FCC TEST REPORT

FCC ID: 2ASNQ-Q19

Product	:	qBiq
Model Name	:	Q19XV010, Q19XV011
Brand	:	Ubiqweus
Report No.	:	PTC18121901901E-FC01

Prepared for

Ubiqweus Inc.

567 Davis Drive Newmarket, Ontario, Canada L3Y 2P5

Prepared by

Dongguan Precise Testing & Certification Corp., Ltd.

Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China

1 TEST RESULT CERTIFICATION

Applicant's name	:	Ubiqweus Inc.
Address	:	567 Davis Drive Newmarket, Ontario, Canada L3Y 2P5
Manufacture's name	:	Dongguan Meina Electronics Co.,Ltd
Address	:	Building 80, Sanjiang Industrial Area, Hengli Town, Dongguan City, China
Product name	:	qBiq
Model name	:	Q19XV010, Q19XV011
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10:2013
Test Date	:	March 01, 2019 to March 12, 2019
Date of Issue	:	March 12, 2019
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.

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Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

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2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Spurious Emission	15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(1)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203	PASS

2.1 Test Site

Dongguan Precise Testing & Certification Corp., Ltd.

Address: Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

3 General Information

3.1 General Description of E.U.T.

Product Name	:	qBiq
Model Name	:	Q19XV010, Q19XV011 (Note: The samples are the same except model number. So Q19XV010 was selected for full tested.)
Operating frequency	:	2412-2462MHz
Number of Channels	:	11
Type of Modulation	:	802.11b: DSSS(DBPSK/DQPSK/CCK) 802.11g/n: OFDM(BPSK/QPSK/16QAM/64QAM)
Antenna installation	:	Internal Antenna
Antenna Gain	:	0dBi
Hardware Version	:	V:0
Software Version	:	QMCU_A2.Y0.60

3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

Frequency and Channel list for 802.11 b/g/n (HT20):

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

Test Frequency and Channel for 802.11 b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Sep.19, 2019
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Sep.19, 2019
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Sep.19, 2019
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Sep.19, 2019
Antenna Connector	Florida RF Labs	N/A	RF01#	N/A	Sep.19, 2019

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(Test Frequency from 9KHz-25GHz)

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-26.5GHz	Sep.19, 2019
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Sep.19, 2019
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Sep.19, 2019
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep.19, 2019
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep.19, 2019
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Sep.19, 2019
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Sep.19, 2019
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Sep.25, 2019
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Sep.19, 2019
RF Cable	R&S	R204	R21X	1GHz-40GHz	Sep.19, 2019

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep.19, 2019
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	9KHz-300MHz	Sep.19, 2019
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Sep.19, 2019

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.
Adapter	Model: PS65B150Y3000S Input: AC100-240V, 50/60Hz, 1.5A Output: DC 5V, 3000mA	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

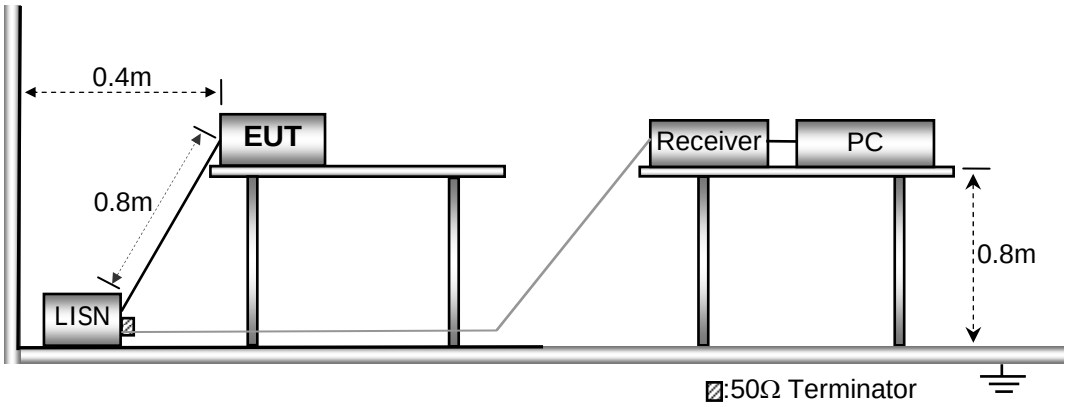
5.1 E.U.T. Operation

Operating Environment **:**

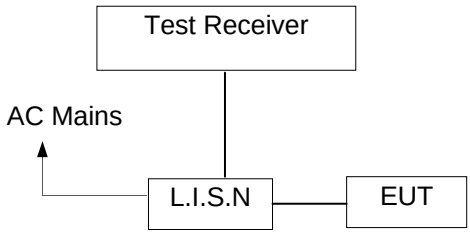
Temperature	:	25.5 °C
Humidity	:	51 % RH
Atmospheric Pressure	:	101.2kPa

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

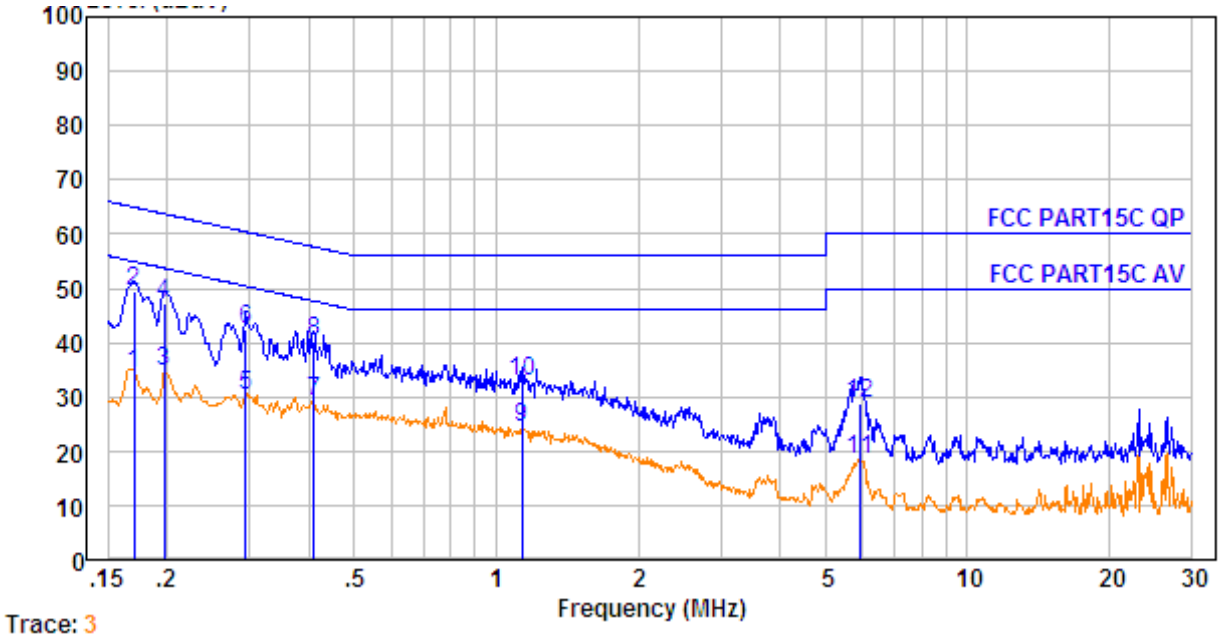
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

Pass.

All the modulation modes were tested the data of the worst mode (AC 120V/60Hz, 802.11b TX 2412MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

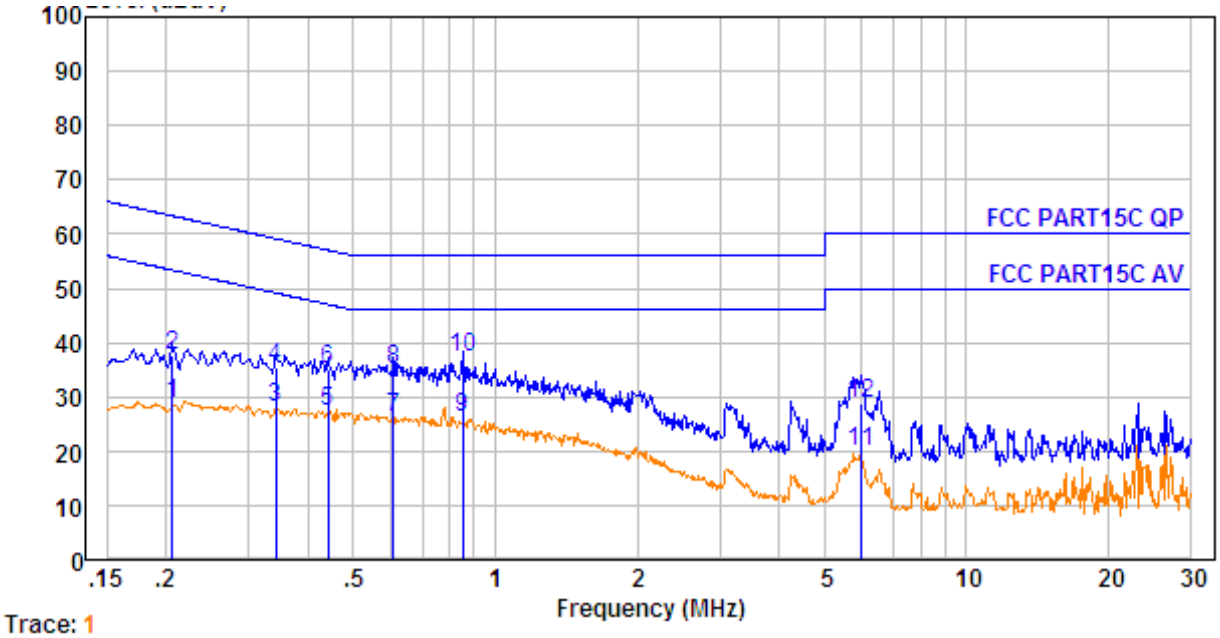
Line-AC 120V/60Hz



Trace: 3

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.170	0.24	9.54	24.58	34.36	54.94	-20.58	Average
2.	0.170	0.24	9.54	39.65	49.43	64.94	-15.51	QP
3.	0.198	0.28	9.59	24.72	34.59	53.71	-19.12	Average
4.	0.198	0.28	9.59	37.44	47.31	63.71	-16.40	QP
5.	0.294	0.37	9.67	20.20	30.24	50.41	-20.17	Average
6.	0.294	0.37	9.67	32.25	42.29	60.41	-18.12	QP
7.	0.410	0.41	9.74	19.06	29.21	47.64	-18.43	Average
8.	0.410	0.41	9.74	30.12	40.27	57.64	-17.37	QP
9.	1.135	0.46	9.83	13.96	24.25	46.00	-21.75	Average
10.	1.135	0.46	9.83	22.65	32.94	56.00	-23.06	QP
11.	5.929	0.53	9.95	8.08	18.56	50.00	-31.44	Average
12.	5.929	0.53	9.95	18.23	28.71	60.00	-31.29	QP

Neutral-AC 120V/60Hz



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.206	0.29	9.63	18.96	28.88	53.36	-24.48	Average
2.	0.206	0.29	9.63	27.57	37.49	63.36	-25.87	QP
3.	0.343	0.39	9.73	17.79	27.91	49.13	-21.22	Average
4.	0.343	0.39	9.73	25.36	35.48	59.13	-23.65	QP
5.	0.442	0.42	9.78	16.98	27.18	47.02	-19.84	Average
6.	0.442	0.42	9.78	24.86	35.06	57.02	-21.96	QP
7.	0.608	0.44	9.82	15.85	26.11	46.00	-19.89	Average
8.	0.608	0.44	9.82	24.89	35.15	56.00	-20.85	QP
9.	0.853	0.45	9.84	15.92	26.21	46.00	-19.79	Average
10.	0.853	0.45	9.84	26.93	37.22	56.00	-18.78	QP
11.	5.961	0.53	9.98	9.28	19.79	50.00	-30.21	Average
12.	5.961	0.53	9.98	18.19	28.70	60.00	-31.30	QP

6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method : ANSI C63.10:2013

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

Operating Environment :

Temperature : 23.5 °C

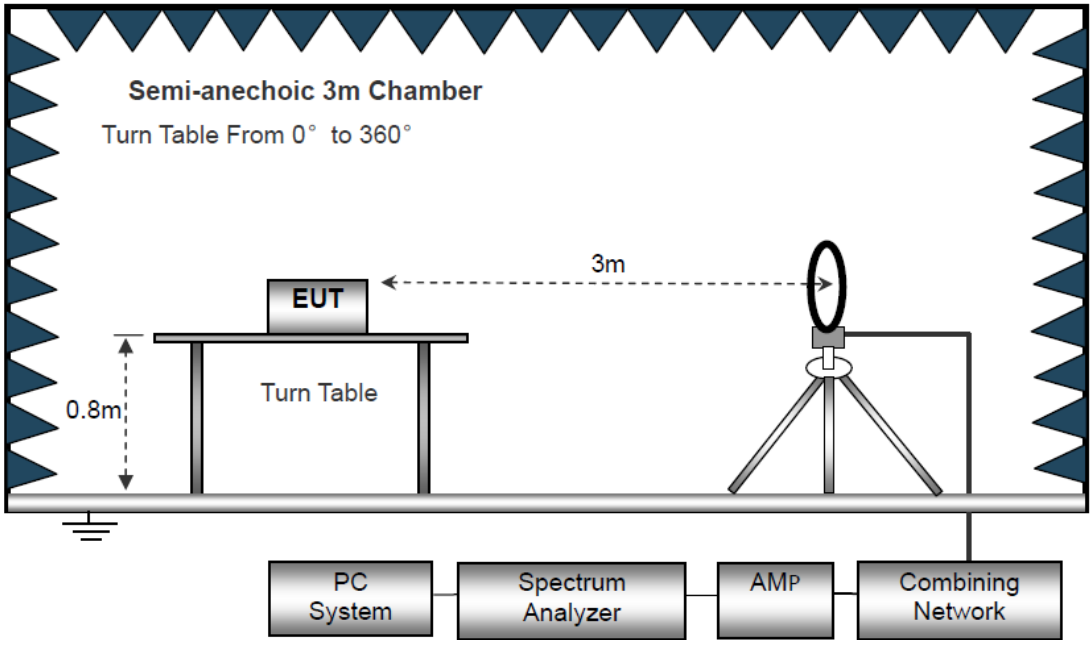
Humidity : 51.1 % RH

Atmospheric Pressure : 101.2kPa

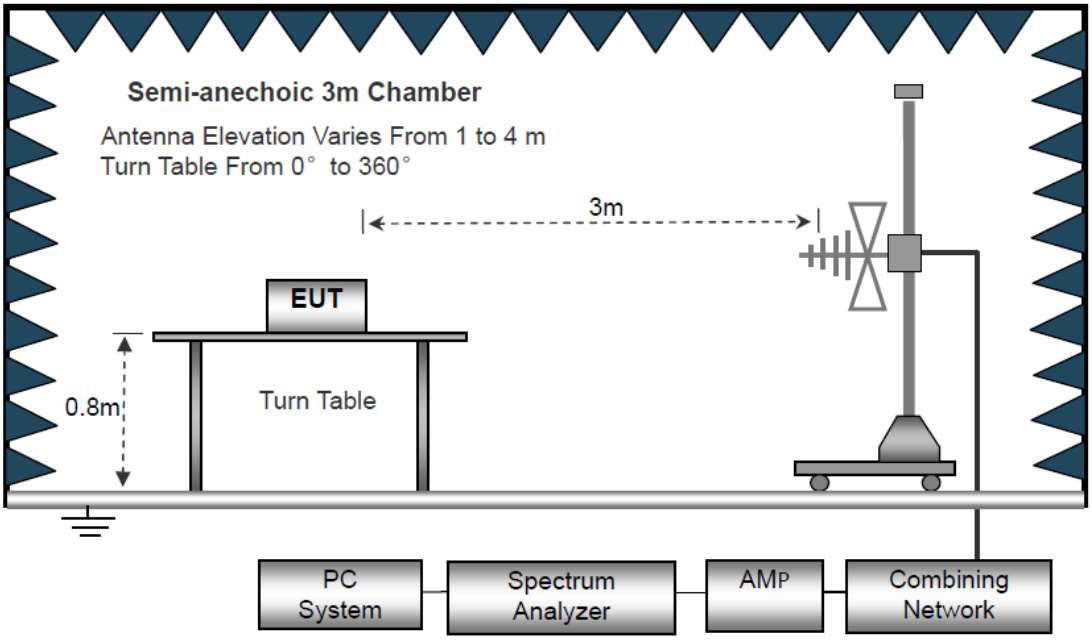
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

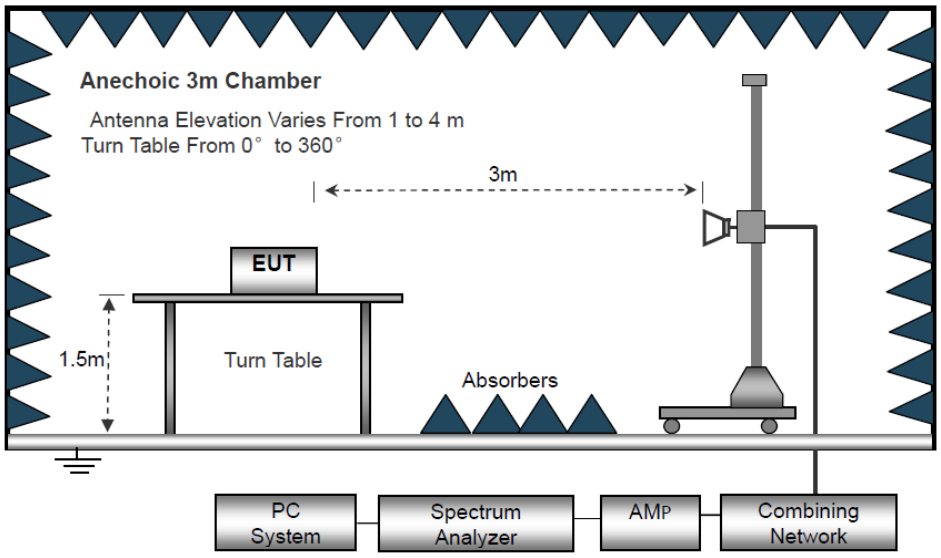
The test setup for emission measurement below 30MHz



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



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

Below 30MHz			
IF Bandwidth	:	10kHz	
Resolution Bandwidth	:	10kHz	
Video Bandwidth	:	10kHz	
30MHz ~ 1GHz			
Detector	:	PK	QP
Resolution Bandwidth	:	100kHz	120kHz
Video Bandwidth	:	300kHz	300kHz
Above 1GHz			
Detector	:	PK	AV
Resolution Bandwidth	:	1MHz	1MHz
Video Bandwidth	:	3MHz	10Hz

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.

8. 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.

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.

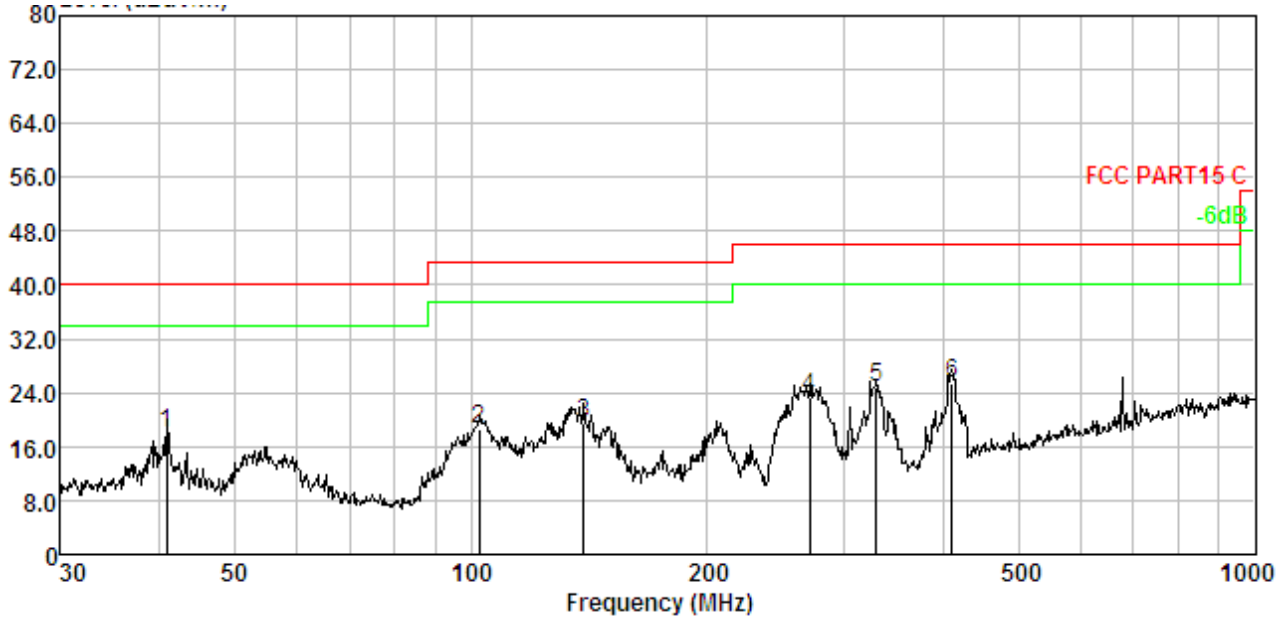
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Pass.

Please refer to the following test plots for the worst test mode (802.11b (CH01: 2412MHz)).

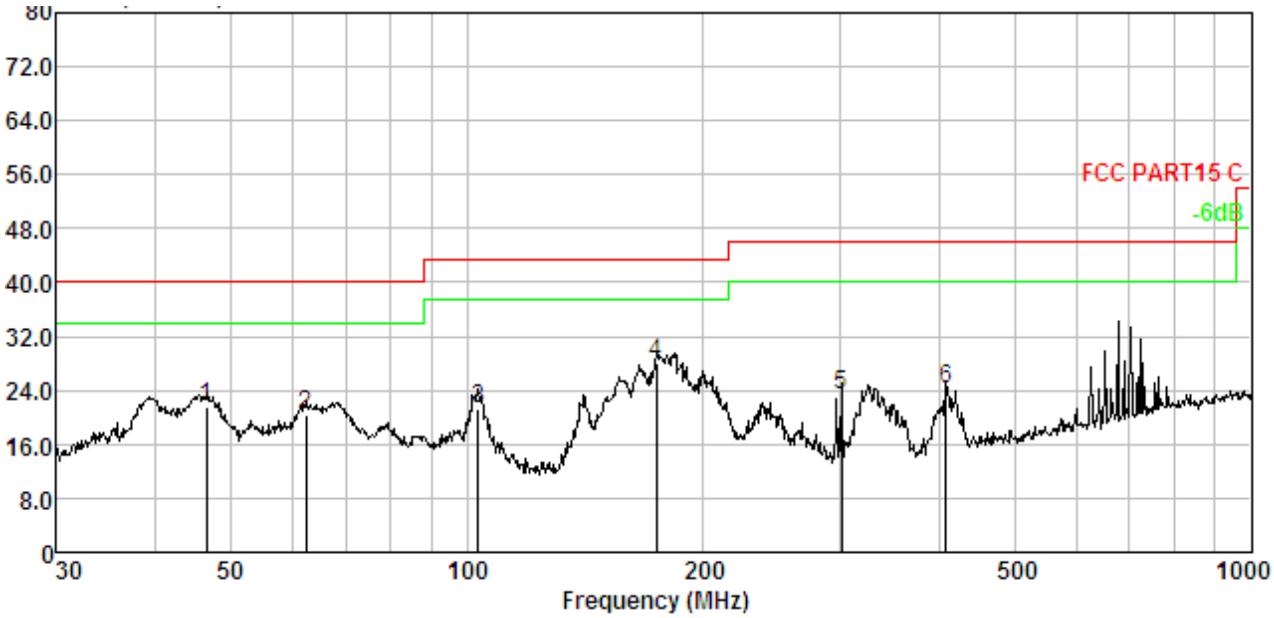
Antenna Polarization: Horizontal GFSK(CH00: 2402MHz)



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.	40.988	1.34	13.61	33.20	30.08	18.07	40.00	-21.93	QP
2.	102.360	2.17	10.44	36.40	30.40	18.61	43.50	-24.89	QP
3.	139.361	2.45	13.31	34.13	30.50	19.39	43.50	-24.11	QP
4.	270.375	3.05	12.49	38.45	30.73	23.26	46.00	-22.74	QP
5.	329.039	3.22	13.85	38.39	30.80	24.66	46.00	-21.34	QP
6.	410.383	3.42	15.52	37.29	30.88	25.35	46.00	-20.65	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Antenna Polarization: Vertical GFSK(CH00: 2402MHz)



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.	46.503	1.45	12.94	37.27	30.12	21.54	40.00	-18.46	QP
2.	62.431	1.72	12.01	36.86	30.22	20.37	40.00	-19.63	QP
3.	103.442	2.18	10.53	38.88	30.40	21.19	43.50	-22.31	QP
4.	174.424	2.65	12.93	42.91	30.58	27.91	43.50	-15.59	QP
5.	300.367	3.14	13.20	37.64	30.77	23.21	46.00	-22.79	QP
6.	408.946	3.42	15.49	36.23	30.88	24.26	46.00	-21.74	QP

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

Test Frequency 1GHz-25GHz:

Low Channel (2412MHz) Worst case 802.11g

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4824	24.36	AV	V	9.08	7.89	8.69	32.64	54	-21.36
4824	26.18	AV	H	9.08	7.89	8.69	34.46	54	-19.54
4824	30.22	PK	V	9.08	7.89	8.69	38.5	74	-35.5
4824	32.48	PK	H	9.08	7.89	8.69	40.76	74	-33.24
14238	27.56	AV	V	9.64	8.11	10.03	35.28	54	-18.72
14238	29.38	AV	H	9.64	8.11	10.03	37.1	54	-16.9
14238	33.12	PK	V	9.64	8.11	10.03	40.84	74	-33.16
14238	35.06	PK	H	9.64	8.11	10.03	42.78	74	-31.22

Middle Channel (2437MHz) Worst case 802.11n (HT20)

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4874	26.35	AV	V	9.08	8.29	9.23	34.49	54	-19.51
4874	28.41	AV	H	9.08	8.29	9.23	36.55	54	-17.45
4874	32.09	PK	V	9.08	8.29	9.23	40.23	74	-33.77
4874	36.59	PK	H	9.08	8.29	9.23	44.73	74	-29.27
15876	28.65	AV	V	11.35	9.15	10.48	38.67	54	-15.33
15876	30.43	AV	H	11.35	9.15	10.48	40.45	54	-13.55
15876	34.09	PK	V	11.35	9.15	10.48	44.11	74	-29.89
15876	36.15	PK	H	11.35	9.15	10.48	46.17	74	-27.83

High Channel (2462MHz) Worst case 802.11b

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4924	26.32	AV	V	9.05	8.29	8.97	34.69	54	-19.31
4924	28.14	AV	H	9.05	8.29	8.97	36.51	54	-17.49
4924	32.06	PK	V	9.05	8.29	8.97	40.43	74	-33.57
4924	35.18	PK	H	9.05	8.29	8.97	43.55	74	-30.45
13263	27.46	AV	V	10.43	9.68	10.46	37.11	54	-16.89
13263	30.29	AV	H	10.43	9.68	10.46	39.94	54	-14.06
13263	34.95	PK	V	10.43	9.68	10.46	44.6	74	-29.4
13263	38.19	PK	H	10.43	9.68	10.46	47.84	74	-26.16

Note:

1. The testing has been conformed to 10*2462MHz=24620MHz.
2. All other emissions more than 30dB below the limit.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
   Margin=Emission Level-Limit
4. X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

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

2.4G WiFi (802.11b/g/n)mode have been tested, and the worst result(802.11g) was report as below

Test Mode: 802.11g Low Channel 2412MHz									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	Test Value
2310.00	26.76	27.27	6.62	0	60.65	74	-13.35	V	Peak
2390.00	27.29	27.53	6.75	0	61.57	74	-12.43	V	
2310.00	26.37	27.27	6.62	0	60.26	74	-13.74	H	
2390.00	26.77	27.53	6.75	0	61.05	74	-12.95	H	
2310.00	12.91	27.27	6.62	0	46.8	54	-7.2	V	Average
2390.00	13.21	27.53	6.75	0	47.49	54	-6.51	V	
2310.00	12.93	27.27	6.62	0	46.82	54	-7.18	H	
2390.00	14.16	27.53	6.75	0	48.44	54	-5.56	H	

Test Mode: 802.11g High Channel 2462MHz									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	Test Value
2483.50	25.69	27.85	6.83	0	60.37	74	-13.63	V	Peak
2500.00	25.68	27.9	6.84	0	60.42	74	-13.58	V	
2483.50	26.12	27.85	6.83	0	60.8	74	-13.2	H	
2500.00	26.17	27.9	6.84	0	60.91	74	-13.09	H	
2483.50	13.03	27.85	6.83	0	47.71	54	-6.29	V	Average
2500.00	12.7	27.9	6.84	0	47.44	54	-6.56	V	
2483.50	14.11	27.85	6.83	0	48.79	54	-5.21	H	
2500.00	12.94	27.9	6.84	0	47.68	54	-6.32	H	

7 Band Edge Measurement

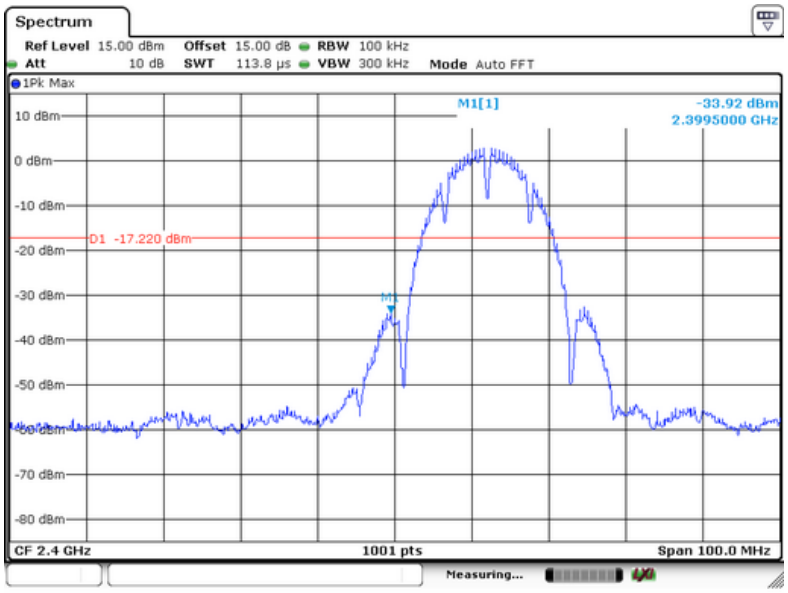
Test Requirement	:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method	:	ANSI C63.10:2013
Test Limit	:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.1 Test Procedure

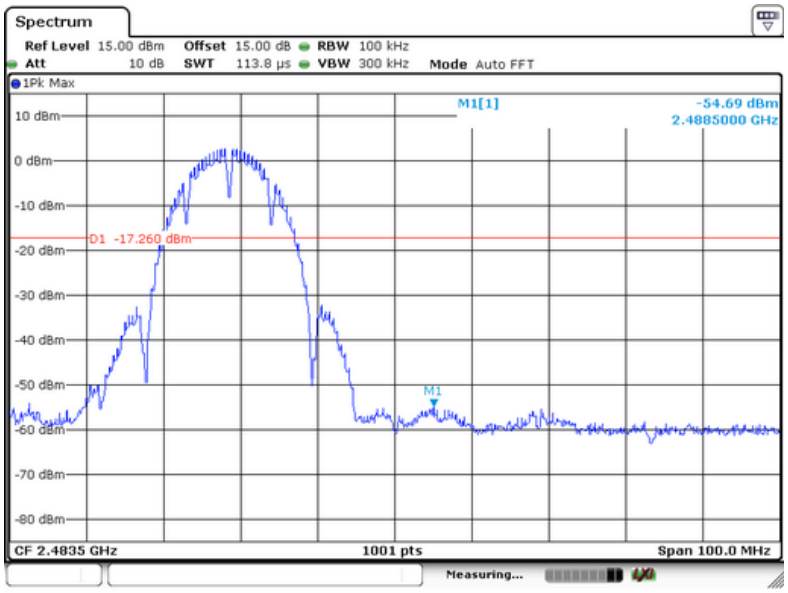
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

7.2 Test Result

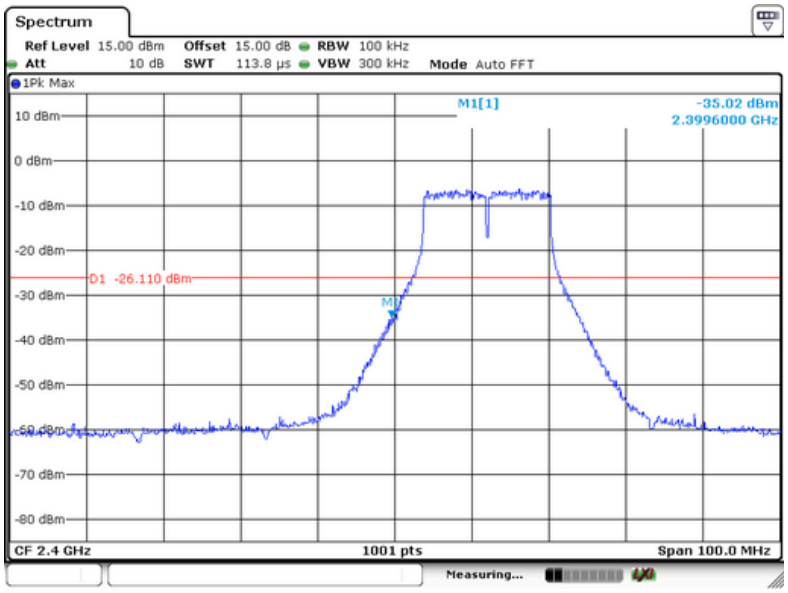
802.11b Low Band Edge Plot



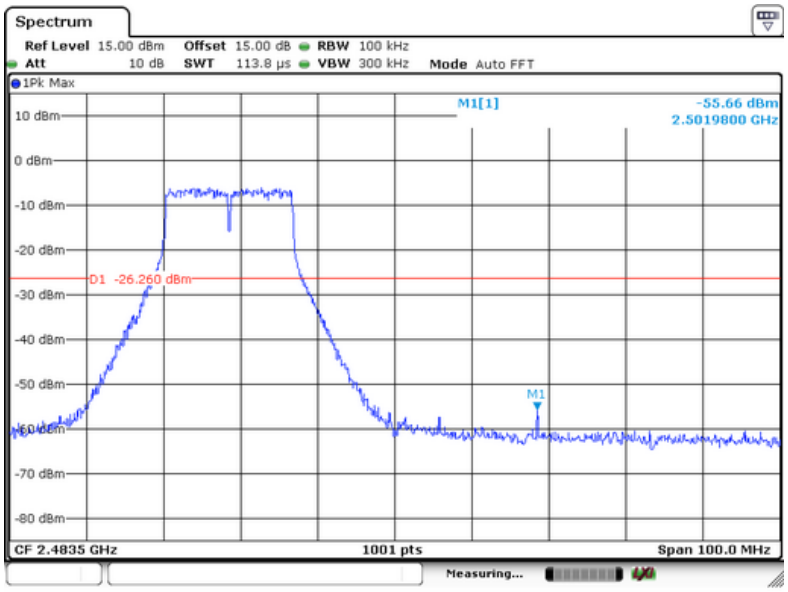
802.11b High Band Edge Plot



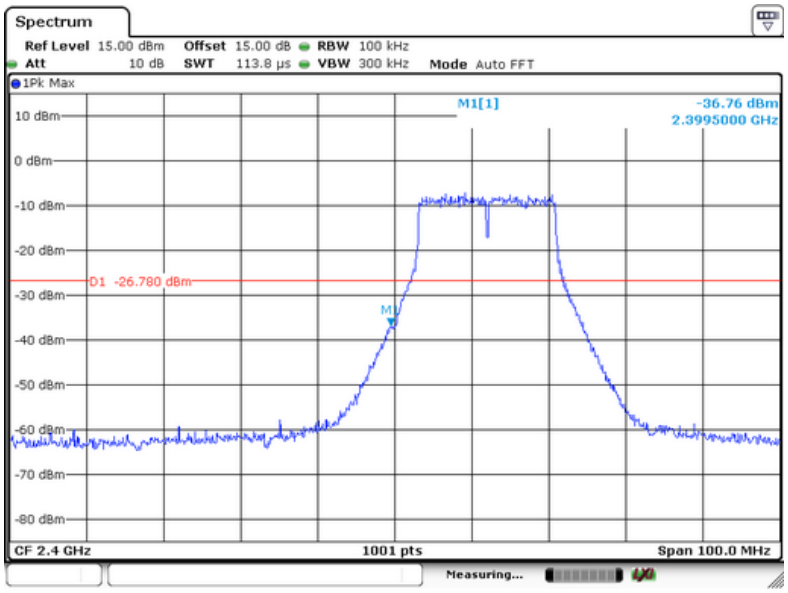
802.11g Low Band Edge Plot



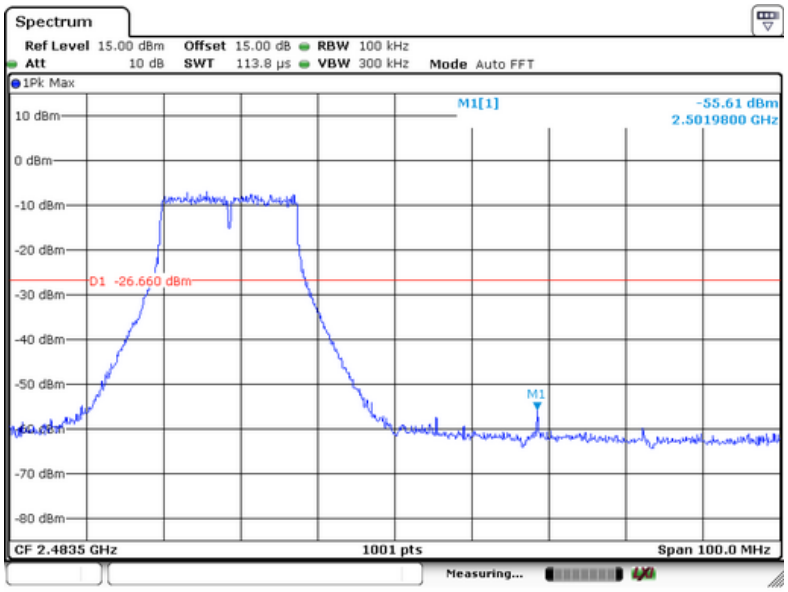
802.11g High Band Edge Plot



802.11n(HT20) Low Band Edge Plot

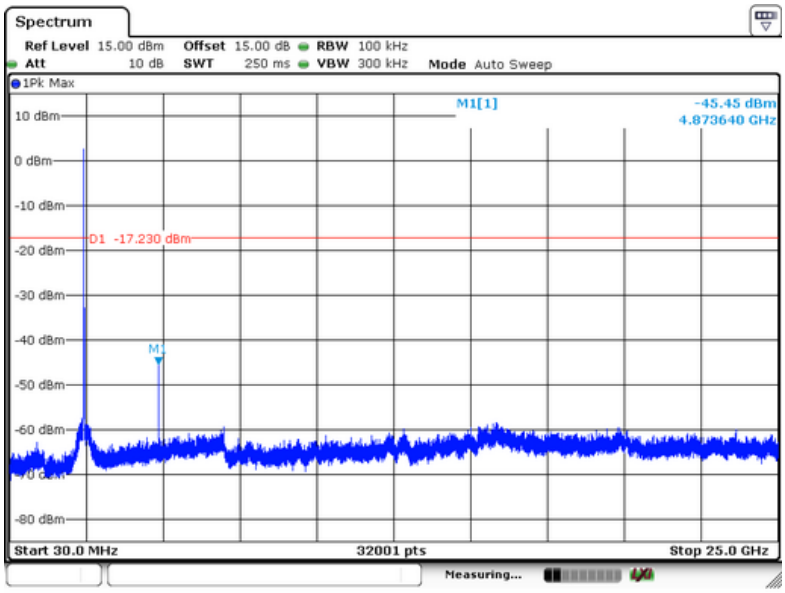


802.11n(HT20) High Band Edge Plot

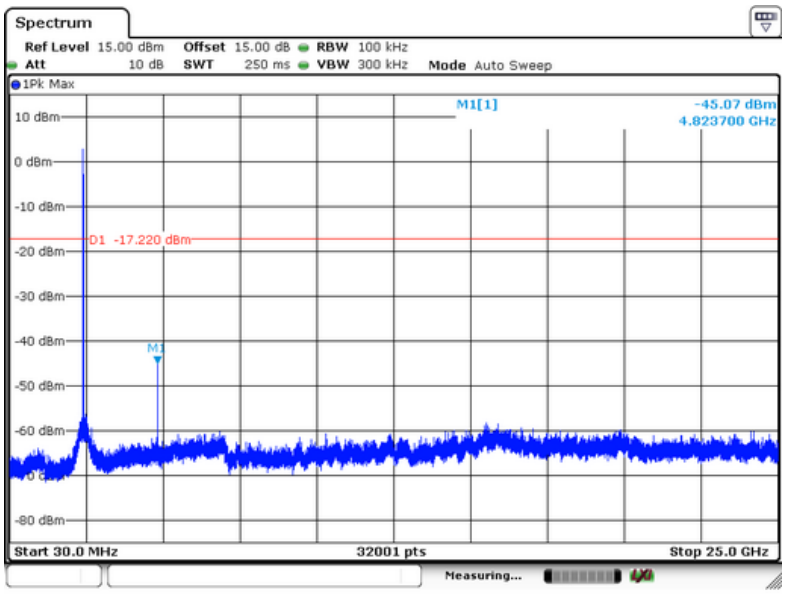


Conducted Spurious Emissions:

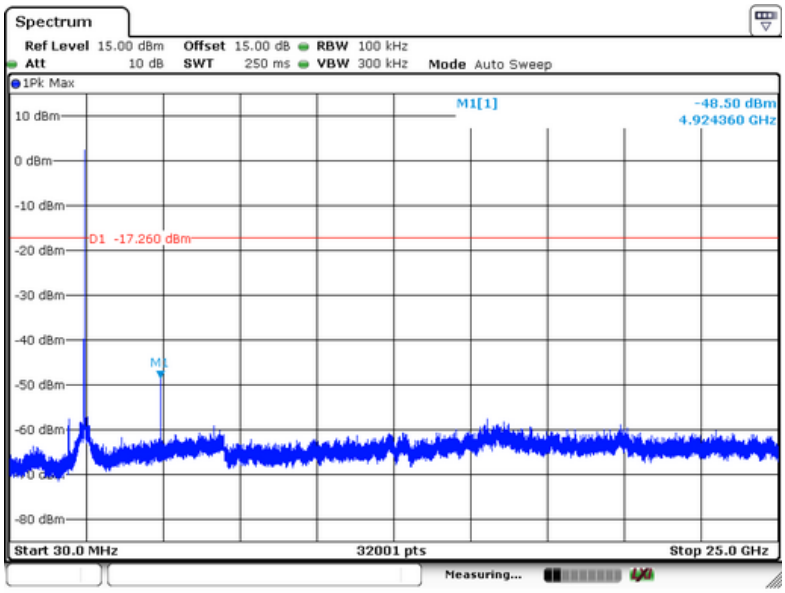
Test Mode: 802.11b



Lowest Channel

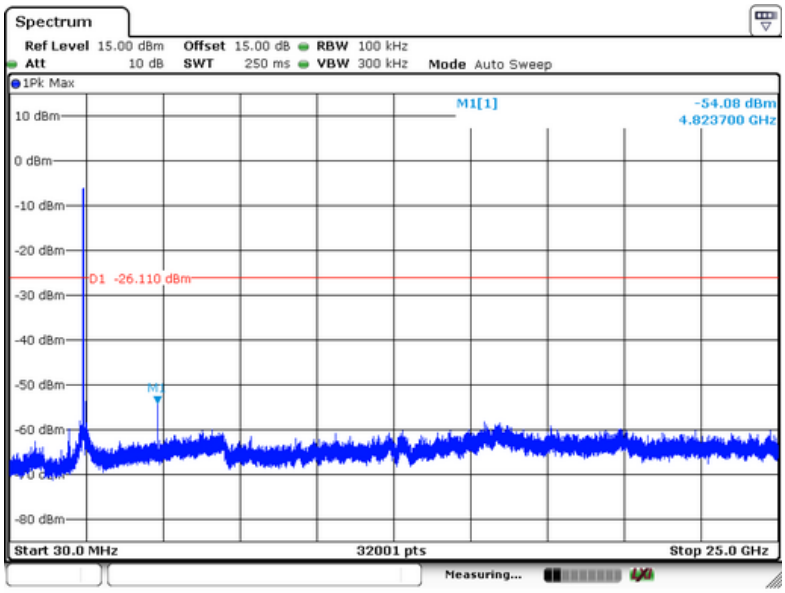


Middle Channel

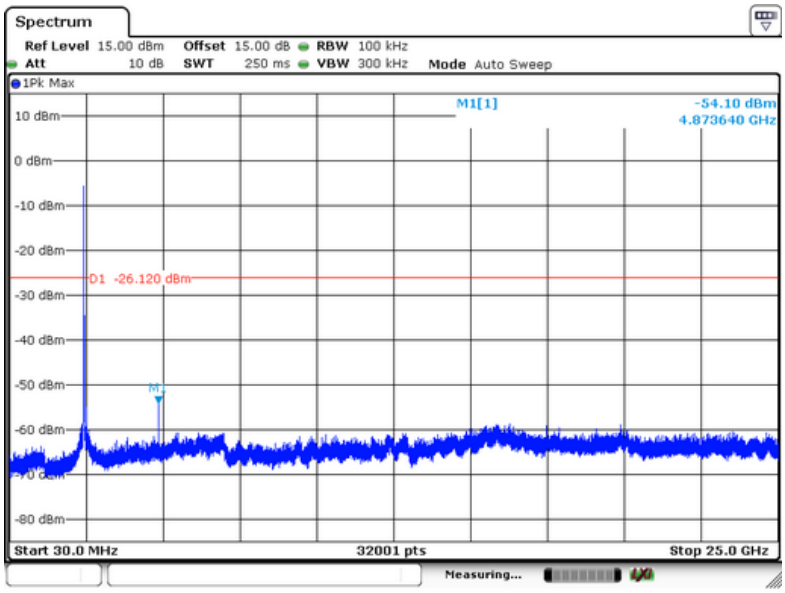


Highest Channel

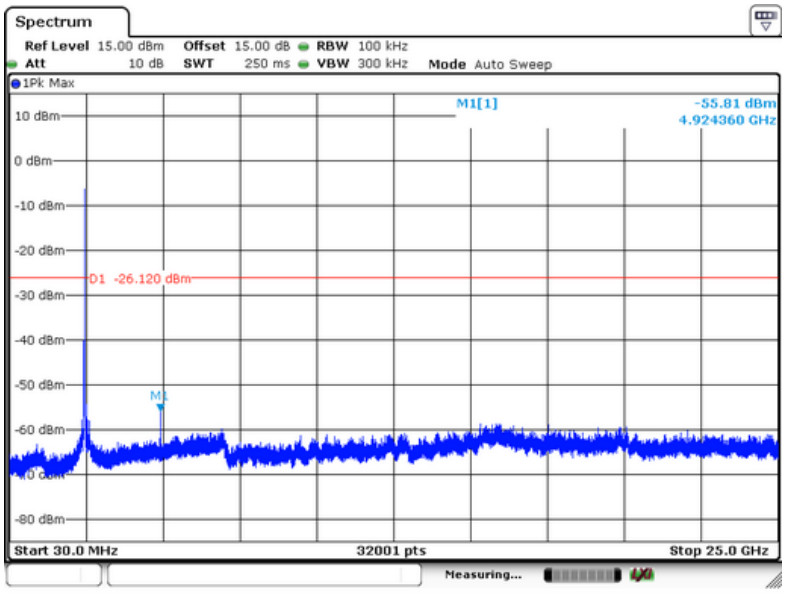
Test Mode: 802.11g



Lowest Channel

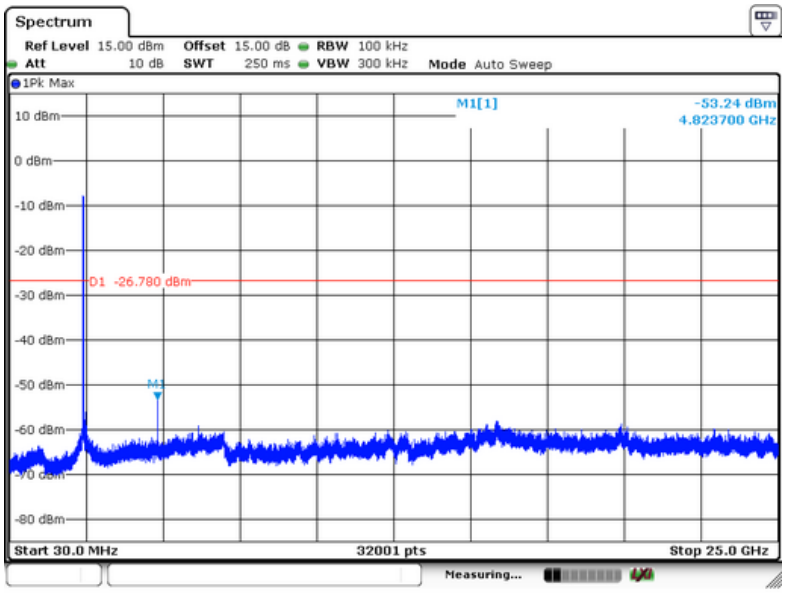


Middle Channel

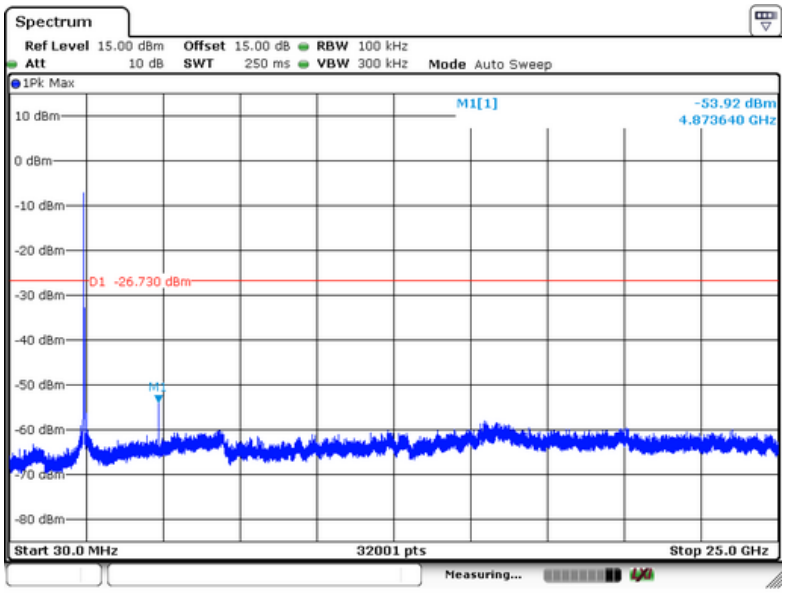


Highest Channel

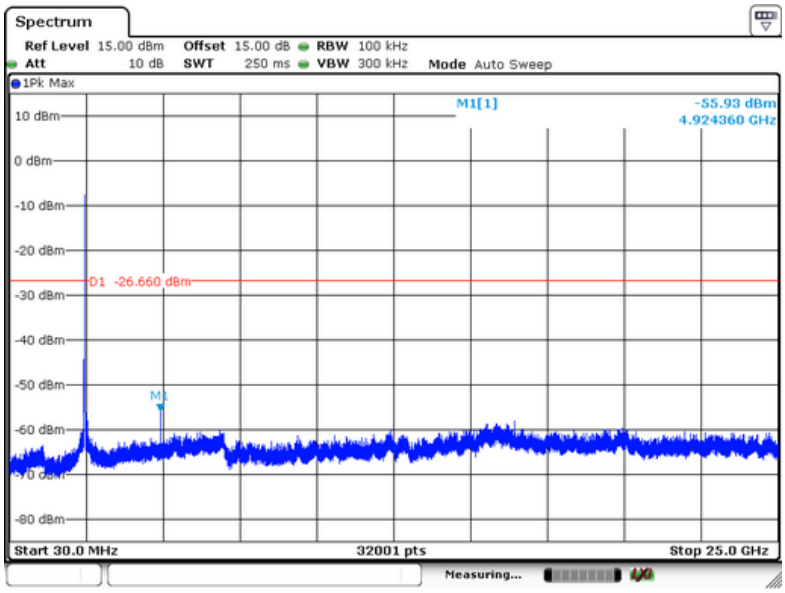
Test Mode: 802.11n(HT20)



Lowest Channel



Middle Channel



Highest Channel

8 6dB Bandwidth Measurement

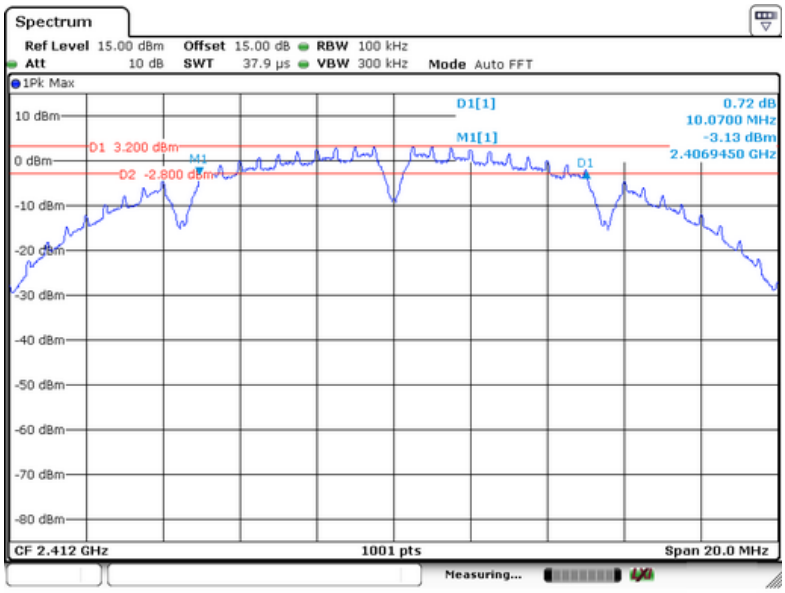
Test Requirement	:	FCC CFR47 Part 15 Section 15.247
Test Method	:	ANSI C63.10:2013
Test Limit		Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

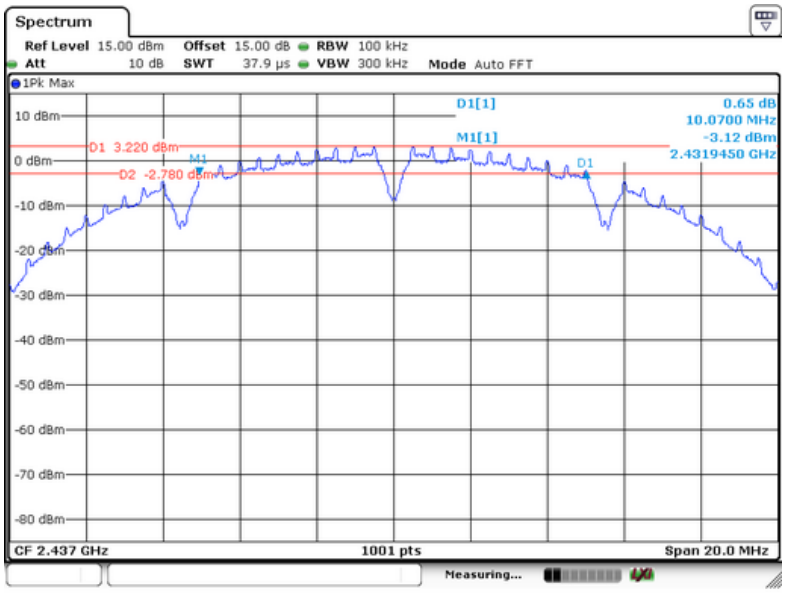
8.1 Test Procedure

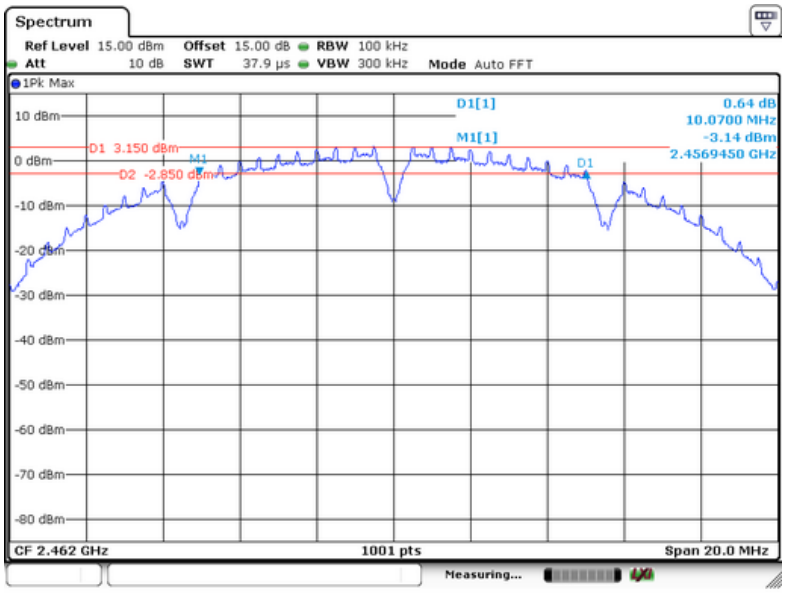
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

8.2 Test Result

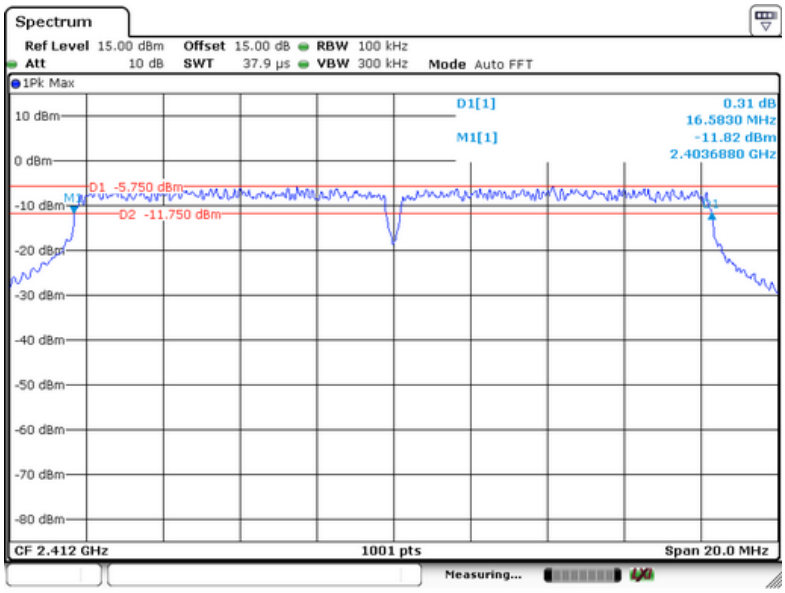
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	10070	>500	Pass
2437	10070	>500	
2462	10070	>500	

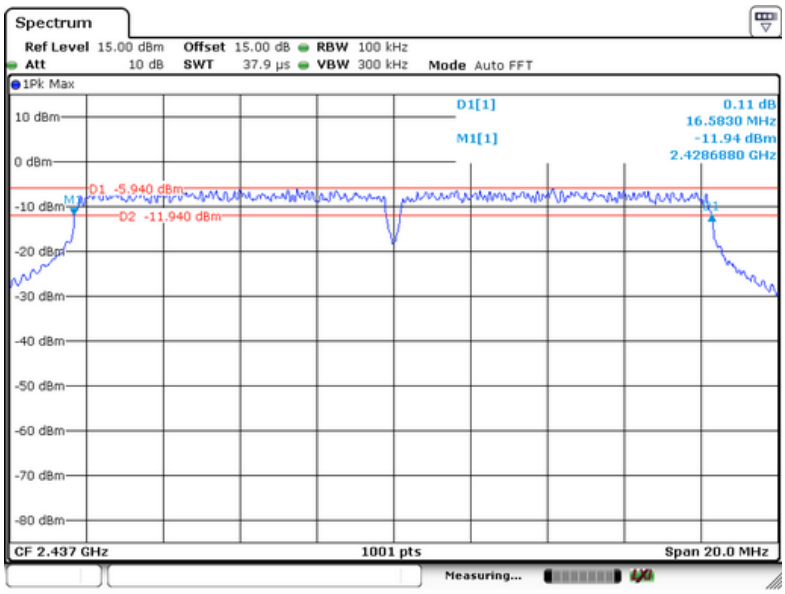

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1]
0.72 dB
10.0700 MHz
M1[1]
-3.13 dBm
2.4069450 GHz
D1 3.200 dBm
D2 -2.800 dBm
M1
D1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.412 GHz
1001 pts
Span 20.0 MHz
Measuring...

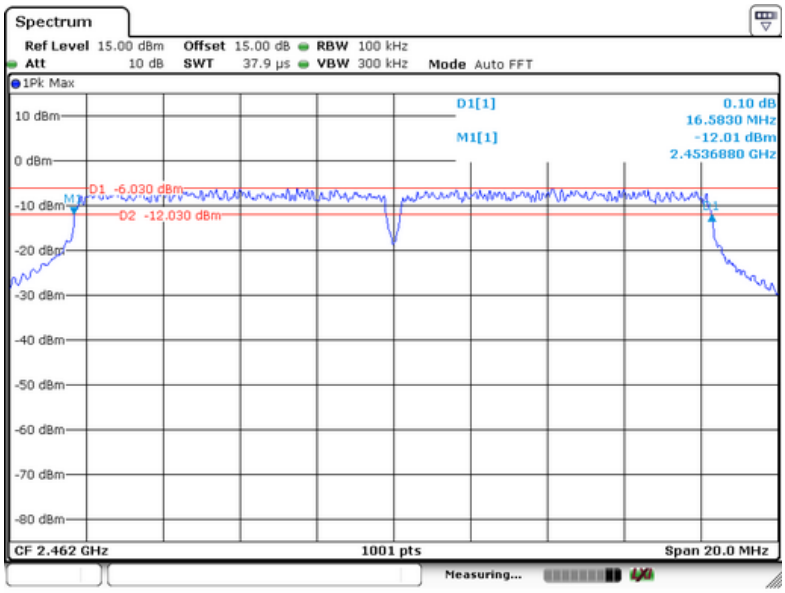

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1]
0.65 dB
10.0700 MHz
M1[1]
-3.12 dBm
2.4319450 GHz
D1 3.220 dBm
D2 -2.780 dBm
M1
D1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.437 GHz
1001 pts
Span 20.0 MHz
Measuring...



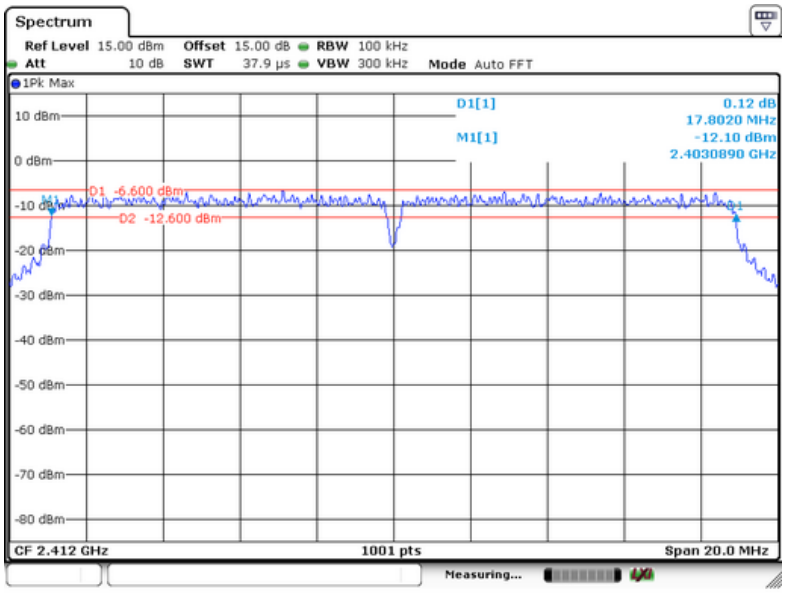
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	16583	>500	Pass
2437	16583	>500	
2462	16583	>500	

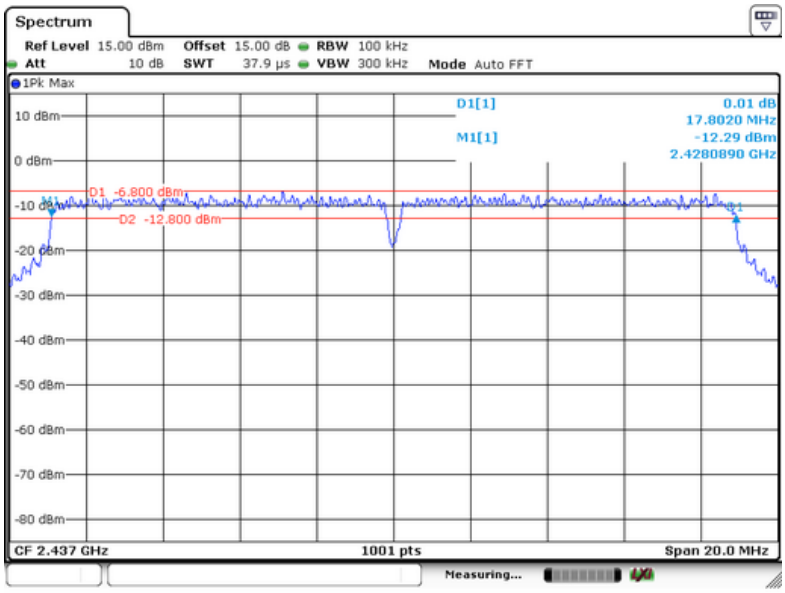

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] 0.31 dB
16.5830 MHz
M1[1] -11.82 dBm
2.4036880 GHz
D1 -5.750 dBm
D2 -11.750 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.412 GHz
1001 pts
Span 20.0 MHz
Measuring...

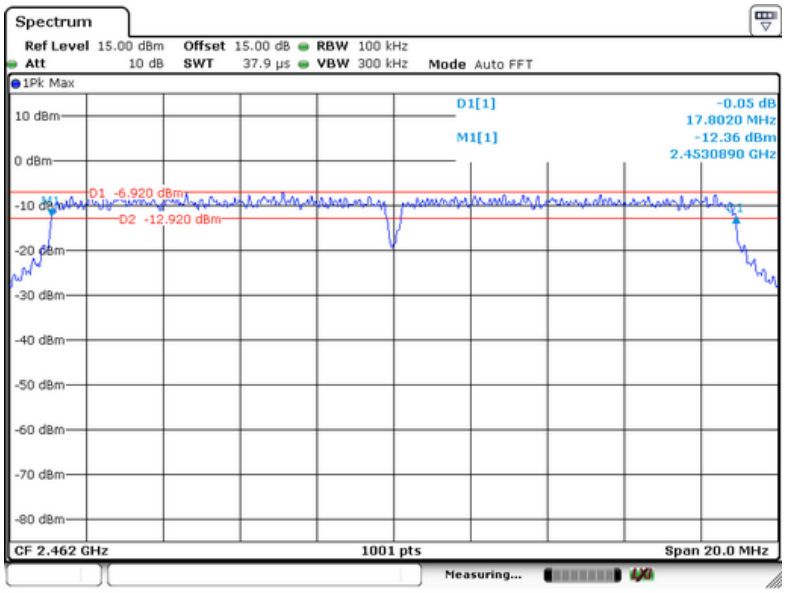

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] 0.11 dB
16.5830 MHz
M1[1] -11.94 dBm
2.4286880 GHz
D1 -5.940 dBm
D2 -11.940 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.437 GHz
1001 pts
Span 20.0 MHz
Measuring...



IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	17802	>500	Pass
2437	17802	>500	
2462	17802	>500	


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] 0.12 dB
17.8020 MHz
M1[1] -12.10 dBm
2.4030890 GHz
D1 -6.600 dBm
D2 -12.600 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.412 GHz
1001 pts
Span 20.0 MHz
Measuring...


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] 0.01 dB
17.8020 MHz
M1[1] -12.29 dBm
2.4280890 GHz
D1 -6.800 dBm
D2 -12.800 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.437 GHz
1001 pts
Span 20.0 MHz
Measuring...


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 100 kHz
Att 10 dB SWT 37.9 µs VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -0.05 dB
17.8020 MHz
M1[1] -12.36 dBm
2.4530890 GHz
D1 -6.920 dBm
D2 -12.920 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.462 GHz
1001 pts
Span 20.0 MHz
Measuring...

9 Maximum Peak Output Power

Test Requirement	:	FCC CFR47 Part 15 Section 15.247
Test Method	:	ANSI C63.10:2013
Test Limit	:	Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

9.1 Test Procedure

1. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Measure the conducted output power and record the results in the test report.

9.2 Test Result

Test Channel	Output Power (dBm)			Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	8.69	7.44	6.38	30	Pass
Middle	8.44	7.26	6.51		
Highest	8.05	7.19	6.45		

10 Power Spectral density

Test Requirement	:	FCC CFR47 Part 15 Section 15.247
Test Method	:	ANSI C63.10:2013
Test Limit	:	Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

10.1 Test Procedure

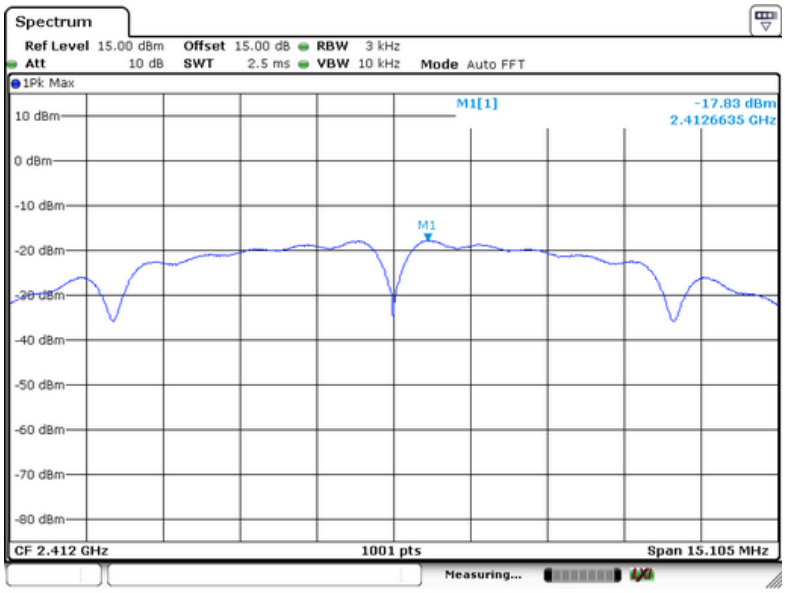
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

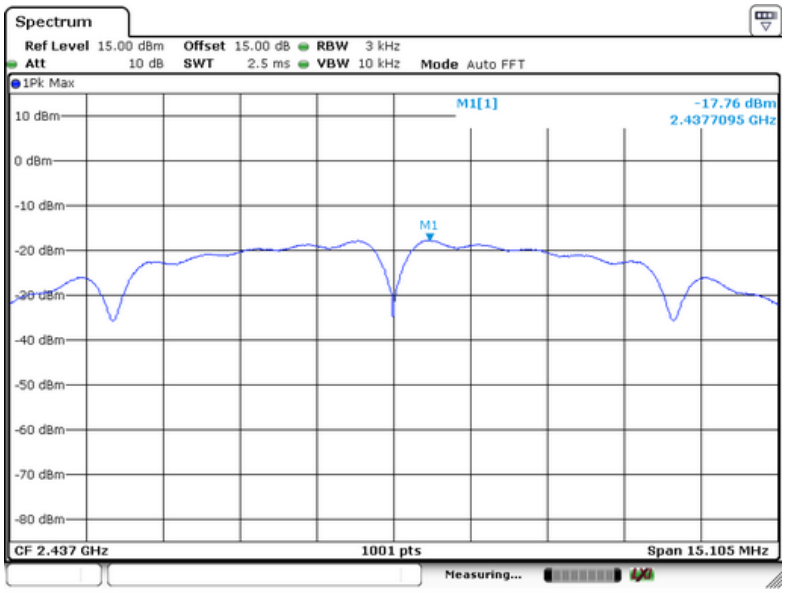
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

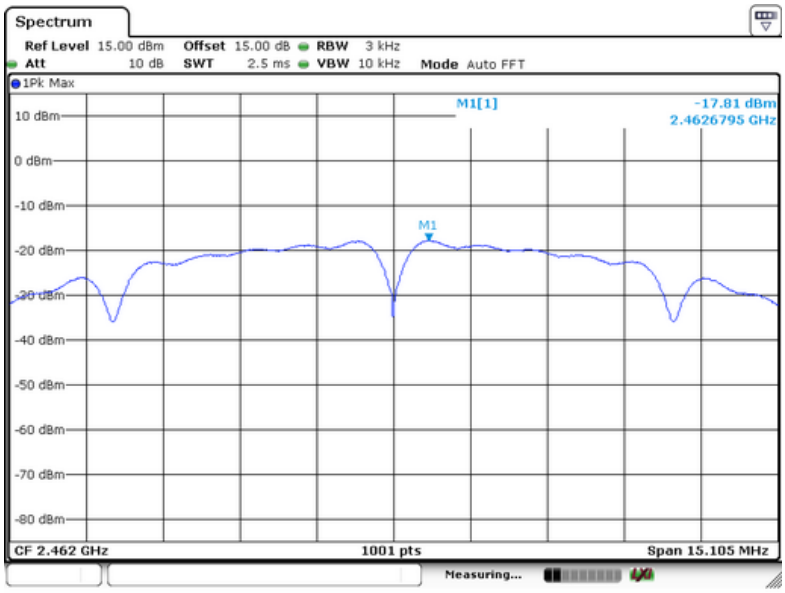
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

10.2 Test Result

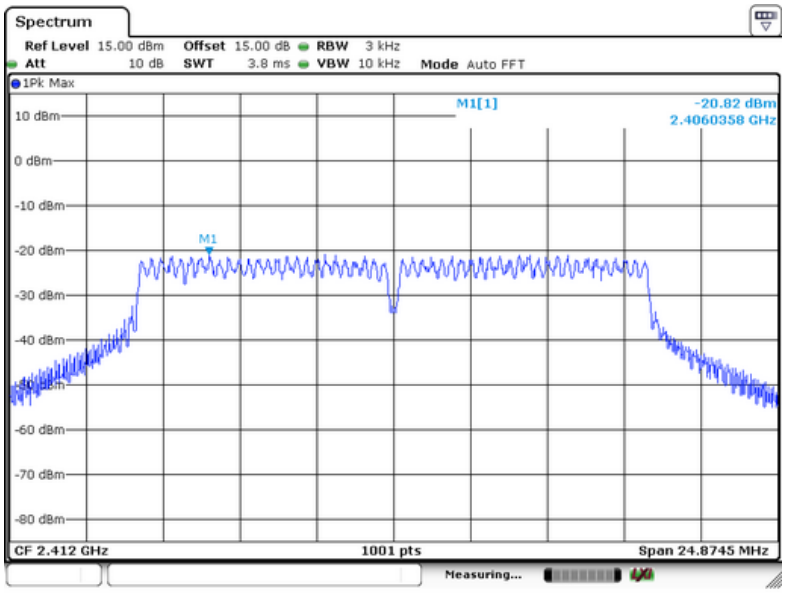
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-17.83	8	Pass
2437	-17.76		
2462	-17.81		

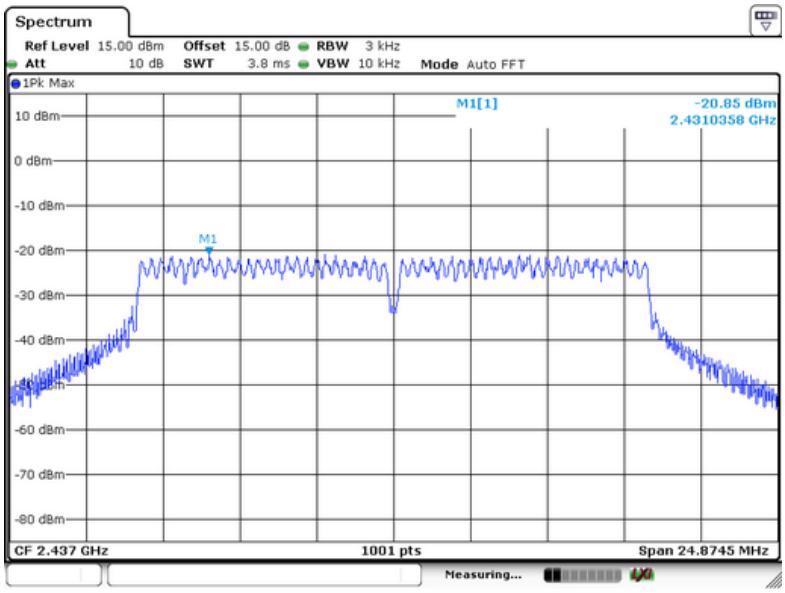

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -17.83 dBm
2.4126635 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
CF 2.412 GHz
1001 pts
Span 15.105 MHz
Measuring...

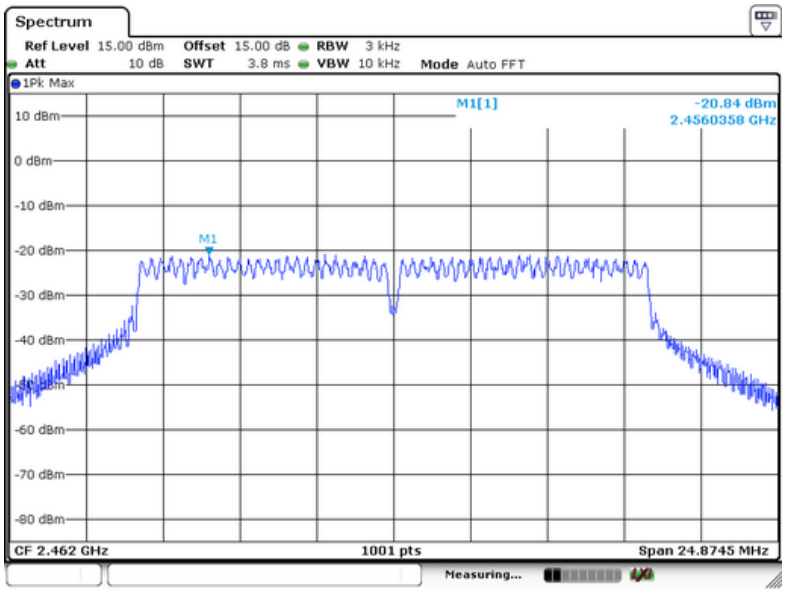

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 2.5 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -17.76 dBm
2.4377095 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
CF 2.437 GHz
1001 pts
Span 15.105 MHz
Measuring...



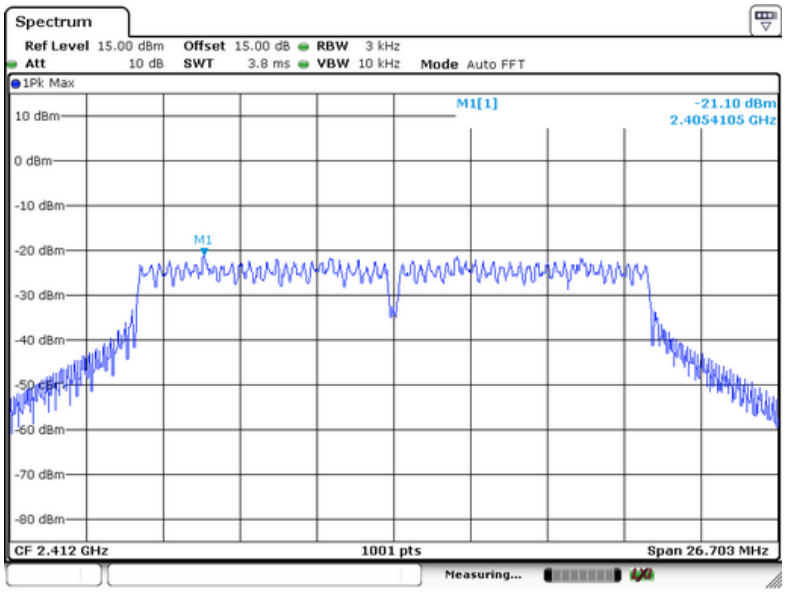
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-20.82	8	Pass
2437	-20.85		
2462	-20.84		

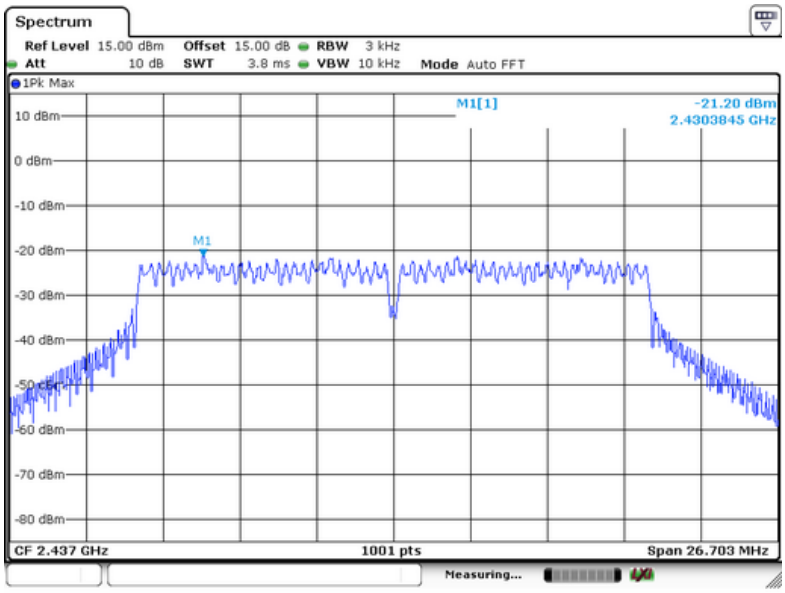

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -20.82 dBm
2.4060358 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.412 GHz
1001 pts
Span 24.8745 MHz
Measuring...

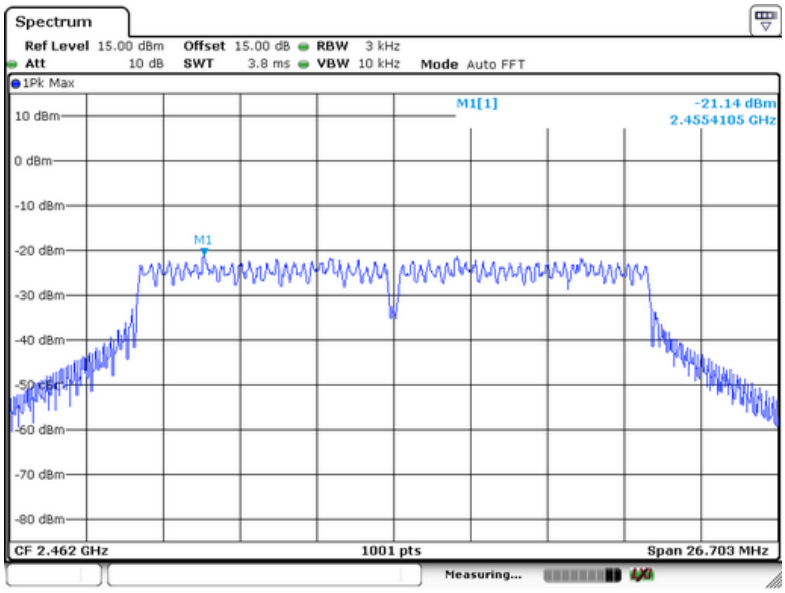

Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -20.85 dBm
2.4310358 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.437 GHz
1001 pts
Span 24.8745 MHz
Measuring...



IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-21.18	8	Pass
2437	-21.20		
2462	-21.14		


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -21.10 dBm
2.4054105 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.412 GHz
1001 pts
Span 26.703 MHz
Measuring...


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -21.20 dBm
2.4303845 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.437 GHz
1001 pts
Span 26.703 MHz
Measuring...


Spectrum
Ref Level 15.00 dBm Offset 15.00 dB RBW 3 kHz
Att 10 dB SWT 3.8 ms VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -21.14 dBm
2.4554105 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.462 GHz
1001 pts
Span 26.703 MHz
Measuring...

11 Antenna Application

11.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

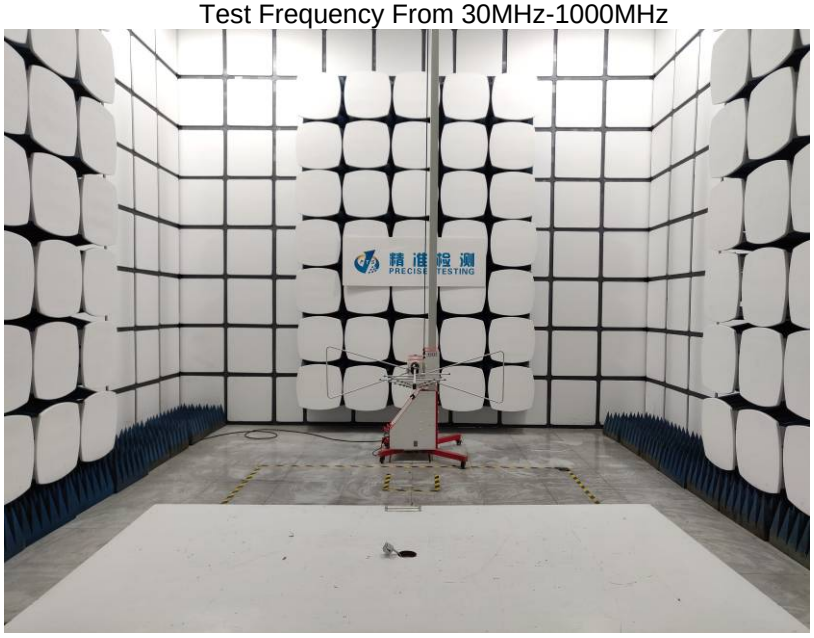
11.2 Result

The EUT'S antenna, permanent attached antenna, is internal antenna. The antenna's gain is 0dBi and meets the requirement.

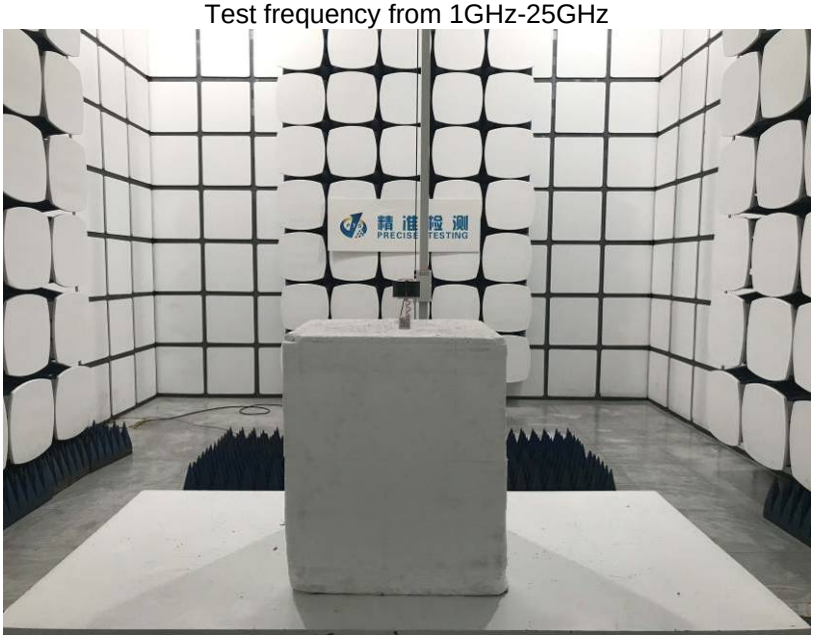
12 Test Setup

Conducted Emissions

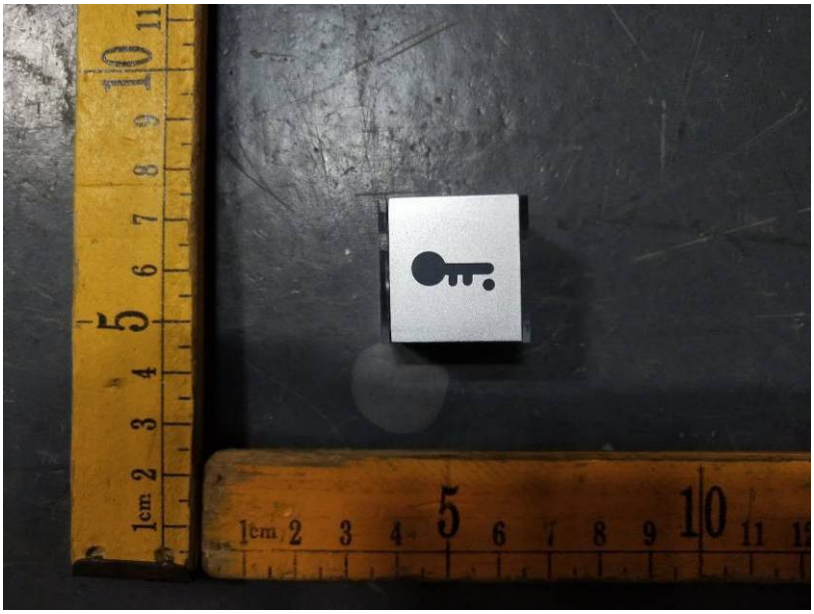
Radiated Spurious Emissions
Test Frequency From 30MHz-1000MHz



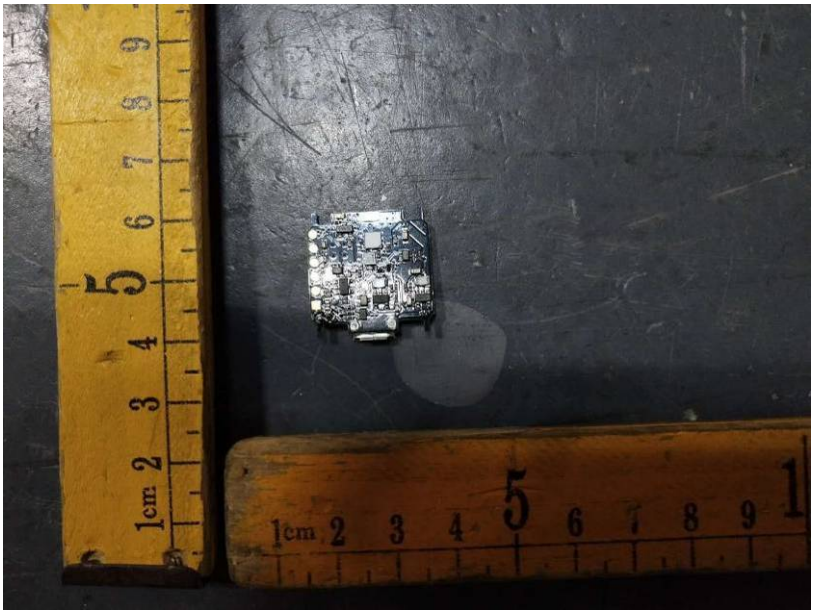
Test frequency from 1GHz-25GHz

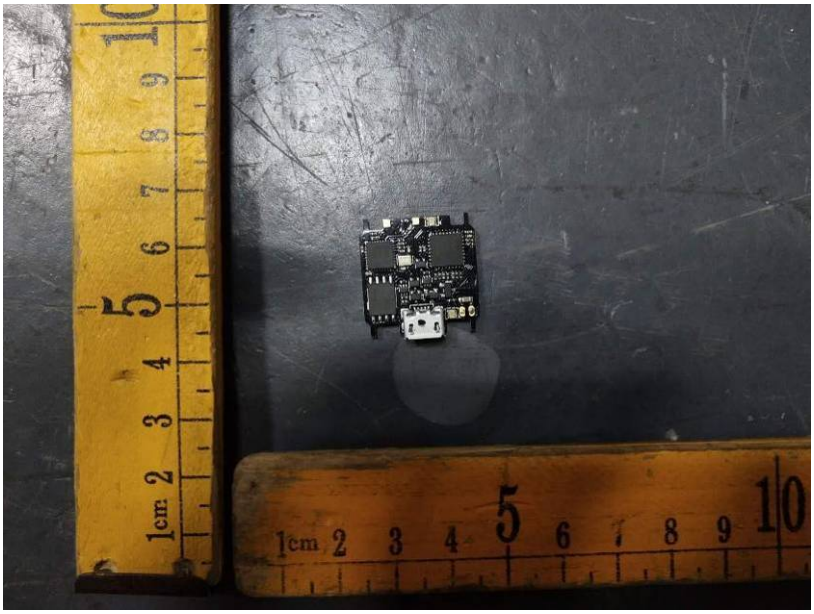


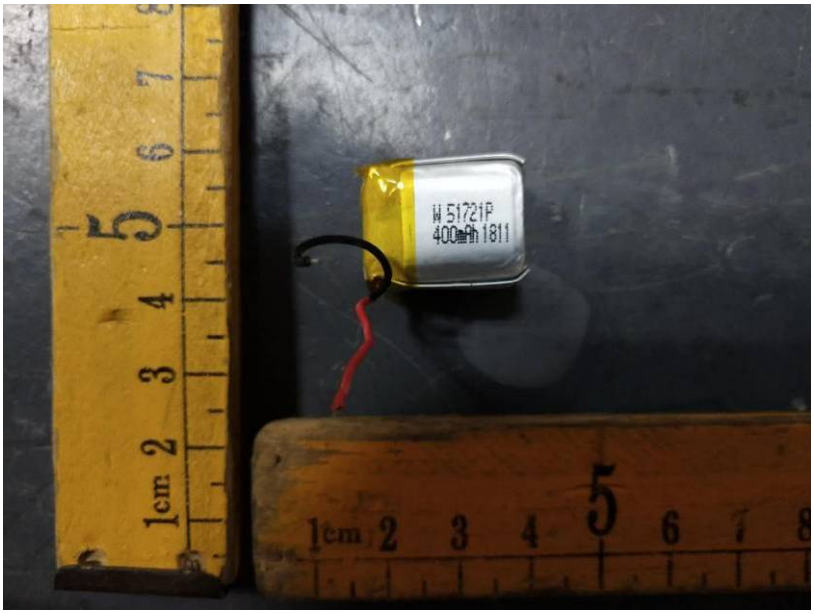
13 EUT Photos

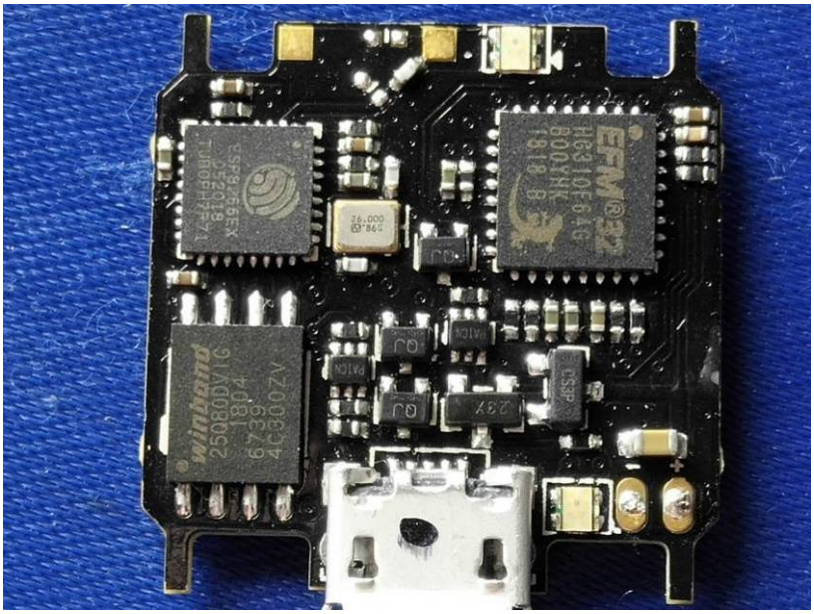


qBiq
www.ubiquweus.com
TLOGG3






W 51721P
400mAh 1811



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