Certificate Number: 5055.02

TEST REPORT FOR WLAN TESTING

Report No.: SRTC2018-9004(F)-18102401(G)

Product Name: HVAC Controller

Product Model: CPO-PC400-UW

Applicant: Honeywell (Beijing) Technology Solutions Lab Co., Ltd.

Manufacturer: Honeywell (Beijing) Technology Solutions Lab Co., Ltd.

Specification: FCC Part 15, Subpart E (2019)

FCC ID: 2ARTN-00001

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30, Shixing Street, Shijingshan District,

Beijing, P.R.China

Tel: 86-10-57996183 Fax: 86-10-57996388

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1. GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
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1.3 Applicant's details

Company:	Honeywell (Beijing) Technology Solutions Lab Co., Ltd.
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City:	Beijing
Country or Region:	China
Contacted person:	Zhang John
Tel:	010 56696736
Fax:	---
Email:	John.Zhang@Honeywell.com

1.4 Manufacturer's details

Company:	Honeywell (Beijing) Technology Solutions Lab Co., Ltd.
Address:	A1 Building, C&W Industry Zone, No.14 Jiuxianqiao Road, Chaoyang District, Beijing, 100015, P.R. China
City:	Beijing
Country or Region:	China
Contacted person:	Zhang John
Tel:	010 56696736
Fax:	---
Email:	John.Zhang@Honeywell.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2018-10-24
Testing Start Date:	2018-10-24
Testing End Date:	2020-04-10

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	30
Maximum Extreme	50	---
Minimum Extreme	0	---

Normal Supply Voltage (V d.c.):	24.0
Maximum Extreme Supply Voltage (V d.c.):	29.0
Minimum Extreme Supply Voltage (V d.c.):	19.0

2. DESCRIPTION OF THE DEVICE UNDER TEST

2.1Final Equipment Build Status

Frequency Band(s)	U-NII-1:5150MHz-5250MHz U-NII-2A:5250MHz-5350MHz U-NII-2C:5470MHz-5725MHz U-NII-3:5725MHz-5850MHz
DFS	Client Without Radar Detection
Modulation Type	802.11a 802.11n (HT20/HT40) 802.11ac (VHT20/VHT40/VHT80)
Power Supply	Charger or DC Power Supply
Hardware Version	100100
Software Version	3.0.9.X
SN	Sample 8#
Antenna type	Refer to Note
Antenna connector	Refer to Note

Note: Antenna requirement (FCC part 15.203)

Professional installed device, only the approved antenna by the manufacturer permitted to be used.

Note: The antenna provide to the EUT, please refer to the following table:

SN	Brand	Model	Antenna gain	Frequency band(GHz)	Antenna type	Connecter Type
Ant1	adam	N/A	4.4	5.150GHz~5.250GHz	Fixed External Antenna	N/A
Ant1	adam	N/A	6.0	5.250GHz~5.350GHz	Fixed External Antenna	N/A
Ant1	adam	N/A	5.5	5.470GHz~5.725GHz	Fixed External Antenna	N/A
Ant1	adam	N/A	3.6	5.725GHz~5.850GHz	Fixed External Antenna	N/A
Ant3	linx	N/A	4.5	5.150GHz~5.250GHz	Fixed External Antenna	N/A
Ant3	linx	N/A	4.5	5.250GHz~5.350GHz	Fixed External Antenna	N/A
Ant3	linx	N/A	4.5	5.470GHz~5.725GHz	Fixed External Antenna	N/A

Ant3	linx	N/A	2.9	5.725GHz~5.850GHz	Fixed External Antenna	N/A
This report tested for all types of antenna which mentioned in page 4 of this report, just the worst data is showing in this report.						

2.2Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency(MHz)
Wi-Fi	U-NII-1	20MHz	36	5180
			40	5200
			44	5220
			48	5240
		40MHz	38	5190
			46	5230
		80MHz	42	5210
	U-NII-2A	20MHz	52	5260
			56	5280
			60	5300
			64	5320
		40MHz	54	5270
			62	5310
		80MHz	58	5290
	U-NII-2C	20MHz	100	5500
			104	5520
			108	5540
			112	5560
			116	5580
			120	5600
			124	5620
			128	5640
			132	5660
			136	5680
			140	5700
		40MHz	102	5510
			110	5550
			118	5590
			126	5630
			134	5670
		80MHz	106	5530
			122	5610
	U-NII-3	20MHz	149	5745
			153	5765
			157	5785
			161	5805

			165	5825
		40MHz	151	5755
			159	5795
		80MHz	155	5775

2.3 Support Equipment

The following support equipment was used to exercise the DUT during testing:
NA

2.4 Note

Automatically Discontinue Transmission	
Description	The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.
Result	While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3 REFERENCE SPECIFICATION

Specification	Version	Title
FCC part 15 Subpart E	2019	Unlicensed national information infrastructure devices
ANSI C63.10	2013	Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 644545 D03	August 14, 2014	Guidance for IEEE std 802.11actm devices emission testing
KDB 905462 D03	August 22, 2016	U-NII client devices without radar detection capability
KDB 905462 D02	April 8, 2016	Compliance measurement procedures for unlicensed-national information infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection
KDB 662911 D01	October 31, 2013	Emissions testing of transmitters with multiple outputs in the same band
KDB 789033 D02	December 14, 2017	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) devices part 15, subpart e

4 KEY TO NOTES AND RESULT CODES

The following are the definition of the test result.

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
NT	Normal Temperature
NV	Nominal voltage
HV	High voltage
LV	Low voltage

5. RESULT SUMMARY

No.	Test case	FCC reference	Verdict
1.	26dB Bandwidth	N/A	Pass
2.	6dB Bandwidth	15.407(e)	N/T
3.	Maximum Conducted Output Power	15.407 (a.1.iv),(a.2), (a.3)	Pass
4.	Maximum Power Spectral Density	15.407 (a.1.iv),(a.2), (a.3)	Pass
5.	Unwanted Conducted Emission Measurement	15.407(b)	Pass
6.	Frequency Stability	15.407(g)	Pass
7.	Unwanted Radiated Emission Measurement	15.205 15.209 15.35(b)	Pass
8.	AC Power line Conducted Emission	15.207	Pass
9.	DFS	15.407(h)	Pass
10.	Automatically Discontinue Transmission	15.407(c)	Pass(See 2.4Note)
11.	Antenna Requirements	15.407(a) &15.203	Pass(See 2.4Note)

This Test Report Is Issued by: Mr. Peng Zhen	Checked by: Mr. Li Bin
Tested by: Mr. He Dengshun	Issued date: 20200410

6 TEST RESULT

6.1 26dB Bandwidth

6.1.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.1.2 Test limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.
The 26dB bandwidth is used to determine the conducted power limits.

6.1.3 Test Procedure Used

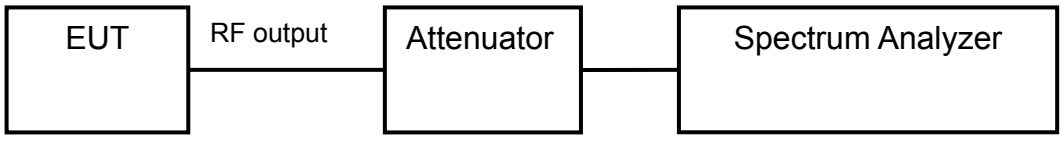
ANSI C63.10-2013 – Section 12.4
KDB 789033 D02 v02r01 – Section C

6.1.4 Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3. VBW > 3 x RBW
4. Detector = Peak
5. Trace mode = max hold

6.1.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.1.6 Test result

The test results are shown in Appendix A.

6.2 6dB Bandwidth

6.2.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.2.2 Test limit

In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.

6.2.3 Test Procedure Used

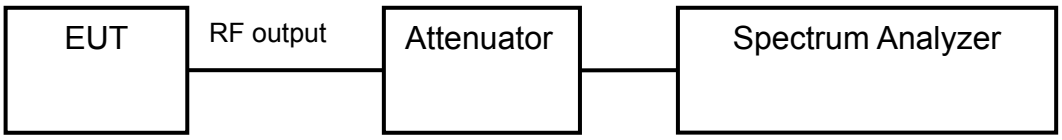
ANSI C63.10-2013 – Section 6.9.2
KDB 789033 D02 v02r01 – Section C

6.2.4 Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100 kHz
3. VBW > 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple

6.2.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.2.6 Test result

The test results are shown in Appendix A.

6.3 Maximum Conducted Output Power

6.3.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.3.2 Test limit

In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is 250mW (23.98dBm). The maximum e.i.r.p. shall not exceed the lesser of 200 mW or 10 + 10 log10B, dBm.
In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log10 (26dB BW). The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.
In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log10 (26dB BW). The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.
In the 5.725 – 5.850GHz band, the maximum permissible conducted output power is 1W (30dBm). The maximum e.i.r.p. is 36 dBm.

6.3.3 Test Procedure Used

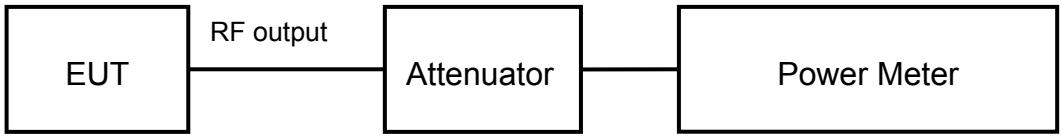
ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G
KDB 789033 D02 v02r01 – Section E)3)b) Method PM-G
ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique
KDB 662911 v02r01 – Section E)1) Measure-and-Sum Technique

6.3.4 Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

6.3.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.3.6 Test result

The test results are shown in Appendix A.

6.4 Maximum Power Spectral Density

6.4.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.4.2 Test limit

In the 5.15 – 5.25GHz, 5.25 – 5.35GHz, 5.47 – 5.725GHz bands, the maximum permissible power spectral density is 11dBm/MHz
In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.

6.4.3 Test Procedure Used

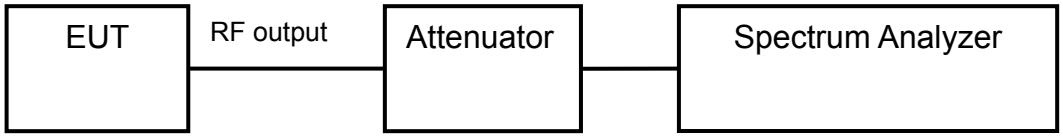
ANSI C63.10-2013 – Section 12.3.2.2
KDB 789033 D02 v02r01 – Section F
ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique
KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique.

6.4.4 Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. Set RBW = 500 kHz, VBW =1.5MHz for the band 5.725-5.85 GHz
4. Set RBW = 1 MHz, VBW =3MHz for the band 5.150-5.250 GHz，5.250-5.350 GHz and 5.470-5.725 GHz
5. Number of sweep points > 2 x (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

6.4.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



6.4.6 Test result

The test results are shown in Appendix A.

6.5 Unwanted Conducted Emission Measurement

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.5.2 Test limit

FCC Part 15.407(b) ,
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

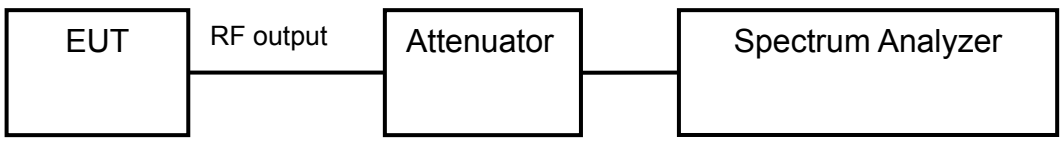
6.5.3 Test Procedure Used

KDB 789033 D02 v02r01,Section G.

6.4.5 Test Settings

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 1 MHz.
c) Set the VBW ≥ 3 MHz.
d) Detector = peak.
e) Set span to encompass the spectrum to be examined
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level.

6.4.6 Test Setup



6.4.7 Test result

The test results are shown in Appendix A.

6.5 Frequency Stability

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	100.9kPa

6.5.2 Test limit

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 user's manual.

6.5.3 Test Procedure Used

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two.

6.5.4 Test result

The test results are shown in Appendix A.

6.6 Unwanted Radiated Emission Measurement

6.6.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	100.9kPa

6.6.2 Test Description

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

6.6.3 Test limit

FCC Part15.205, 15.209,;

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in below Table per Section 15.209. The spectrum shall be investigated from the lowest radio frequency signal generated in the device

Frequency [MHz]	Field strength [μV/m]	Measured 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

Radiated Limits

FCC Part15.35(b):

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit

Used conversion factor: Limit (dBμV/m) = 20 log (Limit (μV/m)/1μV/m)

Frequency [MHz]	Detector	Unit (dBμV/m)
30～88	Quasi-peak	40.0
88～216	Quasi-peak	43.5
216～960	Quasi-peak	46.0
960～1000	Quasi-peak	54.0
1000～5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54.0
	Peak	74.0

Conversion Radiated limits

6.6.4 Test Procedure Used

KDB 789033 D02 v02r01,Sections G.3, G.4, G.5, and G.6.

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 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 recorded the reading with Maximum Hold Mode.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer complied the following setting:

Frequency	RBW
9-150kHz	200-300Hz
0.15-30MHz	9-10kHz

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 in 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 recorded the reading with Maximum Hold Mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detector and recorded the reading 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.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement

antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

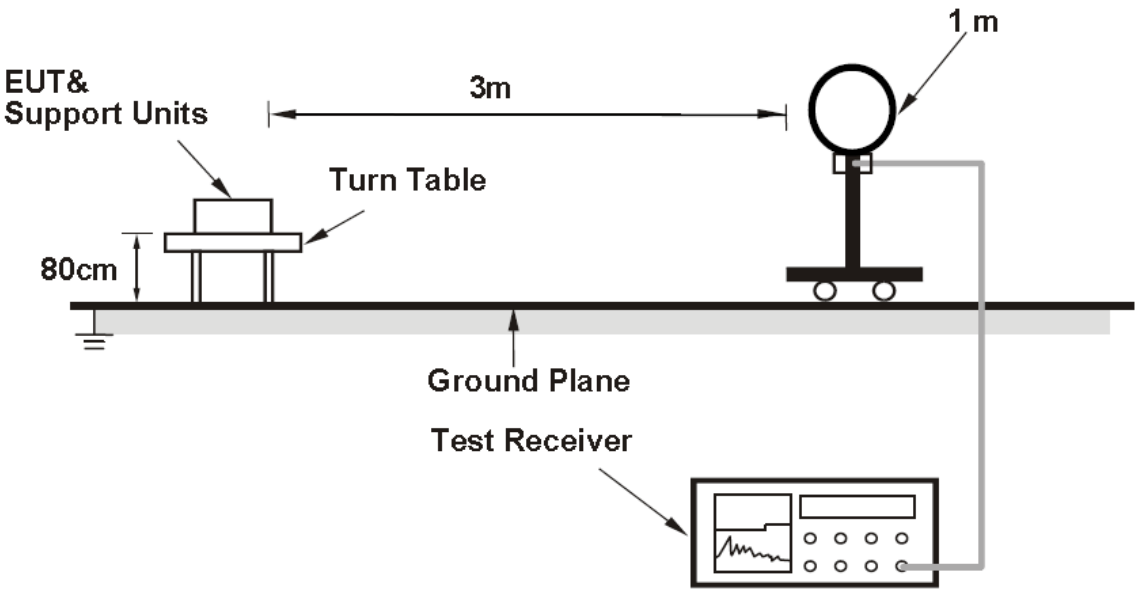
NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Average detection (AV) at frequency above 1GHz. If duty cycle of test signal is < 98%, the duty factor need added to measured value.
4. All modes of operation were investigated and the worst-case emissions are reported.

6.6.5 Test Settings

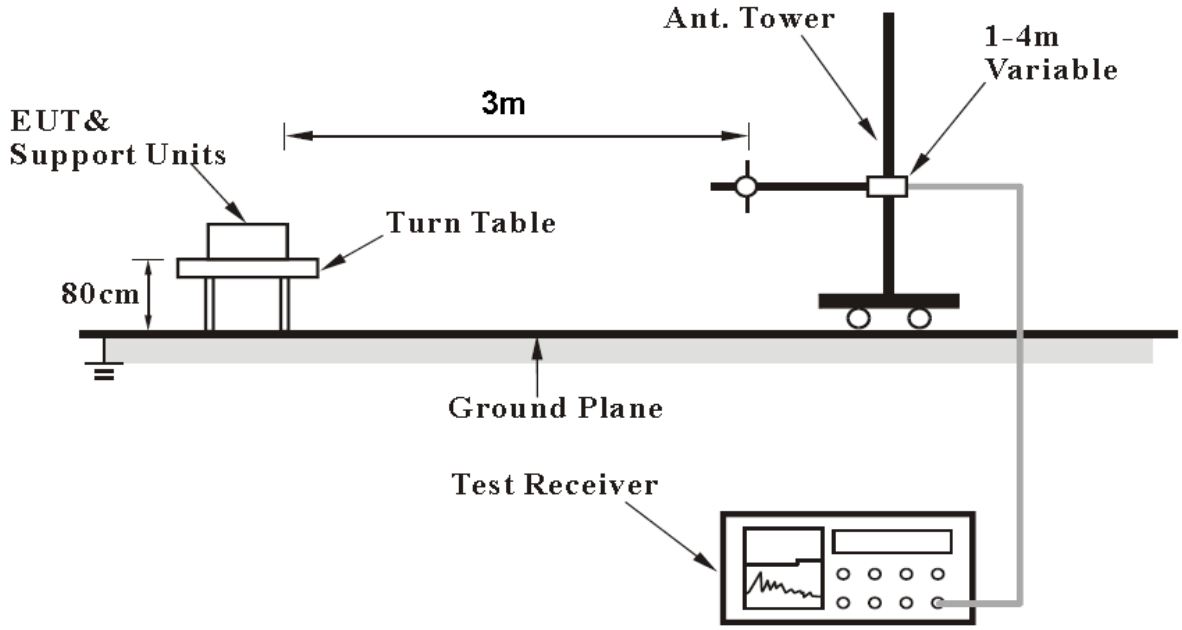
Frequency	Detector
＜1000MHz	Quasi-peak
>1000MHz	Peak and average

Frequency	RBW
9-150kHz	200-300Hz
0.15-30MHz	9-10kHz
30-1000MHz	100-120kHz
>1000MHz	1MHz

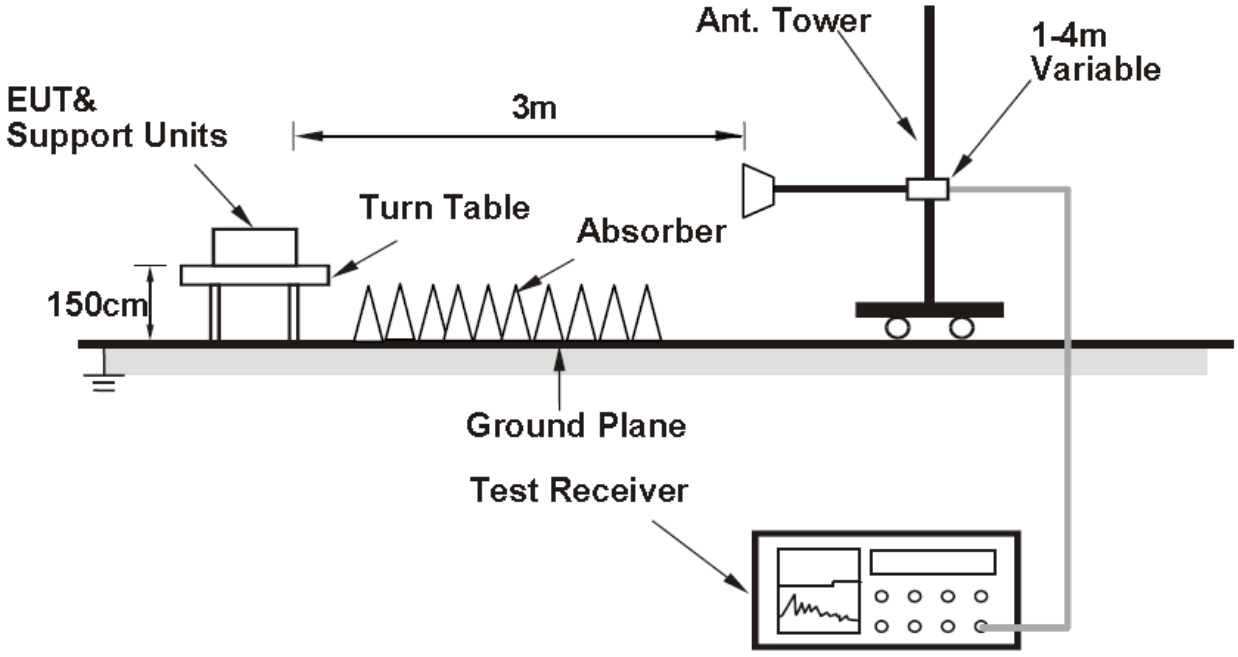
6.6.6 Test Setup
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



6.6.7 Test result

The test results are shown in Appendix B.

6.7 AC Power line Conducted Emission

6.7.1 Ambient condition

Temperature	Relative humidity	Pressure
24°C	36%	100.9kPa

6.7.2 Test limit

FCC Part 15.207(a) ,

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

The measurement is made according to ANSI C63.10-2013

6.7.3 Test result

The test results are shown in Appendix B.

6.8 Dynamic Frequency Selection

6.8.1 Ambient condition

Temperature	Relative humidity	Pressure
25°C	30%	101.5kPa

6.8.2 Test limit

FCC Part 15.407(h) and FCC 06-96 APPENDIX “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION”.

6.8.3 DFS Overview

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	**Value (See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 4: DFS Response Requirement Values

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 6 – Long Pulse Radar Test Waveform

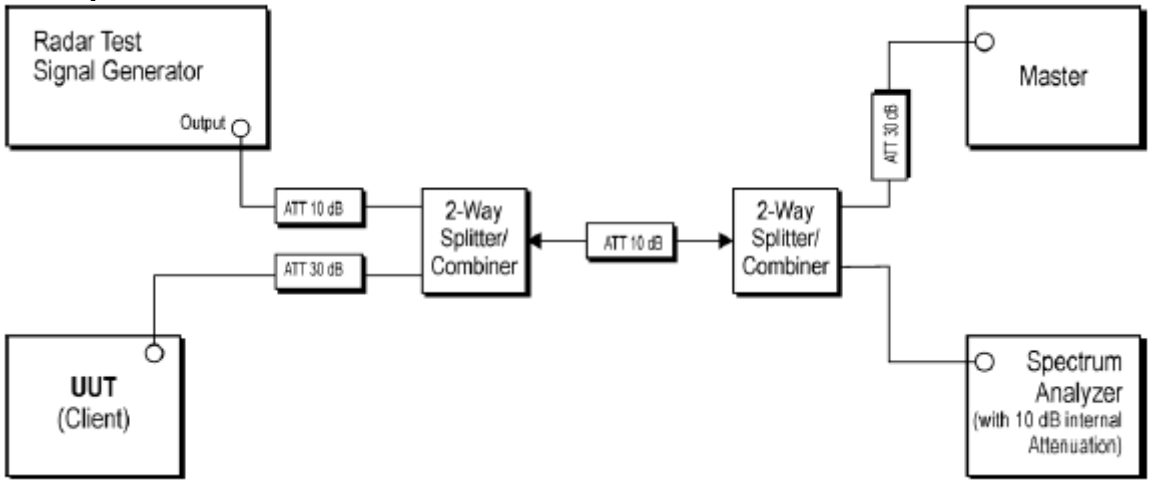
Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Waveform

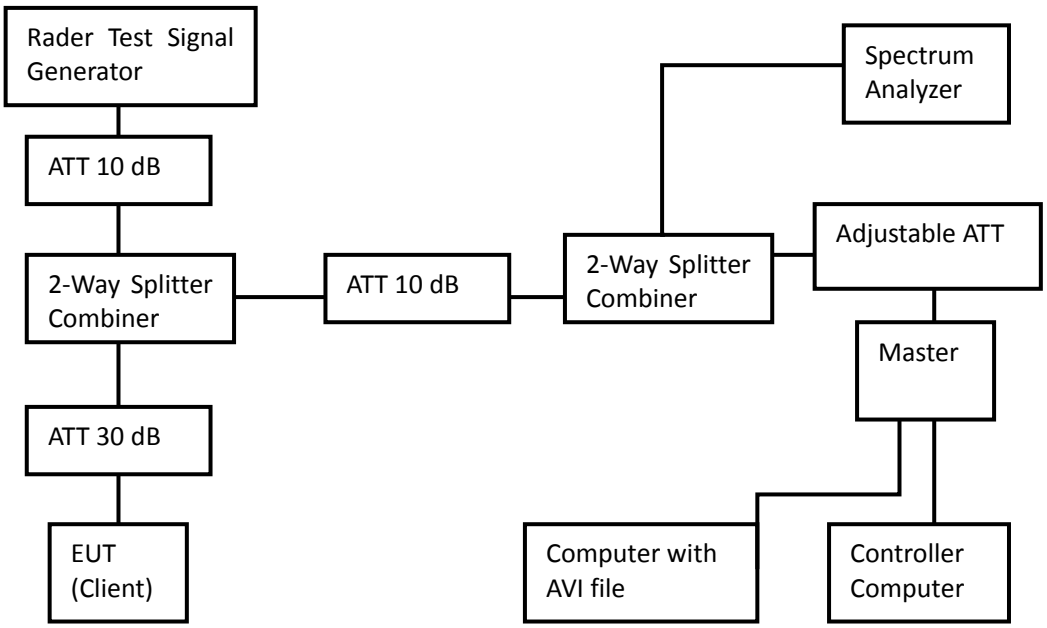
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

6.8.4 TEST AND MEASUREMENT SYSTEM

Principle



Setup for Client with injection at the Master



Client Devices

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.

b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.

d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

Test Setup Operation

System testing was performed with the designated MPEG-4 (1080P,WEBRip,DD5.1.x264-btbta) test file that streams full motion video from the Access Point to the Client in full motion video mode using the media player with the V2.61 Codec package.

This file is used by IP and Frame based systems for loading the test channel during the In-service compliance testing of the device.

The waveform parameters from within the bounds of the signal type are selected randomly using uniform distribution.

A spectrum analyzer is used as a monitor to verify that the EUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move. It is also used to monitor EUT transmissions during the Channel Availability Check Time.

6.8.5 Test Procedure Used

(i) Operational Modes. The DFS requirement applies to the following operational modes:
(A) The requirement for channel availability check time applies in the master operational mode.
(B) The requirement for channel move time applies in both the master and slave operational modes.
(ii) Channel Availability Check Time. A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed in paragraph (h)(2) of this section, is detected within 60 seconds.
(iii) Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.
(iv) Non-occupancy Period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

6.8.6 Test result

The test results are shown in Appendix A.

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
Occupied Bandwidth	3kHz	
Output Power	0.67dB	
Transmitter Power Spectral Density	0.75dB	
Spurious emissions	30MHz～1GHz	2.83dB
	1GHz～12.75GHz	2.50dB
	12.75GHz～40GHz	2.75dB

8 TEST EQUIPMENTS

No.	Name/ Model	Manufacturer	S/N	Cal date	Cal Due date
1.	Spectrum Analyzer FSV	ROHDE&SCHWARZ	101065	2019.08.20	2020.08.19
2.	Signal Analyzer N9020A	Agilent	MY48010771	2019.08.20	2020.08.19
3.	Chamber SH-241	ESPEC	92013758	2019.08.20	2020.08.19
4.	DC Power Apply E3645A	Agilent	MY40000741	2019.03.01	2020.02.29
5.	Power Meter E4416A	Agilent	MY52370013	2019.03.01	2020.02.29
6.	Power Sensor E9327A	Agilent	MY52420006	2019.03.01	2020.02.29
7.	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	-----	-----	-----
8.	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	-----	-----
9.	Turn table Diameter:1m	HD	-----	-----	-----
10.	Turn table Diameter:5m	HD	-----	-----	-----
11.	Antenna master FAC(MA4.0)	MATURO	-----	-----	-----
12.	Antenna master SAC(MA4.0)	MATURO	-----	-----	-----
13.	9.080m×5.255m×3.525 m Shielding room	FRANKONIA	-----	-----	-----
14.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2019.08.20	2020.08.19
15.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	2019.08.20	2020.08.19
16.	HL562 Ultra log antenna	R&S	100016	2019.08.20	2020.08.19
17.	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2019.08.20	2020.08.19
18.	ESI 40 EMI test receiver	R&S	100015	2019.08.20	2020.08.19
19.	Radio tester	CMU 200	114667	2019.08.20	2020.08.19
20.	ESCS30 EMI test receiver	R&S	100029	2019.08.20	2020.08.19
21.	HL562 Receive antenna	R&S	100167	2019.08.20	2020.08.19
22.	ESH3-Z5 LISN	R&S	100020	2019.08.20	2020.08.19
23.	Spectrum Analyzer N9020A	Agilent	MY48010771	2019.08.20	2020.08.19

24.	Signal Generator SMBV100A	R&S	260910	2019.08.20	2020.08.19
25.	Bluetooth Test Set MT8852B	Anritsu	1142010	2019.03.01	2020.02.29
26.	Cable 104EA	SUCOFLEX	9272/4EA	2019.03.01	2020.02.29
27.	Cable 104EA	SUCOFLEX	9266/4EA	2019.03.01	2020.02.29
28.	WLAN AP WIA3300-20	SKSpruce	815201706070039	---	---
29.	Notebook E470c	Lenovo	PF10UZW7	---	---

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Please refer to the attachment.

APPENDIX B – TEST DATA OF RADIATED EMISSION

Please refer to the attachment.

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Duty Cycle

Test Mode	Test Result (%)	Duty Cycle Correction Factor(dB)
802.11a (HT20)	93.4	0.30
802.11n (HT20)	93.0	0.32
802.11n (HT40)	86.9	0.61
802.11ac (VHT20)	92.8	0.32
802.11ac (VHT40)	86.7	0.62
802.11ac (VHT80)	76.9	1.14

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Test Mode	Data Rate
802.11a	6Mbps
802.11n HT20	MCS0(6.5 Mbps)
802.11n HT40	MCS0(13.5 Mbps)
802.11ac HT20	MCS0(6.5 Mbps)
802.11ac HT40	MCS0(13.5 Mbps)
802.11ac HT80	MCS0(29.3 Mbps)

Output Power Result

Conducted power

U-NII-1

Test Mode	Average Power(dBm)			Limit(dBm)	Conclusion
	5180 MHz	5200 MHz	5240MHz		
802.11a	13.89	14.48	15.27	24.0	pass
802.11n(HT20)	13.44	14.04	14.86	24.0	pass
802.11ac(VHT20)	11.83	12.25	13.19	24.0	pass

Test Mode	Average Power(dBm)		Limit(dBm)	Conclusion
	5190 MHz	5230 MHz		
802.11n(HT40)	13.58	14.65	24.0	pass
802.11ac(VHT40)	12.06	13.01	24.0	pass

Test Mode	Average Power(dBm)	Limit(dBm)	Conclusion
	5210 MHz		
802.11ac(VHT80)	12.20	24.0	pass

U-NII-2A

Test Mode	Average Power(dBm)			Limit(dBm)	Conclusion
	5260 MHz	5300 MHz	5320MHz		
802.11a	14.82	15.29	15.76	24.0	pass
802.11n(HT20)	14.50	14.80	15.38	24.0	pass
802.11ac(VHT20)	12.66	13.07	13.60	24.0	pass

Test Mode	Average Power(dBm)		Limit(dBm)	Conclusion
	5270 MHz	5310 MHz		
802.11n(HT40)	14.36	14.98	24.0	pass
802.11ac(VHT40)	12.71	13.28	24.0	pass

Test Mode	Average Power(dBm)	Limit(dBm)	Conclusion
	5290 MHz		
802.11ac(VHT80)	12.69	24.0	pass

U-NII-2C

Test Mode	Average Power(dBm)			Limit(dBm)	Conclusion
	5500 MHz	5560 MHz	5700MHz		
802.11a	15.75	15.83	15.48	24.0	pass
802.11n(HT20)	15.37	15.50	14.78	24.0	pass
802.11ac(VHT20)	13.63	13.73	13.02	24.0	pass

Test Mode	Average Power(dBm)		Limit(dBm)	Conclusion
	5510 MHz	5670 MHz		
802.11n(HT40)	15.61	15.59	24.0	pass
802.11ac(VHT40)	13.74	13.67	24.0	pass

Test Mode	Average Power(dBm)	Limit(dBm)	Conclusion
	5690 MHz		
802.11ac(VHT80)	12.95	24.0	pass

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Test Mode	Average Power(dBm)			Limit(dBm)	Conclusion
	5745MHz	5785MHz	5825MHz		
802.11a	15.74	15.16	15.49	30.0	pass
802.11n(HT20)	15.11	14.80	14.99	30.0	pass
802.11ac(VHT20)	13.67	13.04	13.50	30.0	pass

Test Mode	Average Power(dBm)		Limit(dBm)	Conclusion
	5755 MHz	5795 MHz		
802.11n(HT40)	15.24	14.91	30.0	pass
802.11ac(VHT40)	13.46	13.12	30.0	pass

Test Mode	Average Power(dBm)	Limit(dBm)	Conclusion
	5775 MHz		
802.11ac(VHT80)	13.09	30.0	pass

Occupied Bandwidth

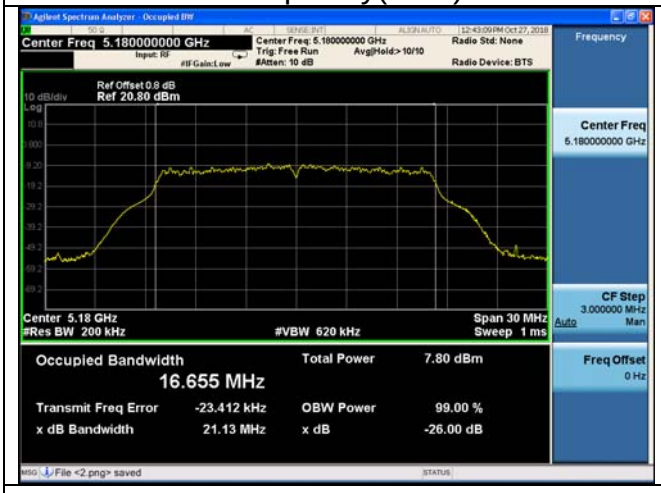
Offset 0.8dB = Temporary antenna connector loss 0.2dB+ Cable loss 0.6dB

U-NII-1

Test Mode: 802.11a

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5180	16.665	21.13	pass
5200	16.610	21.01	pass
5240	16.599	21.15	pass

802.11a
Carrier frequency(MHz):5180



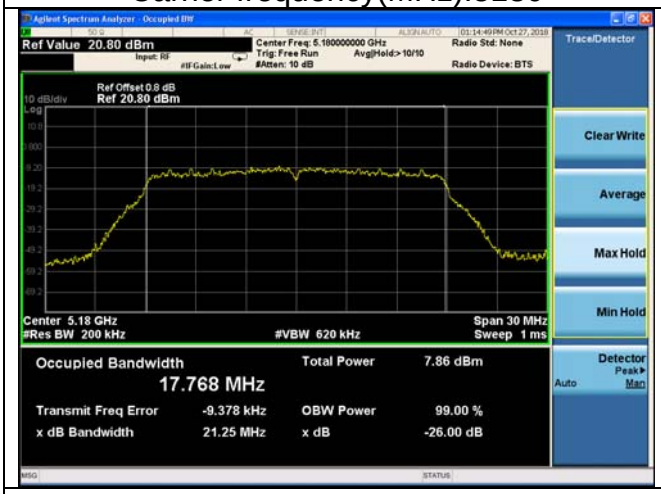
802.11a
Carrier frequency(MHz):5200

802.11a
Carrier frequency(MHz):5240

Test Mode: 802.11n HT20

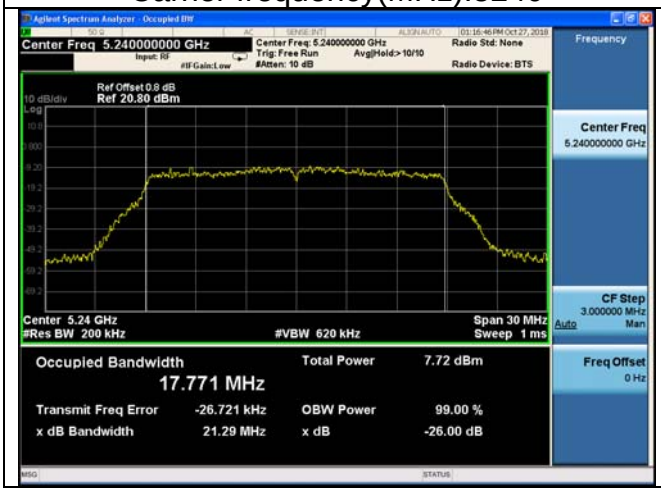
Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5180	17.768	21.25	pass
5200	17.727	21.45	pass
5240	17.771	21.29	pass

802.11n HT20
Carrier frequency(MHz):5180



802.11n HT20
Carrier frequency(MHz):5200

802.11n HT20
Carrier frequency(MHz):5240



Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5190	36.187	39.70	pass
5230	36.134	39.67	pass

802.11n HT40 Carrier frequency(MHz):5190	802.11n HT40 Carrier frequency(MHz):5230
	

Test Mode: 802.11ac VHT80

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5210	75.509	81.15	pass

802.11ac HT80 Carrier frequency(MHz):5210	
	

U-NII-2A
Test Mode: 802.11a

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5260	16.630	20.98	pass
5300	16.605	20.80	pass
5320	16.618	20.87	pass

802.11a
Carrier frequency(MHz):5260

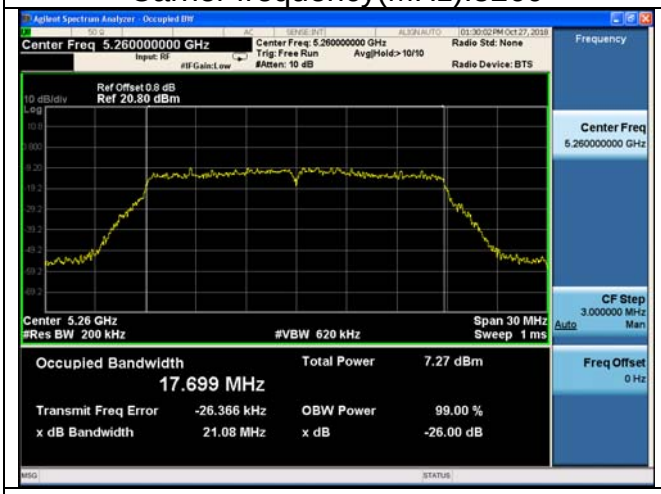
802.11a
Carrier frequency(MHz):5300

802.11a
Carrier frequency(MHz):5320

Test Mode: 802.11n HT20

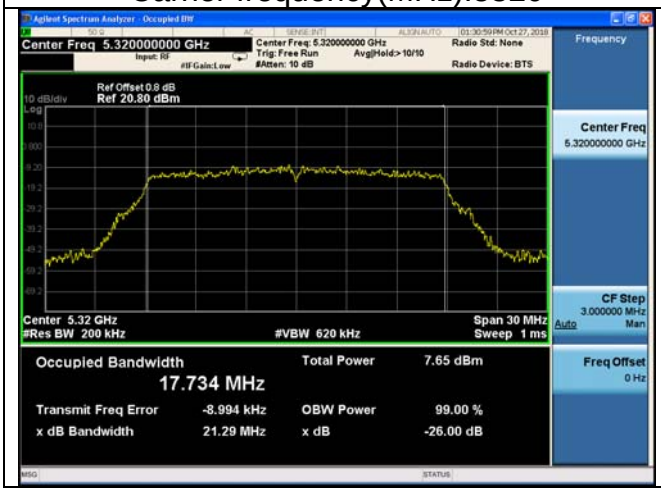
Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5260	17.699	21.08	pass
5300	17.743	20.92	pass
5320	17.734	21.29	pass

802.11n HT20
Carrier frequency(MHz):5260



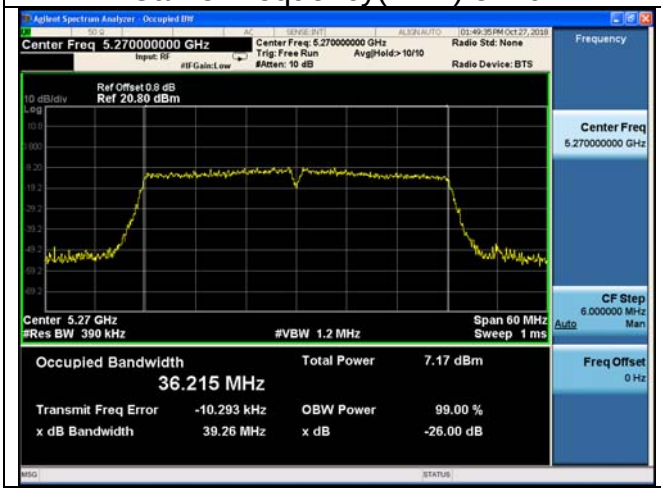
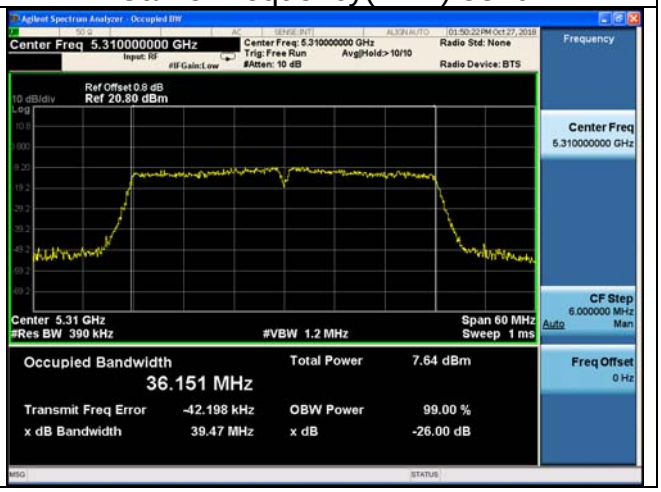
802.11n HT20
Carrier frequency(MHz):5300

802.11n HT20
Carrier frequency(MHz):5320



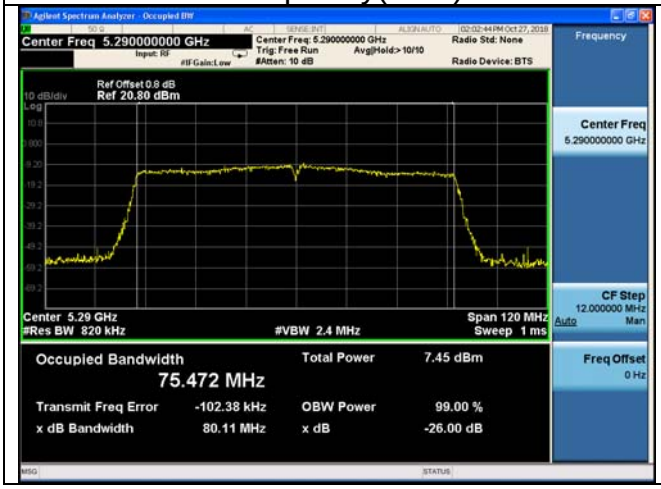
Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5270	36.215	39.26	pass
5310	36.151	39.47	pass

802.11n HT40 Carrier frequency(MHz):5270	802.11n HT40 Carrier frequency(MHz):5310
	

Test Mode: 802.11ac VHT80

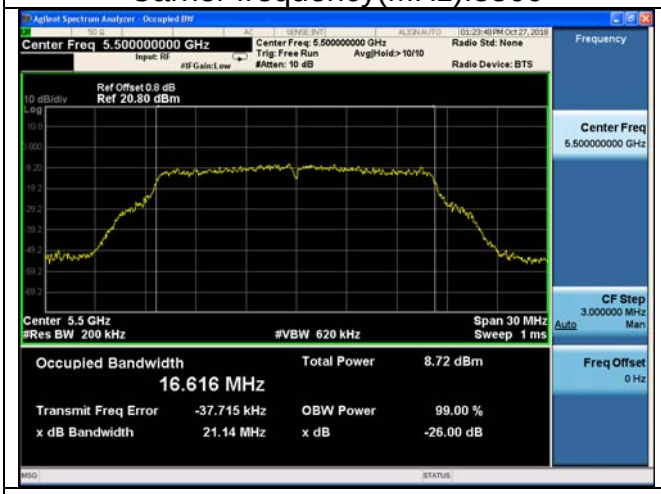
Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5290	75.472	80.11	pass

802.11ac HT80 Carrier frequency(MHz):5290	
	

U-NII-2C
Test Mode: 802.11a

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5500	16.616	21.14	pass
5560	16.601	20.96	pass
5700	16.671	20.85	pass

802.11a
Carrier frequency(MHz):5500



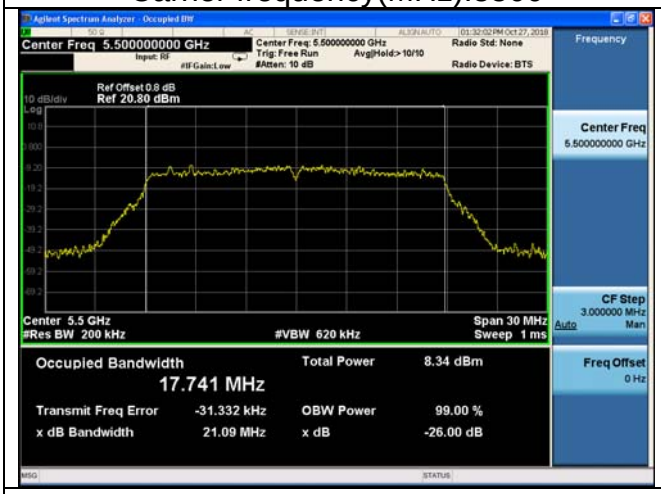
802.11a
Carrier frequency(MHz):5560

802.11a
Carrier frequency(MHz):5700

Test Mode: 802.11n HT20

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5500	17.741	21.09	pass
5560	17.740	21.24	pass
5700	17.753	20.88	pass

802.11n HT20
Carrier frequency(MHz):5500

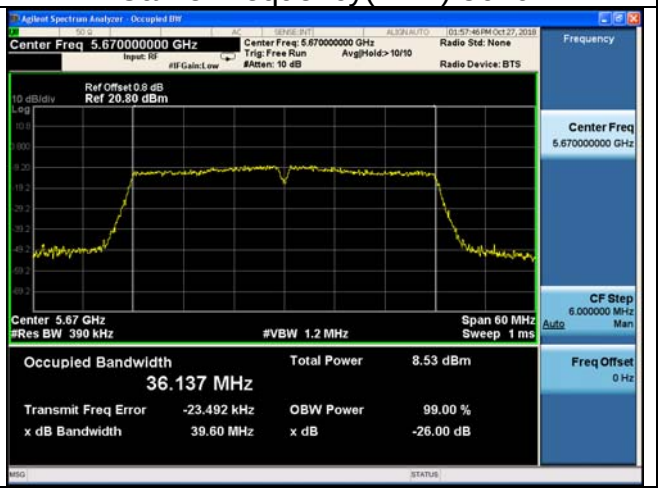


802.11n HT20
Carrier frequency(MHz):5560

802.11n HT20
Carrier frequency(MHz):5700

Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5510	36.157	39.34	pass
5670	36.137	39.60	pass

802.11n HT40 Carrier frequency(MHz):5510	802.11n HT40 Carrier frequency(MHz):5670
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5690	75.580	81.27	pass

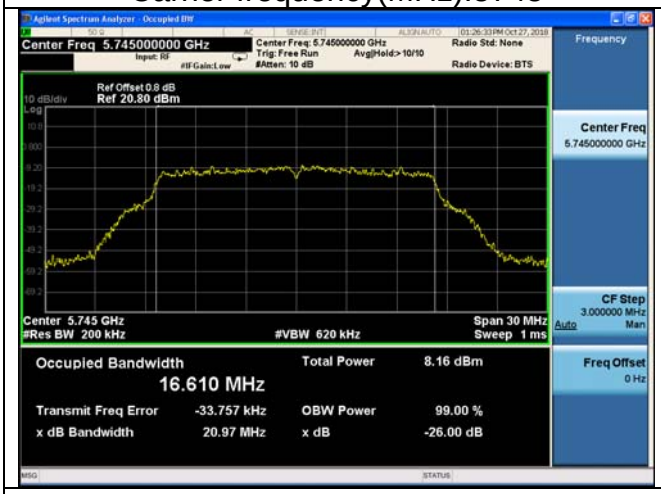
802.11ac HT80 Carrier frequency(MHz):5690	
	

U-NII-3

Test Mode: 802.11a

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5745	16.610	20.97	pass
5785	16.605	21.17	pass
5825	16.647	20.76	pass

802.11a
Carrier frequency(MHz):5745



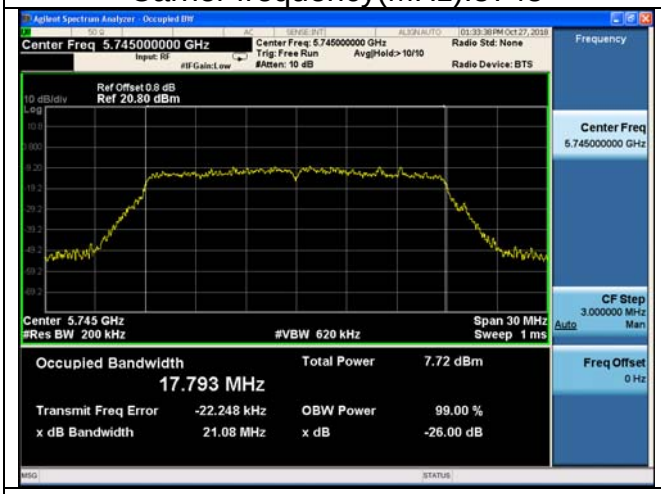
802.11a
Carrier frequency(MHz):5785

802.11a
Carrier frequency(MHz):5825

Test Mode: 802.11n HT20

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5745	17.793	21.08	pass
5785	17.698	21.27	pass
5825	17.732	21.36	pass

802.11n HT20
Carrier frequency(MHz):5745

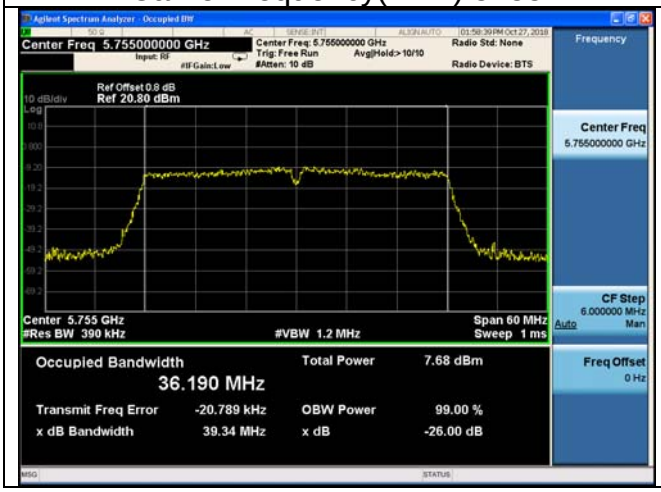


802.11n HT20
Carrier frequency(MHz):5785

802.11n HT20
Carrier frequency(MHz):5825

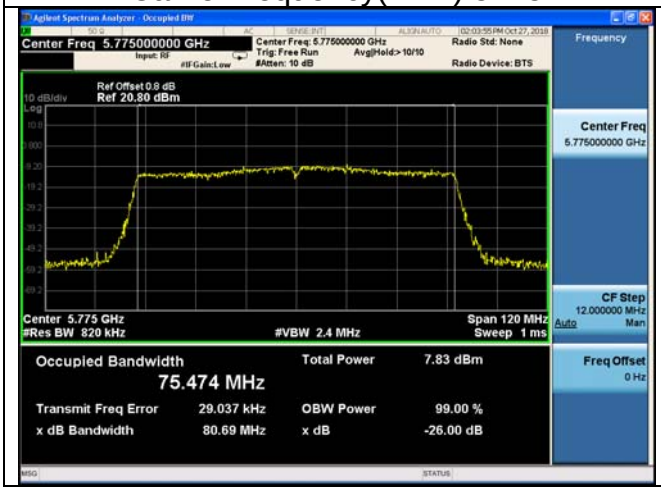
Test Mode: 802.11n HT40

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5755	36.190	39.34	pass
5795	36.190	39.57	pass

802.11n HT40 Carrier frequency(MHz):5755	802.11n HT40 Carrier frequency(MHz):5795
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	99% Bandwidth(MHz)	Minimum 26dB Bandwidth(MHz)	Couclusion
5775	75.474	80.69	pass

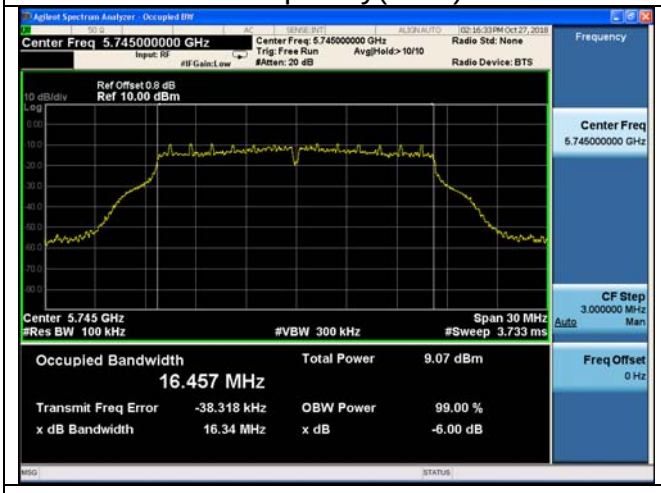
802.11ac HT80 Carrier frequency(MHz):5775	
	

6dB Bandwidth

Offset 0.8dB = Temporary antenna connector loss 0.2dB+ Cable loss 0.6dB
U-NII-3
Test Mode: 802.11a

Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Couclusion
5745	16.34	0.5	pass
5785	16.34	0.5	pass
5825	16.34	0.5	pass

802.11a
Carrier frequency(MHz):5745



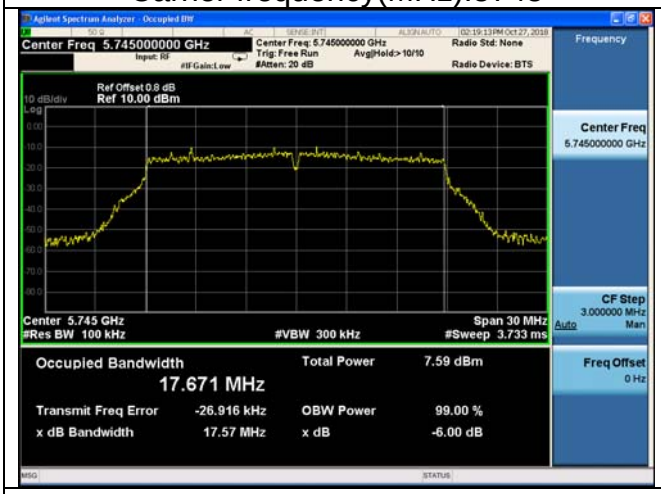
802.11a
Carrier frequency(MHz):5785

802.11a
Carrier frequency(MHz):5825

Test Mode: 802.11n HT20

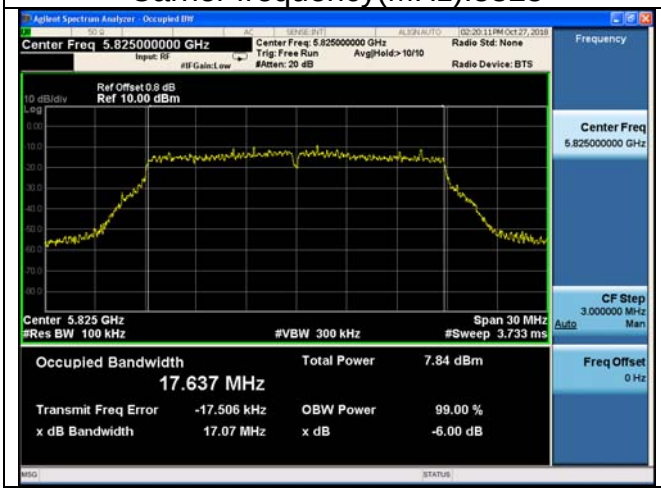
Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Couclusion
5745	17.57	0.5	pass
5785	17.52	0.5	pass
5825	17.07	0.5	pass

802.11n HT20
Carrier frequency(MHz):5745



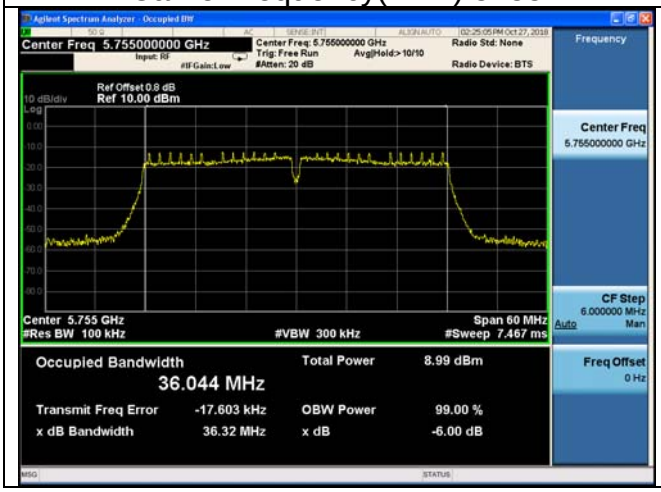
802.11n HT20
Carrier frequency(MHz):5785

802.11n HT20
Carrier frequency(MHz):5825



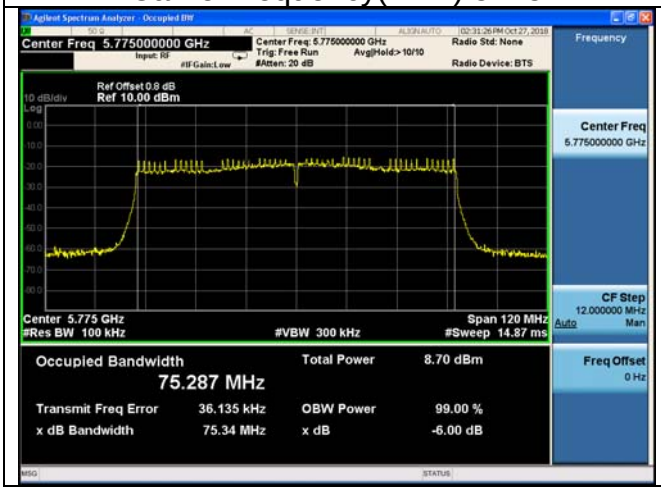
Test Mode: 802.11n HT40

Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Couclusion
5755	36.32	0.5	pass
5795	35.76	0.5	pass

802.11n HT40 Carrier frequency(MHz):5755	802.11n HT40 Carrier frequency(MHz):5795
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	6dB Bandwidth(MHz)	Minimum Limit (MHz)	Couclusion
5775	75.34	0.5	pass

802.11ac HT80 Carrier frequency(MHz):5775	
	

Transmitter Power Spectral Density

Offset 0.8dB = Temporary antenna connector loss 0.2dB+ Cable loss 0.6dB

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Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5180	0.30	-0.668	10.0	pass
5200	0.30	-1.069	10.0	pass
5240	0.30	-0.675	10.0	pass

802.11a
Carrier frequency(MHz):5180

802.11a
Carrier frequency(MHz):5200

802.11a
Carrier frequency(MHz):5240

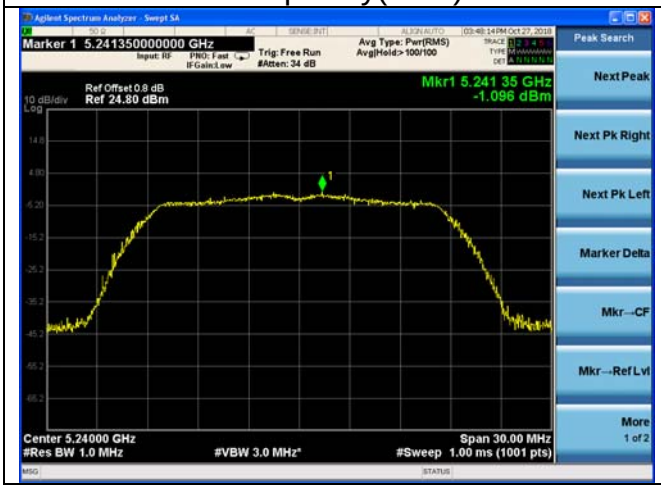
Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5180	0.32	-1.720	10.0	pass
5200	0.32	-0.227	10.0	pass
5240	0.32	-0.776	10.0	pass

802.11n HT20
Carrier frequency(MHz):5180

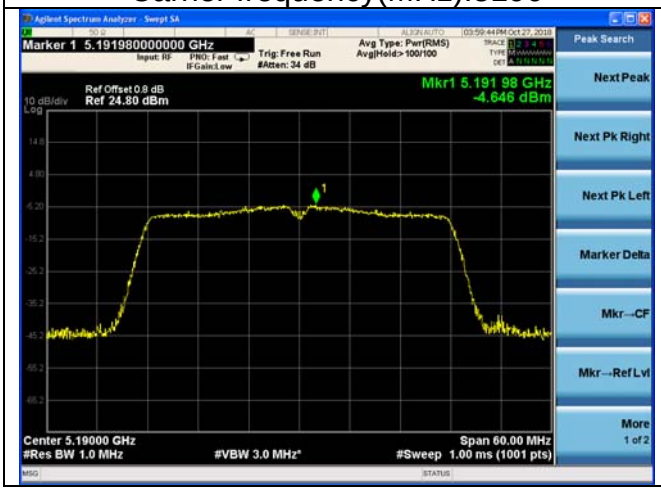
802.11n HT20
Carrier frequency(MHz):5200

802.11n HT20
Carrier frequency(MHz):5240



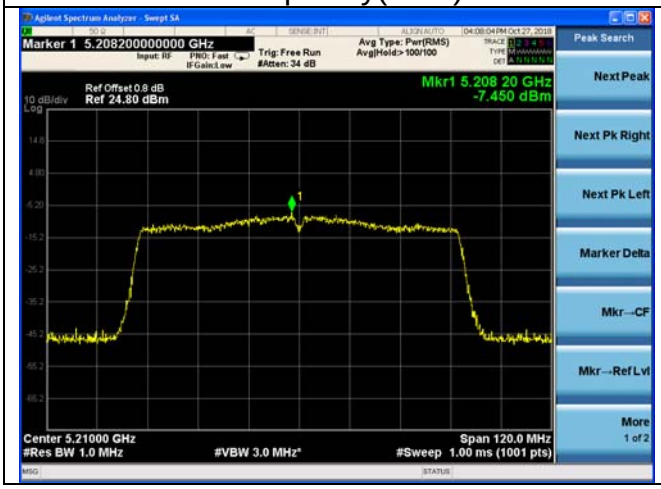
Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5190	0.61	-4.036	10.0	pass
5230	0.61	-4.145	10.0	pass

802.11n HT40 Carrier frequency(MHz):5190	802.11n HT40 Carrier frequency(MHz):5230
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5210	1.14	-6.310	10.0	pass

802.11ac HT80 Carrier frequency(MHz):5210	
	

U-NII-2A
Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5260	0.30	-0.546	10.0	pass
5300	0.30	-0.006	10.0	pass
5320	0.30	0.547	10.0	pass

802.11a
Carrier frequency(MHz):5260

802.11a
Carrier frequency(MHz):5300

802.11a
Carrier frequency(MHz):5320

Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5260	0.32	-1.413	10.0	pass
5300	0.32	-1.372	10.0	pass
5320	0.32	-0.519	10.0	pass

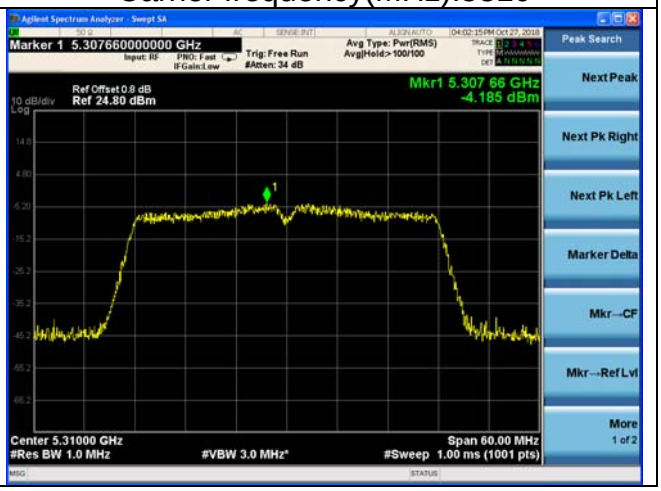
802.11n HT20
Carrier frequency(MHz):5260

802.11n HT20
Carrier frequency(MHz):5300

802.11n HT20
Carrier frequency(MHz):5320

Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5270	0.61	-4.041	10.0	pass
5310	0.61	-3.575	10.0	pass

802.11n HT40 Carrier frequency(MHz):5270	802.11n HT40 Carrier frequency(MHz):5310
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Couclusion
5290	1.14	-7.198	10.0	pass

802.11ac HT80 Carrier frequency(MHz):5290	
	

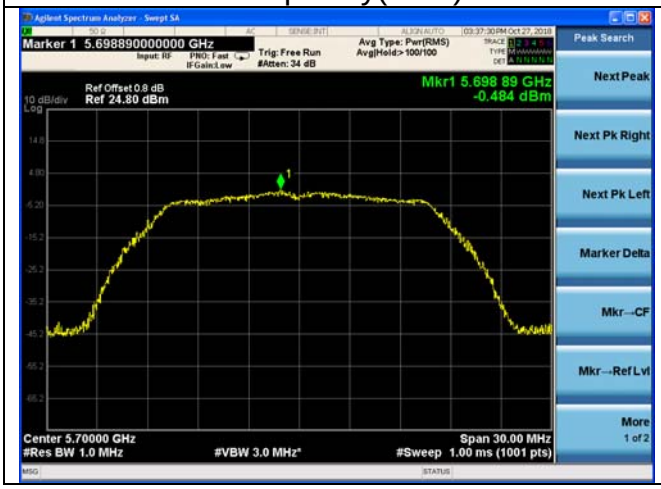
U-NII-2C
Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5500	0.30	0.559	30.0	pass
5560	0.30	0.316	30.0	pass
5700	0.30	-0.184	30.0	pass

802.11a
Carrier frequency(MHz):5500

802.11a
Carrier frequency(MHz):5560

802.11a
Carrier frequency(MHz):5700



Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5500	0.32	-0.045	30.0	pass
5560	0.32	-0.239	30.0	pass
5700	0.32	0.344	30.0	pass

802.11n HT20
Carrier frequency(MHz):5500

802.11n HT20
Carrier frequency(MHz):5560

802.11n HT20
Carrier frequency(MHz):5700

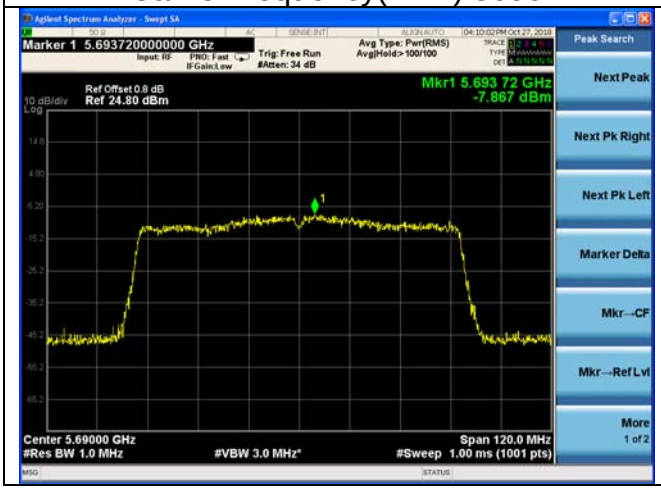
Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5510	0.61	-2.860	30.0	pass
5670	0.61	-3.003	30.0	pass

802.11n HT40 Carrier frequency(MHz):5510	802.11n HT40 Carrier frequency(MHz):5670
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5690	1.14	-6.727	30.0	pass

802.11ac HT80 Carrier frequency(MHz):5690	
	

U-NII-3

Test Mode: 802.11a

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5745	0.30	7.172	30.0	pass
5785	0.30	7.207	30.0	pass
5825	0.30	7.484	30.0	pass

802.11a
Carrier frequency(MHz):5745

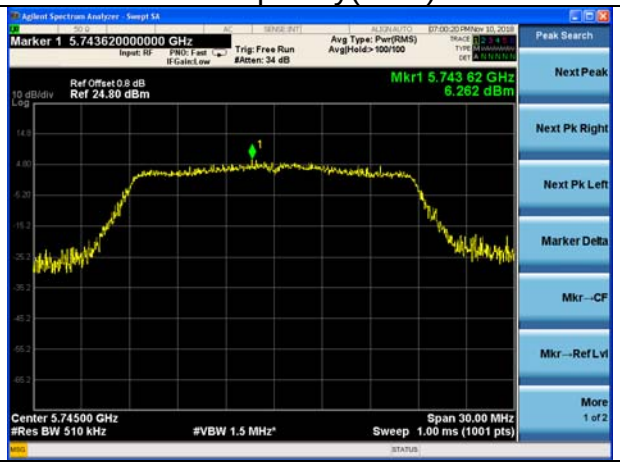
802.11a
Carrier frequency(MHz):5785

802.11a
Carrier frequency(MHz):5825

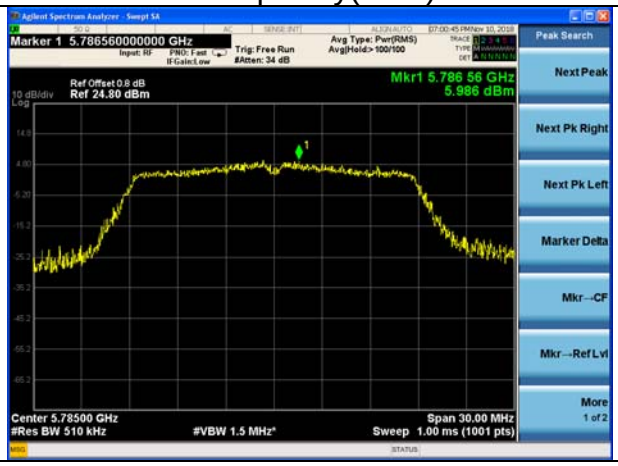
Test Mode: 802.11n HT20

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5745	0.32	6.562	30.0	pass
5785	0.32	6.286	30.0	pass
5825	0.32	6.680	30.0	pass

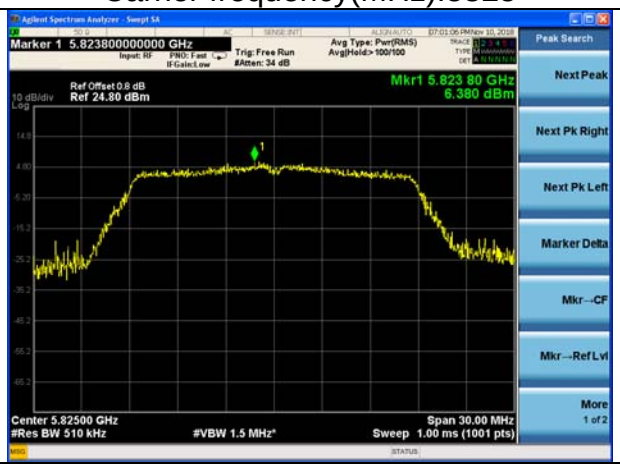
802.11n HT20
Carrier frequency(MHz):5745



802.11n HT20
Carrier frequency(MHz):5785

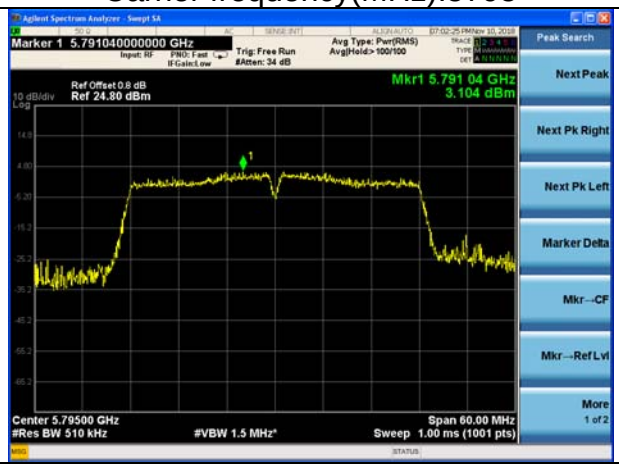


802.11n HT20
Carrier frequency(MHz):5825



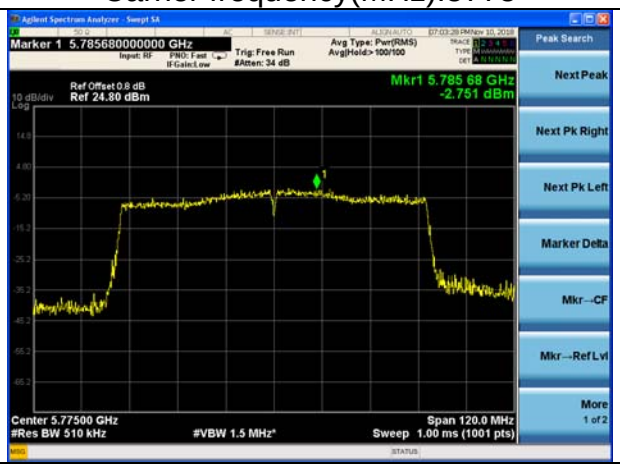
Test Mode: 802.11n HT40

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5755	0.61	2.712	30.0	pass
5795	0.61	3.404	30.0	pass

802.11n HT40 Carrier frequency(MHz):5755	802.11n HT40 Carrier frequency(MHz):5795
	

Test Mode: 802.11ac HT80

Carrier frequency (MHz)	Duty Cycle Correction Factor(dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Couclusion
5775	1.14	-2.451	30.0	pass

802.11ac HT80 Carrier frequency(MHz):5775	
	

Unwanted Conducted Emission Measurement

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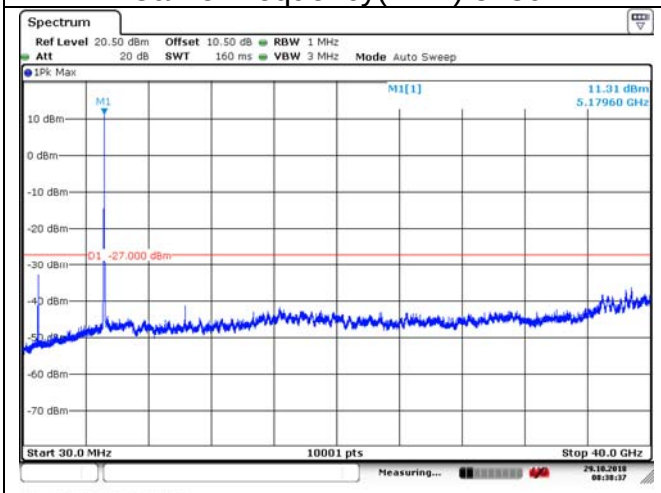
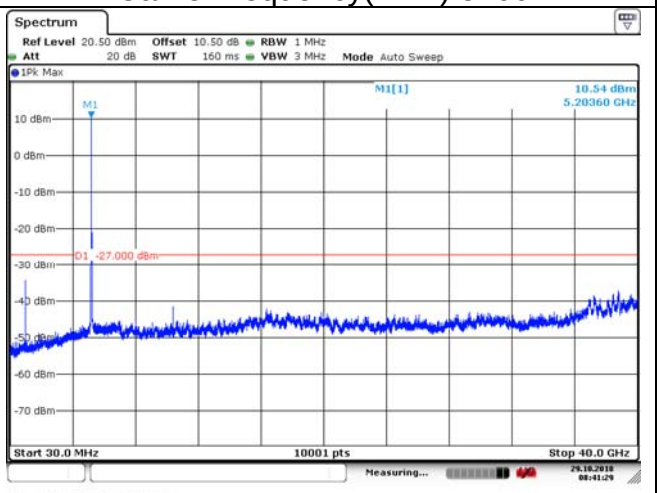
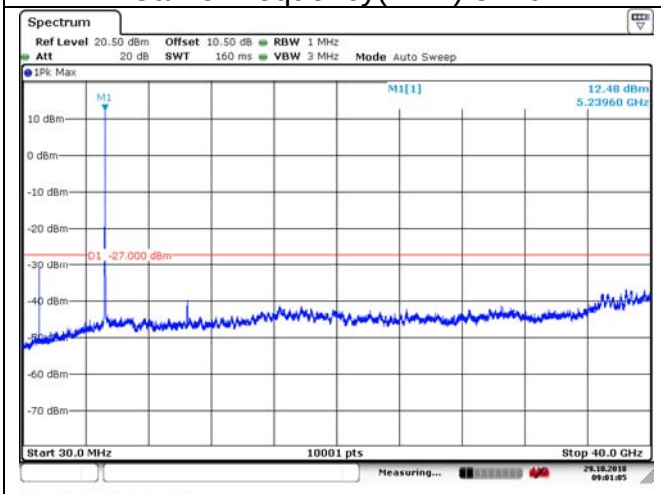
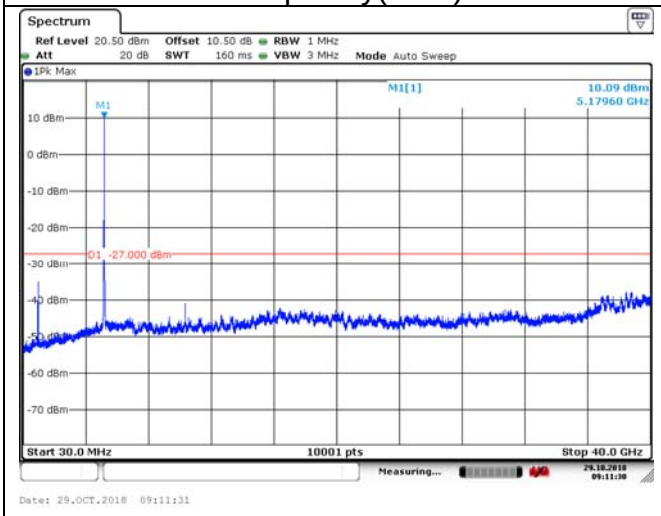
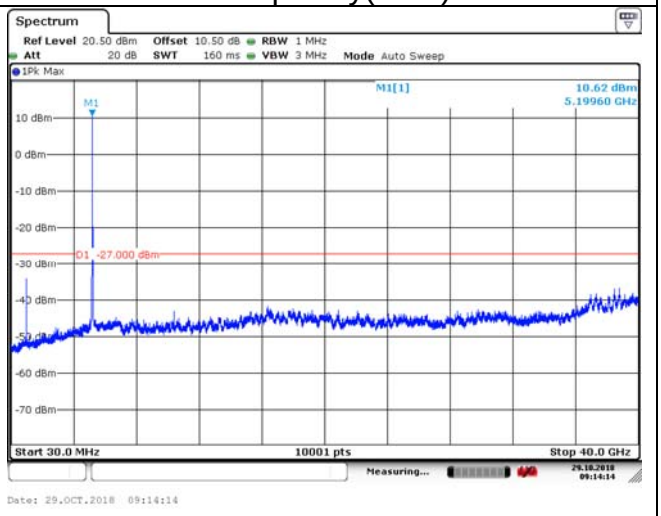
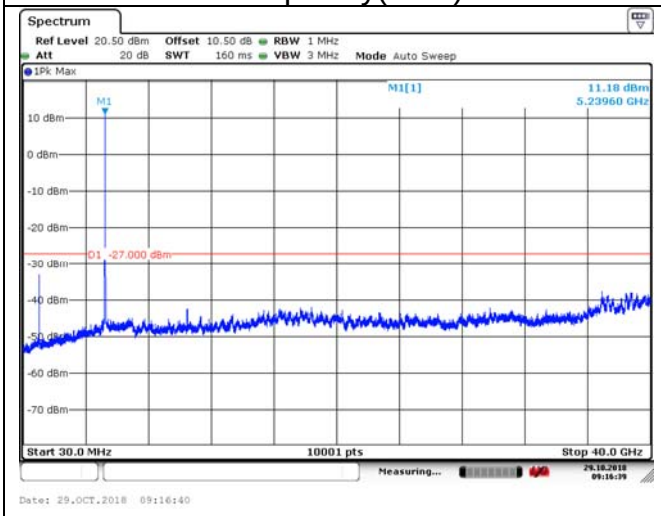
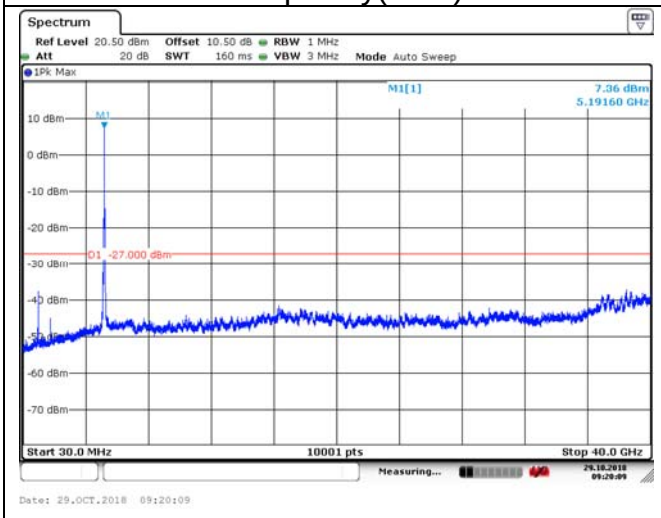
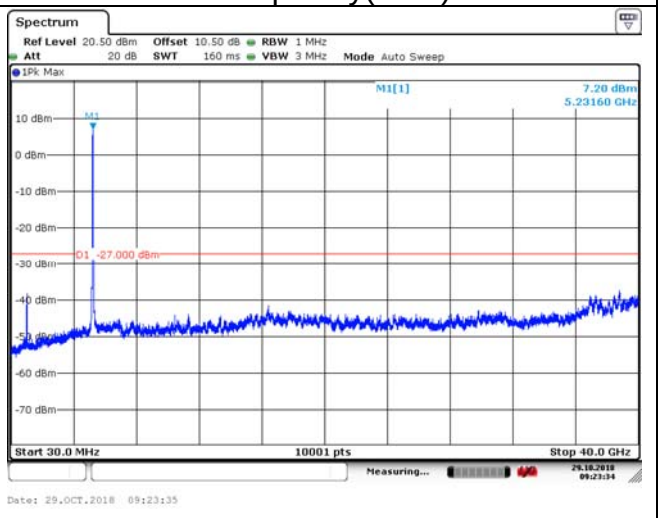
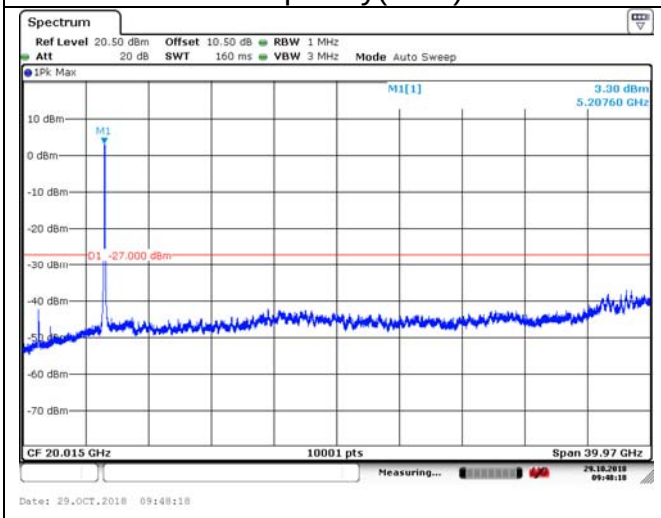
802.11a Carrier frequency(MHz):5180	802.11a Carrier frequency(MHz):5200
	
802.11a Carrier frequency(MHz):5240	
	

802.11n HT20 Carrier frequency(MHz):5180	802.11n HT20 Carrier frequency(MHz):5200
	
802.11n HT20 Carrier frequency(MHz):5240	
	

802.11n HT40 Carrier frequency(MHz):5190	802.11n HT40 Carrier frequency(MHz):5230
	

802.11ac HT80 Carrier frequency(MHz):5210	
	

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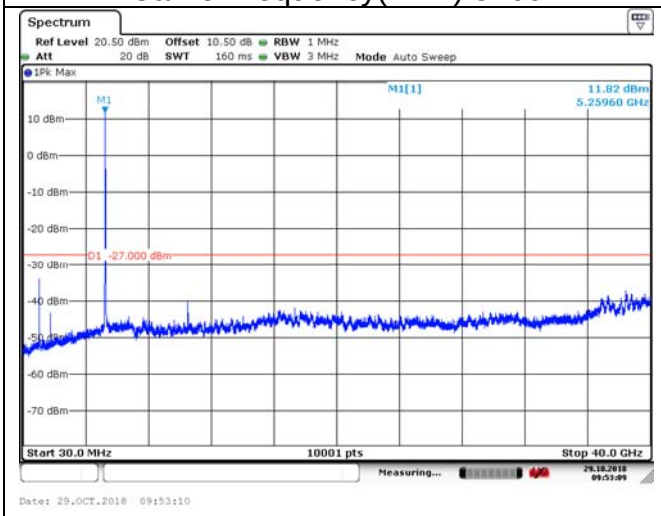
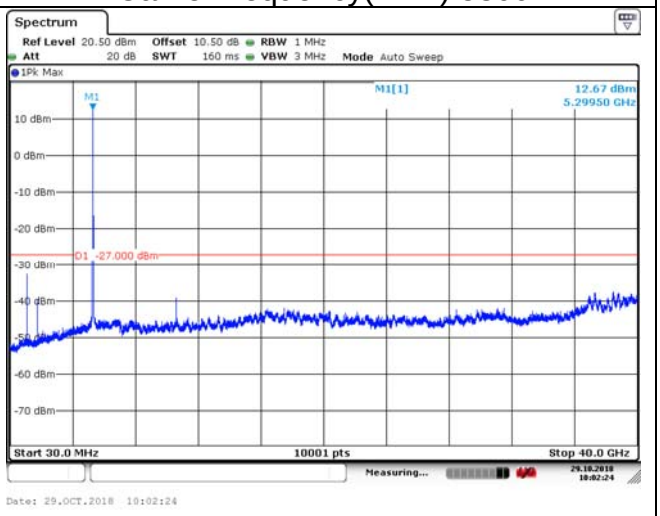
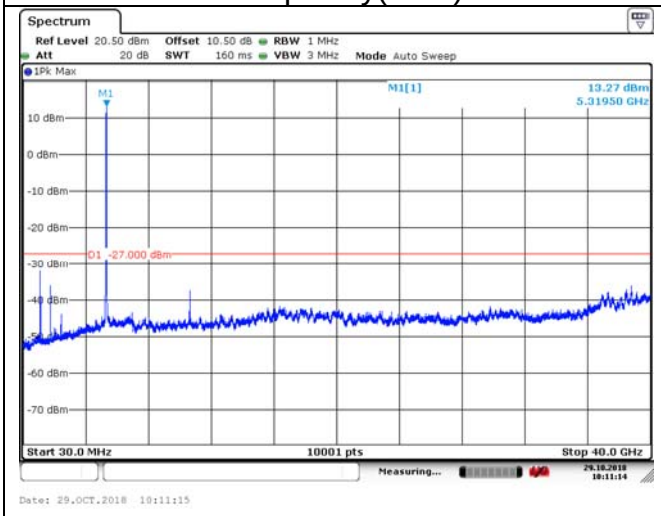
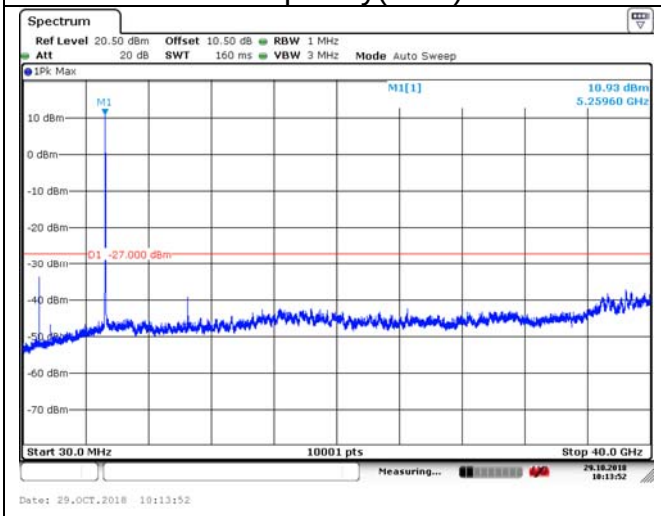
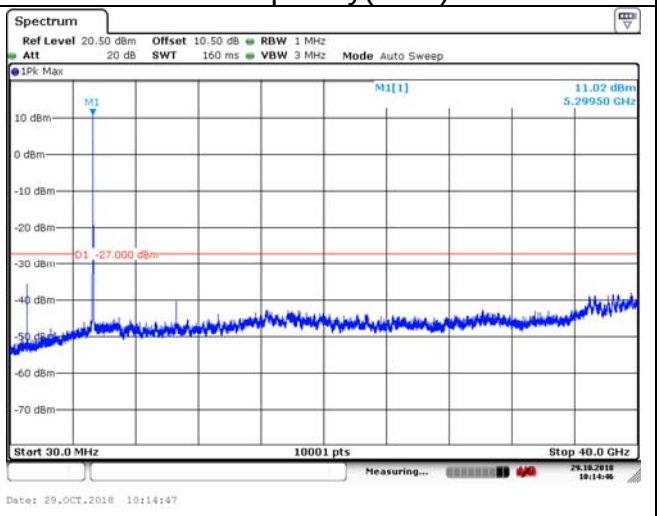
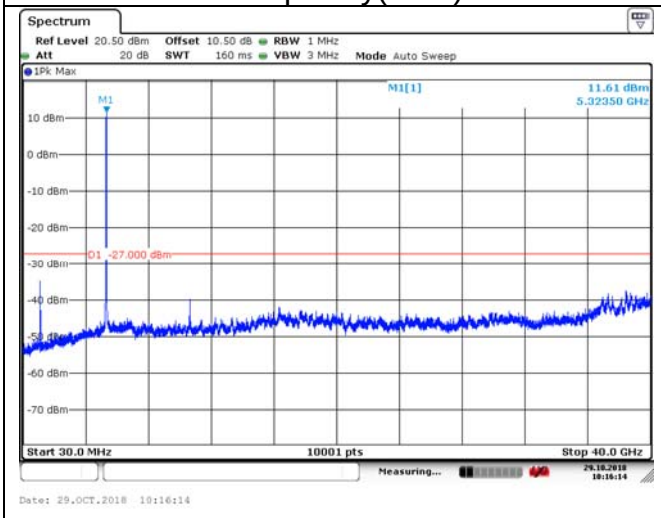
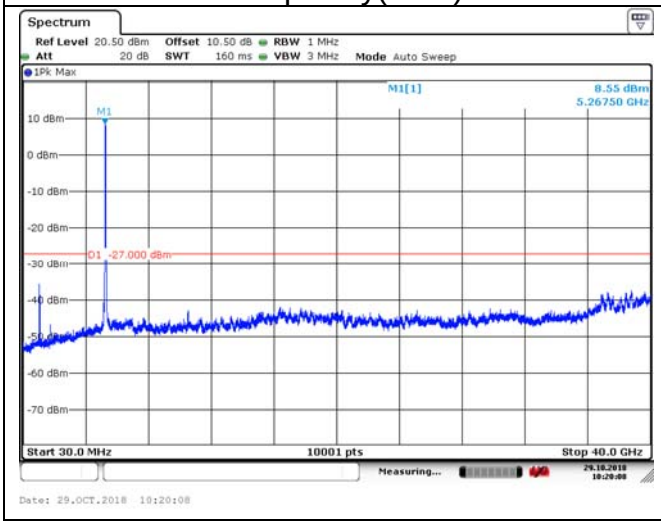
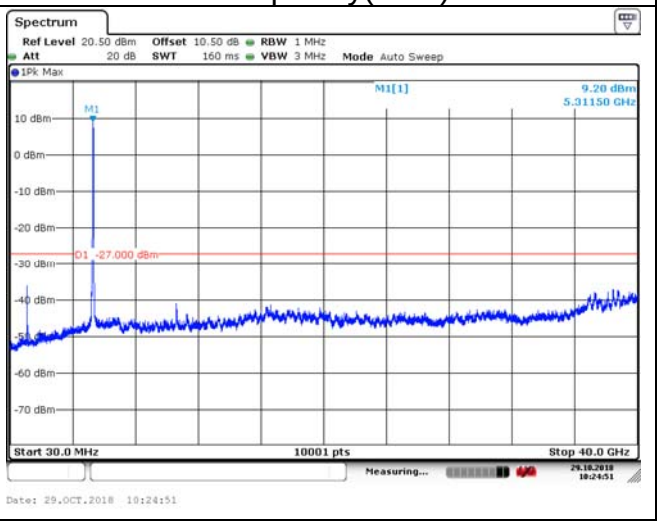
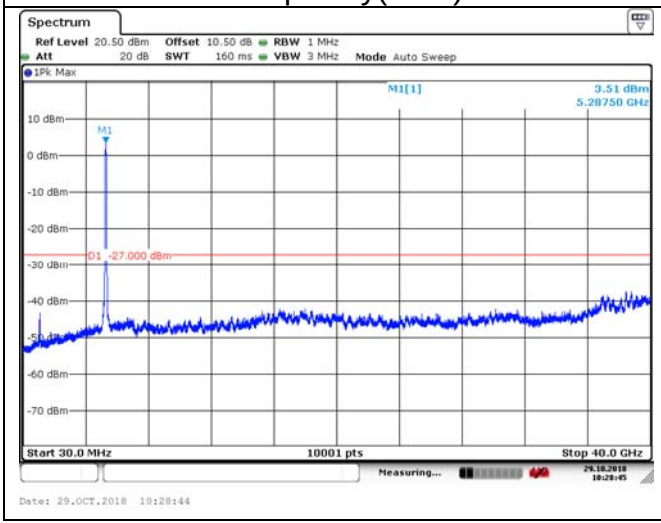
802.11a Carrier frequency(MHz):5260	802.11a Carrier frequency(MHz):5300
	
802.11a Carrier frequency(MHz):5320	
	

802.11n HT20 Carrier frequency(MHz):5260	802.11n HT20 Carrier frequency(MHz):5300
	
802.11n HT20 Carrier frequency(MHz):5320	
	

802.11n HT40 Carrier frequency(MHz):5270	802.11n HT40 Carrier frequency(MHz):5310
	

802.11ac HT80 Carrier frequency(MHz):5290	
	

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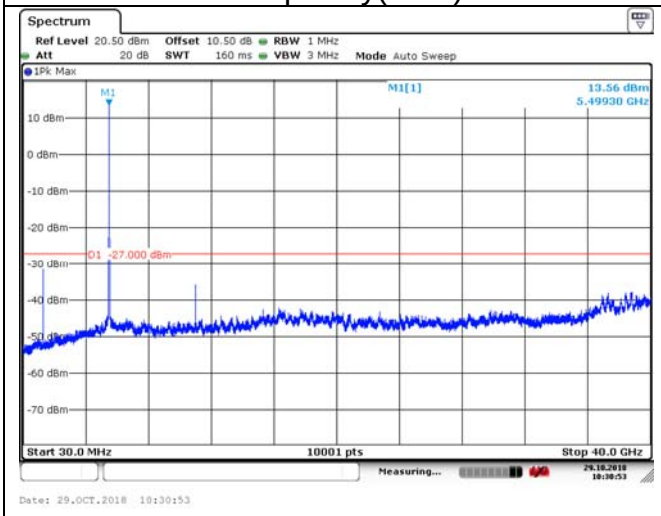
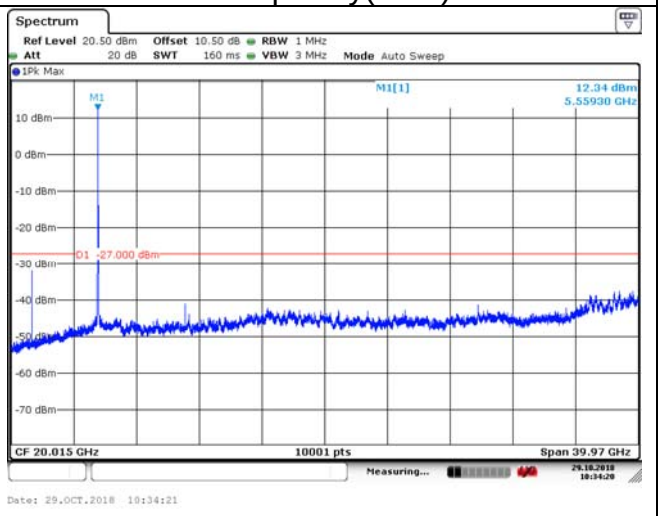
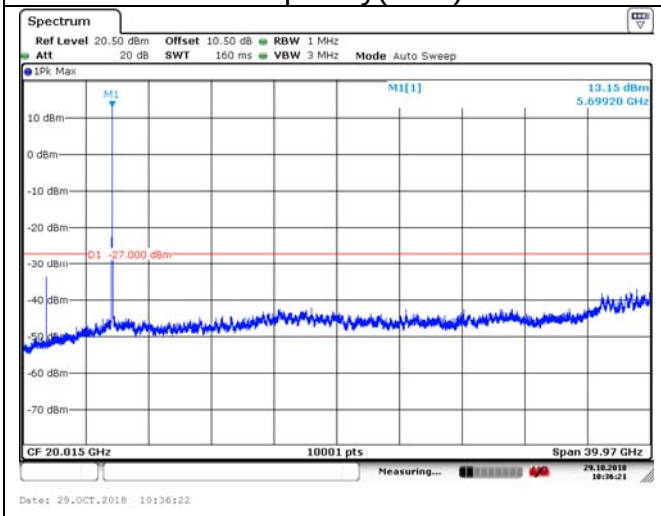
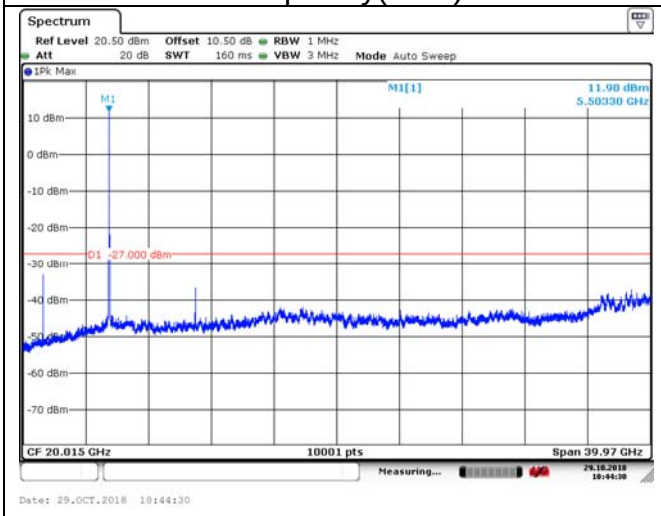
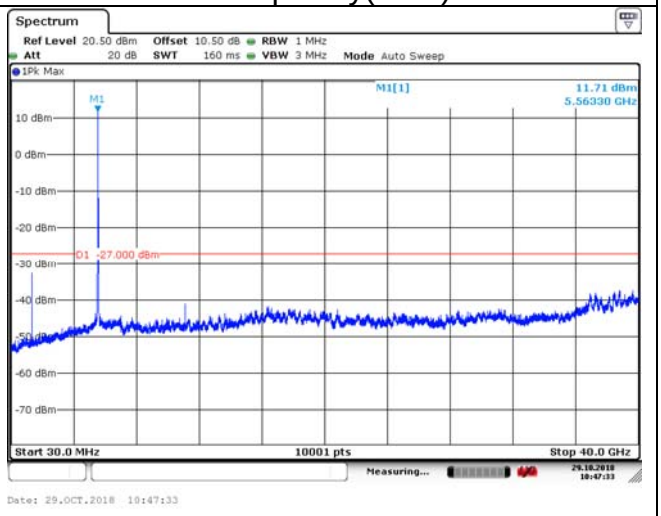
802.11a Carrier frequency(MHz):5500	802.11a Carrier frequency(MHz):5560
	
802.11a Carrier frequency(MHz):5700	
	

802.11n HT20 Carrier frequency(MHz):5500	802.11n HT20 Carrier frequency(MHz):5560
	
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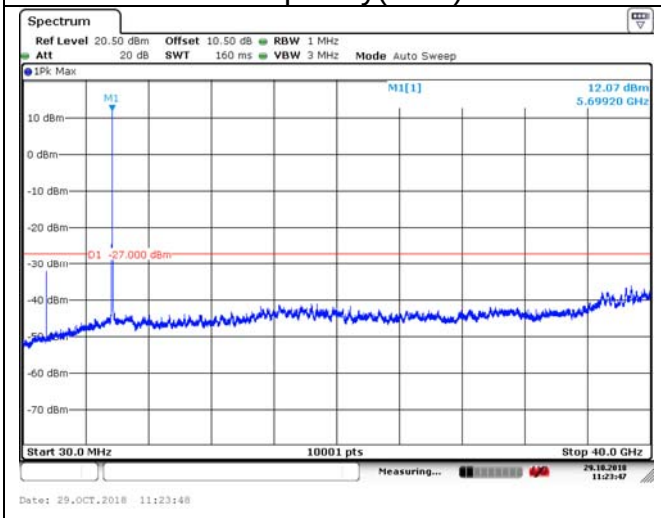
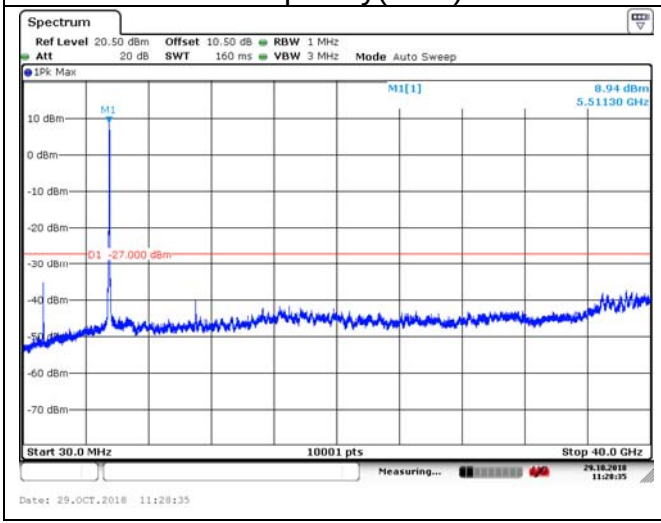
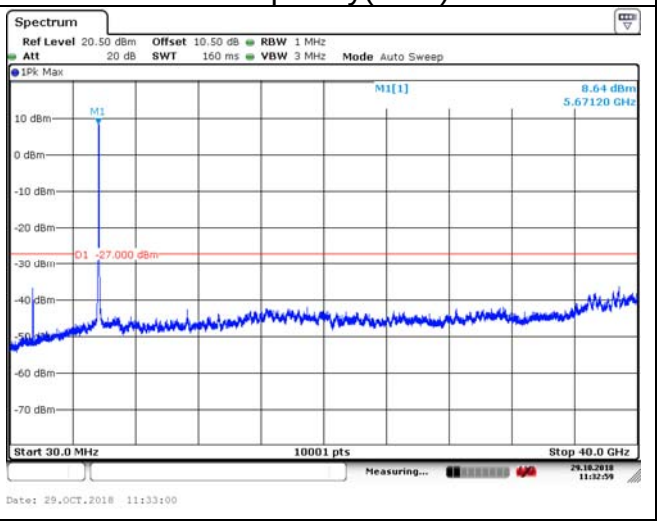
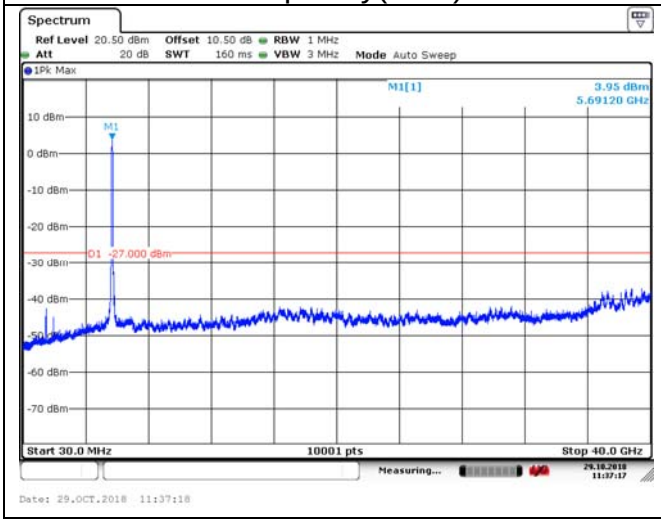
	

802.11n HT40 Carrier frequency(MHz):5510	802.11n HT40 Carrier frequency(MHz):5670
	

802.11ac HT80 Carrier frequency(MHz):5690	
	

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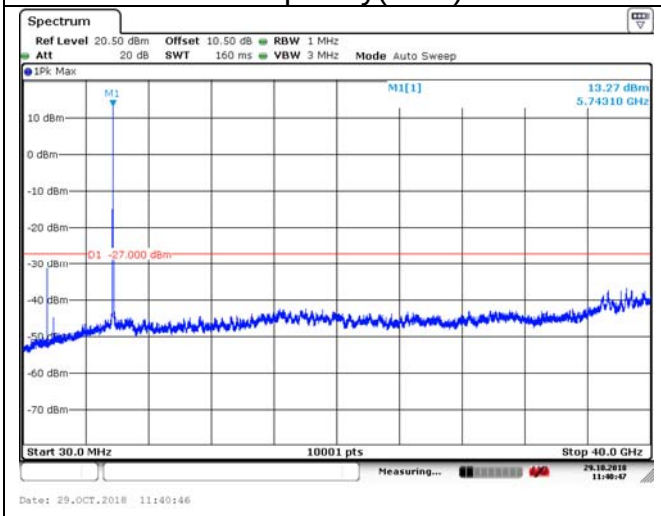
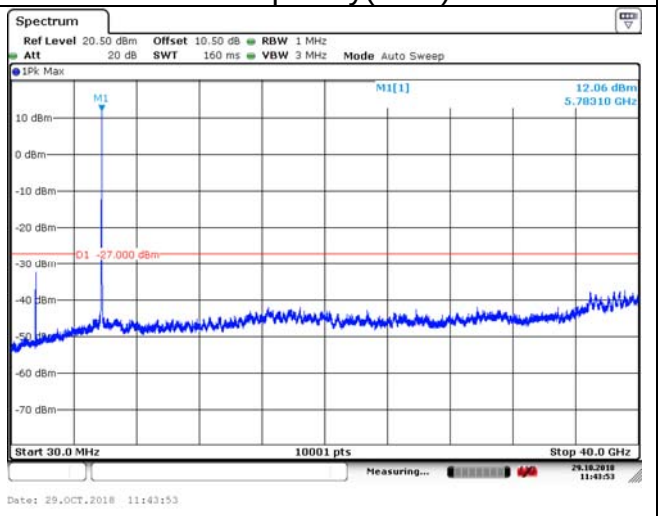
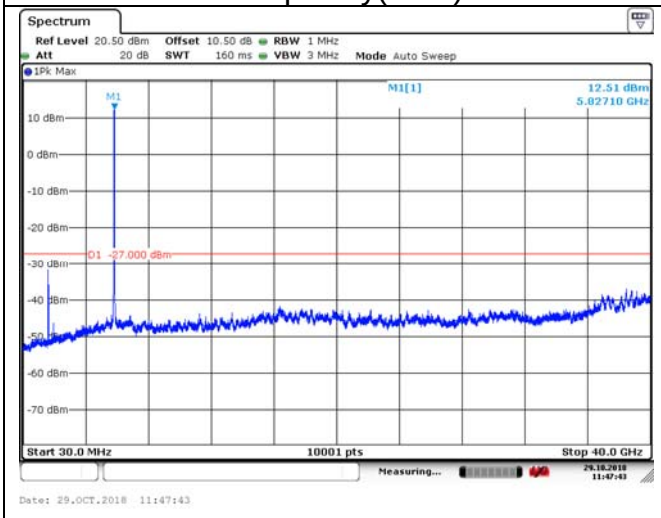
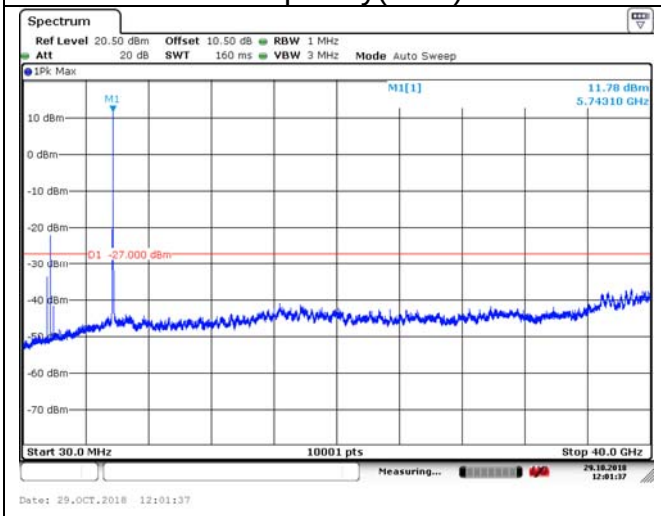
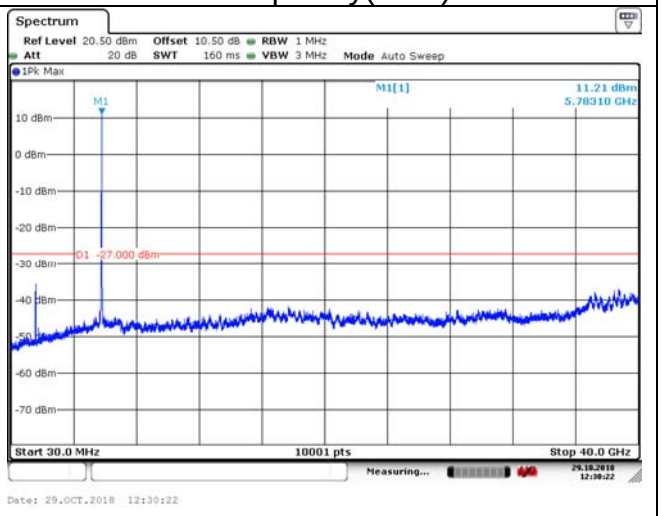
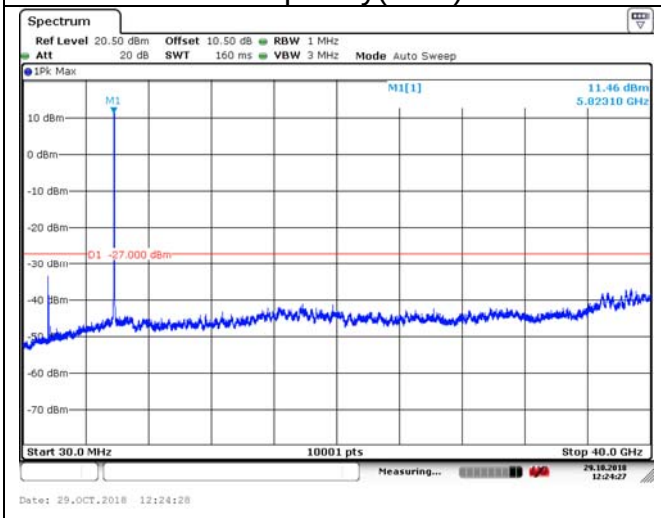
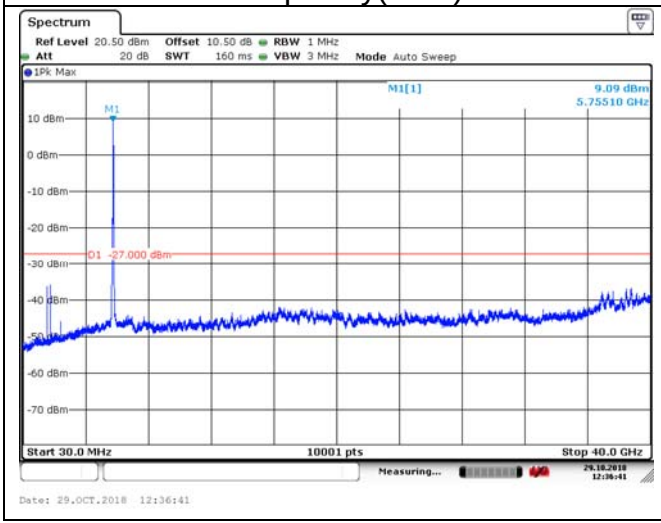
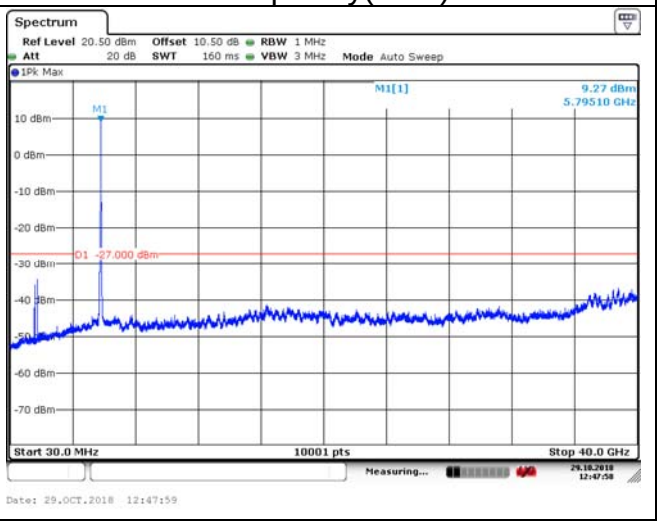
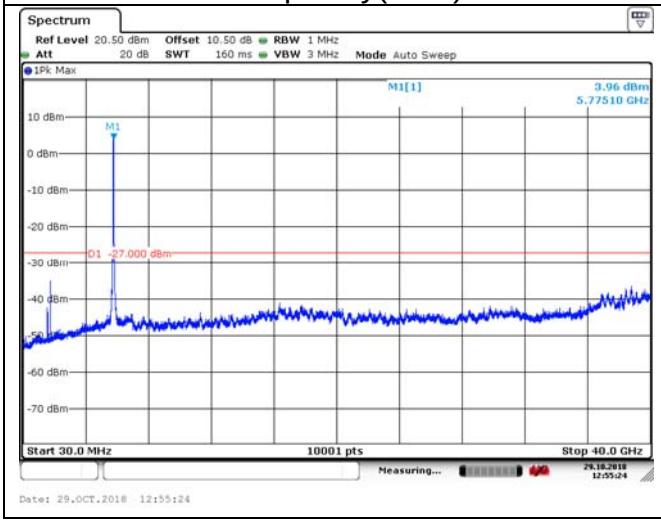
802.11a Carrier frequency(MHz):5745	802.11a Carrier frequency(MHz):5785
	
802.11a Carrier frequency(MHz):5825	
	

802.11n HT20 Carrier frequency(MHz):5745	802.11n HT20 Carrier frequency(MHz):5785
	
802.11n HT20 Carrier frequency(MHz):5825	
	

802.11n HT40 Carrier frequency(MHz):5755	802.11n HT40 Carrier frequency(MHz):5795
	

802.11ac HT80 Carrier frequency(MHz):5775	
	

Frequency Stability

U-NII-1

Mod.	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V.DC)	Temperature(°C)
11a	6Mbps	5180	1.24	24.0	0
11a	6Mbps	5180	1.34	24.0	+10
11a	6Mbps	5180	1.32	29.0	+20
11a	6Mbps	5180	-1.25	24.0	+20
11a	6Mbps	5180	3.23	19.0	+20
11a	6Mbps	5180	3.45	24.0	+30
11a	6Mbps	5180	1.36	24.0	+40
11a	6Mbps	5180	1.27	24.0	+50

U-NII-2A

Mod.	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V)	Temperature(°C)
11a	6Mbps	5300	0.34	24.0	0
11a	6Mbps	5300	3.12	24.0	+10
11a	6Mbps	5300	-1.21	29.0	+20
11a	6Mbps	5300	2.46	24.0	+20
11a	6Mbps	5300	3.12	19.0	+20
11a	6Mbps	5300	0.78	24.0	+30
11a	6Mbps	5300	2.24	24.0	+40
11a	6Mbps	5300	2.12	24.0	+50

U-NII-2C

Mod.	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V)	Temperature(°C)
11a	6Mbps	5500	0.21	24.0	0
11a	6Mbps	5500	0.00	24.0	+10
11a	6Mbps	5500	1.13	29.0	+20
11a	6Mbps	5500	-0.21	24.0	+20
11a	6Mbps	5500	-1.21	19.0	+20
11a	6Mbps	5500	1.12	24.0	+30
11a	6Mbps	5500	0.83	24.0	+40
11a	6Mbps	5500	0.36	24.0	+50

U-NII-3

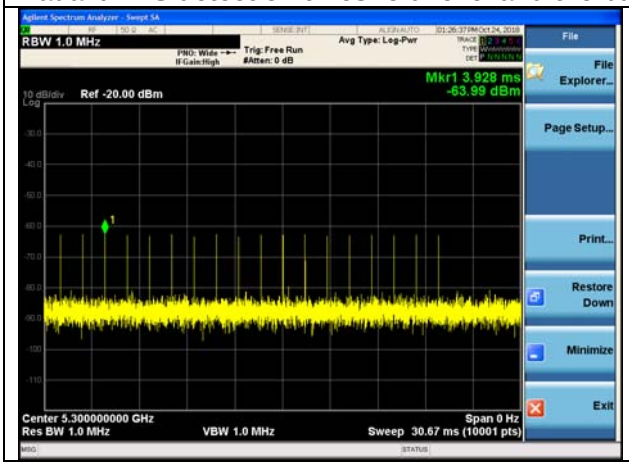
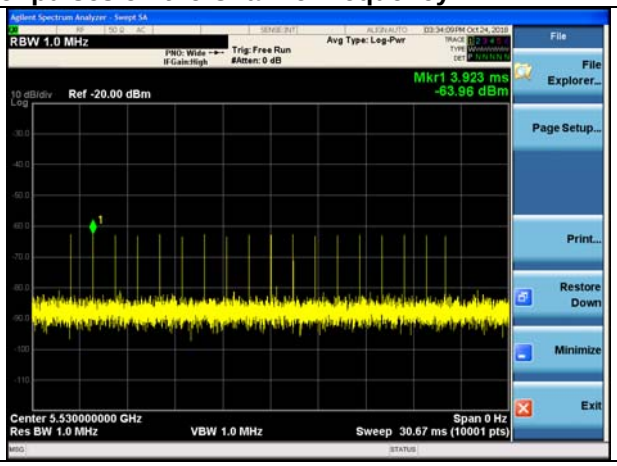
Mod.	Data Rate	Frequency (MHz)	Frequency Stability(ppm)	Voltage(V)	Temperature(°C)
11a	6Mbps	5745	0.16	24.0	0
11a	6Mbps	5745	-0.16	24.0	+10
11a	6Mbps	5745	2.13	29.0	+20
11a	6Mbps	5745	1.34	24.0	+20
11a	6Mbps	5745	2.15	19.0	+20
11a	6Mbps	5745	0.32	24.0	+30
11a	6Mbps	5745	0.46	24.0	+40
11a	6Mbps	5745	2.12	24.0	+50

Dynamic Frequency Selection

DESCRIPTION OF Master Device

The Master Device is a SKSpruce Technologies Co., Ltd., Indoor Access Point, FCC ID: 2AHKT-WIA3300-20. The minimum antenna gain for the Master Device is 3 dBi.
The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.
The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.
Test result

Radar Waveform Calibration Result

<20MHz / 5300 MHz> Radar Type 0	**<80MHz / 5530 MHz> Radar Type 0**
Radar / DFS detection threshold level and the burst of pulses on the Channel frequency	
	

Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test

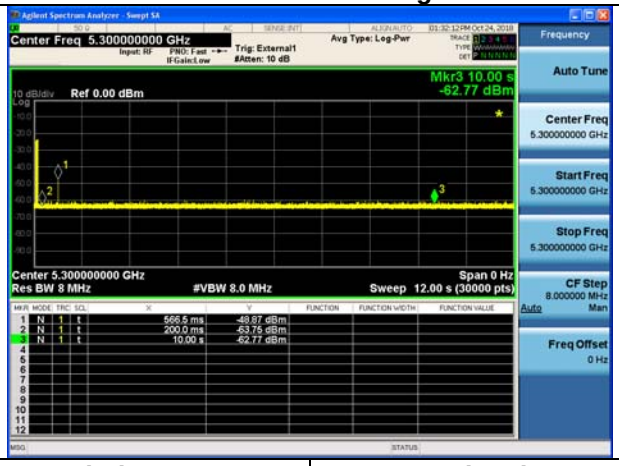
BW / Channel	Test Item	Test Result	Limit	Pass/Fail
20MHz / 5300MHz	Channel Move Time	0.5665 s	＜ 10s	Pass
	Channel Closing Transmission Time	200ms + 0.4 ms	＜ 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass
80MHz / 5530MHz	Channel Move Time	0.5555 s	＜ 10s	Pass
	Channel Closing Transmission Time	200ms + 0.4 ms	＜ 260ms	Pass
	Non-Occupancy Period	≥ 30	≥ 30 min	Pass

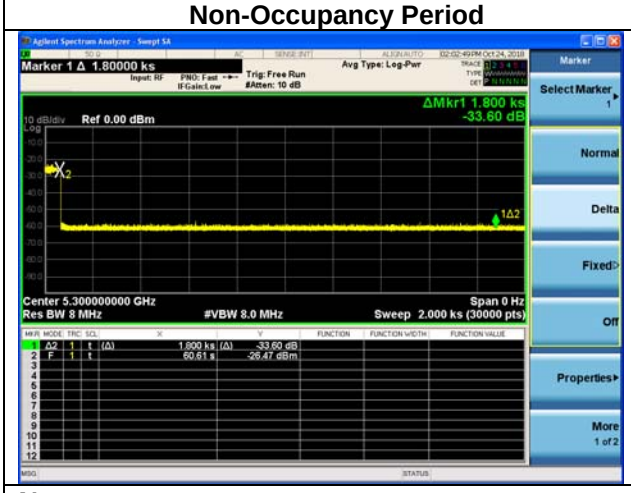
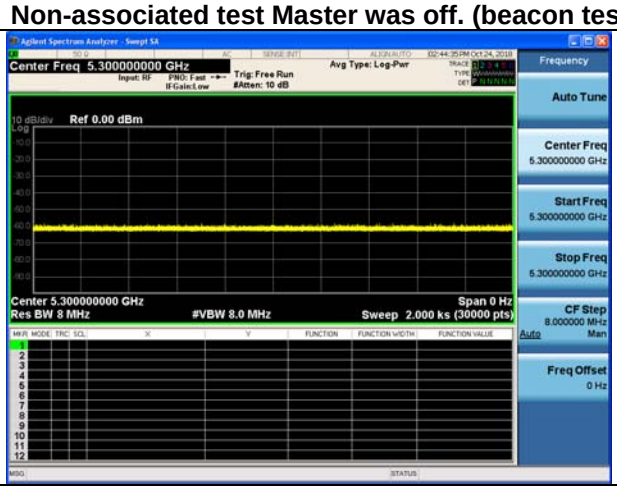
Note: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 seconds period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test Plots

<20MHz / 5300 MHz>

Channel Move Time & Channel Closing Transmission Time

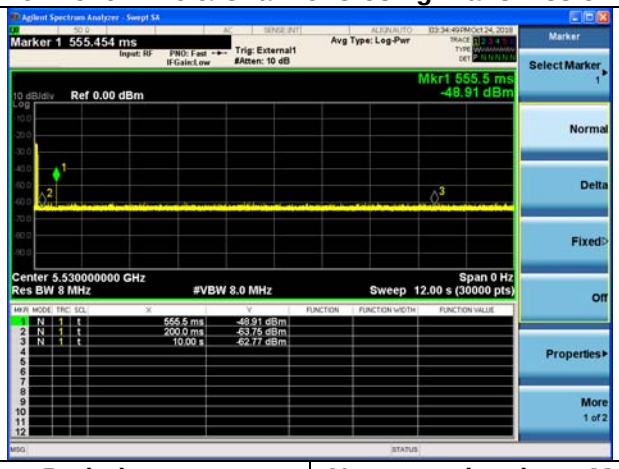


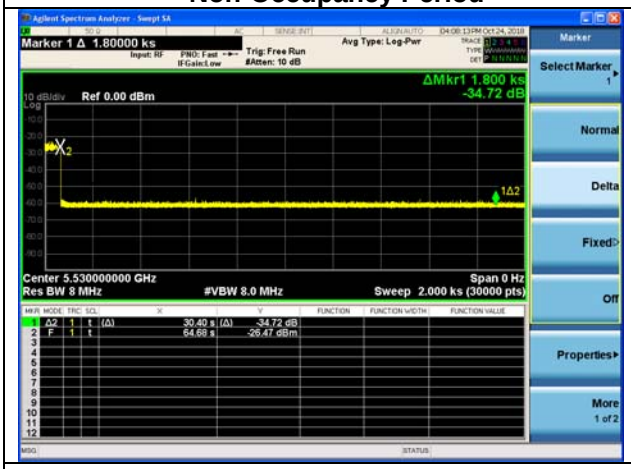
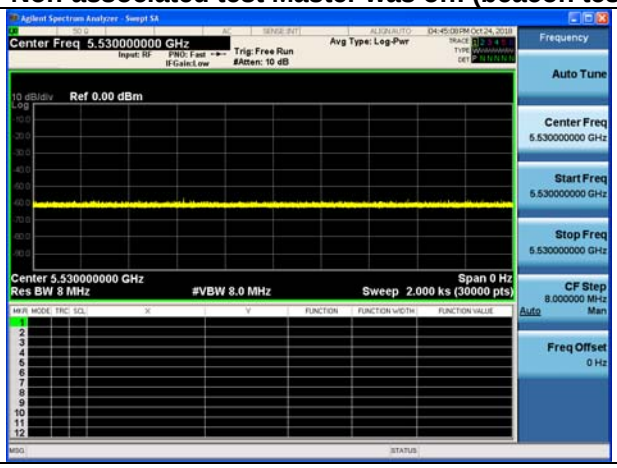
Non-Occupancy Period	Non-associated test Master was off. (beacon test)
	

Note:
Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
Channel Closing Transmission Time (200 + 0.4 ms) = 200 + Number (1) X Dwell (0.4 ms) < 260ms

<80MHz / 5530 MHz>

Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period	Non-associated test Master was off. (beacon test)
	

Note:

Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)

Channel Closing Transmission Time (200 + 0.4 ms) = 200 + Number (1) X Dwell (0.4 ms) < 260ms