FCC&ISED RADIO TEST REPORT

No. 180402312SHA-004

Applicant	:	Libratone A/S Sundkaj 9, DK-2150 Nordhavn, Denmark
Manufacturer	:	Libratone A/S Sundkaj 9, DK-2150 Nordhavn, Denmark
Factory	:	GOERTEK INC. NO.268 DONGFANG RD, NEW&HIGH-TECH INDUSTRY DEVELOPMENT ZONE, WEIFANG, SHANDONG 261031 CHINA
Product Name	:	Wireless Speaker
Type/Model	:	LTH310
TEST RESULT	**:**	**PASS**

SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

47CFR Part 15 (2017): Radio Frequency Devices (Subpart E)

ANSI C63.10 (2014): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 2 (February 2017): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 5 (April 2018): General Requirements for Compliance of Radio Apparatus

Date of issue: May 16, 2018

Prepared by:

Eric Li (Project engineer)

Reviewed by:

Daniel Zhao (Reviewer)

FCC ID: Y2SLTH310
IC: 9452A-LTH310

Contents

Revision History

Issue No.	Version	Description	Date Issued
180402312SHA-004	Rev. 01	Initial issue of report	May 16, 2018

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name	:	Wireless Speaker
Type/Model	:	LTH310
Description of EUT	:	The EUT is a Wireless Speaker, which has WIFI and Bluetooth functions, there is only one model, we test it and list the 5G WIFI results in this report.
Rating	:	19 Vdc,1.8A
Category of EUT	:	Class B
EUT type	:	☒ Table top
		☐ Floor standing
Sample received date	:	March 26, 2018
Date of test	:	March 26, 2018 to April 6, 2018

1.2 RF Technical Information

Assigned Frequency Band	:	5150 ~ 5250MHz 5725 ~ 5850MHz
EUT Modes of Modulation	:	802.11a (HT20) 802.11n (HT20), 802.11n (HT40) 802.11ac(VHT20), (VHT40), (VHT80),
Channel Number	:	For 5150 ~ 5250MHz band: Channel 36 - 48 For 5725 ~ 5850MHz band: Channel 149 - 165
Type of Modulation	:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Antenna	:	PCB antenna， 6.53dBi peak gain
FCC ID	:	Y2SLTH310
IC ID	:	9452A-LTH310

1.3 Description of Test Facility

Name	:	Intertek Testing Services Shanghai
Address	:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone	:	86 21 61278200
Telefax	:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations	:	CNAS Accreditation Lab Registration No. CNAS L0139 FCC Accredited Lab Designation Number: CN1175 IC Registration Lab Registration code No.: 2042B-1 VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252 NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0 A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2017)
ANSI C63.10 (2014)
KDB 662911 D01 (v02r01)
RSS-247 Issue 2 (February 2017)
RSS-Gen Issue 5 (April 2018)

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the continuously transmission was applied by following software.

Software name	Manufacturer	Version	Supplied by
CMD Command	-	-	Client

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)	Mode	Lowest (MHz)	Middle (MHz)	Highest (MHz)	IC power setting	FCC power setting
5150~5250MHz	802.11a	5180	5220	5240	44	66
	802.11n20&ac20	5180	5220	5240	44	66
	802.11n40&ac40	5190	/	5230	44	66
	802.11ac80	5210	/	/	44	66
5725~5850MHz	802.11a	5745	5785	5825	40	40
	802.11n20&ac20	5745	5785	5825	40	40
	802.11n40&ac40	5755	/	5795	40	40
	802.11ac80	5775	/	/	40	40

After this pre-scan, the following data rata was chosen to do the test as the worst case.

Frequency Band (MHz)	Mode	Worst case data rate
5150~5250	802.11a	6Mbps
	802.11n20	MCS0
	802.11n40	MCS0
	802.11ac80	MCS0
5725~5850	802.11a	6Mbps
	802.11n20	MCS0
	802.11n40	MCS0
	802.11ac80	MCS0

There have the following test modes:

Radiated test mode:
Mode 1: EUT transmitted signal with internal antenna;

Conducted test mode:
Mode 2: EUT transmitted signal from PCBA RF port connected to SA directly;

2.3 Test environment condition:

Temperature:	20-26°C
Humidity:	52-60% RH
Atmospheric Pressure:	101-102kPa

2.4 Test peripherals used

Item No	Description	Manufacturer	Model No.	Serial Number
1	Laptop computer	HP	4230s	-
2	AC-DC adapter	/	IU35	Input:100-240V AC Output:19VDC 1.8A

2.5 Test software list:

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESCS 30	EC 2107	2018-09-12
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2018-12-01
☐	A.M.N.	R&S	ENV 216	EC 3393	2018-07-30
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2018-09-12
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2018-05-30
☒	Horn antenna	R&S	HF 906	EC 3049	2018-09-23
☒	Horn antenna	ETS	3117	EC 4792-1	2018-08-24
☒	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2020-07-09
☒	Pre-amplifier	R&S	Pre-amp 18	EC5881	2018-06-19
☒	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2019-01-25
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2018-09-10
☐	Power sensor/ Power meter	Agilent	N1911A/ N1921A	EC4318	2018-05-12
☐	Test Receiver	R&S	ESCI 7	EC 4501	2018-09-12
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Shielded room	Zhongyu	-	EC 2838	2018-01-08
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2019-03-09
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3323	2018-06-14
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3324	2018-04-09
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2019-03-23
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2018-06-28

2.7 Measurement Uncertainty

Test Items	Expanded Uncertainty (k=2) (±)
Maximum conducted output power	0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	5.02dB
Emission outside the frequency band	2.89dB
Power line conducted emission	3.19dB

2.8 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
26 dB Bandwidth & 99% Occupied Bandwidth	15.407(a)	RSS-247 Issue 2 Clause 6	Tested
Minimum 6dB Bandwidth	15.407(e)	RSS-247 Issue 2 Clause 6	Pass
Maximum Conducted Output Power	15.407(a)	RSS-247 Issue 2 Clause 6	Pass
Power spectral density	15.407(a)	RSS-247 Issue 2 Clause 6	Pass
Radiated emission	15.407(b) 15.205 15.209	RSS-247 Issue 2 Clause 6 RSS-Gen Issue 5 Clause 8.10	Pass
Power line conducted emission	15.407(b) 15.207	RSS-Gen Issue 5 Clause 8.8	Pass
Frequency Stability	15.407(g)	RSS-Gen Issue 5 Clause 8.11	Pass
Antenna requirement	15.203	RSS-247 Issue 2 Clause 6	Pass

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

3 26 dB Bandwidth & 99% Occupied Bandwidth

Test result: Pass

3.1 Limit

None

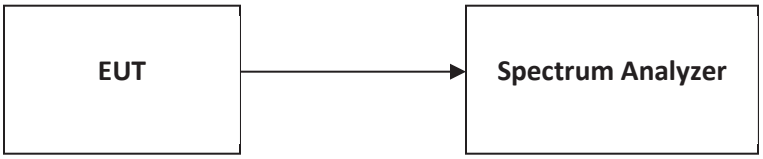
3.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

26 dB Bandwidth
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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

3.3 Test Configuration



3.4 The results of 26 dB Bandwidth & 99% Occupied Bandwidth

Please refer to Appendix A

4 Minimum 6dB Bandwidth

Test result: Pass

4.1 Limit

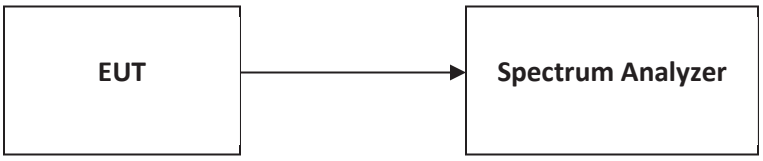
For systems using digital modulation techniques that may operate in the 5725 - 5850 MHz band, the minimum 6 dB bandwidth shall be at least 500 kHz.

4.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

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.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

4.3 Test Configuration



4.4 The results of Minimum 6dB Bandwidth

Please refer to Appendix A

5 Maximum conducted output power and e.i.r.p.

Test result: Pass

5.1 FCC Limit

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

☐ For an indoor access point operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6dBi.

☐ For fixed point-to-point access points operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W.

☒ For client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi.

☐ For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 10logB, where B is the 26dB emission bandwidth in megahertz.

☒ For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W.

IC Limit

☒ For Frequency Band 5150-5250 MHz, The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz.

☐ 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 log10 B, where B is the 99% emission bandwidth in megahertz.

☐ For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

☒ For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

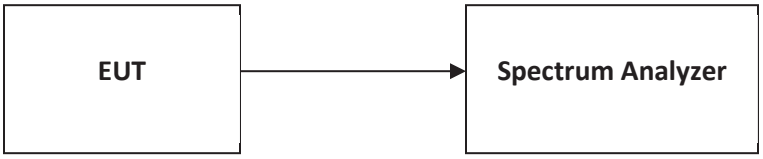
If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

(i) Measure the duty cycle, x, of the transmitter output signal as described in II.B.
(ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(iii) Set RBW = 1 MHz.
(iv) Set VBW ≥ 3 MHz.
(v) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(vi) Sweep time = auto.
(vii) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
(viii) Do not use sweep triggering. Allow the sweep to "free run."
(ix) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
(x) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(xi) Add 10 log (1/x), where x is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25%.

5.3 Test Configuration



5.4 Test Protocol

U-NII-1 FCC:

U-NII-1 AVGSA Output Power						
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	Max Power (dBm)	Limit (dBm)	Result
802.11a	5180	Ant1	0.40	19.04	23.45	Pass
802.11a	5200	Ant1	0.40	19.03	23.45	Pass
802.11a	5240	Ant1	0.41	18.66	23.45	Pass
802.11n (HT20)	5180	Ant1	0.31	18.56	23.45	Pass
802.11n (HT20)	5200	Ant1	0.31	18.45	23.45	Pass
802.11n (HT20)	5240	Ant1	0.32	18.54	23.45	Pass
802.11n (HT40)	5190	Ant1	0.61	18.82	23.45	Pass
802.11n (HT40)	5230	Ant1	0.61	18.75	23.45	Pass
802.11ac (VHT80)	5210	Ant1	0.95	17.92	23.45	Pass

Note: The limit =P-(gain-6dB), gain=6.53dBi， P=250mW=23.98dB

U-NII-1 IC

U-NII-1 AVGSA Output Power							
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	Max Power (dBm)	EIRP (dBm)	ERIP Limit (dBm)	Result
802.11a	5180	Ant1	0.40	13.25	19.78	21.63	Pass
802.11a	5200	Ant1	0.40	12.65	19.18	21.63	Pass
802.11a	5240	Ant1	0.40	11.65	18.18	21.63	Pass
802.11n (HT20)	5180	Ant1	0.31	12.92	19.45	21.94	Pass
802.11n (HT20)	5200	Ant1	0.31	12.31	18.84	21.94	Pass
802.11n (HT20)	5240	Ant1	0.31	11.16	17.69	21.94	Pass
802.11n (HT40)	5190	Ant1	0.61	11.40	17.93	22.48	Pass
802.11n (HT40)	5230	Ant1	0.61	11.65	18.18	22.48	Pass
802.11ac (VHT80)	5210	Ant1	0.95	12.42	18.95	22.48	Pass

NOTE: The limit=Min(P-(Gain-6dB), 10 + 10 log10B), there P=200mW=23.01dB, B is 99% Bandwhith.

U-NII-3

U-NII-3 AVGSA Output Power						
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	Max Power (dBm)	Limit (dBm)	Result
802.11a	5745	Ant1	0.42	4.64	29.47	Pass
802.11a	5785	Ant1	0.42	4.91	29.47	Pass
802.11a	5825	Ant1	0.42	4.02	29.47	Pass
802.11n (HT20)	5745	Ant1	0.36	4.53	29.47	Pass
802.11n (HT20)	5785	Ant1	0.36	4.49	29.47	Pass
802.11n (HT20)	5825	Ant1	0.36	3.77	29.47	Pass
802.11n (HT40)	5755	Ant1	0.74	3.75	29.47	Pass
802.11n (HT40)	5795	Ant1	0.74	4.74	29.47	Pass
802.11ac (VHT80)	5775	Ant1	1.00	4.64	29.47	Pass

Note: the limit=P-(Gain-6dB), P=30dB Gain=6.53dBi

6 Power spectrum density

Test result: **Pass**

6.1 FCC Limit

☐ For an outdoor access point operating in the band 5.15-5.25GHz, the maximum power spectral density shall not exceed 17dBm in any 1 megahertz band.

☐ For an indoor access point operating in the band 5.15-5.25GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

☒ For client devices in the 5.15-5.25GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

☐ For the 5.25-5.35 GHz and 5.47-5.725GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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

IC Limit

☒For the 5.15-5.25GHz band, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

☐ For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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

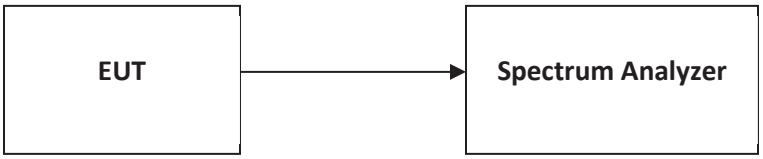
If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the less of original and original + (6 - antenna gain - beamforming gain).

6.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB789033 D02 General UNII Test Procedures New Rules"

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
a) If Method SA-2 or SA-2 Alternative was used, add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum.
b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15 5.25 GHz, 5.25 5.35 GHz, and 5.47 5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725 5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/*T*, where *T* is defined in II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for steps 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

6.3 Test Configuration



6.4 Test Results of Power spectrum density

Please refer to Appendix A

7 Radiated Emissions

Test result: **Pass**

7.1 Limit

The radiated emissions which comply with the radiated emission limits specified in §15.209(a) showed as below:

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

7.2 Measurement Procedure

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) Both X and Y axes of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

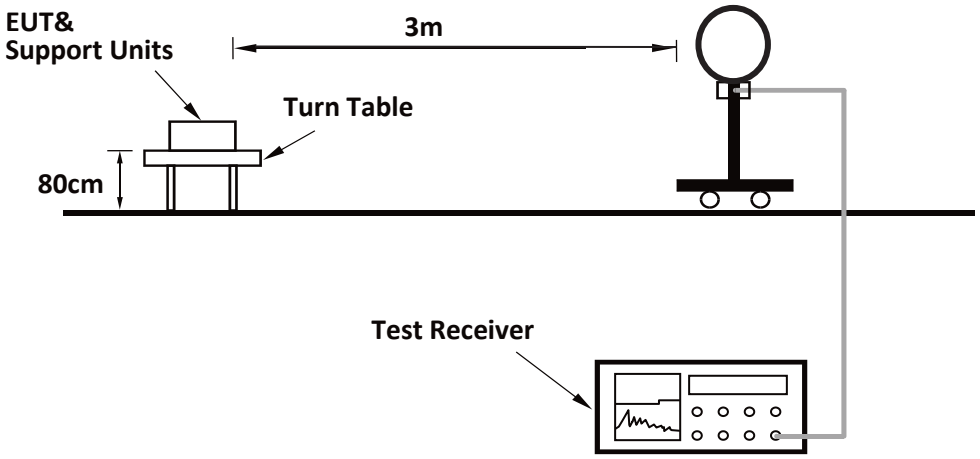
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

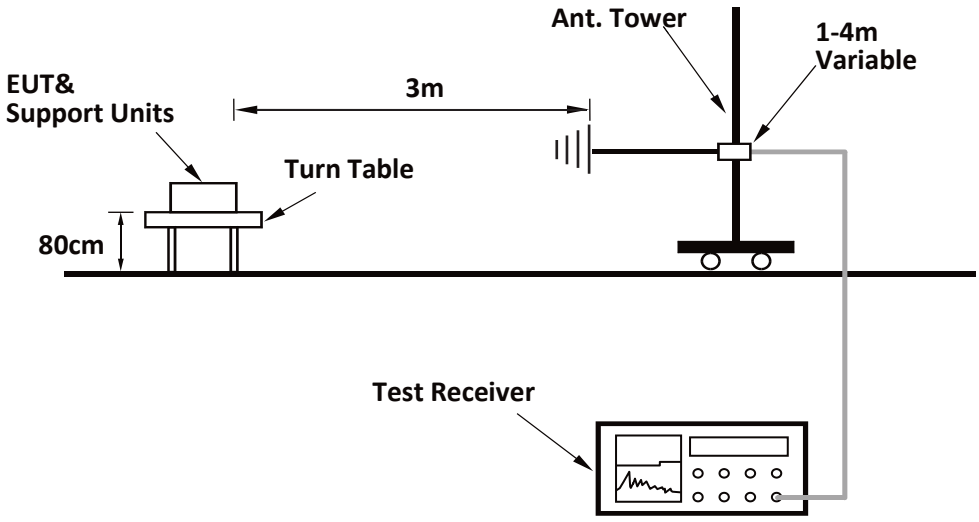
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

7.3 Test Configuration

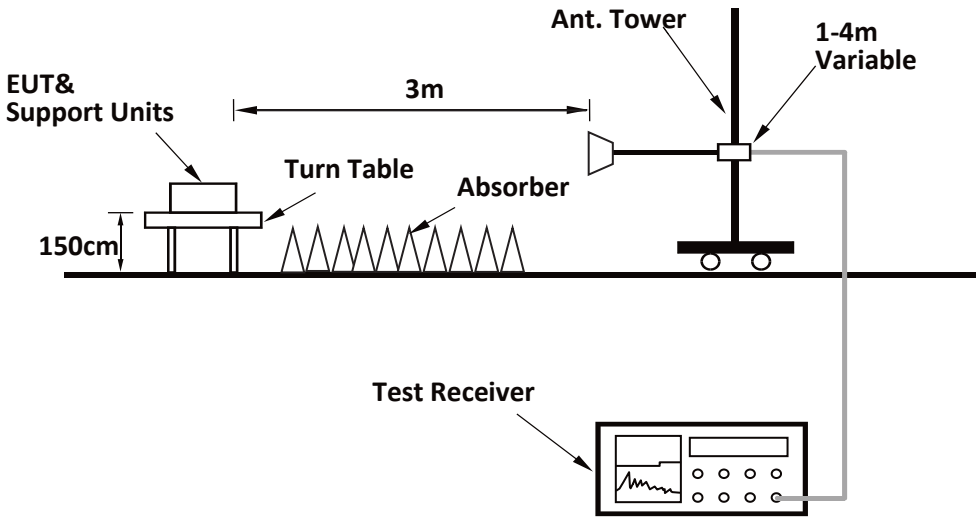
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:

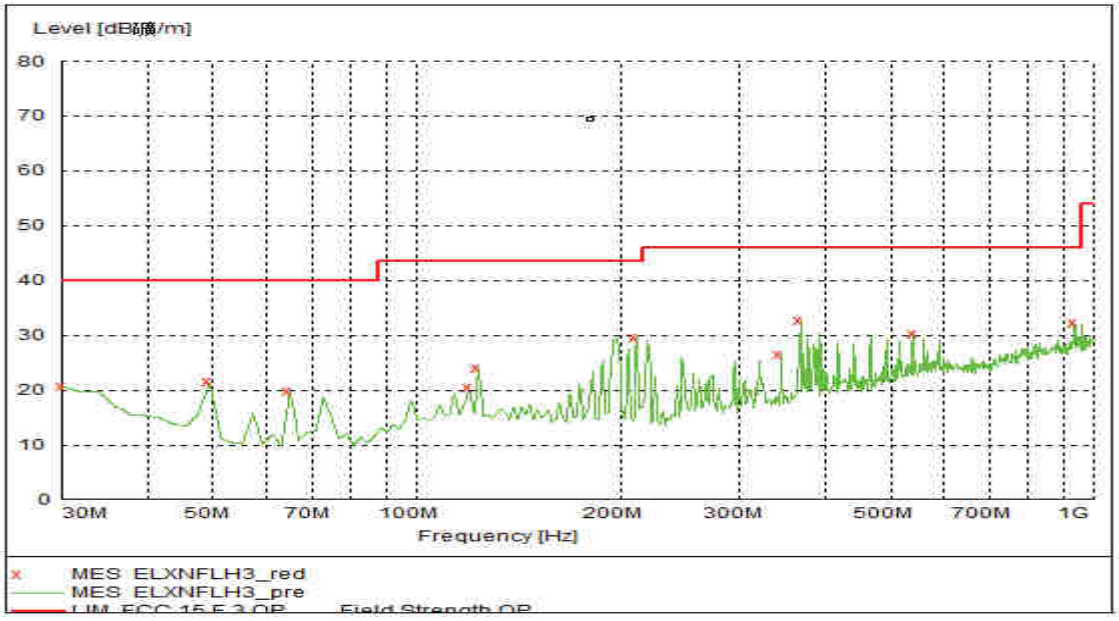


7.4 Test Results of Radiated Emissions

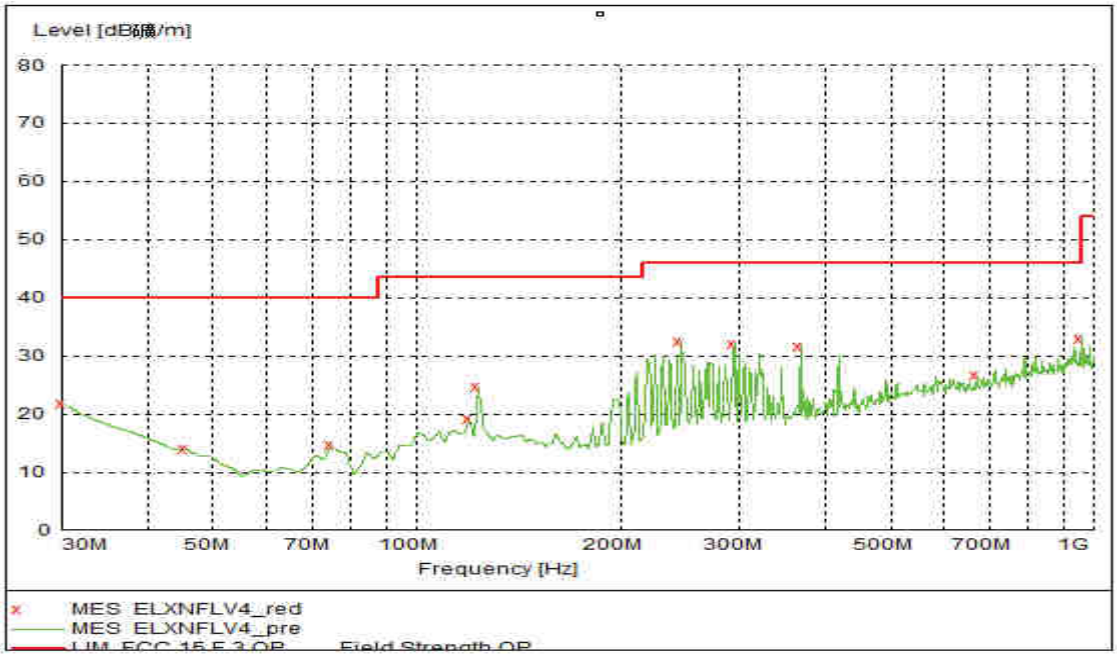
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:

Horizontal



Vertical



Test data 30MHz~1GHz:

Polarization	Frequency (MHz)	Measured level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
H	30.00	22.00	40.00	18.00	PK
	49.44	21.00	40.00	19.00	PK
	64.99	19.90	40.00	20.10	PK
	119.42	21.20	43.50	22.30	PK
	123.31	24.30	43.50	19.20	PK
	210.78	29.20	43.50	14.30	PK
	344.91	28.00	46.00	18.00	PK
	368.24	32.30	46.00	13.70	PK
	541.24	32.60	46.00	13.40	PK
	933.91	32.20	46.00	13.80	PK
V	30.00	21.80	40.00	18.20	PK
	45.55	14.00	40.00	26.00	PK
	74.71	14.60	40.00	25.40	PK
	119.42	19.20	43.50	24.30	PK
	123.31	24.60	43.50	18.90	PK
	245.77	34.70	46.00	11.30	PK
	294.37	34.50	46.00	11.50	PK
	368.24	32.30	46.00	13.70	PK
	671.48	26.60	46.00	19.40	PK
	955.29	33.00	46.00	13.00	PK

Test result above 1GHz:
The emission was conducted from 1GHz to 40GHz, there FCC power setting is larger than IC power, so we Only list the FCC test results in this report.

U-NII-1 Band:
802.11a

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5180.00	91.60	Fundamental	/	PK
	H	5150.00	62.90	74.00	11.10	PK
	H	5150.00	51.40	54.00	2.60	AV
	H	10361.60	46.80	74.00	27.20	PK
	V	10361.80	46.40	74.00	27.60	PK
M	H	5200.00	91.40	Fundamental	/	PK
	H	10401.70	46.50	74.00	27.50	PK
	V	10401.40	47.00	74.00	27.00	PK
H	H	5240.00	91.50	Fundamental	/	PK
	H	5350.00	52.40	74.00	21.60	PK
	H	10481.10	47.90	74.00	26.10	PK
	V	10481.10	47.80	74.00	26.20	PK

802.11n20

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5180.00	91.30	Fundamental	/	PK
	H	5150.00	61.90	74.00	12.10	PK
	H	5150.00	52.54	54.00	1.46	AV
	H	10362.30	45.70	74.00	28.30	PK
	V	10362.25	45.60	74.00	28.40	PK
M	H	5200.00	91.60	Fundamental	/	PK
	H	5150.00	52.60	74.00	21.40	PK
	H	10402.75	47.70	74.00	26.30	PK
	V	10402.43	47.40	74.00	26.60	PK
H	H	5240.00	91.70	Fundamental	/	PK
	H	5150.00	52.70	74.00	21.30	PK
	H	10482.26	47.80	74.00	26.20	PK
	V	10482.74	47.67	74.00	26.33	PK

802.11n40

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5190.00	81.60	Fundamental	/	PK
	H	5150.00	62.71	74.00	11.29	PK
	H	5150.00	48.78	54.00	5.22	AV
	H	10384.14	45.90	74.00	28.10	PK
	V	10384.68	45.80	74.00	28.20	PK
H	H	5230.00	81.50	Fundamental	/	PK
	H	5150.00	52.80	74.00	21.20	PK
	H	10466.90	45.80	74.00	28.20	PK
	V	10466.85	45.70	74.00	28.30	PK

802.11ac80

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5210.00	77.70	Fundamental	/	PK
	H	5150.00	66.96	74.00	7.04	PK
	H	5150.00	51.00	54.00	3.00	AV
	H	10432.15	48.10	74.00	25.90	PK
	V	10432.65	48.00	74.00	26.00	PK

U-NII-3 Band:

802.11a

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5745.00	89.68	Fundamental	/	PK
	H	5720.00	62.20	110.80	48.60	PK
	H	11496.14	49.60	74.00	24.40	PK
	V	11496.58	49.80	74.00	24.20	PK
M	H	5785	89.60	Fundamental	/	PK
	H	11515.14	48.80	74.00	25.20	PK
	V	11508.58	48.70	74.00	25.30	PK
H	H	5825	89.70	Fundamental	/	PK
	H	5855.00	61.80	110.80	49.00	PK
	H	11660.20	48.80	74.00	25.20	PK
	V	11656.40	48.90	74.00	25.10	PK

802.11n20

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5745.00	89.90	Fundamental	/	PK
	H	5649.25	60.60	68.20	7.60	PK
	H	11490.14	48.90	74.00	25.10	PK
	V	11452.58	48.80	74.00	25.20	PK
M	H	5785.00	89.70	Fundamental	/	PK
	H	11521.78	48.80	74.00	25.20	PK
	V	11518.58	48.90	74.00	25.10	PK
H	H	5825.00	89.80	Fundamental	/	PK
	H	5927.24	62.10	68.20	6.10	PK
	H	11658.20	48.80	74.00	25.20	PK
	V	11656.48	48.90	74.00	25.10	PK

802.11n40

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5755.00	80.14	Fundamental	/	PK
	H	5720.00	67.40	110.80	43.40	PK
	H	11516.20	49.10	74.00	24.90	PK
	V	11517.60	48.90	74.00	25.10	PK
H	H	5795.00	80.10	Fundamental	/	PK
	H	5855.00	66.20	110.80	44.60	PK
	H	11598.20	49.10	74.00	24.90	PK
	V	11600.60	49.00	74.00	25.00	PK

802.11ac80

Channel	Polarity	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	5775.00	76.43	Fundamental	/	PK
	H	5720.0	68.70	110.30	41.60	PK
	H	11562.20	49.10	74.00	24.90	PK
	V	11562.70	48.90	74.00	25.10	PK

7.5 Co-location emission

Mode of operation during the test

Mode 1: the Wi-Fi 5G & Bluetooth classic mode transmitted simultaneously;
Mode 2: the Wi-Fi 5G & Bluetooth LE mode transmitted simultaneously;

The Wi-Fi 5G of 5200MHz, Bluetooth LE 2440MHz and Bluetooth classic 2441MHz (GSFK) was chosen to perform test as representative.

Mode 1:

Channel	Frequency (MHz)	Measured level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector	Polarization
5200 & 2441	5150.00	61.70	74.00	12.30	PK	V
	5150.00	52.12	54.00	1.88	AV	V
	4882.65	42.70	74.00	31.30	PK	V
	7320.08	43.50	74.00	30.50	PK	V
Note: after test, no additional Co-location emission was found.						

Mode 2:

Channel	Frequency (MHz)	Measured level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector	Polarization
5200 & 2440	5150.00	61.40	74.00	12.60	PK	V
	5150.00	52.43	54.00	1.57	AV	V
	4880.03	45.30	74.00	28.70	PK	V
	7319.82	46.60	74.00	27.40	PK	V
Note: after test, no additional Co-location emission was found.						

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

8 Power line conducted emission

Test result: **Pass**

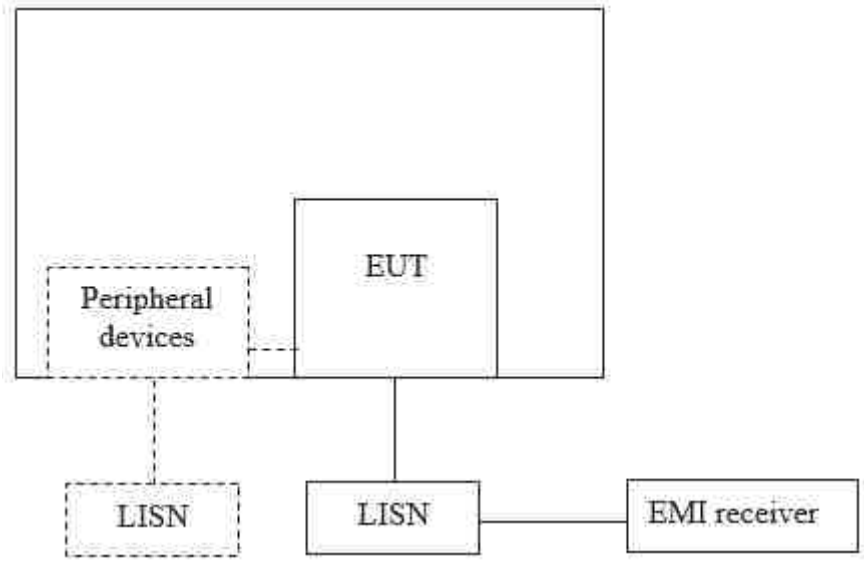
8.1 Measurement Procedure

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

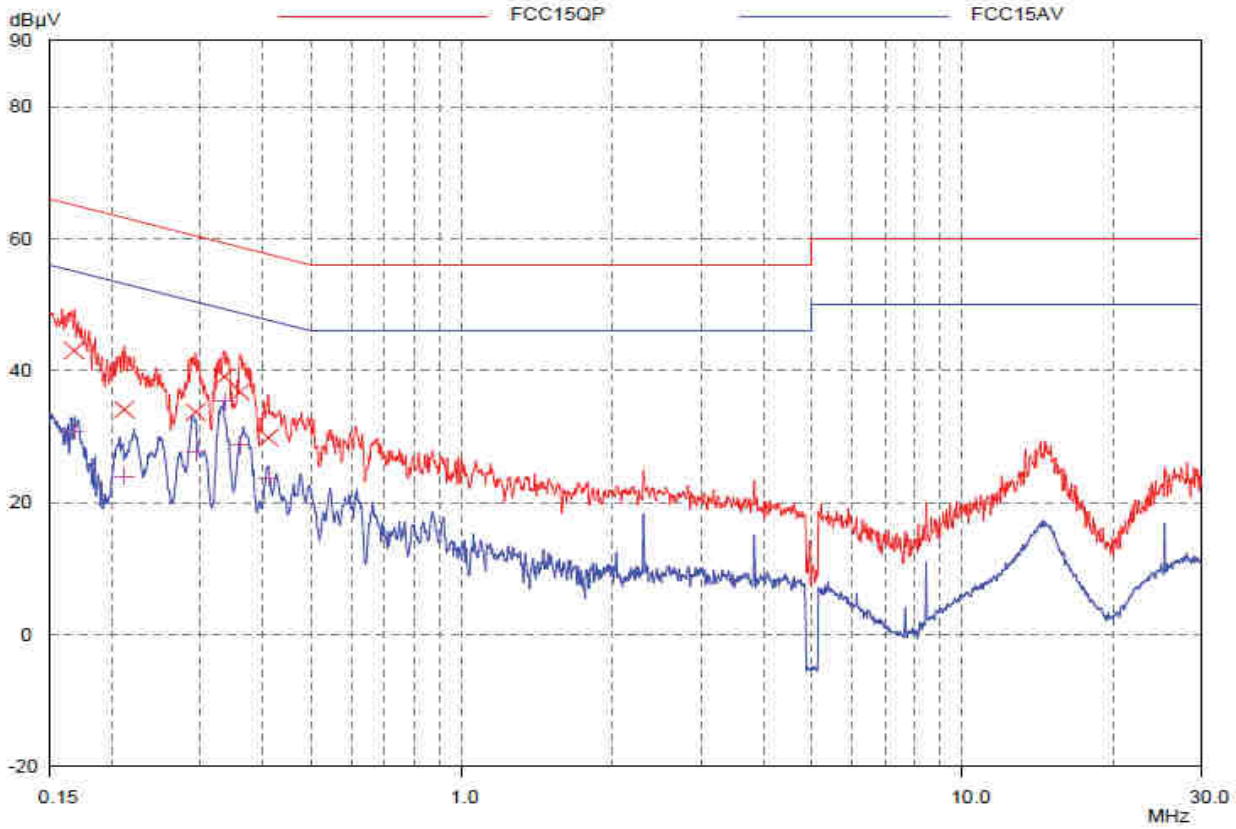
8.2 Test Configuration



8.3 Test Results of Power line conducted emission

Test Curve:

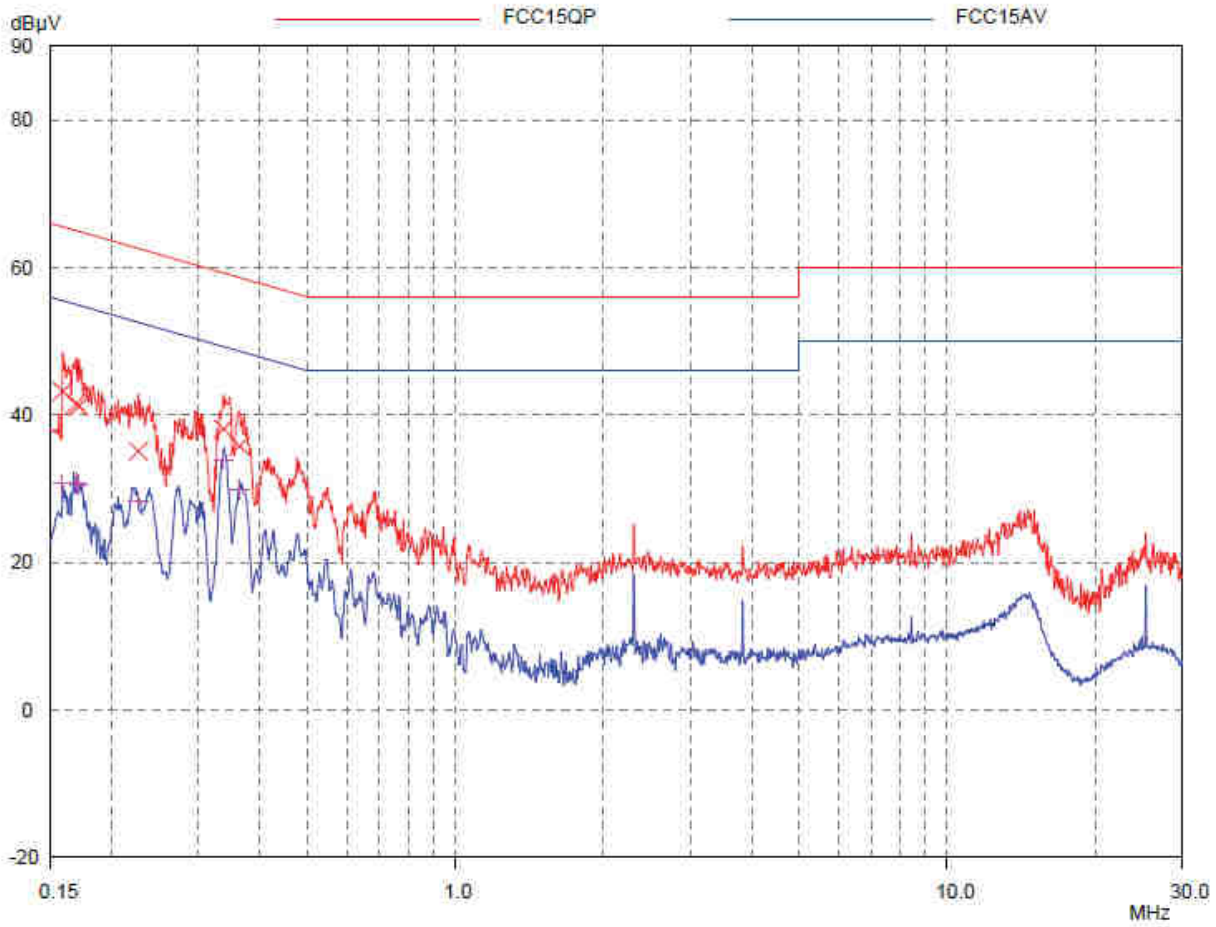
L line



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
0.17	43.03	65.07	22.04	30.85	55.07	24.22
0.21	34.08	63.15	29.07	24.01	53.15	29.14
0.29	33.75	60.43	26.68	27.73	50.43	22.7
0.33	39.09	59.34	20.25	35.38	49.34	13.96
0.36	36.75	58.74	21.99	28.81	48.74	19.93
0.41	29.88	57.64	27.76	23.78	47.64	23.86
Note: All possible modes of operation were investigated. Only the worst case emissions measured.						

N line



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
0.16	43.22	65.54	22.32	30.70	55.54	24.84
0.17	41.54	65.01	23.47	30.77	55.01	24.24
0.17	41.22	64.91	23.69	30.54	54.91	24.37
0.23	35.09	62.59	27.50	28.29	52.59	24.30
0.34	38.12	59.27	21.15	33.97	49.27	15.30
0.36	35.79	58.64	22.85	29.90	48.64	18.74
Note: All possible modes of operation were investigated. Only the worst case emissions measured.						

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
Then Correct Factor = 10.00 + 2.00 = 12.00dB;
Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

9 Frequency Stability

Test result: **Pass**

9.1 Limit

The frequency stability shall be sufficient to ensure that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

9.2 Test Result:

Frequency Error - Temperature Variation

Supply Voltage DC (V)	Temperature (°C)	Frequency Stability (Hz)
		Channel (5180MHz)
19	-20	10.52
	-10	8.68
	0	-6.37
	10	-10.32
	20	4.26
	30	-13.25
	40	-20.86
	50	-22.57

Frequency Error - Voltage Variation

Supply Voltage DC (V)	Temperature (°C)	Frequency Stability (Hz)
		Channel (5180MHz)
17.1	20	12.25
19		-8.44
20.9		-10.89

10 Antenna requirement

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

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

Appendix A: Test results

U-NII-1

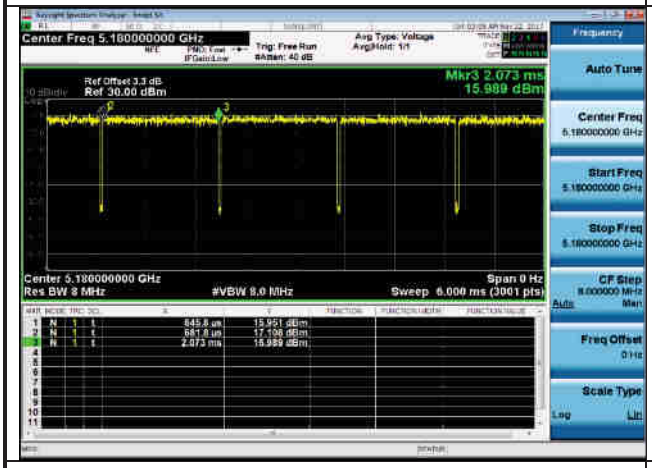
1. Duty Cycle

1.1 Test Data

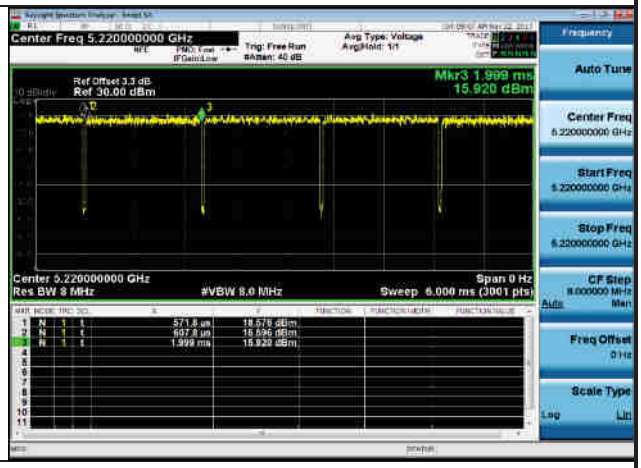
U-NII-1 Duty Cycle				
Mode	Test Frequency (MHz)	Ant	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11a	5180	Ant1	91.18	0.40
802.11a	5200	Ant1	91.16	0.40
802.11a	5240	Ant1	91.03	0.41
802.11n (HT20)	5180	Ant1	93.04	0.31
802.11n (HT20)	5200	Ant1	93.04	0.31
802.11n (HT20)	5240	Ant1	92.82	0.32
802.11n (HT40)	5190	Ant1	86.96	0.61
802.11n (HT40)	5230	Ant1	86.96	0.61
802.11ac (VHT80)	5210	Ant1	80.36	0.95

1.2 Test Plots

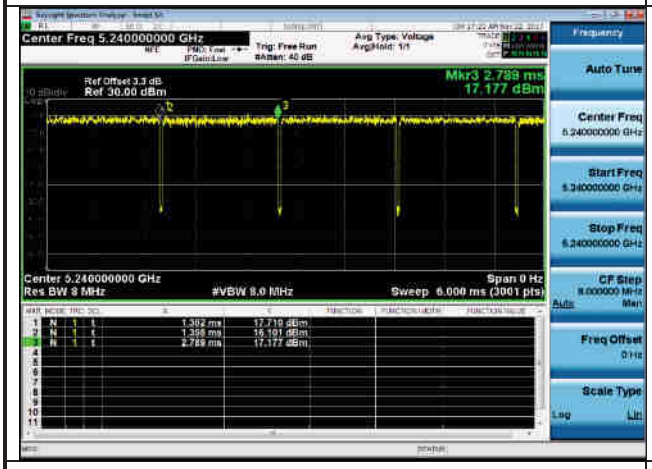
U-NII-1 Duty Cycle：802.11a(20MHz),5180MHz,



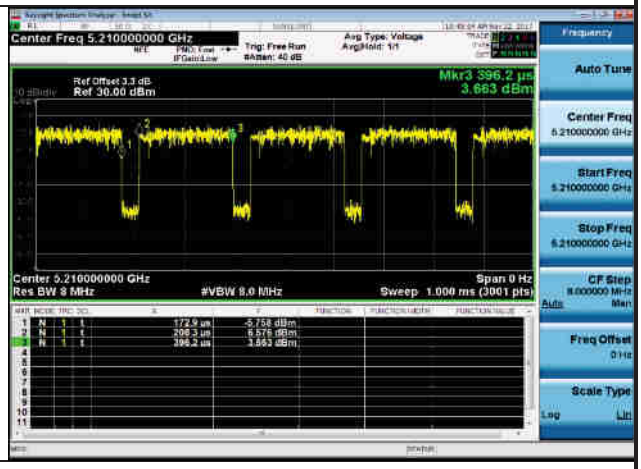
U-NII-1 Duty Cycle：802.11a(20MHz),5220MHz,



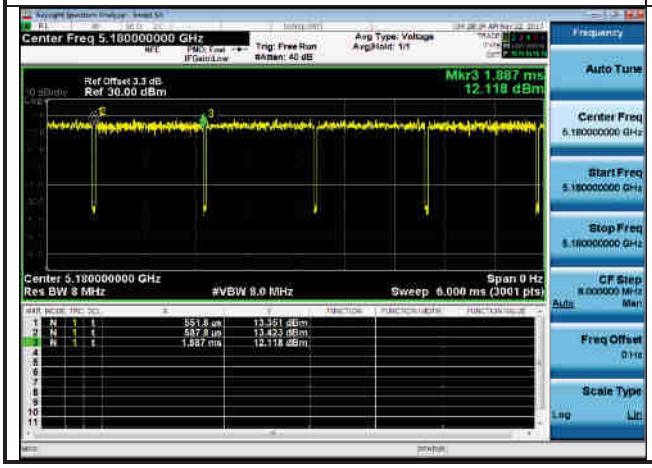
U-NII-1 Duty Cycle：802.11a(20MHz),5240MHz,



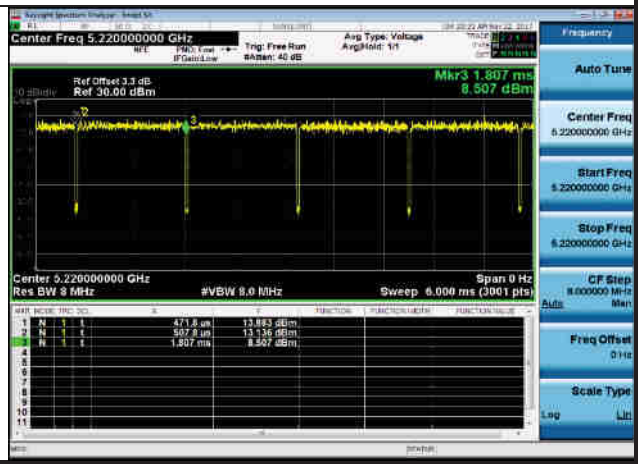
U-NII-1 Duty Cycle：802.11ac(80MHz),5210MHz,



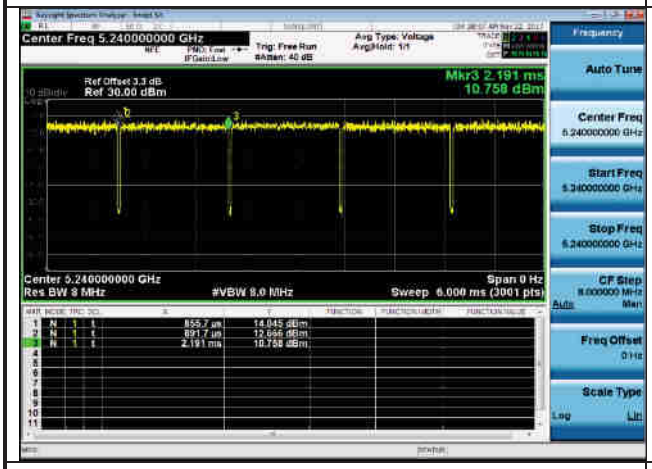
U-NII-1 Duty Cycle：802.11n(20MHz),5180MHz,



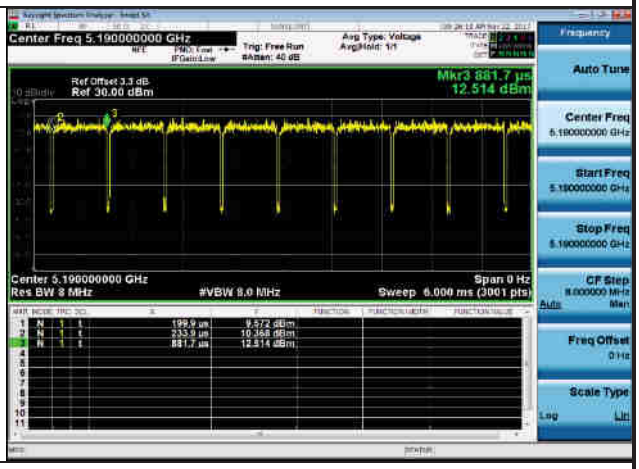
U-NII-1 Duty Cycle：802.11n(20MHz),5220MHz,



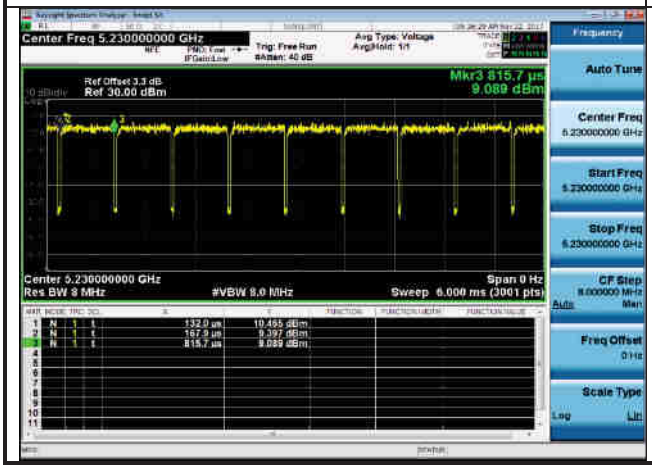
U-NII-1 Duty Cycle：802.11n(20MHz),5240MHz,



U-NII-1 Duty Cycle：802.11n(40MHz),5190MHz,



U-NII-1 Duty Cycle：802.11n(40MHz),5230MHz,



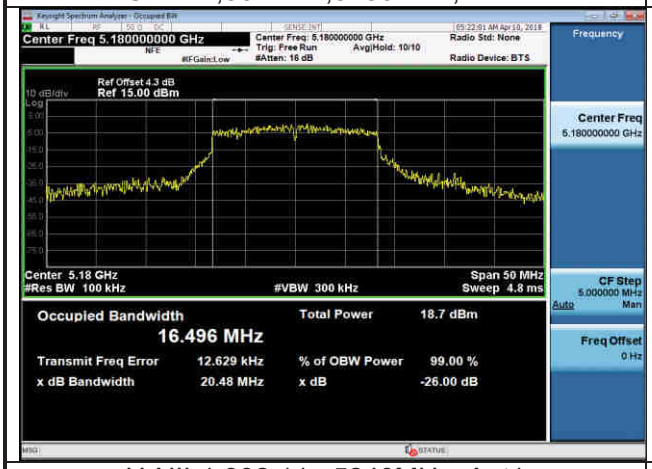
2. 26dB bandwidth

2.1 Test Data

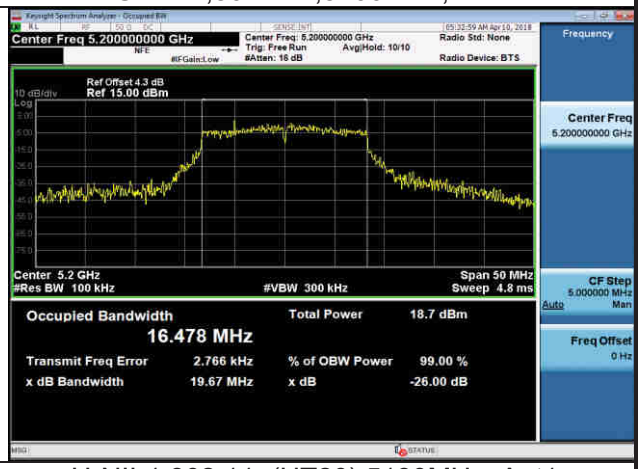
U-NII-1 26dB Bandwidth				
Mode	Test Frequency (MHz)	Ant	Occupied Bandwidth (MHz)	Result
802.11a	5180	Ant1	20.48	Pass
802.11a	5200	Ant1	19.67	Pass
802.11a	5240	Ant1	19.80	Pass
802.11n (HT20)	5180	Ant1	20.89	Pass
802.11n (HT20)	5200	Ant1	21.26	Pass
802.11n (HT20)	5240	Ant1	20.55	Pass
802.11n (HT40)	5190	Ant1	41.72	Pass
802.11n (HT40)	5230	Ant1	38.31	Pass
802.11ac (VHT80)	5210	Ant1	84.05	Pass

2.2 Test Plots

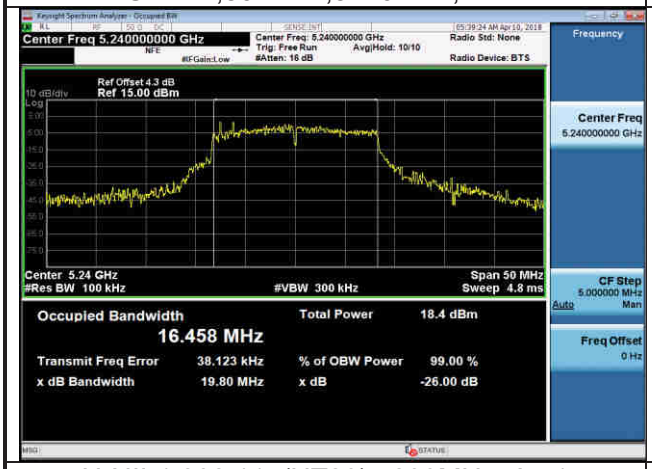
U-NII-1,802.11a,5180MHz, Ant1



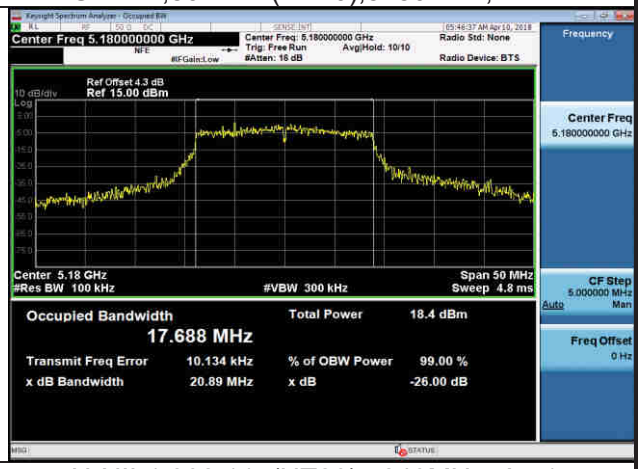
U-NII-1,802.11a,5200MHz, Ant1



U-NII-1,802.11a,5240MHz, Ant1

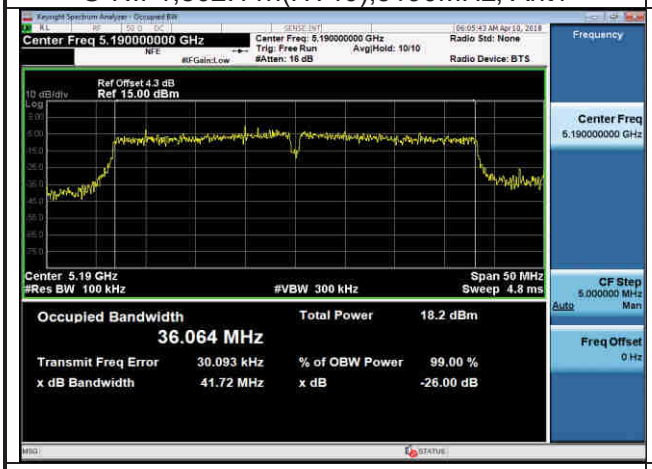
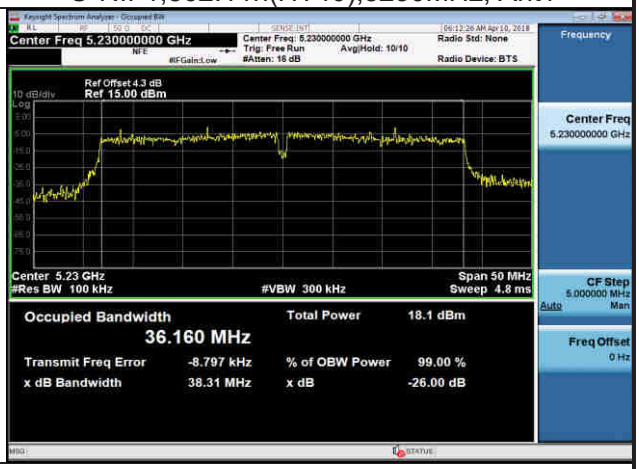


U-NII-1,802.11n(HT20),5180MHz, Ant1



U-NII-1,802.11n(HT20),5200MHz, Ant1

U-NII-1,802.11n(HT20),5240MHz, Ant1

U-NII-1,802.11n(HT40),5190MHz, Ant1	U-NII-1,802.11n(HT40),5230MHz, Ant1
	
U-NII-1,802.11ac(VHT80),5210MHz, Ant1	
	

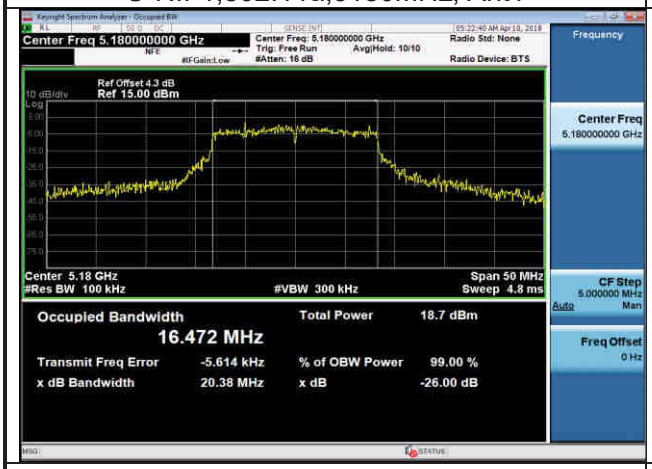
3. 99% Occupied Bandwidth

3.1 Test Data

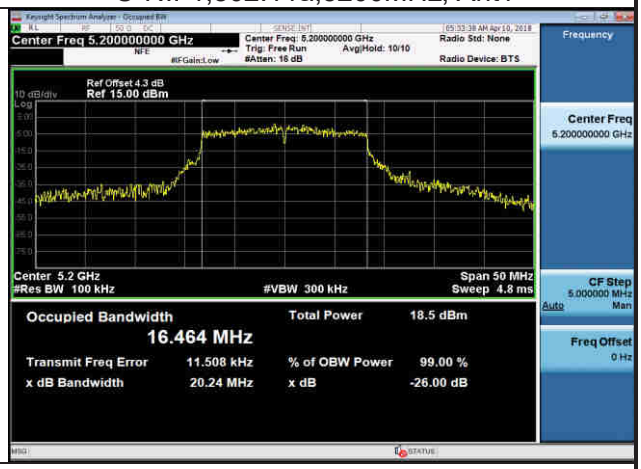
U-NII-1 99% Occupied Bandwidth				
Mode	Test Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz)	Result
802.11a	5180	Ant1	16.472	Pass
802.11a	5200	Ant1	16.464	Pass
802.11a	5240	Ant1	16.470	Pass
802.11n (HT20)	5180	Ant1	17.686	Pass
802.11n (HT20)	5200	Ant1	17.681	Pass
802.11n (HT20)	5240	Ant1	17.680	Pass
802.11n (HT40)	5190	Ant1	36.140	Pass
802.11n (HT40)	5230	Ant1	36.112	Pass
802.11ac (VHT80)	5210	Ant1	75.465	Pass

3.2 Test Plots

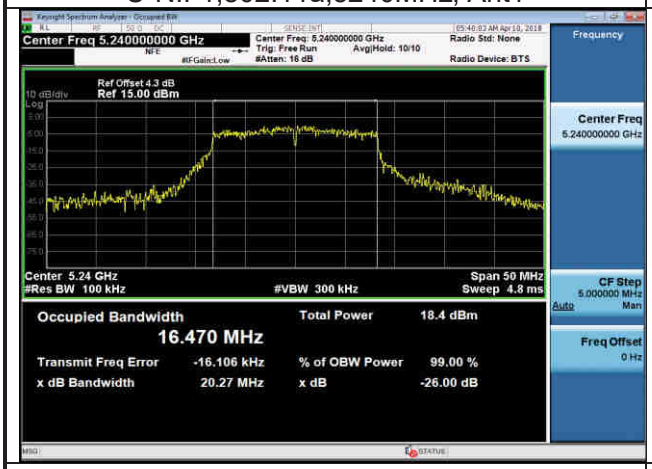
U-NII-1,802.11a,5180MHz, Ant1



U-NII-1,802.11a,5200MHz, Ant1



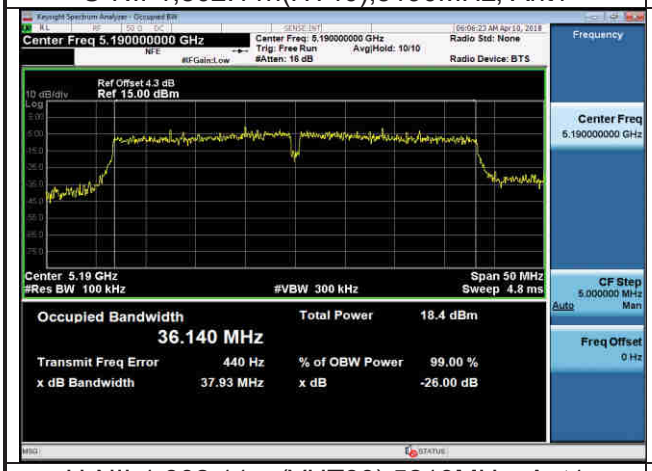
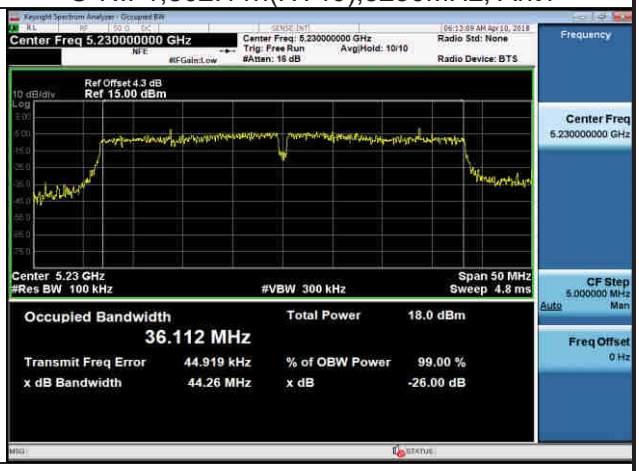
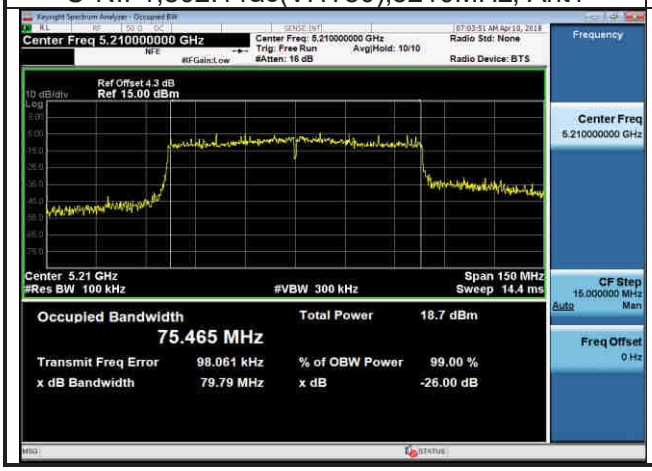
U-NII-1,802.11a,5240MHz, Ant1



U-NII-1,802.11n(HT20),5180MHz, Ant1

U-NII-1,802.11n(HT20),5200MHz, Ant1

U-NII-1,802.11n(HT20),5240MHz, Ant1

U-NII-1,802.11n(HT40),5190MHz, Ant1	U-NII-1,802.11n(HT40),5230MHz, Ant1
	
U-NII-1,802.11ac(VHT80),5210MHz, Ant1	
	

4. Power spectral density

4.1 Test Data

FCC data

U-NII-1 AVGSA Power Spectral Density							
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	PSD (dBm)	RBW (kHz)	Limit (dBm)	Result
802.11a	5180	Ant1	0.40	4.211	1000	11	Pass
802.11a	5200	Ant1	0.40	4.367	1000	11	Pass
802.11a	5240	Ant1	0.41	3.938	1000	11	Pass
802.11n (HT20)	5180	Ant1	0.31	3.580	1000	11	Pass
802.11n (HT20)	5200	Ant1	0.31	3.797	1000	11	Pass
802.11n (HT20)	5240	Ant1	0.32	3.591	1000	11	Pass
802.11n (HT40)	5190	Ant1	0.61	-8.487	100	11	Pass
802.11n (HT40)	5230	Ant1	0.61	-8.703	100	11	Pass
802.11ac (VHT80)	5210	Ant1	0.95	-12.095	100	11	Pass

IC data

U-NII-1 E.I.R.P Spectral Density								
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	PSD (dBm)	Gain (dBm)	E.R.I.P PSD (dBm)	Limit (dBm /MHz)	Result
802.11a	5180	Ant1	0.40	-1.421	6.53	5.11	10	Pass
802.11a	5200	Ant1	0.40	-2.483	6.53	4.05	10	Pass
802.11a	5240	Ant1	0.40	-3.145	6.53	3.39	10	Pass
802.11n (HT20)	5180	Ant1	0.31	-1.708	6.53	4.82	10	Pass
802.11n (HT20)	5200	Ant1	0.31	-2.833	6.53	3.70	10	Pass
802.11n (HT20)	5240	Ant1	0.31	-3.822	6.53	2.71	10	Pass
802.11n (HT40)	5190	Ant1	0.61	-6.847	6.53	-0.32	10	Pass
802.11n (HT40)	5230	Ant1	0.61	-6.142	6.53	0.39	10	Pass
802.11ac (VHT80)	5210	Ant1	0.95	-9.280	6.53	-2.75	10	Pass

Note: E.I.R.P PSD=PSD + Gain

1.1 Test Plots

FCC results

U-NII-1,802.11a,5180MHz, Ant1

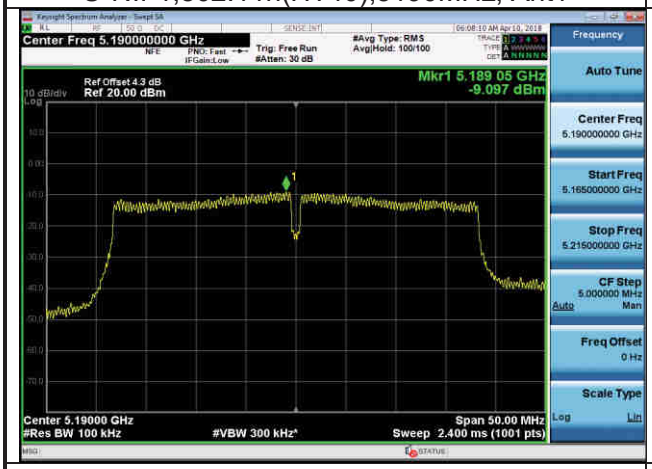
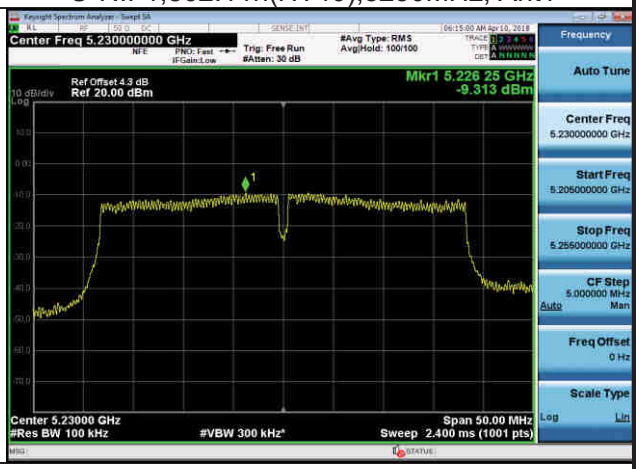
U-NII-1,802.11a,5200MHz, Ant1

U-NII-1,802.11a,5240MHz, Ant1

U-NII-1,802.11n(HT20),5180MHz, Ant1

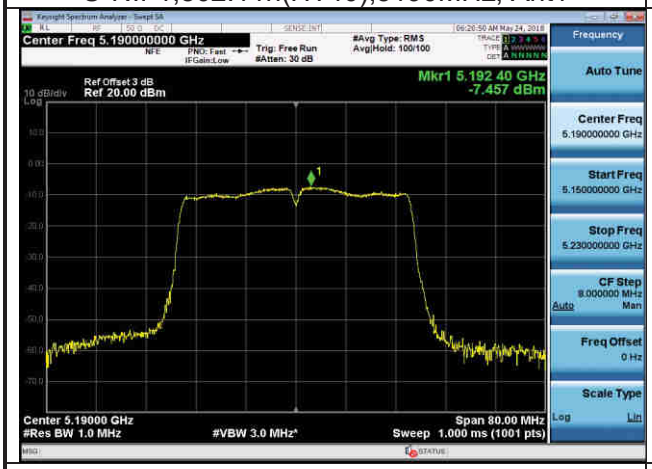
U-NII-1,802.11n(HT20),5200MHz, Ant1

U-NII-1,802.11n(HT20),5240MHz, Ant1

U-NII-1,802.11n(HT40),5190MHz, Ant1	U-NII-1,802.11n(HT40),5230MHz, Ant1
	
U-NII-1,802.11ac(VHT80),5210MHz , Ant1	
	

IC results

U-NII-1,802.11a,5180MHz, Ant1	U-NII-1,802.11a,5200MHz, Ant1
	
U-NII-1,802.11a,5240MHz, Ant1	**U-NII-1,802.11n(HT20),5180MHz, Ant1**
	
U-NII-1,802.11n(HT20),5200MHz, Ant1	**U-NII-1,802.11n(HT20),5240MHz, Ant1**
	

U-NII-1,802.11n(HT40),5190MHz, Ant1	U-NII-1,802.11n(HT40),5230MHz, Ant1
	
U-NII-1,802.11ac(VHT80),5210MHz , Ant1	
	

U-NII-3

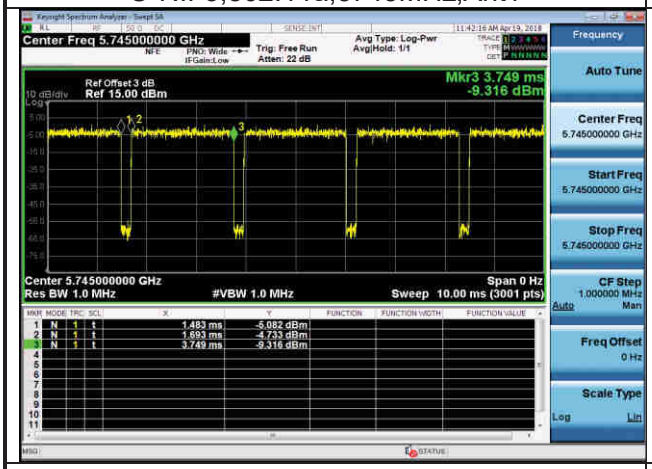
3. Duty Cycle

3.1 Test Data

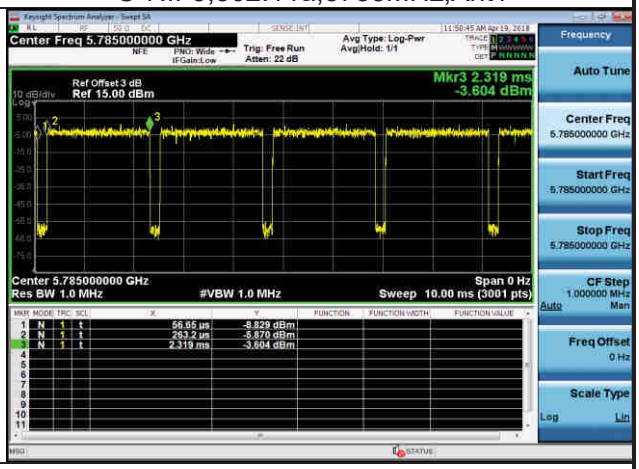
U-NII-3 Duty Cycle				
Mode	Test Frequency (MHz)	Ant	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11a	5745	Ant1	90.74	0.42
802.11a	5785	Ant1	90.87	0.42
802.11a	5825	Ant1	90.74	0.42
802.11n (HT20)	5745	Ant1	92.36	0.35
802.11n (HT20)	5785	Ant1	92.34	0.35
802.11n (HT20)	5825	Ant1	92.13	0.36
802.11n (HT40)	5755	Ant1	84.35	0.74
802.11n (HT40)	5795	Ant1	84.35	0.74
802.11ac (VHT80)	5775	Ant1	79.41	1.00

3.2 Test Plots

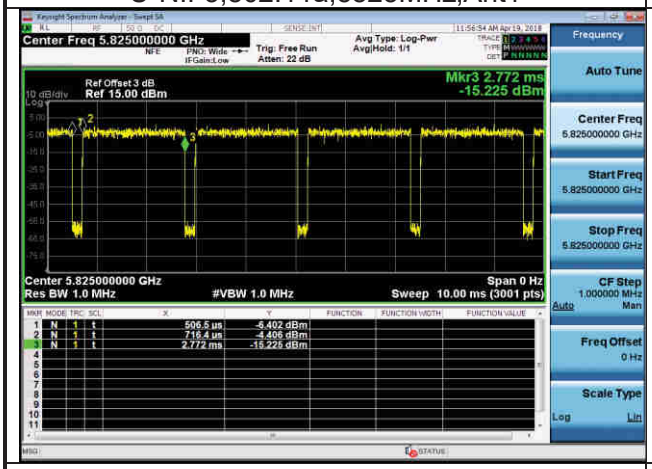
U-NII-3,802.11a,5745MHz,Ant1



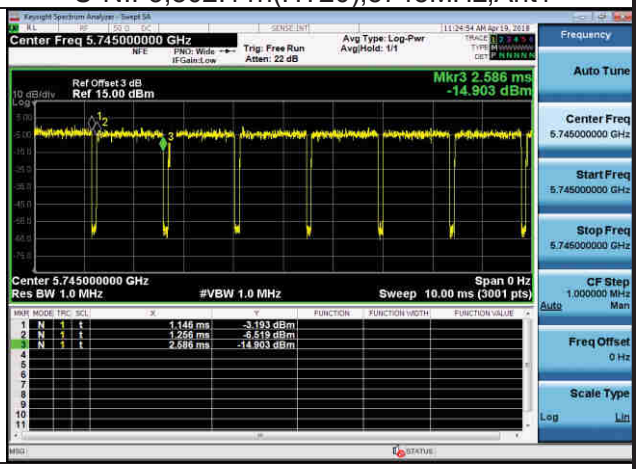
U-NII-3,802.11a,5785MHz,Ant1



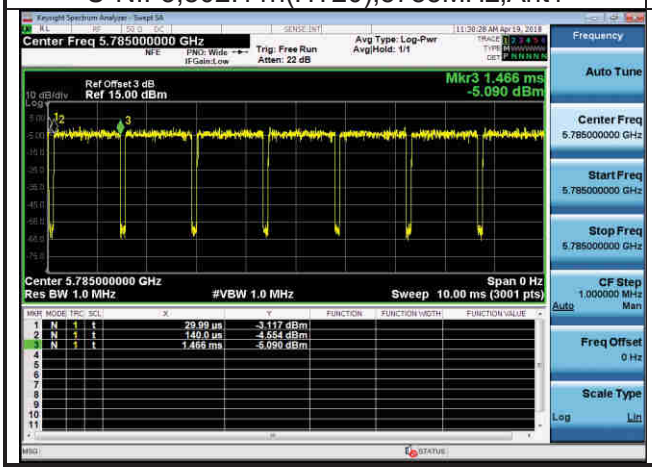
U-NII-3,802.11a,5825MHz,Ant1



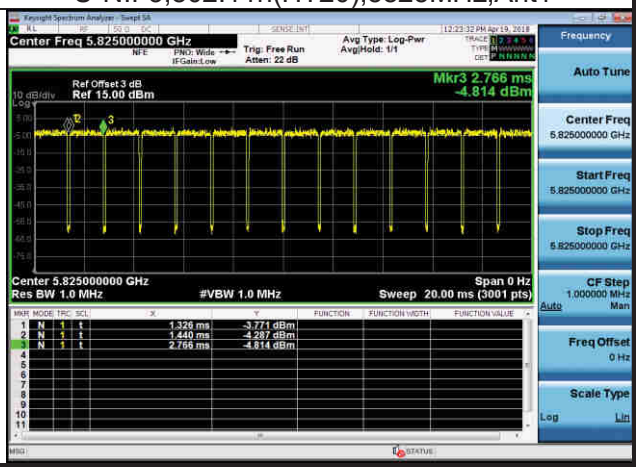
U-NII-3,802.11n(HT20),5745MHz,Ant1

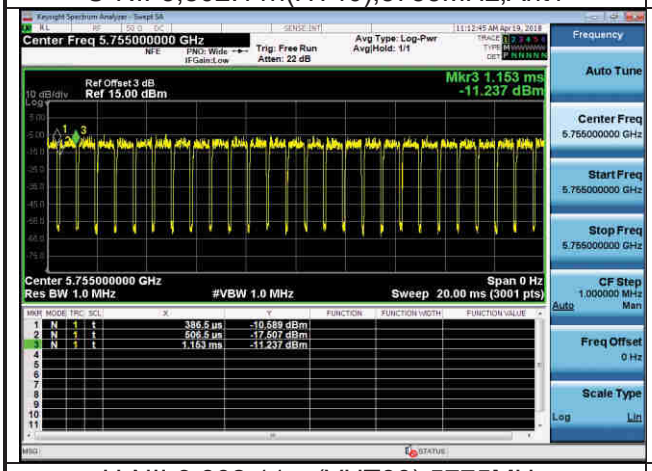
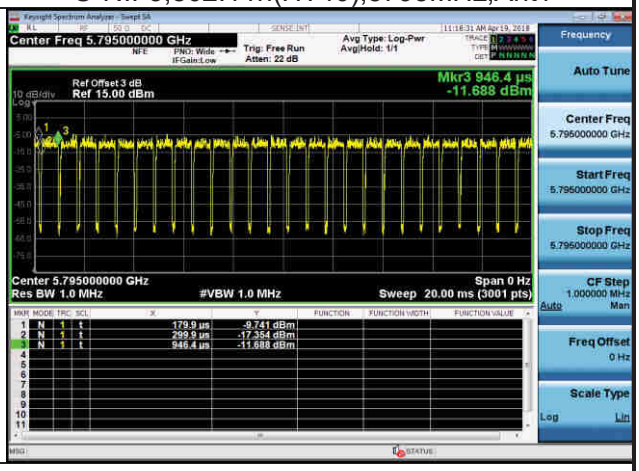
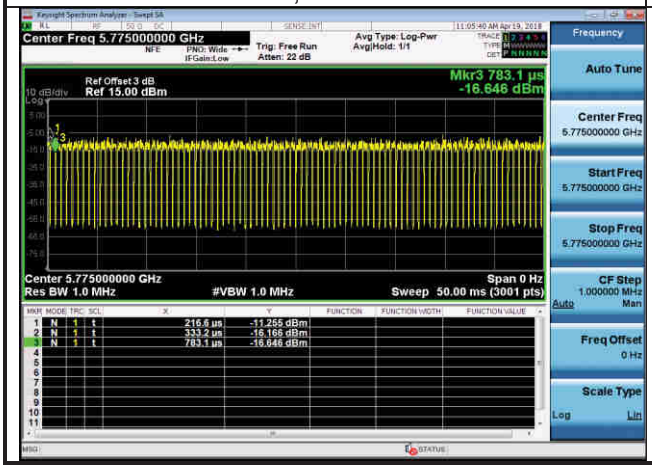


U-NII-3,802.11n(HT20),5785MHz,Ant1



U-NII-3,802.11n(HT20),5825MHz,Ant1



U-NII-3,802.11n(HT40),5755MHz,Ant1	U-NII-3,802.11n(HT40),5795MHz,Ant1
	
U-NII-3,802.11ac(VHT80),5775MHz ,Ant1	
	

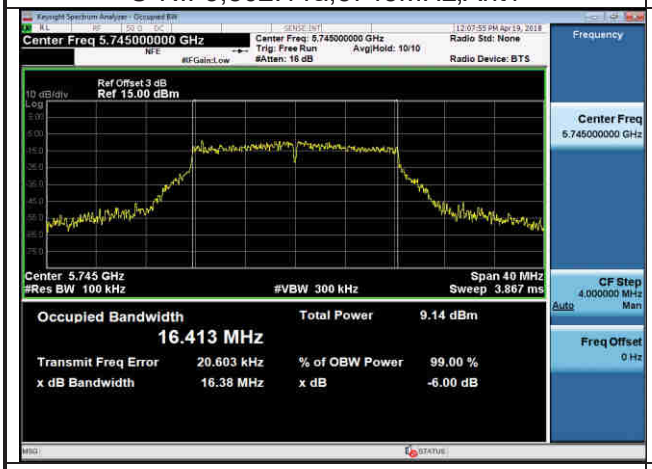
4. 6 dB bandwidth

4.1 Test Data

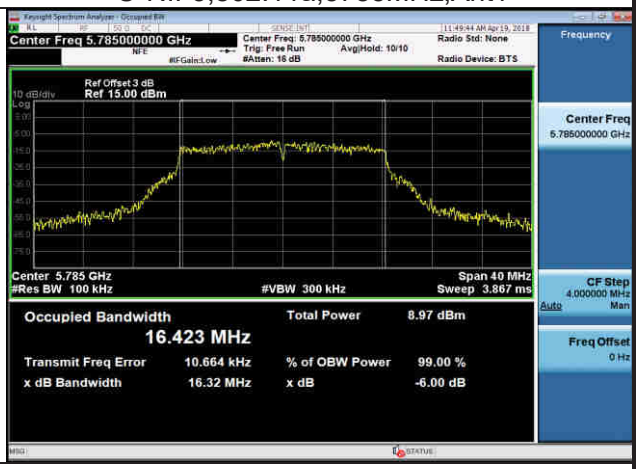
U-NII-3 6dB Bandwidth				
Mode	Test Frequency (MHz)	Ant	Occupied Bandwidth (MHz)	Result
802.11a	5745	Ant1	16.38	Pass
802.11a	5785	Ant1	16.32	Pass
802.11a	5825	Ant1	16.39	Pass
802.11n (HT20)	5745	Ant1	17.58	Pass
802.11n (HT20)	5785	Ant1	17.58	Pass
802.11n (HT20)	5825	Ant1	17.61	Pass
802.11n (HT40)	5755	Ant1	35.46	Pass
802.11n (HT40)	5795	Ant1	36.36	Pass
802.11ac (VHT80)	5775	Ant1	75.40	Pass

Test Plots

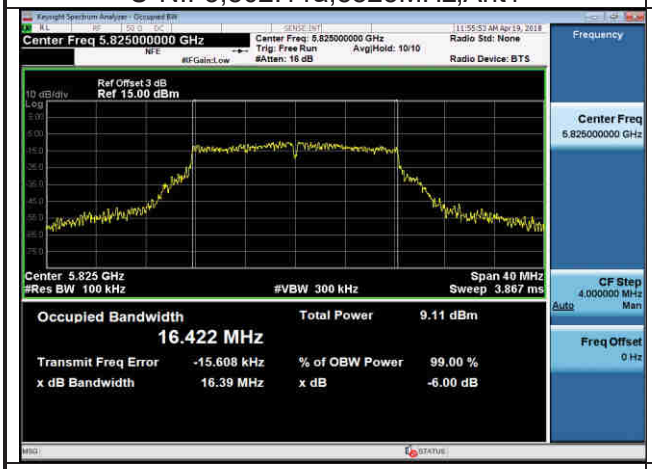
U-NII-3,802.11a,5745MHz,Ant1



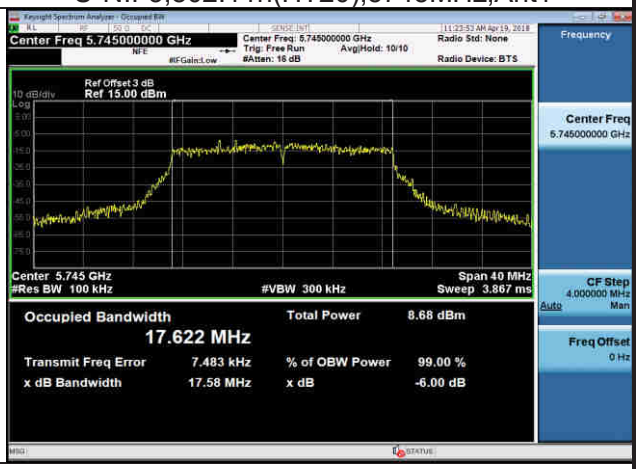
U-NII-3,802.11a,5785MHz,Ant1



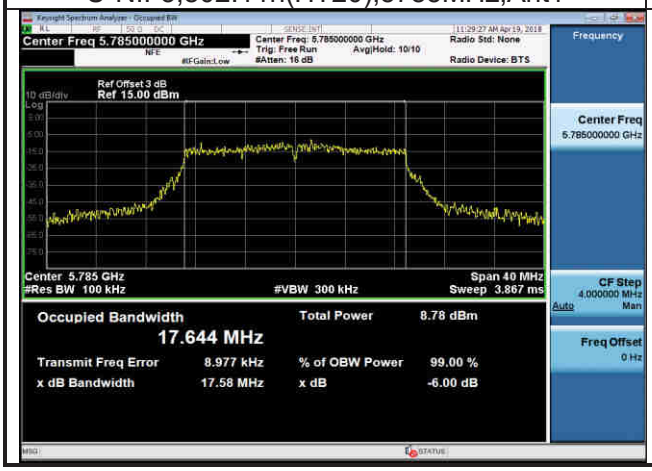
U-NII-3,802.11a,5825MHz,Ant1



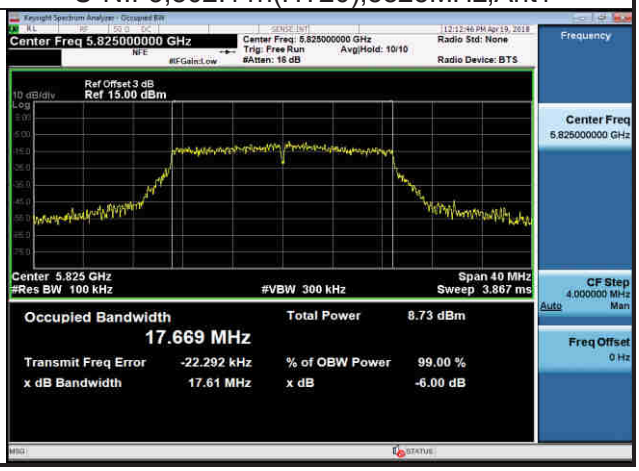
U-NII-3,802.11n(HT20),5745MHz,Ant1

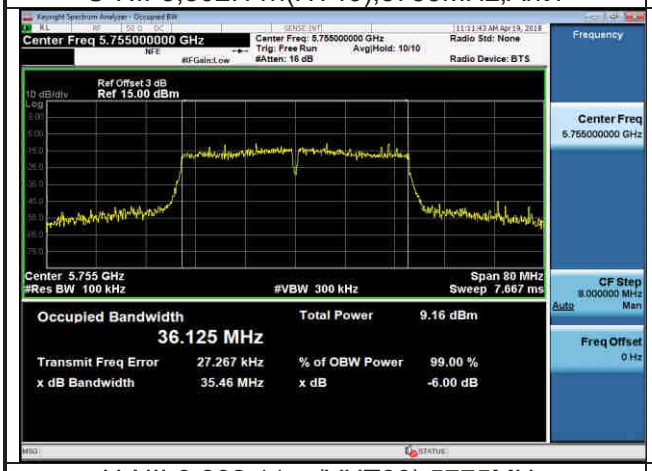
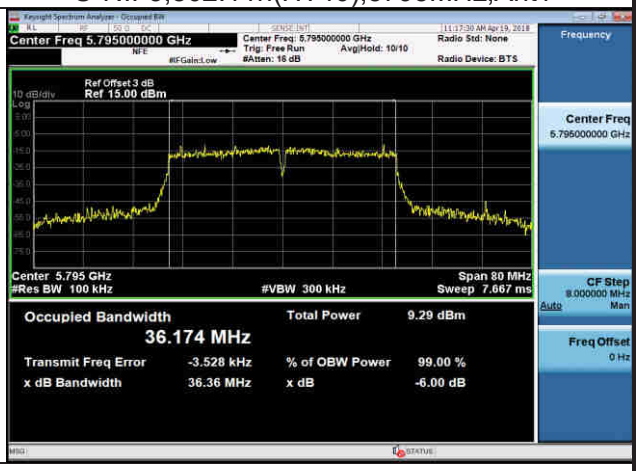
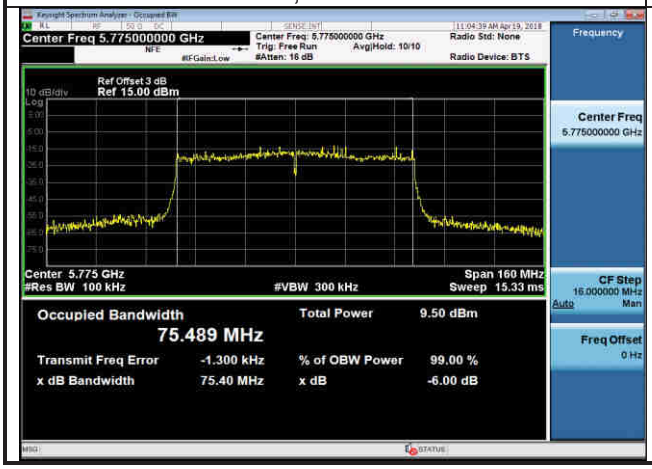


U-NII-3,802.11n(HT20),5785MHz,Ant1



U-NII-3,802.11n(HT20),5825MHz,Ant1



U-NII-3,802.11n(HT40),5755MHz,Ant1	U-NII-3,802.11n(HT40),5795MHz,Ant1
	
U-NII-3,802.11ac(VHT80),5775MHz ,Ant1	
	

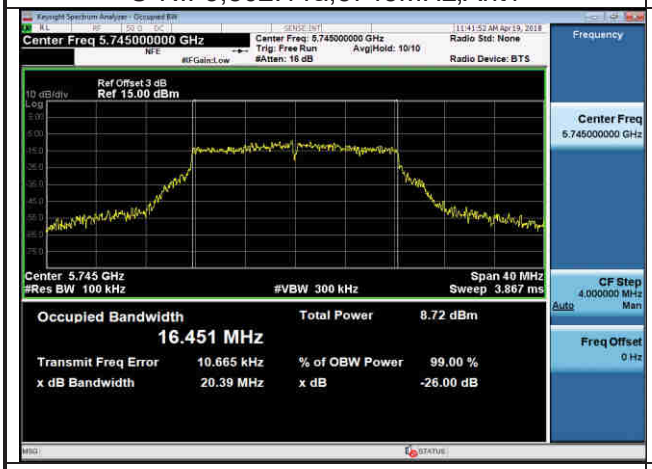
5. 99% Occupied Bandwidth

5.1 Test Data

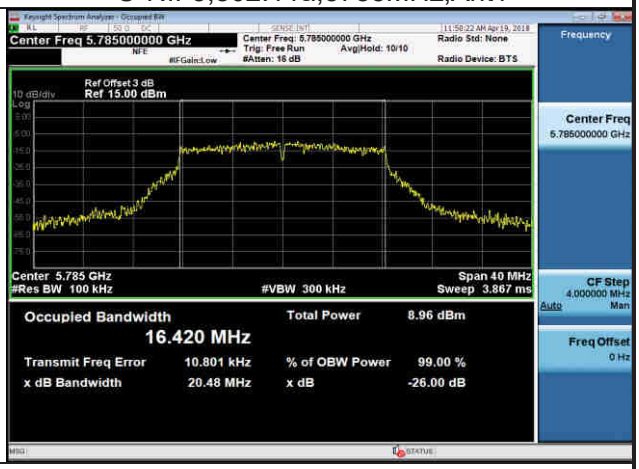
U-NII-3 99% Occupied Bandwidth				
Mode	Test Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz)	Result
802.11a	5745	Ant1	16.451	Pass
802.11a	5785	Ant1	16.420	Pass
802.11a	5825	Ant1	16.443	Pass
802.11n (HT20)	5745	Ant1	17.598	Pass
802.11n (HT20)	5785	Ant1	17.648	Pass
802.11n (HT20)	5825	Ant1	17.672	Pass
802.11n (HT40)	5755	Ant1	36.173	Pass
802.11n (HT40)	5795	Ant1	36.100	Pass
802.11ac (VHT80)	5775	Ant1	75.317	Pass

Test Plots

U-NII-3,802.11a,5745MHz,Ant1

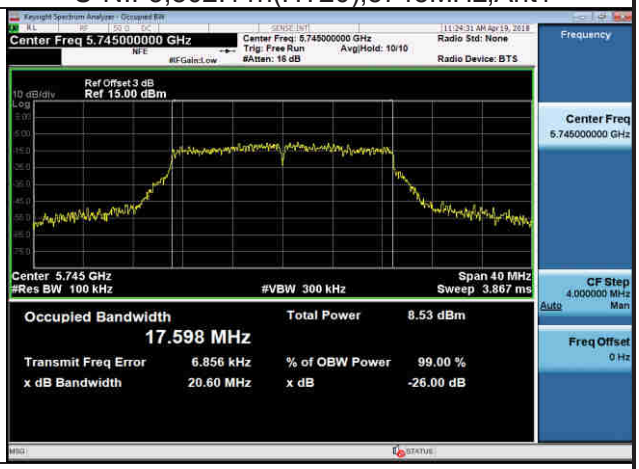


U-NII-3,802.11a,5785MHz,Ant1

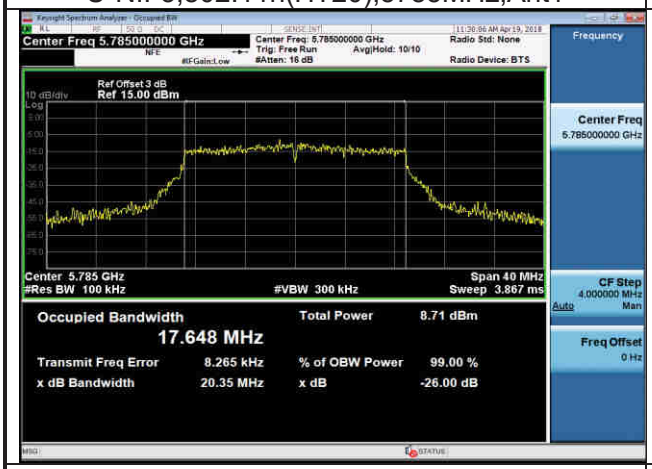


U-NII-3,802.11a,5825MHz,Ant1

U-NII-3,802.11n(HT20),5745MHz,Ant1



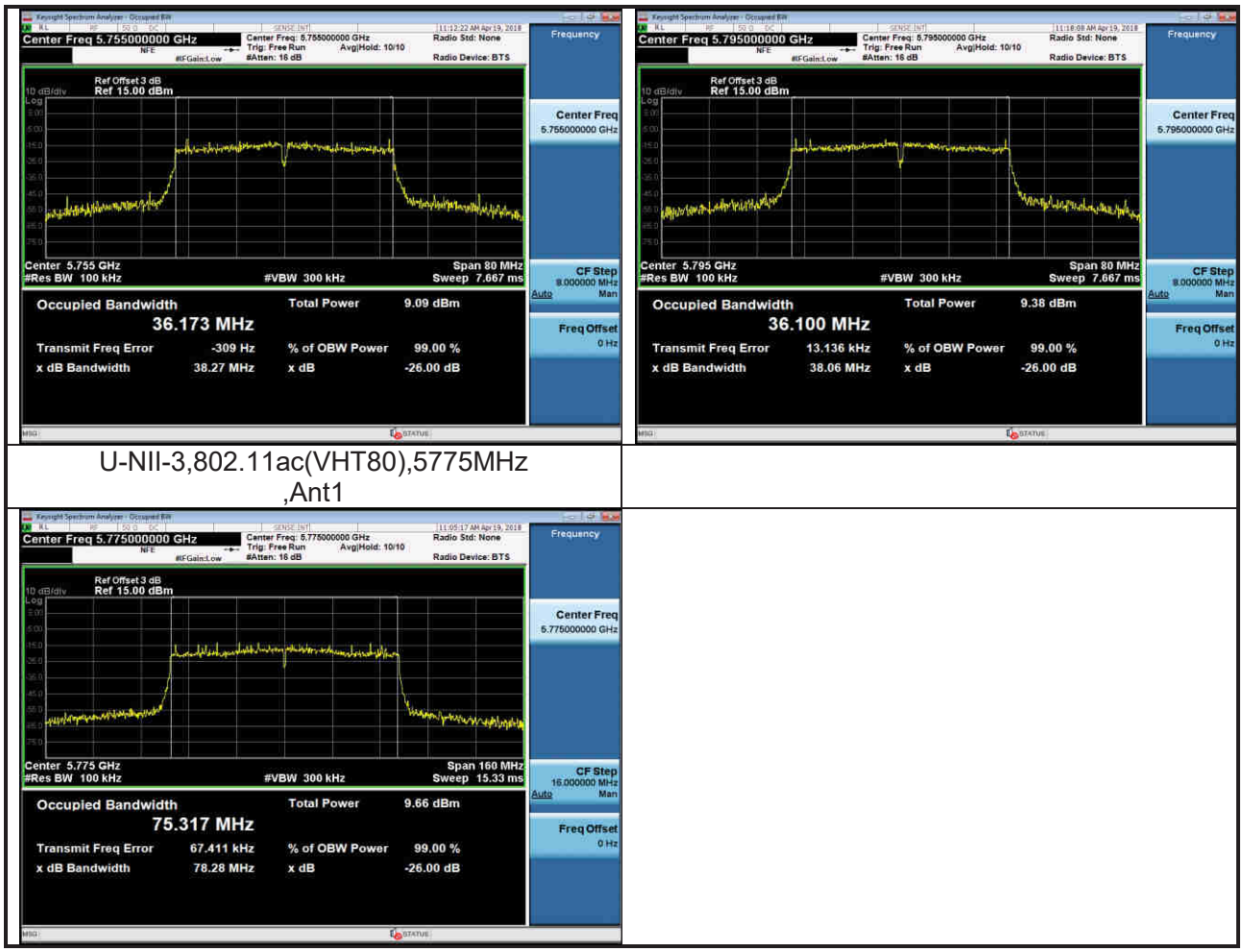
U-NII-3,802.11n(HT20),5785MHz,Ant1



U-NII-3,802.11n(HT20),5825MHz,Ant1

U-NII-3,802.11n(HT40),5755MHz,Ant1

U-NII-3,802.11n(HT40),5795MHz,Ant1



U-NII-3,802.11ac(VHT80),5775MHz ,Ant1

6. Power spectral density

6.1 Test Data

U-NII-3 AVGSA Power Spectral Density							
Mode	Test Frequency (MHz)	Ant	Duty Cycle Factor (dB)	PSD (dBm)	RBW (kHz)	Limit (dBm)	Result
802.11a	5745	Ant1	0.42	-1.318	510	30	Pass
802.11a	5785	Ant1	0.42	-0.809	510	30	Pass
802.11a	5825	Ant1	0.42	-1.664	510	30	Pass
802.11n (HT20)	5745	Ant1	0.36	-1.995	510	30	Pass
802.11n (HT20)	5785	Ant1	0.36	-2.281	510	30	Pass
802.11n (HT20)	5825	Ant1	0.36	-1.966	510	30	Pass
802.11n (HT40)	5755	Ant1	0.74	-4.752	510	30	Pass
802.11n (HT40)	5795	Ant1	0.74	-3.769	510	30	Pass
802.11ac (VHT80)	5775	Ant1	1.00	-6.963	510	30	Pass

Test Plots

U-NII-3,802.11a,5745MHz, Ant1

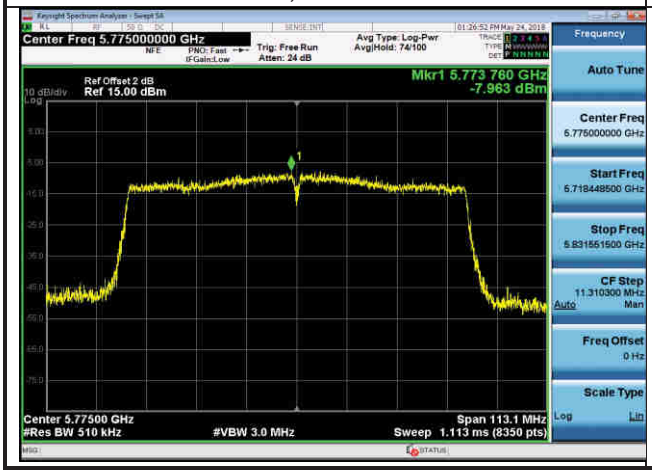
U-NII-3,802.11a,5785MHz, Ant1

U-NII-3,802.11a,5825MHz, Ant1

U-NII-3,802.11n(HT20),5745MHz, Ant1

U-NII-3,802.11n(HT20),5785MHz, Ant1

U-NII-3,802.11n(HT20),5825MHz, Ant1

U-NII-3,802.11n(HT40),5755MHz, Ant1	U-NII-3,802.11n(HT40),5795MHz, Ant1
	
U-NII-3,802.11ac(VHT80),5775MHz , Ant1	
	

********** END **********