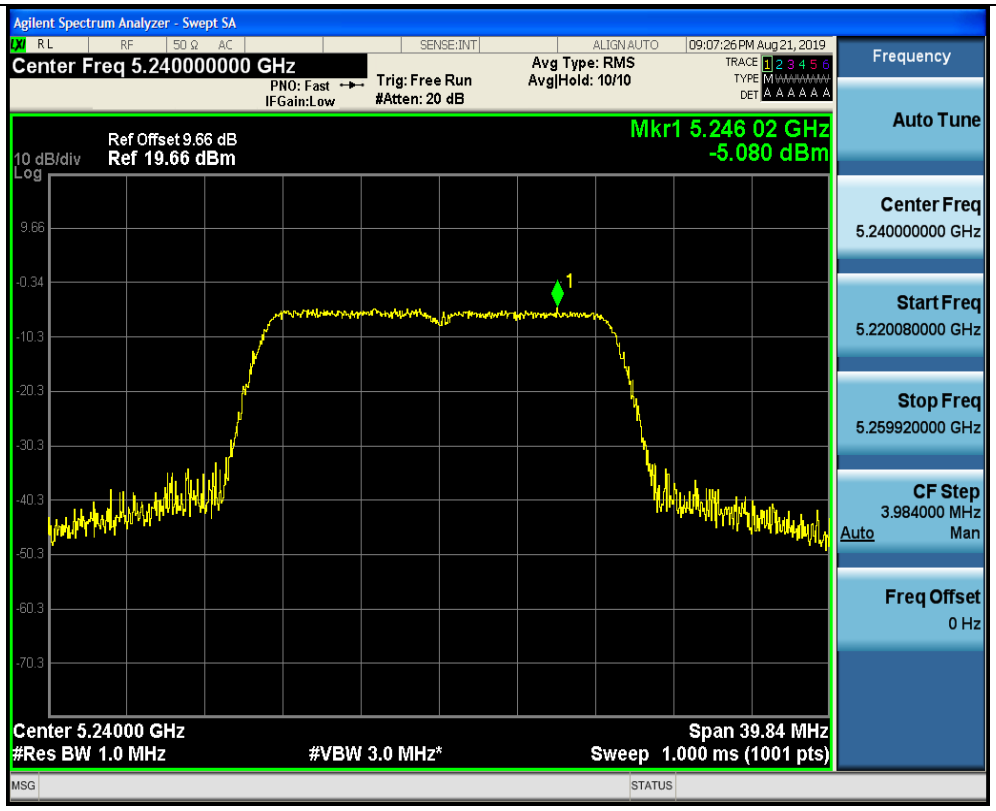
Mid


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.240000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
08:50:25 PM Aug 21, 2019
Frequency
Auto Tune
Ref Offset 9.66 dB
10 dB/div
Ref 19.66 dBm
Log
Mkr1 5.234 78 GHz
-4.495 dBm
Center Freq
5.240000000 GHz
Start Freq
5.220060000 GHz
Stop Freq
5.259940000 GHz
CF Step
3.988000 MHz
Auto
Man
Freq Offset
0 Hz
Center 5.24000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 39.88 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

High

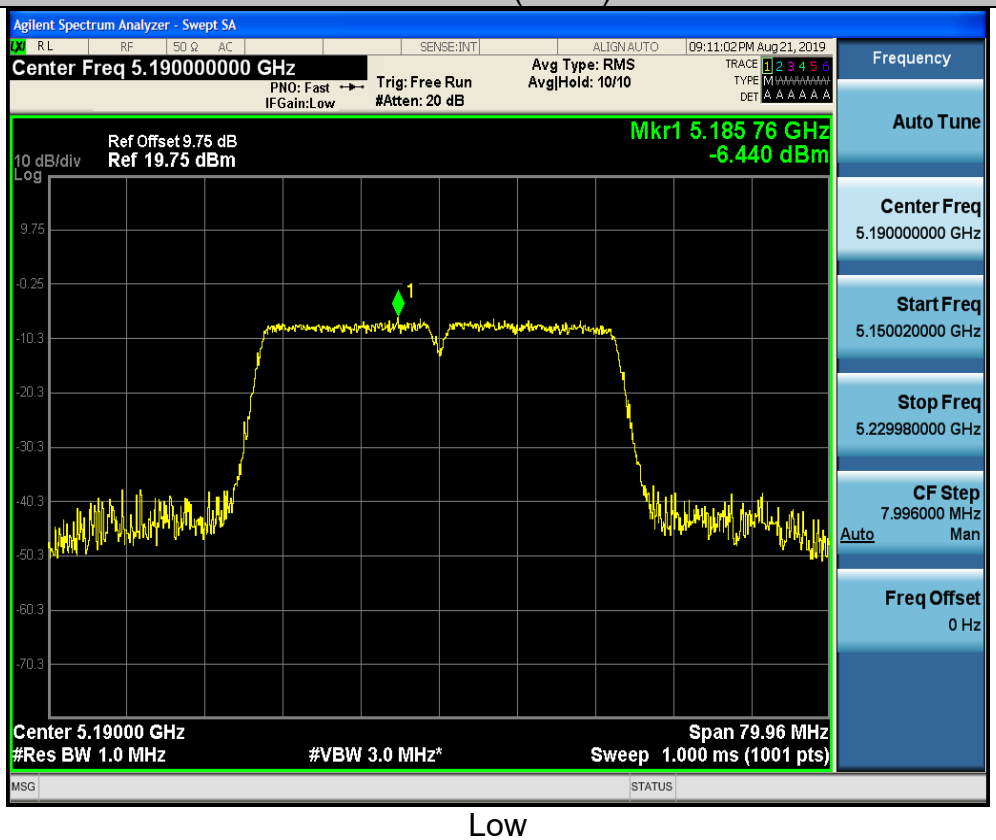
802.11n(HT40)
 Low
 High

802.11ac(HT20)
 Low
 Mid

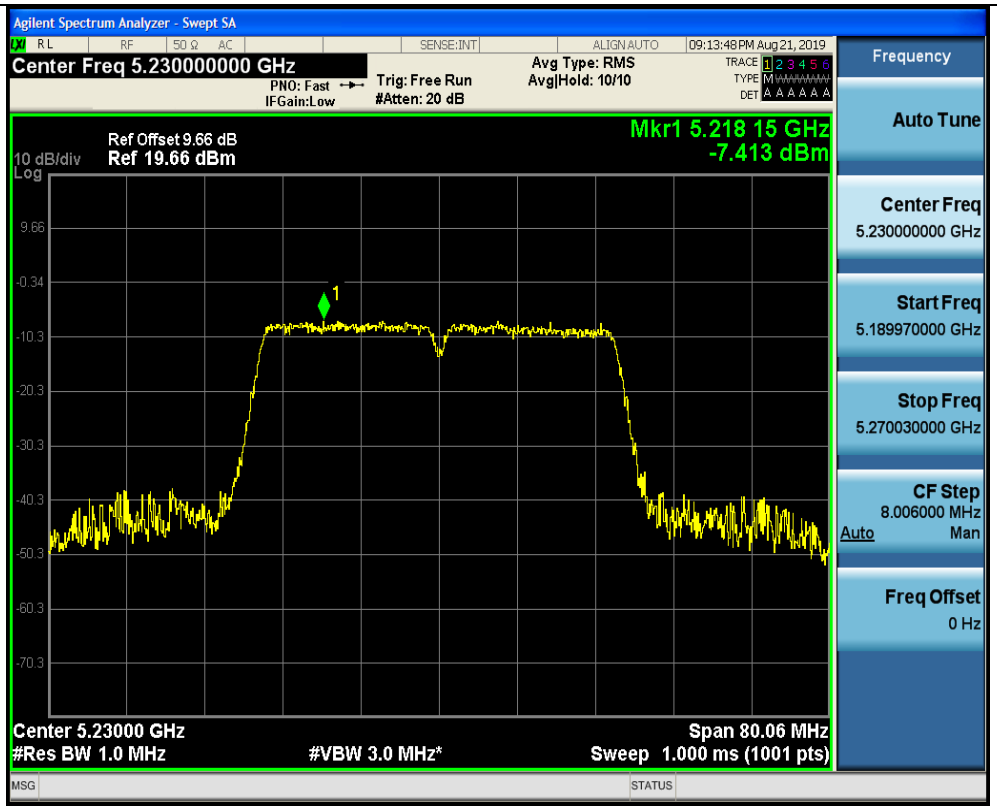


High

802.11ac(HT40)



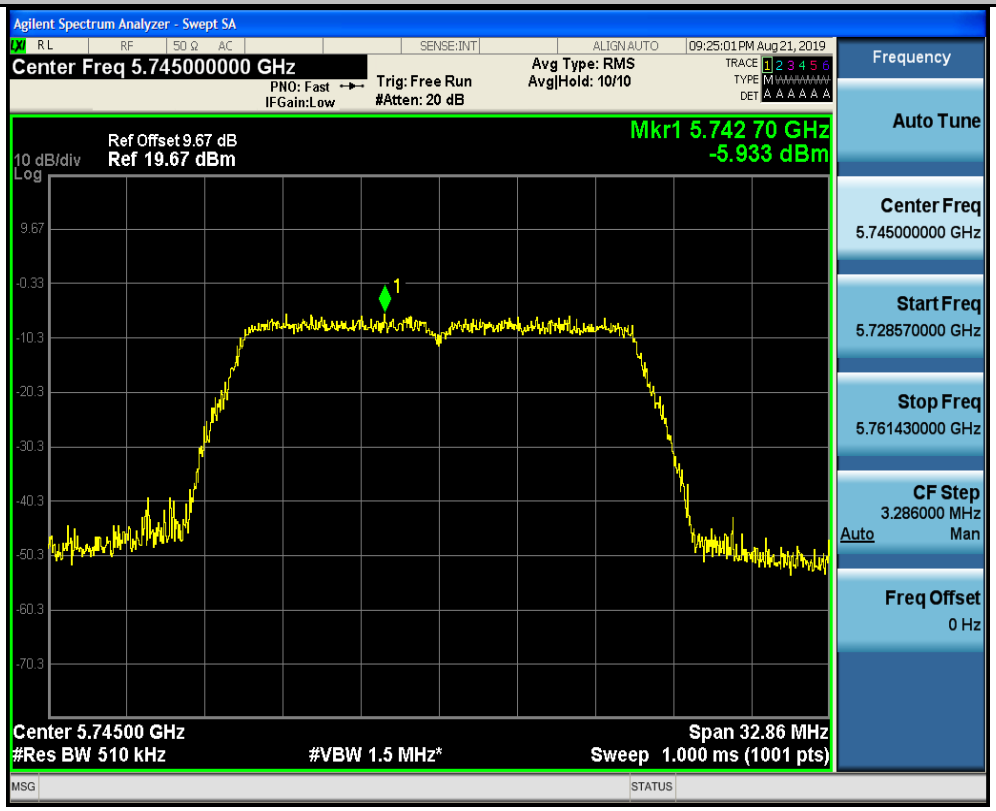
Low


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:13:48 PM Aug 21, 2019
Center Freq 5.230000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Frequency
Auto Tune
Ref Offset 9.66 dB
10 dB/div
Log
Ref 19.66 dBm
Mkr1 5.218 15 GHz
-7.413 dBm
9.66
-0.34
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
Center Freq
5.230000000 GHz
Start Freq
5.189970000 GHz
Stop Freq
5.270030000 GHz
CF Step
8.006000 MHz
Auto
Man
Freq Offset
0 Hz
Center 5.23000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Span 80.06 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

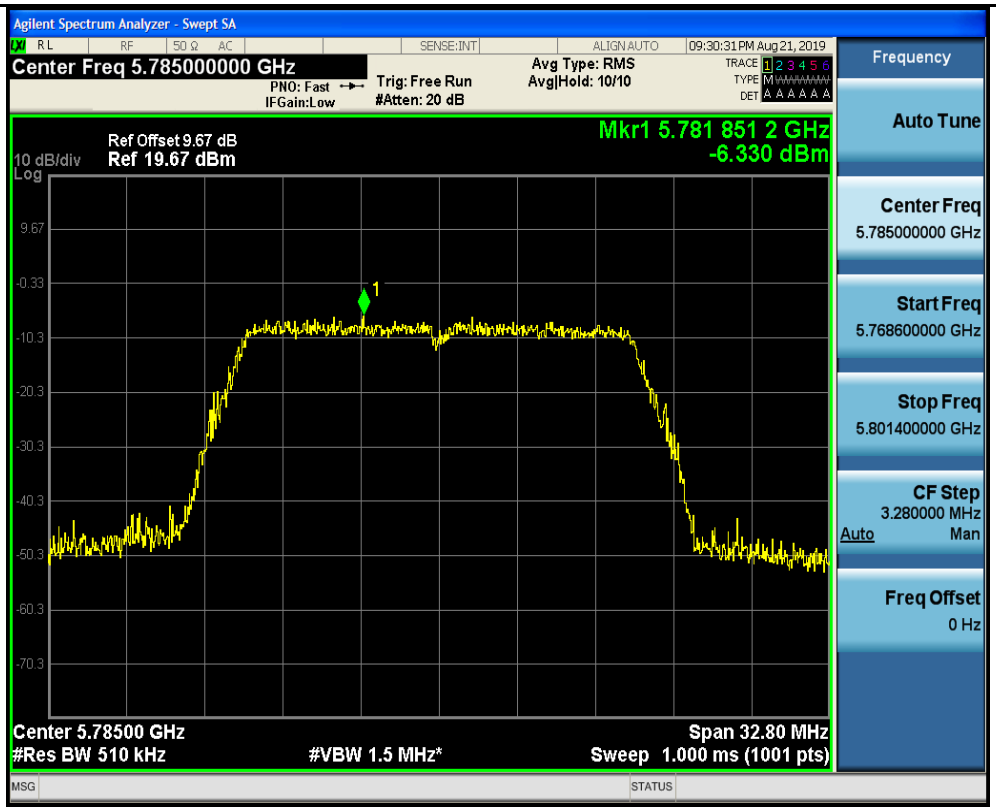
High

Band IV (5725 – 5850 MHz)

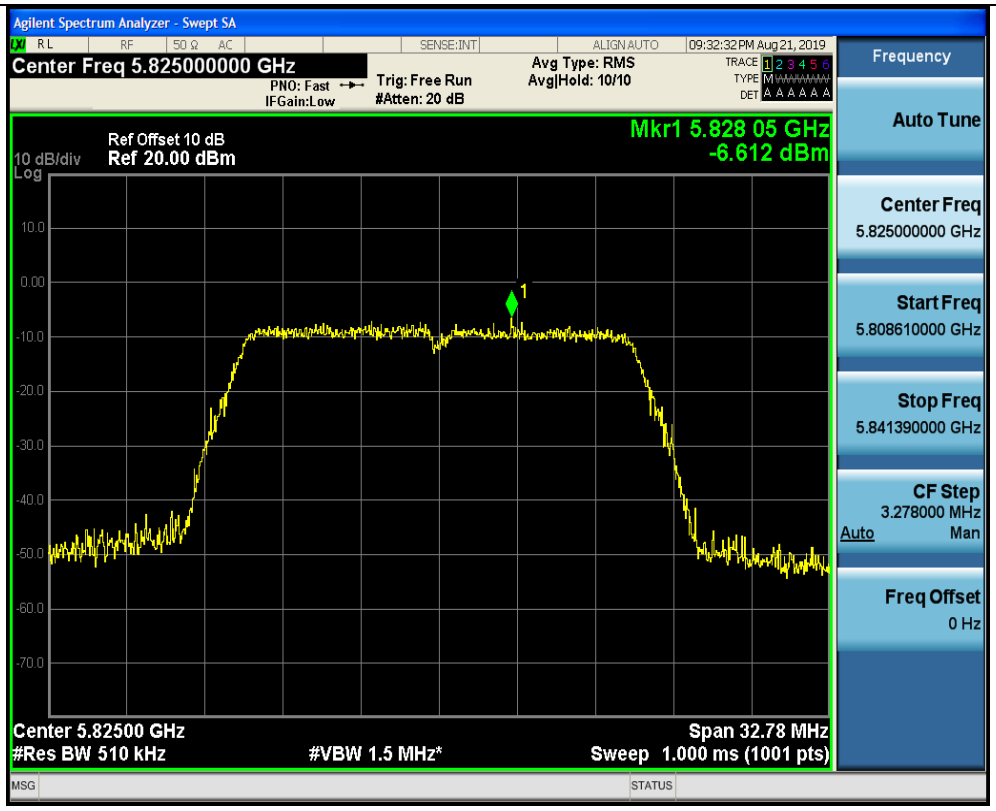
802.11a



Low

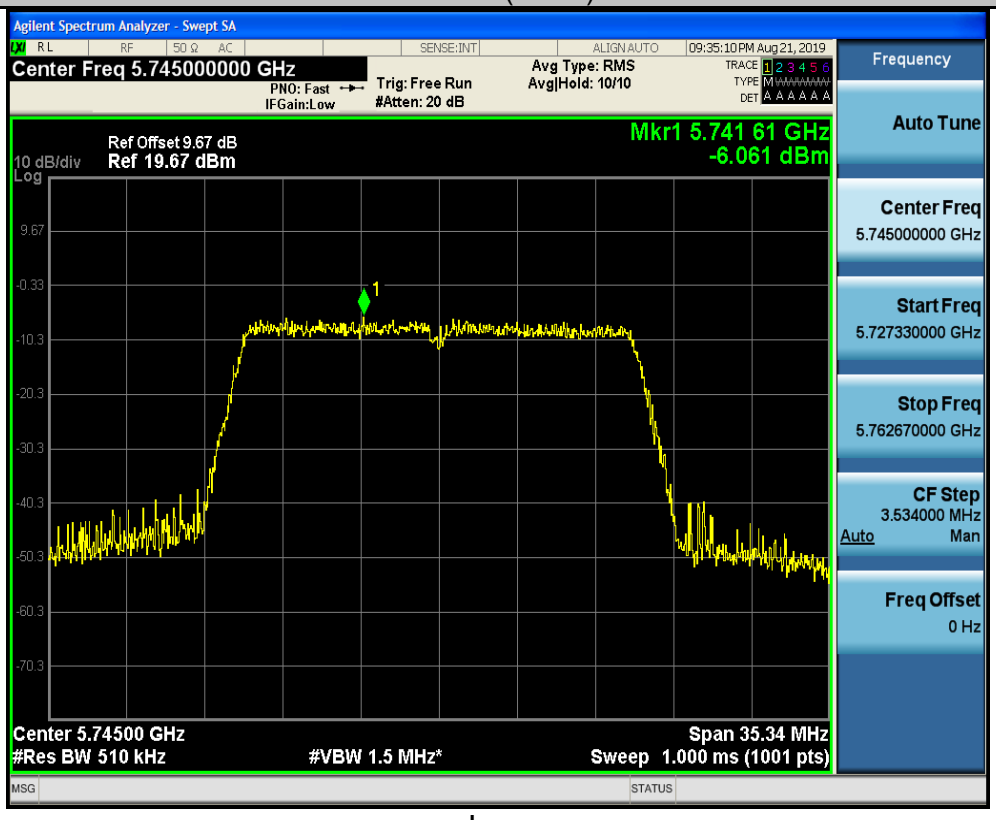


Mid

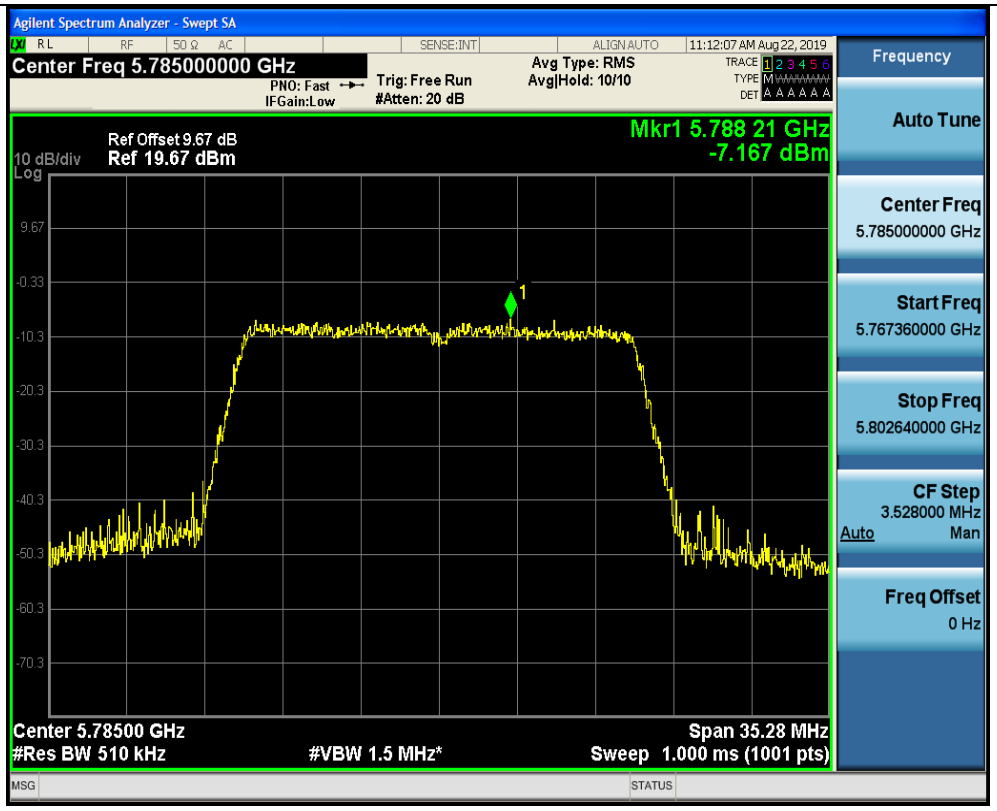


High

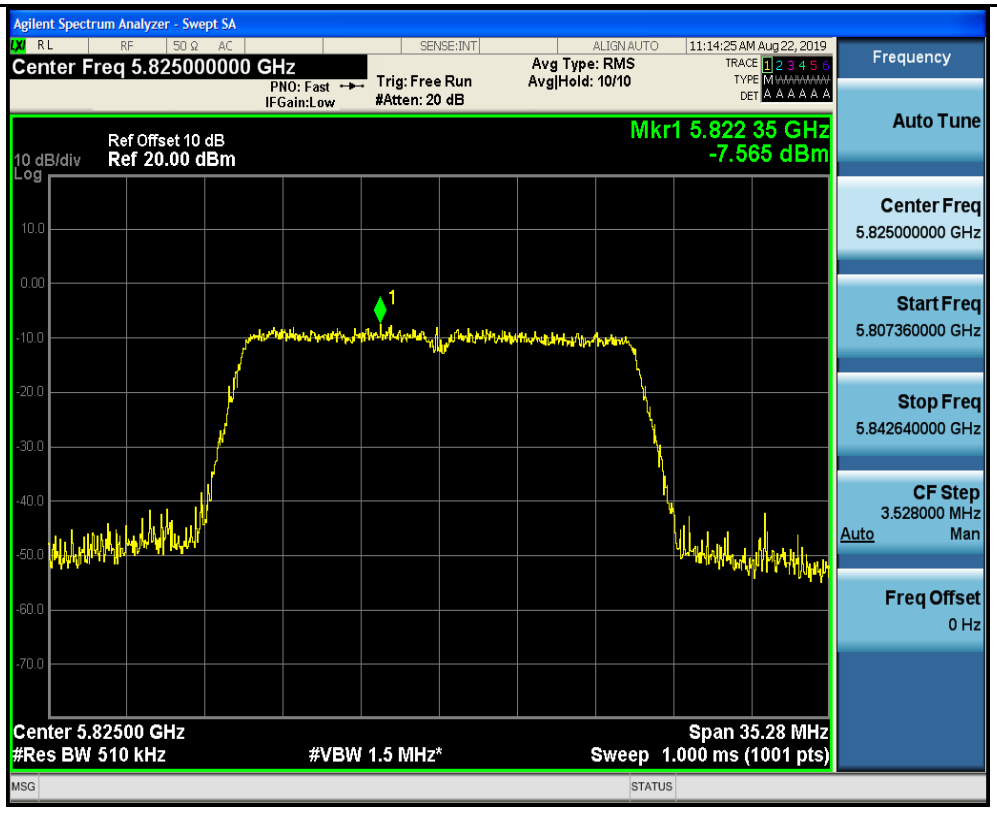
802.11n(HT20)



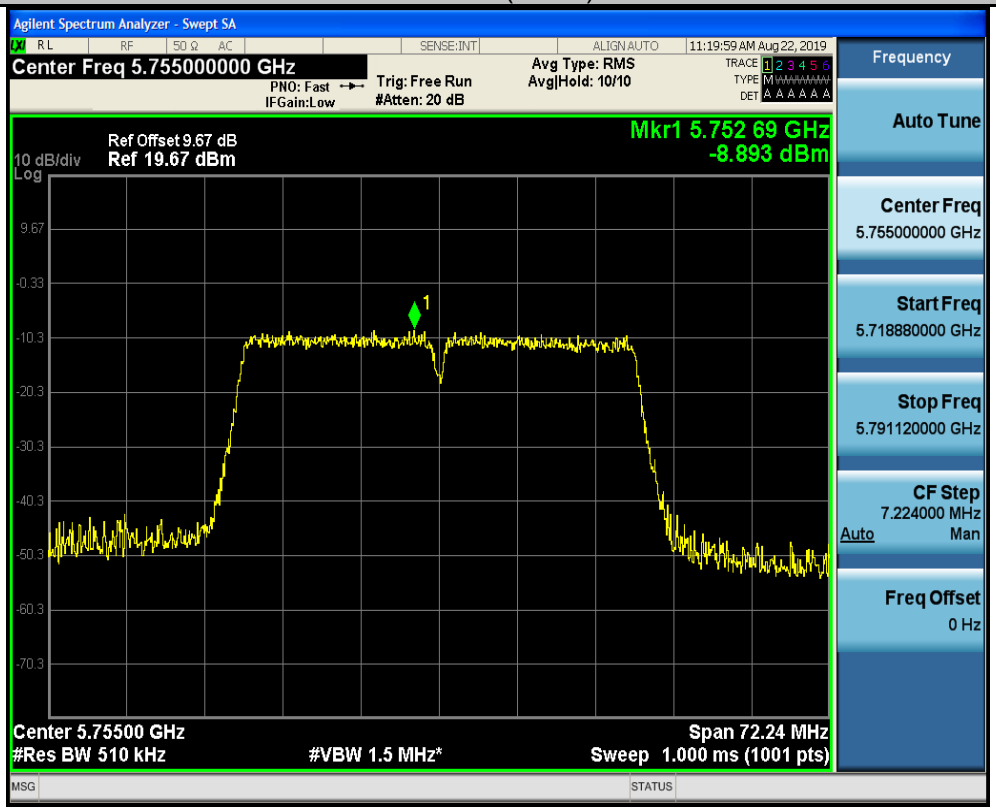
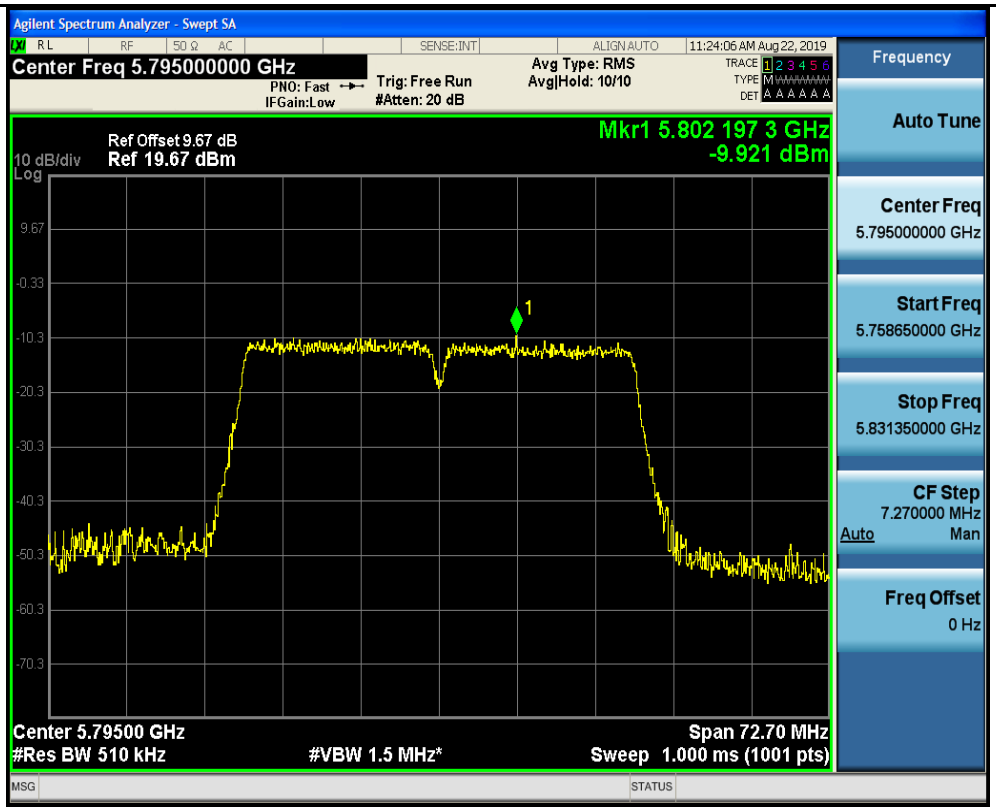
Low

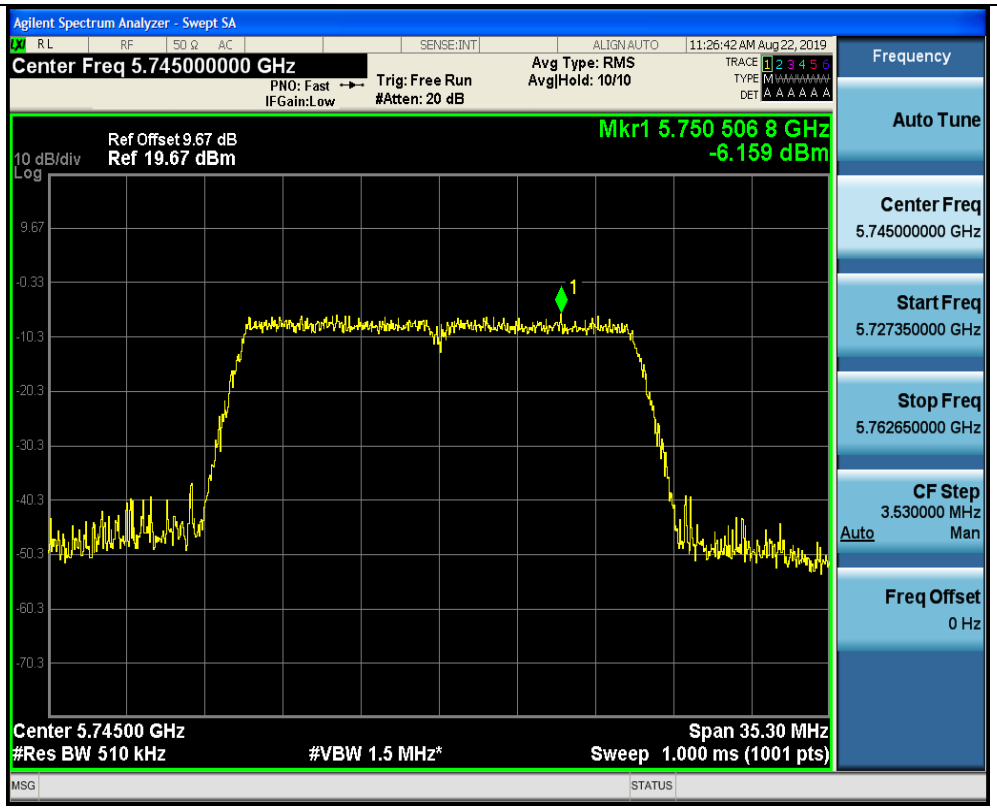

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.785000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
11:12:07 AM Aug 22, 2019
Ref Offset 9.67 dB
10 dB/div
Ref 19.67 dBm
Log
Mkr1 5.788 21 GHz
-7.167 dBm
Center 5.78500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 35.28 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.785000000 GHz
Start Freq
5.767360000 GHz
Stop Freq
5.802640000 GHz
CF Step
3.528000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Mid

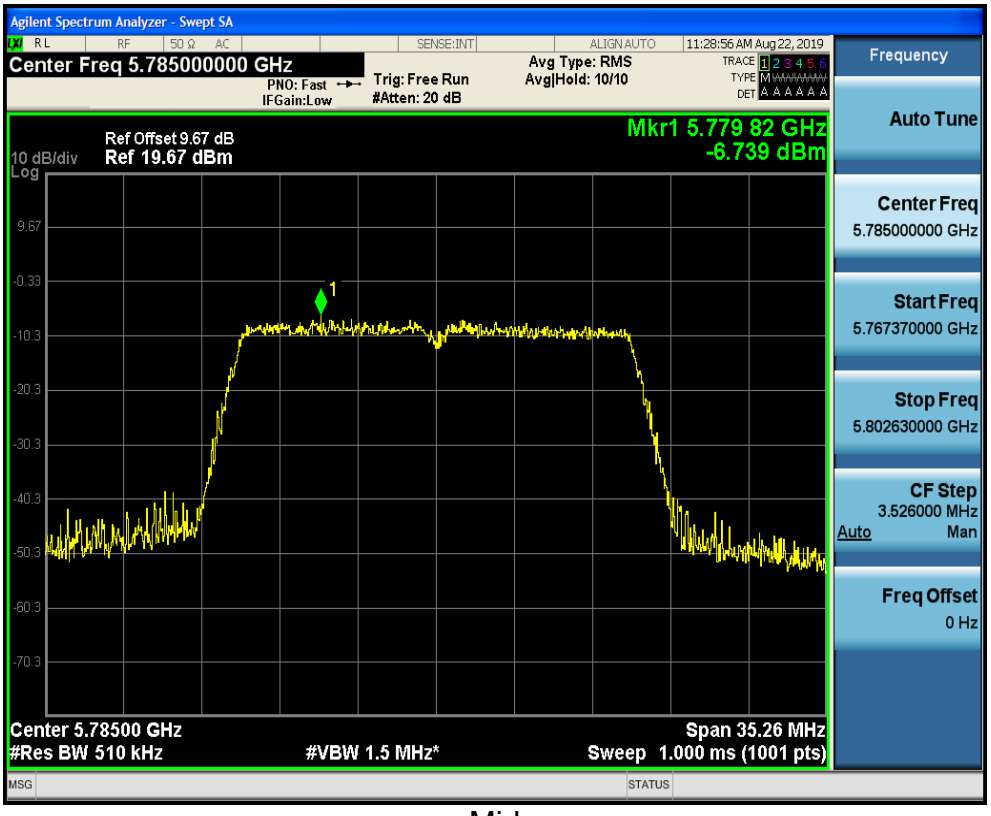

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.825000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
11:14:25 AM Aug 22, 2019
Ref Offset 10 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.822 35 GHz
-7.565 dBm
Center 5.82500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 35.28 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.825000000 GHz
Start Freq
5.807360000 GHz
Stop Freq
5.842640000 GHz
CF Step
3.528000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

High

802.11n(HT40)

Low

High
802.11ac(HT20)


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.745000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
11:26:42 AM Aug 22, 2019
Ref Offset 9.67 dB
10 dB/div
Ref 19.67 dBm
Log
Mkr1 5.750 506 8 GHz
-6.159 dBm
Center 5.74500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 35.30 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.745000000 GHz
Start Freq
5.727350000 GHz
Stop Freq
5.762650000 GHz
CF Step
3.530000 MHz
Auto
Man
Freq Offset
0 Hz

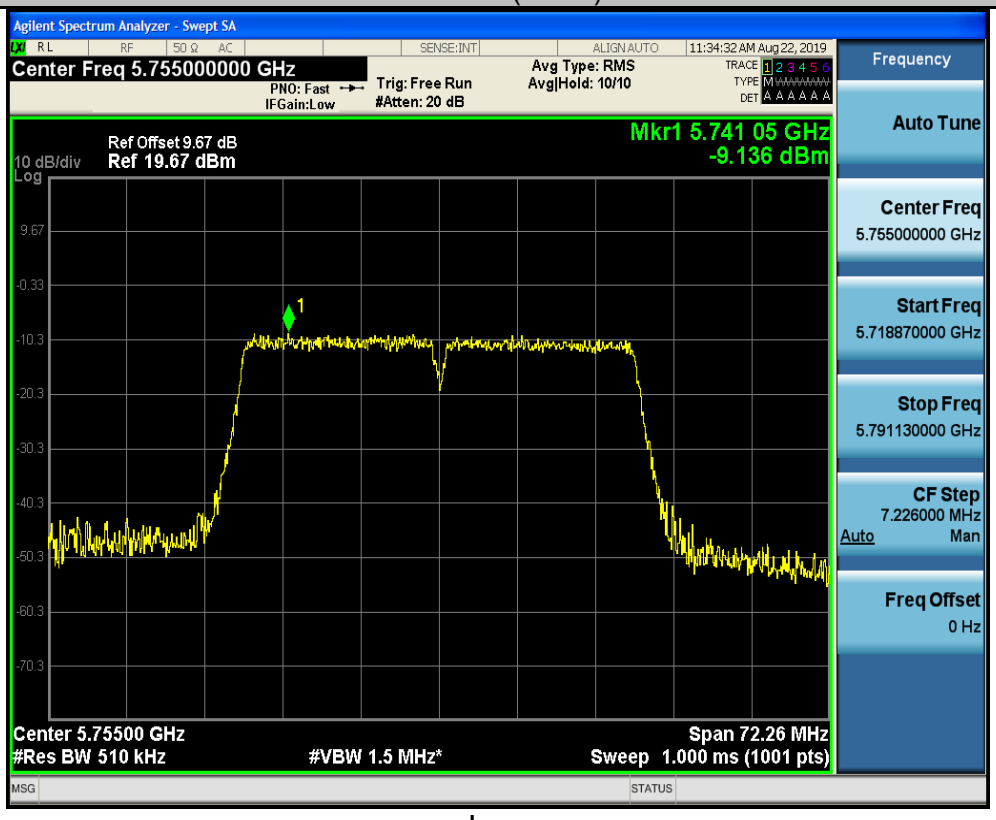
Low


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.785000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
11:28:56 AM Aug 22, 2019
Ref Offset 9.67 dB
10 dB/div
Ref 19.67 dBm
Log
Mkr1 5.779 82 GHz
-6.739 dBm
Center 5.78500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 35.26 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.785000000 GHz
Start Freq
5.767370000 GHz
Stop Freq
5.802630000 GHz
CF Step
3.526000 MHz
Auto
Man
Freq Offset
0 Hz

Mid

High

802.11ac(HT40)



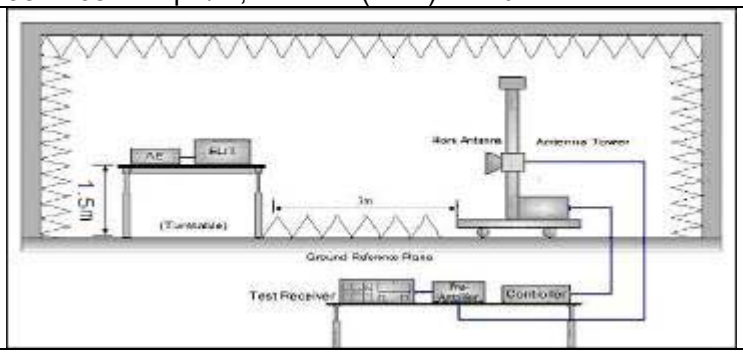
Low


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
11:37:36 AM Aug 22, 2019
Center Freq 5.795000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: RMS
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M
DET A A A A A
Frequency
Auto Tune
Ref Offset 9.67 dB
10 dB/div
Log
Ref 19.67 dBm
Mkr1 5.788 36 GHz
-9.688 dBm
9.67
-0.33
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
1
Center Freq
5.795000000 GHz
Start Freq
5.758890000 GHz
Stop Freq
5.831110000 GHz
CF Step
7.222000 MHz
Auto
Man
Freq Offset
0 Hz
Center 5.79500 GHz
#Res BW 510 kHz
#VBW 1.5 MHz*
Span 72.22 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

High

4.6. Band edge

4.6.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	For band I&II&III: E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBμV/m, for EIRP(dBm)= **-27dBm** For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. For band IV(5715-5725MHz&5850-5860MHz): E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBμV/m, for EIRP(dBm)= **-27dBm**; For band IV(other un-restricted band):E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBμV/m, for EIRP(dBm)= **-27dBm**
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the

	maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.
Test Result:	PASS

4.6.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESRP3	HKE-005	Dec. 27, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Preamplifier	EMCI	EMC051845SE	HKE-015	Dec. 27, 2019
Preamplifier	Agilent	83051A	HKE-016	Dec. 27, 2019
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 26, 2019
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 26, 2019
Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 26, 2019
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
Position controller	Taiwan MF	MF7802	HKE-011	Dec. 27, 2019
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A
RF cable (9KHz-1GHz)	Times	381806-001	N/A	N/A
Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Dec. 27, 2019
RF cable	Tonscend	1-18G	HKE-099	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.6.3. Test Data

Radiated Band Edge Test:
Operation Mode: 802.11a Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	53.26	-2.49	50.77	74	-23.23	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.12	-2.49	49.63	74	-24.37	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.12	-2.28	51.84	74	-22.16	peak
5250	/	-2.28	/	54	/	AVG
5350	52.99	-2.11	50.88	74	-23.12	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	52.97	-2.28	50.69	74	-23.31	peak
5250	/	-2.28	/	54	/	AVG
5350	52.12	-2.11	50.01	74	-23.99	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n20 Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	55.12	-2.49	52.63	74	-21.37	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.12	-2.49	49.63	74	-24.37	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	52.23	-2.28	49.95	74	-24.05	peak
5250	/	-2.28	/	54	/	AVG
5350	50.98	-2.11	48.87	74	-25.13	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	55.23	-2.28	52.95	74	-21.05	peak
5250	/	-2.28	/	54	/	AVG
5350	51.32	-2.11	49.21	74	-24.79	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11 n40 Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	53.46	-2.49	50.97	74	-23.03	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.36	-2.49	49.87	74	-24.13	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.36	-2.28	51.08	74	-22.92	peak
5250	/	-2.28	/	54	/	AVG
5350	48.99	-2.11	46.88	74	-27.12	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.21	-2.28	50.93	74	-23.07	peak
5250	/	-2.28	/	54	/	AVG
5350	50.16	-2.11	48.05	74	-25.95	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11 ac20 Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	55.32	-2.49	52.83	74	-21.17	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.89	-2.49	49.4	74	-24.6	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	55.87	-2.28	53.59	74	-20.41	peak
5250	/	-2.28	/	54	/	AVG
5350	52.87	-2.11	50.76	74	-23.24	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.14	-2.28	51.86	74	-22.14	peak
5250	/	-2.28	/	54	/	AVG
5350	52.87	-2.11	50.76	74	-23.24	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11 ac40 Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	54.61	-2.49	52.12	74	-21.88	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.62	-2.49	50.13	74	-23.87	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.88	-2.28	51.6	74	-22.4	peak
5250	/	-2.28	/	54	/	AVG
5350	52.36	-2.11	50.25	74	-23.75	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.12	-2.28	51.84	74	-22.16	peak
5250	/	-2.28	/	54	/	AVG
5350	50.32	-2.11	48.21	74	-25.79	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11a Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	42	-2.06	39.94	68.2	-28.26	peak
5650	/	-2.06	/	48.2	/	AVG
5700	92.12	-1.96	90.16	105.2	-15.04	peak
5700	/	-1.96	/	85.2	/	AVG
5720	91.28	-2.87	88.41	110.8	-22.39	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.04	-2.14	109.9	122.2	-12.3	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	60.07	-2.06	58.01	68.2	-10.19	peak
5650	/	-2.06	/	48.2	/	AVG
5700	91.13	-1.96	89.17	105.2	-16.03	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.43	-2.87	92.56	110.8	-18.24	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.98	-2.14	109.84	122.2	-12.36	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.54	-1.97	110.57	122.2	-11.63	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.65	-2.13	93.52	110.8	-17.28	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.64	-2.65	84.99	105.2	-20.21	peak
5875	/	-2.65	/	85.2	/	AVG
5925	54.32	-2.28	52.04	68.2	-16.16	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.21	-1.97	111.24	122.2	-10.96	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.23	-2.13	92.1	110.8	-18.7	peak
5855	/	-2.13	/	90.8	/	AVG
5875	84.98	-2.65	82.33	105.2	-22.87	peak
5875	/	-2.65	/	85.2	/	AVG
5925	56.45	-2.28	54.17	68.2	-14.03	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n20 Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.46	-2.06	56.4	68.2	-11.8	peak
5650	/	-2.06	/	48.2	/	AVG
5700	91.99	-1.96	90.03	105.2	-15.17	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.26	-2.87	91.39	110.8	-19.41	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.85	-2.14	110.71	122.2	-11.49	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	62.32	-2.06	60.26	68.2	-7.94	peak
5650	/	-2.06	/	48.2	/	AVG
5700	97.87	-1.96	95.91	105.2	-9.29	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.26	-2.87	91.39	110.8	-19.41	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.96	-2.14	109.82	122.2	-12.38	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.54	-1.97	111.57	122.2	-10.63	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.87	-2.13	92.74	110.8	-18.06	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.61	-2.65	84.96	105.2	-20.24	peak
5875	/	-2.65	/	85.2	/	AVG
5925	52.46	-2.28	50.18	68.2	-18.02	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.32	-1.97	110.35	122.2	-11.85	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.64	-2.13	93.51	110.8	-17.29	peak
5855	/	-2.13	/	90.8	/	AVG
5875	88.12	-2.65	85.47	105.2	-19.73	peak
5875	/	-2.65	/	85.2	/	AVG
5925	58.09	-2.28	55.81	68.2	-12.39	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n40 Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.62	-2.06	56.56	68.2	-11.64	peak
5650	/	-2.06	/	48.2	/	AVG
5700	93.64	-1.96	91.68	105.2	-13.52	peak
5700	/	-1.96	/	85.2	/	AVG
5720	96.32	-2.87	93.45	110.8	-17.35	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.37	-2.14	110.23	122.2	-11.97	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	63.48	-2.06	61.42	68.2	-6.78	peak
5650	/	-2.06	/	48.2	/	AVG
5700	97.46	-1.96	95.5	105.2	-9.7	peak
5700	/	-1.96	/	85.2	/	AVG
5720	93.48	-2.87	90.61	110.8	-20.19	peak
5720	/	-2.87	/	90.8	/	AVG
5725	113.52	-2.14	111.38	122.2	-10.82	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	111.95	-1.97	109.98	122.2	-12.22	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.65	-2.13	93.52	110.8	-17.28	peak
5855	/	-2.13	/	90.8	/	AVG
5875	88.26	-2.65	85.61	105.2	-19.59	peak
5875	/	-2.65	/	85.2	/	AVG
5925	55.11	-2.28	52.83	68.2	-15.37	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	110.87	-1.97	108.9	122.2	-13.3	peak
5850	/	-1.97	/	102.2	/	AVG
5855	93.2	-2.13	91.07	110.8	-19.73	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.95	-2.65	85.3	105.2	-19.9	peak
5875	/	-2.65	/	85.2	/	AVG
5925	54.62	-2.28	52.34	68.2	-15.86	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac20 Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.32	-2.06	56.26	68.2	-11.94	peak
5650	/	-2.06	/	48.2	/	AVG
5700	91.32	-1.96	89.36	105.2	-15.84	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.67	-2.87	91.8	110.8	-19	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.09	-2.14	109.95	122.2	-12.25	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	61.52	-2.06	59.46	68.2	-8.74	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.99	-1.96	89.03	105.2	-16.17	peak
5700	/	-1.96	/	85.2	/	AVG
5720	96.87	-2.87	94	110.8	-16.8	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.43	-2.14	110.29	122.2	-11.91	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.65	-1.97	110.68	122.2	-11.52	peak
5850	/	-1.97	/	102.2	/	AVG
5855	96.65	-2.13	94.52	110.8	-16.28	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.57	-2.65	84.92	105.2	-20.28	peak
5875	/	-2.65	/	85.2	/	AVG
5925	54.37	-2.28	52.09	68.2	-16.11	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.87	-1.97	110.9	122.2	-11.3	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.32	-2.13	92.19	110.8	-18.61	peak
5855	/	-2.13	/	90.8	/	AVG
5875	86.11	-2.65	83.46	105.2	-21.74	peak
5875	/	-2.65	/	85.2	/	AVG
5925	55.16	-2.28	52.88	68.2	-15.32	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac40 Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	59.34	-2.06	57.28	68.2	-10.92	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.64	-1.96	88.68	105.2	-16.52	peak
5700	/	-1.96	/	85.2	/	AVG
5720	92.12	-2.87	89.25	110.8	-21.55	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.22	-2.14	109.08	122.2	-13.12	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	59.31	-2.06	57.25	68.2	-10.95	peak
5650	/	-2.06	/	48.2	/	AVG
5700	91.27	-1.96	89.31	105.2	-15.89	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.64	-2.87	92.77	110.8	-18.03	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.98	-2.14	109.84	122.2	-12.36	peak
5725	/	-2.14	/	102.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

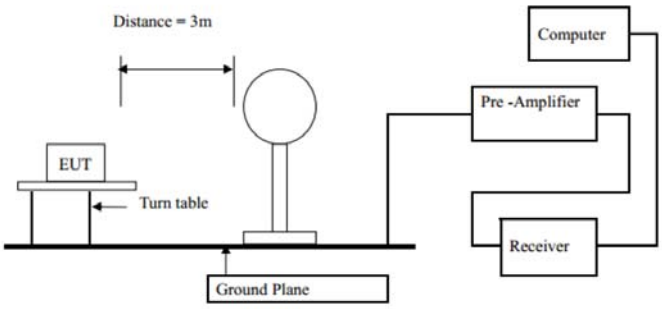
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.45	-1.97	111.48	122.2	-10.72	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.46	-2.13	93.33	110.8	-17.47	peak
5855	/	-2.13	/	90.8	/	AVG
5875	88.45	-2.65	85.8	105.2	-19.4	peak
5875	/	-2.65	/	85.2	/	AVG
5925	63.21	-2.28	60.93	68.2	-7.27	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

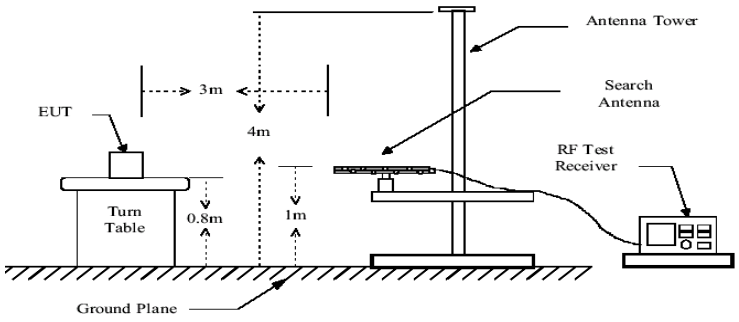
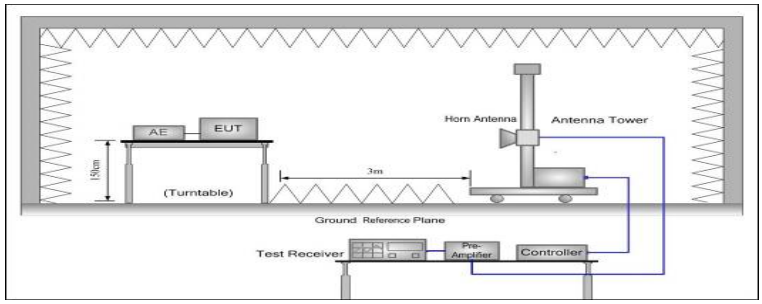
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.62	-1.97	111.65	122.2	-10.55	peak
5850	/	-1.97	/	102.2	/	AVG
5855	91.65	-2.13	89.52	110.8	-21.28	peak
5855	/	-2.13	/	90.8	/	AVG
5875	88.64	-2.65	85.99	105.2	-19.21	peak
5875	/	-2.65	/	85.2	/	AVG
5925	58.15	-2.28	55.87	68.2	-12.33	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

4.7. Spurious Emission

4.7.1.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205</td></tr>
<tr><td>Test Method:</td><td>KDB 789033 D02 v02r01</td></tr>
<tr><td>Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Operation mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>9kHz- 150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,
<table>
<tr><td>Frequency</td><td>Field Strength (microvolts/meter)</td><td>Measurement Distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(KHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(KHz)</td><td>30</td></tr>
<tr><td>1.705-30</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Detector</td></tr>
<tr><td rowspan="2">Above 1G</td><td>74.0</td><td>Peak</td></tr>
<tr><td>54.0</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions below 30MHz
 

30MHz to 1GHz</td></tr>
</table>

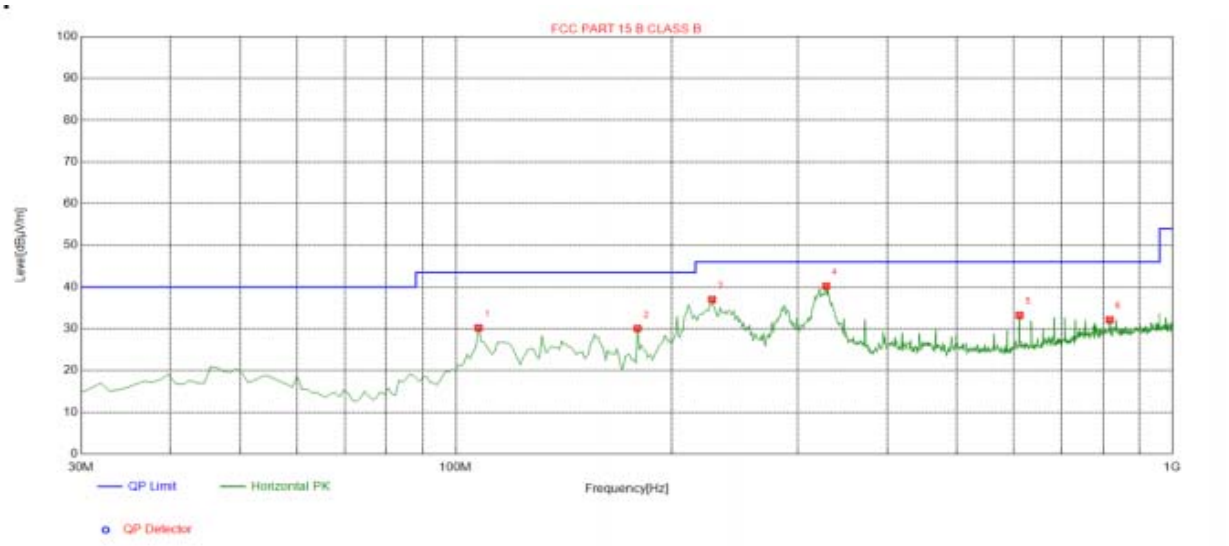
	 Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.
Test results:	PASS

4.7.2. Test Data

All the test modes completed for test. only the worst result of AC 240V/60Hz (802.11a at 5180MHz) was reported

Below 1GHz

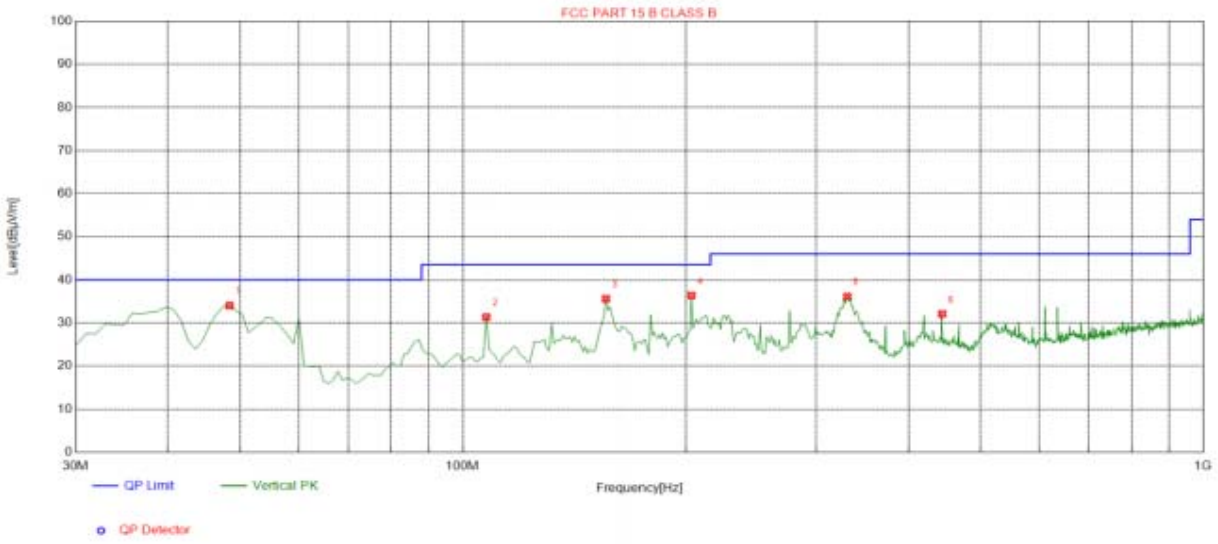
Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	107.600	30.20	-15.42	43.50	13.30	100	208	Horizontal
2	179.380	30.07	-16.88	43.50	13.43	100	11	Horizontal
3	227.880	37.00	-14.37	46.00	9.00	100	302	Horizontal
4	328.760	40.22	-11.65	46.00	5.78	100	299	Horizontal
5	612.000	33.23	-5.55	46.00	12.77	100	30	Horizontal
6	817.640	32.16	-2.76	46.00	13.84	100	96	Horizontal

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.4300	34.04	-13.65	40.00	5.96	100	142	Vertical
2	107.600	31.35	-15.42	43.50	12.15	100	75	Vertical
3	156.100	35.62	-18.50	43.50	7.88	100	163	Vertical
4	203.630	36.38	-14.97	43.50	7.12	100	0	Vertical
5	330.700	36.12	-11.59	46.00	9.88	100	346	Vertical
6	444.190	32.10	-9.24	46.00	13.90	100	328	Vertical

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

Above 1GHz

LOW CH 36 (802.11 a Mode with 5.2G)/5180

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.32	-4.59	57.73	74	-16.27	peak
3647	49.65	-4.59	45.06	54	-8.94	AVG
10360	53.87	3.74	57.61	74	-16.39	peak
10360	42.67	3.74	46.41	54	-7.59	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	63.45	-4.59	58.86	74	-15.14	peak
3647	49.21	-4.59	44.62	54	-9.38	AVG
10360	52.98	3.74	56.72	74	-17.28	peak
10360	42.67	3.74	46.41	54	-7.59	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

MID CH40 (802.11 a Mode with 5.2G)/5200
Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.54	-4.59	57.95	74	-16.05	peak
3647	49.21	-4.59	44.62	54	-9.38	AVG
10400	55.64	3.74	59.38	74	-14.62	peak
10400	42.87	3.74	46.61	54	-7.39	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	63.54	-4.59	58.95	74	-15.05	peak
3647	61.32	-4.59	56.73	54	2.73	AVG
10400	54.32	3.74	58.06	74	-15.94	peak
10400	41.57	3.74	45.31	54	-8.69	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

HIGH CH 48 (802.11a Mode with 5.2G)/5240
Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	63.21	-4.59	58.62	74	-15.38	peak
3647	49.32	-4.59	44.73	54	-9.27	AVG
10480	53.65	3.75	57.4	74	-16.6	peak
10480	42.87	3.75	46.62	54	-7.38	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.54	-4.59	57.95	74	-16.05	peak
3647	46.87	-4.59	42.28	54	-11.72	AVG
10480	53.26	3.75	57.01	74	-16.99	peak
10480	41.32	3.75	45.07	54	-8.93	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz。
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

LOW CH 149 (802.11 a Mode with 5.8G)/5745

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.58	-4.59	57.99	74	-16.01	peak
3647	49.12	-4.59	44.53	54	-9.47	AVG
11570	55.64	4.21	59.85	74	-14.15	peak
11570	41.87	4.21	46.08	54	-7.92	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.34	-4.59	56.75	74	-17.25	peak
3647	48.31	-4.59	43.72	54	-10.28	AVG
11570	52.98	4.21	57.19	74	-16.81	peak
11570	41.54	4.21	45.75	54	-8.25	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

MID CH157 (802.11 a Mode with 5.8G)/5785

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.45	-4.59	57.86	74	-16.14	peak
3647	47.21	-4.59	42.62	54	-11.38	AVG
11570	55.67	4.21	59.88	74	-14.12	peak
11570	41.64	4.21	45.85	54	-8.15	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.34	-4.59	56.75	74	-17.25	peak
3647	52.46	-4.59	47.87	54	-6.13	AVG
11570	53.48	4.21	57.69	74	-16.31	peak
11570	41.32	4.21	45.53	54	-8.47	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

HIGH CH 165 (802.11a Mode with 5.8G)/5825

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	63.54	-4.59	58.95	74	-15.05	peak
3647	46.15	-4.59	41.56	54	-12.44	AVG
11650	55.42	4.84	60.26	74	-13.74	peak
11650	43.98	4.84	48.82	54	-5.18	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

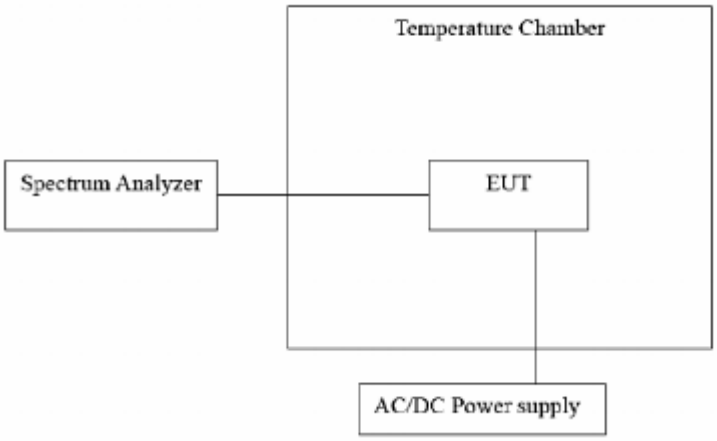
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.08	-4.59	56.49	74	-17.51	peak
3647	46.24	-4.59	41.65	54	-12.35	AVG
11650	56.07	4.84	60.91	74	-13.09	peak
11650	41.35	4.84	46.19	54	-7.81	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz。
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

4.8. Frequency Stability Measurement

4.8.1. Test Specification

Test Requirement:	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
Test Method:	ANSI C63.10: 2013
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Setup:	
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test Result:	PASS
Remark:	N/A

Test Result as follows:

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	5.5V	5179.991	22	5239.981	25
	5V	5179.982	31	5239.985	22
	4.5 V	5179.979	27	5239.972	37

Mode	Temperature (℃)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	-30	5179.995	18	5239.972	35
	-20	5179.972	29	5239.980	30
	-10	5179.980	22	5239.975	32
	0	5179.986	15	5239.979	27
	10	5179.987	34	5239.985	20
	20	5179.981	17	5239.984	23
	30	5179.978	25	5239.976	31
	40	5179.979	26	5239.979	37
	50	5179.970	31	5239.981	25

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	5.5V	5744.983	22	5824.989	20
	5V	5744.990	15	5824.978	27
	4.5 V	5744.979	23	5824.981	24

Mode	Temperature (℃)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5744.988	35	5824.969	35
	-20	5744.982	29	5824.973	23
	-10	5744.970	31	5824.984	21
	0	5744.972	28	5824.987	27
	10	5744.982	19	5824.968	34
	20	5744.994	23	5824.969	37
	30	5744.977	31	5824.987	15
	40	5744.959	28	5824.979	26
	50	5744.977	26	5824.988	19

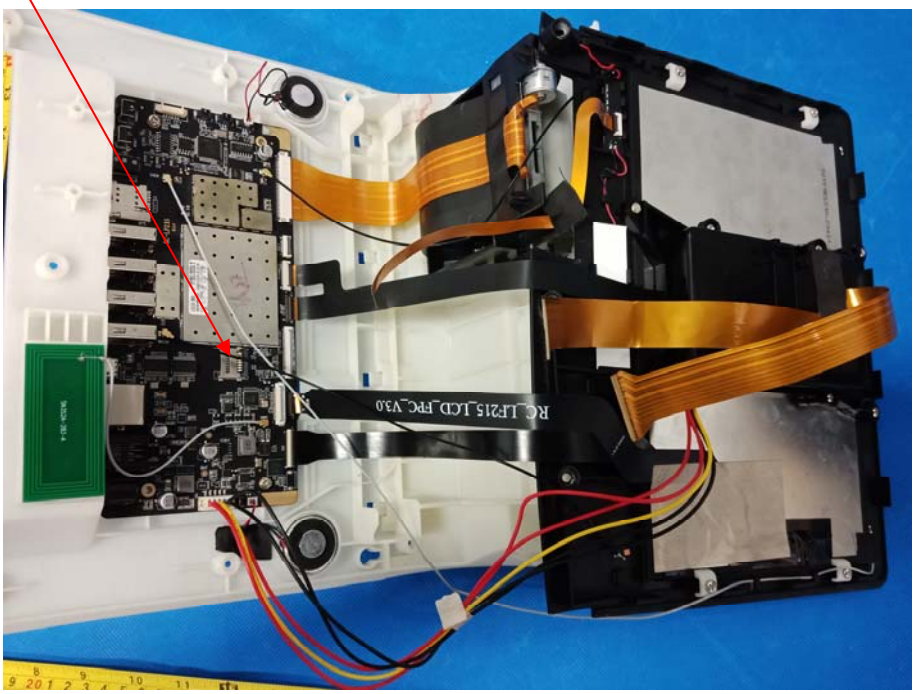
4.9. ANTENNA REQUIREMENT

Standard Applicable
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

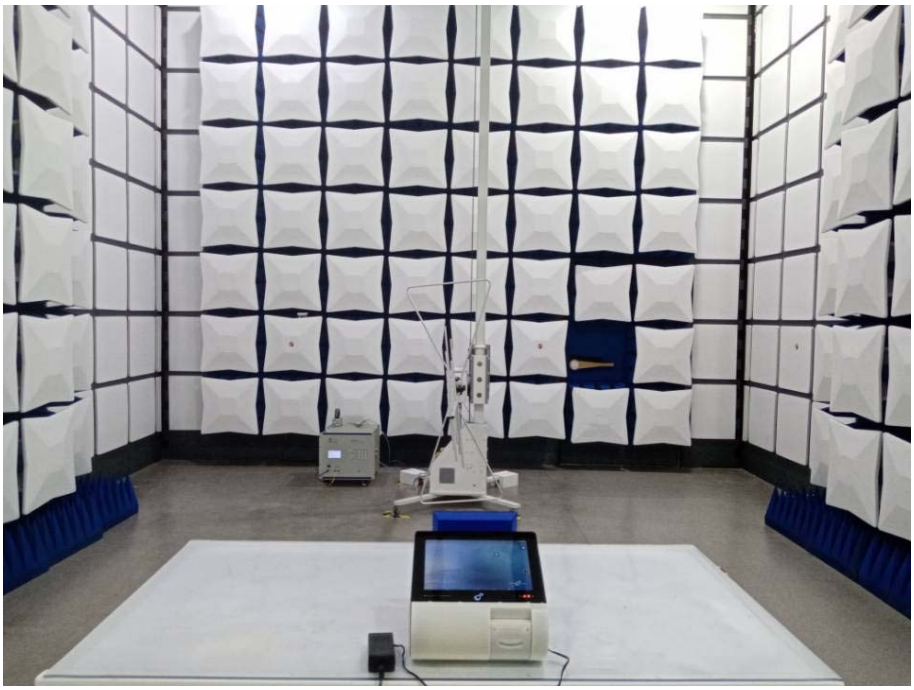
Antenna Connected Construction
The antenna used in this product is a Internal Antenna, The directional gains of antenna used for transmitting is 0dBi.

WIFI ANTENNA



4.10. Photographs of Test Setup

Radiated Emission



Conducted Emission