FCC TEST REPORT

For

Ockel Computers BV

Sirius A

Test Model: OCSA-0812

List Model No.: OCSA-0412, OCSA-0411, OCSA-0811, OCSA-0408, OCSA-0808

Prepared for	:	Ockel Computers BV
Address	:	Wegastraat 33-35, 2516 AN, Den Haag, Netherlands
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	December 16, 2017
Number of tested samples	:	2
Serial number	:	Prototype
Date of Test	:	December 16, 2017~April 26, 2018
Date of Report	:	April 27, 2018

FCC TEST REPORT
FCC CFR 47 PART 15E(15.407): 2017

Report Reference No.	**:**	**LCS171127013AED**
Date of Issue.....	:	April 27, 2018
Testing Laboratory Name	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**:**	**Ockel Computers BV**
Address.....	:	Wegastraat 33-35, 2516 AN, Den Haag, Netherlands
Test Specification		
Standard	:	FCC CFR 47 PART 15E(15.407): 2017
Test Report Form No.	**:**	LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

EUT Description.	**:**	**Sirius A**
Trade Mark.....	:	OCKEL
Test Model	:	OCSA-0812
Ratings.....	:	DC 3.8V by Rechargeable Li-ion Battery(3500mAh) Recharged by DC 5V/2.5A SWITCHING ADAPTOR
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Leo Lee	Dick Su	Gavin Liang
Leo Lee/ File administrators	Dick Su/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : **LCS171127013AED**	April 27, 2018 Date of issue

EUT.....	: Sirius A
Test Model.....	: OCSA-0812
Applicant.....	**: Ockel Computers BV**
Address.....	: Wegastraat 33-35, 2516 AN, Den Haag, Netherlands
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Yuko Technology Co.,Ltd**
Address.....	: Floor 6th, Building A9, TianRui Industrial Park, Fuyuan 1st Road, Xinhe Village, Fuyong, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Factory.....	**: Yuko Technology Co.,Ltd**
Address.....	: Floor 6th, Building A9, TianRui Industrial Park, Fuyuan 1st Road, Xinhe Village, Fuyong, Shenzhen, China
Telephone.....	: /
Fax.....	: /

Test Result:	**Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	April 27, 2018	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Sirius A
Model Number	:	OCSA-0412, OCSA-0812, OCSA-0411, OCSA-0811, OCSA-0408, OCSA-0808
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, Only the model name, DDR, flash and shell color is different for these models.
Test Model	:	OCSA-0812
Power Supply	:	DC 3.8V by Rechargeable Li-ion Battery(3500mAh) Recharged by DC 5V/2.5A SWITCHING ADAPTOR
Hardware Version	:	CT600_MB_V1.1
Software Version	:	Windows10 RS3
Bluetooth	:	
Frequency Range	:	2402-2480MHz
Channel Number	:	79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)
Channel Spacing	:	1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)
Modulation Type	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)
Bluetooth Version	:	V4.0
WIFI(2.4G Band)	:	
Frequency Range	:	2412-2462MHz
Channel Spacing	:	5MHz
Channel Number	:	11 channels for 20MHz bandwidth(2412~2462MHz) 7 channels for 40MHz bandwidth(2422~2452MHz)
Modulation Type	:	802.11b: DSSS(CCK,DQPSK,DBPSK); 802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
WIFI(5.2G Band)	:	
Frequency Range	:	5180-5240MHz
Channel Number	:	4 channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 1 channels for 80MHz bandwidth(5210MHz)
Modulation Type	:	802.11a/n/ac: OFDM(64QAM, 16QAM, QPSK, BPSK)
WIFI(5.8G Band)	:	
Frequency Range	:	5745-5825MHz
Channel Number	:	5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Modulation Type	:	802.11a/n/ac: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	
		Two same Monopole Antenna; ANT0(MAIN) used for WIFI TX/RX, 3.0dBi(Max.) for 2.4G Band and 5.0dBi(Max.) for 5G Band ANT1(AUX) used for WIFI/Bluetooth TX/RX, 3.0dBi(Max.) for 2.4G Band and 5.0dBi(Max.) for 5G Band

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
SONY	TV Set	KDL-32W700B	2011083	DOC
SHENZHEN FUJIA APPLIANCE CO., LTD	SWITCHING ADAPTER (for TV Set)	FJ-SW1904000F	/	DOC
Shenzhen Fujia Appliance Co.,Ltd.	SWITCHING ADAPTOR	FJ-SW1260502500UN	/	VOC

1.3. External I/O Port

I/O Port Description	Quantity	Cable
Display Port	1	N/A
HDMI Port	1	N/A
USB 3.0 Port	2	N/A
Ethernet Port	1	N/A
USB Type C Port	1	N/A
DC Power In Port	1	2.0m, unshielded
3.5mm Audio Port	1	N/A
Micro SD Card Slot	1	N/A

1.4. Description of Test Facility

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A-1.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001
NVLAP Registration Code is 600167-0

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
		200MHz~1000MHz	±3.10dB	(1)
		1GHz~26.5GHz	±3.80dB	(1)
		26.5GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7. Description of Test Modes

The EUT has been tested under operating condition.

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/50Hz, recorded worst case.

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power, which was determined to be IEEE 802.11ac VHT20 mode (High Channel, Combined Antenna Chain0 and Antenna Chain1).

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be IEEE 802.11ac VHT20 mode (High Channel, Combined Antenna Chain0 and Antenna Chain1).

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

IEEE 802.11a Mode: 6 Mbps, OFDM.
IEEE 802.11ac VHT20 Mode: MCS0
IEEE 802.11n HT20 Mode: MCS0, OFDM.
IEEE 802.11ac VHT40 Mode: MCS0, OFDM.
IEEE 802.11n HT40 Mode: MCS0, OFDM.
IEEE 802.11ac VHT80 Mode: MCS0, OFDM.

Antenna & Bandwidth

Antenna	Chain0 (ANT0)			Chain1 (ANT1)			Simultaneously
Bandwidth Mode	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz	/
IEEE 802.11a	☑	☐	☐	☑	☐	☐	☐
IEEE 802.11n	☑	☑	☐	☑	☑	☐	☑
IEEE 802.11ac	☑	☑	☑	☑	☑	☑	☑

Channel & Frequency:

Frequency Band	Channel No.	Frequency(MHz)	Channel No.	Frequency(MHz)
5180~5240MHz	**36**	**5180**	44	5220
	38	**5190**	**46**	**5230**
	40	**5200**	**48**	**5240**
	42	5210	/	/
For IEEE 802.11a/n HT20/ac VHT20, Channel 36, 40 and 48 were tested. For IEEE 802.11n HT40/ac VHT40, Channel 38 and 46 were tested. For IEEE 802.11ac VHT80, Channel 42 was tested.				

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd.

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to FCC's request, Test Procedure 789033 D02 General UNII Test Procedures New Rules v01r03 and KDB 662911 D01 Multiple Transmitter Output v02r01 is required to be used for this kind of FCC 15.407 UII device.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. EUT Exercise Software

The system was configured for testing in a continuous transmits condition and change test channels by software (DRTU.exe) provided by application.

3.3. Special Accessories

N/A.

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart E		
FCC Rules	Description of Test	Result
/	On Time and Duty Cycle	Only reported
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(a)	26dB Bandwidth	Compliant
§15.407(a)	99% Occupied Bandwidth	Compliant
§15.407(b)	Radiated Emissions	Compliant
§15.407(b)	Band edge Emissions	Compliant
§15.205	Emissions at Restricted Band	Compliant
§15.407(g)	Frequency Stability	N/A
§15.207(a)	Line Conducted Emissions	Compliant
§15.203	Antenna Requirements	Compliant
§2.1093	RF Exposure	Compliant

Note: The customer declared frequency stability is better than 20ppm which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.

5. TEST RESULT

5.1. On Time and Duty Cycle

5.1.1. Standard Applicable

None; for reporting purpose only.

5.1.2. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

5.1.3. Test Procedures

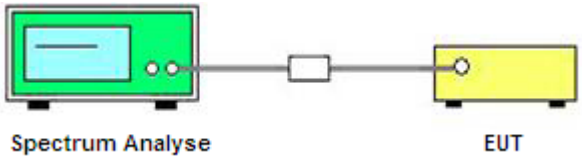
1). Set the Centre frequency of the spectrum analyzer to the transmitting frequency;

2). Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=10.13ms;

3). Detector = peak;

4). Trace mode = Single hold.

5.1.4. Test Setup Layout



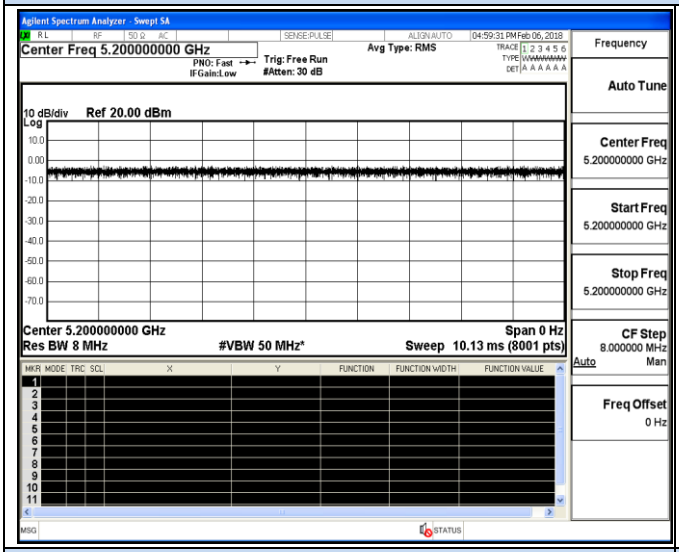
5.1.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

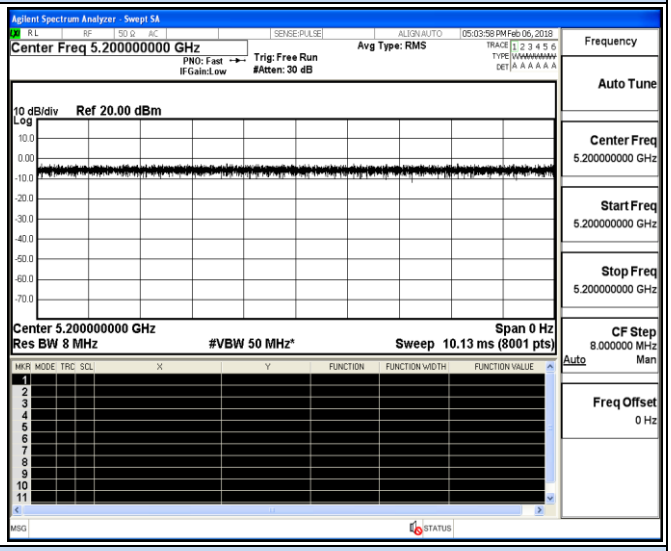
5.1.6. Test result

Mode	On Time B (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW(KHz)
IEEE 802.11a	5.0	5.0	1	100%	0	0.01
IEEE 802.11n HT20	5.0	5.0	1	100%	0	0.01
IEEE 802.11ac VHT20	5.0	5.0	1	100%	0	0.01
IEEE 802.11n HT40	5.0	5.0	1	100%	0	0.01
IEEE 802.11ac VHT40	5.0	5.0	1	100%	0	0.01
IEEE 802.11ac VHT80	5.0	5.0	1	100%	0	0.01
Note: Duty Cycle Correction Factor=10log(1/Duty cycle)						

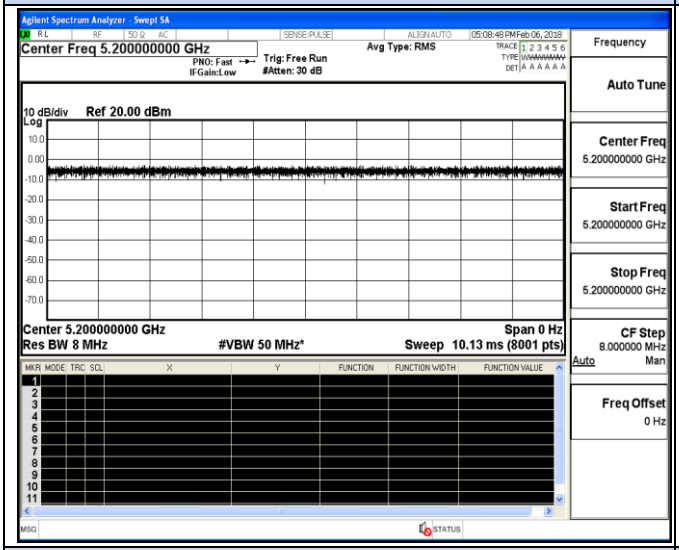
On Time and Duty Cycle



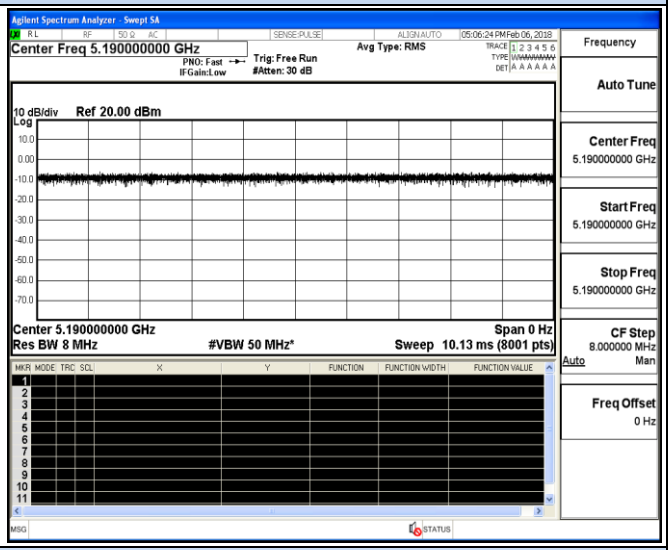
IEEE 802.11a



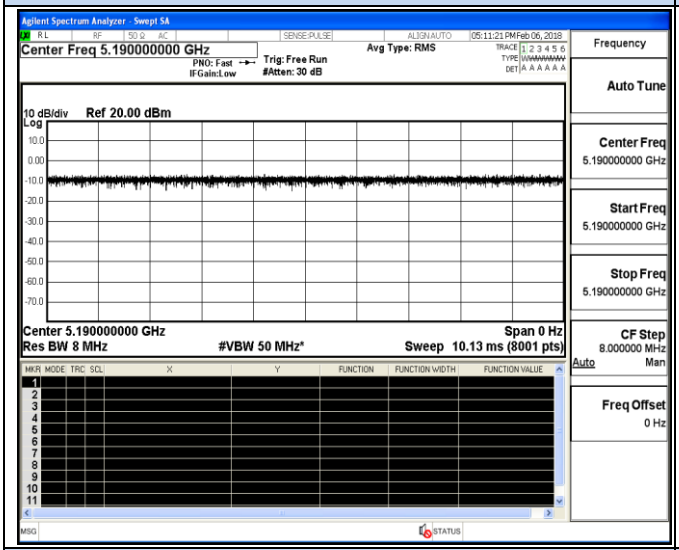
IEEE 802.11n HT20



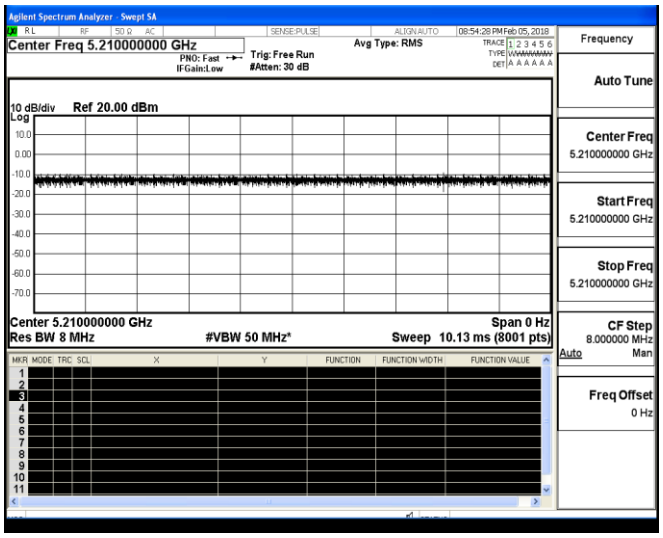
IEEE 802.11ac VHT20



IEEE 802.11n HT40



IEEE 802.11ac VHT40



IEEE 802.11ac VHT80

5.2. Maximum Conducted Output Power Measurement

5.2.1. Standard Applicable

(1) For the band 5.15~5.25GHz

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2.2. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of the power meter.

5.2.3. Test Procedures

The transmitter output (antenna port) was connected to the power meter.

According to KDB 789033 D02 Section 3 (a) Method PM (Measurement using an RF average power meter):

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

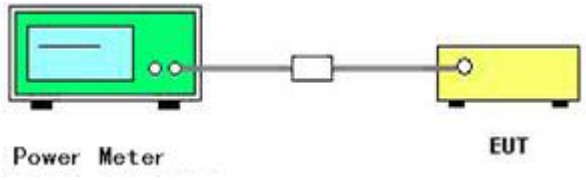
- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25%).

5.2.4. Test Setup Layout



5.1.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.2.6. Test Result of Maximum Conducted Output Power

Temperature	21.6℃	Humidity	52.6%
Test Engineer	Ryan Hu	Configurations	IEEE 802.11a/n/ac

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power (dBm)			Duty Cycle Factor (dB)	Report Conducted Power (dBm)			Maximum Limit (dBm)	Result
			Chain0	Chain1	Sum		Chain0	Chain1	Sum		
IEEE 802.11a	36	5180	11.68	11.17	/	0.000	11.68	11.17	/	24	Complies
	40	5200	11.79	11.77	/	0.000	11.79	11.77	/		
	48	5240	11.30	11.14	/	0.000	11.30	11.14	/		
IEEE 802.11n HT20	36	5180	11.35	11.34	14.36	0.000	11.35	11.34	14.36	21.99	Complies
	40	5200	11.20	10.67	13.95	0.000	11.20	10.67	13.95		
	48	5240	11.18	11.83	14.53	0.000	11.18	11.83	14.53		
IEEE 802.11ac VHT20	36	5180	11.61	10.48	14.09	0.000	11.61	10.48	14.09	21.99	Complies
	40	5200	11.72	10.62	14.22	0.000	11.72	10.62	14.22		
	48	5240	11.90	10.97	14.47	0.000	11.90	10.97	14.47		
IEEE 802.11n HT40	38	5190	10.75	10.99	13.88	0.000	10.75	10.99	13.88	21.99	Complies
	46	5230	11.37	10.77	14.09	0.000	11.37	10.77	14.09		
IEEE 802.11ac VHT40	38	5190	11.16	11.03	14.11	0.000	11.16	11.03	14.11	21.99	Complies
	46	5230	11.36	11.21	14.30	0.000	11.36	11.21	14.30		
IEEE 802.11ac VHT80	42	5210	11.96	11.80	14.89	0.000	11.96	11.80	14.89	21.99	Complies

Remark:

1. *Measured output power at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11a VHT20, IEEE 802.11ac VHT40, IEEE 802.11ac VHT80;*
4. *Report conducted power = Measured conducted average power + Duty Cycle factor.*
5. *The EUT used two same PIFA antenna for WIFI TX/RX, the directional gain=5.0+10*log(2)=8.01dBi. So the power limits of IEEE 802.11n HT20, IEEE 802.11 n HT40, IEEE 802.11 ac VHT20, IEEE 802.11 ac VHT40 and IEEE 802.11 ac VHT80 for MIMO with CDD technology should be reduced.*

5.3. Power Spectral Density Measurement

5.3.1. Standard Applicable

For 5.15~5.25GHz

(i) For an outdoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.note1
(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band.note1
(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band. note1
Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

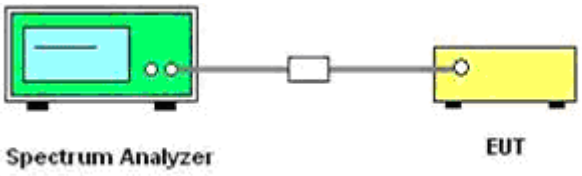
5.3.2. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of Spectrum Analyzer.

5.3.3. Test Procedures

1). The transmitter was connected directly to a Spectrum Analyzer through a directional couple.
2). The power was monitored at the coupler port with a Spectrum Analyzer. The power level was set to the maximum level.
3). Set the RBW = 1MHz.
4). Set the VBW ≥ 3MHz
5). Span=Encompass the entire emissions bandwidth (EBW) of the signal (or, alternatively, the entire 99% occupied bandwidth) of the signal.
6). 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.)
7). Manually set sweep time ≥ 10 × (number of points in sweep) × (total on/off period of the transmitted signal).
8). Set detector = power averaging (rms).
9). Sweep time = auto couple.
10). Trace mode = max hold.
11). Allow trace to fully stabilize.
12). 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, levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively.
13). Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (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%.
14). Use the peak marker function to determine the maximum power level in any 1MHz band segment within the fundamental EBW.

5.3.4. Test Setup Layout



5.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.3.6. Test Result of Power Spectral Density

Temperature	21.6℃	Humidity	52.6%
Test Engineer	Ryan Hu	Configurations	IEEE 802.11a/n/ac

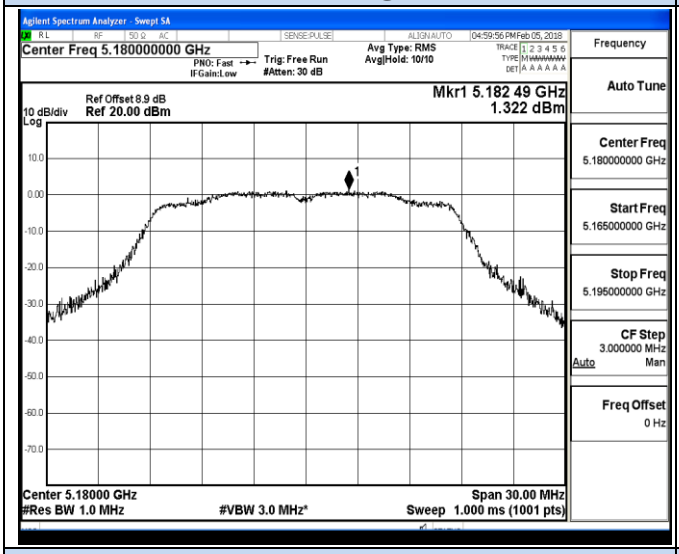
Test Mode	Channel	Frequency (MHz)	Power Density (dBm/MHz)			Duty cycle factor (dB)	Report conducted PSD (dBm/MHz)			Max. Limit (dBm/MHz)	Result
			Chain0	Chain1	Sum		Chain0	Chain1	Sum		
IEEE 802.11a	36	5180	1.32	-1.54	/	0.000	1.32	-1.54	/	11.00	Complies
	40	5200	1.36	0.56	/	0.000	1.36	0.56	/		
	48	5240	2.32	0.49	/	0.000	2.32	0.49	/		
IEEE 802.11n HT20	36	5180	0.81	1.91	4.41	0.000	0.81	1.91	4.41	8.99	Complies
	40	5200	0.89	3.99	5.72	0.000	0.89	3.99	5.72		
	48	5240	1.01	2.21	4.66	0.000	1.01	2.21	4.66		
IEEE 802.11ac VHT20	36	5180	1.42	0.88	4.17	0.000	1.42	0.88	4.17	8.99	Complies
	40	5220	1.17	1.75	4.48	0.000	1.17	1.75	4.48		
	48	5240	1.20	1.24	4.23	0.000	1.20	1.24	4.23		
IEEE 802.11n HT40	38	5190	-1.73	-2.45	0.94	0.000	-1.73	-2.45	0.94	8.99	Complies
	46	5230	-1.54	-1.90	1.29	0.000	-1.54	-1.90	1.29		
IEEE 802.11ac VHT40	38	5190	-1.89	-1.09	1.54	0.000	-1.89	-1.09	1.54	8.99	Complies
	46	5230	-1.84	-2.01	1.09	0.000	-1.84	-2.01	1.09		
IEEE 802.11ac VHT80	42	5210	-3.88	-3.99	-0.92	0.000	-3.88	-3.99	-0.92	8.99	Complies

Remark:

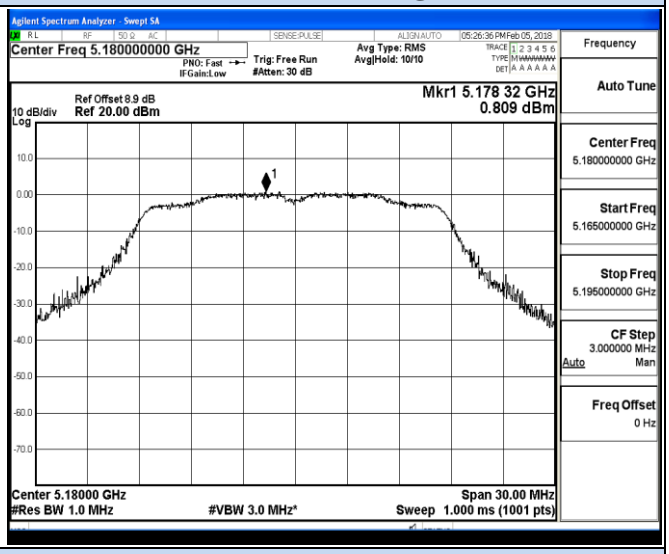
1. *Measured power spectrum density at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11a VHT20, IEEE 802.11ac VHT40, IEEE 802.11ac VHT80;*
4. *The EUT used two same PIFA antenna for WIFI TX/RX, the directional gain=5.0+10*log(2)=8.01dBi. So the PSD limits of IEEE 802.11n HT20, IEEE 802.11 n HT40, IEEE 802.11 ac VHT20, IEEE 802.11 ac VHT40 and IEEE 802.11 ac VHT80 for MIMO with CDD technology should be reduced.*
5. *Report conducted PSD = Measured conducted average power + Duty Cycle factor;*
6. *Please refer to following test plots;*

Power Spectral Density

IEEE 802.11a @ Chain0

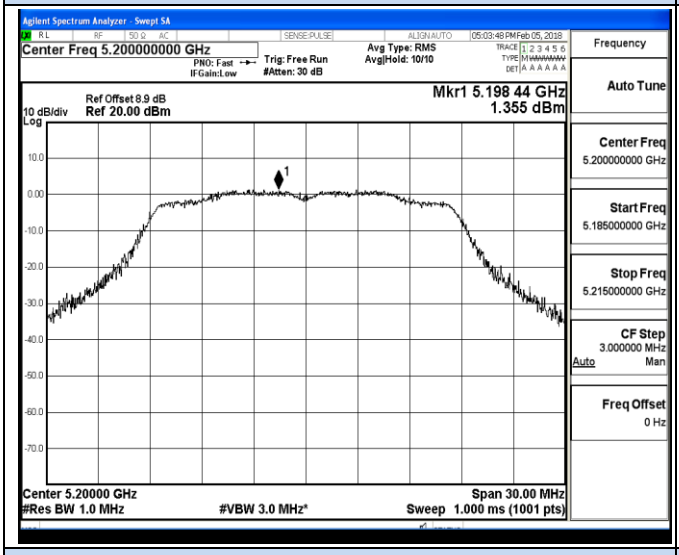


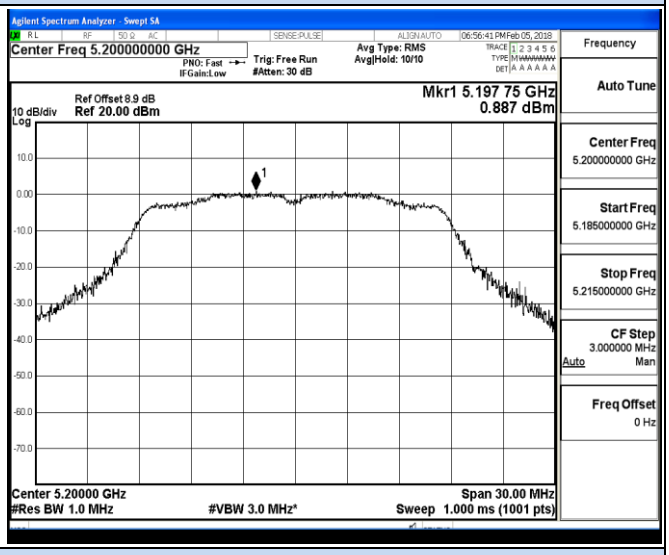
IEEE 802.11n HT20 @ Chain0



Channel 36 / 5180 MHz

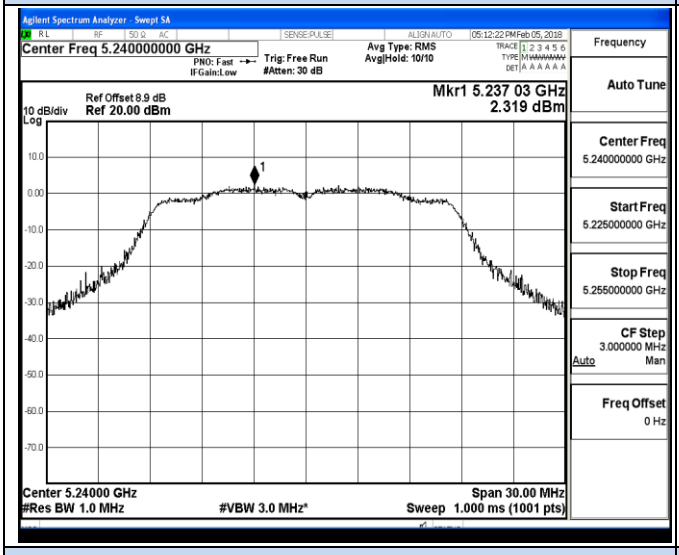
Channel 36 / 5180 MHz

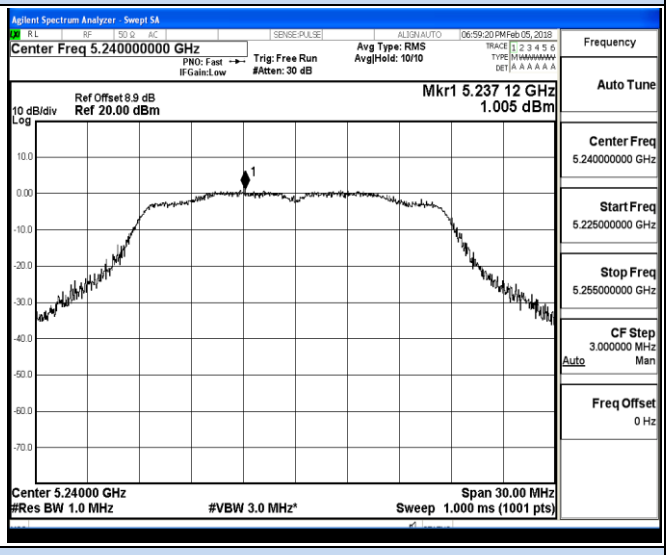




Channel 40 / 5200 MHz

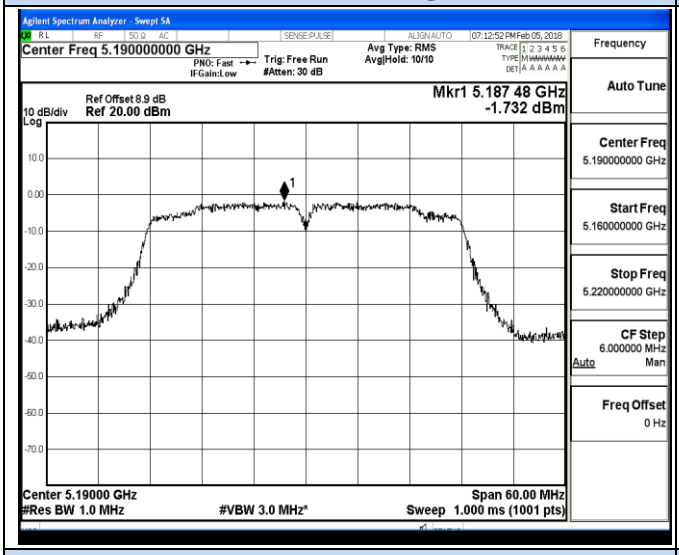
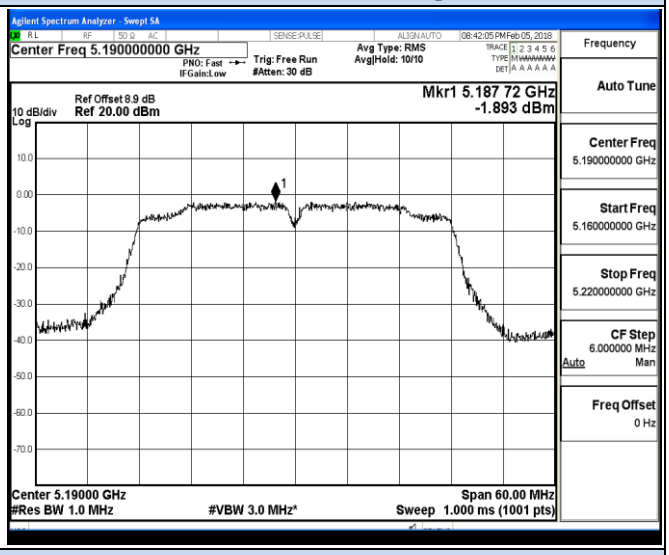
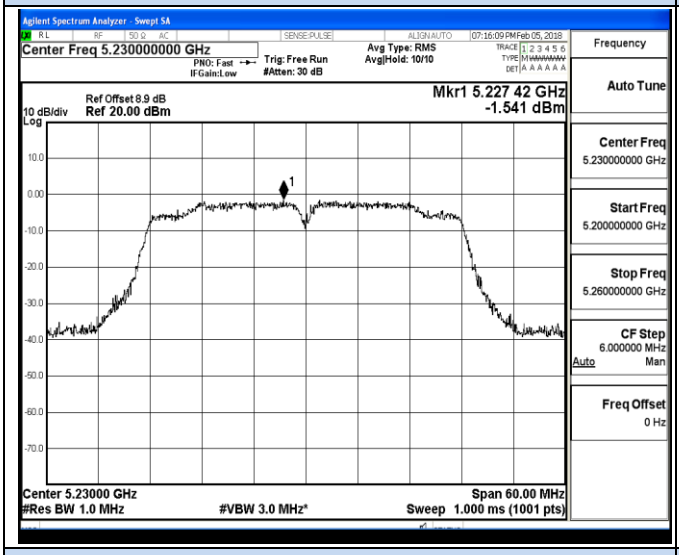
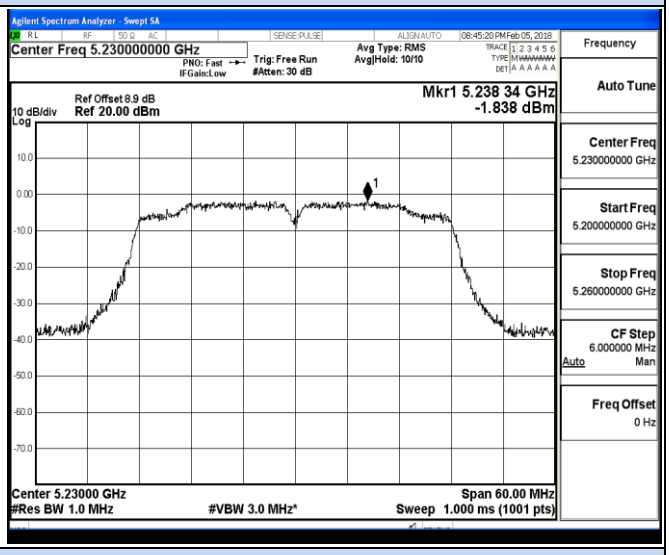
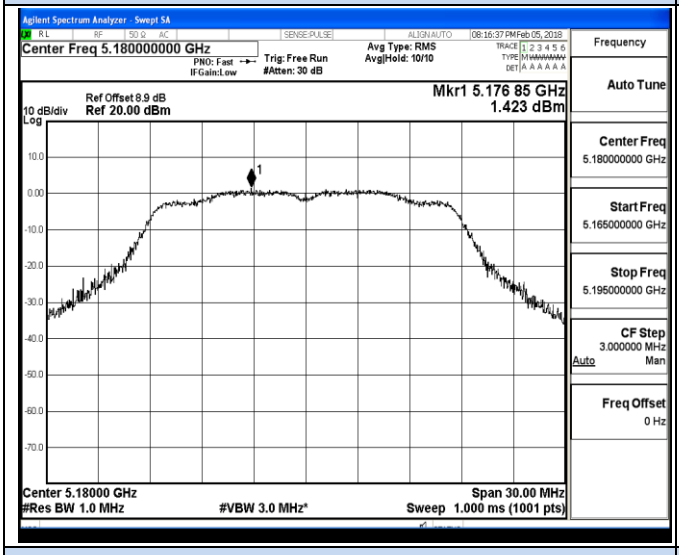
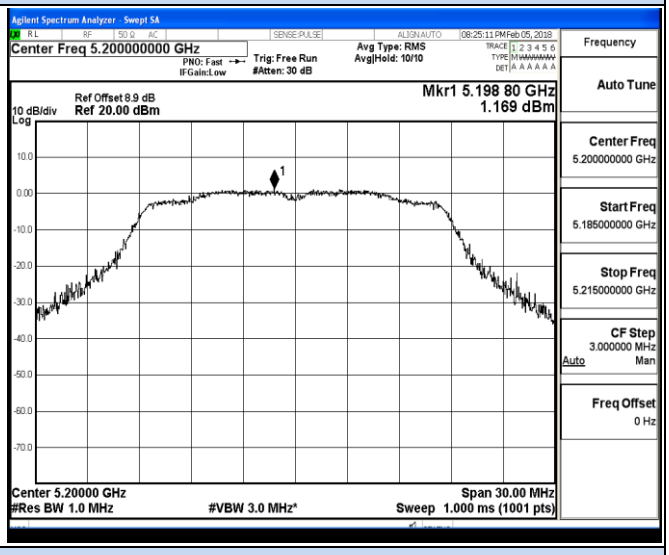
Channel 40 / 5200 MHz

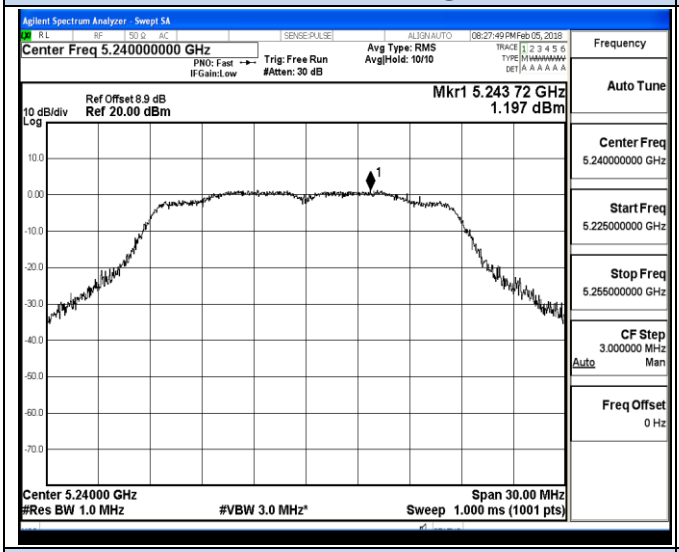
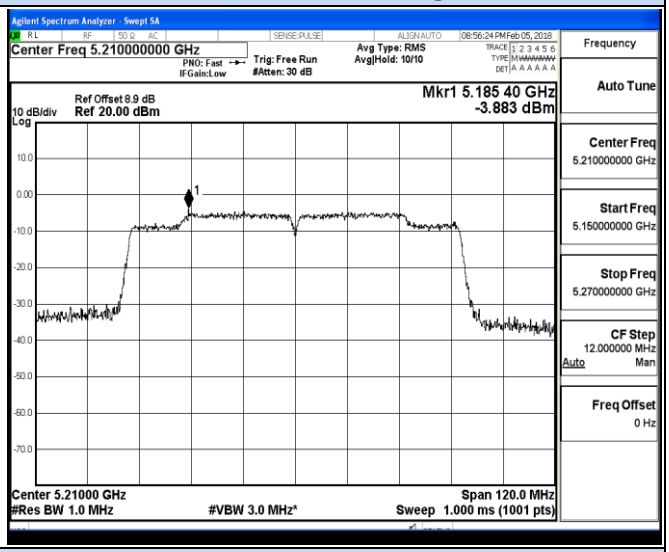




Channel 48 / 5240 MHz

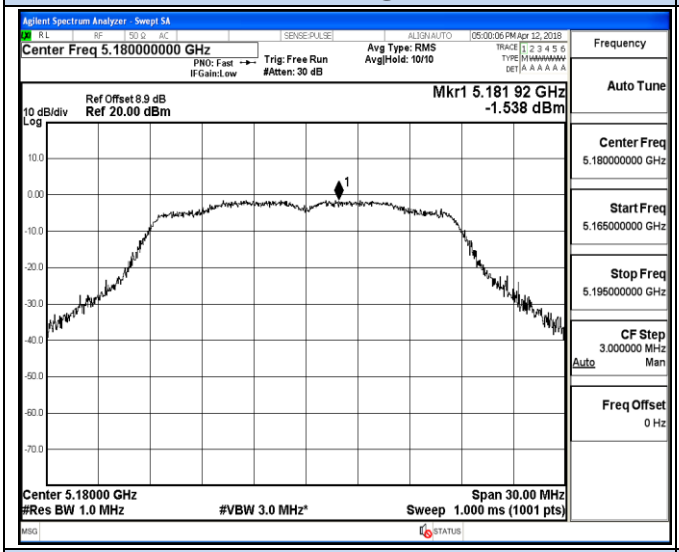
Channel 48 / 5240 MHz

Power Spectral Density	
IEEE 802.11n HT40 @ Chain0	IEEE 802.11ac VHT40 @ Chain0
	
Channel 38 / 5190 MHz	Channel 38 / 5190 MHz
	
Channel 46 / 5230 MHz	Channel 46 / 5230 MHz
IEEE 802.11ac VHT20 @ Chain0	IEEE 802.11ac VHT20 @ Chain0
	
Channel 36 / 5180 MHz	Channel 40 / 5200 MHz

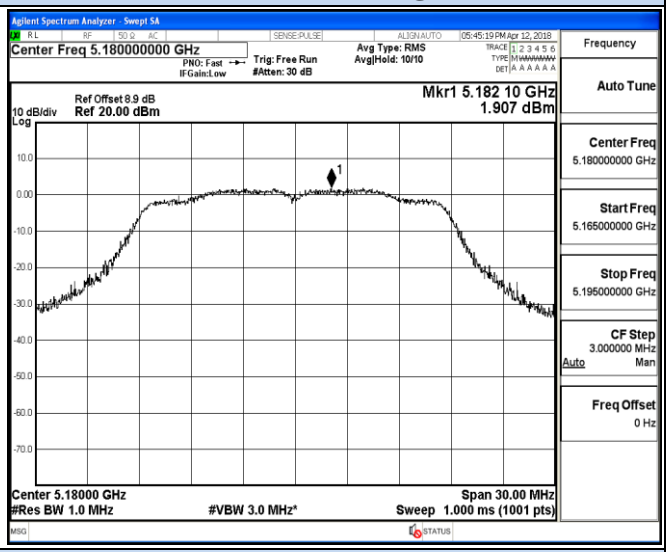
Power Spectral Density	
IEEE 802.11ac VHT20 @ Chain0	IEEE 802.11ac VHT80 @ Chain0
	
Channel 48 / 5240 MHz	Channel 42 / 5210 MHz

Power Spectral Density

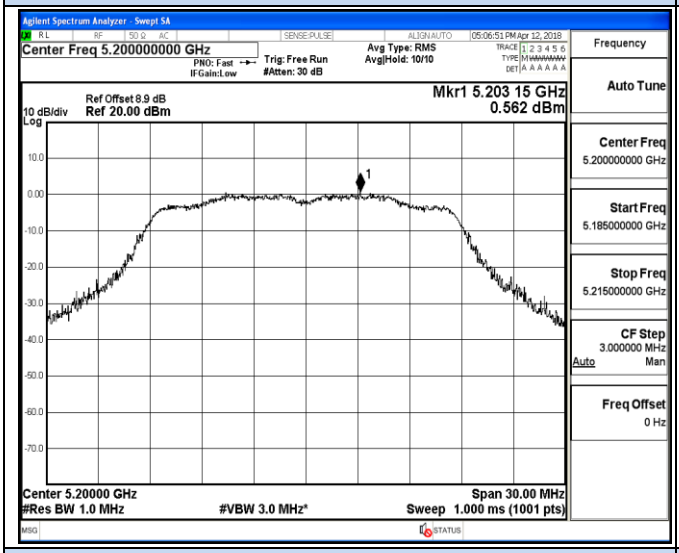
IEEE 802.11a @ Chain1



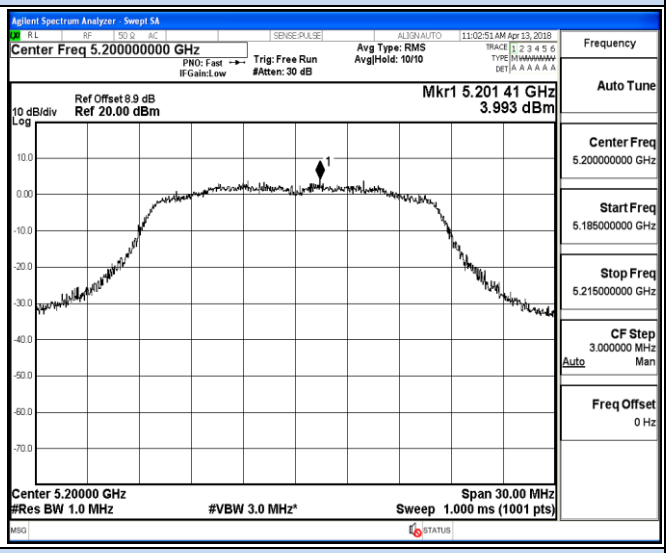
IEEE 802.11n HT20 @ Chain1



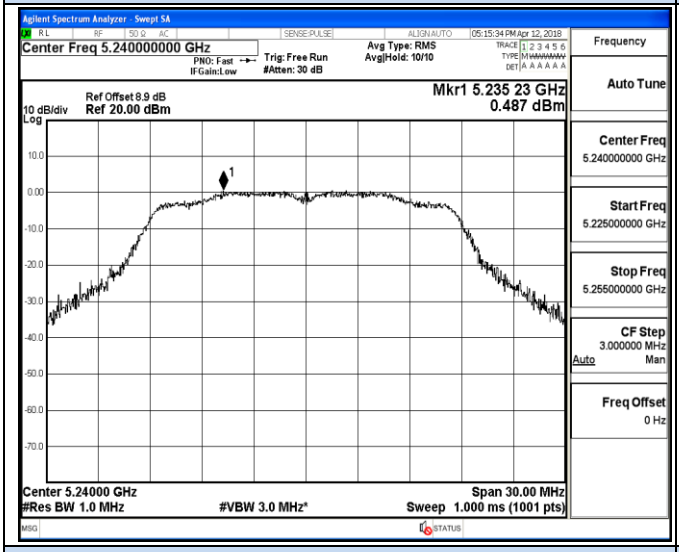
Channel 36 / 5180 MHz



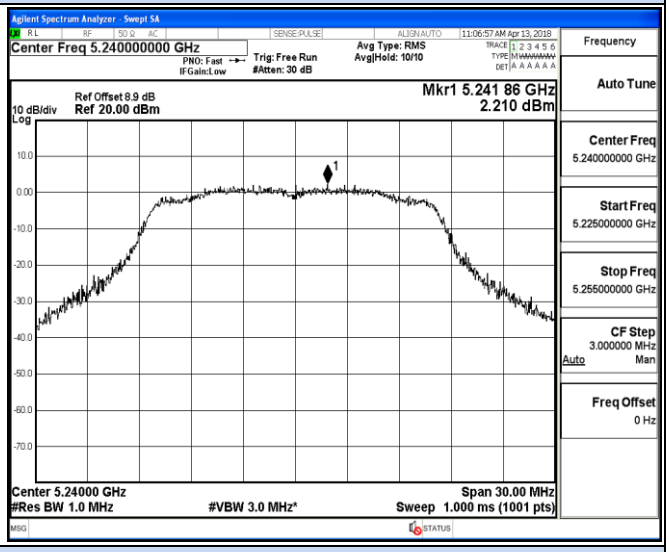
Channel 36 / 5180 MHz



Channel 40 / 5200 MHz

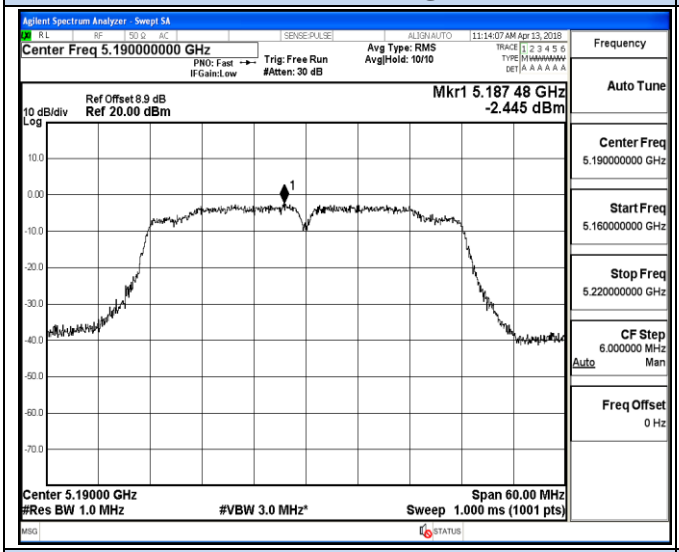
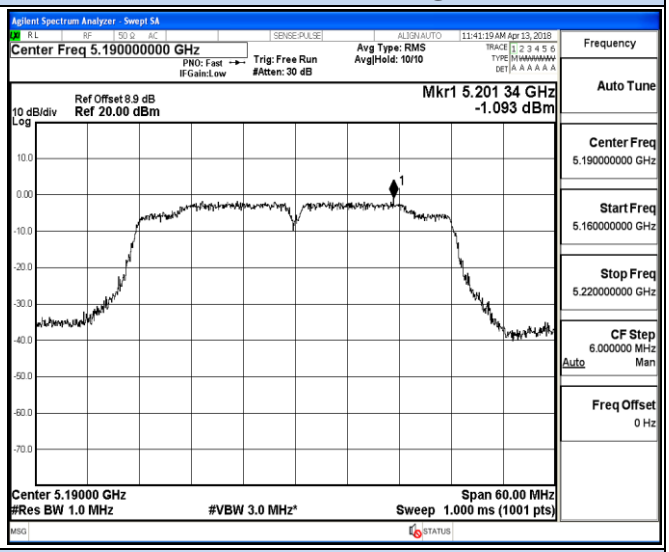
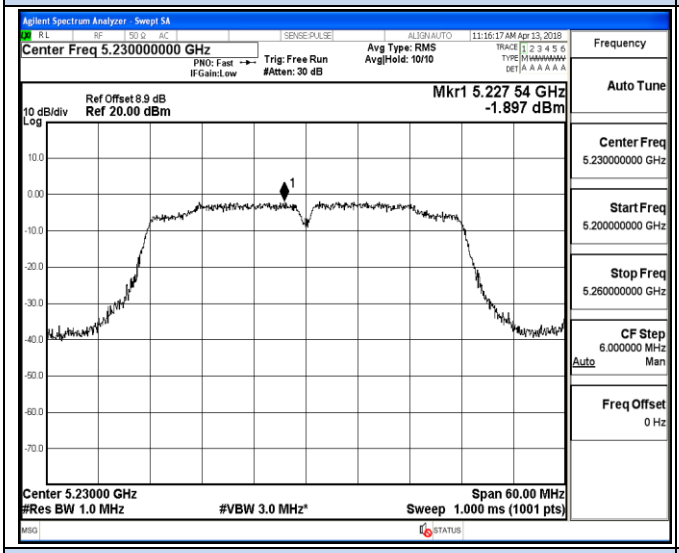
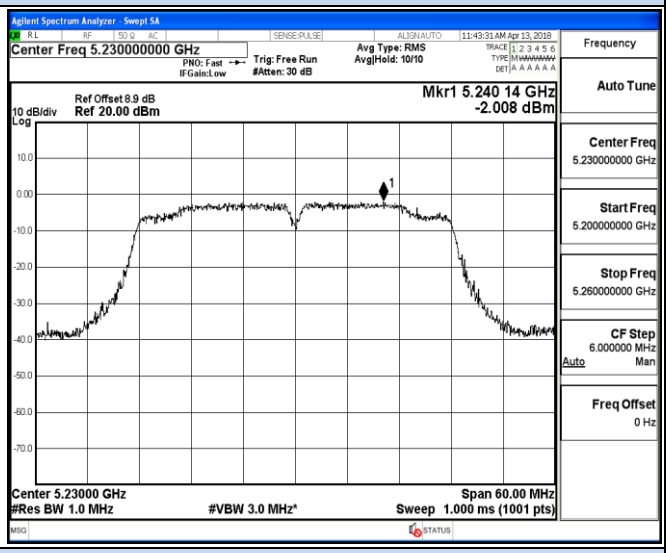
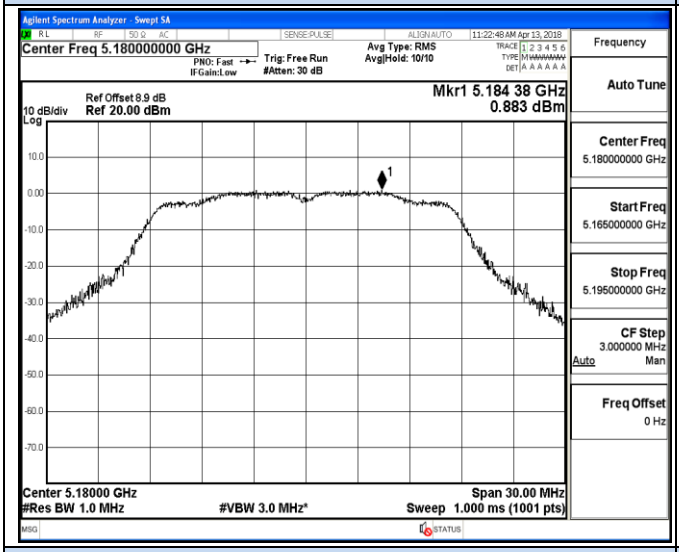
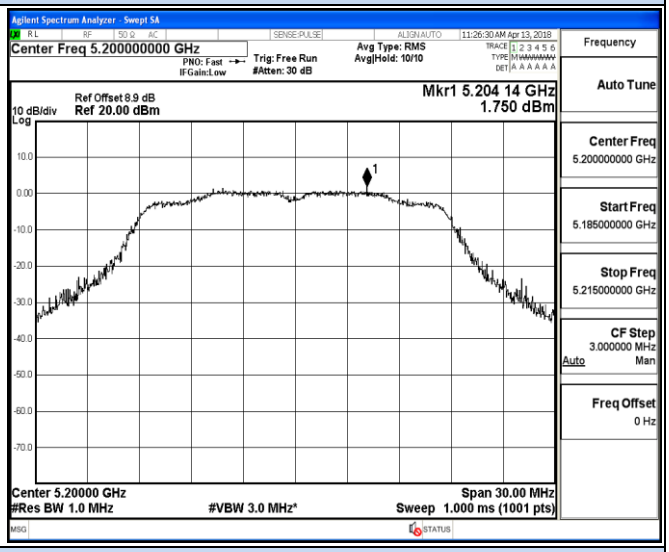


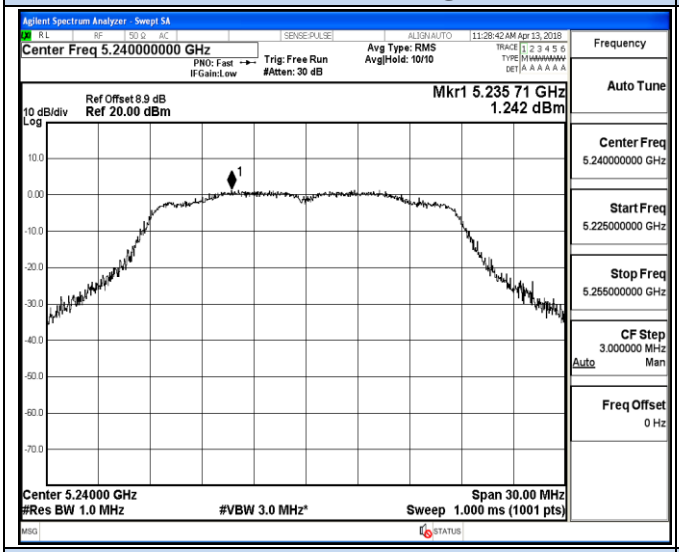
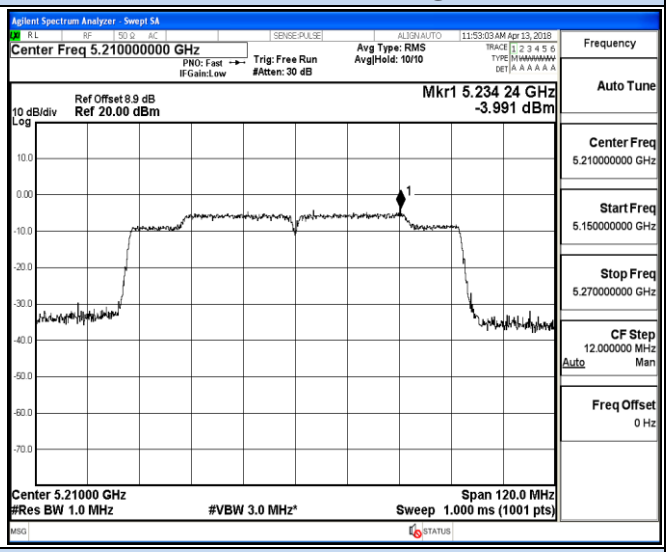
Channel 40 / 5200 MHz



Channel 48 / 5240 MHz

Channel 48 / 5240 MHz

Power Spectral Density	
IEEE 802.11n HT40 @ Chain1	IEEE 802.11ac VHT40 @ Chain1
	
Channel 38 / 5190 MHz	Channel 38 / 5190 MHz
	
Channel 46 / 5230 MHz	Channel 46 / 5230 MHz
IEEE 802.11ac VHT20 @ Chain1	IEEE 802.11ac VHT20 @ Chain1
	
Channel 36 / 5180 MHz	Channel 40 / 5200 MHz

Power Spectral Density	
IEEE 802.11ac VHT20 @ Chain1	IEEE 802.11ac VHT80 @ Chain1
	
Channel 48 / 5240 MHz	Channel 42 / 5210 MHz

5.4. 99% and 26dB Occupied Bandwidth Measurement

5.4.1. Standard Applicable

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

5.4.2. Measuring Instruments and Setting

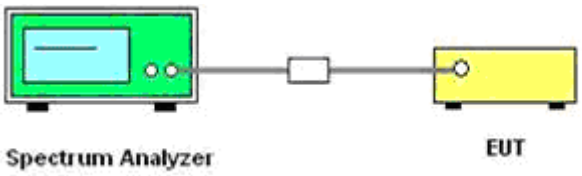
Please refer to equipment list in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span	> 26dB Bandwidth
Detector	Peak
Trace	Max Hold
Sweep Time	100ms

5.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The RBW = 1% - 3% of occupied bandwidth, VBW = 3*RBW;
3. Measured the spectrum width with power higher than 26dB below carrier.

5.4.4. Test Setup Layout



5.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.4.6. Test Result of 99% and 26dB Occupied Bandwidth

Temperature	21.6℃	Humidity	52.6%
Test Engineer	Ryan Hu	Configurations	IEEE 802.11a/n/ac

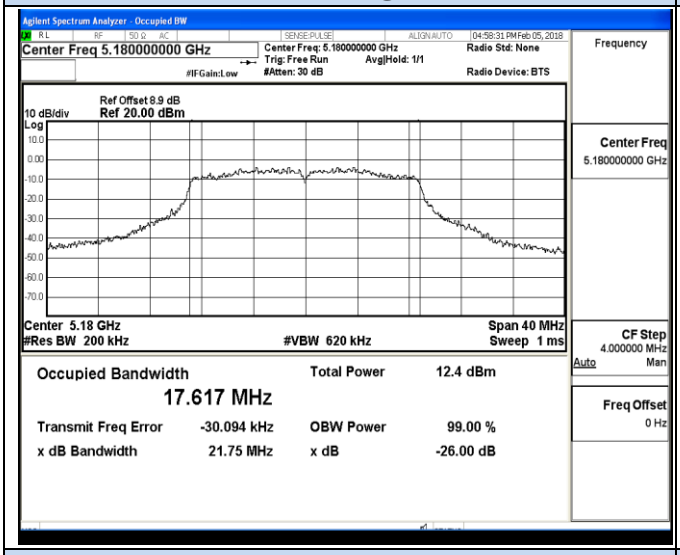
Test Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)		Limits (MHz)	Verdict
			Chain0	Chain1	Chain0	Chain1		
IEEE 802.11a	36	5180	21.75	22.38	17.617	17.651	No Limit	PASS
	40	5200	22.22	22.53	17.616	17.646		
	48	5240	22.06	22.00	17.624	17.606		
IEEE 802.11n HT20	36	5180	22.88	21.96	17.653	17.654	No Limit	PASS
	40	5200	22.25	20.35	17.639	16.408		
	48	5240	22.31	20.11	17.630	16.422		
IEEE 802.11ac VHT20	36	5180	22.53	21.93	17.634	17.630	No Limit	PASS
	40	5200	21.86	22.17	17.618	17.645		
	48	5240	22.18	22.04	17.636	17.635		
IEEE 802.11n HT40	38	5190	41.14	41.13	36.103	36.115	No Limit	PASS
	46	5230	41.30	41.52	36.096	36.095		
IEEE 802.11ac VHT40	38	5190	41.20	41.68	36.103	36.033	No Limit	PASS
	46	5230	41.58	40.88	36.096	36.034		
IEEE 802.11ac VHT80	42	5210	91.41	113.9	75.567	75.510	No Limit	PASS

Remark:

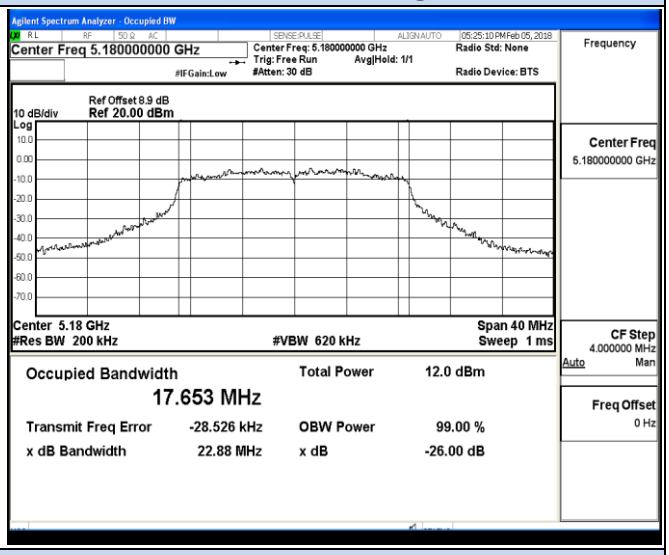
1. *Measured 99% and 26dB bandwidth at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11a VHT20, IEEE 802.11ac VHT40, IEEE 802.11ac VHT80;*
4. *Please refer to following test plots;*

99% and 26dB Occupied Bandwidth

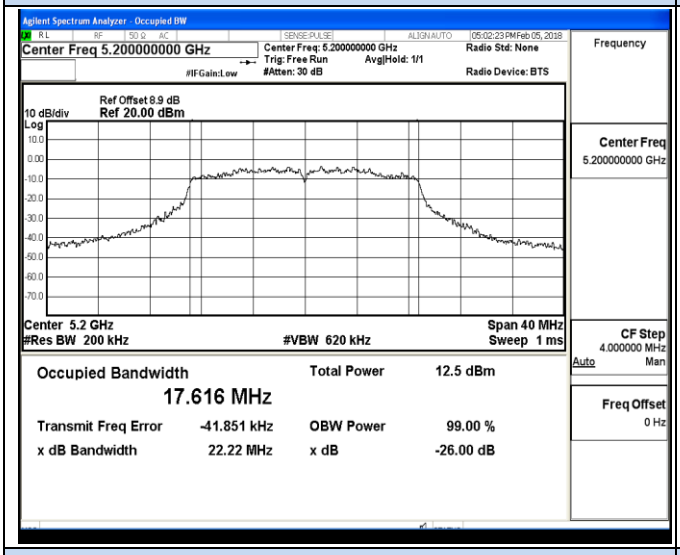
IEEE 802.11a @ Chain0



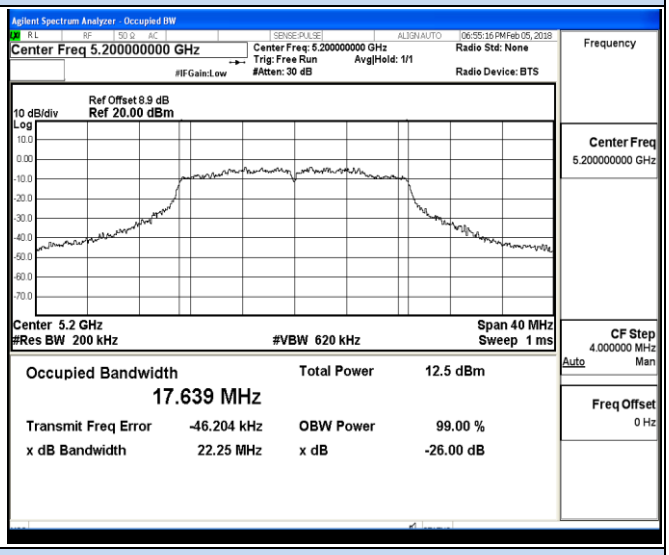
IEEE 802.11n HT20 @ Chain0



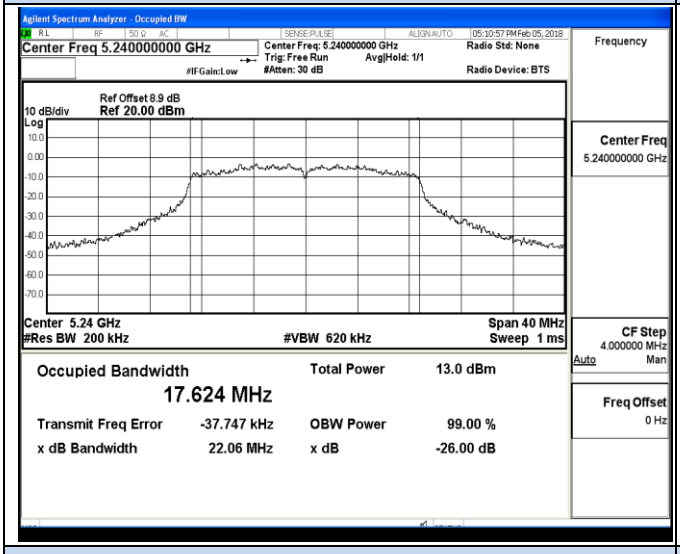
Channel 36 / 5180 MHz



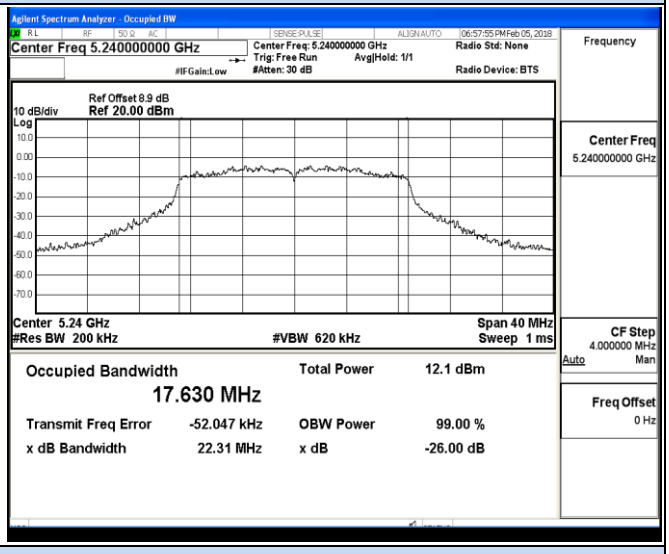
Channel 36 / 5180 MHz



Channel 40/ 5200 MHz



Channel 40 / 5200 MHz

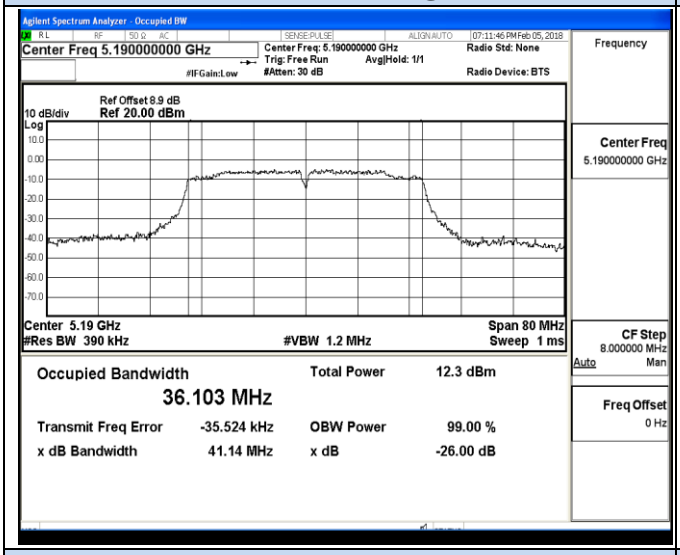


Channel 48 / 5240 MHz

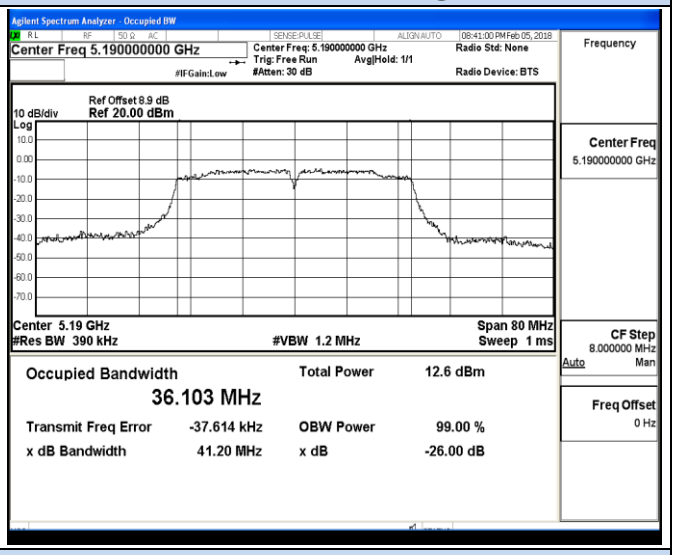
Channel 48 / 5240 MHz

99% and 26dB Occupied Bandwidth

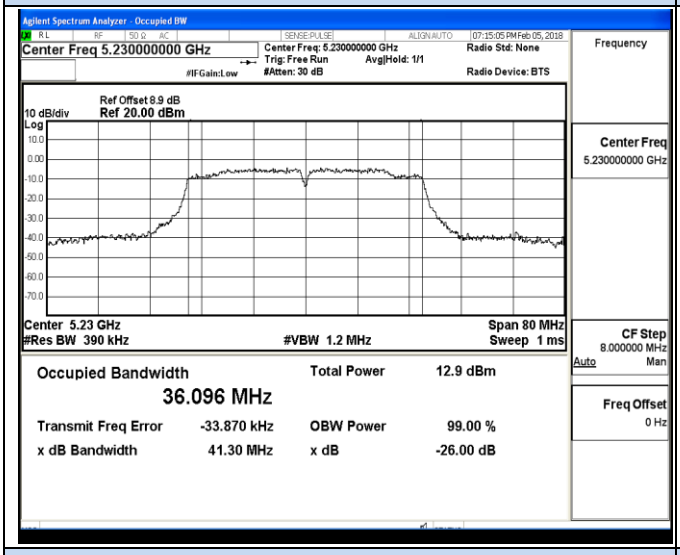
IEEE 802.11n HT40 @ Chain0

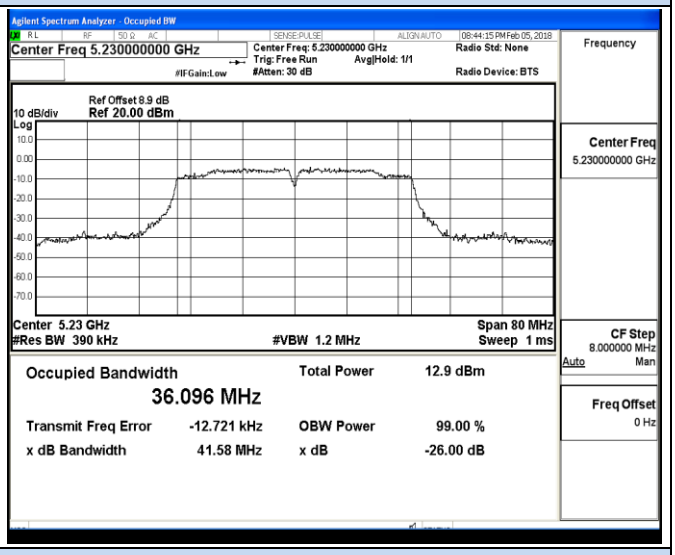


IEEE 802.11ac VHT40 @ Chain0



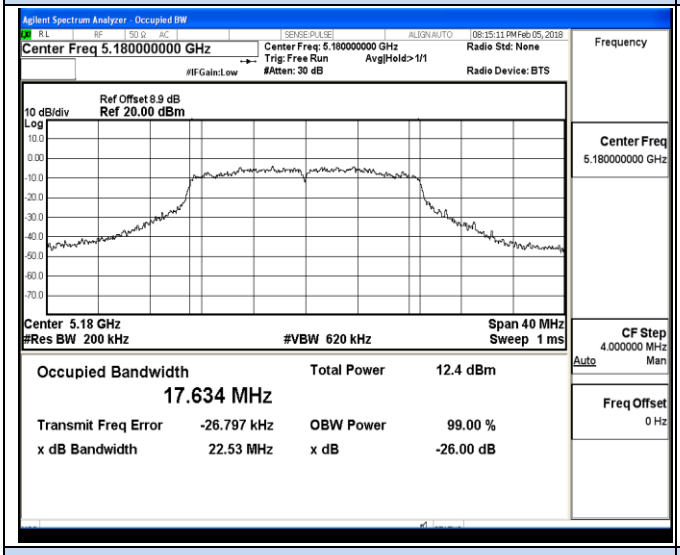
Channel 38 / 5190 MHz | Channel 38 / 5190 MHz



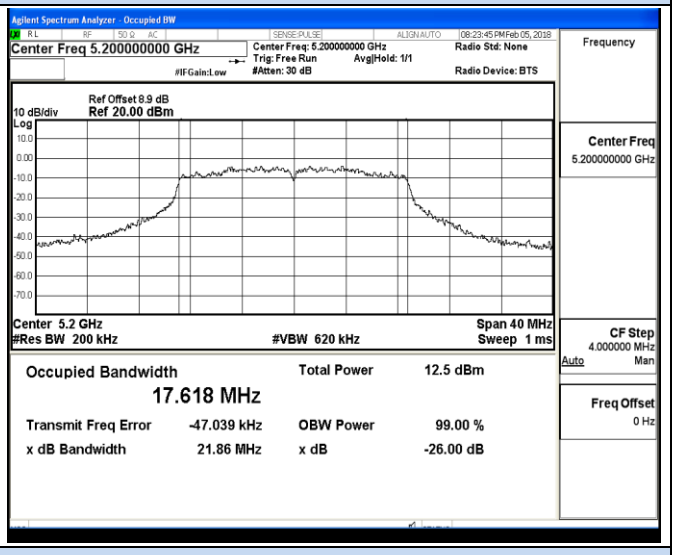


Channel 46 / 5230 MHz | Channel 46 / 5230 MHz

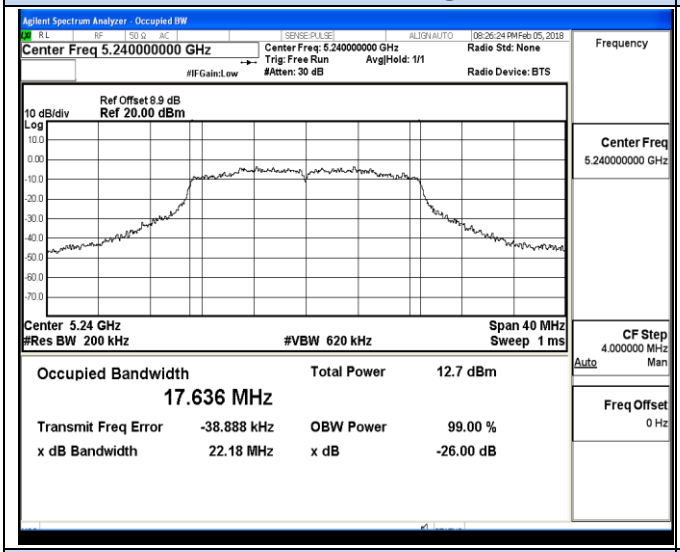
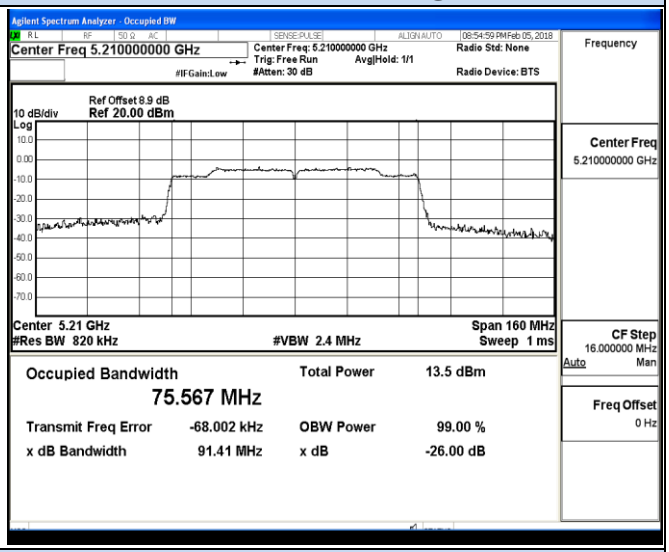
IEEE 802.11ac VHT20 @ Chain0



IEEE 802.11ac VHT20 @ Chain0

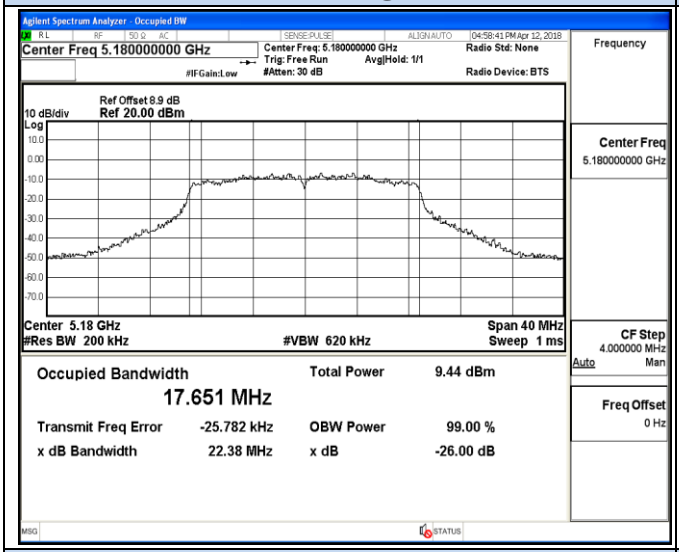


Channel 36 / 5180 MHz | Channel 40 / 5200 MHz

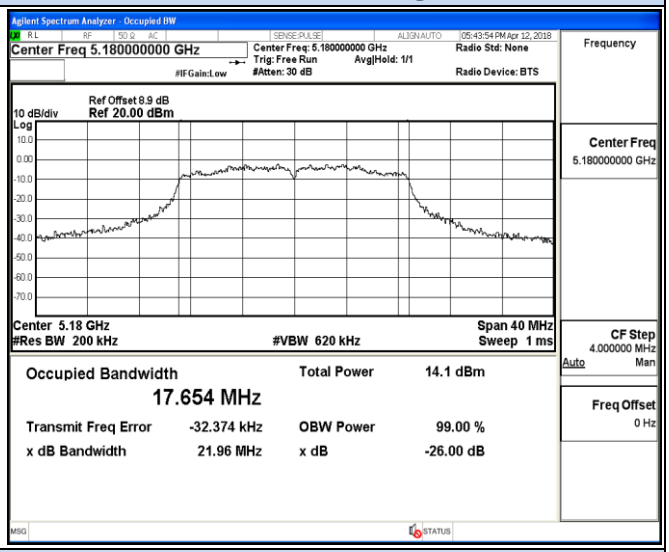
99% and 26dB Occupied Bandwidth	
IEEE 802.11ac VHT20 @ Chain0	IEEE 802.11ac VHT80 @ Chain0
	
Channel 48 / 5240 MHz	Channel 42 / 5210 MHz

99% and 26dB Occupied Bandwidth

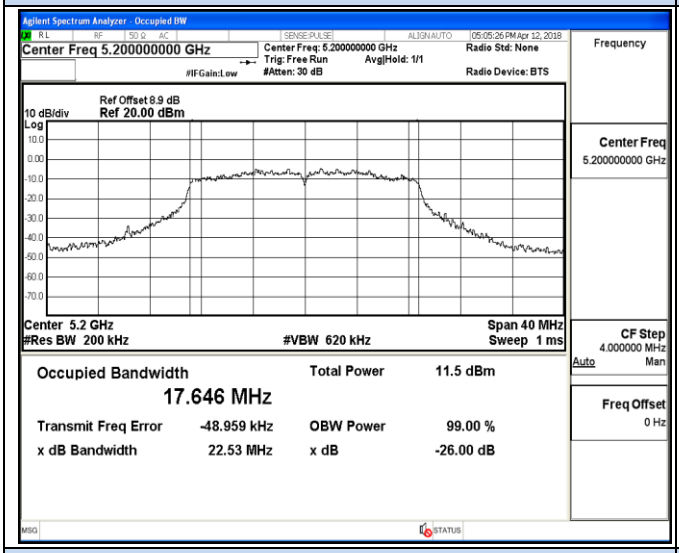
IEEE 802.11a @ Chain1



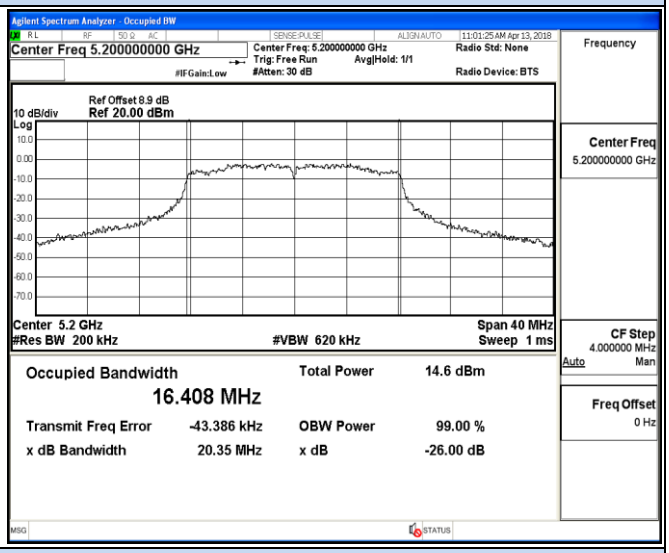
IEEE 802.11n HT20 @ Chain1



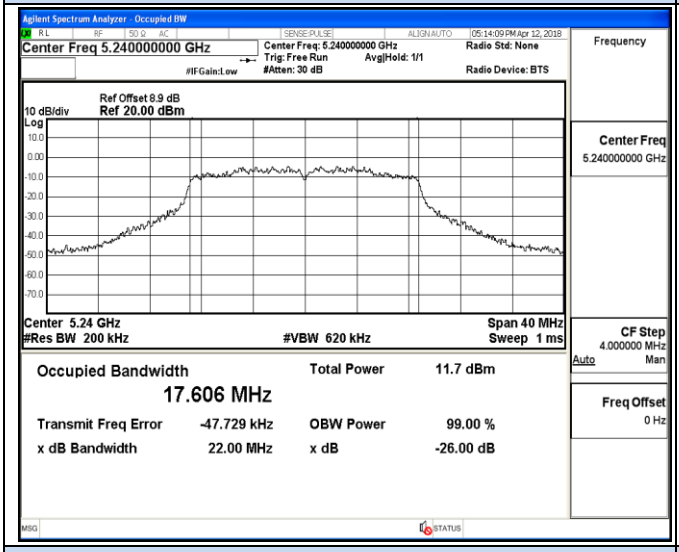
Channel 36 / 5180 MHz



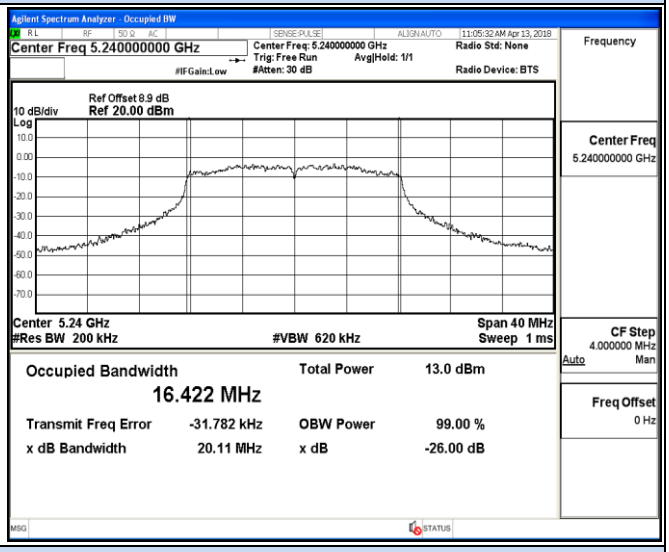
Channel 36 / 5180 MHz



Channel 40/ 5200 MHz



Channel 40 / 5200 MHz

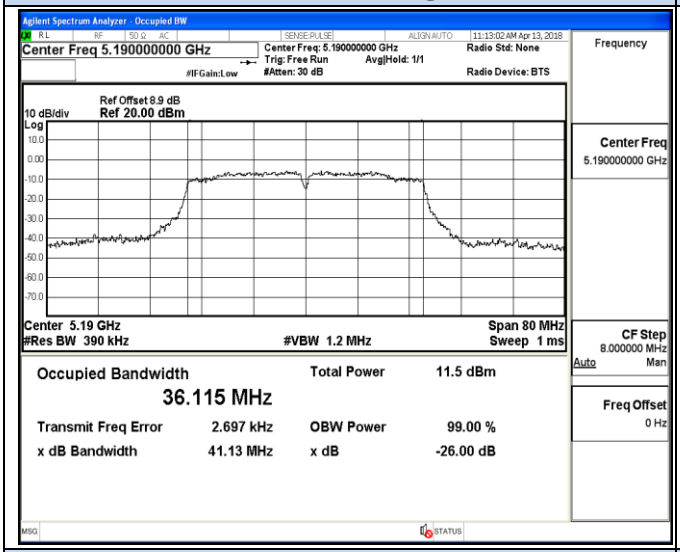


Channel 48 / 5240 MHz

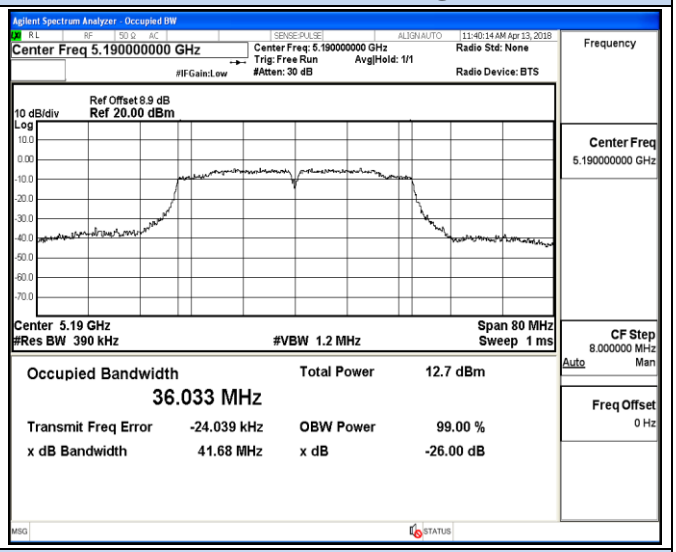
Channel 48 / 5240 MHz

99% and 26dB Occupied Bandwidth

IEEE 802.11n HT40 @ Chain1

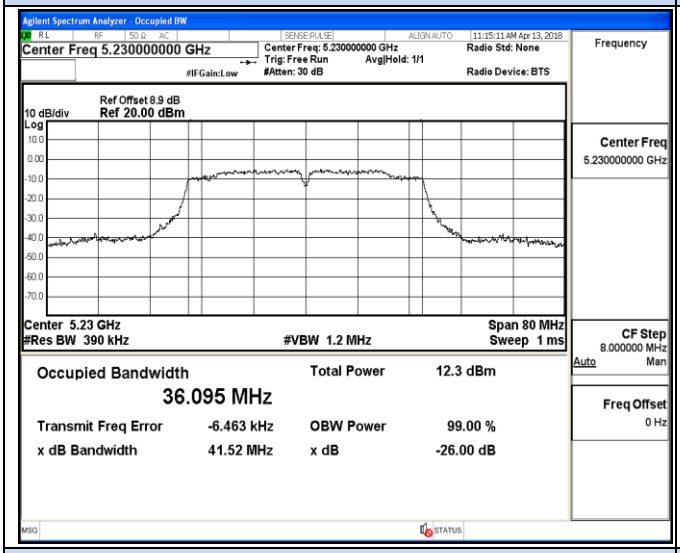


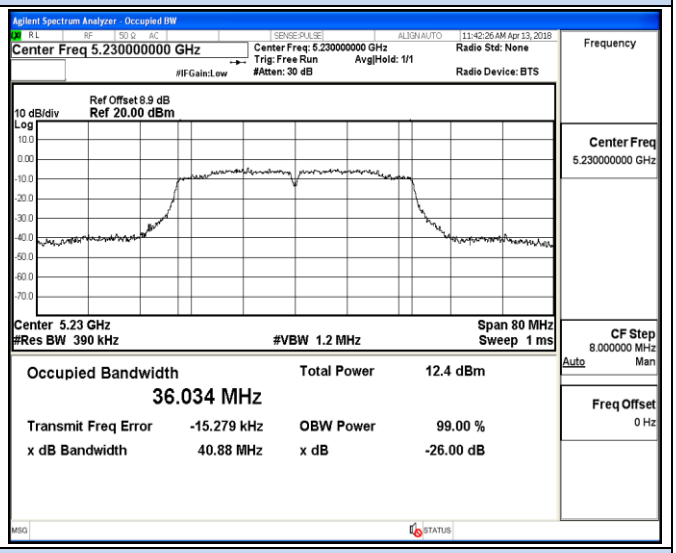
IEEE 802.11ac VHT40 @ Chain1



Channel 38 / 5190 MHz

Channel 38 / 5190 MHz

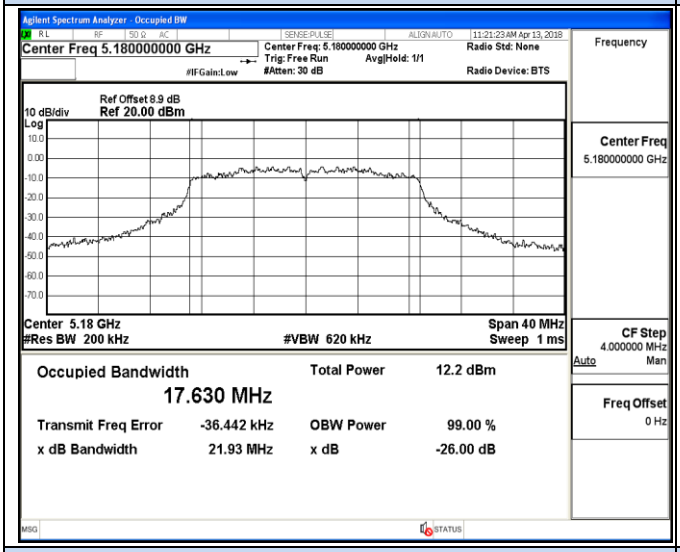




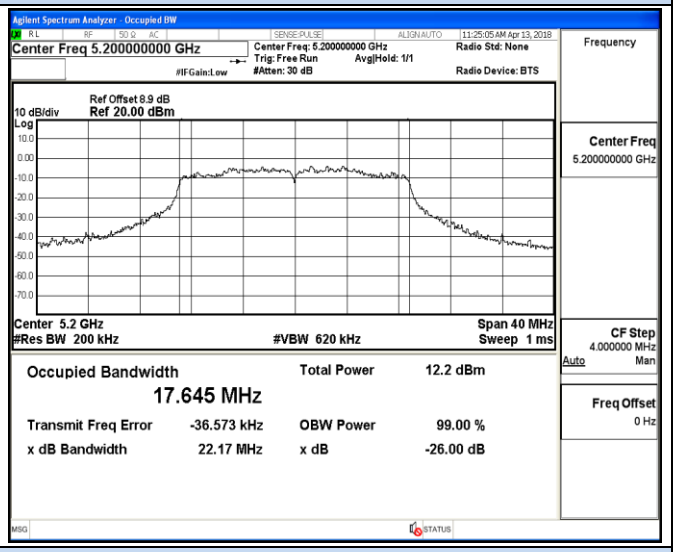
Channel 46 / 5230 MHz

Channel 46 / 5230 MHz

IEEE 802.11ac VHT20 @ Chain1

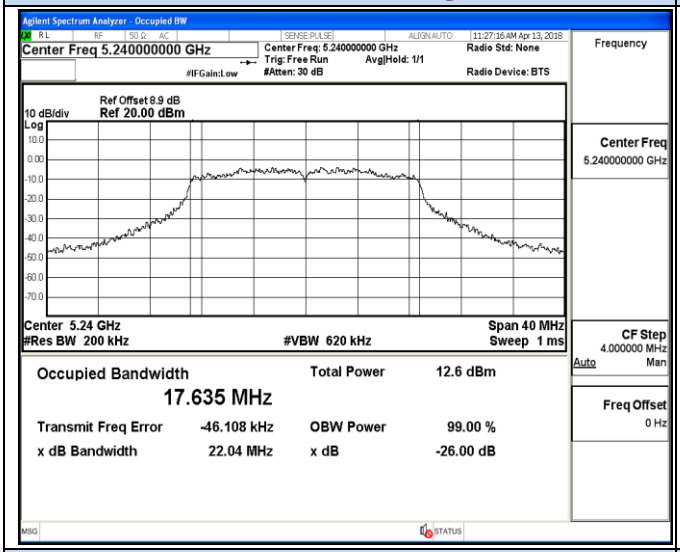
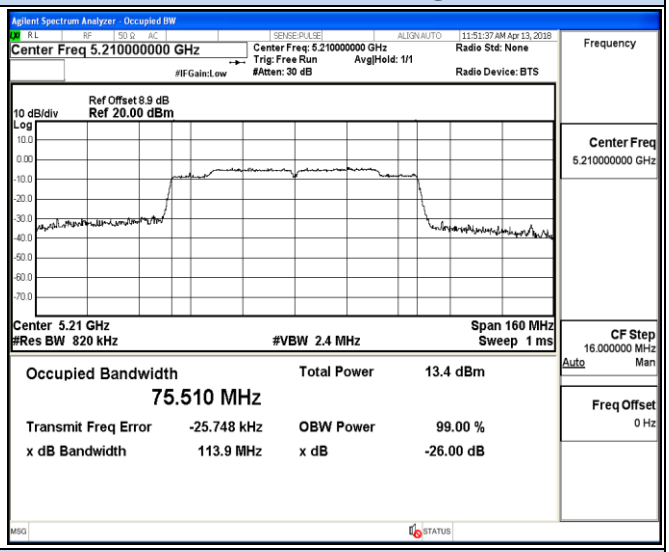


IEEE 802.11ac VHT20 @ Chain1



Channel 36 / 5180 MHz

Channel 40 / 5200 MHz

99% and 26dB Occupied Bandwidth	
IEEE 802.11ac VHT20 @ Chain1	IEEE 802.11ac VHT80 @ Chain1
	
Channel 48 / 5240 MHz	Channel 42 / 5210 MHz

5.5. Radiated Emissions Measurement

5.5.1. Standard Applicable

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

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(\2\)
13.36-13.41			

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
\2\ Above 38.6

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 (68.2dBuV/m at 3m).

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

5.5.2. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

5.5.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarizations of the antenna.

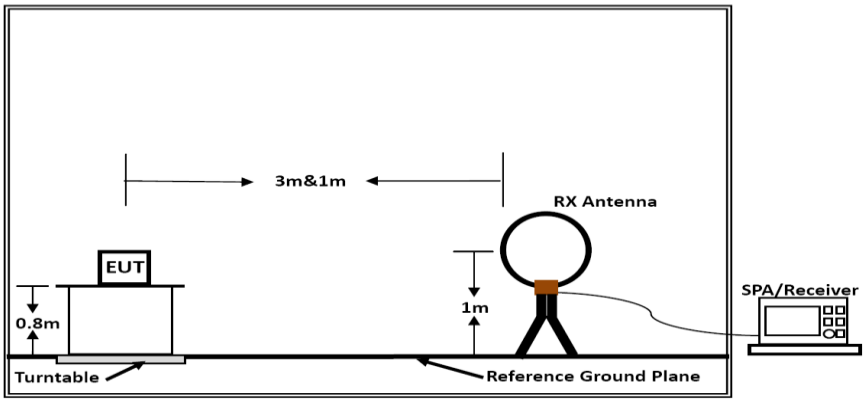
Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

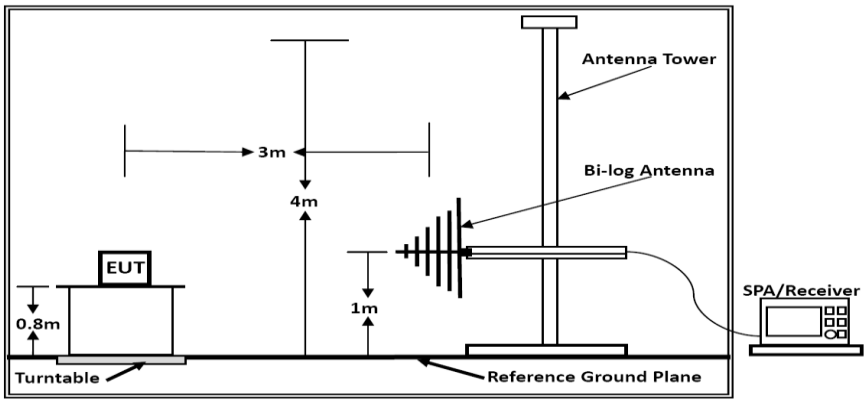
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

5.5.4. Test Setup Layout

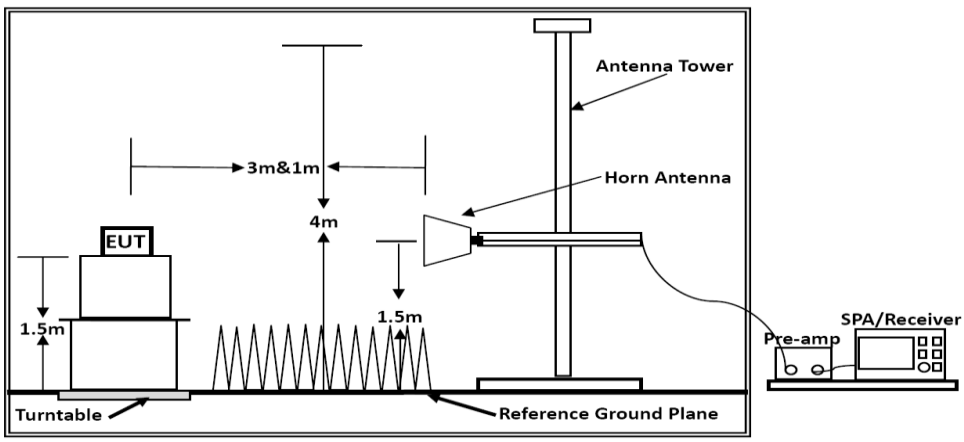
For radiated emissions below 30MHz



Below 30MHz



Below 1GHz



Above 1GHz

Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distanc [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

5.5.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.5.6. Results of Radiated Emissions (9 KHz~30MHz)

Temperature	21.6℃	Humidity	52.6%
Test Engineer	Ryan Hu	Configurations	IEEE 802.11a/n/ac

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dB)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

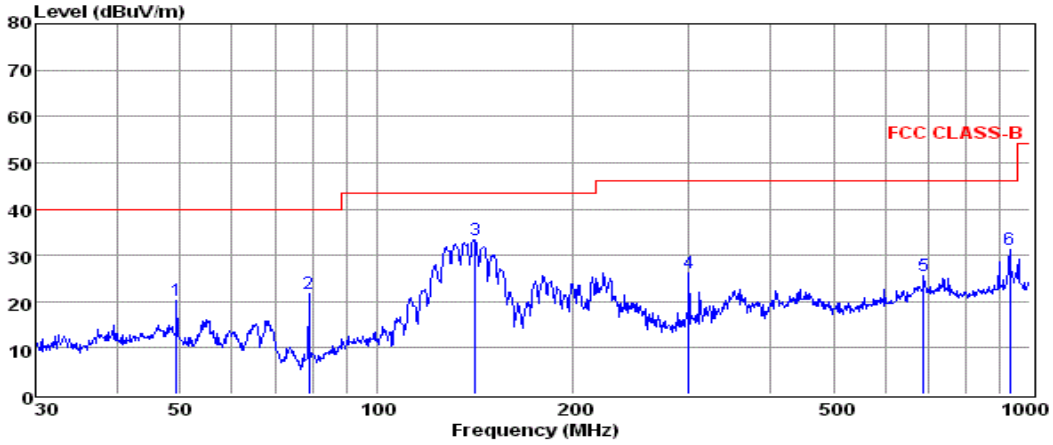
Limit line = specific limits (dBuV) + distance extrapolation factor.

5.5.7. Results of Radiated Emissions (30MHz~1GHz)

Temperature	21.6℃	Humidity	52.6%
Test Engineer	Ryan Hu	Configurations	IEEE 802.11a, High Channel

Test result for IEEE 802.11ac VHT20 mode (High Channel, Combined Antenna Chain0 and Antenna Chain1)

Horizontal:

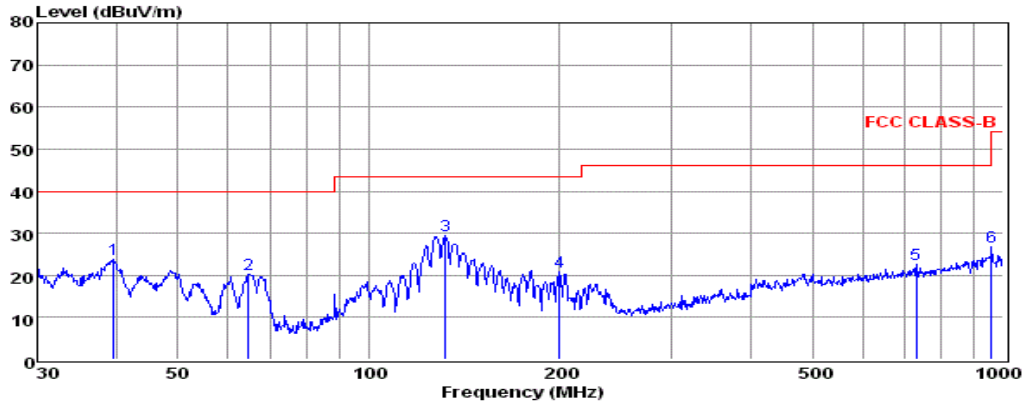


pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	49.36	6.45	0.54	13.29	20.28	40.00	-19.72	QP
2	78.69	12.83	0.47	8.35	21.65	40.00	-18.35	QP
3	141.33	24.35	0.75	8.20	33.30	43.50	-10.20	QP
4	300.37	12.04	1.13	13.06	26.23	46.00	-19.77	QP
5	687.15	4.96	1.73	18.76	25.45	46.00	-20.55	QP
6	932.27	7.91	1.98	21.30	31.19	46.00	-14.81	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Vertical:



pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	39.58	9.86	0.38	13.47	23.71	40.00	-16.29	QP
2	64.66	8.95	0.52	10.84	20.31	40.00	-19.69	QP
3	132.22	19.86	0.76	8.77	29.39	43.50	-14.11	QP
4	199.99	9.55	0.84	10.57	20.96	43.50	-22.54	QP
5	729.36	1.62	1.70	19.18	22.50	46.00	-23.50	QP
6	958.79	3.45	1.90	21.47	26.82	46.00	-19.18	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Note:

Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11ac VHT20 mode (High Channel, Combined Antenna Chain0 and Antenna Chain1)).
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

5.5.8. Results for Radiated Emissions (Above 1GHz)

IEEE 802.11a (Worst Case at Antenna Chain0)

Channel 36 / 5180 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	57.57	33.06	35.04	3.94	59.53	74.00	-14.47	Peak	Horizontal
15.54	42.27	33.06	35.04	3.94	44.23	54.00	-9.77	Average	Horizontal
15.54	58.94	33.06	35.04	3.94	60.90	74.00	-13.10	Peak	Vertical
15.54	40.32	33.06	35.04	3.94	42.28	54.00	-11.72	Average	Vertical

Channel 40 / 5200 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.60	56.83	33.16	35.15	3.96	58.80	74.00	-15.20	Peak	Horizontal
15.60	40.86	33.16	35.15	3.96	42.83	54.00	-11.17	Average	Horizontal
15.60	57.49	33.16	35.15	3.96	59.46	74.00	-14.54	Peak	Vertical
15.60	36.81	33.16	35.15	3.96	38.78	54.00	-15.22	Average	Vertical

Channel 48 / 5240 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	60.68	33.26	35.14	3.98	62.78	74.00	-11.22	Peak	Horizontal
15.72	40.80	33.26	35.14	3.98	42.90	54.00	-11.10	Average	Horizontal
15.72	55.82	33.26	35.14	3.98	57.92	74.00	-16.08	Peak	Vertical
15.72	38.28	33.26	35.14	3.98	40.38	54.00	-13.62	Average	Vertical

IEEE 802.11n HT20 (Combine with Antenna Chain0 and Antenna Chain1)

Channel 36 / 5180 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	61.83	33.06	35.04	3.94	63.79	74.00	-10.21	Peak	Horizontal
15.54	44.46	33.06	35.04	3.94	46.42	54.00	-7.58	Average	Horizontal
15.54	60.03	33.06	35.04	3.94	61.99	74.00	-12.01	Peak	Vertical
15.54	42.90	33.06	35.04	3.94	44.86	54.00	-9.14	Average	Vertical

Channel 40 / 5200 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.60	60.79	33.16	35.15	3.96	62.76	74.00	-11.24	Peak	Horizontal
15.60	44.50	33.16	35.15	3.96	46.47	54.00	-7.53	Average	Horizontal
15.60	58.32	33.16	35.15	3.96	60.29	74.00	-13.71	Peak	Vertical
15.60	36.78	33.16	35.15	3.96	38.75	54.00	-15.25	Average	Vertical

Channel 48 / 5240 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	60.56	33.26	35.14	3.98	62.66	74.00	-11.34	Peak	Horizontal
15.72	42.75	33.26	35.14	3.98	44.85	54.00	-9.15	Average	Horizontal
15.72	58.87	33.26	35.14	3.98	60.97	74.00	-13.03	Peak	Vertical
15.72	39.01	33.26	35.14	3.98	41.11	54.00	-12.89	Average	Vertical

IEEE 802.11ac VHT20 (Combine with Antenna Chain0 and Antenna Chain1)

Channel 36 / 5180 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	61.35	33.06	35.04	3.94	63.31	74.00	-10.69	Peak	Horizontal
15.54	43.84	33.06	35.04	3.94	45.80	54.00	-8.20	Average	Horizontal
15.54	60.28	33.06	35.04	3.94	62.24	74.00	-11.76	Peak	Vertical
15.54	40.66	33.06	35.04	3.94	42.62	54.00	-11.38	Average	Vertical

Channel 40 / 5200 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.60	61.00	33.16	35.15	3.96	62.97	74.00	-11.03	Peak	Horizontal
15.60	41.50	33.16	35.15	3.96	43.47	54.00	-10.53	Average	Horizontal
15.60	57.48	33.16	35.15	3.96	59.45	74.00	-14.55	Peak	Vertical
15.60	37.61	33.16	35.15	3.96	39.58	54.00	-14.42	Average	Vertical

Channel 48 / 5240 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	62.76	33.26	35.14	3.98	64.86	74.00	-9.14	Peak	Horizontal
15.72	41.05	33.26	35.14	3.98	43.15	54.00	-10.85	Average	Horizontal
15.72	57.31	33.26	35.14	3.98	59.41	74.00	-14.59	Peak	Vertical
15.72	38.82	33.26	35.14	3.98	40.92	54.00	-13.08	Average	Vertical

IEEE 802.11n HT40 (Combine with Antenna Chain0 and Antenna Chain1)

Channel 38 / 5190 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.57	59.29	33.06	35.04	3.94	61.25	74.00	-12.75	Peak	Horizontal
15.57	43.49	33.06	35.04	3.94	45.45	54.00	-8.55	Average	Horizontal
15.57	59.66	33.06	35.04	3.94	61.62	74.00	-12.38	Peak	Vertical
15.57	41.65	33.06	35.04	3.94	43.61	54.00	-10.39	Average	Vertical

Channel 46 / 5230 MHz

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.69	59.32	33.16	35.15	3.96	61.29	74.00	-12.71	Peak	Horizontal
15.69	42.34	33.16	35.15	3.96	44.31	54.00	-9.69	Average	Horizontal
15.69	58.56	33.16	35.15	3.96	60.53	74.00	-13.47	Peak	Vertical
15.69	37.12	33.16	35.15	3.96	39.09	54.00	-14.91	Average	Vertical