FCC 47 CFR PART 15 SUBPART E

for

ACCESS POINT

Model:WA2500N,WA2520N,WA1700N,WA1900N,WA2200N,WA2530N,WA2550N, WA2580N, WA3000N, WA3020N, WA3050N, WA3080N

Brand: UTT

Test Report Number:

C160415Z13-RP1-2

Issued Date: June 1, 2016

Issued for

SHANGHAI UTT TECHNOLOGIES CO., LTD.

Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China

Issued by:

Compliance Certification Services (Shenzhen) Inc.

No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd.,

Guan Lan Town, Baoan District, Shenzhen, China

TEL: 86-755-28055000

FAX: 86-755-28055221

E-mail: Service@ccssz.com

ACCREDITED

TESTING CERT #2861.01

Note: *This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc. This document may be altered or revised by Compliance Certification Services (Shenzhen) Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, A2LA, NVLAP, NIST or any government agencies. The TEST RESULTS in the report only apply to the tested sample.*

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 1, 2016	Initial Issue	ALL	Sinphy Xie

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

TABLE OF CONTENTS

1. TEST CERTIFICATION 4
2. EUT DESCRIPTION 5
3. TEST METHODOLOGY 7
3.1 EUT CONFIGURATION 7
3.2 EUT EXERCISE 7
3.3 GENERAL TEST PROCEDURES 7
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS 8
3.5 DESCRIPTION OF TEST MODES 9
4. SETUP OF EQUIPMENT UNDER TEST 10
4.1 DESCRIPTION OF SUPPORT UNITS 10
4.2 CONFIGURATION OF SYSTEM UNDER TEST 10
5. FACILITIES AND ACCREDITATIONS 11
5.1 FACILITIES 11
5.2 EQUIPMENT 11
5.3 ACCREDITATIONS 11
5.4 MEASUREMENT UNCERTAINTY 12
6. FCC PART 15 REQUIREMENTS 13
6.1 26dB EMISSION BANDWIDTH 13
6.2 6dB BANDWIDTH MEASUREMENT 21
6.3 ANTENNA GAIN 29
6.4 PEAK POWER 31
6.5 BAND EDGES MEASUREMENT 34
6.6 PEAK POWER SPECTAL DENSITY 37
6.7 RADIATED UNDESIABLE EMISSION 46
6.8 CONDUCTED UNDESIRABLE EMISSION 62
6.9 POWERLINE CONDUCTED EMISSIONS 67
6.10 FREQUENCY STABILITY 71

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

1. TEST CERTIFICATION

Product	ACCESS POINT
Model	WA2500N,WA2520N,WA1700N,WA1900N,WA2200N,WA2530N,WA2550N, WA2580N, WA3000N, WA3020N, WA3050N, WA3080N
Brand	UTT
Tested	April 15~June 1, 2016
Applicant	**SHANGHAI UTT TECHNOLOGIES CO., LTD.** Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China
Manufacturer	**SHANGHAI UTT TECHNOLOGIES CO., LTD.** Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China

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

We hereby certify that:

Compliance Certification Services (Shenzhen) Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407、FCC 14-30.

The TEST RESULTS of this report relate only to the tested sample identified in this report.

Approved by:

Sunday Hu
Supervisor of EMC Dept.
Compliance Certification Services (Shenzhen) Inc.

Reviewed by:

Ruby Zhang
Supervisor of Report Dept.
Compliance Certification Services (Shenzhen) Inc.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

2. EUT DESCRIPTION

Product	ACCESS POINT
Model Number	WA2500N,WA2520N,WA1700N,WA1900N,WA2200N,WA2530N,WA2550N, WA2580N, WA3000N, WA3020N, WA3050N, WA3080N
Brand	UTT
Model Discrepancy	They are identical to each other except for market designation for marketing purpose.
Serial Number	C160415Z13-RP1-2
Received Date	April 15, 2016
Power Supply	POE or DC12V supplied by the Adapter
Adapter Manufacturer /Model No.	SHENZHEN FUJIA APPLIANCE CO., LTD. / FJ-SW1202000N I/P: 100-240Vac, 50/60Hz, 0.6A max O/P: 12Vdc, 2000mA DC Cable: Unshielded, 1.50m
Frequency Range	UNII Band IV: IEEE 802.11a, 802.11n HT20 : 5745MHz ~ 5825MHz IEEE 802.11n HT40: 5755MHz ~ 5795MHz IEEE 802.11ac 80: 5775MHz
Transmit Power	UNII Band IV: IEEE 802.11a: 25.99dBm IEEE 802.11n HT 20 MHz mode: 25.48dBm IEEE 802.11n HT 40 MHz mode: 25.46dBm IEEE 802.11ac 80: 25.44dBm
Modulation Technique	OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
Transmit Data Rate	IEEE 802.11a mode: 48, 36, 24, 18, 12, 9, 6Mbps IEEE802.11n HT20MHz mode: 6.5,13,19.5,26,39,52,58.5,65Mbps IEEE802.11n HT40MHz mode: 13.5,27,40.5,54,81,108,121.5,135Mbps IEEE802.11ac VHT80MHz mode: 29.3,58.5,87.8,117,175.5,234,263.3,292.5,351, 390Mbps
Number of Channels	UNII Band IV IEEE 802.11a, 802.11n HT20 : 5 Channels IEEE 802.11n HT 40 MHz mode: 2 Channels IEEE 802.11ac 80: 1 Channel
Antenna Specification	Internal antenna with 3dBi gain (Max)
Channels Spacing	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40: 40MHz IEEE 802.11ac 80: 80MHz
Temperature Range	-10°C ~ +50°C
Hardware Version	MT7620-B
Software Version	WA2500N-ENv2.8.0-160116.bin

Note: *1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Operation Frequency:

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)	
CHANNEL	**MHz**
149	5745
151	5755
153	5765
155	5775
157	5785
159	5795
161	5805
165	5825

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-REG08-UTT** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules and FCC 14-30.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 Radiated testing was performed at an antenna to EUT distance 3 meters. The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.407 and FCC 14-30.
Radio testing was performed according to KDB DA 02-2138、KDB 789033 D02、KDB 905462 D06；

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 13.1.4.1 of ANSI C63.10, 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 13.1.4.1 of ANSI C63.10.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

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	4.5 - 5.15
[1]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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] 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.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

3.5 DESCRIPTION OF TEST MODES

The EUT is a 1x1 configuration without beam forming function.

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

Test Item	Test mode	Worse mode
Conducted Emission	**Mode 1:** TX	☒
Radiated Emission	**Mode 1:** TX	☒

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.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.

UNII Band IV:

IEEE 802.11a for 5745 ~ 5825MHz:
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz for 5745 ~ 5825MHz:
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz Channel for 5755~ 5795MHz:
Channel Low (5755MHz) and Channel High (5795MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11ac 80 Channel for 5775MHz:
Channel Low (5775MHz) with 13.5Mbps data rate were chosen for full testing.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

4. SETUP OF EQUIPMENT UNDER TEST

4.1 DESCRIPTION OF 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.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook	E335	N/A	DOC	Thinkpad	Shielded 1.50m	Unshielded 2.00m

Note:

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2 CONFIGURATION OF SYSTEM UNDER TEST

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

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at
No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.10, ANSI C63.7 and CISPR Publication 22.

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 pre-selectors 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 ACCREDITATIONS

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

USA	**A2LA**
China	**CNAS**

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

USA	**FCC**
Japan	**VCCI (C-4815,R-4320,T-2317, G-10624)**
Canada	**INDUSTRY CANADA**

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

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

5.4 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF frequency	+/-1 * 10-5
RF power conducted	+/- 1,5 dB
RF power radiated	+/- 6 dB
Spurious emissions, conducted	+/- 3 dB
Spurious emissions, radiated	+/- 6 dB
Humidity	+/- 5 %
Temperature	+/- 1°C
Time	+/-10 %

Remark: *This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6. FCC PART 15 REQUIREMENTS

6.1 26dB EMISSION BANDWIDTH

6.1.1LIMIT

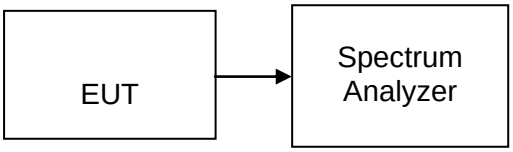
According to §15.303(c), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

6.1.2MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

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

6.1.3TEST CONFIGURATION



6.1.4TEST 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 > 1%EBW, VBW > RBW, Span >26dB bandwidth, Detector = Peak, and Sweep = auto.
4. Mark the peak frequency and –26dB (upper and lower) frequency.
5. Repeat until all the rest channels were investigated.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.1.5TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5745	20.98
Mid	5785	19.17
High	5825	19.28

Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5745	19.88
Mid	5785	19.88
High	5825	19.65

Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5755	39.14
High	5795	38.73

Test mode: IEEE 802.11ac 80 mode / 5775MHz

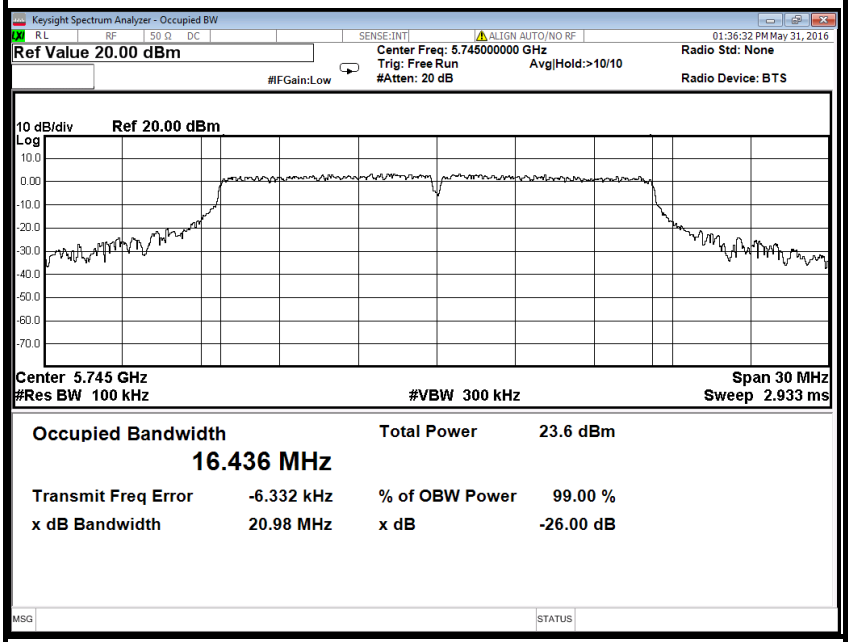
Channel	Frequency (MHz)	Bandwidth(B) (MHz)
	5775	79.62

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

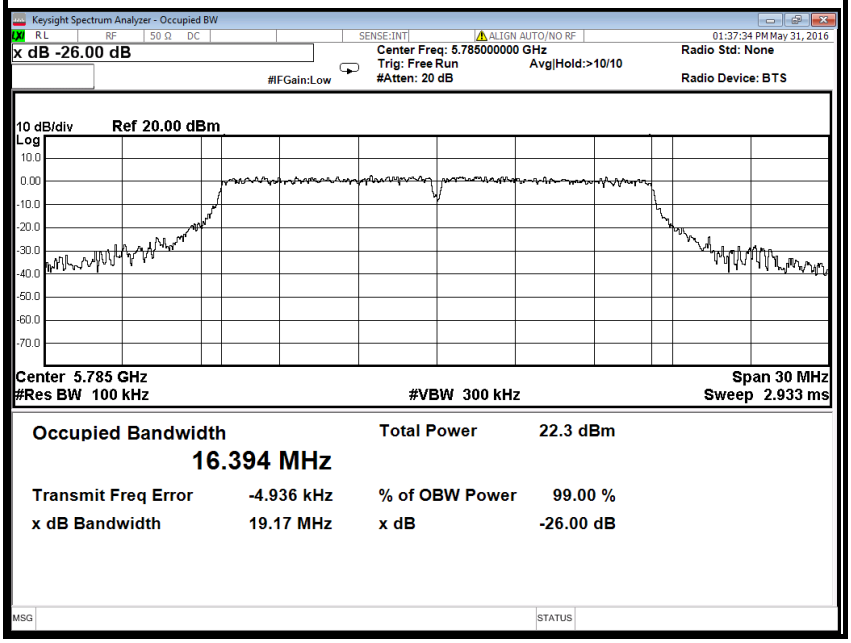
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

26dB Bandwidth (CH Low)

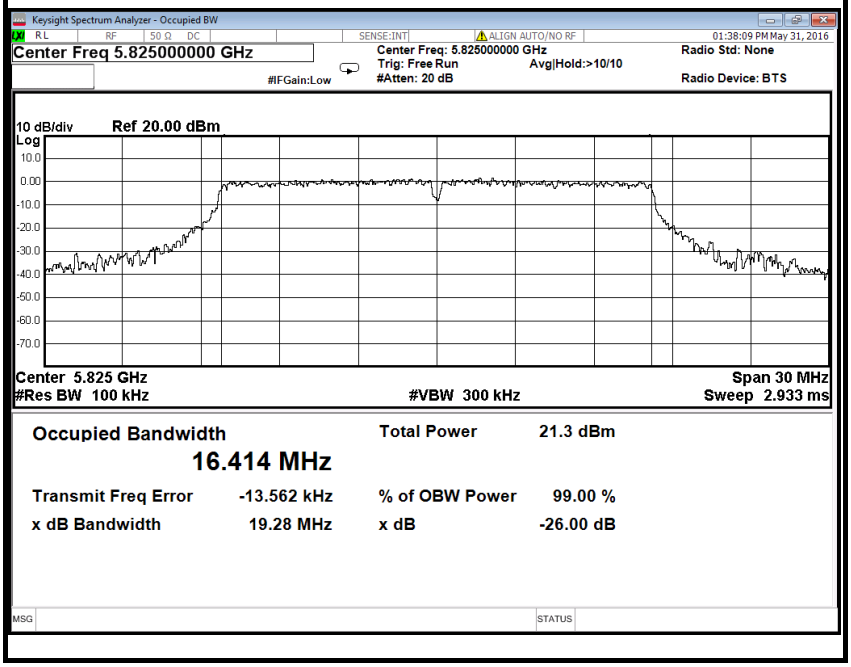


26dB Bandwidth (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

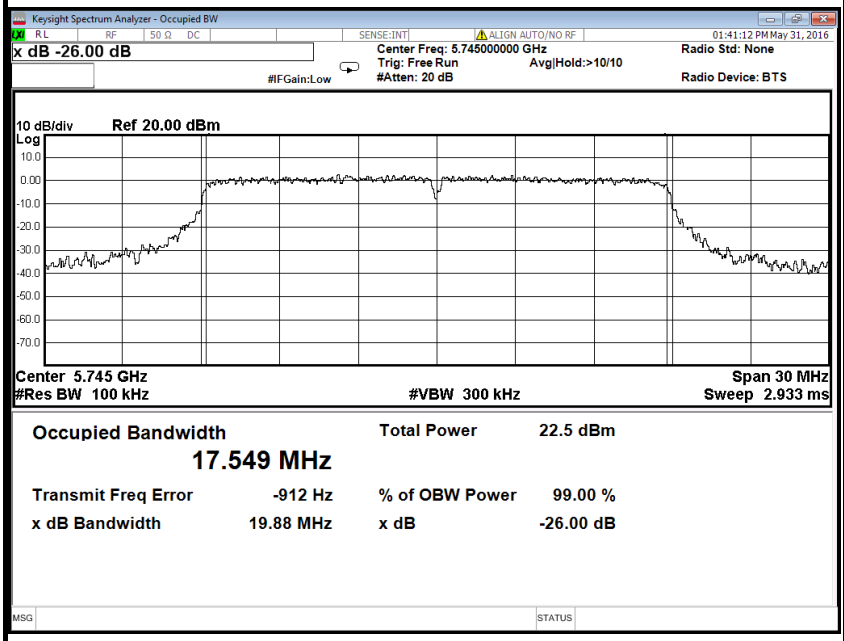
26dB Bandwidth (CH High)



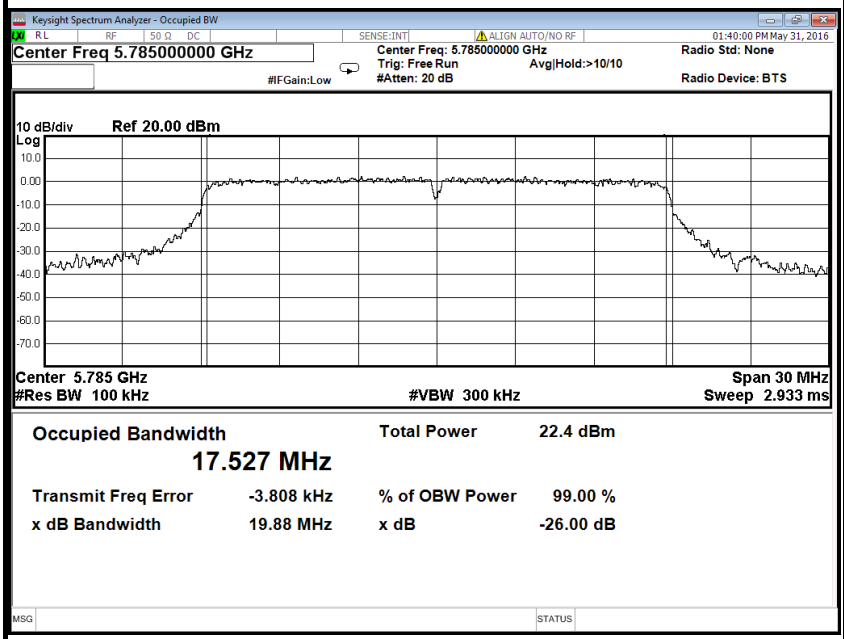
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

26dB Bandwidth (CH Low)

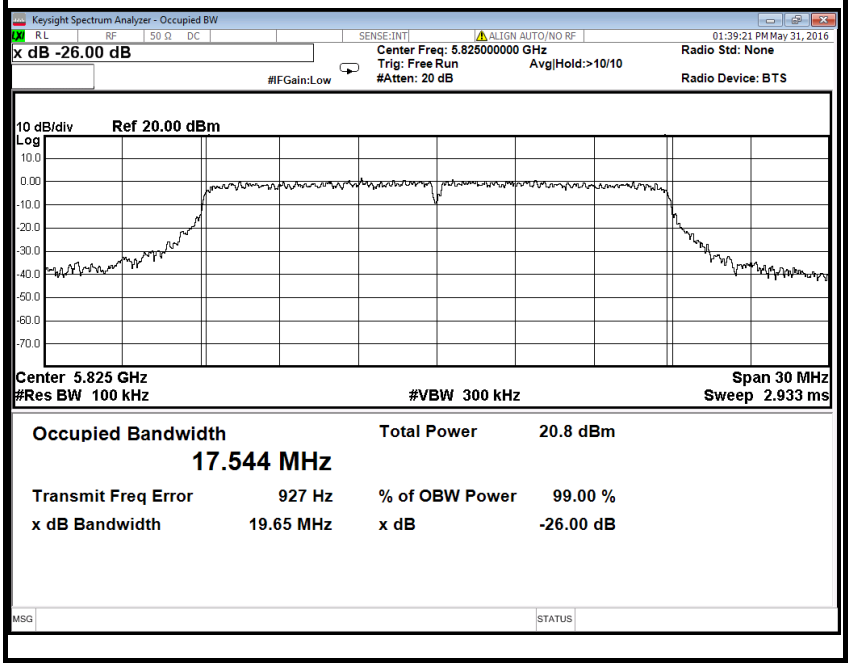


26dB Bandwidth (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

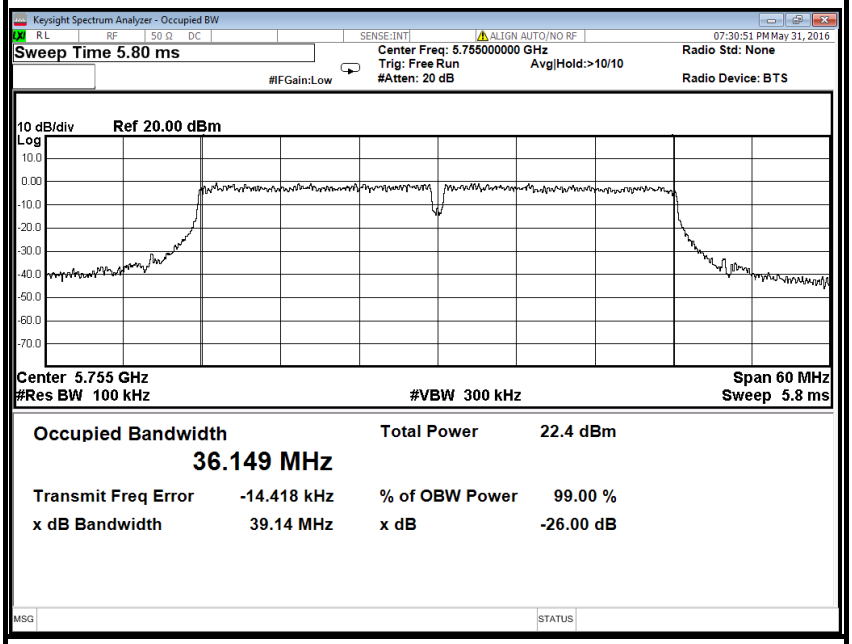
26dB Bandwidth (CH High)



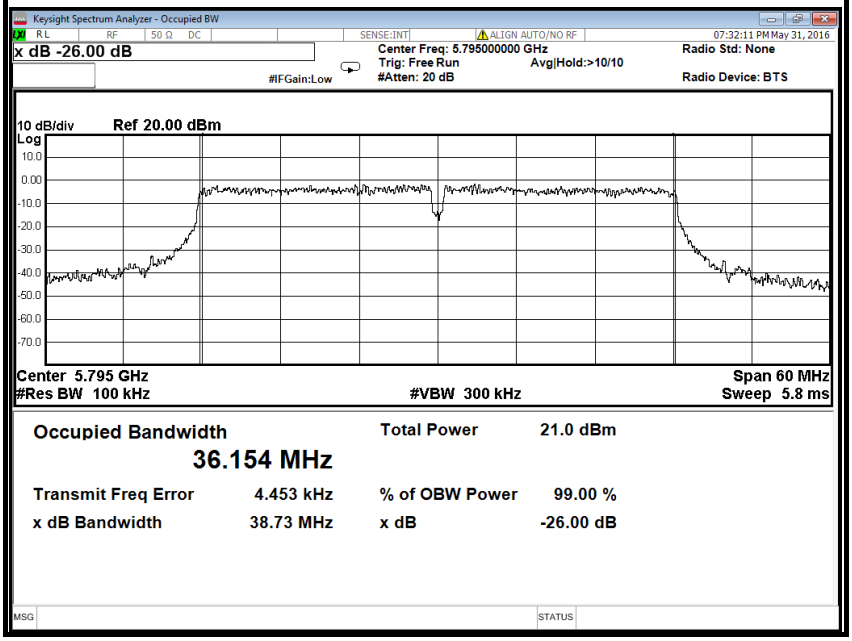
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

26dB Bandwidth (CH Low)



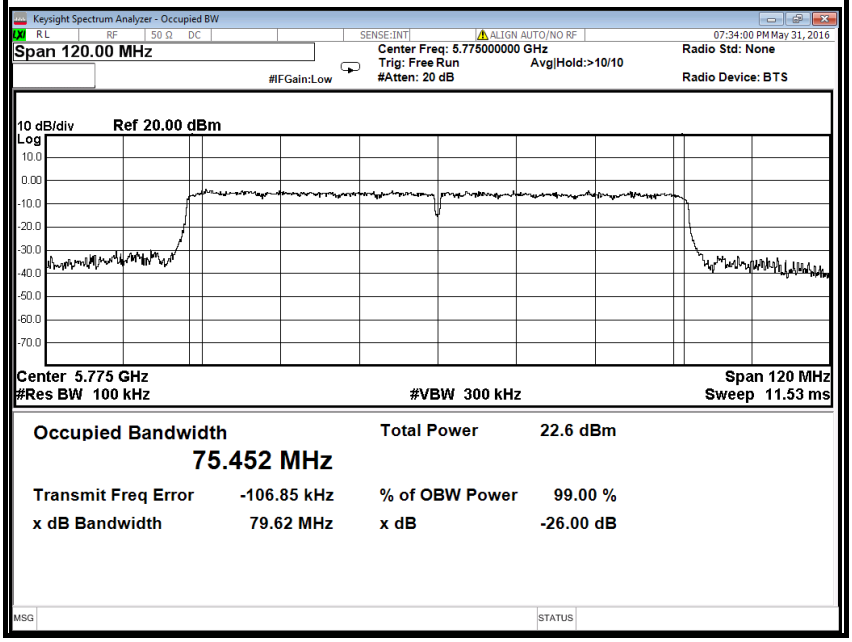
26dB Bandwidth (CH High)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11ac 80 mode / 5775MHz

26dB Bandwidth



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.2 6dB BANDWIDTH MEASUREMENT

6.2.1 LIMITS

According to §15.407(e), Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

6.2.2 TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

6.2.3 TEST PROCEDURES (please refer to measurement standard)

8.1 Option 1:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 x RBW.

c) Detector = Peak.

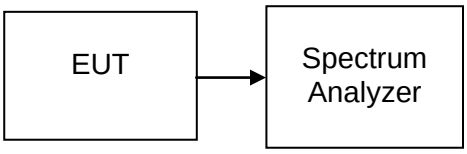
d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.2.4 TEST SETUP



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.2.5 TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5745	16.48
Mid	5785	16.50
High	5825	16.55

Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5745	17.64
Mid	5785	17.63
High	5825	17.64

Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5755	36.50
High	5795	36.53

Test mode: IEEE 802.11ac 80 mode / 5775MHz

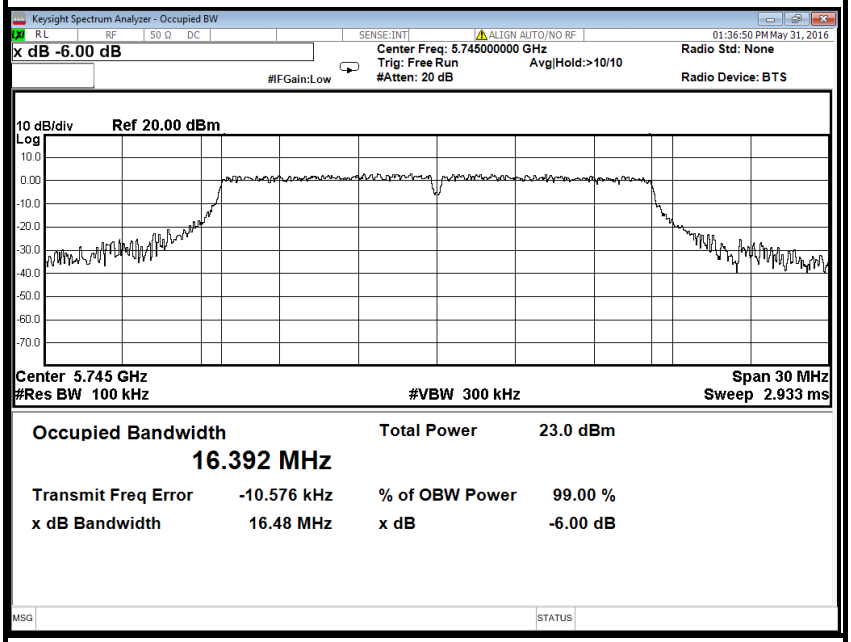
Channel	Frequency (MHz)	Bandwidth(B) (MHz)
	5775	76.43

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

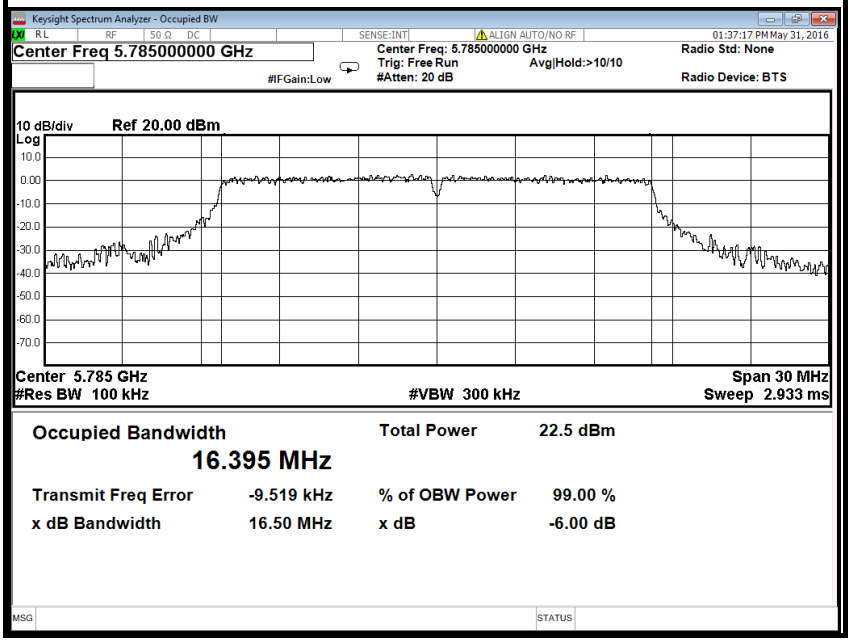
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

6dB Bandwidth (CH Low)

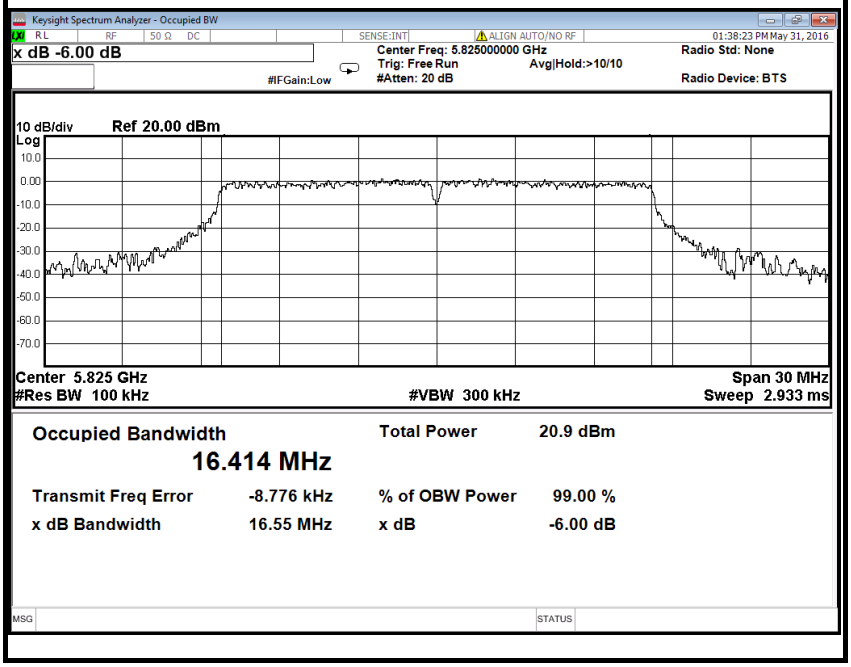


6dB Bandwidth (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

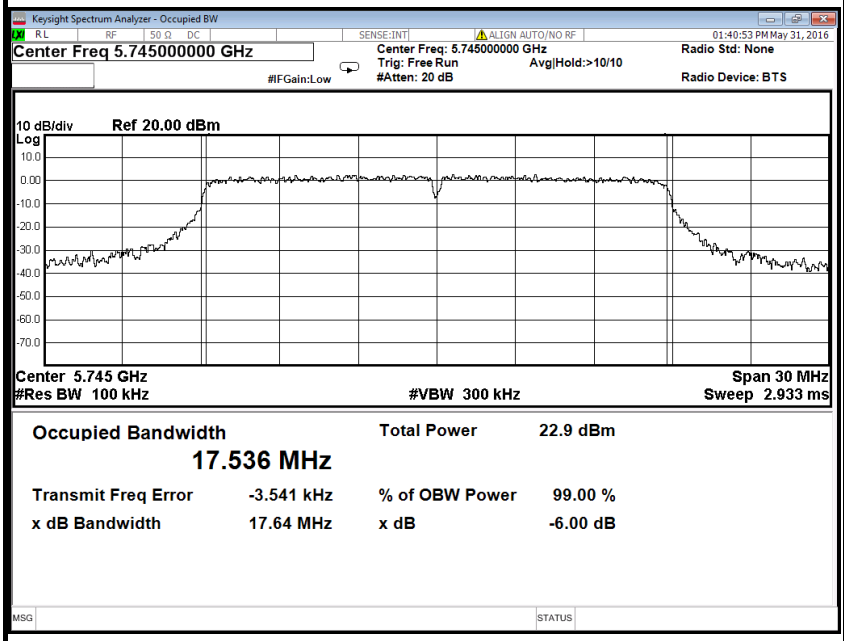
6dB Bandwidth (CH High)



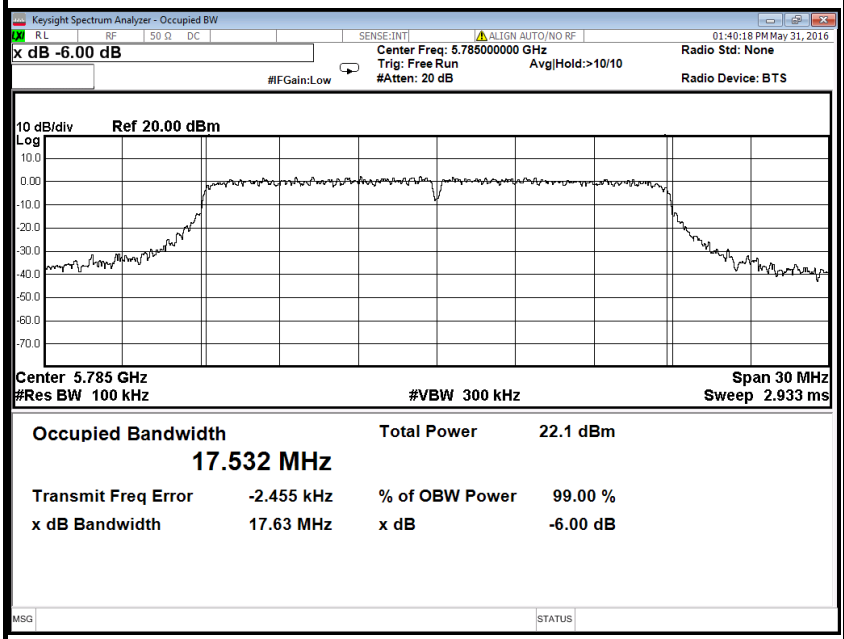
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

6dB Bandwidth (CH Low)

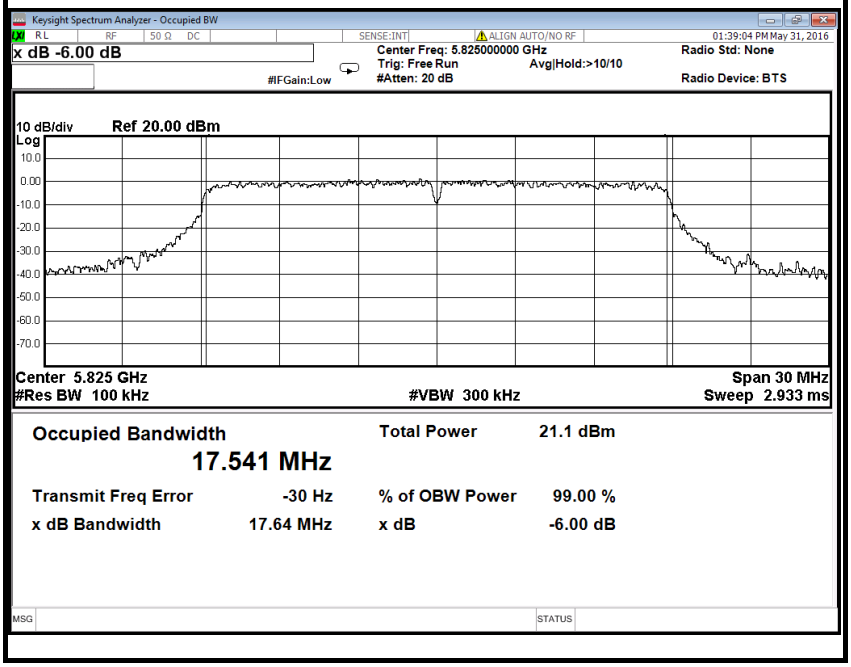


6dB Bandwidth (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

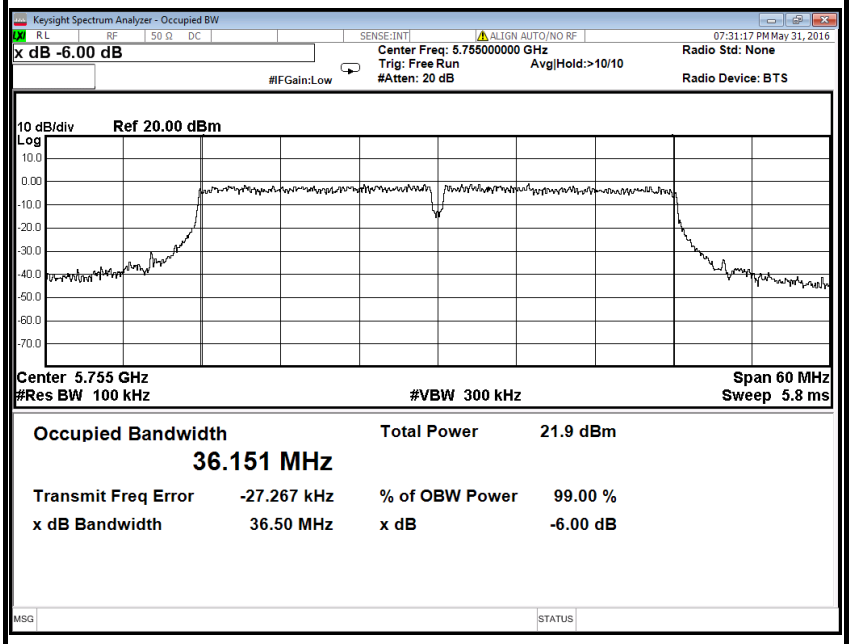
6dB Bandwidth (CH High)



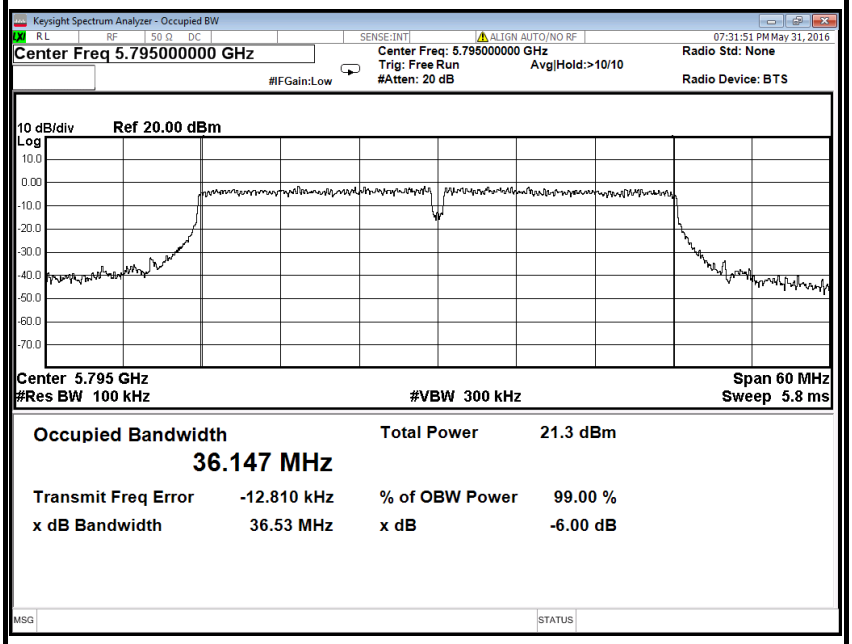
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

6dB Bandwidth (CH Low)



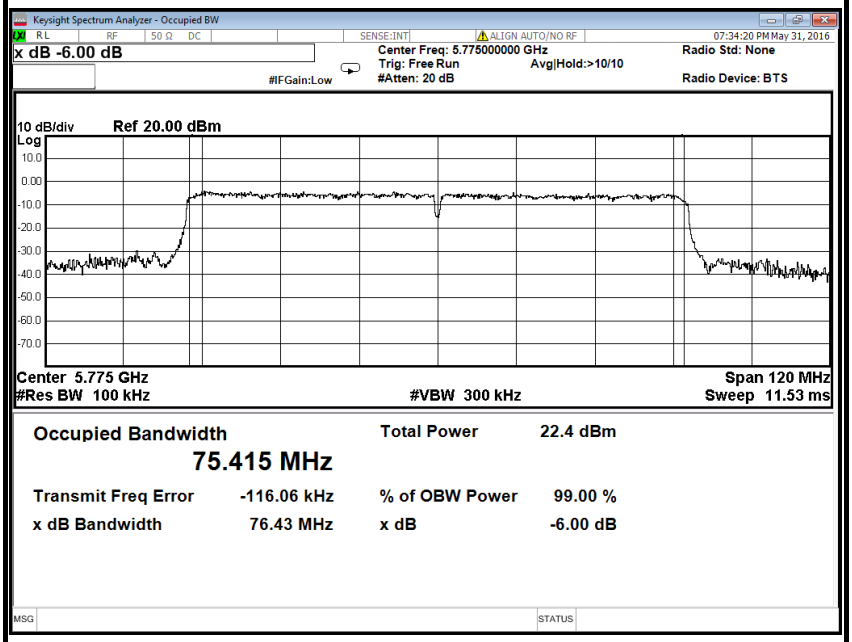
6dB Bandwidth (CH High)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11ac 80 mode / 5775MHz

6dB Bandwidth



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.3 ANTENNA GAIN

MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the OFDM mode is used.

MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

LIMITS

FCC	IC
Antenna Gain	
6 dBi	

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

TEST RESULTS

IEEE 802.11a mode

T_{nom}	V_{nom}	Lowest channel 5745MHz	Highest channel 5825MHz
Conducted power [dBm] Measured with OFDM modulation		12.77	12.22
Radiated power [dBm] Measured with OFDM modulation		14.21	11.37
Gain [dBi] Calculated		1.44	-0.85
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)	

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.4 OUTPUT POWER

6.4.1 LIMIT

According to §15.407(a)& FCC R&O FCC 14 - 30,

(1) (i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 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. In addition, 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 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500 kHz 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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.

Specified Limit of the Peak Power

Not applicable, since the EUT only used band IV.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

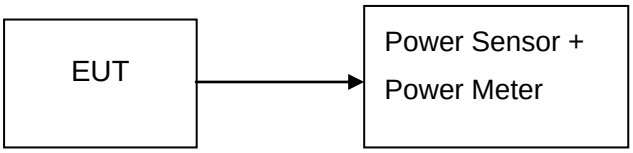
6.4.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	02/21/2016	02/20/2017
Power Sensor	Anritsu	MA2411B	1126150	02/21/2016	02/20/2017

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

6.4.3 TEST CONFIGURATIONS

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



6.4.4 TEST PROCEDURE

Set span to encompass the entire emission bandwidth (EBW) of the signal.

Set RBW = 1 MHz / Set VBW = 3 MHz.

Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”.·Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

6.4.5 TEST RESULTS

No non-compliance noted

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.4.6 TEST DATA

IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak/AVG	Limit (dBm)	Result
Low	5745	25.99	0.39719	Peak	30.00	PASS
Mid	5785	25.59	0.36224			PASS
High	5825	25.07	0.32137			PASS

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak/AVG	Limit (dBm)	Result
Low	5745	25.48	0.35318	Peak	30.00	PASS
Mid	5785	25.43	0.34914			PASS
High	5825	24.88	0.30761			PASS

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHzs

Low	5755	25.46	0.35156	Peak	30.00	PASS
High	5795	25.06	0.32063			PASS

IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak/AVG	Limit (dBm)	Result
	5775	25.44	0.34995	Peak	30.00	PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.5 BAND EDGES MEASUREMENT

6.5.1LIMIT

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.

6.5.2MEASUREMENT EQUIPMENT USED

Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	EMEC	EM330	060661	03/18/2016	03/17/2017
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2015	09/24/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

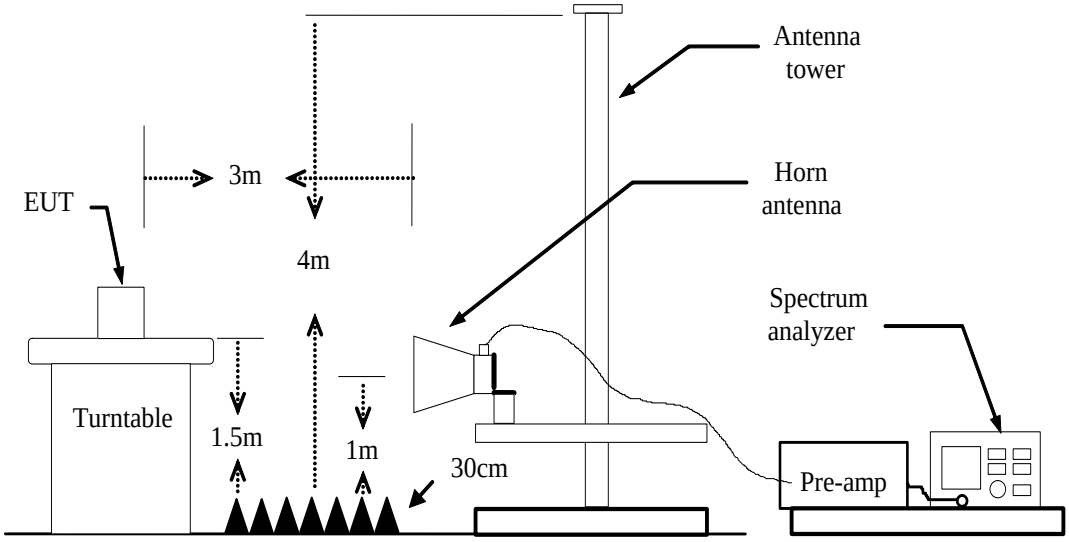
NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The FCC Site Registration number is 101879.

3. N.C.R = No Calibration Required.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.5.3TEST CONFIGURATION



6.5.4TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m 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=1 / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO / Detector=RMS
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.5.5TEST RESULT

IEEE 802.11a mode / 5500 ~ 5700MHz

1. Operating Frequency: 5500-5700MHz
2. CH Low: 5500MHz, CH High: 5700MHz
3. 26dB bandwidth: CH Low: 20.98MHz, CH High: 19.28MHz
4. Frequency Range: 5489.5100MHz, 5709.6400MHz

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.88MHz, CH High: 19.65MHz
4. Frequency Range: 5735.060MHz, 5834.825MHz

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 39.14MHz, CH High: 38.73MHz
4. Frequency Range: 5735.430MHz, 5814.365MHz

IEEE 802.11ac 80 mode / 5755 ~ 5795MHz

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 79.62MHz
4. Frequency Range: 5735.190MHz, 5814.810MHz

Because the mentioned conditions, the test is not applicable.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.6 PEAK POWER SPECTAL DENSITY

6.6.1 LIMIT

According to §15.407(a) & FCC R&O FCC 14-30

(1) (i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 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. In addition, 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 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500 kHz 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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.

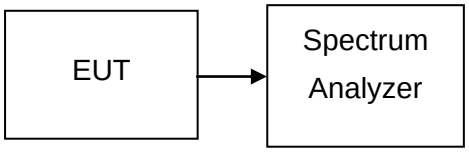
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.6.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

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

6.6.3 TEST CONFIGURATION



6.6.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. For devices operating in the bands 5.15-5.25 GHz,Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = 30MHz, Sweep=1.2ms
3. For devices operating in the bands 5.725-5.85 GHz,Set the spectrum analyzer as RBW = 500kHz, VBW = 1.5MHz, Span = 30MHz, Sweep=1.2ms
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.6.5 TEST RESULTS

Test Data

IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)	factor	Limit (dBm)	Margain	Result
Low	5745	4.977	-3.01	30	-28.033	PASS
Mid	5785	3.741	-3.01		-29.269	PASS
High	5825	2.406	-3.01		-30.604	PASS

Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)	factor	Limit (dBm)	Margain	Result
Low	5745	3.730	-3.01	30	-29.280	PASS
Mid	5785	3.154	-3.01		-29.856	PASS
High	5825	0.883	-3.01		-32.127	PASS

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	PPSD (dBm)	factor	Limit (dBm)	Margain	Result
Low	5755	0.865	-3.01	30	-32.145	PASS
High	5795	0.167	-3.01		-32.843	PASS

IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	PPSD (dBm)	factor	Limit (dBm)	Margain	Result
	5775	-2.851	-3.01	30	-35.861	PASS

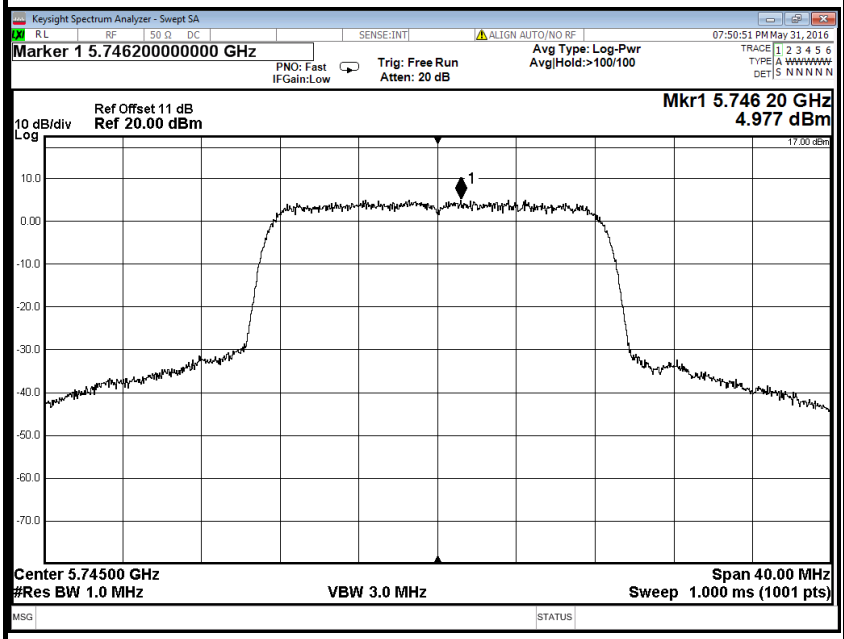
Remark: factor =10*log10(500/RBW)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

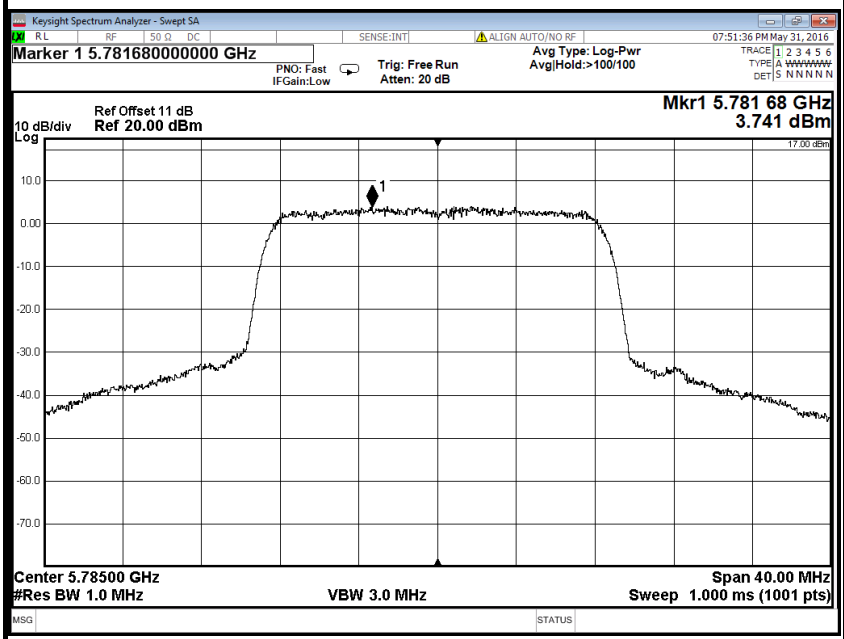
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)

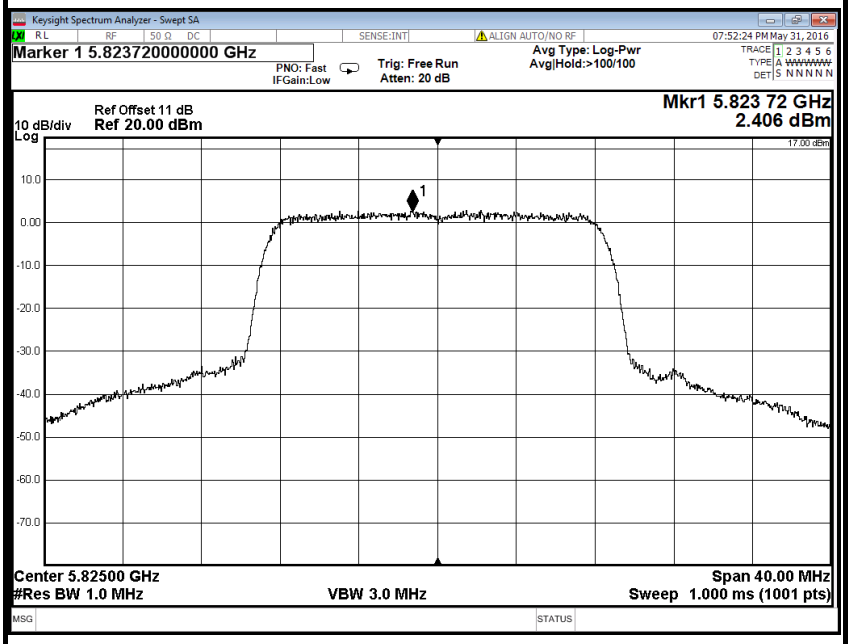


PPSD (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

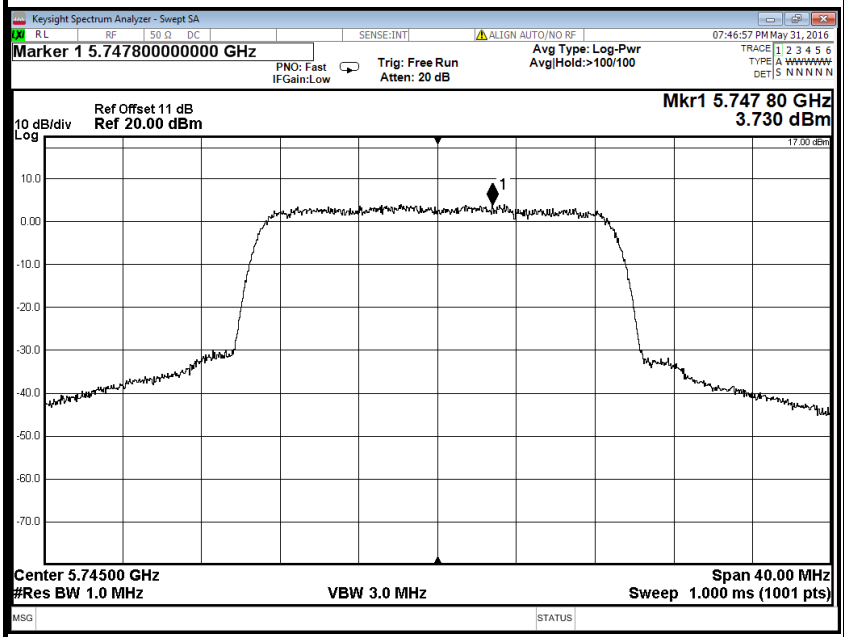
PPSD (CH High)



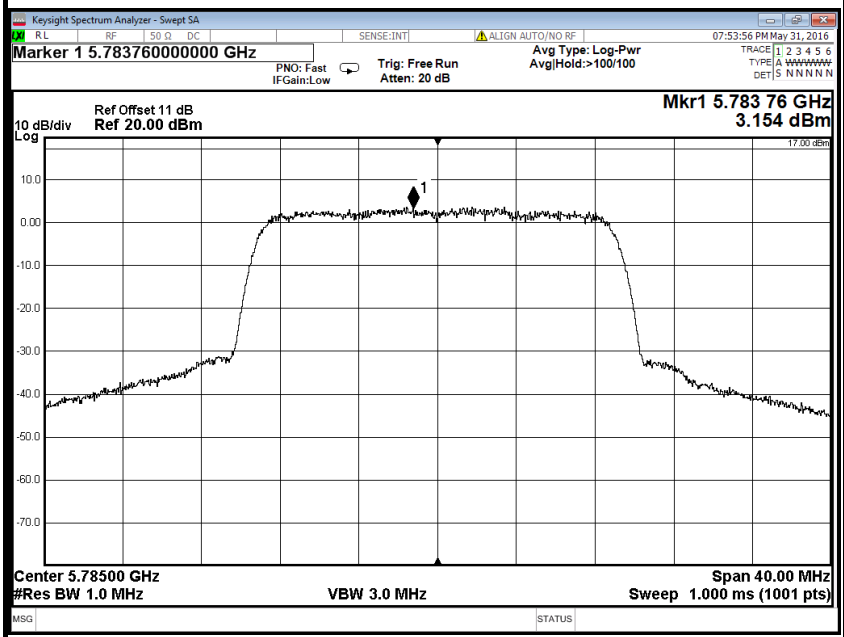
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

PPSD (CH Low)

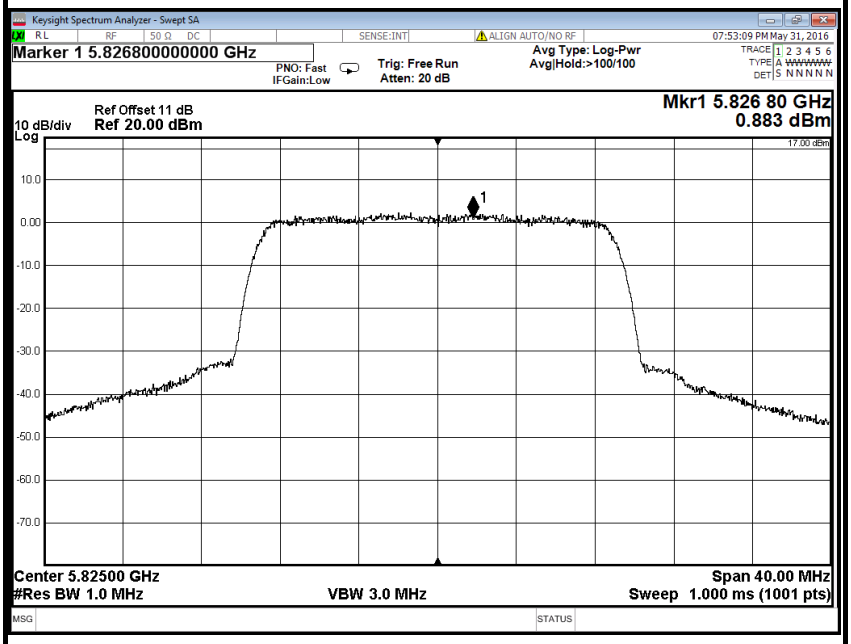


PPSD (CH Mid)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

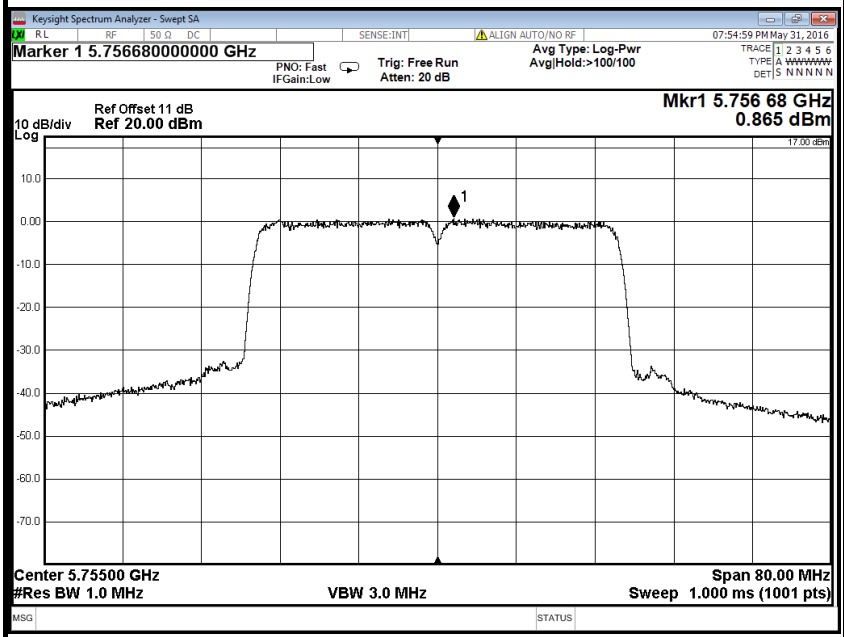
PPSD (CH High)



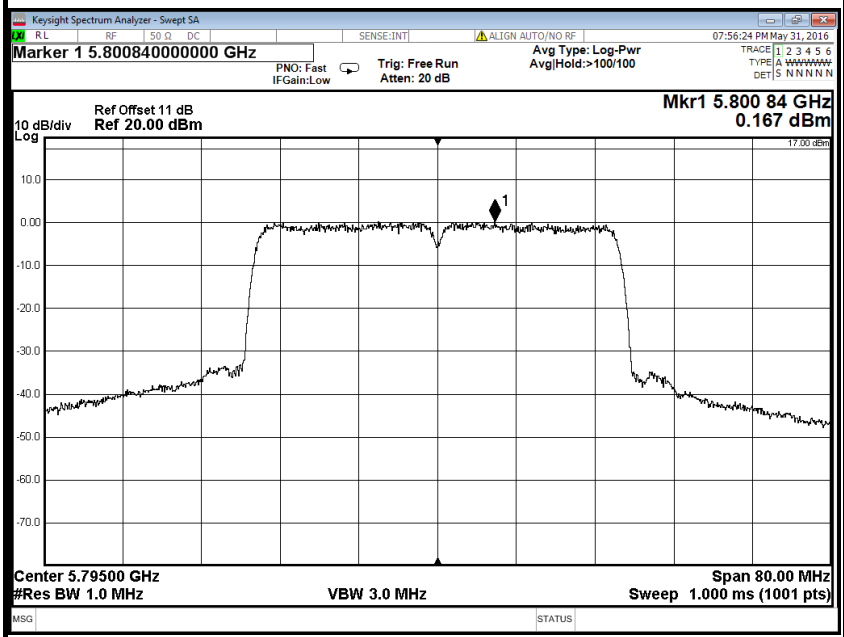
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

PPSD (CH Low)



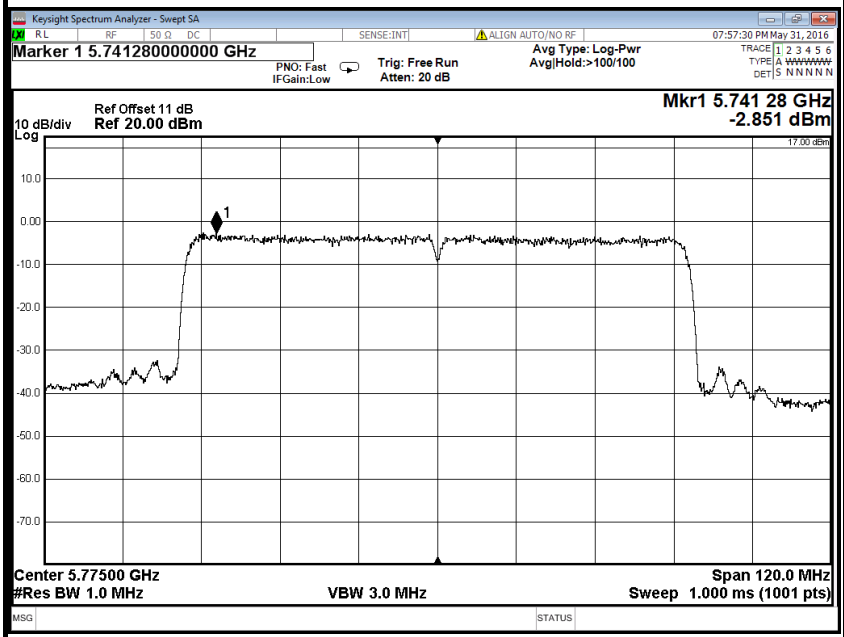
PPSD (CH High)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11ac 80 mode / 5775MHz

PPSD



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.7 RADIATED UNDESIABLE EMISSION

6.7.1 LIMIT

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:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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 (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

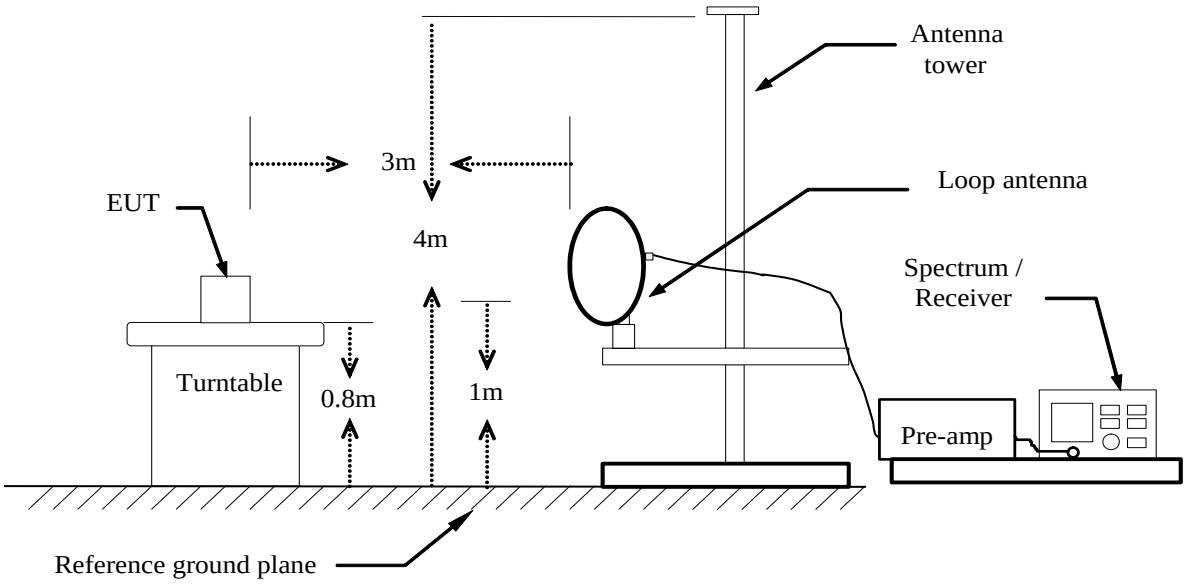
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.7.2 TEST INSTRUMENTS

Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	EMEC	EM330	060661	03/18/2016	03/17/2017
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2015	09/24/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

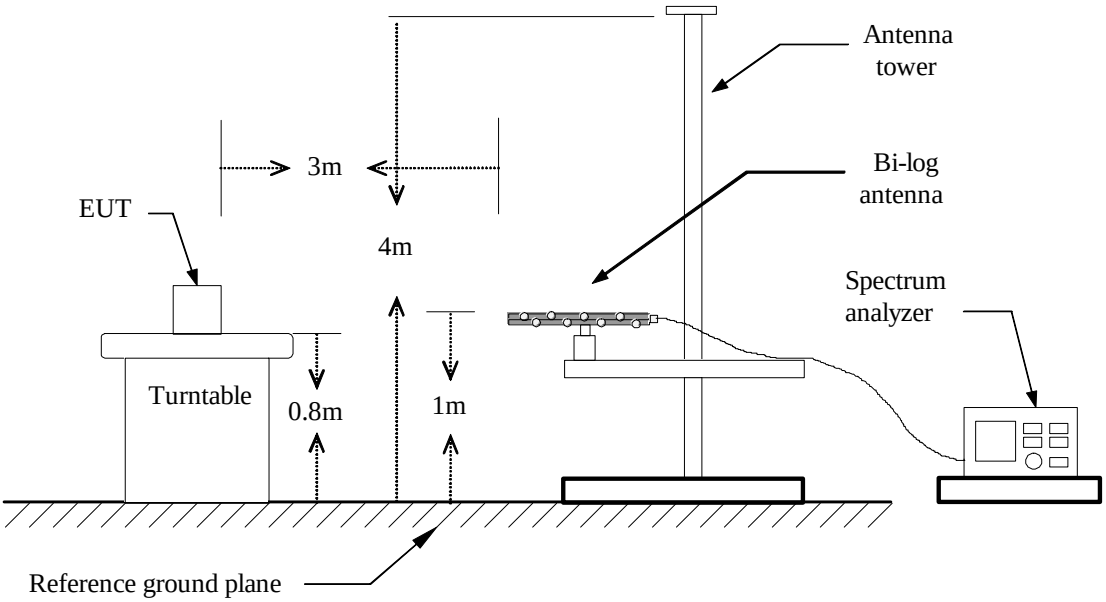
6.7.3 TEST CONFIGURATION

Below 30MHz

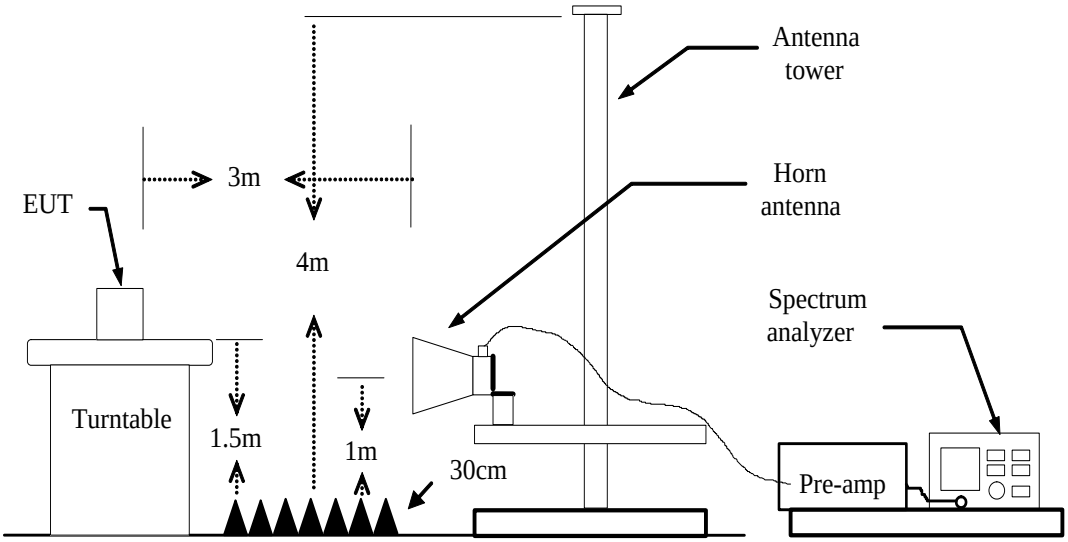


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Below 1 GHz



Above 1 GHz



For the actual test configuration, please refer to the related item – Photographs of the TEST CONFIGURATION.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.7.4 TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m or 1.5m 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=3MHz / Sweep=AUTO / Detector=RMS
7. Repeat above procedures until the measurements for all frequencies are complete.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.7.5 DATA SAPLE

Below 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXX.XXXX	36.37	-12.20	24.17	40.00	-15.83	V	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-peak Reading

Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXXX.XXXX	62.09	-11.42	50.67	74.00	-23.33	V	Peak
XXXX.XXXX	49.78	-11.42	38.36	54.00	-15.64	V	AVG

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Peak = Peak Reading
AVG = Average Reading

Calculation Formula

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
Result (dBuV/m) = Reading (dBuV) + Correction Factor

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.7.6 TEST RESULTS

Below 1 GHz

Test Mode: TX **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
62.0100	58.09	-24.32	33.77	40.00	-6.23	V	QP
178.4100	53.22	-22.95	30.27	43.50	-13.23	V	QP
263.7700	48.86	-20.13	28.73	46.00	-17.27	V	QP
477.1700	43.82	-14.46	29.36	46.00	-16.64	V	QP
677.9600	40.62	-12.37	28.25	46.00	-17.75	V	QP
863.2300	42.89	-10.52	32.37	46.00	-13.63	V	QP
120.2100	52.19	-21.13	31.06	43.50	-12.44	H	QP
222.0600	54.99	-20.66	34.33	46.00	-11.67	H	QP
349.1300	52.82	-17.70	35.12	46.00	-10.88	H	QP
512.0900	48.67	-14.22	34.45	46.00	-11.55	H	QP
800.1800	44.61	-11.11	33.50	46.00	-12.50	H	QP
864.2000	43.26	-10.49	32.77	46.00	-13.23	H	QP

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak 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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Above 1 GHz

1GHz~6GHz

Test Mode: TX / IEEE 802.11a / 5745MHz /(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1765.000	55.73	-6.35	49.38	74.00	-24.62	V	peak
1975.000	46.72	-5.16	41.56	74.00	-32.44	V	peak
2480.000	45.96	-2.37	43.59	74.00	-30.41	V	peak
3575.000	43.72	-0.20	43.52	74.00	-30.48	V	peak
4135.000	43.52	2.07	45.59	74.00	-28.41	V	peak
4910.000	41.86	4.69	46.55	74.00	-27.45	V	peak
2715.000	46.00	-1.87	44.13	74.00	-29.87	H	Peak
3765.000	43.55	0.60	44.15	74.00	-29.85	H	Peak
4370.000	42.18	2.89	45.07	74.00	-28.93	H	Peak
5130.000	41.99	5.21	47.20	74.00	-26.80	H	peak
5420.000	45.54	5.73	51.27	74.00	-22.73	H	peak
5745.000	44.16	5.97	50.13	74.00	-23.87	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11a / 5745MHz /(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7240.000	36.64	8.17	44.81	74.00	-29.19	V	peak
9640.000	37.78	10.94	48.72	74.00	-25.28	V	peak
11320.000	29.86	14.94	44.80	74.00	-29.20	V	peak
12780.000	29.12	17.22	46.34	74.00	-27.66	V	peak
14740.000	28.00	21.01	49.01	74.00	-24.99	V	peak
17240.000	27.96	23.34	51.30	74.00	-22.70	V	peak
8160.000	41.96	9.56	51.52	74.00	-22.48	H	Peak
10320.000	29.93	12.97	42.90	74.00	-31.10	H	Peak
10940.000	29.84	14.89	44.73	74.00	-29.27	H	Peak
12980.000	28.84	17.88	46.72	74.00	-27.28	H	peak
14060.000	28.19	20.61	48.80	74.00	-25.20	H	peak
14960.000	28.25	21.14	49.39	74.00	-24.61	H	peak

Remark:

7. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
8. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
9. *Average test would be performed if the peak result were greater than the average limit.*
10. *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.*
11. *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.*
12. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11a / 5785MHz /(CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
9100.000	30.11	9.39	39.50	74.00	-34.50	V	peak
10380.000	28.71	13.16	41.87	74.00	-32.13	V	peak
11180.000	28.88	15.00	43.88	74.00	-30.12	V	peak
13740.000	26.69	19.90	46.59	74.00	-27.41	V	peak
14940.000	27.64	21.13	48.77	74.00	-25.23	V	peak
17060.000	26.74	23.38	50.12	74.00	-23.88	V	peak
7240.000	33.44	8.17	41.61	74.00	-32.39	H	Peak
8200.000	38.23	9.54	47.77	74.00	-26.23	H	Peak
10260.000	30.08	12.79	42.87	74.00	-31.13	H	Peak
11580.000	30.80	14.82	45.62	74.00	-28.38	H	peak
14240.000	27.95	20.72	48.67	74.00	-25.33	H	peak
15000.000	28.66	21.16	49.82	74.00	-24.18	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11a / 5825MHz /(CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	38.15	8.16	46.31	74.00	-27.69	V	peak
9648.000	38.14	10.97	49.11	74.00	-24.89	V	peak
10620.000	30.26	13.90	44.16	74.00	-29.84	V	peak
12612.000	29.00	16.67	45.67	74.00	-28.33	V	peak
14244.000	28.34	20.72	49.06	74.00	-24.94	V	peak
14760.000	28.59	21.02	49.61	74.00	-24.39	V	peak
7236.000	35.45	8.16	43.61	74.00	-30.39	H	Peak
8244.000	39.35	9.52	48.87	74.00	-25.13	H	Peak
9840.000	30.91	11.52	42.43	74.00	-31.57	H	Peak
10524.000	30.82	13.60	44.42	74.00	-29.58	H	peak
11652.000	31.67	14.79	46.46	74.00	-27.54	H	peak
12816.000	29.35	17.34	46.69	74.00	-27.31	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11n HT 20 MHz / 5745MHz /(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	38.50	8.16	46.66	74.00	-27.34	V	peak
8160.000	34.03	9.56	43.59	74.00	-30.41	V	peak
9648.000	37.10	10.97	48.07	74.00	-25.93	V	peak
12420.000	29.87	16.03	45.90	74.00	-28.10	V	peak
14280.000	28.21	20.74	48.95	74.00	-25.05	V	peak
15144.000	28.63	20.50	49.13	74.00	-24.87	V	peak
7236.000	35.66	8.16	43.82	74.00	-30.18	H	Peak
8160.000	44.41	9.56	53.97	74.00	-20.03	H	Peak
8160.000	30.81	9.56	40.37	54.00	-13.63	H	AVG
10992.000	29.90	15.06	44.96	74.00	-29.04	H	peak
13032.000	29.24	18.03	47.27	74.00	-26.73	H	peak
14208.000	28.02	20.70	48.72	74.00	-25.28	H	peak
14976.000	28.64	21.15	49.79	74.00	-24.21	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11n HT 20 MHz / 5785MHz /(CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
9648.000	33.67	10.97	44.64	74.00	-29.36	V	peak
11040.000	29.89	15.06	44.95	74.00	-29.05	V	peak
11856.000	30.75	14.70	45.45	74.00	-28.55	V	peak
12996.000	29.08	17.94	47.02	74.00	-26.98	V	peak
14244.000	28.36	20.72	49.08	74.00	-24.92	V	peak
15072.000	29.04	20.83	49.87	74.00	-24.13	V	peak
8196.000	39.58	9.54	49.12	74.00	-24.88	H	Peak
10500.000	30.48	13.53	44.01	74.00	-29.99	H	Peak
11568.000	31.29	14.83	46.12	74.00	-27.88	H	Peak
13152.000	28.67	18.35	47.02	74.00	-26.98	H	peak
14244.000	28.76	20.72	49.48	74.00	-24.52	H	peak
14988.000	28.62	21.15	49.77	74.00	-24.23	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11n HT 20 MHz / 5825MHz /(CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	34.19	8.16	42.35	74.00	-31.65	V	peak
9648.000	35.81	10.97	46.78	74.00	-27.22	V	peak
11844.000	30.29	14.71	45.00	74.00	-29.00	V	peak
13944.000	27.12	20.43	47.55	74.00	-26.45	V	peak
14544.000	28.45	20.90	49.35	74.00	-24.65	V	peak
17964.000	28.20	23.21	51.41	74.00	-22.59	V	peak
7236.000	33.48	8.16	41.64	74.00	-32.36	H	Peak
9960.000	30.79	11.86	42.65	74.00	-31.35	H	Peak
11052.000	29.83	15.06	44.89	74.00	-29.11	H	Peak
11652.000	32.75	14.79	47.54	74.00	-26.46	H	peak
14040.000	27.39	20.60	47.99	74.00	-26.01	H	peak
14316.000	28.72	20.76	49.48	74.00	-24.52	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11n HT 40 MHz / 5755MHz /(CH Low) **Tested by:** Jack Chen
Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	38.81	8.16	46.97	74.00	-27.03	V	peak
8160.000	34.74	9.56	44.30	74.00	-29.70	V	peak
9648.000	35.32	10.97	46.29	74.00	-27.71	V	peak
11772.000	30.53	14.74	45.27	74.00	-28.73	V	peak
13140.000	29.09	18.32	47.41	74.00	-26.59	V	peak
14436.000	28.55	20.83	49.38	74.00	-24.62	V	peak
7236.000	33.85	8.16	42.01	74.00	-31.99	H	Peak
8160.000	41.17	9.56	50.73	74.00	-23.27	H	Peak
10272.000	30.38	12.82	43.20	74.00	-30.80	H	Peak
11064.000	29.93	15.05	44.98	74.00	-29.02	H	peak
13008.000	28.94	17.97	46.91	74.00	-27.09	H	peak
14304.000	28.34	20.76	49.10	74.00	-24.90	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11n HT 40 MHz / 5795MHz /(CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	38.71	8.16	46.87	74.00	-27.13	V	peak
8196.000	34.02	9.54	43.56	74.00	-30.44	V	peak
9648.000	36.41	10.97	47.38	74.00	-26.62	V	peak
11844.000	30.50	14.71	45.21	74.00	-28.79	V	peak
13548.000	27.86	19.39	47.25	74.00	-26.75	V	peak
14940.000	28.67	21.13	49.80	74.00	-24.20	V	peak
7236.000	35.21	8.16	43.37	74.00	-30.63	H	Peak
8196.000	44.71	9.54	54.25	74.00	-19.75	H	Peak
8196.000	35.25	9.54	44.79	54.00	-9.21	H	AVG
10824.000	29.84	14.53	44.37	74.00	-29.63	H	peak
11568.000	31.47	14.83	46.30	74.00	-27.70	H	peak
12936.000	29.17	17.74	46.91	74.00	-27.09	H	peak
14016.000	27.39	20.59	47.98	74.00	-26.02	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Mode: TX / IEEE 802.11ac 80 / 5775MHz **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7236.000	37.43	8.16	45.59	74.00	-28.41	V	peak
9648.000	37.63	10.97	48.60	74.00	-25.40	V	peak
11220.000	30.09	14.98	45.07	74.00	-28.93	V	peak
11844.000	30.77	14.71	45.48	74.00	-28.52	V	peak
12684.000	29.17	16.90	46.07	74.00	-27.93	V	peak
13920.000	26.95	20.37	47.32	74.00	-26.68	V	peak
7236.000	36.17	8.16	44.33	74.00	-29.67	H	Peak
8148.000	40.77	9.57	50.34	74.00	-23.66	H	Peak
10428.000	29.91	13.31	43.22	74.00	-30.78	H	Peak
11856.000	30.78	14.70	45.48	74.00	-28.52	H	peak
13560.000	27.61	19.42	47.03	74.00	-26.97	H	peak
14784.000	28.70	21.03	49.73	74.00	-24.27	H	peak

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 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.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.8 CONDUCTED UNDESIRABLE EMISSION

6.8.1 LIMIT

According to 15.407(b) ,

(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 EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.725–5.850 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz.

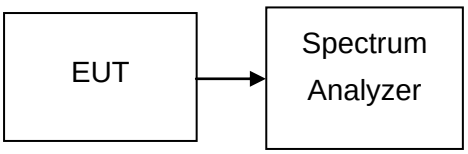
(3) The provisions of §15.205 apply to intentional radiators operating under this section.

6.8.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017

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

6.8.3 TEST CONFIGURATION



6.8.4 TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

6.8.5 TEST RESULTS

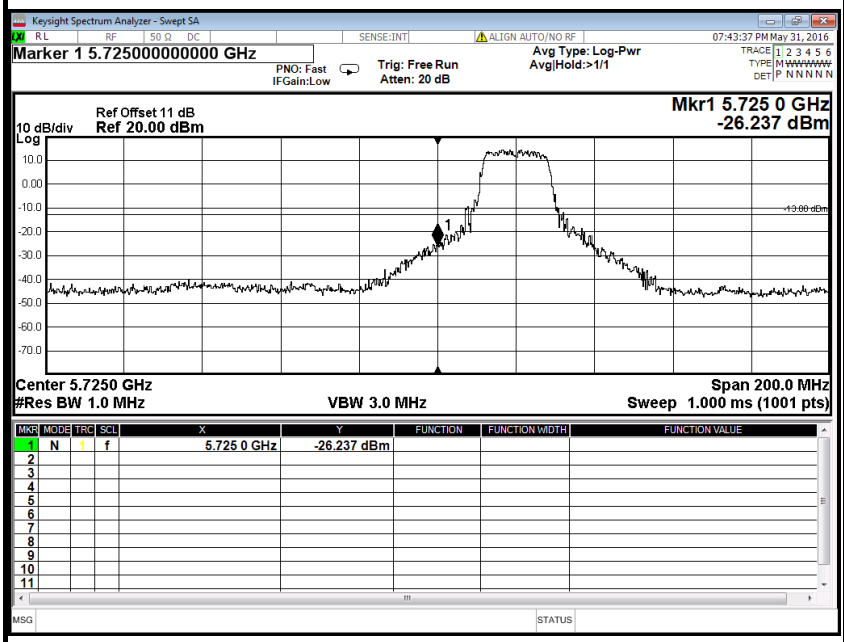
No non-compliance noted

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

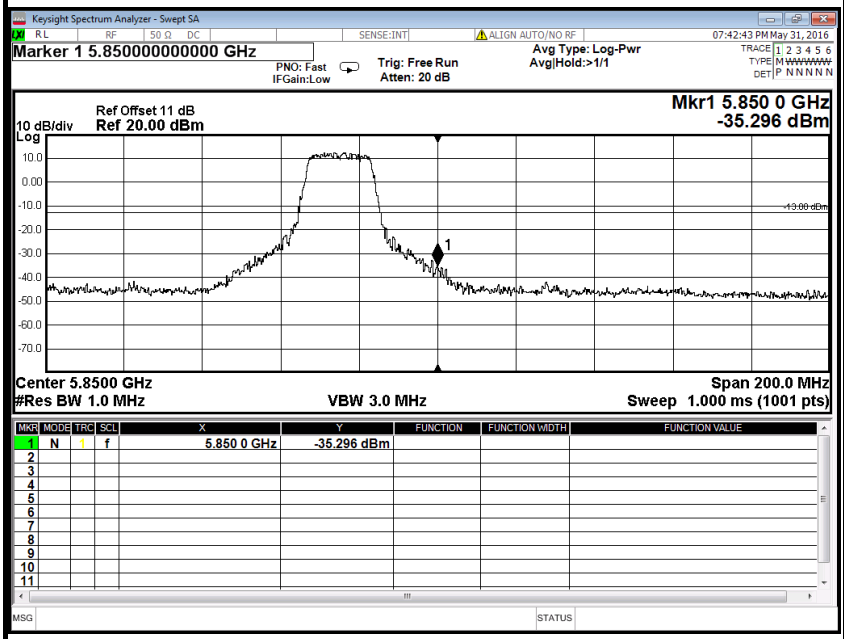
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

CH Low



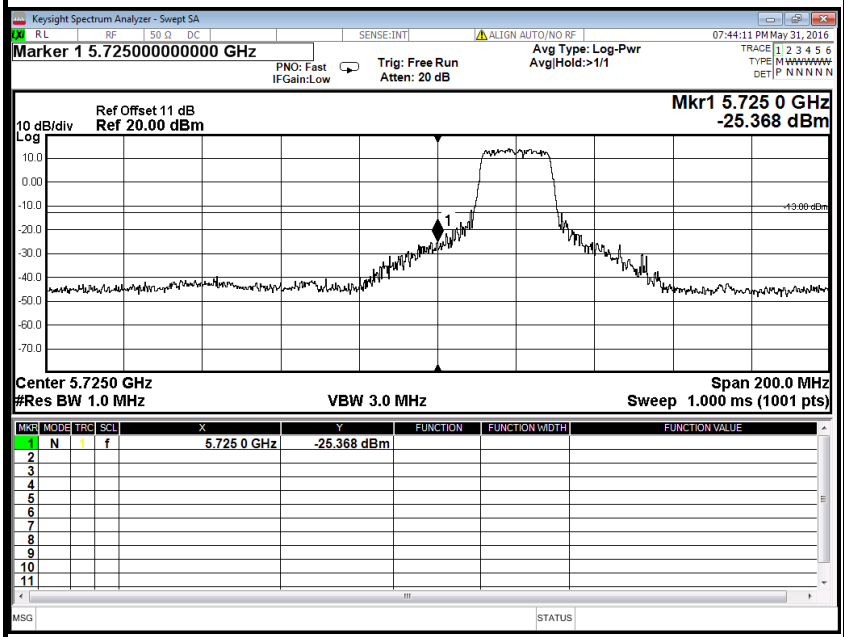
CH High



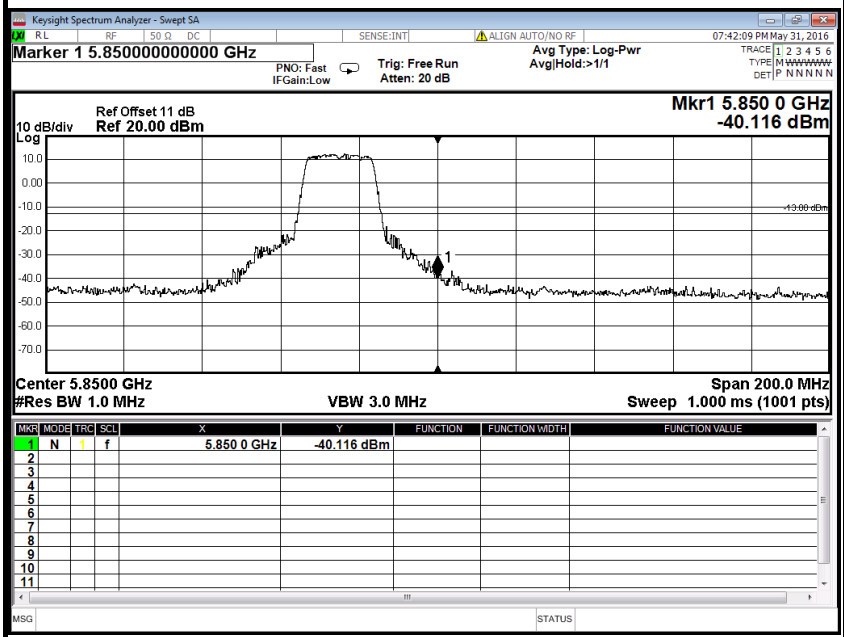
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

CH Low



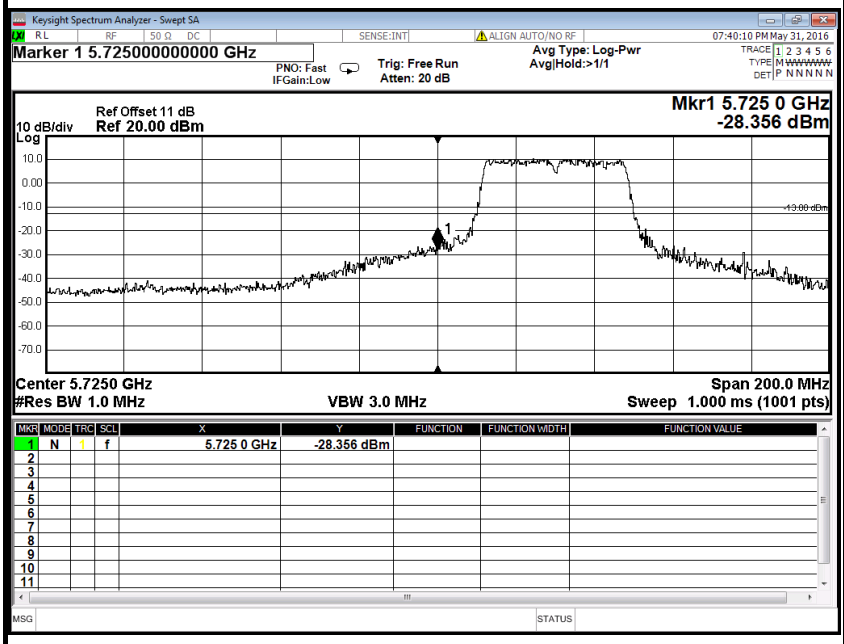
CH High



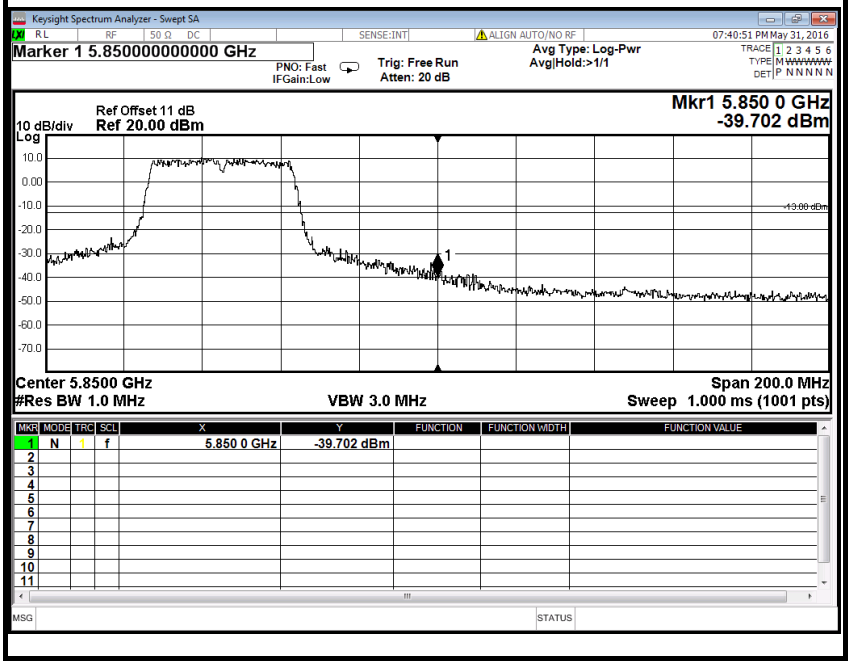
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

CH Low

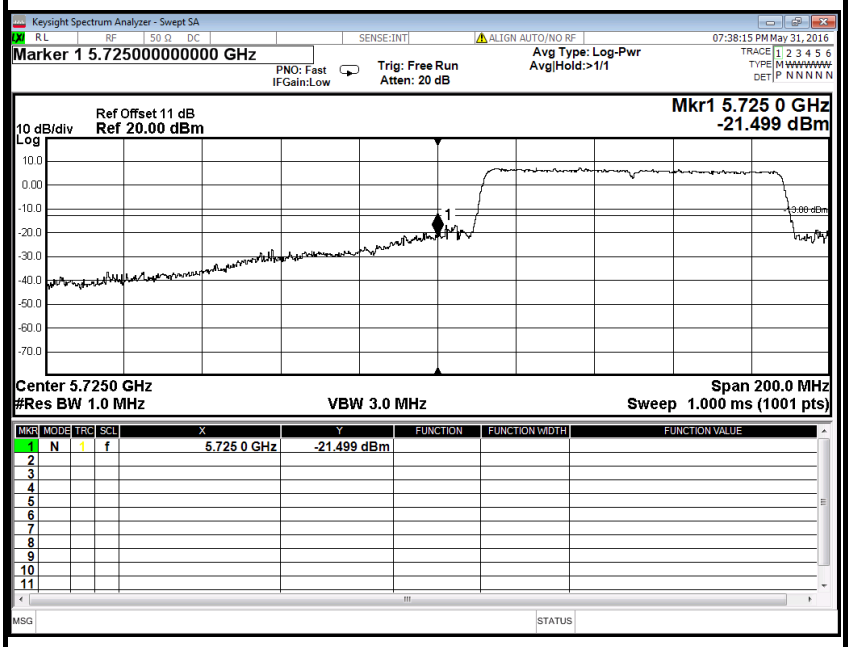


CH High

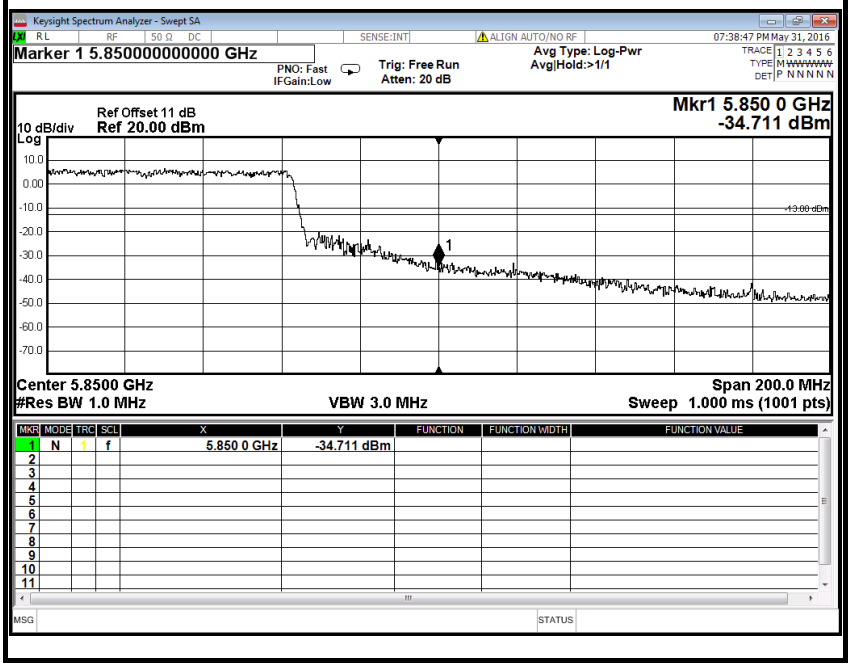


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11ac 80 mode / 5725MHz



IEEE 802.11ac 80 mode / 5850MHz



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.9 POWERLINE CONDUCTED EMISSIONS

6.9.1 LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator 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, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBµV)	
	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.*

6.9.2 TEST INSTRUMENTS

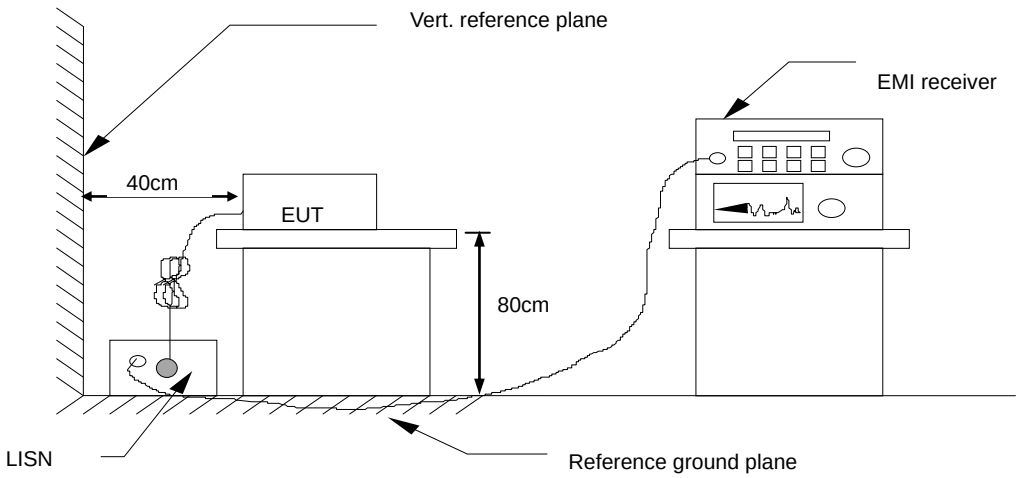
Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	02/21/2016	02/20/2017
LISN	EMCO	3825/2	8901-1459	02/21/2016	02/20/2017
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	02/21/2016	02/20/2017
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.9.3 TEST CONFIGURATION



6.9.4 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.

6.9.5 DATA SAMPLE

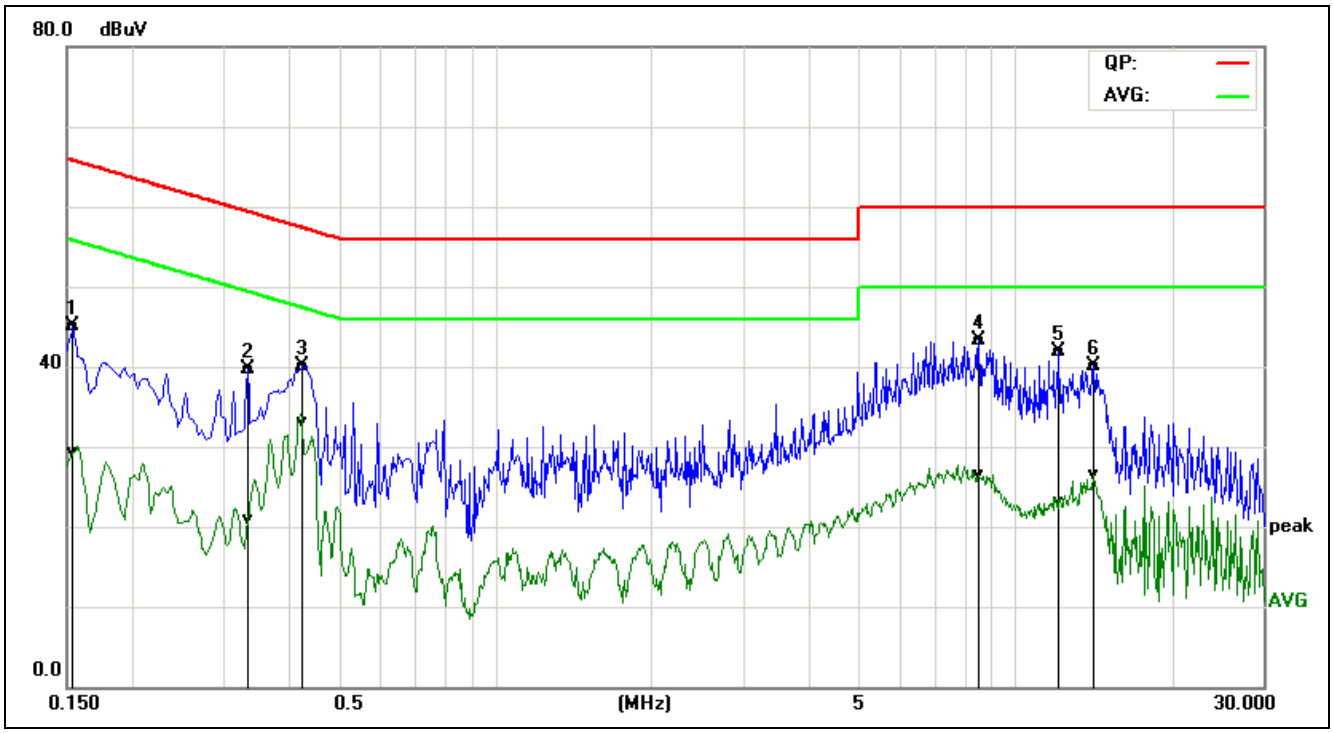
Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.9.6 TEST RESULTS

Model No.	WA2500N	**RBW,VBW**	9 kHz
Environmental Conditions	22°C, 45% RH	**Test Mode**	Mode 1
Tested by	Jack Chen	**Line**	L1
Test Date	April 20, 2016		

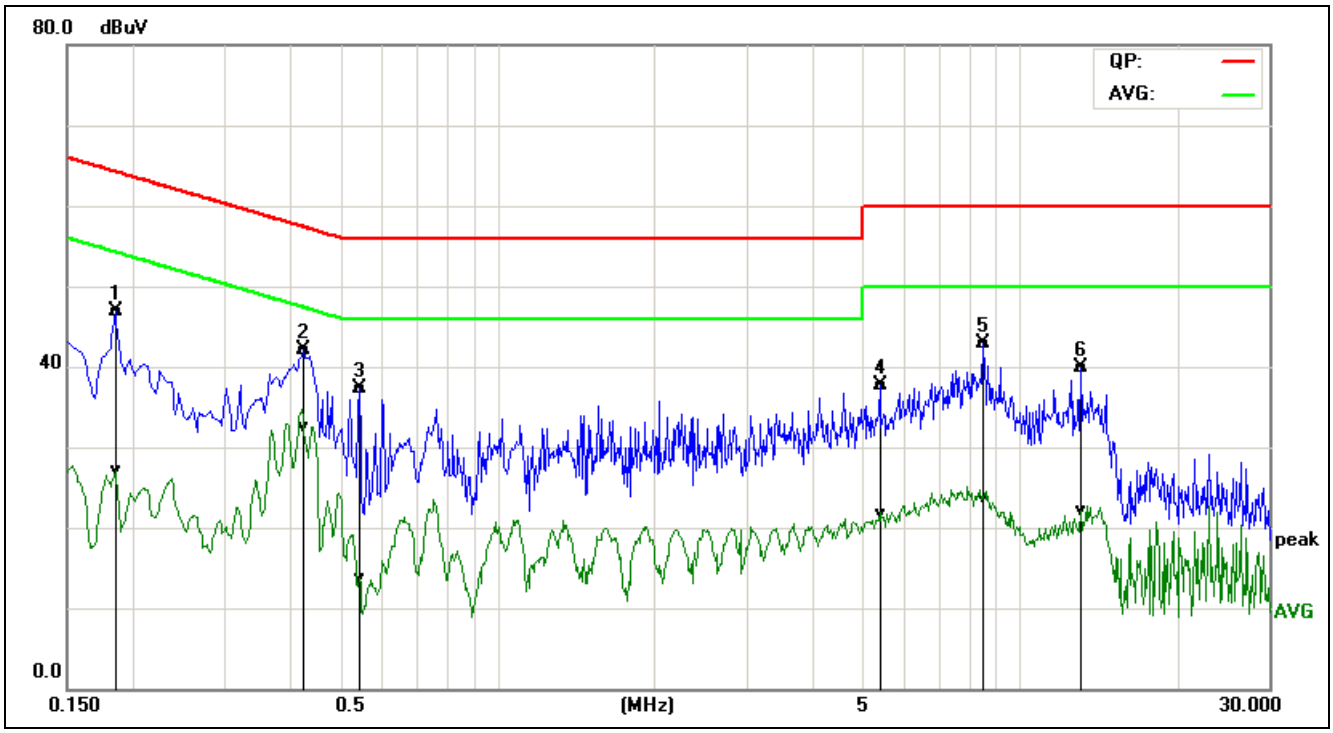


Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)	**Line (L1/L2)**
0.1539	35.37	19.45	9.78	45.15	29.23	65.78	55.79	-20.63	-26.56	Pass	L1
0.3339	29.81	11.14	9.83	39.64	20.97	59.35	49.35	-19.71	-28.38	Pass	L1
0.4260	30.27	23.27	9.86	40.13	33.13	57.33	47.33	-17.20	-14.20	Pass	L1
8.5340	33.26	16.43	10.07	43.33	26.50	60.00	50.00	-16.67	-23.50	Pass	L1
12.1380	31.83	13.04	10.09	41.92	23.13	60.00	50.00	-18.08	-26.87	Pass	L1
14.2100	29.93	16.39	10.10	40.03	26.49	60.00	50.00	-19.97	-23.51	Pass	L1

REMARKS: L1 = Line One (Live Line)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Model No.	WA2500N	**RBW,VBW**	9 kHz
Environmental Conditions	22°C, 45% RH	**Test Mode**	Mode 1
Tested by	Jack Chen	**Line**	L2
Test Date	April 20, 2016		



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 (Pass/Fail)	**Line (L1/L2)**
0.1860	37.10	17.18	9.89	46.99	27.07	64.21	54.21	-17.22	-27.14	Pass	L2
0.4260	32.27	22.72	9.88	42.15	32.60	57.33	47.33	-15.18	-14.73	Pass	L2
0.5460	27.47	3.87	9.88	37.35	13.75	56.00	46.00	-18.65	-32.25	Pass	L2
5.3980	27.55	11.72	10.08	37.63	21.80	60.00	50.00	-22.37	-28.20	Pass	L2
8.5340	32.81	13.54	10.07	42.88	23.61	60.00	50.00	-17.12	-26.39	Pass	L2
13.0580	29.77	12.06	10.09	39.86	22.15	60.00	50.00	-20.14	-27.85	Pass	L2

REMARKS: L2 = Line Two (Neutral Line)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.10 FREQUENCY STABILITY

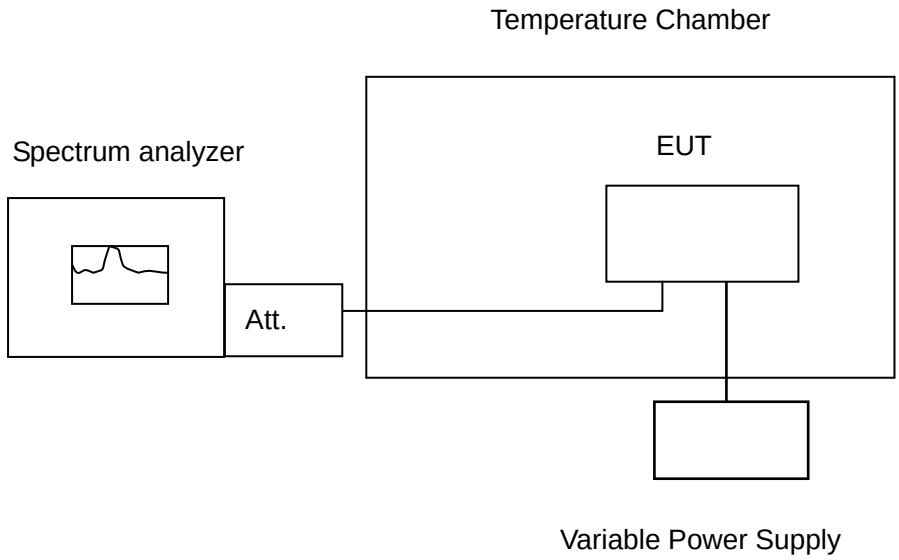
6.10.1 LIMIT

According to §15.407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the operational description.

6.10.2 TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017
DC Power Supply	DAZHENG	PS-605D	20018978	N.C.R	N.C.R
AC POWER SOUCE	UMART	HPA1010	N/A	N.C.R	N.C.R
Power Meter	Anritsu	ML2495A	1204003	02/21/2016	02/20/2017
Power Sensor	Anritsu	MA2411B	1126150	02/21/2016	02/20/2017
Temperature Chamber	TERCHY	MHG-800N	E21104	11/18/2015	11/17/2016
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017

6.10.3 TEST CONFIGURATION



Remark: *Measurement setup for testing on Antenna connector*

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6.10.4 TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

6.10.5 TEST RESULTS

No non-compliance noted.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Test Data

IEEE 802.11a mode / 5745 ~ 5825MHz (Low)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5744.969600	5725-5850	PASS
40	120	5744.996103	5725-5850	PASS
30	120	5744.961057	5725-5850	PASS
20	120	5744.999120	5725-5850	PASS
10	120	5744.974331	5725-5850	PASS
0	120	5744.976200	5725-5850	PASS
-10	120	5744.951651	5725-5850	PASS
-20	120	5744.953119	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5744.970102	5725-5850	PASS
	120	5744.999120	5725-5850	PASS
	132	5744.981347	5725-5850	PASS

IEEE 802.11a mode / 5745 ~ 5825MHz (High)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5824.985781	5725-5850	PASS
40	120	5824.998434	5725-5850	PASS
30	120	5824.957719	5725-5850	PASS
20	120	5824.999060	5725-5850	PASS
10	120	5824.974289	5725-5850	PASS
0	120	5824.982913	5725-5850	PASS
-10	120	5824.969106	5725-5850	PASS
-20	120	5824.955801	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5824.949678	5725-5850	PASS
	120	5824.999060	5725-5850	PASS
	132	5824.980567	5725-5850	PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (Low)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5744.954648	5725-5850	PASS
40	120	5744.956344	5725-5850	PASS
30	120	5744.997769	5725-5850	PASS
20	120	5744.999320	5725-5850	PASS
10	120	5744.971842	5725-5850	PASS
0	120	5744.968013	5725-5850	PASS
-10	120	5744.970165	5725-5850	PASS
-20	120	5744.969134	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5744.984567	5725-5850	PASS
	120	5744.999320	5725-5850	PASS
	132	5744.968550	5725-5850	PASS

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (High)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5824.996121	5725-5850	PASS
40	120	5824.964613	5725-5850	PASS
30	120	5824.968138	5725-5850	PASS
20	120	5824.998380	5725-5850	PASS
10	120	5824.978944	5725-5850	PASS
0	120	5824.989388	5725-5850	PASS
-10	120	5824.992051	5725-5850	PASS
-20	120	5824.983515	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5824.996443	5725-5850	PASS
	120	5824.998380	5725-5850	PASS
	132	5824.969719	5725-5850	PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (Low)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5754.970235	5725-5850	PASS
40	120	5754.986455	5725-5850	PASS
30	120	5754.977364	5725-5850	PASS
20	120	5755.016000	5725-5850	PASS
10	120	5754.997660	5725-5850	PASS
0	120	5754.967413	5725-5850	PASS
-10	120	5754.954857	5725-5850	PASS
-20	120	5754.965336	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5754.964689	5725-5850	PASS
	120	5754.997660	5725-5850	PASS
	132	5754.977154	5725-5850	PASS

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (High)

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5794.998519	5725-5850	PASS
40	120	5794.973234	5725-5850	PASS
30	120	5794.991027	5725-5850	PASS
20	120	5794.997100	5725-5850	PASS
10	120	5794.975817	5725-5850	PASS
0	120	5794.962417	5725-5850	PASS
-10	120	5794.980254	5725-5850	PASS
-20	120	5794.949013	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5794.951014	5725-5850	PASS
	120	5794.997100	5725-5850	PASS
	132	5794.974666	5725-5850	PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11ac 80 mode / 5775MHz

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
50	120	5774.981849	5725-5850	PASS
40	120	5774.958296	5725-5850	PASS
30	120	5774.962252	5725-5850	PASS
20	120	5774.994780	5725-5850	PASS
10	120	5774.963372	5725-5850	PASS
0	120	5774.983398	5725-5850	PASS
-10	120	5774.989285	5725-5850	PASS
-20	120	5774.962434	5725-5850	PASS

Environment Temperature (°C)	Volage (V)	Measured Frequency (MHz)	limit Range	Test Result
20	108	5774.987315	5725-5850	PASS
	120	5774.994780	5725-5850	PASS
	132	5774.963106	5725-5850	PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.