Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

FCC PART 15 SUBPART C 15.247

Report Reference No. .....: **CTL2012301021-WF01**

Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	Happy Guo
Tested by: (position+printed name+signature)	Gary Gao (Test Engineer)	Gary Gao
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	Ivan Xie

Product Name .....:	AC1200 Dual Band WiFi Repeater
Model/Type reference .....:	E3
List Model(s) .....:	E18, E15
Trade Mark .....:	N/A
FCC ID .....:	**T58E3R**
Applicant's name .....:	**NETIS SYSTEMS CO., LTD**
Address of applicant.....:	Floor 8, Building B, TongFang Information Harbor, No.11 Langshan Road, Nanshan District, Shenzhen, China
Test Firm .....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm .....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:	
Standard.....:	**47 CFR FCC Part 15 Subpart C 15.247**
TRF Originator .....:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF .....:	Dated 2011-01
Date of receipt of test item .....:	Dec. 30, 2020
Date of sampling .....:	Dec. 30, 2020
Date of Test Date.....:	Apr. 15, 2021- June 23, 2021
Date of Issue.....:	June 23, 2021
Result .....:	**Pass**

TEST REPORT

Test Report No. :	CTL2012301021-WF01	June 23, 2021 Date of issue

Equipment under Test	:	AC1200 Dual Band WiFi Repeater
Sample No.		CTL201230102-S001
Model /Type	:	E3
Listed Models	:	E18, E15
Applicant	:	**NETIS SYSTEMS CO., LTD**
Address	:	Floor 8, Building B, TongFang Information Harbor, No.11 Langshan Road, Nanshan District, Shenzhen, China
Manufacturer	:	**NETIS SYSTEMS CO., LTD**
Address	:	Floor 8, Building B, TongFang Information Harbor, No.11 Langshan Road, Nanshan District, Shenzhen, China

Test result	Pass *

* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2021-06-23	CTL2012301021-WF01	Tracy Qi

Table of Contents Page

1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:
FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spreda Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules

KDB 662911 D01 v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247(c)	Antenna Requirement	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. 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 399832, December 08, 2017.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)

Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	AC1200 Dual Band WiFi Repeater
Model/Type reference:	E3
Power supply:	AC100~240V 0.3A 50/60Hz
Hardware version:	PB-7509-M04G-20
Software version:	V1.0
WIFI :	
Supported type:	802.11b/802.11g/802.11n(H20)/802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40):OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40):2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40):7
Channel separation:	5MHz
Antenna type:	External Antenna
MIMO	Support MIMO 2*2
Antenna gain:	Antenna 1: 2.0 dBi Antenna 2: 2.0 dBi
Directional gain:	5.01dBi

Note1: For more details, please refer to the user's manual of the EUT.

Note2: *Directional gain* = G_{ANT}+*10 log*(N_{ANT}/N_{SS}) *dBi*, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. For this devices N_{SS} =1.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software(E3_MP tool) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

There are 11 channels provided to the EUT and Channel 01/06/11 were selected for 802.11b/802.11g/802.11n(H20)/test. Channel 03/06/09 were selected for 802.11n(H40) test.

Operation Frequency WIFI :

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	**2412**	8	2447
2	2417	**9**	**2452**
3	**2422**	10	2457
4	2427	**11**	**2462**
5	2432		
6	**2437**		
7	2442		

Note: The line display in grey were the channel selected for testing

Data Rate Used:

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.0Mbps	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(4MHz)/OFDM	13.0Mbps	3/9

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2021/05/15	2022/05/14
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2021/04/08	2022/04/07
EMI Test Receiver	R&S	ESCI	1166.5950.03	2021/05/18	2022/05/17
Spectrum Analyzer	Agilent	E4407B	MY41440676	2021/05/14	2022/05/13
Spectrum Analyzer	Agilent	N9020A	US46220290	2021/05/14	2022/05/13
Spectrum Analyzer	Keysight	N9020A	MY53420874	2021/05/14	2022/05/13
Controller	EM Electronics	EM 1000	060859	2021/05/19	2022/05/18
Horn Antenna	Ocean Microwave	OBH100400	26999002	2020/11/28	2021/11/27
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/05/19	2022/05/18
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/19	2022/05/18
Amplifier	Agilent	8449B	3008A02306	2021/05/15	2022/05/14
Amplifier	Agilent	8447D	2944A10176	2021/05/15	2022/05/14
Temperature/Humidity Meter	Gangxing	CTH-608	02	2021/05/16	2022/05/15
Power Sensor	Agilent	U2021XA	MY55130004	2021/05/14	2022/05/13
Power Sensor	Agilent	U2021XA	MY55130006	2021/05/14	2022/05/13
Spectrum Analyzer	RS	FSP	1164.4391.3	2021/05/15	2022/05/14

			8		

The calibration interval was one year

2.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

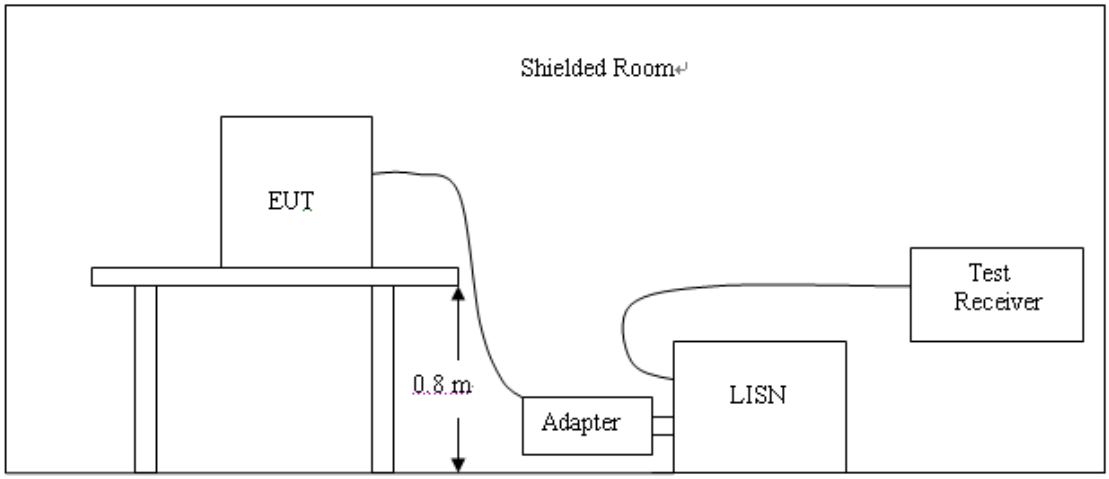
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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 CONFIGURATION



TEST PROCEDURE

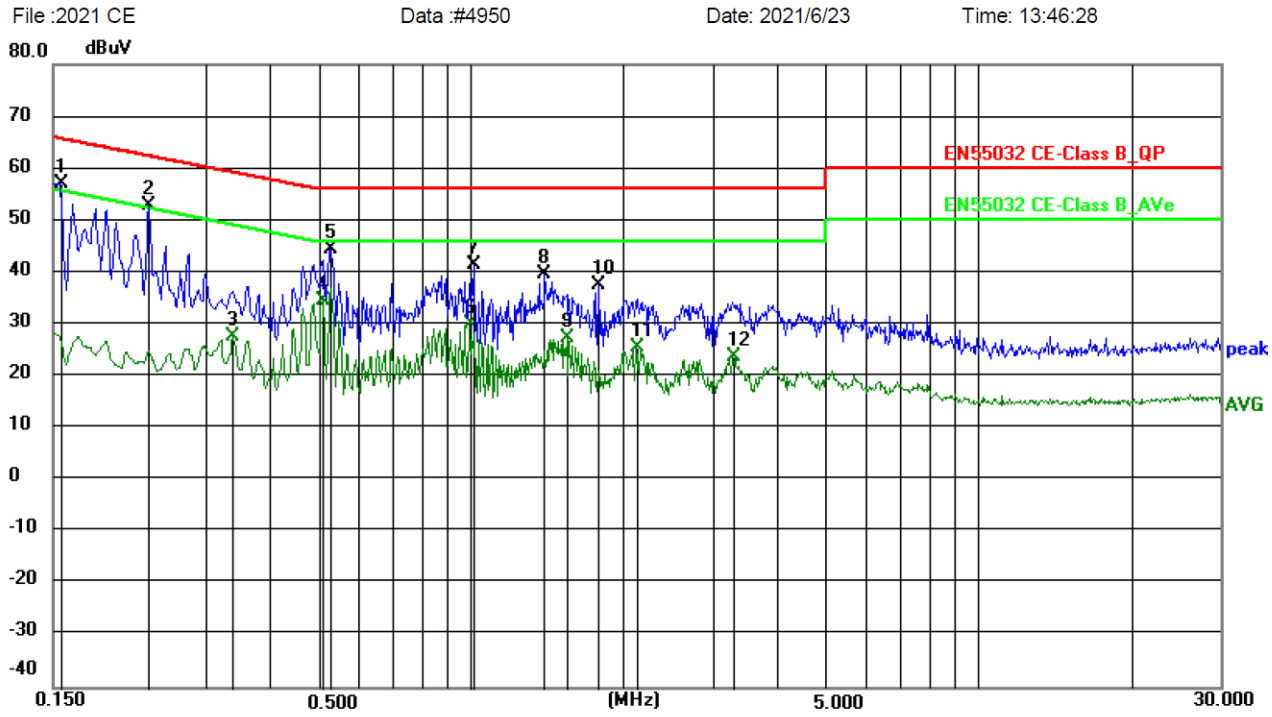
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Temperature	22.8℃	Humidity	56%
Test Engineer	Gary Gao	Configurations	WLAN2.4G

Remark:
1. All modes of 802.11b/g/n were tested at Low, Middle, and High channel; only the worst result of 802.11b CH11 was reported as below:
2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

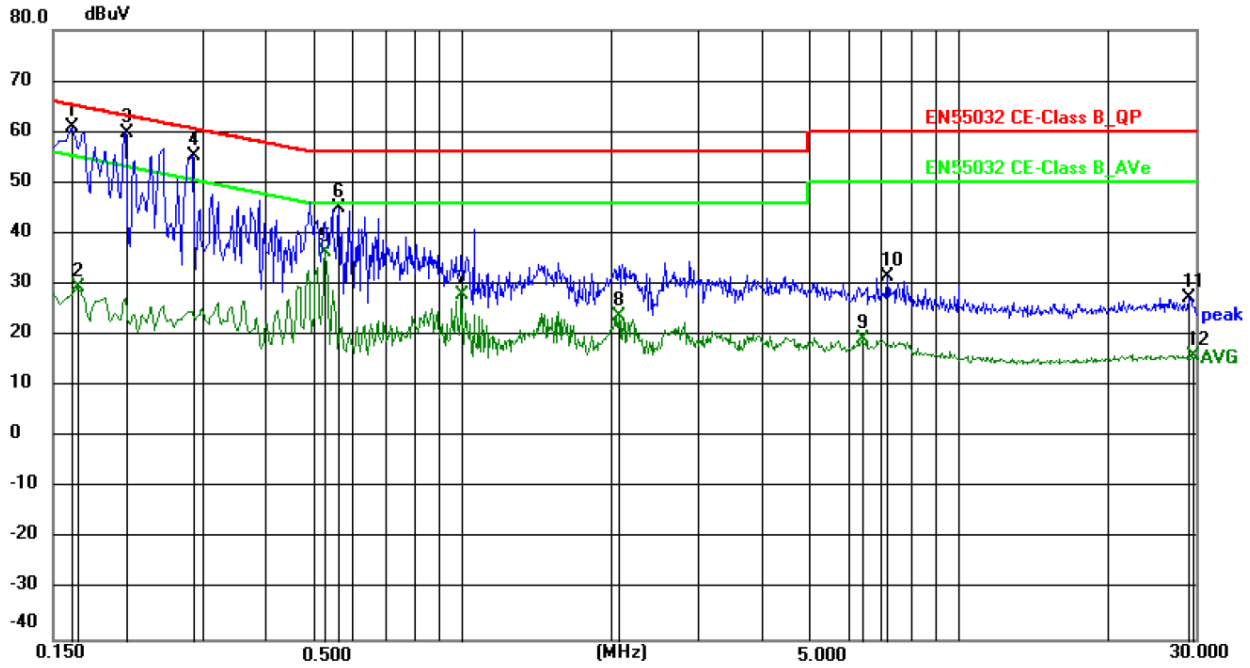
Test Mode	WIFI	Line:	L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1545	47.14	10.03	57.17	65.75	-8.58	peak	P	
2	0.2310	42.93	10.02	52.95	62.41	-9.46	peak	P	
3	0.3390	17.55	10.03	27.58	49.23	-21.65	AVG	P	
4	0.5100	24.51	10.04	34.55	46.00	-11.45	AVG	P	
5	0.5280	34.42	10.05	44.47	56.00	-11.53	peak	P	
6	0.9960	20.02	10.05	30.07	46.00	-15.93	AVG	P	
7	1.0140	31.35	10.05	41.40	56.00	-14.60	peak	P	
8	1.3965	29.73	10.06	39.79	56.00	-16.21	peak	P	
9	1.5450	17.15	10.06	27.21	46.00	-18.79	AVG	P	
10	1.7880	27.47	10.07	37.54	56.00	-18.46	peak	P	
11	2.1165	15.51	10.07	25.58	46.00	-20.42	AVG	P	
12	3.2775	13.55	10.13	23.68	46.00	-22.32	AVG	P	

Test Mode	WIFI	Line:	N

File :2021 CE Data :#4949 Date: 2021/6/23 Time: 13:44:33



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1635	51.02	10.03	61.05	65.28	-4.23	peak	P	
2	0.1680	19.43	10.03	29.46	55.06	-25.60	AVG	P	
3	0.2085	49.88	10.02	59.90	63.26	-3.36	peak	P	
4	0.2850	45.30	10.04	55.34	60.67	-5.33	peak	P	
5	0.5280	26.25	10.05	36.30	46.00	-9.70	AVG	P	
6	0.5639	34.97	10.05	45.02	56.00	-10.98	peak	P	
7	0.9960	17.76	10.06	27.82	46.00	-18.18	AVG	P	
8	2.0760	13.61	10.08	23.69	46.00	-22.31	AVG	P	
9	6.4140	8.89	10.27	19.16	50.00	-30.84	AVG	P	
10	7.1970	21.24	10.30	31.54	60.00	-28.46	peak	P	
11	29.0670	16.67	10.73	27.40	60.00	-32.60	peak	P	
12	29.6160	5.31	10.74	16.05	50.00	-33.95	AVG	P	

Remark: Level(dBuV)=Reading(dBuV) + Factor(dB)
Margin=Level(dBuV/m)-Limit(dBuV/m)

3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

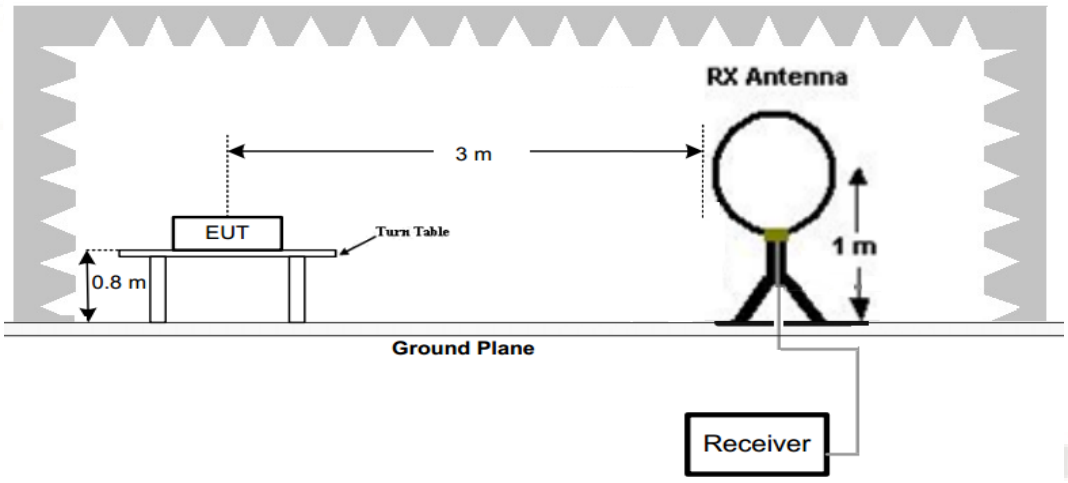
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

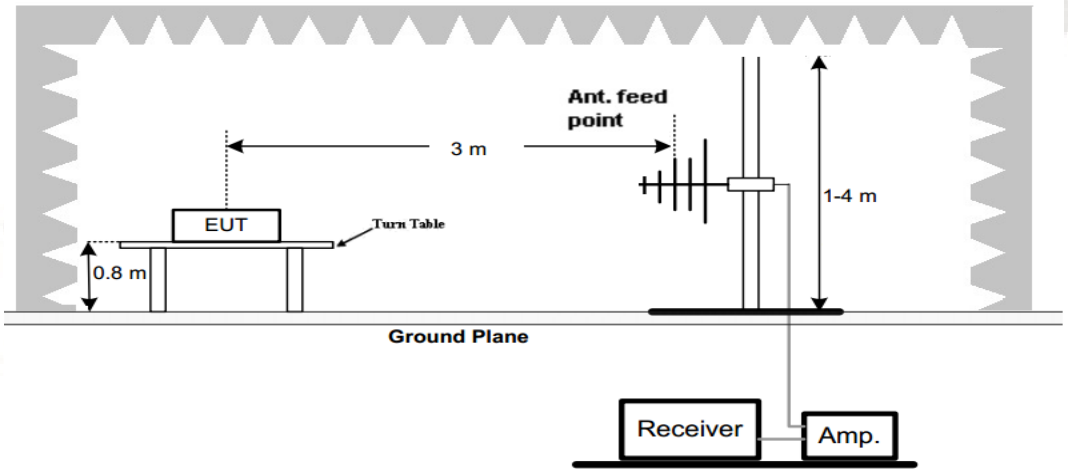
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

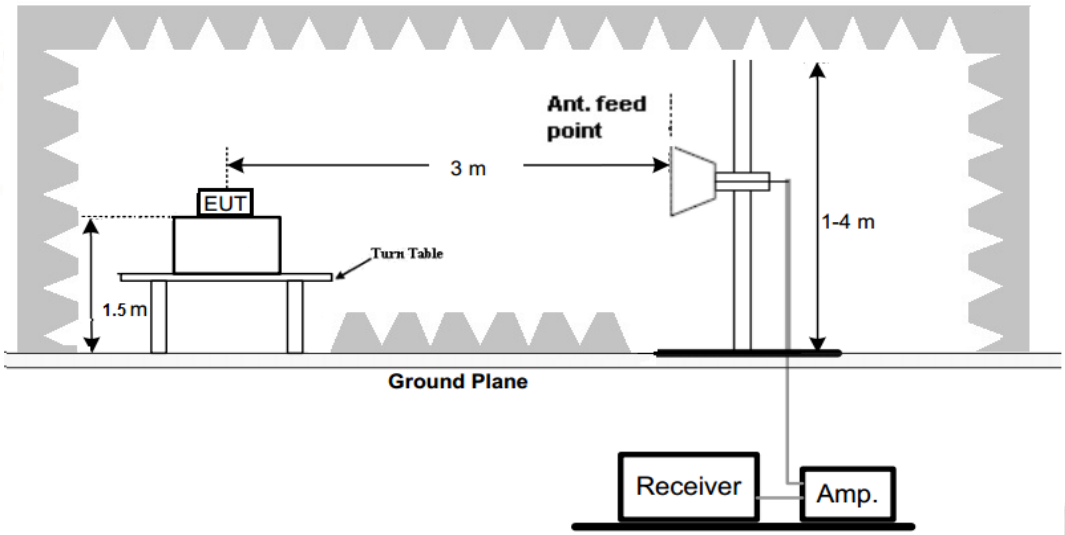
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

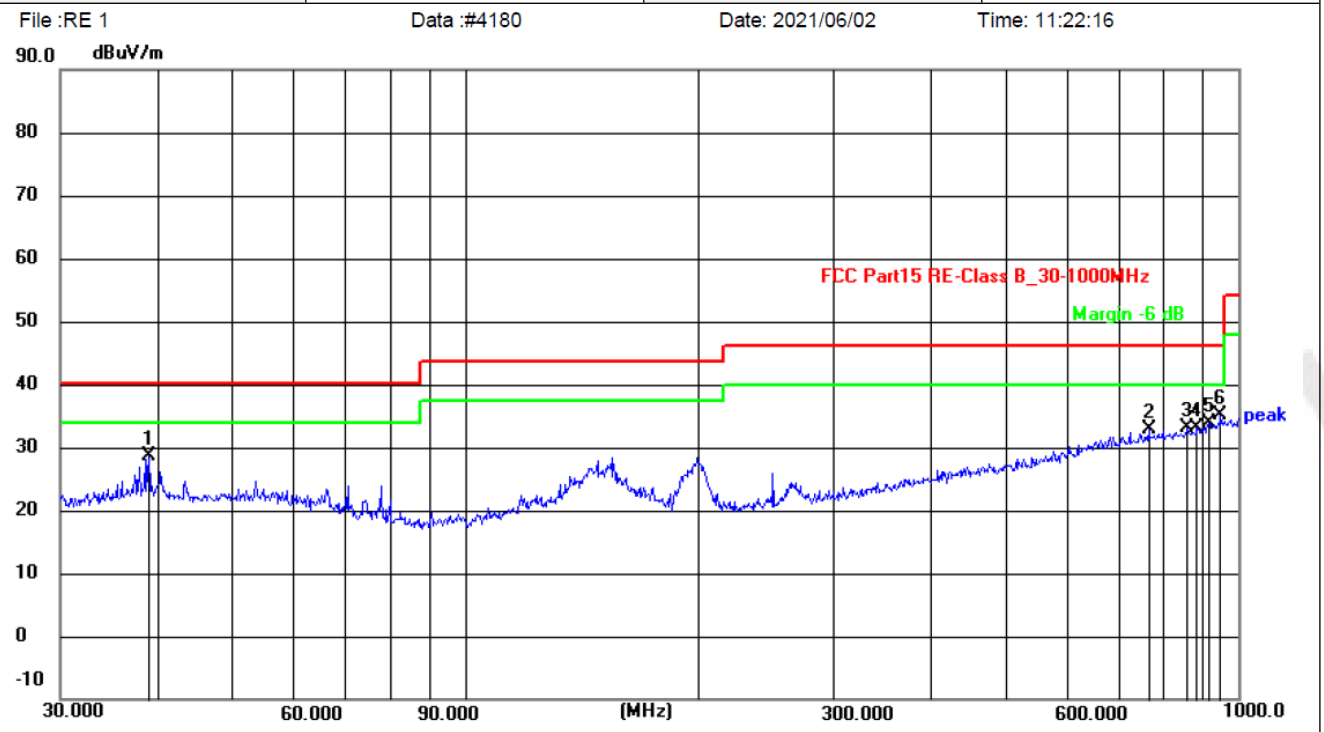
TEST RESULTS

Temperature	22.8℃	Humidity	56%
Test Engineer	Gary Gao	Configurations	WLAN5G

Remark:
1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and The emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.
3. For below 1GHz measurement, all three channels (lowest/middle/highest) of each mode were tested and recorded worst case at 802.11b low channel.
4. For above 1GHz measurement, all three channels (lowest/middle/highest) of each mode were tested and recorded worst case at 802.11n20 MIMO mode.

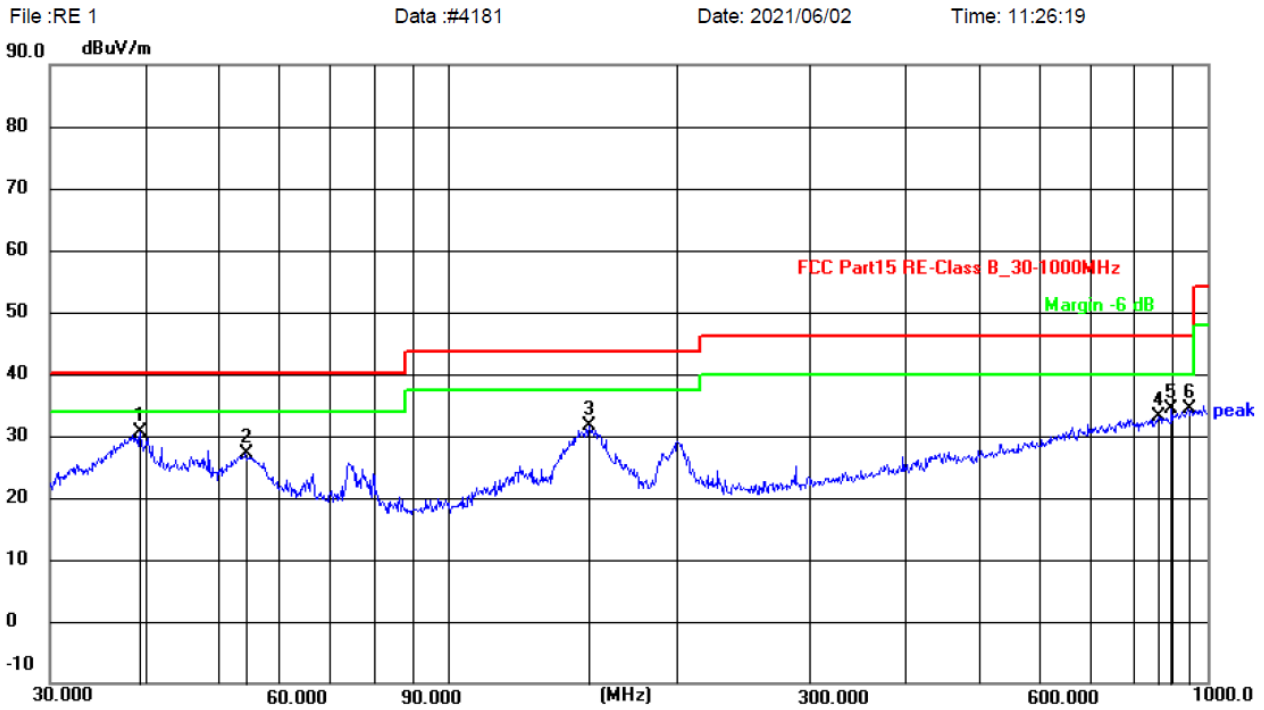
For 30MHz-1GHz

Test mode:	WIFI	Polarization:	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.0244	43.88	-15.26	28.62	40.00	-11.38	peak	300	8	P	
2	766.0571	38.27	-5.47	32.80	46.00	-13.20	peak	200	265	P	
3	860.0351	37.35	-4.31	33.04	46.00	-12.96	peak	300	101	P	
4	884.5028	37.03	-3.91	33.12	46.00	-12.88	peak	100	160	P	
5	916.0686	37.34	-3.36	33.98	46.00	-12.02	peak	300	105	P	
6	948.7609	38.16	-2.94	35.22	46.00	-10.78	peak	200	314	P	

Test mode:	WIFI	Polarization:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.4371	45.93	-15.21	30.72	40.00	-9.28	peak	100	352	P	
2	54.2610	42.72	-15.71	27.01	40.00	-12.99	peak	100	17	P	
3	153.7385	44.54	-13.03	31.51	43.50	-11.99	peak	100	188	P	
4	863.0562	37.31	-4.26	33.05	46.00	-12.95	peak	300	38	P	
5	896.9965	37.95	-3.69	34.26	46.00	-11.74	peak	100	11	P	
6	942.1305	37.45	-3.01	34.44	46.00	-11.56	peak	200	95	P	

Remark: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)
Margin= Level(dBuV/m)-Limit(dBuV/m)

For 1GHz to 25GHz

Frequency(MHz):			2412		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	44.52	PK	74	29.48	39.74	33.71	6.98	35.91	4.78
4824.00	--	AV	54	--	--	--	--	--	--
6420.00	47.68	PK	74	26.32	39.07	35.18	8.23	34.80	8.61
6420.00	--	AV	54	--	--	--	--	--	--
7236.00	49.75	PK	74	24.25	37.87	37.61	9.25	34.98	11.88
7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2412		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	45.65	PK	74	28.35	40.87	33.71	6.98	35.91	4.78
4824.00	--	AV	54	--	--	--	--	--	--
5648.00	46.88	PK	74	27.12	39.17	34.78	7.39	34.46	7.71
5648.00	--	AV	54	--	--	--	--	--	--
7236.00	50.21	PK	74	23.79	38.33	37.61	9.25	34.98	11.88
7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2437		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	45.05	PK	74	28.95	40.27	33.71	6.98	35.91	4.78
4874.00	--	AV	54	--	--	--	--	--	--
5476.00	47.11	PK	74	26.89	39.47	34.75	7.30	34.40	7.64
5476.00	--	AV	54	--	--	--	--	--	--
7311.00	48.54	PK	74	25.46	36.66	37.61	9.25	34.98	11.88
7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2437		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	46.25	PK	74	27.75	41.47	33.71	6.98	35.91	4.78
4874.00	--	AV	54	--	--	--	--	--	--
5366.00	48.11	PK	74	25.89	40.53	34.71	7.24	34.36	7.58
5366.00	--	AV	54	--	--	--	--	--	--
7311.00	50.07	PK	74	23.93	38.19	37.61	9.25	34.98	11.88
7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2462		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	44.25	PK	74	29.75	39.47	33.71	6.98	35.91	4.78
4924.00	--	AV	54	--	--	--	--	--	--
5531.00	46.21	PK	74	27.79	38.55	34.76	7.33	34.42	7.66
5531.00	--	AV	54	--	--	--	--	--	--
7386.00	50.68	PK	74	23.32	38.80	37.61	9.25	34.98	11.88
7386.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2462		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	45.87	PK	74	28.13	41.09	33.71	6.98	35.91	4.78
4924.00	--	AV	54	--	--	--	--	--	--
7295.00	46.89	PK	74	27.11	35.29	37.39	9.22	35.00	11.60
7295.00	--	AV	54	--	--	--	--	--	--
7386.00	51.05	PK	74	22.95	39.17	37.61	9.25	34.98	11.88
7386.00	--	AV	54	--	--	--	--	--	--

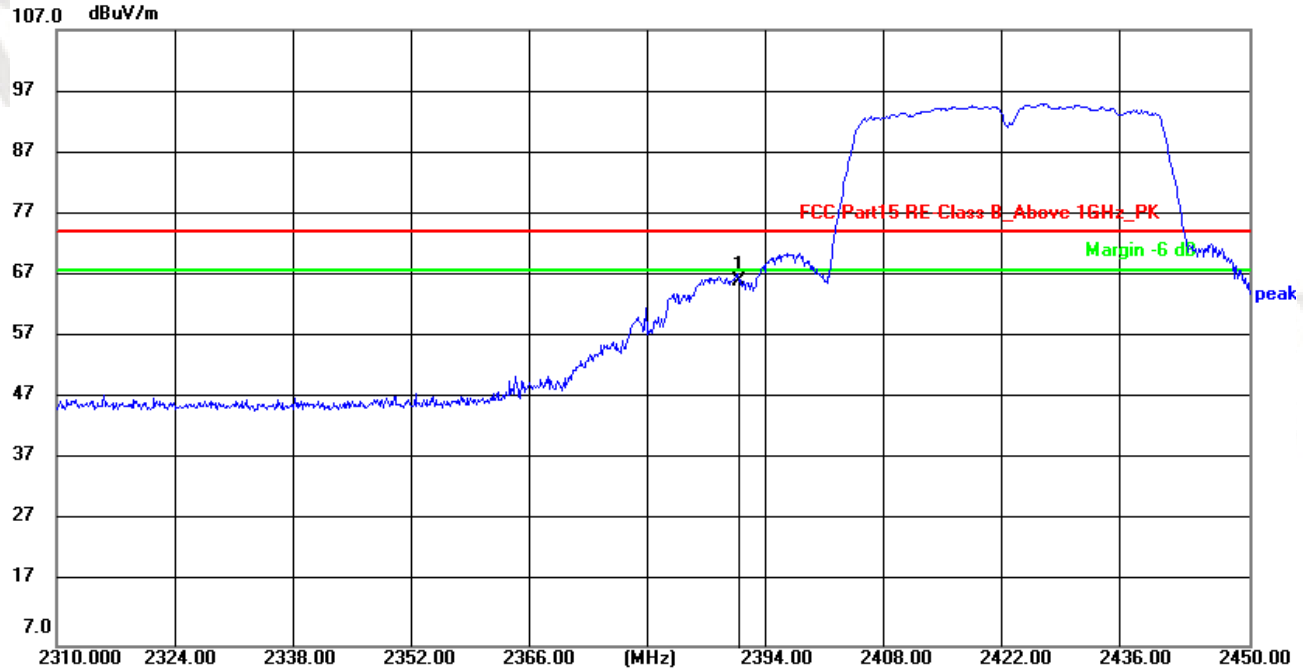
REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Results of Band Edges Test (Radiated)

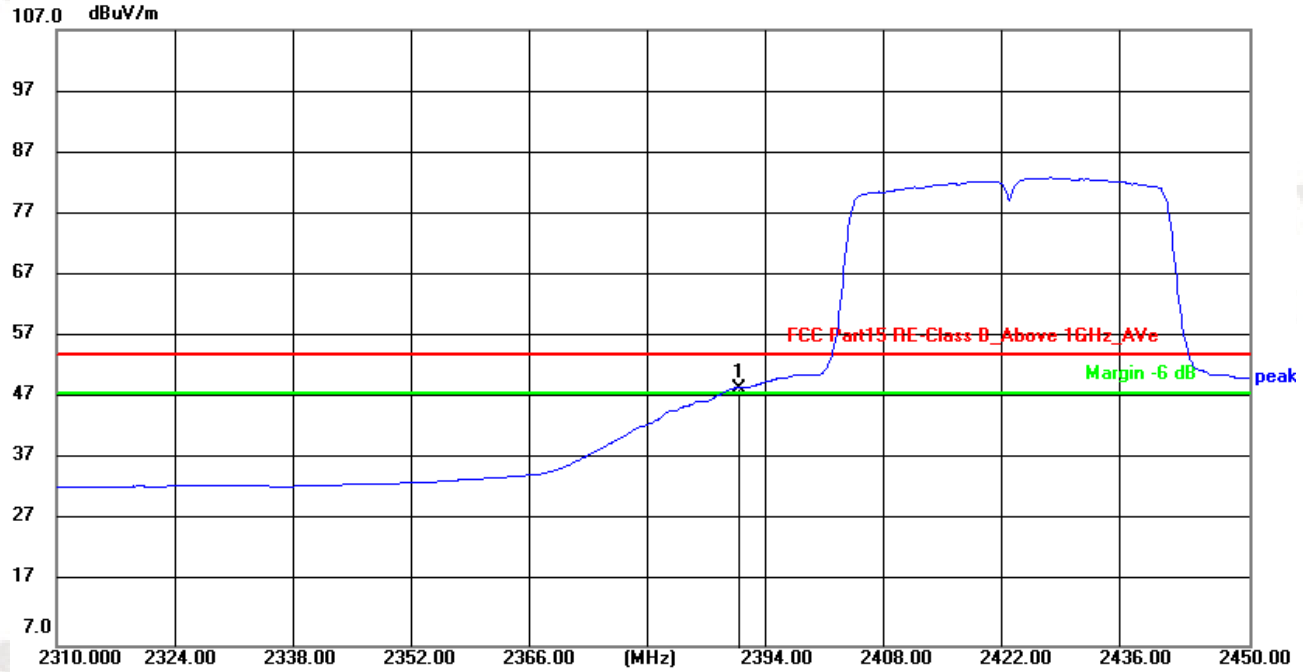
Note: 802.11b/802.11g/802.11n (H20) /802.11n (H40) all have been tested, only worse case 802.11n40 is reported.

Test frequency:	2422	Polarization:	Horizontal



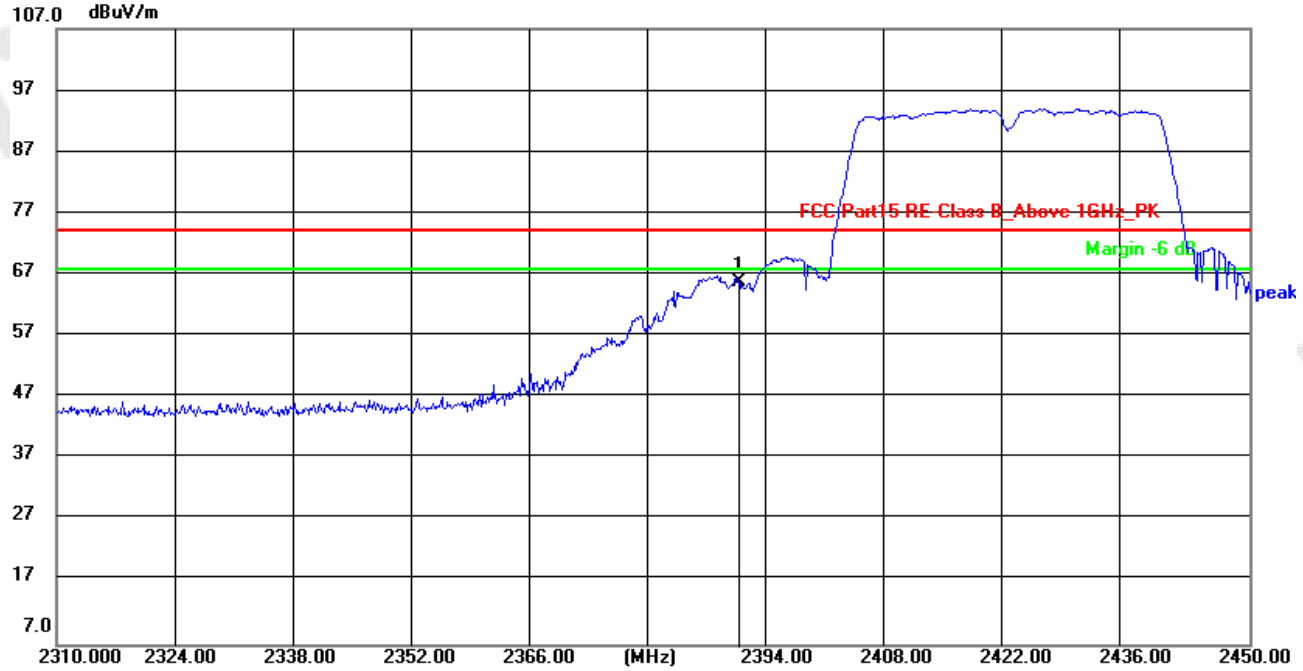
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2390.000	77.01	-10.81	66.20	74.00	-7.80	peak	155	185	PK

Test frequency:	2422	Polarization:	Horizontal



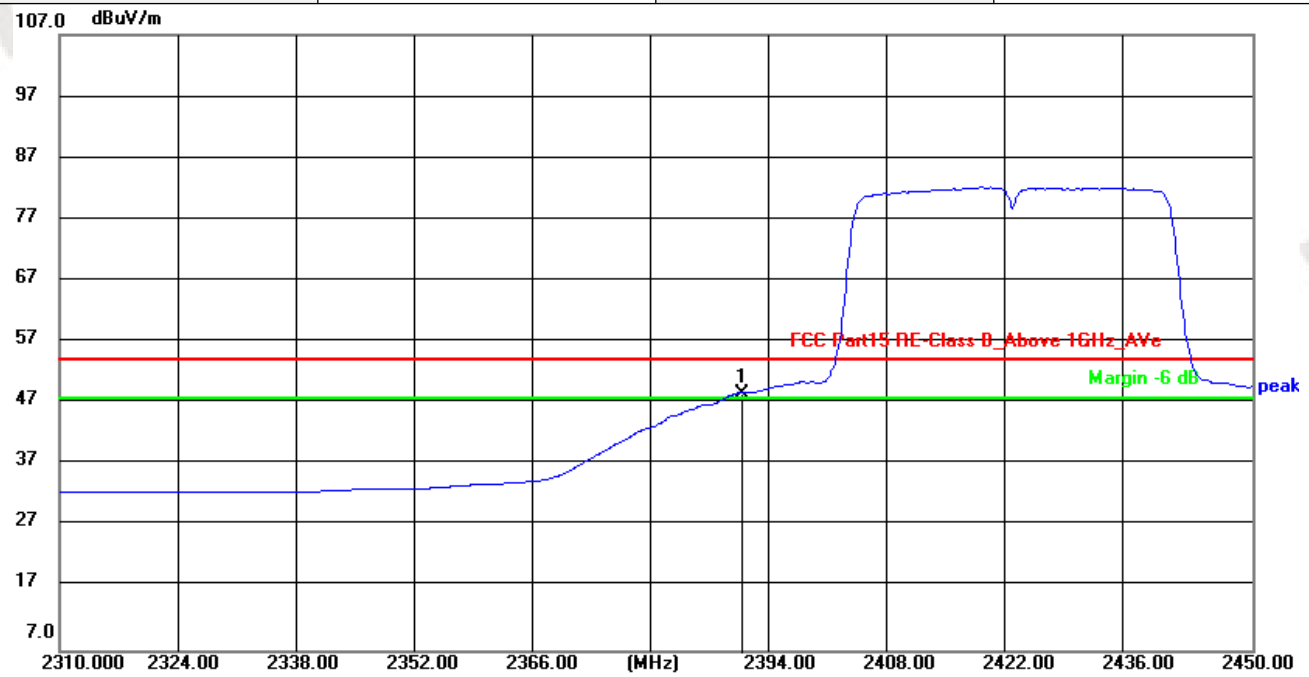
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2390.000	59.72	-10.81	48.91	54.00	-5.09	peak	155	185	AV

Test frequency:	2422	Polarization:	Vertical



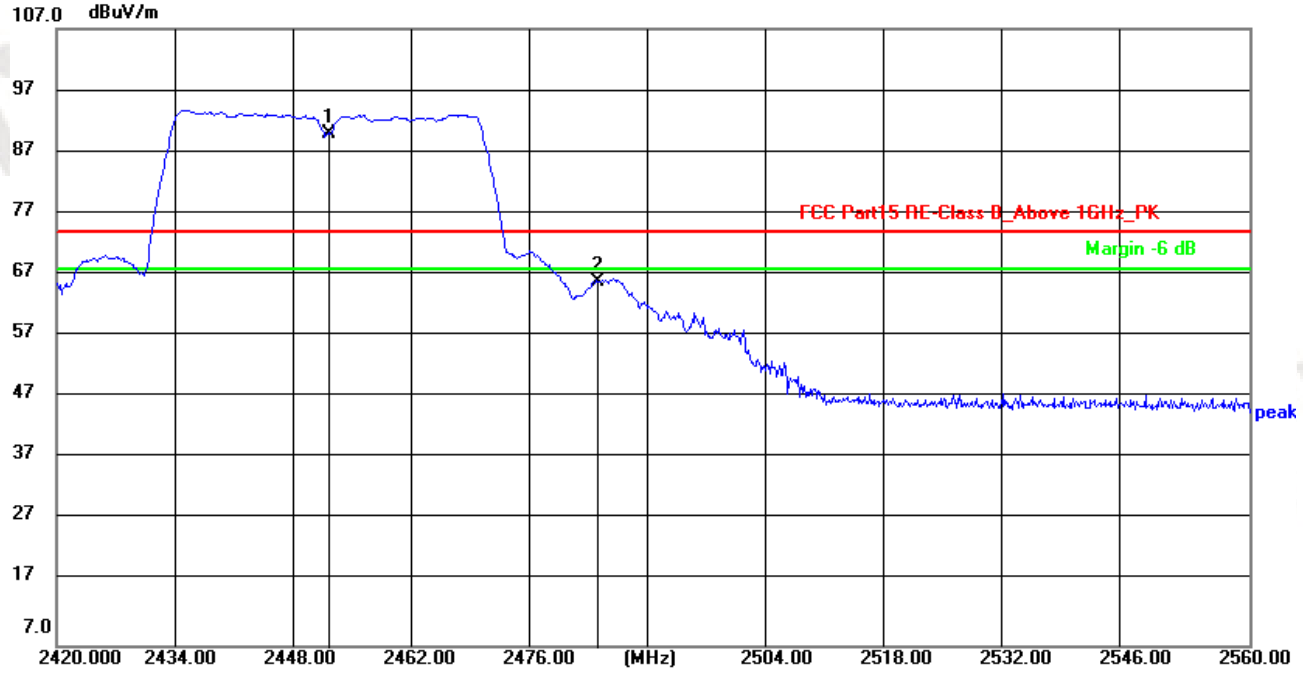
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2390.000	76.72	-10.81	65.91	74.00	-8.09	peak	155	65	PK

Test frequency:	2422	Polarization:	Vertical



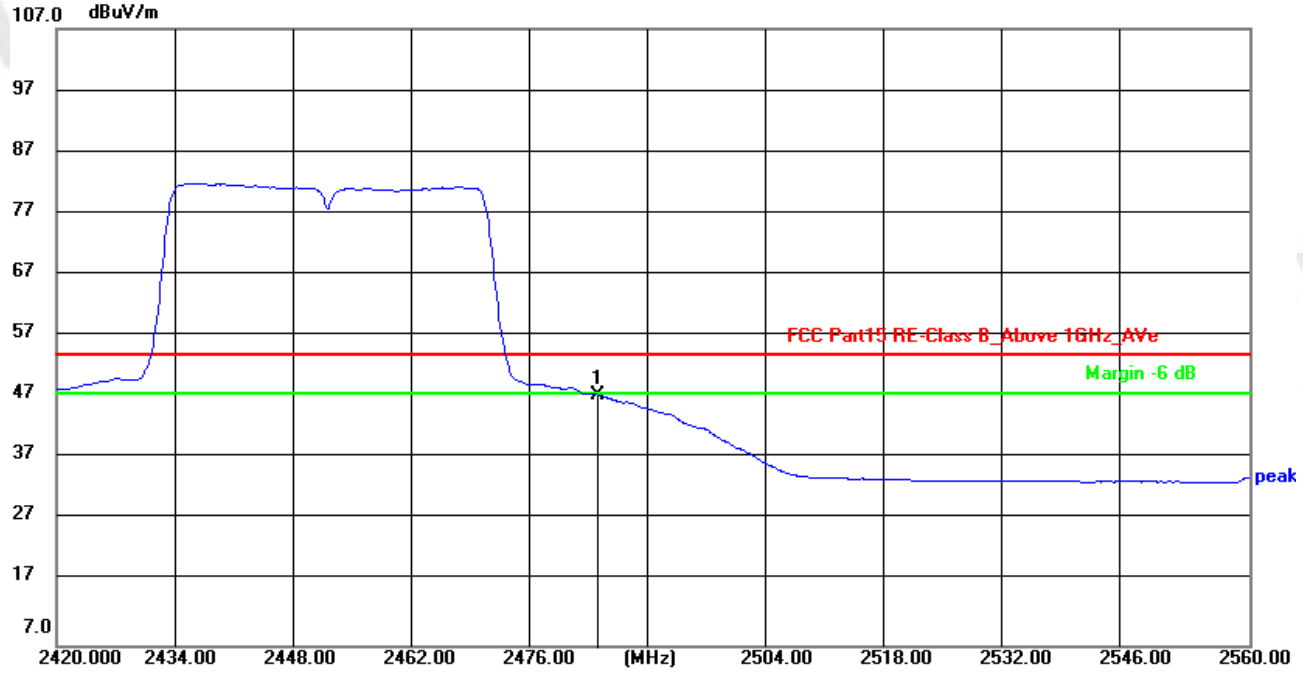
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2390.000	59.72	-10.81	48.91	54.00	-5.09	peak	155	65	PK

Test frequency:	2452	Polarization:	Horizontal



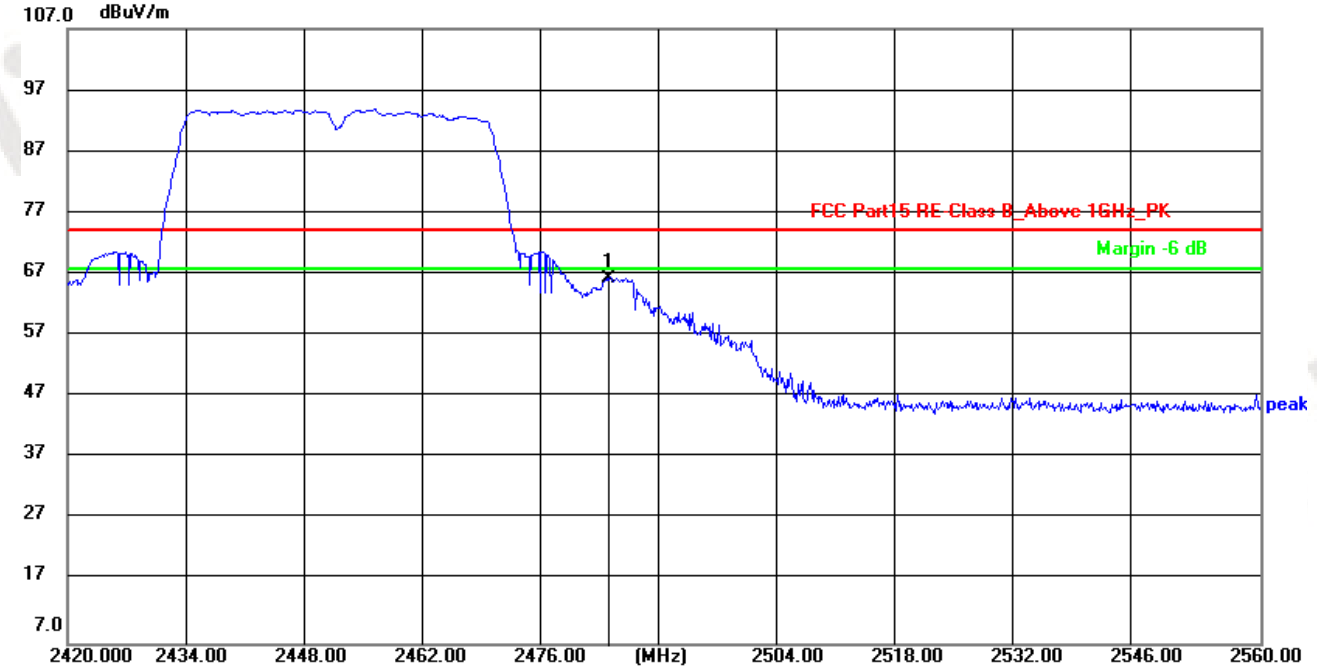
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	2483.500	76.87	-10.82	66.05	74.00	-7.95	peak	155	185	PK

Test frequency:	2452	Polarization:	Horizontal



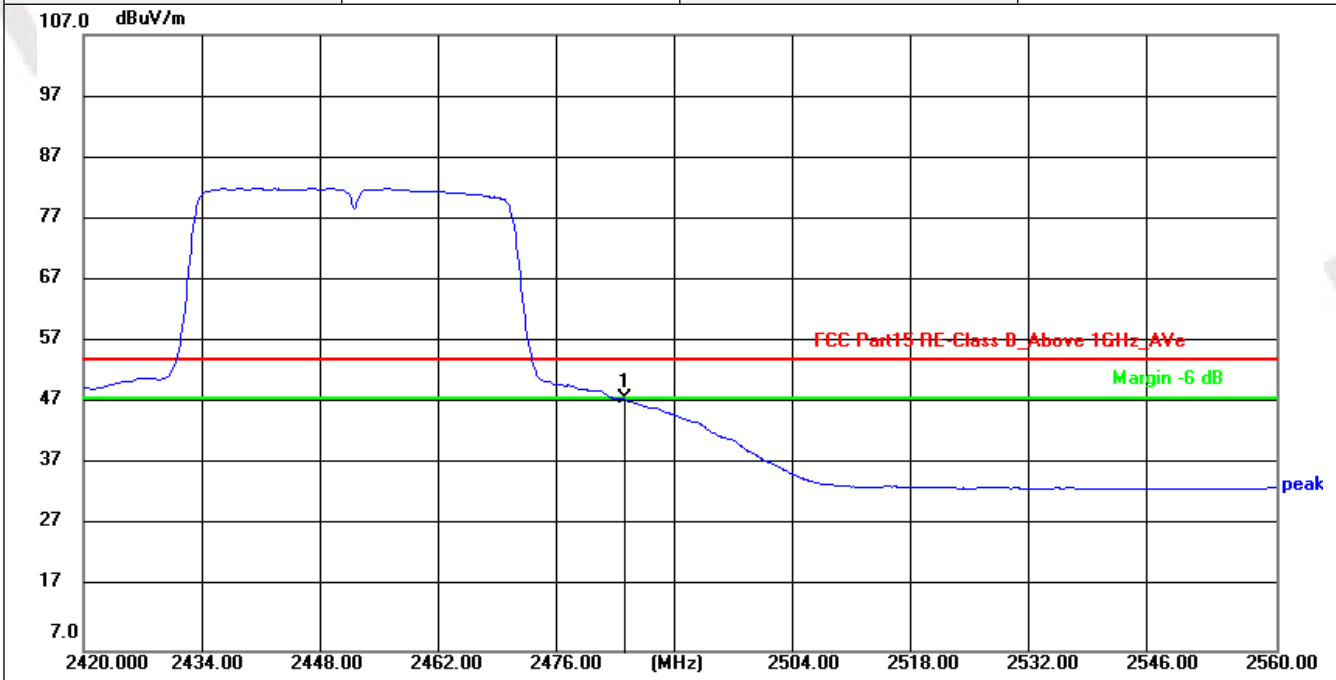
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2483.500	58.62	-10.82	47.80	54.00	-6.20	peak	155	185	AV

Test frequency:	2452	Polarization:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2483.500	77.18	-10.82	66.36	74.00	-7.64	peak	155	65	PK

Test frequency:	2452	Polarization:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1 *	2483.500	58.77	-10.82	47.95	54.00	-6.05	peak	155	65	AV

REMARKS:

1. Level (dBuV/m) =Reading (dBuV)+ Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Level value- Limit value.
4. -- Mean the PK detector measured value is below average limit.

5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

3.3. Maximum Conducted Output Power

Limit

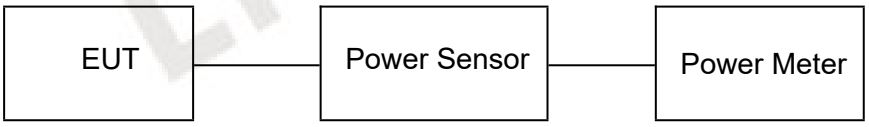
The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power Meter.

Test Configuration



Test Results

Raw data reference to Annex for FCC 2.4G WIFI Appendix C.

3.4. Power Spectral Density

Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration

Test Results

Raw data reference to Annex for FCC 2.4G WIFI Appendix D.

3.5. 6dB Bandwidth

Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

Test Configuration

Test Results

Raw data reference to Annex for FCC 2.4G WIFI Appendix A.

3.6. Out-of-band Emissions

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

Test Configuration

Test Results

Raw data reference to Annex for FCC 2.4G WIFI Appendix F.

3.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c)(1)(i):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

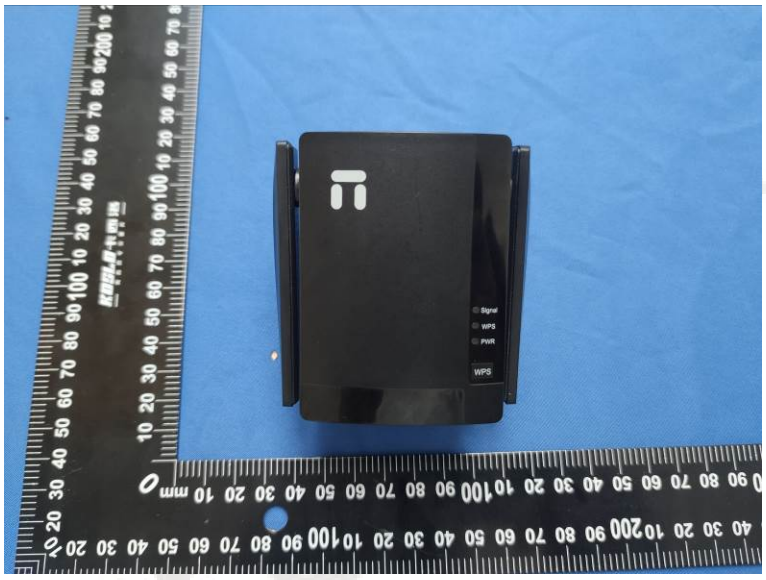
Test Result:

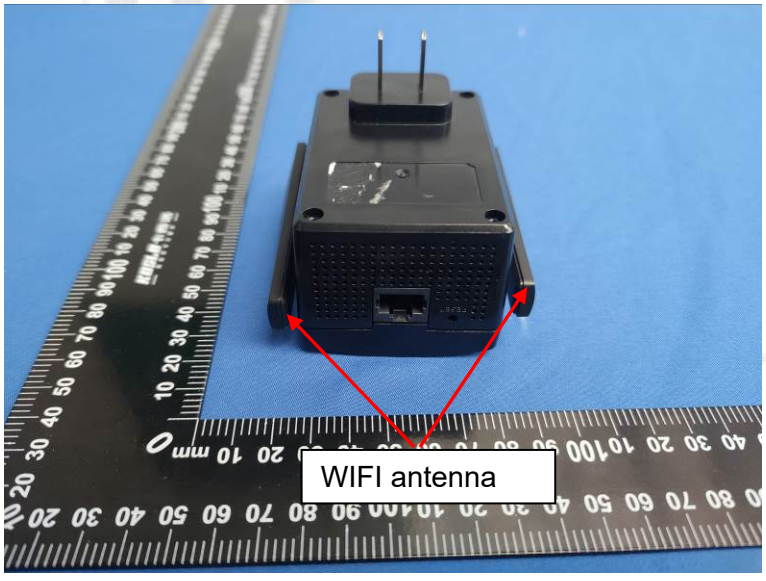
The device used two External Omni antenna, it is soldered on the PCB and the maximum gain is 2dBi with Directional gain 5.01dBi.

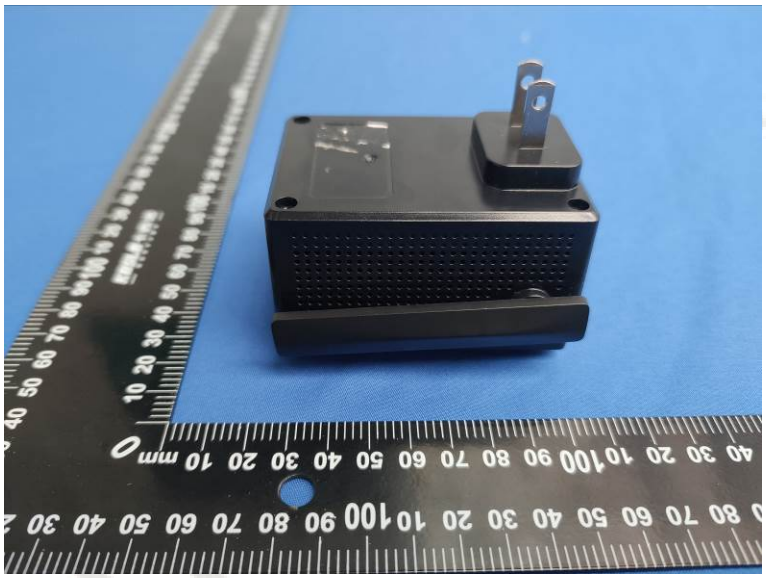
4. Test Setup Photos of the EUT

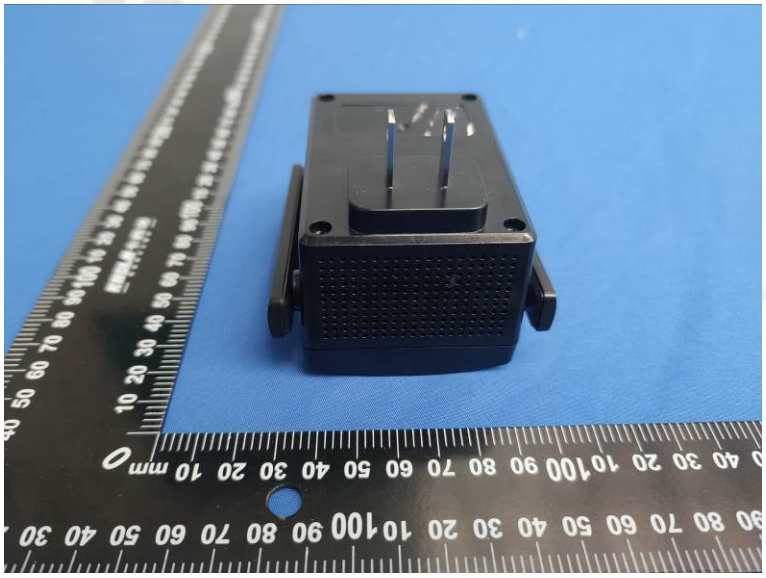
5. Photos of the EUT

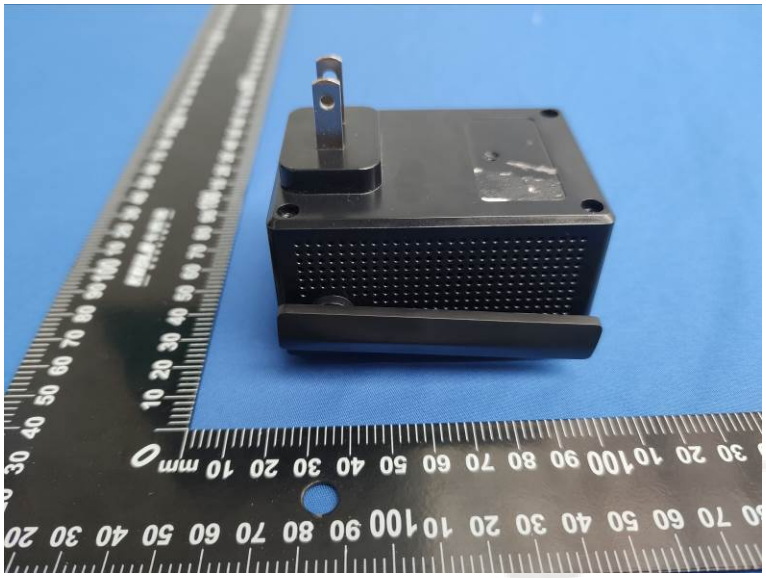
External photos



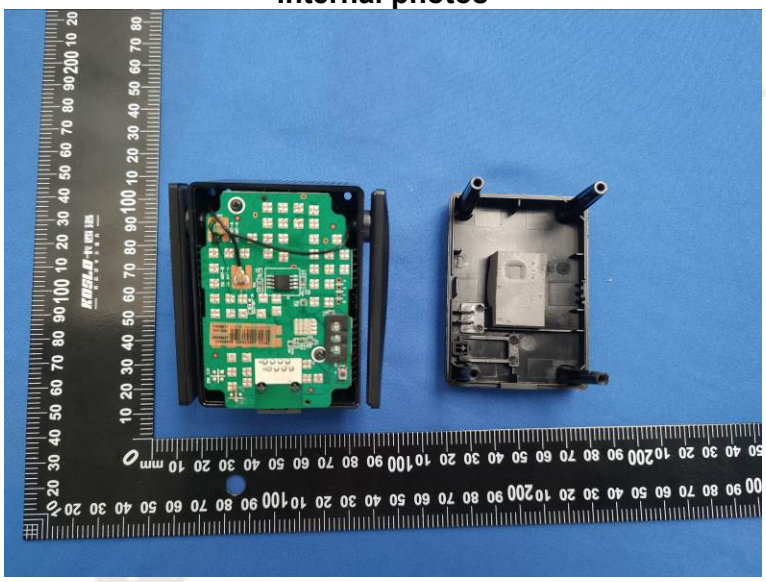


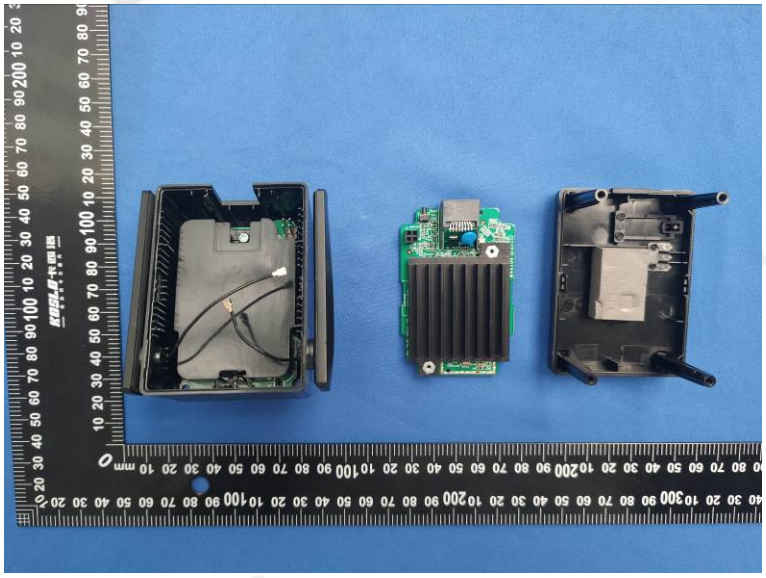


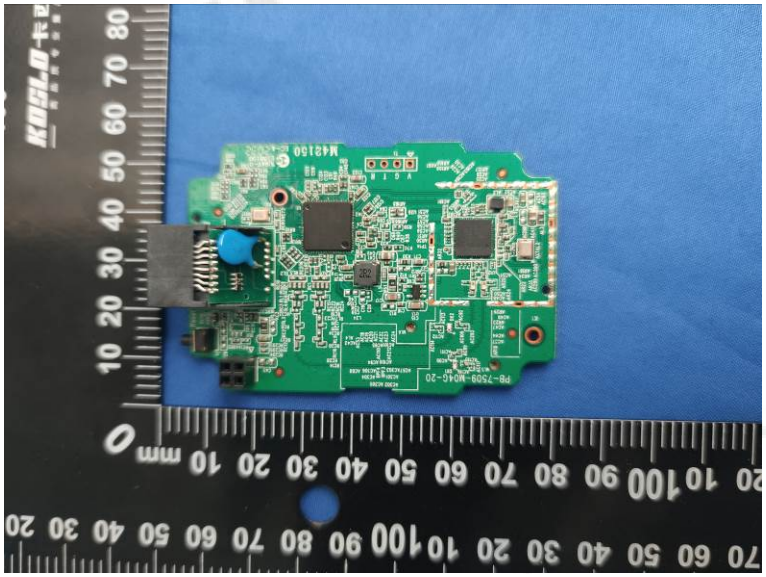


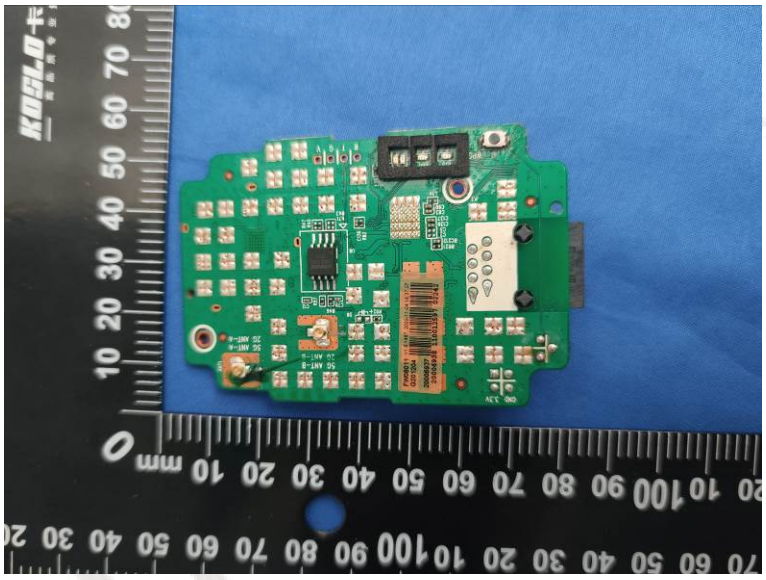


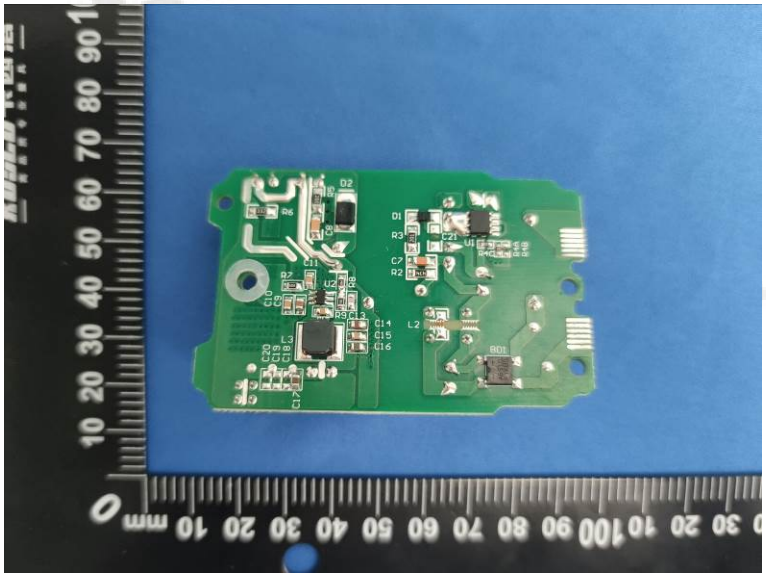
Internal photos

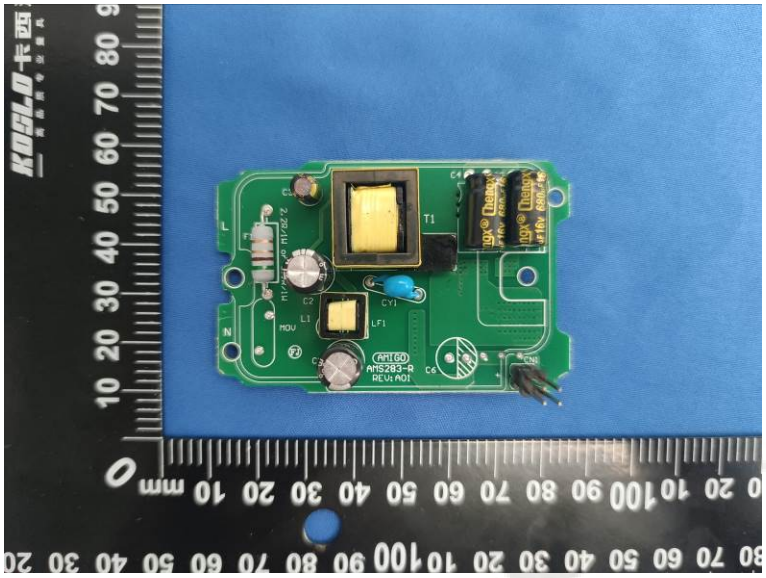












********** End of Report **********