

FCC RF Test Report

APPLICANT : Senao Networks, Inc.
EQUIPMENT : Wireless 802.11 ac/a/b/g/n Access Point
BRAND NAME : Senao Networks
MODEL NAME : CAP7253AG
FCC ID : U2M-CAP7252AG
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jan. 28, 2016 and testing was completed on Apr. 04, 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 : U2M-CAP7252AG

Page Number : 1 of 37

Report Issued Date : Sep. 30, 2016

Report Version : Rev. 02

Report Template No.: BU5-FR15EWLB4 AC MA Version 1.2



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	6
1.5 Modification of EUT	6
1.6 Testing Location	7
1.7 Applicable Standards	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Carrier Frequency and Channel	8
2.2 Pre-Scanned RF Power	9
2.3 Test Mode	10
2.4 Connection Diagram of Test System	11
2.5 Support Unit used in test configuration and system	12
2.6 EUT Operation Test Setup	12
2.7 Measurement Results Explanation Example	13
3 TEST RESULT	14
3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement	14
3.2 Maximum Conducted Output Power Measurement	17
3.3 Power Spectral Density Measurement	18
3.4 Unwanted Emissions Measurement	21
3.5 AC Conducted Emission Measurement	25
3.6 Frequency Stability Measurement	33
3.7 Automatically Discontinue Transmission	34
3.8 Antenna Requirements	35
4 LIST OF MEASURING EQUIPMENT	36
5 UNCERTAINTY OF EVALUATION	37
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. RADIATED SPURIOUS EMISSION	
APPENDIX C. RADIATED SPURIOUS EMISSION PLOTS	
APPENDIX D. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5D2212D2	Rev. 01	Initial issue of report	Sep. 21, 2016
FR5D2212D2	Rev. 02	Revising FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01 to v01r03	Sep. 30, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm/MHz & 15.209(a)	Pass	Under limit 0.19 dB at 66.180 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 2.10 dB at 0.414 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

Senao Networks, Inc.

3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan, R.O.C

1.2 Manufacturer

Senao Networks, Inc.

3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan, R.O.C

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Wireless 802.11 ac/a/b/g/n Access Point
Brand Name	Senao Networks
Model Name	CAP7253AG
FCC ID	U2M-CAP7252AG
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80
EUT Stage	Production Unit

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	MIMO <Ant. Port 1 + 2> 802.11a : 25.43 dBm / 0.3491 W 802.11n HT20 : 22.90 dBm / 0.1950 W 802.11n HT40 : 24.95 dBm / 0.3126 W 802.11ac VHT20: 23.11 dBm / 0.2046 W 802.11ac VHT40: 25.49 dBm / 0.3540 W 802.11ac VHT80: 15.38 dBm / 0.0345 W		
99% Occupied Bandwidth	802.11a : 17.70 MHz 802.11n HT20 : 18.75 MHz 802.11n HT40 : 36.80 MHz 802.11ac VHT20 : 18.70 MHz 802.11ac VHT40 : 36.80 MHz 802.11ac VHT80 : 75.96 MHz		
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)		
Antenna Type	Ant. 1 : Dipole Antenna Ant. 2 : Dipole Antenna		
Antenna Gain	Ant. 1 : 2.95 dBi Ant. 2 : 2.95 dBi		
Antenna Function Description		Ant. 1	Ant. 2
	802.11 a/n/ac MIMO	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	03CH12-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 v01r03
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



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).

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

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

2.1 Carrier Frequency and Channel

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

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

2.2 Pre-Scanned RF Power

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

MIMO <Ant. 1+2>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	25.43	25.09	24.93	24.84	24.75	24.26	24.24	24.18

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Average Power (dBm)	22.90	22.83	22.62	22.61	22.61	22.65	22.54	22.45

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7
Average Power (dBm)	24.95	24.68	24.70	24.77	24.81	24.79	24.69	24.60

5GHz 802.11ac VHT20 mode									
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8
Average Power (dBm)	23.11	22.87	22.86	22.79	22.84	22.65	22.59	22.48	22.45

5GHz 802.11ac VHT40 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	25.49	25.42	25.41	25.44	25.47	25.41	25.40	25.23	25.27	25.21

5GHz 802.11ac VHT80 mode										
Data Rate (MHz)	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Average Power (dBm)	15.38	15.31	15.32	15.08	15.31	15.17	14.85	14.66	14.46	14.41

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

2.3 Test Mode

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

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

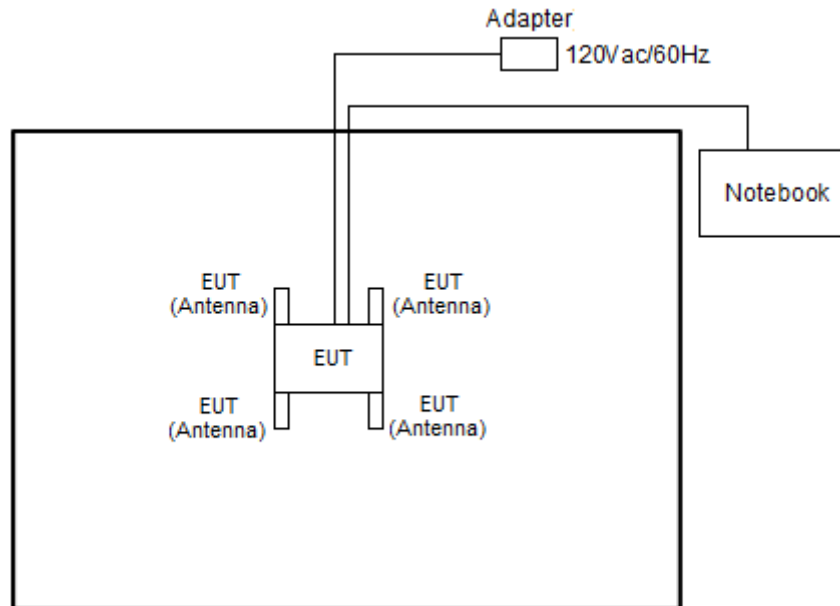
AC Conducted Emission	Mode 1 : 5G Tx + RJ-45 Link + Adapter Mode 2 : 5G Tx + RJ-45 Link + PoE
Remark: The worst case of conducted emission is mode 1; only the test data of it was reported.	

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

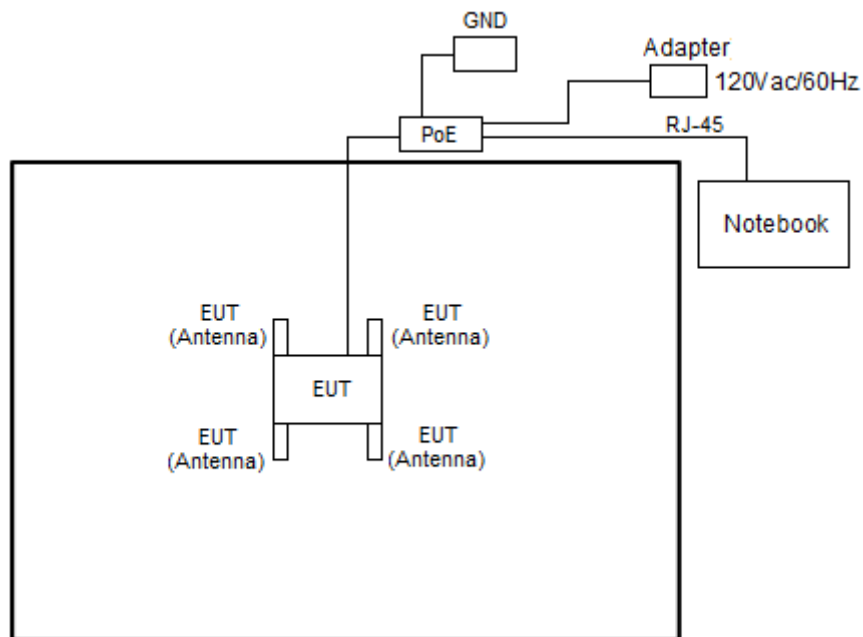
Ch. #		Band IV : 5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.4 Connection Diagram of Test System

<EUT with Adapter Mode>



<EUT with POE Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	Lenovo	M490S	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	Lenovo	IdeaPad (80Q7)	PPD-QCNFA	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	POE Adapter	Powertron Electronics Corp	PA1040-480IB080	N/A	N/A	1.5m
5.	POE	N/A	NPE-5818	N/A	N/A	N/A
6.	Adapter	Powertron Electronics Corp.	PA1015-2I / PA1015-2I PA1015-2I120125	N/A	N/A	1.2m

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, "Art2-gui Tool" installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.



2.7 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

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

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

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.

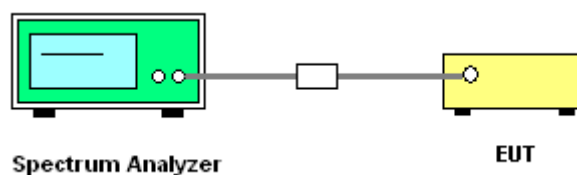
3.1.2 Measuring Instruments

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 v01r03.
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.

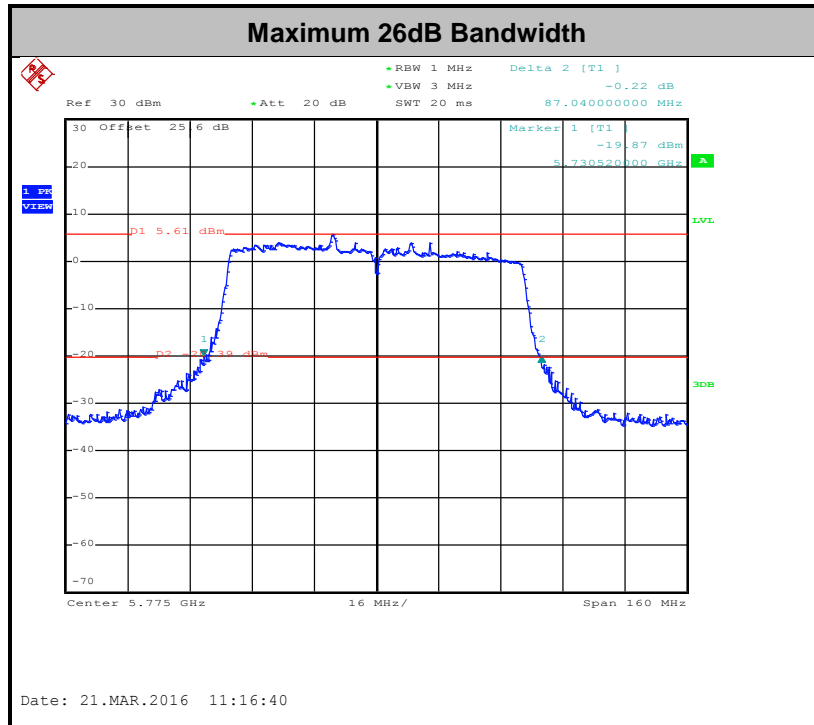
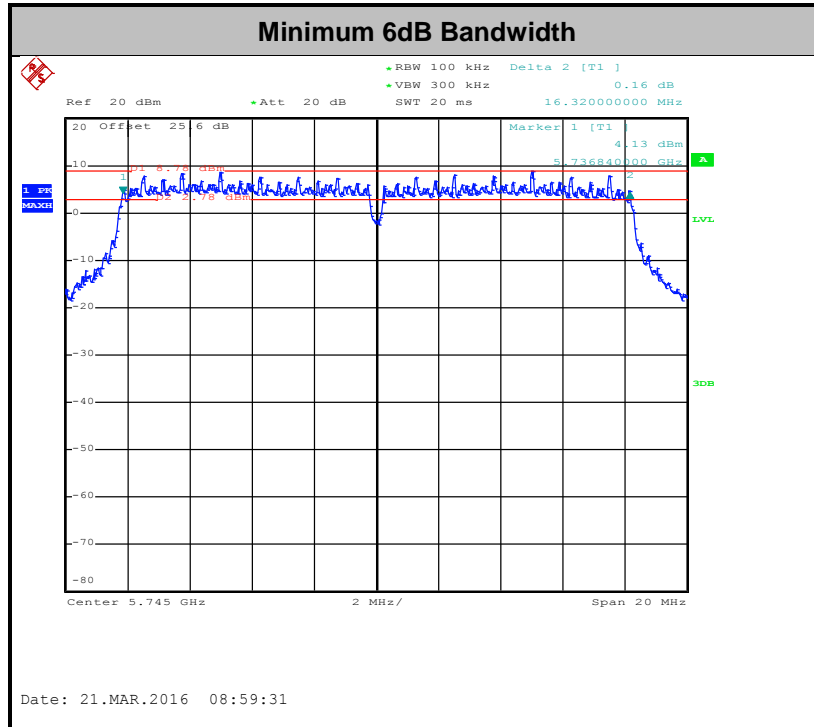
3.1.4 Test Setup

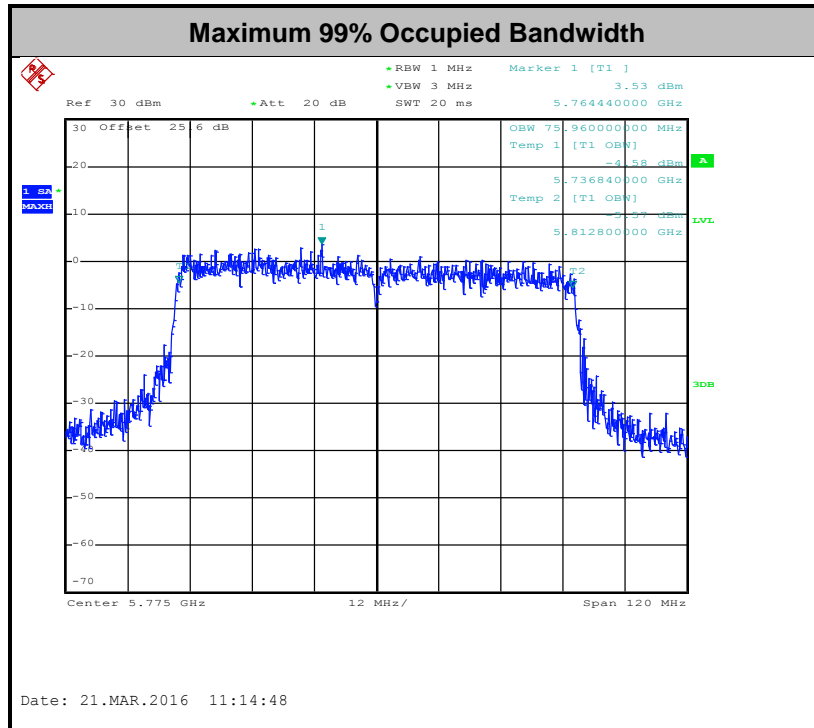




3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.





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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

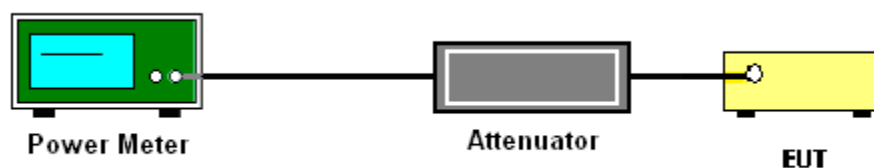
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.
Section F) Maximum power spectral density.

Method SA-2

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

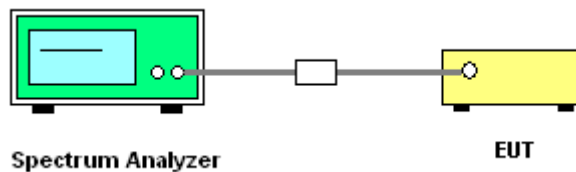
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW \geq 1 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ 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.
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 (a): Measure and sum the spectra across the outputs.

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

3.3.4 Test Setup

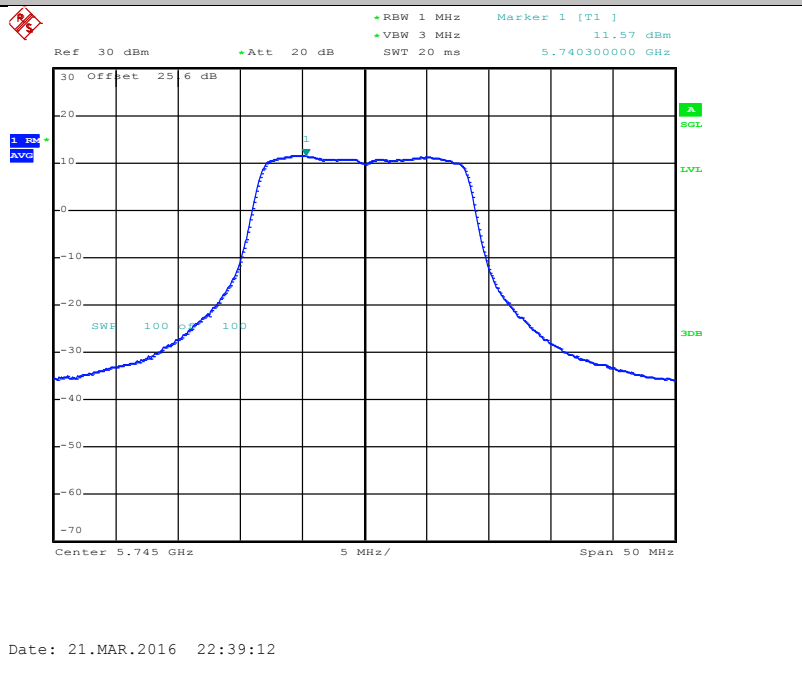


3.3.5 Test Result of Power Spectral Density

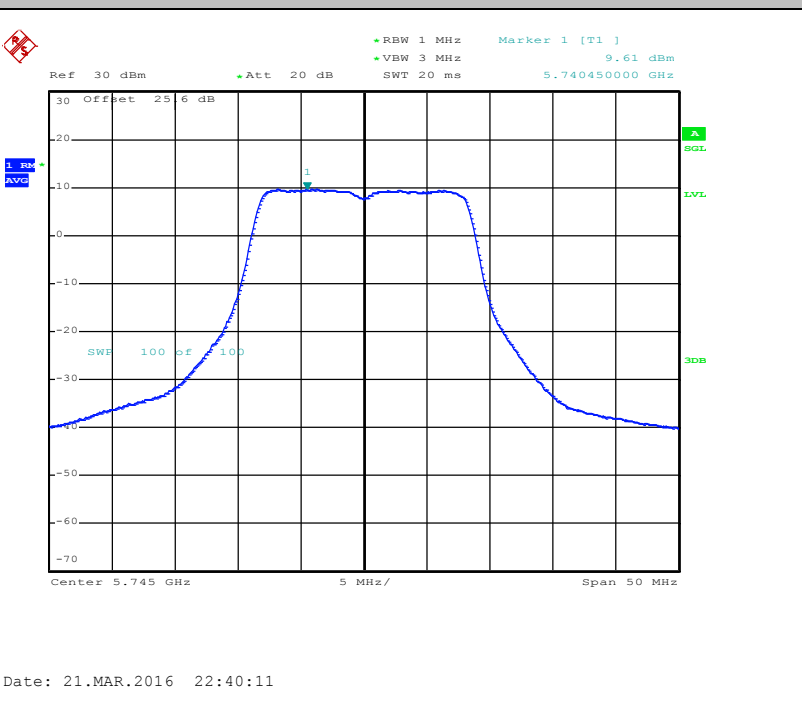
Please refer to Appendix A.



Worst Case Power Density (dBm/300kHz) for MIMO Ant. 1+2(1)



Worst Case Power Density (dBm/300kHz) for MIMO Ant. 1+2(2)



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 Part 15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBμV/m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBμV/m).
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 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

- (1) KDB 789033 D02 General UNII Test Procedures New Rules v01r03 G2)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 v01r03.
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

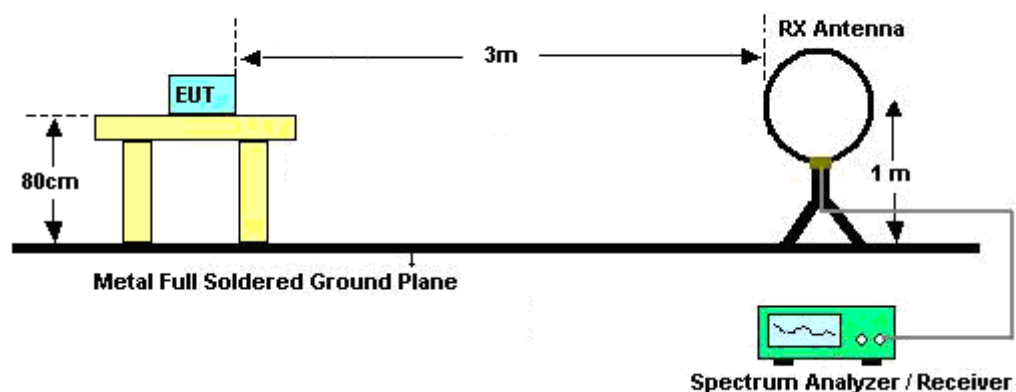
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	5GHz 802.11a for Ant 1	96.68	2040.00	0.49	1kHz
1+2	5GHz 802.11a for Ant 2	96.68	2040.00	0.49	1kHz
1+2	5GHz 802.11ac VHT20 for Ant 1	96.47	1910.00	0.52	1kHz
1+2	5GHz 802.11ac VHT20 for Ant 2	96.45	1900.00	0.53	1kHz
1+2	5GHz 802.11ac VHT40 for Ant 1	93.07	940.00	1.06	3kHz
1+2	5GHz 802.11ac VHT40 for Ant 2	93.07	940.00	1.06	3kHz
1+2	5GHz 802.11ac VHT80 for Ant 1	87.36	456.00	2.19	3kHz
1+2	5GHz 802.11ac VHT80 for Ant 2	87.36	456.00	2.19	3kHz

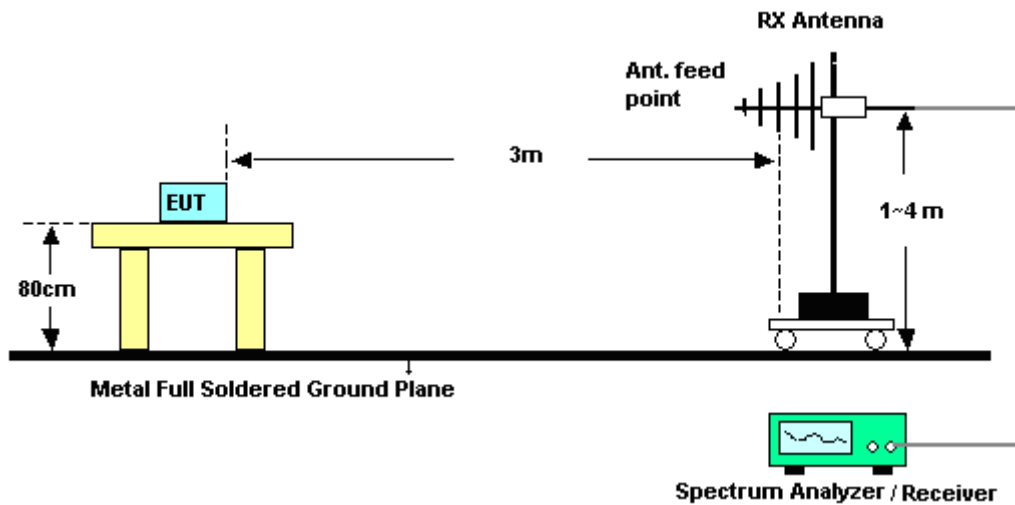
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

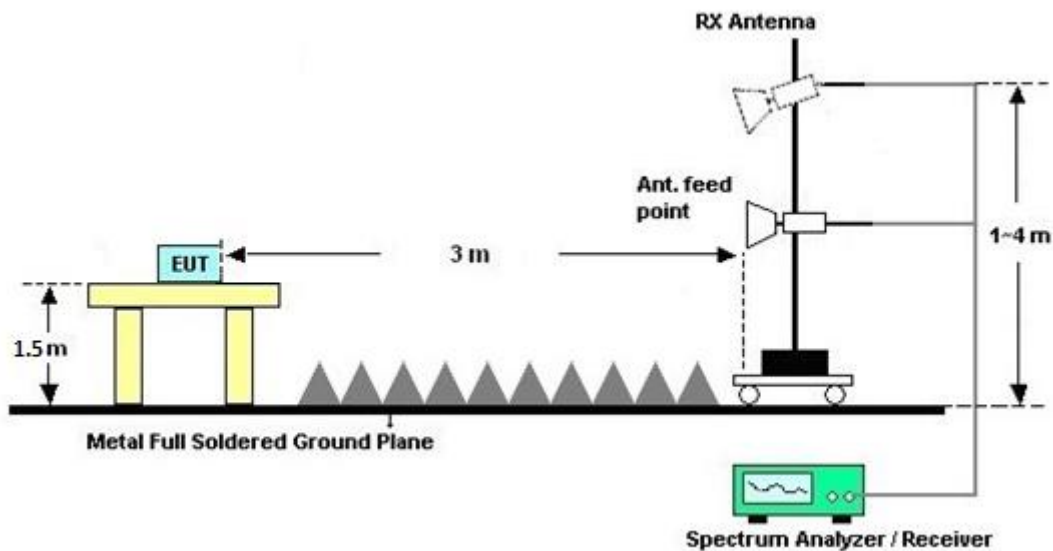
For radiated emissions below 30MHz



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 Appendix C.

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

Please refer to Appendix B and Appendix 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.

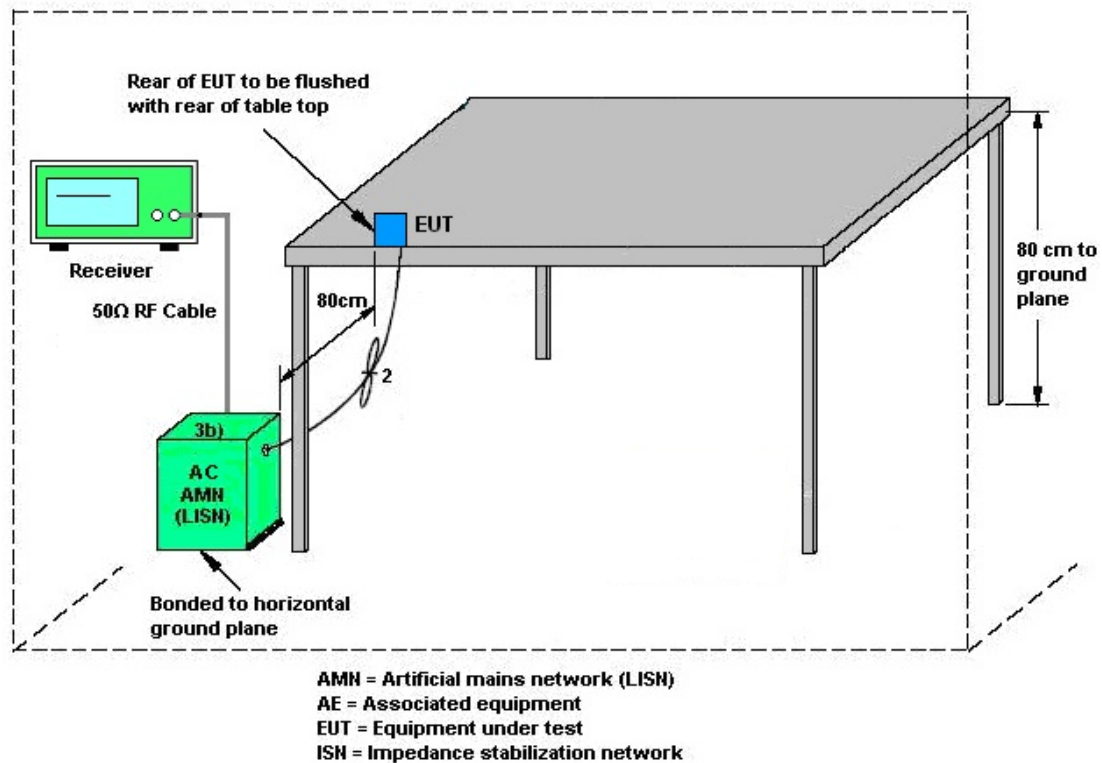
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

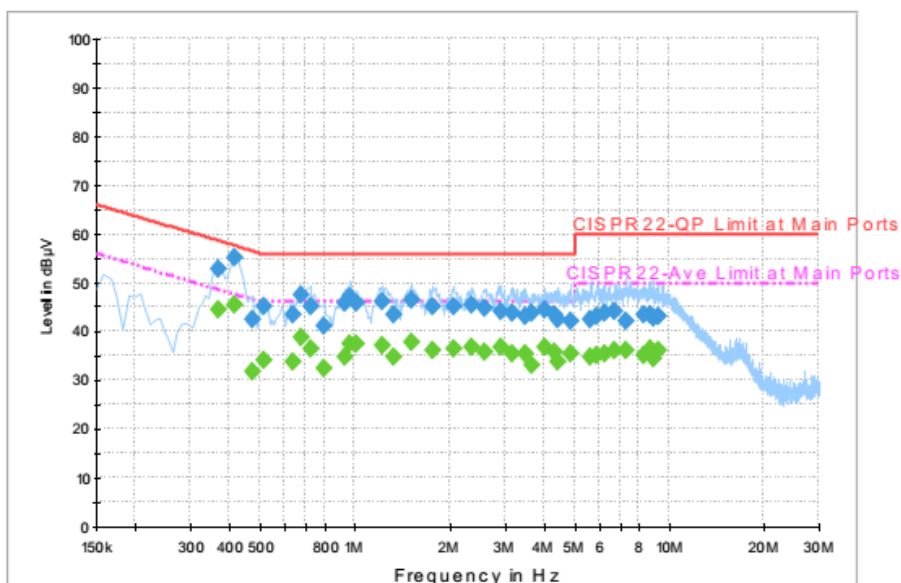
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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



3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	5G Tx + RJ-45 Link + Adapter		

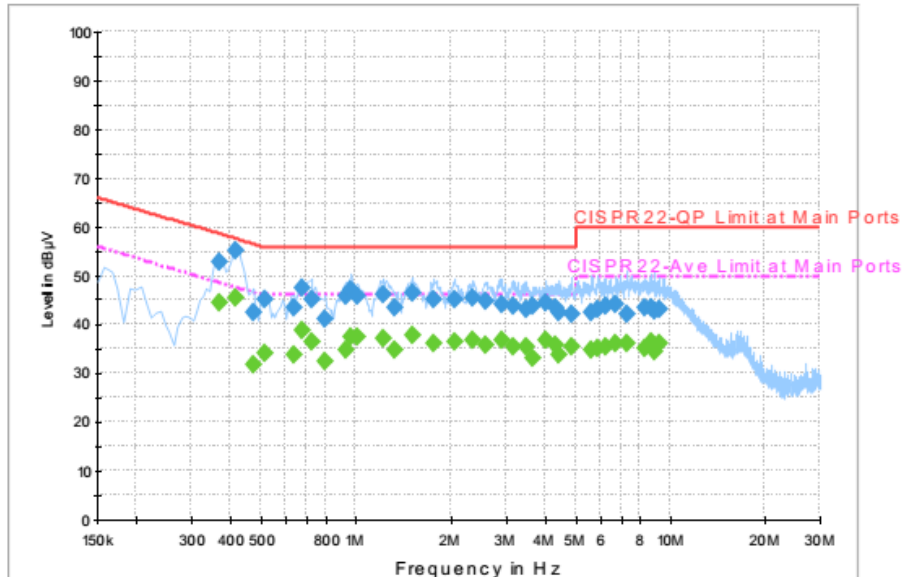


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.366000	52.9	Off	L1	19.6	5.7	58.6
0.414000	55.0	Off	L1	19.6	2.6	57.6
0.470000	42.5	Off	L1	19.6	14.0	56.5
0.510000	45.2	Off	L1	19.6	10.8	56.0
0.630000	43.4	Off	L1	19.6	12.6	56.0
0.670000	47.6	Off	L1	19.6	8.4	56.0
0.718000	45.1	Off	L1	19.6	10.9	56.0
0.798000	41.3	Off	L1	19.6	14.7	56.0
0.926000	45.7	Off	L1	19.6	10.3	56.0
0.966000	47.1	Off	L1	19.6	8.9	56.0
1.006000	45.9	Off	L1	19.6	10.1	56.0
1.214000	46.2	Off	L1	19.6	9.8	56.0
1.326000	43.5	Off	L1	19.6	12.5	56.0
1.502000	46.3	Off	L1	19.6	9.7	56.0
1.766000	45.2	Off	L1	19.6	10.8	56.0
2.062000	45.2	Off	L1	19.5	10.8	56.0
2.334000	45.5	Off	L1	19.5	10.5	56.0
2.582000	44.8	Off	L1	19.6	11.2	56.0
2.894000	44.3	Off	L1	19.6	11.7	56.0

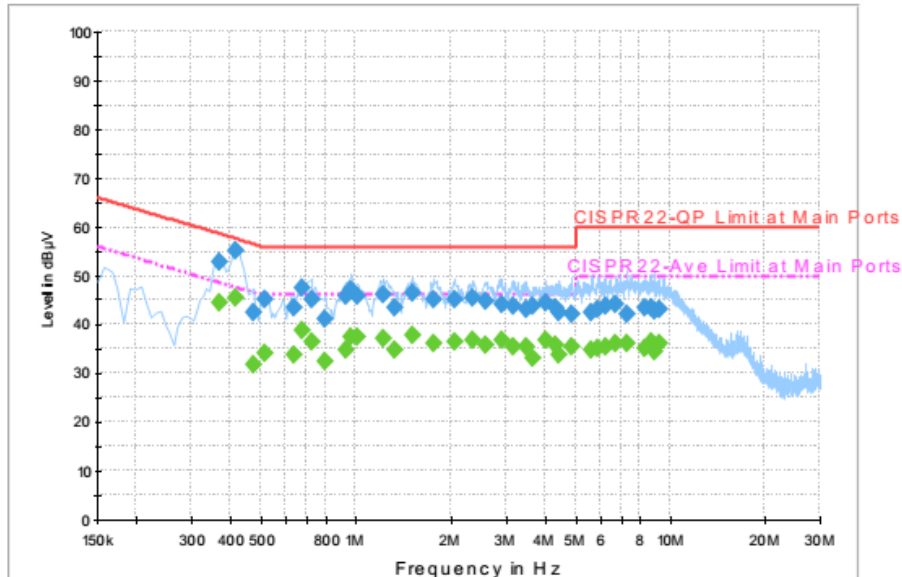


Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	5G Tx + RJ-45 Link + Adapter		

**Final Result : QuasiPeak**

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
3.150000	43.7	Off	L1	19.6	12.3	56.0
3.462000	43.2	Off	L1	19.6	12.8	56.0
3.646000	44.0	Off	L1	19.6	12.0	56.0
4.006000	44.6	Off	L1	19.7	11.4	56.0
4.286000	43.5	Off	L1	19.7	12.5	56.0
4.438000	42.3	Off	L1	19.7	13.7	56.0
4.838000	42.3	Off	L1	19.7	13.7	56.0
5.630000	42.5	Off	L1	19.7	17.5	60.0
5.902000	43.0	Off	L1	19.7	17.0	60.0
6.222000	43.7	Off	L1	19.7	16.3	60.0
6.718000	44.2	Off	L1	19.7	15.8	60.0
7.302000	42.0	Off	L1	19.7	18.0	60.0
8.254000	43.6	Off	L1	19.7	16.4	60.0
8.718000	43.4	Off	L1	19.7	16.6	60.0
8.910000	42.9	Off	L1	19.7	17.1	60.0
9.238000	43.3	Off	L1	19.7	16.7	60.0

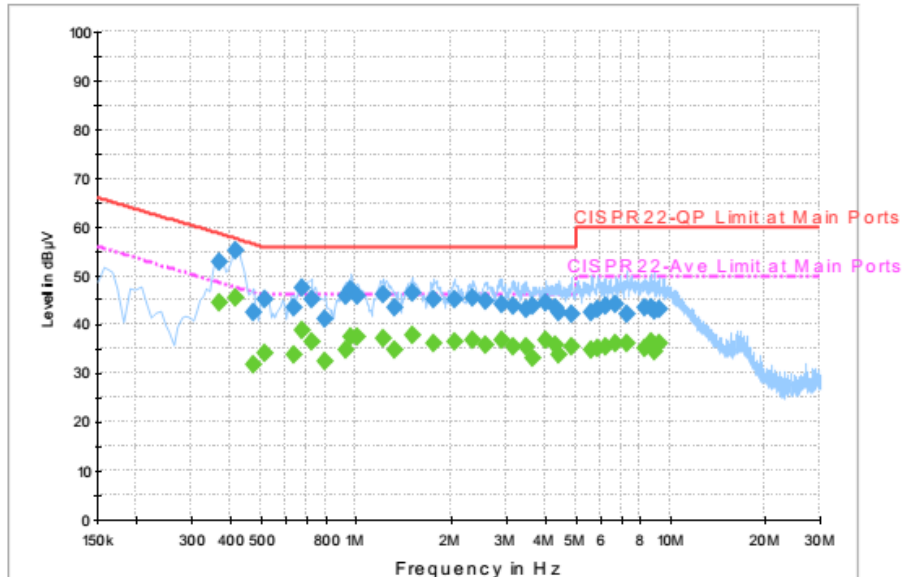
Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	5G Tx + RJ-45 Link + Adapter		


Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.366000	44.5	Off	L1	19.6	4.1	48.6
0.414000	45.5	Off	L1	19.6	2.1	47.6
0.470000	31.8	Off	L1	19.6	14.7	46.5
0.510000	34.2	Off	L1	19.6	11.8	46.0
0.630000	33.8	Off	L1	19.6	12.2	46.0
0.670000	38.8	Off	L1	19.6	7.2	46.0
0.718000	36.5	Off	L1	19.6	9.5	46.0
0.798000	32.5	Off	L1	19.6	13.5	46.0
0.926000	34.8	Off	L1	19.6	11.2	46.0
0.966000	37.5	Off	L1	19.6	8.5	46.0
1.006000	37.3	Off	L1	19.6	8.7	46.0
1.214000	37.2	Off	L1	19.6	8.8	46.0
1.326000	34.7	Off	L1	19.6	11.3	46.0
1.502000	37.6	Off	L1	19.6	8.4	46.0
1.766000	36.1	Off	L1	19.6	9.9	46.0
2.062000	36.6	Off	L1	19.5	9.4	46.0
2.334000	36.8	Off	L1	19.5	9.2	46.0
2.582000	35.7	Off	L1	19.6	10.3	46.0
2.894000	36.7	Off	L1	19.6	9.3	46.0

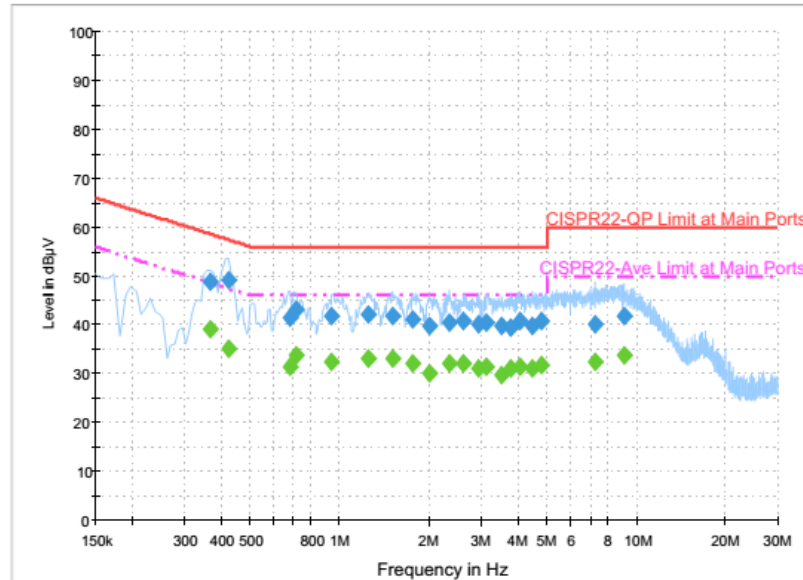


Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	5G Tx + RJ-45 Link + Adapter		

**Final Result : Average**

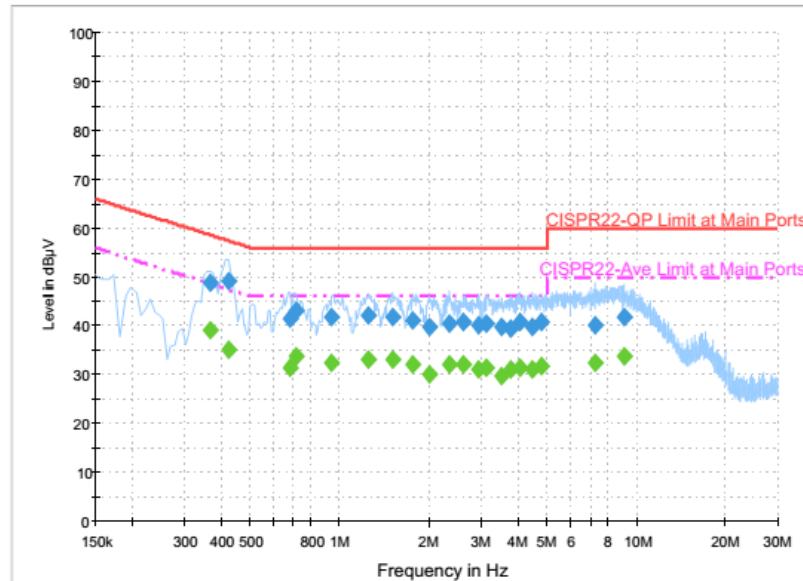
Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
3.150000	35.5	Off	L1	19.6	10.5	46.0
3.462000	35.4	Off	L1	19.6	10.6	46.0
3.646000	33.1	Off	L1	19.6	12.9	46.0
4.006000	36.8	Off	L1	19.7	9.2	46.0
4.286000	35.9	Off	L1	19.7	10.1	46.0
4.438000	33.9	Off	L1	19.7	12.1	46.0
4.838000	35.4	Off	L1	19.7	10.6	46.0
5.630000	34.9	Off	L1	19.7	15.1	50.0
5.902000	35.0	Off	L1	19.7	15.0	50.0
6.222000	35.5	Off	L1	19.7	14.5	50.0
6.718000	36.2	Off	L1	19.7	13.8	50.0
7.302000	36.1	Off	L1	19.7	13.9	50.0
8.254000	35.0	Off	L1	19.7	15.0	50.0
8.718000	36.4	Off	L1	19.7	13.6	50.0
8.910000	34.5	Off	L1	19.7	15.5	50.0
9.238000	36.1	Off	L1	19.7	13.9	50.0

Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	5G Tx + RJ-45 Link + Adapter		


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.366000	48.9	Off	N	19.6	9.7	58.6
0.422000	49.0	Off	N	19.6	8.4	57.4
0.678000	41.5	Off	N	19.6	14.5	56.0
0.710000	43.2	Off	N	19.6	12.8	56.0
0.942000	41.8	Off	N	19.6	14.2	56.0
1.246000	42.1	Off	N	19.6	13.9	56.0
1.510000	41.9	Off	N	19.6	14.1	56.0
1.758000	41.2	Off	N	19.6	14.8	56.0
2.006000	39.8	Off	N	19.6	16.2	56.0
2.350000	40.6	Off	N	19.6	15.4	56.0
2.622000	41.0	Off	N	19.6	15.0	56.0
2.958000	40.2	Off	N	19.6	15.8	56.0
3.142000	40.4	Off	N	19.6	15.6	56.0
3.534000	39.9	Off	N	19.6	16.1	56.0
3.798000	39.6	Off	N	19.6	16.4	56.0
4.054000	40.7	Off	N	19.6	15.3	56.0
4.454000	39.7	Off	N	19.6	16.3	56.0
4.806000	40.9	Off	N	19.6	15.1	56.0
7.278000	40.2	Off	N	19.7	19.8	60.0
9.142000	41.8	Off	N	19.7	18.2	60.0

Test Mode :	Mode 1	Temperature :	24~25°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	5G Tx + RJ-45 Link + Adapter		


Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.366000	39.1	Off	N	19.6	9.5	48.6
0.422000	35.2	Off	N	19.6	12.2	47.4
0.678000	31.3	Off	N	19.6	14.7	46.0
0.710000	33.8	Off	N	19.6	12.2	46.0
0.942000	32.4	Off	N	19.6	13.6	46.0
1.246000	33.1	Off	N	19.6	12.9	46.0
1.510000	33.2	Off	N	19.6	12.8	46.0
1.758000	32.1	Off	N	19.6	13.9	46.0
2.006000	30.1	Off	N	19.6	15.9	46.0
2.350000	32.2	Off	N	19.6	13.8	46.0
2.622000	32.2	Off	N	19.6	13.8	46.0
2.958000	31.1	Off	N	19.6	14.9	46.0
3.142000	31.5	Off	N	19.6	14.5	46.0
3.534000	29.9	Off	N	19.6	16.1	46.0
3.798000	31.2	Off	N	19.6	14.8	46.0
4.054000	31.5	Off	N	19.6	14.5	46.0
4.454000	31.1	Off	N	19.6	14.9	46.0
4.806000	31.9	Off	N	19.6	14.1	46.0
7.278000	32.3	Off	N	19.7	17.7	50.0
9.142000	33.8	Off	N	19.7	16.2	50.0

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

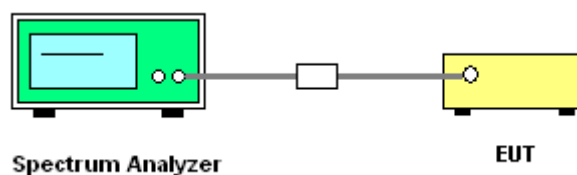
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.



3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

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

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.8 Antenna Requirements

3.8.1 Standard Applicable

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

3.8.2 Antenna Anti-Replacement Construction

R SMA.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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

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

For power measurements on IEEE 802.11 devices,

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

The EUT supports CDD mode.

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

The directional gain "DG" is calculated as following table.

			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant 1	Ant 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	2.95	2.95	2.95	5.96	0.00	0.00

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

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
DC Power Supply	TOPWARD	3303D	740889	N/A	May 27, 2015	Feb. 22, 2016 ~ Apr. 04, 2016	May 26, 2016	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	300MHz~40GHz	Jan. 08, 2016	Feb. 22, 2016 ~ Apr. 04, 2016	Jan. 07, 2017	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Jul. 29, 2015	Feb. 22, 2016 ~ Apr. 04, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 29, 2015	Feb. 22, 2016 ~ Apr. 04, 2016	Jul. 28, 2016	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 18, 2015	Feb. 22, 2016 ~ Apr. 04, 2016	Jun. 17, 2016	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 16, 2015	Feb. 22, 2016 ~ Apr. 04, 2016	Jul. 15, 2016	Conducted (TH02-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Sep. 01, 2016	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D	37059	30MHz~1GHz	Dec. 29, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Dec. 28, 2016	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Sep. 24, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Sep. 23, 2016	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 21, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Dec. 20, 2016	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 02, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Nov. 01, 2016	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Nov. 01, 2016	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103A	161075	10MHz~1GHz	Apr. 09, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Apr. 08, 2016	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 14, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Dec. 13, 2016	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	Jan. 05, 2016	Mar. 03, 2016 ~ Mar. 30, 2016	Jan. 04, 2017	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Mar. 03, 2016 ~ Mar. 30, 2016	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Mar. 03, 2016 ~ Mar. 30, 2016	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0-360 degree	N/A	Mar. 03, 2016 ~ Mar. 30, 2016	N/A	Radiation (03CH12-HY)
Preamplifier	MITEQ	JS44-1800400 0-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Mar. 03, 2016 ~ Mar. 30, 2016	Jun. 01, 2016	Radiation (03CH12-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 27, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Mar. 27, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Mar. 27, 2016	Dec. 01, 2016	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 08, 2016	Mar. 27, 2016	Jan. 07, 2017	Conduction (CO05-HY)



5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9
---	-----



Appendix A. Conducted Test Results

Test Engineer:	AC Chang	Temperature:	21~25	°C
Test Date:	2016/02/22 ~ 2016/04/04	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV													
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	17.65	17.40	24.20	23.10	16.34	16.32	0.5		Pass
11a	6Mbps	2	157	5785	17.70	17.50	23.60	23.00	16.32	16.32	0.5		Pass
11a	6Mbps	2	165	5825	17.35	17.50	23.90	23.30	16.32	16.36	0.5		Pass
HT20	MCS0	2	149	5745	18.75	18.60	25.80	24.80	17.52	17.56	0.5		Pass
HT20	MCS0	2	157	5785	18.75	18.60	25.00	24.20	17.58	17.52	0.5		Pass
HT20	MCS0	2	165	5825	18.55	18.65	24.90	25.00	17.56	17.54	0.5		Pass
HT40	MCS0	2	151	5755	36.50	36.80	46.26	45.54	36.08	35.72	0.5		Pass
HT40	MCS0	2	159	5795	36.60	36.70	46.08	46.08	36.08	35.72	0.5		Pass
VHT20	MCS0	2	149	5745	18.65	18.50	25.00	23.90	17.58	17.56	0.5		Pass
VHT20	MCS0	2	157	5785	18.45	18.65	24.60	24.60	17.56	17.60	0.5		Pass
VHT20	MCS0	2	165	5825	18.70	18.50	24.90	24.60	17.58	17.54	0.5		Pass
VHT40	MCS0	2	151	5755	36.70	36.70	46.62	45.00	36.32	36.28	0.5		Pass
VHT40	MCS0	2	159	5795	36.80	36.80	46.44	45.90	36.32	35.72	0.5		Pass
VHT80	MCS0	2	155	5775	75.84	75.96	86.72	87.04	75.52	74.40	0.5		Pass

TEST RESULTS DATA
Average Power Table

Band IV															
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	149	5745	0.15	0.15	23.05	21.68	25.43	30.00		2.95			Pass
11a	6Mbps	2	157	5785	0.15	0.15	20.27	19.82	23.06	30.00		2.95			Pass
11a	6Mbps	2	165	5825	0.15	0.15	17.70	17.11	20.42	30.00		2.95			Pass
HT20	MCS0	2	149	5745	0.16	0.16	20.34	19.39	22.90	30.00		2.95			Pass
HT20	MCS0	2	157	5785	0.16	0.16	20.05	18.95	22.54	30.00		2.95			Pass
HT20	MCS0	2	165	5825	0.16	0.16	17.95	16.39	20.25	30.00		2.95			Pass
HT40	MCS0	2	151	5755	0.32	0.32	18.55	17.10	20.89	30.00		2.95			Pass
HT40	MCS0	2	159	5795	0.32	0.32	22.65	21.09	24.95	30.00		2.95			Pass
VHT20	MCS0	2	149	5745	0.16	0.16	20.83	19.20	23.10	30.00		2.95			Pass
VHT20	MCS0	2	157	5785	0.16	0.16	20.35	19.85	23.11	30.00		2.95			Pass
VHT20	MCS0	2	165	5825	0.16	0.16	17.76	17.23	20.51	30.00		2.95			Pass
VHT40	MCS0	2	151	5755	0.31	0.31	18.46	17.35	20.95	30.00		2.95			Pass
VHT40	MCS0	2	159	5795	0.31	0.31	23.30	21.46	25.49	30.00		2.95			Pass
VHT80	MCS0	2	155	5775	0.59	0.59	12.61	12.13	15.38	30.00		2.95			Pass

TEST RESULTS DATA
Power Spectral Density

Band IV																	
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail	
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	149	5745	0.15	0.15	2.22					16.95	30.00		5.96		Pass
11a	6Mbps	2	157	5785	0.15	0.15	2.22					14.15	30.00		5.96		Pass
11a	6Mbps	2	165	5825	0.15	0.15	2.22					11.53	30.00		5.96		Pass
HT20	MCS0	2	149	5745	0.16	0.16	2.22					16.85	30.00		5.96		Pass
HT20	MCS0	2	157	5785	0.16	0.16	2.22					16.10	30.00		5.96		Pass
HT20	MCS0	2	165	5825	0.16	0.16	2.22					16.32	30.00		5.96		Pass
HT40	MCS0	2	151	5755	0.32	0.32	2.22					13.98	30.00		5.96		Pass
HT40	MCS0	2	159	5795	0.32	0.32	2.22					13.67	30.00		5.96		Pass
VHT20	MCS0	2	149	5745	0.16	0.16	2.22					13.95	30.00		5.96		Pass
VHT20	MCS0	2	157	5785	0.16	0.16	2.22					13.90	30.00		5.96		Pass
VHT20	MCS0	2	165	5825	0.16	0.16	2.22		11.58	30.00		5.96		Pass			
VHT40	MCS0	2	151	5755	0.31	0.31	2.22		8.61	30.00		5.96		Pass			
VHT40	MCS0	2	159	5795	0.31	0.31	2.22		13.61	30.00		5.96		Pass			
VHT80	MCS0	2	155	5775	0.59	0.59	2.22		1.09	30.00		5.96		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	5744.975	-0.025	-4.35	20	3.2	
11a	6Mbps	1	149	5745	5745.025	0.025	4.35	20	4.2	
11a	6Mbps	1	149	5745	5745.025	0.025	4.35	20	3.7	
11a	6Mbps	1	149	5745	5745.050	0.050	8.70	-30	3.7	
11a	6Mbps	1	149	5745	5745.050	0.050	8.70	50	3.7	



Appendix B. Radiated Spurious Emission

Test Engineer :	J.C. Liang, Ricky Su, and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	55~60%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		5713.72	61.37	-6.93	68.3	51.4	32.29	11.84	34.16	136	228	P	H
		5724.28	66.55	-11.75	78.3	56.56	32.31	11.84	34.16	136	228	P	H
	*	5745	111.01	-	-	100.97	32.34	11.86	34.16	136	228	P	H
		5745	101.79	-	-	91.75	32.34	11.86	34.16	136	228	A	H
													H
													H
													H
													H
		5714.44	67.5	-0.8	68.3	57.53	32.29	11.84	34.16	238	343	P	V
		5724.04	72.69	-5.61	78.3	62.7	32.31	11.84	34.16	238	343	P	V
	*	5745	118.56	-	-	108.52	32.34	11.86	34.16	238	343	P	V
		5745	109.17	-	-	99.13	32.34	11.86	34.16	238	343	A	V
													V
													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		5701.48	58.02	-10.28	68.3	48.05	32.29	11.84	34.16	135	313	P	H
		5717.24	57.24	-21.06	78.3	47.27	32.29	11.84	34.16	135	313	P	H
	*	5783	110.7	-	-	100.6	32.39	11.88	34.17	135	313	P	H
		5783	100.41	-	-	90.31	32.39	11.88	34.17	135	313	A	H
		5852.16	57.61	-20.69	78.3	47.27	32.48	12.03	34.17	135	313	P	H
		5869.2	57.75	-10.55	68.3	47.25	32.51	12.17	34.18	135	313	P	H
													H
													H
		5687.16	59.84	-8.46	68.3	49.91	32.27	11.82	34.16	245	92	P	V
		5723.96	59.54	-18.76	78.3	49.55	32.31	11.84	34.16	245	92	P	V
	*	5783	117.42	-	-	107.32	32.39	11.88	34.17	245	92	P	V
		5783	108.41	-	-	98.31	32.39	11.88	34.17	245	92	A	V
		5855.36	58.33	-19.97	78.3	47.97	32.51	12.03	34.18	245	92	P	V
		5884.4	58.77	-9.53	68.3	48.25	32.53	12.17	34.18	245	92	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	*	5825	105.28	-	-	94.96	32.46	12.03	34.17	251	349	P	H
		5825	95.43	-	-	85.11	32.46	12.03	34.17	251	349	A	H
		5850.8	58.82	-19.48	78.3	48.48	32.48	12.03	34.17	251	349	P	H
		5889.6	57.87	-10.43	68.3	47.32	32.56	12.17	34.18	251	349	P	H
													H
													H
													H
													H
	*	5825	114.18	-	-	103.86	32.46	12.03	34.17	121	360	P	V
		5825	103.96	-	-	93.64	32.46	12.03	34.17	121	360	A	V
		5851.36	66.72	-11.58	78.3	56.38	32.48	12.03	34.17	121	360	P	V
		5874.16	60.76	-7.54	68.3	50.24	32.53	12.17	34.18	121	360	P	V
													V
													V
													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	55.42	-18.58	74	54.69	18.4	40.11	57.78	100	0	P	H
		11490	44.63	-9.37	54	43.9	18.4	40.11	57.78	100	0	A	H
		17235	50.97	-17.33	68.3	43.32	23.14	41.65	57.14	100	0	P	H
													H
		11490	62.88	-11.12	74	62.15	18.4	40.11	57.78	100	324	P	V
		11490	53.26	-0.74	54	52.53	18.4	40.11	57.78	100	324	A	V
		17235	51.03	-17.27	68.3	43.38	23.14	41.65	57.14	100	0	P	V
													V
802.11a CH 157 5785MHz		11570	56.78	-17.22	74	56.14	39.95	18.49	57.8	100	315	P	H
		11570	46.52	-7.48	54	45.88	39.95	18.49	57.8	100	315	A	H
		17355	49.83	-18.47	68.3	42.12	42.02	23.25	57.56	100	0	P	H
													H
		11568	62.82	-11.18	74	62.18	39.95	18.49	57.8	100	346	P	V
		11568	53.48	-0.52	54	52.84	39.95	18.49	57.8	100	346	A	V
		17355	51.39	-16.91	68.3	43.68	42.02	23.25	57.56	100	0	P	V
													V
802.11a CH 165 5825MHz		11650	59.95	-14.05	74	59.37	39.8	18.58	57.8	100	0	P	H
		11650	46.12	-7.88	54	45.54	39.8	18.58	57.8	127	173	A	H
		17472	48.49	-19.81	68.3	40.72	42.39	23.36	57.98	100	0	P	H
													H
		11650	66.47	-7.53	74	65.89	39.8	18.58	57.8	100	345	P	V
		11650	53.24	-0.76	54	52.66	39.8	18.58	57.8	100	345	A	V
		17472	49.11	-19.19	68.3	41.34	42.39	23.36	57.98	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 VHT20 (Band Edge @ 3m)**

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 149 5745MHz		5711.96	61.97	-6.33	68.3	52	32.29	11.84	34.16	112	226	P	H
		5721.72	62.46	-15.84	78.3	52.47	32.31	11.84	34.16	112	226	P	H
	*	5745	110.96	-	-	100.92	32.34	11.86	34.16	112	226	P	H
		5745	100.67	-	-	90.63	32.34	11.86	34.16	112	226	A	H
													H
													H
													H
													H
		5714.52	67.52	-0.78	68.3	57.55	32.29	11.84	34.16	233	343	P	V
		5724.52	69.81	-8.49	78.3	59.82	32.31	11.84	34.16	233	343	P	V
	*	5745	117.55	-	-	107.51	32.34	11.86	34.16	233	343	P	V
		5745	107.78	-	-	97.74	32.34	11.86	34.16	233	343	A	V
													V
													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)
802.11ac VHT20 CH 157 5785MHz		5697.16	57.89	-10.41	68.3	47.96	11.82	32.27	34.16	100	279	P	H
		5720.6	57.83	-20.47	78.3	47.84	11.84	32.31	34.16	100	279	P	H
	*	5785	107.22	-	-	97.12	11.88	32.39	34.17	100	279	P	H
		5785	96.75	-	-	86.65	11.88	32.39	34.17	100	279	A	H
		5856.56	57.55	-20.75	78.3	47.19	12.03	32.51	34.18	100	279	P	H
		5880.32	57.9	-10.4	68.3	47.38	12.17	32.53	34.18	100	279	P	H
													H
													H
		5709.24	59.59	-8.71	68.3	49.62	11.84	32.29	34.16	100	73	P	V
		5721.88	58.32	-19.98	78.3	48.33	11.84	32.31	34.16	100	73	P	V
	*	5785	116.06	-	-	105.96	11.88	32.39	34.17	100	73	P	V
		5785	105.33	-	-	95.23	11.88	32.39	34.17	100	73	A	V
		5850.16	58.6	-19.7	78.3	48.26	12.03	32.48	34.17	100	73	P	V
		5885.92	58.79	-9.51	68.3	48.27	12.17	32.53	34.18	100	73	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)
802.11ac VHT20 CH 165 5825MHz	*	5827	105.7	-	-	95.38	32.46	12.03	34.17	100	69	P	H
		5827	96.18	-	-	85.86	32.46	12.03	34.17	100	69	A	H
		5850	60.82	-17.48	78.3	50.48	32.48	12.03	34.17	100	69	P	H
		5867.36	57.91	-10.39	68.3	47.41	32.51	12.17	34.18	100	69	P	H
													H
													H
													H
													H
	*	5827	117.64	-	-	107.32	32.46	12.03	34.17	329	38	P	V
		5827	107.75	-	-	97.43	32.46	12.03	34.17	329	38	A	V
		5851.6	69.93	-8.37	78.3	59.59	32.48	12.03	34.17	329	38	P	V
		5860.16	64.3	-4	68.3	53.8	32.51	12.17	34.18	329	38	P	V
													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 802.11ac VHT20 (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)
802.11ac VHT20 CH 149 5745MHz		11490	59.77	-14.23	74	59.04	18.4	40.11	57.78	100	131	P	H
		11490	46.6	-7.4	54	45.87	18.4	40.11	57.78	100	131	A	H
		17232	50.42	-17.88	68.3	42.77	23.14	41.65	57.14	100	0	P	H
													H
		11490	66.02	-7.98	74	65.29	18.4	40.11	57.78	106	226	P	V
		11490	52.82	-1.18	54	52.09	18.4	40.11	57.78	106	226	A	V
		17232	50.93	-17.37	68.3	43.28	23.14	41.65	57.14	100	0	P	V
													V
802.11ac VHT20 CH 157 5785MHz		11570	61.02	-12.98	74	60.38	39.95	18.49	57.8	100	130	P	H
		11570	47.79	-6.21	54	47.15	39.95	18.49	57.8	100	130	A	H
		17352	49.73	-18.57	68.3	42.02	42.02	23.25	57.56	100	0	P	H
													H
		11570	66.63	-7.37	74	65.99	39.95	18.49	57.8	100	345	P	V
		11570	53.01	-0.99	54	52.37	39.95	18.49	57.8	100	345	A	V
		17352	50.96	-17.34	68.3	43.25	42.02	23.25	57.56	100	0	P	V
													V
802.11ac VHT20 CH 165 5825MHz		11650	56.52	-17.48	74	55.94	39.8	18.58	57.8	100	44	P	H
		11650	44.89	-9.11	54	44.31	39.8	18.58	57.8	100	44	A	H
		17475	49.29	-19.01	68.3	41.52	42.39	23.36	57.98	100	0	P	H
													H
		11650	65.35	-8.65	74	64.77	39.8	18.58	57.8	295	326	P	V
		11650	53.47	-0.53	54	52.89	39.8	18.58	57.8	295	326	A	V
		17475	51.61	-16.69	68.3	43.84	42.39	23.36	57.98	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 151 5755MHz		5714.12	61.86	-6.44	68.3	51.89	32.29	11.84	34.16	106	58	P	H
		5725	64.86	-13.44	78.3	54.87	32.31	11.84	34.16	106	58	P	H
	*	5755	105.3	-	-	95.25	32.36	11.86	34.17	106	58	P	H
		5755	94.96	-	-	84.91	32.36	11.86	34.17	106	58	A	H
		5857.84	57.97	-20.33	78.3	47.61	32.51	12.03	34.18	106	58	P	H
		5889.76	57.96	-10.34	68.3	47.41	32.56	12.17	34.18	106	58	P	H
													H
													H
		5714.2	67.51	-0.79	68.3	57.54	32.29	11.84	34.16	256	90	P	V
		5725	77.33	-0.97	78.3	67.34	32.31	11.84	34.16	256	90	P	V
	*	5755	115.77	-	-	105.72	32.36	11.86	34.17	256	90	P	V
		5755	105.46	-	-	95.41	32.36	11.86	34.17	256	90	A	V
		5850.32	58.39	-19.91	78.3	48.05	32.48	12.03	34.17	256	90	P	V
		5880.4	58.65	-9.65	68.3	48.13	32.53	12.17	34.18	256	90	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)
802.11ac VHT40 CH 159 5795MHz		5710.68	60.59	-7.71	68.3	50.62	32.29	11.84	34.16	133	228	P	H
		5724.44	60.79	-17.51	78.3	50.8	32.31	11.84	34.16	133	228	P	H
	*	5795	109.26	-	-	99.14	32.41	11.88	34.17	133	228	P	H
		5795	98.59	-	-	88.47	32.41	11.88	34.17	133	228	A	H
		5854.96	64.92	-13.38	78.3	54.56	32.51	12.03	34.18	133	228	P	H
		5863.04	60.91	-7.39	68.3	50.41	32.51	12.17	34.18	133	228	P	H
													H
													H
		5712.6	65.55	-2.75	68.3	55.58	32.29	11.84	34.16	245	344	P	V
		5724.28	65.49	-12.81	78.3	55.5	32.31	11.84	34.16	245	344	P	V
	*	5793	116.34	-	-	106.22	32.41	11.88	34.17	245	344	P	V
		5793	105.78	-	-	95.66	32.41	11.88	34.17	245	344	A	V
		5854.4	69.44	-8.86	78.3	59.08	32.51	12.03	34.18	245	344	P	V
		5861.04	67.79	-0.51	68.3	57.29	32.51	12.17	34.18	245	344	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 151 5755MHz		11510	51.59	-22.41	74	50.84	40.1	18.45	57.8	121	253	P	H
		11510	41	-13	54	40.25	40.1	18.45	57.8	121	253	A	H
		17268	47.88	-20.42	68.3	40.22	41.75	23.17	57.26	100	0	P	H
													H
		11510	56.16	-17.84	74	55.41	40.1	18.45	57.8	257	325	P	V
		11510	46.11	-7.89	54	45.36	40.1	18.45	57.8	257	325	A	V
		17268	49.27	-19.03	68.3	41.61	41.75	23.17	57.26	100	0	P	V
													V
802.11ac VHT40 CH 159 5795MHz		11590	57.57	-16.43	74	56.92	39.91	18.54	57.8	100	130	P	H
		11590	45.05	-8.95	54	44.4	39.91	18.54	57.8	100	130	A	H
		17388	48.98	-19.32	68.3	41.24	42.13	23.29	57.68	100	0	P	H
													H
		11590	63.91	-10.09	74	63.26	39.91	18.54	57.8	100	345	P	V
		11590	51.11	-2.89	54	50.46	39.91	18.54	57.8	100	345	A	V
		17388	50.99	-17.31	68.3	43.25	42.13	23.29	57.68	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	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		5714.92	62.76	-5.54	68.3	52.79	32.29	11.84	34.16	100	348	P	H
		5719.96	66.89	-11.41	78.3	56.9	32.31	11.84	34.16	100	348	P	H
	*	5775	98.92	-	-	88.84	32.39	11.86	34.17	100	348	P	H
		5775	88.4	-	-	78.32	32.39	11.86	34.17	100	348	A	H
		5853.04	58.28	-20.02	78.3	47.94	32.48	12.03	34.17	100	348	P	H
		5889.76	58.88	-9.42	68.3	48.33	32.56	12.17	34.18	100	348	P	H
													H
													H
		5713.96	67.62	-0.68	68.3	57.65	32.29	11.84	34.16	239	295	P	V
		5720.76	74.6	-3.7	78.3	64.61	32.31	11.84	34.16	239	295	P	V
	*	5775	106.56	-	-	96.48	32.39	11.86	34.17	239	295	P	V
		5775	96.07	-	-	85.99	32.39	11.86	34.17	239	295	A	V
		5857.2	59.67	-18.63	78.3	49.31	32.51	12.03	34.18	239	295	P	V
		5861.36	58.56	-9.74	68.3	48.06	32.51	12.17	34.18	239	295	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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

WIFI Ant. 1+2	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	45.99	-28.01	74	45.31	39.99	18.49	57.8	100	0	P	H
		17328	49.14	-19.16	68.3	41.46	41.91	23.21	57.44	100	0	P	H
													H
													H
		11550	47.84	-26.16	74	47.16	39.99	18.49	57.8	100	0	P	V
		17328	48.95	-19.35	68.3	41.27	41.91	23.21	57.44	100	0	P	V
		11550	45.99	-28.01	74	45.31	39.99	18.49	57.8	100	0	P	V
		17328	49.14	-19.16	68.3	41.46	41.91	23.21	57.44	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11ac VHT40 Adapter Mode (LF @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 Adapter LF		65.1	32.97	-7.03	40	50.31	12.05	1.06	30.45	-	-	P	H
		80.22	35.37	-4.63	40	51.04	13.7	1.06	30.43	114	20	P	H
		100.47	30.73	-12.77	43.5	43.6	16.11	1.43	30.41	-	-	P	H
		499.5	33.82	-12.18	46	36.57	23.98	3.08	29.81	-	-	P	H
		560.4	32.71	-13.29	46	34.44	24.69	3.3	29.72	-	-	P	H
		901.3	32.17	-13.83	46	27.91	28.93	4.6	29.27	-	-	P	H
													H
													H
													H
													H
													H
													H
		41.34	36.44	-3.56	40	46.84	19.18	0.78	30.36	165	46	P	V
		123.69	38.69	-4.81	43.5	49.88	17.76	1.43	30.38	-	-	P	V
		203.07	36.56	-6.94	43.5	49.28	15.88	1.7	30.3	-	-	P	V
		426.7	31.52	-14.48	46	35.92	22.68	2.89	29.97	-	-	P	V
		661.9	30.21	-15.79	46	29.87	26.09	3.82	29.57	-	-	P	V
		854.4	31.13	-14.87	46	27.55	28.63	4.28	29.33	-	-	P	V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz

WIFI 802.11ac VHT40 POE Mode (LF @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 POE LF		66.72	35.51	-4.49	40	52.75	12.15	1.06	30.45	102	156	QP	H
		66.72	38.16	-1.84	40	55.4	12.15	1.06	30.45	102	156	P	H
		79.41	30.28	-9.72	40	46.08	13.57	1.06	30.43	-	-	P	H
		111	29.59	-13.91	43.5	41.37	17.19	1.43	30.4	-	-	P	H
		374.9	25.01	-20.99	46	31.02	21.61	2.44	30.06	-	-	P	H
		568.8	29.6	-16.4	46	31.18	24.83	3.3	29.71	-	-	P	H
		946.1	31.93	-14.07	46	26.1	30.19	4.75	29.11	-	-	P	H
													H
													H
													H
													H
													H
		66.18	36.88	-3.12	40	54.17	12.1	1.06	30.45	100	54	QP	V
		66.18	39.81	-0.19	40	57.1	12.1	1.06	30.45	100	54	P	V
		85.62	36.31	-3.69	40	51.43	14.25	1.06	30.43	-	-	P	V
		203.61	37.11	-6.39	43.5	49.79	15.91	1.7	30.29	-	-	P	V
		319.6	31.23	-14.77	46	38.91	20.11	2.34	30.13	-	-	P	V
		450.5	33.83	-12.17	46	37.74	23.12	2.89	29.92	-	-	P	V
		951.7	32.38	-13.62	46	26.44	30.28	4.75	29.09	-	-	P	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 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)
802.11b CH 01		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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



Appendix C. Radiated Spurious Emission Plots

Test Engineer :	J.C. Liang, Ricky Su, and Nick Yu	Temperature :	23~25°C
		Relative Humidity :	55~60%

Note symbol

-L	Low channel location
-R	High channel location

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	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 68.3 78.3</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz - L	
1+2	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 13 : 68.3 78.3</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 13 : 68.3 78.3</p></div>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz - R	
1+2	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 13 : 68.3 78.3</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 13 : 68.3 78.3</p></div>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Frequency (MHz)</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 14 68.3 78.3</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-11</p><p>Frequency (MHz)</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 14 68.3 78.3</p></div>



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+2	Horizontal	Vertical
Peak	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 15 : 68.3 78.3</p></div>	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 15 : 68.3 78.3</p></div>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz - L	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 : 16 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 : 16 : 68.3 78.3</p>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz - R	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 : 16 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Mode : 502212 : 16 : 68.3 78.3</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1+2	Horizontal	Vertical
Peak	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-25</p><p>Frequency (MHz)</p><p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_91200_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Preject : 502212 Mode : 17 68.3 78.3</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-25</p><p>Frequency (MHz)</p><p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_91200_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Preject : 502212 Mode : 17 68.3 78.3</p></div>



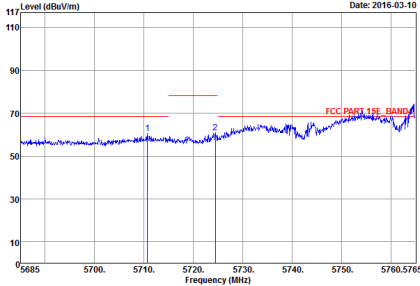
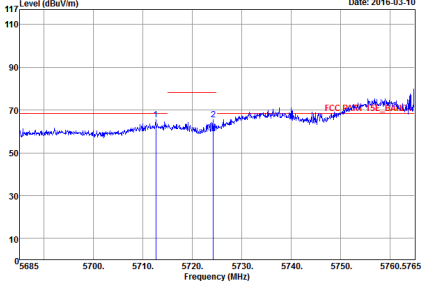
Band 4 5725~5850MHz

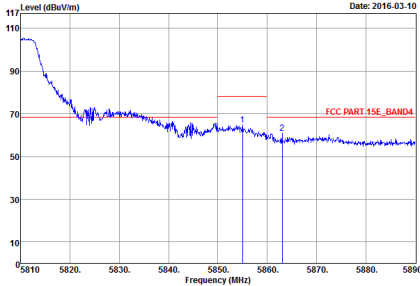
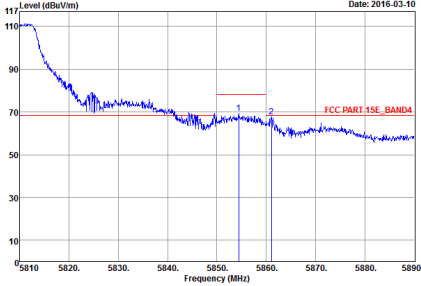
WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz - L	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 18 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 18 : 68.3 78.3</p>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz - R	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 18 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E, BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 18 : 68.3 78.3</p>



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz - L	
1+2	Horizontal	Vertical
Peak	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 19 : 68.3 78.3</p></div>	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 19 : 68.3 78.3</p></div>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz - R	
1+2	Horizontal	Vertical
Peak	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 19 : 68.3 78.3</p></div>	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 502212 Mode : 19 : 68.3 78.3</p></div>

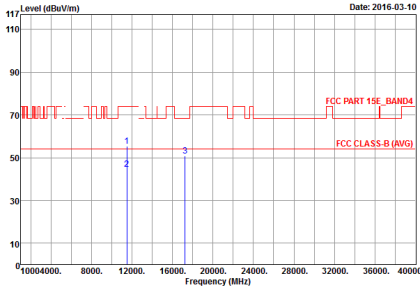
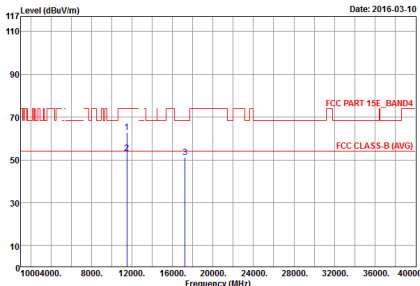
**Band 4 5725~5850MHz****WIFI 802.11ac VHT80 (Band Edge @ 3m)**

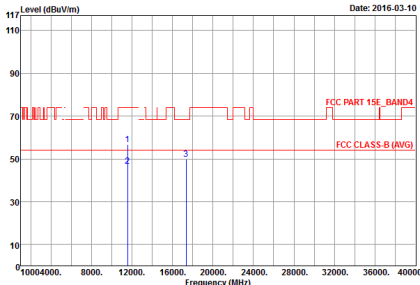
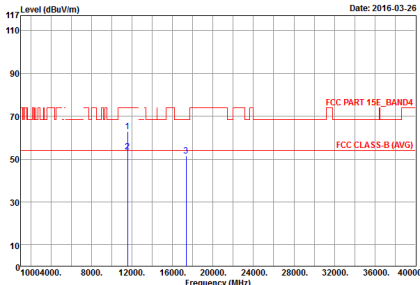
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz - L	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 20 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 20 : 68.3 78.3</p>

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz - R	
1+2	Horizontal	Vertical
Peak	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 20 : 68.3 78.3</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 5D2212 Mode : 20 : 68.3 78.3</p>

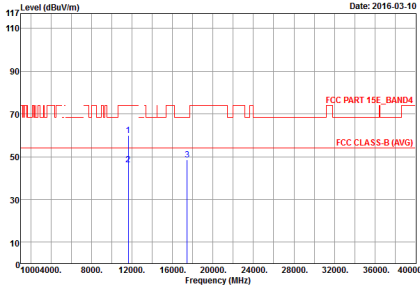
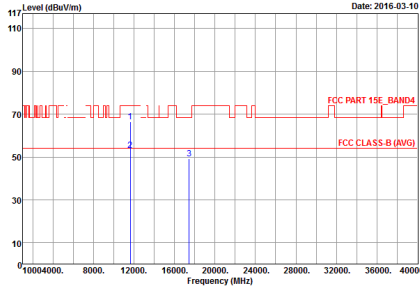


Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
1+2	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 12</p>	 <p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 12</p>

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 13</p>	 <p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 13</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 502212 Mode : 14</p></div>	<div><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 502212 Mode : 14</p></div>

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

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH149 5745MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 15</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 15</p>

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH157 5785MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 16</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 16</p>



WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT20 CH165 5825MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-25</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 502212 Mode : 17</p></div>	<div><p>Level (dBuV/m)</p><p>Date: 2016-03-25</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 502212 Mode : 17</p></div>



Band 4 5725~5850MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT40 CH151 5755MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 18</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 18</p>

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT40 CH159 5795MHz	
1+2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 19</p>	<p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 19</p>



Band 4 5725~5850MHz

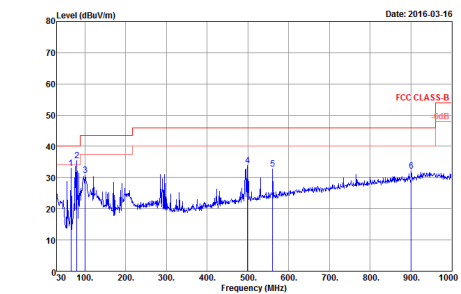
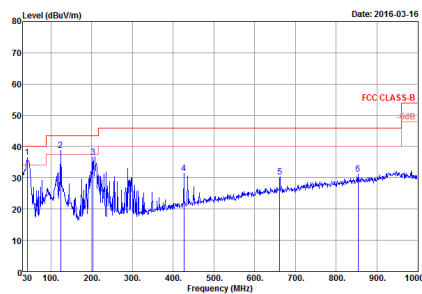
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
1+2	Horizontal	Vertical
Peak Avg.	<div><p>117 Level (dBuV/m) Date: 2016-03-10</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 20</p></div>	<div><p>117 Level (dBuV/m) Date: 2016-03-10</p><p>Site : 03CH12-HY Condition : FCC PART 15E_BAND4 3m HORN_9120D_1328 VERTICAL Detector : Peak Project : 5D2212 Mode : 20</p></div>



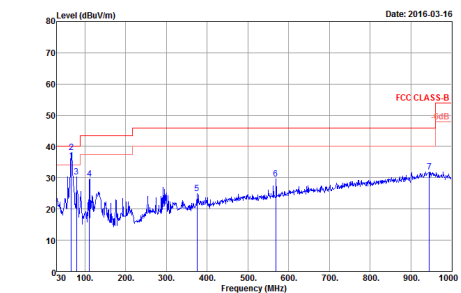
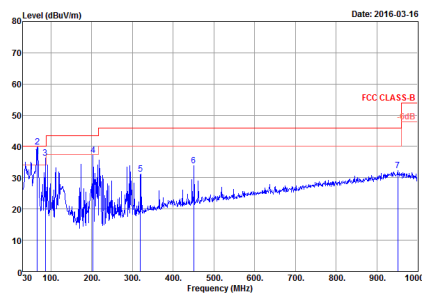
Emission below 1GHz

WIFI 802.11ac VHT40 Adapter Mode (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11ac(40) Adapter LF	
1+2	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 21</p>	 <p>Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 VERTICAL Detector : Peak Project : 5D2212 Mode : 21</p>

Emission below 1GHz

WIFI 802.11ac VHT40 POE Mode (LF)

WIFI	5GHz 5725~5850MHz	
ANT	802.11ac(40) POE LF	
1+2	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 HORIZONTAL Detector : Peak Project : 5D2212 Mode : 22</p>	 <p>Site : 03CH12-HY Condition : FCC CLASS-B 3m BILOG_6111D_37059 VERTICAL Detector : Peak Project : 5D2212 Mode : 22</p>