ACCREDITED
CERT #6827.01

FCC Test Report

Client Name	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Client Address	:	Room 301, Building 6, 2013 Chuangye Valley, Henggang Street, Longgang District, Shenzhen
Product Name	:	Wireless Transmitter & Receiver kit
Report Date	:	July 15 2024

Shenzhen Tian Hai Test Technology Co., Ltd.

Tel:+86-755-86615100 Fax:+86-755-86615105 http://www.tianhaitest.com

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TEST REPORT

Applicant	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Manufacturer	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Product Name	:	Wireless Transmitter & Receiver kit
Model No.	:	WTR21,WTR22,WTR23,WTR2X,EP31,EP32,EP33,EP3X （X Representing numbers）
Trade Mark	:	/
Rating(s)	:	/
Test Standard(s)	**:**	**FCC Part15 Subpart E, Paragraph 15.407**
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 Tian Hai Test Technology Co., Ltd 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 Tian Hai Test Technology Co., Ltd 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 FCC Part 15 Subpart E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Tian Hai Test Technology Co., Ltd.

Date of Receipt	June 19, 2024
Date of Test	June 19~ July 15, 2024
Tested by	(Suny Zhuo)
Reviewed by	(Blue Hu)
Approved & Authorized Signer	(Binglee)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	July 15, 2024

1. General Information

1.1. Client Information

Applicant	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Address	:	Room 301, Building 6, 2013 Chuangye Valley, Henggang Street, Longgang District, Shenzhen
Manufacturer	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Address	:	Room 301, Building 6, 2013 Chuangye Valley, Henggang Street, Longgang District, Shenzhen
Factory	:	Lexiangzhe Technology (Shenzhen) Co., LTD
Address	:	Room 301, Building 6, 2013 Chuangye Valley, Henggang Street, Longgang District, Shenzhen

1.2. Description of Device (EUT)

Product Name	:	Wireless Transmitter & Receiver kit
Model No.	:	WTR21,WTR22,WTR23,WTR2X,EP31,EP32,EP33,EP3X （X Representing numbers） (All samples are the same except the Model No, so we prepare "WTR21" for test only.)
Trade Mark	:	/
Test Power Supply	:	INPUT :100-240V/50-60Hz OUTPUT:DC 5V
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
TPC Function	:	☐ With TPC ☒ Without TPC
DFS Type	:	☒ Slave without radar detection ☐ Slave with radar detection ☐ Master
		☒ Wi-Fi 5.8G: 5725~5850MHz

		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 (BPSK, QPSK, 16QAM, 64QAM) ☒ 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	:	PCB Antenna
Antenna Gain(Peak)	:	2dBi (Provided by customer)
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) The power supply voltage shall be determined by the customer and communicated with the seller to confirm that it can be used normally in the United States		

1.3. Auxiliary Equipment Used During Test

Description	Model	Manufacturer
Laptop computer	Inspiron 3501	DELL
Flat Panel Monitor	S2721QS	DELL
Adapter	MDY-11-EF	MI
Adapter	K24-09	PLSEN

1.4. Description of Test Configuration

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Frequency Band	Mode	Test channel	Frequency (MHz)
5.8GHz	OFDM 802.11a/n(HT20) /ac(VHT20)	CH 149	5745MHz
		CH 157	5785MHz
		CH 165	5825MHz

Note:

1. The measurements are performed at the highest, middle, lowest available channels.
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω, Cable Loss: 1.2 dB
4. The EUT was programmed to be in continuously transmitting mode.
5. Guidance On Directional Gain Calculations

(i) If *any* transmit signals are *correlated* with each other,
Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi

(ii) If *all* transmit signals are *completely uncorrelated* with each other,
Directional gain = G_{ANT}

The device belongs to Class ii Directionalgain = G_{ANT}

1.5. Test Equipment List

Conducted Emission				
Kind of Equipment	Manufacturer	Type	S/N	Calibrate until
EMI Test Receiver	R&S	ESR7	102333	2024-11-13
L.I.S.N	Schwarzbeck	NNLK 8128	5089	2024-11-13
8-Wire ISN CAT6	Schwarzbeck	NTFM 8158	231	2024-11-13
Pulse Limiter	Schwarzbeck	VTSD 9561-F	847	2024-11-13
Test software	FALA	/	EMC-CON 3A1.1	/
Radiated Emission (3m)				
EMI Test Receiver	R&S	ESR7	102333	2024-11-13
MXA Signal Analyzer	Keysight	N9020A	MY51281805	2025-04-22
Bilog Antenna	Schwarzbeck	VULB 9168	01148	2024-11-15
Pre-Amplifier	Schwarzbeck	BBV 9718 B	00109	2024-11-13
Pre-Amplifier	Schwarzbeck	BBV 9743 B	00253	2024-11-13
Pre-Amplifier	GUANGGU ELECTRONIC	GLNA18-40GK-5 372	20210331001	2024-11-20
Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00148	2024-11-20
Horn Antenna	Schwarzbeck	BBHA 9120	02379	2024-11-14
Horn Antenna	A-INFO	LB-180400-KF	J258792	2024-11-20
Test software	FALA	/	FA-03A2 RE	/
RF Test System				
Wideband radio communication tester	R&S	CMW500	131134	2025-04-22
EXA Signal Analyzer	Keysight	N9010A	MY54488841	2025-04-22
MXG Vector Signal Generator	Agilent	N5182B	MY59100603	2025-04-22
Signal Generator	R&S	SMB100A	113650	2025-04-22
RF control unit	Tonscend	JS0806-2	21C8060397	/
DC Power supply	Agilent	E3632A	MY50120052	/
RF test system	Tonscend	/	V2.6.88.0346	/

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1.6. Measurement Uncertainty

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	±2.52 dB ±2.36 dB	±3.80 dB ±3.40 dB
Radiated Emission	Level accuracy (30MHz to 1000MHz)	±5.78 dB	±6.3 dB
	Level accuracy (above 1000MHz)	±4.62 dB	N/A

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.
(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
(3) The measurement uncertainty is not included in the test result.

1.7. Description of Test Facility

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

FCC-Registration No.: 173438

Shenzhen Tian Hai Test 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 No. 173438

Test Location

Shenzhen Tian Hai Test Technology Co., Ltd.
125-126, No.66, Zhangge Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, China

2. Summary of Test Results

Standard	Test Type	Result
15.207 & 15.407(b)	Conducted Emission	PASS
15.205 & 15.209	Spurious Emission	PASS
15.407(b)	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)	Peak Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.203	Antenna Requirement	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

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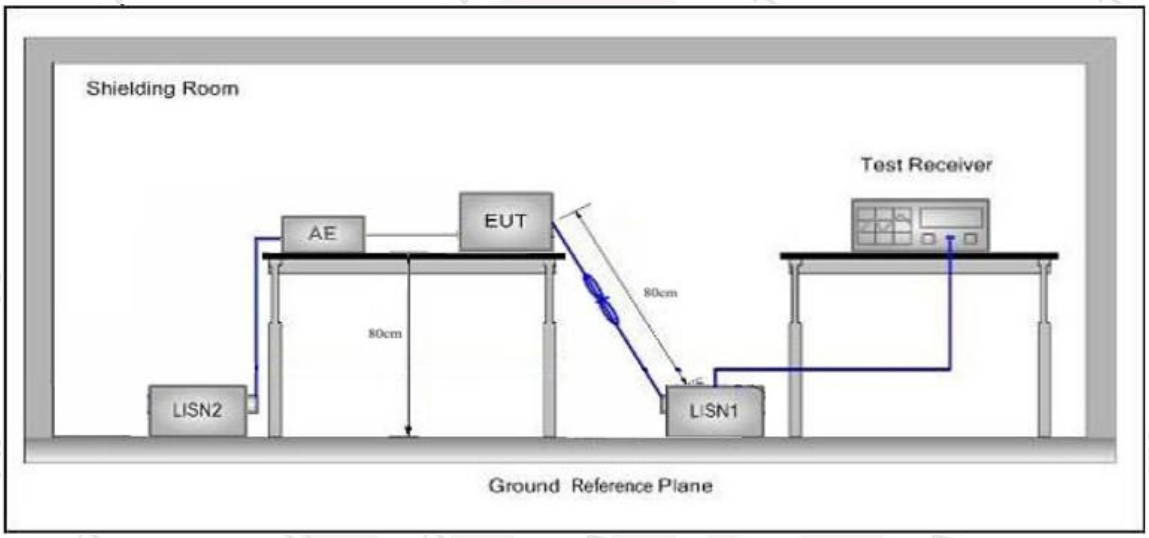
3. Conducted Emission Test

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

PASS

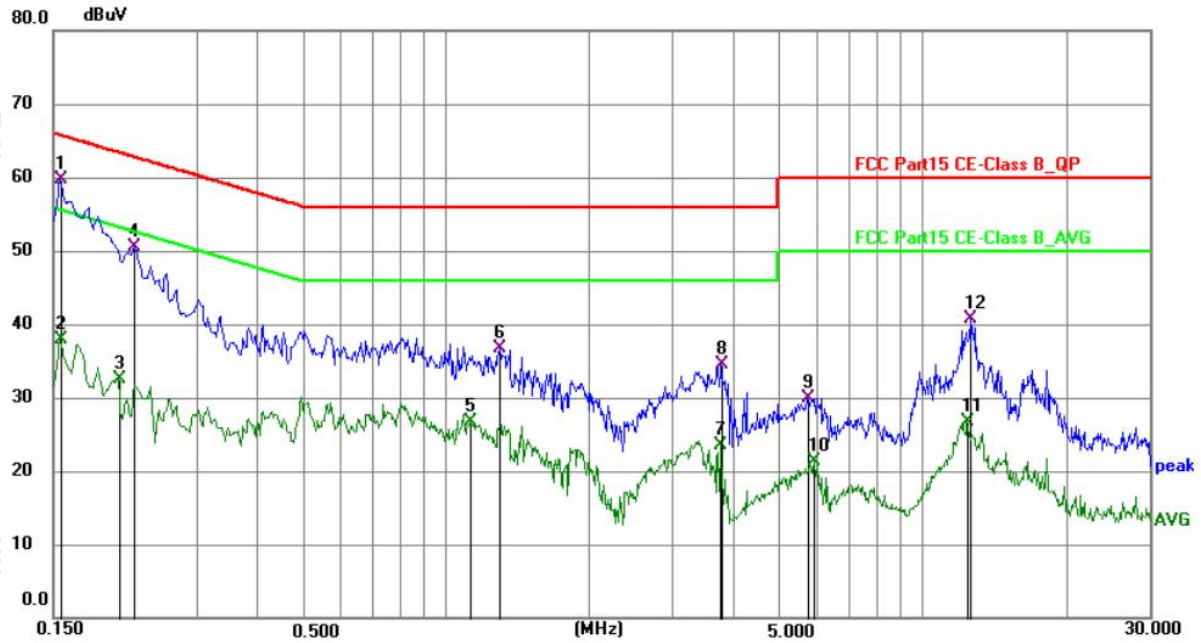
During the test, pre-scan all modes, only the worst case is recorded in the report.

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/60Hz modes, recorded worst case AC 120V/60Hz.

Please to see the following pages.

Conducted Emission Test Data

Test Site:	1# Shielded Room
Operating Condition:	Normal Working
Test Specification:	AC 120V/60Hz
Comment:	Live Line
Temp.(℃)/Hum.(%RH):	22℃/54%RH

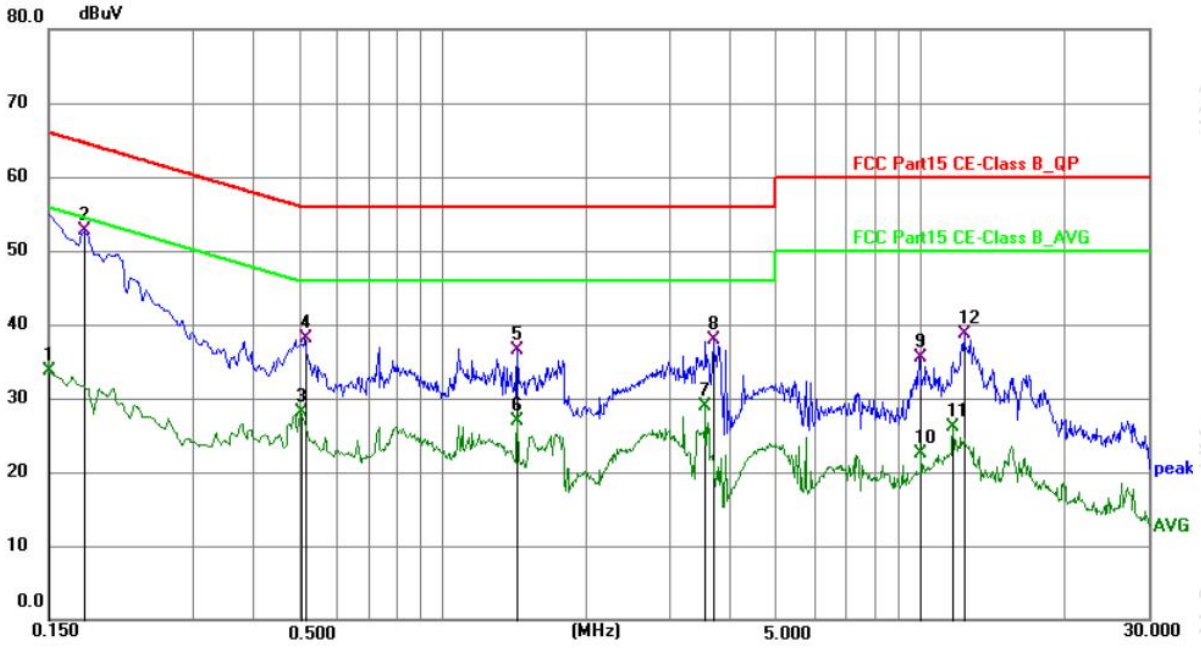


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.1545	49.07	10.59	59.66	65.75	-6.09	QP
2	0.1545	27.31	10.59	37.90	55.75	-17.85	AVG
3	0.2040	21.88	10.56	32.44	53.45	-21.01	AVG
4	0.2220	40.00	10.56	50.56	62.74	-12.18	QP
5	1.1265	15.99	10.64	26.63	46.00	-19.37	AVG
6	1.3020	26.12	10.65	36.77	56.00	-19.23	QP
7	3.7725	12.87	10.72	23.59	46.00	-22.41	AVG
8	3.7815	23.74	10.72	34.46	56.00	-21.54	QP
9	5.7155	19.27	10.72	29.99	60.00	-30.01	QP
10	5.9405	10.64	10.72	21.36	50.00	-28.64	AVG
11	12.4165	15.89	10.90	26.79	50.00	-23.21	AVG
12	12.5875	29.80	10.89	40.69	60.00	-19.31	QP

Note: Result = Reading + Factor Over Limit = Result - Limit

Conducted Emission Test Data

Test Site:	1# Shielded Room
Operating Condition:	Normal Working
Test Specification:	AC 120V/60Hz
Comment:	Neutral Line
Temp.(℃)/Hum.(%RH):	22℃/54%RH



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	23.10	10.59	33.69	56.00	-22.31	AVG
2 *	0.1770	42.10	10.57	52.67	64.63	-11.96	QP
3	0.5055	17.54	10.64	28.18	46.00	-17.82	AVG
4	0.5144	27.45	10.64	38.09	56.00	-17.91	QP
5	1.4370	25.87	10.65	36.52	56.00	-19.48	QP
6	1.4370	16.24	10.65	26.89	46.00	-19.11	AVG
7	3.5520	18.15	10.82	28.97	46.00	-17.03	AVG
8	3.6825	27.16	10.82	37.98	56.00	-18.02	QP
9	9.9635	24.50	10.94	35.44	60.00	-24.56	QP
10	10.0675	11.57	10.94	22.51	50.00	-27.49	AVG
11	11.6875	15.20	10.98	26.18	50.00	-23.82	AVG
12	12.3400	27.63	11.00	38.63	60.00	-21.37	QP

Note: Result = Reading + Factor Over Limit = Result - Limit

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Radiated Spurious Emission					
Test Standard	FCC Part15 C Section 15.205 & 15.209				
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	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5250-5350MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5470-5725MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
	5725-5850 MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
		1GHz-5.65GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak
		5.65GHz-5.7GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak
		5.7GHz-5.72GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m)	Peak
		5.72GHz-5.725GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m)	Peak
		5.85GHz-5.855GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m	Peak

		5.855GHz-5.875GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
		5.875GHz-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

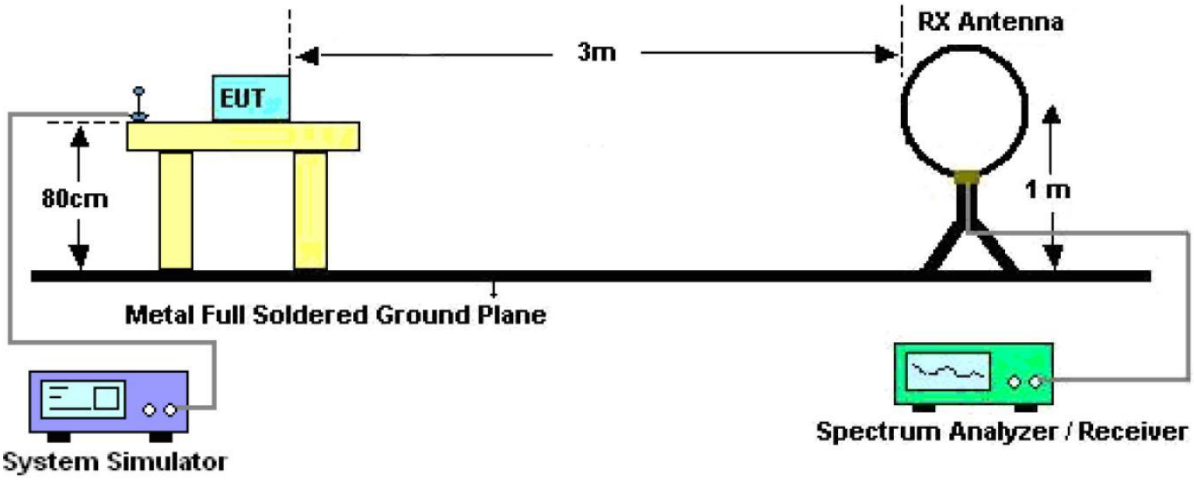


Figure 1. Below 30MHz

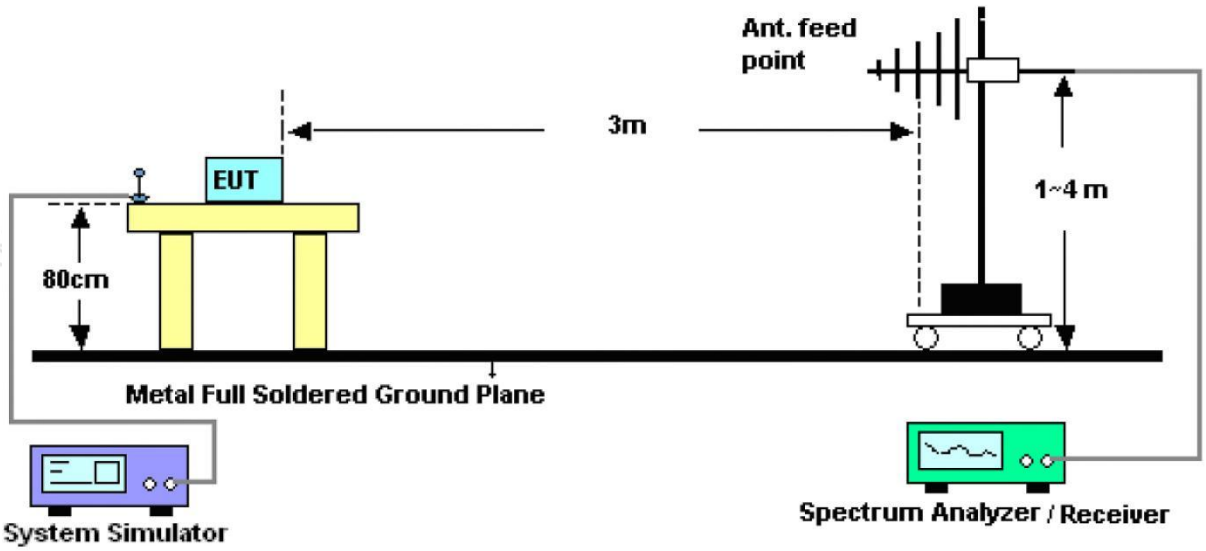


Figure 2. 30MHz to 1GHz

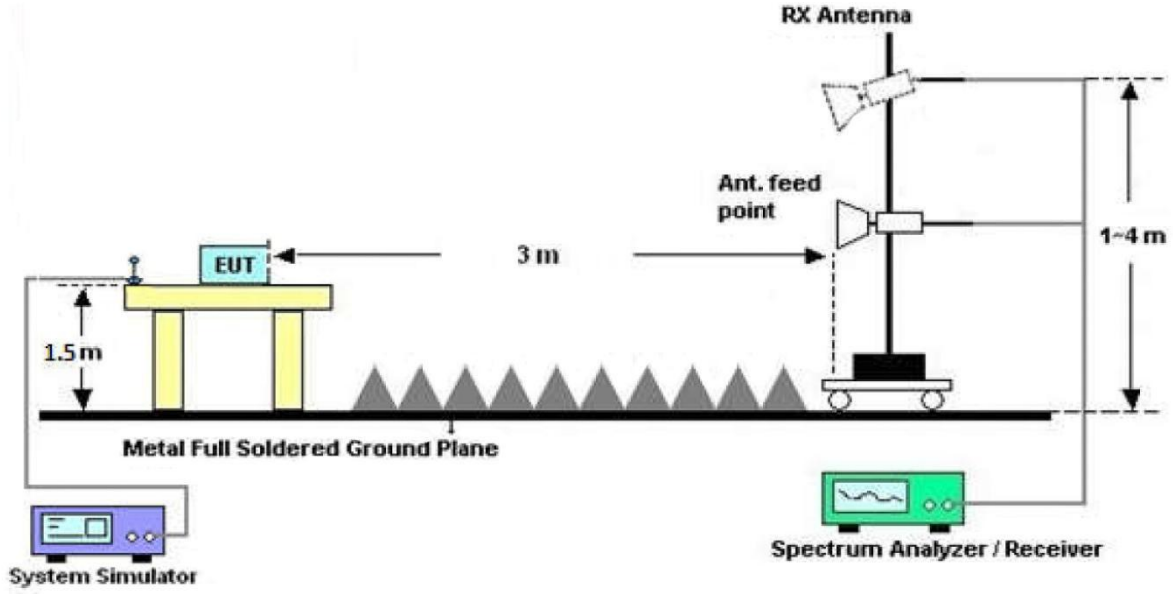


Figure 3. Above 1 GHz

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.

For average measurement:

–VBW=10Hz, When duty cycle is no less than 98 percent

–VBW ⩾ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.4 duty cycle.

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.

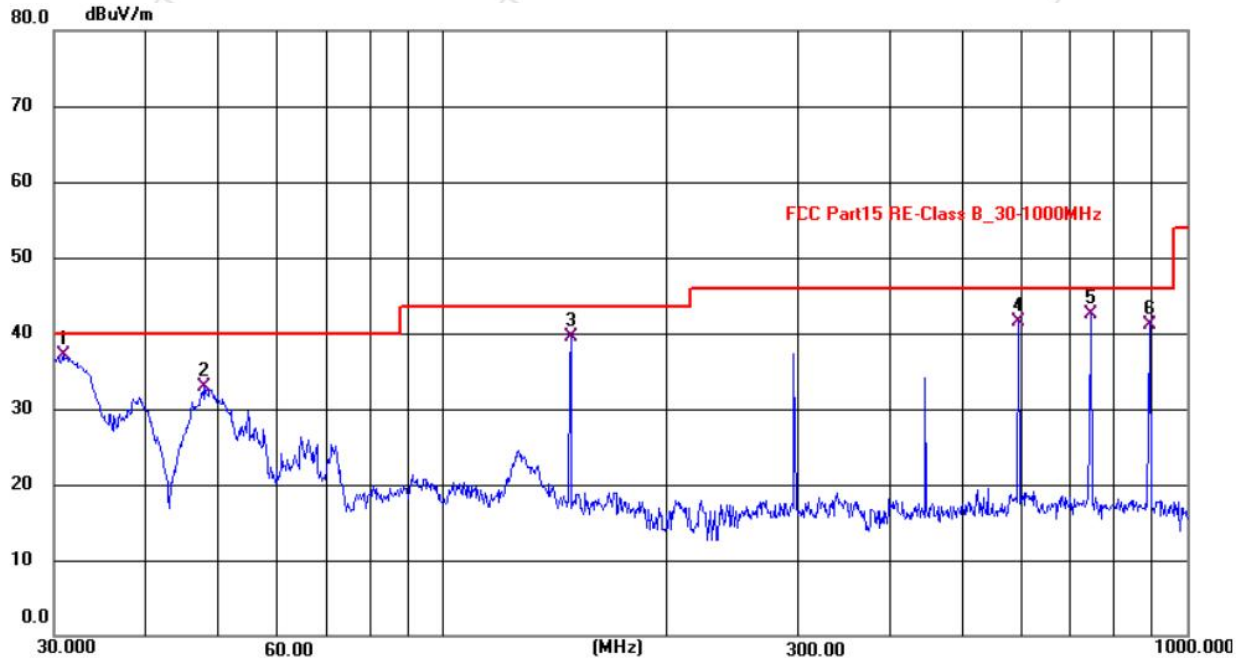
Test Results (30~1000MHz)

Test Mode: Normal Working

Power Source: AC 120V/60Hz

Polarization: Horizontal

Temp.(℃)/Hum.(%RH): 24℃/54%RH



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.8805	52.08	-15.06	37.02	40.00	-2.98	QP
2	47.9519	47.73	-14.82	32.91	40.00	-7.09	QP
3	148.4929	53.51	-14.04	39.47	43.50	-4.03	QP
4	594.0903	48.82	-7.30	41.52	46.00	-4.48	QP
5	742.5190	47.27	-4.69	42.58	46.00	-3.42	QP
6	891.0401	43.91	-2.85	41.06	46.00	-4.94	QP

Note: Result=Reading+Factor Over Limit=Result-Limit

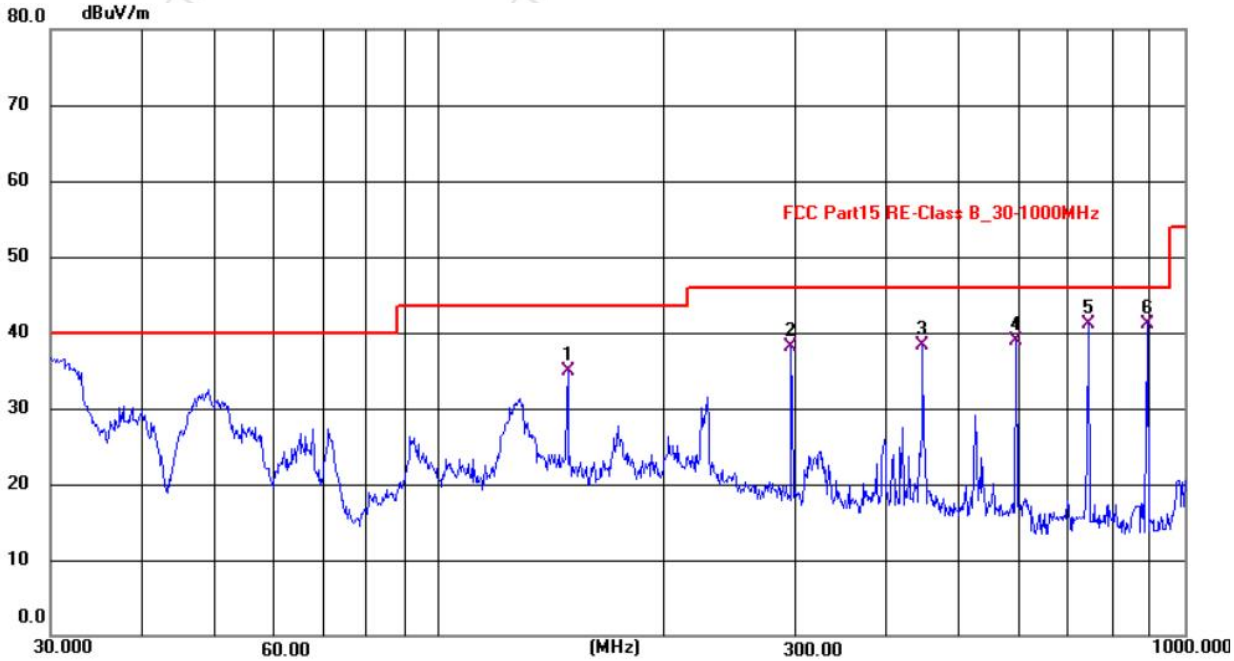
Test Results (30~1000MHz)

Test Mode: Normal Working

Power Source: AC 120V/60Hz

Polarization: Vertical

Temp.(℃)/Hum.(%RH): 24℃/54%RH



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	148.5191	49.81	-14.88	34.93	43.50	-8.57	QP
2	297.0156	52.50	-14.49	38.01	46.00	-7.99	QP
3	445.5538	48.70	-10.38	38.32	46.00	-7.68	QP
4	594.0902	46.23	-7.23	39.00	46.00	-7.00	QP
5	742.5190	45.15	-3.99	41.16	46.00	-4.84	QP
6 *	891.0401	42.83	-1.63	41.20	46.00	-4.80	QP

Note: Result=Reading+Factor Over Limit=Result-Limit

Test Mode: 802.11a for WiFi 5.8G							
Test channel: Low CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11490.00	35.41	26.25	61.66	68.20	-6.54	V	Peak
17235.00	34.11	25.78	59.89	68.20	-8.31	V	Peak
11490.00	37.11	24.45	61.56	68.20	-6.64	H	Peak
17235.00	36.33	26.33	62.66	68.20	-5.54	H	Peak
11490.00	27.11	20.75	47.86	54.00	-6.14	V	AVG
17235.00	26.55	20.14	46.69	54.00	-7.31	V	AVG
11490.00	26.44	21.48	47.92	54.00	-6.08	H	AVG
17235.00	24.85	22.68	47.53	54.00	-6.47	H	AVG
Test channel: Middle CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11570.00	35.21	25.47	60.68	68.20	-7.52	V	Peak
17235.00	36.63	25.47	62.10	68.20	-6.10	V	Peak
11570.00	38.44	24.63	63.07	68.20	-5.13	H	Peak
17235.00	37.11	24.41	61.52	68.20	-6.68	H	Peak
11570.00	24.19	20.39	44.58	54.00	-9.42	V	AVG
17235.00	25.88	20.36	46.24	54.00	-7.76	V	AVG
11570.00	24.11	20.74	44.85	54.00	-9.15	H	AVG
17235.00	26.53	20.67	47.20	54.00	-6.80	H	AVG
Test channel: High CH							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Antenna Pol.	Detector
11650.00	36.99	25.11	62.10	68.20	-6.10	V	Peak
17475.00	35.41	25.15	60.56	68.20	-7.64	V	Peak
11650.00	35.69	24.77	60.46	68.20	-7.74	H	Peak
17475.00	34.44	24.71	59.15	68.20	-9.05	H	Peak
11650.00	27.15	20.44	47.59	54.00	-6.41	V	AVG
17475.00	27.85	20.44	48.29	54.00	-5.71	V	AVG
11650.00	26.35	20.57	46.92	54.00	-7.08	H	AVG
17475.00	25.55	20.53	46.08	54.00	-7.92	H	AVG

Remark:

1. During the testing process, pre scanning was performed on the 802.11a, 802.11n (HT20) modes of 5.8G. It was found that the 802.11a mode was worse, and only this mode was recorded in the report.
2. Result =Reading + Factor

Conducted Measurement:

Please refer to Appendix F of the Appendix Test Data.

Radiated Band Edge: WiFi 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	53.65	9.36	63.01	68.20	-5.19	H	Peak
5725.00	52.26	9.97	62.23	68.20	-5.97	V	Peak
5725.00	37.11	9.55	46.66	54.00	-7.34	H	AVG
5725.00	36.32	9.89	46.21	54.00	-7.79	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	52.33	9.57	61.90	68.20	-6.30	H	Peak
5850.00	53.18	9.63	62.81	68.20	-5.39	V	Peak
5850.00	34.58	9.45	44.03	54.00	-9.97	H	AVG
5850.00	35.66	9.65	45.31	54.00	-8.69	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	51.02	9.36	60.38	68.20	-7.82	H	Peak
5725.00	51.11	9.97	61.08	68.20	-7.12	V	Peak
5725.00	35.62	9.55	45.17	54.00	-8.83	H	AVG
5725.00	36.68	9.89	46.57	54.00	-7.43	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	53.31	9.57	62.88	68.20	-5.32	H	Peak
5850.00	54.11	9.63	63.74	68.20	-4.46	V	Peak
5850.00	35.66	9.45	45.11	54.00	-8.89	H	AVG
5850.00	34.58	9.65	44.23	54.00	-9.77	V	AVG

Remark: 1. Result =Reading + Factor

Conducted Measurement:

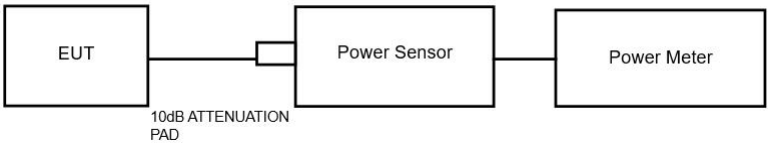
Please refer to Appendix E of the Appendix Test Data.

5. Maximum Peak 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. The Transmitter output (antenna port) was connected to the power meter.

2. Turn on the EUT and power meter and then record the power value.

3. Repeat above procedures on all channels needed to be tested.

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.

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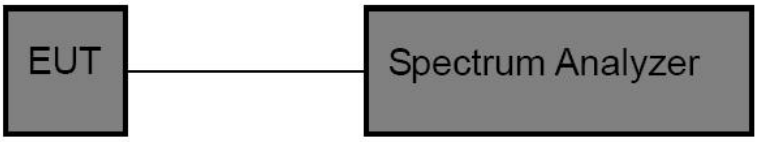
6. 26dB Bandwidth & 99% Occupied Bandwidth Test

6.1. Test Standard and Limit

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

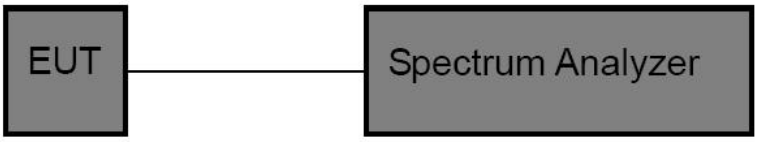
Please refer to Appendix A1&A2 of the Appendix Test Data.

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
Set RBW =100kHz;
Set VBW ≥ 3 RBW=300KHz;
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.

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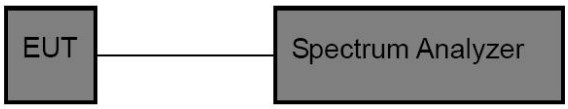
8. Power Spectral Density Test

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

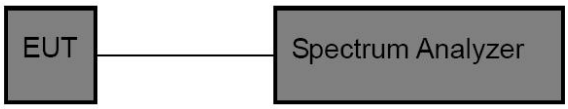
Please refer to Appendix D of the Appendix Test Data.

9. Frequency Stability

9.1. Test Standard and Limit

Test Standard	FCC Part15 E Section 15.407(g)
Test Limit	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of -30 degrees to 50 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.

9.2. Test Setup



9.3. Test Procedure

a. 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.

9.4. Test Data

Pass
Please to see the following pages.

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Test Mode: 5.2G							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VDC)	Measured Frequency (MHz)	Limit	Verdict
802.11a	SISO	5180	20	3.15	5180.44	5172 to 5188	Pass
				3.70	5180.27	5172 to 5188	Pass
				4.26	5180.07	5172 to 5188	Pass
			-30	3.70	5180.19	5172 to 5188	Pass
			-20	3.70	5180.11	5150 to 5250	Pass
			-10	3.70	5180.09	5150 to 5250	Pass
			0	3.70	5180.15	5150 to 5250	Pass
			10	3.70	5180.14	5150 to 5250	Pass
			30	3.70	5180.11	5150 to 5250	Pass
			40	3.70	5180.18	5150 to 5250	Pass
			50	3.70	5180.07	5172 to 5188	Pass
		5200	20	3.15	5200.11	5192 to 5208	Pass
				3.70	5200.16	5192 to 5208	Pass
				4.26	5200.08	5192 to 5208	Pass
			-30	3.70	5200.13	5192 to 5208	Pass
			-20	3.70	5200.08	5150 to 5250	Pass
			-10	3.70	5200.06	5150 to 5250	Pass
			0	3.70	5200.07	5150 to 5250	Pass
			10	3.70	5200.06	5150 to 5250	Pass
			30	3.70	5200.05	5150 to 5250	Pass
			40	3.70	5200.07	5150 to 5250	Pass
			50	3.70	5200.06	5192 to 5208	Pass
		5240	20	3.15	5240.16	5232 to 5248	Pass
				3.70	5240.02	5232 to 5248	Pass
				4.26	5240.13	5232 to 5248	Pass
			-30	3.70	5240.05	5232 to 5248	Pass
			-20	3.70	5240.19	5150 to 5250	Pass
			-10	3.70	5240.16	5150 to 5250	Pass
			0	3.70	5240.05	5150 to 5250	Pass
			10	3.70	5240.07	5150 to 5250	Pass
			30	3.70	5240.04	5150 to 5250	Pass
			40	3.70	5240.16	5150 to 5250	Pass
			50	3.70	5240.13	5232 to 5248	Pass
802.11n (HT20)	SISO	5180	20	3.15	5180.25	5172 to 5188	Pass
				3.70	5180.09	5172 to 5188	Pass
				4.26	5180.07	5172 to 5188	Pass
			-30	3.70	5180.08	5172 to 5188	Pass
			-20	3.70	5180.26	5150 to 5250	Pass
			-10	3.70	5180.14	5150 to 5250	Pass

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			0	3.70	5180.11	5150 to 5250	Pass
			10	3.70	5180.88	5150 to 5250	Pass
			30	3.70	5180.13	5150 to 5250	Pass
			40	3.70	5180.22	5150 to 5250	Pass
			50	3.70	5180.44	5172 to 5188	Pass
		5200	20	3.15	5200.57	5192 to 5208	Pass
				3.70	5200.06	5192 to 5208	Pass
				4.26	5200.08	5192 to 5208	Pass
			-30	3.70	5200.06	5192 to 5208	Pass
			-20	3.70	5200.07	5150 to 5250	Pass
			-10	3.70	5200.06	5150 to 5250	Pass
			0	3.70	5200.08	5150 to 5250	Pass
			10	3.70	5200.11	5150 to 5250	Pass
			30	3.70	5200.06	5150 to 5250	Pass
			40	3.70	5200.08	5150 to 5250	Pass
			50	3.70	5200.04	5192 to 5208	Pass
		5240	20	3.15	5240.06	5232 to 5248	Pass
				3.70	5240.08	5232 to 5248	Pass
				4.26	5240.06	5232 to 5248	Pass
			-30	3.70	5240.16	5232 to 5248	Pass
			-20	3.70	5240.05	5150 to 5250	Pass
			-10	3.70	5240.07	5150 to 5250	Pass
			0	3.70	5240.02	5150 to 5250	Pass
			10	3.70	5240.12	5150 to 5250	Pass
			30	3.70	5240.06	5150 to 5250	Pass
			40	3.70	5240.09	5150 to 5250	Pass
			50	3.70	5240.16	5232 to 5248	Pass

10. Antenna Requirement

10.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 (c)
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.

10.2. Antenna Connected Construction

The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 2dBi It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

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

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

APPENDIX IV -- Test Data

Please refer to separated files Appendix IV -- Test Data

---------- End of Report ----------

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