FCC Test Report

Applicant	:	**Stark Future SL**
Address	:	**Carrer Batan 6, Sant Boi, 08830, Spain**
Product Name	:	**Rugged Handheld**
Report Date	:	**Sept. 06, 2024**

Shenzhen Anbotek Compliance Laboratory Limited

Contents

TEST REPORT

Applicant	:	Stark Future SL
Manufacturer	:	Emdoor Information Co.,Ltd.
Product Name	:	Rugged Handheld
Model No.	:	ARKENSTONE-EEA, ARKENSTONE-RW
Trade Mark	:	StarkFuture
Rating(s)	:	Input: 3.6-6V⎓3A, 6-9V⎓2.0A, 9-12V⎓1.5A Battery capacity: DC 3.8V, 4000mAh
Test Standard(s)	:	**47 CFR Part 15E**
Test Method(s)	:	**ANSI C63.10: 2020** **KDB 789033 D02 General UNII Test Procedures New Rules v02r01**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the 47 CFR Part 15E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of receipt	Jun. 27, 2024
Date of Test	Jun. 27, 2024 ~ Jul. 19, 2024
Prepared by	Nian xiu Chen (Nianxiu Chen)
Approved & Authorized Signer	Edward pan (Edward Pan)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Sept. 06, 2024

1. General Information

1.1. Client Information

Applicant	:	Stark Future SL
Address	:	Carrer Batan 6, Sant Boi, 08830, Spain
Manufacturer	:	Emdoor Information Co.,Ltd.
Address	:	4th Floor, Block B, Haina Baichuan Headquarters Building, No. 6 Baoxing Road, Haibin Community, Xin'an Street, Bao'an District, Shenzhen City, Guangdong Province, China.
Factory	:	Emdoor Information Co.,Ltd.
Address	:	4th Floor, Building C, Chaojie Industrial Park, Danzi Middle Road, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China

1.2. Description of Device (EUT)

Product Name	:	Rugged Handheld
Model No.	:	ARKENSTONE-EEA, ARKENSTONE-RW (Note: All samples are the same except the model number and sales area, so we prepare "ARKENSTONE-EEA" for test only.)
Trade Mark	:	StarkFuture
Test Power Supply	:	AC 120V, 60Hz for Adapter/ DC 3.8V Battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Operation Mode	:	☒ a ☒ n(HT20) ☒ n(HT40) ☒ ac(VHT20) ☒ ac(VHT40) ☒ ac(VHT80) ☐ ac(VHT160) ☐ ax(HEW20) ☐ ax(HEW40) ☐ ax(HEW80) ☐ ax(HEW160)
Device Type	:	☐ Outdoor AP ☐ Indoor AP ☐ Point-to-point AP ☒ Client
Operation Frequency	:	☒ Wi-Fi 5.2G: 5150~5250MHz ☐ Wi-Fi 5.3G: 5250~5350MHz ☐ Wi-Fi 5.6G: 5470~5725MHz ☒ Wi-Fi 5.8G: 5725~5850MHz
Number of Channel	:	Wi-Fi 5.2G: ☒ 4 Channels for 20MHz bandwidth (5180-5240MHz) ☒ 2 Channels for 40MHz bandwidth (5190-5230MHz) ☒ 1 Channels for 80MHz bandwidth (5210MHz) Wi-Fi 5.8G: ☒ 5 Channels for 20MHz bandwidth (5745MHz ~ 5825MHz)

		☒2 Channels for 40MHz bandwidth (5755MHz ~ 5795MHz) ☒1 Channels for 80MHz bandwidth (5775MHz)
Modulation Type	:	☒802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) ☒802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) ☒802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) ☐802.11ax: OFDMA(BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Antenna Type	:	FPC Antenna
Antenna Gain(Peak)	:	WiFi 5.2G: 1.01dBi WiFi 5.8G: -1.5dBi
Remark: 1) All of the RF specification are provided by customer. 2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
Adapter	Manufacturer: IDEA POWER ELECTRONIC TECHNOLOGY (DONGGUAN) CO.,LTD. Model: CH018A Input: 100-240V~ 50/60Hz 0.5A Max Output: 3.6-6V⎓ 3A, 6-9V⎓ 2.0A, 9-12V⎓ 1.5A

1.4. Operation channel list

Operation Band: WiFi 5.2G

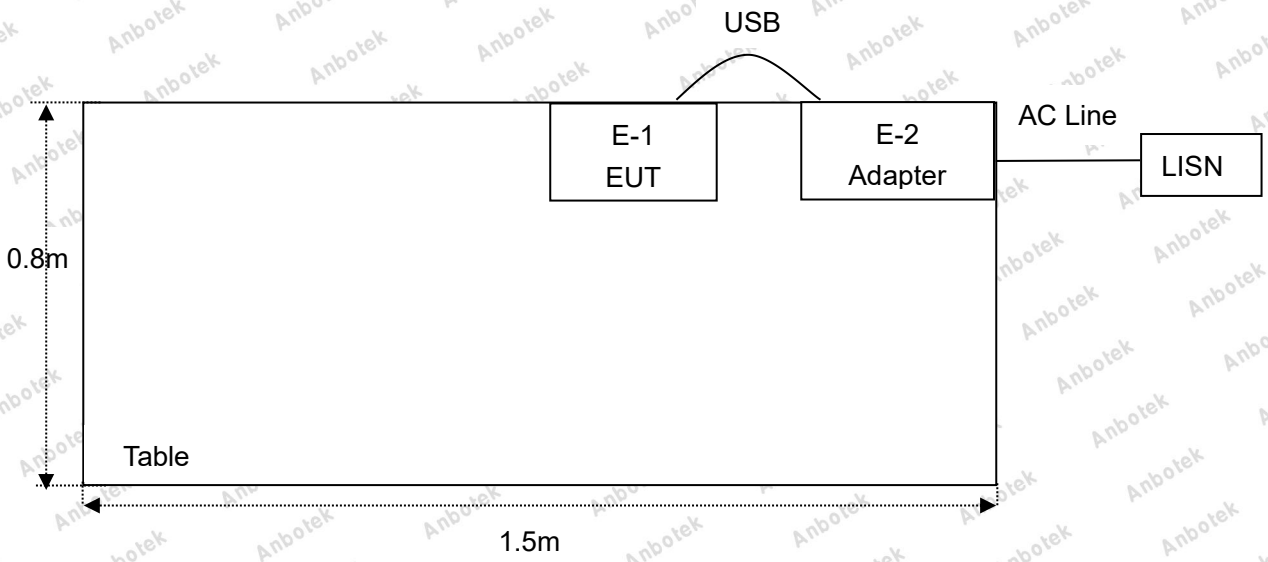
Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	/	/
44	5220	/	/	/	/
48	5240	/	/	/	/

Operation Band: WiFi 5.8G

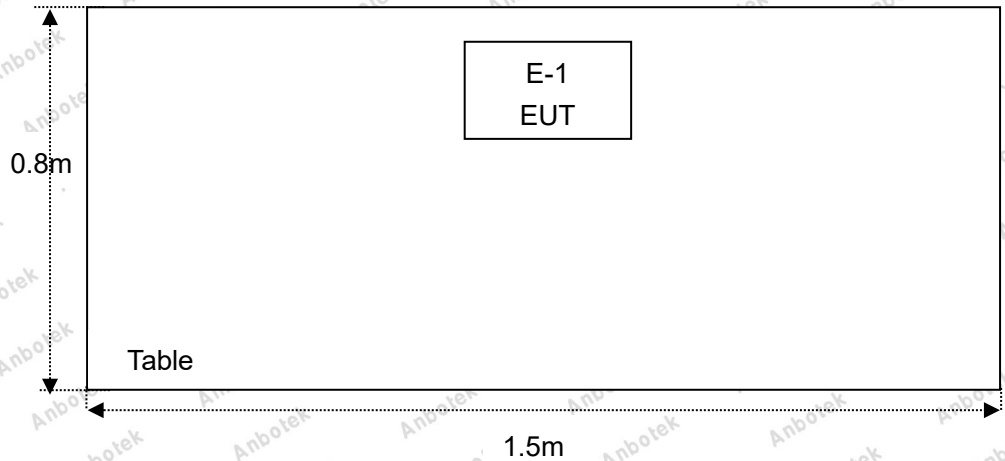
Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795	/	/
157	5785	/	/	/	/
161	5805	/	/	/	/
165	5825	/	/	/	/

1.5. Description Of Test Setup

CE



RE



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Jan. 18, 2024	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jan. 17, 2024	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Jan. 17, 2024	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Jan. 23, 2024	1 Year
5.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
6.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Jan. 17, 2024	1 Year
7.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 12, 2023	1 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Oct. 12, 2023	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Jan. 17, 2024	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 12, 2023	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 12, 2023	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 12, 2023	1 Year
16.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 20, 2023	1 Year
17.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 16, 2023	1 Year
18.	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102150	May. 06, 2024	1 Year

1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Power Spectral Density	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (Below 30MHz)	3.53dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB 18G-40GHz: 5.68dB
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

1.8. Description of Test Facility

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

FCC-Registration No.: 434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Summary of Test Results

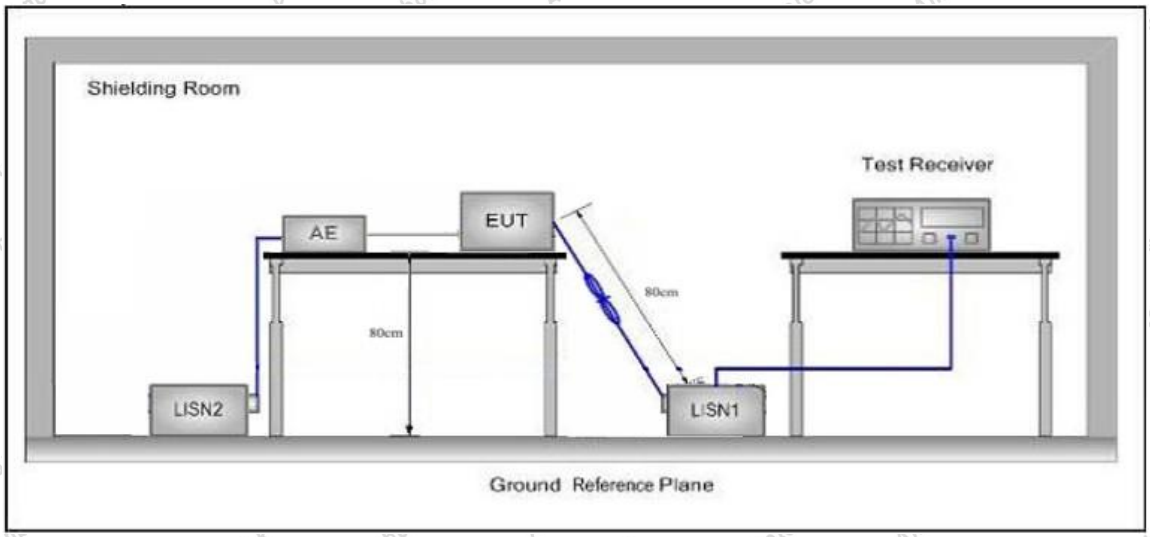
Standard	Test Type	Result
15.207 & 15.407(b)	Conducted Emission	PASS
15.205 & 15.209 & 15.407(b)	Radiated Spurious Emission and Restricted Band	PASS
15.407(b)	Conducted Band Edge	PASS
15.407(a) & 2.1049	26dB Bandwidth & 99% Occupied Bandwidth	PASS
15.407(e)	Minimum 6dB Bandwidth (5.725-5.85GHz Band)	PASS
15.407(a)	Maximum Conducted Output Power	PASS
15.407(a)	Maximum Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.203	Antenna Requirement	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207 & 15.407(b)		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

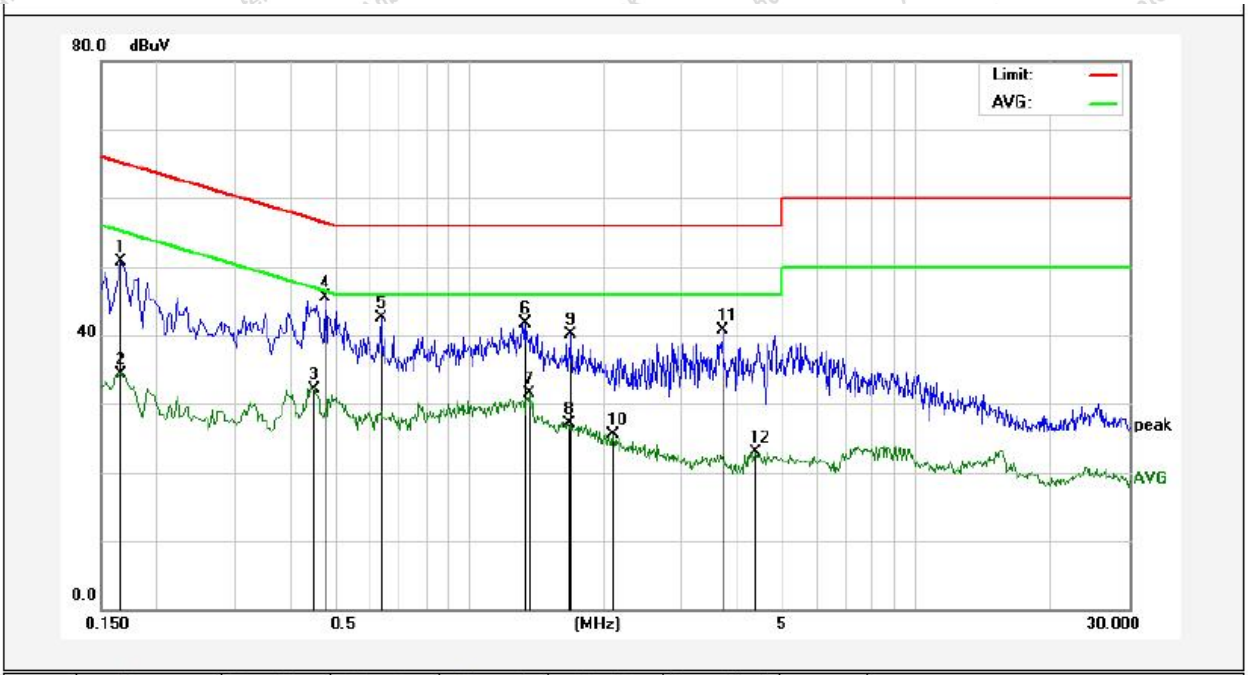
3.4. Test Data

During the test, pre-scan all modes, only the worst case is recorded in the report.

Please to see the following pages.

Conducted Emission Test Data

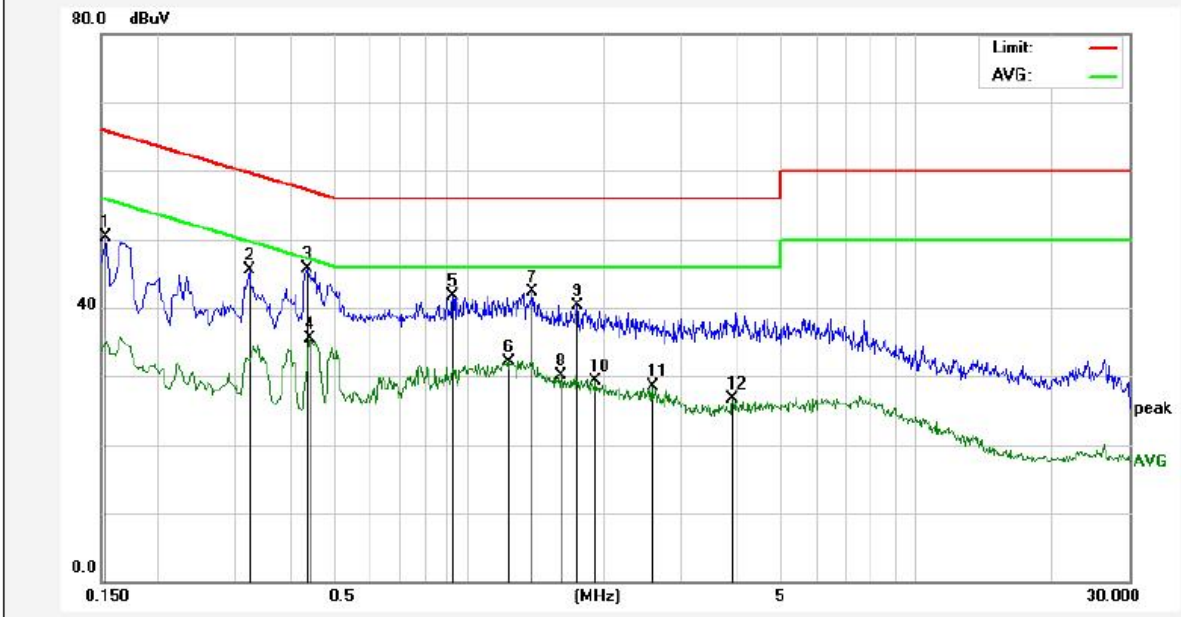
Test Site: 1# Shielded Room
Operating Condition: 802.11ac(VHT80)_5775MHz
Test Specification: AC 120V, 60Hz for Adapter
Comment: Live Line
Temp.(℃)/Hum.(%RH): 24.9℃/53%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1660	32.81	17.83	50.64	65.15	-14.51	QP	
2	0.1660	16.55	17.83	34.38	55.15	-20.77	AVG	
3	0.4500	14.37	17.83	32.20	46.87	-14.67	AVG	
4	0.4779	27.61	17.85	45.46	56.38	-10.92	QP	
5	0.6340	24.55	17.87	42.42	56.00	-13.58	QP	
6	1.3420	23.90	17.86	41.76	56.00	-14.24	QP	
7	1.3619	13.71	17.86	31.57	46.00	-14.43	AVG	
8	1.6659	9.31	17.85	27.16	46.00	-18.84	AVG	
9	1.6899	22.33	17.85	40.18	56.00	-15.82	QP	
10	2.1059	7.63	17.85	25.48	46.00	-20.52	AVG	
11	3.6859	22.80	17.86	40.66	56.00	-15.34	QP	
12	4.3897	5.06	17.85	22.91	46.00	-23.09	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: 802.11ac(VHT80)_5775MHz
Test Specification: AC 120V, 60Hz for Adapter
Comment: Neutral Line
Temp.(℃)/Hum.(%RH): 24.9℃/53%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1539	32.50	17.83	50.33	65.78	-15.45	QP	
2	0.3220	27.57	17.84	45.41	59.65	-14.24	QP	
3	0.4339	27.95	17.82	45.77	57.18	-11.41	QP	
4	0.4420	17.58	17.83	35.41	47.02	-11.61	AVG	
5	0.9220	23.77	17.86	41.63	56.00	-14.37	QP	
6	1.2338	14.31	17.85	32.16	46.00	-13.84	AVG	
7	1.3859	24.43	17.86	42.29	56.00	-13.71	QP	
8	1.6019	12.33	17.85	30.18	46.00	-15.82	AVG	
9	1.7500	22.46	17.86	40.32	56.00	-15.68	QP	
10	1.9219	11.43	17.85	29.28	46.00	-16.72	AVG	
11	2.5698	10.63	17.85	28.48	46.00	-17.52	AVG	
12	3.8980	8.92	17.86	26.78	46.00	-19.22	AVG	

4. Radiation Spurious Emission and Restricted Band Test

4.1. Test Standard and Limit

Radiated Spurious Emission					
Test Standard	FCC Part15 C Section 15.205 & 15.209 & 15.407(b)				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	68.2	Peak	3

Band Edge				
Test Standard	15.407(b)			
Test Limit	Operating Band	Frequency	EIRP Limit	Remark
	5150-5250MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5250-5350MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5470-5725MHz	Out of operation band	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5725-5850 MHz	Below 5.65GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
		5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak
		5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak
		5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m)	Peak
		5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m)	Peak
		5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m	Peak

		5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
		Above 5.925GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak

Remark:
(1)The lower limit shall apply at the transition frequency.
(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.
(3)Above 1GHz limit:E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

4.2. Test Setup

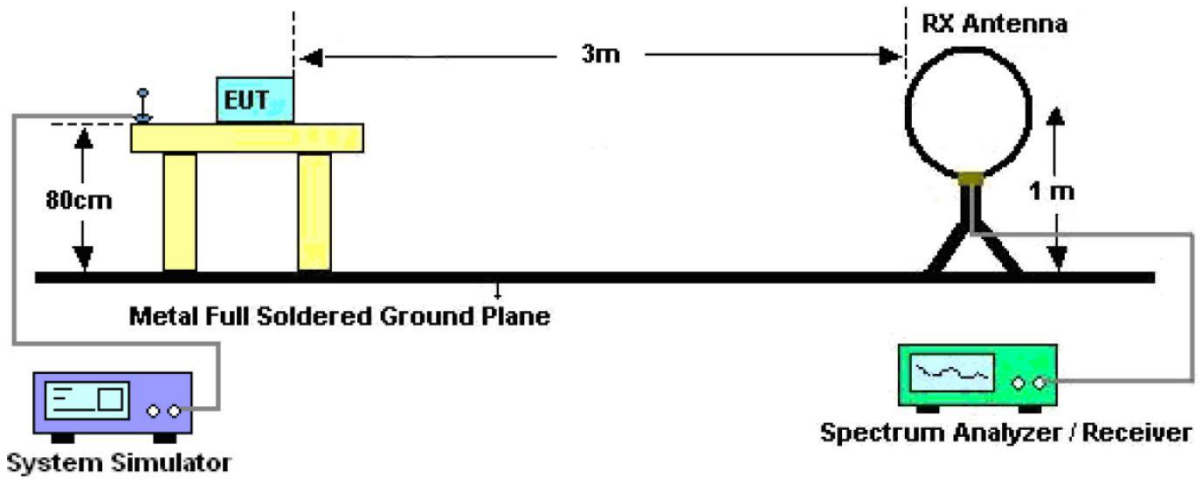


Figure 1. Below 30MHz

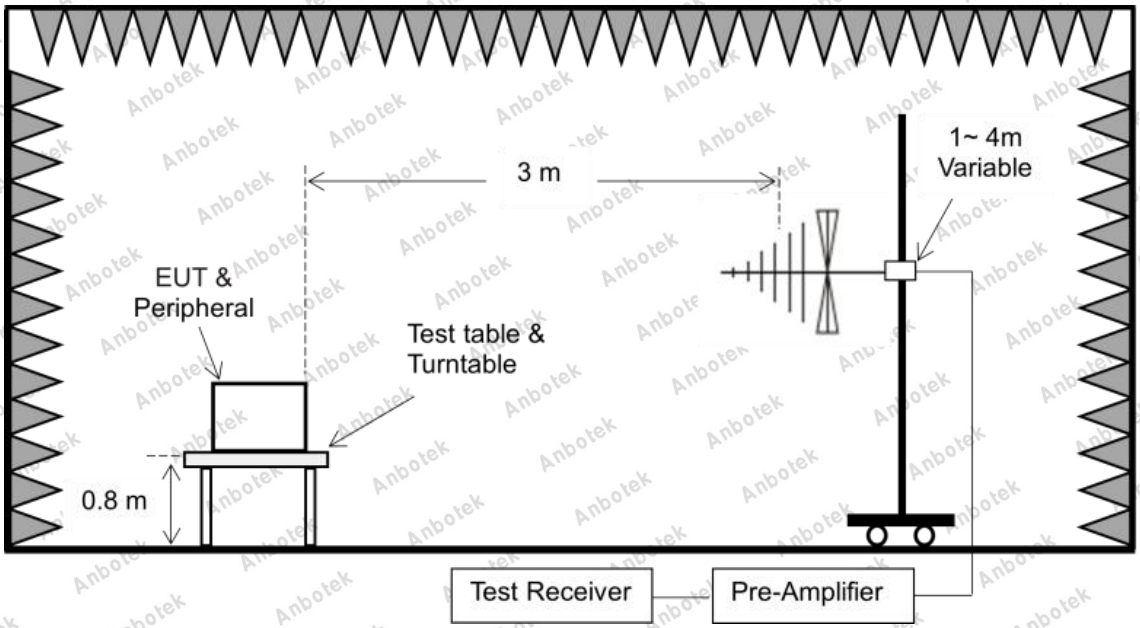


Figure 2. 30MHz to 1GHz

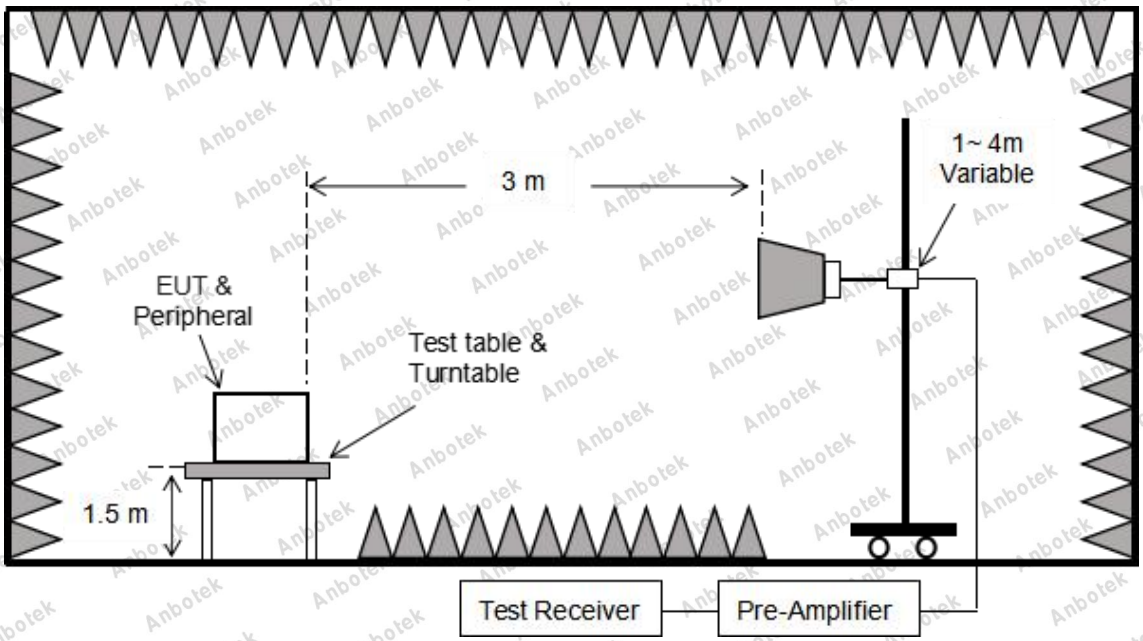


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

Pass

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, only the worst case is recorded in the report.

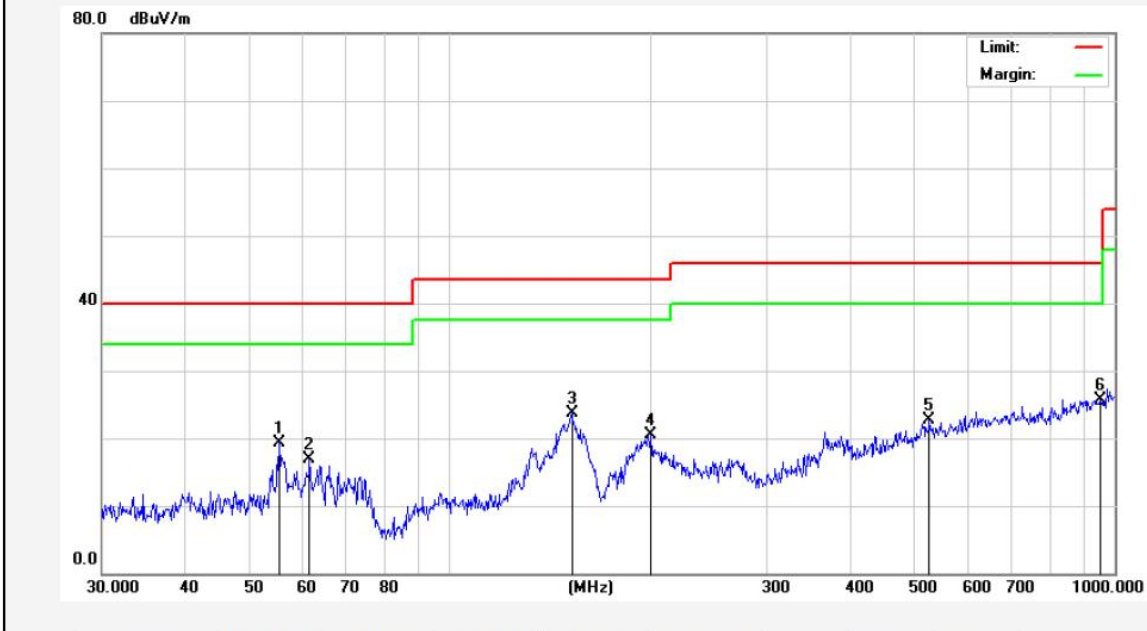
Test Results (30~1000MHz)

Test Mode: 802.11ac(VHT80)_5775MHz

Power Source: DC 3.8V Battery inside

Polarization: Horizontal

Temp.(℃)/Hum.(%RH): 20.3℃/46%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	55.4147	38.69	-19.29	19.40	40.00	-20.60	QP			
2	61.5618	36.88	-20.02	16.86	40.00	-23.14	QP			
3	152.6641	46.28	-22.50	23.78	43.50	-19.72	QP			
4	200.6881	40.50	-20.01	20.49	43.50	-23.01	QP			
5	526.3967	34.51	-11.75	22.76	46.00	-23.24	QP			
6	952.0937	31.60	-5.96	25.64	46.00	-20.36	QP			

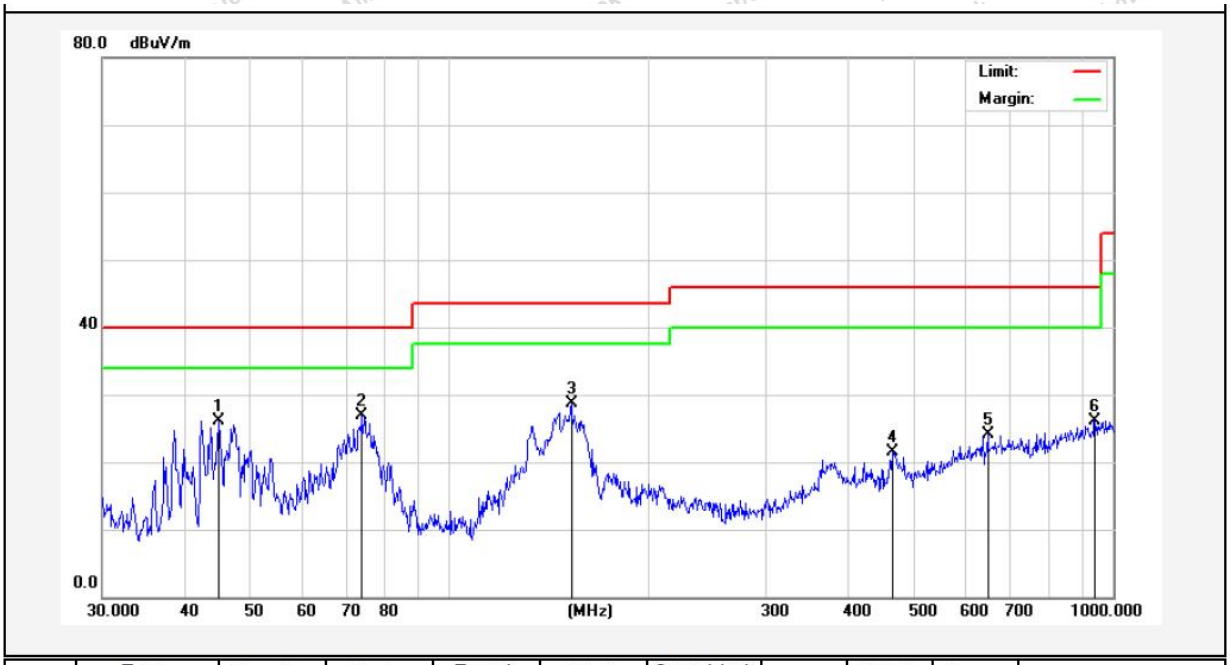
Test Results (30~1000MHz)

Test Mode: 802.11ac(VHT80)_5775MHz

Power Source: DC 3.8V Battery inside

Polarization: Vertical

Temp.(℃)/Hum.(%RH): 20.3℃/46%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	44.9006	44.87	-18.79	26.08	40.00	-13.92	QP			
2	73.8756	50.20	-23.32	26.88	40.00	-13.12	QP			
3	152.6641	51.23	-22.50	28.73	43.50	-14.77	QP			
4	465.5994	34.36	-12.91	21.45	46.00	-24.55	QP			
5	647.3856	33.35	-9.28	24.07	46.00	-21.93	QP			
6	938.8326	32.28	-6.14	26.14	46.00	-19.86	QP			

Test Results (Above 1000MHz)

Test Mode: IEEE 802.11ac(VHT80) for WiFi 5.2G							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
10420.00	30.00	23.81	53.81	68.20	-14.39	V	Peak
15630.00	30.67	29.36	60.03	68.20	-8.17	V	Peak
10420.00	30.91	23.81	54.72	68.20	-13.48	H	Peak
15630.00	32.16	29.36	61.52	68.20	-6.68	H	Peak
10420.00	20.49	23.81	44.30	54.00	-9.70	V	AVG
15630.00	21.41	29.36	50.77	54.00	-3.23	V	AVG
10420.00	20.62	23.81	44.43	54.00	-9.57	H	AVG
15630.00	21.60	29.36	50.96	54.00	-3.04	H	AVG

Remark:

1. During the test, pre-scan the 802.11a, 802.11n(HT20), ac(VHT20), n(HT40), ac(VHT40), ac(VHT80) mode, and found the 802.11ac(VHT80) mode is worse case , the report only record this mode.

2. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT80) for WiFi 5.8G							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11550.000	30.25	23.40	53.65	68.20	-14.55	V	Peak
17325.000	31.05	32.13	63.18	68.20	-5.02	V	Peak
11550.000	31.33	23.40	54.73	68.20	-13.47	H	Peak
17325.000	31.58	32.13	63.71	68.20	-4.49	H	Peak
11550.000	17.77	23.40	41.17	54.00	-12.83	V	AVG
17325.000	18.39	32.13	50.52	54.00	-3.48	V	AVG
11550.000	17.87	23.40	41.27	54.00	-12.73	H	AVG
17325.000	18.91	32.13	51.04	54.00	-2.96	H	AVG

Remark:

1. During the test, pre-scan the 802.11a, 802.11n(HT20), ac(VHT20), n(HT40), ac(VHT40), ac(VHT80) mode, and found the 802.11ac(VHT80) mode is worse case , the report only record this mode.

2. Result =Reading + Factor

Radiated Band Edge: 5.2G

Test Mode: IEEE 802.11a							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	37.35	15.99	53.34	68.20	-14.86	H	Peak
5150.00	39.49	15.99	55.48	68.20	-12.72	V	Peak
5150.00	27.18	15.99	43.17	54.00	-10.83	H	AVG
5150.00	29.34	15.99	45.33	54.00	-8.67	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	37.69	16.43	54.12	68.20	-14.08	H	Peak
5250.00	40.87	16.43	57.30	68.20	-10.90	V	Peak
5250.00	29.15	16.43	45.58	54.00	-8.42	H	AVG
5250.00	29.91	16.43	46.34	54.00	-7.66	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11n(HT20)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	36.16	15.99	52.15	68.20	-16.05	H	Peak
5150.00	37.65	15.99	53.64	68.20	-14.56	V	Peak
5150.00	26.88	15.99	42.87	54.00	-11.13	H	AVG
5150.00	27.84	15.99	43.83	54.00	-10.17	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	38.05	16.43	54.48	68.20	-13.72	H	Peak
5250.00	39.02	16.43	55.45	68.20	-12.75	V	Peak
5250.00	28.11	16.43	44.54	54.00	-9.46	H	AVG
5250.00	29.67	16.43	46.10	54.00	-7.90	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11n(HT40)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	36.87	15.99	52.86	68.20	-15.34	H	Peak
5150.00	38.69	15.99	54.68	68.20	-13.52	V	Peak
5150.00	27.48	15.99	43.47	54.00	-10.53	H	AVG
5150.00	28.91	15.99	44.90	54.00	-9.10	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	38.34	16.43	54.77	68.20	-13.43	H	Peak
5250.00	37.11	16.43	53.54	68.20	-14.66	V	Peak
5250.00	28.73	16.43	45.16	54.00	-8.84	H	AVG
5250.00	29.99	16.43	46.42	54.00	-7.58	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT20)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	37.37	15.99	53.36	68.20	-14.84	H	Peak
5150.00	39.18	15.99	55.17	68.20	-13.03	V	Peak
5150.00	26.79	15.99	42.78	54.00	-11.22	H	AVG
5150.00	29.12	15.99	45.11	54.00	-8.89	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	38.11	16.43	54.54	68.20	-13.66	H	Peak
5250.00	38.33	16.43	54.76	68.20	-13.44	V	Peak
5250.00	28.09	16.43	44.52	54.00	-9.48	H	AVG
5250.00	28.79	16.43	45.22	54.00	-8.78	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT40)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	36.28	15.99	52.27	68.20	-15.93	H	Peak
5150.00	36.59	15.99	52.58	68.20	-15.62	V	Peak
5150.00	26.63	15.99	42.62	54.00	-11.38	H	AVG
5150.00	27.20	15.99	43.19	54.00	-10.81	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	38.36	16.43	54.79	68.20	-13.41	H	Peak
5250.00	37.41	16.43	53.84	68.20	-14.36	V	Peak
5250.00	27.72	16.43	44.15	54.00	-9.85	H	AVG
5250.00	28.00	16.43	44.43	54.00	-9.57	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT80)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5150.00	36.25	15.99	52.24	68.20	-15.96	H	Peak
5150.00	36.92	15.99	52.91	68.20	-15.29	V	Peak
5150.00	27.10	15.99	43.09	54.00	-10.91	H	AVG
5150.00	27.20	15.99	43.19	54.00	-10.81	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5250.00	38.78	16.43	55.21	68.20	-12.99	H	Peak
5250.00	37.83	16.43	54.26	68.20	-13.94	V	Peak
5250.00	29.38	16.43	45.81	54.00	-8.19	H	AVG
5250.00	28.47	16.43	44.90	54.00	-9.10	V	AVG

Remark: 1. Result =Reading + Factor

Radiated Band Edge: 5.8G

Test Mode: IEEE 802.11a							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	38.52	16.37	54.89	68.20	-13.31	H	Peak
5725.00	40.03	16.37	56.40	68.20	-11.80	V	Peak
5725.00	29.29	16.70	45.99	54.00	-8.01	H	AVG
5725.00	30.43	16.70	47.13	54.00	-6.87	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	39.53	17.21	56.74	68.20	-11.46	H	Peak
5850.00	39.96	17.21	57.17	68.20	-11.03	V	Peak
5850.00	29.45	17.21	46.66	54.00	-7.34	H	AVG
5850.00	29.40	17.21	46.61	54.00	-7.39	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11n(HT20)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	38.53	17.05	55.58	68.20	-12.62	H	Peak
5725.00	39.20	17.05	56.25	68.20	-11.95	V	Peak
5725.00	27.79	17.05	44.84	54.00	-9.16	H	AVG
5725.00	28.41	17.05	45.46	54.00	-8.54	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	37.77	17.21	54.98	68.20	-13.22	H	Peak
5850.00	38.29	17.21	55.50	68.20	-12.70	V	Peak
5850.00	28.14	17.21	45.35	54.00	-8.65	H	AVG
5850.00	28.84	17.21	46.05	54.00	-7.95	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11n(HT40)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	38.11	17.05	55.16	68.20	-13.04	H	Peak
5725.00	39.08	17.05	56.13	68.20	-12.07	V	Peak
5725.00	27.33	17.05	44.38	54.00	-9.62	H	AVG
5725.00	28.59	17.05	45.64	54.00	-8.36	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	38.47	17.21	55.68	68.20	-12.52	H	Peak
5850.00	38.75	17.21	55.96	68.20	-12.24	V	Peak
5850.00	28.67	17.21	45.88	54.00	-8.12	H	AVG
5850.00	29.67	17.21	46.88	54.00	-7.12	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT20)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	37.69	17.05	54.74	68.20	-13.46	H	Peak
5725.00	37.68	17.05	54.73	68.20	-13.47	V	Peak
5725.00	28.51	17.05	45.56	54.00	-8.44	H	AVG
5725.00	29.48	17.05	46.53	54.00	-7.47	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	38.43	17.21	55.64	68.20	-12.56	H	Peak
5850.00	39.25	17.21	56.46	68.20	-11.74	V	Peak
5850.00	28.24	17.21	45.45	54.00	-8.55	H	AVG
5850.00	29.44	17.21	46.65	54.00	-7.35	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT40)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	36.60	17.05	53.65	68.20	-14.55	H	Peak
5725.00	38.03	17.05	55.08	68.20	-13.12	V	Peak
5725.00	27.79	17.05	44.84	54.00	-9.16	H	AVG
5725.00	28.45	17.05	45.50	54.00	-8.50	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	37.92	17.21	55.13	68.20	-13.07	H	Peak
5850.00	38.88	17.21	56.09	68.20	-12.11	V	Peak
5850.00	27.95	17.21	45.16	54.00	-8.84	H	AVG
5850.00	27.67	17.21	44.88	54.00	-9.12	V	AVG

Remark: 1. Result =Reading + Factor

Test Mode: IEEE 802.11ac(VHT80)							
Test channel: Lowest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5725.00	35.85	17.05	52.90	68.20	-15.30	H	Peak
5725.00	37.47	17.05	54.52	68.20	-13.68	V	Peak
5725.00	27.02	17.05	44.07	54.00	-9.93	H	AVG
5725.00	27.44	17.05	44.49	54.00	-9.51	V	AVG
Test channel: Highest							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
5850.00	38.13	17.21	55.34	68.20	-12.86	H	Peak
5850.00	38.30	17.21	55.51	68.20	-12.69	V	Peak
5850.00	28.68	17.21	45.89	54.00	-8.11	H	AVG
5850.00	28.64	17.21	45.85	54.00	-8.15	V	AVG

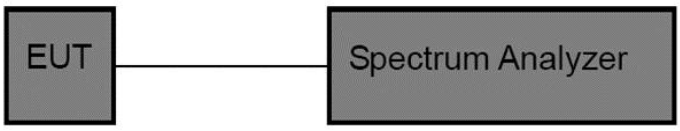
Remark: 1. Result =Reading + Factor

5. Maximum Conducted Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407(a)	
Test Limit	5.15 - 5.25GHz	1) Outdoor AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if GTx>6dBi, then Pout =30-(GTx-6). e.i.r.p. at any elevation angle above 30 degrees≤125mW (21dBm) 2) Indoor AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if GTx>6dBi, then Pout =30-(GTx-6). 3) Point-to-point AP The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if GTx>23dBi, then Pout =30-(GTx-23). 4) Client devices The maximum conducted output power (Pout) shall not exceed the lesser of 250W (23.98dBm). if GTx>6dBi, then Pout =24-(GTx-6).
	5.25 - 5.35GHz	The maximum conducted output power (Pout) shall not exceed the lesser of 250mW (24dBm) or 11dBm+10 log B, where B is the 26dB emission bandwith in MHz. if GTx>6dBi, then Pout =24-(GTx-6).
	5.47- 5.725GHz	The maximum conducted output power (Pout) shall not exceed the lesser of 250mW (23.98dBm) or 11dBm+10 log B, where B is the 26dB emission bandwith in MHz. if GTx>6dBi, then Pout =24-(GTx-6).
	5.725 - 5.85GHz	1) Point-to-multipoint systems (P2M) The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm). if GTx>6dBi, then Pout =30-(GTx-6). 2) Point-to-point systems (P2P) The maximum conducted output power (Pout) shall not exceed the lesser of 1W (30dBm).

5.2. Test Setup



5.3. Test Procedure

1. Measure the duty cycle D of the transmitter output signal.
2. Set span to encompass the entire 99% OBW of the signal.
3. Set RBW = 1 MHz.
4. Set VBW ≥ [3 × RBW].

5. Number of points in sweep ≥ [2 × span / RBW].
6. Sweep time = auto.
7. Detector = RMS
8. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
9. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
10. Add [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.
Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.4. Test Data

Pass
Please refer to Appendix C of the Appendix Test Data.

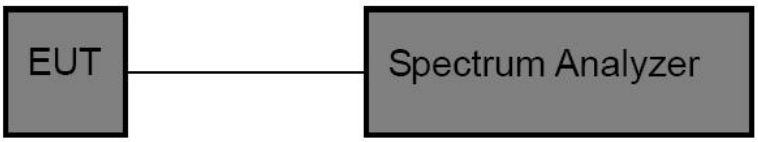
Additional test for duty cycle.
Please refer to Appendix B of the Appendix Test Data.

6. 26dB Bandwidth & 99% Occupied Bandwidth Test

6.1. Test Standard

Test Standard	FCC Part15 C Section 15.407(a) & 2.1049
Test Limit	N/A

6.2. Test Setup



6.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3. Set the spectrum analyzer as:

26 dB &99%bandwidth
RBW = approximately 1% of the emission bandwidth;
Set the VBW>RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.

5. Repeat until all the rest channels are investigated.

6.4. Test Data

Pass

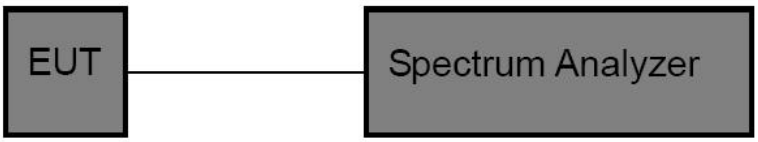
Please refer to Appendix A1&A2 of the Appendix Test Data.

7. Minimum 6dB Bandwidth Test

7.1. Test Standard

Test Standard	FCC Part15 C Section 15.407(e)
Test Limit	≥500 kHz

7.2. Test Setup



7.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

4. Set the spectrum analyzer as:

6 dB bandwidth
RBW = approximately 1% of the emission bandwidth;
Set the VBW>RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

4. Measure the maximum width of the emission that is 6dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.

5. Repeat until all the rest channels are investigated.

7.4. Test Data

Pass

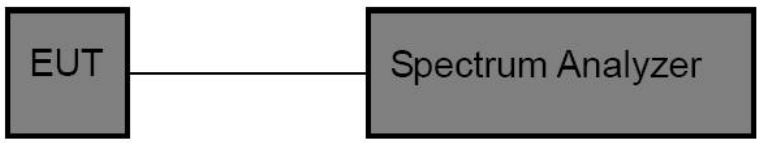
Please refer to Appendix A3 of the Appendix Test Data.

8. Maximum Power Spectral Density Test

8.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407(a)	
Test Limit	5.15 - 5.25GHz	1) Outdoor AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if GTx>6dBi, then PSD =17-(GTx-6). 2) Indoor AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if GTx>6dBi, then PSD =17-(GTx-6). 3) Point-to-point AP The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. if GTx>23dBi, then PSD =17-(GTx-23). 4) Client devices The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if GTx>6dBi, then PSD =11-(GTx-6).
	5.25 - 5.35GHz	The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if GTx>6dBi, then PSD =11-(GTx-6).
	5.47- 5.725GHz	The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. if GTx>6dBi, then PSD =11-(GTx-6).
	5.725 - 5.85GHz	1) Point-to-multipoint systems (P2M) The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz. if GTx>6dBi, then PSD =30-(GTx-6). 2) Point-to-point systems (P2P) The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

8.2. Test Setup



8.3. Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

1. The EUT is directly connected to the spectrum analyzer;

2. Set RBW =1MHz;

3. Set VBW ≥ 3 RBW=3MHz;

3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;

5. Detector=RMS;
6. Sweep time= auto couple;
7. Trace mode=max. hold;

8.4. Test Data

Pass

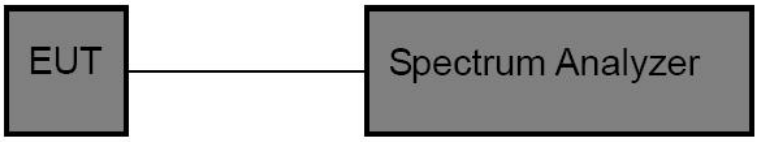
Please refer to Appendix D of the Appendix Test Data.

9. Conducted Band Edge Test

9.1. Test Standard and Limit

Test Standard	15.407(b)			
Test Limit	Operating Band	Frequency	EIRP Limit	Remark
	5150-5250MHz	Out of operation band	-27dBm/MHz	Peak
	5250-5350MHz	Out of operation band	-27dBm/MHz	Peak
	5470-5725MHz	Out of operation band	-27dBm/MHz	Peak
	5725-5850 MHz	Below 5.65GHz	-27dBm/MHz	Peak
		5.65GHz-5.7GHz	-27dBm/MHz to 10dBm/MHz	Peak
		5.7GHz-5.72GHz	10dBm/MHz to 15.6dBm/MHz	Peak
		5.72GHz-5.725GHz	15.6dBm/MHz to 27dBm/MHz	Peak
		5.85GHz-5.855GHz	27dBm/MHz to 15.6dBm/MHz	Peak
		5.855GHz-5.875GHz	15.6dBm/MHz to 10dBm/MHz	Peak
		5.875GHz-5.925GHz	10dBm/MHz to -27dBm/MHz	Peak
		Above 5.925GHz	-27dBm/MHz	Peak

9.2. Test Setup



9.3. Test Procedure

Using the following spectrum analyzer setting:
1. Set the RBW = 1MHz.
2. Set the VBW = 3MHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

9.4. Test Data

Pass

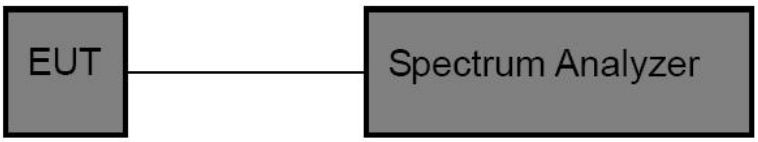
Please refer to Appendix E of the Appendix Test Data.

10. Frequency Stability

10.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.407(g)
Test 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.

10.2. Test Setup



10.3. 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.

10.4. Test Data

Pass

Please to see the following pages.

Test Mode: 5.2G							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit	Verdict
802.11a	SISO	5180	20	3.23	5180.11	5172 to 5188	Pass
				3.80	5180.03	5172 to 5188	Pass
				4.37	5180.09	5172 to 5188	Pass
			-30	3.80	5180.05	5172 to 5188	Pass
			-20	3.80	5180.09	5150 to 5250	Pass
			-10	3.80	5180.12	5150 to 5250	Pass
			0	3.80	5180.08	5150 to 5250	Pass
			10	3.80	5180.02	5150 to 5250	Pass
			30	3.80	5180.11	5150 to 5250	Pass
			40	3.80	5180.06	5150 to 5250	Pass
			50	3.80	5180.07	5172 to 5188	Pass
		5200	20	3.23	5200.10	5192 to 5208	Pass
				3.80	5200.11	5192 to 5208	Pass
				4.37	5200.00	5192 to 5208	Pass
			-30	3.80	5200.13	5192 to 5208	Pass
			-20	3.80	5200.09	5150 to 5250	Pass
			-10	3.80	5200.11	5150 to 5250	Pass
			0	3.80	5200.01	5150 to 5250	Pass
			10	3.80	5200.01	5150 to 5250	Pass
			30	3.80	5200.08	5150 to 5250	Pass
			40	3.80	5200.10	5150 to 5250	Pass
			50	3.80	5200.03	5192 to 5208	Pass
		5240	20	3.23	5240.10	5232 to 5248	Pass
				3.80	5240.11	5232 to 5248	Pass
				4.37	5240.02	5232 to 5248	Pass
			-30	3.80	5240.00	5232 to 5248	Pass
			-20	3.80	5240.04	5150 to 5250	Pass
			-10	3.80	5240.09	5150 to 5250	Pass
			0	3.80	5240.04	5150 to 5250	Pass
			10	3.80	5240.07	5150 to 5250	Pass
			30	3.80	5240.13	5150 to 5250	Pass
			40	3.80	5240.13	5150 to 5250	Pass
			50	3.80	5240.11	5232 to 5248	Pass
802.11n (HT20)	SISO	5180	20	3.23	5180.01	5172 to 5188	Pass
				3.80	5180.06	5172 to 5188	Pass
				4.37	5180.13	5172 to 5188	Pass
			-30	3.80	5180.02	5172 to 5188	Pass
			-20	3.80	5180.12	5150 to 5250	Pass

			-10	3.80	5180.09	5150 to 5250	Pass
			0	3.80	5180.05	5150 to 5250	Pass
			10	3.80	5180.05	5150 to 5250	Pass
			30	3.80	5180.11	5150 to 5250	Pass
			40	3.80	5180.03	5150 to 5250	Pass
			50	3.80	5180.03	5172 to 5188	Pass
		5200	20	3.23	5200.12	5192 to 5208	Pass
				3.80	5200.08	5192 to 5208	Pass
				4.37	5200.04	5192 to 5208	Pass
			-30	3.80	5200.01	5192 to 5208	Pass
			-20	3.80	5200.02	5150 to 5250	Pass
			-10	3.80	5200.03	5150 to 5250	Pass
			0	3.80	5200.12	5150 to 5250	Pass
			10	3.80	5200.11	5150 to 5250	Pass
			30	3.80	5200.05	5150 to 5250	Pass
			40	3.80	5200.08	5150 to 5250	Pass
			50	3.80	5200.09	5192 to 5208	Pass
		5240	20	3.23	5240.08	5232 to 5248	Pass
				3.80	5240.09	5232 to 5248	Pass
				4.37	5240.03	5232 to 5248	Pass
			-30	3.80	5240.06	5232 to 5248	Pass
			-20	3.80	5240.05	5150 to 5250	Pass
			-10	3.80	5240.04	5150 to 5250	Pass
			0	3.80	5240.10	5150 to 5250	Pass
			10	3.80	5240.04	5150 to 5250	Pass
			30	3.80	5240.03	5150 to 5250	Pass
			40	3.80	5240.08	5150 to 5250	Pass
			50	3.80	5240.07	5232 to 5248	Pass
802.11n (HT40)	SISO	5190	20	3.23	5190.08	5174 to 5206	Pass
				3.80	5190.07	5174 to 5206	Pass
				4.37	5190.05	5174 to 5206	Pass
			-30	3.80	5190.09	5174 to 5206	Pass
			-20	3.80	5190.04	5150 to 5250	Pass
			-10	3.80	5190.08	5150 to 5250	Pass
			0	3.80	5190.03	5150 to 5250	Pass
			10	3.80	5190.07	5150 to 5250	Pass
			30	3.80	5190.07	5150 to 5250	Pass
			40	3.80	5190.11	5150 to 5250	Pass
			50	3.80	5190.10	5174 to 5206	Pass
		5230	20	3.23	5230.12	5214 to 5246	Pass
				3.80	5230.08	5214 to 5246	Pass

				4.37	5230.12	5214 to 5246	Pass
			-30	3.80	5230.03	5214 to 5246	Pass
			-20	3.80	5230.05	5150 to 5250	Pass
			-10	3.80	5230.04	5150 to 5250	Pass
			0	3.80	5230.04	5150 to 5250	Pass
			10	3.80	5230.07	5150 to 5250	Pass
			30	3.80	5230.11	5150 to 5250	Pass
			40	3.80	5230.08	5150 to 5250	Pass
			50	3.80	5230.09	5214 to 5246	Pass
802.11ac (VHT20)	SISO	5180	20	3.23	5180.07	5172 to 5188	Pass
				3.80	5180.03	5172 to 5188	Pass
				4.37	5180.11	5172 to 5188	Pass
			-30	3.80	5180.01	5172 to 5188	Pass
			-20	3.80	5180.12	5150 to 5250	Pass
			-10	3.80	5180.00	5150 to 5250	Pass
			0	3.80	5180.05	5150 to 5250	Pass
			10	3.80	5180.09	5150 to 5250	Pass
			30	3.80	5180.03	5150 to 5250	Pass
			40	3.80	5180.03	5150 to 5250	Pass
			50	3.80	5180.11	5172 to 5188	Pass
		5200	20	3.23	5200.01	5192 to 5208	Pass
				3.80	5200.12	5192 to 5208	Pass
				4.37	5200.06	5192 to 5208	Pass
			-30	3.80	5200.04	5192 to 5208	Pass
			-20	3.80	5200.07	5150 to 5250	Pass
			-10	3.80	5200.06	5150 to 5250	Pass
			0	3.80	5200.04	5150 to 5250	Pass
			10	3.80	5200.02	5150 to 5250	Pass
			30	3.80	5200.07	5150 to 5250	Pass
			40	3.80	5200.02	5150 to 5250	Pass
			50	3.80	5200.10	5192 to 5208	Pass
		5240	20	3.23	5240.11	5232 to 5248	Pass
				3.80	5240.10	5232 to 5248	Pass
				4.37	5240.07	5232 to 5248	Pass
			-30	3.80	5240.02	5232 to 5248	Pass
			-20	3.80	5240.02	5150 to 5250	Pass
			-10	3.80	5240.04	5150 to 5250	Pass
			0	3.80	5240.11	5150 to 5250	Pass
			10	3.80	5240.13	5150 to 5250	Pass
			30	3.80	5240.06	5150 to 5250	Pass
			40	3.80	5240.03	5150 to 5250	Pass

			50	3.80	5240.06	5232 to 5248	Pass
802.11ac (VHT40)	SISO	5190	20	3.23	5190.05	5174 to 5206	Pass
				3.80	5190.03	5174 to 5206	Pass
				4.37	5190.02	5174 to 5206	Pass
			-30	3.80	5190.07	5174 to 5206	Pass
			-20	3.80	5190.13	5150 to 5250	Pass
			-10	3.80	5190.09	5150 to 5250	Pass
			0	3.80	5190.09	5150 to 5250	Pass
			10	3.80	5190.13	5150 to 5250	Pass
			30	3.80	5190.01	5150 to 5250	Pass
			40	3.80	5190.03	5150 to 5250	Pass
			50	3.80	5190.05	5174 to 5206	Pass
		5230	20	3.23	5230.13	5214 to 5246	Pass
				3.80	5230.02	5214 to 5246	Pass
				4.37	5230.03	5214 to 5246	Pass
			-30	3.80	5230.03	5214 to 5246	Pass
			-20	3.80	5230.09	5150 to 5250	Pass
			-10	3.80	5230.00	5150 to 5250	Pass
			0	3.80	5230.12	5150 to 5250	Pass
			10	3.80	5230.07	5150 to 5250	Pass
			30	3.80	5230.05	5150 to 5250	Pass
			40	3.80	5230.01	5150 to 5250	Pass
			50	3.80	5230.01	5214 to 5246	Pass
802.11ac (VHT80)	SISO	5210	20	3.23	5210.06	5178 to 5242	Pass
				3.80	5210.08	5178 to 5242	Pass
				4.37	5210.11	5178 to 5242	Pass
			-30	3.80	5210.07	5178 to 5242	Pass
			-20	3.80	5210.09	5150 to 5250	Pass
			-10	3.80	5210.00	5150 to 5250	Pass
			0	3.80	5210.00	5150 to 5250	Pass
			10	3.80	5210.12	5150 to 5250	Pass
			30	3.80	5210.03	5150 to 5250	Pass
			40	3.80	5210.06	5150 to 5250	Pass
			50	3.80	5210.00	5178 to 5242	Pass

Test Mode: 5.8G							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit	Verdict
802.11a	SISO	5745	20	3.23	5745.01	5737 to 5753	Pass
				3.80	5745.09	5737 to 5753	Pass
				4.37	5745.04	5737 to 5753	Pass
			-30	3.23	5745.11	5737 to 5753	Pass
			-20	3.80	5745.09	5725 to 5850	Pass
			-10	3.80	5745.05	5725 to 5850	Pass
			0	3.80	5745.13	5725 to 5850	Pass
			10	3.80	5745.05	5725 to 5850	Pass
			30	3.80	5745.13	5725 to 5850	Pass
			40	3.80	5745.12	5725 to 5850	Pass
			50	3.80	5745.10	5737 to 5753	Pass
		5785	20	3.23	5785.02	5777 to 5793	Pass
				3.80	5785.11	5777 to 5793	Pass
				4.37	5785.13	5777 to 5793	Pass
			-30	3.23	5785.10	5777 to 5793	Pass
			-20	3.80	5785.01	5725 to 5850	Pass
			-10	3.80	5785.09	5725 to 5850	Pass
			0	3.80	5785.02	5725 to 5850	Pass
			10	3.80	5785.04	5725 to 5850	Pass
			30	3.80	5785.03	5725 to 5850	Pass
			40	3.80	5785.03	5725 to 5850	Pass
			50	3.80	5785.09	5777 to 5793	Pass
		5825	20	3.23	5825.11	5817 to 5833	Pass
				3.80	5825.00	5817 to 5833	Pass
				4.37	5825.03	5817 to 5833	Pass
			-30	3.23	5825.11	5817 to 5833	Pass
			-20	3.80	5825.02	5725 to 5850	Pass
			-10	3.80	5825.13	5725 to 5850	Pass
			0	3.80	5825.13	5725 to 5850	Pass
			10	3.80	5825.04	5725 to 5850	Pass
			30	3.80	5825.01	5725 to 5850	Pass
			40	3.80	5825.08	5725 to 5850	Pass
			50	3.80	5825.04	5817 to 5833	Pass
802.11n (HT20)	SISO	5745	20	3.23	5745.06	5737 to 5753	Pass
				3.80	5745.03	5737 to 5753	Pass
				4.37	5745.12	5737 to 5753	Pass
			-30	3.23	5745.04	5737 to 5753	Pass
			-20	3.80	5745.13	5725 to 5850	Pass

			-10	3.80	5745.04	5725 to 5850	Pass
			0	3.80	5745.07	5725 to 5850	Pass
			10	3.80	5745.05	5725 to 5850	Pass
			30	3.80	5745.10	5725 to 5850	Pass
			40	3.80	5745.05	5725 to 5850	Pass
			50	3.80	5745.04	5737 to 5753	Pass
		5785	20	3.23	5785.07	5777 to 5793	Pass
				3.80	5785.08	5777 to 5793	Pass
				4.37	5785.08	5777 to 5793	Pass
			-30	3.23	5785.06	5777 to 5793	Pass
			-20	3.80	5785.06	5725 to 5850	Pass
			-10	3.80	5785.05	5725 to 5850	Pass
			0	3.80	5785.02	5725 to 5850	Pass
			10	3.80	5785.03	5725 to 5850	Pass
			30	3.80	5785.06	5725 to 5850	Pass
			40	3.80	5785.02	5725 to 5850	Pass
			50	3.80	5785.01	5777 to 5793	Pass
		5825	20	3.23	5825.06	5817 to 5833	Pass
				3.80	5825.04	5817 to 5833	Pass
				4.37	5825.10	5817 to 5833	Pass
			-30	3.23	5825.03	5817 to 5833	Pass
			-20	3.80	5825.11	5725 to 5850	Pass
			-10	3.80	5825.12	5725 to 5850	Pass
			0	3.80	5825.07	5725 to 5850	Pass
			10	3.80	5825.01	5725 to 5850	Pass
			30	3.80	5825.05	5725 to 5850	Pass
			40	3.80	5825.03	5725 to 5850	Pass
			50	3.80	5825.08	5817 to 5833	Pass
802.11n (HT40)	SISO	5755	20	3.23	5755.06	5739 to 5771	Pass
				3.80	5755.04	5739 to 5771	Pass
				4.37	5755.05	5739 to 5771	Pass
			-30	3.23	5755.12	5739 to 5771	Pass
			-20	3.80	5755.05	5725 to 5850	Pass
			-10	3.80	5755.04	5725 to 5850	Pass
			0	3.80	5755.10	5725 to 5850	Pass
			10	3.80	5755.13	5725 to 5850	Pass
			30	3.80	5755.10	5725 to 5850	Pass
			40	3.80	5755.12	5725 to 5850	Pass
			50	3.80	5755.13	5739 to 5771	Pass
		5795	20	3.23	5795.06	5779 to 5811	Pass
				3.80	5795.02	5779 to 5811	Pass

				4.37	5795.10	5779 to 5811	Pass
			-30	3.23	5795.11	5779 to 5811	Pass
			-20	3.80	5795.05	5725 to 5850	Pass
			-10	3.80	5795.06	5725 to 5850	Pass
			0	3.80	5795.09	5725 to 5850	Pass
			10	3.80	5795.11	5725 to 5850	Pass
			30	3.80	5795.07	5725 to 5850	Pass
			40	3.80	5795.05	5725 to 5850	Pass
			50	3.80	5795.13	5779 to 5811	Pass
802.11ac (VHT20)	SISO	5745	20	3.23	5745.03	5737 to 5753	Pass
				3.80	5745.08	5737 to 5753	Pass
				4.37	5745.11	5737 to 5753	Pass
			-30	3.23	5745.11	5737 to 5753	Pass
			-20	3.80	5745.01	5725 to 5850	Pass
			-10	3.80	5745.01	5725 to 5850	Pass
			0	3.80	5745.12	5725 to 5850	Pass
			10	3.80	5745.05	5725 to 5850	Pass
			30	3.80	5745.03	5725 to 5850	Pass
			40	3.80	5745.10	5725 to 5850	Pass
			50	3.80	5745.13	5737 to 5753	Pass
		5785	20	3.23	5785.05	5777 to 5793	Pass
				3.80	5785.06	5777 to 5793	Pass
				4.37	5785.08	5777 to 5793	Pass
			-30	3.23	5785.06	5777 to 5793	Pass
			-20	3.80	5785.11	5725 to 5850	Pass
			-10	3.80	5785.07	5725 to 5850	Pass
			0	3.80	5785.11	5725 to 5850	Pass
			10	3.80	5785.13	5725 to 5850	Pass
			30	3.80	5785.10	5725 to 5850	Pass
			40	3.80	5785.11	5725 to 5850	Pass
			50	3.80	5785.04	5777 to 5793	Pass
		5825	20	3.23	5825.05	5817 to 5833	Pass
				3.80	5825.01	5817 to 5833	Pass
				4.37	5825.02	5817 to 5833	Pass
			-30	3.23	5825.11	5817 to 5833	Pass
			-20	3.80	5825.10	5725 to 5850	Pass
			-10	3.80	5825.11	5725 to 5850	Pass
			0	3.80	5825.06	5725 to 5850	Pass
			10	3.80	5825.09	5725 to 5850	Pass
			30	3.80	5825.11	5725 to 5850	Pass
			40	3.80	5825.05	5725 to 5850	Pass

			50	3.80	5825.07	5817 to 5833	Pass
802.11ac (VHT40)	SISO	5755	20	3.23	5755.08	5739 to 5771	Pass
				3.80	5755.03	5739 to 5771	Pass
				4.37	5755.01	5739 to 5771	Pass
			-30	3.23	5755.08	5739 to 5771	Pass
			-20	3.80	5755.09	5725 to 5850	Pass
			-10	3.80	5755.07	5725 to 5850	Pass
			0	3.80	5755.07	5725 to 5850	Pass
			10	3.80	5755.03	5725 to 5850	Pass
			30	3.80	5755.05	5725 to 5850	Pass
			40	3.80	5755.08	5725 to 5850	Pass
			50	3.80	5755.02	5739 to 5771	Pass
		5795	20	3.23	5795.07	5779 to 5811	Pass
				3.80	5795.10	5779 to 5811	Pass
				4.37	5795.01	5779 to 5811	Pass
			-30	3.23	5795.13	5779 to 5811	Pass
			-20	3.80	5795.01	5725 to 5850	Pass
			-10	3.80	5795.12	5725 to 5850	Pass
			0	3.80	5795.10	5725 to 5850	Pass
			10	3.80	5795.12	5725 to 5850	Pass
			30	3.80	5795.03	5725 to 5850	Pass
			40	3.80	5795.05	5725 to 5850	Pass
			50	3.80	5795.01	5779 to 5811	Pass
802.11ac (VHT80)	SISO	5775	20	3.23	5775.01	5743 to 5807	Pass
				3.80	5775.01	5743 to 5807	Pass
				4.37	5775.10	5743 to 5807	Pass
			-30	3.23	5775.01	5743 to 5807	Pass
			-20	3.80	5775.01	5725 to 5850	Pass
			-10	3.80	5775.12	5725 to 5850	Pass
			0	3.80	5775.07	5725 to 5850	Pass
			10	3.80	5775.10	5725 to 5850	Pass
			30	3.80	5775.05	5725 to 5850	Pass
			40	3.80	5775.12	5725 to 5850	Pass
			50	3.80	5775.07	5743 to 5807	Pass

11. Antenna Requirement

11.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /15.407
Requirement	1) 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 2) 15.407 requirement: 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.

11.2. Antenna Connected Construction

The antenna is FPC Antenna which permanently attached, and the best case gain of the antenna is 1.01dBi for WiFi 5.2G and 1.5dBi for WiFi 5.8G. It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_RF

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

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