

TEST REPORT

FCC ID: 2ANM9-EVENT1

Product: Mini Projector

Model No.: Event1

Additional Model No.: N/A

Trade Mark: Epic Event

Report No.: TCT171204E010

Issued Date: Dec. 14, 2017

Issued for:

EPIC OPTIX, INC.

1419 Forest Drive Suite 201, Annapolis, MD. US. 21403

Issued By:

Shenzhen Tongce Testing Lab.

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Appendix A: Photographs of Test Setup

Appendix B: Photographs of EUT

1. Test Certification

Product:	Mini Projector
Model No.:	Event1
Additional Model No.:	/
Trade Mark:	Epic Event
Applicant:	EPIC OPTIX, INC.
Address:	1419 Forest Drive Suite 201, Annapolis, MD. US. 21403
Manufacturer:	EPIC AVIONICS. CO., LTD
Address:	33-7, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
Date of Test:	Dec. 07, 2017- Dec. 13, 2017
Applicable Standards:	FCC Rules and Regulations Part 15 Subpart C Section 15.407 ANSI C63.10: 2013

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:

Dec. 07-13, 2017

Reviewed By:



Joe Zhou

Date:

Dec. 13, 2017

Approved By:



Tomsin

Date:

Dec. 14, 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
Emission mask	§15.407(b)	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:	Mini Projector
Model No.:	Event1
Additional Model No.:	N/A
Trade Mark:	Epic Event
Operation Frequency:	802.11a/n 20:5180~5240 MHz; 5745~5825 MHz 802.11n 40: 5190~5230 MHz; 5755 MHz -5795 MHz
Channel Bandwidth:	802.11a/n 20:20MHz 802.11n 40: 40 MHz
Modulation Technology:	IEEE 802.11a/n20/n40
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Antenna Type:	Chip Antenna
Antenna Gain:	1dBi (Declared by Applicant)
Power Supply:	DC12V, 3A from adapter With AC 120V/60Hz
Adapter:	SWITCHING ADAPTOR MODEL: SW40-12003000-WA4 INPUT: AC100-240V 50/60Hz 1.5A OUTPUT: DC12V 3A

Operation Frequency each of channel

20MHz		40MHz	
Channel	Frequency	Channel	Frequency
36	5180	38	5190
40	5200	46	5230
44	5220	151	5755
48	5240	159	5790
149	5745		
153	5765		
157	5785		
161	5805		
165	5825		

Note:

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

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
40	Mid	5200	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

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

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

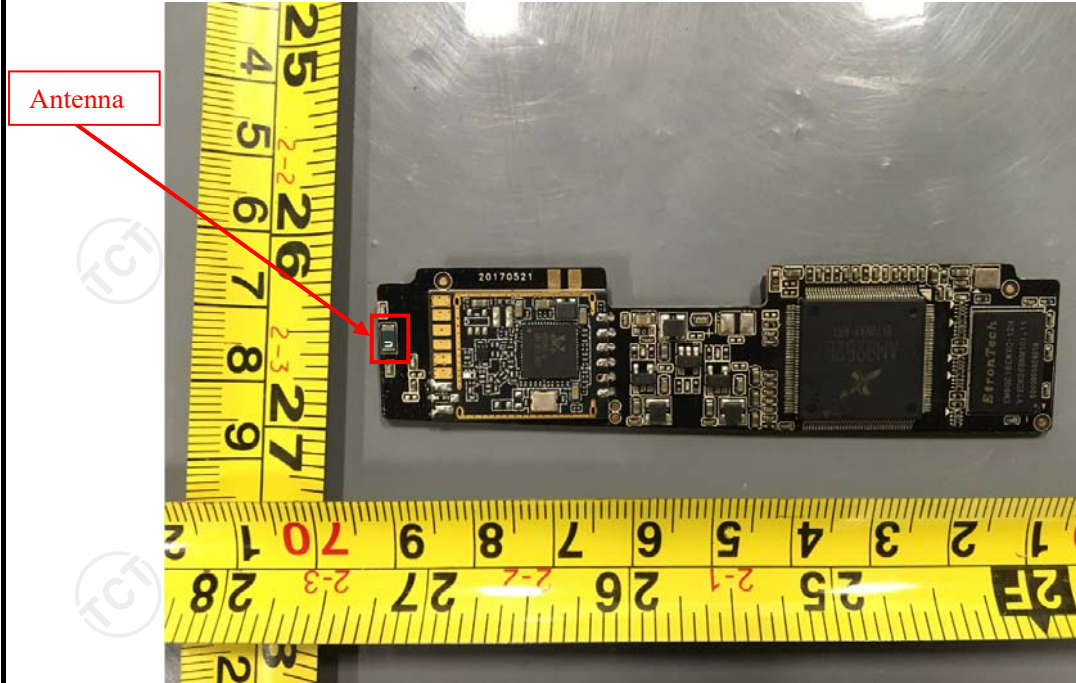
5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where 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	$\pm 1.0\%$

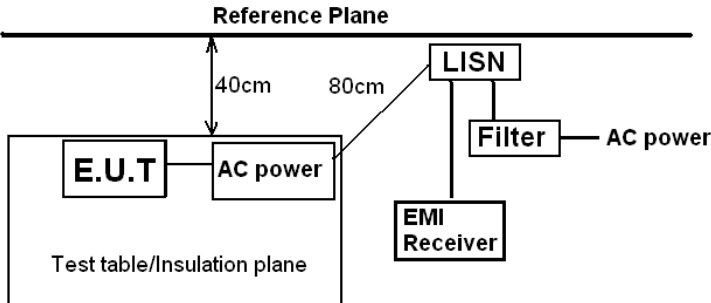
6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>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.</p>	
E.U.T Antenna:	Ceramic antenna
<p>The WIFI antenna is Chip Antenna which permanently attached, and the best case gain of the antenna is 1.0dBi.</p>	
	

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:	<div><p>Reference Plane</p><p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>														
Test Mode:	Tx Mode														
Test Procedure:	<div><div>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.</div><div>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).</div><div>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.</div></div>														
Test Result:	PASS														

6.2.2. Test Instruments

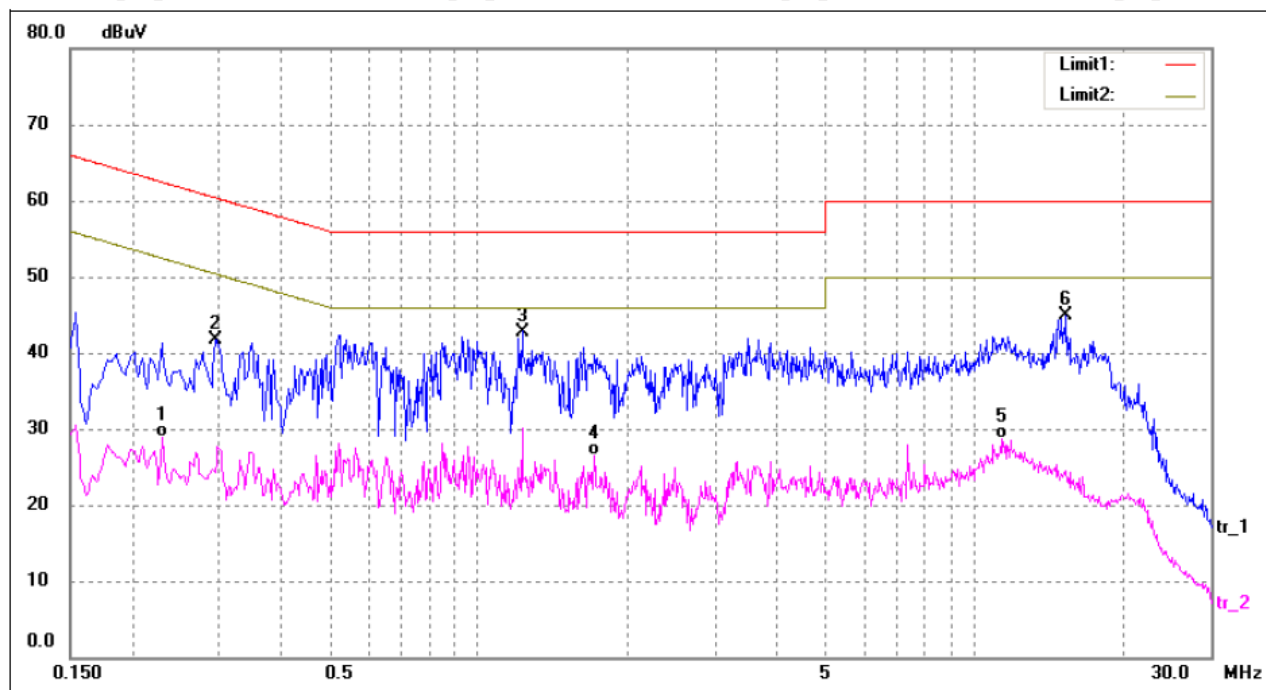
Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	R&S	ESPI	101401	Jun. 12, 2018
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 27, 2018
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Sep. 27, 2018
EMI Test Software	Shurple Technology	EZ-EMC	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 (150 kHz to 30MHz)

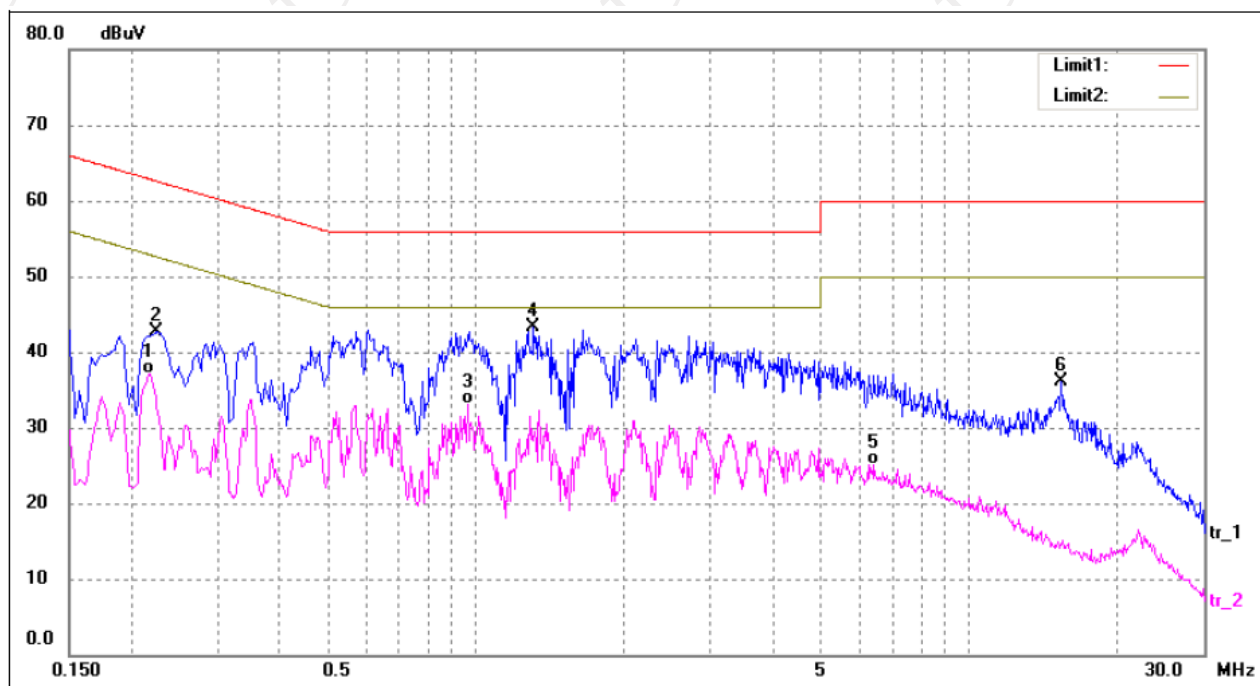


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2300	19.17	9.80	28.97	52.45	-23.48	AVG
2	0.2940	31.90	9.80	41.70	60.41	-18.71	QP
3*	1.2260	33.05	9.75	42.80	56.00	-13.20	QP
4	1.7140	16.68	9.74	26.42	46.00	-19.58	AVG
5	11.3380	19.08	9.54	28.62	50.00	-21.38	AVG
6	15.3660	35.34	9.62	44.96	60.00	-15.04	QP

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)




No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2180	27.38	9.80	37.18	52.89	-15.71	AVG
2	0.2260	32.86	9.80	42.66	62.60	-19.94	QP
3	0.9660	23.31	9.76	33.07	46.00	-12.93	AVG
4*	1.3100	33.47	9.75	43.22	56.00	-12.78	QP
5	6.4260	15.55	9.62	25.17	50.00	-24.83	AVG
6	15.4620	26.52	9.62	36.14	60.00	-23.86	QP

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.

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>	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:	 <p>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).</p>						
Test Mode:	Transmitting mode with modulation						
Test Procedure:	<ol style="list-style-type: none"> 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:	<p>Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0</p> <p>Conducted output power= measurement power</p>						

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
11a	CH36	16.12	24	PASS
11a	CH40	16.11	24	PASS
11a	CH48	15.92	24	PASS
11n(HT20)	CH36	16.32	24	PASS
11n(HT20)	CH40	15.41	24	PASS
11n(HT20)	CH48	15.63	24	PASS
11n(HT40)	CH38	16.11	24	PASS
11n(HT40)	CH46	15.41	24	PASS

Configuration Band IV (5725 - 5850 MHz)				
Mode	Test channel	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)	Result
11a	CH149	15.33	30	PASS
11a	CH157	16.27	30	PASS
11a	CH165	16.41	30	PASS
11n (HT20)	CH149	15.66	30	PASS
11n (HT20)	CH157	16.24	30	PASS
11n (HT20)	CH165	16.35	30	PASS
11n (HT40)	CH151	16.47	30	PASS
11n (HT40)	CH159	15.93	30	PASS

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:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 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).

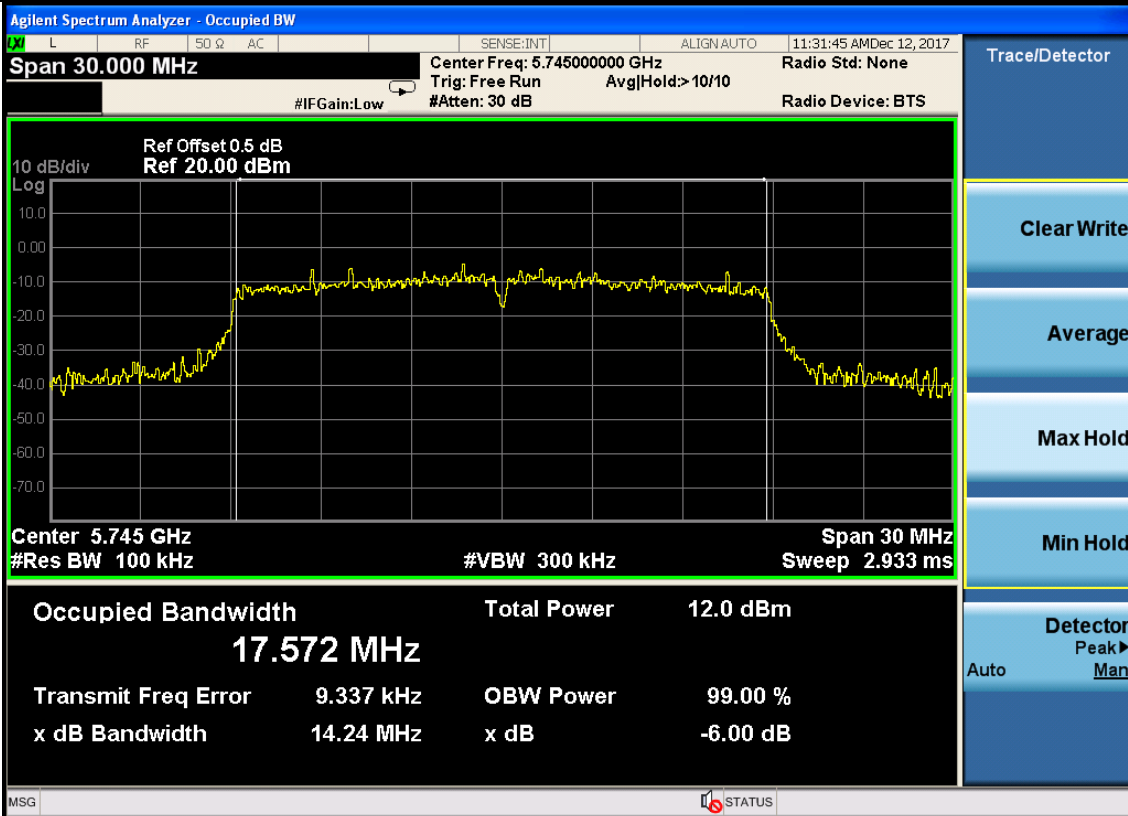
6.4.3. Test data

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	14.24	0.5	PASS
11a	CH157	5785	17.27	0.5	PASS
11a	CH161	5825	15.73	0.5	PASS
11n(HT20)	CH149	5745	15.16	0.5	PASS
11n(HT20)	CH157	5785	17.05	0.5	PASS
11n(HT20)	CH161	5825	15.78	0.5	PASS
11n(HT40)	CH151	5755	35.25	0.5	PASS
11n(HT40)	CH159	5795	35.45	0.5	PASS

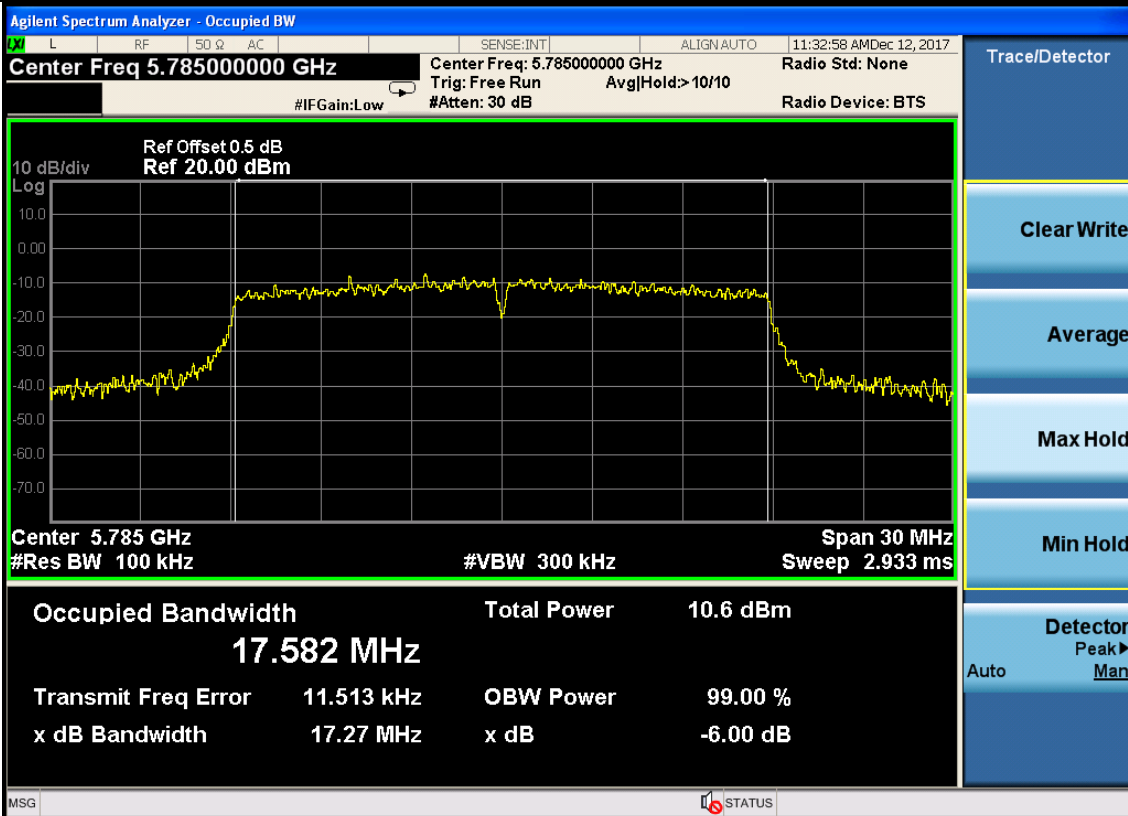
Test plots as follows:

Band IV (5725 – 5850 MHz)

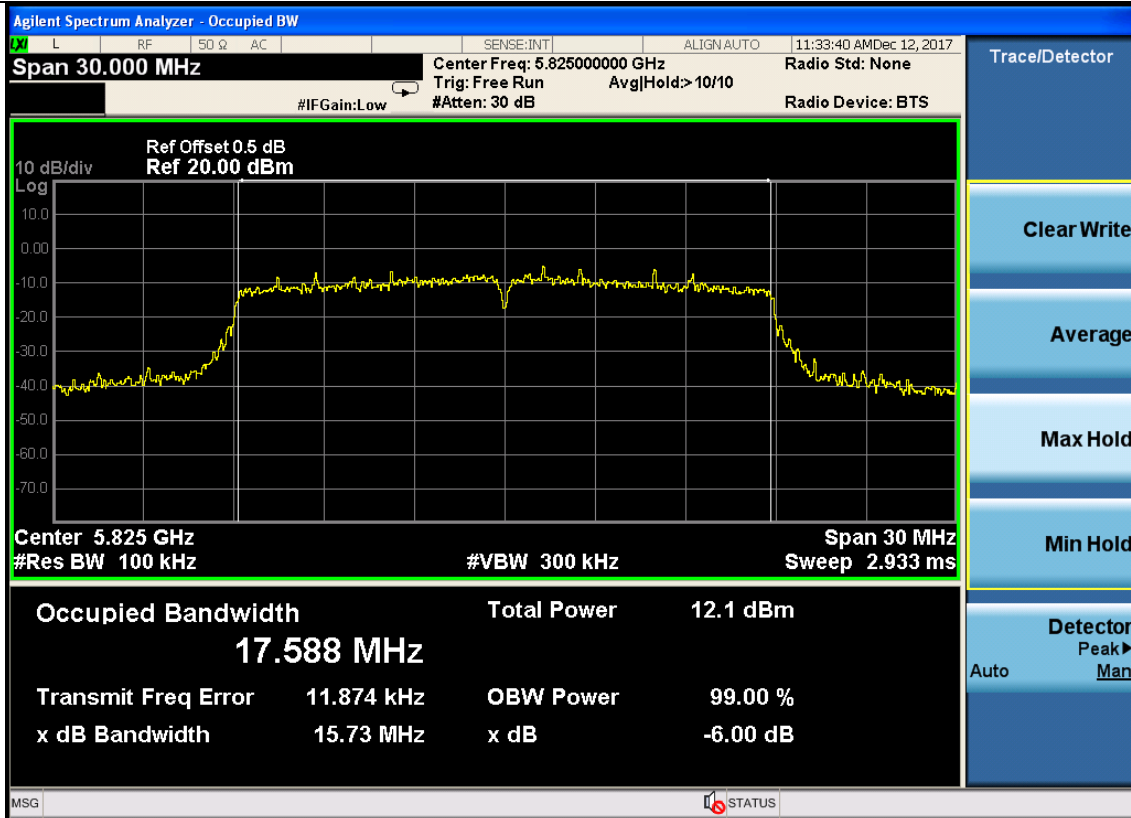
802.11a



Low

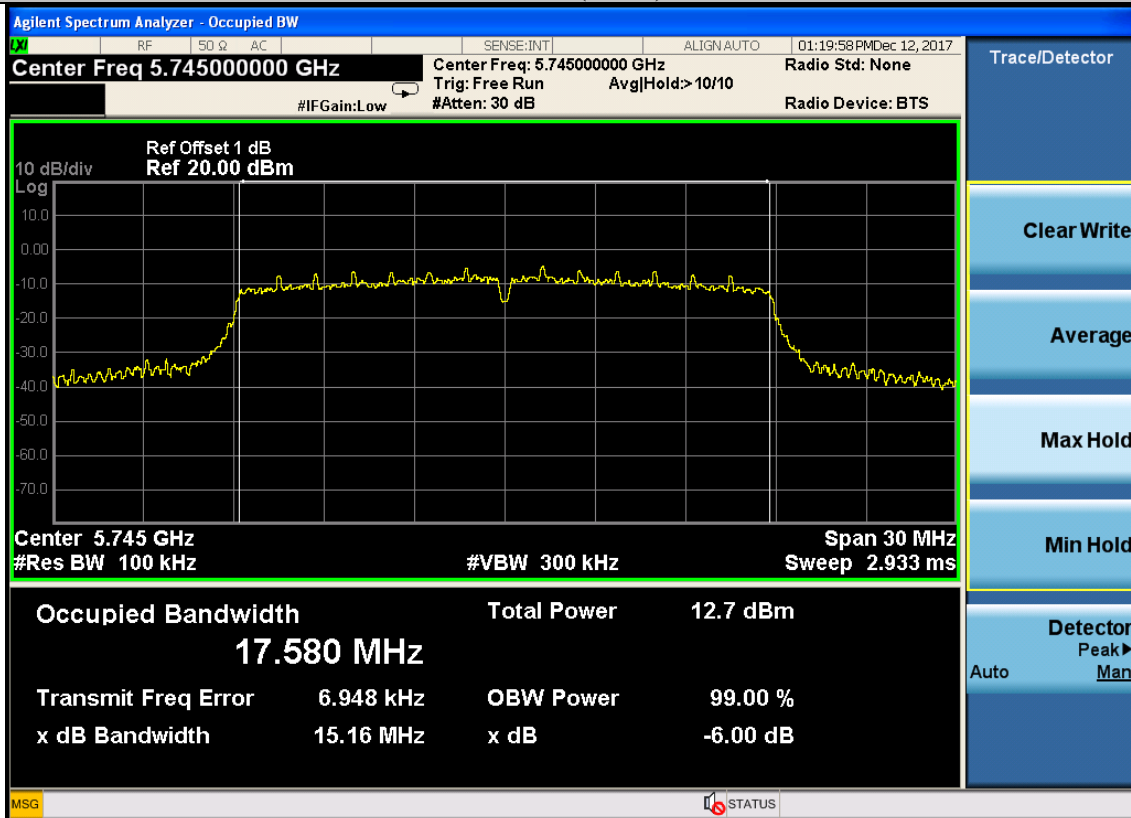


Mid

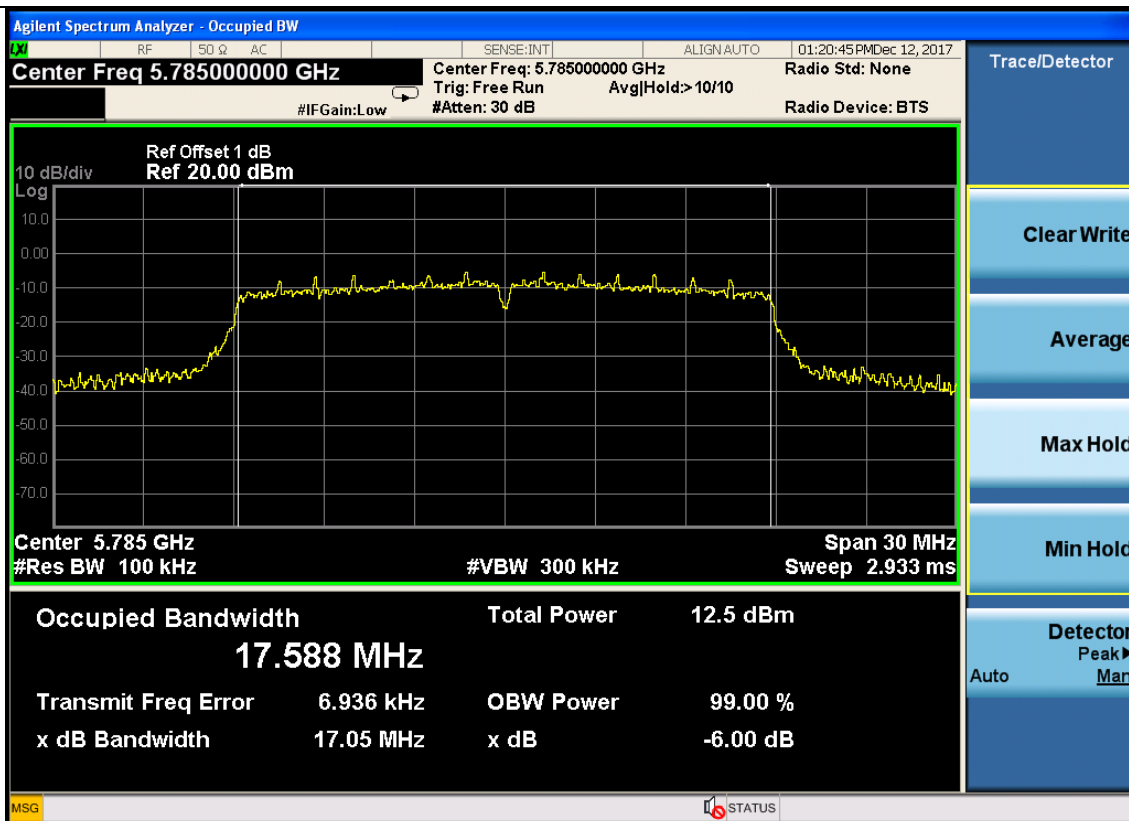


High

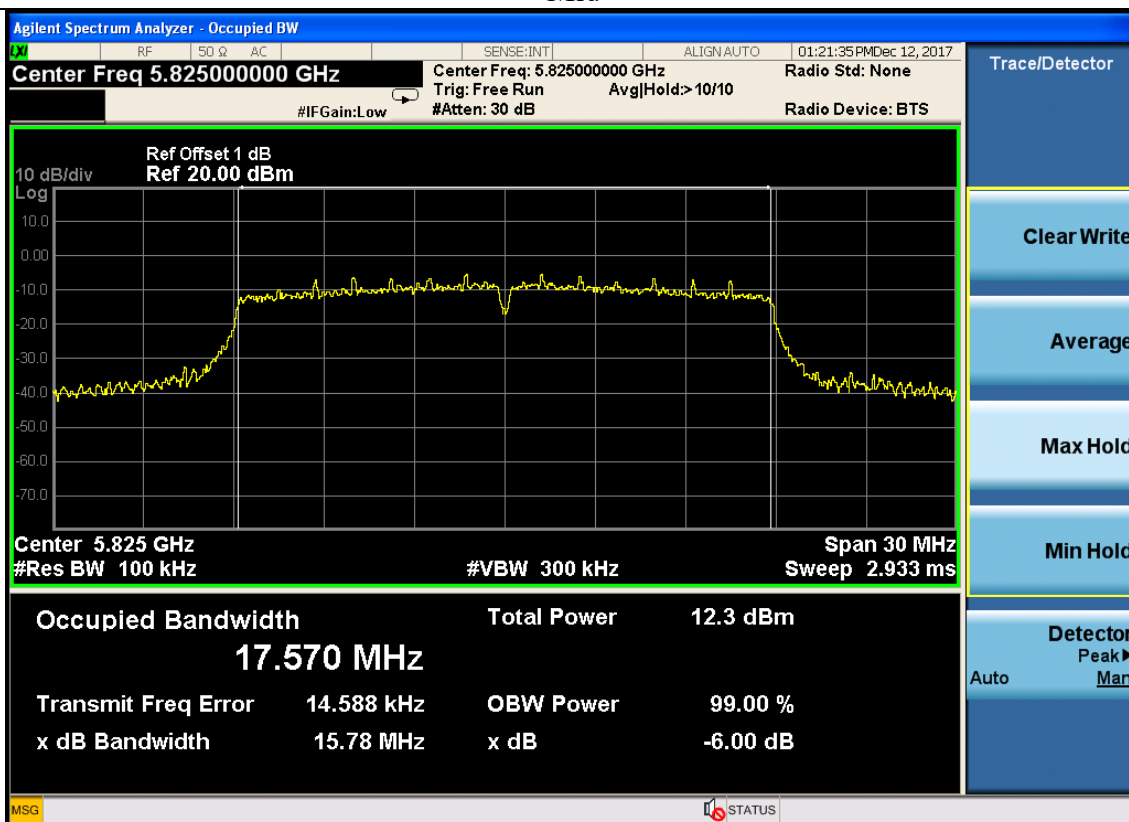
802.11n(HT20)



Low

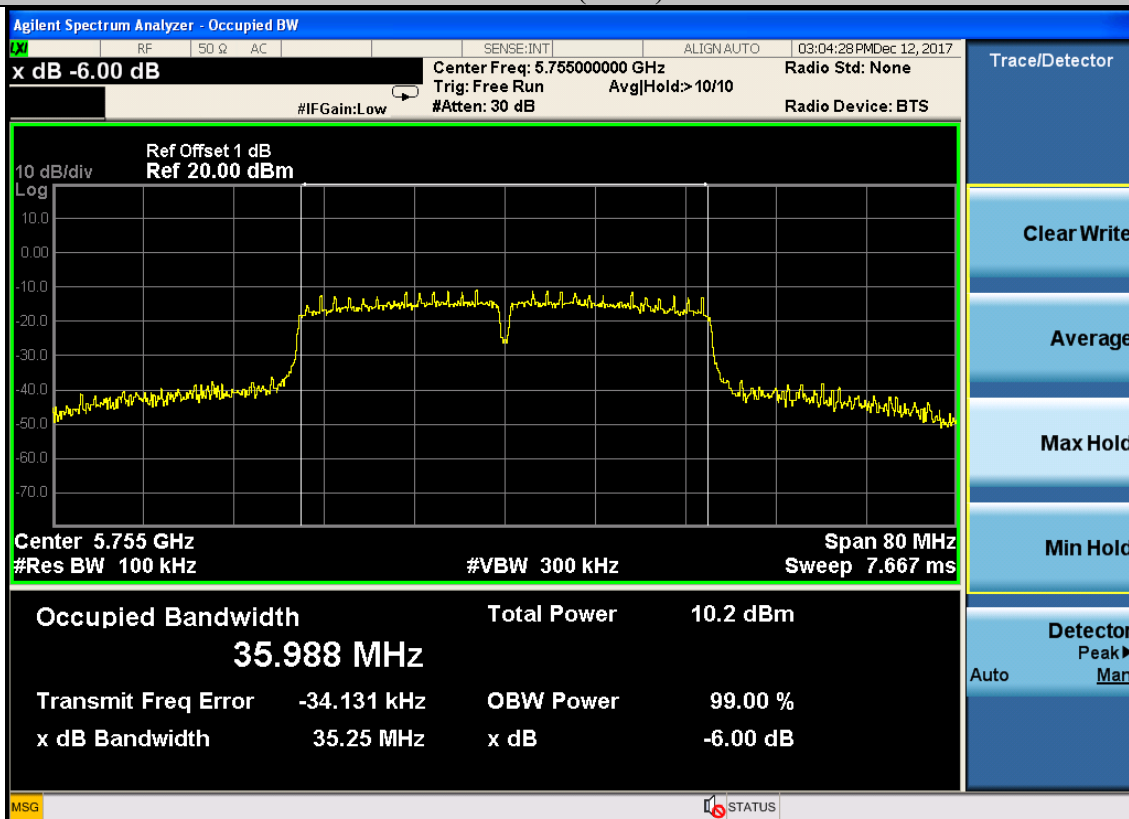


Mid

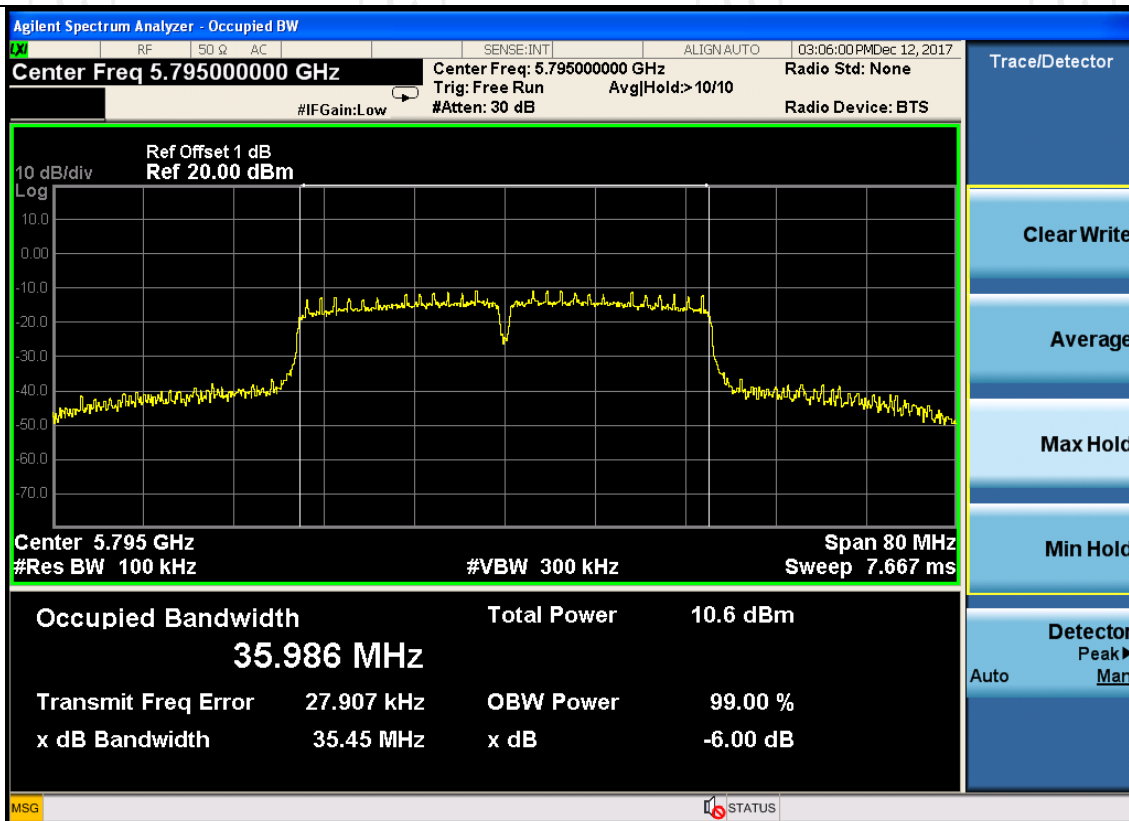


High

802.11n(HT40)




Low



High

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:	 <p>Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 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 $RBW = 1-5 \% EBW$, $VBW \geq 3RBW$, 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).

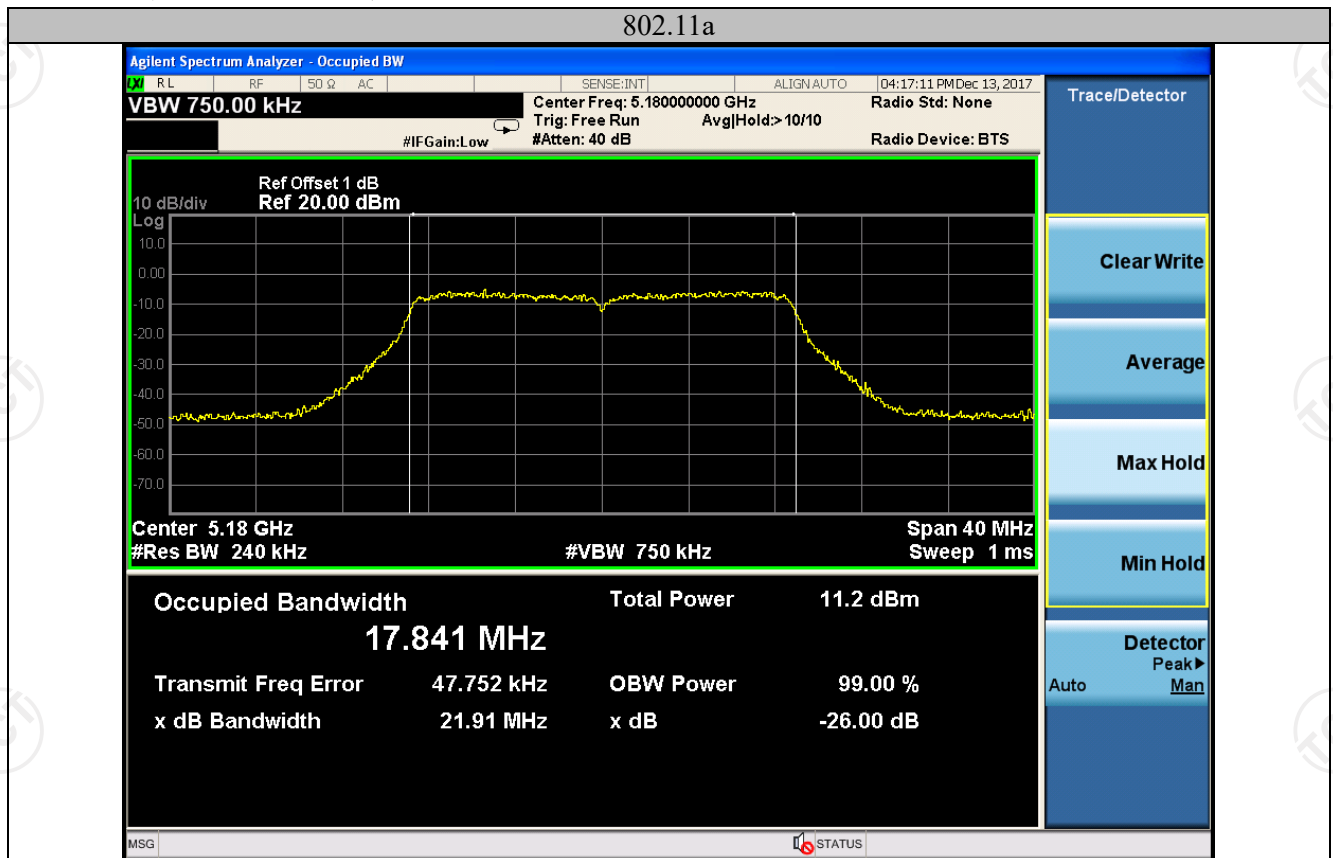
6.5.3. Test data

Band I

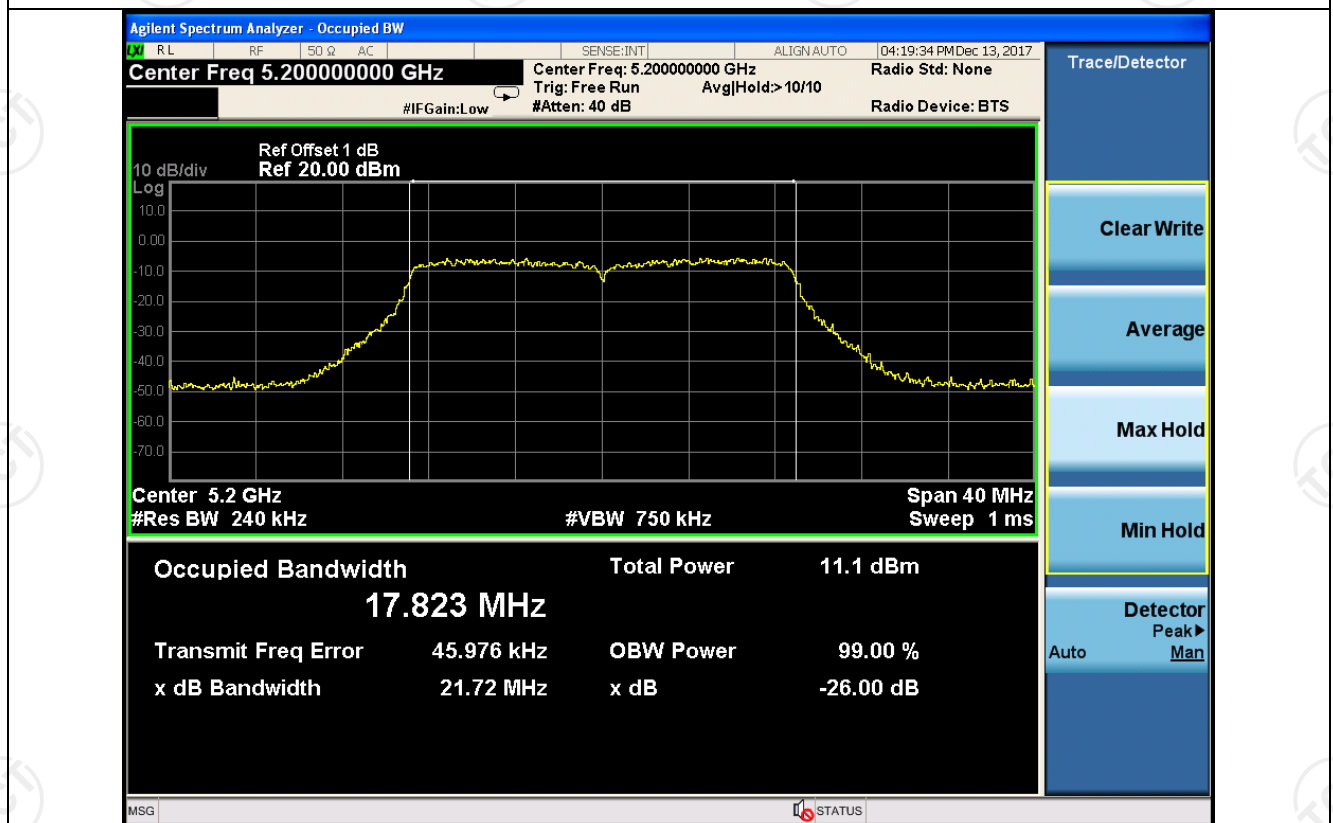
Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	CH36	5180	21.91	17.841
11a	CH40	5200	21.72	17.823
11a	CH48	5240	21.97	17.820
11n(HT20)	CH36	5180	21.91	17.854
11n(HT20)	CH40	5200	22.00	17.834
11n(HT20)	CH48	5240	21.97	17.841
11n(HT40)	CH38	5190	43.43	36.361
11n(HT40)	CH46	5230	43.24	36.469

Test plots as follows:

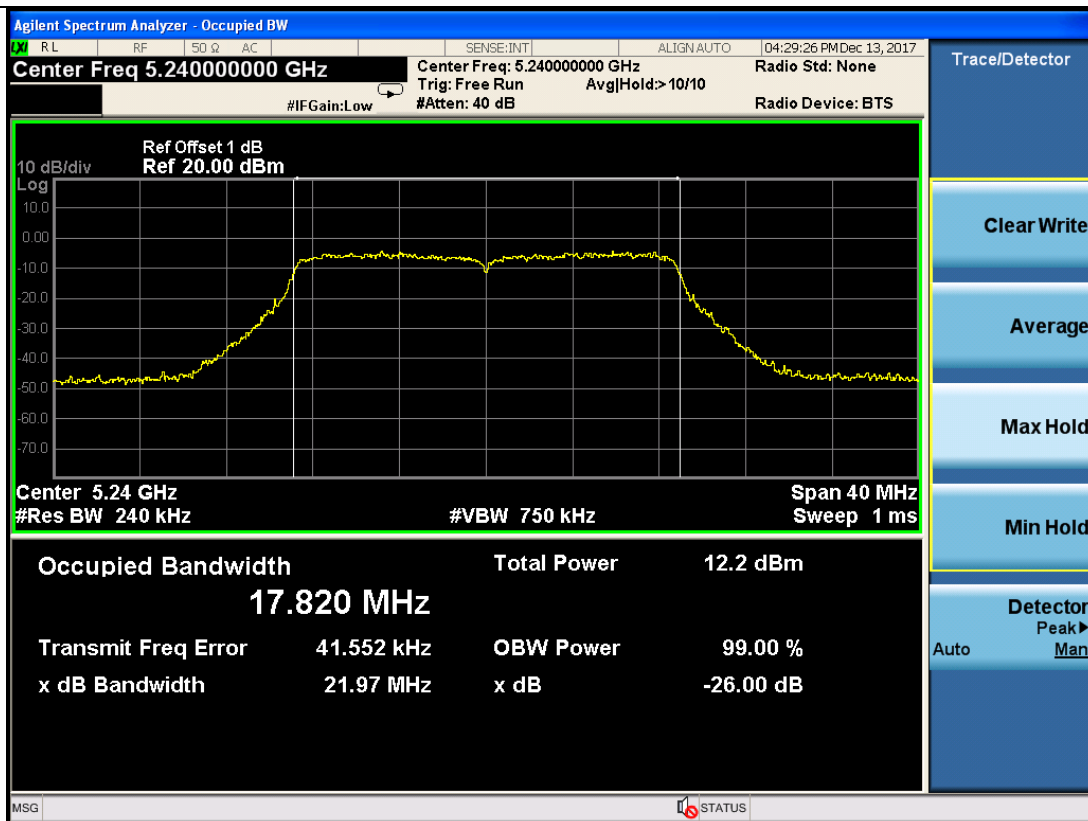
Band I (5150 – 5250 MHz)



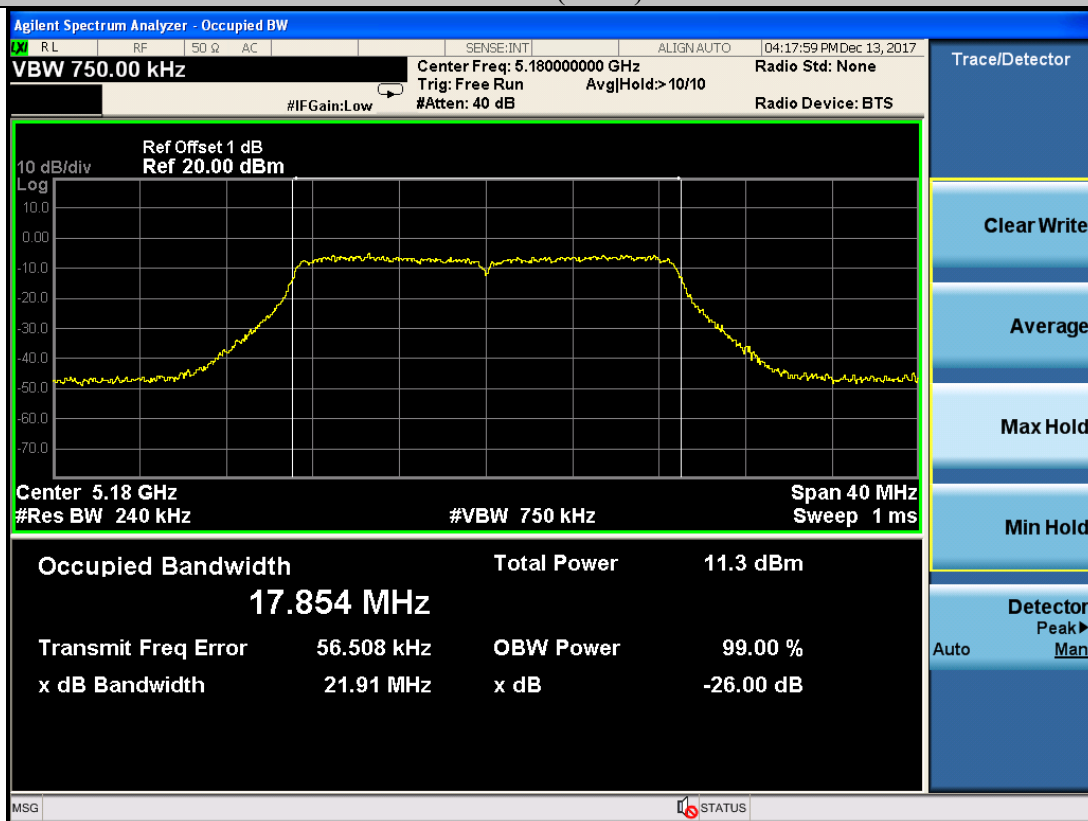
Low



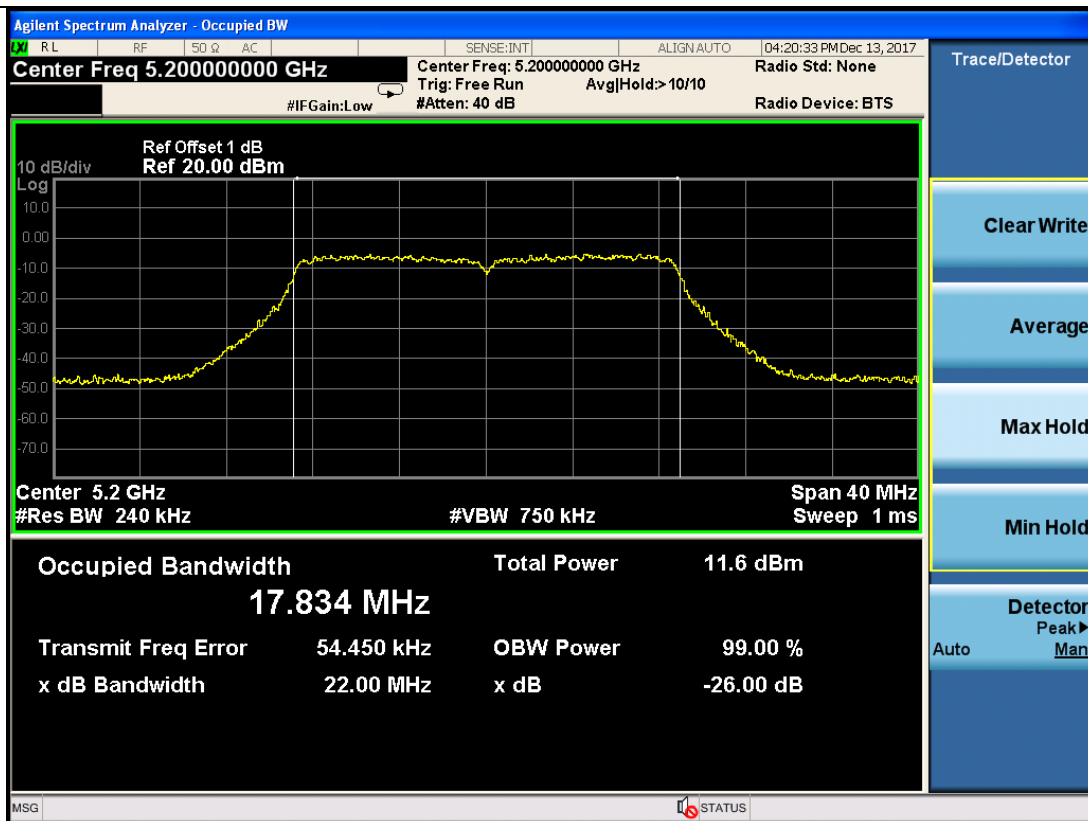
Mid



High



Low

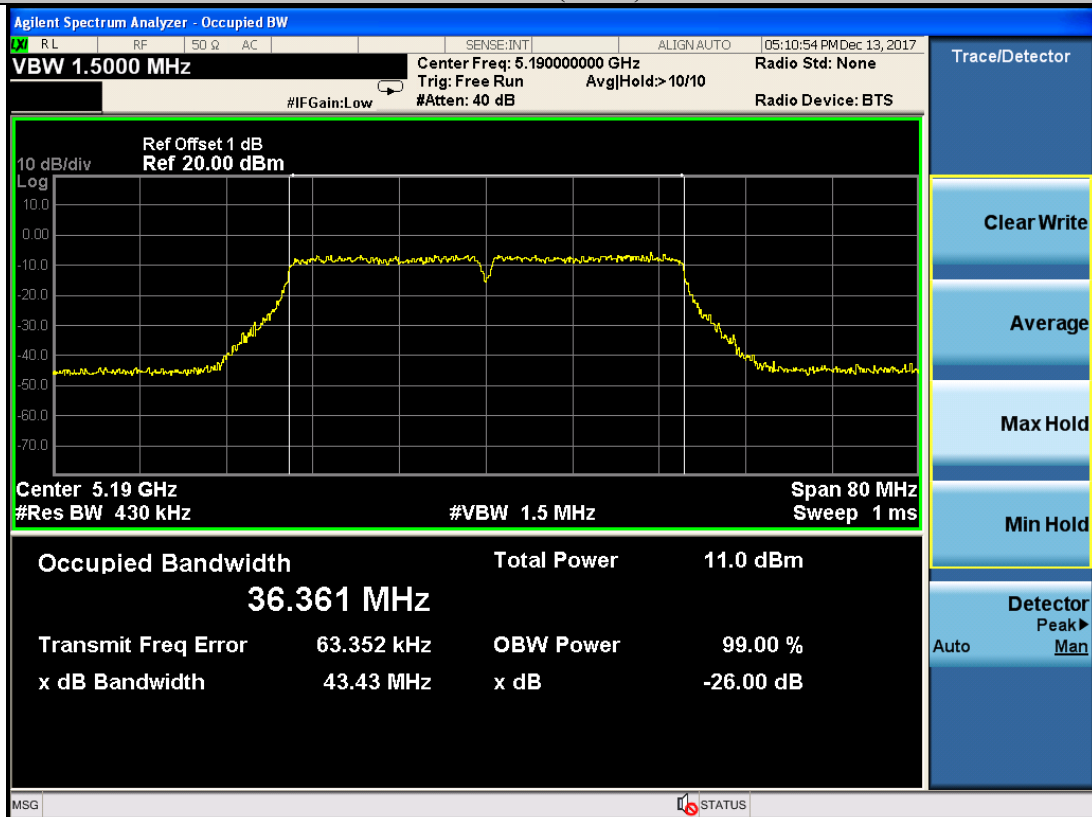


Mid

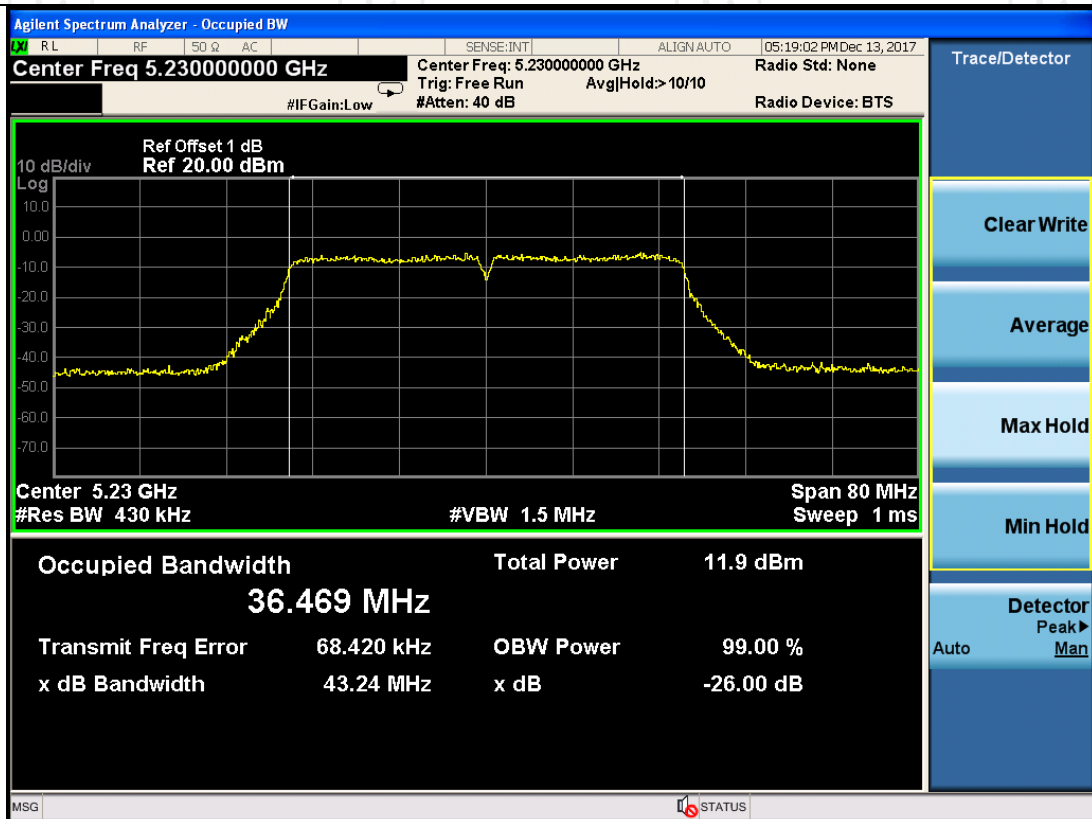


High

802.11n(HT40)




Low



High

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:	$\leq 11.00\text{dBm/MHz}$ 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:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
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

6.6.2. 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).

6.6.3. Test data

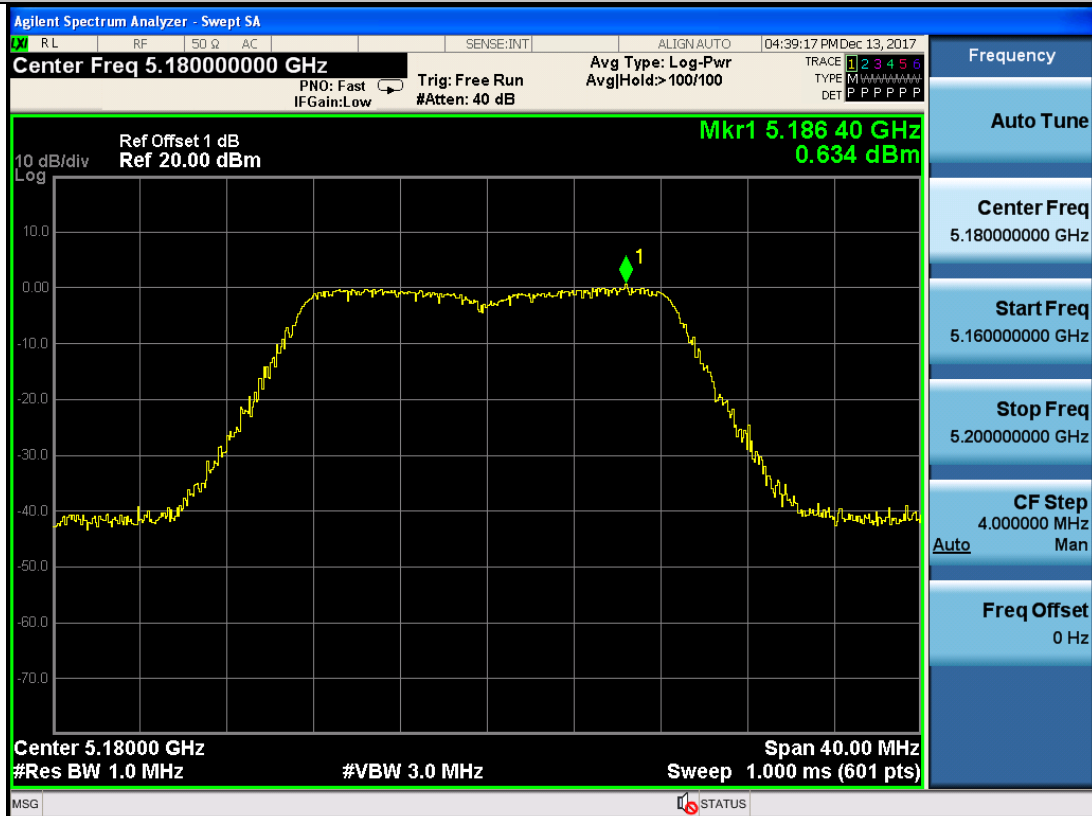
Configuration Band I (5150 - 5250 MHz)				
Mode	Test channel	Power Spectral Density	Limit (dBm/MHz)	Result
11a	CH36	0.634	11	PASS
11a	CH40	0.628	11	PASS
11a	CH48	1.592	11	PASS
11n(HT20)	CH36	-0.057	11	PASS
11n(HT20)	CH40	0.645	11	PASS
11n(HT20)	CH48	1.624	11	PASS
11n(HT40)	CH38	-1.970	11	PASS
11n(HT40)	CH46	-1.520	11	PASS

Configuration Band IV (5725 - 5850 MHz)				
Mode	Test channel	Power Spectral Density	Limit (dBm/500kHz)	Result
11a	CH149	3.961	30	PASS
11a	CH157	3.055	30	PASS
11a	CH161	3.193	30	PASS
11n(HT20)	CH149	2.976	30	PASS
11n(HT20)	CH157	3.055	30	PASS
11n(HT20)	CH161	3.099	30	PASS
11n(HT40)	CH151	0.153	30	PASS
11n(HT40)	CH159	-0.196	30	PASS

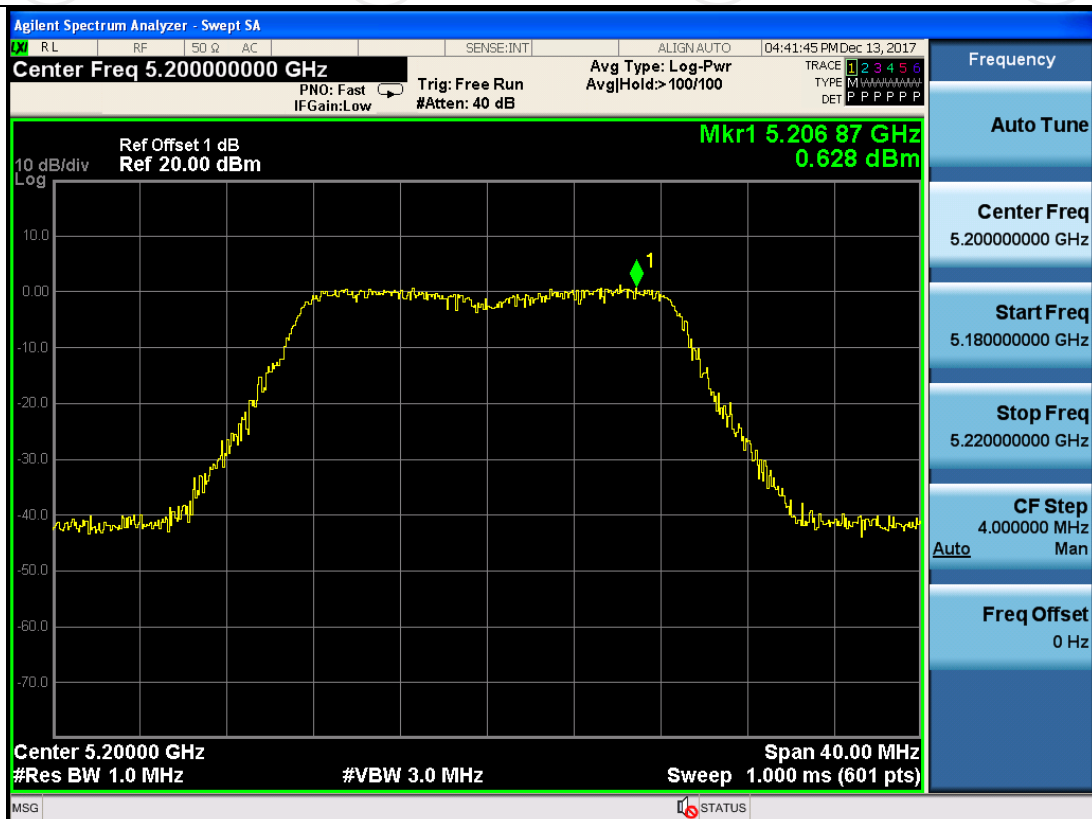
Test plots as follows:

Band I (5150 – 5250 MHz)

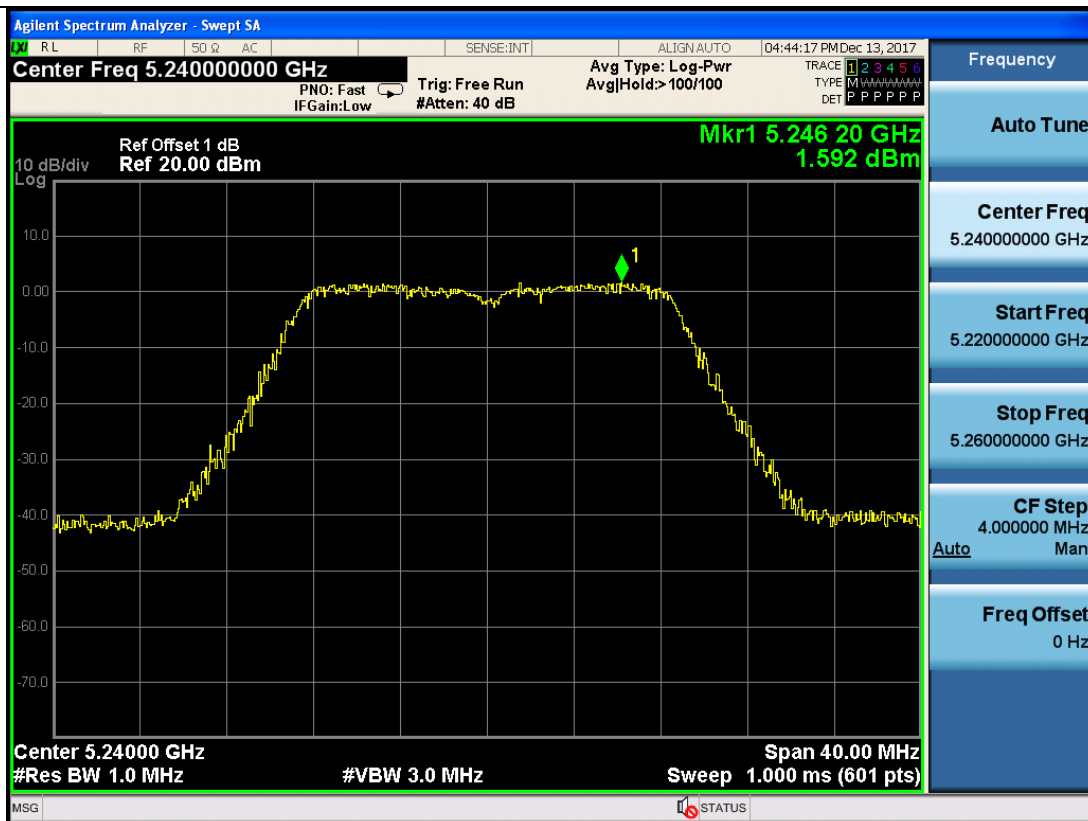
802.11a



Low

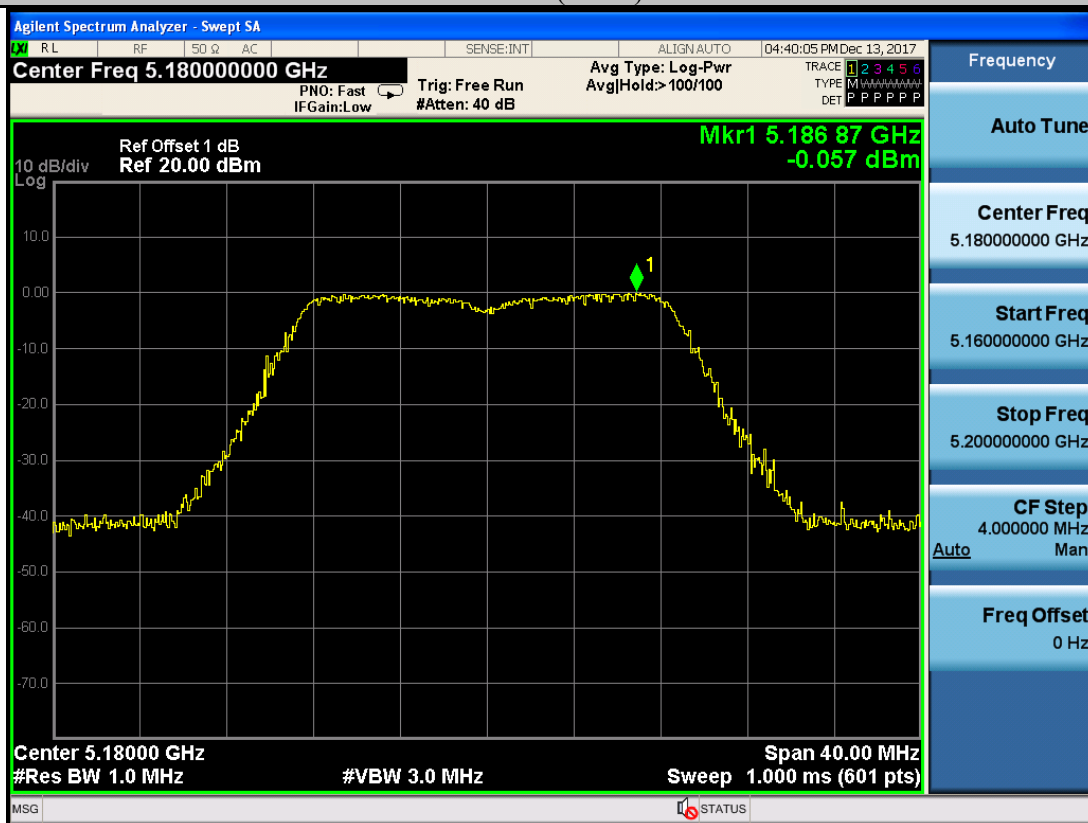


Mid

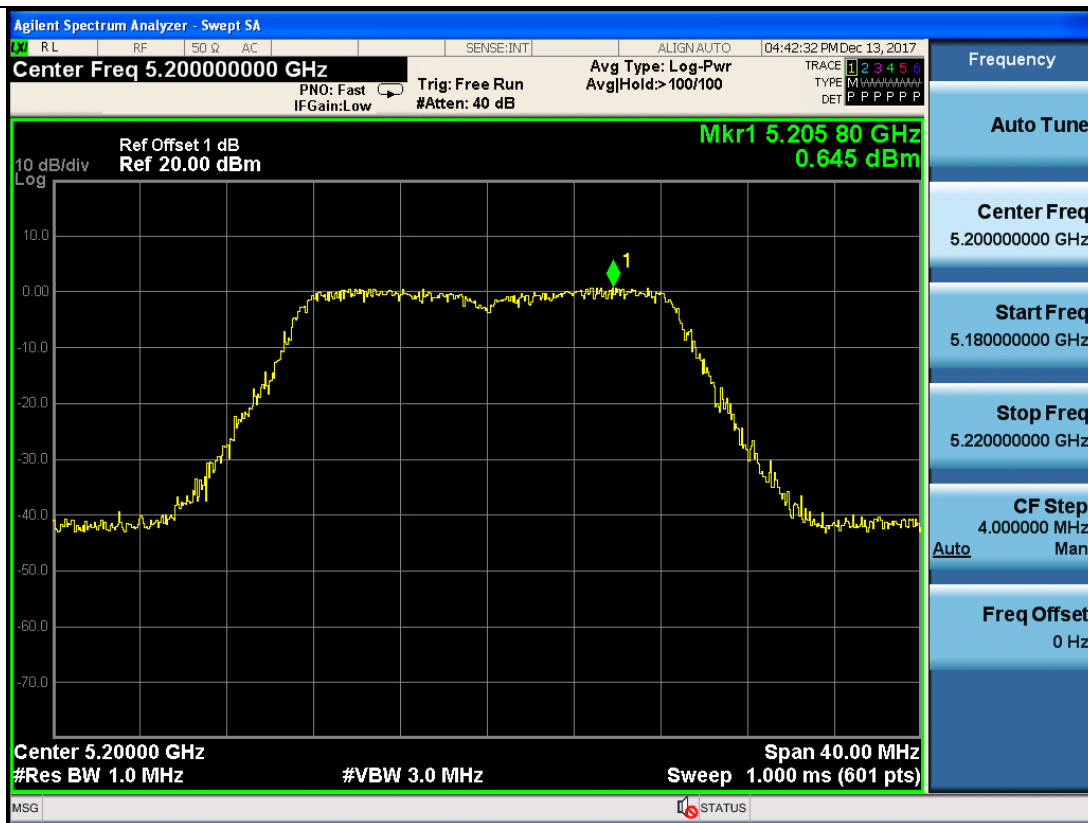


High

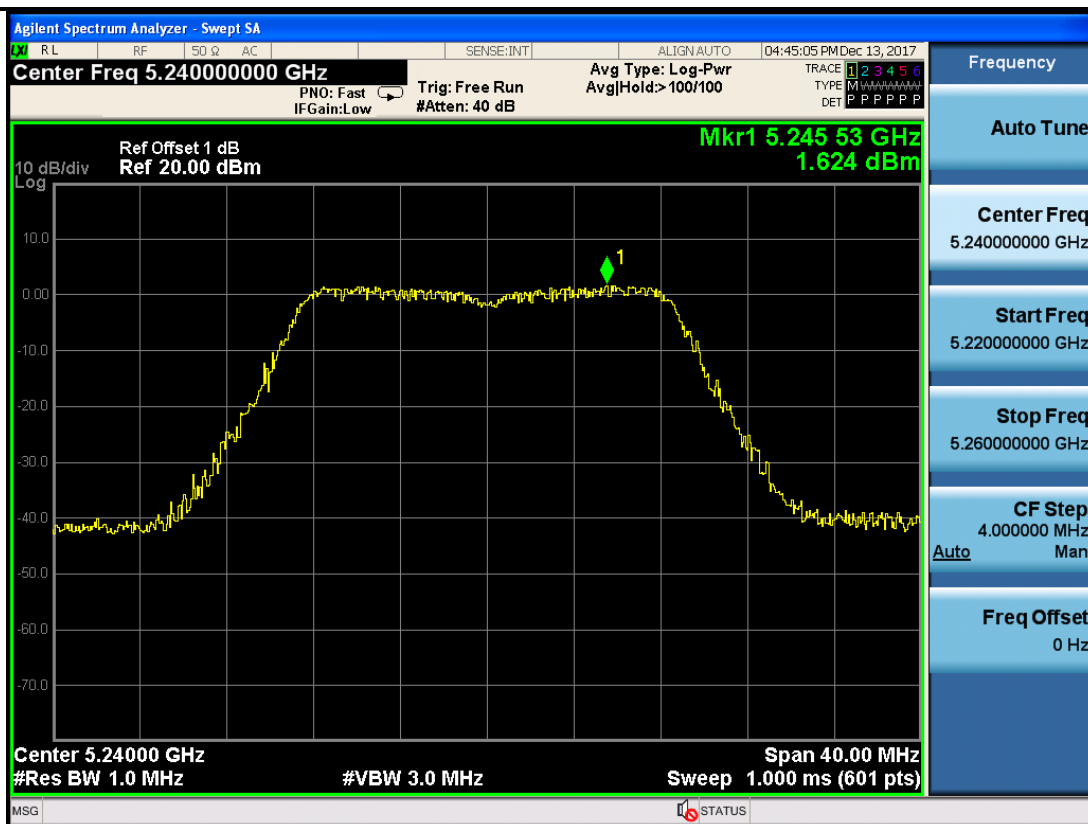
802.11n(HT20)



Low



Mid

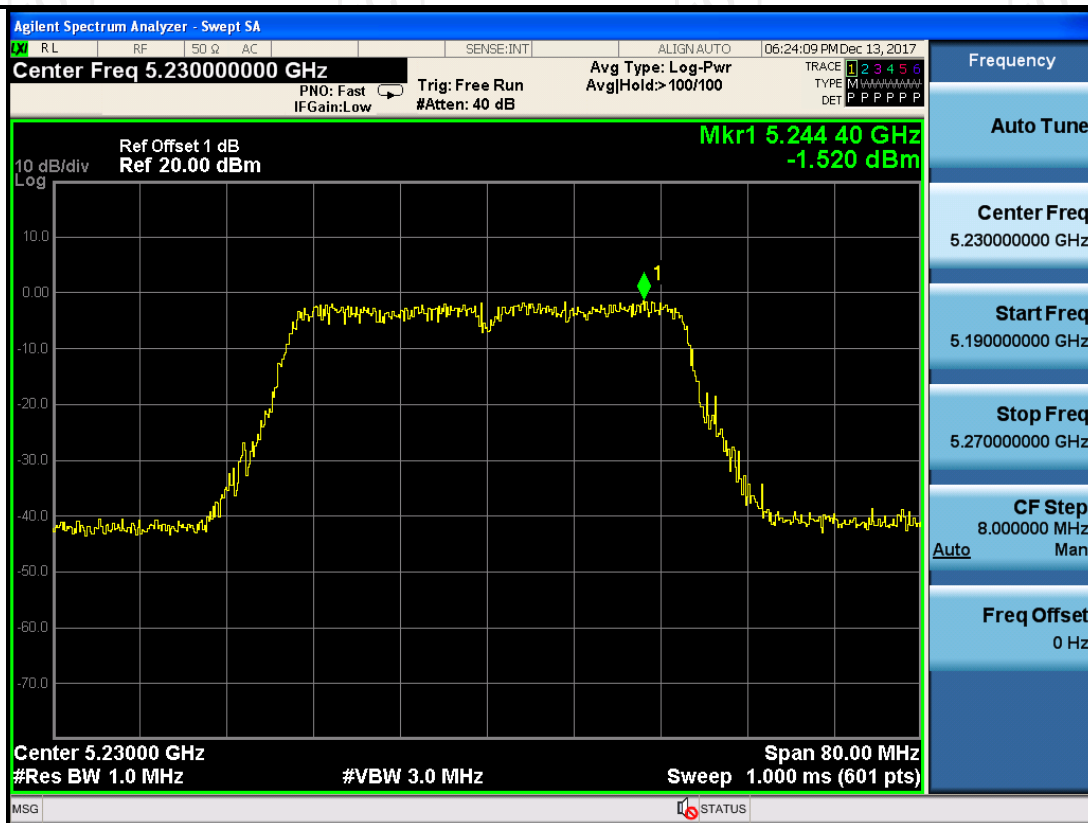


High

802.11n(HT40)



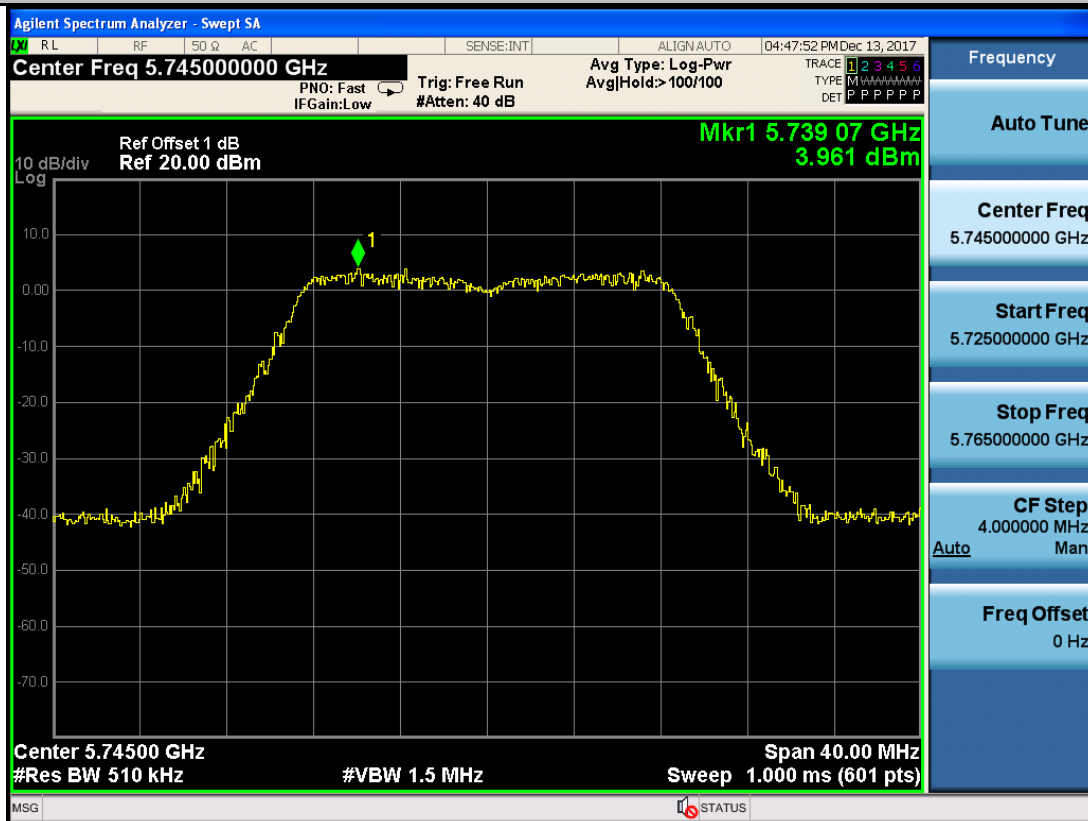
Low



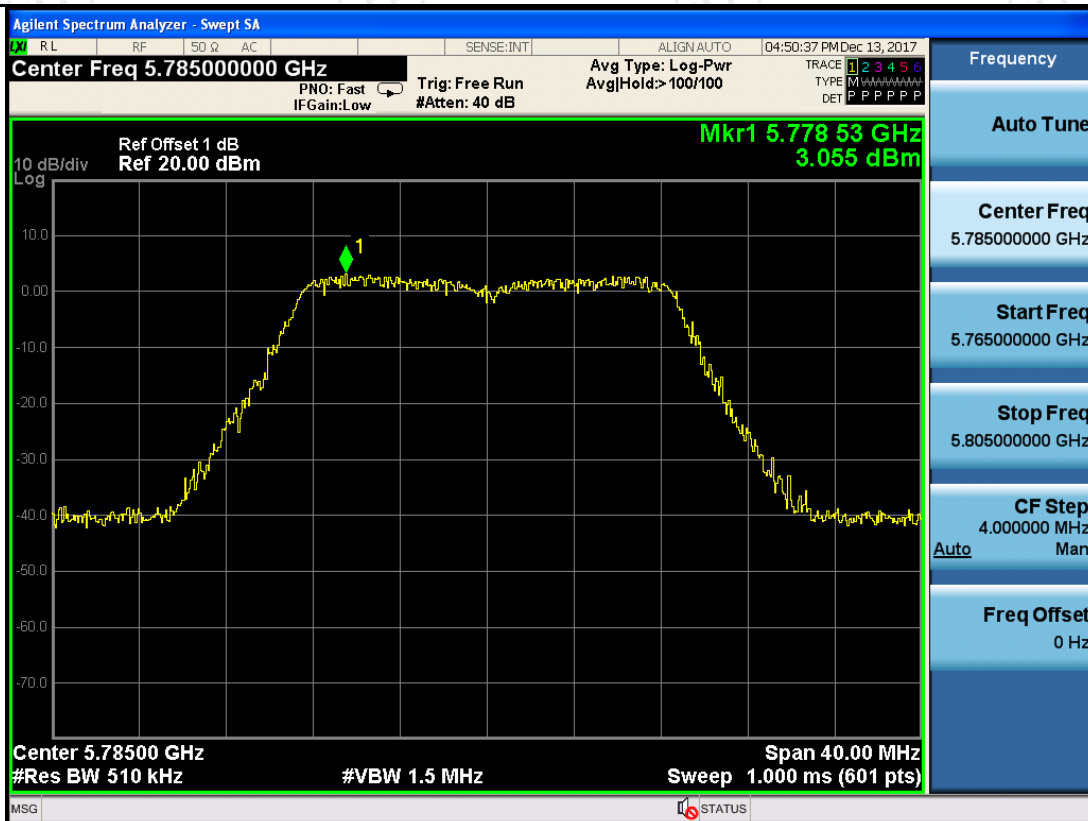
High

Band IV (5725 – 5850 MHz)

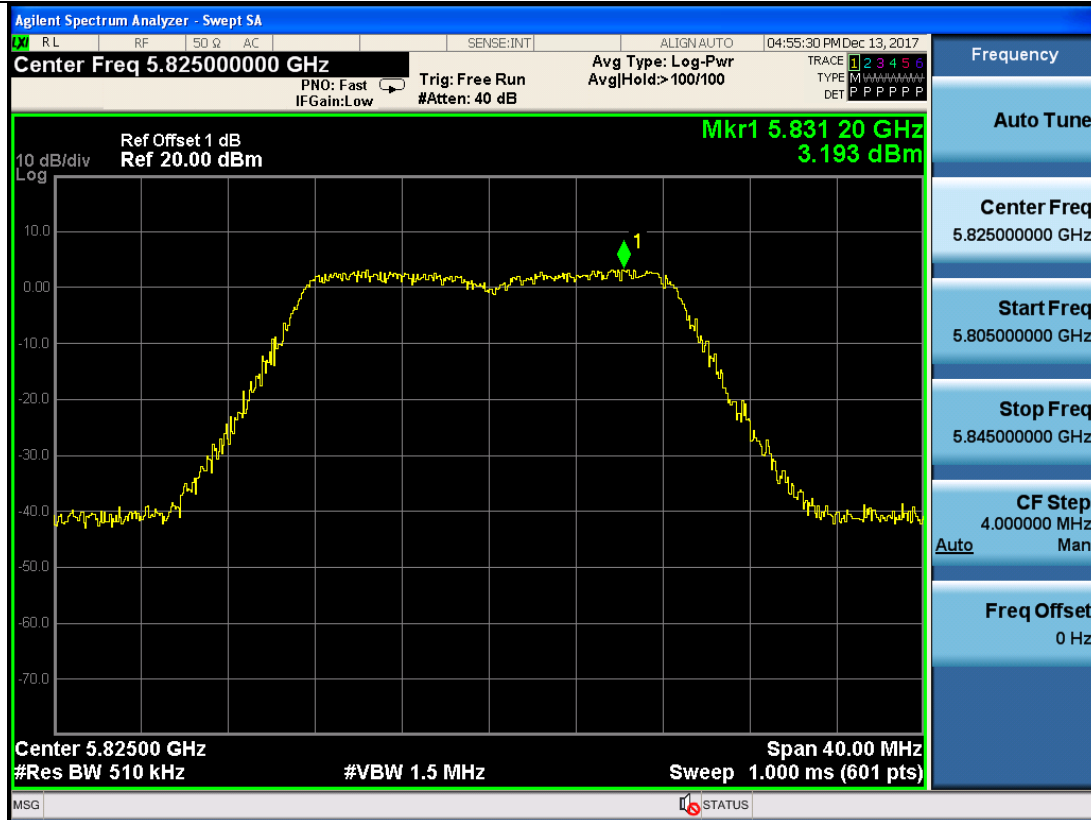
802.11a



Low

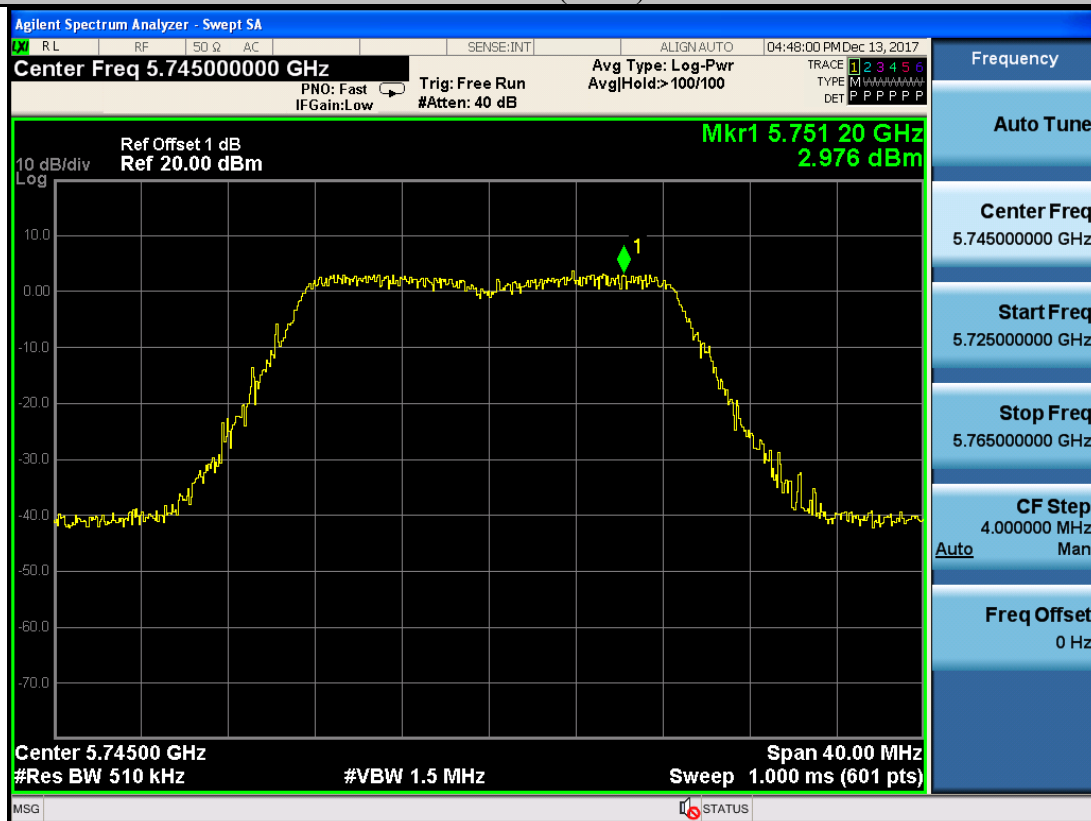


Mid

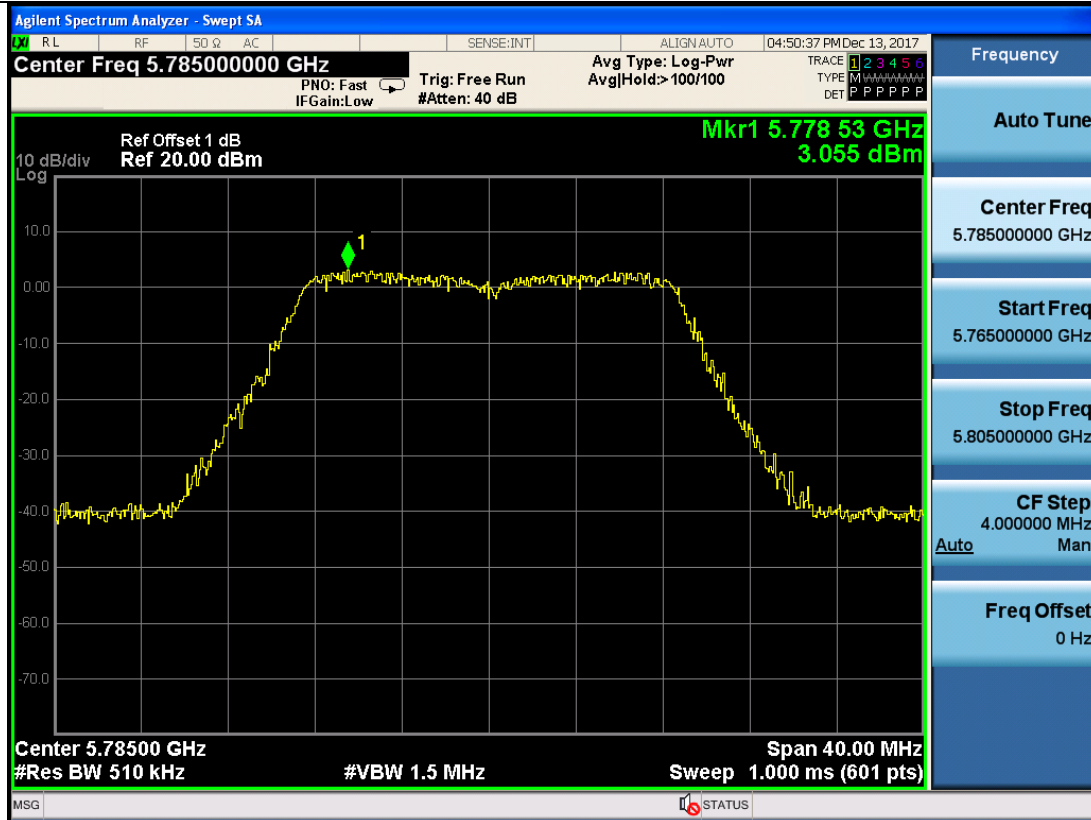


High

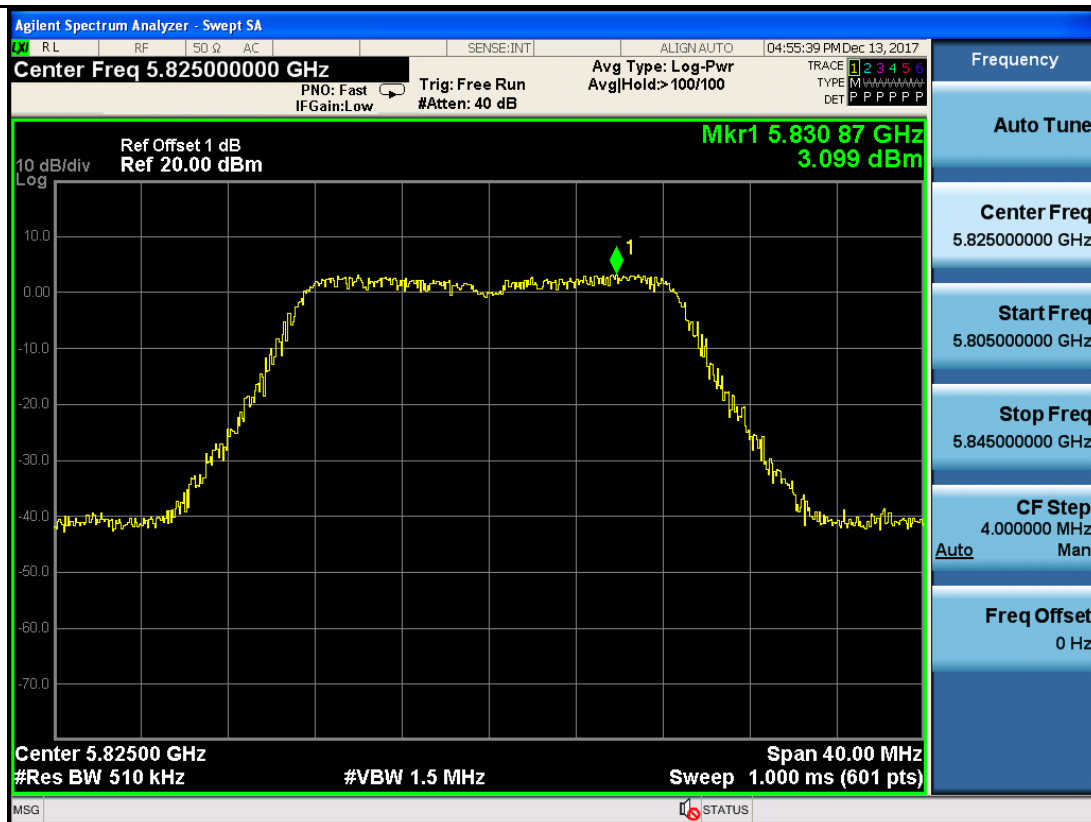
802.11n(HT20)



Low

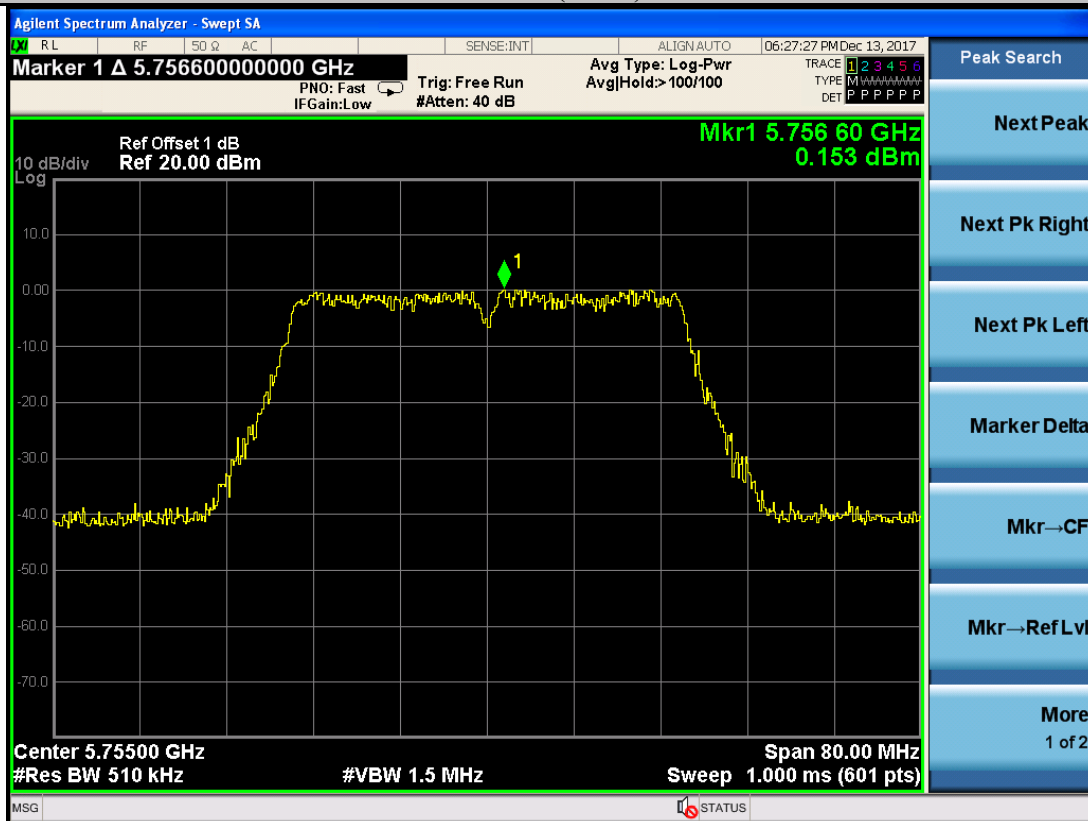


Mid

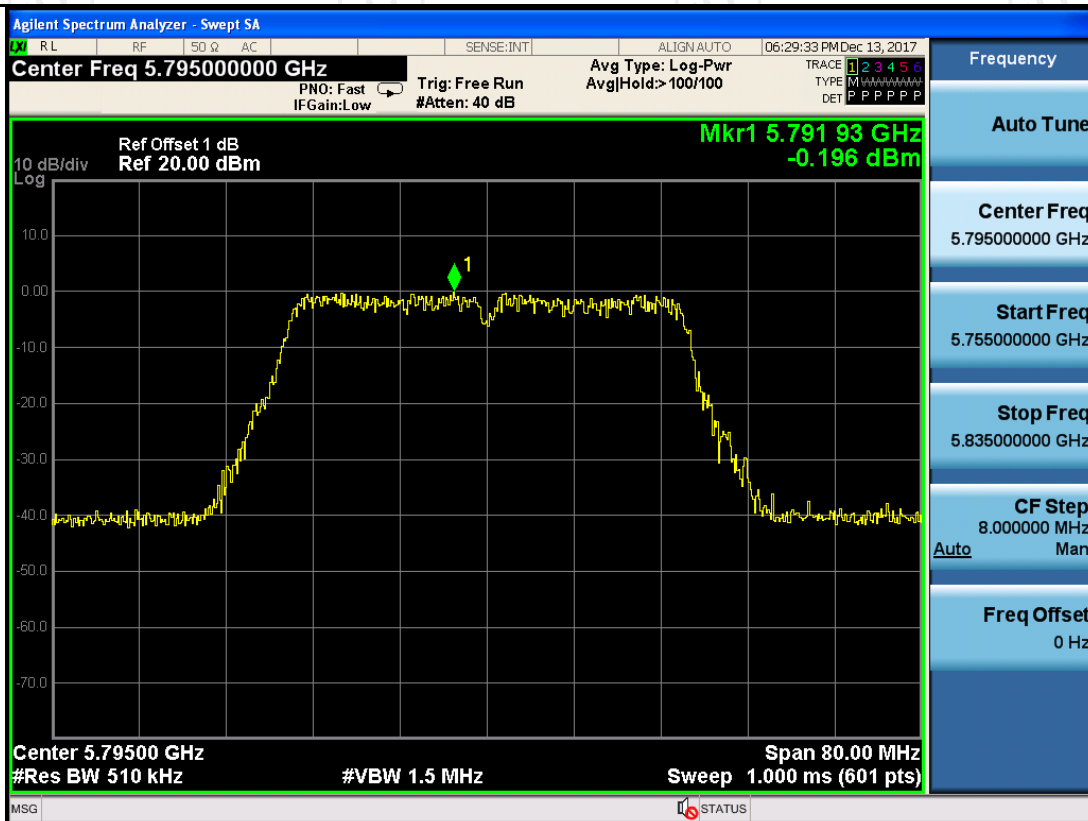


High

802.11n(HT40)



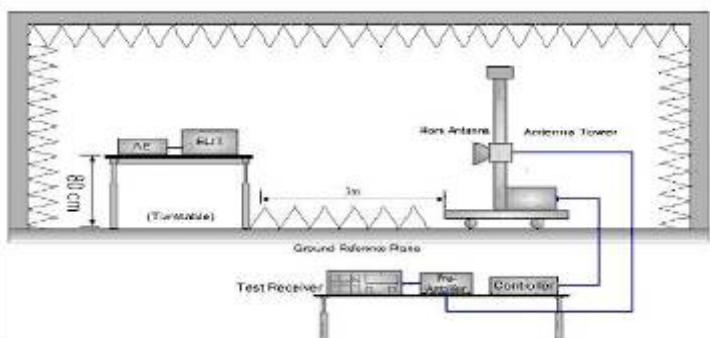
Low



High

6.7. Emission mask

6.7.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	<p>For transmitters operating in the 5.725-5.85 GHz band:</p> <p>All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p> <p>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 $\text{EIRP}(\text{dBm}) = -27 \text{ dBm}$</p> <p>$E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 105.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = 10 \text{ dBm}$</p> <p>$E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 122.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = 27 \text{ dBm}$</p>
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 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

	<p>value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>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.</p> <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p>
Test Result:	PASS

6.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Sep. 27, 2018
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 27, 2018
Pre-amplifier	HP	8447D	2727A05017	Sep. 27, 2018
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 27, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 27, 2018
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
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).

6.7.3. Test Data

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	54.97	-2.03	52.94	88.2	-35.26	peak
5650	/	-2.03	/	68.2	/	AVG
5700	52.46	-2.01	50.45	125.2	-74.75	peak
5700	/	-2.01	/	105.2	/	AVG
5720	52.50	-2.01	50.49	142.2	-91.71	peak
5720	/	-2.01	/	122.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	54.04	-2.03	52.01	88.2	-36.19	peak
5650	/	-2.03	/	68.2	/	AVG
5700	51.84	-2.01	49.83	125.2	-75.37	peak
5700	/	-2.01	/	105.2	/	AVG
5720	53.63	-2.01	51.62	142.2	-90.58	peak
5720	/	-2.01	/	122.2	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	73.70	-1.97	71.73	142.2	-70.47	peak
5830	/	-1.97	/	122.2	/	AVG
5850	52.45	-1.97	50.48	125.2	-74.72	peak
5850	/	-1.97	/	105.2	/	AVG
5900	55.93	-1.94	53.99	88.2	-34.21	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	72.82	-1.97	70.85	142.2	-71.35	peak
5830	/	-1.97	/	122.2	/	AVG
5850	53.69	-1.97	51.72	125.2	-73.48	peak
5850	/	-1.97	/	105.2	/	AVG
5900	54.33	-1.94	52.39	88.2	-35.81	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	55.50	-2.03	53.47	88.2	-34.73	peak
5650	/	-2.03	/	68.2	/	AVG
5700	53.63	-2.01	51.62	125.2	-73.58	peak
5700	/	-2.01	/	105.2	/	AVG
5720	51.74	-2.01	49.73	142.2	-92.47	peak
5720	/	-2.01	/	122.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	54.94	-2.03	52.91	88.2	-35.29	peak
5650	/	-2.03	/	68.2	/	AVG
5700	50.73	-2.01	48.72	125.2	-76.48	peak
5700	/	-2.01	/	105.2	/	AVG
5720	53.04	-2.01	51.03	142.2	-91.17	peak
5720	/	-2.01	/	122.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	72.78	-1.97	70.81	142.2	-71.39	peak
5830	/	-1.97	/	122.2	/	AVG
5850	53.63	-1.97	51.66	125.2	-73.54	peak
5850	/	-1.97	/	105.2	/	AVG
5900	54.46	-1.94	52.52	88.2	-35.68	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	73.42	-1.97	71.45	142.2	-70.75	peak
5830	/	-1.97	/	122.2	/	AVG
5850	54.86	-1.97	52.89	125.2	-72.31	peak
5850	/	-1.97	/	105.2	/	AVG
5900	55.37	-1.94	53.43	88.2	-34.77	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	53.64	-2.03	51.61	88.2	-36.59	peak
5650	/	-2.03	/	68.2	/	AVG
5700	53.89	-2.01	51.88	125.2	-73.32	peak
5700	/	-2.01	/	105.2	/	AVG
5720	53.74	-2.01	51.73	142.2	-90.47	peak
5720	/	-2.01	/	122.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	52.75	-2.03	50.72	88.2	-37.48	peak
5650	/	-2.03	/	68.2	/	AVG
5700	52.75	-2.01	50.74	125.2	-74.46	peak
5700	/	-2.01	/	105.2	/	AVG
5720	52.86	-2.01	50.85	142.2	-91.35	peak
5720	/	-2.01	/	122.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	71.69	-1.97	69.72	142.2	-72.48	peak
5830	/	-1.97	/	122.2	/	AVG
5850	54.42	-1.97	52.45	125.2	-72.75	peak
5850	/	-1.97	/	105.2	/	AVG
5900	53.85	-1.94	51.91	88.2	-36.29	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

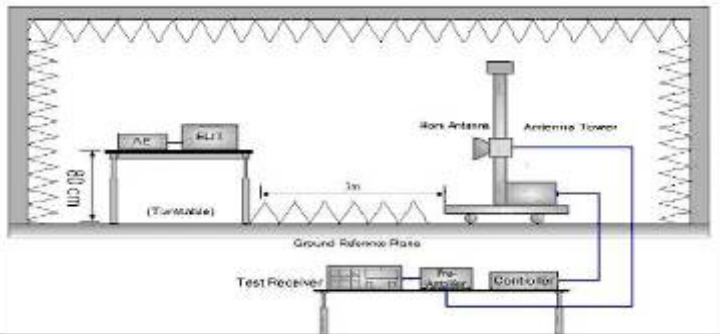
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5830	70.42	-1.97	68.45	142.2	-73.75	peak
5830	/	-1.97	/	122.2	/	AVG
5850	51.31	-1.97	49.34	125.2	-75.86	peak
5850	/	-1.97	/	105.2	/	AVG
5900	55.67	-1.94	53.73	88.2	-34.47	peak
5900	/	-1.94	/	68.2	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

6.8. Band edge

6.8.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	<p>For band I&II&III: $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2$ dB$\mu\text{V}/\text{m}$, for EIRP(dBm)= -27dBm</p> <p>For band IV(5715-5725MHz&5850-5860MHz): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2$ dB$\mu\text{V}/\text{m}$, for EIRP(dBm)= -17dBm;</p> <p>For band IV(other un-restricted band): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2$ dB$\mu\text{V}/\text{m}$, for EIRP(dBm)= -27dBm</p>
Test Setup:	 <p>The diagram illustrates the test setup. A transmitting antenna (EUT) is placed on a rotating table at a height of 0.8 meters. The table is rotated 360 degrees to determine the position of the highest radiation. The receiving antenna is mounted on a variable-height antenna tower, 3 meters away from the transmitting antenna. 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. The test receiver system, including a Test Receiver, Pre-Amplifier, and Controller, is connected to the receiving antenna.</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 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 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

6.8.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Sep. 27, 2018
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 27, 2018
Pre-amplifier	HP	8447D	2727A05017	Sep. 27, 2018
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 27, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 27, 2018
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
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).

6.8.3. Test Data

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5150	50.76	-2.49	48.27	74	-25.73	peak
5150	/	-2.49	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5150	51.57	-2.49	49.08	74	-24.92	peak
5150	/	-2.49	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Operation Mode: TX CH High with 5.2G
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	52.06	-2.28	49.78	74	-24.22	peak
5250	/	-2.28	/	54	/	AVG
5350	49.92	-2.11	47.81	74	-26.19	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	52.53	-2.28	50.25	74	-23.75	peak
5250	/	-2.28	/	54	/	AVG
5350	51.25	-2.11	49.14	74	-24.86	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	53.25	-2.49	50.76	74	-23.24	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.77	-2.49	49.28	74	-24.72	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	50.92	-2.28	48.64	74	-25.36	peak
5250	/	-2.28	/	54	/	AVG
5350	49.27	-2.11	47.16	74	-26.84	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	52.52	-2.28	50.24	74	-23.76	peak
5250	/	-2.28	/	54	/	AVG
5350	50.62	-2.11	48.51	74	-25.49	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	52.18	-2.49	49.69	74	-24.31	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5150	51.63	-2.49	49.14	74	-24.86	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.2G
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	52.52	-2.28	50.24	74	-23.76	peak
5250	/	-2.28	/	54	/	AVG
5350	50.43	-2.11	48.32	74	-25.68	peak
5350	/	-2.11	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5250	52.11	-2.28	49.83	74	-24.17	peak
5250	/	-2.28	/	54	/	AVG
5350	49.76	-2.11	47.65	74	-26.35	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 (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5460	53.80	-2.06	51.74	74	-22.26	peak
5460	/	-2.06	/	54	/	AVG
5725	51.21	-1.96	49.25	74	-24.75	peak
5725	/	-1.96	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5460	52.22	-2.06	50.16	74	-23.84	peak
5460	/	-2.06	/	54	/	AVG
5725	50.79	-1.96	48.83	74	-25.17	peak
5725	/	-1.96	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	51.28	-1.97	49.31	74	-24.69	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	49.24	-1.97	47.27	74	-26.73	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5460	51.34	-2.06	49.28	74	-24.72	peak
5460	/	-2.06	/	54	/	AVG
5725	48.60	-1.96	46.64	74	-27.36	peak
5725	/	-1.96	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5460	52.24	-2.06	50.18	74	-23.82	peak
5460	/	-2.06	/	54	/	AVG
5725	48.88	-1.96	46.92	74	-27.08	peak
5725	/	-1.96	/	54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	51.82	-1.97	49.85	74	-24.15	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	49.09	-1.97	47.12	74	-26.88	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5460	53.47	-2.06	51.41	74	-22.59	peak
5460	/	-2.06	/	54	/	AVG
5725	51.80	-1.96	49.84	74	-24.16	peak
5725	/	-1.96	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5460	52.34	-2.06	50.28	74	-23.72	peak
5460	/	-2.06	/	54	/	AVG
5725	48.99	-1.96	47.03	74	-26.97	peak
5725	/	-1.96	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

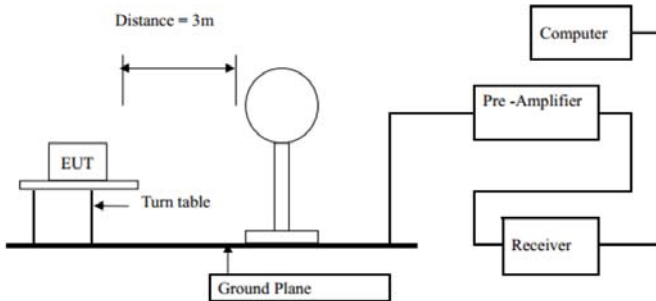
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	51.71	-1.97	49.74	74	-24.26	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

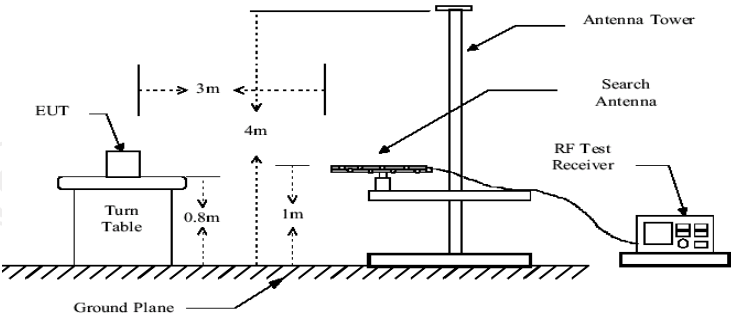
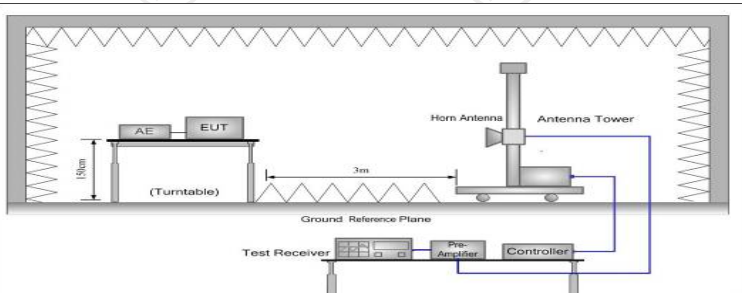
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	50.58	-1.97	48.61	74	-25.39	peak
5850	/	-1.97	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

6.9. Spurious Emission

6.9.1.1. Test Specification

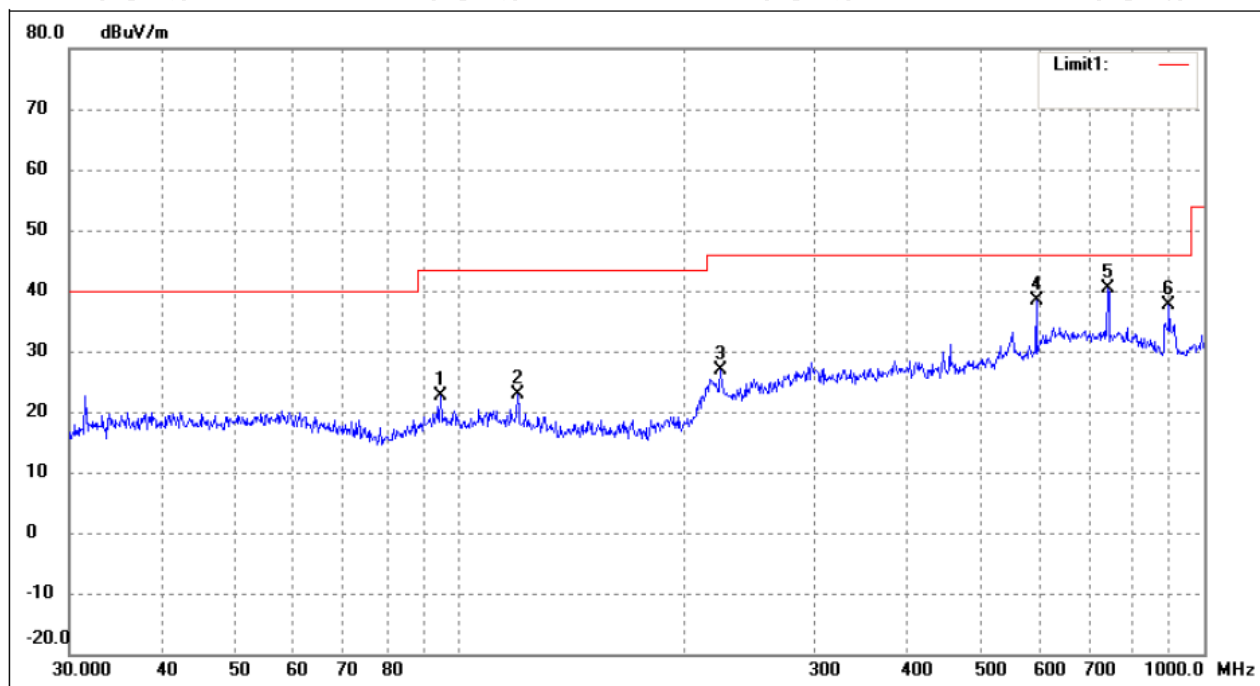
Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v01r04				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	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				
					

	<p>30MHz to 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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.
<p>Test results:</p>	<p>PASS</p>

6.9.2. Test Data

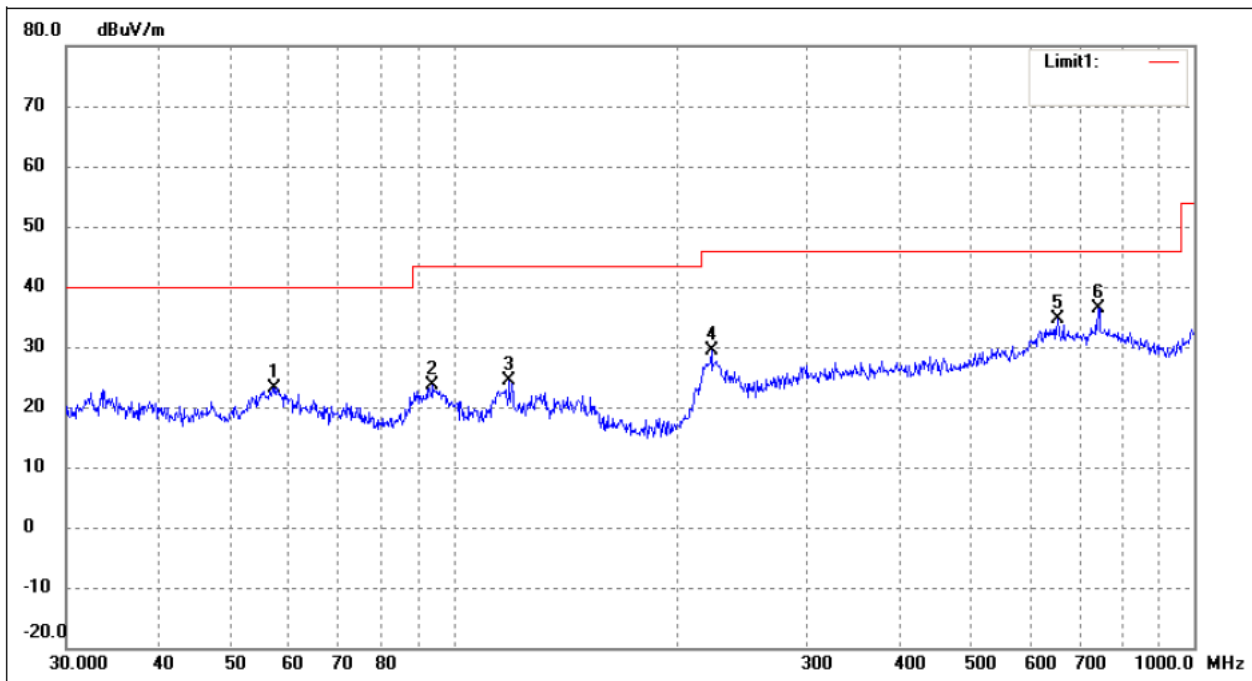
Please refer to following diagram for individual
Below 1GHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	94.4284	18.53	4.10	22.63	43.50	-20.87	51	100	peak
2	119.8556	18.18	4.82	23.00	43.50	-20.50	158	100	peak
3	224.5193	18.91	7.95	26.86	46.00	-19.14	59	100	peak
4	595.1329	20.50	17.85	38.35	46.00	-7.65	167	100	peak
5	742.2587	21.38	18.93	40.31	46.00	-5.69	186	100	peak
6	896.9965	22.27	15.39	37.66	46.00	-8.34	234	100	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	57.1914	18.14	4.99	23.13	40.00	-16.87	338	100	peak
2	93.7685	19.65	4.01	23.66	43.50	-19.84	98	100	peak
3	119.0180	19.64	4.82	24.46	43.50	-19.04	68	100	peak
4	222.9502	21.42	7.85	29.27	46.00	-16.73	99	100	peak
5	654.2318	16.83	17.71	34.54	46.00	-11.46	347	100	peak
6	742.2587	17.55	18.93	36.48	46.00	-9.52	107	100	peak

Above 1GHz

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	62.01	-4.59	57.42	74	-16.58	peak
3647	47.80	-4.59	43.21	54	-10.79	AVG
10360	51.42	3.74	55.16	74	-18.84	peak
10360	38.13	3.74	41.87	54	-12.13	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	61.00	-4.59	56.41	74	-17.59	peak
3647	47.53	-4.59	42.94	54	-11.06	AVG
10360	53.55	3.74	57.29	74	-16.71	peak
10360	40.19	3.74	43.93	54	-10.07	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	62.28	-4.59	57.69	74	-16.31	peak
3647	47.79	-4.59	43.2	54	-10.8	AVG
10400	53.80	3.74	57.54	74	-16.46	peak
10400	39.44	3.74	43.18	54	-10.82	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	60.27	-4.59	55.68	74	-18.32	peak
3647	46.91	-4.59	42.32	54	-11.68	AVG
10400	50.82	3.74	54.56	74	-19.44	peak
10400	37.67	3.74	41.41	54	-12.59	AVG
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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)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	61.36	-4.59	56.77	74	-17.23	peak
3647	47.99	-4.59	43.4	54	-10.6	AVG
10480	52.08	3.75	55.83	74	-18.17	peak
10480	37.69	3.75	41.44	54	-12.56	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	59.87	-4.59	55.28	74	-18.72	peak
3647	45.64	-4.59	41.05	54	-12.95	AVG
10480	50.88	3.75	54.63	74	-19.37	peak
10480	37.73	3.75	41.48	54	-12.52	AVG
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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 36 (802.11 n20 Mode with 5.2G)/5180
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	59.33	-4.79	54.54	74	-19.46	peak
3054	44.54	-4.79	39.75	54	-14.25	AVG
10360	53.62	3.74	57.36	74	-16.64	peak
10360	38.78	3.74	42.52	54	-11.48	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	59.52	-4.79	54.73	74	-19.27	peak
3054	46.11	-4.79	41.32	54	-12.68	AVG
10360	51.33	3.74	55.07	74	-18.93	peak
10360	36.84	3.74	40.58	54	-13.42	AVG
---	---	---	---	---	---	---
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

MID CH40 (802.11 n20 Mode with 5.2G)/5200
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	60.82	-4.79	56.03	74	-17.97	peak
3054	46.14	-4.79	41.35	54	-12.65	AVG
10400	50.84	3.74	54.58	74	-19.42	peak
10400	36.21	3.74	39.95	54	-14.05	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	59.31	-4.79	54.52	74	-19.48	peak
3054	45.94	-4.79	41.15	54	-12.85	AVG
10400	50.80	3.74	54.54	74	-19.46	peak
10400	36.19	3.74	39.93	54	-14.07	AVG
---	---	---	---	---	---	---
---	---	---	---	---	---	---

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

HIGH CH 48 (802.11 n20 Mode with 5.2G)/5240
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	59.81	-4.79	55.02	74	-18.98	peak
3054	46.37	-4.79	41.58	54	-12.42	AVG
10480	51.38	3.75	55.13	74	-18.87	peak
10480	36.63	3.75	40.38	54	-13.62	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	62.58	-4.79	57.79	74	-16.21	peak
3054	49.50	-4.79	44.71	54	-9.29	AVG
10480	52.80	3.75	56.55	74	-17.45	peak
10480	38.12	3.75	41.87	54	-12.13	AVG
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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 CH38 (802.11n40 Mode with 5.2G)/5190
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	59.30	-5.21	54.09	74	-19.91	peak
3432	45.25	-5.21	40.04	54	-13.96	AVG
10380	53.98	3.74	57.72	74	-16.28	peak
10380	40.45	3.74	44.19	54	-9.81	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	59.95	-5.21	54.74	74	-19.26	peak
3432	45.22	-5.21	40.01	54	-13.99	AVG
10380	51.97	3.74	55.71	74	-18.29	peak
10380	37.70	3.74	41.44	54	-12.56	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

HIGH CH46 (802.11n40 Mode with 5.2G)/5230
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	60.74	-5.21	55.53	74	-18.47	peak
3432	46.13	-5.21	40.92	54	-13.08	AVG
10460	53.56	3.75	57.31	74	-16.69	peak
10460	39.15	3.75	42.9	54	-11.1	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	59.40	-5.21	54.19	74	-19.81	peak
3432	45.98	-5.21	40.77	54	-13.23	AVG
10460	51.00	3.75	54.75	74	-19.25	peak
10460	37.38	3.75	41.13	54	-12.87	AVG
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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 (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	60.73	-4.59	56.14	74	-17.86	peak
3647	47.40	-4.59	42.81	54	-11.19	AVG
11570	51.98	4.21	56.19	74	-17.81	peak
11570	37.23	4.21	41.44	54	-12.56	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	62.45	-4.59	57.86	74	-16.14	peak
3647	48.98	-4.59	44.39	54	-9.61	AVG
11570	53.44	4.21	57.65	74	-16.35	peak
11570	38.60	4.21	42.81	54	-11.19	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	61.38	-4.59	56.79	74	-17.21	peak
3647	46.76	-4.59	42.17	54	-11.83	AVG
11570	52.40	4.21	56.61	74	-17.39	peak
11570	38.22	4.21	42.43	54	-11.57	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	59.87	-4.59	55.28	74	-18.72	peak
3647	46.69	-4.59	42.1	54	-11.9	AVG
11570	50.32	4.21	54.53	74	-19.47	peak
11570	35.54	4.21	39.75	54	-14.25	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	62.17	-4.59	57.58	74	-16.42	peak
3647	49.04	-4.59	44.45	54	-9.55	AVG
11650	52.27	4.84	57.11	74	-16.89	peak
11650	38.92	4.84	43.76	54	-10.24	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3647	59.06	-4.59	54.47	74	-19.53	peak
3647	45.22	-4.59	40.63	54	-13.37	AVG
11650	51.60	4.84	56.44	74	-17.56	peak
11650	37.38	4.84	42.22	54	-11.78	AVG
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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 n20 Mode with 5.8G)/5745

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	61.67	-4.79	56.88	74	-17.12	peak
3054	47.86	-4.79	43.07	54	-10.93	AVG
11570	51.05	4.21	55.26	74	-18.74	peak
11570	37.82	4.21	42.03	54	-11.97	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	60.26	-4.79	55.47	74	-18.53	peak
3054	45.64	-4.79	40.85	54	-13.15	AVG
11570	50.94	4.21	55.15	74	-18.85	peak
11570	37.22	4.21	41.43	54	-12.57	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

MID CH157 (802.11 n20 Mode with 5.8G)/5785
Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3054	59.06	-4.79	54.27	74	-19.73	peak
3054	45.75	-4.79	40.96	54	-13.04	AVG
11570	52.46	4.21	56.67	74	-17.33	peak
11570	39.01	4.21	43.22	54	-10.78	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3054	59.05	-4.79	54.26	74	-19.74	peak
3054	44.72	-4.79	39.93	54	-14.07	AVG
11570	53.10	4.21	57.31	74	-16.69	peak
11570	39.29	4.21	43.5	54	-10.5	AVG
---	---	---	---	---	---	---
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

HIGH CH 165 (802.11 n20 Mode with 5.8G)/5825
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	62.25	-4.79	57.46	74	-16.54	peak
3054	48.38	-4.79	43.59	54	-10.41	AVG
11650	53.02	4.84	57.86	74	-16.14	peak
11650	38.66	4.84	43.5	54	-10.5	AVG
---	---	---	---	---	---	---
---	---	---	---	---	---	---

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3054	61.32	-4.79	56.53	74	-17.47	peak
3054	47.59	-4.79	42.8	54	-11.2	AVG
11650	51.93	4.84	56.77	74	-17.23	peak
11650	37.15	4.84	41.99	54	-12.01	AVG
---	---	---	---	---	---	---
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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 CH151 (802.11n40 Mode with 5.8G)/5755
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	60.54	-5.21	55.33	74	-18.67	peak
3432	46.92	-5.21	41.71	54	-12.29	AVG
11510	52.56	4.21	56.77	74	-17.23	peak
11510	37.72	4.21	41.93	54	-12.07	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	61.43	-5.21	56.22	74	-17.78	peak
3432	47.78	-5.21	42.57	54	-11.43	AVG
11510	53.57	4.21	57.78	74	-16.22	peak
11510	40.46	4.21	44.67	54	-9.33	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

HIGH CH159 (802.11n40 Mode with 5.8G)/5795
Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	61.70	-5.21	56.49	74	-17.51	peak
3432	47.32	-5.21	42.11	54	-11.89	AVG
11590	49.95	4.21	54.16	74	-19.84	peak
11590	36.51	4.21	40.72	54	-13.28	AVG
---	---	---	---	---	---	---
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3432	60.44	-5.21	55.23	74	-18.77	peak
3432	45.80	-5.21	40.59	54	-13.41	AVG
11590	53.10	4.21	57.31	74	-16.69	peak
11590	40.02	4.21	44.23	54	-9.77	AVG
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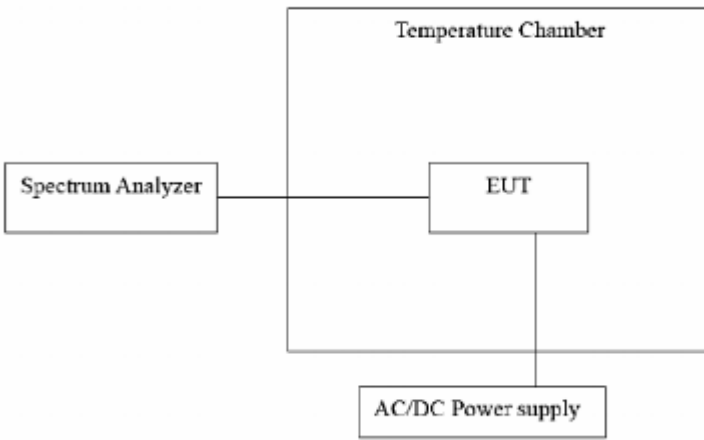
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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.

6.10. frequency Stability Measurement

6.10.1. 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] subgraph TC [Temperature Chamber] EUT end EUT --- 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:	Pre-scan was performed at Antenna 0 and Antenna 1, the worst case was found. Only the test data of Antenna 0 was shown in this report.

Test plots as follows:

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	132 V	5179.986	14	5239.986	14
	120 V	5179.984	16	5239.983	17
	108 V	5179.985	15	5239.983	17

Mode	Temperature (°C)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	-30	5179.955	45	5239.954	46
	-20	5179.961	39	5239.956	44
	-10	5179.971	29	5239.972	28
	0	5179.971	29	5239.977	23
	10	5179.979	21	5239.979	21
	20	5179.985	15	5239.981	19
	30	5179.977	23	5239.974	26
	40	5179.979	21	5239.974	26
	50	5179.969	31	5239.961	39

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	132 V	5744.988	12	5824.983	17
	120 V	5744.987	13	5824.985	15
	108 V	5744.981	19	5824.983	17

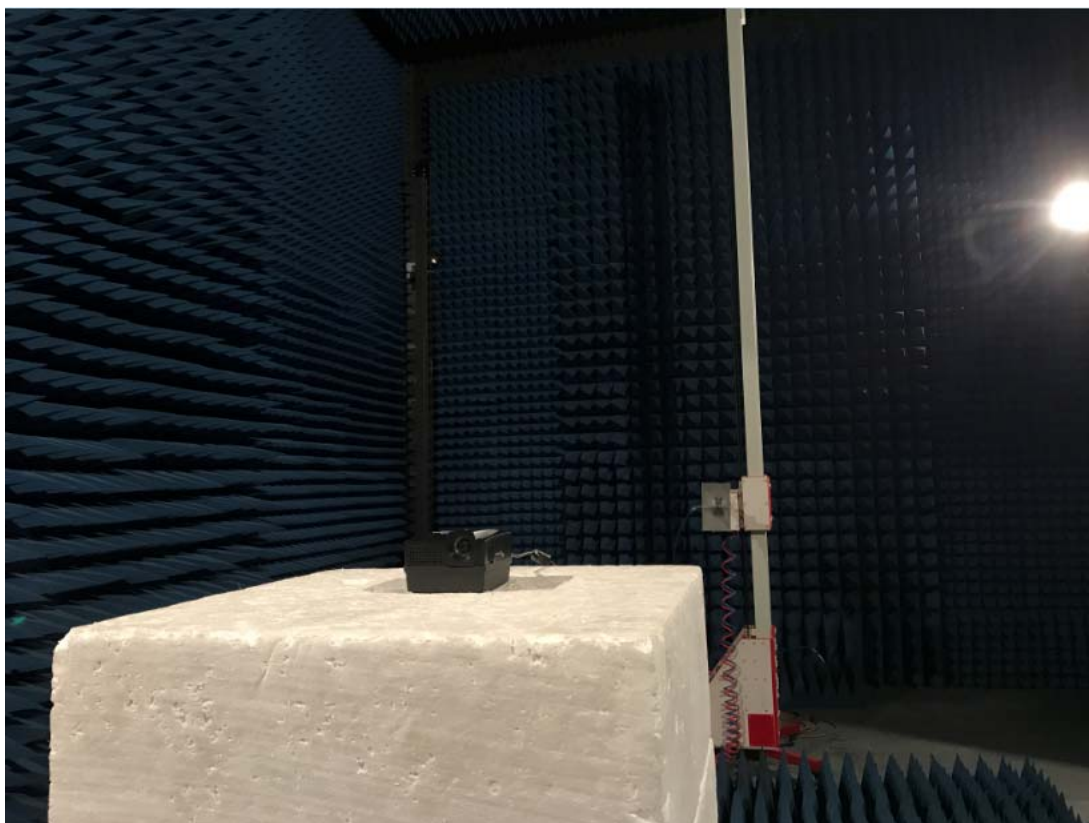
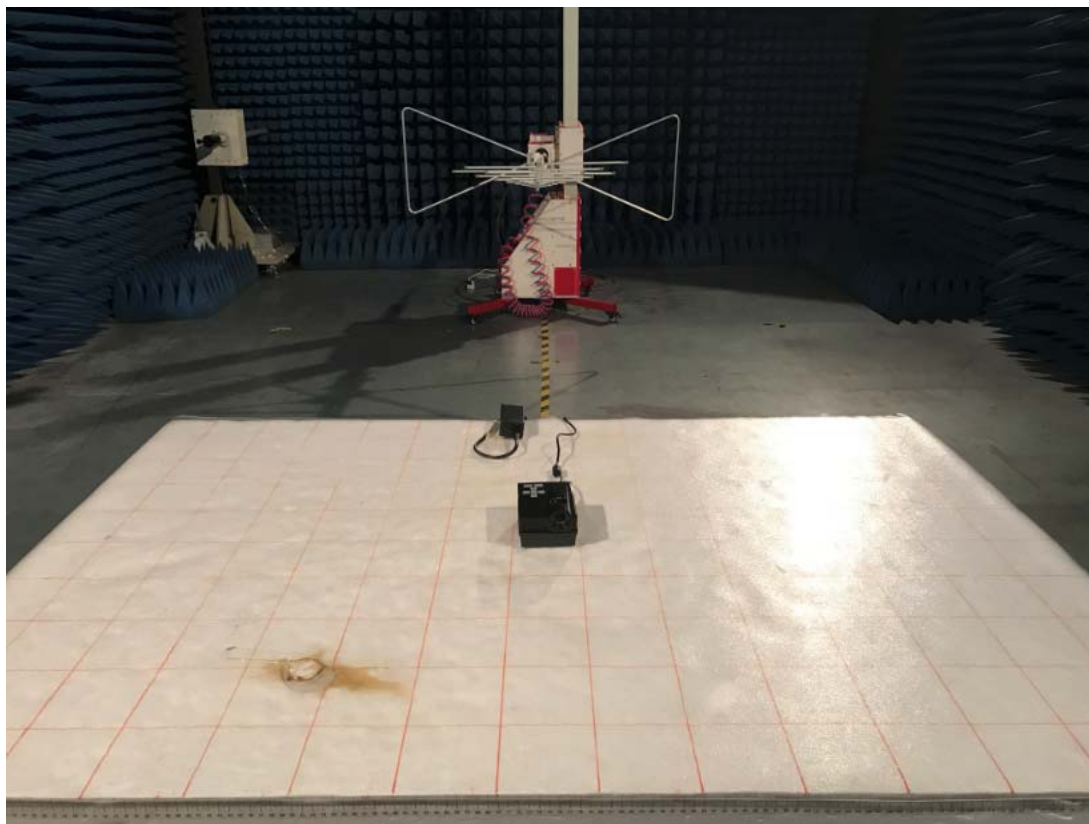
Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5744.954	46	5824.963	37
	-20	5744.963	37	5824.953	47
	-10	5744.973	27	5824.973	27
	0	5744.975	25	5824.971	29
	10	5744.971	29	5824.971	29
	20	5744.988	12	5824.986	14
	30	5744.971	29	5824.973	27
	40	5744.978	22	5824.973	27
	50	5744.968	32	5824.968	32

Appendix A: Photographs of Test Setup

Product: Mini Projector

Model: Event1

Radiated Emission



Conducted Emission



Appendix B: Photographs of EUT

Refer to the test report No.: TCT171204E013

*******END OF REPORT*******