FCC TEST REPORT

Test report
On Behalf of
Shenzhen Four Seas Global Link Network Technology Co., Ltd.
For
Wireless AP
Model No.: CF-EW72, CF-EW71, CF-EW73, CF-EW74, CF-EW75, CF-E5, CF-E7, CF-WA900 V2, CF-E313AC, CF-WR754AC, CF-WR755AC

FCC ID: OYR-CF-EW72

Prepared for :	**Shenzhen Four Seas Global Link Network Technology Co., Ltd** **Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**

Date of Test:	**Aug. 06, 2019~ Aug. 13, 2019**
Date of Report:	**Aug. 13, 2019**
Report Number:	**HK1907291852-3E**

TEST RESULT CERTIFICATION

Applicant's name.....:	Shenzhen Four Seas Global Link Network Technology Co., Ltd.
Address .....:	Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China.
Manufacture's Name.....:	Shenzhen Four Seas Global Link Network Technology Co., Ltd.
Address .....:	Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China.

Product description

Trade Mark:	COMFAST
Product name.....:	Wireless AP
Model and/or type reference .:	CF-EW72, CF-EW71, CF-EW73, CF-EW74, CF-EW75, CF-E5, CF-E7, CF-WA900 V2, CF-E313AC, CF-WR754AC, CF-WR755AC
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 .....:	Aug. 06, 2019~ Aug. 13, 2019
Date of Issue.....:	Aug. 13, 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) §2.1046	PASS
6dB Emission Bandwidth	§15.407(e)	PASS
26dB Emission Bandwidth& 99% Occupied Bandwidth	§15.407(a) §2.1049	N/A
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(a)	PASS
Radiated Emission	§15.407(a) §2.1053	PASS
Frequency Stability	§15.407(g) §2.1055	PASS

Note:

1. PASS: Test item meets the requirement.

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

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

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

1.2. TEST FACILITY

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

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

1.3. Measurement Uncertainty

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

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

2. EUT Description

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Wireless AP
Model Name	CF-EW72
Serial No.	CF-EW71, CF-EW73, CF-EW74, CF-EW75, CF-E5, CF-E7, CF-WA900 V2, CF-E313AC, CF-WR754AC, CF-WR755AC
Trade Mark	COMFAST
Model Difference	All model's the function, software and electric circuit are the same, only with a product outward and model named different. Test sample model: CF-EW72
FCC ID	OYR-CF-EW72
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	DC48V, 0.32A from Adapter With AC100-240V, 50/60Hz, 0.6A Max.
Power Supply:	DC48V, 0.32A from Adapter With AC100-240V, 50/60Hz, 0.6A Max.
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=GANT+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

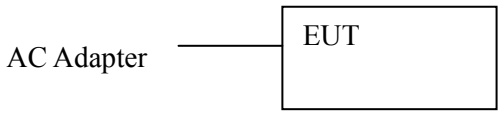
For 802.11n (HT40)/ ac(HT40)		
Channel Number	Channel	Frequency (MHz）
151	Low	5755
159	High	5795

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:



- PC information
  Model: TP00067A
  Input: DC20V, 2.25/3.25A
  Output: 5VDC, 1A

- Adapter information
  Model: R012-4800320Z
  Input: AC10-240V, 50-60Hz, 0.6A Max.
  Output: 48VDC, 0.32A

3. Genera Information

3.1. Test environment and mode

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

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

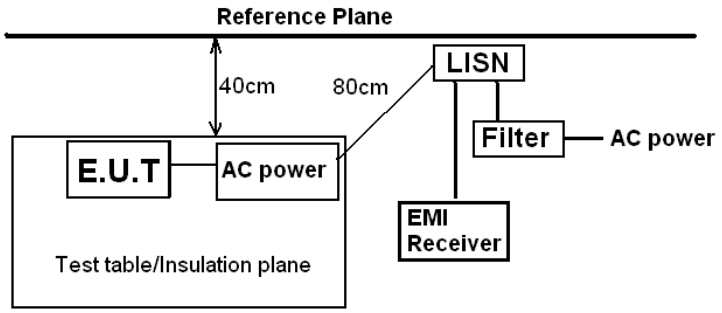
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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

4.1.2. Test Instruments

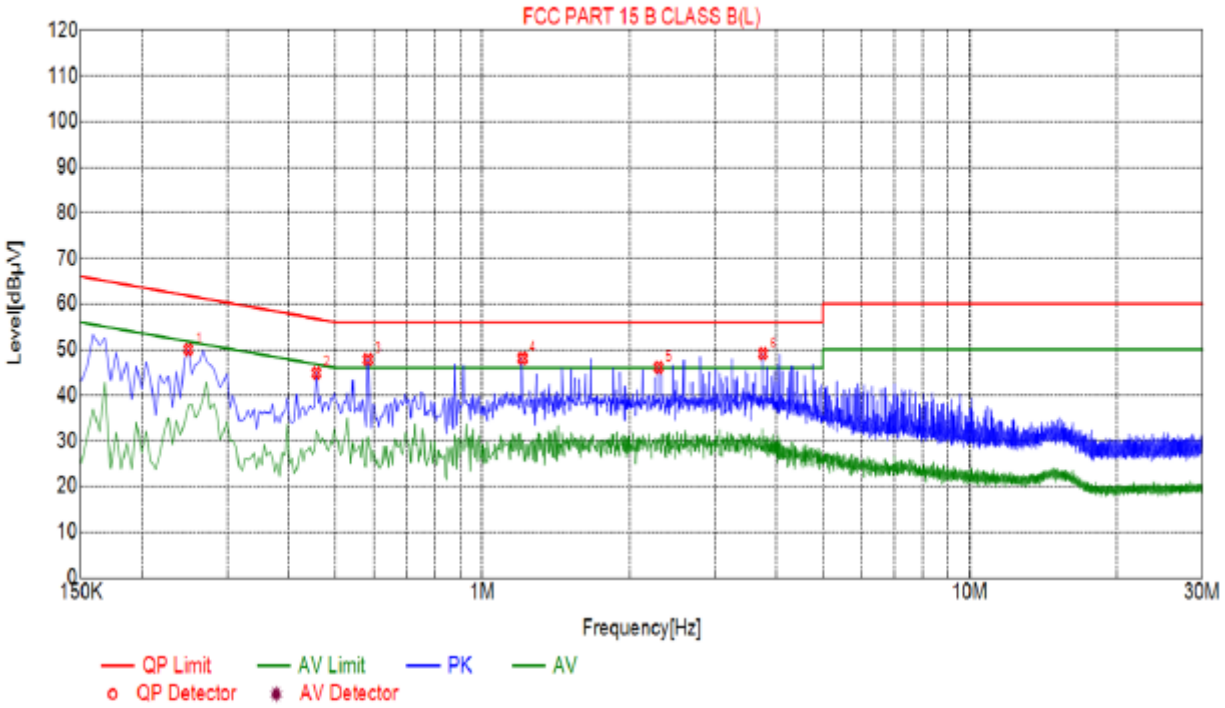
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESCI 7	HKE-010	Dec. 27, 2019
LISN	R&S	ENV216	HKE-002	Dec. 27, 2019
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Dec. 27, 2019
Conducted test software	Tonscend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

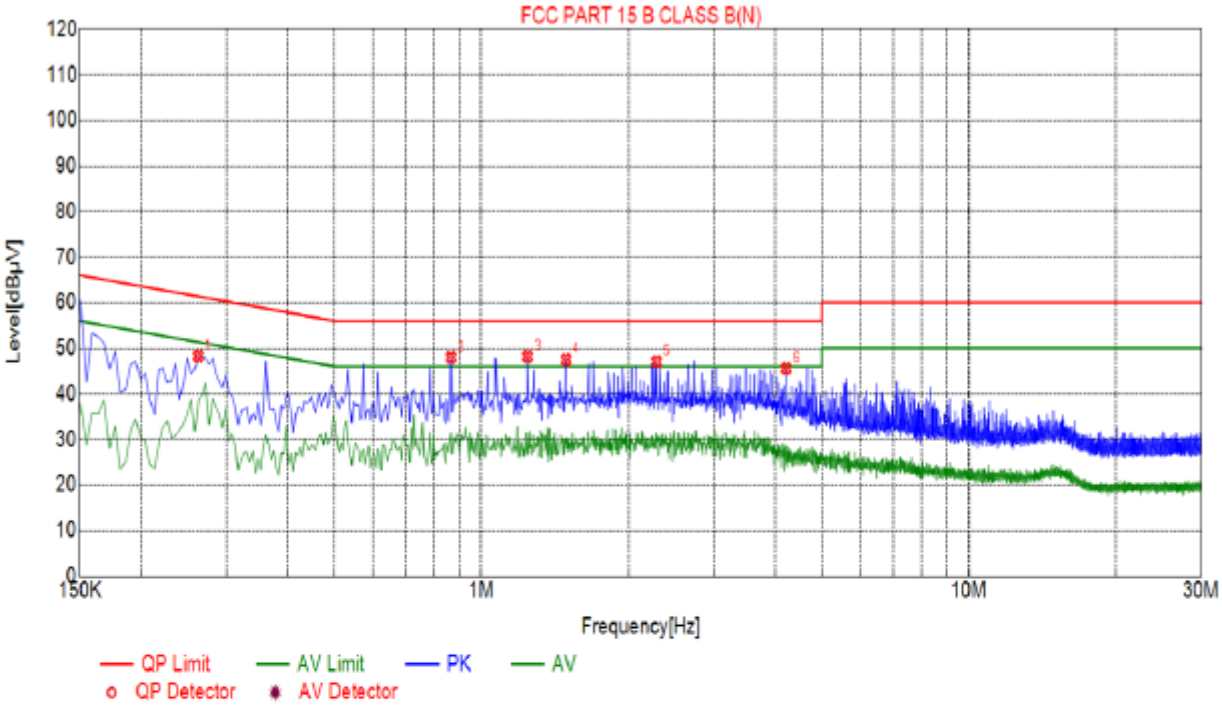
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.2490	50.04	10.04	61.79	11.75	PK
2	0.4560	44.87	10.04	56.77	11.90	PK
3	0.5820	47.81	10.05	56.00	8.19	PK
4	1.2075	48.07	10.09	56.00	7.93	PK
5	2.2965	46.10	10.18	56.00	9.90	PK
6	3.7635	49.10	10.25	56.00	6.90	PK

Remark:
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

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

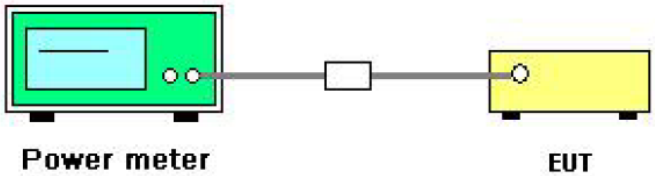


Suspected List						
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.2625	48.29	10.03	61.35	13.06	PK
2	0.8655	48.03	10.06	56.00	7.97	PK
3	1.2435	48.18	10.09	56.00	7.82	PK
4	1.4910	47.52	10.10	56.00	8.48	PK
5	2.2875	47.07	10.18	56.00	8.93	PK
6	4.2225	45.59	10.25	56.00	10.41	PK

Remark:
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

4.2. Maximum Conducted Output Power

4.2.1. Test Specification

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

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

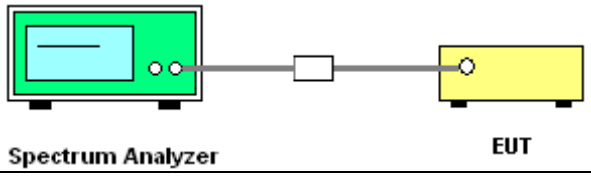
Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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	9.12	8.66	/	30	PASS
11a	CH157	9.35	10.54	/	30	PASS
11a	CH165	10.25	10.36	/	30	PASS
11n(HT20)	CH149	10.56	9.45	13.05	30	PASS
11n(HT20)	CH157	9.33	9.66	12.51	30	PASS
11n(HT20)	CH165	10.52	10.19	13.37	30	PASS
11n(HT40)	CH151	9.36	9.63	12.51	30	PASS
11n(HT40)	CH159	10.12	10.20	13.17	30	PASS
11ac(HT20)	CH149	9.45	9.19	12.33	30	PASS
11ac(HT20)	CH157	11.41	9.78	13.68	30	PASS
11ac(HT20)	CH165	10.63	10.55	13.60	30	PASS
11ac(HT40)	CH151	9.71	9.54	12.64	30	PASS
11ac(HT40)	CH159	10.41	10.28	13.36	30	PASS
11ac(HT80)	CH155	9.39	9.77	12.59	30	PASS

4.3. 6dB Emission Bandwidth

4.3.1. Test Specification

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

4.3.2. Test Instruments

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

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

4.3.3. Test data

ANT 1

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	16.54	0.5	PASS
11a	CH157	5785	16.54	0.5	PASS
11a	CH165	5825	16.54	0.5	PASS
11n(HT20)	CH149	5745	17.69	0.5	PASS
11n(HT20)	CH157	5785	17.64	0.5	PASS
11n(HT20)	CH165	5825	17.67	0.5	PASS
11n(HT40)	CH151	5755	36.44	0.5	PASS
11n(HT40)	CH159	5795	36.46	0.5	PASS
11ac(HT20)	CH149	5745	17.69	0.5	PASS
11ac(HT20)	CH157	5785	17.65	0.5	PASS
11ac(HT20)	CH165	5825	17.68	0.5	PASS
11ac(HT40)	CH151	5755	36.45	0.5	PASS
11ac(HT40)	CH159	5795	36.48	0.5	PASS
11ac(HT80)	CH155	5775	75.30	0.5	PASS

Test plots as follows:

Band IV (5725 – 5850 MHz)

802.11a

Low

Mid

High

802.11n(HT20)

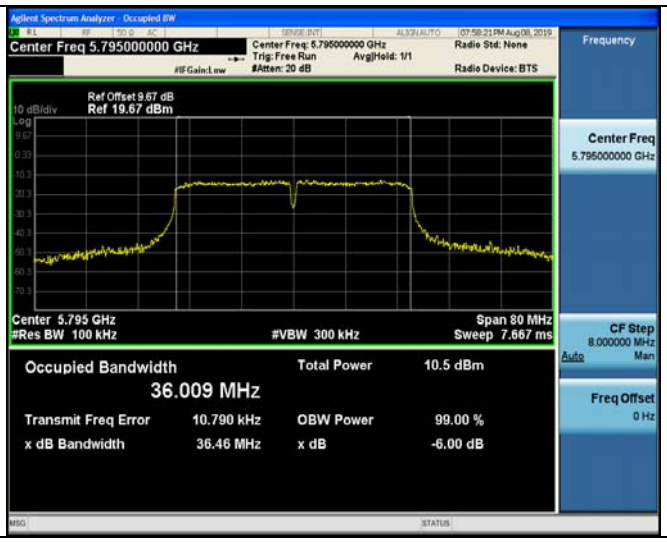
Low

Mid

High

802.11n(HT40)

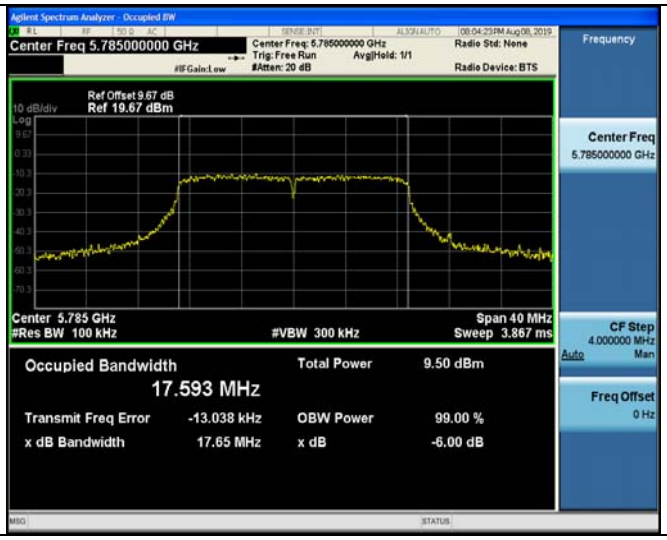
Low



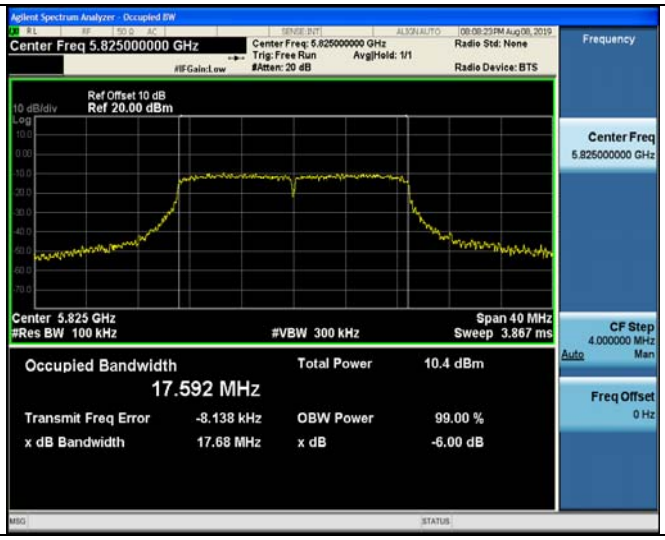
High

802.11ac(HT20)

Low



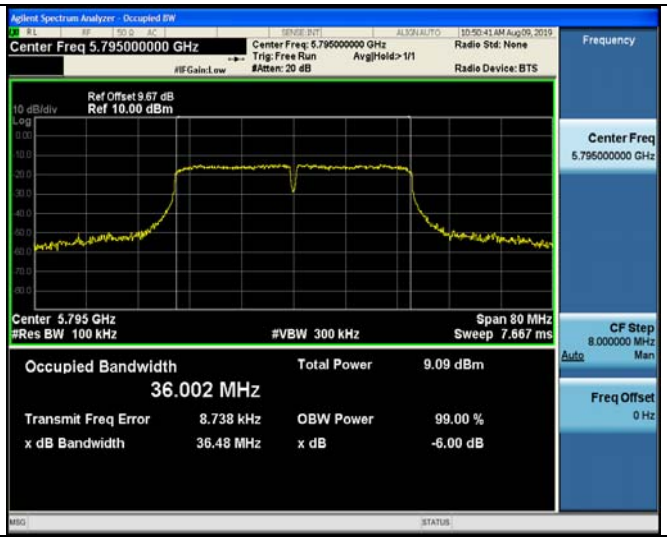
Mid



High

802.11ac(HT40)

Low



High

802.11ac(HT80)

ANT 2

Band IV (5725 - 5850 MHz)					
Mode	Test channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
11a	CH149	5745	16.48	0.5	PASS
11a	CH157	5785	16.53	0.5	PASS
11a	CH161	5825	16.53	0.5	PASS
11n(HT20)	CH149	5745	17.66	0.5	PASS
11n(HT20)	CH157	5785	17.69	0.5	PASS
11n(HT20)	CH161	5825	17.68	0.5	PASS
11n(HT40)	CH151	5755	36.45	0.5	PASS
11n(HT40)	CH159	5795	36.47	0.5	PASS
11ac(HT20)	CH149	5745	17.68	0.5	PASS
11ac(HT20)	CH157	5785	17.65	0.5	PASS
11ac(HT20)	CH165	5825	17.65	0.5	PASS
11ac(HT40)	CH151	5755	36.41	0.5	PASS
11ac(HT40)	CH159	5795	36.44	0.5	PASS
11ac(HT80)	CH155	5755	75.16	0.5	PASS

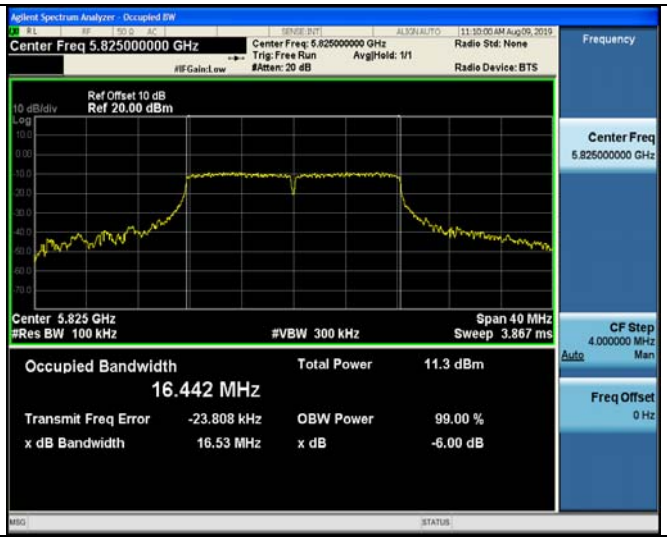
Test plots as follows:

Band IV (5725 – 5850 MHz)

802.11a

Low

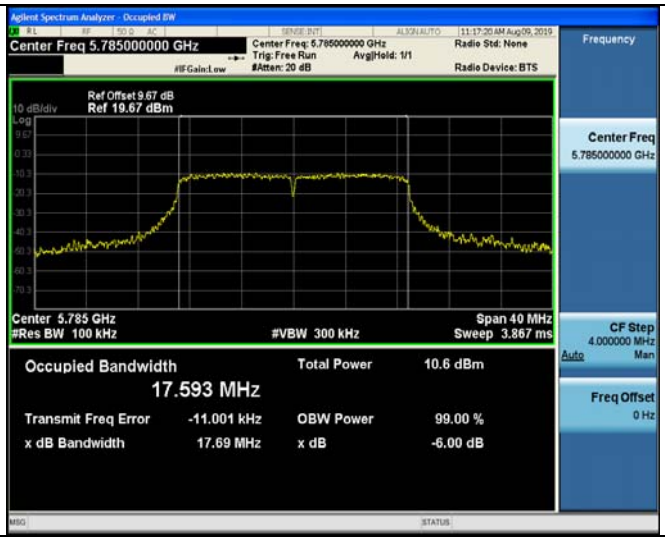
Mid



High

802.11n(HT20)

Low

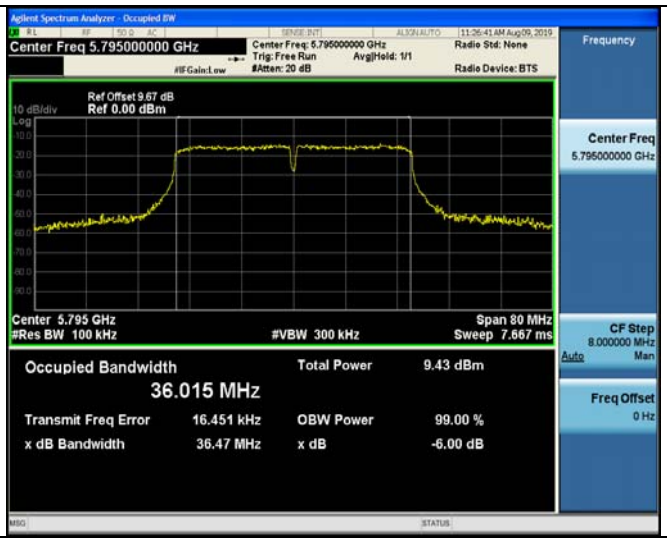


Mid

High

802.11n(HT40)

Low

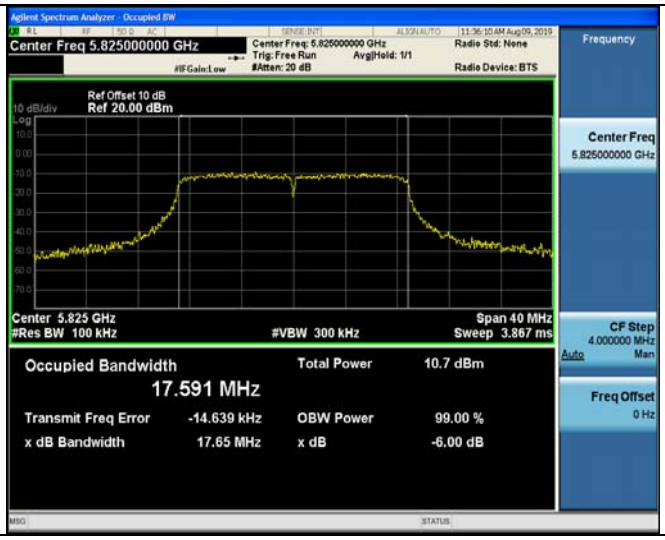


High

802.11ac(HT20)

Low

Mid



High

802.11ac(HT40)

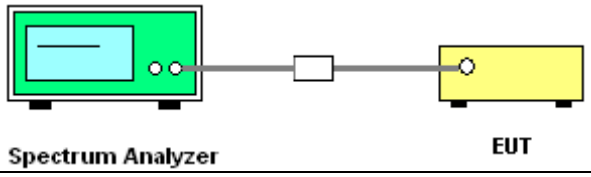
Low

High

802.11ac(HT80)

4.4. 26dB Bandwidth and 99% Occupied Bandwidth

4.4.1. Test Specification

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

4.4.2. Test Instruments

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

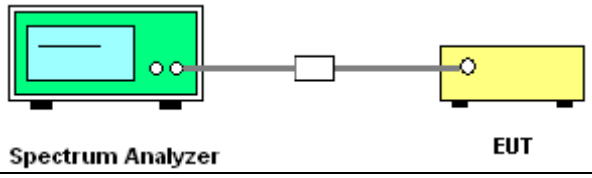
Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.4.3. Test Result

N/A

4.5. Power Spectral Density

4.5.1. Test Specification

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

4.5.2. Test Instruments

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

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

4.5.3. Test data

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	-3.46	0	-3.46	30	PASS
11a	CH157	-2.90	0	-2.90	30	PASS
11a	CH161	-1.87	0	-1.87	30	PASS
11n(HT20)	CH149	-3.70	0	-3.70	30	PASS
11n(HT20)	CH157	-3.53	0	-3.53	30	PASS
11n(HT20)	CH161	-2.71	0	-2.71	30	PASS
11n(HT40)	CH151	-7.99	0	-7.99	30	PASS
11n(HT40)	CH159	-6.86	0	-6.86	30	PASS
11ac(HT20)	CH149	-4.97	0	-4.97	30	PASS
11ac(HT20)	CH157	-4.25	0	-4.25	30	PASS
11ac(HT20)	CH161	-3.44	0	-3.44	30	PASS
11ac(HT40)	CH151	-8.74	0	-8.74	30	PASS
11ac(HT40)	CH159	-8.34	0	-8.34	30	PASS
11ac(HT80)	CH155	-10.74	0	-10.74	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	-3.71	0	-3.71	30	PASS
11a	CH157	-3.23	0	-3.23	30	PASS
11a	CH161	-2.52	0	-2.52	30	PASS
11n(HT20)	CH149	-4.90	0	-4.90	30	PASS
11n(HT20)	CH157	-3.54	0	-3.54	30	PASS
11n(HT20)	CH161	-3.50	0	-3.50	30	PASS
11n(HT40)	CH151	-7.90	0	-7.90	30	PASS
11n(HT40)	CH159	-8.01	0	-8.01	30	PASS
11ac(HT20)	CH149	-4.64	0	-4.64	30	PASS
11ac(HT20)	CH157	-3.49	0	-3.49	30	PASS
11ac(HT20)	CH161	-3.47	0	-3.47	30	PASS
11ac(HT40)	CH151	-8.97	0	-8.97	30	PASS
11ac(HT40)	CH159	-7.87	0	-7.87	30	PASS
11ac(HT80)	CH155	-11.24	0	-11.24	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(T80)

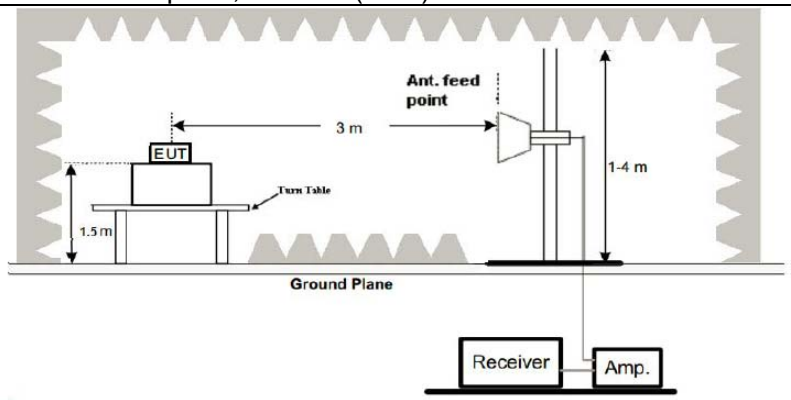
For MIMO antenna port 1+antenna port 2

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	-1.25	30	**PASS**
11n(HT20)	CH157	-0.52	30	**PASS**
11n(HT20)	CH161	-0.08	30	**PASS**
11n(HT40)	CH151	-4.93	30	**PASS**
11n(HT40)	CH159	-4.39	30	**PASS**
11ac(HT20)	CH149	-1.79	30	**PASS**
11ac(HT20)	CH157	-0.84	30	**PASS**
11ac(HT20)	CH161	-0.44	30	**PASS**
11ac(HT40)	CH151	-5.84	30	**PASS**
11ac(HT40)	CH159	-5.09	30	**PASS**
11ac(HT80)	CH155	-7.97	30	**PASS**
	Note: 1 According to KDB 662911, Result power = $10\log(10^{(ant1/10)}+10^{(ant2/10)})$. 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:	For band I&II&III: E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBμV/m, for EIRP(dBm)= **-27dBm** For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. For band IV(5715-5725MHz&5850-5860MHz): E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBμV/m, for EIRP(dBm)= **-27dBm**； For band IV(other un-restricted band):E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBμV/m, for EIRP(dBm)= **-27dBm**
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The EUT was placed on the top of a rotating table 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

4.6.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESRP3	HKE-005	Dec. 27, 2019
Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2019
Preamplifier	EMCI	EMC051845SE	HKE-015	Dec. 27, 2019
Preamplifier	Agilent	83051A	HKE-016	Dec. 27, 2019
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	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 (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	57.22	-2.06	55.16	68.2	-13.04	peak
5650	36.53	-2.06	34.47	48.2	-13.73	AVG
5700	88.32	-1.96	86.36	105.2	-18.84	peak
5700	68.63	-1.96	66.67	85.2	-18.53	AVG
5720	92.21	-2.87	89.34	110.8	-21.46	peak
5720	73.56	-2.87	70.69	90.8	-20.11	AVG
5725	110.02	-2.14	107.88	122.2	-14.32	peak
5725	86.33	-2.14	84.19	102.2	-18.01	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	57.21	-2.06	55.15	68.2	-13.05	peak
5650	34.66	-2.06	32.6	48.2	-15.6	AVG
5700	91.45	-1.96	89.49	105.2	-15.71	peak
5700	66.08	-1.96	64.12	85.2	-21.08	AVG
5720	93.12	-2.87	90.25	110.8	-20.55	peak
5720	76.36	-2.87	73.49	90.8	-17.31	AVG
5725	112.06	-2.14	109.92	122.2	-12.28	peak
5725	90.45	-2.14	88.31	102.2	-13.89	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	110.66	-1.97	108.69	122.2	-13.51	peak
5850	89.25	-1.97	87.28	102.2	-14.92	AVG
5855	94.38	-2.13	92.25	110.8	-18.55	peak
5855	72.08	-2.13	69.95	90.8	-20.85	AVG
5875	86.14	-2.65	83.49	105.2	-21.71	peak
5875	61.34	-2.65	58.69	85.2	-26.51	AVG
5925	53.25	-2.28	50.97	68.2	-17.23	peak
5925	36.09	-2.28	33.81	48.2	-14.39	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
5850	113.36	-1.97	111.39	122.2	-10.81	peak
5850	87.08	-1.97	85.11	102.2	-17.09	AVG
5855	93.55	-2.13	91.42	110.8	-19.38	peak
5855	72.12	-2.13	69.99	90.8	-20.81	AVG
5875	86.37	-2.65	83.72	105.2	-21.48	peak
5875	67.19	-2.65	64.54	85.2	-20.66	AVG
5925	53.53	-2.28	51.25	68.2	-16.95	peak
5925	35.25	-2.28	32.97	48.2	-15.23	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	57.66	-2.06	55.6	68.2	-12.6	peak
5650	33.36	-2.06	31.3	48.2	-16.9	AVG
5700	90.78	-1.96	88.82	105.2	-16.38	peak
5700	66.56	-1.96	64.6	85.2	-20.6	AVG
5720	95.63	-2.87	92.76	110.8	-18.04	peak
5720	77.41	-2.87	74.54	90.8	-16.26	AVG
5725	113.64	-2.14	111.5	122.2	-10.7	peak
5725	91.47	-2.14	89.33	102.2	-12.87	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	61.28	-2.06	59.22	68.2	-8.98	peak
5650	38.69	-2.06	36.63	48.2	-11.57	AVG
5700	96.55	-1.96	94.59	105.2	-10.61	peak
5700	74.45	-1.96	72.49	85.2	-12.71	AVG
5720	94.37	-2.87	91.5	110.8	-19.3	peak
5720	77.28	-2.87	74.41	90.8	-16.39	AVG
5725	112.14	-2.14	110	122.2	-12.2	peak
5725	92.36	-2.14	90.22	102.2	-11.98	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	110.07	-1.97	108.1	122.2	-14.1	peak
5850	86.52	-1.97	84.55	102.2	-17.65	AVG
5855	94.2	-2.13	92.07	110.8	-18.73	peak
5855	72.18	-2.13	70.05	90.8	-20.75	AVG
5875	89.28	-2.65	86.63	105.2	-18.57	peak
5875	71.96	-2.65	69.31	85.2	-15.89	AVG
5925	54.75	-2.28	52.47	68.2	-15.73	peak
5925	38.63	-2.28	36.35	48.2	-11.85	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
5850	110.59	-1.97	108.62	122.2	-13.58	peak
5850	93.63	-1.97	91.66	102.2	-10.54	AVG
5855	94.28	-2.13	92.15	110.8	-18.65	peak
5855	74.34	-2.13	72.21	90.8	-18.59	AVG
5875	86.05	-2.65	83.4	105.2	-21.8	peak
5875	66.15	-2.65	63.5	85.2	-21.7	AVG
5925	57.45	-2.28	55.17	68.2	-13.03	peak
5925	40.78	-2.28	38.5	48.2	-9.7	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	57.15	-2.06	55.09	68.2	-13.11	peak
5650	36.32	-2.06	34.26	48.2	-13.94	AVG
5700	93.15	-1.96	91.19	105.2	-14.01	peak
5700	71.69	-1.96	69.73	85.2	-15.47	AVG
5720	92.58	-2.87	89.71	110.8	-21.09	peak
5720	64.5	-2.87	61.63	90.8	-29.17	AVG
5725	112.27	-2.14	110.13	122.2	-12.07	peak
5725	93.35	-2.14	91.21	102.2	-10.99	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	61.54	-2.06	59.48	68.2	-8.72	peak
5650	36.19	-2.06	34.13	48.2	-14.07	AVG
5700	96.02	-1.96	94.06	105.2	-11.14	peak
5700	72.34	-1.96	70.38	85.2	-14.82	AVG
5720	90.21	-2.87	87.34	110.8	-23.46	peak
5720	75.45	-2.87	72.58	90.8	-18.22	AVG
5725	112.85	-2.14	110.71	122.2	-11.49	peak
5725	91.02	-2.14	88.88	102.2	-13.32	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	112.56	-1.97	110.59	122.2	-11.61	peak
5850	92.45	-1.97	90.48	102.2	-11.72	AVG
5855	94.25	-2.13	92.12	110.8	-18.68	peak
5855	75.48	-2.13	73.35	90.8	-17.45	AVG
5875	87.15	-2.65	84.5	105.2	-20.7	peak
5875	68.98	-2.65	66.33	85.2	-18.87	AVG
5925	54.12	-2.28	51.84	68.2	-16.36	peak
5925	39.25	-2.28	36.97	48.2	-11.23	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	108.15	-1.97	106.18	122.2	-16.02	peak
5850	93.58	-1.97	91.61	102.2	-10.59	AVG
5855	91.64	-2.13	89.51	110.8	-21.29	peak
5855	74.96	-2.13	72.83	90.8	-17.97	AVG
5875	85.15	-2.65	82.5	105.2	-22.7	peak
5875	63.64	-2.65	60.99	85.2	-24.21	AVG
5925	54.63	-2.28	52.35	68.2	-15.85	peak
5925	38.78	-2.28	36.5	48.2	-11.7	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac20 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	57.45	-2.06	55.39	68.2	-12.81	peak
5650	38.48	-2.06	36.42	48.2	-11.78	AVG
5700	88.03	-1.96	86.07	105.2	-19.13	peak
5700	66.96	-1.96	65	85.2	-20.2	AVG
5720	93.45	-2.87	90.58	110.8	-20.22	peak
5720	74.15	-2.87	71.28	90.8	-19.52	AVG
5725	110.09	-2.14	107.95	122.2	-14.25	peak
5725	88.45	-2.14	86.31	102.2	-15.89	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	58.22	-2.06	56.16	68.2	-12.04	peak
5650	38.45	-2.06	36.39	48.2	-11.81	AVG
5700	91.65	-1.96	89.69	105.2	-15.51	peak
5700	67.28	-1.96	65.32	85.2	-19.88	AVG
5720	93.54	-2.87	90.67	110.8	-20.13	peak
5720	77.36	-2.87	74.49	90.8	-16.31	AVG
5725	110.79	-2.14	108.65	122.2	-13.55	peak
5725	90.66	-2.14	88.52	102.2	-13.68	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	110.23	-1.97	108.26	122.2	-13.94	peak
5850	88.47	-1.97	86.5	102.2	-15.7	AVG
5855	95.25	-2.13	93.12	110.8	-17.68	peak
5855	77.39	-2.13	75.26	90.8	-15.54	AVG
5875	89.58	-2.65	86.93	105.2	-18.27	peak
5875	68.13	-2.65	65.48	85.2	-19.72	AVG
5925	54.54	-2.28	52.26	68.2	-15.94	peak
5925	37.76	-2.28	35.48	48.2	-12.72	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
5850	110.6	-1.97	108.63	122.2	-13.57	peak
5850	87.09	-1.97	85.12	102.2	-17.08	AVG
5855	90.64	-2.13	88.51	110.8	-22.29	peak
5855	77.57	-2.13	75.44	90.8	-15.36	AVG
5875	84.64	-2.65	81.99	105.2	-23.21	peak
5875	72.23	-2.65	69.58	85.2	-15.62	AVG
5925	56.45	-2.28	54.17	68.2	-14.03	peak
5925	38.35	-2.28	36.07	48.2	-12.13	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	58.11	-2.06	56.05	68.2	-12.15	peak
5650	37.66	-2.06	35.6	48.2	-12.6	AVG
5700	88.45	-1.96	86.49	105.2	-18.71	peak
5700	69.37	-1.96	67.41	85.2	-17.79	AVG
5720	94.69	-2.87	91.82	110.8	-18.98	peak
5720	73.41	-2.87	70.54	90.8	-20.26	AVG
5725	110.52	-2.14	108.38	122.2	-13.82	peak
5725	90.14	-2.14	88	102.2	-14.2	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	57.55	-2.06	55.49	68.2	-12.71	peak
5650	37.46	-2.06	35.4	48.2	-12.8	AVG
5700	87.37	-1.96	85.41	105.2	-19.79	peak
5700	67.76	-1.96	65.8	85.2	-19.4	AVG
5720	94.05	-2.87	91.18	110.8	-19.62	peak
5720	71.58	-2.87	68.71	90.8	-22.09	AVG
5725	112.63	-2.14	110.49	122.2	-11.71	peak
5725	92.47	-2.14	90.33	102.2	-11.87	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	113.53	-1.97	111.56	122.2	-10.64	peak
5850	91.42	-1.97	89.45	102.2	-12.75	AVG
5855	91.45	-2.13	89.32	110.8	-21.48	peak
5855	75.03	-2.13	72.9	90.8	-17.9	AVG
5875	86.42	-2.65	83.77	105.2	-21.43	peak
5875	65.36	-2.65	62.71	85.2	-22.49	AVG
5925	54.55	-2.28	52.27	68.2	-15.93	peak
5925	37.38	-2.28	35.1	48.2	-13.1	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
5850	112.46	-1.97	110.49	122.2	-11.71	peak
5850	89.37	-1.97	87.4	102.2	-14.8	AVG
5855	90.55	-2.13	88.42	110.8	-22.38	peak
5855	71.38	-2.13	69.25	90.8	-21.55	AVG
5875	87.78	-2.65	85.13	105.2	-20.07	peak
5875	65.34	-2.65	62.69	85.2	-22.51	AVG
5925	56.02	-2.28	53.74	68.2	-14.46	peak
5925	34.85	-2.28	32.57	48.2	-15.63	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac80 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	57.55	-2.06	55.49	68.2	-12.71	peak
5650	38.35	-2.06	36.29	48.2	-11.91	AVG
5700	87.68	-1.96	85.72	105.2	-19.48	peak
5700	66.43	-1.96	64.47	85.2	-20.73	AVG
5720	94.78	-2.87	91.91	110.8	-18.89	peak
5720	76.63	-2.87	73.76	90.8	-17.04	AVG
5725	112.15	-2.14	110.01	122.2	-12.19	peak
5725	91.06	-2.14	88.92	102.2	-13.28	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	57.81	-2.06	55.75	68.2	-12.45	peak
5650	36.12	-2.06	34.06	48.2	-14.14	AVG
5700	91.32	-1.96	89.36	105.2	-15.84	peak
5700	67.45	-1.96	65.49	85.2	-19.71	AVG
5720	94.15	-2.87	91.28	110.8	-19.52	peak
5720	70.78	-2.87	67.91	90.8	-22.89	AVG
5725	112.16	-2.14	110.02	122.2	-12.18	peak
5725	94.56	-2.14	92.42	102.2	-9.78	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	110.55	-1.97	108.58	122.2	-13.62	peak
5850	91.45	-1.97	89.48	102.2	-12.72	AVG
5855	92.08	-2.13	89.95	110.8	-20.85	peak
5855	77.41	-2.13	75.28	90.8	-15.52	AVG
5875	85.19	-2.65	82.54	105.2	-22.66	peak
5875	62.15	-2.65	59.5	85.2	-25.7	AVG
5925	52.55	-2.28	50.27	68.2	-17.93	peak
5925	38.65	-2.28	36.37	48.2	-11.83	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
5850	112.61	-1.97	110.64	122.2	-11.56	peak
5850	93.52	-1.97	91.55	102.2	-10.65	AVG
5855	94.23	-2.13	92.1	110.8	-18.7	peak
5855	77.18	-2.13	75.05	90.8	-15.75	AVG
5875	82.66	-2.65	80.01	105.2	-25.19	peak
5875	65.13	-2.65	62.48	85.2	-22.72	AVG
5925	56.54	-2.28	54.26	68.2	-13.94	peak
5925	37.11	-2.28	34.83	48.2	-13.37	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

ANT 2

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

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	56.21	-2.06	54.15	68.2	-14.05	peak
5650	34.65	-2.06	32.59	48.2	-15.61	AVG
5700	91.09	-1.96	89.13	105.2	-16.07	peak
5700	66.16	-1.96	64.2	85.2	-21	AVG
5720	94.38	-2.87	91.51	110.8	-19.29	peak
5720	74.28	-2.87	71.41	90.8	-19.39	AVG
5725	110.59	-2.14	108.45	122.2	-13.75	peak
5725	90.37	-2.14	88.23	102.2	-13.97	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	58.35	-2.06	56.29	68.2	-11.91	peak
5650	37.48	-2.06	35.42	48.2	-12.78	AVG
5700	91.26	-1.96	89.3	105.2	-15.9	peak
5700	64.6	-1.96	62.64	85.2	-22.56	AVG
5720	96.48	-2.87	93.61	110.8	-17.19	peak
5720	73.37	-2.87	70.5	90.8	-20.3	AVG
5725	110.96	-2.14	108.82	122.2	-13.38	peak
5725	89.52	-2.14	87.38	102.2	-14.82	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	112.25	-1.97	110.28	122.2	-11.92	peak
5850	88.66	-1.97	86.69	102.2	-15.51	AVG
5855	95.17	-2.13	93.04	110.8	-17.76	peak
5855	73.06	-2.13	70.93	90.8	-19.87	AVG
5875	86.4	-2.65	83.75	105.2	-21.45	peak
5875	65.58	-2.65	62.93	85.2	-22.27	AVG
5925	56.37	-2.28	54.09	68.2	-14.11	peak
5925	39.47	-2.28	37.19	48.2	-11.01	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
5850	112.65	-1.97	110.68	122.2	-11.52	peak
5850	90.18	-1.97	88.21	102.2	-13.99	AVG
5855	94.67	-2.13	92.54	110.8	-18.26	peak
5855	78.03	-2.13	75.9	90.8	-14.9	AVG
5875	87.41	-2.65	84.76	105.2	-20.44	peak
5875	67.22	-2.65	64.57	85.2	-20.63	AVG
5925	56.37	-2.28	54.09	68.2	-14.11	peak
5925	38.55	-2.28	36.27	48.2	-11.93	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	59.25	-2.06	57.19	68.2	-11.01	peak
5650	36.47	-2.06	34.41	48.2	-13.79	AVG
5700	90.39	-1.96	88.43	105.2	-16.77	peak
5700	69.24	-1.96	67.28	85.2	-17.92	AVG
5720	91.06	-2.87	88.19	110.8	-22.61	peak
5720	76.38	-2.87	73.51	90.8	-17.29	AVG
5725	112.25	-2.14	110.11	122.2	-12.09	peak
5725	95.75	-2.14	93.61	102.2	-8.59	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	59.38	-2.06	57.32	68.2	-10.88	peak
5650	38.16	-2.06	36.1	48.2	-12.1	AVG
5700	96.45	-1.96	94.49	105.2	-10.71	peak
5700	67.05	-1.96	65.09	85.2	-20.11	AVG
5720	94.63	-2.87	91.76	110.8	-19.04	peak
5720	77.22	-2.87	74.35	90.8	-16.45	AVG
5725	112.49	-2.14	110.35	122.2	-11.85	peak
5725	94.63	-2.14	92.49	102.2	-9.71	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	110.05	-1.97	108.08	122.2	-14.12	peak
5850	88.63	-1.97	86.66	102.2	-15.54	AVG
5855	92.52	-2.13	90.39	110.8	-20.41	peak
5855	79.11	-2.13	76.98	90.8	-13.82	AVG
5875	84.55	-2.65	81.9	105.2	-23.3	peak
5875	67.54	-2.65	64.89	85.2	-20.31	AVG
5925	52.21	-2.28	49.93	68.2	-18.27	peak
5925	37.86	-2.28	35.58	48.2	-12.62	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	110.61	-1.97	108.64	122.2	-13.56	peak
5850	92.03	-1.97	90.06	102.2	-12.14	AVG
5855	94.36	-2.13	92.23	110.8	-18.57	peak
5855	78.76	-2.13	76.63	90.8	-14.17	AVG
5875	86.7	-2.65	84.05	105.2	-21.15	peak
5875	68.52	-2.65	65.87	85.2	-19.33	AVG
5925	58.48	-2.28	56.2	68.2	-12	peak
5925	42.35	-2.28	40.07	48.2	-8.13	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	55.15	-2.06	53.09	68.2	-15.11	peak
5650	36.57	-2.06	34.51	48.2	-13.69	AVG
5700	94.15	-1.96	92.19	105.2	-13.01	peak
5700	64.12	-1.96	62.16	85.2	-23.04	AVG
5720	92.33	-2.87	89.46	110.8	-21.34	peak
5720	73.44	-2.87	70.57	90.8	-20.23	AVG
5725	112.48	-2.14	110.34	122.2	-11.86	peak
5725	91.05	-2.14	88.91	102.2	-13.29	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	61.55	-2.06	59.49	68.2	-8.71	peak
5650	37.05	-2.06	34.99	48.2	-13.21	AVG
5700	96.65	-1.96	94.69	105.2	-10.51	peak
5700	66.06	-1.96	64.1	85.2	-21.1	AVG
5720	90.33	-2.87	87.46	110.8	-23.34	peak
5720	74.78	-2.87	71.91	90.8	-18.89	AVG
5725	112.96	-2.14	110.82	122.2	-11.38	peak
5725	88.12	-2.14	85.98	102.2	-16.22	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G
Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	107.41	-1.97	105.44	122.2	-16.76	peak
5850	88.15	-1.97	86.18	102.2	-16.02	AVG
5855	94.34	-2.13	92.21	110.8	-18.59	peak
5855	77.66	-2.13	75.53	90.8	-15.27	AVG
5875	89.08	-2.65	86.43	105.2	-18.77	peak
5875	64.64	-2.65	61.99	85.2	-23.21	AVG
5925	54.11	-2.28	51.83	68.2	-16.37	peak
5925	41.82	-2.28	39.54	48.2	-8.66	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
5850	108.16	-1.97	106.19	122.2	-16.01	peak
5850	92.26	-1.97	90.29	102.2	-11.91	AVG
5855	93.06	-2.13	90.93	110.8	-19.87	peak
5855	73.61	-2.13	71.48	90.8	-19.32	AVG
5875	86.43	-2.65	83.78	105.2	-21.42	peak
5875	67.28	-2.65	64.63	85.2	-20.57	AVG
5925	52.18	-2.28	49.9	68.2	-18.3	peak
5925	36.37	-2.28	34.09	48.2	-14.11	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac20 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	59.31	-2.06	57.25	68.2	-10.95	peak
5650	38.61	-2.06	36.55	48.2	-11.65	AVG
5700	90.18	-1.96	88.22	105.2	-16.98	peak
5700	67.11	-1.96	65.15	85.2	-20.05	AVG
5720	94.36	-2.87	91.49	110.8	-19.31	peak
5720	74.19	-2.87	71.32	90.8	-19.48	AVG
5725	110.07	-2.14	107.93	122.2	-14.27	peak
5725	94.45	-2.14	92.31	102.2	-9.89	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	58.19	-2.06	56.13	68.2	-12.07	peak
5650	35.36	-2.06	33.3	48.2	-14.9	AVG
5700	90.48	-1.96	88.52	105.2	-16.68	peak
5700	66.26	-1.96	64.3	85.2	-20.9	AVG
5720	96.19	-2.87	93.32	110.8	-17.48	peak
5720	72.37	-2.87	69.5	90.8	-21.3	AVG
5725	110.55	-2.14	108.41	122.2	-13.79	peak
5725	94.26	-2.14	92.12	102.2	-10.08	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	110.51	-1.97	108.54	122.2	-13.66	peak
5850	90.65	-1.97	88.68	102.2	-13.52	AVG
5855	94.3	-2.13	92.17	110.8	-18.63	peak
5855	75.18	-2.13	73.05	90.8	-17.75	AVG
5875	87.96	-2.65	85.31	105.2	-19.89	peak
5875	69.35	-2.65	66.7	85.2	-18.5	AVG
5925	54.61	-2.28	52.33	68.2	-15.87	peak
5925	36.06	-2.28	33.78	48.2	-14.42	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
5850	111.25	-1.97	109.28	122.2	-12.92	peak
5850	90.43	-1.97	88.46	102.2	-13.74	AVG
5855	92.26	-2.13	90.13	110.8	-20.67	peak
5855	75.19	-2.13	73.06	90.8	-17.74	AVG
5875	84.22	-2.65	81.57	105.2	-23.63	peak
5875	64.45	-2.65	61.8	85.2	-23.4	AVG
5925	54.55	-2.28	52.27	68.2	-15.93	peak
5925	36.52	-2.28	34.24	48.2	-13.96	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac40 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	57.22	-2.06	55.16	68.2	-13.04	peak
5650	37.92	-2.06	35.86	48.2	-12.34	AVG
5700	88.08	-1.96	86.12	105.2	-19.08	peak
5700	66.16	-1.96	64.2	85.2	-21	AVG
5720	90.26	-2.87	87.39	110.8	-23.41	peak
5720	75.33	-2.87	72.46	90.8	-18.34	AVG
5725	110.52	-2.14	108.38	122.2	-13.82	peak
5725	92.14	-2.14	90	102.2	-12.2	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	57.54	-2.06	55.48	68.2	-12.72	peak
5650	39.36	-2.06	37.3	48.2	-10.9	AVG
5700	92.25	-1.96	90.29	105.2	-14.91	peak
5700	66.33	-1.96	64.37	85.2	-20.83	AVG
5720	95.24	-2.87	92.37	110.8	-18.43	peak
5720	75.53	-2.87	72.66	90.8	-18.14	AVG
5725	112.16	-2.14	110.02	122.2	-12.18	peak
5725	94.56	-2.14	92.42	102.2	-9.78	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	112.35	-1.97	110.38	122.2	-11.82	peak
5850	91.25	-1.97	89.28	102.2	-12.92	AVG
5855	94.06	-2.13	91.93	110.8	-18.87	peak
5855	76.15	-2.13	74.02	90.8	-16.78	AVG
5875	86.62	-2.65	83.97	105.2	-21.23	peak
5875	68.48	-2.65	65.83	85.2	-19.37	AVG
5925	54.08	-2.28	51.8	68.2	-16.4	peak
5925	34.48	-2.28	32.2	48.2	-16	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
5850	112.13	-1.97	110.16	122.2	-12.04	peak
5850	88.33	-1.97	86.36	102.2	-15.84	AVG
5855	92.15	-2.13	90.02	110.8	-20.78	peak
5855	78.36	-2.13	76.23	90.8	-14.57	AVG
5875	85.28	-2.65	82.63	105.2	-22.57	peak
5875	64.45	-2.65	61.8	85.2	-23.4	AVG
5925	55.63	-2.28	53.35	68.2	-14.85	peak
5925	38.42	-2.28	36.14	48.2	-12.06	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11ac80 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	57.27	-2.06	55.21	68.2	-12.99	peak
5650	36.71	-2.06	34.65	48.2	-13.55	AVG
5700	91.63	-1.96	89.67	105.2	-15.53	peak
5700	75.82	-1.96	73.86	85.2	-11.34	AVG
5720	91.25	-2.87	88.38	110.8	-22.42	peak
5720	65.76	-2.87	62.89	90.8	-27.91	AVG
5725	111.34	-2.14	109.2	122.2	-13	peak
5725	86.21	-2.14	84.07	102.2	-18.13	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	58.15	-2.06	56.09	68.2	-12.11	peak
5650	35.06	-2.06	33	48.2	-15.2	AVG
5700	90.11	-1.96	88.15	105.2	-17.05	peak
5700	68.64	-1.96	66.68	85.2	-18.52	AVG
5720	94.36	-2.87	91.49	110.8	-19.31	peak
5720	75.07	-2.87	72.2	90.8	-18.6	AVG
5725	114.88	-2.14	112.74	122.2	-9.46	peak
5725	93.66	-2.14	91.52	102.2	-10.68	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High with 5.8G

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	114.44	-1.97	112.47	122.2	-9.73	peak
5850	91.63	-1.97	89.66	102.2	-12.54	AVG
5855	93.49	-2.13	91.36	110.8	-19.44	peak
5855	80.22	-2.13	78.09	90.8	-12.71	AVG
5875	85.26	-2.65	82.61	105.2	-22.59	peak
5875	63.37	-2.65	60.72	85.2	-24.48	AVG
5925	52.16	-2.28	49.88	68.2	-18.32	peak
5925	37.73	-2.28	35.45	48.2	-12.75	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
5850	110.26	-1.97	108.29	122.2	-13.91	peak
5850	92.34	-1.97	90.37	102.2	-11.83	AVG
5855	93.25	-2.13	91.12	110.8	-19.68	peak
5855	77.06	-2.13	74.93	90.8	-15.87	AVG
5875	86.36	-2.65	83.71	105.2	-21.49	peak
5875	63.19	-2.65	60.54	85.2	-24.66	AVG
5925	56.35	-2.28	54.07	68.2	-14.13	peak
5925	37.22	-2.28	34.94	48.2	-13.26	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

4.7. Spurious Emission

4.7.1.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205
Test Method:	KDB 789033 D02 v02r01
Frequency Range:	9kHz to 40GHz
Measurement Distance:	3 m
Antenna Polarization:	Horizontal & Vertical
Operation mode:	Transmitting mode with modulation
Receiver Setup:	

Frequency	Detector	RBW	VBW	Remark
9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit:

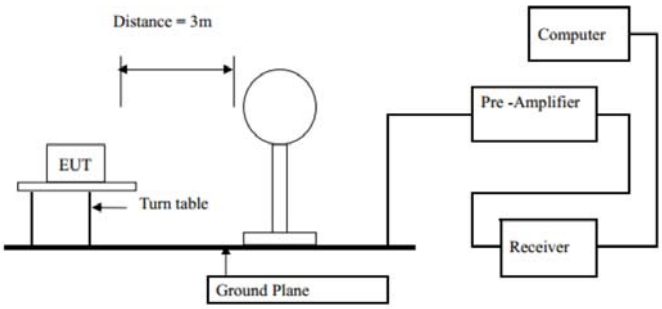
Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

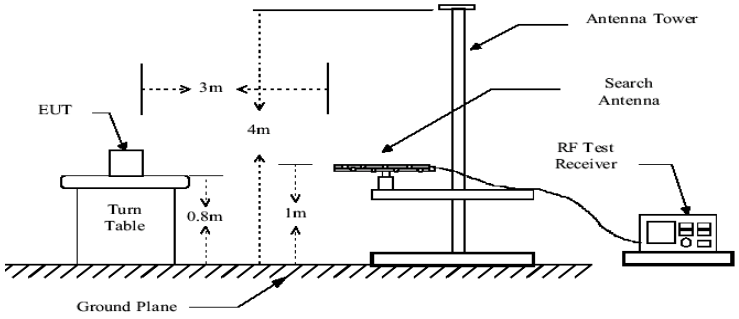
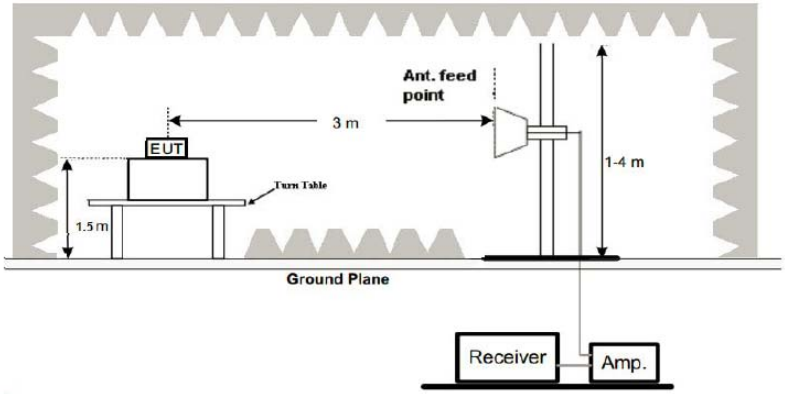
Frequency	Limit (dBuV/m @3m)	Detector
Above 1G	74.0	Peak
	54.0	Average

Test setup:

For radiated emissions below 30MHz



30MHz to 1GHz

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

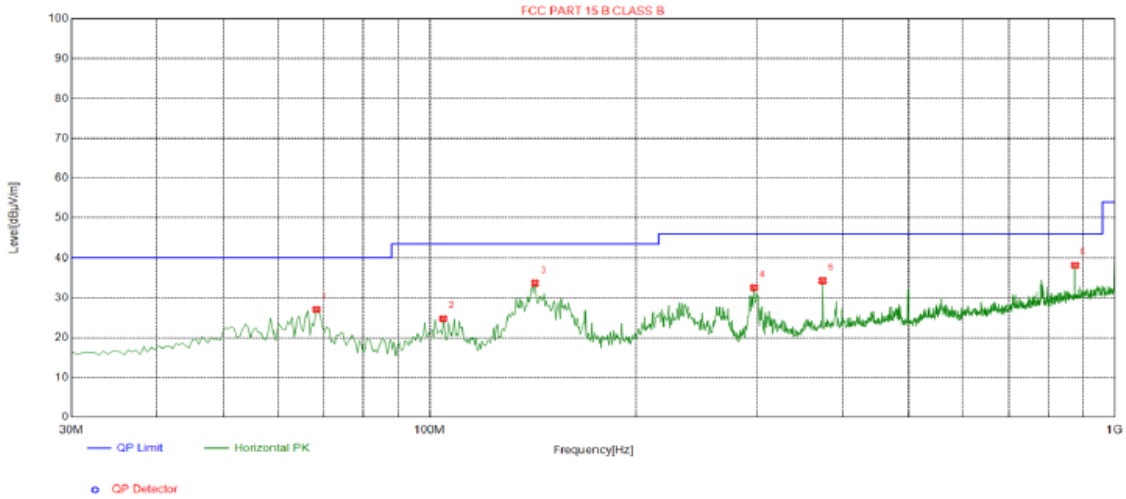
4.7.2. Test Data

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

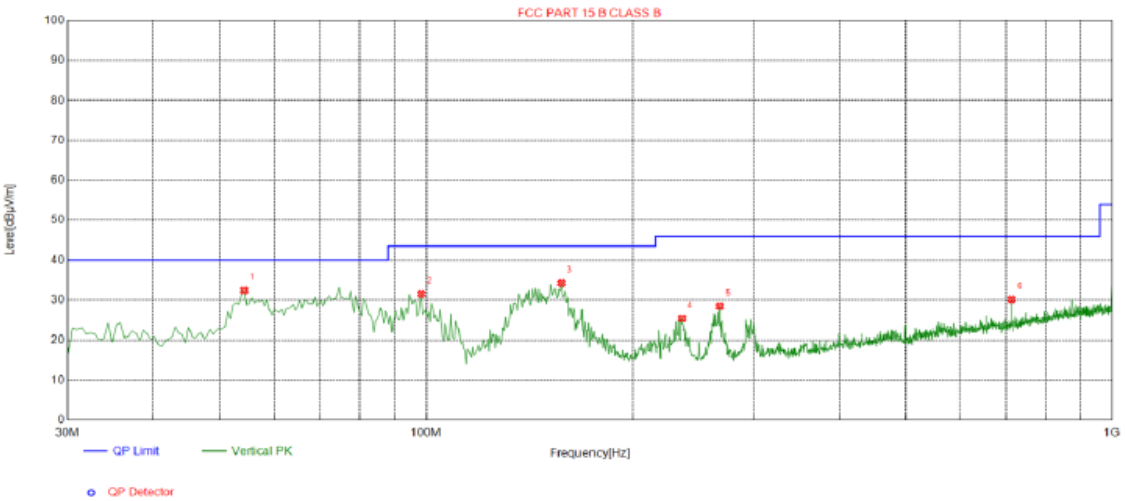
Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	68.3150	27.12	-17.25	40.00	12.88	100	291	Horizontal
2	104.690	24.82	-15.41	43.50	18.68	100	164	Horizontal
3	142.520	33.69	-19.12	43.50	9.81	100	65	Horizontal
4	297.720	32.58	-12.76	46.00	13.42	100	131	Horizontal
5	374.835	34.33	-10.92	46.00	11.67	100	284	Horizontal
6	875.355	38.17	-2.15	46.00	7.83	100	268	Horizontal

Remark:
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.2500	32.40	-14.29	40.00	7.60	100	89	Vertical
2	98.3850	31.49	-15.67	43.50	12.01	100	145	Vertical
3	157.555	34.23	-18.40	43.50	9.27	100	186	Vertical
4	236.125	25.39	-14.04	46.00	20.61	100	349	Vertical
5	268.135	28.47	-13.63	46.00	17.53	100	228	Vertical
6	713.850	30.14	-4.81	46.00	15.86	100	128	Vertical

Remark:
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note:*1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor*

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Above 1GHz

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
3368	64.09	-4.59	59.5	74	-14.5	peak
3368	45.32	-4.59	40.73	54	-13.27	AVG
11096	50.63	4.21	54.84	74	-19.16	peak
11096	38.25	4.21	42.46	54	-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
3368	62.15	-4.59	57.56	74	-16.44	peak
3368	47.34	-4.59	42.75	54	-11.25	AVG
11096	55.09	4.21	59.3	74	-14.7	peak
11096	37.55	4.21	41.76	54	-12.24	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	62.16	-4.59	57.57	74	-16.43	peak
3172	44.34	-4.59	39.75	54	-14.25	AVG
10523	52.22	4.21	56.43	74	-17.57	peak
10523	41.59	4.21	45.8	54	-8.2	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)	
3172	57.31	-4.59	52.72	74	-21.28	peak
3172	45.03	-4.59	40.44	54	-13.56	AVG
10523	53.65	4.21	57.86	74	-16.14	peak
10523	37.12	4.21	41.33	54	-12.67	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	59.19	-4.59	54.6	74	-19.4	peak
2705	48.64	-4.59	44.05	54	-9.95	AVG
11717	54.55	4.84	59.39	74	-14.61	peak
11717	37.27	4.84	42.11	54	-11.89	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

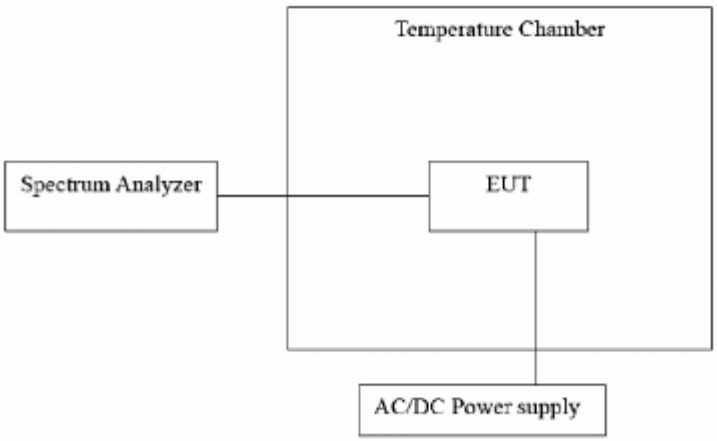
Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	58.54	-4.59	53.95	74	-20.05	peak
2705	45.64	-4.59	41.05	54	-12.95	AVG
11717	51.39	4.84	56.23	74	-17.77	peak
11717	39.15	4.84	43.99	54	-10.01	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 to completed.

4.8. Frequency Stability Measurement

4.8.1. Test Specification

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

Test Result as follows:

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	43.2V	5744.978	22	5824.981	19
	48.0 V	5745.032	32	5824.976	24
	52.8 V	5745.021	21	5825.023	23

Mode	Temperature (℃)	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

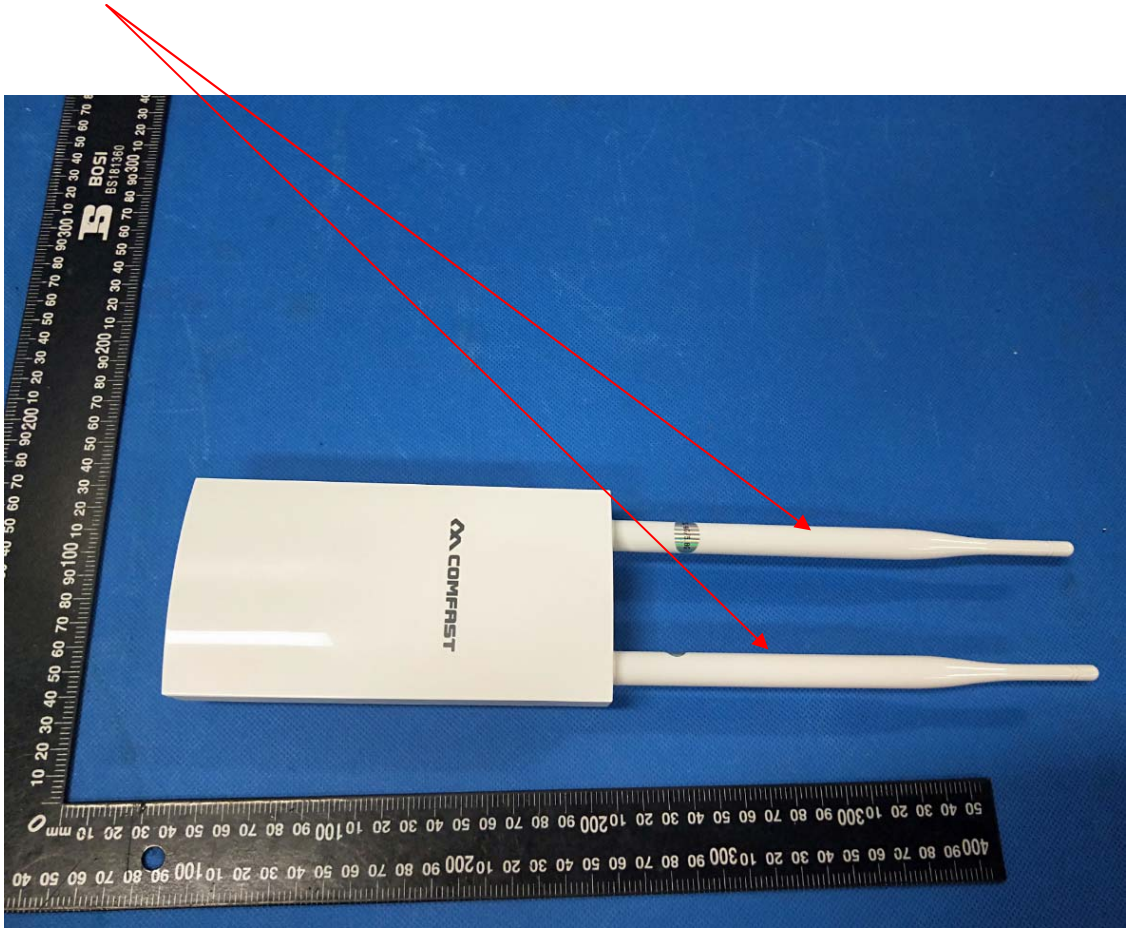
4.9. ANTENNA REQUIREMENT

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.

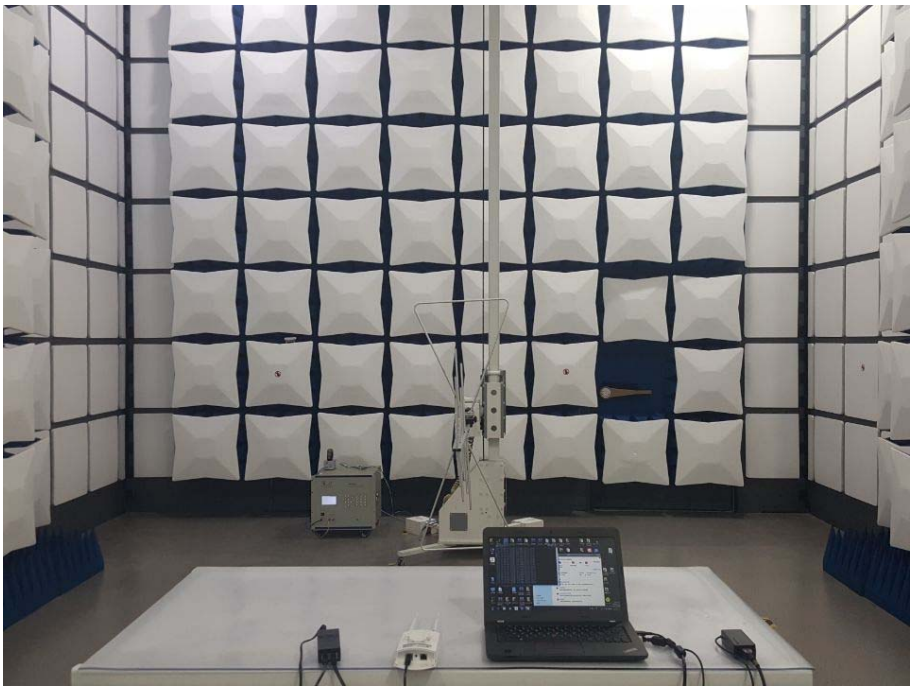
Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

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.

WIFI ANTENNA



4.10. Photographs of Test Setup



4.11. PHOTOS OF THE EUT

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