RADIO TEST REPORT

Report No:STS1811031W04

Issued for

Innominds Software Inc

2055 Junction Avenue, Suite 122, San Jose CA 95131 USA

Product Name:	IOT Card, WiFi+BT, 2.4/5GHz
Brand Name:	Innominds
Model Name:	6001223
Series Model:	N/A
FCC ID:	2ARZI-IWB6001223
IC:	24585-IWB6001223
Test Standard:	FCC Part 15.407
	RSS-247 Issue 2, February 2017

Shenzhen STS Test Services Co., Ltd.
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TEST RESULT CERTIFICATION

Applicant's name	:	Innominds Software Inc
Address	:	2055 Junction Avenue, Suite 122, San Jose CA 95131 USA
Manufacture's Name	:	Innominds Software Inc
Address	:	2055 Junction Avenue, Suite 122, San Jose CA 95131 USA

Product description

Product Name	:	IOT Card, WiFi+BT, 2.4/5GHz
Brand Name	:	Innominds
Model Name	:	6001223
Series Model	:	N/A
Test Standards	:	FCC Part15.407
		RSS-247 Issue 2, February 2017
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&IC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test	:	
Date (s) of performance of tests	:	05 Nov. 2018 ~ 10 Jan. 2019
Date of Issue	:	10 Jan. 2019
Test Result	:	**Pass**

Testing Engineer : Chris chen
(Chris chen)

Technical Manager : Sunday Hu
(Sunday Hu)

Authorized Signatory : Vita Li
(Vita Li)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	10 Jan. 2019	STS1811031W04	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 RSS-247 Issue 2, February 2017		
FCC standard	Test Item	Results
15.207 RSS-Gen Issue 5 April 2018	AC Conducted Emission	PASS
§ 15.407 (2) (26 dB) / § 15.407 (e) (6 dB)/ § 15.407 (a) (99%) RSS-Gen Issue 5 April 2018	26dB/6dB &99% Bandwidth	PASS
15.407(a) (1).(2).(3).(4).(5) RSS-247 Issue 2, February 2017	Maximum Conducted Output Power	PASS
15.407(b)& 15.209 RSS-247 Issue 2, February 2017	Radiated Emission And (bandedge Emissions) Measurement	PASS
15.407(b)7 RSS-247 Issue 2, February 2017	Conducted Emission And (bandedge Emissions) Measurement	PASS
15.407(a) (1).(2).(3).(4).(5) RSS-247 Issue 2, February 2017	Power Spectral Density	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203/15.204 RSS-Gen Issue 5 April 2018	Antenna Requirement	PASS
RSS-Gen Issue 5 April 2018	Frequency Stability	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.
Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.: 625569
IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	RF output power,conducted	±0.71dB
2	Unwanted Emissions,conducted	±0.63dB
3	All emissions,radiated 30-200MHz	±3.43dB
4	All emissions,radiated 200MHz-1GHz	±3.57dB
5	All emissions,radiated>1G	±4.13dB
6	Conducted Emission(9KHz-150KHz)	±3.18dB
7	Conducted Emission(150KHz-30MHz)	±2.70dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name</td><td>IOT Card, WiFi+BT, 2.4/5GHz</td></tr>
<tr><td>Trade Name</td><td>Innominds</td></tr>
<tr><td>Model Name</td><td>6001223</td></tr>
<tr><td>Series Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is a IOT Card, WiFi+BT, 2.4/5GHz
<table>
<tr><td rowspan="2">Operation Frequency:</td><td>IEEE 802.11a/ n(HT20)/ac(VHT20):
5.180GHz-5.240GHz
IEEE 802.11n(HT40)/ac(VHT40):
5.190GHz-5.230GHz
IEEE 802.11ac(VHT80): 5.210GHz</td></tr>
<tr><td>IEEE 802.11a/ n(HT20)/ac(VHT20):
5.745GHz-5.825GHz
IEEE 802.11n(HT40)/ac(VHT40):
5.755GHz-5.795GHz
IEEE 802.11ac(VHT80) 5.775GHz</td></tr>
<tr><td>Modulation Type:</td><td>802.11a(OFDM):
BPSK,QPSK,16-QAM,64-QAM
802.11n(OFDM):
BPSK,QPSK,16-QAM,64-QAM
802.11ac(OFDM):
BPSK,QPSK,16-QAM,64-QAM,256-QAM</td></tr>
<tr><td>Antenna Designation:</td><td>See Note 2</td></tr>
<tr><td>Max.Output Power(Conducted):</td><td>20.13 dBm</td></tr>
<tr><td>Duty Cycle:</td><td>>98%</td></tr>
</table>
More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Test Channel</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Power Rating</td><td>Input: DC 1.8V~3.3V</td></tr>
<tr><td>Hardware version number</td><td>R2.0 (DVT)</td></tr>
<tr><td>Software version number</td><td>SW1</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:For a more detailed features description, please refer to the manufacturer's specifications or the User's 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
5.745GHz-5.825GHz	
Channel	Frequency
149	5745
151	5755
153	5765
157	5785
159	5795
161	5805
165	5825

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)/ac (VHT20)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11n (HT40) /ac (VHT40)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
38	5190	151	5755
46	5230	159	5795

For 802.11ac (VHT80)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
42	5210	155	5775

2.

Ant.	Brand	Model Name	Ant Type	Connector	Gain (dBi)	NOTE
A	Pulse	W1043	Blade style antenna	RP-SMA Male	2.0	2.4GHz and 5 GHz antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible 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 802.11a HT20 CH149&CH157&CH165	6 Mbps
Mode 3	TX IEEE 802.11n HT20 CH36&CH40&CH48	MCS 0
Mode 4	TX IEEE 802.11ac VHT20 CH36&CH40&CH48	NSS1 MCS0
Mode 5	TX IEEE 802.11n HT20 CH149&CH157&CH165	MCS 0
Mode 6	TX IEEE 802.11ac VHT20 CH149&CH157&CH165	NSS1 MCS0
Mode 7	TX IEEE 802.11n HT40 CH38&CH46	MCS 0
Mode 8	TX IEEE 802.11ac VHT40 CH38&CH46	NSS1 MCS0
Mode 9	TX IEEE 802.11n HT40 CH151&CH159	MCS 0
Mode 10	TX IEEE 802.11ac VHT40 CH151&CH159	NSS1 MCS0
Mode 11	TX IEEE 802.11ac VHT80 CH42	NSS1 MCS0
Mode 12	TX IEEE 802.11ac VHT80 CH155	NSS1 MCS0

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

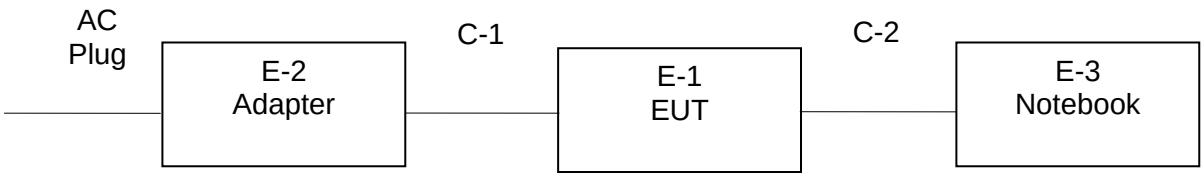
(3) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.

AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 13: Keeping TX + WLAN Link

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious EmissionTest



Conducted Emission Test

2.4 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
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Adapter	N/A	N/A	N/A	N/A
E-3	Notebook	DELL	VOSTRO.3800	N/A	N/A
C-1	DC Cable	N/A	100cm	N/A	N/A
C-2	USB Cable	N/A	110cm	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY51110105	2018.03.08	2019.03.07
Active loop Antenna	ZHINAN	ZN30900C	16035	2017.03.11	2020.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2017.10.27	2020.10.26
SHF-EHF Horn Antenna (15G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2019.03.10
Pre-mplifier (0.1M-3GHz)	EM	EM330	060665	2018.03.09	2019.03.08
PreAmplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2018.10.13	2019.10.12
Temperature & Humitidy	HH660	Mieo	N/A	2018.10.11	2019.10.10
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
LISN	R&S	ENV216	101242	2018.10.13	2019.10.12
LISN	EMCO	3810/2NM	23625	2018.10.13	2019.10.12
Temperature & Humitidy	HH660	Mieo	N/A	2018.10.11	2019.10.10

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
Temperature & Humitidy	HH660	Mieo	N/A	2018.10.11	2019.10.10

3. EMC EMISSION TEST

3.1CONDUCTED 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

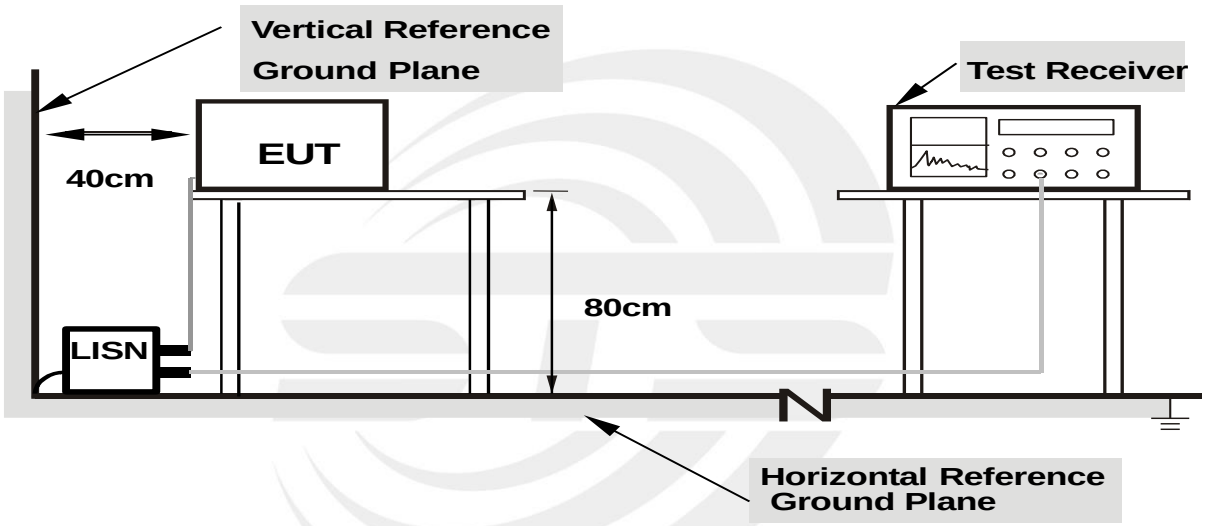
3.1.2 TEST PROCEDURE

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 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

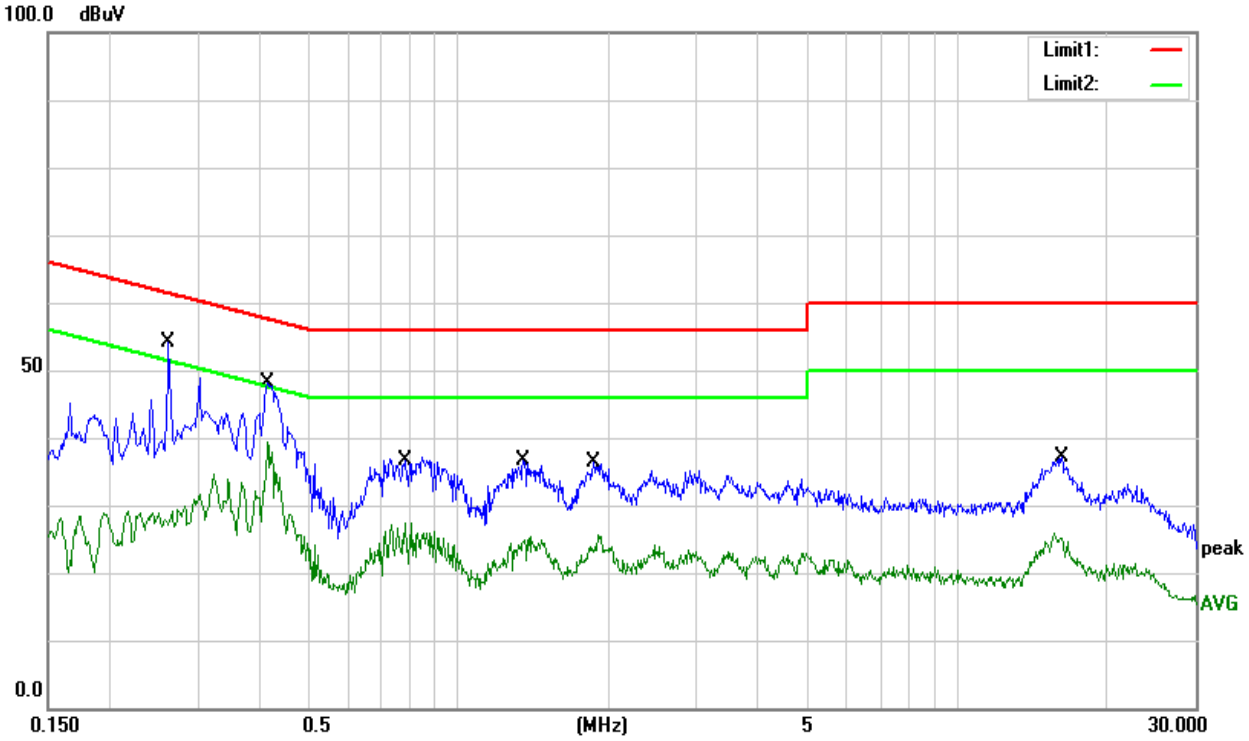
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

Temperature:	25.2 ℃	Relative Humidity:	58%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode：	Mode 13		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.2620	33.51	20.54	54.05	61.37	-7.32	QP
0.2620	14.02	20.54	34.56	51.37	-16.81	AVG
0.4140	27.56	20.49	48.05	57.57	-9.52	QP
0.4140	18.87	20.49	39.36	47.57	-8.21	AVG
0.7820	16.30	20.23	36.53	56.00	-19.47	QP
0.7820	7.17	20.23	27.40	46.00	-18.60	AVG
1.3500	16.55	20.12	36.67	56.00	-19.33	QP
1.3500	5.27	20.12	25.39	46.00	-20.61	AVG
1.8620	16.34	20.07	36.41	56.00	-19.59	QP
1.8620	5.54	20.07	25.61	46.00	-20.39	AVG
16.1540	17.04	19.97	37.01	60.00	-22.99	QP
16.1540	5.92	19.97	25.89	50.00	-24.11	AVG

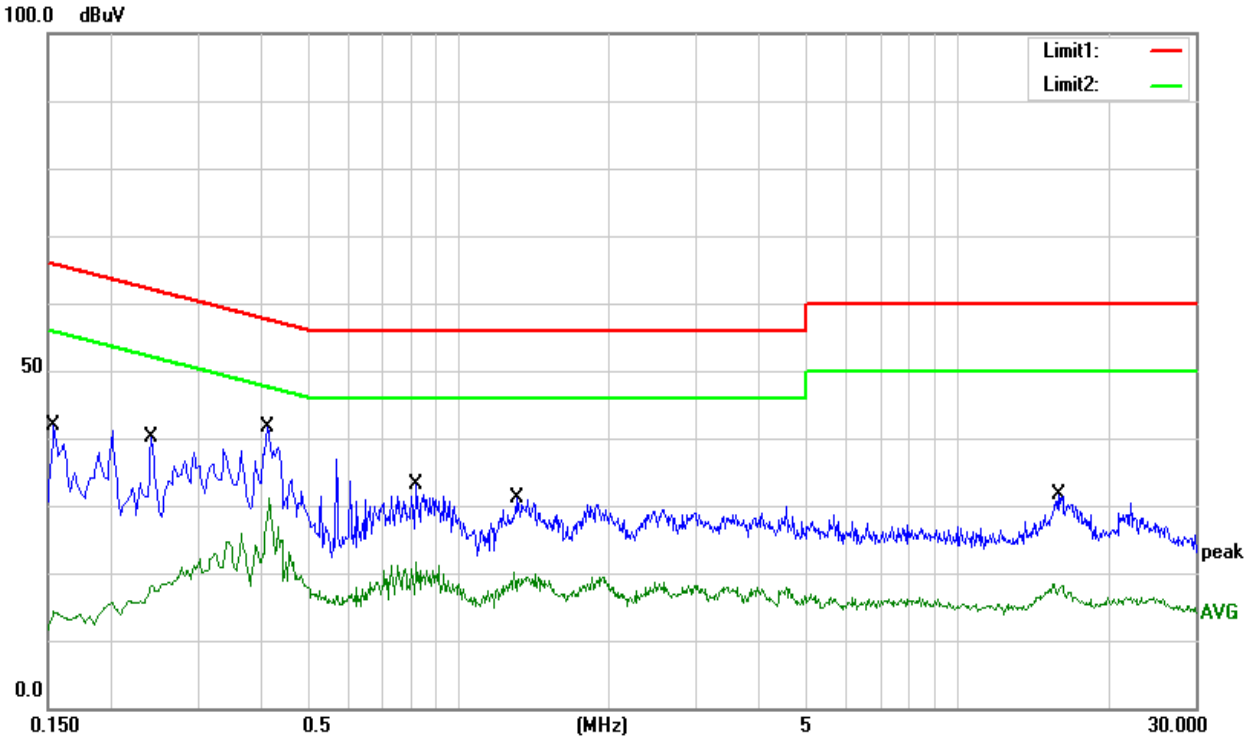
Remark:
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit



Temperature:	25.2 ℃	Relative Humidity:	58%
Test Voltage	AC 120V/60Hz	Phase:	N
Test Mode	Mode 13		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1540	21.62	20.20	41.82	65.78	-23.96	QP
0.1540	-4.49	20.20	15.71	55.78	-40.07	AVG
0.2420	19.63	20.51	40.14	62.03	-21.89	QP
0.2420	-0.48	20.51	20.03	52.03	-32.00	AVG
0.4140	21.22	20.51	41.73	57.57	-15.84	QP
0.4140	10.59	20.51	31.10	47.57	-16.47	AVG
0.8260	12.80	20.23	33.03	56.00	-22.97	QP
0.8260	1.47	20.23	21.70	46.00	-24.30	AVG
1.3060	10.93	20.16	31.09	56.00	-24.91	QP
1.3060	-0.23	20.16	19.93	46.00	-26.07	AVG
15.9340	11.76	19.85	31.61	60.00	-28.39	QP
15.9340	-1.53	19.85	18.32	50.00	-31.68	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; 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 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

a. 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.
b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

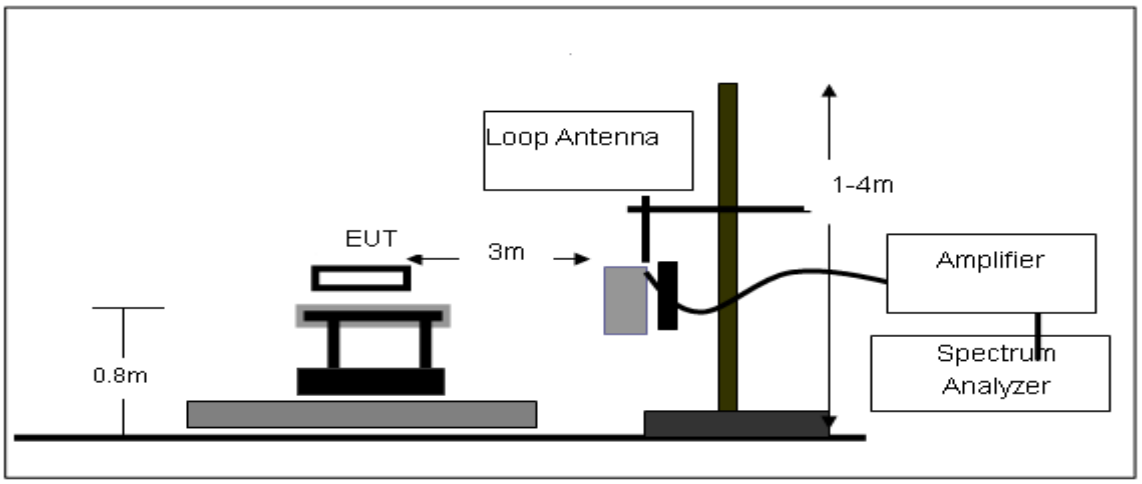
Both horizontal and vertical antenna polarities were tested and performed test to three orthogonal axis. The worst case emissions were reported

3.2.2 DEVIATION FROM TEST STANDARD

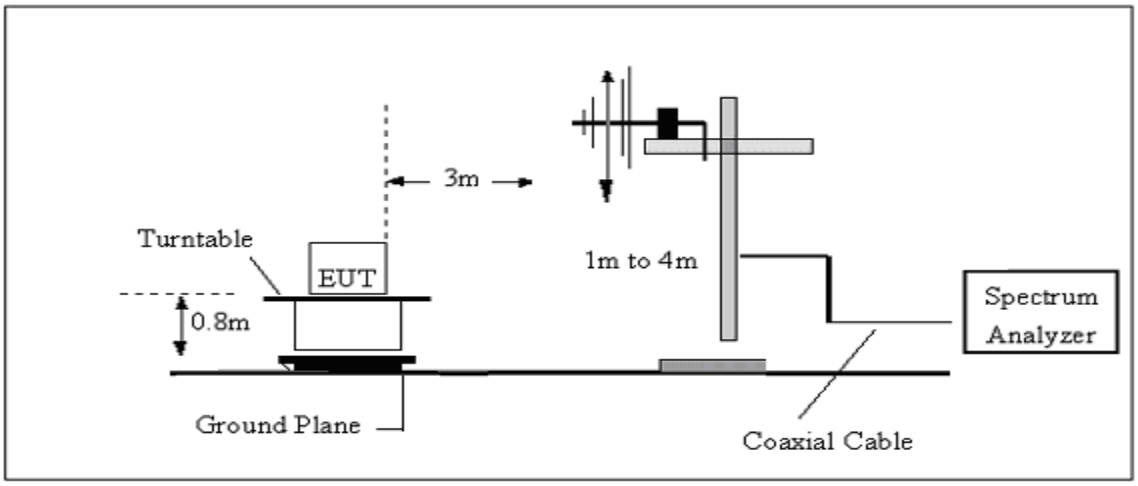
No deviation

3.2.3 TEST SETUP

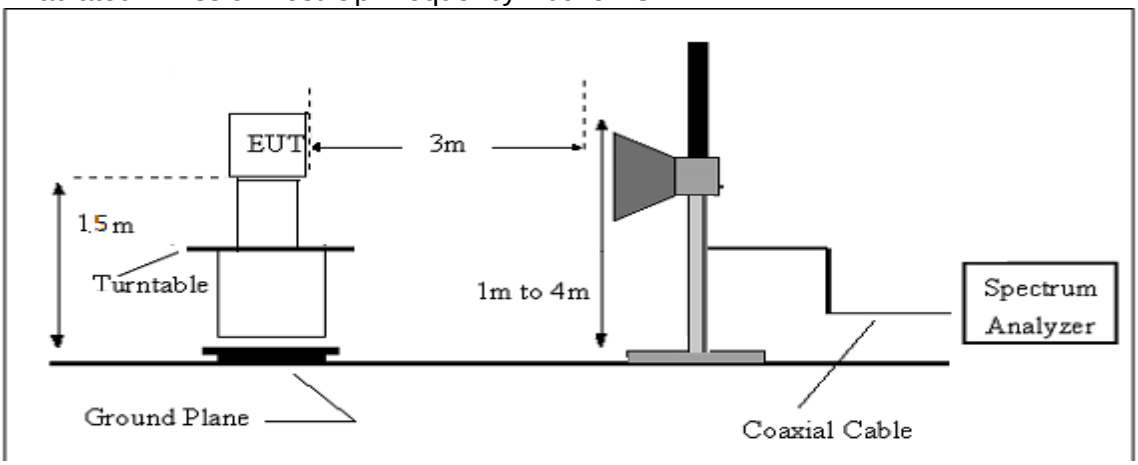
（A）Radiated Emission Test-Up Frequency Below 30MHz



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

Factor=AF+CL-AG

3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

Temperature：	24.5 ℃	Relative Humidtity：	53%
Test Voltage ：	DC 3.3V	Polarization :	--
Test Mode ：	TX Mode		

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

Note:

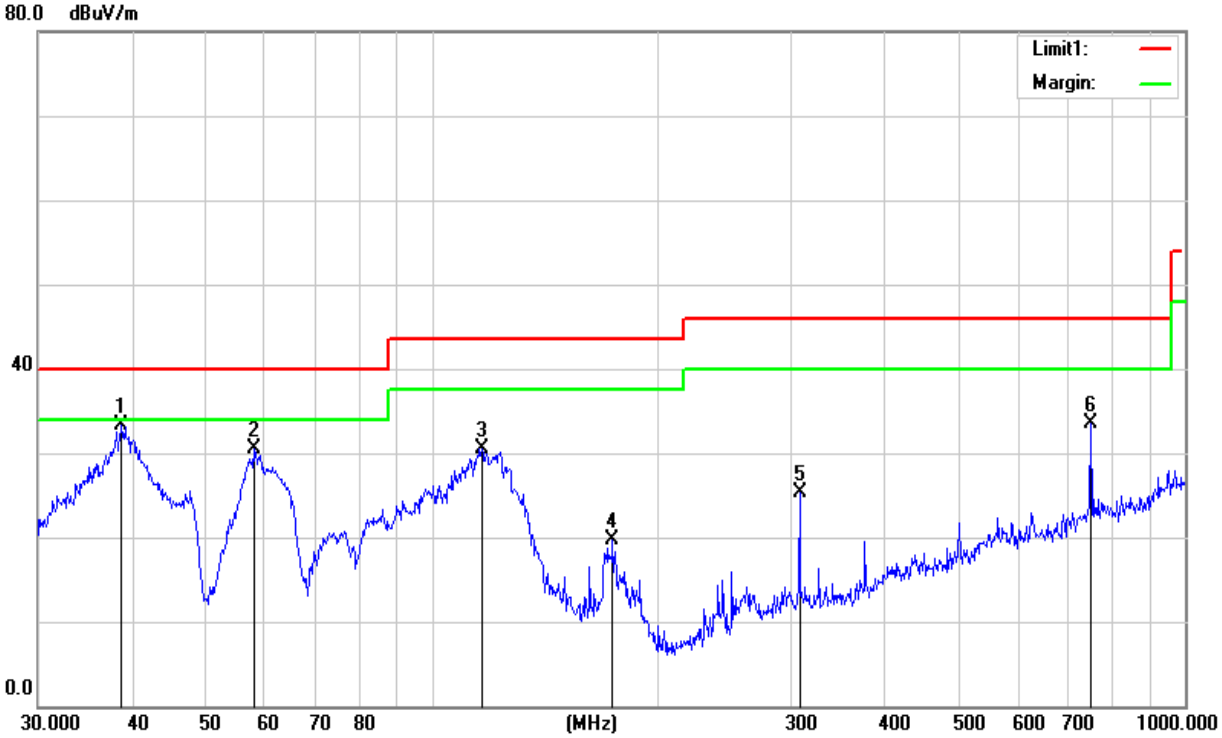
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature	24.5 ℃	Relative Humidtity：	53%
Test Voltage	DC 3.3V	Polarization	Horizontal
Test Mode	Mode 1-12(Mode 8 worst mode)		

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
38.7518	48.99	-15.68	33.31	40.00	-6.69	QP
57.9993	54.21	-23.76	30.45	40.00	-9.55	QP
116.5401	48.48	-17.91	30.57	43.50	-12.93	QP
173.8135	39.07	-19.37	19.70	43.50	-23.80	QP
307.8313	39.84	-14.57	25.27	46.00	-20.73	QP
750.1083	37.13	-3.56	33.57	46.00	-12.43	QP

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

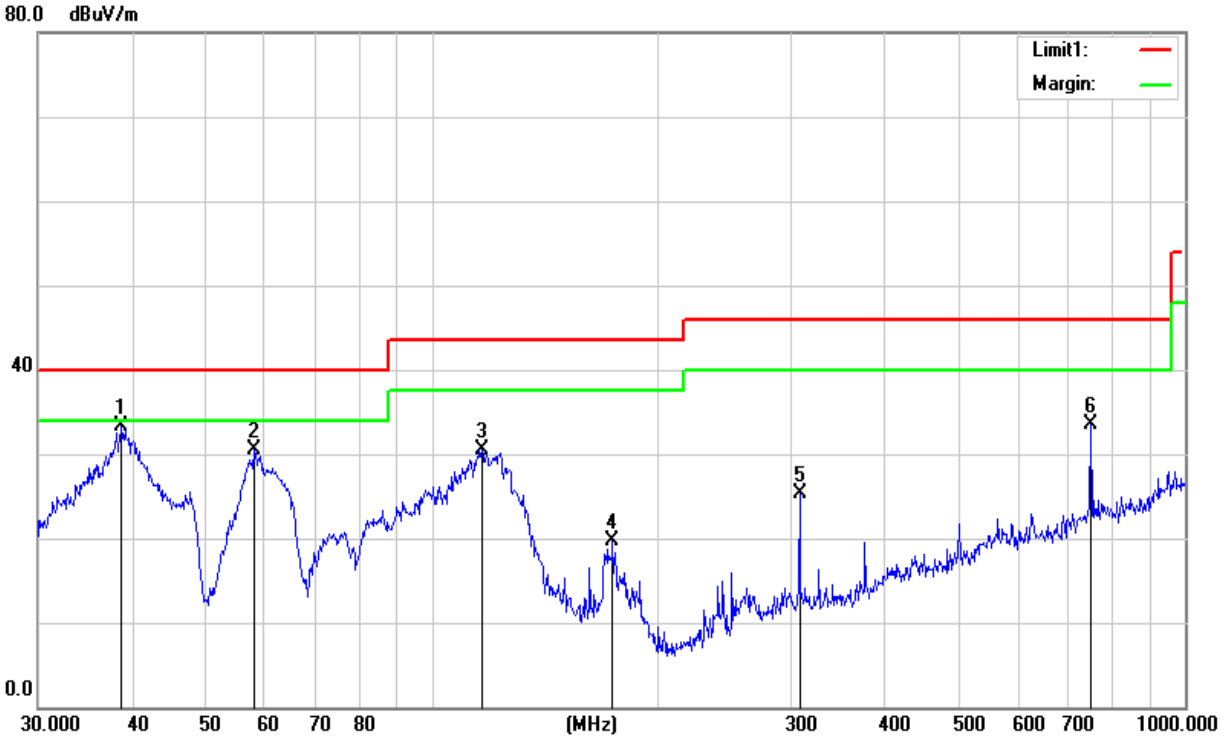


Temperature	24.5 ℃	Relative Humidtity：	53%
Test Voltage	DC 3.3V	Polarization	Vertical
Test Mode	Mode 1-12(Mode 8 worst mode)		

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
38.7518	48.99	-15.68	33.31	40.00	-6.69	QP
57.9993	54.21	-23.76	30.45	40.00	-9.55	QP
116.5401	48.48	-17.91	30.57	43.50	-12.93	QP
173.8135	39.07	-19.37	19.70	43.50	-23.80	QP
307.8313	39.84	-14.57	25.27	46.00	-20.73	QP
750.1083	37.13	-3.56	33.57	46.00	-12.43	QP

Remark:

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



3.2.8 TEST RESULTS (Above 1000 MHz)

Band I 5150-5250MHz

Band I(5.15-5.25) GHz										
Frequency (MHz)	Reading (dBuV)	Amplifier （dB）	Loss （dB）	Antenna Factor （dB/m）	Corrected Factor （dB）	Emission Level (dBμV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11n20/ 5180 MHz)										
3256.61	44.16	44.70	6.70	28.20	-9.80	34.36	74.00	-39.64	PK	Vertical
3256.61	41.26	44.70	6.70	28.20	-9.80	31.46	54.00	-22.54	AV	Vertical
3245.71	44.33	44.70	6.70	28.20	-9.80	34.53	74.00	-39.47	PK	Horizontal
3245.71	41.72	44.70	6.70	28.20	-9.80	31.92	54.00	-22.08	AV	Horizontal
3997.04	39.20	44.20	7.90	29.70	-6.60	32.60	74.00	-41.40	PK	Vertical
3997.04	37.01	44.20	7.90	29.70	-6.60	30.41	54.00	-23.59	AV	Vertical
3998.58	38.66	44.20	7.90	29.70	-6.60	32.06	74.00	-41.94	PK	Horizontal
3998.58	36.85	44.20	7.90	29.70	-6.60	30.25	54.00	-23.75	AV	Horizontal
7230.83	36.88	43.50	11.40	35.50	3.40	40.28	74.00	-33.72	PK	Vertical
7230.83	33.55	43.50	11.40	35.50	3.40	36.95	54.00	-17.05	AV	Vertical
7217.12	37.17	43.50	11.40	35.50	3.40	40.57	74.00	-33.43	PK	Horizontal
7217.12	34.35	43.50	11.40	35.50	3.40	37.75	54.00	-16.25	AV	Horizontal
10360.10	39.40	44.50	13.80	38.80	8.10	47.50	74.00	-26.50	PK	Vertical
10360.10	35.95	44.50	13.80	38.80	8.10	44.05	54.00	-9.95	AV	Vertical
10360.13	39.04	44.50	13.80	38.80	8.10	47.14	74.00	-26.86	PK	Horizontal
10360.13	36.52	44.50	13.80	38.80	8.10	44.62	54.00	-9.38	AV	Horizontal
11024.88	33.00	43.60	14.30	39.50	10.20	43.20	74.00	-30.80	PK	Vertical
11024.88	30.50	43.60	14.30	39.50	10.20	40.70	54.00	-13.30	AV	Vertical
11034.66	33.73	43.60	14.30	39.50	10.20	43.93	74.00	-30.07	PK	Horizontal
11034.66	31.17	43.60	14.30	39.50	10.20	41.37	54.00	-12.63	AV	Horizontal
13295.88	31.76	42.60	15.90	38.90	12.20	43.96	74.00	-30.04	PK	Vertical
13295.88	29.10	42.60	15.90	38.90	12.20	41.30	54.00	-12.70	AV	Vertical
13287.98	32.69	42.60	15.90	38.90	12.20	44.89	74.00	-29.11	PK	Horizontal
13287.98	28.57	42.60	15.90	38.90	12.20	40.77	54.00	-13.23	AV	Horizontal

Mid Channel (802.11 n20/ 5200 MHz)										
3260.93	44.29	44.70	6.70	28.20	-9.80	34.49	74.00	-39.51	PK	Vertical
3260.93	40.88	44.70	6.70	28.20	-9.80	31.08	54.00	-22.92	AV	Vertical
3252.83	44.98	44.70	6.70	28.20	-9.80	35.18	74.00	-38.82	PK	Horizontal
3252.83	41.27	44.70	6.70	28.20	-9.80	31.47	54.00	-22.53	AV	Horizontal
3982.60	39.22	44.20	7.90	29.70	-6.60	32.62	74.00	-41.38	PK	Vertical
3982.60	36.71	44.20	7.90	29.70	-6.60	30.11	54.00	-23.89	AV	Vertical
3999.77	39.95	44.20	7.90	29.70	-6.60	33.35	74.00	-40.65	PK	Horizontal
3999.77	37.08	44.20	7.90	29.70	-6.60	30.48	54.00	-23.52	AV	Horizontal
7221.34	37.16	43.50	11.40	35.50	3.40	40.56	74.00	-33.44	PK	Vertical
7221.34	33.51	43.50	11.40	35.50	3.40	36.91	54.00	-17.09	AV	Vertical
7227.40	37.45	43.50	11.40	35.50	3.40	40.85	74.00	-33.15	PK	Horizontal
7227.40	34.84	43.50	11.40	35.50	3.40	38.24	54.00	-15.76	AV	Horizontal
10400.04	38.83	44.50	13.80	38.80	8.10	46.93	74.00	-27.07	PK	Vertical
10400.04	36.02	44.50	13.80	38.80	8.10	44.12	54.00	-9.88	AV	Vertical
10400.26	39.94	44.50	13.80	38.80	8.10	48.04	74.00	-25.96	PK	Horizontal
10400.26	36.18	44.50	13.80	38.80	8.10	44.28	54.00	-9.72	AV	Horizontal
11019.69	34.02	43.60	14.30	39.50	10.20	44.22	74.00	-29.78	PK	Vertical
11019.69	30.84	43.60	14.30	39.50	10.20	41.04	54.00	-12.96	AV	Vertical
11018.61	33.03	43.60	14.30	39.50	10.20	43.23	74.00	-30.77	PK	Horizontal
11018.61	31.14	43.60	14.30	39.50	10.20	41.34	54.00	-12.66	AV	Horizontal
13280.02	32.29	42.60	15.90	38.90	12.20	44.49	74.00	-29.51	PK	Vertical
13280.02	28.75	42.60	15.90	38.90	12.20	40.95	54.00	-13.05	AV	Vertical
13283.51	31.93	42.60	15.90	38.90	12.20	44.13	74.00	-29.87	PK	Horizontal
13283.51	30.02	42.60	15.90	38.90	12.20	42.22	54.00	-11.78	AV	Horizontal

High Channel (802.11 n20/ 5240 MHz)										
3263.43	43.95	44.70	6.70	28.20	-9.80	34.15	74.00	-39.85	PK	Vertical
3263.43	42.14	44.70	6.70	28.20	-9.80	32.34	54.00	-21.66	AV	Vertical
3254.81	44.38	44.70	6.70	28.20	-9.80	34.58	74.00	-39.42	PK	Horizontal
3254.81	40.77	44.70	6.70	28.20	-9.80	30.97	54.00	-23.03	AV	Horizontal
3996.39	39.48	44.20	7.90	29.70	-6.60	32.88	74.00	-41.12	PK	Vertical
3996.39	36.53	44.20	7.90	29.70	-6.60	29.93	54.00	-24.07	AV	Vertical
3985.62	39.02	44.20	7.90	29.70	-6.60	32.42	74.00	-41.58	PK	Horizontal
3985.62	36.01	44.20	7.90	29.70	-6.60	29.41	54.00	-24.59	AV	Horizontal
7220.20	37.36	43.50	11.40	35.50	3.40	40.76	74.00	-33.24	PK	Vertical
7220.20	34.08	43.50	11.40	35.50	3.40	37.48	54.00	-16.52	AV	Vertical
7234.77	37.00	43.50	11.40	35.50	3.40	40.40	74.00	-33.60	PK	Horizontal
7234.77	34.09	43.50	11.40	35.50	3.40	37.49	54.00	-16.51	AV	Horizontal
10480.40	39.97	44.50	13.80	38.80	8.10	48.07	74.00	-25.93	PK	Vertical
10480.40	37.15	44.50	13.80	38.80	8.10	45.25	54.00	-8.75	AV	Vertical
10480.31	38.96	44.50	13.80	38.80	8.10	47.06	74.00	-26.94	PK	Horizontal
10480.31	37.10	44.50	13.80	38.80	8.10	45.20	54.00	-8.80	AV	Horizontal
11025.21	33.05	43.60	14.30	39.50	10.20	43.25	74.00	-30.75	PK	Vertical
11025.21	30.07	43.60	14.30	39.50	10.20	40.27	54.00	-13.73	AV	Vertical
11028.94	33.58	43.60	14.30	39.50	10.20	43.78	74.00	-30.22	PK	Horizontal
11028.94	30.77	43.60	14.30	39.50	10.20	40.97	54.00	-13.03	AV	Horizontal
13280.95	32.83	42.60	15.90	38.90	12.20	45.03	74.00	-28.97	PK	Vertical
13280.95	29.11	42.60	15.90	38.90	12.20	41.31	54.00	-12.69	AV	Vertical
13293.81	32.09	42.60	15.90	38.90	12.20	44.29	74.00	-29.71	PK	Horizontal
13293.81	29.85	42.60	15.90	38.90	12.20	42.05	54.00	-11.95	AV	Horizontal

Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. 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-20).
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Band IV(5.725-5.850) GHz

Band IV(5.725-5.85) GHz										
Frequency (MHz)	Reading (dBuV)	Amplifier （dB）	Loss （dB）	Antenna Factor （dB/m）	Corrected Factor （dB）	Emission Level (dBμV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11 a/ 5745 MHz)										
3248.52	44.48	44.70	6.70	28.20	-9.80	34.68	74.00	-39.32	PK	Vertical
3248.52	41.75	44.70	6.70	28.20	-9.80	31.95	54.00	-22.05	AV	Vertical
3249.00	44.33	44.70	6.70	28.20	-9.80	34.53	74.00	-39.47	PK	Horizontal
3249.00	40.83	44.70	6.70	28.20	-9.80	31.03	54.00	-22.97	AV	Horizontal
3991.36	39.43	44.20	7.90	29.70	-6.60	32.83	74.00	-41.17	PK	Vertical
3991.36	36.25	44.20	7.90	29.70	-6.60	29.65	54.00	-24.35	AV	Vertical
3994.96	38.68	44.20	7.90	29.70	-6.60	32.08	74.00	-41.92	PK	Horizontal
3994.96	36.32	44.20	7.90	29.70	-6.60	29.72	54.00	-24.28	AV	Horizontal
7222.25	36.47	43.50	11.40	35.50	3.40	39.87	74.00	-34.13	PK	Vertical
7222.25	33.43	43.50	11.40	35.50	3.40	36.83	54.00	-17.17	AV	Vertical
7221.76	36.58	43.50	11.40	35.50	3.40	39.98	74.00	-34.02	PK	Horizontal
7221.76	33.61	43.50	11.40	35.50	3.40	37.01	54.00	-16.99	AV	Horizontal
10506.42	39.22	44.50	13.90	38.80	8.20	47.42	74.00	-26.58	PK	Vertical
10506.42	36.53	44.50	13.90	38.80	8.20	44.73	54.00	-9.27	AV	Vertical
10515.03	39.58	44.50	13.90	38.80	8.20	47.78	74.00	-26.22	PK	Horizontal
10515.03	36.60	44.50	13.90	38.80	8.20	44.80	54.00	-9.20	AV	Horizontal
11490.41	33.81	43.60	14.30	39.50	10.20	44.01	74.00	-29.99	PK	Vertical
11490.41	30.20	43.60	14.30	39.50	10.20	40.40	54.00	-13.60	AV	Vertical
11490.24	34.09	43.60	14.30	39.50	10.20	44.29	74.00	-29.71	PK	Horizontal
11490.24	30.46	43.60	14.30	39.50	10.20	40.66	54.00	-13.34	AV	Horizontal
13287.13	32.33	42.60	15.90	38.90	12.20	44.53	74.00	-29.47	PK	Vertical
13287.13	29.66	42.60	15.90	38.90	12.20	41.86	54.00	-12.14	AV	Vertical
13284.46	31.55	42.60	15.90	38.90	12.20	43.75	74.00	-30.25	PK	Horizontal
13284.46	29.33	42.60	15.90	38.90	12.20	41.53	54.00	-12.47	AV	Horizontal

Mid Channel (802.11 a/ 5785 MHz)										
3264.91	44.99	44.70	6.70	28.20	-9.80	35.19	74.00	-38.81	PK	Vertical
3264.91	41.86	44.70	6.70	28.20	-9.80	32.06	54.00	-21.94	AV	Vertical
3252.06	45.23	44.70	6.70	28.20	-9.80	35.43	74.00	-38.57	PK	Horizontal
3252.06	42.15	44.70	6.70	28.20	-9.80	32.35	54.00	-21.65	AV	Horizontal
3981.93	39.54	44.20	7.90	29.70	-6.60	32.94	74.00	-41.06	PK	Vertical
3981.93	36.73	44.20	7.90	29.70	-6.60	30.13	54.00	-23.87	AV	Vertical
3994.49	39.44	44.20	7.90	29.70	-6.60	32.84	74.00	-41.16	PK	Horizontal
3994.49	36.19	44.20	7.90	29.70	-6.60	29.59	54.00	-24.41	AV	Horizontal
7226.36	37.75	43.50	11.40	35.50	3.40	41.15	74.00	-32.85	PK	Vertical
7226.36	34.65	43.50	11.40	35.50	3.40	38.05	54.00	-15.95	AV	Vertical
7229.51	37.16	43.50	11.40	35.50	3.40	40.56	74.00	-33.44	PK	Horizontal
7229.51	33.83	43.50	11.40	35.50	3.40	37.23	54.00	-16.77	AV	Horizontal
10586.39	39.53	44.50	13.80	38.80	8.10	47.63	74.00	-26.37	PK	Vertical
10586.39	36.72	44.50	13.80	38.80	8.10	44.82	54.00	-9.18	AV	Vertical
10590.30	39.78	44.50	13.80	38.80	8.10	47.88	74.00	-26.12	PK	Horizontal
10590.30	37.15	44.50	13.80	38.80	8.10	45.25	54.00	-8.75	AV	Horizontal
11570.12	33.93	43.60	14.30	39.50	10.20	44.13	74.00	-29.87	PK	Vertical
11570.12	30.93	43.60	14.30	39.50	10.20	41.13	54.00	-12.87	AV	Vertical
11570.42	33.31	43.60	14.30	39.50	10.20	43.51	74.00	-30.49	PK	Horizontal
11570.42	30.37	43.60	14.30	39.50	10.20	40.57	54.00	-13.43	AV	Horizontal
13298.18	33.00	42.60	15.90	38.90	12.20	45.20	74.00	-28.80	PK	Vertical
13298.18	29.14	42.60	15.90	38.90	12.20	41.34	54.00	-12.66	AV	Vertical
13287.40	32.75	42.60	15.90	38.90	12.20	44.95	74.00	-29.05	PK	Horizontal
13287.40	28.79	42.60	15.90	38.90	12.20	40.99	54.00	-13.01	AV	Horizontal

High Channel (802.11 a/ 5825 MHz)										
3251.26	44.94	44.70	6.70	28.20	-9.80	35.14	74.00	-38.86	PK	Vertical
3251.26	41.75	44.70	6.70	28.20	-9.80	31.95	54.00	-22.05	AV	Vertical
3253.19	44.60	44.70	6.70	28.20	-9.80	34.80	74.00	-39.20	PK	Horizontal
3253.19	41.11	44.70	6.70	28.20	-9.80	31.31	54.00	-22.69	AV	Horizontal
3984.23	39.21	44.20	7.90	29.70	-6.60	32.61	74.00	-41.39	PK	Vertical
3984.23	35.92	44.20	7.90	29.70	-6.60	29.32	54.00	-24.68	AV	Vertical
3989.57	40.06	44.20	7.90	29.70	-6.60	33.46	74.00	-40.54	PK	Horizontal
3989.57	36.87	44.20	7.90	29.70	-6.60	30.27	54.00	-23.73	AV	Horizontal
7234.10	36.57	43.50	11.40	35.50	3.40	39.97	74.00	-34.03	PK	Vertical
7234.10	34.52	43.50	11.40	35.50	3.40	37.92	54.00	-16.08	AV	Vertical
7232.80	37.22	43.50	11.40	35.50	3.40	40.62	74.00	-33.38	PK	Horizontal
7232.80	34.49	43.50	11.40	35.50	3.40	37.89	54.00	-16.11	AV	Horizontal
10629.77	39.23	44.50	13.80	38.80	8.10	47.33	74.00	-26.67	PK	Vertical
10629.77	36.01	44.50	13.80	38.80	8.10	44.11	54.00	-9.89	AV	Vertical
10639.94	38.91	44.50	13.80	38.80	8.10	47.01	74.00	-26.99	PK	Horizontal
10639.94	36.91	44.50	13.80	38.80	8.10	45.01	54.00	-8.99	AV	Horizontal
11649.97	32.80	43.60	14.30	39.50	10.20	43.00	74.00	-31.00	PK	Vertical
11649.97	30.21	43.60	14.30	39.50	10.20	40.41	54.00	-13.59	AV	Vertical
11650.02	32.93	43.60	14.30	39.50	10.20	43.13	74.00	-30.87	PK	Horizontal
11650.02	30.64	43.60	14.30	39.50	10.20	40.84	54.00	-13.16	AV	Horizontal
13289.77	31.79	42.70	18.00	37.10	12.40	44.19	74.00	-29.81	PK	Vertical
13289.77	29.24	42.70	18.00	37.10	12.40	41.64	54.00	-12.36	AV	Vertical
13297.54	32.64	42.70	18.00	37.10	12.40	45.04	74.00	-28.96	PK	Horizontal
13297.54	28.99	42.70	18.00	37.10	12.40	41.39	54.00	-12.61	AV	Horizontal

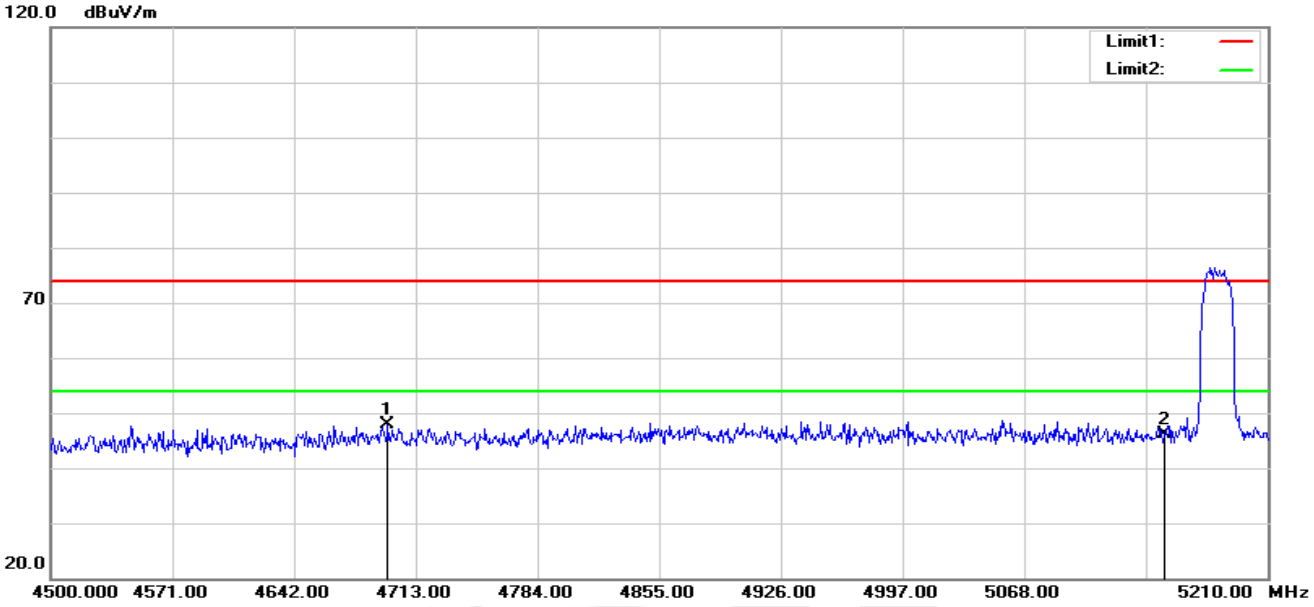
Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11a.
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

3.2.9 Band Edge

Band I(5.15-5.25)GHz

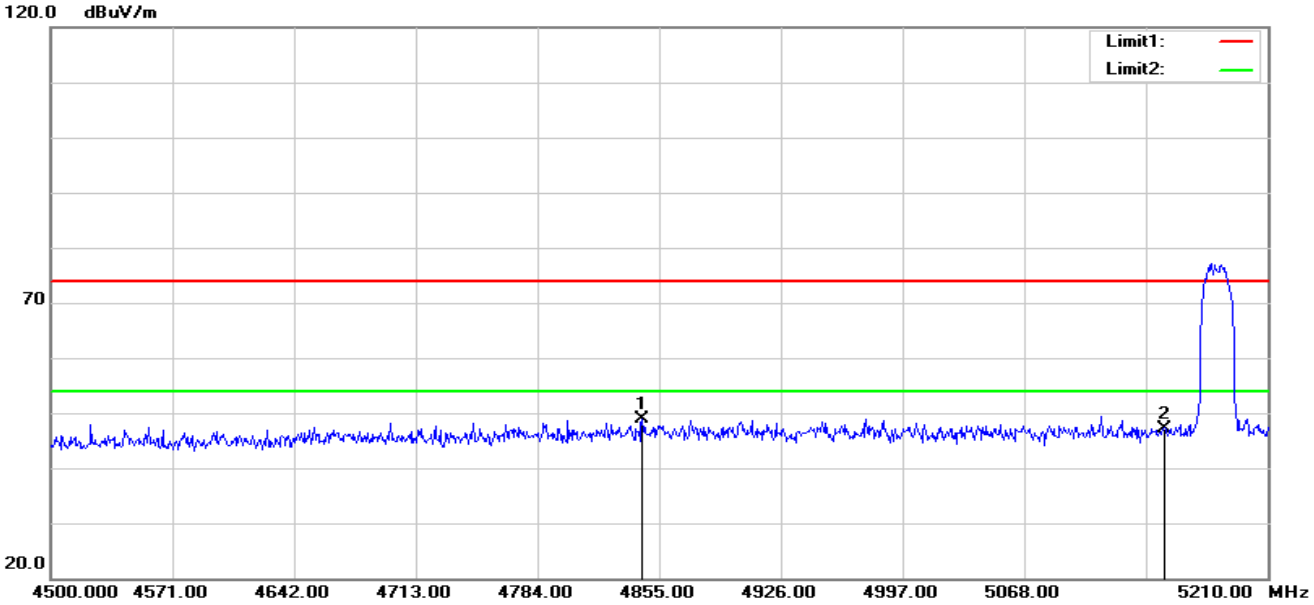
802.11n(HT20)-Low

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4696.670	51.57	-3.71	47.86	74.00	-26.14	peak
2	5150.000	48.41	-2.22	46.19	74.00	-27.81	peak

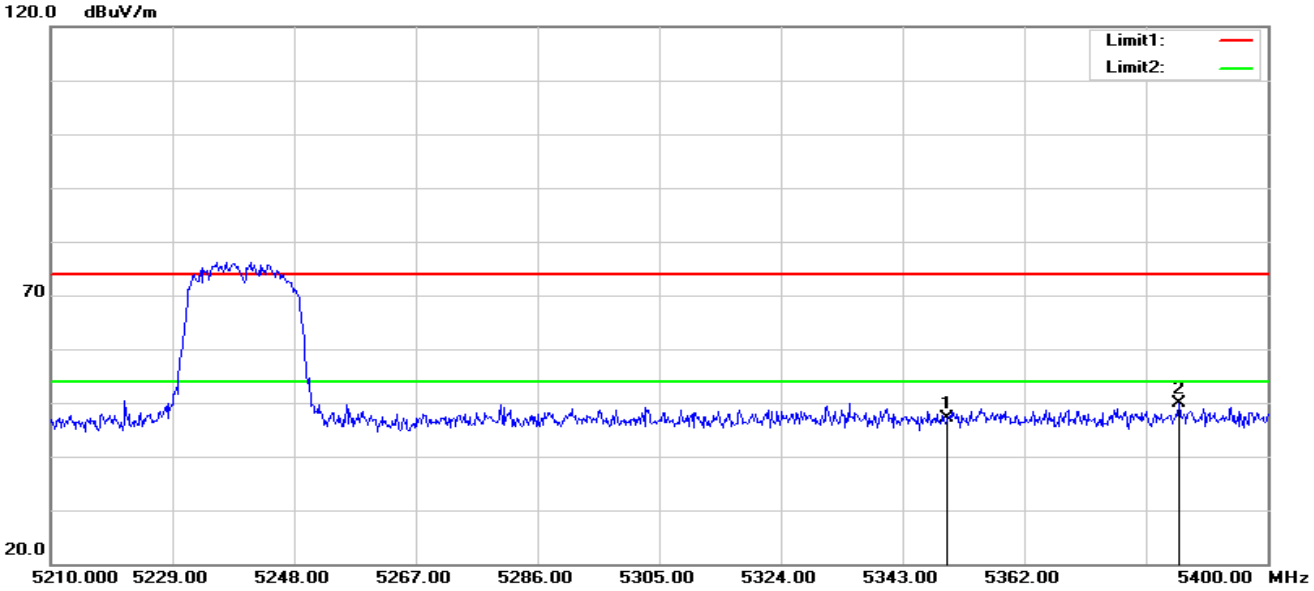
Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4845.060	52.08	-3.16	48.92	74.00	-25.08	peak
2	5150.000	49.41	-2.22	47.19	74.00	-26.81	peak

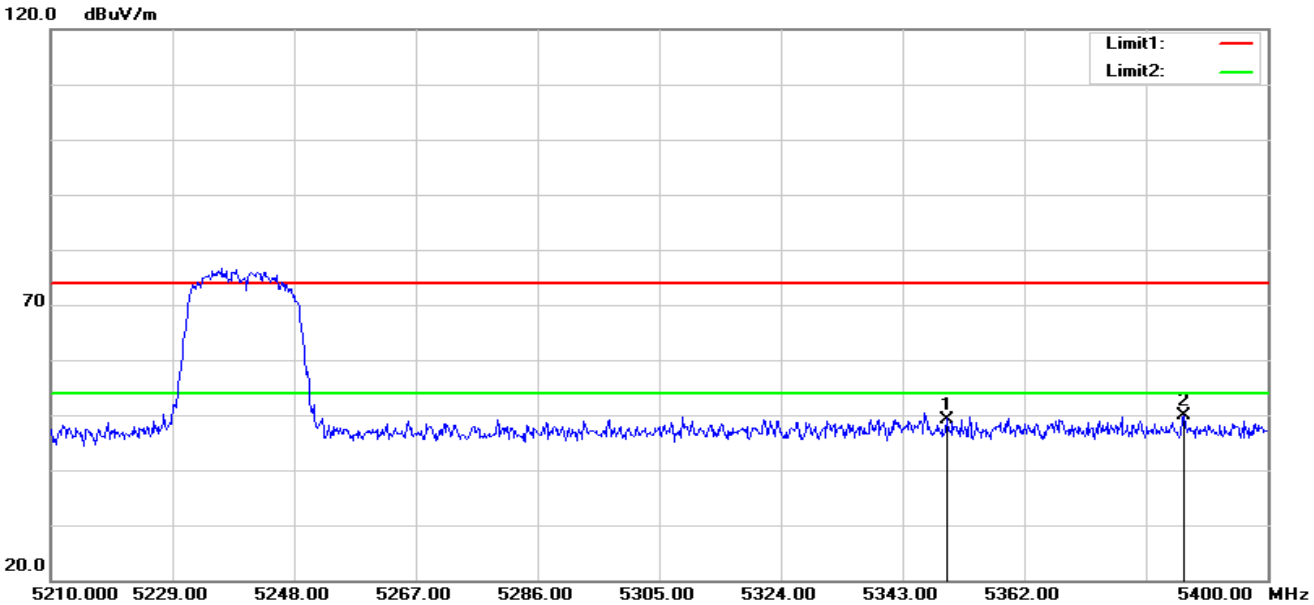
802.11n(HT20)-High

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5350.000	49.04	-1.84	47.20	74.00	-26.80	peak
2	5386.130	51.75	-1.78	49.97	74.00	-24.03	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5350.000	50.94	-1.84	49.10	74.00	-24.90	peak
2	5386.890	51.72	-1.78	49.94	74.00	-24.06	peak

Note: 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) all have been test, the worst case is 802.11n (HT-20), this report only show the worst case.

Band IV(5.725-5.85 GHz)

Note: The main frequency is too far away from the restricted band and does not require to testing.

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

.

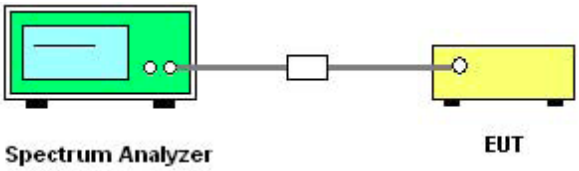
For Band edge

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

Note: The test results contain power + antenna Gain

5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

FCC:

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.

IC:

1. For mobile and portable client devices in the 5.15-5.25 GHz band, , the maximum power spectral density shall not exceed 10 dBm in any 1.0 MHz 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 ≥ 1/*T*, where *T* is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500kHz/RBW) to the measured result, whereas RBW (< 500 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 (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

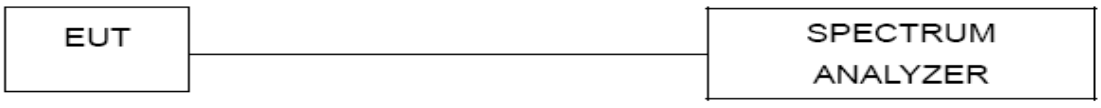
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections5.c) and 5.d) above, since RBW=100 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

Data see Attachment B

6. BANDWIDTH MEASUREMENT

6.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring (26) power bandwidth:

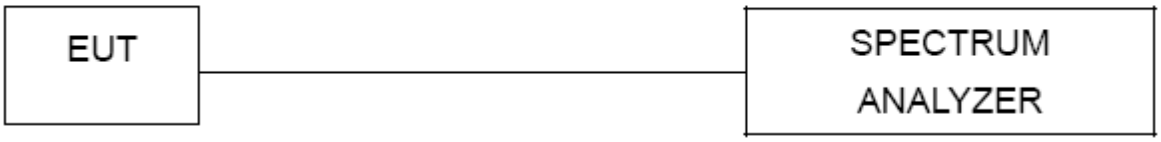
6.1.1 TEST PROCEDURE

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 > =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

Data 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 ≥ 3 · 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.

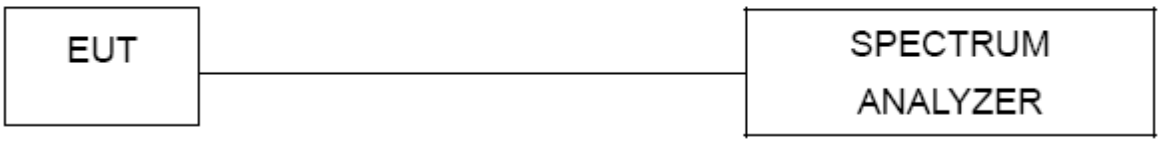
6. Use the 99 % power bandwidth function of the instrument (if available).

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

Data 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) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

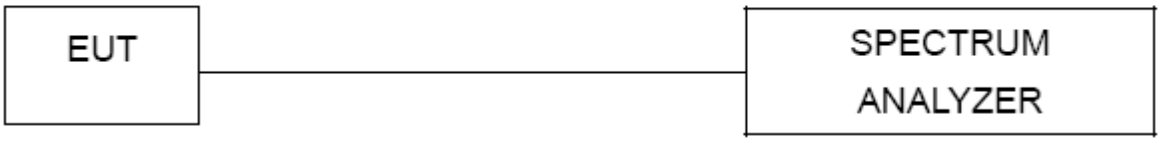
f) Allow the trace to stabilize.

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

Data see Attachment D

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.

<table>
<tr><td colspan="5">FCC Part15 (15.407) , Subpart E</td></tr>
<tr><td>Section</td><td>Test Item</td><td>Limit</td><td>Frequency Range (MHz)</td><td>Result</td></tr>
<tr><td rowspan="2">15.407(a) (1) (iv)</td><td rowspan="3">Peak Output Power</td><td>0.25 watt</td><td>5150-5250</td><td rowspan="3">PASS</td></tr>
<tr><td>The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth)</td><td>5250-5350
5470-5725</td></tr>
<tr><td>15.407(a) (3)</td><td>1 watt</td><td>5725-5825</td></tr>
</table>

1. For devices in the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
3. The maximum conducted output power shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-pointoperations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information

RSS-247 Issue 2, February 2017				
Section	Test Item	Limit	Frequency Range (MHz)	Result
6.2.1.1	Peak Output Power	200 mW or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz	5150-5250	PASS
6.2.2.1 6.2.3.1		The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth)	5250-5350 5470-5725	
6.2.4.1		1 watt	5725-5825	

7.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

RBW ≥ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

Integrated band power method:

The following procedure can be used when the maximum available RBW of the instrument is less than the
DTS bandwidth:

a) Set the RBW = 1 MHz.
b) Set the VBW ≥ [3 × RBW].
c) Set the span ≥ [1.5 × DTS bandwidth].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

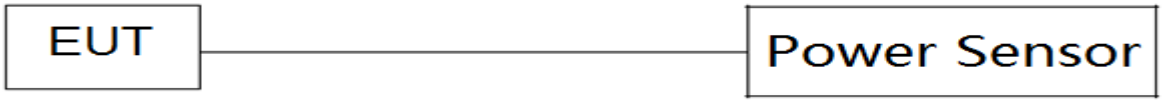
PKPM1 Peak power meter method:

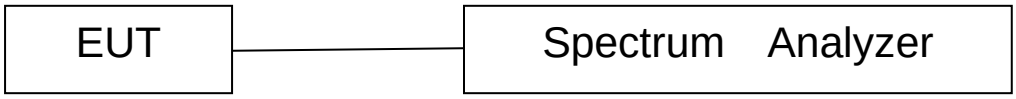
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

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

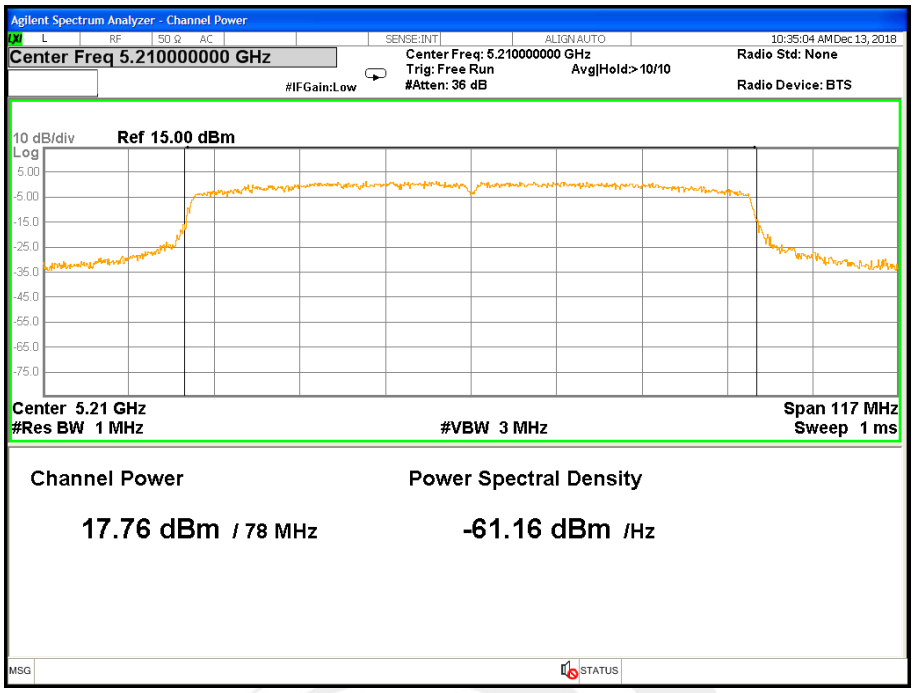
Band I (5.15-5.25GHz)

Band I (5.15-5.25GHz)			
Test Channel	Frequency (MHz)	AV Power (dBm)	LIMIT (dBm)
802.11a			
36	5180	13.12	23.98
40	5200	13.08	23.98
48	5240	12.72	23.98
802.11n(HT20)			
36	5180	13.63	23.98
40	5200	13.44	23.98
48	5240	13.10	23.98
802.11n(HT40)			
38	5190	13.24	23.98
46	5230	12.83	23.98
802.11ac(VHT20)			
36	5180	13.46	23.98
40	5200	13.37	23.98
48	5240	13.08	23.98
802.11ac(VHT40)			
38	5190	13.28	23.98
46	5230	13.07	23.98
802.11ac(VHT80)			
42	5210	17.76	23.98

Note:

1. 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.

802.11ac VHT80(5210MHz)/AV



Band I (5.15-5.25GHz)					
Test Channel	Frequency (MHz)	AV Power (dBm)	Gain(dBi)	EIRP AV (dBm)	LIMIT (dBm)
802.11a					
36	5180	13.12	2	15.12	23
40	5200	13.08	2	15.08	23
48	5240	12.72	2	14.72	23
802.11n(HT20)					
36	5180	13.63	2	15.63	23
40	5200	13.44	2	15.44	23
48	5240	13.1	2	15.1	23
802.11n(HT40)					
38	5190	13.24	2	15.24	23
46	5230	12.83	2	14.83	23
802.11ac(VHT20)					
36	5180	13.46	2	15.46	23
40	5200	13.37	2	15.37	23
48	5240	13.08	2	15.08	23
802.11ac(VHT40)					
38	5190	13.28	2	15.28	23
46	5230	13.07	2	15.07	23
802.11ac(VHT80)					
42	5210	17.76	2	19.76	23

Note:

1. 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 200 mW.

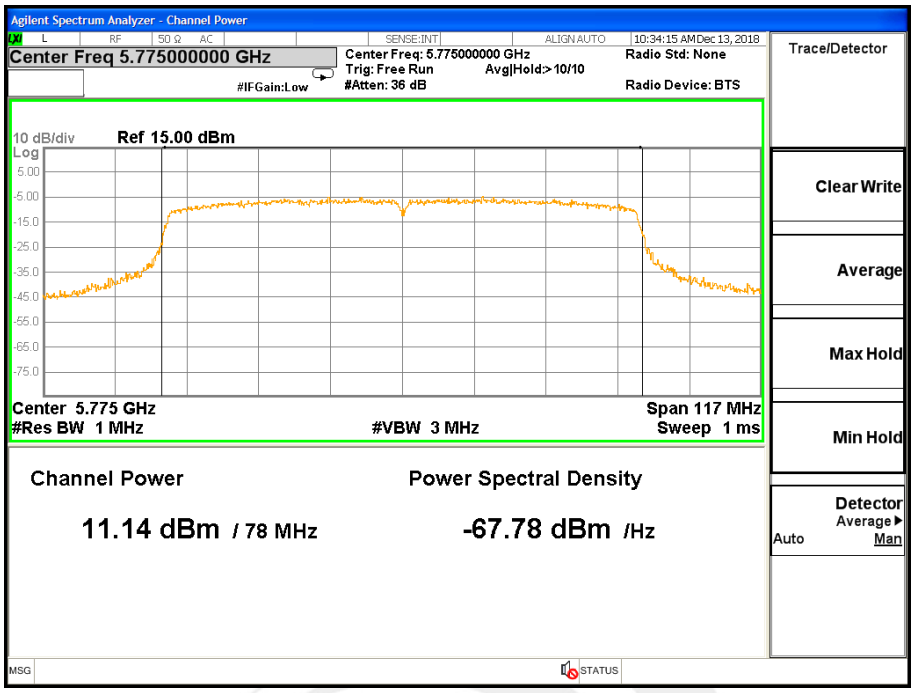
Band IV (5.725-5.85GHz)

Band IV (5.725-5.85GHz)			
Test Channel	Frequency (MHz)	AV Power (dBm)	LIMIT (dBm)
802.11a			
149	5745	6.87	30
157	5785	6.22	30
165	5825	5.86	30
802.11n(HT20)			
149	5745	6.16	30
157	5785	5.8	30
165	5825	5.6	30
802.11n(HT40)			
151	5755	5.57	30
159	5795	5.26	30
802.11ac(VHT20)			
149	5745	6.19	30
157	5785	5.67	30
165	5825	5.39	30
802.11ac(VHT40)			
151	5755	5.57	30
159	5795	5.24	30
802.11ac(VHT80)			
155	5775	11.14	30

Note:

1. For the band 5.745-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W.

802.11ac VHT80(5775MHz)/AV



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 and RSS-Gen Issue 5 requirement: For intentional device, according to 15.203 and RSS-Gen Issue 5: 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 Blade style Antenna. It comply with the standard requirement.

10. FREQUENCY STABILITY

10.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/-0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage,and for a variation in primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees.

10.2 TEST PROCEDURE

1.The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2.Turn the EUT on and couple its output to spectrum analyzer.
3.Turn the EUT off and set the chamber to the highest temperature specified.
4.Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize,turn the EUT on and measure the operating frequency after 2,5,and 10 minutes.
5.Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6.The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes.The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

10.3 TEST RESULT

Channel 40 (5200MHz)

Voltage vs. Frequency Stability

Voltage vs. Frequency Stability Voltage(V)	Measurement Frequency(MHz)
3.78	5200.0024
3.3	5200.0016
2.81	5200.0015
Max.Deviation(MHz)	0.0024
Max.Deviation(ppm)	0.46

Rated working voltage:DC 3.3V

Temperature vs. Frequency Stability

Temperature(℃)	Measurement Frequency(MHz)
-30	5200.0036
-20	5200.0028
-10	5200.0034
0	5200.0028
10	5200.0030
20	5200.0031
30	5200.0030
40	5200.0034
50	5200.0034
Max.Deviation(MHz)	0.0036
Max.Deviation(ppm)	0.69

Channel 157 (5785MHz)

Voltage vs. Frequency Stability

Voltage vs. Frequency Stability Voltage(V)	Measurement Frequency(MHz)
3.78	5785.0025
3.3	5785.0025
2.81	5785.0017
Max.Deviation(MHz)	0.0025
Max.Deviation(ppm)	0.43

Rated working voltage:DC 3.3V

Temperature vs. Frequency Stability

Temperature(℃)	Measurement Frequency(MHz)
-30	5785.0035
-20	5785.0028
-10	5785.0025
0	5785.0026
10	5785.0032
20	5785.0032
30	5785.0034
40	5785.0034
50	5785.0029
Max.Deviation(MHz)	0.0035
Max.Deviation(ppm)	0.61

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※※※※※