RADIO TEST REPORT

Report No.:STS2202080W04

Issued for

Shenzhen EDUP Electronics Technology Co.,Ltd.

6 Floor, #6 Building, No.48, Kangzheng Road, Liantang Industrial Area, Buji Town, Longgang District, Shenzhen, China

Product Name:	1200M Wireless Adapter with Bluetooth Function
Brand Name:	EDUP, EDUP HOME, EDUP LOVE, WISE TIGER, EPSKY, Card-King
Model Name:	EP-AC1681
Series Model:	EP-AC1681S, EP-AC1681-Pro, EP-1681, EP-1681S, EP-1681GS, EP-AC1680, EH-AC1681, EH-AC1681S, EH-AC1681-Pro, EH-1681, EH-1681S, EH-1681GS, EH-AC1680, WT-AC1681,WT-AC1681S, WT-AC1681-Pro, WT-1681, WT-1681S, WT-1681GS，WT-AC1680, KW-AC1681, KW-AC1681-Pro, KW-1681, KW-1681S, KW-1681GS, KW-AC1680, KW-AC1681S
FCC ID:	2AHRD-EPAC1681
Test Standard:	FCC Part 15.407

Shenzhen STS Test Services Co., Ltd.
A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
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TEST RESULT CERTIFICATION

Applicant's Name	:	Shenzhen EDUP Electronics Technology Co.,Ltd.
Address	:	6 Floor, #6 Building, No.48, Kangzheng Road, Liantang Industrial Area, Buji Town, Longgang District, Shenzhen, China
Manufacturer's Name	:	Shenzhen EDUP Electronics Technology Co.,Ltd.
Address	:	6 Floor, #6 Building, No.48, Kangzheng Road, Liantang Industrial Area, Buji Town, Longgang District, Shenzhen, China
Product Description		
Product Name	:	1200M Wireless Adapter with Bluetooth Function
Brand Name	:	EDUP, EDUP HOME, EDUP LOVE, WISE TIGER, EPSKY, Card-King
Model Name	:	EP-AC1681
Series Model	:	EP-AC1681S, EP-AC1681-Pro, EP-1681, EP-1681S, EP-1681GS, EP-AC1680, EH-AC1681, EH-AC1681S, EH-AC1681-Pro, EH-1681, EH-1681S, EH-1681GS, EH-AC1680, WT-AC1681, WT-AC1681S, WT-AC1681-Pro, WT-1681, WT-1681S, WT-1681GS，WT-AC1680, KW-AC1681, KW-AC1681-Pro, KW-1681, KW-1681S, KW-1681GS, KW-AC1680, KW-AC1681S
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	:	21 Feb. 2022
Date (s) of performance of tests	:	21 Feb. 2022 ~ 25 Feb. 2022
Date of Issue	:	25 Feb. 2022
Test Result	:	**Pass**

Testing Engineer : Chris Chen

(Chris Chen)

Technical Manager : Sean She

(Sean she)

Authorized Signatory : Vita Li

(Vita Li)

Table of Contents **Page**

Table of Contents **Page**

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	25 Feb. 2022	STS2202080W04	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 (a) /15.407 (e)	26dB/6dB &99% Bandwidth	PASS
15.407(a)	Maximum Conducted Output Power	PASS
15.407(b)/15.205/15.209	Radiated Emission And (bandedge Emissions) Measurement	PASS
15.407(a)	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
Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
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** ± **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	±0.87dB
2	Unwanted Emissions, conducted	±2.895dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.09dB
5	All emissions, radiated 1G-6GHz	±4.92dB
6	All emissions, radiated>6G	±5.49dB
7	Conducted Emission (9KHz-30MHz)	±2.73dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

<table>
<tr><td>Product Name</td><td>1200M Wireless Adapter with Bluetooth Function</td></tr>
<tr><td>Trade Name</td><td>EDUP, EDUP HOME, EDUP LOVE, WISE TIGER, EPSKY, Card-King</td></tr>
<tr><td>Model Name</td><td>EP-AC1681</td></tr>
<tr><td>Series Model</td><td>EP-AC1681S, EP-AC1681-Pro, EP-1681, EP-1681S, EP-1681GS, EP-AC1680, EH-AC1681, EH-AC1681S, EH-AC1681-Pro, EH-1681, EH-1681S, EH-1681GS, EH-AC1680, WT-AC1681, WT-AC1681S, WT-AC1681-Pro, WT-1681, WT-1681S, WT-1681GS，WT-AC1680, KW-AC1681, KW-AC1681-Pro, KW-1681, KW-1681S, KW-1681GS, KW-AC1680, KW-AC1681S</td></tr>
<tr><td>Model Difference</td><td>Different appearance size and shape</td></tr>
<tr><td>Product Description</td><td>The EUT is a 1200M Wireless Adapter with Bluetooth Function
<table>
<tr><td>Operation Frequency:</td><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 3</td></tr>
<tr><td>Max.Output Power(Conducted):</td><td>15.419 dBm</td></tr>
</table>
More details of EUT technical specification, please refer to the User Manual.</td></tr>
<tr><td>Test Channel</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Rating</td><td>Input: DC 5V</td></tr>
<tr><td>Hardware version number</td><td>V1.0</td></tr>
<tr><td>Software version number</td><td>V6.08</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the Note 1.</td></tr>
</table>

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

2.

Operation Frequency of channel	
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)
149	5745
157	5785
165	5825

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

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

3. 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 GA NT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be co mputed as follows:
(i) If any transmit signals are correlated with each other,
Directional gain = GANT + 10 log(NANT) dBi
(ii) If all transmit signals are completely uncorrelated with each other,
Directional gain = GANT

Antenna number: 2
Antenna A gain : 2dBi
Antenna B gain : 2dBi
MIMO technology Directional gain=5.01dBi

Ant	Brand	Model Name	Ant Type	Connector	Gain (dBi)	NOTE
A	EDUP, EDUP HOME, EDUP LOVE, WISE TIGER, EPSKY, Card-King	EP-AC1681	PCB Antenna	N/A	ANT A: 2 ANT B: 2 MIMO A+B: 5.01	WLAN Ant

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

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 CH149&CH157&CH165	6 Mbps
Mode 2	TX IEEE 802.11n HT20 CH149&CH157&CH165	MCS 0
Mode 3	TX IEEE 802.11ac VHT20 CH149&CH157&CH165	NSS1 MCS0
Mode 4	TX IEEE 802.11n HT40 CH151&CH159	MCS 0
Mode 5	TX IEEE 802.11ac VHT40 CH151&CH159	NSS1 MCS0
Mode 6	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.

(4) The battery is fully-charged during the radited and RF conducted test.

AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 7: Keeping TX + WLAN Link

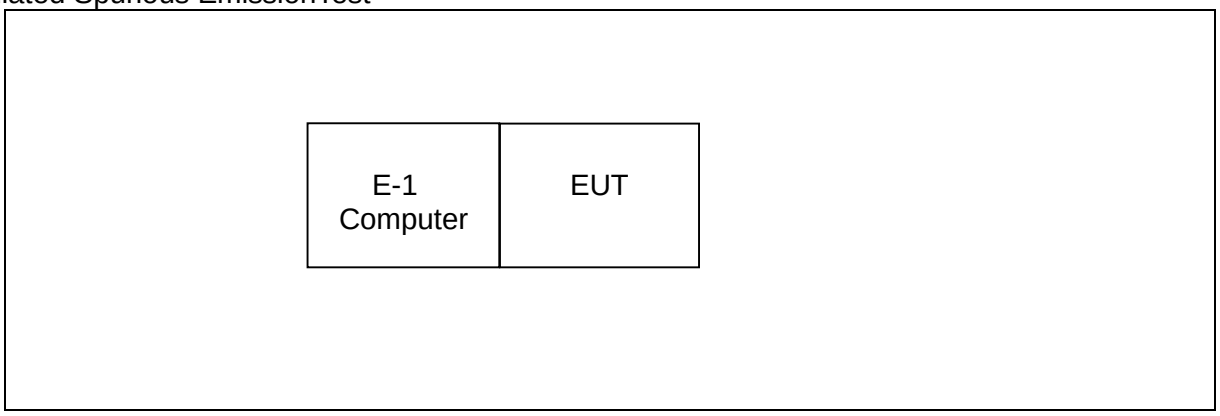
2.3 TEST SOFTWARE AND POWER LEVEL

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

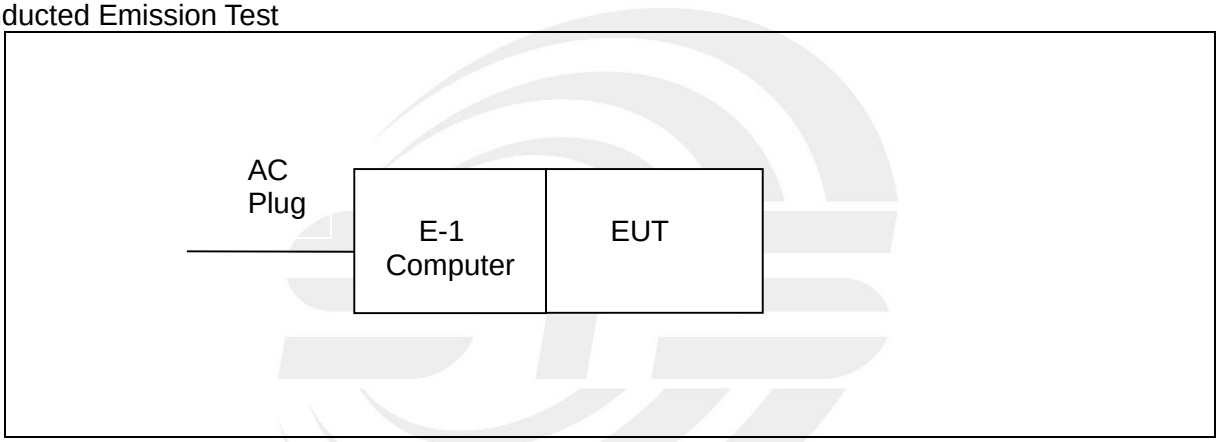
RF Function	Type	Mode Or Modulation type	ANT Gain(dBi)	ANT_A Power Class	ANT_B Power Class	Software For Testing
WIFI(5G)	U-NII-3 (5725MHz-5895MHz)	802.11a	ANT A: 2 ANT B: 2 MIMO A+B: 5.01	Default	Default	MP Tool
		802.11n(HT20)		Default	Default	
		802.11n(HT40)		Default	Default	
		802.11ac(VHT20)		Default	Default	
		802.11ac(VHT40)		Default	Default	
		802.11ac(VHT80)		Default	Default	

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious EmissionTest



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.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-1	Computer	HP	880-190cn	N/A	N/A

Note:

(1) 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
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2023.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
LISN	R&S	ENV216	101242	2021.09.30	2022.09.29
LISN	EMCO	3810/2NM	23625	2021.09.30	2022.09.29
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Power Sensor	Keysight	U2021XA	MY55520005	2021.09.30	2022.09.29
			MY55520006	2021.09.30	2022.09.29
			MY56120038	2021.09.30	2022.09.29
			MY56280002	2021.09.30	2022.09.29
Signal Analyzer	Agilent	N9020A	MY51110105	2021.03.04	2022.03.03
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
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

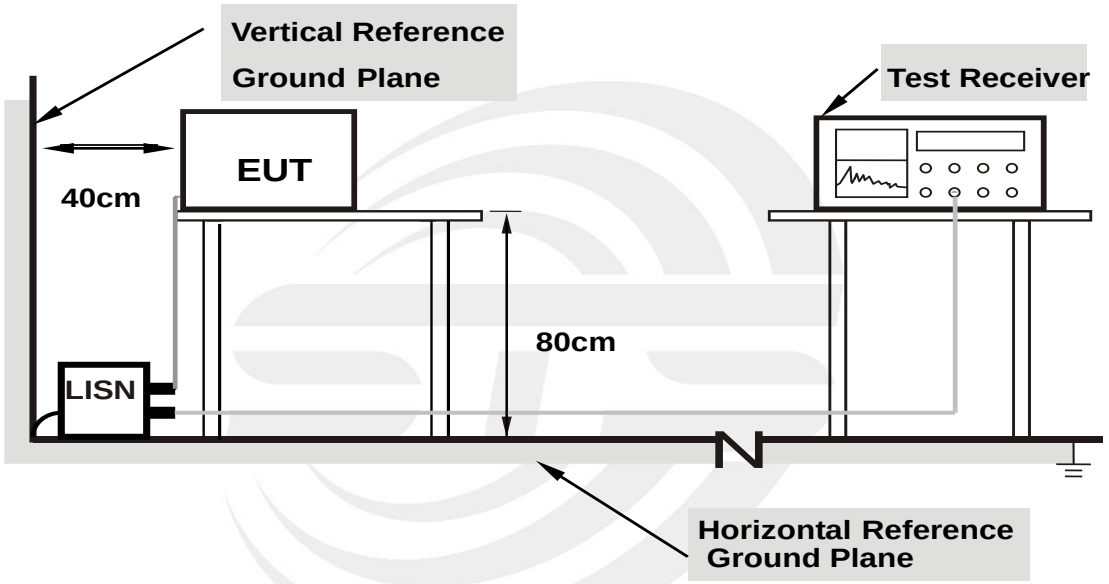
3.1.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 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 is at least 80 cm from the 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 support units.

3.1.5 EUT OPERATING CONDITIONS

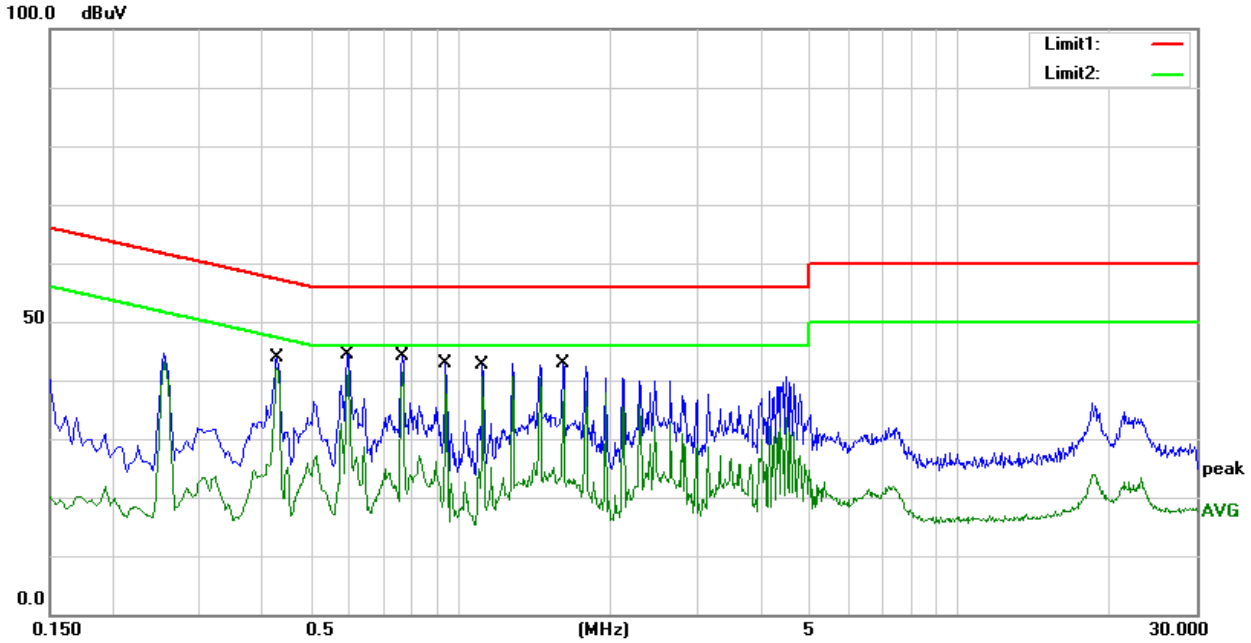
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

Temperature:	23.2(C)	Relative Humidity:	44%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode：	Mode 7		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4300	23.31	20.55	43.86	57.25	-13.39	QP
2	0.4300	21.57	20.55	42.12	47.25	-5.13	AVG
3	0.5940	23.88	20.43	44.31	56.00	-11.69	QP
4	0.5940	21.22	20.43	41.65	46.00	-4.35	AVG
5	0.7660	23.69	20.35	44.04	56.00	-11.96	QP
6	0.7660	21.14	20.35	41.49	46.00	-4.51	AVG
7	0.9420	19.08	20.31	39.39	56.00	-16.61	QP
8	0.9420	20.48	20.31	40.79	46.00	-5.21	AVG
9	1.1100	22.44	20.31	42.75	56.00	-13.25	QP
10	1.1100	20.24	20.31	40.55	46.00	-5.45	AVG
11	1.6100	22.54	20.35	42.89	56.00	-13.11	QP
12	1.6100	17.90	20.35	38.25	46.00	-7.75	AVG

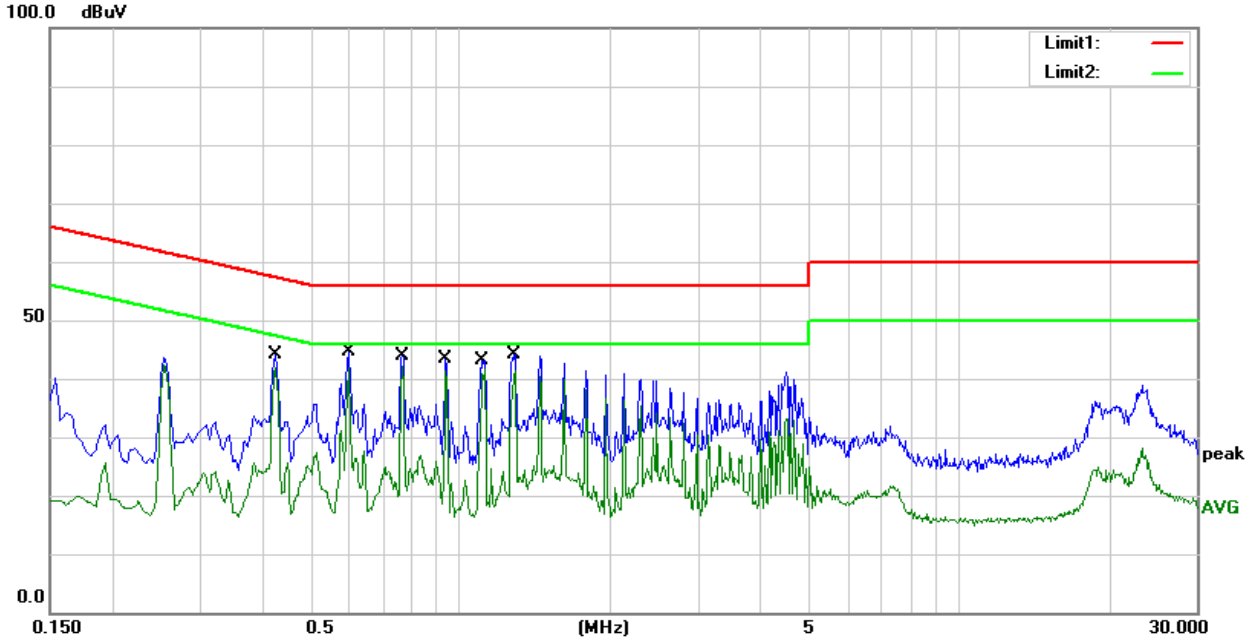
Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



Temperature:	23.2(C)	Relative Humidity:	44%RH
Test Voltage	AC 120V/60Hz	Phase:	N
Test Mode	Mode 7		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4260	23.53	20.55	44.08	57.33	-13.25	QP
2	0.4260	21.26	20.55	41.81	47.33	-5.52	AVG
3	0.5980	24.13	20.43	44.56	56.00	-11.44	QP
4	0.5980	21.36	20.43	41.79	46.00	-4.21	AVG
5	0.7660	23.40	20.35	43.75	56.00	-12.25	QP
6	0.7660	21.72	20.35	42.07	46.00	-3.93	AVG
7	0.9380	23.01	20.31	43.32	56.00	-12.68	QP
8	0.9380	21.10	20.31	41.41	46.00	-4.59	AVG
9	1.1060	22.81	20.31	43.12	56.00	-12.88	QP
10	1.1060	21.21	20.31	41.52	46.00	-4.48	AVG
11	1.2820	23.86	20.33	44.19	56.00	-11.81	QP
12	1.2820	21.05	20.33	41.38	46.00	-4.62	AVG

Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



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 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).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

Note: In case the emission radiated emission above 1000MHz fall within the restricted band the restricted frequency bands, the peak limit is 74 dBuV/m.

LIMITS OF EMISSIONS OUTSIDE OF THE FREQUENCY BANDS

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.

Note: dBuV/m(at 3M) = EIRP(dBm) + 95.2.

Peak Limit = -27dBm/MHz + 95.3 = 68.2 dBuV/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 at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree 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 polarization 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 QuasiPeak detector mode will be re-measured.
e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

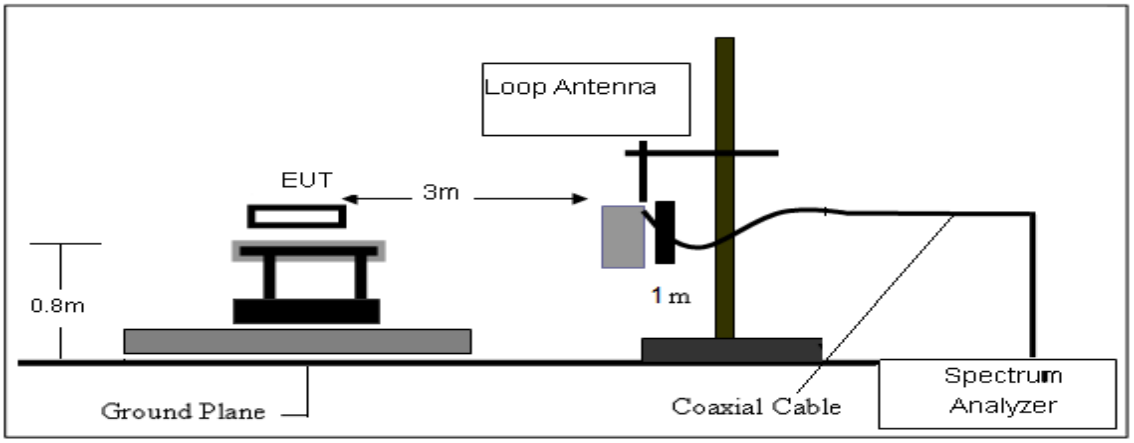
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.2 DEVIATION FROM TEST STANDARD

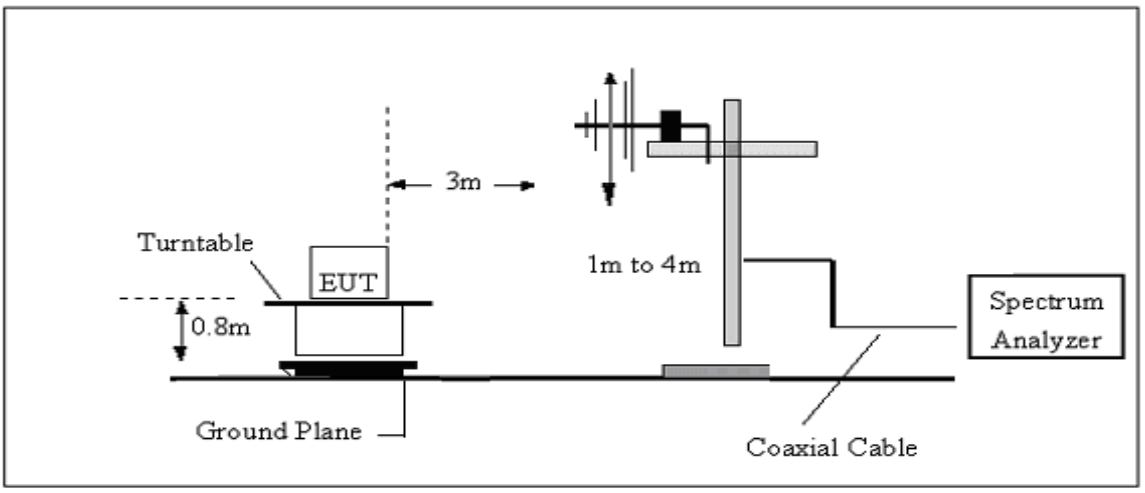
No deviation

3.2.3 TEST SETUP

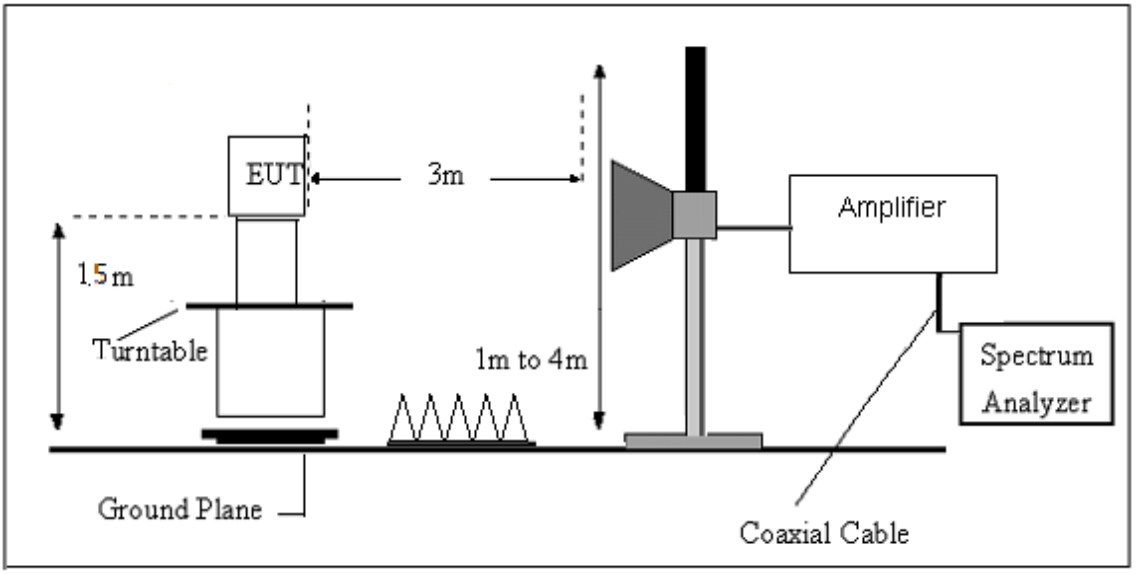
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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:	23.1(C)	Relative Humidtity:	60%RH
Test Voltage:	DC 5V	Polarization :	--
Test Mode:	TX Mode		

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

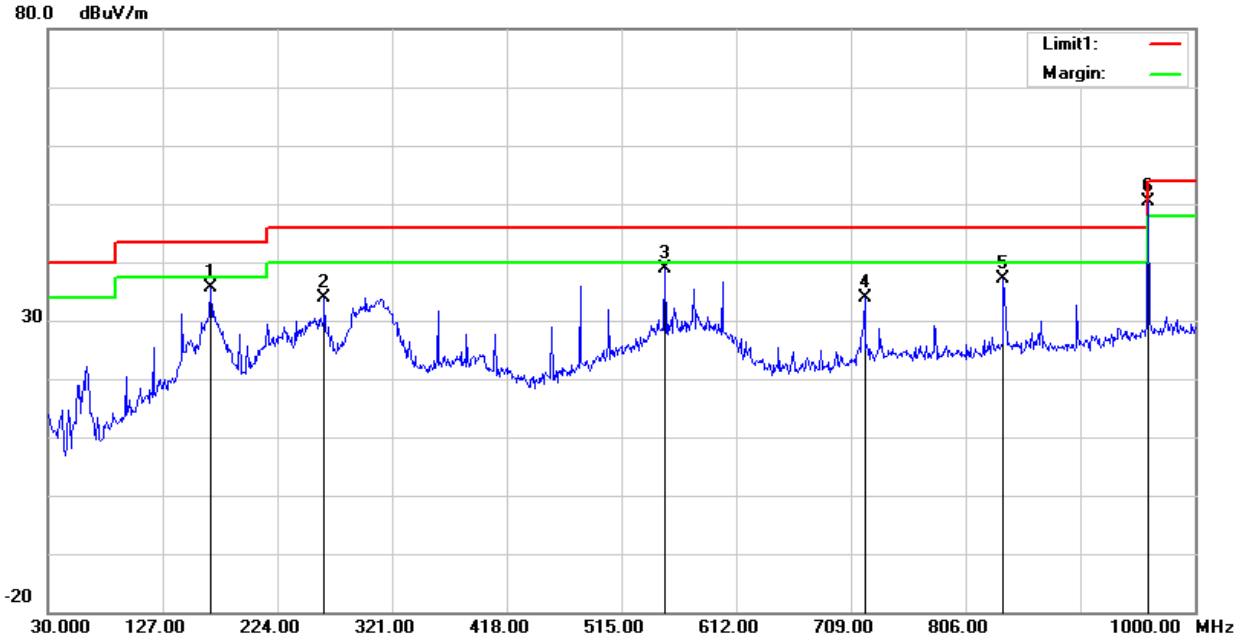
Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature	23.1(C)	Relative Humidtity:	60%RH
Test Voltage	DC 5V	Polarization:	Horizontal
Test Mode	Mode 1~6(Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	167.7400	55.13	-19.58	35.55	43.50	-7.95	QP
2	263.7700	48.67	-14.75	33.92	46.00	-12.08	QP
3	551.8600	44.53	-5.72	38.81	46.00	-7.19	QP
4	720.6400	37.17	-3.20	33.97	46.00	-12.03	QP
5	838.0100	37.49	-0.42	37.07	46.00	-8.93	QP
6	960.2300	48.59	1.76	50.35	54.00	-3.65	QP

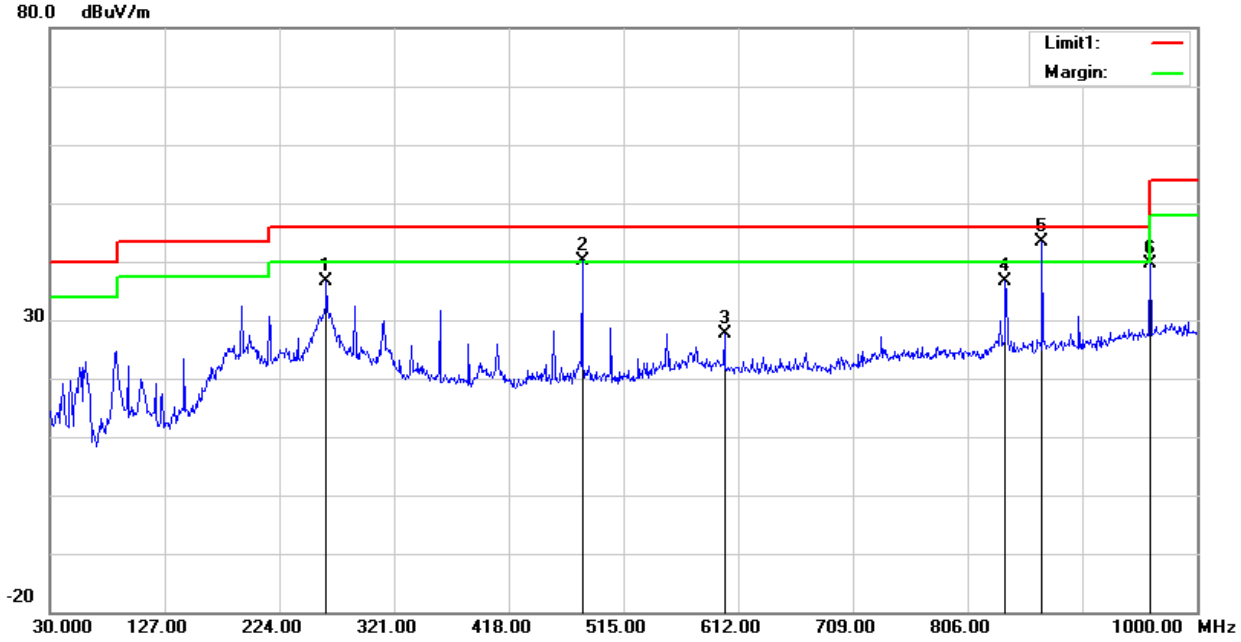
Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



Temperature	23.1(C)	Relative Humidtity:	60%RH
Test Voltage	DC 5V	Polarization:	Vertical
Test Mode	Mode 1~6(Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	263.7700	51.41	-14.75	36.66	46.00	-9.34	QP
2	480.0800	48.72	-8.65	40.07	46.00	-5.93	QP
3	600.3600	33.55	-5.84	27.71	46.00	-18.29	QP
4	838.0100	37.06	-0.42	36.64	46.00	-9.36	QP
5	869.0500	43.82	-0.52	43.30	46.00	-2.70	QP
6	960.2300	37.93	1.76	39.69	54.00	-14.31	QP

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



3.2.8 TEST RESULTS (Above 1000 MHz)

Band IV(5.725-5.850) GHz

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 (802.11a/ 5745 MHz)										
3259.10	44.24	44.70	6.70	28.20	-9.80	34.44	68.20	-33.76	Pk	Vertical
3259.10	41.79	44.70	6.70	28.20	-9.80	31.99	54.00	-22.01	AV	Vertical
3260.42	44.82	44.70	6.70	28.20	-9.80	35.02	74.00	-38.98	Pk	Horizontal
3260.42	41.59	44.70	6.70	28.20	-9.80	31.79	54.00	-22.21	AV	Horizontal
3985.39	39.95	44.20	7.90	29.70	-6.60	33.35	74.00	-40.65	Pk	Vertical
3985.39	35.90	44.20	7.90	29.70	-6.60	29.30	54.00	-24.70	AV	Vertical
3994.62	39.51	44.20	7.90	29.70	-6.60	32.91	74.00	-41.09	Pk	Horizontal
3994.62	37.01	44.20	7.90	29.70	-6.60	30.41	54.00	-23.59	AV	Horizontal
7222.57	36.61	43.50	11.40	35.50	3.40	40.01	68.20	-28.19	Pk	Vertical
7222.57	34.66	43.50	11.40	35.50	3.40	38.06	54.00	-15.94	AV	Vertical
7231.14	36.76	43.50	11.40	35.50	3.40	40.16	68.20	-28.04	Pk	Horizontal
7231.14	34.52	43.50	11.40	35.50	3.40	37.92	54.00	-16.08	AV	Horizontal
10359.94	39.12	44.50	13.80	38.80	8.10	47.22	68.20	-20.98	Pk	Vertical
10359.94	36.43	44.50	13.80	38.80	8.10	44.53	54.00	-9.47	AV	Vertical
10360.39	39.22	44.50	13.80	38.80	8.10	47.32	68.20	-20.88	Pk	Horizontal
10360.39	36.45	44.50	13.80	38.80	8.10	44.55	54.00	-9.45	AV	Horizontal
11029.82	33.27	43.60	14.30	39.50	10.20	43.47	74.00	-30.53	Pk	Vertical
11029.82	29.98	43.60	14.30	39.50	10.20	40.18	54.00	-13.82	AV	Vertical
11035.66	33.64	43.60	14.30	39.50	10.20	43.84	74.00	-30.16	Pk	Horizontal
11035.66	30.51	43.60	14.30	39.50	10.20	40.71	54.00	-13.29	AV	Horizontal
13297.42	32.54	42.60	15.90	38.90	12.20	44.74	74.00	-29.26	Pk	Vertical
13297.42	28.99	42.60	15.90	38.90	12.20	41.19	54.00	-12.81	AV	Vertical
13288.66	32.32	42.60	15.90	38.90	12.20	44.52	74.00	-29.48	Pk	Horizontal
13288.66	29.82	42.60	15.90	38.90	12.20	42.02	54.00	-11.98	AV	Horizontal
Mid Channel (802.11a/ 5785MHz)										
3262.70	44.97	44.70	6.70	28.20	-9.80	35.17	74.00	-38.83	Pk	Vertical
3262.70	41.10	44.70	6.70	28.20	-9.80	31.30	54.00	-22.70	AV	Vertical
3246.56	44.48	44.70	6.70	28.20	-9.80	34.68	68.20	-33.52	Pk	Horizontal
3246.56	41.34	44.70	6.70	28.20	-9.80	31.54	54.00	-22.46	AV	Horizontal
3981.01	39.18	44.20	7.90	29.70	-6.60	32.58	74.00	-41.42	Pk	Vertical
3981.01	37.11	44.20	7.90	29.70	-6.60	30.51	54.00	-23.49	AV	Vertical
3989.40	38.92	44.20	7.90	29.70	-6.60	32.32	74.00	-41.68	Pk	Horizontal
3989.40	36.31	44.20	7.90	29.70	-6.60	29.71	54.00	-24.29	AV	Horizontal
7226.91	37.62	43.50	11.40	35.50	3.40	41.02	68.20	-27.18	Pk	Vertical
7226.91	34.27	43.50	11.40	35.50	3.40	37.67	54.00	-16.33	AV	Vertical
7235.16	36.65	43.50	11.40	35.50	3.40	40.05	68.20	-28.15	Pk	Horizontal
7235.16	33.53	43.50	11.40	35.50	3.40	36.93	54.00	-17.07	AV	Horizontal
10399.99	39.58	44.50	13.80	38.80	8.10	47.68	68.20	-20.52	Pk	Vertical
10399.99	36.40	44.50	13.80	38.80	8.10	44.50	54.00	-9.50	AV	Vertical
10400.15	39.18	44.50	13.80	38.80	8.10	47.28	68.20	-20.92	Pk	Horizontal
10400.15	36.16	44.50	13.80	38.80	8.10	44.26	54.00	-9.74	AV	Horizontal
11023.95	32.94	43.60	14.30	39.50	10.20	43.14	74.00	-30.86	Pk	Vertical
11023.95	30.14	43.60	14.30	39.50	10.20	40.34	54.00	-13.66	AV	Vertical
11029.01	33.87	43.60	14.30	39.50	10.20	44.07	74.00	-29.93	Pk	Horizontal
11029.01	30.47	43.60	14.30	39.50	10.20	40.67	54.00	-13.33	AV	Horizontal
13281.87	31.79	42.60	15.90	38.90	12.20	43.99	74.00	-30.01	Pk	Vertical
13281.87	28.53	42.60	15.90	38.90	12.20	40.73	54.00	-13.27	AV	Vertical
13283.49	32.34	42.60	15.90	38.90	12.20	44.54	74.00	-29.46	Pk	Horizontal
13283.49	28.62	42.60	15.90	38.90	12.20	40.82	54.00	-13.18	AV	Horizontal

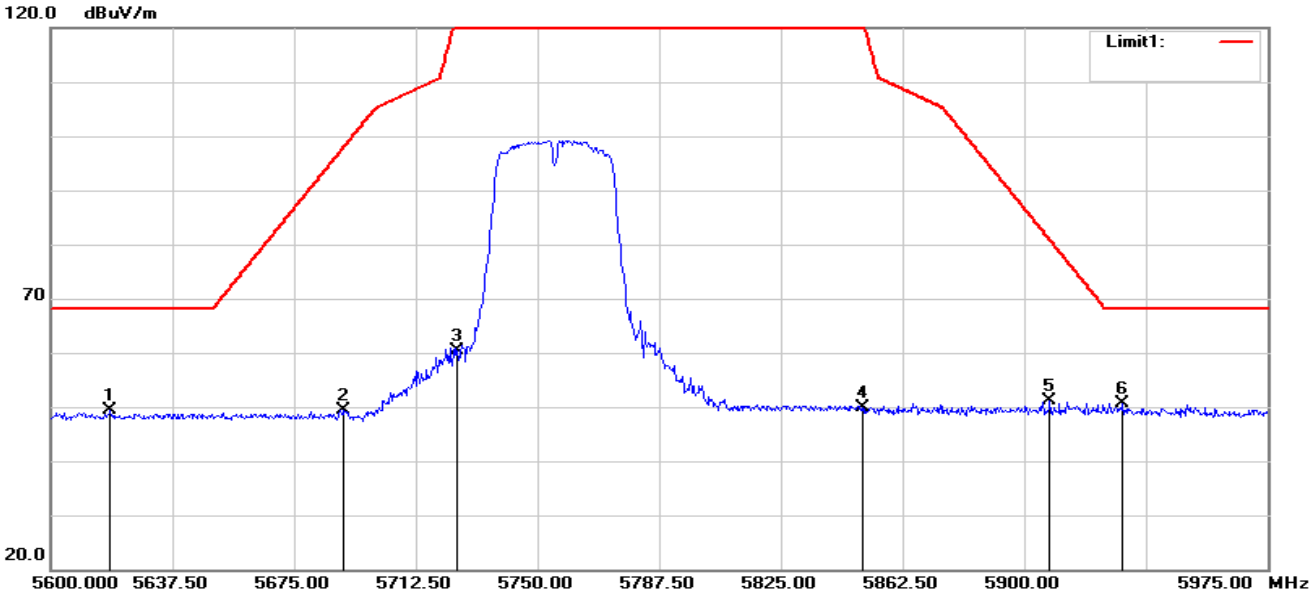
High Channel (802.11a/ 5825 MHz)										
3253.04	45.09	44.70	6.70	28.20	-9.80	35.29	68.20	-32.91	Pk	Vertical
3253.04	41.61	44.70	6.70	28.20	-9.80	31.81	54.00	-22.19	AV	Vertical
3261.51	44.57	44.70	6.70	28.20	-9.80	34.77	74.00	-39.23	Pk	Horizontal
3261.51	42.24	44.70	6.70	28.20	-9.80	32.44	54.00	-21.56	AV	Horizontal
3996.62	38.66	44.20	7.90	29.70	-6.60	32.06	74.00	-41.94	Pk	Vertical
3996.62	36.74	44.20	7.90	29.70	-6.60	30.14	54.00	-23.86	AV	Vertical
3992.91	38.96	44.20	7.90	29.70	-6.60	32.36	74.00	-41.64	Pk	Horizontal
3992.91	36.95	44.20	7.90	29.70	-6.60	30.35	54.00	-23.65	AV	Horizontal
7222.43	37.30	43.50	11.40	35.50	3.40	40.70	68.20	-27.50	Pk	Vertical
7222.43	33.82	43.50	11.40	35.50	3.40	37.22	54.00	-16.78	AV	Vertical
7236.26	37.21	43.50	11.40	35.50	3.40	40.61	68.20	-27.59	Pk	Horizontal
7236.26	34.71	43.50	11.40	35.50	3.40	38.11	54.00	-15.89	AV	Horizontal
10480.03	39.06	44.50	13.80	38.80	8.10	47.16	68.20	-21.04	Pk	Vertical
10480.03	36.96	44.50	13.80	38.80	8.10	45.06	54.00	-8.94	AV	Vertical
10480.29	39.33	44.50	13.80	38.80	8.10	47.43	68.20	-20.77	Pk	Horizontal
10480.29	36.39	44.50	13.80	38.80	8.10	44.49	54.00	-9.51	AV	Horizontal
11018.49	33.71	43.60	14.30	39.50	10.20	43.91	74.00	-30.09	Pk	Vertical
11018.49	30.52	43.60	14.30	39.50	10.20	40.72	54.00	-13.28	AV	Vertical
11017.33	33.78	43.60	14.30	39.50	10.20	43.98	74.00	-30.02	Pk	Horizontal
11017.33	30.61	43.60	14.30	39.50	10.20	40.81	54.00	-13.19	AV	Horizontal
13281.48	32.99	42.60	15.90	38.90	12.20	45.19	74.00	-28.81	Pk	Vertical
13281.48	29.39	42.60	15.90	38.90	12.20	41.59	54.00	-12.41	AV	Vertical
13291.49	31.67	42.60	15.90	38.90	12.20	43.87	74.00	-30.13	Pk	Horizontal
13291.49	29.83	42.60	15.90	38.90	12.20	42.03	54.00	-11.97	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.
4. Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.

3.2.9 RESTRICTED FREQUENCY BANDS AND BAND EDGE

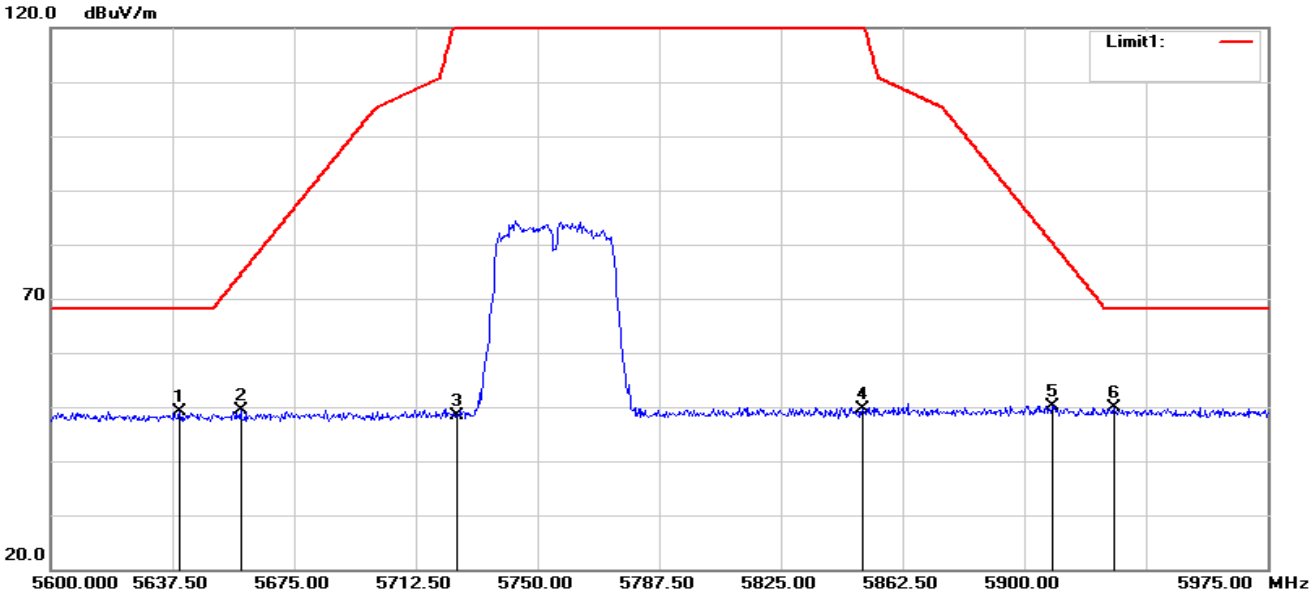
Band IV(5.725-5.85 GHz)

802.11n40-L-H



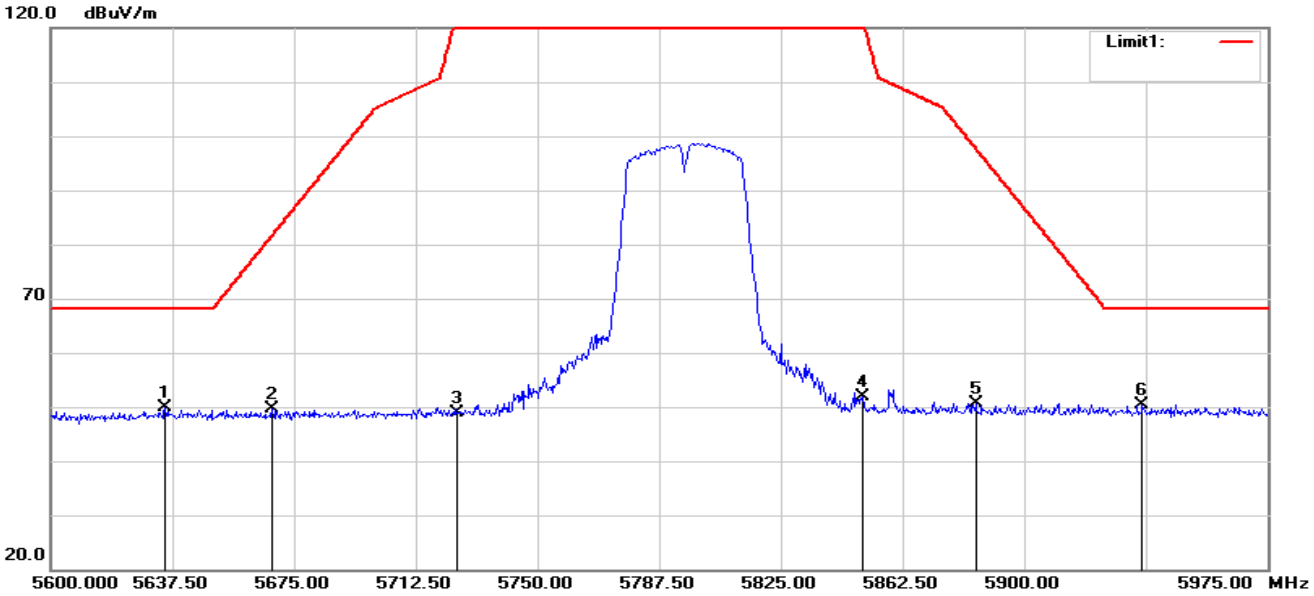
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5618.375	54.08	-4.69	49.39	68.20	-18.81	peak
2	5690.000	54.14	-4.67	49.47	97.80	-48.33	peak
3	5725.000	64.99	-4.57	60.42	122.20	-61.78	peak
4	5850.000	54.08	-4.10	49.98	122.20	-72.22	peak
5	5907.875	54.95	-3.90	51.05	80.87	-29.82	peak
6	5930.375	54.68	-3.93	50.75	68.20	-17.45	peak

802.11n40-L-V



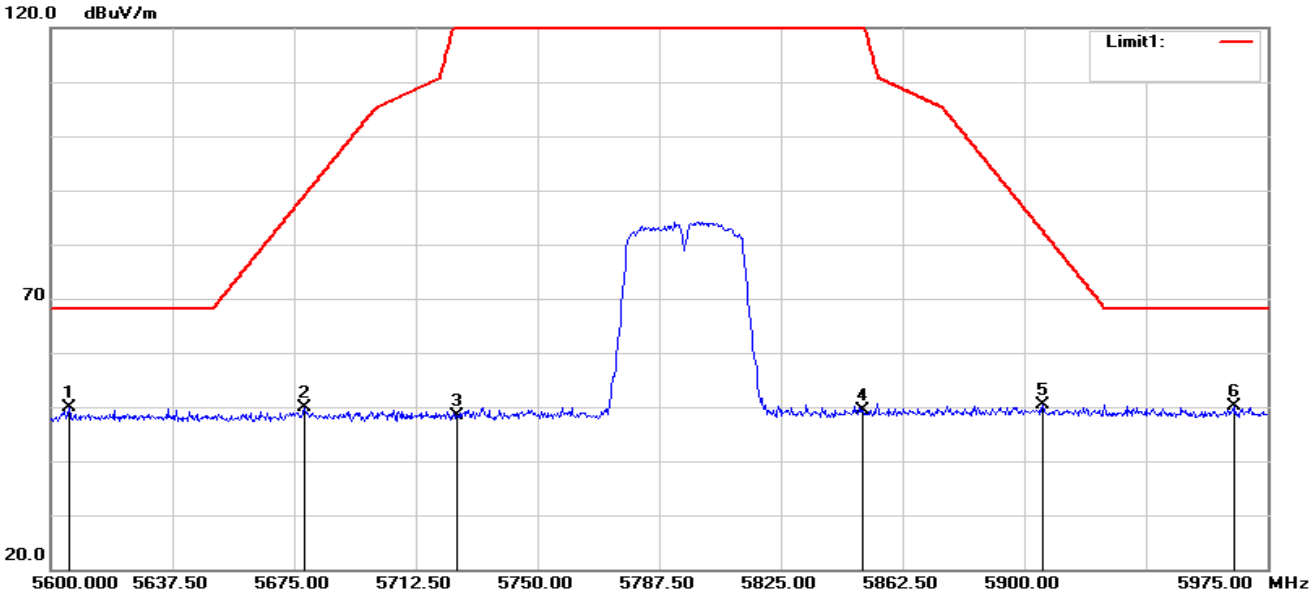
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5639.750	53.72	-4.69	49.03	68.20	-19.17	peak
2	5658.500	54.10	-4.68	49.42	74.49	-25.07	peak
3	5725.000	52.85	-4.57	48.28	122.20	-73.92	peak
4	5850.000	53.70	-4.10	49.60	122.20	-72.60	peak
5	5908.625	54.13	-3.90	50.23	80.32	-30.09	peak
6	5927.750	53.82	-3.93	49.89	68.20	-18.31	peak

802.11n40-H-H



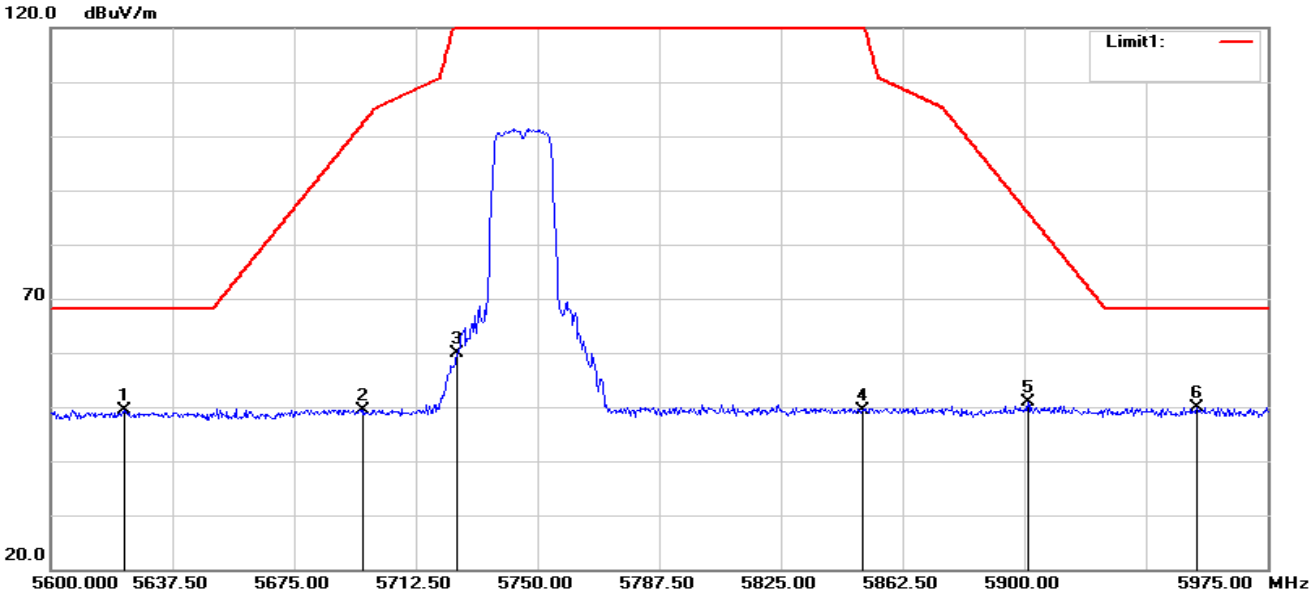
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5635.250	54.45	-4.68	49.77	68.20	-18.43	peak
2	5668.250	54.27	-4.67	49.60	81.70	-32.10	peak
3	5725.000	53.40	-4.57	48.83	122.20	-73.37	peak
4	5850.000	55.86	-4.10	51.76	122.20	-70.44	peak
5	5885.000	54.60	-3.94	50.66	97.80	-47.14	peak
6	5936.375	54.38	-3.94	50.44	68.20	-17.76	peak

802.11n40-H-V



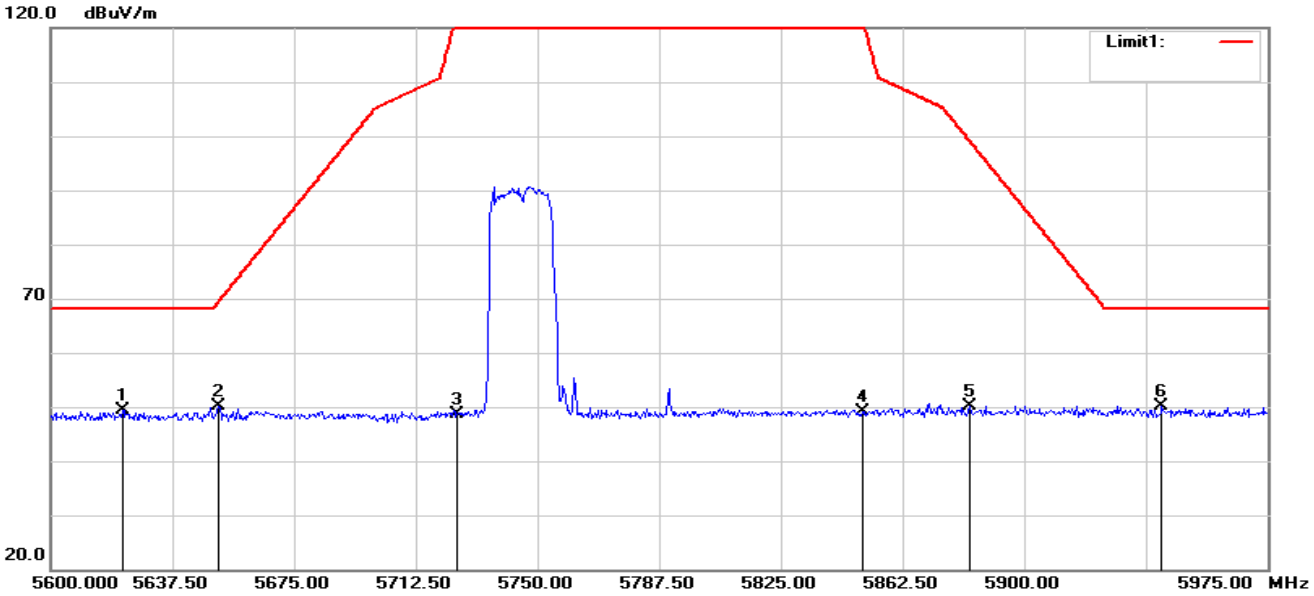
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5605.625	54.57	-4.70	49.87	68.20	-18.33	peak
2	5678.000	54.65	-4.67	49.98	88.92	-38.94	peak
3	5725.000	52.86	-4.57	48.29	122.20	-73.91	peak
4	5850.000	53.46	-4.10	49.36	122.20	-72.84	peak
5	5905.625	54.17	-3.89	50.28	82.54	-32.26	peak
6	5964.875	54.22	-3.99	50.23	68.20	-17.97	peak

802.11ac20-L-H



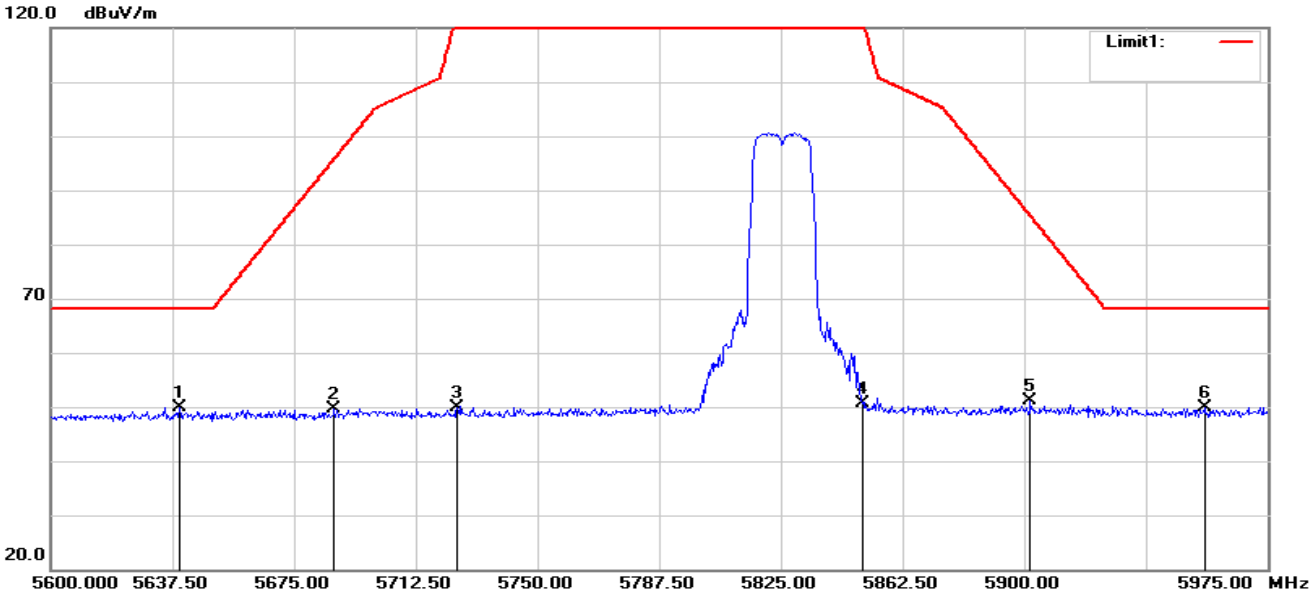
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5622.500	54.08	-4.69	49.39	68.20	-18.81	peak
2	5696.375	54.15	-4.67	49.48	102.52	-53.04	peak
3	5725.000	64.50	-4.57	59.93	122.20	-62.27	peak
4	5850.000	53.41	-4.10	49.31	122.20	-72.89	peak
5	5901.125	54.80	-3.88	50.92	85.87	-34.95	peak
6	5953.250	53.93	-3.97	49.96	68.20	-18.24	peak

802.11ac20-L-V



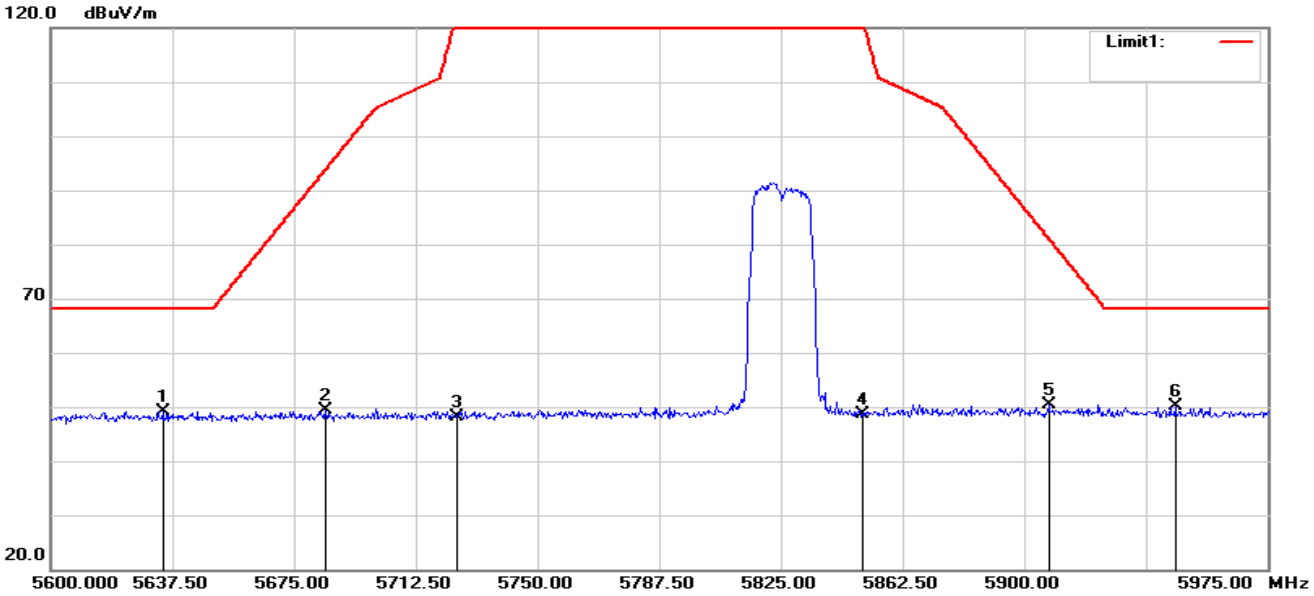
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5622.125	54.13	-4.69	49.44	68.20	-18.76	peak
2	5651.750	54.91	-4.68	50.23	69.50	-19.27	peak
3	5725.000	53.29	-4.57	48.72	122.20	-73.48	peak
4	5850.000	53.12	-4.10	49.02	122.20	-73.18	peak
5	5883.125	54.16	-3.96	50.20	99.19	-48.99	peak
6	5942.375	54.18	-3.95	50.23	68.20	-17.97	peak

802.11ac20-H-H



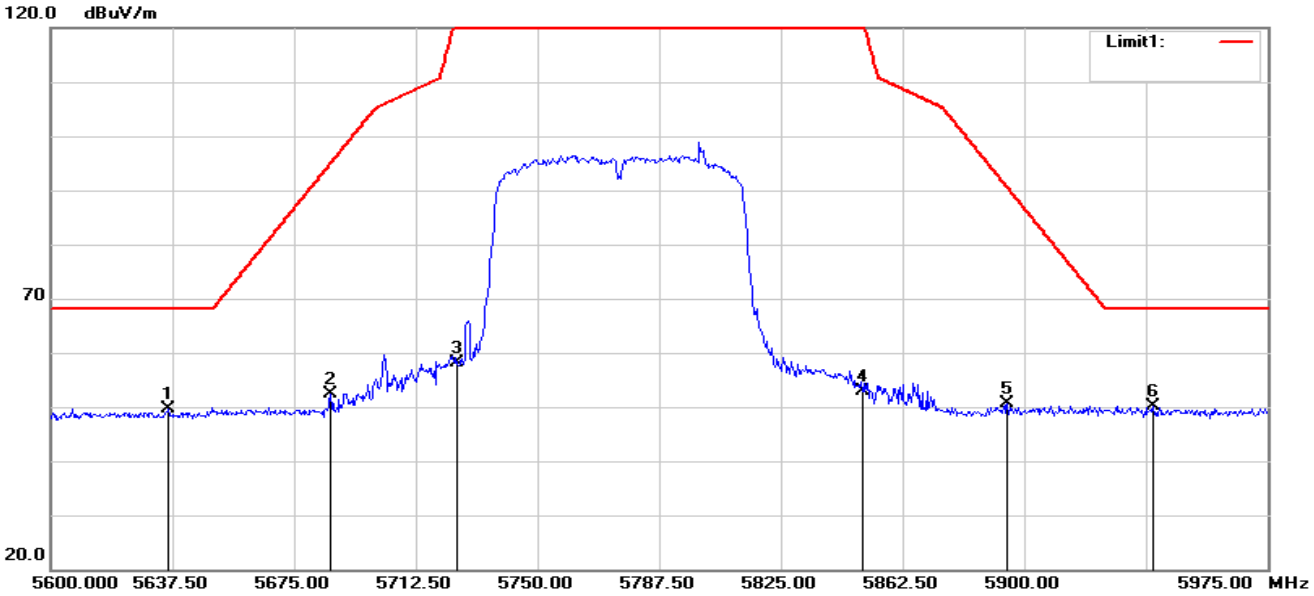
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5639.750	54.65	-4.69	49.96	68.20	-18.24	peak
2	5687.375	54.30	-4.66	49.64	95.86	-46.22	peak
3	5725.000	54.44	-4.57	49.87	122.20	-72.33	peak
4	5850.000	54.67	-4.10	50.57	122.20	-71.63	peak
5	5901.875	54.94	-3.89	51.05	85.31	-34.26	peak
6	5955.500	53.86	-3.97	49.89	68.20	-18.31	peak

802.11ac20-H-V



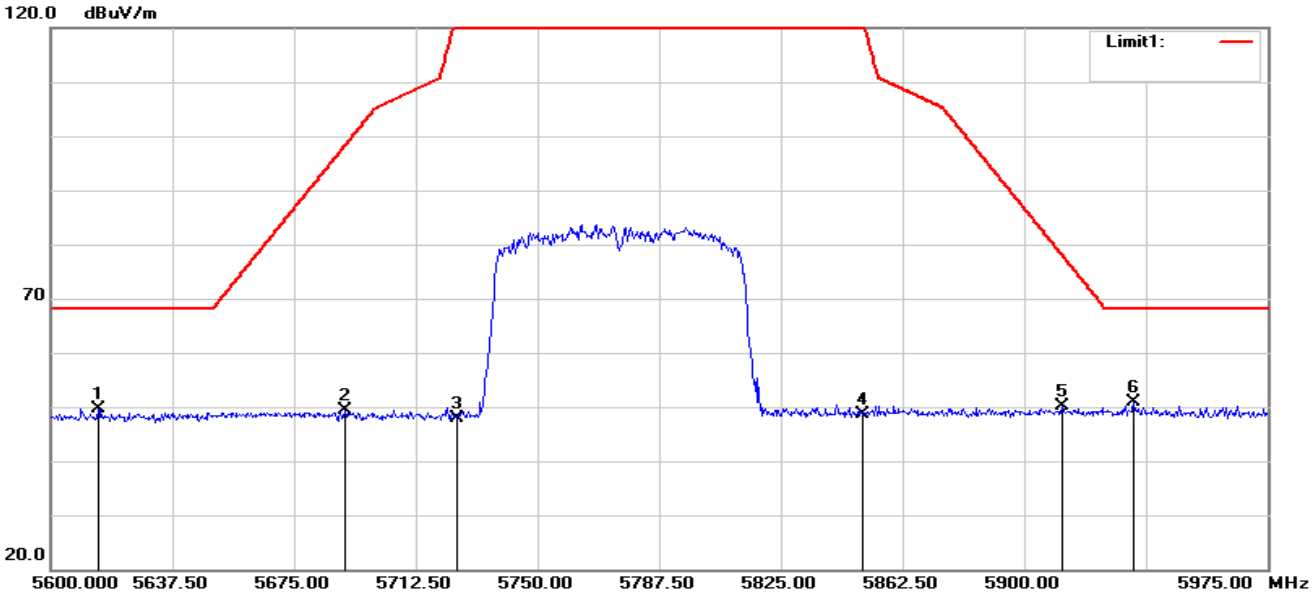
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5634.500	53.82	-4.68	49.14	68.20	-19.06	peak
2	5684.750	54.08	-4.66	49.42	93.92	-44.50	peak
3	5725.000	52.82	-4.57	48.25	122.20	-73.95	peak
4	5850.000	52.73	-4.10	48.63	122.20	-73.57	peak
5	5907.500	54.30	-3.89	50.41	81.15	-30.74	peak
6	5946.500	54.05	-3.96	50.09	68.20	-18.11	peak

802.11ac80-H



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5636.375	54.34	-4.68	49.66	68.20	-18.54	peak
2	5686.250	57.15	-4.66	52.49	95.03	-42.54	peak
3	5725.000	62.59	-4.57	58.02	122.20	-64.18	peak
4	5850.000	56.98	-4.10	52.88	122.20	-69.32	peak
5	5894.750	54.44	-3.90	50.54	90.59	-40.05	peak
6	5939.750	54.20	-3.95	50.25	68.20	-17.95	peak

802.11ac80-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5614.625	54.26	-4.70	49.56	68.20	-18.64	peak
2	5690.750	54.11	-4.66	49.45	98.36	-48.91	peak
3	5725.000	52.54	-4.57	47.97	122.20	-74.23	peak
4	5850.000	52.73	-4.10	48.63	122.20	-73.57	peak
5	5911.625	54.01	-3.90	50.11	78.10	-27.99	peak
6	5933.750	54.77	-3.94	50.83	68.20	-17.37	peak

Note: All modes have been tested. Only the worst mode shown in the report.

4. POWER SPECTRAL DENSITY TEST

4.1 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.

4.2 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.l.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.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP

4.5 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.

4.6 TEST RESULTS

U-NII 3										
Frequency (MHz)	Use RBW 510KHz direct measurement Ant_A Power Density (dBm)	Use RBW 510KHz direct measurement Ant_B Power Density (dBm)	Convert to RBW 500KHz direct measurement Ant_A Power Density (dBm)	Convert to RBW 500KHz direct measurement Ant_B Power Density (dBm)	Duty cycle factor (dB)	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm/ 500KHz)	Result
802.11a										
5745	-0.482	-2.121	-0.568	-2.207	0.395	-0.173	-1.812	--	30	PASS
5785	-0.388	-2.051	-0.474	-2.137	0.395	-0.080	-1.742	--	30	PASS
5825	-0.435	-1.728	-0.521	-1.814	0.395	-0.126	-1.419	--	30	PASS
802.11n20										
5745	-2.375	-1.402	-2.461	-1.488	0.347	-2.114	-1.141	1.410	30	PASS
5785	-3.297	-1.926	-3.383	-2.012	0.347	-3.036	-1.665	0.713	30	PASS
5825	-3.134	-1.598	-3.220	-1.684	0.347	-2.873	-1.337	0.972	30	PASS
802.11n40										
5755	-8.935	-4.782	-9.021	-4.868	0.939	-8.082	-3.929	-2.517	30	PASS
5795	-9.964	-5.666	-10.050	-5.752	0.939	-9.111	-4.813	-3.440	30	PASS
802.11ac20										
5745	-2.188	-1.761	-2.274	-1.847	0.455	-1.819	-1.392	1.410	30	PASS
5785	-3.155	-2.511	-3.241	-2.597	0.455	-2.786	-2.142	0.558	30	PASS
5825	-3.449	-1.563	-3.535	-1.649	0.455	-3.080	-1.194	0.975	30	PASS
802.11ac40										
5755	-10.069	-5.079	-10.155	-5.165	0.807	-9.348	-4.358	-3.162	30	PASS
5795	-10.245	-5.118	-10.331	-5.204	0.807	-9.524	-4.397	-3.233	30	PASS
802.11ac80										
5775	-13.665	-11.777	-13.751	-11.863	1.261	-12.490	-10.602	-8.434	30	PASS

Note: 1. RB conversion formula: 10*LOG(500KHz/RBW)
2. Test plots see Attachment A

5. BANDWIDTH MEASUREMENT

5.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring 26 bandwidth.

5.1.1 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%.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP

5.1.4 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.

5.1.5 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)	Result
802.11a		
5745	18.44	Pass
5785	18.37	Pass
5825	18.44	Pass
802.11n(HT20)		
5745	19.32	Pass
5785	19.27	Pass
5825	19.28	Pass
802.11n(HT40)		
5755	40.39	Pass
5795	41.14	Pass
802.11ac(VHT20)		
5745	19.27	Pass
5785	19.31	Pass
5825	19.34	Pass
802.11ac(VHT40)		
5755	40.77	Pass
5795	40.55	Pass
802.11ac(VHT80)		
5775	80.08	Pass

Test plots see Attachment B

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

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

5.2.1 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.

5.2.2 DEVIATION FROM STANDARD

No deviation.

5.2.3 TEST SETUP

5.2.4 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.

5.2.5 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)	Result
802.11a		
5745	16.32	Pass
5785	16.32	Pass
5825	16.32	Pass
802.11n(HT20)		
5745	17.50	Pass
5785	17.51	Pass
5825	17.51	Pass
802.11n(HT40)		
5755	36.07	Pass
5795	36.06	Pass
802.11ac(VHT20)		
5745	17.50	Pass
5785	17.50	Pass
5825	17.50	Pass
802.11ac(VHT40)		
5755	36.03	Pass
5795	36.10	Pass
802.11ac(VHT80)		
5775	74.57	Pass

Test plots See Attachment B

5.3 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.

5.3.1 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.

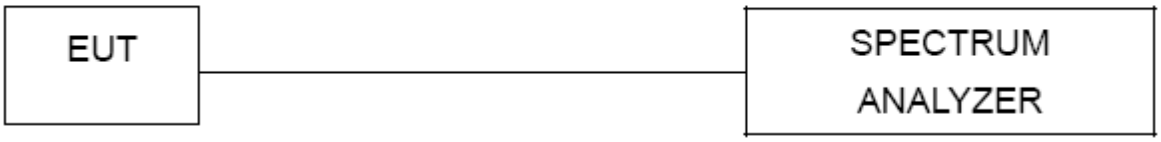
f) Allow the trace to stabilize.

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.

5.3.2 DEVIATION FROM STANDARD

No deviation.

5.3.3 TEST SETUP



5.3.4 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.

5.3.5 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)	6dB Bandwidth (MHz)	Result
802.11a		
5745	16.34	Pass
5785	16.32	Pass
5825	16.33	Pass
802.11n(HT20)		
5745	17.55	Pass
5785	17.55	Pass
5825	17.54	Pass
802.11n(HT40)		
5755	35.28	Pass
5795	35.08	Pass
802.11ac(VHT20)		
5745	17.56	Pass
5785	17.56	Pass
5825	17.57	Pass
802.11ac(VHT40)		
5755	35.13	Pass
5795	35.11	Pass
802.11ac(VHT80)		
5775	75.04	Pass

Data see Attachment C

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1 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	

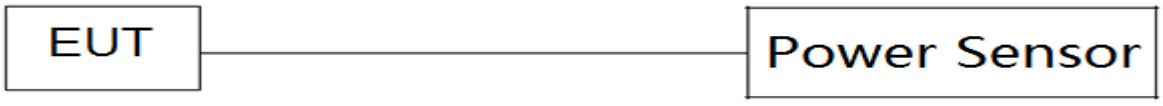
6.2 TEST PROCEDURE

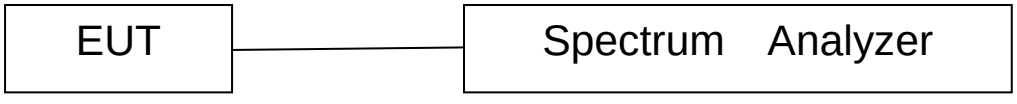
The EUT was directly connected to the Power Sensor&PC

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



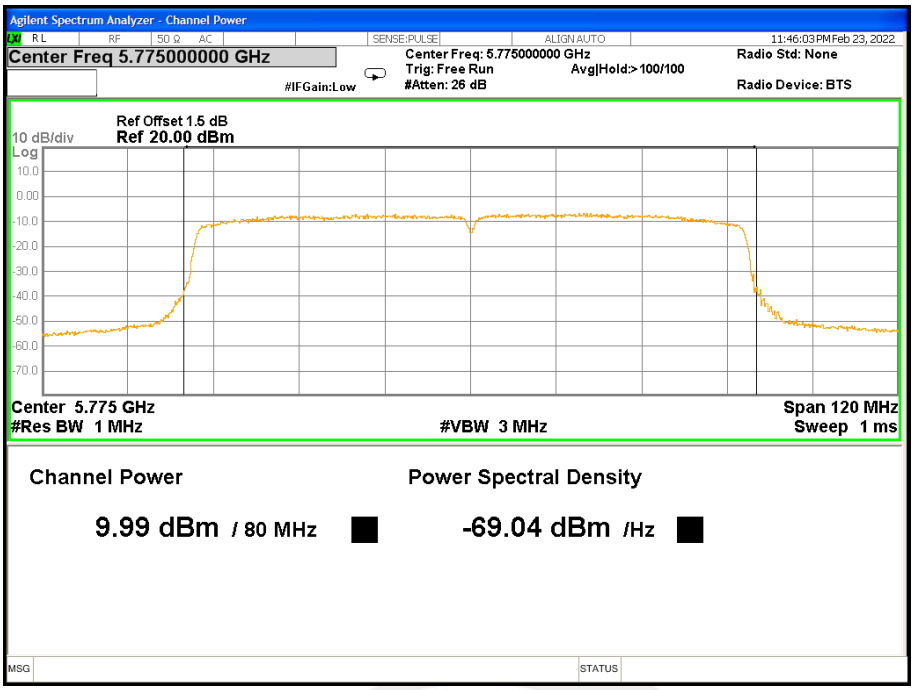


6.5 EUT OPERATION CONDITIONS

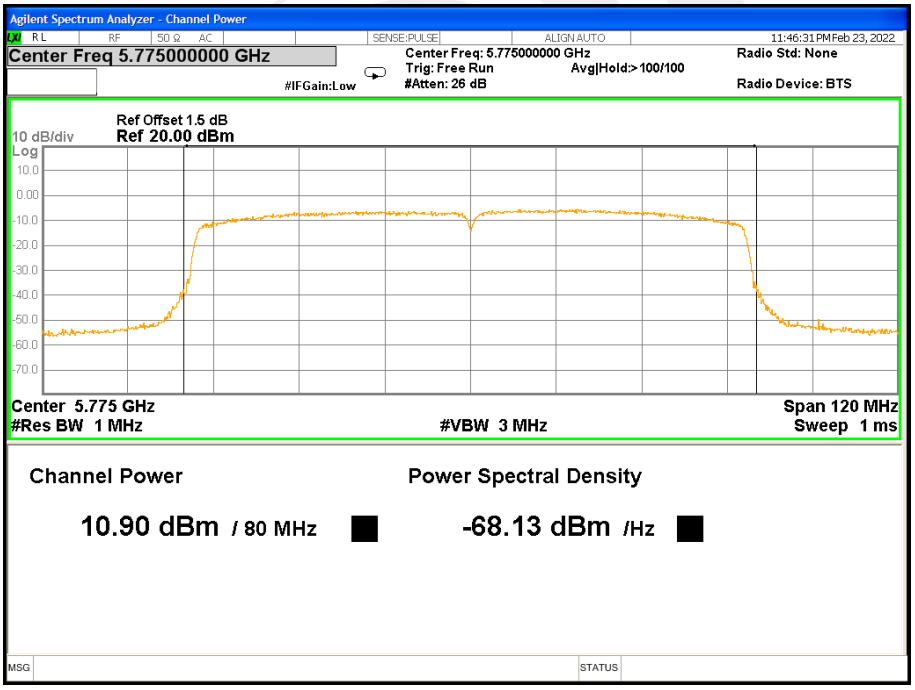
The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

U-NII 3								
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant B_AV Power (dBm)	Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a								
149	5745	12.31	12.11	0.395	12.70	12.50	--	30.00
157	5785	12.07	11.89	0.395	12.46	12.28	--	30.00
165	5825	11.98	11.71	0.395	12.37	12.10	--	30.00
802.11n(HT20)								
149	5745	11.79	11.96	0.347	12.14	12.31	15.233	30.00
157	5785	11.08	12.74	0.347	11.43	13.09	15.346	30.00
165	5825	11.01	12.63	0.347	11.36	12.98	15.252	30.00
802.11n(HT40)								
151	5755	10.61	11.94	0.939	11.55	12.88	15.275	30.00
159	5795	9.98	12.29	0.939	10.92	13.23	15.236	30.00
802.11ac(VHT20)								
149	5745	11.21	12.54	0.455	11.66	12.99	15.391	30.00
157	5785	10.87	12.82	0.455	11.32	13.27	15.419	30.00
165	5825	10.68	12.85	0.455	11.13	13.30	15.364	30.00
802.11ac(VHT40)								
151	5755	9.93	11.74	0.807	10.74	12.55	14.746	30.00
159	5795	10.18	11.84	0.807	10.99	12.65	14.907	30.00
802.11ac(VHT80)								
155	5775	9.99	10.90	1.261	11.25	12.16	14.740	30.00



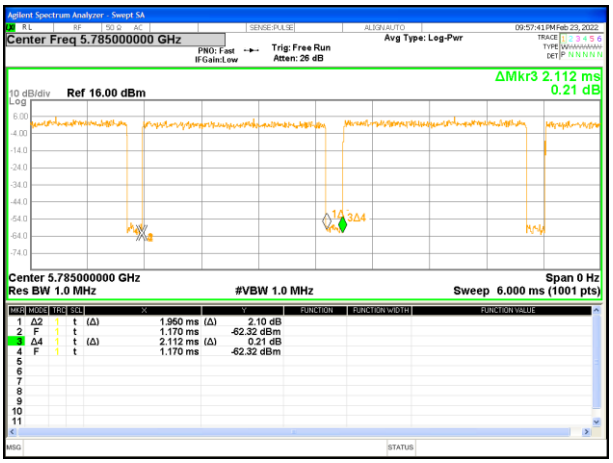
5775MHz_AV_Ant A



5775MHz_AV_Ant B

U-NII 3				
Mode	Ton (ms)	Tp (ms)	Duty cycle (%)	Duty factor (dB)
802.11a	2.082	2.280	91.32%	0.39
802.11n(HT20)	1.950	2.112	92.33%	0.35
802.11n(HT40)	0.957	1.188	80.56%	0.94
802.11ac(VHT20)	1.956	2.172	90.06%	0.45
802.11ac(VHT40)	0.969	1.167	83.03%	0.81
802.11ac(VHT80)	0.466	0.623	74.80%	1.26

Band 4-a20



Band 4-n20

Band 4-n40

Band 4-ac20

Band 4-ac40

Band 4-ac80

7. AUTOMATICALLY DISCONTINUE TRANSMISSION

7.1 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.

7.2 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.

8. ANTENNA REQUIREMENT

8.1 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.

8.2 EUT ANTENNA

The EUT antenna is PCB Antenna 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※※※※※