



RADIO TEST REPORT

Report No.: STS2006257W04

Issued for

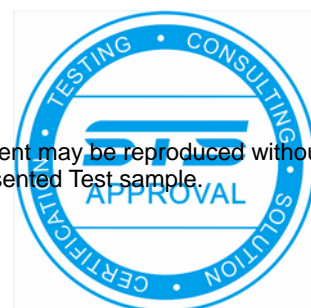
Chengdu Accsoon Technology Co., LTD.

No. 505, Building 6, D Zone, Tianfu Software Park, No.599,
Shijicheng South Road Chengdu, China

Product Name:	Wireless Video Transmitter
Brand Name:	Accsoon
Model Name:	WIT02
Series Model:	WIT02-S, WIT03, WIT03-S, WIT03-P, WIT01-P
FCC ID:	2AOH402WITFR
Test Standard:	FCC Part 15.407

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TEST RESULT CERTIFICATION

Applicant's Name..... : Chengdu Accsoon Technology Co., LTD.
Address : No. 505, Building 6, D Zone, Tianfu Software Park, No.599, Shijicheng South Road Chengdu, China
Manufacture's Name..... : Chengdu Accsoon Technology Co., LTD.
Address : No. 505, Building 6, D Zone, Tianfu Software Park, No.599, Shijicheng South Road Chengdu, China

Product Description

Product Name..... : Wireless Video Transmitter
Brand Name : Accsoon
Model Name : WIT02
Series Model..... : WIT02-S, WIT03, WIT03-S, WIT03-P, WIT01-P

Test Standards..... : FCC Part15.407

Test Procedure..... ANSI C63.10-2013

This device described above has been tested by STS, 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..... :
Date of receipt of test item : 15 June 2020
Date (s) of performance of tests : 15 June 2020 ~ 09 July 2020
Date of Issue..... : 14 July 2020
Test Result..... : **Pass**

Testing Engineer : 

 (Chris Chen)

Technical Manager : 

 (Sean she)

Authorized Signatory : 

 (Vita Li)

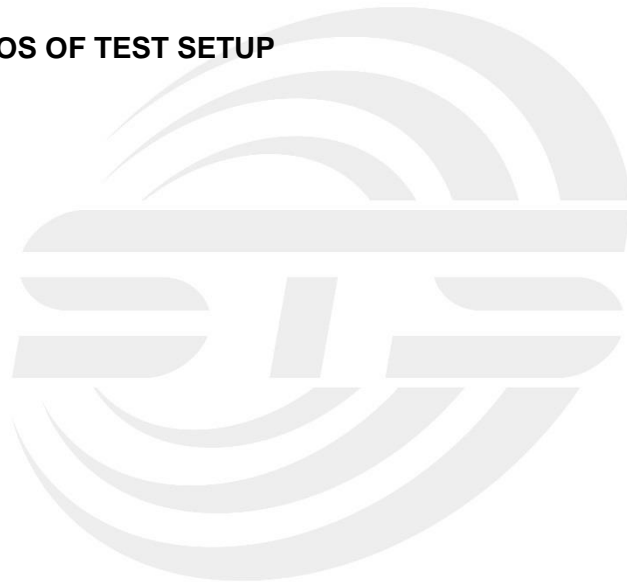




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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	14 July 2020	STS2006257W04	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

§ 15.407, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

FCC Part 15.407		
FCC standard	Test Item	Results
15.207	AC Conducted Emission	PASS
§ 15.407 (2) (26 dB) / § 15.407 (e) (6 dB) / § 15.407 (a) (99%)	26dB/6dB & 99% Bandwidth	PASS
15.407(a) (1).(2).(3).(4).(5)	Maximum Conducted Output Power	PASS
15.407(b) & 15.209	Radiated Emission And (bandedge Emissions) Measurement	PASS
15.407(b)7	Conducted Emission And (bandedge Emissions) Measurement	PASS
15.407(a) (1).(2).(3).(4).(5)	Power Spectral Density	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203/15.204	Antenna Requirement	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

SHENZHEN STS TEST SERVICES CO., LTD

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FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 30-1GHz	$\pm 5.6\text{dB}$
4	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
5	All emissions, radiated >6G	$\pm 5.8\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 3.37\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 3.83\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Wireless Video Transmitter	
Trade Name	Accsoon	
Model Name	WIT02	
Series Model	WIT02-S, WIT03, WIT03-S, WIT03-P, WIT01-P	
Model Difference	Only different in model name.	
Product Description	The EUT is a Wireless Video Transmitter	
	Operation Frequency:	IEEE 802.11a/ n(HT20) (VHT20): 5.180GHz-5.240GHz IEEE 802.11n(HT40) (VHT40): 5.190GHz-5.230GHz
	Modulation Type:	802.11a(OFDN): BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDN): BPSK,QPSK,16-QAM,64-QAM
	Antenna Designation:	See Note 2
	Max.Output Power(Conducted):	13.25 dBm
More details of EUT technical specification, please refer to the User Manual.		
Test Channel	Please refer to the Note 2.	
Power Rating	Input:7.4V~16.8V 1.5A(Normal: DC 12V)	
Hardware version number	V1.1	
Software version number	V1.0	
Connecting I/O Port(s)	Please refer to the Note 1.	

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



1.

Operation Frequency of channel	
5.180GHz-5.240GHz	
Channel	Frequency
36	5180
38	5190
40	5200
42	5210
44	5220
46	5230
48	5240

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Carrier Frequency Channel

5GHz:

For 802.11a/n(HT20) (VHT20)		For 802.11n(HT40) (VHT40)	
Channel	Freq.(MHz)	Channel	Freq.(MHz)
36	5180	38	5190
40	5200	46	5230
48	5240		

2. KDB 662911 D01 Multiple Transmitter Output v02r01

2) Directional Gain Calculations for In-Band Measurements

a) Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as follows:

(i) If any transmit signals are correlated with each other,

$$\text{Directional gain} = G_{ANT} + 10 \log(NANT) \text{ dBi}$$

(ii) If all transmit signals are completely uncorrelated with each other,

$$\text{Directional gain} = G_{ANT}$$

$$\text{Directional gain} = 2 + 10 \log 2 = 5.01 \text{ dBi}$$

Ant	Brand	Model Name	Ant Type	Connector	Gain (dBi)	NOTE
A	Accsoon	WIT02	External	N/A	Antenna A gain : 2dBi Antenna B gain : 2dBi MIMO technology Directional gain=5.01dBi	WLAN Ant



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11a HT20 CH36&CH40&CH48	6 Mbps
Mode 2	TX IEEE 802.11n HT20 CH36&CH40&CH48	MCS 0
Mode 3	TX IEEE 802.11n HT40 CH38&CH46	MCS 0

- 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) We have been tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.

AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 4: Keeping TX + WLAN Link

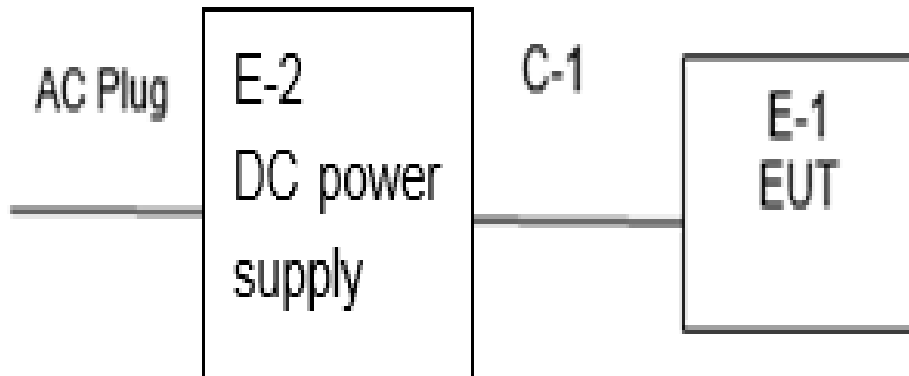
2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

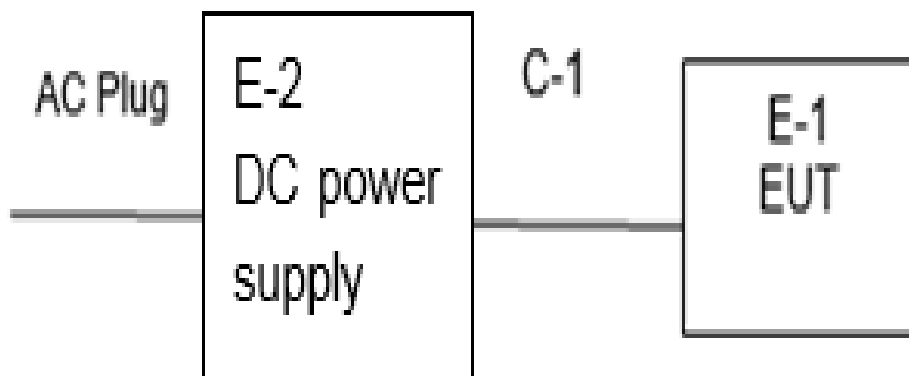
RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Ant_A Power Class	Ant_B Power Class	Software For Testing
WIFI(5G)	5G WIFI Band1 (5150MHz-5250MHz)	802.11a	Ant. A: 2dBi,	70	70	REALTEK 11ac 8822CU USB WLAN NIC Massproduction Kit
		802.11n(HT20)	Ant. B: 2dBi,	60	60	
		802.11n(HT40)	MIMO : 5.01	60	60	

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test





2.5 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
E-2	DC power supply	ZHAOXIN	RXN-605D	N/A	N/A
C-1	DC Cable	N/A	110cm	N/A	N/A

Support units

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



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	101427	2019.10.09	2020.10.08
Signal Analyzer	Agilent	N9020A	MY51110105	2020.03.05	2021.03.04
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2019.10.09	2020.10.08
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-4 5	SK2018080901	2019.10.12	2020.10.11
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2019.10.12	2020.10.11
Temperature & Humidity	HH660	Mieo	N/A	2019.10.17	2020.10.16
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	BULUN	BL410-E/18.905			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.10.09	2020.10.08
LISN	R&S	ENV216	101242	2019.10.09	2020.10.08
LISN	EMCO	3810/2NM	23625	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.17	2020.10.16
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2019.10.09	2020.10.08
Signal Analyzer	Agilent	N9020A	MY49100060	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 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 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

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

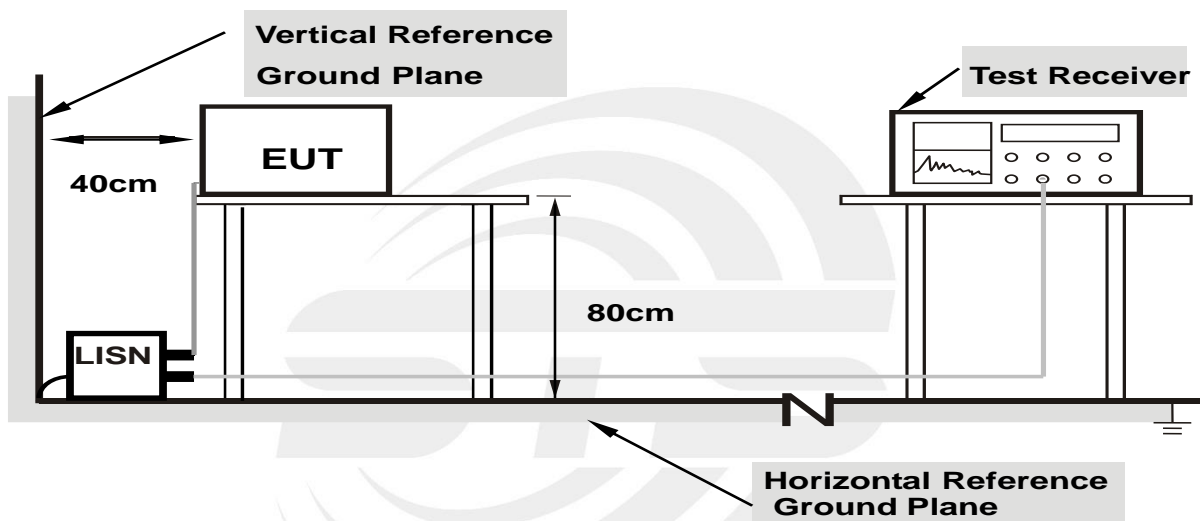
3.1.2 TEST PROCEDURE

- 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.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 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

3.1.5 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.



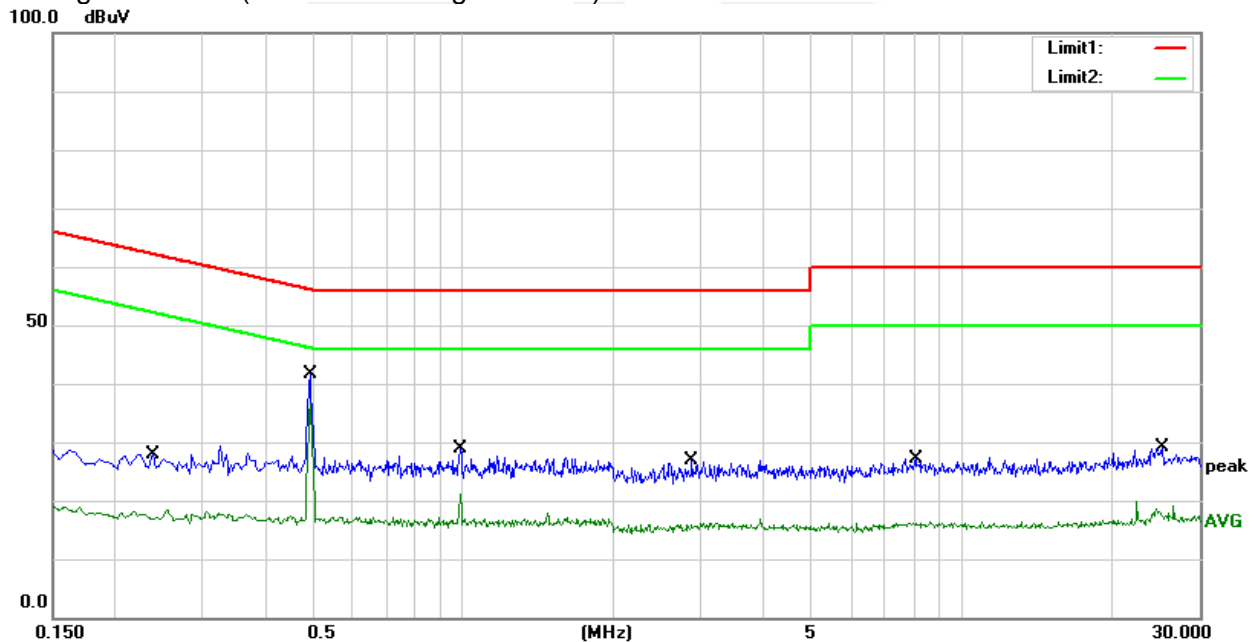
3.1.6 TEST RESULTS

Temperature:	27.1(C)	Relative Humidity:	67%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode :	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2380	7.57	20.42	27.99	62.17	-34.18	QP
2	0.2380	-3.60	20.42	16.82	52.17	-35.35	AVG
3	0.4940	21.03	20.48	41.51	56.10	-14.59	QP
4	0.4940	15.95	20.48	36.43	46.10	-9.67	AVG
5	0.9860	8.79	20.16	28.95	56.00	-27.05	QP
6	0.9860	0.89	20.16	21.05	46.00	-24.95	AVG
7	2.8820	6.77	19.99	26.76	56.00	-29.24	QP
8	2.8820	-4.00	19.99	15.99	46.00	-30.01	AVG
9	8.0740	7.21	19.98	27.19	60.00	-32.81	QP
10	8.0740	-4.12	19.98	15.86	50.00	-34.14	AVG
11	25.2340	8.66	20.57	29.23	60.00	-30.77	QP
12	25.2340	-3.21	20.57	17.36	50.00	-32.64	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit



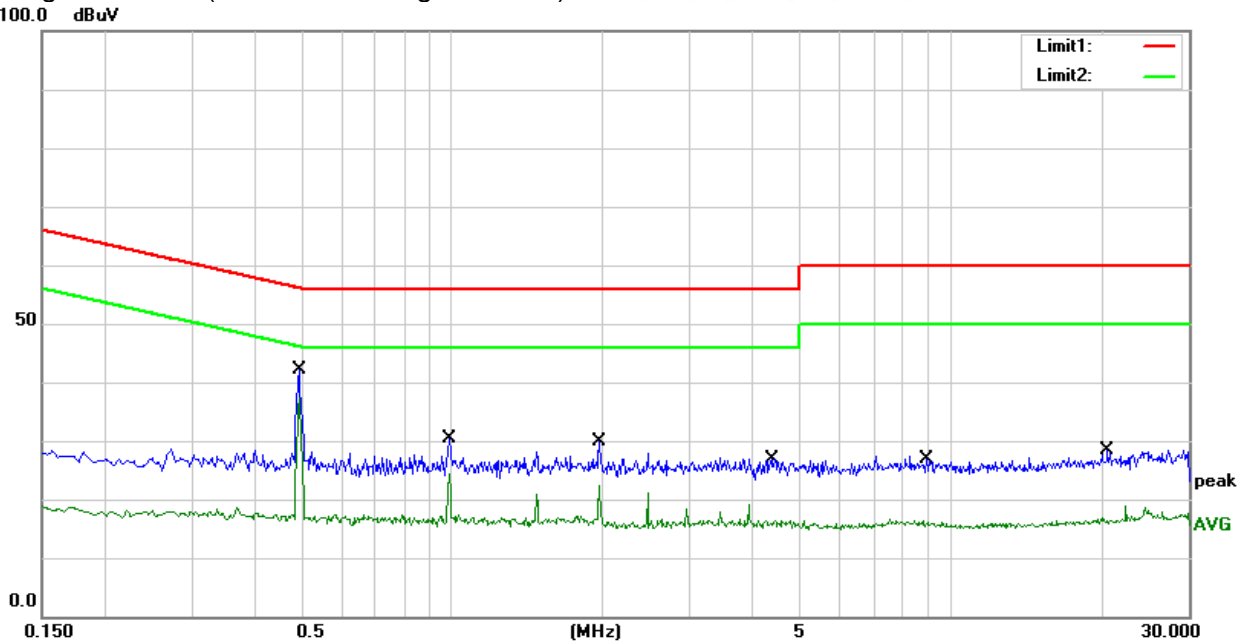


Temperature:	27.1(C)	Relative Humidity:	67%RH
Test Voltage	AC 120V/60Hz	Phase:	N
Test Mode	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4940	21.58	20.48	42.06	56.10	-14.04	QP
2	0.4940	16.97	20.48	37.45	46.10	-8.65	AVG
3	0.9860	10.12	20.16	30.28	56.00	-25.72	QP
4	0.9860	4.25	20.16	24.41	46.00	-21.59	AVG
5	1.9700	9.69	20.06	29.75	56.00	-26.25	QP
6	1.9700	2.23	20.06	22.29	46.00	-23.71	AVG
7	4.3980	7.03	19.95	26.98	56.00	-29.02	QP
8	4.3980	-4.21	19.95	15.74	46.00	-30.26	AVG
9	8.9460	6.83	20.06	26.89	60.00	-33.11	QP
10	8.9460	-4.48	20.06	15.58	50.00	-34.42	AVG
11	20.6060	7.85	20.62	28.47	60.00	-31.53	QP
12	20.6060	-4.74	20.62	15.88	50.00	-34.12	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit



3.2 RADIATED EMISSION AND (BANDEDGE) MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.407(b)7& 15.205/209(a), then the (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	68.2	54

Notes:

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

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic (Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz

For Band edge

Spectrum Parameter	Setting
Detector	Peak
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz



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

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- 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. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

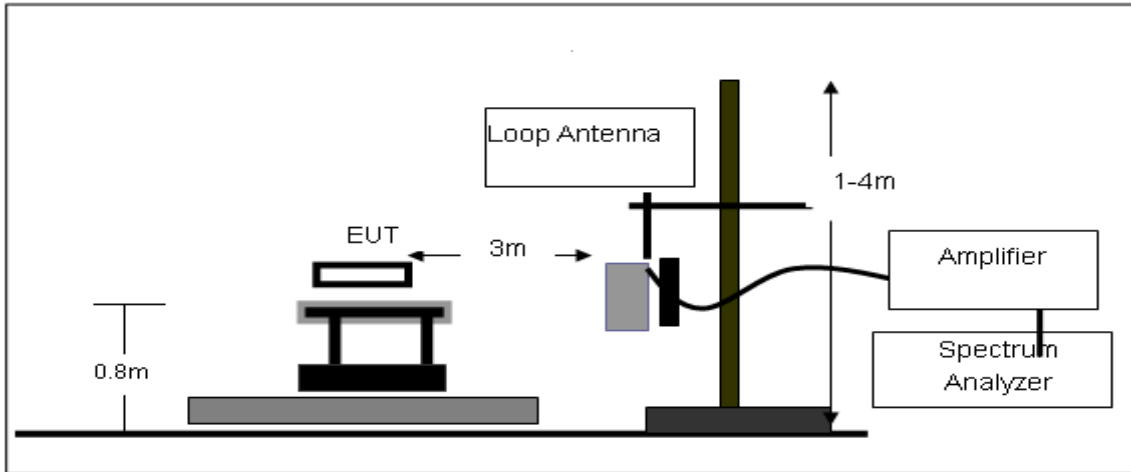
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported

3.2.2 DEVIATION FROM TEST STANDARD

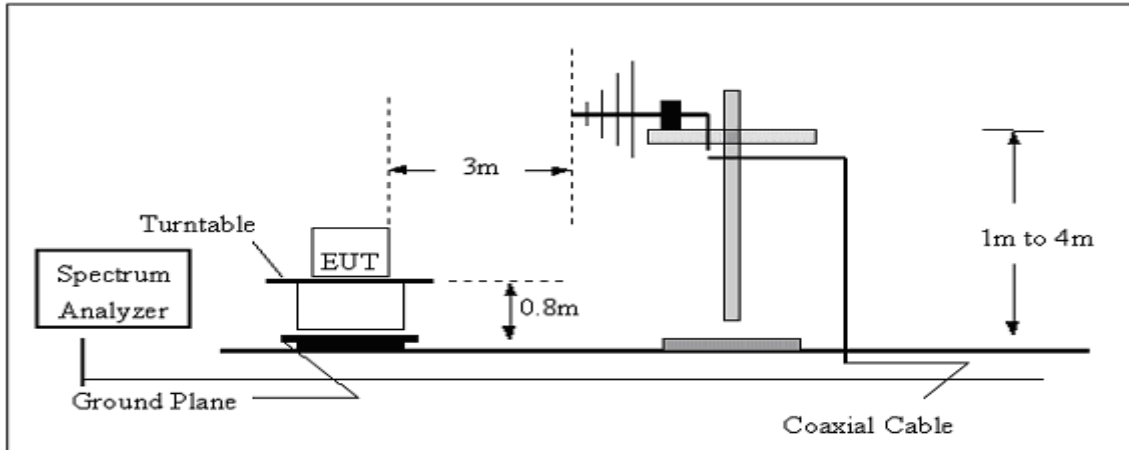
No deviation

3.2.3 TEST SETUP

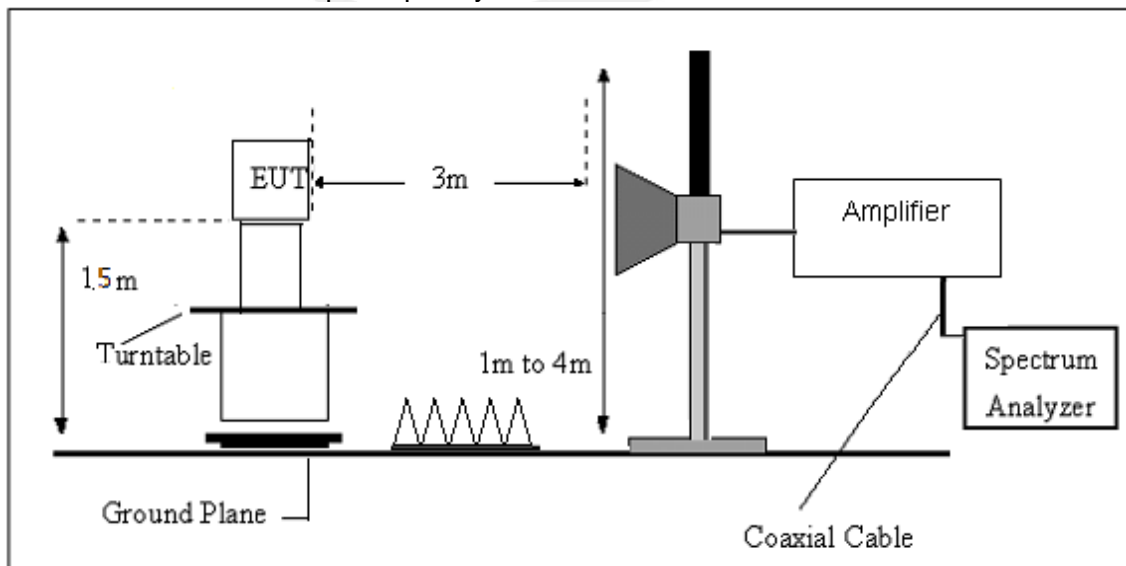
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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





3.2.4 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.

3.2.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

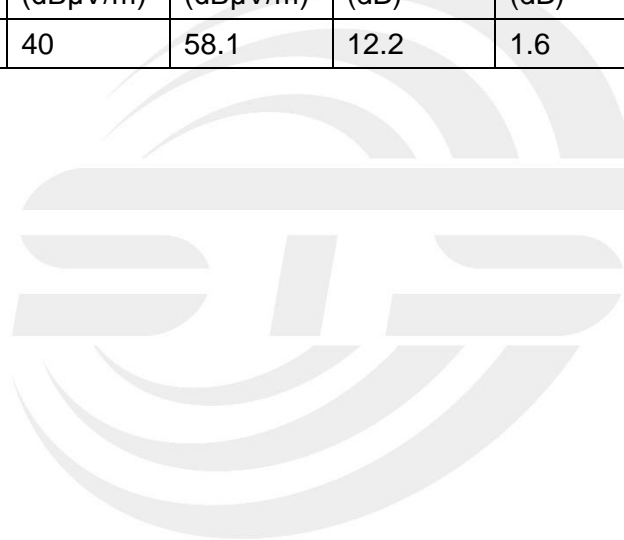
AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency (MHz)	FS (dB μ V/m)	RA (dB μ V/m)	AF (dB)	CL (dB)	AG (dB)	Factor (dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$



**3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)**

Temperature:	23.4(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Polarization :	--
Test Mode:	TX Mode		

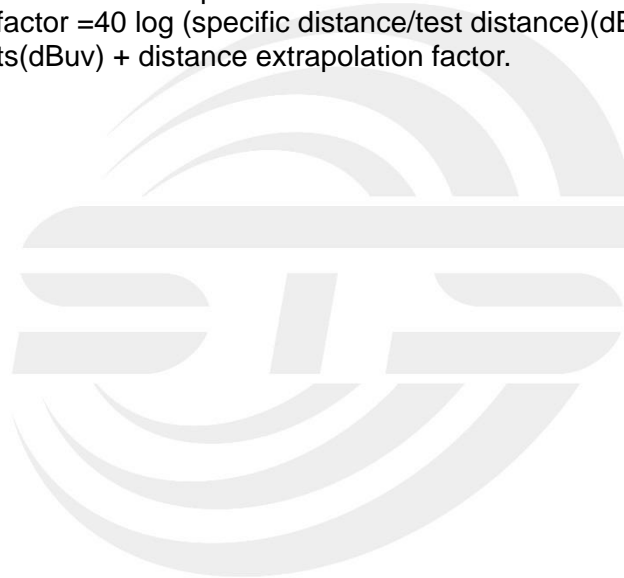
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

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.





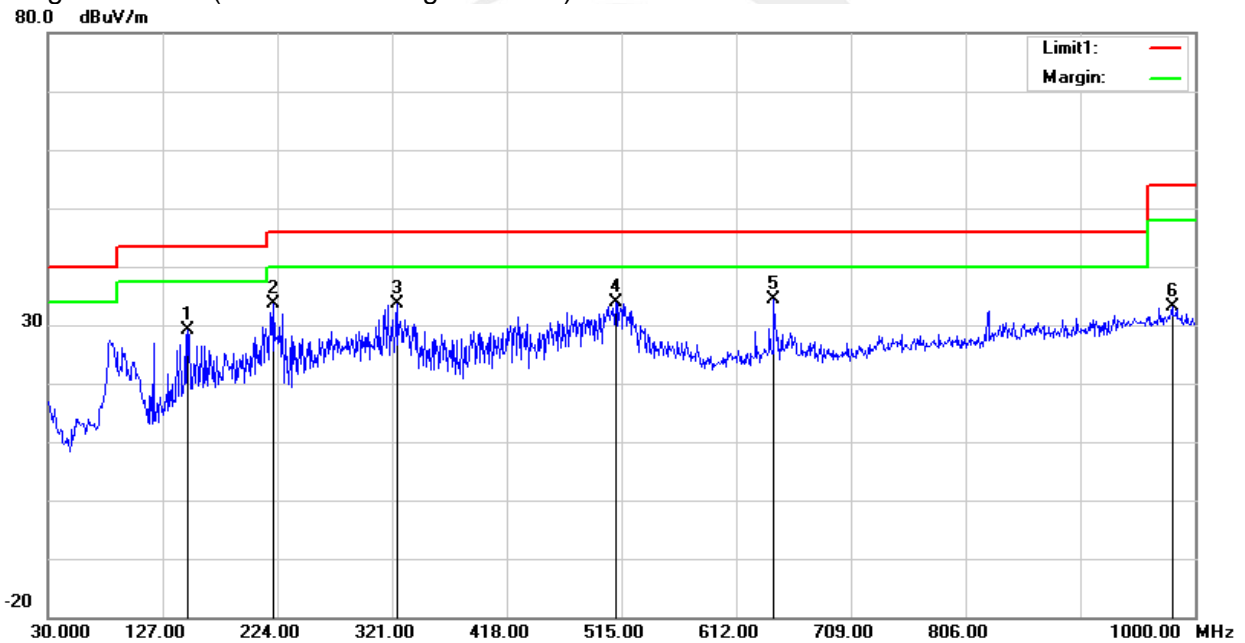
3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature	23.4(C)	Relative Humidity:	60%RH
Test Voltage	DC 12V	Polarization:	Horizontal
Test Mode	Mode 1/2/3/4/5/6/7/8/9(Mode 8 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	148.3400	47.67	-18.46	29.21	43.50	-14.29	QP
2	221.0900	53.17	-19.53	33.64	46.00	-12.36	QP
3	324.8800	47.60	-13.85	33.75	46.00	-12.25	QP
4	510.1500	41.73	-7.94	33.79	46.00	-12.21	QP
5	644.0100	39.14	-4.87	34.27	46.00	-11.73	QP
6	980.6000	30.50	2.63	33.13	54.00	-20.87	QP

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit



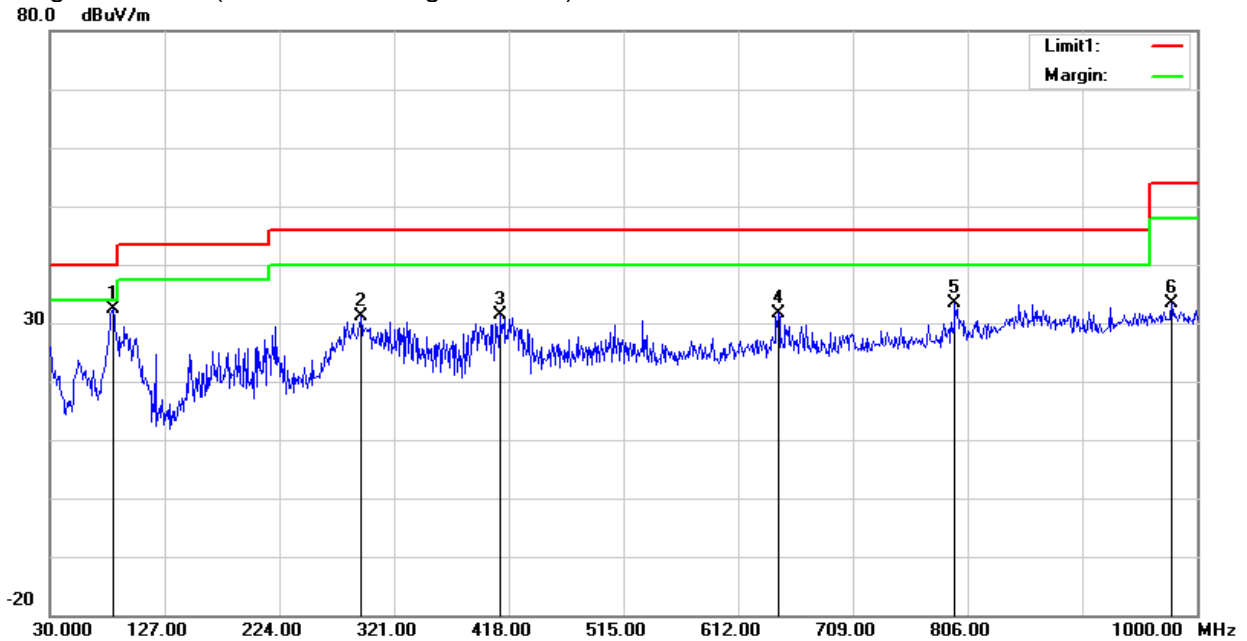


Temperature	23.4(C)	Relative Humidity:	60%RH
Test Voltage	DC 12V	Polarization:	Vertical
Test Mode	Mode 1/2/3/4/5/6/7/8/9(Mode 8 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	83.3500	55.01	-22.52	32.49	40.00	-7.51	QP
2	292.8700	46.27	-15.06	31.21	46.00	-14.79	QP
3	411.2100	41.79	-10.51	31.28	46.00	-14.72	QP
4	645.9500	36.58	-4.87	31.71	46.00	-14.29	QP
5	795.3300	35.35	-2.01	33.34	46.00	-12.66	QP
6	978.6600	30.74	2.58	33.32	54.00	-20.68	QP

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit



**3.2.8 TEST RESULTS (Above 1000 MHz)****Band I 5150-5250MHz**

Frequency (MHz)	Reading (dBuV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBμV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11n40/ 5190 MHz)										
3251.89	43.85	44.70	6.70	28.20	-9.80	34.05	68.20	-34.15	Pk	Vertical
3251.89	42.00	44.70	6.70	28.20	-9.80	32.20	54.00	-21.80	AV	Vertical
3256.55	44.44	44.70	6.70	28.20	-9.80	34.64	68.20	-33.56	Pk	Horizontal
3256.55	41.48	44.70	6.70	28.20	-9.80	31.68	54.00	-22.32	AV	Horizontal
3999.00	40.01	44.20	7.90	29.70	-6.60	33.41	68.20	-34.79	Pk	Vertical
3999.00	36.12	44.20	7.90	29.70	-6.60	29.52	54.00	-24.48	AV	Vertical
4000.32	39.86	44.20	7.90	29.70	-6.60	33.26	68.20	-34.94	Pk	Horizontal
4000.32	35.68	44.20	7.90	29.70	-6.60	29.08	54.00	-24.92	AV	Horizontal
7247.09	36.68	43.50	11.40	35.50	3.40	40.08	68.20	-28.12	Pk	Vertical
7247.09	33.88	43.50	11.40	35.50	3.40	37.28	54.00	-16.72	AV	Vertical
7233.78	36.98	43.50	11.40	35.50	3.40	40.38	68.20	-27.82	Pk	Horizontal
7233.78	34.48	43.50	11.40	35.50	3.40	37.88	54.00	-16.12	AV	Horizontal
10379.96	40.14	44.50	13.80	38.80	8.10	48.24	68.20	-19.96	Pk	Vertical
10379.96	36.05	44.50	13.80	38.80	8.10	44.15	54.00	-9.85	AV	Vertical
10380.33	39.88	44.50	13.80	38.80	8.10	47.98	68.20	-20.22	Pk	Horizontal
10380.33	36.11	44.50	13.80	38.80	8.10	44.21	54.00	-9.79	AV	Horizontal
11057.08	33.37	43.60	14.30	39.50	10.20	43.57	68.20	-24.63	Pk	Vertical
11057.08	29.68	43.60	14.30	39.50	10.20	39.88	54.00	-14.12	AV	Vertical
11053.82	33.85	43.60	14.30	39.50	10.20	44.05	68.20	-24.15	Pk	Horizontal
11053.82	30.68	43.60	14.30	39.50	10.20	40.88	54.00	-13.12	AV	Horizontal
13315.16	32.26	42.60	15.90	38.90	12.20	44.46	68.20	-23.74	Pk	Vertical
13315.16	29.77	42.60	15.90	38.90	12.20	41.97	54.00	-12.03	AV	Vertical
13307.01	32.48	42.60	15.90	38.90	12.20	44.68	68.20	-23.52	Pk	Horizontal
13307.01	29.69	42.60	15.90	38.90	12.20	41.89	54.00	-12.11	AV	Horizontal





High Channel (802.11n40/ 5230 MHz)										
3265.20	45.03	44.70	6.70	28.20	-9.80	35.23	68.20	-32.97	Pk	Vertical
3265.20	41.15	44.70	6.70	28.20	-9.80	31.35	54.00	-22.65	AV	Vertical
3284.04	44.05	44.70	6.70	28.20	-9.80	34.25	68.20	-33.95	Pk	Horizontal
3284.04	41.53	44.70	6.70	28.20	-9.80	31.73	54.00	-22.27	AV	Horizontal
4018.31	39.02	44.20	7.90	29.70	-6.60	32.42	68.20	-35.78	Pk	Vertical
4018.31	36.21	44.20	7.90	29.70	-6.60	29.61	54.00	-24.39	AV	Vertical
4023.09	39.50	44.20	7.90	29.70	-6.60	32.90	68.20	-35.30	Pk	Horizontal
4023.09	36.13	44.20	7.90	29.70	-6.60	29.53	54.00	-24.47	AV	Horizontal
7277.62	36.70	43.50	11.40	35.50	3.40	40.10	68.20	-28.10	Pk	Vertical
7277.62	33.93	43.50	11.40	35.50	3.40	37.33	54.00	-16.67	AV	Vertical
7264.18	36.75	43.50	11.40	35.50	3.40	40.15	68.20	-28.05	Pk	Horizontal
7264.18	34.75	43.50	11.40	35.50	3.40	38.15	54.00	-15.85	AV	Horizontal
10460.10	39.26	44.50	13.80	38.80	8.10	47.36	68.20	-20.84	Pk	Vertical
10460.10	35.79	44.50	13.80	38.80	8.10	43.89	54.00	-10.11	AV	Vertical
10459.98	39.35	44.50	13.80	38.80	8.10	47.45	68.20	-20.75	Pk	Horizontal
10459.98	36.17	44.50	13.80	38.80	8.10	44.27	54.00	-9.73	AV	Horizontal
11082.86	32.82	43.60	14.30	39.50	10.20	43.02	68.20	-25.18	Pk	Vertical
11082.86	30.16	43.60	14.30	39.50	10.20	40.36	54.00	-13.64	AV	Vertical
11094.46	33.63	43.60	14.30	39.50	10.20	43.83	68.20	-24.37	Pk	Horizontal
11094.46	30.60	43.60	14.30	39.50	10.20	40.80	54.00	-13.20	AV	Horizontal
13359.34	32.76	42.60	15.90	38.90	12.20	44.96	68.20	-23.24	Pk	Vertical
13359.34	29.10	42.60	15.90	38.90	12.20	41.30	54.00	-12.70	AV	Vertical
13364.22	32.89	42.60	15.90	38.90	12.20	45.09	68.20	-23.11	Pk	Horizontal
13364.22	29.50	42.60	15.90	38.90	12.20	41.70	54.00	-12.30	AV	Horizontal

Remark:

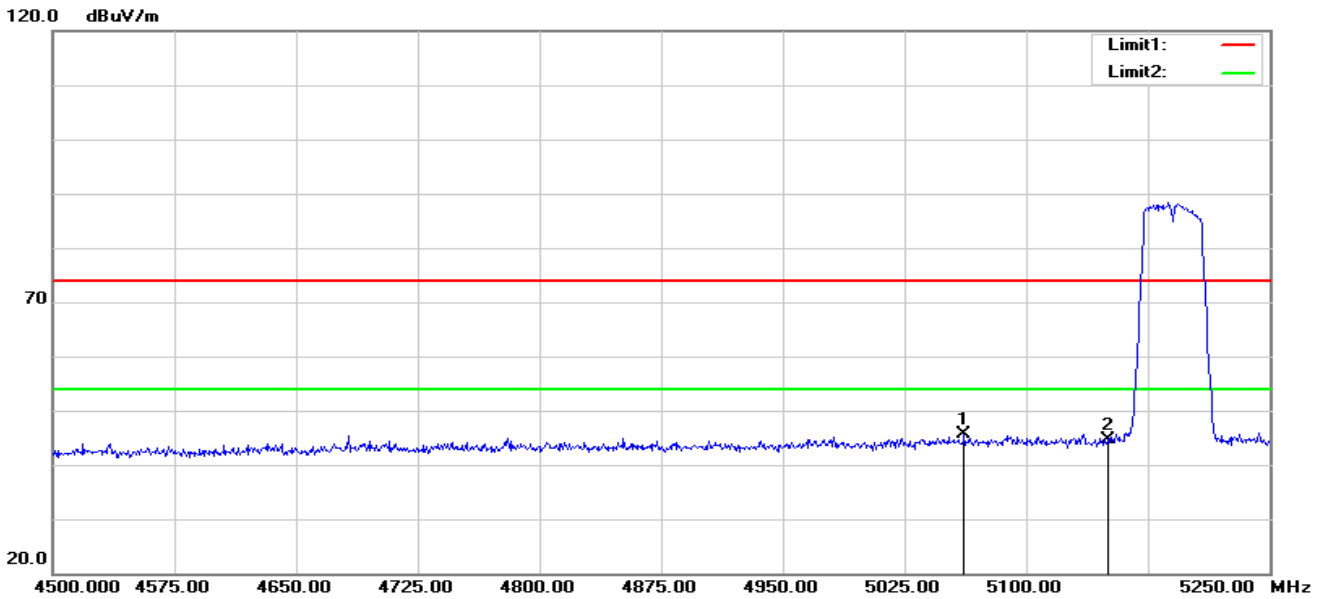
- Factor = Antenna Factor + Cable Loss – Pre-amplifier.
- Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11n (HT-40).
- The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.
- Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.



3.2.9 Band Edge

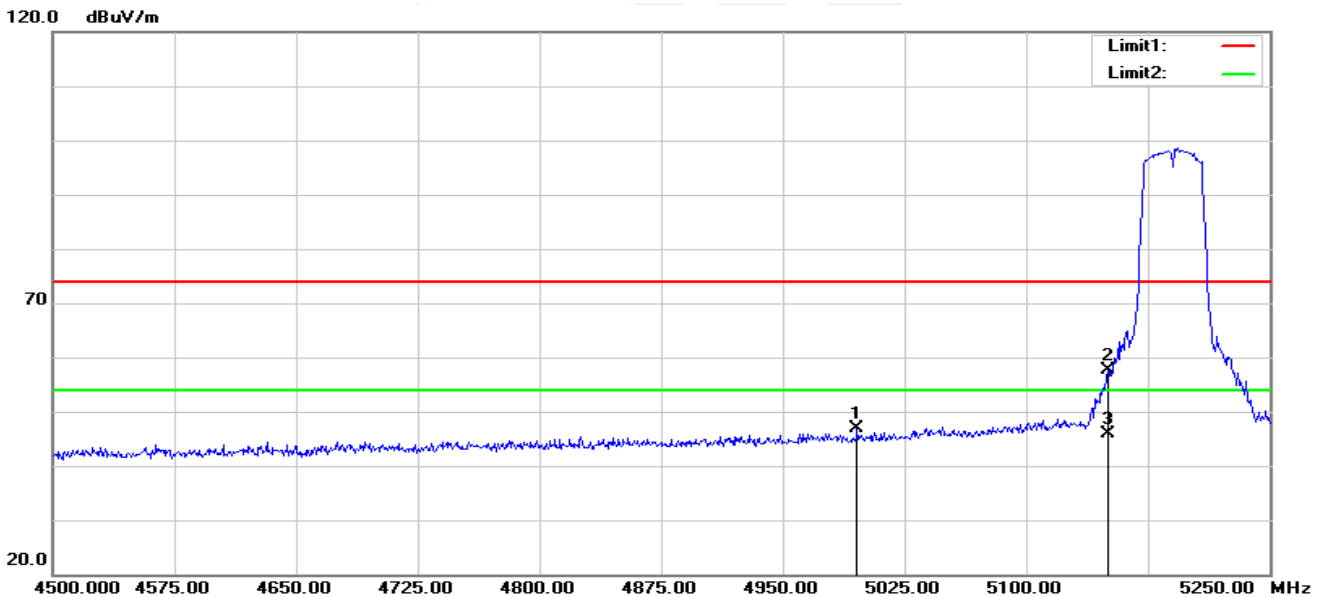
Band I 5150-5250MHz

802.11n (HT-40) Low
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5061.750	51.51	-5.91	45.60	74.00	-28.40	peak
2	5150.000	50.32	-5.73	44.59	74.00	-29.41	peak

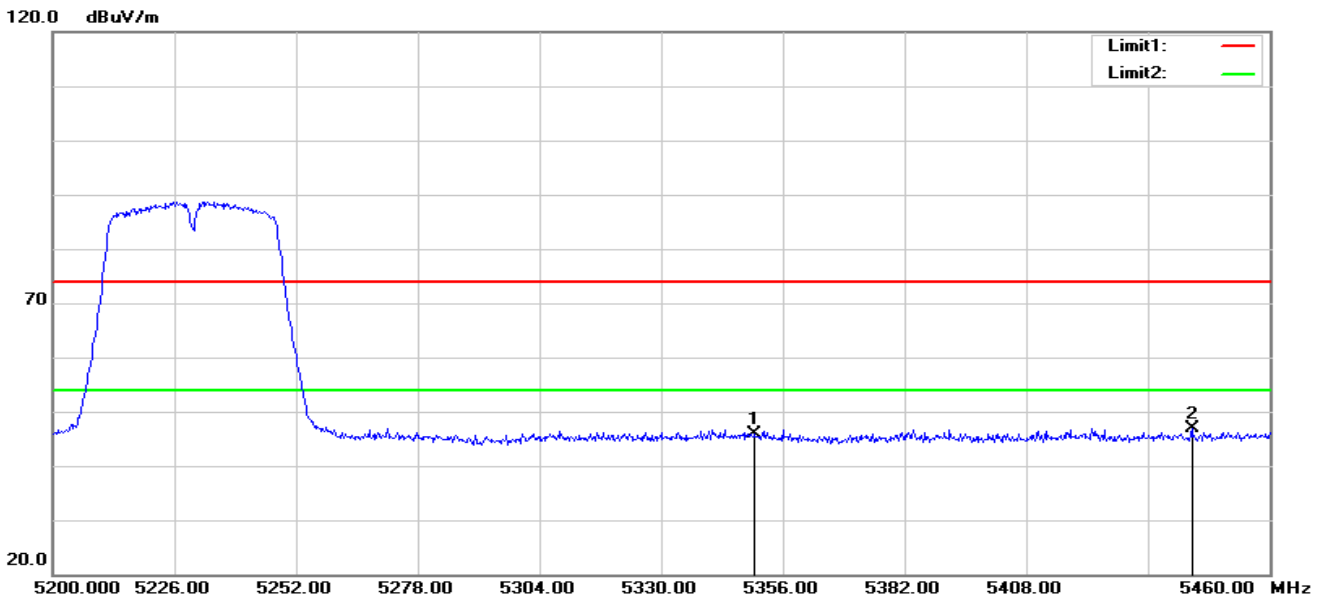
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4995.750	53.02	-6.22	46.80	74.00	-27.20	peak
2	5150.000	63.43	-5.73	57.70	74.00	-16.30	peak
3	5150.000	51.54	-5.73	45.81	54.00	-8.19	AVG

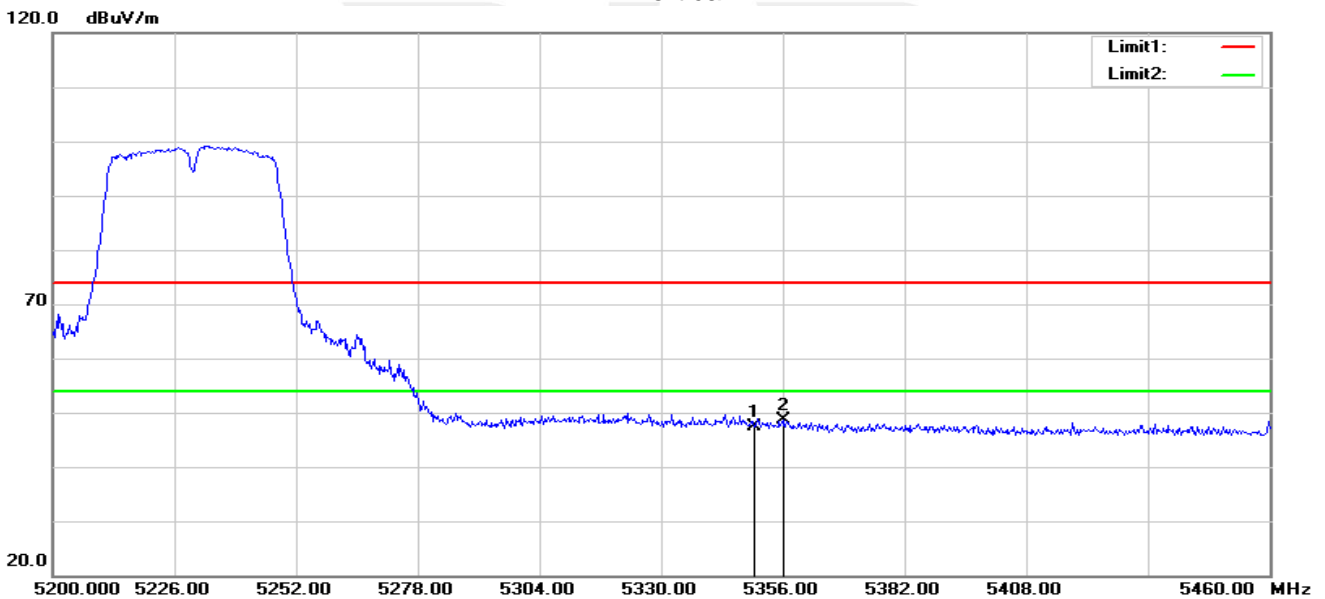


802.11n (HT-40) High Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5355.000	51.00	-5.23	45.77	74.00	-28.23	peak
2	5443.360	51.98	-5.15	46.83	74.00	-27.17	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5355.000	52.53	-5.23	47.30	74.00	-26.70	peak
2	5356.260	53.84	-5.23	48.61	74.00	-25.39	peak

Note: 1.802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) all has been tested, the worst case is 802.11n (HT-40),only shown the worst case.
 2. Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.



4. CONDUCTED SPURIOUS EMISSIONS AND BANDEDGE

4.1 LIMIT

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following 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.
- (2) For transmitters operating in the 5.25-5.35 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.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 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:
 - (i) 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.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	1000 KHz/3000 KHz
Trace-Mode:	Max hold

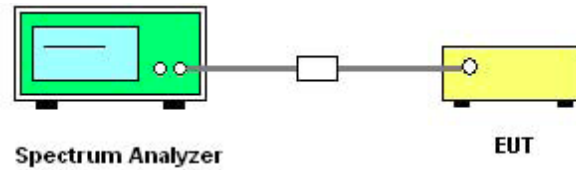
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 5700 to 5725 MHz Upper Band Edge: 5850 to 5870 MHz
RB / VB (emission in restricted band)	1000 KHz/3000 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1000 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

Data See Attachment A.





5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

1. For mobile and portable client devices in the 5.15-5.25 GHz band, , the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2 TEST PROCEDURE

1. The setting follows Method SA-1 of FCC KDB D02 General UNII Test Procedures New Rules v01r03.

For devices operating in the band, the rules specify a measurement bandwidth of 500 kHz.

Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used.

The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (*i.e.*, 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log (1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since $RBW=100 \text{ KHZ}$ is available on nearly all spectrum analyzers.



5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

5150-5250MHz									
Frequency	Direct measurement Ant_A Power Density (dBm)	Direct measurement Ant_B Power Density (dBm)	Ant_A Duty cycle factor	Ant_B Duty cycle factor	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm)	Result
802.11a									
5180	5.382	7.812	1.277	1.277	6.659	9.089	--	11	PASS
5200	5.514	7.948	1.277	1.277	6.791	9.225	--	11	PASS
5240	6.013	7.428	1.277	1.277	7.290	8.705	--	11	PASS
802.11n20									
5180	1.790	4.399	1.403	1.403	3.193	5.802	7.701	11	PASS
5200	2.116	4.309	1.403	1.403	3.519	5.712	7.763	11	PASS
5240	2.631	3.557	1.403	1.403	4.034	4.960	7.532	11	PASS
802.11n40									
5190	-1.044	1.060	2.451	2.451	1.407	3.511	5.595	11	PASS
5230	-0.673	0.566	2.451	2.451	1.778	3.017	5.451	11	PASS

Test plots see Attachment B

6. BANDWIDTH MEASUREMENT

6.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring 26 bandwidth.

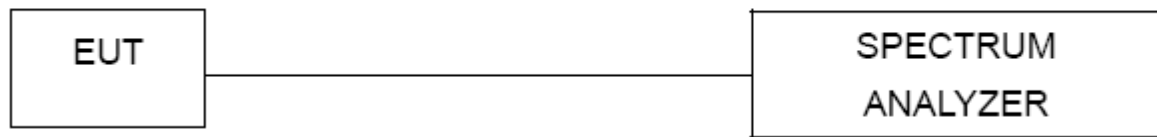
6.1.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW \geq RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION 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.



6.1.5 TEST RESULTS

Note: Antenna A Power > Antenna B Power, Both antenna A and B have been test, Only show the worst data of Antenna A.

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5180	18.38	Pass
5200	18.45	Pass
5240	18.42	Pass
802.11n(HT20)		
5180	19.35	Pass
5200	19.39	Pass
5240	19.38	Pass
802.11n(HT40)		
5190	40.87	Pass
5230	40.67	Pass

Test plots see Attachment C



6.2 OCCUPIED BANDWIDTH (99%) TEST APPLIED PROCEDURES / LIMIT

The following procedure shall be used for measuring (99 %) power bandwidth:

6.2.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.

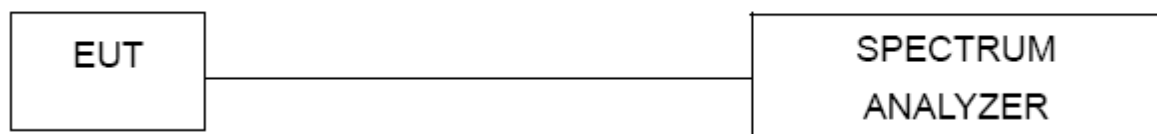
The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.2.2 DEVIATION FROM STANDARD

No deviation.

6.2.3 TEST SETUP



6.2.4 EUT OPERATION 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.



6.2.5 TEST RESULTS

Note: Antenna A Power > Antenna B Power, Both antenna A and B have been test, Only show the worst data of Antenna A.

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5180	16.33	Pass
5200	16.33	Pass
5240	16.33	Pass
802.11n(HT20)		
5180	17.53	Pass
5200	17.53	Pass
5240	17.53	Pass
802.11n(HT40)		
5190	36.01	Pass
5230	36.00	Pass

Test plots See Attachment C



6.3 MINIMUM EMISSION BANDWIDTH(6 DB) PROCEDURES / LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

6.3.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) 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.

6.3.2 DEVIATION FROM STANDARD

No deviation.

6.3.3 TEST SETUP



6.3.4 EUT OPERATION 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.

6.3.5 TEST RESULTS

The EUT not supportband 5.725-5.85 GHz,Not applicable

7. MAXIMUM CONDUCTED OUTPUT POWER

7.1 LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz, If transmitting antennas of directional gain greater than 6 dBi are used.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used.

FCC Part15 (15.407) , Subpart E				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(a) (1) (iv)	Peak Output Power	0.25 watt	5150-5250	PASS
		The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth)	5250-5350	
5470-5725				
15.407(a) (3)		1 watt	5725-5825	

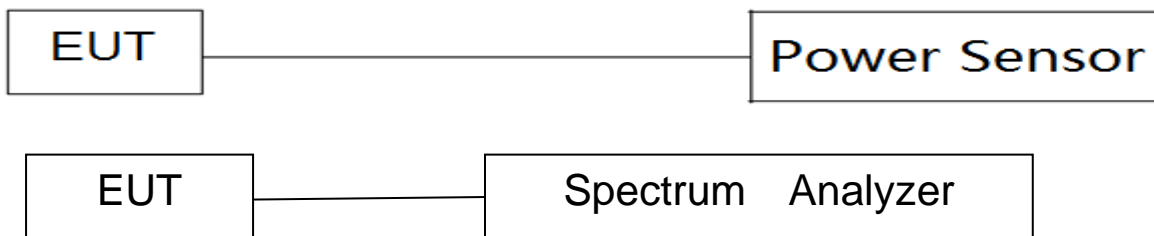
7.2 TEST PROCEDURE

The EUT was directly connected to the Power Sensor&PC

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULTS

Note:For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 0.25 W.

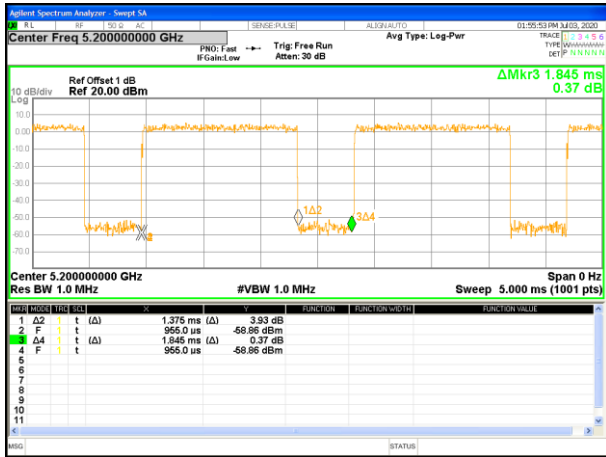
Band I (5.15-5.25GHz)									
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant_B_AV Power (dBm)	Ant_A Duty cycle factor (dB)	Ant_B Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a									
36	5180	11.72	11.47	1.277	1.277	13.00	12.75	--	23.98
40	5200	11.61	11.39	1.277	1.277	12.89	12.67	--	23.98
48	5240	11.20	11.09	1.277	1.277	12.48	12.37	--	23.98
802.11n(HT20)									
36	5180	8.38	8.04	1.403	1.403	9.78	9.44	12.63	23.98
40	5200	8.22	7.99	1.403	1.403	9.62	9.39	12.52	23.98
48	5240	8.01	7.80	1.403	1.403	9.41	9.20	12.32	23.98
802.11n(HT40)									
38	5190	7.96	7.62	2.451	2.451	10.41	10.07	13.25	23.98
46	5230	7.43	7.37	2.451	2.451	9.88	9.82	12.86	23.98





Duty cycle

Band1				
Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty factor(dB)
a	1.375	1.845	74.53%	1.277
n20	1.285	1.775	72.39%	1.403
n40	0.645	1.134	56.88%	2.451



Band 1-a20



Band 1-n20



Band 1-n40



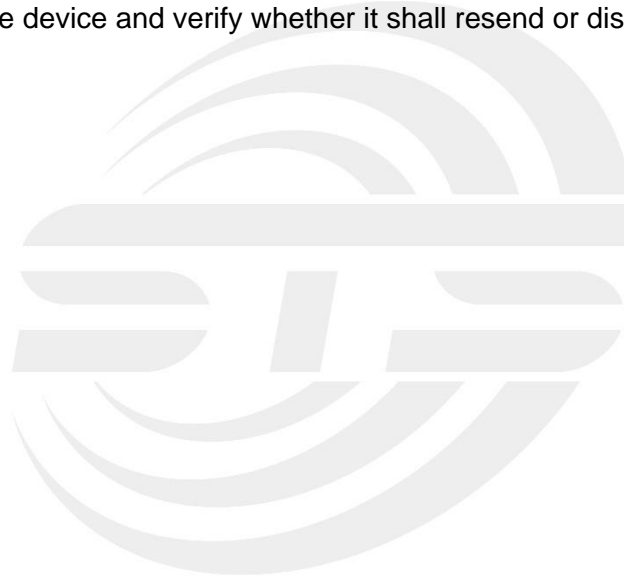
8. AUTOMATICALLY DISCONTINUE TRANSMISSION

8.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

8.2 TEST RESULT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.





9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

9.2 EUT ANTENNA

The EUT antenna is External Antenna. It comply with the standard requirement.





APPENDIX - PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※END OF THE REPORT※※※※

