TEST REPORT

Applicant:	Wyrestorm Technologies LLC
Address of Applicant:	23 Wood Rd, Round Lake, New York 12151, United States
Manufacturer/Factory:	Shen Zhen Proitav Technology Co.,Ltd
Address of Manufacturer/Factory:	301-401, Building 16, Hejing Industrial Park, No.87, Hexiu West Road, Heping Community, Fuhai St., Baoan District, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	HDMI Switcher
Model No.:	SW-540-TX-W (MS330-A01)
Trade Mark:	WyreStorm
FCC ID:	2A2CW-SW540TXW
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	August 23, 2021
Date of Test:	August 24, 2021-September 10, 2021
Date of report issued:	September 13, 2021
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Luo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*September 13, 2021*	*Original*

Prepared By: ***Date:*** *September 13, 2021*

Project Engineer

Check By: ***Date:*** *September 13, 2021*

Reviewer

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4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.407(a)(3)	Pass
Channel Bandwidth and 99% Occupied Bandwidth	FCC part 15.407(e)	Pass
Power Spectral Density	FCC part 15.407(a)(3)	Pass
Band Edge	FCC part 15.407(b)(4)	Pass
Spurious Emission	FCC part 15.205/15.209/15.407(b)(4)	Pass
Frequency Stability	FCC part 15.407(g)	Pass

Remarks：

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013.*
3. *Test Method: KDB 662911 D01 Multiple Transmitter Output v02r01*

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	HDMI Switcher
Model No.:	SW-540-TX-W (MS330-A01)
Serial No.:	WS2126000026
Test sample(s) ID:	GTS202108000221-1
Sample(s) Status:	Engineer sample
Operation Frequency:	802.11ac(HT20): 5745MHz~5825MHz
Channel numbers:	5
Channel bandwidth:	20MHz
Modulation technology:	Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Integral Antenna
Antenna gain:	ANT 1: 2dBi ANT 2: 2dBi
Power supply:	Adapter 1: Model: NBS24J120200D5 Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 12.0V, 2.0A, 24.0W Adapter 2: Model: FJ-SW1202000N Input: AC 100-240V, 50/60Hz, 0.6A Max Output: DC 12.0V, 2.0A, 24.0W

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	153	5765MHz	155	5775MHz
157	5785MHz	159	5795MHz	161	5805MHz	163	5815MHz
165	5825MHz						

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:

Test channel	**Frequency (MHz)**
	802.11ac(HT20)
Lowest channel	5745
Middle channel	5785
Highest channel	5825

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

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
802.11ac(HT20)	6.5Mbps

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Lenovo	Notebook PC	E40-80	N/A

5.4 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-

anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 24 2021	June. 23 2022
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 24 2021	June. 23 2022
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

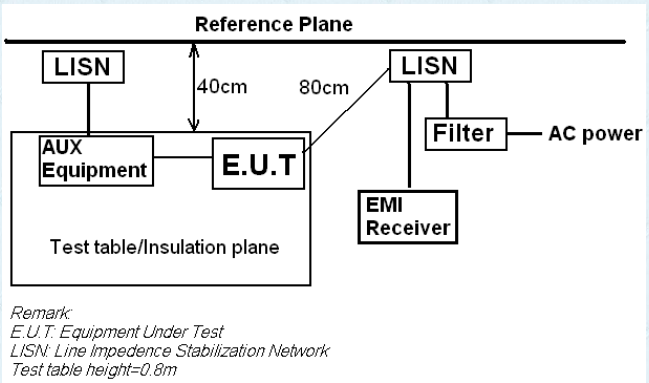
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
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.	
E.U.T Antenna:	
The antenna is Integral antenna, the best case gain of the antenna is 2dBi, reference to the appendix II for details	

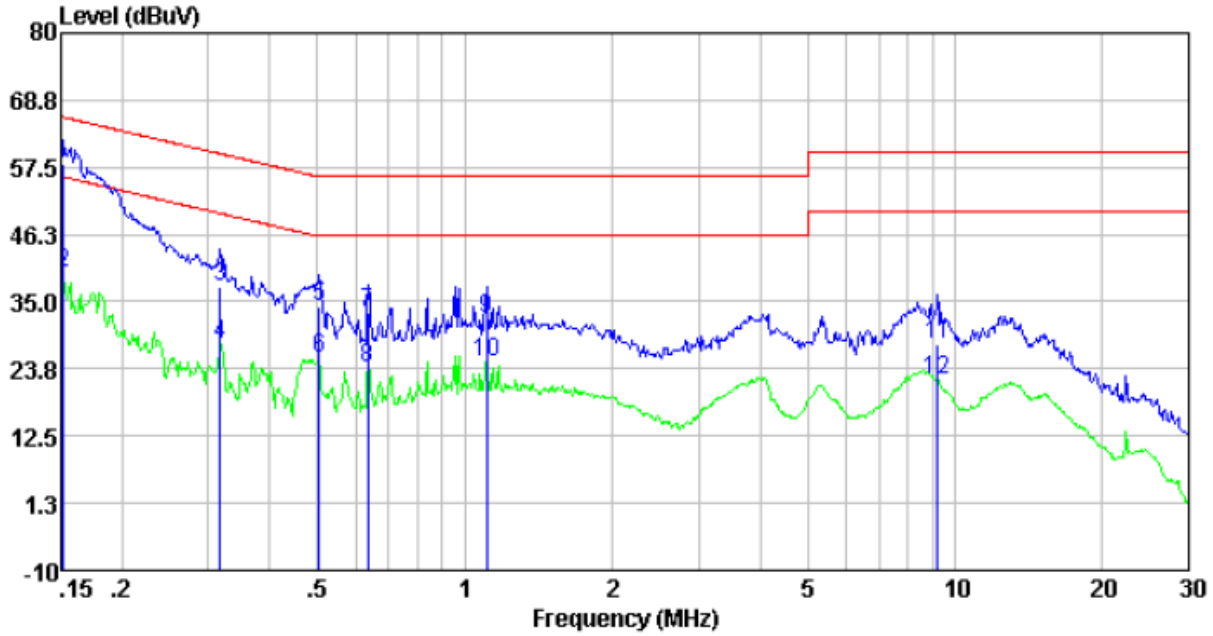
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	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			
	* Decreases with the logarithm of the frequency.					
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*					
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 Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

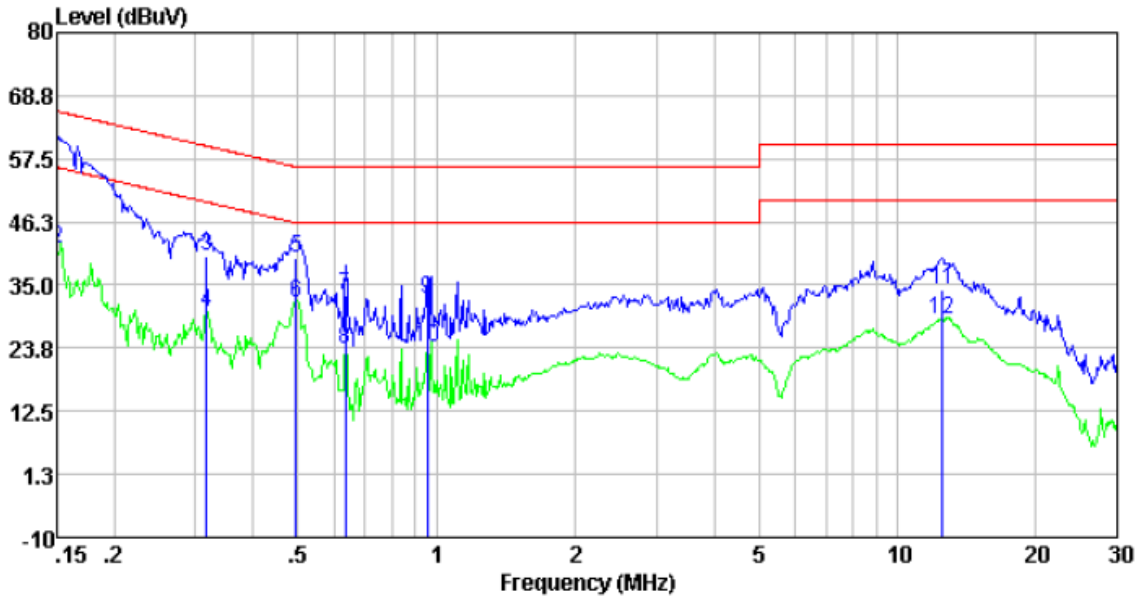
Measurement data

Adapter 1
Line:



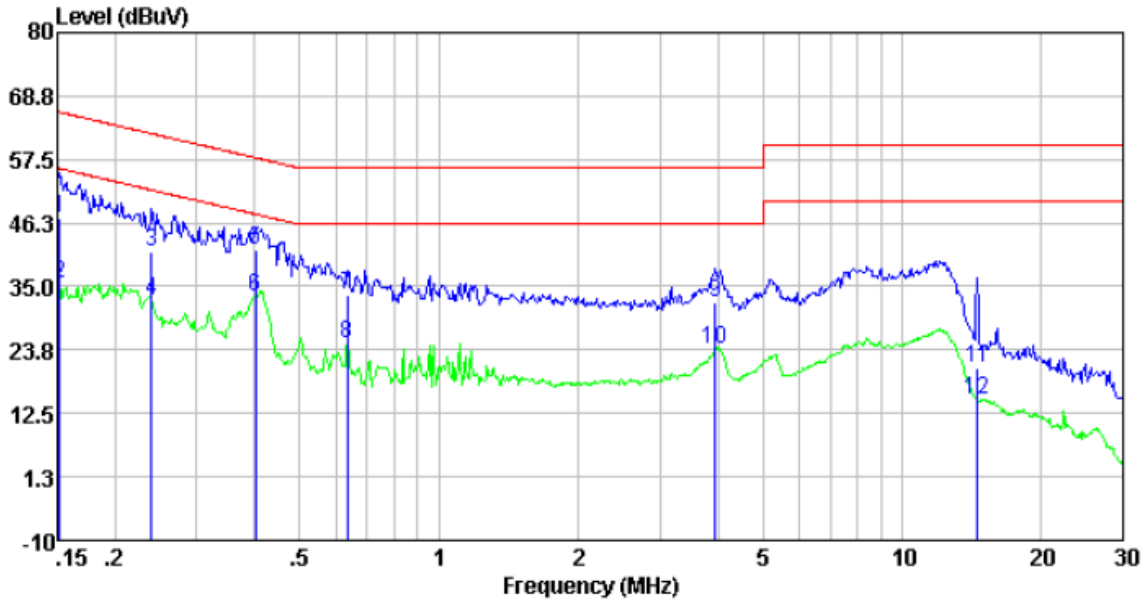
Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dBuV	dBuV	dB	
0.15	47.76	10.40	0.01	58.17	65.91	-7.74	QP
0.15	29.51	10.40	0.01	39.92	55.91	-15.99	Average
0.32	27.08	10.39	0.01	37.48	59.80	-22.32	QP
0.32	17.42	10.39	0.01	27.82	49.80	-21.98	Average
0.50	23.85	10.31	0.01	34.17	56.00	-21.83	QP
0.50	15.33	10.31	0.01	25.65	46.00	-20.35	Average
0.63	23.00	10.28	0.02	33.30	56.00	-22.70	QP
0.63	13.60	10.28	0.02	23.90	46.00	-22.10	Average
1.11	22.09	10.20	0.03	32.32	56.00	-23.68	QP
1.11	14.65	10.20	0.03	24.88	46.00	-21.12	Average
9.20	17.42	10.20	0.10	27.72	60.00	-32.28	QP
9.20	11.42	10.20	0.10	21.72	50.00	-28.28	Average

Neutral:



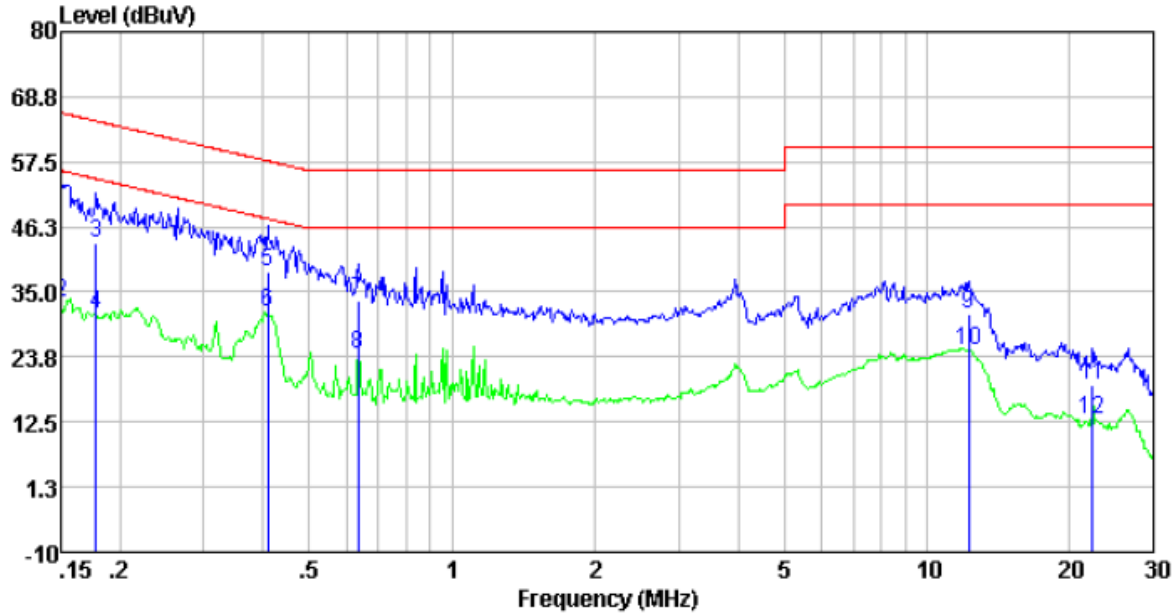
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	48.12	10.40	0.01	58.53	66.00	-7.47	QP
0.15	30.95	10.40	0.01	41.36	56.00	-14.64	Average
0.32	29.82	10.39	0.01	40.22	59.80	-19.58	QP
0.32	19.80	10.39	0.01	30.20	49.80	-19.60	Average
0.49	29.54	10.32	0.01	39.87	56.10	-16.23	QP
0.49	21.40	10.32	0.01	31.73	46.10	-14.37	Average
0.63	23.00	10.28	0.02	33.30	56.00	-22.70	QP
0.63	13.08	10.28	0.02	23.38	46.00	-22.62	Average
0.95	22.32	10.21	0.03	32.56	56.00	-23.44	QP
0.95	13.62	10.21	0.03	23.86	46.00	-22.14	Average
12.52	23.86	10.20	0.14	34.20	60.00	-25.80	QP
12.52	18.45	10.20	0.14	28.79	50.00	-21.21	Average

Adapter 2
Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	36.82	10.40	0.01	47.23	65.91	-18.68	QP
0.15	25.14	10.40	0.01	35.55	55.91	-20.36	Average
0.24	30.76	10.40	0.01	41.17	62.13	-20.96	QP
0.24	21.94	10.40	0.01	32.35	52.13	-19.78	Average
0.40	31.00	10.35	0.01	41.36	57.81	-16.45	QP
0.40	22.75	10.35	0.01	33.11	47.81	-14.70	Average
0.63	23.12	10.28	0.02	33.42	56.00	-22.58	QP
0.63	14.47	10.28	0.02	24.77	46.00	-21.23	Average
3.94	21.95	10.20	0.06	32.21	56.00	-23.79	QP
3.94	13.45	10.20	0.06	23.71	46.00	-22.29	Average
14.52	10.13	10.20	0.16	20.49	60.00	-39.51	QP
14.52	4.71	10.20	0.16	15.07	50.00	-34.93	Average

Neutral:

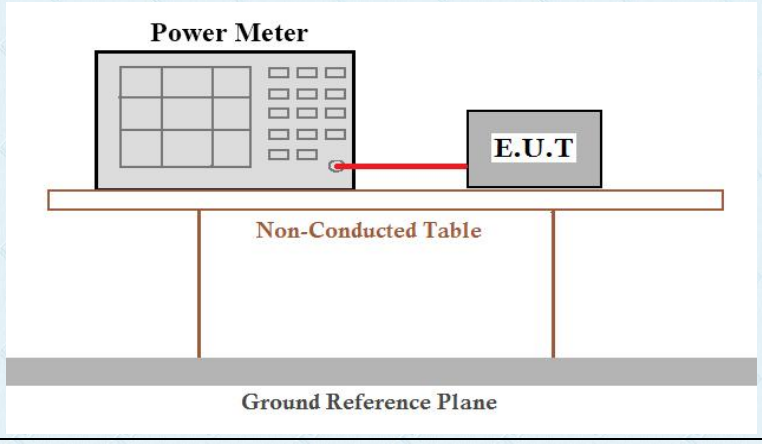


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	36.52	10.40	0.01	46.93	66.00	-19.07	QP
0.15	22.65	10.40	0.01	33.06	56.00	-22.94	Average
0.18	33.21	10.40	0.01	43.62	64.59	-20.97	QP
0.18	20.68	10.40	0.01	31.09	54.59	-23.50	Average
0.41	27.98	10.35	0.01	38.34	57.68	-19.34	QP
0.41	21.10	10.35	0.01	31.46	47.68	-16.22	Average
0.63	23.17	10.28	0.02	33.47	56.00	-22.53	QP
0.63	13.95	10.28	0.02	24.25	46.00	-21.75	Average
12.25	20.71	10.20	0.14	31.05	60.00	-28.95	QP
12.25	14.60	10.20	0.14	24.94	50.00	-25.06	Average
22.30	8.26	10.33	0.19	18.78	60.00	-41.22	QP
22.30	2.24	10.33	0.19	12.76	50.00	-37.24	Average

Notes:

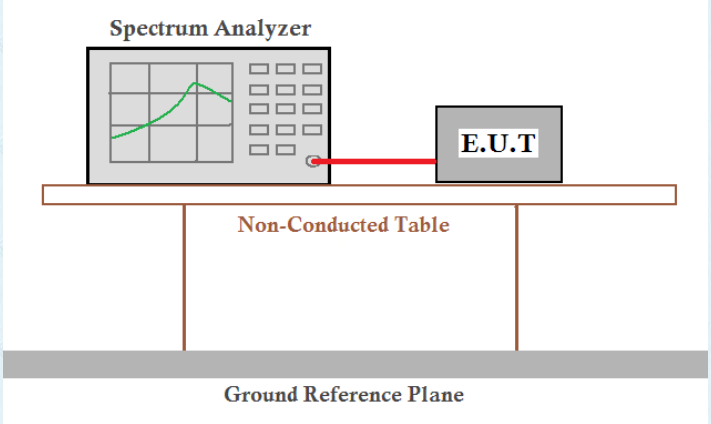
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak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

7.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

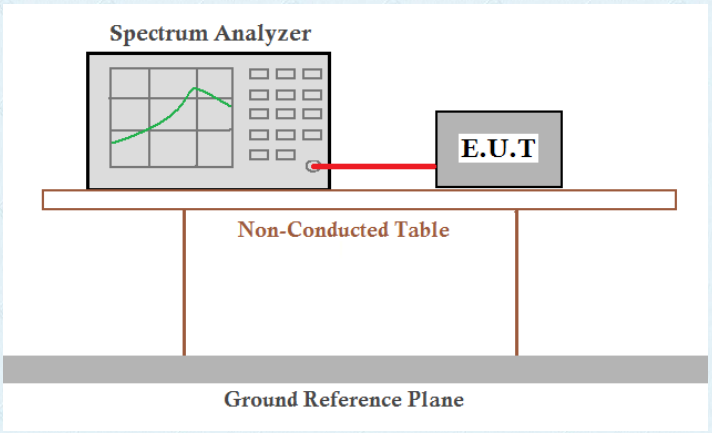
Measurement Data: The detailed test data see Appendix for WIFI_5.8G.

7.4 Channel Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(e)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI_5.8G.

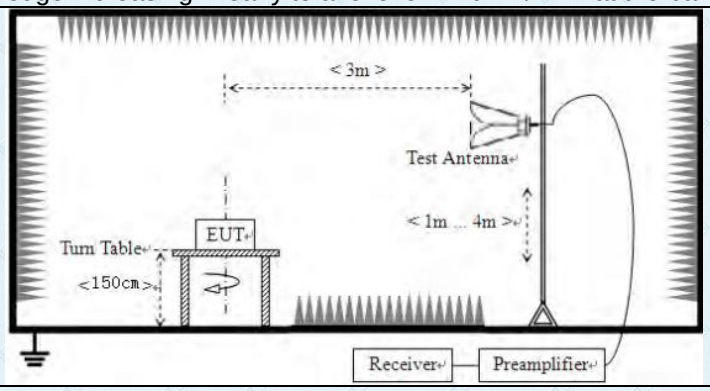
7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	30dBm/500kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI_5.8G.

7.6 Band edge

7.6.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	9kHz to 40GHz, only worse case is reported
Test site:	Measurement Distance: 3m
Receiver setup:	<table><tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>RMS</td></tr></table>
Limit:	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.
Test setup:	
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 6.0 for details

Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

1. *Only the worst case Main Antenna test data..*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
5. *According to KDB 789033 D02v02r01 section G) 1) d),for measurements above 1000 MHz @3m distance, the limit of field strength is computed as follows:*

   E[dBuV/m] = EIRP[dBm] + 95.2;

   E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

   E[dBuV/m] = 10 + 95.2 = 105.2dBuV/m.

   E[dBuV/m] = 15.6 + 95.2 = 110.8dBuV/m.

   E[dBuV/m] = 27 + 95.2 = 122.2dBuV/m

Measurement data:

All adapter have test, only the worst case adapter 1 report.

ANT 1

IEEE 802.11ac 20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	35.21	32.36	9.72	23.83	53.46	68.20	-14.74	Horizontal
5700.00	36.01	32.50	9.79	23.84	54.46	105.20	-50.74	Horizontal
5720.00	36.21	32.53	9.81	23.85	54.70	110.80	-56.10	Horizontal
5725.00	44.32	32.53	9.83	23.86	62.82	122.20	-59.38	Horizontal
5850.00	42.31	32.70	9.99	23.87	61.13	122.20	-61.07	Horizontal
5855.00	35.34	32.72	9.99	23.88	54.17	110.80	-56.63	Horizontal
5875.00	36.82	32.74	10.04	23.89	55.71	105.20	-49.49	Horizontal
5925.00	38.42	32.80	10.11	23.90	57.43	68.20	-10.77	Horizontal
5650.00	35.24	32.36	9.72	23.83	53.49	68.20	-14.71	Vertical
5700.00	36.09	32.50	9.79	23.84	54.54	105.20	-50.66	Vertical
5720.00	36.11	32.53	9.81	23.85	54.60	110.80	-56.20	Vertical
5725.00	43.03	32.53	9.83	23.86	61.53	122.20	-60.67	Vertical
5850.00	41.28	32.70	9.99	23.87	60.10	122.20	-62.10	Vertical
5855.00	36.32	32.72	9.99	23.88	55.15	110.80	-55.65	Vertical
5875.00	35.85	32.74	10.04	23.89	54.74	105.20	-50.46	Vertical
5925.00	36.24	32.80	10.11	23.90	55.25	68.20	-12.95	Vertical

ANT 2

IEEE 802.11ac 20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	33.25	32.36	9.72	23.83	51.50	68.20	-16.70	Horizontal
5700.00	36.32	32.50	9.79	23.84	54.77	105.20	-50.43	Horizontal
5720.00	35.21	32.53	9.81	23.85	53.70	110.80	-57.10	Horizontal
5725.00	42.32	32.53	9.83	23.86	60.82	122.20	-61.38	Horizontal
5850.00	39.86	32.70	9.99	23.87	58.68	122.20	-63.52	Horizontal
5855.00	35.64	32.72	9.99	23.88	54.47	110.80	-56.33	Horizontal
5875.00	36.02	32.74	10.04	23.89	54.91	105.20	-50.29	Horizontal
5925.00	36.37	32.80	10.11	23.90	55.38	68.20	-12.82	Horizontal
5650.00	34.69	32.36	9.72	23.83	52.94	68.20	-15.26	Vertical
5700.00	35.41	32.50	9.79	23.84	53.86	105.20	-51.34	Vertical
5720.00	35.62	32.53	9.81	23.85	54.11	110.80	-56.69	Vertical
5725.00	44.29	32.53	9.83	23.86	62.79	122.20	-59.41	Vertical
5850.00	43.65	32.70	9.99	23.87	62.47	122.20	-59.73	Vertical
5855.00	36.85	32.72	9.99	23.88	55.68	110.80	-55.12	Vertical
5875.00	36.42	32.74	10.04	23.89	55.31	105.20	-49.89	Vertical
5925.00	36.03	32.80	10.11	23.90	55.04	68.20	-13.16	Vertical

7.7 Spurious Emission

7.7.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

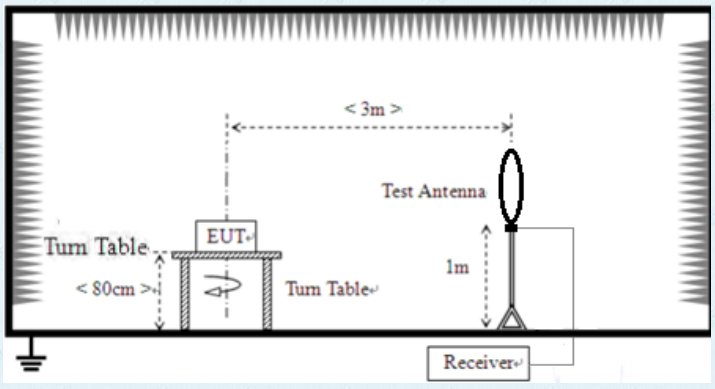
FCC Limit:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

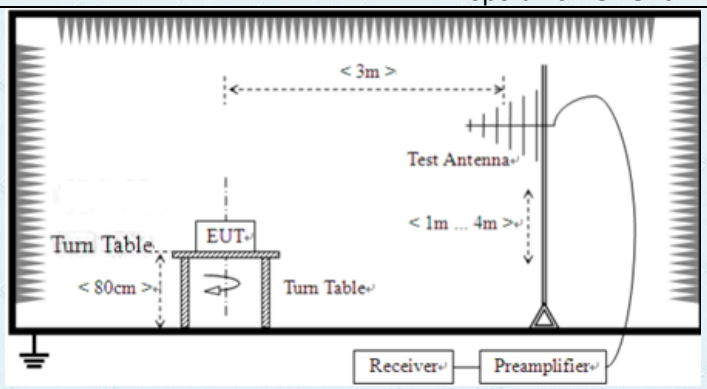
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test setup:

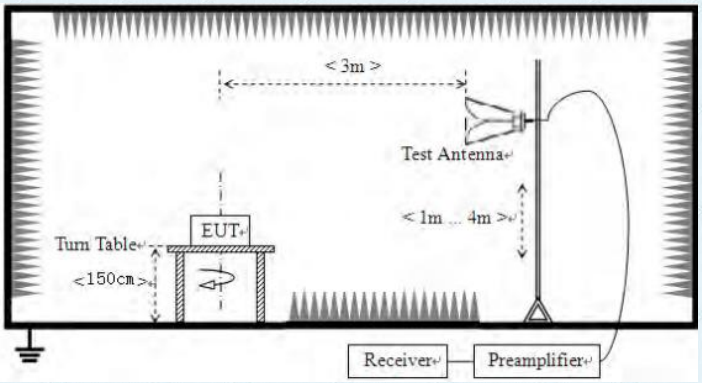
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) 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, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:

1. *Only the worst case Main Antenna test data.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

Measurement Data:

9 kHz ~ 30 MHz

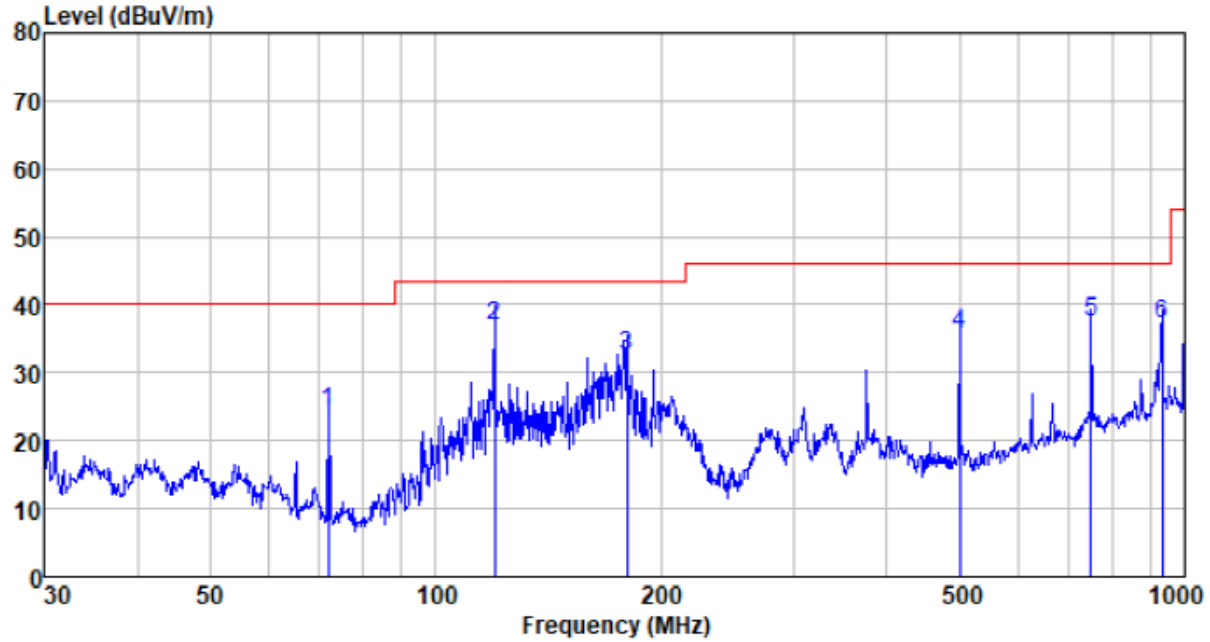
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

All antennas have test, only the worst case ANT 1 report.

Below 1GHz

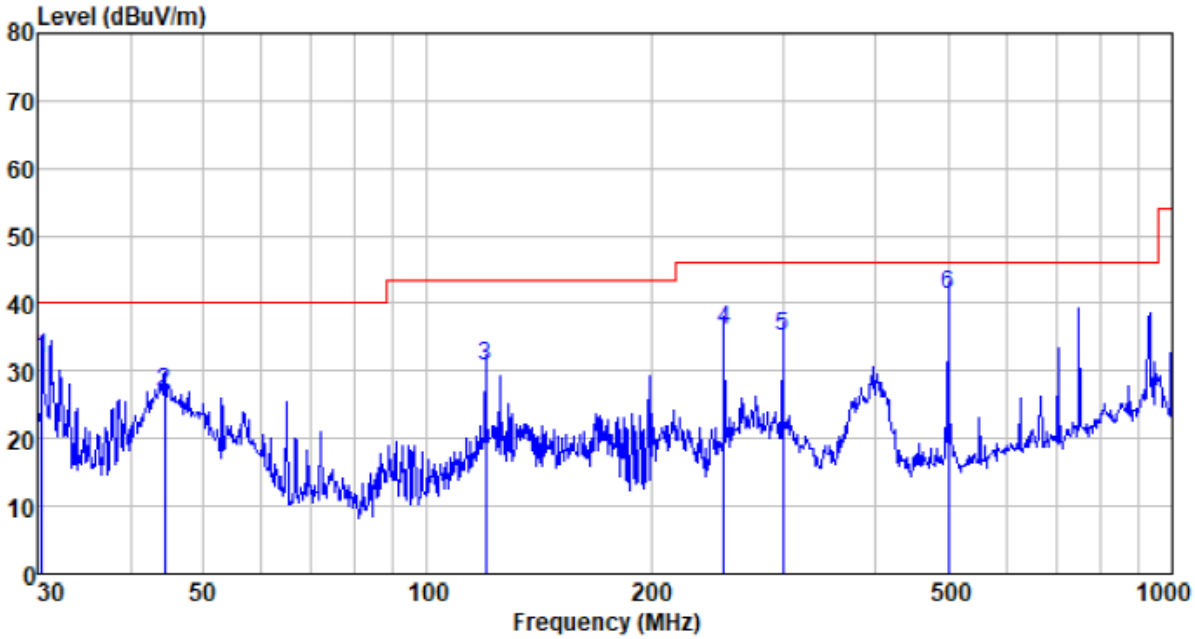
Adapter 1

Test mode:	802.11ac(HT20)	Test channel:	Lowest	Polarziation:	Horizontal



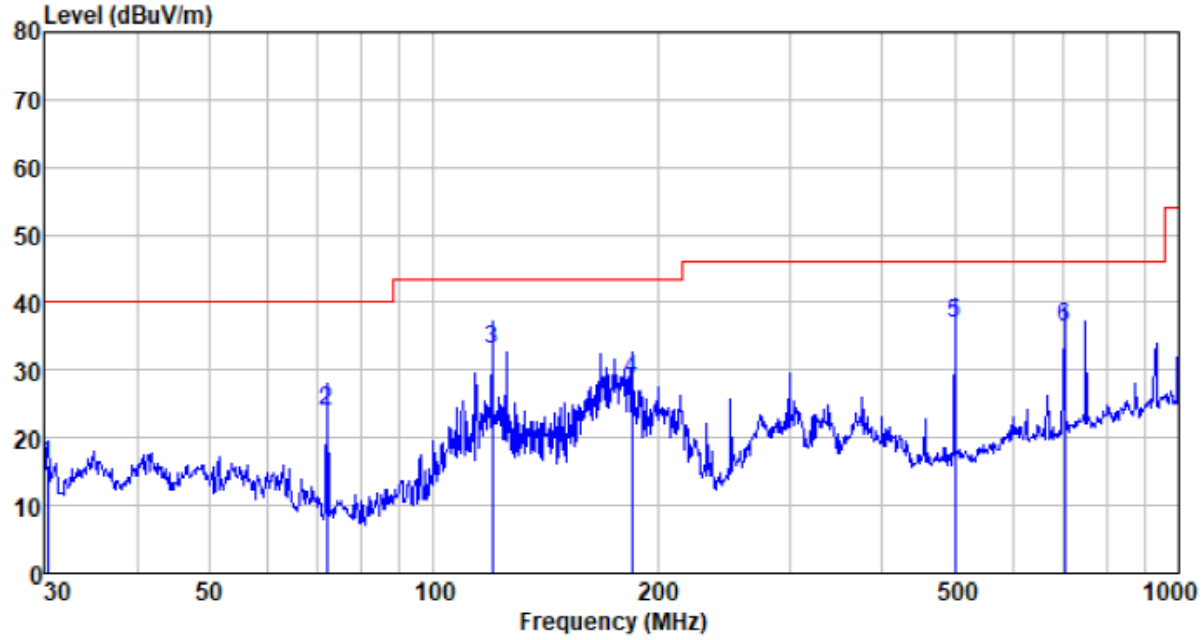
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
71.832	49.45	10.22	0.96	36.46	24.17	40.00	-15.83	QP
119.856	61.48	10.98	1.36	36.88	36.94	43.50	-6.56	QP
180.017	57.01	10.97	1.74	37.24	32.48	43.50	-11.02	QP
501.179	53.41	16.65	3.31	37.51	35.86	46.00	-10.14	QP
750.108	49.16	21.55	4.28	37.62	37.37	46.00	-8.63	QP
932.272	46.28	23.61	4.98	37.57	37.30	46.00	-8.70	QP

Test mode:	802.11ac(HT20)	Test channel:	Lowest	Polarziation:	Vertical



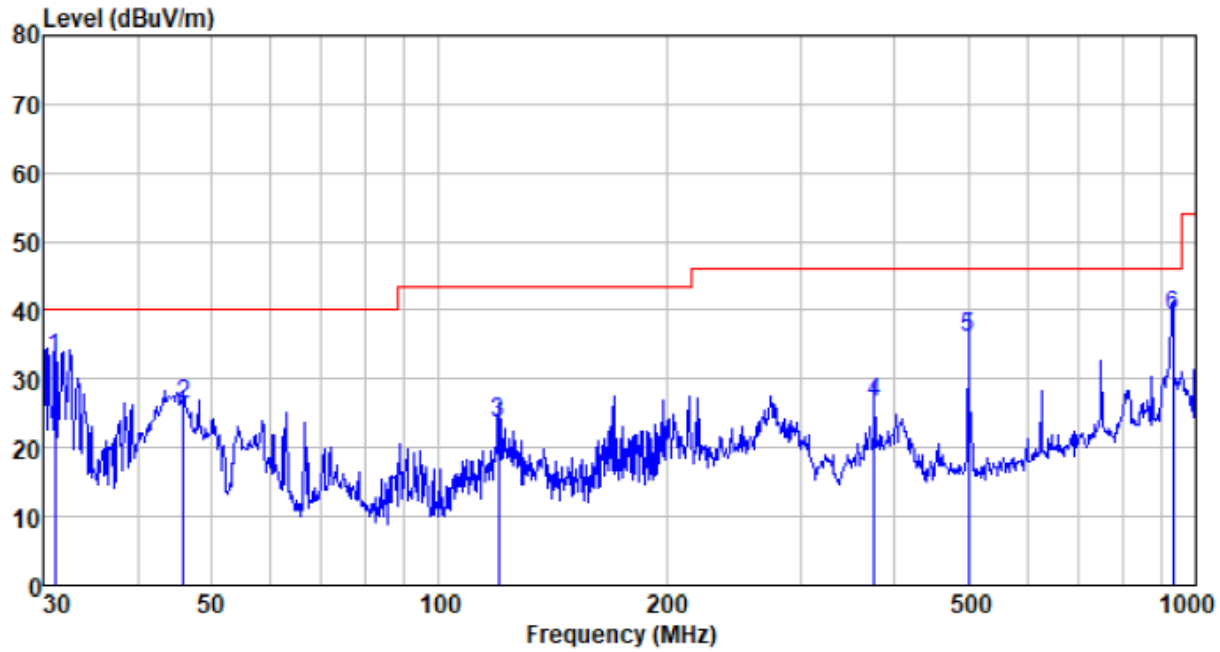
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
30.424	54.29	12.20	0.56	35.03	32.02	40.00	-7.98	QP
44.431	49.14	12.99	0.71	35.91	26.93	40.00	-13.07	QP
119.856	55.13	10.98	1.36	36.88	30.59	43.50	-12.91	QP
250.301	60.58	10.74	2.12	37.38	36.06	46.00	-9.94	QP
300.367	57.83	12.41	2.36	37.42	35.18	46.00	-10.82	QP
501.179	58.78	16.65	3.31	37.51	41.23	46.00	-4.77	QP

Test mode:	802.11ac(HT20)	Test channel:	Middle	Polarziation:	Horizontal



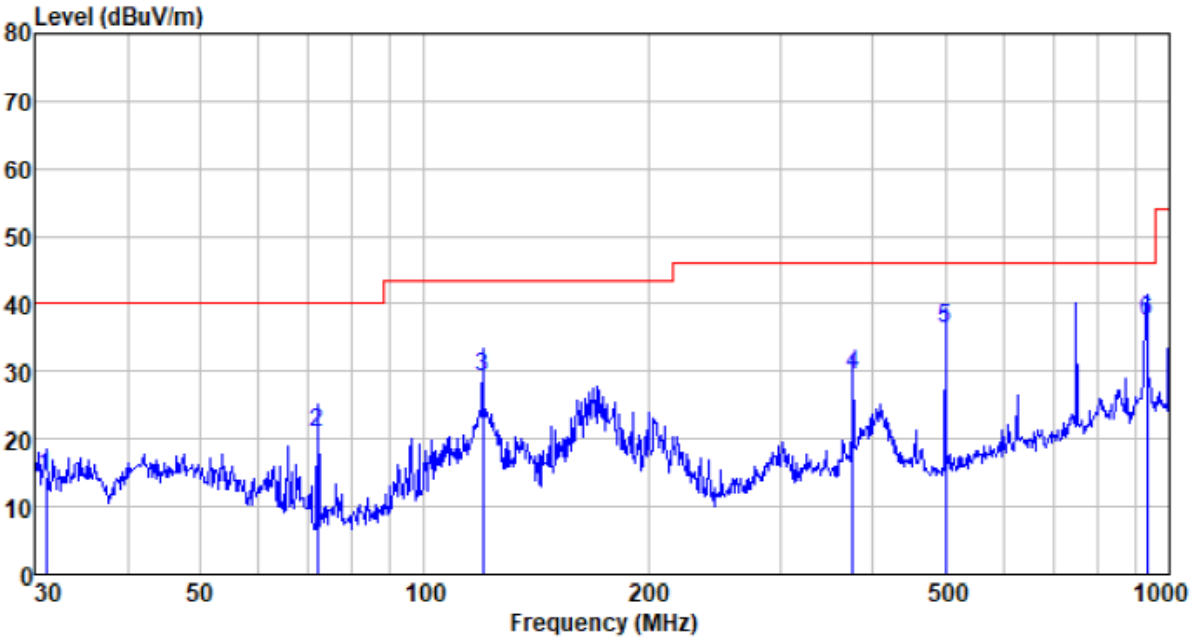
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
30.317	38.13	12.19	0.55	35.02	15.85	40.00	-24.15	QP
71.832	49.25	10.22	0.96	36.46	23.97	40.00	-16.03	QP
119.856	57.70	10.98	1.36	36.88	33.16	43.50	-10.34	QP
184.490	53.82	10.46	1.76	37.26	28.78	43.50	-14.72	QP
501.179	54.39	16.65	3.31	37.51	36.84	46.00	-9.16	QP
701.761	49.30	20.43	4.09	37.63	36.19	46.00	-9.81	QP

Test mode:	802.11ac(HT20)	Test channel:	Middle	Polarziation:	Vertical



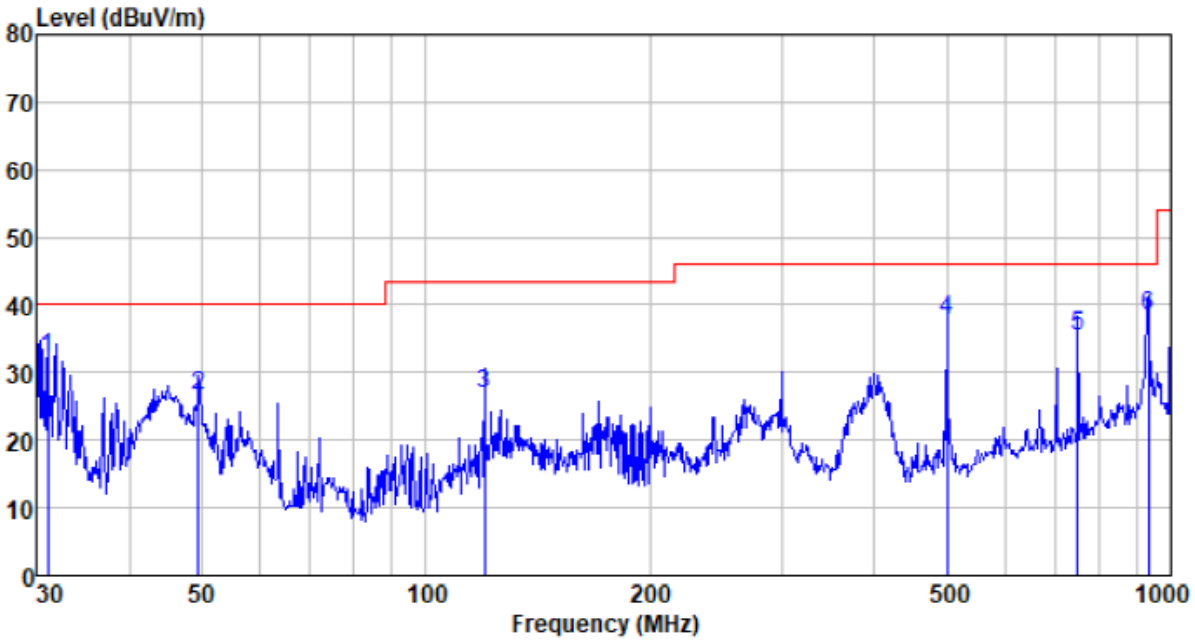
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.071	55.35	12.24	0.56	35.08	33.07	40.00	-6.93	QP
46.016	48.62	12.98	0.73	35.99	26.34	40.00	-13.66	QP
119.856	48.22	10.98	1.36	36.88	23.68	43.50	-19.82	QP
375.939	46.96	14.21	2.75	37.50	26.42	46.00	-19.58	QP
501.179	53.69	16.65	3.31	37.51	36.14	46.00	-9.86	QP
932.272	48.22	23.61	4.98	37.57	39.24	46.00	-6.76	QP

Test mode:	802.11ac(HT20)	Test channel:	Highest	Polarziation:	Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.071	36.80	12.24	0.56	35.08	14.52	40.00	-25.48	QP
71.832	46.28	10.22	0.96	36.46	21.00	40.00	-19.00	QP
119.856	53.87	10.98	1.36	36.88	29.33	43.50	-14.17	QP
375.939	49.98	14.21	2.75	37.50	29.44	46.00	-16.56	QP
501.179	53.91	16.65	3.31	37.51	36.36	46.00	-9.64	QP
932.272	46.35	23.61	4.98	37.57	37.37	46.00	-8.63	QP

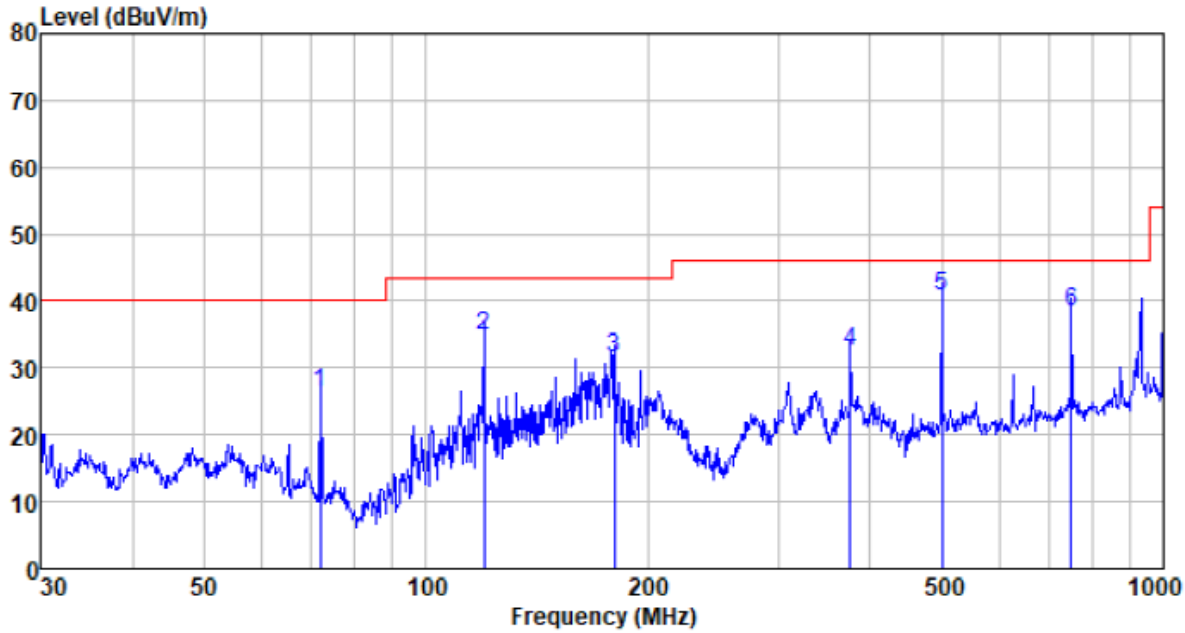
Test mode:	802.11ac(HT20)	Test channel:	Highest	Polarziation:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.071	54.43	12.24	0.56	35.08	32.15	40.00	-7.85	QP
49.533	48.89	13.03	0.77	36.16	26.53	40.00	-13.47	QP
119.856	51.38	10.98	1.36	36.88	26.84	43.50	-16.66	QP
501.179	55.32	16.65	3.31	37.51	37.77	46.00	-8.23	QP
750.108	47.08	21.55	4.28	37.62	35.29	46.00	-10.71	QP
932.272	47.28	23.61	4.98	37.57	38.30	46.00	-7.70	QP

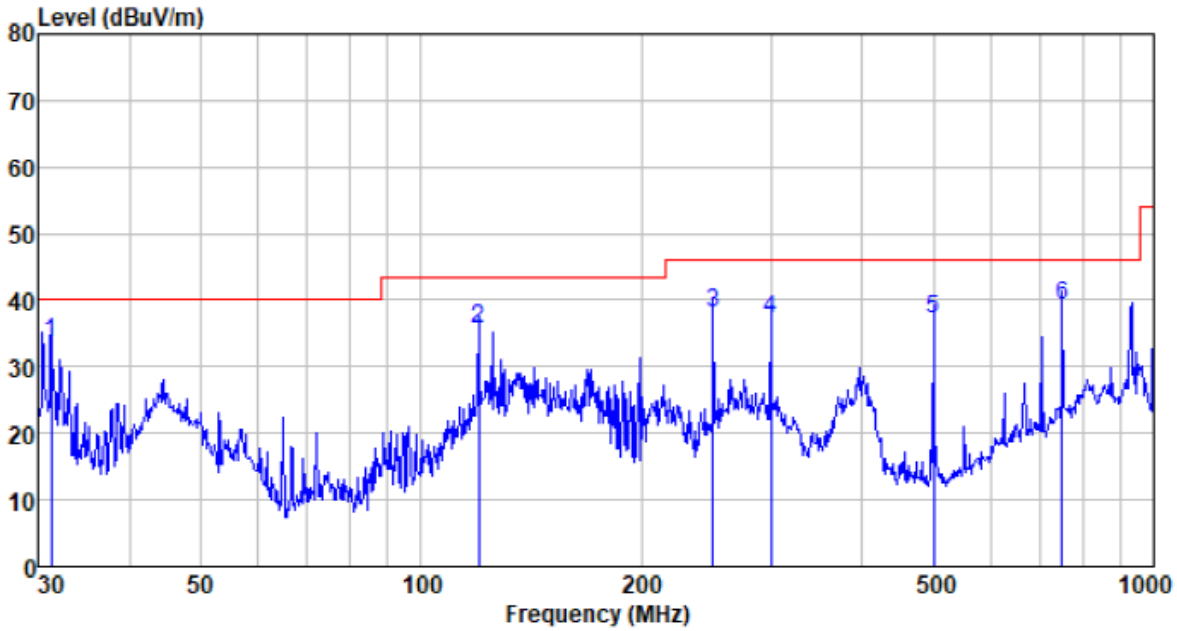
Adapter 2

Test mode:	802.11ac(HT20)	Test channel:	Lowest	Polarziation:	Horizontal



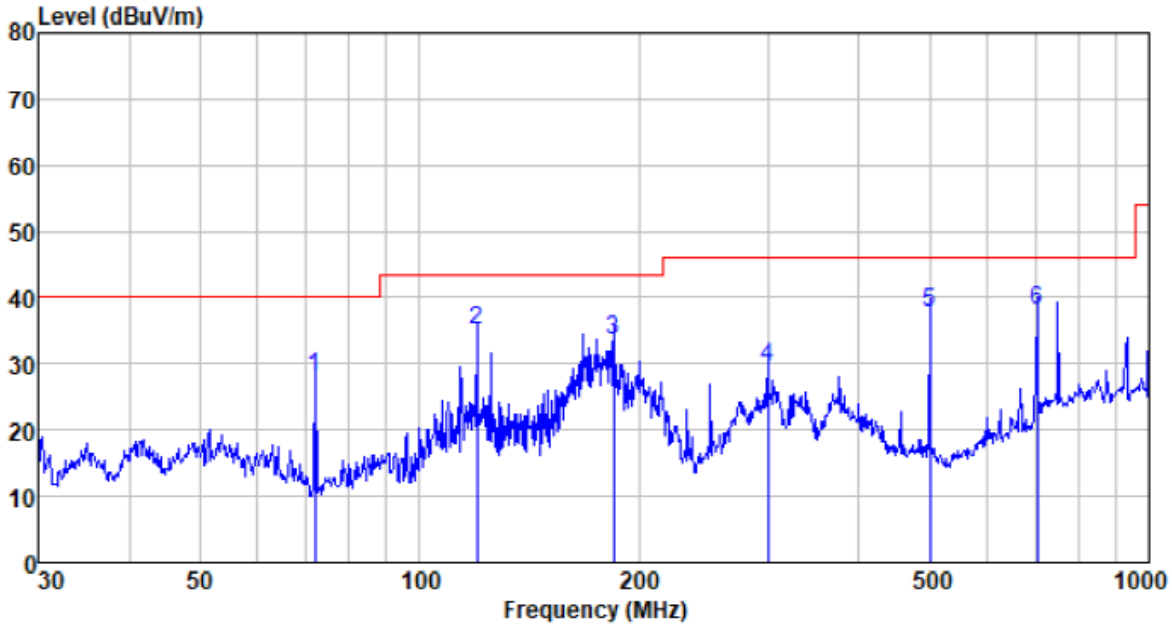
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
71.832	51.45	10.22	0.96	36.46	26.17	40.00	-13.83	QP
119.856	59.48	10.98	1.36	36.88	34.94	43.50	-8.56	QP
180.017	56.01	10.97	1.74	37.24	31.48	43.50	-12.02	QP
375.939	52.88	14.21	2.75	37.50	32.34	46.00	-13.66	QP
501.179	58.41	16.65	3.31	37.51	40.86	46.00	-5.14	QP
750.108	50.16	21.55	4.28	37.62	38.37	46.00	-7.63	QP

Test mode:	802.11ac(HT20)	Test channel:	Lowest	Polarziation:	Vertical



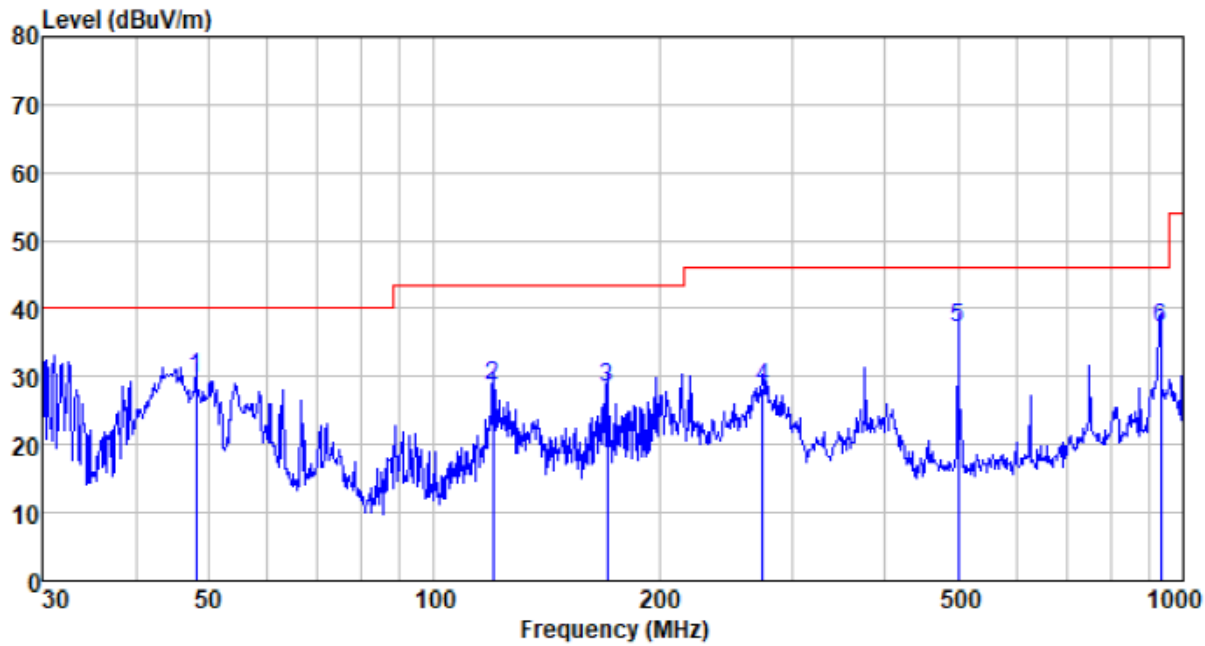
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.289	55.94	12.26	0.57	35.10	33.67	40.00	-6.33	QP
119.856	60.13	10.98	1.36	36.88	35.59	43.50	-7.91	QP
250.301	62.58	10.74	2.12	37.38	38.06	46.00	-7.94	QP
300.367	59.83	12.41	2.36	37.42	37.18	46.00	-8.82	QP
501.179	54.78	16.65	3.31	37.51	37.23	46.00	-8.77	QP
750.108	50.97	21.55	4.28	37.62	39.18	46.00	-6.82	QP

Test mode:	802.11ac(HT20)	Test channel:	Middle	Polarziation:	Horizontal



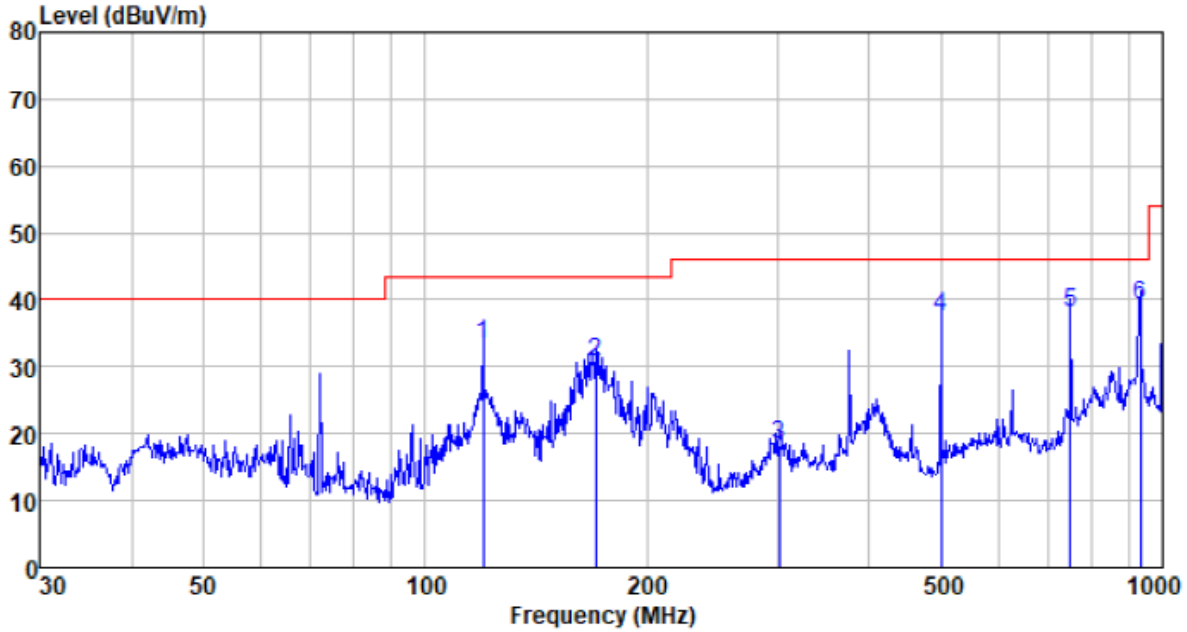
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
71.832	53.25	10.22	0.96	36.46	27.97	40.00	-12.03	QP
119.856	59.70	10.98	1.36	36.88	35.16	43.50	-8.34	QP
184.490	58.82	10.46	1.76	37.26	33.78	43.50	-9.72	QP
300.367	52.11	12.41	2.36	37.42	29.46	46.00	-16.54	QP
501.179	55.39	16.65	3.31	37.51	37.84	46.00	-8.16	QP
701.761	51.30	20.43	4.09	37.63	38.19	46.00	-7.81	QP

Test mode:	802.11ac(HT20)	Test channel:	Middle	Polarziation:	Vertical



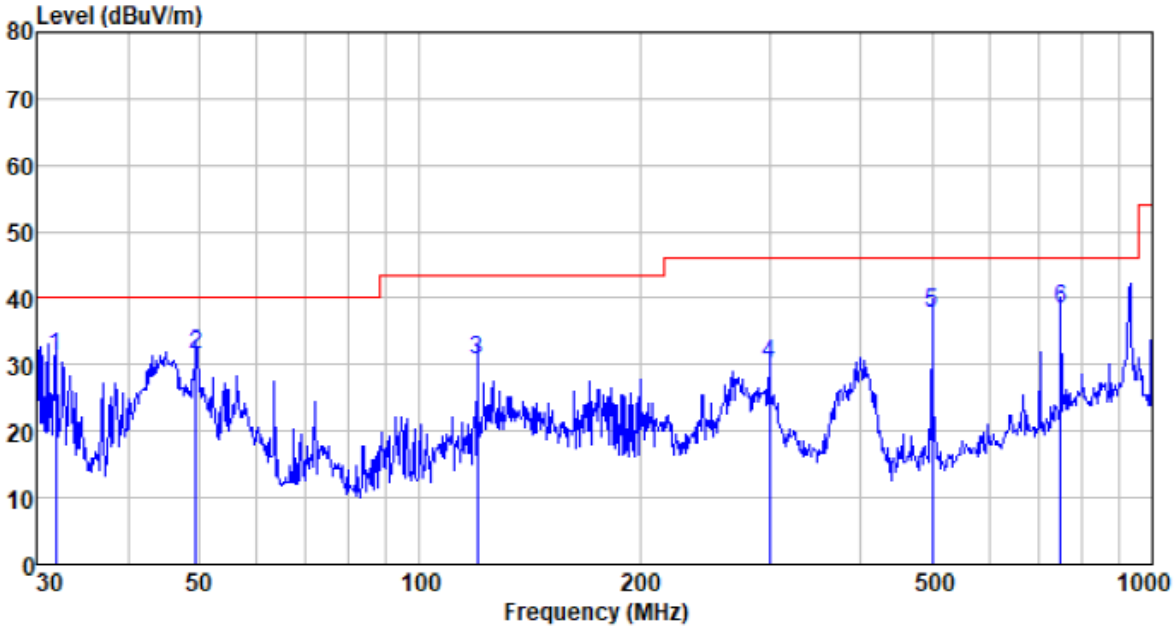
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
48.163	52.23	13.01	0.75	36.09	29.90	40.00	-10.10	QP
119.856	53.22	10.98	1.36	36.88	28.68	43.50	-14.82	QP
170.195	51.52	12.42	1.69	37.19	28.44	43.50	-15.06	QP
274.194	51.87	11.66	2.24	37.40	28.37	46.00	-17.63	QP
501.179	54.69	16.65	3.31	37.51	37.14	46.00	-8.86	QP
932.272	46.22	23.61	4.98	37.57	37.24	46.00	-8.76	QP

Test mode:	802.11ac(HT20)	Test channel:	Highest	Polarziation:	Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
119.856	57.87	10.98	1.36	36.88	33.33	43.50	-10.17	QP
170.195	53.79	12.42	1.69	37.19	30.71	43.50	-12.79	QP
302.481	40.94	12.47	2.37	37.42	18.36	46.00	-27.64	QP
501.179	54.91	16.65	3.31	37.51	37.36	46.00	-8.64	QP
750.108	49.95	21.55	4.28	37.62	38.16	46.00	-7.84	QP
932.272	48.35	23.61	4.98	37.57	39.37	46.00	-6.63	QP

Test mode:	802.11ac(HT20)	Test channel:	Highest	Polarziation:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.843	53.60	12.29	0.57	35.14	31.32	40.00	-8.68	QP
49.533	53.89	13.03	0.77	36.16	31.53	40.00	-8.47	QP
119.856	55.38	10.98	1.36	36.88	30.84	43.50	-12.66	QP
300.367	52.65	12.41	2.36	37.42	30.00	46.00	-16.00	QP
501.179	55.32	16.65	3.31	37.51	37.77	46.00	-8.23	QP
750.108	50.08	21.55	4.28	37.62	38.29	46.00	-7.71	QP

Above 1GHz:

Adapter 1

Test mode:		802.11a		Test channel:		lowest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11490	23.96	21.64	45.60	68.20	-22.60	PK
V	17235	22.31	21.80	44.11	68.20	-24.09	PK
H	11490	22.03	21.83	43.86	68.20	-24.34	PK
H	17235	20.31	21.67	41.98	68.20	-26.22	PK

Test mode:		802.11a		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11570	21.21	21.64	42.85	68.20	-25.35	PK
V	17355	19.03	21.80	40.83	68.20	-27.37	PK
H	11570	19.32	21.83	41.15	68.20	-27.05	PK
H	17355	18.25	21.67	39.92	68.20	-28.28	PK

Test mode:		802.11a		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11610	22.03	21.64	43.67	68.20	-24.53	PK
V	17415	20.31	21.80	42.11	68.20	-26.09	PK
H	11610	19.25	21.83	41.08	68.20	-27.12	PK
H	17415	18.32	21.67	39.99	68.20	-28.21	PK

Adapter 2

Test mode:		802.11a		Test channel:		lowest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11490	22.03	21.64	43.67	68.20	-24.53	PK
V	17235	20.38	21.80	42.18	68.20	-26.02	PK
H	11490	20.54	21.83	42.37	68.20	-25.83	PK
H	17235	20.39	21.67	42.06	68.20	-26.14	PK

Test mode:		802.11a		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11570	20.34	21.64	41.98	68.20	-26.22	PK
V	17355	18.21	21.80	40.01	68.20	-28.19	PK
H	11570	17.03	21.83	38.86	68.20	-29.34	PK
H	17355	17.62	21.67	39.29	68.20	-28.91	PK

Test mode:		802.11a		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11610	18.32	21.64	39.96	68.20	-28.24	PK
V	17415	18.45	21.80	40.25	68.20	-27.95	PK
H	11610	19.36	21.83	41.19	68.20	-27.01	PK
H	17415	18.24	21.67	39.91	68.20	-28.29	PK

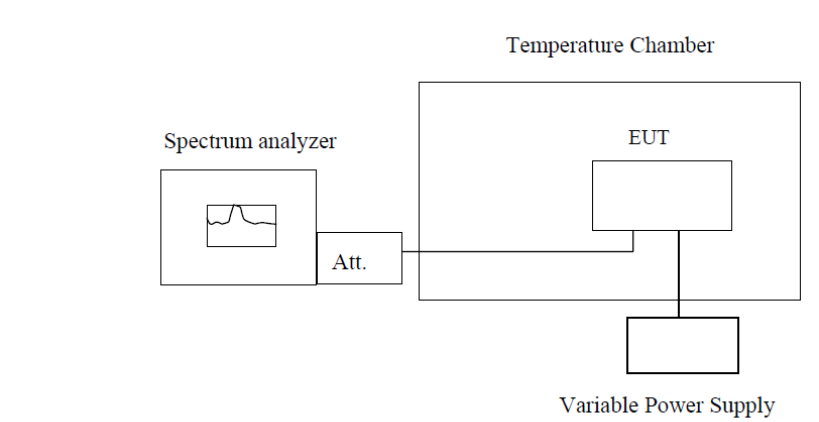
Notes:

1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. The test result on peak is lower than average limit, then average measurement needn't be performed.

7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix for WIFI_5.8G.

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

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