

TEST REPORT

FCC ID: OWI-KW6515

Product: AC 1200Mbps Dual Band Wireless Router

Model No.: KW6515

Additional Model No.: -

Trade Mark: **Kasda**

Report No.: TCT171207E003

Issued Date: December 07, 2017

Issued for:

Kasda Networks inc
3/F, Building No.2, South No.2 Honghualing Industry Zone, Taoyuan Street,
Nanshan, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab.
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Appendix A: Photographs of Test Setup

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1. Test Certification

Product:	AC 1200Mbps Dual Band Wireless Router
Model No.:	KW6515
Additional Model No.:	-
Trade Mark:	
Applicant:	Kasda Networks inc
Address:	3/F, Building No.2, South No.2 Honghualing Industry Zone, Taoyuan Street, Nanshan, Shenzhen, China
Manufacturer:	Kasda Networks inc
Address:	3/F, Building No.2, South No.2 Honghualing Industry Zone, Taoyuan Street, Nanshan, Shenzhen, China
Date of Test:	Sep. 05, 2017~ Nov. 30, 2017
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2017 ANSI C63.10-2013 KDB789033 D02 General U-NII Test Procedures New Rules v01r04 KDB662911 D01 Multiple Transmitter Output v02r01 KDB662911 D02 MIMO with Cross-Polarized Antennas v01

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Brews Xu

Date: November 30, 2017

Reviewed By:



Joe Zhou

Date: December 06, 2017

Approved By:



Tomsin

Date: December 07, 2017

2. Test Result Summary

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) §2.1046	PASS
6dB Emission Bandwidth	§15.407(a) §2.1049	PASS
26dB Emission Bandwidth& 99% Occupied Bandwidth	§15.407(a) §2.1049	PASS
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(a)	PASS
Radiated Emission	§15.407(a) §2.1053	PASS
Frequency Stability	§15.407(g) §2.1055	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.

3. EUT Description

Product:	AC 1200Mbps Dual Band Wireless Router
Model No.:	KW6515
Additional Model No.:	-
Trade Mark:	
Operation Frequency:	Band I: 5180MHz-5240MHz; 5190MHz-5230MHz; 5210 MHz Band IV: 5745MHz-5825MHz; 5755MHz-5795MHz; 5775 MHz
Channel Bandwidth:	802.11a/n(HT20): 20MHz 802.11n(HT40): 40MHz 802.11ac(HT80): 80MHz
Modulation Technology:	Orthogonal Frequency Division Multiplexing(OFDM)
Modulation Type	BPSK, QPSK, 16QAM, 64QAM
Antenna Type:	2 Transmit, 2 Receive
Antenna Gain:	5.0dBi
Power Supply:	DC 12V, 1A
Adapter:	Model No.: RD1201000-C55-26MG Input: AC 100-240V, 50/60Hz, 0.6A Max Output: DC 12V, 1A

NOTE: 802.11a SISO mode only, 802.11n/802.11ac is MIMO mode only.

802.11ac only have 80MHz mode.

Directional gain of MIMO mode is $5+10\log 2=8\text{dBi}$.

Operation Frequency each of channel

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180	38	5190	42	5210
40	5200	46	5230	155	5775
44	5220	151	5755		
48	5240	159	5795		
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:

For 802.11a/n (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
44	Mid	5220	157	Mid	5785
48	High	5240	165	High	5825

For 802.11n (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 802.11n (HT80)

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

4. Genera Information

4.1. 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(HT80)	MCS0
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation

4.2. 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.

5. Facilities and Accreditations

5.1. Facilities

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

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, 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	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$

6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The single antenna is 5 dBi, support MIMO, please refer to the below antenna photo. If transmitting antennas of directional gain greater than 6 dBi are used, both the aximum 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 directional gain=$5+10\log 2=8.01$ dBi.	
	

6.2. Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></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>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Tx Mode														
Test Procedure:	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.														
Test Result:	PASS														

6.2.2. Test Instruments

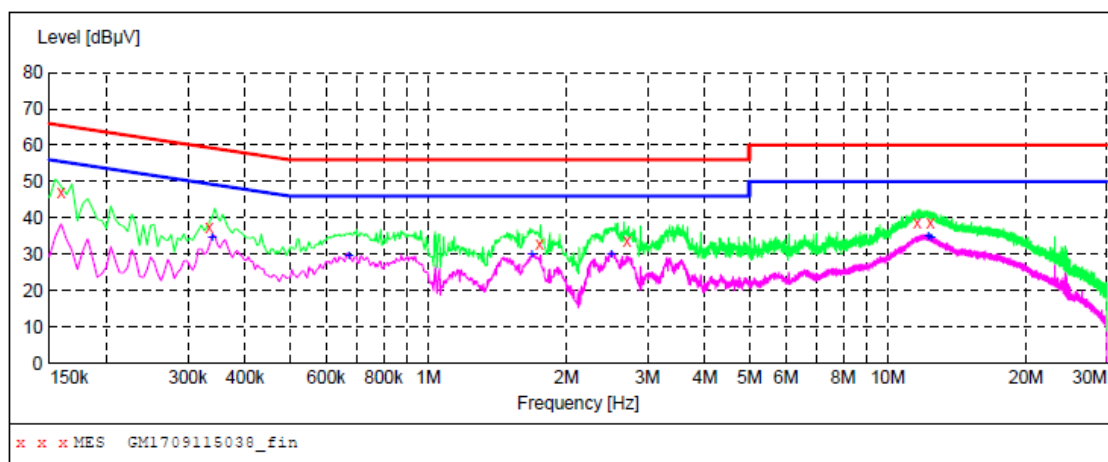
Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	R&S	ESPI	101401	Jun. 12, 2018
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 27, 2018
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Sep. 27, 2018
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

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

6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line



MEASUREMENT RESULT: "GM1709115038_fin"

9/11/2017 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159000	46.90	10.4	66	18.6	QP	L1	GND
0.334500	37.30	10.2	59	22.0	QP	L1	GND
1.747500	32.80	10.2	56	23.2	QP	L1	GND
2.710500	33.60	10.2	56	22.4	QP	L1	GND
11.616000	38.60	10.6	60	21.4	QP	L1	GND
12.394500	38.60	10.5	60	21.4	QP	L1	GND

MEASUREMENT RESULT: "GM1709115038_fin2"

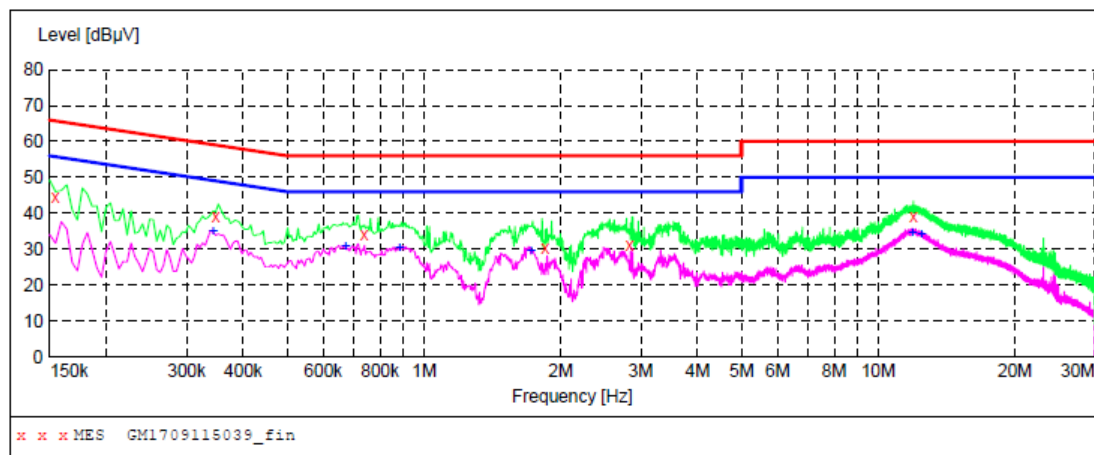
9/11/2017 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.339000	34.70	10.2	49	14.5	AV	L1	GND
0.672000	29.40	10.2	46	16.6	AV	L1	GND
1.680000	29.70	10.2	46	16.3	AV	L1	GND
2.499000	29.70	10.2	46	16.3	AV	L1	GND
12.232500	34.80	10.5	50	15.2	AV	L1	GND
12.390000	34.30	10.5	50	15.7	AV	L1	GND

Remark:

Transd = Cable lose+ PULSE LIMITER factor + ARTIFICIAL MAINS factor; Margin= Limit - Level

Conducted Emission on Neutral Terminal of the power line



MEASUREMENT RESULT: "GM1709115039_fin"

9/11/2017 3:14PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154500	44.40	10.4	66	21.4	QP	N	GND
0.348000	39.00	10.2	59	20.0	QP	N	GND
0.739500	34.00	10.2	56	22.0	QP	N	GND
1.851000	30.50	10.2	56	25.5	QP	N	GND
2.836500	31.20	10.2	56	24.8	QP	N	GND
11.980500	39.00	10.6	60	21.0	QP	N	GND

MEASUREMENT RESULT: "GM1709115039_fin2"

9/11/2017 3:14PM

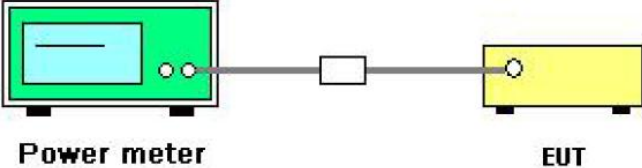
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.343500	35.10	10.2	49	14.0	AV	N	GND
0.672000	30.60	10.2	46	15.4	AV	N	GND
0.883500	30.20	10.1	46	15.8	AV	N	GND
1.720500	29.50	10.2	46	16.5	AV	N	GND
11.868000	34.70	10.6	50	15.3	AV	N	GND
12.439500	34.10	10.5	50	15.9	AV	N	GND

Remark:

Transd = Cable lose+ PULSE LIMITER factor + ARTIFICIAL MAINS factor; Margin= Limit - Level

6.3. Maximum Conducted Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046						
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section E						
Limit:	<table border="1"> <thead> <tr> <th>Frequency Band (MHz)</th><th>Limit</th></tr> </thead> <tbody> <tr> <td>5150-5250</td><td>250mW for client devices</td></tr> <tr> <td>5725-5850</td><td>1 W</td></tr> </tbody> </table> Note:For those cases where it is specified that the conducted output power be reduced by the amount in dB that the directional gain of the transmitting antenna exceeds 6 dBi, the output power effective limit shall be calculated as follows in Equation: $P_{out} = P_{Limit} - (\text{directional gain} - 6)$	Frequency Band (MHz)	Limit	5150-5250	250mW for client devices	5725-5850	1 W
Frequency Band (MHz)	Limit						
5150-5250	250mW for client devices						
5725-5850	1 W						
Test Setup:	 The diagram illustrates the test setup. On the left is a green box labeled 'Power meter'. A cable connects it to a small white box labeled 'Attenuator'. Another cable connects the attenuator to a yellow box labeled 'EUT' (Equipment Under Test).						
Test Mode:	Transmitting mode with modulation						
Test Procedure:	1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v01r04 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.						
Test Result:	PASS						
Remark:	Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power						

6.3.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
Power Meter	Agilent	N1911A	MY45101557	Sep. 27, 2018
Power Sensor	Agilent	N1922A	MY44124432	Sep. 27, 2018
RF Cable (9KHz-40GHz)	TCT	RE-03	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-03	N/A	Sep. 27, 2018

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

6.3.3. Test Data

Configuration Band I (5150 - 5250 MHz)

Mode	Test channel	Maximum Conducted Output Power (dBm)			FCC Limit (dBm)	Result
		Antenna 0	Antenna 1	Total Power		
11a	CH36	17.06	16.51	-	24	PASS
11a	CH44	17.89	16.52	-	24	PASS
11a	CH48	17.53	16.52	-	24	PASS
11n(HT20)	CH36	16.48	16.52	19.51	21.99	PASS
11n(HT20)	CH44	18.39	17.12	20.81	21.99	PASS
11n(HT20)	CH48	17.08	16.82	19.96	21.99	PASS
11n(HT40)	CH38	17.60	15.62	19.72	21.99	PASS
11n(HT40)	CH46	17.37	15.45	19.56	21.99	PASS
11ac(HT80)	CH42	16.02	13.04	17.76	21.99	PASS

Configuration Band IV (5725 - 5850 MHz)

Mode	Test channel	Maximum Conducted Output Power (dBm)			FCC Limit (dBm)	Result
		Antenna 0	Antenna 1	Total Power		
11a	CH149	18.45	18.13	-	30	PASS
11a	CH157	18.07	17.89	-	30	PASS
11a	CH165	17.85	17.75	-	30	PASS
11n(HT20)	CH149	18.35	18.11	21.24	27.99	PASS
11n(HT20)	CH157	17.86	16.35	20.18	27.99	PASS
11n(HT20)	CH165	17.26	17.14	20.21	27.99	PASS
11n(HT40)	CH151	16.48	16.30	19.40	27.99	PASS
11n(HT40)	CH159	16.06	16.14	19.11	27.99	PASS
11ac(HT80)	CH155	13.78	13.73	16.77	27.99	PASS

Note: 802.11a SISO mode only, 802.11n/802.11ac is MIMO mode only.

6.4. 6dB Emission Bandwidth

6.4.1. 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:	 Spectrum Analyzer EUT
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

6.4.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF Cable (9KHz-40GHz)	TCT	RE-03	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-03	N/A	Sep. 27, 2018

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

6.4.3. Test data

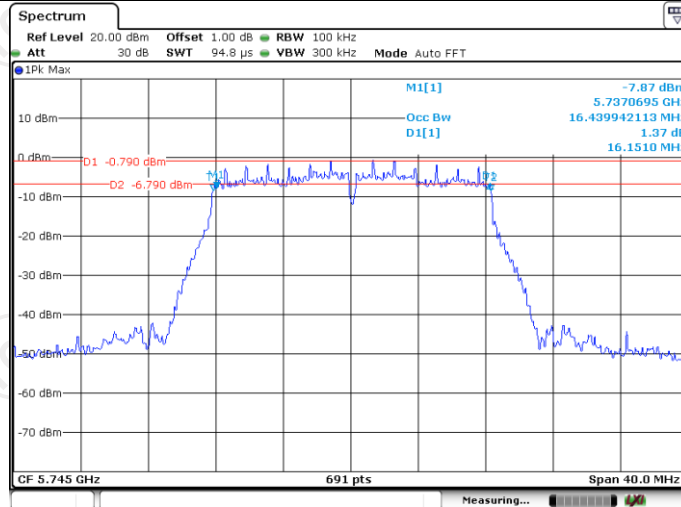
Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
			Antenna 0 (Worst case)		
11a	CH149	5745	16.15	0.5	PASS
11a	CH157	5785	16.04	0.5	PASS
11a	CH161	5825	16.32	0.5	PASS
11n(HT20)	CH149	5745	17.02	0.5	PASS
11n(HT20)	CH157	5785	16.90	0.5	PASS
11n(HT20)	CH161	5825	17.25	0.5	PASS
11n(HT40)	CH151	5755	35.43	0.5	PASS
11n(HT40)	CH159	5795	35.31	0.5	PASS
11ac(HT80)	CH155	5775	73.86	0.5	PASS

Test plots as follows:

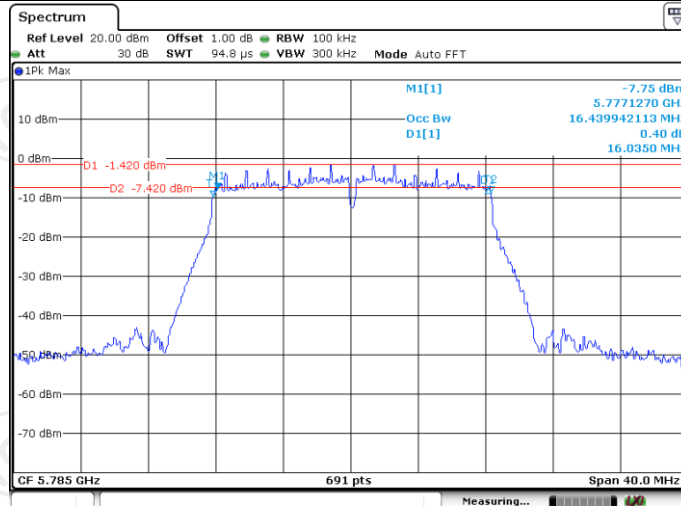
Band IV (5725 – 5850 MHz)

802.11a

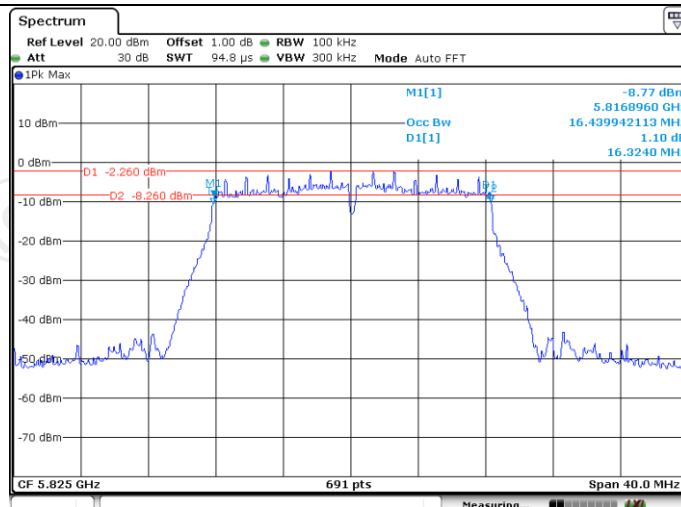
Antenna 0(Worst case)



Low



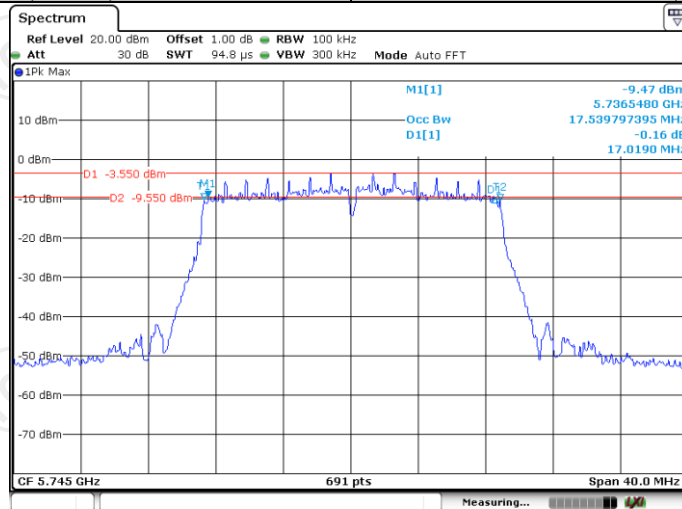
Mid



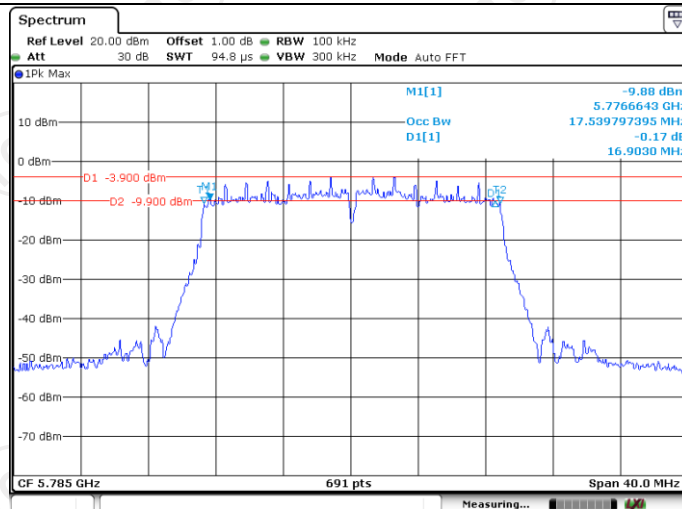
High

802.11n(HT20)

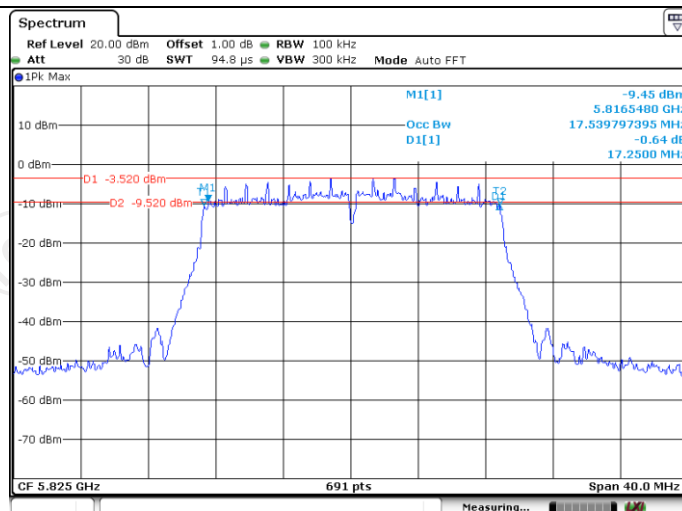
Antenna 0(Worst case)



Low



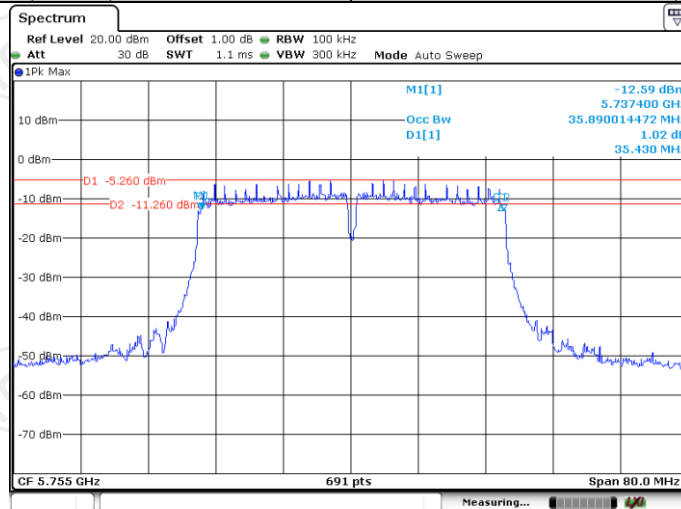
Mid



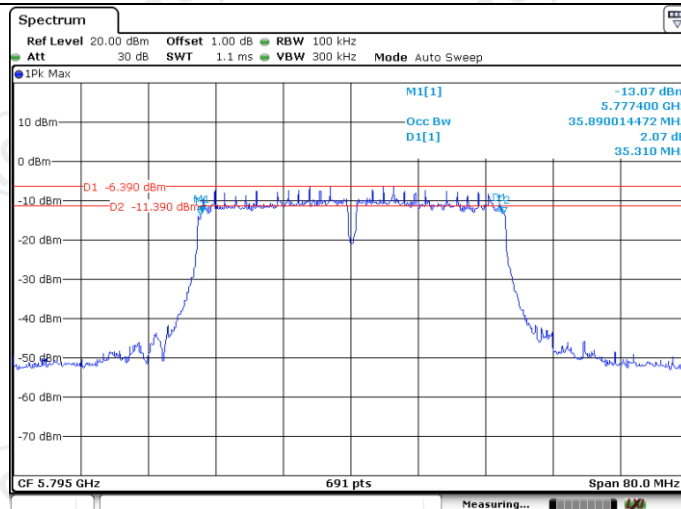
High

802.11n(HT40)

Antenna 0(Worst case)



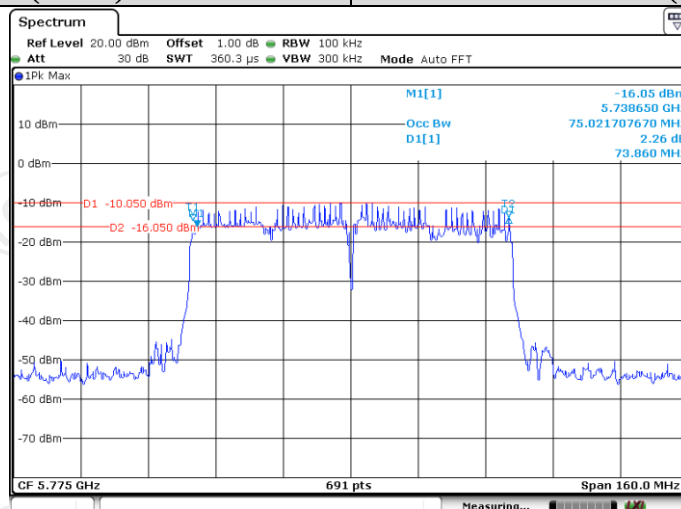
Low



High

802.11ac(HT80)

Antenna 0(Worst case)



6.5. 26dB Bandwidth and 99% Occupied Bandwidth

6.5.1. 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 v01r04 Section D
Limit:	No restriction limits
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section D 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. 4. Measure and record the results in the test report.
Test Result:	PASS

6.5.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF Cable (9KHz-26.5GHz)	TCT	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

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

6.5.3. Test data

Band I Antenna 0

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	CH36	5180	19.60	16.60
11a	CH44	5220	19.44	16.60
11a	CH48	5240	19.51	16.61
11n(HT20)	CH36	5180	19.90	17.58
11n(HT20)	CH44	5220	19.98	17.58
11n(HT20)	CH48	5240	19.89	17.58
11n(HT40)	CH38	5190	40.44	36.13
11n(HT40)	CH46	5230	40.35	36.12
11ac(HT80)	CH42	5210	81.36	74.94

Band I Antenna 1

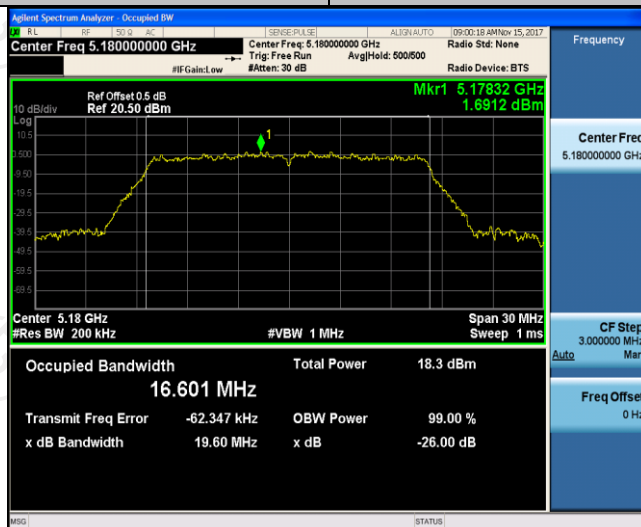
Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	CH36	5180	19.46	16.58
11a	CH44	5220	19.47	16.58
11a	CH48	5240	19.38	16.60
11n(HT20)	CH36	5180	19.90	17.58
11n(HT20)	CH44	5220	19.85	17.58
11n(HT20)	CH48	5240	19.85	17.57
11n(HT40)	CH38	5190	40.62	36.14
11n(HT40)	CH46	5230	40.21	36.08
11ac(HT80)	CH42	5210	81.04	74.99

Test plots as follows:

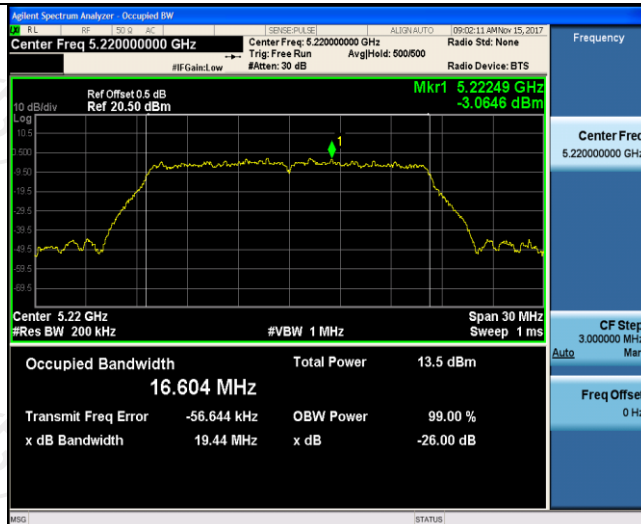
Band I (5150 – 5250 MHz)

802.11a

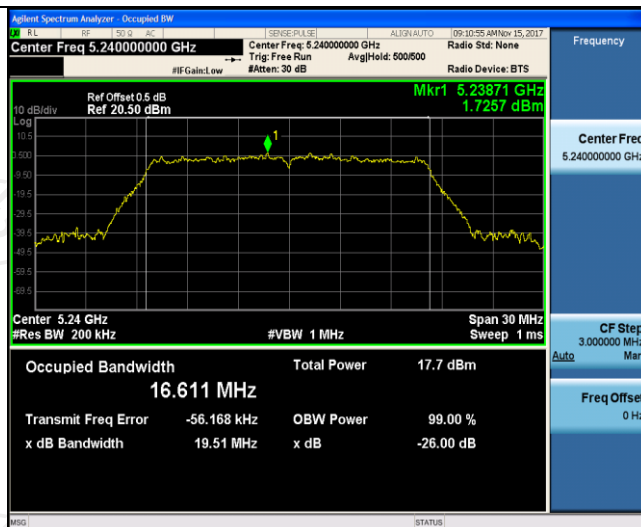
Antenna 0



Low



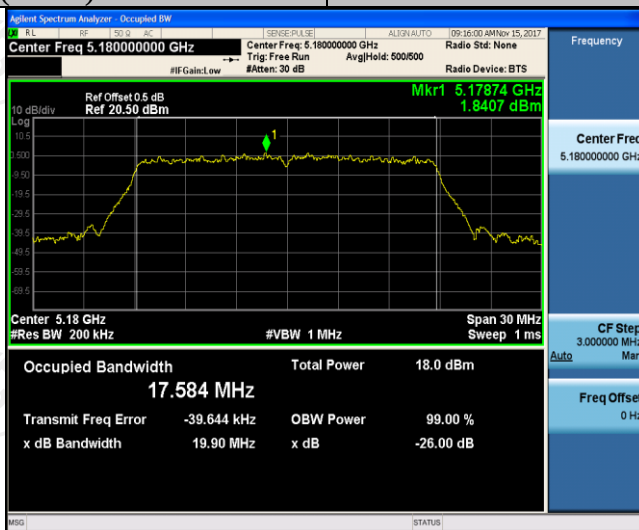
Mid



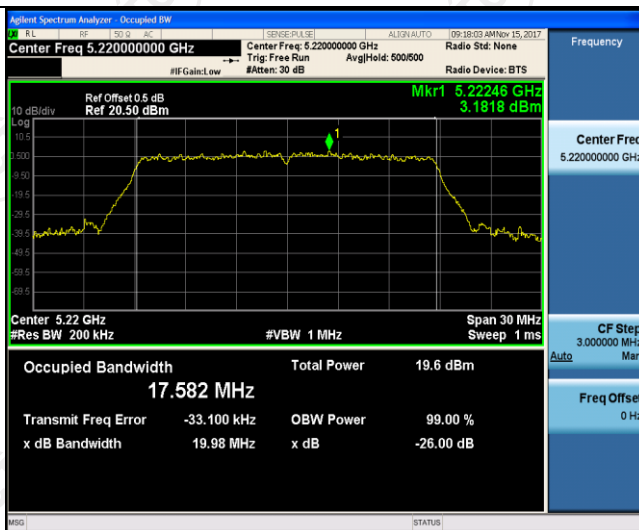
High

802.11n(HT20)

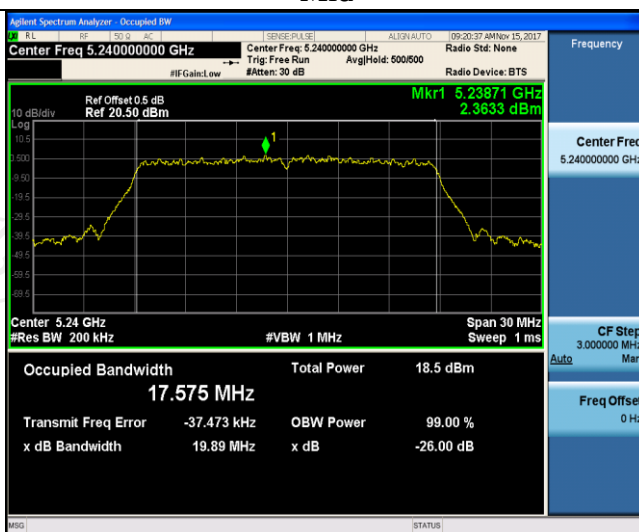
Antenna 0



Low



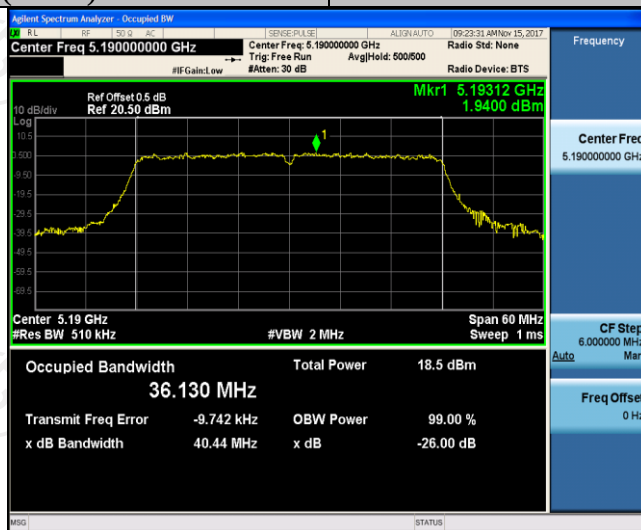
Mid



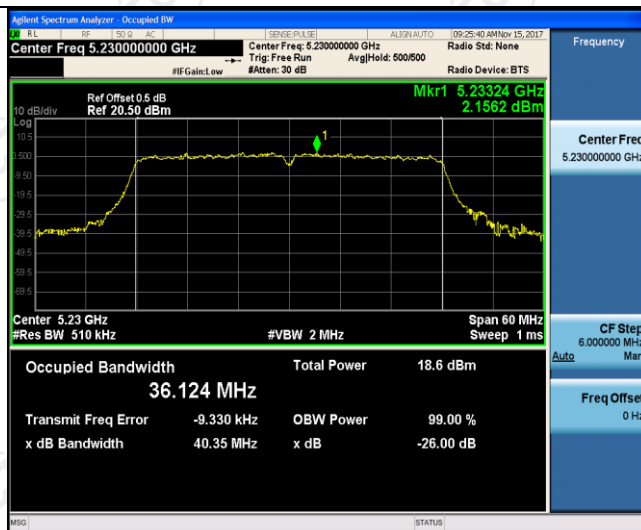
High

802.11n(HT40)

Antenna 0



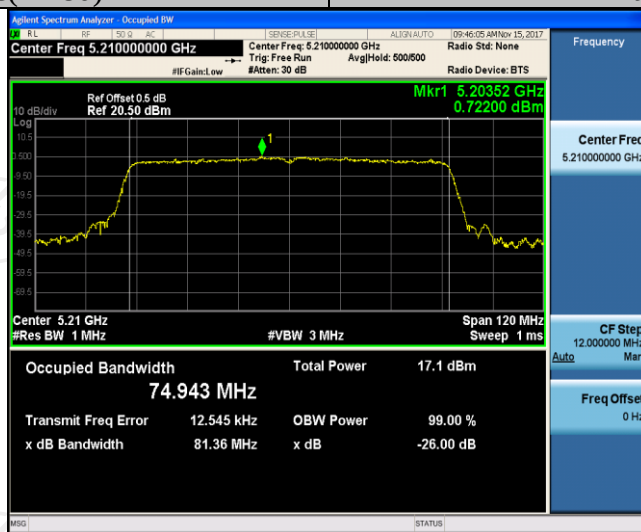
Low



High

802.11ac(HT80)

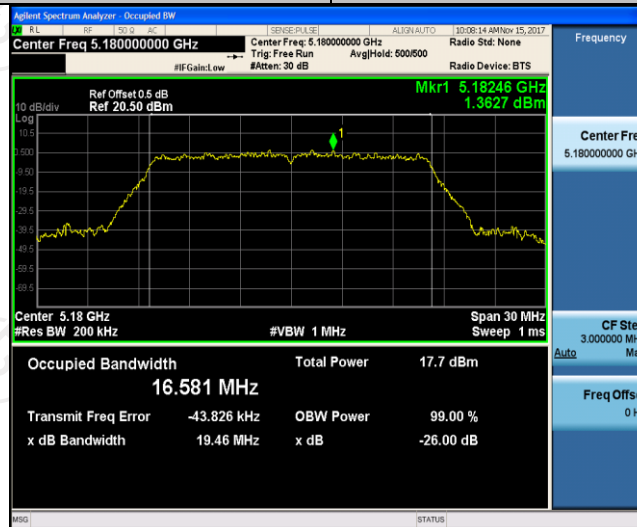
Antenna 0



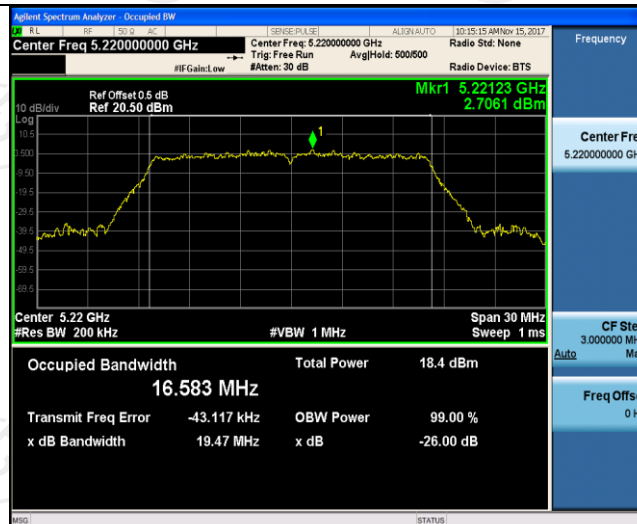
Mid

802.11a

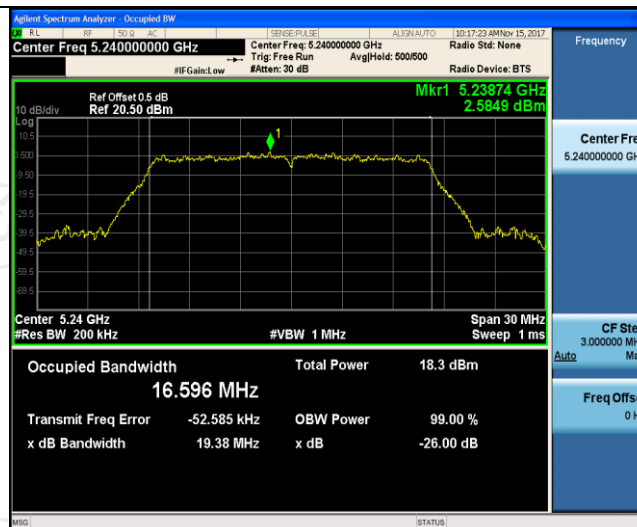
Antenna 1



Low



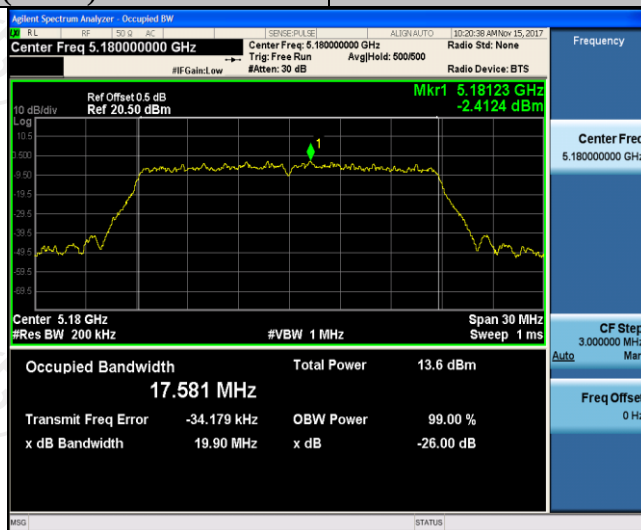
Mid



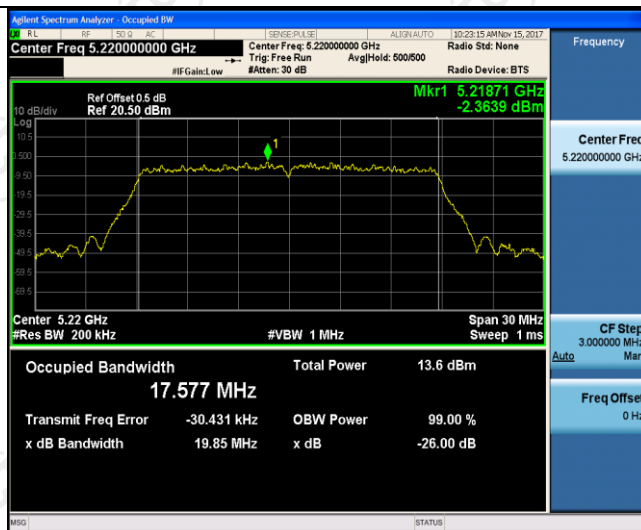
High

802.11n(HT20)

Antenna 1



Low



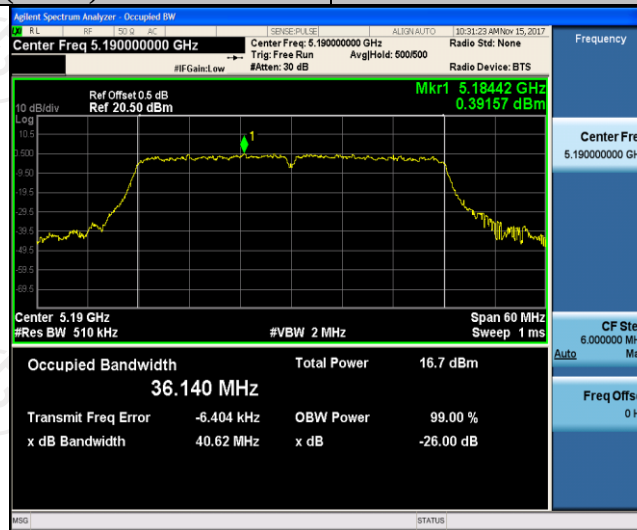
Mid



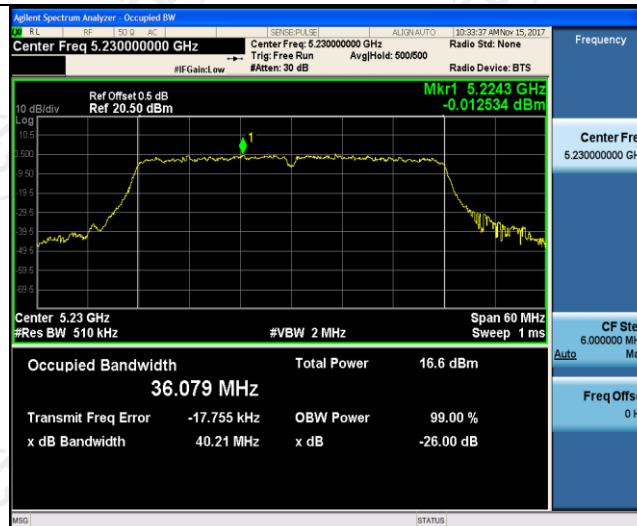
High

802.11n(HT40)

Antenna 1



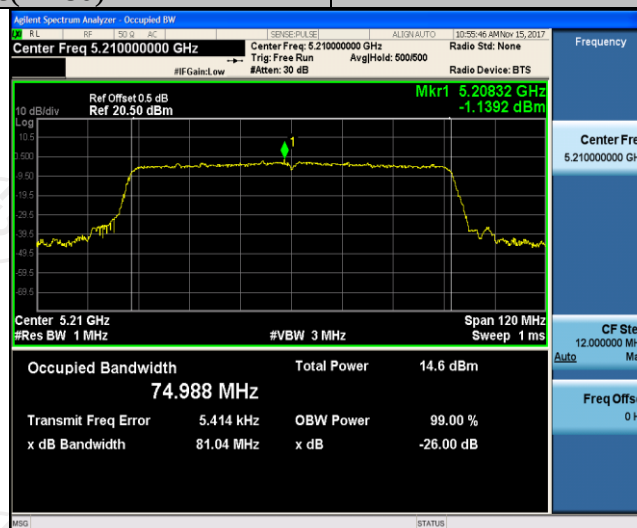
Low



High

802.11ac(HT80)

Antenna 1



Mid

6.6. Power Spectral Density

6.6.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v01r04 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 Note: For those cases where it is specified that the conducted output power be reduced by the amount in dB that the directional gain of the transmitting antenna exceeds 6 dBi, the PSD effective limit shall be calculated as follows in Equation: $PSD_{out} = PSD_{Limit} - (directional\ gain - 6)$
Test Setup:	 Spectrum Analyzer EUT
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 = 500 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

6.6.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHWARZ	FSP40	100056	Sep. 27, 2018
RF Cable (9KHz-40GHz)	TCT	RE-03	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-03	N/A	Sep. 27, 2018

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

6.6.3. Test data

Configuration Band I (5150 - 5250 MHz)						
Mode	Test channel	Power Spectral Density			Limit (dBm/MHz)	Result
		Antenna 0	Antenna 1	Total PSD		
11a	CH36	7.60	6.40	-	11	PASS
11a	CH44	6.88	6.27	-	11	PASS
11a	CH48	7.74	6.45	-	11	PASS
11n(HT20)	CH36	1.49	-0.13	3.77	8.99	PASS
11n(HT20)	CH44	1.97	-0.13	4.06	8.99	PASS
11n(HT20)	CH48	2.47	-0.22	4.34	8.99	PASS
11n(HT40)	CH38	4.48	2.13	6.47	8.99	PASS
11n(HT40)	CH46	3.89	2.31	6.18	8.99	PASS
11ac(HT80)	CH42	-0.94	-2.73	1.27	8.99	PASS

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Power Spectral Density			Limit (dBm/500k Hz)	Result
		Antenna 0	Antenna 1	Total PSD		
11a	CH149	2.17	2.60	-	30	PASS
11a	CH157	2.28	2.20	-	30	PASS
11a	CH161	2.42	2.52	-	30	PASS
11n(HT20)	CH149	0.67	0.72	3.71	27.99	PASS
11n(HT20)	CH157	0.67	0.51	3.60	27.99	PASS
11n(HT20)	CH161	1.14	0.99	4.08	27.99	PASS
11n(HT40)	CH151	-2.24	-2.40	0.69	27.99	PASS
11n(HT40)	CH159	-1.76	-1.71	1.28	27.99	PASS
11ac(HT80)	CH155	-3.67	-3.77	-0.71	27.99	PASS

Note: 802.11a is SISO mode,802.11n/802.11ac is MIMO mode.

Test plots as follows:

Band I (5150 – 5250 MHz)

802.11a

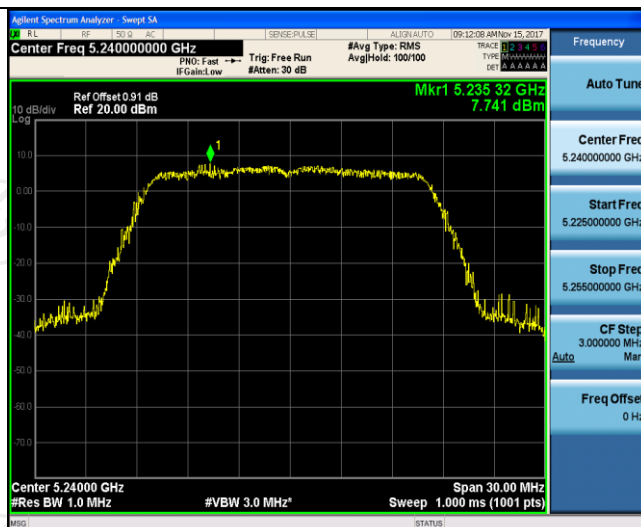
Antenna 0



Low



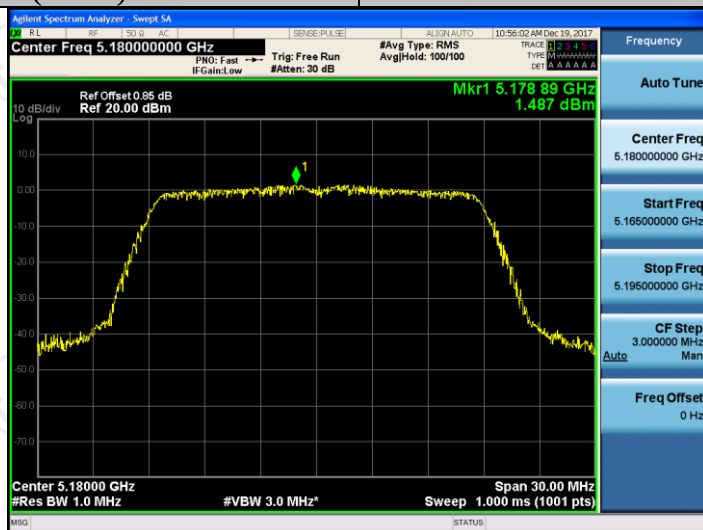
Mid



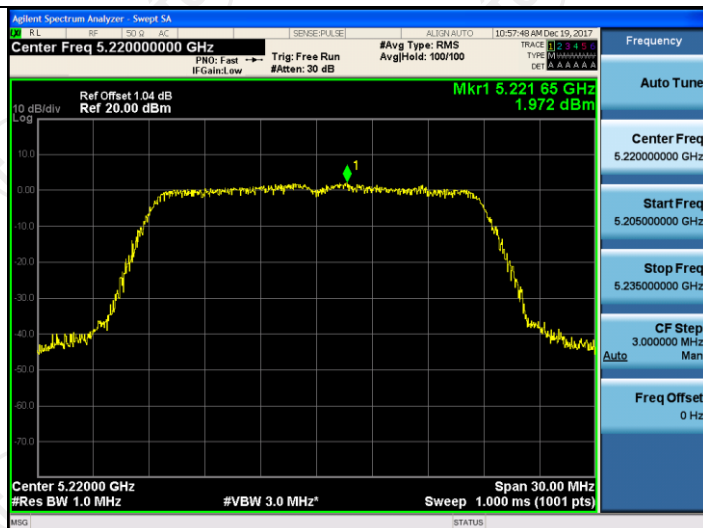
High

802.11n(HT20)

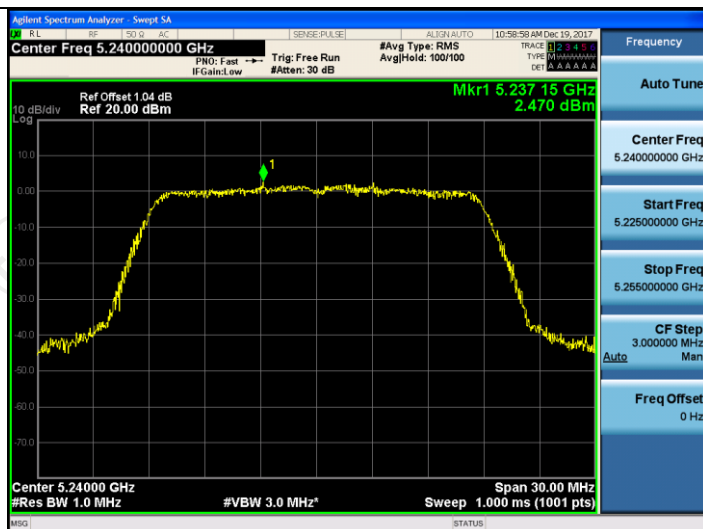
Antenna 0



Low



Mid



High

802.11n(HT40)

Antenna 0



Low



High

802.11ac(HT80)

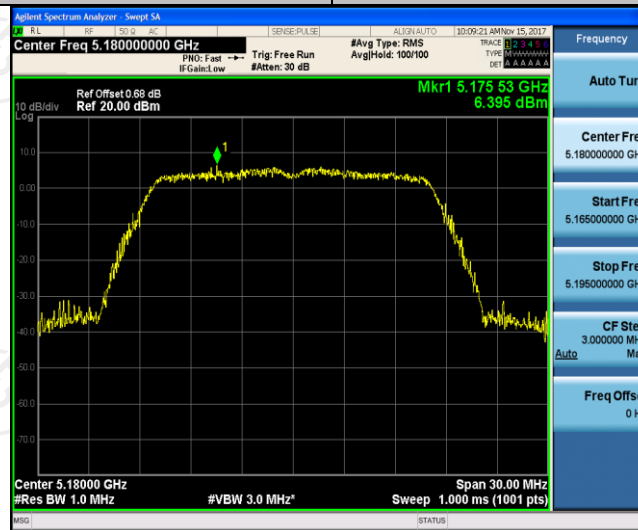
Antenna 0



Mid

802.11a

Antenna 1



Low



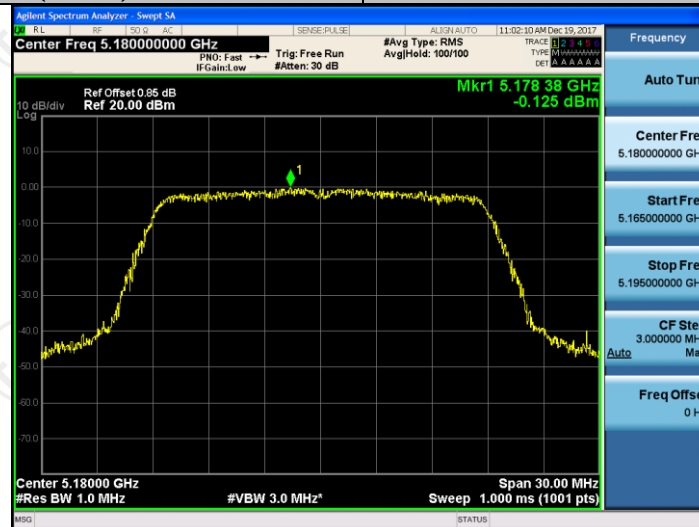
Mid



High

802.11n(HT20)

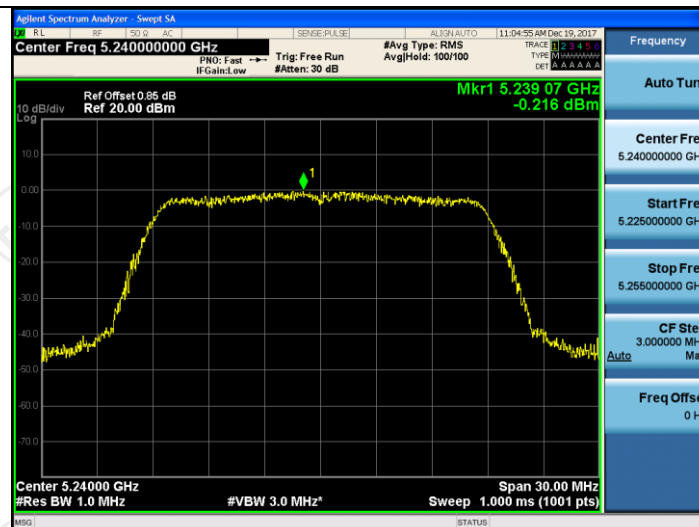
Antenna 1



Low



Mid



High

802.11n(HT40)

Antenna 1



Low



High

802.11ac(HT80)

Antenna 1



Mid