



# FCC Part 15C Test Report

## FCC ID: YWTGWF-5M01

Product Name:	Wireless Module
Trademark:	N/A
Model Name :	GWF-5M01
Prepared For :	Shenzhen Ogemray Technology Co., Ltd.
Address :	3/F-4/F, NO.5 Bldg, Dongwu Industrial Park, Donghuan 1st Road, Longhua Town, Shenzhen, China
Prepared By :	Shenzhen BCTC Technology Co., Ltd.
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	Mar. 02 - Mar. 14, 2017
Date of Report :	Mar. 14, 2017
Report No.:	BCTC-LH170300671-1E



### VERIFICATION OF COMPLIANCE

**Applicant's name**..... Shenzhen Ogemray Technology Co., Ltd.  
Address ..... 3/F-4/F, NO.5 Bldg, Dongwu Industrial Park, Donghuan 1st Road, Longhua Town, Shenzhen, China

**Manufacture's Name** ..... Shenzhen Ogemray Technology Co., Ltd.  
Address ..... 3/F-4/F, NO.5 Bldg, Dongwu Industrial Park, Donghuan 1st Road, Longhua Town, Shenzhen, China

#### Product description

Product name..... : Wireless Module  
Trademark ..... : N/A  
Model Name ..... : GWF-5M01  
Test procedure ..... : FCC Part15.407  
ANSI C63.10-2013  
Standards KDB789033 D02 General UNII Test Procedures New Rules v01r02

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Test Result **Pass**

Testing Engineer : Eric Yang  
Eric Yang

Reviewer : Jade Yang  
(Supervisor) Jade Yang

Authorized : Carson Zhang  
Signer(Manager) Carson Zhang





## TABLE OF CONTENTS

	Page
Test Report Declaration	
<b>1. TEST SUMMARY</b>	<b>4</b>
<b>2. GENERAL PRODUCT INFORMATION</b>	<b>5</b>
2.1. Product Function	5
2.2. Description of Device (EUT)	5
2.3. Test Supporting System	错误! 未定义书签。
2.4. Independent Operation Modes	6
2.5. Test Sites	6
2.6. List of Test and Measurement Instruments	7
<b>3. TEST SET-UP AND OPERATION MODES</b>	<b>8</b>
3.1. Principle of Configuration Selection	8
3.2. Block Diagram of Test Set-up	8
3.3. Test Operation Mode and Test Software	8
3.4. Special Accessories and Auxiliary Equipment	8
3.5. Countermeasures to Achieve EMC Compliance	8
<b>4. EMISSION TEST RESULTS</b>	<b>9</b>
4.1. Conducted Emission Measurement	9
4.2. Radiated Emission Measurement	11
<b>5. BAND EDGE COMPLIANCE TEST</b>	<b>24</b>
5.1. Limits	24
5.2. TEST PROCEDURE	24
5.3. Test Data	24
<b>6. 26DB AND 99% BANDWIDTH TEST</b>	<b>28</b>
6.1. Measurement Procedure	28
<b>7. OUTPUT POWER TEST</b>	<b>34</b>
7.1. Limits	34
7.2. Test setup	34
7.3. Test result	35
<b>8. PEAK POWER SPECTRAL DENSITY TEST</b>	<b>36</b>
8.1. Limits	36
8.2. Test setup	36
8.3. Test data	37
<b>9. DUTY CYCLE TEST SIGNAL</b>	<b>42</b>
<b>10. FREQUENCY STABILITY</b>	<b>45</b>
10.1. Limits	45
10.2. Test setup	45
10.3. Test data	46
<b>11. TRANSMISSION IN THE ABSENCE OF DATA</b>	<b>49</b>
11.1. Limits	49
11.2. Test result	49
<b>12. PHOTOGRAPHS OF TEST SET-UP</b>	<b>50</b>
<b>13. PHOTOGRAPHS OF THE EUT</b>	<b>52</b>



## 1.TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	N/A
Radiated Emissions	15.407(b), 15.209	PASS
26dB bandwidth and 99%dB Bandwidth	15.403(i) 15.407(e)	PASS
Power density	15.407 (a)	PASS
Maximum Peak Output Power	15.407 (a)	PASS
Emissions from out of band	15.407 (b)	PASS
Transmission in case of Absence of Information	15.407(c)	PASS
Frequency Stability	15.407(g)	PASS
Antenna Requirement	15.203	PASS

Note: N/A means not applicable.



## 2.GENERAL PRODUCT INFORMATION

### 2.1. Product Function

Refer to Technical Construction Form and User Manual.

### 2.2. Description of Device (EUT)

Product Name:	Wireless Module
Model No.:	GWF-5M01
Trade Name:	N/A
Operation Frequency:	5180-5240, 5745-5825MHz(802.11a/n(HT20)) 5190-5230, 5755-5795MHz(802.11n(HT40))
Channel numbers:	See channel list
Modulation technology:	64QAM, 16QAM, QPSK, BPSK for OFDM
Data speed (IEEE 802.11a):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 433Mbps
Antenna Type:	PCB antenna
Antenna gain:	-1.0dBi
Power supply:	DC 5V

#### Channel list

##### 802.11a/n20

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220
48	5240	149	5745	153	5765
157	5785	161	5805	165	5825

##### 802.11n40

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230		
151	5755	159	5795		

##### 802.11ac 80

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	155	5775		



## 2.3. Independent Operation Modes

The basic operation modes are:

Pretest Mode	Description
Mode 1	802.11a CH36/CH40/ CH48/CH149/CH157/CH165
Mode 2	802.11n(HT20) CH36/CH40/CH48/CH149/CH157/CH165
Mode 3	802.11n(HT40) CH38/CH46/CH151/CH159
Mode 4	802.11ac(HT80) CH42/ CH155
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a CH36/CH40/ CH48/CH149/CH157/CH165
Mode 2	802.11n(HT20) CH36/CH40/CH48/CH149/CH157/CH165
Mode 3	802.11n(HT40) CH38/CH46/CH151/CH159
Mode 4	802.11ac(HT80) CH42/ CH155

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
- (3) According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup”  
MCS0 for 802.a , MCS0 for 802.11n(HT20), MCS1 for 802.11n(H40), MCS0 for 802.11ac(H80).

## 2.4. Test Sites

### 2.4.1. Test Facilities

Lab Qualifications : FCC Registration No.:187086



## 2.5. List of Test and Measurement Instruments

### Conduction test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03 -101165-ha	2016.08.27	2017.08.26
2	LISN	SCHWARZBECK	NSLK8127	8127739	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	RF cables	R&S	R204	R20X	2016.08.27	2017.08.26
5	Attenuator	R&S	ESH3-Z2	143206	2016.08.27	2017.08.26

### Radiation test, Band-edge test and 6db bandwidth test equipment

Item	equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
2	Test Receiver (9kHz-7GHz)	R&S	ESPI	101318	2016.08.27	2017.08.26
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB 9168	VULB91 68-438	2016.08.27	2017.08.26
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1201	2016.09.03	2017.09.03
5	Horn Antenna (14GHz-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	2016.09.03	2017.09.03
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	2016.08.27	2017.08.26
7	Amplifier (1GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	2016.08.27	2017.08.26
8	Amplifier (18GHz-40GHz)	SCHWARZBECK	BBV 9721	9721-205	2016.08.27	2017.08.26
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	00014	2016.09.03	2017.09.03
10	RF cables1 (9kHz-1GHz)	R&S	R203	R20X	2016.08.27	2017.08.26
11	RF cables2 (1GHz-40GHz)	R&S	R204	R21X	2016.08.27	2017.08.26
12	Antenna connector	Florida RF Labs	N/A	RF 01#	2016.08.27	2017.08.26
13	Power Metter	ANRITSU	ML2487A	6K00001568	2016.08.27	2017.08.26
14	Power Sensor (AV)	ANRITSU	ML2491A	030989	2016.08.27	2017.08.26
15	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010A	MY48030494	2016.08.27	2017.08.26
16	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	2016.08.27	2017.08.26
17	D.C. Power Supply	LongWei	PS-305D	010964729	2016.08.27	2017.08.26

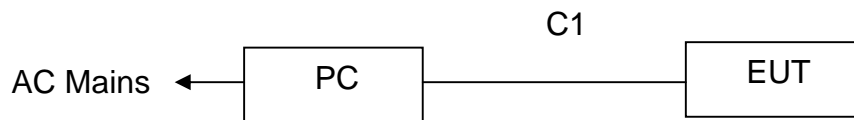
### 3. TEST SET-UP AND OPERATION MODES

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



*(EUT: Wireless Module)*

#### 3.3. Special Accessories and Auxiliary Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Wireless Module	N/A	Wireless Module	N/A	EUT
E-2	PC (Provide by test lab)	ASUS	AWT8000	N/A	I/P: AC 100-240V 60/60Hz

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.0m	USB cable

#### 3.4. Countermeasures to Achieve EMC Compliance

None.

#### 3.5. Test Operation Mode and Test Software

None.





## 4. EMISSION TEST RESULTS

### 4.1. Conducted Emission Measurement

POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi -peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

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

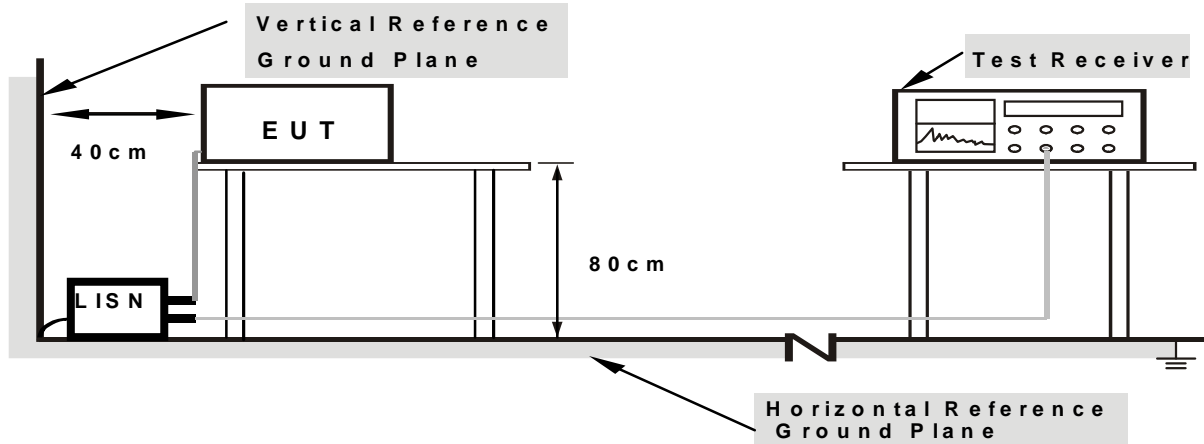
#### 4.1.1. TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal 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.

#### 4.1.2. DEVIATION FROM TEST STANDARD

No deviation

### 4.1.3. 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 from other units and other metal planes

### 4.1.4. EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.

If peak level comply with Quasi-Peak limit, then the Quasi-Peak level is deemed to comply with Quasi-Peak limit.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

### 4.1.5. TEST RESULTS

The EUT 's no power in put, no requirements for this item.



## 4.2. Radiated Emission Measurement

### 4.2.1. Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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 (Above 1000MHz)

FREQUENCY (MHz)	Class B (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).

### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower



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

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

#### 4.2.2. TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter.
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

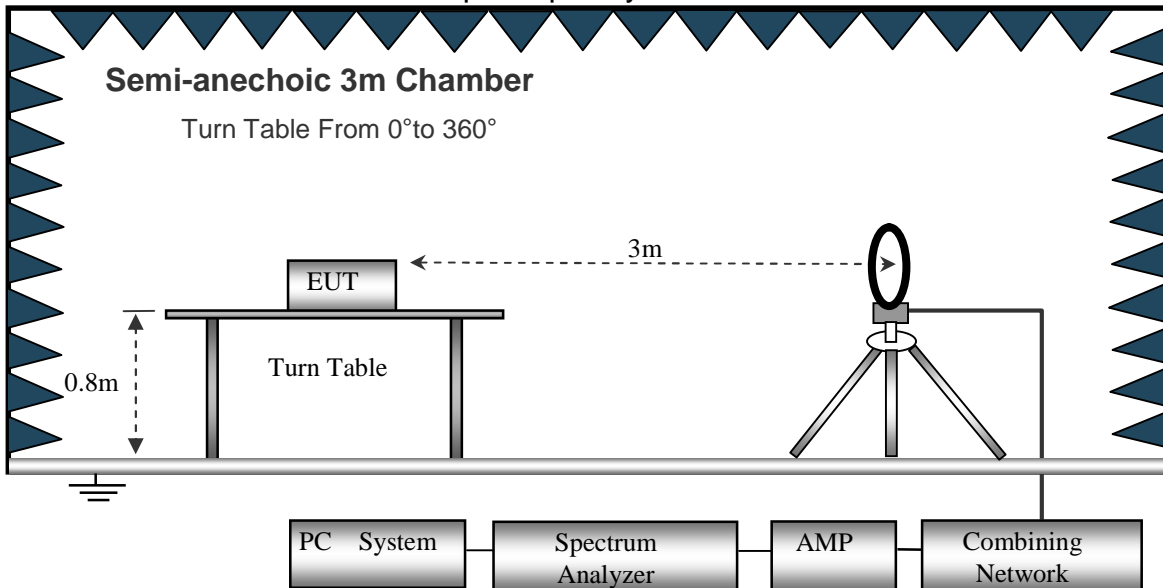
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 4.2.3. DEVIATION FROM TEST STANDARD

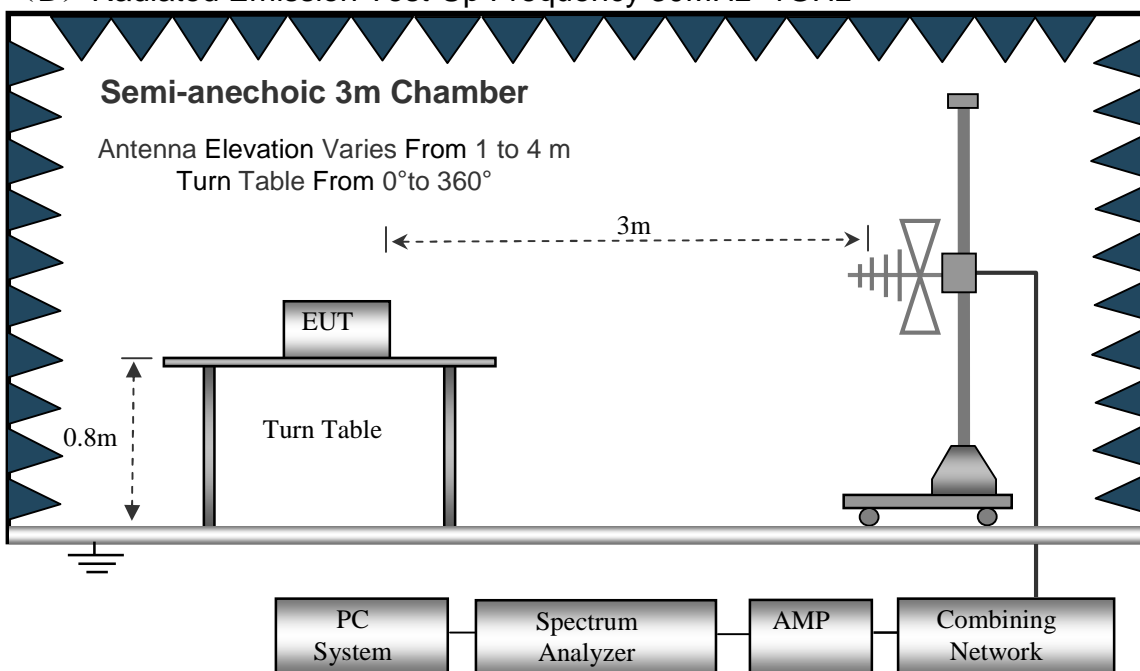
No deviation

#### 4.2.4. TEST SETUP

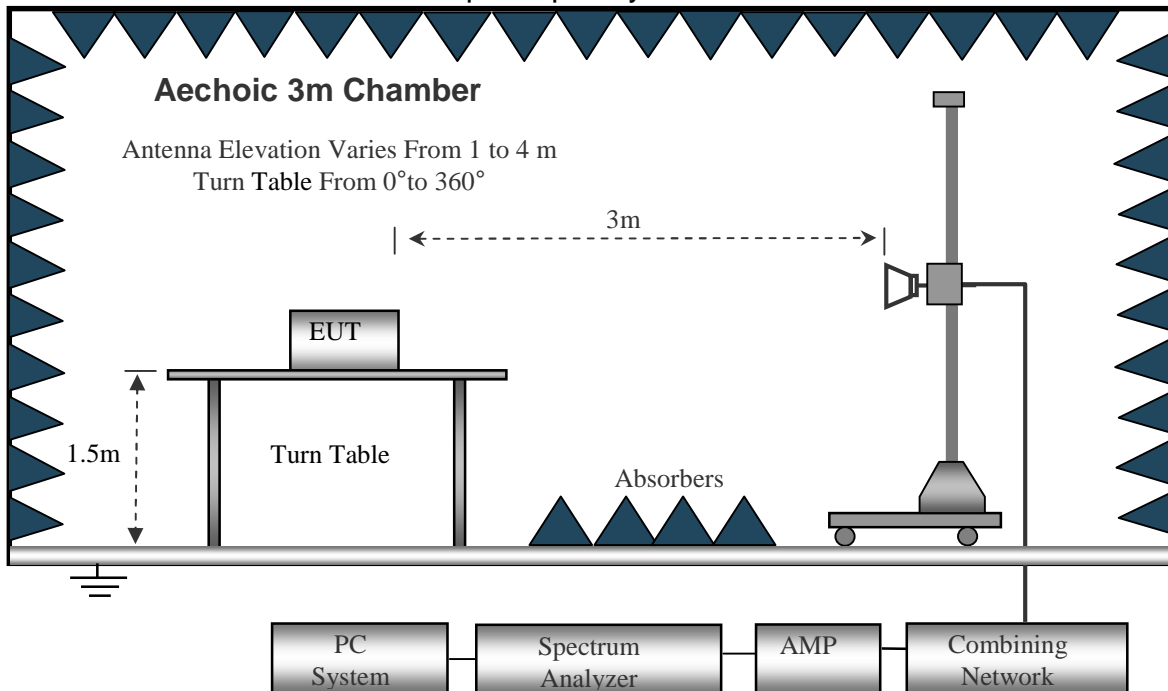
##### (A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



#### 4.2.5. EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.



## Radiated Spurious Emission (Below 30MHz )

Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 5V		
Test Mode :	TX		

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

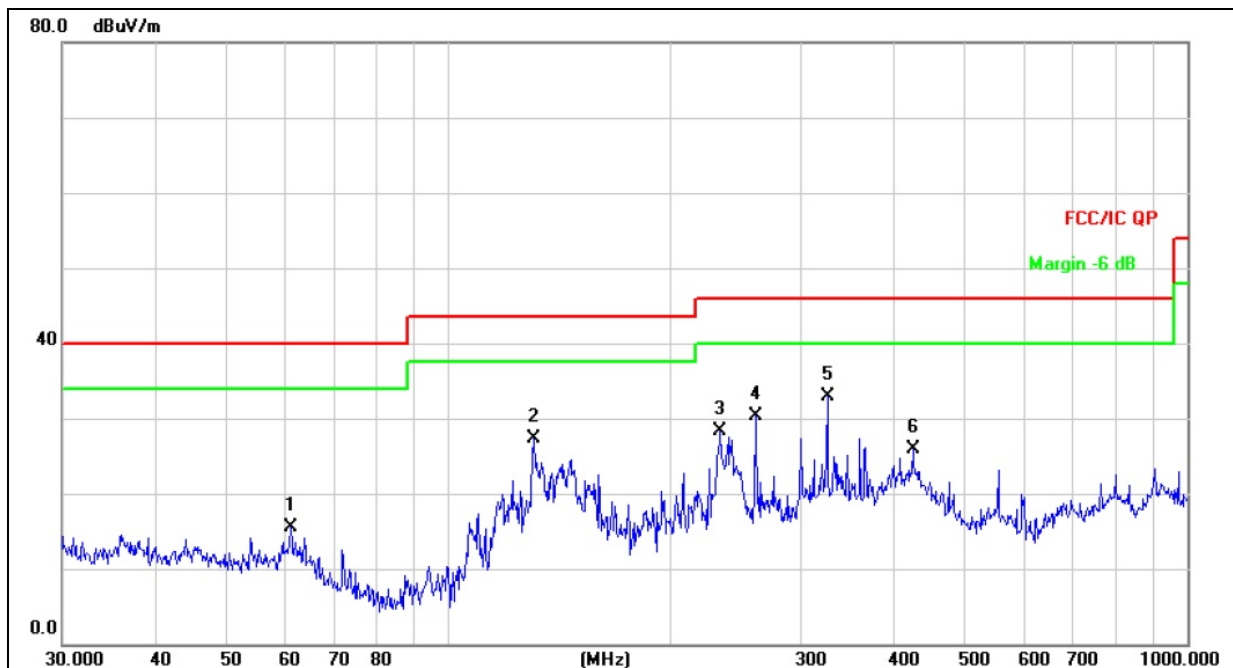
Distance extrapolation factor =  $40 \log (\text{specific distance}/\text{test distance})$ (dB);

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



Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V		
Test Mode : (Worst)	Link Mode		



Remark:

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

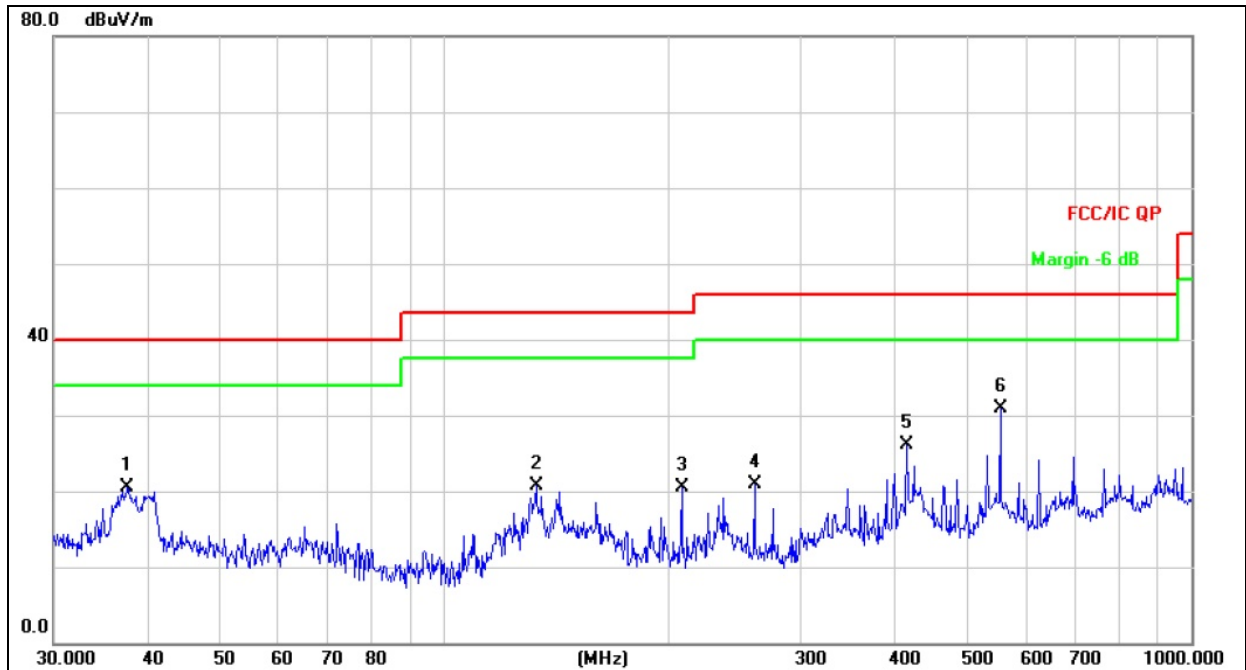
All interfaces was connected, and BT TX mode was link.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		61.1316	27.34	-11.75	15.59	40.00	-24.41	QP
2		130.3789	41.38	-14.08	27.30	43.50	-16.20	QP
3		233.3487	43.13	-14.87	28.26	46.00	-17.74	QP
4		260.1444	44.18	-13.91	30.27	46.00	-15.73	QP
5	*	325.5958	44.80	-11.92	32.88	46.00	-13.12	QP
6		425.0280	35.44	-9.60	25.84	46.00	-20.16	QP





Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V		
Test Mode : (Worst)	Link Mode		



Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
 All interfaces was connected, and BT TX mode was link.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		37.6798	29.26	-8.74	20.52	40.00	-19.48	QP
2		132.6850	34.52	-13.91	20.61	43.50	-22.89	QP
3		207.8501	36.40	-15.98	20.42	43.50	-23.08	QP
4		260.1444	34.76	-13.91	20.85	46.00	-25.15	QP
5		416.1791	35.90	-9.83	26.07	46.00	-19.93	QP
6	*	554.8254	37.84	-6.96	30.88	46.00	-15.12	QP



Radiated Spurious Emission ( Above 1GHz)

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11a Band 1 Operation frequency:5180</b>									
V	10360.00	57.31	39.55	17.85	26.83	62.44	74	-11.56	PK
V	10360.00	38.29	39.55	17.85	26.83	43.42	54	-10.58	AV
V	15540.00	52.36	38.33	18.63	28.21	60.87	74	-13.13	PK
V	15540.00	34.78	38.33	18.63	28.21	43.29	54	-10.71	AV
V	25450.00	37.13	37.23	20.36	30.35	50.61	74	-23.39	PK
H	10360.00	57.82	39.55	17.85	26.83	62.95	74	-11.05	PK
H	10360.00	38.75	39.55	17.85	26.83	43.88	54	-10.12	AV
H	15540.00	52.55	38.33	18.63	28.21	61.06	74	-12.94	PK
H	15540.00	34.01	38.33	18.63	28.21	42.52	54	-11.48	AV
H	25450.00	37.11	37.23	20.36	30.35	50.59	74	-23.41	PK
<b>802.11a Band 1 Operation frequency:5200</b>									
V	10400.00	57.64	39.61	17.89	26.89	62.81	74	-11.19	PK
V	10400.00	38.96	39.61	17.89	26.89	44.13	54	-9.87	AV
V	15600.00	52.75	38.47	18.67	28.27	61.22	74	-12.78	PK
V	15600.00	34.56	38.47	18.67	28.27	43.03	54	-10.97	AV
V	25450.00	37.62	37.23	20.36	30.35	51.10	74	-22.90	PK
H	10400.00	56.97	39.61	17.89	26.89	62.14	74	-11.86	PK
H	10400.00	37.84	39.61	17.89	26.89	43.01	54	-10.99	AV
H	15600.00	52.36	38.47	18.67	28.27	60.83	74	-13.17	PK
H	15600.00	34.12	38.47	18.67	28.27	42.59	54	-11.41	AV
H	25450.00	38.00	37.23	20.36	30.35	51.48	74	-22.52	PK
<b>802.11a Band 1 Operation frequency:5240</b>									
V	10480.00	56.84	39.69	17.93	26.94	62.02	74	-11.98	PK
V	10480.00	38.69	39.69	17.93	26.94	43.87	54	-10.13	AV
V	15720.00	52.29	38.53	18.73	28.32	60.81	74	-13.19	PK
V	15720.00	34.31	38.53	18.73	28.32	42.83	54	-11.17	AV
V	25450.00	37.40	37.23	20.36	30.35	50.88	74	-23.12	PK
H	10480.00	56.73	39.69	17.93	26.94	61.91	74	-12.09	PK
H	10480.00	39.29	39.69	17.93	26.94	44.47	54	-9.53	AV
H	15720.00	52.20	38.53	18.73	28.32	60.72	74	-13.28	PK
H	15720.00	34.21	38.53	18.73	28.32	42.73	54	-11.27	AV
H	25450.00	36.32	37.23	20.36	30.35	49.80	74	-24.20	PK

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11n(HT20) Band 1 Operation frequency:5180</b>									
V	10360.00	56.98	39.55	17.85	26.83	62.11	74	-11.89	PK
V	10360.00	38.07	39.55	17.85	26.83	43.20	54	-10.80	AV
V	15540.00	52.06	38.33	18.63	28.21	60.57	74	-13.43	PK
V	15540.00	34.58	38.33	18.63	28.21	43.09	54	-10.91	AV
V	25450.00	37.56	37.23	20.36	30.35	51.04	74	-22.96	PK
H	10360.00	57.49	39.55	17.85	26.83	62.62	74	-11.38	PK
H	10360.00	39.52	39.55	17.85	26.83	44.65	54	-9.35	AV
H	15540.00	52.25	38.33	18.63	28.21	60.76	74	-13.24	PK
H	15540.00	33.82	38.33	18.63	28.21	42.33	54	-11.67	AV
H	25450.00	36.91	37.23	20.36	30.35	50.39	74	-23.61	PK
<b>802.11n(HT20) Band 1 Operation frequency:5200</b>									
V	10400.00	57.31	39.61	17.89	26.89	62.48	74	-11.52	PK
V	10400.00	38.74	39.61	17.89	26.89	43.91	54	-10.09	AV
V	15600.00	52.45	38.47	18.67	28.27	60.92	74	-13.08	PK
V	15600.00	34.36	38.47	18.67	28.27	42.83	54	-11.17	AV
V	25450.00	37.35	37.23	20.36	30.35	50.83	74	-23.17	PK
H	10400.00	57.64	39.61	17.89	26.89	62.81	74	-11.19	PK
H	10400.00	38.62	39.61	17.89	26.89	43.79	54	-10.21	AV
H	15600.00	52.06	38.47	18.67	28.27	60.53	74	-13.47	PK
H	15600.00	33.93	38.47	18.67	28.27	42.40	54	-11.60	AV
H	25450.00	36.76	37.23	20.36	30.35	50.24	74	-23.76	PK
<b>802.11n(HT20) Band 1 Operation frequency:5240</b>									
V	10480.00	57.07	39.69	17.93	26.94	62.25	74	-11.75	PK
V	10480.00	37.85	39.69	17.93	26.94	43.03	54	-10.97	AV
V	15720.00	52.50	38.53	18.73	28.32	61.02	74	-12.98	PK
V	15720.00	34.45	38.53	18.73	28.32	42.97	54	-11.03	AV
V	25450.00	37.59	37.23	20.36	30.35	51.07	74	-22.93	PK
H	10480.00	56.96	39.69	17.93	26.94	62.14	74	-11.86	PK
H	10480.00	38.45	39.69	17.93	26.94	43.63	54	-10.37	AV
H	15720.00	52.41	38.53	18.73	28.32	60.93	74	-13.07	PK
H	15720.00	34.35	38.53	18.73	28.32	42.87	54	-11.13	AV
H	25450.00	37.44	37.23	20.36	30.35	50.92	74	-23.08	PK
<p><b>Remark:</b></p> <p>1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit</p> <p>2. If peak below the average limit, the average emission was no test.</p> <p>3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.</p>									



Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11n(HT40) Band 1 Operation frequency:5190</b>									
V	10380.00	57.03	39.55	17.85	26.83	62.16	74	-11.84	PK
V	10380.00	38.10	39.55	17.85	26.83	43.23	54	-10.77	AV
V	15570.00	52.10	38.33	18.63	28.21	60.61	74	-13.39	PK
V	15570.00	33.61	38.33	18.63	28.21	42.12	54	-11.88	AV
V	25450.00	37.60	37.23	20.36	30.35	51.08	74	-22.92	PK
H	10380.00	57.54	39.55	17.85	26.83	62.67	74	-11.33	PK
H	10380.00	38.56	39.55	17.85	26.83	43.69	54	-10.31	AV
H	15570.00	52.29	38.33	18.63	28.21	60.80	74	-13.20	PK
H	15570.00	34.84	38.33	18.63	28.21	43.35	54	-10.65	AV
H	25450.00	36.88	37.23	20.36	30.35	50.36	74	-23.64	PK
<b>802.11n(HT40) Band 1 Operation frequency:5230</b>									
V	10460.00	57.01	39.69	17.93	26.94	62.19	74	-11.81	PK
V	10460.00	38.48	39.69	17.93	26.94	43.66	54	-10.34	AV
V	15690.00	52.45	38.53	18.73	28.32	60.97	74	-13.03	PK
V	15690.00	33.39	38.53	18.73	28.32	41.91	54	-12.09	AV
V	25450.00	37.39	37.23	20.36	30.35	50.87	74	-23.13	PK
H	10460.00	57.01	39.69	17.93	26.94	62.19	74	-11.81	PK
H	10460.00	38.48	39.69	17.93	26.94	43.66	54	-10.34	AV
H	15690.00	52.45	38.53	18.73	28.32	60.97	74	-13.03	PK
H	15690.00	34.38	38.53	18.73	28.32	42.90	54	-11.10	AV
H	25450.00	37.78	37.23	20.36	30.35	51.26	74	-22.74	PK
<b>802.11n(HT80) Band 1 Operation frequency:5210</b>									
V	10420.00	56.69	39.61	17.89	26.89	61.86	74	-12.14	PK
V	10420.00	38.65	39.61	17.89	26.89	43.82	54	-10.18	AV
V	15630.00	52.10	38.47	18.67	28.27	60.57	74	-13.43	PK
V	15630.00	33.95	38.47	18.67	28.27	42.42	54	-11.58	AV
V	25450.00	37.63	37.23	20.36	30.35	51.11	74	-22.89	PK
H	10420.00	56.69	39.61	17.89	26.89	61.86	74	-12.14	PK
H	10420.00	38.65	39.61	17.89	26.89	43.82	54	-10.18	AV
H	15630.00	52.10	38.47	18.67	28.27	60.57	74	-13.43	PK
H	15630.00	33.95	38.47	18.67	28.27	42.42	54	-11.58	AV
H	25450.00	37.23	37.23	20.36	30.35	50.71	74	-23.29	PK
<p><b>Remark:</b></p> <p>1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit</p> <p>2. If peak below the average limit, the average emission was no test.</p> <p>3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.</p>									



Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11a Band 4 Operation frequency:5745</b>									
V	11490.00	57.12	39.73	18.19	27.31	62.89	74	-11.11	PK
V	11490.00	38.16	39.73	18.19	27.31	43.93	54	-10.07	AV
V	17235.00	53.18	38.59	18.92	28.41	61.92	74	-12.08	PK
V	17235.00	33.67	38.59	18.92	28.41	42.41	54	-11.59	AV
V	25450.00	37.17	37.23	20.36	30.35	50.65	74	-23.35	PK
H	11490.00	57.63	39.73	18.19	27.31	63.40	74	-10.60	PK
H	11490.00	38.62	39.73	18.19	27.31	44.39	54	-9.61	AV
H	17235.00	53.37	38.59	18.92	28.41	62.11	74	-11.89	PK
H	17235.00	33.90	38.59	18.92	28.41	42.64	54	-11.36	AV
H	25450.00	36.95	37.23	20.36	30.35	50.43	74	-23.57	PK
<b>802.11a Band 4 Operation frequency:5785</b>									
V	11570.00	57.45	39.76	18.25	27.39	63.33	74	-10.67	PK
V	11570.00	38.83	39.76	18.25	27.39	44.71	54	-9.29	AV
V	17355.00	53.57	38.62	19.16	28.48	62.59	74	-11.41	PK
V	17355.00	33.45	38.62	19.16	28.48	42.47	54	-11.53	AV
V	25450.00	37.46	37.23	20.36	30.35	50.94	74	-23.06	PK
H	11570.00	56.78	39.76	18.25	27.39	62.66	74	-11.34	PK
H	11570.00	38.71	39.76	18.25	27.39	44.59	54	-9.41	AV
H	17355.00	53.18	38.62	19.16	28.48	62.20	74	-11.80	PK
H	17355.00	34.01	38.62	19.16	28.48	43.03	54	-10.97	AV
H	25450.00	37.84	37.23	20.36	30.35	51.32	74	-22.68	PK
<b>802.11a Band 4 Operation frequency:5825</b>									
V	11650.00	57.21	39.79	18.32	27.42	63.16	74	-10.84	PK
V	11650.00	37.94	39.79	18.32	27.42	43.89	54	-10.11	AV
V	17475.00	53.62	38.66	19.24	28.53	62.73	74	-11.27	PK
V	17475.00	33.54	38.66	19.24	28.53	42.65	54	-11.35	AV
V	25450.00	37.70	37.23	20.36	30.35	51.18	74	-22.82	PK
H	11650.00	57.10	39.79	18.32	27.42	63.05	74	-10.95	PK
H	11650.00	38.54	39.79	18.32	27.42	44.49	54	-9.51	AV
H	17475.00	52.54	38.66	19.24	28.53	61.65	74	-12.35	PK
H	17475.00	33.44	38.66	19.24	28.53	42.55	54	-11.45	AV
H	25450.00	37.61	37.23	20.36	30.35	51.09	74	-22.91	PK

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11n(HT20) Band 4 Operation frequency:5745</b>									
V	11490.00	57.19	39.73	18.19	27.31	62.96	74	-11.04	PK
V	11490.00	38.21	39.73	18.19	27.31	43.98	54	-10.02	AV
V	17235.00	53.25	38.59	18.92	28.41	61.99	74	-12.01	PK
V	17235.00	34.71	38.59	18.92	28.41	43.45	54	-10.55	AV
V	25450.00	37.73	37.23	20.36	30.35	51.21	74	-22.79	PK
H	11490.00	57.70	39.73	18.19	27.31	63.47	74	-10.53	PK
H	11490.00	38.67	39.73	18.19	27.31	44.44	54	-9.56	AV
H	17235.00	53.44	38.59	18.92	28.41	62.18	74	-11.82	PK
H	17235.00	33.94	38.59	18.92	28.41	42.68	54	-11.32	AV
H	25450.00	37.01	37.23	20.36	30.35	50.49	74	-23.51	PK
<b>802.11n(HT20) Band 4 Operation frequency:5785</b>									
V	11570.00	57.52	39.76	18.25	27.39	63.40	74	-10.60	PK
V	11570.00	37.88	39.76	18.25	27.39	43.76	54	-10.24	AV
V	17355.00	53.64	38.62	19.16	28.48	62.66	74	-11.34	PK
V	17355.00	34.49	38.62	19.16	28.48	43.51	54	-10.49	AV
V	25450.00	37.52	37.23	20.36	30.35	51.00	74	-23.00	PK
H	11570.00	57.85	39.76	18.25	27.39	63.73	74	-10.27	PK
H	11570.00	38.76	39.76	18.25	27.39	44.64	54	-9.36	AV
H	17355.00	53.25	38.62	19.16	28.48	62.27	74	-11.73	PK
H	17355.00	34.05	38.62	19.16	28.48	43.07	54	-10.93	AV
H	25450.00	37.90	37.23	20.36	30.35	51.38	74	-22.62	PK
<b>802.11n(HT20) Band 4 Operation frequency:5825</b>									
V	11650.00	57.28	39.79	18.32	27.42	63.23	74	-10.77	PK
V	11650.00	37.99	39.79	18.32	27.42	43.94	54	-10.06	AV
V	17475.00	53.69	38.66	19.24	28.53	62.80	74	-11.20	PK
V	17475.00	34.58	38.66	19.24	28.53	43.69	54	-10.31	AV
V	25450.00	37.76	37.23	20.36	30.35	51.24	74	-22.76	PK
H	11650.00	57.17	39.79	18.32	27.42	63.12	74	-10.88	PK
H	11650.00	38.59	39.79	18.32	27.42	44.54	54	-9.46	AV
H	17475.00	53.60	38.66	19.24	28.53	62.71	74	-11.29	PK
H	17475.00	34.48	38.66	19.24	28.53	43.59	54	-10.41	AV
H	25450.00	38.67	37.23	20.36	30.35	52.15	74	-21.85	PK

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
<b>802.11n(HT40) Band 4 Operation frequency:5755</b>									
V	11510.00	56.96	39.73	18.19	27.31	62.73	74	-11.27	PK
V	11510.00	38.06	39.73	18.19	27.31	43.83	54	-10.17	AV
V	17265.00	53.03	38.59	18.92	28.41	61.77	74	-12.23	PK
V	17265.00	32.58	38.59	18.92	28.41	41.32	54	-12.68	AV
V	25450.00	37.54	37.23	20.36	30.35	51.02	74	-22.98	PK
H	11510.00	57.47	39.73	18.19	27.31	63.24	74	-10.76	PK
H	11510.00	38.51	39.73	18.19	27.31	44.28	54	-9.72	AV
H	17265.00	53.22	38.59	18.92	28.41	61.96	74	-12.04	PK
H	17265.00	33.80	38.59	18.92	28.41	42.54	54	-11.46	AV
H	25450.00	36.82	37.23	20.36	30.35	50.30	74	-23.70	PK
<b>802.11n(HT40) Band 4 Operation frequency:5795</b>									
V	11590.00	57.29	39.76	18.25	27.39	63.17	74	-10.83	PK
V	11590.00	38.72	39.76	18.25	27.39	44.60	54	-9.40	AV
V	17385.00	53.42	38.62	19.16	28.48	62.44	74	-11.56	PK
V	17385.00	33.36	38.62	19.16	28.48	42.38	54	-11.62	AV
V	25450.00	37.33	37.23	20.36	30.35	50.81	74	-23.19	PK
H	11590.00	57.62	39.76	18.25	27.39	63.50	74	-10.50	PK
H	11590.00	37.61	39.76	18.25	27.39	43.49	54	-10.51	AV
H	17385.00	53.03	38.62	19.16	28.48	62.05	74	-11.95	PK
H	17385.00	33.91	38.62	19.16	28.48	42.93	54	-11.07	AV
H	25450.00	37.71	37.23	20.36	30.35	51.19	74	-22.81	PK
<b>802.11ac(HT80) Band 4 Operation frequency:5775</b>									
V	11550.00	57.05	39.76	18.25	27.39	62.93	74	-11.07	PK
V	11550.00	37.84	39.76	18.25	27.39	43.72	54	-10.28	AV
V	17325.00	53.47	38.62	19.16	28.48	62.49	74	-11.51	PK
V	17325.00	34.44	38.62	19.16	28.48	43.46	54	-10.54	AV
V	25450.00	37.57	37.23	20.36	30.35	51.05	74	-22.95	PK
H	11550.00	56.94	39.76	18.25	27.39	62.82	74	-11.18	PK
H	11550.00	38.43	39.76	18.25	27.39	44.31	54	-9.69	AV
H	17325.00	53.38	38.62	19.16	28.48	62.40	74	-11.60	PK
H	17325.00	32.35	38.62	19.16	28.48	41.37	54	-12.63	AV
H	25450.00	36.48	37.23	20.36	30.35	49.96	74	-24.04	PK

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



## 5. BAND EDGE COMPLIANCE TEST

### 5.1. Limits

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of  $-27$  dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

### 5.2. TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

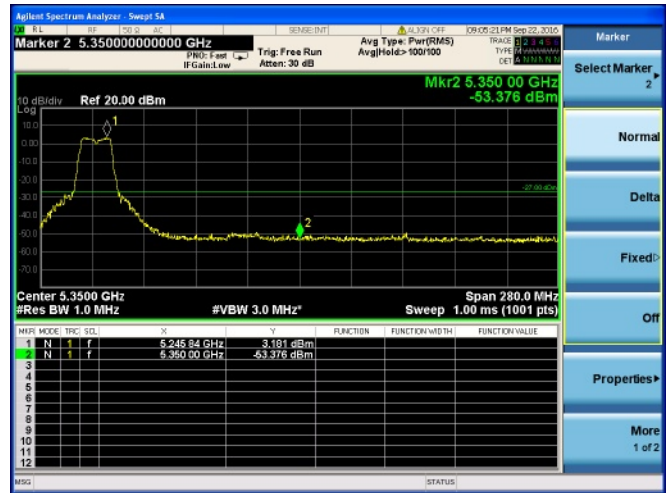
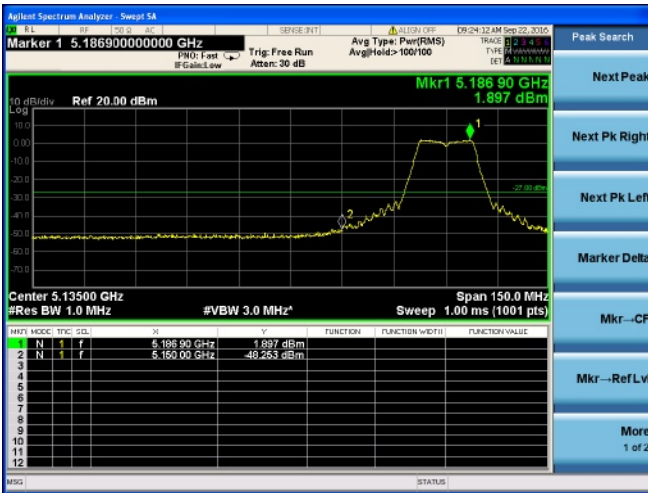
### 5.3. Test Data

Please see data as below:

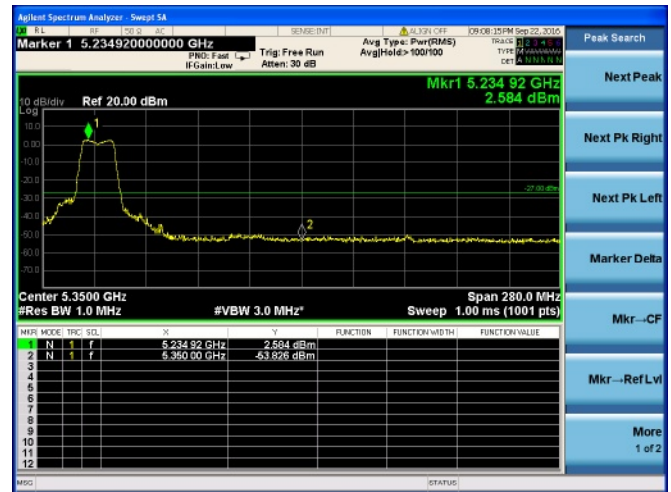
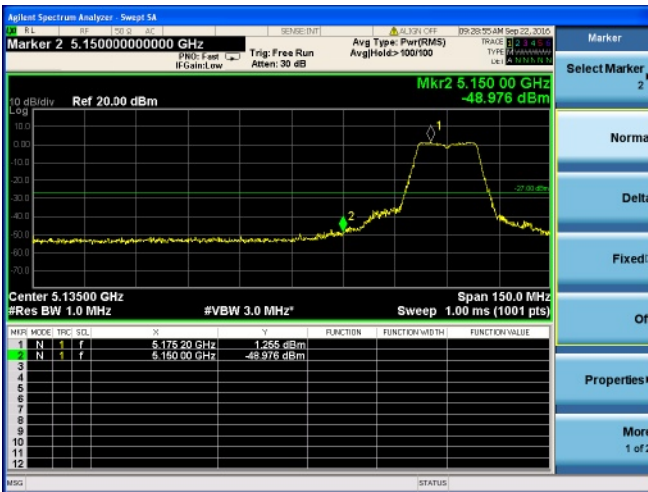




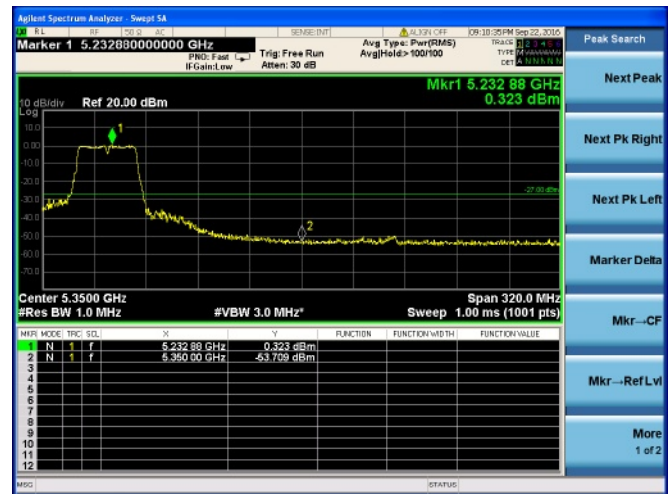
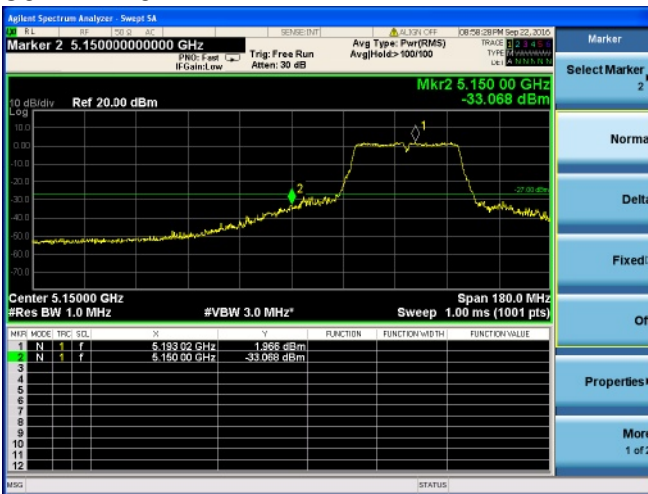
Band 1  
802.11a



802.11n20



802.11n40





Band 4  
802.11a



802.11n20

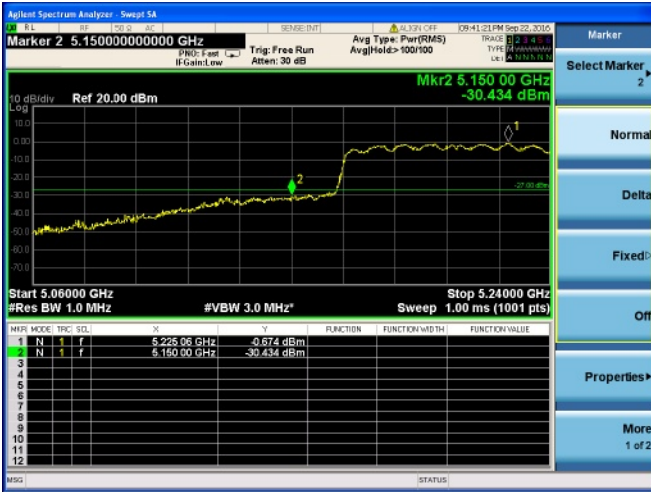


802.11n40





Band 1  
802.11ac



Band 4  
802.11ac

