



FCC TEST REPORT

**Test report
On Behalf of
Delta Electronics Incorporated
For
NovoConnect Wireless collaboration System
Model No.: NC-X700, WCS-X731, WCS-X732, WCS-X741,
WCS-X742, WCS-X700
FCC ID: H79-NCX700**

Prepared for : Delta Electronics Incorporated
3 Tungyung Road Chungli Industrial Zone, Taoyuan County 32063, Taiwan

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
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Date of Test: Nov. 22, 2019 ~Nov. 29, 2019

Date of Report: Nov. 29, 2019

Report Number: HK1910232645-4E



TEST RESULT CERTIFICATION

Applicant's name : Delta Electronics Incorporated
 Address..... : 3 Tungyung Road Chungli Industrial Zone, Taoyuan County
 32063, Taiwan

Manufacturer's Name : Delta Electronics Incorporated
 Address..... : 3 Tungyung Road Chungli Industrial Zone, Taoyuan County
 32063, Taiwan

Product description

Trade Mark: DELTA Vivitek
 Product name..... : NovoConnect Wireless collaboration System
 Model and/or type reference : NC-X700, WCS-X731, WCS-X732, WCS-X741, WCS-X742,
 WCS-X700
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..... : Nov. 22, 2019 ~Nov. 29, 2019
 Date of Issue : Nov. 29, 2019
 Test Result..... : Pass

Testing Engineer : Gary Qian
 (Gary Qian)

Technical Manager : Eden Hu
 (Eden Hu)

Authorized Signatory : Jason Zhou
 (Jason Zhou)



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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)	PASS
6dB Emission Bandwidth	§15.407(e)	PASS
26dB Emission Bandwidth & 99% Occupied Bandwidth	§15.407(a)	N/A
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(a)	PASS
Radiated Emission	§15.407(a)	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2. TEST FACILITY

Test Firm : Shenzhen 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	NovoConnect Wireless collaboration System
Model Name	NC-X700,
Serial No.	WCS-X731, WCS-X732, WCS-X741, WCS-X742, WCS-X700
Trade Mark	DELTA Vivitek
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: NC-X700
FCC ID	H79-NCX700
Operation Frequency:	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	External Antenna
Antenna Gain	Antenna 1:1dBi Antenna 2:1dBi MIMO: 4.010dBi
Power Source	DC 5V from adapter With AC 100-240V, 50/60Hz, 0.4A
Power Supply:	DC 5V from adapter With AC 100-240V, 50/60Hz, 0.4A
Note:	The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers(2T2R), two transmit signals are completely correlated, then, Direction gain= $G_{ANT}+10*\log(2)$ dBi.



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
149	5745	151	5755	155	5775
153	5765	159	5790		
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

Band IV (5725 - 5850 MHz)		
For 802.11a/n (HT20)/ac(HT20)		
Channel Number	Channel	Frequency (MHz)
149	Low	5745
157	Mid	5785
165	High	5825

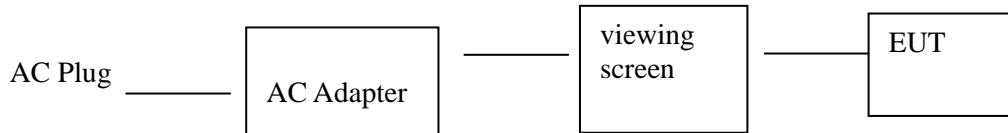
For 802.11n (HT40)/ ac(HT40)		
Channel Number	Channel	Frequency (MHz)
151	Low	5755
159	High	5795

For 802.11ac(HT80)		
Channel Number	Channel	Frequency (MHz)
155	/	5775

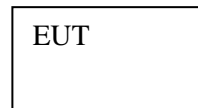


2.4. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing and Radiation testing:



Operation of EUT during Above1GHz Radiation testing:



Display information

Model: 24PFF3661/T3

Input: AC 120V/60Hz

Adapter information

Model: CNXZX3015-050030SA

Input: AC100-240, 50/60Hz, 0.4A

Output: DC5V, 3A

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



3. Genera Information

3.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 100%)
<p>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.</p>	

<p>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:</p>	
<p>Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.</p>	
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 border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <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> </tbody> </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:	<p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test Mode:	Tx Mode														
Test Procedure:	<ol style="list-style-type: none"> 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
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Dec. 27, 2019
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A

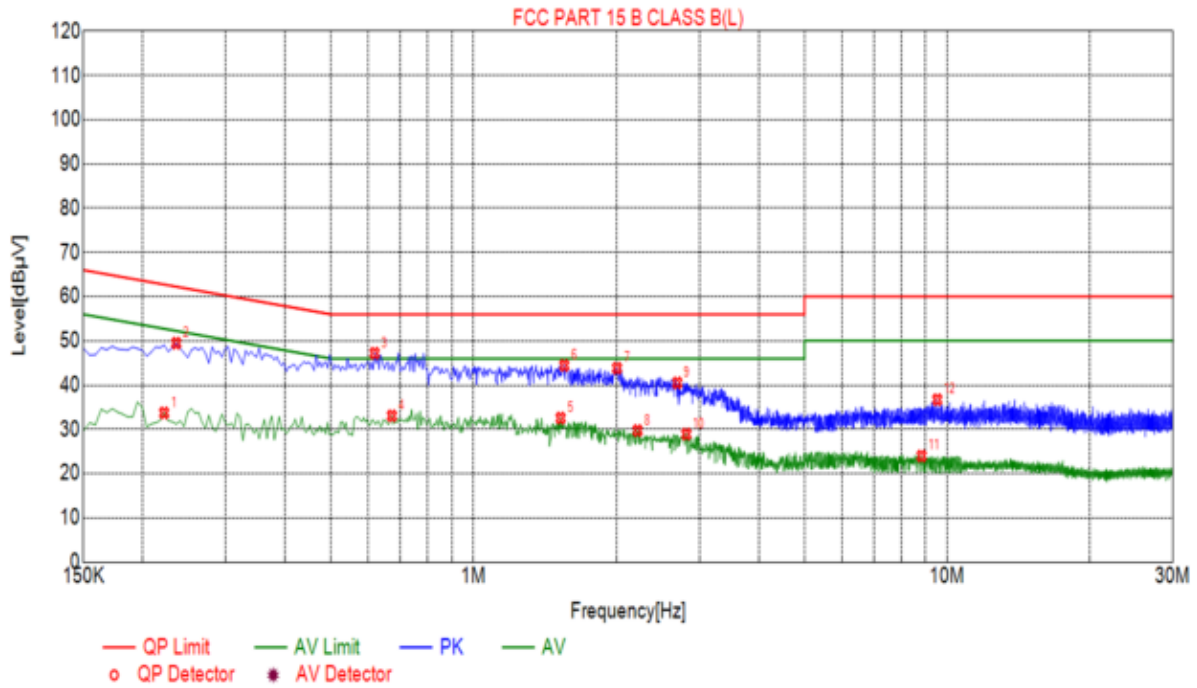
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.1.3. Test data

All the test modes completed for test. only the worst result of AC120V/60Hz(802.11a at 5745MHz) was reported as below:

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

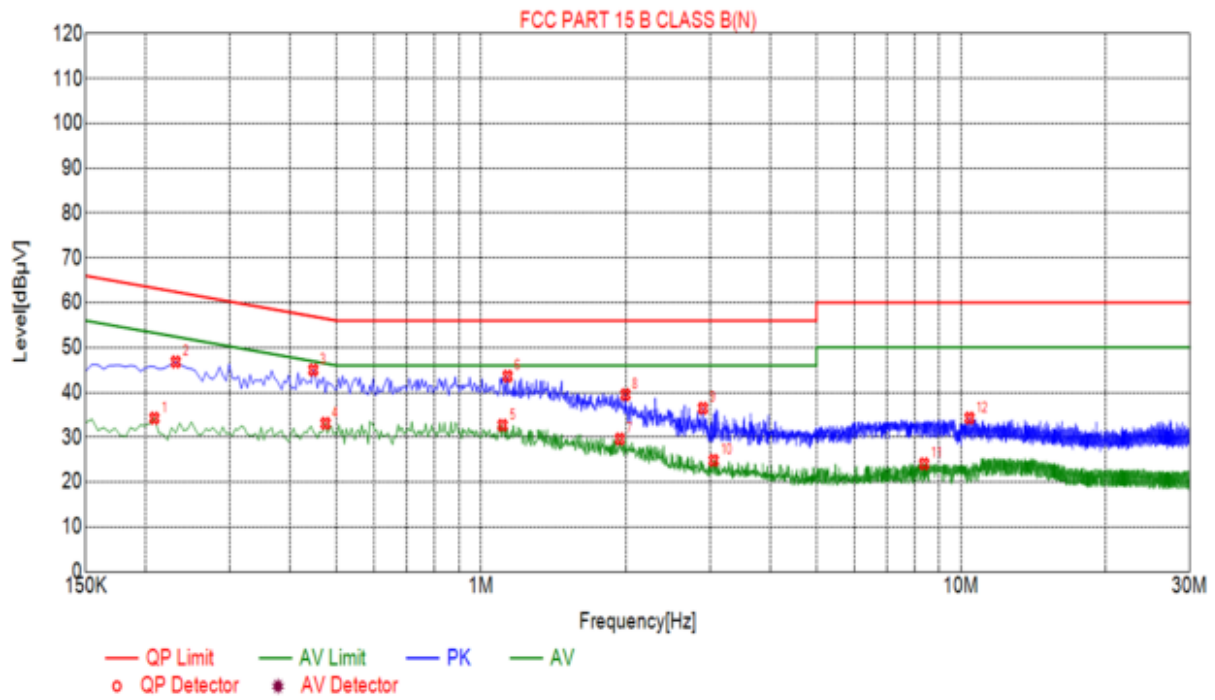


Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.2220	33.72	10.04	52.74	19.02	AV
2	0.2355	49.49	10.03	62.25	12.76	PK
3	0.6180	47.22	10.05	56.00	8.78	PK
4	0.6720	33.06	10.05	46.00	12.94	AV
5	1.5270	32.56	10.11	46.00	13.44	AV
6	1.5540	44.46	10.11	56.00	11.54	PK
7	2.0085	43.84	10.14	56.00	12.16	PK
8	2.2200	29.74	10.17	46.00	16.26	AV
9	2.6925	40.51	10.21	56.00	15.49	PK
10	2.8140	28.94	10.21	46.00	17.06	AV
11	8.8350	23.99	10.11	50.00	26.01	AV
12	9.5370	36.72	10.09	60.00	23.28	PK

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



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	0.2085	34.25	10.04	53.26	19.01	AV
2	0.2310	46.81	10.03	62.41	15.60	PK
3	0.4470	45.01	10.04	56.93	11.92	PK
4	0.4740	33.09	10.04	46.44	13.35	AV
5	1.1085	32.67	10.08	46.00	13.33	AV
6	1.1355	43.61	10.09	56.00	12.39	PK
7	1.9455	29.60	10.14	46.00	16.40	AV
8	1.9995	39.50	10.14	56.00	16.50	PK
9	2.8995	36.46	10.21	56.00	19.54	PK
10	3.0525	24.83	10.22	46.00	21.17	AV
11	8.3805	24.07	10.13	50.00	25.93	AV
12	10.4190	34.27	10.04	60.00	25.73	PK

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



4.2. Maximum Conducted Output Power

4.2.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407(a)						
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02.r01 Section E						
Limit:	<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Band</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>5725-5850</td> <td></td> <td>1 W</td> </tr> </tbody> </table>	Frequency (MHz)	Band	Limit	5725-5850		1 W
	Frequency (MHz)	Band	Limit				
5725-5850		1 W					
Test Setup:	<p>The diagram illustrates the test setup. On the left is a green rectangular device labeled 'Power meter'. A cable connects it to a small white square labeled 'Attenuator'. Another cable connects the attenuator to a yellow rectangular device 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 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:	<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>						



4.2.2. Test Instruments

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

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

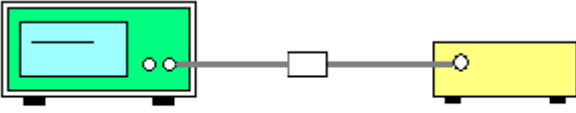
**Test Data**

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Maximum Conducted Output Power (dBm)			FCC Limit (dBm)	Result
		Antenna port 1	Antenna port 2	MIMO		
11a	CH149	9.17	9.23	/	30	PASS
11a	CH157	9.48	9.56	/	30	PASS
11a	CH165	9.26	9.48	/	30	PASS
11n(HT20)	CH149	9.66	9.14	12.42	30	PASS
11n(HT20)	CH157	9.34	9.66	12.51	30	PASS
11n(HT20)	CH165	9.88	9.47	12.69	30	PASS
11n(HT40)	CH151	9.34	9.35	12.36	30	PASS
11n(HT40)	CH159	9.45	9.18	12.33	30	PASS
11ac(HT20)	CH149	8.86	8.67	11.78	30	PASS
11ac(HT20)	CH157	8.65	8.19	11.44	30	PASS
11ac(HT20)	CH165	8.74	8.67	11.72	30	PASS
11ac(HT40)	CH151	8.86	8.55	11.72	30	PASS
11ac(HT40)	CH159	8.25	8.89	11.59	30	PASS
11ac(HT80)	CH155	8.17	8.65	11.43	30	PASS



4.3. 6dB Emission Bandwidth

4.3.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
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

4.3.2. Test Instruments

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

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

**4.3.3. Test data****ANT 1**

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	15.51	0.5	PASS
11a	CH157	5785	15.14	0.5	PASS
11a	CH165	5825	15.14	0.5	PASS
11n(HT20)	CH149	5745	12.93	0.5	PASS
11n(HT20)	CH157	5785	15.10	0.5	PASS
11n(HT20)	CH165	5825	12.64	0.5	PASS
11n(HT40)	CH151	5755	35.18	0.5	PASS
11n(HT40)	CH159	5795	35.13	0.5	PASS
11ac(HT20)	CH149	5745	15.87	0.5	PASS
11ac(HT20)	CH157	5785	15.44	0.5	PASS
11ac(HT20)	CH165	5825	13.89	0.5	PASS
11ac(HT40)	CH151	5755	33.97	0.5	PASS
11ac(HT40)	CH159	5795	35.12	0.5	PASS
11ac(HT80)	CH155	5775	75.33	0.5	PASS

Test plots as follows:



Band IV (5725 – 5850 MHz)

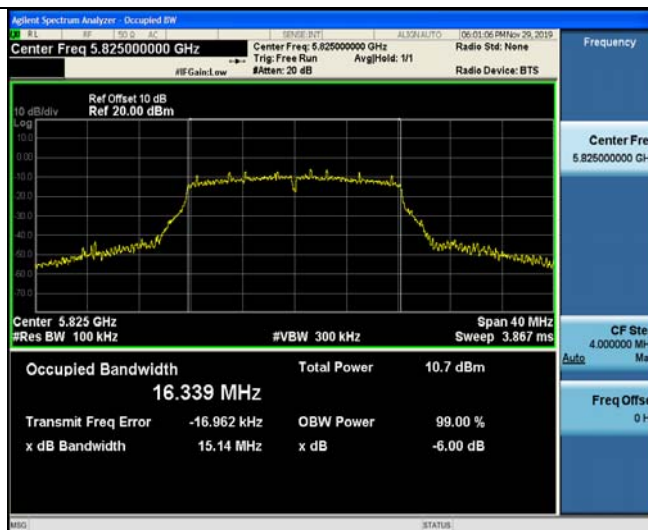
802.11a



Low



Mid



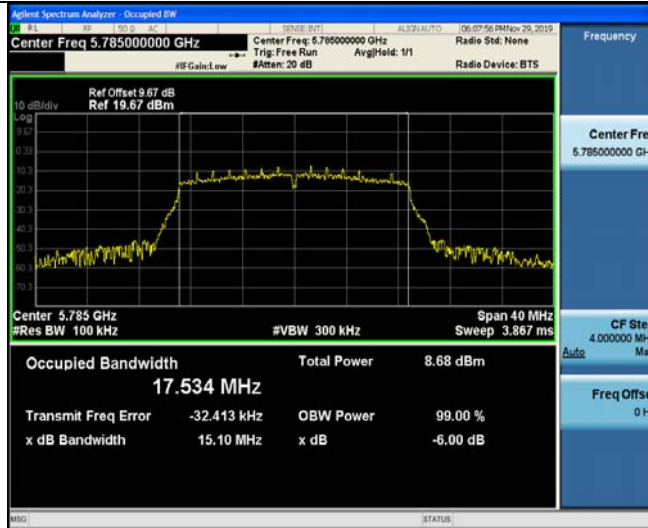
High



802.11n(HT20)



Low



Mid



High



802.11n(HT40)



Low



High

802.11ac(HT20)



Low



Mid



High

802.11ac(HT40)



Low



High



802.11ac(HT80)

**ANT 2**

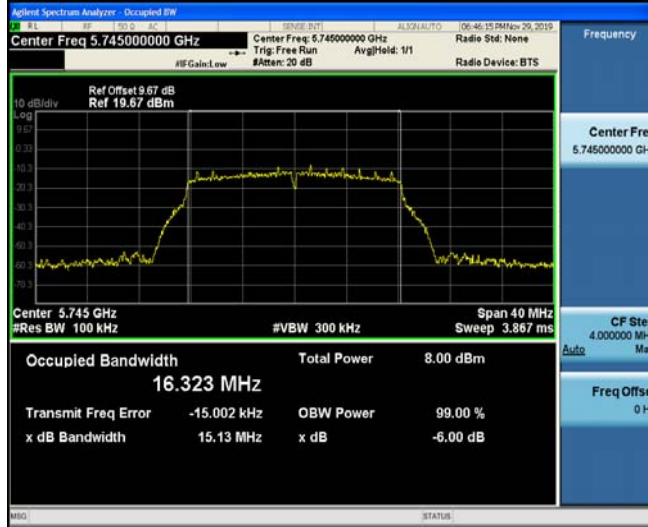
Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	15.13	0.5	PASS
11a	CH157	5785	15.35	0.5	PASS
11a	CH161	5825	15.74	0.5	PASS
11n(HT20)	CH149	5745	15.09	0.5	PASS
11n(HT20)	CH157	5785	15.00	0.5	PASS
11n(HT20)	CH161	5825	15.43	0.5	PASS
11n(HT40)	CH151	5755	35.16	0.5	PASS
11n(HT40)	CH159	5795	33.94	0.5	PASS
11ac(HT20)	CH149	5745	15.17	0.5	PASS
11ac(HT20)	CH157	5785	15.14	0.5	PASS
11ac(HT20)	CH165	5825	15.03	0.5	PASS
11ac(HT40)	CH151	5755	32.69	0.5	PASS
11ac(HT40)	CH159	5795	35.20	0.5	PASS
11ac(HT80)	CH155	5755	75.30	0.5	PASS

Test plots as follows:



Band IV (5725 – 5850 MHz)

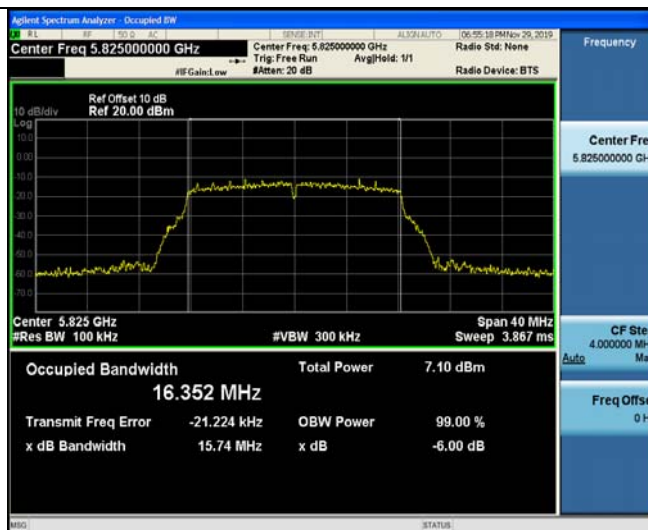
802.11a



Low



Mid



High



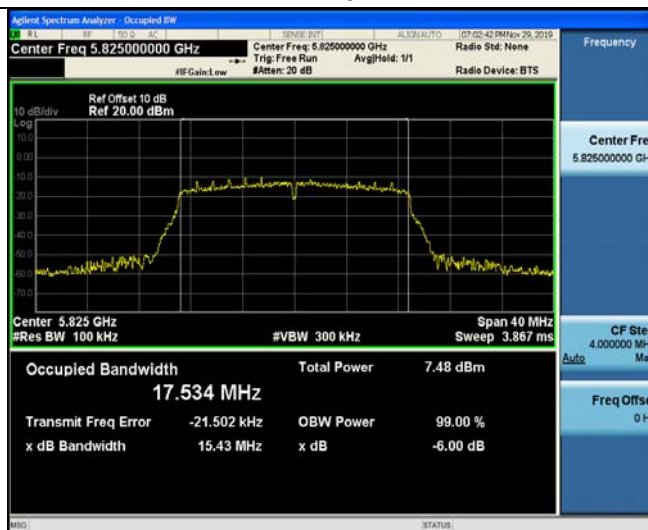
802.11n(HT20)



Low



Mid



High



802.11n(HT40)

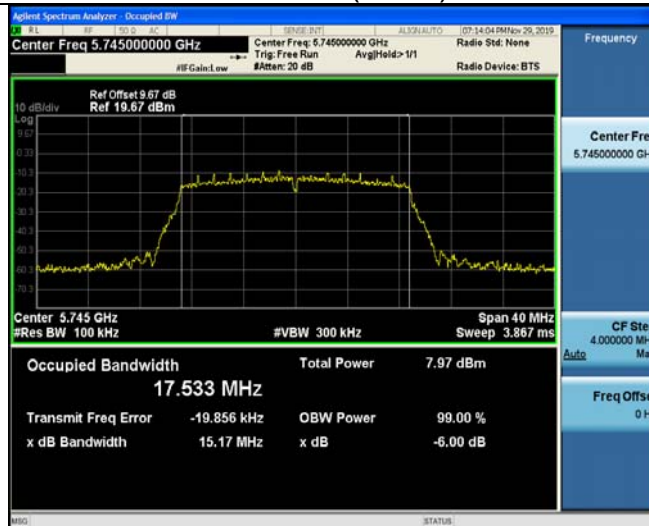


Low



High

802.11ac(HT20)



Low



Mid



High

802.11ac(HT40)

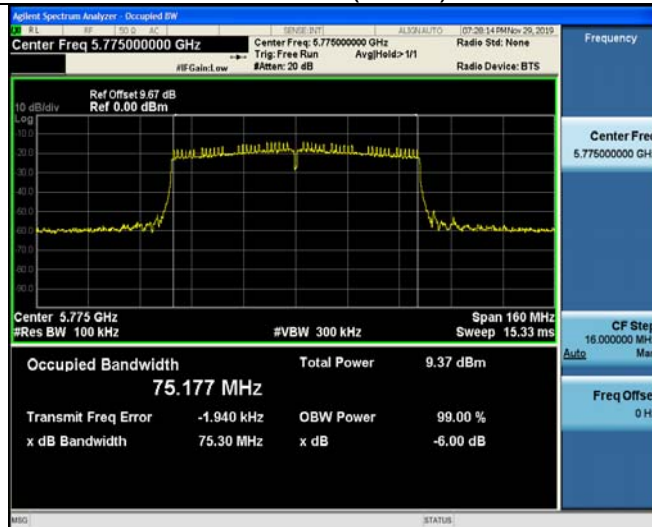


Low



High

802.11ac(HT80)





4.5.3. Test data

ANT 1

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	-3.18	0	-3.04	30	PASS
11a	CH157	-3.03	0	-2.88	30	PASS
11a	CH161	-3.28	0	-3.13	30	PASS
11n(HT20)	CH149	-5.15	0	-5.00	30	PASS
11n(HT20)	CH157	-4.52	0	-4.36	30	PASS
11n(HT20)	CH161	-4.68	0	-4.53	30	PASS
11n(HT40)	CH151	-7.25	0	-6.95	30	PASS
11n(HT40)	CH159	-8.00	0	-7.70	30	PASS
11ac(HT20)	CH149	-4.05	0	-3.90	30	PASS
11ac(HT20)	CH157	-4.44	0	-4.29	30	PASS
11ac(HT20)	CH161	-5.12	0	-4.96	30	PASS
11ac(HT40)	CH151	-7.20	0	-6.90	30	PASS
11ac(HT40)	CH159	-7.49	0	-7.19	30	PASS
11ac(HT80)	CH155	-11.30	0	-10.71	30	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

802.11ac(HT20)



Low



Mid



High

802.11ac(HT40)



Low



High
802.11ac(HT80)





ANT 2

Configuration Band IV (5725 - 5850 MHz)						
Mode	Test channel	Level [dBm/500kHz]	10log(1/x) Factor[dB]	Power Spectral Density	Limit (dBm/500kHz)	Result
11a	CH149	-5.46	0	-5.32	30	PASS
11a	CH157	-6.22	0	-6.07	30	PASS
11a	CH161	-6.55	0	-6.40	30	PASS
11n(HT20)	CH149	-6.29	0	-6.13	30	PASS
11n(HT20)	CH157	-6.16	0	-6.01	30	PASS
11n(HT20)	CH161	-6.30	0	-6.15	30	PASS
11n(HT40)	CH151	-8.17	0	-7.87	30	PASS
11n(HT40)	CH159	-9.10	0	-8.80	30	PASS
11ac(HT20)	CH149	-5.59	0	-5.44	30	PASS
11ac(HT20)	CH157	-6.18	0	-6.03	30	PASS
11ac(HT20)	CH161	-5.72	0	-5.57	30	PASS
11ac(HT40)	CH151	-8.29	0	-7.99	30	PASS
11ac(HT40)	CH159	-8.19	0	-7.89	30	PASS
11ac(HT80)	CH155	-11.08	0	-10.49	30	PASS

Test plots as follows:



802.11n(HT20)



Low



Mid



High



802.11n(HT40)



Low



High

802.11ac(HT20)



Low



Mid



High

802.11ac(HT40)



Low



High
802.11ac(T80)





For MIMO antenna port 1+antenna port 2
Configuration Band IV (5725 - 5850 MHz)

Mode	Test channel	Power Density (dBm)	Limit (dBm)	Result
11a	CH149	/	30	/
11a	CH157	/	30	/
11a	CH161	/	30	/
11n(HT20)	CH149	-2.67	30	PASS
11n(HT20)	CH157	-2.25	30	PASS
11n(HT20)	CH161	-2.40	30	PASS
11n(HT40)	CH151	-4.68	30	PASS
11n(HT40)	CH159	-5.50	30	PASS
11ac(HT20)	CH149	-1.74	30	PASS
11ac(HT20)	CH157	-2.21	30	PASS
11ac(HT20)	CH161	-2.40	30	PASS
11ac(HT40)	CH151	-4.70	30	PASS
11ac(HT40)	CH159	-4.82	30	PASS
11ac(HT80)	CH155	-8.18	30	PASS
Note: 1 According to KDB 662911, Result power = $10\log(10^{\text{ant1}/10} + 10^{\text{ant2}/10})$. 2 Result unit: W, The end result is converted to units of dBm.				

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/ac for MIMO mode, not support 802.11 a for MIMO mode.



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:	<p>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 $\text{EIRP}(\text{dBm}) = -27\text{dBm}$</p> <p>For transmitters operating in the 5.725-5.85 GHz band:</p> <p>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.</p> <p>For band IV(5715-5725MHz&5850-5860MHz): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2 \text{ dB}\mu\text{V}/\text{m}$, for $\text{EIRP}(\text{dBm}) = -27\text{dBm}$;</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>
Test Setup:	<p>The diagram illustrates the test setup. An Equipment Under Test (EUT) is placed on a turn table at a height of 1.5 m. The turn table is positioned 3 m away from an antenna tower. The antenna tower has a height of 1-4 m and a feed point. The antenna is connected to a Receiver and an Amplifier (Amp.) on a Ground Plane.</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



	<p>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



4.6.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	R&S	ESRP3	HKE-005	Dec. 27, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Preamplifier	EMCI	EMC051845S E	HKE-015	Dec. 27, 2019
Preamplifier	Agilent	83051A	HKE-016	Dec. 27, 2019
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Sep. 26, 2019
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Sep. 26, 2019
Horn antenna	Schwarzbeck	9120D	HKE-013	Sep. 26, 2019
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
Position controller	Taiwan MF	MF7802	HKE-011	Dec. 27, 2019
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A
RF cable (9KHz-1GHz)	Times	381806-001	N/A	N/A
Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Sep. 27, 2019
RF cable	Tonscend	1-18G	HKE-099	Dec. 27, 2019
RF cable	Times	1-40G	HKE-034	Dec. 27, 2019

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

**4.6.3. Test Data****ANT 1**

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

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.55	-2.06	55.49	68.2	-12.71	peak
5650	36.03	-2.06	33.97	48.2	-14.23	AVG
5700	88.62	-1.96	86.66	105.2	-18.54	peak
5700	68.13	-1.96	66.17	85.2	-19.03	AVG
5720	92.45	-2.87	89.58	110.8	-21.22	peak
5720	73.16	-2.87	70.29	90.8	-20.51	AVG
5725	110.25	-2.14	108.11	122.2	-14.09	peak
5725	86.18	-2.14	84.04	102.2	-18.16	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.02	-2.06	54.96	68.2	-13.24	peak
5650	54.33	-2.06	52.27	48.2	4.07	AVG
5700	81.65	-1.96	79.69	105.2	-25.51	peak
5700	66.17	-1.96	64.21	85.2	-20.99	AVG
5720	93.45	-2.87	90.58	110.8	-20.22	peak
5720	76.85	-2.87	73.98	90.8	-16.82	AVG
5725	112.45	-2.14	110.31	122.2	-11.89	peak
5725	90.19	-2.14	88.05	102.2	-14.15	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.88	-1.97	108.91	122.2	-13.29	peak
5850	89.45	-1.97	87.48	102.2	-14.72	AVG
5855	94.26	-2.13	92.13	110.8	-18.67	peak
5855	72.16	-2.13	70.03	90.8	-20.77	AVG
5875	86.23	-2.65	83.58	105.2	-21.62	peak
5875	61.77	-2.65	59.12	85.2	-26.08	AVG
5925	53.28	-2.28	51	68.2	-17.2	peak
5925	36.19	-2.28	33.91	48.2	-14.29	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	113.57	-1.97	111.6	122.2	-10.6	peak
5850	87.35	-1.97	85.38	102.2	-16.82	AVG
5855	93.48	-2.13	91.35	110.8	-19.45	peak
5855	72.69	-2.13	70.56	90.8	-20.24	AVG
5875	86.35	-2.65	83.7	105.2	-21.5	peak
5875	67.45	-2.65	64.8	85.2	-20.4	AVG
5925	53.38	-2.28	51.1	68.2	-17.1	peak
5925	35.27	-2.28	32.99	48.2	-15.21	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.52	-2.06	55.46	68.2	-12.74	peak
5650	33.47	-2.06	31.41	48.2	-16.79	AVG
5700	90.12	-1.96	88.16	105.2	-17.04	peak
5700	66.58	-1.96	64.62	85.2	-20.58	AVG
5720	95.26	-2.87	92.39	110.8	-18.41	peak
5720	77.12	-2.87	74.25	90.8	-16.55	AVG
5725	113.56	-2.14	111.42	122.2	-10.78	peak
5725	91.85	-2.14	89.71	102.2	-12.49	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	61.07	-2.06	59.01	68.2	-9.19	peak
5650	38.29	-2.06	36.23	48.2	-11.97	AVG
5700	96.23	-1.96	94.27	105.2	-10.93	peak
5700	74.55	-1.96	72.59	85.2	-12.61	AVG
5720	94.13	-2.87	91.26	110.8	-19.54	peak
5720	77.45	-2.87	74.58	90.8	-16.22	AVG
5725	112.06	-2.14	109.92	122.2	-12.28	peak
5725	92.85	-2.14	90.71	102.2	-11.49	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.02	-1.97	#VALUE!	122.2	#VALUE!	peak
5850	86.99	-1.97	85.02	102.2	-17.18	AVG
5855	94.52	-2.13	92.39	110.8	-18.41	peak
5855	72.16	-2.13	70.03	90.8	-20.77	AVG
5875	89.03	-2.65	86.38	105.2	-18.82	peak
5875	71.24	-2.65	68.59	85.2	-16.61	AVG
5925	54.23	-2.28	51.95	68.2	-16.25	peak
5925	38.82	-2.28	36.54	48.2	-11.66	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.57	-1.97	108.6	122.2	-13.6	peak
5850	93.64	-1.97	91.67	102.2	-10.53	AVG
5855	94.18	-2.13	92.05	110.8	-18.75	peak
5855	74.46	-2.13	72.33	90.8	-18.47	AVG
5875	86.72	-2.65	84.07	105.2	-21.13	peak
5875	66.48	-2.65	63.83	85.2	-21.37	AVG
5925	57.72	-2.28	55.44	68.2	-12.76	peak
5925	40.64	-2.28	38.36	48.2	-9.84	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.14	-2.06	55.08	68.2	-13.12	peak
5650	36.85	-2.06	34.79	48.2	-13.41	AVG
5700	93.55	-1.96	91.59	105.2	-13.61	peak
5700	71.47	-1.96	69.51	85.2	-15.69	AVG
5720	92.36	-2.87	89.49	110.8	-21.31	peak
5720	64.08	-2.87	61.21	90.8	-29.59	AVG
5725	112.95	-2.14	110.81	122.2	-11.39	peak
5725	93.25	-2.14	91.11	102.2	-11.09	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	61.11	-2.06	59.05	68.2	-9.15	peak
5650	36.44	-2.06	34.38	48.2	-13.82	AVG
5700	96.25	-1.96	94.29	105.2	-10.91	peak
5700	72.16	-1.96	70.2	85.2	-15	AVG
5720	90.58	-2.87	87.71	110.8	-23.09	peak
5720	75.36	-2.87	72.49	90.8	-18.31	AVG
5725	112.07	-2.14	109.93	122.2	-12.27	peak
5725	91.21	-2.14	89.07	102.2	-13.13	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.74	-1.97	110.77	122.2	-11.43	peak
5850	92.33	-1.97	90.36	102.2	-11.84	AVG
5855	94.28	-2.13	92.15	110.8	-18.65	peak
5855	75.18	-2.13	73.05	90.8	-17.75	AVG
5875	87.06	-2.65	84.41	105.2	-20.79	peak
5875	68.34	-2.65	65.69	85.2	-19.51	AVG
5925	54.22	-2.28	51.94	68.2	-16.26	peak
5925	39.15	-2.28	36.87	48.2	-11.33	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	108.78	-1.97	106.81	122.2	-15.39	peak
5850	93.05	-1.97	91.08	102.2	-11.12	AVG
5855	91.42	-2.13	89.29	110.8	-21.51	peak
5855	74.58	-2.13	72.45	90.8	-18.35	AVG
5875	85.66	-2.65	83.01	105.2	-22.19	peak
5875	63.14	-2.65	60.49	85.2	-24.71	AVG
5925	54.66	-2.28	52.38	68.2	-15.82	peak
5925	38.24	-2.28	35.96	48.2	-12.24	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.15	-2.06	55.09	68.2	-13.11	peak
5650	38.56	-2.06	36.5	48.2	-11.7	AVG
5700	88.77	-1.96	86.81	105.2	-18.39	peak
5700	66.13	-1.96	64.17	85.2	-21.03	AVG
5720	93.06	-2.87	90.19	110.8	-20.61	peak
5720	74.12	-2.87	71.25	90.8	-19.55	AVG
5725	110.22	-2.14	108.08	122.2	-14.12	peak
5725	88.76	-2.14	86.62	102.2	-15.58	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	58.47	-2.06	56.41	68.2	-11.79	peak
5650	38.26	-2.06	36.2	48.2	-12	AVG
5700	91.52	-1.96	89.56	105.2	-15.64	peak
5700	67.32	-1.96	65.36	85.2	-19.84	AVG
5720	93.28	-2.87	90.41	110.8	-20.39	peak
5720	77.03	-2.87	74.16	90.8	-16.64	AVG
5725	110.25	-2.14	108.11	122.2	-14.09	peak
5725	90.47	-2.14	88.33	102.2	-13.87	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.13	-1.97	108.16	122.2	-14.04	peak
5850	88.33	-1.97	86.36	102.2	-15.84	AVG
5855	95.16	-2.13	93.03	110.8	-17.77	peak
5855	77.52	-2.13	75.39	90.8	-15.41	AVG
5875	89.32	-2.65	86.67	105.2	-18.53	peak
5875	68.11	-2.65	65.46	85.2	-19.74	AVG
5925	54.96	-2.28	52.68	68.2	-15.52	peak
5925	37.24	-2.28	34.96	48.2	-13.24	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.14	-1.97	108.17	122.2	-14.03	peak
5850	87.56	-1.97	85.59	102.2	-16.61	AVG
5855	90.05	-2.13	87.92	110.8	-22.88	peak
5855	77.36	-2.13	75.23	90.8	-15.57	AVG
5875	84.02	-2.65	81.37	105.2	-23.83	peak
5875	72.48	-2.65	69.83	85.2	-15.37	AVG
5925	56.96	-2.28	54.68	68.2	-13.52	peak
5925	38.54	-2.28	36.26	48.2	-11.94	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	58.69	-2.06	56.63	68.2	-11.57	peak
5650	37.71	-2.06	35.65	48.2	-12.55	AVG
5700	88.25	-1.96	86.29	105.2	-18.91	peak
5700	69.71	-1.96	67.75	85.2	-17.45	AVG
5720	94.62	-2.87	91.75	110.8	-19.05	peak
5720	73.46	-2.87	70.59	90.8	-20.21	AVG
5725	110.67	-2.14	108.53	122.2	-13.67	peak
5725	90.48	-2.14	88.34	102.2	-13.86	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.51	-2.06	55.45	68.2	-12.75	peak
5650	37.62	-2.06	35.56	48.2	-12.64	AVG
5700	87.72	-1.96	85.76	105.2	-19.44	peak
5700	67.66	-1.96	65.7	85.2	-19.5	AVG
5720	94.29	-2.87	91.42	110.8	-19.38	peak
5720	71.38	-2.87	68.51	90.8	-22.29	AVG
5725	112.47	-2.14	110.33	122.2	-11.87	peak
5725	92.53	-2.14	90.39	102.2	-11.81	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	113.05	-1.97	111.08	122.2	-11.12	peak
5850	91.23	-1.97	89.26	102.2	-12.94	AVG
5855	91.77	-2.13	89.64	110.8	-21.16	peak
5855	75.63	-2.13	73.5	90.8	-17.3	AVG
5875	86.22	-2.65	83.57	105.2	-21.63	peak
5875	65.13	-2.65	62.48	85.2	-22.72	AVG
5925	54.76	-2.28	52.48	68.2	-15.72	peak
5925	37.62	-2.28	35.34	48.2	-12.86	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.16	-1.97	110.19	122.2	-12.01	peak
5850	89.24	-1.97	87.27	102.2	-14.93	AVG
5855	90.55	-2.13	88.42	110.8	-22.38	peak
5855	71.46	-2.13	69.33	90.8	-21.47	AVG
5875	87.36	-2.65	84.71	105.2	-20.49	peak
5875	65.88	-2.65	63.23	85.2	-21.97	AVG
5925	56.47	-2.28	54.19	68.2	-14.01	peak
5925	34.39	-2.28	32.11	48.2	-16.09	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.77	-2.06	55.71	68.2	-12.49	peak
5650	38.21	-2.06	36.15	48.2	-12.05	AVG
5700	87.66	-1.96	85.7	105.2	-19.5	peak
5700	66.31	-1.96	64.35	85.2	-20.85	AVG
5720	94.25	-2.87	91.38	110.8	-19.42	peak
5720	76.13	-2.87	73.26	90.8	-17.54	AVG
5725	112.35	-2.14	110.21	122.2	-11.99	peak
5725	91.82	-2.14	89.68	102.2	-12.52	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.62	-2.06	55.56	68.2	-12.64	peak
5650	36.74	-2.06	34.68	48.2	-13.52	AVG
5700	91.15	-1.96	89.19	105.2	-16.01	peak
5700	67.43	-1.96	65.47	85.2	-19.73	AVG
5720	94.47	-2.87	91.6	110.8	-19.2	peak
5720	70.25	-2.87	67.38	90.8	-23.42	AVG
5725	112.48	-2.14	110.34	122.2	-11.86	peak
5725	94.67	-2.14	92.53	102.2	-9.67	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.15	-1.97	108.18	122.2	-14.02	peak
5850	91.36	-1.97	89.39	102.2	-12.81	AVG
5855	92.74	-2.13	90.61	110.8	-20.19	peak
5855	77.45	-2.13	75.32	90.8	-15.48	AVG
5875	85.66	-2.65	83.01	105.2	-22.19	peak
5875	62.15	-2.65	59.5	85.2	-25.7	AVG
5925	52.54	-2.28	50.26	68.2	-17.94	peak
5925	38.16	-2.28	35.88	48.2	-12.32	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.45	-1.97	110.48	122.2	-11.72	peak
5850	93.55	-1.97	91.58	102.2	-10.62	AVG
5855	94.12	-2.13	91.99	110.8	-18.81	peak
5855	77.06	-2.13	74.93	90.8	-15.87	AVG
5875	82.69	-2.65	80.04	105.2	-25.16	peak
5875	65.52	-2.65	62.87	85.2	-22.33	AVG
5925	56.22	-2.28	53.94	68.2	-14.26	peak
5925	37.46	-2.28	35.18	48.2	-13.02	AVG

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

**ANT 2**

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	56.61	-2.06	54.55	68.2	-13.65	peak
5650	34.48	-2.06	32.42	48.2	-15.78	AVG
5700	91.27	-1.96	89.31	105.2	-15.89	peak
5700	66.65	-1.96	64.69	85.2	-20.51	AVG
5720	94.81	-2.87	91.94	110.8	-18.86	peak
5720	74.56	-2.87	71.69	90.8	-19.11	AVG
5725	110.37	-2.14	108.23	122.2	-13.97	peak
5725	90.72	-2.14	88.58	102.2	-13.62	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	58.16	-2.06	56.1	68.2	-12.1	peak
5650	37.52	-2.06	35.46	48.2	-12.74	AVG
5700	91.78	-1.96	89.82	105.2	-15.38	peak
5700	64.58	-1.96	62.62	85.2	-22.58	AVG
5720	96.17	-2.87	93.3	110.8	-17.5	peak
5720	73.26	-2.87	70.39	90.8	-20.41	AVG
5725	110.42	-2.14	108.28	122.2	-13.92	peak
5725	89.54	-2.14	87.4	102.2	-14.8	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.24	-1.97	110.27	122.2	-11.93	peak
5850	88.02	-1.97	86.05	102.2	-16.15	AVG
5855	95.63	-2.13	93.5	110.8	-17.3	peak
5855	73.25	-2.13	71.12	90.8	-19.68	AVG
5875	86.11	-2.65	83.46	105.2	-21.74	peak
5875	65.39	-2.65	62.74	85.2	-22.46	AVG
5925	56.62	-2.28	54.34	68.2	-13.86	peak
5925	39.42	-2.28	37.14	48.2	-11.06	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.45	-1.97	110.48	122.2	-11.72	peak
5850	90.86	-1.97	88.89	102.2	-13.31	AVG
5855	94.41	-2.13	92.28	110.8	-18.52	peak
5855	78.64	-2.13	76.51	90.8	-14.29	AVG
5875	87.28	-2.65	84.63	105.2	-20.57	peak
5875	67.69	-2.65	65.04	85.2	-20.16	AVG
5925	56.41	-2.28	54.13	68.2	-14.07	peak
5925	38.85	-2.28	36.57	48.2	-11.63	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	59.77	-2.06	57.71	68.2	-10.49	peak
5650	36.02	-2.06	33.96	48.2	-14.24	AVG
5700	90.55	-1.96	88.59	105.2	-16.61	peak
5700	69.13	-1.96	67.17	85.2	-18.03	AVG
5720	91.44	-2.87	88.57	110.8	-22.23	peak
5720	76.23	-2.87	73.36	90.8	-17.44	AVG
5725	112.07	-2.14	109.93	122.2	-12.27	peak
5725	95.47	-2.14	93.33	102.2	-8.87	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	59.63	-2.06	57.57	68.2	-10.63	peak
5650	38.78	-2.06	36.72	48.2	-11.48	AVG
5700	96.03	-1.96	94.07	105.2	-11.13	peak
5700	67.15	-1.96	65.19	85.2	-20.01	AVG
5720	94.88	-2.87	92.01	110.8	-18.79	peak
5720	77.33	-2.87	74.46	90.8	-16.34	AVG
5725	112.05	-2.14	109.91	122.2	-12.29	peak
5725	94.46	-2.14	92.32	102.2	-9.88	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.15	-1.97	108.18	122.2	-14.02	peak
5850	88.66	-1.97	86.69	102.2	-15.51	AVG
5855	92.34	-2.13	90.21	110.8	-20.59	peak
5855	79.52	-2.13	77.39	90.8	-13.41	AVG
5875	84.36	-2.65	81.71	105.2	-23.49	peak
5875	67.18	-2.65	64.53	85.2	-20.67	AVG
5925	52.34	-2.28	50.06	68.2	-18.14	peak
5925	37.52	-2.28	35.24	48.2	-12.96	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.04	-1.97	108.07	122.2	-14.13	peak
5850	92.55	-1.97	90.58	102.2	-11.62	AVG
5855	94.63	-2.13	92.5	110.8	-18.3	peak
5855	78.54	-2.13	76.41	90.8	-14.39	AVG
5875	86.68	-2.65	84.03	105.2	-21.17	peak
5875	68.23	-2.65	65.58	85.2	-19.62	AVG
5925	58.92	-2.28	56.64	68.2	-11.56	peak
5925	42.13	-2.28	39.85	48.2	-8.35	AVG

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



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

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	55.35	-2.06	53.29	68.2	-14.91	peak
5650	36.54	-2.06	34.48	48.2	-13.72	AVG
5700	94.62	-1.96	92.66	105.2	-12.54	peak
5700	64.23	-1.96	62.27	85.2	-22.93	AVG
5720	92.58	-2.87	89.71	110.8	-21.09	peak
5720	73.85	-2.87	70.98	90.8	-19.82	AVG
5725	112.12	-2.14	109.98	122.2	-12.22	peak
5725	91.33	-2.14	89.19	102.2	-13.01	AVG

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

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	61.25	-2.06	59.19	68.2	-9.01	peak
5650	37.69	-2.06	35.63	48.2	-12.57	AVG
5700	96.33	-1.96	94.37	105.2	-10.83	peak
5700	66.08	-1.96	64.12	85.2	-21.08	AVG
5720	90.16	-2.87	87.29	110.8	-23.51	peak
5720	74.88	-2.87	72.01	90.8	-18.79	AVG
5725	112.45	-2.14	110.31	122.2	-11.89	peak
5725	88.29	-2.14	86.15	102.2	-16.05	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	107.63	-1.97	105.66	122.2	-16.54	peak
5850	88.45	-1.97	86.48	102.2	-15.72	AVG
5855	94.33	-2.13	92.2	110.8	-18.6	peak
5855	77.15	-2.13	75.02	90.8	-15.78	AVG
5875	89.24	-2.65	86.59	105.2	-18.61	peak
5875	64.08	-2.65	61.43	85.2	-23.77	AVG
5925	54.26	-2.28	51.98	68.2	-16.22	peak
5925	41.74	-2.28	39.46	48.2	-8.74	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	108.55	-1.97	106.58	122.2	-15.62	peak
5850	92.15	-1.97	90.18	102.2	-12.02	AVG
5855	93.26	-2.13	91.13	110.8	-19.67	peak
5855	73.08	-2.13	70.95	90.8	-19.85	AVG
5875	86.74	-2.65	84.09	105.2	-21.11	peak
5875	67.12	-2.65	64.47	85.2	-20.73	AVG
5925	52.33	-2.28	50.05	68.2	-18.15	peak
5925	36.82	-2.28	34.54	48.2	-13.66	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	59.74	-2.06	57.68	68.2	-10.52	peak
5650	38.52	-2.06	36.46	48.2	-11.74	AVG
5700	90.36	-1.96	88.4	105.2	-16.8	peak
5700	67.19	-1.96	65.23	85.2	-19.97	AVG
5720	94.22	-2.87	91.35	110.8	-19.45	peak
5720	74.56	-2.87	71.69	90.8	-19.11	AVG
5725	110.47	-2.14	108.33	122.2	-13.87	peak
5725	94.62	-2.14	92.48	102.2	-9.72	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	58.85	-2.06	56.79	68.2	-11.41	peak
5650	35.96	-2.06	33.9	48.2	-14.3	AVG
5700	90.12	-1.96	88.16	105.2	-17.04	peak
5700	66.48	-1.96	64.52	85.2	-20.68	AVG
5720	96.88	-2.87	94.01	110.8	-16.79	peak
5720	72.79	-2.87	69.92	90.8	-20.88	AVG
5725	110.59	-2.14	108.45	122.2	-13.75	peak
5725	94.13	-2.14	91.99	102.2	-10.21	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.27	-1.97	108.3	122.2	-13.9	peak
5850	90.13	-1.97	88.16	102.2	-14.04	AVG
5855	94.69	-2.13	92.56	110.8	-18.24	peak
5855	75.33	-2.13	73.2	90.8	-17.6	AVG
5875	87.34	-2.65	84.69	105.2	-20.51	peak
5875	69.88	-2.65	67.23	85.2	-17.97	AVG
5925	54.51	-2.28	52.23	68.2	-15.97	peak
5925	36.69	-2.28	34.41	48.2	-13.79	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	111.86	-1.97	109.89	122.2	-12.31	peak
5850	90.35	-1.97	88.38	102.2	-13.82	AVG
5855	96.22	-2.13	94.09	110.8	-16.71	peak
5855	75.14	-2.13	73.01	90.8	-17.79	AVG
5875	84.35	-2.65	81.7	105.2	-23.5	peak
5875	64.45	-2.65	61.8	85.2	-23.4	AVG
5925	54.62	-2.28	52.34	68.2	-15.86	peak
5925	36.22	-2.28	33.94	48.2	-14.26	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.15	-2.06	55.09	68.2	-13.11	peak
5650	37.65	-2.06	35.59	48.2	-12.61	AVG
5700	88.46	-1.96	86.5	105.2	-18.7	peak
5700	66.18	-1.96	64.22	85.2	-20.98	AVG
5720	90.62	-2.87	87.75	110.8	-23.05	peak
5720	75.96	-2.87	73.09	90.8	-17.71	AVG
5725	110.64	-2.14	108.5	122.2	-13.7	peak
5725	92.55	-2.14	90.41	102.2	-11.79	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.58	-2.06	55.52	68.2	-12.68	peak
5650	39.24	-2.06	37.18	48.2	-11.02	AVG
5700	92.68	-1.96	90.72	105.2	-14.48	peak
5700	66.72	-1.96	64.76	85.2	-20.44	AVG
5720	95.94	-2.87	93.07	110.8	-17.73	peak
5720	75.37	-2.87	72.5	90.8	-18.3	AVG
5725	112.51	-2.14	110.37	122.2	-11.83	peak
5725	94.67	-2.14	92.53	102.2	-9.67	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.35	-1.97	110.38	122.2	-11.82	peak
5850	91.34	-1.97	89.37	102.2	-12.83	AVG
5855	94.23	-2.13	92.1	110.8	-18.7	peak
5855	76.54	-2.13	74.41	90.8	-16.39	AVG
5875	86.52	-2.65	83.87	105.2	-21.33	peak
5875	68.74	-2.65	66.09	85.2	-19.11	AVG
5925	54.18	-2.28	51.9	68.2	-16.3	peak
5925	34.55	-2.28	32.27	48.2	-15.93	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	112.88	-1.97	110.91	122.2	-11.29	peak
5850	88.64	-1.97	86.67	102.2	-15.53	AVG
5855	92.03	-2.13	89.9	110.8	-20.9	peak
5855	78.14	-2.13	76.01	90.8	-14.79	AVG
5875	85.69	-2.65	83.04	105.2	-22.16	peak
5875	64.45	-2.65	61.8	85.2	-23.4	AVG
5925	55.65	-2.28	53.37	68.2	-14.83	peak
5925	38.07	-2.28	35.79	48.2	-12.41	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	57.34	-2.06	55.28	68.2	-12.92	peak
5650	36.25	-2.06	34.19	48.2	-14.01	AVG
5700	91.45	-1.96	89.49	105.2	-15.71	peak
5700	75.28	-1.96	73.32	85.2	-11.88	AVG
5720	91.72	-2.87	88.85	110.8	-21.95	peak
5720	65.67	-2.87	62.8	90.8	-28	AVG
5725	111.45	-2.14	109.31	122.2	-12.89	peak
5725	86.27	-2.14	84.13	102.2	-18.07	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5650	58.45	-2.06	56.39	68.2	-11.81	peak
5650	35.82	-2.06	33.76	48.2	-14.44	AVG
5700	90.14	-1.96	88.18	105.2	-17.02	peak
5700	68.08	-1.96	66.12	85.2	-19.08	AVG
5720	94.57	-2.87	91.7	110.8	-19.1	peak
5720	75.34	-2.87	72.47	90.8	-18.33	AVG
5725	114.17	-2.14	112.03	122.2	-10.17	peak
5725	93.72	-2.14	91.58	102.2	-10.62	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	114.36	-1.97	112.39	122.2	-9.81	peak
5850	91.41	-1.97	89.44	102.2	-12.76	AVG
5855	93.15	-2.13	91.02	110.8	-19.78	peak
5855	80.71	-2.13	78.58	90.8	-12.22	AVG
5875	85.63	-2.65	82.98	105.2	-22.22	peak
5875	63.17	-2.65	60.52	85.2	-24.68	AVG
5925	52.36	-2.28	50.08	68.2	-18.12	peak
5925	37.11	-2.28	34.83	48.2	-13.37	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
5850	110.25	-1.97	108.28	122.2	-13.92	peak
5850	92.96	-1.97	90.99	102.2	-11.21	AVG
5855	93.15	-2.13	91.02	110.8	-19.78	peak
5855	77.26	-2.13	75.13	90.8	-15.67	AVG
5875	86.93	-2.65	84.28	105.2	-20.92	peak
5875	63.44	-2.65	60.79	85.2	-24.41	AVG
5925	56.71	-2.28	54.43	68.2	-13.77	peak
5925	37.94	-2.28	35.66	48.2	-12.54	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	120KHz	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>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Pre -Amplifier</p> <p>Receiver</p> <p>Computer</p>				
	30MHz to 1GHz				

	<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>



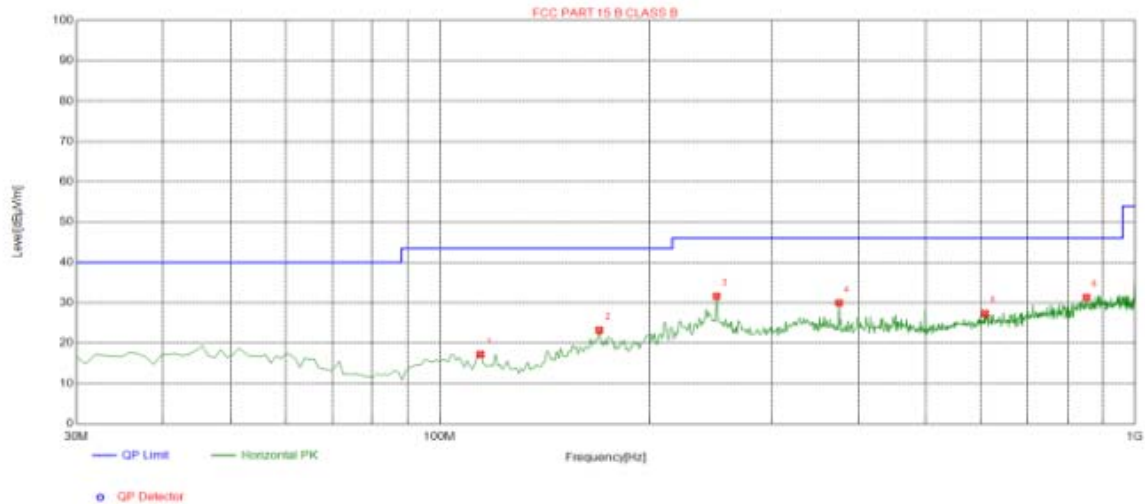
4.7.2. Test Data

test mode: TX 802.11a 5745MHz

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

Below 1GHz

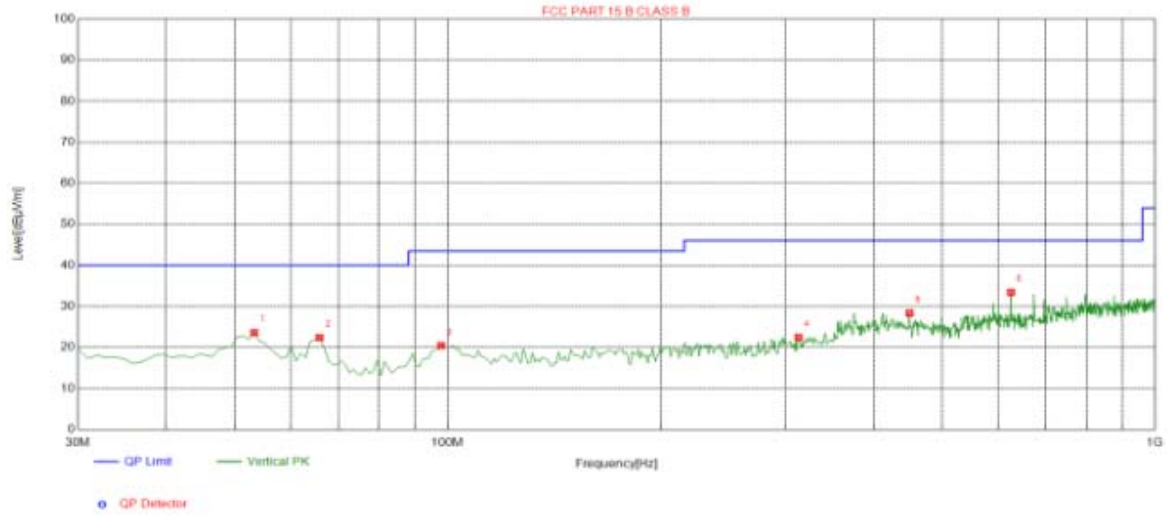
Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	114.390	17.18	-16.16	43.50	26.32	100	54	Horizontal
2	169.680	23.22	-17.33	43.50	20.28	100	22	Horizontal
3	250.190	31.68	-13.39	46.00	14.32	100	1	Horizontal
4	375.320	29.98	-10.91	46.00	16.02	100	312	Horizontal
5	608.120	27.29	-5.66	46.00	18.71	100	48	Horizontal
6	851.590	31.38	-2.64	46.00	14.62	100	107	Horizontal



Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.2800	23.61	-14.15	40.00	16.39	100	12	Vertical
2	65.8900	22.43	-16.64	40.00	17.57	100	68	Vertical
3	97.9000	20.48	-15.75	43.50	23.02	100	182	Vertical
4	313.240	22.48	-12.44	46.00	23.52	100	24	Vertical
5	450.010	28.34	-8.99	46.00	17.66	100	40	Vertical
6	625.580	33.46	-5.50	46.00	12.54	100	214	Vertical

**Above 1GHz**

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

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
3368	64.16	-4.59	59.57	74	-14.43	peak
3368	45.88	-4.59	41.29	54	-12.71	AVG
11096	50.84	4.21	55.05	74	-18.95	peak
11096	38.12	4.21	42.33	54	-11.67	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
3368	62.77	-4.59	58.18	74	-15.82	peak
3368	47.52	-4.59	42.93	54	-11.07	AVG
11096	55.36	4.21	59.57	74	-14.43	peak
11096	37.57	4.21	41.78	54	-12.22	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
3172	62.55	-4.59	57.96	74	-16.04	peak
3172	44.16	-4.59	39.57	54	-14.43	AVG
10523	52.75	4.21	56.96	74	-17.04	peak
10523	41.08	4.21	45.29	54	-8.71	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
3172	57.54	-4.59	52.95	74	-21.05	peak
3172	45.18	-4.59	40.59	54	-13.41	AVG
10523	53.45	4.21	57.66	74	-16.34	peak
10523	37.14	4.21	41.35	54	-12.65	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)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)	
2705	59.58	-4.59	54.99	74	-19.01	peak
2705	48.43	-4.59	43.84	54	-10.16	AVG
11717	54.13	4.84	58.97	74	-15.03	peak
11717	37.26	4.84	42.1	54	-11.9	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)	(dB μ V/m)	(dB μ V/m)	(dB)	
2705	58.24	-4.59	53.65	74	-20.35	peak
2705	45.13	-4.59	40.54	54	-13.46	AVG
11717	51.09	4.84	55.93	74	-18.07	peak
11717	39.07	4.84	43.91	54	-10.09	AVG

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

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 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 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 TD SA[Spectrum Analyzer] --- EUT[EUT] subgraph TC [Temperature Chamber] EUT end P[AC/DC Power supply] --- EUT </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

**Test Result as follows:**

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	12V	5744.978	22	5824.981	19
	13.2 V	5745.032	32	5824.976	24
	10.8 V	5745.021	21	5825.023	23

Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5745.025	25	5824.976	24
	-20	5744.971	29	5824.985	15
	-10	5745.031	31	5825.032	32
	0	5745.022	22	5824.976	24
	10	5744.983	17	5824.981	19
	20	5744.972	28	5824.973	27
	30	5744.969	31	5825.029	29
	40	5745.023	23	5825.027	27
	50	5744.972	28	5824.982	18



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

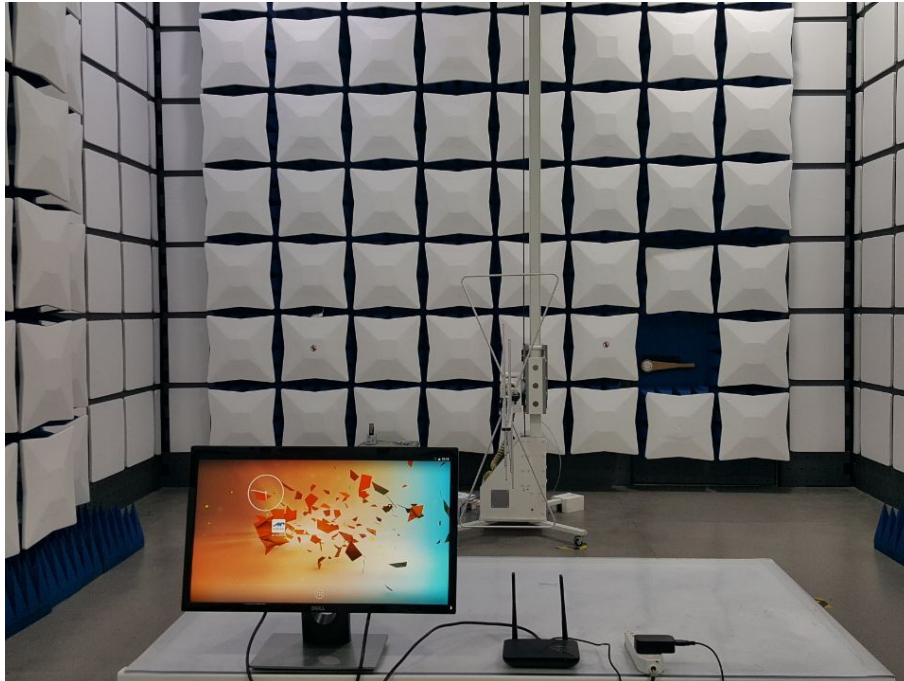
The antenna used in this product is a External Antenna, and the best case gain of the antenna is Antenna port 1:1dBi and Antenna port 2:1dBi.

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