FCC RF Test Report

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

The product was received on Jun. 16, 2016 and testing was completed on Jul. 25, 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
FR661624B	Rev. 01	Initial issue of report	Aug. 03, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	FCC ≤ 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	FCC ≤ 17 dBm (depend on band)	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.61 dB at 5149.500 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 14.00 dB at 0.150 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® AC Access Point
Brand Name	UBIQUITI
Model Name	UAP-AC-M
FCC ID	SWX-UAPACM
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>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power</td><td>MIMO <Ant. 1 + 2>
802.11a : 16.98 dBm / 0.0499 W
802.11n HT20 : 16.98 dBm / 0.0499 W
802.11n HT40 : 16.75 dBm / 0.0473 W
802.11ac VHT20: 16.95 dBm / 0.0495 W
802.11ac VHT40: 16.72 dBm / 0.0470 W
802.11ac VHT80: 9.51 dBm / 0.0089 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 17.65 MHz
802.11n HT20 : 18.75 MHz
802.11n HT40 : 36.90 MHz
802.11ac VHT20 : 18.75 MHz
802.11ac VHT40 : 36.80 MHz
802.11ac VHT80 : 76.08 MHz</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 Type</td><td>Ant. 1 : Dipole Antenna
Ant. 2 : Dipole Antenna</td></tr>
<tr><td>Antenna Gain</td><td>Ant. 1 : 4.00 dBi
Ant. 2 : 4.00 dBi</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr>
<tr><td>802.11 a/n/ac MIMO</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. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +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.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- 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.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38	**5190**	**46**	**5230**
	40	5200	48	5240
	42	5210		

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

2.2 Test Mode

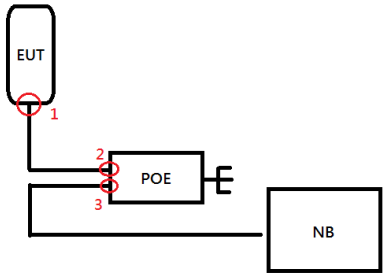
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

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 + LAN Link

Remark: The following figure was the connection diagram of telecommunication port.

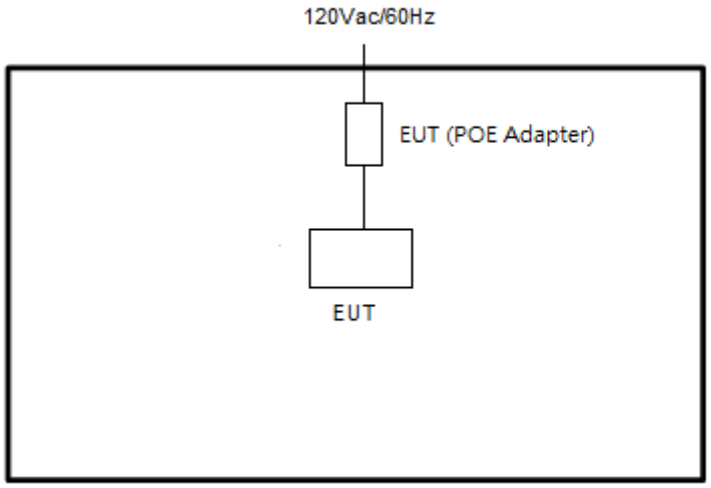


Ch. #		Band I：5150-5250 MHz	Band I：5150-5250 MHz	Band I：5150-5250 MHz
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

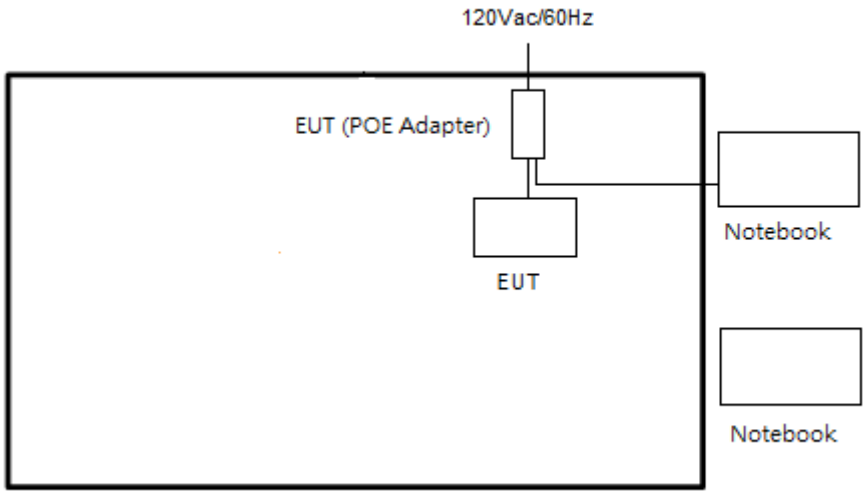
Ch. #		Band I：5150-5250 MHz	Band I：5150-5250 MHz	Band I：5150-5250 MHz
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	36	38	-
M	Middle	44	-	42
H	High	48	46	-

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 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	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 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.

2.6 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 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

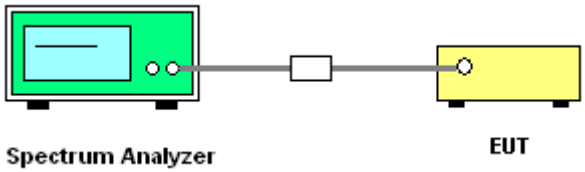
3.1.2 Measuring Instruments

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
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

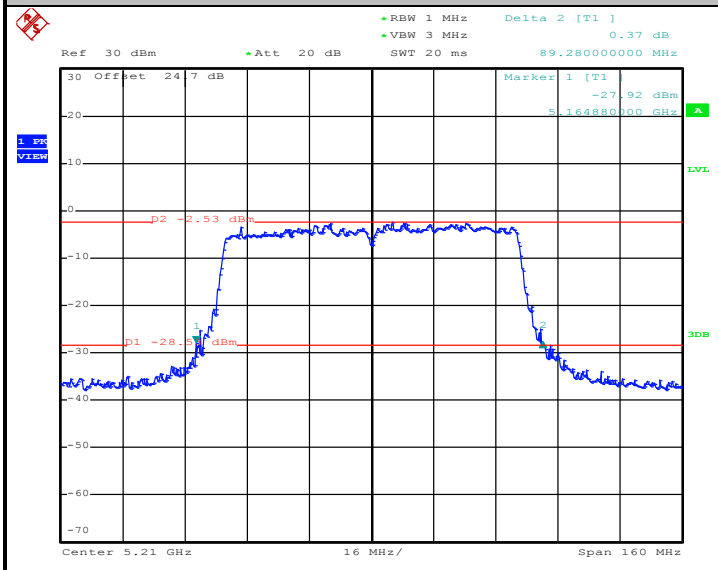
3.1.4 Test Setup



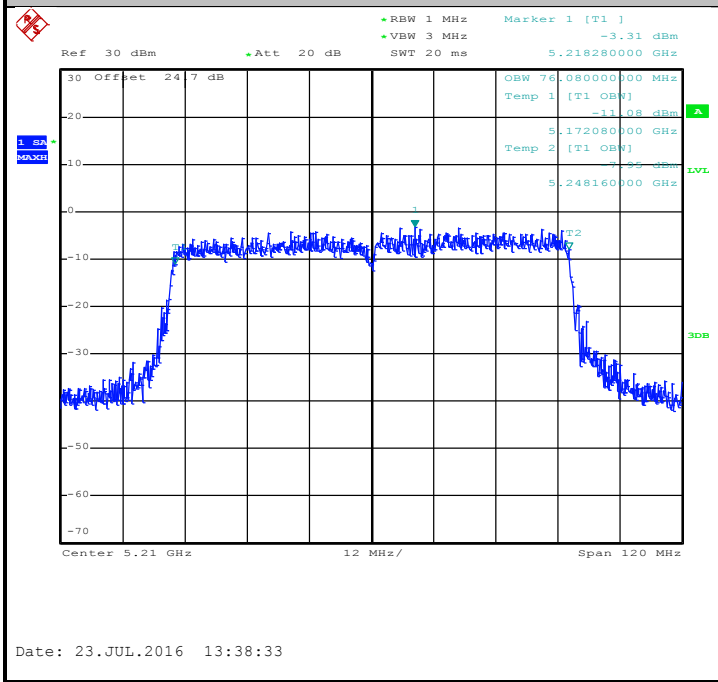
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

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 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.

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.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

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

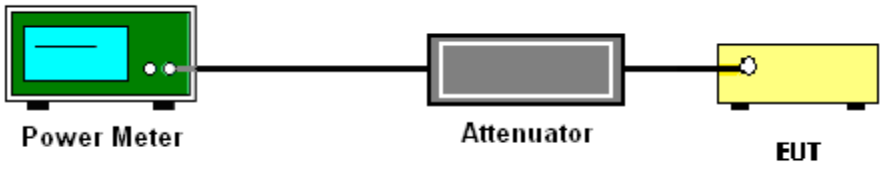
3.2.3 Test Procedures

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 mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz 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 #

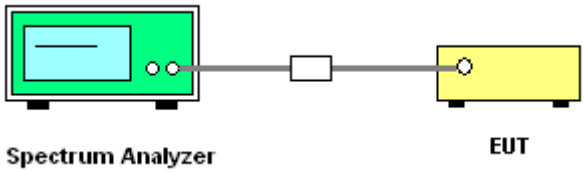
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

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 = 1 MHz.
   - Set VBW ≥ 3 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(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 (1): 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.

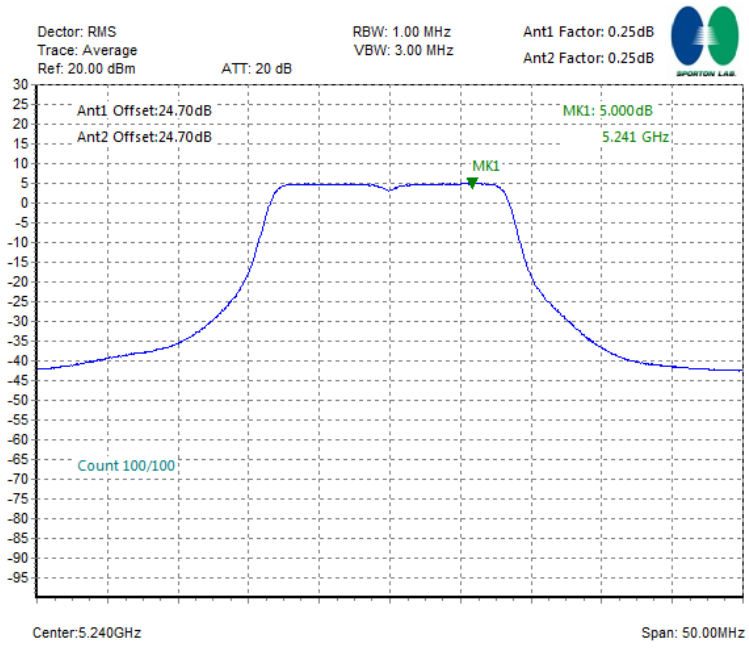
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



Note: Average Power Density (dB) = Measured value+ Duty Factor

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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

(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) KDB789033 D02 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

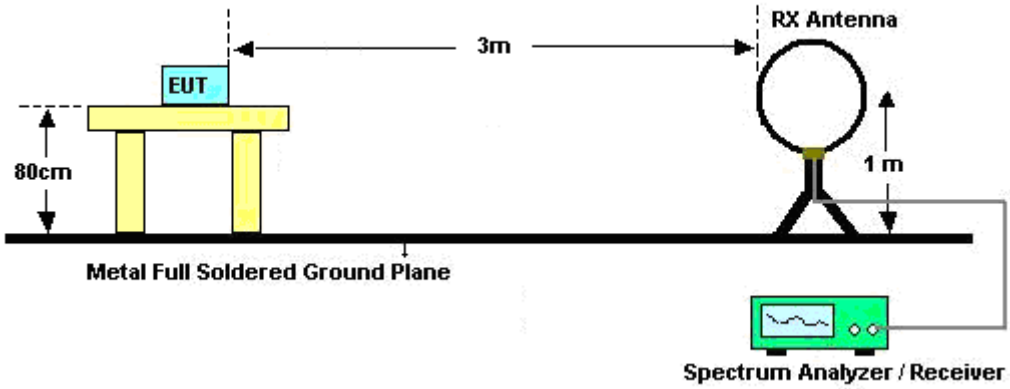
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

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.

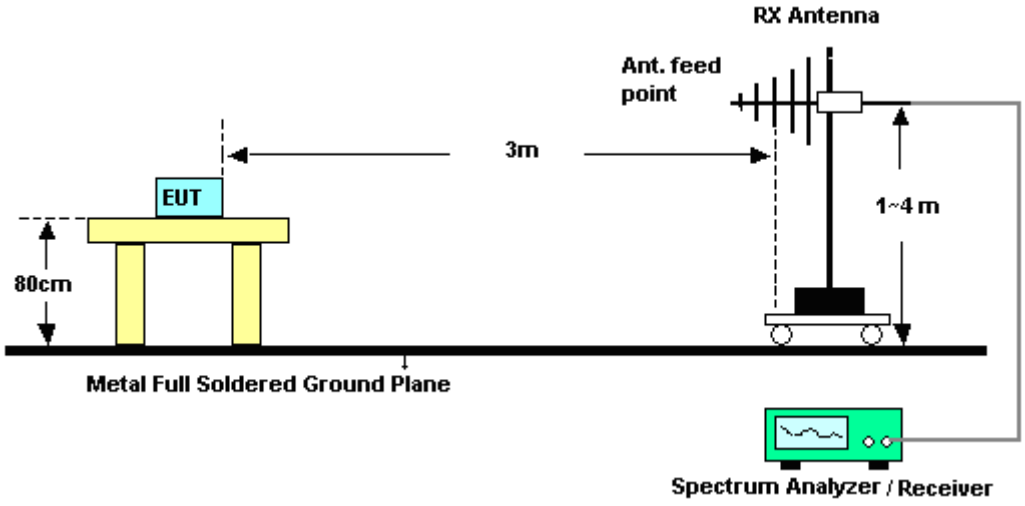
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

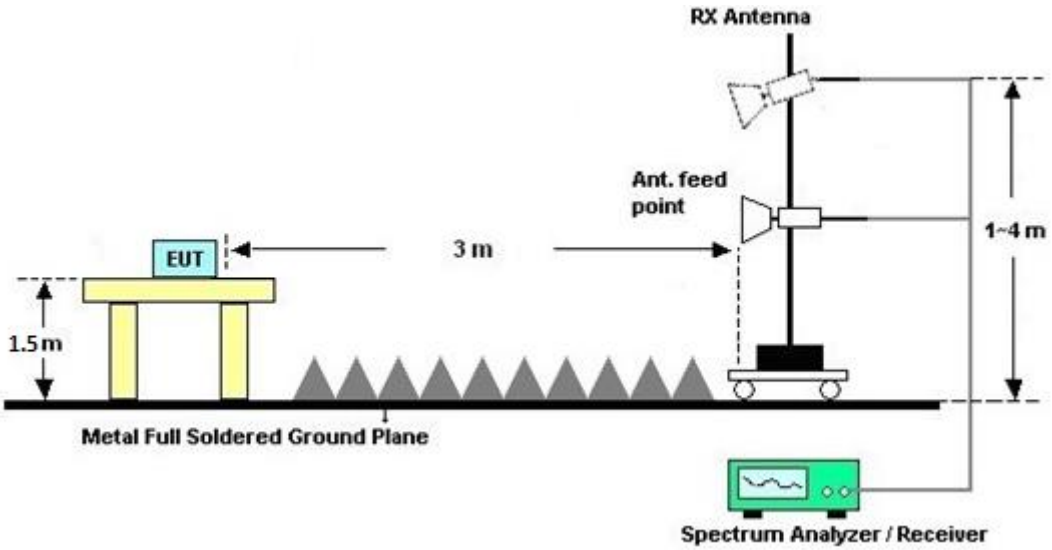
For radiated emissions below 30MHz



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.

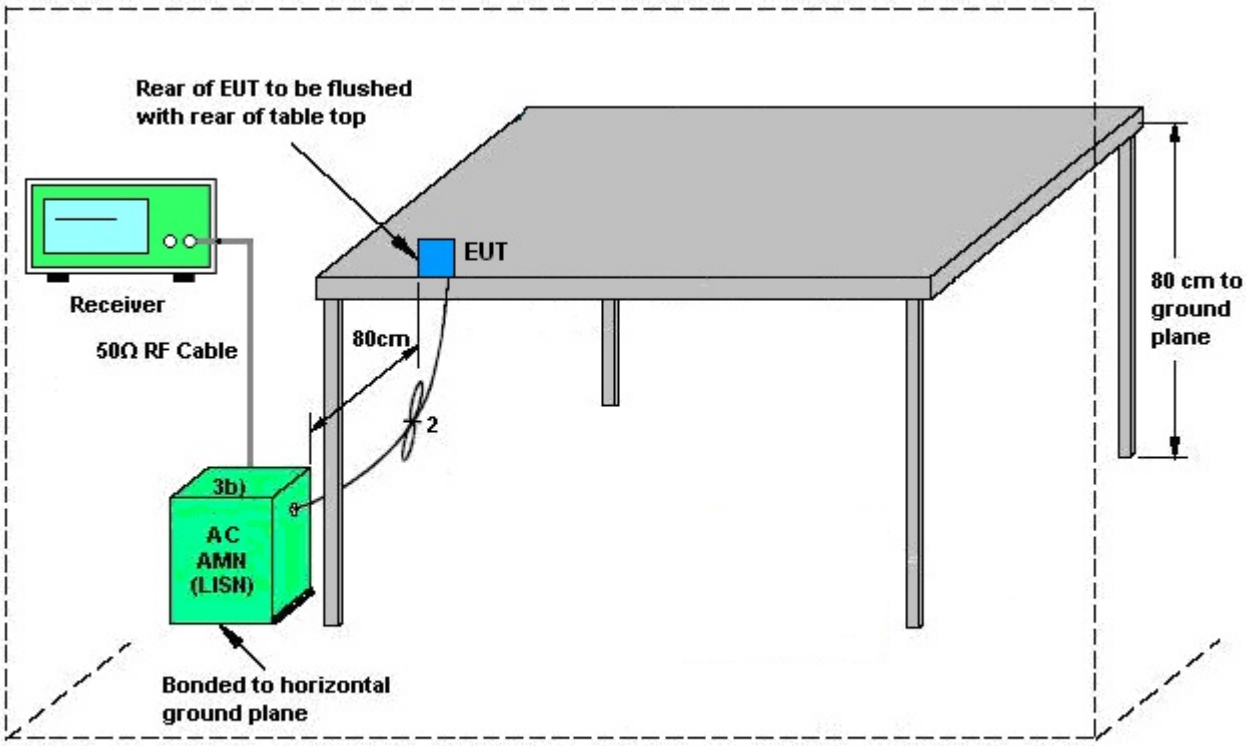
3.5.2 Measuring Instruments

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.

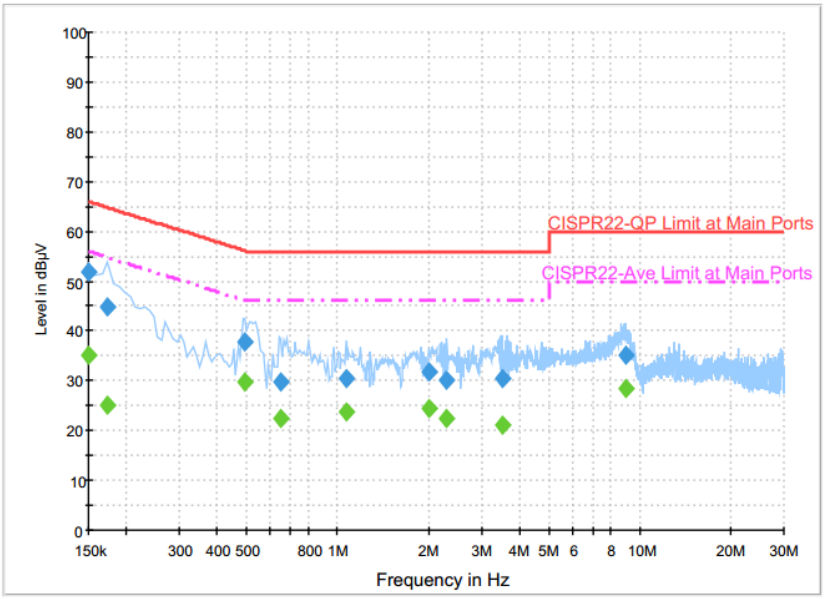
3.5.4 Test Setup



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 :	Arthur Hsieh	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + POE + LAN Link		



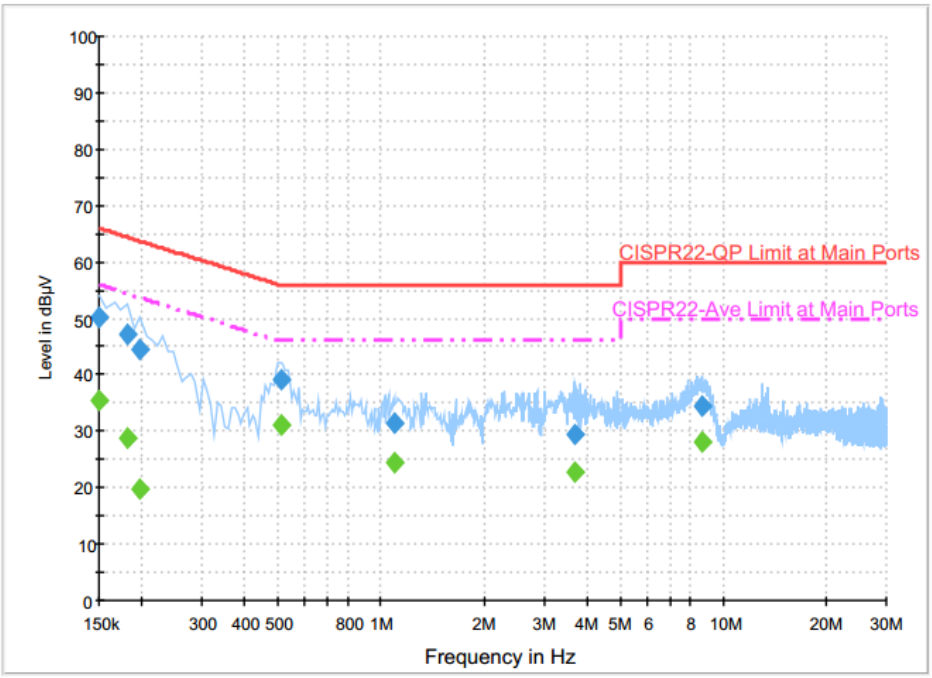
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	52.0	Off	L1	19.6	14.0	66.0
0.174000	44.8	Off	L1	19.6	20.0	64.8
0.494000	37.9	Off	L1	19.6	18.2	56.1
0.646000	29.7	Off	L1	19.6	26.3	56.0
1.070000	30.6	Off	L1	19.7	25.4	56.0
2.006000	31.8	Off	L1	19.7	24.2	56.0
2.302000	30.2	Off	L1	19.6	25.8	56.0
3.510000	30.5	Off	L1	19.8	25.5	56.0
9.022000	35.0	Off	L1	20.0	25.0	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	35.2	Off	L1	19.6	20.8	56.0
0.174000	24.9	Off	L1	19.6	29.9	54.8
0.494000	29.8	Off	L1	19.6	16.3	46.1
0.646000	22.5	Off	L1	19.6	23.5	46.0
1.070000	23.7	Off	L1	19.7	22.3	46.0
2.006000	24.3	Off	L1	19.7	21.7	46.0
2.302000	22.4	Off	L1	19.6	23.6	46.0
3.510000	20.9	Off	L1	19.8	25.1	46.0
9.022000	28.5	Off	L1	20.0	21.5	50.0

Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Arthur Hsieh	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + POE + LAN Link		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	50.3	Off	N	19.6	15.7	66.0
0.182000	47.0	Off	N	19.6	17.4	64.4
0.198000	44.3	Off	N	19.6	19.4	63.7
0.510000	39.2	Off	N	19.6	16.8	56.0
1.094000	31.4	Off	N	19.6	24.6	56.0
3.670000	29.3	Off	N	19.7	26.7	56.0
8.718000	34.4	Off	N	20.0	25.6	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	35.3	Off	N	19.6	20.7	56.0
0.182000	28.9	Off	N	19.6	25.5	54.4
0.198000	19.8	Off	N	19.6	33.9	53.7
0.510000	31.1	Off	N	19.6	14.9	46.0
1.094000	24.5	Off	N	19.6	21.5	46.0
3.670000	22.8	Off	N	19.7	23.2	46.0
8.718000	28.0	Off	N	20.0	22.0	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 $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

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)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	4.00	4.00	4.00	7.01	0.00	1.01

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
AC Power Source	AC POWER	AFC-500W	F104070011	50Hz~60Hz	Dec. 02, 2015	Jun. 24, 2016 ~ Jul. 25, 2016	Dec. 01, 2016	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1132003	300MHz~40GHz	Aug. 12, 2015	Jun. 24, 2016 ~ Jul. 25, 2016	Aug. 11, 2016	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 12, 2015	Jun. 24, 2016 ~ Jul. 25, 2016	Aug. 11, 2016	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 23, 2015	Jun. 24, 2016 ~ Jul. 25, 2016	Nov. 22, 2016	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 08, 2015	Jun. 24, 2016 ~ Jul. 25, 2016	Sep. 07, 2016	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Sep. 01, 2016	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Nov. 19, 2016	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D	35414	30MHz~1GHz	Nov. 17, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Nov. 16, 2016	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 08, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Oct. 07, 2016	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 19, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Nov. 18, 2016	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1902247	1GHz~18GHz	Jun. 22, 2016	Jul. 18, 2016 ~ Jul. 23, 2016	Jun. 21, 2017	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHZ	Sep. 24, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Sep. 23, 2016	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jul. 18, 2016 ~ Jul. 23, 2016	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jul. 18, 2016 ~ Jul. 23, 2016	N/A	Radiation (03CH11-HY)
Preamplifier	MITEQ	TTA0204	1872107	2GHz~40GHz	Feb. 15, 2016	Jul. 18, 2016 ~ Jul. 23, 2016	Feb. 14, 2017	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Jul. 18, 2016 ~ Jul. 23, 2016	Nov. 01, 2016	Radiation (03CH11-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 30, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Jun. 30, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Jun. 30, 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 : FR661624B

Test Engineer:	Bill Kuo	Temperature:	21~25	°C
Test Date:	2016/06/24 ~ 2016/7/25	Relative Humidity:	51~54	%

Report Number : FR661624B

TEST RESULTS DATA
26dB and 99% OBW

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	17.60	17.50	24.47	23.52	-		22.43			
11a	6Mbps	2	44	5220	17.65	17.35	24.24	22.92	-		22.39			
11a	6Mbps	2	48	5240	17.65	17.65	23.64	23.16	-		22.47			
HT20	MCS0	2	36	5180	18.75	18.75	24.00	24.84	-		22.73			
HT20	MCS0	2	44	5220	18.65	18.55	24.84	24.54	-		22.68			
HT20	MCS0	2	48	5240	18.70	18.50	25.44	24.72	-		22.67			
HT40	MCS0	2	38	5190	36.90	36.90	47.40	45.40	-		23.01			
HT40	MCS0	2	46	5230	36.70	36.70	45.40	44.80	-		23.01			
VHT20	MCS0	2	36	5180	18.65	18.70	24.36	24.48	-		22.71			
VHT20	MCS0	2	44	5220	18.65	18.65	25.32	24.96	-		22.71			
VHT20	MCS0	2	48	5240	18.75	18.45	24.36	24.60	-		22.66			
VHT40	MCS0	2	38	5190	36.80	36.70	46.00	45.00	-		23.01			
VHT40	MCS0	2	46	5230	36.60	36.60	44.80	46.00	-		23.01			
VHT80	MCS0	2	42	5210	76.08	75.96	88.32	89.28	-		23.01			

Report Number : FR661624B

TEST RESULTS DATA
Average Power Table

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	0.25	0.25	13.74	13.70	16.73	17.00		4.00			Pass
11a	6Mbps	2	44	5220	0.25	0.25	14.04	13.40	16.74	17.00		4.00			Pass
11a	6Mbps	2	48	5240	0.25	0.25	14.30	13.60	16.98	17.00		4.00			Pass
HT20	MCS0	2	36	5180	0.23	0.30	13.68	13.67	16.69	17.00		4.00			Pass
HT20	MCS0	2	44	5220	0.23	0.30	14.02	13.64	16.85	17.00		4.00			Pass
HT20	MCS0	2	48	5240	0.23	0.30	14.32	13.58	16.98	17.00		4.00			Pass
HT40	MCS0	2	38	5190	0.43	0.44	8.49	7.52	11.04	17.00		4.00			Pass
HT40	MCS0	2	46	5230	0.43	0.44	13.84	13.63	16.75	17.00		4.00			Pass
VHT20	MCS0	2	36	5180	0.23	0.23	13.75	13.58	16.68	17.00		4.00			Pass
VHT20	MCS0	2	44	5220	0.23	0.23	14.12	13.49	16.83	17.00		4.00			Pass
VHT20	MCS0	2	48	5240	0.23	0.23	14.23	13.62	16.95	17.00		4.00			Pass
VHT40	MCS0	2	38	5190	0.47	0.47	8.16	7.69	10.94	17.00		4.00			Pass
VHT40	MCS0	2	46	5230	0.47	0.47	13.76	13.66	16.72	17.00		4.00			Pass
VHT80	MCS0	2	42	5210	0.86	0.86	6.80	6.19	9.51	17.00		4.00			Pass

Report Number : FR661624B

TEST RESULTS DATA
Power Spectral Density

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	0.25	0.25			4.52	15.99		7.01			Pass
11a	6Mbps	2	44	5220	0.25	0.25			4.74	15.99		7.01			Pass
11a	6Mbps	2	48	5240	0.25	0.25			5.00	15.99		7.01			Pass
HT20	MCS0	2	36	5180	0.23	0.30			4.26	15.99		7.01			Pass
HT20	MCS0	2	44	5220	0.23	0.30			4.40	15.99		7.01			Pass
HT20	MCS0	2	48	5240	0.23	0.30			4.71	15.99		7.01			Pass
HT40	MCS0	2	38	5190	0.43	0.44			-4.13	15.99		7.01			Pass
HT40	MCS0	2	46	5230	0.43	0.44			1.23	15.99		7.01			Pass
VHT20	MCS0	2	36	5180	0.23	0.23			4.33	15.99		7.01			Pass
VHT20	MCS0	2	44	5220	0.23	0.23			4.41	15.99		7.01			Pass
VHT20	MCS0	2	48	5240	0.23	0.23			4.74	15.99		7.01			Pass
VHT40	MCS0	2	38	5190	0.47	0.47			-4.39	15.99		7.01			Pass
VHT40	MCS0	2	46	5230	0.47	0.47			1.29	15.99		7.01			Pass
VHT80	MCS0	2	42	5210	0.86	0.86			-8.48	15.99		7.01			Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stablility (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	108	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	132	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	120	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	-30	120	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	50	120	

Appendix B. Radiated Spurious Emission

Test Engineer :	Ken Wu, J.C. Liang, Jacky Hung	Temperature :	20~23°C
		Relative Humidity :	45~50%

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5133.9	49.15	-24.85	74	40.84	31.56	10.22	33.47	154	187	P	H
		5148.2	41.3	-12.7	54	32.96	31.58	10.23	33.47	154	187	A	H
		5180	102.85	-16.15	119	94.47	31.62	10.23	33.47	154	187	P	H
		5180	94.42	-24.58	119	86.04	31.62	10.23	33.47	154	187	A	H
													H
													H
		5149.76	57.71	-16.29	74	49.37	31.58	10.23	33.47	142	360	P	V
		5150	51.22	-2.78	54	42.88	31.58	10.23	33.47	142	360	A	V
		5180	115.06	-3.94	119	106.68	31.62	10.23	33.47	142	360	P	V
	*	5180	107.07	-	-	98.69	31.62	10.23	33.47	142	360	A	V
													V
													V
802.11a CH 44 5220MHz		5083.46	49.32	-24.68	74	41.08	31.5	10.21	33.47	111	195	P	H
		5079.3	40.09	-13.91	54	31.85	31.5	10.21	33.47	111	195	A	H
		5220	102.32	-16.68	119	93.89	31.66	10.24	33.47	111	195	P	H
		5220	94.22	-4.78	99	85.79	31.66	10.24	33.47	111	195	A	H
		5359.68	48.64	-25.36	74	39.55	31.82	10.75	33.48	111	195	P	H
		5443.44	40.26	-13.74	54	30.98	31.92	10.84	33.48	111	195	A	H
		5144.82	53.91	-20.09	74	45.57	31.58	10.23	33.47	140	360	P	V
		5123.5	44.19	-9.81	54	35.88	31.56	10.22	33.47	140	360	A	V
		5220	114.32	-4.68	119	105.89	31.66	10.24	33.47	140	360	P	V
	*	5220	106.12	-	-	97.69	31.66	10.24	33.47	140	360	A	V
		5419.68	52.15	-21.85	74	42.86	31.9	10.87	33.48	140	360	P	V
		5424.72	43.94	-10.06	54	34.68	31.9	10.84	33.48	140	360	A	V

802.11a CH 48 5240MHz		5003.38	49.12	-24.88	74	41	31.4	10.19	33.47	122	192	P	H
		5100.36	40.21	-13.79	54	31.94	31.52	10.22	33.47	122	192	A	H
		5240	102.95	-16.05	119	94.37	31.68	10.37	33.47	122	192	P	H
		5240	95.13	-3.87	99	86.55	31.68	10.37	33.47	122	192	A	H
		5438.4	48.43	-25.57	74	39.15	31.92	10.84	33.48	122	192	P	H
		5460	39.97	-14.03	54	30.67	31.94	10.84	33.48	122	192	A	H
		5123.24	54.36	-19.64	74	46.05	31.56	10.22	33.47	135	0	P	V
		5137.02	44.56	-9.44	54	36.25	31.56	10.22	33.47	135	0	A	V
		5240	114.87	-4.13	119	106.29	31.68	10.37	33.47	135	0	P	V
	*	5240	106.77	-	-	98.19	31.68	10.37	33.47	135	0	A	V
		5412.48	52.45	-21.55	74	43.16	31.9	10.87	33.48	135	0	P	V
		5429.52	44.48	-9.52	54	35.2	31.92	10.84	33.48	135	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2	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 36 5180MHz		10360	56.73	-17.27	74	53.16	39.79	14.86	51.08	297	0	P	H
		10360	48.4	-5.6	54	44.83	39.79	14.86	51.08	297	0	A	H
		15540	46.79	-27.21	74	42.1	38.6	17.89	51.8	100	0	P	H
													H
		10360	52.94	-21.06	74	49.37	39.79	14.86	51.08	371	0	P	V
		10360	44.41	-9.59	54	40.84	39.79	14.86	51.08	371	0	A	V
		15540	44.03	-29.97	74	39.34	38.6	17.89	51.8	100	0	P	V
													V
802.11a CH 44 5220MHz		10440	55.69	-18.31	74	52.05	39.89	14.91	51.16	317	0	P	H
		10440	47.38	-6.62	54	43.74	39.89	14.91	51.16	317	0	A	H
		15660	46.19	-27.81	74	41.82	38.23	17.94	51.8	100	0	P	H
													H
		10440	49.89	-24.11	74	46.25	39.89	14.91	51.16	100	0	P	V
		15660	43.52	-30.48	74	39.15	38.23	17.94	51.8	100	0	P	V
													V
													V
802.11a CH 48 5240MHz		10480	56.2	-17.8	74	52.49	39.97	14.94	51.2	100	340	P	H
		10480	45.25	-8.75	54	41.54	39.97	14.94	51.2	100	340	A	H
		15720	44.77	-29.23	74	40.57	38.03	17.97	51.8	100	0	P	H
													H
		10480	51.15	-22.85	74	47.44	39.97	14.94	51.2	298	0	P	V
		10480	41.88	-12.12	54	38.17	39.97	14.94	51.2	298	0	A	V
		15720	42.71	-31.29	74	38.51	38.03	17.97	51.8	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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)
		5146.64	49.34	-24.66	74	41	31.58	10.23	33.47	154	187	P	H
		5146.9	41.47	-12.53	54	33.13	31.58	10.23	33.47	154	187	A	H
		5180	102.67	-16.33	119	94.29	31.62	10.23	33.47	154	187	P	H
		5180	94.47	-4.53	99	86.09	31.62	10.23	33.47	154	187	A	H
802.11n													H
HT20													H
CH 36		5150	58.25	-15.75	74	49.91	31.58	10.23	33.47	142	360	P	V
5180MHz		5150	52.63	-1.37	54	44.29	31.58	10.23	33.47	142	360	A	V
		5180	114.77	-4.23	119	106.39	31.62	10.23	33.47	142	360	P	V
	*	5180	106.47	-	-	98.09	31.62	10.23	33.47	142	360	A	V
													V
													V
		5109.46	48.51	-25.49	74	40.22	31.54	10.22	33.47	111	195	P	H
		5101.66	40.15	-13.85	54	31.88	31.52	10.22	33.47	111	195	A	H
		5220	102.42	-16.58	119	93.99	31.66	10.24	33.47	111	195	P	H
		5220	93.32	-5.68	99	84.89	31.66	10.24	33.47	111	195	A	H
802.11n		5435.04	48.81	-25.19	74	39.53	31.92	10.84	33.48	111	195	P	H
HT20		5442.72	40.12	-13.88	54	30.84	31.92	10.84	33.48	111	195	A	H
CH 44		5111.8	52.62	-21.38	74	44.33	31.54	10.22	33.47	149	360	P	V
5220MHz		5131.82	44.45	-9.55	54	36.14	31.56	10.22	33.47	149	360	A	V
		5220	114.12	-4.88	119	105.69	31.66	10.24	33.47	149	360	P	V
	*	5220	106.21	-	-	97.78	31.66	10.24	33.47	149	360	A	V
		5396.16	51.71	-22.29	74	42.44	31.88	10.87	33.48	149	360	P	V
		5428.8	44.05	-9.95	54	34.77	31.92	10.84	33.48	149	360	A	V

		5040.56	49.09	-24.91	74	40.9	31.46	10.2	33.47	127	186	P	H
		5103.48	40.15	-13.85	54	31.88	31.52	10.22	33.47	127	186	A	H
		5240	101.63	-17.37	119	93.05	31.68	10.37	33.47	127	186	P	H
		5240	93.47	-5.53	99	84.89	31.68	10.37	33.47	127	186	A	H
802.11n		5398.8	48.42	-25.58	74	39.15	31.88	10.87	33.48	127	186	P	H
HT20		5453.28	39.95	-14.05	54	30.65	31.94	10.84	33.48	127	186	A	H
CH 48		5127.66	53.54	-20.46	74	45.23	31.56	10.22	33.47	136	360	P	V
5240MHz		5130.78	44.71	-9.29	54	36.4	31.56	10.22	33.47	136	360	A	V
		5240	114.37	-4.63	119	105.79	31.68	10.37	33.47	136	360	P	V
	*	5240	106.47	-	-	97.89	31.68	10.37	33.47	136	360	A	V
		5382.72	52.61	-21.39	74	43.36	31.86	10.87	33.48	136	360	P	V
		5425.2	44.26	-9.74	54	35	31.9	10.84	33.48	136	360	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	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)
		10360	55.03	-18.97	74	51.46	39.79	14.86	51.08	100	334	P	H
		10360	46.21	-7.79	54	42.64	39.79	14.86	51.08	100	334	A	H
802.11n		15540	45.35	-28.65	74	40.66	38.6	17.89	51.8	100	0	P	H
HT20													H
CH 36		10360	52.44	-21.56	74	48.87	39.79	14.86	51.08	383	355	P	V
5180MHz		10360	43.82	-10.18	54	40.25	39.79	14.86	51.08	383	355	A	V
		15540	44.2	-29.8	74	39.51	38.6	17.89	51.8	100	0	P	V
													V
		10440	52.02	-21.98	74	48.38	39.89	14.91	51.16	100	358	P	H
		10440	43.56	-10.44	54	39.92	39.89	14.91	51.16	100	358	A	H
802.11n		15660	45.02	-28.98	74	40.65	38.23	17.94	51.8	100	0	P	H
HT20													H
CH 44		10440	48.91	-25.09	74	45.27	39.89	14.91	51.16	100	0	P	V
5220MHz		15660	43.33	-30.67	74	38.96	38.23	17.94	51.8	100	0	P	V
													V
													V
		10480	50.41	-23.59	74	46.7	39.97	14.94	51.2	100	0	P	H
		15720	44.56	-29.44	74	40.36	38.03	17.97	51.8	100	0	P	H
802.11n													H
HT20													H
CH 48		10480	50.96	-23.04	74	47.25	39.97	14.94	51.2	100	0	P	V
5240MHz		15720	41.86	-32.14	74	37.66	38.03	17.97	51.8	100	0	P	V
													V
													V

Remark

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

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	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)
802.11n HT40 CH 38 5190MHz		5024.96	48.76	-25.24	74	40.59	31.44	10.2	33.47	121	193	P	H
		5143.52	41.58	-12.42	54	33.24	31.58	10.23	33.47	121	193	A	H
		5190	94.19	-24.81	119	85.8	31.62	10.24	33.47	121	193	P	H
		5190	86.29	-12.71	99	77.9	31.62	10.24	33.47	121	193	A	H
		5452.08	48.8	-25.2	74	39.5	31.94	10.84	33.48	121	193	P	H
		5409.36	40.08	-13.92	54	30.81	31.88	10.87	33.48	121	193	A	H
		5149.24	59.8	-14.2	74	51.46	31.58	10.23	33.47	144	360	P	V
		5149.5	53.39	-0.61	54	45.05	31.58	10.23	33.47	144	360	A	V
		5190	105.89	-13.11	119	97.5	31.62	10.24	33.47	144	360	P	V
		5190	97.97	-1.03	99	89.58	31.62	10.24	33.47	144	360	A	V
		5422.08	50.01	-23.99	74	40.75	31.9	10.84	33.48	144	360	P	V
		5428.56	41.69	-12.31	54	32.41	31.92	10.84	33.48	144	360	A	V
802.11n HT40 CH 46 5230MHz		5088.4	49.32	-24.68	74	41.08	31.5	10.21	33.47	112	193	P	H
		5033.8	40.63	-13.37	54	32.46	31.44	10.2	33.47	112	193	A	H
		5230	99.27	-19.73	119	90.69	31.68	10.37	33.47	112	193	P	H
		5230	91.07	-7.93	99	82.49	31.68	10.37	33.47	112	193	A	H
		5429.28	48.52	-25.48	74	39.24	31.92	10.84	33.48	112	193	P	H
		5450.4	40.42	-13.58	54	31.12	31.94	10.84	33.48	112	193	A	H
		5146.64	53.36	-20.64	74	45.02	31.58	10.23	33.47	135	360	P	V
		5147.42	45.1	-8.9	54	36.76	31.58	10.23	33.47	135	360	A	V
		5230	110.87	-8.13	119	102.29	31.68	10.37	33.47	135	360	P	V
	*	5230	103.07	-	-	94.49	31.68	10.37	33.47	135	360	A	V
		5416.32	51.02	-22.98	74	41.73	31.9	10.87	33.48	135	360	P	V
		5425.44	43.61	-10.39	54	34.35	31.9	10.84	33.48	135	360	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	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)
		10380	43.01	-30.99	74	39.46	39.81	14.86	51.12	100	0	P	H
		15570	42.12	-31.88	74	37.53	38.49	17.9	51.8	100	0	P	H
802.11n													H
HT40													H
CH 38		10380	43.54	-30.46	74	39.99	39.81	14.86	51.12	100	0	P	V
5190MHz		15570	42.89	-31.11	74	38.3	38.49	17.9	51.8	100	0	P	V
													V
													V
		10460	48.13	-25.87	74	44.5	39.92	14.91	51.2	100	0	P	H
		15690	40.96	-33.04	74	36.67	38.13	17.96	51.8	100	0	P	H
802.11n													H
HT40													H
CH 46		10460	45.92	-28.08	74	42.29	39.92	14.91	51.2	100	0	P	V
5230MHz		15690	41.63	-32.37	74	37.34	38.13	17.96	51.8	100	0	P	V
													V
													V

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

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	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)
802.11ac VHT80 CH 42 5210MHz		5122.72	49.55	-24.45	74	41.24	31.56	10.22	33.47	148	197	P	H
		5138.84	42.99	-11.01	54	34.68	31.56	10.22	33.47	148	197	A	H
		5210	88.55	-30.45	119	80.12	31.66	10.24	33.47	148	197	P	H
		5210	81.55	-17.45	99	73.12	31.66	10.24	33.47	148	197	A	H
		5430.24	47.38	-26.62	74	38.1	31.92	10.84	33.48	148	197	P	H
		5392.56	41.22	-12.78	54	31.97	31.86	10.87	33.48	148	197	A	H
		5148.98	59.11	-14.89	74	50.77	31.58	10.23	33.47	140	360	P	V
		5149.5	52.82	-1.18	54	44.48	31.58	10.23	33.47	140	360	A	V
		5210	101.59	-17.41	119	93.16	31.66	10.24	33.47	140	360	P	V
		5210	93.92	-5.08	99	85.49	31.66	10.24	33.47	140	360	A	V
		5434.08	50.81	-23.19	74	41.53	31.92	10.84	33.48	140	360	P	V
		5440.8	42.84	-11.16	54	33.56	31.92	10.84	33.48	140	360	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2	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)
		10420	43.21	-30.79	74	39.61	39.87	14.89	51.16	100	0	P	H
		15630	40.41	-33.59	74	35.98	38.29	17.94	51.8	100	0	P	H
802.11ac													H
VHT80													H
CH 42		10420	42.2	-31.8	74	38.6	39.87	14.89	51.16	100	0	P	V
5210MHz		15630	41.49	-32.51	74	37.06	38.29	17.94	51.8	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

WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		81.57	33.29	-6.71	40	50.09	13.82	1.17	31.79	-	-	P	H
		215.49	37.15	-6.35	43.5	50.99	16.2	1.74	31.78	125	233	P	H
		224.94	37.07	-8.93	46	50.32	16.55	1.98	31.78	-	-	P	H
		302.8	32.62	-13.38	46	42.37	19.78	2.23	31.76	-	-	P	H
		400.1	30.35	-15.65	46	37.15	22.42	2.58	31.8	-	-	P	H
		650	34.46	-11.54	46	36.94	26.2	3.36	32.04	-	-	P	H
													H
													H
													H
													H
													H
													H
		31.89	35.79	-4.21	40	42.03	24.66	0.93	31.83	-	-	P	V
		81.57	36.68	-3.32	40	53.48	13.82	1.17	31.79	167	212	P	V
		128.01	33.65	-9.85	43.5	46.01	17.94	1.48	31.78	-	-	P	V
		400.1	33.69	-12.31	46	40.49	22.42	2.58	31.8	-	-	P	V
		650	31.84	-14.16	46	34.32	26.2	3.36	32.04	-	-	P	V
		941.2	39.39	-6.61	46	36.26	30.35	3.89	31.11	-	-	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

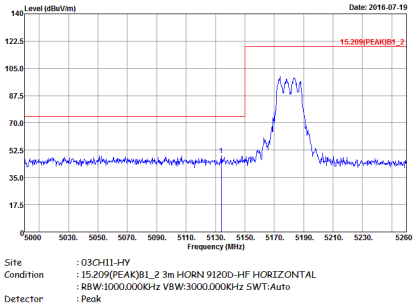
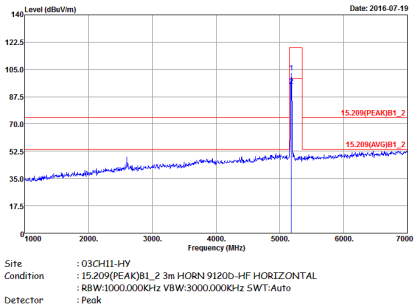
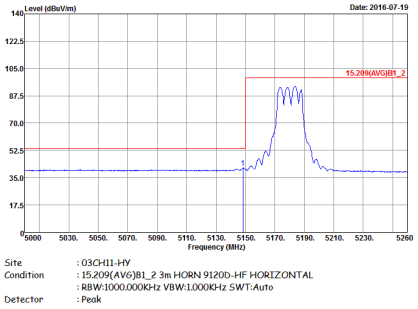
Test Engineer :	Ken Wu, J.C. Liang, Jacky Hung	**Temperature :**	20~23°C
		Relative Humidity :	45~50%

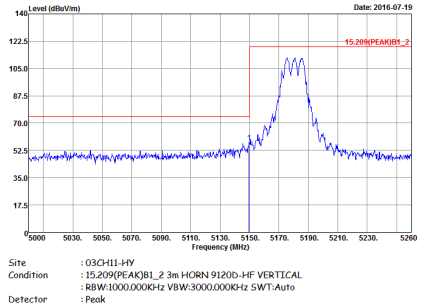
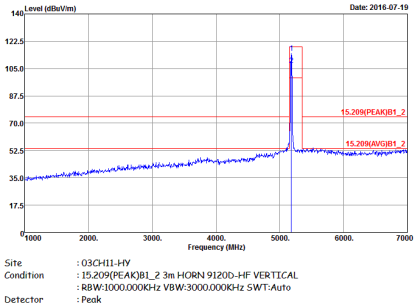
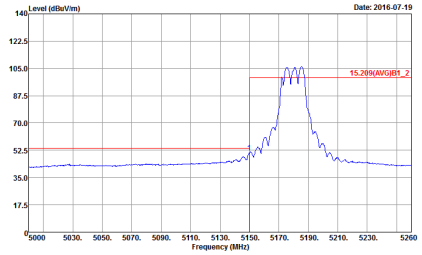
Note symbol

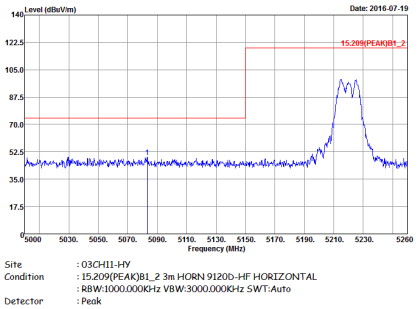
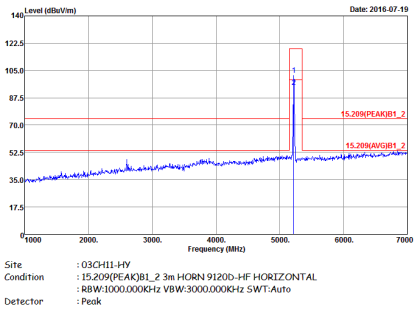
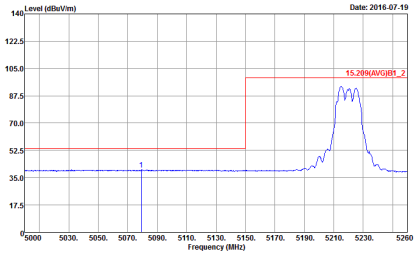
-L	**Low channel location**
-R	**High channel location**

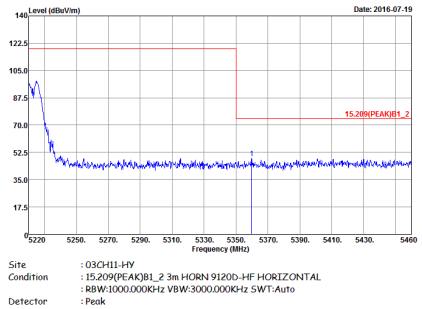
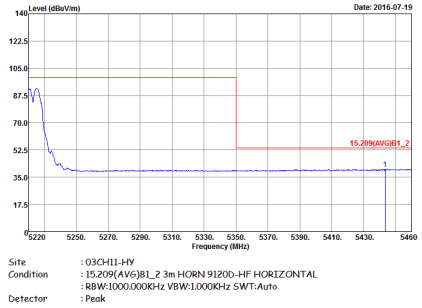
Band 1 - 5150~5250MHz

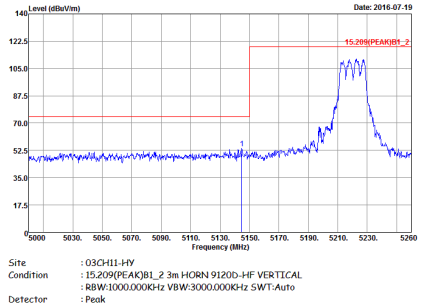
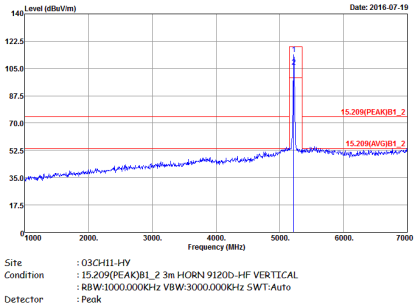
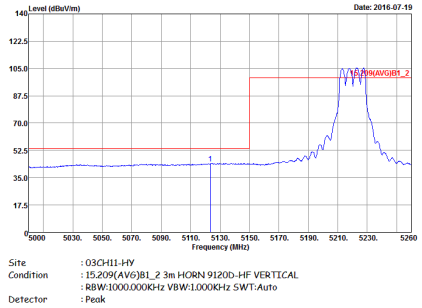
WIFI 802.11a (Band Edge @ 3m)

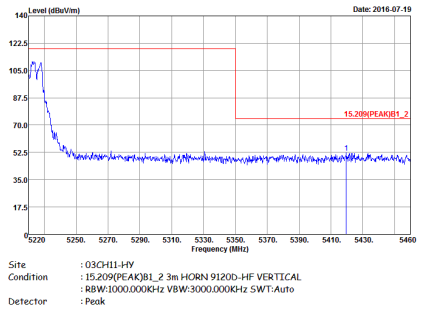
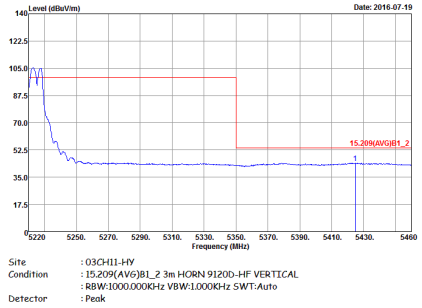
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

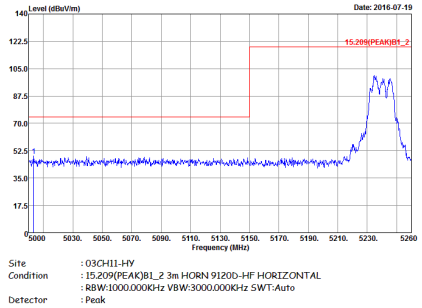
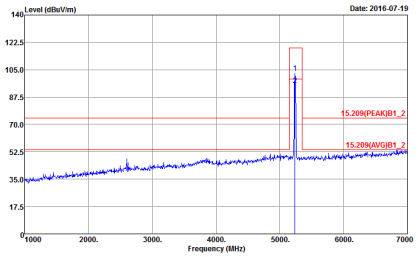
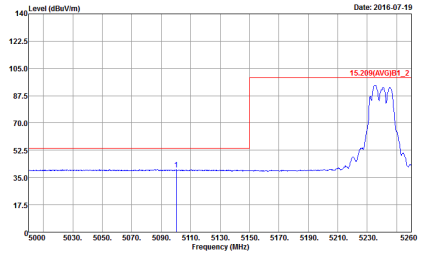
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

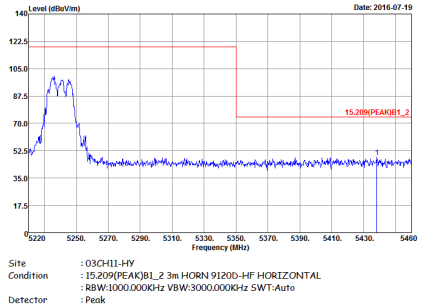
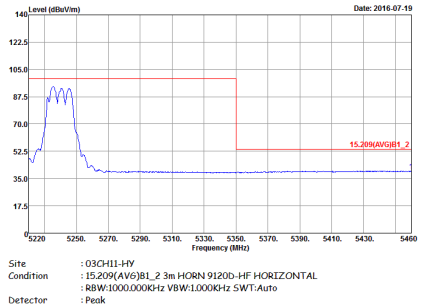
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

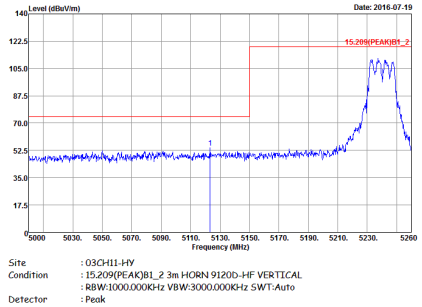
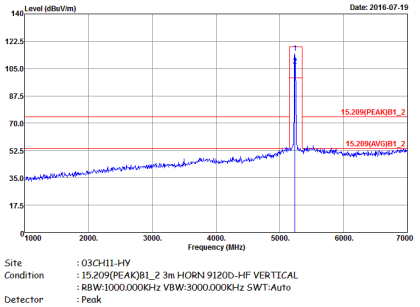
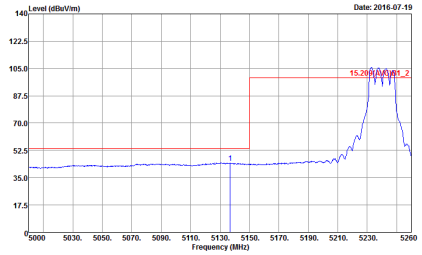
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

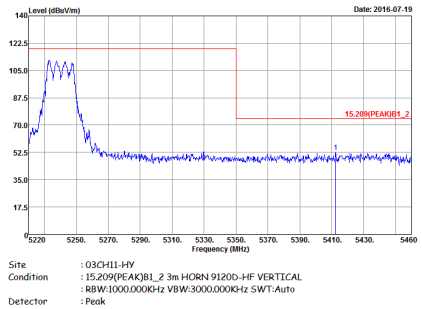
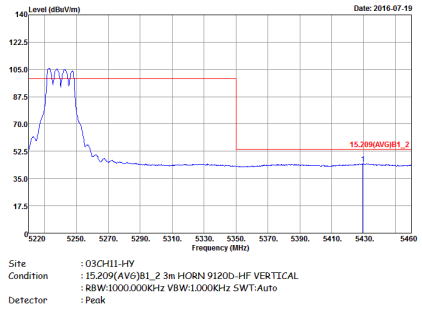
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH44 5220MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

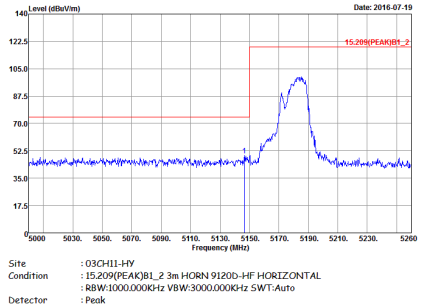
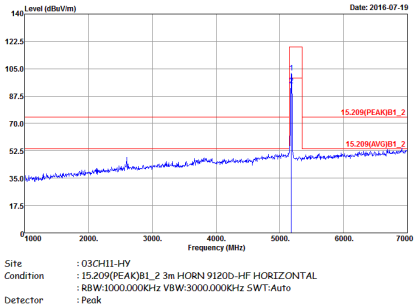
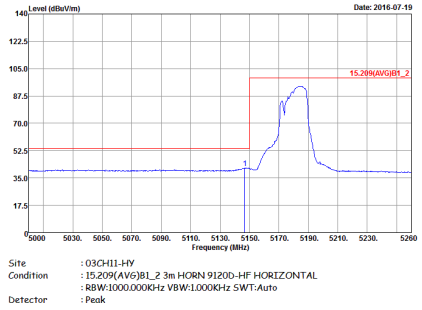
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AV6)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

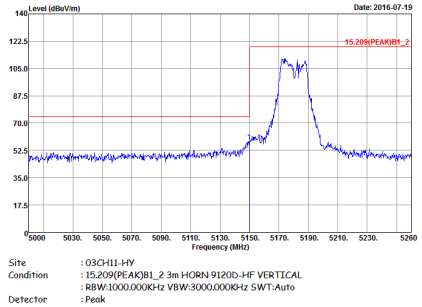
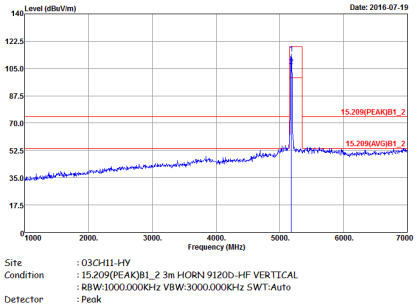
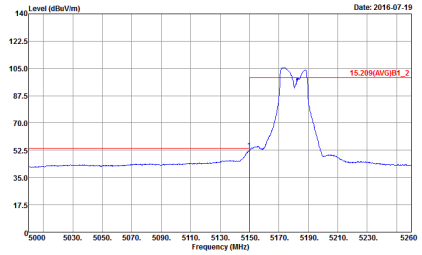
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AV6)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

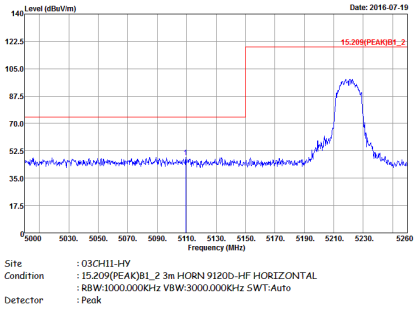
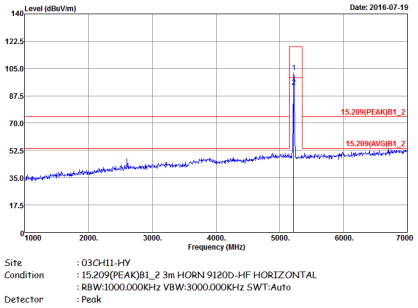
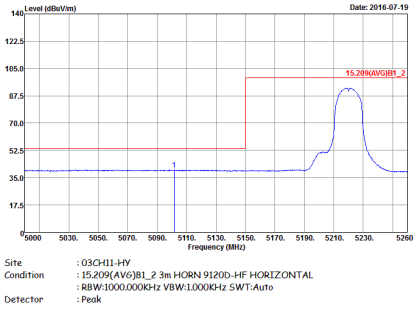
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

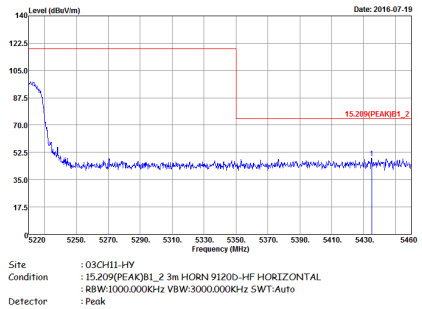
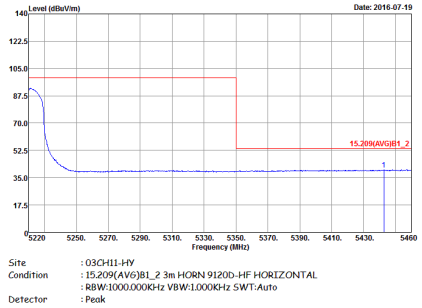
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11a CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

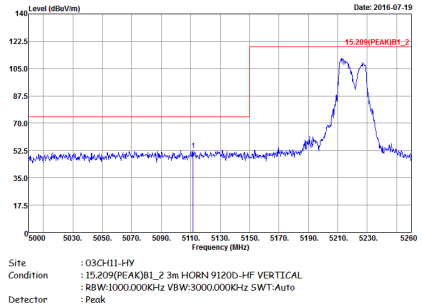
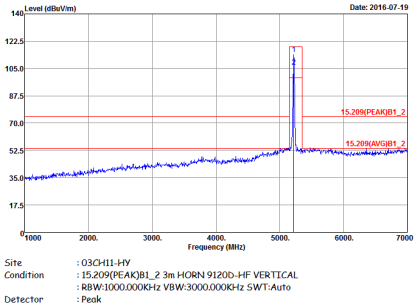
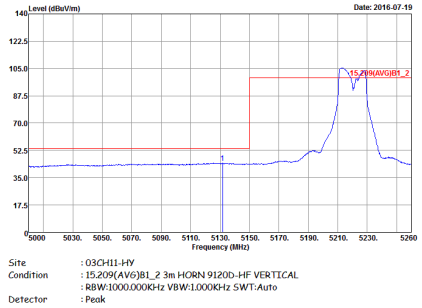
Band 1 5150~5250MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

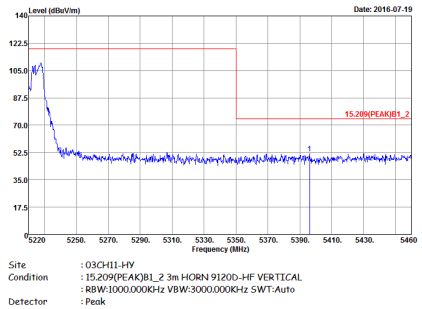
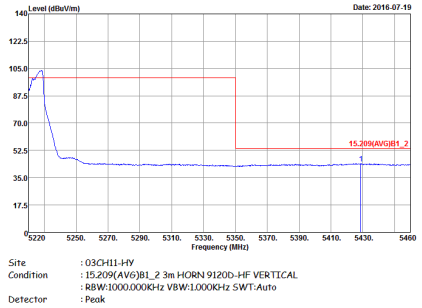
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

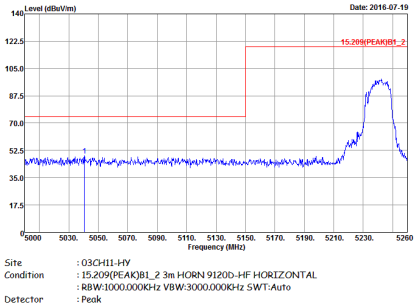
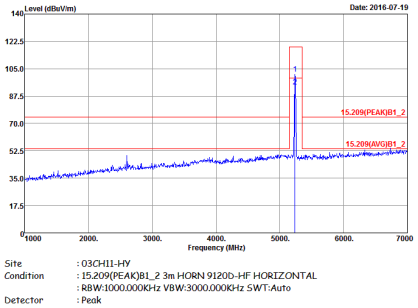
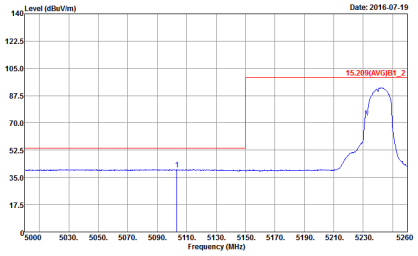
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

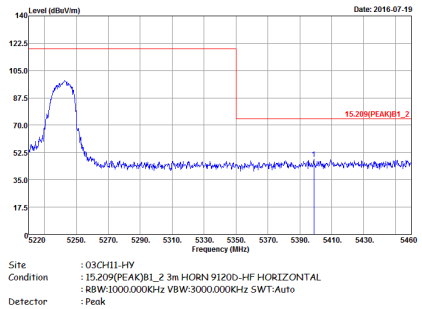
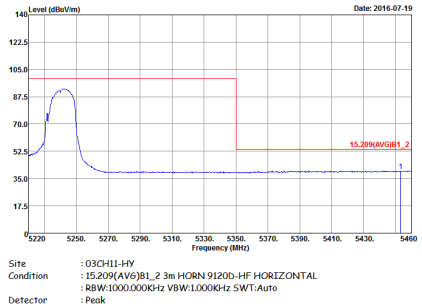
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

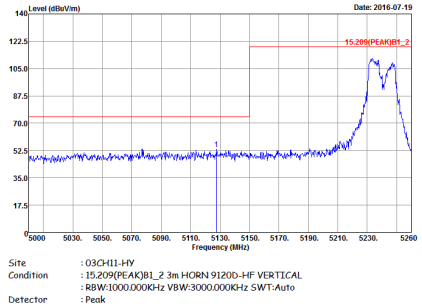
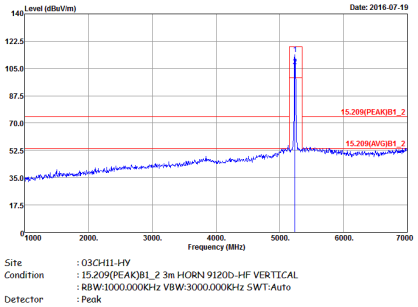
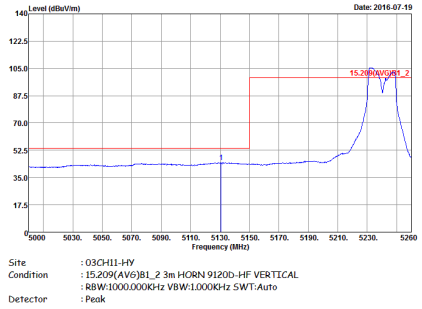
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1+2	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

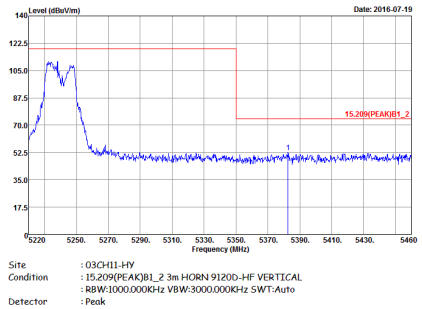
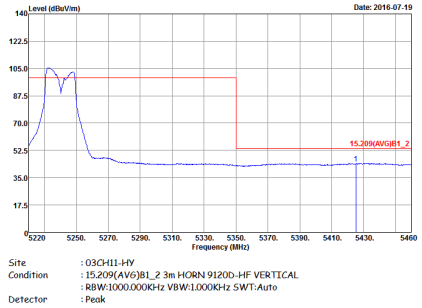
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH44 5220MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

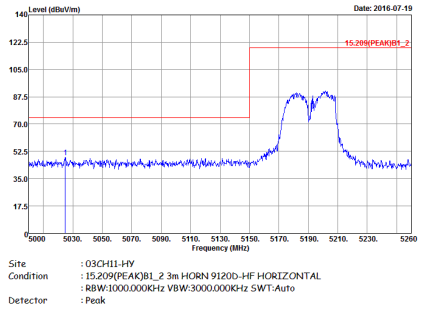
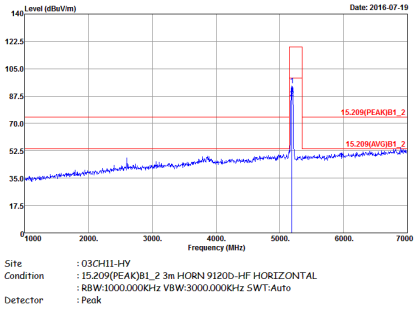
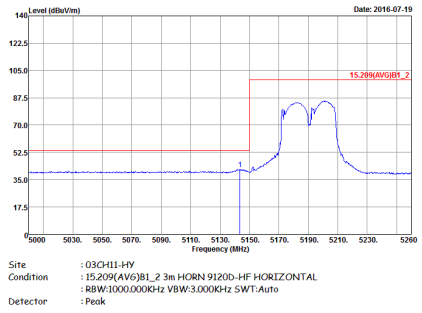
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

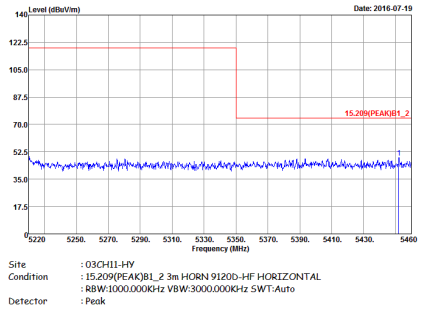
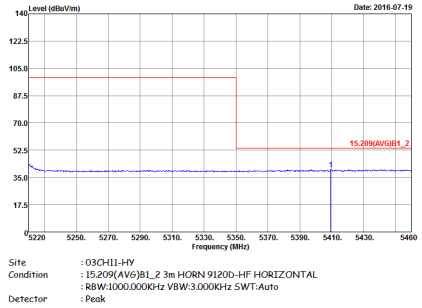
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AV6)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak	Left blank

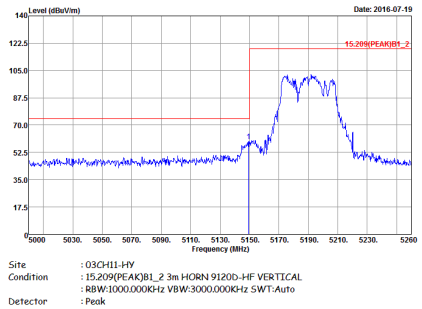
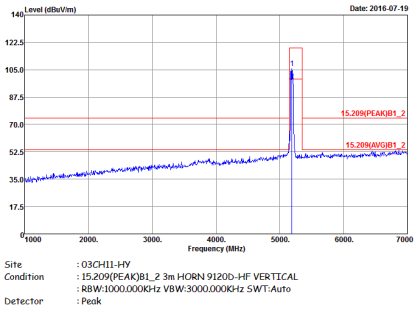
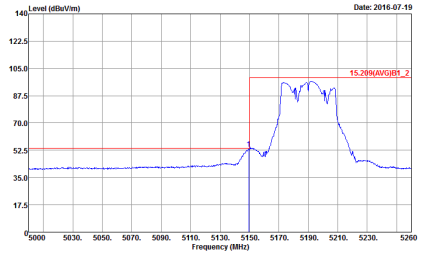
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

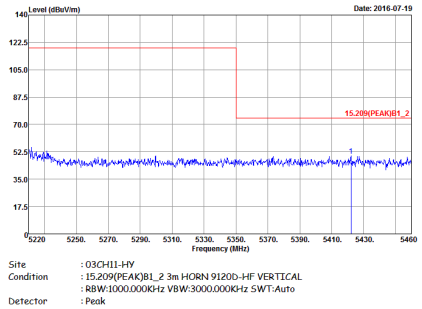
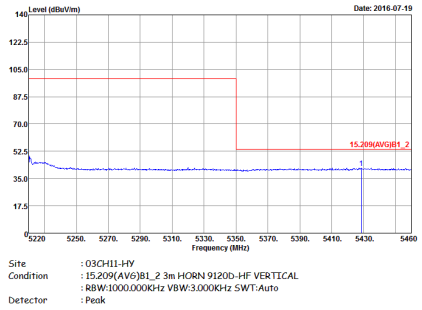
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT20 CH48 5240MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

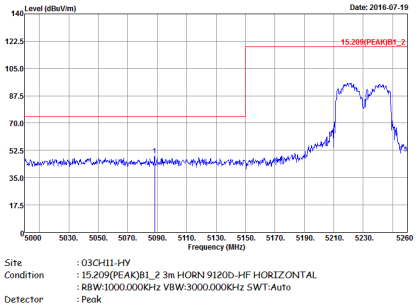
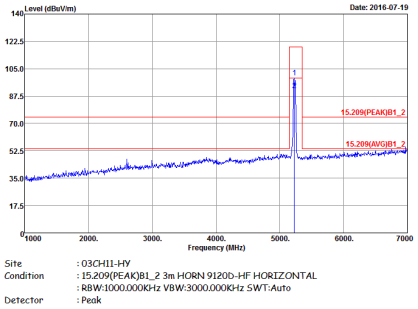
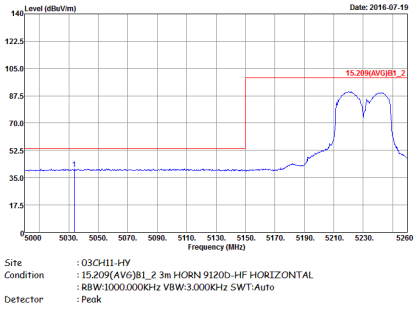
Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

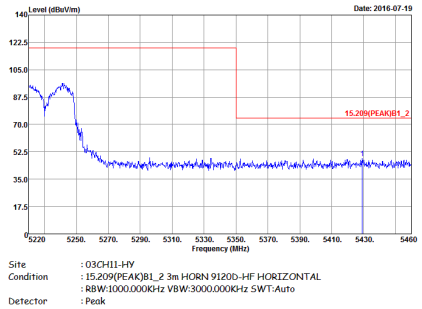
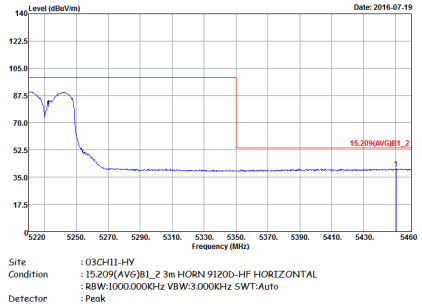
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

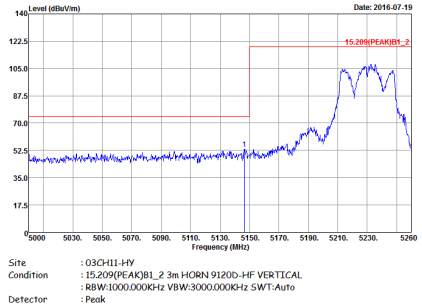
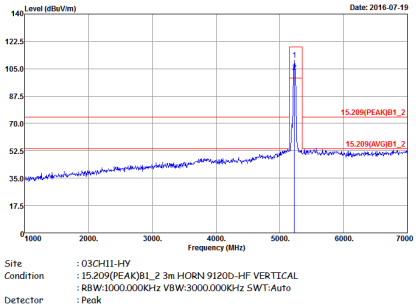
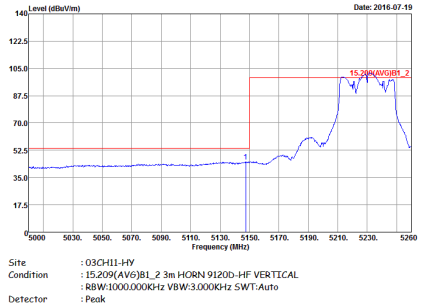
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak	Left blank

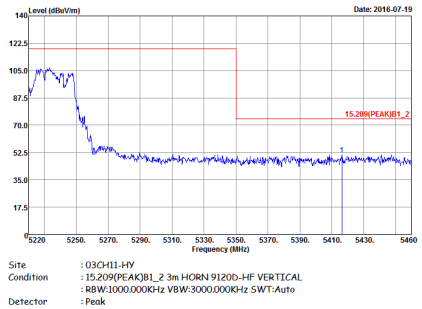
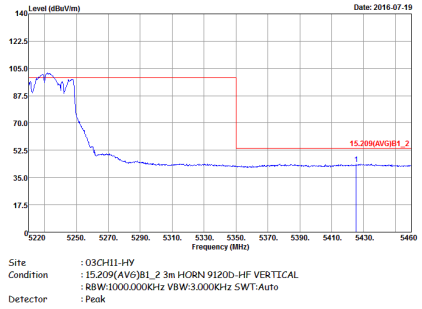
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak
Avg.	 Site : 03CH11-HY Condition : 15.209(AV6)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak	Left blank

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1+2	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

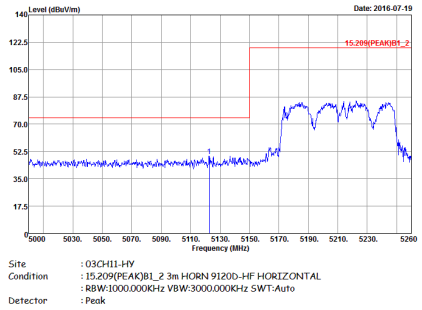
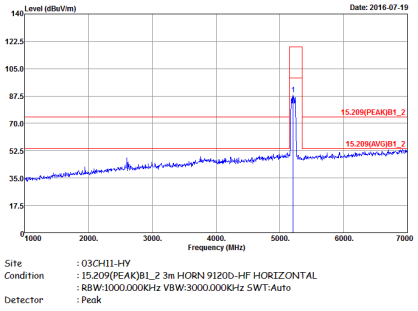
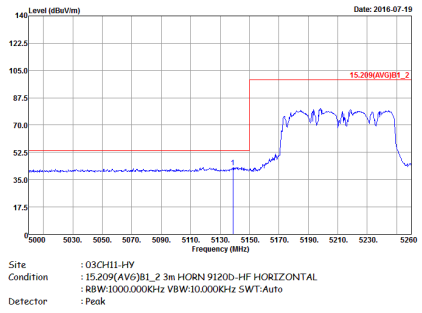
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

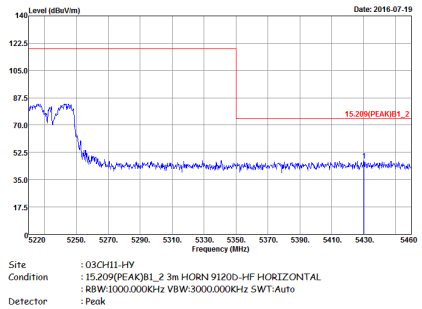
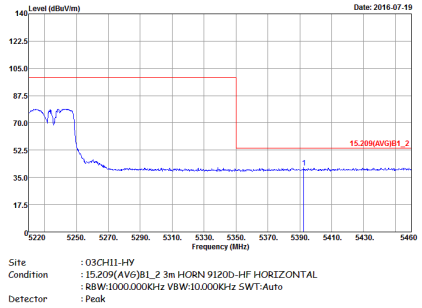
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak	Left blank

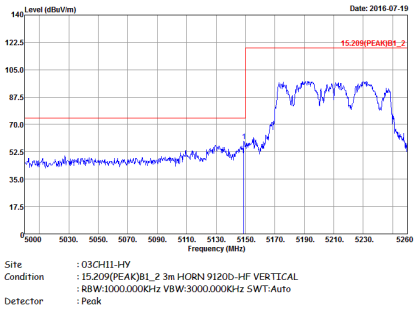
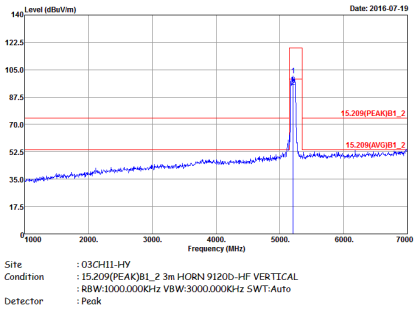
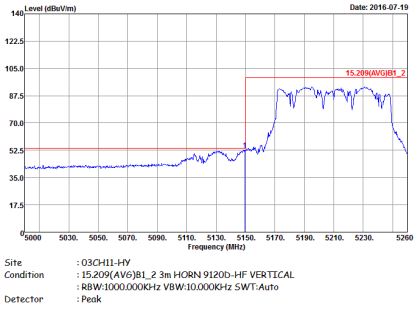
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

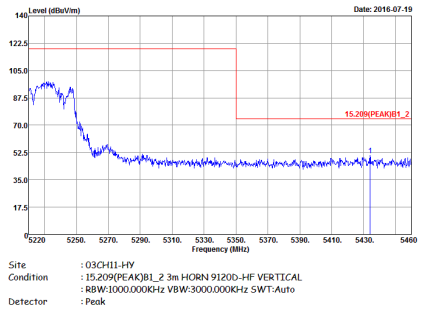
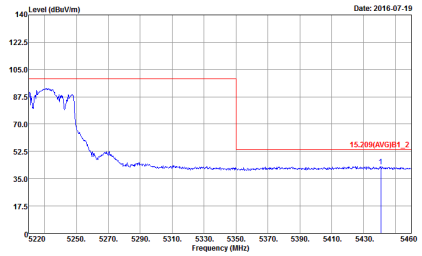
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH46 5230MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AV6)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak	Left blank

Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Horizontal	Fundamental
Peak		
Avg.		Left blank

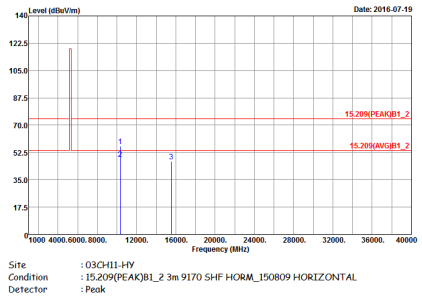
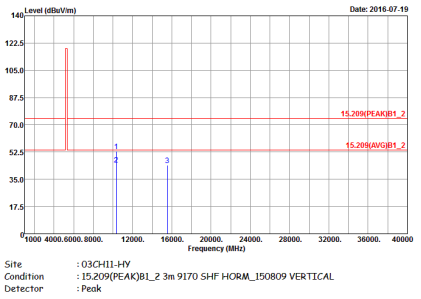
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak	Left blank

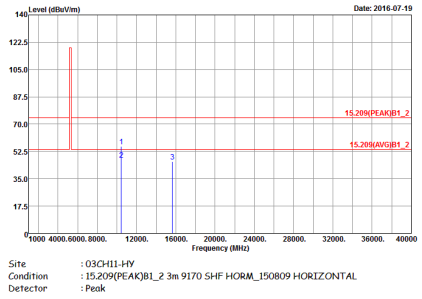
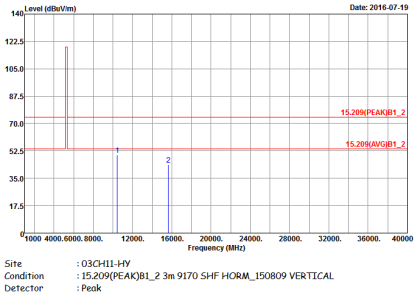
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - L	
1+2	Vertical	Fundamental
Peak		
Avg.		Left blank

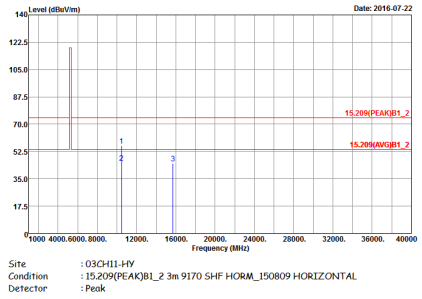
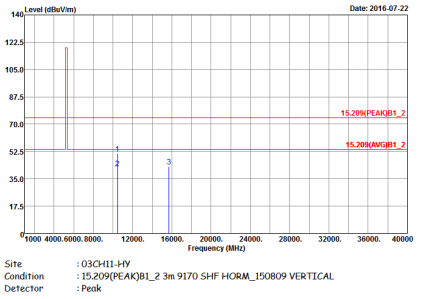
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz - R	
1+2	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak	Left blank
Avg.	 Site : 03CH11-HY Condition : 15.209(AVG)B1_2 3m HORN 9120D-HF VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 661624 Mode : 26 Setting : 16.5	Left blank

Band 1 - 5150~5250MHz

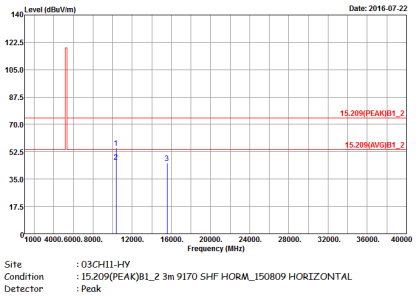
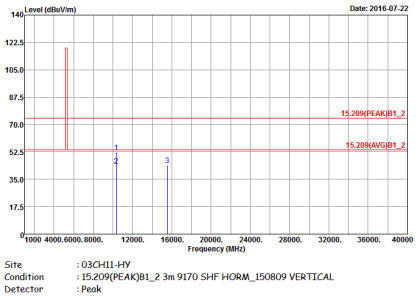
WIFI 802.11a (Harmonic @ 3m)

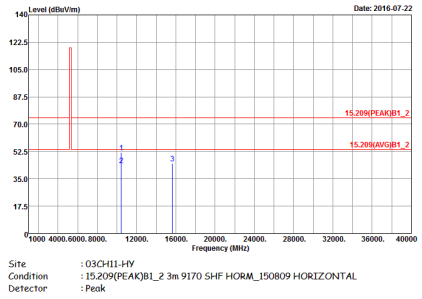
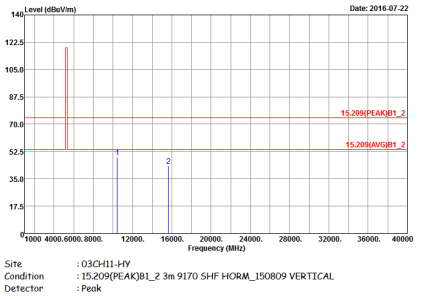
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.		

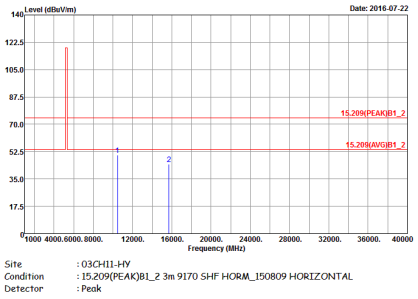
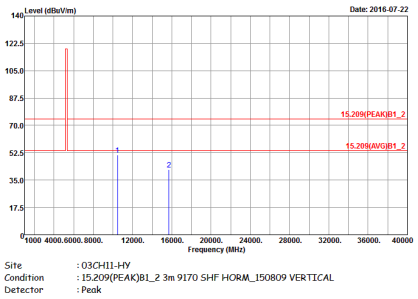
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH44 5220MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11a CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.		

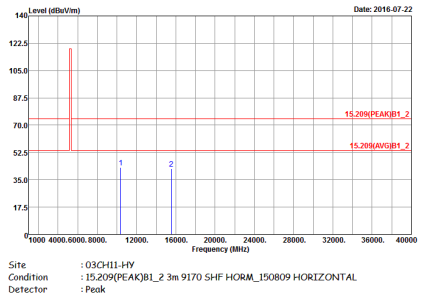
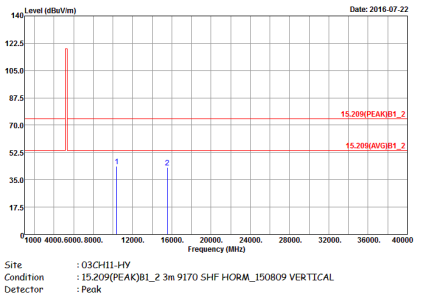
Band 1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

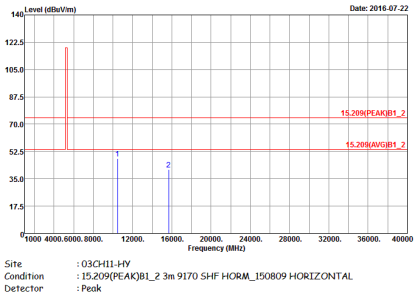
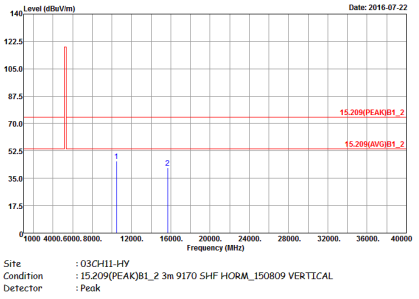
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH36 5180MHz	
1+2	Horizontal	Vertical
Peak Avg.		

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH44 5220MHz	
1+2	Horizontal	Vertical
Peak Avg.		

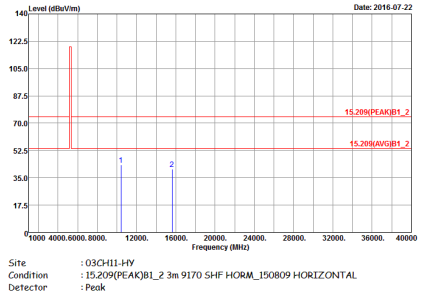
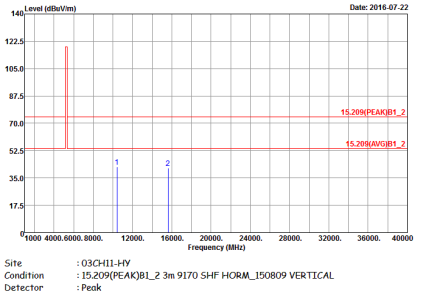
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT20 CH48 5240MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH38 5190MHz	
1+2	Horizontal	Vertical
Peak Avg.		

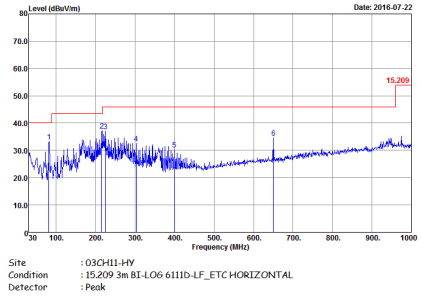
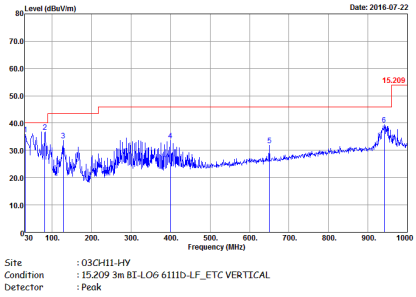
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH46 5230MHz	
1+2	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m 9170 SHF HORM_150809 HORIZONTAL Detector : Peak	 Site : 03CH11-HY Condition : 15.209(PEAK)B1_2 3m 9170 SHF HORM_150809 VERTICAL Detector : Peak

Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH42 5210MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

5GHz WIFI 802.11n HT40 (LF)

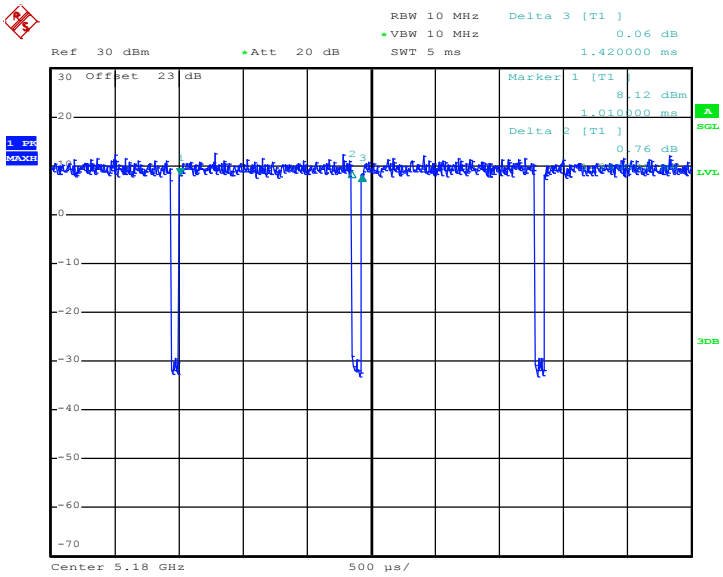
WIFI	5GHz WIFI	
ANT	802.11n HT40 LF	
1+2	Horizontal	Vertical
QP / Peak		

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
MIMO <Ant. 1+2(1)>	802.11a	94.37	1340.00	0.75	1kHz
MIMO <Ant. 1+2(2)>	802.11a	94.37	1340.00	0.75	1kHz
MIMO <Ant. 1+2(1)>	5GHz 802.11n HT20	94.74	1260.00	0.79	1kHz
MIMO <Ant. 1+2(2)>	5GHz 802.11n HT20	93.33	1260.00	0.79	1kHz
MIMO <Ant. 1+2(1)>	5GHz 802.11n HT40	90.52	630.00	1.59	3kHz
MIMO <Ant. 1+2(2)>	5GHz 802.11n HT40	90.44	624.00	1.60	3kHz
MIMO <Ant. 1+2(1)>	5GHz 802.11ac VHT80	82.11	312.00	3.21	10kHz
MIMO <Ant. 1+2(2)>	5GHz 802.11ac VHT80	82.11	312.00	3.21	10kHz

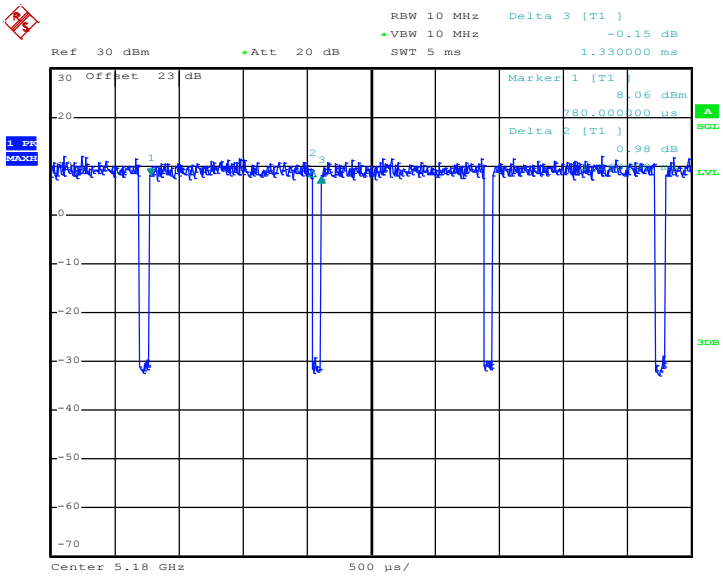
MIMO <Ant. 1+2(1)>

802.11a



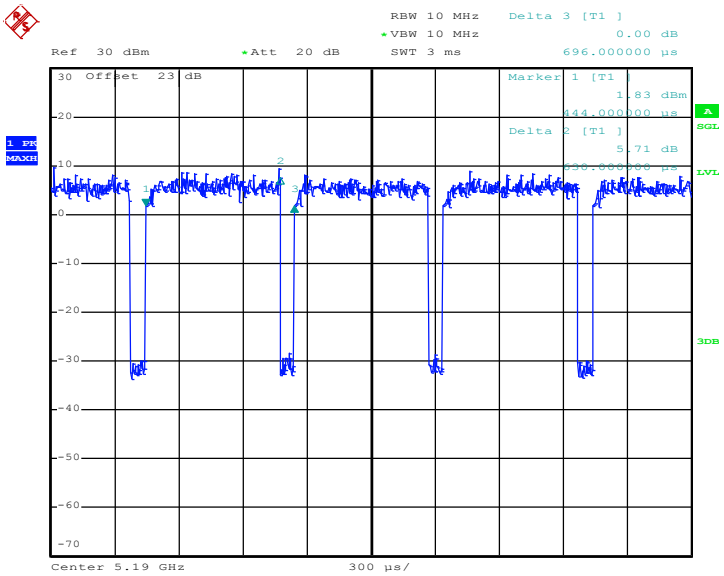
Date: 24.JUN.2016 02:15:10

802.11n HT20



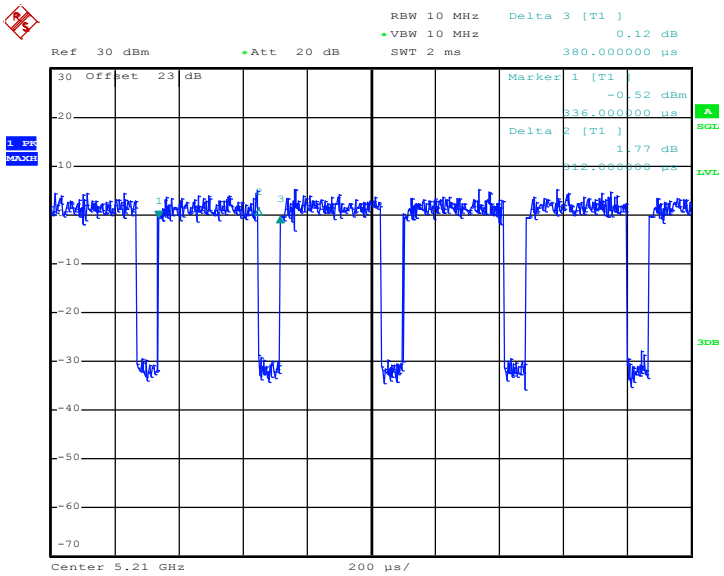
Date: 24.JUN.2016 02:17:45

802.11n HT40



Date: 24.JUN.2016 02:26:33

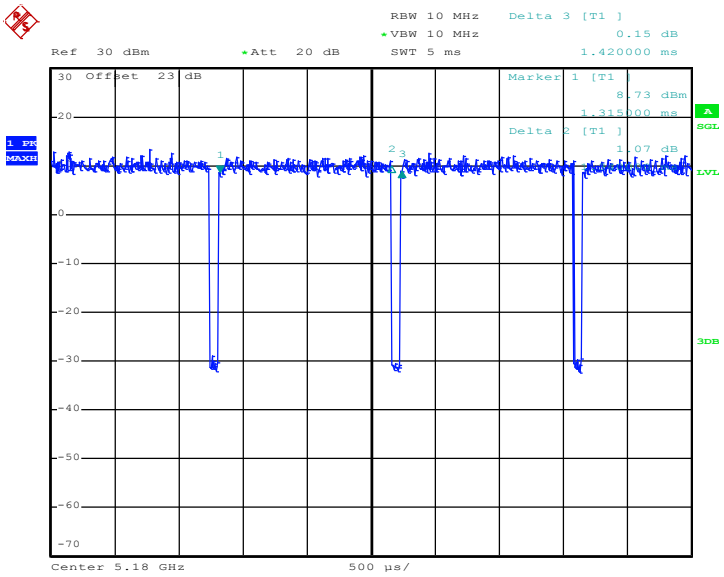
802.11ac VHT80



Date: 24.JUN.2016 02:30:49

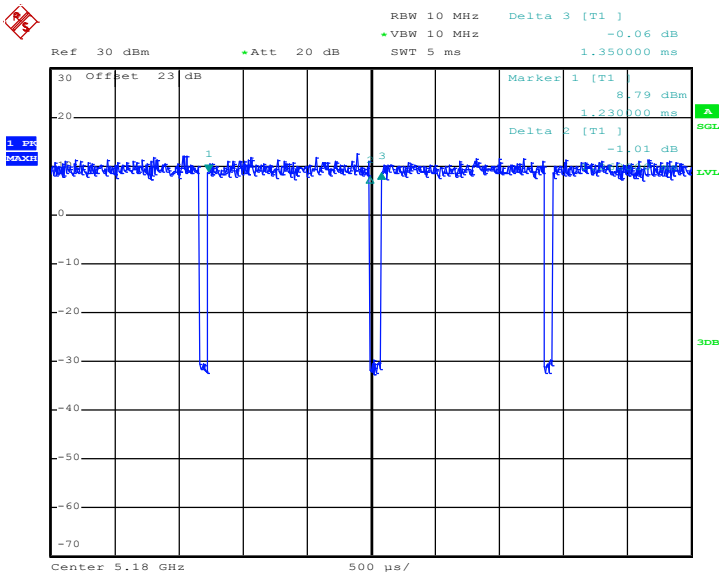
MIMO <Ant. 1+2(2)>

802.11a



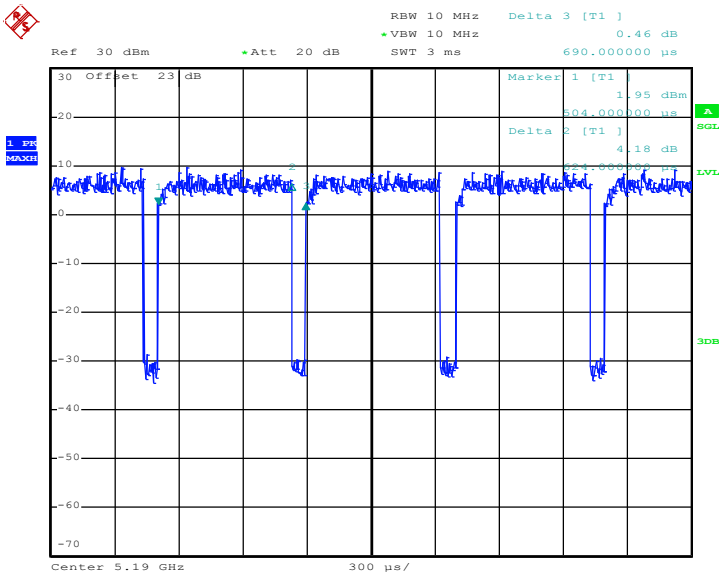
Date: 24.JUN.2016 02:16:31

802.11n HT20



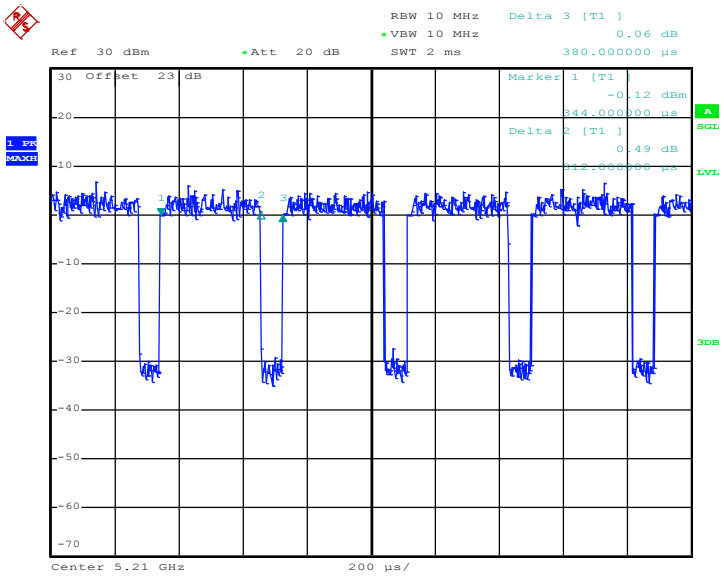
Date: 24.JUN.2016 02:17:19

802.11n HT40



Date: 24.JUN.2016 02:27:10

802.11ac VHT80



Date: 24.JUN.2016 02:30:09