

# FCC RADIO TEST REPORT

**FCC ID: 2AUO6-288ZDP**

**Product:** Smart WiFi Camera

**Trade Name:** N/A

**Model Name:** TV-288ZD-2MP

**Serial Model:** N/A

**Report No.:** UNIA19092318FR-01

## Prepared for

Shenzhen gang fan electronics co. LTD

3K, 3rd Floor, Building A, Building C, Yuwei Factory Complex, Qingxiang  
Road, Qinghua Road, Longhua District, Shenzhen, China

## Prepared by

Shenzhen United Testing Technology Co., Ltd.

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Community, Xixiang Str, Bao'an District, Shenzhen, China

## TEST RESULT CERTIFICATION

**Applicant's name** .....: Shenzhen gang fan electronics co. LTD

Address .....: 3K, 3rd Floor, Building A, Building C, Yuwei Factory Complex, Qingxiang Road, Qinghua Road, Longhua District, Shenzhen, China

**Manufacture's Name** .....: Shenzhen gang fan electronics co. LTD

Address .....: 3K, 3rd Floor, Building A, Building C, Yuwei Factory Complex, Qingxiang Road, Qinghua Road, Longhua District, Shenzhen, China

### Product description

Product name .....: Smart WiFi Camera

Trade Mark .....: N/A

Model and/or type reference : TV-288ZD-2MP

**Standards** .....: FCC Rules and Regulations Part 15 Subpart C Section 15.247  
ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., 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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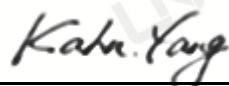
**Date of Test** .....: Sep. 23, 2019

Date (s) of performance of tests .....: Sep. 23, 2019 -- Oct. 08, 2019

Date of Issue .....: Oct. 08, 2019

Test Result .....: Pass

Prepared by:



Kahn yang/Editor

Reviewer:



Sherwin Qian/Supervisor

Approved & Authorized Signer:



Liuzo/Manager

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## 1 TEST SUMMARY

### 1. Environment conditions

During the measurement the environment condition were within the listed ranges:

Normal temperature	25°C
Relative humidity	55%
Air pressure	101KPa

### 2. TEST PROCEDURES AND RESULTS

FCC PART 15.247		
FCC Part 15.207	AC Power Conductedmission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

### 3. TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.  
Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

#### 4. MEASUREMENT UNCERTAINTY

##### Measurement Uncertainty

Conducted Emission Expanded Uncertainty	= 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	= 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	= 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	= 4.06dB, k=2

## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Smart WiFi Camera
Trade Mark	N/A
Model Name	TV-288ZD-2MP
Serial No.	N/A
Model Difference	N/A
FCC ID	2AUO6-288ZDP
Antenna Type	Glue stick antenna
Antenna Gain	2dBi
Frequency Range	802.11b/g/n20: 2412~2462 MHz 802.11n40: 2422~2452MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n40: 7CH
Modulation Type	CCK, OFDM/DSSS
Battery	N/A
Power Source	AC 120 50/60Hz
Adapter Model	MODEL:RXZ--0515 INPUT:100-240~50/60Hz 0.3A max OUTPUT: DC12V== 1500mA

### 2.2 Description of Support Units

Description	Manufacturer	Model No.	Remark	FCC certification
AC-DC adapter	SHENZHEN KEYU POWER SUPPLY TECHNOLOGY CO.,LTD	RXZ--0515	/	SDOC

### 2.3 CARRIER FREQUENCY OF CHANNELS

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		

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452
04	2427	07	2442		
05	2432	08	2447		

## OPERATION OF EUT DURING TESTING

Operating Mode: 802.11b/g/n(20MHz) Duty cycle>98%

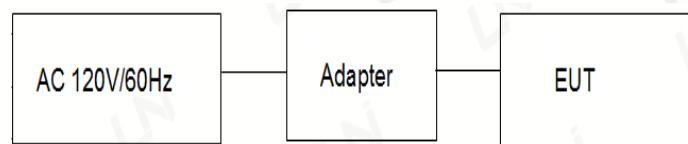
Low Channel:	2412MHz
Middle Channel	2437MHz
High Channel	2462MHz

Operating Mode: 802.11n(40MHz) Duty cycle>98%

Low Channel:	2422MHz
Middle Channel	2437MHz
High Channel	2452MHz

## 2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:



Operation of EUT during Radiation and Above1GHz Radiation testing:



## 2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2020.9.9
2	AMN	ETS	3810/2	00020199	2020.9.9
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2020.9.9
4	AAN	TESEQ	T8-Cat6	38888	2020.9.9
RADIATED EMISSION TEST					
1	Horn Antenna	Sunol	DRH-118	A101415	2020.9.29
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2020.9.29
3	PREAMP	HP	8449B	3008A00160	2020.9.9
4	PREAMP	HP	8447D	2944A07999	2020.9.9
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2020.9.9
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2020.9.28
7	Signal Generator	Agilent	E4421B	MY4335105	2020.9.28
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2020.9.28
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2020.9.9
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2020.9.28
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2020.9.9
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2020.9.9
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2020.3.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2020.3.14
15	RF power divider	Anritsu	K241B	992289	2020.9.28
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2020.9.28
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2020.9.8
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2020.9.8
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2020.9.8
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2020.1.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2020.11.02
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2020.3.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2020.10.24
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2020.5.10
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2020.5.10

### 3 TEST CONDITIONS AND RESULTS

#### 3.1 CONDUCTED EMISSIONS TEST

##### Limit

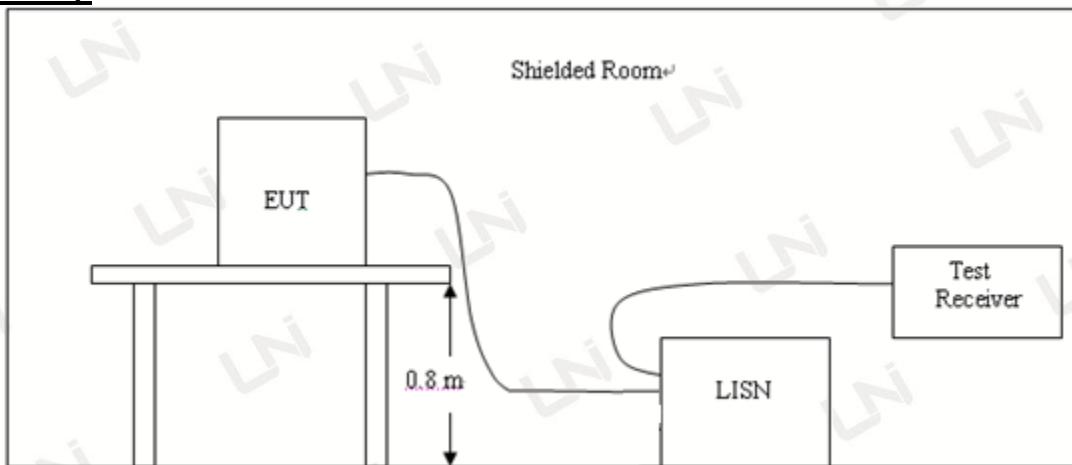
For unintentional device, according to § 15.207(a) Line Conducted Emission Limits is as following

Frequency range (MHz)	Limit (dB <sub>uV</sub> )	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

##### Test Setup



##### Test Procedure

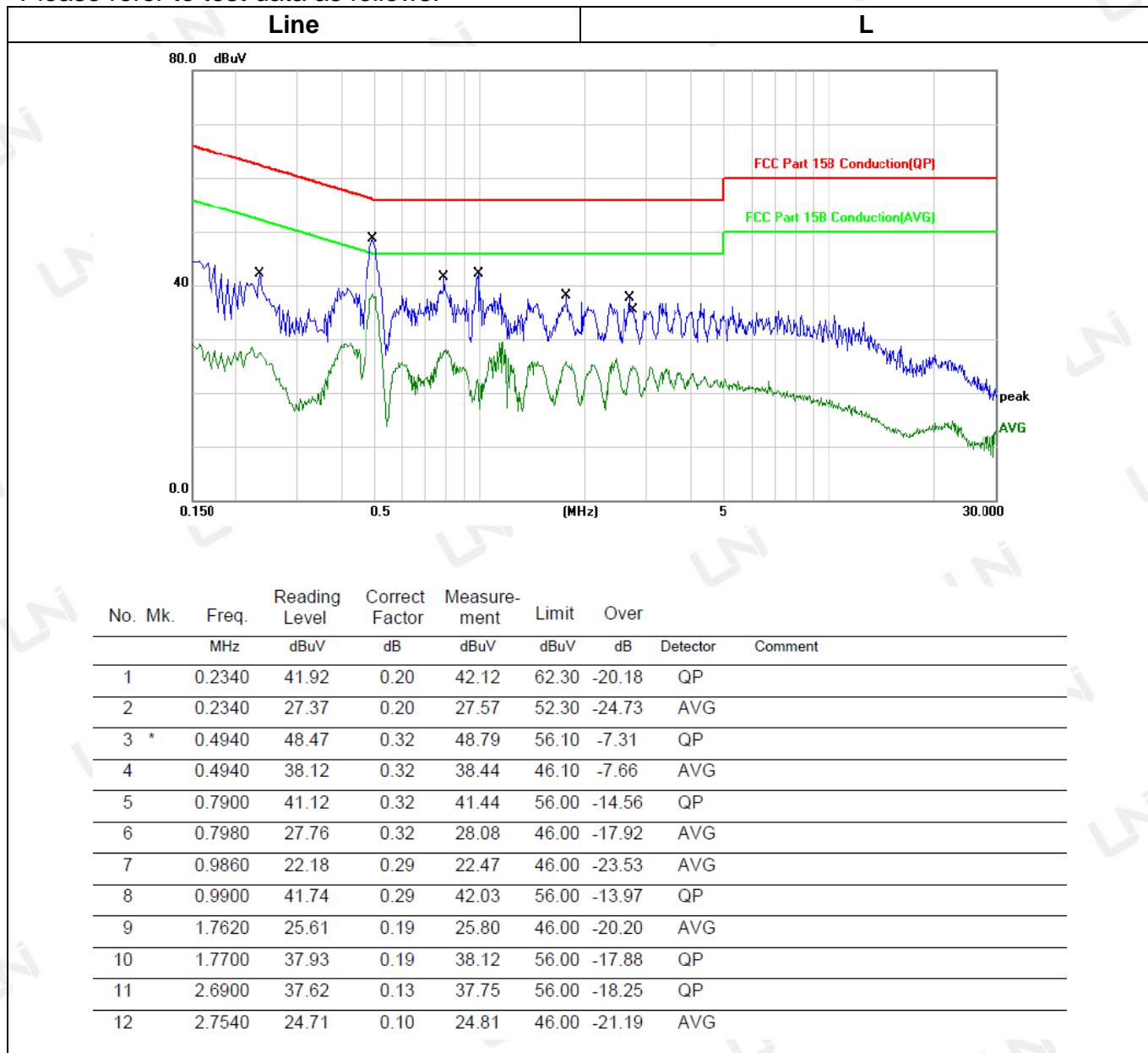
- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

##### Test Result

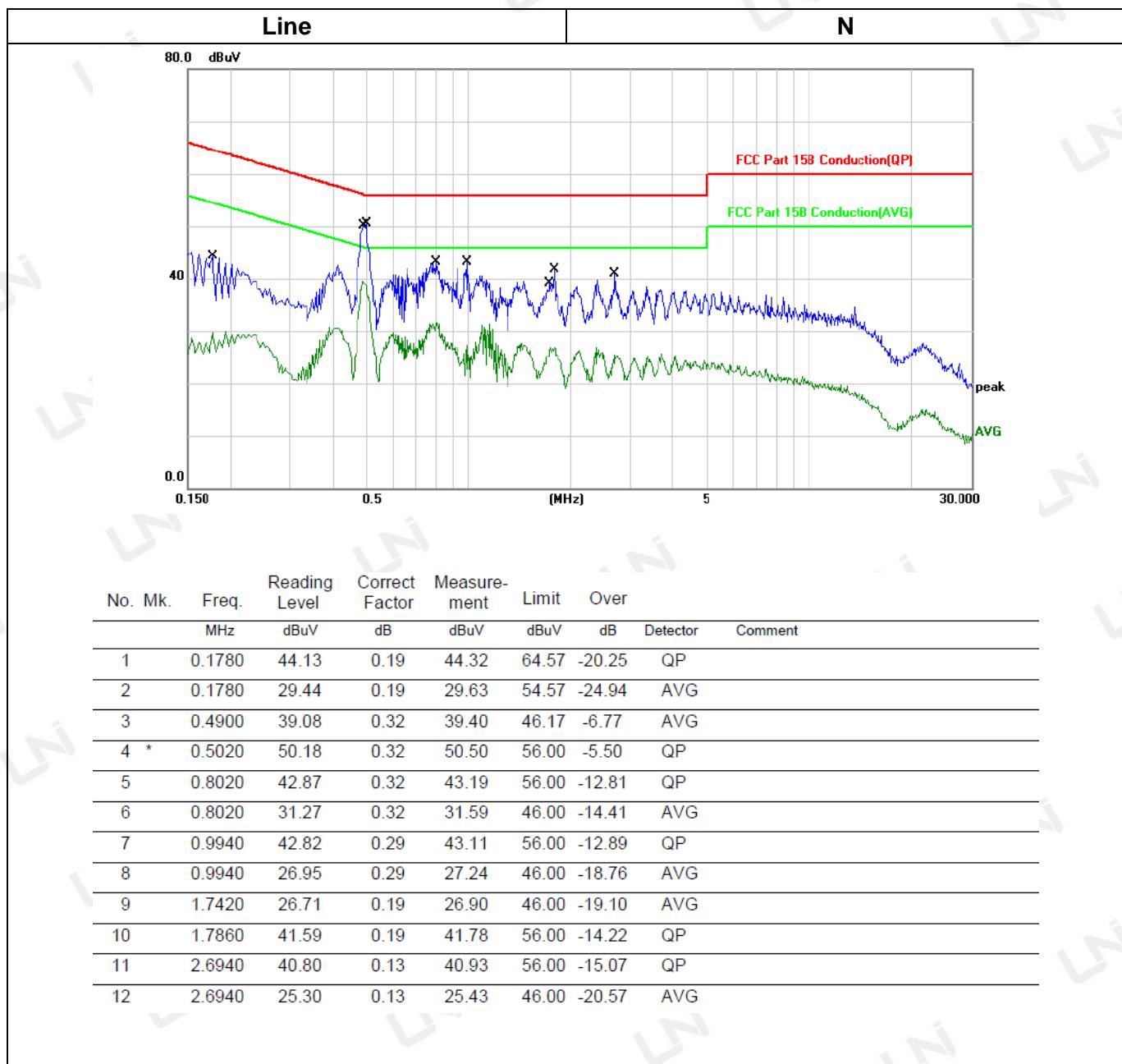
---PASS---

Temperature:	25°C	Relative Humidity:	48%
Test Date:	Sep. 27, 2019	Pressure:	1030hPa
Test Voltage:	AC 120V 60Hz	Polarization:	Horizontal

Please refer to test data as follows:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		0.2340	41.92	0.20	42.12	62.30	-20.18	QP	
2		0.2340	27.37	0.20	27.57	52.30	-24.73	AVG	
3	*	0.4940	48.47	0.32	48.79	56.10	-7.31	QP	
4		0.4940	38.12	0.32	38.44	46.10	-7.66	AVG	
5		0.7900	41.12	0.32	41.44	56.00	-14.56	QP	
6		0.7980	27.76	0.32	28.08	46.00	-17.92	AVG	
7		0.9860	22.18	0.29	22.47	46.00	-23.53	AVG	
8		0.9900	41.74	0.29	42.03	56.00	-13.97	QP	
9		1.7620	25.61	0.19	25.80	46.00	-20.20	AVG	
10		1.7700	37.93	0.19	38.12	56.00	-17.88	QP	
11		2.6900	37.62	0.13	37.75	56.00	-18.25	QP	
12		2.7540	24.71	0.10	24.81	46.00	-21.19	AVG	



## 3.2 RADIATED EMISSION TEST

### Radiation Limit

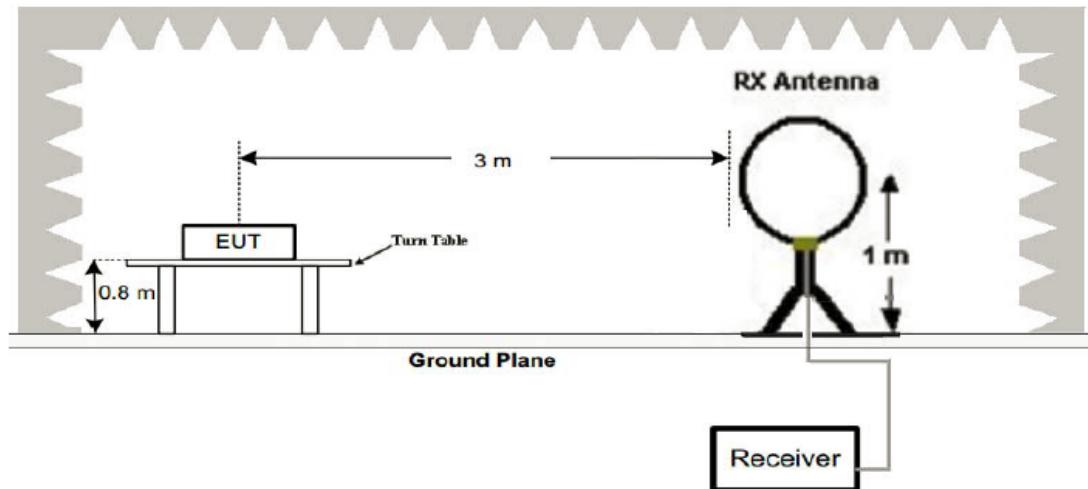
For unintentional device, according to § 15.209(a), except for Class B digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

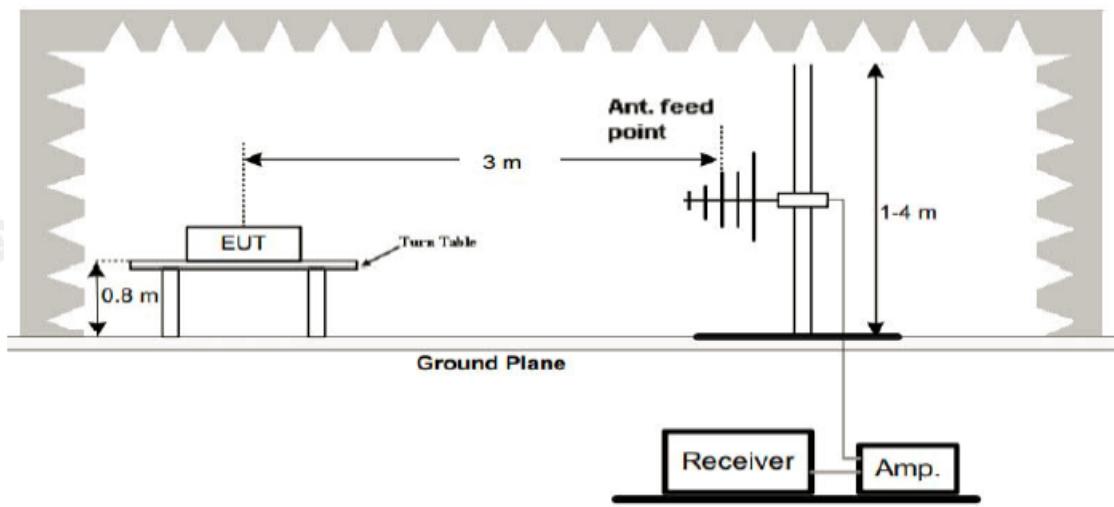
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

### Test Setup

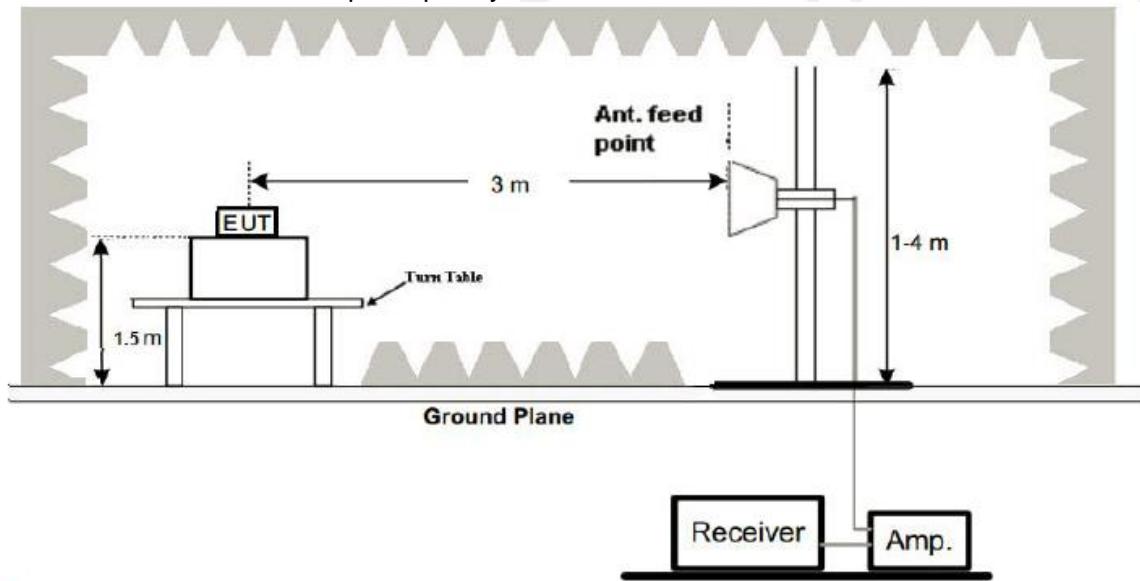
#### 1. Radiated Emission Test-Up Frequency Below 30MHz



#### 2. Radiated Emission Test-Up Frequency 30MHz~1GHz



### 3. Radiated Emission Test-Up Frequency Above 1GHz



#### **Test Procedure**

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9kHz to 25GHz per FCC PART 15.33(a).

**Note:**

For battery operated equipment, the equipment tests shall be performed using a new battery.

#### **Test Result**

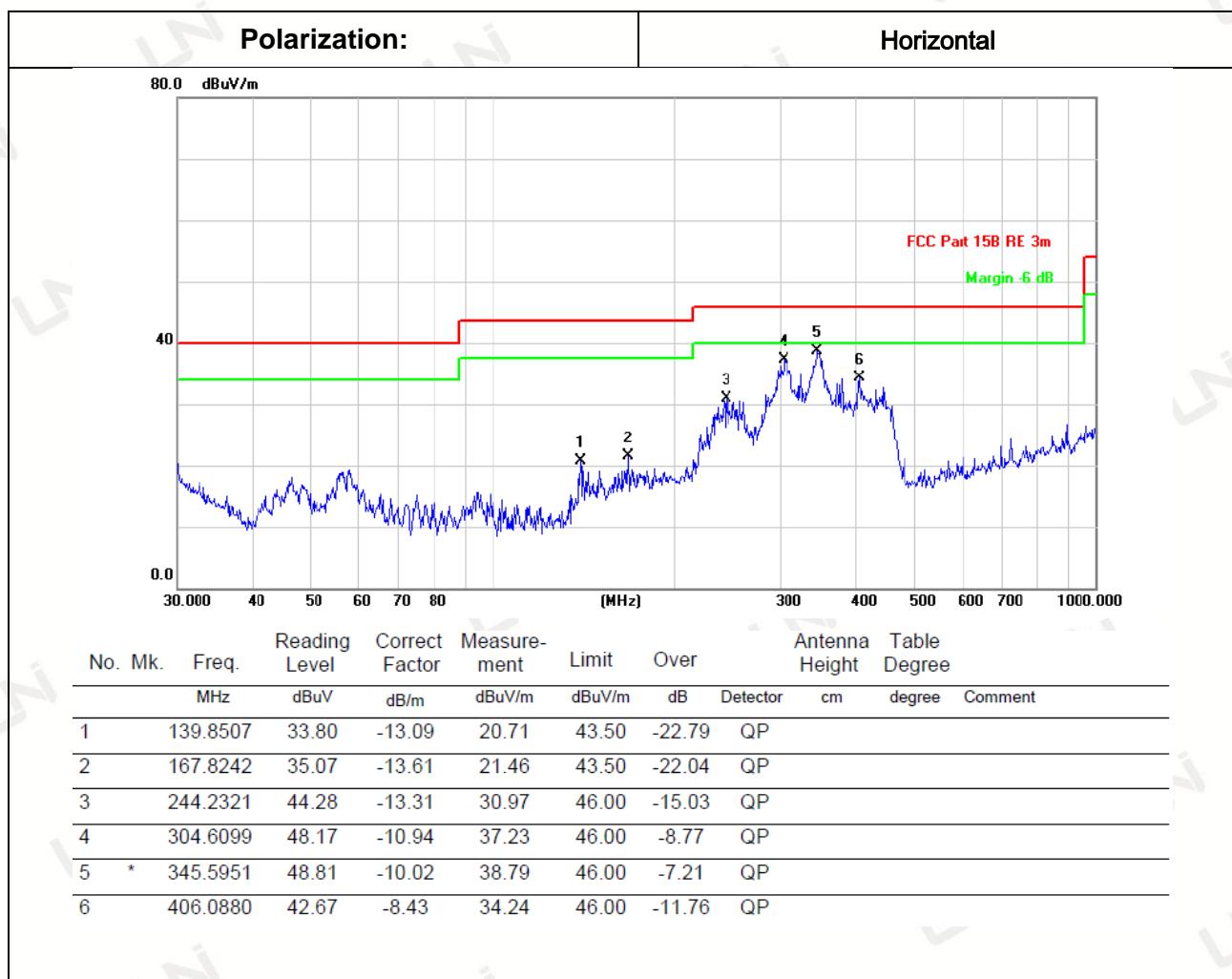
**---PASS---**

**Remark:**

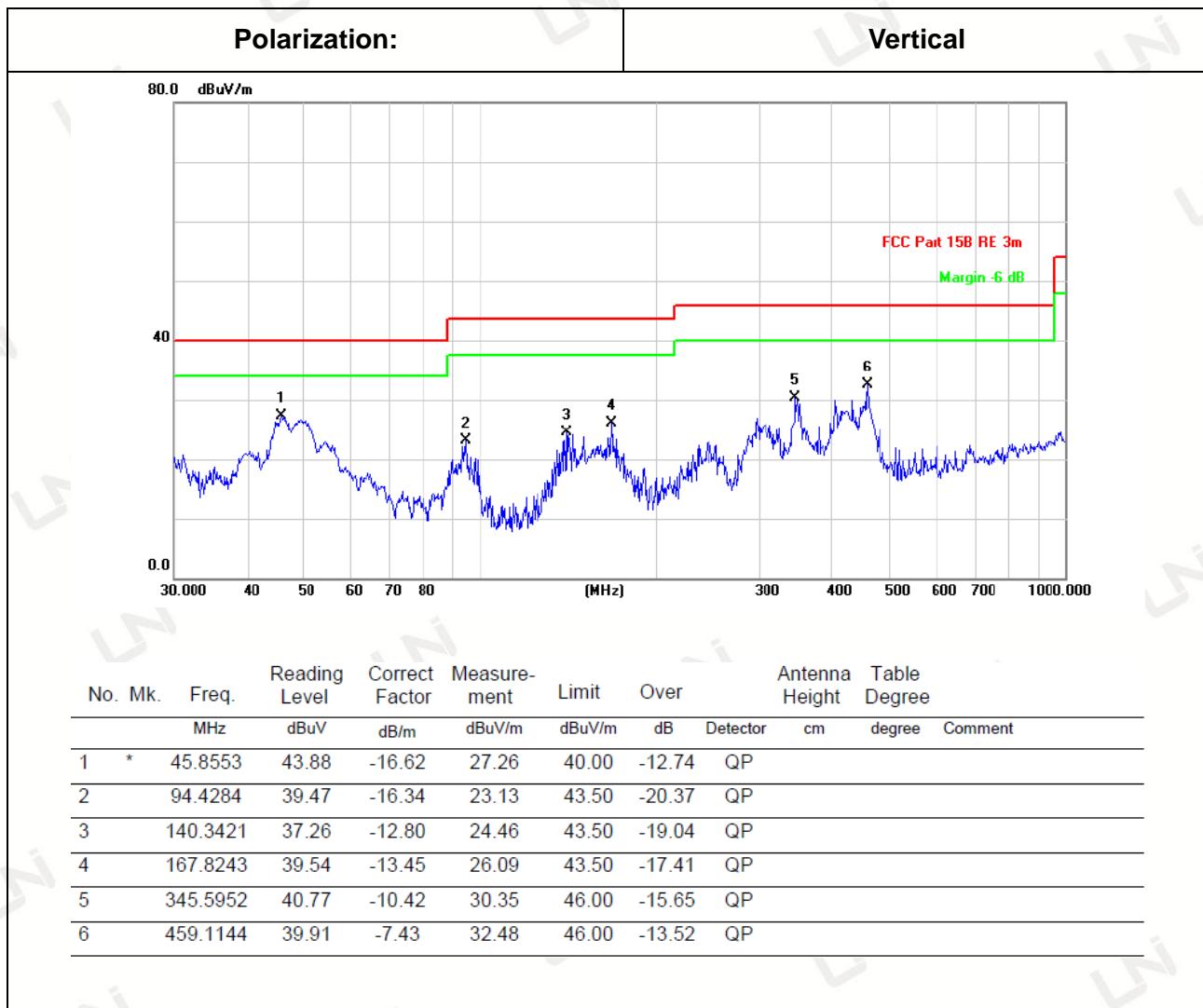
1. All the test modes completed for test. The worst case of Radiated Emission is Middle channel, the test data of this mode was reported.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
3. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.

## Below 1GHz Test Results:

Temperature:	25°C	Relative Humidity:	48%
Test Date:	Sep. 27, 2019	Pressure:	1030hPa
Test Voltage:	AC 120V 60Hz	Polarization:	Horizontal



Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit  
 Factor=Ant. Factor + Cable Loss – Pre-amplifier



Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit  
 Factor=Ant. Factor + Cable Loss – Pre-amplifier

Remark:

- (1) Measuring frequencies from 9 kHz to the 1 GHz, Radiated emission test from 9kHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

## Above 1 GHz Test Results:

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

## 802.11b Mode (2412MHz)

## Horizontal:

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4804	49.06	-3.64	45.42	74	-28.58	PK
4804	40.74	-3.64	37.10	54	-16.90	AV
7206	49.38	-0.95	48.43	74	-25.57	PK
7206	39.24	-0.95	38.29	54	-15.71	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

## Vertical:

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4804	50.37	-3.64	46.73	74	-27.27	PK
4804	39.98	-3.64	36.34	54	-17.66	AV
7206	48.26	-0.95	47.31	74	-26.69	PK
7206	39.85	-0.95	38.90	54	-15.10	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

## 802.11b Mode (2437MHz)

**Horizontal:**

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4880	49.51	-3.51	46.00	74	-28.00	PK
4880	39.04	-3.51	35.53	54	-18.47	AV
7320	48.40	-0.82	47.58	74	-26.42	PK
7320	39.67	-0.82	38.85	54	-15.15	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

**Vertical:**

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4880	49.66	-3.51	46.15	74	-27.85	PK
4880	40.71	-3.51	37.20	54	-16.80	AV
7320	49.59	-0.82	48.77	74	-25.23	PK
7320	39.15	-0.82	38.33	54	-15.67	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

## 802.11b Mode (2462MHz)

**Horizontal:**

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4960.00	49.10	-3.43	45.67	74	-28.33	PK
4960.00	40.39	-3.43	36.96	54	-17.04	AV
7440.00	49.89	-0.75	49.14	74	-24.86	PK
7440.00	39.02	-0.75	38.27	54	-15.73	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

**Vertical:**

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
4960.00	52.94	-3.43	49.51	74	-24.49	PK
4960.00	40.80	-3.43	37.37	54	-16.63	AV
7440.00	49.25	-0.75	48.50	74	-25.50	PK
7440.00	39.46	-0.75	38.71	54	-15.29	AV
--	--	--	--	--	--	--

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

## Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dB $\mu$ V/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dB $\mu$ V/m(PK Value) <54 dB $\mu$ V/m(AV Limit), the Average Detected not need to completed.
- (7) All modes of operation were investigated and the worst-case emissions are reported.

### 3.3 BAND EDGE

#### Limits

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)).

#### Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and set RBW to 1MHz and VBW to 3MHz RMS to measure the average radiated field strength.

#### Test Result

---PASS---

#### Radiated Band Edge Test:

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

## 802.11b Mode (2412 MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2310.00	56.99	-5.81	51.18	74	-22.82	PK
2310.00	43.80	-5.81	37.99	54	-16.01	AV
2390.00	56.01	-5.84	50.17	74	-23.83	PK
2390.00	49.62	-5.84	43.78	54	-10.22	AV
2400.00	59.40	-5.84	53.56	74	-20.44	PK
2400.00	48.65	-5.84	42.81	54	-11.19	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2310.00	55.24	-5.81	49.43	74	-24.57	PK
2310.00	44.13	-5.81	38.32	54	-15.68	AV
2390.00	56.50	-5.84	50.66	74	-23.34	PK
2390.00	47.55	-5.84	41.71	54	-12.29	AV
2400.00	57.57	-5.84	51.73	74	-22.27	PK
2400.00	45.53	-5.84	39.69	54	-14.31	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## 802.11b Mode (2462 MHz)

## Horizontal (Worst case):

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.50	54.76	-5.65	49.11	74	-24.89	PK
2483.50	48.06	-5.65	42.41	54	-11.59	AV
2487.25	56.09	-5.65	50.44	74	-23.56	PK
2487.25	47.59	-5.65	41.94	54	-12.06	AV
2500.00	56.42	-5.72	50.70	74	-23.30	PK
2500.00	45.66	-5.72	39.94	54	-14.06	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## Vertical:

Frequency (MHz)	Reading Result (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.50	57.59	-5.65	51.94	74	-22.06	PK
2483.50	48.32	-5.65	42.67	54	-11.33	AV
2487.25	57.02	-5.65	51.37	74	-22.63	PK
2487.25	47.59	-5.65	41.94	54	-12.06	AV
2500.00	59.35	-5.72	53.63	74	-20.37	PK
2500.00	46.61	-5.72	40.89	54	-13.11	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

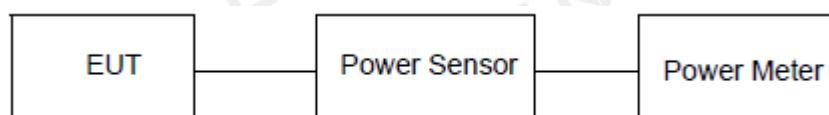
### 3.4 CONDUCTED OUTPUT POWER

#### Limit

The Maximum Peak Output Power Measurement is 30dBm.

#### Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.



#### Test Result

---PASS---

Type	Channel	PK Output power (dBm)	Limit (dBm)	Result
802.11b	01	12.67	30.00	Pass
	06	10.26		
	11	11.55		
802.11g	01	11.03	30.00	Pass
	06	9.43		
	11	11.82		
802.11n(HT20)	01	11.07	30.00	Pass
	06	9.01		
	11	11.33		
802.11n(HT40)	03	8.86	30.00	Pass
	06	7.99		
	09	8.36		

Note: 1.The test results including the cable lose.

### 3.5 POWER SPECTRAL DENSITY

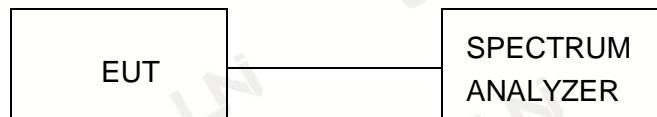
#### Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW  $\geq$  3 kHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

#### Test Configuration

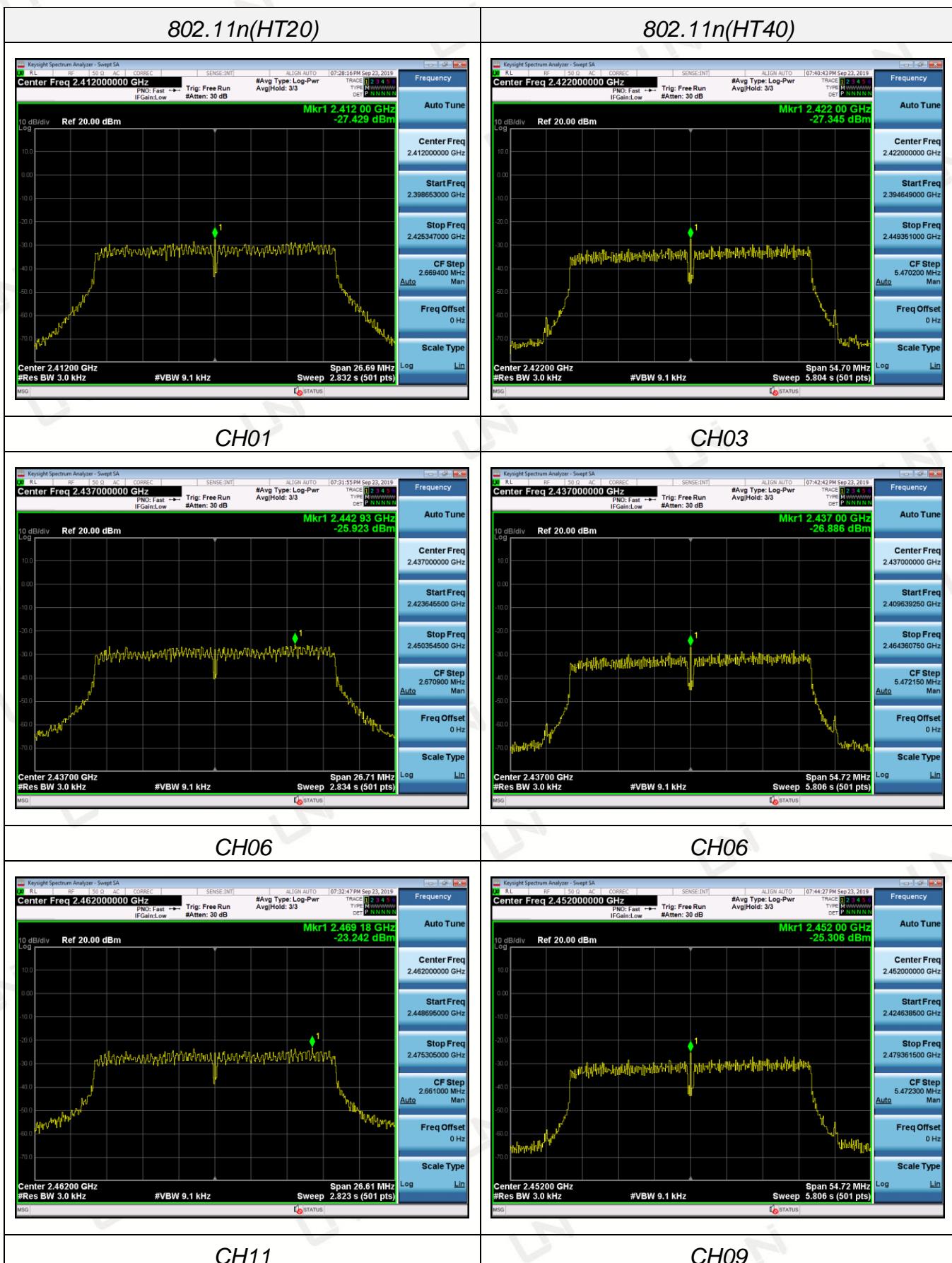


#### Test Results

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-24.639	8.00	Pass
	06	-22.357		
	11	-20.858		
802.11g	01	-25.669	8.00	Pass
	06	-25.167		
	11	-23.151		
802.11n(HT20)	01	-27.429	8.00	Pass
	06	-25.923		
	11	-23.242		
802.11n(HT40)	03	-27.345	8.00	Pass
	06	-26.886		
	09	-25.306		

Test plot as follows:





### 3.6 OCCUPIED BANDWIDTH MEASUREMENT

#### Test Limit

FCC Part15(15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

#### Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW=30KHz, VBW=100KHz, Span=3MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

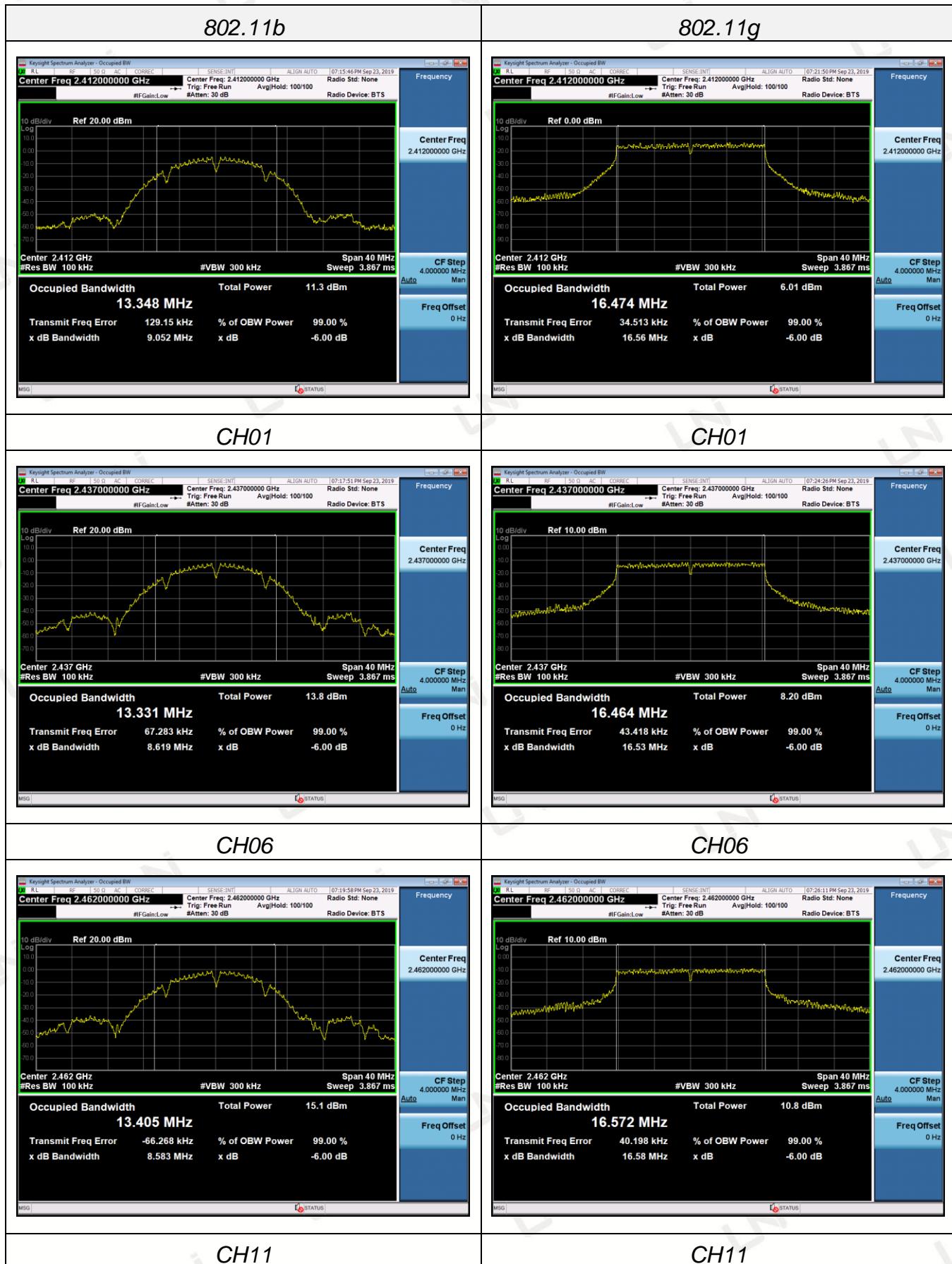
#### Measurement Equipment Used

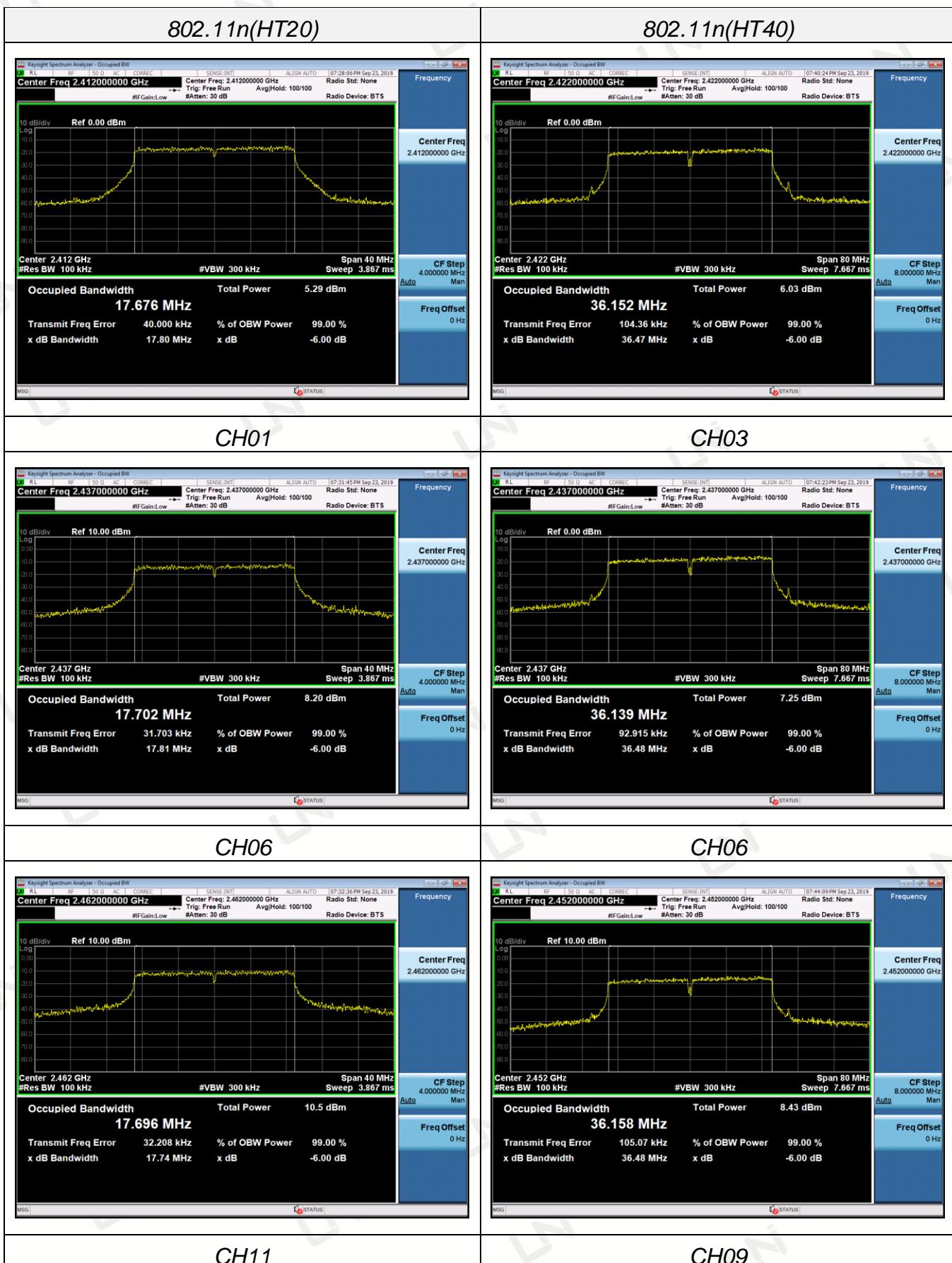
Same as Radiated Emission Measurement

#### Test Result

---PASS---

Type	Channel	6dB Bandwidth (MHz)	99% OBW (MHz)	Limit (KHz)	Result
802.11b	01	9.052	13.348	≥500	Pass
	06	8.619	13.331		
	11	8.583	13.405		
802.11g	01	16.56	16.474	≥500	Pass
	06	16.53	16.464		
	11	16.58	16.572		
802.11n(HT20)	01	17.80	17.676	≥500	Pass
	06	17.81	17.702		
	11	17.74	17.696		
802.11n(HT40)	03	36.47	36.152	≥500	Pass
	06	36.48	36.139		
	09	36.48	36.158		





### 3.7 OUT-OF BAND EMISSIONS

#### Limit

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.

#### Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

#### Test Configuration

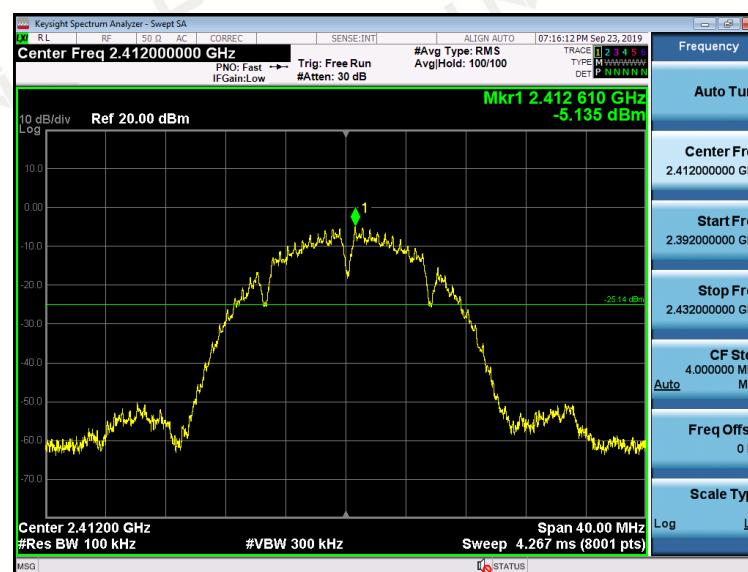


#### Test Results

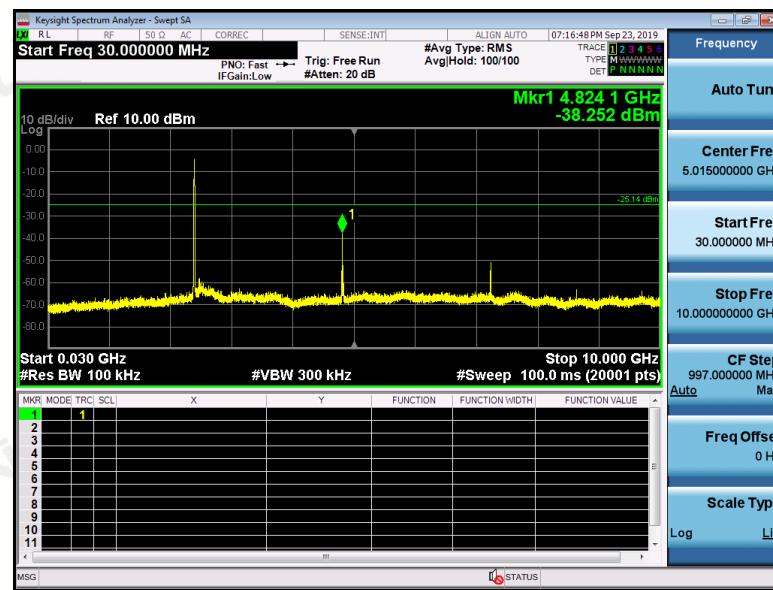
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandage measurement data.

## 802.11b- CH01

Reference



30MHz-10GHz



10GHz-26.5GHz

