TEST REPORT

Applicant:	Boaz Smart Co., Ltd
Address of Applicant:	No. 41, Heping Rd., Tanzi Dist., Taichung City 427, Taiwan (R.O.C.)
Manufacturer:	Hangzhou Xizhi Electronics Co., Ltd.
Address of Manufacturer:	The second floor,Building 3, No. 8 Yuyang Road, Lushan Subdistrict, Fuyang, Hangzhou, Zhejiang

Equipment Under Test (EUT)

Product Name:	Wi-Fi Smart Infrared Universal Remote Control
Model No.:	C068,UFO-R1,UFO-R2,UFO-R3,UFO-R4,C096
Trade Mark:	N/A
FCC ID:	2AVHB-C068
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	Nov.10,2019
Date of Test:	May.08,2020- May.20,2020
Date of report issued:	May.20,2020
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*May.20,2020*	*Original*

Tested/ Prepared By:  ***Date:*** *May.20,2020*

Project Engineer

Check By:  ***Date:*** *May.20,2020*

Reviewer

3 Contents

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4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

Pass: The EUT complies with the essential requirements in the standard.

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:	Wi-Fi Smart Infrared Universal Remote Control
Model No.:	C068
Serial No.:	UFO-R1,UFO-R2,UFO-R3,UFO-R4,C096
Test sample(s) ID:	GTS202005000074-1
Sample(s) Status	Engineer sample
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20 Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	PCB ANT
Antenna Gain:	2.00dBi
Power Supply:	DC 5V From External Adapter

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

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)**
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

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:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC —Registration No.: 381383**

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. Registration 381383.

● **IC —Registration No.: 9079A**

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 with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 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

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

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. 03 2015	July. 02 2020
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. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	FARAD	EZ-EMC	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

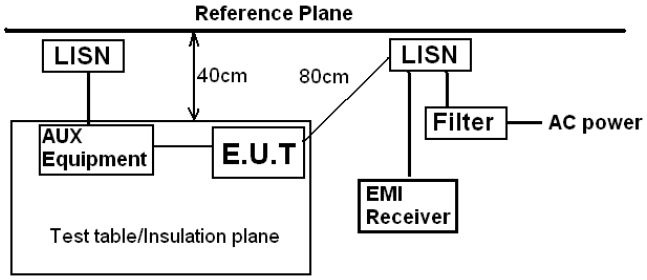
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

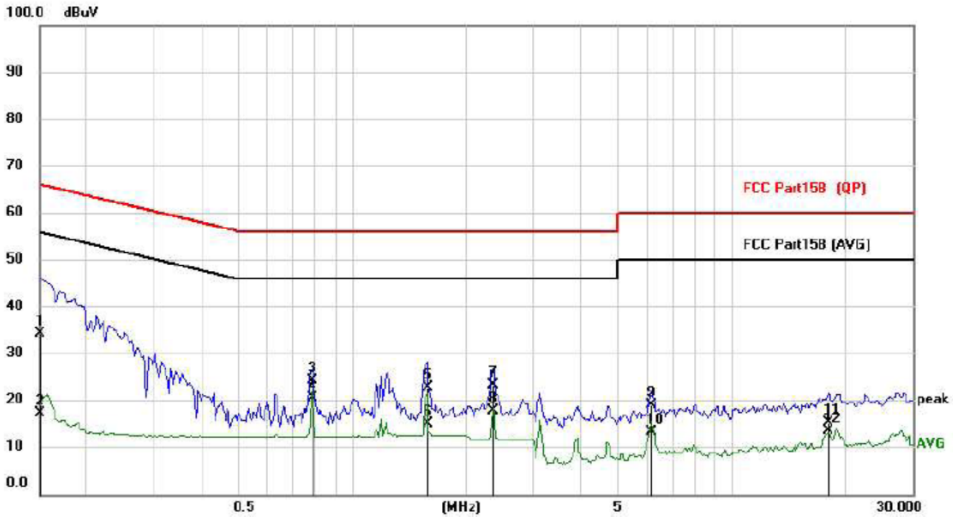
7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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. **15.247(c) (1)(i) requirement:** (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.	
EUT Antenna:	
The antennas are FPC antenna, the best case gain of the antennas are 3.23dBi, reference to the appendix II for details	

7.2 Conducted Emissions

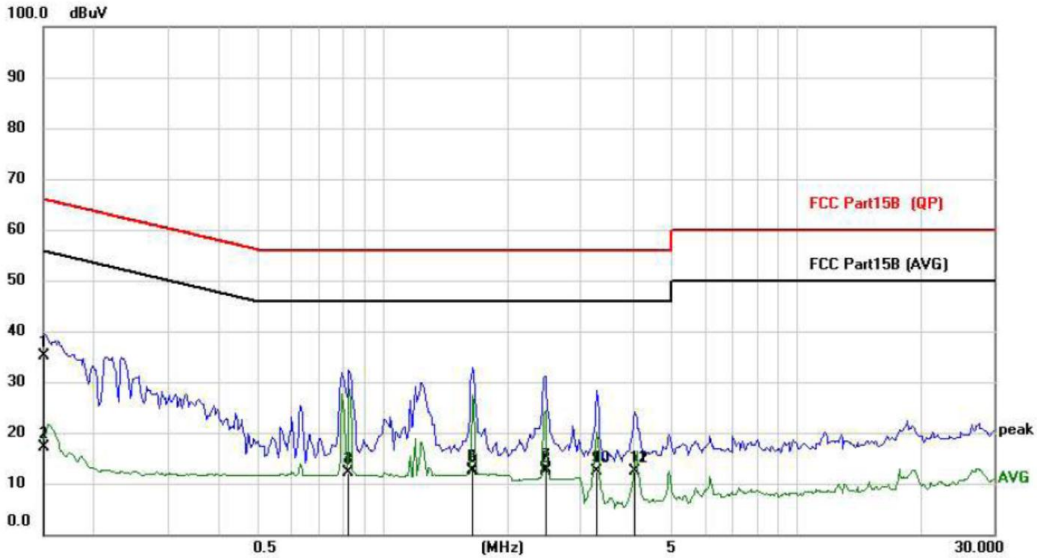
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases 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

Measurement data
Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	23.17	10.92	34.09	66.00	-31.91	QP
2		0.1500	6.14	10.92	17.06	56.00	-38.94	AVG
3		0.7857	13.09	10.92	24.01	56.00	-31.99	QP
4	*	0.7857	9.34	10.92	20.26	46.00	-25.74	AVG
5		1.5774	11.70	10.94	22.64	56.00	-33.36	QP
6		1.5774	4.02	10.94	14.96	46.00	-31.04	AVG
7		2.3535	12.12	10.98	23.10	56.00	-32.90	QP
8		2.3535	6.71	10.98	17.69	46.00	-28.31	AVG
9		6.1434	7.80	11.15	18.95	60.00	-41.05	QP
10		6.1434	1.98	11.15	13.13	50.00	-36.87	AVG
11		18.0111	3.61	11.59	15.20	60.00	-44.80	QP
12		18.0111	1.73	11.59	13.32	50.00	-36.68	AVG

Neutral:

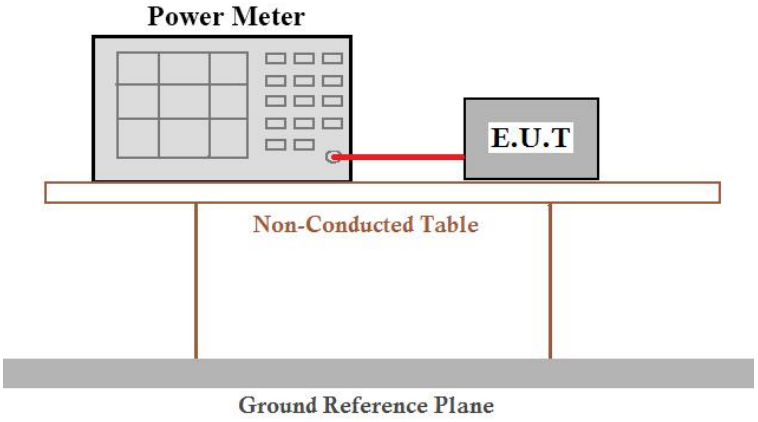


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1500	24.32	10.92	35.24	66.00	-30.76	QP
2		0.1500	6.31	10.92	17.23	56.00	-38.77	AVG
3		0.8247	1.17	10.92	12.09	56.00	-43.91	QP
4		0.8247	1.17	10.92	12.09	46.00	-33.91	AVG
5		1.6437	1.73	10.94	12.67	56.00	-43.33	QP
6		1.6437	1.32	10.94	12.26	46.00	-33.74	AVG
7		2.4627	1.78	10.98	12.76	56.00	-43.24	QP
8		2.4627	1.29	10.98	12.27	46.00	-33.73	AVG
9		3.2847	1.27	11.02	12.29	56.00	-43.71	QP
10		3.2847	1.25	11.02	12.27	46.00	-33.73	AVG
11		4.0491	1.29	11.06	12.35	56.00	-43.65	QP
12		4.0491	1.23	11.06	12.29	46.00	-33.71	AVG

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

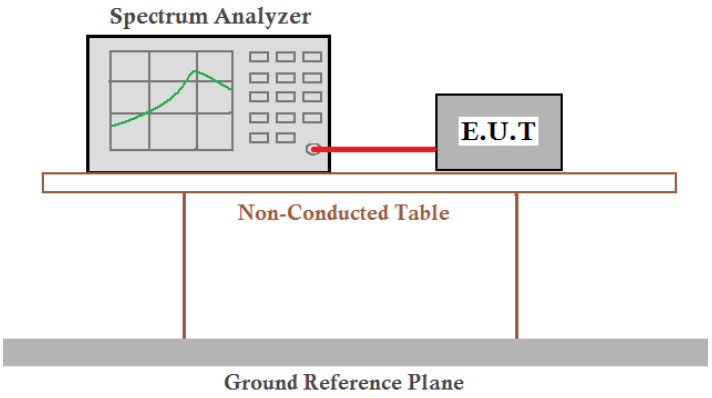
Test Requirement :	FCC Part15 C Section 15.247 (b)(3)
Test Method :	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Test CH	Peak Output Power (dBm)			Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	11.26	12.28	11.79	30.00	Pass
Middle	10.32	11.79	10.63		
Highest	11.05	12.37	11.86		

Test CH	AV Output Power (dBm)			Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	8.61	8.63	8.14	30.00	Pass
Middle	7.67	8.14	6.98		
Highest	8.40	8.72	8.21		

7.4 Channel Bandwidth

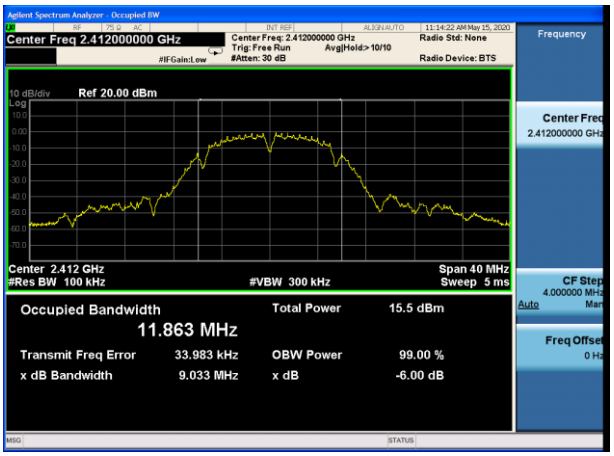
Test Requirement :	FCC Part15 C Section 15.247 (a)(2)
Test Method :	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

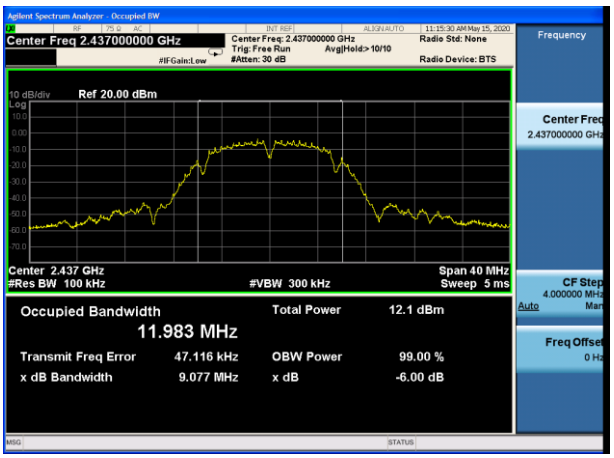
Test CH	Channel Bandwidth (MHz)			Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	9.033	17.55	17.64	>500	Pass
Middle	9.077	17.60	17.72		
Highest	8.537	16.95	17.64		

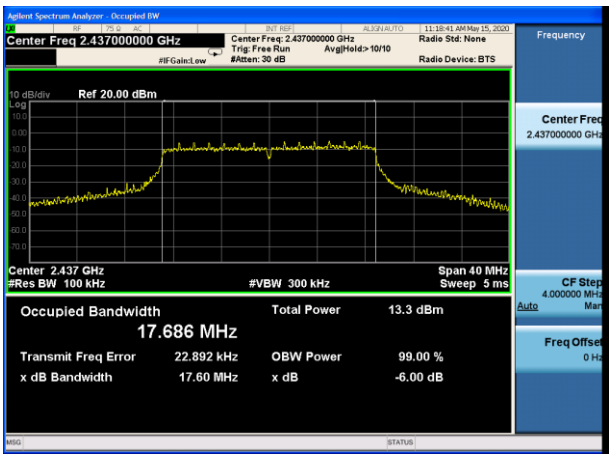
Test plot as follows:

802.11b		802.11g	

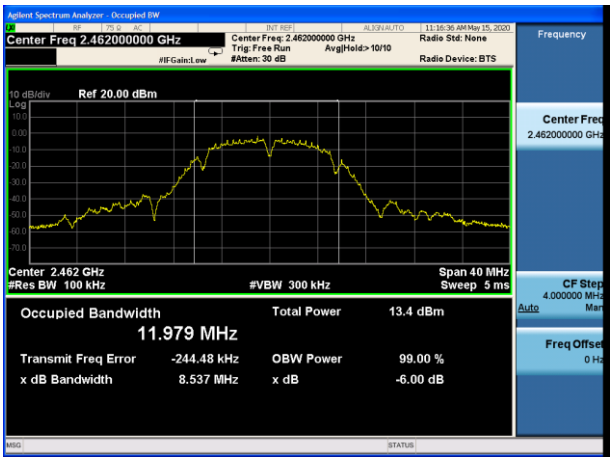


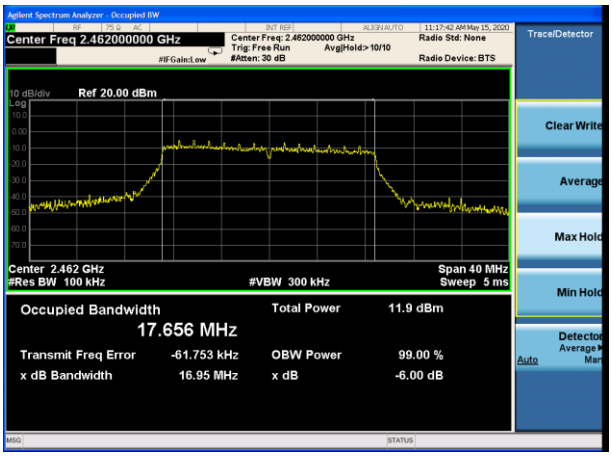
Lowest channel





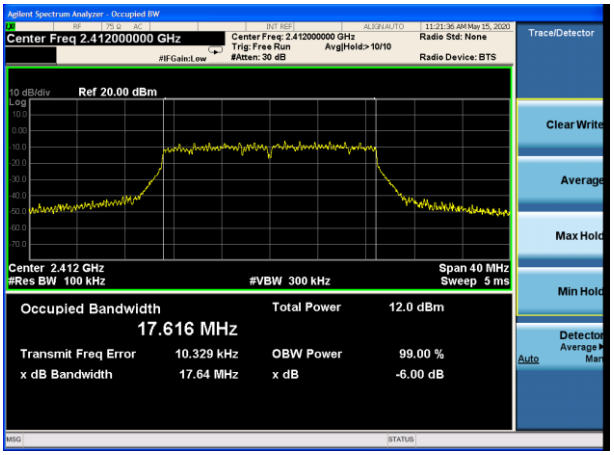
Middle channel



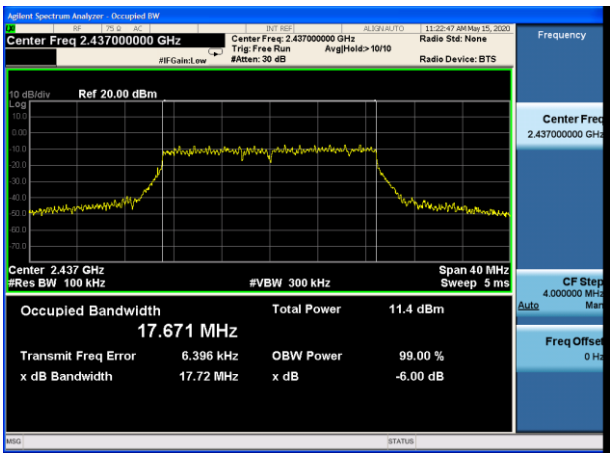


Highest channel

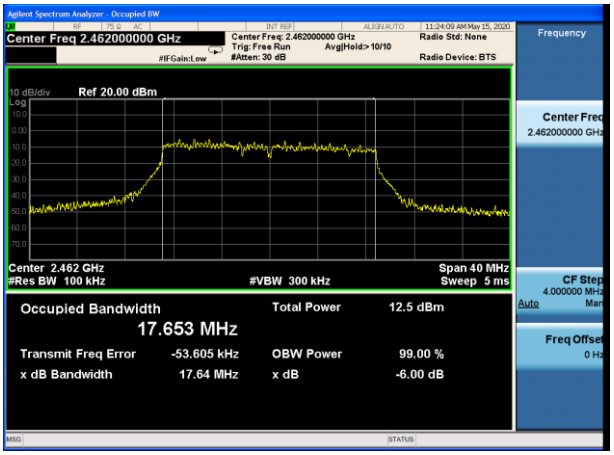
802.11n			



Lowest channel

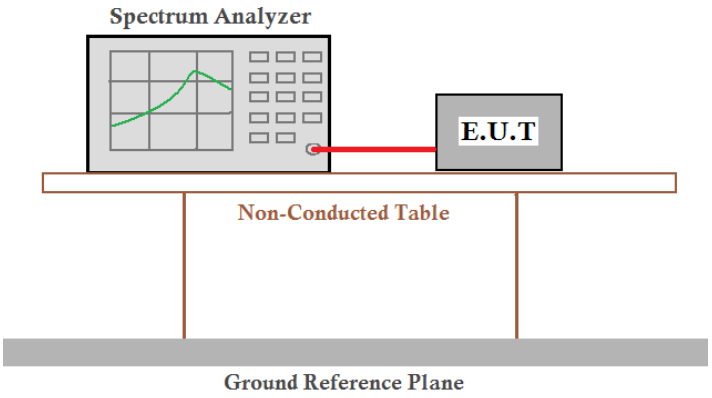


Middle channel



Highest channel

7.5 Power Spectral Density

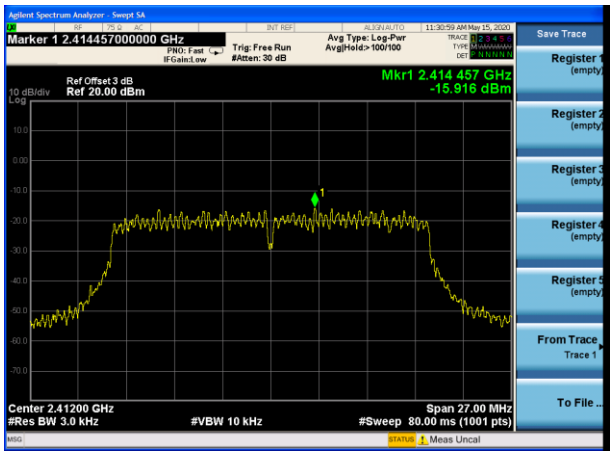
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

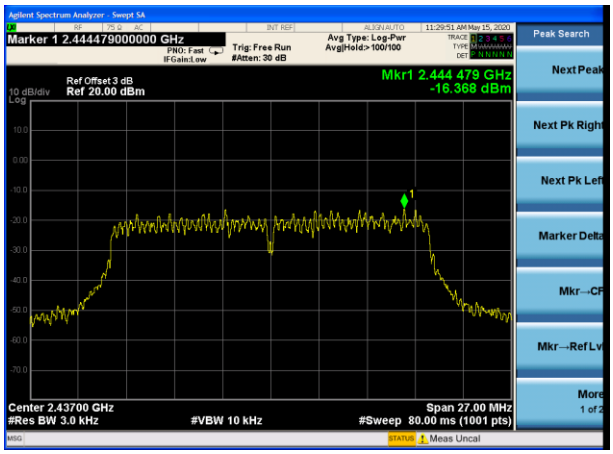
Test CH	Power Spectral Density (dBm/3kHz)			Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	-8.974	-15.916	-18.177	8.00	Pass
Middle	-12.002	-16.368	-18.153		
Highest	-11.922	17.229	-17.436		

Test plot as follows:

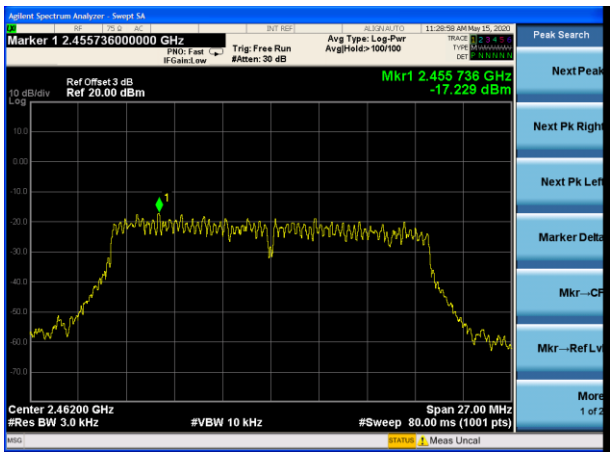
802.11b		802.11g	



Lowest channel

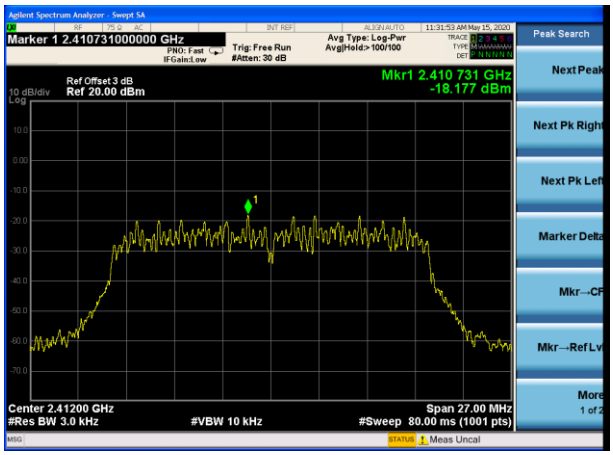


Middle channel

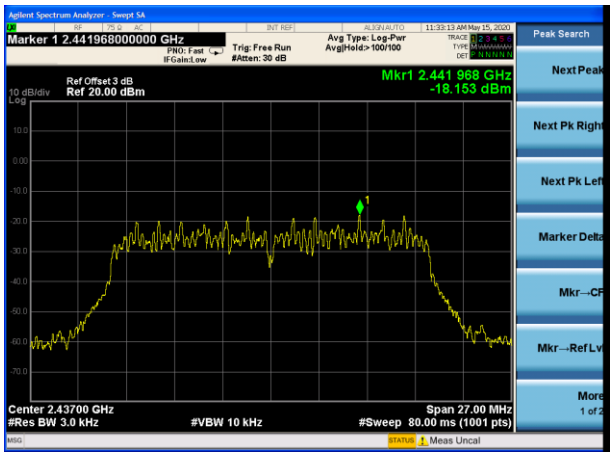


Highest channel

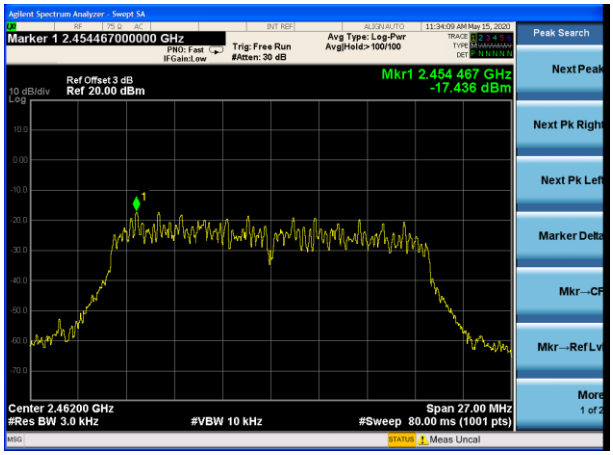
802.11n			



Lowest channel



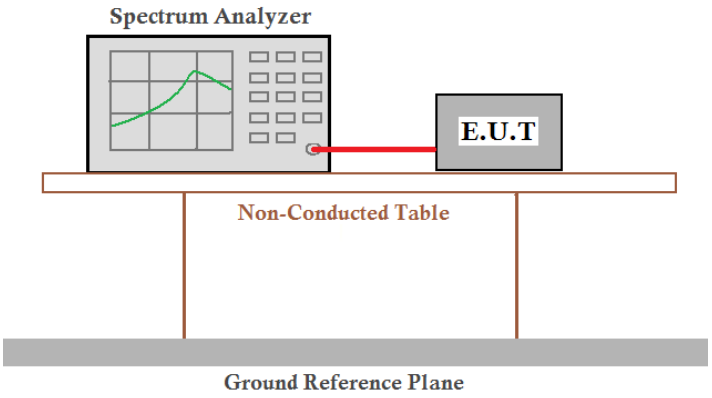
Middle channel



Highest channel

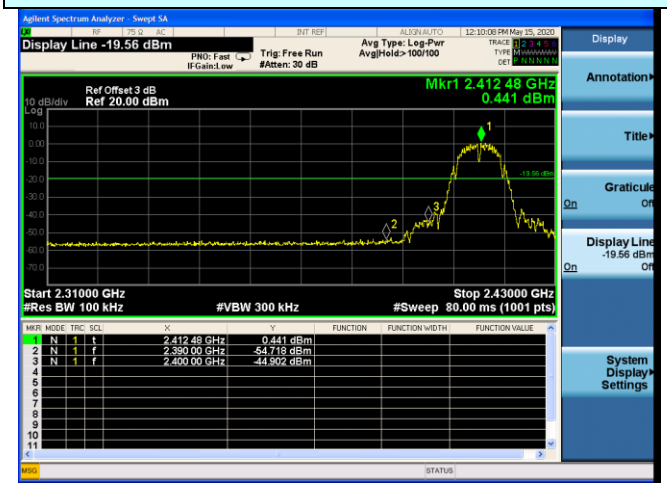
7.6 Band edges

7.6.1 Conducted Emission Method

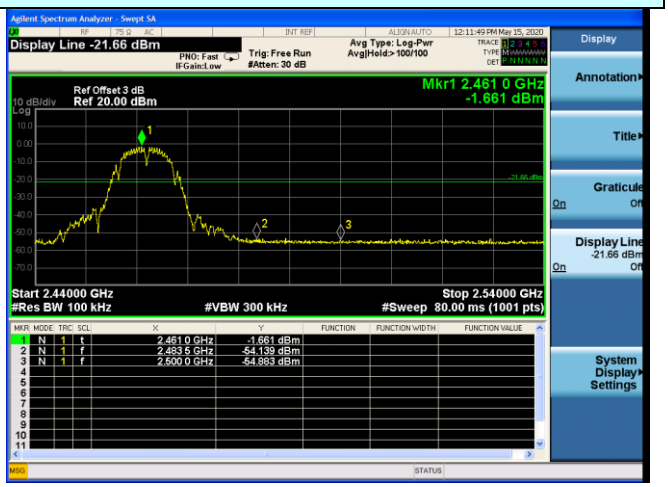
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall 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 conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

Test mode:	802.11b



Lowest channel



Highest channel

Test mode:	802.11g

Lowest channel

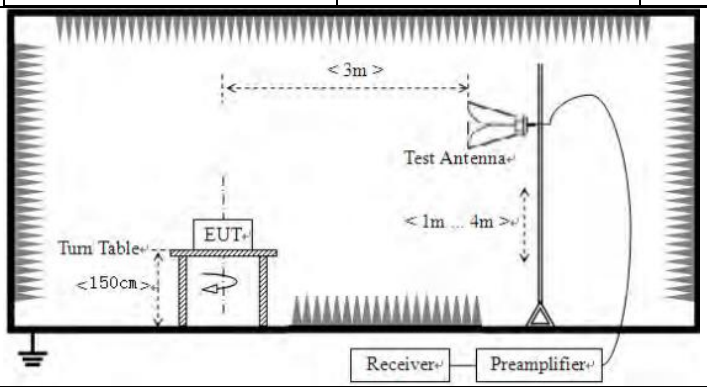
Highest channel

Test mode:	802.11n(HT20)

Lowest channel

Highest channel

7.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>All of the restrict bands were tested, only the worst band’s (2310MHz to 2500MHz) data was showed.</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Average</td><td>1MHz</td><td>3MHz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td colspan="2">Frequency</td><td>Limit (dBuV/m @3m)</td><td>Value</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td>54.00</td><td>Average</td></tr>
<tr><td>74.00</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Procedure:</td><td>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 Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

Measurement data:

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

Horizontal: 802.11b Mode TX CH Low (2412MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	67.52	-5.68	61.84	74	-12.16	peak
2390	48.98	-5.68	43.3	54	-10.7	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical: 802.11b Mode TX CH Low (2412MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2390	68.02	-5.68	62.34	74	-11.66	peak
2390	50.72	-5.68	45.04	54	-8.96	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Horizontal: 802.11b Mode TX CH HIGH (2462MHz)

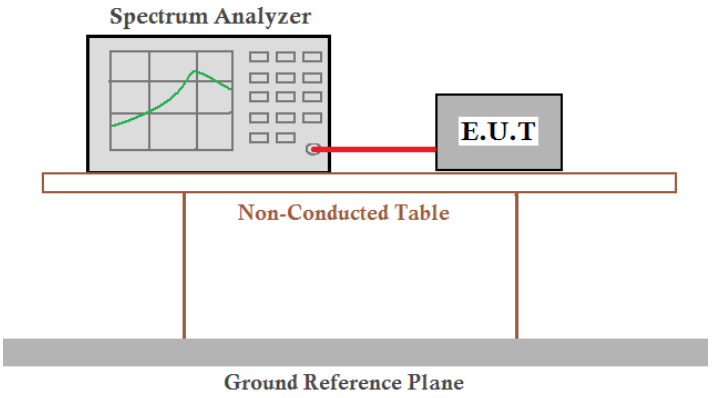
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	67.33	-5.85	61.48	74	-12.52	peak
2483.5	49.19	-5.85	43.34	54	-10.66	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical: 802.11b Mode TX CH HIGH (2462MHz)

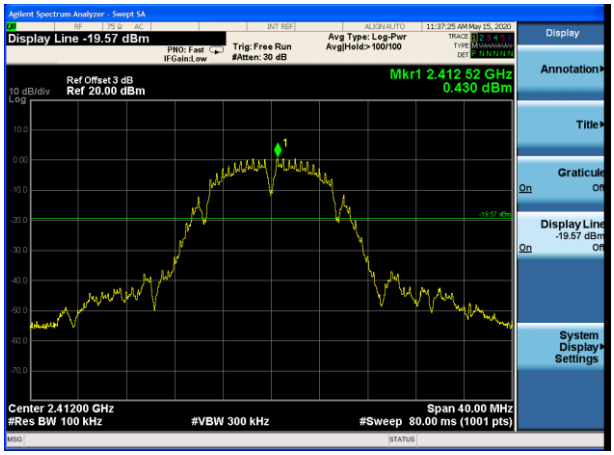
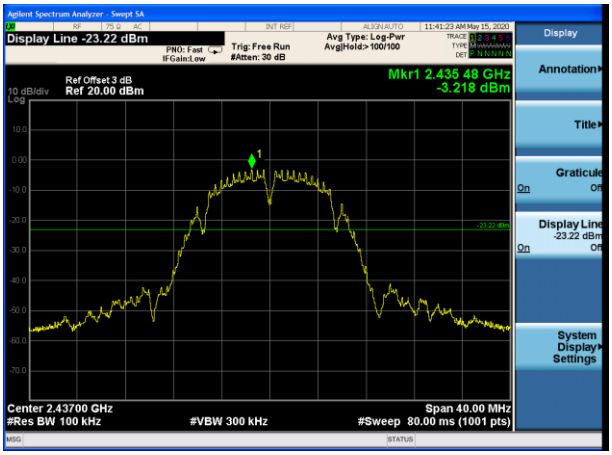
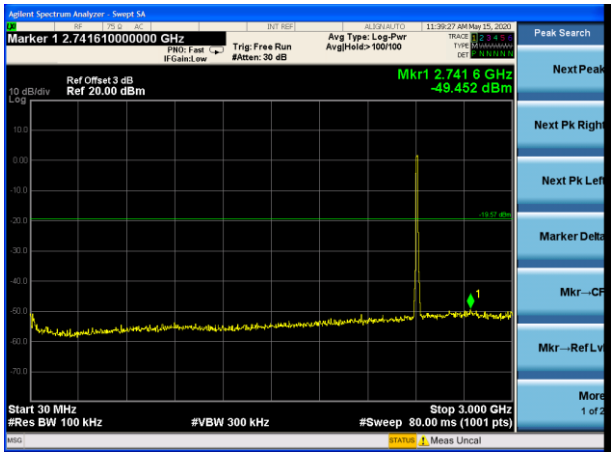
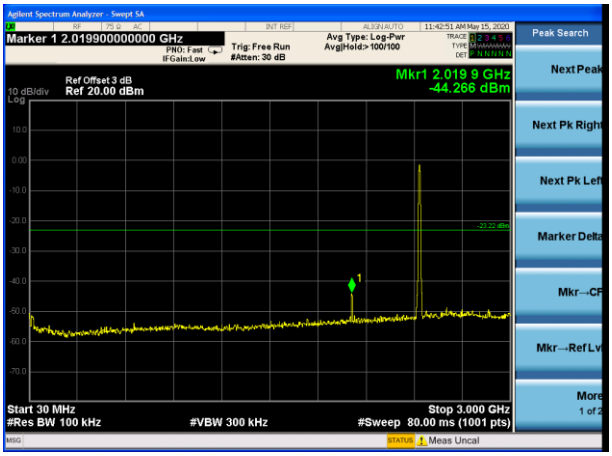
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	67.23	-5.65	61.58	74	-12.42	peak
2483.5	50.32	-5.85	44.47	54	-9.53	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

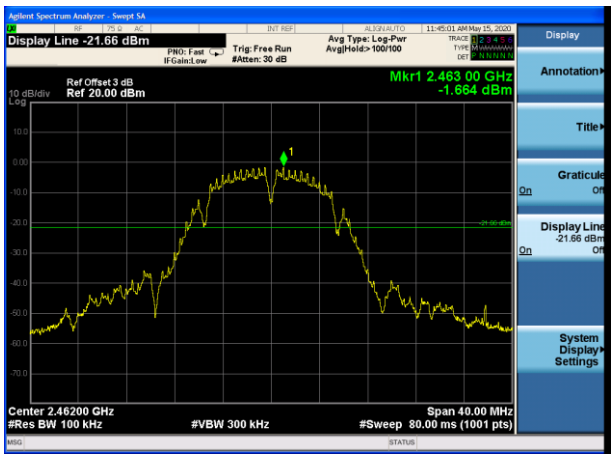
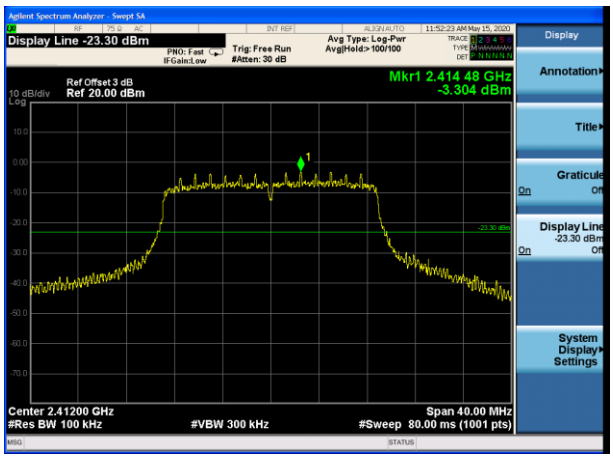
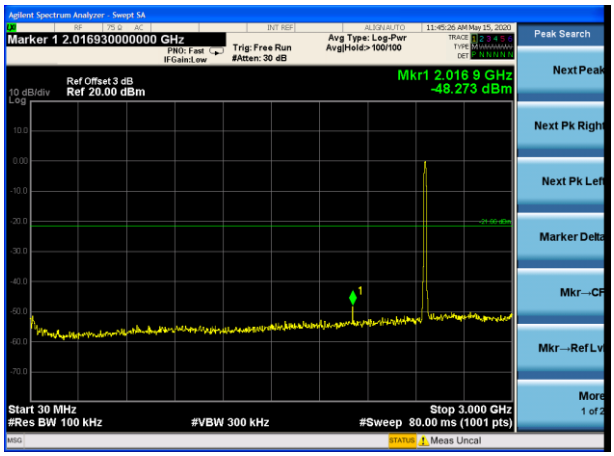
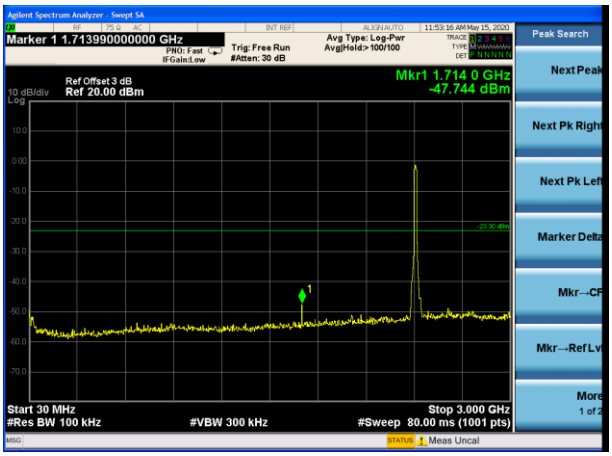
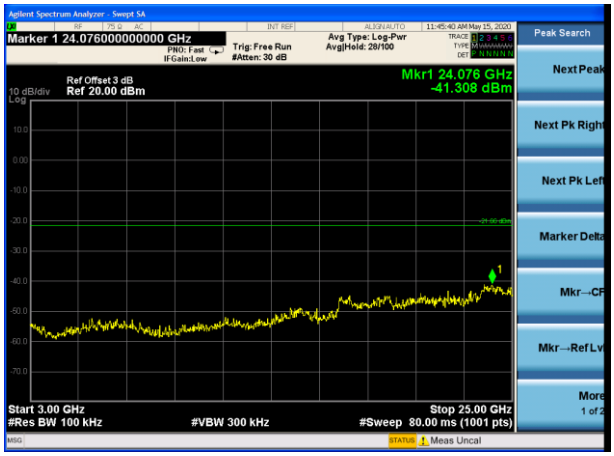
7.7 Spurious Emission

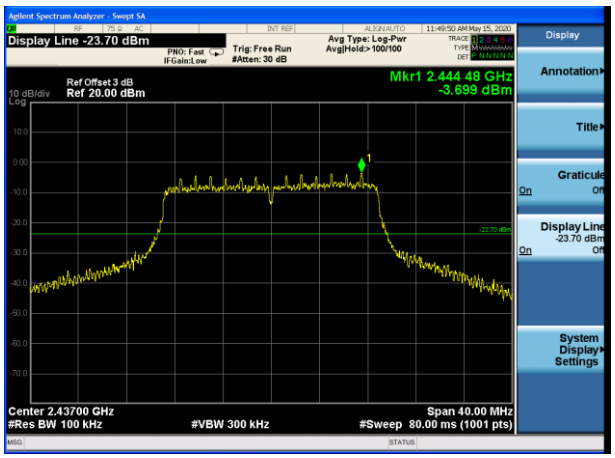
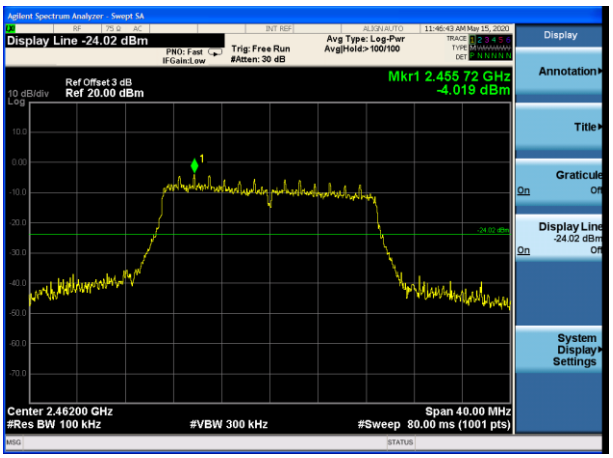
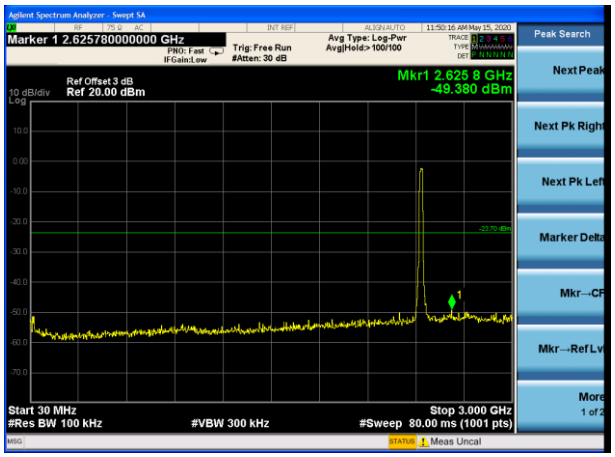
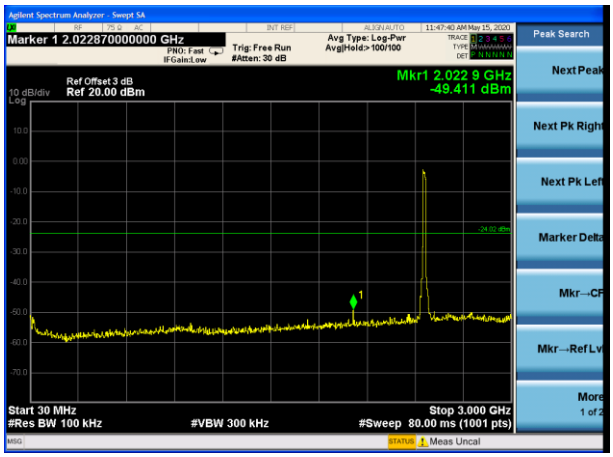
7.7.1 Conducted Emission Method

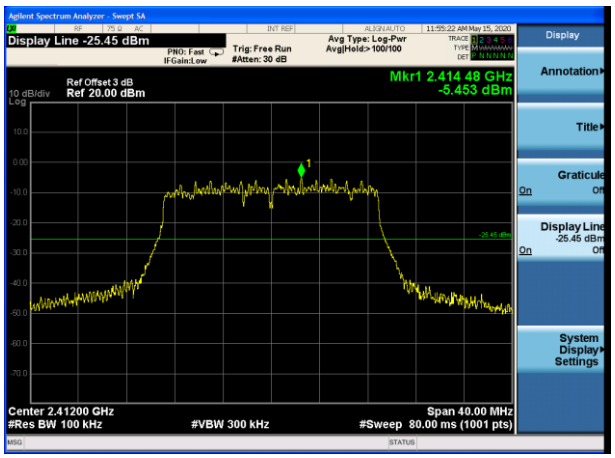
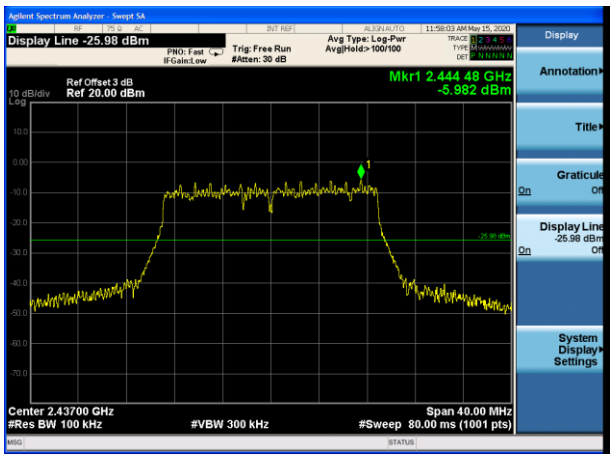
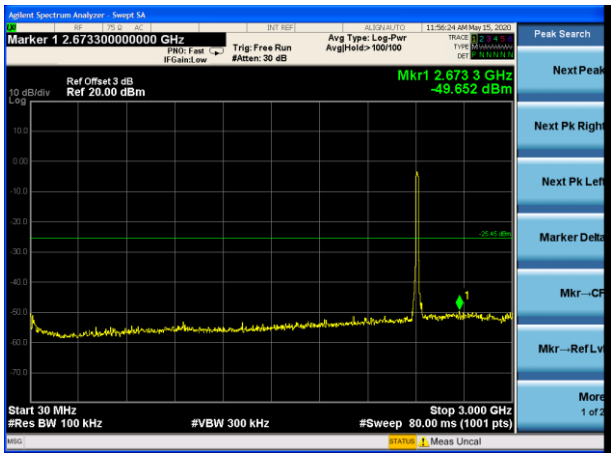
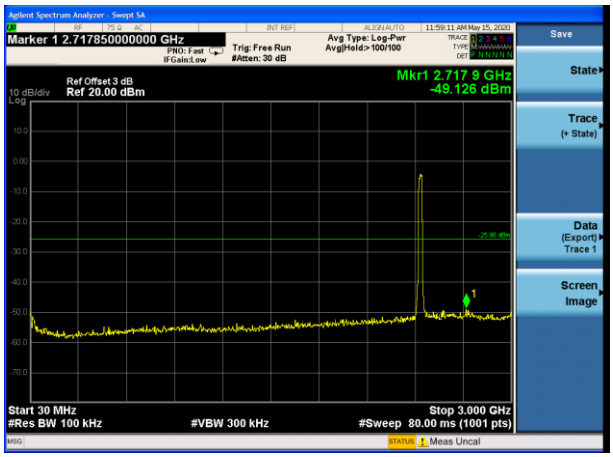
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance v05or02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall 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 conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

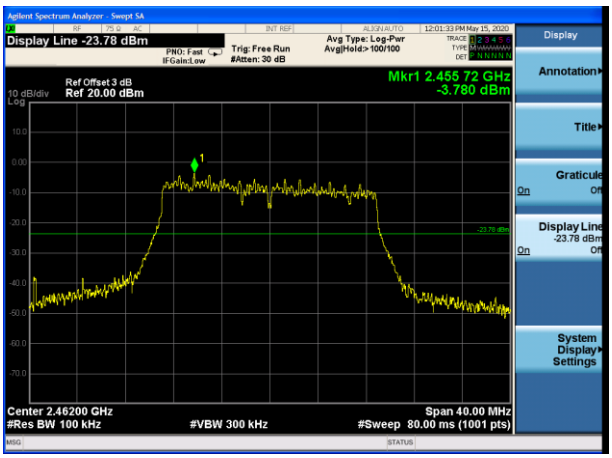
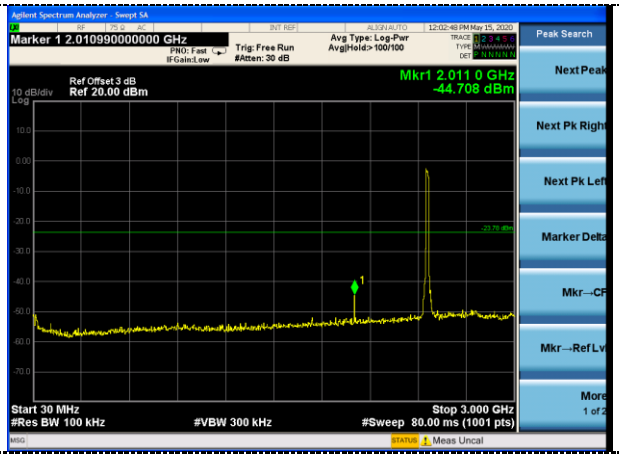
Test plot as follows:

802.11b CH01	*802.11b CH06*
	
Reference	Reference
	
30MHz-3GHz	30MHz-3GHz
	
3GHz-25GHz	3GHz-25GHz

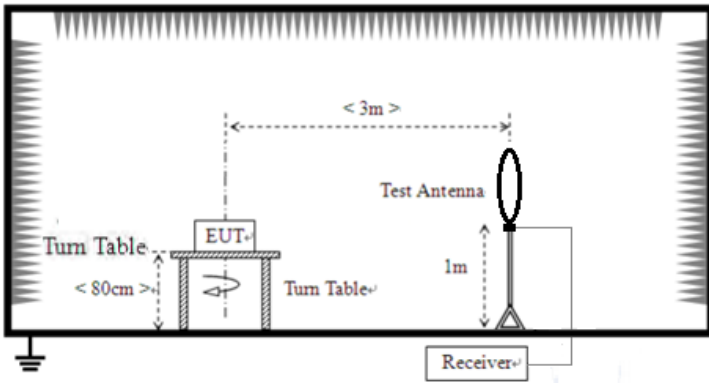
802.11b CH11	802.11g CH01
	
Reference	Reference
	
30MHz-10GHz	30MHz-10GHz
	
10GHz-26GHz	10GHz-26GHz

802.11g CH06	802.11g CH11
	
Reference	Reference
	
30MHz-10GHz	30MHz-10GHz
	
10GHz-26GHz	10GHz-26GHz

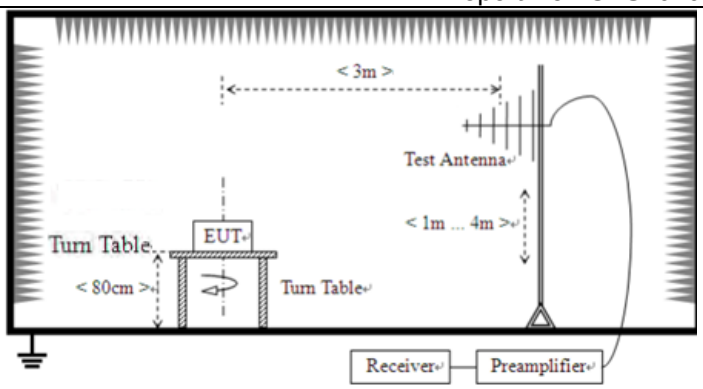
802.11n(HT20) CH01	802.11n(HT20) CH06
	
Reference	Reference
	
30MHz-10GHz	30MHz-10GHz
	
10GHz-26GHz	10GHz-26GHz

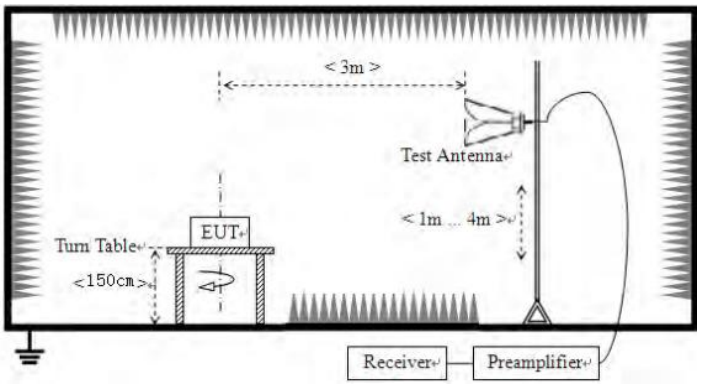
802.11n(HT20) CH11	
	
Reference	
	
30MHz-10GHz	
	
10GHz-26GHz	

7.7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="7">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 

For radiated emissions from 30MHz to1GHz</td></tr>
</table>

<table>
<tr><td></td><td> 

For radiated emissions above 1GHz

</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) 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.</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
</table>

Test mode:	Refer to section 5.2 for details					
Test voltage:	AC120V 60Hz					
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.*

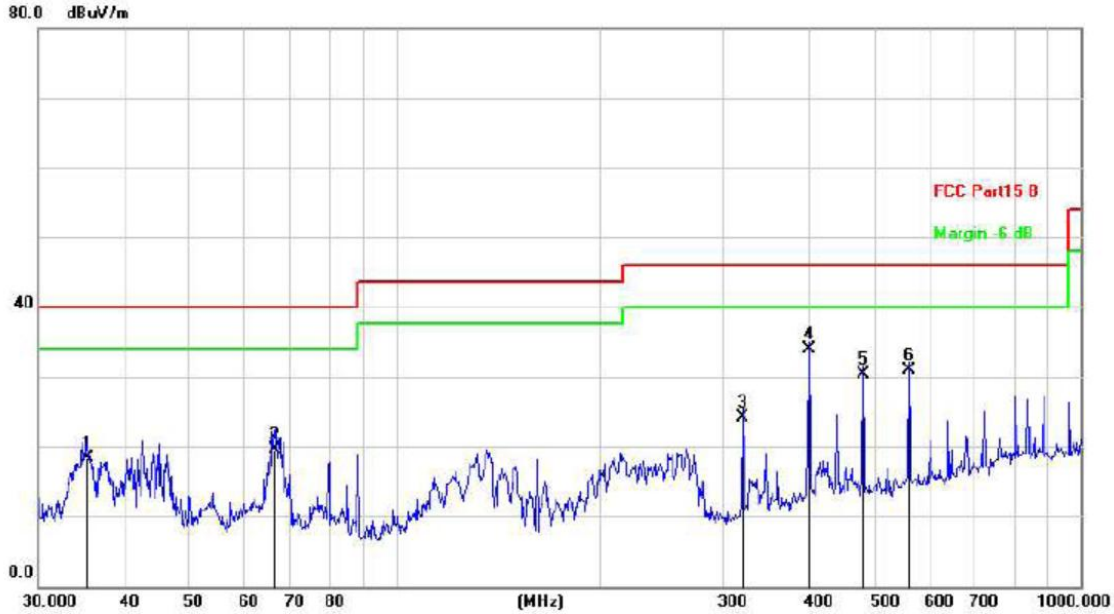
Measurement data:

■ **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

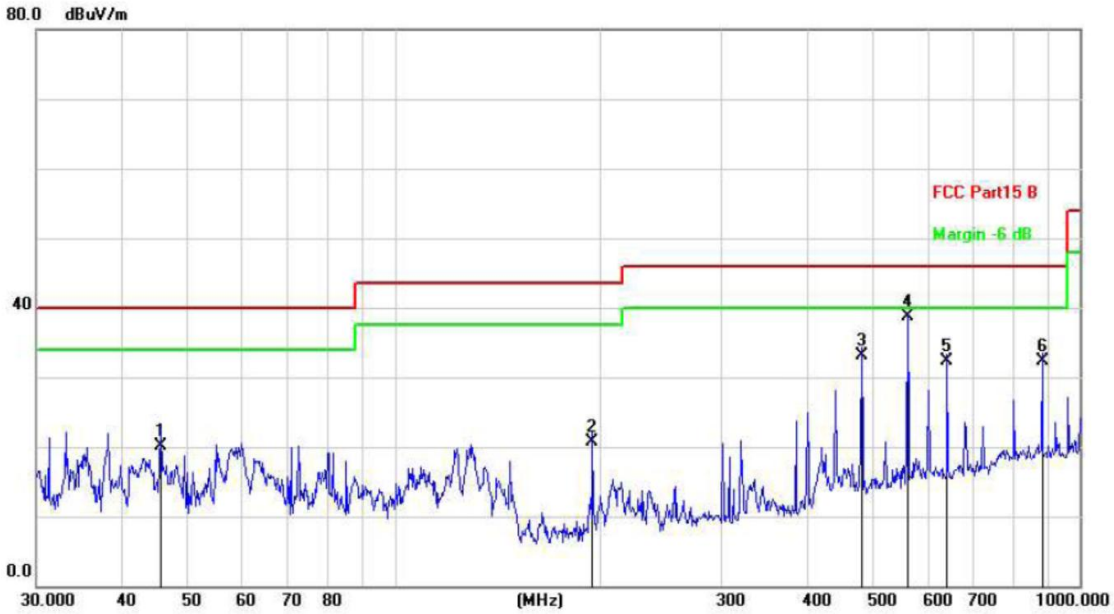
■ **Below 1GHz**

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		35.3750	36.56	-18.26	18.30	40.00	-21.70	QP
2		66.4989	39.02	-19.52	19.50	40.00	-20.50	QP
3		319.9370	42.22	-18.12	24.10	46.00	-21.90	QP
4	*	400.4319	50.07	-16.17	33.90	46.00	-12.10	QP
5		480.5276	46.07	-15.67	30.40	46.00	-15.60	QP
6		560.6928	44.85	-13.85	31.00	46.00	-15.00	QP

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		45.5348	38.39	-18.29	20.10	40.00	-19.90	QP
2		194.4534	40.72	-20.02	20.70	43.50	-22.80	QP
3		480.5276	48.77	-15.67	33.10	46.00	-12.90	QP
4	*	560.6928	52.71	-14.01	38.70	46.00	-7.30	QP
5		640.6110	44.96	-12.66	32.30	46.00	-13.70	QP
6		881.4067	42.05	-9.65	32.40	46.00	-13.60	QP

■ **Above 1GHz**

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

Horizontal: LOW CH1 (802.11b Mode)/2412

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824	65.73	-3.67	62.06	74	-11.94	peak
4824	46.28	-3.64	42.64	54	-11.36	AVG
7236	62.15	-0.9	61.25	74	-12.75	peak
7236	43.62	-0.9	42.72	54	-11.28	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical: LOW CH1 (802.11b Mode)/2412

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824	63.12	-3.67	59.45	74	-14.55	peak
4824	46.76	-3.64	43.12	54	-10.88	AVG
7236	58.02	-0.9	57.12	74	-16.88	peak
7236	44.79	-0.9	43.89	54	-10.11	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Horizontal: MID CH6 (802.11b Mode)/2437

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4874	62.75	-3.53	59.22	74	-14.78	peak
4874	45.49	-3.53	41.96	54	-12.04	AVG
7311	57.12	-0.85	56.27	74	-17.73	peak
7311	42.87	-0.85	42.02	54	-11.98	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical: MID CH6 (802.11b Mode)/2437

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4874	62.75	-3.53	59.22	74	-14.78	peak
4874	46.11	-3.53	42.58	54	-11.42	AVG
7311	59.21	-0.85	58.36	74	-15.64	peak
7311	43.97	-0.85	43.12	54	-10.88	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Horizontal: HIGH CH11 (802.11b Mode)/2462

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	64.36	-3.49	60.87	74	-13.13	peak
4924	46.77	-3.49	43.28	54	-10.72	AVG
7386	60.51	-0.78	59.73	74	-14.27	peak
7386	43.22	-0.78	42.44	54	-11.56	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical: HIGH CH11 (802.11b Mode)/2462

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924	66.33	-3.49	62.84	74	-11.16	peak
4924	46.12	-3.49	42.63	54	-11.37	AVG
7386	60.28	-0.78	59.5	74	-14.5	peak
7386	43.17	-0.78	42.39	54	-11.61	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Remark：
(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

8 Test Setup Photo

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

9 EUT Constructional Details

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

------End------