FCC TEST REPORT

FCC ID: 2A2P3-X8

Product Name	:	tablet PC
Model Name	:	X8,X101,X102,X103,X104,X801,X802,X803,X804
Brand Name	:	N/A
Report No.	:	PTC21070700601E-FC01

Prepared for

Shenzhen Star Wisdom Technology Co., Ltd

Building 3, Binxiuhua Industrial Park, Huada Road, Longhua District, Shenzhen City, Guangdong Province

Prepared by

Precise Testing & Certification Corp., Ltd.

Building 1, No.6 Tongxin Road, Dongcheng Street, Dongguan,China

TEST RESULT CERTIFICATION		
Applicant's name	:	Shenzhen Star Wisdom Technology Co., Ltd
Address	:	Building 3, Binxiuhua Industrial Park, Huada Road, Longhua District, Shenzhen City, Guangdong Province
Manufacture's name	:	Shenzhen Star Wisdom Technology Co., Ltd
Address	:	Building 3, Binxiuhua Industrial Park, Huada Road, Longhua District, Shenzhen City, Guangdong Province
Product name	:	tablet PC
Model name	:	X8,X101,X102,X103,X104,X801,X802,X803,X804
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10:2013
Test Date	:	Jul. 20. 2021 to Aug. 16, 2021
Date of Issue	:	Aug. 17, 2021
Test Result	:	Pass
This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of PTC, this document may be altered or revised by PTC, personal only, and shall be noted in the revision of the document.		

Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

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1 Test Summary

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	**Standard**	**Results**
6dB Bandwidth and 99% Bandwidth	FCC Part 15: 15.247 KDB558074	PASS
Peak Output Power	FCC Part 15: 15.247 KDB558074	PASS
Power Spectral Density	FCC Part 15: 15.247 KDB558074	PASS
Emissions in non-restricted frequency bands	FCC Part 15: 15.247 KDB558074	PASS
Emissions in restricted frequency bands	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 KDB558074	PASS
Band Edge Compliance	FCC Part 15: 15.209 FCC Part 15: 15.247 ANSI C63.10: 2013 KDB558074	PASS
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10: 2013	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

2 TEST FACILITY

Precise Testing & Certification Corp., Ltd.

Address:Building 1, No.6 Tongxin Road, Dongcheng Street, Dongguan,China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A

3 General Information

3.1 General Description of E.U.T.

Product Name	:	tablet PC
Model Name	:	X8,X101,X102,X103,X104,X801,X802,X803,X804
different	:	They are just different in appearance and color.
Brand Name	:	N/A
Radio Technology	:	IEEE802.11b/g
Operating frequency	:	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz
Numbers of Channel	:	11 Channels for 802.11b/g
Antenna Type	:	FPCB Antenna，maximum PK gain: 0 dBi
Modulation Technology	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
Battery	:	3.7V; 2900mAh
Input	:	DC5V 1.5A Adaptor Input AC 100-240V 50/60HZ
Hardware Version	:	K1006C9 -MB-V1.31
Software Version	:	Android 5.1

3.2 Test Mode

EUT was connected to control to a special test jig provided by manufacturer which has a standard RSS-232 connector to connect to Notebook, and the Notebook will run a special test software "MP_Kit_RTL11n_8188EUS_USB" provided by manufacturer to control EUT work in Continuous TX mode (>98% duty cycle), and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
IEEE 802.11b	Low :CH1	2412
	Middle: CH6	2437
	High: CH11	2462
IEEE 802.11g	Low :CH1	2412
	Middle: CH6	2437
	High: CH11	2462
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.		

4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration due	calibration interval time
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Sep.18, 2022	1 year
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Sep.18, 2022	1 year
Antenna Connector	Florida RF Labs	N/A	RF01#	N/A	Sep.18, 2022	1 year
Power Meter	Anritsu	ML2495A	0949003	N/A	Sep.18, 2022	1 year
Power Sensor	Anritsu	MA2411B	0917017	N/A	Sep.18, 2022	1 year

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration due	calibration interval time
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.18, 2022	1 year
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Sep.18, 2022	1 year
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Sep.18, 2022	1 year
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep.18, 2022	1 year
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep.18, 2022	1 year
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Sep.18, 2022	1 year
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Sep.18, 2022	1 year
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Sep.18, 2022	1 year

Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Sep.18, 2022	1 year
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Sep.18, 2022	1 year
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Sep.18, 2022	1 year
RF Cable	R&S	R204	R21X	1GHz-40GHz	Sep.18, 2022	1 year

Conducted Emissions

Name of Equipment	**Manufacturer**	**Model**	**Serial No.**	**Characteristics**	**Calibration due**	**calibration interval time**
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.18, 2022	1 year
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	9KHz-300MHz	Sep.18, 2022	1 year
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Sep.18, 2022	1 year

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

4.3 Description of Support Units

Equipment	Model No.	Series No.
Adaptor	HW-100400C00	N/A

5 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207
Test Method:	:	ANSI C63.10:2013
Test Result:	:	PASS
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B
Detector:	:	Peak for pre-scan (9kHz Resolution Bandwidth)

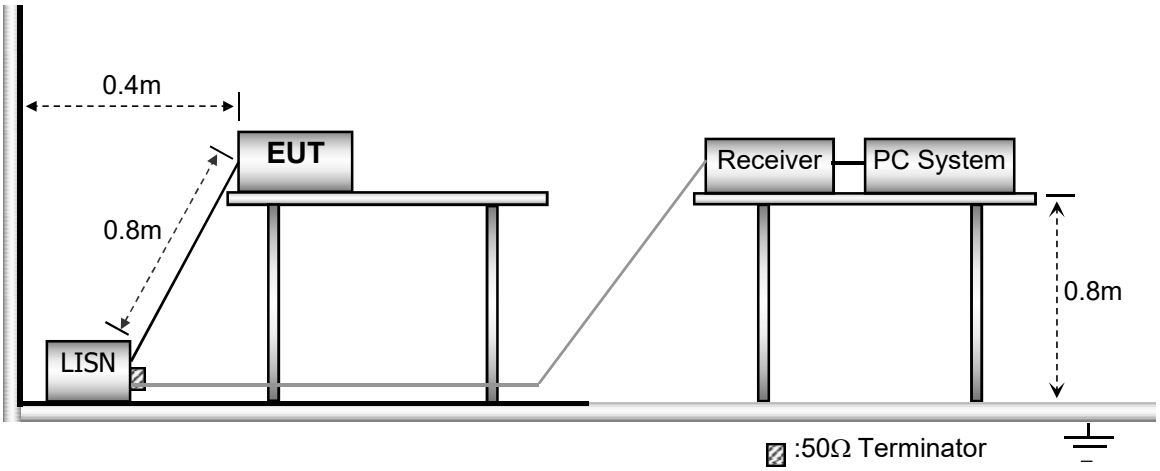
5.1 E.U.T. Operation

Operating Environment **:**

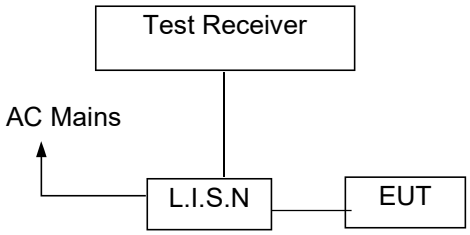
Temperature:	:	25.5 °C
Humidity:	:	51 % RH
Atmospheric Pressure:	:	101.2kPa

5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10: 2013



5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:
1. The lower limit shall apply at the transition frequencies
2.The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

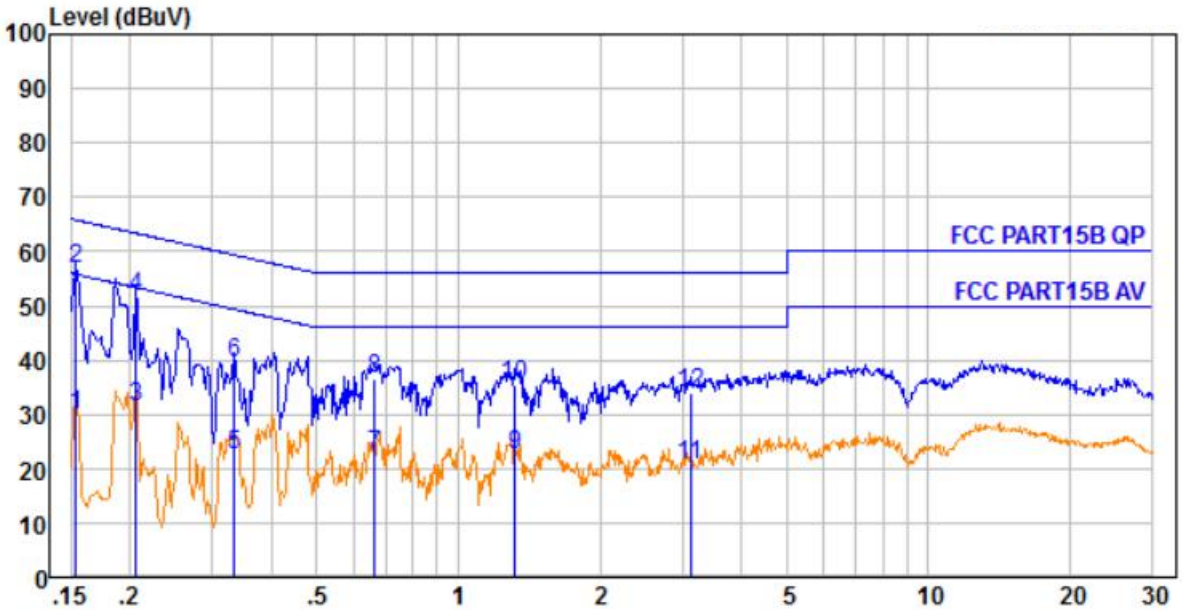
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

Pass.

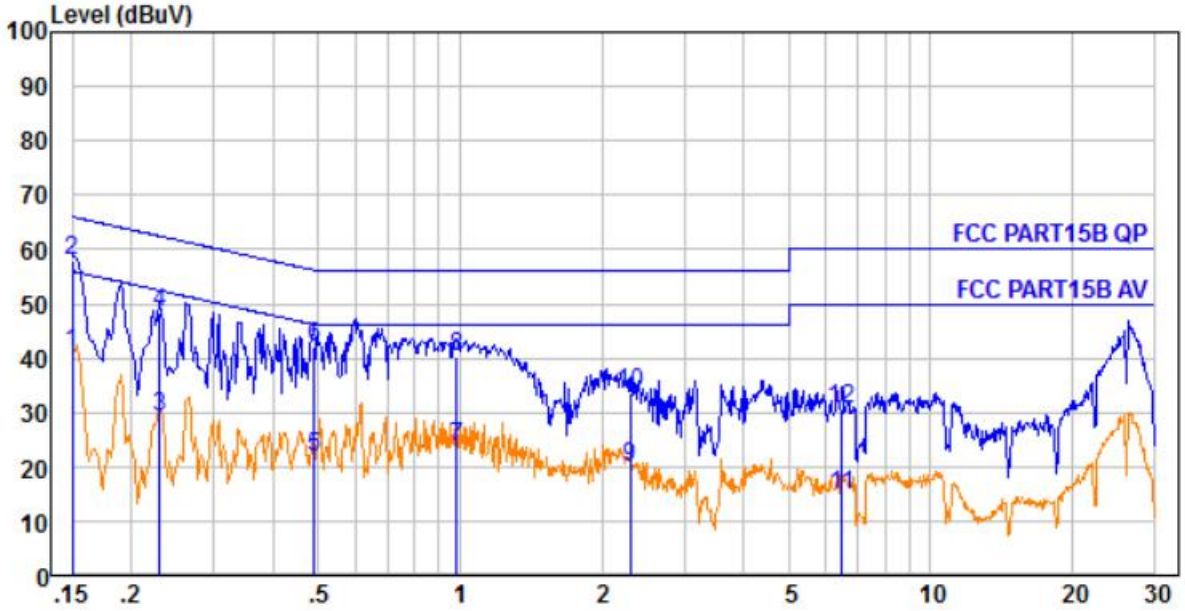
All the modulation modes and all adapters were tested the data of the worst mode (AC 120V/60Hz, TX:802.11b 2.412 GHz, adapter YJS0515D-(Dongguan Yingju Power Co., Ltd.)) are recorded in the following pages and the others modulation methods do not exceed the limits.

Line -120V/60Hz:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBµV	Emission Level dBµV	Limit dBµV	Over Limit dB	Remark
1.	0.154	0.21	9.59	20.18	29.98	55.78	-25.80	Average
2.	0.154	0.21	9.59	46.93	56.73	65.78	-9.05	QP
3.	0.206	0.29	9.59	21.44	31.32	53.36	-22.04	Average
4.	0.206	0.29	9.59	41.91	51.79	63.36	-11.57	QP
5.	0.334	0.38	9.60	12.38	22.36	49.35	-26.99	Average
6.	0.334	0.38	9.60	29.38	39.36	59.35	-19.99	QP
7.	0.665	0.44	9.61	12.30	22.35	46.00	-23.65	Average
8.	0.665	0.44	9.61	26.34	36.39	56.00	-19.61	QP
9.	1.324	0.46	9.61	12.29	22.36	46.00	-23.64	Average
10.	1.324	0.46	9.61	25.29	35.36	56.00	-20.64	QP
11.	3.123	0.47	9.63	10.73	20.83	46.00	-25.17	Average
12.	3.123	0.47	9.63	23.72	33.82	56.00	-22.18	QP

Neutral -120V/60Hz:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBµV	Emission Level dBµV	Limit dBµV	Over Limit dB	Remark
1.	0.150	0.21	9.60	31.12	40.93	56.00	-15.07	Average
2.	0.150	0.21	9.60	48.14	57.95	66.00	-8.05	QP
3.	0.230	0.31	9.61	19.34	29.26	52.44	-23.18	Average
4.	0.230	0.31	9.61	38.55	48.47	62.44	-13.97	QP
5.	0.489	0.43	9.63	11.58	21.64	46.19	-24.55	Average
6.	0.489	0.43	9.63	31.83	41.89	56.19	-14.30	QP
7.	0.984	0.46	9.64	13.51	23.61	46.00	-22.39	Average
8.	0.984	0.46	9.64	30.11	40.21	56.00	-15.79	QP
9.	2.297	0.47	9.65	9.97	20.09	46.00	-25.91	Average
10.	2.297	0.47	9.65	23.51	33.63	56.00	-22.37	QP
11.	6.488	0.54	9.75	4.46	14.75	50.00	-35.25	Average
12.	6.488	0.54	9.75	20.47	30.76	60.00	-29.24	QP

6 Radiated Spurious Emissions

Test Requirement	:	Please refer to FCC §15.205 and §15.209 Please refer to FCC §15.247 (a)(d)(e)
Test Method	:	ANSI C63.10:2013
Test Result	:	PASS
Measurement Distance	:	3m
Limit	:	See the follow table

<table>
<tr><td colspan="4">The field strength of emissions from intentional radiators operated within these frequency bands</td></tr>
<tr><td>Frequency
(MHz)</td><td>Field strength of
Fundamental</td><td>Field strength of
Harmonics</td><td>Distance (m)</td></tr>
<tr><td>902 - 928</td><td>50 mV/m
(94dBuV/m)</td><td>500 uV/m
(54dBuV/m)</td><td>3</td></tr>
<tr><td>2400 – 2483.5</td><td>50 mV/m
(94dBuV/m)</td><td>500 uV/m
(54dBuV/m)</td><td>3</td></tr>
<tr><td>5725 – 5875</td><td>50 mV/m
(94dBuV/m)</td><td>500 uV/m
(54dBuV/m)</td><td>3</td></tr>
<tr><td colspan="4">Emissions radiated outside of the specified frequency bands</td></tr>
<tr><td>Frequency Range
(MHz)
30 - 88</td><td>Field Strength Limit
(uV/m) at 3 m
100</td><td colspan="2">Field Strength Limit
(dBuV/m) at 3 m
Quasi-Peak</td></tr>
<tr><td>30 - 88</td><td>100</td><td colspan="2">40</td></tr>
<tr><td>88 - 216</td><td>150</td><td colspan="2">43.5</td></tr>
<tr><td>216 - 960</td><td>200</td><td colspan="2">46</td></tr>
<tr><td>Above 960</td><td>500</td><td colspan="2">54</td></tr>
<tr><td rowspan="2">Above 1000</td><td rowspan="2">500</td><td>Peak</td><td>Average</td></tr>
<tr><td>74</td><td>54</td></tr>
</table>

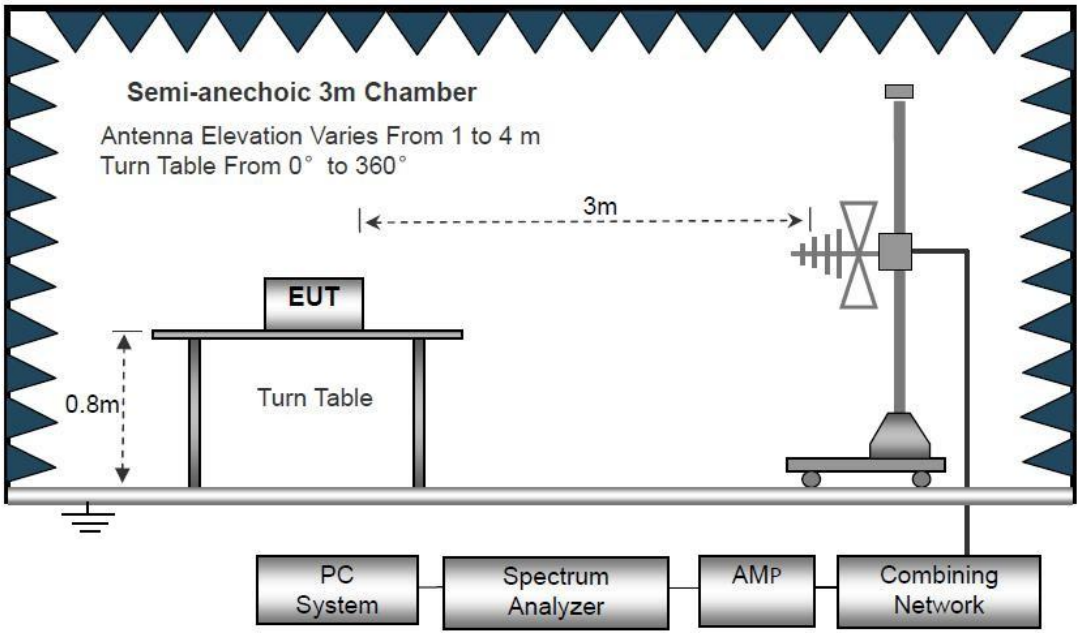
6.1 EUT Operation

Operating Environment :

Temperature	:	23.5 °C
Humidity	:	51.1 % RH
Atmospheric Pressure	:	101.2kPa

6.2 Test Setup

The test setup for emission measurement from 30 MHz to 1 GHz.



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

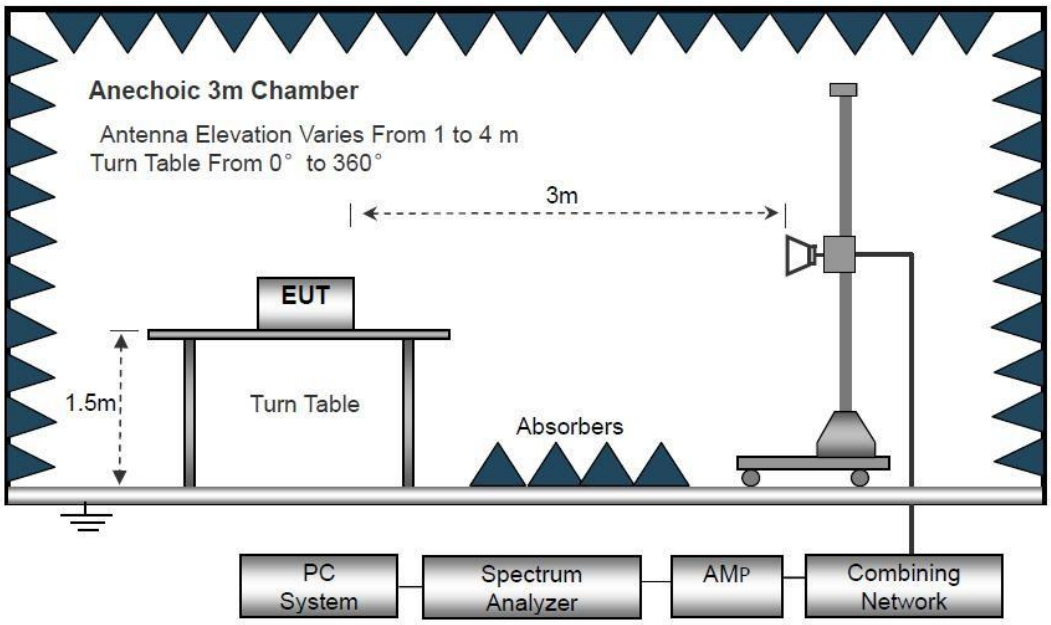
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration)

The test setup for emission measurement above 1 GHz.



The setting of the spectrum analyser

RBW	1M
VBW	3M/10Hz for Average
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test

in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

6. For measurement above 1GHz, the emission measurement will be measured by the peak detector and the AV detector.

7. For fundamental frequency test, set spectrum analyzer's RBW=3MHz, VBW=10MHz. peak detector for PK, RMS detector for AV, Read the Level in spectrum analyzer and record.

8. According exploratory test no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

6.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
8. All model is tested and 802.11B CH1 TX is worst case for recorded.

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

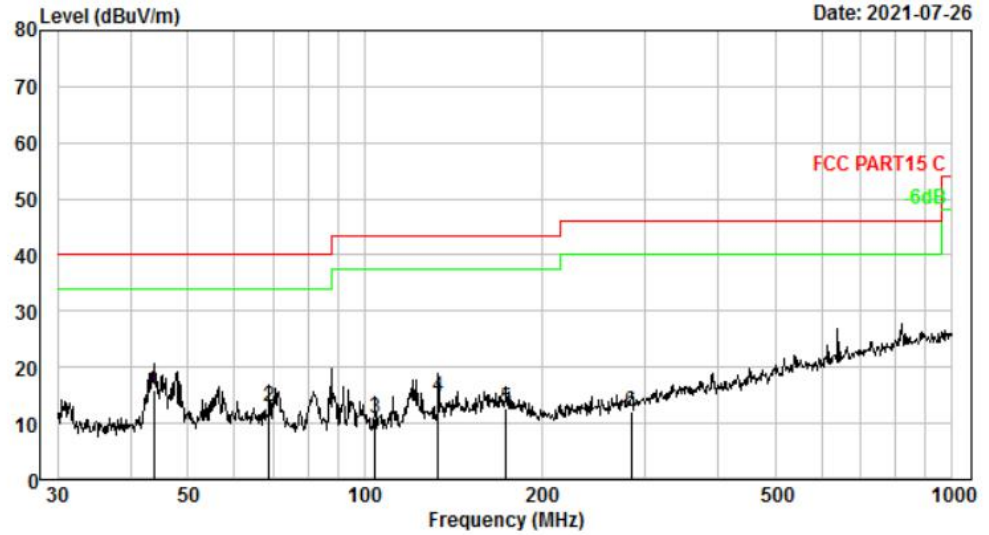
The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported,test with adapter HW-100400C00.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

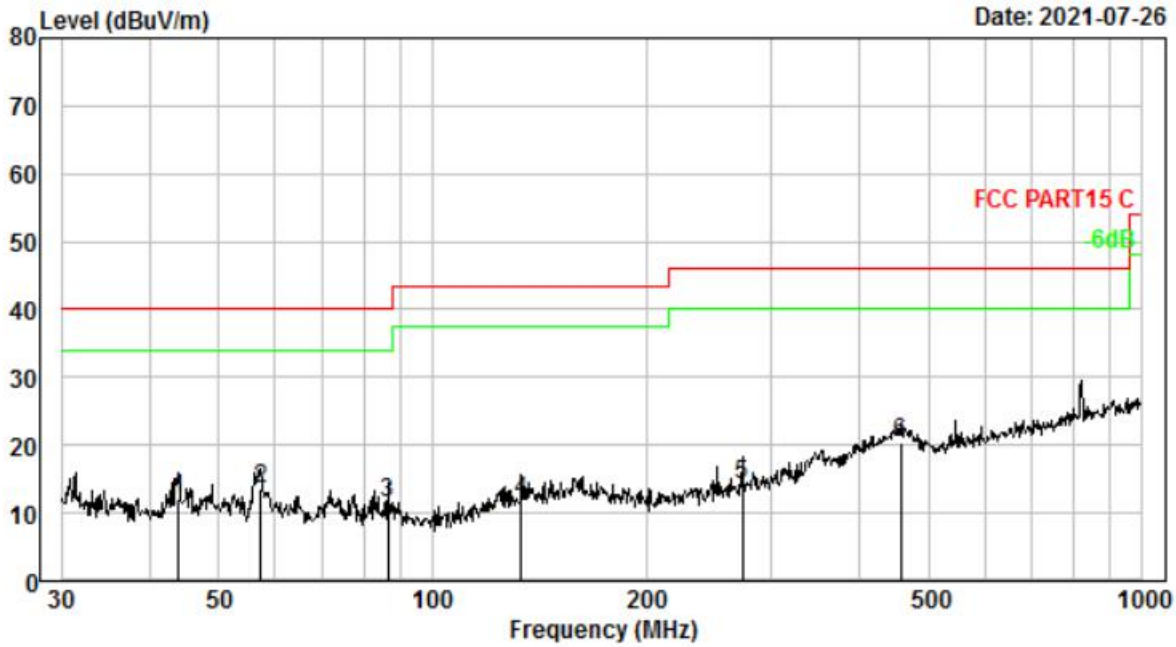
Please refer to the following test plots:

(CH1, TX mode, 802/11B. VERTICAL)



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	43.659	1.85	12.25	31.62	29.91	15.81	40.00	-24.19	QP
2.	68.631	2.63	10.34	29.93	29.95	12.95	40.00	-27.05	QP
3.	104.170	3.34	10.11	27.45	29.99	10.91	43.50	-32.59	QP
4.	133.151	3.77	12.88	28.24	30.01	14.88	43.50	-28.62	QP
5.	173.814	4.22	12.98	25.42	30.03	12.59	43.50	-30.91	QP
6.	283.979	5.07	12.99	24.21	30.28	11.99	46.00	-34.01	QP

((CH1, TX mode, 802/11B., HORIZONTAL)



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	43.812	1.86	12.25	27.88	29.91	12.08	40.00	-27.92	QP
2.	57.191	2.31	11.92	29.22	29.93	13.52	40.00	-26.48	QP
3.	86.503	3.02	8.85	29.50	29.98	11.39	40.00	-28.61	QP
4.	133.151	3.77	12.88	25.02	30.01	11.66	43.50	-31.84	QP
5.	273.234	5.00	12.84	26.73	30.26	14.31	46.00	-31.69	QP
6.	457.507	5.89	16.09	29.10	30.82	20.26	46.00	-25.74	QP

Margin=Emission Level-Limit

.

SPURIOUS EMISSIONS (1~18GHz)

Freq (MHz)	Read level (dBμV)	Antenna Factor (dB/m)	PRM Factor(dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector type	Polarization
11b CH1									
1329.00	49.74	24.73	29.37	4.49	49.59	74.00	-24.41	Peak	VERTICAL
4824.00	33.26	33.73	29.32	8.50	46.17	54.00	-7.83	Average	VERTICAL
4824.00	45.09	33.73	29.32	8.50	58.00	74.00	-16.00	Peak	VERTICAL
7236.00	33.68	36.39	30.52	10.63	50.18	74.00	-23.82	Peak	VERTICAL
1329.00	44.23	24.73	29.37	4.49	44.08	74.00	-29.92	Peak	HORIZONTAL
4824.00	36.60	33.73	29.32	8.50	49.51	54.00	-4.49	Average	HORIZONTAL
4824.00	49.27	33.73	29.32	8.50	62.18	74.00	-11.82	Peak	HORIZONTAL
7236.00	36.28	36.39	30.52	10.63	52.78	74.00	-21.22	Peak	HORIZONTAL
11b CH6									
1322.00	44.36	24.70	29.37	4.49	44.18	74.00	-29.82	Peak	HORIZONTAL
4874.00	36.07	33.72	29.33	8.56	49.02	54.00	-4.98	Average	HORIZONTAL
4874.00	51.23	33.72	29.33	8.56	64.18	74.00	-9.82	Peak	HORIZONTAL
7311.00	37.86	36.45	30.57	10.69	54.43	74.00	-19.57	Peak	HORIZONTAL
1329.00	52.05	24.73	29.37	4.49	51.90	74.00	-22.10	Peak	VERTICAL
4874.00	33.27	33.72	29.33	8.56	46.22	54.00	-7.78	Average	VERTICAL
4874.00	44.33	33.72	29.33	8.56	57.28	74.00	-16.72	Peak	VERTICAL
7311.00	36.49	36.45	30.57	10.69	53.06	74.00	-20.94	Peak	VERTICAL
11b CH11									
1329.00	51.82	24.73	29.37	4.49	51.67	74.00	-22.33	Peak	VERTICAL

4924.00	33.00	33.71	29.34	8.60	45.97	54.00	-8.03	Average	VERTICAL
4924.00	44.33	33.71	29.34	8.60	57.30	74.00	-16.70	Peak	VERTICAL
7386.00	36.64	36.51	30.65	10.75	53.25	74.00	-20.75	Peak	VERTICAL
1329.00	44.82	24.73	29.37	4.49	44.67	74.00	-29.33	Peak	HORIZONTAL
4924.00	36.98	33.71	29.34	8.60	49.95	54.00	-4.05	Average	HORIZONTAL
4924.00	53.81	33.71	29.34	8.60	66.78	74.00	-7.22	Peak	HORIZONTAL
7386.00	39.46	36.51	30.65	10.75	56.07	74.00	-17.93	Peak	HORIZONTAL

Note: 1. 30MHz~18GHz: (Scan with 11b, 11g, the worst case is 11b Mode)

2. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

Note2: All other emissions are attenuated 20dB below the limit, so it does not record.

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

RESTRICTED BANDEDGE

Mode 11b CH1

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	2390.04	37.41	29.99	30.21	5.17	42.36	74.00	-31.64	Peak	HORIZONTAL

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2390.04	35.39	29.99	30.21	5.17	40.34	74.00	-33.66	Peak	VERTICAL

Mode 11b CH11

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2480.50	37.26	30.25	30.25	5.31	42.57	74.00	-31.43	Peak	HORIZONTAL
2	2483.50	35.61	30.25	30.25	5.31	40.92	74.00	-33.08	Peak	HORIZONTAL

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	33.74	30.25	30.25	5.31	39.05	74.00	-34.95	Peak	VERTICAL
2	2487.60	37.60	30.30	30.25	5.31	42.96	74.00	-31.04	Peak	VERTICAL

Mode 11g CH1

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2390.00	34.33	29.99	30.21	5.17	39.28	74.00	-34.72	Peak	VERTICAL

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2390.00	36.90	29.99	30.21	5.17	41.85	74.00	-32.15	Peak	HORIZONTAL

Mode 11g CH11

Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2483.50	49.06	30.25	30.25	5.31	54.37	74.00	-19.63	Peak	HORIZONTAL
2	2483.50	37.60	30.25	30.25	5.31	42.91	54.00	-11.09	Average	HORIZONTAL

Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
2	2483.50	47.52	30.25	30.25	5.31	52.83	74.00	-21.17	Peak	VERTICAL
3	2483.50	35.20	30.25	30.25	5.31	40.51	54.00	-13.49	Average	VERTICAL
4	2484.55	49.38	30.25	30.25	5.31	54.69	74.00	-19.31	Peak	VERTICAL
5	2484.55	36.20	30.25	30.25	5.31	41.51	54.00	-12.49	Average	VERTICAL

7 Emissions in non-restricted frequency bands

7.1 REQUIREMENT

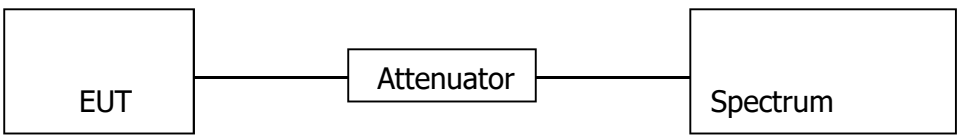
In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

7.2 TEST PROCEDURE

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100KHz
VBW	300KHz
Trace	Max hold
Sweep	Auto couple

.

7.3 TEST SETUP

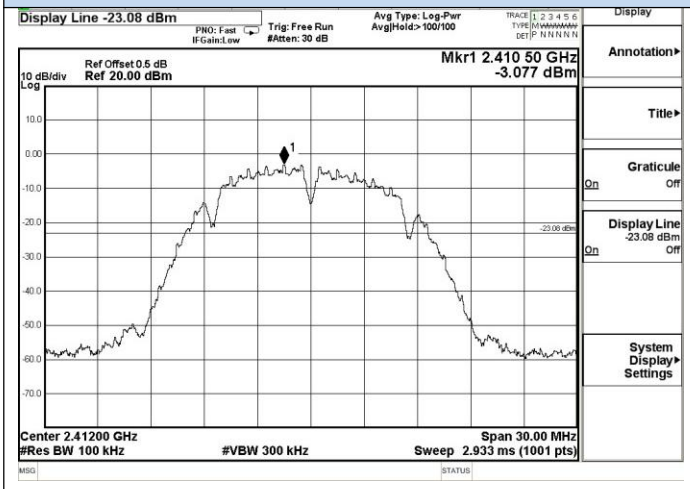
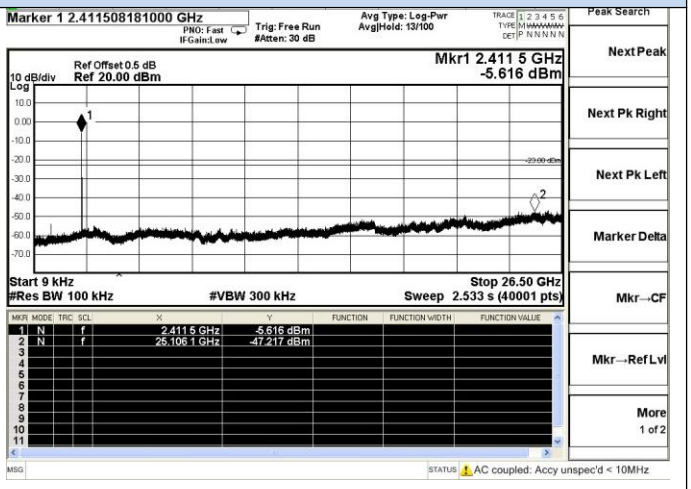
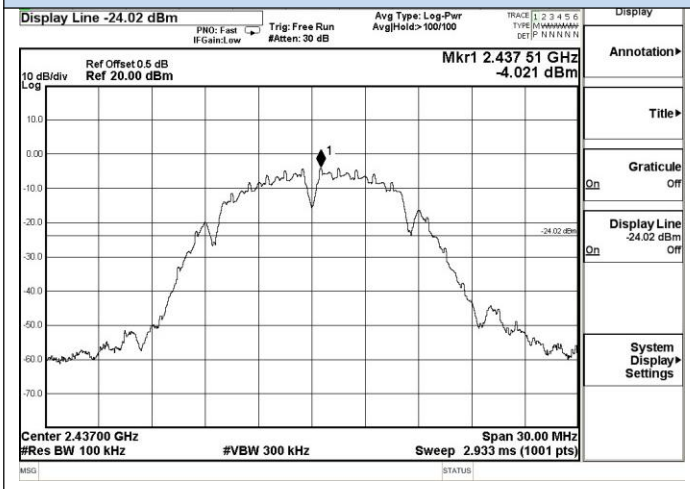
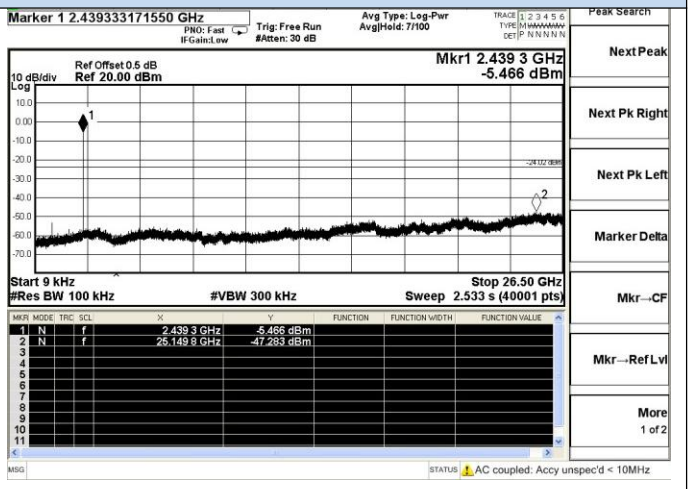


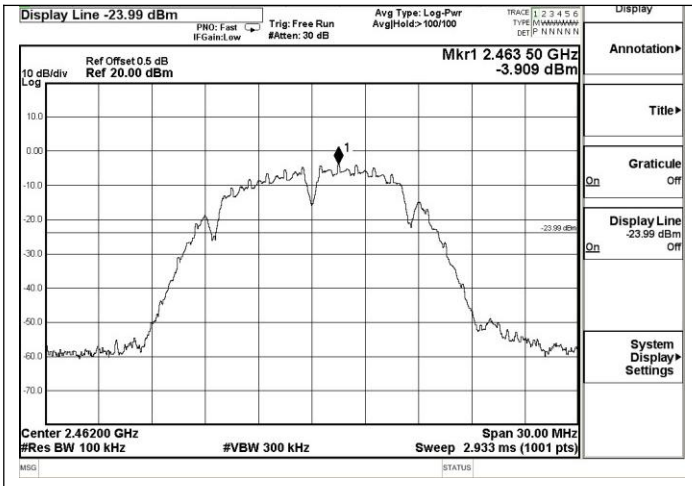
7.4 EUT OPERATION CONDITIONS

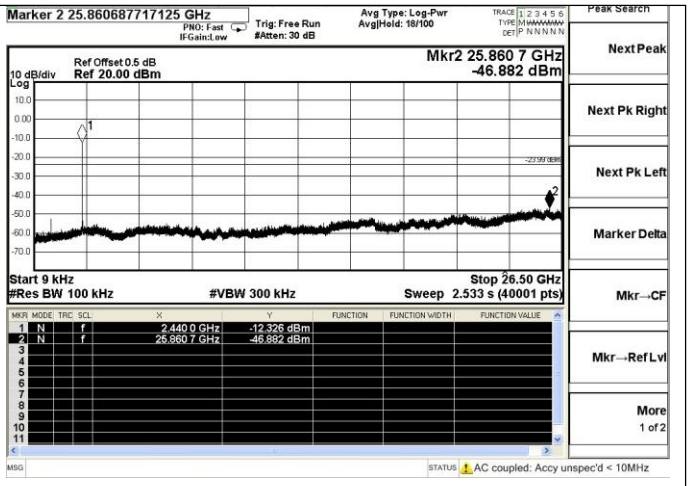
Test Mode: Transmitting mode

7.5 TEST RESULTS

EUT Set Mode	CH or Frequency	Measured Range	Result (dBm)
11b	CH1	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
		2.3GHz-2.43GHz	PASS
	CH6	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
	CH11	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
		2.45GHz-2.6GHz	PASS
11g	CH1	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
		2.3GHz-2.43GHz	PASS
	CH6	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
	CH11	30MHz-1GHz	PASS
		1GHz-25GHz	PASS
		2.45GHz-2.6GHz	PASS

RF Conducted Spurious Emissions	
IEEE 802.11b	
	
2397 – 2427 MHz	*9 KHz – 26.5 GHz*
	
2422 – 2452 MHz	*9 KHz – 26.5 GHz*

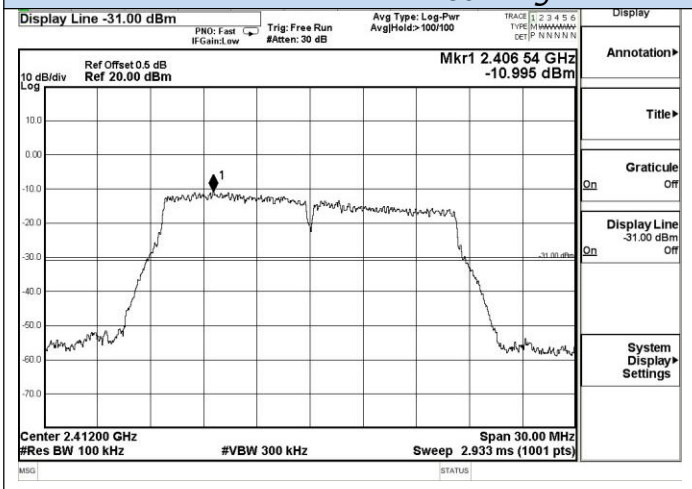


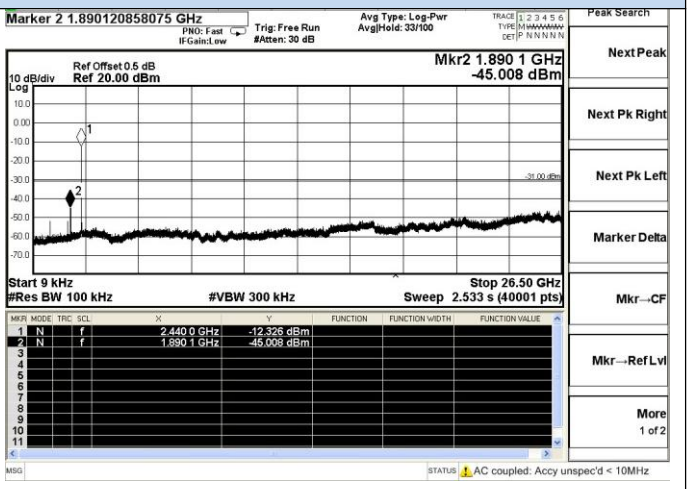


2447 – 2477 MHz	*9 KHz – 26.5 GHz*

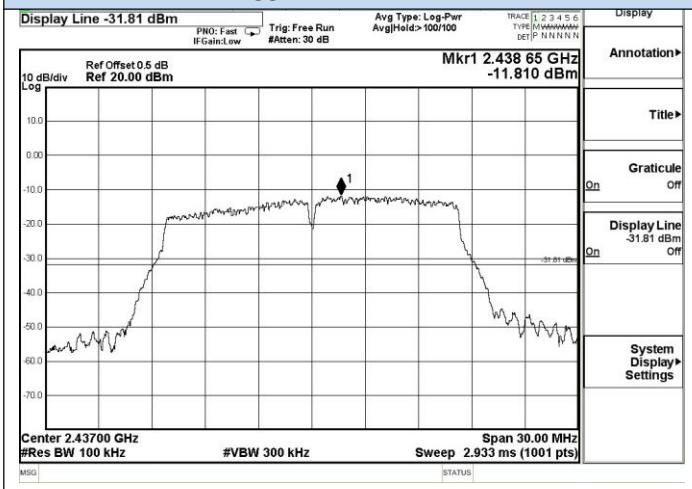
RF Conducted Spurious Emissions

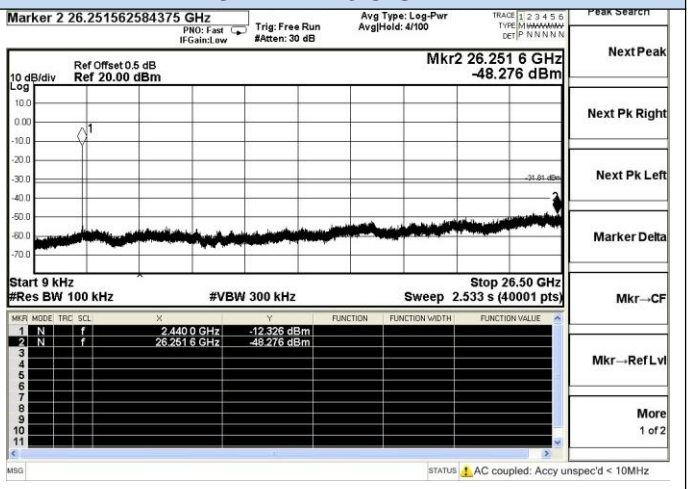
IEEE 802.11g



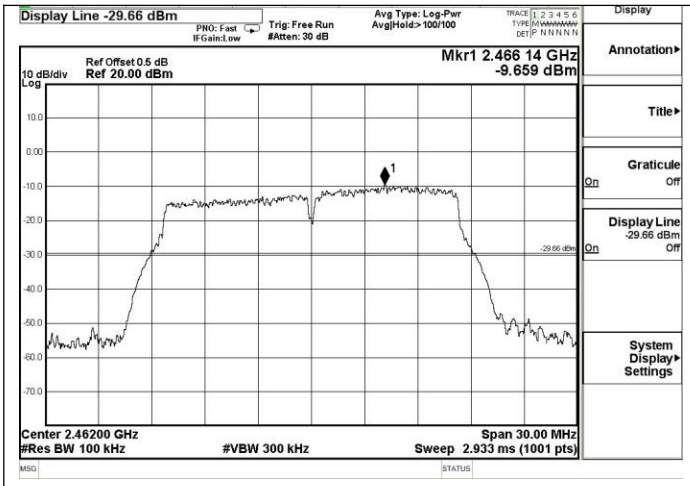


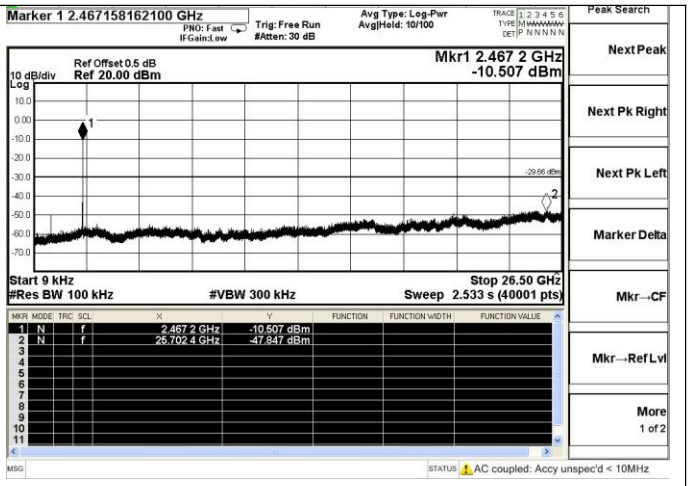
2397 – 2427 MHz	*9 KHz – 26.5 GHz*





2422 – 2452 MHz	*9 KHz – 26.5 GHz*





2447 – 2477 MHz	*9 KHz – 26.5 GHz*

8 6 dB Bandwidth Measurement

Test Requirement	:	For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 KHz
Test Method	:	ANSI C63.10:2013

8.1 Test Procedure

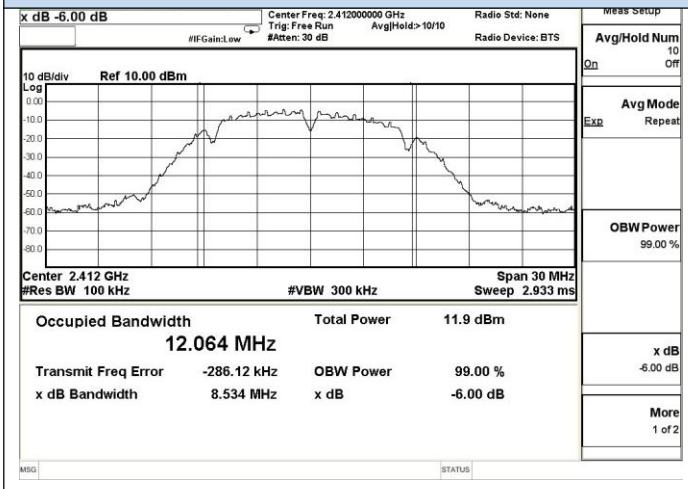
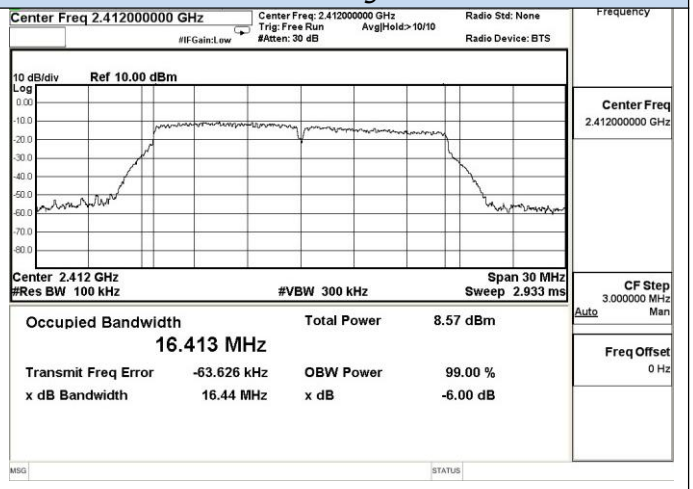
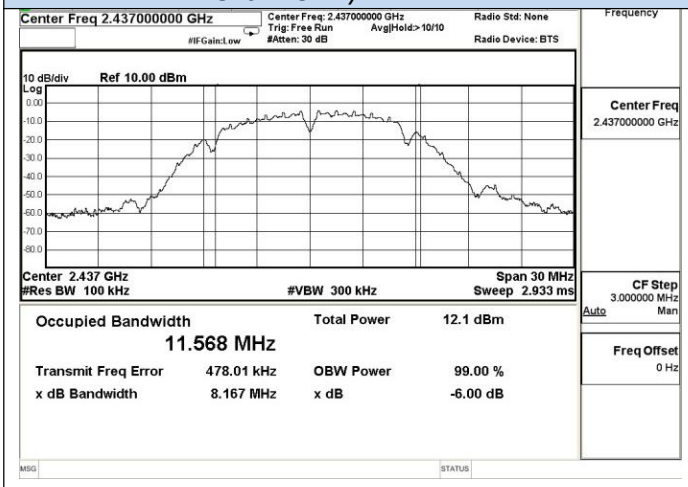
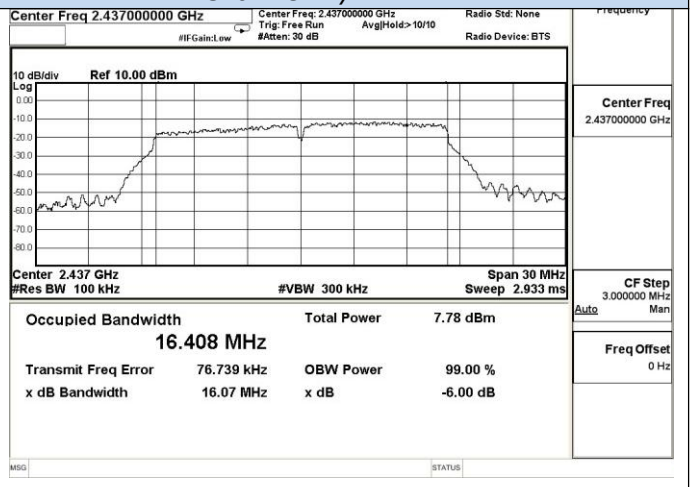
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

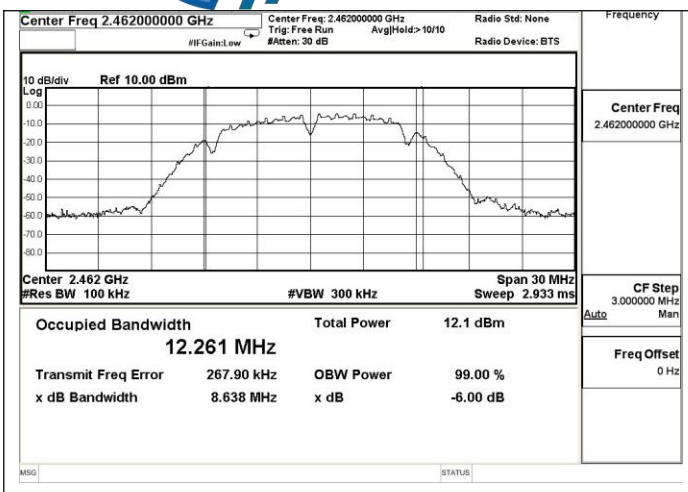
2. Set the spectrum analyzer:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Trace	Max hold
Sweep	Auto couple

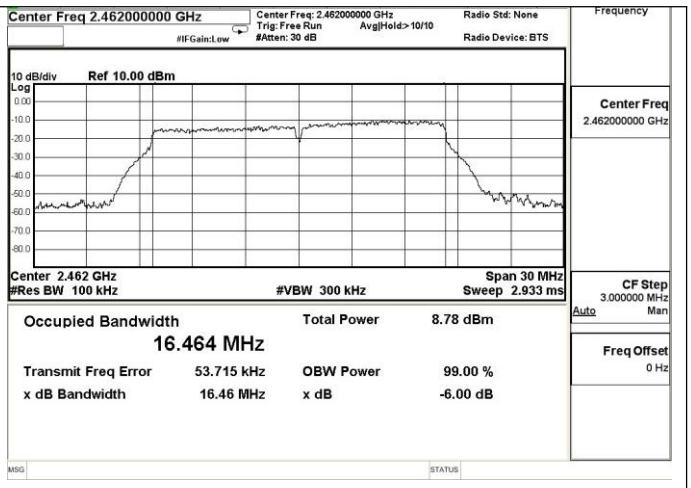
8.2 Test Result

EUT Set Mode	CH or Frequency	6 dB bandwidth	limits	Verdict
		Result (MHz)	Result (MHz)	
11b	CH1	8.534	0.5	pass
	CH6	8.167		pass
	CH11	8.638		pass
11g	CH1	16.44		pass
	CH6	16.07		pass
	CH11	16.46		pass

6 dB Bandwidth	
IEEE 802.11b	*IEEE 802.11g*
	
Channel 1 / 2412 MHz	*Channel 1 / 2412 MHz*
	
Channel 6 / 2437 MHz	*Channel 6 / 2437 MHz*



Channel 11 / 2462 MHz



Channel 11 / 2462 MHz

9 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

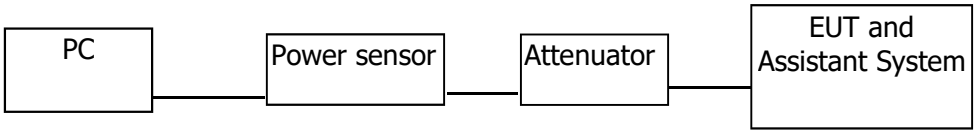
Test Limit : For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.1 Test Procedure

(1) Connect each EUT's antenna output to power sensor by RF cable and attenuator

(2) Measure out the Average and PK output power of each antenna port by power meter.

(3) TEST SETUP



9.2 Test Result

EUT Set Mode	CH	Result(dBm)	Limits(dBm)	Verdict
		Peak		
11b	CH1	12.05	30	pass
	CH6	11.08		
	CH11	10.92		
11g	CH1	11.40	30	pass
	CH6	10.98		
	CH11	11.67		

1. *Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g;*

10 Power Spectral Density

Test Requirement	:	FCC CFR47 Part 15 Section 15.247
Test Method	:	ANSI C63.10:2013
Test Limit	:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.
Test Mode	:	transmitting

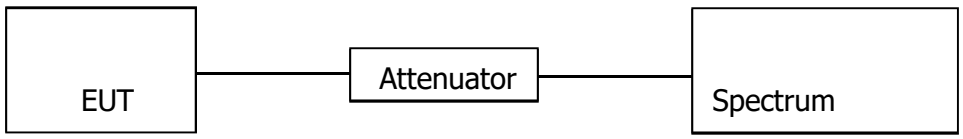
10.1 Test Procedure

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

2. Set the spectrum analyzer:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	3 kHz ≤ RBW ≤ 100 kHz
VBW	≥ 3RBW
Trace	Max hold
Sweep	Auto couple

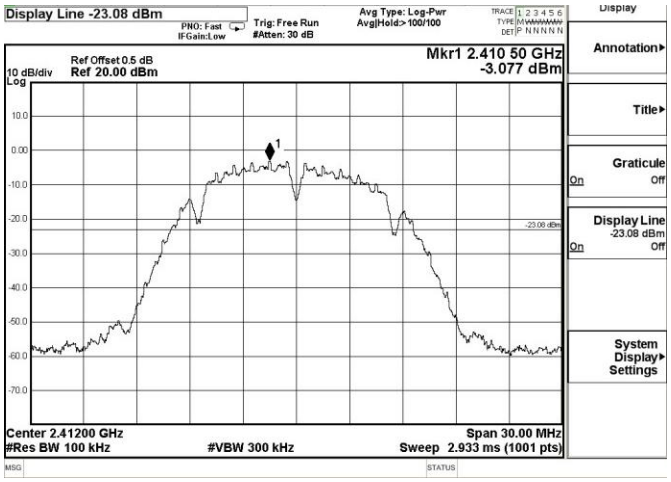
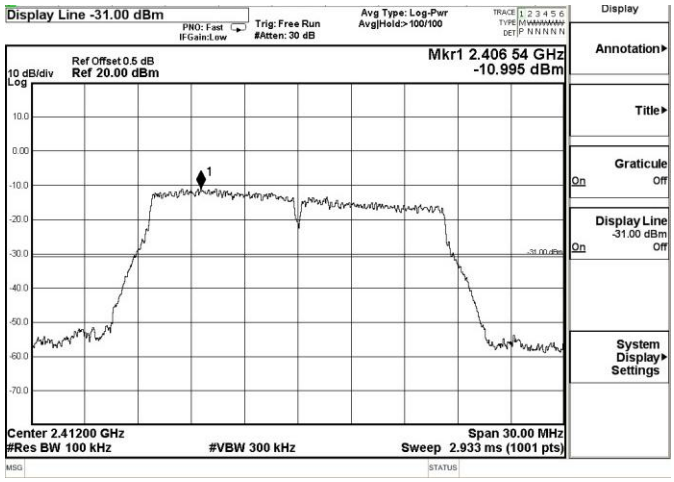
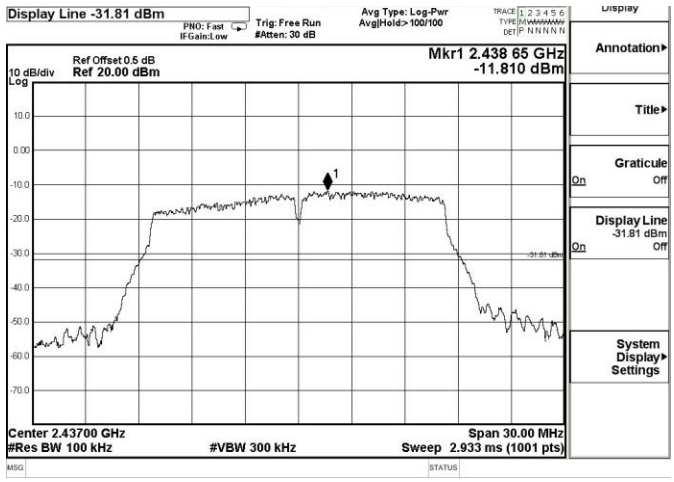
3. TEST SETUP

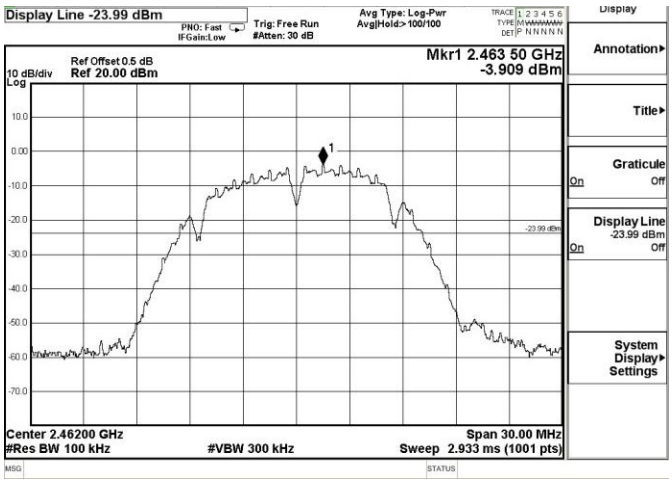


10.2 Test Result

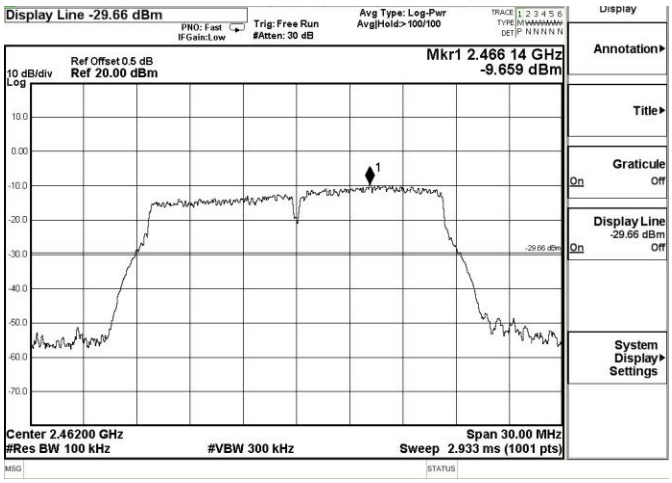
Test Mode:	Transmitting mode

EUT Set Mode	CH or Frequency	Measured Peak Power Spectral Density (dBm/100KHz)	EUT Set Mode	CH or Frequency	Measured Peak Power Spectral Density (dBm/100KHz)
11b	CH1	-3.077	11g	CH1	-10.995
	CH6	-4.021		CH6	-11.810
	CH11	-3.909		CH11	-9.659
Limit: 8dBm/3 kHz					

Peak Power Spectrum Density	
IEEE 802.11b	*IEEE 802.11g*
	
Channel 1 / 2412 MHz	*Channel 1 / 2412 MHz*
	
Channel 6 / 2437 MHz	*Channel 6 / 2437 MHz*



Channel 11 / 2462 MHz



Channel 11 / 2462 MHz

11 Antenna Requirement

11.1 Antenna Requirement

Please refer to FCC §15.203

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

11.2 Result

EUT has an Integrated antenna without antenna connector.

The EUT'S antenna, permanent attached antenna, is Internal PCB Antenna. The antenna's gain is less than 0dBi and meets the requirement.

******THE END REPORT******