



FCC Test Report

Report No: FCS202112092W01

Issued for

Applicant:	I Like Light Technology (Shenzhen)Ltd.
Address:	F/5, Building 8, Huidebao Industrial Park Baihuayuan Road, Guang Ming District, Shenzhen, GD China 518107
Product Name:	eShelf
Brand Name:	N/A
Model Name:	LUXX-ESP30-700
Series Model:	N/A
FCC ID:	2A36O-LUXX-ESP30
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name.....: I Like Light Technology (Shenzhen) Ltd.
Address.....: F/5, Building 8, Huidebao Industrial Park Baihuayuan Road,Guang Ming District,Shenzhen,GD China 518107
Manufacture's Name.....: I Like Light Technology (Shenzhen) Ltd.
Address.....: F/5, Building 8, Huidebao Industrial Park Baihuayuan Road,Guang Ming District,Shenzhen,GD China 518107

Product Description

Product Name.....: eShelf
Model Name.....: N/A
Brand Name: LUXX-ESP30-700
Series Model.....: N/A
Test Standards.....: FCC Part15.247
Test Procedure.....: ANSI C63.10-2013

This device described above has been tested by Flux Compliance Service Laboratory, 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 Flux Compliance Service Laboratory, this document may be altered or revised by Flux Compliance Service Laboratory, personal only, and shall be noted in the revision of the document..

Date of Test.....:

Date (s) of performance of tests.: 21 Dec, 2021 ~ 25 Dec, 2021

Date of Issue.....: 27 Dec, 2021

Test Result.....: Pass

Tested by : Scott Shen
(Scott Shen)

Reviewed by : Duke Qian
(Duke Qian)

Approved by : Jack Wang
(Jack Wang)



Table of Contents	Page
1. SUMMARY OF TEST RESULTS	6
1.1 TEST FACTORY	7
1.2 MEASUREMENT UNCERTAINTY	7
2. GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF THE EUT	8
2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS	11
2.4 EQUIPMENTS LIST	12
3. 6DB BANDWIDTH	13
3.1 LIMIT	13
3.2 TEST PROCEDURE	13
3.3 TEST SETUP	13
3.4 TEST RESULTS	14
4 CONDUCTED OUTPUT POWER	19
4.1 LIMIT	19
4.2 TEST PROCEDURE	19
4.3 TEST SETUP	19
4.5 TEST RESULTS	19
5. POWER SPECTRAL DENSITY	20
5.1 LIMIT	20
5.2 TEST PROCEDURE	20
5.3 TEST SETUP	20
5.5 TEST RESULTS	21
5.6 ORIGINAL TEST DATA	22
6. BAND EDGE AND SPURIOUS(CONDUCTED)	27
6.1 LIMIT	27
6.2 TEST PROCEDURE	27
6.3 TEST SETUP	27
6.5 TEST RESULTS	28
6.5 ORIGINAL TEST DATA	28
7 RADIATED EMISSION MEASUREMENT	37
8 CONDUCTED EMISSION TEST	50

Table of Contents	Page
9. ANTENNA REQUIREMENT	54
9.1 STANDARD REQUIREMENT	54
9.2 RESULT	54

Revision History

Rev.	Issue Date	Effect Page	Contents
00	27 Dec, 2021	N/A	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02

FCC Part 15.247,Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC 15.247 (a) (2)	6dB Bandwidth	PASS	--
FCC 15.247 (b) (3)	Conducted Output Power	PASS	--
FCC 15.247 (e)	Power Spectral Density	PASS	--
FCC 15.247 (d)	Band-edge and Spurious Emissions (Conducted)	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Spurious Emissions	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Band Edge Compliance	PASS	--
FCC 15.207	Power Line Conducted Emission	PASS	--
FCC 15.203	Antenna requirement	PASS	--
15.205	Restricted Band Edge Emission	PASS	--

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.71\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988 \text{ dB}$
3	Conducted Emission (9KHz-150KHz)	$\pm 4.13 \text{ dB}$
4	Conducted Emission (150KHz-30MHz)	$\pm 4.74 \text{ dB}$
5	All emissions, radiated(<1G) 30MHz-1000MHz	$\pm 5.2 \text{ dB}$
6	All emissions, radiated 1GHz -18GHz	$\pm 4.66 \text{ dB}$
7	All emissions, radiated 18GHz -40GHz	$\pm 4.31 \text{ dB}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	eShelf
Trade Name	N/A
Model Name	LUXX-ESP30-700
Series Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
Operation frequency	IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz
Modulation:	IEEE 802.11b: DSSS (CCK, QPSK, BPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20,: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate:	IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: up to 150 Mbps,
Power supply	Input:100-240v 50/60Hz 0.8A Output: DC 12V 2A
Battery	NA
Hardware version number	V1.1
Software version number	V1.1
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452
02	2417	06	2437	10	2457
03	2422	07	2442	11	2462
04	2427	08	2447		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Integral antenna	N/A	1.0 dBi	Antenna

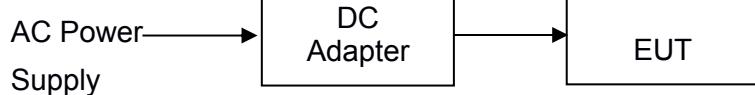
1

0000.2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Block diagram of EUT configuration for test

Mode 1:



Test software: the UI_mptool.exe

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

Tested mode, channel, and data rate information				
Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11b	8	1	LCHCH1	2412
	8	1	MCH: CH6	2437
	8	1	HCH:CH11	2462
IEEE 802.11g	20	6	LCH: CH1	2412
	20	6	MCH: CH6	2437
	20	6	HCH: CH11	2462
IEEE 802.11n HT20	20	MCS8	LCH:CH1	2412
	20	MCS8	MCH: CH6	2437
	20	MCS8	HCHCH11	2462

Note:

(1) According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test,

(2) During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the Nominal rate supply voltage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	Adapter	DAJING	ADP-24F12	N/A	

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	N/A	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2021. 01.28	2022. 01.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2021. 01.28	2022. 01.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2021. 01.28	2022. 01.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2021. 01.28	2022. 01.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2021. 01.28	2022. 01.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2021. 01.28	2022. 01.27
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2021. 01.28	2022. 01.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2021. 01.28	2022. 01.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2021. 01.28	2022. 01.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2021. 01.28	2022. 01.27

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2021. 01.28	2022. 01.27
LISN	R&S	ENV216	FCS-E007	2021. 01.28	2022. 01.27
LISN	ETS	3810/2NM	FCS-E009	2021. 01.28	2022. 01.27
Temperature & Humidity	HTC-1	victor	FCS-E008	2021. 01.28	2022. 01.27

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2021. 01.28	2022. 01.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2021. 01.28	2022. 01.27
Spectrum Analyzer	R&S	FSV-40	101499	2021. 01.28	2022. 01.27
Power Sensor	Agilent	UX2021XA	FCS-E021	2021. 01.28	2022. 01.27

3. 6DB BANDWIDTH

3.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows

RBW: 100kHz

VBW: 300kHz

Detector Mode: Peak

Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

3.3 Test setup



3.4 Test results

TestMode	Channel (MHz)	6dB Bandwidth (MHz)	Limit [MHz]	Verdict
802.11b	2412MHz	10.09	0.5	Pass
802.11b	2437MHz	10.09	0.5	Pass
802.11b	2462MHz	10.08	0.5	Pass
802.11g	2412MHz	16.39	0.5	Pass
802.11g	2437MHz	16.36	0.5	Pass
802.11g	2462MHz	16.36	0.5	Pass
802.11n 20	2412MHz	16.45	0.5	Pass
802.11n 20	2437MHz	16.45	0.5	Pass
802.11n 20	2462MHz	16.46	0.5	Pass

3.5 Original Test Data

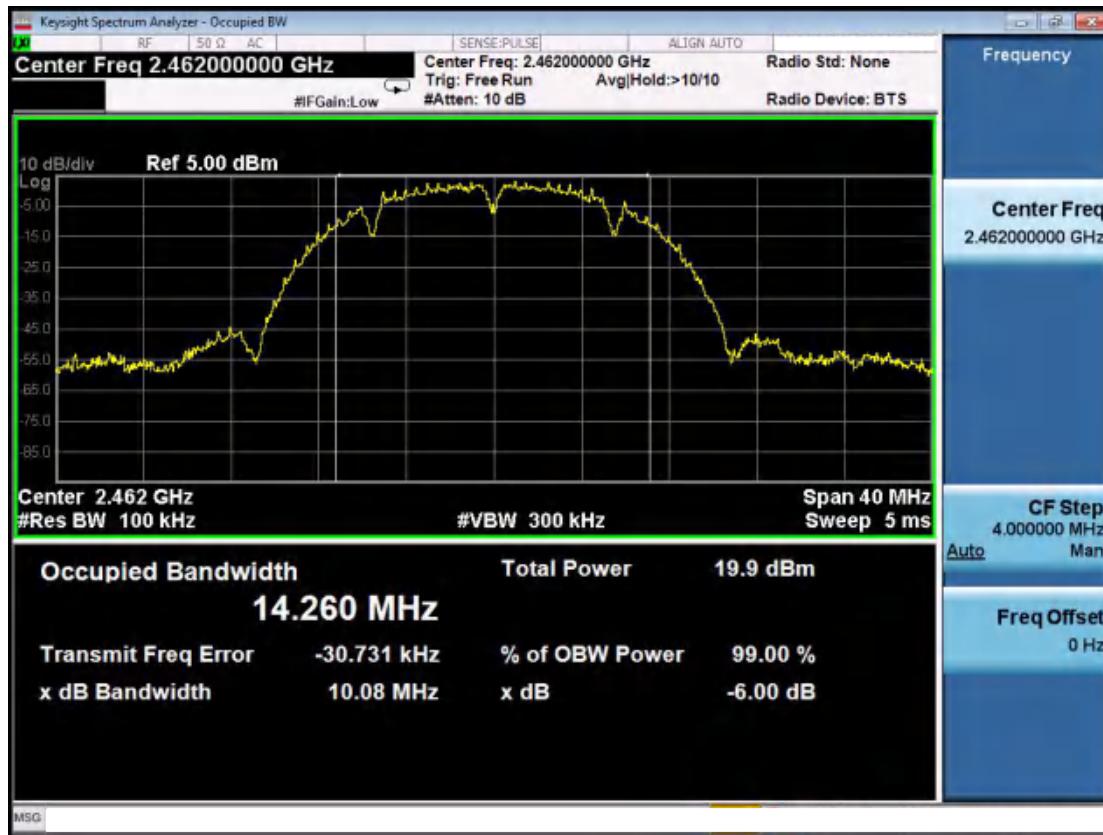
802.11b-CH2412MHZ



802.11b-CH237MHZ



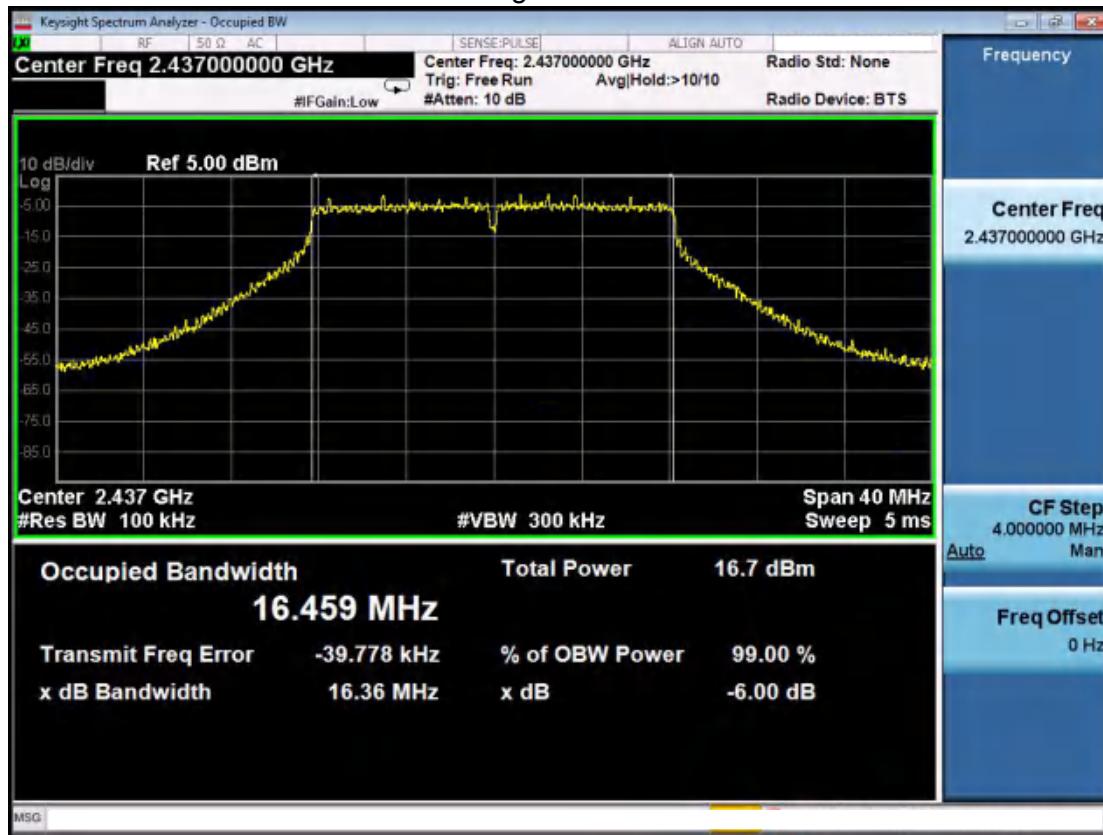
802.11b-CH2462MHZ



802.11g H2412MHz



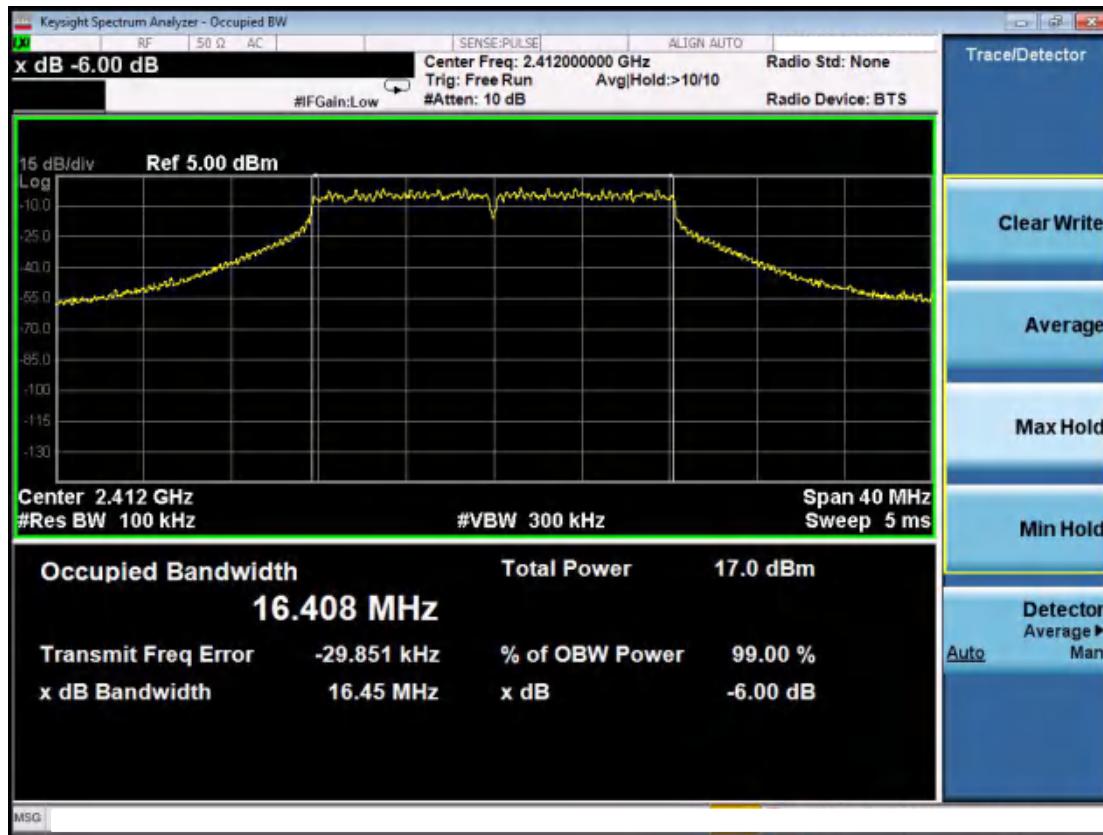
802.11g CH2437MHz



802.11g CH2462MHZ



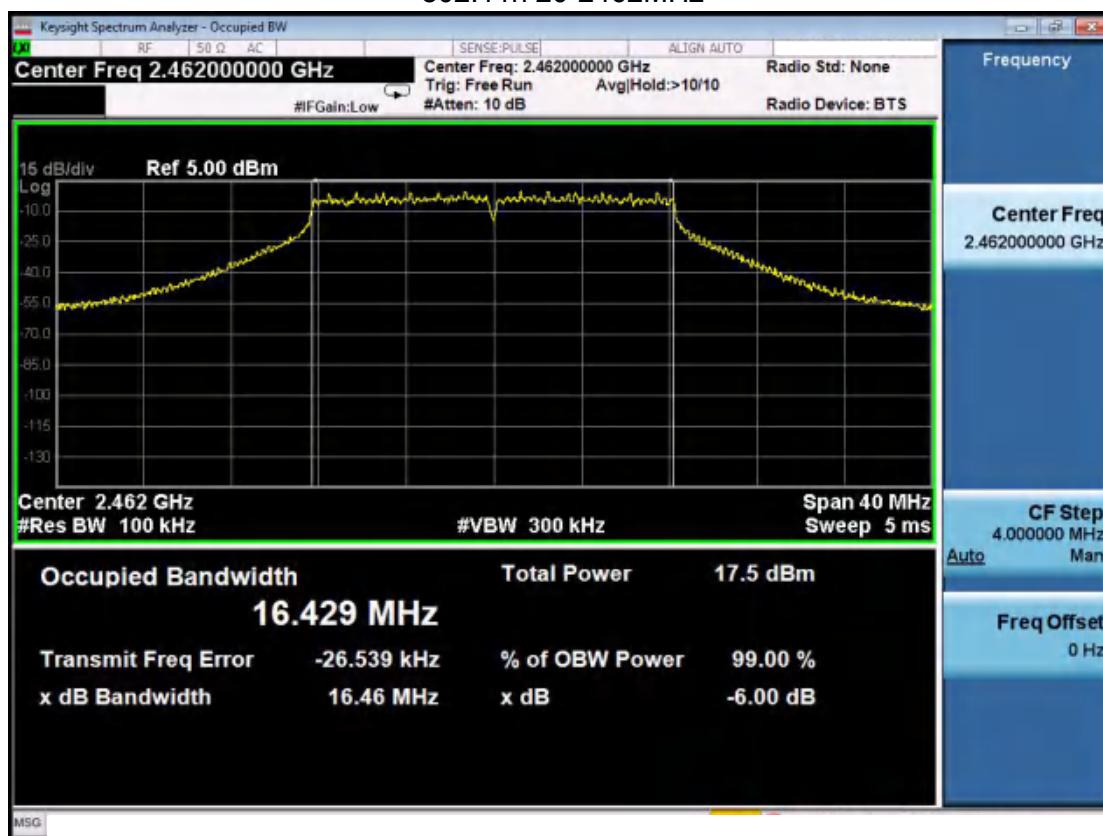
802.11n 20-2412MHz



802.11n 20-2437MHz



802.11n 20-2462MHz



4 CONDUCTED OUTPUT POWER

4.1 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.

4.2 test procedure

- Connect each EUT's antenna output to power sensor by RF cable and attenuator
- Measure the PK output power of each antenna port by power sensor.

4.3 TEST SETUP



4.5 test results

TestMode	Channel (MHz)	Result (dBm)	Limit (dBm)	Verdict
802.11b	2412MHz	8.56	30	Pass
802.11b	2437MHz	8.59	30	Pass
802.11b	2462MHz	8.36	30	Pass
802.11g	2412MHz	8.34	30	Pass
802.11g	2437MHz	8.50	30	Pass
802.11g	2462MHz	8.48	30	Pass
802.11n 20	2412MHz	9.62	30	Pass
802.11n 20	2437MHz	9.71	30	Pass
802.11n 20	2462MHz	9.75	30	Pass

5. POWER SPECTRAL DENSITY

5.1 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.

5.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

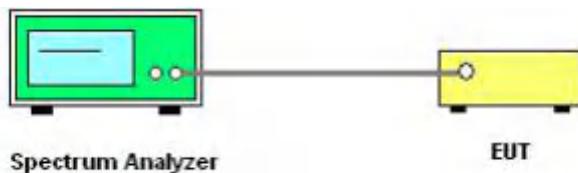
(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 TEST SETUP

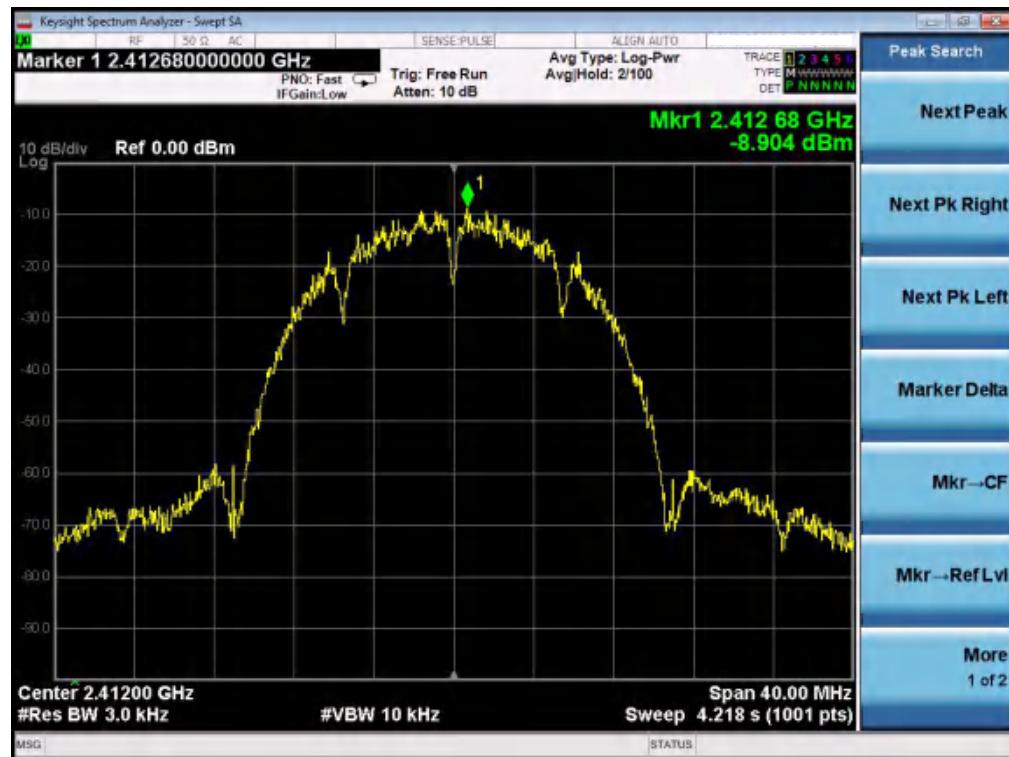


5.4 TEST RESULTS

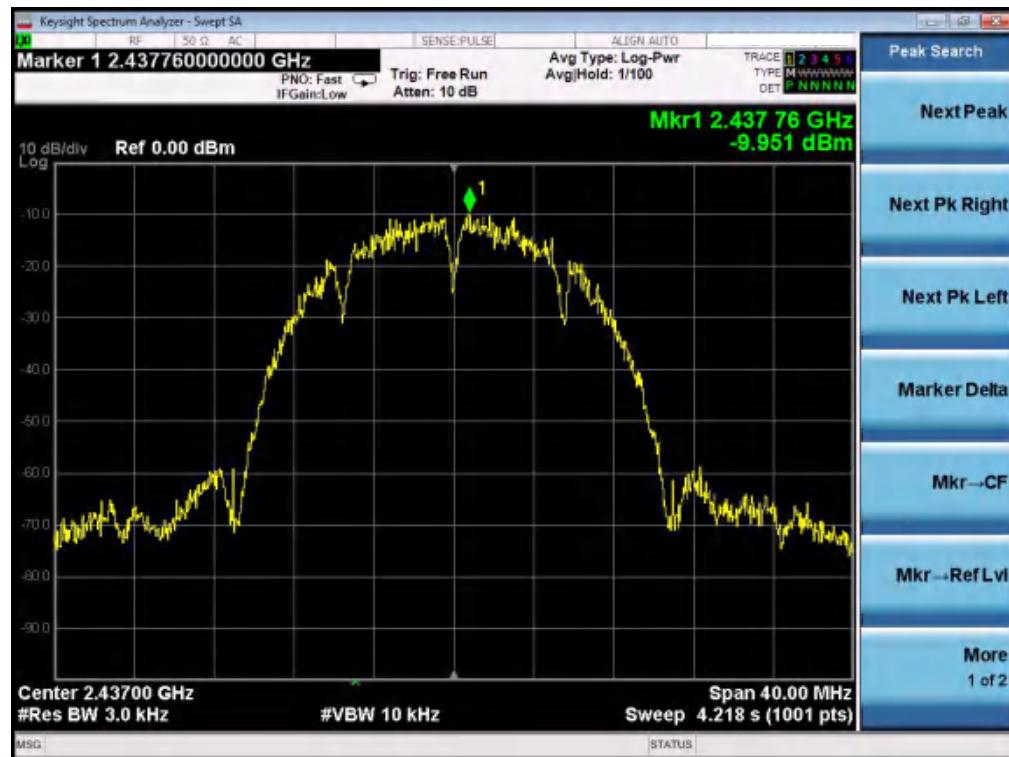
TestMode	Channel (MHz)	Result (dBm/3KHz)	Limit (dBm/3KHz)	Verdict
802.11b	2412MHz	-8.904	8	Pass
802.11b	2437MHz	-9.951	8	Pass
802.11b	2462MHz	-8.717	8	Pass
802.11g	2412MHz	-15.724	8	Pass
802.11g	2437MHz	-16.268	8	Pass
802.11g	2462MHz	-13.389	8	Pass
802.11n 20	2412MHz	-16.828	8	Pass
802.11n 20	2437MHz	-14.313	8	Pass
802.11n 20	2462MHz	-14.388	8	Pass

5.5 original test data

802.11b-2412MHz



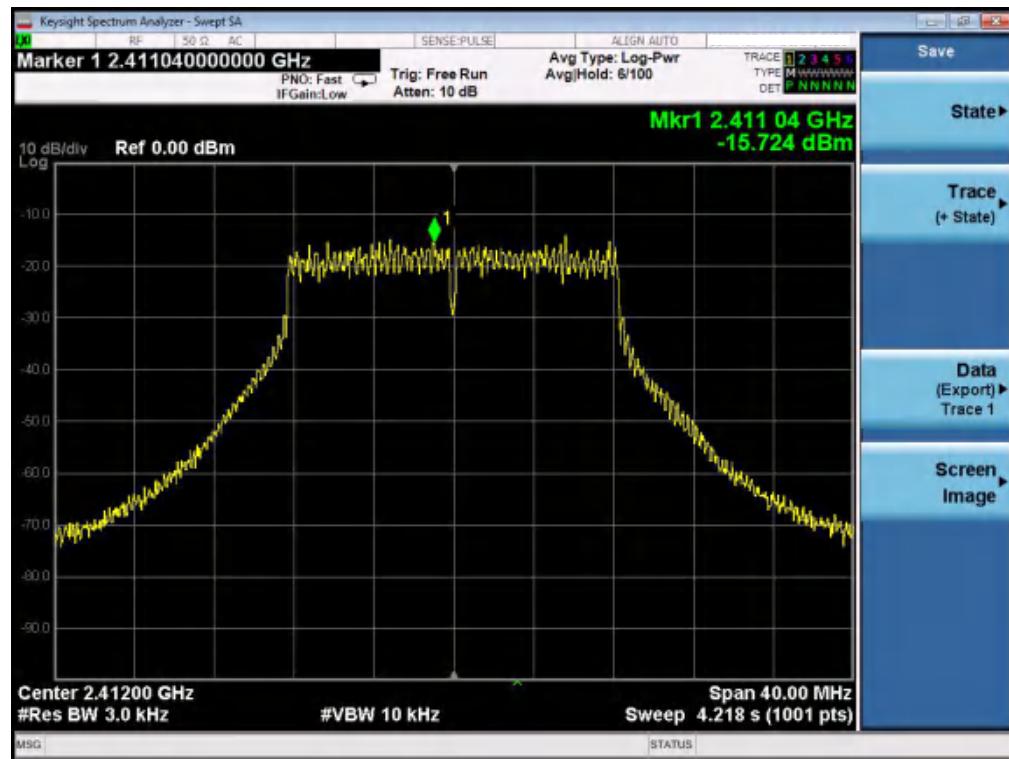
802.11b-2437MHz



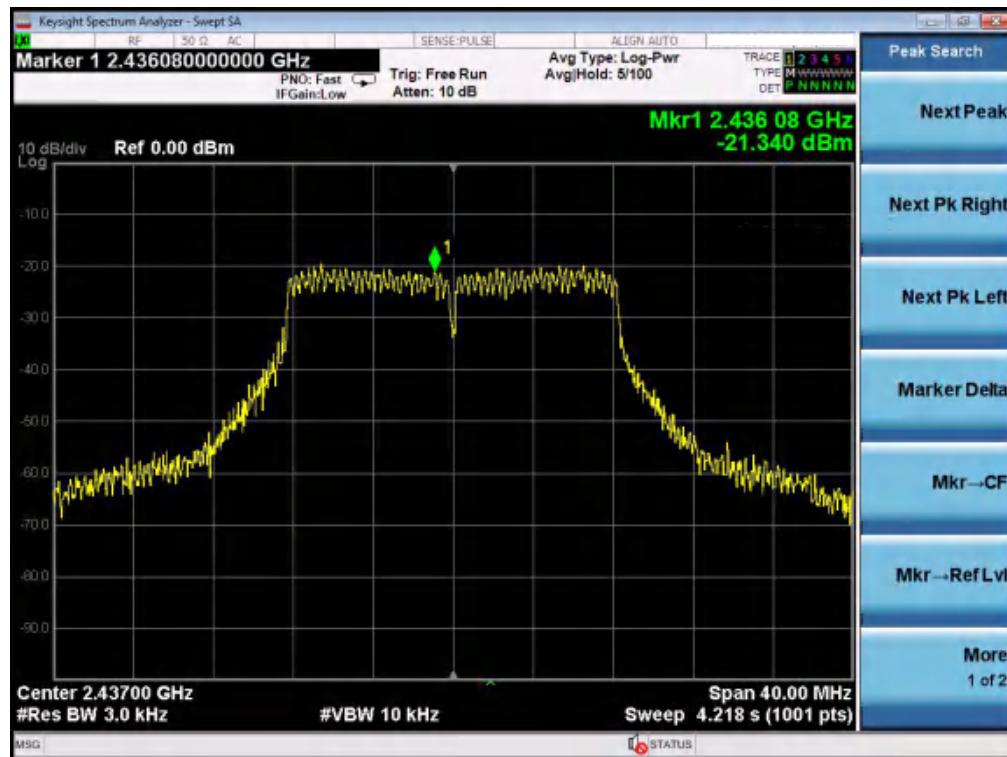
802.11b-2462MHz



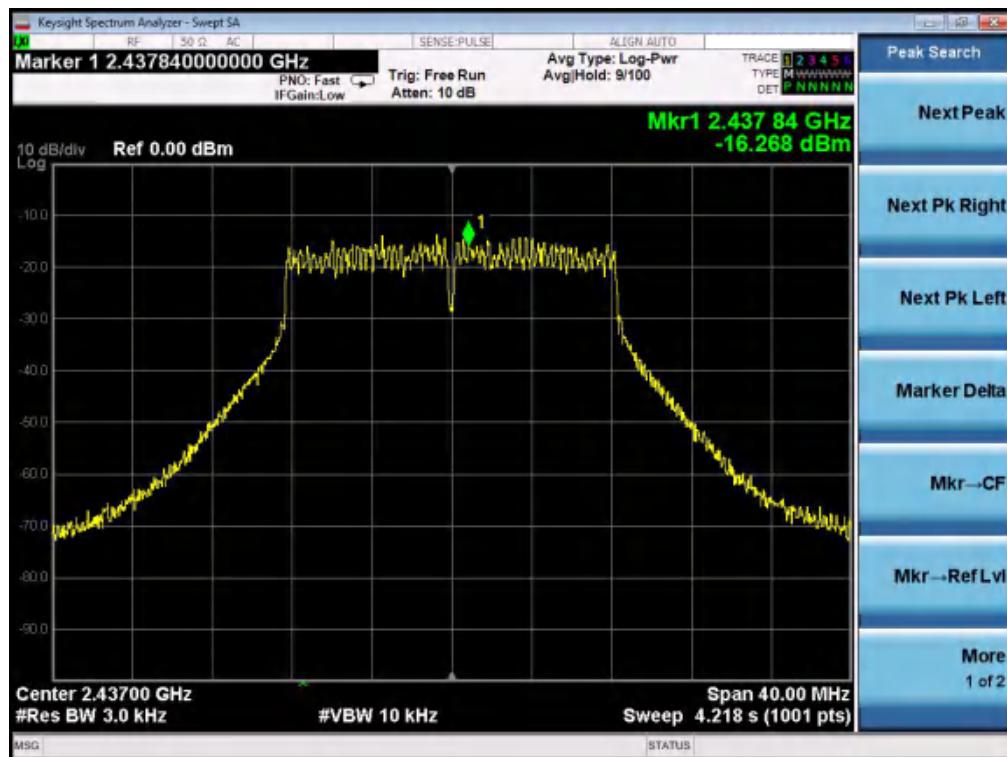
802.11g-2412MHz



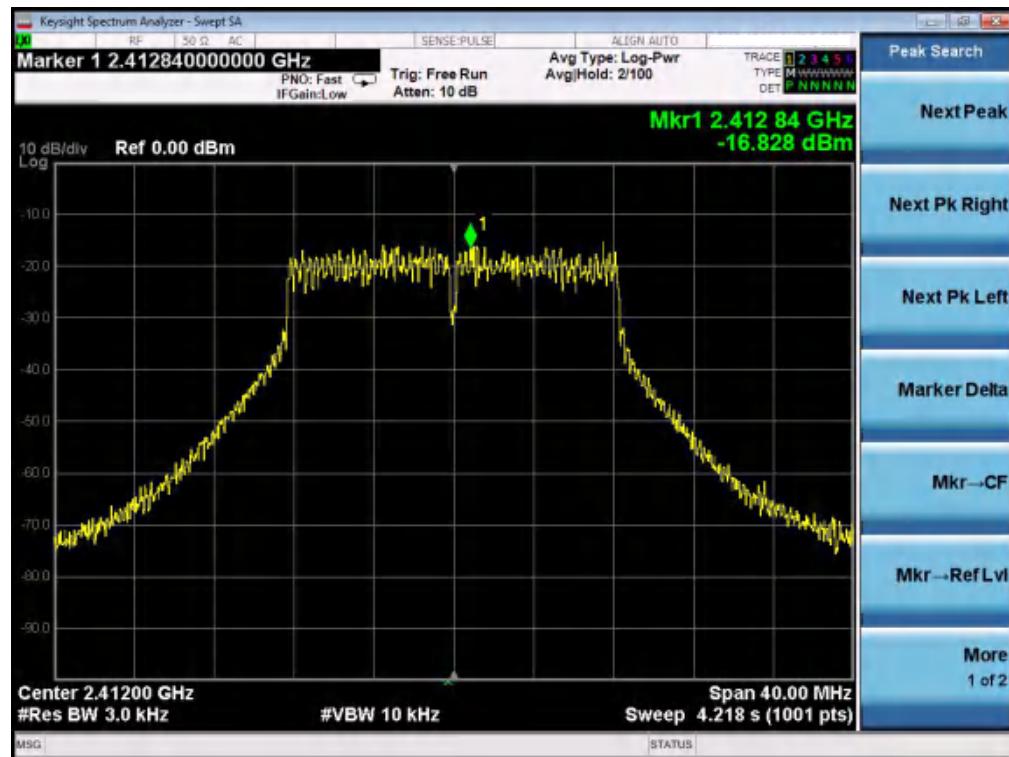
802.11g-2437MHz



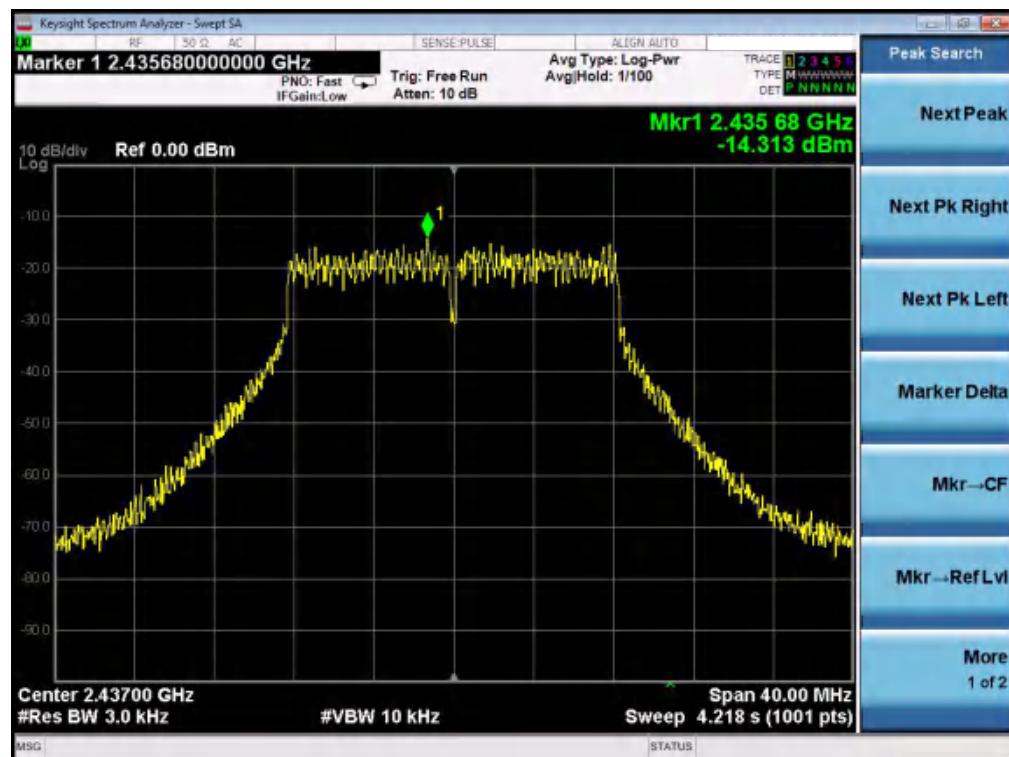
802.11g-2462MHz



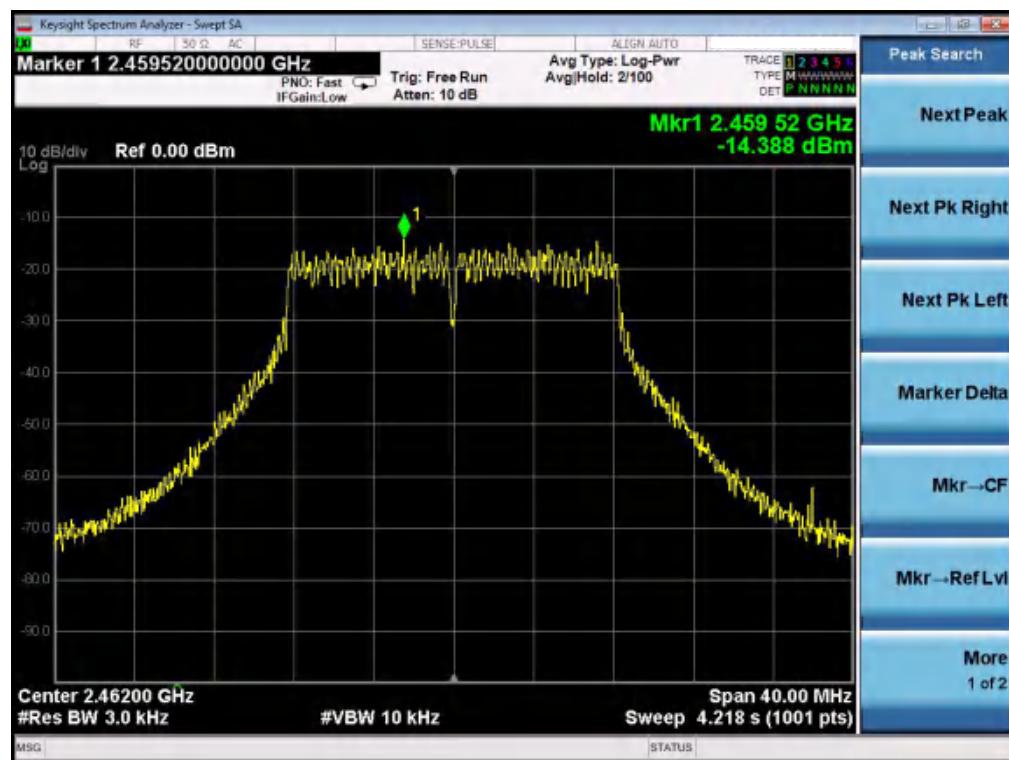
802.11n 20-2412MHz



802.11n 20-2437MHz



802.11n 20-2462MHz



6. Band edge and spurious(conducted)

6.1 LIMIT

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

6.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW:	100kHz
VBW:	300kHz
Span	1.5times the DTS bandwidth
Detector Mode:	Avg
Sweep time:	auto
Trace mode	Max hold

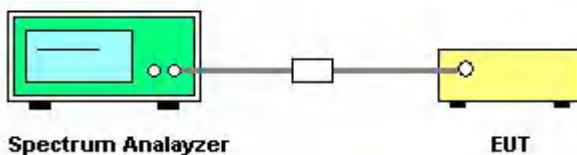
(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW:	100kHz
VBW:	300kHz
Span	Encompass frequency range to be measured
Number of measurement points	\geq span/RBW
Detector Mode:	Avg
Sweep time:	auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

6.3 TEST SETUP

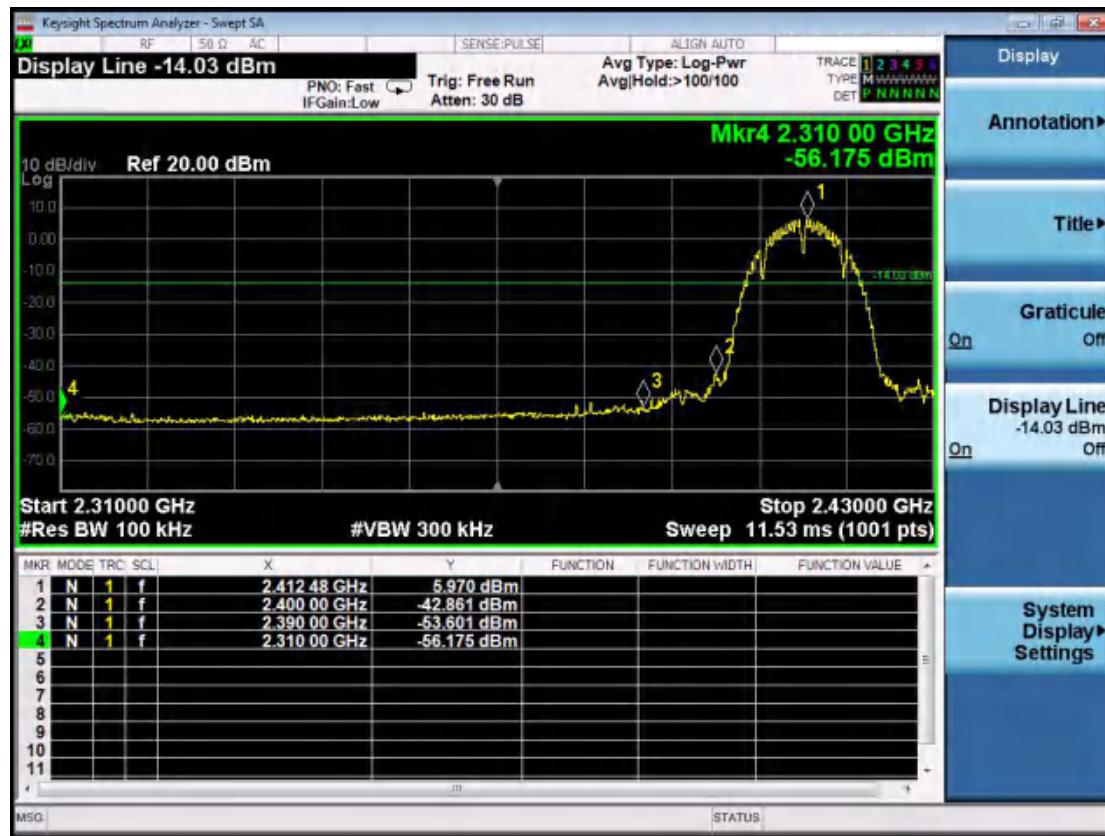


6.5 TEST RESULTS

Eut set mode	CH or Frequency	Result
802.11b	CH1	Pass
	CH11	Pass
802.11g	CH1	Pass
	CH11	Pass
802.11n 20	CH1	Pass
	CH11	Pass

6.5 Original test data

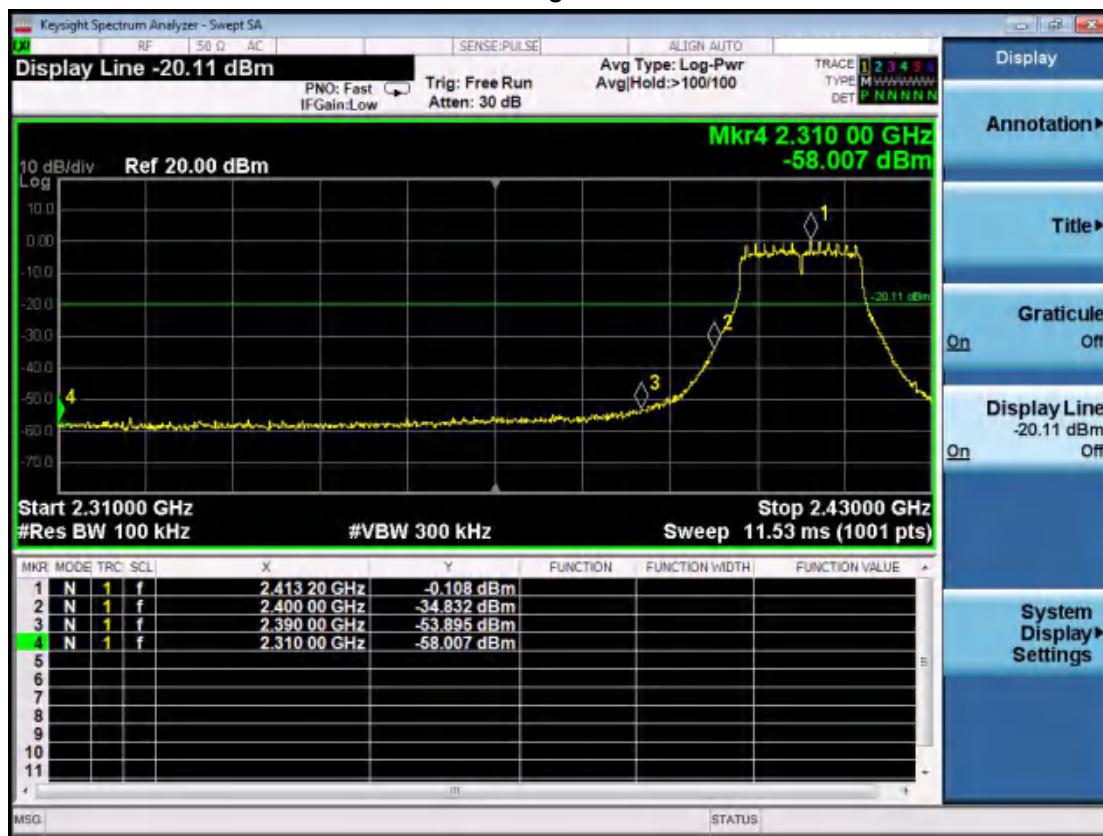
802.11b Low CH



802.11b High CH



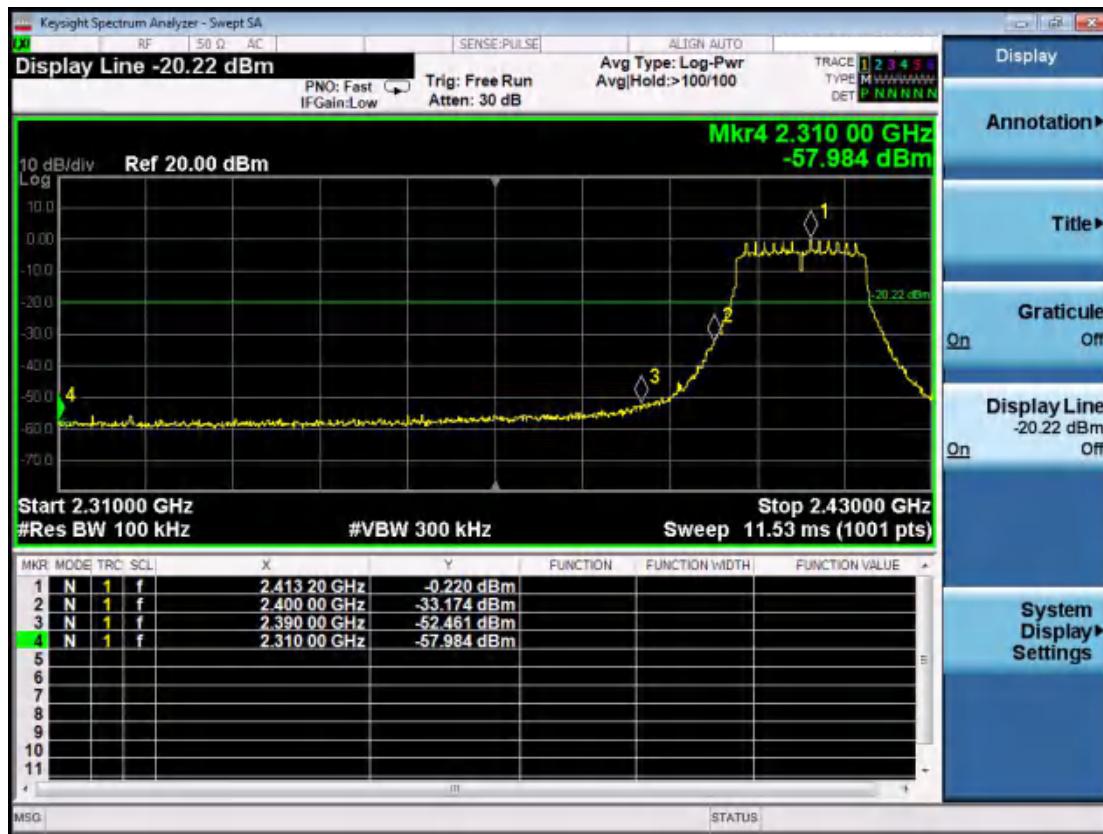
802.11g low CH



802.11g high CH



802.11n20 Low CH

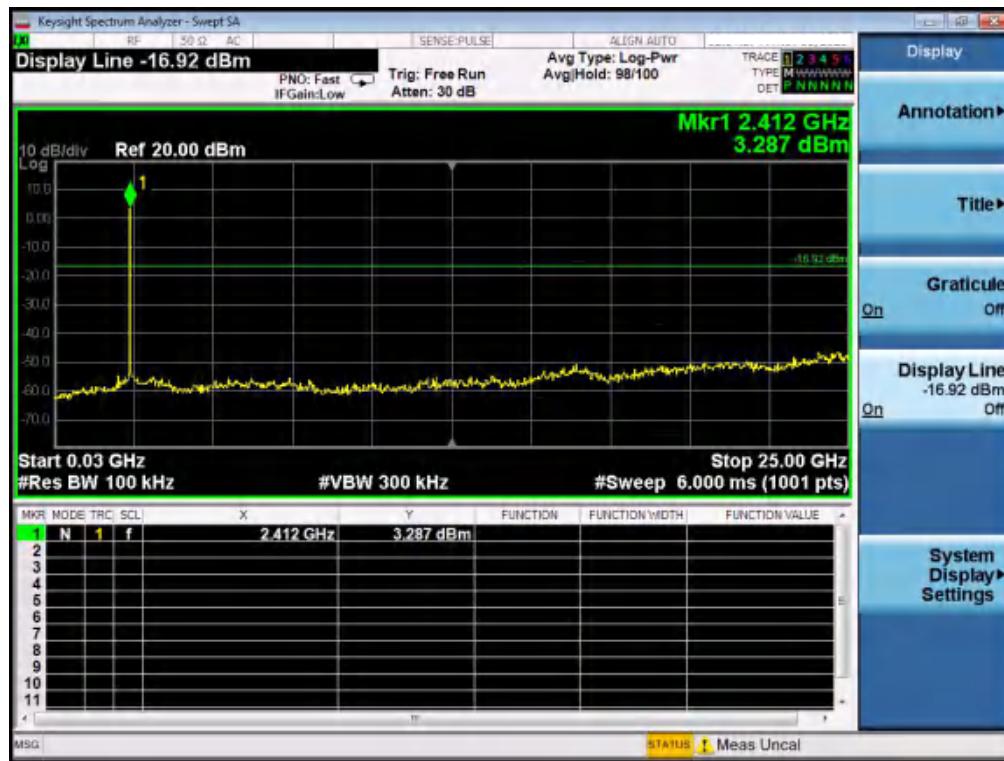


802.11n20 High CH

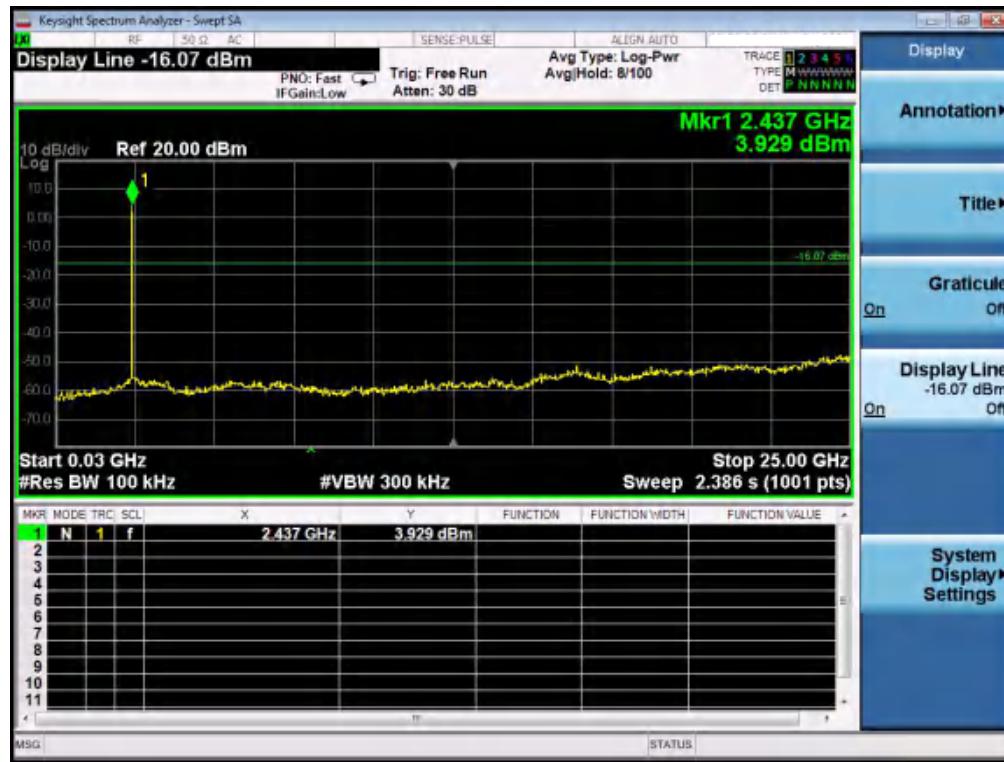


Spurious emissions
(802.11b) Lowest channel

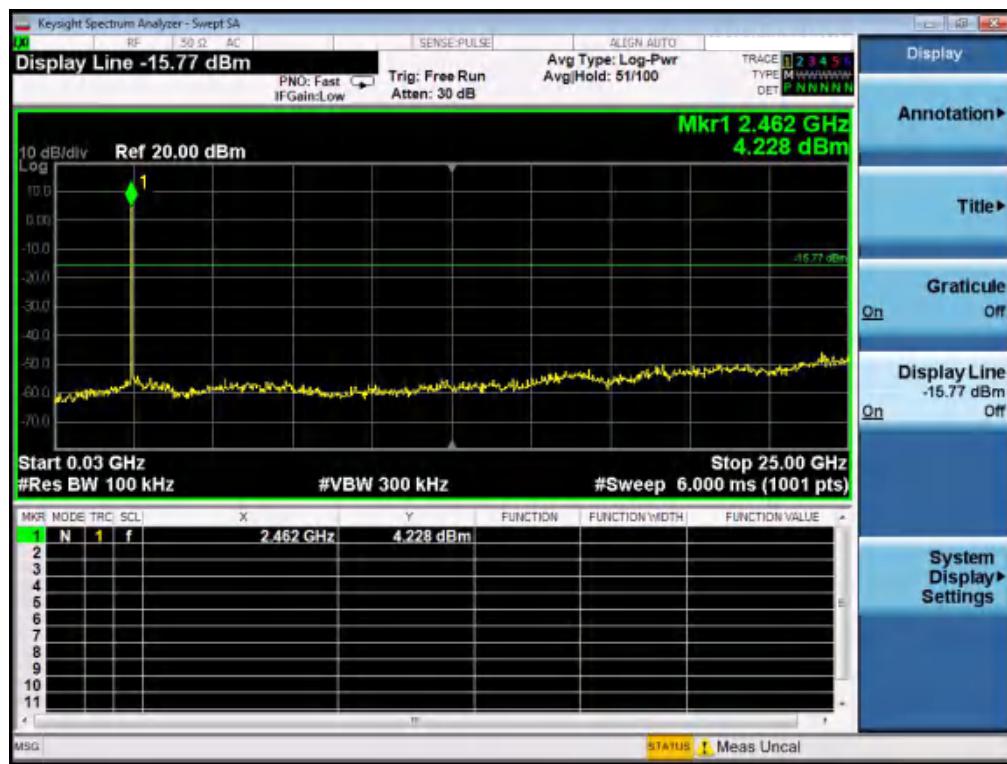
30MHz-25GHz



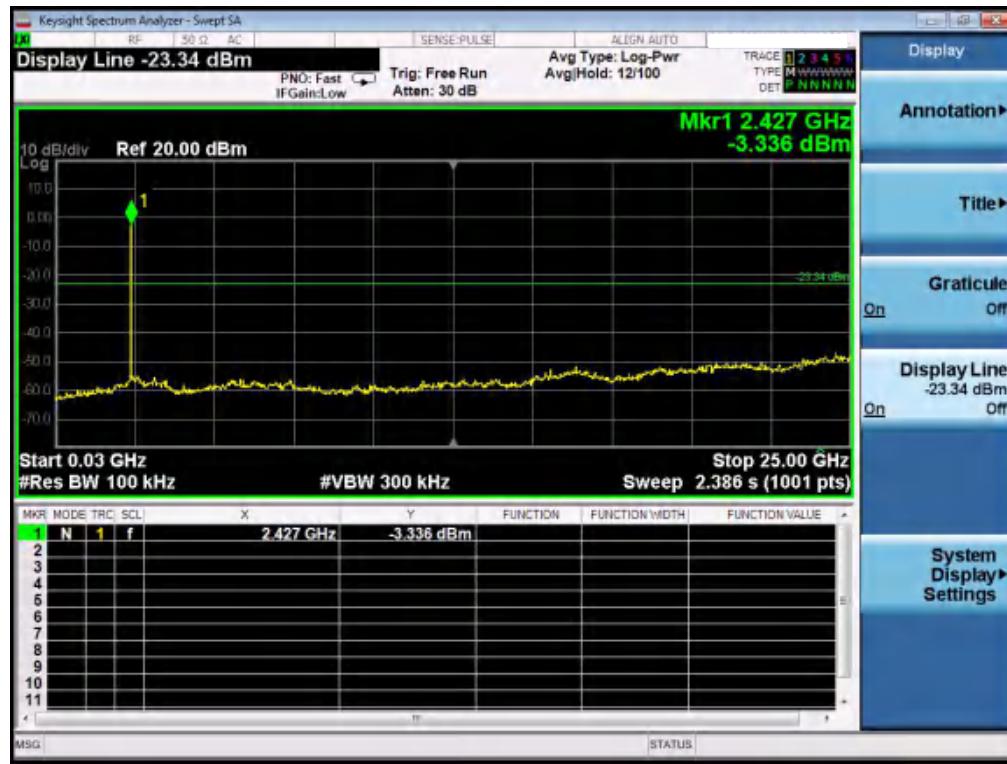
802.11b Middle CH, 2437MHz



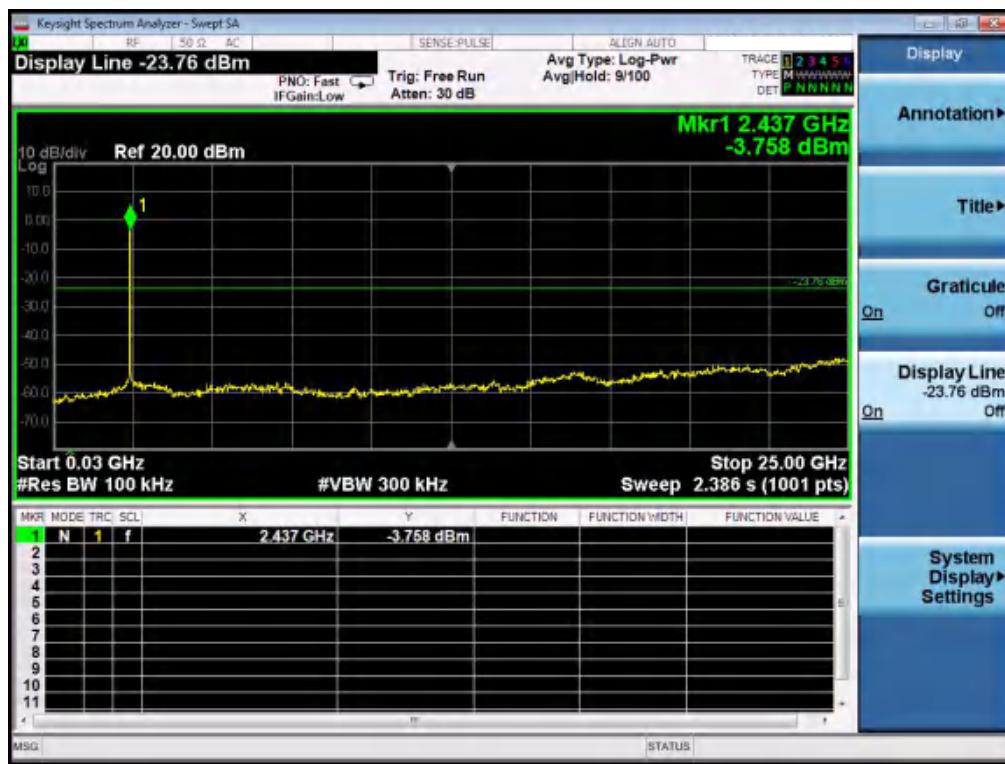
802.11b High CH, 2462MHz
30MHz-25GHz



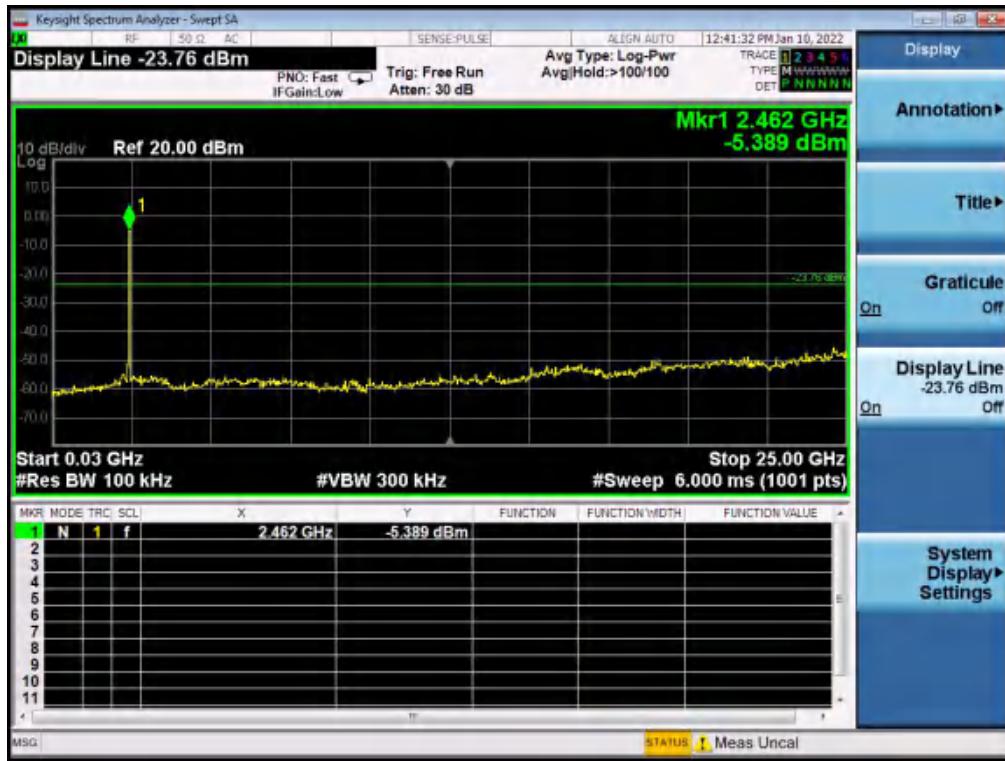
802.11g Low CH, 2412MHz
30MHz-25GHz



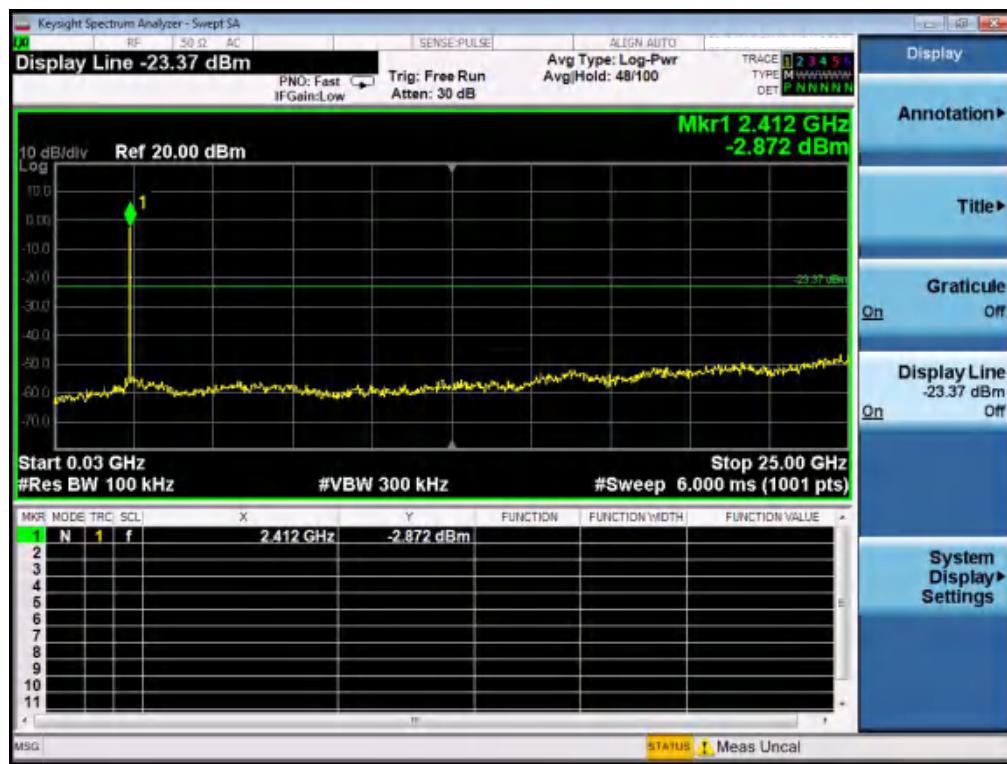
802.11g Middle CH, 2437MHz
30MHz-25GHz



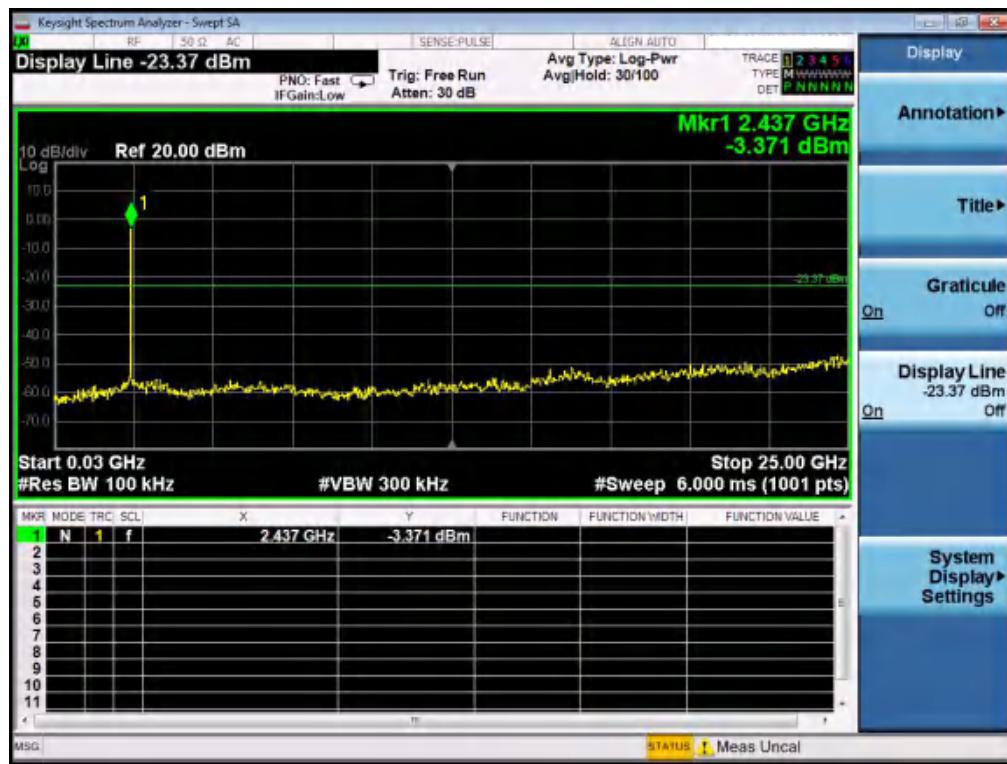
802.11g High CH, 2462MHz
30MHz-25GHz



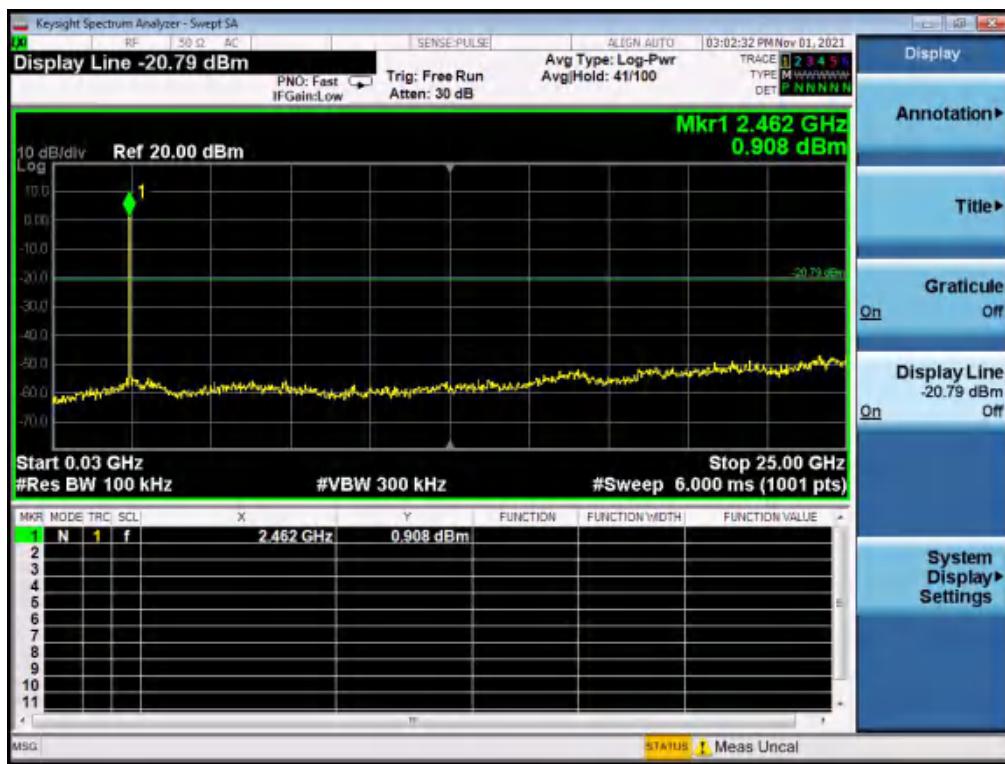
802.11n 20 Low CH, 2412MHz
30MHz-25GHz



802.11n 20 Middle CH, 2437MHz
30MHz-25GHz



802.11n 20 High CH, 2462MHz
30MHz-25GHz



7 RADIATED EMISSION MEASUREMENT

7.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz

For Band edge

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2300 to 2403 MHz Upper Band Edge: 2479 to 2500 MHz
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7.2 TEST PROCEDURE

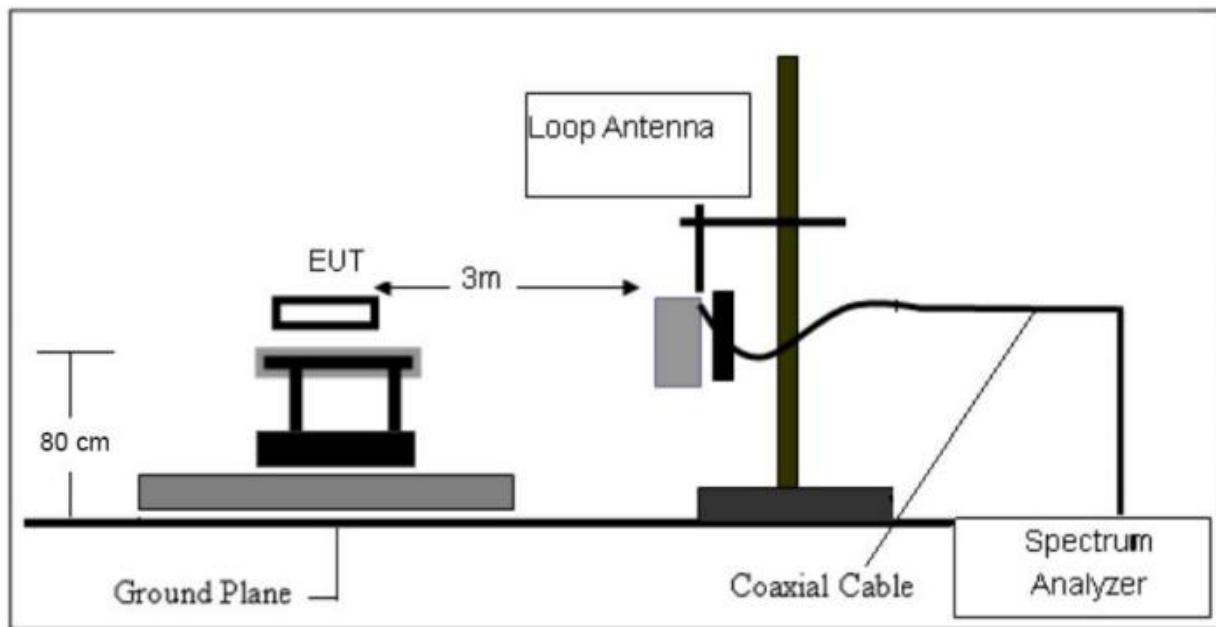
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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 QuasiPeak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

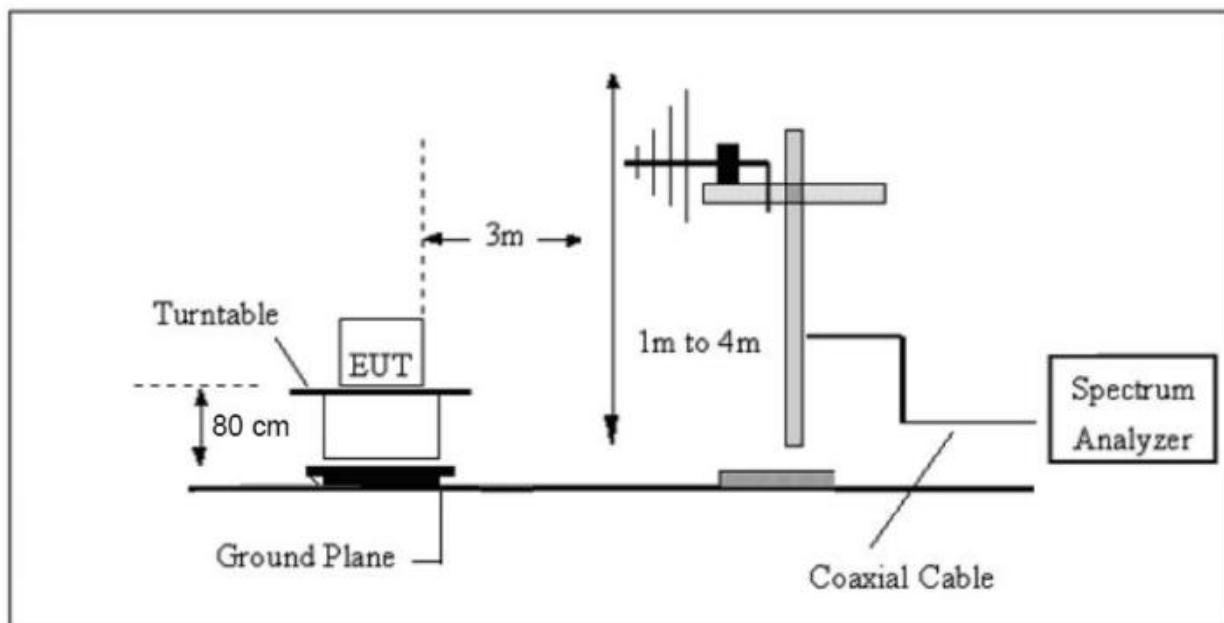
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

7.3 TESTSETUP

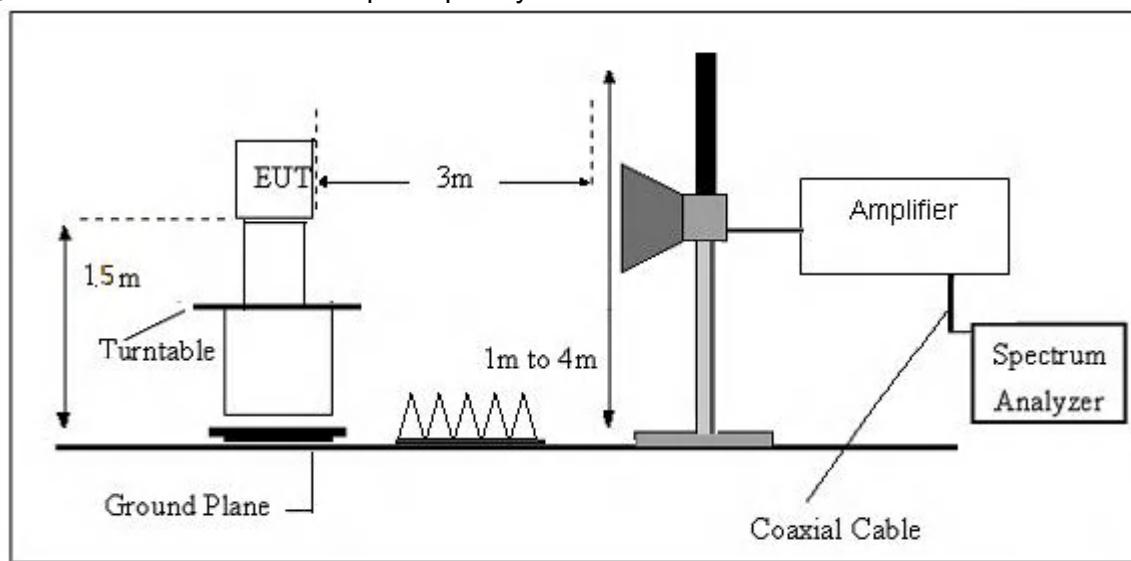
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



7.4. TEST RESULTS

(9KHz-30MHz)

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Test Mode:	802.11b

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F	Test Result
					--
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:

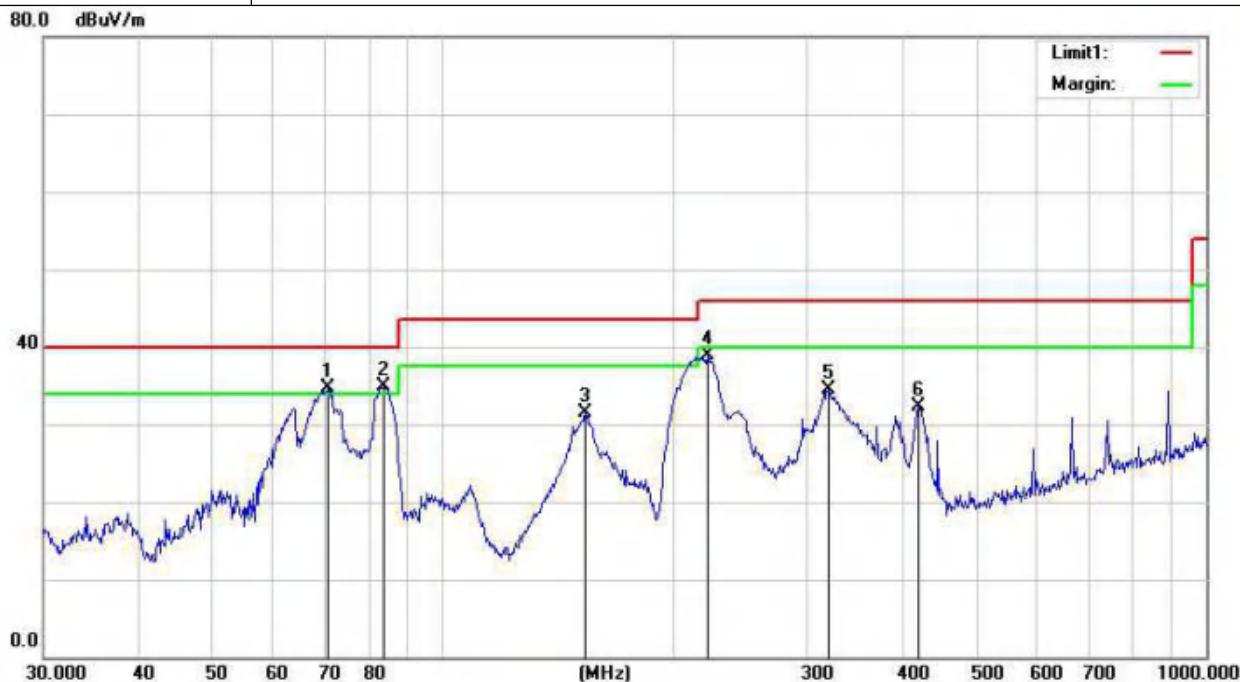
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log \left(\frac{\text{specific distance}}{\text{test distance}} \right)$ (dB);

Limit line = specific limits (dBuv) + distance extrapolation factor.

(30MHz-1000MHz)

Temperature:	24.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Phase:	Horizontal
Test Mode:	802.11b(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	70.8315	55.08	-20.45	34.63	40.00	-5.37	QP
2	83.5220	56.22	-21.28	34.94	40.00	-5.06	QP
3	153.7385	50.81	-19.37	31.44	43.50	-12.06	QP
4	222.1698	54.22	-15.39	38.83	46.00	-7.17	QP
5	319.9370	47.87	-13.28	34.59	46.00	-11.41	QP
6	419.1081	44.53	-12.15	32.38	46.00	-13.62	QP

Note: 1. Margin = Result (Result =Reading + Factor)-Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Phase:	Vertical
Test Mode:	ON		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	66.7325	52.72	-19.67	33.05	40.00	-6.95	QP
2	109.4116	42.89	-16.96	25.93	43.50	-17.57	QP
3	147.9214	44.45	-20.12	24.33	43.50	-19.17	QP
4	227.6906	46.29	-15.37	30.92	46.00	-15.08	QP
5	321.0608	42.77	-13.26	29.51	46.00	-16.49	QP
6	665.8034	45.26	-6.69	38.57	46.00	-7.43	QP

Note: 1. Margin = Result (Result =Reading + Factor)-Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

(1GHz~25GHz) Restricted band and Spurious emission Requirements

802.11b(Worst)-Low

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	36.26	31.79	8.62	32.10	44.57	74.00	-29.43	Vertical
7236.00	31.67	36.19	11.68	31.97	47.57	74.00	-26.43	Vertical
9648.00	30.89	38.07	14.16	31.56	51.56	74.00	-22.44	Vertical
12060.00	*					74.00		Vertical
14472.00	*					74.00		Vertical
16884.00	*					74.00		Vertical
4824.00	35.56	31.79	8.62	32.10	43.87	74.00	-30.13	Horizontal
7236.00	31.74	36.19	11.68	31.97	47.64	74.00	-26.36	Horizontal
9648.00	30.61	38.07	14.16	31.56	51.28	74.00	-22.72	Horizontal
12060.00	*					74.00		Horizontal
14472.00	*					74.00		Horizontal
16884.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	25.66	31.79	8.62	32.10	33.97	54.00	-20.03	Vertical
7236.00	20.63	36.19	11.68	31.97	36.53	54.00	-17.47	Vertical
9648.00	21.31	38.07	14.16	31.56	41.98	54.00	-12.02	Vertical
12060.00	*					54.00		Vertical
14472.00	*					54.00		Vertical
16884.00	*					54.00		Vertical
4824.00	25.31	31.79	8.62	32.10	33.62	54.00	-20.38	Horizontal
7236.00	20.39	36.19	11.68	31.97	36.29	54.00	-17.71	Horizontal
9648.00	20.42	38.07	14.16	31.56	41.09	54.00	-12.91	Horizontal
12060.00	*					54.00		Horizontal
14472.00	*					54.00		Horizontal
16884.00	*					54.00		Horizontal

802.11b(Worst)-Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	36.02	31.85	8.66	32.12	44.41	74.00	-29.59	Vertical
7311.00	32.18	36.37	11.71	31.91	48.35	74.00	-25.65	Vertical
9748.00	32.23	38.27	14.25	31.56	53.19	74.00	-20.81	Vertical
12185.00	*					74.00		Vertical
14622.00	*					74.00		Vertical
17059.00	*					74.00		Vertical
4874.00	37.02	31.85	8.66	32.12	45.41	74.00	-28.59	Horizontal
7311.00	31.09	36.37	11.71	31.91	47.26	74.00	-26.74	Horizontal
9748.00	32.23	38.27	14.25	31.56	53.19	74.00	-20.81	Horizontal
12185.00	*					74.00		Horizontal
14622.00	*					74.00		Horizontal
17059.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	27.13	31.85	8.66	32.12	35.52	54.00	-18.48	Vertical
7311.00	20.57	36.37	11.71	31.91	36.74	54.00	-17.26	Vertical
9748.00	21.54	38.27	14.25	31.56	42.50	54.00	-11.50	Vertical
12185.00	*					54.00		Vertical
14622.00	*					54.00		Vertical
17059.00	*					54.00		Vertical
4874.00	27.30	31.85	8.66	32.12	35.69	54.00	-18.31	Horizontal
7311.00	20.23	36.37	11.71	31.91	36.40	54.00	-17.60	Horizontal
9748.00	22.00	38.27	14.25	31.56	42.96	54.00	-11.04	Horizontal
12185.00	*					54.00		Horizontal
14622.00	*					54.00		Horizontal
17059.00	*					54.00		Horizontal

802.11b(Worst)-High

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	39.14	31.90	8.70	32.15	47.59	74.00	-26.41	Vertical
7386.00	31.33	36.49	11.76	31.83	47.75	74.00	-26.25	Vertical
9848.00	34.43	38.62	14.31	31.77	55.59	74.00	-18.41	Vertical
12310.00	*					74.00		Vertical
14772.00	*					74.00		Vertical
17234.00	*					74.00		Vertical
4924.00	39.34	31.90	8.70	32.15	47.79	74.00	-26.21	Horizontal
7386.00	30.69	36.49	11.76	31.83	47.11	74.00	-26.89	Horizontal
9848.00	30.80	38.62	14.31	31.77	51.96	74.00	-22.04	Horizontal
12310.00	*					74.00		Horizontal
14772.00	*					74.00		Horizontal
17234.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	30.50	31.90	8.70	32.15	38.95	54.00	-15.05	Vertical
7386.00	21.38	36.49	11.76	31.83	37.80	54.00	-16.20	Vertical
9848.00	23.04	38.62	14.31	31.77	44.20	54.00	-9.80	Vertical
12310.00	*					54.00		Vertical
14772.00	*					54.00		Vertical
17234.00	*					54.00		Vertical
4924.00	30.00	31.90	8.70	32.15	38.45	54.00	-15.55	Horizontal
7386.00	20.18	36.49	11.76	31.83	36.60	54.00	-17.40	Horizontal
9848.00	20.15	38.62	14.31	31.77	41.31	54.00	-12.69	Horizontal
12310.00	*					54.00		Horizontal
14772.00	*					54.00		Horizontal
17234.00	*					54.00		Horizontal

1. Notes: emissions are attenuated 20dB below the limits, so it does not record.

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11b, 802.11g, 802.11n (HT-20), the worst case is 802.11b. Emission Level = Reading + Factor Margin = Limit - Emission Level
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise

802.11 b low CH
Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	48.89	27.59	5.38	34.01	47.85	74.00	-26.15	Horizontal
2400.00	54.73	27.58	5.39	34.01	53.69	74.00	-20.31	Horizontal
2390.00	47.76	27.59	5.38	34.01	46.72	74.00	-27.28	Vertical
2400.00	51.59	27.58	5.39	34.01	50.55	74.00	-23.45	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	37.90	27.59	5.38	34.01	36.86	54.00	-17.14	Horizontal
2400.00	43.82	27.58	5.39	34.01	42.78	54.00	-11.22	Horizontal
2390.00	36.12	27.59	5.38	34.01	35.08	54.00	-18.92	Vertical
2400.00	40.68	27.58	5.39	34.01	39.64	54.00	-14.36	Vertical

802.11 b High CH
Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	48.23	27.53	5.47	33.92	47.31	74.00	-26.69	Horizontal
2500.00	45.87	27.55	5.49	29.93	48.98	74.00	-25.02	Horizontal
2483.50	47.68	27.53	5.47	33.92	46.76	74.00	-27.24	Vertical
2500.00	44.05	27.55	5.49	29.93	47.16	74.00	-26.84	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	37.14	27.53	5.47	33.92	36.22	54.00	-17.78	Horizontal
2500.00	34.14	27.55	5.49	29.93	37.25	54.00	-16.75	Horizontal
2483.50	35.29	27.53	5.47	33.92	34.37	54.00	-19.63	Vertical
2500.00	32.40	27.55	5.49	29.93	35.51	54.00	-18.49	Vertical

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

802.11 g Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	61.94	27.59	5.38	34.01	60.90	74.00	-13.10	Horizontal
2400.00	70.56	27.58	5.39	34.01	69.52	74.00	-4.48	Horizontal
2390.00	58.19	27.59	5.38	34.01	57.15	74.00	-16.85	Vertical
2400.00	67.21	27.58	5.39	34.01	66.17	74.00	-7.83	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	44.24	27.59	5.38	34.01	43.20	54.00	-10.80	Horizontal
2400.00	50.90	27.58	5.39	34.01	49.86	54.00	-4.14	Horizontal
2390.00	41.78	27.59	5.38	34.01	40.74	54.00	-13.26	Vertical
2400.00	47.82	27.58	5.39	34.01	46.78	54.00	-7.22	Vertical

802.11 g High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	53.82	27.53	5.47	33.92	52.90	74.00	-21.10	Horizontal
2500.00	47.07	27.55	5.49	29.93	50.18	74.00	-23.82	Horizontal
2483.50	48.91	27.53	5.47	33.92	47.99	74.00	-26.01	Vertical
2500.00	45.36	27.55	5.49	29.93	48.47	74.00	-25.53	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.70	27.53	5.47	33.92	35.78	54.00	-18.22	Horizontal
2500.00	34.80	27.55	5.49	29.93	37.91	54.00	-16.09	Horizontal
2483.50	35.25	27.53	5.47	33.92	34.33	54.00	-19.67	Vertical
2500.00	33.11	27.55	5.49	29.93	36.22	54.00	-17.78	Vertical

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

802.11 N 20 Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	61.98	27.59	5.38	34.01	60.94	74.00	-13.06	Horizontal
2400.00	72.50	27.58	5.39	34.01	71.46	74.00	-2.54	Horizontal
2390.00	57.89	27.59	5.38	34.01	56.85	74.00	-17.15	Vertical
2400.00	68.39	27.58	5.39	34.01	67.35	74.00	-6.65	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	46.17	27.59	5.38	34.01	45.13	54.00	-8.87	Horizontal
2400.00	51.36	27.58	5.39	34.01	50.32	54.00	-3.68	Horizontal
2390.00	42.53	27.59	5.38	34.01	41.49	54.00	-12.51	Vertical
2400.00	47.69	27.58	5.39	34.01	46.65	54.00	-7.35	Vertical

802.11 N 20 High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	52.73	27.53	5.47	33.92	51.81	74.00	-22.19	Horizontal
2500.00	47.15	27.55	5.49	29.93	50.26	74.00	-23.74	Horizontal
2483.50	48.88	27.53	5.47	33.92	47.96	74.00	-26.04	Vertical
2500.00	45.26	27.55	5.49	29.93	48.37	74.00	-25.63	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	36.68	27.53	5.47	33.92	35.76	54.00	-18.24	Horizontal
2500.00	34.84	27.55	5.49	29.93	37.95	54.00	-16.05	Horizontal
2483.50	35.51	27.53	5.47	33.92	34.59	54.00	-19.41	Vertical
2500.00	33.13	27.55	5.49	29.93	36.24	54.00	-17.76	Vertical

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.

8 CONDUCTED EMISSION TEST

8.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

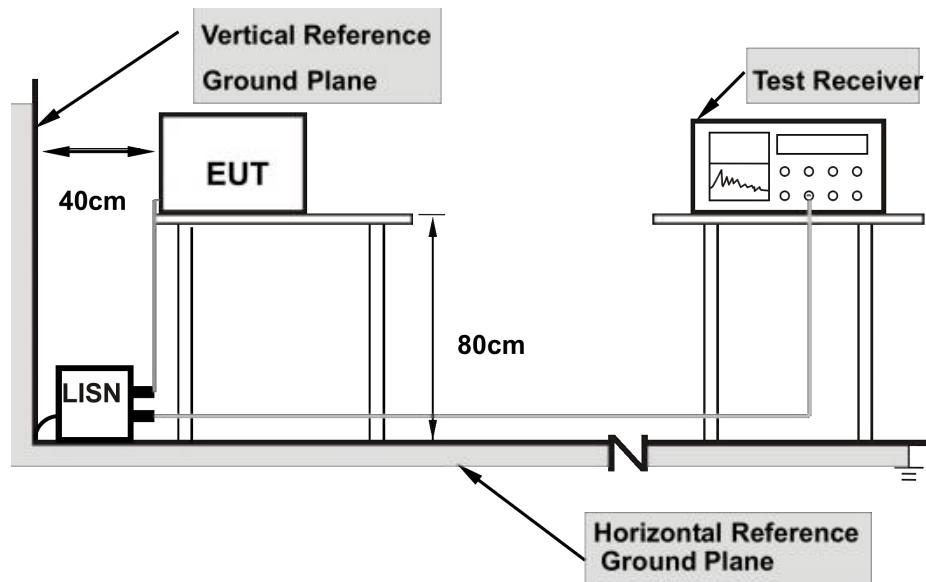
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

8.1.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

8.1.3 TEST SETUP

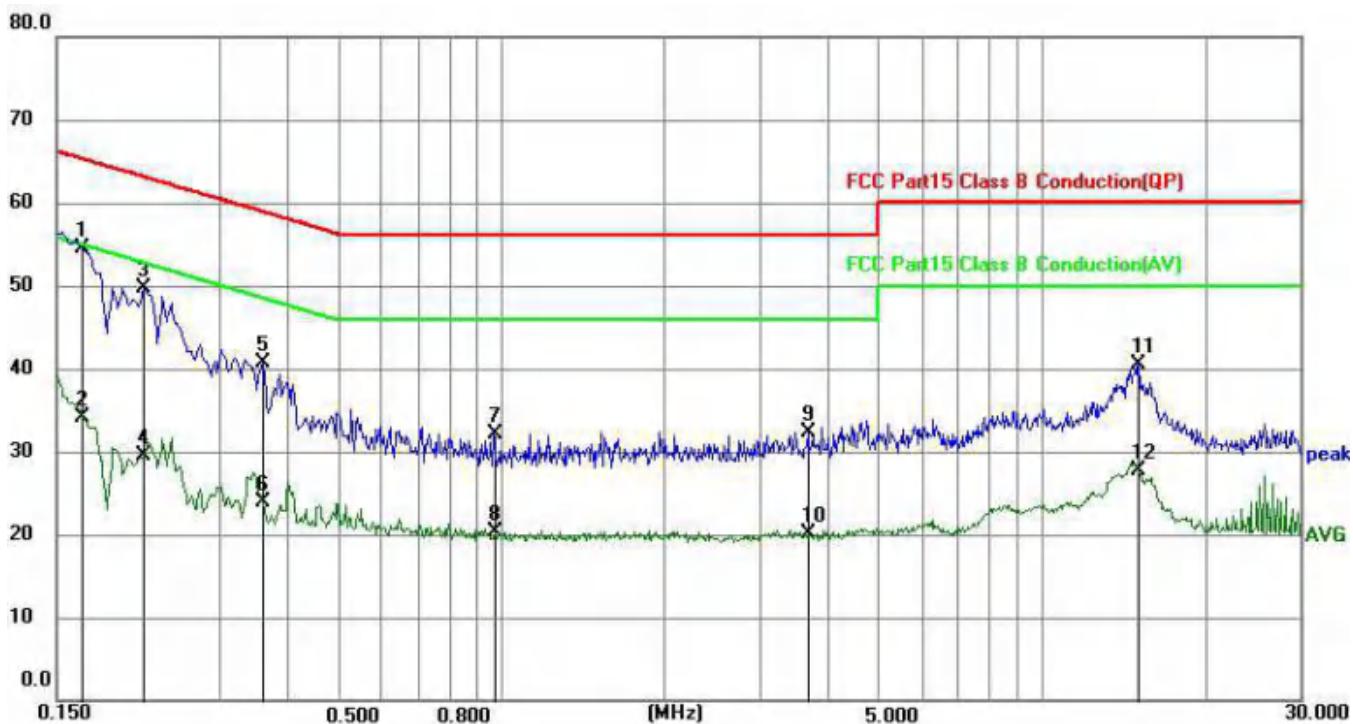


Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

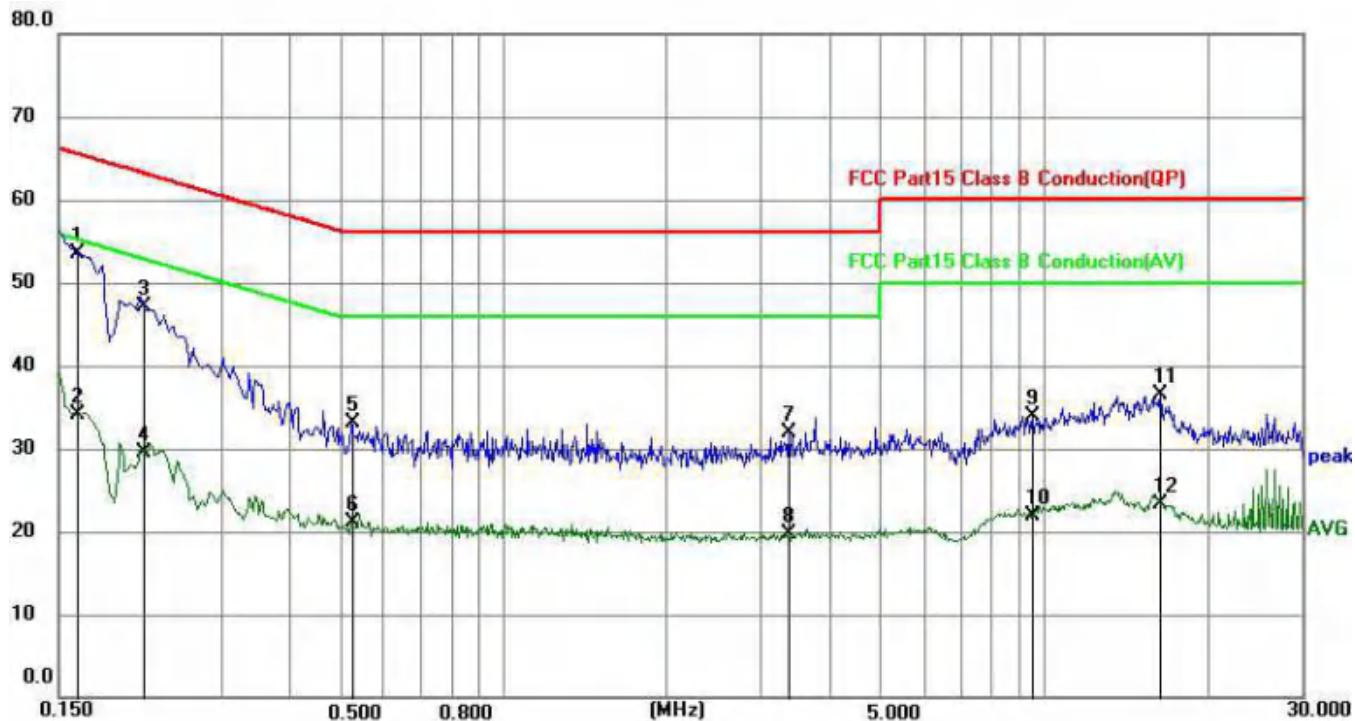
8.1.4 TEST RESULT

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	AC 110	Phase:	L
Test Mode:	802.11b(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1668	44.69	9.78	54.47	65.12	10.65	QP
2	0.1668	24.37	9.78	34.15	55.12	20.97	AVG
3	0.2175	39.88	9.80	49.68	62.91	13.23	QP
4	0.2175	19.61	9.80	29.41	52.91	23.50	AVG
5	0.3615	30.85	9.84	40.69	58.69	18.00	QP
6	0.3615	14.08	9.84	23.92	48.69	24.77	AVG
7	0.9645	22.15	9.92	32.07	56.00	23.93	QP
8	0.9645	10.43	9.92	20.35	46.00	25.65	AVG
9	3.6825	22.39	9.95	32.34	56.00	23.66	QP
10	3.6825	10.06	9.95	20.01	46.00	25.99	AVG
11	15.1035	30.45	10.12	40.57	60.00	19.43	QP
12	15.1035	17.60	10.12	27.72	50.00	22.28	AVG

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	AC 110V	Phase:	N
Test Mode:	802.11b(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1624	43.67	9.77	53.44	65.34	11.90	QP
2	0.1624	24.39	9.77	34.16	55.34	21.18	AVG
3	0.2162	37.28	9.80	47.08	62.96	15.88	QP
4	0.2162	19.64	9.80	29.44	52.96	23.52	AVG
5	0.5235	23.28	9.87	33.15	56.00	22.85	QP
6	0.5235	11.27	9.87	21.14	46.00	24.86	AVG
7	3.3810	22.00	9.97	31.97	56.00	24.03	QP
8	3.3810	9.66	9.97	19.63	46.00	26.37	AVG
9	9.5460	23.79	10.18	33.97	60.00	26.03	QP
10	9.5460	11.76	10.18	21.94	50.00	28.06	AVG
11	16.4265	26.35	10.21	36.56	60.00	23.44	QP
12	16.4265	13.02	10.21	23.23	50.00	26.77	AVG

9. ANTENNA REQUIREMENT

9.1 STANDARD 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.

9.2 RESULT

The antennas used for this product are Integral antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0dBi.

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