



FCC TEST REPORT

**Test report
On Behalf of
LG Electronics USA, Inc.
For
4G Mobile phone
Model No.: LMX130IM**

FCC ID: ZNFX130IM

Prepared for : LG Electronics USA, Inc.
1000 Sylvan Ave. Englewood Cliffs, New Jersey, United States 07632

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street,
Bao'an District, Shenzhen City, China

Date of Test: Jun. 26, 2019 ~ Jul. 11, 2019
Date of Report: Jul. 11, 2019
Report Number: HK1907111624-6E



TEST RESULT CERTIFICATION

Applicant's name: LG Electronics USA, Inc.

Address: 1000 Sylvan Ave. Englewood Cliffs, New Jersey, United States
07632

Manufacture's Name.....: OPTIEMUS ELECTRONICS LIMITED

Address: D-348, Sector 63, Gautam Budh Nagar, Noida, Uttar Pradesh
201307 India

Product description

Trade Mark: LG

Product name.....: 4G Mobile phone

Model and/or type reference .: LMX130IM

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

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Date of Test:

Date (s) of performance of tests: Jun. 26, 2019 ~ Jul. 11, 2019

Date of Issue.....: Jul. 11, 2019

Test Result.....: Pass

Prepared by:

Project Engineer

Reviewed by:

Project Supervisor

Approved by:

Technical Director



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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) §2.1046	PASS
6dB Emission Bandwidth	§15.407(e)	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.

1.2. TEST FACILITY

Test Firm : Shenzhen HUAKE 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 $y \pm U$, where expanded 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	$\pm 1.0\%$



2. EUT Description

2.1. GENERAL DESCRIPTION OF EUT

Equipment	4G Mobile phone
Model Name	LMX130IM
Serial No.	/
Trade Mark	LG
Model Difference	/
FCC ID	ZNFX130IM
Operation Frequency:	IEEE 802.11a/n/ac(HT20) 5.180GHz-5.240GHz IEEE 802.11n/ac(HT40) 5.190GHz-5.230GHz IEEE 802.11ac(HT80) 5.210GHz
	IEEE 802.11a/n/ac(HT20)5.745GHz-5.825GHz IEEE 802.11n/ac(HT40)5.755GHz-5.795GHz IEEE 802.11ac(HT80) 5.775GHz
Modulation Technology:	IEEE 802.11a/n/ac
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Antenna Type	Internal Antenna
Antenna Gain	1.5dBi
Power supply:	DC 5V 2A from AC Adapter or DC3.85V By Battery



2.2. Operation Frequency each of channel

802.11a/802.11n(HT20) 802.11ac(HT20)		802.11n(HT40)/ 802.11ac(HT40)		802.11ac(HT80)	
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	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

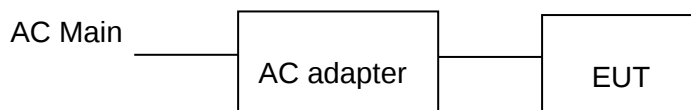


For 802.11ac(HT80)

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 testing and Radiation and Above1GHz Radiation testing:



- Adapter information
Model: UP0920
Input: 100-240V~, 50/60Hz, 0.3A
Output: 5VDC, 2A



3. General 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)/ac(HT80)	/

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

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 40cm 80cm E.U.T AC power Test table/Insulation plane LISN Filter AC power EMI Receiver 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														



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
L.I.S.N.	R&S	ENV216	HKE-059	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).

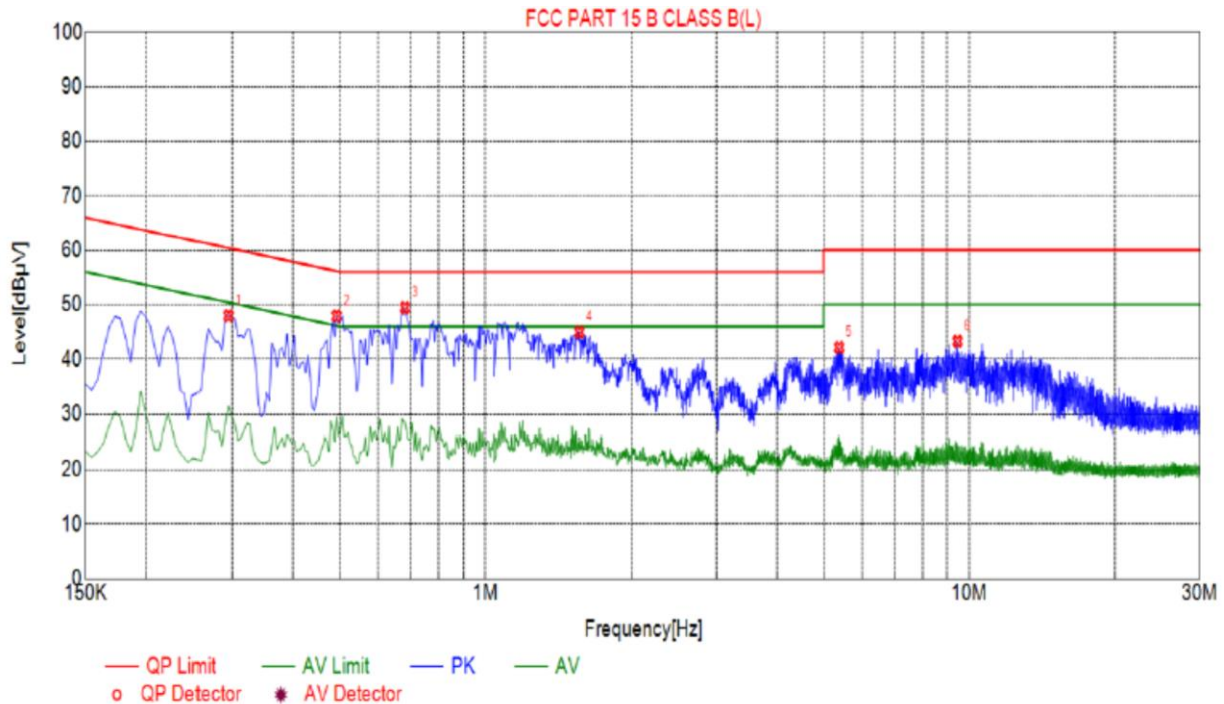


4.1.3. Test data

Remark: We tested three Channels in AC 120V/60Hz and AC 240V/60Hz, the worst case was recorded.

Please refer to following diagram for individual

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

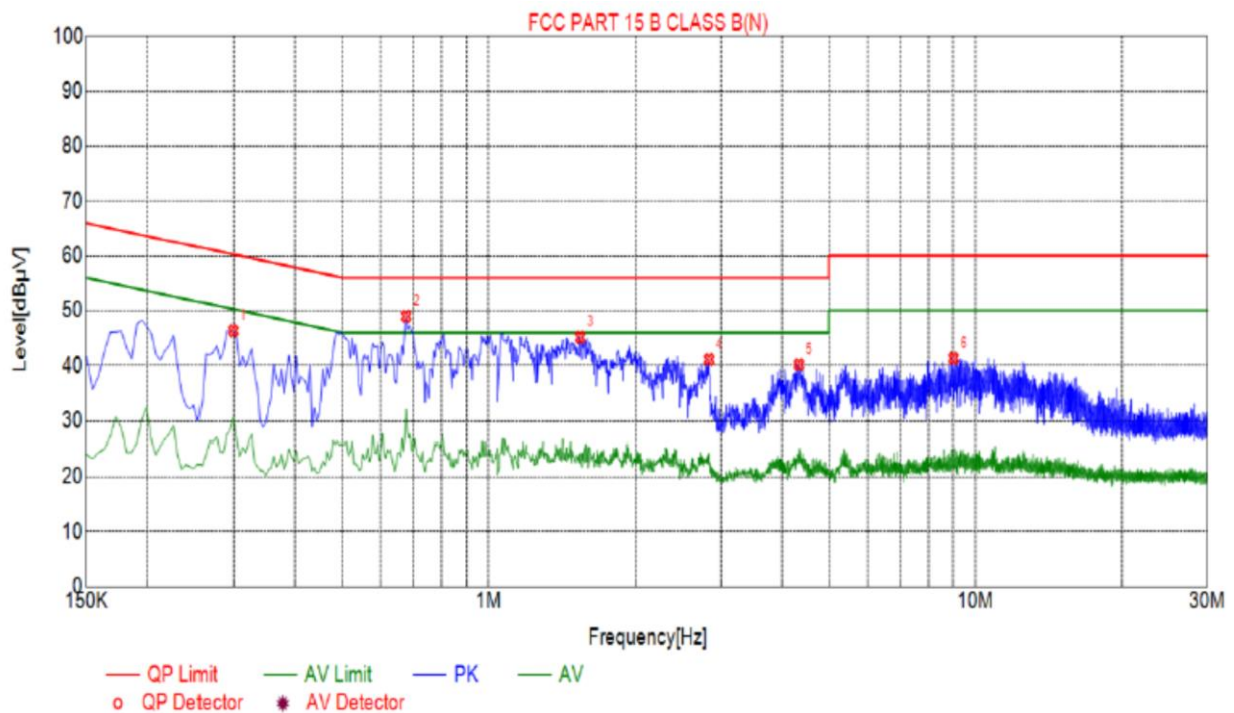


Suspected List						
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.2940	47.99	10.03	60.41	12.42	PK
2	0.4920	47.94	10.04	56.13	8.19	PK
3	0.6810	49.44	10.05	56.00	6.56	PK
4	1.5630	44.97	10.11	56.00	11.03	PK
5	5.3835	42.15	10.26	60.00	17.85	PK
6	9.4560	43.31	10.09	60.00	16.69	PK

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

**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	0.2985	46.35	10.04	60.28	13.93	PK
2	0.6765	48.97	10.05	56.00	7.03	PK
3	1.5405	45.16	10.11	56.00	10.84	PK
4	2.8365	41.13	10.21	56.00	14.87	PK
5	4.3395	40.19	10.25	56.00	15.81	PK
6	9.0150	41.34	10.11	60.00	18.66	PK

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

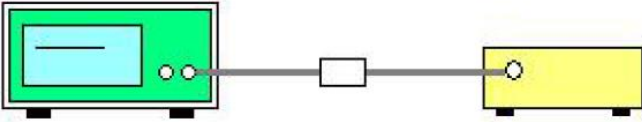
Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.



4.2. Maximum Conducted Output Power

4.2.1. 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 v02.r01 Section E	
Limit:	Frequency Band (MHz)	Limit
	5150-5250	250mW for client devices
	5725-5850	1 W
Test Setup:	 Power meter EUT	
Test Mode:	Transmitting mode with modulation	
Test Procedure:	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.	
Test Result:	PASS	
Remark:	Conducted output power= measurement power $+10\log(1/x)$ X is duty cycle=1, so $10\log(1/1)=0$ Conducted output power= measurement power	



4.2.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power meter	Agilent	E4419B	HKE-085	Dec. 27, 2019
Power Sensor	Agilent	E9300A	HKE-086	Dec. 27, 2019
RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	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) Average	FCC Limit (dBm)	Result
11a	CH36	7.73	23.97	PASS
11a	CH40	7.70	23.97	PASS
11a	CH48	7.61	23.97	PASS
11n(HT20)	CH36	7.67	23.97	PASS
11n(HT20)	CH40	7.63	23.97	PASS
11n(HT20)	CH48	7.65	23.97	PASS
11n(HT40)	CH38	7.55	23.97	PASS
11n(HT40)	CH46	7.41	23.97	PASS
11ac(HT20)	CH36	7.38	23.97	PASS
11ac(HT20)	CH40	7.25	23.97	PASS
11ac(HT20)	CH48	7.37	23.97	PASS
11ac(HT40)	CH38	6.52	23.97	PASS
11ac(HT40)	CH46	6.16	23.97	PASS
11ac(HT80)	CH42	5.51	23.97	PASS



Configuration Band IV (5725 - 5850 MHz)				
Mode	Test channel	Maximum Conducted Output Power (dBm) Average	FCC Limit (dBm)	Result
11a	CH149	7.69	30	PASS
11a	CH157	7.64	30	PASS
11a	CH165	7.12	30	PASS
11n (HT20)	CH149	7.58	30	PASS
11n (HT20)	CH157	7.59	30	PASS
11n (HT20)	CH165	7.44	30	PASS
11n (HT40)	CH151	7.38	30	PASS
11n (HT40)	CH159	7.21	30	PASS
11ac(HT20)	CH149	7.45	30	PASS
11ac(HT20)	CH157	7.30	30	PASS
11ac(HT20)	CH165	7.16	30	PASS
11ac(HT40)	CH151	6.83	30	PASS
11ac(HT40)	CH159	6.24	30	PASS
11ac(HT80)	CH155	5.68	30	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:	 Spectrum Analyzer EUT
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) = 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 (9KHz-40GHz)	Tonscend	170660	N/A	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**

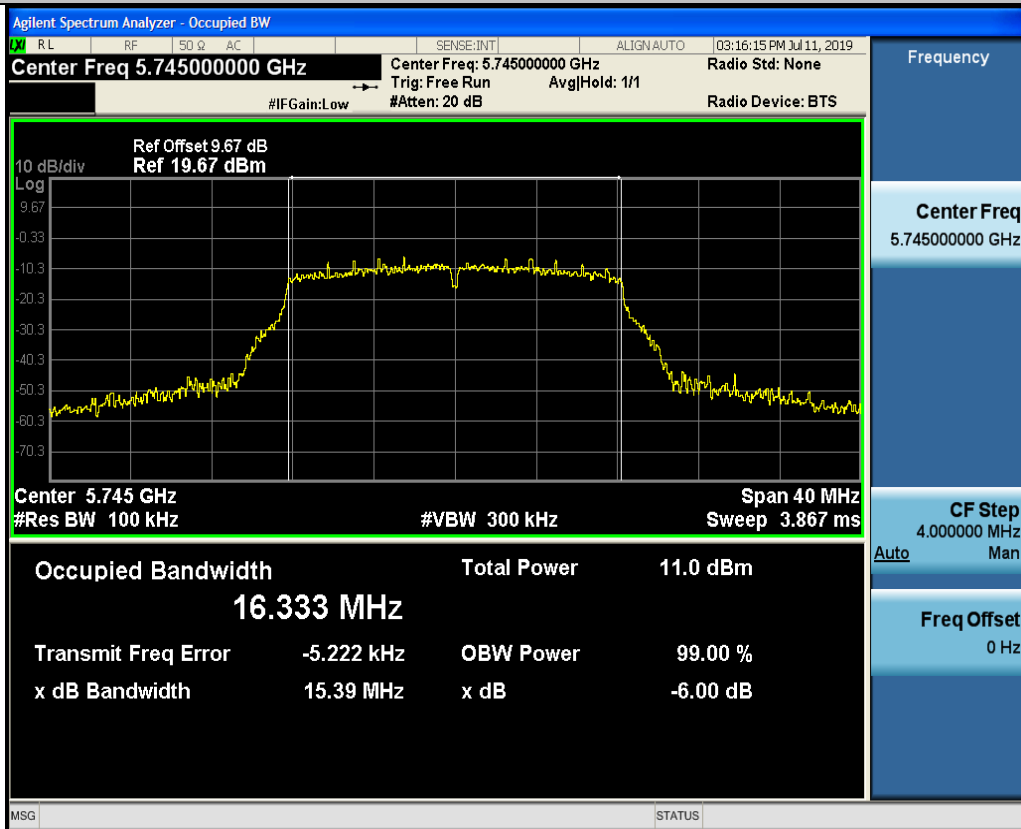
Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	15.39	0.5	PASS
11a	CH157	5785	16.00	0.5	PASS
11a	CH161	5825	15.09	0.5	PASS
11n(HT20)	CH149	5745	15.11	0.5	PASS
11n(HT20)	CH157	5785	16.18	0.5	PASS
11n(HT20)	CH161	5825	15.11	0.5	PASS
11n(HT40)	CH151	5755	33.87	0.5	PASS
11n(HT40)	CH159	5795	35.12	0.5	PASS
11ac(HT20)	CH149	5745	15.07	0.5	PASS
11ac(HT20)	CH157	5785	15.19	0.5	PASS
11ac(HT20)	CH165	5825	15.01	0.5	PASS
11ac(HT40)	CH151	5755	35.18	0.5	PASS
11ac(HT40)	CH159	5795	35.18	0.5	PASS
11ac(HT80)	CH155	5755	75.30	0.5	PASS

Test plots as follows:

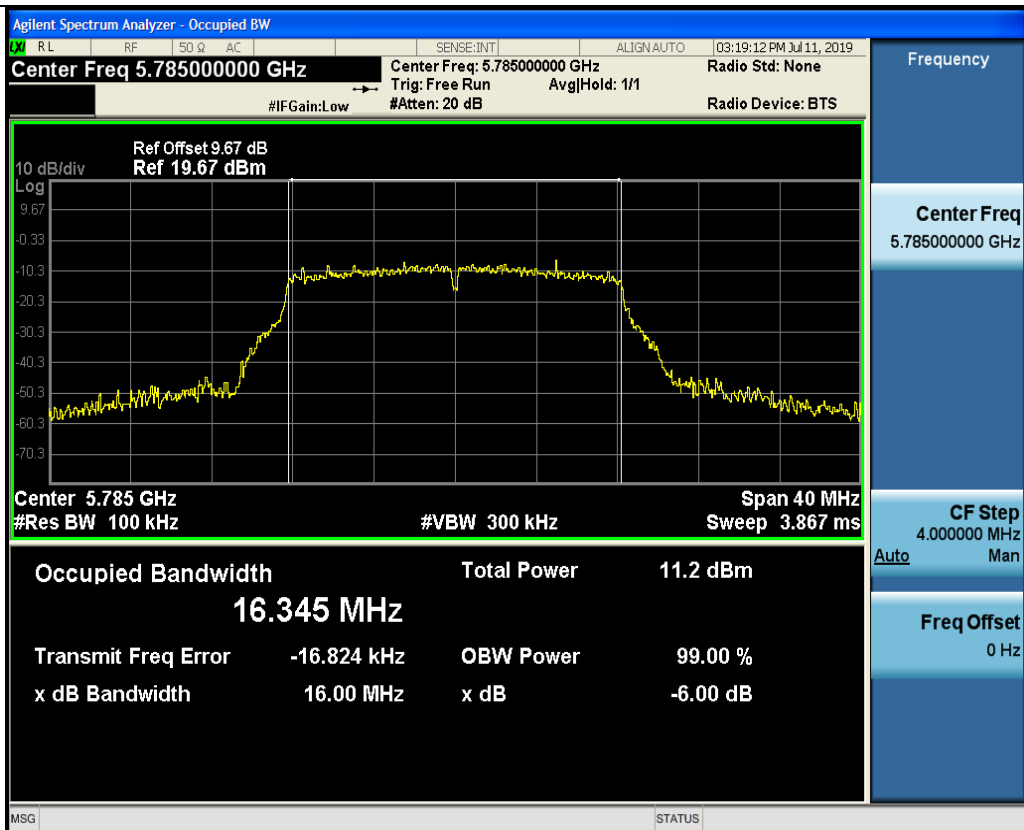


Band IV (5725 – 5850 MHz)

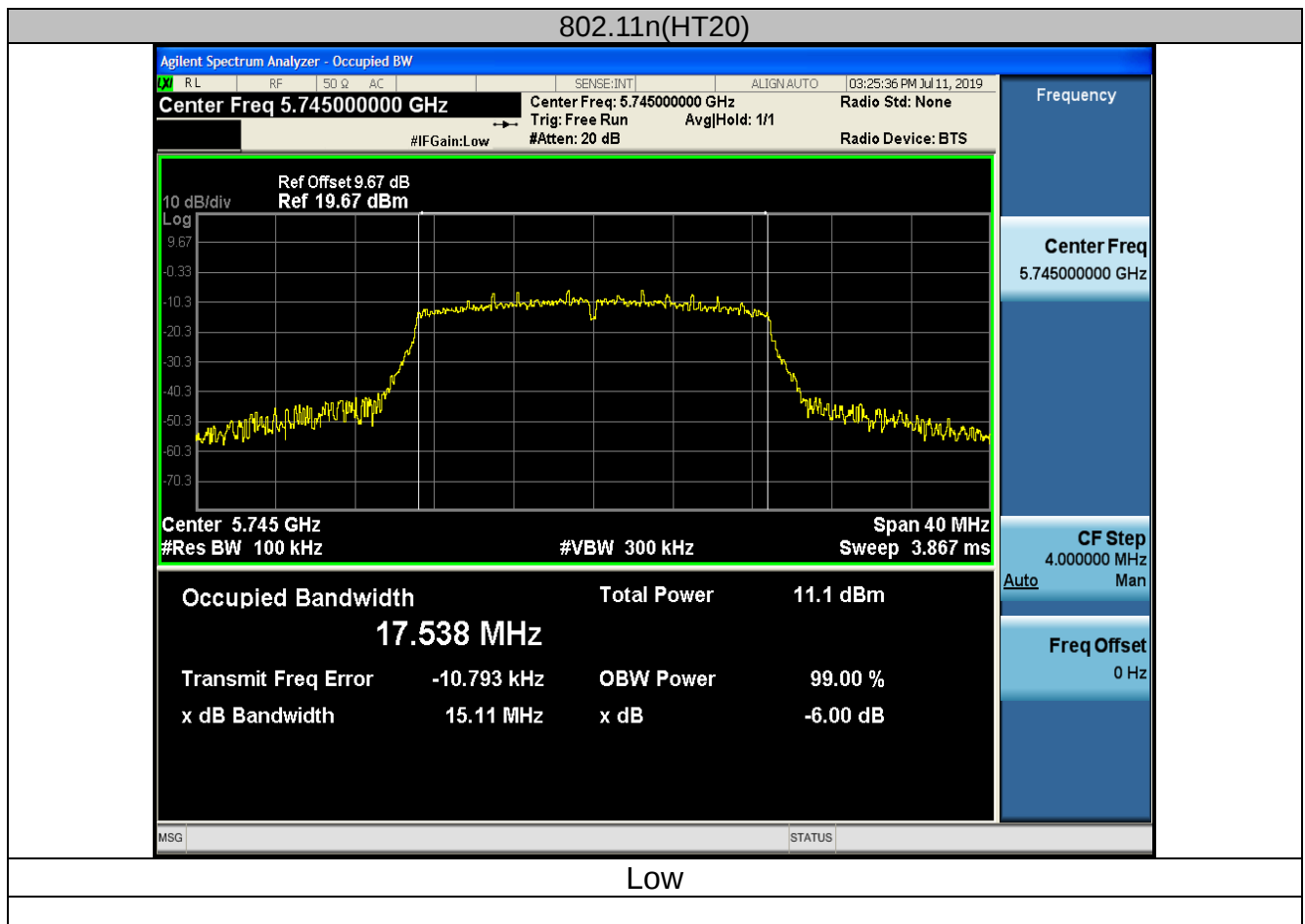
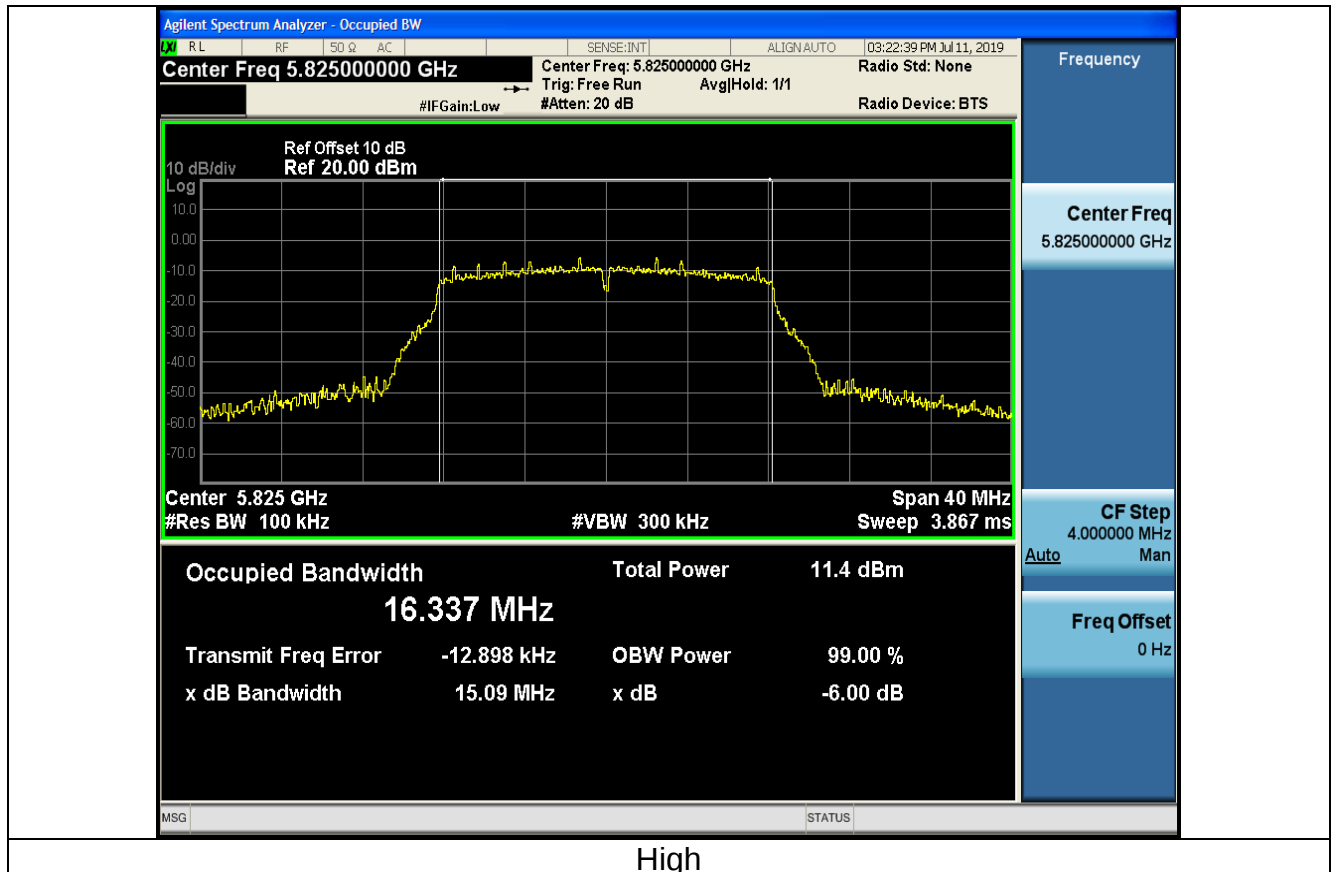
802.11a

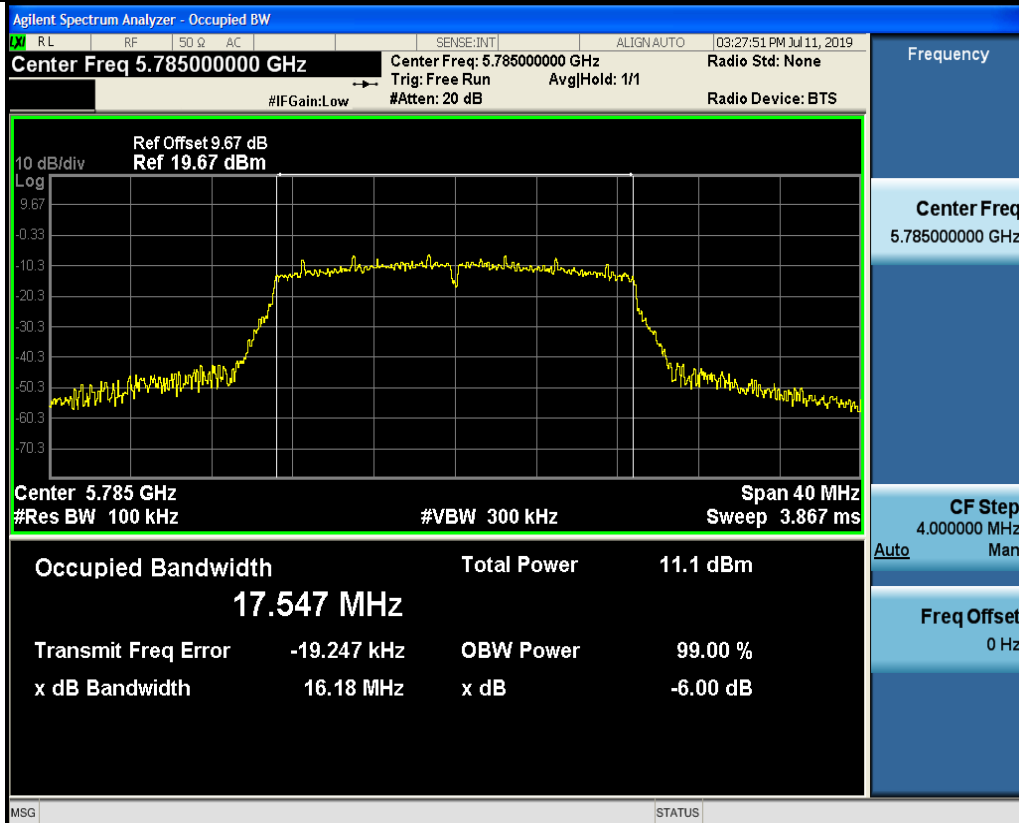


Low

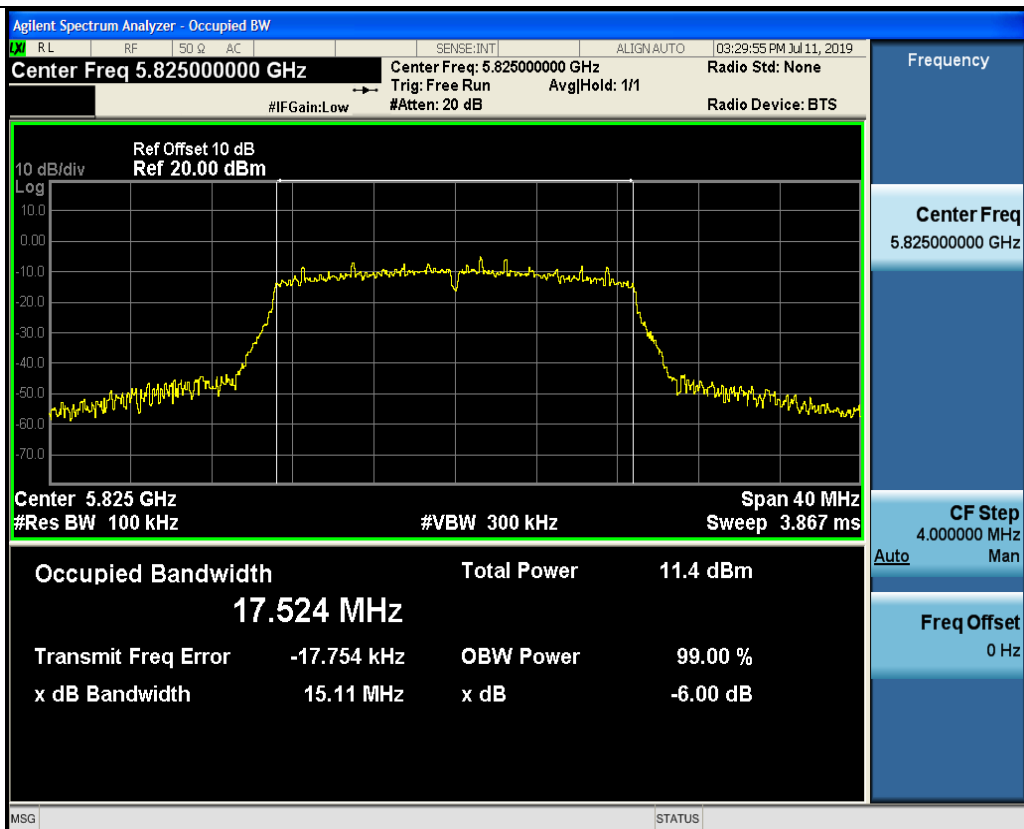


Mid





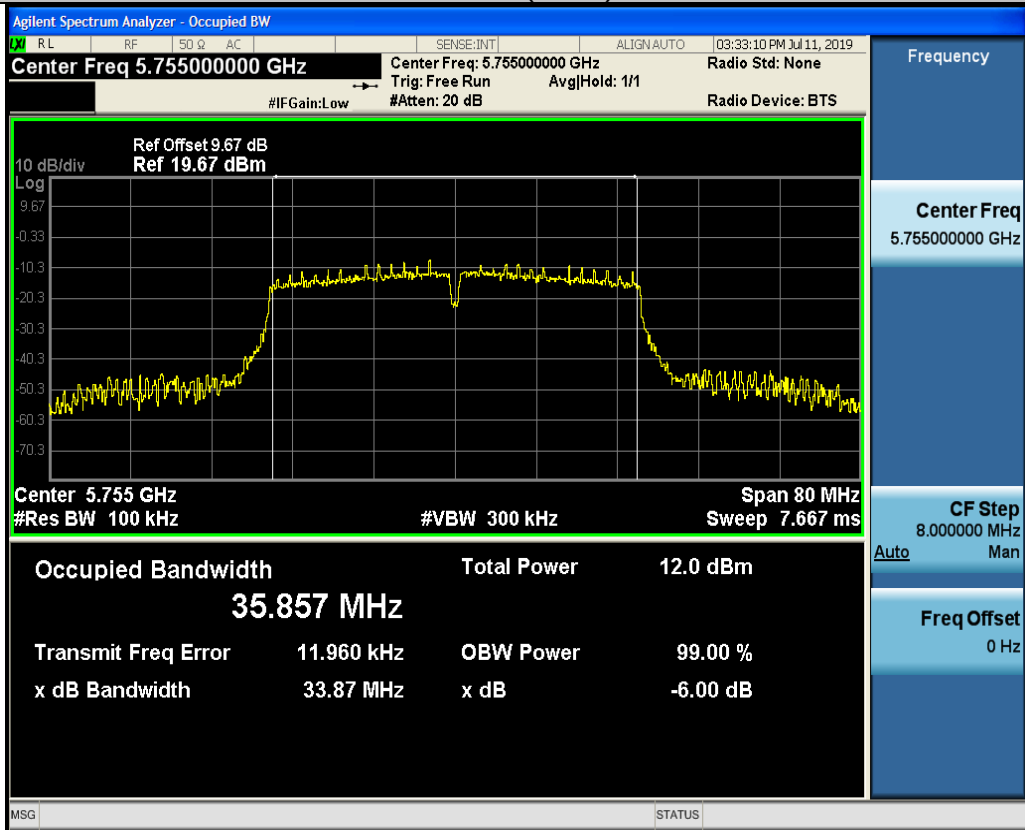
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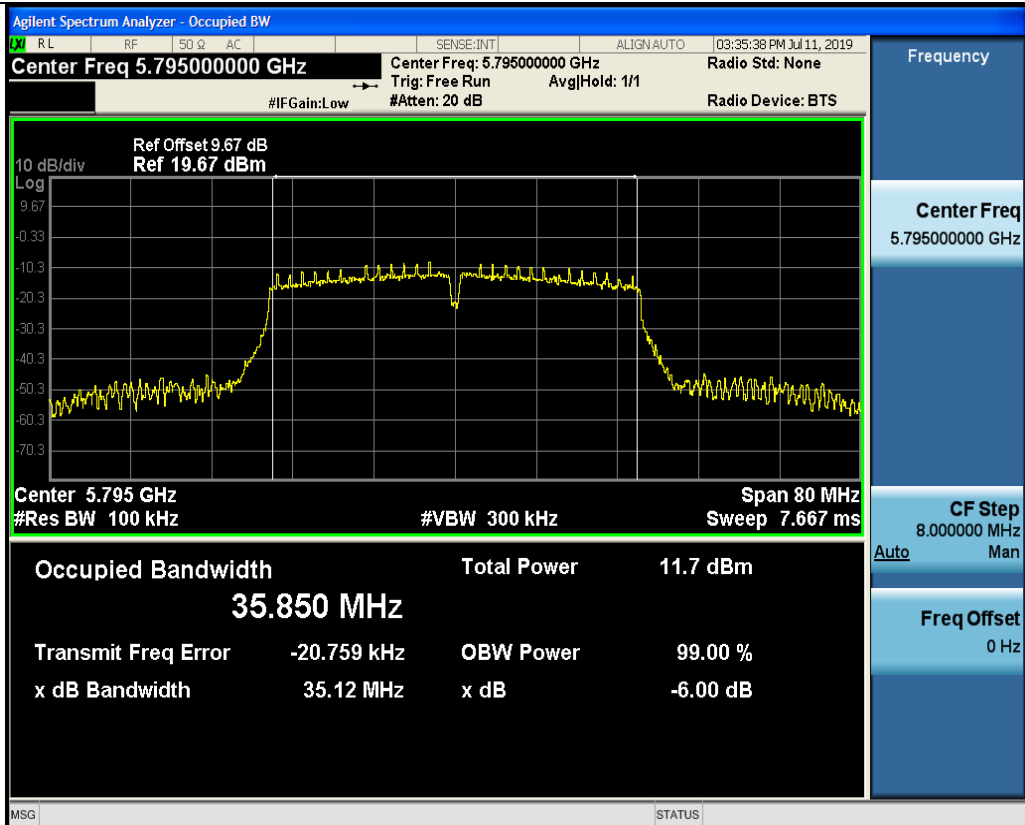
High



802.11n(HT40)



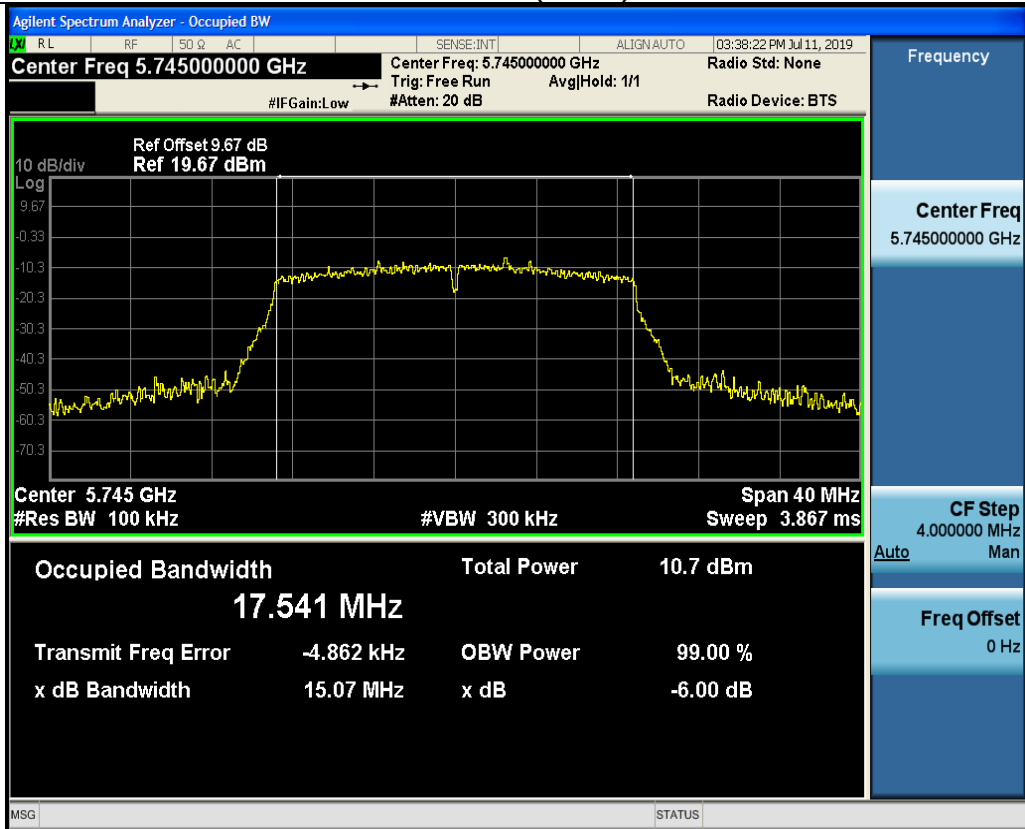
Low



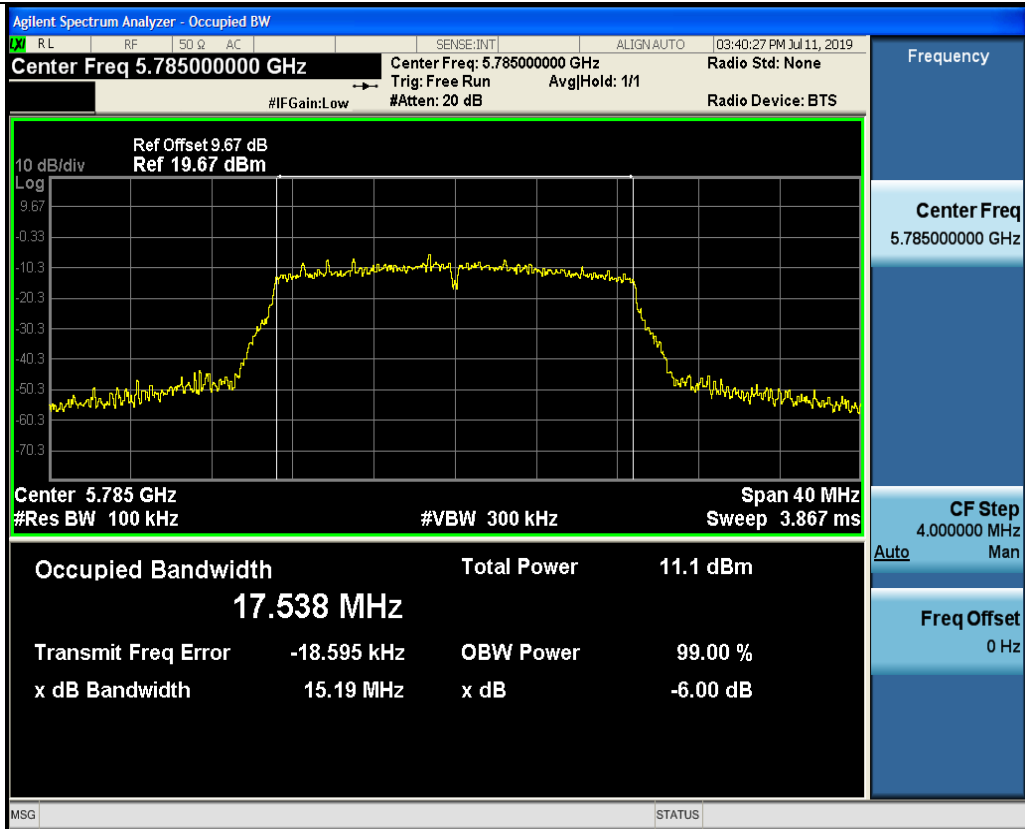
High



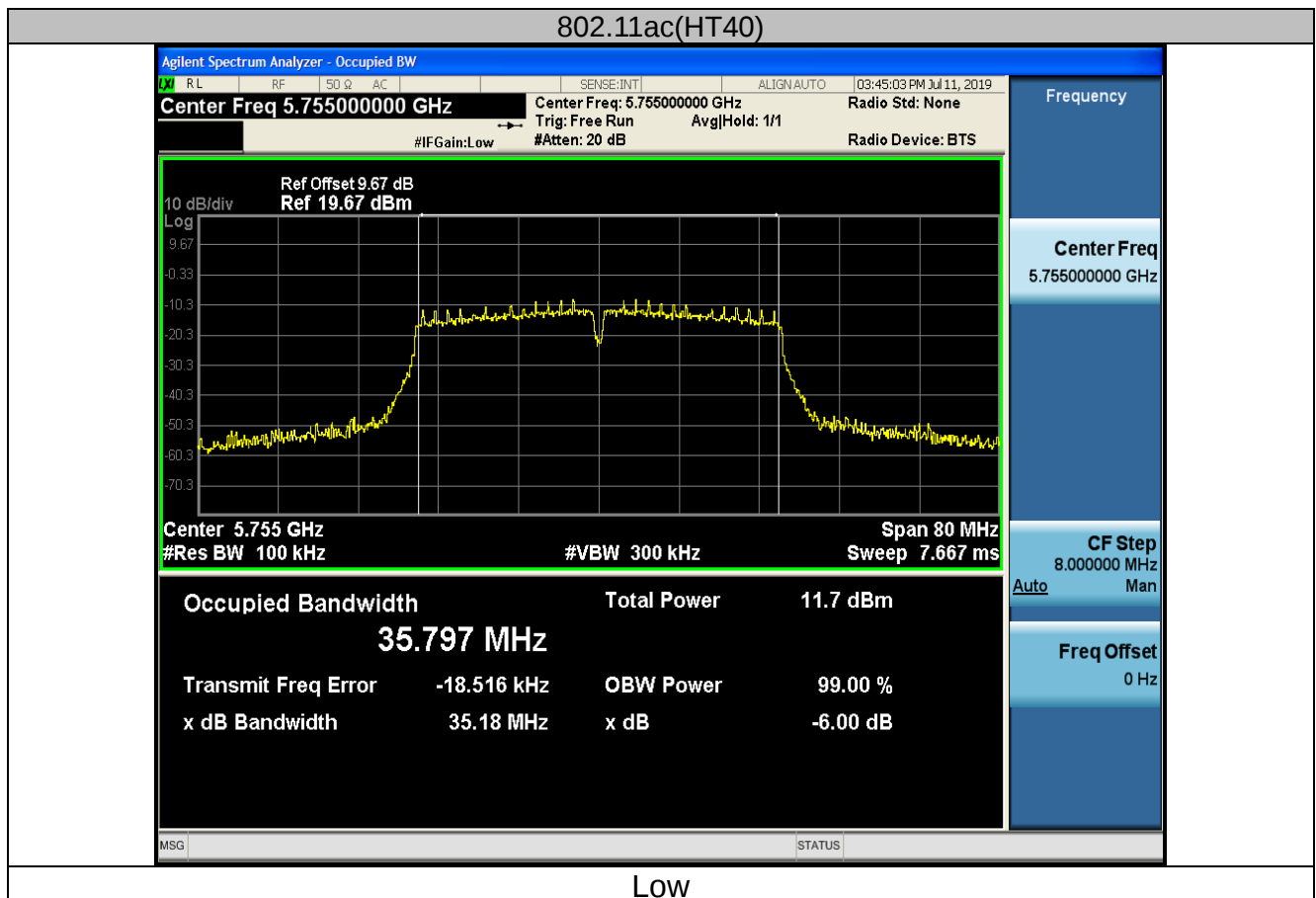
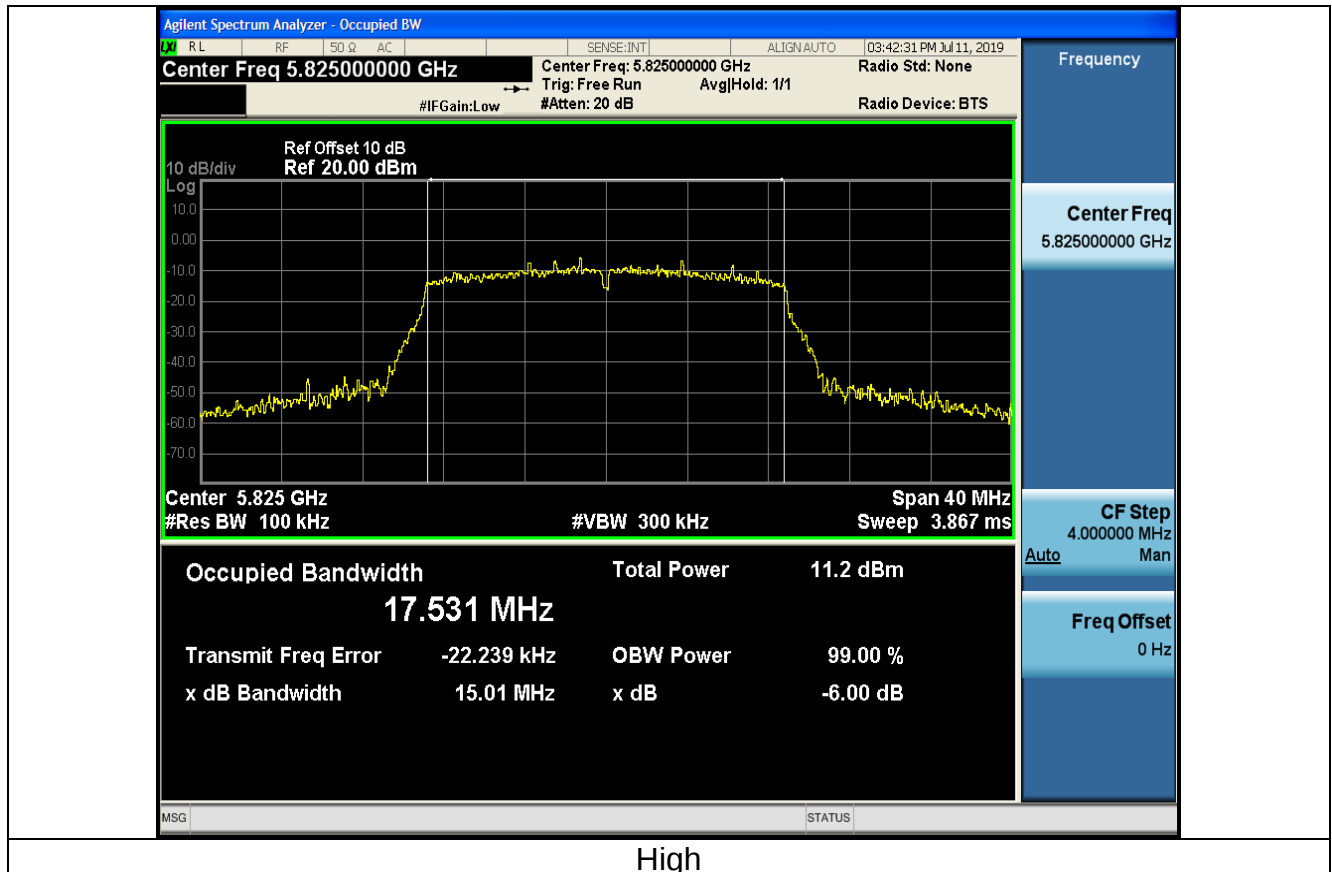
802.11ac(HT20)

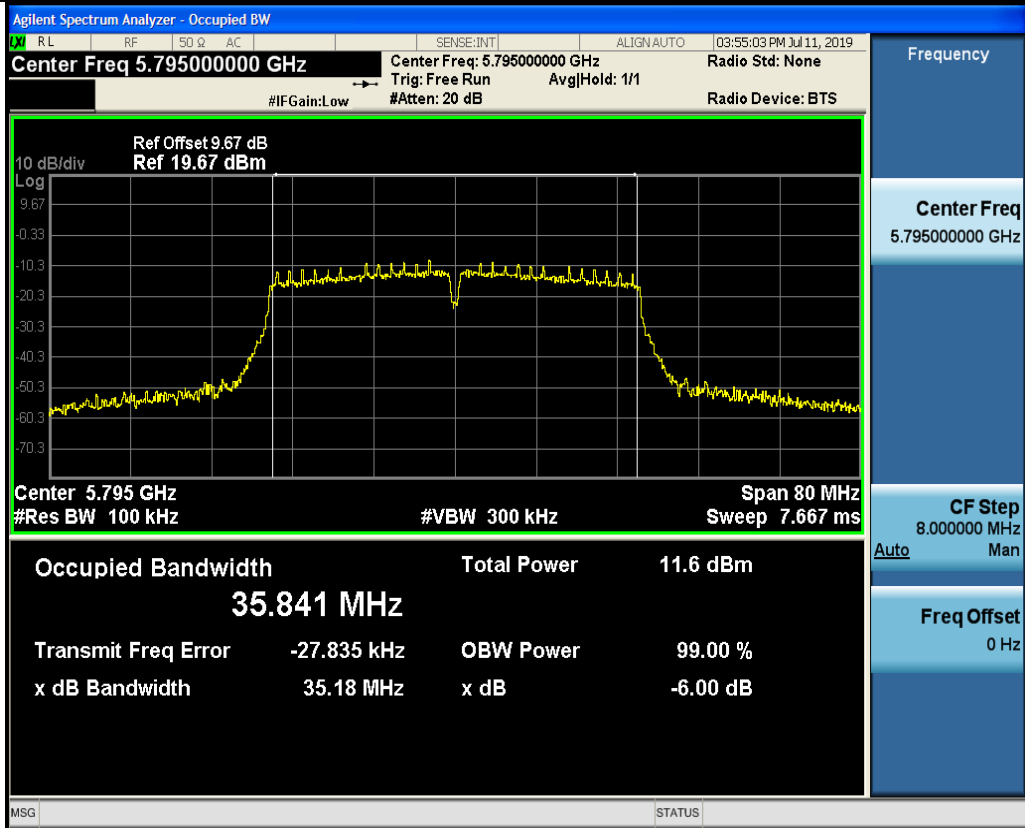


Low



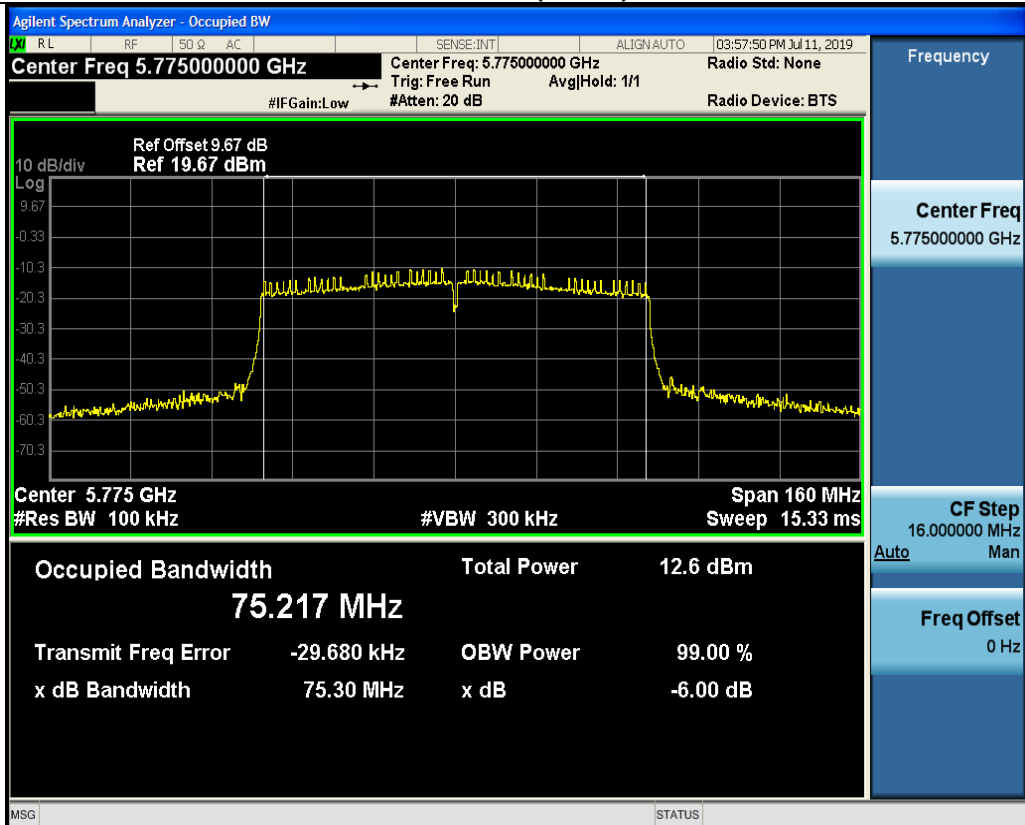
Mid





High

802.11ac(HT80)





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:	 Spectrum Analyzer EUT
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 $RBW = 1\% \text{ EBW}$, $VBW \geq 3RBW$, 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 (9KHz-40GHz)	Tonscend	170660	N/A	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

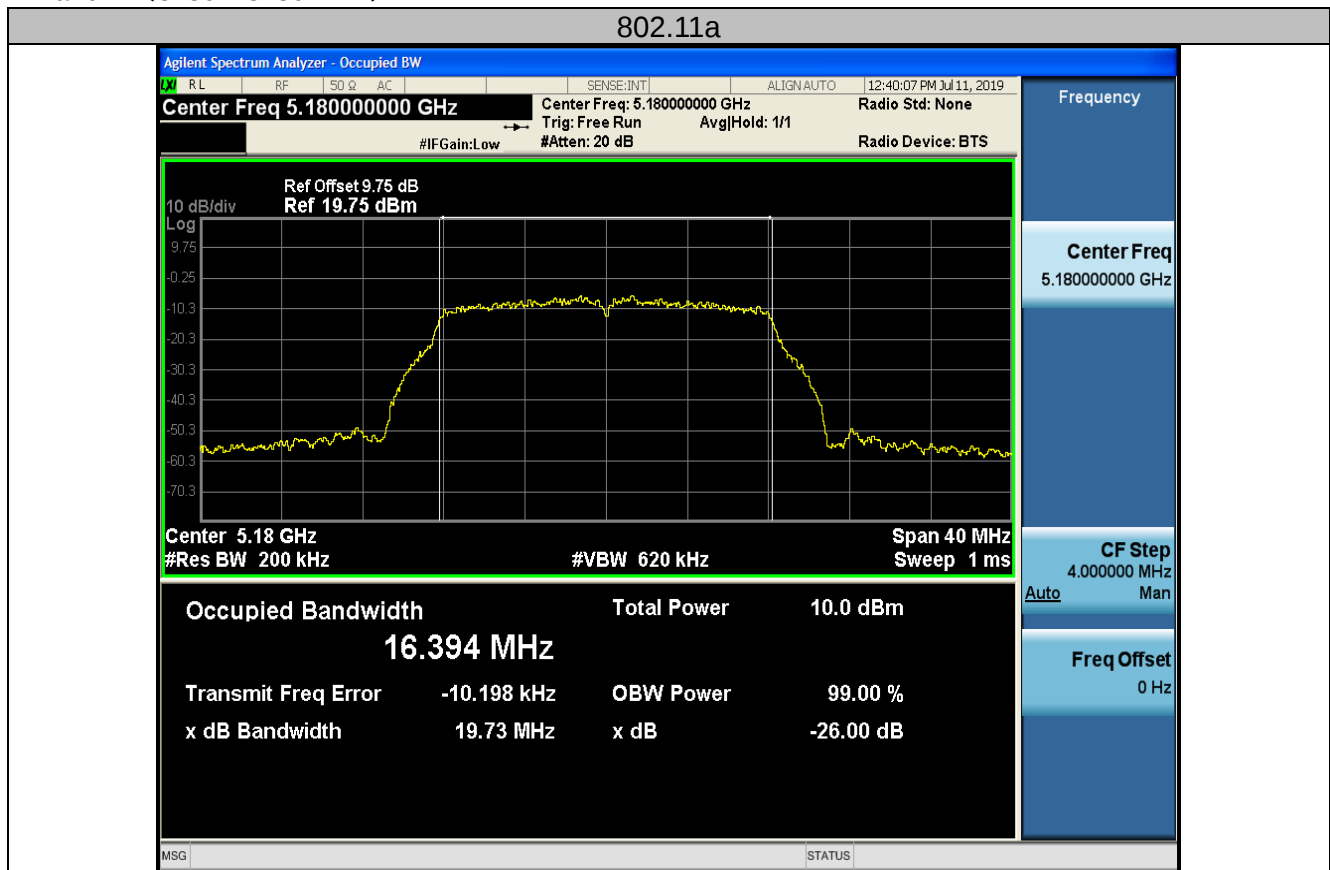
Band I

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
11a	CH36	5180	19.73	PASS
11a	CH40	5200	19.81	PASS
11a	CH48	5240	19.70	PASS
11n(HT20)	CH36	5180	20.12	PASS
11n(HT20)	CH40	5200	20.04	PASS
11n(HT20)	CH48	5240	20.26	PASS
11n(HT40)	CH38	5190	40.17	PASS
11n(HT40)	CH46	5230	40.04	PASS
11ac(HT20)	CH36	5180	20.00	PASS
11ac(HT20)	CH40	5200	20.09	PASS
11ac(HT20)	CH48	5240	20.23	PASS
11ac(HT40)	CH38	5190	40.39	PASS
11ac(HT40)	CH46	5230	40.08	PASS
11ac(HT80)	CH42	5210	80.58	PASS

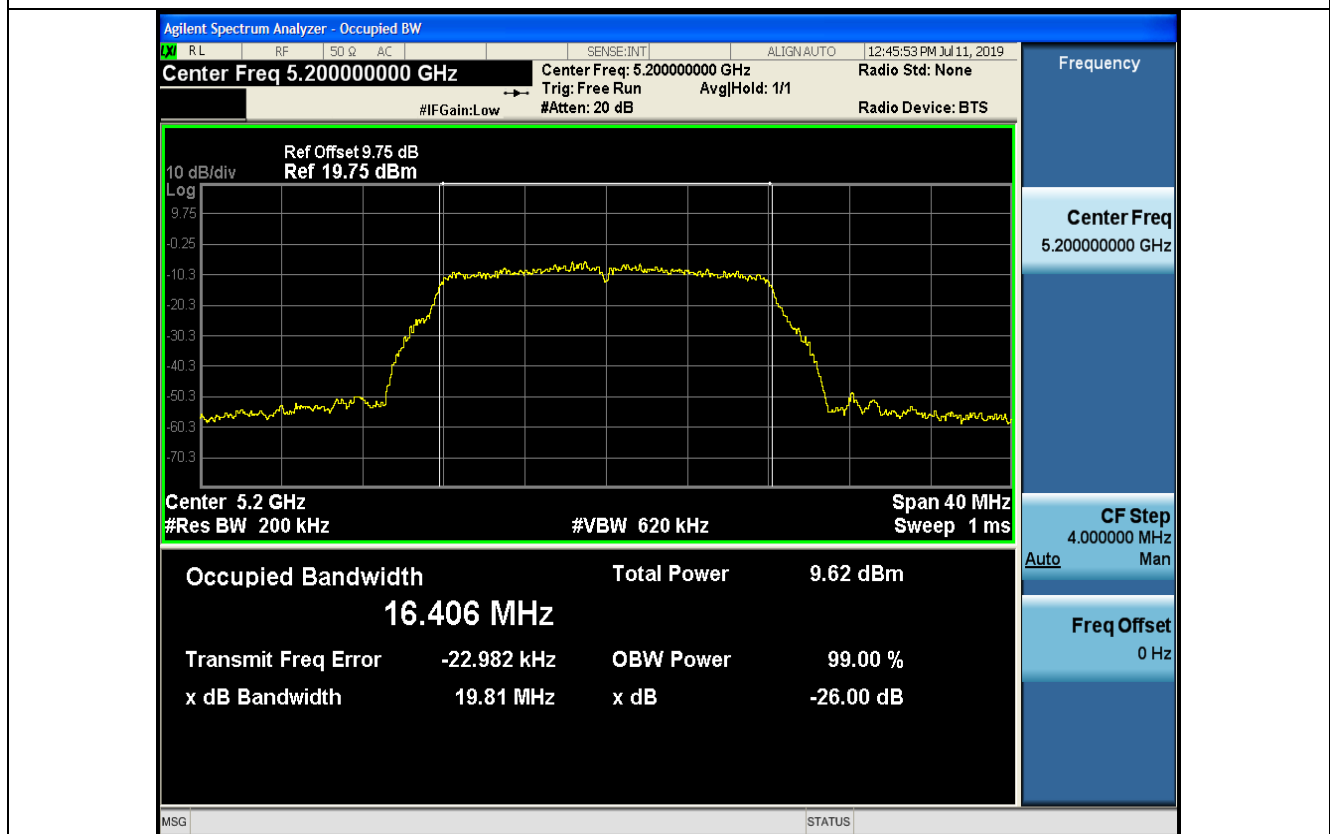
Test plots as follows:



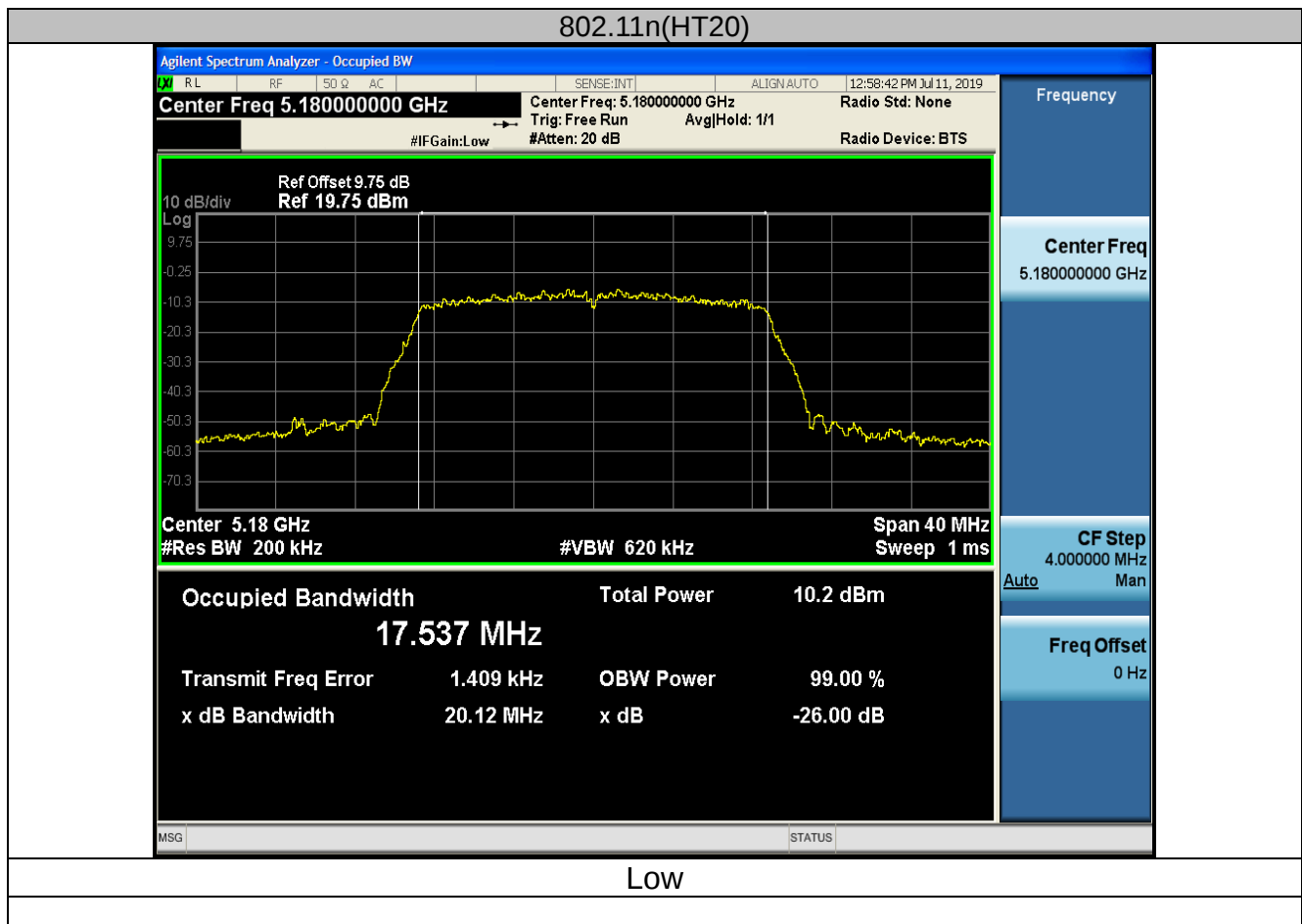
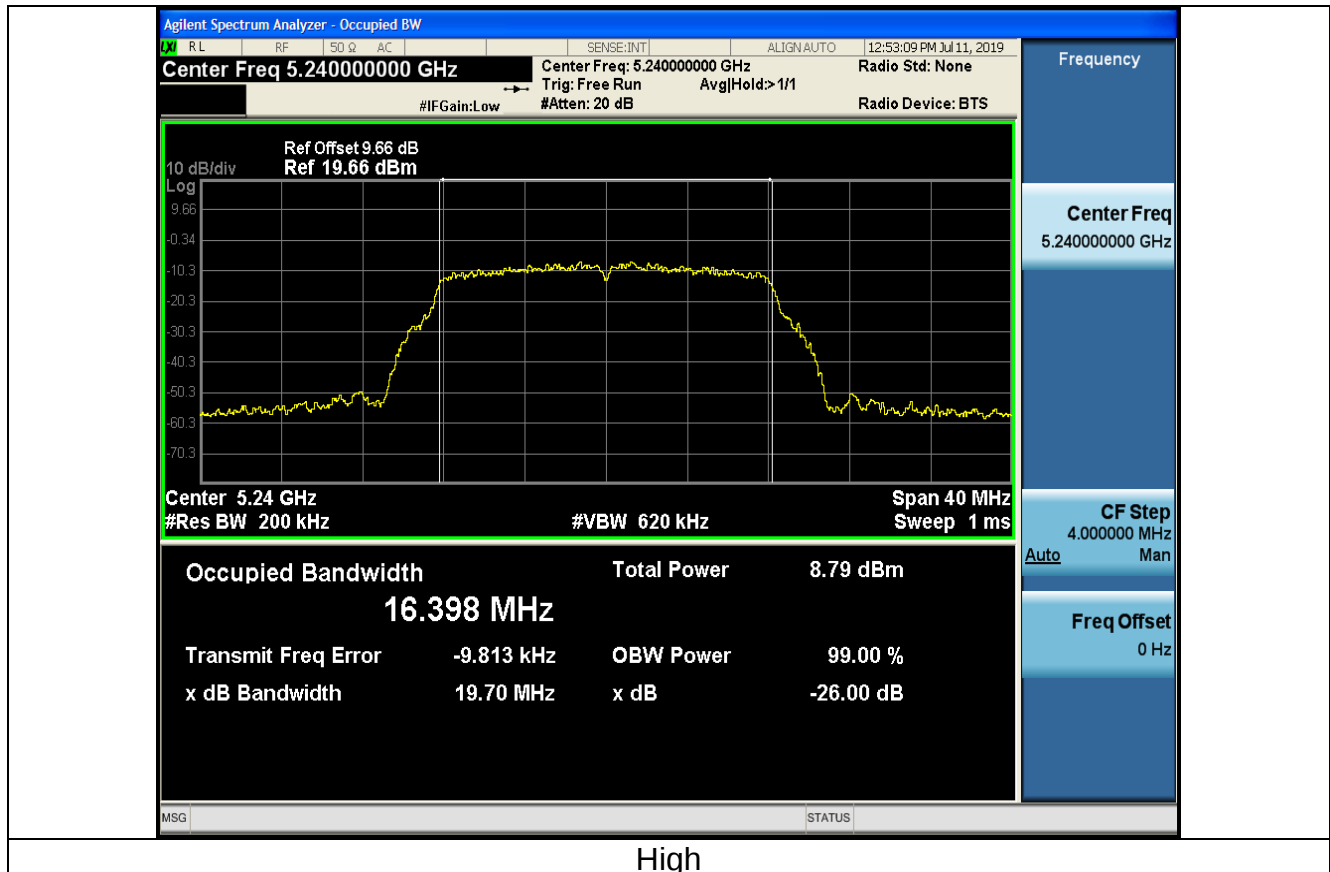
Band I (5150 – 5250 MHz)



Low

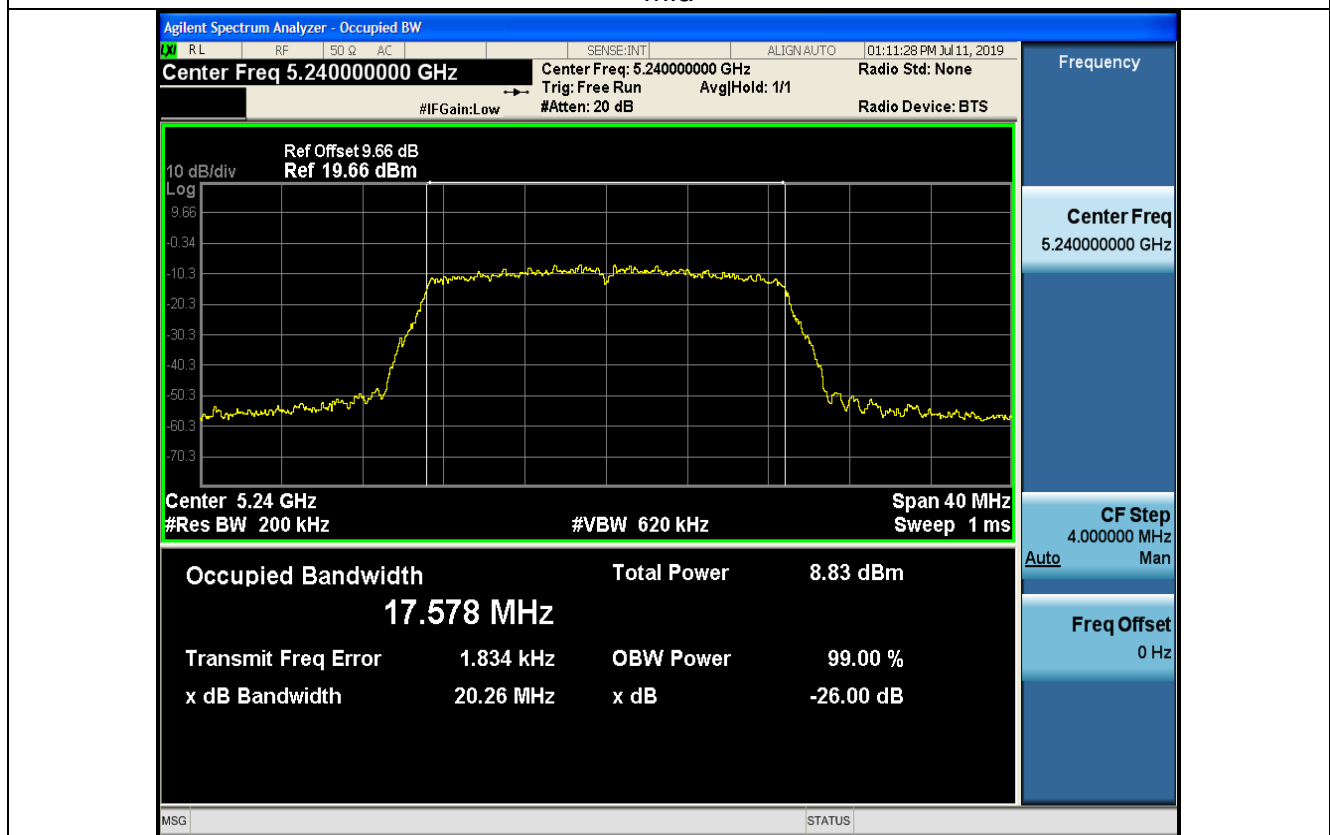


Mid





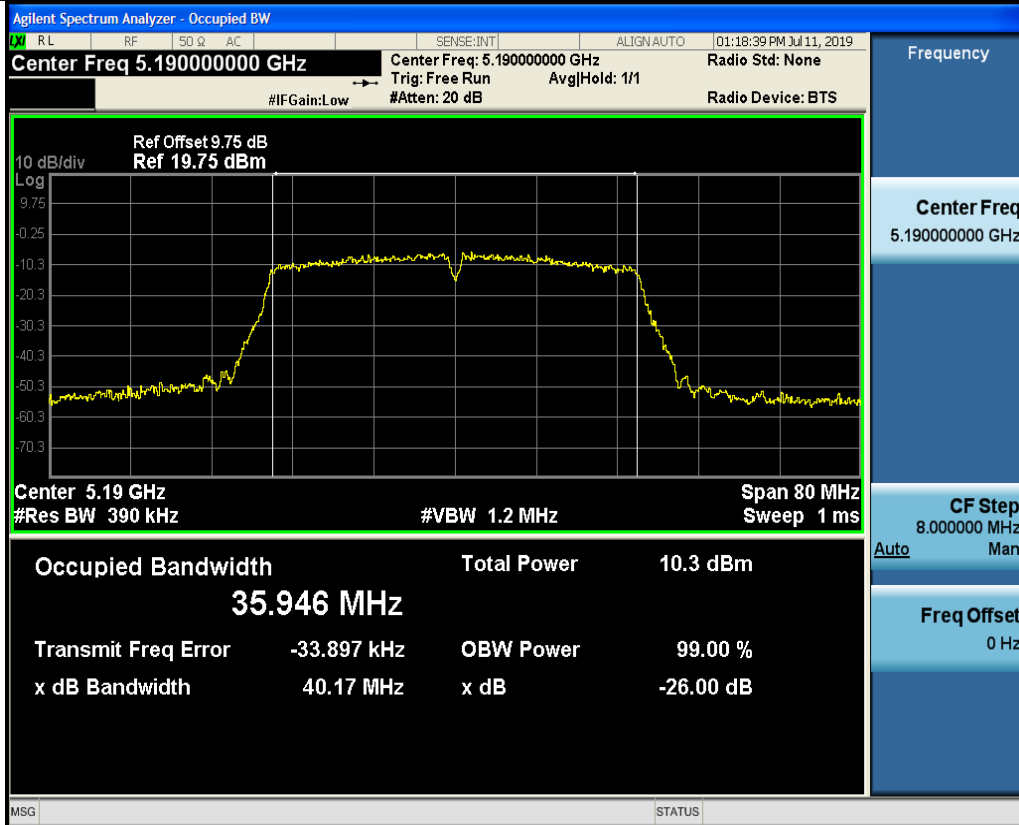
Mid



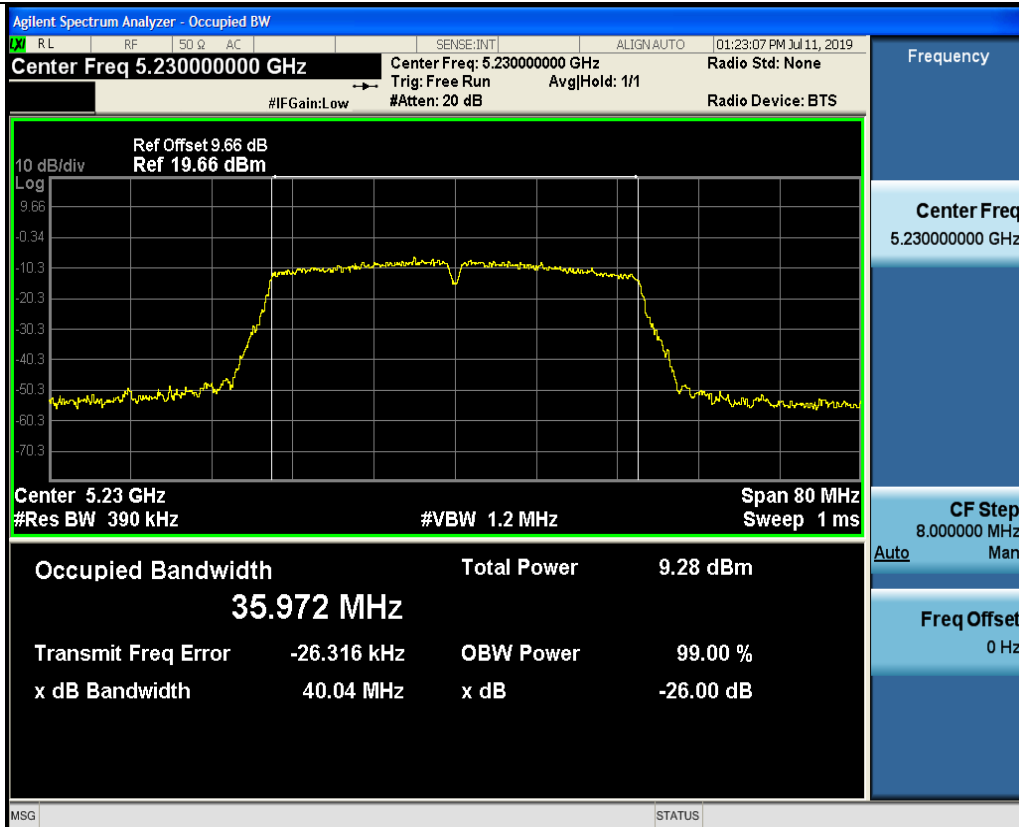
High



802.11n(HT40)



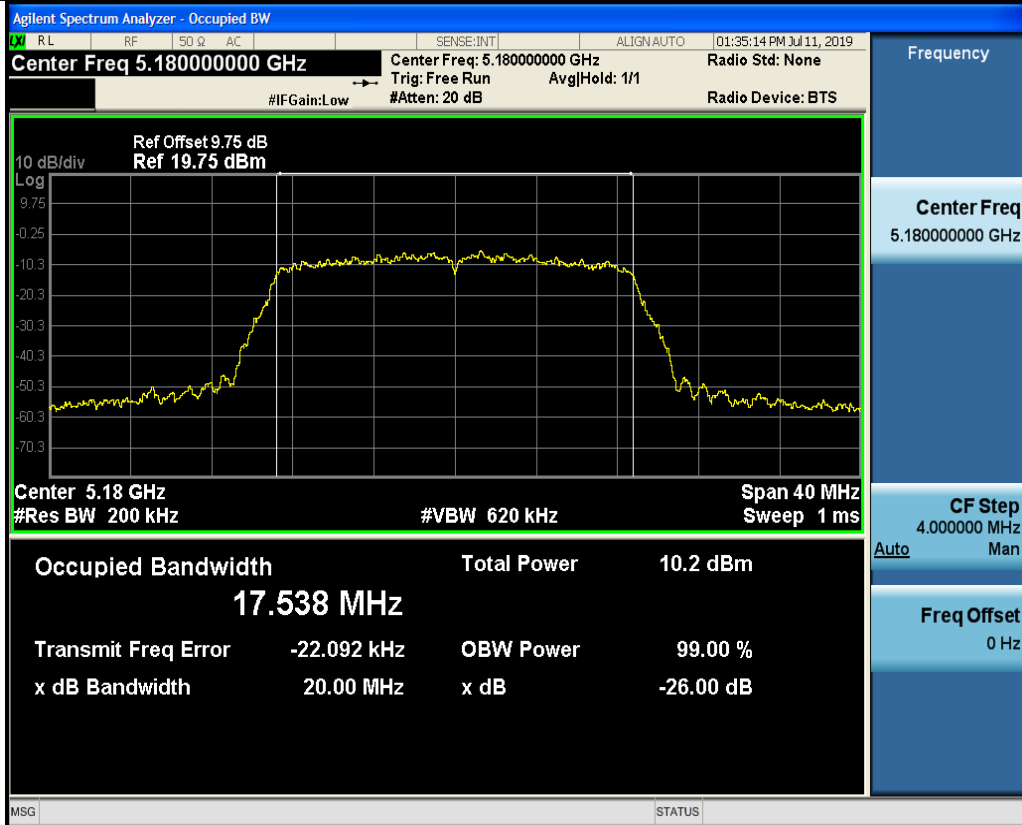
Low



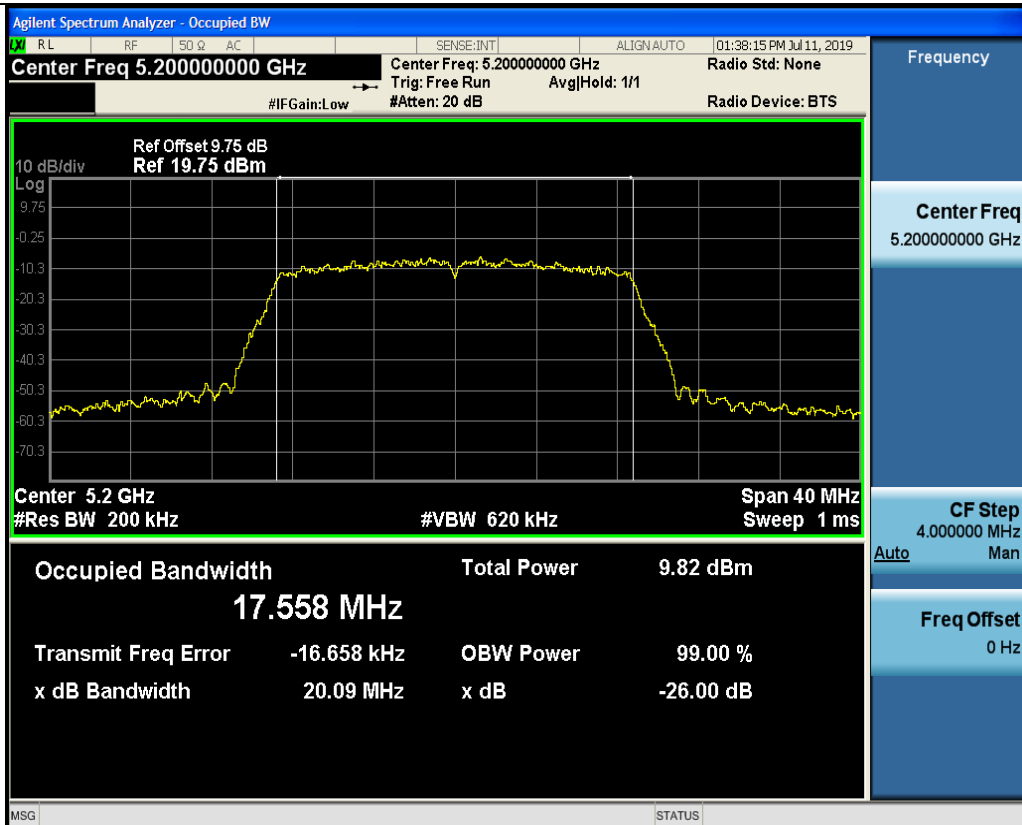
High



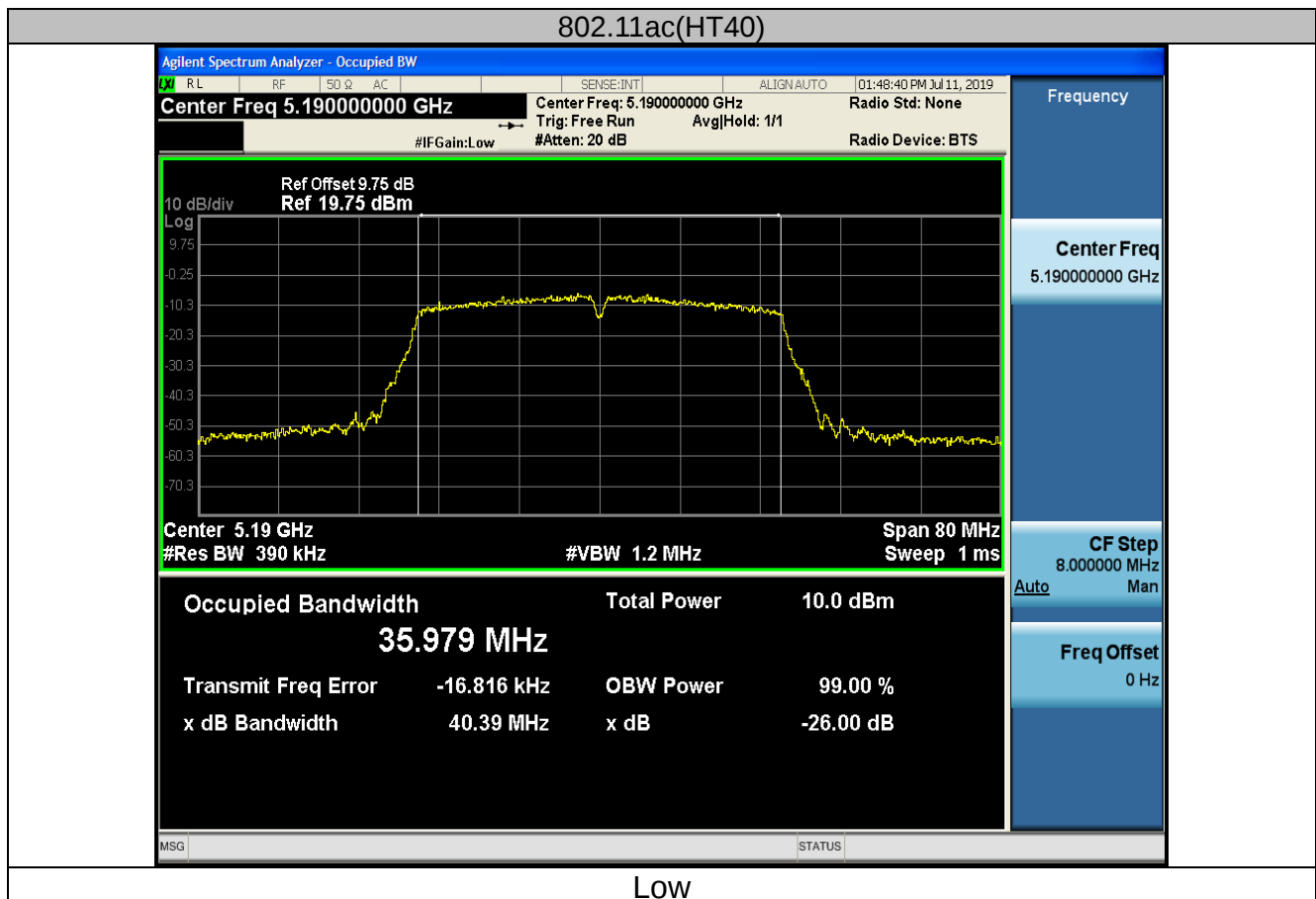
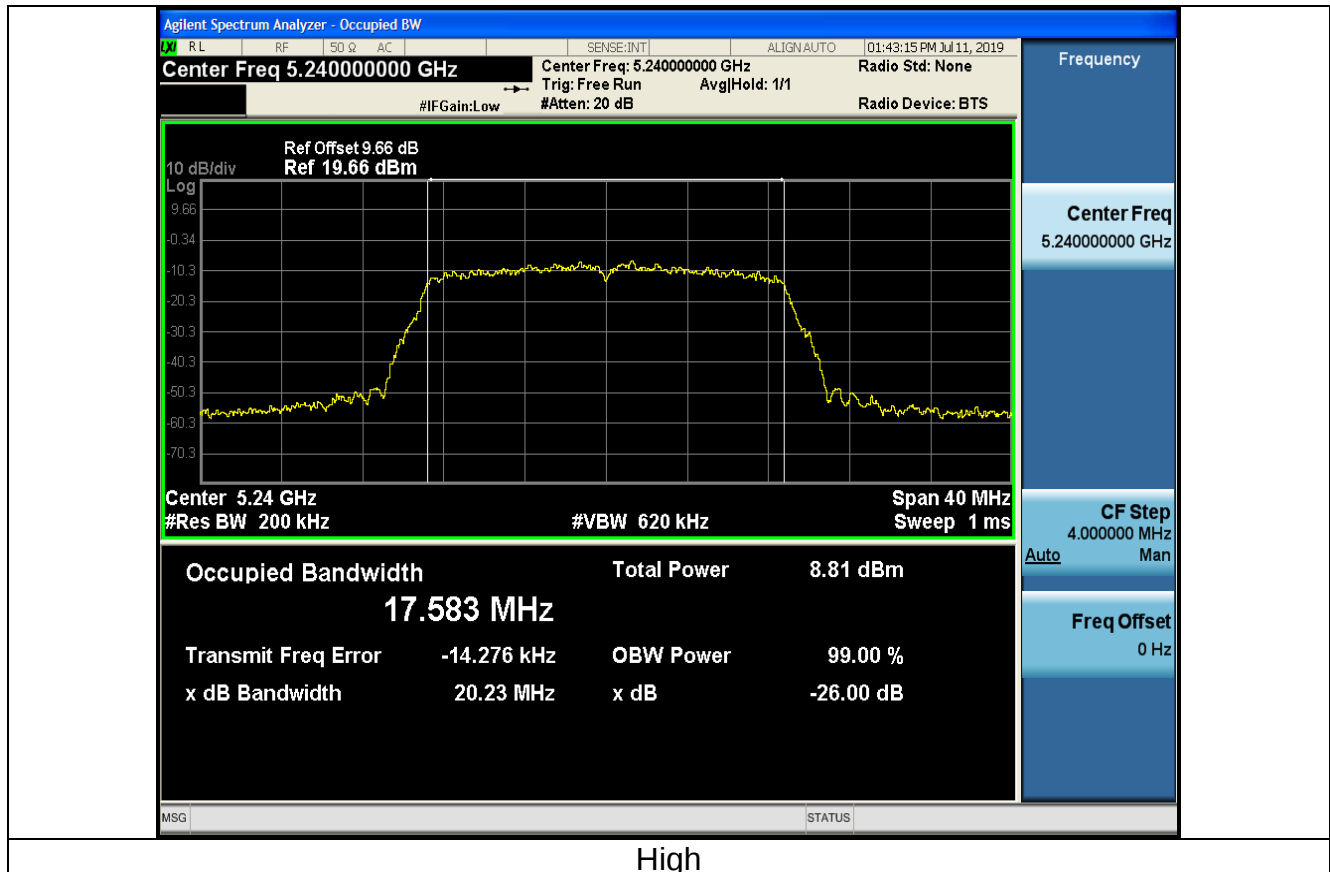
802.11ac(HT20)

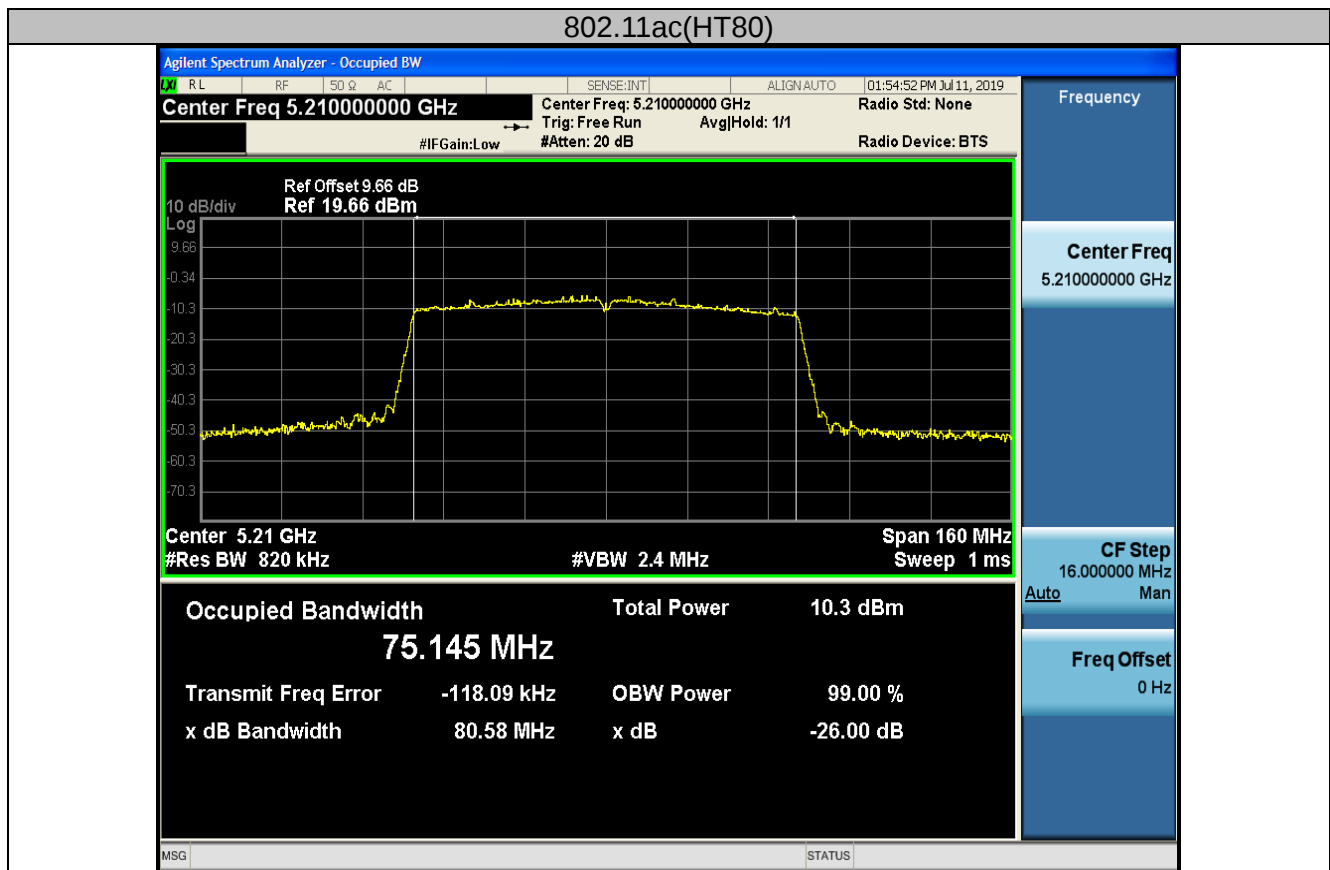
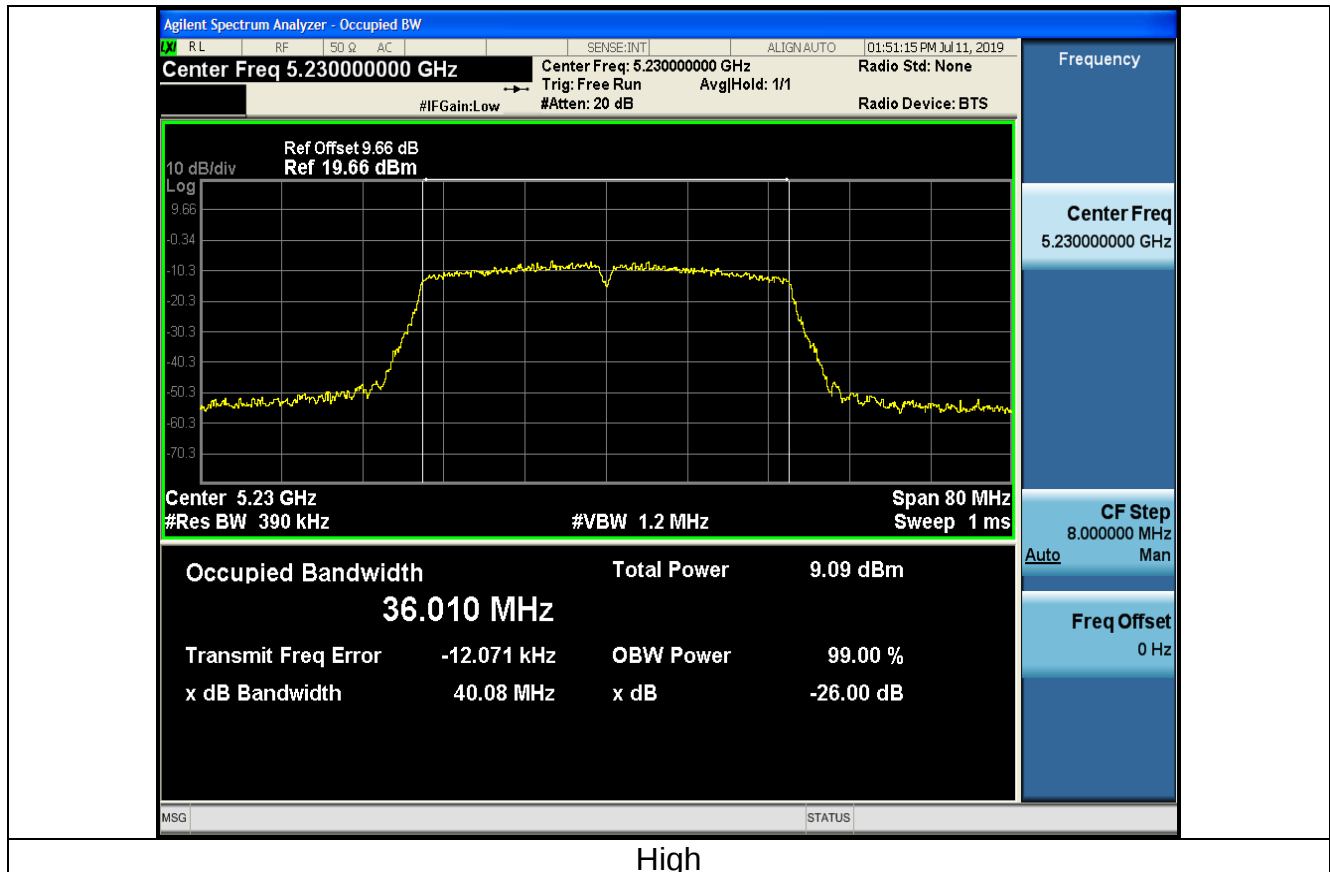


Low



Mid







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:	$\leq 11.00\text{dBm/MHz}$ for Band I 5150MHz-5250MHz $\leq 30.00\text{dBm/500KHz}$ 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:	 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 = 510 kHz/1 MHz, VBW $\geq 3 \times$ 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 (9KHz-40GHz)	Tonscend	170660	N/A	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	-1.54	0	-1.54	11	PASS
11a	CH40	-1.87	0	-1.87	11	PASS
11a	CH48	-2.71	0	-2.71	11	PASS
11n(HT20)	CH36	-1.81	0	-1.81	11	PASS
11n(HT20)	CH40	-1.79	0	-1.79	11	PASS
11n(HT20)	CH48	-2.65	0	-2.65	11	PASS
11n(HT40)	CH38	-3.74	0	-3.74	11	PASS
11n(HT40)	CH46	-5.23	0	-5.23	11	PASS
11ac(HT20)	CH36	-1.39	0	-1.39	11	PASS
11ac(HT20)	CH40	-1.53	0	-1.53	11	PASS
11ac(HT20)	CH48	-3.34	0	-3.34	11	PASS
11ac(HT40)	CH38	-4.54	0	-4.54	11	PASS
11ac(HT40)	CH46	-5.57	0	-5.57	11	PASS
11ac(HT80)	CH42	-7.18	0	-7.18	11	PASS

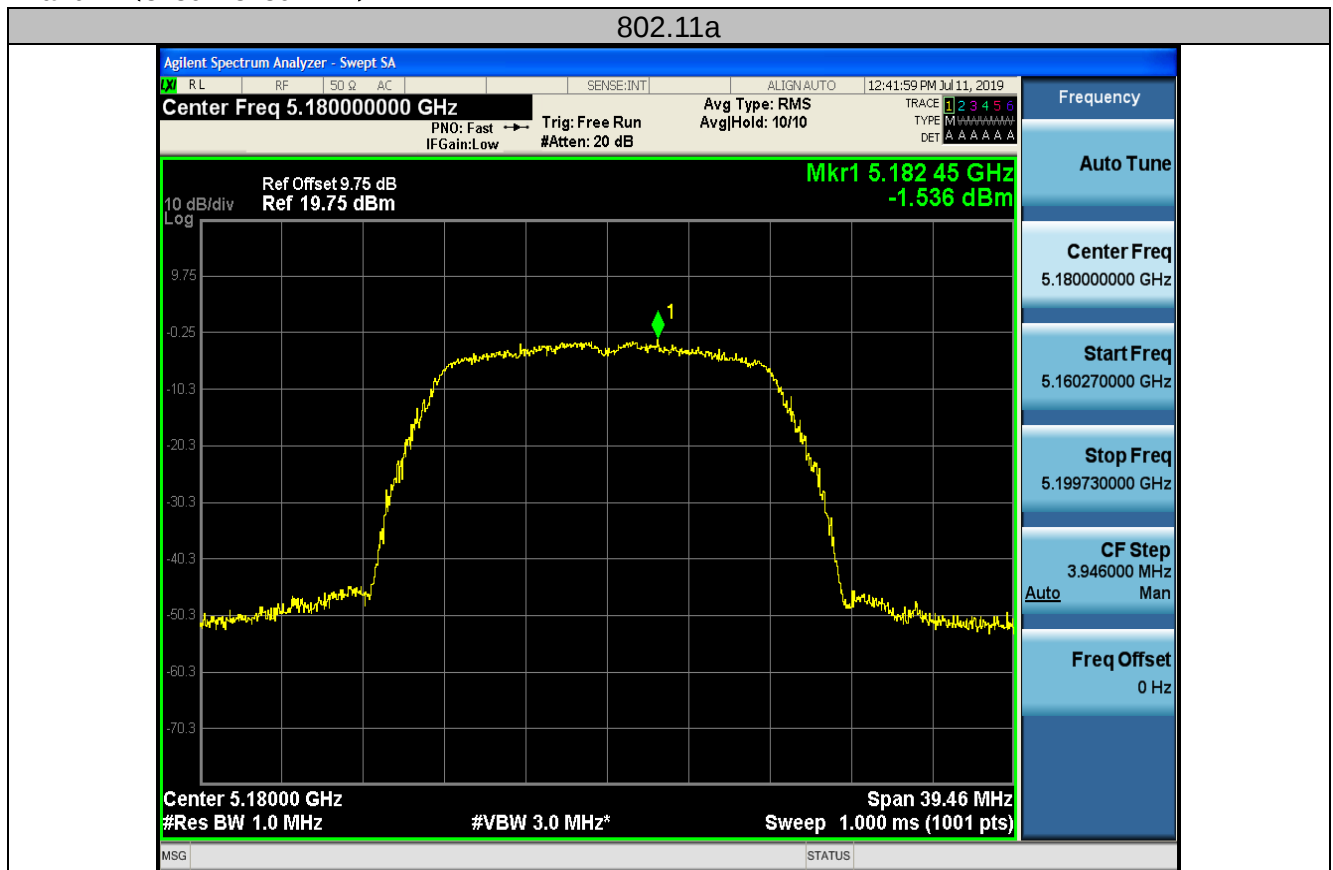


Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Level [dBm/500kHz]	10log(1/x) Factor[dB]	Power Spectral Density	Limit (dBm/500kHz)	Result
11a	CH149	-2.36	0	-2.36	30	PASS
11a	CH157	-2.00	0	-2.00	30	PASS
11a	CH161	-1.67	0	-1.67	30	PASS
11n(HT20)	CH149	-3.09	0	-3.09	30	PASS
11n(HT20)	CH157	-2.53	0	-2.53	30	PASS
11n(HT20)	CH161	-2.31	0	-2.31	30	PASS
11n(HT40)	CH151	-4.94	0	-4.94	30	PASS
11n(HT40)	CH159	-5.19	0	-5.19	30	PASS
11ac(HT20)	CH149	-2.84	0	-2.84	30	PASS
11ac(HT20)	CH157	-2.98	0	-2.98	30	PASS
11ac(HT20)	CH161	-2.15	0	-2.15	30	PASS
11ac(HT40)	CH151	-5.36	0	-5.36	30	PASS
11ac(HT40)	CH159	-5.46	0	-5.46	30	PASS
11ac(HT80)	CH155	-7.67	0	-7.67	30	PASS

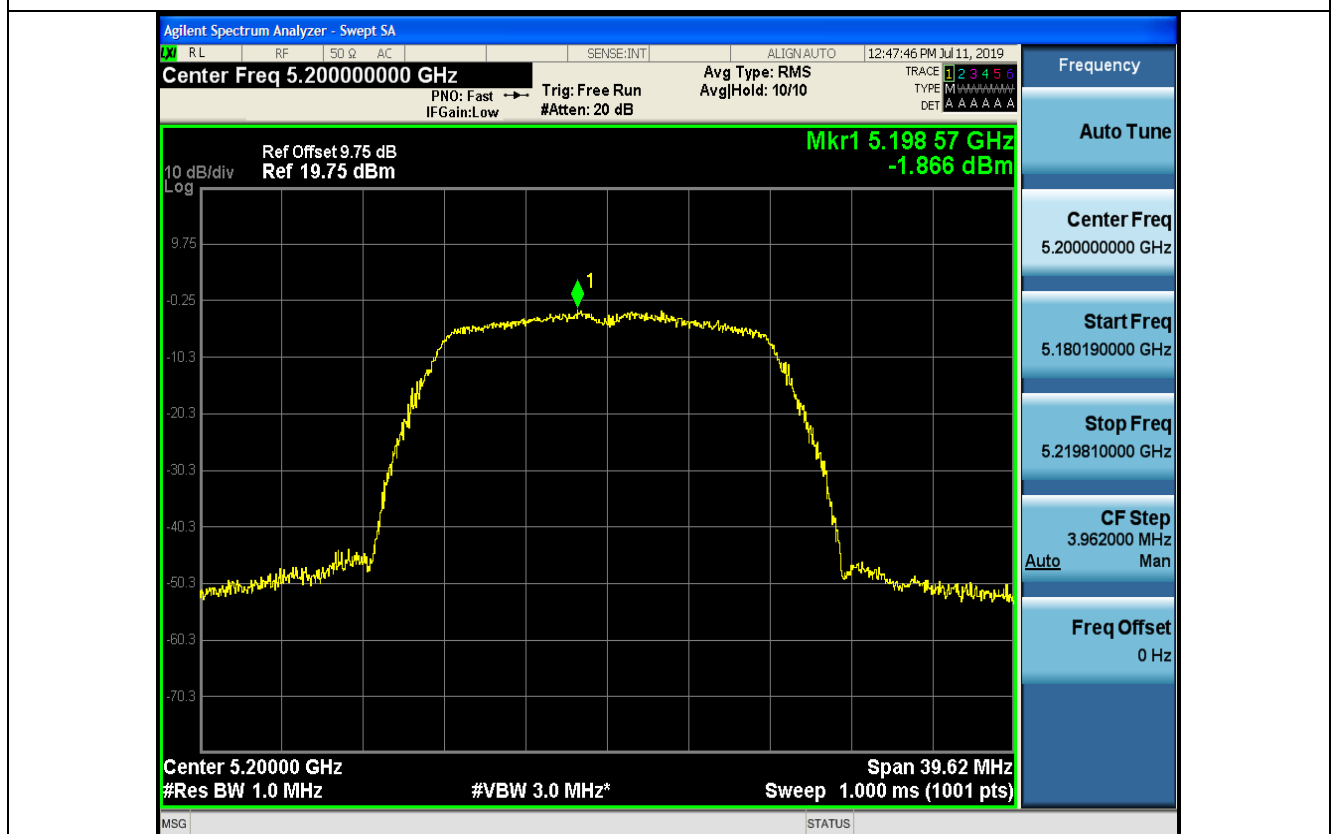
Test plots as follows:



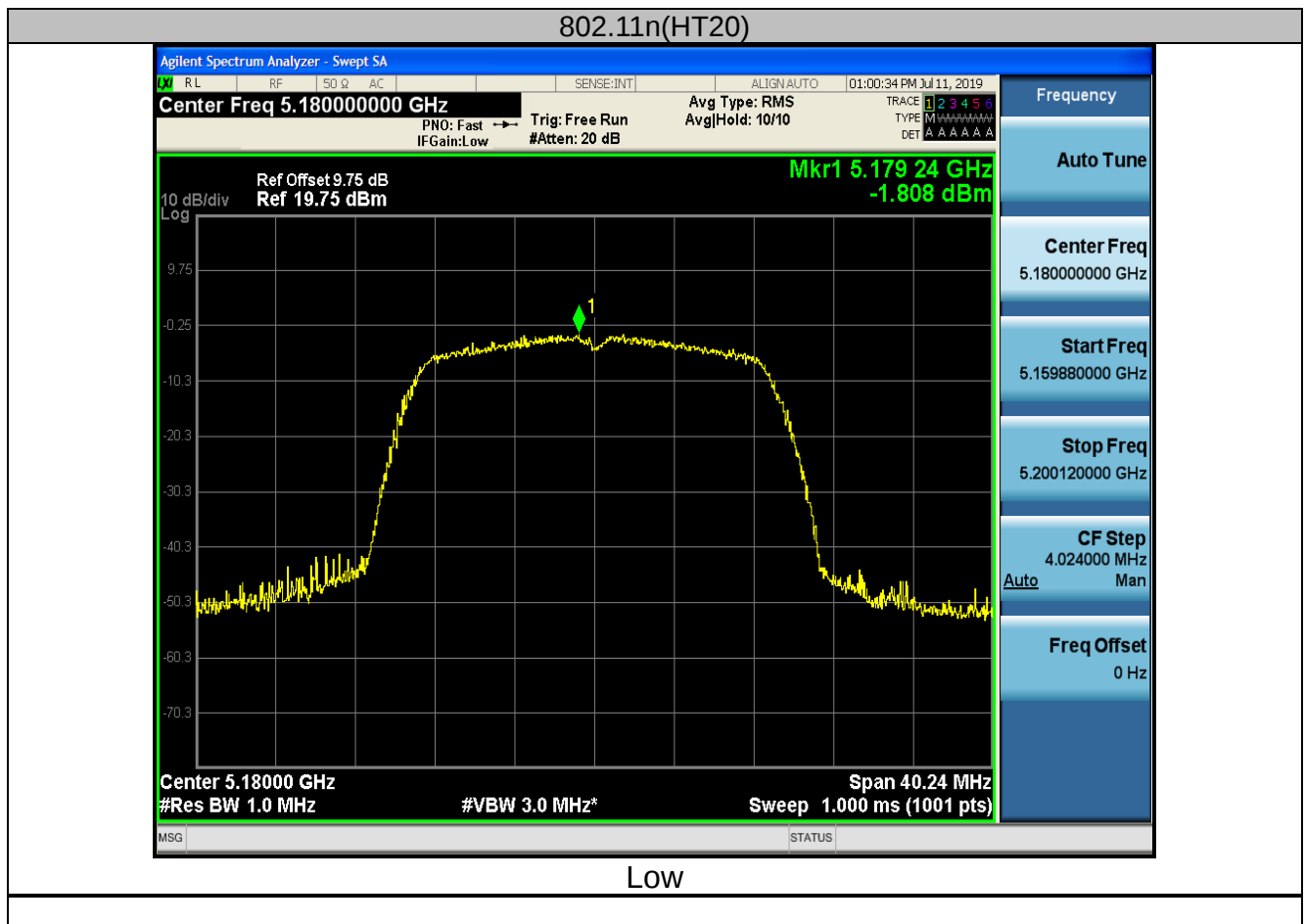
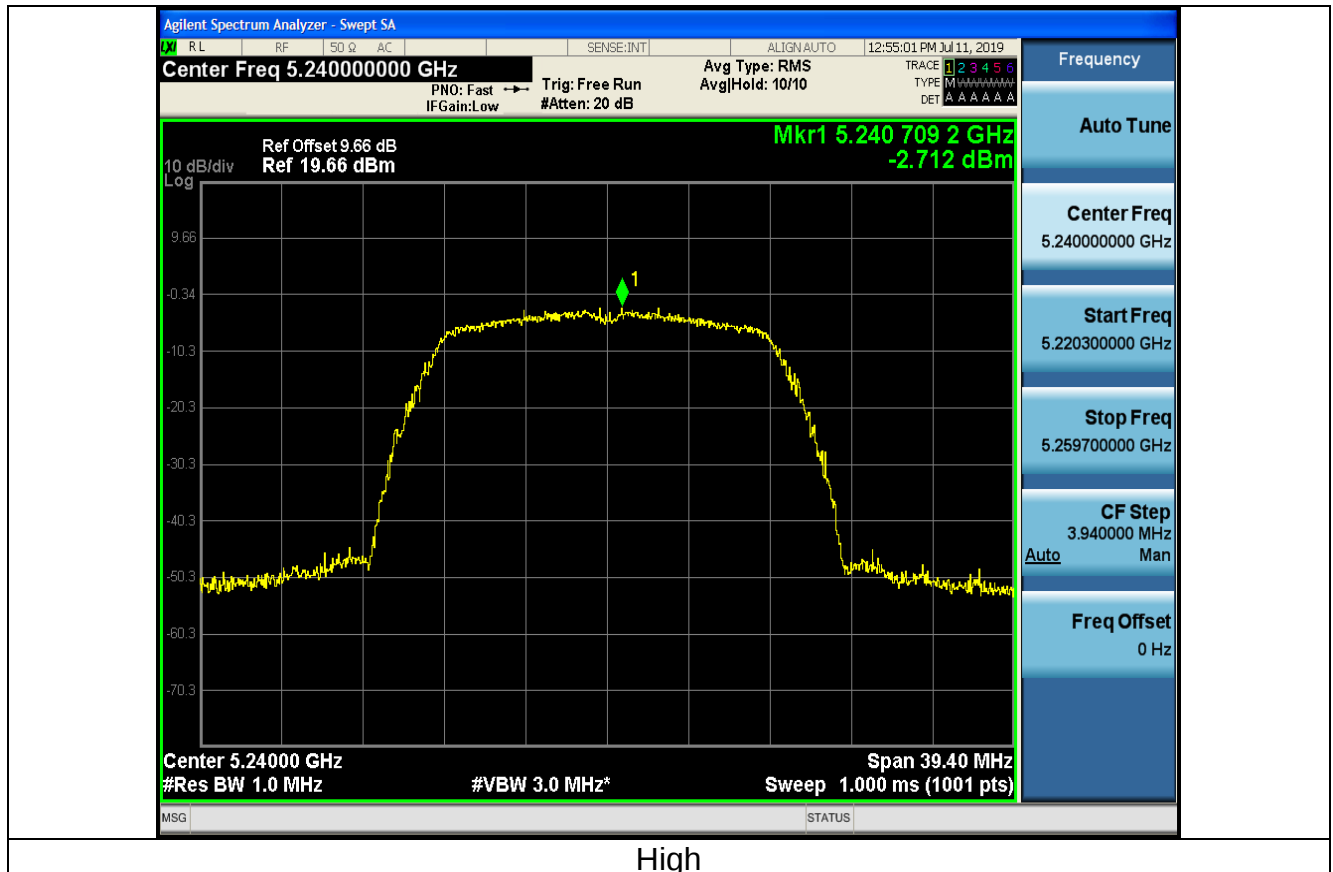
Band I (5150 – 5250 MHz)

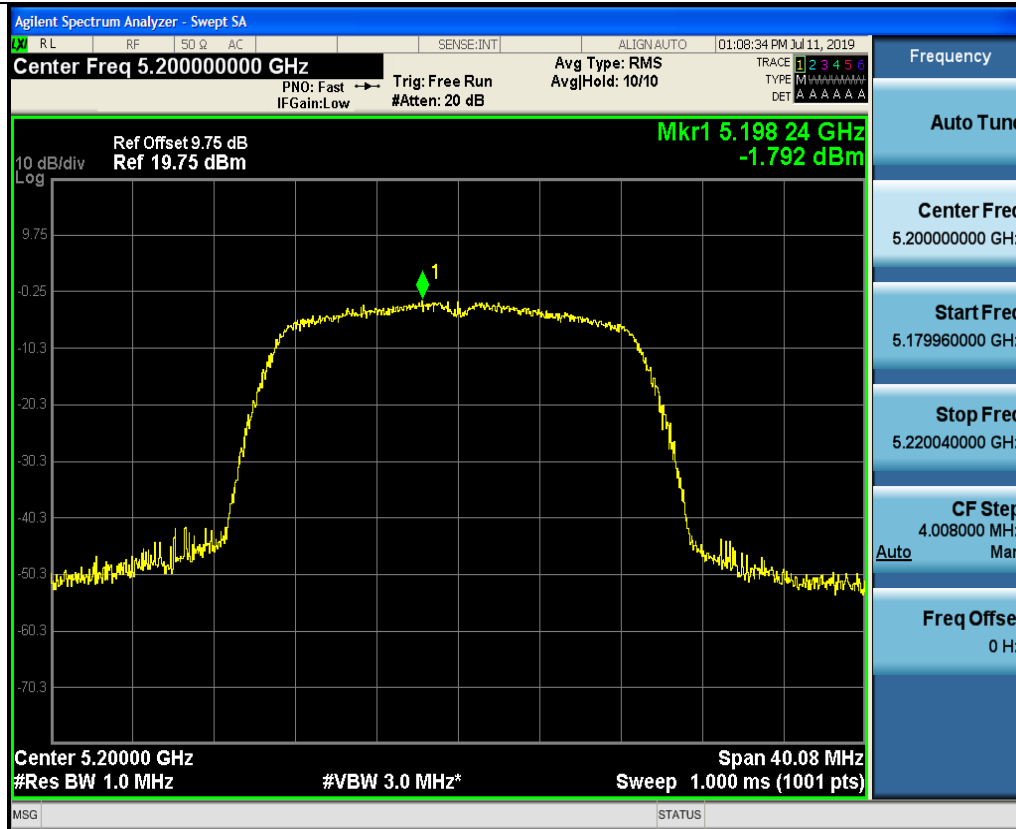


Low

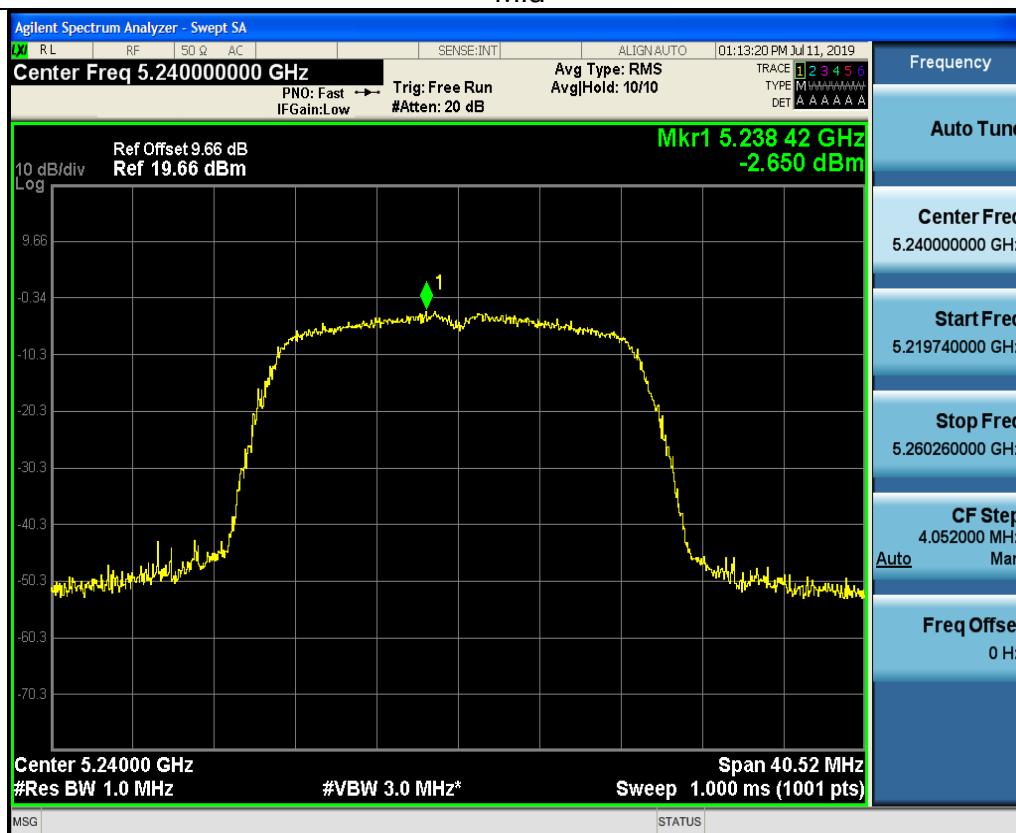


Mid





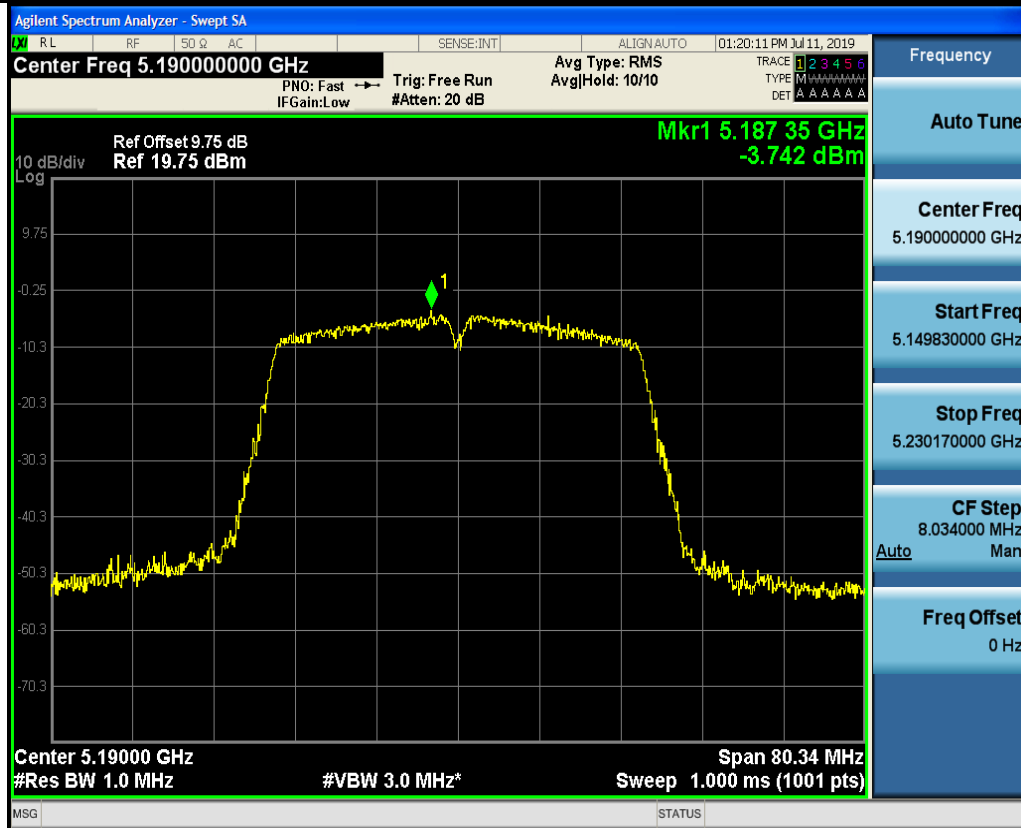
Mid



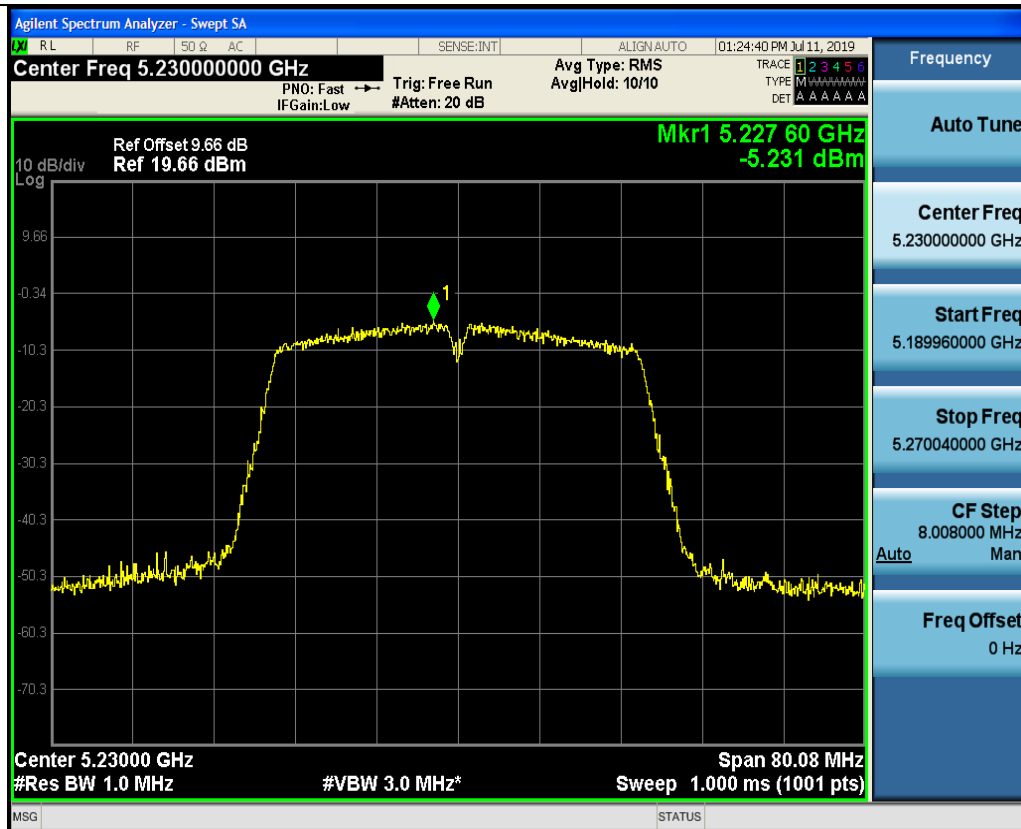
High



802.11n(HT40)



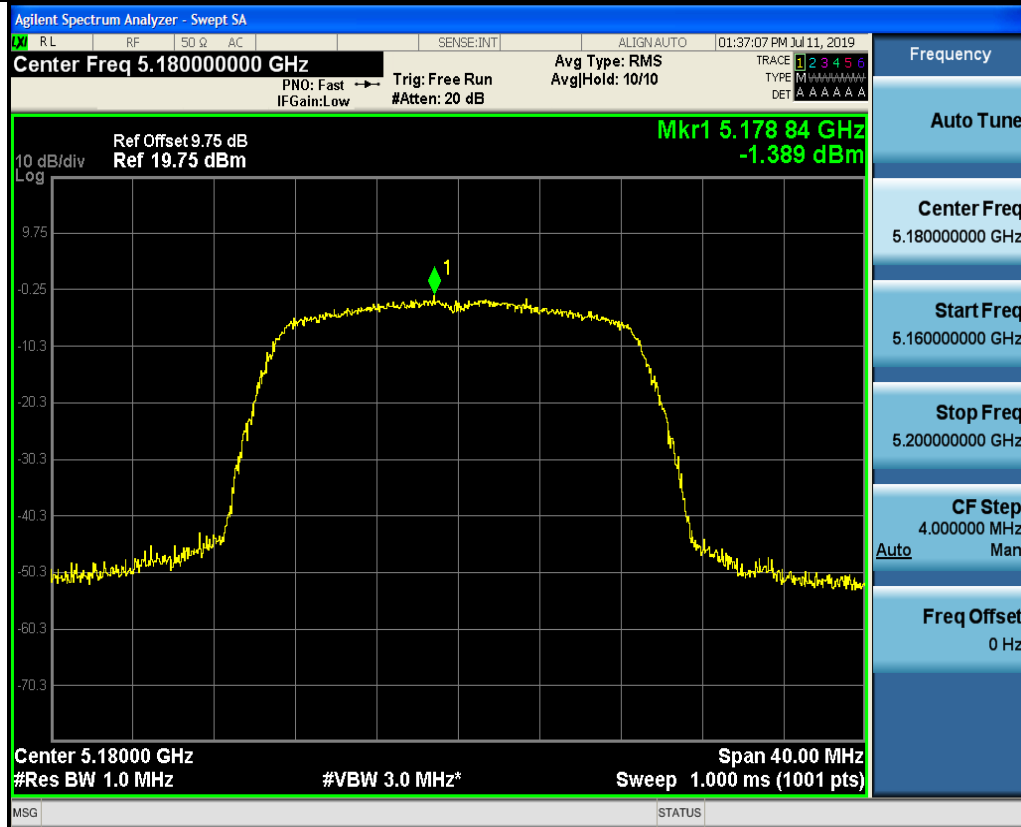
Low



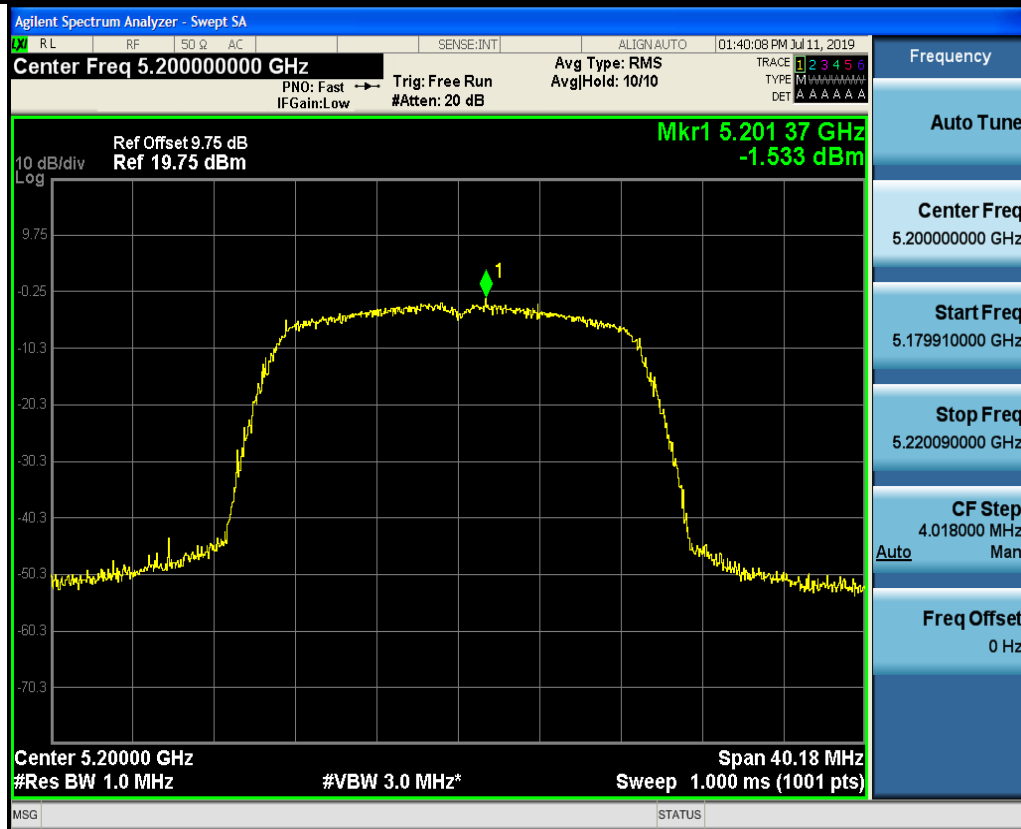
High



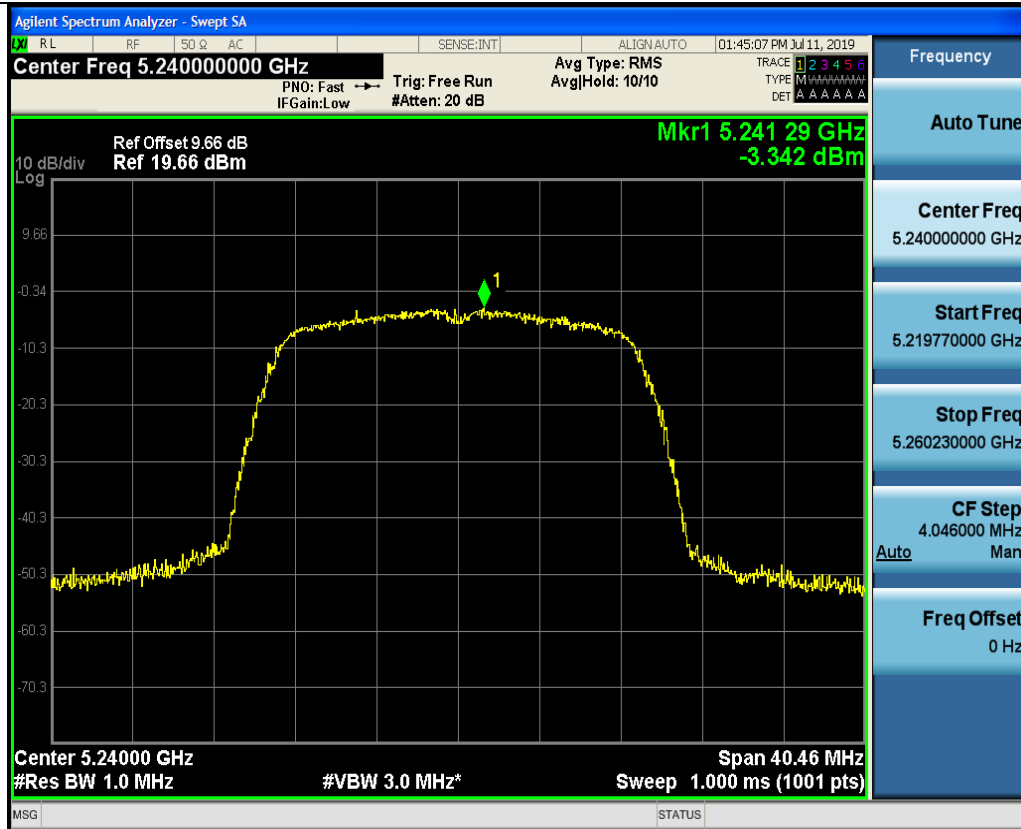
802.11ac(HT20)



Low

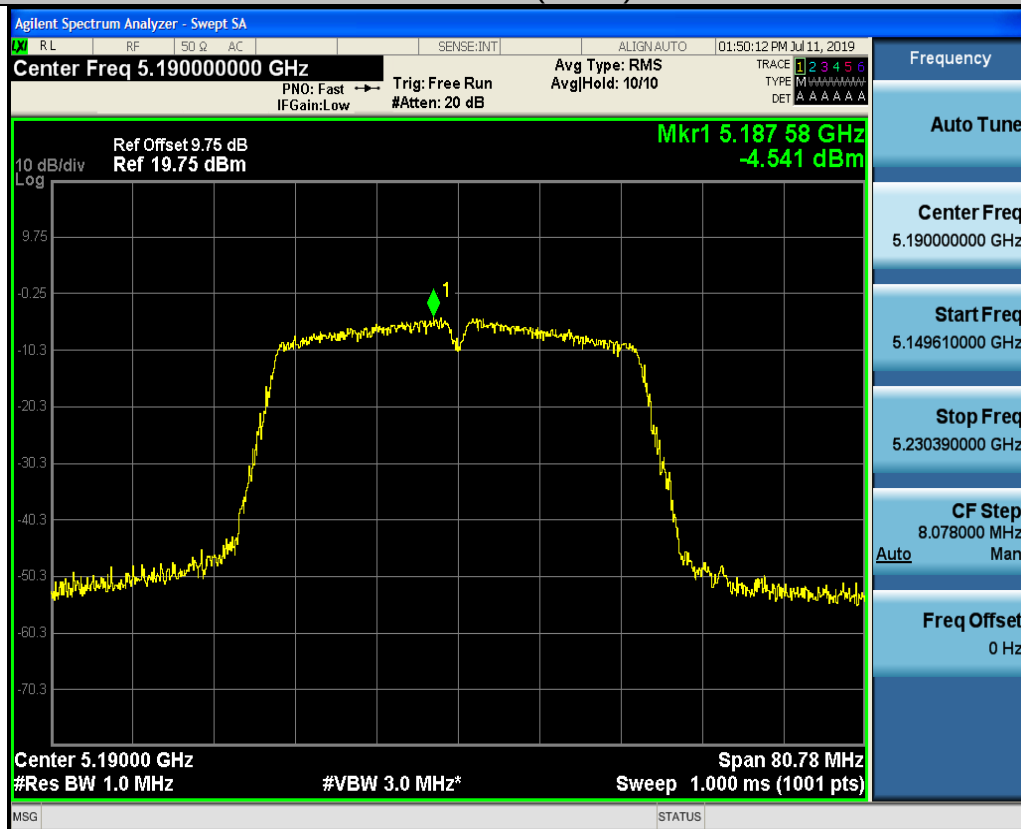


Mid

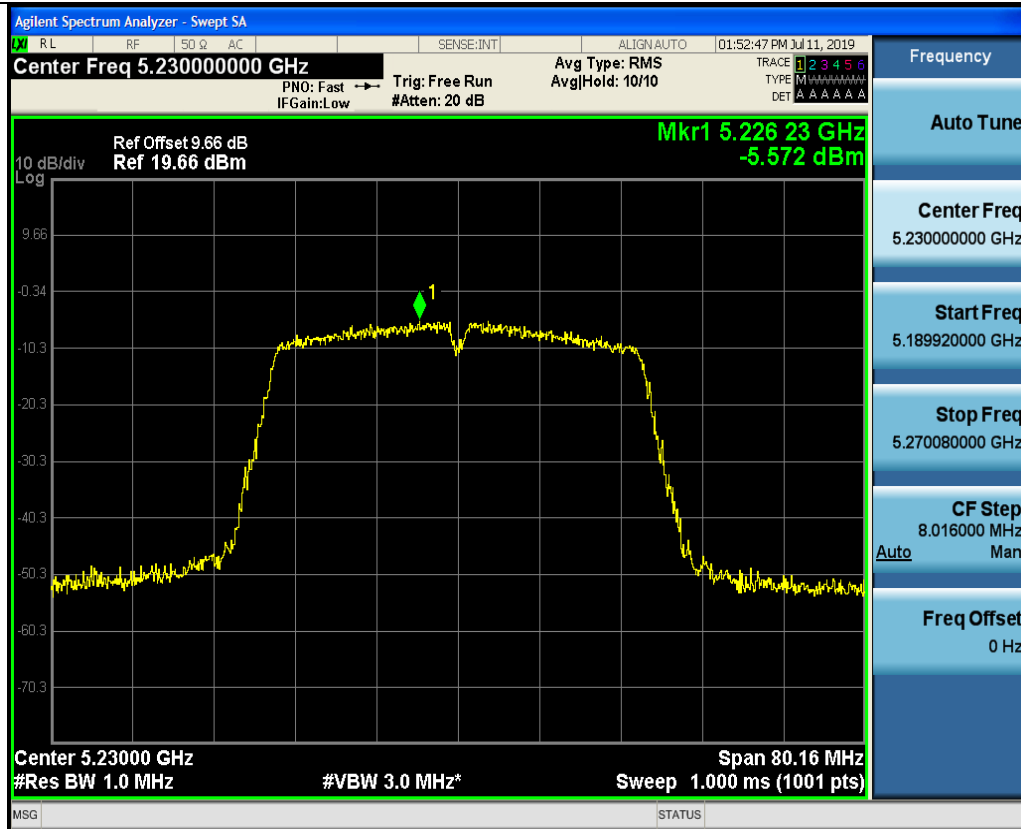


High

802.11ac(HT40)



Low



High

802.11ac(HT80)

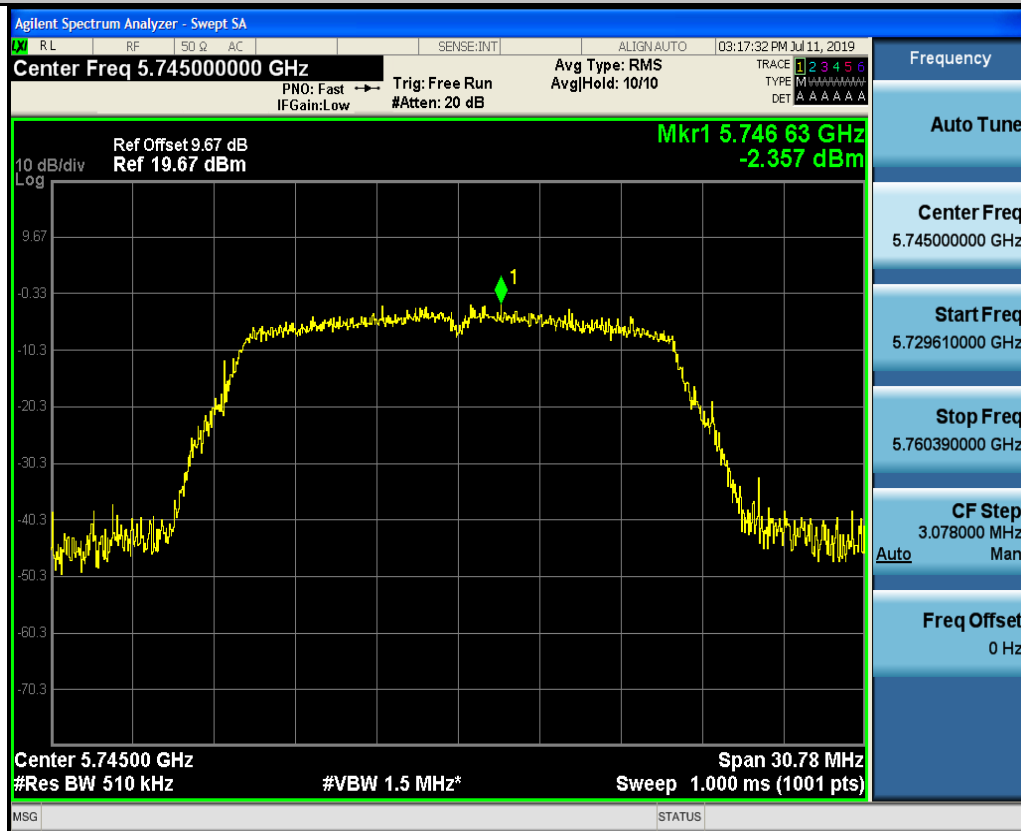


Low

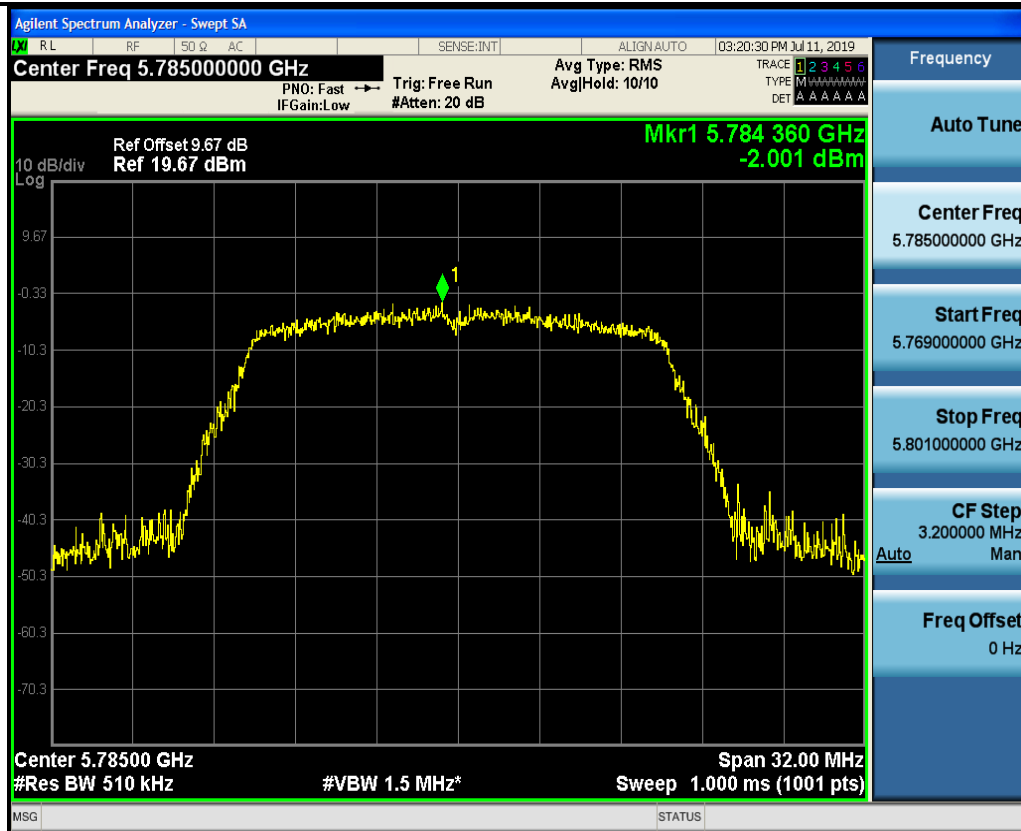


Band IV (5725 – 5850 MHz)

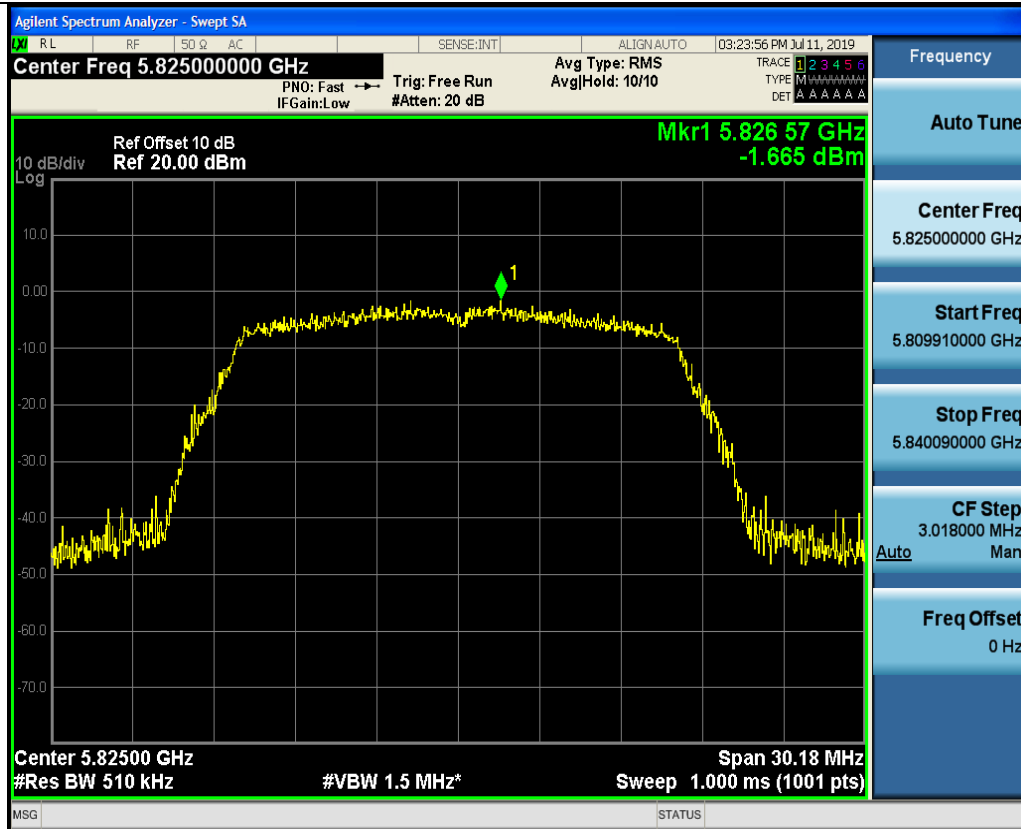
802.11a



Low

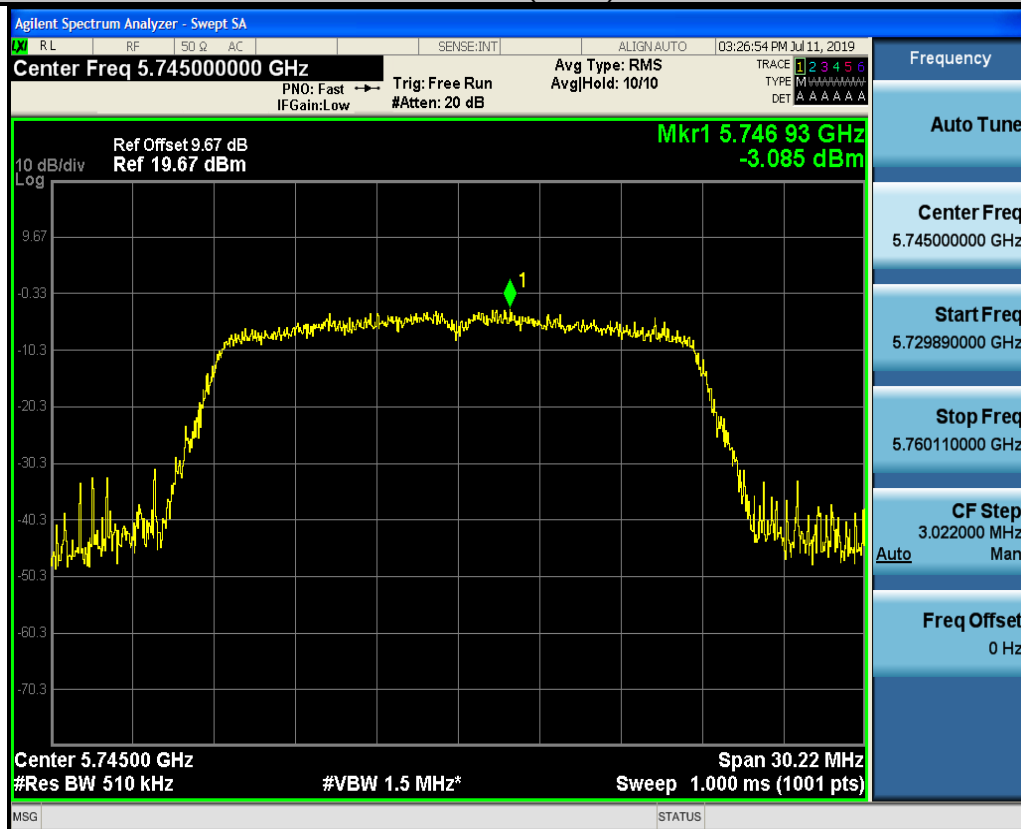


Mid

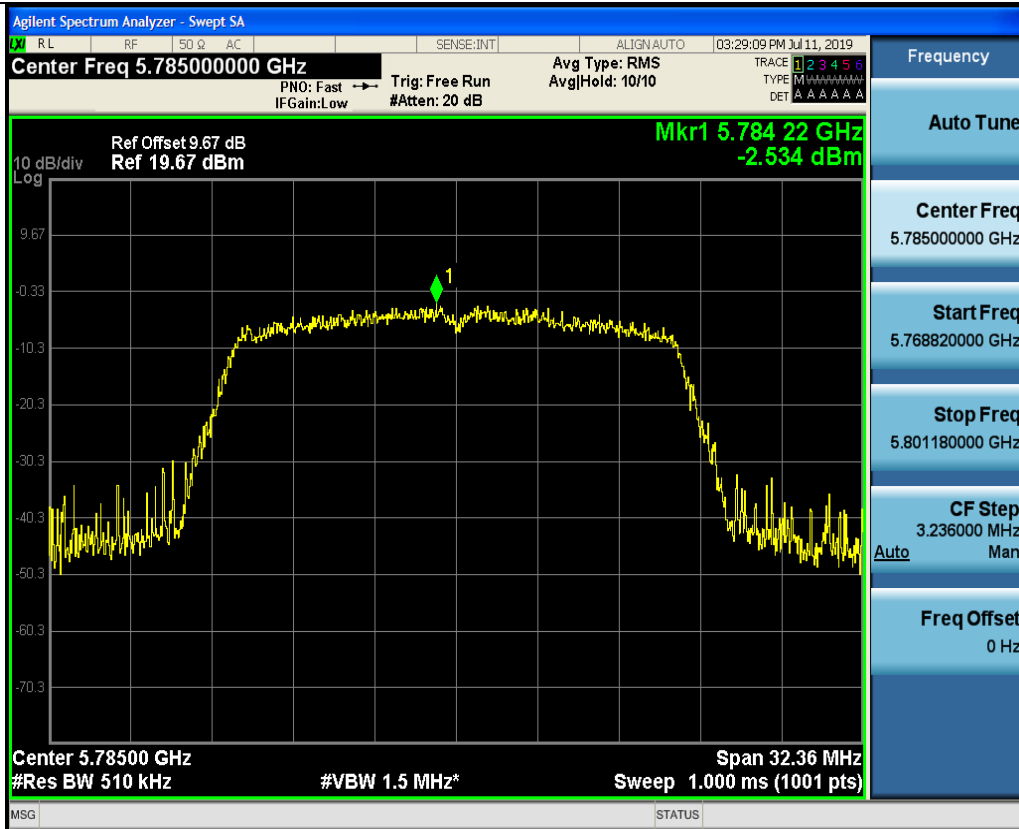


High

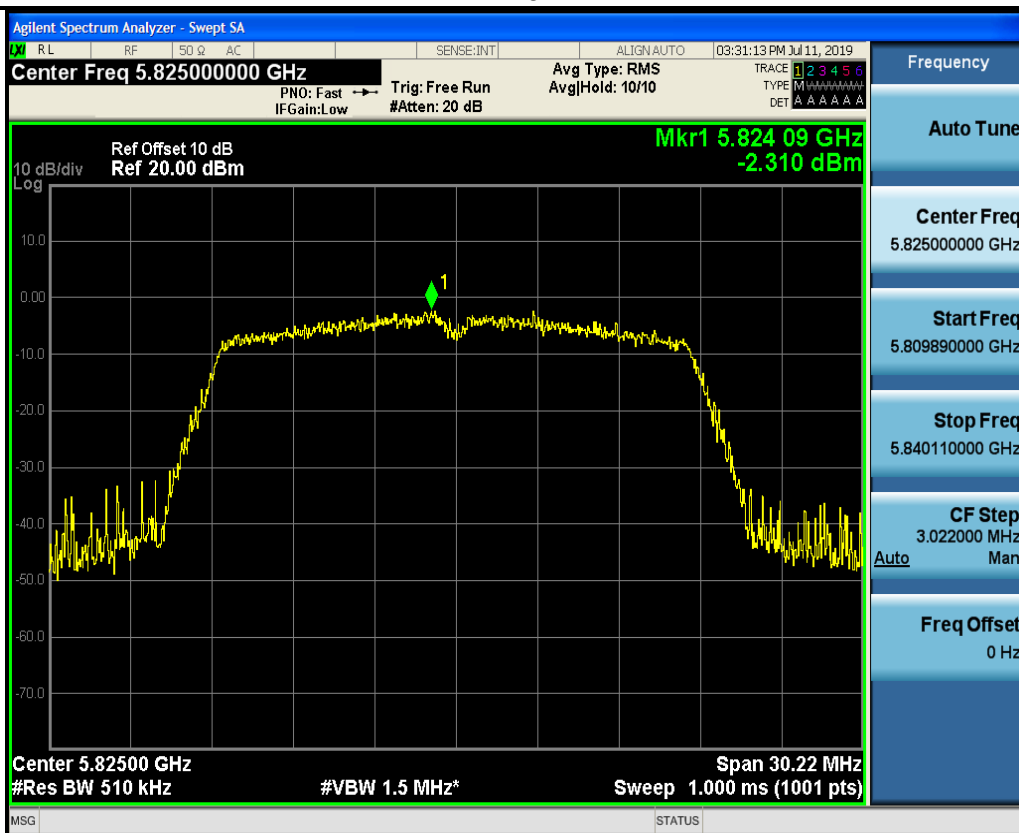
802.11n(HT20)



Low



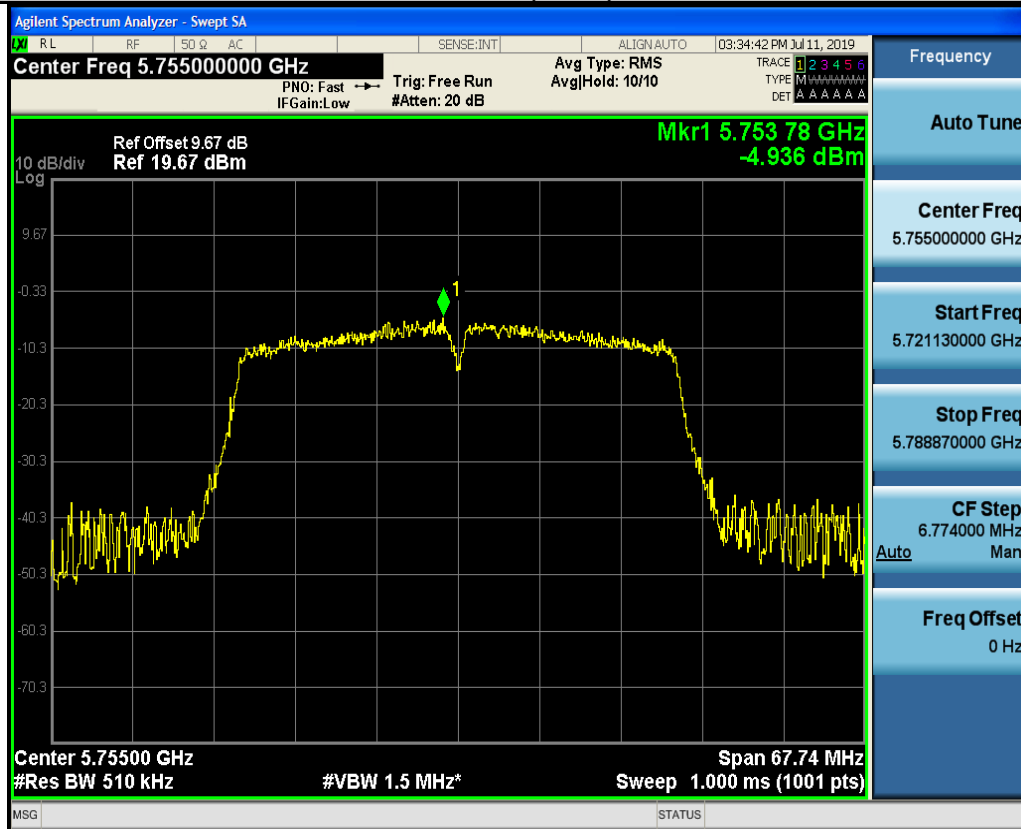
Mid



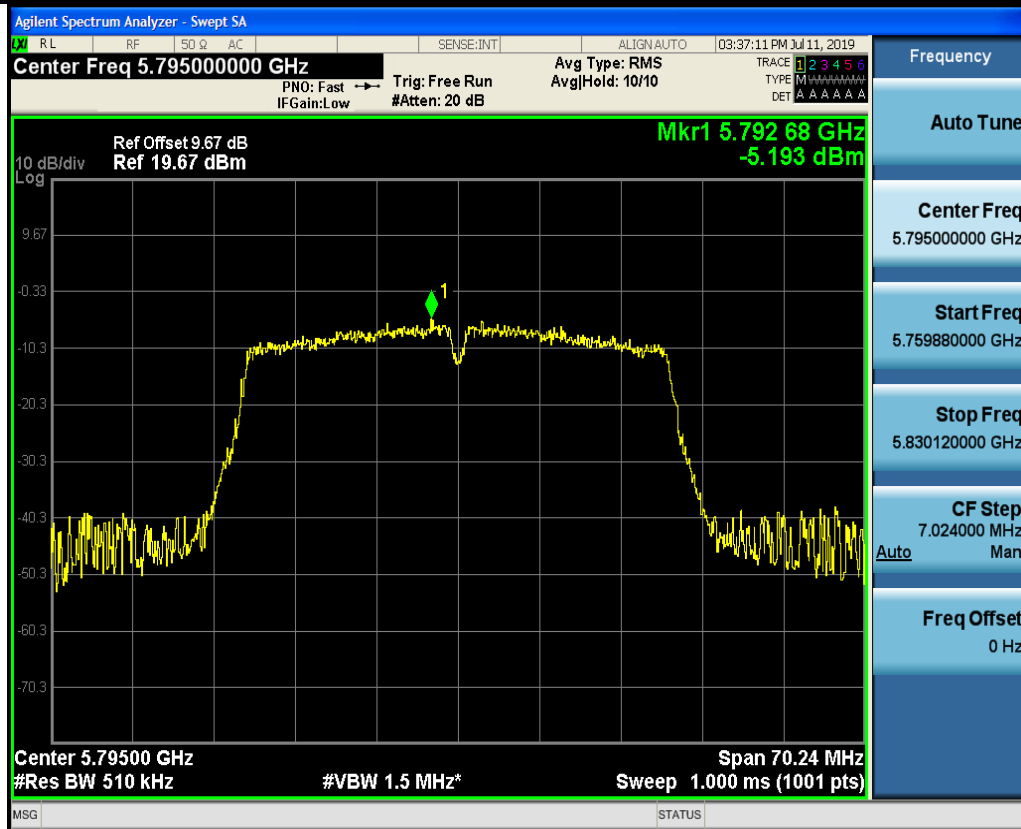
High



802.11n(HT40)



Low

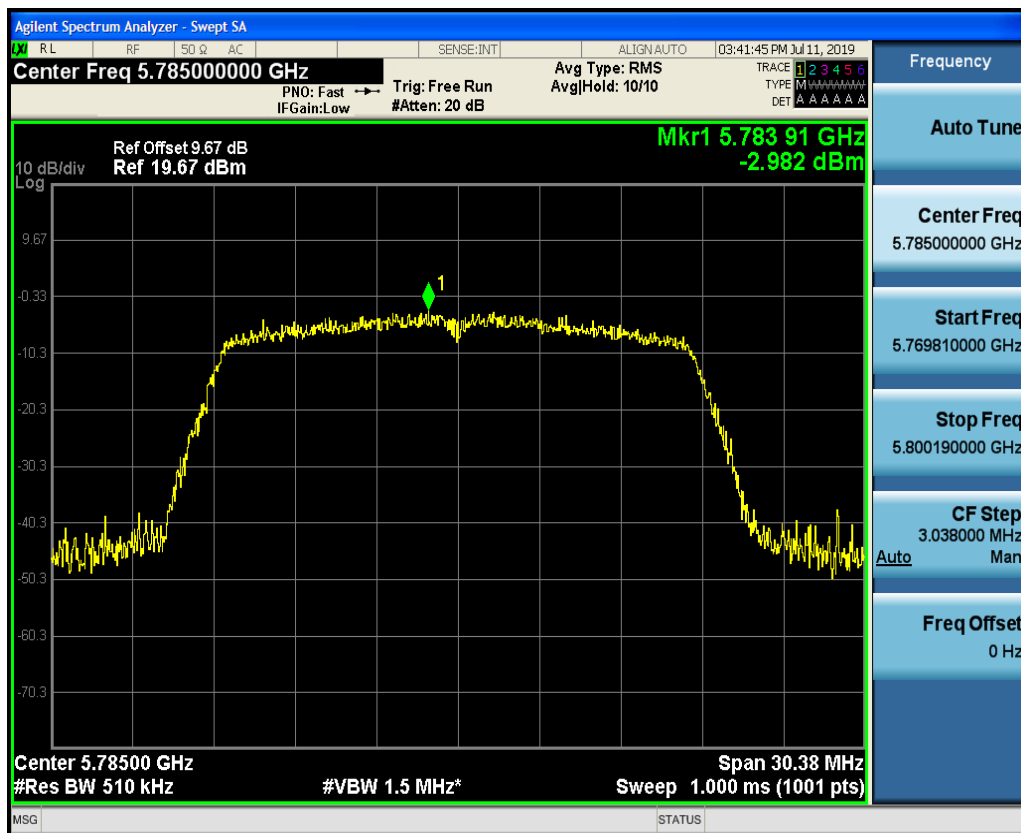


High

802.11ac(HT20)



Low

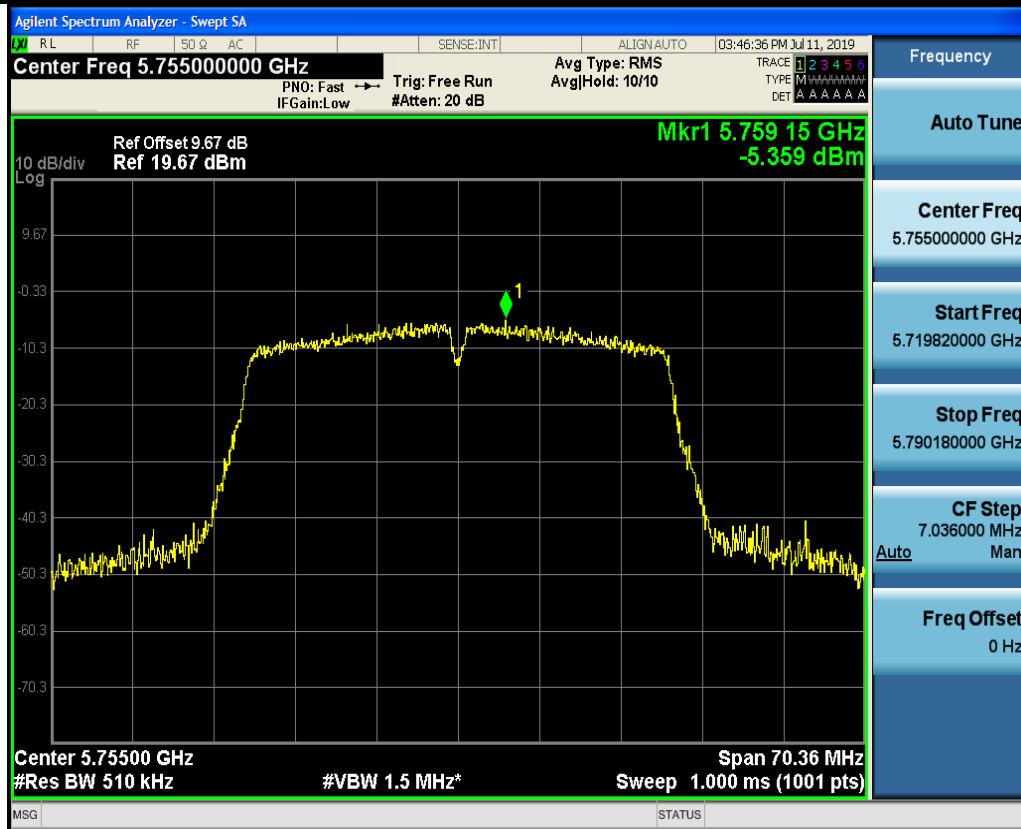


Mid



High

802.11ac(HT40)

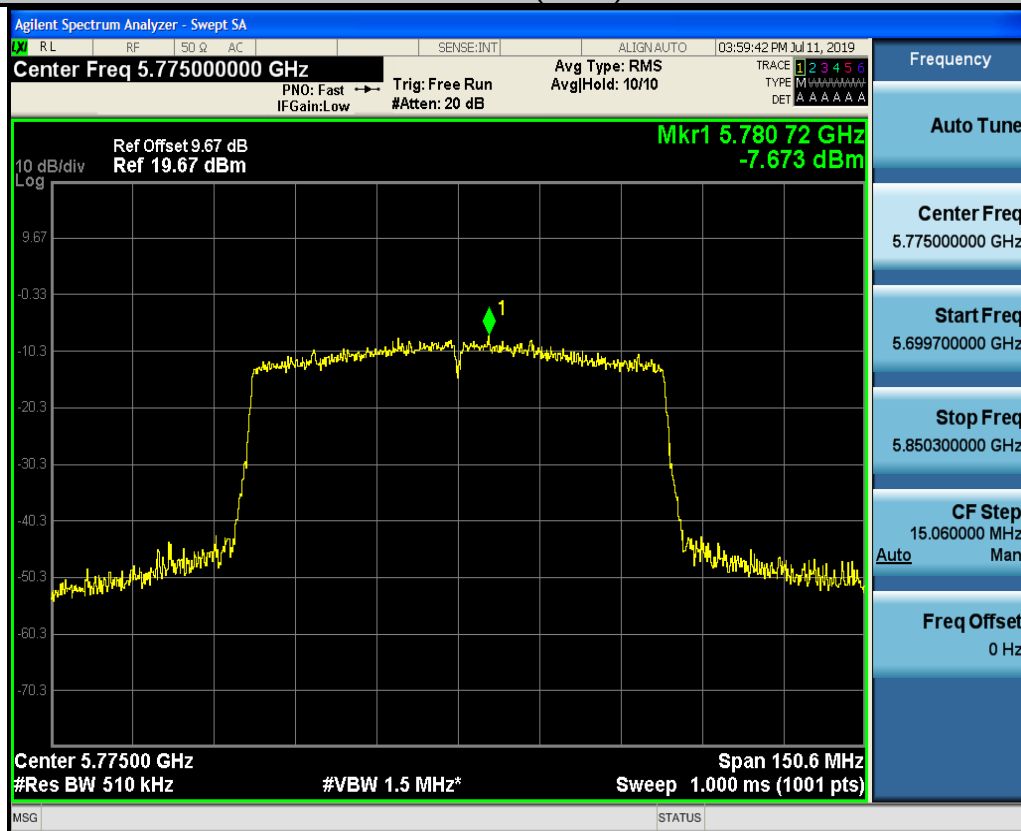


Low



High

802.11ac(HT40)

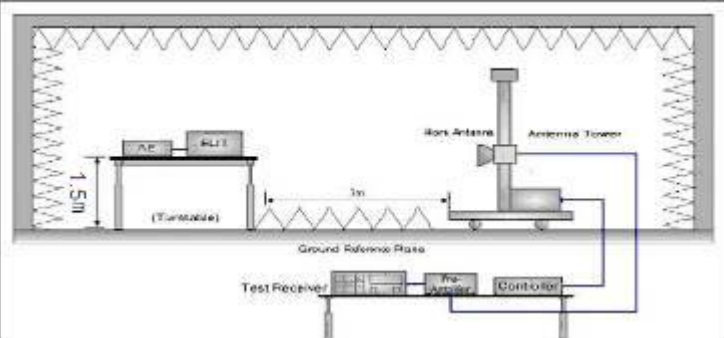


Low



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: $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = -27\text{dBm}$ For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of $-27 \text{ dBm}/\text{MHz}$ at 75 MHz or more above or below the band edge increasing linearly to $10 \text{ dBm}/\text{MHz}$ 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 $15.6 \text{ dBm}/\text{MHz}$ 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 $27 \text{ dBm}/\text{MHz}$ at the band edge. For band IV(5715-5725MHz&5850-5860MHz): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = -27\text{dBm}$; For band IV(other un-restricted band): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = -27\text{dBm}$
Test Setup:	 The diagram illustrates the test setup. An Equipment Under Test (EUT) is placed on a rotating table at a height of 1.5m. The table is rotated 360 degrees. A horn antenna is mounted on a variable-height antenna tower, positioned 3m away from the EUT. The setup is on a ground reference plane. A test receiver, frequency analyzer, and controller are connected to the antenna.
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	ESCI-7	HKE-010	Dec. 27, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Spectrum analyzer	R&S	FSP40	HKE-025	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. 27, 2019
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 27, 2019
Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 27, 2019
High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 27, 2019
Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 27, 2019
High pass filter unit	Tonscend	JS0806-F	HKE-055	Dec. 27, 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(below1GHz)	Times	9kHz-1GHz	HKE-117	Dec. 27, 2019
RF Cable(above 1GHz)	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.24	-2.49	48.75	68.2	-19.45	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.37	-2.49	49.88	68.2	-18.32	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.52	-2.28	51.24	68.2	-16.96	peak
5250	/	-2.28	/	54	/	AVG
5350	51.46	-2.11	49.35	68.2	-18.85	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	52.71	-2.28	50.43	68.2	-17.77	peak
5250	/	-2.28	/	54	/	AVG
5350	51.63	-2.11	49.52	68.2	-18.68	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	53.48	-2.49	50.99	68.2	-17.21	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.33	-2.49	48.84	68.2	-19.36	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	51.65	-2.28	49.37	68.2	-18.83	peak
5250	/	-2.28	/	54	/	AVG
5350	50.19	-2.11	48.08	68.2	-20.12	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.23	-2.28	50.95	68.2	-17.25	peak
5250	/	-2.28	/	54	/	AVG
5350	50.57	-2.11	48.46	68.2	-19.74	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)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
5150	52.66	-2.49	50.17	68.2	-18.03	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)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
5150	51.74	-2.49	49.25	68.2	-18.95	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.14	-2.28	50.86	68.2	-17.34	peak
5250	/	-2.28	/	54	/	AVG
5350	50.28	-2.11	48.17	68.2	-20.03	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	52.62	-2.28	50.34	68.2	-17.86	peak
5250	/	-2.28	/	54	/	AVG
5350	49.78	-2.11	47.67	68.2	-20.53	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	54.29	-2.49	51.8	68.2	-16.4	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.63	-2.49	50.14	68.2	-18.06	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.66	-2.28	52.38	68.2	-15.82	peak
5250	/	-2.28	/	54	/	AVG
5350	52.48	-2.11	50.37	68.2	-17.83	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.25	-2.28	50.97	68.2	-17.23	peak
5250	/	-2.28	/	54	/	AVG
5350	50.63	-2.11	48.52	68.2	-19.68	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	53.72	-2.49	51.23	68.2	-16.97	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.51	-2.49	49.02	68.2	-19.18	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.39	-2.28	52.11	68.2	-16.09	peak
5250	/	-2.28	/	54	/	AVG
5350	52.16	-2.11	50.05	68.2	-18.15	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.37	-2.28	51.09	68.2	-17.11	peak
5250	/	-2.28	/	54	/	AVG
5350	50.15	-2.11	48.04	68.2	-20.16	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						



Operation Mode: 802.11 ac80 Mode with 5.2G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
5150	53.58	-2.49	51.09	68.2	-17.11	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)	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
5150	51.64	-2.49	49.15	68.2	-19.05	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	54.36	-2.28	52.08	68.2	-16.12	peak
5250	/	-2.28	/	54	/	AVG
5350	50.42	-2.11	48.31	68.2	-19.89	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5250	53.68	-2.28	51.4	68.2	-16.8	peak
5250	/	-2.28	/	54	/	AVG
5350	50.24	-2.11	48.13	68.2	-20.07	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	57.4	-2.06	55.34	68.2	-12.86	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.81	-1.96	88.85	105.2	-16.35	peak
5700	/	-1.96	/	85.2	/	AVG
5720	93.2	-2.87	90.33	110.8	-20.47	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.28	-2.14	109.14	122.2	-13.06	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.45	-2.06	56.39	68.2	-11.81	peak
5650	/	-2.06	/	48.2	/	AVG
5700	91.09	-1.96	89.13	105.2	-16.07	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.37	-2.87	92.5	110.8	-18.3	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.51	-2.14	109.37	122.2	-12.83	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.84	-1.97	111.87	122.2	-10.33	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.57	-2.13	93.44	110.8	-17.36	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.59	-2.65	84.94	105.2	-20.26	peak
5875	/	-2.65	/	85.2	/	AVG
5925	54.59	-2.28	52.31	68.2	-15.89	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.68	-1.97	110.71	122.2	-11.49	peak
5850	/	-1.97	/	102.2	/	AVG
5855	93.25	-2.13	91.12	110.8	-19.68	peak
5855	/	-2.13	/	90.8	/	AVG
5875	86.63	-2.65	83.98	105.2	-21.22	peak
5875	/	-2.65	/	85.2	/	AVG
5925	54.78	-2.28	52.5	68.2	-15.7	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	57.32	-2.06	55.26	68.2	-12.94	peak
5650	/	-2.06	/	48.2	/	AVG
5700	92.4	-1.96	90.44	105.2	-14.76	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.83	-2.87	91.96	110.8	-18.84	peak
5720	/	-2.87	/	90.8	/	AVG
5725	113.63	-2.14	111.49	122.2	-10.71	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	60.62	-2.06	58.56	68.2	-9.64	peak
5650	/	-2.06	/	48.2	/	AVG
5700	98.9	-1.96	96.94	105.2	-8.26	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.54	-2.87	91.67	110.8	-19.13	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.79	-2.14	110.65	122.2	-11.55	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	111.37	-1.97	109.4	122.2	-12.8	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.24	-2.13	92.11	110.8	-18.69	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.11	-2.65	84.46	105.2	-20.74	peak
5875	/	-2.65	/	85.2	/	AVG
5925	52.23	-2.28	49.95	68.2	-18.25	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	111.03	-1.97	109.06	122.2	-13.14	peak
5850	/	-1.97	/	102.2	/	AVG
5855	93.51	-2.13	91.38	110.8	-19.42	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	56.8	-2.28	54.52	68.2	-13.68	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	56.85	-2.06	54.79	68.2	-13.41	peak
5650	/	-2.06	/	48.2	/	AVG
5700	92.99	-1.96	91.03	105.2	-14.17	peak
5700	/	-1.96	/	85.2	/	AVG
5720	94.77	-2.87	91.9	110.8	-18.9	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.57	-2.14	110.43	122.2	-11.77	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	61.47	-2.06	59.41	68.2	-8.79	peak
5650	/	-2.06	/	48.2	/	AVG
5700	96.74	-1.96	94.78	105.2	-10.42	peak
5700	/	-1.96	/	85.2	/	AVG
5720	92.77	-2.87	89.9	110.8	-20.9	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.18	-2.14	110.04	122.2	-12.16	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	111.09	-1.97	109.12	122.2	-13.08	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.05	-2.13	92.92	110.8	-17.88	peak
5855	/	-2.13	/	90.8	/	AVG
5875	88.29	-2.65	85.64	105.2	-19.56	peak
5875	/	-2.65	/	85.2	/	AVG
5925	53.22	-2.28	50.94	68.2	-17.26	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	110.86	-1.97	108.89	122.2	-13.31	peak
5850	/	-1.97	/	102.2	/	AVG
5855	93.72	-2.13	91.59	110.8	-19.21	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.89	-2.65	85.24	105.2	-19.96	peak
5875	/	-2.65	/	85.2	/	AVG
5925	52.27	-2.28	49.99	68.2	-18.21	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.87	-2.06	56.81	68.2	-11.39	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.23	-1.96	88.27	105.2	-16.93	peak
5700	/	-1.96	/	85.2	/	AVG
5720	93.05	-2.87	90.18	110.8	-20.62	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.97	-2.14	109.83	122.2	-12.37	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	59.53	-2.06	57.47	68.2	-10.73	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.69	-1.96	88.73	105.2	-16.47	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.17	-2.87	92.3	110.8	-18.5	peak
5720	/	-2.87	/	90.8	/	AVG
5725	112.51	-2.14	110.37	122.2	-11.83	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.96	-1.97	110.99	122.2	-11.21	peak
5850	/	-1.97	/	102.2	/	AVG
5855	95.82	-2.13	93.69	110.8	-17.11	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.87	-2.65	85.22	105.2	-19.98	peak
5875	/	-2.65	/	85.2	/	AVG
5925	53.63	-2.28	51.35	68.2	-16.85	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.58	-1.97	110.61	122.2	-11.59	peak
5850	/	-1.97	/	102.2	/	AVG
5855	92.77	-2.13	90.64	110.8	-20.16	peak
5855	/	-2.13	/	90.8	/	AVG
5875	85.5	-2.65	82.85	105.2	-22.35	peak
5875	/	-2.65	/	85.2	/	AVG
5925	55.23	-2.28	52.95	68.2	-15.25	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	57.88	-2.06	55.82	68.2	-12.38	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.39	-1.96	88.43	105.2	-16.77	peak
5700	/	-1.96	/	85.2	/	AVG
5720	92.6	-2.87	89.73	110.8	-21.07	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.23	-2.14	109.09	122.2	-13.11	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	59.3	-2.06	57.24	68.2	-10.96	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.77	-1.96	88.81	105.2	-16.39	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.91	-2.87	93.04	110.8	-17.76	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.85	-2.14	109.71	122.2	-12.49	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.05	-1.97	111.08	122.2	-11.12	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.71	-2.13	92.58	110.8	-18.22	peak
5855	/	-2.13	/	90.8	/	AVG
5875	87.8	-2.65	85.15	105.2	-20.05	peak
5875	/	-2.65	/	85.2	/	AVG
5925	53.49	-2.28	51.21	68.2	-16.99	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.15	-1.97	111.18	122.2	-11.02	peak
5850	/	-1.97	/	102.2	/	AVG
5855	92.27	-2.13	90.14	110.8	-20.66	peak
5855	/	-2.13	/	90.8	/	AVG
5875	86.47	-2.65	83.82	105.2	-21.38	peak
5875	/	-2.65	/	85.2	/	AVG
5925	55.13	-2.28	52.85	68.2	-15.35	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						



Operation Mode: 802.11ac80 Mode with 5.8G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.26	-2.06	56.2	68.2	-12	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.69	-1.96	88.73	105.2	-16.47	peak
5700	/	-1.96	/	85.2	/	AVG
5720	92.73	-2.87	89.86	110.8	-20.94	peak
5720	/	-2.87	/	90.8	/	AVG
5725	111.28	-2.14	109.14	122.2	-13.06	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5650	59.67	-2.06	57.61	68.2	-10.59	peak
5650	/	-2.06	/	48.2	/	AVG
5700	90.78	-1.96	88.82	105.2	-16.38	peak
5700	/	-1.96	/	85.2	/	AVG
5720	95.72	-2.87	92.85	110.8	-17.95	peak
5720	/	-2.87	/	90.8	/	AVG
5725	113.29	-2.14	111.15	122.2	-11.05	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	113.94	-1.97	111.97	122.2	-10.23	peak
5850	/	-1.97	/	102.2	/	AVG
5855	94.42	-2.13	92.29	110.8	-18.51	peak
5855	/	-2.13	/	90.8	/	AVG
5875	86.31	-2.65	83.66	105.2	-21.54	peak
5875	/	-2.65	/	85.2	/	AVG
5925	52.92	-2.28	50.64	68.2	-17.56	peak
5925	/	-2.28	/	48.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

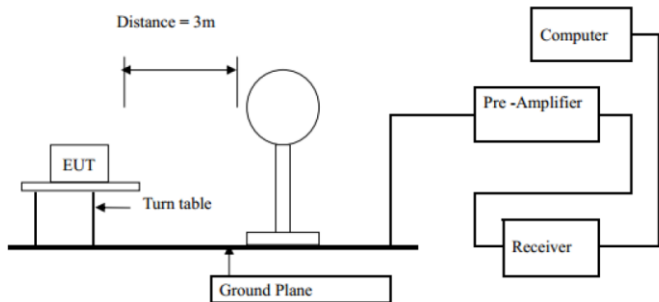
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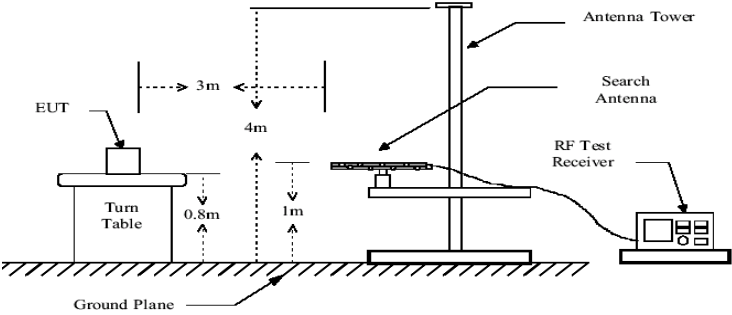
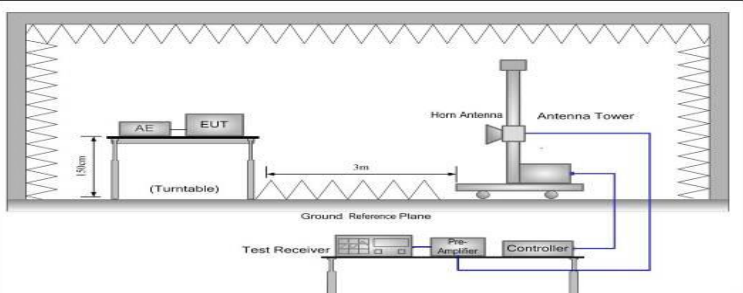
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
5850	111.74	-1.97	109.77	122.2	-12.43	peak
5850	/	-1.97	/	102.2	/	AVG
5855	93.61	-2.13	91.48	110.8	-19.32	peak
5855	/	-2.13	/	90.8	/	AVG
5875	86.46	-2.65	83.81	105.2	-21.39	peak
5875	/	-2.65	/	85.2	/	AVG
5925	55.22	-2.28	52.94	68.2	-15.26	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

Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit:	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,				
	Frequency		Field Strength (microvolts/meter)		Measurement Distance (meters)
	0.009-0.490		2400/F(KHz)		300
	0.490-1.705		24000/F(KHz)		30
	1.705-30		30		30
	30-88		100		3
	88-216		150		3
	216-960		200		3
	Above 960		500		3
	Frequency		Limit (dBuV/m @3m)		Detector
Above 1G		74.0		Peak	
		54.0		Average	
Test setup:	For radiated emissions below 30MHz				
					
	30MHz to 1GHz				

	 Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 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 rotating 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, quasi-peak or average method as specified and then reported in a data sheet.
Test results:	PASS



4.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	R&S	ESCI-7	HKE-010	Dec. 27, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Spectrum analyzer	R&S	FSP40	HKE-025	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. 27, 2019
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 27, 2019
Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 27, 2019
High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 27, 2019
Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 27, 2019
High pass filter unit	Tonscend	JS0806-F	HKE-055	Dec. 27, 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(below1GHz)	Times	9kHz-1GHz	HKE-117	Dec. 27, 2019
RF Cable(above 1GHz)	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).



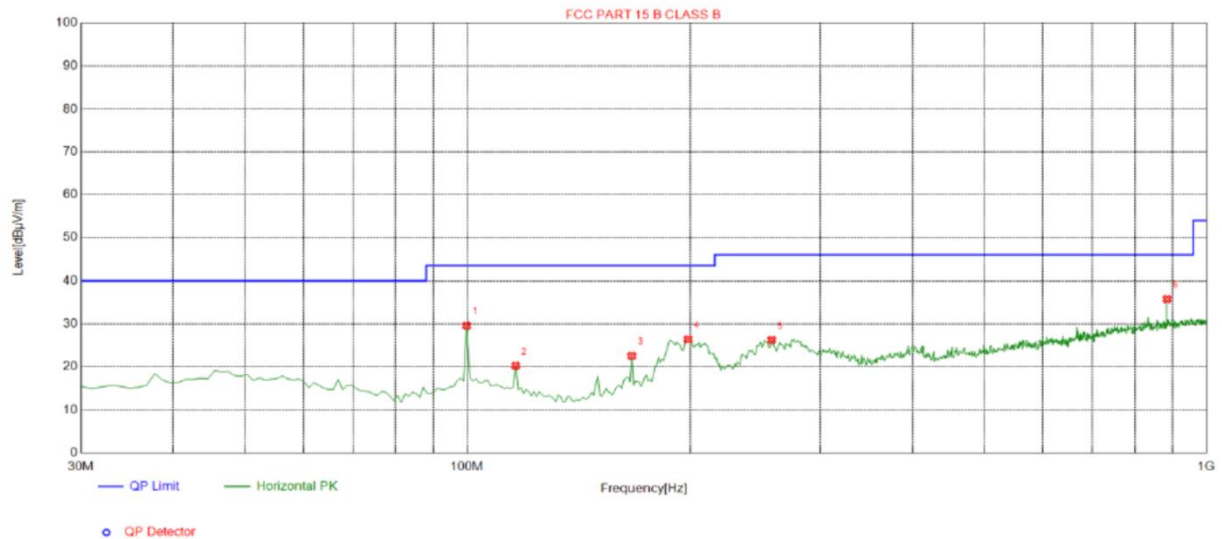
4.7.3. Test Data

Remark: We tested all Channels, the worst case was recorded.

Please refer to following diagram for individual

Below 1GHz

Horizontal

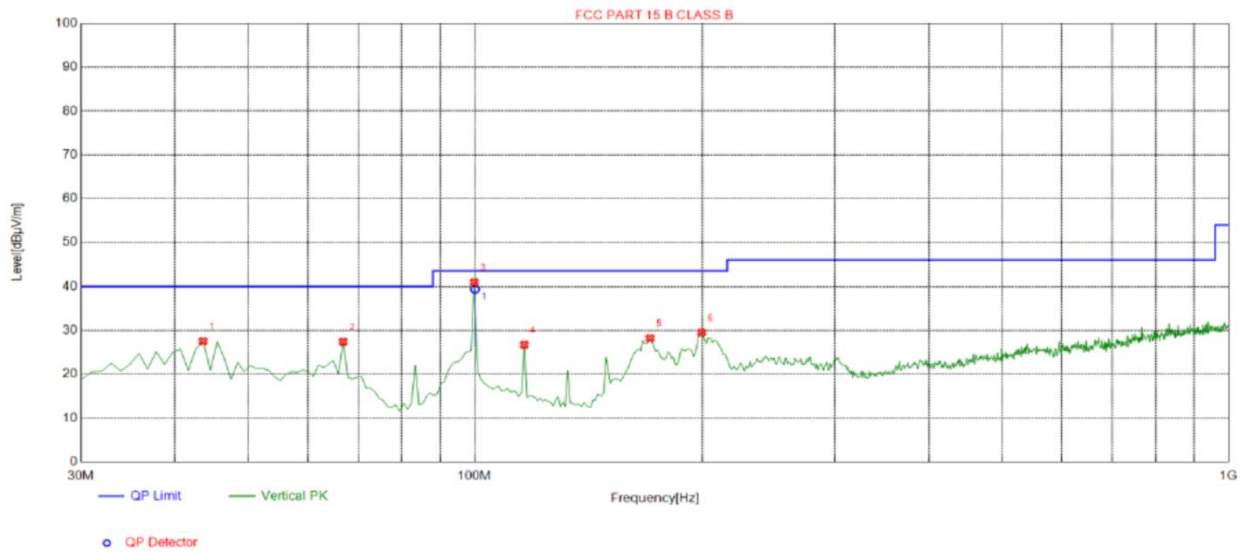


Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	99.8400	29.60	-15.43	43.50	13.90	100	284	Horizontal
2	116.330	20.26	-16.49	43.50	23.24	100	90	Horizontal
3	166.770	22.58	-17.60	43.50	20.92	100	111	Horizontal
4	198.780	26.43	-15.18	43.50	17.07	100	118	Horizontal
5	257.950	26.28	-13.50	46.00	19.72	100	280	Horizontal
6	884.570	35.80	-1.98	46.00	10.20	100	321	Horizontal

Final Data List

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

**Vertical****Suspected List**

Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.5800	27.55	-13.90	40.00	12.45	100	10	Vertical
2	66.8600	27.42	-16.88	40.00	12.58	100	165	Vertical
3	99.8400	40.90	-15.43	43.50	2.60	100	351	Vertical
4	116.330	26.74	-16.49	43.50	16.76	100	348	Vertical
5	170.650	28.22	-17.27	43.50	15.28	100	251	Vertical
6	199.750	29.53	-15.08	43.50	13.97	100	26	Vertical

Final Data List

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	100.029	-15.40	39.41	43.50	4.09	150	345.7	Vertical

Remark: Transd = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

**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/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.53	-4.59	57.94	68.2	-10.26	peak
3647	47.38	-4.59	42.79	54	-11.21	AVG
10360	52.46	3.74	56.2	68.2	-12	peak
10360	41.24	3.74	44.98	54	-9.02	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.34	-4.59	57.75	68.2	-10.45	peak
3647	47.18	-4.59	42.59	54	-11.41	AVG
10360	52.39	3.74	56.13	68.2	-12.07	peak
10360	41.05	3.74	44.79	54	-9.21	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.85	-4.59	58.26	68.2	-9.94	peak
3647	46.67	-4.59	42.08	54	-11.92	AVG
10400	54.33	3.74	58.07	68.2	-10.13	peak
10400	41.42	3.74	45.16	54	-8.84	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.57	-4.59	57.98	68.2	-10.22	peak
3647	46.34	-4.59	41.75	54	-12.25	AVG
10400	53.69	3.74	57.43	68.2	-10.77	peak
10400	41.02	3.74	44.76	54	-9.24	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						



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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	61.78	-4.59	57.19	68.2	-11.01	peak
3647	46.55	-4.59	41.96	54	-12.04	AVG
10480	53.27	3.75	57.02	68.2	-11.18	peak
10480	40.61	3.75	44.36	54	-9.64	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	61.25	-4.59	56.66	68.2	-11.54	peak
3647	46.03	-4.59	41.44	54	-12.56	AVG
10480	52.46	3.75	56.21	68.2	-11.99	peak
10480	39.88	3.75	43.63	54	-10.37	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.59	-4.59	58	68.2	-10.2	peak
3647	46.78	-4.59	42.19	54	-11.81	AVG
11570	54.35	4.21	58.56	68.2	-9.64	peak
11570	40.59	4.21	44.8	54	-9.2	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.35	-4.59	56.76	68.2	-11.44	peak
3647	47.19	-4.59	42.6	54	-11.4	AVG
11570	54.26	4.21	58.47	68.2	-9.73	peak
11570	40.32	4.21	44.53	54	-9.47	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.59	-4.59	57	68.2	-11.2	peak
3647	46.73	-4.59	42.14	54	-11.86	AVG
11570	54.47	4.21	58.68	68.2	-9.52	peak
11570	39.85	4.21	44.06	54	-9.94	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	60.45	-4.59	55.86	68.2	-12.34	peak
3647	46.38	-4.59	41.79	54	-12.21	AVG
11570	53.41	4.21	57.62	68.2	-10.58	peak
11570	39.66	4.21	43.87	54	-10.13	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/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	62.57	-4.59	57.98	68.2	-10.22	peak
3647	47.02	-4.59	42.43	54	-11.57	AVG
11650	54.83	4.84	59.67	68.2	-8.53	peak
11650	42.18	4.84	47.02	54	-6.98	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
3647	61.84	-4.59	57.25	68.2	-10.95	peak
3647	46.29	-4.59	41.7	54	-12.3	AVG
11650	54.55	4.84	59.39	68.2	-8.81	peak
11650	41.31	4.84	46.15	54	-7.85	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:	<pre>graph LR; SA[Spectrum Analyzer] --- EUT[EUT]; EUT --- TCh[Temperature Chamber]; TCh --- P[AC/DC Power supply];</pre>
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

**4.8.2. Test Result as follows:**

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	5.5V	5179.987	13	5239.986	14
	5V	5179.988	12	5239.983	17
	4.5 V	5179.984	16	5239.988	12

Mode	Temperature (°C)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	-30	5179.968	32	5239.966	34
	-20	5179.967	33	5239.968	32
	-10	5179.971	29	5239.973	27
	0	5179.974	26	5239.975	25
	10	5179.972	28	5239.982	18
	20	5179.986	14	5239.980	20
	30	5179.981	19	5239.977	23
	40	5179.979	21	5239.979	21
	50	5179.972	28	5239.966	34



Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	5.5V	5744.988	12	5824.982	18
	5V	5744.987	13	5824.987	13
	4.5 V	5744.984	16	5824.985	15

Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5744.963	37	5824.967	33
	-20	5744.966	34	5824.964	36
	-10	5744.975	25	5824.972	28
	0	5744.977	23	5824.978	22
	10	5744.979	21	5824.976	24
	20	5744.985	15	5824.982	28
	30	5744.978	22	5824.974	26
	40	5744.976	24	5824.973	27
	50	5744.974	26	5824.977	23

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

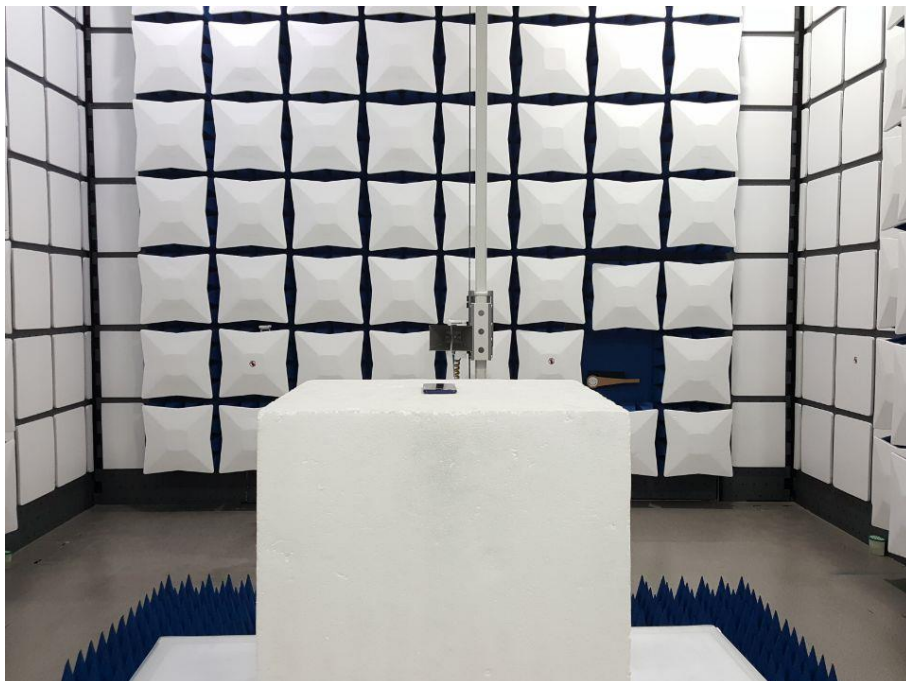
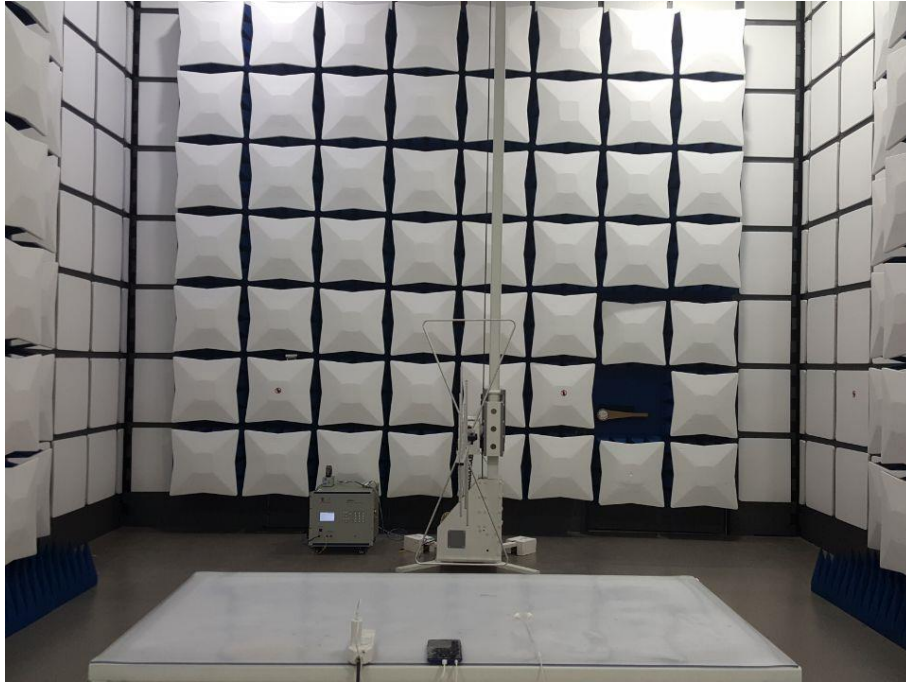
The antenna used in this product is a internal Antenna, The directional gains of antenna used for transmitting is 1.5dBi.

WIFI ANTENNA



4.10. Photographs of Test Setup

Radiated Emission





Conducted Emission





4.11. PHOTOS OF THE EUT

Reference to the reporter : ANNEX A of external photos and ANNEX B of internal photos

-----End of test report-----