



FCC RF Test Report

APPLICANT : Ignition Design Labs (US) LLC
EQUIPMENT : Advanced Wireless Router
BRAND NAME : Ignition Design Labs
MODEL NAME : Portal
MARKETING NAME : Portal
FCC ID : 2AFZUSAP102
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on May 20, 2016 and testing was completed on Jul. 14, 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



SPORTON INTERNATIONAL INC.

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

SPORTON INTERNATIONAL INC.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : 2AFZUSAP102

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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) 15.209(a)	Pass	Under limit 0.59 dB at 11570.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 3.90 dB at 0.550 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

Ignition Design Labs (US) LLC

5F-2., No. 158, Sec. 2, Gongdao 5th Rd., Hsinchu City 30070, Taiwan

1.2 Manufacturer

Ignition Design Labs (US) LLC

5F-2., No. 158, Sec. 2, Gongdao 5th Rd., Hsinchu City 30070, Taiwan

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Advanced Wireless Router
Brand Name	Ignition Design Labs
Model Name	Portal
Marketing Name	Portal
FCC ID	2AFZUSAP102
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v4.1 EDR/LE
HW Version	v1.0
SW Version	v1.0
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

Standards-related Product Specification											
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz										
Maximum Output Power <CDD Modes>	<5745 MHz ~ 5825 MHz> MIMO <Ant. Port 1+2+3+4> 802.11a : 28.09 dBm / 0.6442 W 802.11n HT20 : 25.55 dBm / 0.3589 W 802.11n HT40 : 25.37 dBm / 0.3443 W										
Maximum Output Power <TXBF Modes>	<5745 MHz ~ 5825 MHz> MIMO <Ant. Port 1+2+3+4> 802.11ac VHT20: 25.78 dBm / 0.3784 W 802.11ac VHT40: 25.77 dBm / 0.3776 W 802.11ac VHT80: 25.15 dBm / 0.3273 W										
99% Occupied Bandwidth <CDD Modes>	802.11a : 17.25 MHz										
99% Occupied Bandwidth <TXBF Modes>	802.11ac VHT20 : 18.95 MHz 802.11ac VHT40 : 37.10 MHz 802.11ac VHT80 : 76.32 MHz										
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)										
Antenna Type	PCB Antenna										
Antenna Gain	Antenna 1: 4.26 dBi Antenna 2: 3.49 dBi Antenna 3: 4.30 dBi Antenna 4: 4.67 dBi										
Antenna Function Description	<table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> <th>Ant. 3</th> <th>Ant. 4</th> </tr> </thead> <tbody> <tr> <td>802.11 a/n/ac MIMO</td> <td>V</td> <td>V</td> <td>V</td> <td>V</td> </tr> </tbody> </table>		Ant. 1	Ant. 2	Ant. 3	Ant. 4	802.11 a/n/ac MIMO	V	V	V	V
	Ant. 1	Ant. 2	Ant. 3	Ant. 4							
802.11 a/n/ac MIMO	V	V	V	V							

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 1 st 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.	
	TH02-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.	
	03CH10-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 (X plane) were recorded in this report.

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 2.2.

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 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

	MIMO mode	Power	Conducted	RSE
802.11a	CDD	Test	Test	Test
802.11n HT20/HT40	CDD	Test	Covered by 802.11ac	Covered by 802.11ac
802.11ac VHT20/VHT40/VHT80	TXBF	Test	Test	Test

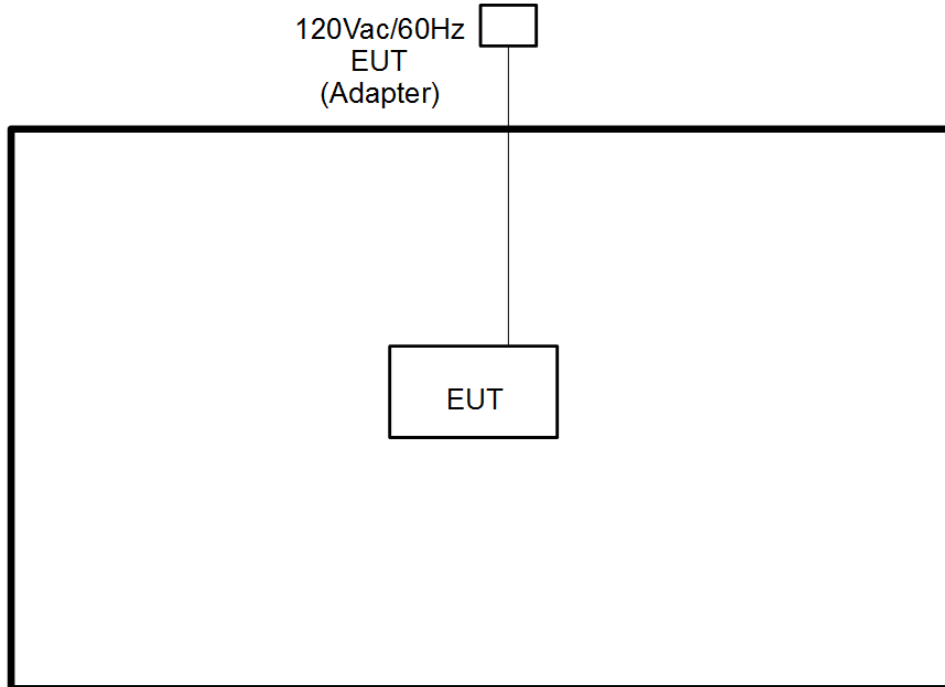
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5GHz) Link 802.11ac VHT80 MCS0 + LAN Link + USB Link + Adapter 1
------------------------------	--

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

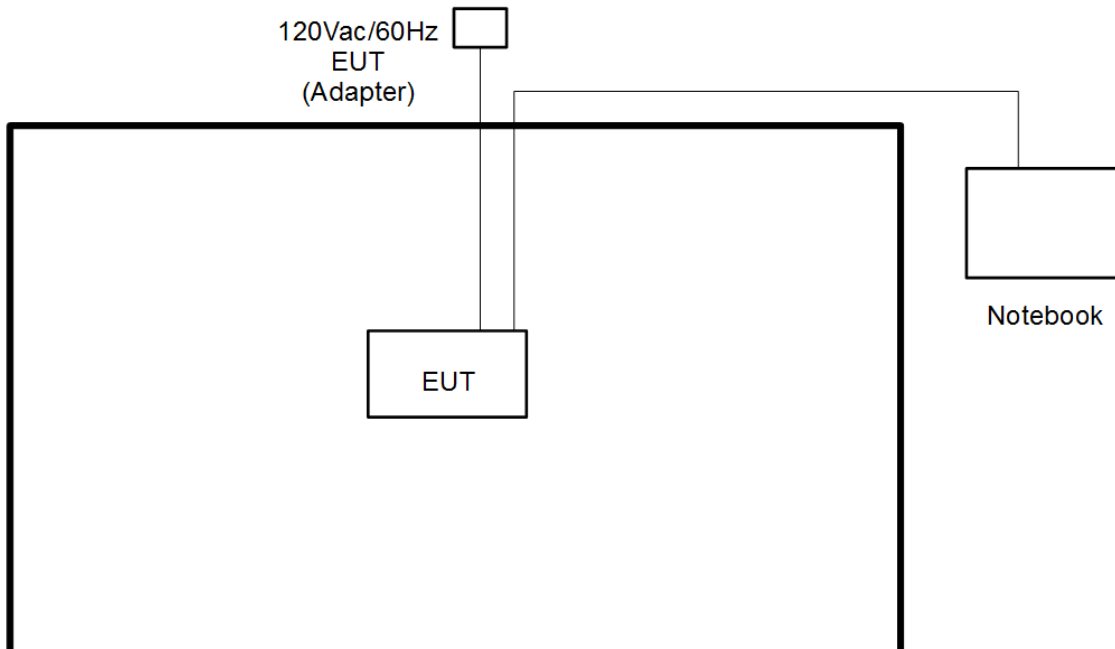
Ch. #		Band IV : 5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.3 Connection Diagram of Test System

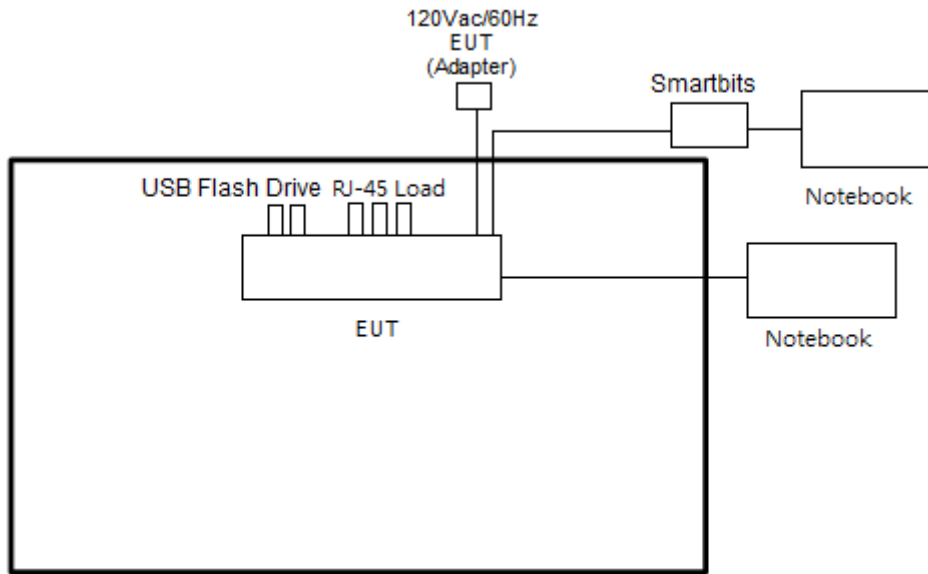
<WLAN Tx CDD Mode>



<WLAN Tx TXBF 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
3.	USB Flash Drive	Transcend	JetFlash 700	FCC DoC	N/A	N/A
4.	Smartbits	Spirent	SMB600B	N/A	Shielded, 1.5 m	Unshielded, 1.8 m



2.5 EUT Operation Test Setup

For CDD modes, programmed RF utility, “QRCT” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

For TXBF modes, Software “LANTEST.EXE” v2.0.0.2 installed in the notebook and command lines 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.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 4.2 + 10 = 14.2 \text{ (dB)} \end{aligned}$$

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.

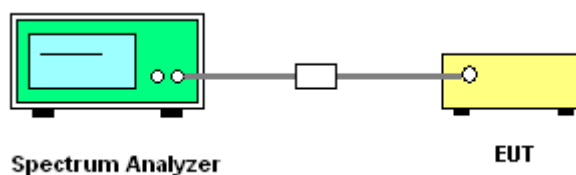
3.1.2 Measuring Instruments

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 $\geq 3 \times$ 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

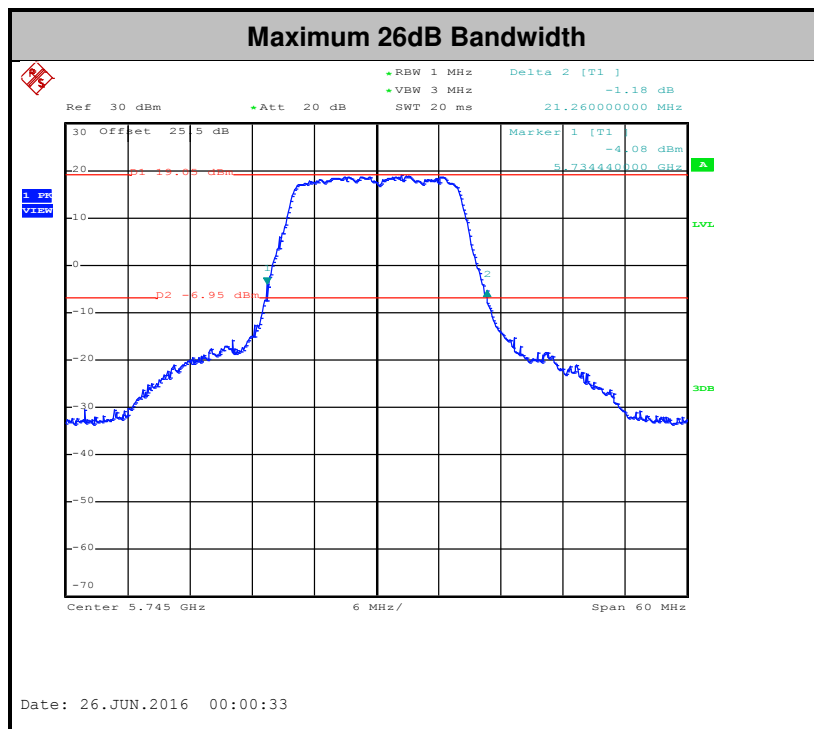
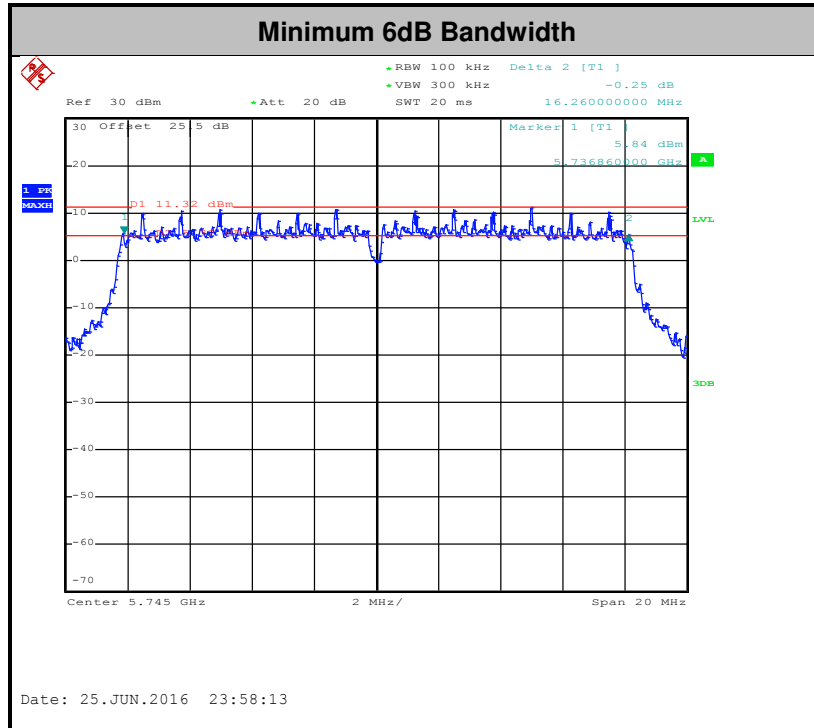


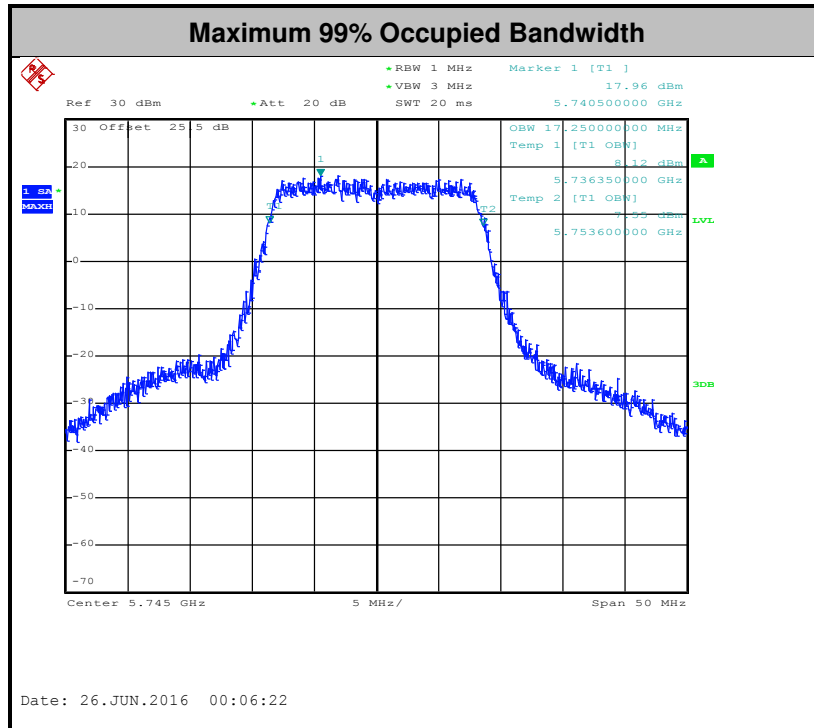


3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

<CDD Modes>

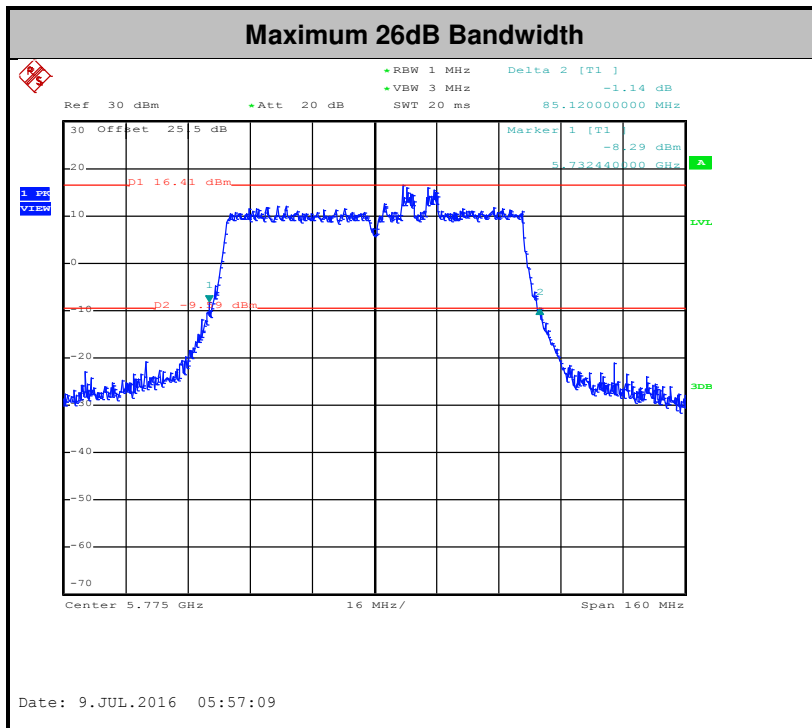
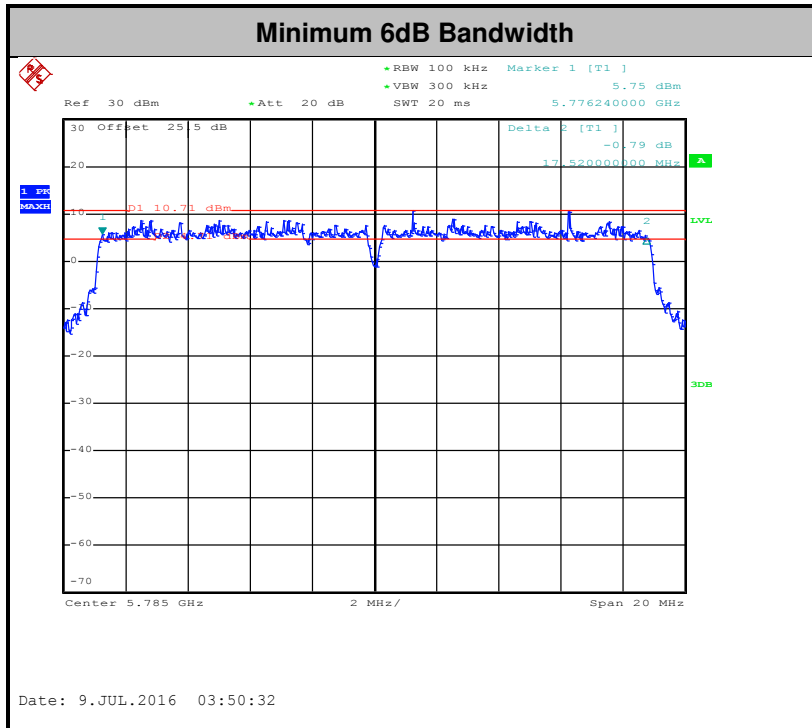


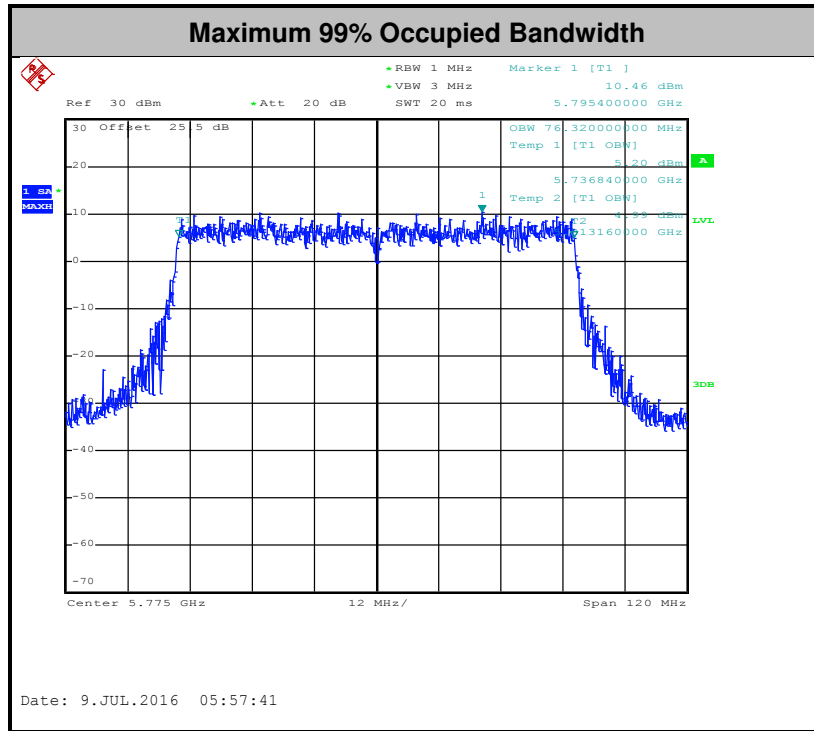


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



<TXBF Modes>





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

CDD modes

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.

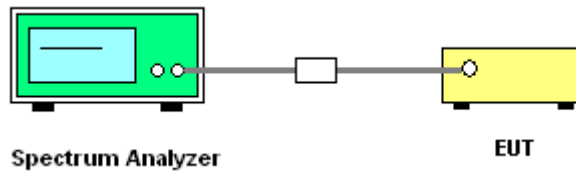
TXBF modes

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02 for TXBF modes.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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 500kHz 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.

CDD modes

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 \geq 1 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ 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.

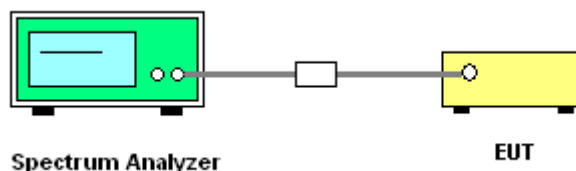
TXBF modes**# Method SA-3 #**

(power averaging (rms) detection with max hold):

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW \geq 1 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time \leq (number of points in sweep) \times 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.
 - Detector = power averaging (rms).
 - Trace mode = max hold.
 - Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
 3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (c): Measure and add $10 \log(N_{ANT})$ dB.

With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{ANT})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{ANT})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{ANT}^{th}$ of the PSD limit.

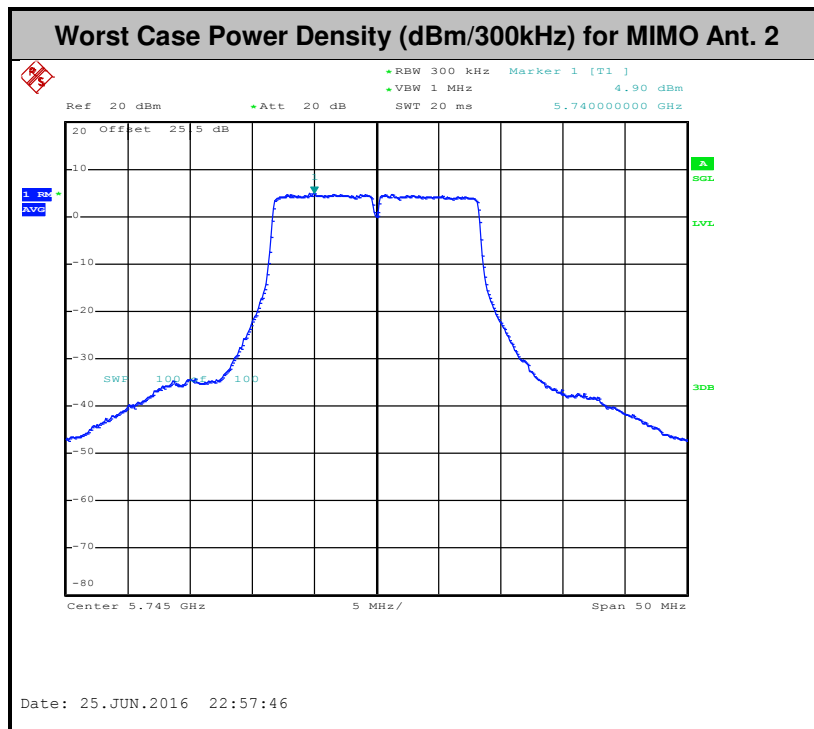
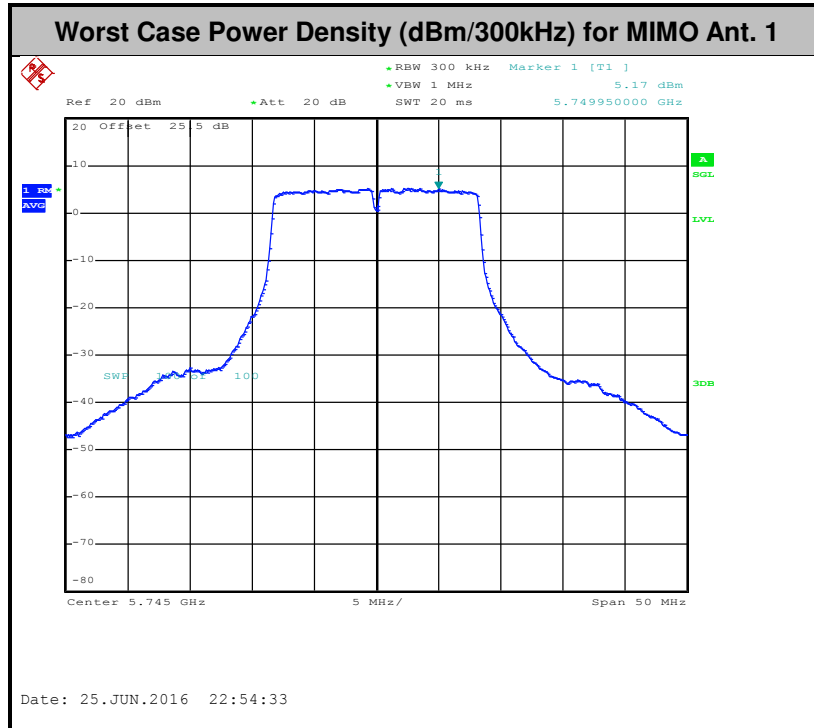
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

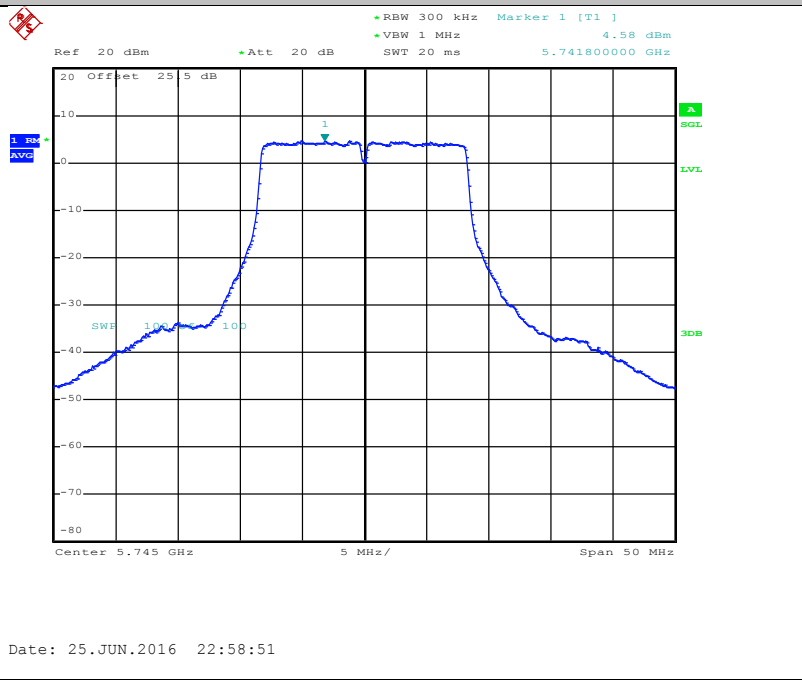
Please refer to Appendix A.

<CDD Modes>

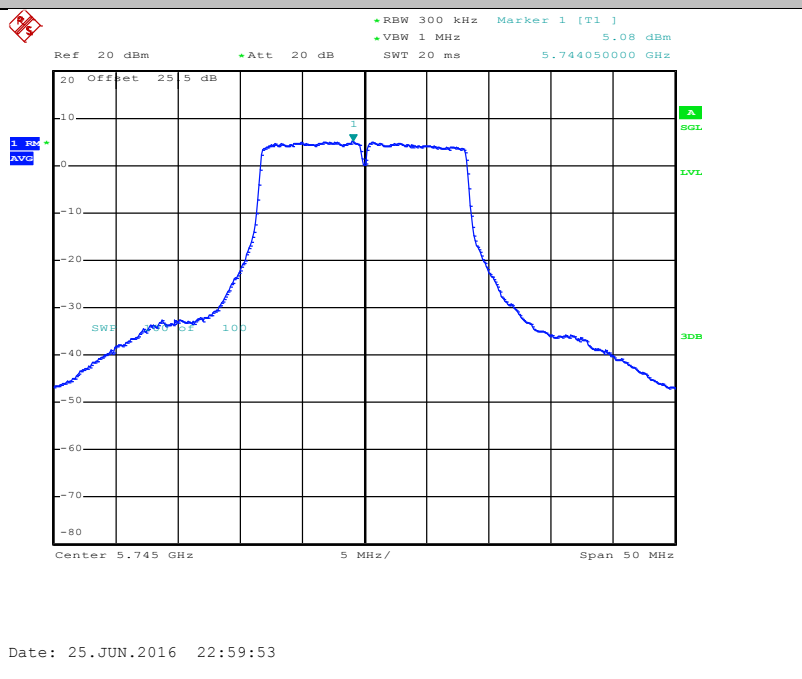




Worst Case Power Density (dBm/300kHz) for MIMO Ant. 3

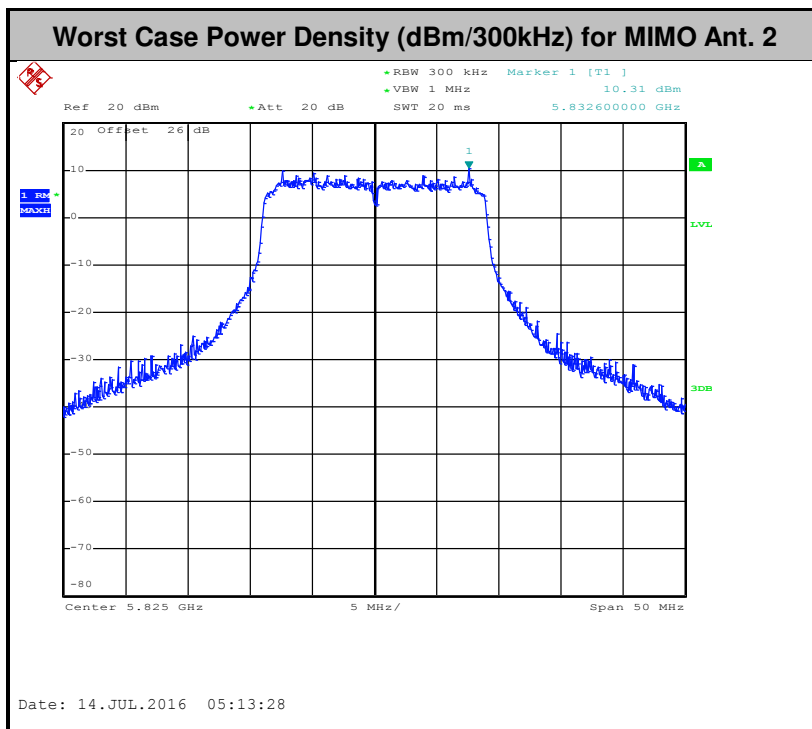
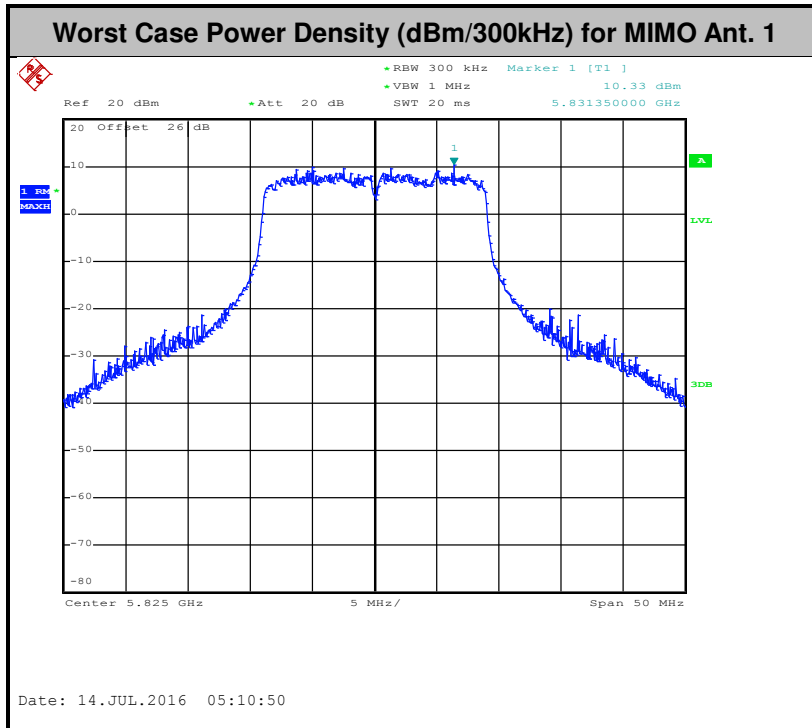


Worst Case Power Density (dBm/300kHz) for MIMO Ant. 4



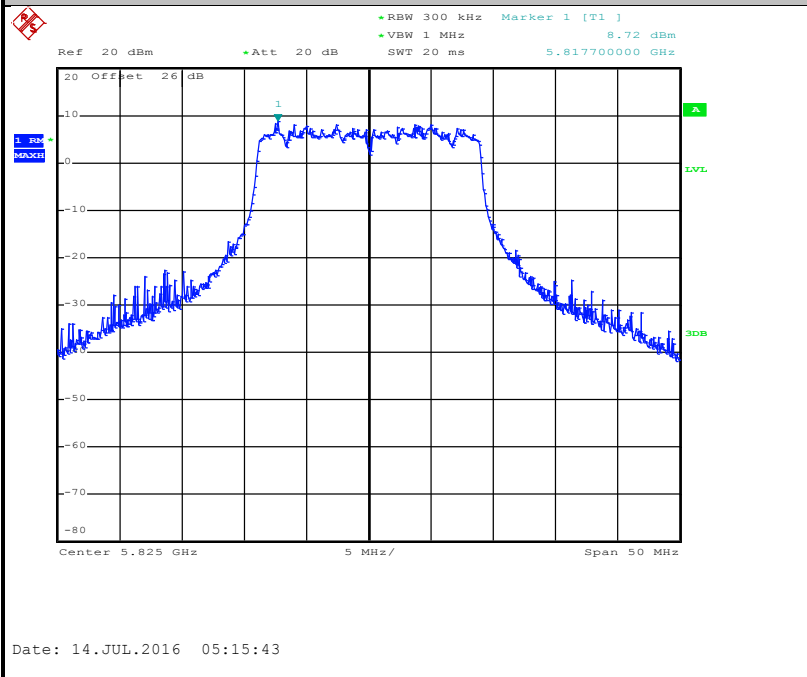


<TXBF Modes>

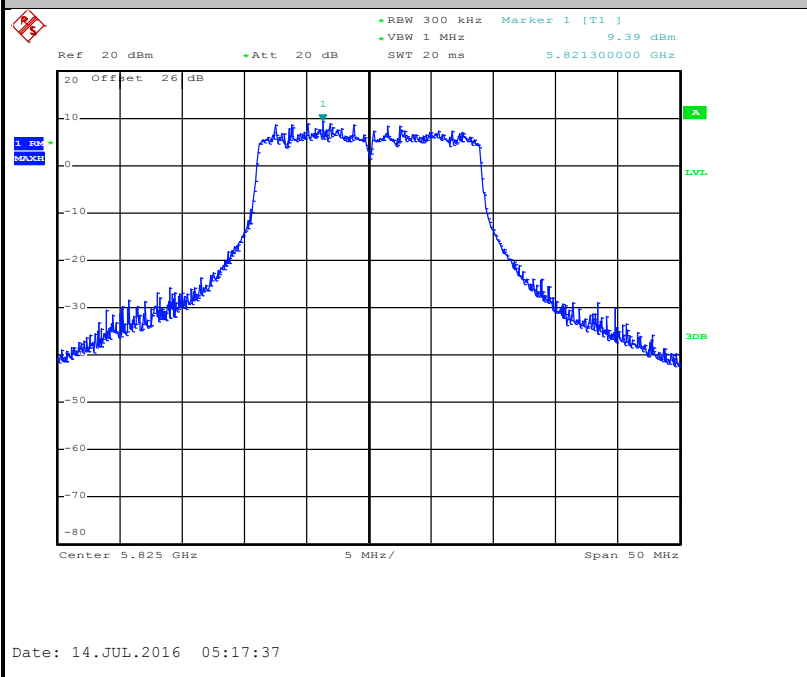




Worst Case Power Density (dBm/300kHz) for MIMO Ant. 3



Worst Case Power Density (dBm/300kHz) for MIMO Ant. 4





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.

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

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 \geq 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

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

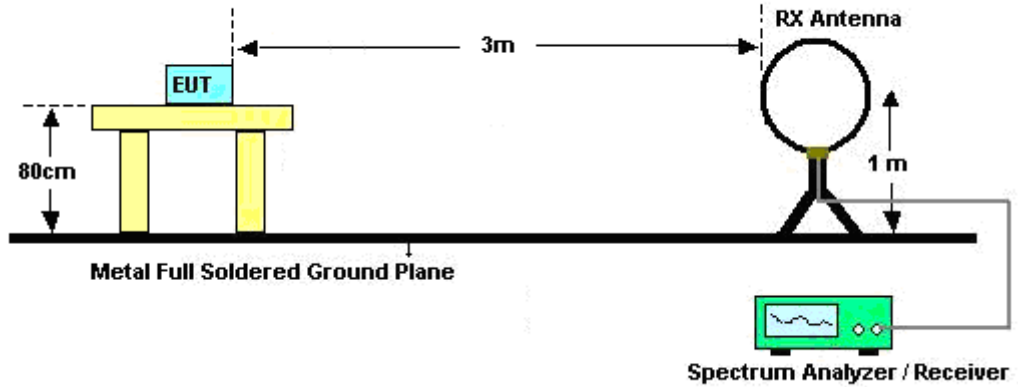
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



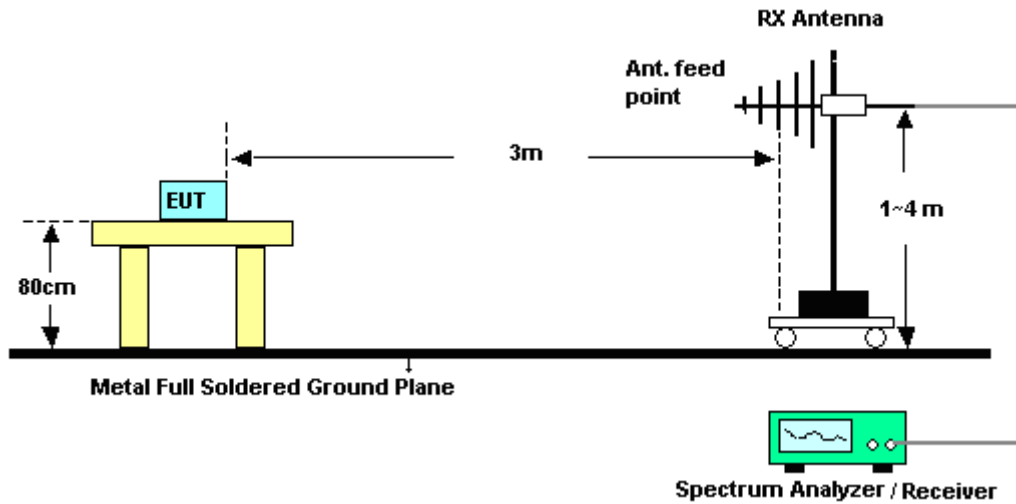
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

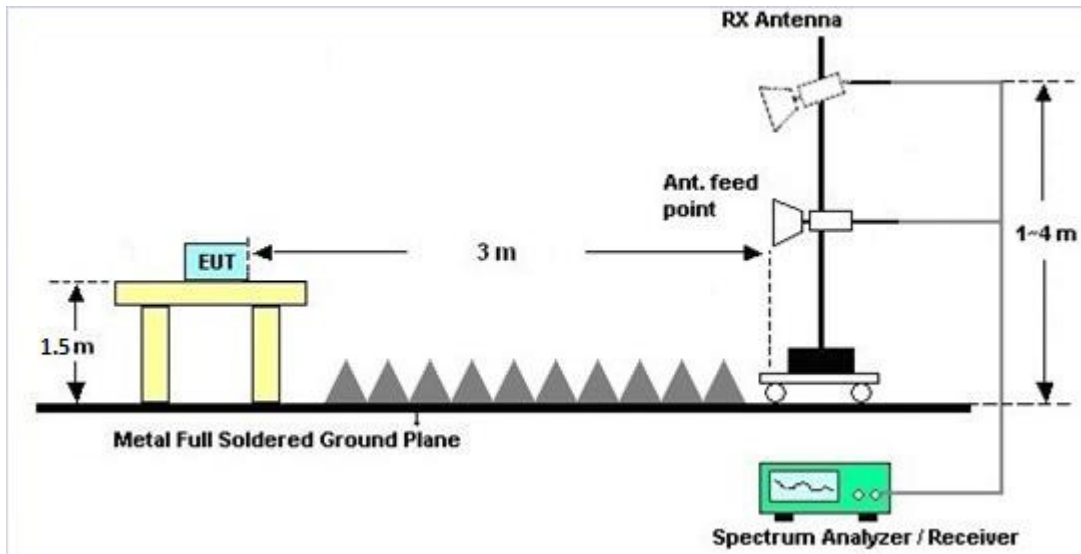
For radiated emissions below 30MHz



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 (dB μ V)	
	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.

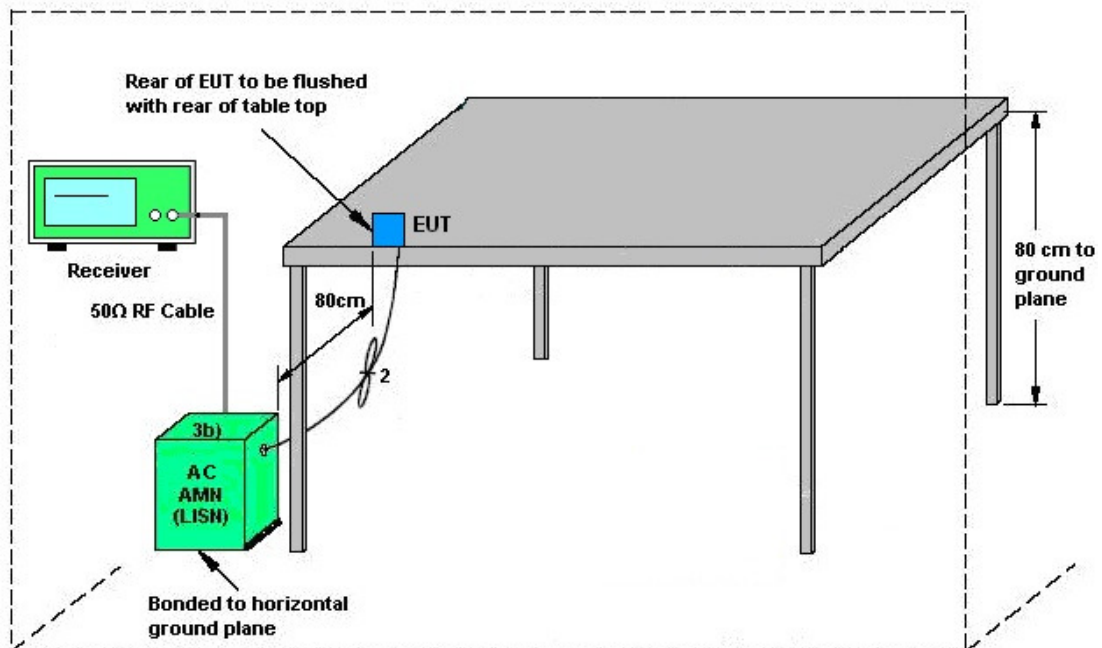
3.5.2 Measuring Instruments

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

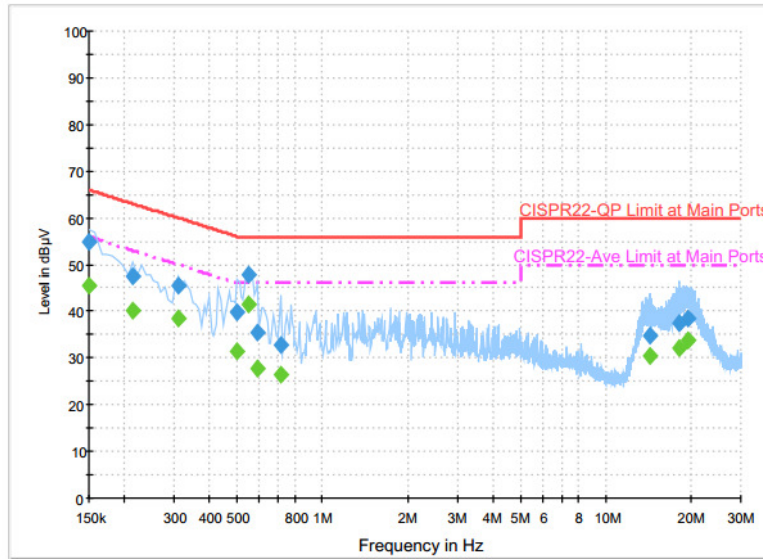


AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network



3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Arthur Hsieh	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN (5GHz) Link 802.11ac VHT80 MCS0 + LAN Link + USB Link + Adapter 1		



Final Result : QuasiPeak

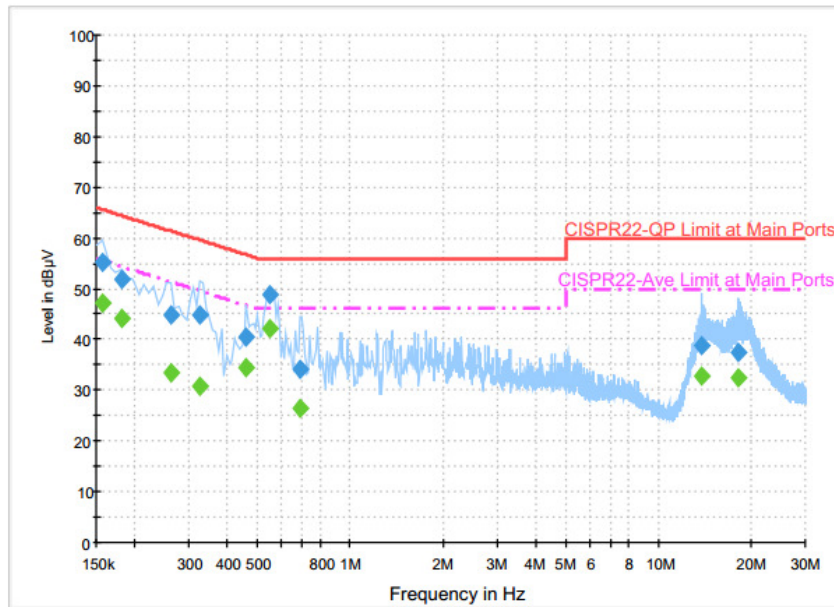
Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	54.7	Off	L1	19.6	11.3	66.0
0.214000	47.5	Off	L1	19.6	15.5	63.0
0.310000	45.6	Off	L1	19.6	14.4	60.0
0.502000	39.7	Off	L1	19.6	16.3	56.0
0.550000	47.7	Off	L1	19.6	8.3	56.0
0.590000	35.6	Off	L1	19.6	20.4	56.0
0.710000	32.7	Off	L1	19.6	23.3	56.0
14.286000	34.9	Off	L1	20.4	25.1	60.0
18.094000	37.4	Off	L1	20.6	22.6	60.0
19.574000	38.3	Off	L1	20.7	21.7	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	45.6	Off	L1	19.6	10.4	56.0
0.214000	40.3	Off	L1	19.6	12.7	53.0
0.310000	38.6	Off	L1	19.6	11.4	50.0
0.502000	31.4	Off	L1	19.6	14.6	46.0
0.550000	41.5	Off	L1	19.6	4.5	46.0
0.590000	27.8	Off	L1	19.6	18.2	46.0
0.710000	26.4	Off	L1	19.6	19.6	46.0
14.286000	30.3	Off	L1	20.4	19.7	50.0
18.094000	32.1	Off	L1	20.6	17.9	50.0
19.574000	33.8	Off	L1	20.7	16.2	50.0



Test Mode :	Mode 1	Temperature :	22~23°C
Test Engineer :	Arthur Hsieh	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN (5GHz) Link 802.11ac VHT80 MCS0 + LAN Link + USB Link + Adapter 1		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	55.2	Off	N	19.6	10.4	65.6
0.182000	51.7	Off	N	19.6	12.7	64.4
0.262000	44.7	Off	N	19.6	16.7	61.4
0.326000	45.0	Off	N	19.6	14.6	59.6
0.462000	40.5	Off	N	19.6	16.2	56.7
0.550000	48.7	Off	N	19.6	7.3	56.0
0.686000	34.0	Off	N	19.6	22.0	56.0
13.870000	38.7	Off	N	20.4	21.3	60.0
18.254000	37.3	Off	N	20.6	22.7	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	47.0	Off	N	19.6	8.6	55.6
0.182000	44.0	Off	N	19.6	10.4	54.4
0.262000	33.4	Off	N	19.6	18.0	51.4
0.326000	30.9	Off	N	19.6	18.7	49.6
0.462000	34.4	Off	N	19.6	12.3	46.7
0.550000	42.1	Off	N	19.6	3.9	46.0
0.686000	26.4	Off	N	19.6	19.6	46.0
13.870000	32.9	Off	N	20.4	17.1	50.0
18.254000	32.3	Off	N	20.6	17.7	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

An embedded-in antenna design is used.

3.8.3 Antenna Gain

CDD Mode

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = $G_{ANT} + \text{Array Gain}$, 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.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

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.

					DG	DG	Power	PSD
					for	for	Limit	Limit
	Ant 1	Ant 2	Ant 3	Ant 4	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	4.26	3.49	4.30	4.67	4.67	10.21	0.00	4.21

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

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



TXBF Mode

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For beamforming transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports beamforming for 802.11ac modes.

The directional gain calculation is following F)2)e)ii) of KDB 662911 D01 v02r01.

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.

					DG	DG	Power	PSD
					for	for	Limit	Limit
	Ant 1	Ant 2	Ant 3	Ant 4	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	4.26	3.49	4.30	4.67	10.21	10.21	4.21	4.21

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 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. 02, 2016 ~ Jul. 14, 2016	Dec. 01, 2016	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Jul. 29, 2015	Jun. 02, 2016 ~ Jul. 14, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 29, 2015	Jun. 02, 2016 ~ Jul. 14, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 17, 2016	Jun. 02, 2016 ~ Jul. 14, 2016	Jun. 16, 2017	Conducted (TH02-HY)
Temperature Chamber	ESPEC	SU-241	92003713	-30℃ ~95℃	Jun. 15, 2015	Jun. 02, 2016 ~ Jul. 14, 2016	Jun. 14, 2016	Conducted (TH02-HY)
Temperature Chamber	ESPEC	SU-241	92003713	-30℃ ~95℃	Jun. 06, 2016	Jun. 02, 2016 ~ Jul. 14, 2016	Jun. 05, 2017	Conducted (TH02-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Sep. 01, 2016	Radiation (03CH10-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Nov. 16, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Nov. 15, 2016	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D	35413	30MHz~1GHz	Jan. 13, 2016	Jun. 17, 2016 ~ Jul. 12, 2016	Jan. 12, 2017	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Sep. 30, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Sep. 29, 2016	Radiation (03CH10-HY)
Preamplifier	Keysight	83017A	MY53270078	1GHz~26.5GHz	Nov. 13, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Nov. 12, 2016	Radiation (03CH10-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1902246	1GHz~18GHz	Nov. 16, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Nov. 15, 2016	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 15, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Oct. 14, 2016	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jun. 17, 2016 ~ Jul. 12, 2016	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Jun. 17, 2016 ~ Jul. 12, 2016	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY55420170	N/A	Mar. 10, 2016	Jun. 17, 2016 ~ Jul. 12, 2016	Mar. 09, 2017	Radiation (03CH10-HY)
Preamplifier	MITEQ	JS44-1800400 0-33-8P	1840917	18GHz ~ 40GHz	Jun. 14, 2016	Jun. 17, 2016 ~ Jul. 12, 2016	Jun. 13, 2017	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Jun. 17, 2016 ~ Jul. 12, 2016	Nov. 01, 2016	Radiation (03CH10-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 24, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Jun. 24, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Jun. 24, 2016	Dec. 01, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 14, 2015	Jun. 24, 2016	Dec. 13, 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
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.50
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Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.90
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Appendix A. Conducted Test Results

<CDD Modes>

Test Engineer:	Derek Hsu	Temperature:	21~25	°C
Test Date:	2016/06/26~2016/7/9	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

Band IV																		
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)				6 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)				6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4		
11a	6Mbps	4	149	5745	17.20	17.25	17.25	17.15	16.26	16.28	16.28	16.3	21.26	21.12	21.06	21.06	0.5	Pass
11a	6Mbps	4	157	5785	17.20	17.25	17.2	17.15	16.26	16.3	16.28	16.3	21.08	20.92	21	20.76	0.5	Pass
11a	6Mbps	4	165	5825	17.15	17.20	17.15	17.20	16.26	16.28	16.26	16.3	21.12	21.12	20.88	21	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	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
11a	6Mbps	4	149	5745	22.33	22.05	21.87	22.05	28.09	30.00	4.67				Pass
11a	6Mbps	4	157	5785	20.09	19.66	19.66	19.73	25.80	30.00	4.67				Pass
11a	6Mbps	4	165	5825	19.19	18.78	18.52	18.57	24.79	30.00	4.67				Pass
HT20	MCS0	4	149	5745	18.91	18.50	18.71	18.70	24.73	30.00	4.67				Pass
HT20	MCS0	4	157	5785	19.21	18.56	18.69	18.70	24.82	30.00	4.67				Pass
HT20	MCS0	4	165	5825	20.05	19.48	19.21	19.34	25.55	30.00	4.67				Pass
HT40	MCS0	4	151	5755	19.41	19.01	19.12	19.30	25.23	30.00	4.67				Pass
HT40	MCS0	4	159	5795	19.64	19.21	19.20	19.34	25.37	30.00	4.67				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	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
11a	6Mbps	4	149	5745	7.55	7.28	6.96	7.46	13.57	25.79	10.21				Pass
11a	6Mbps	4	157	5785	5.11	4.68	4.74	4.66	11.13	25.79	10.21				Pass
11a	6Mbps	4	165	5825	4.54	3.92	3.72	4.06	10.56	25.79	10.21				Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	149	5745	5744.950	-0.050	-8.70	20	99	
11a	6Mbps	1	149	5745	5744.950	-0.050	-8.70	20	121	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	110	
11a	6Mbps	1	149	5745	5745.100	0.100	17.41	-30	110	
11a	6Mbps	1	149	5745	5745.050	0.050	8.70	50	110	



<TXBF Modes>

Test Engineer:	Derek Hsu	Temperature:	21~25	°C
Test Date:	2016/06/02~2016/07/09	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

Band IV																		
Mod.	Data Rate	Nrx	CH.	Freq. (MHz)	99% Bandwidth (MHz)				6 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)				6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4		
VHT20	MCS0	4	149	5745	18.75	18.80	18.85	18.60	17.70	17.74	17.66	17.72	24.5	24.93	25.12	24	0.5	Pass
VHT20	MCS0	4	157	5785	18.95	18.75	18.75	18.70	17.70	17.52	17.64	17.76	25.44	25.49	25.92	25.2	0.5	Pass
VHT20	MCS0	4	165	5825	18.80	18.75	18.85	18.80	17.68	17.68	17.7	17.72	26.87	25.38	25.8	25.56	0.5	Pass
VHT40	MCS0	4	151	5755	37.10	36.70	36.9	36.80	35.44	36.32	36.32	35.64	45.96	44.88	43.77	45.12	0.5	Pass
VHT40	MCS0	4	159	5795	37.00	37.00	36.9	36.90	36.40	36.44	36.36	36.16	44.4	45.24	44.64	45	0.5	Pass
VHT80	MCS0	4	155	5775	76.20	76.32	76.32	76.20	76.16	76.32	75.76	76.48	84.16	85.12	83.68	83.04	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	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
VHT20	MCS0	4	149	5745	19.51	19.25	19.29	18.13	25.10	25.79	10.21				Pass
VHT20	MCS0	4	157	5785	19.71	19.40	19.40	18.50	25.30	25.79	10.21				Pass
VHT20	MCS0	4	165	5825	20.11	19.60	19.62	19.68	25.78	25.79	10.21				Pass
VHT40	MCS0	4	151	5755	19.63	19.44	19.20	18.53	25.24	25.79	10.21				Pass
VHT40	MCS0	4	159	5795	20.30	19.76	19.69	19.17	25.77	25.79	10.21				Pass
VHT80	MCS0	4	155	5775	19.56	19.11	19.14	18.67	25.15	25.79	10.21				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	Ant 4	SUM		Ant 1	Ant 2	Ant 3	Ant 4	
VHT20	MCS0	4	149	5745	8.86	9.50	9.12	8.69	15.52	25.79	10.21				Pass
VHT20	MCS0	4	157	5785	10.17	9.84	9.39	8.62	16.19	25.79	10.21				Pass
VHT20	MCS0	4	165	5825	11.87	10.26	11.27	9.82	17.89	25.79	10.21				Pass
VHT40	MCS0	4	151	5755	7.80	8.77	9.38	8.00	15.40	25.79	10.21				Pass
VHT40	MCS0	4	159	5795	9.91	9.14	7.52	7.29	15.93	25.79	10.21				Pass
VHT80	MCS0	4	155	5775	6.96	5.89	6.62	4.87	12.98	25.79	10.21				Pass



Appendix B. Radiated Spurious Emission

Test Engineer :	Tsung Lee and Stan Hsieh	Temperature :	25~26°C
		Relative Humidity :	48~49%

<CDD Modes>

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	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		5648	49.76	-18.54	68.3	41.64	32.48	8.27	32.63	100	118	P	H	
		5699.2	54.03	-50.68	104.71	45.87	32.51	8.3	32.65	100	118	P	H	
		5718.6	60.95	-49.56	110.51	52.78	32.53	8.3	32.66	100	118	P	H	
		5724.2	66.36	-54.12	120.48	58.16	32.53	8.33	32.66	100	118	P	H	
		5743	116.09	-	-	107.89	32.54	8.33	32.67	100	118	P	H	
		5743	109.15	-	-	100.95	32.54	8.33	32.67	100	118	A	H	
														H
														H
			5625.2	53.04	-15.26	68.3	44.96	32.47	8.23	32.62	100	239	P	V
			5693.2	55.44	-44.85	100.29	47.28	32.51	8.3	32.65	100	239	P	V
			5718.8	66.28	-44.28	110.56	58.11	32.53	8.3	32.66	100	239	P	V
			5721	67.9	-45.28	113.18	59.73	32.53	8.3	32.66	100	239	P	V
			5746	120.6	-	-	112.4	32.54	8.33	32.67	100	239	P	V
			5746	116.41	-	-	108.21	32.54	8.33	32.67	100	239	A	V
													V	
													V	



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 157 5785MHz		5627	54.63	-13.67	68.3	46.55	32.47	8.23	32.62	100	242	P	H	
		5652.2	53.4	-16.54	69.94	45.27	32.49	8.27	32.63	100	242	P	H	
		5711.2	56.1	-52.34	108.44	47.94	32.52	8.3	32.66	100	242	P	H	
		5724	54.09	-65.93	120.02	45.89	32.53	8.33	32.66	100	242	P	H	
		5785	116.49	-	-	108.25	32.57	8.35	32.68	100	242	P	H	
		5785	108.33	-	-	100.09	32.57	8.35	32.68	100	242	A	H	
		5854	54.48	-58.7	113.18	46.13	32.62	8.43	32.7	100	242	P	H	
		5868.8	55.87	-51.16	107.03	47.53	32.62	8.43	32.71	100	242	P	H	
		5923.6	53.76	-15.57	69.33	45.32	32.66	8.51	32.73	100	242	P	H	
		5945.2	55.44	-12.86	68.3	47	32.67	8.51	32.74	100	242	P	H	
														H
														H
			5649.4	58.07	-10.23	68.3	49.95	32.48	8.27	32.63	100	215	P	V
			5651	52.2	-16.84	69.04	44.07	32.49	8.27	32.63	100	215	P	V
			5719	57.58	-53.04	110.62	49.41	32.53	8.3	32.66	100	215	P	V
			5724.8	57.42	-64.42	121.84	49.22	32.53	8.33	32.66	100	215	P	V
		*	5785	122.83	-	-	114.59	32.57	8.35	32.68	100	215	P	V
			5785	114.32	-	-	106.08	32.57	8.35	32.68	100	215	A	V
			5852	55.74	-62	117.74	47.4	32.61	8.43	32.7	100	215	P	V
			5866	55.99	-51.83	107.82	47.65	32.62	8.43	32.71	100	215	P	V
		5924.2	53.7	-15.19	68.89	45.26	32.66	8.51	32.73	100	215	P	V	
		5936.8	56.58	-11.72	68.3	48.15	32.66	8.51	32.74	100	215	P	V	
													V	
													V	



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 165 5825MHz		5823	112.91	-	-	104.61	32.6	8.39	32.69	100	240	P	H	
		5823	106.97	-	-	98.67	32.6	8.39	32.69	100	240	A	H	
		5855	55.02	-55.88	110.9	46.67	32.62	8.43	32.7	100	240	P	H	
		5858.6	56.14	-53.75	109.89	47.8	32.62	8.43	32.71	100	240	P	H	
		5876.6	50.31	-53.8	104.11	41.96	32.63	8.43	32.71	100	240	P	H	
		5939	48.05	-20.25	68.3	39.61	32.67	8.51	32.74	100	240	P	H	
														H
														H
			5824	118.1	-	-	109.8	32.6	8.39	32.69	105	312	P	V
			5824	113.28	-	-	104.98	32.6	8.39	32.69	105	312	A	V
			5851	57.26	-62.76	120.02	48.92	32.61	8.43	32.7	105	312	P	V
			5864.8	57.43	-50.72	108.15	49.09	32.62	8.43	32.71	105	312	P	V
			5881	52.52	-48.32	100.84	44.17	32.63	8.43	32.71	105	312	P	V
			5938	51.79	-16.51	68.3	43.36	32.66	8.51	32.74	105	312	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	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	57.41	-16.59	74	56.02	40.01	12.58	51.2	100	64	P	H
		11490	51.95	-2.05	54	50.56	40.01	12.58	51.2	100	64	A	H
		17233	51.58	-16.72	68.3	47.07	41.05	15.61	52.15	100	0	P	H
													H
		11492	59.86	-14.14	74	58.47	40.01	12.58	51.2	100	26	P	V
		11492	52.11	-1.89	54	50.72	40.01	12.58	51.2	100	26	A	V
		17233	53.54	-14.76	68.3	49.03	41.05	15.61	52.15	100	0	P	V
802.11a CH 157 5785MHz		11570	60.22	-13.78	74	58.88	39.88	12.66	51.2	100	85	P	H
		11570	52.79	-1.21	54	51.45	39.88	12.66	51.2	100	85	A	H
		17355	51.8	-16.5	68.3	46.8	41.38	15.79	52.17	100	0	P	H
													H
		11570	62.93	-11.07	74	61.59	39.88	12.66	51.2	100	20	P	V
		11570	53.41	-0.59	54	52.07	39.88	12.66	51.2	100	20	A	V
		17355	58.06	-10.24	68.3	53.06	41.38	15.79	52.17	100	0	P	V
802.11a CH 165 5825MHz		11650	58.29	-15.71	74	57.01	39.75	12.73	51.2	106	60	P	H
		11650	49.66	-4.34	54	48.38	39.75	12.73	51.2	106	60	A	H
		17473	51.85	-16.45	68.3	46.45	41.71	15.88	52.19	100	0	P	H
													H
		11650	61.56	-12.44	74	60.28	39.75	12.73	51.2	100	153	P	V
		11650	52.75	-1.25	54	51.47	39.75	12.73	51.2	100	153	A	V
		17473	52.65	-15.65	68.3	47.25	41.71	15.88	52.19	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

Emission below 1GHz

5GHz WIFI 802.11a (LF @ 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
5GHz 802.11a LF		84.27	33.34	-6.66	40	50.71	14.38	0.93	32.68	-	-	P	H	
		176.88	37.93	-5.57	43.5	53.41	15.75	1.48	32.71	-	-	P	H	
		283.26	40.48	-5.52	46	52.06	19.39	1.76	32.73	100	58	P	H	
		381.2	37.42	-8.58	46	46.16	21.95	2.13	32.82	-	-	P	H	
		596.8	31.96	-14.04	46	37	25.42	2.57	33.03	-	-	P	H	
		650	39.01	-6.99	46	43.35	26	2.67	33.01	-	-	P	H	
														H
														H
														H
														H
														H
														H
			40.8	33.92	-6.08	40	46.13	19.94	0.65	32.8	100	87	P	V
			80.22	32.53	-7.47	40	50.39	13.9	0.93	32.69	-	-	P	V
			180.93	37.01	-6.49	43.5	52.73	15.51	1.48	32.71	-	-	P	V
			304.2	34.78	-11.22	46	45.79	19.84	1.88	32.73	-	-	P	V
			566	34.08	-11.92	46	39.67	24.83	2.57	32.99	-	-	P	V
			650	36.41	-9.59	46	40.75	26	2.67	33.01	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

For Peak Limit @ 2390MHz:

- 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)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- 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)
- 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”.



<TXBF Modes>

Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11ac VHT20 CH 149 5745MHz		5644.2	48.84	-19.46	68.3	40.72	32.48	8.27	32.63	100	208	P	H	
		5696.6	48.96	-53.83	102.79	40.8	32.51	8.3	32.65	100	208	P	H	
		5713.4	49.21	-59.84	109.05	41.05	32.52	8.3	32.66	100	208	P	H	
		5725	56.19	-66.11	122.3	47.99	32.53	8.33	32.66	100	208	P	H	
		5743	106.62	-	-	98.42	32.54	8.33	32.67	100	208	P	H	
		5743	98.43	-	-	90.23	32.54	8.33	32.67	100	208	A	H	
														H
														H
			5638.6	53.49	-14.81	68.3	45.41	32.48	8.23	32.63	102	234	P	V
			5697.8	55.34	-48.34	103.68	47.18	32.51	8.3	32.65	102	234	P	V
			5715.8	56.97	-52.76	109.73	48.81	32.52	8.3	32.66	102	234	P	V
			5723.2	60.53	-57.67	118.2	52.33	32.53	8.33	32.66	102	234	P	V
			5746	112.41	-	-	104.21	32.54	8.33	32.67	102	234	P	V
			5746	105.58	-	-	97.38	32.54	8.33	32.67	102	234	A	V
													V	
													V	



WIFI Ant. 1	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)
		5605.2	48.83	-19.47	68.3	40.76	32.46	8.23	32.62	100	209	P	H
		5693.4	50.48	-49.95	100.43	42.32	32.51	8.3	32.65	100	209	P	H
		5707.2	49.94	-57.38	107.32	41.78	32.52	8.3	32.66	100	209	P	H
		5724.6	49.43	-71.96	121.39	41.23	32.53	8.33	32.66	100	209	P	H
		5787	106.17	-	-	97.92	32.58	8.35	32.68	100	209	P	H
		5787	99.86	-	-	91.61	32.58	8.35	32.68	100	209	A	H
		5851.4	48.75	-70.36	119.11	40.41	32.61	8.43	32.7	100	209	P	H
		5861.6	49.17	-59.88	109.05	40.83	32.62	8.43	32.71	100	209	P	H
		5880.8	50.05	-50.94	100.99	41.7	32.63	8.43	32.71	100	209	P	H
		5934.4	50.52	-17.78	68.3	42.09	32.66	8.51	32.74	100	209	P	H
													H
													H
802.11ac													
VHT20													
CH 157		5643.4	52.81	-15.49	68.3	44.69	32.48	8.27	32.63	102	250	P	V
5785MHz		5678.6	53.48	-36.02	89.5	45.35	32.5	8.27	32.64	102	250	P	V
		5705	52.44	-54.26	106.7	44.28	32.52	8.3	32.66	102	250	P	V
		5723	52.89	-64.85	117.74	44.69	32.53	8.33	32.66	102	250	P	V
		5783	112.22	-	-	103.98	32.57	8.35	32.68	102	250	P	V
		5783	104.55	-	-	96.31	32.57	8.35	32.68	102	250	A	V
		5851	51.82	-68.2	120.02	43.48	32.61	8.43	32.7	102	250	P	V
		5863	53.17	-55.49	108.66	44.83	32.62	8.43	32.71	102	250	P	V
		5893.2	52.59	-39.21	91.8	44.2	32.64	8.47	32.72	102	250	P	V
		5926	53.06	-15.24	68.3	44.62	32.66	8.51	32.73	102	250	P	V
													V
													V



WiFi Ant. 1	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 VHT20 CH 165 5825MHz		5824	105.09	-	-	96.79	32.6	8.39	32.69	100	193	P	H	
		5824	96.24	-	-	87.94	32.6	8.39	32.69	100	193	A	H	
		5851	50.35	-69.67	120.02	42.01	32.61	8.43	32.7	100	193	P	H	
		5858	49.35	-60.71	110.06	41.01	32.62	8.43	32.71	100	193	P	H	
		5909.6	49.73	-29.93	79.66	41.34	32.65	8.47	32.73	100	193	P	H	
		5942.6	48.27	-20.03	68.3	39.83	32.67	8.51	32.74	100	193	P	H	
														H
														H
			5824	112.09	-	-	103.79	32.6	8.39	32.69	100	256	P	V
			5824	105.23	-	-	96.93	32.6	8.39	32.69	100	256	A	V
			5854.2	55.19	-57.53	112.72	46.84	32.62	8.43	32.7	100	256	P	V
			5860.4	53.51	-55.88	109.39	45.17	32.62	8.43	32.71	100	256	P	V
			5876.2	54.07	-50.34	104.41	45.72	32.63	8.43	32.71	100	256	P	V
			5934	51.47	-16.83	68.3	43.03	32.66	8.51	32.73	100	256	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 VHT20 (Harmonic @ 3m)

WIFI Ant. 1	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 VHT20 CH 149 5745MHz		11490	54.74	-19.26	74	53.35	40.01	12.58	51.2	100	58	P	H	
		11490	46.9	-7.1	54	45.51	40.01	12.58	51.2	100	58	A	H	
		17233	53.75	-14.55	68.3	49.24	41.05	15.61	52.15	100	0	P	H	
													H	
			11490	56.02	-17.98	74	54.63	40.01	12.58	51.2	100	20	P	V
			11490	49.58	-4.42	54	48.19	40.01	12.58	51.2	100	20	A	V
			17233	55.03	-13.27	68.3	50.52	41.05	15.61	52.15	100	0	P	V
													V	
802.11ac VHT20 CH 157 5785MHz		11570	55.06	-18.94	74	53.72	39.88	12.66	51.2	100	61	P	H	
		11570	48.03	-5.97	54	46.69	39.88	12.66	51.2	100	61	A	H	
		17353	53.69	-14.61	68.3	48.73	41.38	15.75	52.17	100	0	P	H	
													H	
			11570	59.69	-14.31	74	58.35	39.88	12.66	51.2	100	23	P	V
			11570	51.56	-2.44	54	50.22	39.88	12.66	51.2	100	23	A	V
			17353	54.95	-13.35	68.3	49.99	41.38	15.75	52.17	100	0	P	V
													V	
802.11ac VHT20 CH 165 5825MHz		11650	55.75	-18.25	74	54.47	39.75	12.73	51.2	100	61	P	H	
		11650	47.71	-6.29	54	46.43	39.75	12.73	51.2	100	61	A	H	
		17475	55.54	-12.76	68.3	50.09	41.71	15.93	52.19	100	0	P	H	
													H	
			11650	59.51	-14.49	74	58.23	39.75	12.73	51.2	100	24	P	V
			11650	51.96	-2.04	54	50.68	39.75	12.73	51.2	100	24	A	V
			17475	54.66	-13.64	68.3	49.21	41.71	15.93	52.19	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 VHT40 (Band Edge @ 3m)

WIFI Ant. 1	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)
		5619.4	48.94	-19.36	68.3	40.86	32.47	8.23	32.62	100	209	P	H
		5655.8	48.31	-24.3	72.61	40.19	32.49	8.27	32.64	100	209	P	H
		5715.4	54.33	-55.28	109.61	46.17	32.52	8.3	32.66	100	209	P	H
		5724	56.4	-63.62	120.02	48.2	32.53	8.33	32.66	100	209	P	H
		5757	104.38	-	-	96.16	32.56	8.33	32.67	100	209	P	H
		5757	96.63	-	-	88.41	32.56	8.33	32.67	100	209	A	H
		5851.6	47.24	-71.41	118.65	38.9	32.61	8.43	32.7	100	209	P	H
		5869	47.99	-58.99	106.98	39.65	32.62	8.43	32.71	100	209	P	H
		5899.2	47.84	-39.51	87.35	39.45	32.64	8.47	32.72	100	209	P	H
		5930.4	48.63	-19.67	68.3	40.19	32.66	8.51	32.73	100	209	P	H
													H
													H
802.11ac VHT40 CH 151 5755MHz		5633.2	49.54	-18.76	68.3	41.46	32.48	8.23	32.63	100	118	P	V
		5690.2	52.18	-45.89	98.07	44.02	32.51	8.3	32.65	100	118	P	V
		5716.6	59.53	-50.42	109.95	51.37	32.52	8.3	32.66	100	118	P	V
		5725	61.64	-60.66	122.3	53.44	32.53	8.33	32.66	100	118	P	V
		5757	102.12	-	-	93.9	32.56	8.33	32.67	100	118	A	V
		5757	109.3	-	-	101.08	32.56	8.33	32.67	100	118	P	V
		5854.6	52.88	-58.93	111.81	44.53	32.62	8.43	32.7	100	118	P	V
		5874.6	51.28	-54.13	105.41	42.93	32.63	8.43	32.71	100	118	P	V
		5876.4	50.52	-53.74	104.26	42.17	32.63	8.43	32.71	100	118	P	V
		5948.4	50.7	-17.6	68.3	42.26	32.67	8.51	32.74	100	118	P	V
													V
													V



WIFI Ant. 1	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)
		5644	49.96	-18.34	68.3	41.84	32.48	8.27	32.63	100	209	P	H
		5662.4	49.94	-27.57	77.51	41.82	32.49	8.27	32.64	100	209	P	H
		5708.6	52.09	-55.62	107.71	43.93	32.52	8.3	32.66	100	209	P	H
		5725	50.78	-71.52	122.3	42.58	32.53	8.33	32.66	100	209	P	H
		5793	103.47	-	-	95.22	32.58	8.35	32.68	100	209	P	H
		5793	95.32	-	-	87.07	32.58	8.35	32.68	100	209	A	H
		5851.4	48.49	-70.62	119.11	40.15	32.61	8.43	32.7	100	209	P	H
		5870.8	50	-56.47	106.47	41.65	32.63	8.43	32.71	100	209	P	H
		5875.4	49.81	-55.19	105	41.46	32.63	8.43	32.71	100	209	P	H
		5945.4	47.69	-20.61	68.3	39.25	32.67	8.51	32.74	100	209	P	H
													H
													H
802.11ac													
VHT40													
CH 159		5637.8	50.38	-17.92	68.3	42.3	32.48	8.23	32.63	100	119	P	V
5795MHz		5697.8	51.83	-51.85	103.68	43.67	32.51	8.3	32.65	100	119	P	V
		5718.6	53.35	-57.16	110.51	45.18	32.53	8.3	32.66	100	119	P	V
		5720.2	51.75	-59.61	111.36	43.58	32.53	8.3	32.66	100	119	P	V
		5795	108.36	-	-	100.11	32.58	8.35	32.68	100	119	P	V
		5795	102.1	-	-	93.85	32.58	8.35	32.68	100	119	A	V
		5854.6	52.31	-59.5	111.81	43.96	32.62	8.43	32.7	100	119	P	V
		5858.8	53.64	-56.19	109.83	45.3	32.62	8.43	32.71	100	119	P	V
		5885.6	52.89	-44.54	97.43	44.51	32.63	8.47	32.72	100	119	P	V
		5937.6	50.19	-18.11	68.3	41.76	32.66	8.51	32.74	100	119	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 VHT40 (Harmonic @ 3m)

WIFI Ant. 1	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 VHT40 CH 151 5755MHz		11510	53.21	-20.79	74	51.83	40	12.58	51.2	100	60	P	H	
		11510	45.26	-8.74	54	43.88	40	12.58	51.2	100	60	A	H	
		17265	54.46	-13.84	68.3	49.8	41.15	15.66	52.15	100	0	P	H	
													H	
			11510	56.39	-17.61	74	55.01	40	12.58	51.2	100	23	P	V
			11510	48.03	-5.97	54	46.65	40	12.58	51.2	100	23	A	V
			17265	54.1	-14.2	68.3	49.44	41.15	15.66	52.15	100	0	P	V
													V	
802.11ac VHT40 CH 159 5795MHz		11590	54.88	-19.12	74	53.58	39.84	12.66	51.2	100	58	P	H	
		11590	46.07	-7.93	54	44.77	39.84	12.66	51.2	100	58	A	H	
		17385	55.08	-13.22	68.3	50	41.47	15.79	52.18	100	0	P	H	
													H	
			11590	58.76	-15.24	74	57.46	39.84	12.66	51.2	100	20	P	V
			11590	48.71	-5.29	54	47.41	39.84	12.66	51.2	100	20	A	V
			17385	53.85	-14.45	68.3	48.77	41.47	15.79	52.18	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	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)
		5627.8	52.38	-15.92	68.3	44.3	32.47	8.23	32.62	100	234	P	H
		5699.4	60.58	-44.28	104.86	52.42	32.51	8.3	32.65	100	234	P	H
		5718.6	65.76	-44.75	110.51	57.59	32.53	8.3	32.66	100	234	P	H
		5724.8	67.81	-54.03	121.84	59.61	32.53	8.33	32.66	100	234	P	H
		5773	103.68	-	-	95.43	32.57	8.35	32.67	100	234	P	H
		5773	97.35	-	-	89.1	32.57	8.35	32.67	100	234	A	H
		5852	64.69	-53.05	117.74	56.35	32.61	8.43	32.7	100	234	P	H
		5860	59.42	-50.08	109.5	51.08	32.62	8.43	32.71	100	234	P	H
		5877.6	57.59	-45.78	103.37	49.24	32.63	8.43	32.71	100	234	P	H
		5935.6	51.05	-17.25	68.3	42.62	32.66	8.51	32.74	100	234	P	H
													H
													H
802.11ac VHT80 CH 155 5775MHz		5643.2	61.13	-7.17	68.3	53.01	32.48	8.27	32.63	100	124	P	V
		5697.2	69.96	-33.28	103.24	61.8	32.51	8.3	32.65	100	124	P	V
		5718.2	73.32	-37.08	110.4	65.15	32.53	8.3	32.66	100	124	P	V
		5722.8	85.6	-31.68	117.28	77.4	32.53	8.33	32.66	100	124	P	V
		5773	111.23	-	-	102.98	32.57	8.35	32.67	100	124	P	V
		5773	103.49	-	-	95.24	32.57	8.35	32.67	100	124	A	V
		5850.6	69.47	-51.46	120.93	61.13	32.61	8.43	32.7	100	124	P	V
		5856.2	69.19	-41.37	110.56	60.84	32.62	8.43	32.7	100	124	P	V
		5876.8	67.54	-36.42	103.96	59.19	32.63	8.43	32.71	100	124	P	V
		5927.4	56.36	-11.94	68.3	47.92	32.66	8.51	32.73	100	124	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	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 155 5775MHz		11550	49.94	-24.06	74	48.61	39.91	12.62	51.2	100	0	P	H	
		17328	50	-18.3	68.3	45.12	41.29	15.75	52.16	100	0	P	H	
													H	
													H	
			11550	50.76	-23.24	74	49.43	39.91	12.62	51.2	100	0	P	V
			17328	50.21	-18.09	68.3	45.33	41.29	15.75	52.16	100	0	P	V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Emission below 1GHz

5GHz WIFI 802.11ac VHT20 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
5GHz 802.11ac VHT20 LF		76.71	36.9	-3.1	40	55.24	13.43	0.93	32.7	100	113	QP	H	
		76.71	38.21	-1.79	40	56.55	13.43	0.93	32.7	100	113	P	H	
		125.04	40.47	-3.03	43.5	53.9	17.9	1.33	32.66	-	-	P	H	
		228.45	40.91	-5.09	46	55.1	16.92	1.62	32.73	-	-	P	H	
		378.4	38.27	-7.73	46	47.08	21.88	2.13	32.82	-	-	P	H	
		500.2	34.54	-11.46	46	40.93	24.2	2.33	32.92	-	-	P	H	
		650	39.69	-6.31	46	44.03	26	2.67	33.01	-	-	P	H	
														H
														H
														H
														H
														H
														H
			50.25	38.24	-1.76	40	54.89	15.2	0.93	32.78	110	0	QP	V
		*	50.25	43.91	3.91	40	60.56	15.2	0.93	32.78	110	0	P	V
			76.44	38.15	-1.85	40	56.49	13.43	0.93	32.7	100	65	QP	V
		*	76.44	40.55	0.55	40	58.89	13.43	0.93	32.7	100	65	P	V
			279.48	41.48	-4.52	46	53.14	19.31	1.76	32.73	-	-	P	V
			370	34.87	-11.13	46	43.86	21.69	2.13	32.81	-	-	P	V
			496	35.1	-10.9	46	41.59	24.1	2.33	32.92	-	-	P	V
		650	38.42	-7.58	46	42.76	26	2.67	33.01	-	-	P	V	
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



Emission below 1GHz

5GHz WIFI 802.11ac VHT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
5GHz 802.11ac VHT40 LF		78.87	35.99	-4.01	40	54.09	13.66	0.93	32.69	106	115	QP	H	
		78.87	37.62	-2.38	40	55.72	13.66	0.93	32.69	106	115	P	H	
		125.04	40.13	-3.37	43.5	53.56	17.9	1.33	32.66	-	-	P	H	
		227.64	41.32	-4.68	46	55.59	16.84	1.62	32.73	-	-	P	H	
		381.9	37.45	-8.55	46	46.16	21.98	2.13	32.82	-	-	P	H	
		650	39.27	-6.73	46	43.61	26	2.67	33.01	-	-	P	H	
		874.7	36	-10	46	36.59	28.7	3.16	32.45	-	-	P	H	
														H
														H
														H
														H
														H
														H
			48.63	38.27	-1.73	40	54.09	16.03	0.93	32.78	100	129	QP	V
		*	48.63	42.61	2.61	40	58.43	16.03	0.93	32.78	100	129	P	V
			76.44	37.94	-2.06	40	56.28	13.43	0.93	32.7	100	81	QP	V
		*	76.44	40.14	0.14	40	58.48	13.43	0.93	32.7	100	81	P	V
			280.83	41.75	-4.25	46	53.39	19.33	1.76	32.73	-	-	P	V
			377.7	34.11	-11.89	46	42.94	21.86	2.13	32.82	-	-	P	V
			500.2	34.47	-11.53	46	40.86	24.2	2.33	32.92	-	-	P	V
		650	37.96	-8.04	46	42.3	26	2.67	33.01	-	-	P	V	
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
5GHz 802.11ac VHT80 LF		78.6	37.01	-2.99	40	55.11	13.66	0.93	32.69	100	77	QP	H	
		78.6	39.26	-0.74	40	57.36	13.66	0.93	32.69	100	77	P	H	
		125.04	40.15	-3.35	43.5	53.58	17.9	1.33	32.66	-	-	P	H	
		280.56	41.02	-4.98	46	52.69	19.3	1.76	32.73	-	-	P	H	
		379.1	38.26	-7.74	46	47.04	21.91	2.13	32.82	-	-	P	H	
		478.5	35.74	-10.26	46	42.58	23.76	2.3	32.9	-	-	P	H	
		650	39.47	-6.53	46	43.81	26	2.67	33.01	-	-	P	H	
														H
														H
														H
														H
														H
														H
			48.09	38.95	-1.05	40	54.77	16.03	0.93	32.78	100	105	QP	V
		*	48.09	43.08	3.08	40	58.9	16.03	0.93	32.78	100	105	P	V
			77.52	38.87	-1.13	40	57.09	13.55	0.93	32.7	100	90	QP	V
		*	77.52	40.16	0.16	40	58.38	13.55	0.93	32.7	100	90	P	V
			281.91	42.32	-3.68	46	53.93	19.36	1.76	32.73	-	-	P	V
			498.1	36.62	-9.38	46	43.05	24.16	2.33	32.92	-	-	P	V
			597.5	34.4	-11.6	46	39.42	25.44	2.57	33.03	-	-	P	V
		650	38.78	-7.22	46	43.12	26	2.67	33.01	-	-	P	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	Peak or Average
H/V	Horizontal or Vertical



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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

For Peak Limit @ 2390MHz:

- 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)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- 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)
- 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

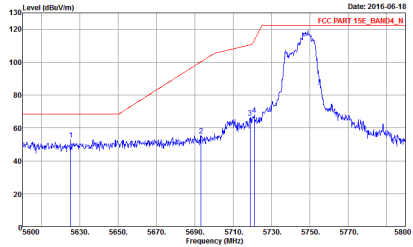
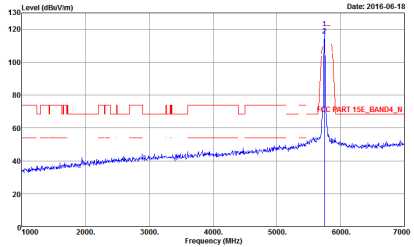
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Band 4 - 5725~5850MHz

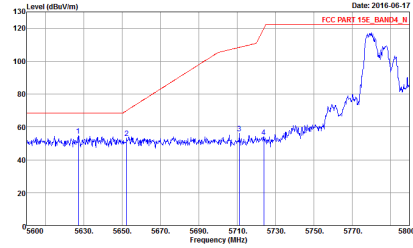
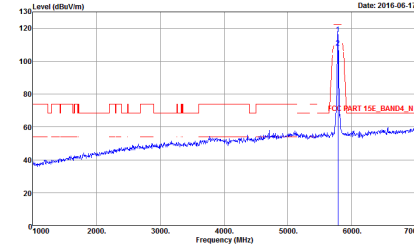
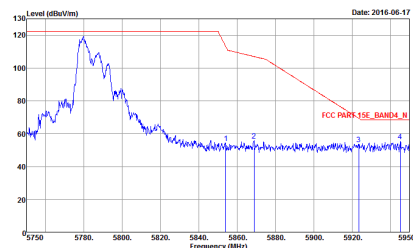
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Fundamental
Peak	<p> Site : 03CH10-1Y Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 14 </p>	<p> Site : 03CH10-1Y Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 14 </p>

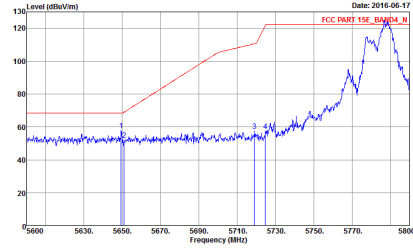
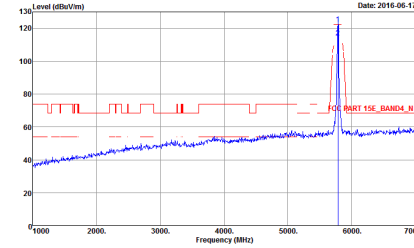
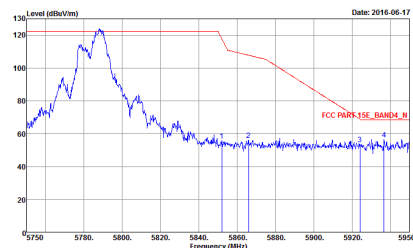


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2016-06-18 FCC PART 15E_BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 14</p>	 <p>Date: 2016-06-18 FCC PART 15E_BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 14</p>

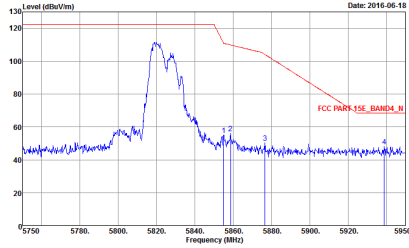
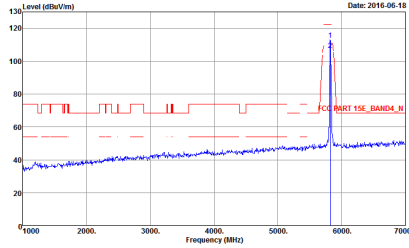


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>
Peak	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>	

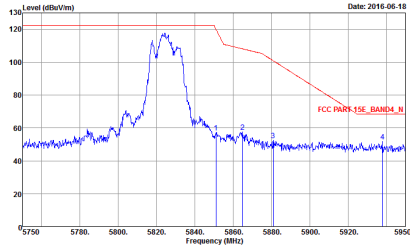
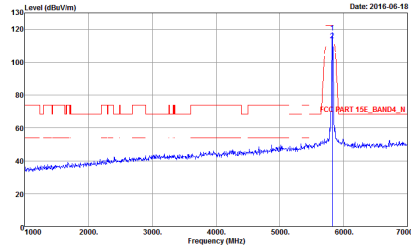


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>
Peak	 <p>Date: 2016-06-17</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 15</p>	



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Fundamental
Peak	 <p>Date: 2016-06-18</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 16</p>	 <p>Date: 2016-06-18</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 16</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Vertical	Fundamental
Peak	 <p>Date: 2016-06-18</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 16</p>	 <p>Date: 2016-06-18</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 16</p>



Band 4 5725~5850MHz

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
<p>Peak Avg.</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 14</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 652049 Mode : 14</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 15</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 15</p>



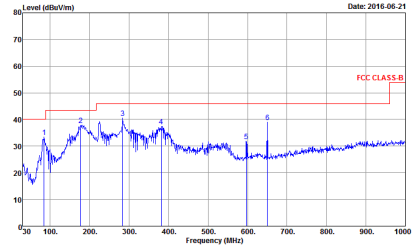
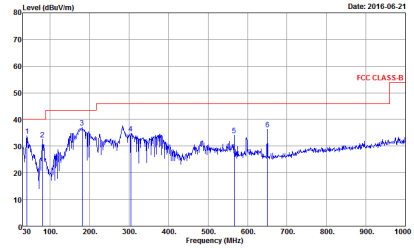
WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 16</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 16</p>



Band 4 5725~5850MHz

Emission below 1GHz

5GHz WIFI 802.11a (LF)

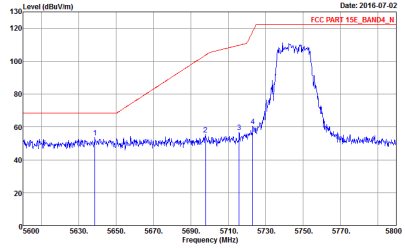
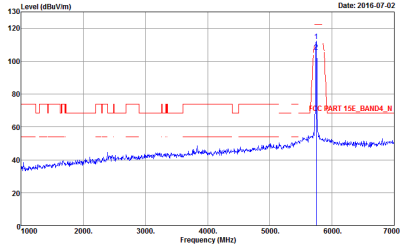
WIFI	5GHz 5725~5850MHz	
ANT	802.11a LF	
1+2	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH10-11Y Condition : FCC CLASS-B 3m BI-LOG 6111D-LF HORIZONTAL Detector : Peak Project : 652049 Mode : Z3</p>	 <p>Site : 03CH10-11Y Condition : FCC CLASS-B 3m BI-LOG 6111D-LF VERTICAL Detector : Peak Project : 652049 Mode : Z3</p>



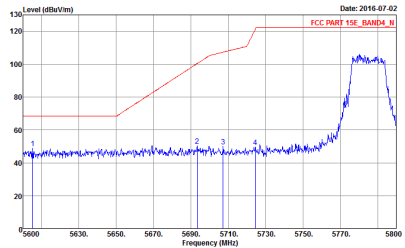
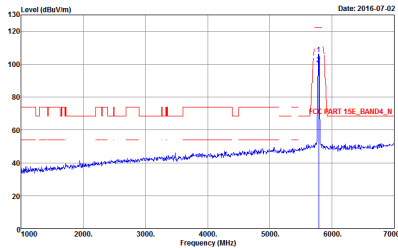
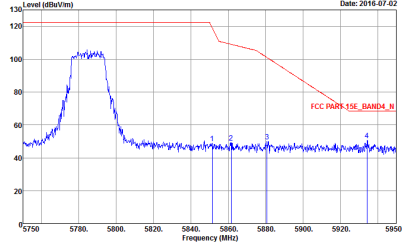
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 Band 4 5725~5850MHz
 WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Horizontal	Fundamental
Peak	<p style="font-size: small;"> Date: 2016-07-02 Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 17 </p>	<p style="font-size: small;"> Date: 2016-07-02 Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 17 </p>

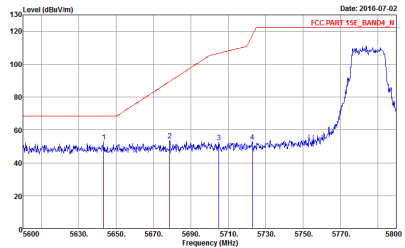
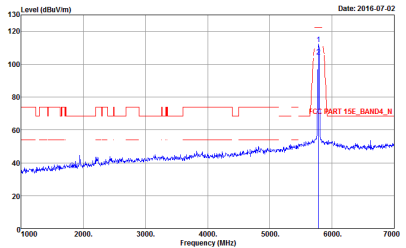
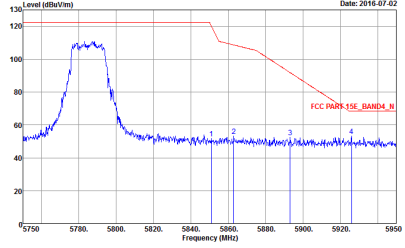


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Vertical	Fundamental
Peak Avg.	 <p>Date: 2016-07-02 FCC PART 15E_BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 17</p>	 <p>Date: 2016-07-02 FCC PART 15E_BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 17</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz	
<p style="text-align: center;">1</p>	<p style="text-align: center;">Horizontal</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 18</p>	<p style="text-align: center;">Fundamental</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 18</p>
<p style="text-align: center;">Peak</p>	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 18</p>	

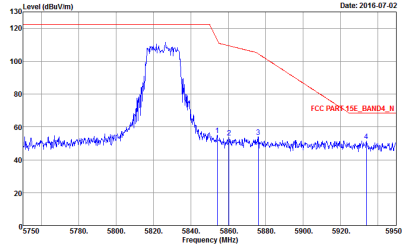
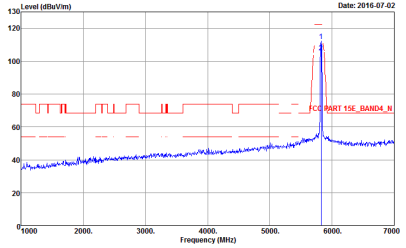


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz	
1	<p style="text-align: center;">Vertical</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 18</p>	<p style="text-align: center;">Fundamental</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 18</p>
Peak	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 18</p>	



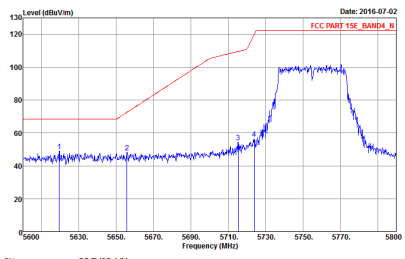
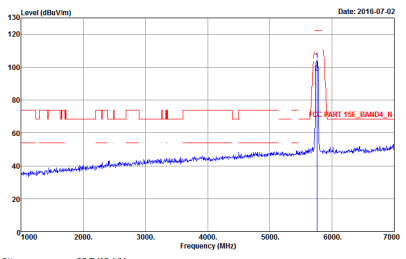
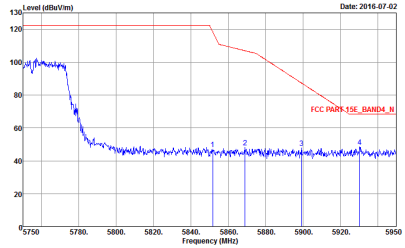
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Horizontal	Fundamental
Peak	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 19</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 19</p>



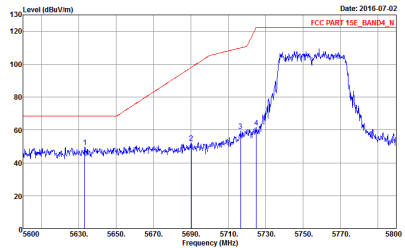
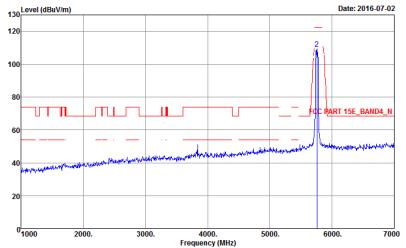
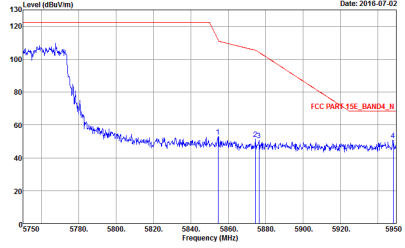
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Vertical	Fundamental
<p>Peak</p> <p>Avg.</p>	 <p>Date: 2016-07-02</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 19</p>	 <p>Date: 2016-07-02</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 19</p>



**Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)**

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
<p align="center">1</p>	<p align="center">Horizontal</p>  <p>Date: 2016-07-02</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 20</p>	<p align="center">Fundamental</p>  <p>Date: 2016-07-02</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 20</p>
<p align="center">Peak</p>	 <p>Date: 2016-07-02</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 20</p>	

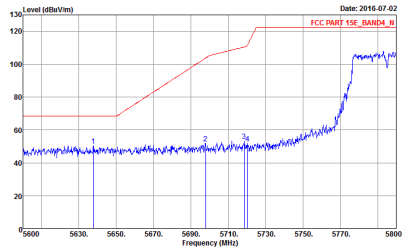
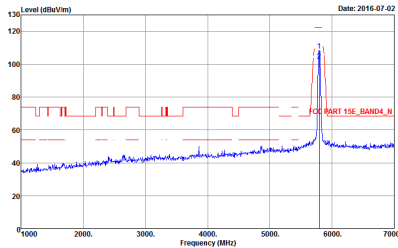
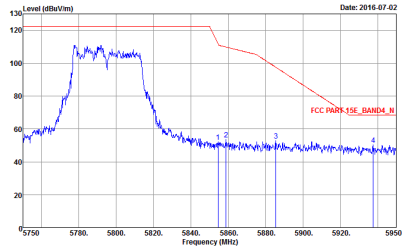


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
1	<p style="text-align: center;">Vertical</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 20</p>	<p style="text-align: center;">Fundamental</p>  <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 20</p>
Peak	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 20</p>	



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Horizontal	
Peak	<p>Date: 2016-07-02 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 21</p>	



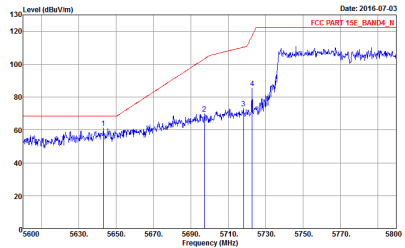
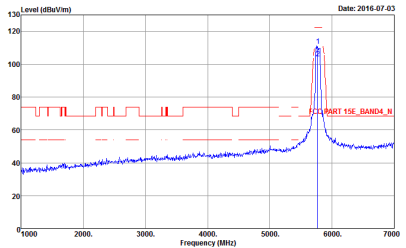
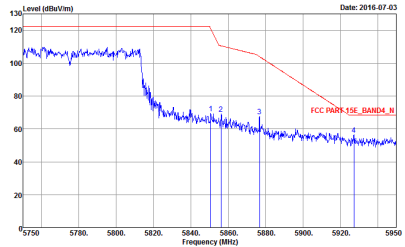
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Vertical	Fundamental
Peak	 <p>Date: 2016-07-02 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 21</p>	 <p>Date: 2016-07-02 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 21</p>
Peak	 <p>Date: 2016-07-02 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 21</p>	



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	Horizontal	Fundamental
Peak	<p>Date: 2016-07-03</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 22</p>	<p>Date: 2016-07-03</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 22</p>
Peak	<p>Date: 2016-07-03</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 22</p>	



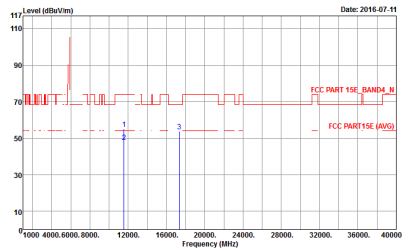
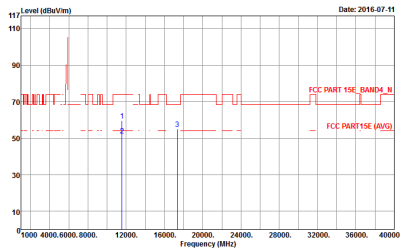
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Vertical	Fundamental
Peak	 <p>Date: 2016-07-03 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 22</p>	 <p>Date: 2016-07-03 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 22</p>
Peak	 <p>Date: 2016-07-03 FCC PART 15E BAND4_N</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 652049 Mode : 22</p>	



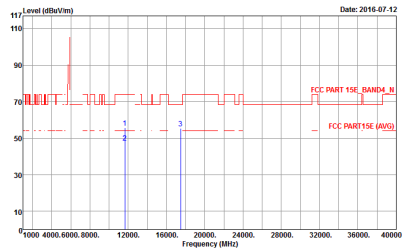
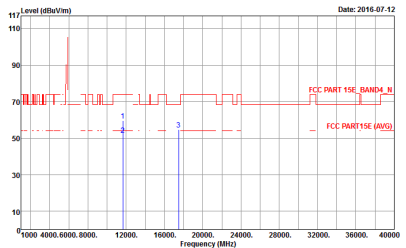
**Band 4 5725~5850MHz
WIFI 802.11ac VHT20 (Harmonic @ 3m)**

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	<p>Date: 2016-07-11</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 17</p>	<p>Date: 2016-07-11</p> <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 17</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz	
1	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 1B</p>	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 1B</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1	Horizontal	Vertical
Peak Avg.	 <p style="font-size: small;"> Date: 2016-07-12 Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 19 </p>	 <p style="font-size: small;"> Date: 2016-07-12 Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 19 </p>

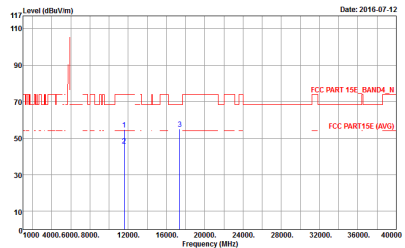
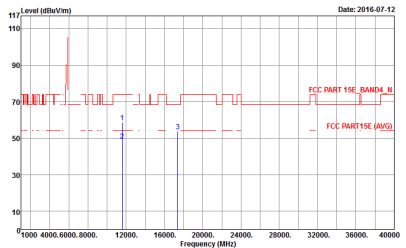


Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Harmonic @ 3m)

Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot of Level (dBuV/m) vs Frequency (MHz) with peak markers and detection parameters.

Peak
Avg.



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 21</p>	 <p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 21</p>



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

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 652049 Mode : 22</p>	<p>Site : 03CH10-HY Condition : FCC PART 15E_BAND4_N 3m HORN 91200-HF VERTICAL Detector : Peak Project : 652049 Mode : 22</p>

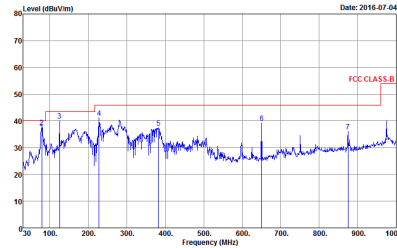
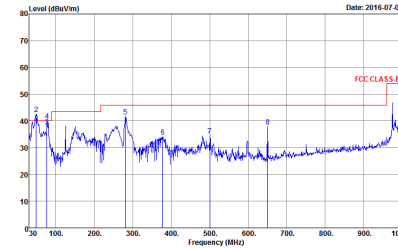


Emission below 1GHz
5GHz WIFI 802.11ac VHT20 (LF)

Table with 2 columns: WIFI (5GHz 5725~5850MHz), ANT (802.11ac VHT20 LF). Row 1: 1. Horizontal plot (Level dBuV/m vs Frequency MHz) and Vertical plot (Level dBuV/m vs Frequency MHz). Both plots show emission levels below the FCC CLASS B limit. Includes site and condition details for both orientations.



**Emission below 1GHz
5GHz WIFI 802.11ac VHT40 (LF)**

WIFI	5GHz 5725~5850MHz	
ANT	802.11ac VHT40 LF	
1	Horizontal	Vertical
<p>QP / Peak</p>	 <p> Site : 03CH10-HY Condition : FCC CLASS-B 3m BI-LOG 6111D-LF HORIZONTAL Detector : Peak Project : 652049 Mode : 25 </p>	 <p> Site : 03CH10-HY Condition : FCC CLASS-B 3m BI-LOG 6111D-LF VERTICAL Detector : Peak Project : 652049 Mode : 25 </p>



**Emission below 1GHz
5GHz WIFI 802.11ac VHT80 (LF)**

WIFI	5GHz 5725~5850MHz	
ANT	802.11ac VHT80 LF	
1	Horizontal	Vertical
QP / Peak	<p> Site : 03CH10-HY Condition : FCC CLASS-B 3m BI-LOG 6111D-LF HORIZONTAL Detector : Peak Project : 652049 Mode : 26 </p>	<p> Site : 03CH10-HY Condition : FCC CLASS-B 3m BI-LOG 6111D-LF VERTICAL Detector : Peak Project : 652049 Mode : 26 </p>



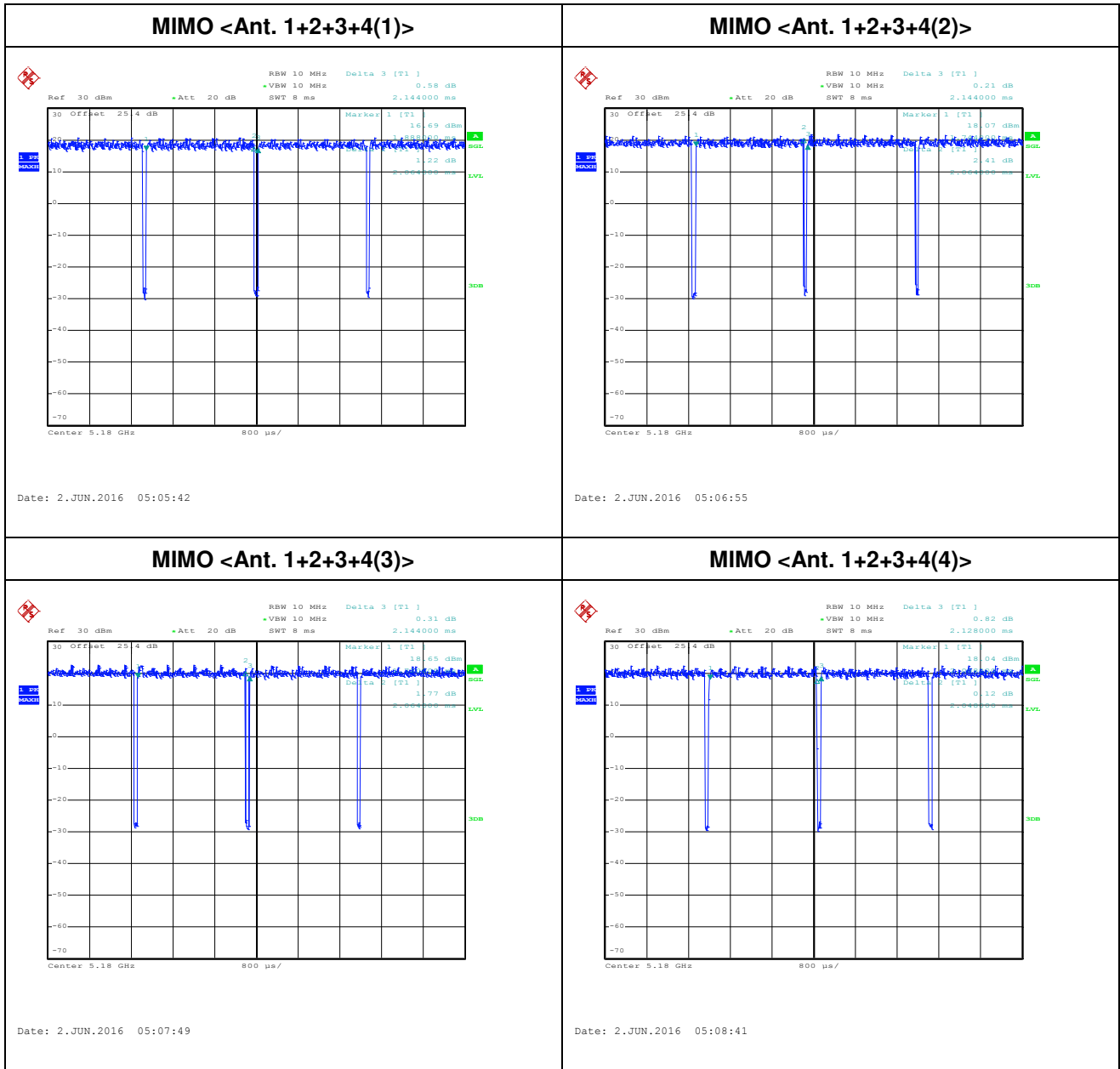
Appendix D. Duty Cycle Plots

<CDD Modes>

Antenna		Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2+3+4	802.11a ANT 1	96.27	2064	0.484	1kHz
1+2+3+4	802.11a ANT 2	96.27	2064	0.484	1kHz
1+2+3+4	802.11a ANT 3	96.27	2064	0.484	1kHz
1+2+3+4	802.11a ANT 4	96.24	2048	0.488	1kHz



802.11a



<TXBF Modes>

Antenna		Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2+3+4	802.11ac VHT20 ANT 1	98.58*	5016	0.194	1kHz
1+2+3+4	802.11ac VHT20 ANT 2	98.58*	5016	0.194	1kHz
1+2+3+4	802.11ac VHT20 ANT 3	98.58*	5016	0.194	1kHz
1+2+3+4	802.11ac VHT20 ANT 4	98.58*	5016	0.194	1kHz

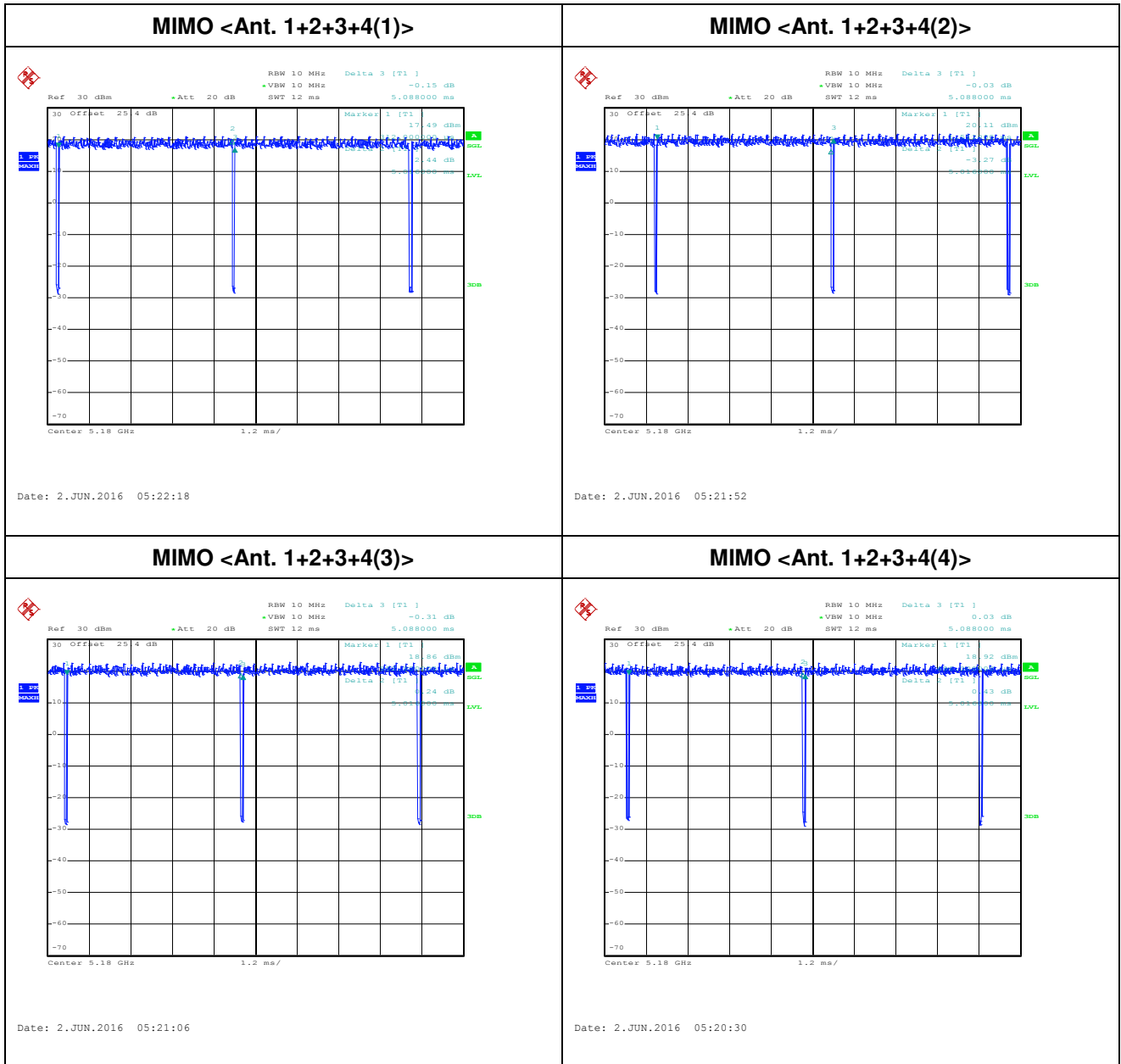
Antenna		Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2+3+4	802.11ac VHT40 ANT 1	96.82*	2432	0.411	1kHz
1+2+3+4	802.11ac VHT40 ANT 2	97.45*	2448	0.408	1kHz
1+2+3+4	802.11ac VHT40 ANT 3	96.82*	2432	0.411	1kHz
1+2+3+4	802.11ac VHT40 ANT 4	97.45*	2448	0.408	1kHz

Antenna		Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2+3+4	802.11ac VHT80 ANT 1	94.31*	1160	0.862	1kHz
1+2+3+4	802.11ac VHT80 ANT 2	93.44*	1140	0.877	1kHz
1+2+3+4	802.11ac VHT80 ANT 3	93.50*	1150	0.869	1kHz
1+2+3+4	802.11ac VHT80 ANT 4	92.74*	1150	0.869	1kHz

Note *: Duty cycle is not a constant value during the continuous beamforming transmission.

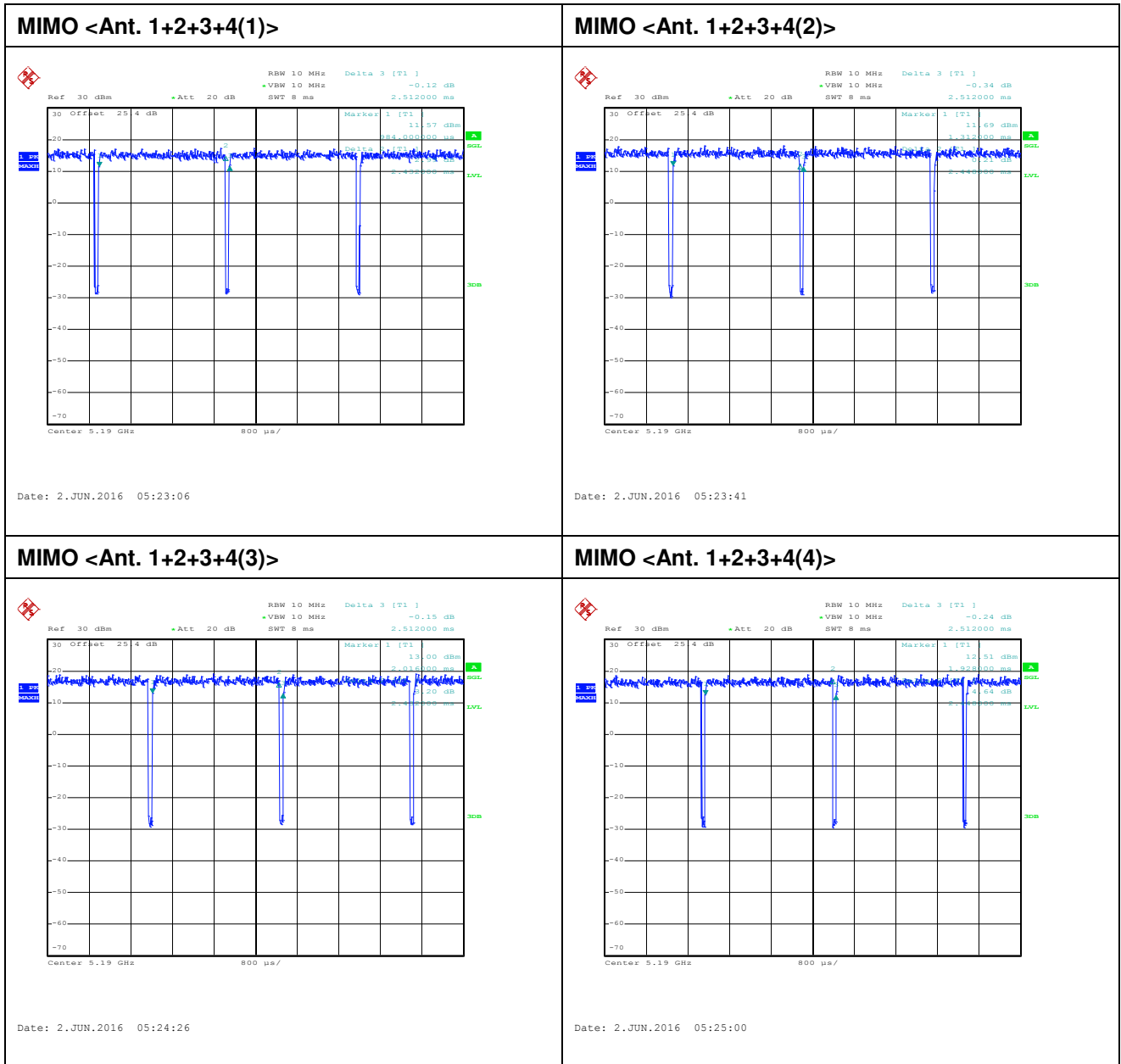


802.11ac VHT20





802.11ac VHT40





802.11ac VHT80

