FCC RF Test Report

APPLICANT	:	Ubiquiti Networks, Inc.
EQUIPMENT	:	UniFi Access Point
BRAND NAME	:	UBIQUITI
MODEL NAME	:	UAP-AC-M-PRO
FCC ID	:	SWX-UAPACPROO
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Feb. 25, 2016 and testing was completed on Jun. 17, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR622510-05C	Rev. 01	Initial issue of report	Aug. 02, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) ≤ -17, -27 dBm/MHz &15.209(a)	Pass	Under limit 0.42 dB at 11490.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 2.00 dB at 0.534 MHz
3.6	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Ubiquiti Networks, Inc.
12F, No. 105, Song Ren Rd., SinYi District, Taipei 110, Taiwan

1.2 Manufacturer

Ubiquiti Networks, Inc.
12F, No. 105, Song Ren Rd., SinYi District, Taipei 110, Taiwan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	UniFi Access Point
Brand Name	UBIQUITI
Model Name	UAP-AC-M-PRO
FCC ID	SWX-UAPACPROO
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>5745 MHz ~ 5825 MHz</td></tr>
<tr><td>Maximum Output Power</td><td>MIMO <Ant. Port 1 + 2+3>
802.11a : 27.82 dBm / 0.6053 W
802.11n HT20 : 27.92 dBm / 0.6194 W
802.11n HT40 : 27.76 dBm / 0.5970 W
802.11ac VHT20: 27.94 dBm / 0.6223 W
802.11ac VHT40: 27.71 dBm / 0.5902 W
802.11ac VHT80: 27.43 dBm / 0.5534 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 33.95 MHz
802.11n HT20 : 34.50 MHz
802.11n HT40 : 67.00 MHz
802.11ac VHT20 : 34.55 MHz
802.11ac VHT40 : 66.10 MHz
802.11ac VHT80 : 96.00 MHz</td></tr>
<tr><td>Antenna Type</td><td>Ant. 1 : PCB Antenna
Ant. 2 : PCB Antenna
Ant. 3 : PCB Antenna</td></tr>
<tr><td>Antenna Gain</td><td>Ant. 1 : 8.00 dBi
Ant. 2 : 8.00 dBi
Ant. 3 : 8.00 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Chain
Port 1</td><td>Chain
Port 2</td><td>Chain
Port 3</td></tr>
<tr><td>802.11 a/n/ac
MIMO</td><td>V</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 58 , Aly. 75, Ln. 564, Wenhua 3rd Rd., Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH11-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151	**5755**	**159**	**5795**
	153	5765	161	5805
	155	5775	165	5825

Note: The above Frequency and Channel in boldface were 802.11n HT40.

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables.

<MIMO Ant. Port 1+2+3>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	27.82	27.53	27.62	27.66	27.59	27.66	27.68	27.75

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	27.92	27.91	27.91	27.85	27.88	27.89	27.90	27.91

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	27.76	27.73	27.69	27.46	27.42	27.57	27.51	27.57

5GHz 802.11ac VHT20 mode									
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Average Power (dBm)	27.94	27.91	27.90	27.87	27.93	27.93	27.84	27.92	27.91

5GHz 802.11ac VHT40 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	27.71	27.64	27.63	27.56	27.58	27.48	27.55	27.54	27.46	27.61

5GHz 802.11ac VHT80 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	27.43	27.30	27.27	27.19	27.22	27.42	27.41	27.42	27.41	27.42

Note: MIMO Ant. 1+2+3 is a calculated result from sum of the power MIMO Ant. 1, MIMO Ant. 2, and MIMO Ant. 3.

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

MIMO Antenna

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

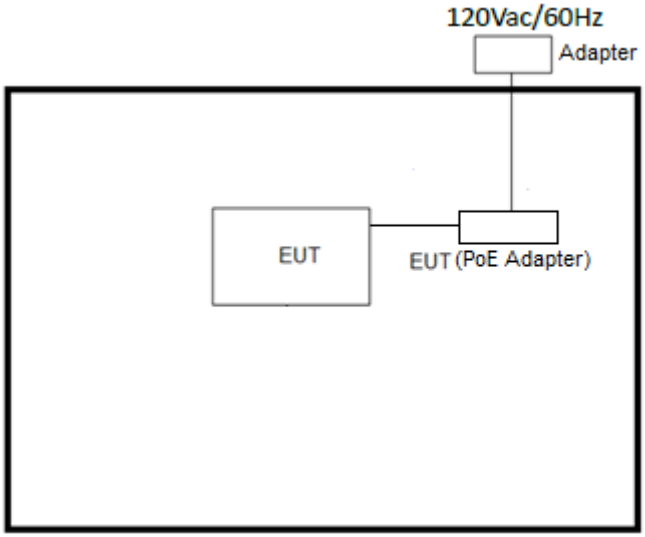
Test Cases	
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + PoE Adapter + LAN Link

Ch. #		Band IV：5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

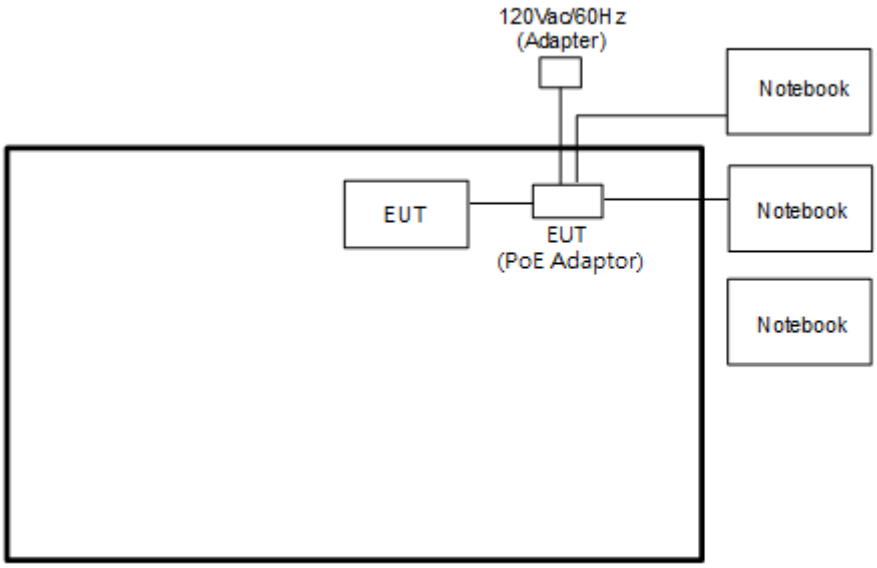
Ch. #		Band IV：5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	Notebook

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “Cart.exe” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals..

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

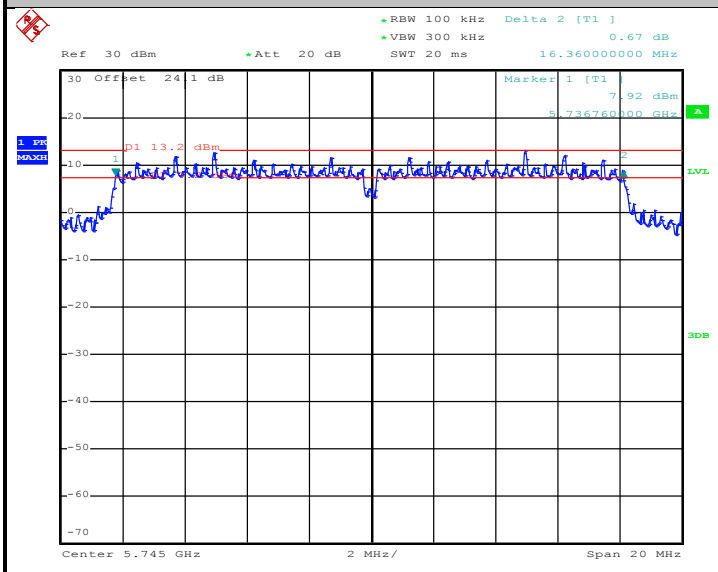
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup

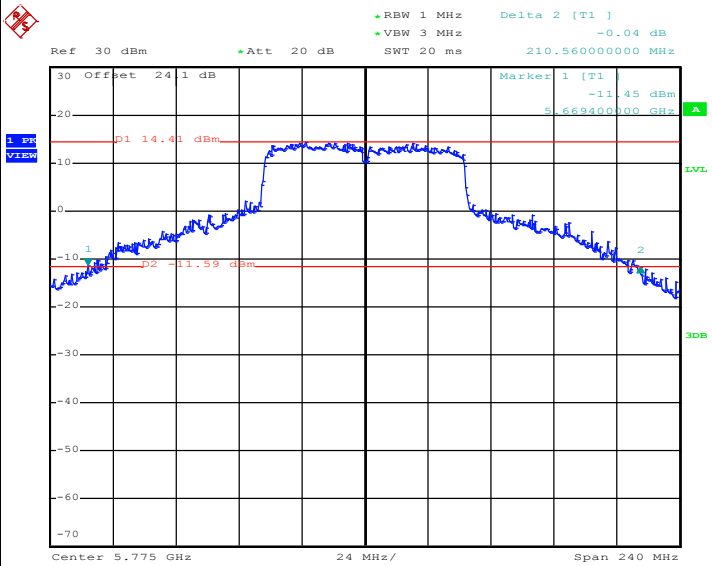
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

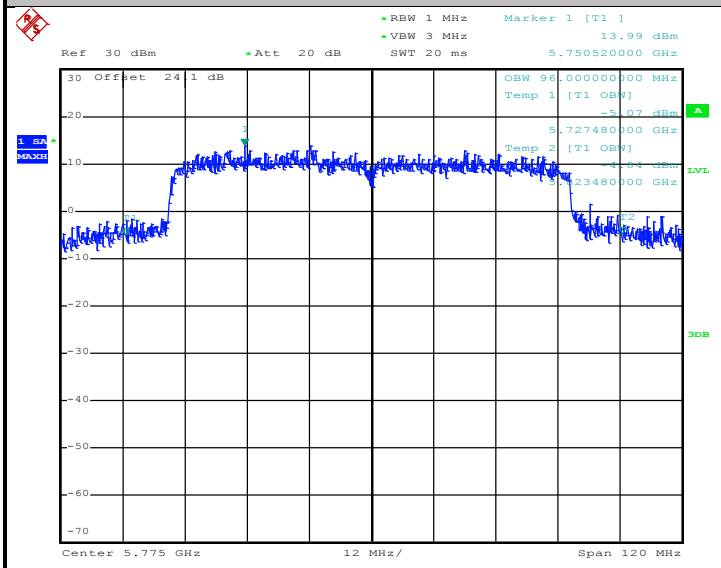
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

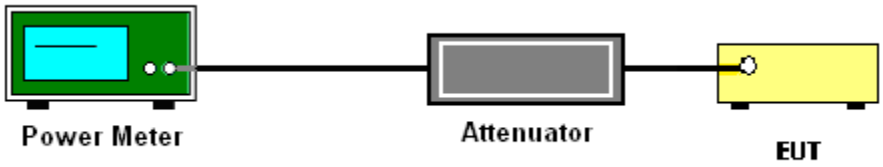
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section F) Maximum power spectral density.

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

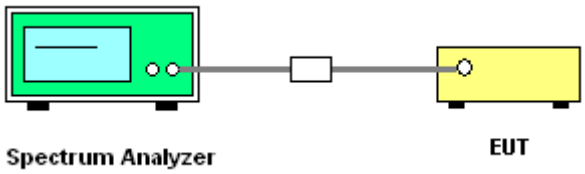
1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 300 kHz.
   - Set VBW ≥ 1 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep time = auto.
   - Detector = RMS
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(500kHz/RBW) to the test result.
   - Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

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

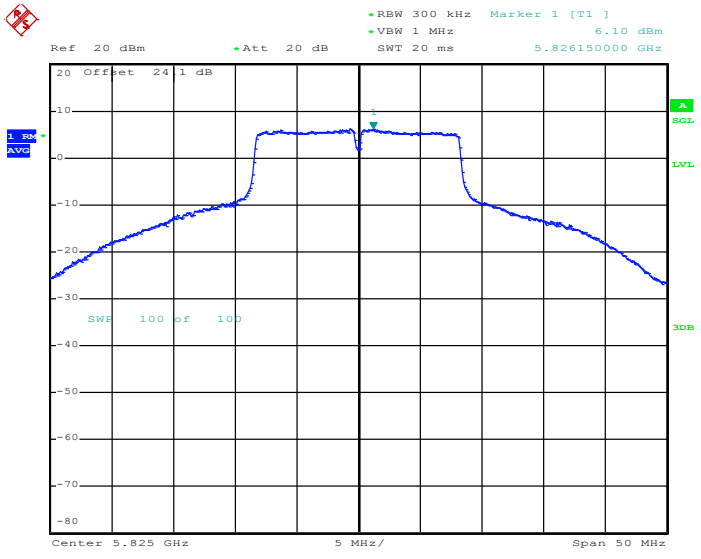
3.3.4 Test Setup



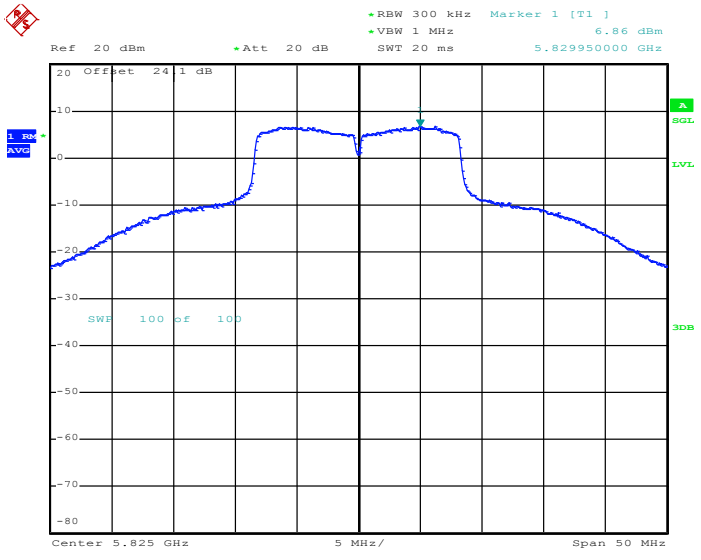
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

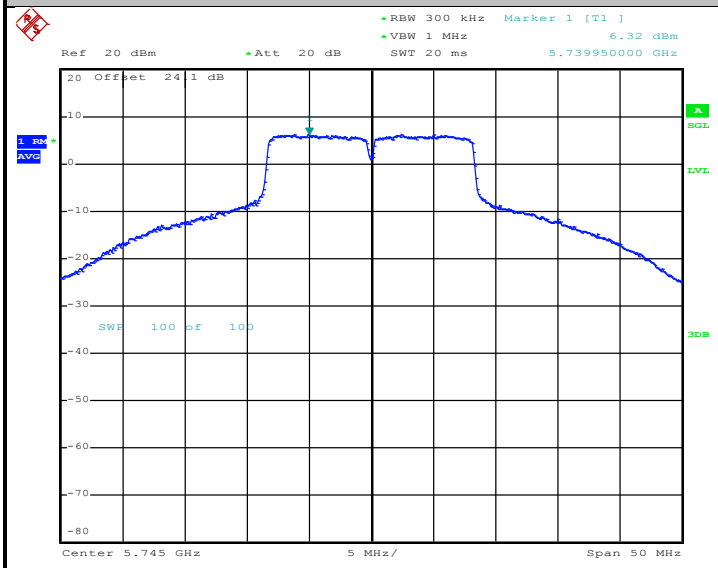
Worst Case Power Density (dBm/300kHz) MIMO Ant. 1



Worst Case Power Density (dBm/300kHz) MIMO Ant. 2



Worst Case Power Density (dBm/300kHz) MIMO Ant. 3



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3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:
15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB 789033 D02 General UNII Test Procedures New Rules v01r02 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

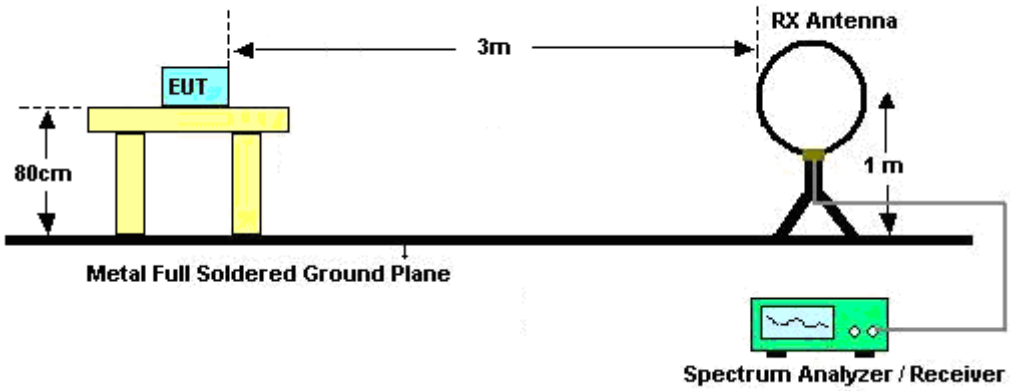
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

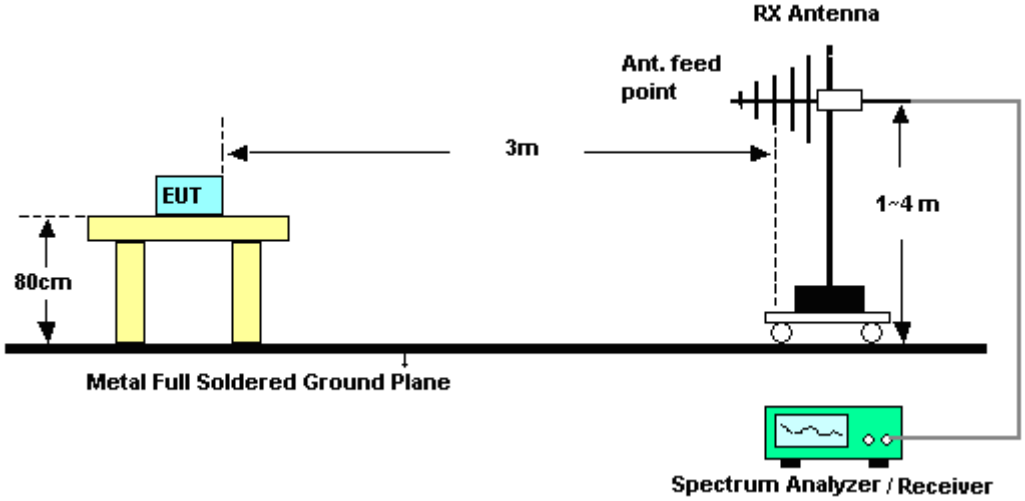
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

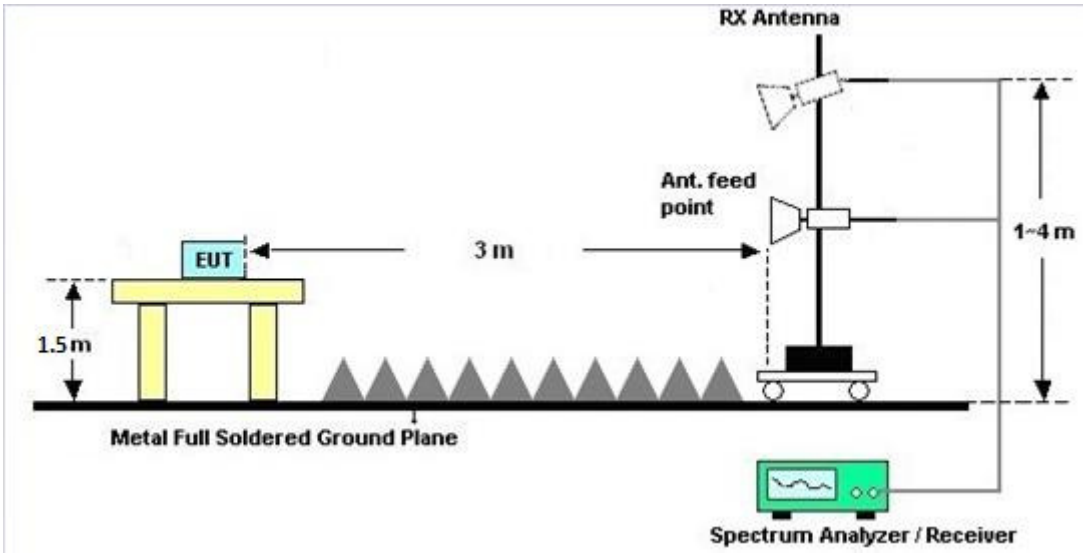
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B and C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

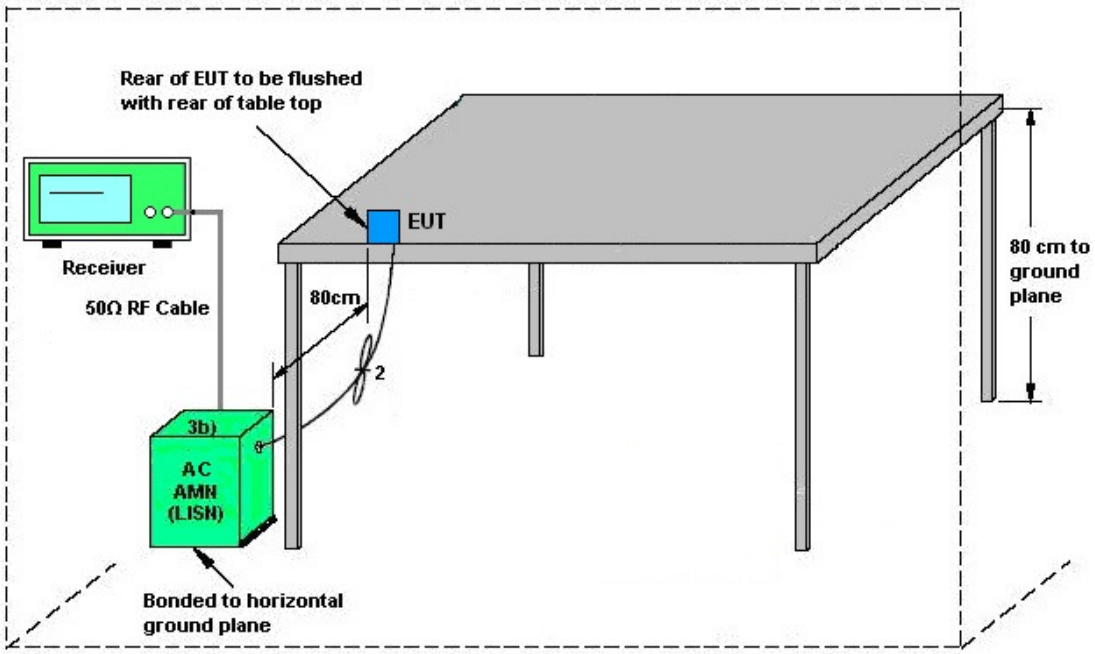
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

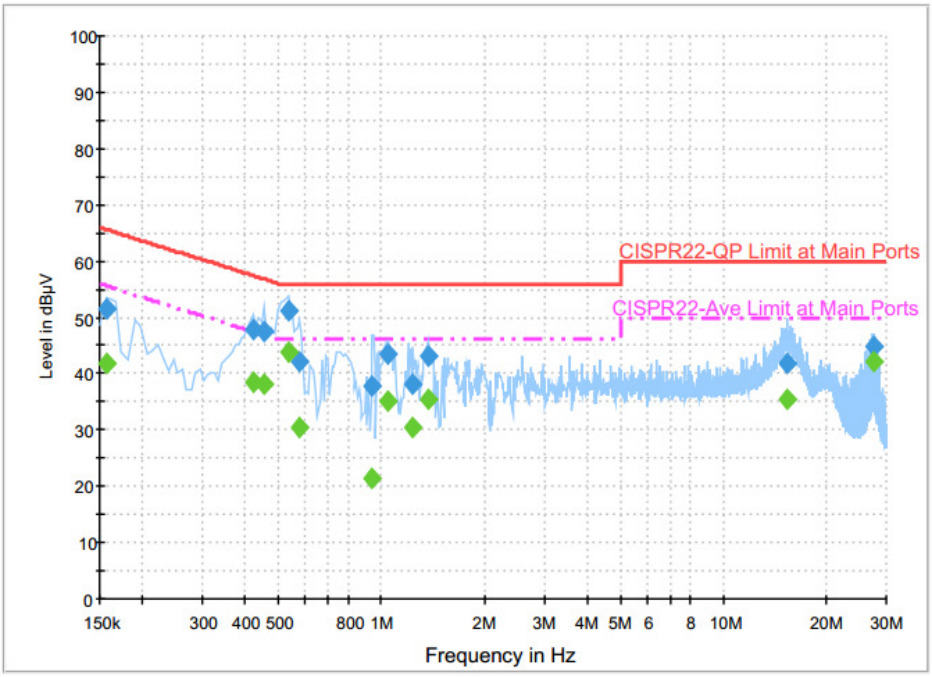
3.5.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.5.5 Test Result of AC Conducted Emission

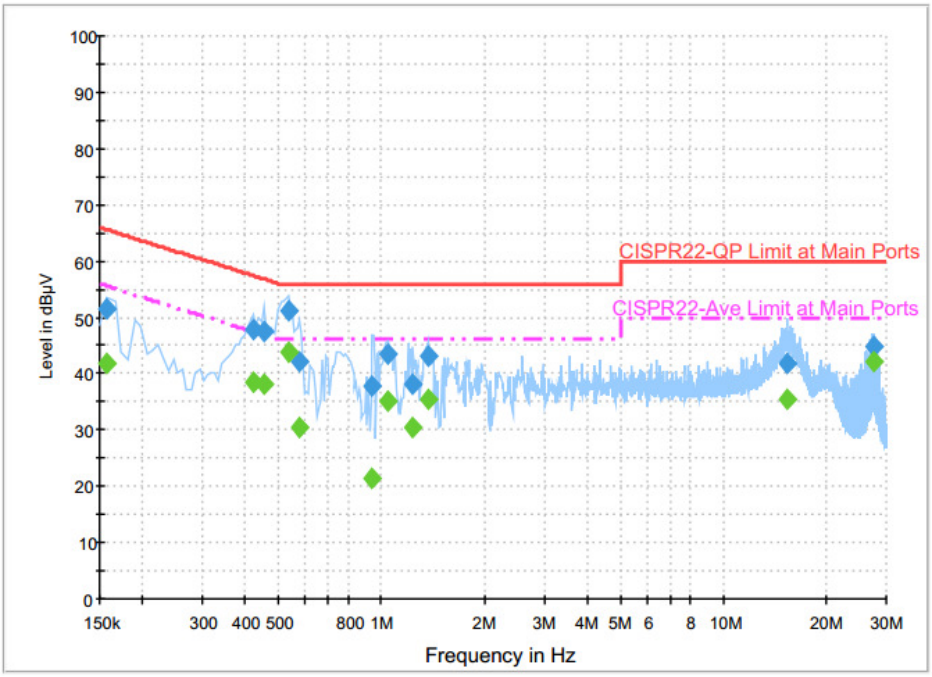
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + PoE Adapter + LAN Link		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	51.5	Off	L1	19.6	14.1	65.6
0.422000	47.9	Off	L1	19.6	9.5	57.4
0.454000	47.5	Off	L1	19.6	9.3	56.8
0.534000	51.3	Off	L1	19.6	4.7	56.0
0.574000	42.0	Off	L1	19.6	14.0	56.0
0.942000	37.8	Off	L1	19.7	18.2	56.0
1.046000	43.4	Off	L1	19.7	12.6	56.0
1.238000	38.3	Off	L1	19.7	17.7	56.0
1.366000	43.0	Off	L1	19.7	13.0	56.0
15.366000	41.8	Off	L1	20.4	18.2	60.0
27.518000	44.9	Off	L1	21.0	15.1	60.0

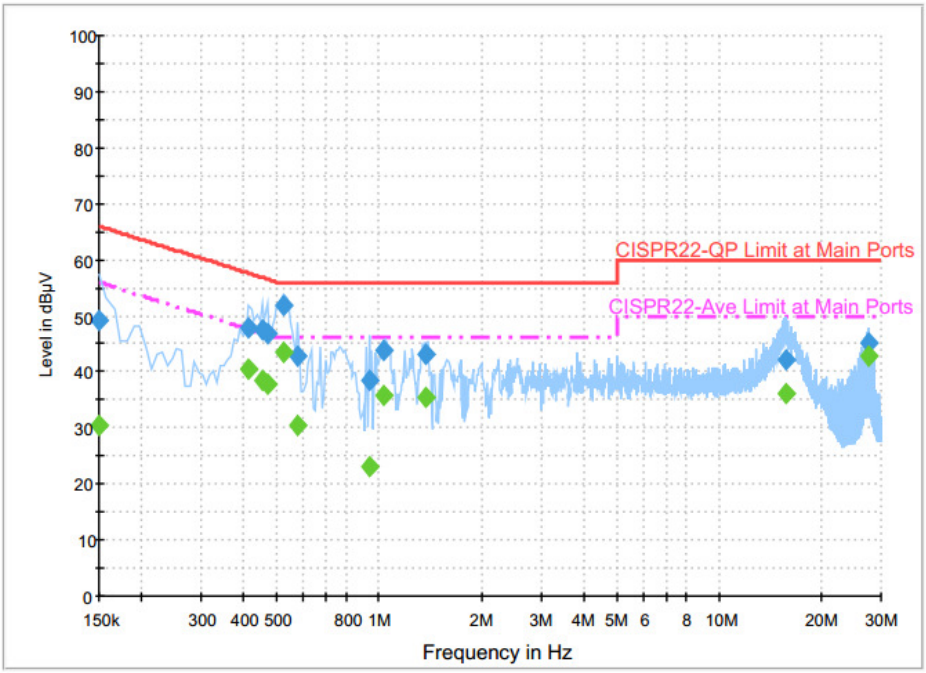
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + PoE Adapter + LAN Link		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	41.8	Off	L1	19.6	13.8	55.6
0.422000	38.4	Off	L1	19.6	9.0	47.4
0.454000	38.0	Off	L1	19.6	8.8	46.8
0.534000	44.0	Off	L1	19.6	2.0	46.0
0.574000	30.4	Off	L1	19.6	15.6	46.0
0.942000	21.5	Off	L1	19.7	24.5	46.0
1.046000	35.2	Off	L1	19.7	10.8	46.0
1.238000	30.5	Off	L1	19.7	15.5	46.0
1.366000	35.5	Off	L1	19.7	10.5	46.0
15.366000	35.4	Off	L1	20.4	14.6	50.0
27.518000	42.1	Off	L1	21.0	7.9	50.0

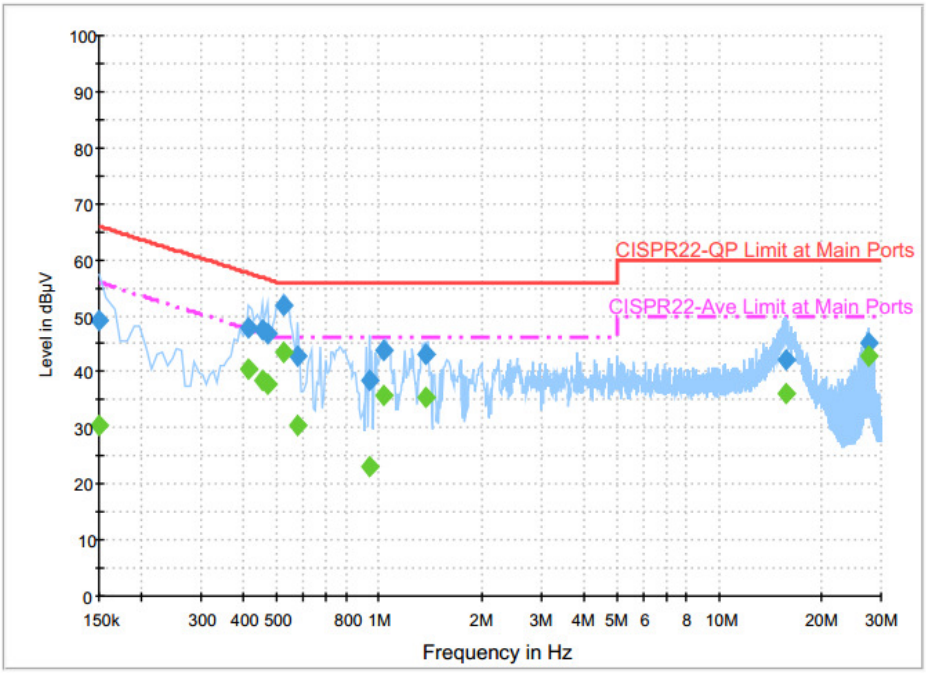
Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + PoE Adapter + LAN Link		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	49.3	Off	N	19.6	16.7	66.0
0.414000	48.0	Off	N	19.6	9.6	57.6
0.454000	47.6	Off	N	19.6	9.2	56.8
0.470000	46.7	Off	N	19.6	9.8	56.5
0.526000	51.9	Off	N	19.6	4.1	56.0
0.574000	42.7	Off	N	19.6	13.3	56.0
0.934000	38.6	Off	N	19.6	17.4	56.0
1.038000	43.8	Off	N	19.6	12.2	56.0
1.366000	43.1	Off	N	19.6	12.9	56.0
15.798000	42.3	Off	N	20.5	17.7	60.0
27.518000	45.0	Off	N	21.2	15.0	60.0

Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + PoE Adapter + LAN Link		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	30.5	Off	N	19.6	25.5	56.0
0.414000	40.5	Off	N	19.6	7.1	47.6
0.454000	38.4	Off	N	19.6	8.4	46.8
0.470000	37.8	Off	N	19.6	8.7	46.5
0.526000	43.5	Off	N	19.6	2.5	46.0
0.574000	30.6	Off	N	19.6	15.4	46.0
0.934000	22.9	Off	N	19.6	23.1	46.0
1.038000	35.7	Off	N	19.6	10.3	46.0
1.366000	35.6	Off	N	19.6	10.4	46.0
15.798000	36.1	Off	N	20.5	13.9	50.0
27.518000	42.8	Off	N	21.2	7.2	50.0

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

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.

3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

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. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup

3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

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.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

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.

3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 Antenna Anti-Replacement Construction

Non-standard antenna connector is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Ant 1 (dBi)	Ant 2 (dBi)	Ant 3 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band IV	8.00	8.00	8.00	8.00	12.77	2.00	6.77

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1132003	300MHz~40GHz	Aug. 12, 2015	Apr. 02, 2016 ~ Jun. 17, 2016	Aug. 11, 2016	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 12, 2015	Apr. 02, 2016 ~ Jun. 17, 2016	Aug. 11, 2016	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 23, 2015	Apr. 02, 2016 ~ Jun. 17, 2016	Nov. 22, 2016	Conducted (TH05-HY)
AC Power Source y	AC POWER	AFC-500W	F104070011	50Hz~60Hz	Dec. 02, 2015	Apr. 02, 2016 ~ Jun. 17, 2016	Dec. 01, 2016	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Sep. 01, 2016	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Nov. 19, 2016	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz~1GHz	Nov. 17, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Nov. 16, 2016	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 08, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Oct. 07, 2016	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 19, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Nov. 18, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1902247	1GHz~18GHz	Jul. 01, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Jun. 30, 2016	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHZ	Sep. 24, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Sep. 23, 2016	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 11, 2016 ~ Jun. 12, 2016	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jun. 11, 2016 ~ Jun. 12, 2016	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jun. 11, 2016 ~ Jun. 12, 2016	N/A	Radiation (03CH11-HY)
Preamplifier	MITEQ	TTA0204	1872107	2GHz~40GHz	Feb. 15, 2016	Jun. 11, 2016 ~ Jun. 12, 2016	Feb. 14, 2017	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Jun. 11, 2016 ~ Jun. 12, 2016	Nov. 01, 2016	Radiation (03CH11-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 31, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	May 31, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	May 31, 2016	Dec. 01, 2016	Conduction (CO05-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.90**

Appendix A. Conducted Test Results

Report Number : FR622510-05C

Test Engineer:	Derek Hsu	Temperature:	21~25	°C
Test Date:	2016/04/02 ~ 2016/6/17	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

Band IV																	
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)			26dB Bandwidth (MHz)			6 dB Bandwidth (MHz)			6 dB Bandwidth Min. Limit (MHz)			Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
11a	6Mbps	3	149	5745	32.95	32.10	32.55	50.93	50.72	54	16.36	16.32	16.36	0.5			Pass
11a	6Mbps	3	157	5785	33.60	31.75	33.95	51.84	52.08	53.92	16.36	16.40	16.4	0.5			Pass
11a	6Mbps	3	165	5825	30.65	33.10	32.35	48.24	53.12	54.8	16.40	16.32	16.4	0.5			Pass
HT20	MCS0	3	149	5745	33.35	32.60	34	53.28	58.56	57.92	17.60	17.60	17.56	0.5			Pass
HT20	MCS0	3	157	5785	33.20	32.50	34.5	50.88	54.08	54.72	17.60	17.60	17.6	0.5			Pass
HT20	MCS0	3	165	5825	31.25	33.75	34.05	53.12	54.56	54.24	17.60	17.60	17.6	0.5			Pass
HT40	MCS0	3	151	5755	62.00	64.50	65	98.86	#####	104.5	36.40	35.76	36.32	0.5			Pass
HT40	MCS0	3	159	5795	64.00	67.00	66.9	#####	#####	101.8	36.40	36.32	36.4	0.5			Pass
VHT20	MCS0	3	149	5745	32.95	33.50	33.75	54.51	55.57	58.26	17.56	17.54	17.54	0.5			Pass
VHT20	MCS0	3	157	5785	33.70	33.70	33.3	52.80	54.57	55.2	17.60	17.56	17.56	0.5			Pass
VHT20	MCS0	3	165	5825	31.75	33.50	34.55	50.32	55.60	53.6	17.60	17.58	17.54	0.5			Pass
VHT40	MCS0	3	151	5755	62.80	64.50	64.1	99.63	#####	101.4	36.00	36.00	36.04	0.5			Pass
VHT40	MCS0	3	159	5795	64.30	64.10	66.1	99.84	#####	103.1	36.24	36.24	36.28	0.5			Pass
VHT80	MCS0	3	155	5775	92.52	94.56	96	#####	#####	208.5	74.96	67.60	62.56	0.5			Pass

TEST RESULTS DATA
Average Power Table

Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)				FCC Conducted Power Limit (dBm)			DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
11a	6Mbps	3	149	5745	22.94	22.73	22.63	27.54	28.00			8.00			Pass
11a	6Mbps	3	157	5785	22.69	22.89	22.46	27.45	28.00			8.00			Pass
11a	6Mbps	3	165	5825	23.14	22.97	23.05	27.82	28.00			8.00			Pass
HT20	MCS0	3	149	5745	23.24	23.12	23.08	27.92	28.00			8.00			Pass
HT20	MCS0	3	157	5785	22.63	22.84	22.58	27.46	28.00			8.00			Pass
HT20	MCS0	3	165	5825	23.14	23.07	22.99	27.84	28.00			8.00			Pass
HT40	MCS0	3	151	5755	22.98	22.85	23.12	27.76	28.00			8.00			Pass
HT40	MCS0	3	159	5795	22.72	22.99	22.67	27.57	28.00			8.00			Pass
VHT20	MCS0	3	149	5745	23.28	23.01	23.18	27.93	28.00			8.00			Pass
VHT20	MCS0	3	157	5785	22.65	22.87	22.51	27.45	28.00			8.00			Pass
VHT20	MCS0	3	165	5825	23.16	23.14	23.21	27.94	28.00			8.00			Pass
VHT40	MCS0	3	151	5755	22.96	22.89	22.96	27.71	28.00			8.00			Pass
VHT40	MCS0	3	159	5795	22.61	22.94	22.61	27.49	28.00			8.00			Pass
VHT80	MCS0	3	155	5775	22.64	22.78	22.54	27.43	28.00			8.00			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band IV															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density with RBW and duty factor (dBm/500kHz)				Average PSD Limit (dBm/500kHz)			DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 3	SUM	Ant 1	Ant 2	Ant 3	Ant 1	Ant 2	Ant 3	
11a	6Mbps	3	149	5745	8.76	6.61	6.47	13.60	23.23			12.77			Pass
11a	6Mbps	3	157	5785	8.23	6.28	5.90	13.27	23.23			12.77			Pass
11a	6Mbps	3	165	5825	8.54	7.06	6.55	14.05	23.23			12.77			Pass
HT20	MCS0	3	149	5745	8.49	6.21	6.08	13.26	23.23			12.77			Pass
HT20	MCS0	3	157	5785	7.82	6.12	5.60	13.11	23.23			12.77			Pass
HT20	MCS0	3	165	5825	8.37	6.26	6.28	13.27	23.23			12.77			Pass
HT40	MCS0	3	151	5755	5.30	3.26	3.07	10.25	23.23			12.77			Pass
HT40	MCS0	3	159	5795	4.67	3.06	2.55	10.05	23.23			12.77			Pass
VHT20	MCS0	3	149	5745	8.53	6.35	6.10	13.34	23.23			12.77			Pass
VHT20	MCS0	3	157	5785	7.96	5.90	5.45	12.89	23.23			12.77			Pass
VHT20	MCS0	3	165	5825	8.30	6.12	6.08	13.11	23.23			12.77			Pass
VHT40	MCS0	3	151	5755	5.05	3.30	3.07	10.29	23.23			12.77			Pass
VHT40	MCS0	3	159	5795	4.89	2.92	2.39	9.91	23.23			12.77			Pass
VHT80	MCS0	3	155	5775	0.73	0.43	0.68	7.66	23.23			12.77			Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	149	5745	5744.950	-0.050	-8.70	20	108	
11a	6Mbps	1	149	5745	5744.950	-0.050	-8.70	20	132	
11a	6Mbps	1	149	5745	5744.950	-0.050	-8.70	20	120	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	-30	120	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	50	120	

Appendix B. Radiated Spurious Emission

Test Engineer :	Ken Wu, JC Liang, Bill Chang, and Jacky Su	Temperature :	20~23°C
		Relative Humidity :	45~50%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		5604.6	53.69	-14.61	68.3	44.37	32.14	10.71	33.53	351	3	P	H
		5656	52.05	-20.71	72.76	42.69	32.22	10.69	33.55	351	3	P	H
		5716.4	61.09	-48.8	109.89	51.72	32.29	10.65	33.57	351	3	P	H
		5723.8	76.31	-43.25	119.56	66.92	32.31	10.65	33.57	351	3	P	H
		5745	113.52	-8.78	122.3	104.12	32.34	10.63	33.57	351	3	P	H
		5745	106.04	-	-	96.64	32.34	10.63	33.57	351	3	A	H
													H
802.11a CH 149 5745MHz													H
		5615.2	49.68	-18.62	68.3	40.36	32.14	10.71	33.53	347	179	P	V
		5656.8	49.22	-24.13	73.35	39.86	32.22	10.69	33.55	347	179	P	V
		5718.2	53.88	-56.52	110.4	44.49	32.31	10.65	33.57	347	179	P	V
		5725	59.33	-62.97	122.3	49.94	32.31	10.65	33.57	347	179	P	V
		5745	104.07	-18.23	122.3	94.67	32.34	10.63	33.57	347	179	P	V
		5745	96.35	-	-	86.95	32.34	10.63	33.57	347	179	A	V
													V
													V

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5613	54.32	-13.98	68.3	45	32.14	10.71	33.53	361	3	P	H
		5659	53.89	-21.09	74.98	44.53	32.22	10.69	33.55	361	3	P	H
		5719.6	51.5	-59.29	110.79	42.11	32.31	10.65	33.57	361	3	P	H
		5720.2	51.69	-59.67	111.36	42.3	32.31	10.65	33.57	361	3	P	H
		5785	114.34	-7.96	122.3	104.93	32.39	10.61	33.59	361	3	P	H
		5785	106.26	-	-	96.85	32.39	10.61	33.59	361	3	A	H
		5852.4	51.76	-65.07	116.83	42.11	32.48	10.78	33.61	361	3	P	H
		5858.8	51.74	-58.09	109.83	42.07	32.51	10.78	33.62	361	3	P	H
		5876.6	51.66	-52.45	104.11	41.81	32.53	10.94	33.62	361	3	P	H
		5938.4	49.6	-18.7	68.3	39.54	32.6	11.11	33.65	361	3	P	H
													H
802.11a CH 157 5785MHz													H
		5632	48.77	-19.53	68.3	39.45	32.17	10.69	33.54	358	147	P	V
		5670.2	48.57	-34.72	83.29	39.21	32.24	10.67	33.55	358	147	P	V
		5702.6	48.79	-57.24	106.03	39.41	32.29	10.65	33.56	358	147	P	V
		5722	47.24	-68.22	115.46	37.85	32.31	10.65	33.57	358	147	P	V
		5785	103.54	-18.76	122.3	94.13	32.39	10.61	33.59	358	147	P	V
		5785	96.06	-	-	86.65	32.39	10.61	33.59	358	147	A	V
		5850	47.38	-74.92	122.3	37.73	32.48	10.78	33.61	358	147	P	V
		5860.4	48.66	-60.73	109.39	38.83	32.51	10.94	33.62	358	147	P	V
		5898.2	49.08	-39.01	88.09	39.21	32.56	10.94	33.63	358	147	P	V
		5935.4	48.87	-19.43	68.3	38.81	32.6	11.11	33.65	358	147	P	V
													V
													V

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5825	115.87	-6.43	122.3	106.23	32.46	10.78	33.6	342	360	P	H
		5825	107.35	-	-	97.71	32.46	10.78	33.6	342	360	A	H
		5850	58.13	-64.17	122.3	48.48	32.48	10.78	33.61	342	360	P	H
		5856	57.52	-53.1	110.62	47.84	32.51	10.78	33.61	342	360	P	H
		5878	51.81	-51.26	103.07	41.96	32.53	10.94	33.62	342	360	P	H
		5925.2	51.1	-17.2	68.3	41.03	32.6	11.11	33.64	342	360	P	H
													H
802.11a													H
CH 165		5824	104.66	-17.64	122.3	95.02	32.46	10.78	33.6	352	144	P	V
5825MHz		5824	96.71	-	-	87.07	32.46	10.78	33.6	352	144	A	V
		5850	51.09	-71.21	122.3	41.44	32.48	10.78	33.61	352	144	P	V
		5857	50.51	-59.83	110.34	40.83	32.51	10.78	33.61	352	144	P	V
		5893	48.7	-43.24	91.94	38.83	32.56	10.94	33.63	352	144	P	V
		5946	48.87	-19.43	68.3	38.62	32.63	11.27	33.65	352	144	P	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	63.96	-10.04	74	74.2	39.91	15.59	65.74	269	152	P	H
		11490	52.24	-1.76	54	62.48	39.91	15.59	65.74	269	152	A	H
		17235	59.66	-8.64	68.3	64.14	41	18.6	64.08	100	129	P	H
		11490	62.64	-11.36	74	72.88	39.91	15.59	65.74	158	208	P	V
		11490	50.09	-3.91	54	60.33	39.91	15.59	65.74	158	208	A	V
		17235	53.24	-15.06	68.3	57.72	41	18.6	64.08	100	190	P	V
802.11a CH 157 5785MHz		11570	63.3	-10.7	74	73.56	39.76	15.64	65.66	117	156	P	H
		11570	52.5	-1.5	54	62.76	39.76	15.64	65.66	117	156	A	H
		17355	59.68	-8.62	68.3	63.9	41.35	18.65	64.22	132	130	P	H
		11570	64.55	-9.45	74	74.81	39.76	15.64	65.66	106	150	P	V
		11570	53.15	-0.85	54	63.41	39.76	15.64	65.66	106	150	A	V
		17355	47.76	-20.54	68.3	51.98	41.35	18.65	64.22	100	0	P	V
													V
802.11a CH 165 5825MHz		11650	65.59	-8.41	74	75.9	39.62	15.69	65.62	245	118	P	H
		11650	52.82	-1.18	54	63.13	39.62	15.69	65.62	245	118	A	H
		17475	59.46	-8.84	68.3	63.42	41.7	18.7	64.36	134	130	P	H
		11650	63.04	-10.96	74	73.35	39.62	15.69	65.62	141	209	P	V
		11650	52.04	-1.96	54	62.35	39.62	15.69	65.62	141	209	A	V
		17475	54.27	-14.03	68.3	58.23	41.7	18.7	64.36	102	187	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5607	53.56	-14.74	68.3	44.24	32.14	10.71	33.53	349	360	P	H
		5699.6	53.16	-51.85	105.01	43.78	32.27	10.67	33.56	349	360	P	H
		5713.4	60.19	-48.86	109.05	50.82	32.29	10.65	33.57	349	360	P	H
		5724.6	66.6	-54.79	121.39	57.21	32.31	10.65	33.57	349	360	P	H
		5745	113.53	-8.77	122.3	104.13	32.34	10.63	33.57	349	360	P	H
		5745	106.15	-	-	96.75	32.34	10.63	33.57	349	360	A	H
802.11n													H
HT20													H
CH 149		5608	49.07	-19.23	68.3	39.75	32.14	10.71	33.53	385	146	P	V
5745MHz		5661	48.55	-27.92	76.47	39.21	32.22	10.67	33.55	385	146	P	V
		5717.8	50.3	-59.98	110.28	40.91	32.31	10.65	33.57	385	146	P	V
		5725	62.49	-59.81	122.3	53.1	32.31	10.65	33.57	385	146	P	V
		5745	102.47	-19.83	122.3	93.07	32.34	10.63	33.57	385	146	P	V
		5745	95.2	-	-	85.8	32.34	10.63	33.57	385	146	A	V
													V
													V

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5610.8	55.06	-13.24	68.3	45.74	32.14	10.71	33.53	364	4	P	H
		5650.6	54.52	-14.23	68.75	45.15	32.22	10.69	33.54	364	4	P	H
		5718	52.57	-57.77	110.34	43.18	32.31	10.65	33.57	364	4	P	H
		5723.2	51.94	-66.26	118.2	42.55	32.31	10.65	33.57	364	4	P	H
		5785	113.23	-9.07	122.3	103.82	32.39	10.61	33.59	364	4	P	H
		5785	104.79	-	-	95.38	32.39	10.61	33.59	364	4	A	H
		5852.2	50.01	-67.27	117.28	40.36	32.48	10.78	33.61	364	4	P	H
		5859.6	51.27	-58.34	109.61	41.6	32.51	10.78	33.62	364	4	P	H
		5885	51.09	-46.78	97.87	41.25	32.53	10.94	33.63	364	4	P	H
		5944	50.27	-18.03	68.3	40.02	32.63	11.27	33.65	364	4	P	H
802.11n													H
HT20													H
CH 157		5636.4	50.79	-17.51	68.3	41.45	32.19	10.69	33.54	375	149	P	V
5785MHz		5671.6	49.61	-34.71	84.32	40.25	32.24	10.67	33.55	375	149	P	V
		5711.8	47.85	-60.76	108.61	38.48	32.29	10.65	33.57	375	149	P	V
		5724	47.01	-73.01	120.02	37.62	32.31	10.65	33.57	375	149	P	V
		5785	102.85	-19.45	122.3	93.44	32.39	10.61	33.59	375	149	P	V
		5785	95.05	-	-	85.64	32.39	10.61	33.59	375	149	A	V
		5851.8	47.69	-70.51	118.2	38.04	32.48	10.78	33.61	375	149	P	V
		5863	48.9	-59.76	108.66	39.07	32.51	10.94	33.62	375	149	P	V
		5915.2	48.71	-26.82	75.53	38.66	32.58	11.11	33.64	375	149	P	V
		5939.2	49.36	-18.94	68.3	39.27	32.63	11.11	33.65	375	149	P	V
													V
													V

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5825	114.62	-7.68	122.3	104.98	32.46	10.78	33.6	354	359	P	H
		5825	106.29	-	-	96.65	32.46	10.78	33.6	354	359	A	H
		5850.2	60.75	-61.09	121.84	51.1	32.48	10.78	33.61	354	359	P	H
		5858.2	58.75	-51.25	110	49.08	32.51	10.78	33.62	354	359	P	H
		5876.2	51.55	-52.86	104.41	41.7	32.53	10.94	33.62	354	359	P	H
		5926	52.56	-15.74	68.3	42.49	32.6	11.11	33.64	354	359	P	H
802.11n													H
HT20													H
CH 165		5830	104.05	-18.25	122.3	94.41	32.46	10.78	33.6	354	152	P	V
5825MHz		5830	96.5	-	-	86.86	32.46	10.78	33.6	354	152	A	V
		5850.6	53.95	-66.98	120.93	44.3	32.48	10.78	33.61	354	152	P	V
		5868.4	48.79	-58.36	107.15	38.96	32.51	10.94	33.62	354	152	P	V
		5900.8	48.59	-37.58	86.17	38.55	32.56	11.11	33.63	354	152	P	V
		5939.8	48.35	-19.95	68.3	38.26	32.63	11.11	33.65	354	152	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		11490	63.35	-10.65	74	73.59	39.91	15.59	65.74	247	155	P	H
		11490	53.58	-0.42	54	63.82	39.91	15.59	65.74	247	155	A	H
802.11n		17235	56.76	-11.54	68.3	61.24	41	18.6	64.08	100	147	P	H
HT20													
CH 149		11490	61.1	-12.9	74	71.34	39.91	15.59	65.74	100	147	P	V
5745MHz		11490	51.48	-2.52	54	61.72	39.91	15.59	65.74	100	147	A	V
		17235	50.41	-17.89	68.3	54.89	41	18.6	64.08	100	0	P	V
													V
		11570	64.33	-9.67	74	74.59	39.76	15.64	65.66	112	155	P	H
		11570	51.17	-2.83	54	61.43	39.76	15.64	65.66	112	155	A	H
802.11n		17355	57.47	-10.83	68.3	61.69	41.35	18.65	64.22	141	132	P	H
HT20													
CH 157		11570	62.29	-11.71	74	72.55	39.76	15.64	65.66	155	211	P	V
5785MHz		11570	50.26	-3.74	54	60.52	39.76	15.64	65.66	155	211	A	V
		17355	47.87	-20.43	68.3	52.09	41.35	18.65	64.22	100	0	P	V
													V
		11650	62.78	-11.22	74	73.09	39.62	15.69	65.62	320	154	P	H
		11650	53.29	-0.71	54	63.6	39.62	15.69	65.62	320	154	A	H
802.11n		17475	59.28	-9.02	68.3	63.24	41.7	18.7	64.36	139	130	P	H
HT20													
CH 165		11650	63.47	-10.53	74	73.78	39.62	15.69	65.62	126	210	P	V
5825MHz		11650	53.07	-0.93	54	63.38	39.62	15.69	65.62	126	210	A	V
		17475	55.16	-13.14	68.3	59.12	41.7	18.7	64.36	100	188	P	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5629	51.65	-16.65	68.3	42.33	32.17	10.69	33.54	349	3	P	H
		5694.6	54.63	-46.69	101.32	45.25	32.27	10.67	33.56	349	3	P	H
		5720	68.84	-42.06	110.9	59.45	32.31	10.65	33.57	349	3	P	H
		5720	68.84	-42.06	110.9	59.45	32.31	10.65	33.57	349	3	P	H
		5755	109.28	-13.02	122.3	99.86	32.36	10.63	33.57	349	3	P	H
		5755	102.07	-	-	92.65	32.36	10.63	33.57	349	3	A	H
		5850.4	50.47	-70.92	121.39	40.82	32.48	10.78	33.61	349	3	P	H
		5870.4	50.11	-56.48	106.59	40.28	32.51	10.94	33.62	349	3	P	H
		5884.2	49.64	-48.83	98.47	39.8	32.53	10.94	33.63	349	3	P	H
		5942.2	49.92	-18.38	68.3	39.67	32.63	11.27	33.65	349	3	P	H
802.11n													H
HT40													H
CH 151		5605.4	48.02	-20.28	68.3	38.7	32.14	10.71	33.53	251	178	P	V
5755MHz		5698.4	48.59	-55.53	104.12	39.21	32.27	10.67	33.56	251	178	P	V
		5719.8	57.21	-53.63	110.84	47.82	32.31	10.65	33.57	251	178	P	V
		5723.2	62.54	-55.66	118.2	53.15	32.31	10.65	33.57	251	178	P	V
		5746	99.36	-22.94	122.3	89.96	32.34	10.63	33.57	251	178	P	V
		5746	91.86	-	-	82.46	32.34	10.63	33.57	251	178	A	V
		5851	47.94	-72.08	120.02	38.29	32.48	10.78	33.61	251	178	P	V
		5857.2	49.03	-61.25	110.28	39.35	32.51	10.78	33.61	251	178	P	V
		5918.6	49.31	-23.71	73.02	39.26	32.58	11.11	33.64	251	178	P	V
		5926.8	48.69	-19.61	68.3	38.62	32.6	11.11	33.64	251	178	P	V
													V
													V

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5607.8	51.03	-17.27	68.3	41.71	32.14	10.71	33.53	361	0	P	H
		5653	51.79	-18.74	70.53	42.42	32.22	10.69	33.54	361	0	P	H
		5700.6	52.98	-52.49	105.47	43.6	32.29	10.65	33.56	361	0	P	H
		5722.2	55.31	-60.61	115.92	45.92	32.31	10.65	33.57	361	0	P	H
		5795	111.99	-10.31	122.3	102.56	32.41	10.61	33.59	361	0	P	H
		5795	104.54	-	-	95.11	32.41	10.61	33.59	361	0	A	H
		5850	56.43	-65.87	122.3	46.78	32.48	10.78	33.61	361	0	P	H
		5861	58.04	-51.18	109.22	48.21	32.51	10.94	33.62	361	0	P	H
		5880.4	52.78	-48.51	101.29	42.93	32.53	10.94	33.62	361	0	P	H
		5946.4	49.79	-18.51	68.3	39.54	32.63	11.27	33.65	361	0	P	H
802.11n													H
HT40													H
CH 159		5607.4	48.42	-19.88	68.3	39.1	32.14	10.71	33.53	378	144	P	V
5795MHz		5652.2	47.87	-22.07	69.94	38.5	32.22	10.69	33.54	378	144	P	V
		5702.6	47.94	-58.09	106.03	38.56	32.29	10.65	33.56	378	144	P	V
		5720.6	46.82	-65.45	112.27	37.43	32.31	10.65	33.57	378	144	P	V
		5795	100.91	-21.39	122.3	91.48	32.41	10.61	33.59	378	144	P	V
		5795	93.7	-	-	84.27	32.41	10.61	33.59	378	144	A	V
		5853.8	50.28	-63.36	113.64	40.6	32.51	10.78	33.61	378	144	P	V
		5871.8	49.76	-56.43	106.19	39.91	32.53	10.94	33.62	378	144	P	V
		5878.2	49.47	-53.45	102.92	39.62	32.53	10.94	33.62	378	144	P	V
		5944	49.46	-18.84	68.3	39.21	32.63	11.27	33.65	378	144	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		11510	58.89	-15.11	74	69.08	39.9	15.61	65.7	325	156	P	H
		11510	48.47	-5.53	54	58.66	39.9	15.61	65.7	325	156	A	H
802.11n		17265	49.25	-19.05	68.3	53.65	41.1	18.62	64.12	100	0	P	H
HT40													H
CH 151		11510	57.94	-16.06	74	68.13	39.9	15.61	65.7	160	205	P	V
5755MHz		11510	47.67	-6.33	54	57.86	39.9	15.61	65.7	160	205	A	V
		17265	40.89	-27.41	68.3	45.29	41.1	18.62	64.12	100	0	P	V
													V
		11590	60.71	-13.29	74	70.97	39.73	15.66	65.65	244	155	P	H
		11590	52.97	-1.03	54	63.23	39.73	15.66	65.65	244	155	A	H
802.11n		17385	51.22	-17.08	68.3	55.37	41.45	18.66	64.26	100	0	P	H
HT40													H
CH 159		11590	59.49	-14.51	74	69.75	39.73	15.66	65.65	155	208	P	V
5795MHz		11590	51.56	-2.44	54	61.82	39.73	15.66	65.65	155	208	A	V
		17385	47.07	-21.23	68.3	51.22	41.45	18.66	64.26	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5603.4	51.72	-16.58	68.3	42.4	32.14	10.71	33.53	352	0	P	H
		5696.8	59.32	-43.62	102.94	49.94	32.27	10.67	33.56	352	0	P	H
		5719.6	63.55	-47.24	110.79	54.16	32.31	10.65	33.57	352	0	P	H
		5722	69.91	-45.55	115.46	60.52	32.31	10.65	33.57	352	0	P	H
		5775	104.1	-18.2	122.3	94.66	32.39	10.63	33.58	352	0	P	H
		5775	98.97	-	-	89.53	32.39	10.63	33.58	352	0	A	H
		5850	59.18	-63.12	122.3	49.53	32.48	10.78	33.61	352	0	P	H
		5856	58.84	-51.78	110.62	49.16	32.51	10.78	33.61	352	0	P	H
		5876.2	50.97	-53.44	104.41	41.12	32.53	10.94	33.62	352	0	P	H
		5943	49.29	-19.01	68.3	39.04	32.63	11.27	33.65	352	0	P	H
802.11ac													H
VHT80													H
CH 155		5621.8	47.69	-20.61	68.3	38.36	32.17	10.69	33.53	382	141	P	V
5775MHz		5695	49.85	-51.76	101.61	40.47	32.27	10.67	33.56	382	141	P	V
		5719.4	54.03	-56.7	110.73	44.64	32.31	10.65	33.57	382	141	P	V
		5723.6	55.01	-64.1	119.11	45.62	32.31	10.65	33.57	382	141	P	V
		5775	94.07	-28.23	122.3	84.63	32.39	10.63	33.58	382	141	P	V
		5775	88.07	-	-	78.63	32.39	10.63	33.58	382	141	A	V
		5850.8	48.94	-71.54	120.48	39.29	32.48	10.78	33.61	382	141	P	V
		5861.2	49.02	-60.14	109.16	39.19	32.51	10.94	33.62	382	141	P	V
		5881.4	48.35	-52.2	100.55	38.5	32.53	10.94	33.62	382	141	P	V
		5929.6	48.56	-19.74	68.3	38.49	32.6	11.11	33.64	382	141	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		11550	50.14	-23.86	74	60.37	39.8	15.64	65.67	100	0	P	H
		17325	40.28	-28.02	68.3	44.58	41.25	18.63	64.18	100	0	P	H
802.11ac													H
VHT80													H
CH 155		11550	48.04	-25.96	74	58.27	39.8	15.64	65.67	100	0	P	V
5775MHz		17325	39.62	-28.68	68.3	43.92	41.25	18.63	64.18	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2+3		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		72.12	36.64	-3.36	40	54.62	12.64	1.17	31.79	125	80	P	H
		201.18	33.81	-9.69	43.5	47.83	16.02	1.74	31.78			P	H
		220.08	32.08	-13.92	46	45.68	16.2	1.98	31.78			P	H
		325.2	26.77	-19.23	46	35.91	20.4	2.23	31.77			P	H
		650	33.58	-12.42	46	36.06	26.2	3.36	32.04			P	H
		866.3	33.11	-12.89	46	31.87	29	3.84	31.6			P	H
													H
													H
													H
													H
5GHz													H
802.11n													H
HT20		42.56	32.12	-7.88	40	44.38	18.62	0.93	31.81	100	84	QP	V
LF		60.78	32.17	-7.83	40	50.85	11.95	1.17	31.8	107	54	QP	V
		200.64	29.25	-14.25	43.5	43.27	16.02	1.74	31.78			P	V
		325.2	24.26	-21.74	46	33.4	20.4	2.23	31.77			P	V
		650	29.64	-16.36	46	32.12	26.2	3.36	32.04			P	V
		946.1	34.46	-11.54	46	31.15	30.49	3.89	31.07			P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

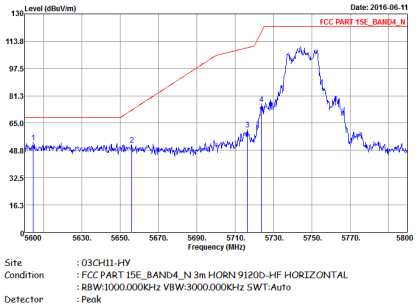
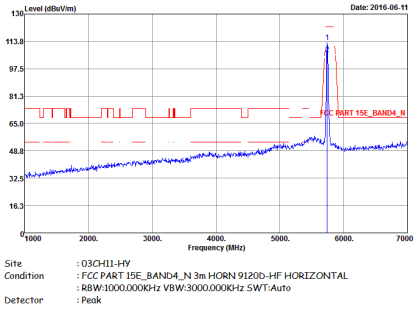
Both peak and average measured complies with the limit line, so test result is "PASS".

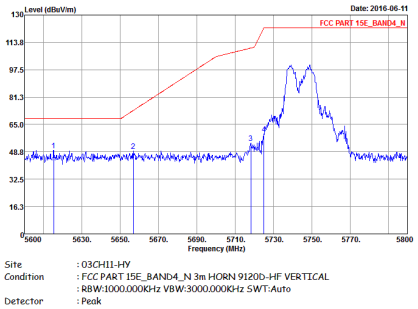
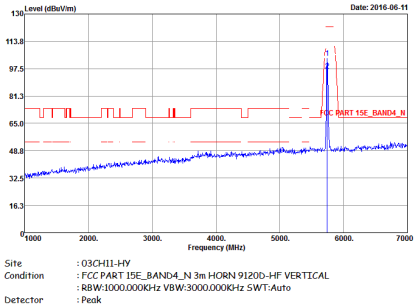
Appendix C. Radiated Spurious Emission Plots

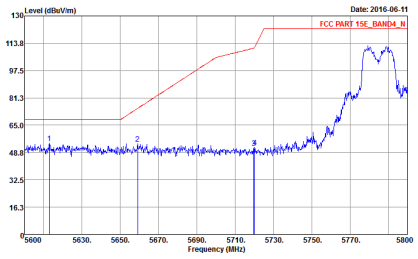
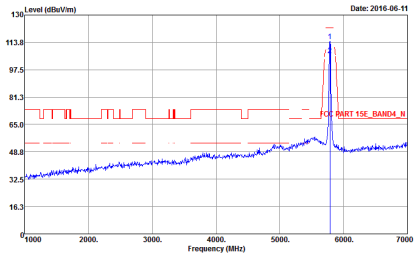
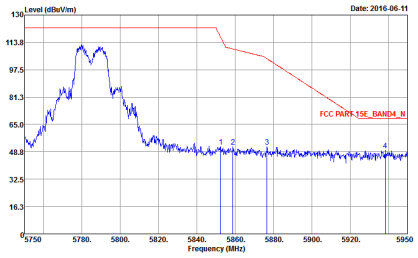
Test Engineer :	Ken Wu, JC Liang, Bill Chang, and Jacky Su	Temperature :	20~23°C
		Relative Humidity :	45~50%

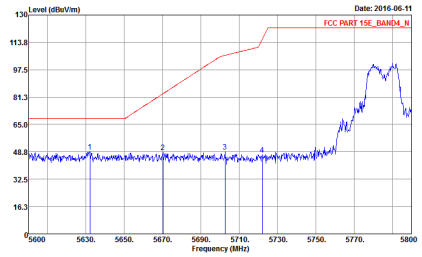
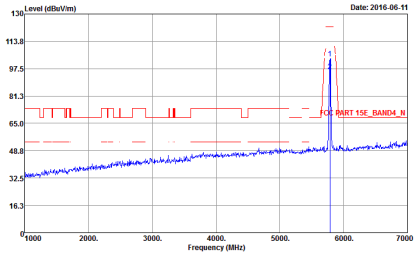
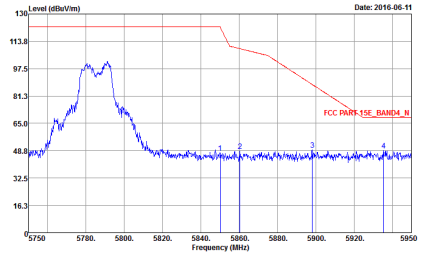
Band 4 - 5725~5850MHz

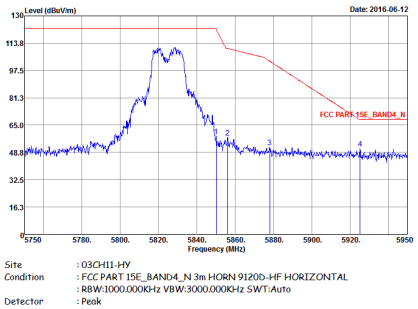
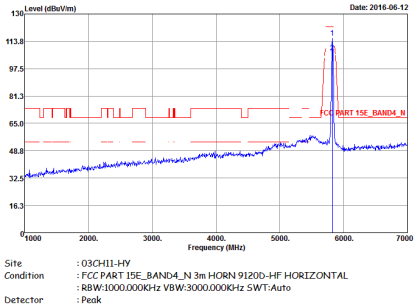
WIFI 802.11a (Band Edge @ 3m)

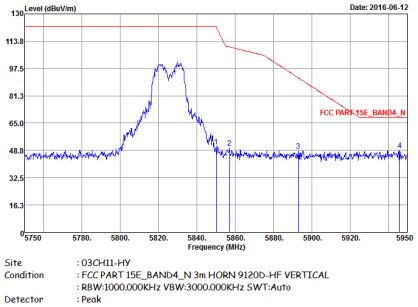
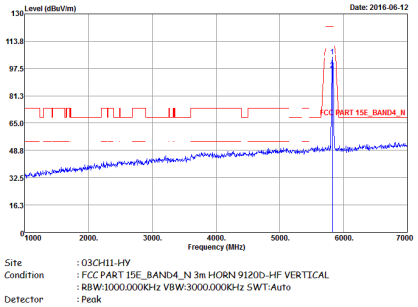
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Fundamental
Peak		

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Vertical	Fundamental
Peak		

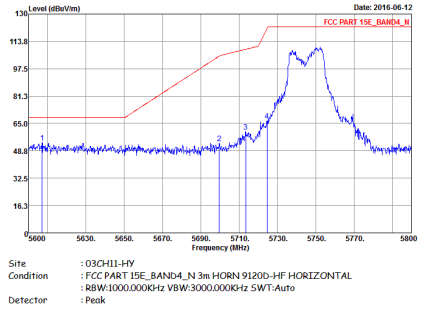
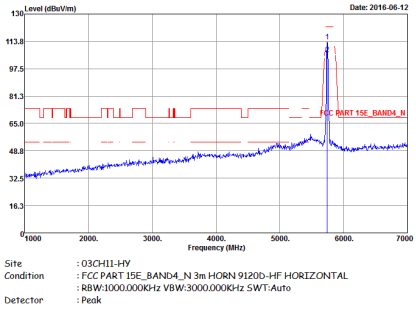
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

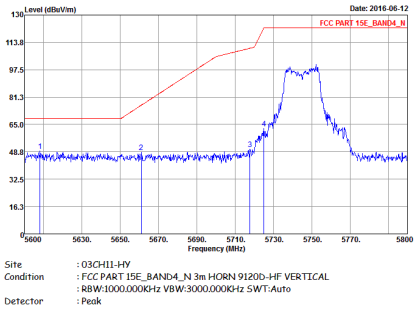
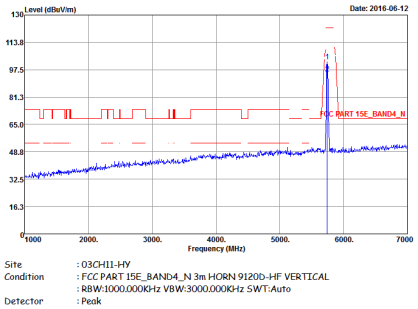
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

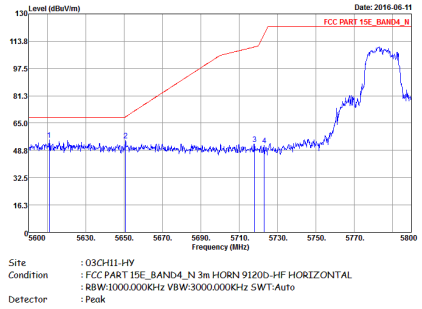
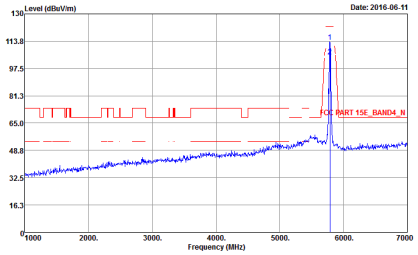
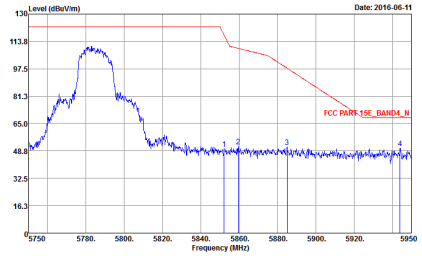
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Fundamental
Peak		

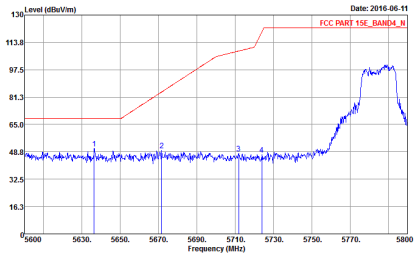
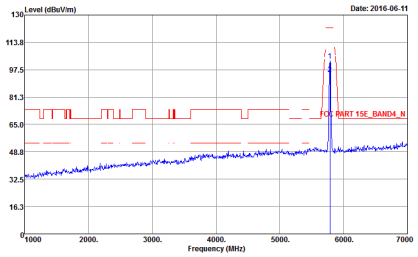
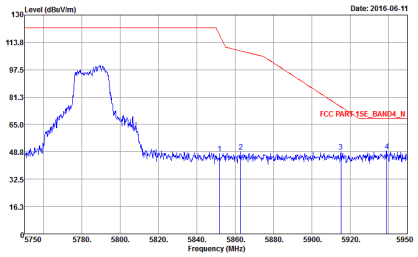
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Vertical	Fundamental
Peak		

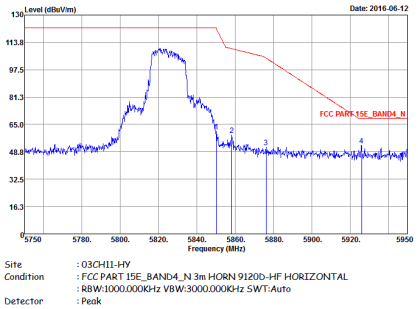
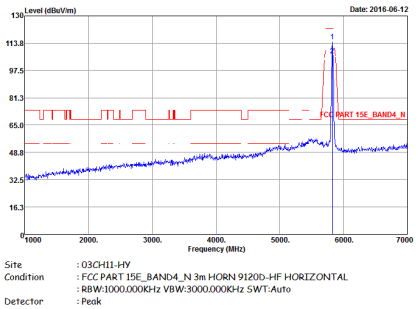
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

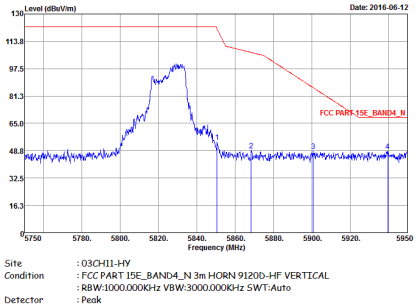
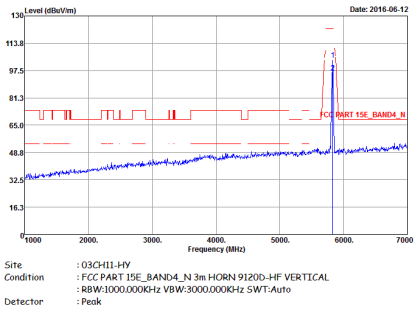
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Horizontal	Fundamental
Peak		

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Vertical	Fundamental
Peak		

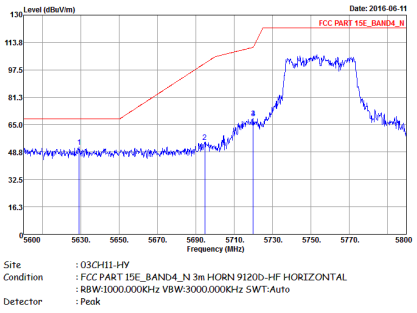
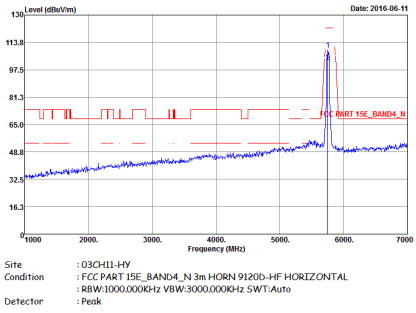
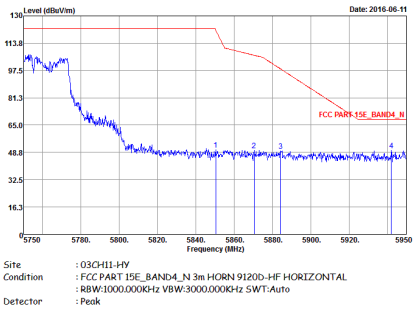
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

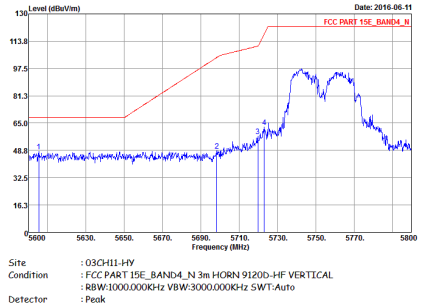
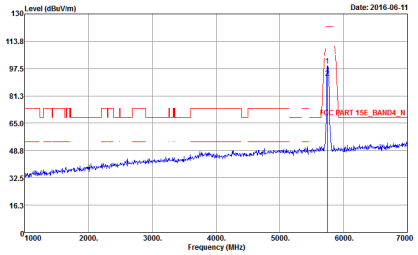
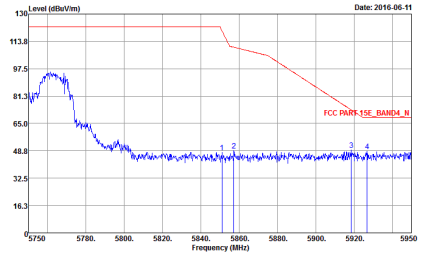
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

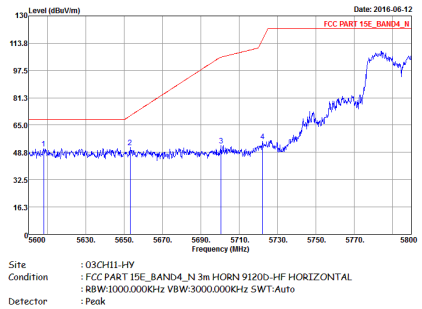
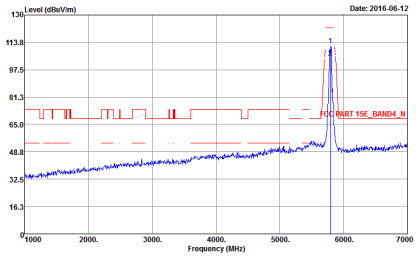
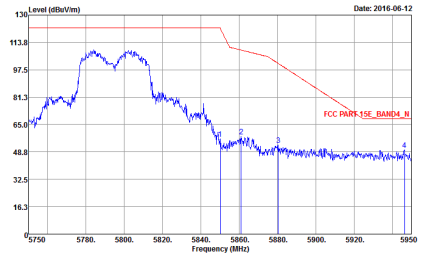
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Horizontal	Fundamental
Peak		

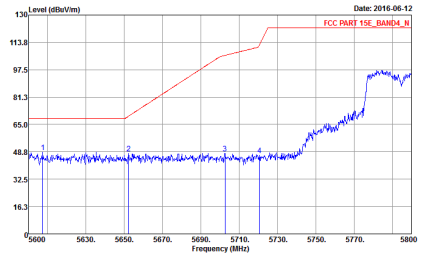
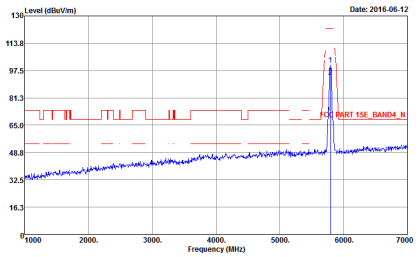
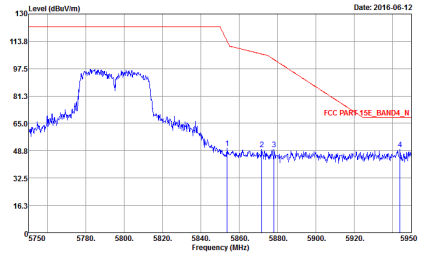
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Vertical	Fundamental
Peak		

Band 4 5725~5850MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

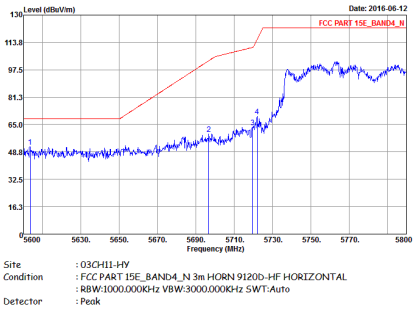
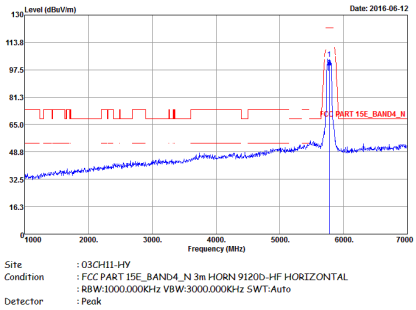
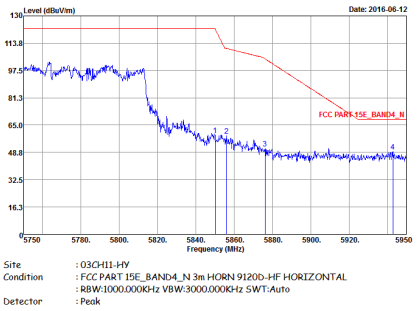
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Horizontal	Fundamental
Peak		
Peak		

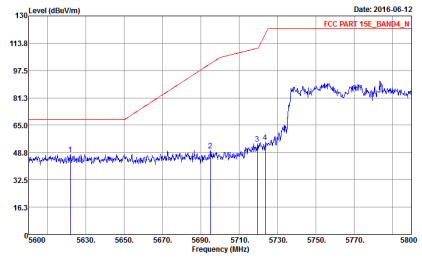
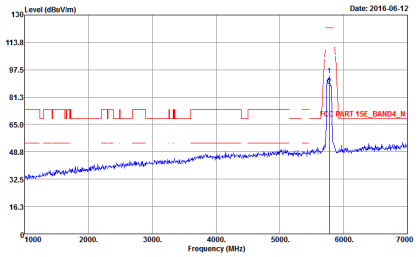
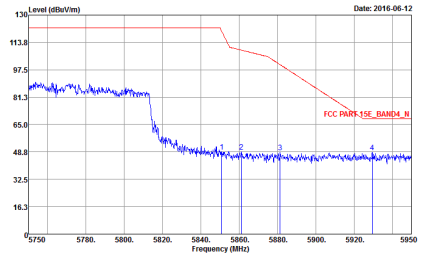
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

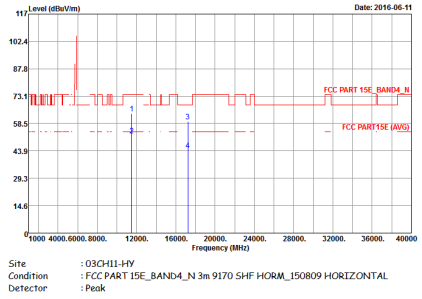
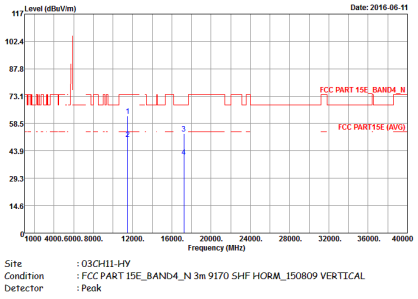
Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

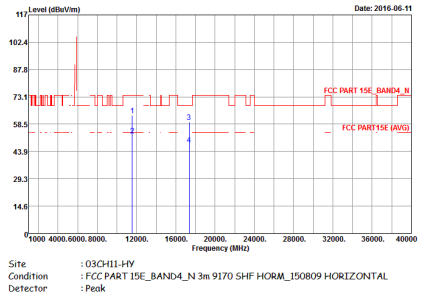
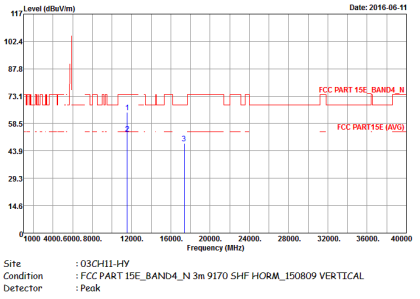
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Horizontal	Fundamental
Peak		
Peak		

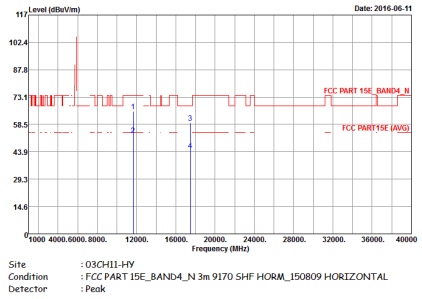
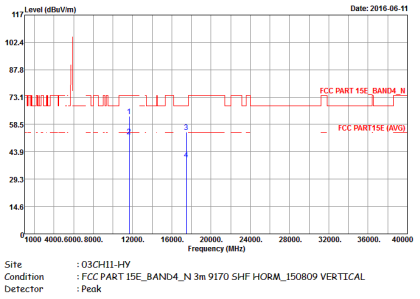
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	

Band 4 - 5725~5850MHz

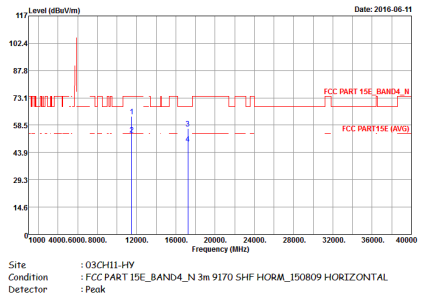
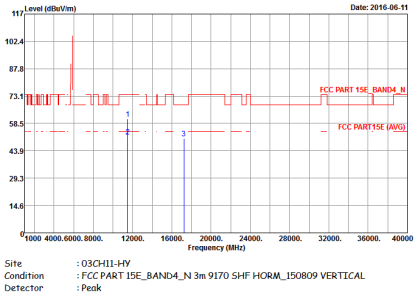
WIFI 802.11a (Harmonic @ 3m)

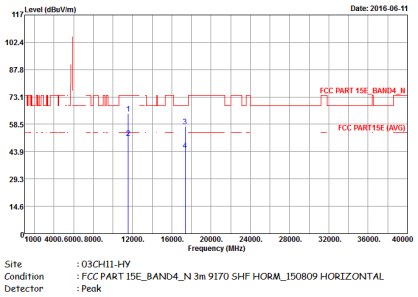
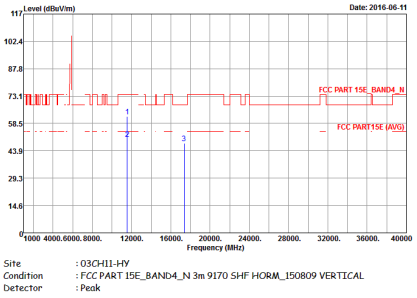
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Vertical
Peak Avg.		

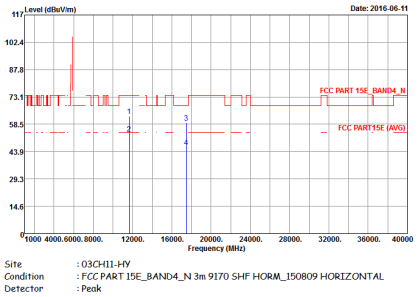
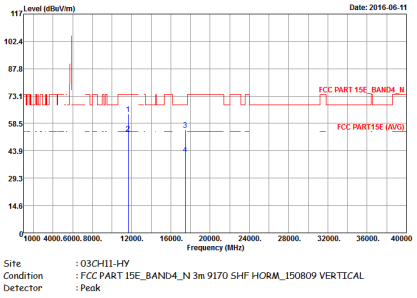
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

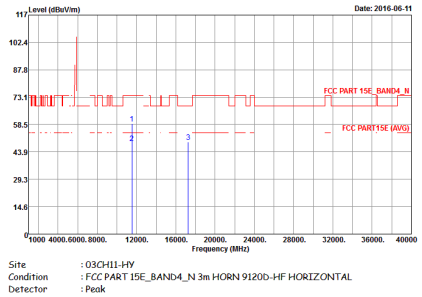
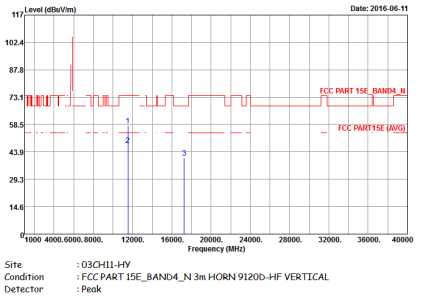
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

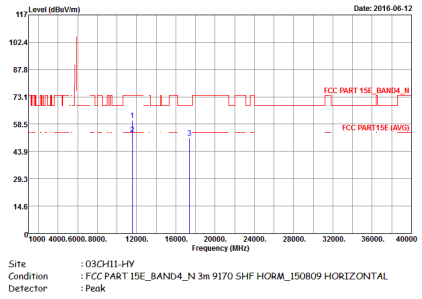
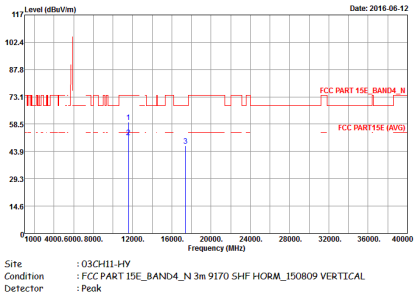
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

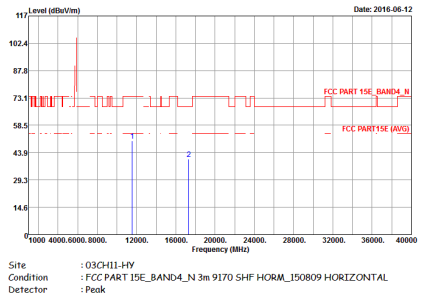
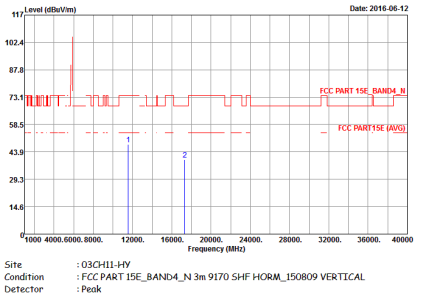
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
1+2	Horizontal	Vertical
Peak Avg.		

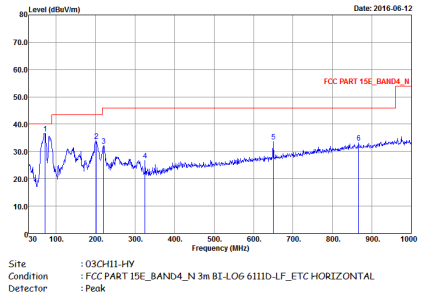
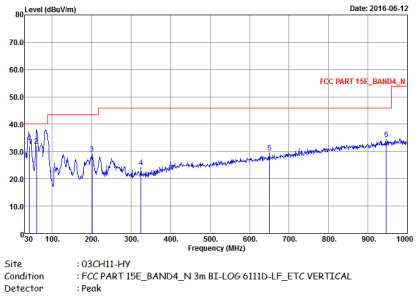
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : FCC PART 15E_BAND4_N 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF)

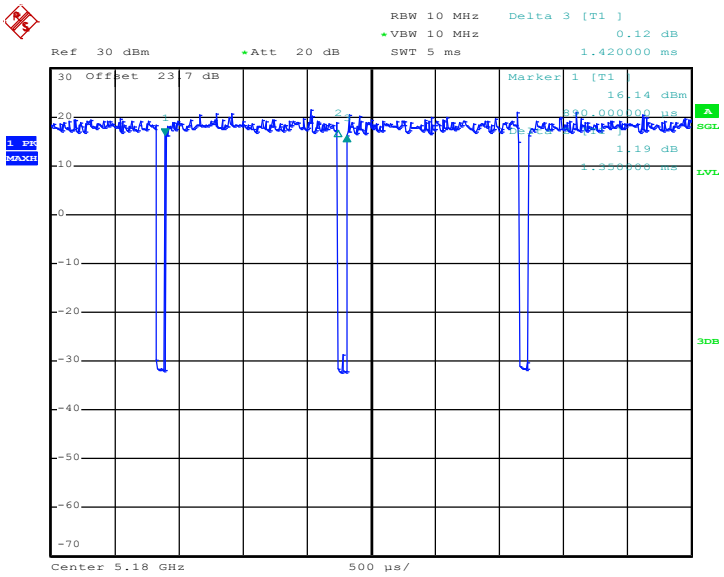
WIFI	5GHz 5725~5850MHz	
ANT	802.11n HT20 LF	
1+2	Horizontal	Vertical
QP / Peak		

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
MIMO Ant. 1	802.11a	95.07	1350	0.740740741	1kHz
MIMO Ant. 2	802.11a	95.48	1352	0.73964497	1kHz
MIMO Ant. 3	802.11a	94.94	1352	0.73964497	1kHz
MIMO Ant. 1	5GHz 802.11n HT20	95.21	1272	0.786163522	1kHz
MIMO Ant. 2	5GHz 802.11n HT20	95.18	1264	0.791139241	1kHz
MIMO Ant. 3	5GHz 802.11n HT20	95.21	1272	0.786163522	1kHz
MIMO Ant. 1	5GHz 802.11n HT40	90.29	632	1.582278481	3kHz
MIMO Ant. 2	5GHz 802.11n HT40	89.77	632	1.582278481	3kHz
MIMO Ant. 3	5GHz 802.11n HT40	90.29	632	1.582278481	3kHz
MIMO Ant. 1	5GHz 802.11ac VHT20	94.78	1270	0.787401575	1kHz
MIMO Ant. 2	5GHz 802.11ac VHT20	94.64	1272	0.786163522	1kHz
MIMO Ant. 3	5GHz 802.11ac VHT20	94.64	1272	0.786163522	1kHz
MIMO Ant. 1	5GHz 802.11ac VHT40	90.34	636	1.572327044	3kHz
MIMO Ant. 2	5GHz 802.11ac VHT40	90.91	640	1.5625	3kHz
MIMO Ant. 3	5GHz 802.11ac VHT40	90.86	636	1.572327044	3kHz
MIMO Ant. 1	5GHz 802.11ac VHT80	82.72	316	3.164556962	10kHz
MIMO Ant. 2	5GHz 802.11ac VHT80	81.03	316	3.164556962	10kHz
MIMO Ant. 3	5GHz 802.11ac VHT80	82.29	316	3.164556962	10kHz

<MIMO Ant. Port 1+2+3(1)>

802.11a



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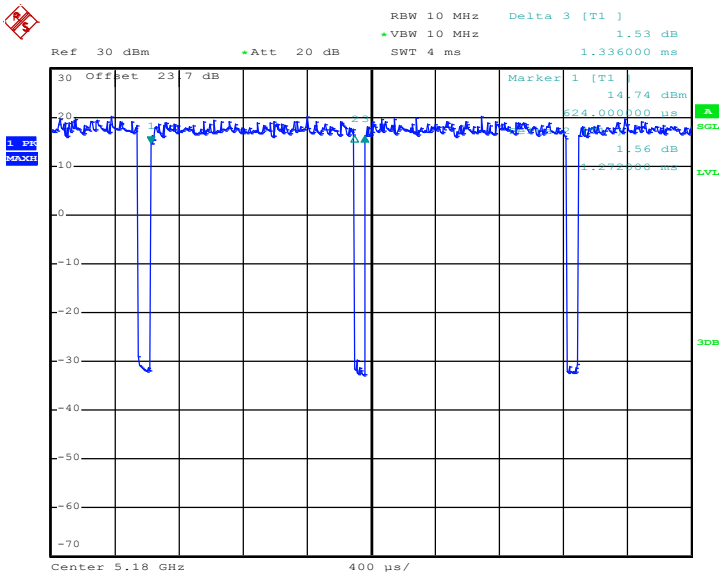
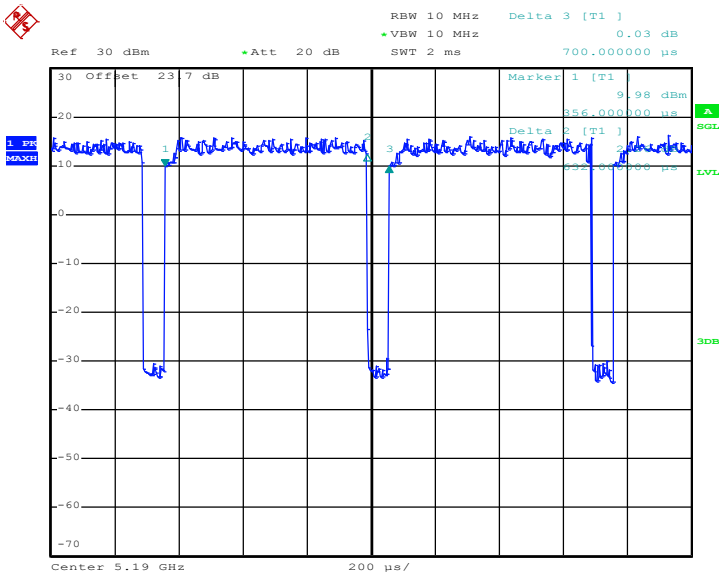
802.11n HT20



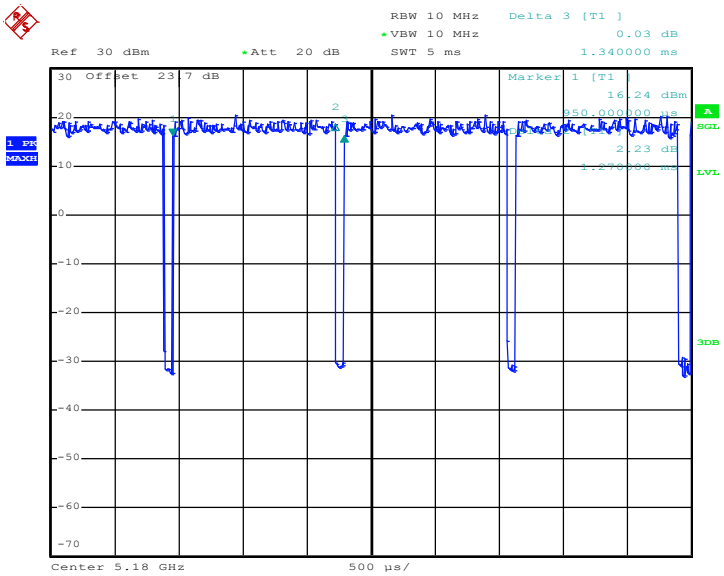
Date: 2.APR.2016 11:06:09

802.11n HT40



Date: 2.APR.2016 11:32:03

802.11ac VHT20



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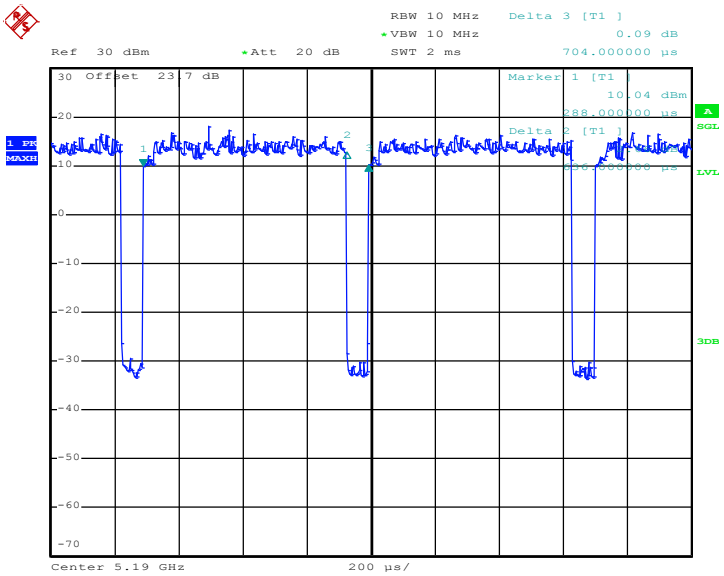
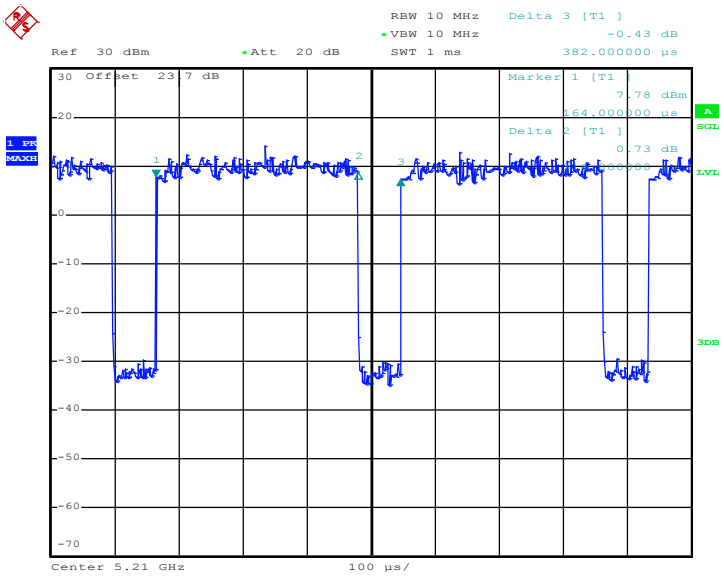
802.11ac VHT40



Date: 2.APR.2016 12:51:20

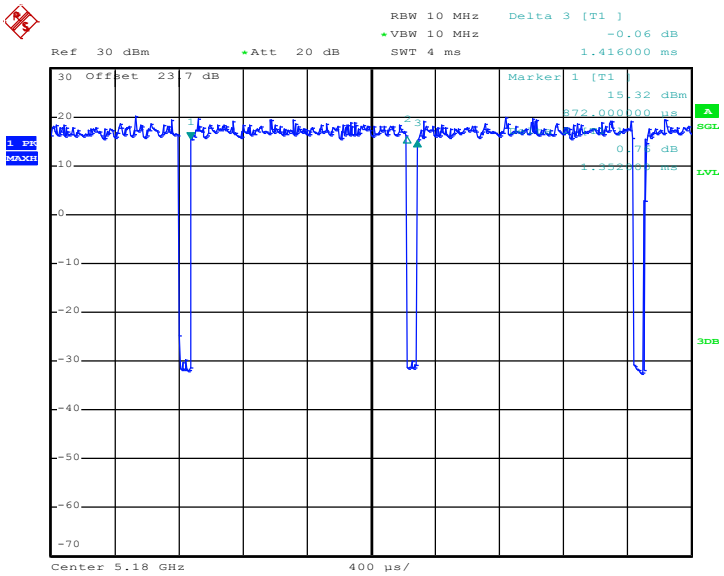
802.11ac VHT80



Date: 2.APR.2016 13:14:38

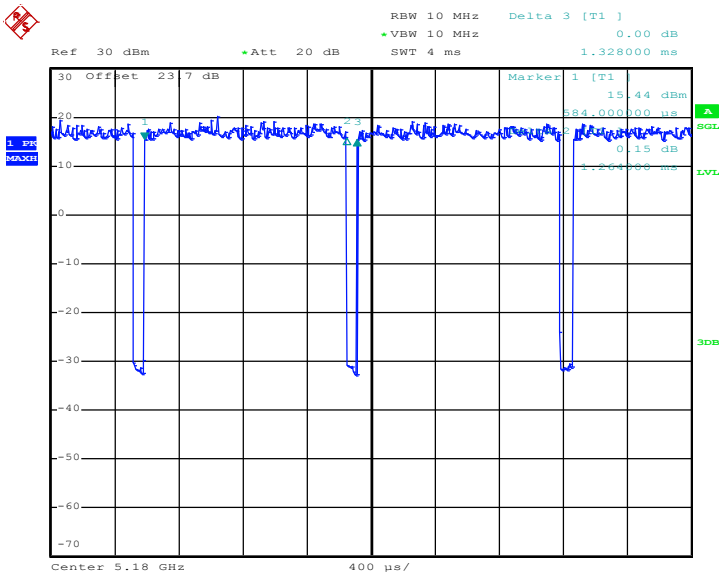
<MIMO Ant. Port 1+2+3(2)>

802.11a



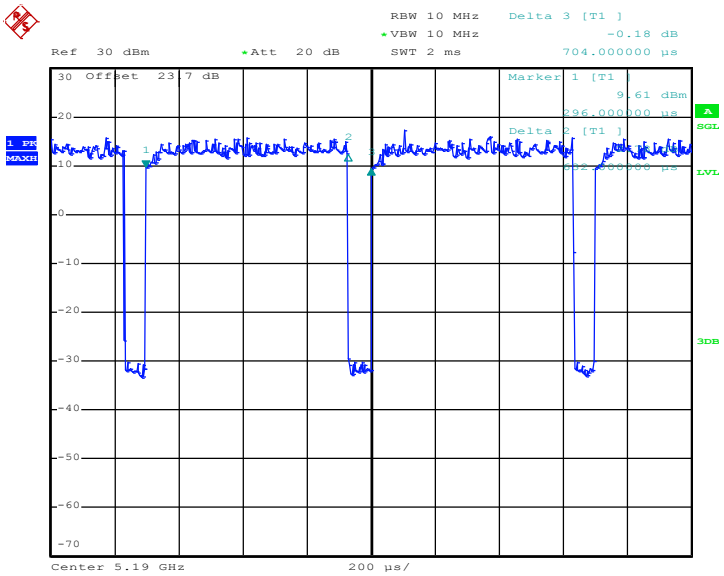
Date: 2.APR.2016 10:03:55

802.11n HT20



Date: 2.APR.2016 11:06:43

802.11n HT40



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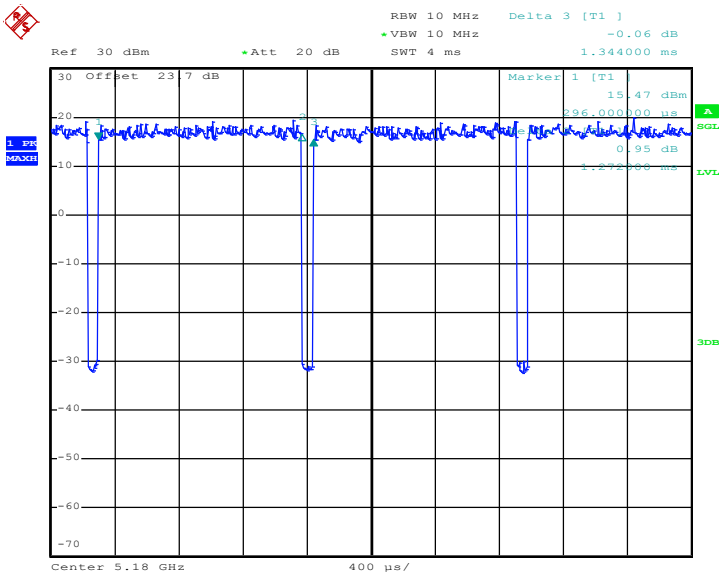
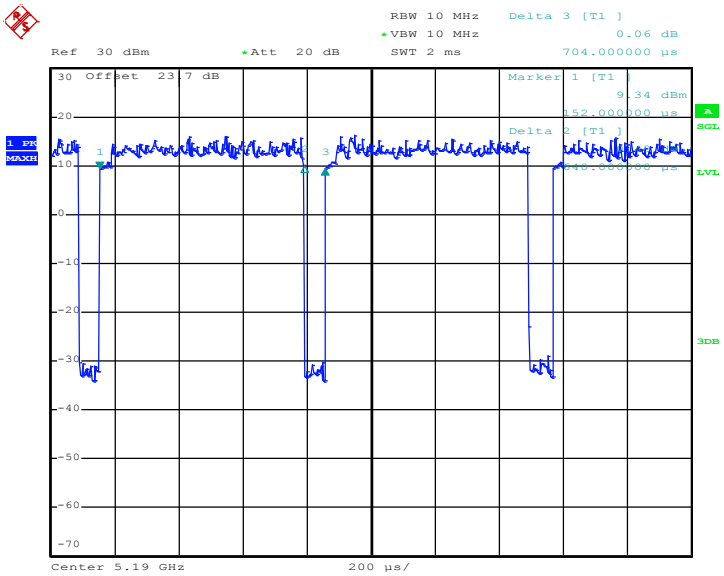
802.11ac VHT20



Date: 2.APR.2016 11:59:43

802.11ac VHT40



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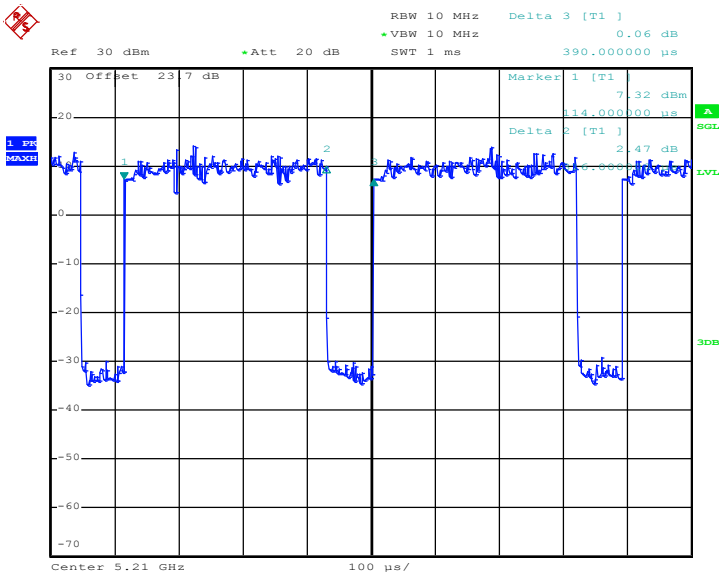
802.11ac VHT80



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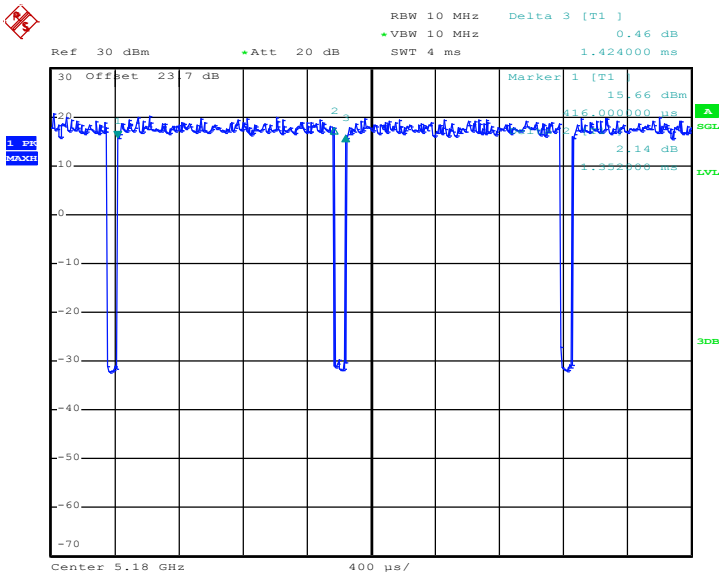
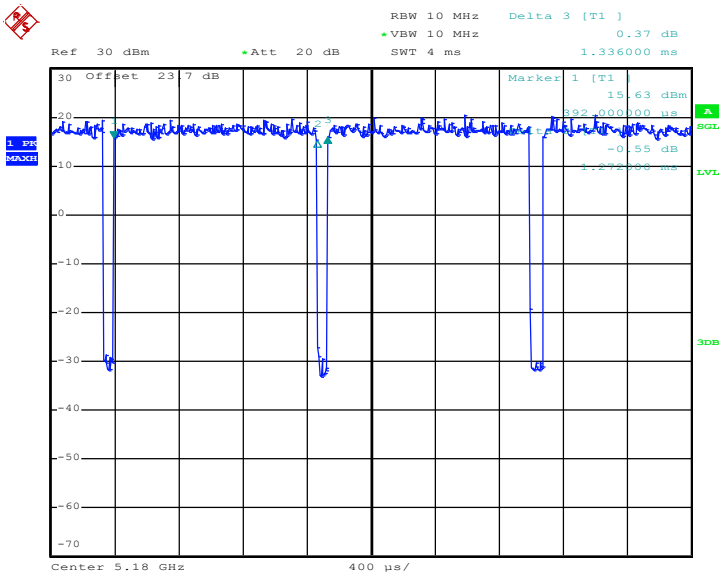
<MIMO Ant. Port 1+2+3(3)>

802.11a



Date: 2.APR.2016 10:06:20

802.11n HT20



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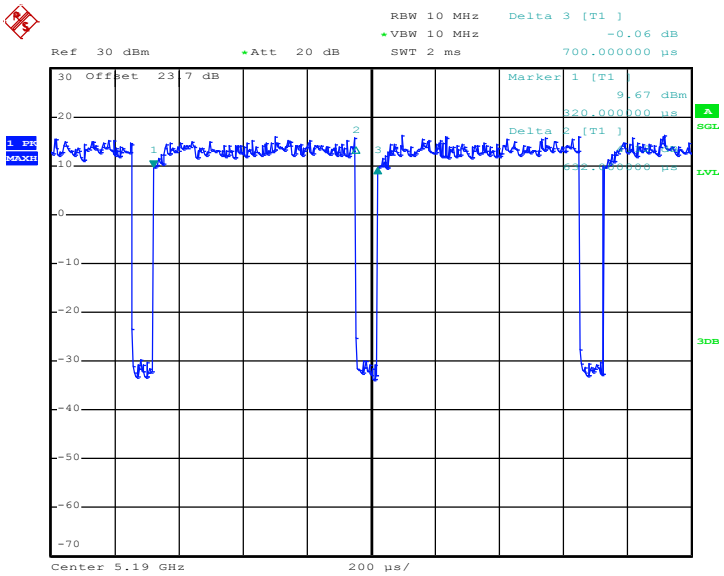
802.11n HT40



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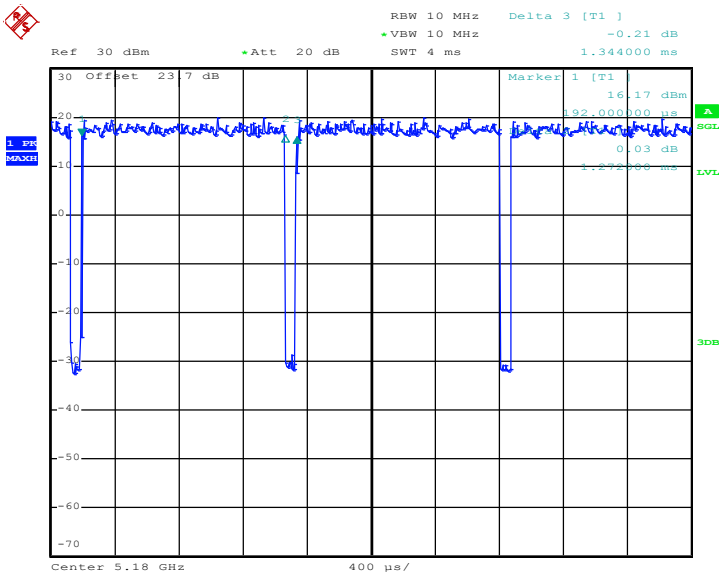
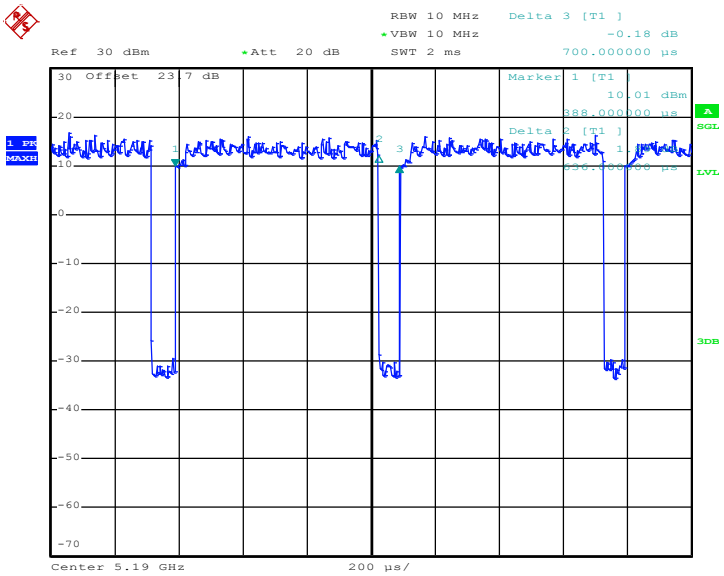
802.11ac VHT20



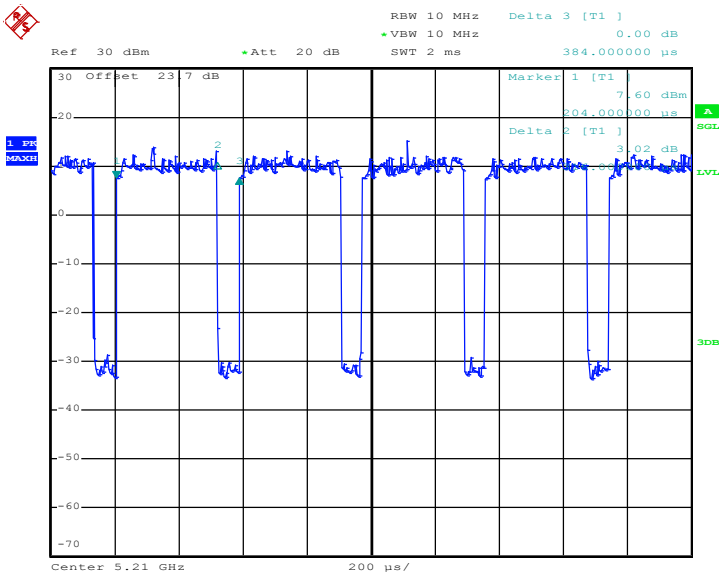
Date: 2.APR.2016 12:00:26

802.11ac VHT40



Date: 2.APR.2016 12:46:01

802.11ac VHT80



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