



# **FCC 47 CFR PART15 SUBPART E**

## **Test Report**

**For**

**Prepared by**

**Product Name: Wireless Router**

**Brand Name: UTT**

**Model No.: AC750GW**

**Series Model.: AC751GW**

**FCC ID: XPF-REG05-UTT**

**Test Report Number:**

**C150127R02-RPB**

**Issued for**

**Shanghai UTT Technologies Co.,Ltd**

**Room 301,No.9 Building,No.518,Xinzhuan Rd,Songjiang District,Shanghai,China**

**Issued by**

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**TESTING CERT #2541.01**

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## 1 TEST RESULT CERTIFICATION

<b>Product Name:</b>	Wireless Router
<b>Trade Name:</b>	UTT
<b>Model Name.:</b>	AC750GW
<b>Series Model:</b>	AC751GW
<b>Applicant Discrepancy:</b>	Initial
<b>Device Category:</b>	Mobile Device
<b>Date of Test:</b>	January 28,2015 ~ March 2, 2015
<b>Applicant:</b>	<b>Shanghai UTT Technologies Co.,Ltd</b> Room 301,No.9 Building,No.518,Xinzhuan Rd,Songjiang District,Shanghai,China
<b>Manufacturer:</b>	<b>Shanghai UTT Technologies Co.,Ltd</b> Room 301,No.9 Building,No.518,Xinzhuan Rd,Songjiang District,Shanghai,China
<b>Application Type:</b>	Certification

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart E	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.407 and KDB 789033 – 20140606.

The test results of this report relate only to the tested sample EUT identified in this report.

**Approved by:**

Jeff.Fang

RF Manager

Compliance Certification Service Inc.

**Tested by:**

James.Yan

Test Engineer

Compliance Certification Service Inc.



## 2 EUT DESCRIPTION

<b>Product Name:</b>	Wireless Router
<b>Brand Name:</b>	UTT
<b>Model Name:</b>	AC750GW
<b>Series Model:</b>	AC751GW
<b>Model Discrepancy:</b>	Only for market segment
<b>Power Adapter Power Rating :</b>	Model:FJ-SW1202000N Input: AC 100V~240V 50/60Hz 0.6A max Output:DC 12V 2000mA
<b>Frequency Range :</b>	5725MHz-5850MHz
<b>Transmit Power :</b>	802.11a mode: 21.56 dBm 802.11an Standard-20 MHz Channel mode: 21.96 dBm 802.11an Wide-40 MHz Channel mode: 21.45 dBm 802.11ac Wide-20 MHz Channel mode: 20.66 dBm 802.11ac Wide-40 MHz Channel mode: 21.06 dBm 802.11ac Wide-80 MHz Channel mode: 18.65 dBm
<b>Modulation Technique :</b>	802.11a mode: OFDM (6,9,12,18,24,36,48 and 54 Mbps) 802.11an Standard-20 MHz Channel mode: OFDM (6.5,13,19.5,26,39,52,58.5 and 65 Mbps) 802.11an Wide-40 MHz Channel mode: OFDM (13.5,27,40.5,54,81,108,121.5 and 135 Mbps) 802.11ac Standard-20 MHz Channel mode: OFDM(MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7,MCS8 and MCS9) 802.11ac Wide-40 MHz Channel mode: OFDM(MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7,MCS8and MCS9) 802.11ac Wide-80 MHz Channel mode: OFDM(MCS0,MCS1,MCS2,MCS3,MCS4,MCS5,MCS6,MCS7,MCS8 and MCS9)
<b>Number of Channels :</b>	IEEE 802.11a mode: 5 Channels IEEE 802.11an 20MHz/ac 20MHz mode: 5 Channels IEEE 802.11an 40MHz/ac 40MHz mode: 3 Channels IEEE 802.11ac 20MHz/ac 20MHz mode: 5 Channels IEEE 802.11ac 40MHz/ac 40MHz mode: 3 Channels IEEE 802.11ac Wide-80 MHz Channel mode: 1 Channel
<b>Antenna Specification:</b>	Dipole antenna for 5GHz Gain 7 dBi

### Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for **FCC ID: XPF-REG05-UTT** filing to comply with FCC Part 15, Subpart E Rules.



## 3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 2009 and FCC CFR 47 15.207, 15.209 and 15.407.

### 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

### 3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

### 3.3 GENERAL TEST PROCEDURES

#### Conducted Emissions

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.3 of ANSI C63.4, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

#### Radiated Emissions

The EUT is placed on the turntable, which is 0.8 m above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.4 of ANSI C63.4.



## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.50 - 5.15
0.495 - 0.505 <sup>(1)</sup>	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.125 - 4.128	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.00 - 74.60	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.80 - 75.20	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 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	149.90 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.70 - 156.90	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358.0	36.43 - 36.5 <sup>(2)</sup>
12.57675 - 12.57725	322.0 - 335.4	3600 - 4400	
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



## 3.5 DESCRIPTION OF TEST MODES

Description	Modulation Technology	Modulation Type
26dB Bandwidth and 99% Bandwidth	OFDM	BPSK
Maximum conducted output power	OFDM	BPSK
Band edges measurement	OFDM	BPSK
Peak Power Spectral Density	OFDM	BPSK
Peak excursion	OFDM	BPSK
Radiated undesirable emission	OFDM	BPSK
Conducted undesirable emission	OFDM	BPSK
Powerline conducted emission	OFDM	BPSK

The EUT transmitting and receiving with three antennas simultaneously working at a/an/ac mode, so 1x1 configuration was used for all testing in this report.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

### IEEE 802.11a mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 54Mbps data rate were chosen for full testing.

### IEEE 802.11an Standard-20 MHz Channel mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 65Mbps data rate were chosen for full testing.

### IEEE 802.11an Wide-40 MHz Channel mode:

Channel Low (5755MHz) and Channel Mid (5795MHz) with 135Mbps data rate were chosen for full testing.

### IEEE 802.11ac Standard-20 MHz Channel mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with MCS9 data rate were chosen for full testing.

### IEEE 802.11ac Wide-40 MHz Channel mode:

Channel Low (5755MHz) and Channel Mid (5795MHz) with MCS9 data rate were chosen for full testing.

### IEEE 802.11ac Wide-80 MHz Channel mode:

Channel (5775MHz) with MCS9 data rate were chosen for full testing.

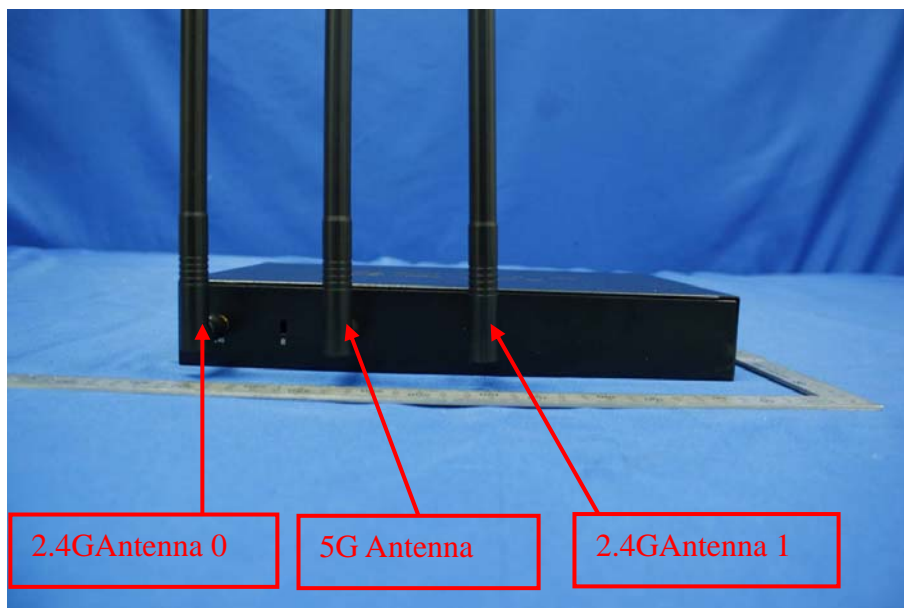


## 3.6 ANTENNA DESCRIPTION

an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”

\* the antenna of this EUT is a unique(dipole Antenna).

\* the EUT complies with the requirement of 15.203.







## 4 INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.1 MEASUREMENT EQUIPMENT USED

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-4-9
Spectrum Analyzer	RS	FSU26	200789	2015-8-11
Detector negative	Agilent	8473B	MY42240176	2015-5-11
OSCILLOSCOPE	Agilent	DSO6104A	MY44002585	2015-3-16
Peak and Avg Power Sensor	Agilent	E9327A	US40441788	2015-3-17
MIMO Power Measurement Test Set	Agilent	U2021XA	MY53120005	2015-7-3
EPM-P Series Power Meter	Agilent	E4416A	GB41292714	2015-3-17
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R
DC POWER SUPPLY	GW instek	GPS-3303C	E903131	N.C.R
Temp. / Humidity Chamber	Kingson	THS-M1	242	2015-1-22

977 Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-4-9
EMI Test Receiver	R&S	ESCI	101378	2016-1-21
Pre-Amplifier	MINI	ZFL-1000VH2	d041703	2016-1-21
Pre-Amplifier	Miteq	JS41-00101800-32-10P	1675713	2016-1-21
Bilog Antenna	Sunol	JB1	A062604	2016-3-5
Horn-antenna	SCHWARZBECK	BBHA9120D	D:266	2016-3-6
Turn Table	CT	CT123	4165	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R
Controller	CT	CT100	95637	N.C.R
Test Software	EZ-EMC			



Conducted Emission				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER	R&S	ESCI	100781	2015-3-16
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	N.C.R
LISN (EUT)	FCC	FCC-LISN-50/250-50-2-02	05012	2015-3-16
Pulse LIMITER	R&S	ESH3-Z2	100524	2015-9-24
Test Software	EZ-EMC			

**Remark:** Each piece of equipment is scheduled for calibration once a year.



## 4.2 MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

**Table 6: Maximum measurement uncertainty**

Parameter	<u>UNCERTAINTY</u>
Radio frequency	$\pm 0.8 \times 10^{-7}$
RF power, conducted	0.2054
Maximum frequency deviation:	
-within 300 Hz and 6 kHz of audio frequency	1.3%
-within 6 kHz and 25 kHz of audio frequency	0.65 dB
Adjacent channel power	0.2054
Conducted spurious emission of transmitter, valid up to 6 GHz	0.2892
Conducted emission of receivers	+1.2/-1.1 dB
Radiated emission of transmitter, valid up to 6 GHz	$\pm 3.94$ dB
Radiated emission of receiver, valid up to 6 GHz	$\pm 3.94$ dB
RF level uncertainty for a given BER	$\pm 0.3$ dB
Temperature	0.1979
Humidity	$\pm 1$ %



## 5 FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ **No.10Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.**

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

<b>USA</b>	A2LA
<b>China</b>	CNAS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>Canada</b>	Industry Canada
<b>Japan</b>	VCCI
<b>Taiwan</b>	BSMI
<b>USA</b>	FCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>.



## 6 SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.
1	Notebook	dell	E5430

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



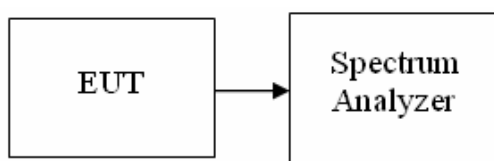
## 7 FCC PART 15 REQUIREMENTS

### 7.1 6 DB BANDWIDTH MEASUREMENT

#### LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz.

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW =100KHz, VBW  $\geq$  3RBW, Detector = Peak. Trace mode = max hold.
4. Measure the maximum width of the emission that is 6 dB down from the peak of the emission..
5. Measure and record the results in the test report

#### TEST RESULTS

*No non-compliance noted*

#### Test Data



Test mode: IEEE 802.11a mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.474	0.5
Mid	5785	16.474	0.5
High	5825	16.442	0.5

Test mode: IEEE 802.11n Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.923	0.5
Mid	5785	16.923	0.5
High	5825	16.891	0.5

Test mode: IEEE 802.11n Wide-40 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	36.026	0.5
High	5795	36.026	0.5

Test mode: IEEE 802.11ac Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.860	0.5
Mid	5785	16.923	0.5
High	5825	16.923	0.5

Test mode: IEEE 802.11ac Wide-40 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	35.769	0.5
High	5795	35.897	0.5



Test mode: IEEE 802.11ac Wide-80 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5775	75.128	0.5

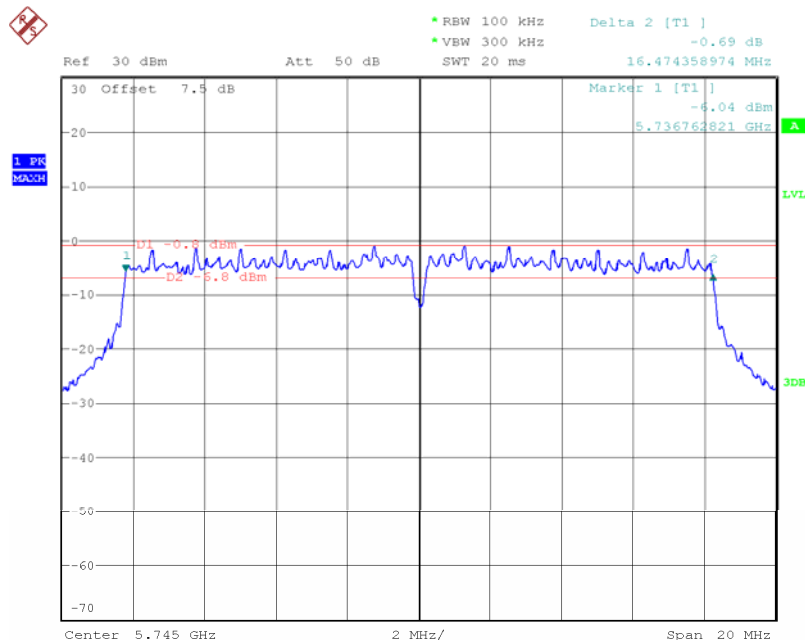




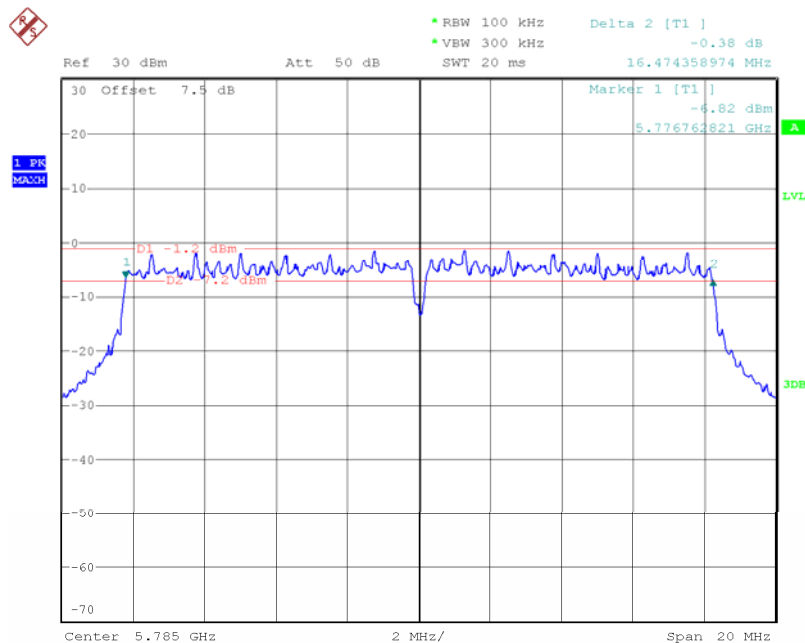
## Test Plot

### IEEE 802.11a mode

### 6dB Bandwidth (CH Low)

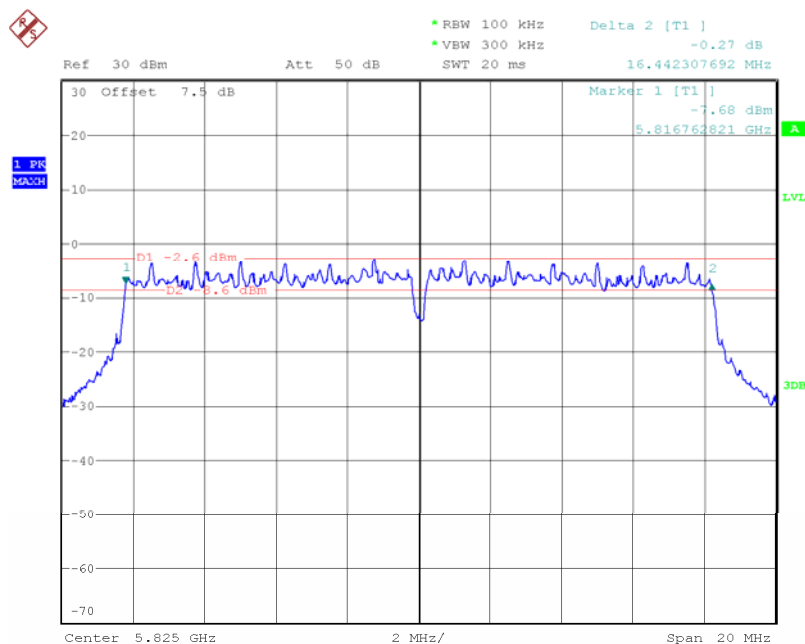


### 6dB Bandwidth (CH Mid)



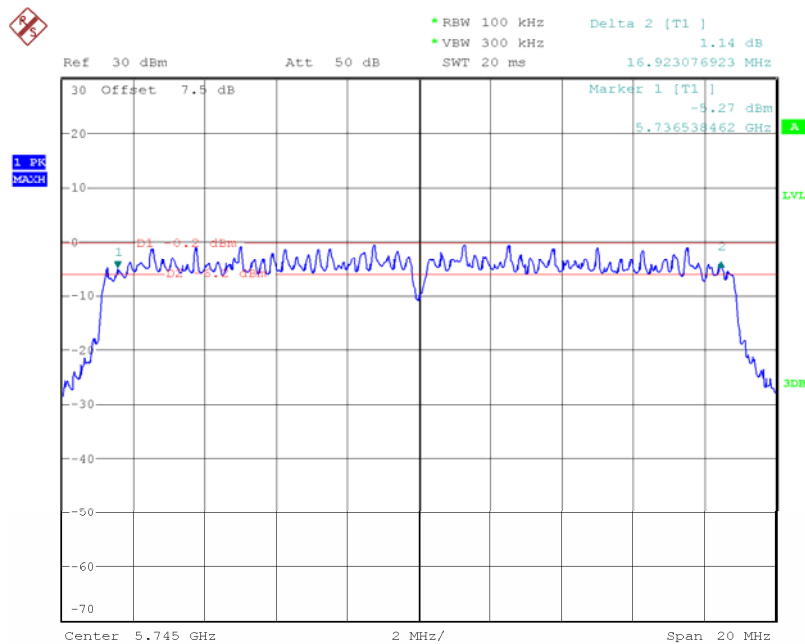


## 6dB Bandwidth (CH High)



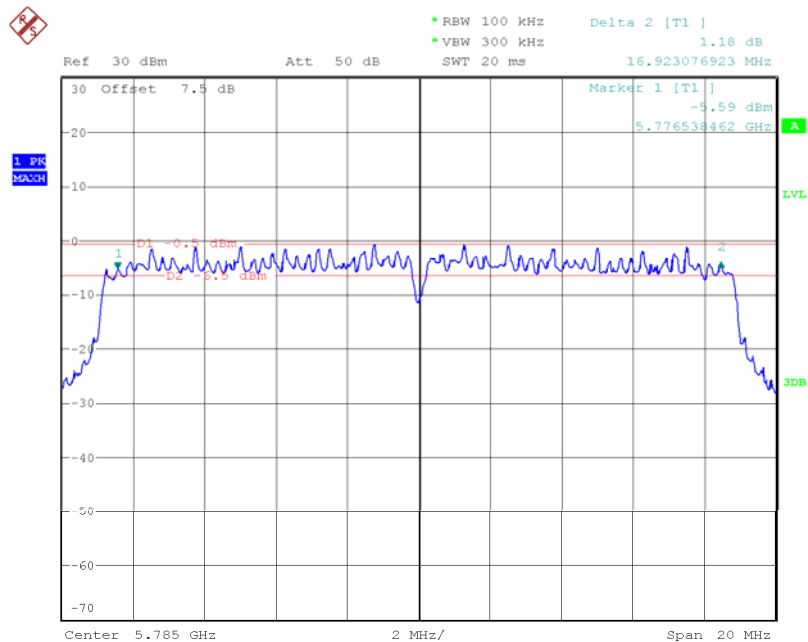
## IEEE 802.11n Standard-20 MHz Channel mode

### 6dB Bandwidth (CH Low)

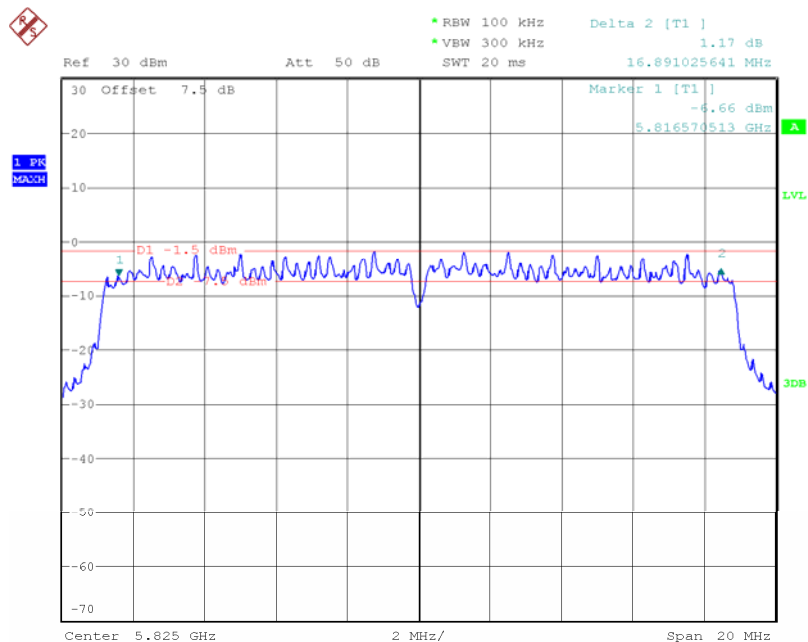




## 6dB Bandwidth (CH Mid)

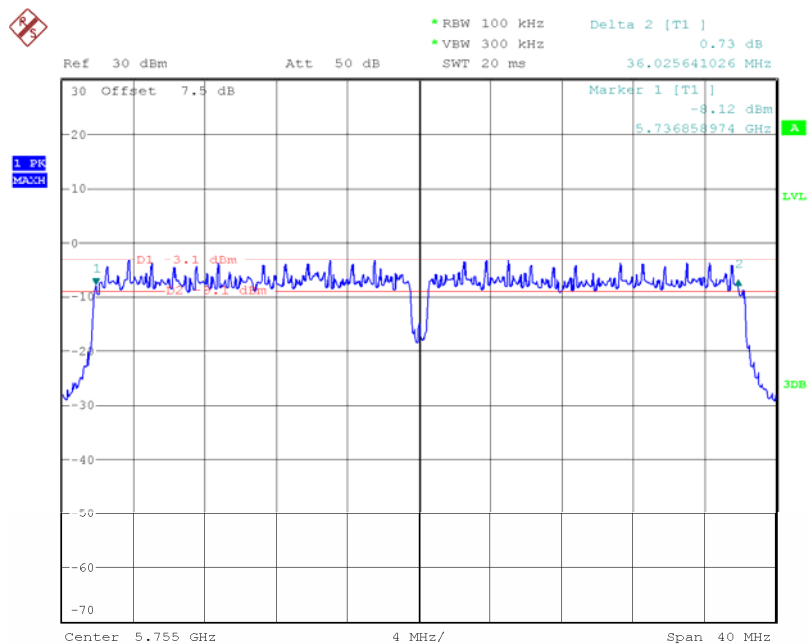


## 6dB Bandwidth (CH High)

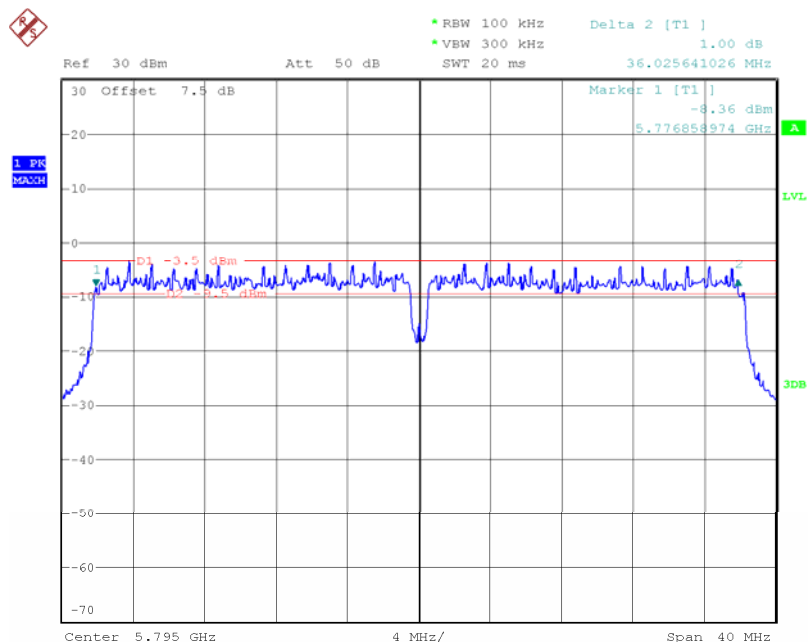


### IEEE 802.11n Wide-40 MHz Channel mode

### 6dB Bandwidth (CH Low)



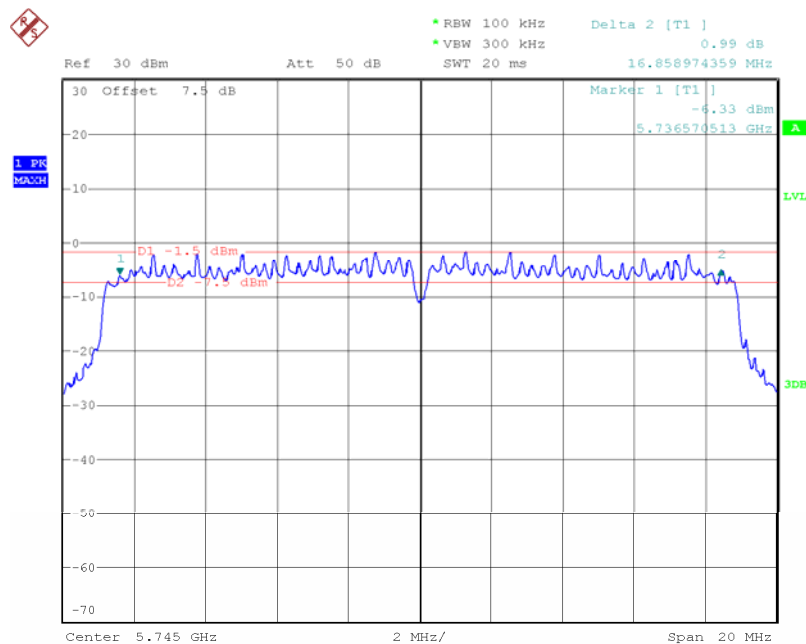
### 6dB Bandwidth (CH High)



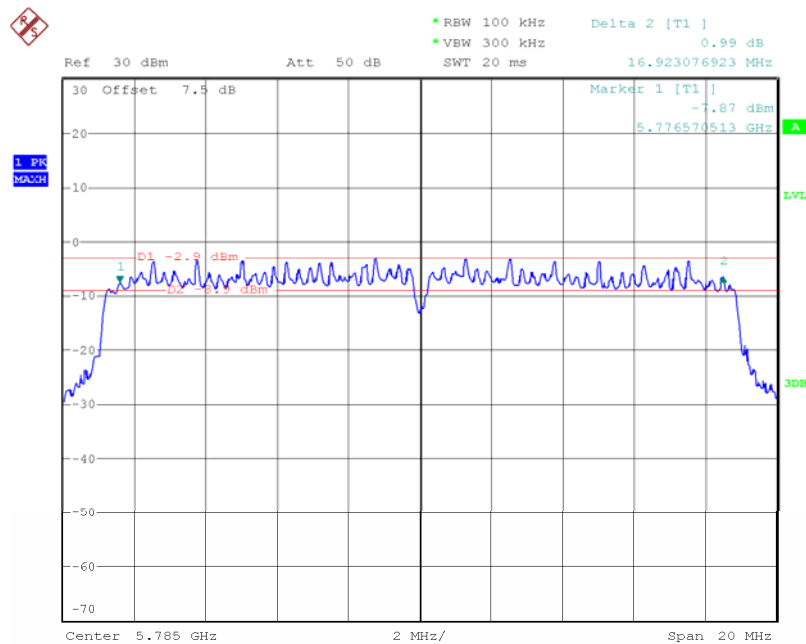


## IEEE 802.11ac Standard-20 MHz Channel mode

### 6dB Bandwidth (CH Low)

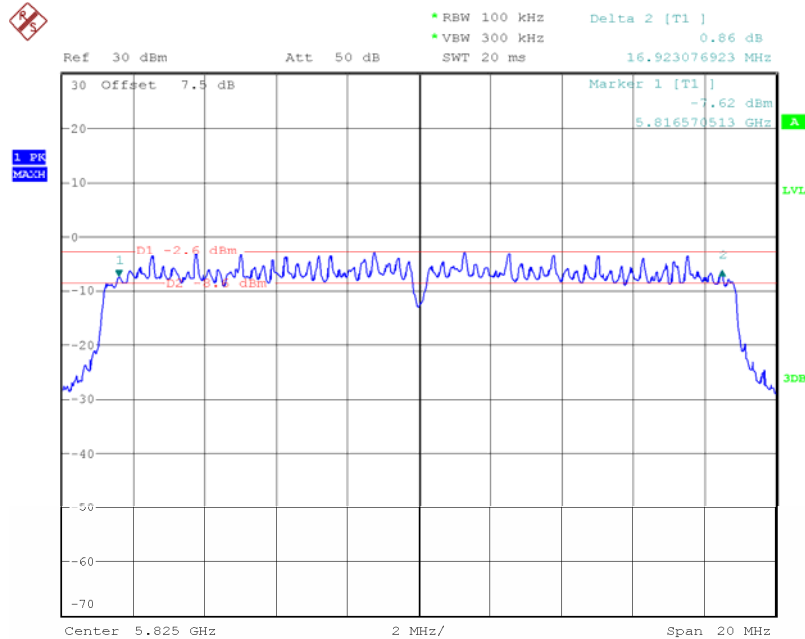


### 6dB Bandwidth (CH Mid)



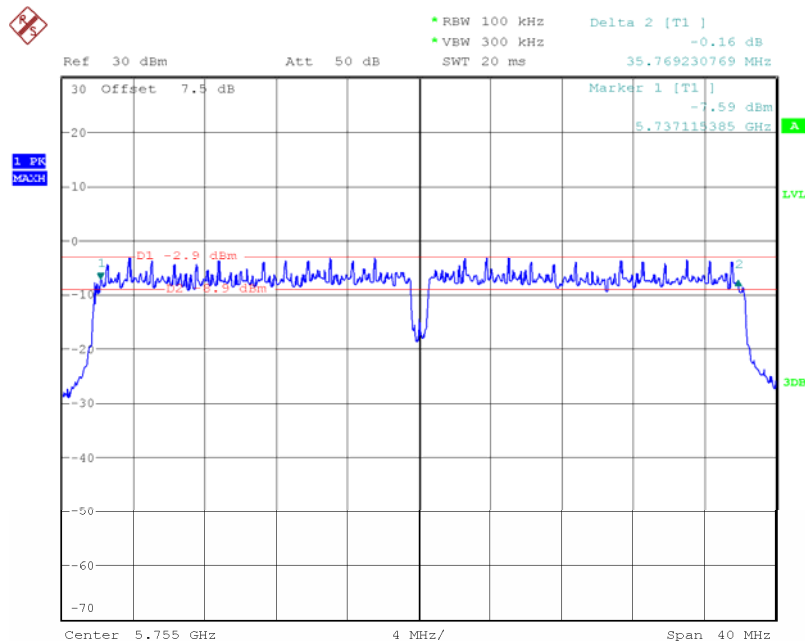


## 6dB Bandwidth (CH High)



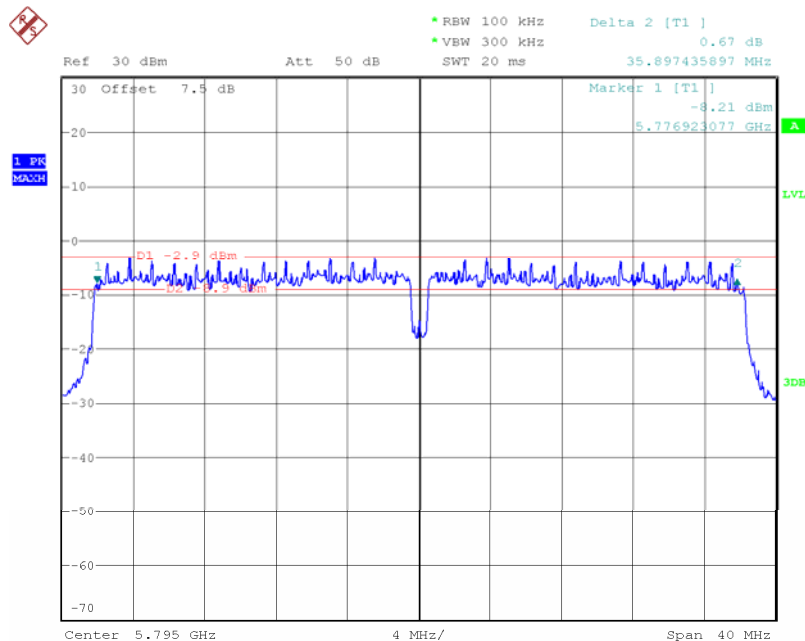
## IEEE 802.11ac Wide-40 MHz Channel mode

### 6dB Bandwidth (CH Low)



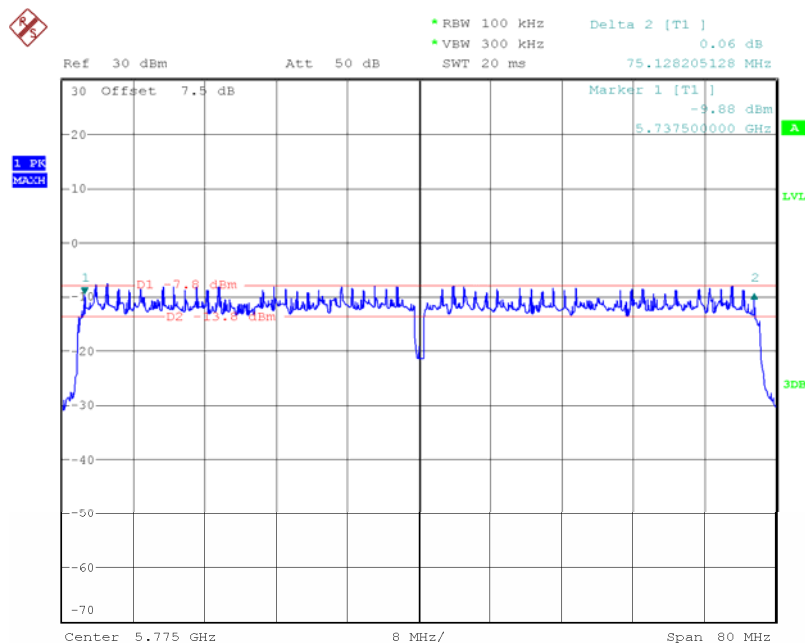


## 6dB Bandwidth (CH High)



## IEEE 802.11ac Wide-80 MHz Channel mode

### 6dB Bandwidth





## 7.2 MAXIMUM CONDUCTED OUTPUT POWER

### LIMIT

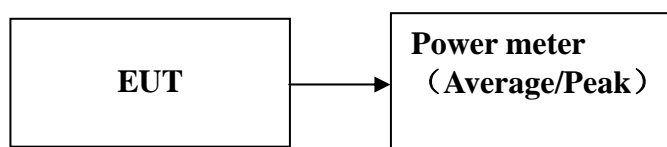
According to §15.407(a),

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 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.*

The peak power shall not exceed the limit as follow:

### Test Configuration



*The EUT was connected to a spectrum analyzer through a 50Ω RF cable.*

### TEST PROCEDURE

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor,  $10 \log(1/x)$ , where x is the duty cycle.

### TEST RESULTS

*No non-compliance noted*





## Test Data

Test mode: IEEE 802.11a mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5745	1.36	21.56	29
Mid	5785	1.36	21.32	29
High	5825	1.36	20.27	29

Test mode: IEEE 802.11n Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5745	3.59	21.96	29
Mid	5785	3.59	21.63	29
High	5825	3.59	20.67	29

Test mode: IEEE 802.11n Wide-40 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5755	4.88	21.45	29
Mid	5795	4.88	21.22	29

Test mode: IEEE 802.11ac Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5745	4.42	19.40	29
Mid	5785	4.42	20.66	29
High	5825	4.42	19.61	29

**Note:** Measured power(dBm) has offset with cable loss and duty factor



**Test mode: IEEE 802.11ac Wide-40 MHz Channel mode  
5745~5850MHz**

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5755	5.01	21.06	29
Mid	5795	5.01	19.82	29

**Test mode: IEEE 802.11ac Wide-80 MHz Channel mode  
5745~5850MHz**

Channel	Frequency (MHz)	Duty factor (dB)	Average Conducted Power (dBm)	Limit (dBm)
Low	5775	5.39	18.65	29

**Note:**Measured power(dBm) has offset with cable loss and duty factor



## 7.3 BAND EDGES MEASUREMENT

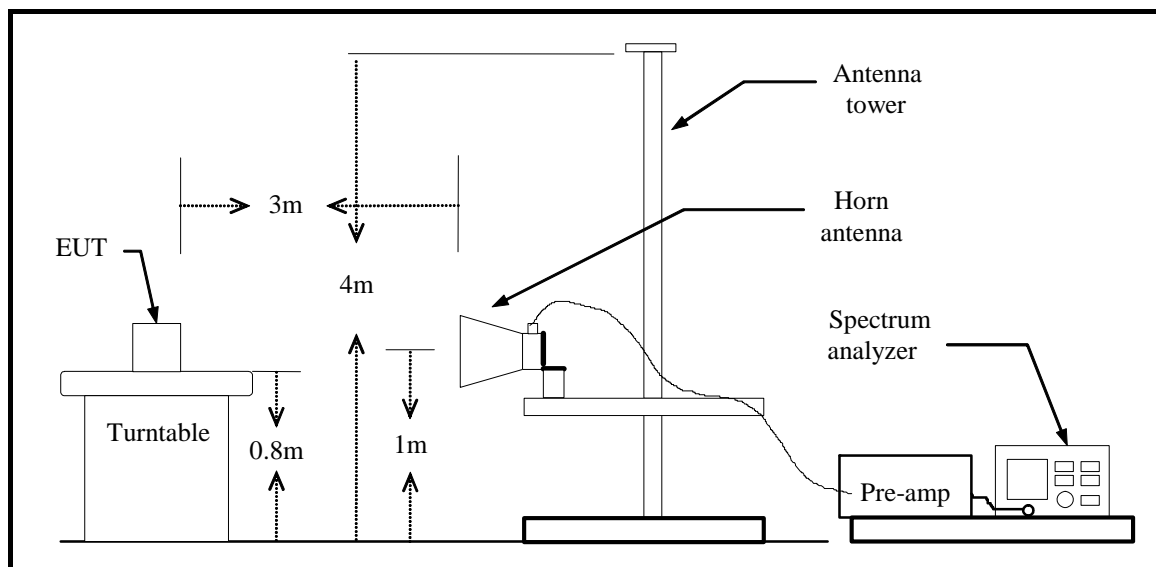
### LIMIT

According to §15.407(b),

(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

### Test Configuration



### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### TEST RESULTS

Refer to attach spectrum analyzer data chart.



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11a mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5713.582	63.83	-4.33	59.50	68.30	-8.80	100	360	peak
2	5723.317	64.59	-4.30	60.29	78.30	-18.01	100	218	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5712.139	64.79	-4.33	60.46	68.30	-7.84	100	153	peak
2	5715.985	69.62	-4.32	65.30	78.30	-13.00	100	84	peak
3	N/A								

<b>Operation Mode:</b>	Tx / IEEE 802.11a mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5852.788	61.64	-3.94	57.70	78.30	-20.60	100	306	peak
2	5867.684	62.15	-3.90	58.25	68.30	-10.05	100	261	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5854.728	66.40	-3.93	62.47	78.30	-15.83	100	185	peak
2	5860.545	65.87	-3.92	61.95	68.30	-6.35	100	191	peak



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11n 20 mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5707.091	61.46	-4.34	57.12	68.30	-11.18	100	285	peak
2	5717.909	61.29	-4.31	56.98	78.30	-21.32	100	157	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5714.183	65.95	-4.32	61.63	68.30	-6.67	100	190	peak
2	5719.231	68.89	-4.31	64.58	78.30	-13.72	100	148	peak

<b>Operation Mode:</b>	Tx / IEEE 802.11n 20 mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5854.327	61.74	-3.93	57.81	78.30	-20.49	100	321	peak
2	5861.699	60.98	-3.91	57.07	68.30	-11.23	100	0	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5851.122	65.20	-3.94	61.26	78.30	-17.04	100	147	peak
2	5860.737	64.71	-3.92	60.79	68.30	-7.51	100	188	peak



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11n 40 mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5710.577	62.12	-4.33	57.79	68.30	-10.51	100	201	peak
2	5721.635	63.39	-4.30	59.09	78.30	-19.21	100	228	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5712.139	67.24	-4.33	62.91	68.30	-5.39	100	263	peak
2	5721.514	71.37	-4.30	67.07	78.30	-11.23	100	263	peak

<b>Operation Mode:</b>	Tx / IEEE 802.11n 40 mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5852.083	61.58	-3.94	57.64	78.30	-20.66	100	338	peak
2	5863.942	61.58	-3.91	57.67	68.30	-10.63	100	13	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5850.320	62.86	-3.95	58.91	78.30	-19.39	100	262	peak
2	5867.788	62.16	-3.90	58.26	68.30	-10.04	100	143	peak



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 20 mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5711.178	62.08	-4.33	57.75	68.30	-10.55	100	139	peak
2	5723.317	62.09	-4.30	57.79	78.30	-20.51	100	272	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5714.543	68.20	-4.32	63.88	68.30	-4.42	100	187	peak
2	5715.986	70.62	-4.32	66.30	78.30	-12.00	100	189	peak

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 20 mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5853.582	61.33	-3.94	57.39	78.30	-20.91	100	58	peak
2	5869.800	61.96	-3.89	58.07	68.30	-10.23	100	242	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5850.144	67.47	-3.95	63.52	78.30	-14.78	100	156	peak
2	5861.955	65.50	-3.91	61.59	68.30	-6.71	100	188	peak



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

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Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 40 mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5713.582	62.68	-4.33	58.35	68.30	-9.95	100	251	peak
2	5716.226	63.88	-4.32	59.56	78.30	-18.74	100	137	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5714.784	67.84	-4.32	63.52	68.30	-4.78	100	261	peak
2	5720.793	72.26	-4.31	67.95	78.30	-10.35	100	263	peak

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 40 mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5854.615	60.87	-3.93	56.94	78.30	-21.36	100	142	peak
2	5860.513	61.49	-3.92	57.57	68.30	-10.73	100	331	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5849.872	61.89	-3.95	57.94	180.00	-122.06	100	261	peak
2	5864.744	61.51	-3.91	57.60	68.30	-10.70	100	137	peak





# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 80 mode CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5713.582	62.68	-4.33	58.35	68.30	-9.95	100	251	peak
2	5716.226	63.88	-4.32	59.56	78.30	-18.74	100	137	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5714.784	67.84	-4.32	63.52	68.30	-4.78	100	261	peak
2	5720.793	72.26	-4.31	67.95	78.30	-10.35	100	263	peak

<b>Operation Mode:</b>	Tx / IEEE 802.11ac 80 mode CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5854.615	60.87	-3.93	56.94	78.30	-21.36	100	142	peak
2	5860.513	61.49	-3.92	57.57	68.30	-10.73	100	331	peak

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	5849.872	61.89	-3.95	57.94	78.30	-20.36	100	261	peak
2	5864.744	61.51	-3.91	57.60	68.30	-10.70	100	137	peak



## 7.4 POWER SPECTRAL DENSITY

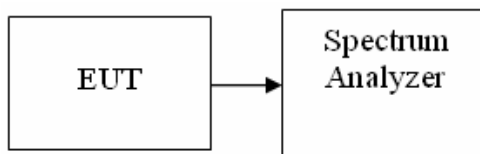
### LIMIT

According to §15.407(a),

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

*If transmitting antennas of directional gain greater than 6dBi are used, both the maximum transmit power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.*

### Test Configuration



### TEST PROCEDURE

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
2. Measure the duty cycle, Set span to encompass the entire emission bandwidth (EBW) of the signal. Set RBW = 300 kHz. Set VBW  $\geq$  1 MHz. Number of points in sweep  $\geq$  2 Span / RBW. Sweep time = auto. Detector = RMS, Trace average at least 100 traces in power averaging mode. Add  $10 \log(500\text{kHz}/\text{RBW})$  to the test result. Add  $10 \log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.
3. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
4. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (1): Measure and sum the spectra across the outputs. The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

### TEST RESULTS

*No non-compliance noted*



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

## Test Data

Test mode: IEEE 802.11a mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSP (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5745	1.36	2.86	2.22	6.44	29.00	PASS
Mid	5785	1.36	3.23	2.22	6.81	29.00	PASS
High	5825	1.36	1.53	2.22	5.11	29.00	PASS

Test mode: IEEE 802.11n Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSP (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5745	3.59	3.72	2.22	9.53	29.00	PASS
Mid	5785	3.59	3.51	2.22	9.32	29.00	PASS
High	5825	3.59	1.64	2.22	7.45	29.00	PASS

Test mode: IEEE 802.11n Wide-40 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSP (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5755	4.88	0.74	2.22	7.84	29.00	PASS
Mid	5795	4.88	0.24	2.22	7.34	29.00	PASS

Test mode: IEEE 802.11ac Standard-20 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSP (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5745	4.42	1.26	2.22	7.9	29.00	PASS
Mid	5785	4.42	2.60	2.22	9.24	29.00	PASS
High	5825	4.42	0.99	2.22	7.63	29.00	PASS



Test mode: IEEE 802.11ac Wide-40 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSPD (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5775	5.01	-0.97	2.22	6.26	29.00	PASS
Mid	5795	5.01	1.03	2.22	8.26	29.00	PASS

Test mode: IEEE 802.11ac Wide-80 MHz Channel mode

5745~5850MHz

Channel	Frequency (MHz)	Duty factor (dB)	Average PSD (dBm/500kHz)	10log (500kHz/ RBW) Factor(dB)	Total PPSPD (dBm)	Average PSD Limit (dBm/500kHz)	Result
Low	5775	5.39	-4.56	2.22	3.05	29.00	PASS

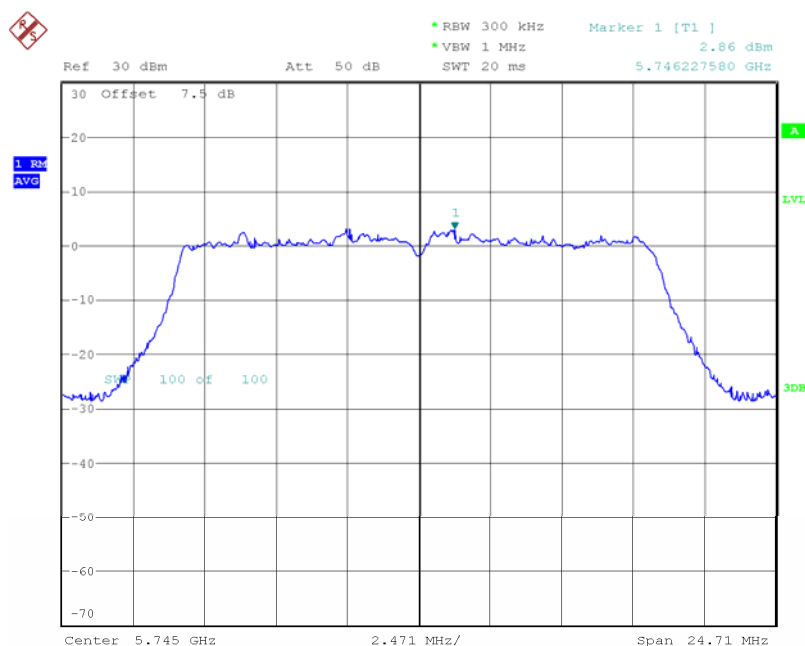
**Test Plot**



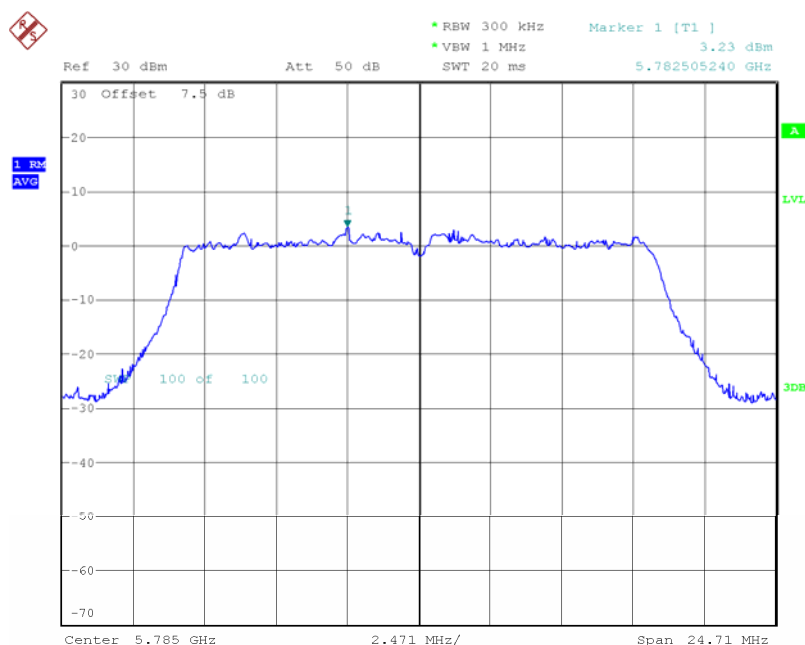
## IEEE 802.11a mode

5745~5850MHz

### CH Low

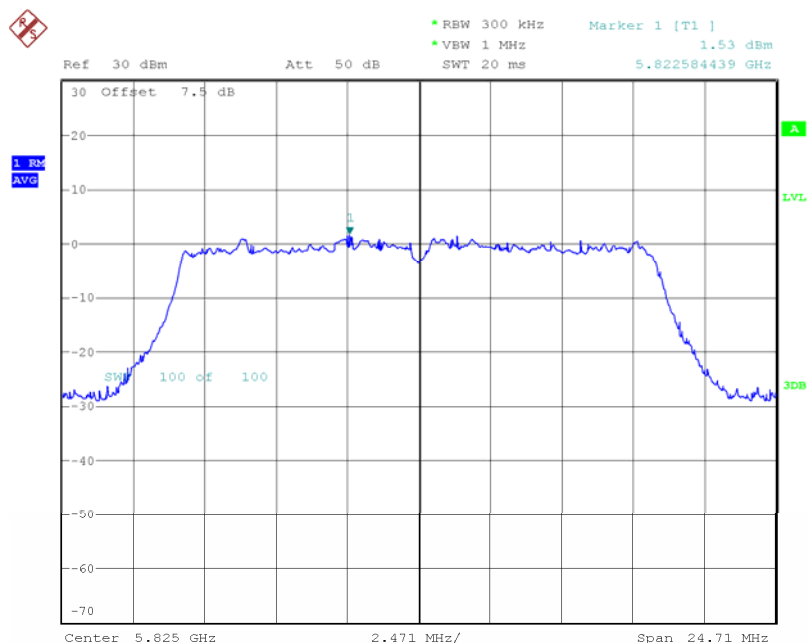


### CH Mid



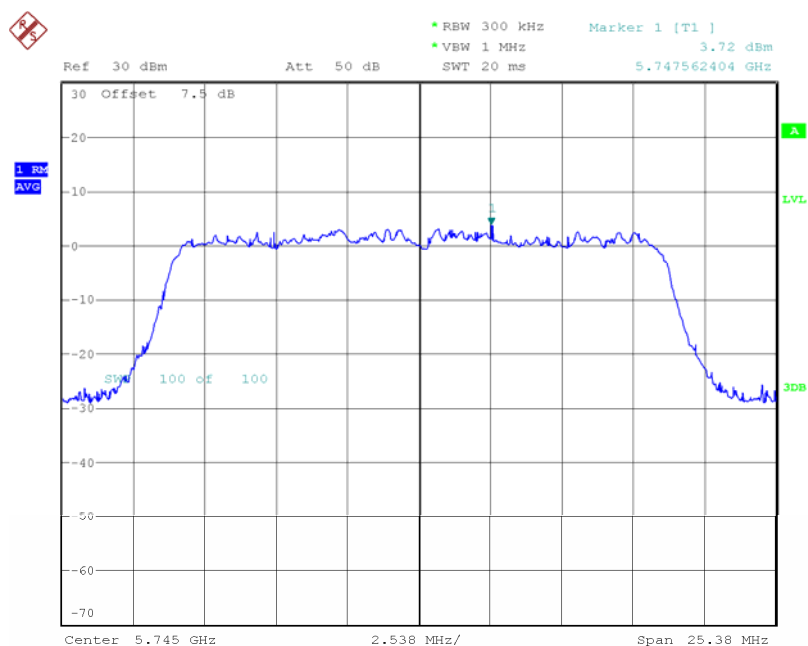


## CH High



## IEEE 802.11n Standard-20 MHz Channel mode 5745~5850MHz

### CH Low





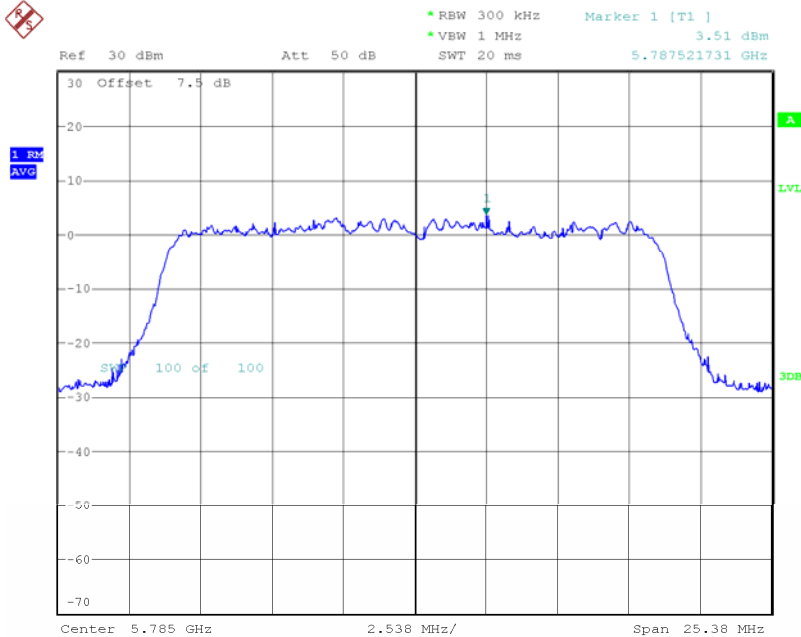
# Compliance Certification Services Inc.

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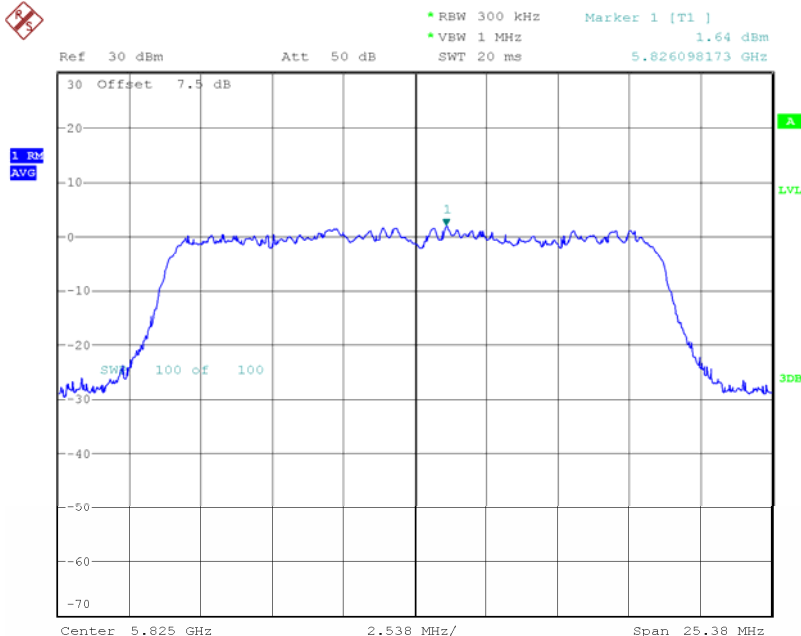
FCC ID: XPF-REG05-UTT

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## CH Mid



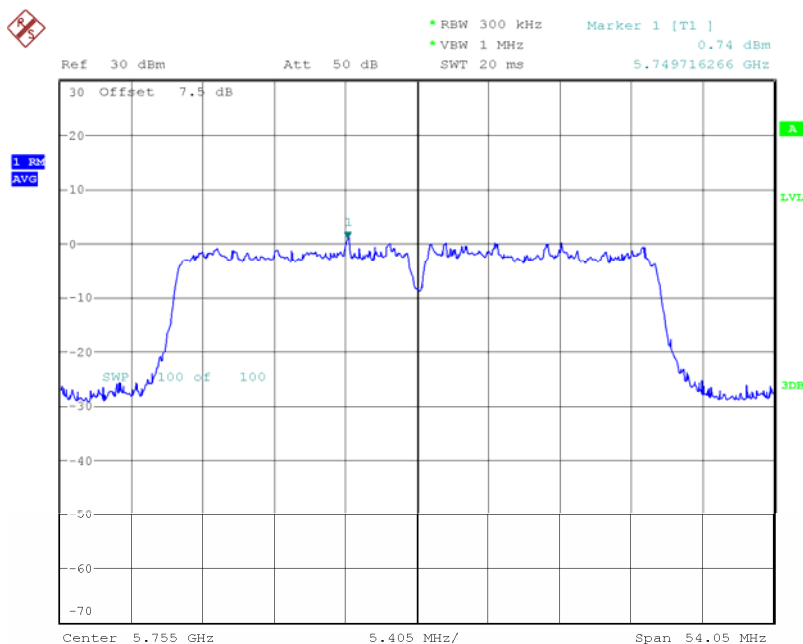
## CH High



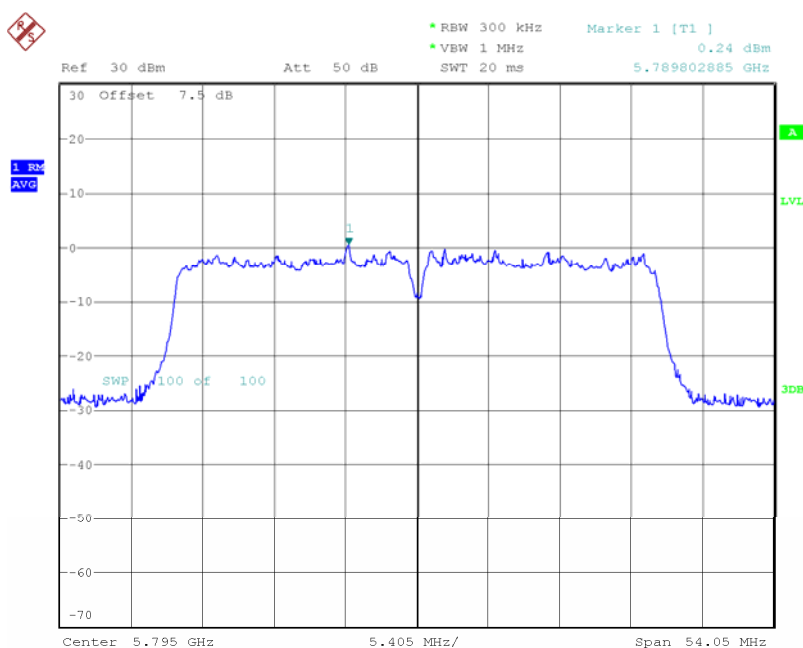


## IEEE 802.11n Wide-40 MHz Channel mode 5745~5850MHz

### CH Low



### CH High

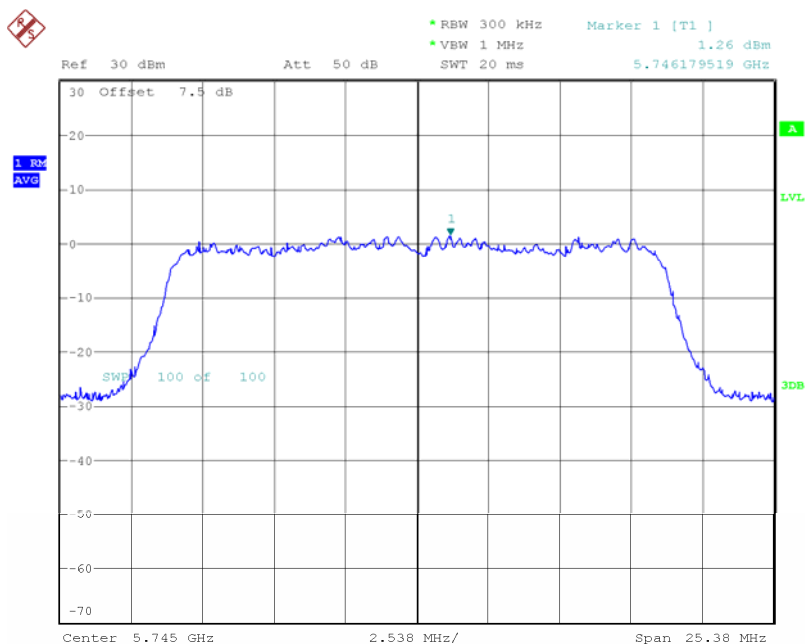




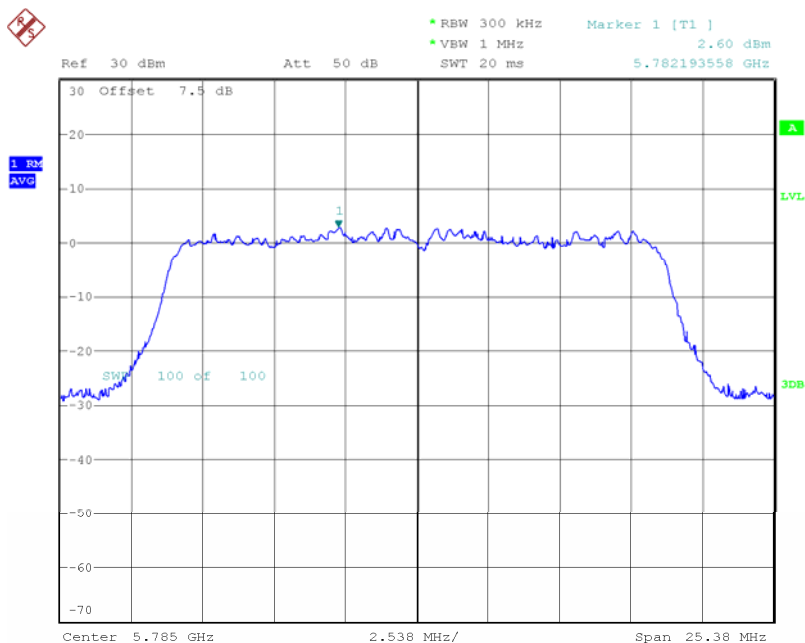


## IEEE 802.11ac Standard-20 MHz Channel mode 5745~5850MHz

### CH Low

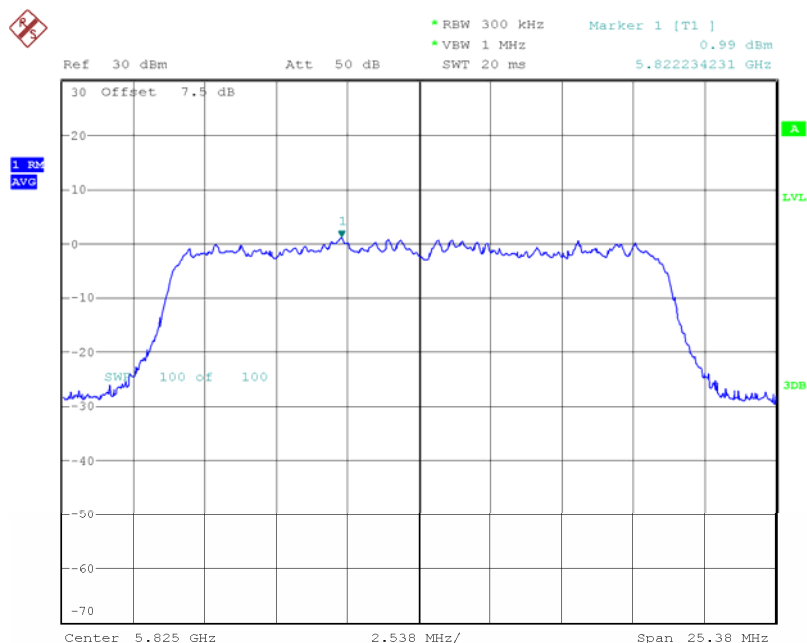


### CH Mid



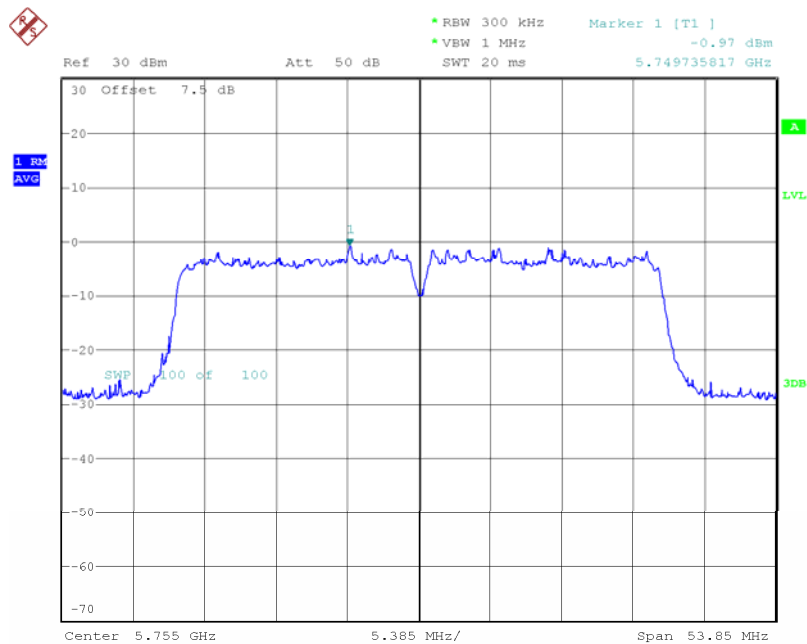


## CH High



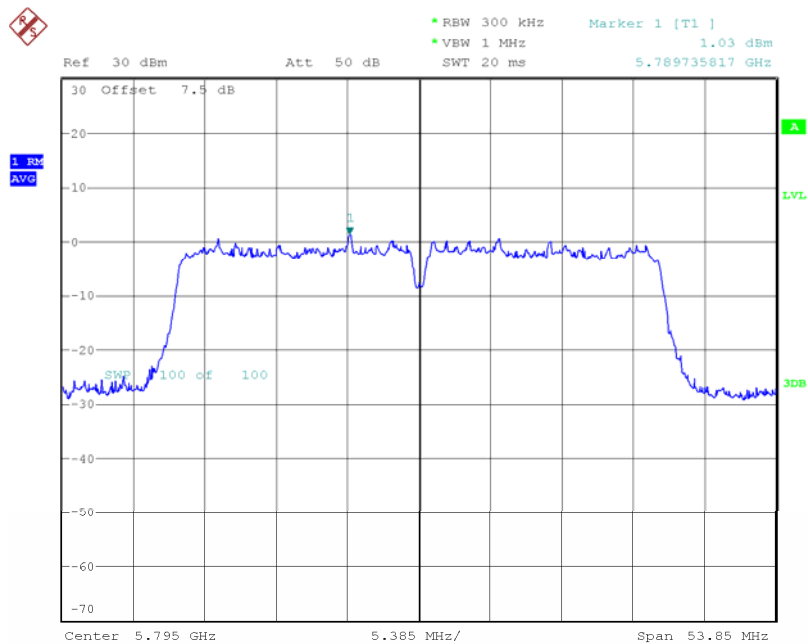
## IEEE 802.11ac Wide-40 MHz Channel mode 5745~5850MHz

## CH Low

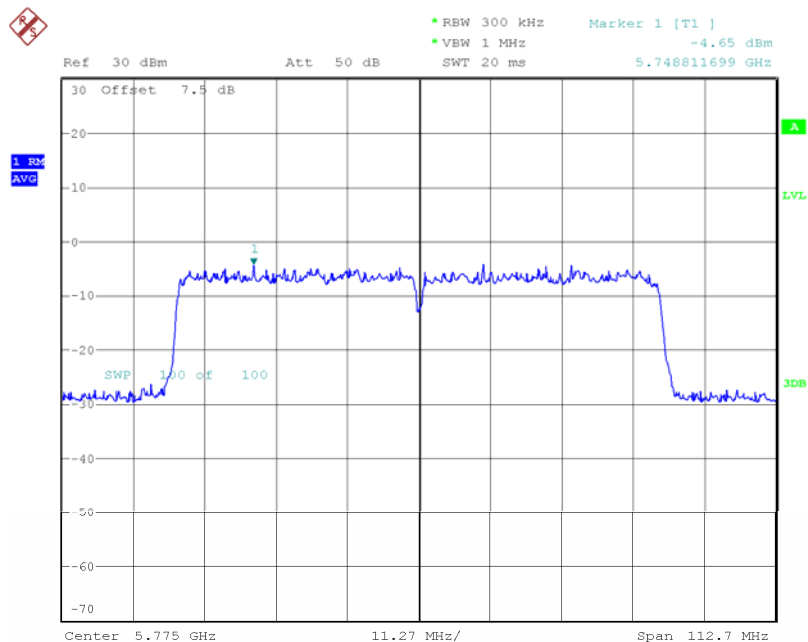




## CH High



## IEEE 802.11ac Wide-80 MHz Channel mode 5745~5850MHz





## 7.5 RADIATED UNDESIRABLE EMISSION

### LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCIES(MHz)	FIELD STRENGTH (microvolts/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

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

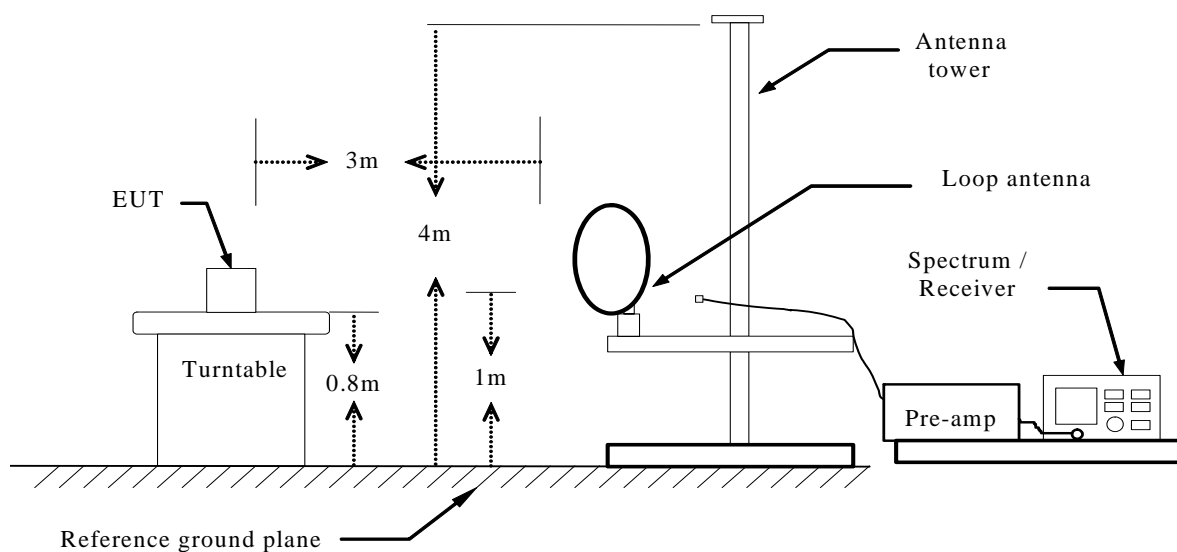
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ( $\mu$ V/m at 3-meter)	Field Strength (dB $\mu$ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

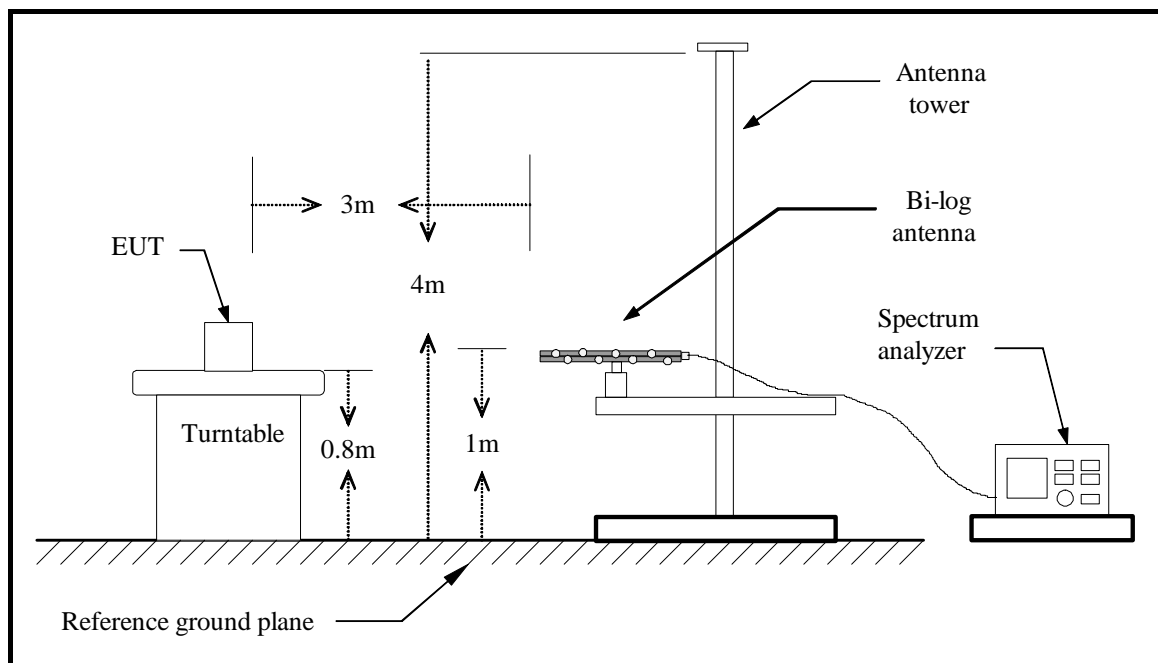
### Test Configuration



## Below 30MHz

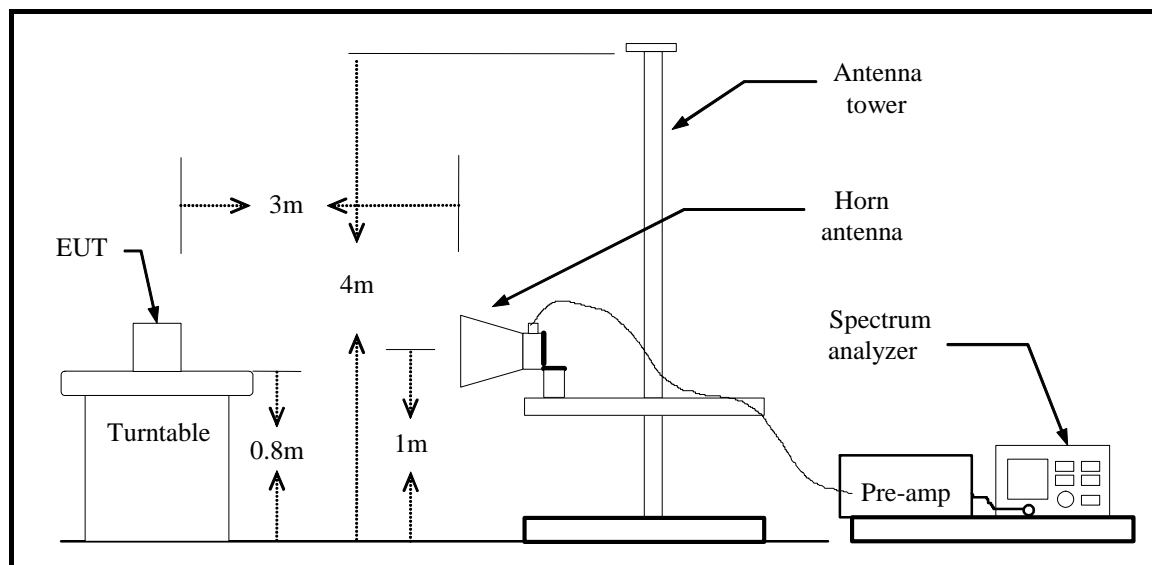


## Below 1 GHz





## Above 1 GHz



### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.



## TEST RESULTS

### Below 1 GHz

<b>Operation Mode:</b>	Normal Link	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	48% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
44.5500	V	20.91	12.48	33.39	40.00	-6.61	Peak
58.1300	V	28.12	8.09	36.21	40.00	-3.79	Peak
156.1000	V	17.27	13.48	30.75	43.50	-12.75	Peak
375.3200	V	21.47	17.45	38.92	46.00	-7.08	Peak
625.5800	V	17.07	21.39	38.46	46.00	-7.54	Peak
828.3100	V	13.48	24.69	38.17	46.00	-7.83	Peak
58.1300	H	28.42	8.09	36.51	40.00	-3.49	Peak
219.1500	H	19.23	13.33	32.56	46.00	-13.44	Peak
293.8400	H	21.76	14.94	36.70	46.00	-9.30	Peak
625.5800	H	15.04	21.39	36.43	46.00	-9.57	Peak
832.1900	H	14.48	24.82	39.30	46.00	-6.70	Peak
935.9800	H	15.10	25.30	40.40	46.00	-5.60	Peak

Remark:

- Measuring frequencies from 30 MHz to the 1GHz.(no emission found from the lowest internal used/generated frequency to 30MHz)
- Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
- Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).



# Compliance Certification Services Inc.

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## Above 1 GHz

Operation Mode:	Tx / IEEE 802.11a mode CH Low	Test Date:	2015-3-5
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

### Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	41.01	0.14	41.15	68.30	-27.15	100	2	peak
2	11080.128	37.76	8.59	46.35	74.00	-27.65	100	308	peak
3	N/A								
4									
5									
6									

### Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	40.34	0.14	40.48	68.30	-27.82	100	87	peak
2	10399.039	38.70	6.79	45.49	74.00	-28.51	100	280	peak
3	N/A								
4									
5									
6									

Operation Mode:	Tx / IEEE 802.11a mode CH Mid	Test Date:	2015-3-5
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

### Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.75	0.14	40.89	68.30	-27.41	100	223	peak
2	11161.859	37.67	8.53	46.20	74.00	-27.80	100	12	peak
3	N/A								
4									
5									
6									

### Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7102.564	40.36	0.16	40.52	68.30	-27.78	100	232	peak
2	10971.154	38.07	8.58	46.65	74.00	-27.35	100	109	peak
3	N/A								
4									
5									
N/A									





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FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

Operation Mode:	Tx / IEEE 802.11a mode CH High	Test Date:	2015-3-5
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7075.320	40.58	0.15	40.73	68.30	-27.57	100	61	peak
2	11189.103	37.86	8.50	46.36	74.00	-27.64	100	126	peak
3	N/A								
4									
5									
6									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.35	0.14	40.49	68.30	-27.81	100	86	peak
2	10780.449	38.20	8.04	46.24	74.00	-27.76	100	160	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n Standard-20 MHz Channel mode /CH Low	Test Date:	2015-3-5
Temperature:	25°C	Tested by:	James.Yan
Humidity:	55% RH	Polarity:	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	40.14	0.14	40.28	68.30	-28.02	100	141	peak
2	10862.180	37.41	8.27	45.68	74.00	-28.32	100	76	peak
3	N/A								
4									
5									
6									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	41.15	0.14	41.29	68.30	-27.01	100	25	peak
2	10671.474	38.37	7.73	46.10	74.00	-27.90	100	117	peak
3	N/A								
4									
5									
6									



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<b>Operation Mode:</b>	TX / IEEE 802.11n Standard-20 MHz Channel mode /CH Mid	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7075.320	40.31	0.15	40.46	68.30	-27.84	100	175	peak
2	11052.885	38.07	8.62	46.69	74.00	-27.31	100	238	peak
3	N/A								
4									
5									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	39.98	0.14	40.12	68.30	-28.18	100	30	peak
2	10698.718	37.92	7.81	45.73	74.00	-28.27	100	235	peak
3	N/A								
4									
5									
N/A									

<b>Operation Mode:</b>	TX / IEEE 802.11n Standard-20 MHz Channel mode /CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.52	0.14	40.66	68.30	-27.64	100	123	peak
2	10834.936	38.23	8.19	46.42	74.00	-27.58	100	65	peak
3	N/A								
4									
5									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	40.41	0.14	40.55	68.30	-27.75	100	325	peak
2	11052.885	37.72	8.62	46.34	74.00	-27.66	100	248	peak
3	N/A								
4									
5									
N/A									



# Compliance Certification Services Inc.

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FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	TX / IEEE 802.11n Wide-40 MHz Channel mode/CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	6993.590	39.12	0.10	39.22	68.30	-29.08	100	313	peak
2	10807.692	37.75	8.12	45.87	74.00	-28.13	100	58	peak
3	N/A								
4									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	40.25	0.14	40.39	68.30	-27.91	100	183	peak
2	11080.128	38.04	8.59	46.63	74.00	-27.37	100	18	peak
3	N/A								
4									
N/A									

<b>Operation Mode:</b>	TX / IEEE 802.11n Wide-40 MHz Channel mode /CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7020.833	40.26	0.14	40.40	68.30	-27.90	100	127	peak
2	11107.372	37.70	8.57	46.27	74.00	-27.73	100	222	peak
3	N/A								
4									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7120.525	50.26	0.14	50.40	68.30	-17.90	100	169	peak
2	11258.372	47.70	8.57	56.27	74.00	-17.74	100	222	peak
3	N/A								
4									
N/A									



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	TX / IEEE 802.11ac Standard-20 MHz Channel mode /CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.88	0.14	41.02	68.30	-27.28	100	359	peak
2	10780.449	38.38	8.04	46.42	74.00	-27.58	100	33	peak
3	N/A								
4									
5									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7075.320	40.75	0.15	40.90	68.30	-27.40	100	360	peak
2	10371.795	38.68	6.67	45.35	74.00	-28.65	100	255	peak
3	N/A								
4									
5									
N/A									

<b>Operation Mode:</b>	TX / IEEE 802.11ac Standard-20 MHz Channel mode/ CH Mid	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.82	0.14	40.96	68.30	-27.34	100	156	peak
2	10535.256	37.83	7.35	45.18	74.00	-28.82	100	187	peak
3	N/A								
4									
5									
6									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7075.320	40.55	0.15	40.70	68.30	-27.60	100	105	peak
2	10780.449	37.67	8.04	45.71	74.00	-28.29	100	117	peak
3	N/A								
4									
5									
N/A									



# Compliance Certification Services Inc.

Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

<b>Operation Mode:</b>	TX / IEEE 802.11ac Standard-20 MHz Channel mode /CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7238.782	40.23	0.20	40.43	68.30	-27.87	100	61	peak
2	10535.256	37.97	7.35	45.32	74.00	-28.68	100	68	peak
3	N/A								
4									
5									
6									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7075.320	40.26	0.15	40.41	68.30	-27.89	100	6	peak
2	10644.231	37.22	7.66	44.88	74.00	-29.12	100	77	peak
3	N/A								
4									
5									
N/A									

<b>Operation Mode:</b>	TX / IEEE 802.11ac Wide-40 MHz Channel mode /CH Low	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	41.05	0.14	41.19	68.30	-27.11	100	161	peak
2	10725.961	38.24	7.89	46.13	74.00	-27.87	100	328	peak
3	N/A								
4									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	40.66	0.14	40.80	68.30	-27.50	100	28	peak
2	11270.833	37.64	8.44	46.08	74.00	-27.92	100	352	peak
3	N/A								
4									
N/A									



# Compliance Certification Services Inc.

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Date of Issue : March 10, 2015

<b>Operation Mode:</b>	TX / IEEE 802.11ac Wide-40 MHz Channel mode /CH High	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7102.564	40.51	0.16	40.67	68.30	-27.63	100	78	peak
2	10780.449	37.74	8.04	45.78	74.00	-28.22	100	143	peak
3	N/A								
4									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7102.564	40.48	0.16	40.64	68.30	-27.66	100	60	peak
2	10671.474	37.78	7.73	45.51	74.00	-28.49	100	321	peak
3	N/A								
4									
N/A									

<b>Operation Mode:</b>	TX / IEEE 802.11ac wide-80 MHz Channel mode	<b>Test Date:</b>	2015-3-5
<b>Temperature:</b>	25°C	<b>Tested by:</b>	James.Yan
<b>Humidity:</b>	55% RH	<b>Polarity:</b>	Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7048.077	41.32	0.14	41.46	68.30	-26.84	100	195	peak
2	10807.692	38.35	8.12	46.47	74.00	-27.53	100	328	peak
3	N/A								
4									
5									
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	7148.077	51.32	1.14	50.46	68.30	-15.84	100	164	peak
2	10862.692	39.35	8.72	44.47	74.00	-24.53	100	315	peak
3	N/A								
4									
5									
N/A									



**Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 3 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*



## 7.6 POWERLINE CONDUCTED EMISSIONS

### LIMIT

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.





# Compliance Certification Services Inc.

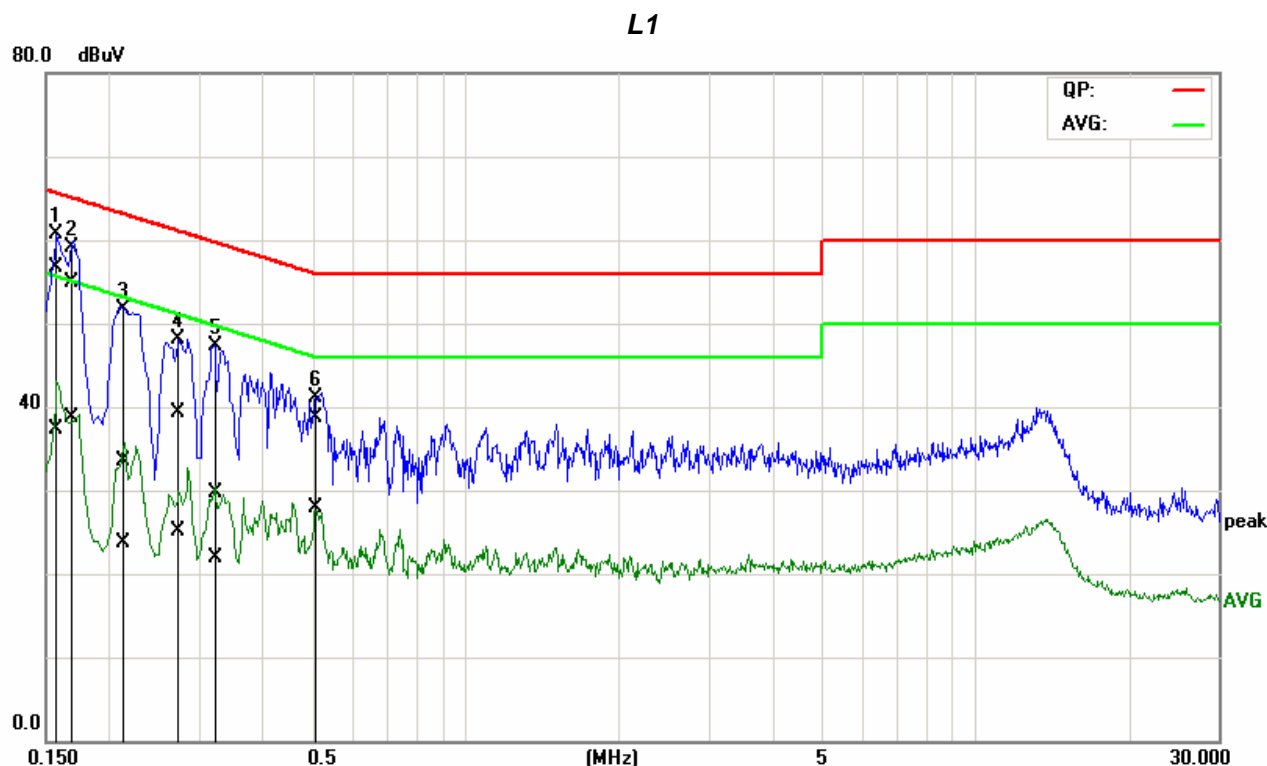
Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

## Test Data

Job No.:	C150127R02	Date:	2015-2-26
Model No.:	AC750GW	Time:	15:32:29
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	James.Yan
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1557	36.90	17.44	19.79	56.69	37.23	65.69	55.69	-9.00	-18.46	Pass
2	0.1661	35.08	18.97	19.74	54.82	38.71	65.15	55.15	-10.33	-16.44	Pass
3	0.2142	13.83	4.09	19.61	33.44	23.70	63.04	53.04	-29.60	-29.34	Pass
4	0.2756	19.55	5.50	19.66	39.21	25.16	60.95	50.95	-21.74	-25.79	Pass
5*	0.3190	9.96	2.25	19.69	29.65	21.94	59.73	49.73	-30.08	-27.79	Pass
6	0.5070	18.92	8.08	19.83	38.75	27.91	56.00	46.00	-17.25	-18.09	Pass

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).



# Compliance Certification Services Inc.

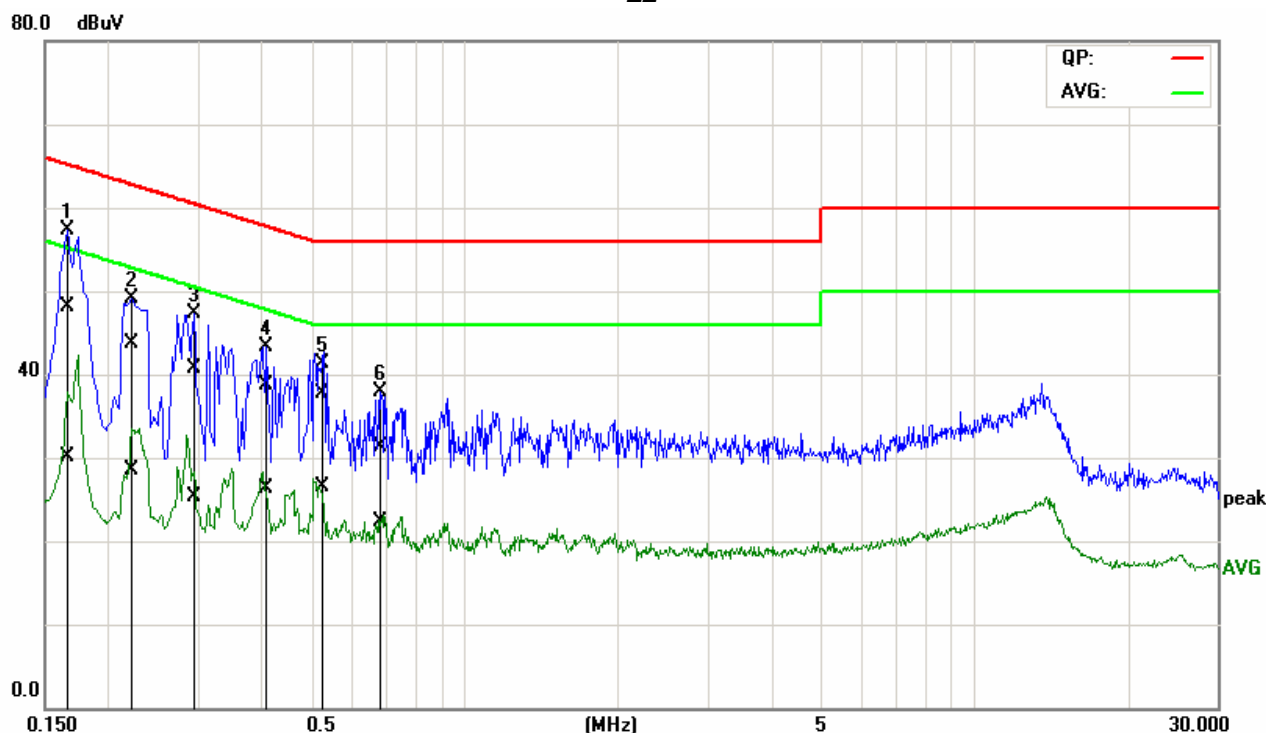
Report No: C150127R02-RPB

FCC ID: XPF-REG05-UTT

Date of Issue : March 10, 2015

Job No.:	C150127R02	Date:	2015-2-26
Model No.:	AC750GW	Time:	15:36:59
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	James.Yan
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	

## L2



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1636	28.34	10.32	19.71	48.05	30.03	65.28	55.28	-17.23	-25.25	Pass
2	0.2230	24.11	8.92	19.66	43.77	28.58	62.71	52.71	-18.94	-24.13	Pass
3	0.2950	20.92	5.57	19.71	40.63	25.28	60.38	50.38	-19.75	-25.10	Pass
4	0.4067	18.88	6.59	19.78	38.66	26.37	57.72	47.72	-19.06	-21.35	Pass
5*	0.5156	17.76	6.63	19.85	37.61	26.48	56.00	46.00	-18.39	-19.52	Pass
6	0.6790	11.37	2.39	19.84	31.21	22.23	56.00	46.00	-24.79	-23.77	Pass

END OF REPORT